



Australian Government

Department of Education, Employment and Workplace Relations

RIIMCU404A Apply and monitor the gas drainage management plan

Release: 1

RIIMCU404A Apply and monitor the gas drainage management plan

Modification History

Not applicable.

Unit Descriptor

This unit covers the application and monitoring of the gas drainage management plan in the coal industry. It includes planning and preparing for the application of the gas management plan, applying the gas drainage management procedures, apply gas drainage management system maintenance procedures. 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 supervisory role or as a technical specialist, 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

<p>Elements describe the essential outcomes of a unit of competency.</p>	<p>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.</p>
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Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
<p>1. Plan and prepare for the application of the gas management plan</p>	<p>1.1. Access, interpret and apply compliance documentation relevant to the work activity</p> <p>1.2. Identify and clarify roles and responsibilities, as specified in the gas drainage management plan</p> <p>1.3. Communicate and clarify work group and individual responsibilities and tasks in an effective and timely manner</p> <p>1.4. Identify, obtain and allocate resources required for the application of the gas drainage management plan</p> <p>1.5. Identify and satisfy individual training needs by accessing the established gas drainage management training program and systems</p> <p>1.6. Encourage, receive, review and, where appropriate, implement suggestions and recommendations for changes to gas drainage management procedures</p>
<p>2. Apply the gas drainage management procedures</p>	<p>2.1. Identify and interpret the impact of changes of gas make, composition, concentration of gas on the mine atmosphere</p> <p>2.2. Identify and apply hazard control procedures associated with gas drainage</p> <p>2.3. Apply gas monitoring system installation, operation and maintenance procedures</p> <p>2.4. Apply drainage service extension and recovery procedures</p> <p>2.5. Apply gas drainage system maintenance requirement procedures</p> <p>2.6. Apply procedures incorporating methods and practices to minimise potential damage to the gas drainage system</p> <p>2.7. Apply and monitor action levels established to minimise the hazards of gas drainage</p> <p>2.8. Apply gas drainage system information recording and reporting procedures</p> <p>2.9. Contribute to systems audit and review requirements in accordance with the gas drainage management plan</p>

<p>3. Apply gas drainage management system maintenance procedures</p>	<p>3.1. Carry out inspections, repair and maintenance activities, in accordance with the <i>gas drainage management plan</i></p> <p>3.2. Record, report and review maintenance activities in accordance with the <i>gas drainage management plan</i></p>
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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 apply and monitor the gas drainage management plan:

- apply legislative, organisation and site requirements and procedures for applying and monitoring the gas drainage management plan
- access, interpret and apply:
 - technical information related to gas drainage
 - site/legislative requirements
 - geological reports
 - briefings and handover details
- access, interpret and apply relevant gas drainage data
- assess the risks and consequences of gas drainage
- apply procedures appropriate to mine operations for management of gas drainage
- plan and coordinate work
- operate hand held monitoring equipment
- identify training needs related to gas drainage

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 apply and monitor the gas drainage management plan:

- legislative and statutory requirements which may include those for gas drainage drilling, gas drainage installation, 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 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
- the 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 and bleeders
- fixed gas drainage monitoring systems types, characteristics, uses and limitations
- portable monitoring equipment for gas drainage purposes, types, characteristics, uses and limitations
- functions, capabilities, advantages, limitations and uses of gas drainage computer modelling and simulation techniques
- computer-based systems for mine environment 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
- emergency response and disaster planning processes and techniques
- general uses and applications of ventilation theory, including:
 - gas laws including Charles and Boyle
 - natural ventilation pressures
 - gas make
 - leakage
 - Kirchoff'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 holes and hole design
- site environmental monitoring requirements
- statutory and mine reporting procedures

Evidence Guide

<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>	
<p>Overview of assessment</p>	
<p>Critical aspects for assessment and evidence required to demonstrate competency in this unit</p>	<p>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:</p> <ul style="list-style-type: none"> • knowledge of the requirements, procedures and instructions for applying and monitoring the gas drainage management plan • implementation of requirements, procedures and techniques for the safe, effective and efficient completion of gas drainage management plan application and monitoring • working with others to plan, prepare and conduct the application and monitoring of the gas drainage management plan • evidence of the consistent successful application and monitoring of the gas drainage management plan
<p>Context of and specific resources for assessment</p>	<ul style="list-style-type: none"> • 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

	<p>required on the job.</p> <ul style="list-style-type: none"> • 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.
<p>Method of assessment</p>	<p>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:</p> <ul style="list-style-type: none"> • written and/or oral assessment of the candidate's required knowledge • observed, documented and/or first hand testimonial evidence of the candidate's: <ul style="list-style-type: none"> • implementation of appropriate requirement, procedures and techniques for the safe, effective and efficient achievement of required outcomes • consistent achievement of required outcomes • first hand testimonial evidence of the candidate's: <ul style="list-style-type: none"> • working with others to undertake and complete the application and monitoring of the gas drainage management plan • provision of clear and timely instruction and supervision by the individual of those involved in the conduct of the application and monitoring of the gas drainage management plan
<p>Guidance information for assessment</p>	<p>Consult the SkillsDMC User Guide for further information on assessment including access and equity issues.</p>

Range Statement

<p>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>	
<p>Relevant compliance documentation may include:</p>	<ul style="list-style-type: none"> • 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
<p>Gas drainage management plans establish procedures for maintaining a safe environment including:</p>	<ul style="list-style-type: none"> • hazard identification and quantification • risk assessment • authority and responsibility • controls established to manage identified risks • reporting and communication • document control • audit and review
<p>Gas drainage management plan may include procedures for:</p>	<ul style="list-style-type: none"> • gas drainage drilling program • gas or geological anomaly detection • mine atmosphere monitoring • stimulation techniques • goaf walls • 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
<p>Gas drainage management training applies to:</p>	<ul style="list-style-type: none"> • mine workers • tradesperson • permanent employees • contractors

	<ul style="list-style-type: none"> • mine officials • other special requirements
<p>Mine atmosphere refers to all areas in the general mine ventilation district and beyond into waste working and goafs in the mine.</p>	
<p>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).</p>	
<p>Hazards may include:</p>	<ul style="list-style-type: none"> • irrespirable atmosphere • noxious atmosphere • flammable or explosive mixtures • outbursts • induced outburst • gas under pressure • location of drainage pipes • static electricity
<p>Gas drainage system maintenance requirement procedures may include those for:</p>	<ul style="list-style-type: none"> • 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
<p>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 made.</p>	

<p>Audit is the validation process to ensure the system, procedures, processes meet the established objectives and are implemented.</p>	
<p>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).</p>	
<p>Principles of mine design include:</p>	<ul style="list-style-type: none"> • recovery • reserve optimisation • mining direction • geological structures • ventilation • strata control • mining method • productivity • environmental considerations • access
<p>Standard operating procedures (SOP) are also known as safe working procedures, safe operating procedures and standard working procedures.</p>	
<p>Mine gases may be seam gases or gases from introduced sources and may include but not be limited to:</p>	
<p>Ventilation systems may include the use of:</p>	<ul style="list-style-type: none"> • main mine fan • auxiliary fans • brattice • regulators • seals • stoppings • overcasts • ventilation doors • surface drainage boreholes • pressure chambers
<p>Geological conditions may</p>	<ul style="list-style-type: none"> • faults • dykes

include:	<ul style="list-style-type: none"> • 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:	<ul style="list-style-type: none"> • rank • petrology • moisture • particle size • seam gas make • pyrites. • Or depositional factors such as: • 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 • molorites zones
Gas make characteristics may include:	<ul style="list-style-type: none"> • gas content • gas pressure • adsorption • desorption • hydrostatic pressure • strata moisture content • permeability and porosity • tectonic stress
Gas drainage monitoring may include:	<ul style="list-style-type: none"> • 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:	<ul style="list-style-type: none"> • vacuum pumps • pipes

	<ul style="list-style-type: none"> • stand pipes • gas separators and casing • surface installations • gas drainage plan 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 plants
<p>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 and temperature alarms.</p>	
<p>Maintenance of the gas drainage system may include inspection, servicing and repair.</p>	

Unit Sector(s)

Coal Mining (Underground)

Competency field

Refer to Unit Sector(s).

Co-requisite units

Not applicable.