

**Paper for Queensland Mining Industry  
Health and Safety Conference 2003,  
Townsville.**

**“Challenge Test – Your Level 1 Emergency  
Exercise”**

Author:  
David Reece  
Senior Inspector of Mines  
Department of Natural Resources and Mines

## CHALLENGE TEST – YOUR LEVEL 1 EMERGENCY EXERCISE

### ABSTRACT

The Level 1 Emergency Exercise has been conducted in Queensland Underground Coal Mines for the past five years and is a specific requirement of the Moura Inquiry findings. The intent of this paper is to provide relevant information on past, present and future actions that will affect underground coal mines and their emergency response systems. It is also of value to other mines (open cut and metalliferous) where the hazards may not be the same yet suggestions and innovations may be utilised.

The paper is in four parts:

- Key recommendations from previous emergency exercises that warrant repeating for emphasis and as a backdrop the change process later in the paper.
- The proposal for and initial operation of a modified program for Level 1 Emergency Exercises.
- Findings and recommendations from the Emergency Exercise conducted at Crinum in July.
- The experience from Crinum's perspective.

### NORTH GOONYELLA RECOMMENDATIONS – FOR INDUSTRY

It is not the intent nor is it appropriate to discuss the findings and recommendations of the North Goonyella Emergency Exercise from November 2002 in this paper (due to the author's non-participation in the exercise). This information has been detailed and reported by Mr Greg Rowan and the Management Team of that exercise and presented at industry forums since that time.

However, a selection of the recommendations from this and previous exercises are repeated here in order to reinforce the need for them to be addressed by mines. This is clearly a source of frustration and concern as expressed by Emergency Exercise Management Teams (EEMT's), industry personnel and the Mines Inspectorate.

#### Duty Cards

Duty card systems are an excellent aid for initial response to an incident and are widely utilised. However, there is a need to "walk through" the intent and operation of all the cards, ensuring effective interactions and identification of personnel, clear roles and responsibilities with no duplication, training in the various roles (including relief personnel and handovers) and clear feedback systems to the IMT.

#### Incident Management Team (IMT)

As the key focal point for any incident the IMT will attract a significant amount of attention, often due in part to hindsight and generally from people not in the "direct line of fire". Nevertheless, all exercises have highlighted the need for improved decision-making, communication and communication systems, data management systems and processes, fatigue management and clear lines of authority. The Emergency Preparedness Course as presented by both NSW and QLD Mines Rescue Services coupled with the regular simulated exercises will go some way to addressing this issue.

Simple knowledge of monitoring system response times is also being overlooked as a necessary piece of information in understanding an incident.

#### Incident Management Rooms

There is an ongoing need for effective tools and techniques (white boards, computer data bases, etc.) to assist in managing the situation as well as aiding in the briefing and decision-making processes. These must be of a style that suits the IMT best, but need to be developed and refined through simulated use.

### **Underground Response**

Communication systems failings continue to arise – either between Control or IMT and individuals underground, mainly when Self Contained Self Rescuer's (SCSR's) are used, or simply between a Control Room and the IMT.

Gas analysis by underground personnel without instruments is regularly raised as a deficiency though not easily answered – a mine still needs a protocol even if it is as simple as “if in doubt assume the worst and use an SCSR”.

Protocols for emergency response (as opposed to escape) need to be developed as appropriate as the use of Compressed Air Breathing Apparatus becomes more prevalent.

### **Previous Recommendations**

The information provided by each emergency exercise is a “free kick” or early warning to all mines, so that if an unfortunate situation does arise, a mine may be somewhat forearmed. Better to learn from another's experiences than make your own mistakes – the industry appears to be slow in picking up the past recommendations.

## **A CHALLENGE FOR THE ORGANISERS – A CHANGE IN THE PROCESS**

A review of the existing Level 1 Emergency Exercise process was undertaken in March 2003 by a team representing mines, union and mines' inspectorate, with the objective of “maintaining relevance to current industry needs”. The primary driver for the review was mainly recommendations from previous EEMT's as well as one of convenience in that the existing schedule would culminate with this year's exercise.

The reasons for the review are summarised below:

- 5 years since the original process was initiated and the schedule of events is now complete.
- The standard for the exercises was initiated prior to the extended implementation of either oxygen SCSR's or CABA.
- The need to test aided response as well as self-escape, given that CABA raises alternative strategies.
- The need to test effectiveness of mine emergency systems not just escape. This is particularly targeting the IMT and associated protocols.
- A general indication from stakeholders that it was opportune for a review and potential change in response to the above issues.

A range of key issues and concerns raised during previous exercises also needed to be addressed by the resulting proposal. These include:

- An excessive number of recommendations that are slow to be taken-up by industry.
- Deficiencies in the IMT processes – changeover to relieving personnel; fatigue management; intra-team communication systems
- Artificial complexity within the exercise, due to the requirement to test all response capabilities in one exercise.

The original objectives of the Level 1 Emergency Exercise were reviewed and modified so that the intent would be clear for all stakeholders and to ensure that the resulting format suited the perceived needs of the industry. There has not been a significant departure from the original intent of the exercises, but more a refocusing on the current level of preparedness at individual mine sites with the view to future developments in techniques and technology.

These objectives are as follows:

- Test each mines emergency preparedness capability at a high level – level 2 and 3 exercises are still to continue at every site.
- Test the individual mine's Incident Management Team processes, decision-making systems and general responses.
- Test the individual mine's systems rather than a standard system that fits all.
- Allow for reality to drive the simulation, this includes – making it relevant to the mine's Principle Hazard Management Plans; if the exercise is well handled and controlled,

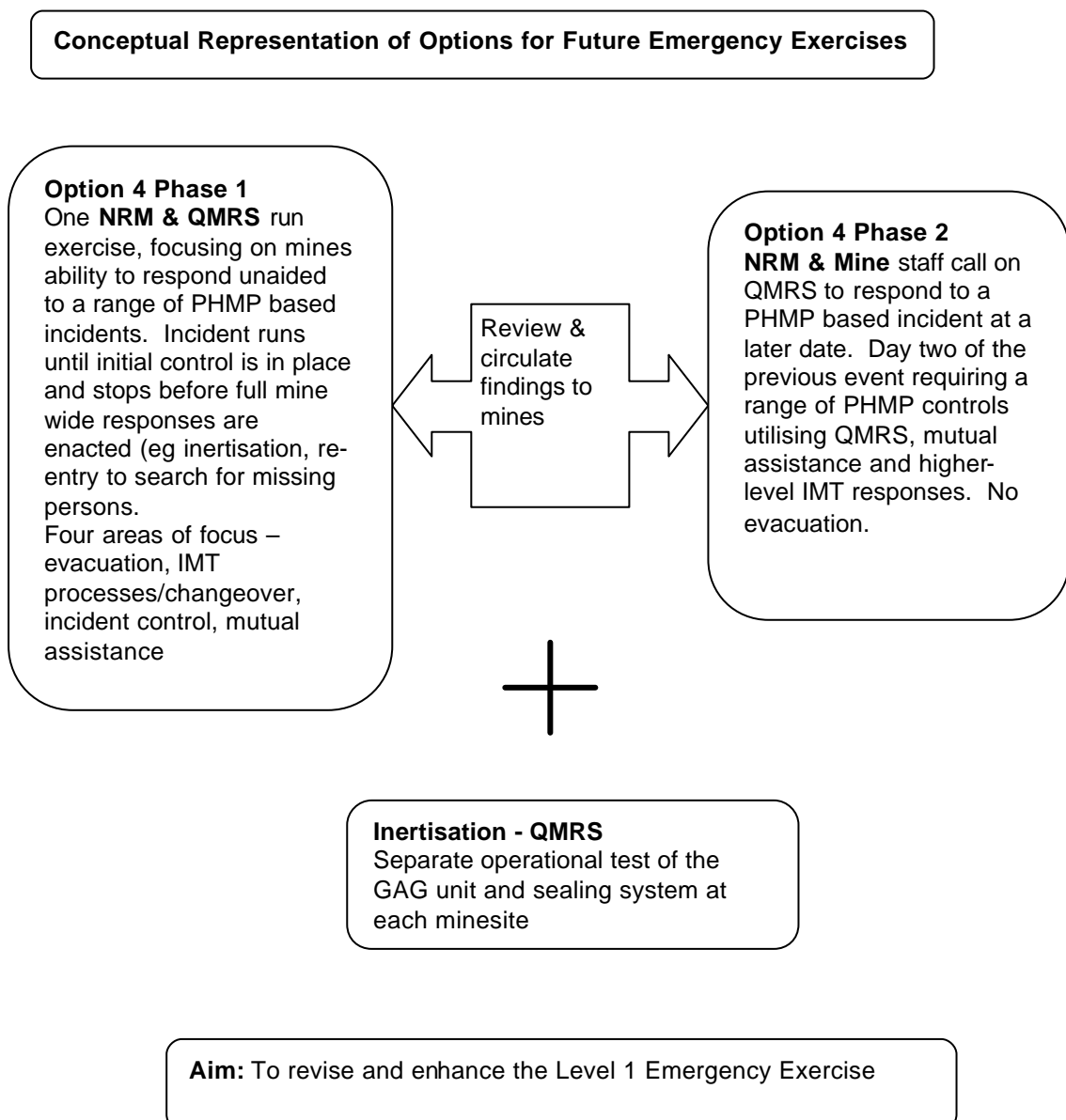
let it runs its course to success; if it is catastrophically failing, curtail the exercise and critique with the management team.

- Test the mutual response process.
- Test the Queensland Mines Rescue Service (QMRS) responses separately to the mines response.
- Increase the level of QMRS involvement in the mine specific testing – the aim being to have senior mines rescue personnel closely aligned with planning and execution of the emergency exercise and therefore more intimately involved with individual mine's Hazard Management Plans then to provide a response capability at a later date.
- Separate the inertisation phase and testing of the mine airlock operation from the emergency exercise.
- Categorise the reporting and recommendations for easier industry implementation.

### The Chosen Model

Three exercise options were considered and evaluated using a SWOT analysis. The option that was agreed upon (a fourth option) was a combination of aspects of the other three options.

The agreed option comprises a three-stage process as illustrated:



### **Phase 1**

An emergency incident occurs underground requiring the full evacuation of the mine and unaided response by the mine. The exercise is co-ordinated by the Department of Natural Resources and Mines and SIMTARS with high-level assistance from QMRS, CFMEU, NSW MRS and industry representatives. The exercise stops when control over the situation is demonstrated. The incident is to be as relevant to the mine as possible based on actual events that either have or could potentially occur at the mine. The incident should be designed in such a way as to challenge the operation of one or more of the mines Hazard Management Plans. Self-escape of personnel will be tested similar to previous exercises with the inclusion of a later (in the day) assessment of an individual's decision making processes. This is to give some added dimension and illumination for an individual worker as if they were required to make their escape entirely on their own abilities. The IMT responses will be closely scrutinised particularly targeting any perceived deficiencies in procedures following on from the EEMT's review of the management plans. This will be further analysed in the second phase particularly given the concerns raised by previous EEMT's with regard to IMT practices and protocols.

### **Phase 2**

A new step, not without controversy. This will be an entirely separate exercise to Phase 1, most likely but not necessarily, conducted at a different mine. It will be, in principle, the next day or stage of an emergency incident following on from the mines initial evacuation. It will follow on from Phase 1 to some degree but will not exactly dovetail due to different mines idiosyncrasies. For instance, Phase 1 may see a mine fully evacuated due to a fire or explosion, Phase 2 could be the extended control of a fire situation due to spontaneous combustion, if the seam is so prone or the recovery of trapped mineworkers following the collapse of strata due to the Phase 1 fire (now extinguished) destroying roof support. The options will clearly depend on the individual mines particular hazards. The focus will now, not only be on the IMT processes, but also those of external agency support – such as QMRS, or whoever the mine nominates as the external support systems for such an event. This will obviously necessitate a different level of co-ordination to the previous exercise and a different range of findings for all concerned. It will not require the evacuation of the affected mine – work should continue largely unaffected. Some mines rescue operation is likely with a similar impact to that of normal training sessions. The greatest impact will be on the mine's IMT who will need to be released to address the "situation".

Both of the exercises will occur within a calendar year, with the aim being to hold Phase 1 prior to this Health and Safety Conference, report the initial findings at the conference with a publicised report to industry shortly after. Then, identifying some level of initiation of the industry based recommendations rather than mine specific recommendations in place at the Phase 2 exercise.

The addition of this second phase is also aimed at reducing the issue of loss of corporate memory – more people exposed to this style of exercise makes for a more robust industry.

### **Phase 3**

Finally the requirement for testing of the mine entry airlock and coupling of the GAG Inertisation unit will occur at a time that is mutually convenient to both the mine and the QMRS. This acknowledges the fact that it may not always be practicable or necessary to instigate these steps in every emergency response. Similarly, it is recognised that fitting these steps in with normal mine downtimes such as main fan outages is more conducive to all parties.

## **A CHALLENGE FOR CRINUM**

It must be stated very clearly at the outset that the Emergency Exercise Management Team (EEMT) had significant difficulty in devising an exercise that would stretch Crinum's systems and retain credibility as a practicable exercise. This was mainly because of the mine's robust ventilation system and the nature of the underground hazards. This is a commendable situation.

The objective of the EEMT was to create a situation of sufficient magnitude that a full mine evacuation was necessary with an integrated response from the mine's Incident Management Team (IMT). This must be to a level of complexity that all personnel are affected to some degree.

### **Crinum's relevant particulars in brief:**

Main Headings - 3 intakes, 2 returns.

Conveyor belt (C Hdg) installed in the centre heading and is segregated from other roads.

Transport roads are predominantly one way – travel inbye using A Hdg, outbye using B Hdg.

The seam exhibits low/medium propensity to spontaneous combustion.

Seam gas is predominantly carbon dioxide at relatively low levels.

Very little timber is used for strata support. It is mainly in the form of steel tendons or bolts with some steel square sets.

Use is made of non-flammable lining of some work areas.

### **Construction of the Incident**

Most major incidents that lead to a co-ordinated response from a mine are generally as a result of a combination of failures as illustrated by the Reason Model. Therefore in simulating the occurrence of an incident each of these factors should be included: Organisational and System Factors, Task and Environmental Conditions, Individual and Team Actions and finally, Absent or Failed Defences.

To this end the following material was reviewed in order to gain an understanding of the mine, relevant existing hazards and potential combinations of use:

- Hazard Management Plans
- Operating Procedures
- Mine Plans
- Ventilation Model
- Operational Layout of the mine
- Incident Records

The main difficulty in creating a suitable incident at Crinum is that it is unlikely to affect other panels due to the ventilation system. Hence the need to actively enlist all aspect of the above model.

Unfortunately, it is not possible to reveal more of the incident or findings at this stage with the exercise programmed to occur just prior to the conference.

## **FINDINGS AND RECOMMENDATIONS FROM THE CRINUM EXERCISE**

To be presented on the day...

Thanks and appreciation is extended to key personnel at Crinum Mine for their assistance and professionalism in conducting this exercise. Specifically: Steve Bullough, Gary McSpadden, Mark McCamley, Peter Baker and Dan Cherry.

Secondly thanks go to the Emergency Exercise Team – particularly Martin Watkinson, Darren Brady and Kirrily Star who carried the bulk of the load; Greg Dalliston, Wayne Hartley, Michael Downs, Peter Baker (NSWMRS), Seamus Devlin, Ron Stothard, Mark Donghi and Bruce McKinnon.

## **RESPONDING TO THE CHALLENGE – CRINUM'S PERSPECTIVE**

To be presented on the day...

## **WHO'S NEXT?**

The previous standard for Emergency Exercises is being redrafted, including the indicative schedule for locations of the exercise. One of the issues that hamper the EEMT is the difficulty in accessing Principle Hazard Management Plans, Ventilation Models and Mine Plans for planning purposes. There is obviously an issue of confidentiality to be addressed, however, with the requirement of a second phase to each exercise, it will be critical to obtain sufficient information for this process. Therefore, there will be requests for this information at different times throughout the year as well as an indication of operational status of selected mines.

Any Volunteers??

**BIBLIOGRAPHY:**

*Recommendations for Level 1 Emergency Exercises – Aiming to maintain relevance to current industry needs. March 2003.* A Review of the existing system. Greg Dalliston, Michael Downs, Wayne Hartley, Mark McCamley, Alan Payne, Greg Rowan, Dan Teale, David Reece, Martin Watkinson.

*North Goonyella Level 1 Emergency Exercise Report.* 2002. Greg Rowan

*The Complete Listing of Emergency Response Recommendations.* 2003 Kirrily Star