

Leaflet 12

Accumulation and Disposal of Radioactive Waste

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Scope

1 This Leaflet covers the requirements for accumulation and disposal of radioactive waste. This leaflet should be read in conjunction with the guidance published in JSP 886 (The Defence Logistics Support Chain Manual) concerning the management and arrangements for the disposal of all surplus materiel.

2 The transfer and sale of items containing radioactive material are addressed in Leaflet 11.

3 Disposal of radioactive substances that are not waste, for example by sale, loan or transfer, is addressed in Leaflet 11.

4 Radiation protection relating to transport of radioactive substances is addressed in Leaflet 10. Transport operations must be undertaken in accordance with JSP800 Vol. 4b; Transport of Dangerous Goods by Road, Rail and Sea or JSP800 Vol. 4a Transport of Dangerous Goods by Air.

Introduction

5 The disposal of radioactive material in England and Wales is controlled by the Environmental Permitting Regulations 2010 (EPR10). In Scotland and Northern Ireland disposal is controlled by the Radioactive Substances Act 1993 (RSA93). EPR10/RSA93 do not apply to MOD, but the Secretary of State for Defence has stated that standards and arrangements will be introduced that will be, so far as is reasonably practicable, at least as good as those required by legislation. Government Policy on radioactive waste management is given in the Review of Radioactive Waste Management Policy: Final Conclusions (Cm2919, July 1995). The MOD policy for the management of Defence related radioactive wastes is given at JSP392 Volume 1 Chapter 1.

6 Establishments which expect to be generating radioactive waste above out of scope or exemption levels either as a result of a workplace practice or process (e.g. working with open sources) or as a result of remediation/refurbishment of buildings or remediation of contaminated land must apply to the appropriate environment agency (the Environment Agency in England and Wales, the Scottish Environment Protection Agency or the Northern Ireland Environment Agency) for an approval to accumulate and/or dispose of radioactive waste before any such work takes place. A suitably qualified and experienced person must be consulted at the earliest opportunity to advise on regulatory issues associated with declaration, accumulation or disposal of radioactive waste where permitting is needed. This person or will often also be the appointed Radioactive Waste Adviser (RWA).

7 Most units or establishments will not accumulate or dispose of radioactive waste, but will return items containing radioactive substances via the appropriate stores organisation as redundant/obsolete items. Following a declaration from a Project Team (PT) that items are obsolete, it will normally be the duty of the stores organisation to declare the items as waste, if they cannot be utilised elsewhere. If a PT cannot be identified, then the Disposal Services Authority (DSA) has the authority to declare items obsolete (further guidance maybe found in JSP 886).

Statutory Requirements

8 In addition to the general requirements of the Health and Safety at Work etc Act 1974 and the Management of Health and Safety Regulations 1999, the following specific legislation may apply:

- Ionising Radiations Regulations 1999 (IRR99) (apply directly);
- Environmental Permitting (England & Wales) Regulations 2010 (as amended) (EPR10) (parallel arrangements);
- Radioactive Substances Act 1993 (Scotland & Northern Ireland) (RSA93) (parallel arrangements);
- Carriage of Dangerous Goods and Transportable Pressure Equipment Regulations 2011 (apply directly);

- High-activity Sealed Radioactive Sources and Orphan Sources Regulations 2005 (HASS2005) (Scotland & Northern Ireland only) (parallel arrangements).

Duties

Commanding Officer and Head of Establishment (CO/HoE)

9 The CO/HoE has a duty to the Secretary of State, and a personal responsibility, to protect the environment and secure the health, safety and welfare of their staff at work. The CO/HoE is also required to protect persons not in MOD employment (e.g. members of the public) against risks to their health and safety arising from the MOD work activities. This includes radiation safety. The CO/HoE's authority (but not responsibility) for radiation safety management arrangements may be delegated to appropriate personnel, such as a Radiation Safety Officer (RSO).

Radiation Safety Officer (RSO)

10 If appointed and where authority has been delegated the Radiation Safety Officer (RSO) will normally discharge the duties of the CO/HoE with respect to seeking Approvals from the appropriate regulator.

Radiation Protection Supervisor (RPS)

11 A Radiation Protection Supervisor must be appointed where it is necessary to designate areas as controlled or supervised (see Leaflet 4). Where an RPS is so appointed they are to ensure that the work is carried out in accordance with local procedures or system of work which should address the requirements of this leaflet.

Workplace Supervisor (WPS)

12 In units where it is unnecessary to appoint an RPS, a WPS may need to be appointed with duties to ensure that work is carried out in accordance with local orders for radiation safety. In addition to those duties, a WPS may be required to assist the RSO in the preparation of documentation requesting the Approval to accumulate and/or dispose of radioactive waste for submission to the appropriate environment agency with assistance of the RWA.

Employees

13 It is the responsibility of all employees to ensure that they comply with all relevant health and safety instructions including local orders. Should there be any change to radioactive holdings or to working practices this must be notified to the WPS/RPS or other appropriate persons.

Categorisation of Radioactive Waste

14 Radioactive waste is categorised as being either:

- 14.1 Outside the scope of regulation
- 14.2 Exempt from the requirements for an approval from the regulatory authorities
- 14.3 Subject to the requirement for an approval

15 Total activity and activity concentration limits for determining radioactive substances that are either out of scope or exempt are set down in legislation from which government guidance is produced (Guidance on the scope of and exemptions from the radioactive substances legislation in the UK, Defra) which sets out conditions which, when complied with, allow for the accumulation and disposal of limited quantities of radioactive waste without the need to obtain approval.

16 In circumstances where accumulation and/or disposal quantities exceed the exemption limits and/or where exemption conditions cannot be complied with, then an approval will be required from the appropriate environment agency (which are: in England and Wales the Environment Agency (EA), the Scottish Environment Protection Agency (SEPA) and the Northern Ireland Environment Agency (NIEA)).

17 Units, establishment and Project Teams should consult an RPA or an RWA to determine which category applies to obsolete equipment containing radioactive substances that are going to be disposed of or equipment incorporating radioactive substances which has become damaged and can be disposed of locally at unit level.

18 There are instances, such as in the decommissioning of facilities/equipment or following a spillage of radioactive material, where items (e.g. tools, bricks etc) or materials (e.g. soil) may be found to be contaminated or potentially contaminated with low levels of radiation. In these situations it is important to correctly quantify the degree of contamination so that the most appropriate disposal routes can be identified. In such circumstances the appointed RPA or an RWA should be consulted.

19 To support this, the MOD has contributed to the Code of Practice (COP) Clearance & Exemption Principles, Processes and Practices for use by the Nuclear Industry – Issue 2. This document sets out industry good practice for identifying and sentencing exempt radioactive material. The code of practice is available at:-

<http://www.cewg.co.uk>.

20 The COP interprets current legislation and provides, through the use of flow charts, clear guidance for commonly found material types. Those seeking to manage the waste disposal process, working with their RPA and RWA, should incorporate the requirements of the COP into local procedures and practices for the disposal, re-use or recycling of radioactive material.

21 Following local procedures that incorporate the principles of the COP will generally be sufficient to enable individual units and establishments to demonstrate that material is being appropriately sentenced in compliance with legislative and MOD requirements.

Application for Approval to Dispose of Radioactive Waste Above Exemption Levels

22 No radioactive waste disposals other than those covered by an appropriate exemption are to be made without first obtaining an approval from the appropriate environment agency. Advice on the arrangements for disposal of radioactive material through an approved route should be sought from an RWA.

23 In addition to the requirement to keep any radiation exposure as low as reasonably practicable (ALARP) under IRR99 the process of seeking an approval from the environmental agencies will require an assessment to be made, as part of the planning process for radiation protection, to determine whether the following maximum doses could be received by individuals as a result of the planned activity:

23.1 0.3 mSv per year from any source from which radioactive discharges are first made on or after 13th May 2000;

23.2 0.5 mSv per year from the discharges from any single site.

24 Radioactive Waste Advisers can advise on all matters related to the management of radioactive waste. It is a condition of the approvals granted by the environment agencies that Approval Holders and Operators (in this case the MOD) appoint in writing a suitably Qualified Expert/RWA. An RWA must be consulted on the following matters:

24.1 Achieving and maintaining an optimal level of protection for the environment and the population

24.2 Checking the effectiveness of technical devices for protecting the environment and the population

24.3 Acceptance into service, from the point of view of surveillance of radiation protection, of equipment and procedures for measuring and assessing, as appropriate, exposure and radioactive contamination of the environment and the population

24.4 Regular calibration of measuring instruments and regular checking that they are serviceable and correctly used

25 Significant input will be required from the RWA in determining the radiological impact of the direct disposals of radioactive waste to the environment and in ensuring that the process employed in accumulating and/or disposing of radioactive waste is optimised such that the best available technique is being implemented to the extent that exposures to the environment are reduced to levels that are as low as reasonably achievable.

26 In most circumstances applications to the environment agencies are co-ordinated through Dstl Environmental Sciences Department (ESD) who will make arrangements for the necessary payments for applications and subsequent annual subsistence charges. MOD establishments with their own resident RWA may apply directly to the environment agency concerned, but must keep Dstl ESD informed by letter, as detailed in Leaflet 3 to ensure that funding arrangements are put in place. MOD establishments that are (nuclear) Authorised Sites will liaise with the environment agencies directly.

27 Approval documents provided by the environment agencies via Dstl ESD are to be held by the unit or establishment. Unless otherwise stated as a condition in the approval or approval and notification, these documents must not be displayed on any notice board. MOD (Army) establishments are to send an additional copy to CESO (Army).

Accumulation of Radioactive Waste

28 In most circumstances exempt radioactive waste should be disposed of as soon as practicable. Regulator guidance states that establishments and units making use of the Very Low Level Waste (VLLW) Exemption (Annex A) provisions should not hold onto waste items for a period exceeding the next waste collection; therefore exempt VLLW such waste shouldn't be accumulated for more than a few weeks. In the case of sealed sources, electrodeposited sources and tritium foil sources (above certain threshold limits – see Annex B rows 3 and 4) these items may be accumulated for a period of up to twenty six weeks. This timeframe allows for the arrangements of contract to transfer this type of waste to a waste permitted person.

29 Where disposal within this timescale would not be practicable an approval for the accumulation of waste over a longer period must be obtained from the appropriate environment agency. Agreement to accumulate waste is required from the appropriate TLB Safety Authority who will then instruct Dstl ESD to obtain an approval.

30 Radioactive waste is to be disposed of in accordance with the terms of any approvals and exemptions. Where it is necessary to accumulate waste, the waste should be stored in accordance with the requirements of Leaflet 9, and comply with the requirements of any conditions set out in the approval.

Disposal Arrangements

31 Unless an exemption applies, discharge or disposal of radioactive waste can only take place after an approval has been received. The disposal must take place in accordance with the conditions of the approval.

32 Once a unit or establishment has no further requirement for an approval to accumulate and/or of radioactive waste, they are to inform the TLB Authority and Dstl ESD, who will initiate proceedings to cancel/surrender the approval.

33 Values of concentrations and quantities of exempt solid radioactive waste as stated in national legislation are reproduced at Annex B. Advice on the application of this table and the exemption limits that apply to liquids and NORM waste as-well-as full details of the exemption conditions that apply (which vary depending upon the type of exempt waste) should be sought from your appointed RPA or an RWA. Guidance on the applicability of the exemption provision is given in the documents referenced in Annex A.

34 In general the following exemption provisions must be complied with when disposing of low volume VLLW:

34.1 Waste must be transferred to:

34.1.1 A person who disposes of substantial quantities of non-radioactive waste for burial in landfill, incineration or recovery (which, for example, includes recycling and recovery of metals) and where the radioactive waste will be mixed with non-radioactive waste.

34.1.2 A person with a Permit to receive such waste.

34.2 A record must be kept indefinitely of the radioactive material (description, nuclide and activity) that has been disposed of including the date of disposal and the disposal route used.

- 34.3 Ensure that where practicable any marking or labelling of the waste or its container is removed before it is disposed of.

35 Sealed sources, tritium foil sources and electrodeposited sources that exceed the limits in Annex B can be disposed of without the need for an Approval, subject to compliance with certain conditions. The source must be disposed of via a person or organisation who is authorised under EPR10/RSA93 to dispose of similar material. Additional advice on the disposal of such sources should be sought from the appointed RPA or an RWA.

36 Large quantities of very low level radioactive waste (the exemption provisions applies only to low volume VLLW) or exempt wastes such as thoriated engine casings should be disposed of through the Disposal Services Agency (DSA), MOD's central contract for the disposal of hazardous and special wastes. The appointed RPA will advise on whether this route or direct disposal via a waste contractor is most appropriate. Further details can be obtained from the DSA.

Spoil from the remediation of sites should be disposed of through DIO or a DIO approved contractor (see Leaflet 13).

37 It should be noted that High Activity Sealed Sources (HASS) should not normally be disposed of, but will generally be transferred to an organisation approved to accept such sources, for example a manufacturer, see Leaflet 3.

Disposal of radioactive special/hazardous wastes

38 In some circumstances some radioactive waste may exhibit hazardous properties not related to its radioactive properties. Hazardous waste (called special waste in Scotland) is waste which exhibits one or more of the properties that are hazardous to health or the environment. These hazardous properties are listed in the European Commission Waste Framework Directive 2008/98/EC. Properties of waste that render them hazardous include:

- Explosive; oxidising; highly flammable and flammable; irritant; harmful; toxic; carcinogenic; corrosive; infectious; teratogenic; mutagenic; substances and preparations which emit toxic or very toxic gases in contact with water, air or an acid; substances and preparations capable by any means, after disposal, of yielding another substance e.g. leachate, which possess any of the characteristics listed above; sensitising and ecotoxic.

39 Where radioactive waste is also hazardous/special waste, disposal advice from the RPA/RWA and the appropriate local Environment Officer or SHEF representative (who can advise on 'other' waste disposal regulations) is to be sought. The disposal of certain radioactively contaminated hazardous wastes may also be available via the DSA.

Recording of Disposals

40 A record of all disposals of radioactive waste is to be kept by the Radiation Safety Officer. Records of disposals are to be kept indefinitely. Suitable forms are provided at Annex B and should be used for recording solid and liquid waste disposals, respectively. Details of gaseous or airborne particulate waste disposals should be recorded on an appropriate form containing the following information:

- 40.1 Details of disposal/discharge (e.g. to landfill via waste disposal contractor or via drain to sewer)

40.2 Radionuclide, its chemical form and total activity

40.3 Date, time and duration of release (where applicable)

41 A statement of all radioactive waste disposals made in that calendar year is to be forwarded to Dstl ESD by all Naval (including ships and submarines), RAF, Army and Defence Agency units and establishments at the end of each calendar year. This should reach Dstl by 31 March of the year following that being reported on. To assist in this procedure, Dstl will distribute blank copies of the reporting form during January of each year, included as a section of the Annual Holdings Return. Additional forms can be provided on request.

Disposal of Waste Overseas

42 Establishments situated overseas are to dispose of radioactive waste in accordance with local national regulations, where permitted to do so. Where regulations on the disposal of radioactive waste do not exist, advice should be sought from the relevant RPA/RWA or service authority.

Related Leaflets

43 Other JSP 392 Leaflets and JSPs referred to within this leaflet are shown in table 1.

Table 1 Related JSPs and Leaflets

JSP/Leaflet Number	Title
3	Notification, Approval & Assessment – Introduction & use of sources of Ionising Radiation including Radioactive Substances
4	Restriction of Exposure to Radiation
9	Storage, Accounting & Leak Testing of Radioactive Materials
10	Movement & Transport of Radioactive Materials
11	Requirements for Transfer, Return to Stores, Sale, Loan & Gifting of Radioactive Materials & Radioactively Contaminated Items
13	Assessment & Management of Radioactively Contaminated Land
JSP 886	The Defence Logistics Support Chain Manual
JSP 800 Vol. 4 a/b	Transport of dangerous goods

Legal and MoD Mandatory Requirements

Table 2 Legal and MOD mandatory requirements

Requirement	Applicable	Comments	Related leaflet*
HSE Notification	✓	Keep a copy indefinitely. Review as appropriate. HSE will not provide acknowledgement of this	3
Risk assessment	✓	Equipment specific risk assessments or prior risk assessments may be required	2
Accounting	✓	Storage and retention of disposal records	9
Approval to accumulate or dispose**	✓	Copy information to Dstl ESD	3
Local orders	✓	Should address disposal requirements for redundant equipment or waste items	16
Designated areas	✓	In some circumstances some radioactive waste stores may need to establish controlled or supervised areas for radiation protection purposes	4
Transport	✓	See also JSP800 Vol. 4b Transport of Dangerous Goods by Road, Rail and Sea	10

*JSP 392, unless otherwise stated

**Environment Agency (EA) for England and Wales, Scottish Environmental Protection Agency (SEPA) and Northern Ireland Environment Agency (NIEA)

Leaflet 12 Annex A

Regulators Exemption Guidance of Relevance to MOD Radioactive Sources

1 For the current version of the Exemption Guidance documents listed below and others under development, look on the environmental agencies websites. Advice should be sought from the RPA/RWA on application of Exemption Guidance.

Guidance No.	Exemption Guidance Title and Description
1	<i>General Guidance on the Use of Exemption Provisions</i> How to determine if Radioactive Material is Out of Scope, Exempt or requires a permit.
2	<i>Very Low Level Radioactive Waste</i> Limited amounts of solid waste combined with non-radioactive waste or "dustbin" waste, including Tritium and Carbon-14 but not GTLS's.
3	<i>Medical and Veterinary Uses of Radioactive Sources</i> Radioactive Material used to diagnose or treat humans and animals.
4	<i>Radioactivity in Museums</i> Closed and open sources luminised with Radium, Promethium or Tritium and items containing Thorium
5	<i>Waste Sealed Radioactive Sources</i> Includes industrial radiography and gauge sources, sources in obsolete equipment or beyond working life and spare sources unlikely to be used.
6	<i>Small Sealed Radioactive Sources</i> GTLDS, electro-deposited sources of Nickel-63 and Tritium and other small sealed sources.
7	<i>Uranium and Thorium</i> Used as chemical compounds or in metals such as thoriated tungsten or magnesium.
8	<i>Small Amounts of Open Radioactive Sources</i> Also called unsealed sources such as liquids or solid open sources that contain artificial or naturally occurring radioactive material.
9	<i>Guidance on Lamps Containing Radioactive Substances</i> Lamps that contain, for example, Krypton-85 or Thorium-232, generally contained in electrical equipment.
10	<i>Guidance on Radioactive Material and Radioactive Waste Stored in Transit</i> Definition of "Waste Stored in Transit" and what conditions apply.
11	<i>Guidance on interpretation of 'Relevant liquid'</i> Definition of Relevant liquid e.g. non-aqueous or has specified hazard classes or categories.
12	<i>Guidance for NORM industrial activities on how to comply with the radioactive substances exemption regime</i>

NOTE: The above Exemption Guidance applies to England, Wales, Scotland and Northern Ireland.

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Leaflet 12 Annex B

Exempt Solid Radioactive Waste Concentration and Quantities

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

Reference: Guidance on the scope and exemptions from the radioactive substances legislation in the UK, September 2011, Version 1, Defra.

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