



BULLI SEAM OPERATIONS

APPENDIX M
PRELIMINARY HAZARD ANALYSIS

APPENDIX M
PRELIMINARY HAZARD ANALYSIS



MAY 2009
Project No. BHPIC-07-01
Document No. APPENDIX M.DOC (00285994.doc)

TABLE OF CONTENTS

<u>Section</u>	<u>Page</u>
M1 INTRODUCTION	M-1
M1.1 OBJECTIVE AND SCOPE	M-1
M1.2 STUDY METHODOLOGY	M-2
M1.2.1 Preliminary Hazard Analysis	M-2
M1.2.2 Risk Management Process	M-2
M1.2.3 Risk Criteria	M-2
M1.2.4 Qualitative Measures of Consequence, Likelihood and Risk	M-3
M2 PROJECT OVERVIEW	M-5
M3 HAZARD IDENTIFICATION	M-6
M3.1 DESCRIPTION OF HAZARDOUS MATERIALS	M-6
M3.1.1 Diesel	M-6
M3.1.2 Petrol	M-6
M3.1.3 Hydrocarbons	M-6
M3.1.4 Liquid Petroleum Gas	M-6
M3.1.5 Explosives	M-6
M3.2 HAZARD IDENTIFICATION PROCESS	M-7
M3.2.1 Project Components	M-7
M3.2.2 Incident Classes	M-7
M3.2.3 Project Risk Treatment Measures	M-8
M4 RISK MANAGEMENT AND EVALUATION	M-11
M5 REFERENCES	M-11

LIST OF TABLES

Table M-1	Qualitative Measures of Probability
Table M-2	Qualitative Measures of Maximum Reasonable Consequence
Table M-3	Risk Ranking Table
Table M-4	Site Specific Management Plans
Table M-5	Management Plans in SMP Areas

LIST OF FIGURES

Figure M-1	Risk Management Process
Figure M-2	Project General Arrangement

ATTACHMENTS

Attachment MA	Bulli Seam Operations Hazard Identification Table
---------------	---

M1 INTRODUCTION

This Preliminary Hazard Analysis (PHA) has been conducted as part of the Director-General's Environmental Assessment (EA) Requirements to evaluate the hazards associated with the Bulli Seam Operations (the Project) in accordance with the general principles of risk evaluation and assessment outlined in the New South Wales (NSW) Department of Urban Affairs and Planning (DUAP) *Multi-Level Risk Assessment* (DUAP, 1999). This PHA also addresses the requirements of State Environmental Planning Policy (SEPP) No. 33 (Hazardous and Offensive Development) and *Applying SEPP 33 – Hazardous and Offensive Development Application Guidelines* (DUAP, 1997), and has been documented in general accordance with *Guidelines for Hazard Analysis: Hazardous Industry Planning Advisory Paper No. 6* (DUAP, 1992a).

Assessed risks are compared to the qualitative risk assessment criteria developed in accordance with Australian Standard/New Zealand Standard (AS/NZS) 4360:2004 *Risk Management* (AS/NZS 4360:2004). Further, this PHA considers the qualitative criteria provided in *Risk Criteria for Land Use Safety Planning: Hazardous Industry Planning Advisory Paper No. 4* (DUAP, 1992b).

The Project is located approximately 25 kilometres north-west of Wollongong in NSW. The Project involves the continuation of underground mining operations at the Appin Mine and West Cliff Colliery with development to extend to the north (Appin Area 7 and West Cliff Area 5), east (North Cliff), west (Appin West [Area 9] and Appin Area 8) and south (Appin Areas 2 and 3 Extended). A description of the Project is provided in Section 2 in the Main Report of the EA.

M1.1 OBJECTIVE AND SCOPE

The objective of this PHA is to identify the risks posed by the Project to people, property and the environment and assess the identified risks using applicable qualitative criteria. This assessment considers off-site risks to people, property and the environment (in the presence of controls) arising from atypical and abnormal hazardous events and conditions (i.e. equipment failure, operator error and external events). The assessment does not consider risks to Illawarra Coal Holdings Pty Ltd (ICHPL) employees or property.

The above scope is consistent with the Director-General's EA Requirements for the Project which states:

The Environmental Assessment of the project must include:

.....

- *Hazards – paying particular attention to public safety.*

This report should be read in conjunction with the following studies conducted for the EA:

- Subsidence Assessment (Appendix A).
- Groundwater Assessment (Appendix B).
- Surface Water Assessment (Appendix C).
- Aquatic Ecology Assessment (Appendix D).
- Terrestrial Flora Assessment (Appendix E).
- Terrestrial Fauna Assessment (Appendix F).
- Aboriginal Cultural Heritage Assessment (Appendix G).
- Non-Aboriginal Heritage Assessment (Appendix H).
- Noise Impact Assessment (Appendix I).
- Air Quality Impact Assessment (Appendix J).
- Road Transport Assessment (Appendix K).
- Socio-Economic Assessment (Appendix L).
- Environmental Risk Assessment (ERA) (Appendix N).
- Upland Swamp Risk Assessment (Appendix O).
- Stream Risk Assessment (Appendix P).

- Aboriginal Heritage Site Risk Assessment (Appendix Q).
- Major Cliff Line Risk Assessment (Appendix R).

M1.2 STUDY METHODOLOGY

The methodology employed during the preparation of this PHA was as follows:

- (i) Identify the hazards associated with the Project.
- (ii) Examine the maximum reasonable consequence of identified events.
- (iii) Qualitatively estimate the likelihood of events.
- (iv) Propose risk treatment measures.
- (v) Qualitatively assess risks to the environment, members of the public and their property arising from atypical and abnormal events and compare these to applicable qualitative criteria.
- (vi) Recommend further risk treatment measures if considered warranted.
- (vii) Qualitatively determine the residual risk assuming the implementation of the risk treatment measures.

M1.2.1 Preliminary Hazard Analysis

The above methodology was undertaken by ICHPL representatives with the assistance of Resource Strategies Pty Ltd. The PHA included review and incorporation of existing risk management reports held by ICHPL in relation to existing mining activities which are comparable in nature to the Project.

M1.2.2 Risk Management Process

This PHA has been undertaken with regard to the risk management process described in AS/NZS 4360:2004 *Risk Management*. The risk management process is shown schematically on Figure M-1 and includes the following components:

- Establish the context – Sections M1.2 and M2.
- Identify risks – Section M3.2 and Attachment MA.
- Analyse risks – Section M4 and Attachment MA.
- Evaluate risks – Section M4 and Attachment MA.
- Treat risks – Section M3.2.3 and Attachment MA.

M1.2.3 Risk Criteria

This PHA considered the following qualitative criteria (summarised from DUAP, 1992b):

- (a) All 'avoidable' risks should be avoided. This necessitates investigation of alternative locations and technologies where applicable.
- (b) The risks from a major hazard should be reduced wherever practicable, irrespective of the value of the cumulative risk level from the whole installation.
- (c) The consequences (effects) of the more likely hazardous events should, wherever possible be contained within the boundaries of the installation.
- (d) Where there is an existing high risk from a hazardous installation, additional hazardous developments should not be allowed if they add significantly to that existing risk.

M1.2.4 Qualitative Measures of Consequence, Likelihood and Risk

To undertake a qualitative risk assessment it is useful to define (in a descriptive sense) the various levels of consequence of a particular event, and the likelihood (or probability) of such an event occurring. Risk assessment criteria were developed in accordance with AS/NZS 4360:2004 which allows the risk assessment team to develop risk criteria during the establishment of context phase.

In accordance with AS/NZS 4360:2004, Tables M-1, M-2 and M-3 were reviewed (Section M1.2.2) as part of establishing the context. The tables were considered to be consistent with the specific objectives and context of the PHA.

Table M-1
Qualitative Measures of Probability

Event	Likelihood	Description
A	Almost Certain	Happens often
B	Likely	Could easily happen
C	Possible	Could happen and has occurred elsewhere
D	Unlikely	Hasn't happened yet but could
E	Rare	Conceivable, but only in extreme circumstances

Source: Safe Production Solutions (2009)

Table M-2
Qualitative Measures of Maximum Reasonable Consequence

	People	Environment	Asset/Production
1	Multiple fatalities	Extreme environmental harm (e.g. widespread catastrophic impact on environmental values of an area)	More than \$1billion (B) loss or production delay
2	Permanent total disabilities, single fatality	Major environmental harm (e.g. widespread substantial impact on environmental values of an area)	\$100 million (M) to \$1B loss or production delay
3	Major injury or health effects (e.g. major lost workday case/permanent disability)	Serious environmental harm (e.g. widespread and considerable impact on environmental values of an area)	\$5M to \$100M loss or production delay
4	Minor injury or health effects (e.g. restricted work or minor lost workday case)	Material environmental harm (e.g. localised and considerable impact on environmental values of an area)	\$250 thousand (k) to \$5M loss or production delay
5	Slight injury or health effects (e.g. first aid/minor medical treatment level)	Minimal environmental harm (e.g. minor impact on environmental values of an area)	Less than \$250k loss or production delay

Source: Safe Production Solutions (2009)

Combining the probability and consequence, Table M-3 provides a qualitative risk analysis matrix to assess risk levels.

**Table M-3
Risk Ranking Table**

Consequence	Probability				
	A	B	C	D	E
1	1 (H)	2 (H)	4 (H)	7 (M)	11 (M)
2	3 (H)	5 (H)	8 (M)	12 (M)	16 (L)
3	6 (H)	9 (M)	13 (M)	17 (L)	20 (L)
4	10 (M)	14 (M)	18 (L)	21 (L)	23 (L)
5	15 (M)	19 (L)	22 (L)	24 (L)	25 (L)

Notes: L – Low, M – Moderate, H – High
Rank numbering: 1 – highest risk; 25 – lowest risk

Legend – Risk levels:

	Tolerable
	ALARP – As low as reasonably practicable
	Intolerable

Source: Safe Production Solutions (2009)

Risk acceptance criteria for the Project have been formulated following consideration of the *Risk Criteria for Land Use Safety Planning: Hazardous Industry Planning Advisory Paper No. 4* (DUAP, 1992b) and AS/NZS 4360:2004 *Risk Management* guidelines, viz.:

Qualitative Risk Acceptance Criteria:

The risk posed by an event is at a level where the residual risk levels are considered tolerable, following consideration of the proposed risk mitigation and minimisation measures.

The hazard identification summary table (Attachment MA) illustrates the systematic application of the above criteria for the Project.

M2 PROJECT OVERVIEW

The main activities associated with development of the Project would include:

- continued development of underground mining operations within existing coal leases and new mining leases to facilitate a total run-of-mine (ROM) coal production rate of up to 10.5 million tonnes per annum (Mtpa);
- ongoing exploration activities within existing exploration tenements;
- upgrade of the existing West Cliff Washery to support the increased ROM coal production;
- continued mine gas drainage and capture for beneficial utilisation at the West Cliff Ventilation Air Methane Project and Appin-Tower Power Project;
- continued generation of electricity by the existing Appin-Tower Power Project (owned and operated by Energy Developments Limited) utilising coal bed methane drained from the Bulli Seam;
- upgrade of existing surface facilities and supporting infrastructure (e.g. service boreholes, ventilation shafts, gas drainage equipment, waste water treatment and waste water disposal);
- continued and expanded placement of coal wash at the West Cliff Coal Wash Emplacement;
- continued road transport of ROM coal from the Appin East pit top to the West Cliff Washery;
- continued road transport of ROM coal from Appin East pit top and West Cliff pit top via the public road network to the Dendrobium Washery at Port Kembla;
- continued road transport of product coal from the West Cliff Washery via the public road network to BlueScope Steelworks, Port Kembla Coal Terminal, Corrimal and Coalcliff Coke Works and other customers;
- ongoing surface monitoring and rehabilitation (including rehabilitation of mine related infrastructure areas that are no longer required) and remediation of subsidence effects; and
- other associated minor infrastructure, plant, equipment and activities.

Figure M-2 illustrates the Project area and surrounds. A detailed description of the Project is provided in Section 2 of the Main Report of the EA.

M3 HAZARD IDENTIFICATION

M3.1 DESCRIPTION OF HAZARDOUS MATERIALS

The major potentially hazardous materials required for the Project include diesel, petrol, hydrocarbons (oils, greases, degreaser and kerosene), gas cylinders and explosives. A brief description of these materials is presented below.

M3.1.1 Diesel

Diesel is classified as a combustible liquid by Australian Standard (AS) 1940:2004 *The Storage and Handling of Flammable and Combustible Liquids* (AS 1940:2004) (Class C1) for the purposes of storage and handling but is not classified as a dangerous good by the criteria of the Australian Dangerous Goods (ADG) Code. In the event of a spill, diesel is damaging to soils and aquatic ecosystems and fires can occur if it is ignited (flash point 61 to 150 degrees Celsius).

The risks associated with the Project include diesel storage and usage. The use of diesel at the Project and the construction and operation of all fuel storage facilities would be undertaken in accordance with the requirements of AS 1940:2004.

M3.1.2 Petrol

Petrol is classified as a flammable liquid (Class 3) by AS 1940:2004 and as such is classified as a dangerous good by the criteria of the ADG Code. On-site petrol usage would be minor. All fuel storage facilities would be constructed and operated in accordance with AS 1940:2004.

M3.1.3 Hydrocarbons

Oil is classified as a combustible liquid (Class C2) by AS 1940:2004. All hydrocarbon storage facilities would be constructed and operated in accordance with AS 1940:2004.

Waste oil would be placed in drums or tanks within a bunded area and would be collected by a licensed waste contractor for off-site disposal.

Small quantities of grease, degreaser and kerosene would also be required. Storage facilities for these hydrocarbons would be constructed and operated in accordance with the requirements of AS 1940:2004.

M3.1.4 Liquid Petroleum Gas

Liquid Petroleum Gas (LPG) is classified as a flammable gas (Class 2.1) by the ADG Code. Gas cylinders would be stored in accordance with AS/NZS 1596:2008 *The Storage and Handling of LP Gas*.

M3.1.5 Explosives

Explosives would be stored in the existing purpose built storage located at the Appin East pit top and in a new storage facility at the Appin West pit top. The explosives storage would be designed and constructed in accordance with the requirements of AS 2187:1998 *Explosives - Storage, Transport and Use – Storage*.

M3.2 HAZARD IDENTIFICATION PROCESS

The Project hazard (or risk) identification summary table (Attachment MA) was formulated as discussed in Section M1.2.4. It provides a summary of the potential off-site risks and hazards identified for the Project and a qualitative assessment of the risks posed.

M3.2.1 Project Components

For the purposes of hazard identification and assessment, the Project was subdivided into the following areas:

- transport to pit top facilities;
- on-site storage;
- construction/development (pit tops);
- construction/development (remote site);
- underground mining operations;
- coal handling and preparation (stockpiles);
- ROM and product coal transport (road);
- coal wash transport;
- water management;
- exploration/monitoring activities;
- rehabilitation and remediation works (remote site); and
- other infrastructure and supporting systems.

M3.2.2 Incident Classes

The following generic classes of incident were identified:

- leaks/spills;
- fire;
- collision;
- explosion; and
- theft.

Other classes of incidents identified included:

- release of noxious gases to atmosphere;
- subsidence in excess of predictions and safety factors; and
- equipment/mine infrastructure malfunction.

These incident classes were applied to the Project component areas to identify scenarios for which treatment measures were developed.

M3.2.3 Project Risk Treatment Measures

A number of hazard treatment and mitigative measures are described in the range of existing management plans developed in accordance with the *Coal Mine Health and Safety Act, 2002* and the *Coal Mine Health and Safety Regulation, 2006*. Where relevant, the management plans would be revised for the Project. Tables M-3 and M-4 below provide a list of site specific and approved Subsidence Management Plans (SMPs) that may require revision to incorporate the Project risk treatments.

**Table M-3
Site Specific Management Plans**

West Cliff Washery	West Cliff Colliery	Appin Mine
<ul style="list-style-type: none"> • Water Management Plan. • Emergency Management Plan. • Approval Process for Introduction on New Hazardous Materials. • Disposal of Hazardous Materials Procedures. • Brennan's Creek Dam Emergency Management Plan. • North Cliff Environmental Management Plan. • Emplacement Management Plan. • Emplacement Rehabilitation Plan. • Water Cart and Sweeper Procedure. • Social Management Plan. • Energy Management Plan. • Cultural Heritage Management Plan. • Environmental Management Plan. • Surface Transport Management Plan. 	<ul style="list-style-type: none"> • Emergency Control Measures and Structure. • Emergency Procedures. • Environmental Emergency Management Plan. • Environmental Incident Response Plan. • Waste Management and Minimisation Action Plan. • Fire and Emergency Provisions – General. • Fire and Emergency Provisions – Underground. 	<ul style="list-style-type: none"> • Water Management Plan. • Emergency Response Plan. • Hazardous Materials Management Plan. • Stockpile Management Plan. • Waste Management Plan. • Dust Explosion Management Plan. • Social Management Plan. • Fire and Explosion Management Plan. • Airborne (Dust) Management Plan. • Ventilation Monitoring and Management Plan. • Outburst Management Plan. • Longwall Gas Management Plan. • Shotfiring and Explosives Management Plan. • Slope Stability Management Plan. • Spontaneous Combustion Management Plan. • Surface Transport Management Plan. • Training and Competency Management Plan.

**Table M-4
Management Plans in SMP Areas**

Management Plans in SMP Areas
<i>Appin Area 7 (LW 701-704)</i>
<ul style="list-style-type: none"> • Subsidence Management Plan. • Property Subsidence Management Plans. • Management Plan for Longwall Mining beneath the HW2 Hume Highway.
<i>Appin Area 4 (LW 409)</i>
<ul style="list-style-type: none"> • Subsidence Management Plan. • Management Plan for the Upper Canal, Cataract Tunnel and Associated Infrastructure. • Property Subsidence Management Plans.
<i>Appin Area 3</i>
<ul style="list-style-type: none"> • Subsidence Management Plan. • Property Subsidence Management Plans. • Cliff and Steep Slopes Safety Management Plan. • Water Management Plan. • McArthur Water Pipeline Management Plan.
<i>Other</i>
<ul style="list-style-type: none"> • Public Road Management Plan. • Illawarra Coal Gas Pipelines Management Plan. • Illawarra Coal Transgrid Management Plan. • Appin Mine Sydney Catchment Authority (SCA) Assets Management Plan. • Illawarra Coal Telecommunications Management Plan. • Illawarra Coal Integral Energy Monitoring Plan. • Illawarra Coal Integral Management Plan. • Illawarra Coal Optical Fibre Cable Management Plan. • Illawarra Coal Australian Rail Track Corporation Ltd (ARTC) Rail Management Plan. • Illawarra Coal Hazardous Substance Management Plan. • Subsidence Management Plans.

A number of hazard treatment and mitigative measures would be described in management plans for the Project, which are summarised in the Statement of Commitments provided in Section 8 in the Main Report of the EA.

In addition, the following hazard treatment measures would be adopted for the Project:

- **Maintenance** – Ongoing and timely maintenance of all mobile and fixed plant and equipment in accordance with the manufacturer's recommended maintenance schedule, and consistent with the maintenance schemes required by relevant standards. Only vehicles permitted to carry dangerous goods would be used for transport of hazardous materials.
- **Staff Training** – Operators and drivers would be trained and (where appropriate) licensed for their job descriptions. Only those personnel licensed to undertake skilled and potentially hazardous work would be permitted to do so.
- **Engineering Structures** – Civil engineering structures would be constructed in accordance with applicable codes, guidelines and Australian Standards.

- **Contractor Management** – All contractors employed by ICHPL would be required to operate in accordance with the relevant Australian Standards and legislation.
- **Storage Facilities** – Storage and usage procedures for potentially hazardous materials (i.e. fuels and lubricants) would be developed in accordance with Australian Standards and relevant legislation.
- **Risk Assessment** – Ongoing Risk Assessment processes would be conducted over the Project Life to identify potential hazards and inform the development of appropriate hazard treatment measures.

M4 RISK MANAGEMENT AND EVALUATION

Attachment MA presents a qualitative assessment of risks associated with the construction and operation of the Project. The assessment evaluates the risk of the Project impacting on the environment, members of the public and their property. Hazard treatment measures have been proposed, where required, to produce a 'low' level of risk in accordance with the risk acceptance criteria described in Section M1.2.4. Proposed treatment measures are identified in Section M3.2.3.

It is anticipated that many of the potential hazardous scenarios raised in this PHA would be further analysed by additional risk assessments through consultation with infrastructure owners and relevant authorities and the SMP process.

M5 REFERENCES

Department of Urban Affairs and Planning (1992a) *Guidelines for Hazard Analysis: Hazardous Industry Planning Advisory Paper No. 6.*

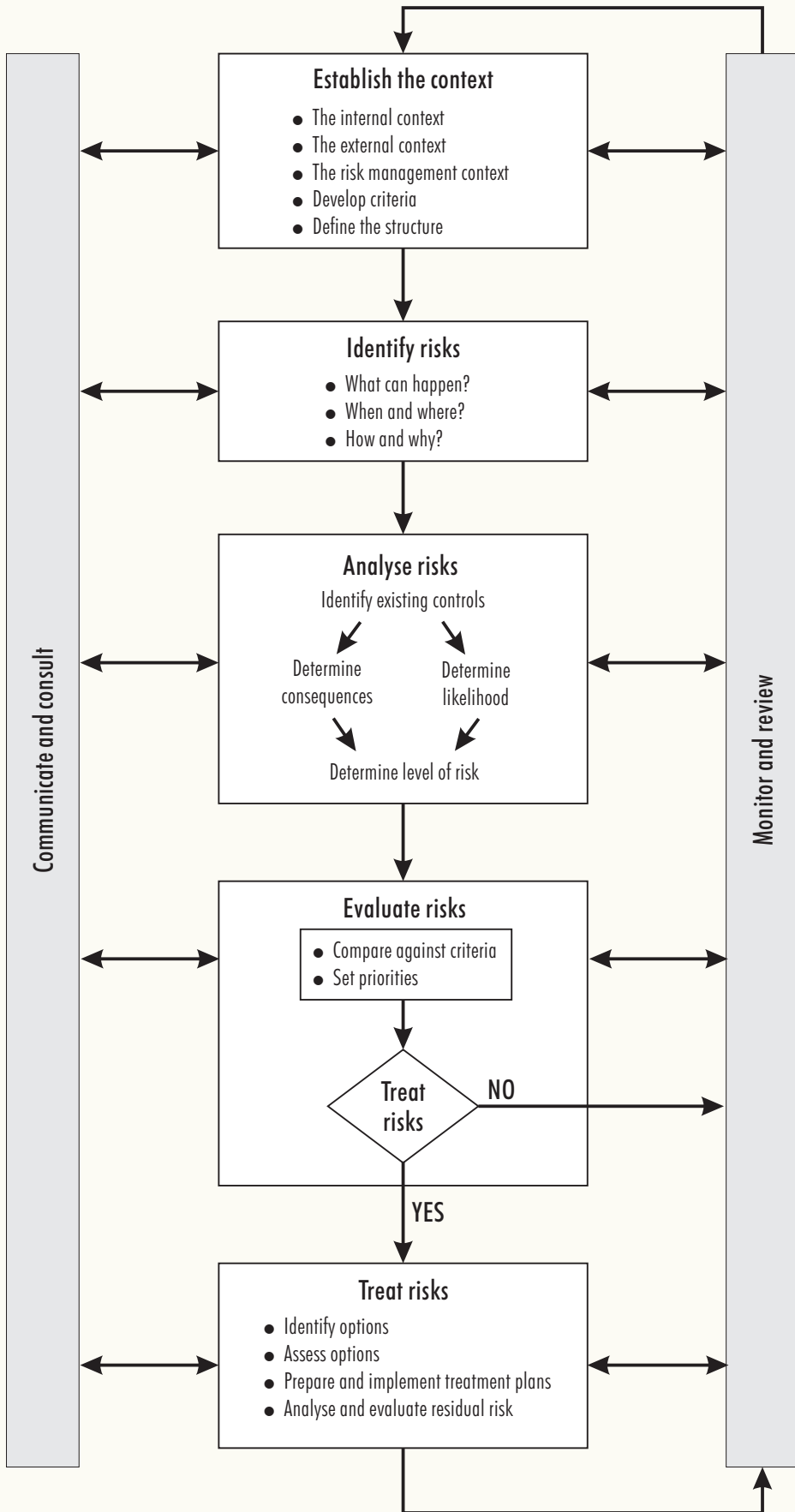
Department of Urban Affairs and Planning (1992b) *Risk Criteria for Land Use Safety Planning: Hazardous Industry Planning Advisory Paper No 4.*

Department of Urban Affairs and Planning (1997) *Applying SEPP 33 – Hazardous and Offensive Development Application Guidelines.*

Department of Urban Affairs and Planning (1999) *Multi-Level Risk Assessment.* Revised Edition.

Safe Production Solutions (2009) *Illawarra Coal Holdings Bulli Seam Operations Environmental Risk Assessment.*

FIGURES

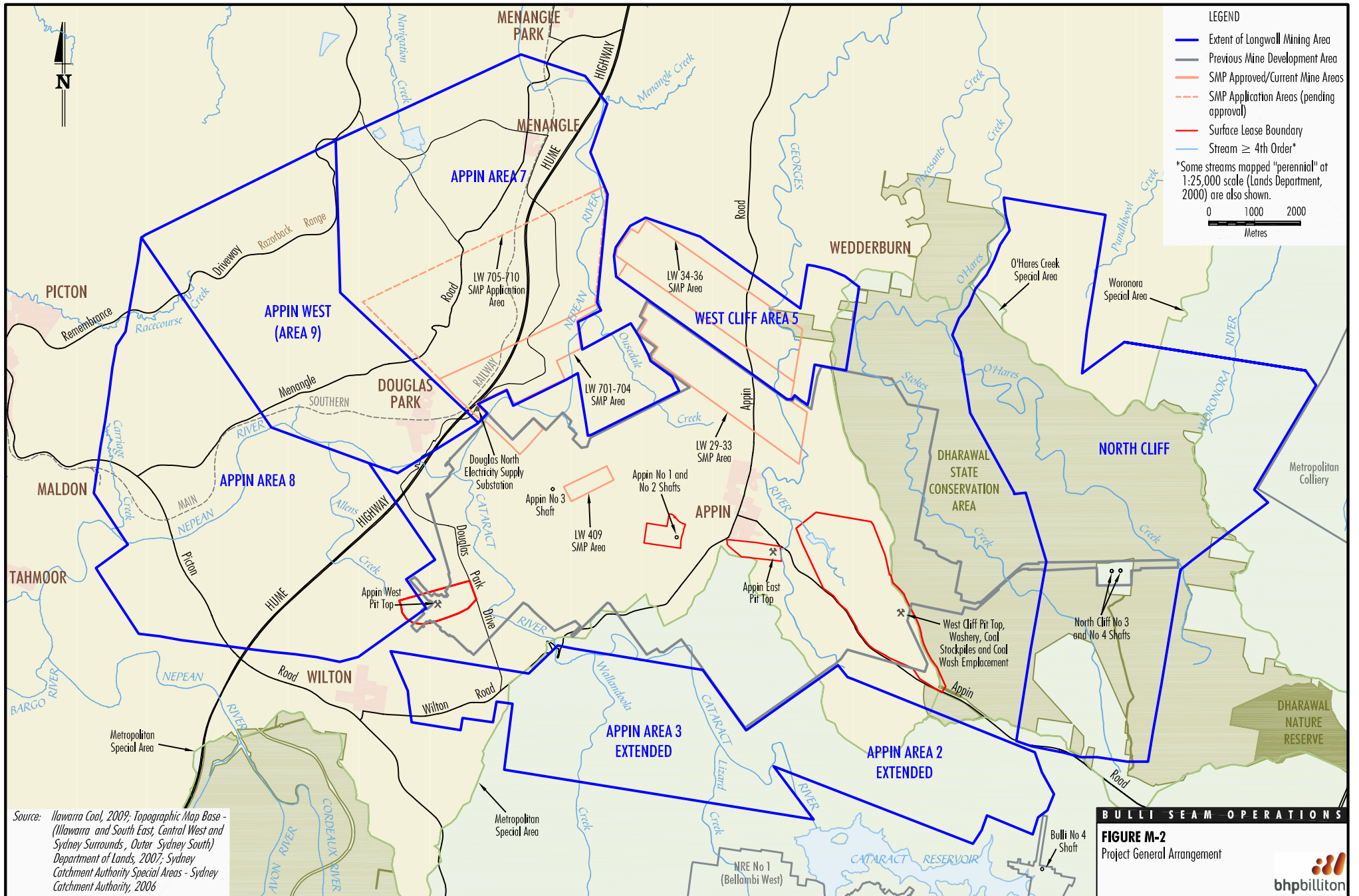


Source: AS/NZS 4360: 2004 Risk Management

BULLI SEAM OPERATIONS

FIGURE M-1
Risk Management Process





Source: Illawarra Coal, 2009; Topographic Map Base - (Illawarra and South East, Central West and Sydney Surrounds, Outer Sydney South) Department of Lands, 2007; Sydney Catchment Authority Special Areas - Sydney Catchment Authority, 2006

BULLI SEAM OPERATIONS

FIGURE M-2
Project General Arrangement



ATTACHMENT MA
BULLI SEAM OPERATIONS
HAZARD IDENTIFICATION TABLE

Bulli Seam Operations Hazard Identification Table

Project Component	Incident Type	Scenario	Proposed Treatment Measures	Likelihood¹	Consequence²	Risk³
Transport to Site (Explosives, Fuels and Hydrocarbons, Chemicals, Dangerous Goods, General Goods, Mobile and Fixed Plant, Construction Materials)	Leaks/Spills	Traffic accident/operator error resulting in leaks/spills of Fuels and Hydrocarbons, Chemicals and other Dangerous Goods.	<ul style="list-style-type: none"> • Emergency Management/Response Plans. • Environmental Emergency Management Plan. • Environmental Incident Response Plan. • Emergency Control Measures/Procedures and Structure. • Surface Transport Management Plan. • Public Road Management Plan. • Emergency Response (internal and external emergency response agencies). • Manifest of all hazardous materials on-board, Material Safety Data Sheet (MSDS)/Substance Evaluation Form. • Operator training (including Safe Work Procedures). • Licensed contractors in accordance with Australian Standards and New South Wales (NSW) legislation. • Communications (mobile telephone and radio). • Spill response equipment and training. • Contractor Incident Investigation. 	C	5	22(L)

Bulli Seam Operations Hazard Identification Table (Continued)

Project Component	Incident Type	Scenario	Proposed Treatment Measures	Likelihood ¹	Consequence ²	Risk ³
Transport to Site (Explosives, Fuels and Hydrocarbons, Chemicals, Dangerous Goods, General Goods, Mobile and Fixed Plant, Construction Materials) (Continued)	Fire/Explosion	Operator error/poor maintenance leading to leak or spill resulting in fire/explosion.	<ul style="list-style-type: none"> • Emergency Management/Response Plans. • Environmental Emergency Management Plan. • Environmental Incident Response Plan. • Emergency Control Measures/Procedures and Structure. • Surface Transport Management Plan. • Public Road Management Plan. • Fire and Explosion Management Plan. • Fire and Emergency Provisions – General. • Training and Competency Management Plan. • Spill response equipment and training. • Emergency Response (internal and external emergency response agencies). • Manifest of all hazardous materials on-board, MSDS/Substance Evaluation Form. • Operator training (including Safe Work Procedures). • Fire fighting and emergency response equipment and associated inspections programs. • Fire emergency equipment inspected monthly. • Annual bushfire management control inspections by Illawarra Coal. • Licensed contractors in accordance with Australian Standards and NSW legislation. • Communications (mobile telephone and radio). • Explosives – storage licence (storage licence covers receipt of explosives and dangerous goods). • Fire fighting equipment on-board where required. • Contractor Incident Investigation. • Communications – contact Rural Fire Service and/or Police. 	D	4	21(L)

Bulli Seam Operations Hazard Identification Table (Continued)

Project Component	Incident Type	Scenario	Proposed Treatment Measures	Likelihood ¹	Consequence ²	Risk ³
Transport to Site (Explosives, Fuels and Hydrocarbons, Chemicals, Dangerous Goods, General Goods, Mobile and Fixed Plant, Construction Materials) (Continued)	Theft	Theft of vehicle transporting Dangerous Goods, Fuels and Hydrocarbons, Chemicals to site and malicious act resulting in injury to a member of the public.	<ul style="list-style-type: none"> • Emergency Management/Response Plans. • Environmental Emergency Management Plan. • Environmental Incident Response Plan. • Emergency Control Measures/Procedures and Structure. • Surface Transport Management Plan. • Public Road Management Plan. • Limited access to site/site security. • Licensed contractors in accordance with Australian Standards and NSW legislation. • Fencing of facility. • Communications – contact Emergency Services (Police). • Explosives – storage licence (storage licence covers receipt of explosives and dangerous goods). • Separate transportation of explosives and detonators. 	E	2	16(L)
	Leaks/Spills	Poor maintenance causing leak/spill.	<ul style="list-style-type: none"> • Emergency Management/Response Plans. • Environmental Emergency Management Plan. • Environmental Incident Response Plan. • Emergency Control Measures/Procedures and Structure. • Surface Transport Management Plan. • Public Road Management Plan. • Manifest of all hazardous materials on-site, MSDS/Substance Evaluation Form. • Operator training (including Safe Work Procedures). • Licensed contractors in accordance with Australian Standards and NSW legislation. • Communications (mobile telephone and radio). • Spill kits on-board vehicles. • Contractor Incident Investigation. 	C	5	22(L)

Bulli Seam Operations Hazard Identification Table (Continued)

Project Component	Incident Type	Scenario	Proposed Treatment Measures	Likelihood ¹	Consequence ²	Risk ³
Transport to Site (Explosives, Fuels and Hydrocarbons, Chemicals, Dangerous Goods, General Goods, Mobile and Fixed Plant, Construction Materials) (Continued)	Leaks/Spills	Overloading, uncovered load or inappropriate load placement in vehicle causing dust impacts through tipping or loss of load.	<ul style="list-style-type: none"> • Environmental Incident Response Plan. • Surface Transport Management Plan. • Public Road Management Plan. • Environmental Management Plan. • Licensed contractors in accordance with Australian Standards and NSW legislation. • Communications (mobile telephone and radio). • Spill kits on-board vehicles. • Vacuum and sweeping of paved roads. • Load covers on trucks. • Contractor Incident Investigation. 	B	5	19(L)

Bulli Seam Operations Hazard Identification Table (Continued)

Project Component	Incident Type	Scenario	Proposed Treatment Measures	Likelihood ¹	Consequence ²	Risk ³
On-site Storage (Fuels and Hydrocarbons, Lubricants, Compressed Gases, Chemicals, Explosives and Water)	Explosion	Explosives magazine detonates by lightning strike, malicious act, or human error leading to off-site impacts.	<ul style="list-style-type: none"> • Emergency Management/Response Plans. • Environmental Emergency Management Plan. • Environmental Incident Response Plan. • Emergency Control Measures/Procedures and Structure. • Hazardous Materials Management Plan/Hazardous Substance Management Plan (depending on site). • Fire and Explosion Management Plan. • Fire and Emergency Provisions – General. • Shotfiring and Explosives Management Plan. • Training and Competency Management Plan. • Limited access to site/site security. • Emergency Response (internal and external emergency response agencies). • Operator training (including Safe Work Procedures). • Fire fighting and emergency response equipment and associated inspections programs. • Fire emergency equipment inspected monthly. • Explosives – storage licence (storage licence covers receipt of explosives and dangerous goods). • Explosive storage complies with relevant Australian Standards and NSW legislation which includes consideration of impact on off-site structures/people. • Lightning protection to Australian Standards. • Authorised personnel with appropriate licences to handle explosives. • Separate storage of explosives and detonators. 	E	5	25(L)

Bulli Seam Operations Hazard Identification Table (Continued)

Project Component	Incident Type	Scenario	Proposed Treatment Measures	Likelihood ¹	Consequence ²	Risk ³
On-site Storage (Fuels and Hydrocarbons, Lubricants, Compressed Gases, Chemicals, Explosives and Water) (Continued)	Explosion	Chemical/fuel/gas cylinders/oxy acetylene detonates by lightning strike, malicious act or human error leading to off-site impacts.	<ul style="list-style-type: none"> • Emergency Management/Response Plans. • Environmental Emergency Management Plan. • Environmental Incident Response Plan. • Emergency Control Measures/Procedures and Structure. • Hazardous Materials Management Plan/Hazardous Substance Management Plan (depending on site). • Fire and Explosion Management Plan. • Fire and Emergency Provisions – General. • Training and Competency Management Plan. • Limited access to site/site security. • Emergency Response (internal and external emergency response agencies). • Operator training (including Safe Work Procedures). • Fire fighting and emergency response equipment and associated inspections programs. • Fire emergency equipment inspected monthly. • Explosives – storage licence (storage licence covers receipt of explosives and dangerous goods). • Audit and inspection regime. • Storage of Chemicals/fuel/gas cylinders/oxy acetylene complies with relevant Australian Standards and NSW legislation. • Communications – contact Rural Fire Service and/or Police. 	D	5	24(L)

Bulli Seam Operations Hazard Identification Table (Continued)

Project Component	Incident Type	Scenario	Proposed Treatment Measures	Likelihood¹	Consequence²	Risk³
On-site Storage (Fuels and Hydrocarbons, Lubricants, Compressed Gases, Chemicals, Explosives and Water) (Continued)	Fire	Diesel/chemicals storage incident results in a fire leading to off-site bushfire.	<ul style="list-style-type: none"> • Emergency Management/Response Plans. • Environmental Emergency Management Plan. • Environmental Incident Response Plan. • Emergency Control Measures/Procedures and Structure. • Fire and Explosion Management Plan. • Fire and Emergency Provisions – General. • Annual bushfire management control inspections by Illawarra Coal. • Limited access to site/site security. • Communications – contact Rural Fire Service and/or Police. • Fire fighting and emergency response equipment and associated inspections programs. • Fire emergency equipment inspected monthly. • Storage of Chemicals/fuel/gas cylinders/oxy acetylene complies with relevant Australian Standards and NSW legislation. 	E	2	16(L)

Bulli Seam Operations Hazard Identification Table (Continued)

Project Component	Incident Type	Scenario	Proposed Treatment Measures	Likelihood ¹	Consequence ²	Risk ³
On-site Storage (Fuels and Hydrocarbons, Lubricants, Compressed Gases, Chemicals, Explosives and Water) (Continued)	Spills/Leaks	Failed tank or pipe leading to off-site impacts including chemical or fuel contamination.	<ul style="list-style-type: none"> • Emergency Management/Response Plans. • Environmental Emergency Management Plan. • Environmental Incident Response Plan. • Emergency Control Measures/Procedures and Structure. • Hazardous Materials Management Plan/Hazardous Substance Management Plan (depending on site). • Waste Management and Minimisation Action Plan/Waste Management Plan (depending on site). • Water Management Plan. • Environmental Management Plan. • Disposal of Hazardous Materials Procedures. • Approval Process for Introduction on New Hazardous Materials. • Site hazardous materials audit. • Risk assessment completed for all hydrocarbon/chemical storage areas in accordance with site's Pollution Reduction Program. • Volume gauge on soluble oils system. • Sight gauges in diesel receival tank. • Spill response equipment and training. • Manifest of all hazardous materials on-site, MSDS/Substance Evaluation Form. • Design of structures/tanks/pipes to relevant Australian Standards and NSW legislation. • Bunding of storage facilities in accordance with Australian Standards. • Purpose built drainage and oil separator system. • Regular inspections and maintenance where required. 	E	4	23(L)

Bulli Seam Operations Hazard Identification Table (Continued)

Project Component	Incident Type	Scenario	Proposed Treatment Measures	Likelihood ¹	Consequence ²	Risk ³
On-site Storage (Fuels and Hydrocarbons, Lubricants, Compressed Gases, Chemicals, Explosives and Water) (Continued)	Theft	Theft of dangerous goods or explosives and malicious act resulting in injury to a member of the public.	<ul style="list-style-type: none"> Emergency Management/Response Plans. Environmental Emergency Management Plan. Environmental Incident Response Plan. Emergency Control Measures/Procedures and Structure. Limited access to site/site security. Hazardous Materials Management Plan/Hazardous Substance Management Plan (depending on site). Storage of Chemicals/fuel/gas cylinders/oxy acetylene and explosives complies with relevant Australian Standards and NSW legislation. Communications – contact Emergency Services (Police). 	E	2	16(L)
Construction/ Development (Pit Top)	Spill/Leak	Spill of diesel, oils, lubricants, solvents or construction materials leading to impacts on nearby watercourses or contamination of land.	<ul style="list-style-type: none"> Emergency Management/Response Plans. Environmental Emergency Management Plan. Environmental Incident Response Plan. Emergency Control Measures/Procedures and Structure. Hazardous Materials Management Plan/Hazardous Substance Management Plan (depending on site). Water Management Plan. Waste Management and Minimisation Action Plan/Waste Management Plan (depending on site). Environmental Management Plan. Disposal of Hazardous Materials Procedures. Approval Process for Introduction on New Hazardous Materials. Fuel, oils and lubricants stored in accordance with Australian Standards and NSW legislation. Spill response equipment and training. Manifest of all hazardous materials on-site, MSDS/Substance Evaluation Form. Site construction runoff control (drains and sumps). Existing site water management controls. Construction specific environmental controls. 	E	4	23(L)

Bulli Seam Operations Hazard Identification Table (Continued)

Project Component	Incident Type	Scenario	Proposed Treatment Measures	Likelihood ¹	Consequence ²	Risk ³
Construction/ Development (Pit Top) (Continued)	Fire	Vehicle fire, fuel storage fire, electrical fire (power-up) resulting in off-site impacts.	<ul style="list-style-type: none"> • Emergency Management/Response Plans. • Environmental Emergency Management Plan. • Environmental Incident Response Plan. • Emergency Control Measures/Procedures and Structure. • Fire and Explosion Management Plan. • Fire and Emergency Provisions – General. • Annual bushfire management control inspections by Illawarra Coal. • Emergency Response (internal and external emergency response agencies). • Operator training (including Safe Work Procedures). • Fire fighting and emergency response equipment and associated inspections programs. • Fire emergency equipment inspected monthly. • Staff training (including drills) and induction. • WorkCover requirements (green card). • 'Hot work' permits. • Housekeeping activities - site would be kept clean and tidy and fire hazards removed where practicable. • Fire control equipment on site vehicles. • Communications – contact Rural Fire Service and/or Police. 	E	2	16(L)

Bulli Seam Operations Hazard Identification Table (Continued)

Project Component	Incident Type	Scenario	Proposed Treatment Measures	Likelihood ¹	Consequence ²	Risk ³
Construction/ Development (Pit Top) (Continued)	Explosion	Explosion involving fuel, gas cylinders or oxy acetylene causing off-site impacts.	<ul style="list-style-type: none"> • Emergency Management/Response Plans. • Environmental Emergency Management Plan. • Environmental Incident Response Plan. • Emergency Control Measures/Procedures and Structure. • Fire and Explosion Management Plan. • Fire and Emergency Provisions – General. • Hazardous Materials Management Plan/Hazardous Substance Management Plan (depending on site). • Emergency Response (internal and external emergency response agencies). • Operator training (including Safe Work Procedures). • Fire fighting and emergency response equipment and associated inspections programs. • Fire emergency equipment inspected monthly. • Fuel and gas cylinders stored in accordance with Australian Standards and NSW Legislation. • Communications – contact Rural Fire Service and/or Police. 	D	5	24(L)

Bulli Seam Operations Hazard Identification Table (Continued)

Project Component	Incident Type	Scenario	Proposed Treatment Measures	Likelihood ¹	Consequence ²	Risk ³
Construction/ Development (Pit Top) (Continued)	Coal Wash Emplacement Failure	Significant rain event, inadequate compaction, operator error, earthquake, wind erosion or construction outside of specification.	<ul style="list-style-type: none"> • Emplacement Management Plan. • Emplacement Rehabilitation Plan. • Water Management Plan. • Training and Competency Management Plan. • Compaction of emplaced materials and compaction tests. • Profiling of finished areas to gentle gradients. • Revegetation. • Sealing of haul roads with bitumous products (Petrotac). • Emplaced coal wash is compacted at optimum moisture content for emplacement stability. • Grading and trimming finished surface levels. • Application of spray irrigation to drier areas to control the effects of wind. • Profiling the finished ground level to gentle gradients to control the effects of wind. • Geotechnical surveying. • Minimal seismic activity in geographical area. • Installation of surface and sub-surface drainage. • Competent emplacement contractor. 	D	3	17 (L)

Bulli Seam Operations Hazard Identification Table (Continued)

Project Component	Incident Type	Scenario	Proposed Treatment Measures	Likelihood¹	Consequence²	Risk³
Construction/ Development (Pit Top) (Continued)	Theft	Theft of construction materials and equipment leading to an off-site event causing injury.	<ul style="list-style-type: none"> • Emergency Management/Response Plans. • Environmental Emergency Management Plan. • Environmental Incident Response Plan. • Emergency Control Measures/Procedures and Structure. • Limited access to site/site security. • Storage facilities designed to Australian Standards and NSW legislation – including security measures. • Restriction of access to storage areas, including securing storage facilities. • Provision of adequate lighting around storage facilities. • Communications – contact Emergency Services (Police). • Site presence 24/7. • Routine inspections. 	E	4	23(L)
	Unauthorised access to site	Unauthorised access to site leading to personal injury.	<ul style="list-style-type: none"> • Emergency Management/Response Plans. • Environmental Emergency Management Plan. • Environmental Incident Response Plan. • Emergency Control Measures/Procedures and Structure. • Limited access to site/site security. • Site presence 24/7. • Routine inspections. • Warning signage. • Shafts are capped. 	E	4	23(L)

Bulli Seam Operations Hazard Identification Table (Continued)

Project Component	Incident Type	Scenario	Proposed Treatment Measures	Likelihood¹	Consequence²	Risk³
Construction/ Development (Remote Site)	Spill/Leak	Spill of diesel, oils, lubricants, solvents or construction materials leading to off-site impacts on nearby watercourses.	<ul style="list-style-type: none"> • Emergency Management/Response Plans. • Environmental Emergency Management Plan. • Environmental Incident Response Plan. • Emergency Control Measures/Procedures and Structure. • Hazardous Materials Management Plan/Hazardous Substance Management Plan (depending on site). • Water Management Plan. • Environmental Management Plan. • North Cliff Environmental Management Plan. • Disposal of Hazardous Materials Procedures. • Approval Process for Introduction on New Hazardous Materials. • Fuel, oils and lubricants stored in accordance with Australian Standards and NSW Legislation. • Spill response equipment and training. • Manifest of all hazardous materials on-site, MSDS/Substance Evaluation Form. • Site construction runoff control (drains and sumps). • Site specific environmental management plan. • Staff training and remote site induction. 	E	3	20(L)

Bulli Seam Operations Hazard Identification Table (Continued)

Project Component	Incident Type	Scenario	Proposed Treatment Measures	Likelihood ¹	Consequence ²	Risk ³
Construction/ Development (Remote Site) (Continued)	Fire	Vehicle fire, fuel storage fire, electrical fire (power-up) resulting in off-site impacts.	<ul style="list-style-type: none"> • Emergency Management/Response Plans. • Environmental Emergency Management Plan. • Environmental Incident Response Plan. • Emergency Control Measures/Procedures and Structure. • Fire and Explosion Management Plan. • Fire and Emergency Provisions – General. • Annual bushfire management control inspections by ICHPL. • Emergency Response (internal and external emergency response agencies). • Operator training (including Safe Work Procedures). • Fire fighting and emergency response equipment and associated inspections programs. • Fire emergency equipment inspected monthly. • Staff training (including drills) and induction. • WorkCover requirements (green card). • 'Hot work' permits. • Housekeeping activities - site would be kept clean and tidy and fire hazards removed where practicable. • Fire control equipment on site vehicles. • Communications – contact Rural Fire Service and/or Police. 	E	2	16(L)

Bulli Seam Operations Hazard Identification Table (Continued)

Project Component	Incident Type	Scenario	Proposed Treatment Measures	Likelihood ¹	Consequence ²	Risk ³
Construction/ Development (Remote Site) (Cont'd)	Explosion	Explosion involving fuel, gas cylinders or oxy acetylene causing off-site impacts.	<ul style="list-style-type: none"> • Emergency Management/Response Plans. • Environmental Emergency Management Plan. • Environmental Incident Response Plan. • Emergency Control Measures/Procedures and Structure. • Fire and Explosion Management Plan. • Fire and Emergency Provisions – General. • Shotfiring and Explosives Management Plan. • Hazardous Materials Management Plan/Hazardous Substance Management Plan (depending on site). • Emergency Response (internal and external emergency response agencies). • Operator training (including Safe Work Procedures). • Fire fighting and emergency response equipment and associated inspections programs. • Fire emergency equipment inspected monthly. • Fuel and gas cylinders stored in accordance with Australian Standards and NSW Legislation. • Communications – contact Rural Fire Service and/or Police. 	E	2	16(L)
	Explosion	Construction blasting causing flyrock damaging property or persons off-site.	<ul style="list-style-type: none"> • Emergency Management/Response Plans. • Environmental Emergency Management Plan. • Environmental Incident Response Plan. • Emergency Control Measures/Procedures and Structure. • Fire and Explosion Management Plan. • Fire and Emergency Provisions – General. • Shotfiring and Explosives Management Plan. • Blasting undertaken by appropriate contractor. • Blast design appropriate for the situation. • Appropriate buffer distances, where practicable. • Adhere to NSW Roads and Traffic Authority (RTA) and Transgrid requirements. • Staff training and remote site induction. • Communications – contact Emergency Services (Police). 	D	5	24(L)

Bulli Seam Operations Hazard Identification Table (Continued)

Project Component	Incident Type	Scenario	Proposed Treatment Measures	Likelihood ¹	Consequence ²	Risk ³
Construction/ Development (Remote Site) (Continued)	Theft	Theft of construction materials and equipment leading to an off-site event causing injury.	<ul style="list-style-type: none"> • Emergency Management/Response Plans. • Environmental Emergency Management Plan. • Environmental Incident Response Plan. • Emergency Control Measures/Procedures and Structure. • Limited access to site/site security. • Storage facilities designed to Australian Standards and NSW legislation – including security measures. • Restriction of access to storage areas, including securing storage facilities. • Provision of adequate lighting around storage facilities. • Communications – contact Emergency Services (Police). • Staff training and remote site induction. 	E	4	23(L)

Bulli Seam Operations Hazard Identification Table (Continued)

Project Component	Incident Type	Scenario	Proposed Treatment Measures	Likelihood ¹	Consequence ²	Risk ³
Underground Mining Operations	Fire	Malfunction of the methane drainage/flaring facility results in a fire off-site causing injury/impacts on the environment.	<ul style="list-style-type: none"> • Emergency Management/Response Plans. • Environmental Emergency Management Plan. • Environmental Incident Response Plan. • Emergency Control Measures/Procedures and Structure. • Fire and Explosion Management Plan. • Fire and Emergency Provisions – General. • Annual bushfire management control inspections by ICHPL. • Flare facility designed by specialist flaring contractor in accordance with relevant Australian Standards. • Risk assessment conducted for flaring facility prior to works commencing. • Emergency Response (internal and external emergency response agencies). • Operator training (including Safe Work Procedures). • Fire fighting and emergency response equipment and associated inspections programs. • Fire emergency equipment inspected monthly. • Staff training (including drills) and induction. • WorkCover requirements (green card). • 'Hot work' permits. • Housekeeping activities - site would be kept clean and tidy and fire hazards removed where practicable. • Fire control equipment on vehicles. • Communications – contact Rural Fire Service and/or Police. • Maintenance Plan - regular inspections. • Gas monitoring. 	E	2	16(L)

Bulli Seam Operations Hazard Identification Table (Continued)

Project Component	Incident Type	Scenario	Proposed Treatment Measures	Likelihood ¹	Consequence ²	Risk ³
Underground Mining Operations (Continued)	Release of Noxious Gases to Atmosphere	Emission from shafts/drift due to underground fire/explosion causing off-site impacts.	<ul style="list-style-type: none"> • Emergency Management/Response Plans. • Environmental Emergency Management Plan. • Environmental Incident Response Plan. • Emergency Control Measures/Procedures and Structure. • Ventilation Monitoring and Management Plan. • Longwall Gas Management Plan. • Outburst Management Plan. • Fire and Emergency Provisions – Underground. • Gas management and monitoring. • Ventilation system (design and maintenance). • Continuous monitoring of gas levels/alarm. • <i>Coal Mine Health and Safety Act, 2002 and Coal Mine Health and Safety Regulation, 2006.</i> • Guidelines for shaft/drift and borehole sealing. • Routine inspections. • Gas drainage system. • Emergency Response (internal and external emergency response agencies). 	D	4	21(L)

Bulli Seam Operations Hazard Identification Table (Continued)

Project Component	Incident Type	Scenario	Proposed Treatment Measures	Likelihood ¹	Consequence ²	Risk ³
Underground Mining Operations (Continued)	Subsidence in excess of predictions and safety factors causing off-site impacts	<p>Impacts in excess of predictions and/or safety factors on:</p> <ul style="list-style-type: none"> • the Hume Highway; • other roads/bridges/railway infrastructure; • gas pipelines, powerlines, telecommunications, water mains; • sites of significant heritage value; • Sydney Catchment Authority (SCA)/Dams Safety Committee (DSC) infrastructure; • the surface of the land; or • community infrastructure (e.g. houses); <p>causing impacts on people and/or property off-site.</p>	<ul style="list-style-type: none"> • Subsidence Management Plans (SMPs). • Property Subsidence Management Plans. • Illawarra Coal Telecommunications Management Plan. • Illawarra Coal Integral Energy Monitoring Plan. • Illawarra Coal Integral Management Plan. • Illawarra Coal Transgrid Management Plan. • Illawarra Coal Gas Pipelines Management Plan. • Illawarra Coal Optical Fibre Cable Management Plan. • McArthur Water Pipeline Management Plan. • Management Plan for Longwall Mining beneath the HW2 Hume Highway. • Illawarra Coal Australian Rail Track Corporation Ltd (ARTC) Rail Management Plan. • Management Plan for the Upper Canal, Cataract Tunnel and Associated Infrastructure. • Appin Mine SCA Assets Management Plan. • Cultural Heritage Management Plan. • Social Management Plan. • Cliff and Steep Slopes Safety Management Plan. • Slope Stability Management Plan. • Specialist subsidence engineers develop predictions based on upper bound prediction methodology. • Monitoring of subsidence impacts from existing mining on an ongoing basis. • Monitoring of specific infrastructure items. • Consideration of other colliery's experience on South Coast. • DSC approval. • RTA requirements. • Modification of extraction geometry. • Specialist investigations (e.g. surface water, groundwater, heritage, etc.). • Mitigation of existing infrastructure to account for subsidence. 	E	2	16(L)

Bulli Seam Operations Hazard Identification Table (Continued)

Project Component	Incident Type	Scenario	Proposed Treatment Measures	Likelihood ¹	Consequence ²	Risk ³
Underground Mining Operations (Continued)	(Continued)	(Continued)	<ul style="list-style-type: none"> Coal Mine Safety Legislation. Mines Subsidence Act. Dams Safety Act – Inundation Plan. 	E	2	16(L)
Coal Handling and Preparation (Stockpiles)	Equipment Malfunction	Malfunction of dust suppression measures combined with unfavourable weather conditions leading to plume of dust travelling off-site.	<ul style="list-style-type: none"> Emplacement Management Plan. Emplacement Rehabilitation Plan. Stockpile Management Plan. Environmental Management Plan. Airborne (Dust) Management Plan. Maintenance of dust suppression equipment. Regular inspections. Use of alternative dust suppression measures (water carts). 	C	5	22(L)
	Leaks/Spills	Unplanned off-site discharge of coal or coal wash.	<ul style="list-style-type: none"> Emplacement Management Plan. Emplacement Rehabilitation Plan. Stockpile Management Plan. Waste Management and Minimisation Action Plan/Waste Management Plan (depending on site). Water Cart and Sweeper Procedure. Design to appropriate standards/legislation. Downstream containment ponds. Regular inspections and maintenance. Bunds to be designed to divert spills to containment structures. Staff training and induction. 	E	5	25(L)

Bulli Seam Operations Hazard Identification Table (Continued)

Project Component	Incident Type	Scenario	Proposed Treatment Measures	Likelihood ¹	Consequence ²	Risk ³
Coal Handling and Preparation (Stockpiles) (Continued)	Fire/Explosion	Mobile plant, fixed plant, human action, powerlines, vehicle fire or fuel storage fire or spontaneous combustion leading to off-site fire related impacts.	<ul style="list-style-type: none"> • Dust Explosion Management Plan. • Spontaneous Combustion Management Plan. • Emergency Management/Response Plans. • Environmental Emergency Management Plan. • Environmental Incident Response Plan. • Emergency Control Measures/Procedures and Structure. • Stockpile Management Plan. • Emplacement Management Plan. • Fire and Explosion Management Plan. • Fire and Emergency Provisions – General. • Annual bushfire management control inspections by ICHPL. • Low potential due to known coal type (based on typical Southern Coalfield coal). • Appropriate stockpile management. • Availability of dozer for rapid stockpile management. • Staff training and induction. • Communications - contact Rural Fire Service and/or Police. • Competent Fire officer. • Competent Emergency Response (Rescue) squad. • Fire fighting and emergency response equipment and associated inspections programs. • Site vegetation maintenance. • Helipad and dam available. • Maintain cleared area (fire break) around infrastructure. 	E	2	16(L)

Bulli Seam Operations Hazard Identification Table (Continued)

Project Component	Incident Type	Scenario	Proposed Treatment Measures	Likelihood¹	Consequence²	Risk³
ROM and Product Coal Transport (Road)	Spill/Leak	Poor maintenance, poor design, collision or human error leading to off-site impacts.	<ul style="list-style-type: none"> • Emergency Management/Response Plans. • Environmental Emergency Management Plan. • Environmental Incident Response Plan. • Emergency Control Measures/Procedures and Structure. • Surface Transport Management Plan. • Public Road Management Plan. • Emergency Response (internal and external emergency response agencies). • Licensed contractors in accordance with Australian Standards and NSW legislation. • Site policies, management plans and procedures. • Manifest of all hazardous materials on-board, MSDS/Substance Evaluation Form. • Development of operating procedures and training to minimise the potential for overloading. • Regular inspection of truck loading activities and intervention/maintenance where required. • Operator training (including Safe Work Procedures). • Spill kits on-board vehicles. • Site Incident Report. • Contractor Incident Investigation. • Communications - contact Emergency Services. 	C	5	22(L)

Bulli Seam Operations Hazard Identification Table (Continued)

Project Component	Incident Type	Scenario	Proposed Treatment Measures	Likelihood ¹	Consequence ²	Risk ³
ROM and Product Coal Transport (Road) (Continued)	Fire/Explosion	Poor maintenance, poor design, collision, human error or spontaneous combustion leading to off-site fire/explosion impacts.	<ul style="list-style-type: none"> • Emergency Management/Response Plans. • Environmental Emergency Management Plan. • Environmental Incident Response Plan. • Emergency Control Measures/Procedures and Structure. • Surface Transport Management Plan. • Public Road Management Plan. • Fire and Explosion Management Plan. • Fire and Emergency Provisions – General. • Site policies, management plans and procedures. • Annual bushfire management control inspections by ICHPL. • Low potential due to known coal type (based on typical Southern Coalfield coal). • Emergency Response (internal and external emergency response agencies). • Manifest of all hazardous materials on-board, MSDS/Substance Evaluation Form. • Operator training (including Safe Work Procedures). • Fire fighting and emergency response equipment and associated inspections programs. • Fire emergency equipment inspected monthly. • Licensed contractors in accordance with Australian Standards and NSW legislation. • Communications - contact Rural Fire Service and/or Police. • Fire fighting equipment on-board where required. • Contractor Incident Investigation. 	D	4	21(L)

Bulli Seam Operations Hazard Identification Table (Continued)

Project Component	Incident Type	Scenario	Proposed Treatment Measures	Likelihood¹	Consequence²	Risk³
Coal Wash Transport	Spill/Leak	Poor maintenance, poor design, collision or human error leading to off-site impacts.	<ul style="list-style-type: none"> • Emergency Management/Response Plans. • Environmental Emergency Management Plan. • Environmental Incident Response Plan. • Emergency Control Measures/Procedures and Structure. • Surface Transport Management Plan. • Public Road Management Plan. • Emergency Response (internal and external emergency response agencies). • Licensed contractors in accordance with Australian Standards and NSW legislation. • Site policies, management plans and procedures. • Development of operating procedures and training to minimise the potential for overloading. • Regular inspection of truck/train loading activities and intervention/maintenance where required. • Operator training (including Safe Work Procedures). • Spill kits on-board vehicles. • Site Incident Report. • Contractor Incident Investigation. • Communications - contact Emergency Services. 	C	5	22(L)

Bulli Seam Operations Hazard Identification Table (Continued)

Project Component	Incident Type	Scenario	Proposed Treatment Measures	Likelihood ¹	Consequence ²	Risk ³
Coal Wash Transport (Continued)	Fire/Explosion	Poor maintenance, poor design, collision, human error or spontaneous combustion leading to off-site fire/explosion impacts.	<ul style="list-style-type: none"> • Emergency Management/Response Plans. • Environmental Emergency Management Plan. • Environmental Incident Response Plan. • Emergency Control Measures/Procedures and Structure. • Fire and Explosion Management Plan. • Fire and Emergency Provisions – General. • Surface Transport Management Plan. • Public Road Management Plan. • Training and Competency Management Plan. • Low potential due to known coal type (based on typical Southern Coalfield coal). • Site policies, management plans and procedures. • Annual bushfire management control inspections by ICHPL. • Emergency Response (internal and external emergency response agencies). • Manifest of all hazardous materials on-site, MSDS/Substance Evaluation Form. • Operator training (including Safe Work Procedures). • Fire fighting and emergency response equipment and associated inspections programs. • Fire emergency equipment inspected monthly. • Licensed contractors in accordance with Australian Standards and NSW legislation. • Communications - contact Rural Fire Service and/or Police. • Fire fighting equipment on-board where required. • Contractor Incident Investigation. 	D	4	21(L)

Bulli Seam Operations Hazard Identification Table (Continued)

Project Component	Incident Type	Scenario	Proposed Treatment Measures	Likelihood ¹	Consequence ²	Risk ³
Water Management	Spill/Leak	Failure of Brennan's Creek dam wall leading to spill impacts off-site.	<ul style="list-style-type: none"> • Brennan's Creek Dam Emergency Management Plan. • Emergency Management/Response Plans. • Environmental Emergency Management Plan. • Environmental Incident Response Plan. • Emergency Control Measures/Procedures and Structure. • Water Management Plan. • Environmental Management Plan. • Designed by specialist consultant to appropriate standards. • Regular inspections and maintenance. • Storm drainage layout to storm water retention dams. • Communications – consult with DSC. • Prescribed Dam. 	C	4	18(L)
	Spill/Leak	Failure of water treatment plant and large rainfall event resulting in spill to creek or river system.	<ul style="list-style-type: none"> • Emergency Management/Response Plans. • Environmental Emergency Management Plan. • Environmental Incident Response Plan. • Emergency Control Measures/Procedures and Structure. • Water Management Plan. • Environmental Management Plan. • Settlement ponds on-site. • On-site treatment of water. • Pollution Reduction Programme No. 7. • Prescribed Dam. • Controlled discharges to provide for storage capacity to minimise uncontrolled releases. • Water treatment prior to discharge. • Regular inspections and maintenance. • Storm drainage layout to storm water retention dams. • Operator training. • Real-time monitoring water reticulation and quality. • Environment Protection Licence requirements. 	D	3	17(L)

Bulli Seam Operations Hazard Identification Table (Continued)

Project Component	Incident Type	Scenario	Proposed Treatment Measures	Likelihood¹	Consequence²	Risk³
Exploration/Monitoring Activities	Spill/Leak	Vandalism leads to off-site impacts.	<ul style="list-style-type: none"> • Emergency Management/Response Plans. • Environmental Emergency Management Plan. • Environmental Incident Response Plan. • Emergency Control Measures/Procedures and Structure. • Limited access to site/site security. • Public access to work areas (including SCA Special Areas) is restricted. • Communications – contact Emergency Services (Police). • Staff training and remote site induction. • SCA Special Areas would be accessed via locked gates. All gates would be kept closed and locked at all times. • Regular inspections. • Inspection of SCA Special Areas by SCA rangers. • Use of suitably qualified or trained personnel. 	D	4	21(L)

Bulli Seam Operations Hazard Identification Table (Continued)

Project Component	Incident Type	Scenario	Proposed Treatment Measures	Likelihood ¹	Consequence ²	Risk ³
Exploration/Monitoring Activities (Continued)	Spill/Leak	Failure of environmental controls leading to off-site impacts.	<ul style="list-style-type: none"> • Emergency Management/Response Plans. • Environmental Emergency Management Plan. • Environmental Incident Response Plan. • Emergency Control Measures/Procedures and Structure. • Experienced/trained drilling contractors. • Installation and maintenance of appropriate erosion and sediment control measures. • Regular inspections of erosion and sediment control structures for structural integrity, effectiveness and for maintenance as necessary to maintain their function. • Managing the use of fuels, oils, etc. to minimise the risk of spills or leaks which could cause water contamination (e.g. use of bunding, regular inspection of equipment for leaks of oil/fuel/coolant, the provision of spill containment/treatment resources and training of personnel in their use). • The use of a daily inspection and reporting system during monitoring equipment installation to check that all controls are in place and working effectively. • Rehabilitation of surface disturbance areas (within SCA Special Areas) would be carried out to the satisfaction of the SCA. • Hazardous Materials Management Plan/Hazardous Substance Management Plan (depending on site). • Water Management Plan. • North Cliff Environmental Management Plan. • Environmental Management Plan. • Fuel, oils and lubricants stored in accordance with Australian Standards and NSW Legislation. • Spill response equipment and training. • Manifest of all hazardous materials on-site, MSDS/Substance Evaluation Form. • Site construction runoff control (drains and sumps). • Site specific environmental management plan. • Staff training and remote site induction. 	D	4	21(L)

Bulli Seam Operations Hazard Identification Table (Continued)

Project Component	Incident Type	Scenario	Proposed Treatment Measures	Likelihood ¹	Consequence ²	Risk ³
Exploration/Monitoring Activities (Continued)	Fire/Explosion	Vehicle fire, fuel storage fire, electrical fire resulting in off-site impacts.	<ul style="list-style-type: none"> • Emergency Management/Response Plans. • Environmental Emergency Management Plan. • Environmental Incident Response Plan. • Emergency Control Measures/Procedures and Structure. • Fire and Explosion Management Plan. • Fire and Emergency Provisions – General. • Annual bushfire management control inspections by ICHPL. • Emergency Response (internal and external emergency response agencies). • Operator training (including Safe Work Procedures). • Fire fighting and emergency response equipment and associated inspections programs. • Fire emergency equipment inspected monthly. • Staff training (including drills) and induction. • WorkCover requirements (green card). • 'Hot work' permits. • Housekeeping activities - site would be kept clean and tidy and fire hazards removed where practicable. • Fire control equipment on site vehicles. • Communications – contact Rural Fire Service and/or Police. 	E	2	16(L)

Bulli Seam Operations Hazard Identification Table (Continued)

Project Component	Incident Type	Scenario	Proposed Treatment Measures	Likelihood ¹	Consequence ²	Risk ³
Rehabilitation and Remediation Works (Remote Site)	Spill/Leak	Transport collision leading to off-site impacts.	<ul style="list-style-type: none"> • Emergency Management/Response Plans. • Environmental Emergency Management Plan. • Environmental Incident Response Plan. • Emergency Control Measures/Procedures and Structure. • Public Road Management Plan. • Training and Competency Management Plan. • Spill response equipment and training. • Vehicle movements would be kept to the minimum necessary. • Vehicles would be required to observe the 40 kilometre per hour speed limit on roads in the catchment area. • SCA requirements for undertaking activities in Special Areas. • Special Areas would be accessed via locked gates. All gates would be kept closed and locked at all times. • Access to the catchment area would not occur after 10 millimetres of rain has been received in any 24 hour period, until such times as the access can occur without causing damage to fire roads (with the exception of access for monitoring purposes). • All gates to the catchment area would be kept closed and locked at all times. • Hazardous materials (fuel, oil, etc.) would not be transported in the area unless they are transported within the confines of an adequately bunded container and they are sealed of any possible leakage points. 	D	4	21(L)

Bulli Seam Operations Hazard Identification Table (Continued)

Project Component	Incident Type	Scenario	Proposed Treatment Measures	Likelihood¹	Consequence²	Risk³
Rehabilitation and Remediation Works (Remote Site) (Continued)	(Continued)	(Continued)	<ul style="list-style-type: none"> • Vehicles would not be used in the catchment unless they have been serviced and maintained to an acceptable standard. • Vehicles would not be operated if they are known to have a defect that may affect safe operation. • Staff training and remote site induction. • The maintenance of a reliable system of communication to enable accidents to be reported. • Spill containment/treatment resources (i.e. spill kits) would be provided and personnel would be trained in their use. 			

Bulli Seam Operations Hazard Identification Table (Continued)

Project Component	Incident Type	Scenario	Proposed Treatment Measures	Likelihood ¹	Consequence ²	Risk ³
Rehabilitation and Remediation Works (Remote Site) (Continued)	Spill/Leak	Failure of pumping systems/hoses leading to off-site impacts.	<ul style="list-style-type: none"> • Emergency Management/Response Plans. • Environmental Emergency Management Plan. • Environmental Incident Response Plan. • Emergency Control Measures/Procedures and Structure. • Hazardous Materials Management Plan/Hazardous Substance Management Plan (depending on site). • Water Management Plan. • Spill response equipment and training. • North Cliff Environmental Management Plan. • Environmental Management Plan. • Fuel, oils and lubricants stored in accordance with Australian Standards and NSW Legislation. • Manifest of all hazardous materials on-site, MSDS/Substance Evaluation Form. • Site specific environmental management plan. • Staff training and remote site induction. • SCA requirements for undertaking activities in Special Areas. • Use of suitably qualified or trained personnel. • Inspection and reporting system during rehabilitation and remediation works to check that all controls are in place and working effectively. • Appropriate erosion and sediment control measures to minimise the potential for sedimentation in accordance with relevant guidelines. • Regular inspection of equipment (e.g. drill rigs, compressors, pumps) for leaks of oil/fuel/coolant. • The use of oil/fuel absorbent material or containment methods to prevent or minimise contact with the surrounding environment. • Provision of spill containment/treatment resources (i.e. spill kits) and training of personnel in their use. 	D	4	21(L)

Bulli Seam Operations Hazard Identification Table (Continued)

Project Component	Incident Type	Scenario	Proposed Treatment Measures	Likelihood ¹	Consequence ²	Risk ³
Rehabilitation and Remediation Works (Remote Site) (Continued)	Spill/Leak	Vandalism and malicious acts leading to off-site impacts.	<ul style="list-style-type: none"> • Emergency Management/Response Plans. • Environmental Emergency Management Plan. • Environmental Incident Response Plan. • Emergency Control Measures/Procedures and Structure. • Hazardous Materials Management Plan/Hazardous Substance Management Plan (depending on site). • Approval Process for Introduction on New Hazardous Materials. • Roll-up hoses at end of day. • Regular inspections. • Use of suitably qualified or trained personnel. • Communications – contact Emergency Services (Police). • Public access to the SCA Special Areas is restricted and managed by the SCA. • Special Areas would be accessed via locked gates. All gates would be kept closed and locked at all times. • Inspections of SCA Special Areas by SCA rangers. 	D	4	21(L)

Bulli Seam Operations Hazard Identification Table (Continued)

Project Component	Incident Type	Scenario	Proposed Treatment Measures	Likelihood ¹	Consequence ²	Risk ³
Rehabilitation and Remediation Works (Remote Site) (Continued)	Fire/Explosion	Vehicle fire, fuel storage fire, electrical fire or gas emissions leading to fire/explosion.	<ul style="list-style-type: none"> • Emergency Management/Response Plans. • Environmental Emergency Management Plan. • Environmental Incident Response Plan. • Emergency Control Measures/Procedures and Structure. • Fire and Explosion Management Plan. • Fire and Emergency Provisions – General. • Annual bushfire management control inspections by ICHPL. • Emergency Response (internal and external emergency response agencies). • Operator training (including Safe Work Procedures). • Fire fighting and emergency response equipment and associated inspections programs. • Fire emergency equipment inspected monthly. • Staff training (including drills) and induction. • WorkCover requirements (green card). • ‘Hot work’ permits. • Housekeeping activities - site would be kept clean and tidy and fire hazards removed where practicable. • Fire control equipment on site vehicles. • Communications – contact Rural Fire Service and/or Police. 	E	2	16(L)

Bulli Seam Operations Hazard Identification Table (Continued)

Project Component	Incident Type	Scenario	Proposed Treatment Measures	Likelihood¹	Consequence²	Risk³
Other Infrastructure and Supporting Systems	Spills/Leaks	Spill of diesel, oils, lubricants, solvents, sewage wastes or domestic wastes leading to impacts on nearby watercourses.	<ul style="list-style-type: none"> • Emergency Management/Response Plans. • Environmental Emergency Management Plan. • Environmental Incident Response Plan. • Emergency Control Measures/Procedures and Structure. • Waste Management and Minimisation Action Plan/Waste Management Plan (depending on site). • Hazardous Materials Management Plan/Hazardous Substance Management Plan (depending on site). • Approval Process for Introduction on New Hazardous Materials. • On-site sewage treatment and irrigation at Environment Protection Licence discharge points. • Waste oil is collected by a licensed contractor for off-site disposal. • All domestic waste and recyclable products would be collected weekly by a licensed waste contractor. • Waste batteries and scrap metal disposed of in accordance with Waste Management Plan. • Licensed contractors in accordance with Australian Standards and NSW legislation. • Regular inspections and maintenance where required. • Site policies, management plans and procedures. • Manifest of all hazardous materials onsite, MSDS/Substance Evaluation Form. • Risk assessment completed for all hydrocarbon/chemical storage areas. • Spill response equipment and training. • Audits on all bulk storage facilities. • Spill diversion into the settlement ponds. 	D	4	21(L)

Project Component	Incident Type	Scenario	Proposed Treatment Measures	Likelihood ¹	Consequence ²	Risk ³
Other Infrastructure and Supporting Systems (Continued)	(Continued)	(Continued)	<ul style="list-style-type: none"> Bunding. Bowser auto cut-off. Excess storage capacity in Dam. Waste transfer station. Agreement in place with on-site waste management contractor. Waste tracking system in place. 	D	4	21(L)
	Fire	Malfunction of power substation results in off-site fire.	<ul style="list-style-type: none"> Emergency Management/Response Plans. Environmental Emergency Management Plan. Environmental Incident Response Plan. Emergency Control Measures/Procedures and Structure. Energy Management Plan. Fire and Explosion Management Plan. Fire and Emergency Provisions – General. Annual bushfire management control inspections by ICHPL. Emergency Response (internal and external emergency response agencies). Fire fighting and emergency response equipment and associated inspections programs. Fire emergency equipment inspected monthly. Staff training (including drills) and induction. Appropriate design to relevant standards. Housekeeping activities - site would be kept clean and tidy and fire hazards removed where practicable. Power usage monitoring and alarms. Communications - contact Rural Fire Service and/or Police. 	E	2	16(L)

¹ Refer to Table M-1.
² Refer to Table M-2.
³ Refer to Table M-3.