6 Dosimetry and Personal Dose Records, Including Medical Surveillance of Classified Persons

Scope

1 This Chapter is intended to assist line managers and employees within MOD in complying with current legislation, guidelines and standards concerned with assessing and recording all significant doses of ionising radiation.

Statutory Requirements

2 In addition to the general requirements of the Health and Safety at Work etc. Act 1974 and the Management of Health and Safety at Work Regulations 1999, specific legislation applies directly. There is a statutory requirement for radiation dose assessment and recording to be kept in accordance with the following specific legislation:

a. The Ionising Radiations Regulations 2017 (IRR17);

b. The Radiation (Emergency Preparedness and Public Information) Regulations 2019 (REPPIR2019);

3 There is a statutory requirement to ensure that all classified persons are certified as fit for their intended type of work and also that arrangements are made for continuing medical surveillance with appropriate records maintained in accordance with the IRR17.

Duties

4 Duties as detailed in Chapter 39 apply. In addition, the following duties also apply.

Commanding Officer and Head of Establishment (CO / HoE)

5 CO / HoEs are responsible for:

a. engaging a suitable Approved Dosimetry Service (ADS) for dose assessment and record keeping;

b. ensuring that personal dosimetry is available for classified persons and other radiation workers where appropriate;

c. ensuring that the results of personal dosimetry are recorded;

d. providing individuals with a copy of their dose record on request;

e. ensuring that classified outside workers are provided with a current individual radiation passbook and that arrangements are made to ensure that it is kept up to date (see Chapter 28, Annex A);

f. ensuring that classified persons are provided with a copy of their termination record upon cessation of radiation work or MOD employment;

g. retaining a copy of the dose record summaries received from an ADS for at least 2 years;

h. conducting an investigation and reporting the findings to the relevant authorities and ADS after an overexposure or whenever estimated doses or special entries are required;

i. ensuring that a registered medical practitioner (adequately trained and appointed by the Health and Safety Executive (HSE)), usually a unit or establishment medical officer, is available to carry out the duties of the Appointed Doctor;

j. ensuring that personnel who require adequate medical surveillance by an Appointed Doctor or employment medical adviser for the purpose of determining their fitness for work with ionising radiations receive such surveillance;

k. ensuring that the Appointed Doctor undertaking medical surveillance is provided with all appropriate information on the personnel they are seeing to allow an appropriate decision on fitness to be made;

l. ensuring that a health record is maintained for personnel who require medical surveillance and a copy of that record is retained; and

m. ensuring that employees who have been subjected to an overexposure have their subsequent exposure to radiation adequately managed and that they are informed of the dose limit applicable for the remainder of the calendar year.

Radiation Safety Officer (RSO) / Radiation Protection Supervisor (RPS) / Dosimetry Co-ordinators

6 Radiation Safety Officer / Radiation Protection Supervisor / Dosimetry Co-ordinators are responsible for:

a. ensuring that personnel are provided with the correct dosimetry;

b. completing the dosimetry administration;

c. instructing personnel in the correct method of wearing the dosimetry; and

d. promptly notifying the ADS of changes in circumstances.

Employees

7 Employees are responsible for:

a. ensuring that they wear the personal dosimetry whenever they are working with ionising radiation;

b. ensuring that they do not damage or interfere with their own or other employee’s personal dosimetry;

c. informing their dosimetry co-ordinator if their personal dosimetry has been lost, damaged or stolen;

d. storing their personnel dosimetry securely in a low background area when not in use; and

e. attending health surveillance or required medical review.

Engaging Suitable Approved Dosimetry Services (ADS)

8 Dosimetry services are approved by the HSE for one or more of the following specific purposes:

a. measurement and assessment of whole-body or part-body doses for staff, arising from external radiation;

b. assessment of doses from intakes of radionuclides;

c. assessment of emergency doses following a radiation emergency (REPPIR2019); and

d. co-ordination of individual dose assessments, making, maintaining and keeping dose records and the provision of summary information.

9 Line managers at units which employ classified persons must have an ADS for dose assessment and dose record keeping. The Radiation Protection Adviser (RPA) can provide advice about the type of radiation exposures that need to be assessed and the types of ADS that are required. Any ADS is to provide clear advice on the use of any dosemeter or other equipment supplied for making measurements and assessing dose. The ADS must be provided with sufficient information about employees to enable assessments to be made and records to be kept.

10 The Dstl ADS provides an integrated range of dosimetry services (Annex A), which are approved by the HSE for assessing and recording dose results. Enquiries about these services can be made by telephoning 01980 950004 or by sending an e-mail to adsenquiries@dstl.gov.uk .

Personal Radiation Monitoring and Assessment

11 Workers carrying out certain types of work, or likely to receive an effective dose (whole body dose) greater than 6 mSv per year, an equivalent dose to the lens of the eye greater than 15 mSv per year, or an equivalent dose to the skin or extremities greater than 150 mSv per year (see Chapter 4), are to be designated as classified persons. Details of the requirements for classified persons are given at Chapter 38 – further information and advice is to be sought from the RPA. Once a person is classified, it is a statutory requirement that radiation exposures of that person are assessed and recorded by an ADS – for external radiation doses, this normally involves the use of personal radiation dosimeters.

12 Within MOD, it is normal practice that non-classified persons, entering controlled areas (see Chapter 4), are also issued with personal radiation dosemeters supplied by an ADS. Non-classified persons must only enter controlled areas under written arrangements (see Chapter 5). In some cases, however, personal radiation dosemeters are unnecessary – in these cases, the doses must still be assessed by alternative methods which must be specified in the written arrangements. RPA advice must always be sought regarding the arrangements for controlled areas (see Chapter 7).

13 In addition to the use of personal dosemeters for external radiation exposure, there are a number of other methods of assessing personal dose which may need to be considered, particularly for internal radiation exposure. The choice of method will depend on the circumstances of individual cases, including the nature of the work and the type of radionuclide and ionising radiation involved. Assessment of committed doses arising from intakes of radionuclides into the body generally involves a combination of techniques including: biological sampling, monitoring part or whole of the body using a whole body monitor, or personal air sampling.

Appropriate Dose Assessment Periods

14 Often the dose assessment period will be one month, but longer periods, such as three months, may be appropriate where doses are very low. For external radiation, the choice of assessment period will depend on the dose rates to which employees are exposed, the ability of the dosemeter to measure low doses, the magnitude of the expected dose and stability of the stored image or signal on the dosemeter over time. More frequent assessment will be appropriate where there is a significant risk of accidental exposure. The longer the assessment period, the more difficult it becomes to determine when and why an individual's dosemeter has received an unusually high dose in the event of an accident or other incident.

Accident and Emergency Doses

15 Under IRR17, when an incident or other occurrence takes place that is likely to result in a person receiving an effective dose (whole body dose) greater than 6 mSv, an equivalent dose to the lens of the eye greater than 15 mSv, or an equivalent dose to the skin or extremities greater than 150 mSv, immediate arrangements must be put in place for a dose assessment to be made by the ADS. Contingency planning requirements (including the need for emergency dosimetry) are included in Chapter 2 (in cases where dosimetry was not worn, the dose must be assessed by an appropriate means as soon as possible having regard to the advice from an RPA). All reasonably practicable steps must be taken to inform the employee of the result of that assessment and a record of the assessment must be kept until the employee has, or would have, attained the age of 75, or for 30 years, whichever is the later.

16 When an emergency plan made under REPPIR2019 (see Chapter 3) concludes that it is possible for an employee to receive an emergency exposure the employer is to, in relation to dosimetry:

a. identify those employees who may be subject to emergency exposures;

b. make arrangements with an ADS for emergency dose assessments to be made without delay for those employees who may potentially receive an emergency exposure (separate to other dose assessment systems in place);

c. make arrangements with the ADS for the results of emergency dose assessments to be reported without delay to the employer and to the regulator;

d. make arrangements to notify the results of emergency dose assessments without delay to the Appointed Doctor or employment medical adviser who is carrying out medical surveillance on the employee to whom the dose assessment relates; and

e. make arrangements for medical surveillance to be carried out without delay for employees who have received emergency exposures.

17 In the unlikely event of a nuclear reactor emergency at any of the MOD sites, the dosemeters which are worn by personnel within the Exclusion Zone must be collected and urgently transported to the ADS. The arrangements in place to meet this objective must be clearly stated in the operator's emergency plan.

18 The ADS is to send the results of accident exposure dose assessments to the employer within 8 hours of receipt of the dosemeters. The employer will send these results on to the Appointed Doctor and the employment medical adviser; or, in the case of a nuclear reactor emergency, to the radiation medicine specialist (Institute of Naval Medicine, INM).

19 Emergency dosimetry (issued for the purposes of assessment of emergency exposures) must also be urgently transported to the ADS. The arrangements in place to meet this objective must be clearly stated in the operator's emergency plan. The ADS must send the results of emergency exposure dose assessments to the employer without delay. The employer will send these results on to the Appointed Doctor and the employment medical adviser; or, in the case of a nuclear reactor accident, to the radiation medicine specialist (INM).

20 A member of staff from the Dstl ADS is permanently on call and is available to assess accident / emergency dosemeters within two hours' notice to ensure timescales in paragraphs 21 and 22 are met. The Dstl ADS can be contacted on 01980 950004 during normal working hours and 02392 768 020 at all other times.

Suspected High Dose

21 Whenever it is suspected that the wearer of a dosemeter has received a significant unintended radiation dose, the dosemeter is to be returned to the ADS for urgent processing. Where practicable, the employer is to provide the ADS with advance warning by telephone that the dosemeter is being returned. Consideration must also be given to returning a dosemeter to the ADS for early processing when the results of control dosimetry indicate that the wearer may be approaching the specified investigation levels (see Chapter 4) or any of the annual dose limits. Such dosemeters are to be accompanied by a copy of their respective Issue Lists with the remarks column of the Issue List annotated accordingly. Furthermore, as a safeguard against irradiation of the dosemeters in transit, the outside of the package used to return the dosemeters is to be clearly labelled 'CAUTION - RADIATION DOSEMETERS - DO NOT X-RAY'.

Assessment of Radiation Dose from Intakes of Radioactive Material

22 Where a unit or establishment, in consultation with the RPA, decides that it is necessary to routinely measure biological samples from personnel working with unsealed radioactive substances or to carry out whole body monitoring, then written application is to be made to the ADS, usually the Dstl ADS. The procedure to be followed is to be agreed by the unit or establishment and the ADS. Dstl ADS routinely undertakes tritium in urine dose assessments as part of a routine assessment of doses to personnel who may be at risk of taking in amounts of tritium during the course of their work.

23 The establishment will receive a report containing the results of assessment of radiation dose resulting from the intake of radioactive material and where appropriate the information will be recorded on the individual's dose record held by the Approved Dosimetry Record Keeping Service, usually the Dstl ADS.

24 If a person's skin becomes contaminated by a radioactive substance which is not readily removable by usual means, or if an intake of radioactive material into the body is known or suspected, then a local investigation is to be undertaken, involving the RPA, to assess the radiation dose.

25 The line manager of the unit or establishment is to produce a report containing the following information:

a. a record of the radiation dose sustained in the incident;

b. an estimate of the intake or levels of skin contamination and the radionuclide(s) involved;

c. the results of any biological monitoring and/or external body radioactivity monitoring test; and

d. circumstances of the intake or skin contamination incident and methods of physical surveillance.

Radiation Overexposures

26 An overexposure means a person receives a dose of ionising radiation in excess a relevant dose limit. When it is suspected that an overexposure is likely to have occurred an immediate investigation must be undertaken. During this investigation the individual involved must not be allowed to continue working with radiation until the results of the investigation are known. The individual is to be informed of the results of the investigation and assessment.

27 Special medical surveillance is to be carried out where a person has received a radiation overexposure in excess of 100 mSv whole body dose in a year or an equivalent dose at least twice any relevant dose limit. This person is to be referred to the Appointed Doctor, regardless of whether they are a classified person, without delay.

28 A copy of each report of investigations into overexposures is to be forwarded to the ADS. These records are to be kept indefinitely.

Dose Limitation for Overexposed Workers

29 The dose limitation for the remainder of a calendar year for an employee who has been overexposed in that year and has not been withdrawn from radiation work by the recommendation of the Appointed Doctor, is the proportion of the calendar year remaining from the end of the last dose assessment period multiplied by the annual dose limit.

Dosimetry Records

30 Units and establishments are to maintain the following radiation dose records:

a. an FMed 291A medical envelope for each person wearing dosimetry employed at the unit or establishment. The envelope is to contain:

(1) Personal Details Forms;

(2) Radiation Dose Record Summaries;

(3) copies of results of any internal dose assessments;

(4) copies of reports of investigations made;

(5) FMed 291F Health Record or the HSE Health Record Form F2067 (classified persons only);

(6) Dose Transfer Records; and

(7) copies of the results of assessment doses received while working under written arrangements and while not wearing dosemeters issued by the establishment's ADS.

b. maintain a radiation passbook for any classified person employed as an outside worker;

c. Laboratory Certificates issued by the ADS for all classified and non-classified persons, including visitors, who have worn a dosemeter at the unit or establishment at any time during the previous two years;

d. any assessments of doses of non-classified persons working under written arrangements; and

e. any assessment of biological samples provided by classified persons or non-classified persons. If an FMed 291A has been raised, it is to contain copies of these assessments.

Outside Workers

31 Persons required to carry out services in a supervised or controlled area designated by an employer other than their own are referred to as outside workers. Line Managers are to seek advice from the RPA on the circumstances in which persons should be designated as outside workers. The responsibilities and duties of the outside worker, their employer and the operator of the supervised / controlled area must be formally agreed before any work is undertaken.

32 Any classified person who fulfils the criteria for an outside worker will need an approved radiation passbook, while a non-classified person will need a FMed 291D (radiation record summary card). These can be obtained from the ADS. These documents are to be kept up to date at all times by the persons authorised by the ADS or employer.

33 Units and establishments that allow outside workers of other employers to enter or work in their supervised or controlled areas will need to provide quick and simple estimates of the doses they receive while working in those areas and arrange to enter those estimates in the radiation passbooks as soon as practicable.

Compensation Scheme and Counselling Scheme

34 The MOD is a member of The Compensation Scheme for Radiation Linked Diseases (the Scheme). The Scheme provides an agreed method of determining whether compensation should be paid in relation to MOD radiation workers who have developed certain types of cancer or cataracts which may be linked with exposure to ionising radiation at work.

35 The Scheme is entirely voluntary; claimants can choose whether to use the scheme or to take legal action. The use of the Scheme is recommended by the trade unions. Potential claimants may apply through the appropriate trade union or (as with Armed Services Claimants) to the Compensation Scheme Executive Secretariat, Sellafield Limited, Sellafield, Seascale, Cumbria CA20 1PG (E-mail: csrld.executive.secretary@sellafieldsites.com; Tel: 01946 774716). It should be noted that former service men and women are also entitled to apply to Veterans UK, though any award would take account of compensation received from other sources. The address is: Veterans UK, Ministry of Defence, Norcross, Thornton Cleveleys, Lancashire, FY5 3WP (Helpline: (UK) 0808 1914 218, (abroad) +44 1253 866043).

Medical Surveillance and Appointed Doctor

36 COs of units where classified persons are employed, or where employees, classified or otherwise, have received an overexposure, or where employees are engaged in work with ionising radiation subject to conditions imposed by an Appointed Doctor, must ensure that they have a registered medical practitioner available to carry out the duties of the Appointed Doctor.

37 The HSE maintain information for employers which includes a list of Appointed Doctors on their website at: http://www.hse.gov.uk/doctors/employers.htm.

38 For Service personnel, Appointed Doctor services should be available from within the Defence Medical Services – either from the Defence Primary Healthcare Service, or from within single Service commands.

39 The Royal Navy is the lead Service for the provision of radiation medicine. Advice can be obtained from the Submarine and Radiation Medicine section of the Underwater Medicine Division at the Institute of Naval Medicine by the following means:

a. By mail: The Underwater Medicine Division
Institute of Naval Medicine,
Crescent Road,
Alverstoke, GOSPORT, Hampshire,
PO12 2DL

b. By email: NAVYINM-UMD@mod.gov.uk

c. By telephone: Working hours: Mil 9380 68241
Civ 02392 768241

Emergencies: via the Duty Diving and Radiation Medicine Consultant on 07827 821980 or via INM main gate on 02392 760020

40 The CO must ensure that each of the employees described above is under adequate medical surveillance by an Appointed Doctor for the purposes of determining the fitness of each employee for the work with ionising radiation which they are to carry out. Adequate medical surveillance, taking into account the nature of the work and the individual's state of health, includes:

a. a medical examination before first being designated as a classified person;

b. periodic health reviews at least once per year;

c. special medical surveillance of an employee which may be necessary following the advice of an Appointed Doctor for any person that may have received an overexposure when a relevant dose limit has been exceeded;

d. determination of whether specific work conditions are needed; and

e. a review of health after cessation of work where this is necessary to safeguard the health of the individual.

41 Only persons with a valid, in date, Appointed Doctor's certification of fitness are to work as classified persons. HSE guidance allows a periodic review to be carried out from one month before to one month after the expiry date of the last entry on the health record. Where the Appointed Doctor certifies that an employee should be subject to certain conditions, the CO must ensure that work is carried out in accordance with those conditions.

42 Further guidance on medical surveillance is provided at Annex C.

Record Retention Periods

43 IRR17 specifies that the dose record of a classified person should be kept until the person has, or would have, attained the age of 75 years, but in any event for at least 30 years from when the record was made. Notwithstanding this statutory requirement, MOD retains primary dose records indefinitely to allow it to defend itself against a variety of claims. Specific record retention periods are as follows:

Table 1 Radiation Dosimetry Record Retention Periods

Records	Establishment	ADS
ADS issued Laboratory Certificates	2 years	Indefinitely
Radiation Dose Record Summary for non-classified person	2 years from the end of the calendar year to which the summary relates	Indefinitely
Radiation Dose Record Summary for classified person	2 years from the end of the calendar year to which the summary relates	Indefinitely (but not less than the statutory requirement)
Record of investigations carried out to make special entries in the dose record	2 years	Indefinitely (but not less than the statutory requirement)
FMed 291F Health Record or the equivalent HSE Health Record Form F2067	Indefinitely (but not less than the statutory requirement)	Indefinitely (but not less than the statutory requirement)
Termination Record	Copy provided to employee on leaving MOD employment	Indefinitely (but not less than the statutory requirement)
FMed 291A and contents for classified persons	Retained until employee leaves establishment or MOD employment and forwarded to next unit or ADS	Indefinitely (but not less than the statutory requirement)
FMed 291A and contents for non-classified persons	Retained until employee leaves establishment or MOD employment and forwarded to next unit or ADS	Indefinitely
Over exposure reports	2 years	Not applicable
Warning reports	2 years	Not applicable
Dose assessment made as a result of an accident or incident	Indefinitely (but not less than the statutory requirement)	Indefinitely (but not less than the statutory requirement)
Radiation Passbooks	Retained until employee leaves establishment or MOD employment and forwarded to next unit or ADS	Indefinitely (but not less than the statutory requirement)
Local dose assessments for non-classified persons using dosemeters not issued by the ADS	Indefinitely	Indefinitely

Note: Statutory requirement means until the person to whom the record relates has, or would have, attained an age of 75 years, or for 30 years, whichever is the longer.

Guidance for Line Managers and Employees on Types of Dosemeter, Dosemeter Care, the Administrative Arrangements for Dosimetry Supply and the Associated Dosimetry Records

Introduction

1 The Dstl ADS is approved for radiation dose record keeping by the Health and Safety Executive (HSE). The scope of the services provided is summarised below:

For Classified Persons

a. the Dstl ADS will make and maintain dose records in accordance with the requirements of IRR17 and will keep those dose records (or a copy) indefinitely. The onus is on the unit or establishment to furnish Dstl ADS with completed record keeping registration forms (Personal Details Forms) to initiate this process. These forms will be provided by the Dstl ADS;

b. following the assessment of personal dosemeters, the Dstl ADS will provide summaries (Laboratory Certificates) of the doses assessed. Within six weeks of the end of each calendar quarter, individual Radiation Dose Record Summary reports will be issued for each person monitored during the current calendar year;

c. the Dstl ADS will notify the unit or establishment in the form of a warning report when any individual exceeds a UK statutory dose limit (as detailed in Chapter 4). In addition, the unit or establishment will be notified immediately following assessment of an over-exposure by e-mail or telephone;

d. warning reports will be issued when any individual exceeds a MOD dose constraint or investigation level, e.g. a whole-body radiation dose of 2 mSv in a calendar year. A warning report will also be issued when a pregnant employee exceeds a whole-body radiation dose of 0.75 mSv over the declared term of the pregnancy, as this is approaching the MOD dose constraint of 1 mSv;

e. if the employee has agreed to participate in the National Registry for Radiation Workers, the Dstl ADS will provide the necessary data to Public Health England;

f. when a classified person ceases radiation employment, the employer must request a termination record from the ADS. The Dstl ADS will send that record to the employer or individual, and a copy to the HSE;

g. the Dstl ADS will, within 3 months of the end of each calendar year, send to the HSE summaries of all classified person dose records for that year;

h. at the request of HSE, the Dstl ADS will provide them with copies of any employee's dose record. The Dstl ADS will notify the establishment and the appropriate Top-Level Budget (TLB) safety authority (e.g. the CESO for the TLB area) that HSE has made this request; and

i. where a unit or establishment requires an employee to be designated as a classified person and that employee has records relating to previous radiation employment, the Dstl ADS will enter the historical doses onto the Dstl Approved Dosimetry Record Keeping System. The unit or establishment is responsible for providing the Dstl ADS with a detailed breakdown of previous radiation exposures.

For Other Persons (only applies to personnel with dosemeters issued by Dstl ADS)

a. in respect to persons who are not designated as classified persons but are registered with the Dstl ADS, the Dstl ADS will undertake the requirements in this chapter; and

b. for persons such as casual visitors and persons working under written arrangements who are not registered with the Dstl ADS, the assessed doses will be provided on Laboratory Certificates. No Radiation Dose Record Summaries will be issued for these persons.

Commencement of Radiation Work

2 The following actions are to be taken by the unit or establishment for persons whose radiation doses are to be assessed and radiation records maintained by the Dstl ADS:

a. submit a fully completed Personal Details Form to the ADS. Where appropriate, annotate NEW WEARER - PUT ON REGULAR ISSUE in the remark's column of the Dstl ADS Dosemeter Issue List;

b. for personnel previously involved in radiation work with another employer, obtain written details of their radiation dose histories (broken down by year) from their previous employer and forward to the ADS for inclusion on their current dose records. It is essential that as much dose information as possible is forwarded to the ADS. For radiation workers who have been employed as classified persons by their previous employer, the actions specified in paragraph will fulfil this obligation; and

c. for classified persons commencing radiation work:

(1) if the person is to become a classified person, the employer (CO / HoE) must notify them in writing to that effect;

(2) arrange for a medical examination, if required, as described in Annex C;

(3) for individuals previously employed as classified persons by a non-MOD organisation obtain a copy of the termination record and forward it to the Dstl ADS. The individual should already be in possession of a copy, if not a copy may be obtained either from their previous employer or from the Health and Safety Executive;

(4) for individuals previously employed as classified persons who wore Dstl ADS personal dosemeters, obtain the FMed 291A envelope containing dose records from the previous unit or establishment or from Dstl ADS; and

(5) if the classified person will be employed as an outside worker, request a radiation passbook be issued to the individual by Dstl ADS.

Types of dose assessment provided by Dstl ADS

3 Line managers and employees are to be aware of the types of dosemeter available from the Dstl ADS. However, the RPA should provide the advice on which type of dosemeter is suitable for a particular task. Employees are to be made aware of their duties and responsibilities for the correct method of wear and care of the dosemeters.

4 The Dstl ADS supplies:

a. whole-body thermoluminescent dosemeters (TLDs);

b. emergency whole-body TLDs;

c. skin / extremity TLDs;

d. eye TLDs;

e. combined photon and neutron dosemeters;

f. personal radon dosemeters;

g. environmental radon dosemeters;

h. tritium-in-urine sampling kits;

i. in vivo (whole body, lung or thyroid) monitoring.

5 Instructions are supplied by the Dstl ADS for the use of the above dosemeters.

6 Whole-body TLDs are used to assess the body dose from γ and X-radiation, as well as the skin dose from ß, γ and X-radiation. Dosemeters can be provided for routine dosimetry (distinguished by a blue stripe on the dosemeter holder) or emergency dosimetry (white stripe).

7 Skin/extremity TLDs are provided for assessing personal exposure from ß, γ and X-radiation to the hands, forearms, feet and ankles.

8 Eye TLDs are provided for assessing the dose to the lens of the eye from ß, γ and X-radiation.

9 Combined photon and neutron dosemeters are used to assess the body dose from γ, X and neutron radiation, as well as the skin dose from ß, γ and X-radiation.

10 Personal radon dosemeters are used to assess personal exposure to radon gas. Environmental radon dosemeters are used to assess the radon gas concentration in workplaces and dwellings.

11 For all practical purposes, doses of radiation are additive, and the assessment of personal dose is to include, whenever necessary, the assessment of external dose, and the assessment of dose from any intake of radionuclides into the body.

Use of Dstl ADS Radiation Dosemeters

12 The RSO or RPS is to ensure that any special instructions issued by the Dstl ADS with regard to the use and care of dosemeters are carried out.

13 Every effort must be made, to prevent wilful or negligent misuse of radiation dosemeters.

Dosemeter Wear

14 Specific instructions are issued by the Dstl ADS on how each of the dosemeters is to be worn.

Care of Radiation Dosemeters

15 The following precautions are to be taken with all Dstl ADS radiation dosemeters. The individual wearing the dosemeter must:

a. wear it according to ADS instructions;

b. wear it whenever in a radiation area;

c. store it in a low background area, remote from any known sources of ionising radiation, when not being worn;

d. do not shield it in any way. Pens, rulers or other metallic objects may shield the dosemeter;

e. if wearing a lead apron, the dosemeter is to be worn beneath the lead apron.

f. do not immerse the dosemeter in any liquid. Particular care is to be taken to remove dosemeters from clothing before laundering. Divers are to wrap their dosemeter in two plastic bags and wear the dosemeter inside their wet suit;

g. keep the dosemeter away from high temperatures, e.g. pipes and radiators;

h. do not share the dosemeter with anyone else;

i. do not damage the dosemeter or holder in any way;

j. do not carry the dosemeter in close proximity to luminised watches or other luminised articles;

k. return the dosemeter promptly at the correct time, ensuring that a replacement is available before giving up the old one, if necessary;

l. notify the RSO or RPS immediately if it is lost or mislaid, especially in a radiation area (even if it is later found), as the employer may need to estimate the individual's dose; and

m. ensure that the dosemeter is not worn inadvertently during medical/dental X-ray examinations when the individual is the patient.

16 For whole-body TLDs and combined dosemeters, consideration is to be given to encapsulating the dosemeter in polythene (approved by the Dstl ADS dosimetry section) whenever the dosemeter is worn in areas where:

a. significant contamination exists;

b. humid or damp conditions occur; and

c. corrosive or chemically reactive gases or vapours, including tear gas or hydrogen sulphide, are present.

17 Radon dosemeters must be kept away from any neutron sources and equipment with high operating voltages.

Lost or Damaged Dosemeters

18 When dosemeters have been lost, damaged or destroyed during the normal wear period, the unit or establishment is to annotate the Remarks / Changes Required column of the Dosemeter Issue List accordingly. The unit or establishment is to investigate the circumstances of the loss or damage of the dosemeter and provide an estimate of the dose to the Dstl ADS. The ADS will supply the appropriate form to be used for the provision of the estimated dose.

19 Where the unit or establishment has investigated the loss or damage of a dosemeter and no estimated dose can be provided, the ADS will enter a notional dose into the individual's radiation record. A notional dose is obtained from the proportion of the annual dose limit for the dosemeter issue period. Notional doses will only be entered into individual dose records in exceptional circumstances when it has not been possible to provide proper estimates of dose.

Irradiated Dosemeters

20 If it is suspected that a dosemeter has been inadvertently irradiated, the unit or establishment is to annotate the Remarks / Changes Required column of the Dosemeter Issue List accordingly. The unit or establishment is to investigate the circumstances and provide an estimate of the dose to the Dstl ADS. The ADS will supply the appropriate form to be used for the provision of the estimated dose.

Issue and Return of Dosemeters

21 The RSO or RPS is to co-ordinate all arrangements for personal dosimetry.

22 The normal wear period for each type of personal dosemeter is detailed in Table A1. Dosemeters are normally to be worn starting from the calendar month for which they have been issued, unless advised specifically otherwise by the RPA. Dosemeters are to be returned immediately to the Dstl ADS for analysis following receipt of the next issue.

Table A1 Period of wear for personal dosemeters

Dosemeter Type	Issue Period
Whole-body routine TLD	1 or 3 months
Skin/extremity and eye TLDs	1 or 3 months
Combined dosemeter	3 months
Radon dosemeter	3 months

23 Dedicated emergency dosemeters, which are not used for routine personal monitoring purposes, are issued every six months by the Dstl ADS. They should only be used during an emergency intervention and then be returned to Dstl without delay for analysis.

24 All dosemeters (including those unused or damaged) are to be returned promptly for assessment to the Dstl ADS together with the completed Dosemeter Issue Lists at the end of the wear period. The returned Dosemeter Issue Lists are to be clearly annotated to indicate any changes which the unit or establishment requires to be made to the original Issue List. These changes are to be annotated in the Remarks / Changes Required column of the Issue List. Dosemeters which will not be used for the wear period are not to be returned early.

25 Units and establishments are to inform Dstl ADS, before dispatch, of any dosemeters that are considered to be contaminated. Advice is to be sought from the Dstl ADS on the method of returning such dosemeters.

Completion of the Dstl ADS Dosemeter Issue List

26 Instructions for completing the Dosemeter Issue List are contained on the form itself. Further advice on completing the Dosemeter Issue List may be obtained from the Dstl ADS.

Issue of Dstl ADS Dosemeters to Personnel in Receipt of Dosemeters Issued by Another Employer

27 Personnel in receipt of dosemeters issued by another employer (such as Army Reserve, Royal Naval Reserve and Royal Air Force Reserve staff who work for other employers as well as MOD) must be issued with dosemeters provided by the Dstl ADS for the period of working with ionising radiation when attached to the MOD. These personnel are to complete a Personal Details Form which is to be forwarded to the Dstl ADS upon return of the worn dosemeters. The completion of this form will facilitate co-operation between employers and ADS to ensure that radiation doses records and dose limits are maintained.

Casual Visitors

28 Units and establishments are to issue radiation dosemeters to casual visitors where specified in local orders. When a casual visitor is issued with a Dstl ADS personal dosemeter, the number 4 is to be entered into the ‘cat’ codes column of the Dstl ADS Dosemeter Issue List for the dosemeter.

Notification of Changes in Circumstances

29 A completed Personal Details Form is to be forwarded to the Dstl ADS when any of the following occur for personnel registered with the ADS:

a. there is a change in personal details such as surname on marriage, job as described in the job code, service or service / pay number;

b. an individual restarts radiation work; and

c. an individual leaves MOD employment for any reason or ceases to be a classified person. In such circumstances a termination record for the individual is to be requested from the Dstl ADS and a forwarding address is to be provided to enable a copy of the termination record to be forwarded to the individual.

Completion of Radiation Work at an Establishment

30 The unit or establishment is to undertake the following tasks for each individual registered with the Dstl ADS who ceases radiation work at an establishment:

a. if the individual is leaving MOD employment, remove their name from the pre-printed Dstl ADS Issue List and add the following text in the remark's column 'Left MOD – Please take off regular issue'. If the individual is ceasing radiation work at an establishment but continuing employment with MOD, delete their name from the pre-printed Dstl ADS Issue List and add the following text in the remark's column - 'Posted/transferred - please take off regular issue';

b. for classified persons leaving MOD employment, submit a Personal Details Form to the Dstl ADS requesting a termination record including a forwarding address and the date of employment termination;

c. for non-classified persons leaving MOD employment who require a termination record or radiation dose history, submit a Personal Details Form to the Dstl ADS including a forwarding address and the date of employment termination;

d. forward the individual's dose records and radiation passbook (if issued) to their next employer if known, or if not return the documents to the Dstl ADS; and

e. inform the individual in writing if they have ceased to be a classified person.

Description of Dstl Approved Dosimetry Service Forms

31 The Dstl ADS produces several dedicated forms to assist MOD personnel with the administration of dosimetry services. The Dstl ADS forms and related MOD medical documents together with their uses are as follows:

a. Form FMed 291A (radiation history envelope): This envelope is provided for establishments to retain all relevant radiation dose records and associated documents. The unit or establishment must maintain a Form FMed 291A for classified persons or persons who have previously been designated as classified persons, and may also choose to use a FMED 291A to hold the radiation dose records for non-classified persons. On transfer of individuals within the MOD, the FMed 291A and all the enclosures held by the unit or establishment are to be forwarded to the next establishment if the individual is to continue radiation work, or returned to the Dstl ADS;

b. Personal Details Form: This form is used to register all radiation workers with the Dstl ADS. The form must be completed by the individual before any radiation dose assessments are undertaken. Full instructions are given on the form, which must be completed as fully as possible and forwarded to the Dstl ADS. Changes to occupational codes or classification are also to be notified using this form;

c. Dosemeter Issue List: The purpose of the Dosemeter Issue List is to ensure that the results of radiation dose assessments, as recorded by personal dosemeters, are recorded in the correct radiation dose record. An Issue List is supplied with each batch of dosemeters. The Issue List contains details of the dosemeter type, dosemeter serial number(s), issue period and where appropriate, details of the dosemeter wearer. Generally, dosemeters which have not been pre-allocated to an individual may be issued to visitors, newly posted individuals or used for environmental monitoring purposes;

d. Laboratory Certificate: This form is issued to each unit or establishment following assessment of returned dosemeters or input of internal dose assessments on to the Dstl Approved Dosimetry Record Keeping System. The Laboratory Certificate provides a summary of all the dose assessments and should be used to review doses to individuals;

e. Quarterly Radiation Dose Record Summary: The Dstl ADS issues these person-specific reports shortly after the end of each calendar quarter for all individuals who have been monitored during that period. In addition, the fourth quarter's report is produced for individuals having any dose assessments included on their dose record during that calendar year. The Radiation Dose Record Summary report is forwarded automatically to the RSO or RPS. The form is to be filed in an individual’s FMed 291A envelope. The form shall be available to the RSO / RPS and the Appointed Doctor, and may be inspected on request by the individual to whom it refers;

f. ADS Form 94 or an ADS generated ADS3: This form is used to provide the ADS with an estimated dose in the event that a dosemeter is lost, damaged or inadvertently irradiated;

g. Dstl ADS Warning Reports/Overexposure Reports: In addition to Laboratory Certificates of dose results provided to each customer, the Dstl ADS also provides Over-exposure Reports and Warning Reports for any person registered with the Record Keeping Service who has exceeded a relevant dose threshold. These reports are dispatched with the Laboratory Certificates;

h. Form FMed 291D (radiation record summary card): This form must be completed by the parent establishment and issued to non-classified persons undertaking work in a controlled area designated by another employer. It shall carry the PD number of its bearer. The RSO or RPS issuing dosemeters for the controlled area shall examine this card, use the PD number as necessary and complete the appropriate columns before the individual returns to their normal MOD station;

i. Radiation Passbooks: Radiation passbooks are issued to classified persons who are required to undertake work in a controlled area designated by another employer. They are available from the Dstl ADS for MOD classified persons. They are either allocated directly to an individual or issued to MOD establishments who will allocate them. The radiation passbook has a unique serial number and is not transferable; and

j. Termination Records: The employer has a statutory duty to ensure that the Dstl ADS raises a termination record whenever a person who is, or has been, designated a classified person leaves MOD employment. The termination record summarises the radiation exposure for the individual during the period of employment. Requests for termination records are to be made by completing a Personal Details Form for the individual which is to be forwarded to the Dstl ADS. The form is to have a tick placed in Box 19 and must include details of a forwarding address for the employee and date of termination of employment. The Dstl ADS will send the termination record to the individual at the address provided and a copy of the termination record to the HSE as required by IRR17.

Guidance for Line Managers and Employees on Estimated Doses and Special Entries

Introduction

1 The ADS will amend dose records in accordance with the special entry arrangements specified in IRR17. Where appropriate, the unit or establishment is responsible for applying for such special entries.

Amendment of Radiation Doses Allocated to an Individual's Radiation Record

2 Classified persons: Whenever any person has reasonable cause to believe that the radiation dose recorded on a Laboratory Certificate issued by the ADS for a classified person is much greater or much less than the dose received by the relevant individual, the circumstances are to be reported to the RPS or RSO. An investigation is to be undertaken by the unit or establishment, and, where the investigation confirms the belief that the dose recorded is incorrect, the following action is to be taken:

a. application is to be made to replace the assessed dose with a special entry to the individual's dose record. Full details of the investigation together with a completed ADS Form 94 (Estimated Dose Form) are to be submitted through normal channels to the appropriate TLB safety authority for radiation safety, for onward transmission to the ADS. For those establishments with a resident full time RPA, application for a special entry is made by submitting full details of the investigation together with a completed estimated dose form to the RPA, for onward transmission to the ADS, with a copy being sent to the appropriate TLB safety authority. A copy of the investigation report is to be retained locally for at least 2 years; and

b. consent for a special entry is required from the HSE in any case where the cumulative recorded dose exceeds a legal dose limit as detailed in Chapter 4.

3 Other radiation workers: For radiation workers who are not designated as classified persons, application for an amendment to the dose record is to be made by submitting full details of the investigation and a fully completed estimated dose form through normal channels to the appropriate TLB safety authority who will approve the amendment to the radiation dose record and inform the ADS.

Definition of Doses Much Greater or Less Than That Recorded in the Dose Record

4 The RSO or RPS is to review the investigation to ensure that it is sufficient to produce an estimate of the dose received by a classified person. That estimate is to be regarded as much greater or less than the original entry in the dose record for a particular period if:

a. the dose received differs from the original entry by at least 1 mSv for recorded doses of 1 mSv or less; or

b. the dose received differs from the original entry by a factor of 2 or more for recorded doses in excess of 1 mSv but less than the relevant dose limit; or

c. the dose received differs from the original entry by a factor of 1.5 or more for recorded doses at, or above, the relevant dose limit.

Adequate Investigation

5 An adequate investigation is one that is sufficiently thorough to show there is reasonable cause to believe that the dose entry in the dose record is substantially incorrect. The investigation is to at least take account of:

a. relevant information provided by the ADS;

b. details of the pattern of work of the individual such as the time spent in particular controlled and supervised areas;

c. measurements from any additional dosemeter or direct reading device worn by the person concerned;

d. individual measurements made on other employees undertaking the same work with ionising radiation; and

e. the results of any area monitoring that has been undertaken.

6 In addition, it is worth considering:

a. a credible reconstruction of the exposure conditions for the employee's dosemeter to demonstrate that there is reasonable cause to believe that the exposure it received was likely to have occurred when not being worn;

b. the layout of the working area, the radiation sources in it and any shielding or other controlled measures available to restrict exposure;

c. the reliability of engineering controls, design features, safety features and warning devices specifically provided to restrict exposure;

d. details of any radiation monitors/alarms and their reliability;

e. training records and experience of employees;

f. arrangements for storage/security of dosemeters against risks of inadvertent/ malicious exposure or contamination; and

g. systems of receipt and handling of dosemeters including the use of security X-ray devices at the unit or establishment.

Approved Dosimetry Service Action

7 The ADS may be reluctant to act on a request for special entry if the information provided appears to be inadequate to support a change to the recorded dose. Dosimetry services are only approved to make special entries requested by units and establishments which satisfy the requirements of the IRR17. In such circumstances, the Dstl ADS will request more information to support the case.

8 When the information provided is adequate, the ADS will perform the requested dose replacement following the details provided and within the investigation report.

9 A revised laboratory certificate will be provided to the unit/establishment following the dose amendment.

10 A revised Quarterly Dose Record will be provided to the unit/establishment for the individual concerned during the relevant quarter in which the amendment was made.

11 A fee will be levied for the administration procedures in amending a dose.

Employee Consultation

12 The classified person must be consulted during the investigation and notified of any special entry proposed. If the classified person is aggrieved by the decision to apply for special entry, they can request the HSE to review that decision within 3 months of being informed. For other persons it is not required.

13 The HSE can direct the unit or establishment to arrange for the original entry to be restored if it is not satisfied with the investigation, or a reasonable estimate of the dose has not been established.

Guidance for Line Managers and Employees on Medical Surveillance of Classified Persons

Introduction

1 The main purpose of medical surveillance is to determine an individual's fitness or continuing fitness for the intended work with ionising radiation. In this context, fitness of the person is not restricted to possible health effects from exposure to ionising radiation. The Appointed Doctor or employment medical adviser will need to take account of the specific features of the work with ionizing radiation and must be allowed to inspect the workplace if they require it.

Medical Surveillance

2 The Appointed Doctor is to be provided with adequate facilities to carry out medical examinations. They are to be provided with copies of dose summary records, sickness / absence records and the health record of personnel being examined and allowed access to working areas so that they may be inspected. At the initial medical examination, a description of the work to be undertaken is required and past medical, family and occupational and social histories should be taken. These details must then be recorded together with the results of a physical examination. For Service personnel who consent, this record should be in their electronic medical record. HSE form MS 101 can be used as a template. No medical tests or examinations are routinely required before an initial medical examination, but the Appointed Doctor is free to require whatever evidence or investigations they may need to make an assessment of fitness. The final outcome certifying the result of the assessment is to be recorded in the Health Record (HSE form 2067).

3 Every classified person is to have a health review conducted by the Appointed Doctor annually. The nature of this review is a matter for the Appointed Doctor using HSE guidance and clinical judgement, taking account of the nature of the work and the individual's state of health.

4 As industrial radiographers have an increased risk of accidental and unsuspected overexposure, all MOD classified persons undertaking site industrial radiography (i.e. work that is conducted outside a protective enclosure) must attend for face to face annual review and be examined for signs of deterministic effects with especial attention directed at the skin and nails of the upper extremities.

5 The Appointed Doctor may undertake health reviews of classified persons at any time within the 12-month period if it is considered necessary. Those whose classified status has lapsed, and / or have not undergone health review by an Appointed Doctor and been certified fit within the preceding 13 months are to be treated as persons starting their first employment as classified persons.

Special Medical Surveillance

6 The Appointed Doctor is to conduct special medical surveillance on any worker who has received a radiation dose more than any statutory relevant dose limit detailed Chapter 4 using guidance provided by the HSE.

Suspension from Employment as a Classified Person

7 The Appointed Doctor may, by signed entry in the health record, suspend from employment as a classified person any worker they have examined and found unfit for radiation work. The Appointed Doctor is to notify line management of any suspension.

8 A classified person who has been suspended is not to be re-employed as a classified person until re-certified fit by signed entry of the Appointed Doctor in the health record.

9 Where full suspension is deemed unnecessary, the Appointed Doctor may impose appropriate restrictions in the health record, either upon initial employment or at annual or earlier review, of a classified person. The person is to be employed by the CO only under the prescribed restrictions.

10 Should any civilian worker disagree with the decision of the Appointed Doctor, they may, within 3 months of notification of the decision, apply in writing to the HSE for the decision to be reviewed. The result of such a review is to be notified to the worker and entered on their health record. Service personnel should not appeal directly to the HSE in the first instance but are to represent their cases through the normal Service procedures. Should they remain dissatisfied, they still have the right to refer their cases to the HSE for resolution.

Transfer of Establishment for Classified Persons

11 If a classified person moves unit, unless the move entails a significant change in duties or environment, or unless there has been a relevant change in the person's medical history, the person can continue to be employed under the terms of any extant certification. Advice must be obtained from the Appointed Doctor before the person starts work in all cases of doubt.

Statistical Returns

12 Appointed Doctors are required to submit statistical returns on a prescribed form at the frequency specified by the HSE. This information will include details of the Appointed Doctor, the number of examinations performed by that doctor and the number of unfit assessments.

Pregnancy and Breastfeeding

13 Every radiation worker must be reminded that they are to notify their employer, in writing, that they are pregnant or breastfeeding. Thereafter, or as soon as the employer might otherwise reasonably become aware, the conditions of exposure must be modified, as necessary, to ensure that:

a. the equivalent dose to the foetus is unlikely to exceed 1 mSv during the remainder of the pregnancy, and that

b. significant contamination by ingestion or inhalation of radioactive substances is prevented whilst breastfeeding.

14 Units and establishments are to inform the ADS by annotating the Remarks/Changes Required column of the Dosimetry Issue List with the date that the pregnancy was declared and the expected date of delivery.