

**IRID: Ionising Radiations
Incident Database**

First Review of Cases Reported and Operation of the Database

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1 Introduction

1.1 Objectives

In 1996, the National Radiological Protection Board (NRPB), the Health and Safety Executive (HSE) and the Environment Agency (the Agency) jointly established the Ionising Radiations Incident Database (IRID) and published its specifications¹. The objectives of the database are

- (a) to act as a national focus on ionising radiation incidents, primarily in the non-nuclear sector,
- (b) through appropriate publications to provide feedback and guidance to users on preventing, or limiting the consequences of radiation accidents,
- (c) to provide regulatory bodies, and others with advisory responsibilities, with analyses of data that help in assessing priorities in resource allocation.

The database is operated by NRPB on behalf of the partners and over the last 18 months the focus of attention has been on the implementation of reporting mechanisms and the entry of available data. A few incident cases from IRID have been reported in the *European ALARA Newsletter*² and there have been a few searches of the databases on behalf of the partners to produce statistical data for internal purposes. The primary objective of this report is to provide the first coherent review of the incidents on the database, which currently total 100. As such it is one of the prime means of meeting the objectives in (b) and (c) above, ie providing feedback and analysis. This report's further objectives are to review the adequacy of the original specifications and the operation of the data collection systems, and to identify possible improvements.

1.2 Target audience

Being the first report, with the spread of objectives it has, there are a number of different audiences to be addressed. Firstly there is the audience of trainers, consultants and managers who can make practical use of the feedback from the case studies and lessons learned, but who may not be particularly interested in the operation of the database. This audience overlaps with the second audience covering professional organisations and government bodies that could potentially provide a route for expanding the incident reporting network. Thirdly there are the three initiating partners with an interest in its operational efficiency and output. In addition to these three groups, interest has been expressed from outside the UK by groups wishing to establish similar databases and to translate the case studies into other languages.

1.3 Structure of report

The report has been structured to meet these different interests. Section 2 provides a summary of the format and key operational features of the database. Section 3 addresses the extent of coverage, both in terms of time frames and geographically, and in particular sets the scene for the necessary limitations on the statistical analysis of the incidents provided in Section 4. Descriptions of many of the incidents, in a format that can be directly copied for training purposes, are given in Annex A. Section 5 identifies some recurring lessons from the incidents, whilst Section 6 reviews the operation of the database, identifies potential improvements and seeks to expand involvement.

2 Specifications of database

2.1 Scope of IRID

The database is designed to cover radiological accidents and incidents involving actual or potential occupational and public exposure. It specifically includes near misses as there are often valuable lessons to be learned from such occurrences. Therefore in developing the database, it was felt more appropriate to use the word ‘incident’, as this has a wider meaning than ‘accident’. The definition used for IRID is

‘An ionising radiation incident is any unintended or ill-advised event, including events resulting from operator error, equipment failure, or the failure of management systems that warranted investigation.’

The database deals primarily with the non-nuclear sector, ie industry, research, teaching and medicine. It specifically excludes the following, as there are existing mechanisms for recording these sorts of event:

- (a) nuclear incidents – covered by HSE Nuclear Installations Inspectorate’s (NII) ‘Statements of Nuclear Incidents’ published each calendar quarter³,
- (b) transport incidents – NRPB runs, under contract to HSE and the Department of Transport, Environment and the Regions (DETR), a database of incidents involving the transport of radioactive material⁴,
- (c) patient exposure incidents – incidents involving patients being exposed to a greater or lesser extent than intended are addressed through arrangements of HSE⁵ and the Medical Devices Agency⁶.

The database does, however, cover radiological incidents on nuclear sites or medical incidents involving occupational exposure and includes unintentional or unauthorised discharges of radioactive material into the environment.

2.2 Confidentiality

Many organisations see the value of sharing information and learning the lesson, but if this is likely to bring them adverse publicity or increased scrutiny by the regulators, then they might be very cautious about contributing to the database. Therefore it was clear from the beginning that the confidentiality of information would be a major issue.

To address this problem, all information contained in the database is non-attributable and confidential. Only the originator of the incident entry will know the names of the organisations or individuals concerned and all data are presented to NRPB in a format that provides anonymity. There will be some instances where, because of the affiliation of the contributor, NRPB may be aware of the organisation involved (but not the names of the persons). For its part, NRPB undertakes not to divulge any such privileged information to a third party. HSE and the Agency are well aware of the natural wariness that potential contributors may have in respect of the involvement of regulatory bodies. Therefore they have given assurances that they will not seek to obtain further information from the other partners (or the contributing organisation if different) about any incident recorded on the database that was not reported to the regulators. This would not prevent HSE and the Agency following up incidents that are notified to them by other means, eg through statutory reporting requirements or complaints from employees or members of the public.

2.3 Format

The database consists of 24 fields, including a text field as summarised in Table 1 below. Each non-text-field contains either numerical data (eg dose in millisieverts) or one or more codes that categorise the incident. A full specification is given by Thomas *et al*¹, but for convenience Annex B reproduces an incident reporting proforma which identifies the various categorisations.

To help categorise the seriousness of an incident the database uses three fields, numbers 4, 5 and 6, to derive an alphanumeric categorisation of the incident. These three fields cover the potential of the incident, the magnitude of the actual exposures and the geographical extent of the consequences. The coding of these fields is given in Table 2 and is used in the 'header' to each incident description in Annex A.

TABLE 1 IRID fields

Field	Title	Field	Title
1	Case number	13	Occupation of worker(s)
2	Area	14	Type of equipment
3	Incident date	15	Nuclide(s) involved
4	Incident category	16	Activity
5	Exposure level	17	Kilovoltage of radiation generator
6	Site level	18	Cause of incident
7	Nature of incident	19	Contingency plans
8	Number exposed: occupational	20	RPA involvement
9	Number exposed: public	21	RPS involvement
10	Whole body dose(s)	22	Follow-up action (eg improvements)
11	Extremity dose(s)	23	Date of entry in database
12	Internal organ dose(s)	24	Description: text field

TABLE 2 Codes to indicate seriousness of an accident

Field	Code	Description
Incident category	A	Person(s) not exposed (eg dosimeter exposed off the person)
	B	Failure of interlocks, components, warning lights, safety procedures, but diversity and redundancy sufficient to prevent abnormal exposures
	C	Near miss: potential for significant consequences, but fortuitous non-exposure or limited exposure
	D	Persons exposed and incident potential realised
Exposure level	1	Exposure not sufficient to cause IRR85 investigation level to be exceeded (eg < 15 mSv whole body from incident), or part body dose limits to be exceeded
	2	Exposure sufficient to cause IRR85 investigation level to be exceeded (eg > 15 mSv whole body exposure from incident)
	3	Exposure sufficient for any dose limit to be exceeded
	4	Exposure ≥ 0.25 Sv to the whole body, blood forming organs or other critical organs, and/or ≥ 6 Sv to the skin locally, and/or ≥ 0.75 Sv to other tissues or organs from external/internal sources
Site level	1	Onsite consequences
	2	Localised offsite consequences
	3	Widespread offsite consequences

As an example, an incident in which a sealed source was left exposed, out of secure control in a part of a factory that had low occupancy, and was found and recovered in a planned manner with staff receiving a few millisieverts would be categorised as C.1.1. The much more significant Goiânia accident, where a caesium teletherapy source was abandoned and subsequently ruptured leading to the death of four persons, would be categorised D.4.3. The values for exposure level 4 were chosen to be compatible with values already in use by IAEA⁷ for more severe accidents.

2.4 Descriptions of incidents

Field 24 is a text field that follows the general format of description of incident, doses/consequences and lessons learned. It has been deliberately formulated to be readily reproducible in reports such as this and for subsequent use as training material as part of the feedback mechanism.

Some descriptions may not be as complete as possible. This is simply because the reporting organisation may have had limitations in the level of involvement and, for instance, may not know the corrective actions actually taken to prevent re-occurrence or design changes made by manufacturers. However, if there are clear lessons to be learned, the policy adopted has been that it is better to report incompletely rather than not at all.

3 Extent of coverage

Whilst the database and the reporting mechanisms came into existence in 1996 it was felt appropriate to 'seed' the database with past cases to provide an initial impetus. It was recognised that this could potentially provide some distortion to any analysis (see Section 4.2); however, the value of the feedback was considered to be overriding.

These 'historical data' fall into two groupings. Firstly there are incidents from the 1970s and 1980s that are of special interest or examples with important lessons to be learned. Most of these cases have been taken from NRPB records and have previously not been published. Indeed, it was this group of cases that had in part provided an incentive to pursue the development of IRID. This derived from the observation that the younger generation of RPA staff were either not aware of these incidents or had received accounts of the incidents that were distorted with time, often masking important lessons.

The second group of 'historical data' covered the period 1990–95 with all partners providing contributions. The choice of 1990 as the start point was partly influenced by the assessment that by this time the impact of the advent of the Ionising Radiations Regulations 1985⁸ (IRR85) would largely have worked its way through the system and incidents could be taken as reflecting the effectiveness of the prevailing radiation protection culture in the country. Another consideration was the amount of effort required to make a retrospective trawl through files to extract incidents. It was therefore agreed that the partners would exercise their own judgement on what was readily available material, again recognising the implications for any kind of analyses.

During 1996 each partner set up reporting systems that encouraged staff to report incidents as they occurred. As with most new systems, IRID has experienced 'teething troubles' in getting the information about reporting to the correct people, familiarising them with the reporting procedures, and ensuring that all appropriate information is provided. These issues are dealt with more fully below, but inevitably have led to some under-reporting by the partners. Another relevant point is that a policy decision was taken to apply the *subjudicice* principle to those incidents that would be the subject of legal proceedings (typically a regulator taking a prosecution) and not to enter data on IRID until this process was complete. This can often be a lengthy process, typically between 6 and 18 months.

It is also relevant to note the geographical coverage of the partner organisations. NRPB, from its regional centres in Glasgow, Leeds and Chilton, has reasonable coverage of England, Scotland and Wales, but very limited coverage in Northern Ireland. HSE has responsibilities for Great Britain only and

so exclude Northern Ireland. The Environment Agency covers England and Wales but seeks IRID contributions from the Scottish Environment Protection Agency (SEPA) and the Northern Ireland Environment and Heritage Service.

It is to be hoped that from this coverage there would be a good level of reporting of the more serious incidents that have resulted in significant doses. However, it is recognised that, in these early days of the database, some relevant items may have escaped the reporting net. Therefore one objective of this report is to trigger recognition by readers of the omission of relevant incidents and to prompt their reporting.

There is one other area of coverage that is worthy of mention, namely the ‘near misses’, ie incidents where things have gone wrong, there are lessons to be learned, but fortuitously the consequences were not severe. Many of these, particularly in the research and medical sectors, would not normally come to the attention of one of the partners, and there is therefore scope for expanding the reporting network (see Section 6.2).

4 Feedback and analysis

4.1 Incident case studies

There are currently 100 incidents on the database and the text descriptions from Field 24 of 84 of these are reproduced in Annex A. The remaining incidents are largely of interest in terms of the overall statistics, with many involving dropped personal monitoring badges or the discovery of low specific activity scale in scrap metal: a few illustrative examples are included. To aid readers in finding incidents that are pertinent to their areas of interest these ‘case studies’ have been grouped by broad areas of use, as below.

- A1 Unsealed radioactive materials
- A2 Industrial process gauges
- A3 Recycling and scrap metal
- A4 X and gamma radiography
- A5 Use and servicing of X-ray equipment
- A6 Nuclear density gauges
- A7 Other radiation uses

Within each area of use, it will be seen that there is a degree of commonality of underlying cause/lesson to be learned (which is addressed in Section 5 on recurring lessons). However, each of the descriptions used brings out either subsidiary points, other contributory causes or a different environment in which the incident occurs. This should provide an appropriate choice of case studies as training material, to match the specific or range of interests of those involved.

The descriptions of incidents may be freely copied for use as training material or in published documents, providing an appropriate acknowledgement of IRID is included.

4.2 Analysis

As indicated in Section 2, a full analysis of IRID is still a little premature, since it can by no means be claimed to be a comprehensive dataset. In particular, it is not possible to analyse the frequency of occurrence of incidents or types of incidents, and hence to identify trends over time. An initial look at some of the IRID classification categories does, however, reveal some interesting information and also gives an indication of the range of the incidents already contained.

Type of equipment: data field 14

Annex C, Table C1, shows the current classification of incidents according to the type of equipment used. Validated suppliers of data must enter one, and only one, category in this field. From the results it is evident that the most frequent incidents, 29%, are related to codes 07 (gamma radiography site) and 08 (gamma radiography facility – permanent) with a further 10% related to codes 09 (X-ray radiography site) and 10 (X-ray radiography facility – permanent). Thus industrial radiography accounts for about one-third of the incidents. This finding is not altogether unexpected; it mirrors the HSE reports on the Central Index of Dose Information (CIDI)⁹, where the majority of the higher radiation doses are to industrial radiographers. The second most common incidents on IRID are those relating to codes 13 and 14 (level and density/moisture gauges), a total of 18%. An in-depth analysis of code 14 reveals that the vast majority of incidents relate to gauges used in the road construction industry for measuring the density/thickness of freshly laid tarmac. These gauges incorporate both a gamma and a neutron source and are either frequently transported to different construction sites (common incidents with these gauges are similar to that described in case number 0007/94), or are incidents where the gauge and/or vehicle in which it is being transported has been stolen. It is reassuring to note that in 90% of cases where the gauge has been stolen, it is later recovered and in an intact condition; thus, doses to the thieves involved and to the general public are probably very small.

The third most common incidents on IRID are those relating to code 26 (processing of ore and scrap materials), at 10%. The majority of the ten incidents relating to scrap material currently recorded have been supplied by NRPB members of staff who have investigated the incidents in the NRPB role as RPA or simply because the scrap yard has called NRPB for specialist advice. However, it is known from contacts with the British Metals Federation¹⁰ that the frequency with which Federation members identify radioactive substances in materials being delivered for processing or recycling is significantly higher. It appears that most incidents relate to items that contain either small amounts of radium-226 (often from luminised components) or low specific activity materials such as scales that form on the inside of pipes originating in the oil and gas industry and which have been sent for recycling. As can be seen from case 0002/90 in Annex A, the items can be very much more significant; worldwide, such incidents have led to fatalities¹¹. This is therefore seen as an important area in which to improve the data on IRID.

Nature of incident: data field 7

Annex C, Table C2, shows a summary of this field, which categorises the nature of the incidents. Here it can be seen that most incidents result in actual or potential external exposure (codes h and i) and very few result in external or internal contamination (codes f and g). Of these incidents, 31% are at least partly related to damaged or defective equipment (code b), 19% involve lost radiation sources (code a), 8% involve a leaking source (code c), and 13% relate to a dropped dosimeter/not worn (code k).

Exposure level: data field 5

Annex C, Table C3, shows that, in over 75% of incidents, the resulting radiation exposure has been insufficient to cause the IRR85 investigation level of 15 mSv to the whole body, or dose limits for other than the whole body to be exceeded. In a further 10% the doses were unknown. The 50 mSv whole body dose limit was exceeded in 7 incidents and very high doses (code 4) were received in a further 2 incidents. An analysis of the doses received by individuals shows that, in each of these incidents, the dose categories identified relate to one person being exposed.

Cause: data field 18

Owing to the complex nature of the vast majority of incidents it is often not possible to identify only one originating cause or contributory factor and so persons supplying data in this field are requested to identify up to four codes that are likely to be the most significant causes/contributory factors to the incident. Annex C, Table C4, shows that the most commonly identified cause is code j (error by worker) at 36%. This is often related to codes e (inadequate local rules – operating procedures) at 29 %, and f (inadequate supervision of persons) at 22%. Inadequate personal training (code h) and failure in use of monitoring instruments (code i) are each represented in approximately 23% of incidents.

Engineering failures (codes a–d) are represented in a total of 38% of incidents, but deliberate or malicious acts (code k) and inadequate personal protective equipment (code g) are represented in less than 5% of incidents.

Not surprisingly, data field 22 – follow-up actions – tends to mirror these results since if the cause was an engineering failure then the most likely follow-up actions would be engineering modifications. Similarly, if the cause was inadequate procedures the most likely follow-up action is revision of those procedures.

Whole body radiation doses: data field 10

In incidents where the investigation has concluded that a radiation dose was received by one or more individuals, the investigation's best estimates of these doses are recorded on IRID. There are currently 87 persons identified as having received effective doses greater than 0.1 mSv. The average effective dose is 15 mSv, the maximum effective dose 370 mSv, and the total collective effective dose 1.3 man Sv. The maximum recorded extremity dose is 60 Sv.

Occupation of worker(s): data field 13

Annex C, Table C5, shows the occupational industrial sectors where the recorded incidents have occurred.

5 Lessons for users of ionising radiations

The most frequently occurring lessons throughout all incidents on IRID are not unexpected and are probably the same lessons that were commonplace long before IRID was developed. The following themes reflect these recurring lessons.

5.1 Ensure proper management systems are in place!

For the categorisation of 'cause' in IRID it is often simpler to identify one or more of the causes or contributory factors that led to an incident than it is to make a judgement on the adequacy of the management systems in place at the time. For this reason, a specific categorisation code for poor management systems is not included. However, it can be argued that the majority of the 'cause' codes, such as 'engineering failure due to inadequate maintenance', 'inadequate local rules', 'inadequate supervision' and 'failure in use of monitoring instruments', may result from the fact that the management systems were not sufficient and it is therefore reasonable to assume that poor management systems were, at least in part, a contributory and overlying factor in many of the incidents recorded. It is therefore vital that employers ensure that they have thorough systems in place and that these systems are reviewed at appropriate intervals depending upon the nature of the work. The Management of Health and Safety at Work Regulations 1992¹² recommends that the elements of planning, organisation, control, monitoring and review all need be considered when managing health and safety.

Case numbers 0006/97 (nuclear density gauges), 0013/95 (unsealed radioactive materials), 0003/98 (industrial process gauges), and 0003/92 (X and gamma radiography) in Annex A are examples where management systems may have been inadequate.

5.2 Use a monitor!

A contributory factor for the vast majority of incidents was the lack of use, or inadequate use, of a radiation monitor whether by error by a worker or through inadequate procedures/training for monitoring. It seems that persons involved in working with ionising radiation must be continually reminded of the importance of the use of a radiation monitor. Procedures should contain sufficient detail for radiation monitoring to be carried out, right from the initial delivery of materials/equipment on the premises, through first use, routine use, prior to storage, and during storage. Procedures not containing these five steps may be inadequate. They should identify the correct instrument, level of training of the intended user, methods of ensuring its correct functionality, methods of monitoring, and appropriate recording of results.

Partial solutions to the problem, where radiation dose rates warrant higher levels of protection, are the issue of personal radiation alarms that may be worn by individuals at all times, or, preferably, the installation of engineering controls that incorporate radiation monitors.

Case numbers 0001/92 (unsealed radioactive materials), 0001/89 (industrial process gauges), and 0002/86 (X and gamma radiography) in Annex A illustrate where the correct use of a radiation monitor may have helped to prevent the occurrence of the incident.

5.3 Maintain security and supervision of radioactive materials at all times!

From the number of cases involving either temporary or permanent loss of radioactive sources it is evident that in a number of instances better source security and closer supervision of radioactive materials are required. The previously-mentioned need to use a radiation monitor is one element of the supervision of sources. Many companies have learned the hard way of the drain on resources associated with the loss of a source, the financial implications, and the associated poor public image. Both the Radioactive Substances Act 1993¹³ and the Ionising Radiations Regulations 1985⁸ require that records must be kept of the current locations of all radioactive materials to which the legislation relates. Apart from the appropriate monitoring issue addressed above, it appears from IRID that there are three situations which regularly challenge the adequacy of the arrangements. These are

- (a) when the radioactive materials are unused for some time and are put into storage,
- (b) when the person responsible for keeping the records leaves his/her current post and management fails to assign the duty to another trained individual,
- (c) when plant/equipment are decommissioned.

In each of these situations source records often lapse and supervision of the materials breaks down, resulting in unauthorised removal or disposal.

In order to help prevent these incidents, management should take a proactive role in the supervision of radioactive materials and not, as is often the case, rely upon the work of the sole Radiation Protection Supervisor (RPS). Management should also ensure that a replacement RPS is fully trained in order to take on the duties immediately when the current RPS moves on, and make efforts to ensure that all unwanted radioactive materials are disposed of appropriately and as soon as practicable after they become redundant.

Case numbers 0001/86 (nuclear density gauges), 0006/94 (unsealed radioactive materials), 0010/95 (industrial process gauges), and 0001/74 (X and gamma radiography) in Annex A illustrate cases of inadequate supervision of radioactive materials.

5.4 Train your operators!

Regulations require all users of ionising radiation to be given full information, instruction and training in the hazards associated with its use. Incidents often occur due to inadequate knowledge of those involved, or where individuals follow inappropriate, incomplete or even incomprehensible instructions. Procedures should be in place for periodically reviewing the content of the operating procedures, together with the training of all involved, and their understanding of the procedures.

Case numbers 0005/98 and 0004/96 (industrial process gauges), and 0001/82 (X and gamma radiography) in Annex A illustrate cases where additional training should have been provided.

5.5 Be prepared for incidents!

Owing to events which are unforeseen or are beyond the control of management, incidents will occur from time to time, and it is the duty of management to minimise the frequency of their occurrence and to mitigate the consequences when they do occur. To this end, contingency plans must be available for operators to act upon, covering a wide range of potential incidents in sufficient detail. Similarly, the necessary emergency equipment must always be available from a convenient location. If the source of ionising radiation is used on different parts of a site or on different sites, then consideration must be given to ensuring that the emergency equipment travels with it at all times. Managements should ask themselves 'Does the risk assessment show that our staff need specific training and/or practice in dealing with incidents?'

Case numbers 0001/86 (nuclear density gauges), and 0009/92 (X and gamma radiography) in Annex A relate to incidents where contingency planning may have reduced the consequences.

5.6 Take care of personal dosimeters!

A number of the incidents that appear on IRID have come to light from investigations into dosimeters that have recorded an unusual radiation dose. Many of these investigations have concluded to varying degrees that the wearer probably did not receive the dose. Such recorded doses may arise from instances such as a dosimeter falling off the wearer and being inadvertently exposed, a dosimeter being stored in an area of elevated radiation dose rates, a dosimeter being worn incorrectly, a dosimeter being incorrectly cared for, and a dosimeter being maliciously exposed. All of these situations may result in the company having to perform a time consuming investigation into the circumstances, possible notification to HSE, and applications to adjust the statutory dose record to the correct dose. It is therefore in everyone's interests for managements to ensure that appropriate instruction is given to wearers on the care and use of dosimeters, and on what to do if it is suspected that a dosimeter has been exposed whilst not being worn.

Case numbers 0003/94 (other radiation uses), 0004/95 (nuclear density gauges), and 0007/92 (X and gamma radiography) in Annex A illustrate typical examples of inadequate care or use of personal dosimeters.

6 Review of operation of IRID

6.1 Database specifications

During the design phase of IRID a significant quantity of trial data was produced, initially by NRPB and HSE and latterly by the Agency. These data came from actual incidents and fictitious incidents and were designed to test all aspects of the reporting methods. Consequently, very few problems have arisen with respect to categorisation of incidents, and no changes have been made to the database specifications or reporting proformas (see Annex B) since the specification document was issued in 1996. The problems that have arisen have mainly been associated with data contributors interpreting the codes inconsistently: local guidance has been issued to address this.

6.2 Network and procedures

So far, reporting problems have been associated with the resources available within each of the three partners, and with the ability to produce a continuous flow of information. IRID has now been widely publicised within the participating organisations and the network for reporting incidents has been strengthened, now including all HSE and Agency inspectors and NRPB RPAs. The task of reminding individuals to submit incident data amongst other competing priorities for effort is a continuous one.

The next task is to try to speed up the reporting of incidents, so that lessons can be learned a lot sooner, and that the repetition of incidents in the intervening time may be avoided. Some incidents inevitably result in prosecution by the regulators and problems associated with *subjudice* can arise if information is released before the case goes to court. This considerably slows down the reporting of incidents and unfortunately, owing to the nature of these cases, they are likely to be the more significant incidents where the lessons to be learned are more substantial. Methods of entering a provisional incident report covering key points are being investigated.

The quality and quantity of data on IRID and the means of accessing the data (see Section 6.3) are the main determining factors in the overall usefulness of IRID. In order to provide a solid basis for the quality of the descriptions of incidents and their categories, the reporting network in this early phase of the operation of IRID was deliberately restricted to the partners, as they could exercise direct control. This phase has been successfully completed and it is now appropriate to look to expanding the network of contributors, whilst still maintaining the data quality and reporting standards. The IRID partners are now actively looking to encourage the establishment of reporting arrangements with other government bodies or agencies and with radiation protection professionals (qualified experts), possibly through professional bodies or industry groupings. Contacts from such organisations to discuss ways forward will be welcomed.

6.3 Development of feedback mechanisms

It is expected that there will be a need for periodic publications providing up-to-date analyses on the full contents of the database and descriptions of newly reported incidents. As with this report these can feed into training material. Experience has shown that the use of incident examples, to which the user can relate, are particularly effective in underpinning training messages.

The partners are also looking at producing topic-specific publications based on the incidents recorded and the lessons to be learned. It is envisaged that such publications would be directly targeted at the users and would need to incorporate a significant amount of visual material. These publications could also be supported by slide sets.

Examples from IRID will continue to be used in existing publications, such as the NRPB *Radiological Protection Bulletin*, the HSE *RPA Newsletter*, various publications of the Environment Agency, and the *European ALARA Newsletter*. The incident case studies published by the partners can be freely used in other publications providing an acknowledgement or reference to IRID is given.

For the dissemination of IRID data and lessons learned beyond the partners there will undoubtedly be a need to develop feedback in an electronic format, whether this be on a PC floppy disk or through the Internet. However, the effort (and cost) involved in this is not trivial, and it is important to choose software and protocols that will stand the test of time in a rapidly changing technology. Further effort will be put into this.

There is also a wider, longer-term question of how IRID could relate to databases in other countries, so that there is a greater sharing of knowledge. This issue was addressed at a workshop entitled 'Good Radiation Practices in Industry and Research' organised by the European ALARA Network. One

objective of this workshop was to make recommendations to the European Commission on improvements in radiation protection; one such recommendation¹⁴ follows.

‘Whilst the establishment of a European accident database may be a useful long term goal, the workshop recommended that the EC should give priority to:

- (a) encouraging the establishment of compatible accident databases in all member states: in this respect the UK database IRID and the experience in establishing it may prove to be a useful template; and
- (b) supporting the establishment and operation of feedback mechanisms to ensure widespread dissemination of case studies and lessons to be learned from accidents.’

7 Conclusions

Following the launch of IRID in 1996, significant progress has been made in establishing it as the national focus on ionising radiation incidents in the non-nuclear sector. A solid base of information has been created and feedback to radiation users has begun. This is a good start but there is now a need to expand the network of contributors. This is particularly important to ensure that we learn from incidents that are not legally reportable or are near misses. This report is the beginning of the learning process but it is for others, eg employers, trainers and RPAs, to disseminate the information and put it to good effect. The IRID partners welcome ideas and suggestions from those with these responsibilities on ways in which they can assist via the presentation and availability of the data contained. If you wish to comment or contribute, please complete the questionnaire at the end of this report (Annex D).

A number of key lessons have been described in this report and it is hoped that this information, together with the grouped incident descriptions appended, will become a valuable source of data and will be used to help prevent the occurrence of some incidents.

8 Acknowledgements

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9 References

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