

EXAMINERS REPORT | CERTIFICATE OF COMPETENCE

Deputy of underground coal mines

March - April 2016

Summary of Written Results

Date:	4 March 2016
Number who passed:	39 out of 49
Highest mark obtained	84%
Average overall mark:	65.4%
Lowest overall mark:	43%

Question 1 (total of 20 marks)

Highest mark obtained	18/20
Average overall mark:	11.7/20
Lowest overall mark:	2/20

Q1 (a)

As with previous legislation questions candidates either went very well or very poorly. Several candidates included equipment damage with no potential risk to persons which is not in the legislation.

Clause 128 (5) (a) of the WHS(M)R deals with events referenced in clause 179 (a) (i)-(xviii). What factors are required to make these events a high potential incident? (5 marks)

128 5 (a) an event referred to in clause 179 (a) (i)-(xviii) that would have been a dangerous incident if a person were reasonably in the vicinity at the time when the incident or event occurred and in usual circumstances a person could have been in that vicinity at that time,

Key points to cover – would have been a dangerous incident (exposes a person to a serious risk to a person's health and safety) if a person had been present.

Q1 (b)

As with previous legislation questions candidates either went very well or very poorly. Several candidates included equipment damage with no potential risk to persons which is not in the legislation.

Clause 179 (a) of the WHS(M)R deals with dangerous incidents. What factors are required for these events to be considered a dangerous incident? (5 marks)

179 (a) an incident in relation to a workplace that exposes a worker or any other person to a serious risk to a person's health or safety emanating from an immediate or imminent exposure to:

Key points – serious risk, imminent or immediate exposure. .

Q1 (c)

Several candidates included the CI 128 incidents – HPI or medical treatments

Sections 15, 16 and 17 of the WHS(M)A deal with notification of notifiable incidents and the handling of site of a notifiable incident. (10 marks)

What is a notifiable incident?

Notifiable incident means:

- (a) the death of a person, or*
- (b) a serious injury or illness of a person that is prescribed by the regulations, or*
- (c) a dangerous incident prescribed by the regulations.*

What are the requirements for notification?

(Note: the WHS(M&PS)A has varied s15(5)(b) to “give a written notice of the incident within 48 hours of giving the notice by telephone” rather than within 48 hours of being required to give written notification – either was accepted by the examiners).

Many candidates neglected to mention the role of the Industry Health and Safety Representative.

15 Duty to notify of notifiable incidents

- (1) A mine operator of a mine must ensure that the regulator is notified immediately after becoming aware that a notifiable incident arising out of the conduct of any business or undertaking at the mine has occurred.*
- (2) A person conducting a business or undertaking at a mine must ensure that the regulator is notified immediately after becoming aware that a notifiable incident arising out of the conduct of the business or undertaking at the mine has occurred.*
- (3) Notice under this section must be given in accordance with this section and by the fastest possible means.*
- (4) The notice must be given:*
 - (a) by telephone, or*
 - (b) in writing.*

Example. The written notice can be given by facsimile, email or other electronic means.

- (5) A person giving notice by telephone must:*
 - (a) give the details of the incident requested by the regulator, and*
 - (b) give a written notice of the incident within 48 hours of that requirement being made.*
- (6) A written notice must be in a form, or contain the details, approved by the regulator*

16 Notifiable incident at coal mine

- (1) A person who is required to ensure that the regulator is notified of a notifiable incident at a coal mine to which Part 5 applies must also ensure that an industry safety and health representative is given notice of the incident in accordance with this section.*
- (2) Notice is to be given in the same manner and form as notice is given to the regulator and is to contain the same details as those required by the regulator in respect of telephone notice or written notice, as the case may be*

What are the requirements for the scene of a notifiable incident?

Many candidates did not recognize the role of the Industry Health and Safety Representative.

17 Duty to preserve incident sites

- (1) When a notifiable incident has occurred at a mine each of the following persons must ensure, so far as is reasonably practicable, that the site where the incident occurred is not disturbed until an inspector arrives at the site or any earlier time that an inspector directs:*
 - (a) any person who is required to ensure that the regulator is notified of the notifiable incident,*
 - (b) each person with management or control of the workplace (or part of the workplace) at which the notifiable incident has occurred.*
- (2) In subsection (1), a reference to a site includes any plant, substance, structure or thing associated with the notifiable incident.*
- (3) Subsection (1) does not prevent any action:*
 - (a) to assist an injured person, or*

- (b) to remove a deceased person, or
 (c) that is essential to make the site safe or to minimise the risk of a further notifiable incident, or
 (d) that is associated with a police investigation, or
 (e) for which an inspector or the regulator has given permission.

(4) An inspector must not direct an earlier time under subsection (1) in the case of a notifiable incident at a coal mine to which Part 5 applies unless the inspector has consulted with an industry safety and health representative.

Question 2 (total 20 marks)

Highest mark obtained 20/20
 Average overall mark: 15.6/20
 Lowest overall mark: 7.5/20

Complete the following gas chart (5 marks)

	Chemical Symbol	Relative Density	Explosive Range	Legal Limits
Methane	CH ₄	0.55	5 - 15	0.25% commencement of hazardous zone 0.25% non-explosion protected electrical equipment 0.5% shotfiring 1% diesel in return alarm 1.25% diesel off 1.25% power 2% people
Carbon Monoxide	CO	0.97	12.5 - 74	30ppm
Carbon Dioxide	CO ₂	1.53	N/A	1.25%
Oxygen	O ₂	1.11	N/A	Lower 19.5%

NB: some diesel machines require that the machine is shutdown at 1% under the Diesel Engine Registration.

Q2 (b)

What are the major constituents of air and what is their proportion, by volume, of air?

(5 marks)

21% Oxygen, 79% Nitrogen, 0.03% Carbon Dioxide and 0.97% Other

Q2 (c)

Nearly all candidates neglected to check the equipment prior to going underground.

You are instructed to take a bag sample from a sealed area of the mine. What procedures would you use to take the sample and ensure their integrity? (10 marks)

- Check the barometer before going into the mine to determine whether rising or falling
- Check equipment is operational
- Bump test gas monitor
- Purge sample tube

Purge sample bag

Deflate bag by rolling the bag from one corner diagonally to the opposite corner

Fix the sample bag to the sampling point at the seal

Inflate and deflate the bag 2 times with gas from behind the seal

Inflate the bag for the 3rd time to about 2/3 full (allow for expansion)

Fold the ends of the tube over and tape to seal

Attach the tag with the following information:

Location sample taken from

Date & time

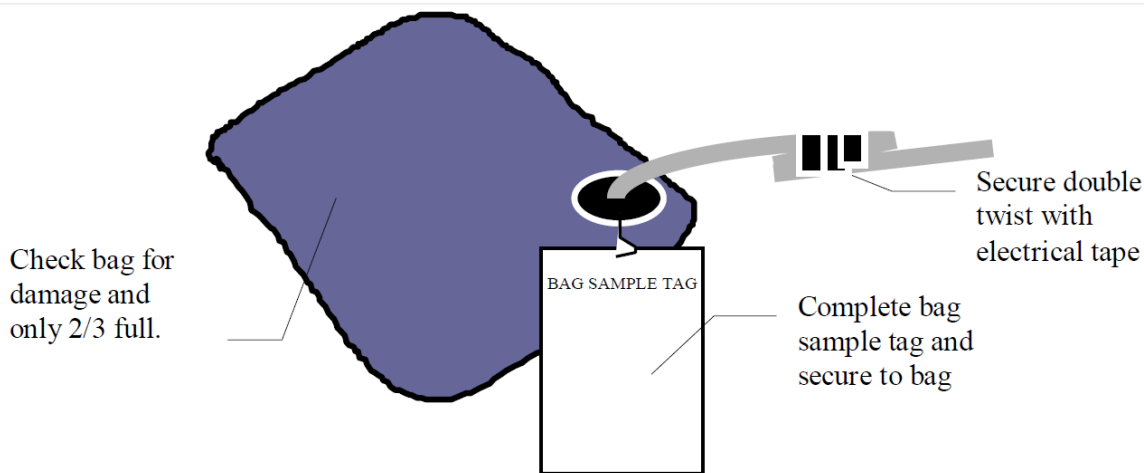
Type of sample – general body / goaf / up-hole / in-seam hole

Name of sampler

Barometer reading

Whether sample point was drawing or expelling at time of sample

Any other relevant comments such as hand held readings if appropriate



Question 3 (total 20 marks)

Highest mark obtained 19/20

Average overall mark: 14.1/20

Lowest overall mark: 8/20

Q3 (a)

Generally well answered.

Describe what is meant by the term “outburst” in relation to underground coal mining? (5 marks)

The sudden release of gas and material from the working place that can vary in magnitude and intensity (MDG1004).

Q3 (b)

Generally very poorly answered, with little demonstrated understanding of the relationship between content and severity or the effect of differing gases.

The answer should clearly state that increasing gas content will increase the likelihood and severity of an outburst. The answer should clearly state that increasing CO₂ as a % of total gas will lower the threshold for an outburst and that CO₂ rich outbursts are considered more violent than CH₄ rich outbursts.

What effect does gas content and gas composition have on the likelihood and consequence of an outburst? (5 marks)

Total Gas Content: The total desorbable volume of gas contained within a known mass of coal at insitu conditions expressed in cubic metres per tonne of coal.

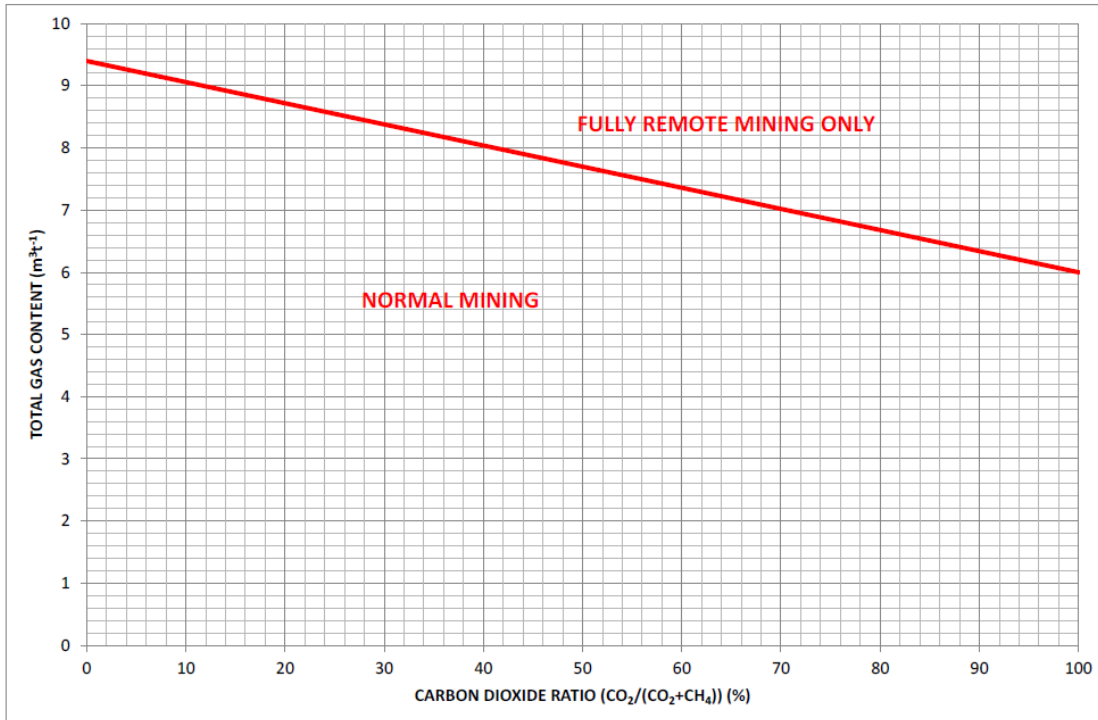
Gas Composition: The chemical composition of the seam gas (i.e. CH₄ or CO₂) as determined by Gas Chromatography. This will be expressed as percentage gas on an air free basis.

The basis of outburst prevention is to effectively drain the gas content of the working section to below the defined outburst threshold. When below the outburst threshold, the risk of an outburst occurring is negligible.

Outburst threshold levels likewise consider the gas composition of the seam, whereby a lower outburst threshold is required due to increasing composition and content.

CO₂ outbursts are considered potentially more violent than a CH₄ outburst.

The outburst threshold values for Appin Colliery are shown below.



Q3 (c)

Generally well answered but some candidates neglected to include the major controls of gas drainage and threshold levels.

What are the principal procedures used to manage the risk of outbursts? (5 marks)

Prediction – Comprising comprehensive data gathering and analysis to allow for a prediction of areas where increased outburst risk exists;

Geological mapping of structures from regional modelling, surface boreholes, underground mapping and in-seam drilling

Geological mapping of gas content and composition from surface boreholes and in-seam cores

Drill hole logs (from survey) used to identify and map structures.

Core samples.

Geological mapping.

Surface 2D & 3D seismic.

Outburst Risk Review Team meetings

Prevention – Including controls that prevent an outburst from occurring, including effective gas drainage coupled with gas flow monitoring and regular core sampling, the setting of effective threshold values for mining, authority to mine system

Protection – Encompassing controls that are designed to protect operators from the effects of an outburst, including training and remote mining techniques as well as emergency response protocols

Q3 (d)

Generally very well answered.

What are the typical “outburst warning signs” that may be evident prior to an outburst? (5 marks)

*More cutters than usual
Change in direction of cutters
Greasy backs
Reddish brown tinge
Poor roof or ribs
Good roof or ribs
Sudden seam dip
Abnormally hard or soft face
Chemicals being blown out from rib holes
Conical Cavity in the face or ribs. (small outburst)
Mylonite zones
Other geological features such as faults or dykes
Calcite bands
Marked increase or decrease in noise from the strata
Gas
Coal spitting from face or face bulging
Wet ribs or face*

Question 4 (total 20 marks)

Highest mark obtained	17/20
Average overall mark:	10/20
Lowest overall mark:	2/20

You are the Deputy in a longwall panel on production. Prior to going underground, the undermanager informs you that the creep is excessive towards the main gate and access is tight. When you reach the panel, you find there is insufficient space to access the face.

Q4 (a)

Many candidates went for generic risk management processes with no discussion how these may be implemented in this specific circumstance. Should follow a logical process – stop, communicate (crew and UM), identify hazards, identify controls for hazards, communicate (crew and UM), control the hazards.

What are your immediate actions, and why? (4 marks)

Stop the crew from entering the face until the following risks are managed

The abutment load on the pillar may cause the rib to buckle (pop out), thus trapping a person trying to move through a tight space between the rib and MG drive,

There is a risk of exposure to personnel falling towards the BSL / AFC chains if personnel climb over the MG drive assuming the mine does not have a sky walk option,

There is a high risk of trapping personnel between the MG drive and rib, should the MG be pushed whilst personnel are accessing the face. (NB: Many mines may have site procedures preventing people working adjacent to the MG drive / BSL when the MG is advanced).

Determine how an injured person could be safely removed from the LW face

Does the mine have an existing procedure that outlines how to address this risk, if so obtain a copy and review the procedure with your crew.

Either way, stop and communicate the risk with the crew and how it will be addressed. This risk could be addressed using an existing procedure, or through the process of a task analysis / change management using input from the crew.

Discuss with the off going Deputy and crew what controls they had in place to manage the risk.

Review these controls with your crew.

Q4 (b)

Several candidates did not identify potential procedures for access – they concentrated on process – this was not seen as an adequate answer to the question.

What procedures could be put into place to provide safe access? (10 marks)

No sky walk option – consider the process of how to isolate the face to allow personnel to access over the MG drive, and ensure that this isolation is aligned with the mines isolation procedure.

Consider if accessing the face via the TG provides a safer outcome until creep is under control (review gas levels, distance of travel, escape equipment, strata conditions, etc)

Review and document procedure for how an injured person could be safely removed from the face.

Either process may require production to stop whilst access occurs.

Assuming isolation is required this would need to align with site standards and may involve an isolation supervisor and permit system that complies with the mine site isolation procedures.

Procedure should include how positive communication will occur between the LW face and the person performing the isolation.

Sky walk option – if the MG is equipped with a sky way over the MG, ensure that the hand rails are in position, and set at the correct walkway height to prevent personnel falling.

Q4 (c)

Generally well answered.

What are the possible causes of the excessive creep? (6 marks)

Too many fly cuts / insufficient fly cuts / incorrect fly cuts

Change in cross grade of the LW block

Not keeping the face straight (may be influenced by equipment failure, geological conditions.

TARP for tracking and managing creep is not complied with

Question 5 (total 20 marks)

Highest mark obtained 19/20

Average overall mark: 13.7/20

Lowest overall mark: 6/20

The attached plan shows an area of a mine with two development units. The seam is moderately gassy. On the plan, show:

a) All ventilation devices (6 marks)

some candidates had double regulation on the gateroad,

b) The location of the hazardous zone for each production area (2 marks)

inbye the point HZ plus panel returns

c) The belt roads and boot end locations (4 marks)

several candidates did not have the mains belt in the centre heading.

d) Quantities at points A to M (4 marks)

total Q would be expected in the 60 to 90 m³/s range

e) Methane concentrations at points A to M (4 marks)

some candidates just put <.25% for intakes and <2% for returns - candidates were given no marks if they did not attempt to determine realistic levels

Fill in the following charts

Quantities at points A to M (4 marks)

A	B	C	D	E	F	G	H	I	J	K	L	M

Methane concentration at points A to M (4 marks)

A	B	C	D	E	F	G	H	I	J	K	L	M

Oral examination results

Date: 27-28 April 2016

Number of candidates eligible to sit: 56

Number of candidates deemed competent: 25

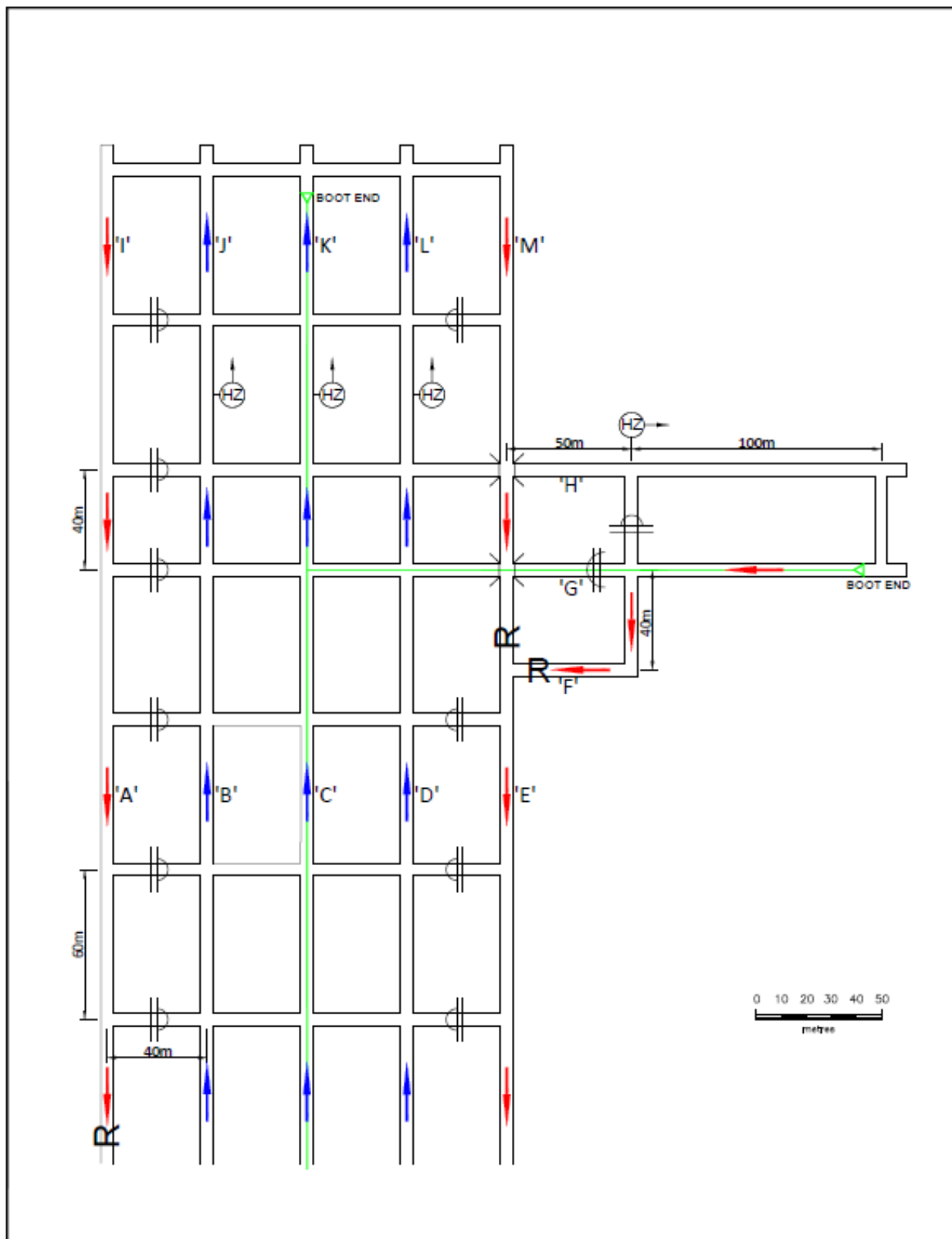
Again, a poor pass rate for the oral exams. The major areas where candidates were found to be not yet competent were the same areas as the last 5 years – ventilation and emergency management. All candidates should be aware that these are two of the most basic areas required in assessment of competence for the awarding of a certificate of competence to be a Deputy.


25 of the 31 candidates deemed not yet competent were unable to demonstrate competence in one or more elements of ventilation. There were 8 candidates with less than adequate understanding of degassing, 6 candidates in relation to auxiliary ventilation, 4 in relation to longwall ventilation and 1 in general ventilation principles.

21 candidates were deemed not yet competent in emergency management. 13 candidates were deemed not yet competent in “associated non-technical skills” (ANTS), mainly decision making and communication.

23 candidates were found to be not yet competent in 3 or more areas.

Candidates need to have a firm grasp of the fundamental ventilation principles and be able to demonstrate their knowledge. They should have an excellent knowledge of systems (not limited to ventilation) at their mine and a good understanding of common systems used in other mines in NSW with differing systems and hazards.



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		DRG. No. 1001	

More information

Business Processes and Authorisations – Mining competence unit

NSW Department of Industry | Resources & Energy - Mine Safety | Governance Branch

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Acknowledgments

Deputy Examination Panel

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