Radiation Management Plan

Portable Density/Moisture Gauge Radiation Management Plan for use in the ACT

# Introduction

Radiation Management Plan of Insert Company Name

for the practice of Portable Density/Moisture Measurements

to be based at Insert address

Document Number: Insert a unique reference number relevant to the Company

Prepared by: Insert Name

Date **Prepared**: Click here to enter a date

Date **submitted** to the Chief Health Officer: Click here to enter a date

Date of scheduled **review**: No more than 12 months after the date submitted

Scheduled annual review date: \_\_\_\_\_\_\_\_\_\_\_\_\_\_

Date of last review: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

The Chief Health Officer has determined that, whilst advice can be sought externally, the responsibility for radiation safety cannot be delegated to a third party, and the Chief Health Officer therefore requires that the RSO must be: someone employed to provide daily advice/supervision services on behalf of the organisation; suitably qualified; and reasonably available to attend the site as required, having regard to the attendant risk of the source type(s) at the location.

Radiation Safety Officer: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Phone: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Responsible Person: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Position: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Phone: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Work location: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Guidance on the use of this template**

This template is designed as an aid to the development of a Radiation Management Plan only. The template may not apply to your practice. As the radiation protection requirements are unique for each situation an appropriate Plan must be prepared. ACT Health does not take responsibility or liability for any protection measures in this template. The use of the template does not in any way imply that approval will be granted, applications are assessed by the Chief Health Officer.

All text in this document must be reviewed to ensure that it is appropriate to the specific context of the practice. In general the un-highlighted text provides generic information which will apply to many practices. Some text is **bolded** as an aid to readability only, which does not infer any additional meaning.

Sections which are highlighted in light grey, Such as this, provide information to the person completing the template. They must be deleted and replaced with content as indicated.

Sections which are highlighted in dark grey, such as this, provide example information that may be applicable to the practice. They must be reviewed and, if appropriate, the highlighting should be removed or the example replaced by practice-specific information.

These guidance notes should be deleted before submitting the plan to the ACT Health Directorate.

For further information please contact the Health Protection Service at [HPS@act.gov.au](mailto:HPS@act.gov.au) or on (02) 5124 9700

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## Scope

The purpose of this plan is to ensure that the use of surface, or near-surface, portable density/moisture gauges which incorporate one or more radioactive sources is conducted as safely as possible and in compliance with the *Radiation Protection Act 2006,* the *Radiation Protection Regulation 2007*, the *Code for Radiation Protection in Planned Exposure Situations (2016)* (RPS C-1), and the ***Code of Practice for Portable Density/Moisture Gauges Containing Radioactive Sources (2004)*** (the Code).

Devices that have a **separate probe** containing a radioactive source and separate source shielding, and which are designed to measure soil density, moisture or mineralisation in bore holes greater than a depth of 10 metres, are **not covered** by this Radiation Management Plan (RMP).

This plan should be **read by all employees** who will deal with any radiation sources at this location, and must be readily available to all staff.

## Responsibilities of employer and employees

**Employers** have a responsibility to provide employees with a **safe working environment**. Employees are also responsible for their safety and that of their co-workers.

Chapters 5 and 6 of the *National standard for limiting occupational exposure to ionizing radiation* NOHSC:1013 – 1995, and Section 3 of the Planned Exposure Code (RPS C-1) outline the duties that employers and employees respectively must carry out. This includes but is not limited to obtaining regulatory approvals and monitoring, as well as implementing and updating, work procedures to keep exposures to ionizing radiation as low as reasonably achievable, societal and economic factors being taken into account.

**All employees** are required to understand and follow the radiation protection practices outlined in this plan.

## Framework of Radiation Protection

The **management of risks** from ionising radiation requires actions that are based on fundamental principles of radiation protection, safety and security.

A brief summary of the radiation protection principals as they apply to Portable Density/Moisture Gauges Containing Radioactive Sources is provided in this section.

### Categories of Exposure

There are a number of persons who may be exposed to radiation from sources covered by this plan. These exposures are **planned exposure situations** as they involve the deliberate introduction and operation of radiation sources. Exposure from background or natural sources are not covered by this plan.

**Occupational** exposures are incurred by staff and contractors. This includes the doses received by the operators of the equipment as well as any other staff who may be exposed at that workplace.

**Medical** exposure is the exposure of patients as part of their medical diagnosis or treatment, and carers and comforters. This is not applicable in the context of Density/Moisture Gauges.

**Member of the Public** is any other person including visitors and people working, or living, in areas close to the work being carried out. Exposures of the embryo or foetus of pregnant workers are considered to be public exposures.

### Fundamental Principles of Radiation Protection

Justification:

The principle of justification requires that the **radiation exposure** situation should **do more good than harm**. That is, the potential risk due to exposure should be less than the benefit to an individual or to society.

In the case of exposure due to Density/Moisture Gauges, the benefit is primarily to the continued safe operation of infrastructure built based on accurate soil density/moisture information. The justification of the use of the gauges is required to take into account exposure to operators and other persons.

Optimisation:

Protection must be optimised so that **radiation risks are as low as reasonably achievable (ALARA),** societal and economic factors taken into account.

This includes the **dose reduction** strategies of minimising **time** exposed to radiation, maximising **distance** from the radiation source, and using appropriate **shielding**.

Optimisation programs can include the use of **dose constraints** and comparisons to **reference levels** or doses received at similar workplaces. Personal monitoring results also provide useful information which helps to optimise exposure.

Limitation:

Limits are set for **Occupational** and **Public Exposure** in RPS C-1. Limits ensure that no individual bears an unacceptable risk of harm.

**Limits are insufficient in themselves** to ensure the best achievable protection under the circumstances, and both the optimisation of protection and the limitation of doses and risks to individuals are necessary to achieve the highest standards of safety.

### Prevention and response to Incidents and Accidents

Efforts must be made to **prevent accidents**, and to **reduce the severity** of radiation risks associated with any reasonably foreseeable event. **Incidents** can result from a variety of causes including inadvertent actions, equipment failure, negligence, or deliberately not following procedures.

Radiation incident prevention can be achieved through the implementation of a range of procedures, regular checks and reviews, and physical protective measures. When properly implemented, this **defence-in-depth** ensures that no single technical, human or organisational failure would result in adverse consequences.

This also includes the **reporting** of radiation incidents both internally and to the regulator where appropriate.

# Overview

## The Responsible Person and the Radiation Safety Officer (RSO)

The **Responsible Person** is the legal person who has **overall management responsibility** and in whose name the sources are registered. This includes having responsibility for the security and maintenance of the sources, and control over who may use the sources.

A **Radiation Safety Officer** (RSO) must be appointed. The RSO must have sufficient knowledge, experience and professional or technical training to perform the Radiation Safety Officer duties laid down in the Code.

The RSO may be the Responsible person. Otherwise, the RSO will **assist** the Responsible Person in ensuring that the following duties are carried out. In order for the RSO to accomplish his or her prescribed duties, the Responsible Person must not prevent the RSO using outside experts and equipment not in the possession of the Responsible Person.

The **Responsible Person** is:

List the **name** and **contact details** of the Responsible Person.

The **Radiation Safety Officer** is:

List the **name** and **contact details** of the Radiation Safety Officer as well as a short summary of qualifications and/or experience.

The Responsible Person **must**:

* ensure a suitable **Radiation Management Plan** (RMP) is developed, documented, resourced, implemented and regularly reviewed;
* ensure all persons affected by the RMP follow and comply with the plan;
* ensure that only **persons** **appropriately authorised** by the Chief Health Officer may use, operate or transport radiation sources, and that these **sources are registered**;
* ensure that the gauge is used, stored, transported, routinely maintained, serviced or repaired in accordance with the provisions of this RMP and the Code;
* **prior to receiving** a gauge, **obtain authorisation** from, and supply relevant information to, the Health Protection Service. Including the proposed use, storage and transport and eventual disposal arrangements;
* ensure that **personal radiation monitoring devices** are supplied to the appropriate people, and are used appropriately;
* ensure that **radiation doses** to occupationally exposed persons and members of the public are kept as low as reasonably achievable and do not exceed the appropriate dose limits;
* ensure that appropriate **records are maintained**;
* ensure **staff are appropriately trained** and informed;
* know the actions required to carry out the **emergency procedures** (including all incidents, damage to sources and other reporting requirements) as specified in this plan;
* prior to the first use of a gauge, and at intervals not exceeding **12 months**, ensure that the **gauge is examined** in accordance with section 3.6.1 of this plan;
* ensure **all radiation warning signs** and labels are properly located, fixed and maintained in a clean and legible condition;
* ensure that **equipment is maintained** in accordance with the Code; and
* advise the Health Protection Service in writing of the **receipt or disposal** of any radiation source.

## Persons dealing with radiation

A complete list of persons who deal with radiation sources is provided in Appendix A.

The following types of **people deal with radiation sources**:

Include In this section a description of the roles and responsibilities for classes of persons who are likely to deal with a radiation source at the practice.

### The Gauge Operator

Only a person who is **appropriately authorised** under a Licence issued by the Chief Health Officer may operate, use, or transport a portable density/moisture gauge.

**The operator must:**

* **comply** with all relevant provisions of the **Radiation Management Plan**;
* obey all signs displayed in places they occupy, and instructions issued to them by the Responsible Person or the Radiation Safety Officer for their safety and the safety of others;
* **follow** the established **protocol** for the procedure;
* **wear a personal radiation monitoring device** provided by the Responsible Person;
* record and **report all incidents** or equipment malfunctions to the Responsible Person; and
* ensure that the radiation **exposure** of all persons is **minimised**.

## Types of radiation sources and tasks performed

A complete list of apparatus is provided in Appendix B.

In this section list all radiation sources at this workplace including all relevant details such as make, model, serial numbers and registration numbers.

e.g.

Surface, or near-surface, portable density/moisture gauges that incorporate one or more radioactive sources are used. Devices that have a separate probe containing a radioactive source and separate source shielding, and which are designed to measure soil density, moisture or mineralisation in bore holes greater than a depth of 10 metres, are not used.

## Hazards associated with the radiation

In this section detail the risks associated with each piece of equipment and each task listed above, including during routine operations and non-routine or potential incidents.   
  
e.g.

**Task:** surface, or near-surface, portable density/moisture measurements

**Risk:** Exposure to radiation from the scattered radiation during routine operation.Exposure to direct radiation from the source if the source is outside the shielded housing but is not extended into soil.

**Description:** This hazard is present immediately around the source, and during field use in the area within 3-10 metres of the source.

**Controls:** Follow procedure as outlined below.

# Procedures and Controls

## Strategies for limitation and minimisation of dose

In this section include general requirements which are employed to reduce the doses received by persons. This may include operational procedures, personal protective equipment or radiation shielding.   
  
This section should include the dose of radiation that is anticipated to be received by a person while the radiation principles and work practices outlined in this document are being followed.

All **equipment is maintained and serviced** on a regular basis by appropriately licensed persons.

### For staff and the general public

All staff must **follow the procedures** outlined in section 3.2 (Specific procedures).

### Other classes of exposed persons

When a member of staff becomes aware that she is **pregnant** she **should notify the responsible person** as soon as is practicable.

The Responsible Person will, if necessary, **adapt the working conditions** of the pregnant staff member so as to ensure that the embryo or foetus is afforded the same level of protection as that of a member of the public (less than 1 mSv per year).

Any person **under the age of 18** will be afforded the same level of protection as that of a member of the public (less than 1 mSv per year).

## Specific procedures

### Operator procedures

The following rules must be followed.

* Before moving the source from its shielded housing, ensure that all people who are not required to assist with measurements are excluded from the vicinity of the gauge, e.g. to a distance of **3 metres**. See section 3.3
* **Keep** the number of **people assisting** with the measurement **to the** absolute **minimum**.
* While a portable density/moisture **gauge is in use**, the **site is appropriately supervised**.
* Always **lock the source** in the shielded position whenever measurements are not being made.
* Never move the source from the shielded housing except to make a measurement or to carry out routine maintenance (e.g. cleaning of the source rod).
* Only move the source from its housing immediately prior to making a measurement, then immediately return the source to its shielding on the completion of the measurement.
* Do not waste time while conducting measurements.
* Do not stay close to the gauge except when necessary to conduct measurements.
* Never conduct measurements unless those workers directly involved with using the gauge are correctly wearing appropriate **personal monitoring devices.**
* **Never place the gauge** where **vehicles** or **machinery** may damage it.

Working rules should be clear and easy-to-understand and should include details of:

* the expected radiation levels around the portable density/moisture gauges.
* the correct and safe methods needed to undertake portable density/moisture measurements on the surface and at various depths using the gauge.
* the methods for conducting the radiation surveys, wipe tests and any other examination required by the RMP, and for reporting and recording results.
* the arrangements for securing the source assembly in the shielded housing and for the security of the gauge.
* arrangements for preventing or minimising radiation exposure of operators and members of the public.
* instructions concerning the posting of radiation warning signs when the gauge is in use.

e.g.

The work instructions are attached in Appendix C, and are also available at the office.

- OR -

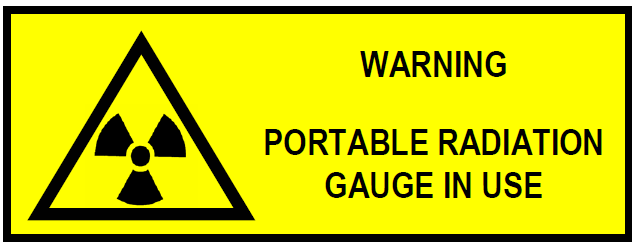
Include sufficient information here.

## Awareness

Access to **working areas** will be **controlled**, though the use of **bunting** or other means, to ensure that **unauthorised access** to the immediate area around the gauge does not occur.

A **Warning** **Sign** will be displayed prominently in the **area where measurements are being taken** to ensure that other persons are aware that the gauge is located and/or operated in the area.

Radiation warning signs and labels, must conform to AS 1319 - 1994 Safety signs for the occupational environment, and AS –1743:2018 Road signs - Specifications. Text and the radiation symbol must be black on a yellow background. An example of suitable warning signs is shown below:



**Each access point** (e.g. door) into the radiation gauge **store** area has a **visible warning sign** to indicate that the room contains an ionizing radiation hazard. For example:



Detail or reference any additional awareness measures here.

## Personal Radiation Monitoring

A **Personal Dosimeter,** such as an electronic personal dosimeter (EPD) and/or a Thermo-Luminescent Dosimeter (TLD) or Optically Stimulated Luminescence (OSL) badge, is **provided to each occupationally exposed person** who:

* **operates** a portable density/moisture gauge, or
* performs routine **maintenance** on a portable density/moisture gauge, or
* undertakes service or **repair** of a portable density/moisture gauge.

The personal monitoring devices provided to each person will be **capable of measuring the type of radiation emitted** by the portable density/moisture gauge being used. This includes neutron and gamma radiation where applicable.

**A record is kept** of the radiation doses received by each occupationally exposed person in accordance with the requirements of RPS C-1.

### Details of Personal Monitoring

Detail or reference the methods of monitoring and recording of radiation sources and doses to workers. Include monitoring details (name of approved supplier etc.) and frequency of monitoring.

e.g.

All operators will be issued with a 3 monthly TLD or OSL Neutron Badge issued by Insert name and contact details of personal radiation monitor service.

Badges must be worn on the *chest* whenever working, especially when operating gauges. When staff members are not working, the badges are stored *at the office* where the control badge is also located.

Records of badge readings will be kept with personnel files, and results will be communicated to all wearers. Abnormally high readings will be investigated and reported where necessary.

## Training

The Responsible Person will ensure that **each person who may be occupationally exposed** to ionizing radiation has undergone training or instruction which relates to:

* the type of work being undertaken;
* the radiation source, and related ancillary equipment, that the individual may be required to use;
* any potential radiation hazards associated with the practice;
* the means of protection from and minimisation of radiation exposure; and
* requirements for complying with the Radiation Management Plan.

Detail the training and information to be provided to persons involved in carrying out the radiation practice (all workers who may come into contact with radioactive sources). Include details of initial training/qualifications and ongoing training requirements, training providers etc.

## Equipment Safety Requirements

Detail or reference the methods used to ensure the safety and security of the radiation sources which are used at your practice.

e.g.

All Radiation Sources will be registered with the Chief Health Officer. Prior to being registered all equipment will be checked for compliance, by appropriately authorised people, against the requirements of the Code. This includes a ‘wipe’ or ‘leakage’ test. All equipment will be retested annually.

### Regular Source Checks

Prior to the first use of a gauge, and at intervals not exceeding 12 months, the gauge is examined:

* for any damage or wear;
* to demonstrate that the source assembly and retraction mechanism operate correctly and safely;
* to demonstrate that the gauge performs satisfactorily when used in accordance with the manufacturer’s instructions;
* to confirm that all labels are still intact, appropriately fitted, and legible;
* to ensure that the shutter or source control mechanism, where fitted, operates correctly and is free of dirt or other clogging agent;
* to demonstrate that when each source is in the shielded position the radiation levels ambient dose equivalent rate or directional dose equivalent rate, as appropriate, do not exceed:
  + 250 μSv/h at any point 0.05 m from the gauge surface, and
  + 10 μSv/h at any point 1 m from the gauge surface.
* to ensure that the gauge complies with Schedule B of the Code.

Records of these inspections are maintained in accordance with section 3.8.

### Survey Meters

A radiation survey meter which meets the requirements below is readily available or accessible to monitor the gamma radiation levels.

The survey meter is readily available from:

Readily available or accessible means that the person can obtain a survey meter within a reasonable time. This may be achieved by borrowing, hiring or sharing a survey meter. Details of how the availability or accessibility of the survey meter is to be achieved are to be included in the Radiation Management Plan. The borrowing, hiring or sharing of a survey meter does not alleviate the Responsible Person, supplier or service provider from the survey monitoring requirements of the Code.

The radiation survey meter:

* has sufficient measurement **range to measure** ambient dose equivalent rates or directional dose equivalent rates, as appropriate, at least throughout the ranges of **1 μSv/h to 500 μSv/h,** or its equivalent, for the radiations emitted from the radioactive sources used in portable density/moisture gauges.
* will continue to indicate, either visibly or audibly, when radiation levels exceed the maximum reading in any measurement range.
* will indicate the measured quantity with a measurement uncertainty not greater than ±25 per cent inclusive of uncertainty due to response variation with energy over the range of energies of the radiation to be measured.

Radiation survey meters must have an **operational and calibration check** prior to initial use, at intervals not exceeding **12 months**, and following damage or repairs.

The calibration of a radiation survey meter must be, in the case of electromagnetic radiation, traceable to the Australian National Standard of air kerma or an equivalent overseas National Standard of air kerma recognised by the relevant regulatory authority.

Where a neutron survey meter has been obtained, the calibration of that survey meter must be traceable to the Australian National Standard for neutron radiation or an equivalent overseas National Standard for neutron radiation recognised by the relevant regulatory authority.

## Repair and servicing of radiation sources

All repair and servicing will be performed by persons who hold an appropriate Radiation Licence.

A person must not carry out routine maintenance on a portable density/moisture gauge containing radioactive source(s) unless that person:

* is authorised to do so by the Responsible Person in relation to the gauge;
* is appropriately licensed and trained in the type of maintenance being carried out;
* carries out such work in accordance with the Radiation Management Plan; and
* conducts a radiation survey after any routine maintenance to confirm that the dose rates do not exceed the expected range.

In this section detail any additional procedures for:

* Repair/Service (when, who repairs radiation sources)
* Disposal of radioactive material (when, how, who authorises the disposal, regulatory Licence and conditions, etc.)
* Replacement for sources containing Radioactive material (End of working life, replacement, etc.)

e.g.

All Service and repairs are performed by: Insert name and contact details of the service company.

Once sources are no longer used by this company they will be returned to the supplier.

## Records management

The following records shall be kept:

A **source register** containing up to date information on the acquisition, relocation, replacement or disposal of all radiation-producing equipment or sealed radioactive sources, the maximum energy or dose rate of radiation sources, and the maximum activity of each radionuclide possessed.

The records for each radioactive source within the responsible person’s control must show:

* the whereabouts and identification number(s) of each radioactive source;
* the type of radioactive source; and
* the activity and date of measurement of the activity of the radioactive source.

The Responsible Person will carry out an **annual audit** of the radioactive **sources and their locations**. The Responsible Person will immediately notify the regulatory authority if a radioactive source cannot be accounted for.

Provide details here

e.g.

This register is kept in 0 of this plan.

Records of all audits and inspections are also kept on file at the office.

For all **source disposals** the records should be kept of disposal information include details of its disposal and written confirmation from the organisation accepting responsibility for it (e.g. the disposal notice).

A register of who has been **authorised to deal with a radiation source**.

Provide details here

e.g.

This register is kept in Appendix A of this plan.

A **radiation incident** report register, containing all internal reports pertaining to radiation related incidents.

Provide details here

e.g.

An electronic register will be kept on file at the office.

**Dose records** of the radiation doses received by each occupationally exposed person in accordance with the requirements of RPS C-1.

Provide details here

e.g.

An electronic register will be kept on file at the office .

**Maintenance and service log** of each service or repair carried out on the radiation sources.

Provide details here

e.g.

An electronic register will be kept on file at the office.

Detail any other records which pertain to radiation sources and or exposure and how they shall be kept

## Transport

**All transport** of radioactive material will be conducted in accordance with the ***Code for the Safe Transport of Radioactive Material (2019)*, RPS C-2 (Rev. 1)** (the Transport Code).

The transport arrangements must be such that the security of the gauge is ensured at all times.

A portable density/moisture gauge must only be transported with the source assembly fully retracted and locked in the shielded position. The portable density/moisture **gauge is transported in its transport case** and the transport case must be **locked during transport**.

A portable density/moisture gauge must **not** be transported in the **passenger compartment** of the transport vehicle.

During transport, the gauge, in its transport case, must be securely stowed in the location that provides the maximum distance achievable from the driver’s position while minimising shock and vibration caused by the road surface.

The transport vehicle and the transport case must be fitted with all **relevant warning signs and labels** required by the Transport Code. Radiation placards, as required by the Transport Code, must be displayed on a vehicle transporting a portable density/moisture gauge. ‘Mixed class’ placards must not be used in place of the standard radiation placard, even where there are other compatible dangerous goods present.

In the event of an **incident** or other emergency, the person in charge of the vehicle, or another Responsible Person, must **notify** the Responsible Person or Radiation Safety Officer and the regulatory authority.

Detail the transport arrangements for your practice

e.g.

All gauges will be transported only while locked in the transport cages located at the rear of the vehicles.

## Storage

All radioactive material will be securely stored with adequate shielding to ensure no persons are exposed to a level above the occupationally allowed levels, and exposures shall be kept as low as reasonably achievable.

Our store is located at Address in a secure locked gauge store room.

Each portable density/moisture gauge must be safely and securely stored when not in use subject to the following requirements:

* when in storage, the source(s) assembly must be fully retracted and key locked into the shielded position;
* the gauge must not be stored with explosives, or combustible, corrosive or oxidising chemicals; and
* a permanent record of the fact that the gauge is stored, or has been issued, must be kept by the Responsible Person.

The store for portable density/moisture gauges is:

* constructed of durable materials capable of physically securing the gauges;
* designed and constructed so that the radiation levels outside the store:
  + do not result in an ambient dose equivalent rate or directional dose equivalent rate, as appropriate, that exceeds 10 μSv/h unless otherwise authorised by the regulatory authority;
  + are as low as reasonably achievable in occupied areas; and
  + are such that no member of the public can receive a dose exceeding 1 mSv per year.
* under the control of the Responsible Person;
* labelled with a conspicuous sign (when radioactive sources are in the store), the letters and symbol of which must be black on yellow background, bearing the radiation hazard warning symbol and a warning notice ‘Store for Radioactive Materials’ or similar; and
* kept locked at all times.

This is achieved through: Detail the storage arrangements for your practice here

# Emergencies and incidents

In formulating the Radiation Management Plan the Responsible Person must develop contingency arrangements detailing the action to be taken following all reasonably foreseeable incidents.

### Emergency procedures

Written emergency procedures for inclusion in the Radiation Management Plan should include the following items:

(a) instructions on the immediate actions that need to be taken to protect human life, limit injury and provide first aid where required;

(b) instructions on the immediate procedures needed to bring the incident under control, including details on the action necessary to:

* prevent the further spread of contamination (if this possibility arises);
* secure an area of at least 3 metres around any unsecured source(s);
* secure the gauge or sources and to prevent any further damage;
* prevent unauthorised and unnecessary access to the secured area;
* provide or augment shielding against external radiation; and
* allay panic.

(c) instructions for the operator involved to report the incident to the Radiation Safety Officer or the Responsible Person;

(d) instructions for the Radiation Safety Officer to:

* assess the nature and scope of any radiation hazard;
* implement any further action required to bring the incident under control;
* immediately report the incident to the Responsible Person, and to the relevant regulatory authority;
* investigate the circumstances of the incident and undertake assessments, measurements and calculations, in order to determine the optimum corrective action plan and to estimate the doses of the operators and members of the public involved in the incident;
* assemble the necessary resources and implement the required corrective action, taking into account instructions from the Responsible Person and the relevant regulatory authority;
* prepare a detailed report of the incident as soon as possible after the incident and submit this report, within seven days of the incident, to the relevant regulatory authority, through the Responsible Person; and
* advise the Responsible Person and the relevant regulatory authority on changes required to prevent the recurrence of a similar incident.

(e) names, addresses and telephone numbers required in the event of an emergency (these should be checked and updated at least once every 12 months and when changes in arrangements are made); and

(f) any other instructions to cover possible emergencies, such as:

* observed or suspected damage to a source or to a gauge, e.g. displacement from a moving vehicle, crushing by a vehicle etc.;
* observed or suspected malfunction of the gauge or the source assembly;
* suspected or actual loss of the gauge or of a source;
* failure of safety procedures or a breach of the working rules; and
* fire, flood, explosion or other disaster or incident.

e.g.

The work instructions for incidents are attached at Appendix D, and are also available at the office.

- OR -

Include sufficient information here.

## Radiation incidents

Any staff member who becomes aware of an incident must ensure that the **incident is reported to** the **Responsible** **Person or Radiation Safety Officer** as soon as practicable and within 24 hours.

Contact the Radiation Safety Officer on Insert phone number here

**In the event of a radiation incident**, the Responsible Person will:

* ensure that the relevant regulatory authority is informed that the incident has occurred, of the steps that have been taken to rectify the situation and of details of any radiation doses known, or suspected to have been received by any person;
* ensure that the radiation incident is **investigated;**
* **submit a written report** of all reportable radiation incidents, including the preventative action to avoid a recurrence, to the Health Protection Service within 7 days. The radiation incident form which is available at [www.health.act.gov.au/businesses/radiation-safety](http://www.health.act.gov.au/businesses/radiation-safety) should be used;
* in the case of a radiation source that is (or is suspected to be) **lost or stolen, immediately report** the event to the Health Protection Service on (02) 5124 9700;
* ensure an **internal report** on each radiation incident is written and kept in the institution’s radiation incident report register; and
* ensure that measures are implemented so that the possibility of the **recurrence** of the radiation incident investigated is **minimised**.

Reportable incidents include:

* incidents that cause or may lead to **radiation injuries** **or** radiation doses **exceeding** the annual **dose limits** to workers or members of the public;
* **lost or stolen** radioactive sources or radiation apparatus;
* **transport** of radioactive material (lost, damaged, or without required documentation or labelling);
* **damage** to, or malfunctioning of, a radiation apparatus or sealed source apparatus; and
* out of control source of radiation (e.g. source not safely secured or shielded).

List any practice specific procedures here.

More information may be obtained in schedule 13 of RPS6, the *National Directory for Radiation Protection, June 2017*.

## Doses exceeding constraints

Where any personal monitoring results indicate more than 1 mSv in any three-month period the Responsible Person will investigate and review practices. If the annual exposure of any person exceeds the limits (i.e. greater than 1 mSv for a member of public or 20 mSv for an occupational dose) the responsible person must submit a radiation incident report to HPS.

Where a personal monitoring device is known to have, or is suspected of having, received a radiation dose in excess of 1 mSv as a result of an incident, the Responsible Person, supplier or service provider must submit the personal monitoring device of each person concerned for urgent assessment.

## Damaged Sources

If a portable density/moisture gauge is damaged, is suspected of being damaged, or the results of radiation monitoring are outside the expected range, the Responsible Person will ensure that:

* the Health Protection Service is notified immediately;
* the gauge is not used until it is repaired and operating correctly and safely in accordance with the provisions of this Code;
* where applicable, the details of any repair or corrective actions taken are recorded and retained; and
* the results of all measurements and examination of the gauge are recorded and retained.

## Acquisition, disposal, and servicing of radiation sources

The Responsible Person will **advise the Health Protection Service** whenever any radiation‑producing equipment or sealed radioactive source is **acquired, serviced** or **disposed of.** This needs to be done **within 7 days**. The appropriate forms (application to register, notification of service or disposal notice) are available from the HPS or at [www.health.act.gov.au/businesses/radiation-safety](http://www.health.act.gov.au/radiationsafety) .

The Responsible Person must not **transfer the ownership** of any portable density/moisture gauge unless this is done with the approval of the regulatory authority using the appropriate Transfer of Ownership form.

# Definitions and related documents

## Documents

*Radiation Protection Act* *2006*

*Radiation Protection Regulation 2007*

ARPANSA Codes of practice (available from [www.arpansa.gov.au/publications/codes/rps.cfm](http://www.arpansa.gov.au/publications/codes/rps.cfm)):

**RPS C-1** *Code for Radiation Protection in Planned Exposure Situations (2016)*

**RPS C-2** *Code for the Safe Transport of Radioactive Material (2019), RPS C-2 (Rev. 1)*

**RPS5** *Code of Practice and Safety Guide for Portable Density/Moisture Gauges Containing Radioactive Sources (2004)*

**RPS6** *National Directory for Radiation Protection, June 2017*

List any practice specific procedures here.

## Dictionary

|  |  |
| --- | --- |
| **HPS** | Health Protection Service of the ACT Government’s Health Directorate |
| **Operator** | Any natural person who has obtained a radiation licence that authorises the operation or use of a portable density/moisture gauge. |
| **OSL** | Optically Stimulated Luminescence (dosimeter) |
| **Radiation Incident** | Any unintended or ill-advised event when using ionizing radiation apparatus, specified types of non-ionizing radiation apparatus or radioactive substances, which results in, or has the potential to result in, an exposure to radiation to any person or the environment, outside the range of that normally expected for a particular practice, including events resulting from operator error, equipment failure, or the failure of management systems that warranted investigation. |
| **Responsible Person** | In relation to any radioactive source, radiation-producing equipment, prescribed radiation facility or premises on which radioactive sources are stored or used means the legal person:   1. having overall management responsibility including responsibility for the security and maintenance of the source, radiation-producing equipment, facility or premises; 2. having overall control over who may use the source, radiation-producing equipment, facility or premises; and 3. in whose name the source, radiation-producing equipment, facility or premises would be registered if this is required. |
| **RMP** | Radiation Management Plan |
| **RPS C-1** | *Code for Radiation Protection in Planned Exposure Situations (2016)*, ARPANSA, Yallambie. |
| **RSO** | Radiation Safety Officer |
| **the Code** | *Code of Practice and Safety Guide for Portable Density/Moisture Gauges Containing Radioactive Sources (2004)* ARPANSA, Yallambie. |
| **TLD** | Thermo-Luminescent Dosimeter (replaced by OSL dosimeters) |
| **Transport Code** | Code for the Safe Transport of Radioactive Material (2019), RPS C-2 (Rev. 1) |

APPENDICES

1. List of persons dealing with Radiation Sources

The following **people deal with radiation sources**:

Include In this section all other personnel who are likely to deal with a radiation source at Include Licence Numbers where appropriate.

| **Person** | **Position** | **Licence/Authorisation** | **Expiry date** |
| --- | --- | --- | --- |
| John Smith | Owner / Responsible Person | RS77\_145 |  |
| Steve Citizen | Gauge Operator | RS14\_452 |  |
| Frank Stevens | Gauge Operator | RS24\_045 |  |
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1. List of Radiation Sources

In this section list all radiation sources at this practice including all relevant details such as serial numbers, registrations numbers, or maximum quantity and activity of radioactive material.

The following sources are handled under this Radiation management plan:

| **Registration Number** | **Expiry date** | **Source Identifier** | **Source Location** | **Manufacturer and Model** | **Apparatus Serial No** | **Type of Radiation Source** | **Source Serial No** | **Source Activity** | **Activity measured Date** | **Last wipe test performed** | **Last date of Audit** |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Example  RS22\_145 |  | Gauge no3 | Store/ Vehicle YA1245 | Humbolt 5001EZ | 4442 | Am-241/Be  Cs-137 | 1552CM  NJ05557 | 1.2 GBq  0.3 GBq | 21-10-2009  02-12-2009 | 2-4-2012 | Dec-2013 |
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