# Material processing, industrial and scientific

**Issued February 2023**

*EPA 1132/23: This document provides information to those in the mining, industrial and scientific sectors on the key changes of the new Radiation Protection and Control Regulations 2022 under the Radiation Protection and Control Act 2021.*

## 1 Scope

Industry sectors which are likely to be impacted by the changes include, but are not limited to, the health sector, industrial, non-destructive testing, exploration and mining sectors, borehole logging and scientific research.

Information pertaining to the following radiation sources is included in this guidance document.

- X-ray analysis apparatus
- Cabinet X-Ray apparatus
- Fixed radiation gauge
- Borehole logging
- Industrial radiography
- Registered premises with unsealed radioactive materials

Further specific information on changes to security enhanced sources, radiation management plans, personal dosimeter requirements, published exemptions, registration of sealed sources and radiation waste management plans are also included.

This guidance is not intended to address requirements associated with mining or processing of radioactive ores.

## 2 Prior legislation

The repealed *Radiation Protection and Control Act 1982* was regulating radioactive substances in South Australia and the *Radiation Protection and Control (Transport of Radioactive Substances) Regulations 2018* covered responsibilities for consignors, carriers and drivers involved with transporting radioactive substances.

## 3 Current legislation

- *Radiation Protection and Control Act 2021* (RPC Act)
- *Radiation Protection and Control Regulations 2022* (RPC Regulations)

Relevant codes can be found in Schedule 2 of the RPC Regulations.

# 4 Interaction between the regulations and relevant codes

As per Regulation 30 of the RPC Regulations under the RPC Act, a radiation source must comply with the provisions of a relevant code (outlined in Schedule 2 of the regulations) that are expressed as mandatory provisions applying in respect of the radiation source.

Much of the technical detail outlined in the Radiation Protection and Control Regulations 2015 has been removed from the 2022 regulations allowing for a more responsive approach to regulating radiation safety as technology evolves. The technical detail now resides in codes that can be updated with greater ease.

## X-ray analysis apparatus

Much of the regulatory requirements pertaining to x-ray analysis apparatus has been removed from the 2022 now resides in the ARPANSA *Code of practice for protection against ionising radiation emitted from an X-ray analysis equipment* (X-ray Code).

For the requirements pertaining to X-ray analysis equipment regarding X-ray tube, tube shutters, beam stops, enclosures, interlocks, radiation shields, and barriers, the X-ray Code should be referred to and complied with.

The X-ray Code also details requirements regarding external exposure limits and radiation monitoring when operating X-ray analysis apparatus. Some of these requirements are different to the *Radiation Protection and Control Regulations 2015* and careful review of the code together with the new regulations is recommended and an update to policies, procedures and radiation management plan where required. For example the 2015 regulations required radiation monitoring surveys of the apparatus once every six months while the new requirement is to monitor apparatus quarterly for enclosed and monthly for partly enclosed X-ray analysis apparatus.

## Cabinet X-ray apparatus

The regulatory requirement for three monthly checks of the cabinet X-ray apparatus safety interlocks and fail-safe indicator lights from the 2015 regulations has now been removed from the RPC Regulations.

All regulatory requirements including frequency of monitoring, safety interlocks, access, external radiation, etc are to be found in the *Statement on cabinet X-Ray equipment for examination of letters, packages, baggage, freight and other articles for security, quality control and other purposes*. Monitoring, as an example is now required at intervals no greater than two years unless a shielding component (barrier or door) has been altered or an x-ray tube replaced.

## Radiation gauge

Much of the detail pertaining to the regulatory requirements for radiation gauges can be found in the *Code of practice and safety guide for safe use of fixed radiation gauges* published by ARPANSA.

## Borehole logging

The regulatory requirements pertaining to borehole logging have been removed from the regulations and are now found in the *Code of practice for the safe use of sealed radioactive sources in borehole logging* published by ARPANSA or in the case of apparatus used for borehole logging the *Code of compliance for apparatus used for borehole logging 2022* published by the EPA. Both documents contain the relevant regulatory requirements as they pertain to access, external dose rate requirements, shielding, monitoring requirements, etc.

## Industrial radiography

The regulatory requirements pertaining to industrial radiography have been removed from the regulations and are now found in the *Code of radiation protection requirements for industrial radiography* published by ARPANSA. This document contains the relevant regulatory requirements as they pertain to general requirements, work practices, radiation monitoring, enclosed and unenclosed sites, etc.

### Security enhanced sources

There are new regulations regarding security enhanced sources. A security enhanced radioactive source is a radioactive source or aggregation of radioactive sources categorised as Category 1, 2 or 3 in accordance with Schedule B of the *Code of practice for the security of radioactive sources* is designated as a security enhanced radioactive source. For a person who is intended to have access to a security enhanced source an identity check and security background check is now required as per Regulation 9 and 10 of the Radiation Protection and Control Regulations 2022. Additionally, a source security plan and a transport security plan will be required for security enhanced sources. More information can be found in the guidance document *Security of sealed radioactive sources*.

## 5 Registered premises for unsealed radioactive material

Registered premises in which unsealed radioactive materials are handled or kept will now be differentiated between Laboratories & Non-laboratories

**Laboratories:** the classification of a laboratory (Type A, B, C) is determined using the Australian/New Zealand Standard as specified in section 3.5 of *AS/NZS 2243.4:2018 Safety in Laboratories Part 4: Ionizing radiations*. The standard details the radiotoxicity groupings and modifying factors used to determine the grading of a laboratory ie a low-level laboratory is determined to be a Type C premise, high-level laboratory is a Type A premise, etc.

The prescribed design and construction requirements correspond to the classification of the laboratory. It is important to note that these requirements are applicable to laboratory premise only, and do not affect non-laboratory premise. For example, an engineering workshop does may not require a fume cupboard as it is considered a non-laboratory premise.

**Non-laboratory premises:** The classification of non-laboratory premises is primarily determined according to the associated risk of the operations being performed. The EPA *Code of Compliance for facility design and shielding 2022* outlines in Schedule 1 common non-laboratory premises, details of operations, and the associated classification (see table below).

| **Premises use** | **Type C** | **Type B** | **Type A** |
|---|---|---|---|
| **Laboratories** | | | |
| Grading against section 3.5 of *AS/NZS 2243.4:2018 Safety in Laboratories Part 4: Ionizing radiations* | Low level laboratory | Medium level laboratory | High level laboratory |
| **Non-laboratory premises** | | | |
| Storage of unsealed radioactive materials | Storage only | | |
| Premises where radioactive materials are administered to animals, flora or humans | Premises where radioactive materials are applied to soil or flora or to animals which are incapable of escaping their enclosure | Premises where low dose radioactive materials are administered to humans or animals. | Premises where radioactive materials are administered to humans for high dose in-patient radionuclide therapy. |
| Non-laboratory premises (eg engineering workshops) | Non laboratory premises handling or keeping: | All other non-laboratory premises | |

| Premises use | Type C | Type B | Type A |
|---|---|---|---|
| | • surface contaminated objects<br>• NORM with a total activity concentration below 10 kBq/g<br>• artificial radioactive materials classified by the transport code as LSA-I | | |

Where a premises is used for more than one use then it will be classified as the highest applicable category − Type A = highest classification, Type C = lowest classification. Should a laboratory be a part of a premise which is used for more than one use, the laboratory requirements set out in in *AS/NZS 2243.4:2018 Safety in Laboratories, Part 4: Ionizing radiations* remain regardless of classification of the non-laboratory operations also being undertaken in that same premise.

Where a premises has multiple parts of the land, building or structure used for storage or handling of radioactive materials, the radiation management plan shall specify the classification of each part of the premises and its precise location within the building or area.

# 6 Radiation management plan and personal dosimetry requirements

EPA has developed the *Code of Compliance for radiation management plans* that provides the mandatory requirements for radiation management plan (RMP) to be submitted and complied with by applicants for a radiation management licence under Part 4 Division 1 of the RPC Act.

The protection and safety elements of the RMP are to be commensurate with the complexity of and the radiation risks associated with the licensed activity in a graded manner. Accordingly, risks will be considered sufficiently low where the effective dose expected to be incurred by any individual is demonstrated:

- under all reasonably foreseeable circumstances to not exceed 100 µSv (microSievert) in a year; and
- for low probability scenarios* to not exceed 1 mSv in a year; and
- for low probability scenarios that would not be classified as a notifiable radiation incident under Schedule 5 of the RPC Regulations.

  * Unless otherwise specified, low probability scenarios are those where the probability of occurrence does not exceed $10^{-02}$ per year.

If the person holding the radiation management licence can demonstrate that the risks associated with the activities involved in their practice is sufficiently low, then the Regulation 86 requirement for an employer to provide radiation monitoring devices for each of their radiation worker can be removed or exempted. It is up to the owners to find a suitable method with which they can demonstrate the low risks associated in their practice. This methodology must be acceptable to the EPA.

For existing radiation sources, some of the possible methods, but not limited to, to estimate the doses could be:

- modelling of radiation sources
- providing the personal dosimetry records of all the radiation workers from past five years
- history of radiation incidents associated with each radiation sources and the doses received out of each incident.

For a new radiation source, some of the possible methods, but not limited to, to estimate the doses could be:

- modelling of radiation sources
- Shielding design report and survey measurements
- providing the personal dosimetry records of radiation workers operating similar radiation apparatus (make and model) for at least one year.

# 7 Dose constraint

The new concept of constraints has been introduced in the EPA *Code of Compliance for facility design and shielding 2022* to design and assess optimisation of protection.

Design constraints under planned exposure situations are:

1 For occupational exposure of a worker:

   a not greater than an effective dose of 5 mSv in a year; or

   b not greater than an effective dose approved by the Minister and documented in an approved radiation management plan; and

2 For exposure of any other person, not greater than an effective dose of 1 mSv in a year.

# 8 Published exemptions

Current exemptions as published in the South Australian Government Gazette under the RPC Act will continue to be valid for a period of 12 months following the commencement of the Act 2021. As such current exemptions will cease to be valid on 11 February 2024. Should a specific exemption be required past this date and is not addressed elsewhere in the RPC Act or RPC Regulations, please contact the EPA prior to 11 February 2024 to discuss further.

# 9 Registration of sealed radioactive sources

Sealed radioactive sources which are exempt from the requirement to be registered are prescribed by Regulation 20. This regulation differs somewhat to the previously prescribed classes of sealed radioactive sources, and as such some sealed radioactive sources which were previously exempt now require registration as per the 2022 Regulations.

The EPA will be publishing an exemption prior to 11 February 2023 which will allow classes of sealed sources that were prescribed from the registration requirement in the 2015 Regulations to continue to be exempted from the requirement to register. This will be an interim measure as the EPA reviews and makes changes to the fee structure for sealed sources and Category 5 low risk sources in particular. Once the fees have been amended, the exemption will be revoked and licensees will be required to register sources as per the requirements of Regulation 20. The EPA will continue to inform and advise of changes on this matter throughout 2023.

# 10 Radiation waste management plan

The requirement for regulatory approval to dispose of unsealed radioactive materials continues.

Approval to dispose of unsealed radioactive material for a period beyond 12 months may be granted as per Regulation 66. Should your organisation wish to apply for an approval period of longer than 12 months the following is to be detailed in your application: the exact period for which the application is sought, justification for the period being sought, as well as the typical information required such as the radionuclides and activities of unsealed radioactive materials purchased and disposed of by your organisation.

# 11 Variations of condition

The condition attached to a Licence to Possess, Radiation Use Licence, Sealed Radioactive Source, Radiation Apparatus or Registered Premise may be varied to bring it into alignment with the RPC Act and RPC Regulations. Licensees will be notified of this change in February 2023.

## 12 Public register

Section 77 of the RPC Act requires the Minister to keep a publicly available register of accreditations, authorisations, registrations and permits. Regulation 125 sets out the information to be included on the register.

## 13 Feedback

The EPA encourages all questions and feedback on the implementation of the new legislation. Please email EPARadiationProtectionBranch@sa.gov.au

## Disclaimer

This publication is a guide only and does not necessarily provide adequate information in relation to every situation. This publication seeks to explain your possible obligations in a helpful and accessible way. In doing so, however, some detail may not be captured. It is important, therefore, that you seek information from the EPA itself regarding your possible obligations and, where appropriate, that you seek your own legal advice.

## Further information

Legislation Online legislation is freely available on https://service.sa.gov.au/12-legislation

### General information

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