

USING IONISING RADIATION AT MONASH UNIVERSITY

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1. PURPOSE

The purpose of this document is to ensure the identification, assessment and control of all practices using ionising radiation at Monash University in accordance with the requirements of the Health Act (1958), the Radiation Act (2005), the Nuclear non-proliferation (Safeguards) Act 1987 and associated regulations and with AS 2243.4:1998 *Safety in Laboratories: Ionizing radiation* and AS/NZS 4801:2001 *Occupational Health & Safety Management Systems – specifications with guidance for use*.

2. SCOPE

The guidance, procedures and processes outlined in this document apply to staff, students, visitors and contractors at all the Australian campuses of Monash University and to Monash controlled entities.

3. ABBREVIATION

ARPANSA	Australian Radiation Protection and Nuclear Safety Agency
CD	Compact disc
MSDS	Material safety data sheet
OHSE	Occupational Health, Safety & Environment unit
OHSPC	Occupational Health and Safety Policy Committee
OHS	Occupational health and safety
RSO	Radiation Safety Officer
RPO	Radiation Protection Officer
SWI	Safe work instructions
μSv	Microsievert
kVp	Peak kilovoltage
mA	Milliampere

4. DEFINITIONS

4.1 EMERGENCY

An emergency is an adverse situation where there is the potential for injury, threat to life or severe damage to property is imminent.

4.2 HEAD OF ACADEMIC/ADMINISTRATIVE UNIT

Head of academic/administrative unit is used to denote the head of the area that is undertaking the activity. For academic areas, this term includes head of faculty, school, department, institute or centre. For administrative areas, the term includes head of division, branch, centre or unit.

4.3 HIERARCHY OF CONTROL

The hierarchy of control ranks risk control measures in decreasing order of desirability and effectiveness. These are:

- *Elimination*
Regulations supporting the OHS Act require the elimination of risks as the first step in risk control.
- *Substitution*
- *Isolation*
- *Engineering controls*
- If a risk to workplace health and safety remains after the above control measures have been used, *administrative controls* (information, training and procedures) should be applied or, if these are still not adequate, *personal*

protective clothing and equipment worn. These methods of risk control are not preferred because the source of the risk is not eliminated or reduced.

4.4 INCIDENT

Incident is defined as any occurrence that leads to, or might have led to, injury or illness, danger to health and/or damage to property or the environment.

For the purpose of these procedures, the term 'incident' is used as an inclusive term for incidents, accidents and near misses.

4.5 IONISING RADIATION

Ionising radiation is defined as electromagnetic or particulate radiation capable of producing ions directly or indirectly but does not include electromagnetic radiation of a wavelength of greater than 100 nanometres.

4.6 IONISING RADIATION SOURCE

For the purposes of this document ionising radiation source is defined as radioactive material, an irradiating apparatus, a sealed source or a sealed source apparatus.

4.7 IRRADIATING APPARATUS

For the purposes of this document, irradiating apparatus is defined as an apparatus that produces ionising radiation when energised (eg an X-ray tube) but does not include a sealed source apparatus. An x-ray machine is an example of an irradiating apparatus.

4.8 MEMBER OF THE PUBLIC

For the purposes of this document, a member of the public is a staff member, student, contractor or visitor who is not classified as a radiation worker.

4.9 MONASH CONTROLLED ENTITY

Monash controlled entities (eg companies) include entities where Monash can control decision making, directly or indirectly, in relation to the financial and operating policies so as to enable the entity to operate with it in pursuing the objectives of Monash University.

For the remainder of this policy, a Monash controlled entity will be referred to as a controlled entity.

4.10 OHS HAZARD

An OHS hazard is a situation with the potential to cause injury or illness to people or damage to property.

4.11 OHS RISK

An OHS risk is the likelihood that exposure to a hazard will result in injury or illness to people or damage to property.

4.12 OHS RISK CONTROL

OHS risk control is action taken to eliminate or reduce the likelihood that exposure to a hazard will result in injury or illness to people or damage to property.

4.13 OHS RISK MANAGEMENT

Risk management is the process of hazard identification, risk assessment, and risk control with the aim of providing healthy and safe conditions for staff, students, visitors and contractors at Monash University.

4.14 RADIATION WORKER

A radiation worker is a staff member or student who is occupationally exposed to ionising radiation source.

4.15 RADIOACTIVE MATERIAL

For the purposes of this document radioactive material is defined as any natural or artificial material that spontaneously emits ionising radiation that has either

- an activity concentration that is equal to or greater 30 becquerels per gram; or
- activity equal to or greater than Table 1, Schedule 2 of the Health (Radiation Safety) Regulations 1994 (a copy of this table is located at <http://www.adm.monash.edu.au/ohse/safety-topics/radiation.html>).

4.16 REGULATIONS

For the purposes of this document, the term, regulations, refers to the Health (Radiation Safety) Regulations 1994.

4.17 REGULATOR

For the purposes of this document the regulator is defined as the Radiation Safety Program of the Victorian Department of Human Services.

4.18 SAFE WORK INSTRUCTIONS

Safe work instructions are written instructions for tasks that outline the preferred method of undertaking a task whilst emphasising ways to minimise any risk(s) of harm.

4.19 SEALED SOURCE

A sealed source is radioactive material that is permanently sealed in a capsule or closely bound and in solid form.

4.20 SEALED SOURCE APPARATUS

Sealed source apparatus are apparatus that produce ionising radiation because they contain a sealed source. A liquid scintillation counter with an internal sealed source is an example of a sealed source apparatus.

4.21 SUPERVISOR

4.21.1 Supervisors are those who are responsible for overseeing:

- the work program of other staff;
- the study program of honours and postgraduate students; and
- undergraduate students in lectures, tutorial and practical classes and on field trips.

4.21.2 The supervisor of staff or students has a particular responsibility for safeguarding the occupational health and safety of those in their charge. The supervisor can delegate the supervision or training of a staff member or student to a suitably qualified and/or experienced person, as appropriate for the task. The supervisor is, however, responsible for ensuring that the staff member or student has received appropriate training and has gained sufficient competence to undertake the task.

4.22 UNSEALED SOURCE

For the purposes of this document, an unsealed source is a radioactive substance that is not a sealed source.

5. SPECIFIC RESPONSIBILITIES

A comprehensive list of OHS responsibilities is provided in the document *Occupational health and safety management at Monash University: Structure, functions, roles and responsibilities*. The responsibilities with respect to using ionising radiation are summarised below.

5.1 OHSE

The responsibilities of OHSE include to:

- develop, maintain, review and audit the university's policies, procedures and systems related to ionising radiation management and to ensure legislative compliance;
- appoint an appropriately qualified Radiation Protection Officer (RPO) and support staff, eg deputy RPO, to supervise radiation safety practices in respect of ionising radiation sources as required by Sections 108AE(3)(a) and 108AF(3)(c) & (d) of the Health Act (1958).
- specify and provide appropriate training, examination and assessment criteria for users of ionising radiation.

5.2 HEADS OF ACADEMIC/ADMINISTRATIVE UNITS OR CONTROLLED ENTITIES

It is the responsibility of the head of academic/administrative unit or controlled entity to ensure that procedures and systems are in place in their unit/entity to manage ionising radiation effectively, including to:

- ensure that adequate resources are available for provision and maintenance of the radiation safety program, such as personal dosimetry, monitoring, calibrations, shielding and containment;
- appoint an Radiation Safety Officer (RSO) and deputy RSO where ionising radiation sources are held or used in the unit/entity;
- ensure that a system is in place to ensure that staff and students complete the training and examination requirements provided by OHSE.

5.3 SUPERVISORS

It is the responsibility of supervisors to ensure that procedures and systems are in place in the areas of their responsibility to manage ionising radiation effectively in order to protect the health and safety of staff, students, visitors and contractors and the environment from the harmful effects of radiation.

They must ensure that:

- staff and students undertake recommended OHS training in the use of ionising radiation;
- mandatory examination requirements are passed by all staff and students that work or study with ionising radiation before commencement of work. Optional multi-media safety training on ionising radiation which covers the examination material is available on two training CDs. Access to the CDs and examination is administered through local RSO;
- local standards and practices comply with legislative requirements and university policy;
- monitoring, shielding and containment equipment that is appropriate to the tasks undertaken is provided and used; and
- they implement the *Procedure on protecting the unborn child from the effects of ionising radiation* where appropriate.

5.4 STAFF AND STUDENTS

Staff and students using ionising radiation must:

- comply with OHS instructions, policies and procedures using control measures and/or personal protective equipment to ensure their own health and safety as well as the health and safety of others; and

- consult with the RSO before:
 - undertaking work with ionising radiation sources; and
 - before any new processes with ionising radiation are started (for example use of a new radioisotope).

5.5 RADIATION PROTECTION OFFICER

The responsibilities of the RPO include:

- development, implementation and management of the ionising radiation safety program at Monash University to achieve legislative compliance;
- being the primary contact for the regulator and the Australian Safeguards Office;
- provision of advice, training and information regarding ionising radiation safety to staff and students;
- managing the acquisition of ionising radiation sources and their disposal;
- development and maintenance of a records management system for items required to be reported to the Australian Safeguards Office under the Nuclear Non-proliferation (Safeguards) Act 1987.

5.6 RADIATION SAFETY OFFICERS

The responsibilities of radiation safety officers include:

- overseeing the purchase of radioactive substances for the unit;
- maintaining registrations of sources of ionising radiation;
- maintain personal monitoring programs for users of radioactive substances;
- providing advice, information, instruction and training on the local use, storage, transport and disposal of radioactive substances;
- administration of the registration process for the on-line examination for ionising radiation for staff and students in the unit/entity.
- assisting with risk management of hazards and risks associated with radioactive substances;
- formulating and implementing OHS policies and procedures with regard to radioactive substances;
- reviewing the radiation safety aspects of new research projects and teaching activities;
- providing the initial response to, and investigation of, accidents and emergencies involving radioactive substances, including reporting to the Radiation Protection Officer (RPO), OHSE and assisting with the development of corrective actions;
- liaising with the RPO, OHSE, the zone OHS&E committee and the head of unit or controlled entity;
- consulting with local health & safety representatives on OHS issues regarding radioactive substances;
- maintaining records related to the purchase, use, storage, transport and disposal of radioactive substances;
- monitoring OHS standards and compliance with OHS policies and procedures at a local level with regard to radioactive substances;
- auditing and analysing the OHS legislative compliance of the unit or controlled entity with regard to radioactive substances, including reporting breaches of compliance to the RPO;
- assisting with the promotion of ionising radiation safety awareness.

6. INFORMATION REGARDING IONISING RADIATION SAFETY

6.1 IONISING RADIATION SAFETY INFORMATION

- General information re ionising radiation is provided on the safety topic page of the OHSE web site (<http://www.adm.monash.edu.au/ohse/safety-topics>).
- Reference material, as well as practical radiation safety information, is included in both the *Radiation Safety Manual* and the *Manual for Users of Ionising Radiation* which are available at the OHSE website (<http://www.adm.monash.edu.au/ohse/safety-topics/radiation.html>).
- For more detailed information, contact your RSO or the OHSE consultant of the area (<http://www.adm.monash.edu.au/ohse/contacts>).

6.2 IONISING RADIATION SAFETY PROCEDURES

OHSE has developed a range of ionising radiation safety procedures that also need to be consulted and understood by users of ionising radiation, which are available at the OHSE website (<http://www.adm.monash.edu.au/ohse/safety-topics/radiation.html>). These are:

- *Procedures for dosimetry of ionising radiation*
- *Procedure on protecting the unborn child from the effects of ionising radiation*
- *Procedure for disposal of liquid radioactive waste*
- *Procedure for disposal of low level solid radioactive waste*
- *Procedures for purchasing, registration and licensing of ionising radiation sources*

7. COMMENCING NEW WORK/STUDY OR MODIFYING EXISTING PRACTICES

Before you commence new work or study using ionising radiation or modify existing ionising radiation practices ensure that you have done the following:

7.1 Complete CD training and examination

See 14. Training

7.2 Complete a new risk assessment or review and update an existing risk assessment

See 12. OHS risk management

7.3 Ensure personal monitoring covers new practices

See *Procedures for dosimetry of ionising radiation* to ensure appropriate Personal monitoring of ionising radiation users occurs

7.4 Ensure suitability of facilities

Laboratories for the use of ionising radiation sources are classified based on the type of source that is used and the level of finishes and facilities available. These requirements are detailed in the *Radiation Safety Manual* and the *Manual for Users of Ionising Radiation* which are available at the OHSE website (<http://www.adm.monash.edu.au/ohse/safety-topics/radiation.html>).

7.5 Consult your RSO

Contact your RSO to ensure all university and regulatory requirements are met.

7.6 Develop new safe work instructions and safe handling practices, if necessary

See 13. Safe work instructions and safe handling practices

8. ADMINISTRATION OF IONISING RADIATION TO HUMANS OR ANIMALS

Ethics clearance is required for the administration of ionising radiation to humans or animals. Details are available at the Research Office website (<http://www.monash.edu.au/research/ethics/>).

9. PURCHASE, REGISTRATION AND LICENSE OF IONISING RADIATION SOURCES

The procedures required for the purchase of ionising radiation sources are outlined in the *Procedures for purchase, registration and licensing of ionising radiation sources*. (<http://www.adm.monash.edu.au/ohse/safety-topics/radiation.html>).

10. PERSONAL MONITORING OF IONISING RADIATION USERS

10.1 PERSONAL MONITORING OF EXTERNAL DOSE

10.1.1 Personal monitoring of external dose is carried out for radioisotopes that present an external hazard using thermoluminescent dosimeters that are analysed by an appropriately approved laboratory as described in *Procedures for dosimetry of ionising radiation*.

10.1.2 Contact your RSO to arrange issue of a dosimeter or to check your results.

10.2 ASSESSING INTAKE OF RADIOACTIVE MATERIALS

Assessment of the intake of radioactive materials to assess the internal dose of ionising radiation users is conducted at Monash on a risk basis. Details of the Monash University internal dose assessment program are outlined in the *Radiation Safety Manual* and the *Manual for Users of Ionising Radiation* which are available at the OHSE website (<http://www.adm.monash.edu.au/ohse/safety-topics/radiation.html>).

11. STORAGE OF IONISING RADIATION SOURCES

11.1 REGISTER

The university is required to maintain a register of ionising radiation sources held and used by units/entities. The register is maintained electronically in a central database by OHSE based on information provided by the department/unit/entity.

11.2 STORAGE LOCATIONS

Storage locations must be listed in the register and the RSO must consult with the RPO before:

- irradiating apparatus or sealed source apparatus are relocated;
- using a new area for storage of sealed sources and unsealed sources.

11.3 STORAGE AND SHIELDING REQUIREMENTS

11.3.1 Radioactive sources must be stored:

- so that the emission levels are $\leq 0.5^* \mu\text{Sv/h}$ at any location that could be occupied by a member of the public.
[*Note: this emission level assumes an occupancy time of 2000 hours per year. If the occupancy time could be higher than corresponding reductions in this level must be made]
- with secondary containment in order to ensure that the potential for contamination of storage location is minimised.

- in a secure location to prevent loss, theft or accidental misuse of the source.
- 11.3.2 For general advice regarding storage requirements and shielding, contact your RSO.

12. OHS RISK MANAGEMENT

Risk management must be completed on all processes/procedures/activities that involve ionising radiation (See *OHS Risk Management at Monash University*; <http://www.adm.monash.edu.au/ohse/documents>).

12.1 OHS RISK MANAGEMENT

OHS risk management must be completed:

- before activities using ionising radiation commence;
- before the introduction of new procedures, processes or equipment that use ionising radiation;
- when procedures or processes or equipment that use ionising radiation are modified.

12.2 OHS RISK MANAGEMENT TOOLS

A range of tools has been developed for staff and students to undertake risk management at the university. At Monash, the emphasis of these processes is to ensure that identified risks are controlled effectively.

12.2.1 Risk control program (<http://www.adm.monash.edu.au/ohse/documents>)

12.2.1.1 The risk control program has been designed to allow assessment teams in each unit to quickly and comprehensively:

- identify and assess the hazards in the workplace;
- rank them in terms of priority; and
- provide guidance for the development of appropriate risk control measures.

12.2.1.2 Ionising Radiation risk management

- Risks associated with ionising radiation are covered in *Reference sheet 5.1 and 5.2 of the Risk Control Program*.

12.2.2 Job safety analysis (<http://www.adm.monash.edu.au/ohse/documents>)

12.2.2.1 The job safety analysis (JSA) tool has been developed to assist Facilities & Services staff to assess and control the risks of their activities that may impact the health and safety of staff, students, visitors and contractors.

12.2.2.2 The JSA has been designed to allow staff performing medium and high risk activities to critically examine a work task to identify the hazards of the job and to work out ways to eliminate or control the hazards.

12.2.2.3 Following completion, the JSA must be checked by a supervisor/foreman prior to commencing the project.

12.3 ACTIONS TO BE TAKEN FOLLOWING ASSESSMENT OF RISK

12.3.1 Risks assessed as extreme:

- do not proceed or, if commenced, stop the activity/process immediately;

- consult with your RSO or OHSE consultant to determine appropriate risk control measures to decrease the risk;
- implement risk controls; Implementation of the risk controls must decrease the risk of the activity to medium or low. If not, contact your supervisor or RSO before commencing the activity.
- record and date actions taken on the risk control worksheets.

12.3.2 Risks assessed as medium or high:

- review the activity/process to determine appropriate measures to decrease the risk;
- consult with your RSO or OHSE consultant to determine appropriate risk control measures if necessary;
- implement risk controls;
Implementation of the risk controls must decrease the risk of the activity to medium or low. If not, contact your supervisor or RSO before commencing the activity.
- record and date actions taken on the risk control worksheets;
- develop safe work instructions (guidelines are provided by OHSE at <http://www.adm.monash.edu.au/ohse/documents>).

12.3.3 Risks assessed as low:

- consult with your RSO to ensure that appropriate licensing and records management is in place.
- further risk control measures are not required, but if additional control measures will decrease the risk, these should be implemented;
- record and date actions taken on the risk control worksheets;
- develop safe work instructions (guidelines are provided by OHSE at <http://www.adm.monash.edu.au/ohse/documents>).

12.4 CONTROLLING OHS RISKS

12.4.1 The OHS Act 2004 requires risk control measures to be selected based on the hierarchy of control.

12.4.2 Throughout the risk control program, examples of control measures based on the hierarchy of control are provided following the assessment table for each hazard type.

12.4.3 The hierarchy of control ranks risk control measures in decreasing order of desirability and effectiveness with the preferred control measures being elimination, substitution *or* engineering controls.

The hierarchy of control includes:

<u>Elimination</u>	Regulations supporting the OHS Act require the elimination of risks as the first step in risk control.
<u>Substitution</u>	Substitution of a less hazardous alternative.
<u>Isolation</u>	Enclosing or isolating the hazard.
<u>Engineering controls</u>	Changing processes, equipment or tools, eg: Ventilation Mechanical aids

If a risk to workplace health and safety remains after the above methods have been used, administrative controls should be applied or, if these are still not adequate, personal protective clothing and equipment worn. These methods of risk control are not preferred because the source of

the risk is not eliminated or reduced.

Administrative controls

Information, training and procedures, eg
Job rotation
Limiting access
Permit systems
Safe operating procedures
Training
Signage

Personal protective equipment, eg

Laboratory coat, safety glasses, closed shoes/boots

12.5 RISK ASSESSMENTS

12.5.1 Risk assessments must include assessment of:

- the effects on the local environment such as other processes, personnel or external environmental impacts;
- types and quantities of wastes generated and their storage, handling, treatment and disposal methods;
- emergency situations which may arise from the task, procedure or equipment, eg from a spill, a fire or an explosion;
- the level of risk associated with the task, procedure or equipment outside of the normal operating hours of the unit, ie during times when the immediate emergency response, eg first aid, is limited. Examples of recommended conditions for work or study at these times are provided in *OHS procedures for work and study during times when emergency response is limited*, which is available at <http://www.adm.monash.edu.au/ohse/documents>.

12.5.2 Generic tasks, procedures and equipment

12.5.2.1 Generic risk assessments may be developed for tasks, procedures and equipment:

- at more than one work place, or
- at more than one work area within a workplace.

12.5.2.2 Generic risk assessments must include modifications specific to each work area.

12.5.2.3 Where used, a copy of the generic risk assessment must be available to staff and students of the unit/entity.

12.6 UPDATE AND REVIEW OF RISK ASSESSMENTS

12.6.1 Risk assessments must be reviewed:

- when significant changes are made to the task, procedure; or equipment that use ionising radiation; or
- at least every 5 years.

12.6.2 Units/entities that undertake research using ionising radiation may need to update their risk assessments frequently, even daily, to ensure that their radiation risk assessments are up to date.

13. SAFE WORK INSTRUCTIONS AND SAFE HANDLING PRACTICES

The intent of following safe work instructions and radiation safety procedures is to minimise radiation exposure as detailed in the *Ionising Radiation Policy*.

13.1 SAFE HANDLING PRACTICES

Basic safe handling requirements are detailed in the *Radiation Safety Manual* and the *Manual for Users of Ionising Radiation* which are available at the OHSE website (<http://www.adm.monash.edu.au/ohse/safety-topics/radiation.html>).

13.2 SAFE WORK INSTRUCTIONS

13.2.1 Following risk management of ionising radiation procedures, processes or equipment that use ionising radiation, safe work instructions must be developed by supervisors of laboratories/studios/workshops or incorporated into laboratory procedures or safety manuals.

13.2.2 OHSE has developed *Guidelines for the development of safe work instructions*, which are available at the OHSE web site (<http://www.adm.monash.edu.au/ohse/documents>) to provide guidance and a template for use by areas.

14. TRAINING

(See *OHS Induction & training at Monash University*, <http://www.adm.monash.edu.au/ohse/documents>).

14.1 RISK MANAGEMENT

Training in the use of the risk control program and the job safety analysis is provided by OHSE both centrally and in work areas.

14.2 USE OF IONISING RADIATION

Training in the use of ionising radiation must be provided at a range of levels, including by laboratory supervisors, safety personnel and OHSE.

14.2.1 OHSE at a university level

14.2.1.1 OHSE has on-line exam that must be undertaken (and passed) by all staff, honours and postgraduate students that work with unsealed sources of ionising radiation before commencement of work.

- The exam is based on two training CDs.
- Access to the CDs and exam registration is administered by the RSO in your unit.

14.2.1.2 OHSE conduct specialist radiation safety training for RSOs that includes assessment criteria.

14.2.1.3 Information regarding the content and scheduling of OHSE courses offered at Monash University is:

- provided at the OHSE web site; (<http://www.adm.monash.edu.au/ohse/training/>), and
- in the OHSE Training Course booklet, which is available from OHSE(9905 1016, ohsehelpline@adm.monash.edu.au).

14.2.2 Safety personnel and experts at a unit/entity level

14.2.2.1 In faculties/divisions/entities with a range of similar risks, training in ionising radiation use can be provided at faculty/divisional level by local safety personnel (eg RSO), experts and/or the local OHSE consultant, eg procedure for iodinations, how to dispose of radioactive waste, etc.

14.2.2.2 Unit/entity OHS training in ionising radiation use can be provided by local safety personnel or experts with specific knowledge of the ionising radiation uses in the area.

14.2.3 Supervisors at a local laboratory

Supervisors of each must provide induction and training in the use of ionising radiation in the laboratory that they supervise. This training must include:

- the location of risk assessments for the ionising radiation procedures used in the area;
- the use and location of monitoring devices for the use of ionising radiation;
- the use and location of personal protective and emergency equipment for the use of ionising radiation;
- local procedures, processes or equipment that use ionising radiation.

14.3 TRAINING RECORDS

14.3.1 In order for units/centres and supervisors to demonstrate effectively that they have provided comprehensive OHS training for the staff and students that they supervise, the training in ionising radiation use that they undertake must be recorded.

14.3.2 OHSE has developed a simple proforma to use to record attendance at OHS training in each unit/entity, which is available at the OHSE web site (<http://www.adm.monash.edu.au/ohse/documents>).

14.3.3 A short description of the points covered in the training should also be documented for all ionising radiation training provided in the unit/entity. The description will act as both a reminder regarding the areas that should be covered in the training and as a record of the areas covered in the training.

14.3.4 OHS training by supervisors

- When a supervisor provides training in ionising radiation procedures, the completion of the training should be recorded.
- Records of ionising radiation training should be maintained in a folder in each area, (eg laboratory) where training is provided.
- The student or staff member being trained should be able to demonstrate competence in the task(s) before the supervisor completes the record of training.

15. TRANSPORT OF IONISING RADIATION SOURCES

15.1 TRANSPORT WITHIN A BUILDING

To ensure that the risk of an incident involving ionising radiation is minimised, the following practice should be followed when transporting a source within a building:

- take the shortest &/or least populated route to your destination.
- ensure that packaging is robust and includes secondary containment in case of spills.
- ensure that a second radiation worker accompanies you during the transport. In case of accident one person stays at the scene and the other person gets assistance.
- minimise your exposure during the transport, eg: use a trolley to maximise the distance between the ionising radiation source and your body (note: if a

trolley is used the source must be secured so that it cannot readily fall off the trolley).

- never leave ionising radiation source unattended.

15.2 TRANSPORT BETWEEN BUILDINGS

15.2.1 The precautions detailed above for transport within a building also apply to transport of ionising radiation between buildings. In addition you need to consider that there are likely to be more members of the public around. Do not transport ionising radiation sources between buildings during peak traffic times, e.g. lecture start and end times.

15.2.2 **Note:** transport of ionising radiation sources by road whilst on campuses is not permitted unless it is carried out in accordance with the requirements detailed in section 15.3 for transport off campus. This is due to the fact that the majority of roads are publicly gazetted so that the Code of Practice for the Safe Transport of Radioactive Material (2001) applies.

15.3 TRANSPORT OFF CAMPUS

Transport of ionising radiation off campus must be carried out in accordance with the *Code of Practice for the Safe Transport of Radioactive Material (2001)* and in consultation with RPO. Transport requirements are detailed in the Radiation Safety Manual which is located on the OHSE website (<http://www.adm.monash.edu.au/ohse/safety-topics/radiation.html>).

16. WASTE DISPOSAL

16.1 RADIOACTIVE WASTE MANAGEMENT

Correct radioactive waste management involves a structured program to ensure that any wastes generated are correctly identified in terms of their potential hazard to the environment and to any staff handling them.

16.2 WASTE DISPOSAL

Waste disposal must be carried out in accordance with unit/entity rules which must conform to the university procedures *Procedure for Disposal of low level, solid radioactive waste* and *Procedure for disposal of liquid radioactive waste*.

16.3 WASTE TRANSPORT

16.3.1 All off-campus transport of radioactive waste must be via a licensed waste contractor.

16.3.2 Radioactive waste must be only be transported by units/entities within a campus.

16.3.3 When radioactive waste is transported within a building or a campus it must be transported in such a manner as to ensure that the health of staff, students, visitors to the university, and/or the environment is not compromised. Issues such as containment in case of incidents should be considered.

17. EMERGENCIES INVOLVING IONISING RADIATION

17.1 INCIDENT AND EMERGENCY RESPONSE

17.1.1 Emergency procedures for a radiation spill are contained in the emergency procedures booklet located near every telephone on all campuses.

Contact OHSE by phone on 9905 1016 or by email on ohsehelpline@adm.monash.edu.au to obtain further copies of the emergency booklet for your campus.

17.1.2 Details regarding assessment and management of incidents involving ionising radiation are outlined in the *Radiation Safety Manual* and the *Manual for Users of Ionising Radiation* which are available at the OHSE website (<http://www.adm.monash.edu.au/ohse/safety-topics/radiation.html>).

17.1.3 The *Procedures for hazard and incident reporting, investigation and recording* (<http://www.adm.monash.edu.au/ohse/documents/>) outline the procedures for reporting incidents involving ionising radiation.

17.2 CRISIS MANAGEMENT

17.2.1 Monash University has invested considerable resources on planning crisis management and recovery. This planning includes consideration regarding crises involving ionising radiation.

17.2.2 Further details and the crisis management plan are located at the Crisis Management and Recovery web site (<http://www.adm.monash.edu.au/sss/crisis-management/>).

18. RECORDS

<u>Record to be kept by</u>	<u>Records</u>	<u>To be kept for:</u>	
Academic/administrative unit/controlled entity	Risk assessments	5 years	
	OHS training records of training provided by unit/entity, including: <ul style="list-style-type: none"> • Attendees; • Short description of training content 	Indefinitely	
	Laboratory/unit/entity records of purchases of ionising radiation sources	2 years after disposal of the ionising radiation source	
	Surveys of laboratories for contamination	5 years	
	OHSE	OHS training records of training provided by OHSE, including: <ul style="list-style-type: none"> • Attendees • Short description of training content 	Indefinitely
		Course evaluation sheets	5 years
		Exam results for OHSE managed assessments	Indefinitely
		Personal dosimetry results	50 years
		Items controlled by OHSE in long term storage	Ask GS
		Registration documentation	2 years after disposal of the ionising radiation source
	Licence documentation managed by OHSE	Indefinitely	
OHSE health team (confidential files)	Bioassay and internal exposure results (where collected by OHSE)	Indefinitely	

19. REFERENCES

19.1 LEGISLATION

Health Act (1958)
Radiation Act (2005)
Nuclear Non-proliferation (Safeguards) Act 1987
Health (Radiation Safety) Regulations 1994
Code of Practice for the Safe Transport of Radioactive Material (2001)
Code of Practice for the Exposure of Humans to Ionizing Radiation for Research Purposes (2005)
Recommendations for Limiting Exposure to Ionizing Radiation (Printed 1995 - Republished 2002) and National Standard for Limiting Occupational Exposure to Ionizing Radiation (Printed 1995 - Republished 2002)

19.2 MONASH UNIVERSITY OHS DOCUMENTS

(<http://www.adm.monash.edu.au/ohse/documents/#policies>)

Guidelines for the development of safe work instructions
Job Safety Analysis
Manual for Users of Ionising Radiation
Occupational health and safety management at Monash University: Structure, functions, roles and responsibilities.
OHS risk management at Monash University
OHS induction and training at Monash University
OHSE training course booklet
OHSE training guide
Procedures for dosimetry of ionising radiation
Procedure on protecting the unborn child from the effects of ionising radiation
Procedure for Purchase, Registration and Licensing of Ionising Radiation Sources
Procedure for disposal of liquid radioactive waste
Procedure for disposal of low level solid radioactive waste
Radiation Safety Manual
Risk Control Program
Training records

19.3 AUSTRALIAN STANDARDS

AS 2243.4:1998 Safety in Laboratories: Ionizing radiation
AS/NZS 4801:2001 Occupational Health & Safety Management Systems – specifications with guidance for use.