APPENDIX 3

WILPINJONG COAL
SPONTANEOUS COMBUSTION MANAGEMENT PLAN

WI-ENV-MNP-0010

June 2017

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General Description of Changes from Previous Version

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WI-ENV-MNP-0010	1	December 2014	Palaris, WCPL	DP&E	New management plan to meet Condition 57A, Schedule 3 of Project Approval 05-0021 (Mod 6)
WI-ENV-MNP-0010	2	May 2015	WCPL	DP&E	Amended to address DP&E comments
WI-ENV-MNP-0010	3	October 2016	WCPL	DP&E	MOD 7
WI-ENV-MNP-0010	4	June 2017	WCPL	DP&E	Revision of AQMP to align with SSD-6764 as a result of the WEP.

Contents

1 Introduction

1.1 Definitions
1.2 Purpose
1.3 Scope
1.4 Consultation

2 Statutory Requirements

2.1 Development Consent (SSD-6764) Requirements for SCMP

3 Baseline Data and Background Information

3.1 Spontaneous Combustion Mechanism
3.2 Material Prone to Spontaneous Combustion
3.3 Material Classifications
3.4 Benchmarking Study

4 Risk Assessment

4.1 Areas at Risk of Spontaneous Combustion

5 Performance Indicators

6 Preventative Management and Control Measures

6.1 Mine Planning
6.2 Spontaneous Combustion Propensity Testing
6.3 Risk Identification and Assessment
6.4 Identification of Potential Hot Spots
6.5 Keylah Dump Removal Management Plan
6.6 Air Quality Management Plan
6.7 Stakeholder Engagement
6.8 Training and Education

7 Inspections and Monitoring

7.1 Spontaneous Combustion Inspection Program
7.2 Weekly Stockpile Plan
7.3 Rehabilitation Monitoring
7.4 Gas/Odour Monitoring

8 Response to Spontaneous Combustion Events

8.1 Hazard/Incident Response
8.2 Corrective Actions

9 Contingency Plan to Manage Unpredicted Impacts

10 Complaints Response Protocol

11 Reporting

11.1 Incident and Non-Compliance Reporting
11.2 Annual Review
11.3 Independent Environmental Audit
11.4 EPL Reporting
11.5 Website Updates

12 Review

13 Responsibilities

14 References

15 Appendices

15.1 Appendix 1: Spontaneous Combustion Management Plan Requirements

15.2 Appendix 2: Keylah Dump Removal Management Plan

15.3 Appendix 3: Correspondence

15.4 Appendix 4: Propensity for Spontaneous Combustion (Lab Results)

15.5 Appendix 5: Risk Assessment Outcomes

15.6 Appendix 6: Air Assessment Criteria

Tables

Table 1: Explanation of Acronyms and Terms 5

Table 2: WCPL's Statutory Approvals.....8

Table 3: Summary of Spontaneous Combustion Assessments – Wilpinjong 12

Figures

Figure 1: Fire Triangle (Coaltech, undated) 9

Figure 2: Stratigraphy of Wilpinjong Coal Mine..... 11

Figure 3: Areas at Risk of Spontaneous Combustion..... 15

Figure 4: Exert from Weekly Stockpile Plan 23

1 Introduction

This Spontaneous Combustion Management Plan (SCMP) has been prepared to satisfy the relevant conditions in Development Consent (SSD-6764) as they relate to the management of spontaneous combustion. The SCMP now forms Appendix 3 of the Air Quality Management Plan (AQMP) and therefore must be read in conjunction with the AQMP.

Where relevant, this SCMP builds on the relevant components of the existing/approved SCMP (**Appendix 3**), including previous feedback from relevant government stakeholders. This SCMP was also reviewed by Torodoski Air Sciences.

1.1 Definitions

Table 1 provides a list of definitions for particular terms and acronyms used throughout this Management Plan.

Table 1: Explanation of Acronyms and Terms

Acronym / Phrase	Explanation
AQMP/S	Air Quality Management Plan/System
Carbonaceous material	Means rock material with a carbon content sufficient to colour the rock dark grey to black and where a risk of self heating may be present
CCC	Community Consultative Committee
CHPP	Coal Handling and Preparation Plant
Development Consent (SSD-6764)	Number SSD-6764 granted by the Minister for Planning under Part 4 of the EP&A Act on 24 April 2017
DP&E	NSW Department of Planning and Environment
DRE	Division of Resources and Energy within the Department of Trade and Investment, Regional Infrastructure and Services
ECM	WCPL Environment and Community Manager
EPA	NSW Environment Protection Authority
EPL	Environment Protection Licence 12425 granted by the EPA under the *Protection of the Environment Operations Act 1997* (POEO Act).
ER	Environmental Representative
FSL	Final Surface Level
H_2S	Hydrogen Sulfide
IEA	Independent Environmental Audit
Inert material	Mineral material free of carbonaceous content and low geochemical reactivity. Generally highly weathered materials such as clays.
LOM	Life of Mine
Management Plan	This Spontaneous Combustion Management Plan prepared by WCPL and as amended from time to time.
Mod	Modification to Project Approval 05_0021
MOP	WCPL Mining Operations Plan (current approved version)
POEO(G) Regulation	means the *Protection of the Environment Operations (General) Regulation 2009*
Pollution	As defined by the POEO Act, means water pollution or air pollution or noise pollution or land pollution.

Acronym / Phrase	Explanation
Pollution Incident	As defined by the POEO Act, means an incident or set of circumstances during or as a consequence of which there is or is likely to be a leak, spill or other escape or deposit of a substance, as a result of which pollution has occurred, is occurring or is likely to occur. It includes an incident or set of circumstances in which a substance has been placed or disposed of on premises, but it does not include an incident or set of circumstances involving only the emission of any noise.
PIRMP	Pollution Incident Response Management Plan
NOx	Oxides of Nitrogen
OCE	Open Cut Examiner
OOPD	Out of Pit Dump
PAHs	Polycyclic Aromatic Hydrocarbons
Project Approval	Project Approval (05-0021) granted by the Minister for Planning under Part 3A of the EP&A Act on 1 February 2006 (as amended).
Reject disposal area	Means coal waste material from the CHPP including coarse reject and belt filter press wastes. This material is to be managed in accordance with the Waste Management Plan.
ROM	Run of Mine
SLT	Senior Leadership Team
SO_2	Sulfur Dioxide
Spontaneous Combustion	The process by which carbonaceous material such as coal or coal rich rock ignites without an external heat source.
Spontaneous Combustion event	Refers to a single episode of spontaneous combustion in a specific area e.g. on the product stockpile. Events can be minor (less than 50m^2 affected, small amounts of smoke , mild sulphurous odour (onsite), no flames and possible safety hazard) or significant (greater than 50m^2 affected, large amounts of smoke and/or steam, strong sulphurous odour (onsite & offsite), may be open flames, PIRMP initiated, safety hazard)
Spontaneous Combustion Hazard	Refers to a spontaneous combustion event that is minor in nature(i.e. may be less than 50m^2 affected and/or, small amounts of smoke may be present, and/or mild sulphurous odour (onsite), no flames present and possible safety hazard and can be addressed through corrective action (<5 days). A hazard report must be filled out by the OCE or CHPP Shift Supervisor for these events.
Spontaneous Combustion Incident	Refers to a spontaneous combustion event that is significant in nature (may be greater than 50m^2 affected, and/or large amounts of smoke and/or steam present, and/or strong sulphurous odour (onsite/offsite), may be open flames), PIRMP initiated and/or, safety hazard or corrective actions works take >5days. An incident report must be filled out by the OCE or CHPP Shift Supervisor for these events and the Environment and Community Manager must be notified of the event immediately.
SCMP	Spontaneous Combustion Management Plan
Tailings emplacement area	Means emplacement areas currently approved under s100 of Coal Mine Health and Safety Act 2002.
TARP	Trigger Action Response Plan
VOCs	Volatile Organic Compounds
WCPL	Wilpinjong Coal Pty Limited

1.2 Purpose

The purpose of this Spontaneous Combustion Management Plan (this SCMP) is to ensure that spontaneous combustion at the Mine is minimised and effectively managed. This SCMP was developed to:

- Address the relevant requirements of Development Consent (SSD-6764) and Environment Protection Licence (EPL) 12425 (**Appendix 1**);
- Identify and characterise all plies, seams and interburden which carry a risk of generating spontaneous combustion;
- Identify all areas (including stockpiles and waste emplacement) at risk of spontaneous combustion events;
- Outline protocols for the ongoing monitoring and management of areas at risk of spontaneous combustion events;
- Outline protocols for the management of on-site heating and spontaneous combustion events;
- Outline protocols for any spontaneous combustion related non-compliance or complaints;
- Describe and assign responsibilities relating to spontaneous combustion management at the Mine; and
- Describe how this SCMP will be reviewed and updated.

1.3 Scope

This SCMP has been prepared in accordance with Condition 20(g), Schedule 3 of Development Consent (SSD-6764), Environmental Protection Licence 12425 (EPL 12425) and WCPL's Mining Operations Plan (MOP), to manage spontaneous combustion at the Mine.

1.4 Consultation

WCPL has consulted with DP&E and EPA on the development of the Keylah Dump Removal Management Plan, which forms an appendix to this SCMP (**Appendix 2**).

This SCMP was submitted to the DP&E for approval on 31 December 2014 (**Appendix 3**). Comments were received from DP&E on 26 February 2015 of which this plan further addressed.

2 Statutory Requirements

This SCMP has been prepared to fulfil the requirements of the Development Consent (SSD-6764), EPL 12425 and MOP (**Appendix 1**). WCPL will implement all reasonable and feasible measures to prevent and/or minimise any material harm to the environment that may result from the construction, operation, or rehabilitation of the project.

2.1 Development Consent (SSD-6764) Requirements for SCMP

Table 2 summarises WCPL's main statutory requirement for developing a spontaneous combustion management plan. For more details on WCPL's statutory requirements refer to **Section 2.0** of the AQMP.

Table 2: WCPL's Statutory Approvals

Development Consent (SSD-6764) Condition	SCMP Section
Air Quality Management Plan 20. Prior to carrying out any development under this consent, unless the Secretary agrees otherwise, the Applicant must prepare an Air Quality Management Plan for the development to the satisfaction of the Secretary. This plan must: (a) Be prepared in consultation with the EPA; (b) Describe the measures that would be implemented to ensure compliance with the relevant air quality criteria and operating conditions of this consent; (c) Describe the air quality management system in detail; (d) Include a protocol for notifying NSW Health and any affected residents of any exceedence of the air quality criteria; (e) Include a review of all air quality management measures against best practice guidelines; (f) Include an air quality monitoring program that: • Adequately supports the air quality management system; • Includes $PM_{2.5}$ monitoring in Wollar Village; • Evaluates and reports on the: - The effectives of the air quality management system; - Compliance with the air quality criteria; - Compliance with the air quality operating conditions; - Defines what constitutes an air quality incident, and includes a protocol for identifying and notifying the Department and relevant stakeholders of any air quality incidents; and (g) Include a Spontaneous Combustion Management Plan that: • Identifies all areas (including stockpiles, waste emplacement, plies, seams and interburden) at risk of spontaneous combustion events; • Includes a protocol for ongoing monitoring and management of areas at risk of spontaneous combustions events; and • Includes a protocol for the management of on-site heating and spontaneous combustion events.	The AQMP Section 3.0 & Section 4.0 Section 7.0 Section 8.0

3 Baseline Data and Background Information

3.1 Spontaneous Combustion Mechanism

MDG 1006 Spontaneous Combustion Management - Technical Reference (I&I NSW, 2011) has described spontaneous combustion as the process of self-heating of coal by oxidation. After exposure to oxygen, coal undergoes a continuous exothermic oxidation reaction. Coal fires require three basic elements to exist as shown **Figure 1**.

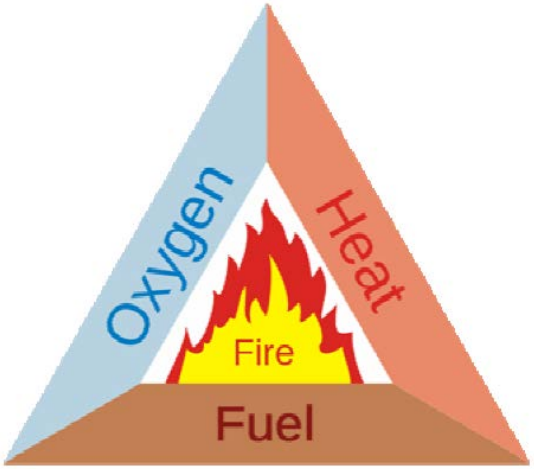


Figure 1: Fire Triangle (Coaltech, undated)

Spontaneous combustion of coal occurs by the following steps (I&I NSW, 2011):

- Oxygen (from airflow and ventilation) reacts with coal. This is called oxidation.
- Oxidation produces heat. This is called an exothermic reaction.
- If this heat is lost to the surroundings (mine environment), then the coal mass will cool. However, if the mine environment favours the heat being retained, the coal mass will increase in temperature and the oxidation rate will increase leading to spontaneous combustion. Significant amounts of heat can also be generated when the coal absorbs moisture.

On exposure to air (i.e. oxygen), and in the presence of water to aid the exothermic reaction, coal undergoes a continuous oxidising reaction. The hazard of spontaneous combustion exists when the rate of heat production exceeds the rate of cooling. The coal can then increase in temperature until combustion takes place.

The mining process begins the cycle by disturbing the coal (carbonaceous material). On exposure to air the coal commences oxidation. The oxidation reaction produces heat which can then potentially cause spontaneous combustion if the self heating continues undisturbed.

The actual spontaneous combustion process is complex. In open pit mining, the major factors affecting the propensity of coal to spontaneously combust are intrinsic factors, (coal characteristics) and extrinsic factors, atmospheric, geological and mining conditions).

The nature of intrinsic factors can be both chemical and physical including but not restricted to (Guney, 1968):

- Coal composition, rank and petrographic constituents;
- Coal friability, particle size and surface area;

- Coal moisture content;
- Presence of pyrite in coal (in certain forms); and
- Other mineral matter in coal (silicates, carbonates and sulphates).

The extrinsic factors are those that have an impact on the coal from the environment, such as (DERM, 1995; Guney, 1968, Coaltech, undated):

- Climatic condition (temperature, relative humidity, barometric pressure and oxygen concentration);
- Dump consolidation, influenced by height, method of formation and equipment used;
- Seam thickness;
- Excavation stability and maintenance (for highwall faces);
- Presence of bacteria;
- Coal stockpile management (compaction, height and method of coal stockpiling);
- Geological disturbances (faults and dykes); and
- Oxygen concentration.

Mining and coal handling can have a significant effect on the propensity of coal to spontaneously combust. Unshaped spoil dumps appear more susceptible to spontaneous combustion, since the batters have not been reshaped. Based on spontaneous combustion occurring at other mines it has been found that reshaping batters allows the movement of air over the surface rather than penetrating through the unshaped steep batters into rock voids, and lowers the likelihood of spontaneous combustion outbreaks.

Additionally, based on previous spontaneous combustion at other coal mines it has been found that areas that have undergone higher compaction (such as roads) exhibit less spontaneous combustion than batter areas. This indicates that compaction is a method of controlling and managing spontaneous combustion.

3.2 Material Prone to Spontaneous Combustion

Spontaneous combustion events at the Mine have historically been associated with both ROM coal stockpiles and carbonaceous material located in out of pit waste rock emplacements. Spontaneous combustion events have occurred in out of pit waste rock emplacements due to construction at the commencement of the Mine, before the higher spontaneous combustion propensity of some carbonaceous waste materials was identified. While these events have been managed in accordance with the Spontaneous Combustion Management Plan, they have at times resulted in reported odour and/or associated environmental complaints from nearby private receivers and/or users of Ulan-Wollar Road.

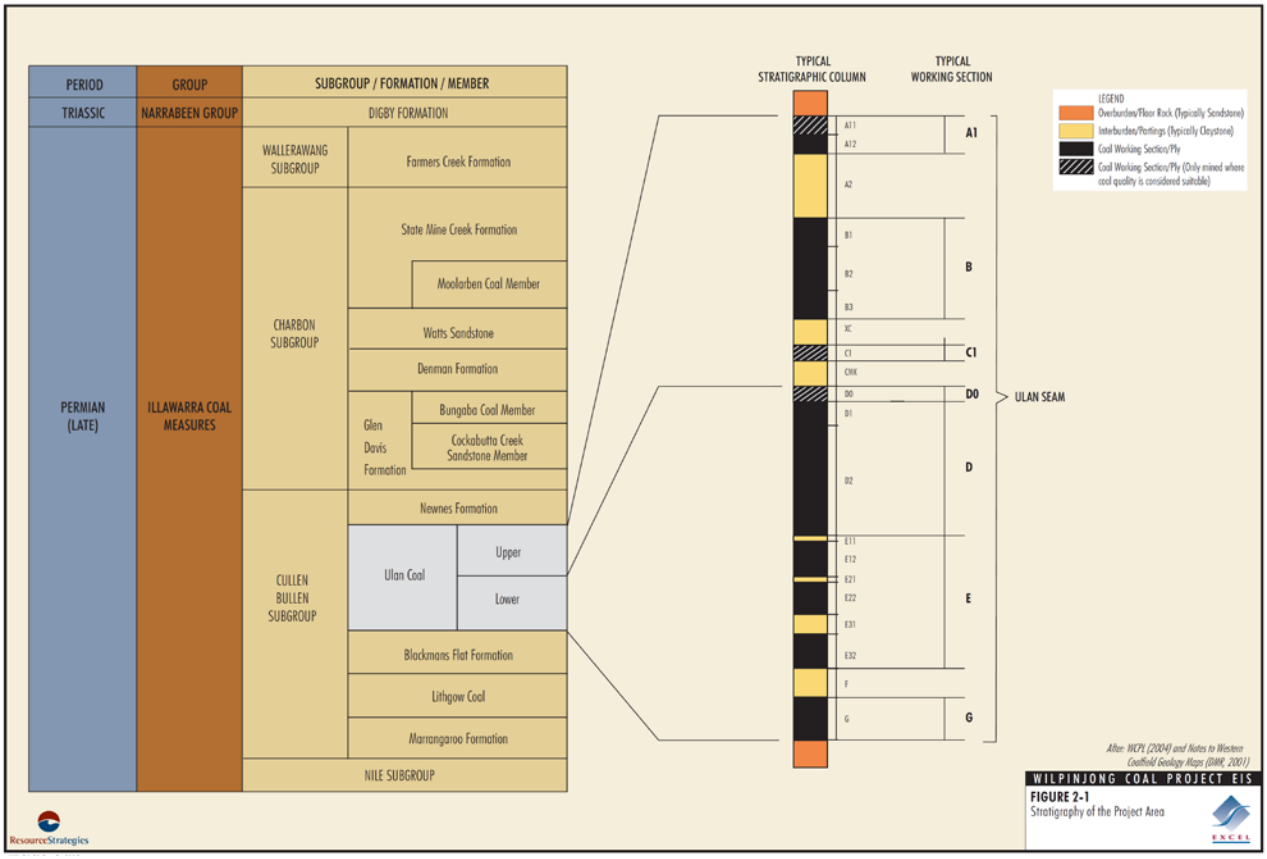
The coal stockpile spontaneous combustion events experienced at the Mine have arose due to stockpiling of ROM coal for an extended period. WCPL has put in place a risk identification system, whereby coal stockpiles that have a higher propensity to spontaneously combust are closely monitored (including physical inspections at eight hour intervals and/or use of thermal guns to identify areas of heating). In addition, after select ROM coal types have been stockpiled on-site for a designated period, they are prioritised for washing in the CHPP, to reduce the risk of spontaneous combustion events occurring in ROM coal. Management strategies for material prone to spontaneous combustion are detailed in **Section 6.0**.

3.3 Material Classifications

3.3.1 Geology

As outlined within the EIS 2005, the Wilpinjong resource is contained in the Ulan Coal which occurs in the lower part of the Late Permian Illawarra Coal Measures (**Figure 2**). These coal measures are overlain by the Triassic Narrabeen Group (locally known as the Wollar Sandstone) and comprise mainly conglomerate and sandstone. The Ulan Coal is divided into two sections (upper and lower) and is separated by the C-marker, CMK (**Figure 2**). The combined sections of the Ulan Coal are commonly named and herein referred to as the Ulan Seam. The Ulan Seam is approximately 15 metres (m) thick and comprises of plies of good to fair quality coal, plies of poorer quality (i.e. high ash) stony coal and partings of carbonaceous claystone, claystone, tuffs and other non-coal lithologies.

Figure 2: Stratigraphy of Wilpinjong Coal Mine



3.3.2 Spontaneous Combustion Propensity

Assessments of the propensity of the coal and carbonaceous partings to spontaneous combust identified the majority of the coal and waste material in the coal stratigraphy had a low propensity for spontaneous combustion. **Table 3** provides details on Summary of Spontaneous Combustion Assessment at the Mine.

Table 3: Summary of Spontaneous Combustion Assessments – Wilpinjong

Report Details	Results
Adiabatic Self-Heating Test (R_{70}), Rail Loop Adjacent to chainage 2085 in layout option 7c Floor RL396. Undated (prior to 2006)	The results showed the average rate of self-heating from 40^0C to 70^0C (R_{70}) was 0^0C/hr. This result indicates that spontaneous of the carbonaceous material is unlikely. The laboratory results are included in **Appendix 4**.
Spontaneous Combustion Assessment of a Parting Lump Sample from Wilpinjong Colliery, Dr Basil Beamish – 01 May 2012	The R70 self-heating rate value recorded for the parting sample from Wilpinjong Colliery is 1.88^oC/h. This rates the sample as having a low-medium intrinsic spontaneous combustion reactivity based on New South Wales conditions. This value is consistent with the rank and type of coal. The relative ignition temperature (RIT) of the Wilpinjong Colliery sample is 150 ºC, which is again consistent with the rank and type of coal. Calculated spontaneous combustion index parameters for minimum self-heating temperature and crossing point temperature indicate the Wilpinjong Colliery sample has a medium spontaneous combustion propensity rating. A moist adiabatic benchmark test of the parting sample from Wilpinjong Colliery indicates that self-heating is significantly controlled by the moisture in the sample. In practical terms this coal would not reach thermal runaway in under 6 to 9 months in a loose pile situation.

Site experience however has shown that parting material in the lowest section of the coal stratigraphy poses a risk for spontaneous combustion. Parting material associated with the lowest coal plies (E & G Seams) presents the highest risk for spontaneous combustion when exposed to atmospheric conditions.

To further understand propensity of carbonaceous material at the Mine, WCPL is currently undertaken a series of Adiabatic Oven R_{70} tests of all coal and carbonaceous partings and is further discussed in **Section 6.0**.

3.4 Benchmarking Study

In September 2014 Palaris was engaged by WCPL to complete a spontaneous combustion management benchmarking study, to identify current operational control strategies and monitoring systems for spontaneous combustion at open cut mines. The study examined industry guidelines, research papers and current spontaneous combustion management plans and procedures of operations in Australia and around the world.

The information presented in the benchmarking study was used during the Spontaneous Combustion Risk Assessment (**Section 4**), in the development of this Management Plan and the Keylah Dump Removal Management Plan (**Appendix 2**). A summary of the recommended control strategies and monitoring systems identified from the benchmarking study is provided in **Table 4**. Control strategies and monitoring systems to be implemented by WCPL are detailed in **Section 6.0** and **Section 7.0**

Table 4: Benchmarking Study Summary

Area	Control Strategies and Monitoring Systems	
	Minimum	Additional
General	• Risk identification using MDG1010 and ISO31000. • Develop a Trigger Action Response Plan. • Good communications between Mining Manager, CHPP Manager and Environment and Community Manager about carbonaceous material and high risk coal. • Determine predominant wind direction. • Lower slopes and higher compaction on windward side. • Lift heights as low as practicable to minimise segregation. • Limit total spoil pile to 10-12 m or as determined by WCPL. • Monitor in several locations.	• Visual monitoring aided by hand held infrared thermometer. • Monitoring of unmanned aircraft systems with thermal camera.
ROM stockpiles/product stockpiles	• Determine incipient heating time for coal. • Load coal in sequential order (first-in-first-out). • Maximum stockpiling time without controls: 2 months. • Monitoring and prioritising rotating of stockpiles. • Daily visual monitoring with increased frequency after incipient heating time has passed or temperature increased.	• Wind anemometer controlled dust suppresser in combination with monitoring coal moisture.
Out of pit spoil stockpiles	• Forward planning waste material budget. • Place carbonaceous material in deeper depths. • Encapsulate carbonaceous material in inert material. • Early identification of material for cover construction, GPS location of material, document volume and particle size distribution. • Visual monitoring between daily-monthly.	• Place compacted inert layer between layers of carbonaceous material. • Compact with rollers instead of dozers. • Before burying, mix carbonaceous material with inert material to decrease pore space.

Rehabilitation areas	• Construct cover system.
	• Indicative cover thickness:
	  o Clay rich material: 1-2 m
	  o Sandstone material: 5-10 m
	• For final landform, plan surface water management to avoid erosion.
	• Monthly visual monitoring.
		• Determine site specific cover thickness.
		• Run cover trials.

4 Risk Assessment

On 19 September 2014, WCPL undertook a detailed risk assessment to assess the environmental, community and regulatory risks associated with spontaneous combustion onsite (in general) as well as the removal and disposal of Keylah Dump material. The risk assessment sought to identify the key risks, existing control measures and any additional controls that could be implemented to reduce impacts during operations.

The risk assessment was undertaken in accordance with WCPL's Risk Management Plan (WI-SAH-MNP-0007). The following WCPL personnel participated in the risk assessment:

- Blair Jackson – General Manager;
- Peter Grosvenor – Mine Manager;
- Kieren Bennetts – Environment and Community Manager (ECM);
- Clark Potter – Senior Environmental Advisor;
- Karin Fogarty – Environmental Advisor;
- Richard Cade – CHPP Manager;
- David Mealing – Maintenance Manager; and
- Nicolas Collings – Technical Services Manager.

A summary of the outcomes of the risk assessment for spontaneous combustion onsite (in general) are included in **Appendix 5**.

Controls identified in **Appendix 5** are discussed further in **Section 6.0** and **Section 7.0**. Specific risks and controls associated with the removal and disposal of Keylah Dump material are detailed in the Keylah Dump Removal Management Plan (**Appendix 2**).

4.1 Areas at Risk of Spontaneous Combustion

The main areas at risk of spontaneous combustion events are:

- Keylah Dump (refer Keylah Dump Removal Management Plan in **Appendix 2**);
- Out of Pit Dumps;
- ROM Stockpiles and associated infrastructure (bins); and
- Product Stockpiles.

These areas are shown on **Figure 3**. Other areas that may be prone to minor spontaneous combustion events are:

- In Pit Dumps;
- Reject Emplacement Areas;
- Tailings emplacement Areas;
- Highwalls; and
- Windrows e.g. along haul roads.

Management measures for all areas are discussed in **Section 6.0** and **Section 7.0**.

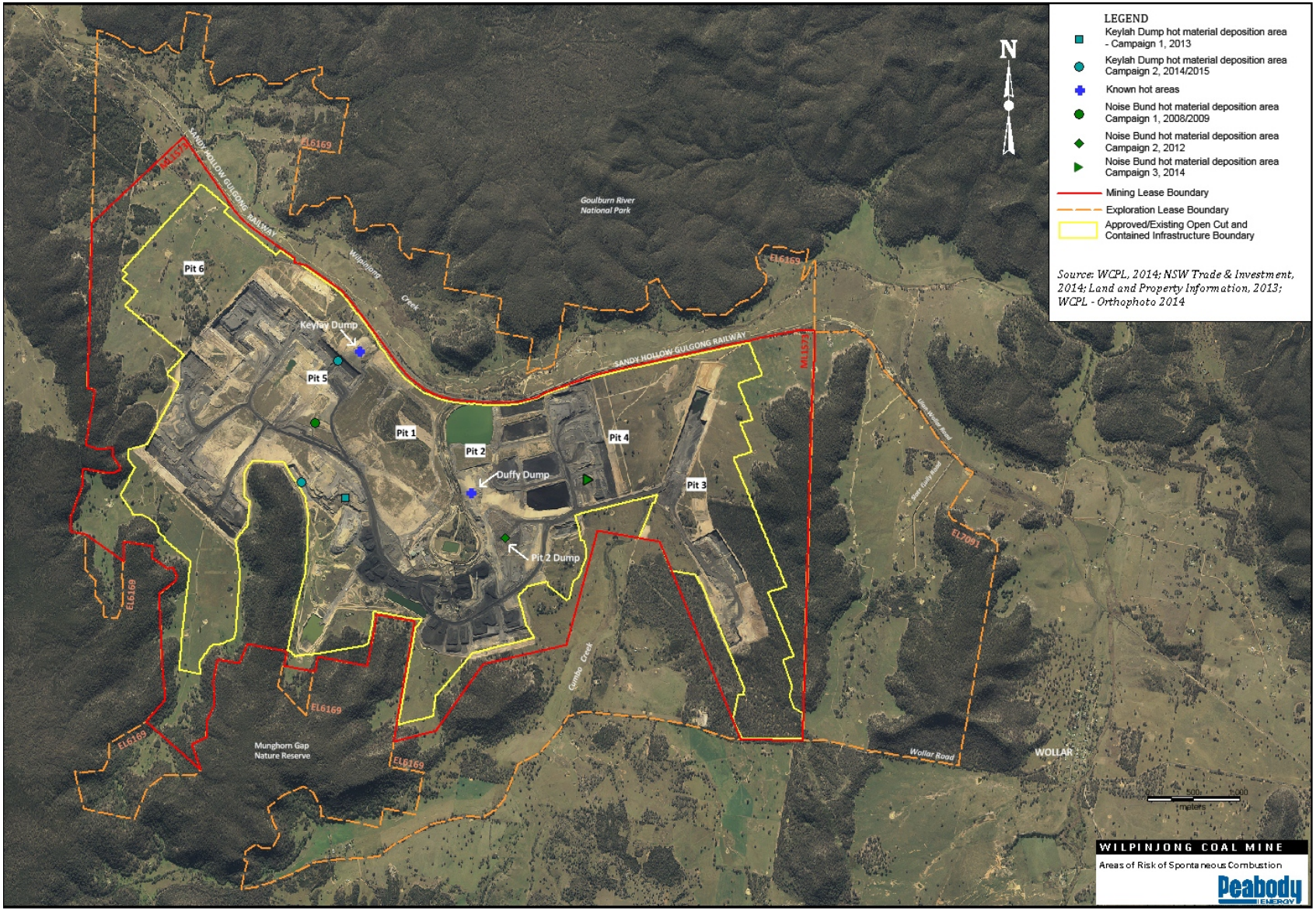


Figure 3: Areas at Risk of Spontaneous Combustion

5 Performance Indicators

WCPL has developed a number of performance indicators for spontaneous combustion management, to assess the performance of the Mine (**Table 5**).

Table 5: Performance Indicators

Performance Indicator	Indicator
Number of verified complaints received relating to spontaneous combustion	0
Number of incidents relating to spontaneous combustion	0
Number of times operations have been shut down as a result of complaints/incidents relating to spontaneous combustion	0

WCPL will report on progress against these performance indicators in the Annual Review (**Section 11.2**). In the event that a complaint is received relating to spontaneous combustion, it will be handled in accordance with the complaints management protocol (**Section 10.0**).

Contingency plans for unpredicted spontaneous combustion impacts are discussed in **Section 8.0**.

6 Preventative Management and Control Measures

Efforts for managing spontaneous combustion at the Mine will be focussed on prevention of outbreaks rather than management of outbreaks. The focus of spontaneous combustion management will be on reducing the risk of an outbreak. However, if an outbreak does occur, the process detailed in **Section 8.1** will be implemented.

6.1 Mine Planning

Mine planning is critical to the prevention and management of spontaneous combustion at the Mine. **Table 6** lists the key mine planning tools utilised at the Mine for spontaneous combustion prevention and management.

Table 6: Mine Planning Tools for Spontaneous Combustion Prevention and Management

Tool	Spontaneous Combustion Prevention and Management
Life of Mine (LOM) Planning	• LOM planning and dumping strategy takes into account management of carbonaceous material i.e. placement within rehabilitated landforms, drainage interactions and post mine landuses. This includes undertaking periodic calculated mass balances to identify expected waste carbonaceous materials and ensure appropriate volumes of inert materials are available for capping.
Mining Operations Plan (MOP)	• The MOP details WCPL's rehabilitation strategy, including placement and capping of rejects and other waste carbonaceous materials to ensure future spontaneous combustion events are minimised in reject emplacement areas. All reject material is placed at least 5m below finished surface level (FSL) in Out of Pit Dumps (OOPDs) and at least 2m below FSL in reject emplacement areas and tailings storage areas and capped with inert material to minimise the potential for spontaneous combustion outbreaks. Furthermore, all hot materials identified within the removal of Keylah Dump is to be deposited between layers of cool non-carbonaceous material up to 3m thick and placed at least 5m below the FSL. • The MOP also includes conceptual drainage designs for final landforms rehabilitation areas. WCPL will further investigate drainage options relevant to spontaneous combustion in the next review of the MOP e.g. Duffy's Dump.
Material placement and capping strategy	• WCPL has identified suitable (inert) capping materials for use in reject emplacement areas and a program is currently being undertaken to assess the chemical composition and document the volume and particle size distribution of these materials. WCPL is currently reviewing the capping strategy to investigate the use of a thicker layer of inert capping material. • High risk partings and reject (E & G coal) is placed as low as practical in the spoil profile. • All hot materials identified within the removal of Keylah Dump is to be deposited between layers of cool non-carbonaceous material up to 3m thick and placed at least 5m below the FSL. • Annual review and inspection of the process for tailings emplacement areas. • A minimum of 2m of inert material will be placed over final dumps of carbonaceous material (unless specified within the MOP). • Final dumps will be track rolled to form low angle batters and covered with inert material as soon as practicable. • In the pit, carbonaceous material will not be placed against the high wall.

Tool	Spontaneous Combustion Prevention and Management
	Carbonaceous material in the low wall will be exposed for the minimum period practical, and where exposed will be visually monitored daily via OCE reports.
Dump design	• Dump designs include a minimum thickness of inert capping material (2m). • Lift heights are kept as low as practicable to minimise segregation. • All hot materials identified within the removal of Keylah Dump is to be deposited between layers of cool non-carbonaceous material up to 3m thick and placed at least 5m below the FSL. • Dump designs have included the addition of appropriate inert material during construction to ensure the cutting down and reshaping out of pit dumps does not damage the integrity of the minimum capping material requirements (i.e. minimum of 2m).
High wall design	• Exposed seams of non-active faces are generally sealed with inert material, with the exception of the high wall in Pit 2 (Pit 2 currently used to store water - a Final Void Management Plan will be developed to manage this void).
Windrow design	• Windrows are built from inert material.
Tailings dam design and management	• WCPL's tailings dams are designed, maintained and decommissioned in accordance with relevant approvals e.g. s100 and s101 approvals and the WCPL Tailings Storage Facility Operation and Maintenance Manual. • When the tailings emplacement area is decommissioned the surface of the tailings will be compacted, if safe to do so, and capped with inert material to a nominal depth of 2m. The actual depth will be determined based on the properties of the tailings. The capped material will then be monitored on a regular basis for signs of spontaneous combustion for the life of the Mine.
Coal stockpile design and management	• Stockpile designs take into account the following elements: o Predominant wind direction (west) o Lower slopes and higher compaction on western side o Incipient heating times for coal o Loading coal in sequential order (first-in-first-out) WCPL has developed a Product Stockpile Management Plan and Procedure to manage onsite product stockpiles • WCPL is reviewing volume management requirements with an aim of minimising ROM stockpiles and reducing rehandling costs Maintaining the "Weekly Stockpile Plan" (Refer to **Section 7.2**)
Planning and Senior Leadership Team (SLT) meetings	• Information on weather forecasts as well as stockpile age and results from weekly inspections (observations) is disseminated to key personnel at daily planning meetings. • Information on potential hotspots is communicated between the Mining Manager, CHPP Manager and Environment and Community Manager at SLT meetings.

6.2 Spontaneous Combustion Propensity Testing

WCPL has conducted a review of spontaneous combustion propensity characteristics throughout the coal seam (including partings) in accessible pits. This included R_{70} testing and analysis of 58 samples from Pit 3, 4, 7 and 5 to understand the intrinsic coal reactivity at the Mine. Results indicate 6.8% of samples are classed as having a low propensity rating, 50% low-medium and 43.2% medium. The G and E coal in Pit 3 and Pit 7 recorded the highest results. WCPL will continue to undertake propensity testing in Pit 6 and Pit 8 once these areas have been exposed to mining.

Results from the program guides improvements to carbonaceous material management and mitigation measures, including the design, construction and monitoring of the Elevated Waste Rock Emplacement in Pit 2.

6.3 Risk Identification and Assessment

WCPL has implemented a risk identification system, whereby coal stockpiles that have a higher propensity to spontaneously combust are closely monitored (including physical inspections each shift and/or use of thermal guns to identify areas of heating) (**Section 7.1**). WCPL will prioritise the washing of selected ROM coal types (that are showing some signs heating or discolouration or have been stockpiled on-site for an extended period) in the CHPP, to reduce the risk of spontaneous combustion events occurring in ROM coal (**Section 7.2**).

6.4 Identification of Potential Hot Spots

WCPL has identified and mapped existing spontaneous combustion hot spots across the Mine, including in all out of pit dumps (OOPDs), stockpiles and reject emplacement areas (**Figure 3**), using thermal imaging technology and visual inspections. Other areas shown on **Figure 3** are areas of which hot material has been placed at depth. The FLF surface above these deposit areas will be continued to be monitored to ensure no signs of surface instability or vegetation damage occurs. Hot spots are monitored and assessed on a regular basis to determine appropriate mitigation strategies as well as provide feedback into the understanding of spontaneous combustion management at the Mine (i.e. appropriate capping depths, timeframe for reactivity of carbonaceous material).

6.5 Keylah Dump Removal Management Plan

WCPL has developed the Keylah Dump Removal Management Plan which is an internal WCPL document that details the strategy and controls for the removal and safe disposal of waste material from the Keylah Dump by the end of 2015 (**Appendix 2**).

6.6 Air Quality Management Plan

The AQMP (WI-ENV-MNP-0004) has been developed to ensure that operational air quality impacts on the local community are minimised to the extent required by Development Consent (SSD-6764) and EPL 12425. The AQMP details WCPL's air quality management and control measures and monitoring program, including the use of predictive weather forecasting and monitoring of meteorological (e.g. wind speed and direction) and air quality conditions in and around the Mine.

Predictive weather forecasting is a useful tool for spontaneous combustion management (requirement for Keylah Dump Removal Management Plan) as it allows mine personnel to pre-empt potential spontaneous combustion outbreaks and respond accordingly i.e. high westerly winds. A daily report containing meteorological forecast information is issued via email to key operational personnel. Where adverse meteorological conditions are forecast the notification will alert these personnel that the Air Quality Management System (AQMS) may need to be implemented in the next 24 hour period (refer to Section 5.4 of the AQMP).

Condition 16 of Schedule 3 of Development Consent (SSD-6764) requires that WCPL will ensure that no offensive odours are emitted from the site, as defined under the POEO Act. Section 8.0 of the Keylah Dump Removal Management Plan details the management control measures that will be implemented by WCPL to minimise the generation of offensive odours during the Keylah Dump removal works. WCPL have also developed a Trigger Action Response Plan (TARP) to respond to elevated levels of gas (H_2S and $S0_4$) detected in Wollar village and odour complaints during the Keylah Dump removal works. Further details can be found in **Appendix 2.** Gas monitoring is undertaken in Wollar Village, in accordance with the monitoring program is described in Section 5.2 of the AQMP and **Section 7.2** of this SCMP.

6.7 Stakeholder Engagement

WCPL regularly communicates with key stakeholders on the prevention and management of spontaneous combustion onsite. Stakeholder engagement activities include:

- Community/stakeholder meetings;
- Community Consultative Committee (CCC) meetings; and
- Distribution of a community fact sheet on spontaneous combustion.

WCPL has also implemented a Complaints Response Protocol to respond to complaints regarding spontaneous combustion (**Section 10.0**).

6.8 Training and Education

All employees will be educated in the basic identification of smoke, heat and smell associated with spontaneous combustion.

All employees will effectively be responsible for detecting spontaneous combustion and reporting any visible signs of smoke/steam to the OCE immediately.

7 Inspections and Monitoring

7.1 Spontaneous Combustion Inspection Program

WCPL has developed an inspection program for spontaneous combustion at the Mine. An inspection program of spoil emplacements, stockpiles and tailings emplacement areas will be implemented, based on visual and odour assessment, targeting cool moist periods when signs will be most visible. This inspection program is summarised in **Table 7**.

Table 7: Spontaneous Combustion Inspection Program

Area	Description	Frequency
All coal stockpiles	• The Open Cut Examiner (OCE) will conduct a visual inspection of the ROM coal stockpiles for evidence of the presence of spontaneous combustion. The inspection is undertaken per shift and involves observing the stockpiles for any visible signs of smoke or any other obvious signs of heat production within the stockpiles. • The CHPP Supervisor will conduct a visual inspection of the product coal stockpiles for evidence of the presence of spontaneous combustion per shift and involves observing the stockpiles for any visible signs of smoke or any other obvious signs of heat production within the stockpiles. • The Coal Quality Engineer will conduct a visual inspection of the ROM stockpiles daily and involves observing the stockpiles for any visible signs of smoke or any other obvious signs of heat production within the stockpiles.	• Every shift (OCE) • Daily (CHPP Logistics Engineer) • Daily (Coal Quality Engineer)
High Wall, Active Pits and reject disposal areas	• The OCE will conduct a visual inspection of high walls and reject disposal areas within active pits for evidence of spontaneous combustion. The OCE will observe the exposed coal seams within the high wall, active pits as well as windrows for any visible signs of smoke or evidence of heat generation. Additionally, the OCE will conduct visual inspections to ensure that reject disposal is being undertaken in accordance with the Waste Management Plan. • The OCE will conduct a regular inspections of the work area during the Keylah Dump removal works to ensure works are being controlled in accordance with the Keylah Dump Removal Management Plan	• Daily (OCE)
Spoil dumps/Out of pit dumps	• The OCE will conduct a visual inspection of spoil dumps for visual evidence of spontaneous combustion.	• Daily (OCE)
Rehabilitation Areas	• The Environmental Representative (ER) will also conduct regular visual inspections of the rehabilitated landforms for evidence of spontaneous combustion	• Quarterly (ER)
Tailings emplacement	• Weekly inspections are undertaken of prescribed tailings facilities for signs of spontaneous combustion.	• Weekly (ER) • Annually

Area	Description	Frequency
areas	• Annual Surveillance Report undertaken by Tailings Engineer.	(Technical Services Manager)
All mine site	• Undertake thermal imaging surveys of the entire site to identify new sites & monitor existing areas for any changes. • Use of the drone for thermal imaging as well as thermal guns for short term requirements where signs of spontaneous combustion is evident (i.e. Keylah Dump) to determine temperatures before applying appropriate risk mitigation.	• Biennially (Survey) • As required (Survey & Production/ CHPP team members)

7.2 Weekly Stockpile Plan

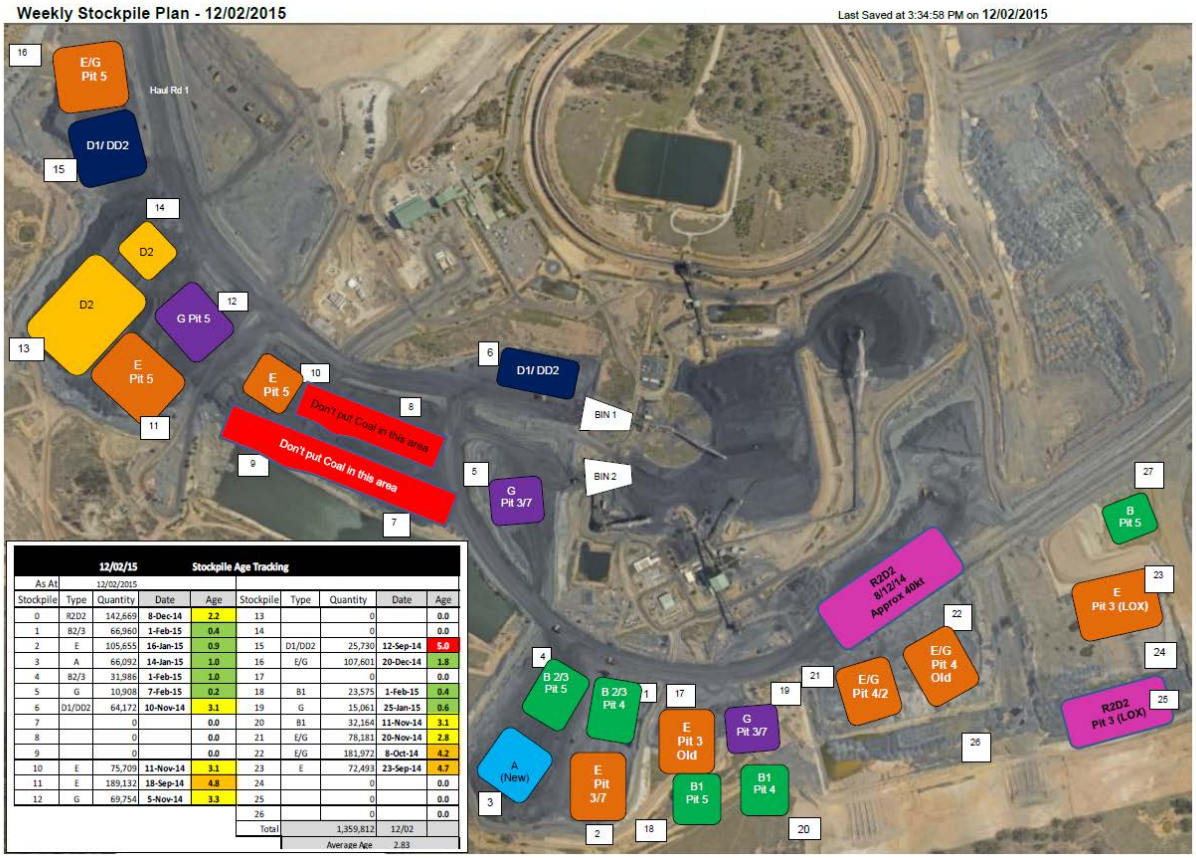
The Weekly Stockpile Plan is a weekly report that is reviewed and updated daily as an operational coal stockpile management plan. Its function is to provide up-to-date information on:

- The location of each ROM and Product stockpile onsite;
- Volumes and age of each stockpile;
- Coal quality details for each stockpile;
- Visual inspection records of ROM stockpiles;
- CHPP feed & washing requirements; and
- Train schedules and marketing requirements.

The Weekly Stockpile Plan also allows WCPL to:

- Monitor for spontaneous combustion of coal stockpiles and apply appropriate mitigation strategies;
- Build an operational understanding of coal propensity to spontaneous combustion and reactivity timeframes/oxidation rates of coal; and
- Manage stockpiles according to age, coal type, volumes and results from visual inspections (as shown in **Figure 4**):
    - Including a traffic light system for stockpile ages
        - Green –up to 1.9 months.
        - Yellow – 2.0 – 3.4 months.
        - Orange – 3.5 – 4.9 months.
        - Red - >5 months.
    - Comments provided through inspections as described in Section 7.1 provide further guidance through the use of a traffic light system including:
        - Green – no priority.
        - Yellow – some priority over stockpiles with no priority.
        - Red – top priority over all other stockpiles.

Determination of the priority is based upon the Coal Quality Engineer's experience and knowledge on coal characteristics, age and stockpile performance as well as any visual signs of preheating.



12/02/15 Stockpile Age Tracking

As At	12/02/2015								
Stockpile	Type	Quantity	Date	Age	Stockpile	Type	Quantity	Date	Age
0	R2D2	142,669	8-Dec-14	2.2	13		0		0.0
1	B2/3	66,960	1-Feb-15	0.4	14		0		0.0
2	E	105,655	16-Jan-15	0.9	15	D1/DD2	25,730	12-Sep-14	5.0
3	A	66,092	14-Jan-15	1.0	16	E/G	107,601	20-Dec-14	1.8
4	B2/3	31,986	1-Feb-15	1.0	17		0		0.0
5	G	10,908	7-Feb-15	0.2	18	B1	23,575	1-Feb-15	0.4
6	D1/DD2	64,172	10-Nov-14	3.1	19	G	15,061	25-Jan-15	0.6
7		0		0.0	20	B1	32,164	11-Nov-14	3.1
8		0		0.0	21	E/G	78,181	20-Nov-14	2.8
9		0		0.0	22	E/G	181,972	8-Oct-14	4.2
10	E	75,709	11-Nov-14	3.1	23	E	72,493	23-Sep-14	4.7
11	E	189,132	18-Sep-14	4.8	24		0		0.0
12	G	69,754	5-Nov-14	3.3	25		0		0.0
					26		0		0.0
					Total		1,359,812	12/02	
							Average Age	2.83	

Figure 4: Exert from Weekly Stockpile Plan

7.3 Rehabilitation Monitoring

WCPL has developed a Biodiversity Management Plan (WI-ENV-MNP-0035) which includes a detailed Biodiversity Monitoring Program for all areas of the Mine, including rehabilitated areas. Monitoring of rehabilitated areas will be undertaken annually to assess the success of the rehabilitation against established completion criteria, as detailed in the Mining Operations Plan (MOP). Rehabilitated areas affected by spontaneous combustion will require rehabilitation to ensure completion criteria are met.

Quarterly inspections of rehabilitated areas will be undertaken by the Environmental Representative to monitor for failure of final landforms and potential spontaneous combustion issues. An annual inspection of rehabilitation areas will also be undertaken for signs of spontaneous combustion. The performance of WCPL's rehabilitation is reported as part of the Annual Review process.

7.4 Gas/Odour Monitoring

WCPL have a temporary ambient air quality monitoring station in the Village of Wollar (**Table 11** in the AQMP). The ambient air quality monitoring station was placed in the Village of Wollar monitor as a key management measure[1] during the removal of Keylah Dump. The ambient air quality monitoring station monitors for the following pollutants that can be released during spontaneous combustion events, including:

[1] Require under Special Condition 9, E1 Spontaneous Combustion Air Monitoring within EPL 12425.

- Oxides of Nitrogen (NOx);
- Sulfur Dioxide (SO2);
- Hydrogen Sulfide (H2S);
- Benzene;
- Toluene; and
- p-Xylene.

The continued monitoring of the above pollutants with the ambient air quality monitoring station will be re-considered at the completion of the Keylah Dump removal program, in consultation with the EPA. The results from 2015 and 2016 ambient air monitoring program indicate no validated trigger of the above mentioned pollutants have occurred. All results from WCPL's ambient air quality monitoring program are provided in the Annual Review (**Section 9.2**).

A Trigger Action Response Plan has also been developed as part of the Keylah Dump Removal Management Plan which includes triggers for H_2S and SO_2.

7.4.1 Monitoring Records

WCPL will record the following details for all gas particulate monitoring samples:

- The date(s) on which the sample was taken;
- The time(s) at which the sample was collected;
- The point at which the sample was taken; and
- The name of the person who collected the sample.

Monitoring records will be:

- Recorded in a legible form, or in a form that can readily be reduced to a legible form;
- Kept for at least 4 years after the monitoring or event to which they relate took place; and
- Produced in a legible form to any authorised officer of the EPA who asks to see them.

8 Response to Spontaneous Combustion Events

8.1 Hazard/Incident Response

When smoke or other evidence of spontaneous combustion is identified on site the process in **Figure 5** will be implemented.

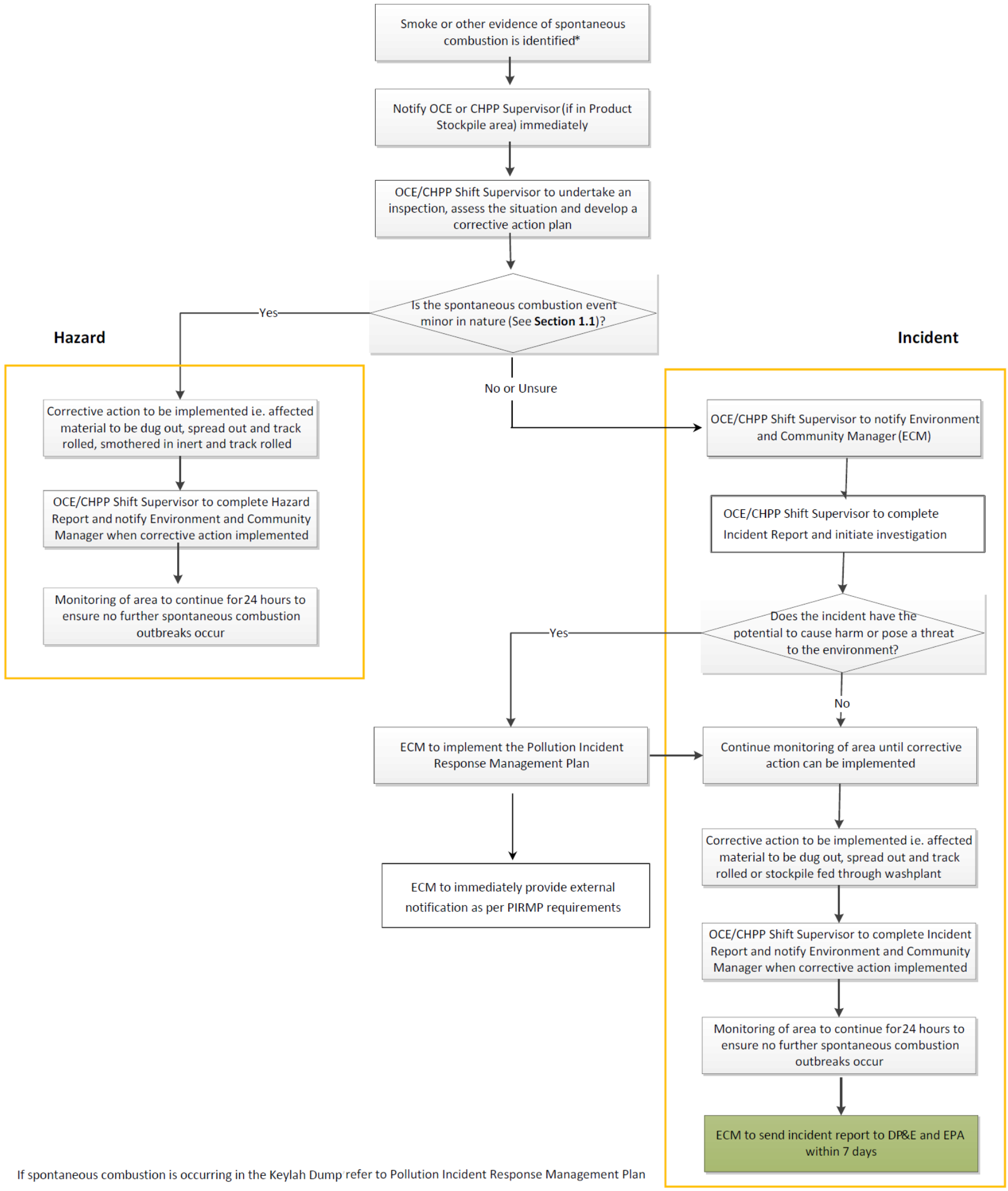


Figure 5: WCPL Response to Spontaneous Combustion Events

8.2 Corrective Actions

WCPL will implement appropriate corrective actions relevant to the spontaneous combustion event on site. All corrective actions will be developed with appropriate risk management considerations including personnel safety.

Where there is a spontaneous combustion event and open flames are identified the area will be saturated in water to put out the flames and cool the combustible material. Wilpinjong maintains a supply of FLAME-OUT on standby in the event of a spontaneous combustion event. FLAME-OUT is added to a water cart and will douse the area with the mixture. The Emergency Response Procedure will be initiated in the event of the identification of any open flames. The use of sporadic water application to prevent an outbreak of spontaneous combustion actually aides and accelerates the process of spontaneous combustion. As such, water will only be used when continuous saturation can be achieved before additional corrective actions are applied i.e. ROM stockpiles being saturated prior to washing through the CHPP.

8.2.1 ROM or Product Stockpiles

If spontaneous combustion is identified within a ROM or product stockpile, the OCE or CHPP Shift Supervisor will organise for the affected material to be pushed out and compacted, either using a dozer or long reach excavator. This action would normally be undertaken as soon as possible (generally by the end of the shift). For stockpiles exhibiting more developed indicators like smoke or flames, stockpiles are to be saturated with water with priority allocated with washing to occur through the CHPP.

8.2.2 Out of Pit Dumps

If spontaneous combustion is identified within an out of pit dump, the OCE will organise for the either the affected material to be dug out, spread and compacted, either using a dozer or excavator or organise for inert material to smother the area before track rolling to add in compaction. The dump will then be reshaped and, where possible, the angle of the batters will be reduced and the batters track rolled to accelerate airflow over the top of the compacted batters.

Corrective actions for Keylah Dump are discussed in detail in the Keylah Dump Removal Management Plan (**Appendix 2**).

8.2.3 Active Pit/Reject Emplacement Areas

If spontaneous combustion is identified within a reject disposal area or active pit area (including windrows) the OCE will organise for the affected material to be dug out, spread and compacted (typically using a dozer) and then covered with a track rolled layer of inert material.

8.2.4 Rehabilitated Areas

If spontaneous combustion is identified within a rehabilitated area the OCE or Environmental Representative will organise for the affected material to be dug out and removed from the area. A layer of inert material will be placed over the area and shaped consistent with the surrounding landform and drainage requirements. The area will then be rehabilitated in accordance with the requirements of the MOP. The material that is removed from the area will be placed in a mined out void and managed similar to material being removed from Keylah Dump.

9 Contingency Plan to Manage Unpredicted Impacts

As outlined within the AQMP, WCPL has a good understanding of the ambient air environment surrounding the Mine and has established a comprehensive AQMS to monitor and respond to air quality management issues. In the event that unpredicted air quality impacts occur as a result of mining activities at the Mine, WCPL will:

- Review the current AQMS (controls and monitoring), to ensure it is effective and criteria is being met;
- Develop and implement additional management or mitigation measures;
- Undertake follow-up air quality monitoring to assess the effectiveness of the additional measures; and
- Report any exceedance and non-compliances in accordance with **Section 11.1.**

10 Complaints Response Protocol

WCPL operates a Community hotline (**1300 606 625**) for the purpose of receiving complaints from members of the public in relation to mining activities at the Mine. For further details refer to **Section 8** of the AQMP.

11 Reporting

The following external reporting will be undertaken by WCPL in accordance with the conditions of the Development Consent (SSD-6764), EPL 12425 and Mining Leases:

- Exceedance and non-compliances /Incident reporting;
- Annual Review;
- Independent Environmental Audit;
- EPL Annual Return; and
- Website updates

For further details refer to **Section 9** of the AQMP.

11.1 Incident and Non-Compliance Reporting

Exceedances and non-compliances of the Air Quality Criteria in **Table 9** will be reported to DP&E, EPA and NSW Health as soon as practicable. As soon as practicable after confirming that an exceedance is a non-compliance, WCPL will notify affected landowners in writing of the non-compliance, and provide regular monitoring results to each affected landowner until the project is again complying with the relevant criteria. For further details refer to **Section 9.1** of the AQMP.

11.2 Annual Review

At the end of March each year, WCPL will review the environmental performance of the Mine including performance against **Section 5.0** and submit an Annual Review report to the DP&E. For further details refer to **Section 9.2** of the AQMP.

11.3 Independent Environmental Audit

Within a year of commencing development under (SSD-6764), and every three years thereafter (unless the Secretary directs otherwise) WCPL will commission an Independent Environmental Audit (IEA) of the Mine. For further details refer to **Section 9.3** of the AQMP.

11.4 EPL Reporting

WCPL will prepare and submit an Annual Return comprising a certified Statement of Compliance and a signed Monitoring and Complaints Summary to the EPA at the end of each EPL reporting period.

The Annual Return for the reporting period will be supplied to the EPA by registered post not later than 60 days after the end of each reporting period. WCPL will retain a copy of the Annual Return for a period of at least four years after the Annual return was due to be supplied to the EPA.

11.5 Website Updates

WCPL will ensure that any information relevant to spontaneous combustion management is uploaded to the website (https://www.peabodyenergy.com/Operations/Australia-Mining/New-South-Wales-Mining/Wilpinjong-Mine/Approvals,-Plans-Reports) (and kept up to date). For further details refer to **Section 9.5** of the AQMP.

12 Review

Within three months of the submission of:

a) The Annual Review;
b) An air quality incident (exceedance) report;
c) An Independent Environmental Audit;
d) The approval of any modification to the conditions of this consent;
e) A direction of the Secretary; and

WCPL will review, and if necessary revise, this AQMP to the satisfaction of the Secretary. For further details refer to **Section 10** of the AQMP.

13 Responsibilities

Table 8 details the responsibilities relating to this SCMP.

Table 8: Management Plan Responsibilities

Responsibility	Task	Timing
General/ Mine Manager	Ensure that adequate resources are available to effectively implement requirements of this Management Plan	As required
Mine Manager	Identify areas where spontaneous combustion is more likely to occur	As required
	Assist OCE and Mining Superintendent to ensure all materials are correctly disposed of and conduct regular inspections of the coal seams and coal stockpiles to monitor for signs of spontaneous combustion to be managed appropriately	As detailed within this Plan
	Ensure the OCE , Mining Superintendent or CHPP Manager undertake collection of any relevant information associated with a spontaneous combustion outbreak	Following a spontaneous combustion outbreak
Mining Engineer	Consider spontaneous combustion in the design of mining operations and spoil emplacement areas	During mine planning

	Assist in the development of a strategy to manage spontaneous combustion for areas identified as requiring attention in consultation with the Mining Superintendent and Environmental Representative	As required
	Identify areas where spontaneous combustion is more likely to occur	As required
	Responsible for considering spontaneous combustion prone material & appropriate capping requirements in the planning of the final landform	During mine planning
	Responsibility of planning the tipping locations of carbonaceous materials	During mine planning
CHPP Supervisor	Conduct a visual inspection of the product coal stockpiles for evidence of the presence of spontaneous combustion and sign of heating.	Per shift
Coal Quality Engineer	Conduct a visual inspection of the ROM stockpiles for evidence of the presence of spontaneous combustion update the "Weekly Stockpile Plan"	Daily
Environment and Community Manager	Ensure that all spontaneous combustion related complaints are responded to in accordance with the Complaints Response Protocol	Following a complaint
	Notify the Mine Manager and Mining Superintendent of community issues associated with management of spontaneous combustion	Following a complaint
	Report any spontaneous combustion related incidents in accordance with legal requirements	Immediately for incidences that has caused, or threatens to cause, material harm to the environment
Environmental Representative	Consult with the Mining Superintendent and Mining Engineer about appropriate management of spontaneous combustion	As required
	Advise on approval and statutory requirements for environmental management of spontaneous combustion	As required
	Report on spontaneous combustion performance and Continuous Improvement Opportunities in the Annual Review	Annually (Annual Review)
Health and Safety Manager	Ensure management of spontaneous combustion is conducted in a safe and competent manner	As required
	Ensure management of spontaneous combustion complies with all statutory safety obligations	As required
Surveyor	Verify that plans for final rehabilitation and spontaneous combustion management comply with details pertaining to the current Mining Operations Plan	As required
	Measure and record the type and depth of cover of	Whenever possible
	Materials applied as inert capping on final landform surfaces Maintain records associated with management of spontaneous combustion (including recording of x, y and z coordinates of 'hot' material	As required
OCE	Undertake inspections to identify and confirm spontaneous combustion events onsite (as per **Section 7**)	As required
	Coordinate corrective actions in accordance with **Section 8.2** of this Management Plan.	As required
	Manage any outbreaks or potential outbreaks as required	As required
	Consult with the Mining Supervisor about appropriate management of spontaneous combustion events	As required

Table 8: Management Plan Responsibilities (cont.)

Responsibility	Task	Timing
Production Superintendent	Effective implementation of this Management Plan	As required
Production Superintendent **Technical Services Manager**	Ensure the OCE conducts inspections competently	As required
	Ensure key planning information is forwarded at appropriate times to the personnel responsible for managing spontaneous combustion events in the field	As required
	Assist the Mine Manager and Mining Supervisor in the collection of any relevant information associated with a spontaneous combustion event	As required
	Ensure all inert materials are correctly placed and not unduly wasted in areas where there is no spontaneous combustion	As required
	Annual Surveillance Report undertaken by Tailings Engineer as per **Section 7**.	Annually
All employees and contractors	Notify the OCE of any potential or actual spontaneous combustion events	As soon as possible after becoming aware of it

14 References

Coaltech Research (undated) - PREVENTION AND CONTROL OF SPONTANEOUS COMBUSTION Best Practice Guidelines for Surface Coal Mines in South Africa

Department of Environment and Resource Management (DERM), 1995. Rehabilitation of spontaneous combustion areas.

Guney, M, 1968. Oxidation and spontaneous combustion of coal: Review of individual factors, *Colliery Guardian*, 216:105-143.

Mine Safety Operations Branch 2011, MDG 1006 Spontaneous Combustion Management Guideline

15 Appendices

15.1 Appendix 1: Spontaneous Combustion Management Plan Requirements

Environmental Protection Licence - EPL 12425

Approval/Licence	Condition	Requirement	Section
EPL	E1.1	The licensee must undertake continuous monitoring of the following pollutants at the Barigan Street, Wollar air monitoring unit: • Oxides of nitrogen; • Sulfur dioxide; • Hydrogen Sulfide; • Volatile organic compounds (VOCs) including benzene, toluene and xylene; and • Polycyclic aromatic hydrocarbons (PAHs) Monitoring must be undertaken in accordance with the relevant methods outlined in the EPA publication "Approved Methods – for the Sampling and Analysis of Air Pollutants in NSW" (2007). This monitoring must be undertaken until 30 June 2014. This data must be used to update the report titled "Ambient Air Monitoring Report – Wilpinjong Coal" prepared by Pacific Environmental Limited and dated 22 July 2013. Reference must be made in the report comparing ambient air monitoring results in Wollar to odour complaints received by the licensee and all known spontaneous events that occurred at the premises during the monitoring period. The updated report must be submitted to the Central West (Bathurst) office of the EPA by 29 August 2014.	7.4
EPL	E1.2	The licensee must undertake near source air monitoring at appropriate locations adjacent to the 'Keylah' and 'Noise Bund'; overburden stockpiles. The monitoring must be undertaken: • At least twice, from either stockpile, during the period up to 30 June 2014; • For a sufficient length of time in order to collect a representative sample; • At a time when a spontaneous combustion event is occurring from the respective stockpile; and • Such that the samples are analysed for Nox, So2, H2S, PAHs and VOCs. Monitoring must be undertaken in accordance with the relevant methods outlined in the EPA publication "Approved Methods – for the Sampling and Analysis of Air Pollutants in NSW" (2007).	7.4

Approval/Licence	Condition	Requirement	Section
		This data must be used to update the report titled “Ambient Air Monitoring Report – Wilpinjong Coal” prepared by Pacific Environmental Limited and dated 22 July 2013. The updated report must be submitted to the Central West (Bathurst) office of the EPA by 29 August 2014.	
EPL	E2.1	Prior to the commencement of works associated with the removal of the Keylah dump at the premises, the licensee must develop a management plan which: • Is consistent with any recognised industry standards or guidelines; • Details how the removal will occur; • Defines the location of where the material will be relocated to; • Provided a timeframe for the completion of works; • Identified mitigation measures for any risks identified during the risk assessment process; • Details the proactive measures that will be utilised to prevent an occurrence of spontaneous combustion during the works, including but not necessarily limited to: o Temperature and oxygen monitoring; o A weather Trigger Action Response Plan (TARP); and o A spontaneous combustion determination and response TARP which includes air quality management triggers and defined response actions; • Details the contingency plans should additional resources be required; • Details air quality management trigger and define the actions performance indicators which will be utilised to minimise offsite impacts including odour and dust; and Outlines the complaint response procedure including verification and follow up action.	Appendix 2
EPL	E2.2	Prior to the commencement of works associated with the removal of the Keylah Dump at the premises, the licensee must review and update the Pollution Incident Response Management Plan for the premises to include incidents which relate to the removal of the Keylah Dump.	Appendix 2
MOP	1	Mining operations are to be undertaken in accordance with the MOP titled Wilpinjong Coal Project Open Cut Operations, Mining Operations Plan, 2014-2019, prepared by Wilpinjong Coal Pty Limited March 2014.	2.1

15.2 Appendix 2: Keylah Dump Removal Management Plan

15.3 Appendix 3: Correspondence

SF17/8470

Mr Blair Jackson
General Manager
Wilpinjong Coal Mine
Locked Bag 2005
MUDGEE NSW 2850

Attention: Kieren Bennetts

22 June 2017

Dear Mr Jackson

Wilpinjong Coal Mine - Revised Management Plans

I refer to the various revised management plans for the Wilpinjong Cola Mine (the Mine) received by the Environment Protection Authority (EPA) on 1 June 2017.

Thank you for forwarding the draft air, blast, noise and water management plans to the EPA. The EPA encourages the development of Environmental Management Plans/Programs to ensure that proponents have determined how they will meet their statutory obligations and environmental objectives as specified by any Project/Development Approval and/or the conditions of an environment protection licence. Please note the EPA does not review these plans/programs (unless in circumstances deemed necessary) as the role of the EPA is to set conditions/criteria for environmental protection and management, not to be directly involved in the development of strategies to comply with such conditions/criteria. As such the EPA will not be reviewing or endorsing the Plans.

As a management tool, such plans should assist the Mine in meeting their commitment to statutory compliance and wider environmental management and where appropriate should be integrated with other operational or management plans. The EPA recommends that such plans be audited to an industry standard or certified to the ISO 14001 standard (if applicable) as part of any overall environmental management system.

Should you have any further enquiries in relation to this matter please contact Ms Sheridan Ledger at the Central West (Bathurst) Office of the EPA by telephoning (02) 6332 7608.

Yours sincerely

DARRYL CLIFT
Head Central West Unit
Environment Protection Authority

PO Box 1388 Bathurst NSW 2795
Level 2 203-209 Russell St Bathurst
Tel: (02) 6332 7600 Fax: (02) 6332 7630
ABN 43 692 285 758
www.epa.nsw.gov.au

Planning Services
Resource Assessments
Contact: Matthew Riley
Phone: 9274 6339
Email: matthew.riley@planning.nsw.gov.au

Mr Kieren Bennetts
Environment and Community Manager
Wilpinjong Coal
Locked Bag 2005
Mudgee NSW 2850

Dear Mr Bennetts

Wilpinjong Coal Mine (05_0021)
Management Plans

I refer to the revised management plans submitted to the Department following approval of the recent modification application for the Wilpinjong Coal Project (05_0021).

The Department has reviewed the management plans and is satisfied that the following plans are adequate:

- Noise Management Plan;
- Blast Management Plan;
- Air Quality Management Plan;
- Site Water Management Plan;
- Biodiversity Management Plan;
- Aboriginal Cultural Heritage Management Plan;
- Waste Management Plan;
- Spontaneous Combustion Management Plan; and
- Environmental Management Strategy.

Consequently, the Secretary approves the above mentioned plans.

If you wish to discuss the matter further, please contact Matthew Riley on 9274 6339.

Yours sincerely

20/3/17.

Mike Young
Director
Resource Assessments
As nominee of the Secretary

Department of Planning & Environment
Level 22, 320 Street Sydney NSW 2000 | GPO Box 39 Sydney NSW 2001 | www.planning.nsw.gov.au

Peabody ENERGY

NSW GOVERNMENT | Planning & Environment

Contact: Chris Schultz
Phone: 02 4224 9478
Fax: 02 4224 9470
Email: Christopher.Schultz@planning.nsw.gov.au

Mr Kieren Bennetts
Environment and Community Manager
Wilpinjong Coal Mine
Locked Bag 2005
MUDGEE NSW 2850

Dear Mr Bennetts,

Wilpinjong Coal Mine (PA 05_0021)
Approval of Management Plans

I refer to the following Management Plans required under Project Approval 05_0021 (the approval), submitted to the Department for consideration:

- Noise Management Plan – Document No. WI-ENV-MNP-0001 dated May 2014;
- Blast Management Plan - Document No. WI-ENV-MNP-0003 dated May 2014, including the Blast Fume Management Strategy dated May 2014;
- Water Management Plan - Document No. WI-ENV-MNP-0006 dated November 2014, including the Site Water Balance, Erosion and Sediment Control Plan, Surface Water Management and Monitoring Plan, Groundwater Monitoring Program and Surface and Groundwater Response Plan; and
- Spontaneous Combustion Management Plan – Document No. WI-ENV-MNP-0010 dated May 2015.

The Department has reviewed the plans and is satisfied that they generally address the requirements set out in the relevant conditions of the approval. Accordingly the Secretary has approved the management plans.

It is requested that the issues identified in Attachment 1 are addressed either prior to the publishing of the management plans on the website or in the next revision of the document.

A copy of these management plans is to be placed on the website in accordance with Schedule 5, Condition 11 of the approval within one month of the date of this letter.

Should you wish to discuss the above matter, please contact Chris Schultz, Senior Compliance Officer, on 02 4224 9478 or Christopher.Schultz@planning.nsw.gov.au.

Yours sincerely

9/5/16

Katrina O'Reilly
Team Leader Compliance Southern Region
as nominee of the Secretary

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15.4 Appendix 4: Propensity for Spontaneous Combustion (Lab Results)

Report No. 210003669

ANALYSIS AND TESTING REPORT

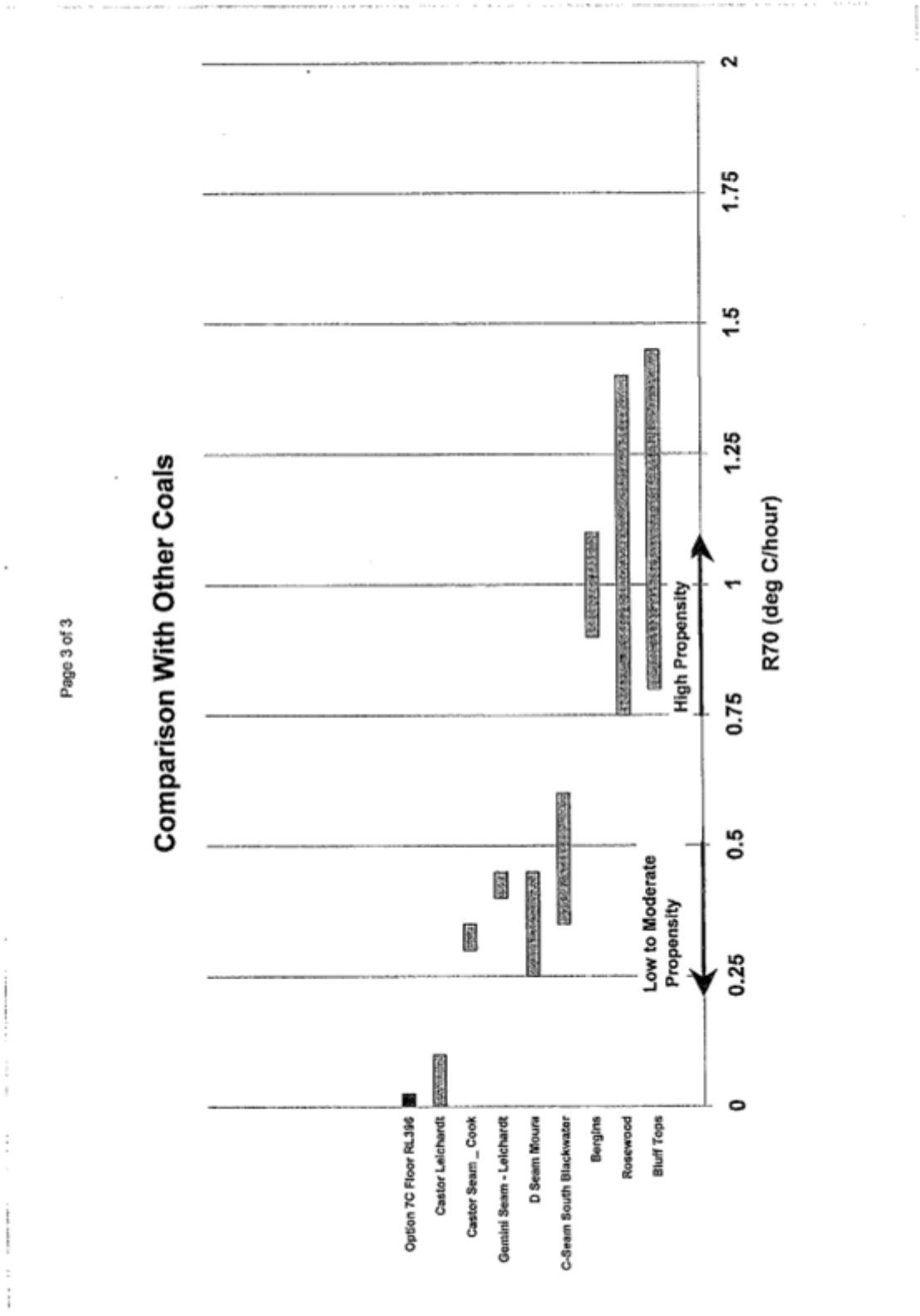
THIESS PTY LTD

Adiabatic Self-Heating Test

Sample Description: Rail Loop Adjacent to chainage 2085 in layout option 7c Floor RL396

Time (Hrs)	Temperature (°C)
0	40.0
1	40.0
5	40.0
9	40.0
13	40.0
17	40.0
21	40.0
25	40.0
29	40.0
33	40.0
37	40.0
41	40.0
45	40.0
49	40.0
53	40.0
57	40.0
61	40.0
65	40.0
69	40.0
70	40.0

R^{70} = $\frac{\text{Temp}}{\text{Time}}$ (40.0 - 40.0) $\frac{0.0}{30}$ = 0.00 °C/hr


Comparison With Other Coals
Option 7C Floor RL396
Castor Leichardt
Castor Seam _ Cook
Gemini Seam - Leichardt
D Seam Moura
C-Seam South Blackwater
Berglins
Rosewood
Bluff Tops
Low to Moderate Propensity
High Propensity
0
0.25
0.5
0.75
1
1.25
1.5
1.75
2
R70 (deg C/hour)

APPENDIX A
THE ACIRL ADIABATIC SELF-HEATING TEST

The coal sample to be tested is prepared by crushing to 200 microns and drying in nitrogen at about 105 C. The coal sample is allowed to cool after drying before being loaded into the vacuum flask reaction vessel. Once loaded, the reaction vessel is sealed with a push fit stopper through which pass a gas inlet, an exhaust, and a double platinum bulb resistance thermometer. As soon as practical, a flow of nitrogen is established through the coal sample in order to prevent pre-oxidation.

The reaction vessel is then placed into a fan forced oven. The temperature of the oven is maintained constant by an electronic controller until the sample temperature stabilises at 40 C. The gas supply which passes through a copper coil housed in the oven to pre-heat it, is then changed from nitrogen to oxygen. The function of the electronic controller is also changed to adiabatic mode in which it holds the oven temperature as close to the coal temperature as possible. The temperature of the coal is recorded during the self-heating period until 70 °C is exceeded or until 72 hours have expired since admission of oxygen. The rate of temperature rise gives a relative measure of the oxidation rate of the coal. Some typical self-heating curves are shown in Figure A.1.

To quantify the propensity of the coal to spontaneous combustion, the average rate of self-heating from 40 C to 70 C (R_{70}) is used as an index. As R_{70} increases, reactivity of the coal, and hance its propensity to spontaneous combustion increases.

For a range of Australian bituminous coals previously tested (Humphreys, 1979 and Humphreys et al, 1981), the range of R_{70} self-heating rates observed was from 0 C/hour to 1.45 C/hour. See Figure A.2. R_{70} values greater than 0.5 °C/h were obtained with coals having some history of spontaneous combustion problems in practice.

REFERENCES

HUMPHREYS, D.R.
A study of Propensity of Queensland Coal to Spontaneous Combustion, M.Sc. Thesis, University of Queensland, 1979

HUMPHREYS, D.R., ROWLANDS, D. and CUDMORE, J.F.
Proceedings of As I,M,M. Symposium on "Ignition, Explosion and Fires in Coal Mines", 1981,

15.5 Appendix 5: Risk Assessment Outcomes

Process Area	Risk Identified	Current controls	Additional Controls
Out of Pit Dumps	Rehabilitation failure of final landform(slumping, tree mortality, failed pastures, excessive erosion) (long term)	• Mining Operations Plan • Survey of FSL minus 5m • Biodiversity Monitoring Plan (including rehab monitoring) • Rehabilitation inspections • Spontaneous Combustion propensity testing • Annual Review and Inspection • Mine Planning • Carboneaous material surface limit (e.g. 20 metres of inert material along western face - Duffy Dump (to allow for mine closure reshaping requirement)	• Map existing spontaneous combustion hot spots in all out of pit dumps (OOPDs) • Undertake thermal imaging of site to identify potential spontaneous combustion hotspots • Review current capping strategy - investigate use of thicker layer of inert capping material • Organise a chemical composition assessment of onsite inert material • Implement rehab drainage commitments as provided by Tech Services • Consider drainage options for spontaneous combustion in next review of Mining Operations Plan e.g. adjacent to Duffy's Dump • Consider all dump designs to include the requirement of a minimum of 3m of inert capping material
	Unacceptable visual amenity impact during rehandling operations (dust, ash, smoke, steam, lighting)	• Air Quality Management Plan • Predictive weather forecasting (daily email) • Weather monitoring • Air Quality Monitoring Program • Community and regulator consultation	• Develop temporary remediation plan for Duffy's Dump (including drainage design) • Continued development of screening i.e. topsoil bund or vegetation bund.
	Distinctive sulphur odour that community finds offensive	• Community Complaints Protocol • Community/stakeholder meetings • CCC meetings • Gas/odour monitoring (including point source) in community • Predictive weather forecasting (daily email) • Weather monitoring	• WCPL will develop and distribute a community fact sheet on spontaneous combustion • WCPL will investigate chemical suppression options to reduce sulphur odour and act as fire retardant. WCPL will trial the RT60 Super Wetter, and FLAME-OUT fire retardants during operations
	Excessive carbonaceous material within new OOPDs	• Survey of FSL minus 5m • Rehab inspections • Dump design • LOM planning does not include OOPDs • LOM dumping strategy • Dump designs which incorporate carbonaceous layers to FSL-2m. This is then controlled via the Leica system and	• No additional controls identified

Process Area	Risk Identified	Current controls	Additional Controls
		further survey activities.	
ROM Stockpiles	Fire outbreak in ROM stockpiles	• Tyre bath • Weekly coal quality inspections • CHPP shift supervisor inspections • Stockpile Age Tracking • Spontaneous Combustion propensity testing • Process coal through CHPP • Thermo graphic camera • Procedure (TARP) for equipment damage and personnel safety • Emergency Response Procedure • Community Complaints Protocol • Experienced operators trained to identify and manage potential combustible material • Predictive weather forecasting (daily email) • Daily meetings (weather - look ahead as well as stockpile age and results from weekly inspections (observations)) • General community and regulatory updates • Reducing ROM stocks	• Develop ROM Stockpile Management Plan (including ROM inspection Procedure) • Develop fire outbreak management procedure for coal stockpiles (traffic light TARP) • Undertake thermal imaging of site to identify potential spontaneous combustion hotspots • Organise training for operators on identification of spontaneous combustion hotspots/indicators • Consider reorientating ROM stockpiles and battering face on prevailing wind side (for high risk coal) • Investigate chemical suppression options to reduce sulphur odour and act as fire retardant
	Distinctive sulphur odour that community finds offensive	• As per “Out of Pit Dumps” above	• As per “Out of Pit Dumps” above
Product Stockpiles	Spontaneous combustion outbreak in Product stockpiles	• Weekly coal quality inspections • CHPP shift supervisor inspections • Stockpile Age Tracking • Spontaneous Combustion propensity testing • Thermo graphic camera • Emergency Response Procedure • Community Complaints Protocol • Experienced operators trained to identify and manage potential combustible material • Predictive weather forecasting (daily email)	• Develop fire outbreak management procedure for coal stockpiles (traffic light TARP) • Undertake thermal imaging of site to identify potential spontaneous combustion hotspots • Organise training for operators on identification of spontaneous combustion hotspots/indicators • Develop coal rotation procedure for product stockpile • Update CHPP daily plan with product stockpile ages (table)

Process Area	Risk Identified	Current controls	Additional Controls
		• Daily meetings (weather - look ahead) • General community and regulatory updates • Product Stockpile Management Plan and Procedure	
	Distinctive sulphur odour that community finds offensive	• As per “Out of Pit Dumps” above	• As per “Out of Pit Dumps” above
In Pit Dumps	Distinctive sulphur odour that community finds offensive	• As per “Out of Pit Dumps” above	• As per “Out of Pit Dumps” above
Reject Emplacement Areas	Rehabilitation failure of final landform(slumping, tree mortality, failed pastures, excessive erosion) (long term)	• Mining Operations Plan • Survey of FSL minus 2m • Biodiversity Monitoring Plan (including rehab monitoring) • Rehab inspections • LOM Tailings Strategy management actions.ie cast blasting and dozer push. • Dump designs which incorporate carbonaceous layers to FSL-2m. This is then controlled via the Leica system and further survey activities. • Spontaneous Combustion propensity testing • Annual Review and Inspection • Mine Planning • Carboneaous material surface limit (e.g. 20 metres of inert material along western face - Duffy Dump (to allow for mine closure reshaping requirement))	• No additional controls identified
	Distinctive sulphur odour that community finds offensive	• Community Complaints Protocol • CCC meetings • Gas/odour monitoring (including point source) in community and reports • Predictive weather forecasting (daily email) • Weather monitoring	• No additional controls identified
	Unacceptable visual amenity impact (dust,	• Air Quality Management Plan	• No additional controls identified

Process Area	Risk Identified	Current controls	Additional Controls
	smoke, steam)	• Predictive weather forecasting (daily email) • Weather monitoring • Community and regulator consultation • Air Quality Monitoring Program	
	Excessive carbonaceous material within new reject emplacement areas	• Survey of FSL minus 2m • Rehab inspections • Reject emplacement area design • LOM dumping strategy	• No additional controls identified
Tailings Storage Areas	Rehabilitation failure of final landform (slumping, tree mortality, failed pastures, excessive erosion) (long term)	• Mining Operations Plan • Survey of FSL minus 2m • Biodiversity Monitoring Plan (including rehab monitoring) • Rehab inspections • Spontaneous Combustion propensity testing • Annual Review and Inspection • Mine Planning • LOM Tailings Strategy • Tailings Dam Design Reports (s100 approvals) • Tailings Storage Facility Operation and Maintenance Manual	• No additional controls identified
	Distinctive sulphur odour that community finds offensive	• Community Complaints Protocol • CCC meetings • Gas/odour monitoring (including point source) in community and reports • Predictive weather forecasting (daily email) • Weather monitoring	• No additional controls identified
	Unacceptable visual amenity impact (dust, smoke, steam)	• Air Quality Management Plan • Predictive weather forecasting (daily email) • Weather monitoring • Community and regulator consultation • Air Quality Monitoring Program	• No additional controls identified

Process Area	Risk Identified	Current controls	Additional Controls
High Walls	Distinctive sulphur odour that community finds offensive	• Community Complaints Protocol • CCC meetings • Gas/odour monitoring (including point source) in community and reports • Predictive weather forecasting (daily email) • Weather monitoring • Exposed seams sealed with inert material	• Develop Final Void Management Plan
	Spontaneous combustion fire in highwall	• Exposed seams sealed with inert material • OCE inspections	• Develop Final Void Management Plan
	Unacceptable visual amenity impact (dust, smoke, steam)	• Quality Management Plan • Predictive weather forecasting (daily email) • Weather monitoring • Community and regulator consultation • Air Quality Monitoring Program	• No additional controls identified
Windrows	Distinctive sulphur odour that community finds offensive	• As per “High Walls” above	• No additional controls identified
	Unacceptable visual amenity impact (dust, smoke, steam)	• As per “High Walls” above	• No additional controls identified
	Excessive carbonaceous material within new windrows	• Windrow design	• No additional controls identified

15.6 Appendix 6: Air Assessment Criteria

Table 2-1: Assessment criteria

Pollutant	Averaging period (basis of criteria)	Goal ppm	Goal mg/m³	Source
Carbon monoxide (CO)	15 minutes	87	100	NSW EPA
	1 hour	25	30	NSW EPA
	8 hours	9	10	NEPM
Toluene (VOC)	1 hour	0.09	0.36	NSW EPA
	3 minutes (odour)	0.17	0.65	EPA Victoria
	3 minutes (toxicity)	3.2	12.3	EPA Victoria
Xylenes (VOC)	1 hour	0.04	0.19	NSW EPA
	3 minutes (odour)	0.08	0.35	EPA Victoria
	3 minutes (toxicity)	2.7	11.4	EPA Victoria
Pollutant	**Averaging period**	**ppm**	**µg/m³**	
Sulfur dioxide (SO_2)	10 minutes	0.25	712	NSW EPA
	1 hour	0.20	570	NEPM
	24 hours	0.08	228	NEPM
	Annual	0.02	60	NEPM
Nitrogen dioxide (NO_2)	1 hour	0.12	246	NEPM
	Annual	0.03	62	NEPM
Benzene (VOC)	1 hour	0.009	0.029	NSW EPA
	3 minutes (carcinogen)	0.017	53	EPA Victoria
Hydrogen sulfide (H_2S)	1 hour	0.005	7	NZ MfE
PAHs (as benzo[a]pyrene)	1 hour	N/A	0.4	NSW EPA

mg/m³ – milligrams per cubic metre
ppm – parts per million
µg/m³ – micrograms per cubic metre

(Source: Pacific Environment Ltd, 2013)