

CHAPTER 6 ENVIRONMENTAL RISK ASSESSMENT

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6 ENVIRONMENTAL RISK ASSESSMENT

This chapter describes the environmental risk assessment process and summarises the key potential environment issues for the Rasp Mine.

6.1 METHODOLOGY

Several risk assessments, including environmental risk assessments (ERA), have been undertaken for the Project to identify the key issues that warranted detailed assessment and review. These were undertaken in 2006 and 2007 and were facilitated by an independent specialist (SP Solutions a company specializing in risk assessment and risk management programs).

Each component was reviewed to take into consideration the concerns of key stakeholders as well as meeting the requirements of the operation, its maintainability, operability, constructability and ultimately it's decommissioning and closure.

The risk assessments were performed in accordance with the principles of *AS/NZS 4360-2004 Risk Management*. Potential risks were assessed against the CBH Risk Matrix and Risk Ranking Criteria.

6.1.1 Key steps

The key steps in the risk assessment process included:

- Confirming the scope of the assessment;
- Conducting site inspections;
- Identifying, analysing and evaluating the risks; and
- Determining, as required, control measures to minimise risks.

The risk assessments were undertaken through workshops attended by a number of BHOP personnel and consultants comprising a wide range of skills, experience and backgrounds. Specific risk assessments were conducted for the processing plant, tailings disposal and overall Project and various risk registers developed.

6.1.2 Risk analysis

Risk criteria assist in clearly defining unacceptable and acceptable levels of risk and enables risks to be prioritised. *Table 6-1* outlines the risk criteria applied.

Table 6-1 Risk criteria

Risk criterion	Objective
Safety	Safety must be upheld at all times. No injuries or fatalities will be accepted.
Financial impact	Project costs should remain within the allocated budget.
Media exposure	The Project must ensure that the reputation of the business is protected from negative media exposure.
Timing	The Project must be completed within the contractual timeframe.

Risk criterion	Objective
Staff management	The Project must utilise existing staff skills. Where a particular skill set is not available, sub-contracting may be considered.
Environment	The Project must operate within requirements of environmental legislation and be consistent with the BHOP environmental policy and commitment.

The level of risk was determined using the CBH Risk Ranking Tool. Identified risks are ranked in priority according to the severity of the possible consequence and the likelihood of its occurrence, refer *Tables 6-2 and 6-3*. The CBH Risk Matrix was used to evaluate and prioritise the risk, refer *Table 6-4*.

Table 6-2 Consequence severity table

	Safety	Environment	Community/Reputation	Operational
Catastrophic	<ul style="list-style-type: none"> Multiple deaths 	<ul style="list-style-type: none"> Multiple deaths Destruction of protected wildlife or plants or their habitat Devastation to large area of land 	<ul style="list-style-type: none"> Community complaint received with impact at National level Cessation of operations by government or local community > 1 month 	<ul style="list-style-type: none"> Downtime of critical equipment > 3 months Potential cost > \$20m
Major	<ul style="list-style-type: none"> Death Permanent disability Prosecution/Litigation 	<ul style="list-style-type: none"> Severely affecting the health of a group of people Single death of a protected species of plant or wildlife or single death of a person. Severely affecting protected wildlife or plants, long term Prosecution/Litigation 	<ul style="list-style-type: none"> Community complaint received with impact at State government level Prosecution/Litigation Cessation of operations by government or local community > 1 week 	<ul style="list-style-type: none"> Downtime of critical equipment > 1 month Potential cost > \$7m
Significant	<ul style="list-style-type: none"> Lost time injury Disabling injury where the person cannot return to normal work within 4 days Serious breach of safety regulations 	<ul style="list-style-type: none"> Recorded health affects (symptoms) by people Environment impact affecting protected wildlife or plants, short term Emission/discharge exceeding legal standard and is reportable to a government authority Any loss of containment off site to private or State property, road, waterway, etc Loss of containment of substance (remains on premises) >200 litres 	<ul style="list-style-type: none"> Community complaint received with impact at local Council level 	<ul style="list-style-type: none"> Downtime of critical equipment > 1 week Potential cost > \$2m
Moderate	<ul style="list-style-type: none"> Medical treatment eg stitches, etc Disabling injury where the person cannot return to normal work for up to a period of 4 days 	<ul style="list-style-type: none"> Loss of containment of substance, (remains on premises) <200 litres Non-compliance with internal environmental target Concern by local community re environmental matter 	<ul style="list-style-type: none"> Local Community complaint satisfactorily resolved between the community and site and has future impact 	<ul style="list-style-type: none"> Downtime of critical equipment > 1 day Potential cost > \$300,000
Minor	<ul style="list-style-type: none"> First aid treatment 	<ul style="list-style-type: none"> Loss of containment of substance (remains on premises) <50 litres. 	<ul style="list-style-type: none"> Local Community complaint satisfactorily resolved between the community and site and no future impact 	<ul style="list-style-type: none"> Downtime of critical equipment > 1 shift (12h) Potential cost > \$150,000

Table 6-3 Likelihood classifications

Almost Certain	Likely	Possible	Unlikely	Rare
Event is expected to occur in most occasions. Frequency – weekly.	Event is expected to occur on many occasions. Frequency - monthly.	Event is expected to occur on some occasions. Frequency - yearly.	Event is expected to occur infrequently. Frequency – 5 years.	Event is not expected to occur, but may occur under exceptional circumstances.

Table 6-4 Risk matrix

RISK RANKING MATRIX					
Likelihood	Consequences				
	Minor	Moderate	Significant	Major	Catastrophic
Almost certain	11	16	20	23	25
Likely	7	12	17	21	24
Possible	4	8	13	18	22
Unlikely	2	5	9	14	19
Rare	1	3	6	10	15
1 – 5 Low Risk		6 – 17 Medium Risk		18 – 25 High Risk	

6.2 KEY POTENTIAL ENVIRONMENTAL ISSUES

The key potential environmental issues identified during the ERA are summarized in *Table 6-5* and are addressed in Chapters 7 to 17. Where relevant the key potential environmental issues are also addressed in the various annexures to the EAR.

Table 6-5 Key potential environmental issues

Potential key Environmental Risks	EAR Reference
Noise from operations	Chapter 7 and Annexures G(A) and G(B)
Deterioration of air quality from the generation of airborne dust	Chapter 8 and Annexure H
Community health impacts related to exposure to lead bearing dust	Chapter 9 and Annexure I
Surface subsidence impacts on rail infrastructure, residential and commercial buildings above the Western Mineralisation in the vicinity of Crystal Street	Chapter 2 and Annexure E
Disturbance of significant heritage sites	Chapter 11 and Annexure L
Loss of containment of airborne dust from TSF1 and TSF2	Chapters 2 and Annexures F and H
Loss of containment of tailings from TSF1	Chapters 2 and Annexures F
Surface water runoff leads to off-site contamination	Chapter 10 and Annexure J
Increase in traffic volume	Chapter 14

Potential key Environmental Risks	EAR Reference
Vibration impacts to local buildings from blasting and rail activities	Chapters 2 and 7, and Annexure G(A) and G(B)
Decrease in the water supply to the City of Broken Hill	Chapter 10
Reduction in groundwater flow and availability affecting other groundwater users	Chapter 10 and Annexure K
Seepage from TSF impacts on local residents	Chapter 2 and Annexure F
Degradation of visual amenity	Chapter 13
Increase in greenhouse gas emissions	Chapter 8
Population impacts and impacts on social infrastructure	Chapter 16

BHOP has a Risk Management Policy and risk management forms part of the safety and environmental management systems of BHOP. Risk reviews will continue to be undertaken at regular intervals during planning, construction, operations and at closure.