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Guidance

Scope of and exemptions from the radioactive substances legislation in England, Wales and Northern Ireland

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Applies to England, Northern Ireland and Wales

Publication for Scotland (https://www.gov.scot/publications/scope-radioactive-substances-legislation-scotland-guidance-document/pages/1/)

Contents

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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 for England, Wales and Northern Ireland, 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. This guidance does not apply to Scotland. The Environmental Authorisations (Scotland) Regulations 2018 and the conditions laid out in its General Binding Rules should be directly referred to.

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 (England and Wales) Regulations 2016 (EPR16). RSA93 is the relevant legislation in Northern Ireland; in England and Wales, EPR16 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 In EPR16, these have been replaced by permitting.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. EPR16 and RSA93 and this accompanying guidance are only relevant to persons using premises for the purposes of an undertaking, which includes any trade, business or professions i.e. it does not apply to private individuals.

1.4. Two concepts are used in this document (see Annex 1 for a fuller explanation of these concepts as applied in the legislation):

- 'Out of scope'. 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 for the purposes of the legislation may nonetheless be exempt from the need for a permit.

Hierarchy of legislation and guidance

1.5. This guidance represents an aid to interpretation of the legislation[footnote 1]. 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’.

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

1.7. The hierarchy involves 3 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 of Northern Ireland and Wales (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 has more detailed explanations of how the legislation applies to particular industrial sectors.

1.8 To illustrate the relationships between the 3 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 exemption and ‘out of scope’ numerical values

1.9. ‘Out of scope’ and exemption are defined in the legislation by reference to various threshold values. 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 2017 (see paragraph 5.3).

1.10. Different dose criteria are used for naturally occurring radioactive materials (NORM) used in ‘NORM industrial activities’ (as specified in the legislation), compared to those used for artificial radionuclides and NORM used for their radioactive, fissile or fertile properties.

1.11. 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) or can be ‘light touch’ (exemption). They are based on international standards and guidance which support the BSSD 2013. The radiological impact assessments carried out by the International Atomic Energy Agency (IAEA) to support the ‘out of scope’ values take into account a wide variety of possible exposure pathways including water and food pathways, and assume no controls are placed on the keeping and use of radioactive substances and accumulation or disposal of radioactive wastes.

1.12. For artificial radionuclides, and for NORM used for their radioactive, fissile or fertile properties (sometimes referred to as a ‘practice’), the numerical values given in Tables 2.3 and 3.1 for ‘out of scope’ and exemption respectively are based on a radiation dose of 10 μSv/year to a member of the public. These values are given in the BSSD 2013 and are taken from IAEA RS-G-1.7[footnote 2] (‘out of scope values’) and EC RP-65[footnote 3] (exemption values). The term ‘practice’ is not used in the legislation. However, this term is used in the BSSD 2013 and in other UK legislation and guidance. In the BSSD 2013 it is given a broad definition: a human activity that can increase the exposure of individuals to radiation from a radiation source. Where it appears in this guidance, it is used in a narrower sense, as a shorthand form to mean ‘an activity involving artificial radionuclides or which employs the radioactive, fissile or fertile properties of NORM’.

1.13. For ‘NORM industrial activities’ (see paragraphs 2.16-2.17), the numerical values given in Table 2.2 (‘out of scope’ values) are based on a number of sources. For solids or ‘relevant liquids[footnote 4], the value of 1 Bq/g for the natural decay chains is taken from IAEA RS-G-1.7 with the values for the some of the decay chain segments being taken from EC RP122 Part 2[footnote 5]. The IAEA value of 1 Bq/g is based on the consideration of the upper end of the worldwide distribution of activity concentrations in soil provided by the United Nations Scientific Committee on the Effects of Atomic Radiation. The EC RP122 Part 2 concentrations used for the decay chain segments are calculated using a dose criterion of 300 µSv/year for any member of the public. This criterion is also the basis for the values calculated for liquids other than ‘relevant liquids’ taken from HPA-CRCE-005[footnote 6] and gaseous concentrations[footnote 7].

1.14. The Table 2.2 ‘out of scope’ values for Ra-226 are applied to management of wastes arising from the remediation of land contaminated by historic radium activities as long as the contamination occurred prior to 13 May 2000 (date of coming into force of the previous European Council Directive 96/29/Euratom).

1.15. The dose criteria selected in order to demonstrate exemption as a Type 1 or 2 NORM waste[footnote 8] are 1000 µSv/year to any landfill worker and 300 µSv/year for any member of the public. A generic radiological impact assessment[footnote 9] has been carried out which demonstrates that for NORM waste concentrations up to the values given in Table 3.3A for Type 1 NORM waste these criteria will be met. For Type 2 NORM waste it is the responsibility of the waste producer to demonstrate that these criteria have been met.

1.16. As well as numerical limits, other conditions are in place to ensure that the generation of radioactive waste is minimised and disposal limits are appropriate to mitigate consequences, so an operator can be sure that they are in control. 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, disposal of considerable quantities of non-radioactive waste) etc. In the case of exemptions, these restrictions are imposed by way of conditions set out in the legislation.

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

1.17. This section explains the relationship between radioactive materials that are:

- outside the scope of the legislation
- exempt from the requirement for a permit under the legislation
- subject to a requirement for a permit

1.18. The legislation applies if the ‘radioactive material’ or ‘radioactive waste’ is either from a ‘NORM industrial activity’ or is used for the radioactive, fissile or fertile properties of naturally occurring radionuclide(s) or is an artificial radionuclide. Any material or waste which falls outside of the above description is outside the scope of the legislation (for example, the distribution and use of natural gas for domestic or industrial use). This is based on Euratom guidance[footnote 10] which identifies those industries of concern for radiological protection purposes.

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

1.20. All materials are, to some extent, radioactive. Table 2.2 and Table 2.3 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 with concentrations at or below those in Tables 2.2 and 2.3 are not deemed to be radioactive.

1.21. Any person who believes that their holdings are, or might be, exempt should refer to Table 3.2 to check if their items are listed. If the item is not included in Table 3.2 then the levels in Table 3.1 should be referred to. If the levels in this table are exceeded, then reference may be made to Table 3.2 in the circumstances, and for materials, described in that table.

1.22. 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 x 10^5 Bq of Ba-137m eluting sources **plus** unlimited number of fixed smoke detectors **plus** 5 x 10^{12} Bq of class A GTLDs.

1.23. However, for any individual row in Table 3.2, if the exempt levels are exceeded, than a permit will be required for all of the holdings, and not just the amount of holdings above the exempt levels.

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

1.24. This section explains the relationship between radioactive wastes that are:

- outside the scope of the legislation

- exempt from the requirement for a permit under the legislation
- subject to a requirement for a permit

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

1.26. 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.

1.27. For any one waste stream, arising from any one particular process, if the ‘out of scope’ activity concentration is X (Tables 2.2 and 2.3) and the exemption activity concentration is Y and total activity is Z (Tables 3.3 and 3.4), then:

- If the activity concentration of a radionuclide is below X it is not deemed to be radioactive; no conditions apply.
- If the activity concentration is between X and Y and the total activity is less than Z, the waste is exempt, but the conditions in the exemption apply to all of the waste.
- If the activity concentration is greater than Y or the total activity is greater than Z, then a permit is required and the permit conditions may apply to all of the waste. The permit will make this clear.

1.28. It should be noted that where a substance contains multiple radionuclides, it is necessary that they are all taken into account when determining if that substance is radioactive waste. This is discussed further in paragraph 2.24.

1.29. The reason for this approach is that it is not practical to deduct some waste which is outside the scope of the legislation 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)[footnote 11] condition for waste minimisation, which must apply to the entire inventory of waste.

Radioactive material and radioactive waste which is ‘out of scope’ of the legislation

General

2.1. The definition of radioactive material and radioactive waste and the associated decision making process is shown diagrammatically in Figure 2.1. (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.

Definition 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 3 categories:

i. It is used in, or arises from, NORM industrial activities listed in Table 2.1a[footnote 12] **and** the concentration of radionuclides in the material exceeds the values in columns 2 (solid or 'relevant liquid'), 3 (aqueous liquid) or 4 (gaseous)[footnote 13] of Table 2.2.

ii. It contains NORM 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.

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 out of scope of the legislation, if it meets one of the 5 criteria set out below:

i. All radionuclides contained in the material are of short half-life (<100 seconds) (see paragraph 2.30).

ii. Its radioactivity is solely attributable to artificial background radiation (see paragraph 2.21-2.23).

iii. It is a contaminated material which remains on the premises where it was contaminated (see paragraph 2.31-2.35).

iv. 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 2.38-2.43).

v. It has arisen from the remediation of land contaminated by Ra-226 prior to 13 May 2000 and the values are less than those given in Table 2.2 (see paragraph 2.36)

2.5. Materials which contain NORM and which are not used in a NORM industrial 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. All aqueous liquids containing either artificial radionuclides or NORM used for their radioactive, fertile or fissile properties (except 'relevant liquids', see paragraphs 2.44- 2.47) and all gases containing such radionuclides are considered to be radioactive material for the purposes of this legislation, irrespective of concentration.

Definition 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 3 categories:

i.It arises from NORM 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 or 'relevant liquid'), 3 (aqueous liquid) or 4 (gaseous) of Table 2.2.

ii. It contains NORM 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 out of the scope of the legislation, if it meets one of the 5 criteria set out below:

i. All radionuclides contained in the material are of short half-life (<100 seconds) (see paragraph 2.30).

ii. Its radioactivity is solely attributable to artificial background radiation (see paragraph 2.21-2.23).

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 2.38-2.43).

iv. It has arisen from the remediation of land contaminated by Ra-226 prior to 13 May 2000 and the values are less than those given in Table 2.2 (see paragraph 2.36)

v. It is gaseous NORM waste from oil and gas production (see paragraph 2.37).

2.9. Wastes which contain NORM and which do not arise from a NORM industrial 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. All aqueous liquid wastes containing either artificial radionuclides or NORM used for their radioactive, fertile or fissile properties (except 'relevant liquids', see paragraphs 2.44-2.47) and all gaseous waste containing such radionuclides are considered to be radioactive waste for the purposes of this legislation, irrespective of concentration.

Unlisted radionuclides and activities

2.11. 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.

2.12. 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.

2.13. Table 2.3, in the case of artificial radionuclides, contains those radionuclides in common use for which radiological impact assessments have been prepared and published in IAEA RS-G-1.7 (except for carbon-14

and caesium-137 which are taken from EC RP122 Part 1). There are some radionuclides given in EPR16 for which no values are specified in IAEA RS-G-1.7. For such radionuclides the EPR16 values will be retained.

2.14. There is a catch-all provision in the table for non-listed radionuclides – 0.01 Bq/g. Alternatively, for these radionuclides only, an appropriate radionuclide-specific value can be calculated based on the concentration which gives rise to a dose to a member of the public of 10 μSv/ year calculated by reference to IAEA RS-G-1.7.

2.15. This means that a person may use the 'out of scope' provisions based on their own calculations, provided that the calculations are carried out using the same methodology as that which was used to calculate the values in the table. Any person considering performing a calculation is advised to discuss with the relevant regulator beforehand.

NORM industrial activities

2.16. Outside the legislation there are many activities involving radioactivity. An example is the collection, preparation and display of geological specimens which contain naturally occurring radioactive material (NORM). However, for the purposes of this legislation, any such activities, unless listed in Table 2.1a or Table 2.1b, do not involve radioactive material or radioactive waste. This is because, following Euratom guidance, it is believed that the radiological consequences (in terms of radiation dose) of such activities are trivial. Only those 'NORM industrial activities' which could conceivably lead to the need for controls are covered by the legislation.

2.17. There are 2 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 (Type 1 NORM Industrial Activities). 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 (Type 2 NORM Industrial Activities). 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

2.18. The legislation does not require that naturally-occurring radionuclides in their normal setting or location be considered 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 classed as radioactive for the purposes of the legislation.

2.19. However, where the fabric of buildings or equipment are contaminated by radionuclides that originate from a NORM industrial activity or by radionuclides that have been used for their radioactive, fissile or fertile properties, these are captured by the legislation. Most of the values in Table 2.2 for NORM industrial activities are based on IAEA RS-G-1.7 values. These values have been chosen as the optimum boundary between, on one hand, the average activity concentrations in soil generally measured worldwide and, on the other hand, activity concentrations in ores, mineral sands, industrial residues and wastes. Therefore there is no need to discount background from the measured NORM. However, the background activity can be discounted for NORM radionuclides where Table 2.3 applies i.e. where the radionuclides have been used for their radioactive, fissile or fertile properties.

2.20. The activity concentration of uranium from natural background is not deducted when the uranium is used as a feedstock or product of a practice; for instance, the manufacture of nuclear fuel.

Artificial background radioactivity

2.21. Artificial radionuclides which are present throughout the environment, for example as a result of atmospheric weapons tests and accidents, are not considered to be radioactive material or radioactive waste. An example is the run-off of rainwater from buildings that can contain Cs-137, which is 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.

2.22. 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 material[footnote 14].

2.23 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 2.38-2.43). For instance, rainwater contains the radionuclide Cs-137 as a result of the presence of this radionuclide in the atmosphere (see paragraph 2.21). If the Cs-137 concentration is then enhanced by additional Cs-137 which arises from a permitted discharge, then this additional concentration of Cs-137 is not excluded under this provision.

Summation rules

2.24. 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.

2.25. The Table 2.2 summation rule is the sum of the ratios 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.

2.26 The Table 2.3 summation rule is the sum of the ratios 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.

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

2.28. 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.

2.29. 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 2.11).

Radionuclides with a short half-life

2.30. 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

2.31. 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 premises[footnote 15] where it was contaminated.

2.32. 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.

2.33. 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. This would also apply to contaminated land (that is, soil, rubble etc) whilst on the site where it became contaminated. In most cases, such land is unlikely to be radioactive waste. However, if and when such land is remediated, radioactive waste may be generated. Such waste may require a permit or compliance with exemption conditions.

2.34. 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 may include contaminated plumbing and extraction systems, cyclotron housing, and other contaminated equipment. Buried contaminated infrastructure such as drains, foundations and vaults may also become waste.

2.35. In summary, in the case of these examples, they are not considered to be radioactive substances unless and until:

- The material in question is removed from the premises for use elsewhere; or
- The material in question becomes waste.

Historic radium contamination

2.36. A substance or article is not radioactive material or radioactive waste, where it arises from the remediation of land contaminated by Ra-226 provided that:

- The contamination occurred prior to 13 May 2000 (coming into force date of the previous European Council Directive 96/29/Euratom).
- In the absence of Ra-226 or its progeny, the substance or article would not otherwise be radioactive material or radioactive waste.
- The concentration of Ra-226 and its resulting progeny do not exceed the values given below (which are the same as those given in Table 2.2 for Ra-226+)
  - For solids or ‘relevant liquids’ 1 Bq/g

- For any other liquids 1 Bq/l
- For gases 0.01 Bq/m^3 (this does not include radon-222 and its short-lived progeny)

Gaseous NORM waste from oil and gas production

2.37. There are incidental releases of gaseous NORM waste arising from the production of oil and gas, for example from process gas flares, vents on storage tanks or fugitive releases. In some cases the only radioactive substances activity taking place is the venting or flaring of trivial amounts of gaseous waste. In this situation the gaseous releases are exempt from the requirement to have a permit.

Contamination by lawful disposals

2.38. A 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; so 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.

2.39. In the special case of a disposal facility designed solely for the burial of solid radioactive waste the deposited material remains ‘radioactive waste’ until the permit relating to disposal has been surrendered or revoked.

2.40. However, a substance is radioactive material or radioactive waste where, following its disposal, a process occurs which was not foreseen at the time of disposal, and results in a substantial increase in radiation exposure to the public or radioactive contamination in the environment.

2.41. 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.

2.42. 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 or an aqueous liquid with specified hazardous properties. If a liquid is not a relevant liquid, it is referred to as ‘any other liquid’. Relevant liquid is an important definition as all other liquids containing either artificial radionuclides or NORM used for their radioactive, fertile or fissile properties are considered to be radioactive waste for the purposes of this legislation, irrespective of their activity concentration. This definition is used to remove relevant liquids from the scope of the legislation if they contain concentrations of radioactive substances below the values in the ‘solids’ column of Table 2.2 and Table 2.3. The rationale for using the solid values is explained in the following paragraphs.

2.45. The radiological impact assessments which support the values in Table 2.2 and Table 2.3 are based on reasonable assumptions. For solids, there is an assumption that they are not directly disposed of to water (e.g. drains, sewers, rivers, sea or groundwater) as other legislation usually prevents such practices. Accordingly, the drinking water pathway giving rise to a human radiation dose is not an immediate concern, although the long-term impact on drinking water for example, via leaching from a landfill into groundwater which may be consumed in the future is considered.

2.46. In the case of non-aqueous liquids (e.g. mercury and oils), like solids an immediate impact on drinking water pathway can be ruled out, because other pollution control legislation does not allow disposal of such substances to the water environment. This legislation therefore applies the ‘solids’ values to non-aqueous liquids as it assumes that the disposal of such materials is to a conventional ‘solid’ waste route such as burial or incineration and 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. Aqueous liquids with specified hazardous properties are also prevented from being disposed of to water due to other pollution control legislation. This class of liquids is defined by reference 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. Accordingly, similar to non-aqueous liquids, the ‘solids’ values have been applied to specify when such liquids fall within the scope of the legislation. It is noted that such hazardous aqueous liquids may be treated to remove the hazardous component to enable clean water to be discharged to the water environment. Any operator carrying out such an operation should be aware that such treatment may generate radioactive waste, for example, solid residues or aqueous waste, the disposal of which may require permitting.##

Table 2.1a: Type 1 NORM Industrial Activities

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

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Table 2.1b: Type 2 NORM Industrial Activities

- Extraction and production 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. For example, activities such as maintenance of clinker ovens for cement production and boilers used at coal-fired power stations.
- 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
- China clay extraction
- Water treatment associated with provision of drinking water
- Geothermal energy production
- The remediation of contamination from any type 1 NORM industrial activity or any of the activities listed above

Table 2.2: Activity concentration of radionuclides: NORM industrial activities[footnote 16]

Radionuclide	Solid or 'relevant liquid' activity concentration (Bq/g)	Any other liquid activity concentration (Bq/l)	Gaseous activity concentration (Bq/m^3)
U-238sec	1	0.1	0.001
U-238+	5	10	0.01
U-234	5	10	0.01
Th-230	10	10	0.001
Ra-226+	1	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	1	0.1	0.001
Th-232	5	10	0.001
Ra-228+	1	0.1	0.01
Th-228+	1	1	0.001

Table 2.3: Activity concentration of radionuclides in 'practices'

Radionuclide	Activity concentration (Bq/g)
H-3	10^2
Be-7	10

Radionuclide	Activity concentration (Bq/g)
C-14	10
F-18	10
Na-22	0.1
Na-24	1
Si-31	10^3
P-32	10^3
P-33	10^3
S-35	10^2
Cl-36	1
Cl-38	10
K-42	100
K-43	10
Ca-45	10^2
Ca-47	10
Sc-46	0.1
Sc-47	100
Sc-48	1
V-48	1
Cr-51	10^2
Mn-51	10
Mn-52	1
Mn-52m	10
Mn-53	10^2

Radionuclide	Activity concentration (Bq/g)
Mn-54	0.1
Mn-56	10
Fe-52+	10
Fe-55	10^3
Fe-59	1
Co-55	10
Co-56	0.1
Co-57	1
Co-58	1
Co-58m	10^4
Co-60	0.1
Co-60m	10^3
Co-61	10^2
Co-62m	10
Ni-59	10^2
Ni-63	10^2
Ni-65	10
Cu-64	10^2
Zn-65	0.1
Zn-69	10^3
Zn-69m+	10
Ga-72	10
Ge-71	10^4

Radionuclide	Activity concentration (Bq/g)
As-73	10^3
As-74	10
As-76	10
As-77	10^3
Se-75	1
Br-82	1
Rb-86	10^2
Sr-85	1
Sr-85m	10^2
Sr-87m	10^2
Sr-89	10^3
Sr-90+	1
Sr-91+	10
Sr-92	10
Y-90	10^3
Y-91	10^2
Y-91m	10^2
Y-92	10^2
Y-93	10^2
Zr-93	10
Zr-95+	1
Zr-97+	10
Nb-93m	10

Radionuclide	Activity concentration (Bq/g)
Nb-94	0.1
Nb-95	1
Nb-97+	10
Nb-98	10
Mo-90	10
Mo-93	10
Mo-99+	10
Mo-101+	10
Tc-96	1
Tc-96m	10^3
Tc-97	10
Tc-97m	100
Tc-99	1
Tc-99m	10^2
Ru-97	10
Ru-103+	1
Ru-105+	10
Ru-106+	0.1
Rh-103m	10^4
Rh-105	10^2
Pd-103+	10^3
Pd-109+	10^2
Ag-105	1

Radionuclide	Activity concentration (Bq/g)
Ag-108m+	0.1
Ag-110m+	0.1
Ag-111	10^2
Cd-109+	1
Cd-115+	10
Cd-115m+	10^2
In-111	10
In-113m	10^2
In-114m+	10
In-115m	100
Sn-113+	1
Sn-125	10
Sb-122	10
Sb-124	1
Sb-125+	0.1
Te-123m	1
Te-125m	10^3
Te-127	10^3
Te-127m+	10
Te-129	10^2
Te-129m+	10
Te-131	10^2
Te-131m+	10

Radionuclide	Activity concentration (Bq/g)
Te-132+	1
Te-133+	1
Te-133m+	1
Te-134	10
I-123	100
I-125	100
I-126	10
I-129	0.01
I-130	10
I-131+	1
I-132	10
I-133	10
I-134	10
I-135	10
Cs-129	10
Cs-131	10^3
Cs-132	10
Cs-134	0.1
Cs-134m	10^3
Cs-135	10^2
Cs-136	1
Cs-137+	1
Cs-138	10

Radionuclide	Activity concentration (Bq/g)
Ba-131	10
Ba-140	1
La-140	1
Ce-139	1
Ce-141	100
Ce-143	10
Ce-144+	10
Pr-142	10^2
Pr-143	10^3
Nd-147	10^2
Nd-149	10^2
Pm-147	10^3
Pm-149	10^3
Sm-151	10^3
Sm-153	10^2
Eu-152	0.1
Eu-152m	10^2
Eu-154	0.1
Eu-155	1
Gd-153	10
Gd-159	10^2
Tb-160	1
Dy-165	10^3

Radionuclide	Activity concentration (Bq/g)
Dy-166	10^2
Ho-166	10^2
Er-169	10^3
Er-171	10^2
Tm-170	10^2
Tm-171	10^3
Yb-175	10^2
Lu-177	10^2
Hf-181	1
Ta-182	0.1
W-181	10
W-185	10^3
W-187	10
Re-186	10^3
Re-188	10^2
Os-185	1
Os-191	10^2
Os-191m	10^3
Os-193	10^2
Ir-190	1
Ir-192	1
Ir-194	10^2
Pt-191	10

Radionuclide	Activity concentration (Bq/g)
Pt-193m	10^3
Pt-197	10^3
Pt-197m	10^2
Au-198	10
Au-199	10^2
Hg-197	10^2
Hg-197m	10^2
Hg-203	10
Tl-200	10
Tl-201	10^2
Tl-202	10
Tl-204	1
Pb-203	10
Pb-210+	0.01
Pb-212+	1
Bi-206	1
Bi-207	0.1
Bi-210	10
Bi-212+	1
Po-203	10
Po-205	10
Po-207	10
Po-210	0.01

Radionuclide	Activity concentration (Bq/g)
At-211	10^3
Ra-223+	1
Ra-224+	1
Ra-225	10
Ra-226+	0.01
Ra-227	100
Ra-228+	0.01
Ac-227+	0.01
Ac-228	1
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	10
Pa-231	0.01
Pa-233	10
U-230+	1

Radionuclide	Activity concentration (Bq/g)
U-231	10^2
U-232+	0.1
U-233	1
U-234	1
U-235+	1
U-235sec	0.01
U-236	10
U-237	10^2
U-238+	1
U-238sec	0.01
U-239	10^2
U-240+	10^2
Np-237+	1
Np-239	10^2
Np-240	10
Pu-234	10^2
Pu-235	10^2
Pu-236	1
Pu-237	10^2
Pu-238	0.1
Pu-239	0.1
Pu-240	0.1
Pu-241	10

Radionuclide	Activity concentration (Bq/g)
Pu-242	0.1
Pu-243	10^3
Pu-244+	0.1
Am-241	0.1
Am-242	10^3
Am-242m+	0.1
Am-243+	0.1
Cm-242	10
Cm-243	1
Cm-244	1
Cm-245	0.1
Cm-246	0.1
Cm-247+	0.1
Cm-248	0.1
Bk-249	10^2
Cf-246	10^3
Cf-248	1
Cf-249	0.1
Cf-250	1
Cf-251	0.1
Cf-252	1
Cf-253	10^2
Cf-253+	1

Radionuclide	Activity concentration (Bq/g)
Cf-254	1
Es-253	10^2
Es-254+	0.1
Es-254m+	10
Fm-254	10^4
Fm-255	10^2
Any other solid or non-aqueous liquid radionuclide that is not of natural terrestrial or cosmic origin	0.01 or that concentration which gives rise to a dose to a member of the public of 10 microsieverts per year calculated by reference to guidance by IAEA RS-G-1.7

Figure 2.1 - Schematic presentation of the scope of the legislation

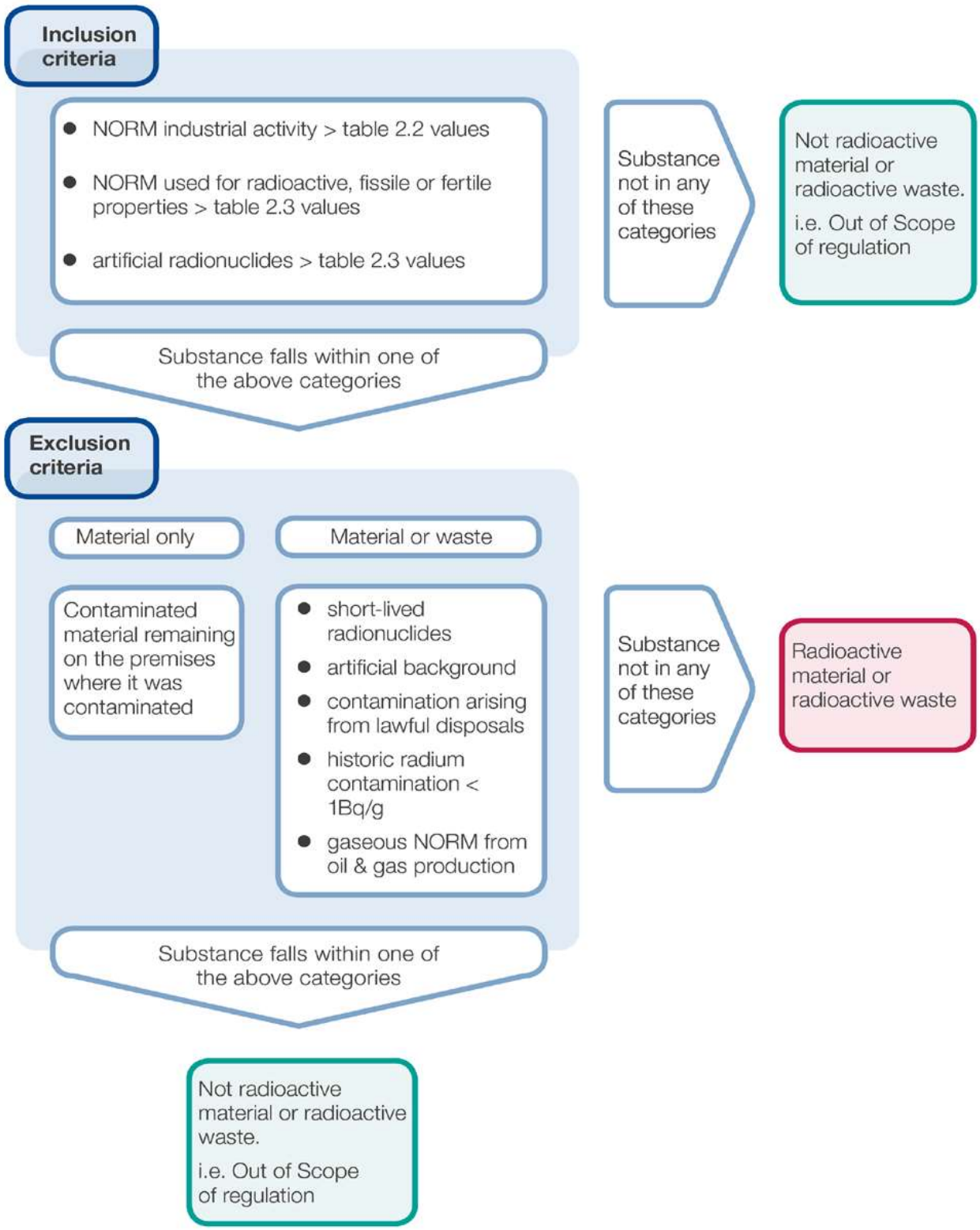

Figure 2.1 description:

A decision tree on whether material or waste falls within or out of scope of the legislation.

A substance or article is only radioactive material if it falls within one or more of the following 3 categories:

1. It is used in, or arises from, NORM industrial activities and the concentration of radionuclides in the material exceeds the values in Table 2.2.
2. It contains NORM 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 Table 2.3.
3. It contains artificial radionuclides, and, for solids and ‘relevant liquids’, the concentration of radionuclides in the material exceeds the values shown in Table 2.3.

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 out of scope of the legislation, if it meets one of the 6 criteria set out below:

1. all radionuclides contained in the material are of short half-life
2. its radioactivity is solely attributable to artificial background radiation
3. it is a contaminated material remaining on the premises where it was contaminated
4. it has been previously lawfully disposed of as a waste
5. it has arisen from the remediation of land contaminated by radium and the values are less than 1Bq/g
6. it is gaseous NORM from oil and gas production

Materials which contain NORM, and which are not used in a NORM industrial 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.

Material and waste which is exempt from permitting

Introduction

3.1. The activities described in this guidance are exempt from permitting on the grounds that the radiological consequences, meaning radiation doses to persons, are trivial and below the dose limits as recommended by the International Commission on Radiological Protection (ICRP)[footnote 17].

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 out 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 that they are exempt (or, indeed, out of scope of the legislation altogether), and they 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 themselves that they have sufficient control over the material in their 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 Type 1 NORM waste
- Disposal of Type 2 NORM waste
- 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.

3.5. In each case, a different set of conditions applies (although many conditions are common to 2 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 provision.

Keeping and use of radioactive materials – universal provisions

General points

3.6. The exemptions apply to radioactive material in any of the common physical forms – solid, liquid or gas.

3.7. The levels are set such that the dose criteria for members of the public will, when the materials become waste, be met in all reasonably foreseeable situations.

3.8. Table 3.1 is intended for holders of unsealed source material and only applies to material which is not described in Table 3.2.

Exemption provisions

3.9. 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 106 Bq/g or may hold up to 109 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:
  - ‘A’ means the quantity of each radionuclide listed in column 1 of Table 3.1 that is present in the material (and waste).
  - ‘B’ means the quantity of that radionuclide specified in column 2 of Table 3.1.
  - ‘C’ means the concentration of each radionuclide listed in column 1 of Table 3.1 that is present in the material (and waste).
  - ‘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 derives from BSSD 2013. However, BSSD 2013 only lists radionuclides known to be in common usage. If a person wishes to claim exemption for any radionuclide not listed in Table 3.1, there are 2 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 0-85951-42-3. There are also additional exemption provisions for isotopically unmodified uranium and thorium.

Exemption conditions

3.10. 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 for sealed sources. The conditions in this section are therefore based on the assumption that the radioactive materials held on the premises are in the form of unsealed source material. If the material is in the form of a sealed source, the conditions set out in the section on small sealed sources are applicable (see paragraphs 3.18-3.28).

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

3.11. Records are kept so that a holder is in control of their 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 3.17 below).

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

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

3.13. The ‘where reasonably 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.

3.14. 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 in most situations and is not deemed proportionate for the purposes of radiological protection of members of the public. However, there are circumstances where 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.

3.15. 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.

3.16. 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:

- **notify the incident to the regulator as soon as practicable; and**
- **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 10 times the value in column 2 of Table 3.1.

3.17. On the grounds of proportionality, a notification to the regulator is only necessary in the above situation. The condition does not 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

3.18. The exemptions in this section must be read in conjunction with the sections relating to mobile radioactive apparatus (see paragraph 3.41-3.56) and accumulation of radioactive waste (see paragraphs 3.57-3.76). 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 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.

3.19. Where a permit is held for keeping and use, there is no need to record exempt holdings in the permit schedule.

Exemption provisions

3.20. 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 giving the maximum total activity of 2×10^8 Bq.
- 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. 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

3.21. 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.

3.22. Records are kept so that a holder is in control of their 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 3.28 below).

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

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

3.24. 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.

3.25. Radioactive substances legislation continues to apply to exempt material (if it is in scope of the legislation). Inspection by the relevant regulatory body is neither necessary nor expected in most situations, and is not deemed proportionate for the purposes of radiological protection of members of the public. However, there are circumstances where 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.

3.26. 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, do 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.

3.27. 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:

- **notify the incident to the regulator as soon as practicable; and**
- **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 10 times the value in column 2 of Table 3.2.

3.28. On the grounds of proportionality, a notification to the regulator is only necessary in the above situation. The condition is therefore not intended to apply to minor accidents of loss (for example, some minor contamination inside the source's container) 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

3.29. 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.

3.30. The exemptions in this section must be read in conjunction with the sections relating to holdings of other unsealed source material (see paragraphs 3.6-3.17), mobile sources (see paragraphs 3.41-3.56), and the accumulation of radioactive waste (see paragraphs 3.57-3.76). 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.

3.31. 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 1×10^8 Bq, the total exempt quantity for keeping and use plus accumulation of waste is 2×10^8 Bq.

Exemption provisions

3.32. 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 trials, 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.

Exemption conditions

3.33. 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 3.10-3.17.

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

3.34. Records are kept so that a holder is in control of their 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 3.40 below).

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

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

3.36. 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.

3.37. Radioactive substances legislation continues to apply to exempt material (if it is in scope of the legislation). Inspection by the relevant regulatory body is neither necessary nor expected in most situations, and is

not deemed proportionate for the purposes of radiological protection of members of the public. However, there are circumstances where 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.

3.38. 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.

3.39. 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 10 times the value in column 2 of Table 3.1.

3.40. On the grounds of proportionality, a notification to the regulator is only necessary in 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

3.41. The exemptions in this section, and the associated conditions, are broadly similar to those for sealed sources; there is recognition, however, that mobile sources may be held at more than one premises.

3.42. The mobile apparatus exemption applies to any of the articles described in column 1 of Table 3.2.

3.43. The exemptions in this section must be read in conjunction with the sections relating to small sealed sources (see paragraphs 3.18-3.28) and accumulation of radioactive waste (see paragraphs 3.57-3.76). 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.

3.44. 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.

3.45. 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.

3.46. 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.

3.47. 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 the mobile radioactive apparatus is taken onto premises temporarily and for a specific purpose.

Exemption provisions

3.48. 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 x 108 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

3.49. 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 and the location within the premises where they are stored or used.

3.50. Records are kept so that a holder is in control of their 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 3.56 below).

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

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

3.52. 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.

3.53. Radioactive substances legislation continues to apply to exempt material (if it is in scope of the legislation). Inspection by the relevant regulatory body is neither necessary nor expected in most situations, and is not deemed proportionate for the purposes of radiological protection of members of the public. However, there are circumstances where 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.

3.54. 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, do 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.

3.55. 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:

- **notify the incident to the regulator as soon as practicable; and**
- **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 10 times the value in column 2 of Table 3.1.

3.56. On the grounds of proportionality, a notification to the regulator is only necessary in 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

3.57. For certain types of sources the accumulation of radioactive waste on any premises is exempt up to defined thresholds (given in Table 3.2) provided that there is intent to dispose of such wastes.

3.58. The exemptions in this section must be read in conjunction with the sections relating to keeping and use of unsealed sources (see paragraphs 3.29-3.40), small sealed sources (see paragraphs 3.18-3.28) and mobile radioactive apparatus (see paragraphs 3.41-3.56). This is because the concept employed in these exemption provisions is that the Table 3.1 values for total activity (Column 2 of Table 3.1) should apply to all of fixed sources + waste accumulated. Similarly, Table 3.2 values for total activity (Column 3 of Table 3.2) should apply to all 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

3.59. For small sealed sources, specified unsealed 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.

3.60. Waste high activity sealed sources (HASS) and sources of similar potential hazard are not exempt from permitting for accumulation and may only be accumulated under the terms of a permit. Sealed sources of lower activity than HASS and similar sources remain exempt from permitting for accumulation subject to the conditions in 3.62 - 3.76. Disposal of all sealed sources remains exempt subject to the conditions in 3.62 - 3.76.

3.61. Accumulation of waste sealed sources is only exempt from permitting where operators have previously held the sources under their own permit, or held the sources themselves under one of the exemptions in Table 3.2. Accumulation of waste sealed sources is not exempt where the operator has received the waste sources for disposal.

Exemption conditions

3.62. 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.

3.63. Records are kept so that a holder is in control of their 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 3.70 below).

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

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

3.65. 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.

3.66. Radioactive substances legislation continues to apply to exempt material (if it is in scope of the legislation). Inspection by the relevant regulatory body is neither necessary nor expected in most situations, and is not deemed proportionate for the purposes of radiological protection of members of the public. However, there are circumstances where 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.

3.67. 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.

3.68. 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, do 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.

3.69. 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:

- **notify the incident to the regulator as soon as practicable; and 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 10 times the value in column 2 of Table 3.1.

3.70. On the grounds of proportionality, a notification to the regulator is only necessary in 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.

3.71. 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.

3.72. 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.

3.73. 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.

3.74. 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.

3.75. Storage is not acceptable if the sole purpose of storage is to defer the cost of disposal to the future.

3.76. 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

3.77. 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.

3.78. The values are supported by radiological impact assessments which demonstrate that the relevant dose criteria are unlikely to be breached under all foreseeable circumstances.

3.79. Some wastes in this category – Very Low Level Radioactive Waste (VLLW) – were historically disposed of via the dustbin. Hence the 0.1 m^3 volume used in most cases in Table 3.3, being the approximate volume of a normal refuse bin.

3.80. 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 batch[footnote 18].

3.81. 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.

3.82. 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.

3.83. 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 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.

3.84. The correct approach to calculating activity is set out in Chapter 4 (see paragraphs 4.9 – 4.11).

3.85. Separate provisions dealing with higher volume NORM wastes are set out in paragraphs 3.96-3.134.

3.86. To comply with the accumulation condition (see paragraphs 3.71-3.76), waste should be disposed of as soon as practicable.

Exemption provisions

3.87. 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.

3.88. 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.

3.89. 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

3.90. 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 and where the radioactive waste will be mixed with such non- radioactive waste
(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 who is situated in another country who is lawfully entitled to receive such waste.

3.91. 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 they have made some 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.

3.92. 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 they have exercised control over the waste, and to allow future dose assessments or verification of dose assessment models to be carried out if necessary.

3.93. 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.

3.94. 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.

3.95. Radioactive substances legislation continues to apply to exempt material (if it is in scope of the legislation). Inspection by the relevant regulatory body is neither necessary nor expected in most situations, and is not deemed proportionate for the purposes of radiological protection of members of the public. However, there are circumstances where 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 Type 1 NORM waste

General points

3.96. Provisions are in place to exempt Type 1 NORM waste, namely high volume low level radioactive waste comprising NORM arising from NORM 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, but with trivial consequences in the radiation dose experienced.

3.97. NORM waste is solid radioactive waste which has arisen as a consequence of an NORM industrial activity (see Table 2.1) or from the remediation of radium contaminated land where the contamination occurred prior to 13 May 2000 (see paragraph 2.36).

3.98. A generic radiological impact assessment has been carried out which demonstrates that for NORM waste concentrations up to the values given in Table 3.3A the relevant dose criteria will be met under all reasonably foreseeable situations. NORM wastes above this limit are dealt with in paragraphs 3.120- 3.134.

3.99. 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.

3.100. To comply with the accumulation condition (see paragraphs 3.71-3.76), 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

3.101. The maximum annual quantity of NORM wastes which can be disposed of from any one premises is given in Table 3.3A. This maximum quantity can be disposed of through any of the 3 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 is exempt as Type 1 NORM waste where

- the NORM waste activity concentration does not exceed the value in column 2 of Table 3.3A (5 Bq/g for all NORM radionuclides except Pb-210+ and Po-210 where the value is 100 Bq/g) and the activity of radionuclides in the total amount of that NORM waste disposed of per year to landfill does not exceed the value in column 3 of Table 3.3A (5 x 10^{10} Bq for all NORM radionuclides except Pb-210+ and Po-210 where the value is 1 x 10^{12} Bq).
- the NORM waste activity concentration does not exceed the value in column 2 of Table 3.3A and the activity of radionuclides in the total amount of that NORM waste disposed of per year to a waste incinerator does not exceed 1 x 10^{8} Bq.
- the NORM waste activity concentration does not exceed the value in column 2 of Table 3.3A and the activity 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 the value in column 3 of Table 3.3A

3.102 A summation rule is used to determine the ‘maximum activity’ and the ‘maximum activity concentration’ when a substance contains a mixture of radionuclides. This rule states that the sum of the ratios A/B or C/D must not exceed 1, where:

i. ‘A’ means the activity of each radionuclide listed in column 1 of Table 3.3A that is present in the waste.

ii. ‘B’ means the activity of that radionuclide specified in column 3 or 4 of Table 3.3A.

iii. ‘C’ means the activity concentration of each radionuclide listed in column 1 of Table 3.3A that is present in the waste.

iv. ‘D’ means the activity concentration of that radionuclide specified in column 2 of Table 3.3A.

3.103. Two examples are given to help the reader. The first considers a waste stream (filter cake) arising from the production of titanium dioxide production. In this case it is assumed that radionuclides in all 3 natural decay chains are in secular equilibrium so that the ‘sec’ entries in Table 3.3A are appropriate. Example concentrations are as shown below alongside the regulatory thresholds for Type 1 NORM and the calculation of the ‘summation ratio’ required for the application of the legislation.

Radionuclide	**Type 1 NORM concentration Bq/g (Table 3.3A)**	**Filter cake activity concentrations (Bq/g)**	**Ratio of activity concentration to value in Table 3.3A**
U-238sec	5	0.5	0.1
U-235sec	5	0.03	0.006
Th-232sec	5	1.2	0.24
Summation of ratios			0.35

3.104. The summation of the ratios for concentrations is less than one and therefore this waste fulfils the activity concentration criterion for an exempt Type 1 NORM waste.

3.105. However, the total activity criterion must also be met. Assuming that 50,000 tonne ($5\ 10^{10}$ g) is disposed of to landfill in a single year, the activity in each decay chain can be calculated and the separate summation calculation performed to test if this is an exempt NORM waste.

Radionuclide	Type 1 NORM total activity for landfill (GBq/year) (Table 3.3A)	Activity disposed of annually (GBq/year)	Ratio of total annual activity to Table 3.3A value
U-238sec	50	25	0.5
U-235sec	50	1.5	0.03
Th-232sec	50	60	1.2
Summation of ratios			1.73

3.106. In the U-238sec component the total activity is 0.5 Bq/g multiplied by 5 10^{10} g/year which is 2.5 10^{10} Bq or 25 GBq. The contributions from the other 2 decay chains are calculated in a similar way. The summation of the ratios is greater than one so this waste stream cannot be an exempt Type 1 NORM waste even though it satisfies the concentration criterion.

3.107. The second example chosen is furnace dust from a metallurgical process. This is chosen because in such dust there is likely to be dis-equilibrium in the U-238 decay series with enhanced levels of Pb-210 and Po-210 present due to their volatility compared to uranium, uranium and thorium isotopes. The following table shows the assumed activity concentrations. Here for simplicity it is assumed that the levels of Pb-210 and Po-210 are identical so that they can be represented by the formula ‘Pb-210+’ used in the legislation.

Radionuclide	Type 1 NORM concentration Bq/g (Table 3.3A)	Furnace dust activity concentrations (Bq/g)	Ratio of activity concentration to value in Table 3.3A
U-238sec	5	0.1	0.02
Pb-210+	100	8	(8 - 0.1)/100 = 0.079
U-235sec	5	0.004	0.0008
Th-232sec	5	0.05	0.01
Summation of ratios			~ 0.11

3.108. Note how a (small) adjustment is made when calculating the ratio for the row for Pb-210+ because the U-238sec value given in Table 3.3A already includes its own component of Pb-210+.

3.109. The summation of the ratios for concentrations is about 0.11 so less than one meaning that this waste fulfils the concentration criterion for an exempt Type 1 NORM waste.

3.110. However, again the quantity criterion must also be satisfied. Assuming that 100 tonnes (1 10^8 g) of waste is to be disposed of as waste in a single year, the following results are calculated.

Radionuclide	**Type 1 NORM total activity for landfill (GBq/year) (Table 3.3A)**	**Activity disposed of annually (GBq/year)**	**Ratio of total annual activity to Table 3.3A value**
U-238sec	50	0.01	0.0002
Pb-210+	1000	0.79	0.00079
U-235sec	50	0.0004	0.000008
Th-232sec	50	0.005	0.0001
Summation of ratios			~0.0011

3.111. The summation of the ratios for annual activity is also less than one so both criteria are met and this material can be an exempt Type 1 NORM waste.

3.112. If Po-210 was present at higher levels than Pb-210 its contribution would need to be considered separately in the summation rule. However, the component of Po- 210 included in the entry for Pb-210+ would be subtracted as that has already been taken into account. For example, if the actual activity concentration of Po-210 was 15 Bq/g it would be assumed that 8 Bq/g of this was already accounted for in the calculations for Pb-210+ and U-238sec. The ‘excess’ Po-210 is only 7 Bq/g and that would add 7/100 = 0.07 to the summation ratio for activity concentration.

3.113. These examples show how both the concentration and total annual activity criteria can be tested for a given waste to determine if it can be an exempt Type 1 NORM waste. The examples are designed to be relatively straightforward. Other calculations can be undertaken for testing different combinations of natural radionuclides or when determining whether a waste could be an exempt Type 2 NORM waste.

Exemption conditions

3.114. The conditions set out below relate to the disposal of high volume low level radioactive Type 1 NORM waste.

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

3.115. 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 they have exercised control over the waste, and to allow future dose assessments or verification of dose assessment models to be carried out if necessary.

3.116. 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.

3.117. 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.

3.118. Radioactive substances legislation continues to apply to exempt material (if it is in scope of the legislation). Inspection of waste disposal records by the relevant regulatory body is neither necessary nor expected in most situations, and is not deemed proportionate for the purposes of radiological protection of members of the public. However, there are circumstances where 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 or incineration and where the radioactive waste will be mixed with such non-radioactive waste for the purposes of such burial or incineration; or
(b) A waste permitted person.

3.119. 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 Type 2 NORM waste

General points

3.120. Provisions are in place to exempt Type 2 NORM waste, namely high volume low level radioactive waste comprising NORM arising from industrial activities or land remediation which does not meet the Type 1 NORM waste limit as described in paragraphs 3.96-3.119. 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, but with trivial consequences in the radiation dose experienced.

3.121. NORM waste is solid radioactive waste which has arisen as a consequence of an NORM industrial activity (see Table 2.1) or from the remediation of radium contaminated land where the contamination occurred prior to 13 May 2000.

3.122. Where NORM waste does not meet the Type 1 NORM waste criteria but meets the Type 2 NORM waste criteria, 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 based on activity concentration of up to 5 Bq g-1.

3.123. To comply with the accumulation condition (see paragraphs 3.71-3.76), 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

3.124. NORM waste is exempt as Type 2 NORM waste if either:

- The activity concentration in the NORM waste is greater than the value given in column 2 of Table 3.3A but less than the value in column 5 (between 5 and 10 Bq/g for all NORM radionuclides except for Pb-210+ and Po-210 for which the value is between 100 and 200 Bq/g); or
- The activity concentration in the NORM waste is less than the value given in column 2 of Table 3.3A (5 Bq/g for all NORM radionuclides except for Pb-210+ and Po-210 where the value is 100 Bq/g) but the activity exceeds the value given in column 3 (50 GBq/year for all NORM radionuclides except for Pb-210+ and Po-210 for which the value is between 1000 GBq/year).

3.125. A summation rule is used to determine the 'maximum activity concentration' when a substance contains a mixture of radionuclides. This rule states that the sum of the ratios A/B must not exceed 1, where:

i. 'A' means the concentration of each radionuclide listed in column 1 of Table 3.3A that is present in the waste

ii. 'B' means the concentration of that radionuclide specified in column 5 of Table 3.3A.

Exemption conditions

3.126. The conditions below relate to the disposal of high volume low level radioactive Type 2 NORM waste.

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:

- **1000 µSv/year to workers at the place of disposal; and**
- **300µSv/year to the public.**

3.127. Persons who wish to dispose of NORM waste under these provisions may prepare the required radiological impact assessment in any form they wish.

3.128. 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.

3.129. The environmental regulators have produced a template which sets out the principal aspects that such a dose assessment should cover and the level of detail required. To reduce the risk for the waste producer that an assessment will be rejected as inadequate, it is recommended that waste producers consult with the appropriate regulator as their plans develop and comply with the template assessment. After consultation, the regulators will accept a dose assessment in another form, or one that has been carried out for purposes other than compliance with this condition, but the checks that will be carried out on such an assessment may be more extensive and lead to delays. 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.

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

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

3.131. 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 they have exercised control over the waste, and to allow future dose assessments or verification of dose assessment models to be carried out if necessary.

3.132. 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.

3.133. 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.

3.134. Radioactive substances legislation continues to apply to exempt material (if it is in scope of the legislation). Inspection of waste disposal records by the relevant regulatory body is neither necessary nor expected in most situations, and is not deemed proportionate for the purposes of radiological protection of members of the public. However, there are circumstances where 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

3.135. The provisions in this section are for the disposal of higher-activity sources when they become waste. 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.

3.136. For low activity sealed sources, the exempt ‘dustbin disposal’ route is available. This is covered in paragraphs 3.77-3.95.

3.137. 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.

Exemption provisions

3.138. 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.

3.139. 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

3.140. 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 who is situated in another country who is lawfully entitled to receive such waste.

3.141. 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.

3.142. 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 exercised control over the waste, and to allow future dose assessments or verification of dose assessment models to be carried out if necessary.

3.143. 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.

3.144. Radioactive substances legislation continues to apply to exempt material (if it is in scope of the legislation). Inspection by the relevant regulatory body is neither necessary nor expected in most situations, and is not deemed proportionate for the purposes of radiological protection of members of the public. However, there are circumstances where 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 XIV of the Basic Safety Standards Directive), in such form as may be required by the regulator.

3.145. 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

3.146. 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 > 100m^3 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.

3.147. 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.

3.148. 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.

3.149. This exemption does not apply if the premises from which the waste disposal takes place are permitted for other aqueous waste streams. This is because most aqueous disposals from any one particular site will be, to

some extent, inter- related; and therefore these discharges will need to be optimised across the site as a whole.

3.150. However, where a permit is in place, the holder can apply for those waste streams which would otherwise be exempt to be included in the existing permit. These wastes will then be subject to the conditions set out in the permit.

3.151. Separate provisions dealing with lower concentration aqueous waste are set out in paragraphs 3.171-3.190.

Exemption provisions

3.152. 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

3.153. 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 100 Bq/ml.

3.154. 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.

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

The waste must be disposed to a relevant sewer or to a waste

permitted person.

3.156. 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.

3.157. 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 the waste producer can demonstrate that they have exercised control over the waste, and to allow future dose assessments or verification of dose assessment models to be carried out if necessary.

3.158. 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.Use this template to create business as usual documents.

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.

3.159. Radioactive substances legislation continues to apply to exempt material (if it is in scope of the legislation). Inspection of waste disposal records by the relevant regulatory body is neither necessary nor expected in most situations, and is not deemed proportionate for the purposes of radiological protection of members of the public. However, there are circumstances where 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

3.160. 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.

3.161. These provisions can be used in addition to the provisions for other aqueous disposals.

3.162. 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.

3.163. 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

3.164. 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 1×10^{10} Bq of Tc-99m and 5×10^{9} 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

3.165. 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.

3.166. At the point of discharge, for most circumstances, it is too late to apply this principle. However, it is expected that operators employ the 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.

3.167. 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.

3.168. 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 they have exercised control over the waste, and to allow future dose assessments or verification of dose assessment models to be carried out if necessary.

3.169. 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.

3.170 Radioactive substances legislation continues to apply to exempt material (if it is in scope of the legislation). Inspection of waste disposal records by the relevant regulatory body is neither necessary nor expected in most situations, and is not deemed proportionate for the purposes of radiological protection of members of the public. However, there are circumstances where 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

3.171. These provisions are intended primarily for those industries from which large quantities of aqueous effluent with low radionuclide concentrations are discharged to the environment.

3.172. 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 3.146-3.159 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.

3.173. 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.

3.174. These flowrates are defined in the legislation in terms of a ‘relevant river’ (> $1m^3$/second) and ‘relevant sewer’ (capacity > $100m^3$ 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, they can assume that these conditions will continue to be met unless information is received to indicate otherwise.

3.175. 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.

3.176. This exemption does not apply if the premises from which the waste disposal takes place are permitted for other aqueous waste streams. This is because most aqueous disposals from any one particular site will be, to some extent, inter- related; so these discharges will need to be optimised across the site as a whole.

3.177. However, where a permit is in place, the holder can apply for those waste streams which would otherwise be exempt to be included in the

existing permit. These wastes will then be subject to the conditions set out in the permit.

3.178. When disposing of waste to a sewer, a user cannot aggregate the exemption in paragraphs 3.146-3.159 (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 3.146-3.159.

Exemption provisions

3.179. The exemptions are set out in Table 3.4.

- 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.

3.180. 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.

3.181. 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.

3.182. A summation rule applies to the common situation where an aqueous discharge contains 2 or more radionuclides as follows:

3.183. The sum of A/B and (C/D 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; and

v. E means the quantity of that radionuclide specified in column 4 of Table 3.4.

Exemption conditions

3.184. 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.

3.185. 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.

3.186. 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.

3.187. 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.

3.188. 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 they have exercised control over the waste, and to allow future dose assessments or verification of dose assessment models to be carried out if necessary.

3.189. 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.

3.190 Radioactive substances legislation continues to apply to exempt material (if it is in scope of the legislation). Inspection of waste disposal records by the relevant regulatory body is neither necessary nor expected in most situations, and is not deemed proportionate for the purposes of radiological protection of members of the public. However, there are circumstances where 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

3.191. 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.

3.192. 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.

3.193. 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.

3.194. Releases of gaseous NORM waste from oil and gas production are addressed in para 2.37.

Exemption provisions

3.195. 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.

3.196. Gaseous radioactive waste containing only Kr-85 as a radioactive component up to an annual total activity released of 1 x 10^{11} Bq is exempt.

Exemption conditions

3.197. 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.

3.198. 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.

3.199. 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.

3.200. Radioactive substances legislation continues to apply to exempt material (if it is in scope of the legislation). Inspection of waste disposal records by the relevant regulatory body is neither necessary nor expected in most situations, and is not deemed proportionate for the purposes of radiological protection of members of the public. However, there are circumstances where 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 – universal provisions

3.201. Users of radioactive substances, and disposers of radioactive waste, need to decide for themselves whether they are in scope of the legislation and, if so, whether exemptions apply to them. However, the regulator may take a view on the correctness of such a decision. All decisions, and the reasons for them, should be documented.

3.202. Users may discuss any issue relating to radioactive substances and waste, whether permitted or not, with the environmental regulators. 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 when an exemption could be claimed.

3.203. If a person relying on exemption provisions becomes aware or suspects that any exemption condition has not been met, for any reason, they must:

- Make efforts to remedy the situation by changing procedures or practices such that the conditions are met; and
- Notify the environmental regulator.

3.204. 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.

3.205. The exemptions regime does not require 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 they may inspect procedures, practices and records against the exemption conditions.

3.206. 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

Radionuclides	Maximum quantity (Bq) on any premises	Maximum concentration (Bq/g)
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

Radionuclides	Maximum quantity (Bq) on any premises	Maximum concentration (Bq/g)
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
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

Radionuclides	Maximum quantity (Bq) on any premises	Maximum concentration (Bq/g)
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

Radionuclides	Maximum quantity (Bq) on any premises	Maximum concentration (Bq/g)
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

Radionuclides	Maximum quantity (Bq) on any premises	Maximum concentration (Bq/g)
Pd-103	10^8	10^3
Pd-109	10^6	10^3
Ag-105	10^6	10^2
Ag-108m+	10^{x6}	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

Radionuclides	Maximum quantity (Bq) on any premises	Maximum concentration (Bq/g)
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

Radionuclides	Maximum quantity (Bq) on any premises	Maximum concentration (Bq/g)
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
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

Radionuclides	Maximum quantity (Bq) on any premises	Maximum concentration (Bq/g)
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

Radionuclides	Maximum quantity (Bq) on any premises	Maximum concentration (Bq/g)
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

Radionuclides	Maximum quantity (Bq) on any premises	Maximum concentration (Bq/g)
Ce-141	10^7	10^2
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

Radionuclides	Maximum quantity (Bq) on any premises	Maximum concentration (Bq/g)
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

Radionuclides	Maximum quantity (Bq) on any premises	Maximum concentration (Bq/g)
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
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

Radionuclides	Maximum quantity (Bq) on any premises	Maximum concentration (Bq/g)
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

Radionuclides	Maximum quantity (Bq) on any premises	Maximum concentration (Bq/g)
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
Pu-241	10^5	10^2

Radionuclides	Maximum quantity (Bq) on any premises	Maximum concentration (Bq/g)
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	104^x	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

Radionuclides	Maximum quantity (Bq) on any premises	Maximum concentration (Bq/g)
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 Public Health England's publication 'Exempt Concentrations and Quantities for Radionuclides not Included in the European Basic Safety Standards Directive'[footnote 19].	1, or the concentration given in respect of that radionuclide in the document referenced in column 2.

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

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 Class B gaseous tritium light device.	1 x 10^{12} Bq	3 x 10^{13} Bq
A Class C gaseous tritium light device.	1 x 10^{12} Bq	No limit
Any sealed source containing only tritium as a radioactive component.	2 x 10^{10} Bq	5 x 10^{12} Bq
A tritium foil source.	2 x 10^{10} Bq	5 x 10^{12} Bq
A smoke detector affixed to premises.	4 x 10^{6} Bq	No limit
An electrodeposited source.	6 x 10^{8} Bq Ni-63 or 2 x 10^{8} Bq Fe-55	6 x 10^{11} Bq
A luminised article (unsealed source).	8 x 10^{7} Bq Pm-147 or 4 x 10^{9} Bq H-3	4 x 10^{10} Bq Pm-147 or 2 x 10^{11} Bq H-3
A Ba-137m eluting source.	4 x 10^{4} Bq Cs-137+	4 x 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.

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 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 x 10^9 Bq Tc-99m and 2 x 10^8 Bq of all other radionuclides, (no more than 1 x 10^8 Bq of which is contained in radioactive material).	1 x 10^9 Bq Tc-99m and 2 x 10^8 Bq of all other radionuclides, (no more than 1 x 10^8 Bq of which is contained in radioactive material).

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 x 10^4 Bq	4 x 10^5 Bq for the sum of all radionuclides per 0.1m^3	2 x 10^8 Bq/year
Solid radioactive waste containing tritium and C-14 only, with no single item > 4 x 10^5 Bq	4 x 10^6 Bq of tritium and C-14 per 0.1m^3	2 x 10^9 Bq/year
Individual sealed sources	2 x 10^5 Bq for the sum of all radionuclides per 0.1m^3	1 x 10^7 Bq/year
Individual sealed sources (includes broken or damaged GTLDs)	2 x 10^{10} Bq of tritium per 0.1m^3	1 x 10^{13} Bq/year
Luminised articles with no single item containing > 8 x 10^7 Bq of	8 x 10^7 Bq per 0.1m3 of Pm-147	2 x 10^9 Bq/year of Pm-147 or 1 x

Radioactive waste	Maximum concentration of radionuclides	Maximum quantity of waste to be disposed of in the period stated
Pm-147 or > 4 x 10^9 of tritium	or 4 x 10^9 Bq per 0.1m^3 for tritium	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 x 10^{10} Bq/year of Tc-99m and 5 x 10^9 Bq/year for the sum of all other radionuclides

Table 3.3A NORM waste concentrations and maximum disposal quantities

Radionuclide	Type 1 NORM concentration (Bq/g)	Type 1 NORM total activity for landfill (GBq/y)	Type 1 NORM total activity for incineration (MBq/y)	Type 2 NORM concentration (Bq/g)
U-238sec	5	50	100	10
U-238+	5	50	100	10
U-234	5	50	100	10
Th-230	5	50	100	10
Ra-226+	5	50	100	10
Pb-210+	100	1000	100	200
Po-210	100	1000	100	200
U-235sec	5	50	100	10
U-235+	5	50	100	10
Pa-231	5	50	100	10
Ac-227+	5	50	100	10
Th-232sec	5	50	100	10
Th-232	5	50	100	10
Ra-228+	5	50	100	10

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	3×10^7	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

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)
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

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)
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	3×10^5	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
As-76	1	107^x	107^x
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

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)
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

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)
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

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)
Cd-115m	1	10^7	10^7
In-111	0.01	10^5	10^5
In-113m	0.01	10^5	10^5
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

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)
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

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)
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
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

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)
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

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)
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^{x7}
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

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)
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
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

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)
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

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)
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
Cm-242	1	10^7	10^7

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-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^{x5}
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

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)
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[footnote 20]	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

Technical considerations

Dilution, 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. Dilution that takes place during normal operations where radioactivity is not a concern is not prohibited, for example 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 to facilitate disposal is not. The regulators will provide guidance on sampling and averaging in such cases.

4.3. Dilution by mixing with non-radioactive wastes may be allowed under certain circumstances where the resulting material will be reused or recycled, and the amount of waste going for disposal will be reduced. Clear evidence of a demand for the resulting material must be demonstrated. This

would need to be authorised under a permit and the operator should discuss with the regulator at the earliest opportunity.

Discounting of ‘normal’ background

4.4. 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.

4.5. 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.

4.6. A 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’[footnote 21].

4.7. 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.

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

Head of chain’ etc. calculations

4.9. 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 ‘+’).

4.10. ‘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.

4.11. ‘+’ where it appears after a radionuclide means that, for the purpose of calculations, the radionuclide includes such of its progeny radionuclides in the decay chain that are relevant for the purposes of radiological impact assessment. These ` radionuclides are listed in Table 4.1 for out of scope material and waste and Table 4.2 for exempt material and waste.

4.12. Calculations using ‘head of chain’ values can be applied to:

- Calculations of ‘out of scope’ levels for industrial activities in Table 2.2.
- Calculations of ‘out of scope’ levels for practices in Table 2.3.
- Calculations of total holdings for keeping and use (and accumulation) in Table 3.1 and Table 3.2.
- Calculations for waste disposal in Table 3.3.
- Calculations for aqueous waste disposal in Table 3.4.
- Calculations for high volume low level radioactive waste disposals containing NORM radionuclides.

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

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

Parent radionuclide	Daughter radionuclides
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

Parent radionuclide	Daughter radionuclides
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, Tl207, 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, Bi212, Tl-208
Th-232sec	Ra-228, Ac-228, Th-228, Ra-224, Rn-220, Po-216, Pb-212, Bi212, Po-212, Tl-208
Th-234+	Pa-234m, Pa-234
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
U-235+	Th-231
U-235sec	Th-231, Pa-231, Ac-227, Th-227, Fr-223, Ra-223, Rn-219, Po215, Pb-211, Bi-211, Tl-207, Po-211
U-238+	Th-234, Pa-234m, Pa-234

Parent radionuclide	Daughter radionuclides
U-238sec	Th-234, Pa-234m, Pa-234, U-234, Th-230, Ra-226, Rn-222, Po218, 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 4.2: Radionuclides in secular equilibrium - Exempt material and waste

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

Parent radionuclide	Daughter radionuclides
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 and Table 3.3A: Rn-222, Po-218, Pb-214, Bi-214, Po-214, Pb-210, Bi-210, Po-210, 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, Po-212, Tl-208
U-235+	Th-231
U-238+	Th-234, Pa-234m

Parent radionuclide	Daughter radionuclides
U-238 sec	Th-234, Pa-234m, 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-240
Np-237+	Pa-233
Am-242m+	Am-242
Am-243+	Np-239

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 (Carriage of Dangerous Goods 2009[footnote 22])

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 unpackaged[footnote 23]; or
- It arrives at the destination where it will be used or disposed of.

Ionising Radiations Regulations (IRR2017)

5.3. IRR2017 is a separate regulatory regime, which uses many of the same activity concentration and quantity values as radioactive substances regulation. The ‘out of scope’ concentrations given in Table 2.3 under this legislation and the concentrations for exemption from notification under IRR2017 are mostly the same. The exemption levels set out in Table 3.1, and the thresholds for registration under IRR2017, are the same.

‘Conventional’ Waste Regulations

5.4. Some radioactive waste may exhibit hazardous properties not related to its radioactive properties. To ensure the environment is protected from the non-radioactive properties of radioactive wastes, the environment agencies must ensure that under environmental permits they are managed to standards consistent with that for non-radioactive waste.

5.5. Any radioactive waste that is exempted from the requirement for an environmental permit in respect of a radioactive substances activity but has hazardous properties is covered by the hazardous waste regulations[footnote 24]. Additionally certain exempt radioactive wastes[footnote 25] can only be disposed to premises with a waste operations permit, under the Environmental Permitting Regulations, that is appropriate for the non-radioactive properties of the waste.

EC Groundwater Daughter Directive (2006)

5.6. The Directive requires that inputs (discharges) of hazardous substances to groundwater are prevented. For the purposes of this Directive, radioactive substances are considered hazardous substances. Defra guidance on environmental permitting for Groundwater Activities[footnote 26] states where the input, in the opinion of the Environment Agency, is of a quantity or concentration so small as to obviate any present or future danger of deterioration in the quality of the receiving groundwater, it may be determined not to be a groundwater activity. In England and Wales, inputs to groundwater containing radioactive substances that are ‘out of scope’ of the relevant radioactive substances legislation are considered to meet this exclusion.

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 2013)	Council Directive 2013/59/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 x 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— (a) in each sealed container in the device does not exceed 8 x 1010 Bq of tritium; and (b) of the device does not exceed 1 x 1012 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 when a substance or article is so affected by (a) absorption, admixture or adhesive of radioactive material or radioactive waste (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	(a) an environmental permit to dispose of radioactive waste under the Environmental Permitting (England and Wales) Regulations 2016

Term or acronym	Meaning
	or (b) an authorisation under the Radioactive Substances Act 1993 to dispose of radioactive waste held in respect of premises situated in Northern Ireland
Disposal (of waste)	The removal, deposit, destruction, discharge (whether into water 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)	A sealed source in a device which is an illiuminant, instrument, sign or indicator which: (a) incorporates tritium in one or more sealed containers constructed to prevent dispersion of that tritium in normal use; and (b) is radioactive material solely because it contains that tritium
ICRP	International Commission on Radiological Protection
Luminised article	An article which is made wholly or partly from a luminescent substance in the form or a file or a paint and which: (a) is radioactive material or radioactive waste solely because it contains Pm-147 or H-3; and (b) is not a sealed source
Management (in respect of waste)	(Where it appears after a radionuclide) means a radionuclide in a metastable state or radioactive decay in which gamma photons are emitted (a) the preparation by checking, cleaning or repairing that waste for its re-use without further processing; (b) the recovery of that waste; (c) the disposal of that waste; or (d) the application of any treatment process to

Term or acronym	Meaning
	that's waste which is preparatory to the recovery or disposal of it.
Mobile radioactive apparatus	Any apparatus, equipment, appliance or other thing which is radioactive material and: (a) is constructed or adapted for being transported from place to place; or (b) is portable and designed or intended to be used for releasing radioactive material into the environment or introducing it into organisms
Nuclear (licensed) site	(a) any site in respect of which a nuclear site licence is for the time being in force; or (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.
NORM	Naturally Occurring Radioactive Material
Practice	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.
Premises	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 include any building or group of buildings etc where, if an environmental permit were required, one permit would apply.
Relevant liquid	A liquid which is: (a) is classified (or would be so 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, subcategories: 1A, 1B or 1C or (iii) hazardous to the aquatic environment: acute category 1 or chronic categories 1 or 2

Term or acronym	Meaning
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 $1m^3s^{-1}$;
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 lean high eater 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	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: (a) U-235 in the uranium it contains is no more than 0.72% by mass; and

Term or acronym	Meaning
	(b) any isotope of thorium it contains is present in the isotopic proportions found in nature.
Undertaking	Any trade, business or profession and: (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 or person (whether corporate or unincorporated), includes any of the activities of that body.
Waste permitted person (in relation to the radioactive waste)	A person who holds: (a) an environmental permit to dispose of radioactive waste under the Environmental Permitting (England and Wales) Regulations 2016; or (b) in respect of premises in Northern Ireland, an authorisation under the Radioactive Substance Act 1993

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

International definitions

1. The IAEA definitions of the terms ‘exclusion’, ‘clearance’ and ‘exemption’ are taken from IAEA Safety Glossary, 2007 Edition.

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 is it 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 any 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 values/exemption values for bulk solid amounts are set out in Annex VII Table A of the BSSD 2013. Exemption levels for moderate amounts[footnote 27] for any type of material (solids, liquids, gases), are set out in Annex VII Table B of the BSSD 2013. The general criteria for the exemption of practices or clearance of authorised practices are set out in Annex VII.

Approach to exclusion and clearance – ‘out of scope’

6. The legislation achieves broadly the same result, in that substances and articles are ‘out of scope’, so not radioactive and not subject to regulatory controls, where they:

- are not amenable to control; or
- have radionuclide concentrations below the IAEA RS-G-1.7 (or equivalent) clearance levels.

7. Table 2.2 gives the values for NORM used in industrial activities and Table 2.3 for artificial radionuclides or NORM used for their radioactive, fertile or fissile properties). Sections 1.12 and 1.13 detail the origin of the values (Table 2.3 derives from the BSSD 2013 Table A).

Approach to exemption

8. For substances and articles which are in scope, a second set of numerical levels (exemption levels) are set out in the legislation (see Table 3.1). 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 derive from the BSSD 2013 Table B. 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. Additional exemptions are included in the legislation for other low-risk activities and substances, subject to certain criteria (dose criteria) being satisfied, as set out in Table 3.2 of this guidance. These 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 disposals are also exempt in certain situations, depending on criteria relating to concentration or mass limits, disposal methods and conditions relating to disposal. These disposal criteria are based to a 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 and in particular HPA-RPD-020[footnote 28]. These numbers have been derived using the general criteria set out in Annex VII of the Directive. Waste disposal criteria are set out mainly in Table 3.3 and Table 3.4 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

Guidance Paragraph	RSA93 Amendment Reference (Northern Ireland[footnote 29])	RSA93 Exemption Order (Northern Ireland) [footnote 30]	EPR16 (Schedule 23)[footnote 31] 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: Part 3: 1. (Table 1) 2.
Para 2.3(ii) Scope (radioactive	3. – 1A 3. –1C(a), (b),	-	Part 2: 3. –(1) 5.

Guidance Paragraph	RSA93 Amendment Reference (Northern Ireland[footnote 29])	RSA93 Exemption Order (Northern Ireland) [footnote 30]	EPR16 (Schedule 23)[footnote 31] Reference (England and Wales)
material) – NORM practice and numerical criteria	(c) Schedule – Schedule 1A, Table 3		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.
Para 2.4(iv) Out of scope (material) – onsite contamination	3. –1G	-	Part 2: 9.
Para 2.4(v)	3. – 1GA	-	Part 2: 9A.

Guidance Paragraph	RSA93 Amendment Reference (Northern Ireland[footnote 29])	RSA93 Exemption Order (Northern Ireland) [footnote 30]	EPR16 (Schedule 23)[footnote 31] Reference (England and Wales)
Historic radium contamination (material)			
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.

Guidance Paragraph	RSA93 Amendment Reference (Northern Ireland[footnote 29])	RSA93 Exemption Order (Northern Ireland) [footnote 30]	EPR16 (Schedule 23)[footnote 31] Reference (England and Wales)
Para 2.8(iii) Out of scope (waste) – lawfully disposed of as waste or contaminated during lawful disposal	3. –1H	-	Part 2: 10.
Para 2.8(iv) Historic radium contamination (waste)	3.- 1GA	-	Part 2: 9A.
Para 2.8(v) Out of scope (waste) – gaseous NORM from oil and gas production	-	Part: 19A	Part 6: 18A
Para 2.14 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 2.17 (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’)

Guidance Paragraph	RSA93 Amendment Reference (Northern Ireland[footnote 29])	RSA93 Exemption Order (Northern Ireland) [footnote 30]	EPR16 (Schedule 23)[footnote 31] Reference (England and Wales)
Para 2.17 (Table 2.1b) Scope (material/waste) – listed NORM industrial activities part b	Schedule – Schedule 1A, Table 1, Part 2	-	Part 2: 2. –(1)(a) – (I) ('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 2.25 Table 2.2 summation rule	Schedule – Schedule 1A, 1.	-	Part 3: 1.-(2)
Para 2.26 Table 2.3 summation rule	Schedule – Schedule 1A, 2.	-	Part 3: 2.-(2).
Para 2.30 Out of scope (material/waste) – short half-life (<100s)	3. –1E	-	Part 2: 7.
Para 2.31 Out of scope (material) – onsite contamination	3. –1G	-	Part 2: 9.
Para 2.36 Out of scope (material/waste) historic radium contamination	3. – 1GA	-	Part 2: 9A
Para 2.37	-	Part: 19A	Part 6: 18A

Guidance Paragraph	RSA93 Amendment Reference (Northern Ireland[footnote 29])	RSA93 Exemption Order (Northern Ireland) [footnote 30]	EPR16 (Schedule 23)[footnote 31] Reference (England and Wales)
Out of scope (waste) – gaseous NORM from oil and gas production			
Para 2.38 Out of scope (material/waste) – lawfully disposed of as waste or contaminated during lawful disposal	3. –1H	-	Part 2: 10. –(1)(a) 10. – (2)(b) 10. – (3)(4) 10. – (7)
Para 2.44 Definition ‘relevant liquid’	5. – (1)(‘relevant liquid’)	-	Part 2: 1. –(1) (‘relevant liquid’)
Table 2.1a Type 1 NORM Industrial Activities	Schedule – Schedule 1A, Table 1, Part 1	-	Part 2: 2. –(1)(a) – (b). (‘type 1 NORM industrial activity’)
Table 2.1b Type 2 NORM Industrial Activities	Schedule – Schedule 1A, Table 1, Part 2	-	Part 2: 2. –(1)(a) – (k). (‘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	Schedule – Schedule 1A, Table 3	-	Part 3: 2. (Table 2)

Guidance Paragraph	RSA93 Amendment Reference (Northern Ireland[footnote 29])	RSA93 Exemption Order (Northern Ireland) [footnote 30]	EPR16 (Schedule 23)[footnote 31] Reference (England and Wales)
(for material/waste from practices)			
Para 3.9 Table 3.1: Conditional exemption from permitting for keeping and use – numerical criteria for radioactive material	-	Schedule 1 – Table 1	Part 6: Section 2.-(3)(1)(a)(ii) Section 5. – (1)(b) Section 6. – (2) Section 9. – 26. (Table 5)
Para 3.9, bullet 2 Table 3.1 Summation rule	-	Schedule 1 – Table 1	Part 6: Section 9 – 27, 28. (Table 5)
Para 3.9, bullet 4 Table 3.1 Unlisted radionuclides	-	Schedule 1 – Table 1	Part 6: Section 9. – 26. (Table 5) (final line)
Para 3.11 Conditional exemption from permitting for keeping and use of radioactive material – condition on record keeping	-	Schedule 2 – 3(a)(ii)	Part 6: Section 4 -11(a)(ii)
Para 3.12 Conditional exemption from permitting for keeping and use of radioactive material – condition on labelling	-	Schedule 2 – 3(b)	Part 6: Section 4 -11(b)

Guidance Paragraph	RSA93 Amendment Reference (Northern Ireland[footnote 29])	RSA93 Exemption Order (Northern Ireland) [footnote 30]	EPR16 (Schedule 23)[footnote 31] Reference (England and Wales)
Para 3.14 Conditional exemption from permitting for keeping and use of radioactive material – condition on allowing regulator access to records	-	Schedule 2 – 3(d)	Part 6: Section 4 -11(d)
Para 3.15 Conditional exemption from permitting for keeping and use of radioactive material – condition on storing safely and securely	-	Schedule 2 – 3(e)	Part 6: Section 4 -11(e)
Para 3.16 Conditional exemption from permitting for keeping and use of radioactive material – condition on preventing unintended/uncontrolled releases	-	Schedule 2 – 3(f)	Part 6: Section 4 -11(f)
Para 3.17 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 6: Section 4 -12(1)

Guidance Paragraph	RSA93 Amendment Reference (Northern Ireland[footnote 29])	RSA93 Exemption Order (Northern Ireland) [footnote 30]	EPR16 (Schedule 23)[footnote 31] Reference (England and Wales)
Para. 3.17 Proportionality of notifying regulators of loss/theft or suspected loss/theft	-	Schedule 2 – 4(2)	Part 6: Section 4 -12(2)
Para 3.20 Table 3.2: Conditional exemption from permitting for keeping and use of small sealed sources – numerical criteria	-	Schedule 1 – Table 2	Part 6: Section 2 – (3)(1)(a) 5(1)(a)6(2) Section 9 – 25. (Table 4)
Para 3.22 Conditional exemption from permitting for keeping and use of small sealed sources – condition on record keeping	-	Schedule 2 - 3(a)(ii)	Part 6: Section 4 -11(a)(ii)
Para 3.23 Conditional exemption from permitting for keeping and use of small sealed sources – condition on labelling	-	Schedule 2 – 3(b)	Part 6: Section 4 -11(b)
Para 3.25 Conditional exemption from permitting for keeping and use of small sealed sources – condition on allowing regulator access to records	-	Schedule 2 – 3(d)	Part 6: Section 4 -11(d)

Guidance Paragraph	RSA93 Amendment Reference (Northern Ireland[footnote 29])	RSA93 Exemption Order (Northern Ireland) [footnote 30]	EPR16 (Schedule 23)[footnote 31] Reference (England and Wales)
Para 3.26 Conditional exemption from permitting for keeping and use of small sealed sources – condition on storing safely and securely	-	Schedule 2 – 3(e)	Part 6: Section 4 -11(e)
Para 3.27 Conditional exemption from permitting for keeping and use of small sealed sources – condition on preventing unintended/uncontrolled releases	-	Schedule 2 – 3(c)	Part 6: Section 4 -11(c)
Para 3.28 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 6: Section 4 -12(1)
Para. 3.28 Proportionality of notifying regulators of loss/theft or suspected loss/theft	-	Schedule 2 – 4(2)	Part 6: Section 4 -12(2)
Para 3.32 Table 3.2: Conditional exemption from permitting for keeping and use of	-	Schedule 1 – table 2	Part 6: Section 2 – 3(1)(a)5 (1)(b)2 Section 9 –

Guidance Paragraph	RSA93 Amendment Reference (Northern Ireland[footnote 29])	RSA93 Exemption Order (Northern Ireland) [footnote 30]	EPR16 (Schedule 23)[footnote 31] Reference (England and Wales)
unsealed sources – numerical criteria			25. (Table 4)
Para 3.34 Conditional exemption from permitting for keeping and use of unsealed sources – condition on record keeping	-	Schedule 2 – 3(a)(ii)	Part 6: Section 4 -11(a)(ii)
Para 3.35 Conditional exemption from permitting for keeping and use of unsealed sources – condition on labelling	-	Schedule 2 – 3(b)	Part 6: Section 4 -11(b)
Para 3.37 Conditional exemption from permitting for keeping and use of unsealed sources – condition on allowing regulator access to records	-	Schedule 2 – 3(d)	Part 6: Section 4 -11(d)
Para 3.38 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 3.39 Conditional exemption from permitting for keeping	-	Schedule 2 – 3(f)	Part 7: Section 4 -11(f)

Guidance Paragraph	RSA93 Amendment Reference (Northern Ireland[footnote 29])	RSA93 Exemption Order (Northern Ireland) [footnote 30]	EPR16 (Schedule 23)[footnote 31] Reference (England and Wales)
and use of unsealed sources – condition on preventing unintended/uncontrolled releases			
Para 3.40 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)
Para. 3.40 Proportionality of notifying regulators of loss/theft or suspected loss/theft	-	Schedule 2 – 4(2)	Part 7: Section 4 -12(2)
Para 3.48 Table 3.2: Conditional exemption from permitting for keeping and use of mobile apparatus – numerical criteria	-	Schedule 1 – Table 2	Part 6: Section 3 – (8) Section 9 – 25. (Table 4)
Para 3.50 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 3.51	-	Schedule 2 – 3(b)	Part 7: Section 4

Guidance Paragraph	RSA93 Amendment Reference (Northern Ireland[footnote 29])	RSA93 Exemption Order (Northern Ireland) [footnote 30]	EPR16 (Schedule 23)[footnote 31] Reference (England and Wales)
Conditional exemption from permitting for keeping and use of mobile apparatus – condition on labelling			-11(b)
Para 3.53 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 3.54 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 3.55 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 3.56 Conditional exemption from permitting for keeping and use of mobile apparatus – condition on notifying regulators of	-	Schedule 2 – 5(1)	Part 6: Section 4 -13(1)

Guidance Paragraph	RSA93 Amendment Reference (Northern Ireland[footnote 29])	RSA93 Exemption Order (Northern Ireland) [footnote 30]	EPR16 (Schedule 23)[footnote 31] Reference (England and Wales)
loss/theft or suspected loss/theft			
Para. 3.56 Proportionality of notifying regulators of loss/theft or suspected loss/theft	-	Schedule 2 – 5(2)	Part 6: Section 4 -13(2)
Para 3.59– 3.61 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 6: Section 2 – 4(1), 5(1) Section 9 – 25. (Table 4)
Para 3.63 Conditional exemption from permitting for accumulating radioactive waste – condition on record keeping	-	Schedule 2 – 3(a)	Part 6: Section 4 -11(a)
Para 3.64 Conditional exemption from permitting for accumulating radioactive waste – condition on labelling	-	Schedule 2 – 3(b)	Part 6: Section 4 -11(b)
Para 3.66 Conditional exemption from permitting for accumulating radioactive waste – condition on	-	Schedule 2 – 3(d)	Part 6: Section 4 -11(d)

Guidance Paragraph	RSA93 Amendment Reference (Northern Ireland[footnote 29])	RSA93 Exemption Order (Northern Ireland) [footnote 30]	EPR16 (Schedule 23)[footnote 31] Reference (England and Wales)
allowing regulator access to records			
Para 3.67 Conditional exemption from permitting for accumulating radioactive waste – condition on storing safely and securely	-	Schedule 2 – 3(e)	Part 6: Section 4 -11(e)
Para 3.68 Conditional exemption from permitting for accumulating radioactive waste – condition on preventing unintended/uncontrolled releases	-	Schedule 2 – 3(f)	Part 6: Section 4 -11(f)
Para 3.69 Conditional exemption from permitting for accumulating radioactive waste – condition on preventing unintended/uncontrolled releases from specific articles	-	Schedule 2 – 3(c)	Part 6: Section 4 -11(c)
Para 3.70 Conditional exemption from permitting for accumulating radioactive waste – condition on notifying regulators of	-	Schedule 2 – 4(1)	Part 6: Section 4 -12(1)

Guidance Paragraph	RSA93 Amendment Reference (Northern Ireland[footnote 29])	RSA93 Exemption Order (Northern Ireland) [footnote 30]	EPR16 (Schedule 23)[footnote 31] Reference (England and Wales)
loss/theft or suspected loss/theft			
Para. 3.70 Proportionality of notifying regulators of loss/theft or suspected loss/theft	-	Schedule 2 – 4(2)	Part 6: Section 4 -12(2)
Para 3.71 Conditional exemption from permitting for accumulating radioactive waste – condition on disposal time limit	-	Schedule 2 – 6	Part 6: Section 4 -14(a)
Para 3.87 Table 3.3, lines 1 - 7: Conditional exemption from permitting for solid radioactive waste disposal – numerical criteria	-	Part4: 11. – (2), 12. (1)(a), 13. – (1) Schedule 1 – Table 3	Part 6: Section 5 – 15(3)(b), 16(1)(a), 17(1) Section 9 – 25. (Table 4)
Para 3.91 Conditional exemption from permitting for solid radioactive waste disposal – condition on transfer and mixing with non-radioactive waste	-	Part 4: 13. – (3)	Part 6: Section 5 – 17(3)
Para 3.92 Conditional exemption from permitting for solid	-	Part 4: 13.- (3)	Part 6: Section 5 – 17(2)(a)

Guidance Paragraph	RSA93 Amendment Reference (Northern Ireland[footnote 29])	RSA93 Exemption Order (Northern Ireland) [footnote 30]	EPR16 (Schedule 23)[footnote 31] Reference (England and Wales)
radioactive waste disposal – condition on record keeping			
Para 3.94 Conditional exemption from permitting for solid radioactive waste disposal – condition on labelling	-	Part 4: 13. – (2)(a)	Part 6: Section 5 – 17(2)(c)
Para 3.95 Conditional exemption from permitting for solid radioactive waste disposal – condition on allowing regulator access to records	-	Part 4: 13. – (2)(e)	Part 6: Section 5 – 17(2)(e)
Para 3.101 Conditional exemption from permitting for Type 1 NORM waste disposal	-	Part 7: 19. – (2)(a)(i), 20. – (1)(c)	Part 6: Section 6 – 18(1), 18(2), 18(3)(a), 18(4), 19(2) Section 9 – 25A. (Table 4A)
Para 3.115 Conditional exemption from permitting for Type 1 NORM waste disposal – condition on record keeping	-	Part 7: 20. (1)(a)	Part 6: Section 6 – 19(1)(a)

Guidance Paragraph	RSA93 Amendment Reference (Northern Ireland[footnote 29])	RSA93 Exemption Order (Northern Ireland) [footnote 30]	EPR16 (Schedule 23)[footnote 31] Reference (England and Wales)
Para 3.117 Conditional exemption from permitting for Type 1 NORM waste disposal – condition on labelling	-	Part 7: 20. 1(b)	Part 6: Section 6 – 19(1)(c)
Para 3.118 Conditional exemption from permitting for Type 1 NORM waste disposal – condition on allowing regulator access to records	-	Part 7: 20. 1(d)	Part 6: Section 6 – 19(1)(d)
Para 3.119 Conditional exemption from permitting for Type 1 NORM waste disposal – condition on disposal route	-	Part 7: 20. 1(c)	Part 6: Section 6 – 19(2)
Para 3.124 Conditional exemption from permitting for Type 2 NORM waste disposal	-	Part 7: 19. – (1), 2(a)(ii), (2)(b), (3)	Part 6: Section 6 – 18(1), 18(3), 18(5) Section 9 – 25A. (Table 4A)
Para 3.127 Conditional exemption from permitting for Type 2 NORM waste disposal – condition on preparing written radiological assessment	-	Part 7: 20. (3)(a)	Part 6: Section 6 – 18(3)(b) 18(5) 19(2)(a) 19(3)(a)

Guidance Paragraph	RSA93 Amendment Reference (Northern Ireland[footnote 29])	RSA93 Exemption Order (Northern Ireland) [footnote 30]	EPR16 (Schedule 23)[footnote 31] Reference (England and Wales)
Para 3.127 Conditional exemption from permitting for Type 2 NORM waste disposal – condition on satisfying dose criteria	-	Part 7: 20. (3)(b)	Part 6: Section 6 – 19(3)(b)
Para 3.130 Conditional exemption from permitting for Type 2 NORM waste disposal – condition on providing to regulator 28 days prior 1st disposal	-	Part 7: 20. – (3)(c)	Part 6: Section 6 – 19(3)(c)
Para 3.130 Conditional exemption from permitting for Type 2 NORM waste disposal – condition on preventing disposal if regulator objects	-	Part 7: 20. – (3)(d)	Part 6: Section 6 – 19(3)(d)
Para 3.130 Conditional exemption from permitting for Type 2 NORM waste disposal – condition on preventing disposal if regulator objects	-	Part 7: 20. – (3)(d)	Part 6: Section 6 – 19(3)(d)

Guidance Paragraph	RSA93 Amendment Reference (Northern Ireland[footnote 29])	RSA93 Exemption Order (Northern Ireland) [footnote 30]	EPR16 (Schedule 23)[footnote 31] Reference (England and Wales)
Para 3.131 Conditional exemption from permitting for Type 2 NORM waste disposal – condition on record keeping	-	Part 7: 20. – (1)(a)	Part 6: Section 6 – 19(1)(a)
Para 3.133 Conditional exemption from permitting for Type 2 NORM waste disposal – condition on labelling	-	Part 7: 20. – (1)(b)	Part 6: Section 6 – 19(1)(c)
Para 3.134 Conditional exemption from permitting for Type 2 NORM waste disposal – condition on allowing regulator access to records	-	Part 7: 20. – (1)(d)	Part 6: Section 6 – 19(1)(d)
Para 3.138-3.139 Conditional exemption from permitting for disposal of specific articles	-	Part 4: 11. – (2), 12. – (1)(b) 13. – (3)(c)	Part 6: Section 4 – 15(3)(a), 16(1)(b), 17(3)(c) 17 (4)(b)
Para 3.141 Conditional exemption from permitting for disposal of specific articles - condition on waste transfer	-	Part 4: 13. – (3)(c)	Part 6: Section 4 – 17(3)(c)

Guidance Paragraph	RSA93 Amendment Reference (Northern Ireland[footnote 29])	RSA93 Exemption Order (Northern Ireland) [footnote 30]	EPR16 (Schedule 23)[footnote 31] Reference (England and Wales)
Para 3.142 Conditional exemption from permitting for disposal of specific articles - condition on record keeping	-	Part 4: 13. – (2)(a)	Part 6: Section 5 – 17(2)(a)
Para 3.144 Conditional exemption from permitting for disposal of specific articles - condition on allowing regulator access to records	-	Schedule 2: 3(b)	Part 6: Section 5 – (17)(2)(e)
Para 3.145 Conditional exemption from permitting for disposal of specific articles - condition on notifying regulators within 14 days of a high-activity source disposal	-	Part 4: 13(2)(d)	Part 6: Section 5 – 17(2)(d)
Para 3.152 Conditional exemption from permitting for aqueous radioactive waste disposal (max 100 Bq/ml)	-	Part 5: 15. – (1), (2), (3) 160 – (4)(a)	Part 6: Section 7 – 21(1), 21(2), 21(3), 22(4)(a),(5)

Guidance Paragraph	RSA93 Amendment Reference (Northern Ireland[footnote 29])	RSA93 Exemption Order (Northern Ireland) [footnote 30]	EPR16 (Schedule 23)[footnote 31] Reference (England and Wales)
Para 3.154 Conditional exemption from permitting for aqueous radioactive waste disposal (max 100 Bq/ml) – condition on no dilution	-	Part 5: 15. - (4)(a)	Part 6: Section 7 – 21(4)(a)
Para 3.155 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 6: Section 7 – 21(4)(b)
Para. 3.156 Conditional exemption from permitting for aqueous radioactive waste (max 100 Bq/ml) disposal – condition on disposal route	-	Part 5: 16. – (1)(a)	Part 6: Section 7 – 22(1)(a)
Para 3.157 Conditional exemption from permitting for aqueous radioactive waste (max 100 Bq/ml) disposal – condition on record keeping	-	Part 5: 16. - (1)(b)	Part 6: Section 7 – 22(1)(b)
Para 3.159 Conditional exemption from permitting for aqueous radioactive waste disposal (max 100 Bq/ml) –	-	Part 5: 16. – (1)(c)	Part 6: Section 7 – 22(1)(d)

Guidance Paragraph	RSA93 Amendment Reference (Northern Ireland[footnote 29])	RSA93 Exemption Order (Northern Ireland) [footnote 30]	EPR16 (Schedule 23)[footnote 31] Reference (England and Wales)
condition on allowing regulator access to records			
Para 3.164 Conditional exemption from permitting for disposal of patient excreta and U&Th compounds	-	Part 5: 14. – (1) Schedule 1 – Table 3	Part 6: Section 7 – 20(1),(3)(a), (b) Section 9 – 27. (Table 6)
Para 3.166 Conditional exemption from permitting for disposal of patient excreta and U&Th compounds – condition on minimising overall activity discharged	-	Part 5: 14. – (2)	Part 6: Section 7 – 20(2)
Para 3.167 Conditional exemption from permitting for disposal of patient excreta and U&Th compounds – condition on disposal route	-	Part 5: 14. (3)(b)	Part 6: Section 7 – 20(3)(b)
Para 3.168 Conditional exemption from permitting for disposal of patient excreta and U&Th compounds – condition on record keeping	-	Part 5: 14. – (3)(c)	Part 6: Section 7 – 20(3)(c)
Para 3.170	-	Part 5: 14. – (3)(d)	Part 6: Section 7 –

Guidance Paragraph	RSA93 Amendment Reference (Northern Ireland[footnote 29])	RSA93 Exemption Order (Northern Ireland) [footnote 30]	EPR16 (Schedule 23)[footnote 31] Reference (England and Wales)
Conditional exemption from permitting for disposal of patient excreta and U&Th compounds – condition on allowing regulator access to records			20(3)(d)
Para 3.179-3.182 (Table 3.4) Conditional exemption from permitting for disposal of low conc. aqueous radioactive waste	-	Part 5: 15. – (1), (3) 16. – (3), (4)(b)(i) Schedule 1 – Table 4	Part 6: Section 7 – 21(1), (2), (3) 22(3), 22(4)(b), 22(6) Section 9 – 30. (Table 7)
Para 3.185 Conditional exemption from permitting for disposal of low conc. aqueous radioactive waste – condition on no dilution	-	Part 5: 15. (4)(a)	Part 6: Section 7 – 21(4)(a)
Para 3.186 Conditional exemption from permitting for disposal of low conc. aqueous radioactive waste – condition on minimising overall activity discharged	-	Part 5: 15. – (4)(b)	Part 6: Section 7 – 21(4)(b)
Para 3.187 Conditional exemption from permitting for disposal	-	Part 5: 16. – (1)(a)	Part 6: Section 7 – 22(1)(a)

Guidance Paragraph	RSA93 Amendment Reference (Northern Ireland[footnote 29])	RSA93 Exemption Order (Northern Ireland) [footnote 30]	EPR16 (Schedule 23)[footnote 31] Reference (England and Wales)
of low conc. aqueous radioactive waste – condition on waste disposal route			
Para 3.188 Conditional exemption from permitting for disposal of low conc. aqueous radioactive waste – condition on record keeping	-	Part 5: 16. – (1)(b)	Part 6: Section 7 – 22(1)(b)
Para 3.190 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 6: Section 7 – 22(1)(d)
Para 3.195-3.196 Conditional exemption from permitting for disposal of gaseous radioactive waste	-	Part 6: 17. – (1), (3) 18. – (1)	Part 6: Section 8 – 23(1), 23(3)
Para 3.198 Conditional exemption from permitting for gaseous radioactive waste disposal – condition on minimising radioactive waste generated	-	Part 6: 17. – (2)	Part 6: Section 8 – 23(2)

Guidance Paragraph	RSA93 Amendment Reference (Northern Ireland[footnote 29])	RSA93 Exemption Order (Northern Ireland) [footnote 30]	EPR16 (Schedule 23)[footnote 31] Reference (England and Wales)
Para 3.200 Conditional exemption from permitting for gaseous radioactive waste disposal – condition on allowing regulator access to records	-	Part 6: 18. - (2)(b)	Part 6: Section 8 – 24(1)(b)
Para 4.1 Dilution to reduce concentration of radioactivity	3. – 1DA	-	Part 2: 6A

Annex 3: Changes to values in Tables

This Annex documents the changes made to Tables 2.2 and 2.3 since the last version of the guidance (1.0) and any deviations from the BSSD 2013 values.

Table 2.2: Concentration of radionuclides: NORM industrial activities

Radionuclide	Solid or 'relevant liquid' activity concentration (Bq/g) (this document)	Solid or 'relevant liquid' activity concentration (Bq/g) (version 1.0)	Reason for change
U-238sec	1	0.5	To reflect value given in BSSD 2013

Radionuclide	Solid or 'relevant liquid' activity concentration (Bq/g) (this document)	Solid or 'relevant liquid' activity concentration (Bq/g) (version 1.0)	Reason for change
Ra-226+	1	0.5	To reflect value given in BSSD 2013
Th-232sec	1	0.5	To reflect value given in BSSD 2013
Th-228+	1	0.5	To reflect value given in BSSD 2013

Table 2.3: Concentration of radionuclides in 'practices'

Radionuclide	Activity concentration (Bq/g) (this document)	Activity concentration (Bq/g) (version 1.0)	Reason for change or deviation from BSSD 2013 values
C-14	10	10	BSSD 2013 value is 1 but the value kept the same for reasons documented in the BEIS consultation[footnote 32]
F-18	10	1	To reflect value given in BSSD 2013
Na-24	1	0.1	To reflect value given in BSSD 2013
Si-31	10^3	100	To reflect value given in BSSD 2013

Radionuclide	Activity concentration (Bq/g) (this document)	Activity concentration (Bq/g) (version 1.0)	Reason for change or deviation from BSSD 2013 values
P-32	10^3	10^2	To reflect value given in BSSD 2013
P-33	10^3	100	To reflect value given in BSSD 2013
Cl-38	10	1	To reflect value given in BSSD 2013
K-42	100	10	To reflect value given in BSSD 2013
K-43	10	1	To reflect value given in BSSD 2013
Ca-47	10	1	To reflect value given in BSSD 2013
Sc-47	100	10	To reflect value given in BSSD 2013
Sc-48	1	0.1	To reflect value given in BSSD 2013
V-48	1	0.1	To reflect value given in BSSD 2013
Cr-51	100	10	To reflect value given in BSSD 2013
Mn-51	10	1	To reflect value given in BSSD 2013
Mn-52	1	0.1	To reflect value given in BSSD 2013
Mn-52m	10	1	To reflect value given in BSSD 2013
Mn-53	100	10^3	To reflect value given in BSSD 2013

Radionuclide	Activity concentration (Bq/g) (this document)	Activity concentration (Bq/g) (version 1.0)	Reason for change or deviation from BSSD 2013 values
Mn-56	10	1	To reflect value given in BSSD 2013
Fe-52+	10	1	To reflect value given in BSSD 2013
Fe-55	10^3	100	To reflect value given in BSSD 2013
Fe-59	1	0.1	To reflect value given in BSSD 2013
Co-55	10	1	To reflect value given in BSSD 2013
Co-58	1	0.1	To reflect value given in BSSD 2013
Co-58m	10^4	100	To reflect value given in BSSD 2013
Co-62m	10	1	To reflect value given in BSSD 2013
Ni-65	10	1	To reflect value given in BSSD 2013
Cu-64	100	10	To reflect value given in BSSD 2013
Zn-65	0.1	1	To reflect value given in BSSD 2013
Zn-69	10^3	100	To reflect value given in BSSD 2013
Zn-69m+	10	1	To reflect value given in BSSD 2013
Ga-72	10	1	To reflect value given in BSSD 2013

Radionuclide	Activity concentration (Bq/g) (this document)	Activity concentration (Bq/g) (version 1.0)	Reason for change or deviation from BSSD 2013 values
As-73	10^3	100	To reflect value given in BSSD 2013
As-74	10	1	To reflect value given in BSSD 2013
As-76	10	1	To reflect value given in BSSD 2013
As-77	10^3	100	To reflect value given in BSSD 2013
Br-82	1	0.1	To reflect value given in BSSD 2013
Rb-86	100	10	To reflect value given in BSSD 2013
Sr-85m	100	10	To reflect value given in BSSD 2013
Sr-87m	100	10	To reflect value given in BSSD 2013
Sr-89	10^3	10	To reflect value given in BSSD 2013
Sr-91+	10	1	To reflect value given in BSSD 2013
Sr-92	10	1	To reflect value given in BSSD 2013
Y-90	10^3	100	To reflect value given in BSSD 2013
Y-91	100	10	To reflect value given in BSSD 2013
Y-91m	100	1	To reflect value given in BSSD 2013

Radionuclide	Activity concentration (Bq/g) (this document)	Activity concentration (Bq/g) (version 1.0)	Reason for change or deviation from BSSD 2013 values
Y-92	100	10	To reflect value given in BSSD 2013
Y-93	100	10	To reflect value given in BSSD 2013
Zr-95+	1	0.1	To reflect value given in BSSD 2013
Zr-97+	10	1	To reflect value given in BSSD 2013
Nb-93m	10	100	To reflect value given in BSSD 2013
Nb-97+	10	1	To reflect value given in BSSD 2013
Nb-98	10	1	To reflect value given in BSSD 2013
Mo-90	10	1	To reflect value given in BSSD 2013
Mo-99+	10	1	To reflect value given in BSSD 2013
Mo-101+	10	1	To reflect value given in BSSD 2013
Tc-96	1	0.1	To reflect value given in BSSD 2013
Tc-96m	10^3	10	To reflect value given in BSSD 2013
Tc-97m	100	10	To reflect value given in BSSD 2013
Ru-97	10	1	To reflect value given in BSSD 2013

Radionuclide	Activity concentration (Bq/g) (this document)	Activity concentration (Bq/g) (version 1.0)	Reason for change or deviation from BSSD 2013 values
Ru-105+	10	1	To reflect value given in BSSD 2013
Ru-106+	0.1	1	To reflect value given in BSSD 2013
Rh-105	100	10	To reflect value given in BSSD 2013
Ag-108m+	0.1	0.1	Value not given in BSSD but retained from EPR 2010
Ag-111	100	10	To reflect value given in BSSD 2013
Cd-109+	1	10	To reflect value given in BSSD 2013
Cd-115+	10	1	To reflect value given in BSSD 2013
Cd-115m+	100	10	To reflect value given in BSSD 2013
In-111	10	1	To reflect value given in BSSD 2013
In-113m	100	10	To reflect value given in BSSD 2013
In-114m+	10	1	To reflect value given in BSSD 2013
In-115m	100	10	To reflect value given in BSSD 2013
Sn-125	10	1	To reflect value given in BSSD 2013
Sb-122	10	1	To reflect value given in BSSD 2013

Radionuclide	Activity concentration (Bq/g) (this document)	Activity concentration (Bq/g) (version 1.0)	Reason for change or deviation from BSSD 2013 values
Sb-124	1	0.1	To reflect value given in BSSD 2013
Sb-125+	0.1	1	To reflect value given in BSSD 2013
Te-125m	10^3	100	To reflect value given in BSSD 2013
Te-127	10^3	100	To reflect value given in BSSD 2013
Te-129	100	10	To reflect value given in BSSD 2013
Te-131	100	10	To reflect value given in BSSD 2013
Te-131m+	10	1	To reflect value given in BSSD 2013
Te-132+	1	0.1	To reflect value given in BSSD 2013
Te-133+	1	1	Value of 10 is given in BSSD 2013 for Te-133 but it does not include its short- lived progeny, so decision taken to retain EPR 2010 value which does.
Te-133m+	1	1	Value of 10 is given in BSSD 2013 for Te-133m but it does not include its short- lived progeny, so decision taken to retain EPR 2010 value which does.
Te-134	10	1	To reflect value given in BSSD 2013

Radionuclide	Activity concentration (Bq/g) (this document)	Activity concentration (Bq/g) (version 1.0)	Reason for change or deviation from BSSD 2013 values
I-123	100	10	To reflect value given in BSSD 2013
I-125	100	1	To reflect value given in BSSD 2013
I-126	10	1	To reflect value given in BSSD 2013
I-129	0.01	0.1	To reflect value given in BSSD 2013
I-130	10	1	To reflect value given in BSSD 2013
I-131+	1	1	Value of 10 is given in BSSD 2013 for I-131 but it does not include its short-lived progeny, so decision taken to retain EPR 2010 value which does.
I-132	10	1	To reflect value given in BSSD 2013
I-133	10	1	To reflect value given in BSSD 2013
I-134	10	1	To reflect value given in BSSD 2013
I-135	10	1	To reflect value given in BSSD 2013
Cs-129	10	1	To reflect value given in BSSD 2013
Cs-132	10	1	To reflect value given in BSSD 2013
Cs-135	100	10	To reflect value given in BSSD 2013

Radionuclide	Activity concentration (Bq/g) (this document)	Activity concentration (Bq/g) (version 1.0)	Reason for change or deviation from BSSD 2013 values
Cs-136	1	0.1	To reflect value given in BSSD 2013
Cs-137+	1	1	BSSD 2013 value is 1 but the value kept the same for reasons documented in the BEIS consultation[footnote 27]
Cs-138	10	1	To reflect value given in BSSD 2013
Ba-131	10	1	To reflect value given in BSSD 2013
Ba-140	1	0.1	To reflect value given in BSSD 2013
La-140	1	0.1	To reflect value given in BSSD 2013
Ce-141	100	10	To reflect value given in BSSD 2013
Ce-143	10	1	To reflect value given in BSSD 2013
Ce-144+	10	10	BSSD 2013 gives Ce-144 rather than Ce-144+. This is a mistake in BSSD 2013 as the source data (IAEA Safety Series 44, Table 1) states that progeny are included.
Pr-142	100	10	To reflect value given in BSSD 2013
Pr-143	10^3	100	To reflect value given in BSSD 2013

Radionuclide	Activity concentration (Bq/g) (this document)	Activity concentration (Bq/g) (version 1.0)	Reason for change or deviation from BSSD 2013 values
Nd-147	100	10	To reflect value given in BSSD 2013
Nd-149	100	10	To reflect value given in BSSD 2013
Pm-147	10^3	100	To reflect value given in BSSD 2013
Pm-149	10^3	100	To reflect value given in BSSD 2013
Sm-151	10^3	100	To reflect value given in BSSD 2013
Sm-153	100	10	To reflect value given in BSSD 2013
Eu-152m	100	10	To reflect value given in BSSD 2013
Eu-155	1	10	To reflect value given in BSSD 2013
Gd-159	100	10	To reflect value given in BSSD 2013
Tb-160	1	0.1	To reflect value given in BSSD 2013
Dy-165	10^3	100	To reflect value given in BSSD 2013
Dy-166	100	10	To reflect value given in BSSD 2013
Ho-166	100	10	To reflect value given in BSSD 2013
Er-169	10^3	100	To reflect value given in BSSD 2013

Radionuclide	Activity concentration (Bq/g) (this document)	Activity concentration (Bq/g) (version 1.0)	Reason for change or deviation from BSSD 2013 values
Er-171	100	10	To reflect value given in BSSD 2013
Tm-170	100	10	To reflect value given in BSSD 2013
Tm-171	10^3	100	To reflect value given in BSSD 2013
Yb-175	100	10	To reflect value given in BSSD 2013
Lu-177	100	10	To reflect value given in BSSD 2013
W-185	10^3	100	To reflect value given in BSSD 2013
W-187	10	1	To reflect value given in BSSD 2013
Re-186	10^3	100	To reflect value given in BSSD 2013
Re-188	100	10	To reflect value given in BSSD 2013
Os-191	100	10	To reflect value given in BSSD 2013
Os-193	100	10	To reflect value given in BSSD 2013
Ir-190	1	0.1	To reflect value given in BSSD 2013
Ir-192	1	0.1	To reflect value given in BSSD 2013
Ir-194	100	10	To reflect value given in BSSD 2013

Radionuclide	Activity concentration (Bq/g) (this document)	Activity concentration (Bq/g) (version 1.0)	Reason for change or deviation from BSSD 2013 values
Pt-191	10	1	To reflect value given in BSSD 2013
Pt-193m	10^3	100	To reflect value given in BSSD 2013
Pt-197	10^3	100	To reflect value given in BSSD 2013
Au-198	10	1	To reflect value given in BSSD 2013
Au-199	100	10	To reflect value given in BSSD 2013
Hg-197	100	10	To reflect value given in BSSD 2013
Hg-197m	100	10	To reflect value given in BSSD 2013
Hg-203	10	1	To reflect value given in BSSD 2013
Tl-200	10	1	To reflect value given in BSSD 2013
Tl-201	100	10	To reflect value given in BSSD 2013
Tl-202	10	1	To reflect value given in BSSD 2013
Tl-204	1	10	To reflect value given in BSSD 2013
Pb-203	10	1	To reflect value given in BSSD 2013
Pb-210+	0.01	0.01	Value not given in BSSD 2013 but id f EPR 2010

Radionuclide	Activity concentration (Bq/g) (this document)	Activity concentration (Bq/g) (version 1.0)	Reason for change or deviation from BSSD 2013 values
Pb-212+	1	1	Value not given in BSSD 2013 but retained from EPR 2010
Bi-206	1	0.1	To reflect value given in BSSD 2013
Bi-210	10	10	Value not given in BSSD 2013 but retained from EPR 2010
Bi-212+	1	1	Value not given in BSSD 2013 but retained from EPR 2010
Po-203	10	1	To reflect value given in BSSD 2013
Po-205	10	1	To reflect value given in BSSD 2013
Po-207	10	1	To reflect value given in BSSD 2013
Po-210	0.01	0.01	Value not given in BSSD 2013 but retained from EPR 2010
At-211	10^3	100	To reflect value given in BSSD 2013
Ra-223+	1	1	Value not given in BSSD 2013 but retained from EPR 2010
Ra-224+	1	1	Value not given in BSSD 2013 but

Radionuclide	Activity concentration (Bq/g) (this document)	Activity concentration (Bq/g) (version 1.0)	Reason for change or deviation from BSSD 2013 values
			retained from EPR 2010
Ra-225	10	1	To reflect value given in BSSD 2013
Ra-226+	0.01	0.01	Value not given in BSSD 2013 but retained from EPR 2010
Ra-227	100	10	To reflect value given in BSSD 2013
Ra-228+	0.01	0.01	Value not given in BSSD 2013 but retained from EPR 2010
Ac-227+	0.01	0.01	Value not given in BSSD 2013 but retained from EPR 2010
Ac-228	1	1	Value not given in BSSD 2013 but retained from EPR 2010
Th-226+	100	100	Value of 10^3 is given in BSSD 2013 but it does not include its short-lived progeny, so decision taken to retain EPR 2010 value which does.
Th-227	1	1	Value not given in BSSD 2013 but retained from EPR 2010
Th-228+	0.1	0.1	Value not given in BSSD 2013 but

Radionuclide	Activity concentration (Bq/g) (this document)	Activity concentration (Bq/g) (version 1.0)	Reason for change or deviation from BSSD 2013 values
			retained from EPR 2010
Th-229+	0.1	0.1	BSSD 2013 gives Th-229 rather than Th-229+. Although the value in BSSD 2013 and EPR 2010 are the same, the value is based on EPR 2010 which includes short-lived progeny.
Th-230	0.1	0.1	Value not given in BSSD 2013 but retained from EPR 2010
Th-231	100	100	Value not given in BSSD 2013 but retained from EPR 2010
Th-232	0.01	0.01	Value not given in BSSD 2013 but retained from EPR 2010
Th-232+	0.01	0.01	Value not given in BSSD 2013 but retained from EPR 2010
Th-232sec	0.01	0.01	Value not given in BSSD 2013 but retained from EPR 2010
Th-234+	10	10	Value not given in BSSD 2013 but retained from EPR 2010

Radionuclide	Activity concentration (Bq/g) (this document)	Activity concentration (Bq/g) (version 1.0)	Reason for change or deviation from BSSD 2013 values
Pa-230	10	1	To reflect value given in BSSD 2013
Pa-231	0.01	0.01	Value not given in BSSD 2013 but retained from EPR 2010
U-230+	1	1	Value of 10 is given in BSSD 2013 but it does not include its short-lived progeny, so decision taken to retain EPR 2010 value which does.
U-231	100	10	BSSD 2013 gives U-231+ rather than U-231. This is a mistake in BSSD 2013 as the source data (IAEA Safety Series 44, Table 1) states that progeny are included
U-234	1	1	Value not given in BSSD 2013 but retained from EPR 2010
U-235+	1	1	Value not given in BSSD 2013 but retained from EPR 2010
U-235sec	0.01	0.01	Value not given in BSSD 2013 but retained from EPR 2010
U-236	10	1	To reflect value given in BSSD 2013

Radionuclide	Activity concentration (Bq/g) (this document)	Activity concentration (Bq/g) (version 1.0)	Reason for change or deviation from BSSD 2013 values
U-237	100	10	To reflect value given in BSSD 2013
U-238+	1	1	Value not given in BSSD 2013 but retained from EPR 2010
U-238sec	0.01	0.01	Value not given in BSSD 2013 but retained from EPR 2010
U-240+	100	10	To reflect value given in BSSD 2013
Np-237+	1	0.1	To reflect value given in BSSD 2013
Np-239	100	10	To reflect value given in BSSD 2013
Np-240	10	1	To reflect value given in BSSD 2013
Pu-236	1	0.1	To reflect value given in BSSD 2013
Pu-237	100	10	To reflect value given in BSSD 2013
Pu-241	10	1	To reflect value given in BSSD 2013
Pu-243	10^3	100	To reflect value given in BSSD 2013
Am-242	10^3	100	To reflect value given in BSSD 2013
Cm-242	10	1	To reflect value given in BSSD 2013

Radionuclide	Activity concentration (Bq/g) (this document)	Activity concentration (Bq/g) (version 1.0)	Reason for change or deviation from BSSD 2013 values
Cm-243	1	0.1	To reflect value given in BSSD 2013
Cm-244	1	0.1	To reflect value given in BSSD 2013
Bk-249	100	10	To reflect value given in BSSD 2013
Cf-246	10^3	10	To reflect value given in BSSD 2013
Cf-250	1	0.1	To reflect value given in BSSD 2013
Cf-252	1	0.1	To reflect value given in BSSD 2013
Cf-253	100	1	To reflect value given in BSSD 2013
Cf-253+	100	1	BSSD 2013 only gives a value for Cf-253 so for completeness the value for Cf-253+ has been retained from EPR2010.
Cf-254	1	0.1	To reflect value given in BSSD 2013
Es-253	100	1	To reflect value given in BSSD 2013
Es-254m+	10	1	To reflect value given in BSSD 2013
Fm-254	10^4	100	To reflect value given in BSSD 2013
Fm-255	100	10	To reflect value given in BSSD 2013

1. In England and Wales this guidance is part of a series of documents supporting the Environmental Permitting Regulations 2016 which are available at: www.gov.uk/government/collections/radioactive-substances-regulation-for-non-nuclear-sites (https://www.gov.uk/government/collections/radioactive-substances-%20regulation-for-non-nuclear-sites)
2. IAEA (2004) Application of the Concepts of Exclusion, Exemption and Clearance Safety Guide. IAEA, Vienna, RS-G-1.7
3. EC (1993). Principles and Methods for Establishing Concentrations and Quantities (Exemption values) Below which Reporting is not Required in the European Directive. European Commission, Luxembourg, Radiation Protection 65.
4. Relevant liquid means a liquid which is (a) non-aqueous or (b) classified (or would be so 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.
5. EC (2002). Practical use of the concepts of clearance and exemption - Part II: Application of the concepts of exemption and clearance to natural radiation sources. European Commission, Luxembourg, Radiation Protection 122
6. HPA (2010). Derivation of liquid exclusion or exemption levels to support RSA93 Exemption Order Review. HPA, Chilton, HPA-CRCE-005.
7. Advised in HPA letter to DECC dated 27 August 2010
8. See Sections 3.96 and 3.120 for explanation of Type 1 and Type 2 NORM wastes
9. HPA (2010). Conditional Exemption Limits for NORM wastes. HPA, Chilton, HPA-CRCE-001.
10. EC (2003) Effluent and dose control from European Union NORM industries: Assessment of current situation and proposal for a harmonised Community approach, . European Commission, Luxembourg, EC RP-135
11. BAT applies in England and Wales while BPM applies in Northern Ireland.
12. All tables referred to here are reproduced at the end of this Chapter. Tables in the legislation have different numbering, depending on the jurisdiction.
13. 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.

14. For instance, rainwater contains known quantities of the radioisotope caesium-137 due to fallout from the atmosphere. If this concentration is known, it can be deducted from the total caesium-137 concentration in rainwater collected in storm water drainage systems on nuclear sites when deciding whether or not exemption or out of scope levels have been exceeded.
15. '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'.
16. Derivation of values given in Section 1.13
17. Reporting under the Ionising Radiations Regulations 2017 may be required, even though exempt from reporting under radioactive substances legislation (see paragraph 5.3).
18. 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.
19. NRPB- R306 - Exempt Concentrations and Quantities for Radionuclides not Included in the European Basic Safety Standards Directive (April 1999), ISBN 0-85951-429-3.
20. 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).
21. This is the terminology used in the legislation. 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.
22. The Carriage of Dangerous Goods and Use of Transportable Pressure Equipment Regulations 2009 (GB), SI 2009 No. 1348 and The Carriage of Dangerous Goods and Use of Transportable Pressure Equipment Regulations (Northern Ireland), SR 2010 No. 160.
23. 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.
24. The Hazardous Waste (England and Wales) Regulations 2005, the Hazardous Waste (Wales) Regulations 2005 and the Hazardous Waste Regulations (Northern Ireland) 2005
25. Wastes include NORM waste; solid radioactive waste with no single item >4x104 Bq; solid radioactive waste containing tritium and C-14 only, with no single item >4x105 Bq; solid radioactive waste which consists of

magnesium alloy or thoriated tungsten in which the thorium concentration does not exceed 4% by mass

26. Available at: www.gov.uk/government/publications/environmental-permitting-guidance-groundwater- activities (https://www.gov.uk/government/publications/environmental-permitting-guidance-groundwater-%20activities)
27. Moderate quantities of materials is defined as “at most of the order of a tonne “ in CEC (1993), Principles and Methods for Establishing Concentrations and Quantities (Exemption Values) below Which Reporting is not Required in the European Directive, RP-65.
28. Chen QQ, Kowe R, Mobbs SF, Jones KA. Radiological assessment of disposal of large quantities of very low level waste in landfill sites. Chilton: HPA; 2007 HPA-RPD-020.
29. The Radioactive Substances Act 1993 (1993 c.12).
30. The Radioactive Substances Exemption (Northern Ireland) 2011 (S.R. 2011 No.289).
31. The Environmental Permitting (England and Wales) Regulations 2016 including Amendment (No 2) Regulations 2018.
32. BEIS (2017) Revised Requirements For Radiological Protection: Regulation of Public Exposures and the Justification of Practices (https://www.gov.uk/government/consultations/revised-requirements-for-radiological-protection-regulation-of-public-exposures-and-the-justification-of-practices#documents)