Health & Safety Policy

IONISING RADIATION SAFETY & ENVIRONMENTAL POLICY
UHSP/14/RADS/2020
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**APPENDIX 1** Summary of Responsibilities for Implementing and Supporting the University Radiation Safety Policy

**APPENDIX 2** University Radiation Approval Process

**APPENDIX 3** Approval Pack Checklist

**APPENDIX 4** Radiation Risk Assessment

**APPENDIX 5** Local Rules

**APPENDIX 6** Guidance Notes on the Use, Accumulation and Disposal of Radioactive Materials

**APPENDIX 7** Dose Limits (IRR17 Regulation 12 Schedule 3 - Part 1)

**APPENDIX 8** Hazard/Risk Management

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Ionising Radiation Safety Policy

1. Introduction

Ionising radiation has many uses in industry, such as energy production, manufacturing, medicine and research and produces many benefits to society. Ionising radiation occurs as either electromagnetic rays (such as X-rays and gamma rays) or particles (such as alpha and beta particles). It occurs naturally (eg from the radioactive decay of natural radioactive substances such as radon gas and its decay products) but can also be produced artificially.1

Artificially produced radioisotopes can be contained and used as sealed sources; the radioactive material is sealed in a container, but the radiation from the material escapes through the container wall. Unsealed radioactive material i.e. radioactive material which is not permanently sealed within a capsule is typically in the form of a liquid or a powder, although solid and gaseous sources can also be used.2

People can be exposed externally to radiation from a radioactive material or a generator such as an X-ray set, or internally by inhaling or ingesting radioactive substances. Wounds that become contaminated by radioactive material can also cause radioactive exposure. Everyone receives some exposure to natural background radiation and much of the population also has the occasional medical or dental X-ray.3

The aim of this policy is to ensure that people working with radiation exercise safe working practice, are aware of the responsibilities of role holders and processes for authorisation and that the practices of the University are consistent with, and where possible exceed, expectations associated with national policy and guidelines. It is expected that all individuals who are responsible for radiation use within the University of Birmingham adhere to the principles of ALARP (As Low As Reasonably Practicable) and create a safe working environment for both themselves and colleagues.

The University is committed to restricting exposures to ionising radiation, so far as reasonably practicable, and discharging its responsibility to develop and administer systems of control relating to radiation protection and delivering practices that are compliant with all legislation governing work with sources of ionising radiation; including Ionising Radiation Regulations 2017 (IRR17) and The Environmental Permitting Regulations 2016 (EPR2016).

This Policy sets out the management and administrative arrangements and responsibilities within the University to ensure compliance with the regulations. It also details the rules for working with ionising radiation and radioactive materials to ensure compliance with the regulatory requirements. All work with ionising radiation must be authorised to ensure the health and safety of staff, students and visitors and the control and management of radioactive materials and radiation generators must be maintained at all times.

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1 Health & Safety Executive: https://www.hse.gov.uk/radiation/ionising/protection.htm
2 Public Health England: RPS-1, Basic Concepts, 06/18
3 Health & Safety Executive: https://www.hse.gov.uk/radiation/ionising/protection.htm
2. Scope

This Policy applies to all employees and other persons that may be affected by ionising radiation arising from the University work activities. This includes the protection of the environment and public by controlling the keeping, use and disposal of radioactive material. The Policy applies to all radioactive substances, and to radiation generators.

In order to use ionising radiation it must be demonstrated that prior to any significant exposure to radiation:

1. The use has been approved by the Chair of the University Radiation Safety Group,
2. The approval confirms the exposure to radiation is justifiable,
3. That effective control measures will be in place at all times, and that exposure to radiation will be prevented or kept as low as is reasonably practical, and
4. That competent advice was sought prior to any significant exposure to the radiation.

3. DEFINITIONS & ABBREVIATIONS

The definitions of terms included in both the Ionising Radiation Regulations 2017 and The Environment Permitting Regulations 2016 and in particular Schedule 23 of EPR 2016 which are provided to help interpret the requirements of the Regulations can be found in Appendix 15.

The following are abbreviations that are used throughout this Policy:

- ADS: Approved Dosimetry Service
- ALARP: As Low As Reasonably Practicable
- CRPC: College Radiation Protection Co-ordinators
- DGSA: Dangerous Goods Safety Adviser
- EA: Environment Agency
- EPR Permit: Environmental Permitting Regulations Permit
- EPR2016: The Environmental Permitting Regulations 2016
- HASS: High Activity Sealed Sources
- HOC: Heads of College
- HOS: Head of School
- HSE: Health & Safety Executive
- IRR17: Ionising Radiation Regulations 2017
- PPE: Personal Protective Equipment
- RIDDOR: Reporting of Injuries, Diseases & Dangerous Occurrence Regulations 2013
- RPA: Radiation Protection Adviser
- RPO: Radiation Protection Officer
- RPS: Radiation Protection Supervisors
- RWA: Radioactive Waste Adviser
- UEB: University Executive Board
- UHSEG: University Health and Safety Executive Group
- URSG: University Radiation Safety Group
4. ROLES & RESPONSIBILITIES

The following responsibilities are in addition to those within the University's Health & Safety Policy and specifically relate to the management and the involvement in ionising radiation work activities. A diagram of the University’s Management Structure for Radiation Safety is included in Appendix 1.

4.1 Vice Chancellor (VC)

The VC is the ‘Radiation Employer’ for the purposes of the Ionising Radiation Regulations (IRR) 2017 and the relevant environmental protection Acts and Regulations.

4.2 Heads of College (HOC)

The HOC must:

- Appoint in writing a competent person to act as the College Radiation Protection Coordinator (CRPC). The CRPC will assist the HOC in implementing the policy. The CRPC will act as the main contact within the College for the Radiation Protection Adviser (RPA), the Radiation Protection Officer (RPO), and others providing radiation protection services.
- Ensure that sufficient competent persons are appointed in writing to act as Radiation Protection Supervisors (RPS). These appointments should be made by the Head of School/Director of Institute in consultation with the RPA.
- Make arrangements to ensure that where work is not compliant with local rules or on the advice of the RPA the work is stopped or restricted

4.3 University Radiation Safety Group (URSG)

The URSG is responsible for:

- Authorising work in accordance with the adopted University Approval Process in Appendix 2
- Ensuring a competent Radiation Protection Service is provided
- Ensuring a competent RPA(s) is appointed
- Disseminating best practice in relation to radiation safety
- Providing assurance reports to the UHSEG

4.4 Heads of School (HOS) and Directors of Institutes (DOI)

HOS and DOI must make arrangements to ensure that:

- All radiation work is subject to a suitable and sufficient risk assessment prior to any significant exposure to radiation. The risk assessment must take into account all significant exposures, including exposure resulting from foreseeable and other emergencies.
- Radiation Risk Assessments, using the form in Appendix 4 and in consultation with the University’s RPA, are carried out in advance of work commencing and that these are reviewed whenever there are significant changes to the work or at least annually to ensure that they remain relevant;
- Local Rules, using the form in Appendix 5, and in consultation with the University’s RPA, are carried out and that these are reviewed whenever there are significant changes to the work or at least annually to ensure that they remain relevant
- Classified persons have been determined as fit to work by the University’s Appointed Doctor
- A decommissioning plan has been developed for any significant equipment, apparatus or facility.
- Access to sources is controlled
- Work with ionising radiation is undertaken safely and in accordance with the Local Rules
- Where appropriate a suitable dosimeter and monitoring service is provided and used by the School’s and Institute’s radiation workers and that records are kept. Also training regarding
their use is delivered and radiation workers are alerted if potential exposures are observed and alert the dosimetry service of potential false exposures.

- Safe working practices and environments are maintained through good housekeeping, on the job training, prevention of build-up of radioactive waste
- HOS and DOI are responsible for:
  - Appointing, in writing, competent persons, in consultation with the University’s RPA where necessary, as RPS
- Providing support for emergency response and contingency plan practices
- Stopping or restricting work which is not compliant with local rules or on the advice of the RPA

4.5 College Health & Safety Management Committee

The College Health & Safety Management Committee (CHSMC) is responsible for:

- Ensuring and monitoring practices of emergency response/ contingency plans
- Carrying out systematic audit of practices

Upon agreement with the CHSMC, relevant roles and responsibilities can be appointed down through internal College Radiation Safety Groups and the findings fed back to the CHSMC.

4.6 Principal Investigator/Researcher

Principal Investigators/Researchers (person responsible for the research project using radiation) are responsible for:

- Identifying any new or changed work with radiation
- Designing experiments, processes and the areas involving radiation work with the support of the RPS, radiation workers and managers to ensure exposure is kept as low as reasonably practicable and that environmental emissions and disposals are kept as low as reasonably practical by using Best Available Techniques
- Ensure that all proposed purchases and acquisitions of radioactive materials are made with appropriate authorisation in consultation with Radiation Protection Officer Services in advance of the transaction to ensure that the permitted levels under the EPR2016 permits are not exceeded
- Carrying out a risk assessment prior to any radiation work being undertaken using the Radiation Risk Assessment template in Appendix 4, with the support of the RPS, in consultation with the RPA, and ensuring the risk assessment is reviewed at least annually
- Developing the Local Rules for the radiation work being undertaken, using the Local Rules template in Appendix 5, with the support of the RPS, in consultation with the RPA (via RPO Services), and ensuring that these are reviewed at least annually
- Developing a decommissioning plan for when the radiation work has been completed, using the template in Appendix 11
- With the support of the Radiation Protection Services preparing the Approval Pack to be provided to the URSG as required by the Approval Process in Appendix 2
- Preventing and reducing the risk of unauthorised access to radioactive sources by controlling and limiting access to them
- Ensuring that all radiation workers are provided with a suitable dosimeter and monitoring and providing training regarding their use
- Delivering annual ‘on the job’ radiation safety training to all radiation workers including Classified Radiation Person and trainee radiation workers and ensuring they are all competent to undertake radiation work
• Delivering annual ‘toolbox talks’ to all radiation workers in their areas of responsibility (including Classified Radiation Person and trainee radiation workers) to ensure they are competent regarding the work, and familiar with the relevant risk assessments, local rules, and emergency procedures.
• Ensuring that all controlled and supervised areas are decommissioned following their use and are left in a safe condition
• Reviewing radiation workers and others at risk (e.g. pregnant women) where necessary with the support of the RPS and/or the CRPC and ensuring action is taken when required
• Reviewing contingency plans, especially after bad practice has been established or an incident or at least annually and recording and analysis when the contingency plans have been carried out
• Assisting in investigations and taking action following any accidents or incidents

4.7 Radiation Protection Supervisors (RPS)
The RPS supports the HOC in implementing the policy by supervising the day to day implementation with regard to a specific area or process.

The duties for an RPS are taken from IRR 2017 and EPR2016, and are as follows:

• Supervising the implementation of the workplace monitoring programme
• Maintaining adequate records of all radiation sources and checking the High Activity Sealed Sources (HASS) ensuring that these are being stored and used in accordance with the Environment Agency Permits and Local Rules and Risk Assessments
• Checking that all radioactive sources are registered on the University’s electronic database
• Carrying out periodic assessments of the condition of the relevant safety and warning systems
• Supervising the implementation of the personal monitoring programme and alerting radiation workers if a potential exposure is observed through dosimetry
• Supervising the implementation of the health surveillance programme;
• Providing new workers with an appropriate introduction to local rules and procedures
• Giving advice and comments on work plans
• Establishing work plans
• Providing reports to the local management
• Participating in the arrangements for prevention, preparedness and response for emergency exposure situations
• Providing information and training for those working with ionising radiation
• Liaising with the RPA.
• Maintaining the Radiation Safety Management File, originally known as the Approval Pack, (record of Local Rules and Risk Assessments and periodic checks etc.), see Appendix 3
• Supervising the radiation work and restricting or stopping work that is not compliant with local rules or on the advice of the RPO
• With the area managers, periodically checking safe working practices defined within Local Rules and ensuring they are being implemented
• Ensuring all controlled or supervised areas are clearly demarcated
• Ensuring that the University’s EPR2016 open source permits are displayed in all areas using and disposing of open sources
• Making entries into passbooks for outside workers

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4 A ‘toolbox talk’ is a short presentation to the workforce on a single aspect of health and safety e.g., radiation safety.
4.8 **Classified Persons**

All Classified Persons, in addition to the responsibilities below in 4.10 are responsible for:

- Wearing their dosimeters
- Attending medicals with the Appointed Doctor to determine their fitness to work with ionising radiation and their continued fitness to work with ionising radiation and review health records
- Ensure the radiation passbook issued to them is valid, kept and updated.

4.9 **Radiation Workers and Other Individuals**

Individuals, including radiation workers, trainees, contractors and visitors must:

- Co-operate with any person appointed to advise or monitor health and safety in the local safety arrangements for radiation safety
- Adopt safe practices in activities involving sources of ionising radiation, in particular to carry out the work in designated areas, to wear appropriate dosimetry, personal protective equipment and clothing where required
- Ensure that radioactive materials are disposed through the correct waste routes and that disposal limits laid out in the University’s EPR2016 permits are not exceeded
- Where required, to keep appropriate records including records detailing the use and disposal of radioactive materials through the University’s electronic database
- Report any radiation incidents, accidents or defects in equipment relating to the handling or use of sources of ionising and non-ionising radiation to the local health and safety co-ordinator as soon as practicable
- Where radiation awareness training is not available, workers can commence radiation work after local training and under direct supervision by an RPS until the next available radiation awareness course becomes available.
- Notify Radiation Protection Officer Services and their CRPC if any radioactive material is to be moved or transported who will then consult the RPA and Dangerous Goods Safety Adviser (DGSA) if required and make changes to the University’s electronic database

No person shall intentionally or recklessly misuse or interfere with any radioactive substance or any radiation generator.

4.10 **Radiation Protection Officer Services (RPO Services)**

Implementation of the policy is supported by a set of services across a number of roles provided by HR Workplace Wellbeing. These radiation protection officer services are co-ordinated by the RPO and are responsible for:

- Being the main point of contact and liaising with for external inspections, e.g. HSE, EA on all matters relating to IRR17 and EPR2016. This will include communications relating to notifying, registering, seeking consent, permitting and statutory reporting.
- Liaising, when necessary, with the appointed RPA and RWA with regards to compliance with IRR17 and EPR2016.
- Supporting and assisting Principal Investigator/Researcher, RPS and CRPC in developing and maintaining local operating procedures, local rules and Risk Assessments contained within the Approval Pack/Radiation Safety Management file, in consultation with the RPA
- Maintaining centrally required statutory records, in cooperation with RPSs, CRPCs and users.
- Managing the centrally provided ionising radiation safety training which includes facilitating the RPA training
- Checking that all notified proposed radioactive material purchases or acquisitions do not exceed the University’s permitted amounts under EPR2016 permits
- Facilitating the disposal of solid radioactive and organic waste
- Formally closing out decommissioned work area in consultation with the University’s RPA
• Consulting with the RPA and DGSA regarding requirements when radioactive materials are to be transported off or across campus
• Providing a Leak Test service for sealed sources and ensuring records are kept
• Participating in the investigation of radiation incidents, in accordance with the University’s Accident and Incident Reporting Policy, and externally reporting these if the reporting criteria is met e.g. RIDDOR
• Commissioning an Appointed Doctor to determine a Classified Radiation Worker’s fitness to work with ionising radiation and their continued fitness to work with ionising radiation and review health records
• The RPO Service, in consultation with the URSG, is also responsible for:
  o Making necessary Permit Applications or alterations
  o Notifying relevant bodies of radiation materials and work
  o Appointing RPAs
  o Reviewing the University’s Ionising Radiation Safety Policy including the training provisions
  o Facilitating the University’s dosimetry and calibration service
  o In liaison with the Chair of the Group, providing assurance reports to the UHSEG

4.11 Radiation Protection Adviser (RPA) & Radioactive Waste Adviser (RWA)

The Basic Safety Standards Directive (BSSD 2013) sets out the role of the “Radiation Protection Expert” (RPE) which in the UK is fulfilled by two different roles specified in different legislation and regulated by different organisations. Radioactive Waste Advisers (RWAs) who are involved in radioactive waste management and environmental radiation protection and Radiation Protection Advisers (RPAs) who advise on occupational radiation protection. The University as the Radiation Employer under IRR17 and site operator listed in the EPR permit must have both an appointed RPA and RWA.

The University’s commissioned RPA fulfils both the RPA and RWA roles and is responsible for:

• Providing consultation and advice in relation to the matters included in Schedule 4 of IRR17:
  o The categorisation and implementation of requirements as to controlled and supervised areas.
  o The prior examination of plans for installations and the acceptance into service of new or modified sources of ionising radiation in relation to any engineering controls, design features, safety features and warning devices provided to restrict exposure to ionising radiation.
  o The appropriateness and regular calibration of equipment provided for monitoring levels of ionising radiation and the regular checking that such equipment is serviceable and correctly used.
  o The periodic examination and testing of engineering controls, design features, safety features and warning devices and regular checking of systems of work provided to restrict exposure to ionising radiation.
• Being consulted and advising on all the Local Rules and radiation risk assessments to provide independent and competent advice, and advising other duty holders on the status of proposals.
• Advising on the nature, extent and results of critical examinations
• Reviewing and delivering the centrally provided radiation safety training content/ practices in accordance with the Training Matrix in Appendix 12B
• Supporting the Principal Investigator/Researcher to undertake the Radiation Risk Assessment including classifying areas and person.

• Providing consultation and advice on:
  o achieving and maintaining optimum protection of the environment and the population
  o checking the effectiveness of equipment used, in support of the above
  o accepting into service the equipment and procedures used to assess exposure and minimise contamination of the environment and the population
  o quality assurance
  o environmental monitoring programme
  o arrangements for radioactive waste management
  o preparedness and response in emergency exposure situations

4.12 College Radiation Protection Co-ordinators (CRPC)

CRPCs support the HOC by co-ordinating the day to day implementation of the policy across the College. The CRPC are supported by the RPA, and RPO - and others providing radiation protection services.

CRPCs are responsible for:

• Arranging the College’s personal dosimetry through an approved dosimetry service, in consultation with the URSG and College Health & Safety Management Committee
• Maintaining the Dose Records for their college and alerting the dosimetry service of potential false exposure and passing onto Outside Workers their recorded dose rates
• Reviewing the effectiveness of controls on work with sources of ionising radiation
• Reviewing the monitoring in designated areas
• Reviewing waste disposal routes and the recording of disposals
• Reviewing the status of Classified Persons
• Implementing, for their College, any actions plans for accident/incident investigations and radiation compliance
• Editing the University’s electronic database when radioactive materials are moved between storage locations
• Reviewing any locally provided radiation safety training content/practices
• Acting as the main contact within the College for the RPA, the RPO and others providing radiation protection services
• Maintaining the college information in support of registration under IRR 2017
• Coordinating the college to ensure an up to date inventory of risk assessments and local rules
• Reporting to the HOC and/or the College Health & Safety Management Committee the status of the risk assessments and local rules
• Providing relevant college records to the RPO
• Providing routine updates to the URSG
• Carry out periodic audits of the radiation safety arrangements in the College.
5. ACTIVITIES TO ENACT THIS POLICY

5.1 Approval of Work Involving Ionising Radiation

The University Radiation Safety Group is responsible for the approval of both new work and work with significant change involving both open and sealed sources.

All new work and work with significant change must be approved, via the approval process in Appendix 2, before work can commence. This process involves the submittal of an approval pack, consisting of a number of documents; radiation risk assessment, local rules etc., please see the Checklist in Appendix 3 for the full list of evidence that will be requested by the URSG. The HSE notification, registration or consent will be carried out on behalf of the University by the RPO services and once the work has been approved the pack will become the Radiation Safety Management file which must be reviewed annually.

RPO services should be contacted and advice sought if clarification is required to identify if new or significantly changed work.

Work with ionising radiation cannot take place until it has been confirmed that Notification to or Registration with the HSE has been made or Consent has been granted by the HSE.

5.2 Notification of the Acquisition of Sources

All proposed open and sealed sources must be entered onto the on-line database and authorised by RPO services prior to ordering or loan/gift agreement or before any significant change is proposed to existing equipment or work involving ionising radiation. Notification requirements to the RPO services also apply to radioactive materials (which are not received in the standard way via the RPO services) including radioactive materials and objects that are made and radiation generators acquired from any place and by any method including purchases, loans and gifts.

The need for any radioactive source should be justified prior to acquisition; justifying the research need and the amount or strength to be acquired, which should be kept to the absolute minimum required. The future disposal cost and liabilities must also be taken into account as part of the costing and justification.

The University’s EPR Permit from the EA dictates that only certain quantities of radioactivity are permitted on University premises at any time subject to specified conditions. In addition, where there are plans to acquire sealed sources, or order significant quantities or generate radioactive materials it should be noted that any change to an existing EPR Permit can take up to 3 months to be processed by the EA. Any change to an existing Permit will require a variation/application fee to be presented with the application form to the EA payable by the College/School/Institute.

5.3 Planning Work involving Sources of Radiation – Radiation Risk Assessment and Local Rules

In consultation with the University’s RPA, before any work is undertaken that involves the use of any type of ionising radiation source, an assessment of the hazards must be made, having regard to potential exposure to external and internal radiation hazards from normal operations and foreseeable accidents as appropriate. Procedures must be devised and protective measures introduced to ensure that exposure to ionising radiation is minimised, and under no circumstances must work be undertaken that could lead to the dose limits, in Appendix 7, being exceeded. The assessment should be made and available to all persons subject to it.

The template and associated guidance in appendix 4 must be used to record the assessment. The University’s RPA must be consulted, via the RPO services, before any new or significantly changed work is undertaken that involves the use of any type of ionising radiation source.
All radiation risk assessments for new and significantly changed work must be submitted to the URSG for approval via the approval process, see appendix 2.

Local rules set out the arrangements for restricting exposure in a particular area and must be in place for controlled areas, and supervised areas. Details given in these rules should be appropriate to the nature and degree of the risk of exposure to ionising radiations. The rules must cover work in normal circumstances and also the particular steps needed to control exposure in the event of a radiation accident. The local rules template can be found in appendix 5.

**Responsibility for carrying out the assessments rests with the PI/Researcher** who must seek advice and assistance from the CRPC, RPO and if necessary from the University’s RPA.

### 5.4 Restricting Exposure

Procedures must be devised and protective measures introduced to ensure that exposure to ionising radiation and the release of radioactive material into the environment is as low as reasonably practicable, and under no circumstances must work be undertaken that could lead to the dose limits in Appendix 7 being exceeded.

Control of exposure should follow the hierarchy of control;

- **Elimination/substitution** - choosing an alternative technique which does not involve ionising radiation.
- **Engineering** – enclosing, containing, shielding, interlocking
- **Supporting systems of work** – local rules, supervision, signage, monitoring
- **Personal protective equipment** – gloves, safety glasses

Good radiation protection practices must be used at all times in order to comply with this requirement. Included in the list of such practices are:

- minimisation of source activity/strength;
- the use of containment, shielding, distance protection;
- interlocks, where appropriate, the operation of which must be checked regularly;
- warning devices to indicate the status of equipment;
- use and maintenance of warning signs, warning lights (i.e. for generators) and labels;
- provision of suitable procedures/facilities to minimise contamination or its spread;
- not directly handling sources, where applicable
- minimisation of exposure time;
- adoption and maintenance of safe systems of work;
- regular contamination monitoring; and
- provision of suitable protective clothing

In particular:

- so far as is reasonably practicable, no sealed source may be held in or directly manipulated by the hand
- so far as is reasonably practicable, no open radioactive substance is to be held in or directly manipulated by hand; and
- no employee shall eat, drink or apply cosmetics in areas where there is a risk of internal radiation hazards.
Relevant items of the type listed above should be included in local rules and systems of work. Further guidance on hazard/risk management is included in Appendix 8.

5.5 On-line database
The on-line database is a commercial software package that the University uses to track radioactive sources and their usage and disposal. This enables the University to demonstrate legal compliance to the EA, ONR and other enforcing bodies.

All radioactive sources, in use and storage must be entered onto the system and labelled with the unique reference number. The usage and disposal of all sources must be recorded on the on-line database.

The on-line database is hosted on citrix, the Remote Access Service, by IT Services and controlled by the RPO services. To access the system ask your RPS to refer you to the RPO services, for information on using the system and user guides please use the following link.
https://intranet.birmingham.ac.uk/hr/wellbeing/worksafe/radiation/index.aspx

Any queries on the usage or content of the on-line database should be emailed to isostock-admin@contacts.bham.ac.uk

5.6 Records of Radioactive Material
College/Schools/Institutes must maintain records of the locations, activities, usage and disposals of all radioactive sources; open and sealed, via the on-line database.

5.7 Records of Radiation Generators
Colleges/Schools/Institutes must keep records of all radiation generators to which these rules apply and copies must be sent to the RPO services on request. The RPO services must be advised of any plans to acquire any new radiation generators or dispose of any.

5.8 Storage of Radioactive Material
Radioactive material must be tightly controlled kept in suitable containers and suitably stored to prevent unauthorised access, inadvertent dispersal and exposure.

The University’s EPR Permits from the EA contain conditions under which certain radioactive material must be stored and secured and relate to the National Counter Terrorism Security Office advice. The conditions in the permits must be complied with at all times. The RPO services should be contacted for advice on storage requirements.

The current Open Source Permits must be displayed wherever radioactive material is stored and used, copies can be obtained from the RPO services.

For radioactive material not in use, a container is suitable where it ensures effective restriction of exposure (surface dose rate should never exceed 2mSv/hr), prevention of dispersal and physical security. The store location must be protected from the weather, resistant to fire sufficient to minimise dispersal and loss of shielding, shielded to achieve the lowest dose rate that is reasonably practicable outside the store. Where non-classified persons may approach the outside of the store, the dose rate must not exceed 2.5 μSv per hour and ventilated for both radioactive and non-radioactive substances that have accumulated as both may be harmful. The store must also be physically security so that access is controlled and appropriately labelled.

Periodic verification of sources is required to be checked against their records at appropriate intervals and recorded on the on-line database. Information on the frequency of checks can be found in the audit section of this policy.
Colleges/Schools/Institutes are required to notify the RPO services immediately if they suspect any sources have been damaged, misplaced, lost or stolen

5.9 Disposal of Radioactive Material
Disposal of radioactive waste in any form is strictly controlled by the EA. The University's EPR Permit from the EA dictates the disposal of radioactive waste only by specified methods, within specified limits and subject to specified conditions. Appendix 6 contains a summary of the current methods and limits that are applicable at the University and of the procedures to be followed in each case. Colleges/Schools/Institutes must record the disposal of all radioactive sources on the on-line database.

The RPO services must be notified of and can facilitate the disposal of radioactive material that requires transfer to other premises away from the place at which they are normally kept, e.g. organic liquid waste and sealed sources. Costs associated with the disposal of radioactive material will be the responsibility of the owner of the source.

5.10 Transport and Movement of Radioactive Material
(a) Transport
Whenever radioactive material, open or sealed, is to be transported (i.e. by road, rail or air) it must be packaged, labelled and carry documentation in accordance with the requirements of relevant regulations. Packages received from recognised commercial suppliers or other Institutions can be expected to be properly packaged, labelled and documented; this being the consignor's responsibility.

If a University College/School/Institute is the consignor (the person sending the material), then responsibility rests with the individual concerned who must seek the advice and assistance of the DGSA through the RPO services.

Vehicles used to transport radioactive material (i.e. on public roads), either to or from the University, or as part of a programme of work, are also subject to the requirements of regulations and the advice of the RPO services must be sought. Those responsible for arranging the transport of radioactive material must ensure that the insurance policy for the vehicle allows its use for such a purpose.

(b) Movement
When radioactive material is moved from place to place within the University, they must be in containers which are appropriately packaged, labelled and suitable for the purpose, having particular regard to restriction of exposure, prevention of dispersal, physical security and the potential hazards likely to be encountered. This applies to movements within buildings as well as from building to building.

5.11 Temporary Removal of Radioactive Material from the University
Temporary removal of radioactive material from the University for use at other premises is controlled by the University’s EPR Permit. Only certain specified sealed sources may be removed; open sources may not be removed for use off-site. Any change to an EA EPR Permit can take up to about 3 months.

The RPO services is responsible for monitoring that the University complies with the quantity conditions relating to the sources that may be removed temporarily. No sources may be removed from the University without first obtaining permission from the RPO services.

5.12 Leak Testing of Radioactive Sources
Leak tests must be carried out on sealed sources at intervals not exceeding 2 years. Where a source is retained beyond its working life the test will be done annually or on a more frequent basis
determined by its condition and usage. Certain sources of low activity may be exempt from testing with the agreement of the RPO services.

The RPO services on behalf of Colleges/Schools/Institutes will perform leak tests for sealed sources and maintain the records on an on-line database.

5.13 Designation of Areas in which Radiation Sources are kept and used

Based on the assessed risks it may be necessary for an area to be classified as “Controlled” or “Supervised” in consultation with the RPA and RPO. This designation is to help ensure that the control measures provided are effective in preventing or restricting routine and potential exposures.

This is achieved by controlling and supervising who can enter or work in such areas and under what conditions. Normally, areas will be designated because it has been recognised the need for people entering the area to follow special procedures.

Examples of some of the criteria used to determine whether or not “Controlled” or “Supervised” areas need to be established are given in Appendix 9. The University’s RPA, via the RPO services, must always be consulted about this matter and will designate the area as appropriate.

“Controlled” and “Supervised” areas must be described in “local rules”. Standard notices must be used to identify controlled, supervised areas and low level areas.

5.14 Entry into controlled areas

Classified persons must have suitable dose monitoring and adequate medical surveillance in place. A classified person must have sufficient training and experience of work involving to enter the area.

Non-classified persons are only allowed access to controlled areas under specified conditions. These conditions are set out in the written arrangements which form part of the local rules. These arrangements will set out how exposure to ionising radiation is restricted, what PPE is used and what restrictions on the type of work allowed and/or the time spent in the area. Examples of when non-classified persons may require access to an area are when:

a) the whole room has been designated as a controlled or supervised area but the work with ionising radiation takes places in a small and controlled area (e.g. a bench or fume cupboard)

b) a person enters the area for a limited time to carry out simple maintenance work, to witness a test or to carry out an inspection

c) work with ionising radiation occurs intermittently in the area

Where non-classified persons enter controlled areas suitable arrangements must be in place to demonstrate that any exposure received does not exceed 6mSv a year.

5.15 Designation of Classified Persons

Individuals who are likely to receive an effective dose in excess of 6 mSv per year or an equivalent dose which exceeds 15 mSv per year for the lens of the eye or 150 mSv per year for the skin or the extremities shall be designated, as a “classified person” and will be informed of this. Normally where “classified person” status needs to finish this will only cease at the end of a calendar year and any individuals affected must be kept informed. Where a “Classified Person” finishes employment then a termination record will be supplied to them.

Classified persons must be 18 years or over.

Before any person may become a designated “classified person”, they must undergo medical examination by the University’s Appointed Doctor within the RPO services. They will then be declared fit (condition or not) or not fit for radiation work. If classified, they will remain under medical
surveillance until they are declassified. Arrangements for medical surveillance and record keeping, by the University’s Appointed Doctor, are made by the RPO services.

5.16 Dose Assessment – Approved Dosimetry Service (ADS)
An employee who is a “classified person” must be subject to appropriate personal dosimetry, via the Approved Dosimetry Service, in order that any significant doses of ionising radiation are assessed. The University’s RPA can advise on appropriate methods of dosimetry and the RPO services can assist in making arrangements with the approved dosimetry services, including arrangements for the compilation of cumulative dose records and the provision of termination records. Where other dose meters are used, that are provided by another dosimetry service, then arrangements need to be made to send copies of dose records to the Record Keeping Service. The RPO services must be promptly informed when any person designated as a “Classified Person” leaves the University.

If personal dose meters are lost, damaged or destroyed, or there is any reason to doubt the validity of a personal dose assessment, or if abnormally large or unexpected doses are recorded, an investigation must be made in collaboration with the RPO services and in consultation with the RPA. In the event of an accident which might result in significant personal contamination or a significant dose being received, the RPO services must be informed immediately so that appropriate action can be taken.

(a) Investigation Level
Where an effective dose exceeds 1mSv (unless otherwise specified in Local Rules) for the first time in a calendar year the circumstances of the exposure shall be investigated by the RPS and reported to the RPO services.

(b) Trigger Level
The circumstances of exposure shall be reviewed locally by the RPS where a dose exceeds 0.2 mSv on a single badge

In consultation with the RPA, the HOS may require some persons who are not “classified persons” to be subject to personal dosimetry. Schools/Institutes will make arrangements with the Approved Dosimetry Service for the provision of dose meters. Records for all persons monitored are kept on behalf of the University by the Record Keeping Service of the Approved Dosimetry Service.

Any persons who are being monitored (or has been in the past) can on request to the RPO services, at reasonable notice, be provided with a copy of their dose record.

5.17 Monitoring of levels of Radiation and Contamination
Every College, School and Institute, where applicable, must make and keep records of measurements of the levels of radiation and contamination in “Controlled” and “Supervised” areas and in adjacent areas. The frequency, nature and extent of such monitoring will depend on local circumstances but it must be such as to detect any significant changes quickly. In other areas where unsealed sources are used, periodic contamination surveys shall be made and recorded. The advice of the University RPA, via the RPO services, must be sought on such monitoring.

Instruments used for monitoring must be properly maintained and be subject to examination and tests, as appropriate, at least once every year. If any modification is made that may affect its response, the instrument needs to be examined. The advice of the University RPA, via the RPO services, must be sought on initial calibration and regular checking of monitoring equipment to ensure it is serviceable and correctly used.

The RPO services facilitate the examination and testing of all monitoring equipment.
Records of measurements must be kept for two years from the measurement or test dates. Suitable instruments for checking personal contamination must be available at all times when unsealed sources are used.

5.18 Notification of Certain Occurrences

If there are any grounds to believe any loss or theft of radioactive material or radioactive waste, this must be reported immediately to the RPO services. All reasonable efforts must be made to recover that radioactive material or radioactive waste and if on investigation confirmed, the EA and Police will be notified forthwith without delay. The circumstances will be reported in writing, as soon as is practicable, to the Environment Agency. In addition, if the quantity exceeds specified amounts given in Column 5 Appendix 10, the HSE will also be notified.

All unforeseen events/incidents must be reported using the University Accident/Incident report form https://intranet.birmingham.ac.uk/hr/documents/private/hsu/information/accidents/23airpf-2018.doc

If there is a release to atmosphere or a spillage of a quantity of radioactive material in excess of specified amounts, examples of which are given in column 4 Appendix 10 for radioisotopes in common use at the University, this must be reported immediately to the RPO services who will make an investigation and if appropriate notify the HSE.

The University, via the RPO Services, must notify the Environment Agency (without delay) and within 24 hours by writing:

- Where detection of any malfunction, breakdown or failure of equipment or techniques or accident which has caused or may cause a sealed source to be damaged or may cause significant pollution may generate significant amounts of radioactive waste
- A breach of a limit specified within the permit.
- A breach of sealed sources permitted activities (Conditions 2.1 & 2.2)
- Reasonable grounds believing contamination of public sewer or watercourse may arise as result of any damage to a sealed source (Category 1-4) also notifying the sewerage undertaker and water supply company
- Any unauthorised use of a sealed source
- Any significant adverse environmental effects
- Any escape of accumulated radioactive waste

Where an accident or other occurrence takes place which is likely to result in a person receiving an effective dose of ionising radiation greater than 6mSv or an equivalent dose greater than 15mSv for the lens of an eye or greater than 150mSv for the skin or the extremities, a dose assessment must be arranged. The results must then be reported immediately to the RPO services who will notify the HSE.

5.19 Arrangements for Dealing with Emergencies

Every College/School/Institute should keep readily available at all times equipment and materials for cleaning up small spillages of radioactive materials and for preventing access to the affected areas. Such equipment should include appropriate protective clothing.

Details of local arrangements for dealing with spills and emergencies i.e. contingency plans should be identified in the radiation risk assessment and local rules. Radiation workers must receive appropriate training for dealing with spills and emergencies which must be reported to the RPO services through the accident reporting policy procedure.
5.20 **Contingency Plans**

Where the radiation risk assessment shows that a radiation accident is reasonably foreseeable, a contingency plan must be prepared, in consultation with the RPA. The level of detail in the plan should reflect the circumstances anticipated and should be proportionate to the risk and likely magnitude of exposure. For example, small contained spillages of radioactive material and other incidents that could not result in exposures of concern are not radiation accidents that would require a contingency plan. These incidents can be dealt with by having a spillage procedure or other protocol under usual risk control methods. An exposure of concern is where the accident, or actions such as clean-up, resulted or could result in a significant exposure, i.e. an exposure which significantly exceeds normal planned exposures.

Where local rules are required, a copy of the contingency plan must be incorporated into them. Section 12 of the local rules template in Appendix 5 identifies the main issues to consider.

Once the contingency plan has been prepared anybody who may be involved with or affected by the arrangements in the plan must be given suitable and sufficient instructions and where appropriate issued with suitable dose meters or other devices. Rehearsals of the arrangements in the plan must be carried out at least annually or more often if the radiation accident is likely to cause significant exposure. Any rehearsals undertaken must be documented and records kept.

If it is necessary for some or all of the arrangements in the plan to be carried out, then:

i. the cause of the circumstances must be analysed to determine, so far as is reasonably practicable, the measures, if any, required to prevent a recurrence of such circumstances;
ii. a record of the analysis must be made and kept for at least 2 years from the date on which it was made; and,
iii. any exposure which occurs due to the above circumstances must be noted on any relevant dose record.

5.21 **Visiting Radiation Workers and Other Persons**

**Entry of Classified Outside Workers**

Before a classified outside worker is allowed to enter the controlled area, the RPS in conjunction with the CRPC/RPO must check:

a) their radiation passbook is up-to-date and contains the required information
b) they have been passed fit by the relevant doctor to undertake this work
c) they are subject to routine dose assessments by an ADS

The RPS of the area, with the support of the RPO services, and the outside workers employer will cooperate to make sure that any classified outside worker has had sufficient training and provided with suitable PPE to work safely within the controlled area.

Similar arrangements must be made when University employees and students who propose to visit other establishments. If this is the case the RPO services must be notified at least 6 weeks in advance of such visits so that medical examinations and passbooks can be arranged if necessary.

**Entry of Non-Classified Outside Workers or Non-Classified Persons**

Non-classified employees and non-classified outside workers must only be allowed conditional access to controlled areas. The Principal Investigator/Researcher in conjunction with the RPS in control of the area must set out the conditions in the Local Rules. The conditions must set out the arrangements in place to restrict exposure to ionising radiation and must consider close supervision, the use of PPE and restrictions on the type of work carried out, or the time spent in the area.
Non-classified employees and non-classified outside workers may require access to a controlled area, for example where:

a) a whole room has been designated as a controlled area but the work with ionising radiation takes place in only one small area, such as a bench or fume cupboard

b) a person enters the area for a limited time to carry out a simple maintenance job, to witness a test or to carry out an inspection

5.22 Decommissioning
When open source work ceases the area in which the work took place must be decommissioned. This is to evidence that the area was not contaminated and was left in a safe condition. Decommissioning will involve the monitoring of work surfaces, storage areas, flooring and disposal areas and the subsequent documentation of results. The RPO services must be notified whenever a controlled or supervised area is to be decommissioned. Further information and record sheets can be found in Appendix 11.

5.23 Use of Ionising Radiation in Medical and Dental Diagnosis, Therapy and Research
Special conditions apply when ionising radiation is deliberately used on human beings in the medical and dental fields for the purposes of diagnosis, therapy and research.

Radioactive medicinal products may only be administered to human beings by a doctor or dentist who holds a certificate issued by the Minister of Health or by a person acting under the direction of such a doctor or dentist. Proposals for research uses of ionising radiation in this area must be submitted to the URSG, for approval.

When ionising radiation is used for diagnostic or therapeutic purposes in the medical and dental fields, the person who directs the exposure must be adequately trained and aware of the requirements of the Ionising Radiation (Medical Exposures) Regulations 2017. Advice may be obtained from the University’s Medical Physics Experts via the radiation protection service.

5.24 Information, Instruction and Training
All employees, trainees and others who may be exposed to ionising radiation must be adequately informed and instructed about the hazards and necessary precautions before commencing work involving sources of ionising radiation. Refer to Appendix 12 for further information on training requirements.

6. MONITORING & AUDITING

6.1 Independent audits, carried out both internally and externally may include the EA, HSE, Office of Nuclear Regulation (Euratom and the packaging, labelling and movement of radioactive substances), Care Quality Commission (IRMER) and the University’s Internal Audit Service and the RPO services. Findings and action plans produced as a result of these audits will be monitored through the URSG and RPA.

6.2 The Euratom safeguards set out requirements for the provision of Basic Technical Characteristics and programmes of activities for installations subject to safeguards, nuclear material accountancy and notifications including Inventory Change Reports, Material balance Reports, Physical Inventory Listings and advance notifications of the import or export of material. Due to this the University is required to undertake a stock check audit at least annually in order to complete the annual return.
This annual stock check audit will be undertaken by Safety Services before the completion and submission of the annual return on behalf of the University.

6.3 The University is required to submit an annual Pollution Inventory that captures releases and transfers to air, waste water, controlled water and waste transfer to the Environment Agency. The information for this will be collated, on behalf of the University, by Safety Services who will then submit the annual return via the Pollution Inventory Electronic Data Capture (PIEDC) system.

6.4 The Self – Assessment Audit Checklist in Appendix 13 must be used annually by specific areas, Schools, Institutes or Colleges to audit their compliance with this Policy.

6.5 For any sealed sources which are rated Category 1 – 4 including high-activity sealed radioactive sources (HASS) Sources, see Appendix 14, there are specific auditing requirements for security reasons to detect unauthorised removal of the source. For these sources there needs to be a daily or weekly audit to ensure that the sources are present. The results of this must be documented and recorded.

6.6 Local School/Institute weekly and monthly audits must also be undertaken for open and sealed sources (radioactive materials) utilising the on-line database ‘checks’ tools.

6.7 Training compliance is monitored by the URSG on a termly basis. The URSG also monitors and receives a Radiation Protection Report which includes information on the RPA Service, enforcement visits and actions, calibration of monitoring instruments and leak (wipe) tests. This information is included in the UHSEGs Assurance Report.

7. POLICY REVIEW

This Policy will be reviewed three yearly or as circumstances dictate by changes in either Legislation or the University’s Organisational Structure by the URSG who will also monitor its implementation and effectiveness. It is sponsored by the RPO services, to whom comments should be passed in the first instance.

8. OTHER SOURCES OF INFORMATION

Ionising Radiations Regulations 2017

The Health and Safety Commission’s publication L121, Work with Ionising Radiation sets out the regulations, approved code of practice and guidance. http://www.hse.gov.uk/pubns/books/l121.htm

Ionising Radiations Regulations 2017 related guidance is available on the HSE’s webpage http://www.hse.gov.uk/radiation/ionising/index.htm


Environmental Permitting Regulations 2016
Euratom Safeguards in the UK http://www.onr.org.uk/safeguards/euratom.htm


The Administration of Radioactive Substances Advisory Committee (ARSAC) http://www.arsac.org.uk/


The Ionising Radiations (Medical Exposure) Regulations 2017 http://www.legislation.gov.uk/uksi/2017/1322/contents/made


https://www.sepa.org.uk/media/381383/guidance_on_rwas.pdf

Radioactive substances regulation (RSR) for non-nuclear sites https://www.gov.uk/government/collections/radioactive-substances-regulation-for-non-nuclear-sites

Workplace Well Being Services Intranet Pages:
https://intranet.birmingham.ac.uk/hr/wellbeing/worksafe/accidents/accreporting/accidentreporting.aspx

https://intranet.birmingham.ac.uk/hr/wellbeing/worksafe/radiation/index.aspx

https://intranet.birmingham.ac.uk/hr/wellbeing/worksafe/courses/index.aspx