



Australian Government

Department of Education, Employment and Workplace Relations

RIIMCU604A Establish and maintain the outburst management plan

Release: 1

RIIMCU604A Establish and maintain the outburst management plan

Modification History

Not applicable.

Unit Descriptor

This unit covers the establishment and maintenance of outburst management plans in the coal industry. It includes identifying, analysing and evaluating hazards associated with mining in outburst prone areas, identifying, analysing and evaluating outburst potential and control options and measures, designing and developing outburst management systems, establishing the outburst management plan, planning and preparing for the implementation of the outburst management plan, and establishing the process to audit the effectiveness of the outburst management plan. 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. Identify, analyse and evaluate hazards associated with mining in outburst prone areas	1.1. Identify, evaluate and clarify coal seam characteristics and conditions which could lead to outburst conditions 1.2. Identify, analyse and evaluate hazards and risks relating to outburst 1.3. Identify, analyse and evaluate geological and geotechnical conditions which may contribute to outburst prone conditions 1.4. Identify, analyse and evaluate the effects of outburst on mine atmosphere, personnel, services and infrastructure 1.5. Identify the requirements for personnel, services and infrastructure protection in relation to outburst
2. Identify, analyse and evaluate outburst potential and control options and measures	2.1. Identify, analyse and evaluate the types and advantages/disadvantages of outburst sampling and analytical process options 2.2. Identify, analyse and evaluate geological and physical conditions of the seam and surrounding strata 2.3. Identify, analyse and evaluate the types and advantages/disadvantages of outburst control methods 2.4. Identify, analyse and evaluate the methods, purposes and capabilities of monitoring systems with regard to outburst 2.5. Identify, analyse and evaluate control options to address outburst hazards 2.6. Identify and clarify the scope and impact of gas drainage on outburst prone areas 2.7. Identify training needs
3. Design and develop outburst management systems	3.1. Incorporate drilling systems, including equipment, processes and techniques into the development of the outburst management system 3.2. Incorporate core sampling and related analysis systems, processes and techniques into the development of the outburst management system 3.3. Identify, select and measure the criteria for addressing geological and geotechnical

	hazards and incorporate into the outburst management plan 3.4. Incorporate personnel safety measures and techniques into the outburst management system 3.5. Incorporate services and infrastructure protection measures into the outburst management system 3.6. Develop monitoring systems, including those for real-time information to minimise the risk of an outburst 3.7. Design and develop controls systems for the outburst management system
4. Establish the outburst management plan	4.1. Develop and establish outburst drilling, sampling, collection, analysis and reporting procedures 4.2. Establish actions and procedures required in response to gas threshold levels 4.3. Establish geological and geotechnical hazard identification and response procedures 4.4. Develop permit to mine procedures in accordance with legislative and site requirements 4.5. Establish personnel safety measures and techniques 4.6. Establish services and infrastructure protection measures to minimise damage caused by outburst 4.7. Establish outburst information recording and reporting procedures 4.8. Establish emergency response and evacuation plans 4.9. Establish training requirements for the outburst management plan
5. Plan and prepare for the implementation of the outburst management plan	5.1. Access, interpret and apply compliance documentation relevant to the work activity 5.2. Identify, clarify and communicate to all personnel roles and responsibilities, as specified in the outburst management plan 5.3. Identify, forecast, obtain and allocate/schedule resources required for the implementation of the outburst management plan

	5.4. Implement the outburst training program 5.5. Encourage, receive, review and, where appropriate, implement suggestions and recommendations for changes to outburst management plan implementation procedures
6. Establish the process to audit the effectiveness of the outburst management plan	6.1. Audit the outburst management system in accordance with legislative and site requirements 6.2. Audit outburst drilling and analytical procedures in accordance with legislative and site requirements 6.3. Audit monitoring systems in accordance with legislative and site requirements 6.4. Audit geological and geotechnical identification, monitoring and response procedures in accordance with legislative and site requirements 6.5. Audit recording plans and procedures in accordance with legislative and site requirements 6.6. Audit outburst training plan for currency, relevance and compliance with the requirements of the outburst management system 6.7. Establish procedures for response to instances of non-compliance or other discrepancies/deficiencies revealed by audit

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 establish and maintain the outburst management plan:

- apply legislative, organisation and site requirements and procedures for establishing and maintaining the outburst management plan
- access, interpret and apply technical information
- access and analyse archival and historical outburst information related to the mine
- interpret and apply mathematical and scientific theorems / laws related to outburst
- perform outburst planning mathematical calculations
- assess the risks and consequences of outburst
- develop procedures appropriate to mine operations for management of outburst
- access and apply design criteria for outburst management systems
- interpret computer spreadsheets and outburst modelling / simulations
- interpret outburst data
- conduct enquiries / investigations and prepare reports
- communicate effectively in the workplace
- access data from monitoring equipment
- operate hand held monitoring equipment
- establish outburst training requirement

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 establish and maintain the outburst management plan:

- legislative and site requirements for mining structures, including mine plans, ventilation, gas monitoring, strata support and safety management plans
- mine planning and design
- the systems of mining, including tunnels, drifts, stone drivage, shaft sinking, pillar extraction, partial extraction, punch mining and fault drivage
- stress analysis, including mining induced stress and topography
- sedimentology subsistence, water bearing strata, permeability of seam and strata, hydrology, physical property testing, caving characteristics, outburst, gas content and over and underlying strata
- systems of work, including bord and pillar, place changing, longwall, highwall, auger mining, pillar extraction, partial extraction and punch mining
- initiation techniques

- mining structure failure modes
- mining and general engineering principles relevant to the behaviour of excavations in rock and coal
- audit methodologies
- site document control requirements
- mine mapping of outburst zones, related geology and features
- the impact of differing geological features and conditions on outburst zones, including faults, dykes, intrusions and strata deformities
- mine gases; the types and their characteristics, sources, physiological effects and methods of detection
- de-gassing; methods of control, including brattice, auxiliary fans, compressed air venturis, sails, hurdles and bleeders
- fixed monitoring systems types, uses / limitations, design criteria, specifications and design processes
- portable monitoring equipment, types, uses / limitations
- the use of simulation techniques and applications relevant to outburst
- use of computer-based systems for real time gas monitoring
- mine outburst management plan development requirements and processes
- processes and techniques for determining alarms and trigger points / levels
- audit and review processes and techniques
- emergency response and evacuation procedures
- the effects of coal seam characteristics on outburst
- methods of control of outburst
- outburst indicators and ratios, including temperature changes, mylonite, coal colour changes, strata sound, crushed coal bands, stretch marks, difficulty of constructing ribs, seam gas pressure, changed cutting conditions
- risk management procedures
- applicable mine rescue procedures
- roles and responsibilities in accordance with outburst management plan

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 establishing and maintaining the outburst management plan • implementation of procedures and techniques for the safe, effective and efficient establishment and maintenance of the outburst 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 outburst management techniques that best meet the required outcomes • working with others to undertake and complete the establishment and maintenance of the outburst management plan • consistent successful establishment and maintenance of the outburst 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 establishment and maintenance of the outburst 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 outburst management techniques 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 establishment and maintenance of the outburst management plan • provision of clear and timely required support and advice on the establishment and maintenance of the outburst 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
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 atmospheres • flammable or explosive mixtures • outburst • geological structures
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).	
Coal seam characteristics may include inherent factors such as:	• rank • petrology • moisture • particle size • seam gas • pyrites Or depositional factors such as: • seam thickness • multi seams

	• seam dip • depth of cover • cleat • friability • intrusions
Geological and geotechnical information includes that related to, but not limited to:	• subsidence • roof and floor technical data • gas content and composition • over and underlying strata • water bearing strata • permeability of seam and strata • physical properties • caving characteristics • outburst and stress waves • faults • intrusions and deformities
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.	
Geological and physical conditions of the seam and surrounding strata which may contribute to outburst potential may include:	• cutters • changing cleat • coal • colour • free gas into atmosphere • mylonite • faults and intrusions • stress
Outburst mining management plans establish procedures for maintaining a safe environment including:	• hazard identification and quantification • risk assessment • authority and responsibility • controls established to managed identified risks • reporting and communication • document control • audit and review
Outburst mining management plan may include:	• procedures for mine atmosphere monitoring • reporting requirements • auditing • ventilation systems and usage

	• pre-drilling techniques • initiation techniques • mine plan • action plans • response plans • emergency procedures • individual group responsibilities • training and education procedure
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.	
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</i> " (AS/NZS 4804: 2001)	
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 site historical information may include:	• sedimentology aspects of the mine-site relating to subsidence • outburst • gas content and composition

	• roof and floor technical data • over and underlying strata • water bearing strata • permeability of seam and strata • hydrology • physical property testing results • caving characteristics • ground stress behaviour • mine plans
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 structures may include:	• stoppings • overcasts • regulators • preparation seals • fire doors • bulk heads • goaf seals • final seals • pressure chambers
Geological conditions may include:	• faults • dykes • intrusions • strata deformities • existing or induced stress or strain
Mine atmosphere monitoring may include:	• continuous monitoring • portable (hand held) monitoring • collection of bag samples • gas chromatography • ventilation measurements from all areas of the mine, including sealed areas and waste workings
Monitoring may include, but is not limited to:	• continuous monitoring • portable (hand held) monitoring

	• core samples • visual observation • geological mapping • audiometry • borehole pressure readings
Defects to mine structures may include:	• deterioration of materials • quality of construction • effects of surrounding strata • physical damage • water damage
Services and infrastructure includes:	• pipes • valves • hoses • pumps • drainage plant • flame arresters • power supply to bore holes • cleaning equipment • all other plant and equipment • ventilation
Personnel safety measures may include, but are not limited to:	• remote control mining • alternative air supply • limitation of numbers • training • physical barriers • emergency equipment • personal protective equipment (PPE)

Unit Sector(s)

Coal Mining (Underground)

Competency field

Refer to Unit Sector(s).

Co-requisite units

Not applicable.