

# How to apply for an environmental permit Part RSR-B4 – New bespoke radioactive substances activity permit (open 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 open 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.

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 open sources kept, used or disposed of on a single defined premises or in the form of mobile radioactive apparatus.

#### **Multiple occupancy premises**

Natural Resources Wales cannot issue a permit in the name of more than one organisation. But we may permit premises which consist of two or more non-adjointing 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 permitting of 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 RSA 93 is for proper control and use of the materials. A single party (for example, a hospital trust) may agree to take full responsibility under the Act 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 open-source permits by placing a notice on the internet.

The Environment Agency has also published additional details on radioactive substances regulation in its Radioactive Substances Guidance (RASAG) and 'How to Comply' documents.

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

#### **Contents**

- 1 Other applications**
- 2 About the activities**
- 3 Using open sources on the premises**
- 4 Radioactive waste**
- 5 Accumulation of radioactive waste from open sources**
- 6 Waste disposal**
- 7 Transfer of waste to another person**
- 8 Receipt of waste**
- 9 Use of mobile radioactive apparatus in the form of open sources**

## **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** Tick the relevant boxes to show which radioactive substances activities you are applying for

You must now 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 (NAIR) or RADS SAFE schemes.

**2b** Describe how and why you intend to use the open 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.

**2c** Where and how will you store the open 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 open 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.

List all open sources 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;
- all alpha-emitting radionuclides.

Where you use small amounts (for example, a few megabecquerels) of similar radionuclides you can opt to permit them as a group. This will give you flexibility. We will include the following open-source groups in new-style permits:

Total alpha-emitting radionuclides	Total beta/gamma (t1/2 >1 y)
Total beta/gamma-emitting radionuclides	Iodine radionuclides
Total positron-emitting radionuclides	Carbon-14, tritium
Total radionuclides	Carbon-14, tritium, iodine-125, phosphorus-32, sulphur-35
Total beta/gamma (t1/2 <1 day)	Thorium natural
Total beta/gamma (t1/2 1–10 days)	Uranium – depleted or natural
Total beta/gamma (t1/2 10 days–1 y)	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 normally issue permits with groups in other than these ones. If you need to use a different grouping of radionuclides you should include a document giving your proposal and reasons with the application.

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.

#### Estimated usage

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

#### Radionuclide generators

If you use radionuclide generators (for example, for technetium 99m), we will permit the parent radionuclide. You should enter 'molybdenum-99' in column 1.

#### 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 Tc99m generators, multiply the nominal activity (of Mo99) 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 order.

We use the information you give us to:

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

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### 3 Using open sources on the premises, continued

#### If you hold a mixture of high- and low-activity sources

If you are happy that you hold low-activity materials which are exempt under the conditions of one of the exemption orders, you do not need to include them in your application to permit other sources.

### 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

'Best available techniques' (BAT) replaces and is equivalent to the former requirement to assess best practicable means (BPM).

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 open 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 open sources

When requested to give details of radionuclides:

- if the waste is mainly made up of a few radionuclides only, you should tell us about each of them;
- you must tell us about all radionuclides that emit alpha radiation;
- if you use just a few megabecquerels of radionuclides that are similar to one another, you can list them as a group.

See section 3 on use of groups. This will allow you some flexibility to use a range of radionuclides without listing each one.

We have issued separate guidance on good practice for accumulation of waste in RASAG.

**5a** Why do you plan to accumulate radioactive waste?

Explain why you want to accumulate waste from open 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 open 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 open sources and what it is made from or composed of.

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

Outline the principal steps in the estimation or analysis of waste from open 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 0.1m<sup>3</sup> of waste containing less than 400 kilobecquerels (kBq) of total activity and single items containing less than 40 kBq of total activity.

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## 5 Accumulation of radioactive waste from open sources, continued

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

- in each 0.1m<sup>3</sup>, 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.

Note that in assessing whether radioactive waste can be disposed of with municipal, commercial or industrial waste, the non-radioactive properties of the waste must be considered.

In a few cases (where volumes of VLLW exceed 50 m<sup>3</sup> per year, e.g. major decontamination of a former radium luminising site), it is necessary for different limits and further consideration to be given to disposal of VLLW. Our guidance on disposing of radioactive waste to landfill gives more details.

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 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 permit 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.

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 Waste disposal

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

6a Indicate which discharge points or routes you plan to use

We need to know which routes to permit.

6b 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 Natural Resources Wales reference number of the environmental permit;
- 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;

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## 6 Waste disposal, continued

- 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 conclude.

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  
<http://publications.environment-agency.gov.uk/epages/eapublications.storefront> – search on ISBN 1844325423.

Science Report SC030162 Initial Radiological Assessment Methodology – Part 2 Methods and Input Data April 2006  
<http://publications.environment-agency.gov.uk/epages/eapublications.storefront> – search on ISBN 1844325431.

We use a spreadsheet tool based on this methodology which is available from our Permitting Centre.

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 a hard 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 both human health and non-human species. You need not include an estimate of the impact on 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.

**6c** State the limits you need for discharge of gaseous waste

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

**6d** State the limits you need for discharge of aqueous waste

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

**Disposal of waste by incineration on the premises**

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

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

**6f** What will you do if your incinerator breaks down?

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

**6g** Give the following details of organic liquid and solid waste you will incinerate

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

## 7 Transfer of waste to another person

**Organic liquid and solid waste**

**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, who you intend to transfer the waste to and what you expect them to do with it.

**7b** Give the following details of your plans to transfer organic liquid waste

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

**7c** Give the following details of your plans to transfer solid waste excluding VLLW

You should give the specified information for each radionuclide or group of radionuclides. Only complete the final column if the waste is not VLLW and is transferred to be landfilled directly.

**7d** Confirm whether you have contracts in place for another organisation to receive all of your organic liquid and solid waste (excluding VLLW)

The operator consigning organic liquid and solid waste (excluding VLLW) 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 Natural Resources Wales, either at the application stage or 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.

To ensure the previous level of transparency under RSA 93 is maintained, 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. This condition will also be added to existing permits before operators of such disposal facilities accept radioactive waste from a new consignor. 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 organic liquid or solid waste become unavailable

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

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## 7 Transfer of waste to another person, continued

### Disposal of organic liquid or solid waste by other means

**7f** Describe any other method you intend to use to dispose of liquid organic or solid waste. Attach your description and radiological assessment

The radiological assessment should cover the same points as the guidance above.

### Disposal of very low-level waste

**7g** What is the maximum amount of very low-level waste (VLLW) you plan to dispose of in a month with your normal rubbish? You should give us this in cubic metres.

**7h** Tell us how you plan to dispose of the VLLW

If permitted, you may dispose of VLLW to any suitable disposal route.

### Disposal of solid wastes by transfer for the purposes of final disposal at the Low-Level Waste Repository (LLWR) at Drigg

**7i** Confirm that you have attached a document of agreement from the site operator to receive your waste

This should be from the LLWR operator if disposal is directly there, or an intermediate site operator if the waste is to be pre-treated before going to the LLWR.

**7j** Will any consignment of waste for the LLWR contain alpha-emitting radionuclides in excess of 4 gigabecquerels per tonne or all other radionuclides in excess of 12 gigabecquerels per tonne?

We will not authorise disposals above these levels.

**7k** What is the chemical and physical nature of the waste for the LLWR?

Give a general description. You will need to comply with the conditions of the LLWR operator.

**7l** What is the maximum annual disposal activity (at the time of transfer) for the LLWR for each of the following?

You should give a value for each radionuclide or group of radionuclides listed in the table. Enter zero if none.

## 8 Receipt of waste

**8a** Provide details of the origin, nature and quantity of waste from open 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 disposal regarding your handling and disposal of it.

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.

## 9 Use of mobile radioactive apparatus in the form of open sources

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

Only answer this question 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. Further guidance on these (RASAG) is available from our website.

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, an SSSI, SAC or 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 or monthly.

**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 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.**