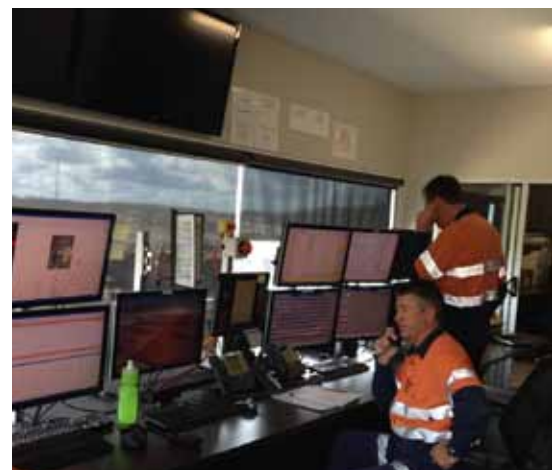


2014 Level 1 Mine Emergency Exercise



Photography

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Contents

Abbreviations and glossary	iv
Preface	1
Executive summary	1
Scenario	1
Objectives	1
Major observations	1
Recommendations	2
Introduction	3
Objectives	3
Kestrel South Coal Mine	3
Scenario	4
Underground assessments	7
Conveyor drift fire site	7
Assessor: Kevin Poynter (Mines Inspector)	7
What worked well?	7
Areas for improvement	7
Recommendations	7
403 panel evacuation	7
Assessors: Ray Smith, Tom Lake and Robin Bent (Video)	7
What worked well?	8
Areas for improvement	8
Recommendations	9
Mains evacuation	9
Assessors: Jason Hill and Jeff Davidson	9
What worked well?	9
Areas for improvement	9
Recommendations	9
Outbye evacuation	10
Assessors: Jason Kachel and Daniel Proffitt	10
What worked well?	10
Areas for improvement	10
Recommendations	10
Trapped coal mine worker on 403 face line	10
Assessor: Rodney Graves	10
What worked well?	10
Areas for improvement	11
Recommendations	11
Surface assessments	12
Control room	12
Assessor: Sean Muller and Ken Liddell	12
What worked well?	12
Areas for improvement	12
Recommendations	12



Incident management.....	13
Incident management process	13
Observers: Senior Sergeant Peter McFarlane and Sergeant Robert Smith	13
Recommendations.....	14
Incident management team (IMT)	14
Assessors: David Cliff and Wouter Niehaus.....	14
Areas for improvement	14
Recommendations.....	15
Logistics	15
Assessor: Russell Albury.....	15
What worked well?.....	15
Areas for improvement	15
Recommendations.....	15
Operations.....	16
Assessor: Gary Mitford.....	16
What worked well?.....	16
Areas for improvement	16
Recommendations.....	16
Planning	16
Assessor: David Connell	16
What worked well?.....	17
Areas for improvement	17
Recommendations.....	17
Media and crisis communication procedures.....	18
Assessors: Jo Clark, Paul Lynch, Elliot Franks and Wade Milne	18
Activation of emergency response arrangements	18
Use of social media	18
Media and communications	18
What worked well?.....	18
Areas for improvement	19
Recommendations.....	19
Front Desk Kestrel South – Administration	19
Assessors: Robyn Lihou	19
What worked well?.....	19
Areas for improvement	19
Recommendations.....	20
BRT Room – Kestrel South	20
Assessors: Robyn Lihou	20
What worked well?.....	20
Areas for improvement	20
Recommendations.....	20
Mines Rescue response.....	20
Assessor: Dale Davis	20
What worked well?.....	20
Areas for improvement	20
Recommendations.....	21



Conclusions.....	22
Recommendations.....	24
Mine	24
Industry	25
QMRS	26
Social Media and Communications.....	26
Exercise team.....	26
Appendices	27
Appendix A: Exercise timeline	27
Appendix B: Assessors	28
References	30

List of figures

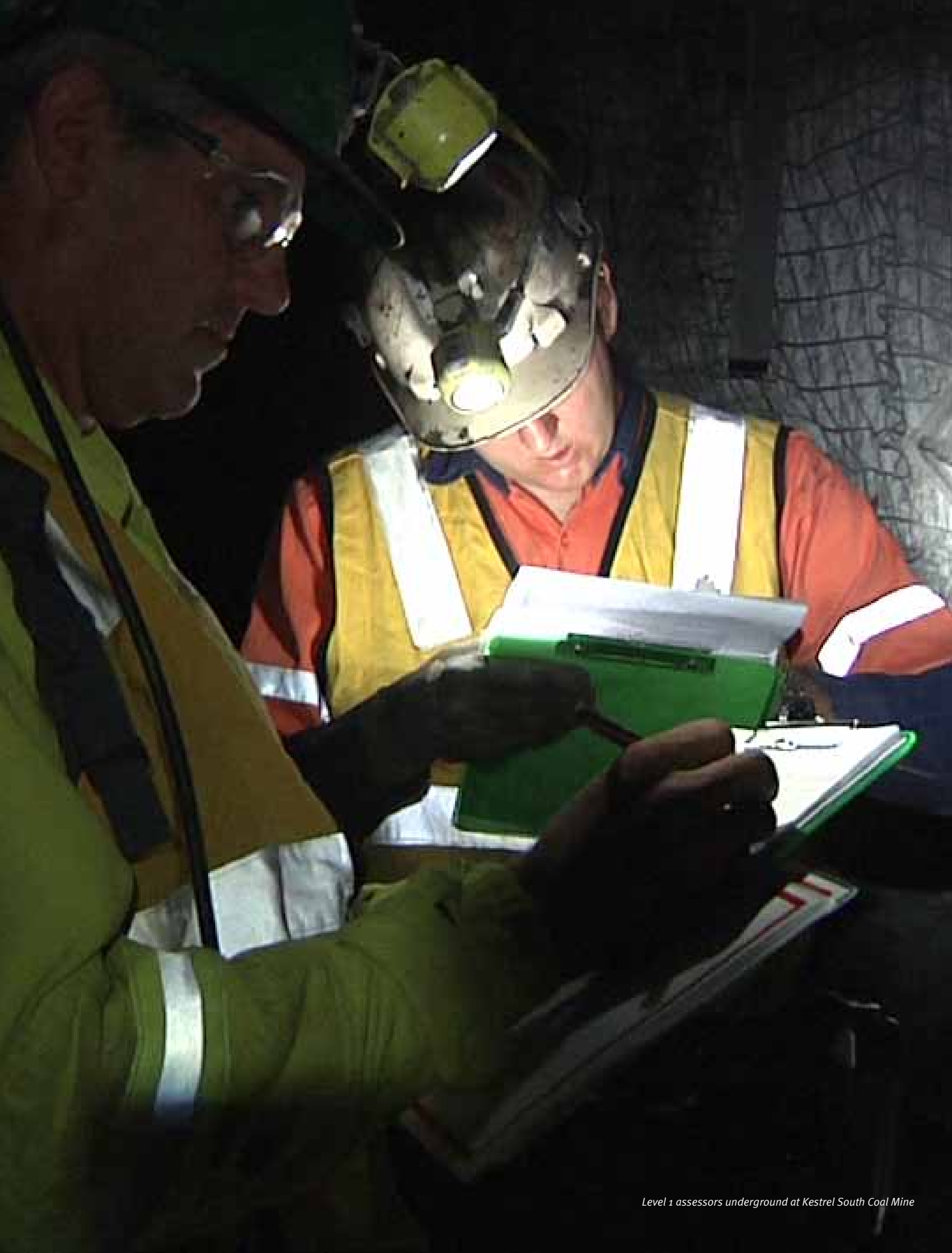
Figure 1: Location of Kestrel South Coal Mine	3
Figure 2: Plan of Kestrel South Coal Mine	4
Figure 3: Conveyor belt fire.....	5
Figure 4: Kestrel control room layout	5
Figure 5: Smoke spread T+5 to +45	6
Figure 6: CMWs at CABA refill station	8
Figure 7: Kestrel Mine site gas chromatograph	11
Figure 8: IMT meeting.....	13
Figure 9: QMRS trailer mounted GAG unit	21
Figure 10: 403 crew's ERZ controller checking with control	23

Abbreviations and glossary

Term	Definition
Approved standard	A standard made for safety and health under the repealed <i>Coal Mining Safety and Health Act 1925</i> stating ways to achieve an acceptable level of risk to persons arising out of coal mining operations.
AusAID	Australian Government's overseas aid program
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
CCTV	closed circuit television
CPR	cardio pulmonary resuscitation
CH ₄	Methane
CITECT	Brand name of supervisory control and data acquisition (SCADA) system
CO	Carbon monoxide
CO ₂	Carbon dioxide
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, also loads coal into rail cars, barges, or ships. They also referred to as a coal preparation plant, prep plant, tipple or wash plant.
Continuous miner	Coal cutting machine used to develop new roadways in a mine.
CMW	Coal mine workers
Crib room	Location where mineworkers eat and a meeting station for the ERZ controllers.
CRO	Control Room Operator
Cut-through (c/t)	A passage cut through the coal, connecting two parallel headings.
DAC	Underground intercom system also referred to as the tannoy.
DNRM	Department of Natural Resources and Mines
Eimco	Brand name of a flameproof mechanical loader.
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.
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 Plans
ICS	Incident Control System
IMT	Incident Management Team (term is interchangeable with ICT)
Inbye	Mining term for 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 <i>Coal Mining Safety and Health Act 1999</i> 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.
Level 1 mine emergency exercise	State level mine emergency exercise 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.

Abbreviations and glossary

Term	Definition
Longwall	A method of mining flat-bedded deposits, in which the working face is advanced over a considerable width at one time.
MEMS	Mine Emergency Management System
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 who control the mines inspectors.
MISHC	Minerals Industry Safety and Health Centre
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
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; for example, 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. Due system enhancements and the ability to readily contact personnel wherever they are underground, PED is also sometimes referred to as Productivity Enhancement Device.
PJB	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 persons arising out of coal mining operations.
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).
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 one hour.
Simtars	Safety in Mines Testing and Research Station
Stopping	A ventilation control device which stops ventilation flow.
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, such as shift supervisor.
Ventsim	Ventilation modelling software
VO	Ventilation Officer



Level 1 assessors underground at Kestrel South Coal Mine

Preface

This report has been compiled by the 2014 Level 1 Organising Committee with input provided by each of the assessors involved in the exercise. Assessors have provided an account of their part in the exercise for this report.

The organising committee would like to thank the assessors for their input and acknowledge the co-operation and assistance of all those involved in the 2014 level 1 Mine Emergency Exercise.

The organising committee would also like to thank Kestrel South Coal Mine for participating in the exercise and providing 40 self-contained self-rescuers for use during the exercise which added to the reality of the experience for evacuating coal mine workers.

Executive summary

This report is for the 2014 Level 1 Mine Emergency Exercise held at Kestrel South Coal Mine between 8:15 am and 4:10 pm on 29 October 2014.

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 08 Conduct of Mine Emergency Exercises in June 2009. It provides guidelines for conducting mine site emergency exercises including the requirement for a test of state-wide emergency response by holding a Level 1 Mine Emergency Exercise at a mine annually.

It is now 20 years since the Moura No 2 disaster (1994), and four years since the Pike River disaster (19 November 2010). The Pike River Royal Commission has led New Zealand to adopt similar legislation regarding emergency exercises.

Since 1998, seventeen level 1 mine emergency exercises have been held in Queensland.

Kestrel South Coal Mine is an underground longwall coal mine with a production capacity of six million tonnes per annum. The mine is located 300 kilometres from the port of Gladstone.

Scenario

The scenario for the exercise was based upon an underground conveyor overrunning and creating a pile up of coal at the end of the shift at the transfer of the main underground conveyor and the drift conveyor.

A faulty conveyor belt idler was the ignition source for the coal which quickly escalated into a coal spillage fire. The pollutant from the fire quickly spread around the mine creating the requirement for an evacuation by coal mine workers (CMWs) using self-contained self-rescuers (SCSR) and compressed air breathing apparatus (CABA).

Objectives

The objectives of the exercise were to test:

1. self-escape capability including changeover process from SCSR to CABA
2. incident management activation and mine's IMT processes
3. mobilisation of Queensland Mines Rescue Service (QMRS) including the deployment of the GAG
4. mobilisation of mines inspectors, industry safety and health representatives (ISHRs) and the Safety in Mines Testing and Research Station (Simtars)
5. external communications including social media interactions.

Major observations

The major observations listed below were made by the 22 assessors following their review of the Kestrel South Coal Mine exercise response and are based on their own observations. The full list of observations is included at the end of this report.

Major observations included.

- Attempts were made to fight the fire by evacuating CMWs and a firefighting team deployed from the surface. This is the correct response, however, the team deployed from the surface lacked equipment including CABA and protective apparel.*
- QMRS response was conducted professionally.
- All three groups that evacuated to the surface/outbye of the fire were proficient in donning SCSRs and the changeover to CABA. There were one or two small issues noted on donning SCSRs and CABA (see the conveyor drift fire site and 403 panel evacuation sections for more detail).

* It should be noted that CMWs with the correct skills and experience should be encouraged to fight underground fires. (Emergency exercises can lead to situations where CMWs believe they need to evacuate if their efforts are not succeeding. Where CMWs fight underground fires significant opportunities are realised,

1. there is a distinct chance that their efforts will be successful and the fire will be extinguished
2. firefighting improves the opportunities for escape for other CMWs inbye of the fire
3. fighting a fire speeds up the deployment of mines rescue personnel because there are eyes on the fire and actual information is available on the surface.

- The time taken for low visibility evacuation surprised one of the ERZ controllers.
- The “trapped and injured CMW” was able to make several external phone calls to his “wife and other family members”.
- Simtars was mobilised, however there was no prompting regarding gas analysis including taking bag samples from the tube bundle and ensuring the atmosphere downstream was not explosive. (There is little methane seam gas present at Kestrel however, pyrolysis of burning coal can produce large amounts of carbon monoxide and hydrogen).
- The Mine Emergency Management System (MEMS) employed by mines as part of their incident response is very similar to the Police Incident Command System (ICS). The main difference was the lack of an intelligence cell operating. The control room is a very valuable source of information and intelligence gathering. A person attending the IMT briefings from the control room would be very useful.
- External agencies were notified very early in the incident, however the mobilisation of some personnel attending from the Mines Inspectorate could have been better considered.
- The Business Resilience plan, which documents the IMT process, was modified immediately before the exercise with an issue/sign off date of 21 October 2014. This Emergency plan was a modification of the previous plan and resulted in the fourth group or cell ‘Services’ being created. This document requires a review of the structure and duty cards, for example:
 - o there is conflict in duties of the groups
 - o the Planning group is dedicated on recovery not incident control
 - o the Ventilation Officer (VO) is in planning and is also reporting to the operations manager.
- There were some misinformation in the social media comments such as the trapped miner having a “broken leg” along with discrepancies in the language being used.
- Some staff do not appear to be aware of the importance of simulated emergency exercises in particular the Queensland Level 1.[#]
- The GAG was requested to be brought to site at 10:00 am and was onsite deployed and ready to go by 3:30 pm.
- The mines rescue room is too remote from the IMT area and has no communications in place which restricted the briefing of teams.
- There is no emergency winding capability for the extraction of CMWs in Queensland.

Recommendations

The recommendations made within the report have been made by the assessors with the aim of providing continuous improvement to the mine and states emergency response capabilities.

Some recommendations have been identified as being the same as those in previous exercises.

Five important recommendations on the industry emergency response are:

1. Many mines use variants of the MEMS. It would be appropriate to convene a forum for the exchange of views within the Queensland industry on whether the basic MEMS is appropriate or needs revision. This should include a review and modification of the Mine Re-entry Assessment System (MRAS) if necessary, to ensure it can be used effectively and quickly.
2. A forum should also be held to discuss the outcomes from level 1 and level 2 exercises and in particular the consolidation of all the recommendations from 17 level 1 emergency exercises.
3. All mines should modify their emergency procedures to ensure that the emergency activation numbers are used for the Mines Inspectorate, QMRS and Simtars.

i. Mines Inspectorate	07 3237 1696
ii. QMRS	1800 7677 20
iii. Simtars	07 3830 5564/1800 331 991
4. Guidance systems into SCSR/CABA locations should be standardised across the mining industry. For example, droppers across roadways, lifelines guiding into locations, wind chimes and the colours used for secondary escape ways.
5. Emergency winding capability including suitable capsules for extracting coal mine workers out of boreholes/shafts should be available in Queensland.

The 2015 level 1 Emergency Exercise will be held at North Goonyella Coal Mine.



Martin Watkinson

Chair 2014 Level Emergency Exercise Committee

[#] A common exercise observation is the lack of urgency by the participating teams. While an emergency exercise is a ‘false situation’, to get the most from these exercises, the scenario should be treated as ‘real’ to ensure all the interactions and communication processes are tried and properly tested. It is often miscommunication, which causes the most issues during a real emergency.

Introduction

This report is for the 2014 Level 1 Mine Emergency Exercise held at Kestrel South Coal Mine between 8:15 am and 4:10 pm on Wednesday 29 October 2014.

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 Warden's inquiry into an explosion at Moura No. 2 Underground Mine on 7 August 1994 in which 11 miners died. One mine is selected to be the focal point of the state's emergency preparedness and is the host for the Level 1 Mine Emergency Exercise. This is the report on the seventeenth level 1 exercise.

The requirements for conducting mine emergency exercises are set out in Recognised Standard 8, which along with reports of recent exercises, is available on the Department of Natural Resources and Mines (DNRM) website.

Kestrel South Coal Mine is a central Queensland underground longwall coal mine located approximately 300 kilometres from Gladstone (see Figure 1). The mine commenced production in 2013 and has just completed the extraction of the first longwall panel.

Objectives

The objectives of the exercise were to test:

1. self-escape capability including changeover process from SCSR to CABA
2. incident management activation and IMT processes
3. mobilisation of QMRS including the mobilisation of the GAG
4. mobilisation of mines inspectors, ISHRs and Simtars
5. external communications including social media interactions.

Kestrel South Coal Mine

Kestrel South Coal Mine is an underground longwall coal mine with a production capacity of six million tonnes per annum. Figure 2 shows the mine layout and locations referred to within this report.

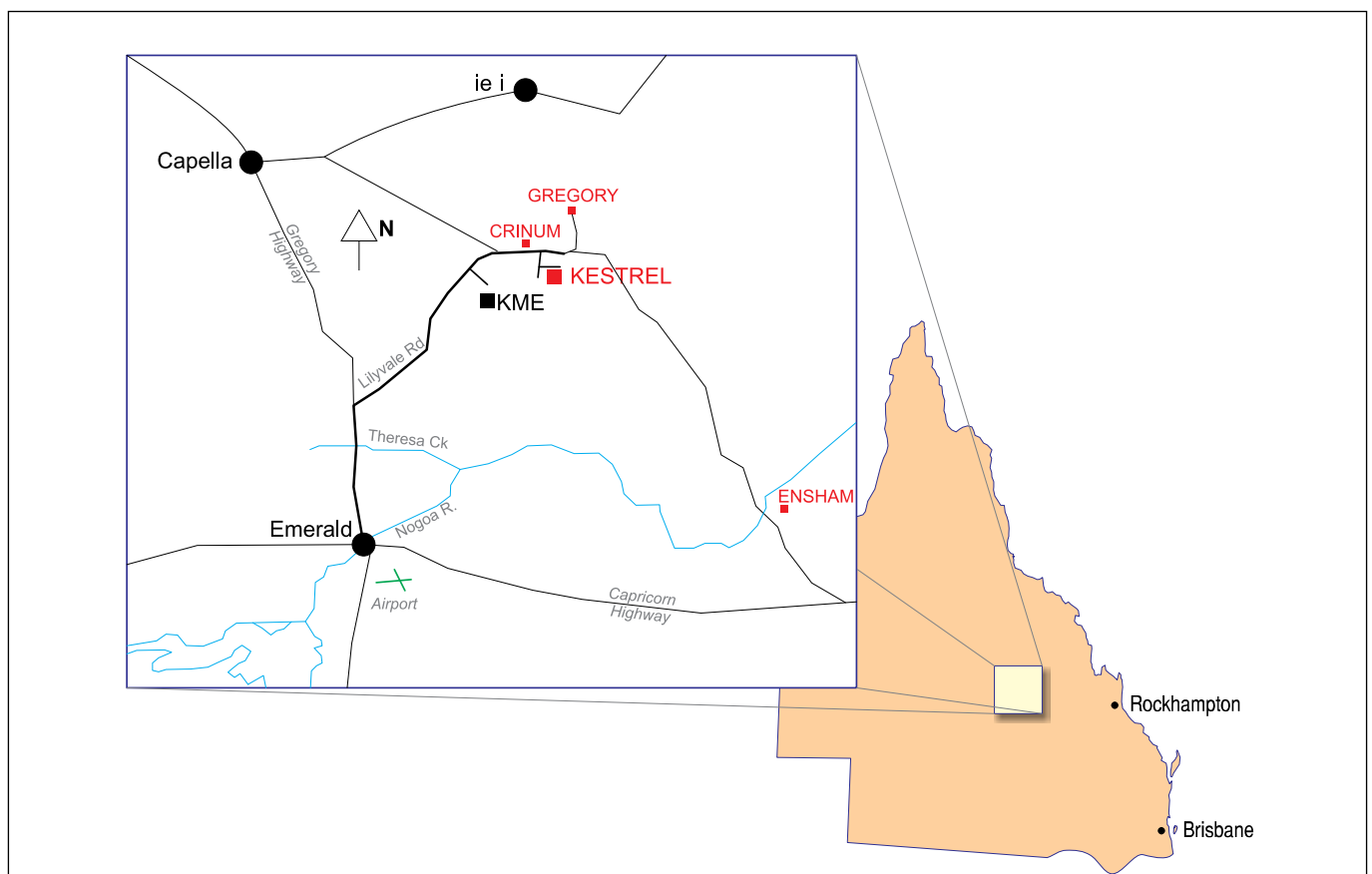


Figure 1: Location of Kestrel South Coal Mine

Scenario

The scenario for the exercise occurs at the end of a shift and involves an underground conveyor overrunning and creating a pile up of coal at the transfer of the main underground conveyor and the drift conveyor. A faulty conveyor belt idler ignites the coal which quickly escalates into a coal spillage fire. Smoke and debris from the fire quickly spread around the mine creating the requirement for an evacuation by CMWs using SCSR and CABA.

Figure 2 shows the location of the fire and Figure 3 depicts what would be seen at the fire site, Figure 3 was used by the underground assessors to brief any personnel attending the site.

The Level 1 management team decided that any initial fire-fighting response would not be successful. This would require the deployment of the QMRS inertisation tool, the GAG and allow for an appraisal of the time taken from requesting its deployment, to the GAG being available to use.

To add complexity for the mine's incident management team (IMT), there is a mineworker with an injured leg in a part of the mine which is not affected by the conveyor belt fire.

His location is on 403 face line which is ventilated by an intake borehole (see Figure 2). The mineworker had access to a telephone and attempts would be made to make external communications.

The mines ventilation simulation software (Ventsim) was used to model the path and concentrations of smoke and gases as they would travel around the mine from a fire in this location. This information was then used to calibrate the Simtars program Safesim which replicates gas data for underground fires and explosions to generate gas data in real time to be presented into a replication of the mines gas monitoring system.

Kestrel South Coal Mine uses the Simtars program Safegas for monitoring, trending and alarming on their tube bundle gas monitoring system. A duplicate gas monitoring system was established in the control room and the control room operator (CRO) responded to the alarms as they were raised. One advantage of this approach is the CRO can log on using his own password and is familiar with the touch and feel of the system. The layout of computers in the Kestrel control room is shown in Figure 4.

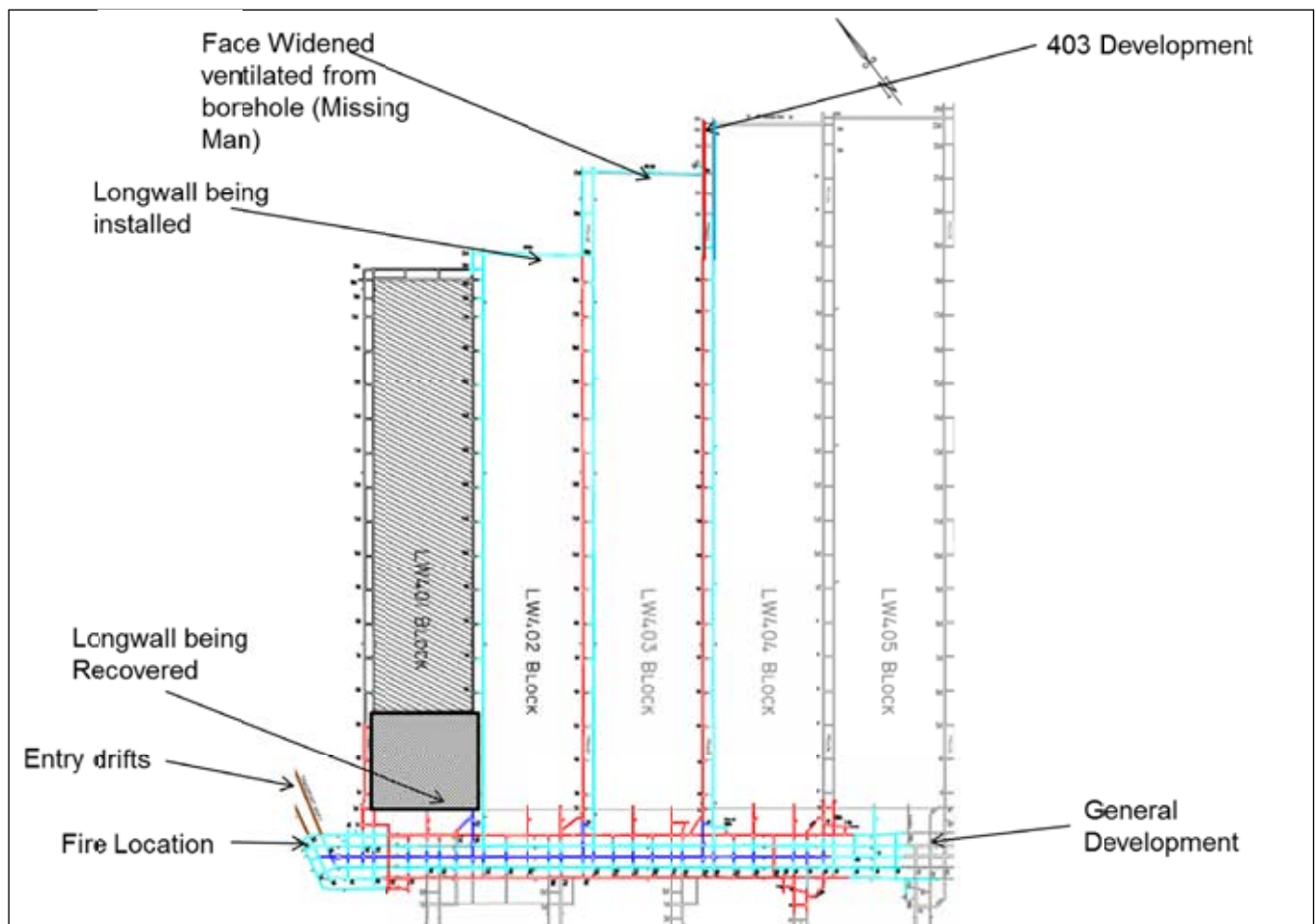


Figure 2: Plan of Kestrel South Coal Mine

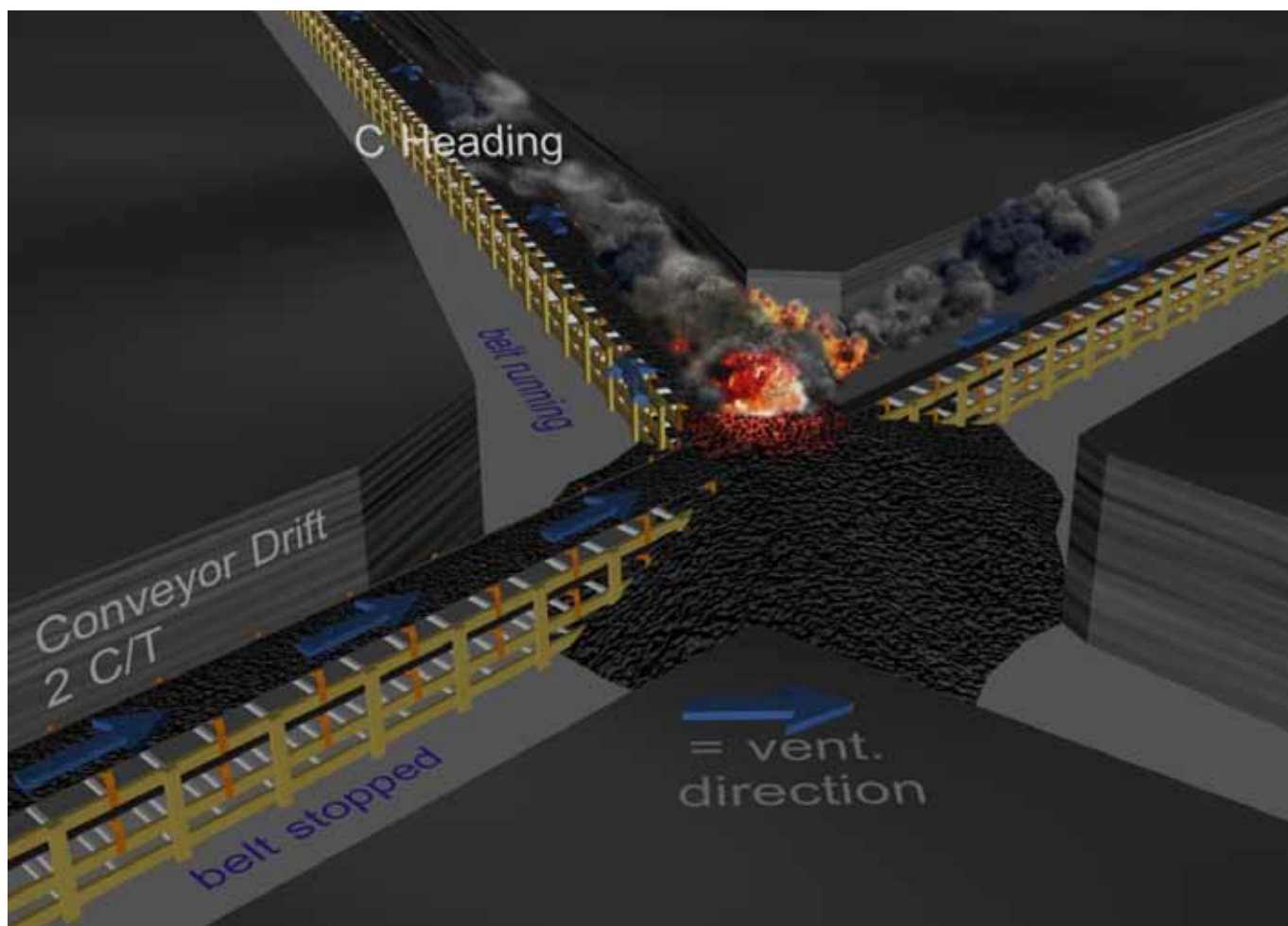


Figure 3: Conveyor belt fire

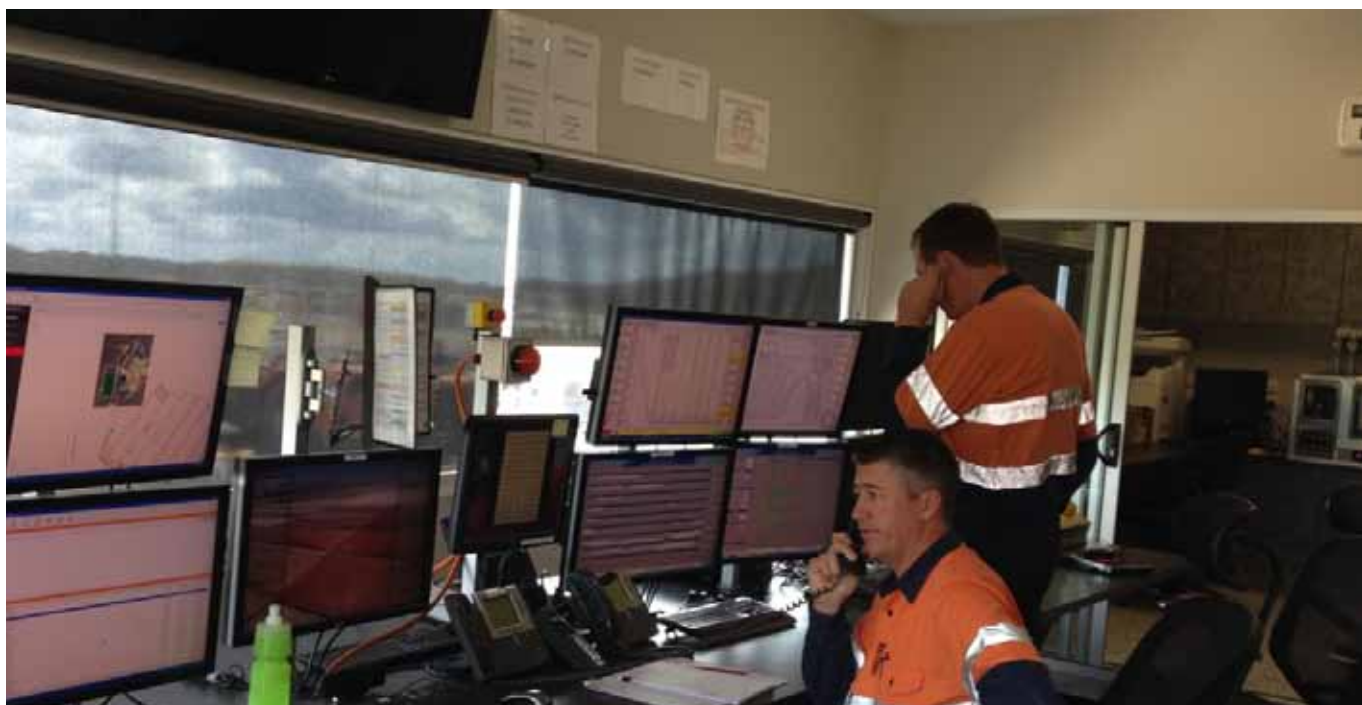


Figure 4: Kestrel control room layout

A simulation was run at Simtars before the exercise to enable the preparation of briefing material for the underground assessors. The material prepared showed the spread of the gas and smoke along with an estimation of the proposed gas concentrations. The spread times and concentrations are shown in Figure 5.

CMW evacuations were undertaken from 403 maingate drive, the mains drive area and outbye in the mains. The longwall recovery face and installation face were not included within the exercise due to operational demands.

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 have been made for industry to consider; where they are specific to Kestrel they are listed as 'Mine'.

A total of 22 assessors were on site with representatives from Simtars, the Queensland Mines Inspectorate, Mines Rescue (Queensland and New South Wales), an industry safety and health representative (ISHR) from the Construction, Forestry, Mining and Energy Union, Minerals Industry Safety and Health Centre (MISHC), mine staff from Oaky North, Grasstree, Crinum, North Goonyella and Kestrel and the Queensland Police Service based in Emerald (see Appendix B for details of the assessors).

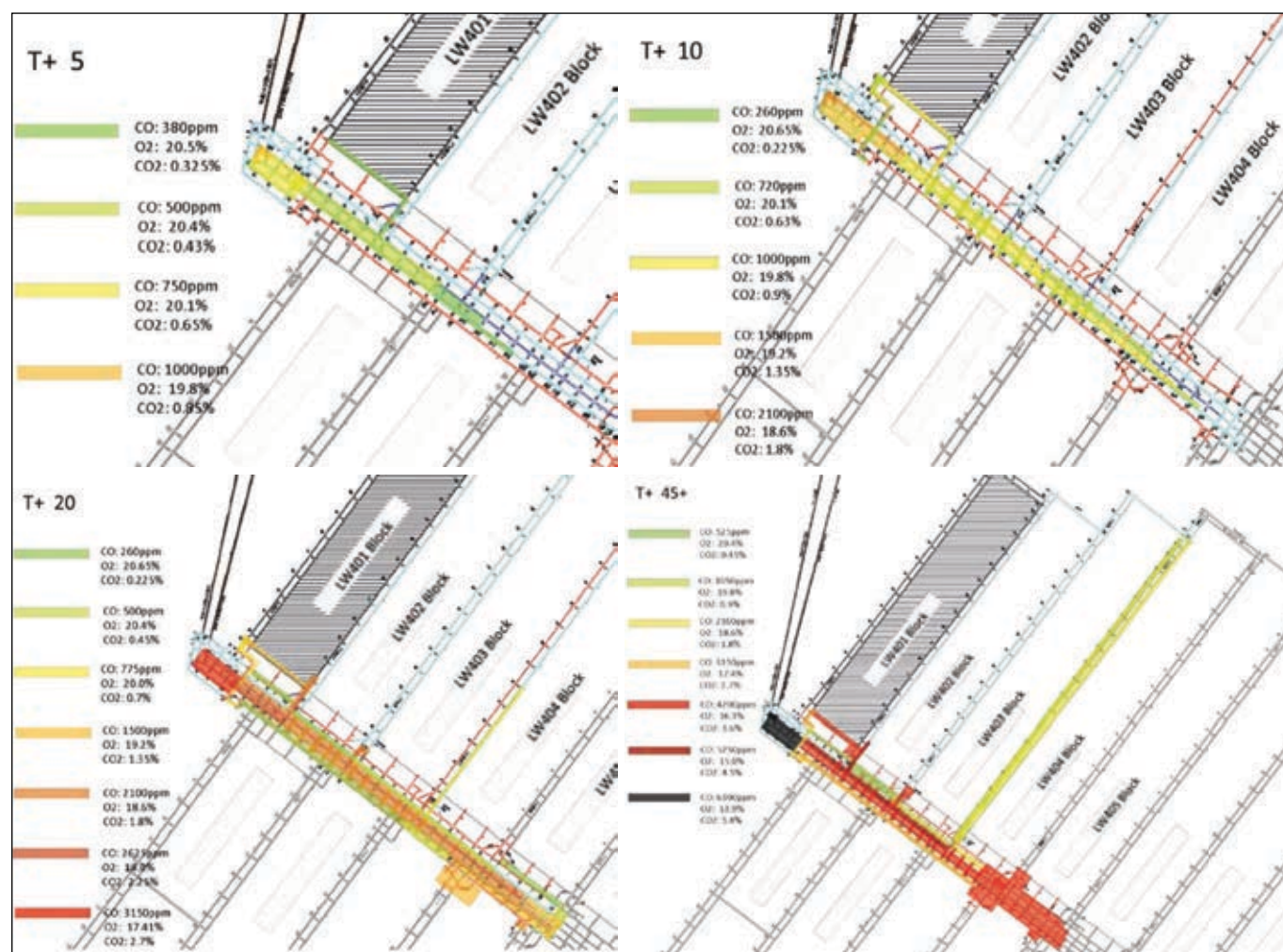


Figure 5: Smoke spread T+5 to +45

Underground assessments

Conveyor drift fire site

Assessor: Kevin Poynter (Mines Inspector)

The first firefighting response at the site was undertaken by two CMWs at 9:15 am. This team attempted to fight the fire with water but were unsuccessful. At 9:21 am a group of CMWs who had evacuated from inbye of the fire approached the site, they were wearing CABA and a discussion was held on the type of firefighting approach to use. This group decided to evacuate the mine as they were informed the fire was increasing in size.

At 11:47 am a Kestrel firefighting team arrived from the surface however they did not have CABA or a gas detector. They had good firefighting knowledge and skills. The team were informed that their attempts to extinguish the fire were not being successful and the team evacuated to the surface. A firefighting pod with foam in it was delivered to two cut-through but was not used as part of the firefighting response.

At 2:28 pm the QMRS team arrived and established a fresh air base (FAB), they were informed the fire had reduced in size. At 2:45 pm the QMRS firefighting team arrived and commenced fighting the fire. At 3:15 pm the fire was deemed to be out and a fire watch established.

It should be noted that CMWs with the correct skills and experience should be encouraged to fight underground fires. (Emergency exercises can lead to situations where CMWs believe they need to evacuate when their efforts are not being successful). Where CMWs fight underground fires significant opportunities are realised:

1. there is a distinct chance that their efforts will be successful and the fire will be extinguished.
2. firefighting improves the opportunities for escape for other CMWs inbye of the fire
3. fighting a fire speeds up the deployment of mines rescue personnel because there are eyes on the fire and actual information is available on the surface.

What worked well?

- Two CMWs evacuating attempted to fight the fire.
- Drills exhibited by Kestrel firefighting crew.
- QMRS Team Captain controlled actions competently.
- Mines Rescue utilised a heat camera to determine fire status.
- Fire watch remained after the fire was extinguished.

Areas for improvement

- Two CMWs attempted to fight the fire but did not have any CABA or personal gas monitoring equipment.
- Phone access and access to the pit bottom CABA station from the main belt requires traversing under the belt.
- Kestrel fire team did not have CABA with them and all had standard work clothes.
- Kestrel does not presently have closed circuit television (CCTV) facilities in place in critical areas to aid in the detection and assessment of fires from the surface.

Recommendations

Industry

- CCTV monitoring of critical areas of the mine. For example conveyor transfer points, entrances and exits.
- Review firefighting risk assessments including: training and determine equipment requirements of fire crews, consideration of clothing and CABA, as well as for the deployment of firefighting teams following evacuation of the mine including the review of the QMRS Mine Re-Entry Assessment System (MRAS) approach.

403 panel evacuation

Assessors: Ray Smith, Tom Lake and Robin Bent (Video)

At 8:56 am the ERZ controller received a personal emergency device (PED) message for the control room to call in. (Emergency PED 1 received at 8:57 am). At 9:00 am the ERZ controller was informed of high carbon monoxide levels in the pit bottom area and to gather the 403 crew together. (Emergency PED 2 received at 9:00 am.)

Note:

PED Emergency message 1 — means go to place of safety such as crib room

PED emergency message 2 — means retreat to pit bottom B heading 2-3 c/t.

At 9:07 am the ERZ controller informed the control room they would be evacuating and all CMWs were accounted for. They would call again from the tag board at the end of the gate road. At 9:10 am the 403 crew left the inbye crib room.

At 9:12 am the crew were informed smoke could be seen, at which time they donned their CABA suits, three of the crew had been prepared with vision impaired face masks to simulate low vision. A couple of the CMWs encountered small issues with donning their CABA suits and were assisted by the other CMWs.

The evacuation under impaired visibility was conducted with the use of blind man's sticks and the ERZ controller frequently had the CMWs check their pressure gauges and a refill was conducted on the way out.

While CABA offers the opportunity for communication the ERZ controller had to repeat what he was saying to the control room officer when he called to report on progress. The ERZ controller received the information on the location of the fire and he then confirmed his planned evacuation route.

At 17 c/t in the mains, the ERZ controller was informed of a broken down vehicle and there was fresh air at 10 c/t in the mains.

The evacuation was then conducted on foot to the pit bottom where the ERZ controller checked the gas readings and found them clear and CABA was removed.

The 403 crew was informed a vehicle was being sent down to bring them out. They correctly made the decision to walk up the drift and meet the vehicle.

At 11:00 am the men were on the surface and the ERZ controller was debriefed from 11:05 to 11:20 am.

What worked well?

- Direction and leadership shown by the 403 panel ERZ controller was very confident and he executed the evacuation very well.

- Walking out under limited visibility went extremely well. The crew were walking at a safe and steady pace.
- Donning of CABA went well with a couple of CMWs helping others when required.
- Checking of gauge pressure conducted frequently and they had a good understanding at refilling.
- ERZ controller communications to surface was excellent, every chance he could communicate he took the opportunity.

Areas for improvement

- The barricade at the CABA refill station was found to be approximately 15 metres from the intersection, which could lead to the possibility of gear and rubbish stowed in front.
- CABA refill locations are lack guide rails to the area, for example, droppers and lifelines could be utilised to assist CMW into the location. When in low visibility, CMW could have walked past these locations.
- Review current safe operating procedure (SOP), as some items indicated in the document are not being followed.
- Yellow droppers found at the Gas Drainage Site, this is the same as secondary escape standard, other mines use other colours such as purple.



Figure 6: CMWs at CABA refill station

- 'Wrong Way' sign found on Main Travel Road in Main Dips, could lead to confusion in Self Escape. There are no other wrong way signs located anywhere throughout the escape route from MG403.
- PED system could be more effective in all areas of the mine.

Recommendations

Mine

- CABA refill locations should be placed closer to the roadway to avoid the possibility of equipment being stored in front of the refill station.
- Do a review of signage on escape ways.

Industry

- During mine site emergency exercises, utilise limited visibility for escape apparatus. Comment from ERZ controller indicated he was surprised at how long it took to self-escape from MG403 19 c/t.
- Guidance systems into SCSR/CABA locations should be standardised across the mining industry. For example, droppers across roadways, lifelines guiding into locations, wind chimes and the colours used for secondary escape ways.

Mains evacuation

Assessors: Jason Hill and Jeff Davidson

At 8:58 am the ERZ controller informed the CMWs he had been advised by the control room operator to withdraw the team to the crib room. He was then advised he could smell smoke entering his panel. The crew donned the SCSRs provided and moved back to the crib room where they effected a change over to CABA which was completed by 9:15 am.

The ERZ controller informed the control room operator he had accounted for all but three of his CMWs and they all had CABA on and would be evacuating using the man transport. The evacuation continued under low visibility until they became aware of the broken down vehicle at 10:24 am. The crew had evacuated to the bottom of the man and material drift where they walked out because no transport was available to be sent from the surface.

What worked well?

- The ERZ controller responded well. He was aware of where all his work groups were in his district.
- The ERZ controller gathered the work groups (other than one) and discussed with them that there was smoke and high carbon monoxide coming into the panel and ordered all persons to don their personnel SCSR and took the CMWs back to the crib room where they changed over to the CABA.
- The process of donning the SCSR was good and the changeover to CABA was conducted effectively.
- The communication between the ERZ controller was clear and all relevant information was given on all occasions.

- The CMWs showed they were competent in using the refill stations for CABA.
- The evacuation was good and the ERZ controller kept an accurate count of CMWs even when additional personnel joined the group.
- The CMWs operated well under restricted vision with the use of the blind man sticks.
- Walking pace with restricted vision was well organised and the CMWs did not outpace anyone.

Areas for improvement

- The ERZ controller's decision to leave a group of CMWs behind, who were working in D heading, without trying to locate or inform them. The D heading group only discovered that there was an incident when they went back to the crib room to find some equipment and rang the Control Room Officer (CRO).
- The crew appeared not to take care of each other very well. There was only one check of air pressure. There appeared to be no concern shown to members of the crew that were taking longer to change over to CABA.
- PED messages were not received throughout the exercise.
- When the CMWs arrived on the surface and they were sent to the surface crib room, they were given a debrief paper. No one was asking questions. The CMWs were just filling out the paper work. Later during observations in the IMT, information from the evacuating CMWs in particular the ERZ controllers was not available.

Recommendations

Mine

- Investigate the lack of cover/transmission with the PED system.
- Review debrief process and system for getting information into IMT.

Industry

- Training on the importance of making sure every reasonable effort to notify/account for all persons in work area before leaving, including the need for CMWs to notify the ERZ controller when entering and leaving a panel.
- Review debrief process and system for getting information into IMT.

Exercise team

- Investigate early deployment of the underground team three to four hours prior to the exercise beginning to prevent the start from being delayed.
- Create detailed plans of the relevant exercise area only.

Outbye evacuation

Assessors: Jason Kachel and Daniel Proffitt

CMWs in the outbye area were informed of smoke entering their working area at 8:50 am and were provided with SCSRs to wear. At 8:57 am Emergency PED 1 was received and the Emergency PED 2 was received at 9:05 am. This team evacuated outbye of the fire site under SCSR. The team took their rescuers off at 3 c/t, however they did not have a gas detector and had no knowledge of the mine atmosphere at this point. This team took CABA units to fight the fire. When the team evacuated to the surface, one of the team wanted to stay and continue firefighting. The crew had completed evacuation to the surface by 9:48 am.

What worked well?

- CMWs checking of each man-door between B heading and C heading to see if they were on outbye side of fire.
- Initial donning of self-rescuers was completed quick and efficiently.
- Good communication with control on their location, intent and amount of persons in group (this was done once reaching pit bottom).
- Good use of diesel vehicles for escape.

Areas for improvement

- Talking whilst wearing of rescuers.
- Did not attempt communication until they reached pit bottom (passed several phones).
- When told that smoke had visibly cleared, one person took off rescuer (no gas detectors or statutory officials).
- Walked past man-door between B and C heading that was ajar, with slider open (taped and tagged for shearer transporter).

Recommendations

Industry

- Ongoing training in the donning of SCSR and change over to CABA including requirement for good seal for the mouth piece and not removing unless in known fresh air or instructed to by a mine official.

Exercise team

- Scenario could benefit by adding real source of (non-toxic) contamination to the airway such as stonedust to simulate smoke.
- Try to avoid quarantined areas during an exercise. It was very distracting from the actual scenario with LW vehicles still driving in the actual escape way circuit.

Trapped coal mine worker on 403 face line

Assessor: Rodney Graves

The CMW (ERZ controller) on 403 face line received a PED message at 8:50 am to call control. However both numbers in the control room were engaged when he attempted to call. Emergency PED message 1 received at 8:56 am called the control room and confirmed his evacuation route to the pit bottom the only information provided as 50 ppm of carbon monoxide(CO).

At 9:05 am Emergency PED message 2 received.

At 9:15 am the CMW called the control room to inform them a slab of coal had fallen off the rib and trapped him briefly and he may have passed out from the pain, he was still in a lot of pain and feeling cold and clammy. His leg really hurts and it may be broken.

Through the period of the exercise communications were made by the CMW to personnel on the surface, five attempts were made to get an outside line to talk to his wife. On another occasion the surface contact did not know how to provide an outside line but passed on the following message "Call mum and dad and tell them I'm still underground and not sure when will get out, there is a fire at pit bottom and I have a broken leg".

At 10:25 am the IMT controller telephoned the injured CMW and informed him of the situation and what was being planned. He confirmed that Rio Tinto had contacted his wife and he was in the safest place and was to stay in his present location. The IMT also stated the CMW would be kept informed of the situation and developments.

At 11:50 am a phone call was made by a mine site medical advisor who gave advice on how to deal with the injured leg. Contact was made by the mine site medical advisor throughout the emergency exercise. The QMRS rescue team arrived at the 17 c/t crib room at 3:55 pm.

What worked well?

- The prompt notification of the event through PED messages and phone calls.
- The transfer of information from IMT leader to CMW underground was very clear and specific in what to do and where to stay.
- The feedback from surface mine site medical advisor to CMW underground in relation to family issues.
- The interaction between mine site medical advisor once assigned to trapped CMW underground to assist with treatment and assessing symptoms of his injury.

Areas for improvement

- There is no winding capability to evacuate CMWs from underground in an emergency.
- Ensuring all parties on mining lease are aware of incident so external communications such as from the warehouse or coal handling and preparation plant are contained.
- Assigning a specific person to keep in contact with injured person underground to contact and assist with their needs and any injuries.

Recommendations

Industry

- Emergency winding capability including suitable capsules for extracting coal mine workers out of boreholes and shafts should be available in Queensland.
- Review the use of communication systems to stop external calls from being made from underground to assist in managing the incident.
- Look at process for allocating a person to communicate and assist trapped CMW underground with symptoms and needs.



Figure 7: Kestrel Mine site gas chromatograph

Surface assessments

Control room

Assessor: Sean Muller and Ken Liddell

The fire scenario was triggered in Safegas at 8:45 am; however, due to the long purge times on the tube bundle system (the tube bundle analyser room is situated next to the control room and the tubers are run over the surface and down both of the drifts a distance of over two kilometres before the tubes are in the seam) alarms were not created for some time. The real time system alarmed in two minutes.

The CRO noted the alarm and also entered it into the alarm log and commenced notifying the inbye ERZ controller to contact control. As the number of alarms increased, there was less time to enter the alarms into the log, rather than notify the underground using the PED, Emergency PED 1 and Emergency PED 2 were used for this purpose.

Whilst there were new copies of the BRT plan in the control, they were not referred to, rather than pick up the duty cards, the CRO and assistant CRO quickly went about the business of dealing with the issue at hand.

A major part of the process is communications and CROs

are very good at this skill. Both CROs dealt with the communications and various requests in a professional manner and were not panicked at any stage of the exercise. However, communications to personnel wearing CABA was difficult at times.

What worked well?

- The real time system used was able to quickly alert the control room of the elevated readings/fire.
- The gas chromatograph (GC) was calibrated and ready to use (see Figure 7).
- The tube bundle system was able to deliver samples from underground to be analysed on gas chromatograph.
- Once QMRS personnel were deployed, they established a call-taker/dispatcher in the control room and he relayed information to their person in the IMT room.
- Good use of the PED system. It avoided the difficulties caused by impaired speech with CABA/Self rescuers.

Areas for improvement

- After the fire was confirmed, critical gas readings such as the calculation of explosibility should be done to ensure relevant and timely information is available for risk assessment for mine personnel and QMRS (for example
- MRAS). This information should be acquired as soon as possible to prevent delays with data required for risk assessment or re-entry.

- The potential for GC samples to be taken for trending was not done until after 12:30 pm, despite tubes delivering fire gases to the surface from 9:30 am.
- Running GC samples may have stressed resources in the control room.
- Some difficulty was identified in using and navigating the gas interpretation software.
- Communications to QMRS personnel already in the drift were not possible until they reached the fresh air base (FAB) and subsequent updates were difficult.
- Control room staff were shouting over people and each other when using telephones/radio.
- Some information, communications and data was not recorded.

Recommendations

Mine

- Update mine site personnel on the functionality of the gas trending and interpretation software.
- Review mine site fire procedure to identify the need to generate appropriate gas data as soon as possible and the data is used for the control fire-fighting activities and mine re-entry.

Industry

- Refresher training for gas monitoring, trending and explosibility determination should be undertaken.
- Review the use of noise cancelling headsets for CRO use.
- Review the use of sound recording equipment for emergency situations.
- QMRS or Simtars should prompt mine site to acquire appropriate data where possible before deployment to avoid delays.

Exercise team

- Assessor familiar with gas analysis should shadow VO and IMT groups to see how gas data is being interpreted.

Incident management

The incident management process at Kestrel South is based on the QMRS Mine emergency management system (MEMS). This is a system derived from the Incident Command system which is used by the Queensland emergency services. Normally the system is based on three operating teams Operations, Planning and Logistics at Kestrel they have added a fourth team Services.

Once the Incident was called by the mine duty manager he formed an Incident management team with all of the positions within the team filled. All non-essential staff were sent and isolated in the surface crib room. This way they could be briefed on the status of the incident as required. One point to note is, evacuating mineworkers also went to the crib room after the debrief, in a real emergency this could cause issues as rumours and innuendo spread and social media could quickly get out of hand.

All four of the 'IMT teams' behaved in a professional manner and were effective in carrying out the activities required. The following sections cover the review of the operations along with the observations made by the Queensland Police Service on the whole emergency response arrangement.

Incident management process

Observers: Senior Sergeant Peter McFarlane and Sergeant Robert Smith

Observations

The processes and procedures were very similar to the Police Incident Command System (ICS). ICS operates with a Command cell, Planning cell, Intelligence cell, Admin/logistics cell and Operations cell. During the exercise the mine operated under different names (IMT) but essentially the cells were the same.

The exception was there was no Intelligence cell. From the ICS approach (especially early on) the Control Room was a valuable source of intelligence. The information coming and going from the control room would have been extremely valuable for the IMT. During the briefings there was some information being relayed to the IMT from the Control Room but it was second hand information that was difficult for the IMT controller to clarify. A more formal approach with a designated person from the control room attending the briefings may have assisted the IMT with up to date information.

The IMT controller was totally in control of the incident from the start:

- he was calm
- he listened to his staff
- it was very clear that he was the person in charge and making the decisions.



Figure 8: IMT meeting

The most important objective was to retrieve the injured worker. All of the experience in the room should have been challenged “what are our options for getting him out”. As a group, they may have come up with several options and from there they could see what was viable and what simply would not work. From the start the only option considered was putting out the fire and the injured worker was fine until that occurred. Not until the third briefing were other options considered and the cage and the crane discussed.

After each briefing, the IMT controller left the IMT and walked over to the SSE’s office to provide a briefing to him. While it was important for the SSE to be briefed, leaving the IMT for up to 20-30 minutes was a risk. The SSE should have attended the briefings personally.

Running logs – having accurate running logs is essential. Some of the major incidents the Police attend often end up in Coroners court or different levels of the criminal court system. When this occurs, having an accurate log of events including accurate timings of decisions is extremely important. When a major incident is unfolding, the information coming and going, the decisions being made and the timings of these decisions can be blurred. The administration officers in the IMT did a great job, but as the person running the incident, the IMT controller could have benefited from using a digital recorder to record times, events and decisions. If it is a prolonged event, the Police use digital recorders and download the recording to assist in completing the statements and running logs.

With regards to the injured person, a QAS should have been on scene monitoring the injured worker constantly, this may have been considered if it was not an exercise.

All in all the personnel did a great job running the incident. The organisation and the knowledge individual staff had with regards to their roles and responsibilities was impressive.

Recommendations

Industry

- Running logs – industry should consider the use of audio recording systems to ensure accurate logs of activities are compiled.
- Review options for capturing the information from the control room and making it available to the IMT room.
- Evacuating mineworkers should be kept separate from the general workforce.

Incident management team (IMT)

Assessors: David Cliff and Wouter Niehaus

What worked well?

- The structure and organisation of the IMT process in general was very effective.
- The Manager IMT regularly checked both his duty card and the Business Resilience Plan to ensure he was following due process.
- There was effective use of electronic information recording and transmission of information. The Manager IMT did not use his actions log but this was not necessary as it was all being recorded by others.
- The SSE was briefed after every IMT meeting.
- The IMT room was well equipped with current plans and documents, and white boards ready formatted.
- Regular IMT meetings were held (approximately every 60–90 minutes).
- External agencies were notified very early in the incident.
- Objectives were set and reviewed regularly.
- The use of process checkers (IMT deputy, IMT coordinator) were very effective in ensuring the completion of tasks and the checking of actions listed on the duty cards, especially during the initiation of the incident management. In addition this role checked to make sure function leaders were clear on their actions and updated the status boards.
- Workforce regularly briefed on situation underground.
- QMRS was contacted and mobilised to site without any delay with quick reaction and response time.

Areas for improvement

- Despite the use of boards to set and monitor objectives, there was inadequate focus on the number and location of persons underground and the mine atmosphere. There was no formal reporting of gas concentrations within the mine, nor trends over time.
- The approval process seemed very informal, except for the deployment of the QMRS managed rescue teams. For example, there was no formal sign-off of the site firefighting teams.
- Better tracking of how many external rescue resources were coming and their estimated time of arrival.
- The severity of the injury and possible complications to the injured CMW underground did not seem to receive adequate attention.
- There was an electronic system for monitoring the location of persons underground, but it did not operate correctly.
- The Planning function could have considered ways to control the fire and apply the GAG through ventilation modification earlier than was discussed at IMT.

- There was no formal systematic recording of the mine atmosphere conditions or changes in the conditions in the IMT room. Gas bags for gas chromatography were not initiated until four hours into the incident.
- The Planning group could have been tasked with finding ways of extricating the injured person.
- Early in the incident, personnel could have been tasked with preparing information to expedite the deployment of rescue teams – for example, access to MRAS.
- Valuable time was lost early on attempting to contact the Mines Inspectorate and ISHR to inform these agencies of the situation.
- There was confusion at the site over which DNRM inspectors were coming and when. Initially, the site was advised that no one was coming, then two individuals were coming, then a third inspector was coming instead, then two different ones actually turned up.

Recommendations

Mine

- The mine should review the effectiveness of the duty cards and other documentation such as checklists and display boards to ensure they were effective.
- The functions of the groups should be reviewed in light of the functions actually carried out vs intended. For example Planning reported on the relief IMT, catering and GAG supplies, which normally should have been a logistics function.
- There needs to be a protocol that can be invoked to ensure the personnel tracking system is functioning properly with all nodes in operation and this should be checked off.
- Had the incident progressed for a longer period, the alternate IMT would need to be implemented and personnel should have been sent home. This may have placed stress on the available resources.

Industry

- Many mines use variants of the MEMS system. It would be appropriate to convene a forum for the exchange of views within the Queensland industry on whether the basic MEMS system is appropriate or needs revision. This should include a review and modification of the MRAS system if necessary, to ensure it can be used effectively and quickly.

Exercise team

- The need for Mines Rescue callout should be reviewed and there may need to be an alternative process invoked to prevent the scenario from becoming too artificial.

Logistics

Assessor: Russell Albury

What worked well?

- The structure of the Logistics operations was almost text book. The manager controlled the inflow and outflow of information well.
- All positions were filled as per the system.
- Participation in the IMT was good as far as close out of actions and updates from Logistics were concerned.
- All actions of the team were logged and closed out systematically.
- The team stayed within their role description and executed their function as per plan.

Areas for improvement

- The IMT did not promote or allow for planning and strategy input from the various team members. Critical decisions seemed to be made by either the IMT leader or by someone outside of the IMT meetings. The IMT meeting was mostly used as a transfer of information and issue of instructions and actions.
- Communication within the Logistics team and from outside the Logistics team needs to be improved. There were three main issues:
 - o The same request for 1 x loader and 2 x drift runners (man riding vehicles) came from three different people. There was some confusion as to whether they were additional requests or the same request.
 - o The request for victaulic pipes for the QMRS when in fact a flexible piping was required.
 - o There was initial confusion over whether the phones had been diverted or not. At one point, it required action from an IT entity in Western Australia.

Recommendations

Mine

- Practice the emergency response system and the function of the MEMS structure and utilise the IMT as a strategising group, to develop the objectives as a team rather than relying so much on the leader.

Industry

- Review emergency response systems to ensure that emergency hotlines such as the Mines Inspectorate emergency are used in an emergency. The number for the mines inspectorate is 07 3237 1696 and they are readily available in the control room/IMT room.

Operations

Assessor: Gary Mitford

What worked well?

- Incident Controller summoned all surface staff in the muster area to brief them on the incident 15 minutes after commencement of the exercise and 10 minutes after he was made aware.
- IMT synchronised watches with clock in IMT room.
- IMT meeting spacings were clearly articulated and managed well.
- The Incident Controller remained extremely calm and level headed throughout the exercise.
- Good use of scribes and electronic display using laptops in all controls.
- Appropriate refreshments organised.
- Communication with injured person.

Areas for improvement

- Although key roles were attributed to individuals promptly, as the incident unfolded it was noted that individual skills didn't fully align with the incident requirement. The Operations Controller was the Engineering Manager who often had to seek advice for operational issues.
- IMT synchronised watches with clock in IMT room, which was not reciprocated in the Operations Room resulted in a two minute time differential.
- Double-up recording of information electronically and on paper pads, could be seen as a strength but was time consuming.
- Operations Control made little use of available emergency plans – they were unaware of firefighting equipment locations and asked Planning Control.
- Operations and Planning had identity crisis with:
 - o Operations asking Planning for gas monitoring readings – would benefit from gas monitoring display capability in Operations (and Planning) Control
 - o Operations asking Planning for firefighting capability in drifts
 - o Operations planning firefighting attempt including conducting a risk assessment
 - o Operations planning rehydration of evacuated personnel.
- Debriefing was inadequate with a basic 'what do you know' type question on the debrief sheet – a competent person should be assigned to be debrief leader to develop question sets and review responses.
- Incident Controller involved in non-incident related activities such as external communications.

- Re-entry risk assessment for Kestrel firefighting attempt was limited due to:
 - o no involvement of persons conducting task
 - o no consideration for MRAS/ explosibility
 - o poor risk and control identification
 - o greatest identified risk was belt separation
 - o RA did not consider personal gas monitoring detectors
 - o CABA was identified but the Kestrel fire-fighting team did not take it.
- Confusion over bottom of borehole status not clarified by simply asking ERZ controllers.
- Insistence on 'peace time' protocols despite human life being at stake (probably caused by lack of exposure to real life incidents) - unwillingness to conduct risk assessment for use of cage through borehole until delivered to site.
- Duty cards are an activity list but would benefit from being a auditable checklist with date, time and initial.
- Although discussed on at least two occasions, Operational Control failed to use inter-control request forms.
- Lack of urgency displayed than would be generated in a real life situation.

Recommendations

Mine

- Review risk assessment process to ensure people doing the work are involved in the risk assessments.
- Review the allocation of roles in the operations group to ensure people allocated to a role have the relevant operational experience.
- Implement MRAS on site and use as part of the decision making tools for risk assessments.

Industry

- Ensure information is available regarding the status/depths of boreholes and firefighting equipment locations.

Planning

Assessor: David Connell

The planning manager chose his staff from those assembled in the surface crib room who then assembled in the planning room and familiarised themselves with their duty card responsibilities.

The planning manager briefed the planning team on the objectives set by the Incident Controller and the current state of the incident.

The planning team developed comprehensive succession plans, other recovery plans and developed detailed future state models for ventilation changes for GAG operations.

What worked well?

- The planning manager selected staff with a broad range of expert skills and knowledge for the planning group.
- The planning manager gained good situational awareness from IMT briefings and developed a good common operating picture with his team by giving regular comprehensive briefings and drawing attention back to incident objectives.
- The planning group successfully followed the Duty Card 4 - 'Planning / Recovery Manager' objective "manages IMT related planning for the detailed recovery and resumption of normal mining operations. The Planning Manager oversees preparation of the Recovery Plan and assists in the development of other specialist plans, if required."
- Future state modelling of ventilation by the VO for GAG deployment was comprehensive and identified new risks. The risks were clearly identified and articulated.
- Succession plans, GAG deployment and rescue cage plans were well advanced.
- Individual contemporaneous notes were taken by most.
- Accurate information was passed on to the IMT during the IMT briefing cycles.

Areas for improvement

- In-house rescue availability not considered until it came up in conversation at 9:58 am.
- The group appeared unfamiliar with their individual responsibilities according to the duty cards.
- There appeared to be insufficient people in the group as the workload increased.
- The Duty Card 4 'Planning /Recovery Manager' objective of recovery planning was not consistent with the Business Resilience Management Plan section 5.2 'IMT Roles and Responsibilities' which states the Planning / Recovery Group prepares immediate contingencies and action plans for consideration by the IMT and maintains a situational understanding of the emergency.
- The duty cards didn't support the group in conducting incident planning as the focus was on recovery post event. There was no mention of tactical incident planning or the writing of Incident Action Plans in the Planning Group.
- Confusion over roles of planning and other functional areas seemed apparent. Operations and Logistics functions were being handled by Planning at times. Some functions such as planning for the deployment of fire teams and mines rescue teams were done outside of the planning group.
- An Incident Action Plan pro forma was not provided.
- Boards in the room were not used to post objectives or current status or actions. These were difficult to get from the electronic log as there was a large amount of other information collected in the log.

- The working memory of planning personnel appeared overloaded as important discussion points appeared to be lost when distractions occurred. The distractions were caused by such things as people from other groups entering the room to make requests and the need for planning personnel to leave the room to gather or pass on information. As current actions and requirements of the group were not clearly posted; the group had to rely on memory to return to important discussion topics.
- For example, was the discussion around getting extra people from among the ERZ controllers assembled in the surface crib room to assist. The point was lost due to the distraction of a logistics request from the Operations Group.
- The objective of "account for people" was given a large chunk of planning time. This is an Operations function that should be covered in SOPs as there is little to be done from the surface to assist once self-escape has been initiated, other than dealing with the reason for the self-escape.

Recommendations

Mine

- Review the plan to ensure roles and responsibilities are consistent throughout the plan and duty cards.
- To be consistent with accepted incident command and control structure standards, the planning duty cards should be rewritten to include current and future incident state planning for both primary Incident Action Plans and contingency planning. Assessment of the risks associated with the plans should be included in the responsibilities of the group.
- Increase requirements of staff to remain familiar with their roles and how they fit within the structure. This may require further targeted training and exposure to more emergency simulations.
- Conduct further training in the structure to ensure all involved understand how functional groups operate and what outputs are required from each group.
- Scalability of the structure is critical to meet the needs of changing incident workload. The option to recruit more people with appropriate skills from the assembled workforce should be reinforced with people assuming senior roles.

Media and crisis communication procedures

Assessors: Jo Clark, Paul Lynch, Elliot Franks and Wade Milne

The assessors worked with the DNRM Incident Response Management team to simulate public and media interest in the emergency response. This included practical examples and advice to ensure media and crisis communication protocols were observed and tested appropriately during the exercise. This year's event included a number of components to test and provide training around media and communication emergency response procedures.

Activation of emergency response arrangements

The company activated its emergency response plan as required by its site safety and health management system in consultation with the Mines Inspectorate. The Mines Directorate Emergency Response Communication Plan is implemented when the Mines Inspectorate is contacted by the company, police or emergency services about a mining emergency, and the Commissioner advises senior officers and ministerial staff to activate special arrangements in support of the response.

This year's scenario included a third party enquiry and social media reports of an emergency situation at the mine site shortly after the exercise commenced. This approach was taken to create a realistic sense of urgency and enable the provision of information about the incident to occur in real-time and scale up or down as the situation unfolded.

Notifications and briefings for all relevant personnel involved or supporting the response were undertaken in close consultation with the IMT and the Commissioner for Mine Safety and his designate at all times. Key contacts for relaying or checking information and roles assigned throughout the response were discussed and reconfirmed at each key stage of testing of the media and communication channels and protocols.

Use of social media

Social media test posts were used by the assessors to create a scenario of what could happen during an emergency incident of this nature. The material was designed to test the procedures of Kestrel South Coal mine and the incident response team. Assessors monitored the use of media, social media and internet platforms during the event. A total of 37 social media alerts were posted by DNRM and 11 social media alerts were issued by the company. Media and social media comments were also used to generate pressure to validate facts quickly and demonstrate the value of close monitoring and integration with the release of all media responses at the company and departmental level.

Media and communications

The DNRM media team worked with the Commissioner, Mines Inspectorate, ministerial media advisors, Queensland Police media and the company's corporate communications manager (noting that the mine operator is the media and communications lead in an emergency) to coordinate the timely release of information. Eight proactive test media statements and responses during the event were issued by the company and DNRM, and one was developed for use by the Premier's Media Office.

This year's event coincided with a Parliamentary sitting day so the Minister and his staff were able to facilitate briefings, ministerial responses and talking points from a central location to assist with the Premier's regular afternoon press conference. This also aided message reach for statewide and local media outlets.

A dedicated incident response web page was developed by DNRM in the event of a fatality or protracted rescue of the injured worker to provide a central internet platform for all media statements, communication materials and other relevant information (audio-visual, images, social media feeds, links and contact information). News and social media alerts were proactively uploaded to the internet as part of the simulation.

What worked well?

- Communication between the IMT team and media/communications staff was well organised, clear and constant. The communications approach adapted well to the nature and extent of the incident.
- All parties worked through their emergency communication procedures and checklists professionally and treated the exercise test as real.
- The company responded quickly to organising on-ground support to handle media and related enquiries from the public.
- Distribution and publishing turn around times for media, web and social media material were monitored and expedited quickly.
- Expeditious approvals of information released by the Commissioner for Mine Safety and consultation with the Minister's Office.
- Test media enquiries were responded to and handled in line with protocols expected during an emergency. The reality of the pressure of urgency, to meet deadlines and limit the number of people requesting information, promoted a genuine training and 'are we ready' experience.
- Contact was established by DNRM early in the process with the Minister's Office ensuring key people involved in the response were on standby for more information and

formal incident updates as new information came to hand. Requests for updates were centrally coordinated and did not impede the IMT.

- Potential issues and briefings to inform media and communication responses were provided in a timely manner. Issues raised in social media forums were addressed.
- Detailed logs were kept of all media, social media and communication actions throughout the exercise. Media and communication updates were provided at key intervals.
- Good and efficient information-sharing and coordination between media and social media team, mining company's corporate communications lead, and Queensland Police Media Unit.
- The wrap-up media statement on the facts of what had occurred and the outcome of the rescue of the injured mine worker, made press before close of business, limiting any inaccurate reporting into the next day.

Areas for improvement

- Some of the formal notifications following test social media reports could have been faster, phone contact was relied on to keep pace with the media responses required and validate facts authoritatively.
- Avoid the use of personal employee accounts in 'official' social media responses, posts can be more readily identified for sharing or retweeting by employees and government agencies when they come from a company account.

Recommendations

Industry

- Mining operators should consider adding an initial statement to their checklist acknowledging an incident response is underway.
- Mining operators should not mention specifics of injuries in media comments unless verified by a physician.
- External phone calls should be limited and monitored during an emergency.
- SSE's and mining companies should review their capacity to respond to social media during an emergency, particularly in situations involving serious injury or fatalities.
- When responding to social media, companies should consider doing so either on their own communities (such as their @miningcompany account) or create a Facebook page, this would remove the need to use personal accounts of employees authorised to respond to media and enquiries from the public.

- Consider the most appropriate provision of photographs and video footage to aid media briefings, reporting and future training with due regard to privacy considerations for individuals and their family members.
- Recognised Standard 08 Conduct of Mine Emergency Exercises identifies the need for possible press/media involvement therefore all mines and mining companies should prepare adequate documentation/information resources to issue to the press at a time of crisis or emergency.

Exercise team

- Have two assessors with the IMT services team to enable the development of the social and media scenarios as this would help aid the recording of observations and events for future training.

Front Desk Kestrel South – Administration

Assessors: Robyn Lihou

At 9:03 am an announcement came via the DAC system informing staff that an incident had occurred and all staff was to muster in the Crib Room. This was followed by a complete shutdown of staff, visitors and contractors entering or leaving the mine site.

What worked well?

- Administration followed and understood emergency procedures and maintained total exclusion of staff entering or leaving mine site.
- Staff managed the restriction of entry and exiting well.
- Managed communication between staff, visitors and contractors precisely and firmly even under duress.
- When directions were not clear, communicated well with senior support staff for clarification.
- When two staff were placed on roadway to intercept traffic it eased congestion in entrance foyer.

Areas for improvement

- Because of the way Kestrel South is situated, security could be an issue. There are too many ways to enter either from North Kestrel Mine or by areas of surrounding equipment yards and holding areas.
- Two-way radios in the administration area were not operational during this emergency exercise. If it was working, it could have saved time for administration trying to get through for backup or confirmation by phone.
- As North Kestrel was still operating, the staff there should be informed as quickly and efficiently as possible after the initial lockdown has been advised.
- Some CMWs do not appear to be aware of the requirement for emergency exercises and procedures.

Recommendations

Mine

- When an emergency has occurred immediately lockdown staff and utilise initial checkpoint on inroad for security and to aid lockdown period.
- Make sure all forms of communication are available for staff during an emergency situation.
- Have backup available as soon as possible for front desk to cope with influx of staff from surrounding areas, visitors and contractors.

Industry

- Refresher training in the requirement of Recognised standard 08 Conduct of Mine Emergency Exercises all of the Mining Industry the importance of running emergency response exercises.

BRT Room – Kestrel South

Assessors: Robyn Lihou

At 10:05 am the BRT staff secured phone lines leaving two security phone lines open, located in the North Parks Room in Kestrel South Mine, and manned at all times. Both staff worked well together and were kept up to date with regular communication in the form of briefings occurring approximately every hour from the Mine Manager. There was also regular communication made with Rio Tinto's Brisbane Head Office made directly after briefings throughout the day, this had importance for media releases made from Rio Tinto.

What worked well?

- Staff followed procedures and entered time line data with every briefing and communication to Rio Tinto's Head Office.
- All communication with Rio Tinto's Head Office was precise and communicated well.
- Staff always asked for clarification on briefing content.
- Managed communication well within Kestrel including staff, made sure North Kestrel's staff was kept up to date with developments.
- Numerous enquiries were made on the welfare of staff in Crib Room.

Areas for improvement

- Because of the expanse of Kestrel South layout the proximity of the BRT Room should have been located closer to the IMT Room.
- As well as phoning stakeholders, consider typed, emailed, faxed communications to stop misinterpretations of information during reporting stages.

Recommendations

Industry

- Provide continued monitoring to ensure the correct information is released to the public in case of emergencies.

Mines Rescue response

Assessor: Dale Davis

The call out to QMRS was made at 9:04 am and to put the GAG on standby. Automated pages from QMRS were received by rescue trained personnel at Kestrel first page received at 9:24 am and the second at 9:32 am. The first mines rescue person activated, arrived on site at 9:50 am. The QMRS operations manager arrived on site with the service trailer at 11:06 am.

Key timings on the GAG deployment are as follows:

- 9:04 GAG put on standby
- 10:00 GAG requested to go to site
- 11:30 GAG left Dysart
- 13:30 arrived Kestrel South Mine
- 14:00 asked to start GAG
- 15:30 GAG ready to run on IMT manager's approval
- 16:00 GAG started.

The tasks observed and assessed included:

- initial call out
- arrival on site
- organisation of teams and equipment
- team deployment risk assessment (MRAS)
- task (firefighting and potential rescue) and team briefing
- FAB and team deployment.

What worked well?

- QMRS call out system via text service.
- Once the go ahead was given, the establishment of teams and testing equipment as per the standards.
- The deployment of teams and gear from the surface.
- The skill set required to approach and fight the fire.
- FAB was deployed to allow set up of fresh air base before teams arrived.
- The set-up of the GAG and its initiation.

Areas for improvement

- Arriving mines rescue teams were not familiar with the location of the Mines Rescue sub station.
- The screening of team members for alcohol (no testing was done on their entry through reception or subsequently) or fatigue.
- Clarification of team member currency (medical and or BA) for deployment.

- The remoteness of the Mines Rescue substation and the lack of communication in the room from the integrated surface/underground phone system (there were phones in the building but not in the immediate mustering/test area).
- The remoteness of the Mines Rescue substation from lamps and self-rescuers.
- The remoteness of the Mines Rescue substation and the need for the Emergency Service Operations representative to walk backwards and forwards from the main building to deliver the updates, changes and team briefings.
- A functioning back-up system for the electronically based MRAS (unfortunately QMRS do not have a stable internet connection which the MRAS system requires and a paper based assessment was required).

Recommendations

Mine

- Where possible liaise with QMRS regarding the protocols required for site access.
- Install a phone in the Mines Rescue substation that has the ability to communicate to surface and underground.
- Where available provide QMRS with an individual who is intimately familiar with the area(s) to be accessed.
- It may be advantageous to install a cap lamp/self-rescuer rack in the Mines Rescue substation so lamps and self-rescuers can be brought from the main building and remain on charge until the team is deployed, rather than have the team wait till the task and team briefing are finalised and then have to walk back to the main building to access lamps and rescuers.

Industry

- Ensure mine procedures for site access include a section designated specifically to the arrival of emergency services.
- Familiarise designated personnel with QMRS's MRAS to assist in the streamlining the process of deploying Mines Rescue teams safely.
- For protracted incidents support the waiting teams with dietary requirements and hydration.
- Provide a WiFi network for emergency services to use such as QMRS to use MRAS.

QMRS

- Review team arrival process and sign on (several team members appeared to be unfamiliar with the sign on and needed help to complete).
- Consider breath testing team members as part of the sign on process.
- Where possible provide an induction to substation site (where are the toilets, lunchrooms and drinks).
- Instil a sense of urgency for readiness once the go ahead is given to deploy.
- Establish/review team briefing process to minimise the potential for miscommunication (for example, from background noise) and confirm with the captain his understanding of the task post briefing.
- Enlist the help of mine personnel to clarify any information required to assist in deploying a team (for example, surveyor and vent officer).



Figure 9: QMRS trailer mounted GAG unit

Conclusions

These conclusions have been made following the review of the exercise response by the 22 assessors. They are based on the assessor's observations of the exercise response at Kestrel South Mine.

It is now 20 years since the Moura No 2 disaster (1994), where 11 coal mine workers were killed in an underground explosion. The warden's inquiry and the subsequent Moura task groups have guided us to our current legislation and processes.

The Pike River disaster (2010) and subsequent Royal Commission has resulted in New Zealand adopting similar legislation regarding emergency exercises.

The main conclusions are listed below.

- Attempts were made to fight the fire by evacuating CMWs and a firefighting team deployed from the surface. This is the correct response; however, the team deployed from the surface lacked equipment including CABA and protective apparel.*
- QMRS response was professionally conducted.
- All three groups that evacuated to the surface/outbye of the fire were proficient in donning SCSRs and the changeover to CABA. There were one or two small issues noted on donning SCSRs and CABA (see the Conveyor drift fire site and 403 panel evacuation sections for more detail).
- ERZ controllers took the leadership role in the evacuation process and communications with the CRO re evacuation route and personnel evacuating.
- Some issues were noted with the ERZ controller not being totally aware of all personnel on their district.
- There were some issues with communicating via telephone whilst wearing of CABA.
- The time taken for low visibility evacuation surprised one of the ERZ controllers.
- The "trapped and injured CMW" was able to make several external phone calls to his "wife and other family members".
- Counselling was offered to the "trapped and injured CMW" by both the IMT leader and the mine site medical advisor. In some cases this was done in an open forum on the surface and would be better conducted from a discreet office.
- Simtars was mobilised, however there was no prompting regarding gas analysis required, such as taking bag samples from the tube bundle and ensuring the atmosphere downstream was not explosive. (There is little methane seam gas present at Kestrel however, coal pyrolysis of burning coal can produce large amounts of carbon monoxide and hydrogen).
- The control room became noisy and congested and all information may not have been written down.
- The MEMS system employed by mines as part of their incident response is very similar to the Police Incident Command System (ICS). The main difference is there was no intelligence cell operating. The control room is a very valuable source of information and intelligence gathering. A person attending briefing from the control room would be very useful.
- External agencies were notified very early in the incident, however some confusion arose over the mobilisation and who would be attending from the Mines Inspectorate.
- The use of process checkers (IMT deputy and IMT coordinator) were very effective in ensuring the completion of tasks and the checking of actions listed on the duty cards, especially during the initiation of the incident management. In addition, this role checked to make sure function leaders were clear on their actions and updated the status boards.
- The Business Resilience plan, which documents the IMT process, was modified immediately before the exercise the issue/sign off date of 21 October 2014. This Emergency plan was a modification of the previous plan and resulted in a fourth group 'Services' being created. This document requires a review of the structure and duty cards, for example:
 - o there is conflict in duties of the groups
 - o the planning group is dedicated on recovery not incident control
 - o the VO in planning is also reporting to operations manager.
- Planning was not challenged on what other methods there were to evacuate the "trapped and injured CMW".
- The IMT controller was totally in control of the incident from the start:
 - o he was calm
 - o he listened to his staff
 - o it was very clear that he was the person in charge and making the decisions.

* It should be noted that CMWs with the correct skills and experience should be encouraged to fight underground fires. (Emergency exercises can lead to situations where CMWs believe they need to evacuate if their efforts are not succeeding. Where CMWs fight underground fires significant opportunities are realised,

1. there is a distinct chance that their efforts will be successful and the fire will be extinguished
2. firefighting improves the opportunities for escape for other CMWs inbye of the fire
3. fighting a fire speeds up the deployment of mines rescue personnel because there are eyes on the fire and actual information is available on the surface.

- The logs of events were kept up to date by the scribes, however on some occasions information may have been missed.
- The IMT rooms were very well equipped with electronic recording of information (MS word).
- The electronic system for monitoring the location and numbers of persons underground was not operating correctly.
- There were some overlaps in groups where planning was conducting operation/logistics tasks and vice versa.
- Re-entry risk assessment for Kestrel firefighting attempt was limited due to:
 - o no involvement of persons conducting task
 - o no consideration for MRAS/ explosibility
 - o poor risk and control identification
 - o greatest identified risk was belt separation
 - o RA did not consider personal gas monitoring detectors
 - o CABA was identified but the Kestrel fire-fighting team did not take it.
- The planning group duty cards were more focussed on recovery than dealing with the incident, which could have caused some issues.
- There was some misinformation in the social media releases such as the trapped miner have in a “broken leg” along with discrepancies in the language being used.
- Rio Tinto does not have a Social Media page.
- Some staff do not appear to be aware of the importance of simulated emergency exercises in particular the Queensland Level 1.
- Briefings of the SSE in the BRT room took place with the IMT controller visiting the SSE this took the IMT manager out of the IMT and away from his team. As documents and plans were emailed this could have been done verbally without the IMT manager leaving the IMT response area.[#]
- The GAG was requested to be brought to site at 10:00 am and was onsite deployed and ready to go by 3:30 pm.
- The mines rescue room is too remote from the IMT area and has no communications in place with restricted the briefing of teams.
- The lack of internet connectivity stopped the MRAS system working and a backup paper based version had to be used.
- A lack of urgency was again displayed by the QMRS team once the task had been established and briefings completed. This could be because it is an exercise.

A common exercise observation is the lack of urgency by the participating teams. While an emergency exercise is a ‘false situation’, to get the most from these exercises, the scenario should be treated as ‘real’ to ensure all the interactions and communication processes are tried and properly tested. It is often miscommunication, which causes the most issues during a real emergency.



Figure 10: 403 crew's ERZ controller checking with control

Recommendations

These recommendations were made by the assessors with the aim of providing continuous improvement to the mine and states emergency response capabilities.

Hence there are a large number of recommendations on process improvements.

Five important recommendations on the industry emergency response are:

1. Many mines use variants of the MEMS. It would be appropriate to convene a forum for the exchange of views within the Queensland industry on whether the basic MEMS is appropriate or needs revision. This should include a review and modification of the MRAS system if necessary, to ensure it can be used effectively and quickly
2. A forum should also be held to discuss the outcomes from level 1 and level 2 exercises and in particular the consolidation of all the recommendations from 17 level 1 emergency exercises.
3. All mines should modify their emergency procedures to ensure that the emergency activation numbers are used for the mines inspectorate, QMRS and Simtars.
 - i. Mines Inspectorate 07 3237 1696
 - ii. QMRS 1800 7677 20
 - iii. Simtars 07 3830 5564/1800 331 991
4. Guidance systems into SCSR/CABA locations should be standardised across the mining industry. For example, droppers across roadways, lifelines guiding into locations, wind chimes and the colours used for secondary escape ways.
5. Emergency winding capability including suitable capsules for extracting coal mine workers out of boreholes/shafts should be available in Queensland.

Mine

1. CABA refill locations should be placed closer to the roadway to avoid the possibility of equipment being stored in front of the refill station.
2. Do a review of signage on escape ways.
3. Investigate the lack of cover/transmission with the PED system.
4. Review debrief process and system for getting information into IMT.
5. Update mine site personnel on the functionality of the gas trending and interpretation software.
6. Review mine site fire procedure to identify the need to generate appropriate gas data as soon as possible and the data is used for the control fire-fighting activities and mine re-entry.

7. The mine should review the effectiveness of the duty cards and other documentation such as checklists and display boards to ensure they were effective.
8. The functions of the groups should be reviewed in light of the functions they actually carried out versus intended. For example Planning reported on the relief IMT, catering and GAG supplies, which normally should have been a logistics function.
9. There needs to be a protocol that can be invoked to ensure the personnel tracking system is functioning properly with all nodes in operation and this should be checked off.
10. Had the incident progressed for a longer period, the alternate IMT would need to be implemented and personnel should have been sent home. This may have placed stress on the available resources.
11. Practice the emergency response system and the function of the MEMS structure and utilise the IMT as a strategising group to develop the objectives as a team rather than relying so much on the leader.
12. Review risk assessment process to ensure people doing the work are involved in the risk assessments.
13. Review the allocation of roles in the operations group to ensure people allocated to a role have the relevant operational experience.
14. Implement MRAS on site and use as part of the decision making tools for risk assessments.
15. Review the plan to ensure roles and responsibilities are consistent throughout the plan and duty cards.
16. To be consistent with accepted incident command and control structure standards, the planning duty cards should be rewritten to include current and future incident state planning for both primary Incident Action Plans and contingency planning. Assessment of the risks associated with the plans should be included in the responsibilities of the group.
17. Increase requirements of staff to remain familiar with their roles and how they fit within the structure. This may require further targeted training and exposure to more emergency simulations.
18. Conduct further training in the structure to ensure all involved understand how functional groups operate and what outputs are required from each group.
19. Scalability of the structure is critical to meet the needs of changing incident workload. The option to recruit more people with appropriate skills from the assembled workforce should be reinforced with people assuming senior roles.
20. When an emergency has occurred immediately lockdown staff and utilise initial checkpoint on inroad for security and to aid lockdown period.
21. Make sure all forms of communication are available for staff during an emergency situation.

22. Have backup available as soon as possible for front desk to cope with influx of staff from surrounding areas, visitors and contractors.
23. Where possible liaise with QMRS regarding the protocols required for site access.
24. Install a phone in the Mines Rescue substation that has the ability to communicate to surface and underground.
25. Where available provide QMRS with an individual who is intimately familiar with the area(s) to be accessed.
26. It may be advantageous to install a cap lamp / self-rescuer rack in the Mines Rescue substation so lamps and self-rescuers can be brought from the main building and remain on charge until the team is deployed rather than have the team wait until the task and team briefing are finalised and then have to walk back to the main building to access lamps and rescuers.

Industry

1. CCTV monitoring of critical areas of the mine. For example conveyor transfer points, entrances and exits.
2. Review firefighting risk assessments including: training and determine equipment requirements of fire crews consideration of clothing and CABA, as well as for the deployment of firefighting teams following evacuation of the mine including the review of the QMRS Mine Re-Entry Assessment System (MRAS) approach.
3. During mine site emergency exercises, utilise limited visibility for escape apparatus. Comment from ERZ controller indicated he was surprised at how long it took to self-escape from MG403 19 c/t.
4. Guidance systems into SCSR/CABA locations should be standardised across the mining industry. For example, droppers across roadways, lifelines guiding into locations, wind chimes and the colours used for secondary escape ways.
5. Training on the importance of making sure every reasonable effort to notify/account for all persons in work area before leaving including the need for CMWs to notify the ERZ controller when entering and leaving a panel.
6. Review debrief process and system for getting information into IMT.
7. Ongoing training in the donning of SCSR and change over to CABA including requirement for good seal for the mouth piece and not removing unless in known fresh air or instructed to by a mine official.
8. Emergency winding capability including suitable capsules for extracting coal mine workers out of boreholes/shafts should be available in Queensland.
9. Review the use of communication systems to stop external calls from being made from underground to assist in managing the incident.
10. Look at process for allocating a person to communicate and assist trapped CMW underground with symptoms and needs.
11. Refresher training for gas monitoring, trending and explosibility determination should be undertaken.
12. Review the use of noise cancelling headsets for CRO use.
13. Review the use of sound recording equipment for emergency situations.
14. QMRS or Simtars should prompt mine site to acquire appropriate data where possible before deployment to avoid delays.
15. Running logs – industry should consider the use of audio recording systems to ensure accurate logs of activities are compiled.
16. Review options for capturing the information from the control room and making it available to the IMT room.
17. Evacuating mineworkers should be kept separate from the general workforce.
18. Many mines use variants of the MEMS system. It would be appropriate to convene a forum for the exchange of views within the Queensland industry on whether the basic MEMS system is appropriate or needs revision. This should include a review and modification of the MRAS system if necessary, to ensure it can be used effectively and quickly.
19. Review emergency response systems to ensure that emergency hotlines such as the Mines Inspectorate emergency are used in an emergency. The number for the Mines Inspectorate is 07 3237 1696 and they are readily available in the control room/IMT room.
20. Ensure information is available regarding the status/depths of boreholes and firefighting equipment locations.
21. Provide continued monitoring to ensure the correct information is released to the public in case of emergencies.
22. Refresher training in the requirement of Recognised Standard 08 Conduct of Mine Emergency Exercises all of the Mining Industry the importance of running emergency response exercises.
23. Ensure mine procedures for site access include a section designated specifically to the arrival of emergency services.
24. Familiarise designated personnel with QMRS's MRAS to assist in the streamlining the process of deploying Mines Rescue teams safely.
25. For protracted incidents support the waiting teams with dietary requirements and hydration.
26. Provide a WiFi network for emergency services to use such as for QMRS to use MRAS.

QMRS

1. Review team arrival process and sign on (several team members appeared to be unfamiliar with the sign on and needed help to complete).
2. Consider breath testing team members as part of the sign on process.
3. Where possible provide an induction to substation site (where are the toilets, lunchrooms and drinks are located).
4. Instil a sense of urgency for readiness once the go ahead is given to deploy.
5. Establish/review team briefing process to minimise the potential for miscommunication (for example, from background noise) and confirm with the captain his understanding of the task post briefing.
6. Enlist the help of mine personnel to clarify any information required to assist in deploying a team (for example, surveyor and vent officer.)

Social Media and Communications

1. Mining operators should consider adding an initial statement to their checklist acknowledging an incident response is underway.
2. Mining operators should not mention specifics of injuries in media comments unless verified by a physician.
3. External phone calls should be limited and monitored during an emergency.
4. SSEs and mining companies should review their capacity to respond to social media during an emergency, particularly in situations involving serious injury or fatalities.
5. When responding to social media, companies should consider doing so either on their own communities (such as their @miningcompany account) or create a Facebook page, this would remove the need to use personal accounts of employees authorised to respond to media and enquiries from the public.
6. Consider the most appropriate provision of photographs and video footage to aid media briefings, reporting and future training with due regard to privacy considerations for individuals and their family members.
7. Recognised Standard o8 Conduct of Mine Emergency Exercises identifies the need for possible press/media involvement therefore all mines and mining companies should prepare adequate documentation/information resources to issue to the press at a time of crisis or emergency.

Exercise team

1. Providing gas data could have low gas reading triggers for further inbye locations.
2. Investigate early deployment of the underground team three to four hours prior to the exercise beginning to prevent the start from being delayed.
3. Create detailed plans of the relevant exercise area only.
4. Scenario could benefit by adding real source of (non-toxic) contamination to the airway such as stonedust to simulate smoke.
5. Try to avoid quarantined areas during an exercise. It was very distracting from the actual scenario with LW vehicles still driving in the actual escape way circuit.
6. Assessor familiar with gas analysis should shadow VO and IMT groups to see how gas data is being interpreted.
7. The need for Mines Rescue callout should be reviewed and there may need to be an alternative process invoked to prevent the scenario from becoming too artificial.
8. Have two assessors with the IMT services team to enable the development of the social and media scenarios as this would help aid the recording of observations and events for future training.

Appendices

Appendix A: Exercise timeline

Location	Surface observation	Time	Underground observation	Location
		8:45	Coal fire ignites/ start of exercise	Fire Site
control	First real-time gas alarm 50ppm CO	8:46		
control	Several real-time CO alarms now active	8:47		
control	CRO informs mine manager of alarms	8:50	Informed CMWs they could see smoke and provided exercise rescuers	Outbye team 18 c/t B hdg Mains Panel
control	Mine manager informs CRO to withdraw all personnel to crib rooms (emergency PED1)	8:56		
		8:57	Emergency PED 1 received	403 MG
control	Mine Manager initiates IMT assumes there may be a fire in the mine	9:00		
control	Mine manager orders withdrawal of all underground personnel (emergency PED 2)	9:04		
		9:05	Emergency PED 2 received	403 MG
		9:07	ERZ Controller decided to use Bhdg for egress	Mains Panel
		9:10	403 personnel completed donning CABA commence evacuation	403 MG
			Mains panel complete donning CABA	Mains Panel
IMT room	IMT established	9:12		
IMT room	IMT manger calls two inspectors and two ISHRS No response	9:14		
control	Information from contractor in drift fire at transfer point	9:15	First CMWs arrive at fire site Injured CMW contacts control	Fire Site 403 Face line
IMT room	Contacted ISHR in Brisbane and advised of the situation			
		9:20	Group of CMWs arrive carrying CABA This was the crew that had evacuated from outbye in the mains Mains Panel Leave crib room in man transporter	403 Fire Site Mains Panel MG
		9:25	403 arrive at 11 c/t top up CABA cylinders	403 MG
		9:30	403 complete topping up CABA Stopped fighting fire and had group discussion around whether to fight or flight. Outbye mains Crew Injured CMW made first phone call to his 'wife'	403 MG Fire Site 403 face line
Planning	UMM has made call to evacuate FF team from UG	9:44		
		9:55	Mains crew in fresh air	11 c/t B heading
		9:48	Outbye mains crew at surface tag board 58 minutes to evacuate including the attempt to fight the fire	
IMT	GAG requested to deploy to site	10:00	Mains Crew walking the drift 82 minutes to evacuate to this point	Mains crew
IMT	IMT aware that injured mine worker has contacted his "wife" and information is out on social media	10:06		
		10:24		
Outside control	IMT manager contacted injured mine worker	10:25		

Appendix A: Exercise timeline cont.

Location	Surface observation	Time	Underground observation	Location
Mines Rescue Sub Station	QMRS representative (training instructor TI [1] arrives and is briefed by team member Team members instructed by team captain to tests 12 suits. 2 more team members arrive. (now 11)	10:32		
		10:43	403 team at bottom of drift	Drift bottom
reception	Mines inspector ¹ arrives on site	10:45		
		10:55	Injured CMW made third external phone call	403 face line
		11:05	403 team on the surface 115 minutes for evacuation	Surface Tag Board
		11:20	Debrief of 403 ERZC complete	De-brief
		11:47	Kestrel firefighting team arrive, informed fire increasing	Fire Site
		11:50	Phone call to injured CMW from site medical advisor	403 face line
ICC	Backup plan was to collect cage from Cook Colliery to extract via borehole.	12:00		
		12:00	Team Captain returned and advised team Mines rescue taking control Keep spray on fire till they arrive	Fire site
control	VO checks for explosibility using Safegas	12:15		
		12:25	Firefighting pod arrived placed at 2 c/t	Fire site
		12:33	Mines rescue team arrive and set up FAB at entrance to dogleg. Advised that heat was dissipating and that the fire has somewhat reduced in size	Fire site
Tube shed	VO shows assistant VO how to take bag samples from tube bundle system	12:45		
control	First analysis completed on GC	13:05		
IMT	Trends presented in IMT GAG arrives on site	13:30		
IMT	Request to start GAG	14:00		
		14:28	QMRS establish FAB	Fire site
		15:02	QMRS commence fire fighting	Fire site
		15:15	Fire out	
Portal	GAG ready to run	15:30		
		15:55	QMRS arrive at 17 c/t to retrieve injured CMW	403 face line
Portal	GAG running	16:00		
IMT	Exercise complete	16:10		

Appendix B: Assessors

Russell Albury (Underground Assessor 201 Panel) Deputy Chief Inspector of Mines

Russell has over 30 years of mining experience largely associated with underground coal.

He is a qualified and experienced underground mine manager and has worked in both New South Wales and Queensland as a mine manager.

Russell is presently employed as a Deputy Chief Inspector of Coal Mines and has been in the department for over two years.

Robin Bent (Senior AV Designer, Social Media DNRM)

Jo Clark (Media and crisis communication assessor) Manager Mining Communications within DNRM Corporate Communication

David Cliff (Organising Committee and IMT Observer) Acting Director, Minerals Industry Safety and Health Centre (MISHC), University of Queensland

David Cliff was appointed Professor of Occupational Health and Safety in Mining and Director of MISHC in 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 over twelve years.

Previously David was the Safety and Health Adviser to the Queensland Mining Council, and prior to that Manager of Mining Research at the Safety In Mines Testing and Research Station. In these capacities he has provided expert assistance in the areas of health and safety to the mining industry for over twenty three years. He has particular expertise in emergency preparedness, gas analysis, spontaneous combustion, fires and explosions, including providing expert testimony to the Moura No. 2 Warden's inquiry and the Pike River Royal Commission. In recent times he has also devoted a lot of energy to fitness for duty issues particularly fatigue management. He has been a member of the organising committee for the level one emergency exercises in Queensland underground coal mines since their inception in 1998. He has also attended or provided assistance in over 30 incidents at mines.

David has also extensive experience in providing training and education in OHS in mining to in many countries.

He has published widely in the area of occupational health and safety in mining including not just the physical hazards but also on the processes for the effective management of these issues. Examples of this include reviews of the annual safety performance report for the Queensland Department of Natural Resources and Mines and assistance to the Mine Safety Advisory Council of NSW in developing Health Management Plans (HMP) and key performance indicators for HMP.

David Connell

Regional Manager (Hunter Valley, New South Wales Mines Rescue)

David Connell is currently the Manager of Hunter Valley Mines Rescue Station. He has 26 years experience in the coal mining industry and 17 years in mines rescue. He has been involved in several mining emergencies including Pike River, Beaconsfield and the Blakefield South incident and recovery. He has also been involved in planning, running and assessing a number of simulated emergencies in both New South Wales and Queensland.

Jeff Davidson

Jeff commenced underground mining in Lithgow New South Wales in the early 1980's at Grose Vally Colliery bord and pillar mine.

Moved to Emerald Queensland in 1993 and worked at Gordonstone (Kestrel) Mine, Oaky Creek mine's and the past 14 years at Crinum Mine.

Jeff has worked as a miner, deputy, and supervisor, coordinator in both Longwall and Development and currently as a Shift Superintendent at Crinum.

Jeff holds a Deputy certificate of competency and has recently completed the Advanced Diploma in Underground Mining.

Dale Davis

Operations Manager (Southern Mines Rescue Illawarra N.S.W)

Dale has 14 years' experience in the mining industry and 10 with mines rescue. He is currently the Operations Manager of the Southern Mines Rescue Station. The several years spent out of the industry were focused on safety, injury prevention and systems auditing including two years at the University of Wollongong. He has participated in numerous simulated emergencies providing input into the planning, running and assessment of the events from both the industry's and Mines Rescue perspective.

Rodney Graves

Shift Superintendent Underground (Under Manager) Crinum Mine

Rodney is currently studying for his first class manager certificate and he has a 13 years of experience in underground coal mining. He is currently the underground shift superintendent at Crinum Coal Mine and has numerous supervisory positions at Kestrel Coal mine from 2001–2012. The last role held was compliance superintendent.

Elliott Franks (Media and crisis communication assessor) Social Media Manager within DNRM

Jason Hill CFMEU ISHR (Industry Safety and Health Representative)

Jason Hill is currently elected as an Industry Safety and Health Representative (ISHR) Jason has a deputies certificate and has been a member of QMRS for 10 years.

Jason has taken part in six level one exercises. Three as assessor, one as part of IMT and two as part of QMRS response.

**Jason Kachel (the 'Mole')
Ventilation Specialist Kestrel South Coal Mine**

Jason Kachel has been working at the Kestrel since 2002 his current role is that of ventilation specialist and he is involved in life of mine planning and a scoping for the second ventilation shaft. His previous duties have ranged from being an operator/maintainer on the longwall to ERZ controller on both longwall and gate road development. Prior to working at Kestrel Jason worked for Walter Construction Group on a number of projects in New South Wales and Queensland.

Tom Lake (Mine Planning Engineer, Grasstree Mine)

Tom has worked at Grasstree Mine since 2011 working primarily in the technical services department, progressing from Graduate Mining Engineer to Mine Planning Engineer whilst also spending time as an underground miner. He is now currently working as Ventilation & Gas Drainage Engineer having completed the Ventilation Officer's qualification in early 2014. This is Tom's first level 1 mine emergency exercise.

Ken Liddell (Director of the Mining Research and Development Centre, Simtars)

Ken is the Director of the Mining Research and Development Centre at Simtars based at Redbank in Queensland.

Prior to joining Simtars in November 2013, he was conducting research into blast induced vibration as part of an Engineering Doctorate at the Institute of Sound and Vibration Research at the University of Southampton, United Kingdom.

Ken has extensive experience in wireless communications, telemetry, and optoelectronics.

Ken holds a Master's Degree in Sustainable Energy Technologies from Southampton University and an Honours Degree in Applied Physics and Solid State Electronics from Heriot Watt University in Edinburgh.

**Robyn Lihou
Administration Simtars**

Robyn has been with Simtars for 5 years as an Administration Officer in the Mining Research and Development Centre as well as the Engineering Testing and Certification Centre. In addition to her administration duty in the Mining Research and Development Centre Robyn also assists with research projects and has recently completed training for the operation of the Steamexfire 300-2. She is also currently studying a Masters of Library and Information Technology studies through Queensland University of Technology to enhance research and information resources and their availability and implementation at Simtars. She is also responsible for the Simtars Library which provides information for Researches and other departments in the Government.

**Paul Lynch (Media and crisis communication assessor)
Media Manager within DNRM Corporate Communication****Peter McFarlane
Senior Sergeant of police
OIC Emerald**

Peter is a Senior Sergeant of police and Officer in Charge of Emerald Police Division. He has 23 years experience as a operational police officer in Queensland.

He completed extensive training in the Incident Command System (ICS) and has been Police Forward Commander (PFC) at multiple incidents including drownings, sieges, complex traffic crashes involving volatile substances, industrial deaths, search and rescues and natural disasters.

He considers the training in mining exercises extremely valuable for both mining employees and emergency serves.

Wade Milne (Media and crisis communication procedures assessor) Web services Manager within DNRM**Gary Mitford
SSE Oaky North Coal Mine**

Gary is a highly accomplished result orientated mining Operations Manager who is self-motivated and able to work efficiently within a highly legislative environment. He has been active in the coal mining industry over 34 years and his experiences include: installation and operation of longwall, mid-wall, short-wall and single entry production units, single, dual and multi entry development units within coal seams ranging from 1.2 m – 7.2 m thickness within a variety of geological difficulties. Gary has worked for Glencore, Vale and Anglo American between 2005 and 2014. Prior to that Gary was employed in the United Kingdom Coal industry.

Sean Muller**Analytical Chemist Simtars**

Sean has extensive use of gas monitoring techniques in underground coal mines, specialising in gas chromatography.

He was involved in the response to the Pike River Emergency in 2010 and gas monitoring for Carborough downs in 2012.

He is part of Simtars on-call emergency response team and has participated in previous level 1 and level 2 exercises as part of Simtars emergency response.

Installation and training for gas monitoring systems in Australia and internationally. His role in the exercise involved the generation of simulated gas data.

Wouter Niehaus (Underground Mine Manager, North Goonyella Coal)

Wouter started his mining career at New Denmark Colliery in South Africa in 2000 after completing his degree at the University of Pretoria. After spending three years at one of the few underground Longwall mines in South Africa, Wouter was offered a transfer to Australia in 2003 where he spent four years at Dartbrook Colliery. From Dartbrook he moved on to North Wambo Underground and later relocated to Queensland in 2011. Wouter is the current Underground Mine Manager at North Goonyella Coal where the site has recently introduced Longwall Top Coal Caving, surface to seam ground consolidation and pumpable standing support.

Kevin Poynter**Inspector of Coal Mines**

Kevin is an inspector of coal mines with over 30 years mining experience. He is based in the DNRM offices in Rockhampton. Prior to moving to Queensland Kevin was a mining inspector in New Zealand.

Daniel Proffitt**Underground Mine Manager Grasstree Mine**

Daniel is a mine manager who has been employed in senior roles by Anglo American and BHP Billiton. Duties covered in his roles have included top coal caving longwall installation statutory compliance and production activities.

Raymond Smith QMRS**Operations Manager – Operations, MRAS, Gas Ticket Certification and Competitions**

Ray has participated in the 2004 level 1 mine emergency exercise evacuating out of the longwall at Oaky No.1 mine, next he was part of the teams deployed in the 2007 level 1 mine emergency exercise at Grasstree Mine. Ray has been involved as the 1st Operations Manager to site at Aquila 2011 and Oaky North 2012. This is Ray's second level 1 mine emergency exercise as part of the 2013/14 organising committee.

With over 16 years in the coal industry, beginning at Newlands Coal in 1998 and continuing with Oaky Creek Coal from 2002-2011, his roles and duties have included ERZ controller, fire officer, shot-firer, SSHR. and Mines Rescue Coordinator.

Ray's competencies include deputy qualifications Class 3 Ticket, Certificate 5 RII50912 in Underground Mining, Certificate 5 in Business BSB5020 and Management BSB51107, training and assessment, and occupational first aid. Ray is currently in preparation to sit for his Second Class Ticket, and studying Advanced Diploma in Business and Management. Ray brings youth, vision, and an enthusiastic approach to strengthen and deliver the principles, purposes and pride that QMRS stands for.

**Martin Watkinson (Chair of the Organising Committee)
Executive Mining Engineer, Simtars, Queensland
Department of Natural Resources and Mines**

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, development of safety management plans.

He is currently involved in completing a major review on the development and use of tube bundle gas monitoring systems.

Martin has been involved in all the level 1 mine 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.

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