

Information that must be included in a radiation safety and protection plan

A Radiation Safety and Protection Plan is the document which details how a possession licensee intends to implement radiation safety measures to ensure the health and safety of all persons during the conduct of the licensee's radiation practice. These measures must be followed by all persons involved in carrying out the practice.

As a Radiation Safety and Protection Plan must be approved by the Chief Executive of Queensland Health, it should be viewed as a binding contract between the possession licensee and Queensland Health.

The *Radiation Safety Act 1999* prescribes what must be included in a Radiation Safety and Protection Plan. This Information Sheet details the minimum suite of radiation safety and protection measures, as prescribed in the legislation, that must be included in each licensee's plan. Your plan must also include any other measures that are necessary to deal with the radiation hazards particular to your practice.

The overall structure and intent of the plan is to:

- (a) identify all of the radiation or radiation related hazards in your practice
- (b) detail how you are going to manage these hazards in your practice to reduce health and environmental risks
- (c) specify what structures or organisational arrangements you will have in place to ensure, on an on-going basis, that your plan is being adhered to and your radiation hazard is being adequately managed.

Note: Codes of Practice and Safety Guides for specific radiation practices are available and these will assist in developing your plan. These documents may be downloaded from the Australian Radiation Protection and Nuclear Safety Agency's website: www.arpansa.gov.au.

Remember:

- **You must sign and date your proposed radiation safety and protection plan**
- **Your proposed plan must accompany your application for a licence to possess a radiation source**
- **Your plan must accurately reflect the radiation practices conducted under your possession licence**
- **Your plan must be written so that it can be easily understood by persons who carry out the radiation practice**

Enquiries

If you have any questions in relation to the development of your Radiation Safety and Protection Plan, please contact the Radiation Health Unit on (07) 3328 9987, or email radiation_health@health.qld.gov.au.

MEASURES TO BE INCLUDED IN A RADIATION SAFETY AND PROTECTION PLAN

A. What are the Hazards?

It is important that your radiation safety and protection plan identifies the radiation hazards specific to your radiation practice. Consequently, your plan must include the following information -

- (i) a clear description of your radiation practice
- (ii) details of the types of radiation sources that are to be used to carry out your radiation practice
- (iii) the radiation hazards specific to your radiation practice and source.

B. How are you going to deal with the Hazards?

Once you have identified the radiation hazards specific to your radiation practice, it is important that you detail in your plan how you, the possession licensee, are actually going to deal with the hazards. Although your plan may contain additional information or instructions, your plan must, at least, deal with the following matters:

Note: You may wish to reference certain specific requirements (e.g. list of users, names of service providers) as attachments to your plan. This will enable you to easily update your plan, as required.

1. Access control arrangements

(Radiation Safety Regulation 2010 – S20)

A fundamental requirement in controlling a radiation hazard is to prevent unauthorised access to the radiation source. Appropriate physical and administrative measures must be in place to ensure that unauthorised persons are prevented from gaining access to, or using, the radiation source.

Your plan must therefore describe the physical and administrative access control arrangements you, the possession licensee, will put in place.

2. Training program to be undertaken

(Radiation Safety Act 1999 – S28(2))

Training is necessary to ensure that all persons are aware of the radiation hazards specific to your practice, and are provided with the necessary knowledge and skills to deal with these hazards. This training must be commensurate with each person's skills and their involvement in the radiation practice.

You must detail in your plan that it will be a duty of your radiation safety officer to provide, or arrange for the provision of, training about radiation hazards and safe working practices to -

- (i) persons carrying out the practice
- (ii) your employees (which includes your agents and the agents' employees), and other persons working for you who may be exposed to radiation emitted from the source.

Your plan must therefore clearly describe the different categories of persons who will require training in your practice and details of the training which will be provided to each category of persons.

This training must include, as applicable -

- (i) details of the radiation hazards specific to your radiation practice
- (ii) specific responsibilities of each category of persons

- (iii) precautions that need to be taken to ensure radiation doses received from the source by any person, are:
 - for ionising radiation - below the radiation dose limit prescribed under the *Radiation Safety Regulation 1999* and as low as reasonably achievable
 - for non-ionising radiation - below the radiation dose limit prescribed under the *Radiation Safety Regulation 1999* and minimised as far as is practicable
- (iv) safe work practices, including minimising radiation dose to patients and users
- (v) regulatory obligations as they apply to persons in the practice
- (vi) for users, the features of, and how to use, the radiation source and ancillary imaging equipment.

Additionally, your plan should also include how you, the possession licensee, intend to ensure that the knowledge is maintained. This may be achieved by annual refresher training.

3. **How radiation sources are to be used**

(Radiation Safety Regulation 2010 – S19(1), S26)

Your plan must clearly detail the safe work methods and procedures that you, the possession licensee, require all persons to comply with when using and handling your radiation source.

This should include the use of:

- safety devices
- personal protective equipment
- personal monitoring devices
- personal alarm dosimeters
- radiation monitoring equipment

Your plan must also require use licensees to record in a register, provided by you, the possession licensee, the names of persons who use your sources to carry out your practice.

Additionally, if your radiation practice will involve the use or storage of unsealed radioactive substances, your plan must include -

- (i) details on how the premises, and persons or things at the premises, are to be monitored to detect, or minimise, contamination of the premises, persons or things
- (ii) details of the monitoring equipment that will be used to detect the contamination
Note: This equipment will need to have the sensitivity, accuracy, range and energy response appropriate to the contamination to be monitored.
- (iii) if an item contaminated with radioactive material needs to be removed from the premises for cleaning, details about how, and the period for which, the item is to be stored before removal from the premises for cleaning
- (iv) details about how waste radioactive material, produced in carrying out the practice, is to be dealt with before its disposal, including:
 - the method to be used to minimise the activity of the radionuclide in, and volume of, the waste radioactive material
 - if applicable, how waste material is to be segregated for storage, having regard to –
 - its half-life, volume, and physical and chemical properties
 - the concentration of the radionuclide in the material
- (v) details about how the amount (activity and volume) of waste radioactive material produced in carrying out the practice is to be minimised
- (vi) the requirement that use licensees will record in a register, provided by you, the possession licensee, details of any disposal of unsealed radioactive material.

If your plan deals with diagnostic radiography, your plan should also detail your arrangements for ensuring safety when contrast media is used. This should include your arrangements for dealing with patients exhibiting adverse health effects following the administration of contrast media, as well as the availability of resuscitation equipment, and emergency staff.

4. How ancillary imaging equipment is to be used

(Radiation Safety Regulation 2010 – S19(1))

If your radiation practice involves the production or viewing of images, your plan must detail the procedures and methods that you, the possession licensee, require all persons to comply with to ensure the correct use of your ancillary imaging equipment, including -

- (i) conventional film processing techniques
- (ii) optimal use of computed/digital radiography systems
- (iii) gamma camera operation (nuclear medicine practices).

5. Quality control procedures to be undertaken

(Radiation Safety Regulation 2010 – S19(1))

It is important that the radiation sources and the equipment used in carrying out your practice are maintained and routinely checked to ensure that they continue to operate in a constant, or predictable, manner.

Your plan must therefore detail the quality control procedures (i.e. routine checks) and the preventative maintenance procedures which will be undertaken to ensure the correct operation of -

- (i) the radiation source
- (ii) if applicable, sealed source apparatus
- (iii) if applicable, ancillary equipment which includes imaging equipment.

Your plan must also state that use licensees will record in a register, provided by you, the possession licensee, the results of the quality control procedures, as well as any comments and recommendations.

6. Safety devices to be provided

(Radiation Safety Regulation 2010 – S21)

Your plan must detail the safety devices which will be provided for use by persons while involved in carrying out your radiation practice. A safety device is any piece of equipment used in such a way as to reduce the radiation exposure of a user, member of the public or other person, but is not personal protective equipment. In the case of a diagnostic radiography practice, safety devices may reduce the need for repeat exposures or may remove the need for someone to hold a patient during exposures.

Examples of safety devices include:

- moveable lead shields
- perspex work stations
- animal control or restraining devices
- handling tongs and lead shot
- foam pads and sandbags
- non-specularly reflecting tools.

Your plan must include -

- (i) details of the minimum suite of devices you will provide

- (ii) details of how, and when, the devices are to be used
- (iii) details of the intervals at which the devices are to be checked for wear and tear, and correct operation
- (iv) details of the qualifications or abilities of the persons who will be checking the devices.

Note: If a possession licensee believes that such devices are unnecessary, the plan must specifically state that such devices are not provided, and provide the rationale behind this decision.

7. Personal protective equipment to be provided

(Radiation Safety Regulation 2010 – S22, S29)

Your plan must detail the personal protective equipment which will be provided for -

- (i) wearing by persons who are involved in carrying out the practice
- (ii) if applicable, wearing by a person who is being exposed as part of a diagnostic, therapeutic or cosmetic procedure (i.e. a treated person).

Personal protective equipment is equipment that may be worn by persons when carrying out a radiation practice to reduce the exposure of the person to radiation. Such equipment may include lead aprons, gloves, overshoes or eyewear.

Your plan must include -

- (i) details of the minimum suite of equipment you will provide
- (ii) details of which categories of persons are required to wear the equipment
- (iii) details of how, and when, the equipment is to be worn by the persons
- (iv) if applicable, a requirement that the use licensee ensures that the treated person wears the equipment, whenever required, while undergoing the procedure
- (v) details of the intervals at which the equipment is to be checked for wear and tear, and correct operation
- (vi) details of the qualifications or abilities of the persons who will be checking the equipment.

Note: If a possession licensee believes that such equipment is unnecessary, the plan must specifically state that such equipment is not provided, and provide the rationale behind this decision.

8. Personal monitoring devices to be provided

(Radiation Safety Act 1999 – S28(3); Radiation Safety Regulation 2010 – S24)

If a person may receive, from the carrying out of the practice, a radiation dose higher than 1 mSv in a year, your plan must state the arrangements in your practice for the supply of a personal monitoring device to that person.

Note: This requirement is not applicable to persons being exposed as part of a diagnostic or therapeutic procedure (i.e. patients).

Your plan must also include -

- (i) details of the persons who are required to wear these devices, described by reference to the nature of their involvement in the carrying out of the practice
- (ii) details of how, when and where these devices are to be worn
- (iii) details of where the devices are to be stored when not being worn
- (iv) details of the intervals at which the devices are to be assessed

- (v) details of the persons who are to perform the assessment of the devices, described by reference to the abilities of the persons to perform the task (e.g. a service provider which uses reference sources directly traceable to the Australian National Standards as required by the National Measurement Act 1960).

9. Personal alarm dosimeters to be provided

(Radiation Safety Regulation 2010 – S25)

If your radiation practice involves the use of ionising radiation sources, your plan must state the arrangements in your practice for the supply of personal alarm dosimeters for use by persons while involved in carrying out the practice.

A personal alarm dosimeter is a device that produces a visual or audible signal when any radiation dose, or dose rate, received by the device is more than a certain dose, or dose rate. These devices are an important means of providing an immediate indication to users about the radiation levels in a certain area.

Note: If a possession licensee believes that such a device is unnecessary, the plan must specifically state that such devices are not provided, and provide the rationale behind this decision.

Your plan must include -

- (i) details of the persons who are required to use the dosimeters, described by reference to the nature of their involvement in the carrying out of the practice
- (ii) details of how, and when, the dosimeters are to be used by the persons
- (iii) details of the dosimeters, having the sensitivity, accuracy, range and energy response appropriate to the source, that will be used
- (iv) details of the intervals, of not more than 12 months, at which the dosimeters are to be checked for sensitivity, accuracy, range and energy response
- (v) a requirement that a repaired dosimeter, or a dosimeter suspected of having been damaged, must not be used unless it is first checked for sensitivity, accuracy, range and energy response
- (vi) details of the persons who are to check the sensitivity, accuracy, range and energy response of the dosimeters, described by reference to the abilities of the persons to perform the task (e.g. a service provider which uses reference sources directly traceable to the Australian National Standards as required by the National Measurement Act 1960).

Note: These assessments must involve the use of a radiation source to check the appropriateness of the response of the equipment to radiation. Tests which do not involve actually irradiating the device are not appropriate or acceptable.

10. Radiation monitoring equipment to be provided

(Radiation Safety Regulation 2010 – S27)

This section applies if your radiation practice involves the use of an ionising radiation source, other than -

- (i) ionising radiation apparatus used for a diagnostic procedure on a person
- (ii) a radiation source used for chemical analysis
- (iii) cabinet radiation apparatus or enclosed radiation apparatus used for its intended use.

For all other radiation practices, your plan must state the arrangements in your practice for the supply of radiation monitoring equipment (equipment that measures the amount of radiation emitted from radioactive substances or ionising radiation).

Note: If a possession licensee believes that such equipment is unnecessary, the plan must specifically state that such equipment is not provided, and provide the rationale behind this decision.

Your plan must also include -

- (i) details of how the radiation monitoring equipment is to be used
- (ii) details of the equipment, having the sensitivity, accuracy, range and energy response appropriate to the radiation source, that will be used
- (iii) details of how the licensee will ensure the sensitivity, accuracy, range and energy response of the equipment, to be used, are maintained
- (iv) details of the intervals, of not more than 12 months, at which the equipment is to be checked for sensitivity, accuracy, range and energy response
- (v) a requirement that repaired equipment, or equipment suspected of having been damaged, must not be used unless it is first checked for sensitivity, accuracy, range and energy response
- (vi) details of the persons who are to check the sensitivity, accuracy, range and energy response of the equipment, described by reference to the abilities of the persons to perform the task (e.g. a service provider which uses reference sources directly traceable to the Australian National Standards as required by the National Measurement Act 1960).

Note: These assessments must involve the use of a radiation source to check the appropriateness of the response of the equipment to radiation. Tests which do not involve actually irradiating the device are not appropriate or acceptable.

11. Register of procedures

(Radiation Safety Regulation 2010 – S29)

If your radiation practice involves the use of a radiation source to carry out a diagnostic, therapeutic or cosmetic procedure on a person, your plan must include a requirement that you, the possession licensee, must provide, and be in control of, a register which includes the following information about each exposure of a treated person -

- (i) the date of use of the source to carry out the procedure
- (ii) details of the procedure, which should also include who was involved in using the source to carry out the procedure
- (iii) details of the radioactive substance injected, administered to, or implanted in the treated person.

Your plan must also stipulate that this register is to be completed by the use licensee.

12. Information on radiographs/images

(Radiation Safety Regulation 2010 – S29)

If your radiation practice involves the use of a radiation source to carry out a diagnostic, therapeutic or cosmetic procedure on a person, your plan must include details of the arrangements in your practice for the recording of certain information on a radiograph or nuclear medicine image.

Your plan must include -

- (i) details of the information that must be permanently marked on the radiograph/image
- (ii) details of the way in which the marking is to be made.

The following details the information that must be marked on the radiograph/image:

radiographs with a surface area of 45cm² or more

The images produced must be marked with the following information:

- the name, or identifying mark, of the use licensee
- the name, or identifying mark, of the possession licensee
- the address, or identifying mark, of the premises at which the radiograph was produced
- the name, gender and date of birth of the treated person
- the date the radiograph was produced
- adequate information to enable the correct interpretation of the radiograph

radiographs with a surface area of less than 45cm²

The images produced must be marked in a way which identifies, or helps in the identification of, the treated person.

nuclear medicine images

The images produced must be marked with the following information:

- the name, or identifying mark, of the use licensee
- the name, or identifying mark, of the possession licensee
- the address, or identifying mark, of the premises at which the image was produced
- the name, gender and date of birth of the treated person
- the date the image was produced
- details of the radiopharmaceuticals administered to, or injected into, the treated person for the production of the image
- adequate information to enable the correct interpretation of the image

13. Duration of procedure

(Radiation Safety Regulation 2010 – S30)

If your radiation practice involves the use of a radioactive substance to carry out a diagnostic or therapeutic procedure involving the irradiation of a person, it is important that your plan provides -

- (i) guidance on the conditions which should be met for the patient's discharge from the hospital or clinic
- (ii) the conditions for the treatment of an outpatient.

The ARPANSA *Recommendations for the discharge of patients undergoing treatment with radioactive substances (2002)* provides guidance on this matter.

14. Production of the radionuclide Radon-222

(Radiation Safety Regulation 2010 – S31)

If your radiation practice results in the production of, or exposure to, the radionuclide radon-222, your plan must provide the arrangements in your practice to ensure that the premises in which the practice is carried out are ventilated in a way that prevents the concentration of the radionuclide being more than 200Bq per cubic metre.

C. How will you ensure that your safety measures remain effective?

It is important that procedures are in place to ensure that the health and safety measures contained within your plan are being followed and remain effective.

Your plan must therefore include how you propose to monitor and review the implementation and effectiveness of the measures you have put in place at your practice. This may include keeping appropriate records to demonstrate that the pre-determined hazard management arrangements detailed in your plan are being followed, and checking that these records are being completed, and actioned as necessary.

As you should be aware, you, the possession licensee, must appoint a radiation safety officer for your practice. A primary role of your radiation safety officer is to inform you of the radiation safety status of your practice.

Consequently, your plan must include that your radiation safety officer will -

- (i) identify ways, consistent with the plan, of minimising the radiation doses received, by persons, from the source
- (ii) identify whether the plan is being complied with
- (iii) regularly review the plan to ensure its continued effectiveness
- (iv) identify whether the relevant radiation safety standard for the source, or premises at which the practice is being carried out, is being complied with. The plan must also state the routine intervals at which this internal check for compliance with the Standard will be performed.
- (v) to advise the licensee of the ways of minimising the radiation doses received by persons from the source
- (vi) to report to the licensee:
 - any contravention of the plan or the relevant radiation safety standard
 - what action needs to be taken to ensure compliance with the plan or standard
- (vii) to advise the licensee of the results of a review of the plan and make recommendations to the licensee about changes to the plan.

Note: The requirements detailed in (v), (vi) and (vii) may not be considered necessary if the possession licensee is an individual who is also the radiation safety officer.

D. What will you do if things go wrong?

Radiation incidents may occur as a result of physical or administrative failure of equipment, poor work practices etc.

It is important to identify what radiation incidents could reasonably be expected to happen in relation to your radiation practice, and what procedures you will have in place to deal with such incidents. These procedures must be designed to minimise any radiation hazard arising from the incident, and should include the arrangements for internal reporting of the incident.

Consequently, your plan will need to clearly detail -

- (i) the types of radiation incidents that could occur at your radiation practice
- (ii) the procedures that must be followed for each type of radiation incident that could occur
- (iii) the internal reporting arrangements, including details of the written report to be supplied to the possession licensee.

It is important to note that the following must be immediately reported to the Chief Executive, Queensland Health:

- (i) any incident in relation to the source for which there are no remediation procedures stated in your plan;
- (ii) if a source is, or appear to have been, lost or stolen; or
- (iii) if equipment that uses, measures or controls radiation emitted for the radiation source malfunctions with the result, or likely result, that there is, or will be, an unintended emission of the radiation or a person is, or will be, unintentionally exposed to the radiation.