



**Australian Government**

**Department of Education, Employment and Workplace Relations**

# **PSPRAD708A Coordinate radiation safety**

**Revision Number: 1**

## PSPRAD708A Coordinate radiation safety

### Modification History

Not applicable.

### Unit Descriptor

<b>Unit descriptor</b>	<p>This unit covers the ability to coordinate an organisation's ongoing safety management of radiation-related work activities for the purpose of protecting workers, the public and the environment from radiation hazards. This involves assessing local radiation protection and safety requirements and assessing implementation of systems and controls that are employed to ensure the organisation/licensee's compliance with relevant radiation protection and safety legislation, standards, licences or codes of practice.</p> <p>No licensing, legislative, regulatory or certification requirements apply to this unit at the time of endorsement.</p>
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### Application of the Unit

<b>Application of the unit</b>	<p>This unit of competency applies to personnel with a local radiation safety coordination role. They may assist a radiation safety officer:</p> <ul style="list-style-type: none"> <li>• at a mine or processing plant that produces radioactive ore or minerals</li> <li>• with instruments that emit ionising radiation at geotechnical, construction, mining and manufacturing sites, or analytical and research facilities</li> <li>• in a laboratory or licensed facility that handles radioactive materials</li> <li>• in a nuclear facility.</li> </ul> <p>The coordination tasks in this unit would be performed under the authority of a responsible person. The unit covers part of the role and functions of a radiation safety professional, such as a radiation safety officer.</p>
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## Licensing/Regulatory Information

Not applicable.

## Pre-Requisites

<b>Prerequisite units</b>	
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## Employability Skills Information

<b>Employability skills</b>	This unit contains employability skills.
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## Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.
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## Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
<p>1. <b>Assess radiation protection and safety requirements.</b></p>	<p>1.1. Review relevant <i>radiation protection and safety legislation, standards, codes and guidelines</i> to confirm radiation protection and safety requirements applicable to a particular site.</p> <p>1.2. Review relevant available records and information about <i>hazards due to radioactive materials, equipment and work activities</i> conducted at the site.</p> <p>1.3. Identify known and potential hazards associated with current and future <i>radiation-related work activities</i>.</p> <p>1.4. Identify appropriate <i>radiation instruments, monitoring equipment</i> and measuring/survey procedures to quantify hazards.</p> <p>1.5. Quantify <i>ionising radiation</i> hazards and anticipated exposure/dose, and compare results with relevant limits.</p> <p>1.6. Review available information about relevant radiation <i>control measures</i>, safety procedures, radiation <i>monitoring programs</i> and personal protective equipment (PPE).</p> <p>1.7. Determine if specific work areas need to be controlled more effectively.</p> <p>1.8. Undertake risk analysis for local site specific to radiation related activity.</p>
<p>2. <b>Develop or revise local radiation management plans.</b></p>	<p>2.1. Review the local procedures for developing or revising radiation protection policy, procedures and plans.</p> <p>2.2. Identify local compliance against radiation safety requirements, including organisational policy and approach.</p> <p>2.3. Design or amend local <i>radiation management plans</i> to control and monitor all radiation-related work activities to comply with regulator requirements.</p> <p>2.4. Identify possible impacts of new or revised local radiation management plans on relevant organisational policies, procedures and systems, and advise relevant personnel.</p> <p>2.5. Forward draft local radiation management plans for feedback and approval in accordance with organisational and regulator's procedures.</p> <p>2.6. Distribute authorised local radiation management</p>

ELEMENT	PERFORMANCE CRITERIA
	<p>plans to relevant personnel and confirm they understand their roles and responsibilities.</p> <p>2.7. Design key performance indicators for radiation safety performance measurement.</p> <p>2.8. Negotiate targets for radiation safety key performance indicators in line with organisational plan.</p> <p>2.9. Develop and implement quantitative risk management and risk assessment tools for radiation.</p>
<p><b>3. Ensure local radiation protection and monitoring systems are implemented effectively.</b></p>	<p>3.1. Design a strategy for implementing the new or revised local radiation management plans that identifies key people, recommended approaches and available resources.</p> <p>3.2. Provide information about radiation protection and monitoring equipment and procedures to relevant personnel and confirm they understand their responsibilities.</p> <p>3.3. Confirm that prescribed radiation signs and safety communication systems, including noticeboards, are maintained in good condition and are readily visible.</p> <p>3.4. Design appropriate audit tools and audit plans.</p> <p>3.5. Conduct audits of radiation protection and monitoring systems, equipment and safety performance in accordance with agreed audit plans.</p> <p>3.6. Analyse audit information to identify non-conformances and opportunities for improvements.</p> <p>3.7. Produce audit reports that clearly define actions required to correct non-conformances.</p> <p>3.8. Record findings, actions and outcomes in accordance with regulator requirements and organisational procedures.</p>
<p><b>4. Investigate and rectify local safety, quality and non-compliance issues.</b></p>	<p>4.1. Investigate atypical dose results with reference to radiation safety key performance indicators.</p> <p>4.2. Examine defects or changes in work practices and equipment, and hazards that could increase exposure of personnel or present an environmental risk at local level, and determine appropriate controls.</p> <p>4.3. Analyse instances of potential or actual non-compliance and re-design work practices and procedures to prevent recurrence.</p> <p>4.4. Identify opportunities and strategies to further</p>

ELEMENT	PERFORMANCE CRITERIA
	<p>improve the organisation's radiation protection and monitoring systems.</p> <p>4.5. Implement authorised corrective and preventative actions.</p> <p>4.6. Record recommendations, actions and outcomes in accordance with regulator requirements and organisational procedures.</p>
<p>5. <b>Inform radiation safety officer management or licensee about radiation protection and safety.</b></p>	<p>5.1. Provide regular status reports, including details of instances of potential or actual non-compliance, or incidents/accidents and the actions taken.</p> <p>5.2. Provide regular information about the adequacy of radiation management plans and protection and monitoring systems, and recommend improvements.</p> <p>5.3. Obtain authorisation for significant equipment purchases.</p> <p>5.4. Obtain authorisation for corrective and preventative actions in accordance with organisational procedures.</p> <p>5.5. Advise the organisation when input from external radiation specialists is required.</p>
<p>6. <b>Promote a radiation safety culture.</b></p>	<p>6.1. Assess the competency of personnel to safely undertake specific radiation-related work activities and make appropriate recommendations to the responsible person.</p> <p>6.2. Access or develop <i>learning and development</i> programs that meet organisational and regulator requirements.</p> <p>6.3. Deliver, or arrange for the delivery of, training that meets the identified needs of personnel.</p> <p>6.4. Communicate effectively the need to make doses as low as reasonably achievable.</p>
<p>7. <b>Manage information about radiation protection and safety.</b></p>	<p>7.1. Specify all information that must be recorded and secured and advise relevant personnel.</p> <p>7.2. Control access to records in accordance with organisational procedures.</p> <p>7.3. Provide reports in accordance with regulator requirements and organisational procedures.</p> <p>7.4. Maintain and secure records, and provide advice on improvements to record management.</p>
<p>8. <b>Respond to potential or actual radiation incidents or</b></p>	<p>8.1. Recognise unusual situations, unexpected hazards, and potential or actual emergency radiation</p>

<b>ELEMENT</b>	<b>PERFORMANCE CRITERIA</b>
<b>accidents.</b>	incidents. 8.2. Inform relevant personnel about the situation, hazard or incident and seek their advice as necessary. 8.3. Assist emergency response personnel to control the situation in accordance with instructions, radiation management plans and organisation's <i>response procedures</i> .

## Required Skills and Knowledge

### REQUIRED SKILLS AND KNOWLEDGE

This section describes the skills and knowledge required for this unit.

#### Required skills

- using relevant information sources to locate and interpret information about radiation protection and safety legislation, standards, codes and guidelines
- assessing and reassessing risks and hazards and designing appropriate controls
- developing plans, organisational policy and procedures and safe work practices
- initiating audits and inspections of radiation protection and safety systems
- choosing and using appropriate available radiation source equipment and radiation instruments
- interpreting manuals for radiation sources/equipment and radiation instruments used in organisation
- designing, planning and conducting monitoring surveys under direction
- analysing radiation data, and verifying and reporting results
- seeking advice in situations that may require decisions or response actions beyond technical competence
- using plain English to explain radiation protection and safety issues, safe working rules and recommended procedures to other personnel

#### Required knowledge

- terms and concepts, such as ionising radiation, radioactivity, radioactive material, NORM, contamination, contamination controls, concentration, shielding, half-life, radionuclide, transport index, safe distance, and weighting factor
- types and properties of ionising radiation sources and shielding methods
- definitions of radiation quantities, such as exposure, dose, effective dose, dose rate, dose equivalent, and dose limits
- exposure pathways and protective measures
- signs and symptoms of radiation exposure, radiation health effects, and deterministic and stochastic effects
- international system (SI) of units for radiation quantities
- operating principles and function of key components, and set-up and calibration checks for radiation instruments, dosimeters and equipment used in job role
- detailed requirements of relevant legislation, codes, guidelines and safety procedures for working with radiation sources/equipment used at the organisation's facilities or sites
- health and safety and workplace emergency response procedures for radiation-related work activities in organisation
- types of PPE for personnel working in ionising radiation environments and the recommended selection process
- potential adverse health and performance effects of wearing PPE while working in



**REQUIRED SKILLS AND KNOWLEDGE**

- potentially hazardous environments
- principles and techniques for decontamination of personnel and equipment
- techniques and procedures for collecting potentially radioactive samples
- techniques for assessing radiation hazards likely to be encountered in organisation
- techniques for conducting contamination surveys
- techniques for control, containment and confinement of radiation sources/equipment encountered by organisation.
- environment, health and safety policy and procedures of the organisation, particularly how different parts of occupational hygiene system are interdependent, such as ventilation, noise, radiation and chemicals
- working knowledge of the business activities and operations conducted at the organisation's sites and the associated radiation risks

## Evidence Guide

<b>EVIDENCE GUIDE</b>	
<p>The Evidence Guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.</p>	
<b>Overview of assessment</b>	
<p><b>Critical aspects for assessment and evidence required to demonstrate competency in this unit</b></p>	<p>Assessment must confirm the ability to:</p> <ul style="list-style-type: none"> <li>• establish and maintain a local radiation management plan that meets regulator requirements</li> <li>• monitor radiation-related work activities and take appropriate action to keep workplace exposure as low as reasonably achievable, to keep doses received below the relevant dose limits, and to protect the environment</li> <li>• identify and rectify radiation safety, quality and non-compliance issues</li> <li>• advise management about radiation safety issues</li> <li>• explain radiation protection and safety measures clearly and train personnel</li> <li>• manage radiation protection and safety information in accordance with regulator requirements</li> <li>• coordinate workplace emergency first response.</li> </ul> <p><b>Consistency in performance</b></p> <p>Competency should be demonstrated by performing radiation safety related components of the day-to-day functions and duties of a radiation awareness officer at a site.</p>
<p><b>Context of and specific resources for assessment</b></p>	<p>Competency should be assessed in the workplace or simulated workplace environment.</p> <p>Assessment must comply with:</p> <ul style="list-style-type: none"> <li>• local regulations regarding the registration of operators, premises and sources at workplaces where radioactive materials and/or ionising radiation equipment are present</li> <li>• organisation's radiation management plan.</li> </ul> <p>Access is required to:</p> <ul style="list-style-type: none"> <li>• registered premises and sources</li> <li>• supervision by a radiation safety professional</li> <li>• organisation's radiation management plan and related policies and procedures.</li> </ul>
<b>Method of assessment</b>	<p>The following assessment methods are suggested:</p>

<b>EVIDENCE GUIDE</b>	
	<ul style="list-style-type: none"> <li>• review of radiation results, records, management plans and reports generated by the candidate</li> <li>• review of radiation safety information developed by the candidate and provided to the work group</li> <li>• feedback from peers, manager, and regulator representative that the candidate is able to coordinate management of radiation safety</li> <li>• oral/written tests and calculations involving: <ul style="list-style-type: none"> <li>• radiation terms, principles and quantities</li> <li>• set-up, calibration and basic maintenance of radiation instruments</li> <li>• selection and use of PPE</li> </ul> </li> <li>• analysis of case studies and reports of relevant emergency incidents and exercises</li> <li>• observation of the candidate promoting radiation safety and providing radiation safety information and instruction to other personnel.</li> </ul> <p>In all cases, practical assessment should be supported by questions to assess underpinning knowledge and those aspects of competency that are difficult to assess directly.</p>
<b>Guidance information for assessment</b>	<p>Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended, for example:</p> <ul style="list-style-type: none"> <li>• PSPRAD006A Work safely with radiation-sealed source equipment</li> <li>• PSPRAD007A Monitor radiation.</li> </ul>

## Range Statement

### RANGE STATEMENT

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.

<p><b><i>Radiation protection and safety legislation, standards, codes and guidelines</i></b> may include:</p>	<ul style="list-style-type: none"> <li>• Australian Radiation Protection and Nuclear Safety Act 1998 and amendments 2005</li> <li>• commonwealth, state and territory radiation control legislation</li> <li>• Australian Radiation Protection and Nuclear Safety Agency (ARPANSA) radiation protection series publications, such as:             <ul style="list-style-type: none"> <li>• RPS No.1 Recommendations for Limiting Exposure to Ionizing Radiation (1995) and National Standard for Limiting Occupational Exposure to Ionizing Radiation (republished 2002)</li> <li>• RPS No.7 Recommendations for Intervention in Emergency Situations Involving Radiation Exposure (2004)</li> <li>• RPS No.6 National Directory for Radiation Protection (2004)</li> <li>• RPS No.9 Code of Practice and Safety Guide for Radiation Protection and Radioactive Waste Management in Mining and Mineral Processing (2005)</li> <li>• RPS No.15 Safety Guide for the Management of Naturally Occurring Radioactive Material (NORM) (2008)</li> </ul> </li> <li>• requirements of commonwealth, state and territory radiation protection and safety legislation</li> <li>• definition of a responsible person</li> <li>• Australian standards.</li> </ul>
<p><b><i>Hazards due to radioactive materials, equipment and work activities</i></b> may include:</p>	<ul style="list-style-type: none"> <li>• inhalation of radioactive dust or gas</li> <li>• ingestion of radioactive dust or contaminated food or water</li> <li>• unplanned exposure to sealed or unsealed radiation sources or partially enclosed equipment that emits ionising radiation</li> <li>• handling radioactive materials in a laboratory.</li> </ul>

<p><b><i>Radiation-related work activities</i></b> may include:</p>	<ul style="list-style-type: none"> <li>• extraction, milling and packing of radioactive ores and minerals</li> <li>• operating, servicing and calibrating fixed radiation gauges, bore hole logging, industrial radiography equipment</li> <li>• operating, servicing and calibrating moisture density gauges</li> <li>• decontaminating equipment that has been in contact with radioactive material</li> <li>• XRF and XRD analysis</li> <li>• using radionuclides in a laboratory</li> <li>• managing wastes</li> <li>• using radiation for quality control in processing systems and factories.</li> </ul>
<p><b><i>Radiation instruments and monitoring equipment</i></b> may include:</p>	<ul style="list-style-type: none"> <li>• air proportional</li> <li>• gas proportional</li> <li>• gas ionisation</li> <li>• Geiger-Muller</li> <li>• ionisation</li> <li>• scintillation</li> <li>• solid state</li> <li>• wipe test equipment</li> <li>• sample containers, shovels, augers, buckets, air/water pumps, and stainless steel bailers.</li> </ul>
<p><b><i>Ionising radiation</i></b> may include:</p>	<ul style="list-style-type: none"> <li>• x-rays, electrons, neutrons, gamma rays, beta particles and alpha particles emitted from radioactive materials, including sealed and unsealed sources</li> <li>• x-rays generated by industrial radiography equipment, XRF and XRD instruments.</li> </ul>

<p><b><i>Control measures</i></b> may include:</p>	<ul style="list-style-type: none"> <li>• hierarchy of controls, including: <ul style="list-style-type: none"> <li>• avoiding exposure, where practicable</li> <li>• isolating sources of radiation where practicable through shielding, containment and remote handling techniques</li> <li>• engineering controls to reduce radiation levels and intakes of radioactive materials in the workplace</li> <li>• adopting safe work practices, including work methods that make use of time, distance and shielding to minimise exposure</li> <li>• using approved PPE where other means of controlling exposure are not practicable or sufficient</li> </ul> </li> <li>• designation of controlled areas and supervised areas</li> </ul>
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	<ul style="list-style-type: none"> <li>• use of appropriate signs and labels</li> <li>• use of investigation levels of exposure for specific categories of work.</li> </ul>
<b><i>Monitoring programs</i></b> include:	<ul style="list-style-type: none"> <li>• identification of relevant sources of radiation exposure within a workplace</li> <li>• assessment of the radiation doses received by employees, including determination of parameters that affect the assessed dose, as required by the appropriate authority</li> <li>• assessment of radioactive discharge to, or contamination of, the environment</li> <li>• detection of changes in the circumstances of exposure, as necessary</li> <li>• acquisition of sufficient information on radiation exposure in the workplace to enable optimisation measures to be adopted.</li> </ul>
<b><i>Radiation management plans</i></b> may include:	<ul style="list-style-type: none"> <li>• plan to keep exposure to radiation in the workplace as low as reasonably achievable and to keep doses received below the relevant dose limits, including: <ul style="list-style-type: none"> <li>• designation of work areas to be controlled, signage and location of protective devices</li> <li>• arrangements for authorising workers to conduct radiation-related activities</li> <li>• procedures for conducting radiation-related tasks and the safe use of radiation equipment</li> <li>• procedures for the security, storage and transport of radioactive materials and waste disposal</li> <li>• procedures for the issue/collection, use and care of personal radiation monitors and PPE</li> </ul> </li> <li>• plan for monitoring radiation exposure and for assessing the doses received by exposed employees, including: <ul style="list-style-type: none"> <li>• dosimetry specifications</li> <li>• deployment of survey monitors</li> <li>• methods for conducting required radiation surveys, wipe tests, examinations and for reporting and recording results</li> <li>• arrangements for personal and environmental monitoring</li> </ul> </li> <li>• plan for dealing with incidents, accidents and emergencies involving exposure to radiation</li> <li>• plan for the induction and ongoing training of workers, visitors and members of the public as appropriate</li> <li>• plan for the selection, procurement, maintenance, repair</li> </ul>

	<p>and disposal of equipment containing radioactive sources</p> <ul style="list-style-type: none"> <li>• audit plan covering such things as: <ul style="list-style-type: none"> <li>• status of specified equipment</li> <li>• use of designated safe work practices</li> <li>• application of specified monitoring procedures</li> <li>• accuracy and completeness of specified records.</li> </ul> </li> </ul>
<b><i>Learning and development</i></b> strategies may include:	<ul style="list-style-type: none"> <li>• face to face training</li> <li>• online or distance learning</li> <li>• mentoring and coaching.</li> </ul>
<b><i>Response procedures</i></b> will include instructions for:	<ul style="list-style-type: none"> <li>• keeping exposures to a minimum, consistent with essential operations through evacuation or otherwise</li> <li>• notifying relevant competent authority if required.</li> </ul>

## Unit Sector(s)

<b>Unit sector</b>	
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## Competency field

<b>Competency field</b>	Radiation Safety
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## Co-requisite units

<b>Co-requisite units</b>	
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