

# **REQUIREMENTS FOR THE APPROVAL OF DOSIMETRY SERVICES UNDER THE IONISING RADIATIONS REGULATIONS 1999**

## **PART 1 - EXTERNAL RADIATIONS**

(revised 2008)

These requirements, which include technical criteria for approval and supporting guidance, are issued by the Health and Safety Executive for the purpose of approving dosimetry services under Regulation 35 Ionising Radiations Regulations 1999. Following the supporting guidance is not compulsory and dosimetry services are free to take other action to demonstrate that the criteria in this document has been met.

## FOREWORD

Dosimetry services undertaking assessment and record-keeping of radiation doses received by classified persons must be approved for these purposes by the Health and Safety Executive (HSE) or by a body authorised in writing by HSE. The organisation responsible for approving dosimetry services is referred to in this document as the 'Approval Body'; and dosimetry services approved by this body may be regarded as approved dosimetric services within the meaning of Council Directive 96/29/Euratom.

The requirements which must be satisfied to obtain approval are specified in three parts and one supplement. This part sets out the procedures and criteria that will be used by the Approval Body for the assessment of dosimetry services seeking approval for the measurement and assessment of doses arising from external radiations (including exposures resulting from accidents). Part 2<sup>1</sup> deals with approval for internal radiations (including radon decay products) and Part 3<sup>2</sup> deals with co-ordination of dose assessments and record keeping of reported doses. The supplement<sup>3</sup> deals with approval for emergency exposures during intervention.

These documents set out the objectives to be achieved and the requirements a service must satisfy to meet those objectives.

This document is in three sections. The first section gives an introduction; the second section describes procedural requirements; and the third section contains the criteria for approval.

The criteria for approval are supplemented by guidance to indicate how they may be satisfied. This guidance is intended to help dosimetry services and the Approval Body. It shows ways in which services have met the criteria in the past and illustrates good practice. The processes set out in the guidance examine the three basic elements of a satisfactory dosimetry service, namely:

- a) the performance characteristics of the dosimetry system;
- b) the ability of the service to provide competent results; and
- c) ensuring consistency of service through a periodic testing regime that includes performance tests and/or intercomparisons and inspection.

Following the guidance is not compulsory and dosimetry services are free to take other action to demonstrate that they meet the criteria in this document. The stages for initial approval, and for reapproval, are illustrated in flow diagrams in section 2.

Separate guidance<sup>4</sup> is available for employers, summarising their responsibilities.

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# SECTION ONE

## INTRODUCTION

### Background

1. Regulation 35 of the Ionising Radiations Regulations 1999<sup>5</sup> (IRR99) enables the Health and Safety Executive (HSE) to approve suitable dosimetry services for some or all of the purposes of:
  - a) Regulation 21 (routine dose assessment and record-keeping for classified persons);
  - b) Regulation 22 (estimates doses and special entries);
  - c) Regulation 23 (accident dosimetry);
  - d) Regulation 12 (provision of dosimeters or other devices for contingencies);
  - e) Regulation 25(3) (entry into the dose record of assessed doses for overexposures),

and to revoke such approvals in writing at any time. HSE may at any time make an agreement in writing with another body to perform this approval function instead. In this document, the term 'Approval Body' is used to mean either HSE or a body appointed by HSE to undertake the approval function.

2. Dosimetry Services may be approved to:
  - a) assess doses received by classified persons, including the measurement and assessment of whole-body or part-body doses arising from external radiation (notably X-rays, gamma rays, beta particles or neutrons), and the provision of relevant information to a service approved for record-keeping;
  - b) undertake part of the dose assessment procedure, such as the calibration and provision of thermoluminescent dosimeters (TLDs), the provision of appropriate direct reading electronic dosimeters and assessment of doses or the receipt and development of film dosimeters;
  - c) assess doses following an accident, occurrence or incident and to report the results to the employer (Regulation 23(1)(a) IRR99), and to the dosimetry service approved for record-keeping when appropriate; or
  - d) Issue dosimeters and assess doses in respect of accidents (under Regulation 12(2)(b)) including where a dose to the whole body greater than 0.5 gray might be received following a radiation accident (special accident dosimetry), and report the results to the employer, and to the dosimetry service approved for record-keeping when appropriate.



In this document, dosimetry services approved for any of these purposes are referred to as ADS (Assessment); dosimetry services approved for co-ordinating contributions to dose assessments and for dose record-keeping are referred to as ADS (Records).

3. HSE has issued a series of publications setting out requirements for the approval of dosimetry services under IRR99. This publication deals with those aspects which are relevant to the assessment of doses from external radiations. It explains:
  - a) the criteria the Approval Body will use to assess whether a dosimetry service appears fit for approval or for continuing approval;
  - b) the arrangements for performance testing (where relevant);
  - c) the information to be sent to ADS (Records);
  - d) the circumstances in which an approval may be revoked.

### **Approval for accident dosimetry**

#### ***Dosimetry for accidents as part of a routine approval***

4. Any service approved for routine measurement and assessment of doses from external radiations is also expected to be capable of assessing and reporting doses rapidly following an accident, occurrence or incident, when requested to do so by the employer (see criterion 14). In addition, separate approval will be required for the type of dosimetry described in paragraph 5 (Special Accident Dosimetry).

#### ***Separate approval for Special Accident Dosimetry for anticipated doses >0.5 gray***

5. A dosimetry service must seek separate approval if it proposes to provide an accident dosimetry service for employers who have to issue anyone with dosimeters or other devices under Regulation 12(2)(b) IRR99 (for example, criticality accident dosimeters) in circumstances where a dose to the whole body greater than 0.5 gray might be received as a result of an accident, occurrence or incident. In this case, criterion 16 will apply, reflecting the need for the appointed doctor or the Employment Medical Advisory Service (EMAS), as arranged by the employer, to receive a rapid report of assessed doses (in compliance with the requirements of Regulation 25 IRR99).

**Guidance  
on  
paragraph  
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#### **Separate approval for Special Accident Dosimetry**

The employer is responsible for determining whether this type of service is required, on the basis of a risk assessment (Regulation 7 IRR99).

Separate approval for Special Accident Dosimetry is not required for the measurement of sodium-24 activation products or other techniques used to estimate dose in the absence of dosimeters or other devices. The employer is responsible for such estimates under regulation 23(1)(c) IRR99

## **Objectives**

6. Any dosimetry service seeking approval to assess doses from external radiations must demonstrate to the Approval Body that it has the necessary expertise in the type of dosimetry for which it seeks approval and can provide and maintain a service which:
- a) produces a reasonable degree of accuracy in the assessment of dose (or contribution to such assessment);
  - b) is highly reliable;
  - c) communicates the results of routine dose assessments to a dosimetry service approved for co-ordination and record-keeping (or forwards the results of other work for which it is approved) in reasonable time; and
  - d) rapidly communicates to the employer, and subsequently to ADS (Records), the results of dose assessments made in the event of an accident, occurrence or incident.

These criteria provide a framework for assessing how successful a dosimetry service has been in achieving these objectives.

7. This document sets out the criteria developed by HSE, after consultation with approved dosimetry services (ADS), which will be used to decide whether or not a dosimetry service can meet the objectives in paragraph 6. Any service that can satisfy the Approval Body that it meets the relevant requirements will receive formal approval under Regulation 35 of IRR99, subject to certain conditions governing the scope of that approval and the maintenance of the standard of service.

### **Guidance on paragraphs 6 and 7**

#### **Non-classified persons**

An ADS may supply dosimeters to employers to help demonstrate compliance with Regulation 18(3) IRR99 for non-classified persons. While the standard of service should normally be the same as that for classified persons it is imperative that systems for reporting dose assessments are sufficiently clear and separate for the two groups of workers. This will allow the employer to keep appropriate records of doses reported for non-classified persons (these records need not be kept by an ADS) thus avoiding any confusion about who should keep statutory dose records for classified persons.



## SECTION TWO

### PROCEDURAL REQUIREMENTS FOR APPROVAL AND ARRANGEMENTS FOR REVOCATION OF APPROVALS

#### Applications for approval

8. HSE publishes a Statement on the Approval of Dosimetry Services (HSE Statement) which sets out:
  - a) the arrangements for making applications for approval and for reassessing approved services;
  - b) the requirements for performance testing of dosimetry services; and
  - c) the current fees charged by the Approved Body.

The HSE Statement is revised from time to time and will include any changes to the requirements for approval including new or revised performance tests. Copies of the HSE Statement are available from the Dosimetry Services Administrator, Corporate Health Specialist Division, Redgrave Court, Merton Road, Bootle, Merseyside L20 7HS. Tel: 0151 951 4894 or 4539; by email to [adsadmin@hse.gsi.gov.uk](mailto:adsadmin@hse.gsi.gov.uk); or from the HSE website at <http://www.hse.gov.uk/radiation/ionising/dosimetry/dosimetry-state.pdf>.

9. Applications for approval should be made in writing to the Approval Body specified in the current HSE Statement and must include:
  - a) A letter from the Head of the Service applying for approval, detailing what dosimetry service(s) are to be approved. The details should include:
    - i) the full name and address of the dosimetry service (and other contact details, e.g. telephone and fax numbers, email address and a contact name);
    - ii) a description of the type and capacity of the service for which approval is sought and the particular radiations to be covered (for example, assessment of doses to the whole body, arising from external X-ray and/or gamma radiation in the energy range ... keV to ... MeV, and/or from external beta radiation from beta particle emissions of maximum spectral energy in the range ... keV to ... MeV from the assessment of ..... dosimeters;)
    - iii) where approval is sought in relation to a service based on personal dosimeters, the type and number of dosimeter(s) that it is intended should be used;
    - iv) if the service is to be limited to certain clients or groups of clients) the names of clients or a description of groups of client;

- b) A Statement of Service for each dosimetry service which gives the required details about the service (see paragraph 11);
- c) A copy of a signed certificate for a successful performance test, where relevant (see paragraph 21);
- d) Examples of all types of outputs from the ADS Assessment to their clients, e.g. dose reports to ADS Co-ordination and Record Keeping (C&RK), measure dose values to another ADS who assesses the dose for onward reporting to the ADS C&RK, and doses reported to employers (including high doses and those following requests for urgent dosimeter assessment). It is also helpful if the submitted examples include, where appropriate, 'screenshots' to illustrate how data is presented to ADS staff; and
- e) The appropriate administration fee (see the current HSE Statement).

### **Reassessment of approved dosimetry services**

10. Approvals are normally granted without a time limit but each approved dosimetry service (ADS) will be subject to formal reassessment, for which a fee will be charged. This is a standard condition of any approval. Dosimetry services approved for external radiations should apply to the Approval Body for reassessment no later than five years after the date specified in the certificate of approval. The Approval Body will contact the ADS before the due date reminding the service to send a letter applying for reassessment of their service(s). The letter should contain the same information as that required for approval (see paragraph 9). In addition, the ADS must include with the letter the following:
- a) a copy of the version of the Statement of Service to be used by HSE for their reassessment. This Statement should cover all the relevant points listed in Appendix 1 of this document (see paragraph 11);
  - b) a copy of a signed certificate for a successful performance test, where relevant (see paragraph 22);
  - c) examples of all types of outputs from the ADS Assessment to their clients, e.g. dose reports to ADS Co-ordination and Record Keeping (C&RK), measured dose to ADS who assess the dose for onward reporting to the ADS C&RK, and doses reported to employers (including high doses and those following requests for urgent dosimeter assessment); and
  - d) the required administration fee (see the current HSE Statement);
  - e) any additional items requested by the Approval Body at the time of reassessment. These will normally be specified in the calling letters.

## **Assessment for approval/continuing approval**

11. The dosimetry service must ensure that the Statement of Service is accurate, up-to-date and sufficient to support the application for approval/continuing approval when considered with any referenced publications and supporting documents. It must cover all the relevant points in Appendix 1, providing a summary of how the criteria in Section 3 of this document are to be satisfied. The Statement of Service should identify how each element of Appendix 1 is addressed, for example by using the same layout or by including an executive summary which explains how each item is covered (e.g. with cross-references to particular paragraphs in the Statement). If it is not clear whether the Statement of Service covers all the points required it will take longer to deal with the application. Inevitably, this will increase the fee for assessing the application (see paragraph 17).
12. If the Approval Body's assessor decides that the Statement of Service is incomplete or inadequate for the purposes of assessment, he or she will ask the dosimetry service to amend it. The assessor may also request copies of any relevant supporting documents whether or not they are referenced in the Statement of Service. If the dosimetry services does not then provide an adequate Statement of Service for assessment (and copies of requested supporting documents) and appears to be incapable of demonstrating that it can satisfy the criteria in this document, the Approval Body will reject the application for approval/continuing approval.
13. The assessor will normally arrange an inspection of the applicant's facilities and this will be at a mutually convenient time. Normally, this inspection will take place after the assessor has received satisfactory replies to queries about the Statement of Service submitted with the application. The assessor will then sample inspect key features of the facilities and the arrangements for dosimetry to check that these match the description in the Statement of Service and are sufficient to indicate that the service is fit to be approved. (Figure 1 illustrates the process of dealing with applications for approval and Figure 2 relates to reassessments of approvals). Dosimetry services wishing to be approved are responsible for ensuring that they comply fully with the relevant criteria for approval and should not rely on the assessor to identify any gaps in their arrangements.
14. An assessor carrying out a reassessment of an AD will take into account the overall performance of the service since the last assessment (including the results of performance tests). The results of any review of performance required under criterion 19 must be made available to the assessor at the inspection. The Approval Body may consider that the criteria for reassessment are not satisfied if the ADS has failed to carry out a required review or has failed to act on the results of such a review.
15. If the assessment of doses depends on two or more parts of the organisation (e.g. one site provides and develops film badge dosimeters but another site makes the dose assessment) both may need approval either separately or jointly for the particular work they carry out.

**Guidance  
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**Dosimetry services operating from more than one site**

In some cases, certain operations connected with the work of the service are carried out on another site, for example the testing, numbering and supply of dosimeters. In such cases it may be necessary for both sites to be named in the approval or even for two separate approvals to be granted.

A second site may need to be mentioned in the certificate of approval for a service where the amount or type of work done forms a significant part of that dosimetry service's work.

The key test for separate approval is control: if the applicant for approval exercises control over the work at the second site, separate approval will not be required. However, if the work at the second site is not under the effective control of the first dosimetry service, a separate approval may be required.

16. The Approval Body will aim to carry out an inspection of the applicant's facilities within two months of receiving a formal application and to reach a decision about approval within four months of that inspection. The inspection will be delayed if the Statement of Service is not adequate for the purposes of assessment (see paragraph 11). The Approval Body will explain in writing the reasons for rejecting any application. If the applicant is aggrieved by the decision it may use the Approval Body's disputes procedure. However, the decision of the Approval Body after use of this procedure will be final. If an application is unsuccessful the service may make a fresh application for approval for a further fee will be payable.

**Fees for approval/continuing approval**

17. Fees are payable for all applications, whether or not they are successful. The fees are set out in the current HSE Statement. The Approval Body will not make a final decision about approval until this fee has been paid.

**Performance tests**

***General***

18. For certain methods of dose assessment dosimetry services are required to undertake a performance test both prior to approval and at intervals not exceeding 18 months thereafter. The current HSE Statement explains which types of dosimetry service will have to undertake performance tests and sets out the pass/fail criteria that will be applied. Each type of test is described in a protocol issued by HSE. The test results will be assigned to one of three Bands: A, B or C, as described in the HSE Statement.
19. The dosimetry service must arrange the performance test with a laboratory service which has received accreditation from the UK Accreditation Service (UKAS) to carry out the particular test in accordance with the relevant published HSE protocol (available on request from the Dosimetry Services

Administrator, Corporate Health Specialist Division, Redgrave Court, Merton Road, Bootle, Merseyside L20 7HS. Tel: 0151 951 4894 or 4539. Email [adsadmin@hse.gsi.gov.uk](mailto:adsadmin@hse.gsi.gov.uk). The applicant is responsible for paying the laboratory to carry out the test. A list of these laboratories can be obtained in writing from UKAS, whose address is: UK Accreditation Service, 21-47 High Street, Feltham, Middlesex TW13 4UN. Tel: 0208 917 8400; Fax: 0208 917 8500, web address: <http://www.ukas.com>.

20. If no laboratory has received UKAS accreditation for the type of test required, the dosimetry service must arrange for the test to be carried out by either the National Physical Laboratory (NPL) or the Health Protection Agency (Radiation Protection Division) [HPA(RPA)], except that HPA(RPA) must arrange for tests of its own services to be carried out by NPL in these circumstances.

### ***Performance test required before approval***

21. Applicants for initial approval should undertake a performance test, where required, no more than three months before application for approval is made. To pass a performance test, applicants for approval must obtain test results that lie in 'Band A'. The applicant must supply the Approval Body with a copy of a signed certificate from the test laboratory, setting out the results of the test. If the applicant fails the pre-approval performance test (i.e. the results of the test are not within 'Band A') it may undertake a further performance test, after correcting any errors in the methods used.

### ***Periodic performance tests***

22. Services required to undertake periodic performance tests must obtain test results that fall either in 'Band A' or in 'Band B'. If the ADS undertakes a performance test and obtains a 'Band B' result it must carry out an in-service review to examine ways of improving the service. The Approval Body will consider the outcome of such reviews at the time of formal reassessment (see paragraph 14). If the test is unsuccessful ('Band C') the ADS may arrange a further test (but see criterion 19 and paragraph 23).
23. The ADS must send the Approval Body a copy of a signed certificate from the accredited test laboratory setting out the results of the periodic performance test undertaken in accordance with criterion 18. This certificate must be dated within the period of 18 months since the date of the previous certificate. If the results of the performance test are unsuccessful ('Band C') the ADS must immediately undertake a thorough in-service review and develop an action plan for improving the service. The ADS must send a copy of the plan to the Approval Body, together with a report of the in-service review, no later than three months after the date of issue of the performance test result.

<b>Guidance on paragraphs</b>
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An ADS that has failed a performance test and submitted its action plan to the Approval Body may choose to undertake a further test to demonstrate that the improvements it has made
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have been effective. In such cases, if a copy of a successful test certificate is sent to the Approval Body within the three month period referred to in paragraph 23 the next performance test will not be required until 18 months from the date on that certificate.

24. An approval may be revoked in the ADS does not provide a copy of the performance test results, and where necessary a report of an in-service review and action plan, within the period allowed.

### **Conditions of approval**

25. The scope of any approval will be limited by Schedule 1 of the certificate of approval which, for example, may restrict the approval to making dose assessments for particular types and energies of radiation using specified dosimeters or dosimetry models. Schedule 2 may specify conditions which, for example, limit the approval to making dose assessments for specified workplaces. An approved dosimetry service proposing to extend the scope of its approval or to use a different system of dosimetry must make a further application to the Approval Body; an additional fee will be charged.

### **Guidance on paragraph 25**

#### **Selection of ADS by the employer**

It is the employer's responsibility under Regulation 21 IRR99 to appoint an ADS (Assessment) that can make appropriate measurements, considering the work undertaken and the types and energies of radiation to which employees are exposed. The employer would be expected to consult the Radiation Protection Adviser (RPA) and the ADS (Records) and to take account of any conditions of approval placed on the ADS (Assessment). Therefore, an ADS (Assessment) should take care to inform potential clients about the scope and conditions of its approval - normally a copy of the certificate of approval could be made available to clients or their RPA(s). See also criterion 12.

#### **Different dosimetry system**

One example of a 'different dosimetry system' would be a change from one type of dosimeter to another, e.g. from a film dosimeter to a direct-reading dosimeter; in this case a change in the physical principle of operation would be involved.

26. Schedule 2 of the certificate restricts the manner in which measurements and assessments are undertaken to those summarised in the relevant Statement of Service agreed at the time of approval. Any significant change to the dosimetry system (including the main laboratory techniques, design of instrumentation and methods of assessment used) or to key personnel (e.g. the head or deputy head of the service) requiring a revision of the Statement of Service might invalidate the approval; changes restricted to supporting documents would not affect the certificate of approval. Therefore, an ADS

should inform the Approval Body, in advance where practicable, of significant changes to the following:

- a) key staff;
- b) location of the service;
- c) dosimeter specification;
- d) specification of dosimeter processing equipment;
- e) calibration system;
- f) methods of dose assessment;
- g) computer controlled systems for issue and return of dosimeters; or
- h) change of name/ownership of the service.

where the change would require a significant revision to a critical part of the Statement of Service referred to in the certificate of approval. If the Approval Body decides that the changes could adversely affect the competence and performance of the ADS to maintain the service in accordance with the requirements in this document, a partial reassessment may be needed. The Approval Body will arrange for an assessor to review the changes and to undertake a partial reassessment of those aspects of the service that have changed; this may involve an inspection. A fee will be charged for such a reassessment, whether or not an inspection is involved.

<p><b>Guidance on paragraph 26</b></p>	<p><b>Changes to the dosimetry system</b></p> <p>Changes to the system will be significant if they might have an adverse/beneficial effects on the performance of the service. The ADS would not need to report superficial changes to a dosimeter, e.g. change in colour would not be notifiable. However, changes to the holder or filter which result in an updated model of the dosimeter referred to in the original Statement of Service (and which may affect the energy and angular dependence of response) should normally be notified.</p> <p>Significant changes would normally include modifications to the chemical or physical properties of the 'active element' of an existing dosimeter or a change from one manufacturer's dosimeter (e.g. a TLD) to that of another. For a TLD, one criterion may be the need to change to a different type of reader.</p> <p>It is advisable for an ADS to try to time important changes to the service to coincide with the next reassessment, where possible. This would reduce the amount of work an assessor needs to do, and consequently reduce the fees charged.</p> <p><b>Purpose of notification to the Approval Body</b></p>
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This should not be seen as a discouragement to innovation. Its purpose is to:

- (a) help the Approval Body ensure that modifications to the operation of an approved service do not result in the service failing to conform to the criteria for approval;
- (b) help ensure that the operation of the service is still covered by the existing certificate of approval (which will refer to the Statement of Service current at the time of approval or at the time of the last reassessment).

If an ADS provides a service that is not covered by the current approval certificate (e.g. use of a different measurement technique not described in the Statement of Service referenced in the certificate), then it may be acting as an unapproved service. Its clients would therefore be in contravention of Regulation 21 IRR99. Similarly, any relocation of the service to different premises could invalidate an existing certificate of approval. In many cases the Approval Body may agree to a variation via a brief letter to the ADS accepting the change.

27. Approvals are given to a specific dosimetry service and cannot be transferred in part of whole to any other dosimetry service. Therefore, it is imperative that the ADS notifies the Approval Body if a change of name is planned as the existing certificate of approval might not be valid for the new organisation.
28. At the request of HSE, an assessor may arrange for:
- a) a visit to the ADS, at a reasonable time, to make enquiries about any significant problem that has come to HSE's attention and to carry out an interim assessment of the service if appropriate; and/or
  - b) a performance test to be carried out either by one of the laboratories accredited by UKAS for the relevant test, or where that is not possible, as indicated in paragraph 20.

No fee will be charged in these circumstances. However, the approval of a dosimetry service may be revoked as a result of adverse findings in either of the above situations.

### **Revocation of an approval**

29. HSE may revoke in writing any approval given to a dosimetry service. An approval for external radiations may be revoked if an ADS:
- a) does not send performance test results in 'Band A' or 'Band B' to the Approval Body (where such tests are required) within the period set out in criterion 19 and paragraph 23, or fails a performance test carried out under paragraph 28(b) (though account will be taken of in-service reviews and action plans referred to in paragraph 23);

- b) does not conform to the current criteria for approval and fails to provide the Approval Body with an action plan which is sufficient to enable the deficiencies to be rectified within three months;
- c) persistently fails to report dose assessments or complete other work for which it is approved within the 14-day period specification in criterion 13;
- d) fails to apply for reassessment of its approval and provide a copy of the current Statement of Service within three months of receipt of a written request from the Approval Body (see paragraph 10), or such longer period as may be agreed;
- e) fails to provide the required fees for reassessment (paragraphs 10 and 17) within three months of receipt of a written request from the Approval Body, or such longer period as may be agreed; or
- f) fails to co-operate with the Approval Body during attempts to carry out an interim assessment or performance test (paragraph 28).

Approval will also be revoked if a dosimetry service requests revocation of its approval or is issued with a new certificate of approval that supersedes the previous certificate.

<p style="text-align: center;"><b>Guidance on paragraph 29</b></p>	<p><b>Monitoring performance</b></p> <p>The ADS should be monitoring its own performance against the targets set out in this document. Therefore, an ADS should be aware of any failure to provide performance test results to the Approval Body on time, or to supply a copy of the Statement of Service to enable a reassessment to proceed or to pay the required fees for reassessment. Similarly, the service should be aware of the time it takes to provide the results of assessments to ADS (Records), or to complete the work for which it is approved (if this constitutes only part of the assessment process).</p> <p><b>Failure to notify significant changes</b></p> <p>It is advisable for an ADS to try, where possible, to time important changes to the service to coincide with the next reassessment.</p> <p>If an ADS fails to notify the Approval Body of significant changes (paragraph 26) likely to affect the Statement of Service this would not, in itself, justify the revocation of its approval. However, if the Approval Body discovers that significant changes have been made which have adversely affected the performance of the service it may consider revocation of the approval.</p> <p><b>Action Plans</b></p>
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If the Approval Body's assessor finds, during a reassessment, that the ADS is not conforming to the criteria in this document, the ADS will be asked to prepare an urgent action plan. The plan should normally show what steps the service will take, with milestones, to restore the level of performance to that required for a service approved to assess doses from external radiation. If the ADS does not produce an action plan within a reasonable period set by the Approval Body, or the plan is unrealistic or inadequate, the Approval Body may consider revocation of the service's approval.

30. If the Approval Body concludes that revocation of the approval should be considered, it will warn the ADS in writing, outlining the key requirements which are not being satisfied. The ADS will be asked to take action to meet these requirements within three months. If the ADS satisfies the Approval Body that it does conform to the requirements in this document, or that it would be unreasonable to require more to be done, no further steps will be taken to revoke the approval. In any other case, the assessor will recommend revocation of the approval. The Approval Body will immediately notify the ADS in writing seeking comments. Subsequently, the Approval Body will consider the recommendation of the assessor together with any written representations from the ADS and decide whether the approval should be revoked. The ADS will be notified of the decision immediately. If the decision is to revoke the approval this will take effect six weeks after the ADS is notified. This period should be sufficient to enable the clients of the service to make alternative arrangements.

**Guidance  
on  
paragraph  
30**

**Responsibility for identifying improvements**

Although the Approval Body will identify the main failings of the service whenever it considers revocation, it remains the responsibility of the ADS, not the Approval Body, to determine what steps need to be taken to improve its performance.

**Action after receipt of a warning letter**

If an ADS receives a letter warning that revocation of its approval is being considered the ADS would be unwise to take on any new customers until the problems identified by the Approval Body have been resolved. Furthermore, it may be necessary for the ADS to prepare existing customers for the possibility that arrangements may need to be made with an alternative ADS.

**Disputes procedure**

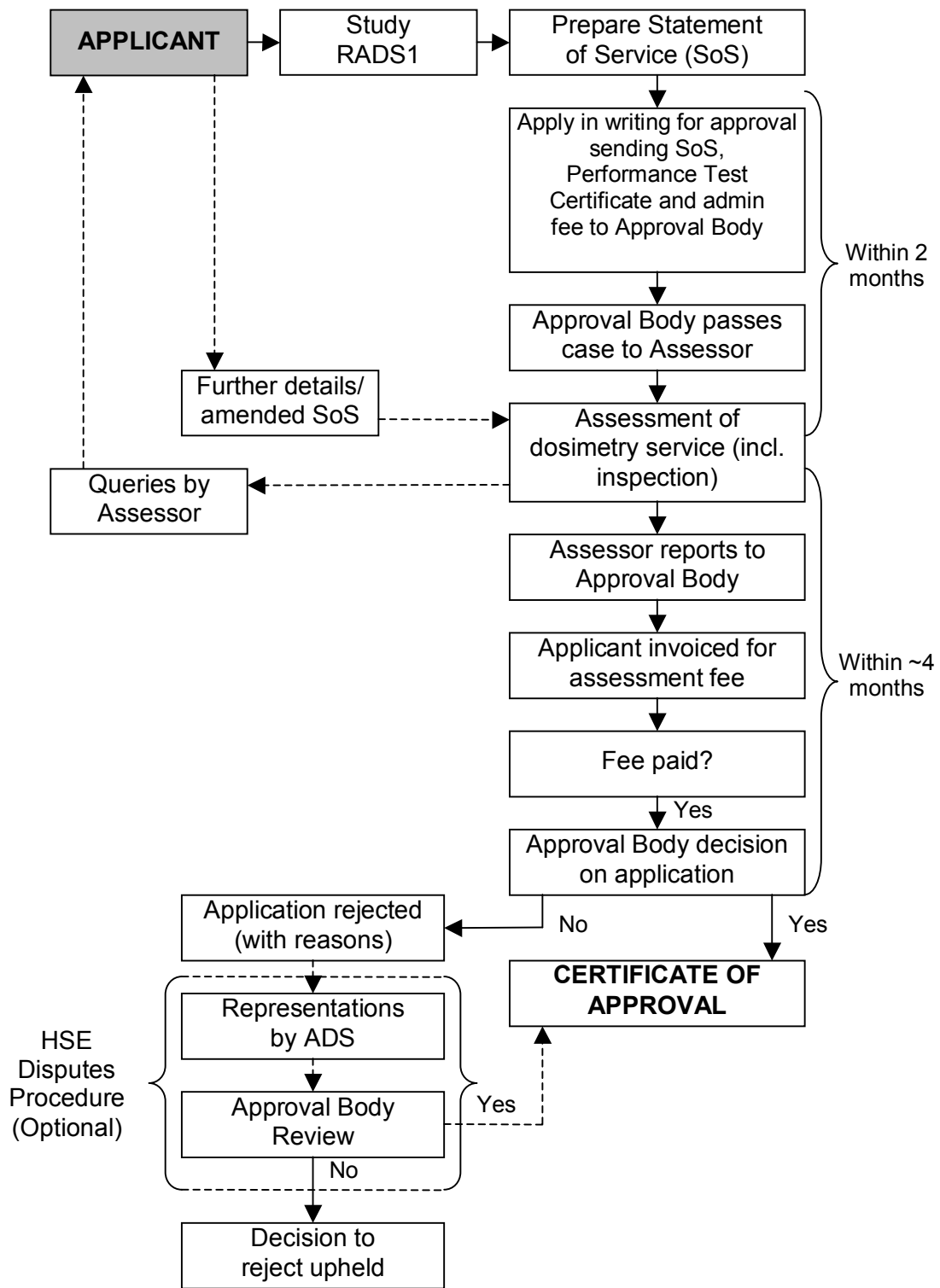
HSE has a disputes procedure whereby anyone who is aggrieved by the actions or decisions of HSE staff may make representations to have the matter resolved at a higher level within HSE. The arrangements are set out in the current HSE Statement. If the Approval Body is not HSE, that body will have a similar disputes procedure.

If the Approval Body recommends that approval should be withheld or revoked, or granted subject to certain conditions, it will write to the dosimetry service to warn them. Two weeks will be allowed to enable the dosimetry service to make representations, which will be considered on a fair and fresh basis before a decision is taken.

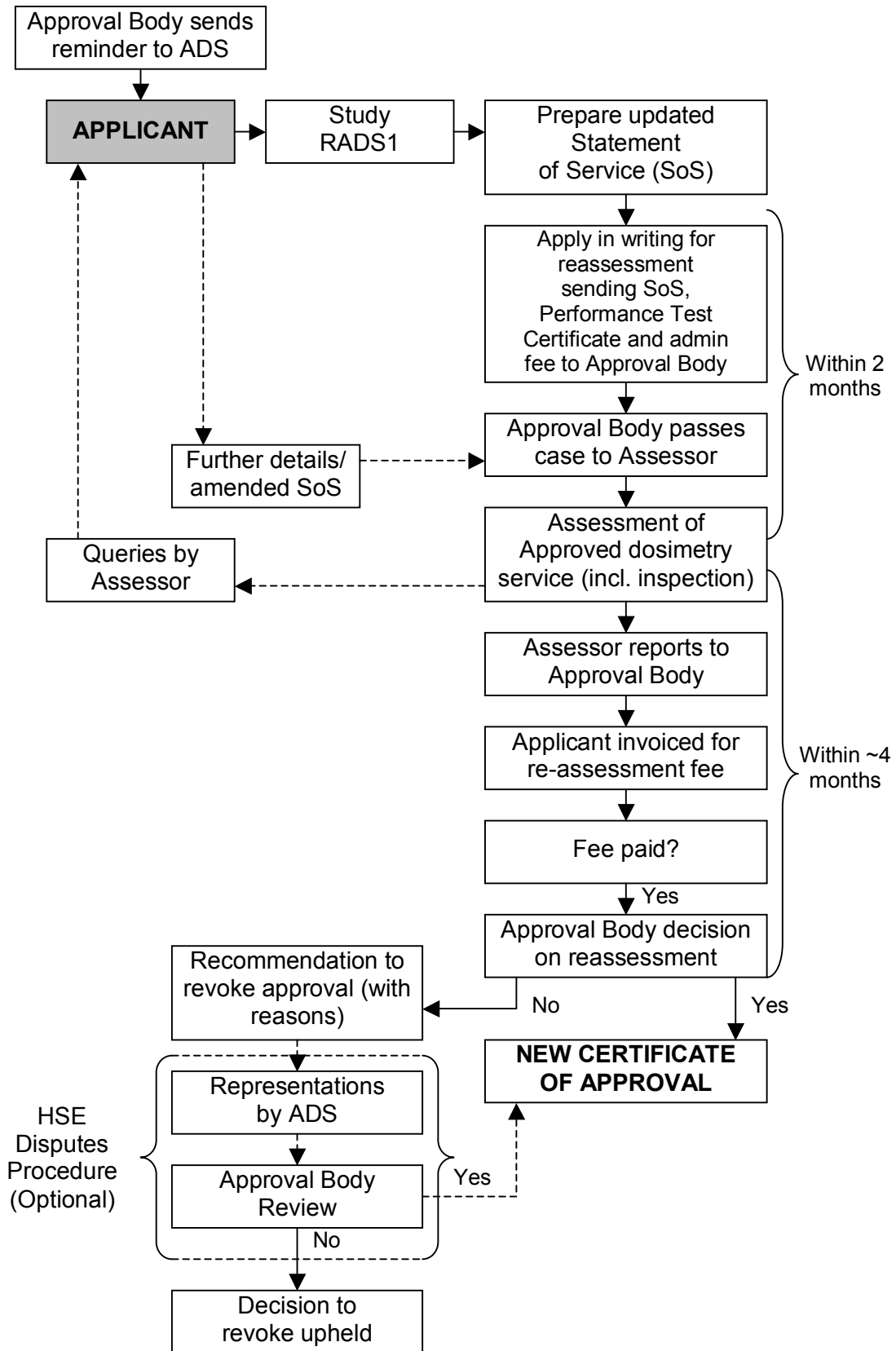
**Meeting with the Approval Body**

In appropriate circumstances, and where time can be saved in so doing, a representative of the Approved Body may arrange a meeting with the ADS, at the office of the Approval Body, to explain why it is considering revocation of the approval.

**Figure 1 - Application for Initial Approval (External Radiation)**



**Figure 2 - Application for Reassessment of Approved Dosimetry Service (External Radiation)**





## SECTION THREE

### HSE CRITERIA FOR APPROVAL

#### General

**Criterion 1. The service shall be able to demonstrate that it has the necessary staff, expertise, resources and facilities to be able to provide and maintain a service which:**

- a) produces a reasonable degree of accuracy in the assessment of dose (or contribution to such assessment);
- b) is highly reliable;
- c) communicates within a reasonable time:
  - i) the results of routine dose assessments to a dosimetry service approved for co-ordination and record-keeping; or
  - ii) the results of their part of the process to an ADS which is approved for the subsequent part or parts; and
- d) rapidly communicates to the employer, and subsequently to ADS (Records), the results of dose assessments made in the event of an accident, occurrence or incident.

**Criterion 2. The service shall take all reasonable steps to ensure that facilities and general arrangements provided for the measurement and assessment of individual doses and the calibre of staff engaged in this work conform to the standards set out in the HSE publication 'General guidance for laboratories providing personal dosimetry services'<sup>6</sup>.**

<b>Guidance on Criterion 2</b>	<b>Experience and independence of staff</b>  2.1 Current staff should have relevant dosimetry experience. Adequate training programmes should be available for new staff and refresher/update training for existing staff. The head of the service should possess qualifications and experience appropriate to the type of dosimetry for which approval is required. The service should be prepared to show that it is independent in character. The responsibilities of staff should be clear and appropriate, for example, if the head of a dosimetry service also fulfils another function for a client employer, such as radiation protection adviser, the two roles should be clearly distinguished; and the latter role should not be allowed to interfere with the former.  <b>Standard of facilities</b>  2.2 No dosimetry service is likely to gain approval if its facilities for carrying out the work are:
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	<ul style="list-style-type: none"> <li>• very cramped;</li> <li>• insecure (for example sensitive areas of the facility are readily accessible to staff from another part of the organisation);</li> <li>• subject to significant levels of external radiation or radioactive contamination; or</li> <li>• not under the direct control of that service.</li> </ul> <p>2.3 In deciding whether or not a dosimetry service satisfies the criterion the Approval Body may take account of the scope of the dosimetry service to show, in particular circumstances, why it is not reasonable or necessary to meet the standards in the general guidance document<sup>5</sup>.</p>
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**Quality assurance**

**Criterion 3. The service shall have written quality assurance procedures for monitoring its overall performance. As part of these procedures all documents relating to the operation of the service including the current Statement of Service and supporting documents shall have appropriate quality assurance control and be formally approved by the service.**

<p><b>Guidance on Criterion 3</b></p>	<p>3.1 The objective of any quality assurance (QA) programme should be to implement a systematic process which will provide confidence that the results are accurate, conform to the criteria for approval and are retrievable. QA procedures would typically cover such matters as:</p> <ul style="list-style-type: none"> <li>• selection and training of staff</li> <li>• clear description of working methods</li> <li>• arrangements for periodic calibration, daily checks and intercomparisons of readers or dosimeters</li> <li>• avoiding contamination of dosimeters</li> <li>• the use of transit dosimeters</li> <li>• a system of ensuring that dosimeters conform to type</li> <li>• procedures for periodic in-house testing; for example using irradiated dosimeters assigned to dummy customers</li> <li>• arrangements to ensure that ancillary equipment continues to fulfil required functions</li> </ul>
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- interface with employers
- inspections, checks and reviews to verify that the work is performed in an acceptable manner
- an audit of specific performance measures such as meeting the 14-day reporting requirement to ADS (Records)
- procedures for investigating abnormal dosimetric results which might indicate a possible fault with a service (e.g. an unusually high dose assessment)
- procedures for reporting internally and remedying 'non-conformances', taking corrective action (including 'disaster recovery', e.g. from contaminated developer) and preventing repetition.
- preparation of sufficient records to show traceability of results reported.

3.2 HSE will accept that a service conforms to some, or all, of the above procedures if it has accreditation against relevant established standards (e.g. ISO17025 'General Requirements for the competence of testing and calibration laboratories'). Otherwise the service should be able to demonstrate equivalence.

### **Methods of dosimetry**

**Criterion 4. The assessment of individual doses shall be based on:**

- a) the issue of individually identifiable personal dosimeters or other devices;**
- b) (if appropriate) the processing of those dosimeters or devices;**
- c) the evaluation of the dose recorded by the dosimeters, or of the response of the devices; and**
- d) the assessment of the appropriate dose quantity for the individual for the relevant monitoring period, or the dose received by the individual as a result of an accident.**

**A dosimetry service may be approved to undertake all of the above stages, or just one or more of the stages.**

### **Identification of dosimeters**

**Criterion 5. The service shall ensure that any dosimeter or other device it uses as part of the dosimetry system is of a readily identifiable type and model**

and can be shown by type testing and field trials to be suitable and reliable for the environments in which it will be used.

<p><b>Guidance on Criterion 5</b></p>	<p>5.1 Dosemeters (or other devices) should be identifiable both by model/version (if more than one model or version of the dosimeter exists). They should also bear an identifiable mark which can be uniquely related to the individual to whom it is issued and the period of assessment. Some services mark the dosimeter with the individual's full name while others provide an ID number or a bar code. Any of these may be acceptable but experience has shown the need for clear and separate systems for issuing and returning dosimeters to classified persons and to non-classified persons so as to avoid confusion about the need to report results to ADS (Records); the records for non-classified persons need not be held by ADS (Records).</p> <p><b>Type testing and field trials</b></p>
	<p>5.2 For a dosimetry system which is not of established and proven design the service applying for approval should be prepared to arrange for sufficient tests to be carried out to demonstrate to the Approval Body that it has the necessary accuracy and reliability. In this context, established and proven design means that the dosimeter, its method of reading, and its dose assessment algorithms have all been agreed as part of an approval in the past and remain acceptable to HSE.</p>
	<p>5.3 Typically the dosimetry service using a novel dosimeter may need to provide information on factors likely to affect the accuracy and reliability of the dosimetry system such as:</p> <ul style="list-style-type: none"><li>• the characteristics of the dosimeter (including dose and energy ranges) for all types of radiation for which approval is sought</li><li>• the ability of the dosimeter to measure small increments of dose above background (particularly where it is planned to issue dosimeters to individuals for periods as short as one day)</li><li>• dose rate, energy and angle dependence of the response of the dosimeter (including data on the dose equivalent response in broad spectra, unless it can be shown that this is inappropriate for the intended use)</li><li>• stability of the latent signal</li><li>• quality control procedures associated with the manufacture or assembly of the dosimeter and, if appropriate, 'before first use' tests</li></ul>

	<ul style="list-style-type: none"> <li>reliability of the dosimeter if exposed to environmental influences such as high/low temperatures, humidity, light, shock, chemical contamination or non-ionising radiations (the extent of any interfering response should be indicated)</li> </ul>
	<ul style="list-style-type: none"> <li>ruggedness of the dosimeter and its resistance to mishandling or dropping and methods of reconstructing data from damaged dosimeters.</li> <li>Safety of the user of the dosimeter (or device), in the environments in which it will be used, from possible hazards associated with the dosimeter, such as electrical faults, emitted radiation, and physical hazards such as sharp edges (section 6 of the Health and Safety at Work etc Act 1974, which places duties on suppliers, etc. may be relevant)</li> </ul>
	<ul style="list-style-type: none"> <li>reliability of any software associated with the dosimeter or reader including the steps necessary to ensure that dose measurements are related uniquely to the individual wearing the dosimeter and to prevent corrupt data from being sent to ADS (Records)</li> <li>security of the readout process, including the steps necessary to prevent alteration or deletion of stored 'images' or data by persons not authorised for that purpose by ADS (Assessment) and the 'recognition' of dosimeters that are not part of the dosimetry system for which the ADS (Assessment) is seeking approval</li> </ul>
	<p>5.4 Dosimeter performance characteristics should be reported against relevant ISO/BS EN technical standards where relevant.</p>

**Consistent level of performance of the dosimeter**

**Criterion 6. The service shall ensure that any type of dosimeter or other device used has a consistent and adequate level of performance in the radiation fields and ambient conditions likely to be encountered in the environments in which it will be used for estimating the quantities referred to in criterion 10.**

<b>Guidance on Criterion 6</b>	<p><b>Energy/dose ranges</b></p> <p>6.1 In general, an appropriate dose range for a dosimeter used in the assessment of E would be ~0.1mSv to ~1Sv for gamma radiation and ~0.2mSv to at least 50mSv for neutrons, for example. If a dosimeter with a more limited range is to be used the dosimetry service should justify its use in the statement of service. If approval is granted, it may be limited to particular environments in which doses outside the range of the dosimeter would not be reasonably foreseeable.</p> <p>6.2 In general, an approved dosimetry service should not offer a dose assessment service to an employer if the range of radiation energies likely to be encountered by classified persons of that employer is broader than stated in the certificate of approval (see also criterion 12). Exceptions to this will include circumstances where the particular dosimeter is supplemented by another dosimeter which covers the remainder of the energy range.</p>
	<p><b>Sufficient response</b></p> <p>6.3 Regard should be had to 'Band A' criteria for established performance tests, where relevant (see criterion 18). Where it is intended to use dosimeters to assess dose to the skin of the extremities from beta radiation the thickness of the sensitive element and the thickness of the covering material will affect the response. The useful range of a dosimeter is best determined by experiment. A minimum value of beta energy to which the approval extends (lower beta energy cut-off) may be specified in the certificate of approval.</p>

**Methods for film badges and TLDs**

**Criterion 7. A service which uses any measurement and assessment methods based on film dosimeters or thermoluminescent dosimeters (TLDs) shall take all reasonable steps to conform to the processing and management standards set out in current national/international standards and similar established guidelines.**

**Calibration and normalisation of the dosimetry system**

**Criterion 8. The service shall, where relevant, use a calibrating system which can be shown to be traceable to national standards and the service shall be aware of the uncertainties associated with the calibration.**

<b>Guidance on Criterion 8</b>	<p>8.1 The general guidance document<sup>6</sup> gives advice on the appropriate standard of calibration.</p> <p>8.2 NRPB publication M-520 (The calibration of Personal Dosimeters<sup>7</sup>) also gives relevant advice.</p>
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8.3 If dosimetry is provided for persons who work at one plant (or a range of similar plants) where the spectral energies encountered are well known it is acceptable to normalise the dosimetry system to a stated energy (using appropriate correction factors where necessary). However, the normalisation energy selected should be appropriate for all the customers of that dosimetry service at the particular plant (or range of similar plants).

8.4 Whatever approach is taken, the ADS should be prepared to give a clear explanation (for example in the Statement of Service of the service) about the arrangements for calibration.

### **Reliability of the level of service**

**Criterion 9. The service shall ensure that adequate arrangements are made for the timely despatch of dosimeters or other devices to employers and for the availability of sufficient and suitable dosimeter processing equipment appropriate to the scope of the service (where appropriate).**

#### **Guidance on Criterion 9**

#### **Availability of dosimeter processing equipment**

9.1 When considering the provision of processing equipment (in order to remain reliable and meet the timescales in this document) the dosimetry service would be expected to make reasonable provision for dealing with breakdowns in this equipment. Provision for breakdown of equipment could include arrangements with the equipment supplier for routine maintenance, repair or temporary replacement of equipment.

### **Dose assessment**

**Criterion 10. The service shall routinely use the operational quantities for external radiation (as specified in Annex 1 to these criteria) as the appropriate estimates of effective dose (E) or equivalent dose ( $H_T$ ) for reporting to ADS (Records).**

#### **Guidance on Criterion 10**

#### **Method of dose assessment**

10.1 Where reliance is placed on the use of algorithms and correction factors to make an assessment of dose it is important to give a full explanation (by reference to type test data, etc) to show that these are justified in the particular circumstances. Where algorithms are used, the ADS should state explicitly which particular algorithm will be used and under what circumstances, in order to avoid ambiguity. The values of any additional factors must also be stated explicitly. A simple statement that a film badge dosimetry service intends to use a published algorithm would not, by itself, be sufficient in most cases.

10.2 The service should give an explanation in the Statement of Service of the methods used to assess the dose quantities from the measurements made. In particular, any correction factors or workplace-related factors that may be applied (e.g. to determine quality factors for neutrons) would need to be justified. Also, the service should be prepared to explain how it excludes doses from natural background radiation received by the dosimeter when it is not being worn; the service may need to explain how it would deal with 'negative' doses achieved by taking background radiation into account.

10.3 Any dosimetry service that proposes to assess the dose received by individuals during a period by summing the measurements made from multiple dosimeters (e.g. finger dosimeters worn for a number of tasks on one or more days in a dose assessment period or direct reading dosimeters taken from a pool of such dosimeters and worn for a single shift) should be able to explain the system it uses to ensure a high standard of reliability in associating the measurement from each dosimeter with that individual.

#### **Doses reported to ADS (Records)**

##### Whole body doses

10.4 ADS should normally assess the ICRU operational dose quantity personal dose equivalent  $H_p(d)$  at a depth of 10mm in the body and report the result to ADS (Records) as the assessment of E (effective dose). The operational quantity should provide a reasonable estimate of the primary quantity E, avoiding underestimation and excessive overestimation in most cases. Normally,  $H_p(10)$  will not overestimate E significantly. However, where an assessed dose exceeds a relevant dose limit the employer may ask the ADS, in conjunction with the RPA, to assist in the investigation required under regulation 25 IRR99. The aim should be to reassess the dose received, taking account of information on the energy spectrum and direction characteristics of the incident radiation in order to provide the best estimate of E.



### **Part-body doses**

10.5 If the dose to the sensitive tissues of the hand (or foot) is controlled by assessment of  $H_p(0.07)$ , reported as  $H_T$  to the skin of the hand/foot, it will be unnecessary, in most practical radiation fields, to make systematic dose assessments of the extremity (hand/foot) dose equivalent  $H_p(0.5)$  as this will usually be smaller. However, assessment of  $H_p(0.5)$  may be more appropriate in certain cases, for example: where the extremity dose may exceed the skin dose, or where the assessment is for thick skin (such as palmar surface), or where protective clothing is always worn. Note that the maximum dose to the skin will need to be averaged over an area of  $1\text{cm}^2$  regardless of the area exposed. The type of dosimeter and wear position will depend on the type of work undertaken by the employer. Normally, co-operation with the employer (in consultation with the employer's RPA) will be needed to confirm the most appropriate dosimeter and wear position given the work undertaken.

Absorbed dose to the lens of the eye may be assessed in terms of the quantity  $H_p(3)$ .

10.7 In many cases, the employer may not need an assessment of dose to the skin where it can reasonably be expected that the skin dose would be much less than 1/10th of the dose limit for the skin. Therefore, a dosimetry service may seek approval only for the assessment of  $H_p(10)$ . However, there are advantages in making a separate assessment of dose to the skin, particularly where an accident resulting in significant exposure of the skin is reasonably foreseeable.

10.8 If a dosimetry service seeks approval for both the assessment of whole body dose (or skin dose) and dose to the eyes, using the same type of dosimeter a case should be made for such a purpose; and the written instructions to the employer (see criterion 12) should cover both uses.

### **Re-assessment and re-evaluation of doses**

**Criterion 11. The service shall make reasonable arrangements to ensure that doses can be reassessed or re-evaluated up to two years (five years in the case of persons subject to a five year dose limit) after the receipt of a dosimeter (or other device), which shall include:**

- a) **sufficient records to link any dose reported to ADS (Records) with a particular dosimeter worn, the method of evaluation of the dosimeter and the method of assessment (including any quality factor used); and either**
- b) **a secure storage facility for the active elements of dosimeters such as film badges; or**

- c) a facility to record and retain the output data retrieved from the dosimeter to assess the original exposure e.g. the glow curve output of TLDs; or
- d) arrangements for independent diagnostic checks built into the dosimeter reader to ensure that the read-out is normal and where practicable is recorded for future reference; or
- e) other equally effective means of re-evaluation.

<p style="text-align: center;"><b>Guidance on Criterion 11</b></p>	<p>11.1 The method used may depend on:</p> <ul style="list-style-type: none"> <li>• a re-examination of the original dosimeter; or</li> <li>• a re-examination of dosimeter outputs such as glow curves; or</li> <li>• reliability checks of the output during the read process,</li> </ul> <p>together with a check of stored records relating individuals to the output for individual dosimeters and any special factors used (e.g. quality factors). Where appropriate the service should have arrangements for secure storage of exposed films/records to prevent loss e.g. in a fire.</p> <p>11.2 Some ADS who provide a service based on TLDs, have suggested that there is no need to retain glow curves below certain dose levels as the information retained is not meaningful. However, a readout indicating a low dose may not have been correct (i.e. it may not have been a true glow-curve).</p> <p>11.3 If, in the event of a query, an ADS could produce documentary evidence that a dosimeter was indeed correctly read out, and that the reader was designed to alarm in some way in all foreseeable fault conditions, this would be an acceptable alternative to retention of the glow-curve.</p> <p>11.4 If, in exceptional cases, a service wishes to seek approval for a system involving the issue of multiple dosimeters to an individual for a particular assessment period (or the use of the same re-readable device by a number of individuals) it should be prepared to give a detailed explanation as to the steps it would use for the reassessment of the dose to an individual in the event of a query. If an ADS identifies a possible problem with a particular dosimeter (for example the measured dose exceeds an investigation level or a dose limit or there is an unusual ratio of body/skin dose) it would be prudent for it to set aside that dosimeter, undertake an investigation and not reissue it until the matter has been resolved.</p>
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## Guidance made available to employers

**Criterion 12. The service shall provide written advice to clients about the proper handling, storage, issue and use of the dosimeter or other device and any other information necessary to ensure that such dosimeters or devices are used correctly.**

<p style="text-align: center;"><b>Guidance on Criterion 12</b></p>	<p>12.1 The written advice to the employer would normally cover matters such as:</p> <ul style="list-style-type: none"><li>• any limitations contained in the certificate of approval of the service (or schedule to that certificate) such as energy restrictions and avoiding exposure to certain fields or environments (note that the employer has a responsibility under regulation 21(4) IRR99 to pass on information to the ADS such as information on the expected radiation fields in which it will be used);</li><li>• recommended dosimeter issue and return procedures, including specific arrangements to ensure named classified persons are unmistakably linked to the dosimeters they wear;</li><li>• the need to distinguish the arrangements for issuing dosimeters to non-classified persons from arrangements relating to classified persons, so there is no confusion about which doses must be reported to ADS (Records);</li><li>• location on the body where dosimeter should be worn;</li><li>• arrangements for dealing with unusual occurrences e.g. late, damaged or lost dosimeters;</li><li>• storage of dosimeters, including security against tampering and avoiding the risk of inadvertent exposure to ionising radiations;</li><li>• security against background radiation and any other environmental condition likely to affect the performance of the dosimeter adversely (this should include reference to the potential for dosimeters to be passed through security scanning equipment which might affect the dosimeter reading);</li><li>• correct assembly of dosimeters e.g. positioning of films/filters etc;</li></ul>
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- the warning period provided in active devices before battery failure;
- special features or arrangements e.g. remote reading of dosimeters/devices;
- contamination monitoring of dosimeters (where applicable);
- any special arrangements for handling dosimeters (or other devices) in the event of an accident, occurrence or incident;
- the need to inform the ADS immediately a classified person leaves employment to ensure that dosimeters are no longer issued for that person and erroneous dose assessments are not transferred to the dose record by ADS (Records); and also to enable the latter to issue a termination record; and
- any separate arrangements for issuing and returning dosimeters for use by classified persons who are 'outside workers' within the meaning of regulation 2(1) of the Ionising Radiations Regulations 1999 and working outside the UK.

12.2 The service should provide advice, on request, on the suitability of their service in relation to the needs of the employer.

### **Reporting results to other ADS**

**Criterion 13. The service shall make adequate arrangements for data transfer to ADS (Records), or, where the service is only approved for part of the dose assessment procedure, to another ADS (Assessment). These arrangements shall involve specified means of data transfer by authorised persons with adequate provision for the security of the information against corruption or loss. The arrangements should ensure that at least the following information can be provided to ADS (Records) in a clear, legible manner within 14 consecutive days of first receipt by the dosimetry service of a dosimeter returned by the employer:**

- a) A unique identifier (e.g. National Insurance Number) and the surname and initials of the classified person for whom the dose assessment has been made;**
- b) Name and address of the employer;**
- c) The position on the body where the dosimeter was worn (e.g. trunk, left hand, forehead etc);**

- d) **The exposure period to which the dose assessment relates**
- e) **Particulars of any assessment of E, or H<sub>T</sub> in mSv in accordance with criterion 10. Unassessed components shall not be reported as zero;**
- f) **An explanation of any abbreviations or code letters used; and**
- g) **Any special observations.**

<b>Guidance on Criterion 13</b>	<p><b>Unique identifier</b></p> <p>13.1 A personal identifier other than NIN can be used providing it is unique (works numbers may not be unique if they can be used by future employees) and there is an unambiguous link to NIN which is reported to ADS (Records) separately.</p> <p><b>Exposure period</b></p> <p>13.2 Normally, the assumption is that this coincides with the wear period for the dosimeter - the information provided for employers (criterion 12) should explain what issue period(s) the ADS uses. The employer should inform the ADS if the actual wear period for an individual is different from the assumed issue period and that person is thought to have been exposed in an accident, incident or occurrence within the period of wear.</p> <p><b>Auditing data</b></p> <p>13.3 The output from the dosimetry system may be transferred electronically to ADS (Records), particularly where this is part of the same organisation. In such cases, ADS (Assessment) should be able to demonstrate that there is a reliable system for checking dose assessments by an authorised person before the results are transmitted. ADS (Assessment) should also be capable of transferring data in written or other suitable form to ADS (Records) if the need arises. If the service does not have this capability the Approval Body may limit the approval accordingly.</p> <p><b>Single-employer ADS</b></p> <p>13.4 If ADS (Assessment) only reports dose assessments for the classified persons of a single employer the name and address of the employer can be omitted from the report to ADS (Records) but the approval may be limited accordingly.</p>
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### **Dose assessments based on two or more dosimeters**

Where more than one dosimeter is issued to an individual in an assessment period (e.g. finger dosimeters), and the employer returns some of these dosimeters before the end of the assessment period, the dosimetry service would not be obliged to report the measured doses from each of these to ADS (Records) within 14 days of receipt, provided that the report is sent within 14 days of receipt of the remaining dosimeters for that assessment period.

### **Role of the employer in transferring data to ADS (Records)**

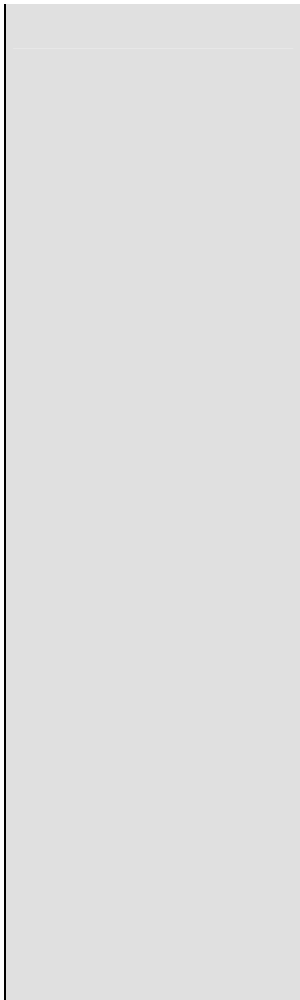
13.6 In exceptional cases, the system for the transfer of assessed doses to ADS (Records) may be initiated by the employer. For example, the dosimeters/devices might be read automatically at the employer's premises and the output of the reader transferred by 'phone line to ADS (Records). In such cases, the dosimetry service should have effective managerial control of the arrangements for temporary data storage and data transfer and for the reliability of this part of the system, which should be subject to quality assurance measures.

13.7 Furthermore, basic instructions might be needed for the employer's staff and provision will be needed for maintenance and checks of the remote reader. In any event, the system should incorporate means of checking the validity of the data to prevent corrupt data from being transferred to the dose records. The system should also ensure that assessment data cannot be irretrievably lost during data transfer.

13.8 The site employer might require separate approval to hold information from a dosimeter/device and to send this on to the ADS (Records) at a later time. For example, where the ADS does not have a robust system for auditing the site arrangements and exercising control to ensure those arrangements are satisfactory.

### **Period allowed for assessment work**

13.9 The 14-day period for the supply of data to ADS (Records) does not include Bank Holidays.



**Below detection threshold**

13.10 Where a measurement indicates that the dose would be below the detection threshold for that technique, then the reported dose may be reported as 'bd' (below detection threshold), with the employer's agreement. There is no obligation on services to use 'bd'. Where 'bd' is reported the corresponding value of dose should be stated in the report sent to the ADS (Records), but ADS (Records) will be expected to treat the dose as zero. For dose from external radiations the term "below detection threshold" is taken to mean "that level of dose which cannot reliably be distinguished (at the 95% confidence level) from the background response of the dosimeter, including spurious readings due to other radiations or flaws in sensor material".

**Unassessed doses**

ADS should not report a zero dose for components of dose that were not assessed, for example because a dosimeter was not issued for a particular assessment period

**Dose quantities**

13.12 It should be clear to ADS (Records) which doses are being reported: 'dose at depth' or 'surface dose' is not usually sufficient. Reported doses should clearly relate to the limiting quantities 'effective dose or equivalent dose' to a named tissue, as appropriate (see criterion 10).

**Reporting dose assessments in the event of an accident, incident or occurrence.**

**Criterion 14. The service shall be capable of reporting forthwith to the employer, on request, the assessed dose for any individual involved in an accident, incident or occurrence where the employer suspects that the individual is likely to have received an effective dose greater than 6 mSv or an equivalent dose exceeding 3/10ths of a relevant dose limit.**

**Guidance  
on  
Criterion  
14**

14.1 "Reporting forthwith" would normally be taken to mean reporting as soon as the results are available (e.g. by fax or telephone), followed up by written confirmation.

**Criterion 15. The service shall be capable of reporting forthwith to the employer any assessed dose in a single dose assessment period that exceeds any relevant dose limit.**

**Separate “Special Accident” approval for anticipated doses greater than 0.5 gray**

**Criterion 16. A service which is separately approved for 'special accident dosimetry' shall have adequate arrangements aimed at:**

- a) identifying to the employer, within a maximum of eight hours of receiving a dosimeter/device (at any time of the day or night), any individual likely to have received a dose greater than 1 gray as a result of an accident, incident or occurrence and;**
- b) carrying out within 48 hours of receiving a dosimeter/device an initial assessment of dose received with an uncertainty of no greater than 50% if the dose exceeds 0.5 gray and forwarding this initial assessment to the employer forthwith; and**
- c) providing to the employer, within one week of receiving a dosimeter/device, a refined assessment of the dose received to reduce uncertainties in dose to less than 30% if the dose exceeds 0.25 gray**
- d) providing the ADS C&RK with the information required to meet Criteria 13. In addition, to report to the ADS C&RK any individual identified to the employer as being likely to have received a dose greater than 1 gray as a result of the accident incident or occurrence, together with the initial assessed dose and the refined assessed dose.**

<b>Guidance on Criterion 16</b>	<p><b>Dose reported</b></p> <p>16.1 In the context of this criterion "dose" would normally be taken to mean 'maximum absorbed dose' due to gamma rays, beta rays, x-rays and neutrons, as appropriate. At a later stage the ADS would be expected to report an assessment of <math>E_{ext}</math> to ADS (Records) as appropriate but criterion 16 is only concerned with the requirements of appointed doctors and/ or the Employment Medical Advisory Service (EMAS) for information about the maximum dose an individual may have received. The requirement does not cover assessment and reporting of doses to the skin or extremities.</p> <p><b>Start of time period for reporting</b></p> <p>16.2 Normally, for the purpose of assessing the reporting period, the Approval Body will not take into consideration the time the employer is likely to take to deliver dosimeters to the ADS in the event of an incident, unless this is likely to place serious constraints on the dosimetry service. However, the employer should take account of this in determining the adequacy of the site emergency arrangements (contingency plan) to ensure that the requirements of regulation 12 IRR99 can be met.</p>
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16.3 No responsible ADS separately approved for special accident dosimetry would be prepared to provide a service for a particular employer unless it had received reasonable assurances from that employer that there were arrangements in place to ensure that dosimeters would be returned reasonably promptly to that ADS in the event of an accident, incident or occurrence.

#### **Use of more than one type of dosimeter**

16.4 The use of a combination of dosimeters and other devices to satisfy Criterion 16 may be acceptable provided the service can demonstrate that it controls the calibration of all the dosimeters/devices and is aware of the uncertainties associated with the measurements. For example, a dosimetry service may propose using a criticality dosimeter and a TLD to satisfy the criterion 16, or a direct reading dosimeter to satisfy the criteria in subparagraphs (a) and (b) and a film badge for subparagraph (c). The service should be able to explain how the requirement is satisfied, and in particular how the special functions of each dosimeter will be used to make an assessment of the total dose received.

### **Late return, damage or loss of dosimeters**

**Criterion 17. The service shall make suitable provision for reporting to ADS (Records) in circumstances where it is not possible to provide an assessed dose for an individual in any particular assessment period.**

#### **Guidance on Criterion 17**

17.1 There is no provision in the Ionising Radiations Regulations 1999 for an ADS (Assessment) to report a notional dose to ADS (Records) in such an event without the involvement of the employer. Appendix 2 gives further advice.

### **Periodic performance tests and intercomparison exercises**

**Criterion 18. If required by HSE's current statement on the approval of dosimetry services, the service shall arrange periodic performance tests in accordance with HSE's published protocols with a UKAS accredited test-house, or a test-house nominated by HSE, and shall provide to the Approval Body a copy of the report of such a performance test at intervals not exceeding 18 months.**

**Where practicable, the service shall participate in periodic dosimetry intercomparison exercises.**

**Guidance  
on  
Criterion  
18**

**Performance Tests**

18.1 The performance test that most types of external dosimetry service are required to undertake is an important aspect of overall QA. Details of each of the performance tests are given in protocols issued by HSE. In each test the dosimetry service supplies a specified number of dosimeters to a test house accredited for the purpose by UKAS. The test house irradiates the dosimeters under specified conditions. Groups of five dosimeters are irradiated to doses within ranges that are given in the protocols. For convenience, these doses are referred to as the "true" doses. The dosimetry service then assesses these doses and reports their results to the test house (the "reported" doses).

18.2 The results will be assigned by the test house to one of three bands

- a) 'Band A' results are a pass and no further action is required;
- b) 'Band B' results are acceptable for a periodic test, but not for a new application for approval; an ADS obtaining Band B results in a periodic performance test is required to undertake a review;
- c) 'Band C' results are a fail; in this case the ADS is required to undertake a review and submit a report with an action plan to the Approval Body.

18.3 The intention is to relate the test results to the expected values for the dosimeter. Therefore, services may apply correction factors to any measurements they make for the purpose of these tests provided that these are clearly justified in the Statement of Service submitted to the Approval Body (or separately explained to that body in writing). The purpose of the correction factors should be to adjust the results of the performance test so that the expected bias in the test is close to zero. These correction factors do not necessarily have to be applied to routine dose assessments.

18.4 It follows that the failure of a service to achieve a Band A result warrants further investigation by that service. The in-service review may be quite limited in scope if it is clear why the performance test results fell outside Band A. The review may reveal that correction factors should be applied to the performance test results to take account of the specific energy of irradiation of the dosimeter during the test.

18.5 Intercomparisons are particularly important where no 'performance tests' are currently available. The results of national and international intercomparisons in which the service has participated should be referenced and summarised.

**Criterion 19.** In any case where the result of a periodic performance test arranged for the purposes of criterion 18 falls into Band B or Band C, as specified in HSE's current statement on the approval of dosimetry services, the service shall carry out an in-service review of performance and produce a written report on the findings. If the test results fall into Band C, a copy of the report shall be sent to the Approval Body.

In either case, the review should focus on the reasons the service failed to achieve test results in 'Band A' and it should result in recommendations for improvements, where appropriate. An action plan should be drawn up by the ADS, and included in the report, to implement the necessary improvements within a reasonable period of time.

**Guidance  
on  
Criterion  
19**

19.1 An ADS which has failed a performance test and submitted its action plan to the Approved Body may choose to undertake a further test to demonstrate that the improvements it has made have been effective. In such cases, if a copy of a successful test certificate is sent to the Approval Body within the three month period referred to in Section 2 paragraph 23 the next performance test will not be required until 18 months from the date on that certificate.

## **Annex to HSE criteria for approval (see criterion 10)**

### Operational quantities for external radiation

The operational quantity for external radiation used for individual monitoring for radiation protection purposes is:

- personal dose equivalent  $H_P(d)$ , where  $d$  is the depth in mm in the body.

**Personal dose equivalent** is the dose in soft tissues at an appropriate depth,  $d$ , below a specified point in the body and is given in sieverts.

Where doses are to be estimated from area monitoring results the relevant operational quantities are:

- ambient dose equivalent  $H^*(d)$  and directional dose equivalent  $H^l(d, \Omega)$

where  $d$  is the depth in mm under the surface of the ICRU sphere. For strongly penetrating radiation a depth of 10 mm is appropriate and for weakly penetrating radiation a depth of 0.07 mm for the skin and 3 mm for the eye is recommended.  $\Omega$  is the angle of incidence.

**Ambient dose equivalent** is the dose equivalent at a point in a radiation field that would be produced by the corresponding expanded and aligned field in the ICRU sphere at a depth,  $d$ , on the radius opposing the direction of the aligned field and is given in sieverts.

**Directional dose equivalent** is the dose equivalent at a point in a radiation field that would be produced by the corresponding expanded field, in the ICRU sphere at a depth,  $d$ , on a radius in a specified direction,  $\Omega$ , and is given in sieverts.

The ICRU sphere is a body introduced by the International Commission on Radiation Units (ICRU) to approximate the human body as regards energy absorption from ionising radiation; it consists of a 30 cm diameter tissue equivalent sphere with a density of  $1\text{ g cm}^{-3}$  and a mass composition of 76.2% oxygen, 11.1% carbon, 10.1% hydrogen and 2.6% nitrogen.

An expanded field is a field derived from the actual field, where the fluence and its directional and energy distributions have the same values throughout the volume of interest as in the actual field at the point of reference.

An expanded and aligned field is a radiation field in which the fluence and its directional and energy distribution are the same as in the expanded field but the fluence is unidirectional.

The fluence,  $\Phi$  is the quotient of  $dN$  by  $da$ , where  $dN$  is the number of particles which enter a sphere of cross-sectional area  $da$ .

### Quality factor

The quality factor, Q, is a function of linear energy transfer (L) and is used to weight the absorbed dose at a point in such a way as to take into account the quality of a radiation.

Unrestricted linear energy transfer (L) is the quotient of dE by dl, where dE is the mean energy lost by a particle of energy E in traversing a distance dl in water.

The relationship between the quality factor Q(L) and the unrestricted energy transfer L is as follows:

Unrestricted linear energy transfer, L, in water (keV $\mu$ m <sup>-1</sup> )	Q(L)
< 10	1
10-100	0.32L-2.2
> 100	300 $\sqrt{L}$

### Tissue weighting factors

Appropriate values of tissue weighting factor ( $W_T$ ) to be used to weight the equivalent dose in a tissue or organ (T), where necessary:

Tissue or organ	Tissue weighting factor
Gonads	0.2
Bone marrow (red)	0.12
Colon*	0.12
Lung	0.12
Stomach	0.12
Bladder	0.05
Breast	0.05
Liver	0.05
Oesophagus	0.05
Thyroid	0.05
Skin	0.01
Bone surface	0.01
Remainder	0.05(**)(***)

(\*) Dose to the colon is taken to be the mass weighted average dose to the upper and lower large intestines.

(\*\*) For the purposes of calculation, the remainder is composed of the following additional tissues and organs: adrenals, brain, small intestine, kidneys, muscle, pancreas, spleen, thymus, uterus and extrathoracic airways.

(\*\*\*) The equivalent dose to the remainder tissues is normally calculated as the mass-weighted mean dose to the ten organs and tissues listed above. In the exceptional case in which the most highly irradiated remainder tissue or organ receives the highest equivalent dose of all organs, a weighting factor of 0.025 (half of remainder) is applied to that tissue or organ and 0.025 to the mass weighted equivalent dose in the rest of the remainder tissues and organs.

Where the effective dose from external radiation ( $E_{\text{ext}}$ ) is estimated directly it is defined by the expression:

$$E_{\text{ext}} = \sum_T W_T H_T = \sum_T W_T \sum_R W_R D_{T,R}$$

Where

- $D_{T,R}$  is the absorbed dose averaged over the tissue or organ T, due to radiation R
- $W_R$  is the radiation weighting factor and
- $W_T$  is the tissue weighting factor for tissue or organ T.

Values of radiation weighting factor,  $W_R$

Values of radiation weighting factor,  $W_R$ , depend on the type and quality of the external radiation field.



## References

- 1 Requirements for the Approval of Dosimetry Services under the Ionising Radiations Regulations 1999: Part 2 Internal Radiations. RADS 2(revised 2004). HSE.
- 2 Requirements for the Approval of Dosimetry Services under the Ionising Radiations Regulations 1999: Part 3 Co-ordination and Record Keeping. RADS 3(revised 2004). HSE.
- 3 Requirements for the Approval of Dosimetry Services under the Ionising Radiations Regulations 1999: Supplement on Approval for Emergency Exposures During Intervention – The Radiation (Emergency Preparedness and Public Information) Regulations, 2001.
- 4 HSE Information sheet 'Radiation doses - assessment and recording'. Ionising Radiation Protection series No.2 rev. HSE .
- 5 The Ionising Radiations Regulations 1999. Statutory Instrument 1999 No HMSO. ISBN 0-11-085614-7
- 6 General Guidance for Laboratories providing Personal Dosimetry Services published by HSE. RADS/G HSE.
- 7 NRPB M-520 Calibration of Personal Dosemeters, D T Bartlett and W J Iles



## Appendix 1 to RADS 1

### STATEMENT OF SERVICE FOR THOSE SEEKING APPROVAL OR CONTINUING APPROVAL FOR EXTERNAL RADIATIONS

The Statement of Service submitted on application for approval or at the time of reassessment should contain the information specified below. References to published information and supporting documents which are not part of this statement will be acceptable provided those references etc contain the necessary information, but dosimetry services should be prepared to provide copies if requested by the Approval Body. Details are not required about aspects of the service which only concern persons who have not been classified under regulation 20 IRR99.

If a service complies with a relevant national/international standard and this demonstrates compliance with any or all of the criteria in these 'Requirements for Approved Dosimetry Services' then this should be explicitly stated. .

The Statement of Service should be in a form such that it can be made available to clients/potential clients. Any 'commercial-in-confidence' and other sensitive information should be submitted in a separate document or in a covering letter.

The Statement of Service should be signed and dated by the Head of the Service or by their Deputy.

#### **General (Criteria 1 and 2)**

1. The name and address of the service (and contact details)
2. The scope of the application including: the type of service for which approval is sought, the particular radiations to be measured and doses assessed, the type and model (or type) number of any dosimeters to be used, and whether separate approval is sought for special accident dosimetry (see paragraph 5).
3. An overview of the service showing how it satisfies **critterion 1**, including:
  - a) the maximum and the normal throughput of the service in terms of the rate at which dosimeters can be and are being processed and the likely number of classified persons for whom the service will be provided;
  - b) an outline description of the administrative and laboratory facilities and arrangements for storage, despatch, reception, handling and processing of dosimeters and for communicating dose assessments (or contribution to such assessments);
  - c) details of the management systems for ensuring that these arrangements are followed so that the service produces a reasonable degree of accuracy, is highly reliable and communicates accurate information within the timescales required;

- d) the name, qualifications and relevant experience of the person in charge of the service and their deputy or deputies; and
- e) details of the training for new staff about the procedures used for dose assessment etc.
- f) A brief explanation of the steps taken to meet the standards in HSE publication 'General guidance providing personal dosimetry services' relevant to that service **(Criterion 2)**

**Quality assurance (Criterion 3)**

- 4. An overview of the quality assurance procedures required for monitoring performance with reference to detailed supporting documents. The overview should include information on the standards to which any software has been designed and the procedures for making changes to that software.

**Methods of dosimetry (Criteria 4 and 5)**

- 5. An outline description of the dosimetry system proposed with details given in referenced supporting documents where appropriate (e.g. where dosimeter is of established and proven design) including:
  - a) design, type and model of dosimeter including any holder, inserts, filters and absorbers
  - b) means of dosimeter identification, and of relating the assessed dose to the individual wearer and to the period of issue
  - c) dose ranges to be covered by the dosimeter,
  - d) dose response characteristics of the dosimeter for each radiation type to be measured (see also criterion 6)
  - e) response of dosimeter to types of radiation (including non-ionising radiation) other than those intended to be measured
  - f) dose rate dependence, if any, for each type of radiation to be measured
  - g) energy dependence for each type of radiation to be measured
  - h) energy range (minimum and maximum) for each type of radiation to be measured
  - i) angle dependence for each type of radiation to be measured
  - j) susceptibility to environmental influences e.g. temperature, humidity, light, shock, chemical contamination, electro-magnetic fields etc.
  - k) stability of latent signal

- l) method used routinely to detect any radioactive contamination present on the dosimeter
- m) ability of dosimeter to distinguish surface contamination of the holder from external radiation
- n) overall accuracy of dose measurements with the proposed dosimeter
- o) the dosimeter processing equipment (if appropriate);
- p) the assessment of the appropriate dose quantity for the relevant monitoring period (see also criterion 10)

**Consistent level of performance (criterion 6)**

- 6. Justification for the ranges of dose to be covered by the dosimeter and its energy response to show that these are adequate in the radiation fields and ambient conditions likely to be encountered and that this level of performance will be consistently maintained for any individual dosimeter of the type supplied by the service.

**Methods for film badges and TLDs (criterion 7)**

- 7. An outline of the specific steps taken to satisfy current national/international standards where these are not covered in item 6.

**Calibration and normalisation of the dosimetry system (criterion 8)**

- 8. A description of the method, extent and frequency of calibration of the components of the dosimetry system which is traceable to National Standards

**Reliability of the level of service (criterion 9)**

- 9. A description of the arrangements for ensuring timely despatch of dosimeters or other devices and for ensuring that sufficient and suitable processing equipment is available where appropriate so that dose assessments can be made and reported within expected timescales.

**Dose assessment (criterion 10)**

- 10. Details of any formulae used and quality factor, conversion factor and correction factor applied (if relevant) to assess the appropriate dose quantity.

**Reassessment and re-evaluation of dose (criterion 11)**

- 11. Procedure for preserving and retaining records of measurements and assessments and for investigation and reassessment or re-evaluation of doses by the ADS (rather than the employer) of any abnormal dosimetric results (such as assessed doses in excess of investigation levels or dose limits or unusual ratios of body/skin dose) and a description of results which the ADS would routinely consider to be abnormal.

### **Guidance made available to employers (criterion 12)**

12. Details of any guidelines given to clients e.g. about the storage and security of dosimeters and the position on the body where they should be worn.

### **Reporting results to other ADS (criterion 13).**

13. A description of the arrangements for data transfer to ADS (Records) - including any necessary auditing of the client employers' arrangements - to ensure the required information is clear, checked to ensure it is free from corruption and meets required timescales. Examples, with dummy data, of each type of output from the ADS Assessment (e.g. measured dose to another ADS Assessment, and dose report to ADS (Records) **must** be included in the Statement of Service (possibly in an annex ) or included in the package of documents sent to HSE in support of the application for approval or continued approval.

### **Reporting dose assessments in the event of an accident etc. (criteria 14, 15) and special approval for anticipated doses >0.5 gray (criterion 16).**

14. A description of the arrangements for reporting these events to the employer as required. Examples, with dummy data, of each type of dose report from the ADS Assessment to the employer under criterion 14, 15, or 16 should be included in the Statement of Service (possibly in an annex ) or included in the package of documents sent to HSE in support of the application for approval or continued approval.

### **Late return, damage or loss of dosimeters etc. (criterion 17).**

15. A general description of default arrangements for dealing with late, lost or damaged dosimeters.

### **Periodic performance tests and intercomparison exercises(criteria 18 & 19).**

16. Details of arrangements for undertaking these tests as appropriate and details of any correction factors specifically applied to performance tests together with an explanation.

### **Note**

Applicants should provide separately a copy of Band A test results relating to a test undertaken within the previous 3 months by the service if a test is required in HSE's current statement on approval of dosimetry services. Those seeking continuing approval should have already provided copies of relevant reports of performance tests at intervals not exceeding 18 months and in addition evidence of in-service reviews and action plans where required by criterion 19.

## Appendix 2 to RADS 1

### NOTIONAL AND ESTIMATED DOSES

1. The following advice only relates to classified persons for whom the ADS is making dose assessments under the Ionising Radiations Regulations 1999 (IRR99).
2. It is the duty of the employer to ensure that assessments are made of all significant doses. Therefore, it is the employer who must ensure that all dosimeters issued during a dose assessment period are returned to the ADS (Assessment) promptly at the end of that period.
3. Statutory dose records should be compiled using systematic measurements and assessments of doses made by the ADS (Assessment) under Regulation 21 IRR99. The only exceptions to this are provided by Regulation 22(1) IRR99 in cases where a dosimeter is lost or destroyed or where the ADS (Assessment) cannot assess the dose received, for example because the dosimeter has been damaged or contaminated or not worn for a significant part of the assessment period or accidentally irradiated when not being worn. In such cases it is the duty of the employer to make an investigation consulting the Radiation Protection Adviser as appropriate, and either:
  - a) estimate the dose and arrange for the ADS (Records) to enter the "estimated dose" in the relevant dose record supplying the ADS with a summary of the information used to estimate that dose; or
  - b) exceptionally, where this is not possible, arrange for the ADS (Records) to enter a "notional dose" in the relevant dose record; and
  - c) as part of an investigation the employer may ask the ADS (assessment) to measure the dose recorded on a damaged dosimeter or a dosimeter worn for only part of the assessment period. In such a situation the results should be reported to the employer for the purposes of the investigation only; the measurements should not be entered into dose records.
4. There is no provision in IRR99 for an ADS (Records) to enter a "notional dose" in a dose record without the agreement of the employer. However, it is recognised that gaps will appear in dose records if employers fail to return dosimeters. These will lead to problems with dose summations and may cause difficulties for the employer in the effective exercise of dose control. Therefore, it is in the employer's interest to resolve this problem.
5. The ADS is required to have a default procedure for dealing with late, lost or damaged dosimeters. The procedure should be capable of adaptation to suit the needs of particular employers and ADS (Records). It is recommended that this procedure takes the following form:
  - a) ensure that the procedure for responding to the non-return of dosimeters or receipt of damaged dosimeters is written into the

general terms of the contract between the ADS and the employer (charges may need to reflect the cost of enquiries about missing dosimeters);

- b) require the employer to indicate on the list of dosimeters issued for the period, which dosimeters are missing or destroyed and which of these are likely to be assigned an estimated dose;
- c) contact the manager designated by the employer, promptly e.g. by telephone or fax/email, if no action has been taken either to return any missing dosimeter or confirm the assignment of an "estimated" or "notional" dose to ADS (Records) by the end of the following assessment period;
- d) write to the employer formally to request the return of the dosimeter if no action is taken by the manager - see example letter attached;
- e) report promptly to the employer receipt of any damaged dosimeter which cannot be assessed;
- f) report to the ADS (Records) by suitable means, e.g. specific code letter in the dose report, when the dosimeter of an individual is missing.

6. Advice for ADS (Records) is given in Part 3.

## **Annex to Appendix 2**

### **DRAFT LETTER**

Dear

#### **NON-RETURN OF DOSEMETER (NAME OF CLASSIFIED PERSON)**

As you have not returned the dosimeter for [Name of classified person] .....  
..... (National Insurance No) we are  
unable to report a dose assessment for the period ..... to ..... to the  
Approved Dosimetry Service (Co-ordination and Record-Keeping).

You should therefore return the dosimeter at once if it is available. If the dosimeter has been lost or destroyed, you should make an investigation of the circumstances under Regulation 22 of the Ionising Radiations Regulations 1999 to estimate the dose received by the above-named person and advise the Approved Dosimetry Service (Co-ordination and Record-keeping) forthwith.

Yours sincerely

**Head of Approved Dosimetry Service**