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PROCEDURE DOCUMENT

Radiation Safety Management Procedure

For managers and workers

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Contents

Purpose

The purpose of this procedure is to inform ACT Health Directorate (ACTHD) managers and workers about the requirements for safely managing the risk from ionising radiation.

This procedure supports the Work Health and Safety (WHS) Policy and the WHS Guideline.

Scope

This procedure applies to all ACTHD managers and workers (including contractors) and others engaged in ACTHD activities for the correct management and use of ionising radiation sources. It applies to all radiation practices in which workers, contractors, and others may be exposed to:

- ionising radiation and radioactive materials, and
- equipment that produces ionising radiation.

This procedure is based on, and uses, material from relevant legislation and codes of practice accessed from the:

- ACT Legislation Register - for the latest information on ACT legislation see https://www.legislation.act.gov.au/
- Australian Radiation Protection and Nuclear Safety Agency (ARPANSA) Internet.

Objectives

ACTHD will:

- meet the requirements for ionizing radiation safety specified in the:
    - *Work Health and Safety Act 2011 (WHS Act)*
    - Work Health and Safety Regulation 2011 (WHS Regulation)
    - *Radiation Protection Act 2006*
    - Radiation Protection Regulation 2007
- implement the Radiation Protection Series published by *ARPANSA*, including the Code for Radiation Protection in Planned Exposure Situations (RPS C-1)
- ensure that there is **justification** whenever a new radiation practice is introduced, or an existing radiation practice is modified or reviewed
- ensure that exposures to ionising radiation are **optimised** for the intended purpose, including that ionising radiation exposure will be kept **as low as reasonably achievable** (ALARA)
- take all reasonable steps to prevent the exposure of individuals to radiation which exceeds regulated or stipulated limits (**limitation**)

- identify and apply risk management to all radiation sources
- hold a current licence from the Chief Health Officer, in accordance with the *Radiation Protection Act 2006* for radiation sources under the control of ACTHD
- ensure that all radiation sources in the required categories (radiation apparatus and sealed sources) are correctly registered with the Chief Health Officer, in accordance with the *Radiation Protection Act 2006*
- maintain a register of all radioactive sources and apparatus producing ionising radiation, and review the register annually
- ensure that Radiation management plans are developed for business units which have a regulated radiation source
- ensure that radiation sources are secure, stored safely and disposed of correctly
- identify all occupationally exposed workers and provide personal radiation monitoring and health assessments, where required by radiation management plans and Health Monitoring to Protect Workers from Harmful Exposures Procedure
- inform workers and prospective workers about radiation safety requirements
- ensure that, when an occupationally exposed female notifies the ACTHD that she is pregnant or is breast-feeding, additional controls are implemented to protect the embryo/foetus or breast-fed infant to a level equivalent to that provided for members of the public
- provide information, instruction and training for workers to mitigate against the risk of injury or illness to themselves or others
- ensure that all workers who use radiation sources are licenced by the Chief Health Officer in accordance with the *Radiation Protection Act 2006*, and
- review and audit the radiation protection procedures to check compliance with radiation management plans.

Roles and Responsibilities

Position	Responsibilities

Director-General who is an officer in accordance with the WHS Act 2011.	• Be the Responsible Person, as defined in the Code for Radiation Protection in Planned Exposure Situations, for the health, safety and welfare of people at or near ACT Health controlled facilities, including implementing the technical and organisational measures necessary for protection and safety for the practices and radiation source[1].
	• Ensure that ACTHD applies appropriate resources and equipment to:
	  ○ ensure that radiation risks are effectively managed, and
	  ○ comply with the *Radiation Protection Act 2006,* Radiation Protection Regulation 2007, WHS Act, WHS Regulation and Radiation Protection Codes.
	• Obtain advice and assistance from a Qualified Expert to ensure compliance with the relevant Code of Practice of the Radiation Protection Series, as required.

Business units which hold radiation sources	• Ensure that a radiation management plan is developed for any regulated radiation source. • Ensure that a Radiation Safety Officer, who has the appropriate competencies, is appointed for the business unit as required by a Radiation management plans. • Plans are in place to manage risks arising from an emergency.
Managers of business units which hold radiation sources	• Maintain a register of radiation sources and that they are registered by the Chief Health Officer • Consult with workers and ensure that they understand any risks associated the hazardous chemical or apparatus • Consult with workers about radiation sources • Ensure that workers receive appropriate information, instruction and training in radiation safety • Ensure that only workers, who hold the appropriate licence, use or handle radiation sources • Ensure that the radiation sources held or used by the business unit are covered by a radiation licence issued by the Chief Health Officer • Ensure that regulated radiation sources are secure and disposed of correctly, and that transfer, or disposal, of a regulated radiation source is advised to Health Protection Service, without delay • Report radiation incidents in accordance with the *Radiation Protection Act 2006* for consideration for inclusion in the Australian Radiation Incident Register (and to WorkSafe ACT where required - refer to the WHS Guideline).

1 The Responsible Person may designate a suitably qualified person to carry out tasks relating to these responsibilities, but the Responsible Person retains the prime responsibility for protection and safety. Code for Radiation Protection in Planned Exposure Situations (2020).

Position	Responsibilities
People Strategy and Culture Branch	• Develop and review the ACTHD WHSMS and provide information about WHS requirements.

Radiation Safety Officer (RSO)	• Develop radiation management plans in consultation with business units for a regulated radiation source, including:
	  ○ identifying ways of minimising the potential associated hazard
	  ○ providing or arranging training for radiation safety and handling
	  ○ monitoring safety and security
	  ○ any actions required by regulations
	• Meet the qualification requirements specified by the Chief Health Officer
	• Maintain a register of radiation sources and radiation licences for business units
	• Review the performance of radiation management plan/s
	• Provide advice on radiation safety and radiation monitoring, including:
	  ○ specifying the radiation monitoring and measurement equipment that is available to workers
	  ○ the type and characteristics of radiation and contamination monitoring and measurement required
	• Identify when workers may require a health assessment
	• Report radiation incidents in accordance with the *Radiation Protection Act 2006* for consideration for inclusion in the Australian Radiation Incident Register (and to WorkSafe ACT where required - refer to the WHS Guideline)
	• Audit compliance with the requirements specified in the Radiation Protection Series.

Workers of business units which hold radiation sources	• Follow safety procedures and instructions, including the radiation management plan where in place • Wear a personal radiation monitor and personal protective equipment • Report any incidents or injuries • Maintain personal radiation safety competencies, where applicable.

Procedure

Regulatory framework

The *Radiation Protection Act 2006* provides for the licensing and registration of radiation facilities and sources in the ACT. The Radiation Protection Regulation 2007 supports the *Radiation Protection Act 2006* including provision for the prohibition of specific radiation sources.

The Australian Radiation Protection and Nuclear Safety Agency (ARPANSA) publishes the Radiation Protection Series for the safe use of ionising radiation[2] sources, which are incorporated documents under the *Radiation Protection Act 2006*.

The WHS Act and WHS Regulation specifies the risk management requirement to managing plant and equipment that produces radiation. Refer to the WHS Management of Plant and Equipment Procedure.

AS/NZS 2243.4:2018 Safety in Laboratories – Part 4 Ionizing Radiations provides specific information about risk controls for ionising radiation in laboratory environments.

Justification

When a business unit identifies an activity that requires the use, or change in the use, of a radiation source, a business case will be developed and approved by the relevant manager to ensure that the use is justified. The process must consider the:

- the justification of any type of practice, and
- review of the justification, as necessary.

The business case must include:

- a risk assessment in accordance with the Enterprise Risk Management Framework and the WHS Guideline, and
- information about who will be the RSO, where a registered radiation source is required, and develop a radiation management plan or amend an existing radiation management plan.

The Director-General, must be informed about the:

- proposed radiation source
- business case
- risk assessment
- name of the responsible RSO, and
- proposed radiation management plan.

2 Ionising radiation. ARPANSA reference

Radiation licences

ACTHD must hold a valid licence from the Chief Health Officer to possess and/or store a regulated radiation source. The business unit must ensure that any regulated radiation source that they hold or control is covered by that licence, or apply for a new licence or to amend an existing radiation licence.

Radiation source registration

Certain categories of radiation sources are required to be registered (including radiation apparatus and sealed sources) with the Chief Health Officer, in accordance with the *Radiation Protection Act 2006.*

The business unit must ensure that each regulated radiation source is registered, where registration of such source applies in accordance with the *Radiation Protection Act 2006*.

Radiation management plans

The RSO must develop the radiation management plan for a regulated radiation source to:

- meet the objectives detailed in this procedure
- comply with *Radiation Protection Act 2006*
- apply the Radiation Safety Codes of Practice
- identify ways of minimising the potential associated hazard
- monitor safety and security
- meet any requirements specified in the regulations
- detail how exposures to both workers and the public will be kept below established dose limits and ALARA
- ensure that workers receive appropriate training, instruction and supervision
- ensure that personal protective equipment is provided and maintained
- implement radiation measurement and monitoring requirements
- ensure the correct disposal of radiation sources
- provide processes and procedures for dealing with incidents, accidents and emergency response.

Optimisation

The radiation management plan will apply the principle of optimisation of the exposure, which requires that the following be kept as low as reasonably achievable, taking into account economic and societal factors (ALARA):

- likelihood of exposures
- number of people exposed
- the magnitude of the exposures.

The level of protection should be the best under prevailing circumstances and should provide for adequate margin of benefit over harm. The optimisation principle offers a means to take a graded approach to management of radiation risks and focuses on achieving an ethically acceptable outcome, based on balancing risks and benefits[3].

Limitation

In planned exposure situations the radiation management plan will apply a source-related **dose constraint**, which is set below the dose limit (Attachment A). The radiation management plan may refer to this as the trigger level.

The dose constraint is an operational tool to be used in the optimisation of protection and safety. For occupational exposure the dose constraint is a value of individual dose used to narrow the range of options for managing the exposure. Actual doses are expected to be below the dose constraint in normal operation.

Dose constraints are not dose limits but will support actions to prevent dose limits from being exceeded and assist in optimising protection. Exceeding a dose constraint does not represent non-compliance but will prompt a review of the cause of the dose constraint being exceeded and, if appropriate, follow-up action.

Radiation monitoring

The type and degree of monitoring required for workers exposed to ionising radiation depends on their level of exposure. Both workplace monitoring and/or individual monitoring may be used.

The ARPANSA Code for Radiation Protection in Planned Exposure Situations (RPS C-1) states that the Responsible Person, in this case the Director-General, must arrange for appropriate radiation monitoring to the extent necessary to:

- demonstrate the effectiveness of the measures for protection and safety
- assess external radiation doses.

The radiation monitoring program must be:

- documented
- reviewed periodically
- amended based on operational experience.

The aim of personal monitoring is to ensure that the doses received by the individual are kept within specified exposure limits (refer Attachment A). Where a person is not directly involved the radiation practice the exposure standard for a member of the public must be applied.

3 Code for Radiation Protection in Planned Exposure Situations (RPS C-1) (arpansa.gov.au)

Personal radiation monitoring will be provided to:

- any worker directly involved in a radiation practice[4]
- anyone who requests radiation monitoring.

ACTHD will assess the likelihood of exposure for:

- any worker who usually works in a designated radiation area
- anyone who occasionally attends a designated radiation controlled area.

Any estimate to assess the level of exposure will take into account the potential exposure in an unplanned incident situation as well as the results of existing or previous workplace monitoring.

Ionising radiation monitoring can include:

- the measurement of doses received by workers
- external dose rates
- amount of radioactive contamination on surfaces and articles
- radioactive contamination in the air and in effluents
- individual health monitoring assessments.

The RSO will:

- specify the radiation monitoring equipment that is available to workers in laboratories where regulated radiation sources are used (Note: If high activity sources (sealed or unsealed), or irradiating apparatus could give rise to an external radiation hazard, a dose-rate monitor will be available)
- provide advice in respect of unsealed radionuclide work or irradiating apparatus about:
    - the type and characteristics of radiation and contamination monitors required
    - whether a radiation monitor is required, and if so, the appropriate type.

Consultation

Consultation about radiation risks will be undertaken in accordance with the ACTHD communication, consultation and co-operation arrangements[5] through:

- WHS committees
- health and safety representatives
- workers in business units.

4 https://www.health.act.gov.au/businesses/radiation-safety

5 Refer to section 3 of the WHS Guideline.

Review and audit

Managers, and RSOs, will:

- monitor the compliance with the radiation management plans
- use monitoring that is sufficient to verify and demonstrate that compliance with the level of exposure from any radiation source is adequately assessed
- undertake an annual audit of the radiation protection procedures to check compliance with radiation management plans.

The result of the monitoring and audit processes will be reported to the:

- Director-General
- WHS Committees
- Corporate Governance and Finance Committee, as required
- health and safety representatives.

Records Management

Business units and managers are required to maintain records of radiation safety management as a corporate record. WHS records must be retained in accordance with the retention and disposal schedule for Occupational Health & Safety (OH&S) Records.

Related Documents

Legislation

- *Radiation Protection Act 2006*
- *Radiation Protection Regulation 2007*
- Radiation Protection (Radiation Protection Series) Codes of Practice 2021 (Notifiable instrument of the National Directory for Radiation Protection being an incorporated document)
- *Work Health and Safety Act 2011*
- *Work Health and Safety Regulation 2011*
- *Health Records (Privacy and Access) 1997*
- *Information Privacy Act 2014*
- *Territory Records Act 2002*

Codes of Practice

- ARPANSA Code for Radiation Protection in Planned Exposure Situations - Radiation Protection Series C-1 (Rev1) (2020)
- ARPANSA Guide for Radiation Protection in Emergency Exposure Situations (2019)
- ARPANSA Code for the Safe Transport of Radioactive Material (2019)
- ARPANSA Code for Disposal of Radioactive Waste by the User (2018)

- ARPANSA Code of Practice for the Security of Radioactive Sources (2019)
- ARPANSA Code of Practice Radiation Protection in the Medical Applications of Ionizing Radiation, May 2008
- Work Health and Safety (Managing Risks of Hazardous Chemicals in the Workplace Code of Practice) Approval 2020

Standards

- ARPANSA Fundamentals for Protection Against Ionising (Radiation 2014)
- AS/NZS 2243.4:2018 Safety in Laboratories – Part 4 Ionizing Radiations

Supporting Documents

- Work Health and Safety Policy
- Work Health and Safety Guideline
- Health Monitoring to Protect Workers from Harmful Exposures Procedure
- WHS Management of Plant and Equipment Procedure
- Hazardous Chemicals Procedure
- WHS Audit and Assessment Procedure
- Enterprise Risk Management Framework
- ACT HD records management policies and procedures
- Territory Records (Records Disposal Schedule – Territory Administrative Records Disposal Schedules – Occupational Health & Safety (OH&S) Records Approval 2009 (No.1)

Definitions

Term	Definition
ALARA	As low as reasonably achievable taking into account economic, social and environmental factors.
Hazardous chemical	Any substance, mixture or article that satisfies the criteria of one or more Globally Harmonised System (GHS) hazard classes, including a classification in Schedule 6 of the WHS Regulation.
Ionising Radiation	Radiation that is capable of producing ions directly or indirectly and is either: • particulate radiation, or • electromagnetic radiation of a wavelength of 100 nanometres or less. Radiation is non-ionising if it is electromagnetic radiation of a wavelength greater than 100 nanometres.
Qualified Expert	A person: • identified and consulted by the Responsible Person as necessary, on the proper observance of the Radiation Safety Code, and • who, by virtue of certification by appropriate boards or societies, professional licence or academic qualifications and experience, is duly recognised as having expertise in a relevant field of specialisation, for example medical physics, radiation protection, occupational health, fire safety, quality management or any relevant engineering or safety specialty. The qualified expert can be an employee of the ACT Public Service or a contractor engaged for that purpose.
Radiation	A phenomenon caused naturally, or created artificially that is: • an electromagnetic waveform, quanta or both; and • propagated through space or through a material medium.
Risk	Is the possibility that harm (death, injury or illness) might occur when exposed to a hazard.
Radiation Licence	A Radiation Licence is issued by the Chief Health Officer under the *Radiation Protection Act 2006* for dealings with regulated radiation sources. Licences are required for any individual or organisation that deals with a radiation source. The nature of the permitted dealings depends on the conditions imposed by the Chief Health Officer.
Radiation Source Registration	A Radiation Registration is issued by the Chief Health Officer under the *Radiation Protection Act 2006* for specific radiation source.

Term	Definition
Radiation Safety Officer (RSO)	A suitably competent person, who is nominated by the Responsible Person, to carry out tasks specified in the legislation and this procedure. The RSO is required to have completed appropriate radiation protection training and/or hold a suitable radiation protection qualification.
Radiation Safety Standards	The standards accepted as the basis of the Radiation Safety Management System.
Radiation Safety Principles	The three radiation safety principles are justification, optimization and limitation: • **Justification** of ionising radiation requires that use is justified for the intended purpose (but is not limited to) whenever a new radiation practice is introduced, or an existing radiation practice is modified or reviewed. • **Optimisation** of ionising radiation requires that exposures are optimised for the intended purpose. Optimisation includes (but is not limited to) the concept that the radiation exposure should be kept **as low as reasonably achievable** (ALARA). • **Limitation** involves setting radiation dose limits, or imposing other measures, so that the health risk to anyone, or the risk of damage to property or the environment, from being exposed to radiation is below unacceptable level).
Radiation Safety Obligations	All users of regulated radiation sources require training and credentialing for those sources that pose a known risk to health and safety. This obligation applies to users of both ionising and non-ionising radiation. All registerable radiation sources shall be registered with the Chief Health Officer and appropriate records maintained. All users of regulated radiation sources, under the control of the Responsible Person, are covered by an appropriate licence issued by the Chief Health Officer and appropriate records maintained.
Radiation Source	A thing is a radiation source if it emits or may emit radiation. A radiation source can be a radiation apparatus, a radiation facility or radioactive material. Refer to section 9 of the *Radiation Protection Act 2006*.

Term	Definition
Radiation Source (dealing with)	A person deals with a radiation source if the person: (a) manufactures the radiation source; or (b) possesses the radiation source; or (c) supplies the radiation source to someone else; or (d) uses the radiation source6; or (e) disposes of the radiation source; (f) inspects and assesses the safety of the radiation source to ensure compliance with this Act, or (g) for radioactive material—stores, packs or transports the material. Refer to section 11 of the *Radiation Protection Act 2006*.
Responsible Person	As defined in the Radiation Safety Standards who is responsible for the health, safety and welfare of people and meeting the requirements of the: · Radiation Protection Act 2006, and · Code for Radiation Protection in Planned Exposure Situations.

Search Terms

Radiation safety/ radiation protection / radiation management plan / radiation source registration.

Version Control

Version	Date	Comments
1.0	1 November 2021	First version
2.0	20 April 2023	Second Version

6 *Radiation Protection Act 2006* Definition: use a radiation source includes—
(a) use radiation emitted from the radiation source; and
(b) if the radiation source is radioactive material—administer to, or inject or implant the material into, a person, animal, plant or thing; and
(c) cause the radiation source to emit radiation.

Attachment A – Dose Limits for Ionising Radiation

Occupational Dose Limits – for directly people involved in the radiation practice

Type of limit	Limit (18 years and over)
Effective dose	20 mSv per year, averaged over a period of five consecutive years. The equivalent dose must not exceed 50 mSv in any single year.
Annual equivalent dose to the lens of the eye	20 mSv per year, averaged over a period of five consecutive years
Annual equivalent dose to the skin	500 mSv per year
Annual equivalent dose to the hands and feet	500 mSv per year

Member of the Public Dose Limits – for people not directly involved in the radiation practice

Type of limit	Limit (18 years and over)
Effective dose	1 mSv per year In special circumstances, a higher value of effective dose could be allowed in a single year, provided that the average over five years does not exceed 1 mSv per year
Annual equivalent dose to the lens of the eye	15 mSv per year, averaged over a period of five consecutive years
Annual equivalent dose to the skin	50 mSv per year

Source: Code for Radiation Protection in Planned Exposure Situations (arpansa.gov.au)