

*Moura Recommendations
Implementation Process*

Task Group 2

*Final Report
and
Recommendations*

December 1996



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This report, to the Chief Inspector Of Coal Mines, contains the results of the work of the group and is presented in four separate documents viz. :-

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M P WALKER
Chairman - Task Group 2

DOCUMENT 1

Guidelines for Protocols Governing Withdrawal of Persons

GUIDELINES FOR PROTOCOLS GOVERNING WITHDRAWAL OF PERSONS

FOREWORD

The inquiry into the explosion at the Moura No 2 Mine in August 1994 identified:-

“There was no protocol at Moura No 2 for the withdrawal of persons from the mine in response to potential dangers. This left consideration of questions of withdrawal to those officials who happened to be on duty at any particular time. In the actual event the question of withdrawal was immersed in uncertainties with regard to the state of the mine and, in any case, appeared to have been left largely to the opinion of the middle ranking official who happened to be on duty. Any attempts that official made to obtain guidance from more senior management were not fruitful and, ultimately, any question to staying out of the mine was left to the workforce. This situation is totally unacceptable.”

The inquiry made the following recommendation regarding the withdrawal of persons:-

- *That mines be required to develop and implement protocols, as a statutory requirement, for the withdrawal of persons when conditions warrant such actions.*
- *That the Chief Inspector of Coal Mines convene an appropriate industry working party to develop guidelines for the use, in turn, of mines in the development of protocols for the withdrawal of persons. Developed and implemented protocols should be required to conform with the guidelines.*
- *That protocols developed for the withdrawal of persons should also be subject to agreement amongst all parties with a valid interest at any particular mine and should be subject to review by the Inspectorate.*

The inquiry panel recognised the difficulty of legislating for all circumstances at all mines which might require a withdrawal of persons. Current legislation does govern some of the less complex circumstances and these are identified in Appendix A.

The process of withdrawing persons as a safety control relative to a hazard is broad ranging. A generic example of the process, in chart form, is contained in Appendix B and this was used to help identify the issues associated with each step of the process.

The process applies across the range from what might be described as ‘localised’ withdrawals associated with every day operations (eg shot firing, ‘working’ roof, auxiliary fan stoppage etc) to an emergency evacuation of the mine.

While these guidelines might assist in identifying and subsequently managing all circumstances involving a withdrawal of persons it is considered necessary to develop protocols only with respect to the principle hazards identified for the mine. Hence protocols become an integral part of the mines Safety Management Plans.

SCOPE

Moura Recommendation Implementation Task Group 2 was given the following scope for the development of guidelines for protocols governing the withdrawal of persons:-

- The guidelines should be generic and applicable to underground coal mines. They should describe a process which identifies the presence of safety risks to mine workers which requires withdrawal of persons from the workplace.
- The guidelines should extend from the standards in the mine Protocol, to the process by which the occurrence of risks are monitored, and include the training of persons to move to a place of safe refuge.

TERMS OF REFERENCE

Moura Recommendation Implementation Task Group 2 was given the following terms of reference:-

As a general indication, the guidelines will need to take account of the following matters. They will need to:

- Recognise the special needs of any Safety Management Plan developed for "key risks" occurring at a mine;
- Be consistent with statutory requirements eg. withdrawal of persons after sealing part of a mine (as per recommendation 14);
- Be part of the mine's induction and refresher training programs particularly in relation to Emergency Procedure training;
- Require places of safety or refuge from particular risks to be identified;
- Recognise all parties with a valid interest at mines;
- Require a well defined communication process which will ensure all affected persons are clearly advised of both the risk and the need to withdraw with adequate time to move to a safe position;
- Ensure the location of persons are recorded after being withdrawn from the mine;
- Have an agreed mine re-entry strategy;
- Ensure appropriate records are kept in the Mine Record Book and
- Require appropriate internal and external audit procedures.

TG2 did not limit consideration with respect to the withdrawal of persons to those events associated with principle hazards but also considered all circumstances where threat to life or health might lead to a partial or total withdrawal.

Note: The issue of re-entry has been dealt with in a separate document.

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DEFINITIONS AND ABBREVIATIONS

"Action Response Plans" :- Elements or sub elements of an MEP which are predetermined actions tied to specific trigger levels or events.

"Evacuation":- The withdrawal of persons to a place of safety.

"M.E.P." "Mine Evacuation Plan" -- A Management Plan developed through the process of risk assessment aimed at ensuring that indicators of principle hazards are identified, monitored and appropriately responded to in a co-ordinated and orderly manner.

Mine Evacuation Plans should:-

- be consistent with guidelines established for Safety Management Plans.
- be a single document that systematically defines all actions necessary to ensure that withdrawal of persons to a place of safety are carried out safely
- include but not be limited to organisational structures, planning, activities, responsibilities, communications, practices, risk identified, audits and reviews.
- be supplementary to, and include the implementation of appropriate codes, rules, regulations or procedures and is the method by which the withdrawal of persons is to be effectively managed and co-ordinated,
- be consistent with the Mine Emergency Procedures and may form a part of the Mine Emergency Procedures

“Incident Control Group” :- A person or group of persons with authority defined by an MEP and an obligation relevant to that MEP to initiate actions associated with the withdrawal of persons to a designated place of safety.

“Place of Safety”:- A designated place where persons will assemble without being in any danger from the hazard that triggered the evacuation. The place of safety :-

- Must reflect the consequence of the hazard that has initiated the evacuation
- Must have an effective means of communication with the surface control.
- May include, but is not limited to, the following locations:-
 - Panel crib room.
 - Main headings opposite a district ventilation split.
 - Pit bottom or the base of intake shaft or drift.
 - Surface location.
 - Refuge Bays

“Principle Hazards” :- Source of potential harm or a situation with a potential to result in multiple fatalities.

“Risk Assessment” :- The process used to determine risk management priorities by evaluating and comparing the level of risk against predetermined standards, target risk levels or other criteria.

“Stakeholders”:- Any party with an interest in the safe operation of the mine.

“Surface Control”:- A competent person on the surface with the authority to initiate and monitor the withdrawal of persons to a place of safety.

“Trigger Level” :- A condition that is not the normal, is able to be measured or observed, and on being reached requires initiation of predetermined actions.

“W.O.P”. - **“Withdrawal of Persons”** -- The organised evacuation of persons from the mine or part of the mine to a designated place of safety when the risk to life or health has exceeded predetermined trigger levels.

ESTABLISHMENT OF TRIGGER LEVELS FOR THE WITHDRAWAL OF PERSONS

Background

The establishment of trigger levels in protocols for the withdrawal of person provides set indicator criteria by which mine personnel can initiate a predetermined action. These actions would result in, but not be limited to,

- The collection of additional data to ascertain a course of action,
- The initiation of Action Response Plans,
- The withdrawal of persons to a place of safety.

Trigger levels will be established for each identified principle hazard defined in the Safety Management Plans.

Trigger levels should:-

1. be measurable or observable.
2. be kept current and included in the MEP
3. be consistent with statutory requirements.
4. be identified by risk assessment.
5. recognise the normal or background conditions.
6. be relevant to the risk being considered.
7. reflect the level of risk and the degree of withdrawal required. i.e. to a place of safety underground or a full withdrawal to surface, (tiered system).
8. initiate predetermined actions.
9. be set after considering the results of any simulated testing, eg. gas emission testing.
10. be set to a level that recognises the time taken to initiate effective response. ie. if an effective response will take considerable time then the trigger should be conservative and possibly involve a staged response approach.
11. be developed by agreement with all stakeholders.

KEY ELEMENTS IN THE PROCESS OF WITHDRAWAL OF PERSONS TO A PLACE OF SAFETY

The intent of the process is to ensure the life safety of all personnel in areas affected by the failure to control a principle hazard. It is to cover both self and assisted incident control and is to be developed as a combination of procedure and technical (equipment) standards.

Regardless of size, all incidents are easier to resolve if they have been assessed in the planning stages. Injuries to response personnel and others will be reduced if trained people respond in a safe manner with adequate supplies of the correct equipment.

Key Elements:-

1. *Risk Assessment* to be undertaken to identify:-

- Hazards requiring withdrawal of persons.
- Key indicators for each hazard.
- Location of the places of safety.
- Method of travel and route to be taken.

2. *Trigger Levels*. Identified in Safety Management Plans.

3. *Surface Control*.

4. *Action Response Plans* to be established for each trigger level.

5. *Process for monitoring principle hazards*. to be established to monitor key indicators.

6. *Communication system* (Including procedures) to be established to:-

- Allow all trigger events and alarms to be sent to Surface Control.
- Communication between surface control and underground.
- Communication between 'places of safety' and surface control.
- Initiate a mechanism that ensures key personnel are advised of the hazard.
- Initiate the emergency response command structure.
- Initiating follow-through on corrective actions

7. *Mine Evacuation Plan* to be developed in accordance with the *Standard for Mine Safety Management Plans*.

8. *Places of Safety* to be defined.

9. *Route and method of transport*

Routes and means of travel from the work place to a place of safety must be defined in the protocol. The risk assessment undertaken to determine the route and method of withdrawal should give adequate consideration to :-

- The distances which persons may need to travel in an emergency
- Seam height and grade
- Travelling conditions
- Fitness of persons underground
- Availability of transport
- Guidance systems

Walking extended distances to a place of safety can no longer be considered adequate although this eventuality must be planned for.

10. *Checking System* Whenever an instruction pursuant to the MEP is given there should be in place steps to ensure that it has been received, understood and acknowledged.
11. *Monitoring of the Location of Persons* Each mine should have a system to monitor:-
- Persons entering and exiting the mine.
 - The general location of persons while underground.

The system should be able to act as a checking system to ensure that all affected persons have moved to the required place of safety.

12. *Training needs.*

PROCESS FOR MONITORING HAZARDS THAT MAY REQUIRE A WITHDRAWAL OF PERSONS.

The mine should have processes in place for the timely evaluation of information gathered from all sources and for decisions to be made based on that information regarding the operation of the MEP.

The MEP should identify the minimum levels of information that must be collected as part of the managed response to an event that may require withdrawal of persons.

The primary aim of this process is for the mine to gather sufficient information to reliably predict the likelihood of a hazardous event needing a withdrawal response.

It is recommended that the collection and recording of this information be in a "mine standard" form.

Indicators of effectiveness of information gathering systems should be developed and put in place to enable effective review.

Whenever persons are underground, the mine should have in place a process by which the occurrence of hazards are monitored.

Such a system should be capable of :-

- Bringing any alarm or event to the attention of a person whose duty it is to monitor and act on such alarms or events.
- Initiating an alarm or event at predetermined trigger levels.

The process should cover, as a minimum, any source of potential harm or any situation with a potential for harm.

This may include but not be limited to:-

- **FIRE**

Heat, flames, vehicles, U/G fuel depots, active goaf, sealed goaf, standing pillar, spontaneous combustion, electrical equipment, flammable gas, welding, equipment generally, chemical fires, surface fires.

- **IRRESPIRABLE ATMOSPHERE**

Oxygen deficient, toxic, dangerous (flammable) outburst, goaf fall, barometric change, toxic seam gases, combustion products, seal failure, flammable gas in the explosive range, gas/dust explosion.

- **VENTILATION FAILURE**

Main fan, auxiliary fan, airway blockage, appliances failure, excessive gas emission.

- **INRUSH**

Water from strata, old workings, new workings, flowing material, gas.

- **FALL OF GROUND**

Local, district, mine. (Already fallen or indication of imminent failure).

- **INJURY**

Single/multiple. (resources required for amelioration and control).

- **MAJOR VEHICLE/EQUIPMENT ACCIDENT**

Injury, loss of second means of egress.

- **CRIMINAL ACTIVITY eg. bomb threat**

As circumstance dictate.

- **SEALING OF GOAF/PART OF MINE**

Ventilation changed/interrupted, fire present, fire risk present, gas present, explosion risk present, seal design, strata instability, loss of automatic gas monitoring capability.

- **OUTBURST**

Irrespirable atmosphere, explosive atmosphere, injures, reduced visibility, return airway contamination, explosive atmosphere at main fan.

- **GENERAL ENVIRONMENTAL**

Contaminated water, excessive dust, diseases, failure of underground communication.

No matter what the scenario communication is a critical factor.

AUDIT PROCEDURES

The mine should establish and maintain procedures for periodic audits of the standards identified in the mine protocol. The audits should include but not be limited to:-

- Process for hazard identification.
- Process for risk monitoring.
- Communication systems/procedures.
- Process for recording location of persons.
- Consistency with Safety Management Plan audit schedule.
- Process for record keeping.
- Compliance with statutory requirements.
- Training of personnel.

TRAINING

1. Internal Training - General

The mine should develop and document appropriate training modules for all persons relevant to the MEP for the mine.

The modules could include but not be limited to:-

- The overall framework of the MEP.
- Identification of hazards to which the plan is designed to respond.
- Description of the development of and implementation of trigger levels.
- Description of predetermined responses and actions.
- Communication process.
- The importance of conformance with procedures and requirements of the MEP
- The significance of the role each individual will be required to fulfil in relation to the MEP.
- The potential consequence of failing to conform with the MEP.

All employees should complete the general training modules as part of the induction training for the mine and receive refresher training at scheduled/regular intervals

Visitors and non permanent employees should receive suitable induction with regards to the relevant elements of the MEP.

2. Internal Training - Specific

For persons with defined responsibilities and authority with respect to the MEP.

The mine should determine the required competency standards for each position identified within the MEP for the mine. Training modules, aimed at developing competencies of selected personnel should be incorporated as an internal standard for the mine.

Prior to being appointed to a position within the MEP candidates should demonstrate that they have attained the required competency.

COMMUNICATION PROCESS

There should be means in place to ensure that up to date information is effectively communicated to those needing such information for effective MEP operation and that means are implemented to maintain objective evidence of those information transfers. In particular, current issues of information must be available at all locations where operations dependent on that information are conducted and obsolete information should be promptly removed from all points of issue or use.

In order to guarantee external communication capability a mine should be able to assemble a communication system, in a timely manner, at an incident control centre to co-ordinate required communication between various parts of the mine and with external agencies.

The communication process should include both systems hardware and procedures.

1. Communication - System Hardware

As a minimum requirement fixed communication systems to the surface control should be provided at the following locations:-

1. Underground

- Working Places.
- Crib Rooms.
- First withdrawal response muster areas and places of safety.
- Subsequent, higher level withdrawal response muster areas and places of safety, eg.:-
 - main headings
 - pit bottom
 - refuge bays

2. Surface

- Surface control
- Incident control centres
- Control centres for the removal and restoration of power
- Control centres for the starting and stopping of fans
-

These locations should be provided with fixed communication means to enable contact with other areas of the mine and surface, independent of underground power.

Multiple Redundancy

The fixed communication systems should be augmented by a minimum of one secondary communication system. At least one of these would be independent of the underground power.

2. Communication - System Procedures

The mine should develop procedures and protocols for the transfer of information and messages needed for the effective implementation of the MEP.

Control or command centres integral to the operation of the MEP should maintain a log of all communications made relevant to the MEP.

Once the MEP is enacted only messages relevant to the overall implementation of the MEP should be allowed. Communication not relevant to the MEP response should be delayed until after the immediate crisis is resolved and the life safety of all personnel is assured.

A system of verification for emergency calls both internal and external should be considered.

The communication protocols and procedures should be supported by appropriate sign posting at all fixed communication installations and within the duty card system.

Structured Communication Messages could include:-

1. The nature of the emergency

- ignition
- explosion
- spontaneous combustion
- fire
- fall of roof or rib
- entrapment
- outburst
- inrush
- medical

2. Severity-

- fatalities
- type of injuries
- number injured
- extent of damage

3. Intensity

- blast damage
- colour/extent of smoke
- visible flame
- type and level of gases

4. Status

- Location and condition of persons
- state of man transport
- state of ventilation
- persons missing

The probable location of persons required to move away from areas of fixed communications should be monitored to enable them to be found quickly.

APPENDIX A

RELEVANT QUEENSLAND LEGISLATION CURRENT AT JUNE 1996

The following extract from the Queensland Coal Mining Act 1925 - 1981 was found to be relevant.

“Part 2A”

OWNERS AND AGENTS

2A.1. The agent or, where no agent has been appointed, the owner, shall ensure that sufficient facilities, materials and equipment are provided at the mine to enable effective implementation of the emergency procedures devised pursuant to rule 3.7.”

5. New rule 3.7. The Principal Rules are amended by inserting immediately after rule 3.6 the following rule:-

“3.7. (1) For the purposes of this rule an emergency situation is any set of circumstances occurring at a mine which involves the loss of life of or injury to any person or a real or apparent immediate danger of the loss of life of or injury to any person, and which requires a co-ordinated response.

(2)

(a) The manager shall devise emergency procedures which when implemented in accordance with their terms shall be appropriate to deal with emergency situations caused by explosions, open fires or spontaneous combustion, and with any other emergency situations identifiable as being reasonably likely to occur at the mine at some time during the life of the mine.

(b) A copy of the emergency procedures shall be forwarded to an inspector.

(c) If an inspector is of the opinion that in the interests of the safety or health of mine personnel the emergency procedures should be amended in any respect he may by requisition upon the manager require such amendment as he may specify. Rule 1.6 (requisition of Inspector) of the General Rules for Underground Coal Mines shall apply to and for the purposes of this rule as if formed part of these rules.

(3) Without limit to the generality of subrule (2), the emergency procedures-

(a) shall be directed, so far as is practicable, to the achievement of the following objectives:-

- (i) the rescue of persons in danger;
 - (ii) minimisation of risk to persons implementing the procedures;
- and

- (iii) the provision of adequate medical assistance;
and
- (b) shall, at a minimum, make detailed provision for
 - (i) the means by which the full nature and extent of an emergency situation can be identified;
 - (ii) a command structure for the giving of instructions, and the particular persons, and substitutes for those persons, who shall implement particular aspects of the procedures;
 - (iii) establishment of , use of, and restriction of entry to, an emergency control centre;
 - (iv) liaison with external emergency services; and
 - (v) the adjusting of responses to changes in the levels of an emergency.
- (4) The manager shall ensure that-
 - (a) individual mine personnel are aware, to the extent appropriate for the effective implementation of the emergency procedures, of the particular duties allocated to themselves and to others under the procedures;
 - (b) exercises are conducted periodically at the mine to assess the likely effectiveness of the emergency procedures;
and
 - (c) copies of the emergency procedures are issued to all persons required thereunder to give instructions to others, and are readily available upon request to any employee at the mine.

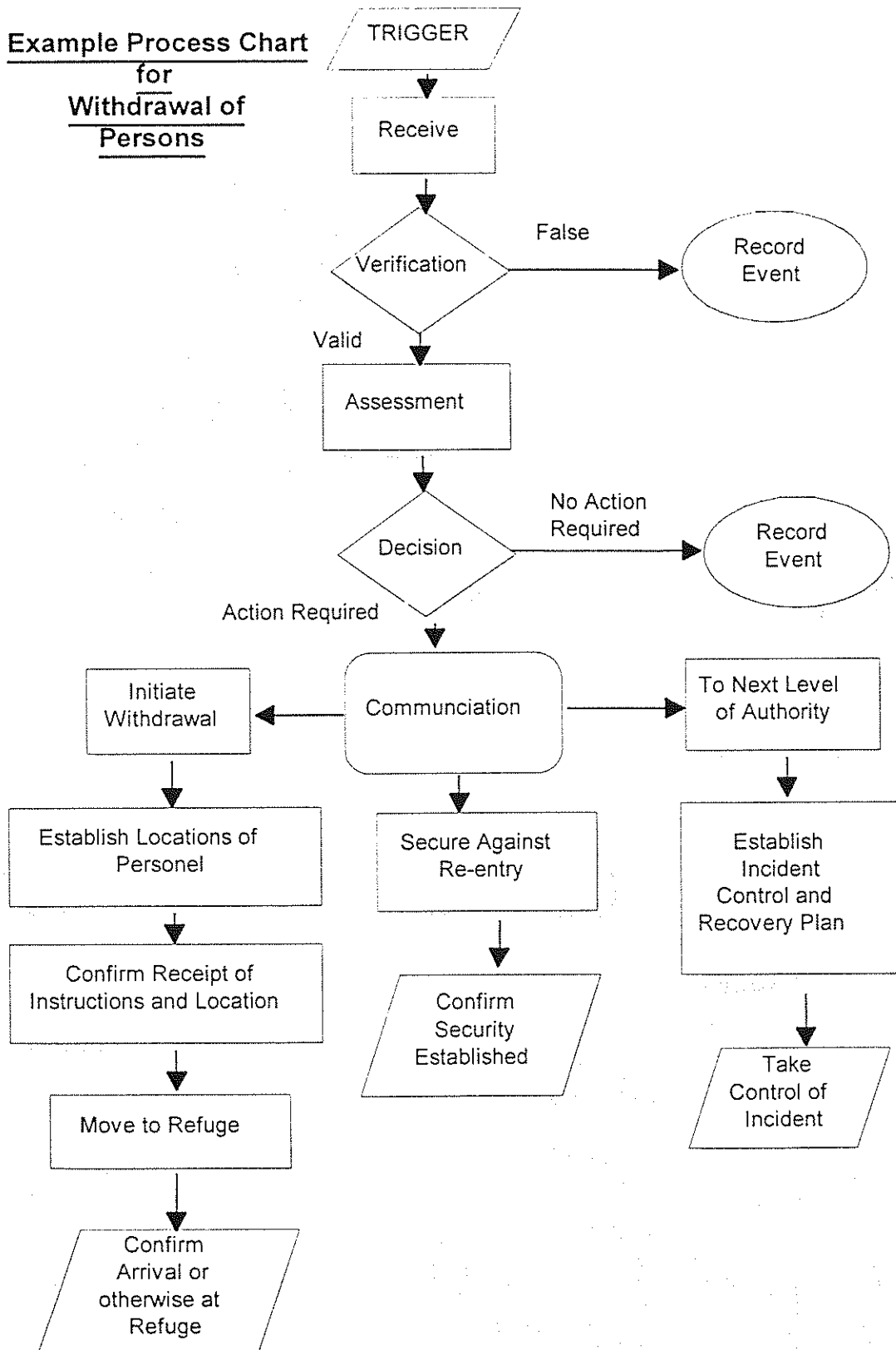
**RELEVANT QUEENSLAND LEGISLATION CURRENT AT JUNE 1996
RELATING TO WITHDRAWAL OF PERSONS**

<i>LEGISLATION</i>	<i>HAZARD</i>	<i>NATURE OF WITHDRAWAL</i>	<i>SUMMARY OF REQUIREMENTS</i>
<i>C.M.A. Section 61</i>	General/Gas	From Mine or Part	If mine or part is dangerous for whatever cause. If flammable gas, dangerous = + 2.5%
<i>C.M.A. Section 71</i>	Loss of Analytical Data	From Part	Securing 'the place' of fatal or serious accident until investigated by Inspector.
<i>C.M.A Section 90</i>	Entrapment	From Mine or Part	Requirement for "at least a second opening to the surface" (2nd Egress) (Inference that withdrawal will occur if 2nd Egress not maintained).
<i>Gen. Rule 2.1 (4)</i>	Inadequate Ventilation	From Part	Deputy/person in charge to restrict access to/evacuate from any part of mine not adequately ventilated per G.R. 2.1 (1) (O ₂ 19%: CO ₂ 0.5% CO 0.005%: H ₂ S 0.001%) except for restoration of ventilation.

<i>General Rule 2.2</i>	Environment Temp. and Humid, Air Velocity Dust	From Part	Manager to ensure no one employed where standard of working conditions in relation to (a) Temp. and Humid (b) Minimum air velocity and (c) Amount of dust in atmosphere, does not comply.
<i>General Rule 2.4</i>	Inadequate Ventilation for Escape	From Mine	"Mechanically operated apparatus to produce ventilation to allow all persons to exit mine safely". Emergency fan - Inference that persons withdrawn if provisions not maintained?
<i>G. R. 2.6 (1) (d)</i>	Toxic Pollution - Diesel Fumes	From Part	Persons not be exposed to NO ₂ exceeding 0.0002%.
<i>Gen. Rule 27 (1)</i>	Fatigue Physiological	From Part	Other than in circumstances further described in the Rules, no employment (a) in working place if temperature = 29.4°C and (b) at a working face where air velocity is less than 15.2 m/min.
<i>Gen. Rule 2.10 (b)</i>	Ventilation Failure	From Mine	Withdrawal to surface if main fan stoppage exceeds 30 mins
<i>G. Rule 5.5 (d) (i)</i>	Ventilation Failure	From Part	Withdrawal from "That part of mine" on failure of auxiliary fan.
<i>General Rule 7.12 (a) and (b)</i>	Inadequate Ventilation	From Part	Immediate withdrawal from "any part of mine" when flammable gas exceeds 2.5%.
<i>General Rule 17.1</i>	Excessive Noise	From Part	Persons not to enter or remain in a place exceeding prescribed noise levels except under prescribed conditions.
<i>General Rule 49.15</i>	Shotfiring	From Part	All persons to be "withdrawn to a place of safety in intake air" before firing shots.
<i>Gen. Rule 55.7 (d)</i>	Naked Flame	From Mine	No persons to remain underground when a heating/cutting device is used other than those performing the tasks (at a location other than in an approved underground workshop).

APPENDIX B

**Example Process Chart
for
Withdrawal of
Persons**



PROCESS CHART ELEMENTS AND THEIR RELATED ISSUES

ELEMENT	ISSUES
<i>Trigger - alarm/event</i>	Systems for monitoring hazards. Alarms - visual; electronic; verbal; computer.
<i>Receival</i>	By whom; to what authority level. When persons underground - need for competent person on the surface/authority to act. Training.
<i>Verification</i>	Genuine? Alarm details. If verification not possible then treat as valid. Training.
<i>Record event</i>	Record alarms/events even if false. Remedial action to reduce false alarms.
<i>Assessment</i>	Authority levels; defined trigger points; response plan; training; escape routes.
<i>Decision</i>	Competence; authority; training.
<i>Communication</i>	Define capability of U/G communication systems; record keeping; reason for withdrawal to be given; roles and responsibilities of person accepting message; withdrawal protocol used. Communication to: - persons affected U/g - persons required to prevent re-entry into affected area - Senior official Training
<i>Initiate withdrawal</i>	Proceed to where? by what route?; reference Emergency Evacuation Plan where appropriate; person in charge; training and practice, consider size of evacuation and whether additional support required.
<i>Establish location of Personnel</i>	Location systems available. Ability to monitor general location of all personnel at all times. Communication.
<i>Confirm locations and receipt of instructions</i>	Ability for all persons to receive an emergency communication. Ability to communicate receipt of an emergency message/intended actions.
<i>Move to place of safety</i>	Route and method. Consider nature and severity of event.
<i>Confirm arrival (or otherwise) at place of safety</i>	Communication system at place of safety. Person in charge. Communicate accurate and relevant information. Location monitoring system - ability to identify persons not reaching place of safety.
<i>Secure against re-entry</i>	Secure affected area against unauthorised entry. Consider condition of affected personnel.
<i>To next level of authority</i>	Need to define reflecting nature and severity.

DOCUMENT 2

Guidelines for Protocols Governing Re-entry of a Mine or Part of a Mine

GUIDELINES FOR PROTOCOLS GOVERNING THE RE-ENTRY OF A MINE OR PART OF A MINE.

FOREWORD

The inquiry into the explosion at the Moura No 2 Mine in August 1994 identified a lack of protocols for the withdrawal of persons from the mine. As part of the Moura Recommendations Implementation Process the Chief Inspector of Coal Mines charged Task Group 2 with the task of preparing *guidelines for protocols governing withdrawal of persons*. The terms of reference also required the question of re-entry of a mine or part of a mine to be addressed.

Guidelines for Protocols Governing Withdrawal of Persons have been developed and are contained in a separate document of that title.

This document deals exclusively with re-entry issues.

A pertinent recommendation in the Wardens Report is :-

“Persons should not be allowed to remain in or enter a mine following a sealing without the Manager first having obtained the written consent of the District Inspector of Mines.”

Further, under the section entitled “Comments” at the end of the sub-section entitled “Re-Entry”, the Warden makes the following statement :-

“The Inquiry further believes that companies who operate mines have certain obligations to the mining industry and to the community from which their workforce is drawn. These obligations are not written in law, but rather, take the form of an unwritten covenant which could expect companies operating mines to, in the event of a disaster :

- *take all possible steps to recover bodies from mines rather than abandoning those mines with bodies entombed, and*
- *take all possible steps to gain whatever evidence may be available with a view to preventing similar disasters.”*

SCOPE

As with the development of "Guidelines For Protocols Governing Withdrawal of Persons" a generic example of the process of re-entry was first developed and used to identify the issues associated with each step of the process.

It should be noted that the 're-entry process' is not a simple reversal of the 'withdrawal process'.

While the process is generic and can be identified with any scale of re-entry the guidelines target a "worst case re-entry" requirement. That is to say full mine recovery following sealing at the surface due to fire or explosion. A lesser or part mine re-entry procedure would be developed using only the relevant parts of the "worst case" example.

It must be stressed that these guidelines are relevant to re-entry of a mine or part of a mine and ARE NOT RELEVANT TO A RESCUE OF PERSONS SITUATION. In enacting these guidelines it is understood that all persons have reached a place of safety and are accounted for.

TERMS OF REFERENCE

The Moura Recommendations Implementation Task Group 2 was given the following term of reference relating to the re-entry process:-

- *Re - entry Guidelines need to be developed to ensure that an agreed (between all stakeholders) mine re-entry strategy is implemented.*

CONTENTS

- DEFINITIONS
- OVERVIEW
- IMPLEMENTATION OF RE-ENTRY PLAN
 - Generic Re-entry Process
- RE-ENTRY MANAGEMENT GROUP
- EXAMPLES OF STANDARDS AND PROCEDURES.

DEFINITIONS

"Fresh air" General body air that meets the standards for mine atmospheres as prescribed by the Queensland Coal Mining Act 1925.

“Primary re-entry” The initial re-entry by an authorised, competent person or persons into a mine or part of a mine in which conditions have warranted the withdrawal of persons for the purpose of assessing the current status and, where necessary, re-establishing an acceptable mine environment to enable the reintroduction of other persons.

“Re-entry Plan” A safety management plan developed using risk assessment techniques to set the technical standards and operational procedures to effect, control and monitor the re-entry and recovery of a mine or part of a mine in which conditions have warranted the withdrawal of persons.

The *Re-entry Plan* should identify the outcomes which, when met, indicate that “normal conditions exist” in the mine.

All Plans, Standards and Procedures should :-

- Ensure that re-entry processes and procedures are comprehensive.
- Identify and deal with all technical matters adequately.
- Ensure that the requirements of the Mine Management, Inspectorate and Mines Rescue Service are met.

“SCBA” Self Contained Breathing Apparatus.

“Trigger Level” :- A condition that is not the normal, is able to be measured or observed, and on being reached requires initiation of predetermined actions.

“Ventilation Control Point” A manned ventilation appliance being used as an essential control during a phase of the re-entry process to initiate and/or regulate the flow of air into an area of the mine being recovered. A ventilation control point must be provided with a means of communication to enable the immediate transfer of relevant information.

OVERVIEW

A clear distinction exists between operations involving the saving of human life and operations involving the protection and recovery of capital. The distinction is the level of residual risk a control group would be prepared to accept in allowing rescue or recovery persons to enter the mine. The toxicity or flammability of an atmosphere that might be encountered is an example of a residual risk that would be considered when developing standards for a re-entry plan.

Regardless of the size of the area, the size of the recovery group or the nature of the event that resulted in a withdrawal of persons the following should be considered when developing a re-entry plan :-

1. **Thorough pre planning** using risk assessment methods to develop standards and procedures will enhance the chances of a safe and successful outcome.
2. **Residual hazards or conditions** that may be triggered by the re-entry process.

3. *Contingency retreat plans.*
4. *Physical and environmental conditions* to be encountered underground.
5. *Isolation of affected areas*
6. *Ventilation.*
 - Composition of atmosphere.
 - Reventilation method.
 - Progressive re-entry.
 - Condition of ventilation appliances.
 - Monitoring and control of atmosphere and dilution of gases.
7. *Radio and/or telephone communication* between control centres, freshair bases and operational teams is essential
8. *Restoration of Electricity.*
 - Flame proof enclosures.
 - Cables.
 - Conditions to enable restoration of power.
9. The *physical stability of the mine* - state of roof and sides
10. *Water.*
11. *Access.*

Except in the case of rescue teams equipped with Breathing Apparatus there is no statement or implied suggestion in these guidelines which would allow persons engaged in a re-entry process to remain in areas where statutory threshold limits are exceeded.

The statutory limits with respect to flammable gases must not be exceeded.

IMPLEMENTATION OF THE RE-ENTRY PLAN

The management of the task should be accomplished by defined groups of people with specific authorities and responsibilities.

Physical activities should be carried out as directed in accordance with approved procedures and standards.

Diagrams showing the various working task and control groups may be prepared. These diagrams could show:-

- Flow of information and instructions
- Monitoring of communication
- Feedback or review processes.

RE-ENTRY MANAGEMENT GROUP

Participants

- Mine Management.
- Mine Workforce Representatives.
- Coal Mines Inspectorate.
- District Union Inspector.
- Queensland Mines Rescue Service.
- SIMTARS.

Functions

- Develop the Re-entry Plan.
- Direct operations in accordance with the Re-entry Plan.
- Monitor conditions to ensure that they are consistent with the Re-entry Plan.
- Monitor and receive feedback.
- Monitor and respond to changed conditions.
- Maintain a complete log on decisions taken, directions given and communications made.

GENERIC RE-ENTRY PROCESS

PROCESS STEP	OBJECTIVES	ISSUES TO BE CONSIDERED
<p><i>Collection of information.</i></p> <p><i>This is an ongoing issue.</i></p>	<p>Timely, accurate, relevant, thorough, reliable.</p>	<ul style="list-style-type: none"> • The integrity of information collection and transfer systems must be tested and assured. In assessing the integrity of these systems the failure modes of the systems must be identified. • Technical and equipment standards need to be set for the collection of samples etc. • The integrity of method must be assured prior to acceptance of results, there should be a set criteria for the acceptance of results. • Unknowns and the significance of unknowns should be identified. • Sensitivity analysis on critical information should be conducted. (life safety issues). • At the commencement and termination of any operational element of the re-entry plan all personnel involved with that element must be effectively briefed and de-briefed. • A thorough record of the re-entry/recovery project needs to be kept, a complete log on decisions taken, directions given and communications made must be maintained.
<p><i>Evaluation of all available information.</i></p>	<p>To assess:</p> <ul style="list-style-type: none"> • The extent purpose and scope of the re-entry project, • The need to re-enter, • The feasibility of re-entry and thereby decide whether to abandon or proceed. 	<ul style="list-style-type: none"> • Involvement of all stakeholders. • Social implications. • Commercial expectations, viability etc. • Practical limitations, resources available. • Moral aspects. • Legal aspects. • Identify additional information required. • Communication. • Counselling for workforce/individuals (external experts).

<p><i>Detailed planning of re-entry.</i></p>	<p>Develop a Re-entry Plan through risk assessment processes so that all hazards are identified and appropriate controls adopted to ensure:</p> <ul style="list-style-type: none"> • No person is injured or put at unacceptable risk. • Access is safely achieved to the extent planned. 	<ul style="list-style-type: none"> • Involvement of all stakeholders. • Recognition that several of the stakeholders will have authorities and responsibilities with respect to the re-entry process. • Formal risk assessment processes. • Resources required. • Identification and use of external resources. • Review of re-entry case histories. • Recognition of levels of noxious or flammable atmospheres. • Statutory requirements.
<p><i>Primary re-entry.</i></p>	<ul style="list-style-type: none"> • To ensure that the Primary Re-entry Procedure follows the Re-entry Plan. • To inspect and confirm actual conditions in the mine. • To secure an acceptable mine environment to enable subsequent recovery activities. 	<ul style="list-style-type: none"> • Use of competent personnel (QMRS, Statutory Officials). • Use of personnel with specialised skills (e.g. QMRS). • Statutory requirements. • Reporting and recording of findings/results. • Re-establishment of Mine Monitoring Systems. • Conditions expected to be found and method of dealing with these to be previously identified. Withdrawal and re-evaluation where significantly worse. • A copy of the re-entry plan and all subsequent revisions must be made available to all persons involved with the implementation of the plan • Underground transport capacity must be sufficient to enable immediate evacuation of all personnel underground. Vehicles to remain underground whilst persons are underground.

<p><i>Review the Re-entry Plan considering primary re-entry reports.</i></p>	<ul style="list-style-type: none"> • Ensure Re-entry Plan is still valid having regard to conditions found. • Modify plan as appropriate . • Decide whether to abandon or proceed. 	<ul style="list-style-type: none"> • Involvement of stakeholders. • Risk assessment. • Communication. • Resources required (e.g. external expertise). • Counselling for workforce/individuals.
<p><i>Subsequent recovery activities.</i></p>	<ul style="list-style-type: none"> • To ensure that the subsequent recovery activities follow the Re-entry Plan. • Complete restoration of mine environment. • Re-establish facilities. • Enable coal production to recommence. 	<ul style="list-style-type: none"> • Staged re-introduction of workforce. • All of the above.

EXAMPLES OF STANDARDS AND PROCEDURES

STANDARD OR PROCEDURE	OBJECTIVES AND ISSUES.
RE-ENTRY	<p>To minimise the risk of asphyxiation or poisoning by gases in the workplace and provide early warning of potentially dangerous or explosive conditions.</p> <p>Re-entry operations can be categorised into two stages:-</p> <ol style="list-style-type: none"> 1. Irrespirable atmosphere operations carried out by teams using SCBA. 2. Fresh air operations carried out by personnel not wearing breathing apparatus.
MONITORING	<p>A standard to define the requirements for monitoring of the atmosphere from boreholes, shafts and the mine during the re-entry and re-ventilation project.</p> <p>As a minimum standard for re-entry procedures following sealing or abandonment of a mine or part of a mine provisions must be made for continuous atmospheric monitoring at strategic locations from within the mine.</p> <p>To provide warning of changes in the mine atmosphere resulting from re-entry and re-ventilation activities and to provide direction for subsequent actions.</p> <p>Results derived from the monitoring system should be immediately available to the control center and ventilation control points underground. This is essential during the re ventilation phase.</p> <p>The distribution and posting of monitoring results:- the results of the monitoring process and the <i>significance and trending</i> of those results must be made known to ALL persons involved in the implementation of a Re-entry Plan.</p>
<p>SETTING TRIGGER LEVELS "Trigger Level" :- A condition that is not the normal, is able to be measured or observed, and on being reached requires initiation of predetermined actions.</p>	<p>To ensure that personnel are withdrawn from areas of the mine when conditions fall outside preset standards.</p> <p>As a minimum trigger levels should be set for:-</p> <ul style="list-style-type: none"> • Oxygen. • Noxious gases. • Flammable gases. • Barometric Change. • Humidity. • Temperature.

VENTILATION	Construction of ventilation appliances. Temporary ventilation arrangements. Re-establishment of main fan. Gas dilution. Seal and stopping inspections.
COMMUNICATION	A procedure is to be used for establishing and operating the telephone and radio system, to ensure appropriate U/G communication during the mine re-entry. Mine Rescue Personnel. Re-establishment teams.
COMPRESSED AIR AND FIRE LINE	A procedure to be used for establishing water and compressed air services underground to ensure appropriate availability.
ELECTRICAL	A procedure to be used for inspecting electrical equipment to ensure that any electrical enclosures that may contain noxious or flammable gases are checked for damage and ventilated before re-energising.
DIESEL EQUIPMENT	A procedure to be used for starting, controlling and operating diesel equipment U/G. A procedure for inspecting and commissioning recovered diesel powered equipment.
CONTROL OF PERSONEL UNDERGROUND	A procedure to be used for managing, recording and controlling entry of personel to the mine. This may also set minimum communication equipment to be carried by persons underground.
FIRST AID	A procedure to be used for establishing and operating a First Aid system to ensure adequate response in managing injury - physical problems.
EVACUATION PROCEDURE	A procedure to be used for controlling, monitoring the orderly evacuation of the mine. The Mine Manager or his designate will determine whether evacuation is to take place. The procedure should consider both immediate and staged withdrawal.

DOCUMENT 3

Guidelines for the Conduct of Emergency Procedures Exercises

GUIDELINES FOR THE CONDUCT OF EMERGENCY PROCEDURES EXERCISES

FOREWORD

The 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.”

SCOPE

Moura Recommendations Implementation Task Group 2 was given the following scope for the conduct of emergency procedures' exercises:-

- “Guidelines are to be prepared for industry consultation with the objective of conducting well structured emergency procedures' exercises on an annual basis.”
- “The task group should consider if there is a need for this matter to be covered by legislation and if so draft legislation should be prepared for consideration.”

TERMS OF REFERENCE

Moura Recommendations Implementation Task Group 2 was given the following terms of reference:-

The guidelines proposed should:

- i. be systematic;
- ii. be consistent with the concept of mutual assistance from other mines;
- iii. require direct reference to the risks at a mine;
- iv. recognise that exercises should be held not necessarily on day shift;
- v. be inclusive of external agencies such as QMRS, police, media and senior company officials;
- vi. have an audit and evaluation process; and
- vii. be subject to risk assessment principles to ensure the exercises do not introduce new safety risks to persons at a mine.

As part of the annual exercise consideration should be made as to requiring inertisation equipment to be put in place as well as confirming airlocks and emergency stoppings on the surface are found to be safely accessible and operative.

OBJECTIVES OF EMERGENCY EXERCISES

The objective of these guidelines is to ensure that Emergency Procedures Exercises are conducted in a manner to:-

- Ensure no personnel injury, equipment damage or introduction of additional risks.
Note: Design of the emergency exercises must be done using Risk Assessment Methods.
- Test the ability of the current Mine Emergency Procedures Plan to meet the desired outcomes of an emergency response.
- Relate to the principle hazards identified as being integral to the mine itself.
- Demonstrate a co-ordinated response.
- Assess all the elements and personnel involved and identify any additional training needs.
- Avoid any community alarm/apprehension,
- Enhance the confidence and ability to respond to an emergency.
- Involve all shifts at some stage through the year. The intent is that the emergency preparedness of the mine is tested for any time of the day or night.
- Allow for a performance analysis and debrief to occur following all major emergency exercises (types A and B) with outcomes recorded and relevant information disseminated to the industry.
- To test the ability of external agencies to respond to an emergency.

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DEFINITIONS AND ABBREVIATIONS

“Action Response Plans” :- Elements or sub elements of an MEP which are predetermined actions tied to specific trigger levels or events.

“Assisted” :- An emergency response that requires a mine to access external aid.

“Desk Top”:- An exercise type that is designed to test a systems preparedness without actually involving an attendance or action response ie a paper, communication and acknowledgment exercise.

“Evacuation”:- The withdrawal of persons to a place of safety.

“M.E.P.” “Mine Evacuation Plan” -- A Management Plan developed through the process of risk assessment aimed at ensuring that indicators of principle hazards are identified, monitored and appropriately responded to in a co-ordinated and orderly manner.

Mine Evacuation Plans should:-

- be consistent with guidelines established for Safety Management Plans.
- be a single document that systematically defines all actions necessary to ensure that withdrawal of persons to a place of safety are carried out safely
- include but not be limited to organisational structures, planning, activities, responsibilities, communications, practices, risk identified, audits and reviews.
- be supplementary to, and include the implementation of appropriate codes, rules, regulations or procedures and is the method by which the withdrawal of persons is to be effectively managed and co-ordinated,
- be consistent with the Mine Emergency Procedures and may form a part of the Mine Emergency Procedures

“Incident Control Group” :- A person or group of persons with authority defined by an MEP and an obligation relevant to that MEP to initiate actions associated with the withdrawal of persons to a designated place of safety.

“Place of Safety”:- A designated place where persons will assemble without being in any danger from the hazard that triggered the evacuation. The place of safety :-

- Must reflect the consequence of the hazard that has initiated the evacuation
- Must have an effective means of communication with the surface control.
- May include, but is not limited to, the following locations:-
 - Panel crib room.
 - Main headings opposite a district ventilation split.
 - Pit bottom or the base of intake shaft or drift.
 - Refuge Bays.

- Surface location

“Practical Exercise”:- Realistic simulated scenarios, relevant to principle hazards associated with the mine, and with observations and actions taken to respond to the scenario.

“Principle Hazards” :- Source of potential harm or a situation with a potential to result in multiple fatalities.

“Risk Assessment” :- The process used to determine risk management priorities by evaluating and comparing the level of risk against predetermined standards, target risk levels or other criteria.

“Self-Reliant”:-Services, personnel or infrastructure provided and available at the minesite capable of responding to an emergency incident.

“Stakeholders”:- Any party with an interest in the safe operation of the mine.

“Surface Control”:- A competent person on the surface with the authority to initiate and monitor the withdrawal of persons to a place of safety.

“Trigger Level” :- A condition that is not the normal, is able to be measured or observed, and on being reached requires initiation of predetermined actions.

“W.O.P”. - **“Withdrawal of Persons”** -- The organised evacuation of persons from the mine or part of the mine to a designated place of safety when the risk to life or health has exceeded predetermined trigger levels.

ELEMENTS OF A MINE EMERGENCY PROCEDURES PLAN

The intent of this process is to ensure the life safety of all personnel in areas affected by the failure to control a principle hazard. It is to cover both self reliant and assisted incident control and is to be developed as a combination of procedures and technical (equipment) standards.

Regardless of their size, all incidents are easier to resolve if they have been thoroughly assessed in the planning stages. Injuries to response personnel and others will be reduced if trained people respond in a safe manner with adequate supplies of the correct equipment.

A Mine Emergency Procedures Plan involves the assessment of the risks and any possible associated unwanted events resulting from those risks and the development of predetermined response to successfully contain the risk and control and limit the consequences.

Response involves positive action on the part of an incident control group. A Mine Emergency Procedures Plan is a tool to be used by that control group.

The plan should be designed to ensure that any statutory obligations will be met.

Mine Emergency Procedures Plans must include an auditing regime to ensure all required facilities are present and in a state of readiness.

The following plan elements would be required to be in place to ensure an adequate level of emergency preparedness:-

1. SELF RELIANT STAGE - ELEMENTS

- Risk Assessment:- Prior, at regular intervals, at milestones and major changes to mine or mining systems e.g., major ventilation changes (new shaft etc).
- Identification of the need for emergency procedures.
- Identification of the personnel roles and responsibilities.
- Identification of the competency levels for the various roles and responsibilities.
- Familiarity with egress routes, communication systems, ventilation systems, emergency equipment and relevant signage.
- State of readiness (personnel availability during normal and special circumstances, contact list, methods).
- Flow diagrams.
- On-site facilities.
- Emergency Command Structure.
- Back-up personnel.
- Co-ordination controls, Duty cards.
- Identification of the training needs.
- Required information, collection and delivery.
- Emergency evacuation.
- Sealing mine or part of mine.
- Communication procedures.
- Site access security.
- Documentation,(incident logs), Document control (Mine Emergency Procedures).

2. ASSISTED STAGE - ELEMENTS

- Identify external services available.
- Identify trigger points for use of external services.
- Identify initiation procedures for external services.
- Identify mutual assistance scheme.

Identify trigger point for initiation of mutual assistance.

EXERCISE TYPES

The mine should set a **SCHEDULE OF EXERCISES** that, during the course of the year tests the emergency preparedness of the mine on a 24 hour basis.

TYPE	CATEGORY	SCOPE	FREQUENCY
A	COMBINED "SELF RELIANT" AND "ASSISTED":- ie. self-reliant plus external services <i>call-out and attendance including mutual assistance attendance.</i> WHOLE MINE	<u>The practical exercise is to test:-</u> Mines internal emergency response system (self reliant) External services ability to respond and administer assistance to the mine (assisted).	A mine will be selected each year to upgrade their Type "B" Exercise to a Type "A" Exercise. See Appendix "A"
B	COMBINED "SELF RELIANT" AND "ASSISTED":- ie. self-reliant plus external services <i>notification but NO call out or attendance of external agencies.</i> WHOLE MINE	<u>The practical exercise is to test:-</u> <ul style="list-style-type: none"> Ability of the Mine Emergency System to respond to a major incident involving loss of life or potential loss of life. Ability of the mine to communicate with external services and seek acknowledgment that the external agency is in a position to respond if needed. The external agency does not then attend the mine. "ARE YOU IN A POSITION TO RESPOND?" Each year the day of the week, the time of day and personnel involved is to be varied. The scenario is to be varied each year in order to test all aspects of the Mine Emergency Procedures Plan	Once per year.
C	"SELF RELIANT":- WHOLE MINE	<u>The practical exercise is to test:-</u> <ul style="list-style-type: none"> Emergency evacuation Communication system. Call out procedure to notification stage. "ARE YOU IN A POSITION TO RESPOND?". 	Once per year for each crew.
D	"SELF RELIANT":- part mine and/or part system	<u>These exercises are to be practical or desk top. They will test:-</u> <ul style="list-style-type: none"> Employee Evacuation. Accounting for all persons. Search and rescue. Ability to respond to a medical emergency underground. 	Once per year for each crew or when their workplace significantly changes.
E	"SELF RELIANT":- part mine and/or part system	<u>These exercises will be practical or desk top. They will test the ability to:-</u> <ul style="list-style-type: none"> Seal the workings from surface or underground. 	Once per year.

**** An exercise may run several of the above listed types concurrently. ****

EXTERNAL ASSISTANCE

Examples of external assistance may include, but would not be limited to:-

- Coal Mines Inspectorate
- District Union Inspectors.
- Radiation Health Department.
- Queensland Railways.
- S.E.S.
- Q.M.R.S. (Mines Rescue).
- S.I.M.T.A.R.S.
- A.C.I.R.L.
- Army/RAAF.
- Police (DVI).
- Hospital/QAS
- C.I.S.D. (Stress De-briefing).
- Q.F.S. (Fire).
- Welfare Agency (Provision of food).
- Medical Services.
- Company stakeholders (external).
- Equipment suppliers.
- N.S.W.M.R.S.(Nitrogen Inertisation).
- Other mines and services.

TRAINING

Reference is made to **Appendix B** "RELEVANT QUEENSLAND LEGISLATION CURRENT AT JUNE 1996" regarding training requirements.

In general individual persons should have completed the training and achieved the required competency relevant to their position prior to being involved in an emergency exercise. It should be noted that the emergency exercise should be designed to identify where this expectation has not been met.

External Training Support Agencies

External agencies should be responsible for ensuring that personnel employed by them have achieved the required competency.

As part of the annual Mine Emergency Procedures Plan Exercise the mine should review the ability of external agencies to provide competent persons.

AUDIT PROCESS

The Mine Emergency Procedures Plan is to be audited (internal and external) against the following criteria.

PLAN ELEMENT	AUDIT CRITERIA	FREQUENCY
1. Identify principle hazards	System to identify key hazards	Annual or changed circumstances
2. Define roles and responsibilities	Compliance with Mine Emergency Procedures Plan	As above
3. Competency in roles and responsibilities	Competency based assessment/challenge test	On appointment and to be defined by Mine Emergency Procedures Plan or other safety management plan.
4. Familiarity with mine egress routes, ventilation systems, communication systems, emergency equipment	As above	As above
5. Schedule of audits	Audit review process	As defined for each element of Mine Emergency Procedures Plan or other safety management plan.
6. On-site facilities	Mine plans and documented check lists	As above
7. Defined command structure	Evidence of challenge test undertaken	Annual minimum or as determined by Mine Emergency Procedures Plan or other safety management plan.
8. Communication procedures <ul style="list-style-type: none"> • Hardware • Information flow • Information recording 	Documented inspection and testing Documented evidence of challenge test	As above
9. Specific event response relating to key hazards	As above	As above
10. Documented control	Evidence of document control	As determined by Mine Emergency Procedures Plan or other safety management plan.
11. Identify resourcing and integrating of external services	Documented evidence, evidence of challenge test	As above
12. Emergency response equipment and installations e.g. surface airlocks / emergency seals	Operable and accessible	As determined by Mine Emergency Procedures Plan or other safety management plan.

APPENDIX "A"

RECOMMENDATIONS FOR THE ORGANISATION, MANAGEMENT AND CONDUCT OF TYPE "A" EMERGENCY PROCEDURES EXERCISES.

FOREWORD

Type "A" emergency exercises are the highest level of exercise. They are referred to as "Combined *Self Reliant And Assisted*" and have the objectives of testing :-

- the mines internal emergency response system (self reliant) and
- external agencies ability to respond *and* render assistance to the mine (assisted)

The exercise is devised and initiated by an *Exercise Management Committee* as described below.

Type "B" emergency exercises are the second level of exercise. They differ from Type "A" with respect to :-

- the second objective ie. external agencies are contacted and their ability to respond is determined. *They are not mobilised.*
- the frequency ie. each mine is to conduct a Type "B" exercise each year.
- the exercise is devised and initiated entirely "in house".

The Type "A" exercise is therefore primarily to test the mobilisation and subsequent abilities of external agencies. In this respect it is of lesser importance to individual mines than the Type "B" exercise and this is reflected in the required frequency.

CONCEPT

In order to avoid significant disruption to external agencies it is proposed that a single Type "A" exercise be conducted in the state on an annual basis.

An Exercise Management Committee will organise the planning, execution and review of the annual Type "A" exercise.

A mine will be selected by the Exercise Management Committee each year to conduct the Type "A" Exercise in place of the annual type "B" Exercise for the mine.

The Exercise Manager must cause a report on the results and the significance of the results of the Type "A" Emergency Procedures Exercise to be written and distributed to industry.

MANAGEMENT STRUCTURE

Type "A" Exercise Manager

The manager of the Queensland Mines Rescue Service shall be the Exercise Manager.

The functions of the Exercise Manager would include but not be limited to:-

- Liaison with external service agencies to explain the process of Type "A" Emergency Procedures Exercises and gain their commitment .
- Ensure that an Exercise Management Committee is formed each year. This committee is to be chaired by himself or a nominee from QMRS.
- Cause to be disseminated to industry information relevant to the conduct and review of Type "A" Emergency Procedures Exercises.
- Liaise with senior company personnel, through the manager of the host mine as a matter of courtesy to advise them of the conduct of the exercise.

Exercise Management Committee

The functions of the Exercise Management Committee would include the organisation, planning, conduct and review/audit of the annual Type "A" Emergency Procedures Exercise.

Composition:-

- Chairman.
- A delegate from each underground coal mining company including the host mine.
- A delegate from the Inspectorate.
- A delegate from the District Union Inspectors.

No member of the Exercise Management Committee may take part in the mines or any external agencies response to the Emergency Procedures Exercise.

It is anticipated that the delegate from the host mine will play a pivotal role in the planning and conduct of the Emergency Procedures Exercise and therefore should be familiar with all operational aspects of the mine including short and long term planning.

GUIDELINES

Selecting a Location

Considerations for the selection of the target mine :-

- The Type "A" exercise is designed predominantly to test the external providers, therefore selection should be based on an analysis of service providers.

- Excessive impact on individual external agencies should be avoided. This may be achieved by varying the areas and/or the nature of the exercise on a yearly basis.
- The mines and companies involved should be varied. A different company should be selected to provide a host mine each year.
- A 5 year plan or schedule should be set.

Planning

The Exercise Management Committee must develop the exercise in accordance with the Guidelines for the Conduct of Emergency Procedures Exercises.

A thorough review of the host mine should be undertaken prior to the development of the specific exercise.

The review should include:-

- Overview of operation.
- Determination of principle hazards identified by the Safety Management Plans.
- Emergency Response Plans.
- History of emergency exercises previously conducted.

Develop an Audit Plan for the exercise which would identify audit criteria and allocate audit functions to members of the committee.

Consider the involvement of the media.

Consideration must be given to the operational and safety status of the mine prior to the initiation of the emergency procedures exercise.

It is a function of the host mine delegate to provide timely information to the committee which would cause the committee to alter or re-schedule the exercise.

APPENDIX "B"

RELEVANT QUEENSLAND LEGISLATION CURRENT AT JUNE 1996

The following extract from the Queensland Coal Mining Act 1925 - 1981 was found to be relevant to these guidelines.

"Part 2A"

OWNERS AND AGENTS

2A.1. The agent or, where no agent has been appointed, the owner, shall ensure that sufficient facilities, materials and equipment are provided at the mine to enable effective implementation of the emergency procedures devised pursuant to rule 3.7."

5. **New rule 3.7.** The Principal Rules are amended by inserting immediately after rule 3.6 the following rule:-

"3.7. (1) For the purposes of this rule an emergency situation is any set of circumstances occurring at a mine which involves the loss of life of or injury to any person or a real or apparent immediate danger of the loss of life of or injury to any person, and which requires a co-ordinated response.

(2)

- (a) The manager shall devise emergency procedures which when implemented in accordance with their terms shall be appropriate to deal with emergency situations caused by explosions, open fires or spontaneous combustion, and with any other emergency situations identifiable as being reasonably likely to occur at the mine at some time during the life of the mine.
- (b) A copy of the emergency procedures shall be forwarded to an inspector.
- (c) If an inspector is of the opinion that in the interests of the safety or health of mine personnel the emergency procedures should be amended in any respect he may by requisition upon the manager require such amendment as he may specify. Rule 1.6 (requisition of Inspector) of the General Rules for Underground Coal Mines shall apply to and for the purposes of this rule as if it formed part of these rules.

(3) Without limit to the generality of subrule (2), the emergency procedures-

- (a) shall be directed, so far as is practicable, to the achievement of the following objectives:-
 - (i) the rescue of persons in danger;
 - (ii) minimisation of risk to persons implementing the procedures;and
 - (iii) the provision of adequate medical assistance;
- and

(b) shall, at a minimum, make detailed provision for :-

- (i) the means by which the full nature and extent of an emergency situation can be identified;
 - (ii) a command structure for the giving of instructions, and the particular persons, and substitutes for those persons, who shall implement particular aspects of the procedures;
 - (iii) establishment of , use of, and restriction of entry to, an emergency control centre;
 - (iv) liaison with external emergency services; and
 - (v) the adjusting of responses to changes in the levels of an emergency.
- (4) *The manager shall ensure that-*
- (a) *individual mine personnel are aware, to the extent appropriate for the effective implementation of the emergency procedures, of the particular duties allocated to themselves and to others under the procedures;*
 - (b) *exercises are conducted periodically at the mine to assess the likely effectiveness of the emergency procedures;*
and
 - (c) *copies of the emergency procedures are issued to all persons required thereunder to give instructions to others, and are readily available upon request to any employee at the mine.*

59.7 That part of the approved training scheme which is directed to a matter specified in Column A of the Table to this rule shall, at a minimum, provide for training in the particular topics set against that matter in Column B of the Table.

TABLE TO RULE 59.7
Scope of Approved Training Scheme

Column A	Column B
Matter to which training is directed	Particular topics
(a) Induction of new employees	(iv) mine emergency procedures
(f) Refresher training	(ii) mine emergency procedures

DOCUMENT 4

Comments and Recommendations to the Implementation Committee

COMMENTS AND RECOMMENDATIONS TO THE IMPLEMENTATION COMMITTEE

Foreword

The work of Task Group 2 has resulted in the production of three documents which provide guidelines for :-

1. *Protocols Governing the Withdrawal of Persons*
2. *Protocols Governing the Re-entry of a Mine Or Part Of a Mine*
3. *The Conduct Of Emergency Procedures Exercises*

Issues arose with respect to each of those subjects which needed to be brought to the attention of the Implementation Committee. This fourth document compiles the recommendations and comments relating to each subject.

1. Guidelines For Protocols Governing Withdrawal Of Persons.

1.1 Sealing of Goaf Areas

Task Group 2 recognises that the withdrawal of persons protocol in relation to the sealing of goaf areas is a vital issue to be addressed by the industry. However the group was unable to resolve this issue due to the varying views with respect to such a protocol.

The following seven questions are relevant and could not be answered by the group :-

- Should protocols be implemented when a combination of trigger levels are reached eg..
Gases in a sealed area are trending towards or are in the explosive range *and* there is evidence of a source of ignition (eg. CO make or other defined indicators are trending above the normal levels for the sealing of the goaf) or should W.O.P be implemented when gases in the goaf are trending towards or are in the explosive range?
- Is an explosion proof seal good enough for persons to remain underground if an ignition source *and* explosive atmosphere exists?
- Is an explosion proof seal good enough for persons to remain underground if an explosive atmosphere exists but no ignition source?

- Is a non-explosive proof seal good enough for persons to remain underground if an explosive atmosphere exists but no ignitions source exists?
- If the goaf to be sealed is expected to go through the explosive range and a spontaneous combustion ignition source may be present, does the need to seal quickly preclude the use of explosion proof seals?
- If explosion proof-seals are not used and a flammable gas reservoir is developed in the sealed area should the initial seals be augmented by explosion proof seals at a later date to protect that area from explosions elsewhere?
- Would the use of storeyed stonedust barriers to isolate these sealed area change the answer to the above questions?

It is recommended that an industry workshop be convened involving all stakeholders to resolve the above questions and develop a strategy for the control of the hazards associated with sealing operations and the development of appropriate protocols.

1.2 Active Goaf Areas

Task Group 2 believes there is insufficient technology available to the underground coal industry to adequately address the issue of “explosive mixtures in goaf areas adjacent to active mining”.

Areas identified as requiring research include:-

- Inertisation of active goafs close to the working area.
- Preventing goaf gases from contaminating the working face without introducing further hazards.
- Sealed area atmospheres.
- Seam gas occurring in a goaf.
- Seal construction standards.
- Sealed area and goaf monitoring.
- Determination of ignition sources.

It is recommended that research be undertaken into the seven areas identified above.

1.3 Emergency Communications

Task Group 2 believes there is insufficient technology available to the underground coal industry to ensure adequate dissemination of emergency messages.

Perhaps the most vital element of an emergency response is the ability to inform the workforce that an emergency exists so that they in turn can react appropriately according to their training. In enterprises located above ground this is a relatively simple task - a siren will alert everyone within seconds triggering evacuation to predetermined places of safety where roll calls can be made and more detailed information communicated.

Many functions within an underground coal mine will draw persons away from areas with fixed communication installations. While there exists some technology "eg. PED system" which has the ability to convey a digital message from the surface to a pager type receiver built into the caplamp battery, there is at present no system which covers an entire mine with guaranteed communication including acknowledgment of messages received.

It is recommended that resources be allocated to develop some form of pager system or similar that will enable messages to be sent (and acknowledged) to all persons underground independent of the mines power supply.

2. Guidelines For Re-entry Of A Mine Or Part Of A Mine

2.1 Information Collection Prior to Re-entry

Concern was expressed within Task Group 2 regarding systems for the collection of information prior to a re-entry procedure. In particular the issue of obtaining samples from boreholes using plastic tubing appeared to have experienced difficulty in the past.

It is recommended that the manager of QMRS convene a stakeholders forum to develop appropriate standards for the sampling from surface boreholes.

2.2 Monitoring of Mine Atmospheres during Re-entry

During the re-entry process the ventilation system must dilute and remove gases in a controlled manner from the area being accessed. Explosive mixtures must not be introduced to potential ignition sources, for example the ventilating fan. Continuous monitoring of the return air stream, at strategic points, is necessary to control the dilution process.

It is recommended that legislation require the provision of continuous monitoring of the return air stream from the mine or part of the mine being re-entered.

2.3 Standards with respect to Mine Atmospheres during recovery operations.

The "Guidelines for the Re-entry of a Mine or part of a Mine" identified the following:-

"A clear distinction exists between operations involving the saving of human life and operations involving the protection and recovery of capital. The distinction is the level of residual risk a control group would be prepared to accept in allowing rescue or recovery persons to enter the mine. The toxicity or flammability of an atmosphere that might be encountered is an example of a residual risk that would be considered when developing standards for a re-entry plan."

Task Group 2 was unable to determine standards with respect to this issue and makes the following recommendation:-

It is recommended that the manager of QMRS convene a forum of stake holders to assess the need and where necessary develop standards for the operation of Self Contained Breathing Apparatus in toxic or flammable atmospheres. Stakeholders would include Coal Mining Companies, QMRS including brigade members, Inspectorate and District Union Inspectors.

2.4 Battery Powered Special Purpose Vehicle

The Moura No.2 disaster highlighted the value of vehicular transport in assisting persons to escape from the mine in an emergency. Similar value was identified in the provision of suitable transportation to Mines Rescue personnel to expedite their access into a mine or part of a mine under adverse conditions.

Benefits of this would include:-

- Ability to extend exploration/information collection capabilities.
- Maximum utilisation of rescue team operating time periods and overall reduction in total operating time.
- Enhanced ability to retrieve persons needing rescue from underground.
- Enhanced effectiveness of rescue team emergency procedures.

It is recommended that a suitable battery powered special purpose vehicle be developed for the use of the Queensland Mines Rescue Service.

3. Guidelines For The Conduct Of Emergency Procedures Exercises

3.1 Training

In the USA the Mining Safety and Health Administration (MSHA) have devised a course of training called The Mine Emergency Response Development course (MERD).

MSHA recognised and were concerned that mine officials faced the prospect of having to manage a variety of mine emergency situations without ever having been exposed to such an event.

The objective of the MERD course therefore is to stage a realistic emergency scenario and involve mine officials in the management of the situation. Course members are also able to experience first hand traumatic events such as smoke and fire underground at MSHA's extensive 'model' mine facilities. As well as experiencing the physical conditions, course members are directed to apply their knowledge in understanding and interpreting analytical data generated to suit the exercise scenario.

It is understood that MSHA can also take a designed emergency exercise to a mine and oversee the conduct of that exercise.

Task Group 2 believes that the priority requirement is for mines to conduct their own emergency exercises designed to regularly and systematically test all aspects of their emergency preparedness.

However, the MERD program raised the interest of the Group. Merit can be seen in a similar program being used in Queensland. Administered by an impartial agency, the program could:

- Maximise the objectivity of the exercise
- Maximise the security of the exercise (mine personnel not involved in the exercise design)
- Provide a consistent approach
- Provide timely feedback to the industry at large on areas of deficiency
- Where appropriate, design the exercise to incorporate assessment of performance of individuals (perhaps a similar methodology to the Mines Rescue Competitions).
- Identify training needs.

It is recommended that a study group visit and research the MSHA training facilities at Berkeley.

3.2 Mutual Assistance.

The Group identified the need to formalise arrangements with respect to 'mutual assistance'.

This would involve collating and maintaining up to date information as to :-

- What resources are available
- Where the resources are held
- Lead times to delivery
- Lines of communication

It was felt that the Queensland Mines Rescue Service was the ideal organisation to maintain a "mutual Assistance Register".

It is recommended that QMRS be given the task of :-

- *consulting with industry stakeholders so as to collate the information above with respect to all resources which may be called upon in an emergency and*
- *maintain that information up to date in a "Mutual Assistance Register".*

4. General

4.1 Definitions and Abbreviations.

Definitions and abbreviations should be made common across all guidelines released as a result of the Moura Recommendations Implementation Process.