



Australian Government

Department of Education, Employment and Workplace Relations

RIIMCU605A Establish and maintain the inrush management plan

Release: 1

RIIMCU605A Establish and maintain the inrush management plan

Modification History

Not applicable.

Unit Descriptor

This unit covers the establishment and maintenance of the inrush management plan in the coal industry. It includes identifying, analysing and evaluating potential sources, causes, hazards and effect associated with mine inrush, identifying, analysing and evaluating potential inrush controls, designing and developing inrush management systems, establishing the inrush management plan, planning and preparing for the implementation of the inrush management plan, and establishing the process to audit and review the effectiveness of the inrush 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 potential sources, causes, hazards and effects associated with mine inrush	1.1. Identify the <i>potential sources</i> and effects of <i>inrushes</i> 1.2. Analyse and evaluate <i>mine site historical information</i> for indications of inrush potential 1.3. Identify, analyse and evaluate <i>geological and physical conditions</i> that contribute to inrush potential 1.4. Identify, analyse and evaluate inrush <i>hazards</i> and <i>risks</i> 1.5. Identify, analyse and evaluate the effects of <i>inrush</i> on mine operations and personnel
2. Identify, analyse and evaluate potential inrush controls	2.1. Identify, analyse and evaluate potential <i>inrush controls</i> 2.2. Identify, analyse and evaluate <i>inrush controls</i> to deal with matters identified from the review of <i>historical information</i> 2.3. Identify, analyse and evaluate <i>inrush controls</i> to deal with <i>geological and physical conditions</i> which may contribute to inrush 2.4. Identify, analyse, evaluate and confirm the validity of mine plans and associated records 2.5. Identify, analyse and evaluate the methods, purposes and capabilities of <i>mine monitoring systems</i> with regard to inrush
3. Design and develop inrush management systems	3.1. Access, interpret and apply <i>compliance documentation</i> relevant to the work activity 3.2. Design and develop inrush controls for addressing inrush hazards for the inrush management system 3.3. Determine <i>personnel safety measures</i> and techniques into the inrush management system 3.4. Design and/or incorporate <i>services and infrastructure</i> protection measures into the inrush management system 3.5. Design and develop mine monitoring requirements relating to inrush 3.6. Integrate the system elements to complete

	the inrush management system design
4. Establish the inrush management plan	4.1. Develop and establish inrush hazard identification, analysis and reporting procedures 4.2. Establish actions and procedures required in response to inrush indicators 4.3. Develop permit-to-mine procedures in accordance with legislative and site requirements 4.4. Establish personnel safety measures and techniques 4.5. Establish services and infrastructure protection measures to minimise damage caused by inrush 4.6. Establish the monitoring, recording and reporting procedures 4.7. Establish emergency response and evacuation plans 4.8. Establish training requirements for the inrush management plan
5. Plan and prepare for the implementation of the inrush management plan	5.1. Identify and interpret the legislative and site requirements related to the inrush management plan 5.2. Access, interpret and clarify the inrush management plan 5.3. Identify, clarify and communicate to all personnel roles and responsibilities, as specified in the inrush management plan 5.4. Identify, forecast, obtain and allocate/schedule resources required for the implementation of the inrush management plan 5.5. Implement the inrush management plan training program 5.6. Encourage, receive, review and, where appropriate, implement suggestions and recommendations for changes to inrush management plan implementation procedures
6. Establish the process to audit and review the effectiveness of the inrush management plan	6.1. Audit the inrush management system in accordance with legislative and site requirements 6.2. Audit mine monitoring systems in accordance with legislative and site

	requirements 6.3.Audit intrush hazard identification, monitoring and response procedures in accordance with legislative and site requirements 6.4.Audit recording plans and procedures in accordance with legislative and site requirements 6.5.Audit intrush training plan for currency, relevance and compliance with the requirements of the intrush management system 6.6. Establish procedures for response to instances of non-compliance or other discrepancies/deficiencies revealed by audit
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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 establish and maintain the inrush management plan:

- apply legislative, organisation and site requirements and procedures for establishing and maintaining the inrush management plan
- access, interpret and apply technical information
- access and analyse archival and historical water storage and inrush information related to the mine
- interpret and apply mathematical and scientific theorems/laws related to inrush
- perform inrush planning mathematical calculations
- assess the risks and consequences of inrush
- develop procedures appropriate to mine operations for prevention of inrush
- access and apply design criteria for inrush management systems
- interpret computer spreadsheets and inrush modelling/simulations
- conduct enquiries / investigations and prepare reports
- communicate effectively in the workplace
- access data from monitoring equipment
- operate hand held monitoring equipment
- establish inrush 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 inrush 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, hydrogeology, physical property testing, caving characteristics, outburst, over and underlying strata
- systems of work, including bord and pillar, place changing, longwall, highwall, auger mining, pillar extraction, partial extraction and punch mining
- 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 inrush zones, related geology and features
- the impact of differing geological features and conditions on inrush zones, including faults, dykes, intrusions and strata deformities
- 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 inrush
- use of computer-based systems for real time monitoring
- mine inrush 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 inrush
- methods of control of inrush
- types of inrush control zones
- risk management procedures
- applicable mine rescue procedures
- roles and responsibilities in accordance with inrush 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 inrush management plan • implementation of procedures and techniques for the safe, effective and efficient establishment and maintenance of the inrush 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 inrush management techniques that best meet the required outcomes • working with others to undertake and complete the establishment and maintenance of the inrush management plan • consistent successful establishment and maintenance of the inrush 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 inrush 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 inrush 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 intrush management plan • provision of clear and timely required support and advice on the establishment and maintenance of the intrush 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).	
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).	
Mine site historical information may include:	• sedimentology aspects of the mine site relating to subsidence • previous inrushes • 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
Inrush may be defined as:	• water or other fluid material, or any material that flows when wet; or

	• flammable or noxious gas • which may put the mine or persons at the mine at risk
Inrush control zones are those areas of heightened awareness, necessitating specialised mining, monitoring and assessment techniques e.g. protective drilling.	
Inrush controls may include:	• controls that eliminate the hazard by removing the damaging energy, e.g. drainage, including pumping and ventilation • controls that reduce the magnitude of the hazard (less water, less pressure etc), e.g. drainage, including pumping and ventilation • controls that reduce the likelihood of the event through engineering or hard barriers, e.g. seals • controls that reduce the likelihood of the event through procedural or soft barriers, e.g. establishment of inrush control zones, protective drilling • controls that reduce the likelihood of the event through warnings, e.g. action levels associated with increased water make
Systems of work may include:	• drilling operations • bord and pillar • place changing • long wall • high wall • auger mining • pillar extraction • partial extraction • punch mining • shaft sinking and drifting
Geological and physical conditions may include:	• rank • petrology • moisture • particle size • seam gas • pyrites • seam thickness • multi seams • seam dip • depth of cover

	• cleat • friability • intrusions
Monitoring may include:	• continuous and/or periodic monitoring • portable (hand held) monitoring • core samples • visual observation • geological mapping • borehole pressure readings
Inrush hazards and potential sources may include:	• subsidence or failure of barriers and dam walls • strata failure • gas content and composition • abnormal rainfall events • over and underlying strata • water bearing strata • any peat, moss, sand, gravel, silt, or other material that flows when wet which may exist on or near a mine • any coal peat, moss, sand, gravel, silt, or other material that may flow from a bin or storage facility/structure • permeability of seam and strata • physical properties • caving characteristics • faults • intrusions • surface sources • tidal waters • oceans • surface creeks, rivers, ponds, lakes • surface impoundments or reservoirs • abandoned mines • workings of adjacent current mines • existing workings of the mine • other non-mining underground openings • shafts • wells • pipelines • tunnels
Personnel safety measures may include:	• remote control mining • limitation of numbers • training

	• physical barriers, e.g. drilling through stuffing box • emergency equipment e.g. oxygen self rescuers • personal protective equipment (PPE)
Legislative, and Site Requirements may include:	• legislation and regulations • relevant Australian standards • management plans • manager's rules • OHS policy • code of practice • dams safety committee publications • manufacturer's instructions • safe working or job procedures (or equivalent)
Inrush management system establish criteria and 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 requirements • document control • audit and review • procedures for mine inrush monitoring • mine plan • action plans • response plans • emergency procedures • individual group responsibilities • training and education procedures
Inrush prevention system must be established in accordance with the NSW Coal Mines (Underground) Regulation 1999 - Division 8, Clause 40 Implementation of an inrush prevention system.	
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</i>	

<i>are implemented effectively and are suitable to achieve the organisation's policy and objectives (AS/NZS 4804: 2001).</i>	
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Unit Sector(s)

Coal Mining (Underground)

Competency field

Refer to Unit Sector(s).

Co-requisite units

Not applicable.