Radiation Management Plan for Industrial Fixed Gauges

May 2022

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# Radiation Management Plan

For: ***Mining Pty Ltd***

*(applicant for licence to possess/licence holder)*

holder of licence ***L00XXXX*** to possess fixed radiation gauges containing sealed radioactive material and In Stream Analysis (ISA) probes containing x-ray source.

for the practice of: Density measurement in mine site(s) or processing plant(s)

to be carried out at: ***River Mine, Tasmania***

Plan prepared by: ***Ms Joe Currie (RSO)***

Date: ***30 April 2021***

Contact details:

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Locations (premises) at which this practice is conducted is listed below:

|  |  |
| --- | --- |
| Address | Approved Premises number |
| xxx | AP - xxx |
| xxx | AP - xxx |

## Statement of acceptance of this plan

The holder of licence L/XXXXXX hereby agrees to adhere to all requirements in this plan.

This radiation management plan has been prepared in accordance with the requirements of Regulation 9 of the *Radiation Protection Regulations 2016*. This plan must be read and understood by all staff involved with the operation of the fixed radiation gauges and ISA probes.

Signature\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

*(licence holder or person authorised to sign for the licence holder)*

Date: **DD/MM/20YY**

Date for review of this plan: **DD/MM/20YY**

# Introduction:

The purpose of this RMP is to describe the radiation safety features specific to your practice. This will help you ensure that any dealings with **industrial gauges**is done safely and meets the requirements from the *Radiation Protection Act 2005* and the *Radiation Protection Regulations 2016*.

List of information to be contained in your Radiation Management Plan, as required under Regulation 9 of Radiation Protection Regulations 2016:

## (a) brief description of the type and scope of the radiation practice:

* Fixed radiation gauges and in-stream analysis probes containing sealed radiation sources (e.g. Cs137, Am24) are used as part of the processing operation control for density measurement of slurry.
* Fixed gauges and In Stream Analysis (ISA) probes that are in storage and awaiting disposal.

## (b) a list of the radiation sources dealt with in the radiation practice:

*As per Schedule 1 Part A of the radiation licence.*

*See current inventory in annex.*

## (c) an assessment of the potential hazards from the radiation sources dealt with in the radiation practice;

Sealed radiation sources used in gauges may deposit significant radiation dose to an operator if appropriate safety measures are not followed. Radiation dose rate on the surface of a gauge in the ‘beam off’ position could be up to 500 µSv/h (micro-Sievert per hour). It is important to keep a safe distance and reduce exposure time during use, transport and storage. Radiation dose rate generally drops off significantly with distance.

With good work safety practices, it is expected that the annual radiation dose to an operator should be below 1 mSv / year (milli-Sievert per year), which is fraction of annual occupational dose limit of 20 mSv. However, the dose to operator may increase significantly if safe work protocols are not followed or if there is an accident involving portable density gauges.

A ‘job safety analysis’ (JSA, attached in annex) is performed prior to any work being carried out near a radiation gauge. The JSA identifies a potential for radiation exposure and requires the RSO to isolate the gauge as per isolation practices. The method of isolating a gauge is given in the working rules document (attached in annex).

ISA probes are serviced by the supplier. If a window is damaged (moisture alarm) the gauge is taken offline and has its transport shutter placed on it for safe storage. A JSA is carried out prior to this work.

## (d) details of the environment likely to be exposed to radiation during the radiation practice;

Storage:

* Gauges are stored with the source assembly fully retracted, and key locked into the ‘beam off’ position
* Gauges must not be stored with explosives, or combustible, corrosive or oxidising chemicals
* The radiation levels at any accessible place outside the store must be less than 10 µSv/h
* Storage and movement records are kept and available for view by regulatory authority
* Gauges are clearly labeled as containing a radioactive source
* All gauges not in use are kept in the approved stores

Use:

* Occupied areas near the gauges have exposure rates near background levels
* Radiation warning signs are placed near all gauges and staff have been informed about these areas during safety induction

## (e) the radiation principles, work practices (including quality-assurance procedures) and equipment (including personal radiation monitors) used to ensure that radiation exposure of persons or the environment is as low as is reasonably achievable during typical types of work carried out within the radiation practice;

* Staff who are authorised to use the gauges understand the use of time, distance and shielding principles to minimise their personal exposure.
* The inspection of all gauges occurs quarterly via a ‘programmed maintenance’ schedule. Gauges are used by authorised users only when the assessment is carried out. The quarterly assessment is made against the Code of Practice requirements and a standard protocol ‘Checking Radiation Gauges’ is adhered to.
* A calibrated survey meter is available on site. The survey meter meets the requirement of Schedule E of RPS 13 “Safety Guide for the safe use of fixed radiation gauges”
* All staff who inspect, isolate or use the gauge (as authorised under the licence) use personal radiation monitors.
* Any contractor coming on site undergoes induction and is required to carry out a JSA before doing their work. The JSA will indicate if radiation exposure is likely, and this triggers the RSO involvement.

## (f) details of the classes of persons likely to be exposed to radiation during the radiation practice, including –

1. **children; and**

Not applicable. Access to the mine is controlled and children are not permitted on site.

1. **Pregnant women; and**

A pregnant worker may continue to work with radiation gauges provided exposure to fetus will not exceed public dose limit (1 mSv). This is in accordance with the Planned Exposure Code RPS C-1.

In such a case personal monitoring is carried out on a monthly interval (rather than 3 monthly) and a record of time near gauges and dose rate measured with site survey meter is kept.

1. **volunteers in biomedical research; and**

Not relevant for this practice.

1. **persons exempt from section 13(1) (licensing requirement) of the Act under Part 10;**

Trainees operator and students

OR

No students/trainees at present.

## (g) the maximum dose of radiation it is anticipated a person of a class of persons specified in paragraph (f) will receive while the radiation principles, work practices and equipment referred to in paragraph (e) are being used, and the action to be taken if those doses are exceeded;

If appropriate safety precautions are followed the operators are not expected to receive more than 250 uSv for a 3-month period. If any operator consistently receives more, then investigation will be carried out to check against the Safe Work Procedures.

Annual radiation dose to any operator should be well below 1 mSv.

Operators’ radiation dose records will be reviewed during annual audit by the RSO or licence holder.

## (h) details of a course of study or training that –

* + 1. is being or will be undertaken by a person who is expected to be dealing with a radiation source in the radiation practice; and
    2. requires, as part of that course of study or training, the person to deal with the radiation source in the radiation practice;

Not relevant for this practice.

## (i) the name, qualifications and experience of the supervisor of a person referred to in paragraph (h)(i) while undertaking that part of a course of study or training referred to in paragraph (h)(ii);

Not relevant for this practice.

## (j) the training and information to be provided to persons involved in carrying out the radiation practice;

* Work Health and Safety procedure
* Review of RMP during induction for a new employee
* Appropriate Radiation Safety Courses to safely operate the gauges and for local Radiation Safety Officer
* Supervised training for new employees to safely operate the gauges
* Operators must have a radiation licence

## (k) the name and contact details of the radiation safety officer for the radiation practice;

Details of Radiation Safety Officer: Name

Contact phone / mobile number

Email address

## l) a brief description of the role of the radiation safety officer;

* Act as central contact for radiation matters especially when the JSA identifies potential radiation exposure for work near a gauge.
* Coordinate and advise in the event of an accident/incident involving radiation
* Ensure personal monitoring conducted appropriately and that monitors are stored with the controls when not in use
* Must be able to carry out the responsibilities as outlined in Annex G of RPS 13 “Safety Guide for the safe use of fixed radiation gauges”

See annex for detailed description of responsibilities of the RSO

## (m) a brief description of the resources available to the radiation safety officer to enable him or her to perform his or her role under the radiation management plan;

Budget includes funding for:

* Radiation protection training for staff
* Personal radiation monitoring
* Calibration of radiation survey meters
* Quarterly maintenance program
* Annual compliance testing

## (n) a description of the roles and responsibilities, that are relevant to a dealing with the radiation source in the radiation practice, of all persons authorised by the licence to deal with the radiation source in the radiation practice;

* The licence holder must carry out responsibilities in accordance with the requirement of the RPS C-1- Planned Exposure Code and RPS 13 – Code of Practice and Safety Guide for Safe Use of Fixed Radiation Gauges
* The Radiation Safety Officer must carry out responsibilities as outlined in the RMP
* All operators are named on licence – as per licence conditions
* All staff are responsible for following the radiation practices specified in this plan
* All staff must obey warning signs and written instructions (developed form part of the site induction) aimed at minimizing their exposure to radiation
* All staff are to report to the RSO any matter that may compromise radiation safety

## (o) the methods used to ensure that the persons referred to in paragraph (n) are aware of their obligations under the Act and the licence;

* Regular toolbox meeting to discuss the responsibilities of staff and employees
* RMP refresher carried out at regular frequency (at least once a year)
* Staff are aware of licence conditions and applicable code of practice such as RPS 13 (Code of Practice and Safety Guide for Safe Use of Fixed Radiation Gauges)

## (p) details of how the radiation source in the radiation practice will be prepared for use, repaired, maintained, transported, stored and disposed of;

* Maintenance and service contract is in place for all gauges
* Compliance checks will be conducted annually as required under Regulation 6 of the Radiation Protection Regulation 2016
* All radiation sources will be disposed of in accordance with the Act and following the requirements under Regulation 20 of Radiation Protection Regulations 2016
* Gauges are stored and transported locked in the ‘beam off’ position, and in accordance with the requirements of RPS 13 (Code of Practice and Safety Guide for Safe Use of Fixed Radiation Gauges)
* The ‘special form certificates’ currency for all sources is regularly reviewed as this may impact on the ability to transport these sources

## (q) details of any emergency response plan for the radiation practice including reporting to the Director of Public Health;

Emergency procedures have been developed. A copy of the emergency procedures is attached in the RMP.

The Director of Public Health will be informed as per the ‘Reporting radiation incident in Tasmania guideline’, available from the Radiation Protection Unit [website](https://www.health.tas.gov.au/health-topics/radiation-protection).

Emergency when dealing with radiation gauges could be caused by

* Flood
* Fire
* Damage to the gauge casing being crushed by heavy machinery
* Damage to gauge casing falling from height (corrosion, fire)

Note that casings and sources are designed to resist some level of heat, fire and vibration.

## (r) details of procedures that are designed to minimise the radiation hazard arising from a radiation incident;

See protocols in (q) above.

## (s) details of reporting procedures for incidents adversely affecting, or likely to adversely affect –

* + 1. equipment used in the radiation practice; or
    2. the environment; or
    3. the health or safety of any person;

Staff required to report to RSO immediately any malfunction of a radiation gauge or if they have observed damage to unit (damage to housing or shutter control). Any other incident also to be reported to RSO who will take immediate action and inform the licence holder for any further investigation and action, including reporting to the DPH.

## (t) details of record-keeping requirements including details of the records that will be kept of movement of any mobile radiation source in the radiation practice;

* Records of source location are kept
* Records of source disposal are kept
* Personal Dosimetry records are kept

## (u) details of the use of radiation warning signs and labels in the radiation practice.

Warning labels on radiation gauges as per Code of Practice, as required for the certificate of compliance.

All warning labels are kept clean and readable.

The storage area has appropriate signage.

# Referenced documents:

* RPS C-1: *Code Radiation Protection in Planned Exposure Situations*, ARPANSA (2016)
* RPS 13: Code of Practice for the Safe Use of Fixed Radiation Gauges (2007)
* *Radiation Protection Regulations 2006*
* *Radiation Protection Act 2005*

# Attached documents:

* Duties of the RSO
* Job Safety Analysis

# Duties of the RSO:

The RSO has sufficient professional or technical training to perform the Radiation Safety Officer duties laid down in Annexe G of the Safety Guide for the safe use of fixed radiation gauges, in particular the RSO will:

1. supervise the radiation protection aspects of the radiation practice that are specified in the Radiation Management Plan;
2. operate and interpret the readings from radiation monitoring equipment that is required for the radiation practice;
3. ensure that all personal monitoring devices and radiation survey meters are in good working order
4. undertakes the measurements, investigations and assessments, makes the reports, keeps the records and performs any other duty required of the Radiation Safety Officer as detailed in the Safety Guide and the Radiation Management Plan;
5. know the actions required to carry out the emergency procedures specified in the Radiation Management Plan;
6. ensures that the Responsible Person is kept informed of the radiation safety status of the practice.