



**Australian Government**

**Department of Education, Employment and Workplace Relations**

# **RIIMCU406A Apply and monitor the inrush management plan**

**Release: 1**

## RIIMCU406A Apply and monitor the inrush management plan

### Modification History

Not applicable.

### Unit Descriptor

This unit covers the application and monitoring of the inrush management plan in the coal industry. It includes planning and preparing for the application of the inrush management plan, applying and monitoring inrush activities, and applying inrush prevention 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
1. Plan and prepare for the application of the inrush management plan	1.1. Access, interpret and apply <b>compliance documentation</b> relevant to the work activity 1.2. Identify and clarify roles and responsibilities, as specified in the <b>inrush management plan</b> 1.3. Communicate and explain work group individual responsibilities and tasks in an effective and timely manner 1.4. Identify, obtain and allocate resources required for the application of the <b>inrush management plan</b> 1.5. Determine individual training needs
2. Apply and monitor inrush activities	2.1. Identify, <b>interpret</b> and apply <b>inrush monitoring</b> , recording and reporting procedures 2.2. Interpret, apply and monitor control measures which impact on <b>inrush control zones</b> and methods 2.3. Interpret, apply and monitor <b>actions</b> and procedures in response to potential <b>inrush</b> 2.4. Confirm, apply, communicate and post permit-to-mine procedures in accordance with the inrush management plan 2.5. Apply and monitor procedures covering inrush <b>personnel safety measures</b> and techniques in accordance with the inrush management plan 2.6. Inspect equipment protection/defensive requirements and measures in accordance with the inrush management plan 2.7. Participate in systems <b>audit</b> and review requirements in accordance with the <b>inrush management plan</b>
3. Apply inrush prevention system maintenance procedures	3.1. Carry out inspections, repair and maintenance activities in accordance with the <b>inrush management plan</b> 3.2. Record, report and review maintenance activities in accordance with the <b>inrush management plan</b>

## 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 inrush management plan:

- apply legislative, organisation and site requirements and procedures for applying and monitoring the inrush management plan
- access, interpret and apply technical information
- access and interpret archival and historical inrush information related to the mine
- access and interpret design criteria for inrush prevention/management systems and devices
- interpret computer spreadsheets and inrush modelling/simulations
- conduct enquiries/investigations and prepare reports
- communicate effectively in the workplace
- access and interpret data from monitoring systems and equipment
- operate hand held monitoring equipment
- interpret 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 apply and monitor 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, including subsidence, water bearing strata, permeability of seam and strata, hydrology, hydrogeology, physical property testing, caving characteristics, over and underlying strata
- systems of work including, bord and pillar, place changing, longwall, highwall, auger mining, pillar extension, partial extension and punch mining
- inrush control zones
- mining structure failure modes
- mining and general engineering principles relevant to the behaviour of excavations in rock
- ground support systems

- audit methodologies
- geotechnical engineering
- excavation engineering
- tunnel engineering and shaft sinking
- rock mechanics
- mine surveying
- mining of coal deposits
- thermodynamics
- the impact of differing geological features and conditions on potential inrush, 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
- 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 disaster planning processes and techniques
- the effects of coal seam characteristics on inrushes
- methods of control of inrush
- risk management procedures
- applicable mine rescue procedures
- roles and responsibilities in accordance with the inrush management plan

## 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><b>Overview of assessment</b></p>	
<p><b>Critical aspects for assessment and evidence required to demonstrate competency in this unit</b></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"> <li>• knowledge of the requirements, procedures and instructions for applying and monitoring the inrush management plan</li> <li>• implementation of requirements, procedures and techniques for the safe, effective and efficient completion of inrush management plan application and monitoring</li> <li>• working with others to plan, prepare and conduct the application and monitoring of the inrush management plan</li> <li>• evidence of the consistent successful application and monitoring of the inrush management plan</li> </ul>
<p><b>Context of and specific resources for assessment</b></p>	<ul style="list-style-type: none"> <li>• 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.</li> <li>• 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.</li> <li>• The assessment environment should not disadvantage the participant. For example, language, literacy and numeracy demands of assessment should not be greater than those</li> </ul>

	<p>required on the job.</p> <ul style="list-style-type: none"> <li>• Customisation of assessment and delivery environment to sensitively accommodate cultural diversity.</li> <li>• Aboriginal people and other people from a non English speaking background may have second language issues.</li> <li>• 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.</li> </ul>
<b>Method of assessment</b>	<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"> <li>• written and/or oral assessment of the candidate's required knowledge</li> <li>• observed, documented and/or first hand testimonial evidence of the candidate's: <ul style="list-style-type: none"> <li>• implementation of appropriate requirement, procedures and techniques for the safe, effective and efficient achievement of required outcomes</li> <li>• consistent achievement of required outcomes</li> </ul> </li> <li>• first hand testimonial evidence of the candidate's: <ul style="list-style-type: none"> <li>• working with others to undertake and complete the application and monitoring of the inrush management plan</li> <li>• provision of clear and timely instruction and supervision by the individual of those involved in the conduct of the application and monitoring of the inrush management plan</li> </ul> </li> </ul>
<b>Guidance information for assessment</b>	<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><b>Relevant compliance documentation</b> may include:</p>	<ul style="list-style-type: none"> <li>• legislative, organisational and site requirements and procedures</li> <li>• manufacturer's guidelines and specifications</li> <li>• Australian standards</li> <li>• Employment and workplace relations legislation</li> <li>• Equal Employment Opportunity and Disability Discrimination legislation</li> </ul>
<p><b>Interpret</b> is defined as: the understanding needed by the person within their job role.</p>	
<p><b>Risk</b> 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><b>Hazard</b> 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><b>Mine site historical information</b> may include:</p>	<ul style="list-style-type: none"> <li>• sedimentology aspects of the mine site relating to subsidence</li> <li>• previous inrushes</li> <li>• gas content and composition</li> <li>• roof and floor technical data</li> <li>• over and underlying strata</li> <li>• water bearing strata</li> <li>• permeability of seam and strata</li> <li>• hydrology</li> <li>• physical property testing results</li> <li>• caving characteristics</li> </ul>



	<ul style="list-style-type: none"> <li>• ground stress behaviour</li> <li>• mine plans</li> </ul>
<b>Inrush</b> may be defined as:	<ul style="list-style-type: none"> <li>• water or other fluid material, or any material that flows when wet; or</li> <li>• flammable or noxious gas</li> <li>• which may put the mine or persons at the mine at risk</li> </ul>
<b>Inrush control zones</b> are those areas of heightened awareness, necessitating specialised mining, monitoring and assessment techniques e.g. protective drilling.	
<b>Inrush controls</b> may include, but are not limited to:	<ul style="list-style-type: none"> <li>• controls that eliminate the hazard by removing the damaging energy, e.g. drainage including pumping and ventilation</li> <li>• controls that reduce the magnitude of the hazard (less water, less pressure etc), e.g. drainage, including pumping and ventilation</li> <li>• controls that reduce the likelihood of the event through engineering or hard barriers, e.g. seals</li> <li>• controls that reduce the likelihood of the event through procedural or soft barriers, e.g. establishment of inrush control zones, protective drilling</li> <li>• controls that reduce the likelihood of the event through warnings, e.g. action levels associated with increased water make</li> </ul>
<b>Systems of work</b> may include:	<ul style="list-style-type: none"> <li>• drilling operations</li> <li>• bord and pillar</li> <li>• place changing</li> <li>• long wall</li> <li>• high wall</li> <li>• auger mining</li> <li>• pillar extraction</li> <li>• partial extraction</li> <li>• punch mining</li> <li>• shaft sinking and drifting</li> </ul>
<b>Geological and physical conditions</b> may include:	<ul style="list-style-type: none"> <li>• rank</li> <li>• petrology</li> <li>• moisture</li> <li>• particle size</li> <li>• seam gas</li> <li>• pyrites</li> </ul>

	<ul style="list-style-type: none"> <li>• seam thickness</li> <li>• multi seams</li> <li>• seam dip</li> <li>• depth of cover</li> <li>• cleat</li> <li>• friability</li> <li>• intrusions</li> </ul>
<b>Monitoring systems</b> may include, but are not limited to:	<ul style="list-style-type: none"> <li>• continuous and/or periodic monitoring</li> <li>• portable (hand held) monitoring</li> <li>• core samples</li> <li>• visual observation</li> <li>• geological mapping</li> <li>• borehole pressure readings</li> </ul>
<b>Inrush hazards and potential sources</b> may include, but are not limited to:	<ul style="list-style-type: none"> <li>• subsidence or failure of barriers and dam walls</li> <li>• strata failure</li> <li>• gas content and composition</li> <li>• abnormal rainfall events</li> <li>• over and underlying strata</li> <li>• water bearing strata</li> <li>• any peat, moss, sand, gravel, silt, or other material that flows when wet which may exist on or near a mine</li> <li>• any coal peat, moss, sand, gravel, silt, or other material that may flow from a bin or storage facility/structure</li> <li>• permeability of seam and strata</li> <li>• physical properties</li> <li>• caving characteristics</li> <li>• faults</li> <li>• intrusions</li> <li>• surface sources</li> <li>• tidal waters</li> <li>• oceans</li> <li>• surface creeks, rivers, ponds, lakes</li> <li>• surface impoundments or reservoirs</li> <li>• abandoned mines</li> <li>• workings of adjacent current mines</li> <li>• existing workings of the mine</li> <li>• other non-mining underground openings</li> <li>• shafts</li> <li>• wells</li> <li>• pipelines</li> </ul>

	<ul style="list-style-type: none"> <li>tunnels</li> </ul>
<p><b>Personnel safety measures</b> may include, but are not limited to:</p>	<ul style="list-style-type: none"> <li>remote control mining</li> <li>limitation of numbers</li> <li>training</li> <li>physical barriers e.g. drilling through stuffing box</li> <li>emergency equipment e.g. oxygen self rescuers</li> <li>personal protective equipment (PPE)</li> </ul>
<p><b>Legislative, and site requirements</b> may include:</p>	<ul style="list-style-type: none"> <li>legislation and regulations</li> <li>relevant Australian standards</li> <li>management plans</li> <li>manager's rules</li> <li>OHS policy</li> <li>code of practice</li> <li>dams safety committee publications</li> <li>manufacturer's instructions</li> <li>safe working or job procedures (or equivalent)</li> </ul>
<p><b>Inrush management system</b> establish criteria and procedures for maintaining a safe environment, including:</p>	<ul style="list-style-type: none"> <li>hazard identification and quantification</li> <li>risk assessment</li> <li>authority and responsibility</li> <li>controls established to managed identified risks</li> <li>reporting and communication requirements</li> <li>document control</li> <li>audit and review</li> <li>procedures for mine inrush monitoring</li> <li>mine plan</li> <li>action plans</li> <li>response plans</li> <li>emergency procedures</li> <li>individual group responsibilities</li> <li>training and education procedures</li> </ul>
<p><b>Inrush prevention system</b> <i>must be established in accordance with the NSW Coal Mines (Underground) Regulation 1999 - Division 8, Clause 40 Implementation of an inrush prevention system.</i></p>	
<p><b>Audit</b> is defined as: <i>a systematic examination against defined criteria to determine whether</i></p>	

<i>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>	
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**Unit Sector(s)**

Coal Mining (Underground)

**Competency field**

Refer to Unit Sector(s).

**Co-requisite units**

Not applicable.