



Radioactive Substances Act Guidance (RASAG)

Chapter 3 - Exemption Orders

Operational instruction

373_04

Issued 21/10/08

What's this document about?

This guidance provides information to support staff in carrying out non-nuclear regulatory duties under Radioactive Substances Act 1993 (RSA93).

This chapter deals with Exemption Orders.



Document details

Who does this apply to?

RSR staff carrying out casework under RSA93



Related documents

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Feedback

Contact for queries

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This guidance note is intended for internal Environment Agency use, to assist officers in interpreting and enforcing the relevant legislation. The explanatory note is based on information contained in the relevant legislation, and on current understanding. The note may be subject to change in the light of regulatory changes, future Government guidance or experience of applying the legislation.

In the interests of transparency, this note is available to others. However, it has no status other than as internal Environment Agency guidance to its staff. Compliance with the law remains the user's responsibility. If users have concerns over compliance, they should seek professional advice, or contact their regulator or local authority.

1 Introduction

1.1 This note provides an introduction to the basis for Exemption Orders (EOs) made under the Radioactive Substances Act, and summarises some of their key features. Most current orders were made under RSA 60, but they continue in force under RSA 93 as though their provisions applied to the corresponding sections in the 1993 Act. Defra are currently (December 2006) reviewing the suite of exemption orders and are expected to change them significantly by 2009.

1.2 This note should be regarded only as an aide-memoire: **it is not a substitute for reading and understanding the detailed provisions of each EO (and for seeking advice from more experienced colleagues as necessary).**

1.3 Copies of the EOs can be obtained at:

http://intranet.ea.gov/organisation/process_management/process_teams/industry_and_water_regulation/rsr/common/eoforms.htm

1.4 Environment Agency advice to users who wish to dispose of small sources to Local Authority waste disposal or to a contracted landfill under the testing instruments EO or small quantities of uranium or thorium compound under the relevant order. Remove, or cover over, any markings that indicate the item contains a radioactive source or uranium or thorium compounds – i.e. the radiation trefoil symbol, or the words “uranium”, “thorium” or “radioactive”, then put the source or jar containing the uranium or thorium compounds inside a small rugged container such as a screw-top plastic jar or bottle, and grout it into that container by filling with plaster of Paris or other suitable solid material.

2 Legislative basis

- 2.1 The powers to make Exemption Orders in England are held by the Secretary of State for Environment, Food and Rural Affairs. **Equivalent** powers in Wales and Scotland are held by the National Assembly for Wales and the Scottish Executive. The Department of the Environment for Northern Ireland holds these powers for Northern Ireland. All the above may thus grant exemptions from the need for the keeping and use of radioactive materials and mobile radioactive apparatus to be registered under section 7 and 10 of RSA93, and from the need for the accumulation and disposal of radioactive waste to be authorised under sections 14 and 13 of RSA93.
- 2.2 In practice, **many EOs apply to the whole of Great Britain**. A single Statutory Instrument is issued for England and Wales but a separate Statutory Instrument may be made for Scotland, with a different SI number. **An exception to this is the testing instruments EO which has not been revised in Scotland.**
- 2.3 The Radioactive Substances (RAS) Division within Defra is responsible for formulating EOs on behalf of the Secretary of State. The Environment Agency advises RAS Division on the regulatory and technical (including radiological) aspects of EOs.
- 2.4 It is for a user to establish whether an EO is relevant to his use of radioactive material or disposal of radioactive waste. In general, the provisions of an EO apply **in addition to** any limits specified in a certificate of registration or authorisation issued to a user: an exception is the Hospitals EO (SI 1990 No 2512).
- 2.5 Inspectors' powers of entry which may be relevant to the inspection of exempted holdings or disposals are specified in EA 95, Section 108.

3 Purpose of exemption orders

- 3.1 For a single or relatively few like cases of a practice involving the use and/or disposal of radioactive substances, individual certification (registration and/or authorisation) is appropriate. But some practices or products involving radioactive substances are very widespread; these include cases in which the radioactivity is an essential property, e.g. smoke detectors, and cases in which radioactivity is an unavoidable concomitant, e.g. phosphate fertilisers. If the Agency were required to issue individual certificates to each user in these cases, this would not only be a massive administrative burden on the Agency, but it would also be liable to discourage the conduct or use of a useful practice or product.
- 3.2 Generally, EOs have been introduced in the following circumstances:
- where a widespread use or disposal of radioactive substances exists or is envisaged;
 - where either the use of radioactivity is justified, or its presence is unavoidable; and
 - where the radiological hazards can be shown to be negligible, or can be made so by observance of conditions in an Order.
- 3.3 Each EO has been prepared after detailed consideration of the practice or practices which it was intended to cover, although Orders have frequently been framed in general terms so that very similar practices or products containing radioactivity would also be exempted. Thus, in drawing up an EO, specific attention has been given as to whether the practice was justified, and where necessary, conditions as to quantities or mode of use or disposal have been placed, so as to limit the radiological impact.
- 3.4 In summary, EOs are set to define the lowest limit of control on radioactive substances; overall, they are governed by three main principles:
- in order to reduce the administrative burden, the mechanism of regulation through registration/authorisation should not be applied for its own sake;
 - by exempting trifling uses of radioactive substances, more effort can be directed towards more important cases; and
 - limitations and conditions can, and where necessary have been, imposed by the Order so as to provide "codes of safe practice."

4 Radiological criteria for exemption; review of EOs

- 4.1 Criteria have been set internationally by the International Commission on Radiological Protection (ICRP) and the International Atomic Energy Agency (IAEA). These are implemented in the EU under the Euratom treaty and the Basic Safety Standards Directive. The Health Protection Agency gives advice on the application in the UK of standards recommended by international or inter-governmental bodies. There are some differences in detail between the recommendations of the different bodies. But essentially the principles are that, for an individual practice to be exempted from regulatory control, it should produce:
- an individual dose no greater than 10 microsieverts per year; and
 - a collective dose no greater than 1 man.sievert per year.
- 4.2 Some EOs have been in force since the early 1960s. In view of developments in the standards of radiological protection, the Agency has reviewed EOs from time to time. In 1987 the Agency's predecessor body, HMIP, engaged a research contractor (Associated Nuclear Services Ltd) to review the EOs that were then current. Their report "A Review of the Justification for Exemption Orders, and for other Low-Level Radioactive Waste Disposal Practices" (reference DOE/RW/87.069, in two volumes plus corrigendum):
- established a method by which the radiological impact of waste disposals under EOs could be assessed;
 - used that method to provide an assessment for each EO; and
 - included an interesting Appendix explaining the historical basis for each EO.
- 4.3 In general the Associated Nuclear Services report provided reassurance that the EOs conformed to modern radiological criteria.
- 4.4 The Exemption Orders were reviewed by DETR RAS Division, to examine whether any changes would be required to comply with the EC Basic Safety Standards Directive which came into effect in May 2000. The review concluded that no changes were necessary. However Defra are currently reviewing the orders against the principles of modern regulation.

5 Exemption orders currently in force

- 5.1 The current EOs (including Amendment Orders made to the Smoke Detectors EO and the Substances of Low Activity EO) are listed in [Table 1](#).
- 5.2 A summary of limits on materials and wastes, as exempted by various EOs, are given in Tables [2](#) and [3](#). Additionally, the Orders for Waste Closed Sources, Schools Etc, Smoke Detectors, Gaseous Tritium Light Devices, Luminous Articles and Testing Instruments exempt the disposal of certain waste closed sources referred to in those Orders by despatch/removal to a person appropriately authorised under Section 13(3) of RSA93, or to a manufacturer of the same kind of source. An EO must be examined carefully, since many contain limitations and conditions on exemption which are of very specific application. In particular, the waste disposal aspects of many EOs are intended only to apply at the stage where exempt material becomes waste in the hands of the original user, and not at subsequent stages of a disposal chain.
- 5.3 It should be noted that HMSO have allowed most of the EOs dating from the 1960s to become out of print - even though they remain current legislation. It may therefore be advisable to send a User a photocopy of any of those EOs when referring to them.
- 5.4 The definitions of radioactive material and radioactive waste in sections 1 and 2 of RSA93 should be read in conjunction with the provisions of the Substances of Low Activity EO and the associated Amendment EO (SIs 1986 No 1002 and 1992 No 647). These provide lower limits for artificial radioactive elements, below which any associated material or waste is exempt from the provisions of sections 7, 13(1) and 13(3) of RSA93. Thus, in the case of a solid substance other than a closed source, which is substantially insoluble in water:
- In determining the activity of that substance for the purpose of deciding whether it is radioactive material or radioactive waste, the activity of any of the natural radioactive elements specified in Schedule 1 of the EO is disregarded, up to the values specified in that Schedule. This effectively qualifies the definition of "radioactive waste" in section 2(b) of RSA93.
 - When the activities of the natural radioactive elements have been disregarded to that extent, then if the activity concentration in the substance does not exceed 0.4 Bq/g, the substance is both exempt from the need for registration under section 1, and is excluded from the need for authorisation under sections 13(1) and 13(3) of RSA93. This provision, in Articles 2 and 3(a) of the EO, effectively puts a lower limit on the activity concentration of natural and man-made radionuclides: this bears on sections 1(2)(b) and 2 of RSA93.
- 5.5 It is suggested that Officers who are responsible for regulation under RSA93 should generally familiarise themselves with the current EOs by reading them, but recognise that the best way to learn about their applicability is by referring to actual cases.

6 Interpretation Of A Numerical Limit In The Phosphatic Substances Exemption Order

- 6.1 The activity concentration limits in the EO refer to the sum total of activity concentrations of all the radionuclides for each element specified in Schedule 1 of the Radioactive Substances Act 1993. Thus the total activity concentration of each radionuclide of each element in the substance must be aggregated and compared with the elemental limit to determine whether the EO applies.
- 6.2 If any natural decay series is present to its full extent or part of a series has fully grown in after chemical separation of one member (eg Ra 226 in the uranium/radium $4n+2$ Series) then all members of the full or part series will be at equilibrium and thus at the same activity concentration unless part of the series has been lost eg by one member (radon 222) escaping as a gas.
- 6.3 The $4n+2$ decay series is indeed a complex one, particularly at its lower end, with a maximum of three radionuclides of the same element polonium present (Po 218, Po 214, Po 210). Members of both the $4n+3$ series and the $4n$ series after Ra223 and Ra224 respectively have short half lives and will not be present in any significant quantity after chemical separation of radium. Thus if the Ra 226 $4n+2$ headed series is fully at equilibrium the 14.8 Bq/g ($4 \times 10^{-4} \mu$ Ci/g as expressed in the EO) limit should be divided by 3 to give 4.9 Bq/g which then applies to each elemental member of the series.
- 6.4 In some cases this may be a pessimistic assumption. If the relevant person can produce satisfactory evidence of measurement showing that all radionuclides from the gaseous radon 222 onwards are present at levels below those expected from the Ra 226 concentration then this can be used to support a case for use of the EO at appropriate higher Ra 226 levels.
- 6.5 In summary, with chemically separated radium, the limit is 4.9 Bq/g of Ra 226 unless the relevant person can show by measurement that the activity concentration of each of the polonium radionuclides is less than this figure.

7 Guidance on the Schools EO (SI 1963 no 1832)

- 7.1 The Order provides conditional exemption for the keeping and use of closed and open sources on exempted premises and conditional exemption for the disposal of radioactive waste arising on exempted premises.
- 7.2 Exempted premises include schools and further education institutions meeting the definitions in the Order.

The term "efficient" is no longer used for Independent Schools so the Order cannot be used by them. However, such schools may well be able to operate within the general EOs eg **Testing Instruments (1985 SI 1049)**, Substances of Low Activity (1986 SI 1002), Prepared Uranium and Thorium Compounds (1962 SI 1049) which apply to schools as much as everyone else. It is considered that very few schools (independent or maintained) actually need the Schools EO to cover their activities. However Independent Schools will, if necessary, need registration and/or authorisation.

A related situation also applies to Further Education Colleges etc. Since the Further and Higher Education Act, 1992, many of these establishments are funded by the Further Education Funding Councils rather than LEAs or the Department responsible for education and, as a result, they also cannot use the Schools EO. However, in contrast to Independent Schools, it is believed a number of such colleges do hold larger sources etc and may require appropriate registration and authorisation.

- 7.3 Exempted schools/colleges are expected to work to Department for Education and Skills procedures and guidance for the use of ionising radiations in education establishments (DES Administrative Memorandum 1/92).
- 7.4 For the purposes of this EO, 'closed source' means a bonded plutonium source, a homogeneous source, a laminated source or a sealed source; each type being defined in the Order. Note that homogeneous sources must not contain alpha-emitters (including decay products), so, for example, uranium disc sources would not be covered by this EO.
- 7.5 Open sources kept under the EO must not contain Sr-90 or any alpha emitters (including decay products).
- 7.6 Numerical limits apply to:
- the total activity in all the exempted sources, ie closed and open (148 MBq); and
 - the total activity in all the exempted open sources (74MBq).
- 7.7 There is no exemption for mobile radioactive apparatus (section 10) under this Order.
- 7.8 Different conditions apply to exempt disposals of waste closed and open sources.
- 7.9 Waste exempt **closed** sources may be disposed of:
- to people suitably authorised under section 6(3) of RSA 60 (section 13(3) of RSA 93), ie authorised to dispose of received waste (it should be noted that the standard authorisation template includes section 13(3)); or

- to people who normally produce radioactive material of the same kind as the waste source. This is normally interpreted as including manufacturers, suppliers and importers of sources of the same radionuclide and approximate size.
- 7.10 The Order does not extend to such manufacturers who receive back waste sources – they must be authorised for accumulation and any final disposal.
- 7.11 The exempted premises may accumulate waste **closed** sources under the EO provided that an exempt disposal route is, or is about to become, available and disposal occurs as soon as practicable.
- 7.12 Solid waste arising from exempt **open** sources may be disposed of (subject to numerical limits) by:
- (i) causing or permitting its removal by a refuse disposal authority or their contractors; or
 - (ii) by depositing it, or causing or permitting its removal (by persons other than those in (i)) for deposit, at a tip etc used for deposit of substantial quantities of non-radioactive waste.
- If a school uses (ii), it must be confident that the person removing the waste will dispose of it by the specified method.
- 7.13 A refuse disposal authority or their contractor receiving waste under (i) is exempted from s13(3) (authorisation for disposal) absolutely, and is exempted from s14(1) (authorisation for accumulation) subject to the waste being disposed of as soon as practicable.
- 7.14 A person receiving waste under (ii) is exempted from s13(3) provided that he deposits the waste in such a tip etc, and not in a part of such tip which is used for the deposit of radioactive waste only. **He may not use the EO to transfer the waste to another person.** He is exempted from s14(1) subject to the waste being disposed of as soon as practicable. In this context, 'as soon as practicable' should generally be interpreted as within 1 or 2 days.
- 7.15 A 'refuse disposal authority' is defined in the EO in relation to the 1936 Public Health Act. This can be interpreted as the equivalent of a 'waste collection authority' as defined in EPA90 Part II (ie district councils/London borough councils in England and Wales).
- 7.16 In virtually all cases nowadays, waste collection authorities contract out the collection of waste to commercial companies. Thus, distinguishing between disposals via routes (i) and (ii) relies on whether the company collecting the waste is doing so under a contract it holds with the district council, or under a contract held directly with the school producing the waste.
- 7.17 Liquid waste arising from exempt **open** sources may be disposed of to the premises' drainage system, subject to numerical limits.
- 7.18 The exempted premises may accumulate solid and liquid waste arising from exempt **open** sources for up to 2 weeks.

Guidance on the Waste Closed Sources EO (SI 1963 no 1831)

- 8.1 The order provides conditional exemption from authorisation for accumulation and disposal of radioactive waste. Conditions include restrictions on accumulation and disposal, record keeping, storage conditions and actions in the event of loss or theft.
- 8.2 The definition of a closed source covers homogeneous sources, laminated sources and sealed sources. Thus it is appropriate to use the WCSEO for C-14 polymethylmethacrylate sources, which are homogeneous. Amounts of uranium or thorium above 100g per day can be disposed of under this order, provided they are solid and homogeneous (and not for example in powder form).
- 8.3 All types of sources have to be free from patent defect for use of the EO. This is interpreted as preventing the order from covering leaking sources. These will need authorisation unless covered by the Testing Instruments Order.
- 8.4 Disposal can be made:
- to an organisation holding a suitable authorisation under section 13(3) of RSA 93 (6(3) of RSA 60), ie authorised to receive waste for disposal (it should be noted that the standard authorisation template includes section 13(3)), or
 - to an organisation which normally produces radioactive material of the same kind as the waste source. This is generally interpreted as including manufacturers, suppliers and importers of sources of the same radionuclide and approximate size.
- 8.5 The order applies only to the original producer of the waste source, ie the user at the time it became waste. So a manufacturer who receives back waste sources from their customers under the order cannot themselves use the order to cover accumulation or final disposal; they need to be authorised under s13(3) and s14.
- 8.6 The order does not apply to the storage of radioactive waste by a waste management company at a waste transfer station. A waste management company receiving waste under this order must be authorised under s13(3) and s14.
- 8.7 Waste sources can be accumulated with a view to disposal for up to 12 weeks from being considered waste.

9 Guidance on the Uranium and Thorium EO (SI 1962 no 2710)

- 9.1 The Order provides conditional exemption for the keeping and use of substances containing natural uranium and/or natural thorium. The purpose of the Order, as originally envisaged, is to exempt the users of products containing U or Th, but not the U/Th producers or intermediate manufacturers. Such products include, for thorium: thorium/magnesium alloys, hardener alloy, gas mantles, ceramics and refractories, tungsten filaments, and welding rods; and for uranium: balance weights, uranium glass and glaze, and uranium catalyst.
- 9.2 Note that, as defined in the Order, 'natural uranium' would include 'depleted uranium' (ie uranium containing less than 0.72% by weight of U-235) but not 'enriched uranium' (ie uranium containing more than 0.72% by weight of U-235).
- 9.3 'Natural U/natural Th' are defined as, *inter alia*, U/Th which has been extracted by a chemical process(es), the purpose of which was the production of U/Th (ie the U/Th has been separated from its ore and from the bulk of its decay products). Thus, the Order applies to substances to which processed U and/or Th have been deliberately added, rather than to, for example, minerals containing U/Th at their naturally occurring levels and with the full complement of decay products (such minerals may be covered by the Phosphatic Substances EO).
- 9.4 Certain specified substances/Articles may be kept without limitation or condition. In addition, other substances/articles meeting the general requirements of the EO may be kept provided that the total weight of U and Th (taken together) in those substances/articles does not exceed 2 kg.
- 9.5 There is no exemption for mobile radioactive apparatus (section 10) under this Order.
- 9.6 Different numerical limits apply to exempt disposal of different waste types:
- a. specified wastes (principally magnesium alloy and gas mantles) – no limit
 - b. thoria ware – 25 kg per month (applies to total mass of the thoria ware)
 - c. solid waste which is substantially insoluble in water (and would be an exempt substance if it were not waste) – 100 g per day (applies to total mass of U and Th in the waste).
- 9.7 There is no exemption for disposal of liquid wastes under this Order.
- 9.8 The waste producer is exempt from s14(1) (authorisation for accumulation) subject to the waste being disposed of as soon as practicable.
- 9.9 All 3 waste types may only be disposed of by:
- (i) causing or permitting its removal by a refuse disposal authority or their contractors; or
 - (ii) by depositing it, or causing or permitting its removal (by persons other than those in (i)) for deposit, at a tip etc used for deposit of substantial quantities of non-radioactive waste.

- 9.10 If a waste producer uses (ii), he must be confident that the person removing the waste will dispose of it by the specified method.
- 9.11 A refuse disposal authority or their contractor receiving waste under (i) is exempted from s13(3) (authorisation for disposal) absolutely, and is exempted from s14(1) (authorisation for accumulation) subject to the waste being disposed of as soon as practicable.
- 9.12 A person receiving waste under (ii) is exempted from s13(3) provided that he deposits the waste in such a tip etc, and not in a part of such tip which is used for the deposit of radioactive waste only. **He may not use the EO to transfer the waste to another person.** He is exempted from s14(1) subject to the waste being disposed of as soon as practicable. In this context, 'as soon as practicable' should generally be interpreted as within 1 or 2 days.
- 9.13 A 'refuse disposal authority' is defined in the EO in relation to the 1936 Public Health Act. This can be interpreted as the equivalent of a 'waste collection authority' as defined in EPA90 Part II (ie district councils/London borough councils in England and Wales).
- 9.14 In virtually all cases nowadays, waste collection authorities contract out the collection of waste to commercial companies. Thus, distinguishing between disposals via routes (i) and (ii) relies on whether the company collecting the waste is doing so under a contract it holds with the district council, or under a contract held directly with the producer of the waste.

10 Guidance on the Prepared Uranium and Thorium Compounds EO (SI 1962 no 2711)

- 10.1 The Order provides conditional exemption for the keeping and use, for specified purposes, of solid or liquid chemical compounds of natural uranium or natural thorium and substances containing one or more such compounds. The purpose of the Order, as originally envisaged, is to exempt the keeping and use of small quantities of uranium and thorium compounds as chemical reagents for such purposes as teaching, analytical reagents, and analytical counting standards in radiochemical laboratories.
- 10.2 Note that, as defined in the Order, 'natural uranium' would include 'depleted uranium' (ie uranium containing less than 0.72% by weight of U-235) but not 'enriched uranium' (ie uranium containing more than 0.72% by weight of U-235).
- 10.3 'Natural U/natural Th' are defined as, *inter alia*, U/Th which has been extracted by a chemical process(es), the purpose of which was the production of U/Th (ie the U/Th has been separated from its ore and from the bulk of its decay products).
- 10.4 The total weight of U and Th (taken together) in all the compounds and substances kept on the premises under the EO must not exceed 2 kg.
- 10.5 There is no exemption for mobile radioactive apparatus (section 10) under this Order.
- 10.6 Exemption is given for disposal of both liquid and solid wastes (falling within the specified descriptions) subject to a limit of 100g per day of U & Th (taken together) in all the disposals.
- NB** Legal advice relating to a recent case has made clear that, to take advantage of the waste exemption, the waste must have been held by the possessor as an exempt compound/substance for one of the purposes specified in the Order.
- 10.7 The waste producer is exempt from s14(1) (authorisation for accumulation) subject to the waste being disposed of as soon as practicable.
- 10.8 Solid waste may only be disposed of by:
- (i) causing or permitting its removal by a refuse disposal authority or their contractors; or
 - (ii) by depositing it, or causing or permitting its removal (by persons other than those in (i)) for deposit, at a tip etc used for deposit of substantial quantities of non-radioactive waste.
- 10.9 If a waste producer uses (ii), he must be confident that the person removing the waste will dispose of it by the specified method.
- 10.10 A refuse disposal authority or their contractor receiving waste under (i) is exempted from s13(3) (authorisation for disposal) absolutely, and is exempted from s14(1) (authorisation for accumulation) subject to the waste being disposed of as soon as practicable.

- 10.11 A person receiving waste under (ii) is exempted from s13(3) provided that he deposits the waste in such a tip etc, and not in a part of such tip which is used for the deposit of radioactive waste only. **He may not use the EO to transfer the waste to another person.** He is exempted from s14(1) subject to the waste being disposed of as soon as practicable. In this context, 'as soon as practicable' should generally be interpreted as within 1 or 2 days.
- 10.12 A 'refuse disposal authority' is defined in the EO in relation to the 1936 Public Health Act. This can be interpreted as the equivalent of a 'waste collection authority' as defined in EPA90 Part II (ie district councils/London borough councils in England and Wales).
- 10.13 In virtually all cases nowadays, waste collection authorities contract out the collection of waste to commercial companies. Thus, distinguishing between disposals via routes (i) and (ii) relies on whether the company collecting the waste is doing so under a contract it holds with the district council, or under a contract held directly with the producer of the waste.
- 10.14 Liquid waste may only be disposed of by the means used for the disposal from the premises of liquid waste which is not radioactive waste (ie generally via the drainage system to sewer).
- 10.15 A broader aspect that may be queried is whether disposals of uranium and thorium compounds are subject to control not only under RSA93 (and the Prepared Uranium and Thorium Compounds Exemption Order) but also under the Hazardous Waste Regulations. On this, our Waste Policy colleagues have clearly stated:

"Uranium and thorium do not need to be assessed in their own right. Therefore if the exempted waste contains uranium and/or thorium but no other hazardous properties it is not hazardous waste."

11 Guidance on the Testing Instruments EO (SI 2006 no 1500)

- 11.1 The Order revokes the old EO (SI 1049 No 1985) from 6 October 2006.
- 11.2 It provides conditional exemption from registration under sections 7 or 10 of RSA 93 of:
- (i) testing instruments; or
 - (ii) certain sources for use with, or for testing or calibrating a testing instrument;
- 11.3 It also provides for the exemption from authorisation for accumulation and disposal of radioactive waste arising from exempt sources.
- 11.4 'Testing instrument' is defined as any apparatus, equipment or appliance designed for testing, measuring or otherwise investigating any of the characteristics of a substance or article and which contains certain radioactive sources. By a strict interpretation of the wording, this definition is different from the previous definition in that the testing instrument should itself include a source, which was not the case previously. The effect of this would be that exemption would no longer be possible for sources which are used for calibration of radiation monitoring instruments unless the instrument itself contains a source. This is believed to be a drafting error and until confirmation is received from Defra that it was the intention to exclude such items the Environment Agency will continue to treat them as exempt.
- 11.5 The Order refers to 'Class 1' and 'Class 2' sources, which may be either a homogeneous source, a laminated source, a sealed source, an electrodeposited Ni-63 or Fe-55 source or a tritium foil source; each type being defined in the Order. Note that homogeneous sources must not contain alpha-emitters (including decay products) so, for example, uranium disc sources would not be covered by this EO (SI 1962 No 2710 applies instead).
- 11.6 The activity (including decay products) of a Class 1 source must not exceed 200 kBq. The activity (including decay products) of a Class 2 source must not exceed the value given in Schedule 1 to the Order for that type of source. A testing instrument may incorporate a number of class 1 or 2 sources, but the total activity of sources of the same type must not exceed the appropriate Schedule 1 value.
- 11.7 Mobile radioactive apparatus containing electrodeposited Fe-55 sources and tritium foil sources are not covered by the Order. Certain Ni-63 electrodeposited mobile sources are covered, representing a change from the previous order. Emergency services CAMS units are therefore exempt.
- 11.8 The Order excludes from exemption, sources used for, or in connection with, the manufacture or storage for sale, hire or exhibition of radioactive material which would otherwise be exempt.
- 11.9 Keeping and use of Class 2 sources is subject to conditions including record-keeping requirements and actions in the event of damage, loss or theft. No such conditions apply to the keeping and use of class 1 sources (although good practice would be to keep records).
- 11.10 Sources which are defective or damaged or leaking radioactive material are excluded from exemption under sections 7 and 10 of RSA 93.
- 11.11 Different conditions apply to exempt disposals of waste Class 1 and Class 2 sources. Note that, although records are not required in relation to the keeping

and use of Class 1 sources, records must be kept of the **disposal** of any waste Class 1 sources.

11.12 Waste **Class 1** sources (including those that were mobile radioactive apparatus), whether intact or damaged, and any waste arising due to contamination by a damaged **Class 1** source, may be disposed of by:

- (i) removal as refuse by a waste collection authority or its contractors; or
- (ii) despatch to, or removal by, a person authorised under s13(3) to dispose of such waste (it should be noted that the standard authorisation template includes section 13(3)); or
- (iii) despatch to, or removal by, a manufacturer of class 1 sources. (For disposal of **intact** sources, this may be interpreted as also including suppliers and importers of Class 1 or Class 2 sources.)

11.13 Where disposal is via (i), the waste must be dispersed in other non-radioactive waste, and not more than 1 former source (whether whole or in parts) may be disposed of by that means in any week.

11.14 The waste producer is exempted from s14(1) (authorisation for accumulation) if he accumulates waste with a view to disposal by one of routes (i) to (iii) and subject to its being disposed of as soon as practicable.

11.15 A waste collection authority or its contractors receiving waste under (i) is exempted from s13(3) (authorisation for disposal of received waste) and s14(1) (authorisation for accumulation) provided that the radioactive waste is dispersed in other refuse and, for s14(1), that such refuse is disposed of as soon as practicable.

11.16 **Intact** waste **Class 2** sources (including those that were mobile radioactive apparatus) may be disposed of by despatch to or removal by:

- (a) a person authorised under s13(3) to dispose of such waste (it should be noted that the standard authorisation template includes section 13(3)); or
- (b) a manufacturer or supplier of Class 2 sources. (This may be interpreted as also including importers of Class 2 sources.)

11.17 A person who produces waste Class 2 sources is exempted from s14(1) (authorisation for accumulation) if he accumulates waste with a view to disposal by one of routes (a) or (b) and subject to its being disposed of as soon as practicable.

11.18 Note that, the Order does not extend to manufacturers who receive back waste sources (Class 1 or Class 2) – they must be authorised for accumulation and any final disposal.

11.19 Note that, **damaged** (to the extent that activity may escape) **Class 2** sources may **not** be disposed of under the Order; authorisation is required.

12 Guidance on the Storage in Transit EO (SI 1962 no 2646)

Background

12.1 Section 47(3) of RSA93 states that:

'In determining, for the purposes of this Act, whether any radioactive material is kept or used on any premises, no account shall be taken of any radioactive material kept or used in or on any railway vehicle, road vehicle, vessel or aircraft if either –

- (a) the vehicle, vessel or aircraft is on those premises in the course of a journey, or*
- (b) in the case of a vessel which is on those premises otherwise than in the course of a journey, the material is used in propelling the vessel or is kept in or on the vessel for use in propelling it.'*

Thus no registration under section 7 or 10 is needed to cover radioactive material on a journey by road, rail, ship or air. A 'journey' includes associated 'short term stops'. Thus for example a motorway services area is not required to be registered for drivers of vehicles delivering radioactive material to take a comfort break. It also includes radioactive material permanently installed into a ship, aeroplane, etc. Such material may be uranium balance weights in aircraft, luminous gauges in aeroplanes, etc.

12.2 However the reference to the journey of (a) and (b) above is to the vehicle, vessel or aircraft and not to the radioactive material being carried. Thus, for instance, if radioactive material is transported by air and waits in an airport storage area for onwards transport by road then the storage area should be registered unless exempted within the terms of an exemption order. The Radioactive Substances (Storage in Transit) Exemption Order 1962 No 2646 provides exemption for specified material and waste in transit.

Exemption of Radioactive material

12.3 Exemption is limited to securely packaged materials throughout a journey including when radioactive material is in transfer areas.

12.4 The Radioactive Substances (Storage in Transit) Exemption Order 1962 (SI 1962 No 2646) dates back to 1962, and some of the detail is out of date (requirement to notify the Minister (and not the Agency), requirement to keep records in terms of curies, measurements in inches). We may read these details as having been updated, so that notifications are to be given to the Environment Agency, records are kept in Becquerels and measurements are made in centimetres. References to RSA 60, the Interpretation Act 1889 and the definition of police force should also be read as though they have been updated to RSA 93, the Interpretation Act 1978 and the definition of "police area" found within the Police Act 1996.

12.5 (1) Exemption from registration is granted without further limits or conditions for storage of packages which meet the following criteria:

- a) the dose rate at or near the surface of the package is less than 4 microgray per hour,
- and**
- b) information on the package or accompanying documentation

indicates that it contains less than 40kBq in total of the radionuclides specified in Schedule 1 of the Order (see below)

and

c) information on the package or accompanying documentation indicates that it contains less than 4MBq in total of the radionuclides specified in Schedule 2 of the Order (see below)

and

d) information on the package or accompanying documentation indicates that it contains less than 40MBq in total of radionuclides other than those specified at b) and c) above.

(2) For packages that do not meet any one of the above criteria (a – d), exemption is subject to the following conditions:

a) each such package is not present on the premises for more than 2 weeks

and

b) there are no more than 5 such packages present at any time

and

c) no such package has a dimension of less than 10cm

and

d) nothing is taken out of any such package

and

e) loss or theft of such a package is notified without delay to the Police and as soon as practicable in writing to the Agency

and

f) breakage or damage or loss of any contents of any such package is notified to the Agency without delay and subsequently in writing

and

g) records are kept of the radionuclides and amounts contained within each such package.

Exclusion of radioactive waste

12.7 Exclusion from the need for authorisation under section 14 applies to securely packaged radioactive waste throughout a journey, including when radioactive waste is in transfer areas.

12.8 Under the terms of the order, waste is excluded from the need for authorisation absolutely if it meets the criteria of (1) above. If it does not meet these criteria, it is excluded from authorisation subject to the conditions in (2) above.

12.9 It is only by virtue of this order that the transport of radioactive waste does not involve a requirement for the premises of railways and roadways to be authorised.

Practical Implications

12.10 The exemption order covers most situations where there is occasional short term storage of radioactive material. Where holders of packages in transit cannot meet the terms of the order, they will need to be registered under RSA. A special registration certificate is used and guidance on this is available in RASAG Chapter 1.

Schedule 1 of SI 1962 NO 2646		
Actinium 227	Curium 244	Plutonium240

Americium 241	Curium 245	Plutonium242
Americium 243	Curium 246	Protactinium 231
Californium 249	Neptunium 237	Radium 226
Californium 250	Plutonium238	Thorium 228
Californium 252	Plutonium239	Thorium 230
Curium 243		
Schedule 2 of SI 1962 NO 2646		
Actinium 228	Polonium 210	Thorium 227
Berkelium 249	Protactinium 230	Uranium 230
Cerium 144	Radium 223	Uranium 232
Curium 242	Radium 224	Uranium 233
Europium 154	Radium 228	Uranium 234
Lead 210	Radon 222	Uranium 236
Plutonium241	Strontium 90	

13 Guidance On The Gaseous Tritium Light Devices Exemption Order (SI 1985 no 1047)

Introduction and Background

- 13.1 Gaseous tritium light devices (GTLDs) have been in widespread use for many years as luminous items requiring no power supply. They are used in both military and civil applications. Some applications have largely ceased but the devices remain in circulation, some continue and new uses are developed. Current uses include exit signs, fishing tackle, self-powered torches and keyrings.
- 13.2 Prior to 1985, all undertakings holding GTLDs were required to register under RSA 60. The effect of the Radioactive Substances (Gaseous Tritium Light Devices) Exemption Order 1985 (GTLD EO) was to define Class A, B and C GTLDs and to conditionally exempt these from registration and authorisation. Over the following few years, many of the registrations were cancelled.
- 13.3 However, in 1987, research indicated that the tritium in GTLDs was present to a larger than expected extent in combined form (rather than elemental). This was interpreted as invalidating the conditions in the GTLD EO. Further cancellation of GTLD registrations was then suspended but registration of new users was not reinstated. Some users thus have pre-1985 registrations, some were de-registered and are generally now not likely to be known to the Agency, and some are post-1985 users who are also generally unknown to the Agency.
- 13.4 Recently the disposal of GTLDs to landfill has been a subject of discussion and it is believed that this may be a possible cause of elevated tritium levels in leachate from some of the landfills monitored by the Agency. The radiation exposure to the public from observed concentrations of tritium in leachate is negligible. In due course the Agency intends to review the data obtained from the monitoring programme and consider appropriate future courses.

Agency Policy

- 13.5 Current Agency policy is contained in an undated note from RSR Policy, "Policy Review of the GTLD Exemption Order" which was agreed by RSR Managers on 13 January 2003. The relevant policy conclusions are that the Agency:
- Interprets the 2% limit in Article 3(a) of the GTLD EO as applying to the gas/vapour phase, and accepts that consequently GTLDs generally conform with the conditions of the GTLD EO.
 - Lifts the suspension on the use of the exemption facilities in the GTLD EO, and allows the exemption from registration requirements.

Definition of terms

- 13.6 For the purposes of this guidance the following terms are used, largely based on the GTLD EO:
- GTL D – An illuminant, instrument, sign or indicator which contains tritium gas in robust sealed containers, is constructed to withstand normal use and contains no other radioactive material

- GTLS – A sealed container of tritium gas forming part of a GTLD
- Class A – A GTLD or GTLS containing less than 20 GBq
- Class B – A GTLD of total activity less than 1TBq and a maximum in each GTLS of 80 GBq
- Class C – A GTLD for use in a vehicle or aircraft.

Restriction on soluble content

- 13.7 The GTLD EO specifies (for the purposes of exemption from registration) that the activity in the form of tritium oxide and other water soluble compounds of tritium in any GTLS must not comprise more than 2% of the total activity of that GTLS, or 5 GBq if the total activity does not exceed 100 MBq.
- 13.8 Following a review of the available information, the Agency considers that the 2% restriction is intended to apply to the gas/vapour phase and that there is little evidence that GTLDs fail to comply with this criterion. This restriction in the GTLD EO should therefore not be used to exclude GTLDs from being exempted from registration under the GTLD EO, unless there is specific information that they contain more than 2% of soluble compounds in the vapour phase. It is not Agency policy that users be asked to demonstrate the level of soluble compounds present.

Keeping and Use of GTLDs and GTLSs

- 13.9 Subject to restrictions on manufacture or supply, Class A, B or C GTLDs can be kept and used by undertakings without registration, subject to the relevant conditions of the GTLD EO. Such items should not be registered by the Agency.
- 13.10 GTLDs being kept or used, which do not meet the definition of Class A, B or C, or where the GTLD EO cannot be used for any other reason, need to be registered under RSA 93.
- 13.11 Users who are exempt from registration based on the Agency's revised interpretation of the GTLD EO, but are currently registered to hold Class A, B or C GTLDs, should have their registrations cancelled.
- 13.12 MoD GTLDs should be regulated in accordance with this guidance and the separate guidance on regulation of MoD premises.

Manufacture and Supply

- 13.13 Premises used for the manufacture of any Class A, B or C GTLDs or the storage for sale or hire of GTLDs containing greater than 20 GBq each, are excluded from exemption from registration under the GTLD EO. Users of such premises will therefore need to be registered.
- 13.14 Premises used for storage or supply of smaller (less than 20 GBq) GTLDs are exempt from registration up to a total holding of 5 TBq; this implies that at least 250 small GTLDs may be held without registration. Provided the GTLDs are

below 20 GBq, then fishing tackle shops, for example, holding up to 250 items, would fall within this category.

Disposal of Waste GTLDs and GTLSs

- 13.15 Disposal of intact or broken GTLDs and GTLSs containing 20 GBq or less at the time of disposal, may be made under the GTLD EO without authorisation (subject to conditions) to:
- waste collection authorities or their contractors,

 - an appropriate licensed landfill site (see 4(2)(a)(ii) of the EO),

 - a person holding a suitable RSA 93 section 13(3) authorisation, or

 - a manufacturer of items incorporating GTLDs (who will in practice require to be authorised themselves under sections 13(1) and 13(3) of RSA 93)
- 13.16 Disposal of intact or broken GTLDs containing greater than 20 GBq is possible without authorisation under the EO, to a person holding a suitable RSA 93 section 13(3) authorisation, or a manufacturer of items incorporating GTLDs. Such waste will always require the recipient to hold a suitable authorisation for accumulation and subsequent disposal. These sources should be recycled where practicable and authorisations should not be issued for other disposal methods without considering this.
- 13.17 Radioactive waste in the form of GTLDs or GTLSs which were formerly exempt, can be accumulated with a view to subsequent disposal, without authorisation for a maximum of 12 weeks at the site where it becomes waste. Once transferred to another person for the purposes of disposal, the EO cannot be applied and authorisation under section 14 of RSA 93 is required.
- 13.18 Broken GTLDs which retain significant activity, are liable to contaminate other items in the vicinity and Officers should expect to see suitable containment where necessary.

Bibliography

1. The Radioactive Substances (Gaseous Tritium Light Devices) Exemption Order 1985, SI 1985 No. 1047
2. Characterisation of Redundant Gaseous Tritium Light Devices by K Harding, 1992. DOE Report No. DoE/HMIP/RR/92/060

3. A Review of the Use and Disposal of Gaseous Tritium Light Devices by S Mobbs et al, NRPB, June 1998 (Environment Agency Report, unnumbered)

TABLE 1 CURRENT EXEMPTION ORDERS

TITLE *	STATUTORY INSTRUMENT
Exhibitions	1962 No 2645
Storage in Transit	1962 No 2646
Phosphatic Substances, Rare Earths Etc	1962 No 2648
Lead	1962 No 2649
Uranium and Thorium	1962 No 2710
Prepared Uranium and Thorium Compounds	1962 No 2711
Geological Specimens	1962 No 2712
Waste Closed Sources	1963 No 1831
Schools Etc	1963 No 1832
Precipitated Phosphate	1963 no 1836
Electronic Valves	1967 No 1797
Smoke Detectors	1980 No 953
Smoke Detectors (Amendment)	1991 No 477
Gaseous Tritium Light Devices	1985 No 1047
Luminous Articles	1985 No 1048
Substances of Low Activity	1986 No 1002
Substances of Low Activity (Amendment)	1992 No 647
Hospitals	1990 No 2512
Hospitals (Amendment)	1995 No 2395
Natural Gas	2002 No 1177
Testing Instruments	2006 No 1500

* Abbreviated titles - Full titles are as follows, using the first on the list as an example:

-The Radioactive Substances (Exhibitions) Exemption Order 1962. SI 1962 No 2645

TABLE 2 ACTIVITY LIMITS FOR KEEPING AND USE OF RADIOACTIVE MATERIALS SPECIFIED BY EXEMPTION ORDERS MADE UNDER RSA60

<p>Exemption Order Exhibitions; SI 1962 No 2645</p>	<p>Activity Limits Homogeneous source: 370 kBq, no alpha-emitters Sealed source: 37 MBq Open source – not more than the following, for each radionuclide: ³H 370 MBq; ¹⁴C 370 MBq; ²⁴Na 37 MBq; ³²P 3.7 MBq; ³⁵S 37 MBq; ⁵⁹Fe 3.7 MBq; ⁶⁰Co 3.7 MBq; ⁹⁰Sr 37 kBq; ¹³¹I 370 kBq; ¹³⁷Cs 3.7 MBq; ¹⁹⁸Au 3.7 MBq; ²²⁶Ra 3.7 kBq.</p>
<p>Storage in Transit; SI 1962 No 2646</p>	<p>Limits per package: (²²⁷Ac + ²⁴¹Am + ²⁴³Am + ²⁴⁹Cf + ²⁵⁰Cf + ²⁵²Cf + ²⁴³Cm + ²⁴⁴Cm + ²⁴⁵Cm + ²⁴⁶Cm + ²³⁷Np + ²³⁸Pu + ²³⁹Pu + ²⁴⁰Pu + ²⁴²Pu + ²³¹Pa + ²²⁶Ra + ²²⁸Th + ²³⁰Th) 37 kBq (²²⁸Ac + ²⁴⁹Bk + ¹⁴⁴Ce + ²⁴²Cm + ¹⁵⁴Eu + ²¹⁰Pb + ²⁴¹Pu + ²¹⁰Po + ²³⁰Pa + ²²³Ra + ²²⁴Ra + ²²⁸Ra + ²²²Rn + ⁹⁰Sr + ²²⁷Th + ²³⁰U + ²³²U + ²³³U + ²³⁴U + ²³⁶U) 3.7 MBq</p>
<p>Phosphatic Substances, Rare Earths etc; SI 1962 No 2648</p>	<p>All other radionuclides, in total: 37 MBq a) Specified rare earth elements (or compounds of them or alloys incorporating them): concentration of each of the RSA93 Schedule 1 elements to be 37 Bq/g. b) Other materials: concentration of each of the RSA93 Schedule 1 elements to be 15 Bq/g.</p>
<p>Uranium and Thorium; SI 1962 No 2710</p>	<p>a) No numerical limit on quantities of materials having the following descriptions: a solid or liquid substance containing 4% natural Th; hardener alloy for Mg-alloy production; incandescent mantle; article of thoria ware. b) Other material: 2 kg of (U+Th) on the premises 2 kg of (U+Th) on the premises</p>
<p>Prepared Uranium and Thorium Compounds; SI 1962 No 2711 Geological Specimens: SI 1962 No 2712</p>	<p>(Natural minerals containing U and/or Th). 100 kg of (U+Th) on the premises.</p>

TABLE 2 (contd.) ACTIVITY LIMITS FOR KEEPING AND USE OF RADIOACTIVE MATERIALS SPECIFIED BY EXEMPTION ORDERS

Exemption Order	Activity Limits										
<p>Schools etc; SI 1963 No 1832</p> <p>Electronic Valves; SI 1967 No 1797</p> <p>Smoke Detectors; SI 1980 No 953 amended by SI 1991 No 477</p> <p>Gaseous Tritium Light Devices; SI 1985 No 1047</p> <p>Luminous Articles; SI 1985 No 1048</p> <p>Hospitals SI 1990 No 2512 amended by SI 1995 No 2395</p>	<p>a) Closed and open sources: total holding 148 MBq</p> <p>b) Open sources: total holding 74 MBq; total activity brought on to the premises 74 MBq in any 4-week period. Refers to "Class 1" and "Class 2" valves – see Table 3 for definitions Class 1 valves, and Class 2 valves incorporated in equipment, are exempted unconditionally. Total holding of "loose" Class 2 valves: 10 such valves.</p> <p>a) Exemption for smoke detectors kept "loose" (not affixed or attached to the premises): 40 kBq of ²⁴¹Am (only) in each detector; 500 such detectors in total.</p> <p>b) Exemption for smoke detectors affixed or attached to premises: 4 MBq of all radionuclides in each detector; no limit on number of detectors held.</p> <p>a) "Class A" (each GTLD containing 20 GBq): total holding 5 TBq</p> <p>b) "Class B" (each GTLD containing 1 TBq, with 80 GBq in any one sealed part): total holding 30 TBq. Each article: <u>either</u> 80 MBq of ¹⁴⁷Pm <u>or</u> 4 GBq of ³H. Total activity on premises: 40 GBq of ¹⁴⁷Pm; 200 GBq of ³H.</p> <p>Applies to open sources containing no alpha-emitters. Total holdings as follows: ⁹⁹Tc 1 GBq; all other radionuclides (in total) 100 MBq, of which 20 MBq comprises radionuclides which are radioisotopes of iodine.</p>										
<p>Natural Gas SI 2002 No 1177</p>	<p>'Specified natural gas' – ie natural gas containing Rn-222 and/or its decay products at concentrations ≤ 5 Bqg⁻¹ for each radionuclide</p>										
<p>Testing Instruments; SI 2006 No 1500</p>	<p>Activity per Class 2 source, or per instrument containing one or more sources:</p> <table data-bbox="740 1585 1453 1753"> <tr> <td>Homogeneous source:</td> <td>0.4 MBq</td> </tr> <tr> <td>Laminated or sealed source:</td> <td>4 MBq</td> </tr> <tr> <td>Electrodeposited source containing ⁵⁵Fe:</td> <td>200 MBq</td> </tr> <tr> <td>Electrodeposited source containing ⁶³Ni:</td> <td>600 MBq</td> </tr> <tr> <td>Tritium foil source:</td> <td>20 GBq</td> </tr> </table>	Homogeneous source:	0.4 MBq	Laminated or sealed source:	4 MBq	Electrodeposited source containing ⁵⁵ Fe:	200 MBq	Electrodeposited source containing ⁶³ Ni:	600 MBq	Tritium foil source:	20 GBq
Homogeneous source:	0.4 MBq										
Laminated or sealed source:	4 MBq										
Electrodeposited source containing ⁵⁵ Fe:	200 MBq										
Electrodeposited source containing ⁶³ Ni:	600 MBq										
Tritium foil source:	20 GBq										

TABLE 3 ACTIVITY LIMITS FOR WASTE DISPOSAL SPECIFIED BY EXEMPTION ORDERS MADE UNDER RSA60

<p>Exemption Order</p> <p>Phosphatic Substances, Rare Earths etc; SI 1962 No 2648</p> <p>Uranium and Thorium; SI 1962 No 2710</p> <p>Prepared Uranium and Thorium Compounds; SI 1962 No 2711</p> <p>Geological Specimens: SI 1962 No 2712</p> <p>Schools etc SI 1963 No 1832</p>	<p>Solid Waste*</p> <p>a) Substantially insoluble waste consisting mainly of one or more of the specified rare earth elements (or compounds of them): concentration of each of the RSA93 Schedule 1 elements to be 37 Bq/g. b) Other substantially insoluble waste: concentration of each of the RSA93 Schedule 1 elements to be 15 Bq/g.</p> <p>a) Mg alloy/thoriated tungsten/dross from hardener alloy: no numerical limit. b) Other material: 100g of (U+Th), "substantially insoluble in water", per day. 100g of (U+Th) per day, for solid + liquid wastes together.</p> <p>Natural minerals containing U and/or Th. a) If "substantially insoluble in water", 100g of (U+Th) per day b) Other waste: 2g of (U+Th) per month, in solid + liquid wastes together.</p> <p>No alpha-emitters or ⁹⁰Sr. 370 kBq in 0.1 m³ of refuse. 37 kBq in any one article. 370 kBq per week.</p>	<p>Liquid/Gaseous Wastes</p> <p><u>Liquid</u>: Waste to contain particles of the solid waste (only).</p> <p>-</p> <p><u>Liquid</u>: 100g of (U+Th) per day, for liquid + solid wastes together. Liquid waste disposed of by a means used to dispose of non-radioactive waste. <u>Gaseous</u>: 1g of (U+Th) per day. <u>Liquid</u>: 2g of (U+Th) per month, in liquid + solid wastes together.</p> <p>No alpha-emitters or ⁹⁰Sr. <u>Liquid</u>: 18.5 MBq per week, to foul water/trade effluent drain system.</p> <p><u>Gaseous</u>: 37 kBq per day</p>
<p>Natural Gas SI 2002 No 1177</p>	<p>Solid, liquid or gaseous waste which is specified natural gas or consists of products derived from the combustion of specified natural gas</p>	

TABLE 3 (contd)

ACTIVITY LIMITS FOR WASTE DISPOSAL SPECIFIED BY EXEMPTION ORDERS

<p>Exemption Order</p> <p>Electronic Valves SI 1967 No 1797</p>	<p>Solid Waste*</p> <p>(Solid Waste only)</p> <p>a) Class 1 Valves, defined as each having:</p> $\left[\frac{KBq(^{60}Co)}{3.7} + \frac{KBq(^{63}Ni)}{3.7} + \frac{KBq(^{137}Cs)}{3.7} + \frac{KBq(Th)}{3.7} + \frac{KBq(^{204}Tl)}{3.7} + \frac{KBq(^{226}Ra)}{3.7} + \frac{KBq(U)}{3.7} + \frac{KBq(^{14}C)}{37} + \frac{KBq(^{36}Cl)}{37} + \frac{KBq(^{147}Pm)}{185} + \frac{KBq(^{85}Kr)}{370} + \frac{KBq(^3H)}{5550} \right] \leq 1.0$ <p>- These are exempted unconditionally.</p> <p>b) Class 2 Valves defined as each having:</p> $\left[\frac{KBq(^{60}Co)}{37} + \frac{KBq(^{63}Ni)}{37} + \frac{KBq(^{137}Cs)}{37} + \frac{KBq(Th)}{37} + \frac{KBq(^{204}Tl)}{37} + \frac{KBq(^{226}Ra)}{37} + \frac{KBq(U)}{37} + \frac{KBq(^{14}C)}{370} + \frac{KBq(^{36}Cl)}{370} + \frac{KBq(^{147}Pm)}{1110} + \frac{KBq(^{85}Kr)}{3700} \right] \leq 1.0$ <p>Not more than 10 such valves to be disposed of, per week.</p>
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TABLE 3 (contd.)

ACTIVITY LIMITS FOR WASTE DISPOSAL SPECIFIED BY EXEMPTION ORDERS

Exemption Order	Solid Waste*	Liquid/Gaseous Wastes
Smoke Detectors; SI 1980 No 953 amended by SI 1991 No 477	For waste arising from detectors containing 40 kBq of ²⁴¹ Am. Limit is 40 kBq of ²⁴¹ Am in 0.1 m ³ of waste + refuse.	-
Gaseous Tritium Light Devices; SI 1985 No 1047	20 GBq of ³ H in any GTLD (ie "Class A" GTLDs only); 1 GTLD in any 0.1 m ³ of non-radioactive waste.	-
Luminous Articles; SI 1985 No 1048	Individual articles contain <u>either</u> 80 MBq of ¹⁴⁷ Pm <u>or</u> 4 GBq of ³ H; 10 such articles to be disposed of per week.	-
Testing Instruments; SI 1500 No 1500	Class 1 sources; 200 KBq of all radionuclides per source; 1 such source disposed of per week.	-
Hospitals SI 1990 No 2512 amended by SI 1995 No 2395	No alpha-emitters. a) 400 kBq in 0.1 m ³ of the waste. 40 kBq in any one article. b) <u>By burning:</u> 25 MBq of (³ H+ ¹⁴ C) per month; 5MBq of all other radionuclides per month. Covers solid and flammable liquid wastes, and includes transfers to another hospital or to an authorised premises for disposal by burning there.	<u>Aqueous Liquid:</u> No alpha-emitters. Disposal to drainage system which drains to a public sewer. <u>For human excreta,</u> 1.0 GBq of ^{99m} Tc, 500 MBq of all other radionuclides, per month. <u>For wastes other than excreta,</u> 50 MBq of all radionuclides per month.

Unless burning is specified, the disposal route required is generally removal by a waste collection authority or its contractors, or disposal to a tip, dump or pit, used solely for the deposit of substantial quantities of refuse which is not radioactive waste. However, the EOs for Luminous Articles, Testing Instruments and Smoke Detectors do not allow the latter option.

