Australian Government

Department of Education, Employment and Workplace Relations

MSL943001A Work safely with instruments that emit ionising radiation

Revision Number: 1

MSL943001A Work safely with instruments that emit ionising radiation

Modification History

Not applicable.

Unit Descriptor

Unit descriptor	This unit of competency covers the ability to safely store, transport and operate instruments that emit ionising radiation following established safe work practices and in accordance with laboratory procedures and licensing requirements. Examples include, use of process control instrumentation, such as fluid level gauges using radioactive sources, on-site non-destructive testing of weldments using X-ray and gamma ray sources and density testing of asphaltic concrete.

Application of the Unit

Application of the unit	This unit of competency is applicable to laboratory or field assistants working in construction materials testing or similar industry sectors. They work under supervision or direction of paraprofessionals. Industry representatives have provided case studies to illustrate the practical application of this unit of competency and to show its relevance in a workplace setting. These are found at the end of this unit of competency under the section 'This competency in practice'.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Prerequisite units		

Employability Skills Information

Employability skills	This unit contains employability skills.

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.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Store instruments safely and securely	1.1. Identify state or territory requirements for storage facilities and associated document processes 1.2. Store instruments in accordance with state or territory requirements and documented procedures 1.3. Secure instruments to prevent unauthorised access 1.4. Record instruments' movements and usage in accordance with documented procedures
2. Transport instruments safely and securely	2.1. Select vehicle suitable for the purpose 2.2. Attach regulation signage in accordance with state or territory requirements to indicate that radioactive sources are being carried 2.3. Ensure that instruments are properly located and fixed securely in place 2.4. Ensure security of instruments when the vehicle is unattended
3. Use instruments safely and maintain security	3.1. Follow safe working practices to minimise own exposure to radiation 3.2. Use radiation dosimeter to monitor own exposure to radiation 3.3. Follow safe work practices to minimise exposure of others to radiation 3.4. Follow safe work practices to protect the instrument from damage 3.5. Maintain instrument security
4. Monitor radiation levels	4.1. Check operation and calibration status of radiation survey meter 4.2. Perform radiation survey following documented procedure 4.3. Report atypical conditions and/or problems to appropriate personnel
5. Maintain records	5.1. Record observations, data and results in accordance with enterprise procedures 5.2. Maintain confidentiality of enterprise information
6. Perform emergency procedures	6.1. Identify potential emergency situations 6.2. Respond to emergencies in accordance with documented procedures 6.3. Report emergency situations to appropriate personnel

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

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

Required skills

Required skills include:

- demonstrating emergency procedures
- performing and documenting radiation surveys using radiation monitors
- using a radiation dosimeter
- placing the instrument into storage safely and securely
- transporting the instrument in a motor vehicle safely
- safely handling and maintaining the instrument and keeping other personnel clear of radiation sources
- observing, interpreting and reporting atypical situations
- promptly communicating problems to appropriate personnel

Required knowledge

Required knowledge includes:

- health, safety and emergency procedures relevant to radioactive devices
- factors affecting radiation intensity
- principles of external radiation protection and practical methods of minimising radiation exposure
- methods of measuring and detecting ionising radiation
- nature of radiation, different types of radiation, their characteristics, sources and shielding methods
- physiological effects of ionising radiation
- state or territory licensing requirements
- national codes of practice
- general guidelines for safe handling of radiation sources

Evidence Guide

EVIDENCE GUIDE	
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.	
Overview of assessment	
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors should ensure that candidates can: • perform operations in accordance with standards, codes, procedures and enterprise requirements • safely handle, store and transport instruments keeping other people clear of radiation sources • perform and document radiation surveys • recognise, interpret and report problems to appropriate personnel promptly.
Context of and specific resources for assessment	This unit of competency is to be assessed in the workplace or simulated workplace environment. This unit of competency may be assessed with: • *MSL924001A Process and interpret data* • *MSL943002A Participate in laboratory/field workplace safety* • *MAL974010A Perform mechanical tests*. Resources may include: • appropriate tools, instruments, equipment and materials • enterprise procedures, test methods, equipment and manuals.
Method of assessment	The following assessment methods are suggested: • analysis of work completed by the candidate over a period of time to ensure accuracy, consistency and timeliness • observation of candidate using the instruments in a range of work contexts • review of enterprise documentation completed by the candidate • feedback from peers and supervisors • use of suitable simulation and/or a range of case studies/scenarios. In all cases, practical assessment should be supported by questions to assess underpinning knowledge and those

EVIDENCE GUIDE	
	aspects of competency which are difficult to assess directly. Where applicable, reasonable adjustment must be made to work environments and training situations to accommodate ethnicity, age, gender, demographics and disability. Access must be provided to appropriate learning and/or assessment support when required. The language, literacy and numeracy demands of assessment should not be greater than those required to undertake the unit of competency in a work like environment.
This competency in practice	Industry representatives have provided the case study below to illustrate the practical application of this unit of competency and show its relevance in a workplace setting. **Construction materials testing** Soil moisture density gauges are used extensively for measuring the density of soils, cement treated roadbase, roller compacted concrete and asphalt. They provide a non-destructive means of monitoring compaction operations during construction, so that additional rolling can be provided before the material sets or is covered with another layer. National and state/territory codes of practice regulate the use of equipment that emits ionising radiation. States and territories also have licensing and registration requirements for people involved in owning, storing, transporting or using such equipment. Soil moisture density gauges are used on construction sites, so they are transported to the test site in motor vehicles. They must be protected from damage and stored safely and securely while not in use. The operator must ensure that bystanders are kept clear to minimise radiation exposure. Owners of gauges are required to have documented procedures and ensure that operators are adequately trained. To ensure the safety and integrity of the gauge, radiation surveys are required at regular intervals. A hand-held radiation meter is used, and the results recorded.

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.	
Codes of practice	Where reference is made to industry codes of practice, and/or Australian/international standards, it is expected the latest version will be used

Standards, **codes**, **procedures and/or enterprise requirements**	Standards, codes, procedures and/or enterprise requirements may include:
	• Australian and international standards, such as:
	  • AS 2243.4-1998 Safety in laboratories - Ionising radiations
	  • AS/NZS 2243.5:2004 Safety in laboratories - Non-ionising radiations - Electromagnetic, sound and ultrasound
	• Australian Dangerous Goods Code
	• Australian Radiation Protection and Nuclear Safety Agency (ARPANSA) Codes of Practice
	• calibration and maintenance schedules
	• enterprise recording and reporting procedures
	• equipment manuals
	• equipment startup, operation and shutdown procedures
	• licensing requirements
	• material, production and product specifications
	• National Association of Testing Authorities (NATA) Accreditation programs requirements
	• national environment protection measures
	• National Health and Medical Research Council (NHMRC) Guidelines
	• occupational health and safety (OHS) national standards and codes of practice
	• production and laboratory schedules
	• quality manuals
	• standard operating procedures (SOPs)

Instruments and equipment	Instruments and equipment used may include:

RANGE STATEMENT	
used	• soil moisture/density gauges • borehole logging probes • fluid density/level detectors • battery chargers • radiation monitors/dosimeters • motor vehicles • storage areas for nuclear sources • documentation, including user manuals and enterprise safety manuals • radiation warning signs
Hazards and problems	Hazards and problems may include: • jamming of the source rod in the exposed position • incidents during transportation • fire • theft of equipment containing radioactive sources • on-site accidents • keeping other personnel clear of instrument • instrument breakdown
Critical elements for radiation safety	Critical elements for radiation safety include: • time (reduce the exposure time) • distance (maintain greatest distance possible at all times) • shielding (interpose as much radiation shielding between yourself and the radiation source as possible)
Occupational health and safety (OHS) and environmental management requirements	OHS and environmental management requirements • all operations must comply with enterprise OHS and environmental management requirements, which may be imposed through state/territory or federal legislation - these requirements must not be compromised at any time • all operations assume the potentially hazardous nature of samples and require standard precautions to be applied • where relevant, users should access and apply current industry understanding of infection

RANGE STATEMENT	
	control issued by the National Health and Medical Research Council (NHMRC) and State and Territory Departments of Health

Unit Sector(s)

Unit sector	Occupational health and safety

Competency field

Competency field	

Co-requisite units

Co-requisite units		