

Guidance on the scope of and exemptions from the radioactive substances legislation in the UK

Guidance Document

September 2011

Version 1.0

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PB 13624

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1. Introduction and background

General

- 1.1 The legislative means by which radioactive substances are regulated in the United Kingdom are different between the various devolved administrations; however, the effects of the legislation are consistent. This guidance sets out the rationale underpinning the exemptions regime, the Government's intentions for the legislation, and how Government intends the regime to be interpreted and implemented. It provides information to the environmental regulators and users on the means by which the objectives of the exemptions regime should be delivered.
- 1.2 In this guidance, the legislation is referred to as 'the legislation', meaning it applies to both the Radioactive Substances Act 1993 (RSA93) and the Environmental Permitting Regulations 2010 (EPR10)¹. RSA93 is the relevant legislation in Scotland and Northern Ireland; in England and Wales, EPR10 applies. In those circumstances where the guidance relates only to one of the pieces of legislation, the specific legislation is referenced. In RSA93, the terms 'authorisation' (for the accumulation and disposal of radioactive waste) and 'registration' (for the keeping and use of radioactive substances), are used. In EPR10, these have been replaced by permitting. In this guidance, the term 'permitting' has been used throughout to apply to both regimes, including both 'registrations' and 'authorisations' under RSA93.
- 1.3 Two concepts are used in this document (see Annex 1 for a fuller explanation of these concepts as applied in UK legislation):
- 'Out of scope' of regulation. Effectively, 'out of scope' equates to 'not radioactive' for the purposes of the legislation. Radioactive substances which are 'out of scope' are not subject to any regulatory requirement under this legislation.
 - 'Exempt from permitting'. Substances which are considered to be radioactive by definition may be exempt from the need for a permit. The Basic Safety Standards Directive 1996 (BSSD) refers to the need or otherwise for 'prior reporting'. In the UK, we have taken 'prior reporting' to be equivalent to 'permitting', and 'exemption' to mean that 'prior reporting' is not necessary.

Hierarchy of Legislation and Guidance

- 1.4 This guidance represents an aid to interpretation of the legislation². It sets out how the various provisions in the legislation have been determined, and how each provision in some way supports the application of 'risk-informed regulation'.
- 1.5 Although this guidance is intended to be 'stand-alone' there are circumstances where the legislation needs to be consulted for a strict legal interpretation. Guidance cannot cover every particular situation. In the case of any doubt, interested parties should refer

¹ As amended by the Environmental Permitting (England and Wales) (Amendment) Regulations 2011. These regulations bring in the changes to the scope of and exemptions from EPR10.

² In England and Wales this guidance is part of a series of documents supporting the Environmental Permitting Regulations 2010 which are available at <http://archive.defra.gov.uk/environment/policy/permits/guidance.htm>

to the legislation itself. Annex 2 of this guidance provides a cross reference between the legislation and this guidance.

1.6 The hierarchy involves three levels:

- **The legislation** sets out the legal provisions dealing with the scope of the legislation and the exemptions from the requirements for a permit.
- **Government guidance** (this document) sets out the expectations of the UK Government and Devolved Administrations (referred to as the “Government” throughout the rest of this document) with regard to this legislation. It is primarily intended for use by the environmental regulators but will also assist those subject to the legislation.
- **Regulators’ guidance** (procedural guidance) sets out procedural matters in detail. It describes, where appropriate, examples of good practice and has more detailed explanations of how the legislation applies to particular industrial sectors.

1.7 To illustrate the relationships between the three levels of the hierarchy, we can take the example of an exemption condition relating to record keeping.

- **The Legislation** states that adequate records of waste disposals must be kept.
- **Government guidance** sets out the purpose of record keeping, and explains why different types of record may be required for different circumstances.
- **Regulators’ guidance** sets out the procedural issues related to record keeping.

Underpinning of the ‘exemptions’ and ‘out of scope’ numerical values

1.8 The basis on which the various numerical values and waste disposal criteria have been developed are mainly related to the radiation dose which could be received by a member of the public. There are exceptions to this general concept. Threshold values for ‘keeping and use’, for instance, are based on practical considerations, bearing in mind that radiation safety for workers for ‘keeping and use’ are a matter for the health and safety regulators under the Ionising Radiations Regulations.

1.9 For the ‘out of scope’ and exemption values, we have selected two radiation dose criteria:

- For naturally occurring radioactive substances or articles used in ‘industrial activities’ (see paragraphs 2.15-2.16), the numerical values are based on a radiation dose of 300 $\mu\text{Sv}/\text{year}$ to a member of the public.
- For artificial radionuclides, and for naturally occurring radioactive substances or articles used for their radioactive, fissile or fertile properties (a ‘practice’), the values are based on a radiation dose of 10 $\mu\text{Sv}/\text{year}$ to a member of the public.

1.10 These dose criteria have been selected as a basis for ‘out of scope’ and exemption as representing appropriate levels of risk below which regulation is either not necessary (out of scope - excluded) or can be ‘light touch’ (exemption). They are based on

international standards and guidance which support the Basic Safety Standards Directive 1996 (BSSD).

- 1.11 Note that the legislation applies if an activity constitutes a 'practice' or is listed as a 'NORM industrial activity'. (Naturally Occurring Radioactive Material = NORM). An activity which is not a 'practice' or a 'NORM industrial activity' is outside the scope of the legislation (for example, the distribution and use of natural gas for domestic or industrial use). This application is based on Euratom guidance which identifies those industries of concern for radiological protection purposes.
- 1.12 The term 'practice' is not used in the legislation. Where it appears in this guidance, it is used as a shorthand form of the expression 'an activity involving artificial radionuclides or which employs the radioactive, fissile or fertile properties of naturally occurring radionuclide(s)'. The term 'practice' is still current in other UK legislation and guidance, although it may be superseded in the future by the term 'planned exposure' if and when recommendations of the International Commission for Radiological Protection (ICRP) are adopted in European, and subsequently UK, legislation.
- 1.13 The radiological impact assessments which have been carried out to support the 'out of scope' values take into account a wide variety of possible pathways, and assume no controls are placed on the keeping and use, accumulation or disposal of radioactive wastes.
- 1.14 The principal difference between the criteria selected for NORM industrial activities (300 μ Sv/year) and for practices (10 μ Sv/year) is that in the former case it is not practicable to regulate NORM such that the lower criterion is met. The exception to this general principle, where the lower criterion can be applied, is when NORM radionuclides are being used specifically for their radioactive, fertile or fissile properties. This is because, in the latter case, NORM radionuclides are deliberately employed in situations where a radiation dose can be expected.
- 1.15 For the exemption levels and waste disposal criteria, the dose limit is, again 10 μ Sv/year to a member of the public for most situations. However, for NORM wastes, the exemption criterion of 300 μ Sv/year applies to disposals from industrial activities, with an additional limit of 1mSv/year to a landfill operative.
- 1.16 In addition to NORM wastes from industrial activities, the same criterion (300 μ Sv/year) applies to exemption for the management of wastes arising from the remediation of land contaminated with NORM radionuclides if the contamination did not occur as a result of an activity carried out on a nuclear licensed site to which the license would have applied³.
- 1.17 However, in the case of exemption for disposal, the radiological impact assessments do not assume uncontrolled disposal of waste to the environment. Restrictions are placed on the type of substance or article (for example, a waste sealed source), on the disposal route (for example, to a sewer, or to a landfill), or on the management of waste (for example, disposed of in considerable quantities of non-radioactive waste) etc. These restrictions are imposed by way of conditions set out in the legislation.

³ For instance, wastes arising from the remediation of land historically contaminated with radium as a result of a radium luminising activity will be exempt, even if this work was carried out on what is now a site licensed under the Nuclear Installations Act 1965, provided that the activity concentration limits are not exceeded. This is because the luminising activity itself is not a practice which requires a license under that Act.

1.18 Exemption conditions are in place to help ensure that the dose criterion of 10 $\mu\text{Sv}/\text{year}$ (300 $\mu\text{Sv}/\text{year}$ in the case of solid NORM wastes) to a member of the public will be met when waste is discharged to the environment; these conditions are often in the form of numerical limits to an annual waste disposal. The other conditions are in place to ensure that the generation of radioactive waste is minimised, limit disposals so as to ensure low consequences, and such that an operator can assure him or herself that they are in control.

Relationship between radioactive materials that are 'out of scope', exempted and permitted

1.19 This section explains the relationship between radioactive materials that are:

- Outside the scope of regulation.
- Exempted from the requirement for a permit under the legislation.
- Subject to a requirement for a permit.

1.20 Some common situations are set out here, but it is recognised that not every unique combination of circumstances can be precisely defined.

1.21 All materials are, to some extent, radioactive. Tables 2.2 and 2.3 (pages 20 and 21) of this guidance set out the levels below which materials are outside the scope of the legislation. That is to say, for the purposes of this legislation, materials and wastes with concentrations at or below those in Tables 2.2 and 2.3 are not deemed to be radioactive.

1.22 The levels in Table 3.1 (page 73) (reproduced from Annex 1 of BSSD) should be the first port of call for any person who believes that their holdings are, or might be, exempt. If the levels in this table are exceeded, then reference may be made to Table 3.2 (page 79) in the circumstances, and for materials, described in that table.

1.23 For Table 3.2 the exemption levels apply to each row; that is, for instance, any one premises will be exempt from permitting for up to $4.0 \times 10^5 \text{Bq}$ of Ba-137m eluting sources **plus** unlimited number of fixed smoke detectors **plus** $5 \times 10^{12} \text{Bq}$ of class A GTLDs.

1.24 However, for any **one particular row** in Table 3.2, suppose the exemption level is X Bq for a certain type of source; this means that we believe that the keeping of X Bq is a low risk activity provided that the exemption conditions are complied with. If an operator wishes to keep and use sources with an activity amounting to X + 1 Bq, then a permit is required for X + 1 Bq. This is because we believe that for an operator to hold X+1 Bq, the exemption conditions do not provide sufficient guarantees of safety; the conditions in the permit need to apply to X+1 Bq.

1.25 The same argument applies to the specific provisions for medical and veterinary practices. If the exempt levels are exceeded, then a permit will be required for all of the holdings, and not just the quantum of holdings above the exempt levels.

Relationship between radioactive wastes that are 'out of scope', exempted and permitted

- 1.26 This section explains the relationship between radioactive wastes that are:
- Outside the scope of regulation.
 - Exempted from the requirement for a permit under the legislation.
 - Subject to a requirement for a permit.
- 1.27 Some common situations are set out here, but it is recognised that not every unique combination of circumstances can be precisely defined.
- 1.28 All wastes are, to some extent, radioactive. Tables 2.2 and 2.3 of this guidance set out the levels below which wastes are outside the scope of the legislation. That is to say, for the purposes of this legislation, wastes with concentrations at or below those in Tables 2.2 and 2.3 are not deemed to be radioactive.
- 1.29 For any one waste stream, arising from any one particular process, if the 'out of scope' level is X (Tables 2.2 and 2.3) and the exemption level is Y (Tables 3.3 and 3.4), then:
- A concentration below X is not deemed to be radioactive; no conditions apply.
 - If the concentration is between X and Y, the waste is exempt, but the conditions in the exemption apply to **all of the waste**.
 - If the concentration is greater than Y, then the permit conditions apply to **all of the waste**. The permit will make this clear.
- 1.30 The reason for this interpretation is that although, strictly, some waste may be outside the scope of the regulations because it is below the levels in Table 2.2 or Table 2.3, it is not practical to deduct this element from consideration of the waste as a whole. Likewise, dividing one waste stream into 'exempt' and 'permitted' components cannot be done. The most important permit condition will relate to the Best Available Technique (BAT)/Best Practicable Means (BPM)⁴ condition for waste minimisation, which logically and obviously has to apply to the entire inventory of waste

⁴ BAT applies in England and Wales while BPM applies in Scotland and Northern Ireland.

2. Radioactive material and radioactive waste which is 'out of scope' of regulation

General

- 2.1 The definition of radioactive material and radioactive waste and the associated decision making process is shown diagrammatically in Figure 2.1 at page 27. (The text in Figure 2.1 is necessarily abbreviated and should be read in conjunction with the legislation and this guidance).
- 2.2 Any situation or radionuclide that is not specifically set out in the following sections is out of scope of the legislation. A situation or radionuclide has to be specifically covered by the legislation for it to be considered 'radioactive' and fall within the scope of regulation. The legislation can therefore be considered to be an 'inclusive' regime.

Meaning of radioactive material

- 2.3 The approach that has been adopted in the legislation is that a substance or article is **only** radioactive material if it falls within one or more of the following three categories:
- i. It is used in, or arises from, industrial activities listed in Table 2.1a⁵ (see page 19) **and** the concentration of radionuclides in the material exceeds the values in columns 2 (solid or relevant liquid), 3 (aqueous liquid) or 4 (gaseous)⁶ of Table 2.2 (see page 20).
 - ii. It contains naturally occurring radionuclides listed in Table 2.3 that are used for their radioactive, fertile or fissile properties, **and**, for solids and relevant liquids, the concentration of the radionuclides in the material exceeds the values shown in column 2 of Table 2.3 (see page 21).
 - iii. It contains artificial radionuclides, **and**, for solids and relevant liquids, the concentration of radionuclides in the material exceeds the values shown in column 2 of Table 2.3.
- 2.4 If a material falls within one or more of these categories it is still possible for it not to be classed as radioactive, and be removed from the scope of the legislation, if it meets one of the four criteria set out below:
- i. All radionuclides contained in the material are of short half life (<100 seconds) (see paragraph 2.31).
 - ii. Its radioactivity is solely attributable to artificial background radiation (see paragraph 2.21-2.24).

⁵ All tables referred to here are reproduced at the end of this Chapter. Tables in the legislation have different numbers, depending on the jurisdiction.

⁶ Liquids and gases can contain entrained solid particulate material, and gases can contain liquids in aerosol form. For the purposes of this legislation, intractable particulates or aerosols can be treated as an integral part of the liquid or gas.

- iii. It has been previously lawfully disposed of as a waste, or is contaminated as a result of such a disposal, unless subject to a process which causes an increase in radiation exposure (see paragraph 2.37-2.43).
 - iv. It is a contaminated material which remains on the premises where it was contaminated (see paragraph 2.32-2.36).
- 2.5 Materials which contain naturally occurring radionuclides and which are not used in a work activity, and which are not used for their radioactive, fertile, or fissile properties, are not captured by the legislation and are therefore not radioactive material.
- 2.6 Aqueous liquids (except 'relevant liquids', see paragraphs 2.44-2.47) and all gases used in a practice are considered to be radioactive material for the purposes of this legislation, irrespective of concentration.

Meaning of radioactive waste

- 2.7 The approach that has been adopted in the legislation is that waste is only radioactive waste if it falls within one or more of the following three categories:
- i. It arises from industrial activities listed in Table 2.1a or table 2.1b, **and** the concentrations of radionuclides in the waste are greater than the values in columns 2 (solid), 3 (aqueous liquid) or 4 (gaseous) of Table 2.2.
 - ii. It contains naturally occurring radionuclides listed in Table 2.3 that are used for their radioactive, fertile or fissile properties, **and**, for solids and relevant liquids, the concentration of the radionuclides in the waste exceeds the values shown in column 2 of Table 2.3.
 - iii. It contains artificial radionuclides, **and**, for solids and relevant liquids, the concentration of radionuclides in the waste exceeds the values shown in column 2 of Table 2.3.
- 2.8 If a waste falls within one or more of these categories it is still possible for it not to be classed as radioactive, and be removed from the scope of the legislation, if it meets one of the three criteria set out below:
- i. All radionuclides contained in the waste are of short half life (<100 seconds) (see paragraph 2.31).
 - ii. Its radioactivity is solely attributable to artificial background radiation (see paragraphs 2.21-2.24).
 - iii. It has been lawfully disposed of or is contaminated as a result of such a disposal (see paragraphs 2.37-2.43).
- 2.9 Wastes which contain naturally occurring radionuclides and which do not arise from a work activity, and which are not used for their radioactive, fertile, or fissile properties, are not captured by the legislation and are therefore not radioactive waste.

- 2.10 Aqueous liquids (except 'relevant liquids', see paragraphs 2.44-2.47) and all gases used in a practice are considered to be radioactive material for the purposes of this legislation, irrespective of concentration.

Unlisted radionuclides and activities

- 2.9 Natural radionuclides that are not listed in Table 2.2 or Table 2.3 are out of scope of this legislation. Examples of such radionuclides are potassium-40 and samarium-147. Materials or wastes containing only unlisted radionuclides are not radioactive materials or wastes.
- 2.11 Radon is not included as a main entry in Table 2.2 or Table 2.3; however, it is included as a component of the decay series of some of the radionuclides that are listed. This means, for instance, that radon in natural gas is out of scope of the legislation. However, where radon is present as a result of the keeping and use of radioactive material that contains radium, or the accumulation and disposal of radioactive waste that contains radium, the Government expects that the regulators will take account of any related radon exposures to the public and the environment when regulating the material or waste containing radium. For example: although radon in natural gas is out of scope of the legislation (the storage, distribution and use of natural gas is not a listed industrial activity), radon exposures to the public resulting from the disposal of wastes containing radium is a legitimate regulatory consideration for such wastes and should be accounted for in any radiological impact assessment undertaken.
- 2.12 For Table 2.3, in the case of artificial radionuclides, the table only contains those radionuclides in common use for which radiological impact assessments have been prepared and published in Euratom Guidance. There is a catch-all provision in the table for non-listed radionuclides – 0.01 Bq/g.
- 2.13 Alternatively, for unlisted radionuclides only, an appropriate radionuclide-specific value can be calculated: 'the concentration which gives rise to the same 10 µSv/ year dose criteria as used in column 2 of this table can be calculated using guidance by Euratom in RP 122 part 1 or any successor Euratom guidance or decision applying to the derivation of the concentrations.
- 2.14 This means that a person may use the exemption provisions based on his or her own calculations, provided that the calculations are carried out using the same methodology as that which was used to calculate the values which already appear in the table.

NORM industrial activities

- 2.15 Outside the legislation there are many activities involving radioactivity. An example is the collection, preparation and display of geological specimens. However, for the purposes of this legislation, any such activities, unless listed in Table 2.1a or 2.1b (see page 19), do not involve radioactive material or radioactive waste as defined in this legislation. This is because in the UK, following Euratom guidance, we believe that the radiological consequences (in terms of radiation dose) of such activities are trivial. Only those 'industrial activities' which could conceivably lead to the need for controls are covered by the legislation.
- 2.16 There are two classes of NORM industrial activity listed in Table 2.1. These are:

- **From Table 2.1a.** NORM industrial activities which employ uranium or thorium, where these elements are deliberately added and are an integral part of the activity. An example is the production and use of gas mantles containing thorium oxides or salts. Note that these radioactive elements are being employed directly, but not for their radioactive, fertile or fissile properties. In this case, raw materials, intermediate products and final products are all deemed to be radioactive material (if the concentration values are above those set out in Table 2.2); and any wastes arising from the industrial activity are likewise defined as radioactive waste, again if the Table 2.2 values are exceeded. If the initial industrial activity is not on the list, then any subsequent product use or waste generation by another party is also out of scope.
- **From Table 2.1b.** NORM industrial activities in which the presence of NORM radionuclides is incidental. An example is the production of titanium oxides from ores. In this case, the raw materials (feedstock), intermediate or final products are not deemed to be radioactive material. However, the wastes arising from such an activity (for example, metallic slags with elevated concentrations of uranium or thorium) can be radioactive waste if the Table 2.2 values are exceeded. If the initial industrial activity is out of scope, then any subsequent product use or waste generation by another party is also out of scope.

Natural background radioactivity

- 2.17 If a material or waste contains both artificial radionuclides which are ‘background’ and additional artificial radionuclides, the background component can be discounted, if it is possible to do so, when determining if a substance exceeds the Table 2.3 concentrations. This background can be either measured prior to the addition of the additional radionuclides, or estimated based on prior knowledge for example, estimated from the known provenance of the material⁷.
- 2.18 The legislation does not require that naturally-occurring radionuclides in their normal setting or location be considered.
- 2.19 When determining if a material or waste containing artificial radionuclides exceeds Table 2.3 values, there is no requirement to take account of any naturally occurring radionuclides present unless they have been processed for their radioactive, fertile or fissile properties. For instance, the fabric of buildings and equipment should not be considered to be captured by this legislation even if they contain background uranium. Uranium-containing brickwork is not ‘radioactive’ for the purposes of the legislation. But where the fabric of buildings or equipment are contaminated by radionuclides that originate from a NORM industrial activity or a practice, these *are* captured by the legislation. In these cases, though, background activity (the activity already present in the virgin building) can be discounted.
- 2.20 ‘Background’ uranium is not deducted when the uranium is used as a feedstock or product of a practice; for instance, the manufacture of nuclear fuel.

⁷ For instance, rainwater contains known quantities of the radioisotope Cs-137 due to fallout from the atmosphere. If this concentration is known, it can be deducted from the total Cs-137 concentration in rainwater collected in stormwater drainage systems on nuclear sites when deciding whether or not exemption or out of scope levels have been exceeded.

Artificial background radioactivity

- 2.21 Artificial radionuclides which are present as a consequence of background radioactivity are not considered to be radioactive material or radioactive waste.
- 2.22 Artificial background in a substance or article means that a radionuclide is present in the substance or article at a concentration at or below that found normally in such a substance or article. 'Found normally' means those radionuclides, at those concentrations, which are ubiquitous in the environment as a result of the interaction between previous human activity and climatic processes such as the circulation of the oceans and the atmosphere. An example would be rainwater which can contain fission products in global circulation as a result of atmospheric weapons tests or the Chernobyl accident. This rainwater is not radioactive material and, if disposed of to a drain, is not radioactive waste.
- 2.23 The term 'normal' is not defined in the legislation. It can be taken to mean that concentration of any particular radionuclide which would be found in the same geographical location at any one time.
- 2.24 The provisions in the legislation which deal with artificial background are not intended to exclude radionuclides which are present in the environment as a result of permitted or exempted discharges; localised concentrations of such radionuclides should not be considered 'normal' if they can be attributed to such discharges. Such contamination is explicitly addressed in a separate provision (see paragraph 2.37-2.43). For instance, rainwater contains the radionuclide Cs-137 as a result of the presence of this radionuclide in the atmosphere. If the Cs-137 concentration is then enhanced by 'picking up' Cs-137 which arises from a permitted discharge, then this additional concentration of Cs-137 is not excluded under this provision.

Summation rules

- 2.25 Where a substance contains multiple radionuclides, it is necessary that they are all taken into account when determining if that substance is radioactive material or radioactive waste. Tables 2.2 and 2.3 both have summation rules that should be used to ensure that this is the case.
- 2.26 The Table 2.2 summation rule is the sum of the quotients A/B where—
- A. means the concentration of each radionuclide listed in column 1 of Table 2.2 that is present in the substance or article; and
- B. means the concentration of that radionuclide specified in (as appropriate)—
- (i) column 2 of Table 2.2 where the material or waste is a solid or a relevant liquid;
 - (ii) column 3 of Table 2.2 where the material or waste is any other liquid; or
 - (iii) column 4 of Table 2.2 where the material or waste is a gas.
- 2.27 The Table 2.3 summation rule is the sum of the quotients A/B where—

A. means the concentration of each radionuclide listed in column 1 of Table 2.3 that is present in the material or waste, and

B. means the concentration of that radionuclide specified in column 2 of Table 2.3.

2.28 Only when the summation rule gives an answer >1 is the material or waste radioactive.

2.29 If a substance has been identified as being or intended to be processed for its radioactive fertile or fissile properties then all of the radionuclides, including those that are of natural terrestrial or cosmic origin, that are listed in Table 2.3 should be considered when comparing the radionuclide concentration to the Table 2.3 values.

2.30 The only natural radionuclides that are listed in Table 2.3 are those in the U-238, U-235 and Th-232 decay chains. Other radionuclides of natural terrestrial or cosmic origin such as K-40 and Sm-147 have been deliberately omitted from Table 2.3 and are out of scope of the legislation (see paragraph 2.9).

Radionuclides with a short half life

2.31 Any substance or article that contains only radionuclides with a half-life not exceeding 100 seconds is not radioactive material or radioactive waste. This applies to all normal physical forms - solid, liquid and gas. If the substance contains radionuclides with a half-life exceeding 100 seconds then the activity of all relevant radionuclides is taken into account, including those with a half life-less than 100 seconds.

Contaminated materials

2.32 Any material that is contaminated is not radioactive material providing that certain conditions are met:

- It was not contaminated with the intention of using the radioactive, fissile or fertile properties of the radionuclides; and
- It remains on the premises⁸ where it was contaminated.

2.33 The first condition is required because contamination has a wide meaning in the legislation and can mean deliberately activating material so that it can be used for its radioactive properties, for example, production of radionuclides in a cyclotron. Such materials are captured by the legislation. However, the activated components of a cyclotron itself (which are inadvertently contaminated/activated) are not considered to be radioactive material for the purposes of this legislation.

2.34 The second condition is required to restrict materials that remain on the premises where they were contaminated. If materials are moved off the premises they will be classed as radioactive material. This recognises the situation of, say, installing a new pump in a process, and the pump becomes contaminated. It is impractical to require a permit for 'keeping and use' of such a pump. However, if the contaminated pump is then taken out of service and put on the market for resale to another organisation, it becomes radioactive material.

⁸ 'Premises' in this context means a site or facility which, if it were permitted under the legislation, would be covered by one permit. A group of buildings on one site occupied by one legal entity would constitute a 'premises'.

- 2.35 This provision of the legislation only applies to materials – if the material becomes a waste then it should be treated as a radioactive waste. Examples include contaminated plumbing and extraction systems, cyclotron housing, and other contaminated equipment, that are no longer used and require to be disposed of.
- 2.36 In summary, in the case of these examples, they are not considered to be radioactive materials unless and until:
- The material in question is removed from the premises for use elsewhere; or
 - The material in question becomes waste.

Contamination by lawful disposals

- 2.37 Any substance is not radioactive material or radioactive waste, where its radionuclide content is attributable to a lawful disposal. Disposal is defined in this legislation to include transfer to another person; therefore this only applies where no further act of disposal is foreseen, for example, discharge of liquid or gaseous waste to the environment or final closure of a solid waste disposal facility where there is no intent to retrieve the waste.
- 2.38 In the special case of a disposal facility designed solely for the burial of solid radioactive waste, post-closure monitoring may be a requirement of a safety case. Such monitoring needs to be overseen in a formal regulatory sense by the environmental regulators. This can be by way of a permit; alternatively, some duties can be enforced even after permit surrender or revocation (for example, the duty to continue with a monitoring programme). In this case, the deposited material remains 'radioactive waste' until such a time that the permit relating to disposal has been surrendered or revoked, or until all duties under the permit have been discharged.
- 2.39 However, a substance is radioactive material or radioactive waste where, following its disposal, a process occurs which was not envisioned at the time of disposal, and results in a substantial increase in radiation exposure to the public or radioactive contamination in the environment.
- 2.40 The question of what may or may not have been envisaged at the time of disposal is not straightforward. The requirement can be taken to mean those matters which may have reasonably been foreseen at the time of disposal. For example, if waste was retrieved from a solid waste disposal facility following surrender or revocation of the facility's permit, that waste would be radioactive waste.
- 2.41 Offshore sediment which has been contaminated by historical and lawful discharges. Such material may be subject to dredging and subsequent disposal further out to sea. In this case the dredgings would not be discharges may be considered to be radioactive material or radioactive waste. This is because disposal of the waste to sea will have been supported by a radiological impact assessment, and re-disposal further out to sea would not introduce any new or unforeseen pathway to a human dose. If, however, the dredged waste was brought to land for use or disposal, this could create exposure pathways which were not taken into account at the time of the original discharge. If the consequent increase in calculated dose was substantial, then the dredgings would be considered to be radioactive material or radioactive waste respectively.

- 2.42 As an example of an increase which is not substantial, background concentrations of tritium (H-3) are relatively high in certain locations for a variety of reasons. If tritium-contaminated property is remediated (a process not foreseen at the time of disposal), this is not likely to lead to a substantial increase in dose for members of the public.
- 2.43 Only the radionuclides associated with the disposal should be considered when deciding whether the resulting dose is significant. Background radioactivity can be discounted.

Relevant liquids

- 2.44 The legislation defines a 'relevant liquid' as a non-aqueous liquid, and certain types of aqueous liquid with specified hazardous properties. The purpose of this definition is to allow such liquids to be treated, for the purposes of this legislation, as a solid because the exposure pathways are the same as those for solids.
- 2.45 Table 2.2 contains three columns, one for each of 'solids', 'aqueous liquids', and 'gases'. Table 2.3 has one column – for solids. For the purposes of waste disposal, the radiological impact assessments which support the values in the tables are based on reasonable assumptions. For instance, the drinking water pathway giving rise to a human radiation dose is a major feature of the assessment for aqueous liquids, but not for solids. Solids are not usually (or legally) disposed of directly to rivers, for example, and other legislation is intended to prevent such an activity.
- 2.46 There are certain liquids – for instance mercury and oils - for which the drinking water pathway equally can be ruled out, not least because other pollution control legislation does not allow disposals to the water environment. This legislation therefore allows such liquids to be compared with the values in the 'solids' column of Table 2.2 and Table 2.3; it assumes that the disposal of such materials is to a conventional 'solid' waste route; that is, not disposed of to drains, sewers, open water or groundwater. A 'conventional' route includes disposal or transfer for the purposes of reuse or recycling.
- 2.47 There are certain aqueous liquids with specified hazardous properties which can likewise be treated as 'solids' for the purposes of this legislation ('relevant liquids'). Again, the drinking water pathway can be ruled out, not least because other pollution control legislation does not allow disposals to the water environment. This legislation therefore allows such liquids to be compared with the values in the 'solids' column of Table 2.2 and Table 2.3; it assumes that the disposal of such materials is to a conventional 'solid' waste route; that is, not disposed of to drains, sewers, open water or groundwater. A 'conventional' route includes disposal or transfer for the purposes of reuse or recycling. In order to define this class of liquids, reference is made in the legislation to Council Regulation No. 1272/2008(1), which defines certain substances as being hazardous to health above specified concentration values. Aqueous liquids which exhibit acute toxicity, skin corrosion/irritation, or are acutely hazardous to the aquatic environment come within this class. Again, an assumption has been made that the disposal of such materials is to a conventional 'solid' waste route; that is, not disposed of to drains, sewers, open water or groundwater. A 'conventional' route includes disposal or transfer for the purposes of treatment, reuse or recycling.

Property contaminated with radioactivity

- 2.48 Property contaminated with radioactivity is not covered by this legislation or its exemption provisions. In the case of land, for instance, where radioactive contamination is present, the radioactivity is not being 'kept or used'; neither is it 'radioactive waste'. If and when such property is remediated, and waste is generated, then the waste is, if within scope, subject to this legislation and requires a permit or compliance with exemption conditions.

Table 2.1a: NORM Industrial Activities (part a)

Production and use of thorium, or thorium compounds, and the production of products where thorium is deliberately added

Production and use of uranium or uranium compounds, and the production of products where uranium is deliberately added

Table 2.1a: NORM Industrial Activities (part a)

Table 2.1b: NORM Industrial Activities (part b)

Extraction, production and use of rare earth elements and rare earth element alloys

Mining and processing of ores other than uranium ore

Production (but not storage, distribution or use) of oil and gas

Removal and management of radioactive scales and precipitates from equipment associated with industrial activities

Any industrial activity utilising phosphate ore

Manufacture of titanium dioxide pigments

The extraction and refining of zircon and manufacture of zirconium compounds

Production of tin, copper, aluminium, zinc, lead and iron and steel

Activities related to coal mine de-watering plants

Water treatment associated with provision of drinking water

China clay extraction

The remediation of contamination from other NORM industrial activities

Table 2.1b: NORM industrial activities (part b)

Table 2.2: Concentration of radionuclides: NORM industrial activities

Radionuclide	Solid or relevant liquid concentration in becquerels per gram (Bq/g)	Any other liquid concentration in becquerels per litre (Bq/l)	Gaseous concentration in becquerels per cubic metre (Bq/m ³)
U-238sec	0.5	0.1	0.001
U-238+	5	10	0.01
U-234	5	10	0.01
Th-230	10	10	0.001
Ra-226+	0.5	1	0.01
Pb-210+	5	0.1	0.01
Po-210	5	0.1	0.01
U-235sec	1	0.1	0.0001
U-235+	5	10	0.01
Pa-231	5	1	0.001
Ac-227+	1	0.1	0.001
Th-232sec	0.5	0.1	0.001
Th-232	5	10	0.001
Ra-228+	1	0.1	0.01
Th-228+	0.5	1	0.001

Table 2.2 Concentration of radionuclides: NORM industrial activities

Table 2.3: Concentration of radionuclides in 'practices'	
Radionuclide	Concentration in becquerels per gram (Bq/g)
H-3	10 ²
Be-7	10
C-14	10
F-18	1
Na-22	0.1
Na-24	0.1
Si-31	10 ²
P-32	10 ²
P-33	10 ²
S-35	10 ²
Cl-36	1
Cl-38	1
K-42	10
K-43	1
Ca-45	10 ²
Ca-47	1
Sc-46	0.1
Sc-47	10
Sc-48	0.1
V-48	0.1
Cr-51	10
Mn-51	1
Mn-52	0.1
Mn-52m	1
Mn-53	10 ³
Mn-54	0.1
Mn-56	1
Fe-52+	1
Fe-55	10 ²
Fe-59	0.1
Co-55	1
Co-56	0.1
Co-57	1
Co-58	0.1
Co-58m	10 ²
Co-60	0.1
Co-60m	10 ³
Co-61	10 ²
Co-62m	1
Ni-59	10 ²
Ni-63	10 ²
Ni-65	1
Cu-64	10
Zn-65	1
Zn-69	10 ²
Zn-69m+	1
Ga-72	1
Ge-71	10 ⁴
As-73	10 ²
As-74	1
As-76	1
As-77	10 ²
Se-75	1

Table 2.3: Concentration of radionuclides in 'practices'	
Radionuclide	Concentration in becquerels per gram (Bq/g)
Br-82	0.1
Rb-86	10
Sr-85	1
Sr-85m	10
Sr-87m	10
Sr-89	10
Sr-90+	1
Sr-91+	1
Sr-92	1
Y-90	10 ²
Y-91	10
Y-91m	1
Y-92	10
Y-93	10
Zr-93	10
Zr-95+	0.1
Zr-97+	1
Nb-93m	10 ²
Nb-94	0.1
Nb-95	1
Nb-97+	1
Nb-98	1
Mo-90	1
Mo-93	10
Mo-99+	1
Mo-101+	1
Tc-96	0.1
Tc-96m	10
Tc-97	10
Tc-97m	10
Tc-99	1
Tc-99m	10 ²
Ru-97	1
Ru-103+	1
Ru-105+	1
Ru-106+	1
Rh-103m	10 ⁴
Rh-105	10
Pd-103+	10 ³
Pd-109+	10 ²
Ag-105	1
Ag-108m+	0.1
Ag-110m+	0.1
Ag-111	10
Cd-109+	10
Cd-115+	1
Cd-115m+	10
In-111	1
In-113m	10
In-114m+	1
In-115m	10
Sn-113+	1
Sn-125	1
Sb-122	1
Sb-124	0.1

Table 2.3: Concentration of radionuclides in 'practices'	
Radionuclide	Concentration in becquerels per gram (Bq/g)
Sb-125+	1
Te-123m	1
Te-125m	10 ²
Te-127	10 ²
Te-127m+	10
Te-129	10
Te-129m+	10
Te-131	10
Te-131m+	1
Te-132+	0.1
Te-133+	1
Te-133m+	1
Te-134	1
I-123	10
I-125	1
I-126	1
I-129	0.1
I-130	1
I-131+	1
I-132	1
I-133	1
I-134	1
I-135	1
Cs-129	1
Cs-131	10 ³
Cs-132	1
Cs-134	0.1
Cs-134m	10 ³
Cs-135	10
Cs-136	0.1
Cs-137+	1
Cs-138	1
Ba-131	1
Ba-140	0.1
La-140	0.1
Ce-139	1
Ce-141	10
Ce-143	1
Ce-144+	10
Pr-142	10
Pr-143	10 ²
Nd-147	10
Nd-149	10
Pm-147	10 ²
Pm-149	10 ²
Sm-151	10 ²
Sm-153	10
Eu-152	0.1
Eu-152m	10
Eu-154	0.1
Eu-155	10
Gd-153	10
Gd-159	10
Tb-160	0.1
Dy-165	10 ²

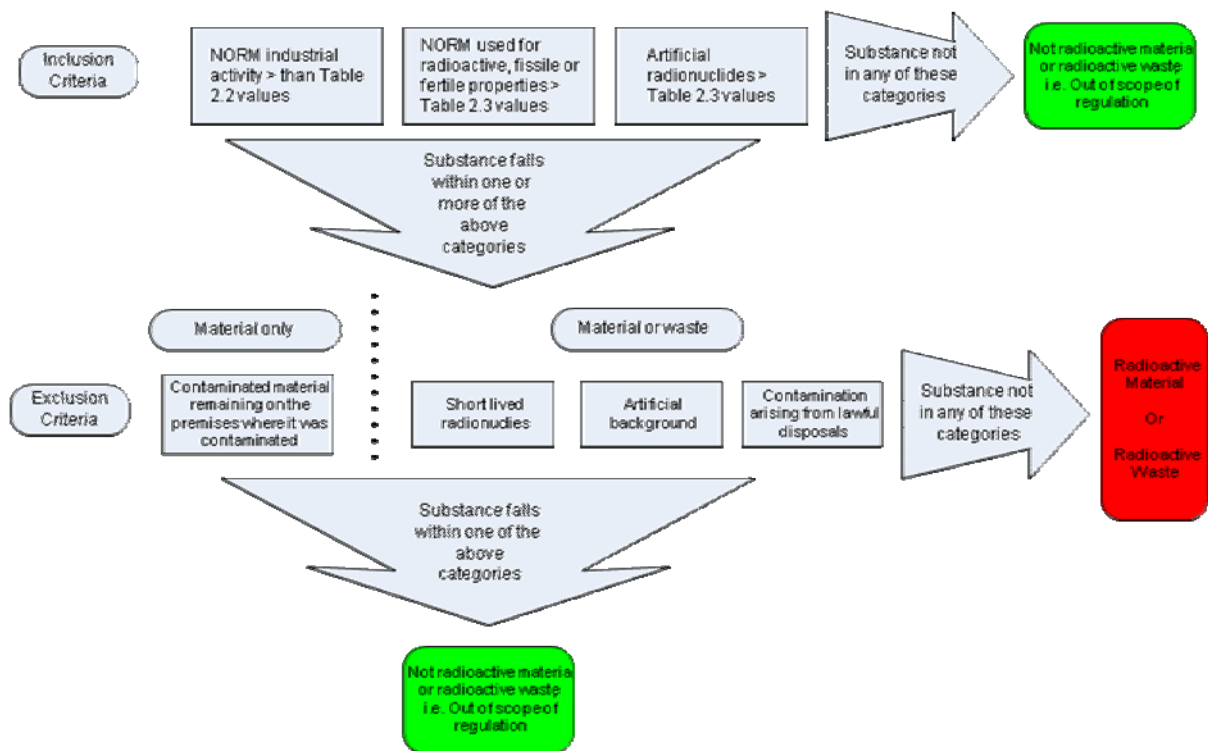
Table 2.3: Concentration of radionuclides in 'practices'	
Radionuclide	Concentration in becquerels per gram (Bq/g)
Dy-166	10
Ho-166	10
Er-169	10 ²
Er-171	10
Tm-170	10
Tm-171	10 ²
Yb-175	10
Lu-177	10
Hf-181	1
Ta-182	0.1
W-181	10
W-185	10 ²
W-187	1
Re-186	10 ²
Re-188	10
Os-185	1
Os-191	10
Os-191m	10 ³
Os-193	10
Ir-190	0.1
Ir-192	0.1
Ir-194	10
Pt-191	1
Pt-193m	10 ²
Pt-197	10 ²
Pt-197m	10 ²
Au-198	1
Au-199	10
Hg-197	10
Hg-197m	10
Hg-203	1
Tl-200	1
Tl-201	10
Tl-202	1
Tl-204	10
Pb-203	1
Pb-210+	0.01
Pb-212+	1
Bi-206	0.1
Bi-207	0.1
Bi-210	10
Bi-212+	1
Po-203	1
Po-205	1
Po-207	1
Po-210	0.01
At-211	10 ²
Ra-223+	1
Ra-224+	1
Ra-225	1
Ra-226+	0.01
Ra-227	10
Ra-228+	0.01
Ac-227+	0.01
Ac-228	1

Table 2.3: Concentration of radionuclides in 'practices'	
Radionuclide	Concentration in becquerels per gram (Bq/g)
Th-226+	10 ²
Th-227	1
Th-228+	0.1
Th-229+	0.1
Th-230	0.1
Th-231	10 ²
Th-232	0.01
Th-232+	0.01
Th-232sec	0.01
Th-234+	10
Pa-230	1
Pa-231	0.01
Pa-233	1
U-230+	1
U-231	10
U-232+	0.1
U-233	1
U-234	1
U-235+	1
U-235sec	0.01
U-236	1
U-237	10
U-238+	1
U-238sec	0.01
U-239	10 ²
U-240+	10
Np-237+	0.1
Np-239	10
Np-240	1
Pu-234	10 ²
Pu-235	10 ²
Pu-236	0.1
Pu-237	10
Pu-238	0.1
Pu-239	0.1
Pu-240	0.1
Pu-241	1
Pu-242	0.1
Pu-243	10 ²
Pu-244+	0.1
Am-241	0.1
Am-242	10 ²
Am-242m+	0.1
Am-243+	0.1
Cm-242	1
Cm-243	0.1
Cm-244	0.1
Cm-245	0.1
Cm-246	0.1
Cm-247+	0.1
Cm-248	0.1
Bk-249	10
Cf-246	10
Cf-248	1
Cf-249	0.1

Table 2.3: Concentration of radionuclides in 'practices'	
Radionuclide	Concentration in becquerels per gram (Bq/g)
Cf-250	0.1
Cf-251	0.1
Cf-252	0.1
Cf-253	1
Cf-253+	1
Cf-254	0.1
Es-253	1
Es-254+	0.1
Es-254m+	1
Fm-254	10 ²
Fm-255	10
Any other solid or non-aqueous liquid radionuclide that is not of natural terrestrial or cosmic origin	0.01, unless the concentration which gives rise to the same 10 µSv/ year dose criteria as used in column 2 of this table can be calculated using guidance by Euratom in RP 122 part 1 or any successor Euratom guidance or decision applying to the derivation of the concentrations in this table, in which case that concentration.

Table 2.3 Concentration of radionuclides in 'practices'

FIGURE 2.1 – Schematic presentation of the scope of the legislation



3. Material and waste which is exempted from permitting

Introduction

- 3.1 On the grounds of proportionality, and based on EURATOM requirements, many activities involving radioactive material and radioactive waste need not be subject to prior reporting to the relevant regulator. The activities described in this guidance have been exempted from such prior reporting to the environmental regulators⁹ on the grounds that the radiological consequences, meaning radiation doses to persons, are trivial and below the dose limits as recommended by the ICRP. However, in order for these dose limits and thresholds to be complied with, it is necessary to place conditions on the various activities. These conditions relate to the manner of, for instance, waste disposal.
- 3.2 The exemptions regime is therefore conditional; that is, if a person does not or cannot comply with the conditions, the exemption does not apply. Where a person carries on various activities in relation to radioactive material or waste and does not have a permit to do so and an exemption does not apply, that person may commit a criminal offence for which the penalties are a fine, imprisonment or both. It is the responsibility of the user to satisfy themselves that they are exempt (or, indeed, out of scope of the regulations altogether), and need to be able to demonstrate this to the regulators if necessary.
- 3.3 Many of the conditions (for example, the need to keep adequate records) are contained within the exemptions such that a person can assure him or herself that they have sufficient control over the material in his/her possession. This factor – proper management arrangements – is an important consideration of whether or not the relevant dose criteria are likely to be met.
- 3.4 Exemptions are in place for a number of situations; these are listed below and covered in detail in the remaining sections of this Chapter:
- Keeping and use of radioactive materials – universal provisions.
 - Keeping and use of small sealed sources .
 - Keeping and use of unsealed sources.
 - Keeping and use of mobile radioactive apparatus.
 - Accumulation of radioactive waste.
 - Disposal of low volumes of solid radioactive waste.
 - Disposal of NORM radioactive waste up to 5 Bq/g.
 - Disposal of NORM radioactive waste up to 10Bq/g.
 - Disposal of waste sealed sources, tritium foil sources and electrodeposited sources.
 - Disposal of aqueous radioactive waste up to 100 Bq/ml to sewer.
 - Disposal of aqueous radioactive waste to sewer – patient excreta and compounds of uranium and thorium.
 - Disposal of low concentration aqueous radioactive waste to sewer, river or sea.
 - Disposal of gaseous radioactive waste.

⁹ Reporting under the Ionising Radiations Regulations 1999 may be required, even though exempt from reporting under radioactive substances legislation.

3.5 In each case, a different set of conditions applies (although many conditions are common to two or more situations). For the purposes of this guidance, the conditions are set out below for each common situation; although this leads to repetition, the guidance is set out in this manner for ease of use – particularly in the common case where a person will only ever need to refer to one category of exemption provisions.

Keeping and use of radioactive materials – universal provisions

General points

- 3.6 The BSSD, in Annex 1, sets out levels below which prior reporting is not required. These levels are shown in Table 3.1 (see page 73). In the UK context, we have decided that 'prior reporting is not required' is equivalent to 'conditional exemption from permitting'.
- 3.7 The exemption applies to radioactive material in any of the common physical forms – solid, liquid or gas.
- 3.8 The exemption levels are equivalent to the de minimus levels under the Ionising Radiations Regulations 1999. This is a deliberate harmonisation, such that radioactive materials which do not have to be notified to the regulator under one piece of legislation are usually exempt under another, and vice versa.
- 3.9 The levels are set such that the dose criteria for members of the public will, when the materials become waste, be met under all reasonably foreseeable situations.
- 3.10 Table 3.1 is intended for holders of unsealed source material and only applies to material which is not described in Table 3.2 (see page 79).

Exemption provisions

- 3.11 The exemptions are set out in Table 3.1:
- The columns of Table 3.1 exempt either 'maximum quantities' or 'maximum concentration' in relation to the same material. For instance, a person may keep, on any one premises, an unlimited total activity of H-3 provided that the concentration of the H-3 does not exceed 10^6 Bq/g or may hold up to 10^9 Bq of this substance regardless of the concentration.
 - A summation rule is used to determine the 'maximum quantity' when more than one radionuclide is kept, and the 'maximum concentration' when a substance contains a mixture of radionuclides. This rule states that:

the sum of A/B or C/D does not exceed 1, where:
 - i. "A" means the quantity of each radionuclide listed in column 1 of Table 3.1 that is present in the material (and waste).
 - ii. "B" means the quantity of that radionuclide specified in column 2 of Table 3.1.
 - iii. "C" means the concentration of each radionuclide listed in column 1 of Table 3.1 that is present in the material (and waste)
 - iv. "D" means the concentration of that radionuclide specified in column 3 of Table 3.1.

- Table 3.1 sets out the maximum activity or maximum concentration of material held. These maxima represent a threshold, above which a permit is required for keeping and use. If concentrations or total activities exceed the values in Table 3.1 then the permit is required for all material; the exempt quantities or concentrations cannot be deducted.
- Table 3.1 is taken from the Directive. However, for reasons of space, the Table only covers radionuclides known to be in common usage. If a person wishes to claim exemption for any radionuclide not listed in Table 3.1, then there are two mechanisms by which that radionuclide may be exempted. (i) a minimum value as set out in the final entry of the table, or (ii) by reference to the source document from which the Table 3.1 values were derived. This document is '*NRPB-R306 – Exempt concentrations and quantities for radionuclides not included in the European Basic Safety Standards Directive (April 1999) ISBN 0-85951-429-3*'. There are also additional exemption provisions for isotopically unmodified uranium and thorium.

Exemption conditions

- 3.12 The conditions set out below, and the limits set out in Table 3.1, are generally intended for radioactive substances in the form of unsealed source material; the table can be used to provide exemptions for sealed sources, but the provisions in Table 3.2 are more appropriate. The conditions in this section are therefore based on the assumption that the radioactive materials held on the premises, as exempt based on Table 3.1, are in the form of unsealed source material. If the material is in the form of a sealed source, then the conditions set out in the section on small sealed sources are applicable (see paragraphs 3.20-3.31).

Keep an adequate record of any exempt radioactive substances held the location within the premises where they are stored or used.

- 3.13 Records are kept such that a holder is in control of his or her radioactive sources, and can demonstrate this. The nature of record keeping – for instance hard copy or electronic – is generally a matter for the holder. Likewise, the retention period is not specified in the legislation. However, in the case of electronic records it is obviously necessary for the records to be retrievable using software which is likely to be supportable for a number of years. A retention period of a minimum of one year (from the time the material is removed from the premises) is necessary because of the 'loss or theft' condition (see paragraph 3.19 below).

Ensure that where practicable, exempt radioactive substances (or the container of such radioactive substances), are marked or labelled as radioactive.

- 3.14 This measure is intended to ensure that persons (workers) on any premises where radioactive materials are stored are aware of the materials present.
- 3.15 The 'where practicable' phrase recognises that labelling of all radioactive material in all circumstances is not possible. It is obviously not expected, for instance, that powders or liquids be individually labelled. However, efforts are required, in such circumstances, to ensure that containers and packets carry clear labelling.

Allow the regulator access to such records or such premises as the regulator may request in order to determine that all of the conditions that apply are complied with.

- 3.16 Radioactive substances legislation continues to apply to exempt material (exempt material is within the scope of the legislation). Inspection by the relevant regulatory body is neither necessary nor expected under most situations, and is not deemed proportionate for the purposes of radiological protection of members of the public. However, there are circumstances whereby a regulator may wish to inspect records. Examples are where an inspector has received intelligence to the effect that exemption conditions are not being complied with, or where there has been an incident of material loss (or several such incidents).

Hold the exempt radioactive substances safely and securely to prevent, so far as practicable, accidental removal, loss or theft from the premises where held, or loss of containment.

- 3.17 Although exempt radioactive materials are, by definition, low risk, security arrangements for materials are still necessary. This is because an accumulation of losses or thefts, perhaps from several premises, could lead to a higher risk.

For exempt radioactive substances in a container, do not modify or mutilate that container, and prevent any uncontrolled or unintended release of radioactive material or radioactive waste from the container.

- 3.18 This is self explanatory. It is simply an expression of good practice in relation to handling of packets or containers. This condition does not mean that packaging etc cannot be removed, provided that there is no loss of radioactive material or labelling. Obviously, the purpose of unsealed radioactive material cannot be fulfilled unless the material is dispensed. This is the reason for the words 'uncontrolled' and 'unintended' in the condition. The condition does not mean that containers or packaging cannot be modified to improve containment, or repaired so as to prevent loss.

For an incident of loss or theft (or suspected loss or theft) of exempt radioactive substances from the premises where it is held:

- (a) notify the incident to the regulator as soon as practicable; and**
- (b) include in that notification the details of any other incidents of loss or theft (or suspected loss or theft) of any radioactive substances from those premises over the 12 months preceding the incident being notified.**

In respect of an incident a notification to the regulator is only necessary where in respect of the aggregated total amount of exempt radioactive substances lost or stolen (or suspected to have been lost or stolen) from the premises in the incident and in all other such incidents in the 12 months preceding it, the quantity of radioactivity exceeds the value that is ten times the value in column 2 of Table 1.

- 3.19 On the grounds of proportionality, a notification to the regulator is only necessary under the above situation. The condition is therefore not intended to apply to minor accidents of loss (for example, a package drop resulting in a small tear in the packaging) where

the impacts of the breach are controllable. However, it does apply in the case of several trivial losses over the course of a year, because the regulators have a legitimate interest in those cases where control appears to be lacking.

Keeping and use of small sealed sources

General points

- 3.20 The BSSD allows Member States to make exemptions for situations where Table 3.1 (see page 73) does not apply, provided that the overall objectives of radiation protection are met. A number of such exemptions have been developed in the UK context, and are supported by radiological impact assessments which show that the relevant dose criteria, when the material becomes waste, are unlikely to be breached under all foreseeable circumstances.
- 3.21 The exemptions in this section must be read in conjunction with the sections relating to mobile radioactive apparatus (see paragraph 3.44-3.59) and accumulation of radioactive waste (see paragraphs 3.60-3.79). This is because the concept employed in these exemption provisions is that the Table 3.2 values (see page 79) for total activity (Column 3 of Table 3.2) should apply to all of fixed sources + mobile sources (on the premises) + waste accumulated. In other words, the nature (fixed or mobile) and current function (in-use or awaiting disposal) of the material is not relevant; it is the total of all these categories on any one premises which is limited.
- 3.22 Where a permit is held for keeping and use, there is no need to record exempt holdings in the permit schedule.

Exemption provisions

- 3.23 The exemptions are listed in Table 3.2.
- The second column of Table 3.2 sets out the maximum activity per individual item held; the third column sets out the maximum activity which can be held on any one premises. For instance, for most sealed sources (line 1 of Table 3.2), at the maximum activity of 4×10^6 Bq per item, up to 50 such items may be kept at the maximum activity of 2×10^8 Bq each.
 - The maximum premises activity represents a threshold, above which a permit is required for keeping and use. If the exemption threshold in terms of activity is exceeded, the exempt quantities cannot be deducted, and a permit is required for the total activity.
 - Each line of Table 3.2 is stand-alone and can be treated independently. That is to say, any one premises can have, for example, up to 50 standard sealed sources plus 250 class A Gaseous Tritium Light Devices (GTLDs) plus an unlimited number of smoke detectors (affixed to the premises), each detector containing no more than 4×10^6 Bq, without the need for a permit.
 - Each line of Table 3.2 represents the exempt quantities of a total of all radioactive substances, whether they are material (in use, fixed or mobile) or are waste being accumulated awaiting disposal.

Exemption conditions

- 3.24 The conditions relate to radioactive material in the form of sealed source material, a luminous article containing Pm-147 or a Ba-137m eluting source as set out in Table 3.2.

Keep an adequate record of any exempt radioactive substances held the location within the premises where they are stored or used.

3.25 Records are kept such that a holder is in control of his or her radioactive sources, and can demonstrate this. The nature of record keeping – for instance hard copy or electronic – is generally a matter for the holder. Likewise, the retention period is not specified in the legislation. However, in the case of electronic records it is obviously necessary for the records to be retrievable using software which is likely to be supportable for a number of years. A retention period of a minimum of one year (from the time the material is removed from the premises) is necessary because of the ‘loss or theft’ condition (see paragraph 3.31 below).

Ensure that where practicable exempt radioactive substances or the container of such radioactive substances, are marked or labelled as radioactive.

3.26 This measure is intended to ensure that persons (workers) on any premises where radioactive materials are stored are aware of the materials present.

3.27 The ‘where practicable’ phrase recognises that labelling of all radioactive sources in all circumstances is not possible, for instance, in the case of iodine seeds.

Allow the regulator access to such records or such premises as the regulator may request in order to determine that all of the conditions that apply are complied with.

3.28 Radioactive substances legislation continues to apply to exempt material (which is within the scope of the legislation). Inspection by the relevant regulatory body is neither necessary nor expected under most situations, and is not deemed proportionate for the purposes of radiological protection of members of the public. However, there are circumstances whereby a regulator may wish to inspect records. Examples are where an inspector has received intelligence to the effect that exemption conditions are not being complied with, or where there has been an incident of material loss (or several such incidents).

Hold the exempt radioactive substances safely and securely to prevent, so far as practicable, accidental removal, loss or theft from the premises where held, or loss of containment.

3.29 Although exempt radioactive materials are, by definition, low risk, security arrangements for materials are still necessary. This is because an accumulation of losses or thefts, perhaps from several premises, could lead to a higher risk.

For exempt radioactive substances which are sealed sources, electrodeposited sources or tritium foil sources, not modify or mutilate those sources or cause a loss of containment such that radioactive material or radioactive waste may be released outside the source.

3.30 This is self explanatory. It is simply an expression of good practice in relation to handling of sealed sources. The condition does not mean that sources cannot be modified to improve containment, or repaired so as to prevent loss.

For an incident of loss or theft (or suspected loss or theft) of exempt radioactive substances from the premises where it is held:

(a) notify the incident to the regulator as soon as practicable; and

(b) include in that notification the details of any other incidents of loss or theft (or suspected loss or theft) of any radioactive substances from those premises over the 12 months preceding the incident being notified.

In respect of an incident a notification to the regulator is only necessary where in respect of the aggregated total amount of exempt radioactive substances lost or stolen (or suspected to have been lost or stolen) from the premises in the incident and in all other such incidents in the 12 months preceding it, the quantity of radioactivity exceeds the value that is ten times the value in column 2 of Table 1.

3.31 On the grounds of proportionality, a notification to the regulator is only necessary under the above situation. The condition is therefore not intended to apply to minor accidents of loss (for example, a package drop resulting in a small tear in the packaging) where the impacts of the breach are controllable. However, it does apply in the case of several trivial losses over the course of a year, because the regulators have a legitimate interest in those cases where control appears to be lacking.

Keeping and use of unsealed sources

General points

- 3.32 The BSSD allows Member States to exempt radioactive materials not listed in Table 3.1 (see page 73), provided that the overall objectives of radiation protection are met. A number of such exemptions have been developed in the UK context, and are supported by radiological impact assessments which show that the relevant dose criteria are unlikely to be breached under all reasonably foreseeable circumstances when the material becomes waste. In addition to the exemptions listed in Table 3.1, which cover the generality of unsealed sources, there are further exemptions relating to certain unsealed source materials.
- 3.33 The exemptions in this section must be read in conjunction with the sections relating to holdings of other unsealed source material (see paragraphs 3.6-3.19), mobile sources (see paragraphs 3.44-3.59), and the accumulation of radioactive waste (see paragraphs 3.60-3.79). This is because the concept employed in these exemption provisions is that the values for total activity should apply to all sources + waste accumulated. In other words, the nature and current function (in-use or awaiting disposal) of the material is not relevant; it is the total of all these categories on any one premises which is limited.
- 3.34 The one exception to the above rule is in the case of unsealed source material used for medical purposes. Although the limit for keeping and use of medical unsealed source material is $1 \times 10^8 \text{Bq}$, the total exempt quantity for keeping and use **plus** accumulation of waste is $2 \times 10^8 \text{Bq}$,

Exemption provisions

- 3.35 The following unsealed sources are exempt:
- A substance or article which is or contains magnesium alloy or thoriated tungsten in which the thorium concentration does not exceed 4% by mass.
 - Up to a total of 5 Kg of uranium and thorium which is comprised in substances or articles
 - which are or contain metallic uranium or thorium or prepared compounds of uranium or thorium; and
 - where the proportion of U-235 in the uranium in any of those substances or articles is no more than 0.72%, and the proportion of any particular thorium isotope in any of those substances or articles does not exceed the proportions which may be found in nature. The thorium isotopic ratios are known to vary in natural thorium from place to place. This provision is intended to ensure that thorium metal and thorium compounds can be exempted, while at the same time not exempting thorium or thorium compounds which arise from a physical process in the nuclear fuel cycle which modifies the thorium isotope ratios for the purposes of manufacturing or reprocessing thorium fuels.

- A substance or article which is intended for use for medical or veterinary diagnosis or treatment or clinical or veterinary trials¹⁰, and which is not a sealed source up to 1×10^9 Bq Tc-99m and 1×10^8 Bq of all other radionuclides.
- Each of the above provisions is stand-alone and can be treated independently. That is, a medical establishment can, for example, keep up to the maximum quantities of the specified unsealed source material, plus the maximum quantities of thorium and uranium compounds, plus sources from each line of Table 3.2 (see page 79).

Exemption conditions

3.36 The conditions below, and the limits set out in this section are generally intended for radioactive substances in the form of unsealed source material and are broadly similar to the conditions in paragraphs 3.12-3.19.

Keep an adequate record of any exempt radioactive substances held the location within the premises where they are stored or used.

3.37 Records are kept such that a holder is in control of his or her radioactive sources, and can demonstrate this. The nature of record keeping – for instance hard copy or electronic – is generally a matter for the holder. Likewise, the retention period is not specified in the legislation. However, in the case of electronic records it is obviously necessary for the records to be retrievable using software which is likely to be supportable for a number of years. A retention period of a minimum of one year (from the time the material is removed from the premises) is necessary because of the ‘loss or theft’ condition (see paragraph 3.43 below).

Ensure that where practicable, exempt radioactive substances (or the container of such radioactive substances), are marked or labelled as radioactive.

3.38 This measure is intended to ensure that persons (workers) on any premises where radioactive materials are stored are aware of the materials present.

3.39 The ‘where practicable’ phrase recognises that labelling of all radioactive material in all circumstances is not possible. It is obviously not expected, for instance, that powders or liquids be individually labelled. However, efforts are required, in such circumstances, to ensure that containers and packets carry clear labelling.

Allow the regulator access to such records or such premises as the regulator may request in order to determine that all of the conditions that apply are complied with.

¹⁰ A clinical trial means an investigation in human subjects to ascertain the safety or efficacy of medicinal products as defined in the Medicines for Human Use (Clinical Trials) Regulations 2004. A veterinary trial means an investigation to ascertain the safety or efficacy of veterinary products. Such studies should be conducted under the conditions of day-to-day use of the product, in the species for which it is intended to be used. Clinical or veterinary trials do not include ‘environmental studies’ involving tracers.

- 3.40 Radioactive substances legislation continues to apply to exempt material (which is within the scope of the legislation). Inspection by the relevant regulatory body is neither necessary nor expected under most situations, and is not deemed proportionate for the purposes of radiological protection of members of the public. However, there are circumstances whereby a regulator may wish to inspect records. Examples are where an inspector has received intelligence to the effect that exemption conditions are not being complied with, or where there has been an incident of material loss (or several such incidents).

Hold the exempt radioactive substances safely and securely to prevent, so far as practicable, accidental removal, loss or theft from the premises where held, or loss of containment.

- 3.41 Although exempt radioactive materials are, by definition, low risk, security arrangements for materials are still necessary. This is because an accumulation of losses or thefts, perhaps from several premises, could lead to a higher risk.

For exempt radioactive substances in a container, do not modify or mutilate that container, and prevent any uncontrolled or unintended release of radioactive material or radioactive waste from the container.

- 3.42 This is self explanatory. It is simply an expression of good practice in relation to handling of packets or containers. This condition does not mean that packaging etc cannot be removed, provided that there is no loss of radioactive material or labelling. Obviously, the purpose of unsealed radioactive material cannot be fulfilled unless the material is dispensed. This is the reason for the words 'uncontrolled' and 'unintended' in the condition. The condition does not mean that containers or packaging cannot be modified to improve containment, or repaired so as to prevent loss.

For an incident of loss or theft (or suspected loss or theft) of exempt radioactive substances from the premises where it is held:

- (a) notify the incident to the regulator as soon as practicable; and**
- (b) include in that notification the details of any other incidents of loss or theft (or suspected loss or theft) of any radioactive substances from those premises over the 12 months preceding the incident being notified.**

In respect of an incident a notification to the regulator is only necessary where in respect of the aggregated total amount of exempt radioactive substances lost or stolen (or suspected to have been lost or stolen) from the premises in the incident and in all other such incidents in the 12 months preceding it, the quantity of radioactivity exceeds the value that is ten times the value in column 2 of Table 1.

- 3.43 On the grounds of proportionality, a notification to the regulator is only necessary under the above situation. The condition is therefore not intended to apply to minor accidents of loss (for example, a package drop resulting in a small tear in the packaging) where

the impacts of the breach are controllable. However, it does apply in the case of several trivial losses over the course of a year, because the regulators have a legitimate interest in those cases where control appears to be lacking.

Keeping and use of mobile radioactive apparatus

General points

- 3.44 The BSSD allows Member States to exempt radioactive materials not listed in Table 3.1 (see page 73), provided that the overall objectives of radiation protection are met. A number of such exemptions have been developed in the UK context, and are supported by radiological impact assessments which show that the relevant dose criteria are unlikely to be breached under all foreseeable circumstances when the materials in question become waste.
- 3.45 The exemptions in this section, and the associated conditions, are broadly similar to those for sealed sources; there is a recognition, however, that mobile sources may be held at more than one premises.
- 3.46 The legislation allows mobile apparatus to consist of any of the articles described in column 1 of Table 3.2 (see page 79).
- 3.47 The exemptions in this section must be read in conjunction with the sections relating to small sealed sources (see paragraphs 3.20-3.31) and accumulation of radioactive waste (see paragraphs 3.60-3.79). This is because the concept employed in these exemption provisions is that the Table 3.2 values for total activity (Column 3 of Table 3.2) should apply to all of fixed sources + mobile sources + waste accumulated. In other words, the nature (fixed or mobile) and current function (in-use or awaiting disposal) of the material is not relevant; it is the total of all these categories on any one premises which is limited.
- 3.48 For this reason, mobile sources which are taken onto a premises on which fixed sources are already kept, however briefly, need to be accounted for to ensure that the premises limits are not exceeded. That is to say, a person may not hold double the exemption threshold by claiming that half the sources are fixed and half mobile. Similarly, the exemption does not apply if the total activity of all the sources exceeds the threshold, but they are held at more than one location. When determining if the threshold is exceeded, any waste sources (fixed or mobile) which are being accumulated as waste should also be taken account of.
- 3.49 For mobile sources, limits also apply to any one person; that is, a person may only own a number of mobile sources up to the relevant limits even though such sources are, at any one time, held at more than one location.
- 3.50 Mobile apparatus is sometimes taken onto premises on which fixed sources are already present, but are kept by a different person. It is possible to do this and remain exempt even if the cumulative activity is above the exemption threshold, so long as different persons are responsible for the 'fixed' and 'mobile' element, and that the mobile radioactive apparatus is taken onto a premises temporarily and for a specific purpose.

Exemption provisions

- 3.51 The exemptions are listed in Table 3.2.
- The second column of Table 3.2 sets out the maximum activity per individual item held; the third column sets out the maximum activity which can be held by any one individual. For instance, for most sealed sources (line 1 of Table 3.2), at the

maximum activity of 4×10^6 Bq per item, up to 50 such items may be owned (maximum 2×10^8 Bq).

- In the above example, the maximum activity represents a threshold, above which a permit is required for keeping and use. If 51 sources meeting the description in Column 1 of Table 3.1 (a total of 2.04×10^8 Bq) are owned, then the permit is required for all 51 sources; the exempt quantities cannot be deducted.
- Each line of Table 3.2 is stand-alone and can be treated independently. That is to say, any one individual can, for example, hold up to 50 standard sealed sources plus 200 tritium foil sources in mobile apparatus, without the need for a permit.

Exemption conditions

3.52 The conditions below are for radioactive material owned by an individual in the form of sealed source material contained within mobile apparatus as set out in Table 3.2.

Keep an adequate record of any exempt radioactive substances held the location within the premises where they are stored or used.

3.53 Records are kept such that a holder is in control of his or her radioactive sources, and can demonstrate this. The nature of record keeping – for instance hard copy or electronic – is generally a matter for the holder. Likewise, the retention period is not specified in the legislation. However, in the case of electronic records it is obviously necessary for the records to be retrievable using software which is likely to be supportable for a number of years. A retention period of a minimum of one year (from the time the material is removed from the premises) is necessary because of the ‘loss or theft’ condition (see paragraph 3.59 below).

Ensure that where practicable exempt radioactive substances or the container of such radioactive substances, are marked or labelled as radioactive.

3.54 This measure is intended to ensure that persons (workers) on any premises where radioactive materials are stored are aware of the materials present.

3.55 The ‘where practicable’ phrase recognises that labelling of all radioactive sources in all circumstances is not possible, for instance, in the case of iodine seeds.

Allow the regulator access to such records or such premises as the regulator may request in order to determine that all of the conditions that apply are complied with.

3.56 Radioactive substances legislation continues to apply to exempt material (which is within the scope of the legislation). Inspection by the relevant regulatory body is neither necessary nor expected under most situations, and is not deemed proportionate for the purposes of radiological protection of members of the public. However, there are circumstances whereby a regulator may wish to inspect records. Examples are where an inspector has received intelligence to the effect that exemption conditions are not

being complied with, or where there has been an incident of material loss (or several such incidents).

Hold the exempt radioactive substances safely and securely to prevent, so far as practicable, accidental removal, loss or theft from the premises where held, or loss of containment.

- 3.57 Although exempt radioactive materials are, by definition, low risk, security arrangements for materials are still necessary. This is because an accumulation of losses or thefts, perhaps from several premises, could lead to a higher risk.

For exempt radioactive substances which are sealed sources, electrodeposited sources or tritium foil sources, not modify or mutilate those sources or cause a loss of containment such that radioactive material or radioactive waste may be released outside the source.

- 3.58 This is self explanatory. It is simply an expression of good practice in relation to handling of sealed sources. The condition does not mean that sources cannot be modified to improve containment, or repaired so as to prevent loss.

For an incident of loss or theft (or suspected loss or theft) of exempt radioactive substances from the premises where it is held:

- (a) notify the incident to the regulator as soon as practicable; and**
- (b) include in that notification the details of any other incidents of loss or theft (or suspected loss or theft) of any radioactive substances from those premises over the 12 months preceding the incident being notified.**

In respect of an incident a notification to the regulator is only necessary where in respect of the aggregated total amount of exempt radioactive substances lost or stolen (or suspected to have been lost or stolen) from the premises in the incident and in all other such incidents in the 12 months preceding it, the quantity of radioactivity exceeds the value that is ten times the value in column 2 of Table 1.

- 3.59 On the grounds of proportionality, a notification to the regulator is only necessary under the above situation. The condition is therefore not intended to apply to minor accidents of loss (for example, a package drop resulting in a small tear in the packaging) where the impacts of the breach are controllable. However, it does apply in the case of several trivial losses over the course of a year, because the regulators have a legitimate interest in those cases where control appears to be lacking.

Accumulation of radioactive waste

General points

- 3.60 The accumulation of radioactive waste (VLLW dustbin; NORM waste; sealed sources, tritium foil sources and electrodeposited sources) on any premises is exempt up to certain thresholds provided that there is an intent to dispose of such wastes.
- 3.61 The exemptions in this section must be read in conjunction with the sections relating to keeping and use of unsealed sources (see paragraphs 3.32-3.43), small sealed sources (see paragraphs 3.20-3.31) and mobile radioactive apparatus (see paragraphs 3.44-3.59). This is because the concept employed in these exemption provisions is that the Table 3.1 values (see page 73) for total activity (Column 2 of Table 3.1) should apply to all of fixed sources + waste accumulated. Similarly, Table 3.2 values (see page 79) for total activity (Column 3 of Table 3.2) should apply to all of fixed sources + mobile sources + waste accumulated. In other words, the nature (fixed or mobile) and current function (in-use or awaiting disposal) of the material is not relevant; it is the total of all these categories on any one premises which is limited.

Exemption provisions

- 3.62 For NORM wastes and LV VLLW, the exempt quantity of waste which may be accumulated is equivalent to the annual disposal limits set out in Table 3.3 (see page 80).
- 3.63 For sealed sources and mobile apparatus, the limit for keeping and use plus accumulation is equivalent to the values in the third column of Table 3.2.
- 3.64 Waste closed sources may be accumulated prior to disposal without limit, provided that the sources in question were exempt for keeping and use, or were kept or used under the terms of a permit.

Exemption conditions

- 3.65 The conditions applying to this exemption which are broadly similar to those for keeping and use situations are set out below and are generalised to cover all situations of waste accumulation.

Keep an adequate record of any exempt radioactive substances held the location within the premises where they are stored or used.

- 3.66 Records are kept such that a holder is in control of his or her radioactive materials and wastes, and can demonstrate this. The nature of record keeping – for instance hard copy or electronic – is generally a matter for the holder. Likewise, the retention period is not specified in the legislation. However, in the case of electronic records it is obviously necessary for the records to be retrievable using software which is likely to be supportable for a number of years. A retention period of a minimum of one year (from the time the material is removed from the premises) is necessary because of the 'loss or theft' condition (see paragraph 3.73 below).

Ensure that where practicable, exempt radioactive substances (or the container of such radioactive substances), are marked or labelled as radioactive.

- 3.67 This measure is intended to ensure that persons on any premises where radioactive materials are stored are aware of the materials present.
- 3.68 The 'where practicable' phrase recognises that labelling of all radioactive material in all circumstances is not possible. It is obviously not expected, for instance, that powders or liquids be individually labelled. However, efforts are required, in such circumstances, to ensure that containers and packets carry clear labelling.

Allow the regulator access to such records or such premises as the regulator may request in order to determine that all of the conditions that apply are complied with.

- 3.69 Radioactive substances legislation continues to apply to exempt material (which is within the scope of the legislation). Inspection by the relevant regulatory body is neither necessary nor expected under most situations, and is not deemed proportionate for the purposes of radiological protection of members of the public. However, there are circumstances whereby a regulator may wish to inspect records. Examples are where an inspector has received intelligence to the effect that exemption conditions are not being complied with, or where there has been an incident of material loss (or several such incidents).

Hold the exempt radioactive substances safely and securely to prevent, so far as practicable, accidental removal, loss or theft from the premises where held, or loss of containment.

- 3.70 Although exempt radioactive materials are, by definition, low risk, security arrangements for materials are still necessary. This is because an accumulation of losses or thefts, perhaps from several premises, could lead to a higher risk.

For exempt radioactive substances in a container, do not modify or mutilate that container, and prevent any uncontrolled or unintended release of radioactive material or radioactive waste from the container.

- 3.71 This is self explanatory. It is simply an expression of good practice in relation to handling of packets or containers. This condition does not mean that packaging etc cannot be removed, provided that there is no loss of radioactive material or labelling. Obviously, the purpose of unsealed radioactive material cannot be fulfilled unless the material is dispensed. This is the reason for the words 'uncontrolled' and 'unintended' in the condition. The condition does not mean that containers or packaging cannot be modified to improve containment, or repaired so as to prevent loss.

For exempt radioactive substances which are sealed sources, electrodeposited sources or tritium foil sources, not modify or mutilate those sources or cause a loss of containment such that radioactive material or radioactive waste may be released outside the source.

- 3.72 This is self explanatory. It is simply an expression of good practice in relation to handling of sealed sources. The condition does not mean that sources cannot be modified to improve containment, or repaired so as to prevent loss.

For an incident of loss or theft (or suspected loss or theft) of exempt radioactive substances from the premises where it is held:

- (a) notify the incident to the regulator as soon as practicable; and**
- (b) include in that notification the details of any other incidents of loss or theft (or suspected loss or theft) of any radioactive substances from those premises over the 12 months preceding the incident being notified.**

In respect of an incident a notification to the regulator is only necessary where in respect of the aggregated total amount of exempt radioactive substances lost or stolen (or suspected to have been lost or stolen) from the premises in the incident and in all other such incidents in the 12 months preceding it, the quantity of radioactivity exceeds the value that is ten times the value in column 2 of Table 1.

- 3.73 On the grounds of proportionality, a notification to the regulator is only necessary under the above situation. The condition is therefore not intended to apply to minor accidents of loss (for example, a package drop resulting in a small tear in the packaging) where the impacts of the breach are controllable. However, it does apply in the case of several trivial losses over the course of a year, because the regulators have a legitimate interest in those cases where control appears to be lacking.

Accumulated waste must be disposed of as soon as practicable after it has become waste, and additionally in the case of such waste where it is a sealed source, a tritium foil source or an electrodeposited source, in any event within 26 weeks of that time unless the regulator advises in writing that a longer period of accumulation may take place.

- 3.74 This condition applies to the person who generates the waste (the initial point of arising), plus any intermediary; for instance, a person who receives waste for some form of pre-treatment ('management') prior to final disposal.
- 3.75 For sealed sources being disposed of by the 'dustbin' route, there are few reasons why disposal should not be immediate. The 26 week limit is intended to apply where a user is accumulating sealed sources for transfer to a permitted undertaking (that is, the provision replaces the previous Waste Closed Sources Exemption Order). In such cases, immediate disposal may not be practicable.
- 3.76 Decay storage is an acceptable method of initially managing radioactive waste if the subsequent management is made easier by such a process. Radioactive wastes may be decay-stored provided that the sole purpose of such decay storage is to allow the waste to be more manageable and that decay storage is carried out in a specific location, with adequate records relating to the radioactive inventory.

- 3.77 In any decision to undertake decay storage as a means of managing radioactive waste, consideration of the benefit of such decay must be weighed against the risks, including possible increase in radiation dose to persons (workers) on the premises, and the increased likelihood of theft.
- 3.78 Storage is not acceptable if the sole purpose of storage is to defer the cost of disposal to the future.
- 3.79 Decisions on disposal timings should be taken on the basis of:
- The waste hierarchy, taking into account considerations of reuse, recycling, waste minimisation etc.
 - Radiation dose to persons (workers) on the premises responsible for waste store management etc.
 - Minimising the number of radioactive waste transfers; that is, time may be allowed, within reason, for making up a full load for transport.
 - Contractual agreements with waste disposers, including financial considerations; that is, within reason, some accumulation prior to disposal may be acceptable in order to minimise overall disposal costs.

Disposal of low volumes of solid radioactive waste

General points

- 3.80 Exempt values for the disposal of solid radioactive waste are derived from Government's Low Level Radioactive Waste Policy of 2007, and also from some minor exemption provisions extant prior to 2011.
- 3.81 The values are supported by radiological impact assessments which demonstrate that the relevant dose criteria are unlikely to be breached under all foreseeable circumstances.
- 3.82 Some wastes in this category – Very Low Level Radioactive Waste (VLLW) – were historically disposed of via the dustbin. Hence the 0.1m³ volume used in most cases in Table 3.3 (see page 80), being the approximate volume of a normal refuse bin.
- 3.83 The radiological impact assessments are based on the assumption that such wastes follow the 'normal' route for disposal of conventional wastes to a landfill or an incinerator, via (in many cases) a sorting, recovery or pre-treatment step and are co-disposed with substantial quantities of non-radioactive waste. The assessment is based on known common practice:
- A waste producer, at the point of origin, places waste in a container such that the radioactive content is no more than the concentration limits in Table 3.3.
 - A batch of such wastes is dispatched to a waste management company.
 - The receiver of the waste – the waste management company – disposes of the batch to a landfill or incinerator, possibly following a sorting step.
 - The waste management company disposes of several batches of non-radioactive waste immediately prior to, and again after, the disposal of the radioactive batch¹¹.
- 3.84 If this is not the case, and the waste is disposed of to a facility where dilution by co-disposal as described above is not expected to take place, then the exemption does not apply.
- 3.85 These exemption provisions are primarily intended for 'small users' of radioactive materials; for example, laboratories and medical establishments. However, nuclear sites are not precluded from using these provisions in the event that they may be appropriate. A principle employed in these exemption provisions is to the effect that the source of radioactive waste is not important; the risks posed by the same radionuclides at the same concentrations do not depend on the source of the waste.
- 3.86 There are persons who receive radioactive waste (premises used for management etc. of wastes which are not radioactive) for burial on land or incineration but who may be unaware of the presence of very low concentrations of radioactivity or trivial strength sources in a dustbin. Provided that the waste is deemed exempt at the point of arising, and that the waste disposer is dealing with substantial quantities of non-radioactive

¹¹ Note that this is an assumption used in the radiological impact assessment, representing a likely scenario; in practice, a waste disposer would not actually know which batches of waste were radioactive waste and which not.

waste, there is a specific unconditional exemption which applies at the point of disposal. The principle here is that, in order to meet the relevant criterion for safety, conditions are applied to the waste producer, and not to the waste disposer. Further controls are not necessary when the waste has left the premises where it arose.

- 3.87 The correct approach to calculating activity is set out in Chapter 4 (see paragraphs 4.8-4.11).
- 3.88 Separate provisions dealing with higher volume NORM wastes are set out in paragraphs 3.99-3.129.
- 3.89 As per the accumulation condition (see paragraphs 3.74-3.79), waste should be disposed of as soon as practicable.

Exemption provisions

- 3.90 The exemptions are set out in Table 3.3, lines 1 – 7 inclusive.
- Column 1 sets out a description of the type of waste exempted.
 - Column 2 sets out the maximum concentrations of radionuclides in the waste, usually couched in (volume) terms of a 'dustbin load'.
 - Column 3 sets out the maximum quantities of waste which can be disposed of in any one year to qualify for exemption. The legislation does not specify 'rolling year'. That is, in the unlikely event that the column 3 values are disposed of on the final day of a year, followed by a similar amount on the first day of the next year, this is permitted, and the eventuality is covered by the relevant radiological impact assessment.
- 3.91 Disposal of items in different lines of Table 3.3 in the quantities listed in columns 2 and 3 are additive. However, although allowed by the legislation, in practice it is highly unlikely that any one waste producer will need to make use of more than one line in Table 3.3 in any one year except in certain special circumstances for example, a small laboratory.
- 3.92 It is common practice for certain solid laboratory reagents to be dissolved in water for the purposes of disposal. In this case, the aqueous disposal limits must be used. This is because the radiological impact assessments for solid (usually to landfill or incinerator) and aqueous liquids (usually to a sewer) are different, and are based on different assumptions and pathways.

Exemption conditions

3.93 The conditions set out below relate to low volume solid low level radioactive waste.

Waste must be transferred to:

- (a) A person who disposes of substantial quantities of non-radioactive waste for burial in landfill, incineration or recovery and where the radioactive waste will be mixed with such non-radioactive waste for the purposes of such burial, incineration or recovery;**
- (b) a waste permitted person; or**
- (c) where the waste is a sealed source, an electrodeposited source or a tritium foil source, to a licensee of a nuclear site or to a person situated in another Member State who is lawfully entitled to receive such waste.**

3.94 Waste producers will not necessarily be certain that this condition will be fulfilled. Such a person has no control over the management of wastes when they have left the point of arising. However, in the case of dustbin disposal, a waste producer can reasonably assume that this condition will be fulfilled, unless he/she has made some particular arrangement with a waste disposer where the likelihood of co-disposal is not demonstrably the case. In such circumstances, the waste disposal is not exempt.

Keep an adequate record of the solid radioactive waste which the person disposes of on or from any premises.

3.95 When waste has been disposed of or transferred from the point of arising, it is effectively beyond the control of the waste producer. This condition is so that the waste producer can demonstrate that he/she has exercised control over the waste, and to allow future dose assessments or verification of dose assessment models to be carried out if necessary.

3.96 The nature of record keeping – for instance hard copy or electronic – is generally a matter for the holder. Likewise, the retention period is not specified in the legislation. However, in the case of electronic records it is obviously necessary for the records to be retrievable using software which is likely to be supportable for a number of years.

Ensure that where practicable any marking or labelling of the waste or its container is removed before the person disposes of that waste.

3.97 The discovery of trefoil labelling in a conventional landfill can be wasteful of regulatory (or even police) resources. The intent is therefore that radioactive waste is not labelled when the destination is one where substantial quantities of non-radioactive waste are disposed of. This is acceptable because, provided the exemption conditions are complied with at the point of arising (the waste producer), then no further action downstream is necessary.

Allow the regulator access to such records or such premises as the regulator may request in order to determine that all of the conditions that apply are complied with.

- 3.98 Radioactive substances legislation continues to apply to exempt material (which is within the scope of the legislation). Inspection by the relevant regulatory body is neither necessary nor expected under most situations, and is not deemed proportionate for the purposes of radiological protection of members of the public. However, there are circumstances whereby a regulator may wish to inspect records. Examples are where an inspector has received intelligence to the effect that exemption conditions are not being complied with

Disposal of NORM radioactive waste up to 5Bq/g

General points

- 3.99 Provisions are in place to exempt high volume low level radioactive waste comprising NORM arising from industrial activities or land remediation. Examples include some pipe scale from the offshore oil and gas sector, the manufacture of titanium dioxide, and the remediation of land contaminated by radionuclides as a consequence of past practices. These low-risk activities are cases where there have been significant disposals historically, and yet with trivial consequences in the radiation dose experienced.
- 3.100 NORM waste is solid radioactive waste which has arisen as a consequence of an industrial activity (see Table 2.1 on page 19) or from the remediation of contaminated land. This exemption does not apply to NORM wastes arising from the remediation of land on nuclear licensed sites, except in a very particular circumstance. This circumstance being sites that contain contaminated land which was contaminated before a site license was in force, or before any activity took place on the site which would have required a site license. If land on a nuclear site was contaminated by a non-licensable process (for instance, luminising instruments with radium-based paint), then the waste arising from remediation of such contaminated land is a candidate for exemption.
- 3.101 NORM waste concentration means, in respect of radionuclides contained in the waste, the sum of the concentrations of the single radionuclide with the highest concentration in each of the natural decay chains beginning with U-238; U-235; and Th-232.
- 3.102 A generic radiological impact assessment has been carried out which demonstrates that for NORM waste concentrations up to 5 Bq/g the relevant dose criteria will be met under all reasonably foreseeable situations. Other provisions, for NORM wastes above this limit, are dealt with in paragraphs 3.112-3.129.
- 3.103 Some NORM wastes may be subject to pre-treatment, sorting etc ('management'). The exemption provisions apply even though the waste is not going directly for disposal, but is routed through a facility which carries out such activities.
- 3.104 As per the accumulation condition (see paragraphs 3.74-3.79), waste should be disposed of as soon as practicable. For NORM wastes, decay storage is not likely to be an option for the safe management and disposal of the waste because of the very long half-lives associated with most of the NORM radionuclides.

Exemption provisions

- 3.105 The maximum annual quantity of NORM wastes which can be disposed of from any one premises is 5×10^{10} Bq. This maximum quantity can be disposed of through any or all of three routes set out below (landfill, incineration, to a permitted person). The waste can also be sent to a person who manages wastes by sorting or processing, but who does not actually carry out the final disposal of the waste.

- NORM waste with a NORM waste concentration that does not exceed 5 Bq/g where the quantity of radionuclides in the total amount of that NORM waste disposed of per year to landfill does not exceed 5×10^{10} Bq is exempt.
- NORM waste with a NORM waste concentration that does not exceed 5 Bq/g where the quantity of radionuclides in the total amount of that NORM waste disposed of per year to a waste incinerator does not exceed 1×10^8 Bq.
- NORM waste with a NORM waste concentration that does not exceed 5 Bq/g where the quantity of radionuclides in the total amount of that NORM waste disposed of per year to a person authorised (permitted) to receive such waste does not exceed 5×10^{10} Bq.

Exemption conditions

3.106 The conditions set out below relate to the disposal of high volume low level radioactive NORM waste.

Keep an adequate record of the NORM waste which is disposed of on or from any premises.

3.107 When waste has been disposed of or transferred from the point of arising, it is effectively beyond the control of the waste producer. This condition is such that the waste producer can demonstrate that he/she has exercised control over the waste, and to allow future dose assessments or verification of dose assessment models to be carried out if necessary.

3.108 The nature of record keeping – for instance hard copy or electronic – is generally a matter for the holder. Likewise, the retention period is not specified in the legislation. However, in the case of electronic records it is obviously necessary for the records to be retrievable using software which is likely to be supportable for a number of years.

Ensure that where practicable any marking or labelling of the waste or its container is removed before the person disposes of that waste.

3.109 The discovery of trefoil labelling in a conventional landfill can be wasteful of regulatory (or even police) resources. The intent is therefore that radioactive waste is not labelled when the destination is one where substantial quantities of non-radioactive waste are disposed of.

Allow the regulator access to such records or such premises as the regulator may request in order to determine that all of the conditions that apply are complied with.

3.110 Radioactive substances legislation continues to apply to exempt material (which is within the scope of the legislation). Inspection of waste disposal records by the relevant regulatory body is neither necessary nor expected under most situations, and is not

deemed proportionate for the purposes of radiological protection of members of the public. However, there are circumstances whereby a regulator may wish to inspect such records. Examples are where an inspector has received intelligence to the effect that exemption conditions are not being complied with, or where there has been an incident involving a solid waste disposal.

Waste must be transferred to:

- (a) A person who disposes of substantial quantities of non-radioactive waste for burial in landfill, incineration or recovery and where the radioactive waste will be mixed with such non-radioactive waste for the purposes of such burial, incineration or recovery; or**
- (b) A waste permitted person.**

3.111 This condition applies to the person who generates the waste (the initial point of arising), plus any intermediary; for instance, a person who receives waste for some form of pre-treatment ('management') prior to final disposal.

Disposal of NORM radioactive waste up to 10Bq/g

General points

- 3.112 Provisions are in place to exempt high volume low level radioactive waste comprising NORM arising from industrial activities or land remediation which do not meet the 5 Bq/g limit as described in paragraphs 3.99-3.111. Examples include the manufacture of titanium dioxide, and the remediation of land contaminated by radionuclides as a consequence of past practices. These low-risk activities are cases where there have been significant disposals historically, and yet with trivial consequences in the radiation dose experienced.
- 3.113 This exemption also applies in respect of waste which is low concentration but which doesn't meet the maximum quantity limit in the previous section.
- 3.114 NORM waste is solid radioactive waste which has arisen as a consequence of an industrial activity (see Table 2.1 on page 19) or from the remediation of contaminated land. This exemption does not apply to NORM wastes arising from the remediation of land on nuclear licensed sites, except in a very particular circumstance. This circumstance being sites that contain contaminated land which was contaminated before a site license was in force, or before any activity took place on the site which would have required a site license. If land on a nuclear site was contaminated by a non-licensable process (for instance, luminising instruments with radium-based paint), then the wastes arising from remediation of such contaminated land is a candidate for exemption.
- 3.115 NORM waste concentration means, in respect of radionuclides contained in NORM waste, the sum of the concentrations of the single radionuclide with the highest concentration in each of the natural decay chains beginning with U-238; U-235¹²; and Th-232.
- 3.116 For NORM wastes to be exempt either between 5 and 10 Bq/g or where the concentration remains below 5Bq/g but the quantity exceeds 5×10^{10} Bq, a waste producer must carry out a radiological impact assessment to demonstrate that the relevant dose criteria will be met under all reasonably foreseeable situations. This is because the generic dose assessment, carried out to support the development of this legislation was limited to this.
- 3.117 A user with a permit relating to NORM waste with a concentration >10 Bq/g can only use the exemption for low volume low concentration NORM waste (that is, below 5 Bq/g).
- 3.118 As per the accumulation condition (see paragraphs 3.74-3.79), waste should be disposed of as soon as practicable. For NORM wastes, decay storage is not likely to be an option for the safe management and disposal of the waste because of the very long half-lives associated with most of the NORM radionuclides.

¹² U-235 will not make a significant contribution to the overall dose, and can usually be omitted from consideration in any radiological impact assessment.

Exemption provisions

- 3.119 NORM waste with a NORM waste concentration either (i) between 5 and 10 Bq/g or (ii) where the concentration remains below 5Bq/g but the activity exceeds 5×10^{10} Bq, is exempt.

Exemption conditions

- 3.120 The conditions below relate to the disposal of high volume low level radioactive NORM waste which does not meet the 5 Bq/g limit.

A disposer must make a written radiological assessment of the reasonably foreseeable pathways for the exposure of workers and the public to radiation in respect of the disposal of that waste at the place of disposal and be satisfied that the assessment demonstrates that radiation doses are not expected to exceed:

- **1mSv per year to workers at the place of disposal; and**
- **300µSv per year to the public.**

- 3.121 Persons who wish to dispose of NORM waste under these provisions may prepare the required radiological impact assessment in any form they wish.
- 3.122 A dose criterion of 300 µSv/year applies for a member of the public; 1000 µSv/year for a worker, and 3000 µSv/year for inadvertent intrusion.
- 3.123 The environmental regulators have produced a template which sets out the nature of such a dose assessment and the level of detail required. Persons wishing to use these provisions are strongly advised to consult and comply with the template assessment. The regulators will accept a dose assessment in any other form, or one that has been carried out for purposes other than compliance with this condition, but if NORM waste producers modify the format of their assessments to comply with the template, this will save the regulators time while at the same time providing a level of risk mitigation for the waste producer; that is, the likelihood that an assessment will be rejected as inadequate will be substantially reduced.
- 3.124 If any form of pre-treatment (sorting, recovery, segregation etc) is intended to be employed, then these activities must be accounted for in the assessment.

The assessment must be provided to the regulator at least 28 days before the first disposal is made, and not dispose of that waste or continue to do so if the regulator objects in writing to that assessment.

- 3.125 If no such objection is received, then a waste producer may assume that the radiological impact assessment is satisfactory. If an objection is received, then the disposal operation may not take place until the objection is withdrawn. If an objection is made once the disposal has commenced, then the disposal must not continue.

Keep an adequate record of the NORM waste which is disposed of on or from any premises.

- 3.126 When waste has been disposed of or transferred from the point of arising, it is effectively beyond the control of the waste producer. This condition is such that the waste producer can demonstrate that he/she has exercised control over the waste, and to allow future dose assessments or verification of dose assessment models to be carried out if necessary.
- 3.127 The nature of record keeping – for instance hard copy or electronic – is generally a matter for the holder. Likewise, the retention period is not specified in the legislation. However, in the case of electronic records it is obviously necessary for the records to be retrievable using software which is likely to be supportable for a number of years.

Ensure that where practicable any marking or labelling of the waste or its container is removed before the person disposes of that waste.

- 3.128 The discovery of trefoil labelling in a conventional landfill can be wasteful of regulatory (or even police) resources. The intent is therefore that radioactive waste is not labelled when the destination is one where substantial quantities of non-radioactive waste are disposed of.

Allow the regulator access to such records or such premises as the regulator may request in order to determine that all of the conditions that apply are complied with.

- 3.129 Radioactive substances legislation continues to apply to exempt material (which is within the scope of the legislation). Inspection of waste disposal records by the relevant regulatory body is neither necessary nor expected under most situations, and is not deemed proportionate for the purposes of radiological protection of members of the public. However, there are circumstances whereby a regulator may wish to inspect such records. Examples are where an inspector has received intelligence to the effect that exemption conditions are not being complied with, or where there has been an incident involving an aqueous waste disposal.

Disposal of waste sealed sources, tritium foil sources and electrodeposited sources

General points

- 3.130 The provisions in this section are for the accumulation and disposal of higher-activity sources when they become waste, and effectively reproduces the provisions of the former Waste Closed Sources Exemption Order. These provisions exempt transfer to a person for recovery, re-use, or medium-term storage pending final disposal to a permitted facility, which usually means a facility designed for higher-activity wastes.
- 3.131 For small sealed sources, the exempt 'dustbin disposal' route is available. This is covered in paragraphs 3.80-3.98).
- 3.132 Sealed sources may be accumulated and disposed of to a permitted person without the need for permitting at the point of arising / accumulation. There are no limits on individual source strength, on the number of sources disposed of, or on the total activity which can be disposed of in any time period.
- 3.133 As per the accumulation condition (see paragraphs 3.74-3.79), waste should be disposed of as soon as practicable. The 26 week limit is intended to apply where a user is accumulating sealed sources for transfer to a permitted undertaking. In such cases, immediate disposal may not be practicable.

Exemption provisions

- 3.134 This provision is in place to ensure that an undue regulatory burden is not placed on a holder of sealed sources. The exemption applies where:
- The sealed sources in question have been used on a premises (or are mobile sources) under the terms of a permit, or are exempt from the need for such a permit under this legislation; and
 - The sealed sources are being sent to a person who holds a permit to manage this type of waste.
- 3.135 Waste sealed sources may be disposed of in unlimited quantities provided that the receiver of the waste is permitted to receive such wastes.

Exemption conditions

- 3.136 The conditions set out below are for the disposal of higher activity sources when they become waste.

Waste must be transferred to a waste permitted person or where the waste is a sealed source, an electrodeposited source or a tritium foil source, to a licensee of a nuclear site or to a person situated in another Member State who is lawfully entitled to receive such waste.

3.137 This condition replaces the Waste Closed Sources Exemption Order. It is not for the ultimate disposal of sources; it covers transfers to an authorised person for treatment, recovery, storage or disposal.

Keep an adequate record of the solid radioactive waste which the person disposes of on or from any premises.

3.138 When waste has been disposed of or transferred from the point of arising, it is effectively beyond the control of the waste producer. This condition is so that the waste producer can demonstrate that he/she has exercised control over the waste, and to allow future dose assessments or verification of dose assessment models to be carried out if necessary.

3.139 The nature of record keeping – for instance hard copy or electronic – is generally a matter for the holder. Likewise, the retention period is not specified in the legislation. However, in the case of electronic records it is obviously necessary for the records to be retrievable using software which is likely to be supportable for a number of years.

Allow the regulator access to such records or such premises as the regulator may request in order to determine that all of the conditions that apply are complied with.

3.140 Radioactive substances legislation continues to apply to exempt material (which is within the scope of the legislation). Inspection by the relevant regulatory body is neither necessary nor expected under most situations, and is not deemed proportionate for the purposes of radiological protection of members of the public. However, there are circumstances whereby a regulator may wish to inspect records. Examples are where an inspector has received intelligence to the effect that exemption conditions are not being complied with

Where the waste is or was a high-activity source, notify the details of the disposal to the regulator within 14 days of the disposal (including the information required by Annex II of the HASS Directive), in such form as may be required by the regulator.

3.141 This is self-explanatory. It relates to the legal requirements in legislation for high-activity sealed sources.

Disposal of aqueous radioactive waste up to 100 Bq/ml to sewer

General points

- 3.142 These provisions are intended primarily for the non-nuclear sector – medical and research facilities etc – from which small quantities of aqueous effluent are discharged to a laboratory pipeline and ultimately to a relevant sewer (capacity > 100m³ of effluent / day at the sewerage plant), or to a person (by tanker) who is permitted to receive such waste. However, any person may use these provisions, provided that the conditions are met.
- 3.143 The radiological impact assessments are based on small scale disposals from, say a medical facility, in which the waste is disposed of to a sewer. Other pathways to human dose (for instance, disposal to a soakaway) are not covered by the impact assessment, and thus disposal routes other than to a sewer are not exempt.
- 3.144 Aqueous liquid waste can include entrained solids or suspensions, provided that all practical measures have been used to attempt to remove such solid suspensions from the waste stream prior to disposal.
- 3.145 Separate provisions dealing with lower concentration aqueous waste are set out in paragraphs 3.165-3.183.

Exemption provisions

- 3.146 The exemption for radionuclide concentrations up to 100 Bq/ml is a maximum annual disposal activity of 1×10^8 Bq for:
- The sum of: H-3, C-11, C-14, F-18, P-32, P-33, S-35, Ca-45, Cr-51, Fe-55, Ga-67, Sr-89, Y-90, Tc-99m, In-111, I-123, I-125, I-131, Sm-153, Tl-201; and
 - 1×10^6 Bq for the sum of all other radionuclides.

Exemption conditions

- 3.147 The conditions set out below relate to small quantities of aqueous waste.

The waste must not be diluted with the intention that the waste has a concentration of radioactivity which is below 100Bq/ml.

- 3.148 This does not mean that dilution *per se* is not allowed. Dilution of some low concentration waste streams by large volumes of uncontaminated water is a feature of many processes; vessels and reagent bottles can be washed out prior to disposal of the contents, and it is not intended that these practices be discontinued.

All practicable measures available must be used to minimise the quantity of radionuclides generated as waste.

- 3.149 At the point of discharge, for most circumstances, it is too late to apply this principle. However, it is expected that operators employ throughout the process the principle of minimising the activity discharged to the environment in the same way that they would be required to do for a permitted discharge. Only wastes which have been generated according to this principle can be exempted.

The waste must be disposed to a relevant sewer or to a waste permitted person.

- 3.150 The exemption is not used for disposal to open waters; the radiological impact assessments cover sewer disposal only.

Keep an adequate record of the waste which is disposed of from any premises.

- 3.151 When waste has been disposed of or transferred from the point of arising, it is effectively beyond the control of the waste producer. This condition is such that the waste producer can demonstrate that he/she has exercised control over the waste, and to allow future dose assessments or verification of dose assessment models to be carried out if necessary.
- 3.152 The nature of record keeping – for instance hard copy or electronic – is generally a matter for the holder. Likewise, the retention period is not specified in the legislation. However, in the case of electronic records it is obviously necessary for the records to be retrievable using software which is likely to be supportable for a number of years.

Allow the regulator access to such records or such premises as the regulator may request in order to determine that all of the conditions that apply are complied with.

- 3.153 Radioactive substances legislation continues to apply to exempt material (which is within the scope of the legislation). Inspection of waste disposal records by the relevant regulatory body is neither necessary nor expected under most situations, and is not deemed proportionate for the purposes of radiological protection of members of the public. However, there are circumstances whereby a regulator may wish to inspect such records. Examples are where an inspector has received intelligence to the effect that exemption conditions are not being complied with, or where there has been an incident involving an aqueous waste disposal.

Disposal of aqueous radioactive waste to sewer - patient excreta and compounds of uranium and thorium

General points

- 3.154 These provisions are intended primarily for the non-nuclear sector – medical and educational facilities etc – from which small quantities of aqueous effluent (patient excreta and uranium/thorium aqueous liquids) are discharged to a relevant sewer (capacity > 100m³ of effluent / day at the sewerage plant). They are therefore a 'special case' of aqueous waste disposals. However, any person may use these provisions, provided that the conditions are met.
- 3.155 These provisions can be used in addition to the provisions for other aqueous disposals.
- 3.156 The aqueous waste disposal radiological impact assessments are based on small scale disposals from, say a medical facility, in which the waste is disposed of to a sewer. Other pathways to human dose (for instance, disposal to a soakaway) are not covered by the impact assessment, and thus other disposal routes are not exempt.
- 3.157 Aqueous liquid waste can include entrained solids or suspensions, provided that all practical measures have been used to attempt to remove such solid suspensions from the waste stream prior to disposal.

Exemption provisions

- 3.158 The exemptions are:
- Radioactive waste in aqueous solution being patient excreta. The concentration of radionuclides is unlimited, but the annual totals for exempt disposal are 1x10¹⁰ Bq of Tc-99m and 5x10⁹ Bq of all other radionuclides.
 - Aqueous liquid radioactive waste which is or contains uranium or thorium or prepared compounds of uranium or thorium in which the U-235 concentration is no more than 0.72% in the case of uranium, and the thorium is in its isotopic proportions found in nature, up to a total of 0.5 Kg of U+Th in a year.

Exemption conditions

- 3.159 The conditions set out below relate to patient excreta and uranium/thorium aqueous waste.

All practicable measures available must be used to minimise the quantity of radionuclides generated as waste.

- 3.160 At the point of discharge, for most circumstances, it is too late to apply this principle. However, it is expected that operators employ throughout a process the principle of minimising the activity discharged to the environment in the same way that they would be required to do for a permitted discharge. Only wastes which have been generated according to this principle can be exempted.

The waste must be disposed to a relevant sewer or to a waste permitted person.

3.161 The exemption is not used for disposal to open waters; the radiological impact assessments cover sewer disposal only.

Keep an adequate record of the waste which is disposed of from any premises.

3.162 When waste has been disposed of or transferred from the point of arising, it is effectively beyond the control of the waste producer. This condition is such that the waste producer can demonstrate that he/she has exercised control over the waste, and to allow future dose assessments or verification of dose assessment models to be carried out if necessary.

3.163 The nature of record keeping – for instance hard copy or electronic – is generally a matter for the holder. Likewise, the retention period is not specified in the legislation. However, in the case of electronic records it is obviously necessary for the records to be retrievable using software which is likely to be supportable for a number of years.

Allow the regulator access to such records or such premises as the regulator may request in order to determine that all of the conditions that apply are complied with.

3.164 Radioactive substances legislation continues to apply to exempt material (which is within the scope of the legislation). Inspection of waste disposal records by the relevant regulatory body is neither necessary nor expected under most situations, and is not deemed proportionate for the purposes of radiological protection of members of the public. However, there are circumstances whereby a regulator may wish to inspect such records. Examples are where an inspector has received intelligence to the effect that exemption conditions are not being complied with, or where there has been an incident involving an aqueous waste disposal.

Disposal of low concentration aqueous radioactive waste to sewer, river or sea

General points

- 3.165 These provisions are intended primarily for those industries from which large quantities of aqueous effluent with low radionuclide concentrations are discharged to the environment.
- 3.166 The waste disposal route can be to (only one of) a sewer or a watercourse. This means that in any calendar year, if waste is disposed of under this exemption or the exemption set out in paragraphs 3.142-3.153 to a sewer, then no waste can be disposed of under the exemption to a watercourse in that year. Likewise if waste is disposed of to a watercourse, then no radioactive disposals may be made in the same year to a sewer under this exemption or the previous (100 Bq/ml) exemption.
- 3.167 A watercourse means a river, a tidal estuary or the sea. Discharges may also be made to a person who is permitted to receive such waste (for instance, via tanker). Discharges to static water (lakes, backwaters etc) are not exempt; the radiological impact assessments which support the exemption limits depend upon dilution in flowing water above a certain flowrate.
- 3.168 These flowrates are defined in the legislation in terms of a 'relevant river' (> 1m³/second) and 'relevant sewer' (capacity > 100m³ of effluent / day at the sewerage plant). A producer of aqueous radioactive waste will not know the precise flow rate of a river at any one time, and obviously has no control over how a sewerage plant is operated. However, if the waste producer is satisfied that these conditions have been met on first use of the exemption provisions, he/she can assume that these conditions will continue to be met unless information is received to indicate otherwise.
- 3.169 Aqueous liquid waste can include entrained solids or suspensions, provided that all practical measures have been used to attempt to remove such solid suspensions from the waste stream prior to disposal.
- 3.170 This exemption does not apply if the premises from which the waste disposal takes place holds a permit for other aqueous waste streams.
- 3.171 When a permit is in place, it needs to cover all aqueous radioactive waste disposals. This is because most aqueous disposals from any one particular site will be, to some extent, inter-related; the regulators need to take a holistic view of all such discharges from large or complex sites. However, for those waste streams which would otherwise be exempt, the conditions placed on any such permit by the environmental regulator will be the same as the exemption conditions set out in this section. In addition, when such a waste stream is added to an existing permit, there is no need for the permit holder to carry out or submit a radiological impact assessment relating to the waste disposal; the radiological impacts for these waste streams have already been carried out for generic cases, and the results of these assessments have shown the radiation doses to members of the public are below the relevant dose thresholds¹³.

¹³ ¹³ The dose limit of 0.5mSv/year from any single site still needs to be considered.

3.172 When disposing of waste to a sewer, a user cannot aggregate the exemption in paragraphs 3.142-3.153 (low volume) with this exemption (high volume). In respect of the total of all aqueous waste disposed of to a sewer from a premises in a year, the user must either meet the tests in this exemption, or the exemption set out in paragraphs 3.142-3.153.

Exemption provisions

3.173 The exemptions are set out in Table 3.4 (see page 81).

- Column 2 sets out the maximum concentration of each radionuclide to qualify for exemption.
- Column 3 sets out the maximum annual activity of each radionuclide disposed of to qualify for exemption when the disposal route is to a sewer.
- Column 4 sets out the maximum annual activity of each radionuclide disposed of to qualify for exemption when the disposal route is to a watercourse other than a sewer.
- Columns 3 and 4 are identical in most cases; however, the radiological impact assessments have shown situations where the sewer disposal route needs to be more restrictive. This is because of the additional pathway to human dose arising from operations at a sewerage works, which can dominate the assessment.

3.174 In the case of the sewer disposal route, note that the provisions set out in the low volume section may be more appropriate for many situations.

3.175 Most radionuclides in common use are listed in Table 3.4. However, a de minimus value can be applied to any radionuclide not listed; alternatively, the final line of Table 3.4 allows a waste producer to calculate the appropriate value for any radionuclide not listed by using the original methodology.

3.176 A summation rule applies to the common situation whereby an aqueous discharge contains two or more radionuclides as follows:

The sum of A/B and $[C/D \text{ or } C/E]$ should be less than or equal to 1, where:

- i. A means the concentration in Bq/ litre of each radionuclide listed in column 1 of table 3.4 that is present in aqueous waste;
- ii. B means the concentration of that radionuclide specified in column 2 of table 3.4.
- iii. C means the quantity in Bq of each radionuclide listed in column 1 of table 3.4 that is present in the aqueous waste.
- iv. D means the quantity of that radionuclide specified in column 3 of table 3.4.
- v. E means the quantity of that radionuclide specified in column 4 of table 3.4.

Exemption conditions

3.177 The conditions set out below relate to large quantities of aqueous waste with low radionuclide concentrations.

The waste must not be diluted with the intention that the waste has a concentration of radioactivity which is below the Table 3.4 values.

3.178 This does not mean that dilution *per se* is not allowed. Dilution of some low concentration waste streams by large volumes of uncontaminated water is a feature of many processes, or process vessels and reagent bottles can be washed out prior to disposal of the contents, and it is not intended that these practices be discontinued.

All practicable measures available must be used to minimise the quantity of radionuclides generated as waste.

3.179 At the point of discharge, for most circumstances, it is too late to apply this principle. However, it is expected that operators employ throughout a process the principle of minimising the activity discharged to the environment in the same way that they would be required to do for a permitted discharge. Only wastes which have been generated according to this principle can be exempted.

The waste must be disposed to a relevant sewer, a relevant river or the sea, or to a waste permitted person.

3.180 The exemption is used for disposal to sewer, to a watercourse or by transfer to another person for the purposes of treatment or disposal.

Keep an adequate record of the waste which is disposed of from any premises.

3.181 When waste has been disposed of or transferred from the point of arising, it is effectively beyond the control of the waste producer. This condition is such that the waste producer can demonstrate that he/she has exercised control over the waste, and to allow future dose assessments or verification of dose assessment models to be carried out if necessary.

3.182 The nature of record keeping – for instance hard copy or electronic – is generally a matter for the holder. Likewise, the retention period is not specified in the legislation. However, in the case of electronic records it is obviously necessary for the records to be retrievable using software which is likely to be supportable for a number of years.

Allow the regulator access to such records or such premises as the regulator may request in order to determine that all of the conditions that apply are complied with.

3.183 Radioactive substances legislation continues to apply to exempt material (which is within the scope of the legislation). Inspection of waste disposal records by the relevant regulatory body is neither necessary nor expected under most situations, and is not deemed proportionate for the purposes of radiological protection of members of the public. However, there are circumstances whereby a regulator may wish to inspect such records. Examples are where an inspector has received intelligence to the effect that

exemption conditions are not being complied with, or where there has been an incident involving an aqueous waste disposal.

Disposal of gaseous radioactive waste

General points

- 3.184 This provision covers the situation where containers of liquids or solids are opened and the release of a small quantity of gas or vapour cannot be avoided. The exemption does not apply if the gas or vapour arises because a process (for example, deliberate heating) has been applied to the contained material. It does not cover any loss of gas or vapour after the liquid or solid has been dispensed.
- 3.185 Gaseous waste streams may contain solid particulates or liquids in aerosol form. Provided that all practical measures have been used to attempt to fully remove such solid and liquid components from the gaseous waste stream, such particulates or aerosols may be treated as an integral part of the gaseous waste stream.
- 3.186 There is an additional provision specifically for the case of the low radiotoxicity inert gas Kr-85. Lighting devices which contain this radionuclide often undergo recycling procedures which result in release of the gas direct to atmosphere. A user can use both of the provisions below.

Exemption provisions

- 3.187 Gaseous radioactive waste which is released from within a container at the time that the container is opened, where that gas has been emitted by solid or liquid radioactive material within the container is exempt.
- 3.188 Gaseous radioactive waste containing only Kr-85 as a radioactive component up to an annual total activity released of 1×10^{11} Bq is exempt.

Exemption conditions

- 3.189 These conditions relate to the disposal of gaseous radioactive waste.

All practicable measures available must be used to minimise the quantity of radionuclides generated as waste.

- 3.190 At the point of discharge, for most circumstances, it is too late to apply this principle. However, it is a requirement that operators employ throughout a process the principle of minimising the activity discharged to the environment in the same way that they would be required to do for a permitted discharge. Only wastes which have been generated according to this principle can be exempted.

To the extent that is reasonably practicable, in respect of gaseous radioactive waste which arises in a building, cause the waste to be disposed of by an extraction system which removes the waste from the area where it arose and which vents the waste into the atmosphere; and prevent the entry or the re-entry, of the gaseous radioactive waste into a building.

- 3.191 If there is a fume hood available in the laboratory, then good practice (and this condition) requires that the fume hood be used, and that the process is not carried out on an open bench.

Allow the regulator access to such records or such premises as the regulator may request in order to determine that all of the conditions that apply are complied with.

- 3.192 Radioactive substances legislation continues to apply to exempt material (which is within the scope of the legislation). Inspection of waste disposal records by the relevant regulatory body is neither necessary nor expected under most situations, and is not deemed proportionate for the purposes of radiological protection of members of the public. However, there are circumstances whereby a regulator may wish to inspect such records. Examples are where an inspector has received intelligence to the effect that exemption conditions are not being complied with, or where there has been an incident involving a gaseous waste disposal.

Compliance with exemption conditions

- 3.193 Users of radioactive substances, and disposers of radioactive waste, need to decide whether or not they are outside the scope of the legislation, or whether exemptions apply to them. This is solely a user decision, but the regulator may take a view on correctness of such a decision. These decisions, and the reasons for them, should be documented.
- 3.194 The principle of exemption, according to the BSSD, means that no prior reporting is necessary under these regulations. However, users may wish to discuss any issue relating to radioactive substances and waste, whether permitted or not, with the environmental regulators, although the responsibility for this decision rests with the user. In the case of exempt waste or material, the regulators may advise on compliance with the exemption conditions on request. In exceptional circumstances, on request by a user, the regulator may issue a permit for matters which are actually exempt.
- 3.195 Any person relying on exemption provisions, on knowing or suspecting that any exemption condition has not been met, for any reason, must:
- Make efforts to remedy the situation by changing procedures or practices such that the conditions are met; and
 - Notify the environmental regulator.
- 3.196 Users of radioactive materials and disposers of radioactive waste are encouraged to check (audit) their procedures and practices at regular intervals to ensure that they are compliant with exemption conditions.
- 3.197 The exemptions regime does not involve notification to the environmental regulators (except in the specific circumstances of high volume NORM waste for which a case-specific radiological impact assessment is required). However, the regulators may inspect any premises where they know or suspect that radioactive substances are being held, or radioactive waste is undergoing storage or disposal, and inspect procedures, practices and records against the exemption conditions.
- 3.198 Such inspections are likely to be infrequent. The purpose of the exemptions regime is to enable the regulators to focus their resources on higher-risk activities in a proportionate manner, and not expend undue effort on the lower-risk activities for which the exemptions regime was designed.

Table 3.1: Radionuclides: values of exempt quantities and concentrations

Radionuclides	Maximum quantity (Bq) on any premises	Maximum concentration (Bq/g)
H-3	10^9	10^6
Be-7	10^7	10^3
C-14	10^7	10^4
O-15	10^9	10^2
F-18	10^6	10
Na-22	10^6	10
Na-24	10^5	10
Si-31	10^6	10^3
P-32	10^5	10^3
P-33	10^8	10^5
S-35	10^8	10^5
Cl-36	10^6	10^4
Cl-38	10^5	10
Ar-37	10^8	10^6
Ar-41	10^9	10^2
K-42	10^6	10^2
K-43	10^6	10
Ca-45	10^7	10^4
Ca-47	10^6	10
Sc-46	10^6	10
Sc-47	10^6	10^2
Sc-48	10^5	10
V-48	10^5	10
Cr-51	10^7	10^3
Mn-51	10^5	10
Mn-52	10^5	10
Mn-52m	10^5	10
Mn-53	10^9	10^4
Mn-54	10^6	10
Mn-56	10^5	10
Fe-52	10^6	10
Fe-55	10^6	10^4
Fe-59	10^6	10
Co-55	10^6	10
Co-56	10^5	10
Co-57	10^6	10^2
Co-58	10^6	10
Co-58m	10^7	10^4
Co-60	10^5	10
Co-60m	10^6	10^3
Co-61	10^6	10^2
Co-62m	10^5	10
Ni-59	10^8	10^4
Ni-63	10^8	10^5
Ni-65	10^6	10
Cu-64	10^6	10^2
Zn-65	10^6	10
Zn-69	10^6	10^4
Zn-69m	10^6	10^2
Ga-72	10^5	10
Ge-71	10^8	10^4
As-73	10^7	10^3
As-74	10^6	10

Table 3.1: Radionuclides: values of exempt quantities and concentrations

Radionuclides	Maximum quantity (Bq) on any premises	Maximum concentration (Bq/g)
As-76	10 ⁵	10 ²
As-77	10 ⁶	10 ³
Se-75	10 ⁶	10 ²
Br-82	10 ⁶	10
Kr-74	10 ⁹	10 ²
Kr-76	10 ⁹	10 ²
Kr-77	10 ⁹	10 ²
Kr-79	10 ⁵	10 ³
Kr-81	10 ⁷	10 ⁴
Kr-83m	10 ¹²	10 ⁵
Kr-85	10 ⁴	10 ⁵
Kr-85m	10 ¹⁰	10 ³
Kr-87	10 ⁹	10 ²
Kr-88	10 ⁹	10 ²
Rb-86	10 ⁵	10 ²
Sr-85	10 ⁶	10 ²
Sr-85m	10 ⁷	10 ²
Sr-87m	10 ⁶	10 ²
Sr-89	10 ⁶	10 ³
Sr-90+	10 ⁴	10 ²
Sr-91	10 ⁵	10
Sr-92	10 ⁶	10
Y-90	10 ⁵	10 ³
Y-91	10 ⁶	10 ³
Y-91m	10 ⁶	10 ²
Y-92	10 ⁵	10 ²
Y-93	10 ⁵	10 ²
Zr-93+	10 ⁷	10 ³
Zr-95	10 ⁶	10
Zr-97+	10 ⁵	10
Nb-93m	10 ⁷	10 ⁴
Nb-94	10 ⁶	10
Nb-95	10 ⁶	10
Nb-97	10 ⁶	10
Nb-98	10 ⁵	10
Mo-90	10 ⁶	10
Mo-93	10 ⁸	10 ³
Mo-99	10 ⁶	10 ²
Mo-101	10 ⁶	10
Tc-96	10 ⁶	10
Tc-96m	10 ⁷	10 ³
Tc-97	10 ⁸	10 ³
Tc-97m	10 ⁷	10 ³
Tc-99	10 ⁷	10 ⁴
Tc-99m	10 ⁷	10 ²
Ru-97	10 ⁷	10 ²
Ru-103	10 ⁶	10 ²
Ru-105	10 ⁶	10
Ru-106+	10 ⁵	10 ²
Rh-103m	10 ⁸	10 ⁴
Rh-105	10 ⁷	10 ²
Pd-103	10 ⁸	10 ³
Pd-109	10 ⁶	10 ³
Ag-105	10 ⁶	10 ²

Table 3.1: Radionuclides: values of exempt quantities and concentrations

Radionuclides	Maximum quantity (Bq) on any premises	Maximum concentration (Bq/g)
Ag-108m+	10 ⁶	10
Ag-110m	10 ⁶	10
Ag-111	10 ⁶	10 ³
Cd-109	10 ⁶	10 ⁴
Cd-115	10 ⁶	10 ²
Cd-115m	10 ⁶	10 ³
In-111	10 ⁶	10 ²
In-113m	10 ⁶	10 ²
In-114m	10 ⁶	10 ²
In-115m	10 ⁶	10 ²
Sn-113	10 ⁷	10 ³
Sn-125	10 ⁵	10 ²
Sb-122	10 ⁴	10 ²
Sb-124	10 ⁶	10
Sb-125	10 ⁶	10 ²
Te-123m	10 ⁷	10 ²
Te-125m	10 ⁷	10 ³
Te-127	10 ⁶	10 ³
Te-127m	10 ⁷	10 ³
Te-129	10 ⁶	10 ²
Te-129m	10 ⁶	10 ³
Te-131	10 ⁵	10 ²
Te-131m	10 ⁶	10
Te-132	10 ⁷	10 ²
Te-133	10 ⁵	10
Te-133m	10 ⁵	10
Te-134	10 ⁶	10
I-123	10 ⁷	10 ²
I-125	10 ⁶	10 ³
I-126	10 ⁶	10 ²
I-129	10 ⁵	10 ²
I-130	10 ⁶	10
I-131	10 ⁶	10 ²
I-132	10 ⁵	10
I-133	10 ⁶	10
I-134	10 ⁵	10
I-135	10 ⁶	10
Xe-131m	10 ⁴	10 ⁴
Xe-133	10 ⁴	10 ³
Xe-135	10 ¹⁰	10 ³
Cs-129	10 ⁵	10 ²
Cs-131	10 ⁶	10 ³
Cs-132	10 ⁵	10
Cs-134m	10 ⁵	10 ³
Cs-134	10 ⁴	10
Cs-135	10 ⁷	10 ⁴
Cs-136	10 ⁵	10
Cs-137+	10 ⁴	10
Cs-138	10 ⁴	10
Ba-131	10 ⁶	10 ²
Ba-140+	10 ⁵	10
La-140	10 ⁵	10
Ce-139	10 ⁶	10 ²
Ce-141	10 ⁷	10 ²

Table 3.1: Radionuclides: values of exempt quantities and concentrations

Radionuclides	Maximum quantity (Bq) on any premises	Maximum concentration (Bq/g)
Ce-143	10^6	10^2
Ce-144+	10^5	10^2
Pr-142	10^5	10^2
Pr-143	10^6	10^4
Nd-147	10^6	10^2
Nd-149	10^6	10^2
Pm-147	10^7	10^4
Pm-149	10^6	10^3
Sm-151	10^8	10^4
Sm-153	10^6	10^2
Eu-152	10^6	10
Eu-152m	10^6	10^2
Eu-154	10^6	10
Eu-155	10^7	10^2
Gd-153	10^7	10^2
Gd-159	10^6	10^3
Tb-160	10^6	10
Dy-165	10^6	10^3
Dy-166	10^6	10^3
Ho-166	10^5	10^3
Er-169	10^7	10^4
Er-171	10^6	10^2
Tm-170	10^6	10^3
Tm-171	10^8	10^4
Yb-175	10^7	10^3
Lu-177	10^7	10^3
Hf-181	10^6	10
Ta-182	10^4	10
W-181	10^7	10^3
W-185	10^7	10^4
W-187	10^6	10^2
Re-186	10^6	10^3
Re-188	10^5	10^2
Os-185	10^6	10
Os-191	10^7	10^2
Os-191m	10^7	10^3
Os-193	10^6	10^2
Ir-190	10^6	10
Ir-192	10^4	10
Ir-194	10^5	10^2
Pt-191	10^6	10^2
Pt-193m	10^7	10^3
Pt-197	10^6	10^3
Pt-197m	10^6	10^2
Au-198	10^6	10^2
Au-199	10^6	10^2
Hg-197	10^7	10^2
Hg-197m	10^6	10^2
Hg-203	10^5	10^2
Tl-200	10^6	10
Tl-201	10^6	10^2
Tl-202	10^6	10^2
Tl-204	10^4	10^4
Pb-203	10^6	10^2

Table 3.1: Radionuclides: values of exempt quantities and concentrations

Radionuclides	Maximum quantity (Bq) on any premises	Maximum concentration (Bq/g)
Pb-210+	10 ⁴	10
Pb-212+	10 ⁵	10
Bi-206	10 ⁵	10
Bi-207	10 ⁶	10
Bi-210	10 ⁶	10 ³
Bi-212+	10 ⁵	10
Po-203	10 ⁶	10
Po-205	10 ⁶	10
Po-207	10 ⁶	10
Po-210	10 ⁴	10
At-211	10 ⁷	10 ³
Rn-220+	10 ⁷	10 ⁴
Rn-222+	10 ⁸	10
Ra-223+	10 ⁵	10 ²
Ra-224+	10 ⁵	10
Ra-225	10 ⁵	10 ²
Ra-226+	10 ⁴	10
Ra-227	10 ⁶	10 ²
Ra-228+	10 ⁵	10
Ac-228	10 ⁶	10
Th-226+	10 ⁷	10 ³
Th-227	10 ⁴	10
Th-228+	10 ⁴	1
Th-229+	10 ³	1
Th-230	10 ⁴	1
Th-231	10 ⁷	10 ³
Th-232 sec	10 ³	1
Th-234+	10 ⁵	10 ³
Pa-230	10 ⁶	10
Pa-231	10 ³	1
Pa-233	10 ⁷	10 ²
U-230+	10 ⁵	10
U-231	10 ⁷	10 ²
U-232+	10 ³	1
U-233	10 ⁴	10
U-234	10 ⁴	10
U-235+	10 ⁴	10
U-236	10 ⁴	10
U-237	10 ⁶	10 ²
U-238+	10 ⁴	10
U-238 sec	10 ³	1
U-239	10 ⁶	10 ²
U-240	10 ⁷	10 ³
U-240+	10 ⁶	10
Np-237+	10 ³	1
Np-239	10 ⁷	10 ²
Np-240	10 ⁶	10
Pu-234	10 ⁷	10 ²
Pu-235	10 ⁷	10 ²
Pu-236	10 ⁴	10
Pu-237	10 ⁷	10 ³
Pu-238	10 ⁴	1
Pu-239	10 ⁴	1
Pu-240	10 ³	1

Table 3.1: Radionuclides: values of exempt quantities and concentrations

Radionuclides	Maximum quantity (Bq) on any premises	Maximum concentration (Bq/g)
Pu-241	10 ⁵	10 ²
Pu-242	10 ⁴	1
Pu-243	10 ⁷	10 ³
Pu-244	10 ⁴	1
Am-241	10 ⁴	1
Am-242	10 ⁶	10 ³
Am-242m+	10 ⁴	1
Am-243+	10 ³	1
Cm-242	10 ⁵	10 ²
Cm-243	10 ⁴	1
Cm-244	10 ⁴	10
Cm-245	10 ³	1
Cm-246	10 ³	1
Cm-247	10 ⁴	1
Cm-248	10 ³	1
Bk-249	10 ⁶	10 ³
Cf-246	10 ⁶	10 ³
Cf-248	10 ⁴	10
Cf-249	10 ³	1
Cf-250	10 ⁴	10
Cf-251	10 ³	1
Cf-252	10 ⁴	10
Cf-253	10 ⁵	10 ²
Cf-254	10 ³	1
Es-253	10 ⁵	10 ²
Es-254	10 ⁴	10
Es-254m	10 ⁶	10 ²
Fm-254	10 ⁷	10 ⁴
Fm-255	10 ⁶	10 ³
Any other radionuclide that is: (a) not of natural terrestrial or cosmic origin; or (b) listed in table 1 of schedule 1 .	10 ³ , or the quantity given in respect of that radionuclides in the Health Protection Agency's publication 'Exempt Concentrations and Quantities for Radionuclides not Included in the European Basic Safety Standards Directive' ⁽¹⁴⁾ .	1, or the concentration given in respect of that radionuclide in the document referenced in column 2.

Table 3.1 Radionuclides: values of exempt quantities and concentrations

¹⁴⁾ NRPB- R306 - Exempt Concentrations and Quantities for Radionuclides not Included in the European Basic Safety Standards Directive (April 1999), ISBN 0-85951-429-3

Table 3.2 Radioactive material and accumulated radioactive waste: values of maximum quantities		
Radioactive material or accumulated radioactive waste type	Maximum quantity of radionuclides for each item of material or waste	Maximum quantity of radionuclides: - on any premises in items of the material or waste which satisfy the limit in column 2; or -in mobile radioactive apparatus held by a person
A sealed source of a type not described in any other row of this table.	4×10^6 Bq	2×10^8 Bq
A Class A gaseous tritium light device.	2×10^{10} Bq	5×10^{12} Bq
A Class B gaseous tritium light device.	1×10^{12} Bq	3×10^{13} Bq
A Class C gaseous tritium light device.	1×10^{12} Bq	No limit
Any sealed source containing only tritium as a radioactive component.	2×10^{10} Bq	5×10^{12} Bq
A tritium foil source.	2×10^{10} Bq	5×10^{12} Bq
A smoke detector affixed to premises.	4×10^6 Bq	No limit
An electrodeposited source.	6×10^8 Bq Ni-63 or 2×10^8 Bq Fe-55	6×10^{11} Bq
A luminised article (unsealed source).	8×10^7 Bq Pm-147 or 4×10^9 Bq H-3	4×10^{10} Bq Pm-147 or 2×10^{11} Bq H-3
A Ba-137m eluting source.	4×10^4 Bq Cs-137+	4×10^5 Bq Cs-137+
A substance or article which is or contains magnesium alloy or thoriated tungsten in which the thorium concentration does not exceed 4% by mass.	No limit.	No limit.
A uranium or thorium compound.	Up to a total of 5 kg of uranium and thorium.	Up to a total of 5 kg of uranium and thorium.
A substance or article (other than a sealed source) which is intended for use for medical or veterinary diagnosis or treatment or clinical or veterinary trials.	1×10^9 Bq Tc-99m and in respect of the total for all other radionuclides— (i) 1×10^8 Bq if the substance or article is radioactive material; or (ii) 2×10^8 Bq if the substance or article is radioactive waste.	1×10^9 Bq Tc-99m and 2×10^8 Bq of all other radionuclides, (no more than 1×10^8 Bq of which is contained in radioactive material).

Table 3.2 Radioactive material and accumulated radioactive waste: values of maximum quantities

Table 3.3: Radioactive waste: values of quantities and concentrations		
Radioactive waste	Maximum concentration of radionuclides	Maximum quantity of waste to be disposed of in the period stated
Solid radioactive waste, with no single item > 4×10^4 Bq	4×10^5 Bq for the sum of all radionuclides per 0.1m^3	2×10^8 Bq/year
Solid radioactive waste containing tritium and C-14 only, with no single item > 4×10^5 Bq	4×10^6 Bq of tritium and C-14 per 0.1m^3	2×10^9 Bq/year
Individual sealed sources	2×10^5 Bq for the sum of all radionuclides per 0.1m^3	1×10^7 Bq/year
Individual sealed sources	2×10^{10} Bq of tritium per 0.1m^3	1×10^{13} Bq/year
Luminised articles with no single item containing > 8×10^7 Bq of Pm-147 or > 4×10^9 of tritium	8×10^7 Bq per 0.1m^3 of Pm-147 or 4×10^9 Bq per 0.1m^3 for tritium	2×10^9 Bq/year of Pm-147 or 1×10^{11} Bq/year of tritium
Solid radioactive waste which consists of magnesium alloy, thoriated tungsten or dross from hardener alloy	4% thorium by mass	No limit
Solid radioactive waste which is or contains uranium or thorium or prepared compounds of uranium or thorium in which the U-235 concentration is no more than 0.72% in the case of uranium, and the thorium is in its isotopic proportions found in nature	No limit	0.5 kg of uranium or thorium per week
Aqueous liquid radioactive waste which is or contains uranium or thorium or prepared compounds of uranium or thorium in which the U-235 concentration is no more than 0.72% in the case of uranium, and the thorium is in its isotopic proportions found in nature	No limit	0.5 kg of uranium or thorium per year
Radioactive waste in aqueous solution being human excreta	No limit	1×10^{10} Bq/year of Tc-99m and 5×10^9 Bq/year for the sum of all other radionuclides

Table 3.3 Radioactive waste: values of quantities and concentrations

Table 3.4 Aqueous radioactive waste values

Radionuclide	Concentration in Bq/ litre	Maximum annual quantity of radionuclides to a relevant sewer (Bq/ year)	Maximum annual quantity of radionuclides directly to a relevant river or the sea (Bq/ year)
H-3	10 ³	10 ¹⁰	10 ¹⁰
Be-7	1	10 ⁷	10 ⁷
C-14	0.1	10 ⁶	10 ⁶
F-18	0.1	10 ⁶	10 ⁶
Na-22	1	10 ⁶	10 ⁷
Na-24	1	10 ⁷	10 ⁷
Si-31	10	10 ⁸	10 ⁸
P-32	0.001	10 ⁴	10 ⁴
P-33	0.001	10 ⁴	10 ⁴
S-35	10	3 x 10 ⁷	10 ⁸
Cl-36	10	10 ⁷	10 ⁸
Cl-38	0.1	10 ⁶	10 ⁶
K-42	0.01	10 ⁵	10 ⁵
K-43	0.01	10 ⁵	10 ⁵
Ca-45	1	10 ⁷	10 ⁷
Ca-47	0.1	10 ⁶	10 ⁶
Sc-46	0.001	10 ⁴	10 ⁴
Sc-47	0.01	10 ⁵	10 ⁵
Sc-48	0.001	10 ⁴	10 ⁴
V-48	1	10 ⁷	10 ⁷
Cr-51	10	10 ⁸	10 ⁸
Mn-51	0.001	10 ⁴	10 ⁴
Mn-52	0.001	10 ⁴	10 ⁴
Mn-52m	0.001	10 ⁴	10 ⁴
Mn-53	1	10 ⁷	10 ⁷
Mn-54	0.01	10 ⁵	10 ⁵
Mn-56	0.001	10 ⁴	10 ⁴
Fe-52	0.01	10 ⁵	10 ⁵
Fe-55	1	10 ⁷	10 ⁷
Fe-59	0.01	10 ⁵	10 ⁵
Co-55	0.001	10 ⁴	10 ⁴
Co-56	0.001	10 ⁴	10 ⁴
Co-57	0.1	10 ⁶	10 ⁶
Co-58	0.1	10 ⁶	10 ⁶
Co-58m	1	10 ⁷	10 ⁷
Co-60	0.01	10 ⁵	10 ⁵
Co-60m	1	10 ⁷	10 ⁷
Co-61	0.1	10 ⁶	10 ⁶
Co-62m	0.001	10 ⁴	10 ⁴
Ni-59	1	10 ⁷	10 ⁷
Ni-63	10 ²	10 ⁹	10 ⁹
Ni-65	0.01	10 ⁵	10 ⁵
Cu-64	0.1	10 ⁶	10 ⁶
Zn-65	0.1	3 x 10 ⁵	10 ⁶
Zn-69	10	10 ⁸	10 ⁸
Zn-69m	0.1	10 ⁶	10 ⁶
Ga-67	0.1	10 ⁶	10 ⁶
Ga-72	0.001	10 ⁴	10 ⁴
Ge-71	1	10 ⁷	10 ⁷
As-73	10	10 ⁸	10 ⁸
As-74	1	10 ⁷	10 ⁷

Table 3.4 Aqueous radioactive waste values

Radionuclide	Concentration in Bq/ litre	Maximum annual quantity of radionuclides to a relevant sewer (Bq/ year)	Maximum annual quantity of radionuclides directly to a relevant river or the sea (Bq/ year)
As-76	1	10^7	10^7
As-77	1	10^7	10^7
Se-75	0.1	3×10^5	10^6
Br-82	0.1	10^6	10^6
Rb-86	0.1	10^6	10^6
Sr-85	0.1	10^6	10^6
Sr-85m	0.1	10^6	10^6
Sr-87m	0.1	10^6	10^6
Sr-89	1	10^7	10^7
Sr-90+	0.1	3×10^5	10^6
Sr-91	0.01	10^5	10^5
Sr-92	0.01	10^5	10^5
Y-90	1	10^7	10^7
Y-91	1	10^7	10^7
Y-91m	0.01	10^5	10^5
Y-92	0.1	10^6	10^6
Y-93	0.1	10^6	10^6
Zr-93	10	10^8	10^8
Zr-95+	0.001	10^4	10^4
Zr-97	0.01	10^5	10^5
Nb-93m	10	10^8	10^8
Nb-94	0.1	10^6	10^6
Nb-95	1	10^7	10^7
Nb-97	1	10^7	10^7
Nb-98	0.1	10^6	10^6
Mo-90	0.1	10^6	10^6
Mo-93	1	10^7	10^7
Mo-99	0.1	10^6	10^6
Mo-101	0.01	10^5	10^5
Tc-96	1	10^7	10^7
Tc-96m	10^2	10^9	10^9
Tc-97	10^2	10^9	10^9
Tc-97m	10	10^8	10^8
Tc-99	10	10^7	10^8
Tc-99m	10	3×10^7	10^8
Ru-97	0.01	10^5	10^5
Ru-103	0.01	10^5	10^5
Ru-105	0.01	10^5	10^5
Ru-106+	0.1	10^6	10^6
Rh-103m	10	10^8	10^8
Rh-105	1	10^7	10^7
Pd-103	0.1	10^6	10^6
Pd-109	0.1	10^6	10^6
Ag-105	1	10^7	10^7
Ag-108m	0.1	10^6	10^6
Ag-110m	0.1	10^6	10^6
Ag-111	10	10^8	10^8
Cd-109	1	10^7	10^7
Cd-115	0.1	10^6	10^6
Cd-115m	1	10^7	10^7
In-111	0.01	10^5	10^5
In-113m	0.01	10^5	10^5

Table 3.4 Aqueous radioactive waste values

Radionuclide	Concentration in Bq/ litre	Maximum annual quantity of radionuclides to a relevant sewer (Bq/ year)	Maximum annual quantity of radionuclides directly to a relevant river or the sea (Bq/ year)
In-114m	0.01	10 ⁵	10 ⁵
In-115m	0.01	10 ⁵	10 ⁵
Sn-113	0.1	10 ⁶	10 ⁶
Sn-125	0.01	10 ⁵	10 ⁵
Sb-122	0.1	10 ⁶	10 ⁶
Sb-124	0.1	10 ⁶	10 ⁶
Sb-125	1	10 ⁷	10 ⁷
Te-123m	1	10 ⁷	10 ⁷
Te-125m	1	10 ⁷	10 ⁷
Te-127	10	10 ⁸	10 ⁸
Te-127m	1	10 ⁷	10 ⁷
Te-129	10	10 ⁸	10 ⁸
Te-129m	1	10 ⁷	10 ⁷
Te-131	1	10 ⁷	10 ⁷
Te-131m	1	10 ⁷	10 ⁷
Te-132	0.1	10 ⁶	10 ⁶
Te-133	1	10 ⁷	10 ⁷
Te-133m	1	10 ⁷	10 ⁷
Te-134	1	10 ⁷	10 ⁷
I-123	1	10 ⁷	10 ⁷
I-125	1	10 ⁷	10 ⁷
I-126	0.1	10 ⁶	10 ⁶
I-129	0.1	10 ⁶	10 ⁶
I-130	0.1	10 ⁶	10 ⁶
I-131	0.1	10 ⁶	10 ⁶
I-132	0.1	10 ⁶	10 ⁶
I-133	0.1	10 ⁶	10 ⁶
I-134	0.1	10 ⁶	10 ⁶
I-135	0.1	10 ⁶	10 ⁶
Cs-129	0.01	10 ⁵	10 ⁵
Cs-131	0.1	10 ⁶	10 ⁶
Cs-132	0.01	10 ⁵	10 ⁵
Cs-134	0.01	10 ⁵	10 ⁵
Cs-134m	0.1	10 ⁶	10 ⁶
Cs-135	0.1	10 ⁶	10 ⁶
Cs-136	0.001	10 ⁴	10 ⁴
Cs-137+	0.01	10 ⁵	10 ⁵
Cs-138	0.001	10 ⁴	10 ⁴
Ba-131	0.1	10 ⁶	10 ⁶
Ba-140	0.1	10 ⁶	10 ⁶
La-140	0.001	10 ⁴	10 ⁴
Ce-139	0.1	10 ⁶	10 ⁶
Ce-141	0.1	10 ⁶	10 ⁶
Ce-143	0.01	10 ⁵	10 ⁵
Ce-144	0.1	10 ⁶	10 ⁶
Pr-142	0.1	10 ⁶	10 ⁶
Pr-143	10	10 ⁸	10 ⁸
Nd-147	0.01	10 ⁵	10 ⁵
Nd-149	0.01	10 ⁵	10 ⁵
Pm-147	10	10 ⁸	10 ⁸
Pm-149	1	10 ⁷	10 ⁷
Sm-151	10 ²	10 ⁹	10 ⁹

Table 3.4 Aqueous radioactive waste values

Radionuclide	Concentration in Bq/ litre	Maximum annual quantity of radionuclides to a relevant sewer (Bq/ year)	Maximum annual quantity of radionuclides directly to a relevant river or the sea (Bq/ year)
Sm-153	0.1	10 ⁶	10 ⁶
Eu-152	0.01	10 ⁵	10 ⁵
Eu-152m	0.01	10 ⁵	10 ⁵
Eu-154	0.01	10 ⁵	10 ⁵
Eu-155	0.1	10 ⁶	10 ⁶
Gd-153	0.1	10 ⁶	10 ⁶
Gd-159	0.1	10 ⁶	10 ⁶
Tb-160	0.01	10 ⁵	10 ⁵
Dy-165	0.1	10 ⁶	10 ⁶
Dy-166	0.1	10 ⁶	10 ⁶
Ho-166	0.1	10 ⁶	10 ⁶
Er-169	10	10 ⁸	10 ⁸
Er-171	0.01	10 ⁵	10 ⁵
Tm-170	1	10 ⁷	10 ⁷
Tm-171	10	10 ⁸	10 ⁸
Yb-175	0.1	10 ⁶	10 ⁶
Lu-177	0.1	10 ⁶	10 ⁶
Hf-181	0.01	10 ⁵	10 ⁵
Ta-182	0.001	10 ⁴	10 ⁴
W-181	0.1	10 ⁶	10 ⁶
W-185	1	10 ⁷	10 ⁷
W-187	0.01	10 ⁵	10 ⁵
Re-186	1	10 ⁷	10 ⁷
Re-188	1	10 ⁷	10 ⁷
Os-185	0.01	10 ⁵	10 ⁵
Os-191	0.1	10 ⁶	10 ⁶
Os-191m	1	10 ⁷	10 ⁷
Os-193	0.1	10 ⁶	10 ⁶
Ir-190	0.001	10 ⁴	10 ⁴
Ir-192	0.01	10 ⁵	10 ⁵
Ir-194	0.1	10 ⁶	10 ⁶
Pt-191	0.01	10 ⁵	10 ⁵
Pt-193m	1	10 ⁷	10 ⁷
Pt-197	0.1	10 ⁶	10 ⁶
Pt-197m	0.1	10 ⁶	10 ⁶
Au-198	1	10 ⁷	10 ⁷
Au-199	1	10 ⁷	10 ⁷
Hg-197	1	10 ⁷	10 ⁷
Hg-197m	0.1	10 ⁶	10 ⁶
Hg-203	0.1	10 ⁶	10 ⁶
Tl-200	0.01	10 ⁵	10 ⁵
Tl-201	0.1	10 ⁶	10 ⁶
Tl-202	0.01	10 ⁵	10 ⁵
Tl-204	0.1	10 ⁶	10 ⁶
Pb-203	0.01	10 ⁵	10 ⁵
Pb-210	0.001	10 ⁴	10 ⁴
Pb-212	0.1	10 ⁶	10 ⁶
Bi-206	0.01	10 ⁵	10 ⁵
Bi-207	0.1	10 ⁶	10 ⁶
Bi-210	10	10 ⁸	10 ⁸
Bi-212	1	10 ⁷	10 ⁷
Po-203	0.001	10 ⁴	10 ⁴

Table 3.4 Aqueous radioactive waste values

Radionuclide	Concentration in Bq/ litre	Maximum annual quantity of radionuclides to a relevant sewer (Bq/ year)	Maximum annual quantity of radionuclides directly to a relevant river or the sea (Bq/ year)
Po-205	0.001	10 ⁴	10 ⁴
Po-207	0.001	10 ⁴	10 ⁴
Po-210	0.001	10 ⁴	10 ⁴
At-211	1	10 ⁷	10 ⁷
Ra-223	0.01	10 ⁵	10 ⁵
Ra-224+	0.01	10 ⁵	10 ⁵
Ra-225	0.01	10 ⁵	10 ⁵
Ra-226+	0.01	10 ⁵	10 ⁵
Ra-227	1	10 ⁷	10 ⁷
Ra-228	0.01	10 ⁵	10 ⁵
Ac-227	0.1	10 ⁶	10 ⁶
Ac-228	0.001	10 ⁴	10 ⁴
Th-226	0.1	10 ⁶	10 ⁶
Th-227	0.01	10 ⁵	10 ⁵
Th-228	1	10 ⁷	10 ⁷
Th-229	0.01	10 ⁵	10 ⁵
Th-230	1	10 ⁷	10 ⁷
Th-231	0.1	10 ⁶	10 ⁶
Th-232	1	10 ⁶	10 ⁷
Th-234	0.1	10 ⁶	10 ⁶
Pa-230	0.01	10 ⁵	10 ⁵
Pa-231	0.01	10 ⁵	10 ⁵
Pa-233	0.1	10 ⁶	10 ⁶
U-230	0.1	10 ⁶	10 ⁶
U-231	10	10 ⁸	10 ⁸
U-232	0.1	10 ⁶	10 ⁶
U-233	0.1	10 ⁶	10 ⁶
U-234	0.1	10 ⁶	10 ⁶
U-235+	0.1	10 ⁶	10 ⁶
U-236	0.1	10 ⁶	10 ⁶
U-237	10	10 ⁸	10 ⁸
U-238+	0.1	10 ⁶	10 ⁶
U-239	10	10 ⁸	10 ⁸
U-240	10	10 ⁸	10 ⁸
Np-237	0.1	10 ⁶	10 ⁶
Np-239	1	10 ⁷	10 ⁷
Np-240	0.1	10 ⁶	10 ⁶
Pu-234	0.01	10 ⁵	10 ⁵
Pu-235	0.01	10 ⁵	10 ⁵
Pu-236	1	10 ⁷	10 ⁷
Pu-237	0.1	10 ⁶	10 ⁶
Pu-238	0.1	10 ⁶	10 ⁶
Pu-239	0.1	10 ⁶	10 ⁶
Pu-240	0.1	10 ⁶	10 ⁶
Pu-241	10	10 ⁸	10 ⁸
Pu-242	0.1	10 ⁶	10 ⁶
Pu-243	0.1	10 ⁶	10 ⁶
Pu-244	0.1	10 ⁶	10 ⁶
Am-241	0.1	10 ⁶	10 ⁶
Am-242	0.1	10 ⁶	10 ⁶
Am-242m	0.1	10 ⁶	10 ⁶
Am-243	0.1	10 ⁶	10 ⁶

Table 3.4 Aqueous radioactive waste values			
Radionuclide	Concentration in Bq/ litre	Maximum annual quantity of radionuclides to a relevant sewer (Bq/ year)	Maximum annual quantity of radionuclides directly to a relevant river or the sea (Bq/ year)
Cm-242	1	10 ⁷	10 ⁷
Cm-243	0.1	10 ⁶	10 ⁶
Cm-244	0.1	10 ⁶	10 ⁶
Cm-245	0.01	10 ⁵	10 ⁵
Cm-246	0.1	10 ⁶	10 ⁶
Cm-247	0.01	10 ⁵	10 ⁵
Cm-248	0.1	10 ⁶	10 ⁶
Bk-249	10 ²	10 ⁹	10 ⁹
Cf-246	1	10 ⁷	10 ⁷
Cf-248	1	10 ⁷	10 ⁷
Cf-249	0.01	10 ⁵	10 ⁵
Cf-250	0.1	10 ⁶	10 ⁶
Cf-251	0.01	10 ⁵	10 ⁵
Cf-252	0.1	10 ⁶	10 ⁶
Cf-253	10	10 ⁸	10 ⁸
Cf-254	0.0001	10 ³	10 ³
Es-253	1	10 ⁷	10 ⁷
Es-254	0.1	10 ⁶	10 ⁶
Es-254m	0.01	10 ⁵	10 ⁵
Fm-254	1	10 ⁷	10 ⁷
Fm-255	0.1	10 ⁶	10 ⁶
Any other radionuclide that is not of natural terrestrial or cosmic origin	0.0001 or that concentration which gives rise to the same 10 µSv/ year dose criteria as used to calculate other values in this table ¹⁵	10 ³ or that quantity which corresponds to 3000m ³ of aqueous radioactive waste up to the appropriate concentration as calculated in accordance with column 2	10 ³ or that quantity which corresponds to 10000m ³ of aqueous radioactive waste up to the appropriate concentration as calculated in accordance with column 2

Table 3.4 Aqueous radioactive waste values

⁽¹⁵⁾ HPA-CRCE-005 - Derivation of Liquid Exclusion or Exemption Levels to Support the RSA93 Exemption Order Review, published in August 2010 (ISBN 0-978-85951-673-0).

4. Technical considerations

Averaging and assay for radioactive waste

- 4.1 In general the levels in the tables apply to waste as measured at the point of arising.
- 4.2 Where radioactive material must be chemically or mechanically processed prior to disposal, averaging of concentrations over reasonable quantities of (non-radioactive) waste in mixtures is permissible, but deliberate dilution to render a mixture of waste below the relevant levels is not. The regulators will provide guidance on sampling and averaging in such cases.

Discounting of 'normal' background

- 4.3 The 'out of scope' levels and the exemption levels are based on the calculated values after removing background, if possible, in the specific circumstances. It will be incumbent on the operator to either:
- Use the total measured value of any substance, or
 - Be able to demonstrate, if challenged, if and how, by calculation, it is appropriate to deduct the component due to background.
- 4.4 Separate processes, giving rise to separate solid waste streams, can be treated on their own for the purposes of the above paragraphs. A 'separate process' can be defined as one in which optimisation can be done without compromising any optimisation steps for another process.
- 4.5 Any substance or article is not regarded as radioactive material or radioactive waste unless the concentration of any artificial radionuclide is above the levels *'found normally in such a substance'*¹⁶.
- 4.6 The purpose of this provision is to remove from the need for regulation materials and wastes containing radionuclides which are not amenable to controls because of their ubiquitous presence in the earth, its waters or atmosphere. The concept applies to artificial radionuclides found in naturally occurring materials. For instance, due to historical atmospheric weapons tests and the Chernobyl accident, certain fission products are in global circulation. Obviously, such radioactivity is not amenable to control. Neither is the radioactivity in rainwater arising from the presence of these artificial radionuclides in the atmosphere.
- 4.7 Practical considerations of assay/measurement also need to be taken into account. Waste managers would be expected to use good practice to determine the radiochemical assay of the waste, but where the difference between the level *'found normally in such a substance'* and the increment due to additional contamination

¹⁶ Note that, for natural radionuclides, background levels are already out of scope of the legislation when the material in question, or wastes arising, are not being used in an 'industrial activity' or a practice.

genuinely cannot be separated or reasonably measured, then the entire material can be considered as 'out of scope'.

'Head of chain' etc. calculations

- 4.8 For the purposes of calculating the total activity in wastes, the head of the chain may be taken to already include all radionuclides in a decay chain (in the case of radionuclides followed by the term 'sec'), or all the listed radionuclides (in the case of the term '+').
- 4.9 'sec' where it appears after a radionuclide means that, for the purpose of calculations, all radionuclides in the decay chain in secular equilibrium have been taken into account for the purposes of radiological impact assessment.
- 4.10 '+' where it appears after a radionuclide means that, for the purpose of calculations, the radionuclide includes such of its daughter radionuclides in the decay chain that are relevant for the purposes of radiological impact assessment. These daughter radionuclides are listed in Table 4.1 (see page 89) for out of scope material and waste and Table 4.2 (see page 91) for exempt material and waste.
- 4.11 Calculations using 'head of chain' values can be applied to:
- Calculations of 'out of scope' levels for industrial activities in Table 2.2 (see page 20).
 - Calculations of 'out of scope' levels for practices in Table 2.3 (see page 21).
 - Calculations of total holdings for keeping and use (and accumulation) in Tables 3.1 and Table 3.2 (see pages 73-79).
 - Calculations for waste disposal in Table 3.3 (see page 80).
 - Calculations for aqueous waste disposal in Table 3.4 (see page 81).
 - Calculations for high volume low level radioactive waste disposals containing NORM radionuclides.

(For NORM waste, the concentration is the sum of the concentrations of the single radionuclide with the highest concentration in each of the natural decay chains beginning with U-238; U-235; and Th-232).

Table 4.1 Radionuclides in secular equilibrium

Parent radionuclide	Daughter radionuclides
Fe-52+	Mn-52m
Zn-69m+	Zn-69
Sr-90+	Y-90
Sr-91+	Y-91m
Zr-95+	Nb-95m
Zr-97+	Nb-97m, Nb-97
Nb-97+	Nb-97m
Mo-99+	Tc-99m
Mo-101+	Tc-101
Ru-103+	Rh-103m
Ru-105+	Rh-105m
Ru-106+	Rh-106
Pd-103+	Rh-103m
Pd-109+	Ag-109m
Ag-108m+	Ag-108
Ag-110m+	Ag-110
Cd-109+	Ag-109m
Cd-115+	In-115m
Cd-115m+	In-115m
In-114m+	In-114
Sn-113+	In-113m
Sb-125+	Te-125m
Te-127m+	Te-127
Te-129m+	Te-129
Te-131m+	Te-131
Te-132+	I-132
Te-133+	I-133, Xe-133m, Xe-133
Te-133m+	Te-133, I-133, Xe-133m, Xe-133
I-131+	Xe-131m
Cs-137+	Ba-137m
Ce-144+	Pr-144, Pr-144m
Pb-210+	Bi-210, Po-210
Pb-212+	Bi-212, Tl-208
Bi-212+	Tl-208
Ra-223+	Rn-219, Po-215, Pb-211, Bi-211, Tl-207
Ra-224+	Rn-220, Po-216, Pb-212, Bi-212, Tl-208
Ra-226+	Rn-222, Po-218, Pb-214, Bi-214, Po-214
Ra-228+	Ac-228
Ac-227+	Th-227, Fr-223, Ra-223, Rn-219, Po-215, Pb-211, Bi-211, Tl-207, Po-211
Th-226+	Ra-222, Rn-218, Po-214
Th-228+	Ra-224, Rn-220, Po-216, Pb-212, Bi-212, Tl-208
Th-229+	Ra-225, Ac-225, Fr-221, At-217, Bi-213, Tl-209, Pb-209
Th-232+	Ra-228, Ac-228, Th-228, Ra-224, Rn-220, Po-216, Pb-212, Bi-212, Tl-208
Th-232sec	Ra-228, Ac-228, Th-228, Ra-224, Rn-220, Po-216, Pb-212, Bi-212, Po-212, Tl-208
Th-234+	Pa-234m, Pa-234
U-230+	Th-226, Ra-222, Rn-218, Po-214

Table 4.1 Radionuclides in secular equilibrium	
Parent radionuclide	Daughter radionuclides
U-232+	Th-228, Ra-224, Rn-220, Po-216, Pb-212, Bi-212, Tl-208
U-235+	Th-231
U-235sec	Th-231, Pa-231, Ac-227, Th-227, Fr-223, Ra-223, Rn-219, Po-215, Pb-211, Bi-211, Tl-207, Po-211
U-238+	Th-234, Pa-234m, Pa-234
U-238sec	Th-234, Pa-234m, Pa-234, U-234, Th-230, Ra-226, Rn-222, Po-218, Pb-214, Bi-214, Po-214, Pb-210, Bi-210, Po-210
U-240+	Np-240m, Np-240
Np-237+	Pa-233
Pu-244+	U-240, Np-240m, Np-240
Am-242m+	Np-238
Am-243+	Np-239
Cm-247+	Pu-243
Cf-253+	Cm-249
Es-254+	Bk-250
Es-254m+	Fm-254

Table 4.1 Radionuclides in secular equilibrium – Out of scope material and waste

Table 4.2 Radionuclides in secular equilibrium	
Parent radionuclide	Daughter radionuclides
Sr-90+	Y-90
Zr-93+	Nb-93m
Zr-95+	Nb-95
Zr-97+	Nb-97
Ru-106+	Rh-106
Ag-108m+	Ag-108
Cs-137+	Ba-137m
Ba-140+	La-140
Ce-144+	Pr-144
Pb-210+	Bi-210, Po-210
Pb-212+	Bi-212, Tl-208, Po-212
Bi-212+	Tl-208, Po-212
Rn-220+	Po-216
Rn-222+	Po-218, Pb-214, Bi-214, Po-214
Ra-223+	Rn-219, Po-215, Pb-211, Bi-211, Tl-207
Ra-224+	Where Ra-224+ is referred to in Table 3.1: Rn-220, Po-216, Pb-212, Bi-212, Tl-208, Po-212 Where Ra-224+ is referred to in Table 3.4: Pb-212
Ra-226+	Where Ra-226+ is referred to in Table 3.1: Rn-222, Po-218, Pb-214, Bi-214, Pb-210, Bi-210, Po-210, Po-214 Where Ra-226+ is referred to in Table 3.4: Rn-222, Po-218, Pb-214, Bi-214, Po-214
Ra-228+	Ac-228
Th-226+	Ra-222, Rn-218, Po-214
Th-228+	Ra-224, Rn-220, Po-216, Pb-212, Bi-212, Po-212, Tl-208
Th-229+	Ra-225, Ac-225, Fr-221, At-217, Bi-213, Po-213, Pb-209
Th-232 sec	Ra-228, Ac-228, Th-228, Ra-224, Rn-220, Po-216, Pb-212, Bi-212, Po-212, Tl-208
Th-234+	Pa-234m
U-230+	Th-226, Ra-222, Rn-218, Po-214
U-232+	Th-228, Ra-224, Rn-220, Po-216, Pb-212, Bi-212, Tl-208, Po-212
U-235+	Th-231
U-238+	Th-234, Pa-234m, Pa-234
U-238 sec	Th-234, Pa-234m, U-234, Th-230, Ra-226, Rn-222, Po-218, Pb-214, Bi-214, Pb-210, Bi-210, Po-210, Po-214
U-240+	Np-240
Np-237+	Pa-233
Am-242m+	Am-242
Am-243+	Np-239

Table 4.2 Radionuclides in secular equilibrium – Exempt material and waste

5. Interface with other legislation and policy

5.1 This section sets out the interface the exemptions regime has with key legislation and policy.

Transport Regulations

5.2 The transport of hazardous materials and wastes, including radioactive materials and wastes, is regulated. Nothing in the legislation affects the exemption thresholds or conditions (including labelling conditions) under the transport regulations. When radioactive materials are stored in transit in the course of a journey, the transport regulations may apply. 'Storage in transit' becomes permanent storage (thus coming within the remit of radioactive substances legislation) when:

- It is stored in one location for a period exceeding 14 days; or
- It is unpackaged¹⁷; or
- It arrives at the destination where it will be used or disposed of.

Ionising Radiations Regulations (IRR99)

5.3 The exemption levels set out in Table 3.1 under this legislation, and the thresholds for prior notification under IRR99, are the same. Otherwise, this legislation does not affect the IRR99 in any way.

'Conventional' Waste Regulations

5.4 Some radioactive waste may exhibit hazardous properties not related to its radioactive properties. For radioactive waste which is exempted from the need for permitting, waste producers need to be aware of the hazardous properties of the waste and take appropriate action¹⁸. This action may include a consideration of other hazardous waste legislation in respect of hazardous waste. Regardless of these other hazardous properties, exempt waste is still 'waste' and subject to regulation as such.

5.5 In England and Wales some radioactive wastes fall into the requirement for a waste operation permit where it is exempt from the requirement for a permit in respect of a radioactive substances activity. This is dealt with in more detail in the Environmental Permitting guidance on Radioactive Substances Regulation¹⁹.

¹⁷ It is still 'stored in transit' if it is unloaded from a vehicle or transferred from one vehicle to another; it is not 'stored in transit' if the material or waste containment is deliberately breached.

¹⁸ For instance, the exemptions provisions in this legislation for the disposal of aqueous liquids containing uranium and thorium compounds should not be taken to imply that these compounds can be disposed of safely; only that the radiological properties need not be taken into account.

¹⁹ Available at www.defra.gov.uk/environment/policy/permits/guidance.htm

Low Level Radioactive Waste Policy (2007)

- 5.6 Details of this policy have been carried through into this legislation. The definition of Low Volume Very Low Level Radioactive Waste has been used to set out one of the waste exemptions in the legislation ('Low Volume VLLW' is now equivalent to 'conditionally exempt'). Furthermore, this legislation and its guidance makes clear how VLLW containing NORM radionuclides is defined. For NORM waste, the concentration is the sum of the concentrations of the single radionuclide with the highest concentration in each of the natural decay chains beginning with U-238; U-235; and Th-232.

Glossary

Term or acronym	Meaning
Ba-137m eluting source	A source which consists of Cs-137 in a sealed container which is designed and constructed to allow the elution of Ba-137m, and which is radioactive material or radioactive waste solely because of that Cs-137
Basic Safety Standards Directive (BSSD)	Council Directive 96/29/EURATOM ⁽²⁰⁾ laying down basic safety standards for the protection of the health of workers and the general public against the dangers arising from ionising radiation.
Class A gaseous tritium light device (GTLD)	Such a device (GTLD) where the activity of the device does not exceed 2×10^{10} Bq of tritium
Class B gaseous tritium light device (GTLD)	Such a device (GTLD) which is installed or intended to be installed on premises and where the activity— (c) in each sealed container in the device does not exceed 8×10^{10} Bq of tritium; and (d) of the device does not exceed 1×10^{12} Bq of tritium;
Class C gaseous tritium light device (GTLD)	Such a device (GTLD) installed or intended to be installed— (a) in a vessel or aircraft; or (b) in a vehicle or other equipment used or intended to be used by the armed forces of the Crown;
Contamination	Contamination occurs where a substance or article is so affected by— (a) absorption, admixture or adhesion of radioactive material or radioactive waste; or (b) the emission of neutrons or ionising radiations, as to become radioactive or to possess

	increased radioactivity. This means that the common term 'activation' is included within the definition of 'contamination'.
Disposal permit	<p>(a) an environmental permit to carry on the radioactive substances activity described in this legislation, or</p> <p>(b) an authorisation under the Radioactive Substances Act 1993 to dispose of radioactive waste held in respect of premises situated in Northern Ireland or Scotland</p>
Disposal (of waste)	The removal, deposit, destruction, discharge (whether into water or into the air or into a sewer or drain or otherwise) or burial (whether underground or otherwise).
Electrodeposited source	An article where radionuclides are electrodeposited onto a metal substrate and which is radioactive material or radioactive waste solely because it contains Ni-63 or Fe-55
Gaseous tritium light device (GTLD)	<p>A sealed source in a device which is an illuminant, instrument, sign or indicator which—</p> <p>(a) incorporates tritium in one or more sealed containers constructed to prevent dispersion of that tritium in normal use; and</p> <p>(b) is radioactive material solely because it contains that tritium</p>
ICRP	International Commission on Radiological Protection
Luminised article	<p>An article which is made wholly or partly from a luminescent substance in the form of a film or a paint and which—</p> <p>(a) is radioactive material or radioactive waste solely because it contains Pm-147 or H-3; and</p> <p>(b) is not a sealed source;</p>
M	(Where it appears after a radionuclide) means a radionuclide in a metastable state of radioactive decay in which gamma photons are emitted.
Management (in respect of waste)	(a) the preparation by checking,

	<p>cleaning or repairing that waste for its re-use without further processing;</p> <p>(b) the recovery of that waste;</p> <p>(c) the disposal of that waste; or</p> <p>(d) the application of any treatment process to that waste which is preparatory to the recovery or disposal of it.</p>
Mobile radioactive apparatus	<p>Any apparatus, equipment, appliance or other thing which is radioactive material and—</p> <p>(a) is constructed or adapted for being transported from place to place; or</p> <p>(b) is portable and designed or intended to be used for releasing radioactive material into the environment or introducing it into organisms</p>
Nuclear (licensed) site	<p>(a) any site in respect of which a nuclear site licence is for the time being in force; or</p> <p>(b) any site in respect of which, after the revocation or surrender of a nuclear site licence, the period of responsibility of the licensee has not yet come to an end.</p>
NORM	Naturally Occurring Radioactive Material
Practice	<p>An activity which involves the radioactive, fertile or fissile properties of a substance. Note that the word 'practice' does not occur in the legislation. It is used in this guidance as a shorthand term.</p>
Premises	<p>Any land, whether covered by buildings or not, including any place underground and any land covered by water. In general, the word 'premises' in this legislation can be taken to mean any building or group of buildings etc. where, if an environmental permit were required, one permit would apply.</p>
Relevant liquid	<p>A liquid which is-</p> <p>(a) is non-aqueous; or</p> <p>(b) is classified (or would be so</p>

classified in the absence of its radioactivity) under Council Regulation No. 1272/2008) as having any of the following hazard classes and hazard categories (as defined in that Regulation)—

- (i) acute toxicity: categories 1, 2 or 3;
- (ii) skin corrosion/irritation: category 1 corrosive, sub-categories: 1A, 1B or 1C; or
- (iii) hazardous to the aquatic environment: acute category 1 or chronic categories 1 or 2

Relevant river

A river or a part of a river which is not a part of the sea; and at the place and time of any disposal into it of aqueous radioactive waste from a sewage disposal works or directly from premises, has a flow-rate which is not less than $1\text{m}^3\text{s}^{-1}$;

Relevant sewer

A public sewer or a disposal main which leads to a sewage disposal works that—

(a) has the capacity to handle a minimum of 100m^3 of effluent per day; and

(b) discharges treated effluent only to the sea or to a relevant river

["public sewer", "disposal main", "sewage disposal works" and "effluent" have the same meaning as in the Water Industry Act 1991]

Sea

Open offshore waters, including any area submerged at mean high water springs and also includes, so far as the tide flows at mean high water springs, an estuary or arm of the sea and the waters of any channel, creek, bay or river.

Sealed source

A radioactive source containing radioactive material where the structure is designed to prevent, under normal use, any dispersion of radioactive substances, excluding such a source where it is an electrodeposited source or a tritium foil source

Stored in transit	The storage in the course of transit of radioactive material or radioactive waste but does not include any storage of such material or waste where it is removed from its container
Tritium foil source	An article which has a mechanically tough surface into which tritium is incorporated; and is radioactive material or radioactive waste solely because of that tritium;
Uranium or thorium compound	<p>A substance or article which is radioactive material or radioactive waste solely because it is or contains metallic uranium or thorium, or prepared compounds of uranium or thorium, and in respect of which metal or compound the proportion of:</p> <ul style="list-style-type: none"> (a) U-235 in the uranium it contains is no more than 0.72% by mass; and (b) any isotope of thorium it contains is present in the isotopic proportions found in nature.
Undertaking	<p>Any trade, business or profession and—</p> <ul style="list-style-type: none"> (a) in relation to a public or local authority, includes any of the powers or duties of that authority, and (b) in relation to any other body of persons (whether corporate or unincorporate), includes any of the activities of that body.
Waste permitted person (in relation to the radioactive waste)	<p>A person who holds—</p> <ul style="list-style-type: none"> (a) an environmental permit to carry on the radioactive substances activity described in This legislation; or (b) in respect of premises in Scotland or Northern Ireland, an authorisation under the Radioactive Substances Act 1993

Annex 1: UK approach to exclusion, clearance and exemption in radioactive substances legislation

International definitions

1. The definitions of the terms 'exclusion', 'clearance' and 'exemption' are taken from IAEA, 1996: International Basic Safety Standards for Protection Against Ionising Radiation and the Safety of Radioactive Sources: Safety Series 15, Vienna.
2. **Exclusion** is defined as:
'The deliberate exclusion of a particular category of exposure from the scope of an instrument of regulatory control on the grounds that it is not considered amenable to control through the regulatory instrument in question'.
3. **Clearance** is defined as:
'The removal of radioactive materials or radioactive objects within the authorised practices from further regulatory control'.
4. **Exemption** is defined as:
'The determination by a regulatory body that a source or practice need not be subject to some or all aspects of regulatory control on the basis that the exposure due to the source or practice is too small to warrant the application of those aspects'.
5. Euratom has developed these concepts further to derive numerical values for both 'clearance' and 'exemption'. Clearance levels have been published in Euratom Radiation Protection Series Documents 122 parts one and two (although these publications do not constitute any part of Euratom legislation). Exemption levels, as well as criteria for the creation of new exemptions by member states, are set out in Annex 1 of the BSSD.

The UK approach to exclusion and clearance – 'out of scope'

6. In practice, the effect of both 'exclusion' and 'clearance' is the same. For the purposes of UK legislation 'exclusion' and 'clearance' are therefore treated in the same way - as removal from the scope of regulation. The effect achieved by the legislation is that substances and articles are not subject to regulatory controls where they:
 - are not amenable to control; or
 - have radionuclide concentrations below the RP 122 (or equivalent) clearance levels.
7. These levels are a feature of the legislation, and appear as Table 2.2 (dealing with naturally occurring radionuclides used in industrial activities) (see page 20) and Table 2.3 (dealing with practices) (see page 21) of this guidance. The levels for solids are taken directly from documents RP122 parts one and two, as referred to above. The levels for aqueous liquids and gases in Table 2.2 have been derived by the Health

Protection Agency for the purposes of this legislation using similar methods to those employed by Euratom in the derivation of their solid concentration levels.

The UK approach to exemption

8. For substances and articles which are defined as radioactive (i.e. the radionuclide concentrations are above the 'out of scope' levels), a second set of numerical levels (exemption levels) are set out in the legislation (see Table 3.1 on page 73). Exemption levels are generally given as concentrations of radionuclides in a substance or article, but there are also levels for total quantities of any substance held on any particular premises. In both cases, these levels apply to a substance or article in any of the common physical forms (solid, liquid or gas).
9. The exemption levels in Table 3.1 are taken directly from the BSSD Annex 1. They are used to exempt an activity in relation to a substance or article from the need for permitting, but the activity is subject to exemption conditions.
10. In addition to setting out numerical exemption levels, the BSSD allows Member States to introduce other exemptions for low-risk activities and substances, subject to certain criteria (dose criteria) being satisfied. The UK legislation uses this provision to set out such additional exemptions. These additional exemptions are set out in Table 3.2 (see page 79) of this guidance. The additions are based on pre-2011 exemption orders for such things as, for example, certain low-activity sealed sources, including luminised articles incorporating tritium up to certain activity limits.
11. Waste disposal criteria (concentration or mass limits, disposal methods and conditions relating to disposal) are also exempt in certain situations. These disposal criteria are based to large extent on the Government's policy statement on low level radioactive wastes (2007), and are supported by radiological impact assessments carried out by the Health Protection Agency. In accordance with Article 5 of the BSSD, these numbers have been derived using the basic criteria set out in Annex 1 of the Directive and Euratom guidance. Waste disposal criteria are set out mainly in Tables 3.3 and 3.4 (see pages 80-86) of this guidance, although there are additional provisions for wastes containing only NORM and certain medical and veterinary practices.

Annex 2: References to the legislation

Table A2 References to the legislation			
Guidance Paragraph	RSA93 Amendment Reference (Scotland ²¹ / Northern Ireland ²²)	RSA93 Exemption Order Reference (Scotland ²³ / Northern Ireland ²⁴)	EPR10 (Schedule 23) ²⁵ Reference (England and Wales)
Para 2.3(i) Scope (radioactive material) – NORM industrial activity and numerical criteria	3. – 1A 3. – 1B (1)(a), (c), (2) Schedule – Schedule 1A, Part 1; Table 2		Part 2: 2. –(1)(a) - (b) 3. 4. –(1)(a), (c), –(2) Part 3: (Table 1) 2.
Para 2.3(ii) Scope (radioactive material) – NORM practice and numerical criteria	3. – 1A 3. –1C(a), (b), (c) Schedule – Schedule 1A, Table 3		Part 2: 3. –(1) 5. Part 3: 3. (Table 2) 4.
Para 2.3(iii) Scope (radioactive material) – practice and numerical criteria	3. –1A 3. –1D Schedule – Schedule 1A, Table 3		Part 2: 3. –(1) 6. Part 3: 3.(Table 2) 4.
Para 2.4(i) Out of scope (material) – short half-life (<100s)	3. –1E		Part 2: 7.
Para 2.4(ii) Out of scope (material) – radioactivity solely from artificial background	3. –1F		Part 2: 8.
Para 2.4(iii) Out of scope (material) – lawfully disposed of as waste or contaminated during lawful disposal	3. –1H		Part 2: 10.

²¹ The Radioactive Substances Act 1993 Amendment (Scotland) Regulations 2011 (SSI 2011/207)

²² The Radioactive Substances Act 1993 (Amendment) Regulations (Northern Ireland) 2011 (NISR2011/290)

²³ The Radioactive Substances Exemption (Scotland) Order 2011 (SSI 2011/147)

²⁴ The Radioactive Substances Exemption (Northern Ireland) Order 2011 (NISR2011/289)

²⁵ The Environmental Permitting (England and Wales) (Amendment) Regulations 2011 (SI 2011/2043)

Table A2 References to the legislation

Guidance Paragraph	RSA93 Amendment Reference (Scotland ²¹ / Northern Ireland ²²)	RSA93 Exemption Order Reference (Scotland ²³ / Northern Ireland ²⁴)	EPR10 (Schedule 23) ²⁵ Reference (England and Wales)
Para 2.4(iv) Out of scope (material) – onsite contamination	3. –1G		Part 2: 9.
Para 2.7(i) Scope (radioactive waste) – NORM industrial activity and numerical criteria	3. – 1A 3. – 1B (1), (2) Schedule – Schedule 1A, Table 1; Part 1 and Part 2; Table 2		Part 2: 2. –(1), 3. 4. –(1)(a), (b), (c), –(2) Part 3: 1. (Table 1) 2.
Para 2.7(ii) Scope (radioactive waste) – NORM practice and numerical criteria	3. –1A 3. –1C(a), (b), (c) Schedule – Schedule 1A, Table 3		Part 2: 3. –(1), (2), 5. –(a), (b), (c) Part 3: 3. (Table 2) 4.
Para 2.7(iii) Scope (radioactive waste) – practice and numerical criteria	3. –1A 3. –1D Schedule – Schedule 1A, Table 3		Part 2: 3., 6. Part 3: 3. Table 2 4.
Para 2.8(i) Out of scope (waste) – short half-life (<100s)	3. –1E		Part 2: 7.
Para 2.8(ii) Out of scope (waste) – radioactivity solely from artificial background	3. –1F		Part 2: 8.
Para 2.8(iii) Out of scope (waste) – lawfully disposed of as waste or contaminated during lawful disposal	3. –1H		Part 2: 10.
Para 2.13 Scope (material/waste) – unlisted artificial radionuclides and calculated numerical criteria	Schedule –Schedule 1A, Table 3 (final line)		Part 3: 3. Table 2 (final line)
Para 2.16 (Table 2.1a) Scope (material/waste) – listed NORM industrial activities part a	Schedule –Schedule 1A, Table 1, Part 1		Part 2: 2. –(1)(a) – (b) ("type 1 NORM industrial activity")

Table A2 References to the legislation

Guidance Paragraph	RSA93 Amendment Reference (Scotland²¹/ Northern Ireland²²)	RSA93 Exemption Order Reference (Scotland²³/ Northern Ireland²⁴)	EPR10 (Schedule 23)²⁵ Reference (England and Wales)
Para 2.16 (Table 2.1b) Scope (material/waste) – listed NORM industrial activities part b	Schedule –Schedule 1A, Table 1, Part 2		Part 2: 2. –(1)(a) – (l) (“type 2 NORM industrial activity”)
Para 2.21 Out of scope (material/waste) – artificial background radioactivity	3. –1F		Part 2: 8.-(1)(a)(i)
Para 2.26 Table 2.2 summation rule	Schedule –Schedule 1A, 1.		Part 3: 2.
Para 2.27 Table 2.3 summation rule	Schedule –Schedule 1A, 2.		Part 3: 4.
Para 2.31 Out of scope (material/waste) – short half-life (<100s)	3. –1E		Part 2: 7.
Para 2.32 Out of scope (material) – onsite contamination	3. –1G		Part 2: 9.
Para 2.37 Out of scope (material/waste) – lawfully disposed of as waste or contaminated during lawful disposal	3. –1H		Part 2: 10. –(1)(a) 10. – (3)(4) 10. – (2)(b) 10. – (7)
Para 2.44 Definition ‘relevant liquid’	5. –(1)(“relevant liquid”)		Part 2: 1. –(1) (“relevant liquid”)
Table 2.1a List of NORM Industrial Activities (part a)	Schedule –Schedule 1A, Table 1, Part 1		Part 2: 2. –(1)(a) – (b). (“type 1 NORM industrial activity”)
Table 2.1b List of NORM Industrial Activities (part b)	Schedule –Schedule 1A, Table 1, Part 2		Part 2: 2. –(1)(a) – (l). (“type 2 NORM industrial activity”)
Table 2.2 Radionuclide concentration (for material/waste from NORM industrial activities)	Schedule –Schedule 1A, Table 2		Part 3: 1. (Table 1)
Table 2.3 Radionuclide concentration (for material/waste from practices)	Schedule –Schedule 1A, Table 3		Part 3: 1. (Table 2) 3.

Table A2 References to the legislation

Guidance Paragraph	RSA93 Amendment Reference (Scotland ²¹ / Northern Ireland ²²)	RSA93 Exemption Order Reference (Scotland ²³ / Northern Ireland ²⁴)	EPR10 (Schedule 23) ²⁵ Reference (England and Wales)
Para 3.11 Table 3.1: Conditional exemption from permitting for keeping and use – numerical criteria for radioactive material		Schedule 1 –Table 1	Part 7: Section 2.- (3)(1)(a)(ii) Section 5. – (1)(b) Section 6. –(1) Section 9. – 26. (Table 5)
Para 3.11, bullet 2 Table 3.1 Summation rule		Schedule 1 –Table 1; 1., 2.	Part 7: Section 9 – 27, 28. (Table 5)
Para 3.6, bullet 4 Table 3.1 Unlisted radionuclides		Schedule 1 –Table 1 (final line)	Part 7: Section 9. – 26. (Table 5) (final line)
Para 3.13 Conditional exemption from permitting for keeping and use of radioactive material – condition on record keeping		Schedule 2 -3(a)(ii)	Part 7: Section 4 -11(a)(ii)
Para 3.14 Conditional exemption from permitting for keeping and use of radioactive material – condition on labelling		Schedule 2 -3(b)	Part 7: Section 4 -11(b)
Para 3.16 Conditional exemption from permitting for keeping and use of radioactive material – condition on allowing regulator access to records		Schedule 2 -3(d)	Part 7: Section 4 -11(d)
Para 3.17 Conditional exemption from permitting for keeping and use of radioactive material – condition on storing safely and securely		Schedule 2 -3(e)	Part 7: Section 4 -11(e)
Para 3.18 Conditional exemption from permitting for keeping and use of radioactive material – condition on preventing unintended/uncontrolled releases		Schedule 2 -3(f)	Part 7: Section 4 -11(f)
Para 3.19 Conditional exemption from permitting for keeping and use of radioactive material – condition on notifying regulators of loss/theft or suspected loss/theft		Schedule 2 -4(1)	Part 7: Section 4 -12(1)

Table A2 References to the legislation

Guidance Paragraph	RSA93 Amendment Reference (Scotland ²¹ / Northern Ireland ²²)	RSA93 Exemption Order Reference (Scotland ²³ / Northern Ireland ²⁴)	EPR10 (Schedule 23) ²⁵ Reference (England and Wales)
Para. 3.19 Proportionality of notifying regulators of loss/theft or suspected loss/theft		Schedule 2 -4(2)	Part 7: Section 4 -12(2)
Para 3.23 Table 3.2: Conditional exemption from permitting for keeping and use of small sealed sources – numerical criteria		Schedule 1 –Table 2	Part 7: Section 2 – (3)(1)(a) 5(1)(a)(i) 6(2) Section 9 – 25. (Table 4)
Para 3.25 Conditional exemption from permitting for keeping and use of small sealed sources – condition on record keeping		Schedule 2 -3(a)(ii)	Part 7: Section 4 -11(a)(ii)
Para 3.26 Conditional exemption from permitting for keeping and use of small sealed sources – condition on labelling		Schedule 2 -3(b)	Part 7: Section 4 -11(b)
Para 3.28 Conditional exemption from permitting for keeping and use of small sealed sources – condition on allowing regulator access to records		Schedule 2 -3(d)	Part 7: Section 4 -11(d)
Para 3.29 Conditional exemption from permitting for keeping and use of small sealed sources – condition on storing safely and securely		Schedule 2 -3(e)	Part 7: Section 4 -11(e)
Para 3.30 Conditional exemption from permitting for keeping and use of small sealed sources – condition on preventing unintended/uncontrolled releases		Schedule 2 -3(c)	Part 7: Section 4 -11(c)
Para 3.31 Conditional exemption from permitting for keeping and use of small sealed sources – condition on notifying regulators of loss/theft or suspected loss/theft		Schedule 2 -4(1)	Part 7: Section 4 -12(1)

Table A2 References to the legislation

Guidance Paragraph	RSA93 Amendment Reference (Scotland ²¹ / Northern Ireland ²²)	RSA93 Exemption Order Reference (Scotland ²³ / Northern Ireland ²⁴)	EPR10 (Schedule 23) ²⁵ Reference (England and Wales)
Para. 3.31 Proportionality of notifying regulators of loss/theft or suspected loss/theft		Schedule 2 -4(2)	Part 7: Section 4 -12(2)
Para 3.35 Table 3.2: Conditional exemption from permitting for keeping and use of unsealed sources – numerical criteria		Schedule 1 –Table 2	Part 7: Section 2 – (3)(1)(a) (5)(1)(b) 2 – (6) Section 9 – 25. (Table 4)
Para 3.37 Conditional exemption from permitting for keeping and use of unsealed sources – condition on record keeping		Schedule 2 -3(a)(ii)	Part 7: Section 4 -11(a)(ii)
Para 3.38 Conditional exemption from permitting for keeping and use of unsealed sources – condition on labelling		Schedule 2 -3(b)	Part 7: Section 4 -11(b)
Para 3.40 Conditional exemption from permitting for keeping and use of unsealed sources – condition on allowing regulator access to records		Schedule 2 -3(d)	Part 7: Section 4 -11(d)
Para 3.41 Conditional exemption from permitting for keeping and use of unsealed sources – condition on storing safely and securely		Schedule 2 -3(e)	Part 7: Section 4 -11(e)
Para 3.42 Conditional exemption from permitting for keeping and use of unsealed sources – condition on preventing unintended/uncontrolled releases		Schedule 2 -3(f)	Part 7: Section 4 -11(f)
Para 3.43 Conditional exemption from permitting for keeping and use of unsealed sources – condition on notifying regulators of loss/theft or suspected loss/theft		Schedule 2 -4(1)	Part 7: Section 4 -12(1)

Table A2 References to the legislation

Guidance Paragraph	RSA93 Amendment Reference (Scotland ²¹ / Northern Ireland ²²)	RSA93 Exemption Order Reference (Scotland ²³ / Northern Ireland ²⁴)	EPR10 (Schedule 23) ²⁵ Reference (England and Wales)
Para. 3.43 Proportionality of notifying regulators of loss/theft or suspected loss/theft		Schedule 2 -4(2)	Part 7: Section 4 -12(2)
Para 3.51 Table 3.2: Conditional exemption from permitting for keeping and use of mobile apparatus – numerical criteria		Schedule 1 –Table 2	Part 7: Section 3 – (8) Section 9 – 25. (Table 4)
Para 3.53 Conditional exemption from permitting for keeping and use of mobile apparatus – condition on record keeping		Schedule 2 -3(a)(i)	Part 7: Section 4 -11(a)(i)
Para 3.54 Conditional exemption from permitting for keeping and use of mobile apparatus – condition on labelling		Schedule 2 -3(b)	Part 7: Section 4 -11(b)
Para 3.56 Conditional exemption from permitting for keeping and use of mobile apparatus – condition on allowing regulator access to records		Schedule 2 -3(d)	Part 7: Section 4 -11(d)
Para 3.57 Conditional exemption from permitting for keeping and use of mobile apparatus – condition on storing safely and securely		Schedule 2 -3(e)	Part 7: Section 4 -11(e)
Para 3.58 Conditional exemption from permitting for keeping and use of mobile apparatus – condition on preventing unintended/uncontrolled releases		Schedule 2 -3(c)	Part 7: Section 4 -11(c)
Para 3.59 Conditional exemption from permitting for keeping and use of mobile apparatus – condition on notifying regulators of loss/theft or suspected loss/theft		Schedule 2 -5(1)	Part 7: Section 4 -13(1)

Table A2 References to the legislation

Guidance Paragraph	RSA93 Amendment Reference (Scotland ²¹ / Northern Ireland ²²)	RSA93 Exemption Order Reference (Scotland ²³ / Northern Ireland ²⁴)	EPR10 (Schedule 23) ²⁵ Reference (England and Wales)
Para. 3.59 Proportionality of notifying regulators of loss/theft or suspected loss/theft		Schedule 2 -5(2)	Part 7: Section 4 -13(2)
Para 3.62 – 3.64 Conditional exemption from permitting for accumulation of specific substances or articles – numerical criteria		Part 2: 6. -(1)(a), 7. -(1), 8. -(2), (4) Schedule 1 –Table 2	Part 7: Section 2 – 4(1), 5(1) Section 9 –25. (Table 4)
Para 3.66 Conditional exemption from permitting for accumulating radioactive waste – condition on record keeping		Schedule 2 –3(a)	Part 7: Section 4 -11(a)
Para 3.67 Conditional exemption from permitting for accumulating radioactive waste – condition on labelling		Schedule 2 –3(b)	Part 7: Section 4 -11(b)
Para 3.69 Conditional exemption from permitting for accumulating radioactive waste – condition on allowing regulator access to records		Schedule 2 –3(d)	Part 7: Section 4 -11(d)
Para 3.70 Conditional exemption from permitting for accumulating radioactive waste – condition on storing safely and securely		Schedule 2 –3(e)	Part 7: Section 4 -11(e)
Para 3.71 Conditional exemption from permitting for accumulating radioactive waste – condition on preventing unintended/uncontrolled releases		Schedule 2 –3(f)	Part 7: Section 4 -11(f)

Table A2 References to the legislation

Guidance Paragraph	RSA93 Amendment Reference (Scotland ²¹ / Northern Ireland ²²)	RSA93 Exemption Order Reference (Scotland ²³ / Northern Ireland ²⁴)	EPR10 (Schedule 23) ²⁵ Reference (England and Wales)
<p>Para 3.72</p> <p>Conditional exemption from permitting for accumulating radioactive waste – condition on preventing unintended/uncontrolled releases from specific articles</p>		Schedule 2 –3(c)	Part 7: Section 4 -11(c)
<p>Para 3.73</p> <p>Conditional exemption from permitting for accumulating radioactive waste – condition on notifying regulators of loss/theft or suspected loss/theft</p>		Schedule 2 –4(1)	Part 7: Section 4 -12(1)
<p>Para. 3.73</p> <p>Proportionality of notifying regulators of loss/theft or suspected loss/theft</p>		Schedule 2 -4(2)	Part 7: Section 4 -12(2)
<p>Para 3.74</p> <p>Conditional exemption from permitting for accumulating radioactive waste – condition on disposal time limit</p>		Schedule 2 –6	Part 7: Section 4 -14(a)
<p>Para 3.90</p> <p>Table 3.3, lines 1 - 7: Conditional exemption from permitting for solid radioactive waste disposal – numerical criteria</p>		Part 4: 11. -(2), 12. -(1)(a) 13. -(1) Schedule 1 –Table 3	Part 7: Section 4 – 15(3)(b), 16(1)(a), 17(1) Section 9 – 25. (Table 4)
<p>Para 3.94</p> <p>Conditional exemption from permitting for solid radioactive waste disposal – condition on transfer and mixing with non-radioactive waste</p>		Part 4: 13. -(3)	Part 7: Section 5 – 17(3)
<p>Para 3.95</p> <p>Conditional exemption from permitting for solid radioactive waste disposal – condition on record keeping</p>		Part 4: 13. -(2)(a)	Part 7: Section 5 – 17(2)(a)

Table A2 References to the legislation

Guidance Paragraph	RSA93 Amendment Reference (Scotland ²¹ / Northern Ireland ²²)	RSA93 Exemption Order Reference (Scotland ²³ / Northern Ireland ²⁴)	EPR10 (Schedule 23) ²⁵ Reference (England and Wales)
<p>Para 3.97</p> <p>Conditional exemption from permitting for solid radioactive waste disposal – condition on labelling</p>		<p>Part 4: 13. –(2)(c)</p>	<p>Part 7: Section 5 – 17(2)(c)</p>
<p>Para 3.98</p> <p>Conditional exemption from permitting for solid radioactive waste disposal – condition on allowing regulator access to records</p>		<p>Part 4: 13. –(2)(e)</p>	<p>Part 7: Section 5 – 17(2)(e)</p>
<p>Para 3.105</p> <p>Conditional exemption from permitting for NORM waste disposal up to 5 Bq/g</p>		<p>Part 7: 19. –(2)(a)(i), 20. –(1)(c)</p>	<p>Part 7: Section 6 – 18(1)(a), 18(1)(b)(i), 18(2), 18(3)(a), 18(4), 19(2)</p>
<p>Para 3.107</p> <p>Conditional exemption from permitting for NORM waste disposal up to 5 Bq/g – condition on record keeping</p>		<p>Part 7: 20. –(1)(a)</p>	<p>Part 7: Section 6 – 19(1)(a)</p>
<p>Para 3.109</p> <p>Conditional exemption from permitting for NORM waste disposal up to 5 Bq/g – condition on labelling</p>		<p>Part 7: 20. –(1)(b)</p>	<p>Part 7: Section 6 – 19(1)(c)</p>
<p>Para 3.110</p> <p>Conditional exemption from permitting for NORM waste disposal up to 5 Bq/g – condition on allowing regulator access to records</p>		<p>Part 7: 20. –(1)(d)</p>	<p>Part 7: Section 6 – 19(1)(d)</p>
<p>Para 3.115</p> <p>Conditional exemption from permitting for NORM waste disposal up to 5 Bq/g – condition on disposal route</p>		<p>Part 7: 20. –(1)(c)</p>	<p>Part 7: Section 6 – 19(2)</p>

Table A2 References to the legislation

Guidance Paragraph	RSA93 Amendment Reference (Scotland ²¹ / Northern Ireland ²²)	RSA93 Exemption Order Reference (Scotland ²³ / Northern Ireland ²⁴)	EPR10 (Schedule 23) ²⁵ Reference (England and Wales)
Para 3.119 Conditional exemption from permitting for NORM waste disposal up to 10 Bq/g		Part 7: 19. –(1), (2)(a)(ii), (2)(b), (3)	Part 7: Section 6 – 18(1), 18(3), 18(4)(b), 18(5)
Para 3.121 Conditional exemption from permitting for NORM waste disposal up to 10 Bq/g – condition on preparing written radiological assessment		Part 7: 20. –(3)(a)	Part 7: Section 6 – 18(3)(b)(ii) 18(5) 19(2)(a) 19(3)(a)
Para 3.121 Conditional exemption from permitting for NORM waste disposal up to 10 Bq/g – condition on satisfying dose criteria		Part 7: 20. –(3)(b)	Part 7: Section 6 – 19(3)(b)
Para 3.125 Conditional exemption from permitting for NORM waste disposal up to 10 Bq/g – condition on providing to regulator 28 days prior 1 st disposal		Part 7: 20. –(3)(c)	Part 7: Section 6 – 19(3)(c)
Para 3.125 Conditional exemption from permitting for NORM waste disposal up to 10 Bq/g – condition on preventing disposal if regulator objects		Part 7: 20. –(3)(d)	Part 7: Section 6 – 19(3)(d)
Para 3.126 Conditional exemption from permitting for NORM waste disposal up to 10 Bq/g – condition on record keeping		Part 7: 20. –(1)(a)	Part 7: Section 6 – 19(1)(a)
Para 3.128 Conditional exemption from permitting for NORM waste disposal up to 10 Bq/g – condition on labelling		Part 7: 20. –(1)(b)	Part 7: Section 6 – 19(1)(c)

Table A2 References to the legislation

Guidance Paragraph	RSA93 Amendment Reference (Scotland ²¹ / Northern Ireland ²²)	RSA93 Exemption Order Reference (Scotland ²³ / Northern Ireland ²⁴)	EPR10 (Schedule 23) ²⁵ Reference (England and Wales)
Para 3.129 Conditional exemption from permitting for NORM waste disposal up to 10 Bq/g – condition on allowing regulator access to records		Part 7: 20. –(1)(d)	Part 7: Section 6 – 19(1)(d)
Para 3.134-3.135 Conditional exemption from permitting for disposal of specific articles		Part 4: 11. -(2), 12. –(1)(b), 13. –(3)(c)	Part 7: Section 4 – 15(3)(a), 16(1)(b), 17(3)(c) 17 (4)(b)
Para 3.137 Conditional exemption from permitting for disposal of specific articles - condition on waste transfer		Part 4: 13. –(3)(c)	Part 7: Section 4 – 17(3)(c)
Para 3.138 Conditional exemption from permitting for disposal of specific articles - condition on record keeping		Part 4: 13. –(2)(a)	Part 7: Section 5 – 17(2)(a)
Para 3.140 Conditional exemption from permitting for disposal of specific articles - condition on allowing regulator access to records		Schedule 2: 3(b)	Part 7: Section 5 – (17)(2)(e)
Para 3.141 Conditional exemption from permitting for disposal of specific articles - condition on notifying regulators within 14 days of HASS disposal		Part 4: 13(2)(d)	Part 7: Section 5 – 17(2)(d)
Para 3.146 Conditional exemption from permitting for aqueous radioactive waste disposal (max 100 Bq/ml)		Part 5: 15. -(1), (2), (3) 16. –(4)(a)	Part 7: Section 7 – 21(1), 21(2), 21(3), 22(4)(a)(5)

Table A2 References to the legislation

Guidance Paragraph	RSA93 Amendment Reference (Scotland ²¹ / Northern Ireland ²²)	RSA93 Exemption Order Reference (Scotland ²³ / Northern Ireland ²⁴)	EPR10 (Schedule 23) ²⁵ Reference (England and Wales)
Para 3.148 Conditional exemption from permitting for aqueous radioactive waste disposal (max 100 Bq/ml) – condition on no dilution		Part 5: 15. -(4)(a)	Part 7: Section 7 – 21(4)(a)
Para 3.149 Conditional exemption from permitting for aqueous radioactive waste disposal (max 100 Bq/ml) – condition on minimising overall activity discharged		Part 5: 15. -(4)(b)	Part 7: Section 7 – 21(4)(b)
Para. 3.150 Conditional exemption from permitting for aqueous radioactive waste (max 100 Bq/ml) disposal – condition on disposal route		Part 5: 16. -(1)(a)	Part 7: Section 7 – 22(1)(a)
Para 3.151 Conditional exemption from permitting for aqueous radioactive waste (max 100 Bq/ml) disposal – condition on record keeping		Part 5: 16. -(1)(b)	Part 7: Section 7 – 22(1)(b)
Para 3.153 Conditional exemption from permitting for aqueous radioactive waste disposal (max 100 Bq/ml) – condition on allowing regulator access to records		Part 5: 16. -(1)(c)	Part 7: Section 7 – 22(1)(d)
Para 3.158 Conditional exemption from permitting for disposal of patient excreta and U&Th compounds		Part 5: 14. -(1) Schedule 1 – Table 3	Part 7: Section 7 – 20(1)(3)(a)(b) Section 9 – 29. (Table 6)
Para 3.160 Conditional exemption from permitting for disposal of patient excreta and U&Th compounds – condition on minimising overall activity discharged		Part 5: 14. -(2)	Part 7: Section 7 – 20(2)

Table A2 References to the legislation

Guidance Paragraph	RSA93 Amendment Reference (Scotland ²¹ / Northern Ireland ²²)	RSA93 Exemption Order Reference (Scotland ²³ / Northern Ireland ²⁴)	EPR10 (Schedule 23) ²⁵ Reference (England and Wales)
<p>Para 3.161</p> <p>Conditional exemption from permitting for disposal of patient excreta and U&Th compounds – condition on disposal route</p>		<p>Part 5: 14. -(3)(b)</p>	<p>Section 7 – 20(3)(b)</p>
<p>Para 3.162</p> <p>Conditional exemption from permitting for disposal of patient excreta and U&Th compounds – condition on record keeping</p>		<p>Part 5: 14. -(3)(c)</p>	<p>Part 7: Section 7 – 20(3)(c)</p>
<p>Para 3.164</p> <p>Conditional exemption from permitting for disposal of patient excreta and U&Th compounds – condition on allowing regulator access to records</p>		<p>Part 5: 14. -(3)(d)</p>	<p>Part 7: Section 7 – 20(3)(d)</p>
<p>Para 3.173-3.176 (Table 3.4)</p> <p>Conditional exemption from permitting for disposal of low conc. aqueous radioactive waste</p>		<p>Part 5: 15. -(1), (3) 16. -(3), (4)(b)(i)</p> <p>Schedule 1 – Table 4</p>	<p>Part 7: Section 7 – 21(1), (2), (3) 22(3), 22(4)(b), 22(6)</p> <p>Section 9 –30. (Table 7)</p>
<p>Para 3.178</p> <p>Conditional exemption from permitting for disposal of low conc. aqueous radioactive waste – condition on no dilution</p>		<p>Part 5: 16. -(4)(a)</p>	<p>Part 7: Section 7 – 21(4)(a)</p>
<p>Para 3.179</p> <p>Conditional exemption from permitting for disposal of low conc. aqueous radioactive waste – condition on minimising overall activity discharged</p>		<p>Part 5: 15. -(4)(b)</p>	<p>Part 7: Section 7 – 21(4)(b)</p>
<p>Para 3.180</p> <p>Conditional exemption from permitting for disposal of low conc. aqueous radioactive waste – condition on waste disposal route</p>		<p>Part 5: 16. -(1)(a)</p>	<p>Part 7: Section 7 – 22(1)(a)</p>

Table A2 References to the legislation

Guidance Paragraph	RSA93 Amendment Reference (Scotland ²¹ / Northern Ireland ²²)	RSA93 Exemption Order Reference (Scotland ²³ / Northern Ireland ²⁴)	EPR10 (Schedule 23) ²⁵ Reference (England and Wales)
Para 3.181 Conditional exemption from permitting for disposal of low conc. aqueous radioactive waste – condition on record keeping		Part 5: 16. -(1)(b)	Part 7: Section 7 – 22(1)(b)
Para 3.183 Conditional exemption from permitting for disposal of low conc. aqueous radioactive waste – condition on allowing regulator access to records		Part 5: 16. -(1)(c)	Part 7: Section 7 – 22(1)(d)
Para 3.187-3.188 Conditional exemption from permitting for disposal of gaseous radioactive waste		Part 6: 17. -(1), (3), 18. -(1)	Part 7: Section 8 – 23(1), 23(3)
Para 3.190 Conditional exemption from permitting for gaseous radioactive waste disposal – condition on minimising radioactive waste generated		Part 6: 17. -(2)	Part 7: Section 8 – 23(2)
Para 3.191 Conditional exemption from permitting for gaseous radioactive waste disposal – condition on ventilation		Part 6: 18. -(2)(a)	Part 7: Section 8 – 24(1)(a)
Para 3.192 Conditional exemption from permitting for gaseous radioactive waste disposal – condition on allowing regulator access to records		Part 6: 18. -(2)(b)	Part 7: Section 8 – 24(1)(b)