

How to apply for an environmental permit Part RSR-B4 – New or varied bespoke radioactive substances activity permit (unsealed sources and radioactive waste)



Guidance notes

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

Complete part RSR-B4 if you are applying for a new bespoke permit for a radioactive substances activity involving unsealed sources and/or radioactive waste on a non-nuclear site. If you want to make on-site disposals of solid waste to land, also fill in part RSR-B5.

Only fill in the sections relevant to your application. If you are applying to vary (change) an existing permit for unsealed sources and/or radioactive waste you should only fill in the sections which cover the changes you are seeking.

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

When to use this form

This part of the application form should be used for unsealed sources kept, used or disposed of on a single defined premises or in the form of a mobile radioactive apparatus.

Multiple occupancy premises

The Environment Agency cannot issue a permit in the name of more than one organisation. But we may permit premises which consist of two or more non-adjoining parts. We will only consider this if the two parts are:

- reasonably close together;
- managed and controlled by a single applicant.

Where more than one organisation holds radioactive material on a single premises, it can be difficult to decide who is the appropriate applicant. For example, an NHS hospital trust and a university medical school may both hold radioactive sources on the same hospital premises. The straightforward solution is for each occupant to apply separately for permits in clearly defined parts of the overall premises. However, this may lead to difficulties where:

- radioactive material frequently passes between the occupants;
- staff fulfil roles in both organisations;
- there is interaction in the use of facilities.

The overriding requirement under EPR16 is for proper control and use of the materials. A single party (for example, a hospital trust) may agree to take full responsibility under EPR16 for:

- the overall premises;
- the activities of all persons using radioactive material.

This sort of arrangement should:

- provide clear managerial control;
- reduce the amount of record keeping needed.

You must discuss your proposals with us and send a clear written statement of what is proposed (and the reasons) with your application.

We will advertise applications for new unsealed source permits by placing a notice on the internet. We may also publicise other applications or communicate with the public in other ways, in accordance with [our public participation statement](#)

Where you see the term ‘document reference’ on the form, give the document references and send the documents with the application form when you’ve completed it.

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1 Other applications

1a Is this an application for a new permit or a variation? Part RSR B4 is used for new permits and variations to existing permits. In either case only fill in the sections for which you are proposing new or changed information.

1b 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 Tick the relevant boxes to show which radioactive substances activities you are applying for.

If you seek to receive radioactive waste you must apply to do so even if you only intend to do this as a result of your participation in the National Arrangements for Incidents Involving Radioactivity (NAIR) or RADSAFE schemes.

2b Describe your reasons for keeping, using, accumulating or disposing of unsealed sources. We need to have an overall description of your work with sources so that we can judge whether your proposals are reasonable.

2c If you are applying for a variation describe the changes and reasons for them. We need to have an overall description of changes so that we can judge whether your proposals are reasonable.

2d Describe how and why you intend to use the unsealed sources.

We need to know:

- how you intend to use the sources;
- why you need the sources;
- why you cannot use sources of lower activity.

2e Where and how will you store the unsealed sources when they are not in use?

Give general details of the building, room, security measures, fire alarm systems and proximity of inflammable materials, etc.

3 Using unsealed sources on the premises

Users must apply the principles of ‘best available techniques’ (BAT) to ensure that they hold only the types and quantities of radioactive material that are reasonably necessary for them to carry out their activities.

3a List all radionuclides that you want to keep and use on these premises in order, starting with the highest-activity material and finishing with the lowest-activity material. List individually a single radionuclide or a few radionuclides which dominate your usage;

Where you use small amounts (for example, a few megabecquerels) of similar radionuclides, you can opt to apply for them as a group. This will give you flexibility. We will only include the following unsealed-source groups

Total alpha-emitting radionuclides	Carbon-14, tritium
Total beta/gamma-emitting radionuclides	Carbon-14, tritium, iodine-125, phosphorus-32, sulphur-35
Total positron-emitting radionuclides	Thorium natural
Total radionuclides	Uranium – depleted or natural
Iodine radionuclides	Uranium – enriched

‘Total’ means not specified separately.

‘Beta/gamma’ includes electron capture and auger emission radionuclides.

For example, if you intend to use up to 10 MBq sulphur-35, 5 MBq iodine-125 and 15 MBq phosphorus-32, you can list them as carbon-14, tritium, iodine-125, phosphorus-32, sulphur-35 with a maximum activity 30 MBq.

We will not issue permits with groups other than these ones.

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

Maximum activity

This column refers to the total activity of the specified radionuclide to be held on the premises at any one time.

Radionuclide generators

If you use radionuclide generators (for example, for technetium-99m), we will permit the parent radionuclide. In column 1 you should enter the parent radionuclide with the radionuclide generated in brackets, for example, “molybdenum-99 (Tc-99m generator)”.

Using becquerels

You should list activity in SI units (becquerels). Write the prefix kilo-, mega-, giga-, etc. clearly (in full) to minimise the risk of error. For natural thorium and natural and depleted uranium, give their mass in kilograms.

Rounding up substances of nominal activity

If you use radioactive substances of nominal activity (particularly with radionuclides of short half-life), you may round up the figure to ensure you do not risk exceeding your permitted limit (even temporarily). If you do round up a figure, please make sure you say how and where you have done this.

For technetium-99m generators, multiply the nominal activity (of molybdenum-99) by 5 to cover early delivery and continued use of decaying generators.

Details of the materials and how you intend to use them

It is up to you to give us all the information we need to issue your permit. If you give us information which is incomplete or unclear:

- we may not be able to process your application;
- there may be a delay while we ask for more details.

It is important that you use the application form to tell us why you want to hold radioactive materials, and how you will use them. Include radioactive materials that you reasonably expect to hold at any one time over the next 1–2 years. You need not include materials you are confident you can hold under the terms of an exemption.

We use the information you give us to:

- consider whether the use of radioactive material is appropriate;
- specify those uses on the certificate;
- set out any special conditions for your premises.

4 Radioactive waste

4a Enclose your assessment of how you plan to use the ‘best available techniques’ to reduce the amount of radioactive waste you create and have to dispose of.

You should describe how you will use BAT for the following aspects, as far as they are relevant to you:

- (a) to minimise the activity of radioactive material kept or used on the premises;
- (b) to minimise the period over which radioactive waste is accumulated;
- (c) to minimise the activity of radioactive waste produced on the premises that will need to be disposed of on or from the premises;
- (d) to minimise the activity of gaseous and aqueous radioactive waste disposed of by discharge to the environment;
- (e) to minimise the volume of radioactive waste disposed of by transfer to other premises; and
- (f) to dispose of radioactive waste at times, in a form and in a manner so as to minimise the radiological effects on the environment and members of the public.

You should be aware that permits for unsealed source use and disposal also contain other requirements for use of BAT, which you should be prepared to comply with.

4b Do you have an emergency role under the National Arrangements for Incidents Involving Radioactivity (NAIR) or RADSAFE schemes?

Search the internet if you need more information about these schemes.

4c Do you want us to include the standard conditions for organisations taking part in NAIR or RADSAFE on this permit?

If you are a NAIR or RADSAFE respondent we can include in your permit conditions which would enable you to accumulate and dispose of radioactive waste collected as part of the scheme.

5 Accumulation of radioactive waste from unsealed sources

When requested to give details of radionuclides:

- if the waste is mainly made up of only a few radionuclides, you should tell us about each of them;
- You can list radionuclides as a group – see section 3. This will allow you some flexibility to use a range of radionuclides without listing each one.

5a Why do you plan to accumulate radioactive waste?

Explain why you want to accumulate waste from unsealed sources. You should put in place procedures to reduce the amount of waste you accumulate as far as is practical.

5b How do you plan to accumulate radioactive waste?

Explain what facilities and controls you will use to accumulate waste from unsealed sources. Give details of what controls you will use to help keep the waste safe before you dispose of it; for example, security, fire alarms, procedures for preventing fires and segregation of different types of waste.

5c Give the chemical and physical details of the radioactive waste.

Describe the types of waste from unsealed sources and what they are made from or composed of.

5d How will you measure the activity of all the types of radioactive waste?

Outline the principal steps in the estimation or analysis of waste from unsealed sources, including type of radiation detection; for example, liquid scintillation counter.

5e, 5f, 5g Give the following details of the gaseous, aqueous or organic liquid waste you will accumulate.

Give the maximum activity and volume of the relevant waste types you will hold at any one time; also the maximum time you will hold the waste for. Different radionuclides or types of waste may need different periods.

5h Give the following details of the very low-level waste (VLLW) you will accumulate.

Very low-level waste (VLLW) means:

- radioactive waste which can be disposed of with municipal, commercial or industrial waste, each 0.1m³ of waste containing less than 400 kilobecquerels (kBq) of total activity and single items containing less than 40 kBq of total activity.

For wastes containing only carbon-14 or hydrogen-3 (tritium):

- in each 0.1m³, the activity limit is 4,000 kBq for carbon-14 and hydrogen-3 (tritium) taken together; and
- for any single item, the activity limit is 400 kBq for carbon-14 and hydrogen-3 (tritium) taken together.

The normal accumulation period permitted for VLLW is two weeks as it is usually disposed of with regular refuse collections. If you need longer before you dispose of it, you should tell us why you need the extra time.

Low-level solid waste other than VLLW

5i Give the following details of low-level solid waste (other than VLLW) you will accumulate.

Give the maximum activity and volume of the LLW other than VLLW you will hold at any one time. Also give the maximum time you will hold the waste for. Different radionuclides or types of waste may need different periods.

6 Radioactive waste disposal

6a Provide a description of your arrangements for disposing of radioactive waste by the above means.

Explain the arrangements you have made to dispose of your radioactive waste gases or liquids or incinerate solid or organic liquid waste on the premises. You should describe the disposal routes you intend to use and why you have chosen those. Note question 4a requires a description of your use of best available techniques and 6c an assessment of the risk of radiation from the discharged waste.

We will not issue permits for 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 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;
- we strongly advise you to talk to us before completing this form.

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

6b Discharge of radioactive gas or aqueous liquid and incineration of waste on the authorised premises

Indicate which discharge points or routes you plan to use.

We need to know which routes to permit.

6c Provide your assessment of the risk of radiation from the waste you plan to discharge.

This is called a ‘radiological assessment’.

You should assess the potential dose of radiation to the individuals who are likely to receive the highest radiation dose but are not involved in your work with radioactive substances. You must show your calculations.

For each gaseous discharge point you should give details of:

- the height of the discharge point above the ground;
- the height of the discharge point above the highest part of the nearest building;
- the rate that gases are discharged;
- details of any filters on the discharge system;
- how you plan to measure or assess the activity of the waste;
- the number of days a year you intend to make discharges.

For each aqueous discharge route you should give details (as relevant) of:

- the name of any water body you plan to release into;
- whether any water body is a lake, pond or estuary;
- the Ordnance Survey national grid reference of the discharge point;
- the name and Ordnance Survey national grid reference of any sewage treatment works receiving the discharge;
- the total volume of water you plan to release;
- how you plan to measure or assess the activity of the waste;
- the number of days a year you intend to make discharges;
- details of disposal of any sludges or solids resulting from aqueous waste.

For each incinerator on your premises to be used for radioactive waste you should give details of:

- the Environment Agency reference number of the environmental permit for the incinerator installation;
- the height of the discharge point above the ground;
- the height of the discharge point above the highest part of the nearest building;
- details of any filters on the discharge system;
- the maximum volumes of organic liquid and solid wastes that you plan to burn in a day and a month;
- the number of days a year you plan to make discharges;
- how you plan to measure or assess the activity of ash and the solids from your filter system;
- how you plan to dispose of ash and the solids from your filter system.

You may describe and quantify your assessment of the radiological impact of the waste management practices you propose in ways which best suit you and your circumstances. But you must make clear the approach you have adopted, any underpinning assumptions and the dose estimates you have made.

The Environment Agency has developed an initial radiological assessment tool which we use when determining applications. The underpinning science is published and freely available in the following documents:

Science Report SC030162 Initial Radiological Assessment Methodology – Part 1 User Report April 2006 – search on ISBN 1844325423.

Science Report SC030162 Initial Radiological Assessment Methodology – Part 2 Methods and Input Data April 2006 – search on ISBN 1844325431. Guidance is available at: <https://www.gov.uk/government/publications/assessment-of-prospective-public-doses-from-authorised-discharges>.

These documents are currently being reviewed and updated versions may be available. You can check with your regulatory officer.

We use a spreadsheet tool based on this methodology which is available from your Regulatory Officer.

If you use our tool to support your application, you should confirm the input data you have used and the output from the tool. Providing an electronic copy of the completed spreadsheet is the most straightforward way to do that.

We use the tool to do a screening assessment for the impact on the health of both human and non-human species. You need not include an estimate of the impact on the health of non-human species in your application; we will continue to do that, so that we can confirm that the combined challenges to relevant sites are not significant.

6d Only answer this question if your activity can be described as one of the operations in the Transboundary Radioactive Contamination Direction (England) 2020 and you meet the criteria for providing a transboundary radiation dose assessment as described in the RSR-B4 guidance notes.

If you are:

- applying for a new permit, or
- applying for a variation to increase your permitted radioactive waste disposal limits or add a new disposal route or radionuclide to your existing permit

and your activity is described in paragraphs 2(c), 2(g), 2(h) or 2(k) of the Transboundary Radioactive Contamination (England) Direction 2020. From the Direction, these activities are:

- (c) the mining, milling and conversion of uranium and thorium;
- (g) the handling and processing of artificial radioactive substances on an industrial scale;
- (h) the predisposal management, including storage, of radioactive waste arising from operations (c) or (g); or
- (k) the industrial processing of naturally occurring radioactive materials.

and your radiological risk assessment provided in response to question 6c indicates that:

- the local representative person would receive a radiation dose $\geq 10 \mu\text{Sv}$ per year, or
- there are exceptional pathways of exposure to EU Member States and/or Norway, e.g. involving the export of foodstuffs.

you will need to extend the boundaries of your assessment to address potential impacts to far field receptors in the European Union and/Norway. Note that the EA's Initial Radiological Assessment tool referred to in the guidance for question 6c is not suitable for transboundary radiological dose assessments. Other modelling software is available that can perform transboundary assessments. If required, further advice can be obtained from your Regulatory Officer.

With reference to activity 2(g), “industrial scale” means involving quantities of radioactive substances at or above the levels contained in Schedule 1 to the Radiation (Emergency Preparedness and Public Information) Regulations 2019. Where more than one radionuclide is involved, a sum of fractions approach should be taken to determine applicability.

With reference to activity 2(k), “industrial processing”, means involving quantities of radioactive substances at or above the levels contained in Schedule 1 to the Radiation (Emergency Preparedness and Public Information) Regulations 2019. Where more than one radionuclide is involved, a sum of fractions approach should be taken to determine applicability.

Do not respond to this question if your application is for a military site or an activity that uses radioactive substances for military purposes.

If required, your assessment should include:

Airborne effluents

Models, including where appropriate generic models, and parameter values used to calculate the consequences of the releases in the vicinity of the plant and for other affected Member States and/or Norway:

- atmospheric dispersion of the effluents;
- ground deposition and re-suspension;
- food chains, inhalation, external exposure etc.;
- living habits (diet, exposure time etc.);
- other parameter values used in the calculations.

Evaluation of concentration and exposure levels associated with the envisaged discharge limits:

- annual average concentrations of activity in the atmosphere near the ground and surface contamination levels, for the most exposed areas in the vicinity of the plant and in affected EU Member States and/or Norway;
- for the reference group(s) in the vicinity of the plant and in affected EU Member States and/or Norway, corresponding annual exposure levels: effective dose to adults, children and infants, taking account of all significant exposure pathways.

Liquid effluents

Models, including where appropriate generic models, and parameter values used to calculate the consequences of the releases in the vicinity of the plant and for other affected EU Member States and/or Norway:

- aquatic dispersion of the effluents;
- their transfer by sedimentation and ion exchange;
- food chains, inhalation of sea spray, external exposure etc.;
- living habits (diet, exposure time etc.);
- other parameter values used in the calculations.

Evaluation of concentration and exposure levels associated with the envisaged discharge limits:

- annual average concentrations of activity in surface waters, at the points where such concentrations are highest, in the vicinity of the plant and in affected EU Member States and/or Norway;

for the reference group(s) in the vicinity of the plant and in affected EU Member States and/or Norway: effective dose to adults, children and infants, taking account of all significant exposure pathways.

6e State the limits you need for discharge of gaseous waste to air.

You should give the monthly maximum for each radionuclide or group of radionuclides.

6f State the limits you need for discharge of aqueous waste to sewer or water.

You should give the monthly maximum for each radionuclide or group of radionuclides.

Disposal of waste by incineration on the premises

6g What type(s) of incinerator do you have on the premises?

Give the make, model number, capacity and date of installation.

6h What will you do if your incinerator breaks down?

You should state your plans, including what will happen to waste already created or accumulated.

6i, 6j Give the following details of the solid and organic liquid waste you will incinerate.

You should give the annual and daily maximums for each radionuclide or group of radionuclides.

Disposal of liquid or solid waste by other means

6k Describe any other method you intend to use to dispose of liquid or solid waste.

Attach your description and radiological assessment.

The radiological assessment should cover the same points as the guidance above. If you want to make on-site disposals of solid waste to land, you should apply using part RSR-B5 and not this form.

7 Transfer of radioactive waste to another person

7a Provide a description of your arrangements for transferring radioactive waste to another person.

Explain the arrangements you have made to transfer your radioactive waste to another person. You should describe the waste types, how and why they arise, why you have chosen those, whom you intend to transfer the waste to and what you expect them to do with it. You do not need to include radioactive waste that you intend to dispose of under an exemption. See [Guidance on the scope of and exemptions from the radioactive substances legislation in the UK](https://www.gov.uk/guidance/guidance-on-the-scope-of-and-exemptions-from-the-radioactive-substances-legislation-in-the-uk) GOV.UK (www.gov.uk)

Organic/aqueous liquid and solid waste

7b Give the following details of your plans to transfer solid waste.

You should give the specified information for each radionuclide or group of radionuclides.

7c Give the following details of your plans to transfer organic or aqueous liquid waste.

You should give the annual maximum for each radionuclide or group of radionuclides.

7d Confirm whether you have contracts in place for another organisation to receive all of your organic liquid and solid waste and any aqueous liquid waste, that you intend to dispose by transfer.

The operator consigning liquid and solid waste must have in place contracts with a waste disposal/storage company or companies to dispose of all of the waste. (It is acceptable to establish a contract or contracts with a waste disposal company. It is not necessary to specify any particular site which will receive the waste.) These contracts and transfer records should be available for inspection by the Environment Agency, either at the application stage or at any subsequent stage of regulatory activity.

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. This may take the form of a letter of agreement in principle from a waste recipient to accept waste.

We will include in new permits for sites that receive waste for final disposal a condition requiring operators to inform their local authority before they first receive waste from any new consignor. Under this condition operators should inform the local authority of the origin and nature of the radioactive waste before the first waste is received from a new consignor.

7e Describe contingency arrangements should your planned transfer routes for liquid or solid waste become unavailable.

You should state your plans, including what will happen to waste already created or held.

7f Do you intend to transfer solid waste to a landfill site?

Answer 'Yes' if you wish to dispose of solid waste to a named landfill with its own permit to receive radioactive waste. You do not need to include waste that you are intending to dispose of under an exemption.

If you do then provide details of your proposal. You will need to show that your waste is within the types permitted to be received at the site.

Disposal of very low-level waste

Most disposals of VLLW are exempt from permitting and details of these should not be entered in the form. In cases where the total annual disposal of VLLW will exceed the maximum quantities allowed in the exemption we will need to give further consideration to how your disposal of VLLW will be regulated. Annual disposal limits for VLLW are given in Table 3.3 of the guidance referred to in 7a above.

7g Provide details of how you plan to dispose of the VLLW. Only answer this question if you are not able to use the exemption. Where this is the case, include details for all of the VLLW that you will generate, not just for the quantity of waste above the exemption limit.

8 Receipt of radioactive waste

8a Provide details of the origin, nature and quantity of waste from unsealed sources to be accepted onto the premises, and how you will manage and dispose of it.

Give a general description here and complete section 5 on waste accumulation and section 6 on waste disposal regarding your handling and disposal arrangements.

Do not answer this question if the only radioactive waste that you will receive from elsewhere is that which may arise as a result of your participation in NAIR or RADSAFE schemes.

9 Use of mobile radioactive apparatus in the form of unsealed sources

9a Fill in the table with details of the radioactive material that you will use in mobile form.

Answer this question only if you are applying for an activity described in Schedule 23, Part 2, paragraph 11(5)(a) or 11(5)(b). Examples include a mobile PET facility, certain tests in GP surgeries or industrial tracer studies.

You should provide details of the radioactive material that you will use in mobile form. Include the total radioactivity to be used for the environmental study (allowing for all reasonably foreseeable requirements) and the maximum radioactivity to be released to the environment in a day.

9b Where will the mobile radioactive apparatus be used?

We need to be able to locate the premises. Give an Ordnance Survey map reference if no address exists; for example, ST 12345 67890.

9c Is it within a 5km radius of any environmentally sensitive site?

For example, a site of special scientific interest (SSSI), special area of conservation (SAC) or special protection area (SPA).

9d What is the size of the area where the radioactivity is to be used?

Give the approximate size in square metres.

9g Give the frequency of use over the period.

For example, daily, weekly, monthly or single use.

9i What measures will be in place to avoid human or animal contact with the radioactive materials when being used?

Unless the activity involves directly introducing radioactivity into organisms, you should describe the precautions you will take to prevent people or animals coming into contact with radioactivity.

9j Provide your assessment of the risk of radiation from the use of mobile radioactive apparatus to release radioactivity to the environment.

State the expected amounts of radioactivity likely to be released. Give the same details and calculations as stated in section 6 for waste discharges.

Now fill in part RSR-F of the form.