



EXAM PAPER | CERTIFICATE OF COMPETENCE

Undermanager

AUGUST 2015

UB1 – Mining legislation

Examination date: 26 August 2015

Examination time: 09:00am – 10:00am

Examination venue: Hunter TAFE, Kurri Kurri

Instructions to candidates: All five (5) questions are to be attempted. All questions are of equal value – 20 marks each. 10 minutes reading time is allowed prior to the start of the examination.

Question 1 (20 marks)

Work Health and Safety (Mines) Regulation 2014

- Subdivision 1, Control of Risk. How is risk controlled on a mine site? (10 marks)
- Subdivision 4. Contractors. Clauses 19, 20, 21, and 22 relate to contractors, including duty on contractors and duty on the mine operator in relation to contractors. What is required to be done to use contractors at a mine? (10 marks)

Question 2 (20 marks)

Work Health and Safety (Mines) Regulation 2014

- What does Principal Control Plan mean? (5 marks)
- What are the requirements relating to principal control plans and the names of each control plan? (15 marks)

Question 3 (20 marks)

Work Health and Safety (Mines) Regulation 2014

Clause 128 requires the notification of High Potential Incidents.

List any 8 of the 15 High Potential Incidents that must be notified. Also state who must be notified and the regulated timeframes for notification.

Question 4 (20 marks)

Work Health and Safety (Mines) Regulation 2014

Clause 104 (2) and (3) outlines the duty to provide suitable and adequate information, training and instruction to each worker at the mine.

What are the areas that must be addressed in relation to the information, training and instruction?



Question 5 (20 marks)

Work Health and Safety (Mines) Regulation 2014.

Clause 31, Explosives and explosive precursors.

What are the requirements of this clause?

END OF QUESTION

END OF PAPER

UB2 – Mine Ventilation

- Examination date:** 26 August 2015
- Examination time:** 10:30am – 12:30pm
- Examination venue:** Hunter TAFE, Kurri Kurri
- Instructions to candidates:** All questions are to be attempted. Questions 1 and 2 are of equal value – 100 marks each. 10 minutes reading time is allowed prior to the start of the examination.

Question 1 (100 marks)

Dunn's Creek Colliery workings are shown on the attached plan.

The colliery works the "Lower Woodville" seam, which has a moderate to high propensity to spontaneous combustion. The "Lower Woodville" seam is 4.0 metres thick and is overlaid by the "Upper Woodville" seam which is 12 metres thick.

20 metres above the working section the strata is dominated by a very thick, competent sandstone beam. The target working section is the 4 metres of the "Lower Woodville" seam.

The immediate strata below the "Lower Woodville" seam is a 1.0 metre thick, reasonably competent bed of shale. The 4 metre-thick "Paterson" coal seam is below the shale floor.

The workings are accessed via two mine entrances. There is also one upcast ventilation shaft and one downcast shaft (both 350 metres long). The upcast shaft is 5.5 metres in diameter which is concrete lined.

The "Lower Woodville" seam has very high virgin gas content, with a moderate permeability. With a virgin seam gas content of typically 10 m³/t, CO₂:CH₄ ratio of 80:20.

The "Paterson" seam also has very high virgin gas content, typically around 12 m³/t, also with a CO₂:CH₄ ratio of 80:20.

Typical roof support is 6 x 2.1 metre bolts and a 1 metre x 4.8 metre mesh module per metre. Ribs are generally fractured and prone to failure in the upper third of the rib and require mesh and 2 x 1.8 metre point anchor bolts every metre.

The mine produces coking coal from two continuous miners in the gateroad development unit seven days per week, and the LW7 panel operates five days per week. The mine produces approximately 3.0 million tonnes per year. The two continuous miners are being used to develop a gate road for the new longwall panel, LW9.

On the accompanying plan:

- Show the location of all the production faces, together with an estimate of their daily production levels. (10 marks)
- Ventilate the plan using the code of symbols specified in the Australian Standard AS4368-1996 Mine Plans – Preparation and Symbols. (35 marks)
- Document the air quantities you would expect to be entering each production panel measured at the commencement of the hazardous zone. Indicate why these quantities have been chosen. (15 marks)
- Based on your assumptions and the data provided calculate the general body methane and carbon dioxide content in the LW 7 panel return whilst the LW is producing coal. Clearly state assumptions you are relying upon in these calculations and why you have chosen these assumptions. (20 marks)
- Calculate the main ventilation fan power requirements to ventilate this mine. Clearly state assumptions you are relying upon in these calculations and why you have chosen these assumptions. (20 marks)

Question 2 (100 marks)

- Using the data supplied in Question 1 and in relation to the mine design / layout as per the attached plan, identify and list the relevant hazards associated with the ventilation of this mine. Your answer should include ventilation arrangements and any other identified major hazard management requirements associated with the ventilation. (60 marks)
- In relation to Dunn's Creek Colliery:

- i. Discuss the primary methods you would expect to be implemented at the Dunn's Creek Colliery for the management of the high virgin gas content present. (12 marks)
- ii. What spontaneous combustion management hazards have you identified? (10 marks)
- iii. Describe monitoring arrangements for detecting a heating event at Dunn's Creek. (10 marks)
- iv. Discuss what measures you would design into the Spontaneous Combustion TARP (Triggered Action Response Plan) to deal with a heating event. (8 marks)

END OF QUESTION

END OF PAPER

UB3 – Coal Mining Practice

Examination date: 26 August 2015

Examination time: 13:30pm – 16:30pm

Examination venue: Hunter TAFE, Kurri Kurri

Instructions to candidates: Only five (5) of the eight (8) questions are to be attempted. All questions are of equal value – 20 marks each. 10 minutes reading time is allowed prior to the start of the examination.

Question 1 (20 marks)

A contractor has been engaged at your mine to drive a roadway near pit bottom.

The contractor proposes to use their own machinery, a road header, to drive the roadway as the mine has no spare continuous miners available. The roadway is to be driven at a height of 3.0 metres.

You are the undermanager in charge of the district and your manager has instructed you to prepare a safe system of work for using the road header before this operation starts.

Detail the elements of the plan and discuss how you, as the undermanager, will ensure this plan is followed by all of the contractor's employees.

Question 2 (20 marks)

You are the undermanager on duty at a large underground mine and the manager is absent and you have been called to an emergency situation by the surface foreman.

A contract scraper operator has been constructing a tailings dam for the washery and has rolled the scraper.

Outline the course of action you would take in response to this emergency, including:

- Who you would report this incident to.
- All of the hazards you will have to deal with as a result of this incident.
- The control measures you would recommend to prevent this incident from occurring again.

Question 3 (20 marks)

a) Explain what is meant by the term "windblast". (4 marks)

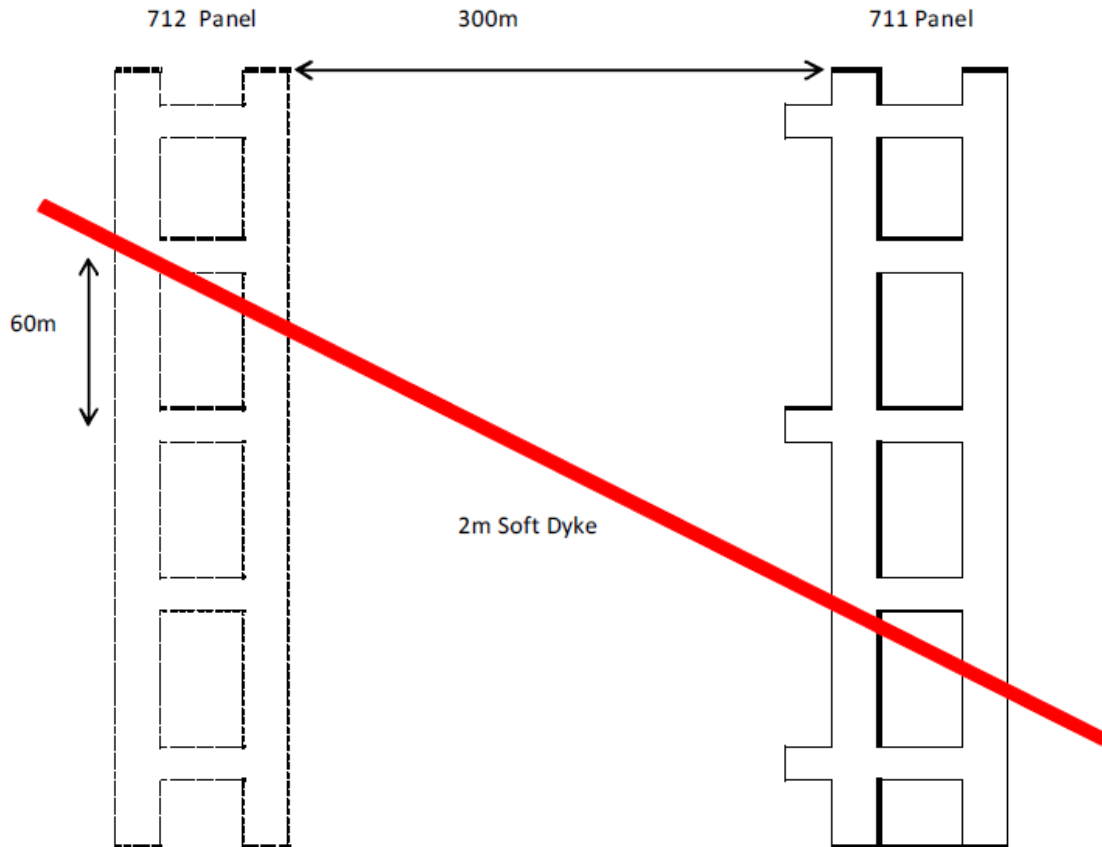
b) List the factors that may contribute to windblast. (4 marks)

c) Outline the hazards associated with windblast. (4 marks)

d) You are the undermanager at a longwall mine and a channel of overlying strata for the next longwall is likely to cause windblast problems. You are required to develop a windblast management plan. Describe the way in which you would complete the task and list the control measures to be put into place to minimise the dangers associated with windblast. (8 marks)

Question 4 (20 marks)

a) Draw a pre-drainage in-seam drilling pattern to cover 712 panel from the drill stubs in 711 panel. 712 panel is due to be mined in 12 months time, gas content is 12m³/t at 70% CH₄ and permeability is average (6 marks)



- Explain what is meant by the “end of hole” effect regarding gas drainage holes and how can drill holes be designed to overcome it. (4 marks)
- Explain the concept of “worst case sampling” with regard to gas drainage and what factors are taken into account. (4 marks)
- After 6 months, gas holes covering the indicated area in 712 are showing lower than normal gas flows and will not be drained in time to mine through at permitted gas levels. Outline the options available to safely mine 712 panel. (6 marks)

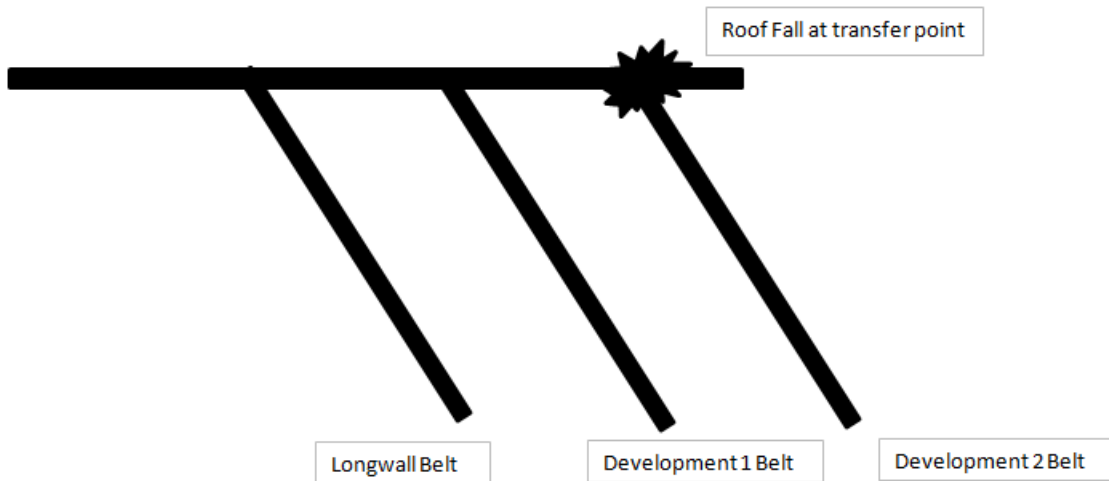
Question 5 (20 marks)

You are night shift undermanager at an underground coal mine that is moderately gassy and has a moderate to high propensity for spontaneous combustion.

- Explain the R70 index and how it is derived. (4 marks)
- Name 3 key ratios for evaluating a spontaneous combustion event, the gases involved and how the ratios are useful. (6 marks)
- During your shift, a Level 1 Triggered Action Response Plan (TARP) is activated for the longwall return. There is a discrepancy between the tube bundle system and real time monitoring system where the tube bundle is reading 24ppm CO and the real time is reading 30ppm CO. Outline how you would resolve this difference to get the correct reading and ensure the gas monitoring system is accurately reporting information to be used in the TARP. (10 marks)

Question 6 (20 marks)

You are the undermanager on shift when the control room reports the development panel belt and the associated trunk belt have stopped. The outbye deputy reports there has been a fall of roof on the transfer point between the development 2 belt and the trunk belt.



- Detail the first actions you would take or initiate to ensure the health and safety of individuals at the mine is maintained. (10 marks)
- This area is a high roof area that had been shot-fired for extra height to accommodate the infrastructure for the coal transfer. The mining engineering manager tasks you with completing an investigation as to how the strata failure occurred. Detail the areas your investigation would cover and how would you complete your investigation. (10 marks)

Question 7 (20 marks)

You are an undermanager of a moderately gassy underground mine and at the start of your shift, you are instructed by the mining engineering manager to make arrangements for cutting and welding repairs to a continuous miner shovel during your shift. The continuous miner is located at the face and can be flitted if required.

- Outline the systems you would expect to be in place at the mine to enable this hot work to be undertaken. (4 marks)
- Document the process you would take on shift to develop and implement a plan to safely complete the cutting and welding repairs. Provide detail on the content of the plan including controls following the hot work being completed. (10 marks)
- Provide detail on the emergency response preparation you would take as a precaution in case the works led to an underground fire. (6 marks)

Question 8 (20 marks)

You are the night shift undermanager of a moderately gassy underground mine and you have just been notified that a frictional ignition has occurred at a development heading face at the mine. This is the first time a frictional ignition has occurred at the mine.

You have been advised that whilst mining with the continuous miner, methane was ignited at the face and the fire was immediately extinguished by the continuous miner operator using a water hose. The development panel had just encountered a conglomerate channel in the immediate seam roof and two faults of 0.2m throw are evident in the face.

- Outline the immediate steps you would take. (8 marks)
- Outline the process that would be followed to enable a continuation of mining and describe what hazard controls would be considered and implemented as part of the development of a Frictional Ignition Management Plan. (12 marks)

END OF QUESTIONS

END OF PAPER

More information

Business Processes and Authorisations Unit – 4931 6625

Acknowledgments

Undermanager examination panel

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