

APPROVED STANDARD

# FOR

MINE SAFETY MANAGEMENT PLAN

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STANDARD FOR THE DEVELOPMENT OF SAFETY MANAGEMENT PLANS

The risk of various hazards arising in underground mines throughout Queensland ranges from zero or almost zero to high depending upon the seam being worked and the complexity and size of the mining operation.

The Safety Management Plans required to be developed to cover these two extrernes will vary from small concise plans to a very detailed comprehensive ones.

The accompanying inforrnation is provided to guide mines in the development and implementation of Safety Management Plans to control Principal Hazards arising at underground coal mines.

This document gives an outline of what elements must be considered in the development of a managed approach to those hazards. The document comprises two parts

PART A Standard for the development of a Safety Management Plan

PART B Guidelines for development of Hazard Management Plans

 (1) Spontaneous Combustion

(2) Emergency evacuation

1. Protocols governing Withdrawal of Persons
2. Protocols governing re -entry into mines

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Each mine must develop a Safety Management Plan that includes as a minimum Hazard Management Plans to deal with

1. Ventilation Management

Gas Management

1. Methane Drainaae
2. Emergency evacuation
3. Spontaneous combustion
4. Strata Management

The information that is required to be included, researched and assessed in the development of the Safety Management Plan will need to be accessed through technical publications, relevant Australian and Overseas Standards, Government publications, mine history, seam history, local history and knowledge, research information and evaluation ( SIMTARS, Universities and other research organisations) and other relevant sources. The information sought should be similar to but not limited to the kind of infon•nation supplied in PART B of this document to assist in the development of a Spontaneous Combustion Hazard Management

It must be emphasised that this document is not meant to be definitive on the subject of Safety Management Plan development but is intended as a starting point for the development and implementation of individually deve ed Safety Management Plans tailored made to suit the circumstances at particular mines.



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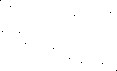
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# PART A





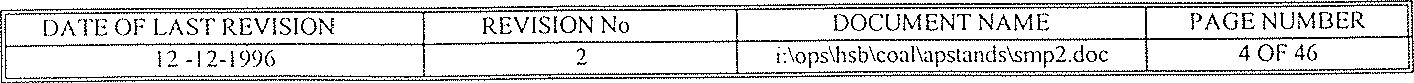
STANDARD FOR THE DEVELOPMENT OF SAFETY MANAGEMENT PLANS

## FOREWORD

The absence of a reliable system for management of the spontaneous combustion hazard was identified by the Inquiry as contributing to the explosion at Moura No 2 mine in August 1994. A recommendation of the Inquiry was that mines be required to develop Safety Management Plans to control spontaneous combustion as well as other principal hazards and related matters at underground coal mines.

Safety management plans (SMP's) are intended to formalise the process by which mines address principal hazards and other related matters to ensure the safety of mine personnel. They are intended to put in place means for the management of the principal hazards of mining which are independent of changes of personnel at mines. They are also intended to provide consistency in the way hazards are controlled while catering for changes in conditions through the conduct of regular reviews of SMP's operation and adequacy.

Much of the coal mining industry has, for some years now, been moving toward more systematic methods of management. This has included in many cases the principles of quality assurance standards and the model of a management system which they represent. SMP's should consolidate that direction for those operations already on the path.

It is anticipated that codes, standards, regulations and guidelines already in force or used by mines would be incorporated within SMP's where appropriate. SMP's are therefore not intended to be an additional layer of pseudo-regulation but are, rather to provide a framework within which safety may be more effectively managed. Mines might use SMP's as a means to control the way that statutory requirements are implemented and monitored at their site. SMP's in no way remove the obligation to fulfil statutory requirements.

These standards are intended to guide mines in the development of SMP's and while encouraging a degree of uniformity aim to leave actual plan content and ownership with individual mines. SAFETY DEFINITIONS

Hazard: A source of potential harrn or a situation with a potential to cause loss.

Principal Hazards: means a hazard with a potential to result in multiple fatalities.

Risk: The chance of something happening that will have an impact upon objectives. it is measured in terms of consequences and likelihood.

Safety Management Plan:

A Safety Management Plan:

 is a systematic definition of all the actions necessary to ensure that mining operations are carried out safely;

• includes but is not limited to organisational structures, planning, activities, responsibilities, practices, risk identification, audits and reviews;

e is suppleznentary to, and includes the implelnentation of appropriate codes, rules, regulations or procedures and is the method by which 111ine safety and health is to be effectively managed and coordinated.

## SAFETY MANAGEMENT PLAN

Introduction

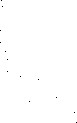
A safety management plan (SMP) is required to set out formally the actions controls and procedures which have been instituted to demonstrate that principal hazards have been identified and controlled.

The SMP would be expected to set out the means by which the hazards are identified and risks assessed, the way in- which performance standards are to be set and met, , how the standards are to be monitored, the Setting of safety objectives for the mine, the system whereby the objectives are to be met, and the SMP reviewed and audited.

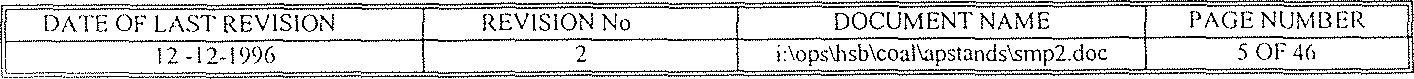
The Safety Management Plan consist of two levels, these being

Level l Management Overview Plan Level 2 Hazard Management Plans

## MANAGEMENT OVERVIEW PLAN

The purpose of the Management Overview Plan is to ensure that:

 all the elements that make up the plan are being addressed

* the elements are being addressed in the appropriate order  to what degree and how effectively the elements are being addressed
* are there ways the activities can be improved?

Elements Of Management Overview Plan

The key elements must include the fö\lowing but are not limited to:

1. Introduction

Objective: To state the overall objective of the Safety Management Plan and to establish the framework and ownership of the document as well as guidance as to its use.

2 Scope

l'his section should cover all the Hazard Management Plans at a particular mine and as a  include the following.

Ventilation nyanaoement

Gas Management

O. Methane Drainage

1. Emeroency evacuation
2. Spontaneous combustion
3. Strata Management

Specific nunes Inay have additional hazards or other [natters that, in the interests of safeguarding the hea;th and safety of persons, require additional Hazard Managerncnt Plans.

3. Mine Characteristics

This Element outlines the mine characteristics that are factors in the current Hazard Management Plans. The section should briefly describe such matters as:-

Seams mined

Seam characteristics

Depth of mining Mining methods



Shift working systems

Employment

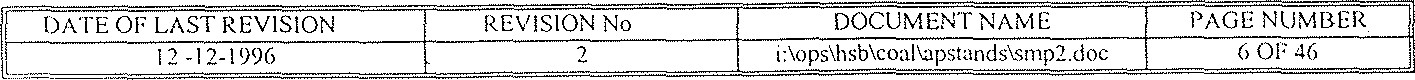
Ventilation

Access to mine

and should take into account current and future mine design

1. Identification of Principal Hazards

Objective: To outline the method by which the principal hazards are identified, who was involved in the process by position title, the scope of the hazard analysis/risk assessment, and the identified principal hazards.

In ten t:

* 1. Personnel involved in hazard]risk assessments should be carefully selected to ensure their relevance to the Hazard/risk being examined.
  2. Personnel should be selected for their competence and experience and should be broadly spread across the mine organisation. Personnel involved should be given hazard analysis/risk assessment training prior to being involved in the process.
  3. Sufficient time and resources should be made available to ensure that assessments are effectively undertaken.
  4. Risk assessment/hazard analysis should be carried out in accordance with one of the many established risk assessment methods eg. Australian Standard, AS/NZS 3931 (1995).

1. Organisational Responsibilities and Resources

Objective: To demonstrate the resources and responsibilities the oruanisation Iras put in place to fulfil the requirements of the Safety Management Plan.

1. Management Review

Objective: To demonstrate Senior Management's responsibility to review the Safety Management Plan at regular intervals. The purpose is to ensure its continuing suitability and effectiveness, identify new hazards where appropriate, implement improvements and corrective actions.

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The Inine must develop and implement the following elements in the operation of the specific Hazard Management Plans.

These elements must be considered rnandatory although the mode and degree of implementation of any element be tailored to the assessed needs of the mine and the hazard/risk to be managed.

The purpose of the Hazard Management Plans is to address the specific hazards encountered or likely to be encountered at a mine.

Elements Of Hazard Management Plans

1. Introduction

The aim of this section is to state the objective and scope with respect to the issue of the specific Hazard Management Plans being addressed.

1. Identified Hazards

This section will outline the method by which the hazards were identified and assessed, the scope of the hazard identification and identified principal hazards.

1. Control Procedures

This section will outline the controls, procedures to be followed, and responsible persons relevant to each of the principal hazards. This part of the plan may reference procedures rather than including the procedure in the document. This could be laid out in a format similar to the following.

Example

Principal Controls Procedures Responsible Position

Hazard

Conveyor Fire Inspections Shiftly Inspection Competent person

Scraper Instal lation WI IBI 150 021 Engineering Coordinator

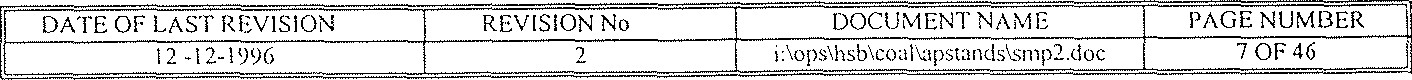
Housekeeping WI IBI 150 040 Mineworker

Conveyor design PB 1B250 100 Engineering Manaaer

1. Roles and Responsibilities

This section will outline the roles, responsibilities and competencies of ail persons having accountability under the plan. The responsibility assigned to persons should take account of any statutory obligations undertaken by those persons. Roles and responsibilities assigned will include such peoplc as external providers and internal personnel.

1. Resources Required rrhe objective of this section is to state the resources the organisation has to put in place to meet the requiremcnts of the specific Hazard Manage\*nent Plan.



1. Action Response Plans (Triggers)

This section outlines the trigger points and/or events which necessitate specific actions to be taken.



Exarnplc:

Trigger - 2h% CH4 in working place Action - withdraw persons.

Responsibilities shall be assigned to manage specific trigger actions.

1. Communications

The mine shall establish and maintain procedures for

* 1. internal communication between the various levels and functions of the mine;
  2. receiving, documenting and responding to relevant communications to the hazard being addressed.

1. Training 

The mine shaft identify training needs to address a specific hazard. All personnel whose work may impact upon that hazard shall receive appropriate training.

The mine shall establish and maintain procedures to make its employees at each relevant function and level alvvare of:-

* 1. the importance of conformance with procedures and with the requirements of the Hazard 'Management Plan;
  2. the significant safety impacts, actual or potential of their work activities and the safety benefits of improved personal performance;
  3. their roles and responsibilities in achieving conformance with procedures and with the requirements of the Hazard Management Plan including emergency preparedness and response requirements;
  4. the potential consequences of departure from the Hazard Management Plan.

1. Corrective Action

The mine shall establish and maintain procedures for defining responsibility and authority for handling and investigating non-conförmance, taking action to mitigate any impacts caused and for initiating and completing corrective and preventive actions.

Any corrective or preventive action taken to eliminate the causes of actual and potential non-conformance Shali be appropriate to the magnitude of problems and commensurate with the hazard being controlled.

The Imine shall implement and record any changes in the documented procedures resulting from corrective and preventive action.

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1. Review

Mine management shall, at intervals as determined, review the Hazard Management Plan to ensure its continuing suitability, adequacy and effectiveness. The management review process shall ensure that the necessary information is collected to allow management to carry out this evaluation. This review shall be documented.

The management review shall address the possible need for changes to policy, objectives and other elements of the Hazard Management Plan, in the light of Hazard Management Plan audit results, changing circumstances and the commitnent to continual improvement.

1. Audit

The mine shall establish and maintain programme(s) and procedures for periodic Hazard Management Plan audits and reviewe be carried out, in order to:

determine whether or not the Hazard Management Plan;

 conforms to planned arrangements för safety management,  has been properly implemented and maintained;

provide information on the results of audits and reviews to rnanagement.

The audit programme, including any schedule should be based on the importance of the hazard concerned and the results of previous audi ts.

In order to be comprehensive, the audit procedures shall cover the audit scope, frequency and methodologies, as well as the responsibilities and requirements for conducting audits and reporting results.

1. Document Control

"fhe mine shall establish and maintain procedures for controlling all documents required by the Hazard

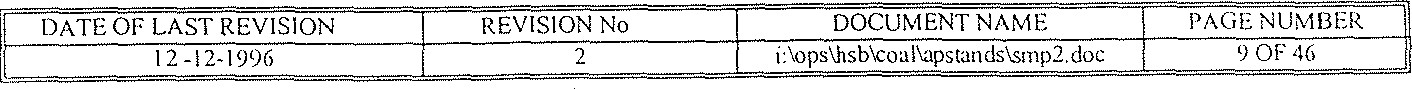
Management Plan to ensure that:

* + 1. they can be readily located and be accessible;
    2. they are periodically reviewed, revised as necessary and approved for adequacy by authorised personnel;
    3. the current versions of relevant documents are available at all locations where operations essential to the effective functioning of the plan are performed;

(d) obsolete documents are promptly removed from ali points of issue and points of use or otherwise assured against unintended use;

(e) any obsolete documents retained for legal and or knowledge preservation purposes are suitablv identified.

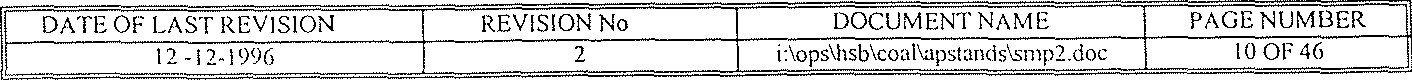
Documentation shall be legible, dated (with dates of revision) and readily identifiable, maintained in an orderly ru annerr and retained for a specified period. Procedures and responsibilities shall be established and ny,.iintained concerning the creation and modification of the various types of document.

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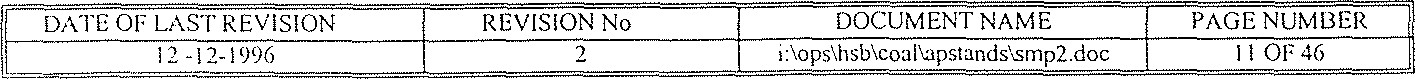
1. Records

The mine should establish and maintain procedures for the identification, maintenance and disposition of safety records. These records should include training records and the results of audits and reviews.

Safety records should be legible, identifiable and traceable to the activity involved. Safety records should be stored and maintained in such a way that they are readily retrievable and protected against damage, deterioration or loss. Their retention times shall be established and recorded.

Records should be maintained as appropriate to the plan and to the organisation, to demonstrate conformance to the requirements of this Hazard Management Plan.



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# PART B



GUIDELINES FOR

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DEVELOPING A SPONTANEOUS COMBUSTION 

HAZARD MANAGEMENT PLAN

1. GUIDELINES FOR DEVELOPING A SPONTANEOUS COMBUSTION HAZARD MANAGEMENT PLAN

This guideline of factors to bc considered in a Spontaneous Combustion Hazard Management Plan is a collection of the measures to be undertaken to assess, detect and control spontaneous combustion risks at a particular mine, and it is intended that working SCHMP's are tailored to suit the situation at any individual nune.

1. SCOPE

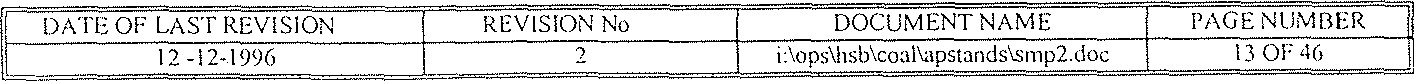
This document is intended to apply to underground coal mining operations which may be subject to spontaneous combustion risks.

1. DEFINITIONS

For the purpose of this docunlent, the following definitions apply:

 Spontaneous Combustion - oxidation at exposed coai surfaces which occurs at, or near, ambient temperature producing heat energy. Spontaneous combustion, in itself, may or may not present a risk depending on whether oxidation rates are static or increasing.

 Spontaneous Combustion Risk - the set of risks to people and/or property which may arise from spontaneous combustion where the rate of oxidation will, or is likely to, increase.

Heating - situation where the dissipation of heat energy resulting from spontaneous combustion is insufficient to restrain coal oxidation from becoming self sustaining and for an ongoing temperature rise of the surroundings to occur (this is analogous to the terrn 'spontaneous heating' which may be found in literature).

• Sour.ce\_of-lgnit.io.n - a heating which has progressed to a point where sufficient energy is available to ignite a flammable gas mixture.

1. SCHMP REQUIREMENTS

This section describes the requirements considered appropriate to be in place for effectively operating SCHMP's. As far as practicable, requirements are framed in performance terrns•, outcomes rather than outputs, ie. what is to be done rather than how to do it.

1. GENERAL REQUIREMENTS

Every mine must have systems for control of spontaneous combustion related risks to be known collectively as the Spontaneous Combustion Hazard Management Plan (SCHMP) for the mine and which must be put in effect at the mine. The mine must only work in accordance with any SCHNTP in effect at the mine.

The following aeneral requirernents for the SCHMP should be met:

* 1. -

Initial formulation of the SCHMP must be based on a rigorous evaluation of the spontaneous combustion risk to be managed at the particular minesite. Mines are advised that external facilitation for the conduct of such a risk evaluation may be beneficial to the objectivity of the results.

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The mine must have in place processes for the timely collection of appropriate infomation related to spontaneous combustion risk. The primary aim of those processes is for the mine to gather sufficient information to develop means to reliably predict the likelihood of risk arising from spontaneous combustion related events.

In particular, the mine must have processes in place for:

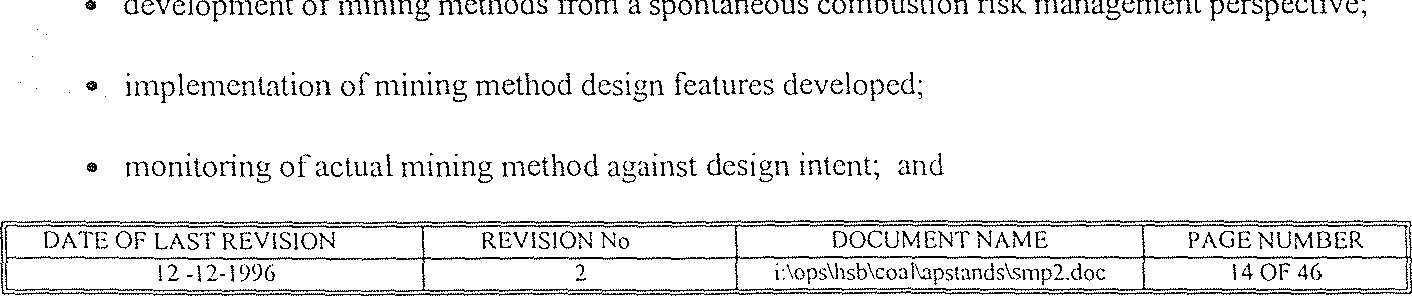
* + - evaluating the spontaneous combustion related history of both the mine and any adjacent or prior operations in the same seam(s);
    - evaluating external information including review of other's experience, regular review of available information, and regular review of emerging technology;

 developing particular indicators of spontaneous combustion risk for the mine based on the previous evaluations and to provide input into mine's evaluation/decision processes related to spontaneous combustion. Those indicators developed for the mine must be maintained as an internal standard.

NOTE l: Indicators of spontaneous conabustion risk should include both gas analysis based indicators and other sensory or observation based indicators where these may be of utility.

NOTE 2: Chosen indicators of spontaneous combustion risk are to be used as input to the 'nine 's evaluation/decision process in the developnent of trigger levels

1. SPONTANEOUS COMBUSTION RISK PREVENTION
   1. Mine Design and Develo ment - The mine must have in place a process for ongoing mine design and development sufficient to adequately cater for those aspects of mine design which impact on the potential for spontaneous combustion. This process should include procedures for:
      * development of mine (re)design from a spontaneous combustion risk management perspective;
      * implementation of mine design features developed; and
      * monitoring of actual mine development against design intent. This process should include consideration of both whole of mine and individual panel design and be supported by mine standards sufficient to adequately support the implementation of design intent.
   2. Minina IVIethods - The mine should have in place a process for defining mining methods sufficient to adequately cater för those aspects of mining which impact on the potential for risk arising from spontaneous combustion. This process should include procedures for:



development

of

mining

methods

from

a

spontaneous

combustion

risk

management

perspective;

' review of potential impact on the spontaneous combustion risk prior to significant Illining method changes being implemented.

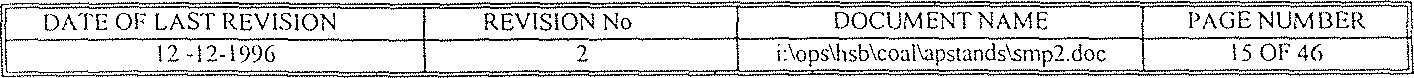
This process should be supported by mine standards sufficient to adequately support the implementation of design intent.

* 1. Ventilation Design and Practice - The mine should have in place a process for defining mine ventilation sufficient to adequately cater for those aspects of ventilation which impact on the potential for risk arising from spontaneous combustion. This process should include procedures for:
     + development of mine ventilation design from a spontaneous combustion risk management perspective;

 implementation of mine ventilation design from a spontaneous combustion risk management perspective;

* + - monitoring of actual ventilation practice against design intent; and

e review of potential impact on the spontaneous combustion risk prior to significant ventilation changes being implemented.

This process should be supported by rnine standards sufficient to adequately support the implementation of design intent and, in particular, standards defining designed flow and pressure ranges, means of monitoring those design parameters, and design and construction of ventilation appliances.

* 1. Segregation-of-Pa.r-ts-of-Min\_e - The mine should have in place a process for defining means for the effective segregation of panels, and other parts of the mine where desirable, to control potential for risk arising from spontaneous combustion.

NOTE: In this context the tenn segregation includes \*'neans ofsealing, or otherwise separating parts Qf the 'nine from nonnal mine ventilation, or the external atnzosphere, through, for exanzple, the installation ofseals or pressure balance chambers, or roadways, or by other means,

This process should include procedures for:

* + - development of segregation design from a spontaneous combustion risk management perspective;

 implementation of segregation installation consistent with design features developed;

* + - Inonitoring of actual segregation installation against design intent; and  monitoring of segregation performance against design intent.

This process should be supported by mine standards for design and construction of segregation together with supporting inspection and reporting standards.

* 1. Mon itorin han e Detection - The lüine should have in place processes for the detection of changes in the nlining environment which may indicate an increased risk fronl spontaneous cornbustion. These

procedures should include the timely transfer of information of change detection into the mine's evaluation/decision processes.

Change detection processes should be developed and implemented for the following:

* 1.  - The mine should have in place processes for continuous gas monitoring  sufficient to provide adequate information related to spontaneous combustion for the mines evaluation/decision processes. These processes should be supported by procedures for installation and standards for location and type of gas monitoring points together with procedures and standards for maintenance and calibration of continuous gas monitoring systems in use at the mine.
  2. Discrete Gas Sampling and Analysis - The mine should have in place processes for discrete gas sampling and analysis (for requirements not covered by continuous monitoring) sufficient to provide adequate information related to spontaneous combustion for the mines evaluation]decision processes.

These processes should be supported by procedures and equipment standards for gas sampling and analysis from boreholes or seals, or within mine airways where these sampling methods are used at the mine, together with procedures and standards for maintenance and/or calibration of gas sampling and detection equipment in use at the mine.

* 1. Indicator Observation/Reporting - The mine should have in place processes for the effective observation and reporting of spontaneous combustion indicators (other than gas analysis based indicators) in use at the mine. These processes should be supported by procedures and reporting standards for observations employed at the mine intended to detect changes in the mine environment and which may indicate increased risk from spontaneous combustion.

NOTE: It is advisable that reporting systems for spontaneous combustion indicators are maintained clistinctfrom other hazard reporting systetns in use at a mine.

* 1. Segregated Area Monitoring - The mine should have in place processes for the effective monitoring of segregated (sealed) areas of the mine. These processes should be supported by procedures and reporting standards for segregated area monitoring.
  2. Other Monitoring Requirement$ - Any other processes in use at the mine for monitoring as a function of the spontaneous combustion management plan are to have adequate procedures and standards developed and implemented as part of the SCHMP.
  3. Evaluation Decision - The mine should have processes in place for the timely evaluation of information gathered from all relevant sources and for decisions to be made based on that information regarding any impending risk arising from spontaneous combustion.

 In particular, the mine should have documented evaluation/decision processes for the following:

 the setting of trigger levels or conditions for spontaneous combustion indicators in use at the mine  and which result in the activation of pre-determined decision processes and actions;

NOTE l: The indicators to be used at the \*nine are those developed the '\*line 's Spontaneous C'onzbustion Prediction process.

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NOTE 2: Indicators in use nzay include observations other than those based on gas analysis and interpretation.

 the development and implementation of pre-determined responses action plans) to defined triggers indicative of spontaneous combustion;

 accessing of appropriate expertise external to the mine of an advisory or service provision nature; and  performing notifications required by both corporate and regulatory provisions in effect at the mine.

These documented evaluation/decision processes should identify who should be involved in each process, who has authority for the decision(s) and the criteria to which the decisions are to be made. All evaluation/decision processes should be supported by action plans which are implemented as a result of decisions and which are documented as internal standards at the mine.

NOTE 1: A mandatory action plan is the invoking of a pre-defined control group in response to higher level triggers which may indicate a significant risk to persons or the nzine.

NOTE 2: Decision trees, flow charts or other means of effectively docujnenting decision processes may be desirable to effectively support the evaluation/decision process at a naine.

5.12 Protective Actions - The mine should have in place processes to control harmful effects arising from any spontaneous combustion occurring at the mine. These processes should include means for the protection of personnel together with protection of the mine through the mitigation of the effects of spontaneous combustion. These processes are to be action plans to be invoked by the mine's evaluation decision processes. As minimum requirement the mine should develop and have ready for implementation the following action plans:

1. ACTION REQUIRED
   1. Control Group - The mine should define and document the level and type of trigger which will invoke the operation of a pre-defined control group to manage spontaneous combustion events which present significant risk to persons or the mine. Any control group should comprise persons with sufficient authority to implement decisions, together with appropriate expertise and representation of stakeholders.

When invoked the control group should maintain an event log sufficient to effectively record issues, decisions, actions and resulting events. Any control group should not be disbanded until a controlled and stable condition exists at the mine with respect to spontaneous combustion risk.

IVOTE l: The control group should not disband prior to conducting a de-briefing and a review o residual spontaneous corn bustion risk This review may lead to mnodification of the SCHMP.

NOTE 2: It is acceptable that middle level tnine nzanagenzent tnayfonn part of a control group but when doing so they should be effectively relieved of their nonnal line pnanagenzent duties until such titne that the control group is disbanded.

* 1. Withdrawal of Persons - The mine should develop and imple:nent a process for the withdrawal of persons from the mine in the event of a life threatening situation arising from a heating. This process should be supported by a procedure for evaluation of all relevant införmation regarding the safety of persons and" mine standards for the conditions under which persons should be initially, and then remain, withdrawn.

 - The mine should develop and implement processes for the rapid sealing of specific areas (which may include the entire mine) in response to defined triggers in the mine's evaluation]decision equipment standards together with inventory of materials to be maintained on-site, or to have guaranteed ready availability of, at all times.

6.4  Criteria to support action plans developed at the mine

NOTE: These criteria may include, but 'nay not be linzited to, triggers for control group formation, control group conzposition, contingency plans for group, event log recording, conditions for withdrawal of persons, naaterial inventories for rapid sealing, and equipment and infrastructure requirenzents for inertisation orflooding

## 7. EXTERNAL RESOURCES

The mine should develop and implement processes for effectively accessing external resources to provide support to the operation of the mine's SCHMP. These processes are to be supported by procedures to be followed for access and a register of external resources.

NOTE: Such resources nzay include off-site or mobile gas analysis services, or access to particular expertise.

## 8. SPONTANEOUS COMBUSTION MITIGATION

Where they form part of the mine's response to spontaneous combustion risk, the mine should develop and implement processes for the mitigation of the development of heating's. These processes are to be supported by procedures to be followed at the mine together with necessary equipment standards.

NOTE: Spontaneous combustion nzitigation processes 'nay include, but tnay not be limited to, inertisation orflooding of affected areas.

8.1 Mining Method - Criteria for mining method(s) intended to reduce and control risk which may arise  from spontaneous combustion.

NOTE: Mining nzethod criteria may include, but \*nay not be linütecl to, type of extraction, percentage extraction, jnining height versus sewn height, support svstems, drainage systenzs, controls on fornz and cunount of loose coal, and Illining rate.

8.2 Y-eut.jLa-tLQILD-es.igu - Criteria for the mine's ventilation systelPl intended to reduce and control risk which Inay arise from spontaneous combustion.

NOTE: Ventilation system criteria 'nay include, but nuzy not be litnitecl to, vehüilation quantities, pressure differentials, dispositi0'1 cf tnain air•ways, together with bleeder headings, balance roadways, vvaste ventilation.

Criteria for ventilation appliances intended to reduce and control risk which may arise froln spontaneous coinbustion.

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IVOTE: Ventilation appliance criteria may include, but nzay not be linzited to, purpose, location, nzaterials, construction, installation scheduling and security.

8.3 Ventilation Monitoring - Criteria for ventilation monitoring at the mine sufficient to determine if the tnine ventilation system is meeting the design intent.

 NOTE: Items covered by ventilation monitoring may include, but may not be linzited 10, location of nzonitoring stations, specification of frequency, specification of Inezhod of nzeasurenzenls (including equipnent and procedures).

8.4 -Gas-Mon-itarjng-Sy-stcm(es)

Criteria for type and location of gas monitoring points and information to be provided by the system.

Criteria for setting, acceptance, re-setting and reporting of gas monitoring system alarms.

Criteria for maintenance and calibration of gas monitoring systems in use at the mine.

8.5 Gas-SampIin.g-aud-Au.aIys\_is

Criteria for gas sampling and analysis to be employed at the mine including reporting criteria.

NOTE: These criteria 'nay include, but may not be linzitecl to, satnpling and analysis equipnzent to be used and strategies and methods to ensure consistency and repeatability in tneasurenenls.

Criteria for maintenance and calibration of gas sampling and analysis equipment in use at the mine.

NOTE: These criteria may include, but tnay not be limited to, the frequency of calibration (periodic, bejöre use), equipnzent requiredfor calibration.

servation e rtino

Criteria {br the consistent reporting of observations made at the mine and intended to detect increasing risk from spontaneous combustion.

NOTE l: These criteria may include, but nzay not be lipnited to, identijication of indicators to be reported on, content and fornzat of reports, and reporting criteria for different groups at the 'nine (workjbrce, officials).

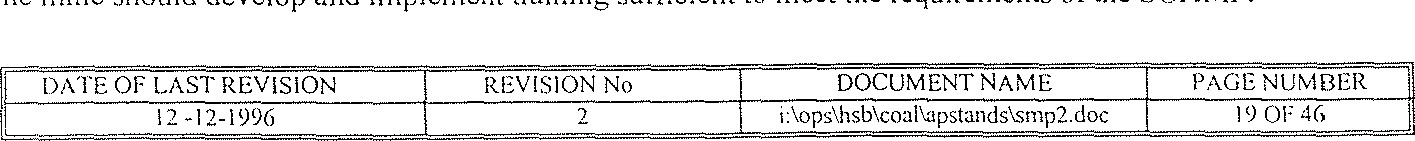
IVOI'E 2: Spontaneous conzbustion reporting arrangenzents at the nüne should be dislinc.f .fi•onz generic hazard reportb•zg systetns such as deputv 's reports.

9. REGISTER OF EXTERNAL RESOURCES

r l'hc Inine should establish and maintain a register of external resources which should include a listing of personnel and service providers who may need to be contacted in response to demands of the SCI-IMP.

10. TRAINING

[he nune should develop and ilnplernent training sufficient to ineet the requirements of the SCI-IMP



In particular, the mine should have standards for training which define:

e who or v.'hich entities are to conduct training and the requisite level of certification or other qualification required by trainers;

 the classes of persons at the mine who are to receive training;

* •the competencies sought to be imparted to those classes of persons;
* means by which the acquisition of required competencies is to be assessed;

 frequencies for reinforcement of competencies through re- training;

* means by which additional training needs are to be identified.

 The minimum content of training at the mine should cover, but in no way is limited to:

* the importance of compliance with the SCHMP in effect at the mine;
* roles and responsibilities of persons in relation to the operation of the SCHMP;
* means for the identification of spontaneous combustion related signs including:

 increase or change in gas concentrations  the observation of unexplained smells, hazes  the observation of sweating or condensation on strata

* appropriate means of recording and reporting the observation of any spontaneous combustion related signs; and

' standards and technical specifications associated with the SCHMP.

rIhe mine must maintain objective evidence of the conduct of training and the assessment of competencies imparted by that training.

11. REVIEW

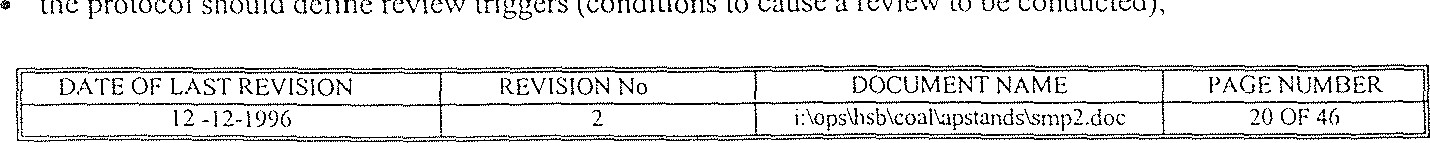
There must be means in place for the timely and effective review of the content and operation of the SCHMP with the aim of assessing the plan's continued suitability and effectiveness in nianaging spontaneous combustion related risks at the Inine.

In order to achieve this the mine should prepare a review protocol conforming to the following requirelnents•.

 reviews should be based on a re-evaluation of the spontaneous combustion related risks to be catered for in the SCI-IMP;

 the protocol should define who is to participate in reviews;

 reviews should cover all aspects of the SCHMP including general elements, required processes and technical standards;

the protocol should define review triggers (conditions to cause a review to be conducted);



 there should be two types of review triggers defined: time based and event based;

 event based review triggers must include, as a minimum requirement, the triggering of a review on significant change in mining systems, conditions or circumstances and Inay include such factors as change of equipment, or change of management;

 the protocol must indicate who must decide if significant change has occurred, and to what criteria that decision is to be made.

The mine should conduct SCHMP reviews in accordance with the review protocol and must maintain records of such reviews. Those records must be made available to relevant statutory authorities seeking evidence of review conduct.

Where the conduct of any review indicates that the SCHMP is no longer suitable and in nmanaging spontaneous combustion related risks present then management must implement corrective action to amend the plan to make it suitable and effective for this purpose.

NOTE: Mines are advised that external facilitation and/or expertise may be desirable as an aid to the effective conduct ofSCHMP reviews.

It should be noted that effective, and timely, reviews are a valuable means to give management, and others, assurance that the SCHMP continues to adequately cater for the conditions and risks prevailing at the tirne or the review.

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MANAGEM ENT PLAN

## EMERGENCY EVACUATION

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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 ofpersons front 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 intmersed in uncertainties with regard to the state of the "lilte and, in any case, appeared to have been left largely to the opinion of the nziddle ranking official who happened to be on duty. Any attempts that official ntade to obtain guidance front "tore senior ntanagenzent 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 "'tines be required to develop and implement protocols, as a statutory requirenzent, for the withdrawal ofpersons 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 'nines in the developtnent ofprotocols for the withdrawal ofpersons.

Developed and implemented protocols should be required to conform with the guidelines.

 That protocols developed for the withdrawal ofpersons should also be subject to agreenzent amongst all parties with a valid interest at any particular niine 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 accross 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 Inight assist in identifying and subsequently ntanaaing all circunzstances involving a h'ithdrawal of persons it is considered necessary to develop protocols only with respect to the principle hazards identified for the 'nine. Hence protocols beconze an integral part of the Illines Safetp Managenzent Plans.

SCOPE

Moura Recommendation finplelnentation Task Group 2 was given the following scope for the develomnent 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.

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 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;

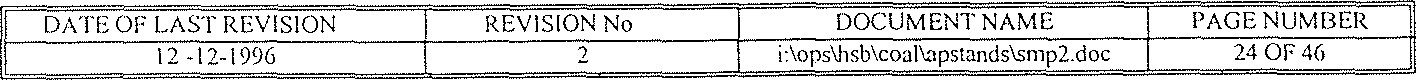
 Require a well defined communication process which will ensure all affected persons are clearly advised of both the risk and the need to withdraw with adequate time to move to a safe position;  Ensure the location of persons are recorded after being withdrawn from the mine;  Have an agreed mine re-entry strategy;

 Ensure appropriate records are kept in the Mine Record Book and  Require appropriate internal and external audit procedures.

This guideline does not linzit consideration with respect to the withdrawal of persons to those events associated with principle hazards but also considers all circuntstances 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

ESTABLISHMENT OF TRIGGER LEVELS FOR THE WITHDRAWAL OF PERSONS

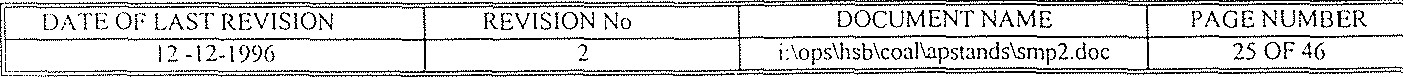
KEY ELEMENTS REQUIRED IN DEFINING A PROCESS FOR THE WITHDRAWAL OF

PERSONS TO A PLACE OF SAFETY

HAZARDS THAT MAY REQUIRE A WITHDRAWAL OF PERSONS

AUDIT PROCEDURES

TRAINING

1. Internal Training - General
2. Internal Training - Specific

COMMUNICATION PROCESS

Communication - System Hardware Multiple Redundancy

Communication - System Procedures

APPENDIX A

 Relevant Queensland Legislation Current At June 1996

 Relevant Queensland Legislation Current At June 1996 Relating To Withdrawal Of Persons

APPENDIX B

 Example Process Chart For The Withdrawal Of Persons 



DEFINITIONS AND ABBREVIATIONS

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

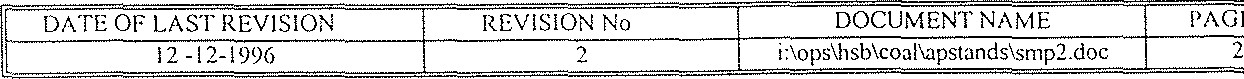
"Evacuation ":- The withdrawal of persons to a place of safety.

"M.E.P." "Mine Evacuation Plan" — A Management Plan developed through the process of risk assessment aimed at ensuring that indicators 01 principle hazards are identified, monitored and appropriately responded to in a cotordinated 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 predeterlnined actions.

"W.O.P". "Withdrawal of Persons" The organised evacuation of persons from the mi mine to a designated place of safety when the risk to life or health has exceeded predetermined

ESTABLISHMENT OF TRIGGER LEVELS FOR THE WITHDRAWAL OF PERSm

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:-

l . be measurable or observable.

1. be kept current and included in the MEP

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1. be consistent with statutory requirements.
2. be identified by risk assessment.
3. recognise the normal or background conditions.
4. be relevant to the risk being considered.
5. 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).
6. initiate predetermined actions.
7. 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. 

1 1 .be developed bytagreemen )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 rnanner with adequate supplies of the correct equipment.

 QML) Key Elements:-

i. Risk Assessntent 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.

1. Trigger Levels. Identified in Safety Management Plans.
2. Surface Control.
3. Action Response Plans to be established for each trigger level.
4. Process for ntonitoril.•g principle hazards. to be established to monitor key indicators.
5. Connnunication 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.

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  Initiate the emergency response command structure.

 Initiating follow-through on corrective actions

1. Mine Evacuation Plan to be developed in accordance with the Standardfor Mine Safety Managen:ent Plans.
2. Places ofSafety to be defined.
3. Route and ntethod oftransport

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 ofsafety can no longer be considered adequate although this eventuality must be plannedfor.

10. Checking Systenz 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.

SAFE'I\*Y

Monitoring ofthe Location ofPersons Each mine should have a system to monitor: Persons entering and exiting the mine.

 The general location of persons while underground.

The systen', 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.

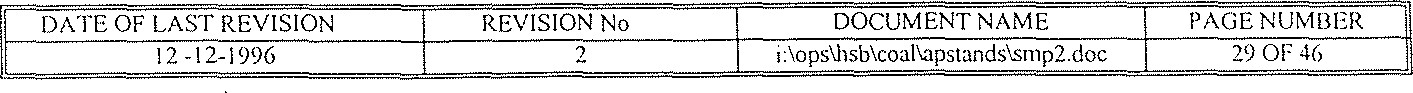
The mine should have processes in place for the timely evaluation of information gathered from all sources and for decisions to be made based on that information regarding the operation of the MEP.

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 printary aint 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 alanns or events.

 Initiating an alarm or event at predetemined 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:-

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 sea!u gases, coinbustion products, seal failure, flammable gas in the explosive range, gas/dust explosion.

 VENTILATION FAILURE

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

### INRUSH

\rVater strata, old workings, new workings. flowin€{ Illatcrial, 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/EQUIPMENTACCIDENT

Injury, loss of second means of egress.

* CRIMINAL ACTIVITY eg. bo,nb threat As circumstance dictate.

 SEALING OF GOAF/PARTOFMINE

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

 OUTBURST

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

* GENERAL ENVIRONMENTAL

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

No matter what the scenario conmutnication is a criticalfactor.

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. o 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

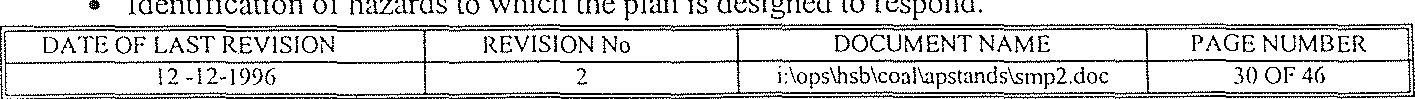
1. Internal Training - General

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

the Inine.

The Inodules could include but not be liznited to:-

' "I'he 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.  Conununication 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 schedu led/regular intervals

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

1. 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 conununication 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 - Svstem Hardware 

As a minimum requirernent fixed coinmunication systems to the surface control should be provided al the following locations:-

1. Underground

 Working Places.

 Crib Rooms.

 First withdrawal response muster areas and places of safety.

 Subsequent, higher level withdrawal responsc muster areas and places of safety, eg.:

 Imain headings  pit bott0in  refuge bays

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1. 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.

MultiÖIe Redundancy

The fixed communication •systems should be augmented by a minimunt of one secondmy communication system. At least one ofthese would be independent of the underground power.

Communication - Svstem Procedures

The mine should develop procedures and protocols for the transfer of information and Inessages 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 rnade 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 entergency  ignition  explosion  spontaneous combustion

 fall of roof or rib  en trapment  outburst  inrush

 Inedical

1. Severity fatalities  type of injuries  nutnber injured  extent of damaue

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1. Intensity  blast damage  colour/extent of smoke  visible flame  type and level of gases
2. 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.



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#### 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 faciiities, 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. (l) 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.

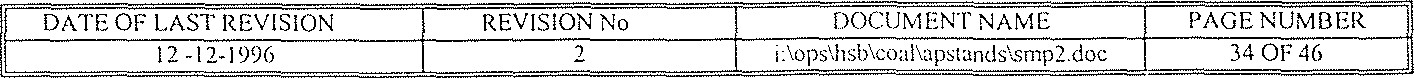
(2)

1. 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.
2. A copy of the emergency procedures shall be fonvarded to an inspector.
3. 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 arnendment 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 forrned part of these rules.
4. Without limit to the generality of subruie (2), the emergency procedures-
   1. shall be directed, so fir as is practicable, to the achievement of the following ohjectives:-

the rescue of persons in danger; minimisation of risk to persons implementing the procedures; and

the provision of adequate medical assistance; and

* 1. shall, at a nunilnllln, make detailed provision for



the means by which the full nature and extent of an emergency situation can be identified; 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; establishment of , use of, and restriction of entry to, an emergency control centre; liaison with external emergency services; and

(v) the adjusting of responses to changes in the levels of an emergency.

1. The manager shall ensure that-
   1. \*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;
   2. exercises are conducted periodically at the mine to assess the likely effectiveness of the emergency procedures; and
   3. 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

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| I-EGISLATION | HAZARD | NATURE OF  WITI„DRAWAL | SUMMARY OF  REQUIREMENTS |
| C.M.A. Section 61 | GeneralJGas | From Mine or Pan | If mine or part is dangerous for W'hatever cause. If flammable gas, dangerous = + 2.5% |
| Section 71 | Loss of Analytical  Data | From Part | Securing 'the place' of fatal or serious accident until investigated by Inspector. |
| C.M.A  Section 90 | Entrapment | From Mine or Part | Requirement for 'Cat least a second opening to the surface" (2nd Egress) (Inference that withdrawal will occur if 2nd Egress not maintained). |
| Gen. Rule 2.1  (4) | 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 (l ) (O.  19%: C02 0.5% co 0.005%: H.S 0.001%) except for restoration of ventilation. |
| General Rule | Environment  Temp. and  Humid, Air Velocity  Dust | From Part | N(anager to ensure no one einployed where standard of ivorking conditions in relation to (a) Teinp. and Humid (b) Mininuiln air velocity and (c)  Alnount of dust in atmosphere. |
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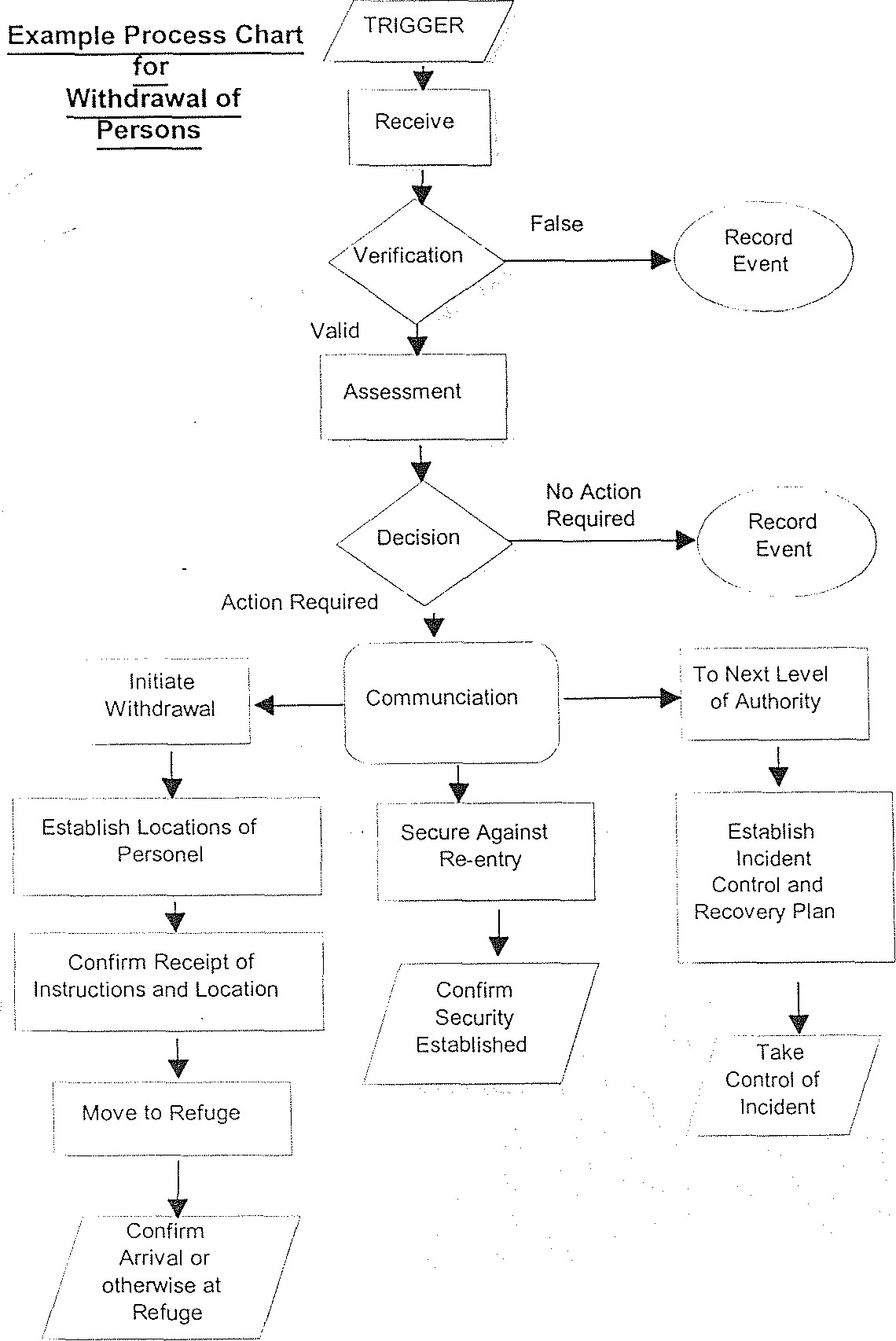
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|  | |  |  | |  | does not comply. | | |
| General Rule  2.4 | |  | Inadequate Ventilation for Escape | | From Mine | "Mechanically operated apparatus ...... to produce ventilation ...... to allow all persons to exit mine safely" Emergency fan - Inference that persons withdrawn if provisions not maintained? | | |
| G. R. 2.6 (1) (d) | |  | Toxic  Pollution -  Diesel Fumes | | From Part | Persons not be exposed to N02 exceeding 0.0002%. | | |
| Gen.Ru1e 27 (1) | |  | Fatigue  Physiological | | From Part | Other than in circumstances further described in the Rules, no employment (a) in working  0  place if temperature 29.40 and (b) at a working face where air velocity is less than 15.2 m]min. | | |
|
| Gen. Rule 2.10  (b) | | - | Ventilation Failure | | From Mine | Withdrawal to surface if main fan stoppage exceeds 30 mins | | |
| G. Rule 5.5 (d) | |  | Ventilation Failure | | From Part | Withdrawal from "That part of mine" on failure of auxiliary fan. | | |
| General Rule  7.12 (a) and (b) | |  | Inadequate Ventilation | | From Part | Immediate withdrawal from "any part of mine" when flammable gas exceeds 2.5%. | | |
| General Rule  17.1 | |  | Excessive  Noise | | From Part | Persons not to enter or remain in a place exceeding prescribed noise kevels except under prescribed conditions. | | |
| General Rule  49.15 | |  | Shotfiring | | From Part | All persons to be "withdrawn to a place of safety in intake air" before firing shots. | | |
| Gen. Rule 55.7 | |  | 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). | | |
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|  | |  | | | PROCESS CHART ELEMENTS AND THEIR RELATED ISSUES | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |  | | |  | |  | |
| ELEMENT | | | | | | | | | | | | | | ISSUES | | | | | | | | | | | | | | | | | | | | |
| Trigger - alarm/event | | | | | | | | | | | | | | Systems for monitoring hazards.  Alarms - visual; electronic; verbal; computer. | | | | | | | | | | | | | | | | | | | | |
| Receiv\_al | | | | | | | | | | | | | | By whom; to what authority level. When persons underground need for competent person on the surface/authority to act. Training. | | | | | | | | | | | | | | | | | | | | |
| Verification | | | | | | | | | | | | | | Genuine? Alarm details. If verification not possible then treat as valid. Training. | | | | | | | | | | | | | | | | | | | | |
| Record event | | | | | | | | | | | | | | Record alarms/events even if false. Remedial action to reduce false alarms. | | | | | | | | | | | | | | | | | | | | |
| Assessntent | | | | | | | | | | | | | | Authority levels; defined trigger points; response plan; training; escape routes. | | | | | | | | | | | | | | | | | | | | |
| Decision | | | | | | | | | | | | | | Competence; authority; training. | | | | | | | | | | | | | | | | | | | | |
| Conznzunication | | | | | | | | | | | | | | 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 | | | | | | | | | | | | | | | | | | | | |
| Initiate withdrawal | | | | | | | | | | | | | | 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. | | | | | | | | | | | | | | | | | | | | |
| Establish location of Personnel | | | | | | | | | | | | | | Location systems available. Ability to monitor general location of all personnel at all times. Communication. | | | | | | | | | | | | | | | | | | | | |
| Confirnz locations and receipt ofinstructions | | | | | | | | | | | | | | Ability for all persons to receive an emergency communication. Ability to communicate receipt of an emergency message/intended actions. | | | | | | | | | | | | | | | | | | | | |
| Move to place ofsafety | | | | | | | | | | | | | | Route and method. Consider nature and severity of event. | | | | | | | | | | | | | | | | | | | | |
| Confirnt arrival (or otherwise) at plåce of safety | | | | | | | | | | | | | | 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. | | | | | | | | | | | | | | | | | | | | |
| Secure against re-entry | | | | | | | | | | | | | | Secure affected area against unauthorised entry. Consider condition of affected personnel. | | | | | | | | | | | | | | | | | | | | |
| To next level of authority | | | | | | | | | | | | | | Need to define reflecting nature and severity. | | | | | | | | | | | | | | | | | | | | |
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### OR PART OF A MINm

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 ofpersons. 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 doculnent 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 ntinefollowing a sealing without the Manager first having obtained-the written consent ofthe District Inspector ofMines. '

Further,under the section entitled "Comments" at the end of the sub-section entitled "Re-Entry", the Warden nvakes the following statement :

"The Inquiry further believes that conapanies who operate nzines have certain obligations to the ntining indusüy and to the connnunity front which their workforce is drawn. These obligations are not written in law, but rather, take thefornt of an unwritten covenant whiclz could expect con:panies operating "tines to, in the event of a disaster :

* take all possible steps to recover bodies front nzines rather than abandoning those n:iltes with bodies entontbed, and
* take all possible steps to gain whatever evidence nzay be available with a view to preventing sintilar disasters. '

SCOPE

As with the developement 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.

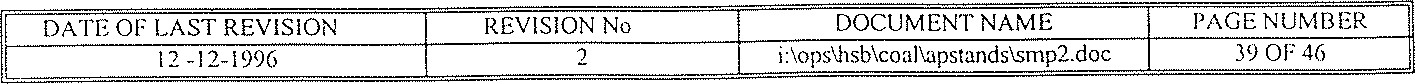
it should be noted that the 're-entry process' is not a simple reversal of the 'withdrawal process'.

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 nzust be stressed that these guidelines are relevant to re-entry of a nzine or part of a ntine 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 accountedfor.



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#### 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 reentry strategy is inzplentented.

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 1Mining Act 1925.

"Prinzary 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.

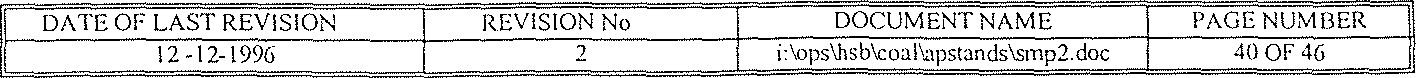
All Plans, Standards and Procedures should :

 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" Scif 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. c Progressive re-entry.

• Condition of ventilation appliances.

 Monitoring and control of atmosphere and dilution of gases.

1. Radio and/or telephone communication between control centres, freshair bases and operational teanns is essential
2. Restoration ofElectricity.

 Flame proof enclosures.

 Cables.

 Conditions to enable restoration of power.

1. The physical stability of the wnine - state of roof and sides
2. Water.

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1. A ccess.

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 liniits 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 accorda.nce 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.

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GENERIC RE-ENTRY PROCESS

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| PROCESS STEP | OBJECTIVES | | ISSUES TO BE CONSIDERED | | | |
| Collection of inforntation.    This is an ongoing issue. | Timely, accurate, relevant, thorough, reliable. | | 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. | | | |
| Evaluation of all available information. | To assess:  The extent purpose and scope of the re-entry project,  The need to re-enter, The feasibility of re-entry and therebye decide whether to abandon or proceed. | | Involvement of all stakeholders.  Social implications.  Commercial expectations, viability etc. Practical limitations, resources available.  Moral aspects.  Legal aspects.  Identify additional information required.  Communication.  Counsel[ing for workforce/individuals (external experts). | | | |
| Detailed planning of re-entry. | Develop a Re-entry Plan through risk assessment processes so that all hazards are identified and appropriate controls adopted to ensure: No person is injured or put at unacceptable risk.  Access is safely achieved to the extent planned. | | Involvement of all stakeholders.  Recognition that several of the stakeholders will have authorities and responsibilities with respect to the re-entry process.  Fonnal 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. | | | |
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| Printary reentry. | To ensure that the Primary Re-entry Procedure follows the Re-enfry Plan. To inspect and confirm actual conditions in the    mme.  To secure an acceptable mine environment to enable subsequent recovery activities. | Use of competent personnel (QMRS, Statutory Officials).  Use of personnel with specialised skills (e.g.  QMRS).  Statutory require!nents.  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. |
| Review the Reentry Plan considerinø primary reentry reports. | Ensure Re-entry Plan is still valid having regard to conditions found.  Modify plan as appropriate  Decide whether to abandon or proceed. | Involvement of stakeholders.  Risk assessment.  Communication.  Resources required (e.g. external expertise).  Counselling for workförce/individuais. |
| Subsequent recovery activities. | To ensure that the subsequent recovery activities follow the Reentry Plan.  Complete restoration of mine environment.  Re-establish facilities. Enable coal production to recommence. | Staged re-introduction of workforce.  All of the above. |

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EXAMPLES OF STANDARDS AND PROCEDURES

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| STANDARD OR PROCEDURE | | OBJECTIVES AND ISSUES. | | | |
| RE-ENTRY | | To minimise the risk of asphyxiation or poisoning by gases in the workplace and provide early warning of potentially dangerous or explosive conditions.  Re-entry operations can be categorised into two stages:-  l. Irrespirable atmosphere operations carried out by teams using SCBA.  2. Fresh air operations carried out by personnel not wearing breathing apparatus. | | | |
| MONITORING | | A standard to define the requirements for monitoring of the atmosphere from boreholes, shafts and the mine during the reentry and re-ventilation project.  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.  To provide warning of changes in the mine atmosphere resulting from re-entry and re-ventilation activities and to provide direction for subsequent actions.  Results derived from the monitoring system should be ilnmediately available to the control center and ventilation control points underground. This is essential during the re ventilation phase.  The distribution and posting of monitoring results:results of the monitoring process and the significance and trending of those results must be made known to ALL persons involved in the implementation of a Re-entry Plan. | | | |
| SETTING TRIGGER LEVELS "Trigger Level" A condition that is not the nonnal, is able to be measured or observed, and on being reached requires nitiation of predetermined actions.    VENTILATION | | To ensure that personnel are withdrawn from areas of the mine svhen conditions fall outside preset standards.  As a minimum trigger levels should be set for:Oxygen.  Noxious gases.  Flammable gases.  Barometric Change.  Humidity.  Temperature.   |  |  | | --- | --- | |  | Construction of ventilation appliances.  "Feinporary 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 UIG communication during the mine re-entry.  Mine Rescue Personnel.  Re-establishment teams. | | | |
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MANAGEMENT

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| 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. | | | |
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