

Safety and Radiation Protection Office

Working with Radioactive Substances

Radiation Safety Rules
Closed/Sealed Sources and Open/Unsealed Sources

April 2018



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Radiation Safety Rules - Radioactive Substances

Work with ionising radiations is governed by the legal requirements of the Ionising Radiations Regulations 2017 and the Environmental Permitting Regulations 2010. Employers are required to ensure compliance, and this is monitored by Inspectors from both the Health and Safety Executive and the Environment Agency, both of whom can stop the work if they find breaches of the law.

This document, to be referred to as the University Local Rules, is intended to indicate the general arrangements for work with sources of ionising radiations, which are in force at this University. For each area in which ionising radiation is used (controlled or supervised) there are Local Rules giving details of the area and of the detailed procedures to be used therein. Together these comprise the local rules for the purpose of enabling the work with ionising radiation to be carried out in compliance with the requirements of the Regulations.

Organisation for Radiation Safety

Director of Health and Safety (Radiation Protection Officer)

The Director of Health and Safety is responsible for ensuring that policies and procedures to secure compliance with the relevant legislation are developed, monitored and reviewed; that advice is provided on standards for the design, refurbishment and decommissioning of radiation facilities; and that University's notifications, applications and incident reports are submitted to the relevant regulatory agencies. Matters concerning work with radiation are reported to the University Safety Committee, including an annual report relating to work with radiation.

Radiation Protection Advisor

Under the Ionising Radiation Regulations 2017 the NUH NHS Trust Medical Physics Department has been appointed as Radiation Protection Adviser, in which capacity they advise the University:

- on matters of limiting radiation dose to personnel,
- as Medical Physics Expert in relation to equipment used for medical exposures,
- as Radioactive Waste Advisor in respect of arrangements for securing compliance with the Environmental Permitting Regulations 2010, and licences issued under this, concerning the acquisition, use and disposal of sources.

Radiation Protection Supervisor

The Head of any School working with sources of radiation shall appoint sufficient Radiation Protection Supervisors to develop and monitor local radiation safety arrangements. The Radiation Protection Supervisor shall have appropriate experience and seniority and shall receive appropriate formal training for the role.

Principal Investigators/Academic Supervisors

Principal Investigators or Academic Supervisors are responsible for ensuring that those working under their supervision receive the necessary training and instruction to enable them to work safely and in accordance with the Local Rules. There should be sufficient supervision to enable the continuing adherence to correct procedure to be monitored.

Medical Adviser

Medical advice concerning exposures to ionising radiation is obtained through the University's appointed Occupational Health provider:

Internal telephone: 14329;

External telephone: 9514329

Summary of the Key Administrative Arrangements.

- The Safety Office must be pre-notified of and approve any intention to commence work with radiochemicals or other open/unsealed sources, either for the first time, or at a new location, or with new sources, or to use existing sources for a new application.
- The Safety Office must be pre-notified of and approve any intention to acquire, relocate, modify, decommission or dispose of a closed/sealed radioactive source or equipment containing such a source. (Similar requirements apply to X-ray equipment).
- Each School working with radiation sources must appoint at least one Radiation Protection Supervisor. Any area used for work with ionising radiation must be under the effective supervision of a Radiation Protection Supervisor.
- Each School must develop a set of written Local Rules for safe working with radiation.
- Prior to working with radiation sources, a risk assessment must be completed and written procedures for use produced.
- Every person working with ionising radiation must be registered with the Safety Office.
- No radiation work may be carried out without the knowledge and consent of the Radiation Protection Supervisor and the Safety Office.
- Incidents involving spillage, loss or theft of radioactive sources must be notified to the Safety Office, which will notify relevant regulators as appropriate.

General Principles for the Control of Radiation Exposure

Authorisation of Work with Sources of Ionising Radiation

All work with sources of ionising radiation must be pre-notified to and approved by the Safety Office. This is to ensure that suitable facilities and procedures are in place to enable the work to be carried out safely in accordance with the Ionising Radiations Regulations and that the requirements for the keeping and disposal of radioactive sources under the Environmental Permitting Regulations 2010 are in place. A supervisor will be nominated as taking full responsibility for radiological safety in the proposed work.

There are formal notification procedures for

- Open/unsealed sources (e.g. radiochemicals),
- Closed/sealed sources (e.g. for calibrating instruments or as part of the detection or measurement device such as gas chromatographs and liquid scintillation counters), and
- X-ray generating equipment.

It is a requirement that for work with sources of ionising radiation to be carried out: -

- The School and/or Division must have suitable organisational controls in place with competent responsible persons appointed to supervise the work,
- The location(s) in which the radioactive source is to be used and stored has been assessed for suitability by the Safety Office and designated for the work,
- The sources have been approved for the quantities to be held, used and disposed, if appropriate, and
- Work with the sources is restricted to registered radiation workers with the exception of some undergraduate work. (See table at the back of these Rules for the requirements relating to undergraduate work).

Designation of Radiation Areas

A radiation area will be designated into one of three categories which reflect the work done in them, the maximum external dose-rate likely to be present and/or the potential for contamination leading to internal exposure, and the facilities provided. The designation categories are:

- Controlled Area - the nature of the work, the quantity and properties of the isotope and/or the external dose rates deem this to be a higher hazard radiation area and/or follow "special procedures to restrict exposure";
- Supervised Area - an intermediate hazard radiation area subject to ongoing review to ensure that conditions are maintained;
- Registered Area - an area of minor radiation hazard requiring minimal controls but subject to ongoing review to ensure that conditions are maintained. This is the minimum designation for any area in which a radioactive source, including those found in instruments, can be used. Dispensing of isotopes or other open manipulations of these should not normally be undertaken in order to avoid contamination of these lower designation areas.

It is not permitted for work with sources of ionising radiation to be carried out other than in a designated area.

A Radiation Protection Supervisor shall oversee each designated area and shall be responsible to the University for ensuring that all work in the area is carried out in accordance with the Local Rules. All workers must ensure that they are aware of who is the RPS for any area they enter or work in.

Registration of Radiation Workers

Any person intending to work with a source of radiation and who may be exposed to it **must** be registered with the Safety Office as a radiation worker before starting the work. There is an exception to this for supervised undergraduate laboratory practical work.

A radiation worker can only be registered against an existing radiation project. The nature of the sources (isotope, activity, energy etc) stated in the new worker registration form must not exceed those stated in the project registration.

The Registration Form must be countersigned by the Radiation Protection Supervisor before it is sent to the Safety Office. This must be accompanied by a [Local Rules acknowledgement form](#) confirming that the worker has seen and understood the University local Rules relevant to the nature of the work. The Safety Office will determine the dosimetry requirements for the worker. Once the Safety Office has received the above confirmation the Radiation Protection Supervisor will be notified that the registration process has been completed and issued with a dosimeter and/or Isostock Password as appropriate for distribution to the worker.

Radiation Dosimetry

Radiation workers are responsible for the care and correct use of their personal radiation dosimeter. In particular it must be worn when carrying out radiation work and at other times kept in an area away from sources of external radiation. The dosimeter must be available for prompt exchange at the end of the wear period. Loss of a dosimeter will incur a charge to the School.

The Safety Office receives a quarterly report of dosimeter readings. These are reviewed by the Safety and Radiation Protection Officer. Annual investigation levels are set at 1mSv pa annual whole body dose, 4mSv extremities. Furthermore any readings for a quarter that exceed 0.5 mSv for a whole body badge or 2 mSv for an extremity badge are investigated. In either case these are followed up via the Radiation Protection Supervisor. These levels although low exceed normal expectation for the type of work. A Radiation Worker is entitled to information concerning his or her dose history on proof of identity.

The Ionising Radiations Regulations require that workers who might receive a dose in excess of 6 mSv or three-tenths of any other relevant dose limit shall be "Classified". The nature of work

with radiation at the University is such that exposures are highly unlikely to approach this hence workers are normally not classified. Any worker designated as a classified worker will require Medical Surveillance via Occupational Health.

Entry into Designated Areas

No-one may enter a controlled, supervised or registered area without being aware of the Local Rules for that area (and when in the area must conform to those Rules and with any written system of work applying therein).

This applies both to radiation workers and to all other staff or visitors who may enter the area, including for example cleaners, security staff and contractors. Entry by maintenance operatives is additionally subject to a formal entry procedure to ensure that the area has been made safe for the work to be carried out. Deep cleaning of controlled and supervised areas is also subject to the entry permit procedure. Routine cleaning should be carried out in accordance with a standard operating procedure reflecting the limited range of low-risk activities to be carried out by inducted cleaning staff aware of relevant hazards.

Information, Instruction and Training

It is a principle of radiation protection in general and of the Regulations in particular that the University must make arrangements to limit the exposure to all persons as far as reasonably practicable. The University will inform individuals of these arrangements via the personal issue of the University Local Rules when they first register to undertake work with ionising radiation.

Radiation workers are required to attend an introductory session on the principles of radiation safety at the earliest opportunity. Failure to do so may result in the registration being suspended. Further instruction and training specific to the individual's work will be given within their School. The [notes accompanying this](#) are published on the Safety Office Website. Radiation workers must attend all training sessions arranged by their School, and be aware of the particular procedures applying within any controlled,

supervised or registered area they may enter. (These are available from the Radiation Protection Supervisor whose name is displayed on the notice at the entrance to the area).

Thereafter every individual working with ionising radiations or radioactive substances has a duty to protect themselves and others from any hazard arising from their work. They must not expose themselves or others to ionising radiations to a greater extent than is reasonably necessary for the purpose of their work. Radiation Workers must follow the University and School Local Rules. They must be aware of the conclusions from the risk assessments relating to their work and adhere to relevant written procedures to ensure safe use. The work area must be regularly monitored and recorded in the laboratory or workstation monitoring record book. Use and disposal of labelled compounds must be accurately and promptly recorded.

For radiation work involving undergraduates, i.e. laboratory practical work or research projects, there are particular requirements on authorising the work and registration of the student. These are summarised in the table in the appendix. The undergraduates must receive written information setting out the hazards of the work, the precautions to be followed and any conditions under which they are taking part in the project.

Accounting for Radioactive Materials

Both the Ionising Radiations Regulations and the Environmental Permitting Regulations 2010 require the recording of all radioactive material held. No radioactive sources may be acquired (either by official purchase order, gift, sample or by any other route) without the knowledge and approval of the Radiation Protection Supervisor or appointed deputy.

Radiochemical acquisitions must be made through Isostock (the University's radiochemical accounting system). This requires approval by the RPS before the order can be completed.

Any purchase or acquisition of a closed source, or equipment containing a closed source, (e.g. liquid scintillation counter or gas

chromatograph with electron capture detector) must be notified to and approved by the Safety Office prior to acquisition.

Transport of Radioactive Materials

There are regulations for the transport of radioactive materials by road (e.g. when taking isotopes between different sites) and legal requirements concerning insurance. Guidance on this is available on the Safety Office website.

It is prohibited to send radioactive materials through the post or to carry them on public transport (including bus, taxi, train, or aeroplane).

Hazards of Working with Radioactive Substances

The arrangements at the University for work with radioactive substances are designed on the principle of restricting the exposure of workers to ionising radiation to the lowest level that is reasonably practicable as determined by a [risk assessment](#) for the work, in accordance with Regulations 8 and 9 of the Ionising Radiations Regulations 2017.

Regulation 15 requires that workers should be informed of the health hazards, if any, associated with their work, the precautions to be taken, and the importance of complying with medical and technical requirements. This should include being made aware of the risk assessment for the work and any associated safe operating procedures.

It is known that ionising radiation can affect cells in the body. At high levels of radiation given in a short time the effect can show up as actual damage to the skin or to the blood cells. Longer-term effects can occur: the induction of cancer in the irradiated individual or mutations in reproductive cells that may cause hereditary defects in offspring.

However it should be remembered that the body has a cell repair mechanism which has adapted to natural levels of radiation in the environment. Also, cancer arises naturally from other causes. The dose limits set by ICRP, and incorporated in the Ionising Radiations Regulations are such that at these levels there is an extremely low risk of any of the harmful effects occurring. In addition, at the University the levels of radiation actually experienced are a small fraction of these limits, and no harmful effect to any worker has so far been demonstrated. Nevertheless the potential is there, and workers are required to comply with the precautions prescribed, to minimise the risk.

It is known that dividing cells are particularly at risk. This means that there is a possible hazard to a foetus in early pregnancy. This is the reason for the requirement of Regulation 15 that women should inform the employer as soon as they discover that they have become pregnant. (This enables their work to be re-assessed to ensure a minimum of exposure). A further risk assessment of their work will be carried out by their manager/academic supervisor in relation to this.

Working Arrangements with Closed/Sealed Sources

The following gives the general principles, which should be covered in appropriate detail in the Area Local Rules.

1. The Regulations require that the dose from radiation external to the body shall be kept to a minimum and in any case below the specified dose limits.

To demonstrate that the limits are not being exceeded personal dosimeters are issued, other than for work with low energy isotopes that cannot be meaningfully detected, to record the external radiation. The risk assessment for the equipment or process shall include an estimation of the dose rate. Where appropriate a monitoring regime shall be

established and incorporated into the area local rules and/or operating procedures.

2. External exposure should be minimised by:

(a) Using a source emitting the smallest practicable dose rate.
(b) Ensuring that adequate shielding of the source is used.

(c) Keeping all parts of the body at the greatest practicable distance from the source. In particular no source shall be held in the hand or manipulated directly by hand if the work can be carried out by another means, unless the dose to the skin of the hand is not significant (i.e. less than 75 $\mu\text{Sv/hr}$) and skin contamination risks are controlled effectively.

Therefore remote-handling devices should be used for gamma-emitters and hard beta-emitters and for all sources not in protective containers.

(d) Restriction of the period of exposure to the minimum practicable. If this technique is used careful planning is necessary and a trial run should be carried out in advance.

3. Closed/sealed sources must be kept securely, normally within a locked cupboard within a locked room. Access to keys and codes must be restricted.

4. Closed/sealed sources must be strictly accounted for to ensure that their location is known. This includes the performance of daily, weekly or monthly checks by the source supervisor and/or the Radiation Protection Supervisor as defined for that source by the Safety Office. Mobile sources must be signed out and on return. The Radiation Protection Supervisor shall submit a quarterly return to the Safety Office to confirm that accounting checks have been satisfactorily completed. The Safety Office shall audit all such sources twice per year.

5. The individual user of any sealed source is responsible for its custody and safe use while in their care. At anytime the whereabouts of all sealed sources should be readily ascertainable. Where logbooks to record use are in place these must be completed. Periodic checks are made by the School Radiation Supervisor and by staff of the Safety Office.
6. Any suspected loss of, or damage to a source must be reported immediately to the Radiation Protection Supervisor, who shall immediately notify the Safety Office.
7. Regular leak testing must be carried out. A suitable interval for most sources is once every two years but circumstances might require alternative frequencies to be adopted.

Working Arrangements with Open/Unsealed Sources

The following gives the general principles, which should be covered in appropriate detail in the Area Local Rules. The notes accompanying the introductory session for new radiation workers (Safety Office website) include practical guidance on handling common radiochemicals.

1. Radiation dose exposure can arise if a source irradiates the body from the outside or if it is ingested into the body. The Regulations quote limits for the sum of the dose due to external exposure and that due to exposure from any ingested material, so each of these must be assessed.

External dose can be assessed by the use of portable dose-rate monitors and by the wearing of personal dosimeters.

Internal dose is more difficult to assess and this can normally be done indirectly only, by biological monitoring. Consequently priority must be given to ensuring the effective containment of the substances as a means of preventing

dispersal or contamination. This is to be achieved by ensuring that the minimum quantities necessary are used, the substances are contained as much as possible, work is carried out in designated areas that can be easily and successfully decontaminated and an effective contamination monitoring strategy is in place. As a guide the maximum quantities of radioactive material that may be held in any working area and the maximum surface and air contamination levels have been specified. The levels quoted for each isotope are such that with normal working methods it is extremely unlikely that any significant quantity will be ingested. It is important therefore to ensure that these working methods are always used.

To demonstrate that the prescribed dose limits are not being exceeded personal dosimeters are issued to record external radiation and monitoring of the current dose rate levels must be carried out regularly with dose monitors where provided.

To demonstrate that the likelihood of ingestion is being minimised, monitoring of the work area must be carried out in accordance with the procedures laid down in the Local Rules for the area. Note that for each individual isotope there is a specific contamination limit, details of which are available from the Safety Office. Different monitoring instruments may be needed for each different isotope and these too will be specified in the Area Local Rules.

All radiation monitors must be regularly calibrated. This is arranged annually by the Safety Office.

2. External exposure should be minimised by:
 - (a) Using a source emitting the smallest practicable dose rate.
 - (b) Ensuring that adequate shielding of the source is used.
 - (c) Keeping all parts of the body at the greatest practicable distance from the source. In particular no source shall be held in the hand or manipulated directly by hand if the

work can be carried out by another means, unless the dose to the skin of the hand is not significant (i.e. less than 75 uSv/hr) and skin contamination risks are controlled effectively.

Therefore remote-handling devices should be used for gamma-emitters and hard beta-emitters and for all sources not in protective containers.

- (d) Restriction of the period of exposure to the minimum practicable. If this technique is used careful planning is necessary and a trial run should be carried out in advance.
3. The risk of ingestion of radioactive material should be minimised by:
- (a) Good planning: The use of the smallest practicable amount of material of the minimum radio-toxicity, preceded by a trial run with inactive material to test the technique. The Annual Limit on Intake (ALI) for the material is a good indication of its radiotoxicity - the lower the value, the greater the risk. Data on ALIs should be available from the supplier and is also published by the Safety Office for a range of common isotopes.
 - (b) Banning all mouth operations: pipetting by mouth, label licking, smoking or taking snuff, eating or drinking, applying cosmetics etc.
 - (c) Cleanliness and tidiness. Always use the minimum of equipment necessary. Always label all containers. The label should identify the isotope, activity date and name of the user.
 - (d) The use, where necessary, of protective equipment.
 - (e) Containment, both primary to avoid spills, and secondary to avoid the spread of any material spilled inadvertently.

- Cover the bench with "Benchkote" or similar material, absorbent side upwards, and work over drip trays.
 - Never put any possibly contaminated article on the bench but always use drip trays.
 - Always use double containers for radioactive solutions.
 - Keep contamination off the skin by wearing rubber (or PVC etc.) gloves. The gloves must not be worn outside the laboratory.
 - Avoid contaminating the insides of non-disposable gloves when they are being removed.
 - No contaminated glassware or other equipment may be removed from the laboratory or used for an unauthorised purpose.
 - Always wear the special laboratory coats, which are provided for use solely in the radiation laboratory and are not to be used elsewhere.
 - In the event of a spill, avoid the spread of contamination and refer immediately to your supervisor or to the Radiation Protection Supervisor.
 - Do not wear potentially contaminated gloves when handling monitors or where their use may spread contamination, e.g. handles of doors and refrigerators.
4. Before leaving the laboratory all glassware, other apparatus and benches must be decontaminated and monitored. Leave adequate time for this. Any remaining contamination must be labelled and brought to the notice of the supervisor or the Radiation Protection Supervisor. Details must be entered into the monitoring record book.
 5. Skin or any clothes that might be contaminated must also be monitored and any remaining contamination reported at once.
 6. Regular biological monitoring should be carried out if this is prescribed in the Area Local Rules.
 7. First aid procedure for use in minor accidents:

See emergency procedures section.

8. It is a legal requirement that radioactive material may only be present on the premises in accordance with the Certificate of Registration from the Environment Agency. This applies both to closed/sealed and open/unsealed sources. Isotopes must always be stored in lockable containers, shielded where necessary. If refrigerators are used material must be stored in containers with tight-fitting lids within the refrigerator, not in baskets or directly on shelves. If more than one group of workers is using a refrigerator then each group's isotopes must be stored separately and be clearly identifiable. Refrigerators, freezers and other containers for storing radiochemical stocks must be locked when not in use.
9. It is a legal requirement that radioactive waste may be accumulated and disposed of only in accordance with the authorisation of the Environment Agency. For details see the Certificate posted in the laboratory. All radiation workers should be familiar with the restrictions imposed on the period of accumulation of waste and on disposal routes and quantities as indicated on the certificates. The limits must not be exceeded.

Undergraduates must not attempt to dispose of any radioactive waste.

10. The arrival, use and ultimate disposal of each quantity of isotope must be recorded using the Isostock system. The record must be updated at the time that the stock is used or disposed. Stocks and disposals are monitored by the Radiation Protection Supervisor and the Safety Office. The Radiation Protection Supervisor will ensure that a monthly stock check against the Isostock record is performed. The Safety Office also carries out checks on radiochemical stocks.

The Environment Agency requires that the procedures outlined in 8, 9 and 10 are observed meticulously. If not, they have the power to stop work immediately.

Emergencies in Radiation Areas

In the event of an accident involving personal injury, however minor; or a serious spill; or in the case of fire; the Radiation Protection Supervisor and the Safety and Radiation Protection Officer must be informed immediately. Outside normal working hours they should be contacted by telephone via Trent Security.

Emergency arrangements for each radiation area should be included in the Area Local Rules. Radiation workers should be familiar with the action necessary to be taken to deal with the situation.

In the case of a spill involving unsealed sources of radioactive material, and if ingestion is suspected, consideration will be given to initiating biological monitoring.

Radiation workers should be familiar with the arrangements made by the University in the event of fire and for summoning an ambulance. These arrangements are detailed in a printed notice displayed in each radiation laboratory.

FIRE FIGHTING AND THE TREATMENT OF SERIOUS INJURIES MUST TAKE PRECEDENCE OVER DECONTAMINATION AND CONTAINMENT OF CONTAMINATION

If the evacuation of a laboratory is required, the following action should be taken where time and circumstances permit:

1. In the case of an emergency arising from an apparatus producing ionising radiations, the apparatus should be switched off at once;
2. Where sealed sources are involved they should, if possible, be returned to their containers or provided with temporary shielding;
3. Except where there is radioactive gas to be dispersed, all laboratory services except lighting, but including mechanical ventilation should be switched off, and all doors and windows should be closed. If radioactive gas is to be dispersed,

mechanical ventilation and lighting should be switched on and, with discretion, doors and windows should be left open.

Decontamination Procedures

Decontamination kits are available within the vicinity of all the radiation areas. The location should be identified on a notice within the radiation laboratory, which also summarises personal and laboratory decontamination procedures. The kit contains the equipment and materials to enable decontamination to be carried out safely. It includes protective clothing, bags for waste, absorbent materials, remote handling, tools, radioactive warning tape and notice, equipment for de-marking and separating effective areas and cleaning materials referred to in the decontamination procedures.

Medical emergencies take priority over decontamination procedures.

- **Skin contamination:** Sites of contamination should be washed or scrubbed gently using cool or warm water, soap and a soft nail brush. Very warm or hot water should not be used to avoid causing the pores in the skin to open and allow contamination to enter. Do not break the surface of the skin or allow contamination to enter the bloodstream. Ensure uncontaminated cuts or sores are covered with a waterproof dressing prior to washing. Extensive contamination should be washed in a shower.
- **Persistent skin contamination:** Use 4% solution of potassium permanganate and allow to dry. Brown staining should be removed with 5% solution of sodium metabisulphite. Dry and monitor.
- **Hair:** Use ordinary shampoo. Limit spread. If persistent, cut hair.
- **Finger nails:** Use soft nail brush. Carefully cut nails. Calamine lotion may be used. Allow to dry and brush nails inside a plastic bag.
- **Eyes:** Normal 0.9% saline in eyewash.
- **Mouth:** Advise subject not to swallow. Remove dentures. Copious mouth washes and brush teeth.

- **Ears and Nose:** Obtain medical help. Swabs and cotton buds. Blow nose, use ear wash.
- **Open wounds:** Irrigate with sterile water or saline.

Minor spills on benches and floors

1. Demark the affected area.
2. Wear disposable gloves and overshoes if necessary. Change these at intervals if they become contaminated.
3. Drop paper tissues/towels on the affected area to limit the spread of contamination.
4. Mop up spilled material, working from periphery inwards. Wash affected area placing contaminated towels in plastic bags.
5. Monitor surface and repeat washing if necessary.
6. Report incident to RPS.

Assess amount and cause of accident.

In all cases monitoring should be carried out at the end of the decontamination procedure to confirm that this has been successful or whether repetition or referral for further medical attention is required. Should further medical attention be required it should be at the Queen's Medical Centre which is the closest Hospital to the University designated for the reception of casualties contaminated with radioactivity.

In the event of serious contamination, or contamination coupled with a serious medical condition, an ambulance should be called and details of the contamination should be given to the ambulance staff who will telephone the information on to the Accident & Emergency Department where the person will be received.

In the event of minor but persistent contamination the individual should also attend the Accident & Emergency Department of the Queen's Medical Centre.

Appendix - Procedures for Registering Undergraduate Radioactive Work

Registration of Work	
Research project work:	<p>The following must be submitted to the Safety Office:</p> <ul style="list-style-type: none"> • a radiation project registration form • risk assessment with dose estimate <p>Based on the isotopes used, a decision will be reached as whether or not a dosimetry badge is required for the individual workers</p>
Practical classes:	<p>The following must be submitted to the Safety Office:</p> <ul style="list-style-type: none"> • a radiation project registration form • risk assessment with dose estimate • experimental procedure/method must be submitted to the Safety Office <p>The project approval for the practical will specify any requirements relating to registration and dosimetry of students.</p>
Registration of Workers	
Undertaking Research Project work:	<p>All undergraduates are to be Registered. Following appraisal of the documents submitted;</p> <ul style="list-style-type: none"> • based on the isotopes and quantities used, a decision will be reached as whether or not a dosimetry badge is required for the individual workers, and • whether a medical is required.
Undertaking Supervised Laboratory Practical Class work:	<p>Registration is not required. The experiment should be inherently safe for undergraduates to carry out under supervision and will not contravene guidance contained within IRR 99. The conditions specified in the project approval for the practical will describe what dosimetry, if any, will be required.</p>

NB. There are particular limits and prohibitions concerning work with radioactive materials by those under 18 years of age.