

**Waste classification  
guidelines  
Part 3: Waste containing  
radioactive material**



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**Published by:**

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ISBN 978 1 74359 799 6

EPA 2014/0797

November 2014

## Contents

<b>Who should use this guide?</b> .....	<b>1</b>
<b>How to use this guide</b> .....	Error! Bookmark not defined.
<b>Classification of wastes containing radioactive material</b> .....	<b>1</b>
Step 1: Assessing the level of radioactivity .....	1
Step 2: Identifying hazardous wastes .....	1
Step 3: Calculating the total activity ratio and specific activity ratio.....	1
Step 4: Total activity ratio or specific activity ratio greater than one.....	2
Step 5: Total activity ratio and specific activity ratio less than or equal to one .....	2
<b>Notes</b> .....	<b>2</b>

Classifying wastes into groups that pose similar risks to the environment and human health facilitates their management and appropriate disposal. It is the responsibility of those who generate waste to classify that waste. To assist waste generators classify the wastes they produce, the EPA has developed the Waste Classification Guidelines ('the Guidelines') which are a step-by-step process for classifying waste.

Generators and waste facilities must carefully follow the procedures in these Guidelines to ensure they comply with applicable laws in classifying their waste and safeguard protection of the environment and human health.

The Guidelines are comprised of the following sections, of which this document is Part 3:

Overview of the Guidelines

Part 1: Classifying waste

Part 2: Immobilisation of waste

Part 3: Waste containing radioactive material

Part 4: Acid sulfate soils

All sections of the Guidelines are available for download from the EPA website at [www.epa.nsw.gov.au/waste/classification.htm](http://www.epa.nsw.gov.au/waste/classification.htm).



## Who should use this part of the Guidelines?

This part of the EPA Waste Classification Guidelines (the Guidelines) should be used by waste generators to assist in identifying the classification and management requirements for solid and liquid wastes containing radionuclides.

## Classification of wastes containing radioactive material

Wastes containing any natural or artificial substance that emits ionising radiation spontaneously must be classified on the basis of both their radioactive and other characteristics, according to the step-by-step procedure outlined below.

### Step 1: Assessing the level of radioactivity

The radioactivity of the waste must be assessed in accordance with the *Radiation Control Act 1990* and the Radiation Control Regulation 2013.

### Step 2: Identifying hazardous wastes

Liquid or non-liquid wastes with a specific activity greater than 100 becquerels per gram and consisting of, or containing more than, the prescribed activity of a radioactive element in Schedule 1 of the Radiation Control Regulation 2013, whether natural or artificial, must be classified as *hazardous* wastes.

### Step 3: Calculating the total activity ratio and specific activity ratio

For liquid or non-liquid wastes with a specific activity of 100 becquerels per gram or less and/or consisting of, or containing, the prescribed activity or less of a radioactive element in Schedule 1 of the Radiation Control Regulation 2013, whether natural or artificial, the *total activity ratio* and *specific activity ratio* must be calculated according to the mathematical expressions below:

**Total activity ratio** is calculated using the expression:

$$\text{Total activity ratio} = (A1 \times 10^{-3}) + (A2 \times 10^{-4}) + (A3 \times 10^{-5}) + (A4 \times 10^{-6})$$

where A1 to A4 are the total activity of Group 1 to Group 4 radionuclides, as set out in Column 1 of Schedule 1 of the Radiation Control Regulation 2013.

**Specific activity ratio** is calculated using the expression:

$$\text{Specific activity ratio} = SA1 + (SA2 \times 10^{-1}) + (SA3 \times 10^{-2}) + (SA4 \times 10^{-3})$$

where SA1 to SA4 are the specific activity (of the material) of Group 1 to Group 4 radionuclides, as set out in Column 1 of Schedule 1 of the Radiation Control Regulation 2013.

*Specific activity* is defined in the *Code of Practice for the Safe Transport of Radioactive Materials*<sup>1</sup> as follows:

‘Specific activity of a radionuclide shall mean the activity per unit mass of that nuclide. The specific activity of a material shall mean the activity per unit mass of the material in which the radionuclides are essentially uniformly distributed.’

The Code is referred to in clause 36 of the Radiation Control Regulation 2013.

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<sup>1</sup> Australian Radiation Protection and Nuclear Safety Agency 2008, *Code of Practice for the Safe Transport of Radioactive Materials*, Radiation Protection Series Publication No. 2, Australian Radiation Protection and Nuclear Safety Agency, Yallambie, VIC.

*Total activity* of a material means the activity of the whole of the material in which the radionuclides are essentially uniformly distributed (determined using 1-kilogram representative samples of the whole material).

#### Step 4: Total activity ratio or specific activity ratio greater than one

Where the specific activity ratio or total activity ratio is greater than one, the waste must be classified as follows:

*Liquid wastes* must be managed on a case-by-case basis. Advice on the appropriate management of such materials should be sought from the EPA on (02) 9995 5959.

*Non-liquid wastes* must be classified as *restricted solid waste* **unless**:

- other characteristics of the waste mean that it must be classified as *hazardous waste* (for example, it may be pre-classified as hazardous waste in accordance with Step 3 of Part 1 of the Guidelines)

or

- it may contain chemical contaminants that will lead to its assessment as *hazardous waste* (see Step 5 of Part 1 of the Guidelines).

#### Step 5: Total activity ratio and specific activity ratio less than or equal to one

Where the specific activity ratio and total activity ratio are equal to or less than one, the waste must be classified according to its other characteristics in line with Part 1 of the Guidelines.

### Notes

The principal legislation for the control of radioactive materials in NSW is the *Radiation Control Act 1990* (the Radiation Act) and Radiation Control Regulation 2013. The Radiation Act requires those who use or sell radioactive substances to hold a licence for all high activity sources that, when requiring disposal, correspond to the types of sources classified as *hazardous waste* in these guidelines. The Radiation Act also controls the disposal of such sources. Any person handling radioactive sources in this category requires a Radiation Act licence to do so.

In the case of liquid radioactive wastes, the *hazardous waste* criteria used in these guidelines have been extended downwards in activity by a factor of 100 to reflect the additional risk associated with these wastes. The corresponding classification for non-liquid radioactive wastes is *restricted solid waste*. In both cases the Radiation Act does not directly control the disposal of these low-level radioactive wastes; rather, a system of licence conditions and a 'consent to dispose' are attached to a licence, either under the Radiation Act or the *Protection of the Environment Operations Act 1997*.

Radioactive material that has very low levels of activity (including materials with naturally occurring background levels) is recognised as being 'below regulatory concern'. The criteria adopted in these guidelines for the levels of radioactivity that permit wastes to be classified in the general solid waste categories closely relate to the international criteria used to assess radioactive materials as being 'below regulatory concern'. Disposal of such materials does not require formal approval, but advice should be sought in the case of liquid wastes to ensure compliance with other requirements (for example, trade waste agreements).