

# GUIDELINES FOR THE DEVELOPMENT OF A RADIATION MANAGEMENT PLAN

(Please note that these are generic guidelines for irradiating apparatus, sealed and unsealed radioactive sources. Some sections of the document may not apply to your practice.)

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This document outlines both regulatory requirements and provides guidance information. In the document the words 'must' and 'should' have a particular meaning. The word 'must' indicates that the requirement is considered to be mandatory. The word 'should' indicates a recommendation and may be assumed to summarise agreed best practice in relation to a particular matter.

## INTRODUCTION

The *Health Act 1958* and *Health (Radiation Safety) Regulations 1994* are the two primary pieces of legislation that control the use of ionising radiation in Victoria. Radiation users throughout Victoria must comply with the *Health Act 1958* and *Health (Radiation Safety) Regulations 1994*. Contained within the legislation are requirements to have documented working rules dealing with the use of ionising apparatus and plans for dealing with radiation accidents and emergencies. Also, there are requirements to ensure that personnel are informed of any hazards and are provided with adequate training. Finally, through the conditions of licence and/or registration there may also be a requirement for equipment and users of ionising radiation to comply with appropriate Codes of Practice and Australian Standards.

In order for organisations to meet the mandatory requirements of the Act and Regulations they must meet the following criteria:

- Individuals or companies/institutions be appropriately licensed.
- Ionising apparatus must be registered;
- Periodic compliance testing must be undertaken;
- Working rules for the control of radiation exposure in the workplace;
- Radiation safety training provided to employees and other persons.
- Plans for dealing with radiation accidents and emergencies;
- Personnel monitoring requirements;
- Transport requirements;
- Disposal requirements; and
- Appointment of a radiation safety officer (RSO);

The legislation also gives the authority to *specialty authorised officers* of the Department of Human Services the provision to request inspection of any record required to be kept by persons under the Regulations.

The Radiation Safety Program considers that the formulation of a document, called a Radiation Management Plan, which contains the above mandatory requirements along with any site-specific working practices and other relevant information to be beneficial to organisations in achieving good radiation practice. In addition, by the development of this type of document it allows organisations to be fully aware of their regulatory obligations, the ionising apparatus on-site and the operators of such equipment.

The development of a Radiation Management Plan is not a compulsory requirement, however there are certain mandatory documents required of organisations that could be included in a Radiation Management Plan. The plan should be written in a way so as to be understood easily by persons who deal with radiation in the practice. It is suggested that the plan should be signed and dated by the RSO and the CEO/manager of the practice. The plan should be viewed as a living document such that as changes occur to equipment, operators or work practices it should be updated to reflect the changing nature of the use of radiation at the practice. Subsequent versions should again be signed and dated by the RSO and the CEO/manager.

In what follows, *the Regulations* refers to the *Health (Radiation Safety) Regulations 1994* and *the Act* refers to the *Health Act 1958*.

This document is intended to serve as a guide to assist in the preparation of the Radiation Management Plan for practices that use radiation.

# 1. GENERAL INFORMATION

This section could include the following background information:

## 1.1 The Persons Who Should Read This Document

This part should list the persons at your practice that should read this plan. This will include persons who use or are involved with the use of radiation at your practice.

## 1.2 How Does the Practice Use Radiation

This part should briefly describe the manner in which radiation is used in your practice.

## 1.3 Why Radiation is Used

The benefit of using radiation should outweigh the risks involved. This is the principle of **Justification** as defined by the International Commission on Radiological Protection (ICRP).

This part should include a justification for why radiation is used as opposed to some other less hazardous means.

## 1.4 Regulatory Requirements

This part should list the radiation safety legislation that is relevant to your practice, including the Act and Regulations; conditions of licence and registration; and any codes of practice or standards that are cited by the Regulations or required to be complied with by the conditions of licence and registration.

Copies of relevant documentation should be available with the plan.

**Note:** the Act and Regulations are available on the internet:

*Health Act 1958:*

[www.dms.dpc.vic.gov.au/l2d/H/ACT00954/9\\_1.html](http://www.dms.dpc.vic.gov.au/l2d/H/ACT00954/9_1.html)

*Health (Radiation Safety) Regulations 1994:*

[www.dms.dpc.vic.gov.au/l2d/H/STAT00166/1\\_1.html](http://www.dms.dpc.vic.gov.au/l2d/H/STAT00166/1_1.html)

or from Information Victoria, 356 Collins St, Melbourne, ☎. 9603 9900.

## 1.5 Penalties for Legislative Contravention

This part should spell out the penalty for contraventions against, or failures to comply with, the Act and Regulations or any conditions or restrictions made under the Act or Regulations, ie. up to 100 penalty units (currently one penalty unit is \$100).

## 1.6 Contact Details

This part should list the contact details of all organisations and individuals relevant to the maintenance of radiation safety at the practice, eg. the radiation safety officer for the practice, the registrant / licensee, the Radiation Safety Program, emergency services, the Australian Radiation Protection and Nuclear Safety Agency (ARPANSA), the approved provider of personal monitoring, manufacturers of equipment, and radiation consultants (eg. organisations that provide services such as calibration of radiation monitors or wipe tests of radioactive sources).

## 2. LICENSING REQUIREMENTS

*Reference to licensing can be found in parts 108AF & 108AG of the Health Act 1958 and part 3 of the Health (Radiation Safety) Regulations 1994.*

This section should list the details of licensees. It should include the requirements and responsibilities as required by the Act and Regulations and the conditions of any licence.

The *Health Act 1958* requires that persons (that is an individual, company or institution) who:

operate,*	use,*
manufacture,	store,
transport,	sell,
possess,	install,*
service,*	maintain,*
repair,*	dispose,
or otherwise deal with	

any ionising radiation apparatus may only do so if a licence is held under the Act.

The categories marked (\*) above are usually covered by an **operator licence**, the professional groups that are normally issued operator licences can be found in the Regulations.

For the remaining categories a **company or institution licence** is required. For example a licence is required for the following:

- sale of ionising apparatus (X-ray, sealed or unsealed radioactive sources);
- possession of unsealed radioactive materials in nuclear medicine, pathology, veterinary purposes or other laboratory;
- transport of radioactive materials;
- education and general research or research involving human volunteers.

## 3. REGISTRATION REQUIREMENTS

*Reference to registration requirements for ionising apparatus can be found in parts 108AC, 108AD, 108AE & 108AG of the Health Act 1958 and part 4 of the Health (Radiation Safety) Regulations 1994.*

This section should list the details of all registered ionising apparatus. It should include the requirements and responsibilities of the registrant by the Regulations and the conditions specific to that registration.

The *Health Act 1958* requires that ionising radiation apparatus or sealed radioactive sources must be individually registered. The *Health Act 1958* can also impose conditions on the registration specific to the type of apparatus.

## **4. RADIATION SAFETY TESTING**

*Reference to the testing of ionising apparatus can be found in part 5 of the Health (Radiation Safety) Regulations 1994.*

### **Compliance of Equipment with the Regulations**

This part should detail how your practice will ensure the compliance of equipment with the Regulations; conditions of licence and registration; and other compliance requirements that may be issued by the Radiation Safety Program to your practice from time to time.

The Regulations state that the Secretary of the Department of Human Services has the authority to require any ionising radiation apparatus, sealed radioactive source or sealed source apparatus to be tested prior to registering the apparatus or source. Furthermore, the Regulations also allow the Secretary to specify the type of testing required.

### **Quality Assurance (QA Program)**

A sound QA program will assist your practice's compliance with the legislative requirements. This section should detail both the type and frequency of quality control tests to be carried out, including details of persons who carry out these tests.

Examples of quality control tests include carrying out sensitometry measurements of the film processor in radiography and high count flood uniformity checks of gamma cameras in nuclear medicine.

### **Wipe Tests**

This part should describe the requirements, who can conduct and analyse wipe tests of radioactive sources with respect to the appropriate code of practice or standard for the particular radiation source used at the practice, including the frequency of such tests.

### **Maintenance Procedures and Safety Checks**

This section should detail the frequency of servicing of radiation apparatus at the practice recommended by the manufacturer, safety checks and radiation monitoring to be carried out, including their frequency.

It should be noted that only persons appropriately licensed can service radiation apparatus.

The RSO should ideally conduct any routine safety checks and radiation monitoring.

All records should be kept of maintenance, safety checks and radiation monitoring conducted by either the RSO or licensed testers.

## 5. WORKING RULES

### **General**

If the Radiation Management Plan is being used to meet the requirements of the Regulations, this section must contain a description of the working rules for the control of radiation exposure in the workplace. In order to satisfy these requirements the working rules should contain descriptions of how to use radiation safely at your practice in a routine manner, eg. start up, operation and turn off for a radiation gauge; and general laboratory hygiene in the use of unsealed sources. In addition, it should also outline what persons at the practice should do to minimise exposure to radiation. Below is a guide to the type of information that could be included in this section:

### **Dose Limits**

*Reference to Dose Limits can be found in Schedule 1 parts 1 & 2 of the Health (Radiation Safety) Regulations 1994.*

This part should detail the dose limits prescribed in the Regulations. All persons working with ionising radiation must not exceed the following dose limits prescribed in the Regulations.

<b>Occupational</b>	
Whole Body:	50 mSv in any one year. 20 mSv per year averaged over any 5 year period.
Lens of the Eye:	150 mSv per year.
Skin:	500 mSv (averaged over 1cm <sup>2</sup> ) per year.
Hands and Feet:	500 mSv per year.
<b>Public</b>	
Whole Body:	1 mSv per year averaged over any 5 year period.
Lens of the Eye:	15 mSv per year.
Skin:	50 mSv (averaged over 1cm <sup>2</sup> ) per year.

It should be noted that:

- Radiation doses should be kept As Low As Reasonably Achievable (ALARA), economic and social factors taken into account. This is the principle of **Optimisation** as defined by the ICRP.
- The ICRP further requires that individual doses be limited: the principle of **Limitation**.

Women who wish to declare a pregnancy should seek the advice of the RSO if they are working with radiation. The purpose for seeking this advice is that the Regulations specifically address the issue of exposing the foetus to radiation while in the workplace.

## **Hazard Assessment**

*Reference to hazard assessment can be found in Part 7 of the Health (Radiation Safety) Regulations 1994.*

This part should include a description of the manner in which the radiation may present a hazard, eg. loss of shielding, spillage of an unsealed radioactive source, or the over-riding of interlocks in the case of irradiating apparatus. The *Health (Radiation Safety) Regulations 1994* requires the organisation or the person delegated with the responsibility must be and remain informed of all radiation hazards associated with the ionising apparatus that is owned, possessed or controlled by that organisation or person. Furthermore, the organisation or person delegated with that responsibility has the duty to inform all employees and visitors involved with the ionising apparatus of the associated hazards. Therefore, in order to comply with the requirements of the Regulations this Section should identify the hazards associated with the ionising apparatus and detail how this information is conveyed to employees and visitors of the site.

Inclusion of possible radiation doses due to such scenarios may also be included here and compared with the radiation dose limits in the Regulations.

## **Responsibilities of Employees**

This part should list the practices to be adopted or avoided by employees in order to maintain a high standard of radiation safety for the practice.

## **Storage**

This part should describe your practice's specific requirements for a radiation store as per the appropriate Code of Practice or Standard.

## **Shielding**

This part should detail what shielding is provided at the practice and what records are kept regarding the shielding.

## **Decontamination**

This part should describe the requirements for decontamination of surfaces and objects contaminated with radioactive material (usually where unsealed radioactive sources are used at the practice). It should also include details of the radiation monitoring equipment used to ensure that decontamination has been properly carried out.

## **6. RADIATION SAFETY TRAINING**

*Reference to training or instruction can be found in Part 7 of the Health (Radiation Safety) Regulations 1994.*

The *Regulations* require the organisation or person delegated with the responsibility must provide, or arrange for the provision of, training or instruction concerning radiation hazards, safe working practices and any device that may be necessary for safety to all employees and visitors involved with the ionising apparatus.

The radiation safety training program should include at least the following:

- a description of the radiation hazards in the practice;
- how to avoid the hazards;
- how to minimise radiation dose; and
- details of this Radiation Management Plan.

This section should include details of training requirements, training providers and safety devices or protective equipment to be used or provided with the ionising apparatus

### **Safety Devices and Personal Protective Equipment**

This should include details of the safety devices provided to minimise or prevent health risks from radiation exposure, eg. collimators and fume cupboards. It should also contain details of personal protective equipment that is required to be used, eg. lead aprons and gonadal or thyroid shielding, etc. in medical practices; protective glasses; rubber gloves; and protective clothing, and the persons to whom the equipment will be issued.

This section should also detail Occupational Health and Safety requirements concerning the use of safety devices and personal protective equipment.

### **Radiation Monitoring**

This should contain a list of the survey monitors and contamination monitors available at the practice; the radiation types and energies for which they may be used; operating procedures for use; and the requirement that they be calibrated at intervals recommended by the manufacturer.

## **7. EMERGENCY PROCEDURES**

*Reference to plans for dealing with radiation accidents and emergencies can be found in part 7 of the Health (Radiation Safety) Regulations 1994.*

The *Regulations* require the organisation or the person delegated with the responsibility must have plans for dealing with radiation accidents and emergencies.

This section should detail the procedures to be adopted in the event of an emergency or incident involving radiation in your practice. In addition to general procedures, some specific scenarios should be considered, eg. fire, flood, or loss of control and unintended human exposure.

This section should also contain the details of the medical centre that victims will be taken to following any radiation incident. Note that ensuring the medical stability of any person involved in a radiation incident should be the **first priority**.

The Regulations require that where a person has received a radiation dose greater than 1 mSv as a result of a radiation incident or accident it must be reported to the Secretary of the Department of Human Services. A written report, dealing all the facts, must be forwarded to the Secretary within 5 working days of the incident occurring. A copy of the report must also be placed in the appropriate personal record.

If a source of radiation is or has been out of control, damaged, malfunctioned, resulted in an area being contaminated or being released into the atmosphere at levels greater than specified in the Regulations, the responsible person must report all the relevant facts to the Secretary, in writing, as soon as practicable but not later than 5 working days after the day on which the incident occurred.

If an irradiating apparatus or radioactive source is or has been lost or stolen, the Secretary must be notified of that loss or theft immediately.

## **8. PERSONAL RADIATION MONITORING**

*Reference to personal radiation monitoring can be found in Part 9 of the Regulations.*

This section should detail how personal monitoring is undertaken at your practice, including contact details of the approved personal monitoring supplier, the wearing period and details of the supplier's recommendations concerning the use of the personal monitors.

The Regulations require that any person who is likely to be exposed to a radiation dose in excess of 1 mSv in any one year (as a result of their work) must wear an approved personal monitoring device.

In some instances, personal alarm monitoring devices (pocket beepers) are required in addition to personal radiation monitoring devices, eg. industrial radiography.

## **9. TRANSPORT OF RADIOACTIVE SUBSTANCES**

*Reference to the transport of radioactive materials can be found in part 11 of the Regulations.*

This section should detail how radioactive substances are transported according to the Regulations by your practice.

It should be noted that transporters must have an appropriate licence to transport radioactive substances. Furthermore, the Regulations require that the transport of radioactive material must be carried out in accordance with the *Code of Practice for the Safe Transport of Radioactive Substances 1990*.

## 10. DISPOSAL REQUIREMENTS

*Reference to the disposal of radioactive waste can be found in part 12 of the Regulations.*

This part should detail how your practice disposes of radioactive material and/or X-ray equipment. The disposal of radioactive waste must be carried out in accordance with the requirements of the Regulations. The disposal of solid radioactive wastes (sealed radioactive sources and sealed source apparatus) must only be carried out in accordance with procedures approved by this Department. Typically, the disposal path for solid radioactive wastes is via the supplier of the radioactive material or by an approved company.

X-ray equipment may be disposed of at a municipal tip if the high voltage wires to the tube have been cut or the X-ray unit has been otherwise *permanently* disabled. This applies only to the radiation hazard. The tip or EPA may have further or other requirements for the disposal of such equipment, such as generator (cooling) oils.

## 11. RADIATION SAFETY OFFICER (RSO)

*Reference to the radiation safety officer can be found in parts 108AE & 108AF of the Health Act 1958.*

### Appointment of a Radiation Safety Officer

The Act requires that for all registered ionising apparatus an RSO must be appointed. This section should name the RSO for your practice, including relevant contact details.

### Responsibilities of the RSO

This section should list the responsibilities of the RSO.

The RSO should be responsible for the development of the Radiation Management Plan. Other typical responsibilities of the RSO are included in the document *Radiation Safety Officer - Typical Duties* produced by the Radiation Safety Program and is available on the web-site at:

[www.dhs.vic.gov.au/phd/radiationsafety/downloads/publications/reqs\\_rso.pdf](http://www.dhs.vic.gov.au/phd/radiationsafety/downloads/publications/reqs_rso.pdf)

The RSO should keep the licensee or registrant informed on the radiation safety status of the practice.

### Radiation Safety Committee

In large organisations, a Radiation Safety Committee may be established to formulate and review radiation related matters.

### Radiation Related Documentation

It is essential that all documentation related to any radiation safety matters should be kept by either the organisation or persons (RSO) delegated with that responsibly. This documentation could include ionising apparatus registered, persons licensed, safe work practices, emergency procedures, personal monitoring records, maintenance procedures and safety checks, quality assurance results, inventory and location of radioactive sources, results of calibration of monitors and incident reports.

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