Health and Safety - Ionising Radiation Management Procedure

Section 1 - Purpose / Objectives

(1) To ensure that Victoria University (VU) has a system established to eliminate or minimise risk of injury as far as reasonably practicable to all employees, students, contractors, visitors and volunteers from exposure to ionising radiation.

(2) That VU has a system established for effective dose limits for all ionising radiation practices and use of radiation sources that complies with current legislative requirements.

(3) That VU complies with the conditions of the Radiation Management Licence and current occupational health and safety and radiation legislation.

Section 2 - Scope / Application

(4) This Procedure applies across the University and all controlled radiation practices.

Section 3 - Definitions

(5) Ion – An ion is an electrically charged atom or grouping of atoms.

(6) Ionisation – The process by which a neutral atom or molecule acquires or loses an electric charge i.e. the production of ions.

(7) Ionising Radiation – Ionising radiation is radiation that produces ionisation in matter. Examples are alpha particles, gamma rays, x-rays and neutrons.

(8) Radiation – Is the process of emitting energy as waves or particles.

(9) Radioactive Material – Is any material that spontaneously emits ionising material e.g. a radionuclide.

(10) Radionuclide – Is an unstable nuclide that emits ionising radiation.

(11) Radiation Practice – Refers to any of the following activities:

a. procuring or selling a radiation source;
b. transporting radioactive material;
c. repairing a radiation source;
d. maintaining a radiation source;
e. managing or controlling the use of a radiation source;
f. disposing of a radiation source;
g. procuring or arranging research involving the irradiation of persons; and

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h. any activity conducted in relation to a radiation source that my result in exposing a person or the environment to radiation.

(12) Radiation Source – Refers to the following:

a. radioactive material;
b. a radiation apparatus, and
c. a sealed source apparatus.

(13) Sealed Source – Means radioactive material that is:

a. permanently sealed in a capsule; or
b. closely bound and in solid form.

Section 4 - Policy Statement

(14) Refer to Health and Safety Policy.

Section 5 - Procedures

Part A - Roles/Responsibilities

Roles	Responsibility
Executives and Leaders	- Oversee the management of ionising radiation practices and compliance to current legislative requirements. - Support and endorse the implementation of VU's 'Ionising Radiation Management Plan'. - Provide resources to meet the conditions of VU's radiation 'Management Licence'.
Principal Researchers	- Ensure that all research work is conducted in line with the principals of radiological protection i.e. justification, limitation and optimization. - Ensure that a risk assessment and safe operating procedure (SOP) is completed and appropriate controls for each research project are in place prior to commencement of the activities. - Oversee research activities in order to reduce radiation exposure to a level as low as reasonably achievable (ALARA).
Radiation Safety Officer (RSO)	- Provide advice associated with the use, storage, disposal and transport of ionising radiation in line with legislative requirements. - Maintain the VU radiation' Management Licence' and 'Radiation Management Plan'. - Lead investigation of radiation incidents and notify the relevant authority as required by legislation. - Procure Thermo Luminescent Dosimetry (TLD) monitors and maintain radiation' dose reports' from TLD results. - Develop and update radiation procedures and guidelines as required. - Provide radiation training as required. - Conduct safety audits of radiation facilities as required.
Laboratory Technical Manager and Technical Staff	- Oversee and manage activities within the laboratory to ensure compliance with legislative requirements. - Facilitate laboratory induction and training for users, contractors & visitors as required. - Maintain training and induction records. - Notify RSO of any incidents involving radiation safety. - Conduct regular inspections of the laboratory to review compliance with laboratory radiation safety procedure and manual. - Maintain a 'Plant and Equipment' Register for all radiation apparatus. - Provide and maintain safety and personal protective equipment (PPE). - Assist radiation users to conduct work safely in the laboratory.

Roles	Responsibility
Radiation Users (e.g. Research Officers/Post Doctorate and PHD Students)	- Follow radiation laboratory safety procedures and guidelines. - Maintain a record of all radioactive sources used. - Conduct radiation monitoring of work areas. - Ensure that a risk assessment and safe operating procedure has been completed and reviewed prior to commencing work with radiation. - Report any incidents (inclusive of spills), hazards or unsafe practices to the Laboratory Technical Manager.

Part B - Procedures

Procurement

(15) The procurement of radioactive material and apparatus must be in line with VU's 'Radiation Management Licence' and VU's Purchasing Procedure for chemicals and plant and equipment.

(16) Prior to procurement of any new and/or additional radioactive materials or apparatus the Laboratory Technical Manager and RSO must be notified.

Records

(17) Current and accurate records and registers of radioactive material, apparatus and personal exposure levels must be maintained at all times as per below:

a. purchase, disposal and transfer of radiation apparatus is to be documented on a 'Plant and Equipment Register';
b. a documented register of all radioactive material which specifies type, quantity, responsible user and location; and
c. a documented register of TLDs and monitoring records.

Management Licence

(18) No radioactive material may be procured or brought on site without it first being permitted under VU's Radiation licence. The University's RSO shall maintain the Radiation Management Licence. Changes to the license are required to be approved by the relevant regulatory authority via the RSO prior to the decision to:

a. purchase new radioactive material;
b. relocate existing radioactive material; and
c. remove existing radioactive material.

Training

(19) Employees must complete training prior to commencement of working with radiation and also complete refresher training every 3 years.

(20) The following specific radiation training is to be completed:

a. all employees working with ionising radiation must complete an appropriate 'ionising radiation training' course;
b. all employees using the DEXA machine must complete a training course approved by the relevant authority to obtain a 'User Licence';
c. all employees must complete a specific laboratory induction for either the DEXA or Radiation Laboratory prior to commencement of work; and

d. the RSO is to complete specific RSO training.

Risk Assessments / Safe Operating Procedures (SOPs)

(21) Risk assessments and safe work procedures are to be completed for all activities relating to usage of radioactive material and radiation apparatus.

(22) All risk assessments are to be reviewed by the Laboratory Technical Manager and / or the RSO and approved by the Principal Researcher.

(23) Risk Assessments and controls must take the following into account:

a. Limiting radiation exposure through the 'hierarchy of controls' and ALARA principle;
b. Introduction of new processes, apparatus or radioactive material; and
c. Method of storage and disposal.

(24) Risk Assessments are to be reviewed every 3 years or when changes to work tasks or apparatus occur.

(25) Safe work procedures must take the following into account:

a. laboratory/workplace inspection inclusive of radiation monitoring;
b. applicable personal protective equipment (PPE);
c. applicable shielding requirements;
d. wearing of TLD monitor/s;
e. restricted access, including a list of authorised users who have undertaken the appropriate training; and
f. completion of a log book to record and monitor the use of ionising radiation isotopes.

Labelling / Signage

(26) Radioactive material must be clearly labelled with the following information:

a. the radionuclide;
b. the activity of the radioactive material; and
c. the date the activity was measured.

(27) Rooms containing radioactive material and /or radiation apparatus must be clearly signed at access points to the room and clearly display:

a. the ionising radiation hazard symbol;
b. the words, CAUTION – RADIOACTIVE MATERIAL; and
c. the letters and symbol in black on a yellow background.

(28) Radiation apparatus must be clearly labelled with the following information:

a. the ionising radiation hazard symbol; and
b. the symbol in black on yellow background.

Storage / Shielding

(29) Storage requirements for radioactive material must take into account the following:

a. chemical properties;

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b. radioactive properties; and
c. the level of risk associated with use.

(30) Access to storage and areas where radioactive material is used is restricted to authorized staff and personnel only.
The Laboratory Technical Manager is the only person able to issue authorisation for access.

(31) Shielding is to be used when working with radiation material when identified as a control within the risk assessment.

Incident Management

(32) All incidents involving radioactive material and/or apparatus are to be immediately reported to the RSO and Technical Manager and an Incident Report is to be completed in VU's on-line Incident Management Database.

(33) Based on the severity of the incident the RSO will make a determination whether the incident is required to be reported to the relevant regulatory authority.

Emergency Procedures

(34) The Emergency Planning Committee (EPC) will develop and maintain local area emergency procedures that take into account:

a. the type and use of radioactive material; and
b. the risks involved with uncontrolled release of radioactive substances.

(35) Following an emergency event the RSO is to be notified.

(36) The RSO will initiate an investigation and report mandatory radiation incidents to the relevant authority as per the VU 'Management Licence' and legislative requirements.

Monitoring

(37) Personal monitoring will occur via wearing a TLD monitor in radiation work areas.

(38) TLD monitors will be issued on a three month basis to approved personnel by the Radiation Safety Officer or Technical Manager upon:

a. completion of the relevant training course and evidence of a User Licence, where applicable;
b. completion of relevant inductions; and
c. completion of ethics approvals, where applicable.

(39) TLD monitors will be sent by the RSO to the relevant regulating body every three months for analysis and results reviewed and retained as per current legislative requirements.

(40) Contamination monitoring will occur in radiation work areas as deemed necessary and will be conducted via the following methods:

a. use of a radiation monitor, or
b. application of a swab test.

(41) If an approved radiation user is to cease working with ionising radiation advice should be sent to the RSO to enable the cancellation of TLD badge provision. This will reduce administration and cost.

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Disposal of Radioactive Material

(42) Three methods of waste disposal are available and shall be determined via completion of a risk assessment as per below:

a. dilution and dispersion;
b. delay and decay; and
c. containment.

(43) Short-lived radioactive material can be stored and allowed to decay and disposed of as non-radioactive waste. Radioactive wastes can also be diluted until deemed to be non-radioactive.

(44) Non-radioactive waste can then be disposed of through appropriate waste streams.

(45) Consideration of waste disposal must also consider co-existing hazards such biohazard, chemical or GMO waste.

Transport of Radiation Sources

(46) Transport of radioactive material must meet legislative requirements specifically in relation:

a. packaging;
b. labelling; and
c. placarding.

(47) If transportation of radioactive material is required between VU campuses or from other facilities then clearance must be obtained from the RSO prior to transportation taking place.

Section 6 - Guidelines

(48) Nil

Section 7 - References

(49) This Procedure is required to comply with the following legislation:

a. Occupational Health and Safety Act 2004
b. Occupational Health and Safety Regulations 2017
c. Radiation Act 2005
d. Radiation Regulations 2007

(50) The following documents are referenced in this Procedure:

a. VU radiation ‘Management Licence’;
b. VU Ionising Radiation Management Plan; and
c. Health and Safety - OHS Incident Reporting and Investigation Procedure

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