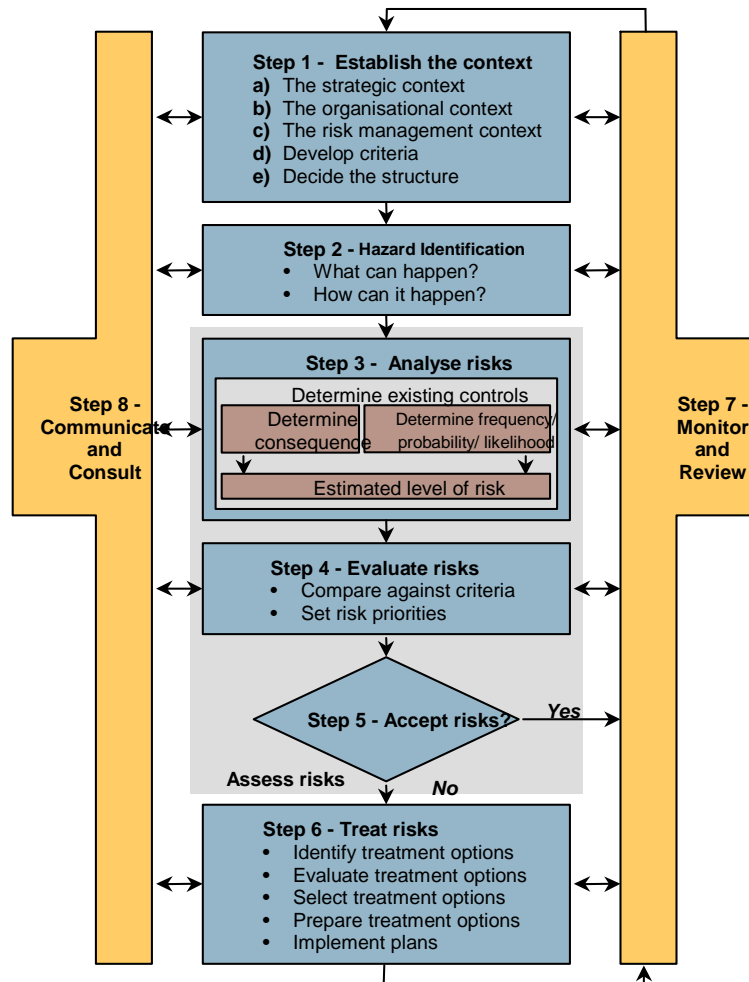


# Qualitative Risk Assessment

for

## DENDROBIUM MINE

### Area 3A Mine Subsidence (Longwalls 6 -10)



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# Section 1. Executive Summary

This analysis was commissioned by Cardno Forbes Rigby Pty Ltd to determine the risks associated with mining Area 3A (Longwalls 6-10) at Dendrobium Mine with the aim of developing the Subsidence Management Plan (SMP) for the mining of these longwalls by BHP Billiton Illawarra Coal.

This report details the methods used and the recommendations from the risk assessment which was conducted at BHPB CRM Office on August 24th of 2007.

Risk ranking was undertaken in accordance the BHP Billiton Enterprise Wide Risk Management (EWRM) Standard.

In accordance with the scope, high level risk issues were considered and recorded by the risk assessment team. The reader should refer to the sections regarding the Objectives, Scope and Assumption and Limitations of this risk assessment.

At the conclusion of the risk assessment the team assessed the Gross Exposure to those hazards believed to be the highest consequence to the organisation, these hazards and their ranking are identified within Section 8 of this report.

Attachment 2 (Analysis Worksheets) identifies all of the hazards, existing controls, risk rankings and any new treatment options and the responsibilities for their implementation.

Attachment 5 (Risk Treatment Schedule) provides the new treatment options and the people responsible for their implementation. In addition, a required date and sign off is also provided.

Attachment 3 and 4 (Risk Rank Order and Consequence Order) provides all of the identified hazards and treatment options in order of highest risk to lowest risk and from highest consequence to lowest consequence. The BHPB EWRM standard does not require these reports, however to provide compliance to the Department of Primary Industries MDG1010 and MDG1014 standards they are included.

## Section 2. Analysis and Report

This Analysis was facilitated by: Shane Chiddy  
The Analysis took place: 24th August 2007

This Analysis has been verified by: Bruce Blunden / Gary Brassington  
The Verification occurred: 29 August 2007

This Report has been compiled by: Shane Chiddy  
The Report was compiled: 24th August 2007

## Section 3. Participants

The following people participated in the Analysis:

<u>Participant</u>	<u>Participant Role</u>	<u>Relevant Experience</u>
Richard Walsh	BHPB Illawarra Coal Manager Approvals	26 Years
Gary Brassington	BHPB Illawarra Coal Manager Environment	15 Years
Bruce Blunden	BHPB Illawarra Coal Manager Environmental Approvals	15 Years
Adam West	BHPB Illawarra Coal Mining Approvals Co-ordinator	3 Years
James Reeves	Biosis Reserch Pty Ltd Archeologist	9 years
Rhidian Harrington	Biosis Reserch Pty Ltd Manager - Senior Ecologist	13 Years
Mathew Carden	Cardno Forbes Rigby Environmental Engineer	2 Years
Chris McEvoy	Cardno Forbes Rigby Manager Mining / Environmental Scientist	15 Years
Steve Short	Ecoengineers Director	34 Years
Andrew Leventhal	GHD Geotechnics Senior Principal Geotechnical Engineer	30 Years
James Barbato	Mine Subsidence Engineering Consultants (MSEC)	3 Years
Theresa Dye	The Ecology Lab Senior Environmental Scientist	22 Years
Doug Hazell	The Ecology Lab Senior Environmental Scientist	5 Years

## **Section 4. Purpose**

In August of 2007 AXYS Consulting was commissioned to facilitate a risk assessment for Area 3A (Longwalls 6-10) at Dendrobium Mine Subsidence Management Plan (SMP) to consider the potential risk of impacts to Illawarra Coal and other key stakeholders.

This report details the methods used and the recommendations resulting from the risk assessment which was conducted at the BHPB CRM offices on August 24th of 2007.

Area 3A (Longwalls 6-10) at Dendrobium Mine will require the development and submission of a SMP, and as such this risk assessment is being performed to assist in the development of this SMP.

The aspects included in this SMP are the natural and built features required to be considered by the SMP Guidelines.

Residential houses are not situated within the area of this assessment.

Subsidence predictions have been completed for the application area and the subsidence model includes vertical and horizontal displacement predictions. The subsidence impact assessment report is due for finalisation by the end of September 2007.

## **Section 5. Objectives**

The objectives of this assessment is to assist Dendrobium Mine in the identification and control of risks associated with Area 3A (Longwalls 6 to 10) subsidence in accordance with requirements from:

BHPB Policy and Standards;

State and Commonwealth Legislation;

Evaluate and record a formal risk assessment in accordance with the BHP Billiton EWRM Standard;

NSW Department of Primary Industries - Mineral Resources Guideline for application for Subsidence Management Approvals.

## **Section 6. Scope**

The scope of this report is to identify subsidence risks from all potential sources for Area 3A (Longwalls 6-10) at Dendrobium Mine.

This risk assessment is to assist in the development of the SMP.

Areas for consideration include surface and sub-surface features as defined by Process Area List based on the NSW Department of Primary Industries - Mineral Resources Guideline for Application for Subsidence Management Approvals - Appendix B.

Specifically, this report is to assess the risks associated with mining Area 3A (Longwalls 6-10) at Dendrobium Mine with the aim of developing the SMP, in accordance with the BHP Billiton EWRM Standard in terms of;

- Health and Safety (HS);
- Estimated Shareholder Value / Material Damage / Financial Loss (FL);
- Project Net Present Value (NPV);
- Natural Environment (NE);
- Social / Cultural / Heritage (SC);
- Community / Government Reputation / Media (R);
- Legal (L).

## **Section 7. Assumptions**

The following assumptions and limitations have been applied to this risk assessment:

1. Subsidence would generally be in accordance with predictions as identified in the MSEC report developed by Mine Subsidence Engineering Consultants.
2. Impact would be similar to those previously observed in comparable areas.
3. There may be isolated cases where subsidence will not occur as predicted. These cases will be taken into account in the MSEC report and the Impact Assessment and the SMP.
4. Rigorous monitoring can identify anomalous subsidence which can be used to manage impacts through strategies.
5. Surface features and land use remains substantially constant during the mining period.
6. BHPB IC will initiate consultation to identify any changes to surface infrastructure in the area that may be impacted.
7. Focus of this risk assessment is for the development of the SMP.
8. Risk evaluation is for the highest most likely impact on the risk being assessed.

## Section 8. Gross Exposure

At the conclusion of the risk assessment the team assessed the Gross Exposure to those hazards believed to be the highest risk, these hazards are identified below.

Gross Exposure is defined as:

The total negative financial impact on BHP Billiton in respect of a specific Risk Issue, assuming that all active risk control measures are ineffective. Active risk control measures are those that have any reasonable possibility of failure and include any hedging or insurance contracts. It is equal to the sum of the Net Present Value lost plus the legal liability or compensation payments made and the opportunity costs.

In a health and safety context, the Gross Exposure could be the maximum credible number of fatalities likely to occur from the event being considered.

The Gross Exposure measure is independent of potential likelihood.

The items identified within the Gross Exposure assessment include.

- |  |                |
|--|----------------|
| 1 - SMP not being approved<br>Unable to proceed with<br>Longwall production  | Severity - 300 |
| 2 - Damage to TransGrid and Integral<br>Electricity transmission lines due<br>to mine subsidence. Loss of future<br>approvals to operate mines result. | Severity - 30  |
| 3 - Substantial loss of stored water from<br>Cordeaux Reservoir due to mine<br>subsidence. Loss of future approvals<br>to operate mines result.        | Severity - 300 |
| 4 - Irreparable widespread environmental<br>impacts across entire 3A surface area.<br>Loss of future approvals to operate<br>mines result.             | Severity - 300 |

## **Section 9. Facilitator Qualifications**

Shane Chiddy holds an Associate Diploma in Engineering (Electrical), is a Graduate Officer of the Institution of Engineers (Australia) and is a member of the Maintenance Engineering Society of Australia (MESA). He has also completed Conveyancing Law through Macquarie University and Establish the Risk Management Systems (Mine 7033 - G3) through Queensland University.

Prior to commencing his consulting career, Shane Chiddy qualified as an electrician and worked underground for 15 years. He then occupied a number of engineering roles within Rio Tinto, including such roles as electrical supervisor, Development Engineer and Senior Production Engineer. This latest role was responsible for the Longwall, underground diesel equipment and conveyors.

Additionally Shane Chiddy has been trained and accredited by John Moubray in the UK as a certified RCM II practitioner, and has conducted a number of extensive Reliability-centred Maintenance II analyses including underground and surface equipment such as Longwalls, Continuous Miners and conveying systems. He has facilitated RCM II analysis and delivered training in the mining, defence and telecommunications industries.

His consulting experience includes the application of Reliability-centred Maintenance II and extensive Risk Management and Project Management assignments. Shane is also experienced in software development and in the development and presentation of training packages.



## Section 10. Sub-Systems Analysed:

SUB-SYSTEM		STEP IN PROCESS	
1	Natural Features	A	1.01 Catchment areas and declared Special Areas
		B	1.02A Rivers and creeks (Sandy Creek, Wongawilli Creek)
		C	1.02B Rivers and creeks (Tributaries)
		D	1.03A Aquifers, known groundwater resources (for commercial extraction)
		E	1.03B Aquifers, known groundwater resources (for contribution to stored water)
		F	1.04 Springs
		G	1.05 Sea/Lake
		H	1.06 Shorelines
		I	1.07 Natural dams
		J	1.08 Cliffs / pagodas
		K	1.09 Steep slopes
		L	1.10 Escarpments
		M	1.11 Land prone to flooding or inundation
		N	1.12 Swamps, wetlands, water related ecosystems
		O	1.13 Threatened and protected species
		P	1.14 National Parks
		Q	1.15 State Recreation Areas
		R	1.16 State forests particularly areas zoned FMZ 1, 2 and 3
		S	1.17 Natural vegetation
T	1.18 Areas of significant geological interest		
U	1.19 Any other feature considered significant		
2	Public Utilities	A	2.01 Railways
		B	2.02 Roads (all types) and associated infrastructure
		C	2.03 Bridges
		D	2.04 Tunnels
		E	2.05 Culverts
		F	2.06 Water/gas/sewerage pipelines
		G	2.07 High pressure gas pipelines
		H	2.08 Electricity transmission lines (overhead/underground) and associated plants
		I	2.09 Telecommunication lines (overhead/underground) and associated plants
		J	2.10 Water tanks, water and sewage treatment works
		K	2.11 Dams, reservoirs and associated works
		L	2.12 Air strips
3	Public Amenities	A	3.01 Hospitals
		B	3.02 Places of worship

## Section 10. Sub-Systems Analysed:

SUB-SYSTEM		STEP IN PROCESS			
3	Public Amenities	C	3.03 Schools		
		D	3.04 Shopping centres		
		E	3.05 Community centres		
		F	3.06 Office buildings		
		G	3.07 Swimming pools		
		H	3.08 Bowling greens		
		I	3.09 Ovals and cricket grounds		
		J	3.10 Race courses		
		K	3.11 Golf courses		
		L	3.12 Tennis courts		
		M	3.13 Any other amenities considered significant		
		4	Farm Land and Facilities	A	4.01 Agricultural utilisation or agricultural suitability of farm land
				B	4.02 Farm buildings / sheds
C	4.03 Gas and / or fuel storages				
D	4.04 Poultry sheds				
E	4.05 Glass Houses				
F	4.06 Hydroponic systems				
G	4.07 Irrigation systems				
H	4.08 Fences				
I	4.09 Farm dams				
J	4.10 Wells, bores				
K	4.11 Any other feature considered significant				
5	Industrial, Commercial and Business Establishments	A	5.01 Factories		
		B	5.02 Workshops		
		C	5.03 Business or commercial establishments		
		D	5.04 Gas and / or fuel storages and associated plants		
		E	5.05 Waste storages and associated plants		
		F	5.06 Buildings, equipment and operations that are sensitive to surface movements		
		G	5.07 Surface mining (open cut) voids and rehabilitated areas		
		H	5.08 Mine infrastructure including tailings dams and emplacement areas		
		I	5.09 Any other feature considered significant		
6	Areas of Archaeological and/or Heritage significance	A	6.01 Areas of Archaeological and/or Heritage Significance		
7	Items of Architectural Significance	A	7.01 Items of Architectural Significance		
8	Permanent Survey Control Marks	A	8.01 Permanent Survey Control Marks		
9	Residential Establishments	A	9.01 Houses		

## Section 10. Sub-Systems Analysed:

SUB-SYSTEM		STEP IN PROCESS	
9	Residential Establishments	B	9.02 Flats / Unit
		C	9.03 Caravan parks
		D	9.04 Retirement/aged care villages
		E	9.05 Associated structures such as workshops, garages, on-site waste water systems, water or gas tanks, swimming pools and tennis courts
		F	9.06 Any other feature considered significant

**Attachment 1**  
**Definitions and**  
**Risk Ranking Methodology**

## **Consequence**

The size and nature of the impact from an event or occurrence.

## **Exposure**

The frequency at which BHP Billiton could be exposed to consequences at the specified severity. These consequences may not manifest themselves, but there is a possibility they might.

## **Exposure factor**

Is a measure of the frequency of occurrence of the risk issue during which BHP Billiton and/or its stakeholders could be exposed to consequences at the specified level of severity.

## **Hazard**

A hazard is the intrinsic potential for an agent, activity or process to lead to an incident, or ongoing condition.

*Environment note:* The term 'hazard' is essentially equivalent to 'environmental aspect'.

## **Impact/Effect**

Impacts are specific adverse effects resulting from an incident and may be related to people, the environment, plant or property, or a combination of these.

## **Incident (or ongoing condition)**

An incident (or ongoing condition) is any occurrence that has the potential to result in adverse consequences to people, the environment, property/plant, or a combination of these.

## **Likelihood**

The chance of occurrence per unit time (normally per year) In BHP Billiton this term will be used instead of "Frequency" because it helps the user think "is it likely?"

## **Frequency**

The chance of occurrence per unit time (typically, per year).

## **Probability Factor**

Represents the chance of consequences as the specified level of severity occurring when the risk issue occurs (i.e. during the Exposure).

## **Risk**

Risk is defined as the likelihood of an impact on people, the environment, property, or a combination of these.

## **Risk Rating**

The numerical rating applied to a risk calculated as the product of a severity factor, a probability factor, and an exposure factor.

## **Severity factor**

Is a measure of the degree of consequences that are most likely to occur associated with a risk. Those consequences could either negatively impact BHP Billiton, its brand and its stakeholders or be the expected level of unrealised opportunity for gain that could be missed.

### **Risk Control Effectiveness (RCE)**

The Risk Control Effectiveness (RCE) is defined as “the actual level of control that is currently present and effective, expressed as a percentage of that reasonably achievable for that particular risk issue”  
 In practice there would always be some room for improvement in the completeness and/or effectiveness of the controls associated with a risk issue. Accordingly, a value of 100% should not normally be claimed for the Risk Control Effectiveness rating.

Description	RCE
“Just getting started” / “A lot of work still to be done”	20 – 30%
“About half way there”	50 – 60%
“Most things in pace and working, but some more still to be done”	75 – 80%
“Nothing more to be done except review and monitor the existing controls”	> 90%

### **EXPOSURE FACTOR**

Choose a description that best fits the frequency of the “window of opportunity” during which impacts of the selected type and level of severity could be incurred (experienced) by BHP Billiton or its stakeholders, taking into account the existing controls.

Frequency of the "window of opportunity"	Factor
At least once per week	10
One a month or so	3
Once or twice a year	1
One or twice every 10 years	0.3
Once or twice in a 100 years	0.1

### **PROBABILITY FACTOR**

Choose a description that best fits the chance of BHP Billiton or its stakeholders actually incurring (experiencing) impacts of the selected type and level of severity during a “window of opportunity”, taking into account the existing controls.

Chances of the impact actually being incurred (experienced) during a "window of opportunity"	Factor
Happens often	10
Could easily happen	3
Could happen and has occurred here or elsewhere	1
Hasn't happened yet but could	0.3
Conceivable, but only in extreme circumstances	0.1

## SEVERITY FACTOR

Choose a description that best fits the most likely degree harm, injury, loss or potential gain. Where there is more than one consequence type possible, look across the table and choose the highest level and corresponding Severity Factor. (Note: ESVA NPV and other terms are as defined in EWRM Standard No. 6)

Severity Level	Change in ESVA	Change in Project return (-NVP)	Health and Safety	Natural environment	Social / Cultural heritage	Community / Govt / Reputation / Media	Legal
1000	>US\$ 1B	>US\$ 5B	> 500 fatalities or very serious irreversible injury to 5000 persons.	Very significant impact on highly value species, habitat or eco system.	Irreparable damage to highly valued items of great cultural significance or complete breakdown of social order.	Prolonged international Condemnation.	Potential jail terms for executives and or very high fines for company. Prolonged, multiple litigation
300	US\$ 100M – US\$ 1B	US\$ 500M – US\$ 5B	>50 fatalities, or very serious irreversible injury to >500 persons	Significant impact on highly valued species, habitat, or ecosystem.	Irreparable damage to highly valued items of cultural significance or breakdown of social order.	International multi- NGO and media condemnation.	Very significant fines and prosecutions. Multiple litigation
100	US\$ 10M – US\$ 100M	US\$ 50M – US\$ 500M	Multiple fatalities, or significant irreversible effects to >50 persons	Very serious, long- term environmental impairment of ecosystem function	Very serious widespread social impacts. . Irreparable damage to highly valued items.	Serious public or media outcry (international coverage).	Significant prosecution and fines. Very serious litigation, including class actions.
30	US\$ 1M – 10M	US\$ 5M – 50M	Single fatality and/ or severe irreversible disability (> 30%) to one or more persons.	Serious medium term environmental effects.	On- going serious social issues. Significant damage to structures/ items of cultural significance.	Significant adverse national media/ public/ NGO attention.	Major breach of regulation. Major litigation.
10	US\$ 100, 000 – 1M	US\$ 50, 000 – 5M	Moderate irreversible disability or impairment (< 30%) to one or more persons.	Moderate, short- term effects but not affecting ecosystem function.	On going social issues. Permanent damage to items of cultural significant.	Attention from media and/ or heightened concern by local community. Criticism by NGOs	Serious breach of regulation with investigation or report to authority with prosecution and/ or moderate fine possible.
3	US\$ 10, 000 – \$100,000	US\$ 50, 000 – 500,000	Objective but reversible disability requiring hospitalisation	Minor effects on biological or physical environment.	Minor medium- term social impacts on local population. Mostly repairable.	Minor, adverse local public or media attention and complaints	Minor legal issues, non-compliances and breaches of regulation
1	<US\$ 10, 000	<US\$ 50, 000	No medical treatment required	Limited damage to minimal area of low significance.	Low- level repairable damage to commonplace structures.	Public concern restricted to local complaints.	Low- level legal issue.

## PRIORITY GUIDE

Once a risk rating has been calculated, the following scheme should be used to assign priority of action. It should be noted that if action is not taken within the time specified, then the continued toleration of the residual 'downside' risk should be explicitly 'signed-off'. The suggested level of seniority for sign-off is as shown below.

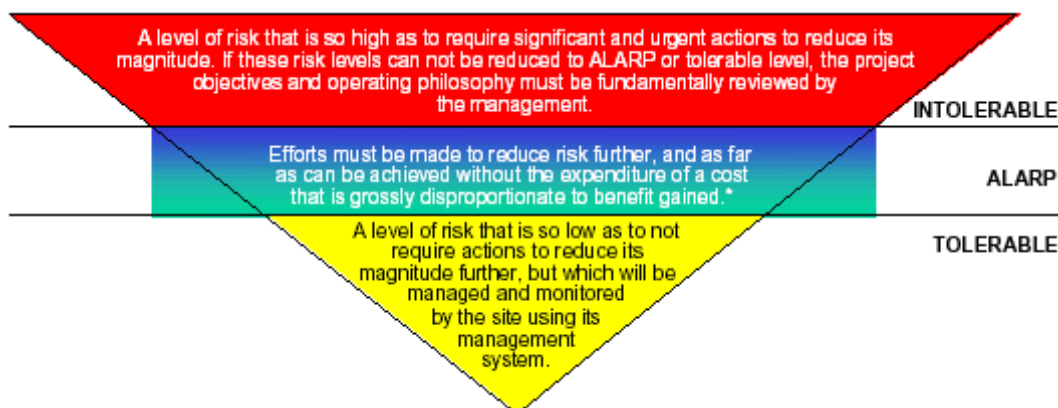
Priority	Risk Rating	Suggested Action	Suggested Timing	Authority for continued toleration of residual risk
1	>300	Cessation until the residual risk is reduced to 300 or below – unless exposure is authorised as indicated.	Immediate	BHP Billiton CEO and Board
2	91 - 300	Take action to reduce residual risk to 90 or below	Short term Normally within 1 month	President CSG
3	31 - 90	Plan to deal with in keeping with business plan.	Medium term, Normally within 3 months	Presidents direct reports
4	11 - 30	Plan in keeping with all other priorities.	Normally within 1 year.	Manager
5	< 10	Low priority. Will still require attention	Ongoing control as part of management system	Manager direct reports

The decision to tolerate a risk should be based on a consideration of:

- Whether the risk is being controlled to a level that is reasonably achievable,
- Whether it would be cost-effective to further control risk,
- The tolerability of the organisation (risk appetite) for risks of that type.

For decisions about HSEC Risks, the principles outlines in HSEC Toolkit No. T07 should be followed involving the application of the ALARP criteria given there.

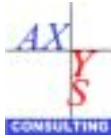
Likelihood or Frequency / Probability	Consequence Severity				
	Low	Minor	Moderate	Major	Critical
Almost Certain	High 100	High 300	Extreme 1,000	Extreme 3,000	Extreme 10,000
Likely	Moderate 30	High 90	High 300	Extreme 900	Extreme 3,000
Possible	Low 10	Moderate 30	High 100	Extreme 300	Extreme 1,000
Unlikely	Low 3	Low 9	Moderate 30	High 90	Extreme 300
Rare	Low 1	Low 3	Moderate 10	High 30	High 100





**Attachment 2**  
**Analysis Worksheets**

**Qualitative  
Risk Analysis.  
Analysis Worksheet**



<b>SYSTEM:</b> AR0460	Dendrobium Mine Area 3A Mine Subsidence (Longwalls 6 -10)	<b>Compiled by:</b> <b>Date:</b>	Shane Chiddy 24th August 2007	<b>Sheet:</b> <b>of:</b>	1 19
<b>SUB SYSTEM:</b> No: 1	Natural Features	<b>Verified by:</b> <b>Date:</b>	Bruce Blunden / Gary Br 29 August 2007		

STEP IN PROCESS	CAUSE & IMPACT	EXISTING CONTROLS	RCE	Sev	Exp	Prob	Rate	TID	TREATMENT OPTIONS	RESPONSIBLE
A 1.01 Catchment areas and declared Special Areas	1 SMP not approved. Non adherence to government requirements. SMP does not meet special area management requirements.	SMP process is in place  BHPB Environmental management system to ISO14001	75 - 80%	30	1	1	30	1	Completed SMP and the monitoring programs (include audit of commitments)	BHPB Illawarra Coal - Manager Environment
	2 Non adherence to SMP and government requirements (breach of conditions and/or special area management requirements).	SMP process is in place  BHPB Environmental management system to ISO14001	75 - 80%	30	1	0.3	9	1	Completed SMP and the monitoring programs (include audit of commitments)	BHPB Illawarra Coal - Manager Environment
B 1.02A Rivers and creeks (Sandy Creek, Wongawilli Creek)	1 Water flow and quality changes, fracturing of river bed and rock bars to creeks due to mine subsidence. Flow on environmental impacts result.	Monitoring programs in place for Area 3A  Remediation techniques have been developed for creeks  Subsidence predictions have been developed  Mine layout minimises subsidence impact	75 - 80%	10	1	1	10	1	Completed SMP to include consideration of Sandy and Wongawilli Creeks and the monitoring programs	BHPB Illawarra Coal - Manager Environment
C 1.02B Rivers and creeks (Tributaries)	1 Water flow and quality changes over the catchment area, fracturing of creek bed and rock bars to creeks due to mine subsidence. Large flow on environmental impacts result over the wide area.	Monitoring programs in place for Area 3A  Remediation techniques have been developed for creeks  Subsidence predictions have been developed	75 - 80%	10	1	1	10	1	Completed SMP to include consideration of tributaries and the monitoring programs	BHPB Illawarra Coal - Manager Environment
D 1.03A Aquifers, known groundwater resources (for commercial extraction)	1 Ground water level and quality changes due to mine subsidence.	No use of groundwater resource in the area for commercial extraction  Monitoring programs in place for Area 3A	75 - 80%	1	1	0.1	0	1	Completed SMP to include consideration of aquifers and the monitoring programs	BHPB Illawarra Coal - Manager Environment



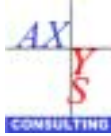
**Qualitative  
Risk Analysis.  
Analysis Worksheet**



<b>SYSTEM:</b> AR0460	Dendrobium Mine Area 3A Mine Subsidence (Longwalls 6 -10)	<b>Compiled by:</b> <b>Date:</b>	Shane Chiddy 24th August 2007	<b>Sheet:</b> <b>of:</b>	3 19
<b>SUB SYSTEM:</b> <b>No:</b> 1	Natural Features	<b>Verified by:</b> <b>Date:</b>	Bruce Blunden / Gary Br 29 August 2007		

STEP IN PROCESS	CAUSE & IMPACT	EXISTING CONTROLS	RCE	Sev	Exp	Prob	Rate	TID	TREATMENT OPTIONS	RESPONSIBLE
I 1.07 Natural dams	1 The area of subsidence under analysis does not include any natural dams and did not require further assessment.									
J 1.08 Cliffs / pagodas	1 Rock falls from cliffs due to mine subsidence. Rock fall causes localised damage to environment. (Note: There were no pagodas identified in the area)	Base line assessment has been completed, cliffs are at known locations  Monitoring programs in place  Subsidence predictions have been developed	75-80%	1	1	3	3	1	Completed SMP and the monitoring programs (include audit of commitments)	BHPB Illawarra Coal - Manager Environment
	2 Rock falls from cliffs due to mine subsidence. Rock fall causes injury to personnel. (Note: There were no pagodas identified in the area)	Base line assessment has been completed, cliffs are at known locations  Monitoring programs in place  Subsidence predictions have been developed  Crown land not accessible by the public	75-80%	10	1	0.1	1	1	Completed SMP to include Public Safety and the monitoring programs	BHPB Illawarra Coal - Manager Environment
K 1.09 Steep slopes	1 Mass movement of steep slopes due to mine subsidence. Localised damage to environment.	Base line assessment has been completed, steep slopes are at known locations  Past mining has not lead to any significant mass downhill earth movements of steep slopes in the area.  Subsidence predictions have been developed  Limited development of colluvium  Landscape impact assessment and monitoring programs	75 - 80%	1	1	0.1	0	1	Completed SMP and the monitoring programs	BHPB Illawarra Coal - Manager Environment

**Qualitative  
Risk Analysis.  
Analysis Worksheet**



<b>SYSTEM:</b> AR0460	Dendrobium Mine Area 3A Mine Subsidence (Longwalls 6 -10)	<b>Compiled by:</b> <b>Date:</b>	Shane Chiddy 24th August 2007	<b>Sheet:</b> <b>of:</b>	4 19
<b>SUB SYSTEM:</b> No: 1	Natural Features	<b>Verified by:</b> <b>Date:</b>	Bruce Blunden / Gary Br 29 August 2007		

STEP IN PROCESS	CAUSE & IMPACT	EXISTING CONTROLS	RCE	Sev	Exp	Prob	Rate	TID	TREATMENT OPTIONS	RESPONSIBLE
L	1.10 Escarpments	2 Surface cracking along steep slopes due to mine subsidence. Localised damage to environment and enhancement of erosion and sedimentation.	75 - 80%	1	1	1	1	1	Completed SMP and the monitoring programs	BHPB Illawarra Coal - Manager Environment
M	1.11 Land prone to flooding or inundation	1 The area of subsidence under analysis does not include any escarpments and did not require further assessment.								
N	1.12 Swamps, wetlands, water related ecosystems	1 The area of subsidence under analysis does not include any land prone to flooding or inundation and did not require further assessment. (See River 1.02 and swamps 1.12)								
N	1.12 Swamps, wetlands, water related ecosystems	1 Change in swamp function, environmental damage to swamps, wetlands, water related ecosystems sites due to mine subsidence.	75 - 80%	10	1	1	10	1	Completed SMP to include swamps, wetlands, water related ecosystems and the monitoring programs	BHPB Illawarra Coal - Manager Environment
O	1.13 Threatened and protected	1 Mine subsidence leads to loss	75-80%	10	1	1	10	1	Completed SMP to include consideration of Threatened and	BHPB Illawarra Coal - Manager

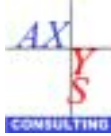








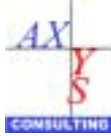
**Qualitative  
Risk Analysis.  
Analysis Worksheet**



<b>SYSTEM:</b> AR0460	Dendrobium Mine Area 3A Mine Subsidence (Longwalls 6 -10)	<b>Compiled by:</b> <b>Date:</b>	Shane Chiddy 24th August 2007	<b>Sheet:</b> <b>of:</b>	8 19
<b>SUB SYSTEM:</b> No: 2	Public Utilities	<b>Verified by:</b> <b>Date:</b>	Bruce Blunden / Gary Br 29 August 2007		

STEP IN PROCESS		CAUSE & IMPACT	EXISTING CONTROLS	RCE	Sev	Exp	Prob	Rate	TID	TREATMENT OPTIONS	RESPONSIBLE
G	2.07 High pressure gas pipelines	1 The area of subsidence under analysis does not include any high pressure gas pipelines and did not require further assessment.									
H	2.08 Electricity transmission lines (overhead/underground) and associated plants	1 Damage to TransGrid and Integral Electricity transmission lines due to mine subsidence. Electricity transmission lines requires repair. (Includes 330kV, 33kV)	Subsidence predictions have been developed  Monitoring programs in place TransGrid and Integral  Previous experience with mining under power lines	50-60%	1	1	0.3	0	1	Completed SMP to include consideration of the TransGrid and Integral Electricity transmission lines and the monitoring programs  2 Asset owners to develop internal impact assessments  3 Revise the Integral Management Plan to include Area 3A  4 Develop a Management Plan with TransGrid  5 Revise the asset protection plan to include Area 3A	BHPB Illawarra Coal - Manager Environment  BHPB Illawarra Coal - Manager R&I  BHPB Illawarra Coal - Manager R&I  BHPB Illawarra Coal - Manager R&I  BHPB Illawarra Coal - Manager R&I
I	2.09 Telecommunication lines (overhead/underground) and associated plants	1 The area of subsidence under analysis does not include any telecommunication lines and did not require further assessment.									
J	2.10 Water tanks, water and sewage treatment works	1 The area of subsidence under analysis does not include any water tanks, water and sewage treatment works and did not require further assessment.									
K	2.11 Dams, reservoirs and associated works	1 Damage to Cordeaux and Upper Cordeaux No 2 Dam due to mine subsidence. Dams will require repair.	Subsidence predictions have been developed	75 - 80%	1	1	0.1	0	1	Completed SMP to include consideration of Cordeaux and Upper Cordeaux No 2 Dams	BHPB Illawarra Coal - Manager Environment
		2 Unacceptable loss of stored water from Cordeaux Reservoir	Subsidence predictions have been developed	50-60%	10	1	0.3	3	1	Completed SMP to include consideration of Cordeaux Reservoir	BHPB Illawarra Coal - Manager Environment

**Qualitative  
Risk Analysis.  
Analysis Worksheet**



<b>SYSTEM:</b> AR0460	Dendrobium Mine Area 3A Mine Subsidence (Longwalls 6 -10)	<b>Compiled by:</b> <b>Date:</b>	Shane Chiddy 24th August 2007	<b>Sheet:</b> <b>of:</b>	9 19
<b>SUB SYSTEM:</b> No: 2	Public Utilities	<b>Verified by:</b> <b>Date:</b>	Bruce Blunden / Gary Br 29 August 2007		

STEP IN PROCESS		CAUSE & IMPACT	EXISTING CONTROLS	RCE	Sev	Exp	Prob	Rate	TID	TREATMENT OPTIONS	RESPONSIBLE
L	2.12 Air strips	<p>due to mine subsidence. Reservoir will require repair.</p> <p>1 The area of subsidence under analysis does not include any air strips and did not require further assessment.</p>	<p>Mine layout minimises subsidence impact</p> <p>No reservoir water reporting to Dendrobium Area 1 or 2</p>						2	Dams Safety Committee (DSC) approval required to mine within the notification area of Cordeaux Reservoir	BHPB Illawarra Coal - Manager Approvals







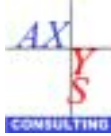








**Qualitative  
Risk Analysis.  
Analysis Worksheet**



<b>SYSTEM:</b> AR0460	Dendrobium Mine Area 3A Mine Subsidence (Longwalls 6 -10)	<b>Compiled by:</b> <b>Date:</b>	Shane Chiddy 24th August 2007	<b>Sheet:</b> <b>of:</b>	16 19
<b>SUB SYSTEM:</b> <b>No:</b> 6	Areas of Archaeological and/or Heritage significance	<b>Verified by:</b> <b>Date:</b>	Bruce Blunden / Gary Br 29 August 2007		

STEP IN PROCESS		CAUSE & IMPACT	EXISTING CONTROLS	RCE	Sev	Exp	Prob	Rate	TID	TREATMENT OPTIONS	RESPONSIBLE
A	6.01 Areas of Archaeological and/or Heritage Significance	1 Damage to Archaeological Significant sites due to mine subsidence.	Base line assessment has been completed, known sites within the area  Subsidence predictions have been developed	50-60%	3	1	0.3	1	1	1 Completed SMP to include consideration of Areas of Archaeological Significance and the monitoring programs	BHPB Illawarra Coal - Manager Environment
		2 Damage to Heritage Significant sites due to mine subsidence.	Heritage search completed, no known sites within the area  Subsidence predictions have been developed	75-80%	1	1	0.1	0	1	2 Obtain consent under the National Parks and Wildlife Act 1974 - Section 90 (prior to the mining of Longwall 6)  1 Completed SMP to include consideration of Areas of Heritage Significance and the monitoring programs (include base line assessment of Heritage Significant sites within the area)	BHPB Illawarra Coal - Manager Environment



**Qualitative  
Risk Analysis.  
Analysis Worksheet**




<b>SYSTEM:</b> AR0460	Dendrobium Mine Area 3A Mine Subsidence (Longwalls 6 -10)	<b>Compiled by:</b> <b>Date:</b>	Shane Chiddy 24th August 2007	<b>Sheet:</b> <b>of:</b>	18 19
<b>SUB SYSTEM:</b> <b>No:</b>	Permanent Survey Control Marks 8	<b>Verified by:</b> <b>Date:</b>	Bruce Blunden / Gary Br 29 August 2007		


STEP IN PROCESS		CAUSE & IMPACT	EXISTING CONTROLS	RCE	Sev	Exp	Prob	Rate	TID	TREATMENT OPTIONS	RESPONSIBLE
A	8.01 Permanent Survey Control Marks	1 Movement of Permanent Survey Control Marks due to mine subsidence. Surveyors rely on false location of the marks.	NSW Department of Lands are advised of affected survey control marks  Subsidence predictions have been developed  Base line assessment has been completed, known sites of the survey control marks within the area	75-80%	1	1	0.3	0	1	Completed SMP to include consideration of Permanent Survey Control Marks and the monitoring programs	BHPB Illawarra Coal - Manager R&I



## **Attachment 3**

### **Risk Treatment Schedule (Risk Rank Order)**


Qualitative Risk Analysis Risk Treatment Schedule		ANALYSIS NUMBER: AR0460	ANALYSIS SITE AND NAME Dendrobium Mine Area 3A Mine Subsidence (Longwalls 6 -10)		Sheet: 1 of: 2
Ref	Risk	Hazard	TID	Treatment Options	
1A1	30	SMP not approved. Non adherence to government requirements. SMP does not meet special area management requirements.	1	Completed SMP and the monitoring programs (include audit of commitments)	
1B1	10	Water flow and quality changes, fracturing of river bed and rock bars to creeks due to mine subsidence. Flow on environmental impacts result.	1	Completed SMP to include consideration of Sandy and Wongawilli Creeks and the monitoring programs	
1C1	10	Water flow and quality changes over the catchment area, fracturing of creek bed and rock bars to creeks due to mine subsidence. Large flow on environmental impacts result over the wide area.	1	Completed SMP to include consideration of tributaries and the monitoring programs	
1N1	10	Change in swamp function, environmental damage to swamps, wetlands, water related ecosystems sites due to mine subsidence.	1	Completed SMP to include swamps, wetlands, water related ecosystems and the monitoring programs	
1O1	10	Mine subsidence leads to loss of listed species or their habitat.	1	Completed SMP to include consideration of Threatened and protected species and the monitoring programs	
1A2	9	Non adherence to SMP and government requirements (breach of conditions and/or special area management requirements).	1	Completed SMP and the monitoring programs (include audit of commitments)	
1F1	9	Enhancement or development of spring flow resulting in water quality changes due to mine subsidence. Flow on environmental impacts result.	1	Completed SMP and the monitoring programs (include audit of commitments)	
1E1	3	Contribution of shallow ground water resource to catchment yield. Ground water level and quality changes due to mine subsidence.	1	Completed SMP to include consideration of aquifers and the monitoring programs	
1J1	3	Rock falls from cliffs due to mine subsidence. Rock fall causes localised damage to environment. (Note: There were no pagodas identified in the area)	1	Completed SMP and the monitoring programs (include audit of commitments)	
2K2	3	Unacceptable loss of stored water from Cordeaux Reservoir due to mine subsidence. Reservoir will require repair.	1 2	Completed SMP to include consideration of Cordeaux Reservoir Dams Safety Committee (DSC) approval required to mine within the notification area of Cordeaux Reservoir	
5H1	3	Damage to exploration bore holes due to mine subsidence. Resulting in the release of gas or water to the surface or water enters deep storage.	1	Completed SMP to include consideration of exploration bore holes and associated equipment and the monitoring programs	
1J2	1	Rock falls from cliffs due to mine subsidence. Rock fall causes injury to personnel. (Note: There were no pagodas identified in the area)	1	Completed SMP to include Public Safety and the monitoring programs	
1K2	1	Surface cracking along steep slopes due to mine subsidence. Localised damage to environment and enhancement of erosion and sedimentation.	1	Completed SMP and the monitoring programs	
2B1	1	Damage to fire roads due to mine subsidence. Roads require repair.	1 2	Completed SMP to include consideration of roads and the monitoring programs. Revise management of SCA roads to include Area 3A	
6A1	1	Damage to Archaeological Significant sites due to mine subsidence.	1	Completed SMP to include consideration of Areas of Archaeological Significance and the monitoring programs	


Qualitative Risk Analysis Risk Treatment Schedule		ANALYSIS NUMBER: AR0460	ANALYSIS SITE AND NAME Dendrobium Mine Area 3A Mine Subsidence (Longwalls 6 -10)		Sheet: 2 of: 2
Ref	Risk	Hazard	TID	Treatment Options	
1D1	0	Ground water level and quality changes due to mine subsidence.	2	Obtain consent under the National Parks and Wildlife Act 1974 - Section 90 (prior to the mining of Longwall 6)	
1K1	0	Mass movement of steep slopes due to mine subsidence. Localised damage to environment.	1	Completed SMP to include consideration of aquifers and the monitoring programs	
1S1	0	Mine subsidence leads to damage or loss of natural vegetation.	1	Completed SMP and the monitoring programs	
2C1	0	Damage to bridges due to mine subsidence. Bridges will require repair.	1	Completed SMP to include consideration of natural vegetation and the monitoring programs	
2H1	0	Damage to TransGrid and Integral Electricity transmission lines due to mine subsidence. Electricity transmission lines requires repair. (Includes 330kV, 33kV)	1	None Identified	
2K1	0	Damage to Cordeaux and Upper Cordeaux No 2 Dam due to mine subsidence. Dams will require repair.	1	Completed SMP to include consideration of the TransGrid and Integral Electricity transmission lines and the monitoring programs	
6A2	0	Damage to Heritage Significant sites due to mine subsidence.	2	Asset owners to develop internal impact assessments	
8A1	0	Movement of Permanent Survey Control Marks due to mine subsidence. Surveyors rely on false location of the marks.	3	Revise the Integral Management Plan to include Area 3A	
			4	Develop a Management Plan with TransGrid	
			5	Revise the asset protection plan to include Area 3A	
			1	Completed SMP to include consideration of Cordeaux and Upper Cordeaux No 2 Dams	
			1	Completed SMP to include consideration of Areas of Heritage Significance and the monitoring programs (include base line assessment of Heritage Significant sites within the area)	
			1	Completed SMP to include consideration of Permanent Survey Control Marks and the monitoring programs	

## **Attachment 4**

### **Risk Treatment Schedule (Consequence Order)**



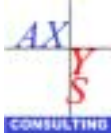
Qualitative Risk Analysis Risk Treatment Schedule		ANALYSIS NUMBER: AR0460	ANALYSIS SITE AND NAME Dendrobium Mine Area 3A Mine Subsidence (Longwalls 6 -10)		Sheet: 1 of: 2
Consequence Order					
Ref	Cons	Hazard	TID	Treatment Options	
1A1	30	SMP not approved. Non adherence to government requirements. SMP does not meet special area management requirements.	1	Completed SMP and the monitoring programs (include audit of commitments)	
1A2	30	Non adherence to SMP and government requirements (breach of conditions and/or special area management requirements).	1	Completed SMP and the monitoring programs (include audit of commitments)	
1B1	10	Water flow and quality changes, fracturing of river bed and rock bars to creeks due to mine subsidence. Flow on environmental impacts result.	1	Completed SMP to include consideration of Sandy and Wongawilli Creeks and the monitoring programs	
1C1	10	Water flow and quality changes over the catchment area, fracturing of creek bed and rock bars to creeks due to mine subsidence. Large flow on environmental impacts result over the wide area.	1	Completed SMP to include consideration of tributaries and the monitoring programs	
1J2	10	Rock falls from cliffs due to mine subsidence. Rock fall causes injury to personnel. (Note: There were no pagodas identified in the area)	1	Completed SMP to include Public Safety and the monitoring programs	
1N1	10	Change in swamp function, environmental damage to swamps, wetlands, water related ecosystems sites due to mine subsidence.	1	Completed SMP to include swamps, wetlands, water related ecosystems and the monitoring programs	
1O1	10	Mine subsidence leads to loss of listed species or their habitat.	1	Completed SMP to include consideration of Threatened and protected species and the monitoring programs	
2K2	10	Unacceptable loss of stored water from Cordeaux Reservoir due to mine subsidence. Reservoir will require repair.	1	Completed SMP to include consideration of Cordeaux Reservoir	
			2	Dams Safety Committee (DSC) approval required to mine within the notification area of Cordeaux Reservoir	
1E1	3	Contribution of shallow ground water resource to catchment yield. Ground water level and quality changes due to mine subsidence.	1	Completed SMP to include consideration of aquifers and the monitoring programs	
1F1	3	Enhancement or development of spring flow resulting in water quality changes due to mine subsidence. Flow on environmental impacts result.	1	Completed SMP and the monitoring programs (include audit of commitments)	
5H1	3	Damage to exploration bore holes due to mine subsidence. Resulting in the release of gas or water to the surface or water enters deep storage.	1	Completed SMP to include consideration of exploration bore holes and associated equipment and the monitoring programs	
6A1	3	Damage to Archaeological Significant sites due to mine subsidence.	1	Completed SMP to include consideration of Areas of Archaeological Significance and the monitoring programs	
			2	Obtain consent under the National Parks and Wildlife Act 1974 - Section 90 (prior to the mining of Longwall 6)	
1D1	1	Ground water level and quality changes due to mine subsidence.	1	Completed SMP to include consideration of aquifers and the monitoring programs	
1J1	1	Rock falls from cliffs due to mine subsidence. Rock fall causes localised damage to environment. (Note: There were no pagodas identified in the area)	1	Completed SMP and the monitoring programs (include audit of commitments)	
1K1	1	Mass movement of steep slopes due to mine subsidence. Localised damage to environment.	1	Completed SMP and the monitoring programs	

Qualitative Risk Analysis Risk Treatment Schedule		ANALYSIS NUMBER: AR0460	ANALYSIS SITE AND NAME Dendrobium Mine Area 3A Mine Subsidence (Longwalls 6 -10)		Sheet: 2 of: 2
Ref	Cons	Hazard	TID	Treatment Options	
1K2	1	Surface cracking along steep slopes due to mine subsidence. Localised damage to environment and enhancement of erosion and sedimentation.	1	Completed SMP and the monitoring programs	
1S1	1	Mine subsidence leads to damage or loss of natural vegetation.	1	Completed SMP to include consideration of natural vegetation and the monitoring programs	
2B1	1	Damage to fire roads due to mine subsidence. Roads require repair.	1	Completed SMP to include consideration of roads and the monitoring programs.	
			2	Revise management of SCA roads to include Area 3A	
2C1	1	Damage to bridges due to mine subsidence. Bridges will require repair.	1	None Identified	
2H1	1	Damage to TransGrid and Integral Electricity transmission lines due to mine subsidence. Electricity transmission lines requires repair. (Includes 330kV, 33kV)	1	Completed SMP to include consideration of the TransGrid and Integral Electricity transmission lines and the monitoring programs	
			2	Asset owners to develop internal impact assessments	
			3	Revise the Integral Management Plan to include Area 3A	
			4	Develop a Management Plan with TransGrid	
			5	Revise the asset protection plan to include Area 3A	
2K1	1	Damage to Cordeaux and Upper Cordeaux No 2 Dam due to mine subsidence. Dams will require repair.	1	Completed SMP to include consideration of Cordeaux and Upper Cordeaux No 2 Dams	
6A2	1	Damage to Heritage Significant sites due to mine subsidence.	1	Completed SMP to include consideration of Areas of Heritage Significance and the monitoring programs (include base line assessment of Heritage Significant sites within the area)	
8A1	1	Movement of Permanent Survey Control Marks due to mine subsidence. Surveyors rely on false location of the marks.	1	Completed SMP to include consideration of Permanent Survey Control Marks and the monitoring programs	

## **Attachment 5**

### **Risk Treatment Schedule and Action Plan**

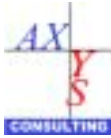
**Qualitative  
Risk Analysis  
Treatment Schedule**



<b>SYSTEM:</b> AR0460	Dendrobium Mine Area 3A Mine Subsidence (Longwalls 6 -10)	<b>Compiled by:</b> <b>Date:</b>	Shane Chiddy 24th August 2007	<b>Sheet:</b> <b>of:</b>	1 6
<b>SUB SYSTEM:</b> <b>No: 1</b>	Natural Features	<b>Verified by:</b> <b>Date:</b>	Bruce Blunden / Gary Br 29 August 2007		

ID	HAZARD & EFFECTS	TID	TREATMENT	DATE REQUIRED	RESPONSIBLE OFFICER	DATE COMPLETED
1A1	SMP not approved. Non adherence to government requirements. SMP does not meet special area management requirements.	1	Completed SMP and the monitoring programs (include audit of commitments)	Friday, 28 September 2007	BHPB Illawarra Coal - Manager Environment	
1A2	Non adherence to SMP and government requirements (breach of conditions and/or special area management requirements).	1	Completed SMP and the monitoring programs (include audit of commitments)	Friday, 28 September 2007	BHPB Illawarra Coal - Manager Environment	
1B1	Water flow and quality changes, fracturing of river bed and rock bars to creeks due to mine subsidence. Flow on environmental impacts result.	1	Completed SMP to include consideration of Sandy and Wongawilli Creeks and the monitoring programs	Friday, 28 September 2007	BHPB Illawarra Coal - Manager Environment	
1C1	Water flow and quality changes over the catchment area, fracturing of creek bed and rock bars to creeks due to mine subsidence. Large flow on environmental impacts result over the wide area.	1	Completed SMP to include consideration of tributaries and the monitoring programs	Friday, 28 September 2007	BHPB Illawarra Coal - Manager Environment	
1D1	Ground water level and quality changes due to mine subsidence.	1	Completed SMP to include consideration of aquifers and the monitoring programs	Friday, 28 September 2007	BHPB Illawarra Coal - Manager Environment	
1E1	Contribution of shallow ground water resource to catchment yield. Ground water level and quality changes due to mine subsidence.	1	Completed SMP to include consideration of aquifers and the monitoring programs	Friday, 28 September 2007	BHPB Illawarra Coal - Manager Environment	
1F1	Enhancement or development of spring flow resulting in water quality changes due to mine subsidence. Flow on environmental impacts result.	1	Completed SMP and the monitoring programs (include audit of commitments)	Friday, 28 September 2007	BHPB Illawarra Coal - Manager Environment	
1J1	Rock falls from cliffs due to mine subsidence. Rock fall causes localised damage to environment. (Note: There were no pagodas identified in the area)	1	Completed SMP and the monitoring programs (include audit of commitments)	Friday, 28 September 2007	BHPB Illawarra Coal - Manager Environment	
1J2	Rock falls from cliffs due to mine subsidence. Rock fall causes injury to personnel. (Note: There were no pagodas identified in the area)	1	Completed SMP to include Public Safety and the monitoring programs	Friday, 28 September 2007	BHPB Illawarra Coal - Manager Environment	

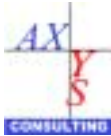
**Qualitative  
Risk Analysis  
Treatment Schedule**



<b>SYSTEM:</b> AR0460	Dendrobium Mine Area 3A Mine Subsidence (Longwalls 6 -10)	<b>Compiled by:</b> <b>Date:</b>	Shane Chiddy 24th August 2007	<b>Sheet:</b> <b>of:</b>	2 6
<b>SUB SYSTEM:</b> <b>No: 1</b>	Natural Features	<b>Verified by:</b> <b>Date:</b>	Bruce Blunden / Gary Br 29 August 2007		

ID	HAZARD & EFFECTS	TID	TREATMENT	DATE REQUIRED	RESPONSIBLE OFFICER	DATE COMPLETED
1K1	Mass movement of steep slopes due to mine subsidence. Localised damage to environment.	1	Completed SMP and the monitoring programs	Friday, 28 September 2007	BHPB Illawarra Coal - Manager Environment	
1K2	Surface cracking along steep slopes due to mine subsidence. Localised damage to environment and enhancement of erosion and sedimentation.	1	Completed SMP and the monitoring programs	Friday, 28 September 2007	BHPB Illawarra Coal - Manager Environment	
1N1	Change in swamp function, environmental damage to swamps, wetlands, water related ecosystems sites due to mine subsidence.	1	Completed SMP to include swamps, wetlands, water related ecosystems and the monitoring programs	Friday, 28 September 2007	BHPB Illawarra Coal - Manager Environment	
1O1	Mine subsidence leads to loss of listed species or their habitat.	1	Completed SMP to include consideration of Threatened and protected species and the monitoring programs	Friday, 28 September 2007	BHPB Illawarra Coal - Manager Environment	
1S1	Mine subsidence leads to damage or loss of natural vegetation.	1	Completed SMP to include consideration of natural vegetation and the monitoring programs	Friday, 28 September 2007	BHPB Illawarra Coal - Manager Environment	

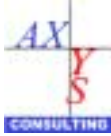
**Qualitative  
Risk Analysis  
Treatment Schedule**



<b>SYSTEM:</b> AR0460	Dendrobium Mine Area 3A Mine Subsidence (Longwalls 6 -10)	<b>Compiled by:</b> <b>Date:</b>	Shane Chiddy 24th August 2007	<b>Sheet:</b> <b>of:</b>	3 6
<b>SUB SYSTEM:</b> <b>No: 2</b>	Public Utilities	<b>Verified by:</b> <b>Date:</b>	Bruce Blunden / Gary Br 29 August 2007		

ID	HAZARD & EFFECTS	TID	TREATMENT	DATE REQUIRED	RESPONSIBLE OFFICER	DATE COMPLETED
2B1	Damage to fire roads due to mine subsidence. Roads require repair.	1	Completed SMP to include consideration of roads and the monitoring programs.	Friday, 28 September 2007	BHPB Illawarra Coal - Manager R&I	
		2	Revise management of SCA roads to include Area 3A	Friday, 28 September 2007	BHPB Illawarra Coal - Manager R&I	
2C1	Damage to bridges due to mine subsidence. Bridges will require repair.	1	None Identified			
2H1	Damage to TransGrid and Integral Electricity transmission lines due to mine subsidence. Electricity transmission lines requires repair. (Includes 330kV, 33kV)	1	Completed SMP to include consideration of the TransGrid and Integral Electricity transmission lines and the monitoring programs	Friday, 28 September 2007	BHPB Illawarra Coal - Manager Environment	
		2	Asset owners to develop internal impact assessments	Friday, 28 September 2007	BHPB Illawarra Coal - Manager R&I	
		3	Revise the Integral Management Plan to include Area 3A	Saturday, 1 December 2007	BHPB Illawarra Coal - Manager R&I	
		4	Develop a Management Plan with TransGrid	Saturday, 1 December 2007	BHPB Illawarra Coal - Manager R&I	
		5	Revise the asset protection plan to include Area 3A	Saturday, 1 December 2007	BHPB Illawarra Coal - Manager R&I	
2K1	Damage to Cordeaux and Upper Cordeaux No 2 Dam due to mine subsidence. Dams will require repair.	1	Completed SMP to include consideration of Cordeaux and Upper Cordeaux No 2 Dams	Friday, 28 September 2007	BHPB Illawarra Coal - Manager Environment	
2K2	Unacceptable loss of stored water from Cordeaux Reservoir due to mine subsidence. Reservoir will require repair.	1	Completed SMP to include consideration of Cordeaux Reservoir	Friday, 28 September 2007	BHPB Illawarra Coal - Manager Environment	
		2	Dams Safety Committee (DSC) approval required to mine within the notification area of Cordeaux Reservoir	Friday, 28 September 2007	BHPB Illawarra Coal - Manager Approvals	

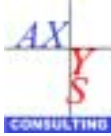
**Qualitative  
Risk Analysis  
Treatment Schedule**



<b>SYSTEM:</b> AR0460	Dendrobium Mine Area 3A Mine Subsidence (Longwalls 6 -10)	<b>Compiled by:</b> <b>Date:</b>	Shane Chiddy 24th August 2007	<b>Sheet:</b> <b>of:</b>	4 6
<b>SUB SYSTEM:</b> <b>No: 5</b>	Industrial, Commercial and Business Establishments	<b>Verified by:</b> <b>Date:</b>	Bruce Blunden / Gary Br 29 August 2007		

ID	HAZARD & EFFECTS	TID	TREATMENT	DATE REQUIRED	RESPONSIBLE OFFICER	DATE COMPLETED
5H1	Damage to exploration bore holes due to mine subsidence. Resulting in the release of gas or water to the surface or water enters deep storage.	1	Completed SMP to include consideration of exploration bore holes and associated equipment and the monitoring programs	Friday, 28 September 2007	BHPB Illawarra Coal - Manager Environment	

**Qualitative  
Risk Analysis  
Treatment Schedule**

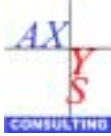


<b>SYSTEM:</b> AR0460	Dendrobium Mine Area 3A Mine Subsidence (Longwalls 6 -10)	<b>Compiled by:</b> <b>Date:</b>	Shane Chiddy 24th August 2007	<b>Sheet:</b> <b>of:</b>	5 6
<b>SUB SYSTEM:</b> <b>No: 6</b>	Areas of Archaeological and/or Heritage significance	<b>Verified by:</b> <b>Date:</b>	Bruce Blunden / Gary Br 29 August 2007		

ID	HAZARD & EFFECTS	TID	TREATMENT	DATE REQUIRED	RESPONSIBLE OFFICER	DATE COMPLETED
6A1	Damage to Archaeological Significant sites due to mine subsidence.	1	Completed SMP to include consideration of Areas of Archaeological Significance and the monitoring programs	Friday, 28 September 2007	BHPB Illawarra Coal - Manager Environment	
		2	Obtain consent under the National Parks and Wildlife Act 1974 - Section 90 (prior to the mining of Longwall 6)	Friday, 1 January 2010	BHPB Illawarra Coal - Manager Environment	
6A2	Damage to Heritage Significant sites due to mine subsidence.	1	Completed SMP to include consideration of Areas of Heritage Significance and the monitoring programs (include base line assessment of Heritage Significant sites within the area)	Friday, 28 September 2007	BHPB Illawarra Coal - Manager Environment	



**Qualitative  
Risk Analysis  
Treatment Schedule**



<b>SYSTEM:</b> AR0460	Dendrobium Mine Area 3A Mine Subsidence (Longwalls 6 -10)	<b>Compiled by:</b> <b>Date:</b>	Shane Chiddy 24th August 2007	<b>Sheet:</b> <b>of:</b>	6 6
<b>SUB SYSTEM:</b> <b>No:</b> 8	Permanent Survey Control Marks	<b>Verified by:</b> <b>Date:</b>	Bruce Blunden / Gary Br 29 August 2007		

ID	HAZARD & EFFECTS	TID	TREATMENT	DATE REQUIRED	RESPONSIBLE OFFICER	DATE COMPLETED
8A1	Movement of Permanent Survey Control Marks due to mine subsidence. Surveyors rely on false location of the marks.	1	Completed SMP to include consideration of Permanent Survey Control Marks and the monitoring programs	Friday, 28 September 2007	BHPB Illawarra Coal - Manager R&I	

**Attachment 9**  
Revisions

## Document Revision History

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Revision	Date	Modification Description
1	28-Sep-07	Released for comments
2	28-Aug-07	Minor word and grammar corrections from Cardno Forbes Rigby Pty Ltd.
3	04-Sep-07	Minor word and grammar corrections from BHPB personnel
4	12-Sep-07	Separate Gross Exposure section added into the report

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