

How to apply for an environmental permit

Part RSR-B3 – New bespoke radioactive substances activity permit (nuclear site – open sources and radioactive waste)



Guidance Notes

Please read these guidance notes carefully before you fill in the form.

Complete part RSR-B3 if you are applying for a new bespoke permit for a radioactive substances activity involving open sources and/or radioactive waste on a nuclear site. If you want to make on-site disposals of solid waste to land, also fill in part RSR-B5.

For security reasons, applications for radioactive substances activities involving sealed sources must be made separately using part RSR-B2.

Where you see the term ‘document reference’ on the form: give the document reference here and send the document with the application form when you’ve completed it. If you are making a joint submission to us and HSE, specify which part (for example, chapter or section number) of the document is relevant to each question.

If your application relates to a nuclear power station that has been through the generic design assessment (GDA) process, you must clearly identify:

- any information that is different from that provided for GDA;
- where you have addressed any GDA issues and assessment findings related to the GDA statement of design acceptability.

Contents

- 1 Other applications
- 2 About the activities
- 3 Operating techniques
- 4 Disposal of radioactive waste
- 5 Monitoring
- 6 Radiological assessment
- 7 Receipt of radioactive waste
- 8 Radioactive material
- 9 Mobile radioactive apparatus (environmental studies)
- 10 How to contact us

1 Other applications

Tell us if you have recently made, or you intend to make, an application for an environmental permit to operate a regulated facility, other than a radioactive substances activity, on the premises. This will enable us to coordinate our determination work.

2 About the activities

2a What activities are you applying for?

Tell us which radioactive substances activities you are applying for.

A nuclear site licensee does not need a permit to keep or use radioactive material on the premises, but a tenant on a nuclear licensed site does.

You must apply to receive radioactive waste even if you only intend to do this as a result of your participation in the National Arrangements for Incidents involving Radioactivity or in the Radsafe scheme. We expect that most operators on nuclear sites will need to receive waste at some point and advise you to apply for this activity.

2b Is a submission to the European Commission under Article 37 of the Euratom treaty required for these activities?

Details of when Article 37 applies are set out in the 2010 Commission Recommendation (2010/635/Euratom): http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=uriserv:OJ.L_.2010.279.01.0036.01.ENG

Your submission should be made to the Department of Energy and Climate Change (DECC) who will send it on to the Commission.

If a submission under Article 37 is required, we cannot make a decision on your application until you receive an opinion from the Commission. If you apply before the opinion is received, we will commence work on determining your application (and charge you accordingly) but we will not make a decision until the opinion has been received and we have considered its contents.

2c Provide a technical description of your activities

Your description should include:

- the overall function of the facility in which you carry out the radioactive substances activities;
- its main plants, systems and processes;

- identification of the plants, systems and processes which have a bearing on radioactive waste generation, treatment, measurement, assessment and disposal (and, if you are a tenant, those associated with the keeping and use of radioactive material in the form of open sources);
- how radioactive wastes will arise, be managed and disposed of throughout the facility's lifecycle, including:
 - sources of radioactivity and matters which affect wastes arising;
 - gaseous, aqueous and other wastes;
 - discharge points for gaseous wastes and discharge routes (see note 1) for aqueous wastes (including any minor discharge points such as building or tank vents); and
 - disposal routes for other wastes (see note 2);
- the purpose of and method for any proposed environmental study (see note 3).

Note 1

We will not permit direct inputs of radioactive waste to groundwater (for example, a discharge to a borehole that extends down to or into the water table). If you are proposing to dispose of aqueous radioactive waste into the ground (for example, a discharge to a soakaway that is not directly connected to the saturated zone):

- you should also tell us about any non-radioactive pollutants in the waste; and
- we strongly advise you to talk to us before completing this form.

Note 2

If these include on-site disposal of solid waste to land, complete part RSR-B5 of the application form. Where you intend to dispose of waste by transfer to another person, you should provide evidence that you have contractual arrangements in place to do this, or, where disposal may not take place for some time, that such contractual arrangements can be put in place.

Note 3

We may permit an environmental study involving the discharge of radioactive material to groundwater subject to strict controls and provided it is for scientific purposes to characterise, protect or remediate bodies of water.

3 Operating techniques

Describe how you manage the production, discharge and disposal of radioactive waste to protect the environment and to optimise the protection of people.

You should:

- describe your optimisation process; and
- identify and justify the techniques you are proposing as best available techniques (BAT).

In identifying techniques, you should address both the technology you use and the way your facility is designed, built, maintained, operated and dismantled.

In justifying techniques as BAT you will need to address the following, in respect of wastes arising throughout the lifetime of the facility:

- preventing and minimising (in terms of radioactivity) the creation of radioactive waste (see note 1);
- minimising (in terms of radioactivity) discharges of gaseous and aqueous radioactive wastes;
- minimising the impact of those discharges on people, and adequately protecting other species;
- minimising (in terms of mass/volume) solid and non-aqueous liquid radioactive wastes;
- selecting optimal disposal routes (taking account of the waste hierarchy and the proximity principle) for those wastes; and
- the suitability for disposal of any wastes you create for which there is no currently available disposal route (ILW and HLW) and how you will manage them in the interim so as not to prejudice their ultimate disposal (see note 2).

If you are proposing to dispose of aqueous radioactive waste into the ground, you will also need to explain how you will take all necessary and reasonable measures to:

- prevent the input of radioactive waste and any other hazardous substances to groundwater; and
- limit the input of non-hazardous pollutants to groundwater to ensure that such inputs don't pollute groundwater.

Note 1

This is not applicable if your facility is solely for managing (treatment or disposal) radioactive wastes created elsewhere.

Note 2

We do not expect you to provide a full analysis of the disposability of the wastes or of the impact of interim storage as part of this application (because this should form part of your application to HSE for a nuclear site licence). However, we do expect you to provide evidence that you have carried out these analyses and state their conclusions.

Further guidance on optimisation is provided in 'RSR: Principles of optimisation in the management and disposal of radioactive waste'.
<https://www.gov.uk/government/publications/rsr-principles-of-optimisation>

Guidance on non-radioactive pollutants and groundwater is given in 'H1 Environmental risk assessment for permits'.
<https://www.gov.uk/government/collections/horizontal-guidance-environmental-permitting>

4 Disposal of radioactive waste

4a Provide quantitative estimates for normal operation of:

- discharges of gaseous and aqueous radioactive wastes;
- arisings of combustible waste and disposals by on-site or off-site incineration; and
- arisings of other radioactive wastes (by category and disposal route (if any)).

‘Normal operation’ includes the operational fluctuations, trends and events that are expected to occur over the lifetime of the facility, such as start-up, shutdown, maintenance, etc. It does not include increased discharges arising from other events, inconsistent with the use of BAT, such as accidents, inadequate maintenance, and inadequate operation (including inadequate training and supervision).

For gaseous and aqueous radioactive wastes, you should estimate your monthly discharges:

- on an individual radionuclide basis for significant radionuclides;
- on a group basis (for example, ‘total alpha’ or ‘total beta’) for other radionuclides; and
- via each discharge point and discharge route (as identified in your response to question 2c).

‘Significant’ radionuclides are those which:

- are significant in terms of radiological impact for people or non-human species;
- are significant in terms of the quantity of radioactivity discharged (that is, numerically high);
- have long half-lives, may persist and/or accumulate in the environment, and may contribute significantly to collective dose; and
- are significant indicators of facility performance and process control.

You should select from the radionuclides and groups of radionuclides listed in the RSR Pollution Inventory (PI) as far as practicable.

For combustible and other radioactive wastes, you should estimate the annual arisings and disposals during operation. You should also give an indication of the likely arisings during decommissioning. You should identify wastes in terms of their category (HLW, ILW, LLW), physico-chemical characteristics and proposed disposal route (if any). Quantification should be in terms of activity of key individual radionuclides and overall groupings of radionuclides (for example, total alpha), together with mass and/or volume.

Your estimates of discharges and disposals should clearly show the contribution of each constituent aspect of normal operations, including:

- routine operation (that is, typically, the design basis or ‘flowsheet design’ and the minimum level of disposals);
- start-up and shutdown;
- maintenance and testing; and
- infrequent but necessary aspects of operation, for example, plant wash-out; and the foreseeable, undesired deviations from planned operation (based on a fault analysis) consistent with the use of BAT, for example, occasional fuel pin failures in a reactor.

You should support your estimates with performance data from similar facilities and explain, where relevant, how changes in design or operation from those facilities affect the expected discharges and disposals.

4b Provide your proposed limits for:

- gaseous discharges;
- aqueous discharges; and
- disposal of combustible waste by on-site incineration.

Provide your proposals for annual site limits (on a rolling twelve months basis) for gaseous and aqueous discharges, and monthly limits for disposals by on-site incineration, and tell us how you derived these. They should be consistent with the information you provided in response to question 4a and reflect your likely operations over the next five to ten years.

For discharges, they should take account of:

- Statutory guidance to the Environment Agency concerning the regulation of radioactive discharges into the environment (DECC, 2009, http://webarchive.nationalarchives.gov.uk/20121217150421/http://www.decc.gov.uk/assets/decc/what%20we%20do/uk%20energy%20supply/energy%20mix/nuclear/radioactivity/dischargesofradioactivity/1_20091202160019_e_@@_guidanceeea_radioactivedischarges.pdf)

For each of air and water, you should propose a site limit for each radionuclide or group of radionuclides that:

- is significant in terms of radiological impact on people (that is, the dose to the most exposed group at the proposed limit exceeds 1 μ Sv per year (see note 1));
- is significant in terms of radiological impact on non-human species (this only needs to be considered where the impact on reference organisms from the discharges of all radionuclides/groups at the proposed limits exceeds 40 μ Gy/hour);
- is significant in terms of the quantity of radioactivity discharged (that is, the discharge exceeds 1 TBq per year);
- may contribute significantly to collective dose (this only needs to be considered where the 500-year collective dose from the discharges of all radionuclides at the proposed limits exceeds 1 man-sievert per year); and

- is constrained under national or international agreements or is of concern internationally.

Note 1

The RSR PI thresholds may be used as an initial screen since these relate to about 1 μ Sv per year under assumed conditions. This can be refined by the radiological assessments undertaken in relation to question 6.

You may additionally propose ‘campaign’ limits, where appropriate. For example, if your operations (and consequent discharges) are cyclical or on a batch basis, you might want to propose limits for a complete cycle, or for one or more batches.

5 Monitoring

5a Provide a description of the sampling arrangements, techniques and systems for measurement and assessment of discharges and disposals of radioactive waste

Your description should:

- include details of your in-process monitoring arrangements, as well as those for your final discharges and disposals;
- demonstrate your proposals represent the best available techniques for monitoring; and
- confirm the sensitivity is sufficient to:
 - readily demonstrate compliance with the proposed limits; and
 - for nuclear power reactors or reprocessing plants, meet the levels of detection specified in EU Commission Recommendation 2004/2/Euratom
http://ec.europa.eu/energy/sites/ener/files/documents/2004_2_en.pdf

Further guidance is given in Radiological Monitoring Technical Guidance Note 1 – Standardised reporting of radioactive discharges from nuclear sites

http://www.sepa.org.uk/media/101584/radiological_monitoring_technical_guidance_note_1_standardised_reporting_of_radioactive_discharges_from_nuclear_sites.pdf

5b Provide a description of your environmental monitoring programme

You should provide your proposed environmental monitoring programme for:

- the operational phase of your facility; and
- establishing a pre-operational baseline (or provide the results of this if already completed).

Your operational programme should take account of the guidance in Radiological Monitoring Technical Guidance Note 2 – Environmental radiological monitoring

https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/296529/geho0811btvy-e-e.pdf

6 Radiological assessment

6a Provide a prospective dose assessment at the proposed limits for discharges and for any on-site disposal (such as incineration, but not on-site disposal of solid waste to land)

Your dose assessment should include:

- annual dose to most exposed members of the public for aqueous discharges;
- annual dose to most exposed members of the public for gaseous discharges (identifying separately the dose associated with on-site incineration where applicable);
- annual dose to most exposed members of the public through the groundwater pathway, if you are proposing to dispose of aqueous radioactive waste into the ground ;
- annual dose to the most exposed members of the public for all discharges from the facility;
- annual dose from direct radiation to the most exposed member of the public;
- annual dose to the critical group for the facility;
- potential short-term doses, including via the food chain, based on the maximum anticipated short-term discharges from the facility in normal operation;
- a comparison of the calculated doses with the relevant dose constraints (taking account of any historical and future discharges from other facilities in the locality where appropriate);
- an assessment of whether the build-up of radionuclides in the local environment of the facility, based on the anticipated lifetime discharges, might have the potential to prejudice legitimate users or uses of the land or sea; and
- collective dose, truncated at 500 years, to the UK, European and world populations.

You should tell us which model(s) you used to calculate these doses and why they are appropriate, and set out all the data and assumptions (with reasoning) that you used as input into the model(s) including:

- radionuclide composition of each discharge;
- chemical form of each radionuclide discharged;
- gaseous discharge points details (including location, heights, effective heights and volumetric flow rates);

- aqueous waste discharge points details;
- proportions of discharges made via each discharge point (including incinerators);
- data used to estimate incinerator discharges (including quantities of waste to be incinerated, expected radionuclide composition and concentrations, retention factors for any abatement provided);
- hydrographic data (mean volumetric flow for inland water courses or volumetric exchange rate for estuaries/coasts);
- location of dose receptor points;
- weather data;
- deposition velocities, washout coefficients and surface roughness factors;
- dose per unit intake factors;
- food consumption rates;
- critical group habits data;
- nearest food production location;
- nearest habitation; and
- hydrogeological and soil data, if you are proposing to dispose of radioactive waste into the ground.

Your assessment should take account of the principles and guidance in: 'Principles for the Assessment of Prospective Public Doses arising from Authorised Discharges of Radioactive Waste to the Environment', August 2012, https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/296390/geho1202bklh-e-e.pdf

6b Provide an assessment of the impact of the radioactive discharges and on-site disposals on non-human species

You should assess the dose-rates to reference organisms that result from your proposed discharges (including any indirect input to groundwater you propose). An appropriate range of reference organisms for freshwater, marine and terrestrial ecosystems is included in the ERICA tool (see below). You should calculate worst-case dose-rates by assuming the presence of the reference organisms for the relevant ecosystem at the position of maximum environmental concentration due to discharges (usually, close to the site boundary for the terrestrial ecosystem, and close to the point of discharge for aquatic ecosystems).

Tell us which model you used to calculate these dose-rates and why it is appropriate, and set out all the data and assumptions (with reasoning) you used as input into the model, where not already covered in question 6a.

You should compare the assessed dose-rates with our guideline value of 40 microGy/hour (the level below which we consider there will be no adverse effect on non-human species).

Note that, the Environment Agency will:

- assess the combined impact of discharges, from your and all other relevant permitted sites, on each potentially affected Natura 2000 site; and
- compare those combined impacts with the 40 microGy/hour guideline value.

An appropriate tool for assessing impacts on non-human species is available on the ERICA website: <http://www.ERICA-tool.com/>. (ERICA was a research project under the EC Euratom 6th Framework programme).

6c Provide an assessment of the impact on people and non-human species of the environmental studies

(only answer this question if you are applying for an activity described in Schedule 23, Part 2, paragraph 11(5)(b))

You should provide an additional assessment to that in questions 6a and 6b, which specifically addresses the impact of the proposed release of radioactive material into the environment or into organisms. Tell us about the model(s), data and assumptions you used, as in questions 6a and 6b.

7 Receiving radioactive waste

Provide details of the origin, nature and quantity of each waste stream to be accepted onto the premises, and how you will manage and dispose of it.

For each waste stream you plan to receive (see note 1), tell us:

- where the waste will come from (you may only be able to do this in general terms, for example, 'from decommissioning nuclear power stations');
- its category (LLW, ILW, HLW);
- its physico-chemical properties;
- how much of it (mass or volume and radioactivity content) you will receive and over what period;
- how you will treat or store it; and
- how and when you will dispose of it.

Note 1

Tell us if you may receive waste as a result of your participation in the National Arrangements for Incidents involving Radioactivity or in a Radsafe incident response – no further details are required for such waste.

8 Radioactive material

Only answer this question if you are a tenant applying for an activity described in Schedule 23, Part 2, paragraph 11(2)(a) involving unsealed sources.

Fill in Table 2 with details of the radioactive material that you will keep or use on the premises.

List all radionuclides you will have on the premises in the form of open sources, in order, starting with the highest activity material and finishing with the lowest activity material.

List individually:

- a single or a few radionuclides which dominate your usage; and
- all alpha emitting radionuclides.

Where you use small amounts (for example, a few megabecquerels) of similar radionuclides you may list them as a group (for example, 'beta/gamma emitting radionuclides').

You do not need to include radionuclides that are only present as a result of radioactive decay of the listed radionuclides.

Tell us the total radioactivity of each specified radionuclide you will hold on the premises at any one time (allowing for all reasonably foreseeable requirements). Use units of becquerels with an appropriate prefix (kilo, mega, giga and so on). For natural thorium and natural and depleted uranium, give their mass in kilograms.

Only fill in the 'estimated usage per month' column if your monthly usage will exceed the maximum radioactivity of sources held on the premises (for example, where there is a large turnover of radionuclide stock).

9 Mobile radioactive apparatus for environmental studies

Only answer this question if you are applying for an activity described in Schedule 23, Part 2, paragraph 11(5)(b).

Fill in Table 3 with details of the radioactive material that you will use for environmental studies.

List all radionuclides in the form of mobile sources you intend to use in the study, in order, starting with the highest activity material and finishing with the lowest activity material.

You do not need to include radionuclides that are only present as a result of radioactive decay of the listed radionuclides.

For each specified radionuclide, tell us the:

- total radioactivity to be used for the environmental study (allowing for all reasonably foreseeable requirements); and
- maximum radioactivity to be released to the environment in a day.

Use units of becquerels with an appropriate prefix (kilo, mega, giga and so on).