



Australian Government

Department of Education, Employment and Workplace Relations

RIIMCU503A Implement the gas drainage management plan

Release: 1

RIIMCU503A Implement the gas drainage management plan

Modification History

Not applicable.

Unit Descriptor

This unit covers the implementation of gas drainage management plans in the coal industry. It includes planning and preparing for the implementation of the gas management plan, implementing the gas drainage management procedures, and implementing systems for the audit and review of gas drainage systems and equipment. Licensing, legislative, regulatory and certification requirements that apply to this unit can vary between states, territories, and industry sectors. Relevant information must be sourced prior to application of the unit.

Application of the Unit

This unit is appropriate for those working in a management or supervisory role at worksites within:

- Coal mining

Licensing/Regulatory Information

Refer to Unit Descriptor.

Pre-Requisites

Not applicable.

Employability Skills Information

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.
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Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Plan and prepare for the implementation of the gas management plan	1.1. Access, interpret and apply compliance documentation relevant to the work activity 1.2. Access, interpret and clarify the gas management plan 1.3. Identify and communicate to the relevant persons roles and responsibilities as specified in the gas management plan 1.4. Identify, forecast, schedule and record resources required for the implementation of the gas management plan 1.5. Identify training needs
2. Implement the gas drainage management procedures	2.1. Implement hazard control procedures associated with the gas drainage management plan 2.2. Implement the gas monitoring and testing system installation, operation and maintenance procedures in accordance with site requirements 2.3. Implement the gas drainage service installation and recovery procedures 2.4. Implement the gas drainage system maintenance procedures 2.5. Implement the gas drainage management plan training requirements 2.6. Implement action levels established to minimise the hazards of gas drainage 2.7. Implement gas drainage management system information recording and reporting procedures
3. Implement systems for audit and review of gas drainage systems and equipment	3.1. Audit gas drainage monitoring systems in accordance with legislative and site requirements 3.2. Audit recording and reporting systems in accordance with legislative and site requirements 3.3. Audit gas drainage installation, operation, maintenance and recovery procedures 3.4. Audit the gas drainage management training plan for currency, relevance and compliance with the requirements of the

	<i>gas drainage management plan</i> 3.5. Implement procedures for response to instances of non-compliance or other discrepancies/deficiencies revealed by <i>audit</i>
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Required Skills and Knowledge

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

Required skills

Specific skills are required to achieve the Performance Criteria of this unit, particularly for its application in the various circumstances in which this unit may be used. This includes the ability to carry out the following, as required to implement the gas drainage management plan:

- apply legislative, organisation and site requirements and procedures for the implementation of the gas drainage management plan
- access, interpret and apply:
 - technical information
 - site/legislative requirements
 - geological information
 - records and reports
 - briefings and handover details
- apply the principles of mine design
- perform gas drainage planning mathematical calculations
- access, evaluate and apply design criteria for gas drainage systems and devices
- collect, collate and evaluate gas drainage data
- establish technical procedures relating to gas drainage
- conduct enquiries/investigations and prepare reports
- assess the risks and consequences of gas drainage
- develop procedures appropriate to mine operations for management of gas drainage
- plan and coordinate work
- identify training needs related to the gas drainage
- operate hand held monitoring equipment

Required knowledge

Specific knowledge is required to achieve the Performance Criteria of this unit, particularly for its application in the various circumstances in which this unit may be used. This includes knowledge of the following, as required to implement the gas drainage management plan:

- legislative and site requirements which may include those for gas drainage drilling, gas drainage installation and recovery, ventilation requirements, return airways gas levels, intake airway gas accumulated levels, gas control and distribution, environmental management, local government requirements, inspections and reporting
- the methods of gas drainage and their applications/limitations against the mine design, mine and panel ventilation systems, systems of mining and current and future mine development
- the impact of gas drainage on mining techniques, mine and panel design and

production output

- the impact of the strata geology and coal seam characteristics on the gas drainage management plan, including coal seam gradient, moisture content, friability, the porous features of the coal seam, stresses and intrusions
- outburst mining monitoring procedures
- drilling options and related equipment and techniques
- hazard management processes and techniques
- the effects of the type and quantity of gas in the coal seam
- impacts of accumulation of coal dust after gas drainage has been completed
- pressure changes; causes, the impacts on the ventilation system, and the effects on gas drainage
- heat/humidity; the sources and factors which may impact on gas drainage and personnel
- mine fans; fan laws, fan types, performance characteristics, configurations, applications and limitations in association with the gas drainage management plan,
- ventilation control devices; the types, purposes, design criteria and specifications, distribution/placement criteria and limitations in association with the gas drainage management plan,
- ventilation control devices; the types, purposes, design criteria and specifications, distribution/placement criteria and limitations
- de-gassing; methods of control - including brattice, auxiliary fans, compressed air venturis, sails, hurdles, bleeders and purging
- fixed gas drainage monitoring systems types, characteristics, uses and limitations
- use of computer-based systems for mine environment and gas drainage systems analysis
- Gas Drainage Management Plan development requirements and processes
- gas drainage surveys; the types, frequency and method for conducting including pressure/quantity/temperature and gas
- processes and techniques for determining alarms and trigger points/levels
- audit and review processes and techniques
- site document control requirements
- emergency response and evacuation procedures
- general uses and applications of ventilation theory, including:
 - Atkinson's equation
 - methods of determining frictional resistance
 - gas laws, including Charles and Boyle
 - natural ventilation pressures
 - gas make
 - leakage
 - determination of mine resistance curves
 - regulator and equivalent orifice calculation
 - determination of fan operating/duty points
 - Kirkoff's laws

- mine operational procedures
- strata control systems and their effects on gas drainage
- mine and goaf ventilation systems
- underground water management principles and systems
- impacts of intersecting and intersected holes and hole design
- site environmental monitoring requirements
- legislative and mine reporting procedures

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	The evidence required to demonstrate competency in this unit must be relevant to worksite operations and satisfy all of the requirements of the performance criteria, required skills and knowledge and the range statement of this unit and include evidence of the following: • knowledge of the requirements, procedures and instructions for implementing the gas drainage management plan • implementation of procedures and techniques for the safe, effective and efficient implementation of the gas drainage management plan • the identification of the relevant information and scope of the work required to meet the required outcomes • the identification of viable options and the selection of gas drainage management plan elements that best meet the required outcomes • working with others to undertake and complete the implementation of the gas drainage management plan • consistent successful implementation of the gas drainage management plan
Context of and specific resources for assessment	• This unit must be assessed in the context of the work environment. Where personal safety or environmental damage are limiting factors, assessment may occur in a simulated environment provided it is realistic and sufficiently rigorous to cover all aspects of workplace performance, including task skills, task management skills, contingency management skills and job role environment skills. • Assessment of this competency requires typical resources normally used in a resources and infrastructure sector environment. Selection and use of resources for particular worksites may differ due to the site

	circumstances. • The assessment environment should not disadvantage the participant. For example, language, literacy and numeracy demands of assessment should not be greater than those required on the job. • Customisation of assessment and delivery environment to sensitively accommodate cultural diversity. • Aboriginal people and other people from a non English speaking background may have second language issues. • Where applicable, physical resources should include equipment modified for people with disabilities. Access must be provided to appropriate learning and/or assessment support when required.
Method of assessment	This unit may be assessed in a holistic way with other units of competency. The assessment strategy for this unit must verify required knowledge and skill and practical application using more than one of the following assessment methods: • written and/or oral assessment of the candidate's required knowledge to apply in undertaking of the implementation of the gas drainage management plan • observed, documented and/or first hand testimonial evidence of the candidate's: • implementation of appropriate requirement, procedures and techniques for the safe, effective and efficient achievement of required outcomes • identification of the relevant information and scope of the work required to meet the required outcomes • identification of viable options and the selection of gas drainage management plan elements that best meet the required outcomes • consistent achievement of required outcomes • first hand testimonial evidence of the candidate's: • working with others to undertake and

	complete the implementation of the gas drainage management plan • provision of clear and timely required support and advice on the implementation of the gas drainage management plan
Guidance information for assessment	Consult the SkillsDMC User Guide for further information on assessment including access and equity issues.

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.

Relevant compliance documentation may include:	• legislative, organisational and site requirements and procedures • manufacturer's guidelines and specifications • Australian standards • Employment and workplace relations legislation • Equal Employment Opportunity and Disability Discrimination legislation
Interpret is defined as:	• the understanding needed by the person within their job role
Hazard is defined as: <i>a source of potential harm or a situation with a potential to cause loss</i> (definition from AS/NZS 4360:1999 Risk Management).	
Hazards may include:	• irrespirable atmosphere • noxious atmosphere • flammable or explosive mixtures • outbursts • induced outburst • gas under pressure • location of drainage pipes • static electricity • damage to pipelines and other infrastructure • spontaneous combustion
Gas drainage system maintenance procedures may include those for:	• construction • action response • permit to work • condition monitoring • auditing • maintenance • document control • atmosphere monitoring • ventilation system control

	• communication systems • survey procedures • standard operating procedures • changes • training • recording/reporting
Action (alarm or trigger) level is a generic term used to describe a level determined at the mine site at which action is initiated or a response is made.	
Audit is defined as: <i>a systematic examination against defined criteria to determine whether activities and related results conform to planned arrangement, and whether these arrangements are implemented effectively and are suitable to achieve the organisation's policy and objectives (AS/NZS 4804: 2001).</i>	
Gas drainage management plans establish procedures for maintaining a safe environment including:	• hazard identification and qualification • risk assessment • authority and responsibility • controls established to manage identified risks • reporting and communication • document control • audit and review
Gas drainage management plan may include procedures for:	• gas drainage drilling program • gas or geological anomaly detection • mine atmosphere monitoring • stimulation techniques • goaf seals • reporting requirements • auditing • ventilation systems and usage • mine plan • action plans • systems of mining • response plans • emergency procedures • individual and group responsibilities

	• training and education procedures
Gas drainage management training applies to:	• mine workers • tradespeople • permanent employees • contractors • mine officials • other special requirements
Risk is defined as: <i>the chance of something happening that will have an impact upon objectives. It is measured in terms of consequences and likelihood</i> (definition from AS/NZS 4360:1999 Risk Management).	•
Principles of mine design include:	• recovery • reserve optimisation • mining direction • geological structures • ventilation • strata control • mining method • productivity • environmental considerations • access
Standard operating procedures (SOP) are also known as safe working procedures, safe operating procedures and standard working procedures.	
Mine atmosphere refers to the atmosphere in all areas in the general mine ventilation district and beyond into waste working and goafs in the mine.	
Mine gases may be seam gases or gases from introduced sources and may include but not be limited to:	• methane • carbon dioxide • carbon monoxide • oxides of nitrogen • hydrogen • sulphur dioxide • hydrogen sulphide

	• hydrocarbons • combinations
Ventilation systems may include the use of:	• main mine fan • auxiliary fans • brattice • regulators • seals • stoppings • overcasts • ventilation doors • surface drainage boreholes • pressure chambers
Geological conditions may include:	• faults • dykes • intrusions • strata deformities • induced stresses • depth of overlaying strata • strength of immediate strata • under and over the coal seam • mining lease gas make
Coal seam characteristics may include inherent factors such as:	• rank • petrology • moisture • particle size • seam gas make • pyrites <i>Or depositional factors such as:</i> • seam thickness • multi seams • seam dip • depth of cover • cleats • friability • interaction of other coal seams and gas makes • clay bands within the coal seam and molorite zones
Gas make characteristics may include:	• gas content • gas pressure • absorption • desorption

	• hydrostatic pressure • strata moisture content • permeability and porosity • tectonic stress
Gas drainage monitoring may include:	• continuous monitoring • leakage monitoring (laser beam technology) • portable (hand held) monitoring • collection of bag samples • pipeflow and pressure measurements • gas chromatography • ventilation measurements from relevant areas
Gas drainage infrastructure may include:	• vacuum pumps • pipes • boreholes and stand pipes • gas separators and casing • surface installations • gas drainage plant including building • valves • hoses • water pumps • flame and lightening arresters • power supply to bore holes • cleaning equipment • air compressors • electricity and water services • pressure gauges • hydration plans
Alarm systems and action plans may include those for:	• gas concentration/make • combustion indicators • condition monitoring for fans (vibration/temperature/current failures) • ventilation devices • monitoring hardware • temperature alarms
Maintenance of the gas drainage system may include:	• inspection • servicing • repair

Unit Sector(s)

Coal Mining (Underground)

Competency field

Refer to Unit Sector(s).

Co-requisite units

Not applicable.