

Health and Safety Department

# Ionising Radiation Policy

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## 1. Overview

### 1.1 Purpose

This policy provides detail on the governance structure and management systems in to ensure the safety of staff, students and visitors who are exposed/or could be potentially exposed to ionising radiation.

#### Definition

Ionising radiation is radiation that has enough energy to cause ionisation in matter. Examples are alpha particles, beta particles, neutrons, gamma and X-rays. When these radiations pass through the tissues of the body they have sufficient energy to damage DNA or kill cells.

### 1.2 Scope

This policy provides a framework for Schools and Services to develop and implement their own radiation safety management programs to fulfil their statutory duties and ensure the health and safety of staff and students exposed to or potential exposed to ionising radiation. **Local rules are provided which detail further information and must be used in conjunction with this policy.**

The policy applies to:

- All staff, students (both postgraduate and undergraduate) and personnel (e.g. contractors and visitors) at workplaces under the control of Loughborough University.
- All open and sealed radioactive sources
- All equipment producing ionising radiation (for example X-ray devices)
- All NORM (Naturally Occurring Radioactive Material) used for its radioactive properties.
- All 'Out of Scope' radioactive material used for its radioactive properties
- All nuclear material
- Research projects subjected to nuclear safeguards

Separate policies for Lasers, and other Non-Ionising Radiation are available from the UH&HS website.

## 2. Key Legislative Requirements

### 2.1 Ionising Radiation Regulations (IRR) 2017

### 2.2 Environmental Permitting (England & Wales) Regulations 2012

### 2.3 Other Key Legislation

- Justification of Practices Involving Ionising Radiation (Amendment) Regulation 2018
- Ionising Radiation Medical Exposure Regulations 2017
- Carriage of Dangerous Goods and Use of Transportable Pressure Equipment Regulations 2009
- EC Euratom Regulations 302/2005
- Nuclear Safeguards – additional protocol

### 3. Duty Holders

#### 3.1 Chief Operating Officer

The 'radiation employer' is responsible for compliance on advice from the University H&S team, with statutory requirements laid down in the IRR17, EPR2012 and associated Environmental Permits; in the university the Chief Operating Officer is the radiation employer and permit holder.

Part of this authority is discharged to the Radiological Protection Safety team including Strategic Scientific Development Officer, RWA/RPA and Radiological Safety Officer.

Chief Operating Officer is required to appoint in writing a Radioactive Waste Advisor, Radiation Protection Advisor and Radiation Protection Supervisors.

#### 3.2 Deans of Schools/Heads of Professional Services

Deans of Schools/Heads of Professional Services shall:

- Ensure that systems are in place to control the purchasing or acquisition of ionising radiation material or equipment producing ionising radiation.
- Ensure that systems are in place to comply with this policy and University Local Rules (approved by Council)
- Ensure that adequate resources are made available to implement this policy. In particular:
  - Allocate sufficient resources to install and maintain effective control measures in accordance with statutory requirements
  - Provide training for staff to comply with this policy
- Nominate a responsible person to act as a Radiation Protection Supervisor (RPS) – appointment will be made by Chief Operating Officer and Radiation Protection Team.
- Ensure training and competencies for all relevant staff and student
- Ensure safe disposal of all radioactive material

#### 3.3 Radiation Protection Supervisors

Persons appointed to the role of RPS should be sufficiently competent through experience and/or qualification to carry out the role. Radiation Protection Supervisors will be appointed in writing by the Chief Operating Officer and attend the meetings of the Radiological Sub-Committee.

Training for RPS's is mandatory and satisfied by attendance on suitable professional training courses with refresher training every four years and in-house training by Radiation Protection Team.

Duties of Radiation Protection Supervisors – see appendix 1

#### 3.4 Line Manager/Academic Supervisor

Staff who are responsible for managing the activities carried out by students, staff or volunteers are considered as laboratory or academic supervisors. As such they have a duty to ensure the health and safety of the students/staff they supervise and have responsibilities where their students/staff handle ionising radiation.

Line managers are responsible for the health and safety of the staff/students they manage and others who may be affected by their work.

Line Managers/Academic Supervisors will ensure:

- That they are a registered radiation user themselves and have completed the mandatory radiation protection training course.
- The risks posed by the use and handling of ionising radiation are assessed prior to work in accordance with the University Local Rules and that action is taken to prevent or control exposure so far as reasonably practicable
- Personnel they manage/supervise are registered as radiation users and have completed the mandatory training.
- Measures are employed to ensure that Radiation Exposure Limits – Statutory and University level (where applicable) are not exceeded
- All risk assessments signed off by themselves and then by an RPS and the University Radiation Protection Team.
- Ensure using the hierarchy of control to facilitate the risk assessment process.
- Ensure equipment and work areas they are responsible for are decontaminated

### 3.5 University Radiation Protection Team - URPT

The University Radiation Protection Team shall:

- Produce, and as often as necessary, review the Ionising Radiation Policy, Approved Local Rules and associated guidance documents
- Monitor compliance with this policy
- On request provide information and guidance to staff/students on workplace exposures
- Support Deans/Heads of Professional Services in their duty to provide sufficient training to comply with this policy.
- Arrange monitoring for Ionising Radiation where appropriate
- Attend University Radiation Protection Committee and escalated reports to the University Health, Safety and Environment Committee as necessary
- Liaise with external regulatory bodies and ensure all statutory returns to these bodies are carried out accordingly
- Audit Schools/Departments to ensure compliance

The Radiation Protection Team and/or Chief Operating Officer have the authority to require the cessation of experimental work in any area in which the Local Rules or this policy are not being followed until such times that the arrangements for future operation are satisfactory.

### 3.6 Radioactive Waste Advisor (RWA)

The Radioactive Waste Advisor shall advise the University on all aspects of radioactive waste and EA permit compliance in relation to EPR 2012. Schedule 23 of EPR2010 enacts the requirement laid down in Euratom Basic Safety Standards Directive for the Radiation User (Chief Operating Officer) to consult RWA on application of Best Available Techniques (BAT) for the protection of the environment and populations.

### 3.7 Radiation Protection Advisor (RPA)

The RPA, shall advise the University on all aspects of the use of ionising radiations and radioactive substances relating to the health and safety of workers, including the designation of workers and the classification of controlled areas in accordance with IRR17.

### 3.8 Radiation Protection Sub Committee

The Radiological Protection Sub-Committee shall monitor health aspects and control of ionising radiations and radioactive materials within the University. It is also responsible for establishing protocols and procedures for the management of radioactive materials and wastes under the terms of the University's permits from the Environment Agency. The Sub-committee is responsible for drafting Local Rules for approval by Council and for ensuring that these regulations are enforced. It shall report to Council annually. See Appendix 2 for Membership and Terms of reference.

### 3.9 Appointed Doctor

The University will appoint a suitably qualified doctor as an "Appointed Doctor" under the requirements of The Ionising Radiations Regulation 2017. The HSE will be notified of the appointment.

### 3.10 Employees and students

Employees and students shall:

- Attend training as requested by the RPS or Radiation Protection Team
- Ask for approval if ionising radiation materials are to be brought into the School/Service other than by the School/Service own procurement procedures.
- Co-operate with the University to implement any control measures identified in the risk assessments
- Report any defects in equipment producing ionising radiation and or report any theft or losses of radioactive material
- Follow University Local Rules

## 4. General Requirements and Guidance

### 4.1 Purchase and acquisition

The following requirements relate to both the purchase of radioactive material and equipment producing ionising radiation plus situations where these items are brought into the University from other organisations.

Radioactive material/Equipment producing radiation may only be procured and delivered through the University system by current members of staff and post graduate research students for use in legitimate university activities. All procurement must have prior approval from the University RWA. Detailed procurement information is available within the Radiation Local rules document.

When acquiring previously held substances, line manager/academic supervisors must ensure an up to date risk assessment exists to cover the task for which the radioactivity is to be used for. Risk assessments should be reviewed regularly and following any significant change.

Staff purchasing/acquiring radioactive material/equipment producing radiation that must liaise with their RPS and URPT to ensure the university has the correct permit and the appropriate authorities are notified.

If ordering on Agresso the following Agresso codes must be used:

P_LYA	Open radioactive sources/Uranium/Thorium salts/NORM
P_LYB	Sealed radioactive sources
P_LYC	Equipment producing ionising radiation

## 4.2 Disposal and Decontamination

It is important for Schools/Services to consider the waste disposal route before purchasing or using radioactivity for the first time. A suitable waste disposal route must be identified and approved by the University's RWA. Please refer to the Local Rules for guidance and information.

All equipment which has been used in conjunction with radioactive material must be decontaminated and assessed for any residual risk posed by the radiation before it is released for maintenance, repair or disposal. Please speak to University Radiation Protection Team for clearance certificates.

Infrastructure, sinks, drainage and extractions clearance certificates must be approved and issued by URPT.

## 4.3 Emergency Arrangements

To protect people and the environment from the potential consequences and to maintain business continuity it is vital that all persons who have a part to play in any intervention or 'recovery' act in a consistent manner and follow a considered plan of action. The approved local rules contain contingency information to define the procedures to be followed in the event of a significant incident.

The contingency information deals with theft or loss, or significant damage to radioactive sources or to radiation facilities and major spillages. Minor spillages and decontamination procedures should be covered separately in local documentation

## 4.4 Emergency Arrangements

Regulation 15 of IRR17 requires all employees/students who are engaged in work with ionising radiation are given appropriate training in the field of radiation protection and receive such information and instruction as is suitable and sufficient for them to know:

- The risks to health created by exposure to ionising radiation
- The precautions which should be taken; and
- The importance of complying with the medical, technical and administrative requirements of these Regulations

Some employees/students may not be closely involved with the work but need suitable information or instruction to avoid being unnecessarily exposed to ionising radiation. This is particularly important in areas with sealed sources.

Everyone working with radioactivity must attend the mandatory Radiation Protection Awareness training delivered by the University Radiation Protection Team.

## 5. Specific Requirements

### 5.1 Emergency Arrangements

The University is must have a notification and registration for radioactive work approved by the HSE.



Schools/Services must ensure arrangements are in place to comply with IRR17. This is accomplished by liaising with the local Radiation Protection Supervisors, University Radiation Protection team and adhering by the University Local Rules.

The risks to health of staff and students from activities involving radioactivity must be assessed (IRR17 Regulation 8) prior to work commencing. The risk assessment should reflect:

- The nature of the sources of ionising radiation to be used, or likely to be present, including accumulation of radon in the working environment
- Estimated radiation dose rates to which anyone can be exposed
- The likelihood of contamination arising and being spread
- The results of any previous dosimetry
- Advice from manufacturer or supplier of equipment about its safe use and maintenance
- Any planned systems of work
- Estimated levels of airborne and surface contamination likely to be encountered
- The effectiveness and the suitability of PPE to be provided
- Possible accident situations, their likelihood and potential severity
- The consequences of possible failures of control measures

There must be university Local Rules (regulation 18) in place (written by the URPT) and approved by the University Council.

## NOTIFIABLE EVENTS

Under the Ionising Radiations Regulation 2017, the over-exposure of a person (Regulation 27) is notifiable to the HSE, the Appointed Medical Doctor of the HSE, and to the University's Occupational Health Physician.

Unauthorised release or spillage of specified quantities of radionuclides is notifiable to the HSE in accordance with Regulation 31 of the Ionising Radiations Regulation 2017 (IRR17– Schedule 7).

### 5.2 Environmental Permitting Regulations 2010 (EPR10)

The University in accordance with EPR10 had 2 permits. One to hold and dispose of open source radioactivity and one to hold sealed radioactive sources. Both permits cover the whole of the University site.

Schools/Services must ensure arrangements are in place to comply with EPR10. This is accomplished by liaising with the local Radiation Protection Supervisors, University Radiation Protection team and adhering by the University Local Rules.

**The permit stipulates the method of disposal authorised and the conditions of disposal. The Local Rules must be followed to avoid any breach of the permit.**

All new work involving the disposal of radioactive material must be discussed, in advance, with the relevant RPS and justified using the Justification and Waste Calculation form (RP26). This is a condition of the LU BAT (Best Available Techniques) document.

We are required to use BAT to:

- Justify the use of radioactive materials
- Minimise activity and volume of radioactive waste generated
- Dispose of radioactive waste so as to minimise the impact on the environment and the public

We are required to routinely check effectiveness of procedures, systems and facilities in meeting the requirements of BAT. Staff should be adequately trained to meet the requirements and appropriate records must be kept demonstrating compliance. All facilities used for the disposal and storage of radioactive waste should be maintained in good repair. This relates to LEV, drainage systems and storage areas.

## NOTIFIABLE EVENTS

Under the Environmental Permitting Regulations 2010 (EPR2010 – Schedule 23) and the University's various Permits, plus IRR17 Regulation 30, the loss or theft of a radioactive source must be notified forthwith to the Environment Agency and the Counter Terrorism Security Office.

## 6. Regulated Substances

### 6.1 Euratom – nuclear material

Euratom requirements for small users of nuclear material in the UK (outside the major nuclear facilities) are set out in the Euratom Treaty 1957, with the reporting requirements amplified in Commission Regulations (Euratom) No 302/2005. Some small users of nuclear material in the UK were given derogation to report annually using a shortened version.

Loughborough has nuclear material in the form of Uranium and thorium salts (for example Uranyl nitrate), depleted Uranium, highly enriched Uranium (U-233) and Plutonium (Pu-239). These stocks are stored in Radiochemistry.

The University is required to keep detailed records of each individual stock which must include information such as date of acquisition, MBA code of supplier, where it has originated from and why we have it.

Under the Euratom regulations the University is required to report the following onto an EC specialised reporting database named Enmas:

1. Inventory Change Reports (ICR) (Monthly)
2. Basic Technical Characteristics (Annually)
3. Physical Inventory Listings (PIL) (Annually)
4. Material Balance Record (MBR) (Annually)

### 6.2 Nuclear Declaration

(Protocol Additional to the Agreement between the United Kingdom of Great Britain and Northern Ireland, the European Atomic Energy Community and the International Atomic Energy Agency for the Application of Safeguards in the United Kingdom of Great Britain and Northern Ireland in Connection with the Treaty on the Non-Proliferation of Nuclear Weapons)

The UK is required to provide the IAEA with the next update declarations of the information identified in Articles 2.a.(i), (iii), (ix) and Article 2.b. of the UKAP.

In general, the following process can be used to determine whether or not any particular R&D project is declarable:

- Is the work nuclear fuel cycle-related, as defined in Article 18a of the UK Additional Protocol (The full text of the Protocol can be found on the IAEA website at
- Does the work involve collaboration with a non-nuclear weapon State (NNWS, i.e. any State other than China, France, Russia, UK and USA), or is it otherwise related to a NNWS?
- Is the work funded, specifically authorised or controlled by or carried out on behalf of the UK Government?
- Is the work related to enrichment, reprocessing of nuclear fuel or the processing of intermediate or high-level waste containing plutonium, high enriched uranium or uranium-233 that involves separation of elements?

**The research project does not have to involve physically working with nuclear material, it can include modelling and sub groups of research stemming off the main research purpose.**

URPT will report this on behalf of the university annually.

## 7. Technical References and Further Reading

Loughborough University Local Rules (ask URPT for copy)

LU BAT (ask URPT for a copy)

Work with Ionising radiation (IRR17) Approved Code of Practice and Guidance

Ionising Radiation Regulations 2017

Environmental Permitting Regulations 2010

## Appendix 1 - Duties of Radiation Protection Supervisors

The Radiation Protection Supervisors will be responsible, in close collaboration with the Radiation Protection Officer, for day-to-day matters of safety and close supervision of radiation work within their own Schools/Departments. These include:

- Keeping a weekly register of all sealed radioactive sources kept permanently in the department together with a record of periodic leakage tests, which must be carried out at regular intervals not exceeding 24 months. Records relating to the whereabouts of each sealed source must be kept up to date on a daily basis.
- Keeping an up-to-date register of unsealed sources, their use and ultimate disposal.
- Sending, at intervals of not more than 1 month, a copy of the current sealed source register or registers and at intervals of not more than 1 month a copy of the unsealed source registers and waste disposal records to the Radiation Protection Officer.
- Carrying out and recording regular surveys for contamination where unsealed radioactive materials have been used and to audit the contamination monitoring carried out within their own laboratories.
- Carrying out and recording regular leakage surveys on equipment emitting ionising radiations at a frequency of not less than 6 months.
- In consultation with the Radiation Protection Officer, carrying out duties relating to the registration of radiation workers, administration of TLD or film badges and notification of termination of work together with other general measures controlling safety as laid down in the Local Rules. Exceptionally, in order to ensure the necessary close supervision, it may be necessary to appoint more than one Radiation Protection Supervisor within a School/Department.
- Ensuring suitable risk assessments are carried out on all new work involving the use of ionising radiation
- Making arrangements for the delivery of appropriate information and training to radiation workers in their area.
- Reporting any suspected loss or theft immediately to the Radiation Protection Officer
- Reporting any significant accidental exposures, breaches of the Local Rules or any other matters giving cause for concern to the RPO.

## Appendix 2 - Membership and Terms of Reference for Radiation Protection Sub-Committee

The members of the committee shall consist of:

- Chief Operating Officer (permit holder)
- University Radiation Protection Officer and Radiation Protection Team
- RWA (if different to above)
- Radiation Protection Supervisors who shall be members of staff in Schools/Departments working with ionising radiations, nominated by their Dean of School and appointed by the University Chief Operating Officer
- Occupational Health Advisor
- University Health, Safety & Risk Manager
- Facilities H&S representative
- A secretary who shall be a member of the administrative staff of the University

### Terms of Reference

- The Radiological Protection Sub-Committee shall monitor health aspects and control of ionising radiations and radioactive materials within the University.
- It shall be responsible for establishing protocols and procedures for the management of radioactive materials and wastes under the terms of the University's Authorisation from the Environment Agency.
- The Sub-committee is responsible for drafting local rules for approval by Council and for ensuring that these regulations are enforced.
- Meetings are held 3 times a year with further meetings as necessary.
- It shall report to Council yearly through the Radiation Protection Officer.