SAFETY AND HEALTH RISK MANAGEMENT

GUIDELINE

NOVEMBER 1999

TABLE OF CONTENTS

FOREWORD

This Mines Occupational Safety and Health Advisory Board (MOSHAB) Guideline offers a simple, practical approach to carrying out risk management in the workplace.

Comments on, and suggestions for, improvements to the Guideline are encouraged. The Guideline will be revised as appropriate. Comments should be sent to:

> State Mining Engineer
> Safety Health and Environment Division
> Department of Industry and Resources
> 100 Plain Street
> EAST PERTH WA 6004

ISBN 0 7309 7807 9

1.0   INTRODUCTION

This Guideline has been developed by the Mines Occupational Safety and Health Advisory Board (MOSHAB) to provide an understanding of the process to be followed when carrying out risk management in accordance with the *Mines Safety and Inspection Act 1994* and *Mines Safety and Inspection Regulations 1995*.

Employers and employees have a duty of care to ensure people are not exposed to hazards. The extent to which the risk of exposure must be controlled is to a level that which is "reasonably practicable".

There are a number of different scenarios in which risk management may take place. Risk management may include such activities as:

- A comprehensive exercise where every activity carried out in the workplace is broken down and analysed;

- Job safety analysis carried out every time high risk jobs are done;

- Planned regular inspections and audits; or

- Managing any change such as the introduction of new equipment or legal requirements.

The risk management activity must be relevant and adequate for the risks which arise from the particular work environment and work activities.

This Guideline, in conjunction with the Safety and Health Risk Management workplace presentation[1], is intended to provide supervisors, safety and health officers, safety and health representatives and members of the safety and health committees with practical steps to assist them in implementing and communicating risk management activity in their workplace.

---

[1] Workplace Presentation package was in development by MOSHAB at the time of release of the Guideline. Contact the Department of Minerals and Energy for further details.

2.0   THE RISK MANAGEMENT PROCESS

Risk management is essential for preventing injury and disease. It includes:

- Spotting the hazards;

- Assessing the risks; and

- Making the changes necessary to eliminate the hazard or minimise the risk of injury or harm to health.

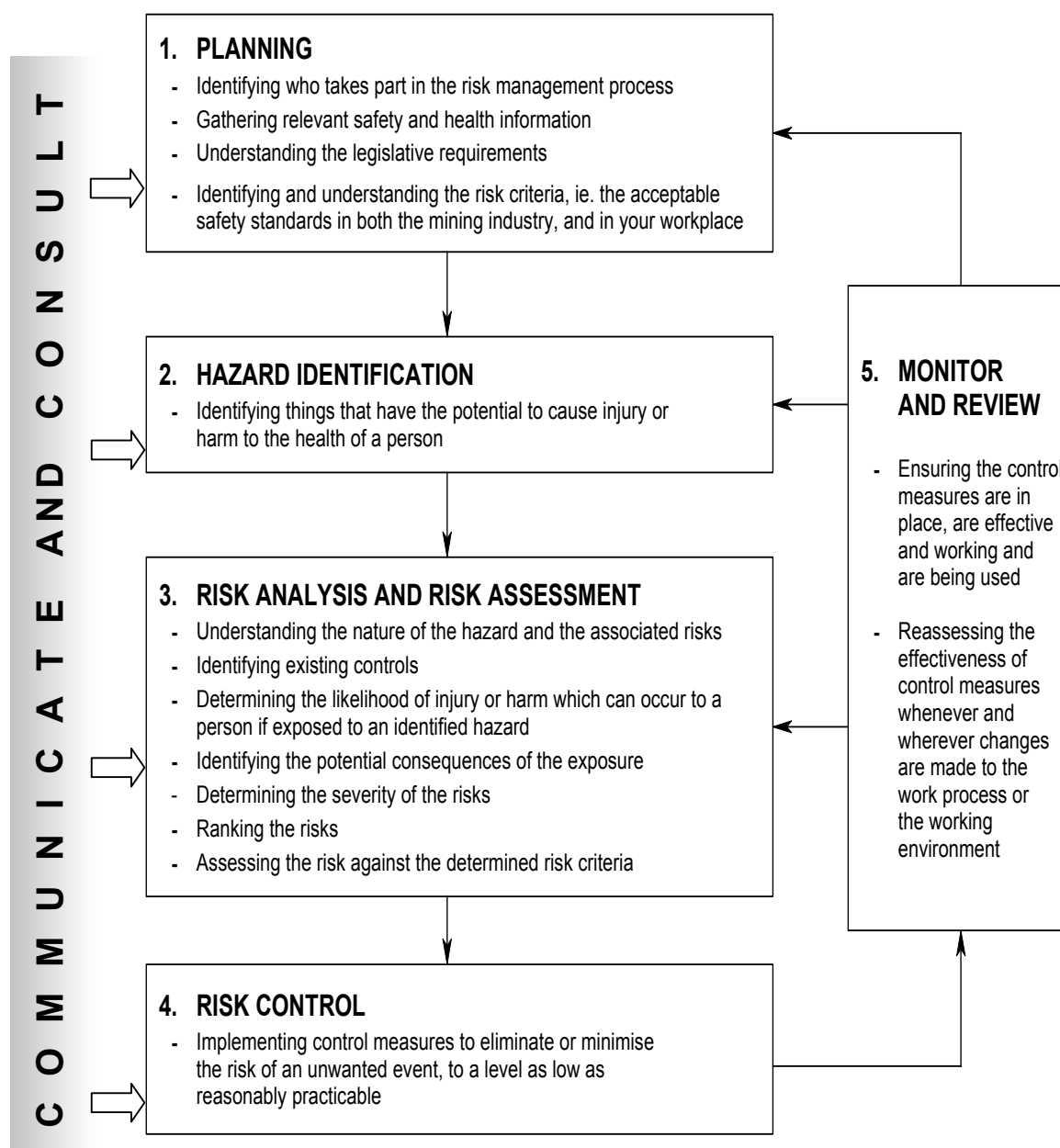The risk management process involves **five key steps** which are outlined in **Figure 1** below.

COMMUNICATE AND CONSULT

1. PLANNING
- Identifying who takes part in the risk management process
- Gathering relevant safety and health information
- Understanding the legislative requirements
- Identifying and understanding the risk criteria, ie. the acceptable safety standards in both the mining industry, and in your workplace

2. HAZARD IDENTIFICATION
- Identifying things that have the potential to cause injury or harm to the health of a person

3. RISK ANALYSIS AND RISK ASSESSMENT
- Understanding the nature of the hazard and the associated risks
- Identifying existing controls
- Determining the likelihood of injury or harm which can occur to a person if exposed to an identified hazard
- Identifying the potential consequences of the exposure
- Determining the severity of the risks
- Ranking the risks
- Assessing the risk against the determined risk criteria

4. RISK CONTROL
- Implementing control measures to eliminate or minimise the risk of an unwanted event, to a level as low as reasonably practicable

5. MONITOR AND REVIEW
- Ensuring the control measures are in place, are effective and working and are being used
- Reassessing the effectiveness of control measures whenever and wherever changes are made to the work process or the working environment

FIGURE 1:   THE RISK MANAGEMENT PROCESS

It is important that this process is flexible, so at times it may be necessary to go back to previous steps to ensure the assessment is thorough. Each step is covered in detail below.

STEP 1   PLANNING

THE TEAM

The risk assessment team should include management, supervisors and employees who could be exposed to the hazard. This could mean the members of the team may change several times across the workplace, dependent on the area and the activity being assessed.

The team should also include safety and health personnel, safety and health representatives and, if necessary, persons with specialist expertise.

GATHERING INFORMATION

The team should have access to all relevant information, including:

- Legislative requirements;
- Department of Minerals and Energy safety and health information, eg. Significant Incident Reports, Safety Bulletins, Codes of Practice, Guidelines etc.;
- National and industry safety and health standards;
- The Company's risk criteria;
- Safe working procedures;
- Material Safety Data Sheets;
- Floor plans, mine plans (old and new);
- Accident and incident data, including accident investigation reports;
- Inspection reports; and
- Audit reports.

RISK CRITERIA

To assess the risks, the team must have an understanding of the context in which a hazard can be controlled. The objective is to eliminate the risk, however it is not always possible.

Risk criteria are agreed at the commencement of the process. Risk criteria set the "acceptable" level of risk against which each risk is to be assessed. The criteria allow the team to determine what action needs to be taken to control the risk.

Before identifying the hazards and assessing the risk, the team needs to agree on what is an "acceptable level of risk" for that workplace, and this becomes the "risk criteria" against which risks are assessed.

In determining its risk criteria the team will consider such factors as operational, technical and/or legal requirements, local community sensitivities and public perception. For example, sometimes a risk may be analysed as being low but because of public perception, legal requirements or other factors, it is increased as having high priority for that workplace.

Analysis will allow the team to **assess the risk** against the **agreed risk criteria**, that is against the acceptable level of risk.

The team will need to make some judgement on the potential **likelihood** and **consequences** of the exposure to each hazard, such as, fatal injury, serious injury, and have an understanding of the means and cost of controlling the associated risk.

STEP 2   HAZARD IDENTIFICATION

HAZARD IDENTIFICATION

All hazards, no matter how minor, with the potential to injure or harm a person must be identified.

In relation to each hazard, the assessment team needs to identify:

- What could happen?

- How and why it could happen?

To answer these questions the team should review the relevant information gathered under Step 1 Planning and conduct an inspection of the workplace to address what is actually happening:

- Observe actual practice, not procedures or job instructions;

- Consider non-routine operations, including breakdown and scheduled maintenance; and

- Pay attention to changes and interruptions.

The team should prepare a comprehensive list of hazards or events that might affect the work activity. This may be easier if the workplace is divided into sections and inspected individually. A checklist can be useful to ensure all hazards are identified and documented.

During the inspection, the team should observe the actual tasks and talk to the employees working in the area to obtain their views on the nature of the risks involved. All hazards may not be apparent during the inspection period and it may be necessary to return when specific tasks are being carried out.

STEP 3   RISK ANALYSIS AND RISK ASSESSMENT

RISK ANALYSIS

Using the list of hazards the team undertakes the risk analysis by identifying possible consequences and the likelihood of them occuring. This will help to assess the likelihood of an event occurring and the potential exposure. There are many ways an exposure or event can be initiated. It is important that all causes are considered.

In the analysis, include all who could be affected, such as contractors, or visitors. Highlight those groups or individuals particularly at risk, and take into account and objectively assess the effectiveness of existing control measures.

To analyse risk the team needs to consider the chance of the hazardous situation occurring - the **likelihood** - and the extent of the harm that would result – the **consequence**.

For each hazard, the team needs to determine:

- **How people are exposed;**

- **Likelihood of exposure happening**;

- **Frequency of exposure** (when and how often), eg. intermittent (decanting a hazardous substance), or continuous (noise); and

- **Consequences of exposure**, eg. fatality, serious injury or permanent health impairment, machinery damage, minor injury or reversible health effect, lost production time.

Likelihood can be rated as:

LEVEL	DESCRIPTION	TYPICAL TIME FRAME
Almost Certain	Expect to occur in most cases	Daily
Very likely	Could happen frequently	Every two months
Likely	Could happen occasionally	Yearly
Unlikely	Could happen, but only rarely	Ten-yearly
Rare	Could happen, but probably never will	Never

Consequence, with regard to injury, can be rated as:

Fatal Injury	Sudden death, or death after prolonged disease
Serious injuries	Normally irreversible injury, or serious health impairment
Minor injuries	Normally reversible injury, or damage to health needing several days off work
First Aid Injuries	Normally very minor injuries that will not require time off work

The level of detail should match the level of risk. In most cases it may be necessary to do a preliminary analysis first followed by a more detailed analysis later.

The likelihood and consequence are then compared to determine the **severity** of the risk. **Table 1** provides an example of how this may be determined.

TABLE 1: RISK SEVERITY TABLE

CONSEQUENCE	LIKELIHOOD				
	Rare	Unlikely	Likely	Very Likely	Almost Certain
Fatal injury	MEDIUM	HIGH	HIGH	HIGH	HIGH
Serious injuries	MEDIUM	MEDIUM	HIGH	HIGH	HIGH
Minor injuries	LOW	MEDIUM	MEDIUM	MEDIUM	HIGH
First Aid injuries	LOW	LOW	MEDIUM	MEDIUM	MEDIUM

Situations assessed as "very likely with fatal consequences" are the most serious (HIGH risk); those assessed as "highly unlikely with first aid injuries" are the least serious (LOW risk).

RISK ASSESSMENT

Risk assessment involves **comparing** the level of risk identified during the risk analysis process with previously established risk criteria, and **ranking** the risks in order of severity.

What the team is trying to do is assess all of the risks that each hazard presents so it can be controlled.

Once the risks have been assessed and ranked, the action to eliminate or reduce the risk should be identified and prioritised according to the assigned risk value.

STEP 4   RISK CONTROL

Risk control and risk reduction involves identifying and implementing a range of options to treat those risks that fail to meet the agreed risk criteria. Risks should be made as low as reasonably practicable, irrespective of any absolute criteria. Account should be taken of technological advances when controlling risks.
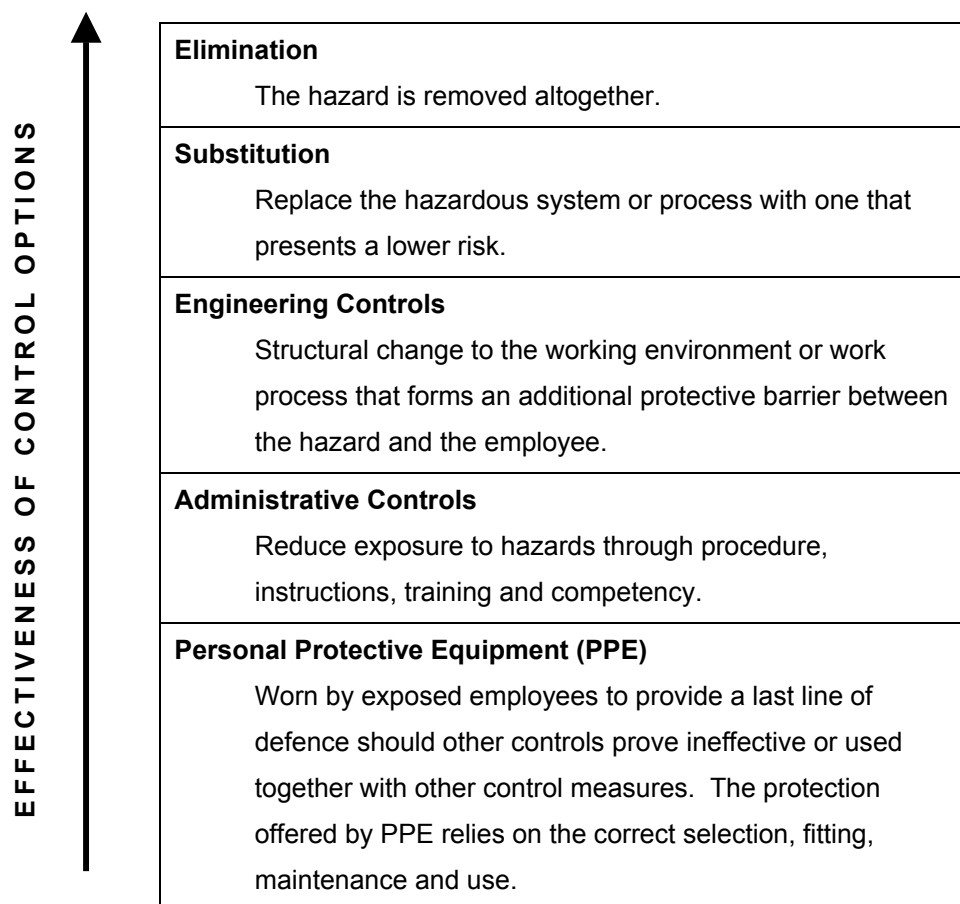
Unless a particular hazard is removed, the risk associated with that hazard can never be completely eliminated. It is always better to avoid a risk altogether. Risk should be eliminated at the source rather than adopting secondary measures, and whenever possible, work should be adapted to the individual rather than the individual adapting to the work.

Measures which reduce the HIGH level risks should be given priority. LOW level risks may be acceptable with minimal further treatment but should be monitored and periodically reviewed to ensure they remain acceptable.

Measures to avoid, prevent and reduce risk must be an accepted part of the organisation's culture, at all levels. Employees need to understand what they must do to ensure the controls work.

The methods of risk control and reduction are commonly referred to as the **Hierarchy of Control**. Often more than one method of control will be necessary to meet the risk criteria.

The hierarchy of control methods include:

<table>
<tr><td rowspan="5" style="writing-mode: vertical">EFFECTIVENESS OF CONTROL OPTIONS ↑</td><td>Elimination
The hazard is removed altogether.</td></tr>
<tr><td>Substitution
Replace the hazardous system or process with one that presents a lower risk.</td></tr>
<tr><td>Engineering Controls
Structural change to the working environment or work process that forms an additional protective barrier between the hazard and the employee.</td></tr>
<tr><td>Administrative Controls
Reduce exposure to hazards through procedure, instructions, training and competency.</td></tr>
<tr><td>Personal Protective Equipment (PPE)
Worn by exposed employees to provide a last line of defence should other controls prove ineffective or used together with other control measures. The protection offered by PPE relies on the correct selection, fitting, maintenance and use.</td></tr>
</table>

In some cases where the risk of exposure is unacceptably high, immediate action may be necessary to control the exposure before long-term control, or more permanent or more costly, measures can be introduced. For example, employees may be required to wear respiratory protection to control exposure to a hazardous substance in the short term until more effective local exhaust ventilation can be installed.

REASONABLY PRACTICABLE

What is known about an individual hazard, its associated risks and the severity of potential injury or harm to health is considered in relation to the overall cost and feasibility of the control measures necessary to eliminate or reduce the risk.

Selecting the appropriate level of control will require a judgement on what is "reasonably practicable".

The *Mines Safety and Inspection Act 1994* defines reasonably practicable as the following.

"Practicable" means reasonably practicable having regard, where the context permits, to -

(a)   the severity of any potential injury or harm to health that may be involved and the degree of risk of such injury or harm occurring; and

(b)   the state of knowledge about -

    (i)   the injury or harm to health referred to in paragraph (a); and

    (ii)   the risk of that injury or harm to health occurring; and

    (iii)   means of removing or mitigating the potential injury or harm to health;

    and

(c)   the availability, suitability, and cost of the means referred to in paragraph (b) (iii);

Therefore, that which is "reasonably practicable" is that which should be done.

The team needs to determine:

- How serious the hazard and associated risks are.

- How much is known about it, and how to control it.

- Whether the means to control the risk are available.

- Whether the benefit will justify the cost.

In making a judgement as to whether a control measure is reasonably practicable, the team needs to take into account what is common practice and knowledge throughout the industry. It is not acceptable for an employer to claim not to know what to do about certain hazards if those hazards are widely known by others in the industry, and safeguards are in place.

STEP 5   MONITORING AND REVIEW

A monitoring and review program must be established to ensure that the control measures remain valid, ie. that they control the risk of exposure to within acceptable standards. Hazards and risks need to be monitored to ensure changing circumstances do not alter the effectiveness of control measures.

The monitoring program should be developed to review changes to the:

The nature of the hazard	Have noise levels increased or have more toxic, or concentrated, ingredients been included in the hazardous substance.
Likelihood and frequency of exposure	How many and how often are employees exposed
Severity of the consequences	HIGH level risks should be monitored more closely than LOW level risks.

These programs include:

Testing and Maintaining Controls	Ensures the integrity of the controls that have been put in place
Inspection	Provides confirmation that the nature of the hazard or the environment in which the hazard exists has not changed.
Consultation	Allows for communication to ensure any changes to the hazard, controls or environment can be appropriately managed.

Any changes to the process or work activity, including change in employees carrying out the task, should initiate a review of the assessment.

Follow-up inspections and reviews should be adequately documented and training identified where necessary.
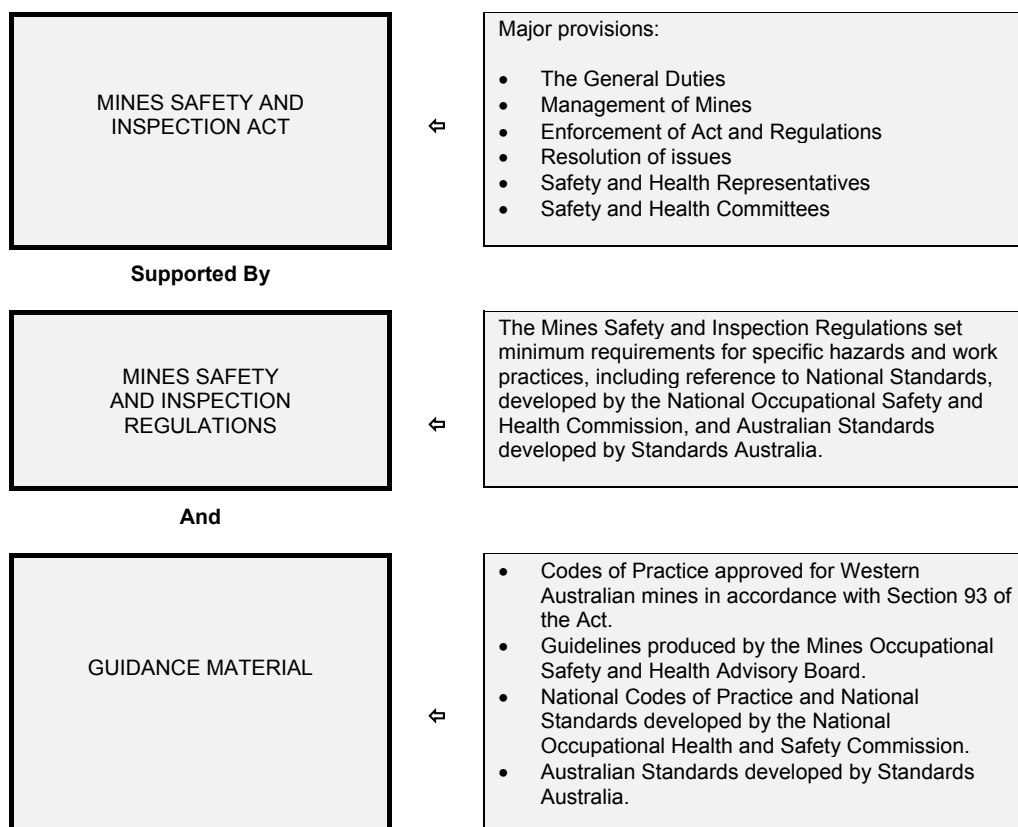
APPENDIX A

LEGISLATIVE FRAMEWORK

The *Mines Safety and Inspection Act 1994* sets objectives to promote and improve occupational safety and health standards. The Act sets out broad duties and is supported by more detailed requirements in the *Mines Safety and Inspection Regulations 1995*. A range of guidance material, including Guidelines, further supports the legislation. The legislative framework is set out in Figure 1.

Guidance material includes explanatory documents that provide more detailed information on the requirements of the legislation and include codes of practice and guidelines.

Guidelines contain practical information on how to comply with legislative requirements. They describe safe work practices that can be used to reduce the risk or work-related injury and disease and may also contain explanatory information.

FIGURE 2: LEGISLATIVE FRAMEWORK

MINES SAFETY AND INSPECTION ACT	⇐	Major provisions: • The General Duties • Management of Mines • Enforcement of Act and Regulations • Resolution of issues • Safety and Health Representatives • Safety and Health Committees

Supported By

MINES SAFETY AND INSPECTION REGULATIONS	⇐	The Mines Safety and Inspection Regulations set minimum requirements for specific hazards and work practices, including reference to National Standards, developed by the National Occupational Safety and Health Commission, and Australian Standards developed by Standards Australia.

And

GUIDANCE MATERIAL	⇐	• Codes of Practice approved for Western Australian mines in accordance with Section 93 of the Act. • Guidelines produced by the Mines Occupational Safety and Health Advisory Board. • National Codes of Practice and National Standards developed by the National Occupational Health and Safety Commission. • Australian Standards developed by Standards Australia.

The information included in a Guideline may not represent the only acceptable means of achieving the standard referred to. There may be other ways of setting up a safe system of work and, providing the risk of injury or disease is reduced as far as practicable, the alternatives should be acceptable.

APPENDIX B

FURTHER READING

Department of Minerals Resources (1997) Guide to Reviewing a Risk Assessment of Mine
Equipment and Operations. MDG 1014. Department of Minerals Resources, Sydney.

Department of Minerals Resources (1997) Risk Management Handbook for the Mining Industry:
How to conduct a risk assessment of mine operations and equipment and how to manage the
risks. MDG 1010. Department of Minerals Resources, Sydney.

Standards Australia (1998) AS/NZ 3931: Risk Analysis to Technological Systems – Application
Guide. Standards Australia, Sydney.

Standards Australia (1999) AS/NZ 4360: 1995: Risk Management, Standards Australia, Sydney.