Work Health and Safety Management System (WHSMS) Handbook

Element 3 Implementation

Chapter 3.9 Radiation Safety Management

Safety and Wellbeing

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CRICOS Provider No. 00120C

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CHAPTER 3.9 Radiation Safety Management

Aims and Objectives

1. The aim is to implement and maintain best practice and compliance with radiation legislation and the Australian National University (the University) licence conditions with respect to radiation safety.
2. This chapter should be read in conjunction with the University Radiation Safety Policy and Radiation Safety Procedure.
3. The objectives are to ensure the University and its Colleges, Schools, Divisions and Portfolios:
    a) Ensure that all risks of radiation activities are identified, assessed and controlled appropriately to prevent injury and minimise exposure.
    b) Ensure that all radiation–related incidents are reported and investigated in a timely manner and identified corrective actions implemented to reduce recurrence.

Scope

4. The University has developed this chapter to ensure implementation of Radiation Safety Policy and Procedure.
5. This includes complying with legislation, the University licence conditions and relevant Australian Standards.

Inclusion

6. This chapter applies to all workers, students, volunteers, external visitors and contractors taking part in any University activity that involves radiation in teaching and research activities.
7. This chapter applies to the following types of radiation, for example:
    a) Radioactive sources (sealed or unsealed).
    b) Ionising apparatus (X-rays, CT scanner, etc.).
    c) Lasers (class 3B or 4)
    d) Non-ionising apparatus (ultraviolet, radiofrequency, etc.).

Definitions

8. Radiation Safety Procedure encompasses the definitions related to radiation activities. However, the important definitions are:

a) **ARPANSA** refers to Australian Radiation Protection and Nuclear Safety Agency. The University is licensed according to ARPANS Act, 1998 and ARPANS Regulations, 2018 to carry out radiation–related research and teaching.

b) **ASNO** refers to Australian Safeguards and Non-Proliferation Office. The University holds a permit to carry out teaching and research according to nuclear non-proliferation legislation. The Vice Chancellor is the permit holder for the University.

c) **Licence** refers to a source licence or a facility licence issued by the Australian Radiation Protection and Nuclear Safety Agency (ARPANSA) to the University with the Vice Chancellor named as the licence holder.

d) **Laser Safety Officer** (LSO) refers to a person(s) at the University who possesses the necessary skills, training, experience and qualifications to effectively manage the radiation protection program for their designated local area.

e) **Radiation** includes ionising radiation (alpha, beta, gamma, x-rays, and neutrons) and non-ionising radiation (infrared, visible light, ultraviolet, microwaves, radiofrequency waves, and magnetic fields).

f) **Radiation Safety Advisory Group** (RSAG) refers to a group of subject–matter experts, who provides advice on radiation–related matters and meets quarterly.

g) **Radiation Safety Officer** (RSO) refers to a person(s) at the University who possess(s) the necessary skills, training, experience and qualifications to effectively manage the radiation–protection program for their designated local area.

h) **Safety and Wellbeing (S&W)** coordinates regulatory and safety activities between the university and the regulators.

i) **Worker** is defined as anyone who carries out work for the University. A worker includes staff, volunteers, contractors, students and visitors at the University.

Roles and Responsibilities

9. Roles and Responsibilities are listed in the University Radiation Safety Policy and Radiation Safety Procedure; however, to ensure the regulatory compliance, this chapter provides duties (listed below).
10. Each Dean or Director at a research school or college, which has controlled sources or apparatus, is responsible for implementing research, teaching and operational work in their local area and workplace that:
    a) is safe and healthy for staff, students, contractors and visitors.
    b) identifies and controls the risk to the environment.
    c) complies with the relevant legislation, University licence conditions and delegations.
    d) appoints a Radiation Safety Officer (RSO) or Laser Safety Officer (LSO) at the research school or college that has radioactive sources or apparatus that produces radiation.
11. All supervisors are responsible for:
    a) ensuring their workplace is safe and healthy for all staff, students, contractors and visitors.
    b) ensuring the staff, students and contractors are provided with appropriate induction, training, advice and supervision.
    c) providing documented safe-work procedures and ensuring the staff, students and contractors they supervise understand and observe them.
    d) reporting any radiation incidents, exposures, hazards or Work Health and Safety (WHS) concerns within their jurisdiction.
12. Workers are responsible for:
    a) complying with relevant safe-work procedures and risk assessment.
    b) operating the equipment, only if they are authorised.
    c) meeting training obligations.
    d) reporting all radiation–related incidents, hazards, exposure or near-misses to their supervisor or local area RSO/LSO.
13. Radiation Safety Officer or Laser Safety Officers are responsible for:
    a) providing advice to their respective local area on radiation–related matters.
    b) reviewing local–area procedures.
    c) Investigating radiation–related incidents.

d) Coordinating local–area personal radiation dosimeters and reports.
e) Submitting quarterly ARPANSA reports to Safety and Wellbeing (S&W).

14. Safety and Wellbeing (S&W) is responsible for:
    a) Liaising with regulators.
    b) Maintaining the University Licences and Permit(s).
    c) Reporting notifiable incidents to regulators.
    d) Reviewing personal dose reports for radiation workers.
    e) Regulatory reporting in accordance with the University Licences and permit(s).

Process

15. The Radiation Safety Procedure details:
    a) New-work approval
        I. Local–area assessment
        II. RSAG assessment
        III. ARPANSA assessment
        IV. ASNO notification
    b) Assessment according to section 63 of the ARPANS Regulations
    c) Disposal of radioactive laboratory waste
    d) Storage of long-term radioactive waste
    e) Storage and handling of ionising sources
    f) Storage and handling of inactive apparatuses

Implementation

16. The implementation of this chapter will be assessed in conjunction with compliance with Radiation Safety Policy and Procedure.

Monitoring and Evaluation

17. **Personal Ionising Radiation Monitoring**: Radiation workers must wear their issued radiation-monitoring dosimeter while working with ionising radiation (unless exemption is received in writing from ARPANSA). The University utilises a NATA–accredited organisation for personal dosimeters. The following wearing cycle applies:
    a) Whole–body dosimeters: quarterly.
    b) Finger badges: monthly or quarterly.

18. ARPANSA mandates that the annual dose received by radiation workers should not exceed 20 mSv, averaged over five consecutive years, with no more than 50 mSv in any one year.
19. The University has the following dose constraints regarding personal dose reports:
    a) <80 µSv/month
    b) <250 µSv/quarter
    c) <1000 µSv/year
20. **Area, Zone and Equipment Monitoring:** S&W conducts personal and area monitoring to identify whether any dose exceeds worker dose constraints, or where changes have occurred. Documented (ionising and non-ionising) radiation monitoring results provide information that assists in generating actions that reduce the radiation dosage to personnel. This also includes regularly monitoring equipment for leaks or contamination that could lead to personal exposure.

Review

21. S&W, WHS Consultant will review the personal dose reports quarterly before submission to the Australian National Radiation Dose Register (ANRDR). The quarterly reporting to ANRDR is an ARPANSA Licence condition for the University.

Audit

22. The following audit checklist should be used by the local area RSO/LSO to assess their respective area compliance with current Australian Standards:
    a) Ionising radiation apparatus/material
    b) non-ionising radiation
    c) lasers or
    d) laser system or equipment
23. ARPANSA has an audit schedule for the University to assess the compliance with relevant legislation and standards.
24. ANU S&W will audit the compliance as per University Tier 2 audit schedule.

Other Considerations

25. **Pregnant radiation worker:** Workers working with radiation must notify their supervisor (or the RSO/LSO or Safety & Wellbeing) as soon as they suspect they are pregnant. Once the pregnancy is confirmed, the supervisor actively seeks to further control exposure and provide information to the radiation worker on the risks to the embryo or foetus when the parent is working with radiation. When a radiation worker is no longer able to continue working with radiation, the supervisor (in consultation with the RSO) provides suitable alternative tasks.
26. Where a pregnant radiation worker continues to work with ionising radiation, a more stringent dose limit must be applied to the embryo or foetus. The dose limit for a pregnant radiation worker is 1 mSv a year during pregnancy.
27. These conditions also apply to breastfeeding radiation workers.
28. Radiation monitoring badges are worn at the level of the waist by a pregnant radiation worker or the chest by a breastfeeding radiation worker. Refer to ARPANSA Radiation Protection Series - 1 (Rev.1)
29. **Radiation worker with medical implants:** Workers with a medical condition or a medical implant that may be affected by exposure to radiation (e.g. a heart pacemaker in a magnetic field) discuss this with their supervisor, the RSO or S&W.
30. Supervisors and managers of the local area provide suitable alternative tasks where the worker is no longer able to work with radiation for health reasons.

Record Management

Table 1: Reports are provided at the indicated intervals to the specified areas.

Report Name	Report Type	Frequency	Audience	Supplied By
Quarterly	Source Inventory Workbook and local area update to S&W	Quarterly	ARPANSA	Local area and S&W
Radiation worker	Personal dose reports	Quarterly	ANRDR	S&W

dose record				
ASNO ASO 316	Building location update	Yearly	ASNO	Local area and S&W
NUMBAT	Annual reporting	Yearly	ASNO	Local area and S&W

Table 2: Document version control.

Version	Author	Date	Changes
1.0	Neha Kodwani	15 Feb 2023	Draft version
1.1	Neha Kodwani	5 April 2023	2nd version
1.2	Neha Kodwani	18 May 2023	Final version
1.3	Neha Kodwani	23 May 2025	Revised version

Performance Measures

31. The University will use the performance measures listed below to assist in identifying areas of success and/or where corrective action is required to meet the objectives and targets of this process.
32. The level of compliance with the chapter and effectiveness will be determined during the internal audit process in turn to determine the compliance with WHSMS.

Table 3: Performance Measures

Objective	Performance Measures	Objective Evidence	Frequency	Indication of Success
ARPANSA Reporting	Timely submission of reports to ARPANSA	Acknowledgement email from ARPANSA	Quarterly	100%
ANRDR Reporting	Timely submission of occupational dose data to ANRDR	Acceptance status on ANRDR webpage	Quarterly	100%
ASNO Report	Timely submission of report	Acknowledgement email from ASNO	Annually	100%
Annual ASNO Inventory	Timely submission of report	Acknowledgement email from ASNO	Annually	100%

Appendix A: Resources

Legislation

- Work Health and Safety Act 2011
- Work Health and Safety Regulations 2011
- Australian Radiation Protection and Nuclear Safety Act 1998
- Australian Radiation Protection and Nuclear Safety Regulations 2018
- Nuclear Non-Proliferation (Safeguards) Act 1987

References

- *Australian Radiation Protection and Nuclear Safety Agency* (Cth)- *Radiation Protection Series*
- *Australian Radiation Protection and Nuclear Safety Agency* (Cth)- *Radiation Health Series*
- *AS/NZS 2243.1 – Safety in laboratories – Planning and operational aspects*
- *AS/NZS 2243.4 – Safety in laboratories – Ionising radiation*
- *AS/NZS 2243.5 – Safety in laboratories – non-ionizing radiation – Electromagnetic, sound and ultrasound*
- *AS/NZS IEC 60825.1 Safety of laser products, Part 1: Equipment classification and requirements.*
- *AS/NZS IEC 60825.14 Safety of laser products, part 14: A User's guide*

Appendix B: Forms and Checklists

- Ionising radiation apparatus application form
- Ionising radiation isotope application form
- Non-Ionising radiation equipment application form
- laser application form
- Radiation store security audit checklist
- Laser laboratory audit checklist
- laser system or equipment audit checklist
- Ionising radiation audit checklist
- Non-Ionising radiation audit checklist
- Controlled Apparatus Identification and local listing form