



**Industry &
Investment**

Risk assessment workbook for mines

**Metalliferous, extractive and opal
mines, and quarries**

IGA-019

December 2009

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OBJECTIVE

This workbook is designed to give the user a starting point to identify and manage hazards at the mine site. It is a step-by-step approach to identify hazards, assess risks and implement controls.

It is consistent with other NSW Mine Safety Operations publications such as the *Risk Management Pocket Guide* and the *General Workplace Inspection Checklist*.

The *Risk Management Pocket Guide* provides a daily prompt for people on the job to develop their understanding and experience by encouraging the daily discipline of managing risks whilst carrying out tasks in the mining and quarrying industries.

This workbook is designed to take those principles from the *Risk Management Pocket Guide* and implement them at the mine site from the front gate to the back gate, prompting the user to look at a wide range of hazards.

This workbook uses a simplified form of a Workplace Risk Assessment and Control (WRAC). It does not cover all hazards and the user should add those hazards not identified in the workbook.

This workbook highlights the prescribed hazards from the *Mine Health and Safety Regulation 2007* and the *Occupational Health and Safety Regulation 2001*.

This workbook allows the user to assess the risks from the identified hazards from low to high. This should enable the user to have a better understanding of what hazards have a high risk and thus examine if existing controls used are appropriate or need to be reviewed.

The General Workplace Inspection Checklist can then be used to ensure that the controls put in place are effective, utilised and maintained.

This workbook should be reviewed on a regular basis to ensure that all identified hazards are being effectively and efficiently controlled.

WHY DO RISK ASSESSMENTS?

Risk assessments will help mine operators to identify high, medium and low risk levels. This is a requirement of the *Occupational Health and Safety Act 2000* (refer Sections 7 & 8). Risk assessments will help to prioritise the risks and provide information on the need to safely control the risks. In this way, mine owners and operators will be able to implement safety improvements.

WHAT IS RISK ASSESSMENT?

A risk assessment involves a detailed and systematic examination of any activity, location or operational system to identify hazards. The assessment will consider the relationship between the likelihood and potential consequence of the risk of hazards occurring, and to review the current or planned approaches to controlling the hazards. New or improved hazard controls are added where required.

DEFINITIONS

1. Hazard

A hazard is *a source of potential harm or a situation with potential to cause harm* (AS/NZS 4360 *Risk Management*).

Identifying hazards and compiling information about them is the first step in planning for safety.

2. Prescribed Hazard

The *Mine Health & Safety Regulation 2007* requires mines to conduct OH&S risk assessments in relation to certain high risk, prescribed hazards associated with ground instability, inrush, atmospheric contamination, mine shafts, conveyors, earth moving machinery, fire, explosives, electrical work and mine roads.

If you identify a prescribed hazard, the *Mine Health & Safety Regulation 2007* clause 35 requires you to take into account certain factors that are relevant to the hazard. These factors are:

- (a) the time, place and location of the hazard;
- (b) work organisation relating to the hazard;
- (c) work environment relating to the hazard;
- (d) the skills and experience of persons dealing with the hazard;
- (e) the age of persons dealing with the hazard;
- (f) special needs (temporary or permanent) relevant to the hazard;
- (g) any other factors considered relevant by the operator, by any other employer at the mine, by any employee of the operator or such an employer, or by any representative of any such employee on health and safety issues.

3. Risk

Risk is defined as *the chance of something happening that will have an impact upon objectives (AS/NZS 4360 Risk Management)*. In other words, risk is the chance of something happening that will have a negative impact on the health or safety of a person.

Risks are measured in terms of likelihood and consequence.

Risk = Likelihood (Probability) of an occurrence x Consequences of the occurrence

The highest risk levels (i.e. most severe consequences and highest likelihood of occurring) should be controlled or minimised first.

4. Workplace Risk Assessment and Control (WRAC)

WRAC is a proactive or pre-event approach to examining any or all parts of the work site to ensure that risks are understood and controlled to a reasonable level. It is *'a participative approach for identifying potential production or maintenance operational losses (MDG1010 Risk Management Handbook for the Mining Industry).'*

WRAC is a specific qualitative risk assessment method designed to be applied when an organisation wants to understand its risks and clearly identify the priority or highest risks in its operation.

5. Standards

Standards can be taken to mean Australian Standards, International Standards, Guidelines, Legislation, Codes of Practice, even the mine's own set of standards.

HOW DO I USE THE RISK ASSESSMENT WORKBOOK?

This workbook provides a step-by-step approach to identify hazards, assess risks and allows the user to identify and list controls. The process identifies where a likelihood and consequence of harm could occur to a person in and around the mine. It records specific hazards, possible problems and risks levels.

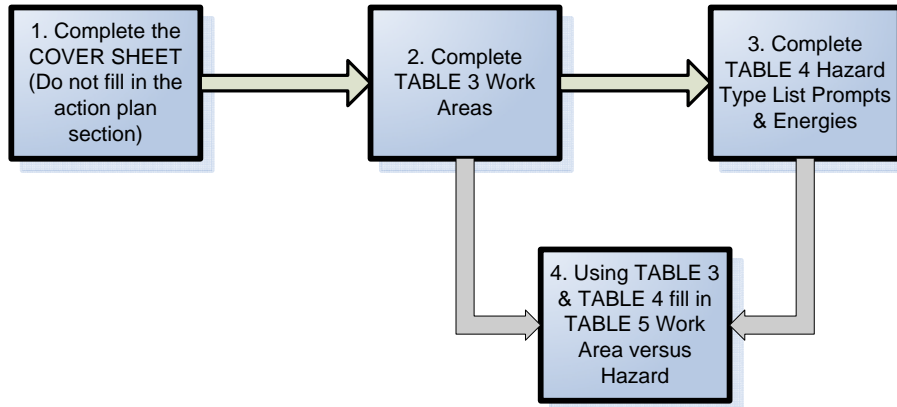
The workbook consists of 3 stages:

- 1 [Cover Sheet](#) and [Hazard Type List – Prompts and Energies](#)
- 2 [Risk Assessment](#)
- 3 [Action Planning](#)

It is important that you take the time to read these instructions for the next 3 stages.

STAGE 1

HAZARD IDENTIFICATION



1. Go to the [Cover Sheet](#) and fill in the mine name, date of the assessment, assessors' names and signatures. (See example 1 below). Do not fill in the action plan section until you have completed Stage 2.

COVER SHEET

RISK ASSESSMENT WORKBOOK	
Mine Name:	<i>ACME Quarry</i>
Date:	<i>1 September 2008</i>
Assessor's Name:	Assessor's Signature:
<i>John Citizen</i>	<i>J. Citizen</i>
<i>Jane Citizen</i>	<i>Jane Citizen</i>
Action Plan Written:	
Date:	
By:	
Review	
Date:	
By:	

Example 1 Cover Sheet

2. Complete 'TABLE 3 Work Areas' by ticking the boxes that apply at your mine site.

EXAMPLES

TABLE 3 Work Areas (Tick what work areas apply at your mine site)

SURFACE MINE (e.g. quarry, open cut, pit, sand or gravel operation, dredging)	UNDER GROUND MINE (e.g. ground support, access egress ventilation)	FACILITIES (e.g. workshop, fuel, chemical ,explosive storage, generator)	PLANT / TREATMENT FACILITY (e.g. fixed plant, conveyors, crushers, screens, mobile plant, dredges)	ADMINISTRATION (e.g. buildings, structures, weighbridge and other facilities)
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

Example 2 A hard rock quarry that uses explosives, crushes rock, has a laboratory and weighbridge

TABLE 3 Work Areas (Tick what work areas apply at your mine site)

SURFACE MINE (e.g. quarry, open cut, pit, sand or gravel operation, dredging)	UNDER GROUND MINE (e.g. ground support, access egress ventilation)	FACILITIES (e.g. workshop, fuel, chemical ,explosive storage, generator)	PLANT / TREATMENT FACILITY (e.g. fixed plant, conveyors, crushers, screens, mobile plant, dredges)	ADMINISTRATION (e.g. buildings, structures, weighbridge and other facilities)
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Example 3 a sand mine that is worked by a front end loader into a sand dune with no workshop, screening plant or weighbridge

Example 3- TABLE 3 Work Areas (Tick what work areas apply at you mine site)

SURFACE MINE (e.g. quarry, open cut, pit, sand or gravel operation, dredging)	UNDER GROUND MINE (e.g. ground support, access egress ventilation)	FACILITIES (e.g. workshop, fuel, chemical ,explosive storage, generator)	PLANT / TREATMENT FACILITY (e.g. fixed plant, conveyors, crushers, screens, mobile plant, dredges)	ADMINISTRATION (e.g. buildings, structures, weighbridge and other facilities)
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

Example 4 An underground mine that uses explosives, crushes ore or rock, with a workshop, screening plant and weighbridge

3. Now go to [Table 4 'Hazard Type List – Prompts and Energies'](#) which groups hazards with similar properties.

Using this table, tick the hazard types that exist at the mine and complete the relevant section of the hazard type list.

For example if the mine site uses petrol, tick the DUST, CHEMICALS & HAZARDOUS SUBSTANCES box. If the mine does not use explosives then leave the EXPLOSIVES box blank. If a section is not ticked then record why under the “Reason(s) for not ticking”. It is good practise to record why any section has not been used e.g. “no explosives on mine site”.

TABLE 4 - Hazard Type List Prompts & Energies

Tick if it applies	Section	Page	Reason(s) for not ticking
<input checked="" type="checkbox"/>	DUST, CHEMICALS & HAZARDOUS SUBSTANCES <ul style="list-style-type: none"> Chemicals and dusts that can affect health such as silica, asbestos, lead and other dusts. Flammable gases such as acetylene, LPG and methane. Chemical fumes from welding/cutting, grinding, glues, grouts, fuels. Chemicals such as petrol, diesel, oils, degreasers, solvents, chlorine, pesticides, cleaners, paints. Gases such as H₂S, CO, CO₂, NO_x etc, Explosive Dusts such as coal and sulphide ore dusts 	23 - 26	
<input checked="" type="checkbox"/>	ELECTRICAL ENERGIES <ul style="list-style-type: none"> Energy from apparatus such as electrical switchboards, control panels, power points, light fittings, switches, power tools, flexible leads, power boards, generators, etc 	27 - 30	
<input type="checkbox"/>	EXPLOSIVES <ul style="list-style-type: none"> Explosive transport, storage and handling 	31 - 32	<i>No explosives use on site</i>

Example 5

Example 5 (above) shows that the DUST, CHEMICALS & HAZARDOUS SUBSTANCES box is ticked because the mine uses diesel, welds, grinds, etc. The ELECTRICAL ENERGIES box is ticked as the mine uses electricity for power tools and lighting. This particular mine does not use explosives so the EXPLOSIVES box is left blank. “No explosives are used on site” has been recorded.

It is important to look at all aspects of the mine site and include all work places (offices, buildings, mining areas, stockpiles, plant, treatment facilities, etc) and apply each of the hazard types to those areas of the mine.

4. Now go to [Table 5 'Work Area versus Hazards'](#) which is a matrix that has been provided to identify the types of hazards that may exist in each work area.

Transfer the tick areas from [Table 3 'Work Areas'](#) into the top row of [Table 5 'Hazards versus Work Area'](#).

Transfer the tick areas from [Table 4 'Hazard Type List – Prompts and Energies'](#) into the first column of [Table 5 'Hazards versus Work Area'](#)

Complete the matrix which will provide a snapshot of hazard types found at your mine.

Table 5 Work Area versus Hazard

		SURFACE MINE (e.g. quarry, open cut, pit, sand or gravel operation, dredging)	UNDER GROUND MINE (e.g. ground support, access egress ventilation)	FACILITIES (e.g. workshop, fuel, chemical ,explosive storage, generator)	PLANT / TREATMENT FACILITY (e.g. fixed plant, conveyors, crushers, screens, mobile plant, dredges)	ADMINISTRATION (e.g. buildings, structures, weighbridge and other facilities)
Tick the work areas that apply →		<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Tick the hazards that apply ↓		<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
DUST, CHEMICALS & HAZARDOUS SUBSTANCES	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
ELECTRICAL ENERGIES	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
EXPLOSIVES	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
GRAVITATIONAL ENERGIES	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
RADIATION ENERGIES, THERMAL ENERGIES AND FIRES	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
MECHANICAL ENERGIES	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
PRESSURE (FLUIDS/GASES)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
WORK ENVIRONMENT	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

Example 6 Completed TABLE 5

Example 6 shows a quarry that extracts material by ripping and tearing, crushes rock, and has a laboratory and weighbridge. The user has transferred the ticks from TABLE 3 into the top part of Table 5. In this example, SURFACE MINE, SURFACE FACILITIES, PLANT / TREATMENT FACILITY, and ADMINISTRATION have been ticked.

The user has then transferred the ticks from TABLE 4 into the first column in TABLE 5. Notice that in this example, all of the hazards for this quarry have been ticked except EXPLOSIVES as the quarry does not use explosives.

The user then completes the matrix aligning the work areas with the hazards that occur at that particular work area.

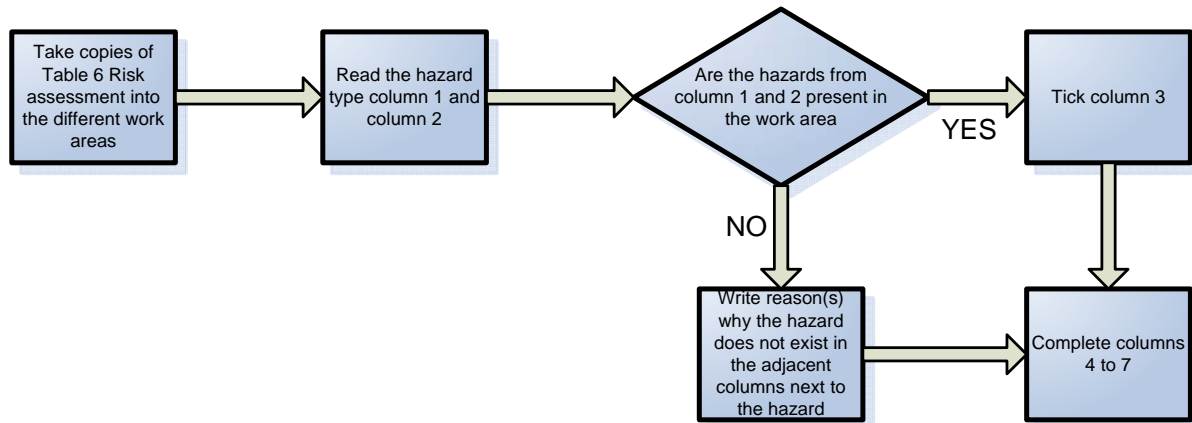
		Tick the work areas that apply →				
		SURFACE MINE (e.g. quarry, open cut, pit, sand or gravel operation, dredging)	UNDER GROUND MINE (e.g. ground support, access egress ventilation)	FACILITIES (e.g. workshop, fuel, chemical storage, generator)	PLANT / TREATMENT FACILITY (e.g. fixed plant, conveyors, crushers, screens, mobile plant, dredges)	ADMINISTRATION (e.g. buildings, structures, weighbridge and other facilities)
Tick the hazards that apply ↓		<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
DUST, CHEMICALS & HAZARDOUS SUBSTANCES	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
ELECTRICAL ENERGIES	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

The hazards identified for this quarry include DUST, CHEMICALS & HAZARDOUS SUBSTANCES which occur at the SURFACE MINE, FACILITIES and the PLANT / TREATMENT FACILITY. This means that the risk assessment for DUST, CHEMICALS & HAZARDOUS SUBSTANCES from [Table 6 'RISK ASSESSMENT'](#) needs to be completed for each work area (i.e.3 times).

It also shows that the hazards for ELECTRICAL ENERGIES occur at the FACILITIES, PLANT / TREATMENT FACILITY and the ADMINISTRATION area. This means that the risk assessment for ELECTRICAL ENERGIES from [Table 6 'RISK ASSESSMENT'](#) needs to be completed for each work area (i.e. 3 times).

STAGE 2

RISK ASSESSMENT



[Table 6 'RISK ASSESSMENT'](#) includes a list of hazards or prompts; this list is used to help identify the hazards that could occur at the mine. This is the actual risk assessment of the mine site. Space is provided to list other hazards identified at the mine site that are not listed in this workbook.

[Table 6 'RISK ASSESSMENT'](#) should be used while physically walking through the identified work areas (from [Table 5 'Work Area versus Hazards'](#)).

To complete [Table 6 'RISK ASSESSMENT'](#) begin by looking at each of the hazard prompts, located in the first 2 columns. Continue to identify the hazards and resultant problems that **could** occur. That is, problems that are foreseeable and realistic, and based upon a working knowledge of the mine site.

If the hazard or prompt does not exist at your mine site, it would be good practise to write why the hazard or prompt does not exist. (Use column 5 Reason for Selecting the Likelihood).

For example, Dust, Chemicals and Hazardous Substances are used at this site but asbestos is not present, so record next to the asbestos prompt "no asbestos on site".

Carry out the following steps:

Hazard Identification:

1. Work through the first 2 columns from [Table 6 'RISK ASSESSMENT'](#).
2. Decided from the hazard type and the related prompts, listed in the first 2 columns, if they are present or possible at your mine.
3. Place a tick in column 3 for each prompt (column 2) that is present or possible.

Note: if you decide that the hazard type and the related prompt does not exist then write your reason(s) why in the adjacent columns (see example on next page).

DUST, CHEMICALS & HAZARDOUS SUBSTANCES		Work Area: <i>Surface mine</i>
1 HAZARD TYPE	2 Are any of these present / possible or considered?	3 ✓ if applies
1 <i>Dusts that can effect health such as silica</i>	1.1 creation and/or accumulation of amounts sufficient to effect health	✓
	1.2 confined space exposures	<i>No confined spaces on site</i>
	1.3 dust monitoring and analysis	✓
	1.4 other -	
2 <i>Asbestos</i>	2.1 asbestos on mine site includes naturally occurring and manufactured products	<i>No asbestos on site</i>
	2.2 other -	
WORK PREMISES OHSR cl 43 "ASBESTOS"		
3 <i>Other dusts that can effect operations</i>	3.1 dust levels that effect operators visibility	✓
	3.2 dust levels that effect equipment	✓
	3.3 combustible dusts such as sulphide or coal	<i>None on site</i>

Risk Assessment:

4. Next, fill in the LIKELIHOOD Level (column 4). Refer to Likelihood Level from the Risk Classification Sheet ([Table 1](#)). Think about how *Likely* the problem identified will happen.

2 Are any of these present / possible or considered?	3 ✓ if applies	4 Likelihood Level	5 Reason for Selecting the Likelihood	6 Maximum Consequence	7 Risk Rating
1.1 creation and/or accumulation of amounts sufficient to effect health	✓	<i>L4</i>			
1.2 confined space exposures	<i>No confined spaces on site</i>				
1.3 dust monitoring and analysis	✓	<i>L3</i>			
1.4 other -					

5. Write in the next column (column 5 Reason for selecting the Likelihood) the REASON for selecting this likelihood. This reason could be based on your knowledge of the mine's safety history, safety alerts, incidents at similar types of mines, etc.

2 Are any of these present / possible or considered?	3 ✓ if applies	4 Likelihood Level	5 Reason for Selecting the Likelihood	6 Maximum Consequence	7 Risk Rating
1.1 creation and/or accumulation of amounts sufficient to effect health	✓	<i>L4</i>	<i>Dust tests indicate no harmful effects</i>		
1.2 confined space exposures	<i>No confined spaces on site</i>				
1.3 dust monitoring and analysis	✓	<i>L3</i>	<i>Last dust test 3 years ago</i>		
1.4 other -					

6. Fill in the MAXIMUM CONSEQUENCE column. Refer to the Consequence Level from the Risk Classification Sheet ([Table 1](#)). Think how serious, or what

would be the most likely *Consequence* to persons and/or the mine if that problem did in fact happen. Consider *consequence* independently of *likelihood*.

2 Are any of these present / possible or considered?	3 ✓ if applies	4 Likelihood Level	5 Reason for Selecting the Likelihood	6 Maximum Consequence	7 Risk Rating
1.1 creation and/or accumulation of amounts sufficient to effect health	✓	L5	Dust tests indicate no harmful effects	C2	
1.2 confined space exposures	No confined spaces on site				
1.3 dust monitoring and analysis	✓	L3	Last dust test 3 years ago	C2	
1.4 other -					

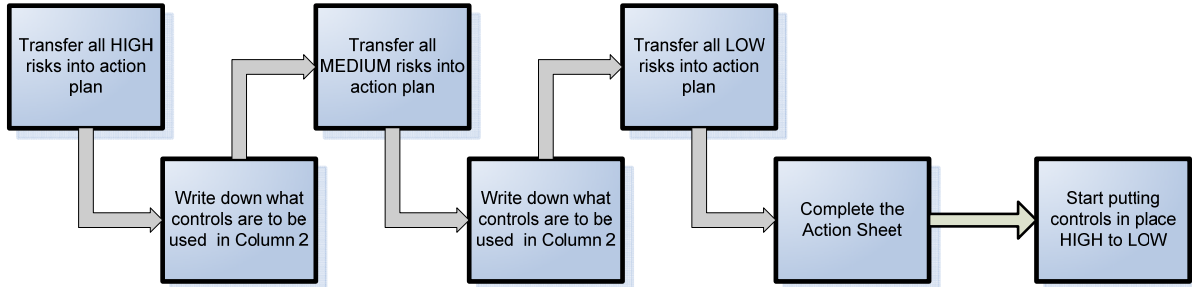
7. Having determined the Likelihood (L1 – L5) and Consequence (C1 – C5), of the hazard select the **RISK RATING** from the Risk Matrix ([Table 2](#)). Write the level (High, Medium or Low) in the last column (Risk Rating).

2 Are any of these present / possible or considered?	3 ✓ if applies	4 Likelihood Level	5 Reason for Selecting the Likelihood	6 Maximum Consequence	7 Risk Rating
1.1 creation and/or accumulation of amounts sufficient to effect health	✓	L5	Dust tests indicate no harmful effects	C2	Low
1.2 confined space exposures	No confined spaces on site				
1.3 dust monitoring and analysis	✓	L3	Last dust test 3 years ago	C2	Medium
1.4 other -					

NOTE: This workbook may be modified to accommodate the mine's own risk management program. Mines should be consistent when using risk management programs and should use its own risk assessment (classification system) where appropriate.

STAGE 3

ACTION PLANNING



Where a hazard has been identified and assessed for risk, there is a duty to take action to eliminate the risk or, if elimination can not be achieved, minimise the risk.

After identifying the hazards and risk rating them, complete [Table 7 'Action Planning Sheet \(Risk Assessment Summary\)'](#) by:

Carry out the following steps:

- Using [Table 7](#), fill in the item No. from column 2 of [Table 6](#), starting with the hazards that have been identified as high, then the medium hazards and then finally the low risk hazards. Only enter the item number for the hazard in column 1 of [Table 7](#).

1 Item No.	2 ACTIONS for all HIGH / MEDIUM / LOW Risk Classifications (strike out which doesn't apply)
59.4	
59.6	

- Write down the actions required to control the hazards in the Actions Column (column 2). Use the [HIERACHY OF CONTROLS](#) (page 8) and select the best control possible. There may be controls already in place. Write these down and review these against the [HIERACHY OF CONTROLS](#), and improve where possible. List other controls that may be missing.

1 Item No.	2 ACTIONS for all HIGH / MEDIUM / LOW Risk Classifications (strike out which doesn't apply)
59.4	<i>Install non slip flooring</i>
	<i>Supply appropriate footwear</i>
	<i>PPE Register</i>
	<i>Add footwear to inspection checklist</i>
59.6	<i>Fix broken steps to AS 1657</i>
	<i>Add stairs and ladders to inspection checklist</i>

- Nominate someone who will be responsible for ensuring that the actions for that hazard will be undertaken and record this in column 3.

2 ACTIONS for all HIGH / MEDIUM / LOW Risk Classifications (strike out which doesn't apply)	3 Action by Whom
<i>Install non slip flooring</i>	<i>J. Bloggs</i>
<i>Supply appropriate footwear</i>	<i>J. Citizen</i>
<i>PPE Register</i>	<i>J. Bloggs</i>
<i>Add footwear to inspection checklist</i>	<i>J. Bloggs</i>
<i>Fix broken steps to AS 1657</i>	<i>J. Citizen</i>
<i>Add stairs and ladders to inspection checklist</i>	<i>J. Bloggs</i>

- Put realistic target dates as to when the actions will be completed in column 4.
- When the actions have been completed review those actions to ensure that they are appropriate and best control the hazard. If so, write in the completion date in column 5.

6. When you have completed the Action Planning stage go back to the cover sheet and complete the bottom section.

COVER SHEET	
RISK ASSESSMENT WORKBOOK	
Mine Name:	<i>ACME Quarry</i>
Date:	<i>1 September 2008</i>
Assessor's Name:	Assessor's Signature:
<i>John Citizen</i>	<i>J. Citizen</i>
<i>Jane Citizen</i>	<i>Jane Citizen</i>
Action Plan Written:	
Date:	<i>30 September 2008</i>
By:	<i>J. Bloggs & J Citizen</i>
Review	
Date:	<i>1 September 2009</i>
By:	

This has now gone some way to recording and managing hazards at the mine site. However, it must be remembered that this is not a comprehensive list and there may be other hazards at your site that are not listed. Ensure any additional hazards are added to this workbook.


HIERACHY OF CONTROLS

Hazard control often involves limiting the exposure of persons to risks or hazards. It is important that control measures are considered in the order providing the greatest effect.

When selecting a control for an identified hazard, always choose the highest measure of control possible.

In practice, it may be necessary to use a combination of the different approaches to control a hazard.

The following order is recommended:

	<i>Best Control</i>	Elimination <i>Is it possible to eliminate the hazard altogether?</i>
		Substitution <i>Is it possible to replace the substance or, equipment with something less hazardous?</i>
		Isolation <i>Is it possible to stop persons from interacting with the hazard e.g. machine guarding, remote handling?</i>
		Engineering <i>Where people have to interact with a hazard is it possible to engineer a less hazardous solution e.g. stairs instead of a ladder, ventilation devices, refuel machinery from the ground?</i>
		Administrative <i>Is it possible to lessen the exposure of people through changing the way the job is done, rotating people through the job, administrative controls such as training, high risk permits?</i>
	<i>Worst Control</i>	PPE <i>Last resort – is PPE appropriate to the type, level of hazard and has it been selected correctly?</i>

REFERENCES

[NSW Mine Health and Safety Act 2004](#)

[NSW Mine Health and Safety Regulations 2007](#)

[NSW Occupation Health and Safety Act 2000](#)

[NSW Occupation Health and Safety Regulations 2001](#)

[NSW Explosives Act 2003](#)

[NSW Explosives Regulations 2005](#)

[NSW Department of Primary Industries Risk Management Pocket Guide](#)

[NSW Department of Primary Industries General Workplace Inspection Checklist](#)

[NSW Department of Primary Industries Small Mines Safety Management Kit](#)

[MDG 1010 Risk Management Handbook](#)

[MDG 1014 Guideline to reviewing a risk assessment of mine equipment and operations](#)

[MINERALS INDUSTRY SAFETY HANDBOOK](#)

RISK CLASSIFICATION SHEET

METHOD TO CLASSIFY RISK:

TABLE 1 Risk = Likelihood (Probability) x Consequence

Step 1 Assess the Likelihood				Step 2 Assess the Consequences		
L1	Happens every time we operate	Almost Certain	Common or repeating occurrence	C1	Fatality	Catastrophic
L2	Happens regularly (often)	Likely	Known to have occurred "has happened"	C2	Permanent disability	Major
L3	Has happened (occasionally)	Possible	Could occur or "heard of it happening"	C3	Medical/hospital or lost time	Moderate
L4	Happens irregularly (almost never)	Unlikely	Not likely to occur	C4	First aid or no lost time	Minor
L5	Improbable (never)	Rare	Practically impossible	C5	No injury	Insignificant

Once the likelihood L1 to L5 (Table 1 Step 1) and consequence numbers C1 to C5 (Table 1 Step 2) are selected, a single Risk Rating can be selected from the risk Matrix (Table 2) below:

TABLE 2 Risk Matrix

Risk Rank Likelihood x Consequence	L1 Almost Certain	L2 Likely	L3 Possible	L4 Unlikely	L5 Rare	RISK RATING High Risk 1 – 6 Medium Risk 7 – 15 Low Risk 16 – 25
C1 Catastrophic	1	2	4	7	11	
C2 Major	3	5	8	12	16	
C3 Moderate	6	9	13	17	20	
C4 Minor	10	14	18	21	23	
C5 Insignificant	15	19	22	24	25	

(Note: we conduct our risk assessment with the current controls in place)

Example: Likelihood is **L2**, Consequence is **C2**, and then Risk Rating is 5 or **HIGH**.

COVER SHEET

RISK ASSESSMENT WORKBOOK	
Mine Name:	
Date:	
Assessor's Name:	Assessor's Signature:
Action Plan Written:	
Date:	
By:	
Review	
Date:	
By:	

TABLE 3 Work Areas (Tick what work areas apply at you mine site)

SURFACE MINE <small>(e.g. quarry, open cut, pit, sand or gravel operation, dredging)</small>	UNDER GROUND MINE <small>(e.g. ground support, access egress ventilation)</small>	FACILITIES <small>(e.g. workshop, fuel, chemical ,explosive storage, generator)</small>	PLANT / TREATMENT FACILITY <small>(e.g. fixed plant, conveyors, crushers, screens, mobile plant, dredges)</small>	ADMINISTRATION <small>(e.g. buildings, structures, weighbridge and other facilities)</small>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

TABLE 4 - Hazard Type List Prompts & Energies

Tick if it applies	<u>Section</u>	<u>Page</u>	<u>Reason(s) for not ticking</u>
<input type="checkbox"/>	DUST, CHEMICALS & HAZARDOUS SUBSTANCES <ul style="list-style-type: none"> • Chemicals and dusts that can affect health such as silica, asbestos, lead and other dusts. • Flammable gases such as acetylene, LPG and methane. • Chemical fumes from welding/cutting, grinding, glues, grouts, fuels. • Chemicals such as petrol, diesel, oils, degreasers, solvents, chlorine, pesticides, cleaners, paints. • Gases such as H₂S, CO, CO₂, NO_x etc, Explosive Dusts such as coal and sulphide ore dusts 	23 - 26	
<input type="checkbox"/>	ELECTRICAL ENERGIES <ul style="list-style-type: none"> • Energy from apparatus such as electrical switchboards, control panels, power points, light fittings, switches, power tools, flexible leads, power boards, generators, etc 	27 - 30	
<input type="checkbox"/>	EXPLOSIVES <ul style="list-style-type: none"> • Explosive transport, storage and handling 	31 - 32	
<input type="checkbox"/>	GRAVITATIONAL ENERGIES <ul style="list-style-type: none"> • Gravitational sources such as roofs, backs, sides, floor, high walls (collapse or slump of wall, materials falling off, equipment or people going over), slopes, grades, ramps (where equipment can move in an uncontrolled manner), items falling, such as components, tools, structures, and persons falling from heights. 	33 - 40	
<input type="checkbox"/>	RADIATION ENERGIES, THERMAL ENERGIES AND FIRES <ul style="list-style-type: none"> • Radiation such as sunshine, welding, measuring devices. • Thermal heat sources such as electrical apparatus, engines, pumps, friction points such as bearings, idlers, etc. • Potential for any source of fire. 	41 - 44	
<input type="checkbox"/>	MECHANICAL ENERGIES <ul style="list-style-type: none"> • Fixed mechanical equipment such as conveyors, crushers, screens, processing plant. • Mobile mechanical equipment such as trucks, loaders, dozers, utes, rail, winders, drills, shovels, excavators, dredges and portable equipment such as compressors. 	45 - 48	
<input type="checkbox"/>	PRESSURE (FLUIDS/GASES) <ul style="list-style-type: none"> • Pressures arising from <ul style="list-style-type: none"> ○ Water (including in pipes, dams, adjacent mines/pits, adjacent workings). ○ Foul air (including gases in containers, adjacent workings). ○ Hydraulic, pneumatic or water pressure from pump stations and reticulation or equipment and storage. ○ Store pressure/energy such as accumulators, spring/tension devices/steam from overheated pumps. 	49 - 53	
<input type="checkbox"/>	WORK ENVIRONMENT <ul style="list-style-type: none"> • Buildings, structures, conditions, maintenance, cleaning. • Ventilation, lighting, noise, vibration, slips/trips, biological exposures hot & cold environments. • Hygiene facilities, storage. • Manual handling. • Wildlife, external threats. • Confined spaces. • Miscellaneous areas. 	54 - 61	

TABLE 5 Hazard versus Work Area

Use this table to identify what hazard types exist in the various work areas of your mine, and then apply the following risk assessments (table 4) at each of those work areas.

		SURFACE MINE (e.g. quarry, open cut, pit, sand or gravel operation, dredging)	FACILITIES (e.g. workshop, fuel, chemical, explosive storage, generator)	PLANT / TREATMENT FACILITY (e.g. fixed plant, conveyors, crushers, screens, mobile plant, dredges)	UNDER GROUND MINE (e.g. ground support, access egress ventilation)	ADMINISTRATION (e.g. buildings, structures, weighbridge and other facilities)
Tick the work areas that apply (from TABLE 3) →		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Tick the hazards that apply (TABLE 4) ↓		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
DUST, CHEMICALS & HAZARDOUS SUBSTANCES	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
ELECTRICAL ENERGIES	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
EXPLOSIVES	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
GRAVITATIONAL ENERGIES	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
RADIATION ENERGIES, THERMAL ENERGIES AND FIRES	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
MECHANICAL ENERGIES	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
PRESSURE (FLUIDS/GASES)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
WORK ENVIRONMENT	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

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TABLE 6 RISK ASSESSMENT

DUST, CHEMICALS & HAZARDOUS SUBSTANCES				Work Area:		
1 HAZARD TYPE	2 Are any of these present / possible or considered?	3 ✓ if applies	4 Likelihood Level	5 Reason for Selecting the Likelihood	6 Maximum Consequence	7 Risk Rating
1 <i>Dusts that can effect health such as silica</i>	1.1 creation and/or accumulation of amounts sufficient to effect health					
	1.2 confined space exposures					
	1.3 dust monitoring and analysis					
	1.4 other -					
2 <i>Asbestos</i> WORK PREMISES OHSR cl 43 "ASBESTOS"	2.1 asbestos on mine site includes naturally occurring and manufactured products					
	2.2 other -					
3 <i>Other dusts that can effect operations</i>	3.1 dust levels that effect operators visibility					
	3.2 dust levels that effect equipment					
	3.3 combustible dusts such as sulphide or coal					
	3.4 other -					
4 <i>Explosive dusts / ores such as sulphide dust</i> PRESCRIBED HAZARD MHSR cl 40 & 53 "FIRE AND EXPLOSION"	4.1 creation and/or accumulation of explosive amounts (also consider explosive gas/dust mixture)					
	4.2 exposure to ignition sources					
	4.3 type and placement of fire fighting equipment					
	4.4 dust suppression systems					
	4.5 other -					

DUST, CHEMICALS & HAZARDOUS SUBSTANCES				Work Area:		
1 HAZARD TYPE	2 Are any of these present / possible or considered?	3 ✓ if applies	4 Likelihood Level	5 Reason for Selecting the Likelihood	6 Maximum Consequence	7 Risk Rating
5 Fines or build up of combustible particles PRESCRIBED HAZARD MHSR cl42 & 58-68 "ELECTRICITY" MHSR cl 40 & 53 "FIRE AND EXPLOSION"	5.1 build up on potential ignition sources e.g. electrical energy source					
	5.2 fines build up that effects equipment operation					
	5.3 type and placement of fire fighting equipment					
	5.4 other –					
6 Use of flammable gases such as Acetylene, LPG	6.1 escape and/or accumulation of flammable levels					
	6.2 exposure to heat sources					
	6.3 cylinders stored and used to standard					
	6.4 type and placement of fire fighting equipment					
	6.5 PPE					
	6.6 Material Safety Data Sheets (MSDS)					
	6.7 other -					
7 Chemical fumes such as from welding/cutting, grinding, glues/grouts, diesels	7.1 escape and/or accumulation of amounts sufficient to effect health					
	7.2 confined space exposures					
	7.3 ventilation					
	7.4 MSDS					
	7.5 other –					

DUST, CHEMICALS & HAZARDOUS SUBSTANCES				Work Area:		
1 HAZARD TYPE	2 Are any of these present / possible or considered?	3 ✓ if applies	4 Likelihood Level	5 Reason for Selecting the Likelihood	6 Maximum Consequence	7 Risk Rating
8 <i>Gases such as H₂S, CO, CO₂ NO_x (including general ventilation)</i>	8.1 escape and/or accumulation of amounts sufficient to affect persons (e.g. vehicle emissions, blasting) 8.2 confined space exposures (ventilation issues) 8.3 exposure to heat sources 8.4 outburst of gas (underground) 8.5 type and placement of fire fighting equipment 8.6 other -					
9 <i>Chemicals such as petrol, diesel, oils, degreasers, solvents</i>	9.1 exposure of chemical to heat source 9.2 leaks/spills (no bunding) 9.3 storage to standard 9.4 MSDS 9.5 type and placement of fire fighting equipment 9.6 other -					
10 <i>Chemicals that may affect health such as cleaners, oils/lubes, solvents, degreaser</i>	10.1 exposure of chemical to contact, ingestion or inhalation situations (MSDS available) 10.2 leaks/spills 10.3 storage, handling and security 10.4 other –					

DUST, CHEMICALS & HAZARDOUS SUBSTANCES				Work Area:		
1 HAZARD TYPE	2 Are any of these present / possible or considered?	3 ✓ if applies	4 Likelihood Level	5 Reason for Selecting the Likelihood	6 Maximum Consequence	7 Risk Rating
11 Atmosphere – diesel pollutants (Underground Only) PRESCRIBED HAZARD MHSR cl 49 “MINIMISATION OF POLLUTANTS FROM DIESEL PLANT”	11.1 Airflows have been determined by the dilution required to achieve the atmospheric limits specified by the NOHSC 1003 Standard 11.2 Exhaust conditions are used on engines greater than 100kW 11.3 Exhaust gases are sampled and analysed on a regular basis 11.4 Exhausted or contaminated air at the surface is not used for ventilation of the mine 11.5 other -					
	12.1 other -					

ELECTRICAL ENERGIES				Work Area:		
1 HAZARD TYPE	2 Are any of these present / possible or considered?	3 ✓ if applies	4 Likelihood Level	5 Reason for Selecting the Likelihood	6 Maximum Consequence	7 Risk Rating
13 Electricity PRESCRIBED HAZARD MHSR cl 42 & 58-68 "ELECTRICITY" WORK PREMISES OHSR cl 41 "ELECTRICITY" USE OF PLACES OF WORK OHSE cl 64 "ELECTRICITY" HAZARDOUS PROCESSES OHSE cl 205 - 208 "ELECTRICAL WORK"	13.1 high voltage installations (design, manufacture, construction, installation, commissioning, operation, maintenance, repair, decommissioning, disposal)					
	13.2 injury to persons from sources of electrical energy					
	13.3 unintended operation of plant					
	13.4 electrical safeguards with appropriate safety integrity					
	13.5 type and placement of fire fighting equipment					
	13.6 electrical installations comply with AS3000 & AS3007					
	13.7 procedures for the safe removal and restoration of electrical power					
	13.8 testing, maintenance, authorisation					
	13.9 electrical cut-outs, earth continuity protection (415V or above), earth faults					
	13.10 earthing, touch, transfer or step potential, earth faults					
	13.11 lightning being transferred to underground parts of the mine					
	13.12 switch gear					
	13.13 electrical qualifications / competencies					

ELECTRICAL ENERGIES				Work Area:		
1 HAZARD TYPE	2 Are any of these present / possible or considered?	3 ✓ if applies	4 Likelihood Level	5 Reason for Selecting the Likelihood	6 Maximum Consequence	7 Risk Rating
	13.14 electrical supply authority 13.15 control panels, switchrooms, switchyards and substations, etc are suitably secured to prevent inadvertent access 13.16 persons entering an area in which electrical installations are situated are appropriately trained in issues such as safe entry, emergency procedures and safe use of electrical plant and equipment. 13.17 persons working in, or undertaking maintenance on, the mine site (apart from those undertaking electrical work) are prevented from coming within an unsafe distance from any overhead electrical power lines or live electrical installations 13.18 documentation of any significant modifications made to electrical circuits at the premises from the person doing the work and ensure that the documentation is maintained and kept readily accessible for persons undertaking further electrical work 13.19 PPE 13.20 test equipment 13.21 signage 13.22 other –					

ELECTRICAL ENERGIES				Work Area:		
1 HAZARD TYPE	2 Are any of these present / possible or considered?	3 ✓ if applies	4 Likelihood Level	5 Reason for Selecting the Likelihood	6 Maximum Consequence	7 Risk Rating
14 Electrical energy from apparatus such as cables, transformers, switch gear, connections, PRESCRIBED HAZARD MHSR cl 40 & 53 "FIRE AND EXPLOSION" USE OF PLACES OF WORK OHSE cl 64 "ELECTRICITY"	14.1 inappropriate exposure to energised electrical equipment (e.g. cable fault/contacts, cabinet open)					
	14.2 isolation error (tagging system)					
	14.3 electrical equipment failure					
	14.4 fires from electrical sources					
	14.5 type and placement of fire fighting equipment					
	14.6 electrical cord extension sets, flexible cables or fittings are located where they are not likely to be damaged (including damage by liquids) or are protected against any damage					
	14.7 electrical cord extension sets, flexible cables or fittings are not laid across passageways or access ways unless they are suitably protected					
	14.8 electrical equipment exposed to moisture, heat, vibration, corrosive substances or dust that is likely to result in damage.					
	14.9 other -					

ELECTRICAL ENERGIES				Work Area:		
1 HAZARD TYPE	2 Are any of these present / possible or considered?	3 ✓ if applies	4 Likelihood Level	5 Reason for Selecting the Likelihood	6 Maximum Consequence	7 Risk Rating
15 Electrical Equipment	15.1 poor condition / disrepair 15.2 inspection, testing and tagging to standard 15.3 other -					
16 Other:	16.1 other -					

EXPLOSIVES				Work Area:		
1 HAZARD TYPE	2 Are any of these present / possible or considered?	3 ✓ if applies	4 Likelihood Level	5 Reason for Selecting the Likelihood	6 Maximum Consequence	7 Risk Rating
17 Explosives Storage - including detonators	17.1 storage/magazine problems (not to standard)					
	17.2 transportation separation of detonators and explosives					
PRESCRIBED HAZARD MHSR cl 40 & 53 "FIRE AND EXPLOSION"	17.3 lightning strike on explosives storage					
	17.4 type and placement of fire fighting equipment					
	17.5 other –					
18 Handling Explosives	18.1 loading and stemming of blast holes					
PRESCRIBED HAZARD MHSR cl 41 & 54-57 "EXPLOSIVES"	18.2 connection of initiation systems					
	18.3 exclusion zones					
	18.4 ignition by electric charge					
	18.5 security of explosives					
	18.6 type and placement of fire fighting equipment					
	18.7 persons handling explosives unsupervised are licensed					
	18.8 register of people using explosives at the mine (BEUL & UHL)					
	18.9 coordination & communication between operator and shotfirer					
	18.10 other –					

EXPLOSIVES				Work Area:		
1 HAZARD TYPE	2 Are any of these present / possible or considered?	3 ✓ if applies	4 Likelihood Level	5 Reason for Selecting the Likelihood	6 Maximum Consequence	7 Risk Rating
19 Explosives – general <div style="border: 1px solid black; padding: 2px; background-color: #e0e0e0;"> PRESCRIBED HAZARD MHSR cl 41 & 54-57 "EXPLOSIVES" </div>	19.1 unauthorised person entering shot 19.2 inappropriate firing 19.3 dealing with misfire 19.4 flyrock occurrences 19.5 weather 19.6 noise & vibration 19.7 neighbours 19.8 other -					
20 Other:	20.1 other -					

GRAVITATIONAL ENERGIES				Work Area:		
1 HAZARD TYPE	2 Are any of these present / possible or considered?	3 ✓ if applies	4 Likelihood Level	5 Reason for Selecting the Likelihood	6 Maximum Consequence	7 Risk Rating
21 Roof / backs (Underground Only) PRESCRIBED HAZARD MHSR cl 36 & 46 "GROUND INSTABILITY"	21.1 falls of roof or backs					
	21.2 geology and geotechnical conditions					
	21.3 adequacy of installed ground support					
	21.4 monitoring the condition & stability of roof /backs					
	21.5 training person(s) in ground conditions & stability issues					
	21.6 storage of ground support materials					
	21.7 other -					
22 Rib / sides (Underground Only) PRESCRIBED HAZARD MHSR cl 36 & 46 "GROUND INSTABILITY"	22.1 spalling or slumps of ribs or sides					
	22.2 geology and geotechnical conditions					
	22.3 adequacy of installed ground support					
	22.4 monitoring the condition & stability of ribs / sides					
	22.5 training person(s) in ground conditions & stability issues					
	22.6 storage of ground support materials					
	22.7 other -					

GRAVITATIONAL ENERGIES				Work Area:		
1 HAZARD TYPE	2 Are any of these present / possible or considered?	3 ✓ if applies	4 Likelihood Level	5 Reason for Selecting the Likelihood	6 Maximum Consequence	7 Risk Rating
23 Floor PRESCRIBED HAZARD MHSR cl 36 & 46 "GROUND INSTABILITY"	23.1 floor heave or break up					
	23.2 geology and geotechnical conditions					
	23.3 monitoring the condition & stability of floors					
	23.4 training person(s) in ground conditions & stability issues					
	23.5 other -					
24 High wall / pit wall / stockpiles / berms PRESCRIBED HAZARD MHSR cl 36 & 46 "GROUND INSTABILITY"	24.1 collapse or slump of wall					
	24.2 materials falling off					
	24.3 equipment or persons going over					
	24.4 geology and geotechnical conditions					
	24.5 monitoring the condition & stability of pit walls, berms and stockpiles					
	24.6 training person(s) in ground conditions & stability issues					
	24.7 mine design & planning					
	24.8 other -					

GRAVITATIONAL ENERGIES				Work Area:		
1 HAZARD TYPE	2 Are any of these present / possible or considered?	3 ✓ if applies	4 Likelihood Level	5 Reason for Selecting the Likelihood	6 Maximum Consequence	7 Risk Rating
25 Mine excavations (includes access points to, or entrances to, shafts or other vertical openings, stopes, passes, winzes, mine or quarry faces, pit walls faces, trenches, costeans and pits) PRESCRIBED HAZARD MHSR cl 76 "MINE EXCAVATIONS"	25.1 fall and dislodgement of earth and rock					
	25.2 inrush of water and other substances					
	25.3 placement of excavated material					
	25.4 instability of the excavation and adjoining structure					
	25.5 instability due to persons or plant working adjacent to the excavation					
	25.6 unauthorised entry to the extraction area					
	25.7 access and egress (include emergency)					
	25.8 other -					

GRAVITATIONAL ENERGIES				Work Area:		
1 HAZARD TYPE	2 Are any of these present / possible or considered?	3 ✓ if applies	4 Likelihood Level	5 Reason for Selecting the Likelihood	6 Maximum Consequence	7 Risk Rating
26 Shafts (Underground Only) PRESCRIBED HAZARD MHSR cl 38 & 50-52 "SHAFTS" MHSR cl 40 & 53 "FIRE AND EXPLOSION"	26.1 falls of persons, plant substances or objects					
	26.2 unintentional movement of plant					
	26.3 unintended fire in shaft					
	26.4 type and placement of fire fighting equipment					
	26.5 maintenance, repairs of shafts and shaft conveyances					
	26.6 Safe Work Method Statements available for shaft construction, equipping, stripping, repair and maintenance					
	26.7 prevention of spillage into shaft from loading of equipment, gear or material					
	26.8 power disruptions					
	26.9 transportation of materials and equipment					
	26.10 other -					

GRAVITATIONAL ENERGIES				Work Area:		
1 HAZARD TYPE	2 Are any of these present / possible or considered?	3 ✓ if applies	4 Likelihood Level	5 Reason for Selecting the Likelihood	6 Maximum Consequence	7 Risk Rating
27 Mine road design and construction PRESCRIBED HAZARD MHSR cl 43 "MINE ROAD DESIGN AND CONSTRUCTION"	27.1 slope, cross-grade and width of road 27.2 road drainage 27.3 characteristics and line of sight of mobile plant 27.4 vehicle runaways 27.5 toppling/rolling over (berms not in place etc) 27.6 road maintenance 27.7 other –					
28 Subsidence & Ground Support (Underground Only) PRESCRIBED HAZARD MHSR cl 36 "GROUND INSTABILITY"	28.1 subsidence at or outside the mine 28.2 adequacy of installed ground support 28.3 access to subsidence zones 28.4 subsidence management plan 28.5 other -					

GRAVITATIONAL ENERGIES				Work Area:		
1 HAZARD TYPE	2 Are any of these present / possible or considered?	3 ✓ if applies	4 Likelihood Level	5 Reason for Selecting the Likelihood	6 Maximum Consequence	7 Risk Rating
29 Disused workings (Underground Only)	29.1 left unventilated if isolated from the ventilation system					
	29.2 securely barricaded to prevent access					
PRESCRIBED HAZARD MHSR cl 78 "DISUSED WORKINGS"	29.3 indicated on the mine plan					
	29.4 dangerous accumulations of gas or contaminants are prevented					
	29.5 re-entry to disused workings					
	29.6 other -					
30 Air blasts / wind	30.1 air/windblast					
	30.2 surface wind effect on structure/equipment					
PRESCRIBED HAZARD MHSR cl 36 "GROUND INSTABILITY"	30.3 unplanned movement of material into a void					
	30.4 hanging wall, pillar or crown collapse					
	30.5 other -					
31 Fall of things such as components, tools, structures	31.1 Frail and/or corroded structures or unstable structure locations					
	31.2 components/tools used in an unprotected manner at height					
	31.3 materials falling from elevated process, such as conveyors, stackers, grid mesh flooring,					
	31.4 other -					

GRAVITATIONAL ENERGIES				Work Area:		
1 HAZARD TYPE	2 Are any of these present / possible or considered?	3 ✓ if applies	4 Likelihood Level	5 Reason for Selecting the Likelihood	6 Maximum Consequence	7 Risk Rating
32 Objects / structures falling on people	32.1 raising and lowering of plant, materials and debris					
	32.2 secure barriers to prevent falling objects					
	32.3 arresting falling objects					
	32.4 no go zones					
	32.5 PPE					
	32.6 other					
33 Working at heights	33.1 stable and securely fenced work platforms (scaffolding) elevated work platforms					
WORK PREMISES OHSR cl 39 & 56 "FALL PREVENTION"	33.2 WorkCover licences (scaffolds, EWP)					
	33.3 secure perimeter screens, fencing, handrails, or other					
	33.4 fall arrestors, anchorage points,					
	33.5 safe means of movement between different levels					
	33.6 training,					
	33.7 inspection of fall arrest devices					
	33.8 emergency procedures					
	33.9 other -					

GRAVITATIONAL ENERGIES				Work Area:		
1 HAZARD TYPE	2 Are any of these present / possible or considered?	3 ✓ if applies	4 Likelihood Level	5 Reason for Selecting the Likelihood	6 Maximum Consequence	7 Risk Rating
34 <i>Fall of persons from height greater than 2 metres</i>	34.1 work locations at 2 metres or more with poor or no fall protection 34.2 elevated work access or passages with poor or no fall protection 34.3 other -					
35 <i>Other:</i>	35.1 other -					

RADIATION / THERMAL / FIRES				Work Area:		
1 HAZARD TYPE	2 Are any of these present / possible or considered?	3 ✓ if applies	4 Likelihood Level	5 Reason for Selecting the Likelihood	6 Maximum Consequence	7 Risk Rating
36 <i>Radiation such as isotopes, lasers</i>	36.1 exposure to radioactive sources 36.2 burns that could lead to cancers 36.3 other -					
37 <i>Radiation such as sunshine</i>	37.1 exposure of skin (sunburns) that could lead to cancers 37.2 reflected ultraviolet light to exposed eyes (e.g. limestone) 37.3 photochemical sensitive substances 37.4 PPE 37.5 other –					
38 <i>Radiation such as welding</i>	38.1 welding flash 38.2 welding screens 38.3 PPE 38.4 other –					
39 <i>Thermal heat sources such as electrical apparatus, engines, pumps, friction points such as bearings, idlers</i>	39.1 thermal sources > 150 °C possible close to flammable substances 39.2 possible overheating near fuel sources 39.3 type and placement of fire fighting equipment 39.4 thermal heat monitoring 39.5 other -					
PRESCRIBED HAZARD MHSR cl 40 & 53 "FIRE AND EXPLOSION"						

RADIATION / THERMAL / FIRES				Work Area:		
1 HAZARD TYPE	2 Are any of these present / possible or considered?	3 ✓ if applies	4 Likelihood Level	5 Reason for Selecting the Likelihood	6 Maximum Consequence	7 Risk Rating
40 Fire & explosion PRESCRIBED HAZARD MHSR cl 40 & 53 "FIRE AND EXPLOSION" USES OF PLACES OF WORK OHSR cl 62 "FIRE AND EXPLOSION"	40.1 potential sources of fire					
	40.2 type and placement of fire fighting equipment					
	40.3 type and placement of remote fire detection monitoring systems					
	40.4 flammable or explosive atmospheres from the work process					
	40.5 static electricity					
	40.6 friction					
	40.7 welding					
	40.8 slipping belts					
	40.9 flammable material / substance					
	40.10 storage, transport and disposal of flammable or explosive substances					
	40.11 housekeeping					
	40.12 smoking, accumulated dust, waste materials					
	40.13 other -					

RADIATION / THERMAL / FIRES				Work Area:		
1 HAZARD TYPE	2 Are any of these present / possible or considered?	3 ✓ if applies	4 Likelihood Level	5 Reason for Selecting the Likelihood	6 Maximum Consequence	7 Risk Rating
41 Fire Equipment <div style="background-color: #cccccc; padding: 2px;">PRESCRIBED HAZARD MHSR cl 40 & 53 "FIRE AND EXPLOSION"</div>	41.1 sufficient fire equipment for risk 41.2 incorrect type (e.g. water extinguisher for electrics) 41.3 inspection or tagged to standard 41.4 type and placement of fire fighting equipment 41.5 training 41.6 maintenance 41.7 other -					
42 Hot Work –Welding & Cutting <div style="background-color: #cccccc; padding: 2px;">HAZARDOUS PROCESSES OHSR cl 185 – 189 "WELDING"</div>	42.1 atmospheric conditions 42.2 ventilation 42.3 respiratory protection 42.4 type and placement of fire fighting equipment 42.5 training 42.6 maintenance 42.7 PPE 42.8 signage 42.9 other –					

RADIATION / THERMAL / FIRES				Work Area:		
1 HAZARD TYPE	2 Are any of these present / possible or considered?	3 ✓ if applies	4 Likelihood Level	5 Reason for Selecting the Likelihood	6 Maximum Consequence	7 Risk Rating
43 Molten metal <div style="border: 1px solid black; padding: 2px; text-align: center;"> HAZARDOUS PROCESSES OHSR cl 195 - 198 "MOLTEN METAL" </div>	43.1 atmospheric conditions 43.2 isolation 43.3 ventilation 43.4 respiratory protection 43.5 radiation exposure 43.6 type and placement of fire fighting equipment 43.7 training 43.8 maintenance 43.9 PPE 43.10 signage 43.11 other –					
44 Other:	44.1 other –					

MECHANICAL ENERGIES				Work Area:		
1 HAZARD TYPE	2 Are any of these present / possible or considered?	3 ✓ if applies	4 Likelihood Level	5 Reason for Selecting the Likelihood	6 Maximum Consequence	7 Risk Rating
45 Fixed mechanical equipment such as conveyor, crusher, screens, other PRESCRIBED HAZARD MHSR cl 39 "USE OF CONVEYORS AND EARTH MOVING MACHINERY" MHSR cl 40 & 53 "FIRE AND EXPLOSION"	45.1 conditions under which plant is used					
	45.2 conformance to design parameters					
	45.3 inappropriate access to operating machinery (e.g. guards missing)					
	45.4 isolation error					
	45.5 mechanical failure (including critical systems)					
	45.6 safe access/procedures					
	45.7 blockages and spillage					
	45.8 unintentional fire or explosion					
	45.9 means of prevention, detection and suppression of fires					
	45.10 contact of mobile plant with overhead structures					
	45.11 Fit for purpose equipment and plant					
	45.12 other –					

MECHANICAL ENERGIES				Work Area:		
1 HAZARD TYPE	2 Are any of these present / possible or considered?	3 ✓ if applies	4 Likelihood Level	5 Reason for Selecting the Likelihood	6 Maximum Consequence	7 Risk Rating
46 Mobile mechanical equipment such as earth moving machinery (trucks, loaders, dozers, etc), utes, rail, winders, mining equipment such as drills, shovels, excavator, other PRESCRIBED HAZARD MHSR cl 39 "USE OF CONVEYORS AND EARTH MOVING MACHINERY" MHSR cl 40 & 53 "FIRE AND EXPLOSION"	46.1 conditions under which plant is used					
	46.2 conformance to design parameters					
	46.3 inappropriate exposure to moving machinery					
	46.4 park brake / isolation error					
	46.5 loss of control of a vehicle or other machinery at the mine					
	46.6 mechanical failure (including critical systems)					
	46.7 road traffic in and out issues					
	46.8 interaction between mobile plant (include heavy and light plant)					
	46.9 interaction between mobile plant and pedestrians					
	46.10 unintentional fire or explosion					
	46.11 means of prevention, detection and suppression of fires					
	46.12 contact of mobile plant with overhead structures					
	46.13 other –					

MECHANICAL ENERGIES				Work Area:		
1 HAZARD TYPE	2 Are any of these present / possible or considered?	3 ✓ if applies	4 Likelihood Level	5 Reason for Selecting the Likelihood	6 Maximum Consequence	7 Risk Rating
47 Dredge	47.1 conditions under which plant is used					
PRESCRIBED HAZARD MHSR cl 39 "USE OF CONVEYORS AND EARTH MOVING MACHINERY" MHSR cl 40 & 53 "FIRE AND EXPLOSION"	47.2 conformance to design parameters					
	47.3 inappropriate access to operating machinery (e.g. guards missing)					
	47.4 isolation error					
	47.5 mechanical failure (including critical systems)					
	47.6 unintentional fire or explosion					
	47.7 means of prevention, detection and suppression of fires					
	47.8 contact of dredge(s) with overhead structures					
	47.9 access and egress					
	47.10 walkway less than 750mm wide/ no handrails/ not secured					
	47.11 maximum number of persons on board posted					
	47.12 sufficient number of life jackets/vests for maximum number person on board					
	47.13 training in life saving appliances/equipment					
	47.14 toilet and amenities					
	47.15 dredge has less than 150mm of freeboard					

MECHANICAL ENERGIES				Work Area:		
1 HAZARD TYPE	2 Are any of these present / possible or considered?	3 ✓ if applies	4 Likelihood Level	5 Reason for Selecting the Likelihood	6 Maximum Consequence	7 Risk Rating
	47.16 warning signs 47.17 communication devices 47.18 maritime hazard e.g. lights/indicators to standard 47.19 mooring secure 47.20 submerged cables 47.21 persons falling into water 47.22 other -					
48 Other	48.1 other -					

PRESSURE (FLUIDS/GASES)				Work Area:		
1 HAZARD TYPE	2 Are any of these present / possible or considered?	3 ✓ if applies	4 Likelihood Level	5 Reason for Selecting the Likelihood	6 Maximum Consequence	7 Risk Rating
49 <i>Water</i>	49.1 dam, diversion or storage facility collapse 49.2 inrush into/flood intrusion of mine (directly or indirectly) 49.3 inability to manage 49.4 flow failure of pumping system e.g. outlet blockage 49.5 unusual rain event 49.6 other -					
50 <i>Water - with significant rates of make</i>	50.1 inability to manage flow 50.2 failure of pumping system 50.3 unusual rain event 50.4 other -					
51 <i>Water - from rain or storms</i>	51.1. inrush into/flood of surface portals 51.2. unusual rain event 51.3. operation of plant during wet conditions 51.4. road drainage 51.5. nearby water ways/sources 51.6. other –					

PRESSURE (FLUIDS/GASES)				Work Area:		
1 HAZARD TYPE	2 Are any of these present / possible or considered?	3 ✓ if applies	4 Likelihood Level	5 Reason for Selecting the Likelihood	6 Maximum Consequence	7 Risk Rating
52 Inrush from water, gas, rock or other substances (Underground Only)	52.1. mine plans showing location of other workings and accuracy of plans of other workings 52.2. strength of ground between workings 52.3. accumulation of hazardous water, gas, rock or other substances					
	PRESCRIBED HAZARD MHSR cl 37 & 47 "INRUSH" 52.4. use of registered mining surveyor. to prepare plans and information about old workings 52.5. exploratory boreholes drilled in advance of work to check on location of old workings 52.6. monitoring equipment 52.7. emergency plan 52.8. other -					

PRESSURE (FLUIDS/GASES)				Work Area:		
1 HAZARD TYPE	2 Are any of these present / possible or considered?	3 ✓ if applies	4 Likelihood Level	5 Reason for Selecting the Likelihood	6 Maximum Consequence	7 Risk Rating
53 Atmosphere – Ventilation (Underground Only) PRESCRIBED HAZARD MHSR cl 48 “VENTILATION”	53.1 ventilation circuits do not allow airflows to re-circulate					
	53.2 controls for the regulation of airflows are provided and maintained					
	53.3 unfit air does not pass through work areas					
	53.4 exhausted or contaminated air at the surface is not used for ventilation of the mine					
	53.5 mine plans show all major ventilating fans, air doors, brattices or other ventilating devices					
	53.6 direction, course, quality and quantity of air is adequately monitored, measured and recorded on mine plans					
	53.7 dead end openings are not worked unless adequate ventilation is provided					
	53.8 persons cannot go underground unless adequately ventilated					
	53.9 ventilation design, monitoring and analysis by competent person					
	53.10 emergency plan					
	53.11 failure of ventilation					
	53.12 other –					

PRESSURE (FLUIDS/GASES)				Work Area:		
1 HAZARD TYPE	2 Are any of these present / possible or considered?	3 ✓ if applies	4 Likelihood Level	5 Reason for Selecting the Likelihood	6 Maximum Consequence	7 Risk Rating
54 Hydraulic pressure from pump stations and reticulation or equipment PRESCRIBED HAZARD MHSR cl 40 & 53 "FIRE AND EXPLOSION"	54.1 unwanted pressure releases such as intensification, hoses detaching, equipment failure	54.7				
	54.2 high pressure leaks					
	54.3 maintenance of high pressure equipment					
	54.4 removal and restoration of high pressure					
	54.5 type and placement of fire fighting equipment					
	54.6 other -					
55 Pneumatic pressure from compressor and reticulation or equipment PRESCRIBED HAZARD MHSR cl 40 & 53 "FIRE AND EXPLOSION"	55.1 unwanted pressure releases such as hoses detaching, equipment failure					
	55.2 high pressure leaks					
	55.3 heat generation from compressed air					
	55.4 maintenance of high pressure equipment					
	55.5 removal and restoration of high pressure					
	55.6 type and placement of fire fighting equipment					
	55.7 other –					

PRESSURE (FLUIDS/GASES)				Work Area:		
1 HAZARD TYPE	2 Are any of these present / possible or considered?	3 ✓ if applies	4 Likelihood Level	5 Reason for Selecting the Likelihood	6 Maximum Consequence	7 Risk Rating
56 Water pressure from pump stations and reticulation or equipment	56.1 unwanted pressure releases such as hoses detaching, equipment failure					
	56.2 high pressure leaks					
	56.3 maintenance of high pressure equipment					
	56.4 removal and restoration of high pressure					
	56.5 other -					
57 Stored pressure/energy such as accumulators, spring/tension devices	57.1 unwanted pressure releases such as hoses detaching, equipment failure					
	57.2 high pressure leaks					
	57.3 maintenance of stored pressure equipment					
	PRESCRIBED HAZARD MHSR cl 40 & 53 "FIRE AND EXPLOSION"	57.4 removal and restoration of stored pressure				
		57.5 type and placement of fire fighting equipment				
		57.6 other -				
58 Other:	58.1 other –					

WORK ENVIRONMENT				Work Area:		
1 HAZARD TYPE	2 Are any of these present / possible or considered?	3 ✓ if applies	4 Likelihood Level	5 Reason for Selecting the Likelihood	6 Maximum Consequence	7 Risk Rating
59 Condition of Buildings / Structures PRESCRIBED HAZARD MHSR cl 69-72 "STRUCTURES AND BUILDINGS" WORK PREMISES OHSR cl 39 "FALL PREVENTION" USE OF PLACES OF WORK OHSR cl 45 "WORKING SPACE"	59.1 obstructions					
	59.2 cords over walkways					
	59.3 nails, sharps etc					
	59.4 slippery floor					
	59.5 floor drainage and floor coverings					
	59.6 broken steps					
	59.7 poor condition of windows, doors, gutters, walls, roof, fences, gates					
	59.8 no safety glass in hazardous area					
	59.9 access to roofs, brittle roofing					
	59.10 maintenance of amenities, buildings and structures					
	59.11 integrity is periodically assessed by a competent person					
	59.12 other -					
60 Building maintenance / cleaning WORK PREMISES OHSR cl 39 "FALL PREVENTION"	60.1 access to carry out cleaning of windows and maintenance of buildings					
	60.2 other -					

WORK ENVIRONMENT				Work Area:		
1 HAZARD TYPE	2 Are any of these present / possible or considered?	3 ✓ if applies	4 Likelihood Level	5 Reason for Selecting the Likelihood	6 Maximum Consequence	7 Risk Rating
61 Effects of Ventilation	61.1 poor condition of filters for air conditioners/heaters					
	61.2 dirty filters extraction systems					
	61.3 factors causing in-house stress such as dust, heat, cold, fumes					
	61.4 other -					
62 Effects of Lighting / Lights USE OF PLACES OF WORK OHSR cl 46 "LIGHTING"	62.1 poorly lit areas					
	62.2 missing/broken fittings/switches					
	62.3 defective/dirty windows					
	62.4 dead bulbs/fluorescent tubes					
	62.5 sufficient lighting and emergency lighting					
	62.6 excessive glare or reflection					
	62.7 facilitates safe access to and egress from the place of work, including emergency exits					
	62.8 other					

WORK ENVIRONMENT				Work Area:		
1 HAZARD TYPE	2 Are any of these present / possible or considered?	3 ✓ if applies	4 Likelihood Level	5 Reason for Selecting the Likelihood	6 Maximum Consequence	7 Risk Rating
63 Sufficient Hygiene Facilities	63.1 drinking water 63.2 sufficient toilets, change house or waiting places 63.3 designated lunch area/kitchen 63.4 storage facility for food or personal items 63.5 food in unauthorised area(s) 63.6 other -					
64 Storage Methods	64.1 sufficient width of aisles and storage areas 64.2 no demarcation - obstructions in aisles 64.3 unstable or hazardous stacks 64.4 unauthorised stacking (incompatible materials/chemicals) 64.5 windows sills not clear 64.6 stacking on cupboard tops higher than 1.5m 64.7 other					

WORK ENVIRONMENT				Work Area:		
1 HAZARD TYPE	2 Are any of these present / possible or considered?	3 ✓ if applies	4 Likelihood Level	5 Reason for Selecting the Likelihood	6 Maximum Consequence	7 Risk Rating
65 Slip/trip hazards	65.1 poor housekeeping					
	65.2 poorly placed cables/hoses					
USE OF PLACES OF WORK OHSR cl 45 "WORKING SPACE"	65.3 uneven surfaces					
	65.4 steps/stairs not to standard					
	65.5 footwear					
	65.6 wet/greasy areas					
	65.7 other					
66 Hot & cold working environments	66.1 adequate ventilation and air movement is provided in indoor environments					
	66.2 Fatigue, rest regimes, fitness, medication					
USE OF PLACES OF WORK OHSR cl 47-48 "HEAT AND COLD"	66.3 employees exposed to cold have adequate access to heated or sheltered work areas and warm clothing or other personal protective equipment					
	66.4 other -					
67 Noise	67.1 noisy equipment					
	67.2 poor use of hearing protection					
USE OF PLACES OF WORK OHSR cl 49 "NOISE MANAGEMENT"	67.3 noise that exceed an 8-hour noise level equivalent of 85 dB(A)					
	67.4 noises peak at more than 140dB(C)					
	67.5 other -					

WORK ENVIRONMENT				Work Area:		
1 HAZARD TYPE	2 Are any of these present / possible or considered?	3 ✓ if applies	4 Likelihood Level	5 Reason for Selecting the Likelihood	6 Maximum Consequence	7 Risk Rating
68 <i>Vibration</i>	68.1 rough roads 68.2 fixed plant 68.3 handheld tools & machinery 68.4 mobile plant (drill rigs, trucks, etc) 68.5 other					
69 <i>Manual handling hazards</i>	69.1 action and movements (repetition) 69.2 workplace and workstation layout 69.3 working posture and position 69.4 duration and frequency of manual handling 69.5 location of loads and distances moved 69.6 weights and forces 69.7 characteristics of loads and equipment 69.8 work organisation and environment 69.9 mechanical aids 69.10 skills and experience, training 69.11 age 69.12 clothing 69.13 other -					
USE OF PLACE OF WORK OHSR cl 80 - 81 "MANUAL HANDLING"						

WORK ENVIRONMENT				Work Area:		
1 HAZARD TYPE	2 Are any of these present / possible or considered?	3 ✓ if applies	4 Likelihood Level	5 Reason for Selecting the Likelihood	6 Maximum Consequence	7 Risk Rating
70 Wildlife such as kangaroos, snakes, spiders, insects	70.1 vehicle collisions 70.2 bites and stings 70.3 other –					
71 Biological, such as exposure to work related bacteria	71.1 health problems due to bacteria in water systems, including drinking, cooling, etc, 71.2 airborne transmitted diseases 71.3 biological media used in mineral processing 71.4 other -					
72 External threats	72.1 bushfire effect on surface facilities 72.2 bushfire effect underground					
PRESCRIBED HAZARD MHSR cl 40 & 53 "FIRE AND EXPLOSION"	72.3 security threat to operations (bomb, terrorism, violence, etc)					
	72.4 other activities in close proximity effect operations 72.5 other					

WORK ENVIRONMENT				Work Area:		
1 HAZARD TYPE	2 Are any of these present / possible or considered?	3 ✓ if applies	4 Likelihood Level	5 Reason for Selecting the Likelihood	6 Maximum Consequence	7 Risk Rating
73 Confined space USE OF PLACE OF WORK OHSR cl 65A - 78 "WORKING IN A CONFINED SPACE" <i>Note: the above clauses do not apply to the underground parts of mining workplace</i>	73.1 Fire or explosion (flammable contaminants)					
	73.2 storage tanks, boilers, pressure vessels, silos, other tank like compartments, workshop pits, bins, etc					
	73.3 isolation of equipment and/or potentially hazardous services whilst person(s) inside confined space					
	73.4 purging and oxygen levels					
	73.5 temperature inside confined space					
	73.6 entry permits					
	73.7 stand by person(s)					
	73.8 rescue and first aid					
	73.9 signage and protective barriers					
	73.10 PPE					
	73.11 training					
	73.12 other -					

WORK ENVIRONMENT				Work Area:		
1 HAZARD TYPE	2 Are any of these present / possible or considered?	3 ✓ if applies	4 Likelihood Level	5 Reason for Selecting the Likelihood	6 Maximum Consequence	7 Risk Rating
74 Work yard , junk and salvage and other miscellaneous areas	74.1 poor stacking/storing of superfluous (re-useable) materials 74.2 redundant (scrap) material and/or equipment lying around 74.3 housekeeping 74.4 weed control and pesticides 74.5 security and control of persons 74.6 other -					
75 Other:	75.1 other -					

TABLE 7 - Action Planning Sheet (Risk Assessment Summary)

Date of Assessment:	
Mine Reviewed:	
Assessor(s):	
Location:	

1 Item No.	2 ACTIONS for all HIGH / MEDIUM / LOW Risk Classifications (strike out which doesn't apply)	3 Action by Whom	4 Target Date	5 Completion Date

1 Item No.	2 ACTIONS for all HIGH / MEDIUM / LOW Risk Classifications (strike out which doesn't apply)	3 Action by Whom	4 Target Date	5 Completion Date

31. Feedback sheet

Your comments will be very helpful in reviewing and improving this workbook document.

Please copy and complete the Feedback Sheet and return it to:

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Mine Safety Operations
Industry & Investment NSW
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Phone: (02) 4931 6666*

Email: mine.safety@industry.nsw.gov.au

How did you use, or intend to use, this document?

What do you find most useful about this document?

What do you find least useful?

Do you have any suggested changes to the document?

Thank you for completing and returning this Feedback Sheet