Level 1 Mine Emergency Exercise 2019

Cook Colliery

25 September 2019

Queensland Government

This publication has been compiled by the Level 1 Mine Emergency Exercise Organising Committee, and the Department of Natural Resources, Mines and Energy.

Interpreter

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Abbreviations and glossary

Term	Definition
Afterdamp	Old terminology for gases found in underground coal mines post explosion normally nitrogen, carbon dioxide, carbon monoxide and low percentages of oxygen
Approved standard	A standard made for safety and health under the repealed *Coal Mining Safety and Health Act 1925* stating ways to achieve an acceptable level of risk to people arising out of coal mining operations
Bord and pillar	Another name for room and pillar where roadways are driven to a pattern and pillars of coal are left to support the roof
CABA	Compressed air breathing apparatus
CPR	Cardio pulmonary resuscitation
CH_4	Methane
CITECT	Brand name of SCADA system
CO	Carbon monoxide
CO_2	Carbon dioxide
CHPP	Coal handling and preparation plant is a facility that washes coal of soil and rock; crushes it into graded sized chunks (sorting); stockpiles grades preparing it for transport to market; and (more often than not) loads coal into rail cars, barges, or ships. They can also be referred to as a coal preparation plant, prep plant, and tippler or wash plant.
CMW	Coal mine worker
CoB	Change over bay
Continuous miner (CM)	Coal cutting machine used to develop new roadways in a mine
Crib room	Location where mineworkers eat and a meeting station for the ERZ controllers
CRO	Control room operator
CSE	Brand name of a self-contained self-rescuer
Cut-through (c/t)	A passage cut through the coal, connecting two parallel headings
DAC	Direct audio communications Underground intercom system also referred to as the tannoy
Deputy	Safety supervisor who makes statutory inspections not referred to as an ERZ controller in Queensland regulation
DNRME	Department of Natural Resources, Mines and Energy
Driftrunner	Brand name for a flameproof diesel powered man-riding vehicle carrying up to 12 personnel

Term	Definition
Downcast	Shaft of bore hole where air enters the mine. Sometimes referred to as an intake shaft.
Eimco	Brand name of a flameproof diesel powered mechanical loader
EMP	Emergency management plan (interchangeable with ERP)
EMQnet	Brand name for a business resilience communication solution which has been adopted by some mines for everyday management as well as communications and information handing during an emergency response
ERP	Emergency response plan (interchangeable with EMP)
ERZ	Explosion risk zone
ERZ controller	Mine worker responsible for safety inspections traditionally referred to as a Deputy
Face	The exposed surface of a coal deposit in the working place where mining is proceeding
Fresh air base (FAB)	A continuously monitored station for dispatch or return of rescue teams in close proximity to irrespirable zones
FREEK	First response emergency evacuation kits—these are the containers that hold the CABA and associated equipment
Gas chromatograph.	A laboratory instrument used to analyse the composition of gas samples
“Go line”	An assembly area on the surface where mobile plant is left after servicing and when available for use
HMP	Hazard management plan
IAP	Incident action plan—developed by the IMT and signed off so that each of the teams, logistics, operations and planning have clear direction
ICT	Incident control team
ICS	Incident control system
IMT	Incident Management Team (term is interchangeable with ICT)
Inbye	Mining term for going into the underground mine (away from the surface) from the point of reference
Industry Safety and Health Representative (ISHR)	A person who is appointed under section 109(1)5 of the *Coal Mining Safety and Health Act 1999* to represent coal mine workers on safety and health matters and who performs the functions and exercises the powers of an industry safety and health representative mentioned in part 8, division 2
Intake (roadway)	A name or fresh air as defined in the coal mine regulations
Level 1 mine emergency exercise	State level mine emergency exercise recommended in the Moura inquiry, designed to test the mine’s emergency response system; test the ability of external services to administer assistance; and provide a focal point for emergency preparedness in the state

Term	Definition
Longwall	A method of mining flat-bedded deposits, in which the working face is retreated over a considerable width at one time
Mines Inspector	Official employed to make examinations of, and to report upon, mines and surface plants for compliance with mining laws, rules and regulations, safety methods
Mines Inspectorate	The organisation which controls the mines inspectors
MEMS	Mine Emergency Management System
MRAS	Mine Re-entry Assessment System
MSHA	Mine Safety Health Administration, United States of America - Department of Labour
Mole	Name used to refer to the mine site representative on the organising committee for the level 1 mine emergency exercise
Non-verbal communication	Method of communicating using beeps on a telephone or DAC similar to Morse code
O_2	Oxygen
Outburst	An ejection of gas and coal from the solid face, where the gas is a mixture of methane and carbon dioxide
Outbye	Mining term for out of the underground mine (towards the surface) from the point of reference
Panel	The working of coal seams in separate panels or districts, e.g. single unit panel—a longwall face is sometimes referred to as a panel
Personal emergency device (PED)	Ultra-low frequency through-the-earth communication system used for paging—originally developed to provide a fast and reliable method of informing underground miners of emergency situations
PJB	Brand name for a flameproof diesel powered man-riding vehicle carrying up to 12 personnel
Portal	The surface entrance to an underground mine
ppm	Parts per million
QMRS	Queensland Mines Rescue Service
Recognised standard	A standard made for safety and health under the *Coal Mining Safety and Health Act 1999* stating ways to achieve an acceptable level of risk to people arising out of coal mining operations
Return (Roadway)	Name for air that has ventilated a working face often contaminated with heat, dust and gases
Rib	The solid coal on the side of a gallery or longwall face; a pillar or barrier of coal left for support
Safegas	Brand name of a mine gas monitoring system (developed by Simtars)

Term	Definition
SCADA	Supervisory Control and Data Acquisition—software for monitoring and/or controlling plant and equipment
Self-contained self-rescuer (SCSR)	A respiratory device used by miners for the purpose of escape during mine fires and explosions—it provides the wearer a closed-circuit supply of oxygen for periods of time usually less than 1 hour
Simtars	Safety in Mines Testing and Research Station
SMV	Brand name for a flameproof diesel powered man-riding vehicle carrying up to 12 personnel
Stopping	A ventilation control device which stops ventilation flow through a roadway
Tag board	Peg board where underground personnel place a token to indicate their presence in a section of the mine
Undermanager	Mineworker who is in charge of the mine on a shift basis (i.e. shift supervisor)
Upcast	Shaft of borehole where the air leaves the mine. Sometimes referred to an a return shaft
Ventsim	Ventilation modelling software
VCD	Ventilation control device—an air door, stopping, seal or brattice
VO	Ventilation Officer—person responsible for coordination of all ventilation related activities at the mine including running a computer base ventilation modelling system

Preface

This report has been compiled by the 2019 Level 1 Emergency Exercise Organising Committee (the committee) with input provided by each of the assessors involved in the exercise. Assessors have provided an account of their part of the exercise for this report.

The committee would like to thank all assessors for their input and acknowledge the co-operation and assistance of all those involved in the 2019 Level 1 Mine Emergency Exercise. In addition, the committee would also like to thank Cook Colliery for participating in the exercise and providing self-contained self-rescuers (SCSRs) for use during the exercise, adding to the reality of the experience for evacuating coal mine workers.

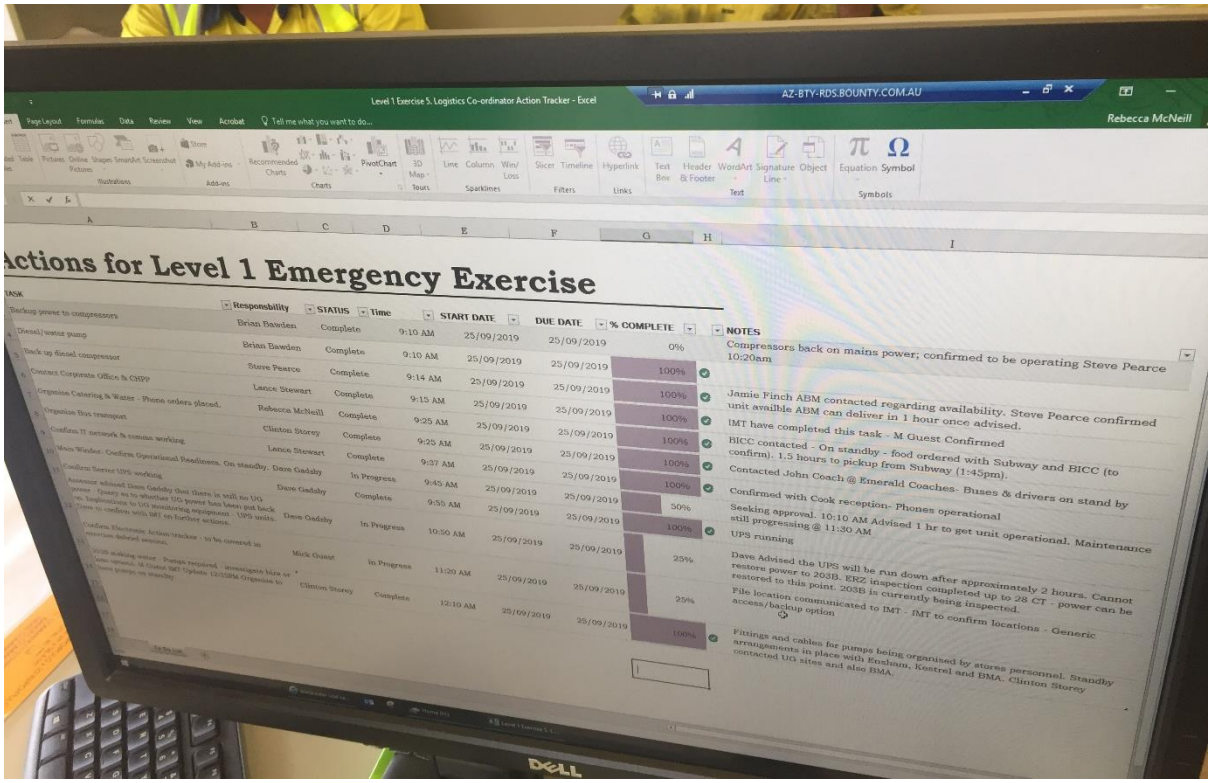


Figure 1 Logistics team action sheet

Executive summary

This report covers the 2019 Level 1 Mine Emergency Exercise held at Cook Colliery between 08:30 and 16:00 on Wednesday 25 September 2019. Cook Colliery is an underground bord and pillar mine 29 kilometres south of Blackwater in Central Queensland (see *Figure 2*).

The Queensland Mining Warden's inquiry into the explosion at the Moura No. 2 mine in August 1994 recommended, 'emergency procedures should be exercised at each mine on a systematic basis, the minimum requirement being on an annual basis for each mine. (Windridge et al.1996)

In December 1996, the Approved Standard for the Conduct of Emergency Procedures Exercises was published. This approved standard was updated and issued as Recognised Standard 8 Conduct of Mine Emergency Exercises (RS8) in June 2009. It provides guidelines for conducting mine site emergency exercises, including the requirement to test state-wide emergency responses by holding an annual exercise.

It is 25 years since the Moura No 2 disaster, and nine years since the Pike River disaster. The Pike River Royal Commission led New Zealand to adopt similar legislation regarding emergency exercises. Since 1998, 22 Level 1 Mine Emergency Exercises have been held in Queensland.

In all, 22 assessors took part in the exercise, with representatives from Cook Colliery, Simtars, Queensland Mines Inspectorate, Queensland and New South Wales mines rescue services, an industry safety and health representative (ISHR) from the Construction, Forestry, Mining and Energy Union (CFMEU), Minerals Industry Safety and Health Centre (MISHC), Department of Natural Resources, Mines and Energy (DNRME), Office of the Commissioner for Mine Safety and Health and mine staff from Kestrel, Oaky North, Moranbah North and Grosvenor coal mines. This report contains a number of writing styles and each input has been reviewed and edited to provide a consistent theme.

Objectives

The objectives were established by the requirements of RS8 and by reviewing previous exercise reports. The objectives of the exercise were to test:

- the ability of coal mine workers (CMWs) to self-escape
- the mine site incident response
- the capacity for triage on a large number of CMWs
- donning self-contained self-rescuers (SCSR)
- the interaction with ISHR, Queensland Mines Inspectorate and the Police Service
- the mobilisation of Queensland Mines Rescue Service (QMRS) and the establishment of a fresh air base (FAB)
- social and mainstream media interaction.

Scenario

- The scenario for the exercise was based on a substantial earthquake—measuring 7.6 on the Richter scale—that caused major disruption to the mine power and infrastructure, including: A major fall in the drift, no access in or out and a substantial blockage of ventilation.
- Loss of power to the mine site at the Ergon Energy substation with back-up power generators starts for the control room and gas monitoring.

- Power restored at the Ergon Energy substation after 30 minutes.
- Available shaft for man-riding was covered by a standby generator.
- One team of CMWs were to be trapped with rising water, methane (CH_4) and carbon dioxide (CO_2); within an oxygen-depleted, irrespirable atmosphere. Three of the CMWs are injured. The earthquake created a connection to the sealed Castor Seam workings above the workings in the Argo seam. The water and irrespirable atmosphere then flowed into the area where the trapped CMWs were[1] located.
- Escaping CMWs from the other panels are injured/distressed with a limited capability for inseam response.
- Minor roof falls elsewhere in the mine.

This scenario presented the following issues to be addressed:

- CMWs ability to self-escape via the second egress cage.
- Mine site to deal with multiple casualties.
- Trapped CMWs to test the duration of the belt worn SCSR and the long duration SCSR as well as changeover between units.
- Mine to use non-verbal communications with the trapped CMWs.
- The restoration of power as a surface electrician talks through the re-powering of the system.
- Mine site to form an incident management team (IMT) with no power for the first 30 minutes to 1 hour.
- QMRS to deploy underground and establish a fresh air base and rescue the trapped CMWs.

Major conclusions

The following major conclusions were made by the 22 assessors observing the response:

- The QMRS response was affected by the initial activation being to put them on standby. There were also issues with the availability of brigades personnel from nearby mines.
- The underground response from the Cook Colliery CMWs was professional and controlled.
- The major fall in the dolly car drift was not recognised until late into the exercise.
- The Cook Colliery emergency response was based on the MEMS system. However, this process was not followed and the lack of an electronic database for managing the response meant that key information was missed.
- A risk-based approach to developing responses was not demonstrated.
- Social and mainstream media responses were limited and notification procedures were not followed.

Recommendations

All mine sites and other agencies involved in mine emergency incident response should review these recommendations and use them in the gap analysis and periodic review of their emergency response systems, as well as audit tool prompts and checklists.

The following recommendations arose from the exercise for the emergency response:

[1] Cook Colliery had a water inundation from the Castor Seam on a longwall panel in March 2017 approximately 1200 m inbye of the location of the “trapped CMWs”.

- All mines to identify the resources and deployment of rescue personnel at each operation to be able to respond to the mutual assistance group (MAG) requirements.

- Chief Inspector of Coal Mines and the CEO of QMRS to remind all mines that it is part of their mines rescue agreement to release personnel at the time of a level 1 exercise. The only way effective emergency response can be tested is if everyone treats their response as if it was a real event.

- Two control room operators (CRO's) in the control room at any given point of time should be the industry standard to enable efficient communication and site monitoring.

- All mines should adopt an electronic database and information sharing system, which are commercially available, or the electronic version developed by QMRS targeting mine emergency management and incident control. These systems should be used as part of the everyday mine communications and data transfer systems, not just for emergency response.

- Improved preparation for dealing with social and mainstream media in the event of an emergency, namely:

    - Explore the consequences of misinformation on emergency response situations and review emergency response plans to develop action plans to counteract misinformation on social and mainstream media.

    - Develop social media communities to ensure next of kin and community have a reliable single source of information in emergency situations.

    - Consider media training for key personnel who may be called on to respond to media enquiries.

Last year, it was recommended that a review be conducted regarding whether to implement the level 1 exercise in two parts:

- Run the normal level 1 exercise to evaluate the capability of the CMWs to self-escape and respond to the scenario they face, the mine to form an IMT and conduct data analysis to see if a mines rescue re-entry to the mine is acceptable. This would involve the Queensland Mines Inspectorate, ISHR, mine corporate and QMRS operations managers and can be conducted over a full shift.

- To have people underground ready for the exercise as assessors to test QMRS emergency response capabilities. In this case, an incident action plan and re-entry assessment would already be prepared. This will have minimum impact on the host mine management or production, but responding personnel from the mutual assistance groups would be actively deployed and gain operational experience.

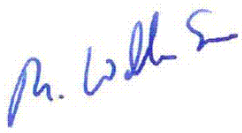
No decision has yet been made on this proposed process change.

The exercise committee will continue to draw assessors from other operations to participate in the level 1 exercises, in particular CMWs who are studying for statutory certificates. Previous assessors have stated how they have benefited from participating in the level 1 exercise. This will benefit them as individuals and the operation from which they come. Individuals wishing to be involved in the 2020 level 1 exercise are requested to contact a

member of the organising committee: Martin Watkinson, Simtars, Shaun Dobson, Inspector, Tim Jackson QMRS and Stephen Woods ISHR.

From 2018 there will be no level 1 exercise window announced. The mine will know the day on which the assessors will attend the mine for their induction and the exercise will be conducted on any night or day shift after that induction. No-go dates supplied by the mine will be avoided where possible.

The 2020 Level 1 Emergency Exercise will be held at Moranbah North Coal Mine near Moranbah in central Queensland.



Martin Watkinson

Chair of the Level 1 Emergency Exercise Organising Committee

urce: Queensland Competition Authority, Aurizon Rail, March 2017

Figure 2 Cook Colliery Location

Introduction

This Report relates to the 2019 Level 1 Mine Emergency Exercise, held at Cook Colliery, between 8:30 am and 4.00 pm on Wednesday 25 September 2019. Cook Colliery is an underground bord and pillar mine, approximately 29 kilometres south of the town of Blackwater in Central Queensland (Figure 2).

All Queensland underground coal mines are required to test their emergency preparedness by running simulated emergency exercises annually. This requirement was a recommendation of the Queensland Mining Warden's inquiry into the explosion at Moura No. 2 underground mine on 7 August 1994 in which 11 miners died. One mine each year is selected to be the focal point of the state's emergency preparedness and is the host for the Level 1 Mine Emergency Exercise.

The requirements for conducting mine emergency exercises are set out in Recognised Standard 8 Conduct of Mine Emergency Exercise which, along with reports of recent exercises, is available on the Queensland Government website at www.business.qld.gov.au.

Objectives

The objectives of the exercise were set using the requirements of the recognised standard and reviewing previous exercise reports. The objectives were to test:

- coal mine workers (CMWs) ability to self-escape
- mine site incident response
- ability for triage on a large number of CMWs
- donning of self-contained self-rescuers (SCSR)
- interaction with ISHR, Queensland Mines Inspectorate and the Police Service
- mobilisation of Queensland Mines Rescue Service (QMRS) and the establishment of a fresh air base (FAB)
- social and mainstream media interaction.

The exercise is the focal point for emergency preparedness in the state.

Cook Colliery

Cook Colliery mine is approximately 40 years old and is the oldest operating underground coal mine in Queensland. Coal extraction is by the bord and pillar mine method using continuous miners and shuttle cars. There have been two unsuccessful attempts at longwall mining at Cook Colliery. *Figure 3* shows the panel layouts at the mine.

Figure 3 Mine layout Cook Colliery

Scenario

The scenario for the exercise was based on a substantial earthquake—measuring 7.6 on the Richter scale—that caused major disruption to the mine power and infrastructure, including:

- A major fall in the drift, with no access in or out and a substantial blockage of ventilation.
- Loss of power to the mine site at the Ergon Energy substation with back-up power generators starts for the control room and gas monitoring.
- Power restored at the Ergon Energy substation after 30 minutes.
- Available shaft for man-riding was covered by a standby generator.
- One team of CMWs were to be trapped with rising water, methane (CH_4) and carbon dioxide (CO_2); within an oxygen-depleted, irrespirable atmosphere. Three of the CMWs are injured. The earthquake created a connection to the sealed Castor Seam workings above the workings in the Argo seam. The water and irrespirable atmosphere then flowed into the area where the trapped CMWs were[2] located.
- Escaping CMWs from the other panels are injured/distressed with a limited capability for inseam response.
- Minor roof falls elsewhere in the mine.

This scenario presented the following issues to be addressed:

- CMWs ability to self-escape via the second egress cage.
- Mine site to deal with multiple casualties.
- Trapped CMWs to test the duration of the belt worn SCSR and the long duration SCSR as well as changeover between units.
- Mine to use non-verbal communications with the trapped CMWs.
- The restoration of power as a surface electrician talks through the re-powering of the system.
- Mine site to form an incident management team (IMT) with no power for the first 30 minutes to 1 hour.
- QMRS to deploy underground and establish a fresh air base and rescue the trapped CMWs.

A timeline of key events and activities was recorded by all assessors and a combined exercise timeline is presented at Appendix A.

A summary of activities at each location assessed is presented in the next section of this report. Recommendations for improvement have been made in each section for industry to consider; where they are specific to Cook Colliery they are listed as Mine.

Appendix C contains reference material from the assessors on recommendations to assist in planning the running of emergency exercises.

In all, 22 assessors took part in the exercise, with representatives from Cook Colliery, Simtars, Queensland Mines Inspectorate, Queensland and New South Wales mines rescue services, an ISHR from the Construction, Forestry, Mining and Energy Union (CFMEU), Minerals Industry Safety and Health Centre (MISHC), Department of Natural Resources, Mines and Energy (DNRME), Office of the Commissioner for Mine Safety and Health and mine staff from Kestrel, Oaky North and Grosvenor coal mines. Mine staff representatives

[2] Cook Colliery had a water inundation from the Castor Seam on a longwall panel in March 2017 approximately 1200 m inbye of the location of the “trapped CMWs”.

were mainly personnel studying for statutory certificates who wished to broaden their experience in emergency response. Underground assessments

203 Extraction Panel

Assessors: Tim Jackson and Ben Lang

The assessors introduced themselves to the crew at the crib room and requested that they continue on as per their normal day and they would be provided with further instructions as and when required. The crew was given the Level 1 briefing as per the notes at Appendix D: Briefing notes prepared for the Assessors.

The crew was made up of:

- one explosion risk zone controller (ERZC)
- seven CMWs
- one yellow hat (0-3months experience)
- two orange hats (3-12months experience)
- four CMWs (more than 12 months experience) wearing white hats.

The CMWs were deployed to the following areas at the start of the shift:

- three CMWs were at the continuous miner (CM) B heading 7-8ct
- three around the shuttle car in C heading 6-7c/t
- one CMW operating load haul dump machine (LHD) outbye.

The assessors split up for the start of the exercise to inform both major groups of CMWs of the exercise event.

The earthquake occurred at 8:30 am. The crew were informed that ventilation had stopped and there was no power (CMWs felt an over pressure in the panel).

All three CMWs located at the CM received injuries from the earthquake. The ERZC had a broken right leg, the CM driver had a broken left arm and the inexperienced CMW was unconscious as a result of his injuries.

The three CMWs from C heading made their way around to B heading and found the three injured CMWs. Triage was completed in a timely manner; one CMW went to the cribroom for first aid equipment and phoned the control room operator (CRO) at the district circuit breaker (DCB). He then returned with the Driftrunner and basic first aid equipment.

During this time a CMW inspected the panel and reported back to the ERZC that there were impassable roof falls B heading 7-8ct, C heading 7-8ct & 5-6ct, 7ct C-D & 6ct C-D (Blocking all escapeways except the B heading travel road).

The LDH outbye operator came to the CM and informed the ERZC that the travel road had experienced a roof fall outbye the cribroom B heading 5-6ct. *Figure 4* shows the locations of the roof falls.

The ERZC was notified that of low ventilation and that gas levels where rising along with an inflow of water.

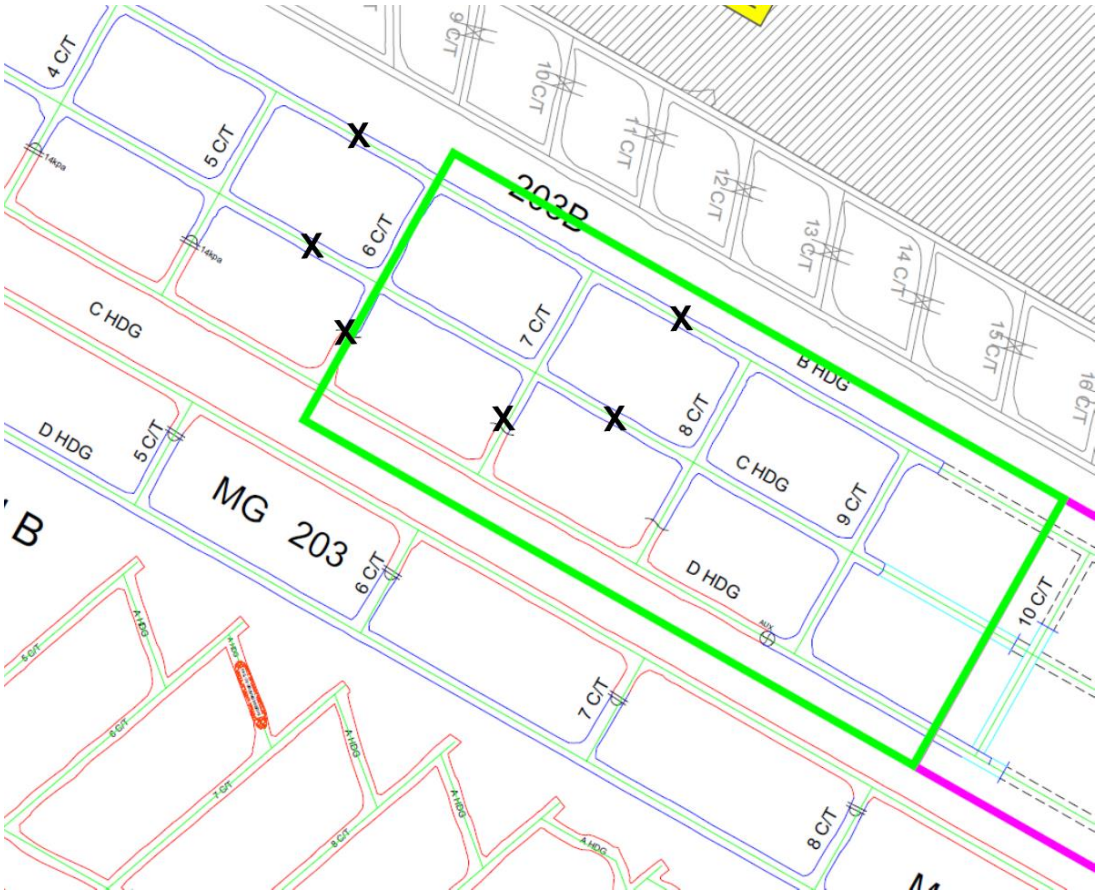


Figure 4 Roof fall locations in Panel 203B

The three injured CMWs were placed into the Driftrunner and taken to the cribroom.

Further first aid was administered to the injured CMWs in the crib room. Fractures were immobilised and regular checks on the wellbeing of the CMW with the head injury were carried out.

All information was relayed to the CRO.

The ERZC told the crew to put on their belt worn SCSR as the gas values were indicating an irrespirable atmosphere. A CMW notified the CRO of the situation and advised he would now use non-verbal communication methodologies. The CMW making the communications to the CRO was an inexperienced CMW with 3-12 months experience. He made notes of the communications for reference purposes later. A copy of these notes can be found at *Appendix E: 203 B CMW hand written notes.*

All communications between the crew were done via note pad and pen. The CMW communicating with the CRO used the note pad to seek guidance from the ERZC on what had to be relayed to the CRO.

All communications to CRO were non-verbal, using the telephone key pad; three beeps for yes and two beep for no. This caused confusion and frustration for both parties when open questions were asked and led to internal communications between the trapped CMWs.

The CMWs changed over to another SCSR (all had issues with breathing tube as stuck together for being packed) a couple didn't fit nose clip on the new rescuer.

Two Cook Colliery response crews attempted to rescue the trapped CMWs but were unable to get past 5 c/t (*see Figure 4*). The first team were affected by an aftershock. Three of the six team members were injured, the second team could not advance inbye of 4 c/t due to an irrespirable atmosphere.

Mines rescue were deployed to establish ventilation in area, install roof support and recover the trapped CMWs.

What worked well

The assessors noted that the following elements of the exercise worked well:

- The non-verbal communication from the CMW (orange hat) between CRO and other CMWs.
- Triage of injured CMWs and first aid given (ERZC and crew first aider injured).

Areas for improvement

The assessors noted the following areas for improvement:

- Improved training in what real SCSR are like to wear and the differences between a real SCSR and a trainer SCSR.
- The non-verbal communication questions need to be closed questions that only require a yes or no type response.
- When asking questions, the control room operator should allow time for the CMW to interpret the question and provide the answer.

205 Mains Development

Assessors: Jason Hegarty, Reka Fox and Paul Shorthouse (AV)

Evacuation video footage was taken using a GoPro camera and a Lume Cube lighting system. *(See Figure 5).* The footage is used:

- to verify events recorded by the assessors
- as a training tool for the mine
- to provide a storyline for dissemination of exercise learnings to industry.

The assessment team deployed to 205 Mains Panel and briefed the 14 man crew on what was expected of them in the area inbye of the panel gate end box. A copy of the briefing information is supplied at

Appendix D: Briefing notes prepared for the Assessors*.*

At 8:30 am, the ERZC learned of the earthquake and the injuries to his team. In response:

- four CMWs were allocated to assist the injured worker with a broken leg
- two CMWs went to the cribroom to obtain first aid equipment and a stretcher
- two CMWs maintained care of the injured CMW
- three CMW assisted an injured CMW with a sustained a broken arm - they helped the injured CMW to the cribroom and provided first aid
- other CMWs began to get the Driftrunners ready for transportation to pit bottom.

The CMW with a broken leg was treated, put into the stretcher and carried to the cribroom. Both CMWs were then given Entonox for pain relief (the mask was wiped out between patients).

Both injured CMWs were then given priority into the Driftrunner, the holding brackets were put into the correct place and then the stretcher locked in. Two non-injured workers were then loaded into the Driftrunner to take care of the injured men.

The panel ERZC gave instructions to the driver to drive to the shaft as the drift haulage was out of service due to maintenance[3]. He then asked the non-injured CMW to communicate to the driver about any issues with the injured CMW.

The driver drove to the conditions of the roadways and was aware of the injured patients. The team stopped at the tag board, retrieving their tags and then proceeded outbye. As the team were proceeding along South Mains they were stopped by the shift undermanager (UM), who communicated with them about the situation and the status of the injured CMWs.

When the team arrived, the Driftrunner was parked as close as possible to the cage so the injured workers could be put into the cage easily. When the UM arrived at the cage he formalised a plan for personnel to be taken to the surface and asked an ERZC to transcribe the names of the CMWs as they entered.

The UM also started to formulate a plan to take uninjured CMWs back inbye to try and help the trapped CMWs in 203 panel. At some stages the UM commented on the lack of information flow from the surface IMT and this led to decisions being made underground without surface involvement. The shaft attendant maintained good communications with the pit bottom area.

The injured CMW from 205 Panel reached the surface at 09:21 and were taken to the first aid room. They were both treated there and taken to hospital via “ambulances”[4].

[3] The scenario of the earthquake was designed to test the Cook Colliery shaft winder capability by blocking egress from the drift due to the roof fall. As the drift haulage was out of commission the evacuating crews did not go to the bottom of the drift and view “the blockage”. Cook Colliery already had staff at the winder so there was no delay in getting a winder operator.
[4] The Queensland Ambulance Service was not involved in the exercise and no ambulance vehicles were used.

Figure 5 GoPro and Lume Cube equipment

What worked well

The assessors noted that the following elements of the exercise worked well:

- The assistance and treatment provided to the injured workers by the panel crew.
- Communication by the ERZC to the panel crew.
- Driving to the underground conditions with injured men in the vehicle.
- Underground travel road droppers for 2nd egress.

Areas for improvement

The assessors noted the following areas for improvement:

- Stretcher at cage (if needed).
- First aid training for workers.
- Training for workers in administering Entonox to better understand the gas and how to use it.
- More masks for Entonox for multiple injuries.
- Communications between the underground workings and the surface

204 B extraction

Assessors: Steffan Ryder and Brendan Clinch

The assessors travelled to 204B extraction panel and introduced themselves to the crew.

They requested the crew continue on as per their normal day and would provide further instructions when required. The crew carried out pick changes and maintenance on the miner in preparation to cut for the day. The miner was in the area of 13 c/t c heading and was about to set up for a plunge.

The crew was given the Level 1 briefing as per the notes at

Appendix D: Briefing notes prepared for the Assessors*.* The crew consisted of one ERZC and six CMWs.

At 08:30 the production crew was given the exercise scenario. Three CMWs were designated to have injuries (one with a broken arm, one with a laceration to the forearm and one with a laceration to the forehead). Initial first aid was rendered on scene as the ERZC instructed the crew to retreat back to the cribroom.

On arrival at the crib room the ERZC called the CRO on 555 (the emergency number) and was successful on the third attempt. The ERZC provided the CRO with detailed primary information on the situation, injuries to CMWs and proposed means of egress. The ERZC then briefed the crew on their proposed egress strategy in the Driftrunner.

The crew got into the Driftrunner to turn it round as it was parked nose into the stub. The ERZC remained in the cribroom to assemble the Entonox, taking five minutes to complete. The only member of the crew with Entonox training was the ERZC.

The crew then headed out via primary egress and stopped at 1 c/t SCSR cache for the ERZC to update CRO. The ERZC were informed the dolly car was out of service and they would have to exit the mine via the man cage at pit bottom. The ERZC indicated he would take spare SCSRs for crew as a contingency.

The crew drove past the tag-board (leaving tags behind) and headed to the next cache at 24 c/t mains where the ERZC updated the CRO and further first aid was rendered to the injured CMWs.

The evacuating crew met the UM at the next cache at 5 c/t mains. The UM boarded the Driftrunner to return to pit bottom at the cage location.

The crew arrived at the cage at 09:03 and were met by an outbye work group. The UM took control of the situation, prioritised the evacuation and ensured that the injured CMWs were monitored. The UM called the CRO for an update.

The UM were informed of:

- a roof fall
- entrapment of the crew in main gate (MG) 203B
- injuries to the 203B CMWs
- the increasing gas levels
- falling oxygen levels
- mobilisation of QMRS and ambulance services.

The UM delegated tasks by directing MG 204C ERZC to stay and monitor the evacuation of the injured people and control the man cage activities.

The UM then briefed two ERZCs and four CMWs about travelling back inbye to assess the fall and the situation around the entrapped CMW’s.

At 5 c/t mains cache the UM called the CRO and informed him of the plan. On entry to 203B panel he called the CRO at the tag-board and informed him of the manning of panel. During the trip in the two ERZCs checked all ventilation control devices (VCD’s) for damage and every c/t for any available timber.

On arrival at 5 c/t 203B *(see Figure 4)* the team were informed of the fall locations and gas levels. At this point there was an aftershock and three of the CMWs in the recue team were

injured. The decision was made for all to head back and evacuate the injured personnel to surface.

The UM updated the CRO of the situation on exiting the panel and was told a ventilation change was required to maximise ventilation in the 203B panel. The CRO also relayed this information to the ERZC controlling the cage activities at 09:53.

At 5 c/t mains the UM rang the CRO and spoke with the ventilation officer (VO) about the required ventilation change and was given details of the required changes to the panel regulators. The UM then explained the required changes to a CMW using a mine plan. The ‘ventilation change’ was conducted in a timely manner and all required information was communicated back to CRO at 11:30.

At 11:40, the ERZC were informed that a crew was being sent underground to isolate the services to 203 B panel and attempt to repower 203 A and 205 mains. Once the crew arrived underground the assessor followed the repowering crew to drop an operator off to get a load haul dump machine (LHD) at 5 c/t 205 mains and on to 28 c/t transformer. On arrival to the transformer the ERZC inspected for methane and the electrician made a call on repowering the mine. The electrician was told to wait for approval from the electrical engineering manager. There was confusion with the labelling of the ERZ/NERZ boundary monitors and panels. The panels could potentially be named differently as 203 B was not to be powered but 203 A was. 203 A was labelled MG 203. There was also a 204 C panel inbye the 203 A panel and a MG 204 label. There was definitely potential for someone to power the wrong area.

All non-essential personnel were evacuated to surface at 12:05 and the UM was informed that QMRS were onsite at 12:21.

At 13:20, the re-ventilation team were informed that they unable to ventilate 4 c/t 203 B, and there was still an irrespirable atmosphere. QMRS were required as well as an evacuation back to pit bottom. This crew removed the tags from the 203 A tag board and took them outbye.

At 13:35, the crew arrived back to pit bottom. The UM was in contact with surface and was informed that the CMWs were to be sent out of the mine. The UM, two ERZCs and one CMW stayed underground until QMRS arrived.

At 14:45, QMRS arrived at the pit bottom and used the waiting vehicles (one of which was out of air) and headed inbye to recover the entrapped personnel.

At 14:55, the UM were informed that an inspection of the weigh station and transfer point of the drift belt was required *(see Figure 6).* Two ERZCs went to the area and discovered a substantial roof fall at pit bottom which was restricting ventilation. This had also damaged a 4 inch water pipe. The pipe was then isolated, the area demarcated, and the relevant information were passed on to CRO at 15:15.

The exercise stopped at 16:00hrs.

Figure 6 Roof fall at the bottom of the dolly car drift

What worked well

The assessors noted that the following elements of the exercise worked well:

- The team performed first aid with a level of competence, considering the only first aid trained person was designated with a broken arm.
- The primary egress was well designated with the droppers clearly showing correct direction with green for go and red for no.
- MG 204B ERZC and crew worked well together and communication was very good throughout exercise.
- The UM controlled underground activities very well and had passed on suggestions when the opportunity presented itself.

Areas for improvement

The assessors noted the following areas for improvement:

- On evacuation from the underground the crew did not stop and retrieve their tags from the panel tag board. The failure to use the tag board system could have left CMWs in the district with their whereabouts unknown.
- The naming of the panels and the labelling of the boundary monitors at 28 c/t transformer in the mains appeared to cause confusion.
    - Panel 203 B is entered via MG 202 and was labelled as 203 B on the boundary.
    - 203 A and 204 C are both entered via MG 203 and labelling on the monitors included MG 203, MG 204, MG 205 and south mains.

    - There is the potential for someone unfamiliar (for instance a panel electrician sent to assist) to power the wrong district.
- The crew had minimal First aid and Entonox training.
    - Only one CMW was first aid trained and the ERZC was the only Entonox trained person in 203 A crew.
    - In the event that there was an actual multi-casualty event, the benefit of more people trained in first aid and pain relief could not be understated.
- The ERZC's could have been used better during the exercise. Given the scenario of an earthquake, the potential for compromised roof and sides would be high. Rather than an ERZC controlling pit bottom of the cage, a CMW could have been used and an inspection of roof and sides throughout the mine could have been undertaken. This potentially would have discovered the fall in the drift earlier (the incident occurred at 08:30 and the fall was not found till 15:00).
- First aid was administered well in spite of a limited number of trained and competent people on crew.
- Leaving tags on the tag-board is not best practice, as it is essential in an emergency situation to have control and the ability to account for men.
- A quick and safe evacuation is paramount when the need arises. The scenario didn't require as many stops and updates as were given by the crew.
- Evacuation was hindered by the fact that the Driftrunner was not reversed into cribroom.

Outbye

Assessors: Nathan Kidman and Blaise Gassin

The outbye assessors' duties were to locate CMWs who were deployed to activities other than the main work areas. These personnel were not the main focus of the exercise but needed to be covered to see what communications they received and how they responded. The outbye work team were located in 205 mains development; the assessors followed this group as they evacuated back to the shaft and then the recovery crews sent into 203B.

The 14 crew, were given the Level 1 briefing as per the notes at Appendix D: Briefing notes for Assessors.

At 08:30, the CMWs were informed of the earthquakes and the injuries to two CMWs; one CMW with broken leg and one CMW with a broken arm. First aid was applied to the injured CMWs. They were placed in a Driftrunner with two CMWs to monitor/provide assistance as they drove out via the 2nd egress shaft. The dolly car/drift winder was down for maintenance at the time.

This left nine CMWs in the panel, one of whom was an ERZC.

The ERZC briefed the remaining CMWs with the information he had received (dolly car down, use 2nd egress), escapeway plans were taken from the cache in the cribroom and the remaining Driftrunners prepared to evacuate the crew. After approximately five minutes the crews were instructed to exit the panel by the ERZC. The ERZC stopped at the panel entry and ensured all CMW's from the district were accounted for before the Driftrunners left for pit bottom. The ERZC instructed the Driftrunner operator to travel with caution to the 2nd egress shaft and the ERZC stopped the Driftrunner at 5 c/t in the south mains to contact the CRO to inform him of the location of the crew and to check for any updated information.

The crew arrived at the 2nd egress shaft and were meet by the UM. He informed them there were trapped CMW's in 203B panel and ran through a plan for a group of uninjured CMWs

to travel back inbye to attempt to rescue them. The recovery team consisted of the 205 mains ERZC, UM and five CMWs. The UM left two CMWs and the ERZC from 204 panel at the bottom of the 2nd egress shaft.

At approximately 09:14, the UM took the recovery team into 203B. He maintained regular communication with the CRO, accounting for his recovery team and the plan going forward. He proceeded to create a plan to establish ventilation and support the lip of the fall that was potentially blocking egress of the trapped CMWs. When the team arrived in 203B where the UM was told there had been an aftershock and three of his recovery team were injured and the UM was therefore unable to provide assistance.

The 204 panel ERZC (stationed at the 2nd egress shaft) maintained regular communications with the CRO. On the third update, they were told that the recovery team sent inbye to attempt a rescue, were retreating to the 2nd egress shaft. They had sustained additional injuries due to a roof fall at 5 c/t B heading 203B. The ERZC then called the cage operator and requested the cage be locked out at pit bottom until the injured CMWs were ready to be evacuated to the surface. Five CMWs (three injured) from the recovery team arrived at pit bottom and were evacuated to the surface. The 204 panel ERZC were told by the CRO that the UM and another CMW from the rescue party were conducting tasks as requested by the IMT. Another group of CMW's were being prepared to be sent down.

During this time, the UM spoke with the VO about making ventilation changes to the panel to establish a high differential pressure across the roof fall in 203B. The UM and the CMW completed these tasks and arrived at pit bottom approximately one hour later.

Additional CMWs arrived from the surface to discuss a plan with UM. This involved one group to start repowering the mine and another to travel into 203 panel, isolate services and assess the fall to determine the easiest one to remove.

The group of CMWs (one ERZC from 205 panel and five CMWs) left for 203B panel dropping off one CMW at pit bottom who was to bring in a LHD and bucket. The crew arrived in 203B panel at approximately 12:07 and isolated the service pipes at the start of the panel.

The ERZC notified the CRO of the current status and informed him that:

- the group was travelling inbye
- the Driftrunner got to mid pillar 4 to 5 B heading and 'shut down on methane (CH_4)' - the ERZC found the gas reading was 1.4% CH_4.
- The Driftrunner was then bypassed and parked outbye of the gas fringe.
- The ERZC advanced on foot from 4 c/t to 5 c/t B Hdg and found O_2 at 18.88% and CH_4 at 1.97%, approximately 10 meters inbye from where the Driftrunner shut down. *(See Figure 4)*

The ERZC rang the CRO and informed them of gas concentrations he had found and was told the other group were ready to re-energise the electricity supply to 203B panel.

The ERZC stated 'do not send power into the panel' and that he would wait for further instructions.

The VO contacted the ERZC by phone at 4 c/t and requested that the stoppings and various ventilation changes be made to try and remove the accumulation of gases at the roof falls.

When the ERZC tried to build a bag wing, the crew were overwhelmed by gas. The ERZC assessed the situation as uncontrolled and unassailable. He then removed himself and the CMW's to 4c/t and contacted the CRO. He informed them they were retreating to pit bottom and QMRS were needed due to the atmospheric conditions.

At approximately 14:30, the UM were asked by CRO to inspect the drift and trunk conveyors as there may be a possible restriction/roof fall. He sent two ERZCs for the inspection and they arrived back at approximately 15:15. He notified the CRO of a roof fall in the drift blocking egress.

The UM ensured the Driftrunners at pit bottom were watered up and facing the correct direction so they were ready to go when QMRS arrived.

Seven CMWs entered the cage and were returned to the surface where their details were recorded. The crew waited for approximately 20 minutes and then decided to walk back to the main surface buildings as there was no transport for them. Once back at the main surface area the crew names and lamp numbers were recorded and the crew were provided food. After a break, a surface person debriefed three of the CMWs.

What worked well

The assessors noted that the following elements of the exercise worked well:

- ERZC communications to both the crew and to the surface during the event.
- Evacuation was carried out in an orderly manner.
- UM gave clear concise direction while large congregation at the bottom of the shaft:
    - Ensured while communicating back to the CRO he was accounting for CMWs with him, status of those CMWs, the plan going forward, and the next location of contact.
    - Communicated the plan clearly to his crew.
- 205 ERZC evacuated slowly instead of erratic evacuation.
- 205ERZC personally accounted for men on the tag board by handing out tags.
- Ad-hoc plan to initially recover men was created efficiently and throughout this process communications to surface seemed adequate.

Areas for improvement

The assessors noted the following areas for improvement:

- There would be a benefit from having at least two people trained in first aid on each crew.
- Passing on of information of tasks already completed (crew arriving in 203 did not know of previous ventilation change conducted by the UM).
- 205 Panel deputy – initially lacking assertion.
- Had sent everyone up, didn't leave people down as resources to use – so they sent people back down to isolate services and take measurements.
- UM spent time looking for resources to support the lip of the fall and establish ventilation when he could have used the emergency pod.
- Limited rescue personnel underground.
- After his initial coordination of underground activities, the UM may have been better suited to take up a positon on the surface in operations in the IMT structure.

Conclusions: underground

These conclusions have been derived from the review of the comments of the underground assessors on the observations they made while assessing the evacuating CMWs.

- The ERZCs at Cook Colliery led by example and initiated emergency response.
- ERZCs need to assert themselves as the leader of the group in an emergency situation.
- Parking of Driftrunners nose into stubs impacted on the time taken to evacuate the panel.
- UM took control of the shaft location, communicated to surface and raised an inseam response team.
- Entonox systems were difficult to assemble.
- Nose clips are uncomfortable.
- First aid was rendered to injured personnel quickly to ensure a timely evacuation.
- Good strategic options for fall recovery and ventilation of the fall sites.
- Issues with labelling of electrical supply equipment.
- Some frustrations were experienced with the non-verbal questioning.
- One crew left their tags on the Tag-board during the evacuation.
- Contact with the CRO was delayed at the beginning of the incident due to the large volume of calls being made.
- UM was left underground all-day controlling activities. It is possible that the UM would have been better used in the IMT. Two ERZCs could have coordinated the underground response.
- Dolly car being down for maintenance changed the dynamic of the scenario so everyone went straight to the winder.
- Operational personnel who are not kept in the information loop will sometimes make decisions and act on them.
- No available first aid equipment or stretcher in the winder shed.

Recommendations: underground

These recommendations are based on the observations of the underground assessors and their identification of areas for improvement.

Mine

Recommendations for the mine are:

- Review the panel tag board process especially in the event of an emergency and re-iterate to crews why tag board use is essential.
- Review the labelling of the NERZ/ERZ boundaries at the mine. It created confusion between the electricians and the ERZC.
- Train more people in first aid to ensure CMWs are familiar with the skills and are able to use everything available to them at the time i.e. Entonox.
- Review non-verbal communication protocols including the use of closed questions.
- Keep CMWs informed of the situation as much as possible. Personnel were getting concerned / agitated about time taken to be rescued.

Industry

Recommendations for the industry are:

- All mines to review their emergency response systems by way of a gap analysis against the level 1 recommendations. It would be beneficial to learn from and implement changes so that the same shortfalls are not repeated during future level 1 exercises. By doing so, the process across the industry will be improved.
- Review nose clips on both short and long duration SCSR. Personnel complained of the pain to their noses causing them to take them off periodically to massage their nose before replacing.
- Need a better methodology for two-way communication; it should be standardised for Queensland. The current nonverbal is very frustrating and confusing for both the CRO and the communicator underground.

Surface assessments

Cook Colliery uses the Mine Emergency Management System (MEMS) for emergency response. MEMS was developed by Queensland Mines Rescue Service (QMRS) to provide an outline and structure for mines to coordinate their emergency response. The system is based on the Australasian Inter-service Incident Management System (AIIMS 2017). See Figure 7.

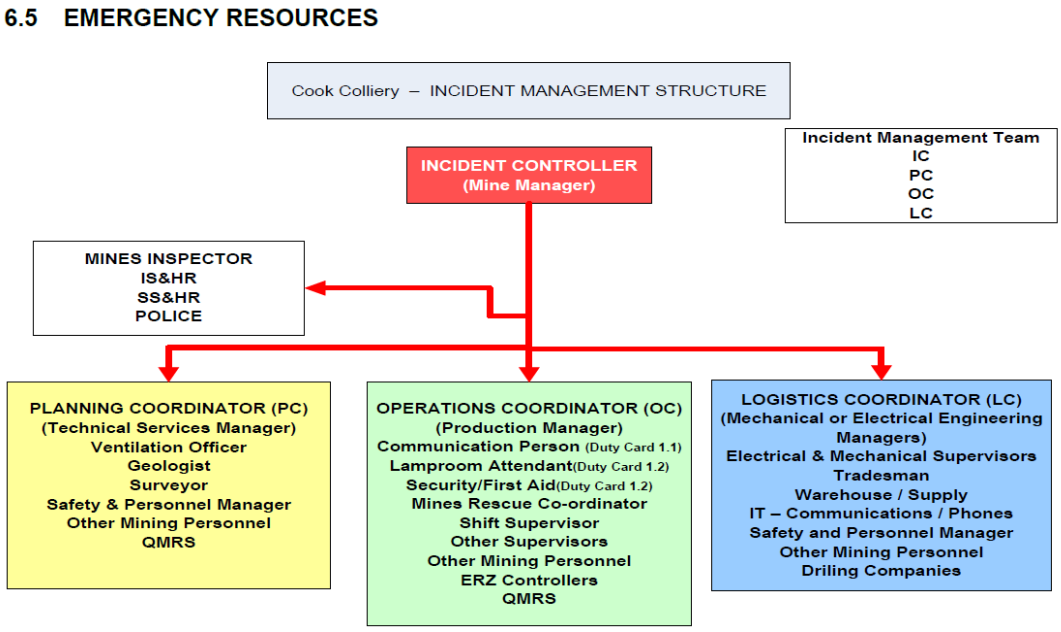


Figure 7 Cook Colliery Incident Management Structure

Control room

Assessor: Snezana Bajic

The Level 1 exercise commenced at 08:30 when the CRO was notified of the exercise scenario - an earthquake had caused a loss of power across the site; except in the control room, which had an uninterruptable power supply (UPS) and back-up generator.

The CRO:

- initiated the mine site emergency procedure
- selected the 'communications person' vest
- activated the activity log sheet (to record all actions and communications made), as per PHMP002APPB (Underground Emergency Response Plan Duty Cards)
- called the electrician in charge and requested investigation into restoring site power.

A back-up CRO and a scribe were appointed; the back-up CRO was on site for non-regular workshop duties at the time of the incident.

The emergency alarm was sounded and multiple phones were ringing in the control room. This increased the noise levels and made internal communication within the room difficult.

The tag board reconciliation was carried out several times in an attempt to work out who was trapped once it was identified that CMWs were trapped in 203B extraction panel.

Initially it was thought that seven personnel were trapped as per the tag board. At 09:41, all eight trapped personnel were identified by the control room operators, and the information was communicated to the operations team by the scribe.

An issue of water level rising in 203 B was identified at 10:35 and the incident controller (IC) and VO were immediately informed.

Regular communication was maintained with the trapped CMWs. However, it was difficult when mines rescue were deployed, as that phone line was a party[5] line.

Although Cook Colliery is not a particularly gassy mine, the VO checked the gas monitoring system for any changes in gas levels.

What worked well

The assessors noted that the following elements of the exercise worked well:

- Two CRO's and scribe had the communications under control, collected and evaluated the available data.
- The team organised themselves and delegated tasks and responsibilities as appropriate as part of the emergency response.
- Non-verbal communication was clear, quick and any misunderstandings were quickly resolved.
- Ambulance was deployed in reasonable time to assist injured personnel.

Areas for improvement

The assessors noted the following areas for improvement:

- The control room became overcrowded and noisy.
- There was confusion about who belonged to which team (operations, logistics and planning). The reporting lines were not clear.
- The three people in the control room were taking separate notes, mostly duplicates of the same information, there was missed and/or miscommunicated information and the emergency response templates were not used.
- There was confusion regarding "*control room operator"* and "*communication surface*" duties. Neither of the CROs used the duty cards.
- CRO appeared not to have any time available to activate the duty card system.
- Notification list as per PHMP002APPB was not used.
- TARP for situation was not used/referred to by CRO.
- It was not clear who is responsible for communicating with next-of-kin.
- Mines rescue response register was not completed in the control room, as per the site procedure
- Change-out (relieve) duties for key personnel as per PHMP002 was not organised:
- Gate security was notifying the control room every time when someone entered the mine site, while CRO's were trying to manage the emergency situation.

[5] A party line is where two or more phones are put on one number and conversations can be interrupted by a CMW picking up the phone not in use

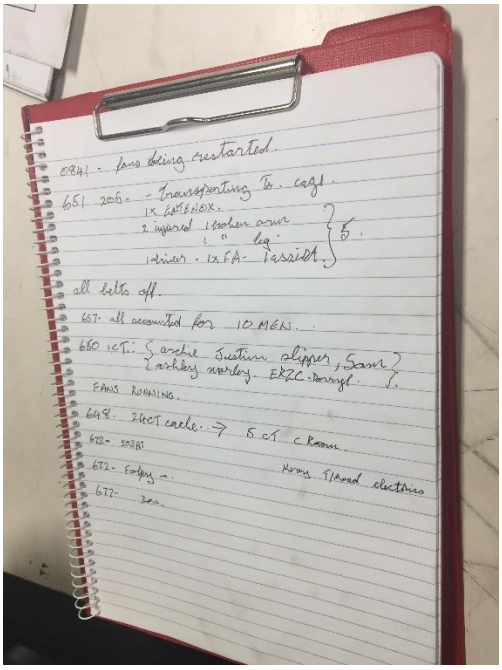


Figure 8 one of the control room logs

Incident Management Team and functional groups

Assessor: Shaun Dobson

The emergency commenced at 08:30 and the alarm was sounded at 08:37. The site senior executive (SSE) called staff into the muster area, and informed them to get their duty cards. If they were not assigned a job they were told to stay in their offices.

The Health, Safety, Environment and Training Superintendent (HSET) retrieved the duty cards from the control room and commenced issuing them in the Operations room at 08:42 *(see Figure 9).* At the end of the process there were 10 people who did not have a duty card allocated.

During the process of allocating the duty cards the HSET Superintendent arranged to have the site access gate secured. The HSET Superintendent did not participate in any official duty card role for the whole of the exercise.

The HSET Superintendent was informed that no senior level first aiders were available for the first aid room. He informed the person that he would assist.

At 9:15, the IC informed the IMT that all of the functional coordinators were to remain in their rooms when not at the IMT.

The VO suspected that the fall had holed through to the overlying Castor seam. The IC said that was not geotechnically possible and it was illogical for low oxygen to occur so quickly[6].

The IC stated that getting fresh air to 203 B crib room was required.

Whilst the MEMS system was being practised, most of the initiatives were developed by the IC in the IMT meetings. Most of these ideas were logical approaches to the situation faced

[6] Cook Colliery had a water inundation from the Castor Seam on a longwall panel in March 2017 approximately 1200 m inbye of the location of the “trapped CMWs”.

by the mine. However, when the planning or operations groups acted on them there was no evidence of risk assessments being undertaken. The planning group did conduct modelling of the ventilation options using the mine ventilation simulation software.

Several of the initiatives were on ventilation options to provide clean air to the trapped CMWs. These included:

- Altering regulators in the Argo seam to provide a pressure differential across the falls.
- Altering mine site regulators to draw air up into the Castor seam.
- Sending uninjured CMWs to clean up the falls.
- Utilising compressed air to improve the atmosphere behind the falls.
- Repowering the underground infrastructure after mine site power was restored (this was also after the failure of the real time gas monitoring system after the UPS had failed).

Police from Blackwater attended the site and were briefed on the incident in the IMT room *(see Figure 13).* Record keeping was completed on whiteboards/paper other than in the logistics room that had an active spreadsheet.

The Senior Sergeant from Rockhampton was also present at the exercise, although not in a response role, he was there as an observer of the mine and industry response process. The Senior Sergeant was briefed on the exercise scenario, the objectives to test and the anticipated responses from the mine.

He asked his officers to brief him on the status of the mine response at intervals. This would have been the case in a real event if he had been remote from site and they were the first response team sent by the police.

The IC briefed the police officers and the mines inspector approximately 40 minutes after they arrived on site. In a real incident it is doubtful if the police and the mines inspector would have been as patient to wait this long for a briefing.

The police were asked for advice on how to deal with ‘distraught relatives’ and how to control site access.

In an incident where there is a single or multiple fatalities, the police become the Coroners’ representative and have the ultimate authority over the incident site. In recent incidents with single fatalities, the police service have used the mines inspectorate for advice and guidance.

There was some cross over between operations and planning and the MEMS process was not truly followed.

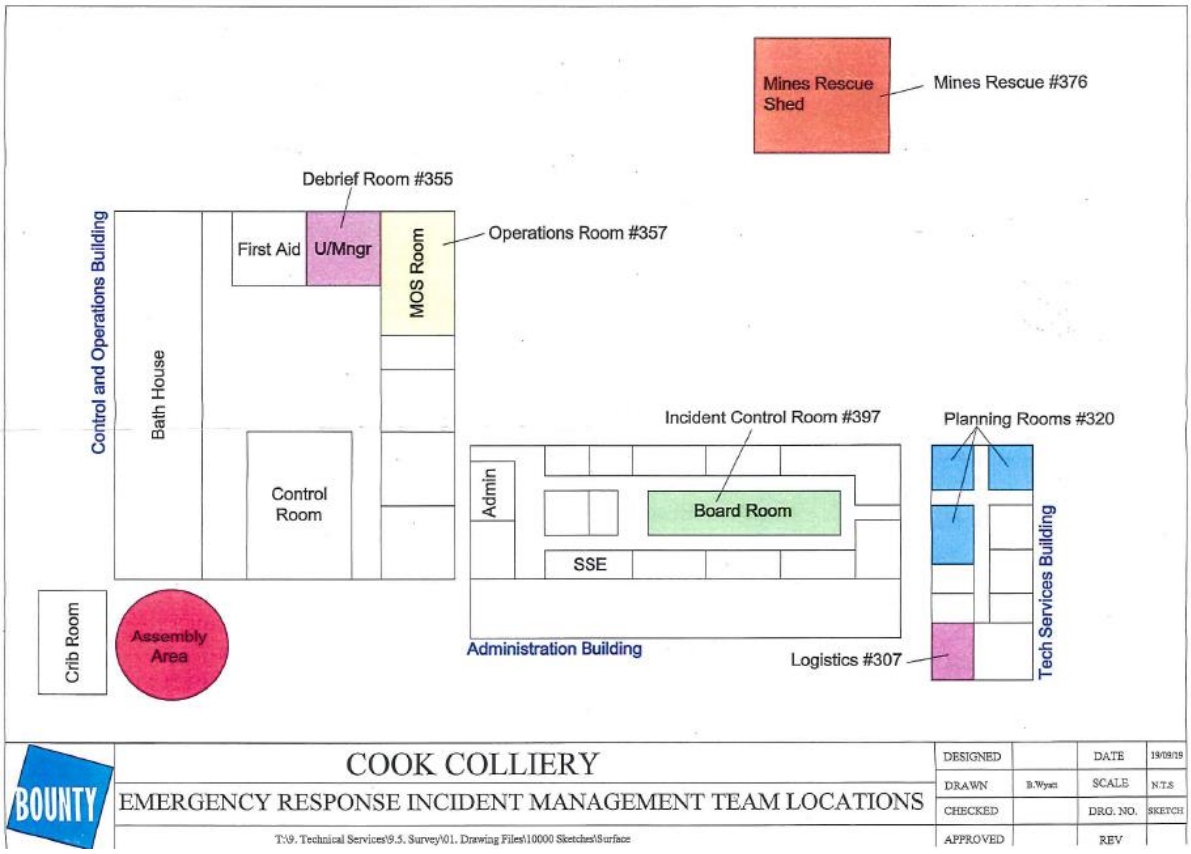


Figure 9 Location of IMT rooms

The logistics room was well organised and process driven.

The planning room consisted of the VO and planning coordinator working on the ventilation changes.

The IC did not have any contact details for the ISHR's.

The mine was conducing critical maintenance on the dolly car winder. This impacted on the underground CMWs escape plan and they went straight to the secondary shaft winder and did not see the 'fall' in the main drift, *(See Figure 6).* This fall was not recognised until late in the exercise. This would have had an impact on any risk assessment for mine re-entry as the mine was effectively in single entry conditions.

What worked well

The assessor noted that the following elements of the exercise worked well:

- The QMRS teams completed their assigned tasks.
- Practical solutions were identified for providing ventilation to the trapped CMWs.
- The mine attempted an inseam response to recover the trapped CMWs.

Areas for improvement

The assessors noted the following areas for improvement:

- Utilisation of the MEMS process and resources.
- Timely identification of relevant objectives and ongoing reference to these.
- Effective review of relevant information.
- Mobilisation of QMRS at earliest opportunity.
- Release of CMWs/Brigadesmen from surrounding mines.
- Effective use of duty card process and training of people in these roles.
- Confirmation of communications and critical information.

Incident Management Team

Assessors: David Cliff & Nikky LaBranche

This commentary should be viewed bearing in mind that Cook Colliery is a single mine company with limited resources and a number of key staff were unavailable. The scenario did not envisage that the main drift winder would be out of service for maintenance. The emergency management plan must allow for this.

The incident management process is modelled on the mine emergency management system (MEMS) based on the Australasian Inter-service Incident Management System (AIIMS 2017). It is relevant to contrast the exercise this year and last year in terms of number and function of duty cards and the number of personnel available to carry out key functions.

What worked well

The assessor noted that the following elements of the exercise worked well:

- IMT meetings were held frequently usually at around 30 minutes apart and were focussed and quite brief and kept on the issues. There were occasions when some members were late or forgot to attend meetings. (See Figure 10 and note the limited space available and the extensive use of handwritten notes).
- Objectives were identified and followed through.
- Incident controller carried out the initial briefing of surface personnel well.
- Key duty cards were allocated quickly (within five minutes of incident being triggered).
- Key function personnel focussed on their roles and stayed focussed on their functions.
- Personnel volunteered to fill functions that were unallocated due to limited resources – e.g. counselling families.
- IMT tried to work out the size of the falls with trapped miners to determine which area to tackle first.

Figure 10 Typical IMT meeting

Areas for improvement

The assessors noted the following areas for improvement:

- Information management processes could be improved.
    - The MEMS process contains a number of forms and processes that could be used.
    - Prepared sheets/white boards focussing on key issues would help focus the incident management team (IMT) process – e.g. situation report, personnel location/injury management, task list.
    - Information was lost between control room and IMT e.g. loss of main trunk conveyor.
    - Use of MEMS standard forms may have expedited the deployment of mines rescue teams underground as they are compatible with the mine re-entry assessment scheme (MRAS) process.

- The IMT had difficulty identifying the number and location of personnel underground. Information appeared to be available, but not used, in the control room (tag board). Information was recorded on various boards and sheets of paper but often not copied completely from one to another.
- In a real emergency there would have been greater requirements to communicate to corporate office and manage public interest. A small mining company will always be stretched but need to find a robust way of managing this.
- Social and mainstream media strategy should be more clearly defined and a duty cardholder assigned. In various places throughout the documentation media relations

are assigned to the Managing Director (Appendix B- Duty Cards s3), Chief Executive Officer (PHMP002 s8), Incident Controller (Emergency Response Checklist) or Media Liaising Officer (Appendix B- Duty Cards p45). The media liaising officer is listed as an IMT member, however, there is no duty card for this position.

- A formal succession plan needs to be included in the emergency management plan for key roles.
- On a number of occasions key decision making did not seem to be supported by risk assessments.
- It is recommended that the emergency response plan (including Appendices) and associated duty cards be reviewed in the light of the activities of this exercise. This does not imply that the actions actually undertaken were inappropriate, rather they were not consistent with the principle hazard management plan (PHMP). It should be noted that the PHMP was last reviewed with a different management team in place.

    - Alternate officers should be nominated to undertake functions when key personnel are absent (e.g. managing director for media relations- appendix B item 3, gas sampling and monitoring).
    - The action plans seemed to be developed in the IMT rather than in the planning group.
    - Not clear who the communications person was as the control room often communicated with IC via telephone – no evidence of control room log being delivered to IMT (ref duty card 1.1 line 5).
    - The gas sampling and monitoring role should be filled by someone other than the VO, as during an incident, ventilation management and scenario modelling will occupy the VO time – VO reports to planning coordinator (as per duty card 3) and Gas sampling person to IC (as per duty card 2) – PHMP specifies VO to be gas monitoring person.
    - Counselling services were not provided by safety and personnel manager (ref IC duty card No.2).
    - No evidence that the IMT members record sheet was completed.
    - Appendix C details the re-entry and assisted escape planning requirements. Other assessors may be better placed to comment on this but there was no evidence of the IC approving any risk assessments note objectives (item 2 Appendix C) – no evidence of an assisted escape management team being formed (item 4 appendix C) nor the development of an assisted escape plan as detailed in that item.
    - The IC authorisation of incident action plans was informal and verbal.
    - Not aware of the IC reporting regularly to corporate office (refer IC checklist).

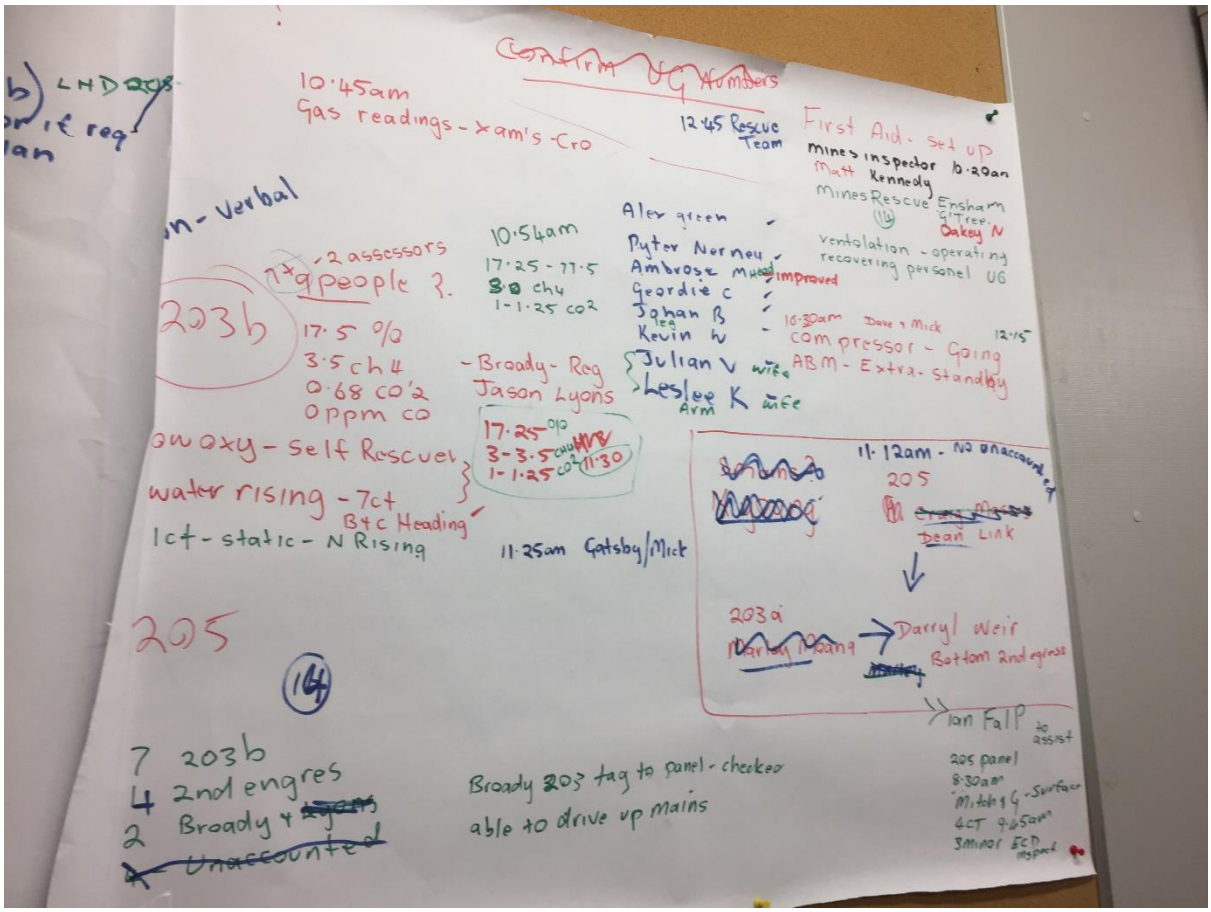


Figure 11 Missing people and other information

One of the sheets of paper displaying the dispersal of personnel underground and their injuries.

Note the overwriting and crossing out and the difficulty identifying updates, some areas time stamped others were not.

Note (*Figure 11*) the number of people underground has been updated (bottom left) but no time attached – identifies seven in 203B but list in top middle lists eight people.

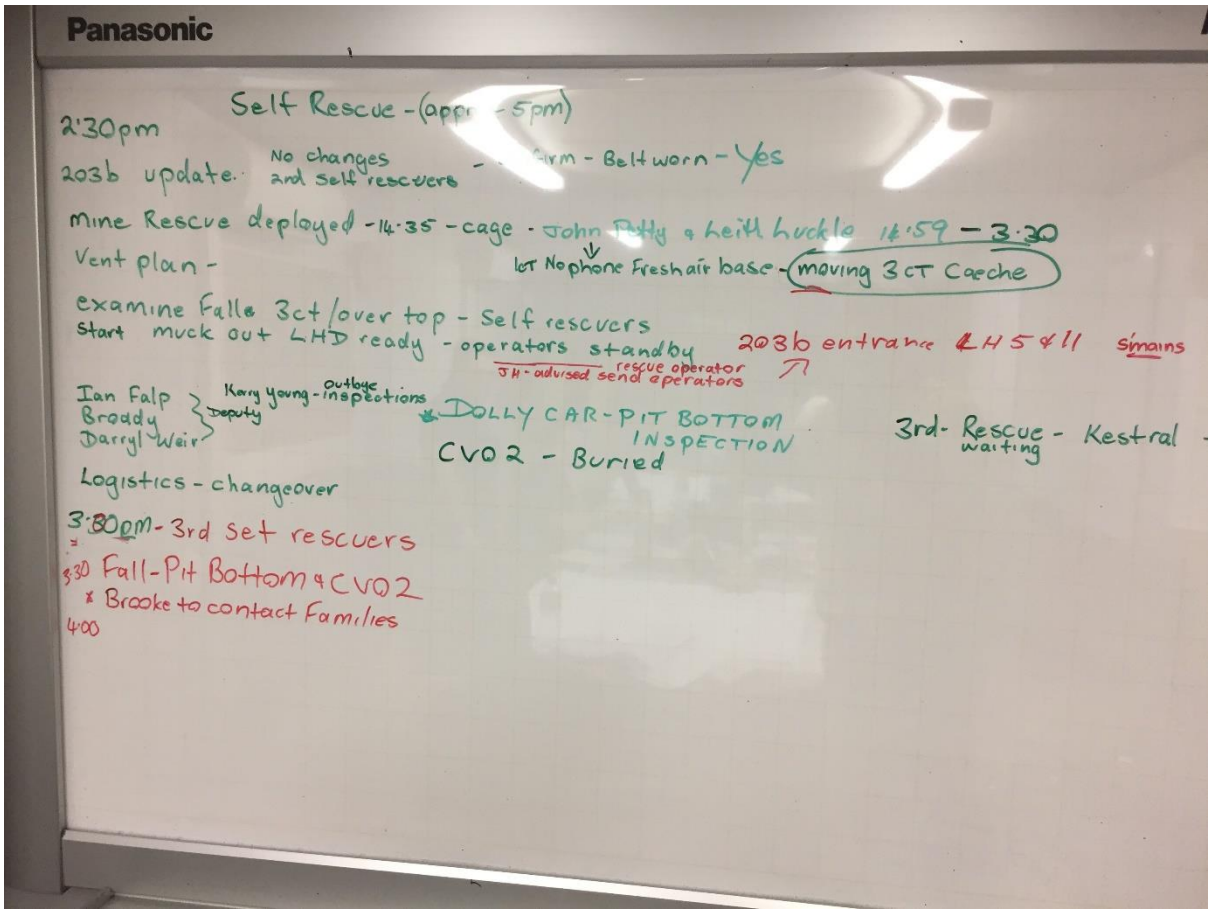


Figure 12 possible situation report and action plan

Figure 12 shows another display with selective updating of information with date stamping in some areas and not others. This is somewhere between a situation report and action plan.

Figure 13 Police officers being briefed on the underground situation

APPENDIX 1 ENTRAPMENT FAULT TREE

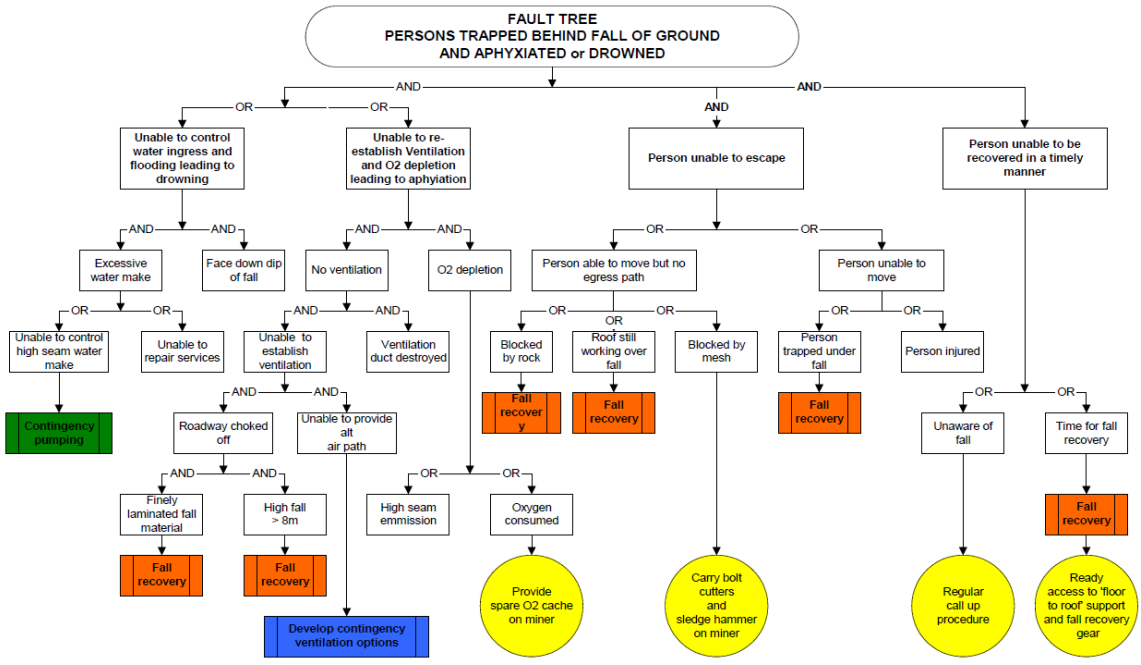


Figure 14 Entrapment fault tree

Operations

Assessor: Gregory Hall

The level 1 exercise response was activated by the SSE/Underground Mine Manager (UMM). He instructed that the site duty card system be activated. The CMW allocated the operations controller (OC) card was not familiar with the responsibilities and duties of the card. The operations team worked through the tasks allocated by the IMT, including the deployment of QMRS.

There were some issues with the allocation of the task list to QMRS and the QMRS operations manager insisted on a formal task allocation sheet. This included the development of a formal mine re-entry assessment under the MRAS process.

This process was driven by QMRS, not the mine site.

What worked well

The assessors noted that the following elements of the exercise worked well:

- CMWs successfully evacuated out of the 2nd egress shaft
- Injured people were treated effectively.
- There were enough people to help with tasks
- The operations team conducted the tasks given to them.
- There were clear instructions from the operations controller.

Areas for improvement

The assessors noted the following areas for improvement:

- The IMT did not identify the drift fall until late in the exercise; its influence on the mine ventilation and making the QMRS deployment under single entry conditions.
- There was no formal objective given in IMT, just tasks based.
- The IMT used numerous boards and there wasn't a time line; it became confusing with so much information continually being added to the boards.
- The IMT doors were not closed, people were coming and going and just given/providing information.
- No formal risk assessments conducted
- No site document or TARPs referenced in particular SWP 009 Entrapment procedure (see Figure 14).
- No formal update from the operations controller to team after each IMT meeting.
- No risk assessment conducted for mines rescue tasks. QMRS insisted that formal instructions be provided.
- Poor task list initially given to QMRS (see *Figure 15*).
- No person sent to help with injured off site.

1410 HR
GIVEN
PLAN TO MINES RESCUE.

Current situation	4 ct stopping removed
	B, C, D Hdg's gassed out 4-5 ct
	B & C Hdg intake airways
	D Hdg return
1	B Hdg 4-5 ct ventilate with brattice
2	Breach stopping 5 ct B- C Hdg
3	Re establish 4 ct brattice stopping B-C Hdg
4	Breach stopping 5 ct C-D Hdg
1	Positively ventilate to the falls from 5 ct in each heading
2	ascertain the distance to the falls and communicate
3	ascertain best method to establish ventilation to 6 ct crib room eg pipes and or tubes
4	ascertain best access to remove, support past fall

Figure 15 Initial task list given to QMRS

Planning

Assessor: Michael Lerch

The planning group evaluates and analyses intelligence on the current and forecast situation. They then develop strategies and plans to meet the incident objectives for consideration by the IMT. The control room and communications officers both have a direct reporting line to the IC. This means that key 'intelligence' bypasses the planning team and goes straight to the IC. Some of this information was recorded on the whiteboards as required in the IMT (See Figure 12).

The planning team formed approximately 20 minutes after the commencement of the emergency exercise. The technical services manager was handed duty card 3; planning coordinator. The planning coordinator was assisted by the VO who wore the vest as the 'gas monitor'.

The planning coordinator (PC) included all available information provided to date onto a mine plan. They them worked with the operations coordinator, in the operations room, to develop an action plan.

The IC requested the planning coordinator provide fresh air to the crib room area of 203B (which was surrounded by roof falls trapping seven CMWs, much later determined to be eight CMWs) as it was deteriorating into an irrespirable atmosphere.

The VO developed a plan to increase ventilation to 203N crib room. The change required them to fully open the affected panel's regulator and bratticing over the other panel regulators to force more air through the falls surrounding the crib room. This was a good technical solution for the problem, however for the purposes of the exercise this was not deemed to be successful.

IC requested PC and VO determine if it was possible to ventilate the overlying Castor seam in order to increase ventilation to the incident area. It was determined that this was possible but direction was given to disregard this option by the exercise organiser.

The option to open a compressed air line and provide fresh air to the area was discounted, as information had suggested the fall had damaged the air and water lines. It was identified that water lines needed to be isolated to assist in mitigating the risk of the rising water level in the trapped area.

At 10:43, the real time gas monitoring was lost as the UPS supplying them was exhausted. From this time on the planning group relied on tube bundle monitoring and hand-held monitoring by the ERZCs. They reported readings through to the CRO for monitoring the underground mine atmosphere.

A plan was developed by OC in consultation with the PC to determine which falls to clear in order to create a ventilation circuit. Men were allocated to provide two crews of three men each using two loaders to clear the falls. The size of each fall was still to be determined.

At 11:25, the VO informed the planning group that no additional air had been provided to the incident area despite the ventilation changes, the atmosphere was still irrespirable and requiring QMRS to access.

It was reported that all three headings were gassed out at 203 B 4ct (see Figure *4*). A ventilation plan was developed to ventilate up to the falls using brattice. This task was to be performed by QMRS.

The trapped CMWs measured the internal distances to the falls. QMRS were required to measure external distances in order to calculate the size of each fall and evaluate which fall could be cleared to help provide fresh air to the trapped CMWs.

The inspector advised the VO and PC should complete Ventsim modelling and documentation for the proposed ventilation change.

The VO assisted the OC in briefing the QMRS teams on ventilation tasks to be completed. They provided a plan showing the location of the proposed fresh air base (FAB) and steps required to complete tasks were noted on the plan

At 15:05, the inspector asked if there were any issues with the drift pit bottom area. CV02 would not run and they needed to inspect the area. At 15.30, the IMT was informed of a roof fall at drift pit bottom, but there was no recognition of the importance of only one means of egress being available at the mine and what that entailed for the CMWs in the mine.

What worked well

The assessors noted that the following elements of the exercise worked well:

- Planning team communicated well with OC and control room and were efficient in the supply of requested information and plans.
- The VO provided detailed explanations in briefing the QMRS team about the planned tasks to be performed prior to their deployment underground.
- Some well thought out options provided to IMT for providing additional ventilation to the incident area.

Areas for improvement

The assessors noted the following areas for improvement:

- More structured approach required to interaction/ information exchange with IMT.
- No risk assessments were completed for the options identified.
- No reference to SHMS, or Tarps and the IMT needed to be prompted to utilise Ventsim modelling and documentation by the mines inspector.
- The fall in the main drift was not identified despite disruption to ventilation, collar pressure increase and tripping of conveyor belt.
- Did not use the whiteboard in the planning room or have a structured, documented approach as they developed plans, however, the team worked in well with the OC and the CRO.

Logistics

Assessor: Phil Fletcher

The logistics team started to assemble in the logistics room within 10 minutes of the declaration of an incident by the UMM/SSE. The Logistics Coordinator (LC) arrived after the initial IMT meeting. The Electrical Engineering Manager (EEM) commenced the operation of the logistics team by asking relevant questions for clarification and establishing a list of contact numbers:

- Was there firefighting water underground?
- Was there backup power for the compressors?
- Requested the coal handling and preparation plant (CHPP) to stop haulage of run of mine coal from the mine site,
- Identified contacts by placing a phone list on the wall and external stakeholders were identified to be called, QMRS were notified.

At 9:31, the LC arrived and briefed the logistic team on the incident. An action list was commenced. Team members proceeded to check on the status of power, services including IT, phones and the availability of external services compressors etc. The logistics personnel responded with urgency and focus.

The team included:

- Warehouse superintendent - Logistics Co-ordinator.
- EEM.
- Commercial Superintendent.
- Purchasing officer.
- Maintenance planner.
- Diesel fitter.
- Maintenance administration officer.

At 10:38, the LC returned from the IMT and reported no required actions. This happened again at 11:25 and at 11:51. In between the logistic team continued to investigate options status of stores, purchase orders etc.

At 12:00, there were a number of requests from IMT:

- Order food and water for 70 people.
- Look for intrinsically safe (IS) Flygt pumps, hoses and fittings for pumps either onsite or from local operations.
- Trailing cables for power pumps.

At 13:10 and 14:05, the LC returned from the IMT with no actions. The plan at the next meeting was to identify succession planning. The logistics team identified internal people to cover the store, mechanical and electrical trades and a winder operator.

Additional food was ordered as the initial order, while ordered in generous quantities, was consumed quickly. At 15:40, the LC again returned from the IMT without any allocated actions. The final IMT meeting was held at 16:10 when the exercise was completed.

What worked well

The assessors noted that the following elements of the exercise worked well:

- The logistics team worked together well as a team.
- The team responded quickly and in numbers, seven in the team, with good capability and authority to action requests.
- The team allocated tasks between themselves well.
- Tasks were delegated to others outside the team i.e. stores / trades to get things done.
- The team adapted well and developed their own white board setup and computerised action plan (*See Figure 16).*
- The team looked at *what if* scenarios they were the 1st team on site to identify the need for succession planning both for themselves and the IMT.

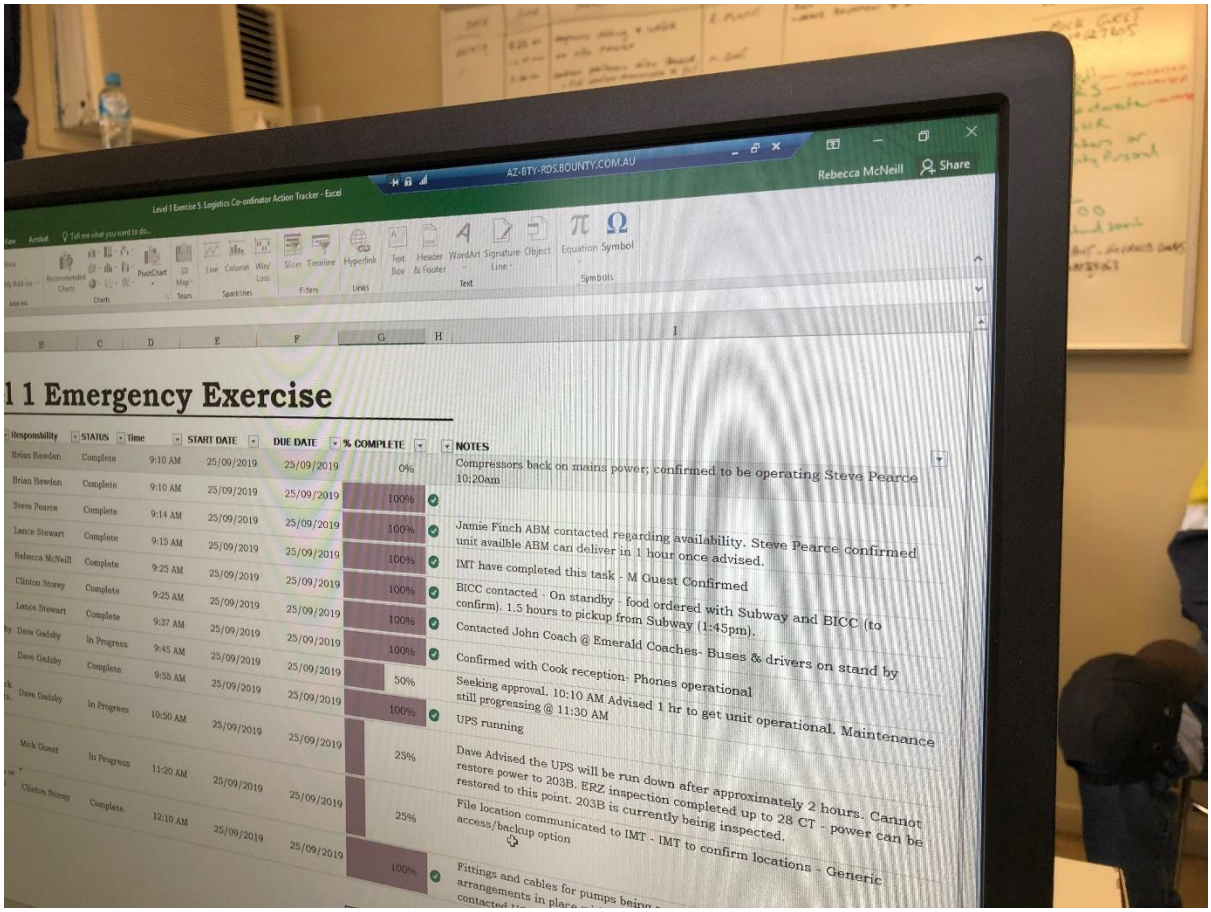


Figure 16 Logistics team Excel action sheet

Areas for improvement

The assessors noted the following areas for improvement:

- A lot of instructions were given verbally instead of being written with details on a request form i.e. the pipe sizes and connections required for a pump out line.
- There were no formal systems for the team i.e. MEMS, logistics white board setup or logistic request form.
- The team did not appear to be well used by the IMT as there were considerable quiet periods for the team rather than sourcing materials or services.

Surface power supply

Assessor Paul Sullivan

The assessor monitored the mines response to a seismic event, resulting in a power loss to site. At the commencement of the exercise it was requested that the lighting in the rooms, not supplied by the back-up generator, be turned off to convey a power outage simulation.

Cook Colliery has an automatic back-up generator that, on the loss of mains supply, will start and power up the control room and server room. This allows for the underground and surface communication systems (direct audio communications (DACs) and phones) to be operational.

The surface alarms and sirens were also activated to signal an emergency event and later turned off due to their volume being quite loud.

The electrical co-ordinator and a mine site electrician responded to the power outage scenario. They demonstrated their assessment if there was an issue with the 66 kV being supplied to the mine or an internal fault at the mine. This was done on the supervisory control and data acquisition (SCADA) screen in the control room. The contact number and details for the supply authority were also easy to obtain and they went through the process followed the last time the mine site power was lost.

The mine site electrician organised:

- a vehicle
- keys to the main fan house
- the main supply generator
- a copy of the repowering procedure.

At 08:40, the surface re-powering team left the administration area and proceeded to the main fan house and generator.

At approximately 08:45, the mine site electrician worked through the procedure to power up the generator and get two of the three main surface fans operational. This procedure also covered how to move power from the generator to the second egress winder. The procedure was easy to follow, with critical points photographed for easier understanding.

At 09:05, two main surface fans were ‘operational’.

At approximately 9:10, the team travelled to the 2nd egress winder and informed CMWs evacuating the injured, that the winder could now be powered from the generator.

At 09:15, mains power (6.6 kV) was ‘restored to site’ and the reverse switching process had to be undertaken. The electrical coordinator identified that the 2nd egress winder should be contacted. They informed them to complete the winder operation and leave it either at the top or bottom of the shaft while the return to mains power process was undertaken. This was not written in the procedure.

The reverse switching to mains power and the repowering of all three fans and the 2nd egress winder was completed by 09:25. The Electrical Coordinator informed the control room and the EEM that underground power had not been restored underground to pit bottom substation SB0001 as permission to do so had not been provided. The site safe operating procedure (SOP) detailed the approval process for restoring power to the underground after a power outage of more than 30 minutes.

It should be noted that the mine's uninterruptable power supply systems for the underground gas monitoring systems begin to fail one to four hours after operation. After the UPS systems fail the gas monitoring being supplied also fails. There appears to have been an assumption made by the IMT that power was supplied underground at the same time as the main fans were powered. This was a failure in communication.

What worked well

The assessors noted that the following elements of the exercise worked well:

- The contacting the supply authority and the repower procedure for the main fans was good.
- The electrical coordinator had a clear understanding of the mines procedure to power the surface generator and also conduct reverse switching.
- The mechanical coordinator who was at the 2nd egress winder and coordinating the removal of CMWs from underground, highlighted that they were stating the names of the CMWs who were being brought to the surface and their injury status over hand held radios. This could easily be listened into by media groups so he changed the method of contact to control via the mines phone system.

Areas for improvement

The assessors noted the following areas for improvement:

- The repowering procedure needs to document that the 2nd egress winder is to be notified and any winding being done is to be completed prior to turning off the main surface generator.
- Though the switching procedure was good there should be an emphasis on improving the familiarisation of this process with mine site electricians.
- The IMT failed to realise that they had not provided permission to power up the underground substation and then to the various gas monitors. This scenario then would have gradually had the underground gas monitoring system failing and this reporting back to the IMT which was not done.

Mines rescue response

Assessor: Stephen Watts and Jason Hegarty

The exercise started at 08:30. At 08:37, the emergency alarm was activated and surface personnel were immediately observed reporting to the muster area.

The control room notified QMRS at 09:05.

The surveyor took fresh plans over to the mines rescue substation at 09:30, approximately 125 m outside the secured site access gate. It was also noted that the QMRS substation had to be re-stocked with water as there were none available. Some of the responding QMRS brigade's personal had travelled more than two hours to get there.

The emergency services coordinator (ESC) from Cook Colliery was originally given the debriefing duty card. He was meeting with personnel as they withdrew from the mine and interviewing witnesses. One of the witnesses interviewed was a mines rescue member. At approximately 10:20, the mines rescue member, who had evacuated from the mine, was allocated emergency services duties to allow the ESC to complete debriefing.

The mine rescue member went over to the substation and opened it up, turned the air conditioners on and was instructed to advise when QMRS personnel turned up at site.

The first QMRS person arrived at 1030 and he had the rescue trailer and equipment with him. This was parked outside the substation and he immediately started equipment preparations.

At 11:00, when more QMRS staff arrived, they re-arranged the substation as it was not adequately set up for emergency response.

At 11:24, the mines rescue team had their first briefing. At this stage they were told they were not yet required. They were told there were seven CMWs trapped.

At 11:35, the first voluntary rescue members arrived from Oaky North Mine. This consisted of three Oaky North CMWs and one Kestrel CMW. They were asked if any more from Oaky North were coming and told no. They happened to be on the surface about to start rescue training when they were notified.

At 12:15, another briefing was held between the ESC and QMRS. At this stage they were able to start formulating plans and go into detail for possible deployments. They were again told that seven CMWs were trapped.

At 12:45, a briefing was held in the operations room and attended by the ESC and QMRS operations manager. At this meeting it was confirmed that eight CMWs were trapped. QMRS were also informed that the trapped CMWs had just donned their second rescuer. With 25 rescuers in the crib room, and current usage rates, it was calculated that the trapped CMWs had approximately five hours of oxygen left. This established a timing of 18:00 for the rescue or provision of an air supply to the trapped CMWs.

At 1320, enough Brigadesmen had arrived to make up two five-member rescue teams, active and standby. The ESC was notified of this however told rescue that QMRS were not required at this stage andyep ☺ he would seek clarification. A runner from the ICT turned up at the substation ten minutes later and said that the mine was ready for the mine rescue teams. Soon after the QMRS operations manager was briefed in the operations room where they discussed objectives, FAB location and what else was required. From this information, the authority to enter and captains task forms were completed and taken to the IMT to sign off.

A short time later rescue teams went and put cap lamps and rescuers on. A meeting was held between senior rescue personnel, team captains and vice captains. The IC interjected and informed them they had 1.5 hours of oxygen left to rescue trapped personnel. This was at approximately 14:00, meaning there was only enough oxygen to last until 15:30. This was two and a half hours less than the earlier determined time of 18:00.

At around 14:25 the QMRS teams were deployed. During the operation there was good regular communication between the underground teams and the surface substation. The emergency response co-ordinator was kept well informed, and provided information and

assistance to mines rescue as required. They kept in communication using mobile phones which meant the ESC was available at all times.

The last of the on call rescue personnel arrived from Kestrel at 14:35. With these members a third team was established as a surface standby team.

The rescue was completed at 16:07 and all rescue teams were out of the mine at around 17:30.

A copy of the deployment information and the authority to enter provided to QMRS can be seen at *Figure 17, Figure 18, Figure 19, Figure 20 and Figure 21*.

Authority to Enter

Time Issued:

Date Issued: 25-9-19

Team Captain: DAVID DAVIES / DAN TORLINGTON.

Team Name: Green / Yellow

Nature of Incident: TRAPPED By Roof Falls x 8 People.

Incident Location: 6 c/T 203 'B'

Incident Time: 0830

Incident Date: 25-9-19

LAR/NLAR:

Barometer: 1021

Fan Pressure: 1379 pa.

Power: Y

Air Supply: Y To 1 c/T 203 'B'

Water Supply: NS AIR

Associated Documents:	Version:	Signature:
Current Mine Plan For Area of Entry:	Attached	
Latest Mine and Operational Area Atmospheric Monitoring Trends:	Printed	

Expected physical and Environmental conditions — Location and Condition — Time

Roof Fall 5-6 c/T B+C Hdg. 6-7 c/T 6 c/T C-D Hdg. — 1330,

Strata Conditions: OK

Visibility: OK

Water Hazards and Extent:

Debris Hazard and Extent:

Roadway Conditions for Travel: ok, Normal

Thermal Conditions: oK Normal. 25°C approx.

TARP Level Mine: Level 1 — %LEL <60% — % ONP >60% — Ignition Source Present: unlikely.

TARP Level Where Teams Will Operate: Level 1. — %LEL <60% — % ONP >60% — Ignition Source Present: unlikely.

Ignition Source Presence and Location: unlikely.

Authorisation to Enter: Location: 6 c/T 203 'B' - Staging Area at 1st ~~2 c/T~~. 1 4 203B — Date Valid To: — Time Valid To:

Incident Controller: — Signature:

Approved By:

Mines Rescue Official's Name:

Figure 17 QMRS Authority to enter page 1

Authority to Enter

Team Captain: David Davies / Dan Tarlington.	Time Issued:	Team Name: Green Yellow	Date Issued: 25-9-19

Nature of Incident: Trapped By Roof Falls x 8 People.

Incident Location:	Incident Time:	Incident Date:	LAR/NLAR:
6 c/t 203 'B'	0830	25-9-19	

Barometer:	Fan Pressure:	Power:	Air Supply:	Water Supply:
1021	1379 pa.	Y	Y To 1 c/t 203 'B'	As AIR

Associated Documents:	Version:	Signature
Current Mine Plan For Area of Entry:	Attached	[signature]
Latest Mine and Operational Area Atmospheric Monitoring Trends:	Printed	[signature]

Expected physical and Environmental conditions	Location and Condition	Time
Strata Conditions:	Roof Fall 5-6 c/t B+C Hdg. 6-7 c/t 6 c/t C-D Hdg.	1330.
Visibility:	OK	
Water Hazards and Extent:	OK	
Debris Hazard and Extent:		
Roadway Conditions for Travel:	OK, Normal	
Thermal Conditions:	OK Normal: 25°C approx.	

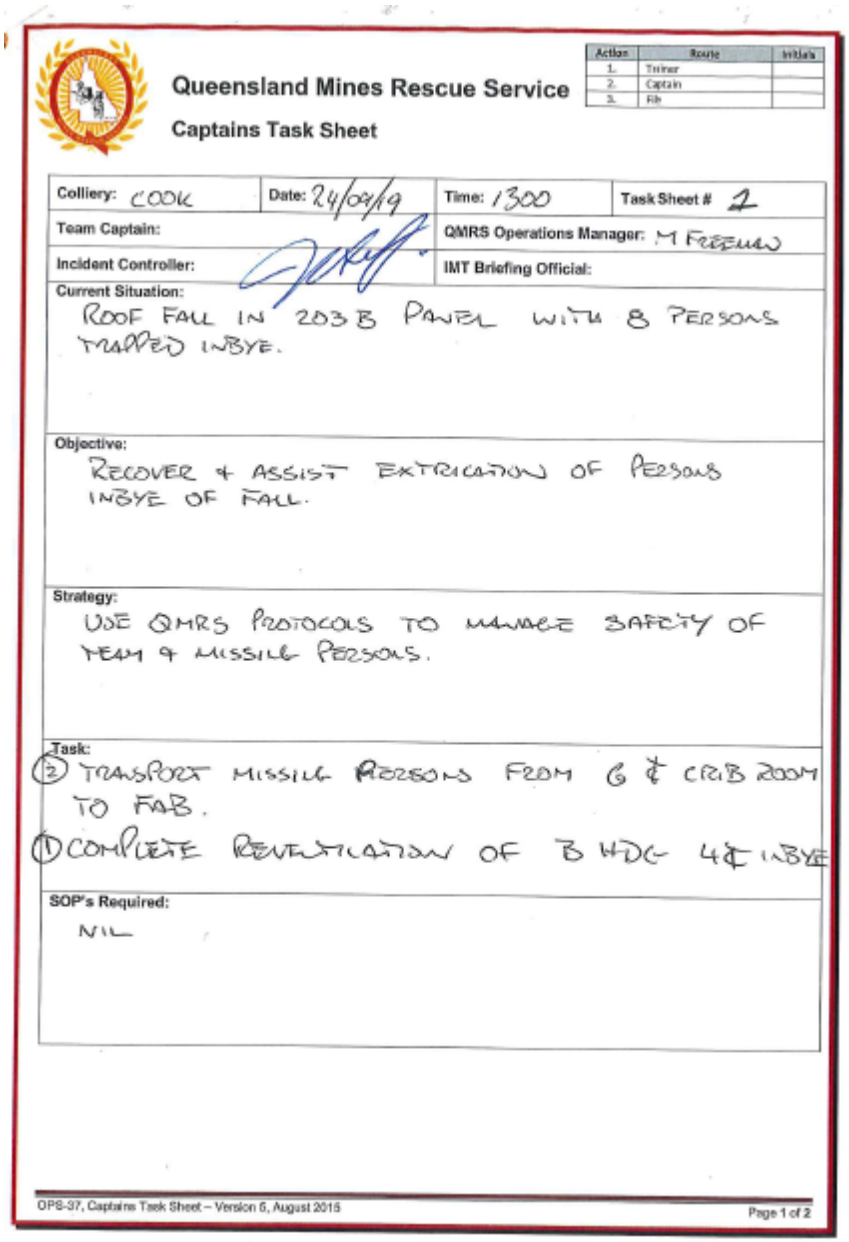
	%LEL	%ONP	Ignition Source Present
TARP Level Mine: Level 1	<60%	>60%	Unlikely.
TARP Level Where Teams Will Operate: Level 2.	<60%	>60%	Unlikely.

Ignition Source Presence and Location: Unlikely.

	Location:	Date Valid To:	Time Valid To:
Authorisation to Enter:	6 c/t 203 'B' - Staging Area At ~~19~~ ~~72 c/t~~. 1 ✝ 203B		

Approved By:	Incident Controller:	Signature: [signature]
	Mines Rescue Official's Name:	[signature] [signature]

Figure 18 QMRS Authority to enter page 2



Queensland Mines Rescue Service

Captains Task Sheet

Action	Route	Initials
1.	Trainer	
2.	Captain	
3.	Fib	

Colliery: COOK	Date: 24/09/19	Time: 1300	Task Sheet # 2
Team Captain:		QMRS Operations Manager: M FREEMAN	
Incident Controller:		IMT Briefing Official:	

Current Situation:
ROOF FALL IN 203B PANEL WITH 8 PERSONS TRAPPED INBYE.

Objective:
RECOVER & ASSIST EXTRICATION OF PERSONS INBYE OF FALL.

Strategy:
USE QMRS PROTOCOLS TO MANAGE SAFETY OF TEAM & MISSING PERSONS.

Task:
(2) TRANSPORT MISSING PERSONS FROM 6 & CRIB 200M TO FAB.
(1) COMPLETE RECONNAISSANCE OF B HDG 4& INBYE

SOP's Required:
NIL

OPS-37, Captains Task Sheet – Version 6, August 2015 Page 1 of 2

Figure 19 QMRS Captains task sheet page 1

Missing Persons? ☐ Yes ☐ No If Yes, list missing persons

Name	Lamp/SCSR#	Last Known Location

Resources Required	Location	Check
MINIMUM EQUIPMENT	SUBSTATION	
8 SCSR	3 ₵ 203B	

FAB Location 3₵ 203B	FAB Phone 677
FAB Controller MR LUCKEL ESQ	FAB Assistant MR J PETTY
Standby Team Captain DAN TARLINGTON	Standby Team Name YELLOW
Standby Team Location	

AUTHORISATION

Authority to Enter Required ☐ Yes ☐ No	Authority Issued and Current ☐ Yes ☐ No
Incident Controller Signature	
QMRS Operations Manager Signature	
Copies of Task Sheet to be provided to: *Team Captains, Operations Co-Ordinator, FAB Controller*	

OPS-37, Captains Task Sheet – Version 5, August 2015 Page 2 of 2

Figure 20 QMRS Captains task sheet page 2

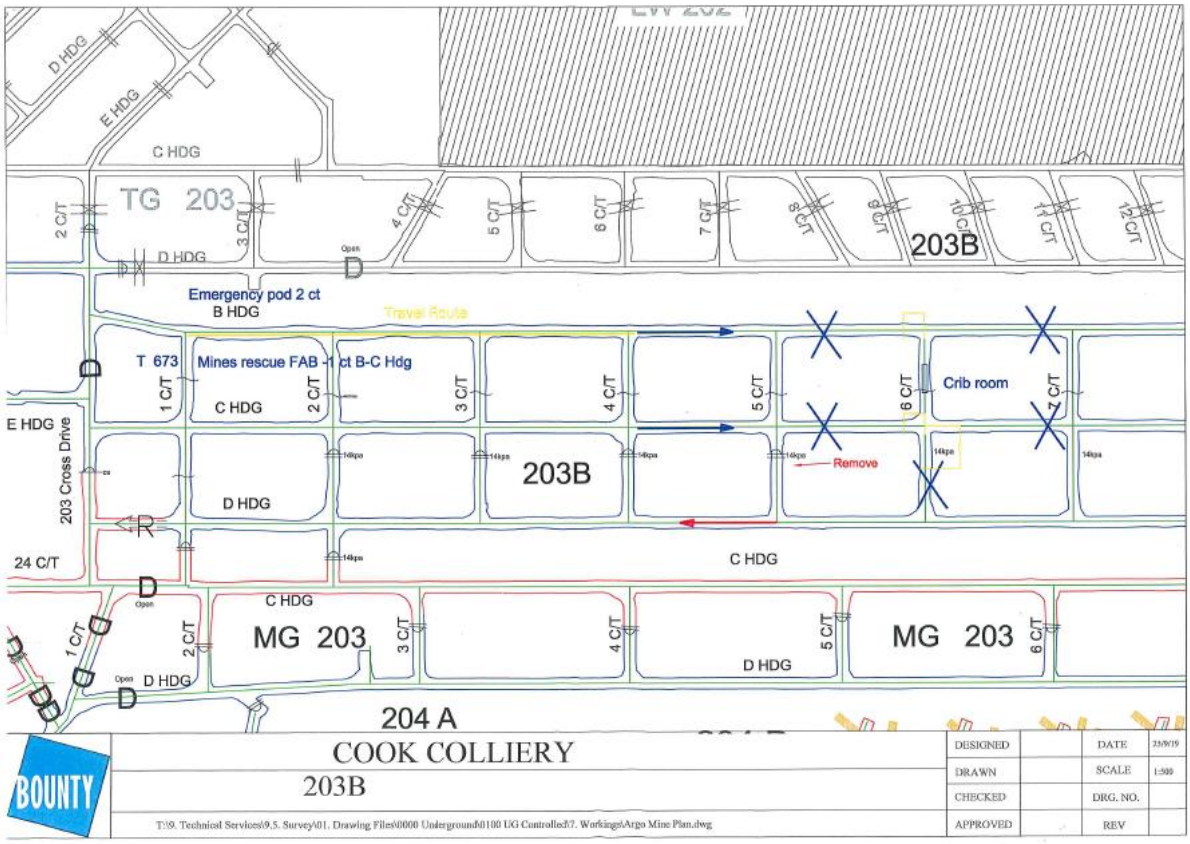


Figure 21 roof fall location provided to QMRS

The assessor noted that:

- during QMRS briefings the plans supplied by the IMT were constantly changing.
- ventilation plans supplied to QMRS were inconsistent – one plan had temporary stopping at 4c/t and the other plan showed no stopping at all.
- the mine plan supplied by IMT to QMRS had the falls in different roadways to those informed to the control room. See Figure 4 and Figure 21.
- there was no transport from sub-station to cage – used Oaky North's bus – QMRS had to drive the bus. No sign off for bus or driver by mine.
- the normal access gate to cage near the store was locked QMRS went to the operations room for a key. They were told to use another gate, also near the store. Had to get control to open electronic gate.

Three QMRS personnel plus equipment for FAB went down on the 1st wind. Three Cook Colliery CMWs were sent to transport rescue personnel underground but they were delayed on the surface by QMRS priorities. QMRS got permission from the UM for QMRS person to drive the Driftrunner (he had a ticket at his own mine), this allowed the Cook CMW to bring remaining QMRS members to the fall area. Otherwise further delays would have occurred.

What worked well

The assessors noted that the following elements of the exercise worked well:

- Good rescue substation: clean, adequately equipped, air conditioned, in a good visible location.

- Mobile reception allowed emergency services co-ordinator to be contactable at all times.
- Mines rescue personnel performed well in a timely and efficient manner with the information they had.

Areas for improvement

The assessors noted the following areas for improvement:

- Communication from IMT down the chain to QMRS. For example, it was reported there were seven CMWs trapped when there were in fact eight. Also there was wrong information about the amount of time until the trapped miners ran out of oxygen.
- Time of response by on call rescue members. It was around five hours from commencement of the event until there were the minimum required rescue personnel on site for deployment (two five-person teams).
- Mine emergency services co-ordinator should not be given other roles, such as debrief, to allow focused preparation of emergency response.
- The swipe gates between the substation and mine offices were a hindrance and cost time as QMRS personnel did not have swipe cards and needed to ring control every time they needed to enter. This would also be unnecessary interruption to CRO.
- There were no risk management processes used.
- Mines rescue personnel complained about the quality of the plans. They were different, for example some had stopping locations and some didn't.

Social media

Assessors: Elliott Franks and Theo Georga

Story and brief review of response vs procedure

A simulation of how mainstream and social media would interact with the emergency response was created by the assessors. This scenario was designed to test the mine's ability to:

- notify next-of-kin
- communicate accurate information with the public
- correct misinformation.

The elements of the scenario were communicated to the mine's incident response team, using screenshots of simulated mainstream and social media scenarios, simulated phone calls and live role plays. No external media or social media channels were used and scenario elements were sent to nominated contacts via email.

As the level 1 exercise began, it was assumed news of the emergency would begin filtering through to the local community within an hour of the earthquake. This can occur via radio scans of emergency channels or the use of phones by mine staff. The use of phones by mine staff can also communicate details such as names of affected workers and potential injuries.

Staff at the mine were observed using mobile phones on the surface muster areas at around 09:00 and this triggered the initial social media scenario to be sent to the mine. The mine did not respond to the initial social media scenario. It was not clear to the assessor team who would be responsible for communication, responding to mainstream media and social media. Emails were sent to the contact email address from the Bounty website which were not replied to at any time.

Phone communication was made to head office at around 09:30 by an assessor who was role playing a television journalist. The assessor advised that a journalist and camera crew were on their way to the mine and wanted to interview someone on air. After this point, head office did not answer any inbound phone calls. Head office did call the journalist back at around 10:50 to provide a response.

Approximately two hours after the scenario began, an assessor role playing a trapped miner's next-of-kin, arrived at the site. Security at the front gate stopped the next of kin and did not contact the control room. Soon after this, an additional next-of-kin contacted head office and posted comments on social media. She stated her intention was to visit the mine site. The head office took her phone number and did not return her call.

The second next-of-kin arrived at the site and presented in an agitated state. Security called for backup as the next-of-kin had stated she was going to jump the fence. Police arrived to assist security. This stopped the next of kin from breaking in, however she was left at the gate in an agitated state, with the first next-of-kin.

At 12:30, the local CFMEU representative (played by an assessor) arrived at site.

At 12:55, the journalist spoke to a Brisbane office engineer over the phone. He was told of the current state of the miners, their health and mentioned a lack of oxygen. He also stated there were nine miners trapped.

At 13:00, an assessor role playing 'WIN News' arrived on site for a press conference. The journalist spoke to the now extremely agitated (and possibly dehydrated) next-of-kin, the local CFMEU representative and the Cook Colliery representative. The Cook Colliery representative was asked about the lack of oxygen and stated that there were two hours of oxygen remaining underground.

The lack of oxygen became the headline mainstream and social media story for the rest of the afternoon.

Notification of next of kin

At no point were there any efforts to contact next-of-kin. When next-of-kin attempted to contact the mine, there was no communication on the individual status of mine workers. When next-of-kin arrived at the mine, there were no attempts to provide information or comfort.

Reception at the mine stated that during an emergency it was their policy not to answer phone calls from external phone numbers. All attempts to contact the reception desk went unanswered.

A protocol for notifying next-of-kin was included as part of the incident response plan, but in no instance was this protocol enacted.

Information

A great deal of simulated misinformation was circulated via social media and mainstream media during the exercise. Attempts to counteract misinformation were limited and, in the opinion of the assessors would not have been successful in a real-life scenario.

Concerned community and family members would have arrived at site to gather more information.

When addressing the mainstream media, incorrect information was communicated and there were no subsequent attempts to correct that misinformation when media reports were communicated via social and mainstream media.

What worked well

The assessors noted that the following elements of the exercise worked well:

- The exercise demonstrated the importance of contacting next-of-kin and creating a social and mainstream media protocol. Even in a simulated environment, media and social media demands applied additional pressure on the IMT and may have distracted attention away from rescue efforts.

Areas for improvement

The assessors noted the following areas for improvement:

- The need to apply next-of-kin protocols as a matter of urgency.
- The need to establish and follow social media protocols.
- The need to establish and follow mainstream media protocols
- The need for contingency plans in case of key personnel being unavailable

It is highly likely that the mine would have lost control of the message very early in the day. Family members, concerned locals, media and union representatives arriving on site would have created a significant distraction for the emergency response team.

In an emergency situation, it is imperative that next of kin are notified as early as possible. This is to ensure that all the proper assistance is given to the family members and to ensure correct messages are being passed to the public.

An immediate controlled response or action is required in relation to social media events to quickly correct misleading information. If communications are not controlled, the media may cause additional stress on the emergency response. This can hamper rescue operations by distracting attention away from the emergency response.

Media contacts should have media response training and be aware of the media protocols contained in the emergency response plan. Access to outside communications should be limited during an emergency. If workers are allowed to use their personal mobile phone, at a minimum, they should be told not to pass on information apart from their current health.

A policy of not answering external telephone calls to the mine reception may mean relevant external stakeholders are unable to communicate important information to the mine.

Conclusions surface

These conclusions have been derived from the review of the comments of the surface assessors on the observations they made while assessing the surface response.

- Cook Colliery is a small mine with limited resources but did manage to form an IMT and fill key duty card positions during the exercise.
- Only one IMT group (logistics) started to prepare for relief personnel to carry on their functions.
- The control room was manned by three CMWs who all took individual hand written notes.
- The control room was noisy and there was unrestricted access.
- Reconciliation of the tag boards again was an issue and even when it was identified that there were eight CMWs trapped in 203B it took some time for that information to reach the IMT.
- The MEMS process was followed but only the logistics team and they had an electronic form in use.
- Some good practical solutions were identified to resolve the issues faced by the mine.
- The IMT worked on a number of white boards and paper record which became confusing as they were updated.
- The roof fall in the drift was not identified until late into the exercise.
- Verbal instructions were given to QMRS regarding deployment.
- Mainstream and social media responses were not handled well.
- There was no evidence of any risk based approach to actions taken other than filling out the MRAS forms for QMRS re-entry and key information regarding the roof fall in the drift was not included in this assessment.
- Poor quality plans were provided to QMRS (lacking information on the overlying seam working and the wrong locations of the falls Figure 4 and Figure 21)
- QMRS were delayed in establishing sufficient brigades personnel for a response due to delayed mobilisation from the mine and the availability of brigades personnel from nearby mines.
- QMRS access to site was hampered at the swipe card gate, there was a lack of tags for QMRS to deploy underground, insufficient numbers of drivers provided for the surface and underground transport of QMRS.
- Evacuated CMWs who are waiting around become idle and hungry. They consumed a lot more food than expected.

Recommendations surface

These recommendations are based on the observations of the surface assessors and their identification of areas for improvement.

Mine

- The mine should review the flow and collection of information to ensure that it is optimised and systematic. The mine should use the MEMS system documentation and be able to provide mine re-entry assessment system (MRAS) information in optimal format. This should include the adoption of an electronic database and information sharing system which are commercially available or the electronic version developed by QMRS targeting mine emergency management and incident control.
- The mine should review its emergency response plan to ensure that it has effective coverage of all key roles at all times. Duty card(s) should be created for dealing with media and families as appropriate. There should be a designated place for next-of-kin to gather and arrangements made for counselling.

- Ensure numbers for external and emergency contacts are correct and up to date including ISHRs, Inspectors and Simtars.
- It was identified that the labelling and identification of the underground gas monitors as well as what they trip was unclear to tradesmen and ERZ controllers and this needs to be clarified.
- The surface repowering procedure needs to document that the 2nd egress winder is to be notified and any winding being done is to be completed prior to turning off the main surface generator. And there should be an emphasis on improving the familiarisation of this process with mine electricians.

Industry

Recommendations for the industry are:

- Develop a more detailed list of non-verbal questions to ask in different scenarios. The CRO had the opportunity to ask multiple questions while workers were trapped and under self-rescuer. There was a struggle to be come up with closed questions to obtain pertinent information. A longer list of closed questions should be developed and available to industry to cover various situations. Copies of this list should also be put underground so trapped miners can tell the CRO what questions they want to be asked to convey information. (Some of this work has been done in a draft emergency management standard).
- Consider the human resources required at each operation to manage an effective and sustained emergency response.
- Identify the resources and deployment of rescue personnel at each operation to be able to respond to the MAG requirements.
- Two CRO's in the control room at any given point of time should be the industry standard to enable efficient communication and site monitoring.
- Explore the consequences of misinformation on emergency response situations and review emergency response plans to develop action plans to counteract misinformation on social and mainstream media.
- Develop social media communities to ensure next-of-kin and community have a reliable single source of information in emergency situations.
- Consider media training for key personnel who may be called on to respond to media enquiries.
- Chief Inspector of Coal Mines and the CEO of QMRS to remind all mines that it is part of their mines rescue agreement to release personnel at the time of a level 1 exercise. The only way effective emergency response can be tested is if everyone treats their response as if it was a real event.
- All mines should adopt an electronic database and information sharing system which are commercially available or the electronic version developed by QMRS targeting mine emergency management and incident control. These systems should be used as part of the everyday mine communications and data transfer systems, not just for emergency response.

Exercise recommendations

These recommendations have been made with the aim of providing continual improvement in the mines and in the Queensland emergency response capability. Information is provided at Appendix C on issues to consider when running future emergency exercises.

The recommendations have not been ranked in any order of priority. All mine sites and other agencies should review the recommendations and should use them in the gap analysis of their emergency response systems, as well as audit tool prompts.

The numbering system being used is derived from a spreadsheet first established by Mike Caffery as gap analysis between level 1 exercise recommendations and coal mine emergency response schemes. This spreadsheet has been used as part of the chief inspector's initiative to form a second work group to follow up on the recommendations from task group 4 (Moura No 2 Disaster).

As this is the 22nd level 1 exercise, the primary number is 22. This will assist in cross referencing the spreadsheet and level 1 exercise reports.

Mine

22.01	Review the panel tag board process especially in the event of an emergency and re-iterate to crews why tag board use is essential.
22.02	Review the labelling of the NERZ/ERZ boundaries at the mine. It created confusion between the electricians and the ERZC.
22.03	Train more people in first aid to ensure CMWs are familiar with the skills and are able to use everything available to them at the time i.e. Entonox.
22.04	Keep CMWs informed of the situation as much as possible. Personnel were getting concerned / agitated about time taken to be rescued.
22.05	The mine should review its emergency response plan to ensure that it has effective coverage of all key roles at all times. Duty card(s) should be created for dealing with media and families as appropriate. There should be a designated place for next-of-kin to gather and arrangements made for counselling.
22.06	Ensure numbers for external and emergency contacts are correct and up to date including ISHRs, Inspectors and Simtars.
22.07	It was identified that the labelling and identification of the underground gas monitors as well as what they trip was unclear to tradesmen and ERZ controllers and this needs to be clarified.
22.08	The surface repowering procedure needs to document that the 2nd egress winder is to be notified and any winding being done is to be completed prior to turning off the main surface generator. And there should be an emphasis on improving the familiarisation of this process with mine electricians.

Industry

22.09	All mines to review their emergency response systems by way of a gap analysis against the level 1 recommendations. It would be beneficial to learn from and implement changes so that the same shortfalls are not repeated during future level 1 exercises. By doing so, the process across the industry will be improved.
22.10	Review nose clips on both short and long duration SCSR. Personnel complained of the pain to their noses causing them to take them off periodically to massage their nose before replacing.
22.11	Need a better methodology for two-way communication; it should be standardised for Queensland. The current nonverbal is very frustrating and confusing for both the CRO and the communicator underground. Develop a more detailed list of non-verbal questions to ask in different scenarios. The CRO had the opportunity to ask multiple questions while workers were trapped and under self-rescuer. There was a struggle to be come up with closed questions to obtain pertinent information. A longer list of closed questions should be developed and available to industry to cover various situations. Copies of this list should also be put underground so trapped miners can tell the CRO what questions they want to be asked to convey information. (Some of this work has been done in a draft emergency management standard).
22.12	Consider the human resources required at each operation to manage an effective and sustained emergency response.
22.13	To identify the resources and deployment of rescue personnel at each operation to be able to respond to the MAG requirements. Chief Inspector of Coal Mines and the CEO of QMRS to remind all mines that it is part of their mines rescue agreement to release personnel at the time off a level 1 exercise. The only way effective emergency response can be tested is if everyone treats their response as if it was a real event.
22.14	Two CRO's in the control room at any given point of time should be the industry standard to enable efficient communication and site monitoring.
22.15	All mines should adopt an electronic database and information sharing system, which are commercially available, or the electronic version developed by QMRS targeting mine emergency management and indecent control. These systems should be used as part of the everyday mine communications and data transfer systems, not just for emergency response.
22.16	Improved preparation for dealing with social media and normal media in the event of an emergency namely: • Explore the consequences of misinformation on emergency response situations and review emergency response plans to develop action plans to counteract misinformation on social and mainstream media • Develop social media communities to ensure next-of-kin and community have a reliable single source of information in emergency situations. • Consider media training for key personnel who may be called on to respond to media enquiries

Appendix A: Exercise timeline

Location	Surface Observation	Time	Underground Observation	Location
Surface	Assessors arrived on site	6:40		
Control room	event started, CRO is new to control room	8:30	Level 1 simulation begins - Earthquake 1 x CMW has a broken leg & 1 x CMW has a broken arm sustained during earthquake. Three injured CMWs in 203B ext	205 Mains MG 204B ext 203B Ext
Surface	Mine site has lost power only the control room and server room have power from the generator	8:32		
Control room	asked for electrician outbye to check power in person	8:34	ERZC assigned CMWs to deal with injuries of crew and escort the injured members back to the crib room.	MG204B
Control room	checked gas monitoring, all normal; CRO took out communications book and put on "communication person" vest	8:35	Man is placed on stretcher and carried to crib room (No transport organised- Drifty Still in crib room- Stretcher crew standing waiting)	Panel 205
		8:38	ERZC attempting to contact CRO. Using 555 it took three calls to get a response.	MG204B
Lamp Room	UMM - Brief to CMWs and all present that Level 1 has started. Get all duty cards and go to operations room to hand out to required people	8:39	CMW - BL was put into the drifty on a stretcher (using the brackets provided). CMW-BA was also put in the back of the drifty with 3 x CMW taking care of them.	205 Mains
IMT Room	IC, scribe and second scribe start to set up IMT in admin conference room. This includes bag of stationary with notebooks, pens, post-its and lollies.	8:39	ERZC made contact with CRO. ERZC informed CRO of incident and injuries. Nil details given to ERZC from CRO. Injured CMWs being treated. Air splint used for CMW with broken arm.	MG204B
IMT Room	Start writing on boards. Status of ventilation, location of people and gas monitoring. Planning is set up. Question if logistics is set up. Operations duty card holders have been identified. IC stated this was a standard loss of power and ventilation.	8:40	Drfity Set up with hooks for stretcher CMW Loaded stretcher and basic first aid equipment into the drift runner at cribroom	Panel 205 303B ext
Control room	Electrician reported he is going to start fans; CRO communications surface was copying notes from CRO surface controller	8:41	ERZC addressed crew and discussed the evacuation route with crew.	MG204B

Location	Surface Observation	Time	Underground Observation	Location
		8:42	Begin evacuation via1ct, 24ct and 5ct mains to man cage at pit bottom. Didn't remove tags from tag board, UM picked up at 5 c/t at 8:58hrs	MG204B
Control room	call from 203A man are in transporter, in drifty - heading outbye	8:44	Driftrunner turned around to face outbye. ERZC set up Entonox for injured people. Stretcher drifty leaves crib room	MG204B 205 panel
IMT Room	First reports from underground coming into IMT: 203B broken leg, head injury, ERZ controller also with broken leg. Crew heading to crib room. 203A injury drifty heading outbye. 205 no status yet. Head office has been notified.	8:47	Leaving crib room. Travelling via primary egress. Droppers work well. Long green to show correct direction of travel. Red on backs for wrong direction.	MG204B
Control room	CRO communications surface phoned QMRS; got to speak to someone at 8:51; advised person that the mine may need some assistance;	8:48	Dolly car down, ERZC gets rescue plan, power still down, instructs they will evacuate via the winder	Panel 205
Control room	Experienced CRO on duty in the store took the role of ops coordinator	8:49	Stopped at the tag board and removed tags	205 Mains
		8:50	Outbye CMW arrived at CM and notified of impassable roof fall in B HDG 5-6ct. All injured CMWs into Driftrunner, 3 x CMW walked to Cribroom	203b B Hdg 7-8ct
Control room	call from 650 1ct;directed them to continue and call at the next phone 204C 1ct whole group with him; towards 2nd egress cage; asked to check injured if they need any other assistance.	8:51	Stopped at 1 ct MG 203. ERZC out to phone CRO. Crew self-checking condition of each other while waiting. CMW with broken arm mimicking using Entonox for pain relief. The only trained person with Entonox in crew is the ERZC.	B hdg 1 ct MG203
		8:53	left 1ct. Arrive at start of the panel - tags off - ERZC hands out/delegates tags	MG 203A 205 panel
		8:53	Call received from CRO Status report of injured CMWs Notified CRO all escapeways were impassable	203b Cribroom 6ct B-C Hdg
Control room	call from 648; 203A panel, 24ct cache; going towards crib room to 5ct	8:54	Shift Under- Manager (at South Mains) and consulted on the events that had happened. He is informed of the two injured CMWs Stopped at 24ct B hdg mains. ERZC out again to ring CRO.	205 Mains 204B

Location	Surface Observation	Time	Underground Observation	Location
IMT Room	Report from OC: 205-2 injured and one first-aid, 10 men in crew rest of crew going to 2nd egress cage as main winder is out for maintenance. Queensland ambulance service is on the way and will need to be advised of injuries. Security to be sent to front gate, second egress and main portal.	8:55		
Logistics	Logistics team arrived - briefed by Assessor - "This is an emergency exercise …… as per sheet" briefed team on status - 2 Fans running off generator 203B & 205 have injured mineworkers	8:58	Called CRO, Notified that CMWs would be putting on SCSR and that all communications after call would be Non-Verbal & that they had 25 long duration units available in the cribroom cache.	203b Cribroom 6ct B-C Hdg
IMT Room Muster area	IC reported the ventilation is done as the two fans are running. 26 x CMW's counted in muster area. One CMW observed using mobile phone.	9:00	Crew self-checking welfare of injured CMW's. Leaving 5 ct cribroom. UM travelling with us now.	Primary egress.
		9:00	All CMWS put on Belt SCSR- Assistance was given to injured CMWs.	203B
Control room	call from 672: 205 crew 5ct going to 2nd egress cage	9:01	ERZC Stops at 5c/t to communicate to CRO	205 Panel
Control room	phone: 203 gone non-verbal (NV)	9:02		
IMT Room	IMT office being relocated from admin conference room with no windows to the SSE office with window due to lack of power/light to the admin offices. First IMT meeting called for 9:15	9:03	Arrived at cage. CMWs disembarking. ERZC checking on condition of CMWs. Informed the ERZC that all his crew were now suffering from shock.	MG204B
Control room	phone to external QMRS, CRO communications surface, calling to initiate to come; provided update, they are coming	9:05	Crew from mains already at cage with an injured CMW in a stretcher. ERZC's formulating an egress order via the cage. Decision to send CMW in stretcher with broken leg and two CMWs with broken arms up first and whoever else would fit. Other minor injuries after that.	MG204B
Logistics	Team discussed options - fire water UG - Backup power for air compressors	9:06	Observed Note pads used to communicate between CMWs	203a Cribroom 6ct B-C Hdg

Location	Surface Observation	Time	Underground Observation	Location
Logistics	66kv & surface power back to site No power UG yet	9:07	ERZC's checking on injured CMWs condition. Informed of situation in entrapment panel via CRO	MG204B
Control room	called "000" ambulance , informed on injured people, at least 3 injuries, we need assistance	9:08		
IMT Room	Power back on and IC and Scribes moved IMT room back to admin conference room. Reviewed objectives on board and ticked off the power to offices objective.	9:08		
IMT Room	IC develop a list of questions for operations: what does the emergency generator operate? Admin, control, main fan, gas monitoring, dolly car, drift Winder discussion of ramifications to group in 203B of injured personnel. ERZ controller out with leg injury, number two in the panel CM driver also injured, which puts third person in charge.	9:09	UM and ERZC"s now aware of trapped crew in 203b panel. Formulating plan to effect a rescue of trapped CMWs. UM and 0ne ERZC with five CMWs to go back and try and effect a rescue of trapped crew. Nil rescuers were QMRS trained. Two CMWs to stay at pit bottom to drive mines rescue teams when they turned up into panel. One ERZC to stay at pit bottom and control cage. All other CMWs to go to surface.	Pit bottom Cage
Control room	CRO communications surface called underground 203B non-verbal, they are in crib room, advised them that fans are running and mine ventilation is reinstated ; asking frequently to confirm if they understand; advised that QMRS was contacted; asked if injuries have deteriorated; asked them to stay by the phone and they will be updated	9:10	CMW in stretcher being put into winder - Rescue manning short underground, One Rescue member sent to surface with stretcher and instructed to come back down straight away	Pit Bottom 205 Crew
muster area	Taped off access points from Muster area and toilets. Tag states do not enter & First aid room being prepared for injuries	9:10	UM and crew depart to assess the fall and entrapped people in MG203B	Cage, 5ct then panel
		9:10	*Call received from CRO*, (First CMW removed SCSR to talk to CRO) Secondary Assessments conducted on injured CMWs. Real "bump" occurred in cribroom area.	203b Cribroom 6ct B-C Hdg
		9:14	Injured CMW into cage (CMW -BL --- CMW -BA 3 x other CMW also in cage for the first trip to the surface	205 Crew

Location	Surface Observation	Time	Underground Observation	Location
Logistics	Call CHPP to stop haulage Phone list to wall Discussed winder and transport to winder (in place) Discussed clearing car park for Ambo Discussed water / lunch etc. or bus to town	9:15	CMW Handed out CSE SCSR to all CMWs. ERZ Controller instructed CMWs to use smaller units for as long as possible before changeover	203b Cribroom 6ct B-C Hdg
IMT Room	First IMT meeting coordinators told to stay in their rooms and have gophers run errands if there is something that needs to be done outside the room. Report from VO: there is ventilation underground with two fans running there is a fall In 203 restricting ventilation with 19% oxygen drawing of the location has been created with six falls inbye and outbye crib room surrounding it and miners cannot get out. There is suspicion that these low oxygen is a breakthrough from the Castor seam. Six operators going to 203B to check fall.	9:16	ERZC taking names of all CMWs at pit bottom and sorting who will go to surface and who will stay at pit bottom to assist.	pit bottom Cage
Control room	CRO communications surface called underground 203B non-verbal, "this is Cook control room non-verbal, I want to establish gas values; oxygen less than 18%; less than 17%, is it above 17.5% to 18% - confirmed methane: 1.97% previously, has that increased above 2.5% yes; above 3% yes, above 4% no; above 3.5% no, between 3-3.5% confirmed CO2 0.68% is it higher, repeated because there were other calls at the same time, noise in Control room; is it lower than 0.68% yes alarm is going off in background, phones ringing confirmed CO2 0.68-1% CO static confirmed has there been deterioration in injuries? No have you noticed improvement in ventilation since	9:17	ERZC's current info is 203b panel has had a roof fall. Men trapped with casualties. UM and 205 mains ERZC gone back in with 5 X CMWs to attempt a rescue and assess falls. Information is also that fans are now back on.	pit bottom Cage

Location	Surface Observation	Time	Underground Observation	Location
	fans were re-established? he will call every 5 minutes to check on them			
		9:18	Undermanager stops at 5c/t communicates to CRO - Telling plan - 7 x CMW present, going into 203 to prevent fall from getting worse. Tells the resources available at the bottom of the shaft and what the deputies are doing at the bottom of the shaft. UM says he will call CRO at the tag board when he arrives	South Mains
		9:20	Cage docked at the surface - Mine fans are now operational	205 Crew
		9:20	3x CMWs had cap lamps on low beam and all other CMWs had cap lights off.	203a Cribroom 6ct B-C Hdg
IMT Room	New objective put on board-fresh air to 203B crib room.	9:21	UM briefs crew on the plan going forward and the information he has received from COMMS- Trapped CMW, irrespirable atmosphere - They are going to establish ventilation and bolt their way in	South Mains
IMT Room	Operations report to IMT muster area set up on surface for guys coming out Queensland ambulance service on the way 203B ERZ controller report on phone-17.5-18% oxygen, 3-3.5% methane no deterioration in injuries, non-verbal communication being used	9:25	Update from CRO. Roof fall in all 3 hdgs. ERZC broken leg. 2 x CMWs with broken arms. Oxygen decreasing and Carbon dioxide increasing. Mines rescue and Qld ambulance have been mobilised.	pit bottom Cage
Surface	Mines rescue member that had evacuated was instructed to go back u/g to assist.	9:25		
IMT Room	Instructions from IC to VO: increase ventilation pressure in 203B close regulators at 203A, go to end. 204 and 205	9:26	MG204B ERZC giving CMWs at pit bottom update of situation including falls in 203 b and injuries sustained by CMWs.	pit bottom Cage
IMT Room	Logistics report maintenance has fuelled vehicles to send to the second egress and suppliers ready if other items are needed. Next IMT meeting 10:00 AM	9:27		
		9:28	Arrive 203B Tag board	recovery team,

Location	Surface Observation	Time	Underground Observation	Location
Mines rescue station	Surveyor takes plan of mine over to Mines rescue station as no plan of mine over there. Went to go out gate without swipe card. Told to use unlocked side gate. No security stationed at swipe gate entrance.	9:29	Call received from CRO, Notified that crew on way to assist.	203b Cribroom 6ct B-C Hdg
Logistics	MG arrived & briefed logistics team- people injured etc. etc. Tasks - Equipment to briefing people back CMW allocated to debrief room when required Action - Scribe to write up action list	9:31	Checking for seal breaches, accumulations of gas	203B Panel
Control room	phone, CRO surface controller asked how many people were there, confirmed 8, still on original CSE SCSR they have 7 people on tag board CRO surface controller to read names to verify all names; communications surface to validate non verbal	9:33		
IMT Room	IC called weekend number to advise mines inspector at DNRME. Crew trapped underground with roof falls in 203B. Reported eight people in 203B (but this number was confused with the eight people being sent to 203B as there was not yet a total number given for trapped miners). Reported trying to increase ventilation. Some confusion as to which injuries were where. Gave 17.5% is oxygen as last reading. Call with mechanical Inspector ended at 9:47	9:34		
Control room	CRO surface controller called police	9:35		
muster area	Muster area briefed on current situation	9:35		
Control room	CRO surface controller received phone call from 632 panel 8 people names in cage	9:39	Arrive at 203B; Assessor instructs there has been an aftershock and now the crew that have come to assist in the fall have been injured and cannot offer an assistance - receives atmospheric readings from Assessor	recovery team,

Location	Surface Observation	Time	Underground Observation	Location
Surface	Asked emergency services co-ordinator (ESC) what his role was. He said it was debrief, bit early for mines rescue & would do that role later.	9:40	First Response team, At B Hdg 4ct 2X Driftrunners with 6x CMWs arrived -told that there was an aftershock and that 3 X CMWs in their team had been injured during event. -CMW seen impassable fall at 5-6ct -Team evacuating to surface as had injured personnel	203b B hdg 4-6ct
		9:43	Recovery crew on way out - UM contacts CRO at tag board with update - Atmospheric readings - tells CRO they are heading to pit bottom to remove injured CMW. VO hops on the phone to UM - Plans to restrict ventilation to maximise differential pressure across the fall	203B Tag board
		9:47	CMWs starting to change from belt worm SCSR to CSE SCSR, * All CMWs experienced issues removing the lids *they were not aware that the real units the breathing tube come squashed flat and need to be pulled apart prior to wearing -All CMWs fitted own SCSR then Assisted others (1CMW still wearing belt worn until 1000Hrs as communicating on phone)	203b Cribroom 6ct B-C Hdg
IMT Room	First phone call attempt to Jason Hill ISHR.	9:48		
OPs Rm	ESC debriefed Ops room on known on witness information.	9:48		
Control room	CRO communications surface established there is one extra person; communications surface found name on sign on sheet	9:51		
Control room	CRO communications surface called Non Verbal to verify if *** is missing person, his tag was not on a tag board	9:52	Leave Tag board location - Drifty with injured CMW to pit bottom, UM drifty to 5c/t.	recovery team,
Surface	ESC debriefed CMW from 205 panel. He was mines rescue member. Noted was able to give good clear information and clarified previous information.	9:52		
		9:53	ERZC ringing CRO for update. Information of a second tremor. There has been another fall. 4 x CMWs in rescue party have been injured. Rescue	pit bottom Cage

Location	Surface Observation	Time	Underground Observation	Location
			party making way back to cage. Fall at 5 ct B hdg in 203 b	
IMT Room	VO Discussion with IC: regulators and brightest need to be built other ERZC underground to do this. Open 203B regulator for more air and then close the others.	9:55	ERZC instructed winder operator to leave cage at pit bottom and then opened door so cage could not be moved.	pit bottom Cage
IMT Room	IC was going to ring Greg Dalliston but was told by the assessors that he has retired. Steve Watts was assessing the exercise so couldn't be called . Steve Woods was not on the ISHR list. Second call to Jason Hill was made.	9:57		
IMT Room	Questions between IC and scribes About eight in 203B versus eight going to 203B. There were seven confirmed names into unknown in the meeting so assumed the two unknown are the assessors.	9:59	VO on phone to UM - Ventilation Plan communicated to maximise ventilation (Plan didn't include to get new ventilation readings after the ventilation change)	recovery team,
IMT Room	Non-verbal questions to ask: do you have 25 CSE-100s? Can you access compressed air at entrance to crib room? Give an update on ventilation to men underground	10:00	All CMWs in comfortable positons / 4x lights on low beam and all other turned off, 1x CMW roving between groups relaying messages via pen and paper. All CMWs were asked if breathing resistance & temperature was OK on their SCSR - all acknowledged OK with thumbs up.	203b Cribroom 6ct B-C Hdg
IMT Room	Logistics update in IMT statutory work being done on Dolly car Winder bus company on notice catering on notice water provided to crews outbye go line	10:05		
ICR	ICM told ESC about plan to change ventilation in attempt to ventilate trapped area. ESC told the ICT that he would allocate his emergency services role to mines rescue member & send to prep mines rescue substation (MRSS).	10:05	Call received from CRO, Going to conducted vent change -open 203b regulator -close 205 regulator * told to notify if change to vent flow or gases	203b Cribroom 6ct B-C Hdg
IMT Room	Scribe reports that annoying wives are calling through. Decision made to give them a number in corporate office	10:15	Vent change conducted and reported, instructed to isolate water in 203B 10:15-11:30	

Location	Surface Observation	Time	Underground Observation	Location
Control room	CRO communications surface NV; asking questions to confirm if they have 25 SCSR Q: are you able to change over? : YES Q: Can you access compressed air valve from where you are? : NO Q: is there part of crib room which has fresh air pockets? :NO	10:16		
IMT Room	IC Contacted CFMEU to get other ISHR number	10:16		
		10:18	Call received from CRO, Told to turn on Compressed air in B Hdg (No Compressed Air)	203b Cribroom 6ct B-C Hdg
Control room	CRO informed that calls from family members should be diverted to CFO,	10:19		
Control room	police arrived	10:20		
IMT Room	VO update to IC: will give instructions to open compressed air valve yes crew has 25 CSEs yes can get to compressed air no to any fresh air	10:20	203B 11c/t Regulator open	203 Panel Return
Surface	ESC told mines rescue member to prep MRSS and notify if any rescue personnel turned up.	10:20		
IMT Room	Call to EB first head office media person who has been put in charge of calls. Has already had calls with people ringing from DNRME. Does not have a script. Told ventilation and power have been reinstated, recovery of people underground is underway. There are nine stuck in 203B. Don't mention injuries being treated. Confirm no deaths. Give email to JG in head office.	10:22		
Control room	CRO communications surface : mines rescue arrived	10:25		
Swipe gate entrance	Mines Inspector arrived on site. Met at gate by Surface Controller.	10:25		
Swipe gate entrance	2 x police officers arrived on site. Met at gate and let in by Surface Controller.	10:27		

Location	Surface Observation	Time	Underground Observation	Location
IMT Room	Call from IC to ISHR #2 have had an earthquake and have reinstated power nine trapped in crib room in 203B panel rest of crews have come out three injured or are stable opened compressed air line	10:28		
MR Substation	Mines rescue employee arrived with rescue trailer and went straight to MRSS and immediately started prepping gear.	10:30		
Control room	CRO surface controller: Grasstree and Ensham MR don't have ID, needs to find if it is the issue	10:31		
Control room	CRO communications surface NV: Q: has there been issue with water: Yes Q: is the water coming from inbye of your position Q: Is the water rising rapidly Q: Is the water level visible from the crib room : within 20m from crib room : next ct inbye	10:35	Call received from CRO, *checking condition of CMWs Asked about water level (1ct inbye cribroom) (no word about vent change)	203b Cribroom 6ct B-C Hdg
IMT Room	Police arrive in IMT room	10:35	ERZC rang for update. Mines rescue still not on site. Unsure if drift winder operational.	pit bottom Cage
Control room	CRO communications surface update to VO: , gas static, belt not restarting	10:40	33-34c/t Regulator Closed	205 Return
MR Substation	QMRS technician tried to contact ESC by mobile. Left message	10:40		
IMT Room	First report on list of tags on surface boards. Told water is building up at seven cut through. Seven blokes underground with one belt worn self-rescuer and three cache rescuers each. This should give them 6.5 hours of air.	10:41		
MR Substation	Substation phone rang from ops room asking for update.	10:42		
IMT Room	Report from CRO on second tremor. Team that went to assist made it to 4 cut through and sustained	10:43		

Location	Surface Observation	Time	Underground Observation	Location
	injuries. Rubble on roads but everything is trafficable.			
Control room	CRO communications surface NV: Q: Has your situation changed: YES Q: Is it water Q: is it atmosphere deteriorating / is there improvement in gas levels atmosphere is static O2 17.5% CO 0 CO2 1-1.25% CH4 3-3.5% Q: Checking on injuries water level checked - static	10:44		
		10:44	Call received from CRO, *checking of status of injured people *water level inbye (static) - gas levels deteriorated	203b Cribroom 6ct B-C Hdg
IMT Room	New objective-isolate air 1 c/t 203B.	10:50	Dogleg Regulator Closed	204 Return
MR Substation	Mark Freeman MR Ops Manager arrived. He stated he got notified at 0935.	10:50		
Control room	Security came: Mark Freeman arrived on site tank water sampling	10:52		
Muster area	An update is provided to muster area by security and another Qld mines rescuer arrives. Planning Co-ordinator discussion noted with VO. Injured man needs confirmation by 1st aider to go back UG	10:52		
IMT Room	Briefing to police and mines inspector. (Mines inspector has been there 25 minutes and police have been there 17. They would not have been so patient in a real emergency).	10:53		
Sub Station	QMRS rep arrives & asks for the Sub Station Co-ordinator (there is no one) he takes over as Sub Station Co-ordinator	10:55		
		10:58	Call received from CRO, * Told about completed vent change *Checked on locations of falls and to get distances of fall from c/t	203b Cribroom 6ct B-C Hdg
Sub Station	Started to re - arrange sub-station in a better configuration - T-cards started	10:58		

Location	Surface Observation	Time	Underground Observation	Location
Control room	CRO communications surface gave update NV on regulators being closed Q: Do you have tape (100m) to pace distances to the fall Q: go to B hdg 6ct pace as safe as possible to fall in 1m pace do the same for c hdg do the same for centre c-d hdg (Planning confirmed HDG and that he is OK with that plan)	10:59		
IMT Room	Mines Rescue coordinator arrives on site	11:00	Ventilation survey conducted	203 Panel Return
Surface	MR Ops Manager taken to ICR then ops room.	11:00		
OPs Rm	Noted that duty of Emergency Services had been updated on the whiteboard	11:05	2xCMWs went and inspected the falls and counted the roof mesh to determine distances	203b
		11:05	All CMWs stopped wearing SCSR except 1 until 1135Hrs	203b Cribroom 6ct B-C Hdg
Surface	MR Ops Manager had discussion with ESC. ESC told him that he was on debrief duties and would finish what he was doing and meet him in Ops Rm.	11:10	2x CMWs returned and informed CRO of fall locations **was a very long process to get information about distance of fall locations as Non-verbal)	203b Cribroom 6ct B-C Hdg
IMT Room	13 men determined to be underground and no one missing. List of names of seven men in 203B put on board in IMT room.	11:12	ERZC rang for update. Gas levels in 203 b changed. Panel was flooding but now water level steady. UM checking air flow 10/11 c/t in 203 b panel. Mines rescue starting to turn up on site.	pit bottom Cage
OPs Rm	ESC officially took over duties and updated on whiteboard. ESC decided to go to MRSS for briefing with MR Ops MGr.	11:15		
Swipe gate entrance	QMRS Ops MGr. could not get out swipe gate, ESC arranged swipe card.	11:16		
MR Substation	Mines rescue personnel had discussion. Statement made that they hadn't had briefing yet, and did not know if they were needed at this stage. Prepping of gear was ongoing. T-card process in place.	11:20	Call received from CRO, *told of current information in regards to trapped CMWS *Asked if any information was missing	203b Cribroom 6ct B-C Hdg
MR Substation	ESC arrived and briefed MR Ops Mngr. 7 x CMW trapped. Were some questions that required chasing up. ESC left.	11:24		

Location	Surface Observation	Time	Underground Observation	Location
Sub Station	QMRS arrives - ESC Cook Colliery MR Co-ord briefs on the situation at 203 panel- 7 x trapped CMW in panel- All wearing CSE-100 s due to the low oxygen levels. They work out that the CMW have enough spare rescuers to last until 4pm	11:25		
		11:30	Call received from CRO, Checking if any change to atmosphere, Ventilation, water level or injured CMWs conditions **unable to tell CRO that Head injured patient had now became conscious	203b Cribroom 6ct B-C Hdg
MR Substation	4 x mines rescue personnel arrived in van from Oaky Nth. They got notified approx. 0930hrs and were on the surface about to commence rescue training at Oaky Nth at the time.	11:35		
Control room	CRO surface controller: surface controller said he asked for list of people who are going underground, however they left and the list was not provided; scribe went to ask for list	11:38	Phone rang. Crew coming from surface to isolate pipes going into 203 b panel. Measure distance from rib line to falls to ascertain the size of the falls.	pit bottom Cage
MR Substation	MR Ops Mgr. briefed rescue personnel. They immediately started prepping.	11:49		
IMT Room	TV crew arrives at front gate	11:55		
Logistics	Tasks:- Request food for 70 people - RM 4 x IS flight pumps for UG & 200m of hoses - CS Call Oaky Creek and Ensham - CS	12:00		
IMT Room	Police return to IMT and tell IC to give the wives a call as there are two angry wives at the gate.	12:12	Stopped at b hdg 29 c/t and parked drift runner. Walked to 28 c/t B heading transformer. ERZC inspecting for methane. Elec ringing to surface to find details about powering up 203 A and 205 mains. Out of service tags fitted to 203 B isolator stating not to be powered. Confusion between elects and ERZC about labelling of boundary monitors. (MG204, MG203, MG205, south mains and 203b). ERZC inbye checking areas and boundary monitors for build-up of methane. Then going to ring through ok to power.	28 c/t B hdg transformer.

Location	Surface Observation	Time	Underground Observation	Location
MR Substation	ESC returned and briefed MR senior personnel with further information. Atmospheric readings, injuries, 7x CMW trapped, measuring fall etc. MR people discovered that fall areas marked on plan were wrong. They had been transferred upside-down from mobile phone picture.	12:15	2nd Response Team arrived at 4ct with 4x CMWs *Drive 10m inbye and vehicle shuts down due to CH4 1.40% (vehicle by-passed and removed outbye to 3ct). * ERZC walked 10m and gas levels increased CH4 1.97%, O2 18.9%	203b B hdg 4-6ct
IMT Room	Determined there are now eight trapped in 203B and not seven but still a question on who has the head injury.	12:16		
		12:25	ERZC made call to CRO, (was apparent that the response team had not been given much information in regards to trapped CMWs e.g. gas levels, that inbye was flooded) **ERZC was told do remove stopping at 4ct C-D and install brattice across 1ct regulator (3Xintake Airways)	203b B hdg 4-6ct
Control room	phone from 673: ERZC called to inform VO: no ventilation; all three HDG gassed out; B 4ct inbye	12:28		
Logistics	returned from IMT Water is coming out of Caster into Argo seam Currently not looking for a Flight Pump - keep it on standby Still need pump fittings Require water for crews on pit top	12:34		
Control room	call from NV: last SCSR lasted 2.5h, 20 min ago donned second SCSR, they only have 5 left for 8 people	12:35		
Swipe gate entrance	MR personnel had to ask to get through gate again.	12:38		
		12:42	ERZC ringing for update on 203 b. Informed gassed out. Had to complete vent change to get in. Mines rescue assembling.	28 c/t B hdg transformer.
OPs Rm	Briefing attended by ERC and MR Ops Mgr. Given the info that 8 x CMW trapped. Were told that trapped workers had just donned 2nd rescuers. Calculation that they had approx. 5hrs oxygen left. Giving the rescue time to approx. 1800 hrs. Rescue	12:45		

Location	Surface Observation	Time	Underground Observation	Location
	personnel in transit discussed - how many, where from. (6GT, 6KT, 2CO, 3ON, 2EN)			
		12:50	CRO asked how many long duration units left - advised that the CMWs had used 16 of the 25 units available - 9 left	203b Cribroom 6ct B-C Hdg
MR Substation	2 x MR personnel from Ensham arrived. They were notified u/g approx. 10am.	13:00		
Front gate	Site media liaison (a second scribe) arrives at front gate. At the gate is a media van with reporter, CFMEU representative and the wives of two miners trapped underground.	13:06		
		13:17	2nd Response Team had made vent changes (changes would have worked) but told them that now the situation had escalated and now out of control, (needed Mines rescue)	203b Cribroom 6ct B-C Hdg
MR Substation	1 x MR arrived from Grasstree. Was told now had enough rescue personnel for 2 x teams.	13:20		
MR Substation	ESC gave briefing to senior MR personnel. Told MR not required at this stage.	13:25		
		13:28	Stopped at MG 203 tag board and retrieved crews' tags from tag board. Had not removed on initial evacuation from mine.	MG 203 B hdg tag board
MR Substation	3 x more Grasstree MR arrived. One arrived with no u/g gear - hardhat, boots, and belt. Had to be sourced from store.	13:30		
MR Substation	A runner from ICT came and informed MR that the mine was ready for mines rescue teams.	13:35		
Control room	NV communications surface gases, water and injuries are static 2nd SCSR CSE 100's still on them	13:41	CRO called and informed UM of QMRS in briefing	cage
OPs Rm	MR Ops Mgr. briefed in ops rm. Discussed objectives, FAB location, plans required.	13:45		

Location	Surface Observation	Time	Underground Observation	Location
IMT Room	Two mines rescue teams are now ready to go.	13:48	UM rang CRO. Tags being organised for mines rescue. CMWs sent to check that all drift runners have sufficient fuel and water.	pit bottom Cage
ICR	IC presented with and signed off authority to enter and captains task forms. MR Ops Mgr. was given the info that the environment around the fall was irrespirable. QMRS were not aware of that info.	13:50		
IMT Room	Questions succession planning and IC decides it will be addressed at the next meeting which is 2:30.	13:55	UM informed by CRO to send out non-essential personnel	
		13:59	Call received from CRO, *Checking if any change to atmosphere, Ventilation, water level or injured CMWs conditions **Told Mines rescue would be entering in 5 to10 min	203b Cribroom 6ct B-C Hdg
Muster area	Mines rescue team ready to go UG & sign off Lamp & deployment register	14:00		
Ops Room	Ops Manager briefing Captains on the updated situation Deployment tasks	14:01		
Operations	VO walked in Ops to talk with MR	14:14		
IMT Room	Crews donned second CSE at 12:35. The first lasted 150 minutes and next change at expected at 3 PM.	14:20		
Control room	call in from 203B 2nd SCE @12:35, 130 minutes at that pace they will be changing at 3pm; 5:30pm is time as they have another lot of spare	14:22		
MR Substation	Active MR team deployed in van to shaft.	14:25		
Muster area	Noticed that where the QMRS were accessing there vehicle to go UG the gate was locked and there was confusion on locating the key to open. Went through wrong gate as should have gone through main gate.	14:26		
		14:31	Call received from CRO, *Mines recue on route to 2nd egress Cage *Checking if any change to atmosphere, Ventilation, water level or injured CMWs conditions	203b Cribroom 6ct B-C Hdg
Control room	Security said MR in mini bus; CRO to be informed when they are about to go underground	14:33		

Location	Surface Observation	Time	Underground Observation	Location
QMRS		14:34	Rescue teams at cage Ready for deployment	QMRS
IMT Room	IMT meeting operations assessing falls from the outbye side looking to possibly throw more self-rescuers over top of the fall. There is an LHD authorised operator in each rescue team going in under BG4. Next meeting 3:30PM	14:35		
MR Substation	6 x Kestrel MR personnel arrived. U/g people were notified approx. 1130 hrs. People in town were notified approx. 1000 hrs. One person in town went out to Kestrel where van then left Kestrel and picked up more people in town before heading to Cook.	14:35		
		14:36	First cage 5 x rescue members 1 x Cook CMW & equipment	QMRS
MR Substation	Kestrel MR personnel briefed.	14:40	Undermanager Speaks to CRO and is asked to send ERZC to inspect the drift	Pit Bottom
		14:43	Mines rescue arrive at pit bottom with equipment for team and equipment for FAB. More still to come down.	pit bottom Cage
Control room	CRO communications surface called by QMRS; they are at tag board going in to panel (203Btag board)	14:59		
Control room	CRO surface controller, call from pit bottom, at outbye of the switch on Dolly car (CV02 buried) they had to isolate fire hydro because it is leaking	15:00	Pulled up at bottom of dolly car rails. ERZC's walking up to drift and informed there has been a fall in the drift and shown the photo. Also shown the photo of the damaged hydrant. 1 x ERZC rang control to inform. The other ERZC isolated the hydrant and put info tags on the valves. Nil no road tape in area to barricade fall so crossed pogo's and hazard tape with info tags used.	Dolly car pit bottom.
Control room	call in from QMRS to CRO surface controller: update from underground FAB has no phone have to communicate DAC can you set up FAB at cache: asking permission : IC gave permission	15:07	Call over DAC from mines rescue to CRO -No phone at 1ct where told to set up FAB -Asked if could move forward to 3ct SCSR Cache location	203b Cribroom 6ct B-C Hdg

Location	Surface Observation	Time	Underground Observation	Location
		15:13	*Emergency evacuation alarm came across DAC *Mines rescue trying to contact to CRO	203b Cribroom 6ct B-C Hdg
Control room	CRO communications surface NV: at 3ct MR set up cache, started third last set of SCE, no other changes	15:15	MR drift runner out of air	Pit Bottom
		15:20	Set up FAB at 3 c/t One team active One at FAB	QMRS
IMT Room	Reported to IMT that's trapped miners changed to 3rd self-rescuer at 3 PM	15:22		
JH		15:28	Constructed brattice screen at 4 c/t	QMRS
IMT Room	IMT Meeting Injuries head injury being held at Blackwater hospital with concussion laceration injuries can be released to camp need to send someone to pick them up notifications to next of kin of those hospitalised identified as necessary person assigned to contact those families (still no next of kin notifications made to trapped miners) Next meeting 4 PM	15:30		
MR Substation	Some excess MR team members went home due to fatigue. They were not part of the 3 x teams (Active, standby or surface standby).	15:30		
MR Substation	Phone call with update from u/g FAB. Stopping 5ct removed, stopping 4ct built. Need more pogos as only 4 x in emergency pod.	15:43		
MR Substation	MR Ops Mgr. phone CRO to arrange additional equipment.	15:48		
MR Substation	Phone call from MR u/g - fresh air at 5ct. Active team approaching fall.	15:59		
IMT Room	IMT meeting mines rescue has requested pogo sticks which the mine doesn't have. Timber supplies are being brought to start timbering. loader at glory hole and two loaders at entrance	16:00		

Location	Surface Observation	Time	Underground Observation	Location
		16:00	Exercise finished 4pm	
Surface	Rescue teams out. Reported to MR substation for debrief and captains report.	17:30		

Appendix B: Resumes of assessors

Dr Snezana Bajic Technical Services Manager Simtars

Dr Snezana Bajic is the Technical Services Manager at Simtars. She holds Bachelor of Science, Bachelor of Engineering (Mining Engineer of Mineral Processing, Dipl. Ing. Rudarstva za PMS) degree, PhD Mineral Processing (UQ) and Graduate Certificate in Business.

Snezana and her team are responsible for providing mine technical support services, emergency support services, consulting, research and development for the industry. She has been the Level 1 Exercise assessor three times and she has recently become spontaneous combustion trainer on accredited Simtars courses.

Snezana has over 17 years of industrial experience in both the coal and hard rock mining. She was responsible for executing projects on many mine sites in Australia, USA, Serbia, Canada, China and Turkey. Snezana is currently in charge of looking after the mine emergency response unit, Safegas and CAMGAS mine support.

David Cliff (Organising Committee and IMT observer) | Professor of Occupational Health and Safety in Mining, Minerals Industry Safety and Health Centre (MISHC) University of Queensland

David Cliff has been Professor of Occupational Health and Safety in mining since 2011. His primary role is providing education, applied research and consulting in health and safety in the mining and minerals processing industry. He has been at MISHC for over 14 years.

Previously David was the Safety and Health Adviser to the Queensland Mining Council, and prior to that Manager of Mining Research at SIMTARS, providing expert assistance in the areas of health and safety to the mining industry for over 26 years.

He has particular expertise in emergency preparedness, and fires and explosions, including providing expert testimony to the Moura No2 Warden's inquiry, the Pike River Royal Commission and the Hazelwood Mine Fire Inquiry. He has also attended or provided assistance to over 30 incidents at mines involving fire or explosion.

Brendan Clinch ERZC, Grosvenor Coal Mine

Brendan Clinch is currently working as an ERZ Controller at Grosvenor Mine and is working towards attaining his second class competency.

He has experience in both production and outbye across NSW and QLD. He recently became a QLD Mines rescue member. With 17 years' experience he has a mechanical trade back ground and has worked as an ERZC/Deputy for the last 8 ½ years

Shaun Dobson Deputy Chief Inspector of Coal Mines, DNRME

Shaun Dobson has over 30 years of coal mining experience starting his career in with a mining contractor in 1978.

Shaun worked for British Coal before emigrating to Australia in 2000 and has undertaken several senior roles in Queensland and NSW underground coal mines including Mine Manager at Carborough Downs, North Goonyella and Broadmeadow.

Shaun joined the inspectorate in 2013 and was the Deputy Chief Inspector of coal mines since 2017. Shaun was the Chief Inspector of coal mines at the time of the exercise.

Reka Fox Mining Engineer, Cook Colliery

Reka has 14 years underground coal industry experience with time spent at the Huntly East Mine (NZ), Moranbah North Mine and Cook Colliery.

His roles have included underground operator, deputy, geologist, geotechnical engineer and he is currently the mining engineer at Cook Colliery. Reka was the mole for this year's level 1 emergency exercise.

Phil Fletcher Compliance Superintendent, Kestrel Coal

Phil Fletcher is the compliance superintendent at Kestrel Coal. Phil is an underground coal Mining Engineer with 25 years industry experience. He has qualifications as a mining engineer, undermanager and deputy and has worked in such roles for a variety of New South Wales and Queensland mining operations. Initially starting as a mining engineering and then an operator at Oaky No. 1 Mine, he has since worked deputy, undermanager, technical services manager, consultant and outbye superintendent.

Elliott Franks Social Media Manager, DNRME

Elliott Franks has been a level 1 assessor for 6 years. He is the Social Media Manager for DNRME. He has worked in Social Media for 13 years and has managed communities for DAF, DTESB, DNRME and DITID.

Elliott specialises in risk and emergency management in Social Media and Communication and regularly works with the State Disaster Coordination Centre during emergency responses.

Blaise Gassin Mining Engineer, Oaky North Coal Mine

Blaise Gassin has four years Mining Experience, worked in the Glencore Graduate Program for 2 years as a Mining Engineer.

Currently employed as a Trainee Deputy at Oaky North. Joined QMRS in 2017, completed an Advanced Diploma In Underground Coal Mine Management in 2019. Have worked in gate road development, mains development, long wall process and production

Theodore Georga Manager Stakeholder Coordination, Office of the Commissioner for Mine Safety and Health

Theodore Georga is the Manager, Stakeholder Coordination in the Office of the Commissioner for Mine Safety and Health.

He has regularly participated in state-wide emergency responses as part of the State Disaster Coordination Centre and in the Department of Health State Health Emergency Coordination Centre.

Theodore has more than 15 years of experience in media, communication and social media roles in the Queensland Government and private sector.

Gregory Hall Shift Manager, Oaky North Coal Mine

Gregory Hall has had two years experience as Shift Manager at Oaky OCN (10 + as fill in). He has been an ERZC for 16 plus years at various mines in Qld. (25 years U/G). Gregory completed advanced diploma and diploma of U/G coal mining.

He is a 2019 current QMRS member and has completed Level 2 at OCN as Operations assessor 2019.

Jason Hegarty Training Co-Ordinator at Southern Mines Rescue Station, NSW Coal Services.

Jason Started in the coal industry 1992 in the Illawarra, worked at BHP Appin Colliery as a Machine man/ Deputy from 1993 to 2006. Obtained Deputies qualification in 2005. Started at SMRS in 2006 as a Training Officer – promoted to Training Co-Ordinator 2018.

Primary role includes Duty Officer for Emergency Response, training of Mines Rescue Brigade Members. Underground Mines Rescue Competition Co-Ordinator at SMRS for 8 years, owner of all fire training courses for NSW Mines Rescue. Other roles include training of personnel in Fire Team Ops – Confined Space – Working at Heights/ Rescue – Pain management – Emergency Wardens.

Tim Jackson General Manager Operations, QMRS

Commenced with QMRS in February 2019 in the current position. He has 47 years' experience in the coal industry, nationally & internationally, having worked at mines in the Northern, Southern, Western coalfields of New South Wales, Bowen Basin in Central Queensland, Indonesia and the United States of America.

For 10 years he was an active member of mines rescue in NSW and Qld. He has held a variety of operational and corporate positions during that time, including: Mine Mechanical Engineer, Maintenance Manager, Undermanager In Charge, Production Manager, Longwall Manager, Mine Manager, General Mine Manager, Inspector of Mines and Corporate Risk Manager.

Tim holds the following qualifications: 1st, 2nd & 3rd Class Certificates of Competency (Qld & NSW), Mine Mechanical Engineers Certificate of Competency (NSW), Ventilation Officer (Qld), Shotfirer (Qld & NSW), Master's Degree in Business & Technology (MBT) from the UNSW and is a fellow in the AusIMM.

Sharon Jones Senior Administration Officer, Simtars

Sharon has been at Simtars for 10 years and was responsible for the coordination of all activities to prepare and organise the other 32 assessors to ensure the efficient running of the Level 1 exercise.

Nathan Kidman ERZC, Kestrel Coal Mine

15 years mining experience, fitter and turner by trade, worked as a contract fitter at Crinum and Kestrel, started with Kestrel full time in 2006 as a development operator, joined QMRS in 2009, achieved deputies competency in 2012 and have worked in all areas of the operation as a deputy currently as a longwall deputy and relief undermanager, He is currently studying for 2nd class ticket.

Nikky LaBranche Industry Fellow Minerals Industry Safety and Health Centre (MISHC) University of Queensland

Nikky LaBranche is the inaugural Industry Fellow in the Minerals Industry Safety and Health Centre (MISHC) within the Sustainable Minerals Institute (SMI) at the University of Queensland on secondment from Simtars.

She is a mining engineer with 15 years' experience in surface and underground coal through her work in the US, Colombia and Australia. She is an experienced researcher in incident management having assessed five Level 1 Emergency exercises and performed NIOSH research in self-escape and built-in-place shelters.

She is currently working on aligning emergency management systems across all Queensland underground coal mines. At UQ, Nikky is currently undertaking a strategic gap analysis in the understanding and management of particulates in the resources sector. She is also pursuing her PhD in characterising the impact of dust on the respiratory health of coal mine workers. Prior to her current position Nikky has worked in various mining engineering roles for Simtars, BMA Coal, NIOSH Office of Mine Safety and Health Research and Drummond Company.

Ben Lang- Shift Undermanager, Kestrel Coal mine

19years underground mining Experience in Queensland & New south wales, from Operator, Deputy to Undermanager. (Last 14years at Kestrel), 13year Mines rescue experience.

Have previously participated in Level 1 exercises as a Deputy in a development Panel.

Michael Lerch Mine Manager Moranbah North Coal Mine

38 years mining experience in roles including Director of Operations, GM, SSE, Underground Mine Manager, Undermanager and Deputy in NSW and Queensland mines

Qualifications include MBA, Bachelor of Mathematics, Advanced Diploma of Coalmine Engineering, Associate Diploma of Coalmine Engineering, and Diploma of Education

Statutory qualifications include SSE certificate, 1st Class Mine Managers Certificate of Competency NSW and Qld, 2nd and 3rd Class Certificates of Competency

Steffan Ryder ERZC Kestrel Coal Mine

Steffan Ryder and has been in the industry for 11years. Steffan has worked at numerous mines in NSW and has been in Qld since 2016.

Steffan is currently employed by Xcoal Mining Services at Kestrel south as a Longwall Deputy/ERZC. He has recently completed his Diploma and is studying towards sitting for a Second Class ticket in 2020.

Paul Sullivan Mines Inspector (Electrical), DNRME

Paul Sullivan is a Mines Inspector (Electrical) with DNRME and has been in this position for seven years. He has an Associate Degree in Electrical / Electronic Engineering. Prior to this he has been an EEM at Oaky No1 and Ensham underground mines with 6 years' experience in this role.

He has been in other electrical and trade supervisory positions in underground coal mines for over 12 years and has been in the industry both in NSW and Queensland for over 30 years.

Martin Watkinson Executive Mining Engineer Simtars, DNRME

Martin is the Executive Mining Engineer based at Simtars providing technical assistance to the Australian mining industry in the fields of ventilation, gas monitoring, emergency response, risk management and developing safety management plans.

Martin has been involved in the level 1 emergency exercises between 2001 and 2008 and was the Chair of the committees for the 2006, 2007, 2013 and 2014 exercises. Between 2007 and 2013 Martin worked for Vale and Adani in senior management roles. He has provided emergency response advice and coordinated emergency exercises in Queensland, New South Wales and New Zealand.

Stephen Watts ISHR

Stephen Watts is a recently appointed Industry Safety and Health Representative for the CFMEU. He has over 18 years' experience in underground mining at both coal and metalliferous operations.

He is a qualified deputy, and from learnt experiences working underground has gained a passion for protecting and improving the safety and health of mine workers.

Appendix C: Things to consider when organising an emergency exercise

Recognised Standard 8 defines that an audit approach should be taken in developing the scenario for a level 1 exercise. The time frame available for the exercise is one shift.

The standard requires the underground deployment of QMRS. Given that this will take a minimum of four hours, only certain elements of the mine's and States' emergency response system can be checked every year.

Previous recommendations have been made to split the underground deployment of QMRS away from the level 1 exercise. This would enable a full test and interaction of ISHR, Inspectorate at the site IMT meetings and a separate underground deployment could be conducted with deployment sheets and MRAS completed thus not delaying the underground deployment.

Every year the assessors identify ways to improve the exercise. These are presented here to help guide other organisations in their preparation of such exercises.

Many mines that have had exercises held on day shift during the week do not fare well in the assessor's review of the incident management process.

2019 exercise

- Social and mainstream media responses are not handled well in the level 1 exercises. It is being considered to utilise local drama students as actors for various roles of external parties, i.e. family, media, etc. to improve the reality of the situation. Social and mainstream media responses from mines and mining companies will continue to be tested at the level 1 exercises.
- The committee will review options to develop scenarios that require the immediate mobilisation of QMRS rather than the operation trying to solve the emergency through alternate solutions. (The spitting of the exercise could also enable a similar result if not better result).
- To develop more visual aids/information that ensures the operation cannot miss/ignore key matters i.e. the fall in the main drift.

2018 exercise

- Too much time spent in area prior to exercise commencing. This gave the workers time to adjust and think about how they would approach an escape rather than a more immediate arrival and response.
- A screen shot of the shearer position in the TG for the CRO to simulate the shearer position for the scenario.
- There seems to be an opportunity to utilise the playback system on the Citect or SCADA system to better simulate the exercise.
- The date was evident to the CMW's they state they knew on Monday that the time of the exercise was being held.
- Self-rescuers for all of the team would have provided greater realism.
- Still camera could benefit from separate light (as originally planned), on mount connected to camera – can use headlamp, but not as steady, and sometimes you want to look around to make sure you're not missing anything.
- The exercise information given was not correctly detailed and had the potential to create confusion. There was no picture of the deceased CMW's at the TG therefore

the focus on this was not apparent. Information on whether power was still on underground and were the main fans still running was not clearly communicated.

- The people involved underground as assessors was not communicated effectively as when reconciliation of tags and lamps was being undertaken it was not clear who was who. I.e. Cap lamps from the other roster in use by the assessors.
- Environmental information given to the FAB controller for the LW MG was illogical. Very little oxygen deficiency was evident yet they were informed that off scale carbon monoxide was evident. For the XAM7000 this meant 10000ppm.
- Because crew knew it was an exercise, and knew to some extent how it would go, this may have affected communications – particularly verbal.
    - Possibly less focus on providing all possible information.
    - Possibly less emotional than would be in actual situation.
    - Future exercise may benefit from some communication protocol to encourage some role-play – e.g. assessor reminds participants at intervals about possible emotional status “Your legs are broken, you’ve received burns, you’ve been stuck down here for hours and you’re not sure how long until you get out. You’re probably in a lot of pain, and might be somewhat scared or desperate.”
        - Ideally based on real world examples of emotional status vs time.
        - If participants act emotions well it could help motivate surface staff.

- GC results for exercise should be available in the standard output format of the site GC to prevent transcription errors.
- To clearly define the objective of the level 1 exercise. If this is to test the effectiveness of a state wide response then all stakeholders need to be tested and proved effective. The exercise stopped after the fatalities were mapped which demonstrated an effective response and deployment by QMRS. It did not demonstrate the mines ability to effectively respond and mitigate the perceived hazards without introducing further risks.
- To utilise more person as observers who are in the process of attaining Deputy and Second class certificates of competency.

Appendix D: Briefing notes prepared for the Assessors

Surface observers

- *This is an emergency exercise that you have already been informed about.*
- *Please treat this exercise as a real event.*
- *I am the observer for this group.*
- **Start communication with Level 1 exercise communication**
- ***Do not ring 000 or any external services***
- ***Please tell me if you would have contacted an external service as part of your response/Duty card***
- ***You are free to call QMRS, Inspectorate, ISHR, Simtars or Bounty personnel as required***
- *You are free to make your own decisions.*
- *You are not to endanger your own or any other people safety in this exercise.*
- *As I am an observer I am not allowed to assist you by answering questions.*
- Engage with the site personnel until T=0 general discussions about objectives and learnings of level 1 exercises

Underground observers

- *This is an emergency exercise that you have already been informed about.*
- *Please treat this exercise as a real event.*
- *I am the observer for this event*
- ***Do not put your belt worn self-rescuer on. You will be given one if required.***
- **Start communication with:**

"This is a Level 1 exercise communication"

- *You are free to make your own decisions.*
- *You are not to endanger your own or any other people safety in this exercise.*
- *I will give instructions/information with regard to the environment.*
- *I may ask you to perform activities as part of the exercise test*
- *As I am an observer I am not allowed to assist you by answering questions.*
- Engage with the site personnel until T=0 general discussions about objectives and learnings of level 1 exercises.

Wear your PPE there is a camera present.

203 Extraction

Use the briefing sheet to put the people at ease.

Secure continuous miner ensure there is no support issues:

T=0

Once you have notified them of the earthquake notify them of injuries:

Give them injured man with broken legs, bleeding

One with head injury and

One with broken arm

Triage should delay the evacuation

As they try to evacuate through or exit the area for first aid equipment explain that these roadways are collapsed and not passible.

There needs to be a telephone call to control room in the panel/ entrapment areas. If there is not a telephone for the purposes of the exercise let the deputy go to one to report the issue.

He must tell the control room that for the purposes of the exercise this phone is in the area where the CMWs are trapped

Pick a suitable location for this

T= 0

Phone call out at 08:30 or 9:00 am depending on Triage,

Can report on water level rising and musty smell.

Once this call is made go to non-verbal communications CMWs wearing SCSR.

You will have a self-rescuer for everyone to try. Ask them if they are willing to see how long it lasts at rest remember lifting it away from the body reduces the temperature and makes it more comfortable.

Take lots of photographs, When QMRS come to recover the fall.

This team will need to prepare a pile of coal for QMRS to clean up.

Put it where it could be picked up later by a loader or the miner if things don’t go to plan with the exercise

205 Mains

Secure continuous miner ensure there is no support issues:

Use the briefing sheet to put the people at ease.

T=0

Show the signs:-

Earthquake one man injured and needs to be put on a stretcher

Drive past multiple roof falls bottom of drift blocked by massive roof fall and damaged hydrant use photographs

Can they get a stretcher in the PJB? Along with the normal crew?

Will they take the PJB or walk? Their call.

Show the pictures of the bottom of the drift and the hydrant

If the stretcher does not fit and not safe to travel and they would have taken the PJB let them travel to pit bottom safely. Take stretcher with you as we want to get a video of getting the stretcher out of the mine.

Need to evacuate via winder

Follow the team to triage/debrief

204 C

Secure continuous miner ensure there is no support issues:

Use the briefing sheet to put the people at ease.

Superficial arm and leg injuries, can travel by PJB as long as there are seats. 3 injured personnel others shook up

Blocked exit at bottom of drift.

Show the pictures of the bottom of the drift and the hydrant

Need to evacuate via winder

Follow the team to triage/debrief

T=0 start to act as an observer

Outbye/drift haulage

Use the briefing sheet to put the people at ease.

Liaise with Reka as to where the outbye personnel; are.

Tag along with them

Talk to them about the exercise

T=0 show them the information on the card about the earthquake

Show the pictures at the bottom of the drift

Evacuate via the winder

Surface

Use the briefing note to put people at ease.

T=0 brief everyone using the briefing note

All offices other than the control room loose power

Power only brought back to site once electrical engineer has talked through re-powering with Paul Sullivan (PS has a radio)

If power not back on in time they can notionally gravity wind the people out of the mine. Must explain to a surface assessor

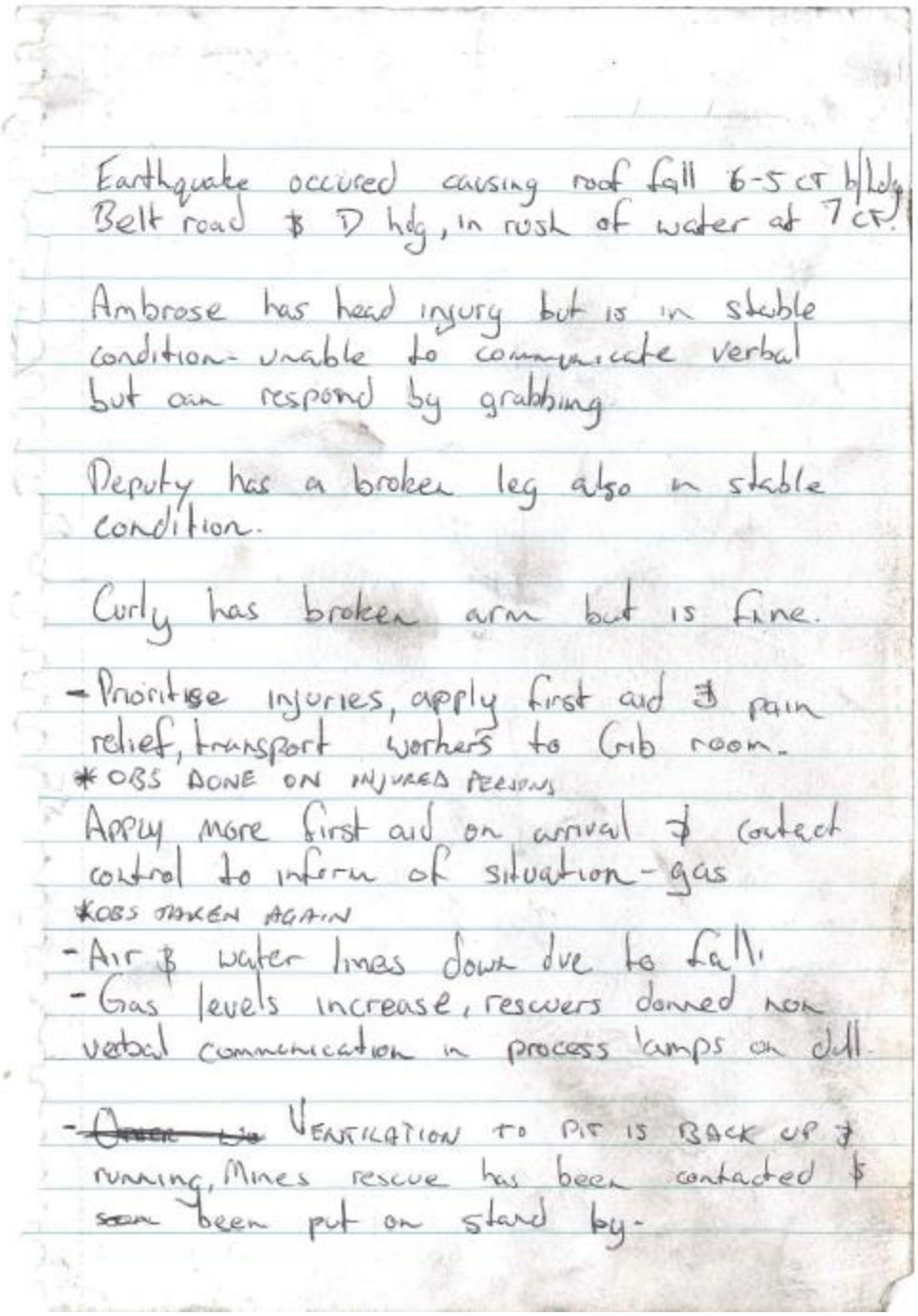
<u>You are allowed to interject if they have gone off track</u>

When fans start high collar pressure was 1360 now 1470 pa

Intake shaft now 8 m/s was 5.2 m/s

Conveyor belt will not re-start

Appendix E: 203 B CMW hand written notes



Earthquake occured causing roof fall 6-5 CT b/Hdg
Belt road & D hdg, in rush of water at 7 CT.

Ambrose has head injury but is in stable condition- unable to communicate verbal but can respond by grabbing

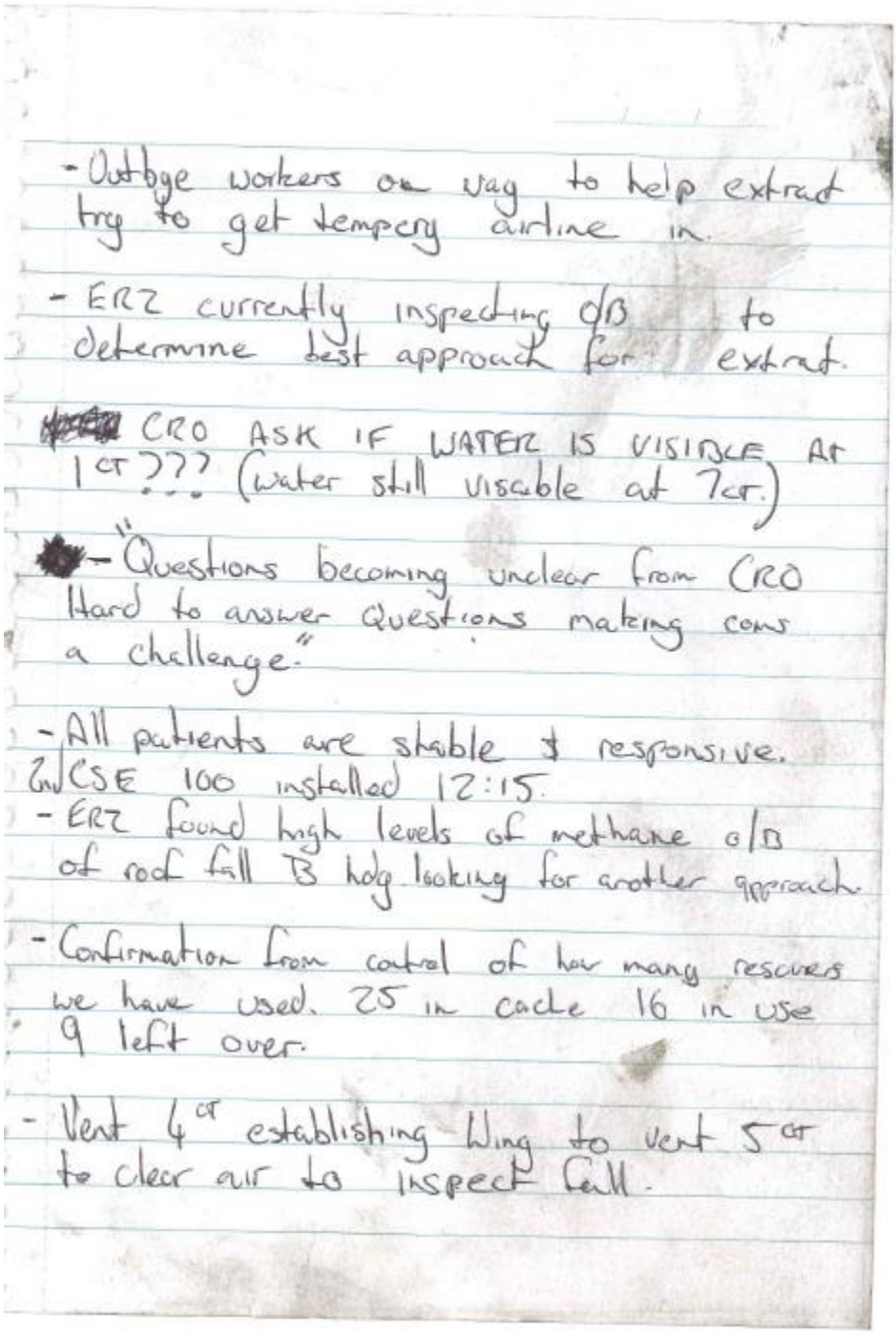
Deputy has a broken leg also in stable condition.

Curly has broken arm but is fine.

- Prioritise injuries, apply first aid & pain relief, transport workers to Crib room.
* OBS DONE ON INJURED PERSONS
Apply more first aid on arrival & contact control to inform of situation - gas
*OBS TAKEN AGAIN
- Air & water lines down dve to fall.
- Gas levels increase, rescuers donned non verbal communication in process lamps on dull.
- ~~Omen to~~ VENTILATION TO PIT IS BACK UP & running, Mines rescue has been contacted & ~~soon~~ been put on stand by.

Workers outbye on way to assist.

- Confirmation of workers in area (poor comms)
- raised gas levels, injuries stable
- risk assesment is happening to begin extraction
- Plan to open regulator at 203B. Close regulators at other panels to try increase out pressure.
- Call 362 if levels change
- levels still haven't changed.
- All regulators closed at 10:45
- Broady checking intake side.
- Measure of falls (poors comms)
- Mines rescue on surface getting ready. 11:50



- Outbye workers on way to help extract try to get tempory airline in.

- ERZ currently inspecting c/B to determine best approach for extract.

CRO ASK IF WATER IS VISIBLE AT 1CT??? (water still visable at 7CT.)

- "Questions becoming unclear from CRO Hard to answer Questions making cons a challenge."

- All patients are stable & responsive. 2nd CSE 100 installed 12:15.
- ERZ found high levels of methane o/B of roof fall B help looking for another approach.

- Confirmation from control of how many rescuers we have used. 25 in cache 16 in use 9 left over.

- Vent 4CT establishing Wing to vent 5CT to clear air to inspect fall.

- Gas levels have risen outbye of fg ll so bratice wing isn't an option (Mines resque has been deployed at 1:20p.)

- Gas/water levels are static, patients are stable.

- Mines resque is about to leave master area. 15min until they are u/G. 2:00pm

- 2:15 mines resque still not deployed waiting for further information - all status are as same.

- 2:30 resque team deployed.

- 3:15 Mines resque trying to establish FAB.

- 3:20 FAB established at 3 CT 203B Waiting to hear further actions. 1 team in on way.

-3.30:

References

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