

Ionising Radiations Regulations 1999 An Overview



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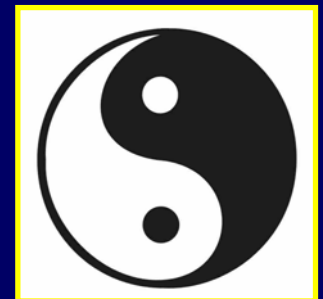
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Introduction

- Ionising Radiations Regulations 1999 (IRR99) made under the Health and Safety at Work Act (1974), implements the majority of the Basic Safety Standards Directive 96/29/Euratom.
- IRR99 came into force on 1st January 2000 (replaces IRR85)
- The general requirements of the regulations are explained in the Approved Codes of Practice and the Medical and Dental Guidance Notes published by the IPEM (2002).
- The main changes are the need for formal (prior) risk assessment and the implementation of Quality Assurance programmes.
- IRR99 complements IRMER 2000 (Ionising Radiation Medical Exposure Regulations).

IRR vs. IRMER

- IRR99 is aimed at employers (NHS Tayside).
- Under IRR99 the employer must demonstrate a structured approach to radiation protection.
- IRMER addresses patient safety.
- IRMER describes the personnel involved in the patient's treatment namely, the Referrer, Practitioner, Operator and Medical Physics Expert (MPE).



Purpose of IRR99

- The main aim of IRR99 is to establish a framework for ensuring that exposure (staff & public) to ionising radiation during work activities, is kept as low as reasonably practicable (ALARP).



Structure of IRR99

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P2_R5 Authorisation of Specified Practices

- A Radiation Employer (NHS) shall not, except in accordance with a prior authorisation granted by the Executive in writing, carry out the following practices –
- Use electrical equipment to produce x-rays for the purpose of the exposure of persons for medical treatment.
- Use linear accelerators.



P2_R7 Prior Risk Assessment

- Before a Radiation Employer commences a new activity involving work with ionising radiation, he shall make a suitable and sufficient assessment of the risk to any employee and other persons to ionising radiation.

The assessment must -

- Identify all hazards with the potential to cause a radiation accident.
- Evaluate the nature and magnitude of the risks arising from those hazards.

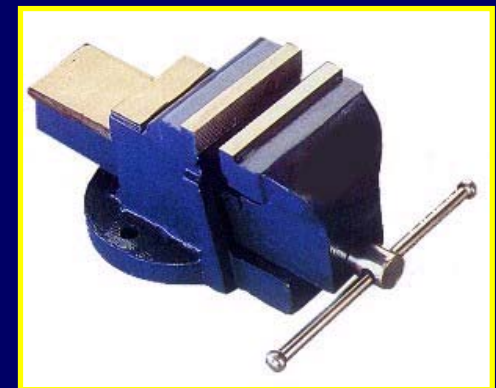
Take practicable steps to -

- Prevent any such accident.
- Limit the consequences of any such accident.
- Provide employees with the information and training to restrict their exposure to ionising radiation.



P2_R8 Restriction of Exposure

- The Radiation Employer shall take all necessary steps to restrict so far as is reasonably practicable the extent to which his employees and other persons are exposed to ionising radiation.
- Restrict exposure by means of engineering controls, design features, safety features, warning devices and appropriate systems of work.



P2_R9 Personal Protective Equipment

- Any personal protective equipment provided by a Radiation Employer shall comply with the Personal Protective Equipment (EC Directive) Regulations 1992.
- Eg: Film badges, direct reading dosimeter.



P2_R11 Dose Limitation

- A Radiation Employer shall ensure that employees are not exposed to ionising radiation that exceeds the relevant dose limit in any calendar year.

Area/Worker	Whole Body (mSv)	Extremity / Skin (mSv)
Supervised Area	1	50
Controlled Area	6	150
Classified	20	500
Under 18s Non classified*	6	150
Non radiation*	0.3	15

NB: IRR99 Dose Limits do *not* apply to 'Comforters and Carers'.
Dose Constraint more appropriate.

P2_R12 Contingency Plans

- The Radiation Employer shall prepare a contingency plan designed to ensure the restriction of exposure to ionising radiation and the health and safety of persons who may be affected by an accident.
- Contingency plans should be outlined in the Local Rules (**P4_R17**).
- Rehearsals of the arrangements in the plan may be carried out at suitable intervals.



P3_R13 Radiation Protection Adviser

- The Radiation Employer shall appoint a Radiation Protection Adviser (RPA) in writing and shall detail the scope of the advice which the radiation protection adviser is required to give.
- The Radiation Employer shall provide any RPA appointed with adequate information and facilities for the performance of their functions.



P3_R14 Information Instruction & Training

Every Radiation Employer shall ensure that those employees engaged in work with ionising radiation are given appropriate training in the field of RP to enable them to know –

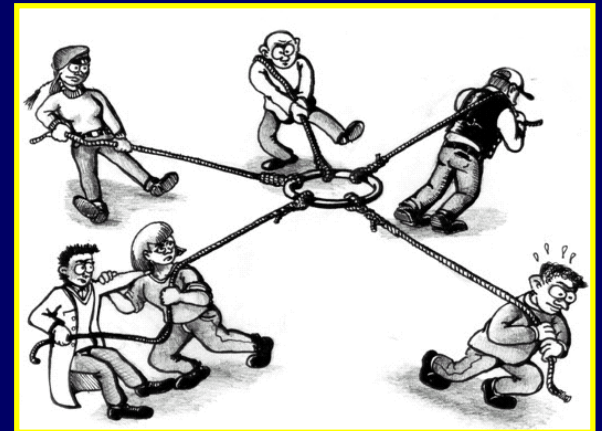
- The health risks of exposure to ionising radiation.
- The precautions to be taken.
- The need to comply with medical, technical and administrative requirements of IRR99.

Female employees should inform the Radiation Employer in writing as soon as possible, after becoming aware of their pregnancy or if they are breast feeding.



P3_R15 Cooperation Among Employers

- If one Employer's work is likely to give rise to exposure the employee of another employer, the employers shall cooperate to ensure that they comply with the requirements of IRR99.



P4_R16 Designation of Controlled or Supervised Areas (A)

Every employer shall designate as a Controlled Area any area in which –

- It is necessary for any person who enters or works in the area to follow special procedures designed to restrict significant exposure to ionising radiation.
- Any person working in the area is likely to receive an Effective Dose greater than 6 mSv a year or an Equivalent Dose greater than 30% of any relevant dose limit.



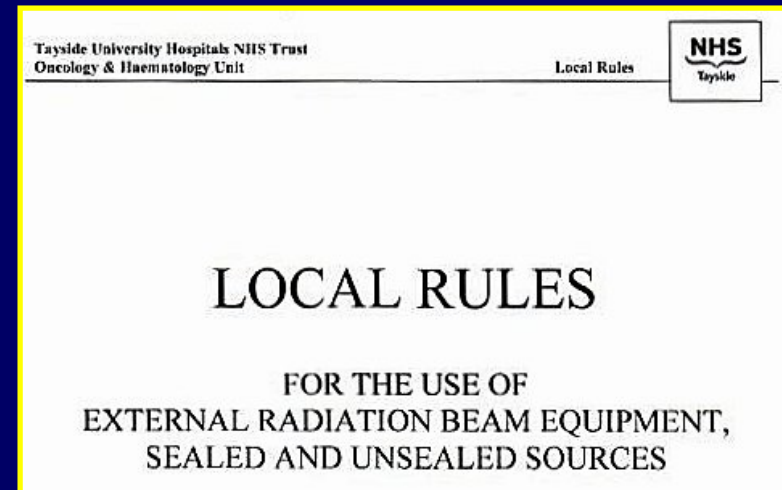
P4_R16 Designation of Controlled or Supervised Areas (B)

An employer shall designate as a Supervised Area any area under his control, (not designated as a controlled area) –

- Where any person is likely to receive an Effective Dose greater than 1mSv a year or an Equivalent Dose greater than 10% of any relevant dose limit.
- Where it is necessary to keep the conditions of the area under review to determine whether the area should be designated as a controlled area.

P4_R17 Local Rules and RPS

- The Local Rules should contain work instructions for that controlled or supervised area.
- They should be relevant to the nature and risk of the ionising radiations and include contingency plans.
- Should include a summary of the arrangements for restricting access into that area.
- Should give the name of the Radiation Protection Supervisor.



P4_R19 Monitoring of Designated Areas

- Employers should ensure that levels of ionising radiation in designated areas are monitored and working conditions are kept under review.
- The Employer must provide suitable and sufficient monitoring equipment.
- This equipment should be properly maintained, adequately tested and examined at appropriate intervals.



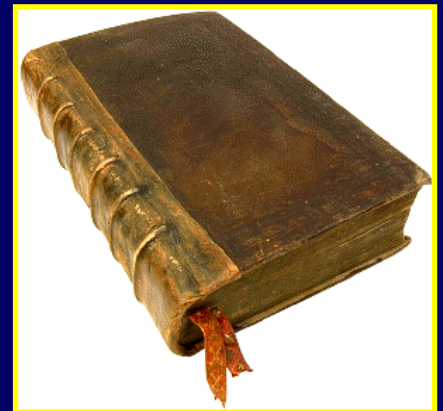
P5_R21 Dose Assessment & Recording

Employer shall ensure that –

- For all classified persons, a recorded assessment is made of all significant doses of ionising radiation received.

Approved Dosimetry Service shall –

- Keep the records made for at least 50 years.
- Provide the Employer with copies of the dose record relating to any of his employees as required.



P5_R23 Dosimetry for Accidents

If an accident results in a person receiving an effective dose exceeding 6 mSv or an equivalent dose greater than 30% of the dose limit, the employer shall –

- For classified persons, arrange for a dose assessment to be made by the approved Dosimetry Service.
- For other employees with a film badge, arrange for it to be examined and assessed by the Dosimetry Service asap.



P5_R25 Investigation & Notification of Overexposure

The radiation employer should notify any suspected overexposure to the -

- Employee
- Executive
- In the case of 'outside' employees, their employer.
- In the case of own employee, the appointed doctor or employment medical adviser.



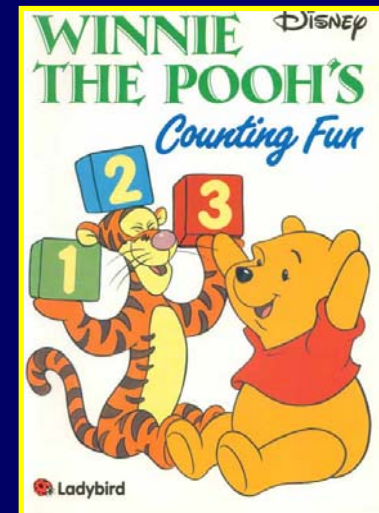
P6_R27 Sealed Sources and Articles Containing Radioactive Substances

- Where a radioactive substance is used, the employer shall ensure that it is in the form of a sealed source.
- The radiation employer shall ensure that the design, construction and maintenance of any container for a radioactive substance minimises leakage.
- The radiation employer should ensure that regular tests are carried out to detect any leakage. Records should be retained for at least 2 years.



P6_R28 Accounting for Radioactive Substances

- The radiation employer must account for and keep records of the quantity and location of radioactive substances for at least 2 years from the date they were made.
- For at least 2 years from the date of disposal.



P6_R29 Keeping and Moving of Radioactive Substances

Every radiation employer shall ensure, that any radioactive substance under his control -

- Is kept in a suitable receptacle.
- Is kept in a suitable store.



P6_R31 Duties of Manufacturers etc. of Articles for Use in Work with Ionising Radiation

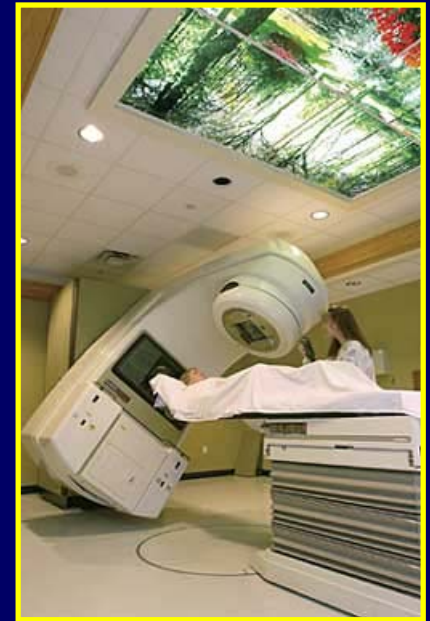
- Where a person erects or installs ionising radiation equipment for use at work, they shall undertake a *critical examination* of the way in which equipment is erected or installed to ensure that -
- The safety features and warning devices operate correctly.
- There is sufficient protection for persons from exposure to ionising radiation.



P6_R32 Equipment Used for Medical Exposure

Every employer who has control of any equipment used for medical exposure, shall ensure that -

- It is maintained such that it restricts the dose to anyone undergoing a medical exposure, so that it is compatible with the intended clinical purpose.
- The equipment indicates the quantity of radiation produced during a radiological procedure.
- Make arrangements for a suitable Quality Assurance programme.



P7_R34 Duties of Employees

- Any employee working with ionising radiation shall not knowingly expose themselves (or others) to ionising radiation to an extent greater than is reasonably necessary.
- Make full and proper use of any personal protective equipment.
- Immediately report to their employer any defect they discover in any such personal protective equipment.



P7_R40 Modifications Relating to MoD

The Secretary of State for Defence may, in the interests of national security exempt -

- Her Majesty's Forces
- Visiting forces
- Any person engaged in work with ionising radiation on behalf of the Secretary of State for Defence.



...from all or any of the requirements or prohibitions imposed by IRR99.

Any such exemptions may be time limited and revoked at any time by a certificate in writing.

Summary of Employer's Duties

Employer must demonstrate a structured approach to radiation protection based on the following guidelines:

1. Radiation risk assessment.
2. Establishment of Local Rules.
3. Restriction of exposure.
4. Designation of areas (Controlled or Supervised).
5. Training in radiation protection for all staff.
6. Radiation monitoring and record keeping.
7. Frequent review of procedures.



Summary of Employee's Duties

- Employees shall not intentionally expose themselves or any other person to ionising radiation to an extent greater than is reasonably necessary.
- Employees should make full and proper use of personal protective equipment.
- Employees should immediately report any defect they discover in any such personal protective equipment.



IRR99 Breach

Northumbrian Educational Trust Ltd was fined for breaches of Safety Legislation. Breaches relate to the loss in 1997, of 3 radioactive isotopes of americium-241, cobalt-60 and strontium-90 used in physics lessons.

School did not store the isotopes adequately nor keep records of their location during a school refurbishment, when the isotopes were moved from a lab to a boiler room.

The Trust was fined £1,500 plus £2,226 costs and made aware of the serious nature of the misdemeanour at Magistrates Court.



The Ionising Radiations Regulations 1999 (IRR99) and the Approved Code of Practice and Guidance Work with Ionising Radiations is relevant to the keeping and use of radioactive substances, (Reg 29).

References

1. Ionising Radiations Regulations (1999). SI No. 3232. HSE, London.
2. Ionising Radiation (Medical Exposure) Regulations (2000). Statutory Instrument 2000. No. 1059.
3. C. J. Martin, D. G. Sutton. Practical Radiation Protection In Healthcare (2002). Oxford University Press.

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