Health and Safety Executive	Information Document
	HSE 560/43

THE IONISING RADIATIONS REGULATIONS 1999:
special entries in dose records

Contents

Information Document	The Ionising Radiations Regulations 1999: special entries in dose records
Appendix 1	Examples of good and bad special entry cases
Appendix 2	Special entry procedure for doses received on/after 1 January 2000
Appendix 3	Content of suggested proforma - case for special entry

1. This document contains internal guidance which has been made available to the public. The guidance is considered good practice (rather than compulsory) but you may find it useful in deciding what you need to do to comply with the law. However, the guidance may not be applicable in all circumstances and any queries should be directed to the appropriate enforcing authority.

2. This Information Document is aimed at employers of classified persons whose dose records are suspected of showing incorrect dose assessments**.** It complements the general HSE Information Sheet on *Dose Assessment and Dose Recording*, which gives an overview of the dosimetry requirements in the Ionising Radiations Regulations 1999 (IRR99), including special entries in formal dose records to replace incorrect doses. This Information Document advises you about the steps you should take if you suspect that an assessed dose recorded in such a record is much less than or much greater than the actual dose received in the period concerned.

What are special entries in dose records?

3. These are entries made in formal dose records maintained by an approved dosimetry service (ADS) for classified persons to replace a dose entry for a particular period, eg effective dose (whole body dose) for the period 4 June to 3 July. They should only be used when it is clear that the dose entry in the formal dose record is much greater than or much less than the dose that an individual actually received in that period. They are fairly unusual, under the Ionising Radiations Regulations 1985 (IRR85) special entries were made for less than 20 classified persons each year, out of more than 40,000 individuals with doses recorded on HSE's Central Index of Dose Information (CIDI).

4. The Ionising Radiations Regulations 1999 require employers to:
    1. designate certain employees as classified persons;
    2. arrange for an approved dosimetry service (ADS) to make systematic assessments of all doses received by those employees that are likely to be significant;
    3. arrange for an ADS to make and formal dose records for those employees; and
    4. investigate incorrectly recorded doses, where necessary, and arrange for special entries to be made in the record when the recorded dose is clearly much less than or greater than the dose actually received by a classified person.

5. The HSE publication L121 *Work with ionising radiations Ionising: Radiations Regulations 1999: Approved code of practice and guidance* (hereafter referred to as

the ACoP) advises that the radiation protection adviser (RPA) should normally be involved in such investigations.

What is meant by doses much greater than or much less than that recorded in the dose record?

6. This is a matter of professional judgement in the circumstances of any particular case. The ACoP advises that where the employer's investigation is sufficient to produce an estimate of the dose received by a classified person that estimate should be regarded as much greater than or much less than the original entry in the dose record for a particular period if:

    1. the dose received differs from the original entry in the dose record by at least one millisievert (mSv) for recorded doses of one mSv or less: or
    2. the dose received differs from the original entry in the dose record by a factor of 2 or more for recorded doses in excess of one mSv but less than the relevant dose limit; or
    3. the dose received differs from the original entry in the dose record by a factor of 1.5 or more for recorded doses at or above the relevant dose limit.

7. Advice given in the ACoP has a particular legal status. If you do not follow the ACoP the onus will fall on you to show that you complied with the requirement for special entries in IRR99 regulation 22(3) by other means.

8. If your investigation suggests that all the employees in a particular group received 0.3 millisieverts in the period 4 June to 3 July but one of those employees had a recorded dose of 0.9 millisieverts for that period the difference is less than one mSv and a special entry in his or her dose record would not be justified. Similarly, if the individual's recorded dose was 12 mSv and the estimated dose was 7 mSv then a special entry would probably not be appropriate; in this case the recorded dose is less than the dose limit and the difference between the two doses is less than a factor of two. The radiological consequences and imprecision of dose assessment techniques would not make any changes worthwhile in these cases. In contrast, if the estimated dose was 15 mSv but the entry in the dose record was only 5 mSv for the period a special entry would be appropriate, providing that the supporting evidence for that estimate is sufficient.

9. Where special factors apply, eg a systematic problem is revealed for groups of employees over a series of dose recording periods, special entries may be appropriate although the criteria referred to in the ACoP are not satisfied. You are advised to seek further guidance from the local HSE office.

When might an employer suspect that a special entry is needed?

10. Typical situations might include:

    1. an incident has occurred in which an employee is believed to have been exposed to ionising radiation but the individual was not wearing a dosemeter at the time or it was shielded from the radiation in some way;
    2. an employee reveals that a dosemeter has been exposed to high dose rates of ionising radiation when not being worn or the employer discovers that an employee has not been wearing a dosemeter or has been wearing the wrong dosemeter;
    3. an employer discovers that a group of dosemeters has accidentally received a prolonged exposure in an X-ray security device during transit to/from a site; or
    4. the pattern of recorded doses for an individual seems highly unusual and inconsistent with the work he or she undertook in the relevant period

(**although the initial assumption should be that the dose recorded was received**).

What should an employer do if it is suspected that an entry in a dose record is incorrect?

11. The Ionising Radiations Regulations 1999 regulation 22(3) requires you to carry out an adequate investigation to establish the facts. Normally, this will be in conjunction with the radiation protection adviser, as advised in the ACoP. The investigation might involve:

    1. checking with the relevant ADS to see if there has been a technical or recording fault, the ADS can amend the dose record if appropriate;
    2. consulting the employee affected and other employees who may have relevant evidence to establish whether there is adequate information available to estimate the dose received by the employee during the period concerned; and
    3. consulting the appointed doctor, eg if the dose received might have exceeded 100 mSv and a special medical examination is indicated.

12. Your investigation will need to be carried out promptly to ensure that the necessary evidence is reasonably fresh and complete. The Ionising Radiations Regulations 1999 regulation 22 only provides for special entries made within 12 months of the original entry in the formal dose record (5 years in the case of an employee subject to a special 5 year dose limit).

What is an adequate investigation?

13. It is all too easy to dismiss an unusual dose assessment result as an error. However, it might reveal an unexpected or accidental exposure. **Initially, therefore, you should assume that any unusual dose is real and needs to be explained**. The investigation may start off as one required by IRR99 regulation 8(7), to see why an employees exposure has not been restricted as far as reasonably practicable. If, during that the course of investigation, you discover it is unlikely the recorded dose was actually received the focus of the investigation should turn to the need for a special entry.

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

    1. relevant information provided by the approved dosimetry service;
    2. details of the pattern of work of the individual such as the time spent in particular controlled and supervised areas;
    3. measurements from any additional dosemeter or direct reading device worn by the person concerned;
    4. individual measurements made on other employees undertaking the same work with ionising radiations; and
    5. the results of monitoring for controlled and supervised areas carried out in accordance with regulation 19.

15. Typically, you may also need to consider:

    1. a credible reconstruction of the exposure conditions for the employee's dosemeter to demonstrate that there is reasonable cause to believe that the

exposure it received was likely to have occurred when not being worn, eg it was stored inside a shielded enclosure in a particular location;
2. the layout of the working area, the radiation sources in it and any shielding or other control measures available to restrict exposure;
3. the reliability of engineering controls, design features, safety features and warning devices specifically provided to restrict exposure;
4. details of any radiation monitors/alarms and their reliability (ie evidence from tests etc that they were working properly);
5. training record and experience of employees;
6. arrangements for storage/security of dosemeters/samples against risks of inadvertent/malicious exposure or contamination; and
7. systems for receipt, handling etc of dosemeters and samples including the use of X-ray security devices at the establishment.

As well as consulting the RPA, it will usually be appropriate to consult any appointed safety representative. An example of good and bad special entry cases is given at Appendix 1.

What information is needed to provide an adequate estimate of the dose actually received?

16. The ACoP advises that, taking account of the evidence already mentioned, the information used to estimate the dose received will be adequate if it:

    1. shows that there is reasonable cause to believe that the dose received by the classified person was much greater than or much less than the dose recorded in the dose record; and
    2. includes sufficient information to permit a reliable reconstruction of the exposure conditions for the person during the relevant dose assessment period.

17. Often, the results of measurements made by other dosemeters (eg direct-reading dosemeters) worn by the individual, or the doses recorded for other employees doing very similar work in the same period, will provide a suitable basis for estimating the dose actually received. However, you cannot always rely on doses received by work mates. You need to be sure that the employee's pattern of exposure is consistent with that of his or her work mates, eg if the employee worked on different jobs/days from the rest of the group recorded doses for work mates are unlikely to be valid for making a useful estimate.

What action is required following an adequate investigation?

18. If, as a result of the investigation, you have reasonable cause to believe that the estimated dose is much greater or much less than the recorded dose, you should make arrangements with the ADS for a special entry in the employee's dose record (see paragraphs 19-29 and Appendix 2). If the estimated dose is not much greater than or much less than the recorded dose you cannot make arrangements to replace the recorded dose. **Note that this procedure only relates to doses received and recorded on or after 1 January 2000. For doses received before that date the employer should have sought approval from HSE to make a special entry in the dose record, as provided by IRR99 regulation 39(9) before 30 April 2000.** After that date, HSE can no longer grant such approval and dose records made under IRR85 must be kept (unchanged) in the same manner and for the same period as required under those Regulations.

What should the employer send the ADS?

19. The ADS (record-keeping) will be concerned to keep reliable and accurate records on behalf of the employer. The ADS will need to be reassured that any request to arrange a special entry is properly founded. Therefore, you should normally ensure that a request for a special entry is signed by a senior person in the organisation with appropriate authority and provide evidence of support from the RPA. If you do not, your ADS might not act on the request.

20. The employer should send the ADS (record-keeping):

    1. sufficient details to identify the individual concerned, the relevant dose assessment period and the entry to be replaced; and
    2. an adequate summary of the information obtained during the investigation to estimate the dose actually received together with the relevant estimate to be entered as a special entry in the record.

21. Appendix 3 sets out an example of a proforma that you could send to the ADS (record-keeping), who would normally retain the summary of the information for the same period as the relevant dose record.

What if the affected employee objects?

22. You must consult the employee during the investigation and notify him or her of any special entry you propose to arrange (IRR99 regulation 22(3)). If employees are aggrieved by an employer's decision they can ask HSE to review that decision. An employee has 3 months from the date of being notified about the employer's decision to ask HSE to carry out a review. Whenever you intend to arrange for a special entry you should inform the employee of the right to ask HSE for a review.

Can an ADS refuse to make a special entry in a dose record?

23. The employer is responsible for complying with the requirements for special entries, not the ADS. However, an ADS may be reluctant to act on a request for a special entry if the information provided appears to be inadequate to support a change to the recorded dose. In such cases, the ADS might inform you that you have not provided an adequate summary of the investigation, in accordance with IRR99 regulation 22(3), and request further and better details. Dosimetry services are only approved to make special entries requested by employers which satisfy the requirements of IRR99 regulation 22.

24. The aproved dosimetry service might wish to seek advice from HSE in cases where the employer insists on a special entry but refuses to provide persuasive evidence that such an entry is appropriate

Does HSE need to approve special entries?

25. In general no, the arrangements for special entries have changed under IRR99 (but see paragraph 18 for doses received before 1 January 2000). An employer can arrange for the ADS responsible for maintaining the dose records to make a special entry without reference to HSE if:

    1. the employee's total recorded dose (including the dose to be replaced) for the year so far is less than any relevant dose limit;
    2. where an employee is subject to a special 5 year limit on whole body dose the total recorded whole body dose (including the dose to be replaced) so far in the year is less than 20 mSv;

3. the relevant period was not before 1 January 2000.

26. If these conditions are not satisfied HSE must give its consent before the employer makes any arrangements for a special entry (see Figure 2); for recorded doses relating to periods prior to 1 January 2000 HSE must approve a special entry (but see paragraph 27). Employers should contact their local HSE office (contact details in telephone directory).

27. HSE can only approve special entries for doses entries covering 1999 or earlier until the end of April 2000 (see paragraph 18). After that period dose records cannot be altered (IRR99 regulation 41(4)). As HSE inspectors need time to to follow up applications for special entries, such applications would have to have been made by February 2000 to ensure that HSE could properly consider the case for approval.

Can HSE reverse the employer's decision?

28. HSE can direct the employer to arrange for the original entry to be restored if, as a result of a review, whether resulting from an employee's objections or otherwise, HSE is not satisfied that:

    1. the employer's investigation was adequate to show reasonable cause for disregarding the dose entry; and
    2. a reasonable estimated dose has been established.

29. If HSE finds that the employer has acted incorrectly it may also take enforcement action, including action to reverse the employer's decision, if:

    1. HSE consent was not sought when required;or
    2. the special entry was arranged less than 12 months after the original entry was made in the dose record (5 years in the case of employees subject to a special 5 year dose limit).

Should HSE be notified of every special entry?

30. No, the employer is not obliged to notify a special entry to HSE. The approved dosimetry sevices are required to report special entries to HSE's Central Index of Dose Information each year and HSE inspectors will have the opportunity to follow up any suspicious special entries at that time.

What will HSE do if it has to consider giving consent for/reviewing special entries?

31. HSE has an existing system for dealing with applications for special entries. This system is being modified to respond to the changes in IRR99 requirements for special entries in dose records as follows:

    1. an HSE inspector will be asked to consider any evidence put forward by the employer, eg an investigation report, whether as part of an application for consent or at HSE's request, to support the special entry;
    2. that inspector will consult one of HSE's radiation specialist inspectors;
    3. the inspectors will consider the adequacy of the evidence in the light of the advice given above about undertaking an adequate investigation and providing a sufficient estimate of the dose actually received;

4. if the lead inspector is satisfied there is reasonable cause to believe that the recorded dose was not received and the replacement dose is a reasonable estimate of the dose that was received he or she will recommend that HSE gives its consent where necessary or takes no further action in any other case beyond informing relevant parties of its decision;
5. if the lead inspector is not satisfied he or she will recommend that HSE refuses its consent or takes action to reinstate the original entry;
6. in cases of serious doubt about the adequacy of the evidence provided by the employer, they will refer that evidence to at least one other radiation specialist inspector from a different part of HSE for peer review before recommending any further action; and
7. any action by HSE to give or refuse consent or to require the reinstatement of an original entry will be taken by a superintending inspector or equivalent specifically designated by HSE for this purpose.

What should the employer do about persons who are not classified?

32. HSE's consent is not required. As these records are not held formally, in compliance with IRR99, a 'special entry' is not required. However, see IRR99 regulation 25 regarding possible overexposures.

May 2000

ID APPENDIX 1
(para 15)

Examples of good and bad special entry cases

Problems can arise because employers assume it is sufficient to assert that the individual's dosemeter was exposed whilst not being worn, eg following temporary loss or storage in a 'high dose' area. In these cases, some corroborating evidence is important, eg from an exposure reconstruction by the RPA, work records, copies of dose summaries for work colleagues etc. Chromosome aberration analysis of a sample of the individual's blood can also be valuable provided the recorded dose exceeds the limit of detection for this test (typically > 100mSv whole body gamma or x-radiation). To illustrate these points, details are given of two cases for special entries.

A poor case - a non-destructive testing contractor wanted special entries for several of its radiographers on the grounds that their TLD were thought to have been accidentally exposed in a mail-room X-ray surveillance device when delivered to site.

The employer's investigation report stated that the 'high' doses were unprecedented and coincided with the use of the mail-room monitor for the first time. However, no attempt was made to confirm that the mail-room X-ray device was the cause of the problem by setting up test exposures, for example. Also, the application gave no information about the work schedules of the radiographers. Therefore, there was nothing to show that the doses were unlikely to have been received during the course of the employees' normal work - for NDT work involving the use of large sources, evidence of this kind is crucial.

A good case - a fitter working on nuclear plant temporarily lost his dosemeter whilst in an undesignated area; the dosemeter was later recovered but by then, it had been exposed to radiation during some radiography work.

The dosemeter was returned to the ADS but, because it was thought to have been lost in an undesignated area, the employer did not mention it had been exposed while not being worn. The measurement of the dose received by the dosemeter was therefore entered in the employee's dose record. When the employer realised that the individual's dose was incorrect an investigation was undertaken, with great thoroughness.

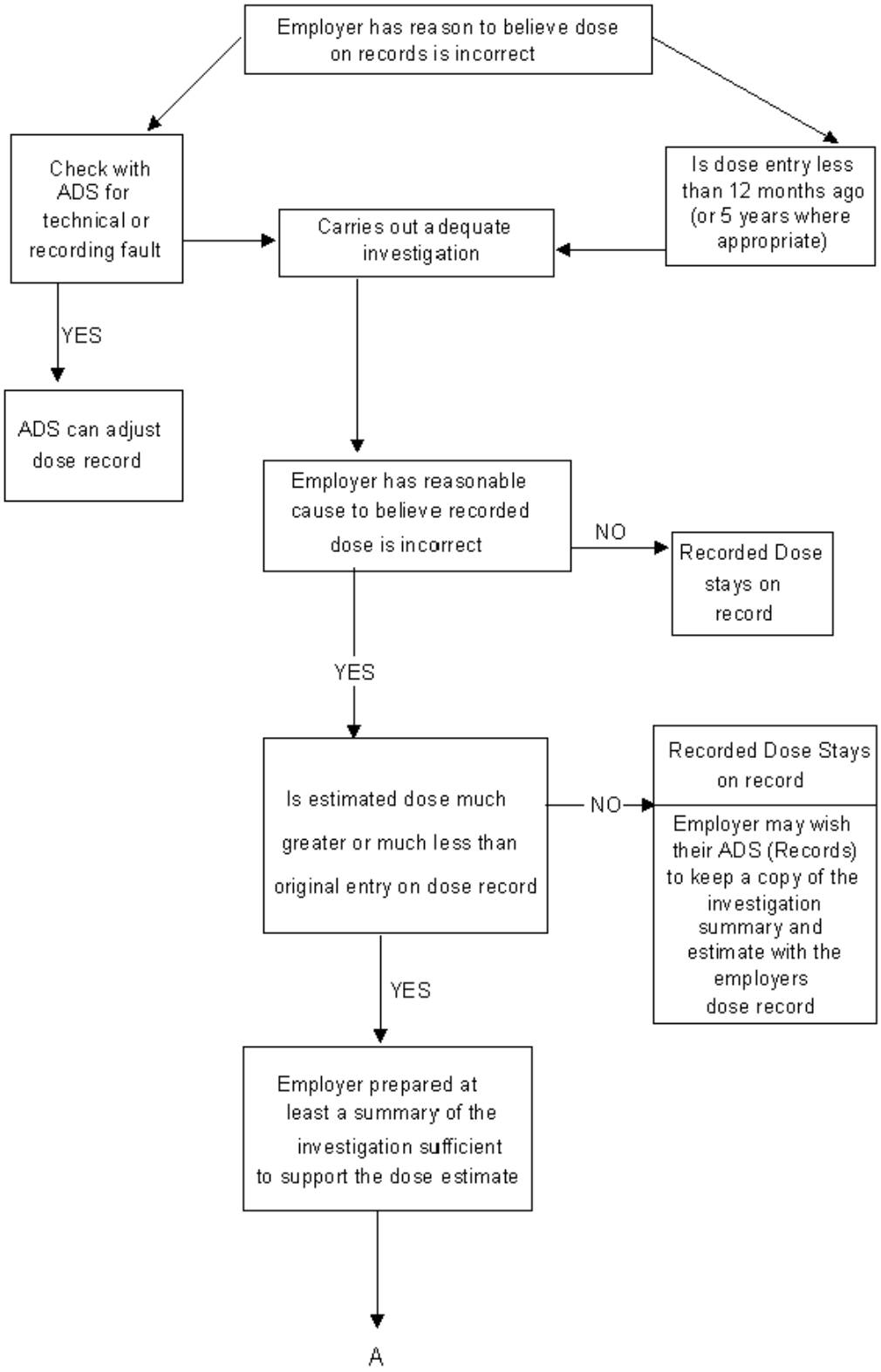
First, a comprehensive exposure 'reconstruction' was conducted. Then the ADS was asked to check the dosemeter worn by the employee for anything unusual about its sensitivity or performance (ie glow-curve, contamination and calibration checks). Also, the employer checked the record of doses shown by the personal indicating dosemeters worn daily by the employee for any unusual exposures - none were identified.

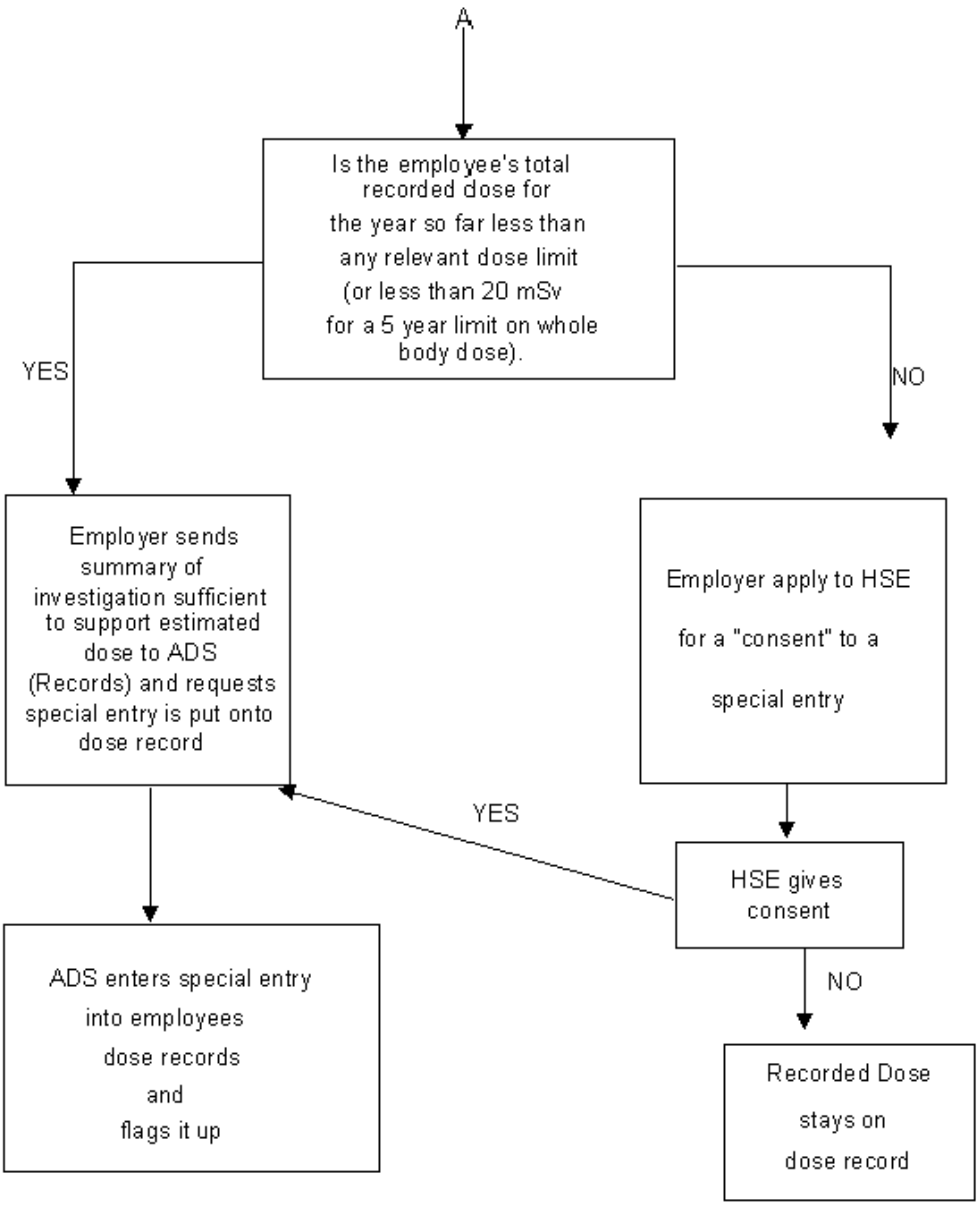
[Evidence obtained of the fact that radiography had been performed in the area where the lost dose meter was retrieved from during the period that it was missing could be added to the example]

The employer's 'reconstruction' exercise and the record of doses for the employee's personal indicating dosemeter made it highly unlikely that the dose recorded by the dosemeter had been received by the individual.

ID appendix 2 (para 18)

Special entry procedure for doses received on/after 1 January 2000




A
Is the employee's total recorded dose for the year so far less than any relevant dose limit (or less than 20 mSv for a 5 year limit on whole body dose).
YES
NO
Employer sends summary of investigation sufficient to support estimated dose to ADS (Records) and requests special entry is put onto dose record
Employer apply to HSE for a "consent" to a special entry
YES
HSE gives consent
NO
ADS enters special entry into employees dose records and flags it up
Recorded Dose stays on dose record

ID appendix 3 (para 21)

CONTENT OF SUGGESTED PROFORMA

CASE FOR SPECIAL ENTRY

I confirm that I have carried out an adequate investigations as required by Regulation 22(3) of the Ionising Radiations Regulations 1999 and concluded that it is likely that the radiation dose recorded in the record of

_____ Name

_____ National Insurance No. [or other ADS identifier]

for the period

from_____ to_____

is very different from that actually received.

The dose actually received is estimated to be _____

I have adequate evidence to support this estimate, and have appended an adequate summary as required by Reg 22(3)a. Therefore I request you make a special entry on this basis.

INVESTIGATIONS PERFORMED: [tick box]

[Note: Please tick the appropriate boxes of the proforma below to indicate the main criteria on which the case for a special entry is based. Please note ticking the boxes is in itself not a sufficient case, it has to be backed up by an adequate summary from your investigation].

A OTHER DOSEMETER [ ]

The employee used another dosemeter which showed a dose different from that in the record.

B AREA MONITORING MEASUREMENTS/ OCCUPANCY [ ]

I have measurements made at the time which show the dose rate in the work area in question. I know that the employee was in the area, exposed to that dose rate, for a time which is not consistent with the dose in the record.

C INFORMATION FROM SUBSEQUENT INVESTIGATION [ ]

I have information as described at (B) but which has been collected since the dose in question was reported.

D DOSES FOR OTHER EMPLOYEES [ ]

I know that other employees *who were working with the employee in question at the time* received significantly different doses from that in his/her record.

E DOSE RECONSTRUCTION [ ]

I have used identical dosemeters or other means of dosimetry to show how the employee's dosemeter could have registered the dose shown in the record.

F LIKELY SECURITY X-RAY EXPOSURE [ ]

I know that this dosemeter was one of a group which all received similar doses, and that this was likely to have been caused by a security X-ray machine. I have carried out a reconstruction to confirm this.

G INFORMATION FROM ADS (ASSESSMENT) [ ]

The dosimetry service which assessed the dose has provided information which shows that the dose in the record may be significantly different from that actually received by the employee.

H LACK OF CONTROL [ ]

My subsequent investigation has shown that the dosemeter which recorded the dose in question is not known to have been in a safe place at all times. There is a risk that it could have been exposed to radiation without my knowledge.

I OTHER (please specify) [ ]

Signatures

(Print name)

(Position) (Date)

(Print name)

(Position) (Date)