



# Control of radioactive substances

## Ionising Radiation Protection Series No 8

### Introduction

This guidance has been written in association with the Environment Agency, the Scottish Environment Protection Agency, the Environment and Heritage Service and the Health and Safety Executive for Northern Ireland.

This information sheet is aimed at users of radioactive substances who are subject to the Ionising Radiations Regulations 1999 (IRR99), and the Ionising Radiations (Northern Ireland) Regulations 2000, and who also hold registrations or authorisations under the Radioactive Substances Act 1993 (RSA93). Any reference to IRR99 can be taken as also including the Northern Ireland Regulations.

The information sheet outlines some areas of similarity between IRR99 and RSA93 and the standards which will satisfy both sets of regulations. It does not give advice about other important aspects of IRR99 and RSA93 (see *Further information*) nor does it give advice on these two sets of legislation to those holding a licence under the Nuclear Installations Act 1965. It is, however, relevant to employers (other than the licence holder) working on a site run by an organisation holding a licence under the Nuclear Installations Act 1965. It also provides information on the European legislation controlling shipments of radioactive substances between EU Member States.

### Legislation

IRR99 set down requirements for the safety of people who work with ionising radiations, including radioactive substances, and are enforced by the Health and Safety Executive (HSE) or in some cases by local authorities.

RSA93 is enforced by the Environment Agency (EA) in England and Wales, the Scottish Environment Protection Agency (SEPA) in Scotland and the Environment and Heritage Service (EHS) in Northern Ireland. The primary purpose of RSA93 is to control radioactive substances and in particular radioactive waste. It requires:

- registration with EA/SEPA/EHS for the keeping and use of radioactive materials and mobile radioactive apparatus; and
- authorisation by EA/SEPA/EHS for the accumulation and disposal of radioactive waste.

Some radioactive sources can be kept, used and disposed of without registration/authorisation provided they are held in accordance with the conditions of an exemption order under RSA93.

### Notification, registration and authorisation

Before you start work with radioactive substances for the first time, you will need to send details about that work to your local HSE office under IRR99. Normally you will also need to have applied for, and been granted, certificates of registration and/or authorisation under RSA93, by EA/SEPA/EHS. There are, however, some exemptions from these requirements. Please contact the appropriate agency if you need more advice. Anyone using radioactive substances in more than one of Scotland, Northern Ireland, England and Wales needs to register with each agency. Remember, if your company uses a radioactive substance owned by someone else, you still have to register.

### Management responsibilities

Both IRR99 and RSA93 place management responsibilities on employers. You may use existing management arrangements to comply with both sets of legal requirements. For example:

- Under the Management of Health and Safety at Work Regulations 1999 (and the Management of Health and Safety at Work Regulations (Northern Ireland) 2000), employers have a general responsibility to make arrangements for the planning, organisation, control, monitoring and review of control measures.
- Under IRR99, radiation employers must carry out a prior risk assessment before undertaking any activity involving work with radioactive substances and, for any areas designated as controlled, must prepare written local rules summarising the arrangements for controlling work with ionising radiations. Local rules may also be considered appropriate for supervised areas, depending on the nature of the work carried out there. Where local rules apply, a radiation protection supervisor (RPS) who is trained in the use of ionising radiation must be appointed to ensure that the arrangements set out in them are followed.
- As a condition of registration or authorisation under RSA93, you will need to ensure there is adequate supervision by suitably qualified and experienced people to ensure compliance with registration and authorisation conditions.

The same person(s) could act as RPS and provide the adequate supervision required by RSA93. However, the overall responsibility rests with the employer.

You will probably need to consult, and possibly appoint, a suitable radiation protection adviser (RPA) under

IRR99. Their advice will help you decide what must be done to meet IRR99. This might include preparing local rules, summarising the arrangements for controlling the work, and appointing radiation protection supervisors to ensure that the local rules are followed. The advice will also cover the need for prior risk assessment, contingency plans, dose assessment and, where appropriate, medical surveillance. The RPA might also be able to advise on compliance with RSA93, but you will need to ensure that they are competent to do so.

Under the Basic Safety Standards Directive there is a requirement for a qualified expert(s) to be employed in the discharge of duties related to the use and disposal of radioactive substances with respect to protection of the population and the environment. (The Basic Safety Standards Directive is a EURATOM Directive implemented in the UK by IRR99 and the Ionising Radiations Regulations (Northern Ireland) 2000, RSA93 and other national legislation.) The qualified expert will need to have relevant expertise, training and knowledge to ensure all requirements are met under RSA93. For many simple uses of radioactive material, an appointed RPA may have suitable expertise, but this will need to be agreed with the relevant agency.

### **Keeping and accounting for radioactive substances**

You must have appropriate accounting procedures to ensure that the location of all radioactive substances is always known. Suitable procedures will enable you to identify radiologically significant losses quickly. These procedures should include sufficient written/computer records to satisfy IRR99 and any conditions of registration/authorisation under RSA93. The type of information to keep for these purposes should include:

- a means of identification, which for sealed sources should usually be unique;
- the date of receipt;
- the activity at a specified date;
- the whereabouts of the substance, updated at appropriate intervals; and
- the date and manner of proper disposal and to whom it was sent.

It is advisable to carry out an annual audit of the arrangements to ensure that the accounting record is a true record, supported by records of ordering, receipt, stock and disposal of radioactive material.

### **Routine checks on source location**

For radioactive sources securely attached to machines or other fixed equipment, checks may be carried out once a month provided that additional checks are carried out following any maintenance or repair which could have affected the source. Records should be kept of these checks. If the source is portable, eg nuclear moisture/density gauges or site radiography containers, daily checks and records (on each working day the

equipment is used) are recommended. In small-scale laboratories using open sources, it will be sufficient to know the radioactivity present and the radionuclides involved in each room, supported by records of ordering, receipt, stock and disposal of radioactive material.

### **Leak tests**

Unless it is inappropriate to do so (the RPA will be able to advise you on this), you will need to ensure that any article containing or embodying a radioactive substance is tested for leakage of the radioactive substance. The interval between leak tests should not normally exceed two years. However, it is advisable to increase the frequency when a sealed source is going to be retained in use beyond the recommended working life given to the source capsule by the supplier or manufacturer. The manufacturer or supplier will normally advise about periodic leak testing and the methods to adopt to give the required level of assurance that radioactive material will not be allowed to disperse. In the absence of such advice, test methods set out in ISO 9978 may be appropriate (see *Further information*).

### **Keeping, moving and transporting radioactive substances**

You should normally keep radioactive sources, including any radioactive waste which is in storage, in suitable containers inside a suitable store to protect against accidental damage or loss and to protect employees and the general public.

The container for the radioactive source(s) is likely to be suitable if it:

- is sufficiently secure to prevent loss/unauthorised exposure or dispersal;
- offers the protection needed to withstand damage from foreseeable use/misuse and fire; and
- provides adequate shielding to ensure the surface dose rate never exceeds 2 millisieverts per hour (usually it should be much less).

Note: This value is consistent with The Radioactive Material (Road Transport) (Great Britain) Regulations 1996 for the maximum surface dose rate at any external surface of a package.

The store is likely to be suitable if it:

- offers protection from the weather;
- has sufficient resistance to fire;
- provides shielding to achieve outside the store the lowest dose rate that is reasonably practicable. Where non-classified persons may approach the outside of the store it is advisable that the dose rate does not normally exceed 2.5 microsieverts an hour. It may need to be lower in special cases if the employer wishes to avoid designating the area as a supervised area;

- provides adequate ventilation to prevent the build up of gases, vapours (whether radioactive or not) or of any accidentally dispersed radioactive substance;
- offers proper physical security; and
- has a prominently displayed radiation warning sign which complies with the Health and Safety (Safety Signs and Signals) Regulations 1996.

You should avoid storing explosive, corrosive or highly flammable substances in the same store. It is also recommended that any store allocated to radioactive substances is reserved for these substances, their containers and ancillary items such as handling tools and shielding material. A radioactive store should not be built close to a flammable substances store. The RPA should be consulted on storage of radioactive substances.

Keeping portable sources in a vehicle overnight is only acceptable if it is not reasonably practicable to provide or make use of a proper store and if the vehicle is locked and kept in a secure place, such as a locked compound. When moving radioactive substances on site, you should ensure that the substance is kept in a suitable receptacle and suitably labelled.

You need to consider the following factors when judging the suitability of a receptacle for site movement:

- the adequacy of the shielding to protect the person moving the substances;
- the distance to be moved;
- the likely hazards and the consequences of an incident, for example from spillage or dispersal; and
- the physical and chemical form of the substances being moved.

If radioactive substances are moved on site, the labelling must provide sufficient information to ensure that the person moving the receptacle is aware of the hazards. This information should include the nature and radioactivity of the substances being moved. The extent of the information will depend on circumstances, but would include information on taking appropriate action in the event of accidental spillage or dispersal.

If you intend to transport radioactive material by common carrier, you must follow the standards for packaging and labelling during transport required by the Radioactive Material (Road Transport) (Great Britain) Regulations 1996 and the Packaging, Labelling and Carriage of Radioactive Material by Rail Regulations 1996, as appropriate to the mode of transport. 'Transport' essentially covers all conveyance through public places. The EHS enforces the relevant transport regulations in Northern Ireland.

Before transporting radioactive substances, you need to appoint an appropriately qualified Dangerous Goods Safety Adviser who has a UN Class 7 ticket from the

Department of Transport, Local Government and the Regions (DTLR).

### **Shipment of radioactive substances between European Union Countries**

If you are shipping sealed sources or other relevant sources (defined in the regulations) to another member state within the European Union (EU) or receiving a shipment from another member state, you need to comply with Council Regulation (EURATOM) No 1493/93 on shipments of radioactive substances between member states.

If you are a holder (consignor) of sealed sources, you cannot export these radioactive substances to another member state until a written declaration, endorsed by the regulatory authority in that state, has been received from the person you are sending the shipment to. You must also send to the appropriate regulatory authority in the recipient's state quarterly reports (in arrears) of actual shipments of sealed and other relevant sources. If you wish to receive a sealed source from another member state, you must complete a declaration, have it stamped by the relevant UK authority and send the stamped declaration to the holder before the sealed source can be despatched.

The regulatory authorities in the UK are EA (England and Wales), SEPA (Scotland) and EHS (Northern Ireland), and, for sites licensed under the Nuclear Installations Act 1965, HSE's Nuclear Installations Inspectorate. For more details, visit the website or ring the contact telephone number of the relevant enforcing authority.

### **Incidents**

You will need to inform EA/SEPA/EHS and the police if you lose a radioactive source or one is stolen or you cannot account for all the radioactive substances on your inventory. You will also need to inform HSE if the quantity of radioactive substance concerned is above levels given in column 5 of Schedule 8 to IRR99. Damage to a source or accidental spillages or release of radioactive material may also require notification to HSE (if the amount of radioactive material released or spilled exceeds that in column 4 of Schedule 8 of IRR99) and EA/SEPA/EHS. Incidents where equipment malfunction causes a radioactive source to fail to return to a safe (shielded) position at the end of the intended exposure period also need to be notified to HSE under the Reporting of Injuries, Diseases and Dangerous Occurrences Regulations (RIDDOR). When a source has been damaged, you will need to take urgent action to prevent further damage and to minimise the spread of any contamination. Your contingency plan (if identified as needed under the IRR99 prior risk assessment) should include action required to minimise contamination. You will be expected to carry out your own investigation in these cases. You will also need to write a report following your investigation and keep a copy of this report as required by IRR99.

## Further information

*Ionising Radiations Regulations 1999* SI 1999/3232  
Stationery Office 1999 ISBN 0110856147

*Ionising Radiations Regulations (Northern Ireland) 2000*  
Statutory Rule 2000 No 375 The Stationery Office 2000  
ISBN 0 337 01092 7

*Work with ionising radiation. Ionising Radiations  
Regulations 1999. Approved Code of Practice and  
guidance* L121 HSE Books 2000 ISBN 0 7176 1746 7

*Radioactive Substances Act 1993* HMSO  
ISBN 0 10 541293 7

RSA 1,2,3 Application Forms and Guidance for  
registration and authorisation under RSA93. These  
forms are available from Environment Agency local  
offices.

*Safety signs and signals. The Health and Safety (Safety  
Signs and Signals) Regulations 1996. Guidance on  
regulations* L64 HSE Books 2000 ISBN 0 7176 0870 0

*Radiation protection supervisors Ionising Radiation  
Information Sheet IRIS6.* HSE Books 2000

*Atomic Energy and Radioactive Substances. The  
Radioactive Material (Road Transport) (Great Britain)  
Regulations 1996* SI 1996/1350 HMSO 1996  
ISBN 0 11054742 X

*The Carriage of Dangerous Goods by Road (Driver  
Training) Regulations* SI 1996 /2094 HMSO 1996  
ISBN 0 11062928 0

*Radiation protection - sealed radioactive sources -  
leakage test methods* International Organization for  
Standardization 1992 ISO 9978

*The Reporting of Injuries, Diseases and Dangerous  
Occurrences Regulations 1995* SI 1995/3163 HMSO  
1995 ISBN 0110537513

While every effort has been made to ensure the  
accuracy of the references listed in this publication, their  
future availability cannot be guaranteed.

## Further information

Should you have any queries relating to this information  
sheet, the contact numbers for HSE, EA, SEPA, EHS  
and HSE NI are as follows:

The Health and Safety Executive: HSE Infoline 08701  
545 500. Website: [www.hse.gov.uk](http://www.hse.gov.uk)

Environment Agency: 01454 624 411. The Environment  
Agency's contact number for trans-frontier shipments is  
0161 973 2237.

Website: [www.environment-agency.gov.uk](http://www.environment-agency.gov.uk)

Scottish Environment Protection Agency: 01786 457 700.

Website: [www.sepa.org.uk](http://www.sepa.org.uk)

Environment and Heritage Service (Northern Ireland):  
028 9025 4773.

Website: [www.ehsni.gov.uk](http://www.ehsni.gov.uk)

Health and Safety Executive for Northern Ireland:

0800 032 0121. Website: [www.hseni.gov.uk](http://www.hseni.gov.uk)

HSE priced and free publications are available by mail  
order from HSE Books, PO Box 1999, Sudbury, Suffolk  
CO10 2WA Tel: 01787 881165 Fax: 01787 313995  
Website: [www.hsebooks.co.uk](http://www.hsebooks.co.uk) (HSE priced publications  
are also available from bookshops.)

The Stationery Office (formerly HMSO) publications are  
available from The Publications Centre, PO Box 276,  
London SW8 5DT Tel: 0870 600 5522 Fax: 0870 600 5533  
Website: [www.clicktso.com](http://www.clicktso.com) (They are also available  
from bookshops.)

For information about health and safety ring HSE's  
InfoLine Tel: 08701 545500 Fax: 02920 859260 e-mail:  
[hseinformationservices@natbrit.com](mailto:hseinformationservices@natbrit.com) or write to HSE  
Information Services, Caerphilly Business Park,  
Caerphilly CF83 3GG. You can also visit HSE's website:  
[www.hse.gov.uk](http://www.hse.gov.uk)

This leaflet contains notes on good practice which are  
not compulsory but which you may find helpful in  
considering what you need to do.

This publication may be freely reproduced, except for  
advertising, endorsement or commercial purposes. The  
information is current at 10/01. Please acknowledge the  
source as HSE/Environment Agencies.

