WAMBO COAL
AIR QUALITY & GREENHOUSE GAS MANAGEMENT PLAN

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Document Control

Document No.	WA-ENV-MNP-508
Title	Air Quality and Greenhouse Gas Management Plan
General Description	Air quality and greenhouse gas management at WCPL
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Revisions

Rev No	Date	Description	By	Checked	Signature
0	Sep 2013	Original Draft	Pacific Environment	JC	
1/2	Oct 2013	Final	Wambo Coal	TF	
3	Feb 2014	Final	Wambo Coal	TF	
4	Oct 2016	Major revision including updated format & revised monitoring program	Palaris & WCPL	SP	
5	Aug 2017	Incorporation of DP&E comments	WCPL	SP	

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1.0 Introduction

1.1 Background

The Wambo Coal Mine (the Mine) is situated approximately 15 kilometres west of Singleton, near the village of Warkworth, New South Wales (**Figure 1**). Wambo is owned and operated by Wambo Coal Pty Limited (WCPL), a subsidiary of Peabody Energy Australia Pty Limited.

A range of open cut and underground mine operations have been conducted at WCPL since mining operations commenced in 1969. Mining under the current Development Consent (DA 305-7-2003) commenced in 2004 and permits both open cut, underground operations and associated activities to be conducted. The approved run-of-mine (ROM) coal production rate is 14.7 million tonnes per annum (Mtpa) and all product coal is transported from WCPL by rail. A summary of the approved Wambo Coal Mine is provided in **Table 1**.

Table 1: Summary of the Approved Wambo Coal Mine

Component	Approved Wambo[1]
Life of Mine	28 years (from the date of the commencement of Development Consent [DA 305-7-2003]). 1st March 2032
Open Cut Mining	Open cut mining at a rate of up to 8 Mtpa of ROM coal from the Whybrow, Redbank Creek, Wambo and Whynot Seams An estimated total open cut ROM coal reserve of 98 Mt Open cut mining operations under current approved MOP
Underground Mining	Underground mining of up to 9.75 Mtpa of ROM coal from the Whybrow, Wambo, Woodlands Hill and Arrowfield ~~and Bowfield~~ Seams Underground ROM coal reserves are estimated at 143.3 Mt
Subsidence commitments and management.	The subsidence performance measures listed in Conditions 22 and 22A of the Development Consent (DA 305-7-2003)
ROM Coal Production Rate	Up to 14.7 Mtpa of ROM coal
Total ROM Coal Mined	241.3 Mt
Waste Rock Management	Waste rock deposited in open cut voids and in waste rock emplacements adjacent open cut operations
Total Waste Rock	640 million bank cubic metres (Mbcm)
Coal Washing	Coal handling and preparation plant (CHPP) capable of processing approximately 1,800 tonnes per hour (tph)
Product Coal	Production of up to 11.3 Mtpa of thermal coal predominantly for export
CHPP Reject Management	Coarse rejects and tailings would be incorporated, encapsulated and/or capped within open cut voids in accordance with existing Wambo management practices
Total CHPP Rejects	Approximately 36.6 Mt of coarse rejects and approximately 22.4 Mt of tailings
Water Supply	Make-up water demand to be met from runoff recovered from tailings storage areas, operational areas, dewatering, licensed extraction from Wollombi Brook and Hunter River
Mining Tenements	Coal Lease (CL) 365, CL374, CL397, Consolidated Coal Lease (CCL) 743, Mining Lease (ML) 1402, ML1572, ML1594, Authorisation (A) 444, Exploration Licence (EL) 7211

Note: [1] Development Consent DA 305-7-2003 (as modified December 2016)

In accordance with Schedule 4, Condition 5C of DA305-7-2003, WCPL are required to prepare a detailed Air Quality and Greenhouse Gas Management Plan (AQGGMP). In accordance with WCPL's continuous improvement and review processes and Conditions 4 & 6, Schedule 6 of DA305-7-2003, a review of the AQGGMP has been undertaken to ensure that activities at the Mine continue to be undertaken in a manner that ensures compliance and reduces impacts on the local community. The following changes have been made to the AQGGMP as part of this revision (Version 5):

- Incorporating comments received from the Department of Planning and Environment (DP&E);
- Updates to statutory conditions relating to air quality (**Appendix A**) and to reflect the approval of DA305-7-2003 MOD 12; and
- Updated air quality monitoring program

1.2 Purpose

The purpose of this AQGGMP is to ensure that air quality impacts from the Mine are minimised to the extent required by DA305-7-2003 and Environment Protection Licence (EPL 529). This AQGGMP has been developed to:

- Describe the measures to be implemented to comply with the relevant air quality and greenhouse gas conditions;
- Describe the management strategies to be implemented to minimise air quality impacts during adverse meteorological conditions and extraordinary events;
- Describe the management strategies to be implemented to minimise the release of greenhouse gas emissions from the Mine;
- Describe the proposed air quality management system and monitoring program;
- Describe the greenhouse gas monitoring and reporting program;
- Describe contingency plans to manage any unpredicted impacts and their consequences, i.e. Trigger Action Response Plans (TARPs);
- Provide a protocol for managing and reporting any air quality related incidents, exceedances or non-compliances;
- Communicate with the local community and regulators regarding WCPL's air quality monitoring activities;
- Describe and assign responsibilities relating to air quality and greenhouse gas management at WCPL; and
- Describe how this AQGGMP will be reviewed and updated.

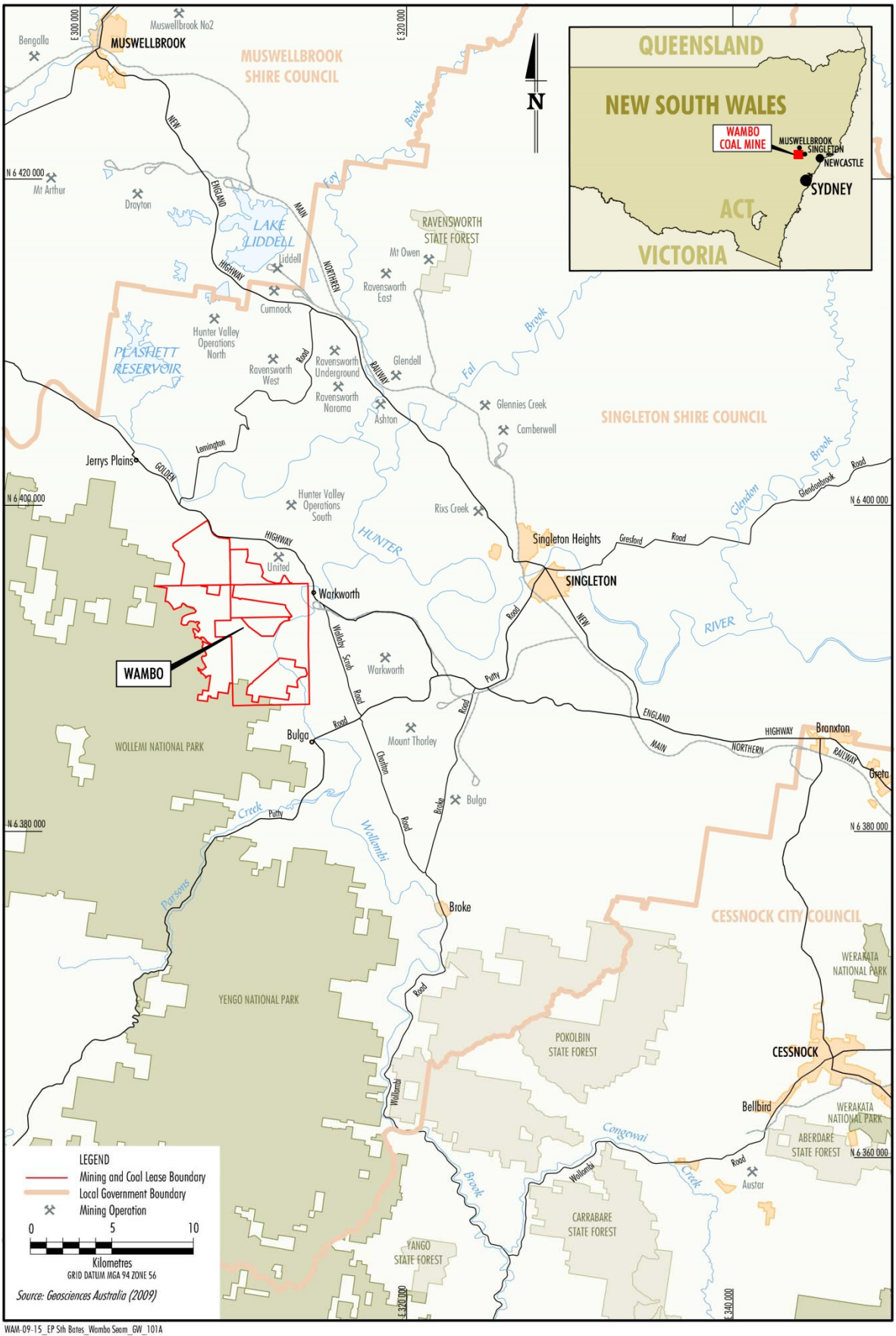


Figure 1: Wambo Coal Regional Location

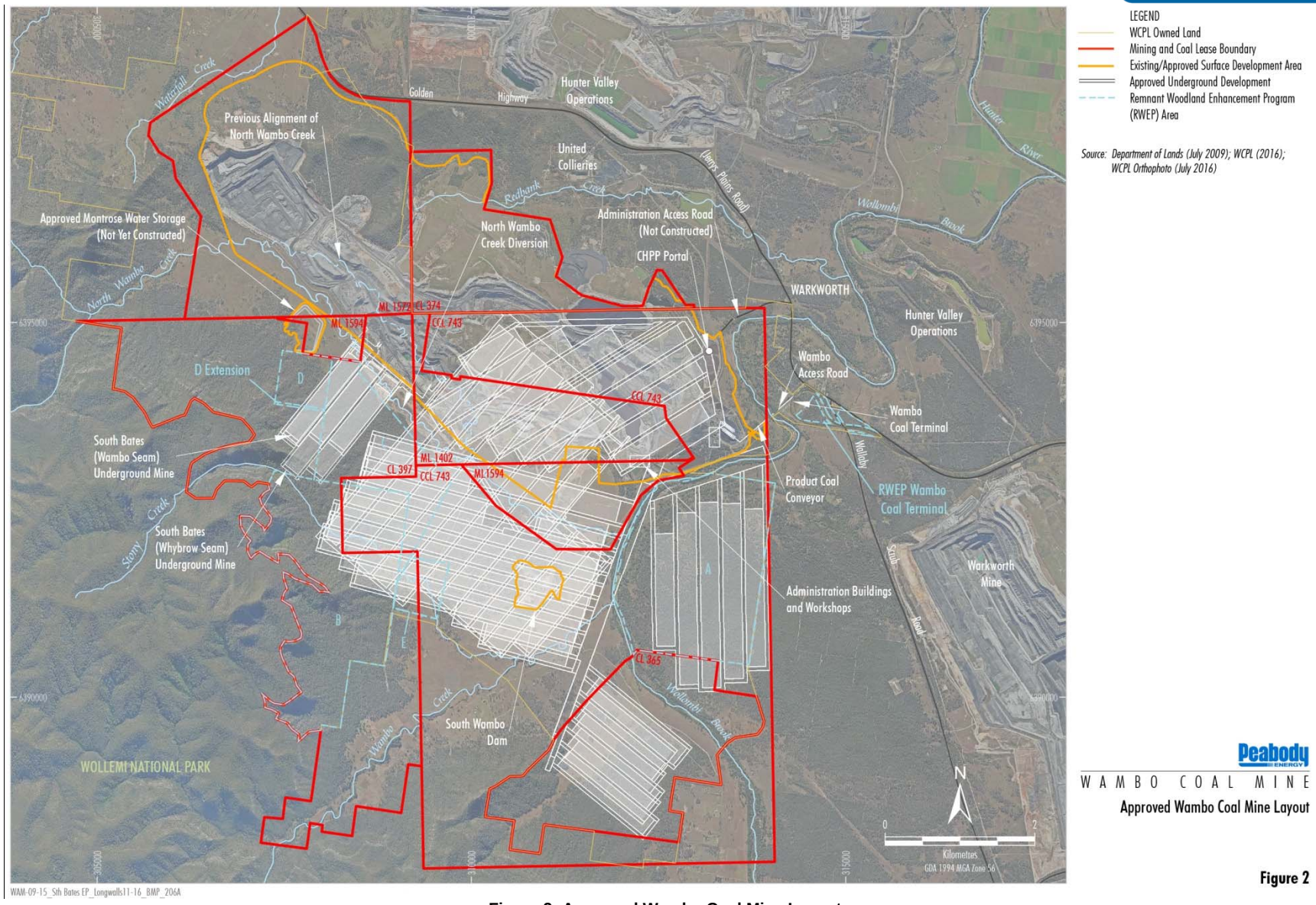


Figure 2: Approved Wambo Coal Mine Layout

1.3 Scope

This AQGGMP applies to all activities undertaken within WCPL's mining authorisations and approved mining areas (**Figure 2**) that may impact on air quality. This AQGGMP has been prepared to address the requirements detailed in WCPL's statutory approvals for air quality and greenhouse gas management and provides management actions to be implemented to minimise WCPL's impact on the local community and environment.

This AQGGMP forms part of WCPL's Environmental Management System (EMS) and provides a consistent process for notification and reporting in accordance with the Pollution Incident Reporting Management Plan (PIRMP).

1.4 Statutory Requirements

This AQGGMP has been prepared to address the relevant conditions within DA305-7-2003 and DA177-8-2004 and the requirements of WCPL's Environment Protection Licence (EPL) 529 (**Appendix A**). This AQGGMP also complies with the following legislation and standards:

- The Protection of the Environment Operations (Clean Air) Regulations 2010; and
- The Approved Methods for the Sampling and Analysis of Air Pollutants in NSW Guideline (NSW EPA, 2005) ('Approved Methods').

1.4.1 Environmental Planning & Assessment Act 1979

WCPL received Development Consent (DA305-7-2003) in accordance with the *Environmental Planning & Assessment Act 1979* (EP&A Act) from the NSW Department of Planning and Environment (DP&E), formerly NSW Department of Planning, on 4 February 2004. Conditions within DA305-7-2003 relevant to air quality and greenhouse gas are summarised in **Appendix A**.

DA177-8-2004 was granted on 16 December 2004 for the Wambo Rail Development. Conditions within DA177-8-2004 relevant to air quality and greenhouse gas are summarised in **Appendix A**.

1.4.2 Protection of the Environment Operations Act 1997

WCPL operates under Environmental Protection Licence 529 (EPL 529), issued by the NSW Office of Environment & Heritage (OEH) under the authority of the *Protection of the Environment Operations Act 1997* (POEO Act). EPL 529 is administered by the NSW Environment Protection Authority (EPA). Conditions within EPL529 relevant to air quality and greenhouse gas are summarised in **Appendix A**.

A Pollution Incident Response Management Plan (PIRMP) has been prepared by WCPL, as holder of EPL 529 in accordance with Part 5.7A of the POEO Act and Part 3A of the *Protection of the Environment Operations (General) Regulation 2009* (Regulation). For more information regarding WCPL's protocol for reporting environmental incidents refer to **Section 8.5.**

1.5 Stakeholder Consultation

The AQGGMP (Rev 1) was approved by the DP&E in 2014. Since this time the Upper Hunter Air Quality Monitoring Network (UHAQMN) has been established in partnership with the NSW Government and Upper Hunter coal and power industries (**Section 2.1**).

In July 2016 the DP&E requested that WCPL review its air quality monitoring program, following the establishment of the UHAQMN and discussions between the DP&E and EPA

regarding rationalisation of the existing dust monitoring network within the Hunter Valley airshed. DP&E requested that WCPL submit an updated monitoring program for approval by 31 October 2016. Details of the monitoring program review are discussed in **Section 5.0.**

In September 2016 the EPA issued WCPL with a draft licence variation for EPL529. The proposed changes relate to the optimisation of air quality monitors in the Hunter Valley following the establishment of the UHAQMN (**Section 5.1**).

DP&E provided comments on the AQGGMP on 5 July 2017. These comments were incorporated into this version.

A copy of this version was provided to EPA and a standard response was received 16 October 2017, advising that the EPA does not review such documents.

Correspondence in relation to the AQGGMP is attached as **Appendix B**.

2.0 Baseline Data

2.1 Upper Hunter Air Quality Monitoring Network (UHAQMN)

In October 2009, the NSW Government, in partnership with the Upper Hunter coal and power industries, announced the establishment of an air quality monitoring network in the Upper Hunter Valley i.e. the UHAQMN. The UHAQMN continuously measures dust particulates (i.e. particulate matter <10µm in diameter or PM10) in the air at 14 sites throughout the region (**Figure 3**). Three of these sites also monitor particulate matter <2.5µm in diameter or PM2.5.

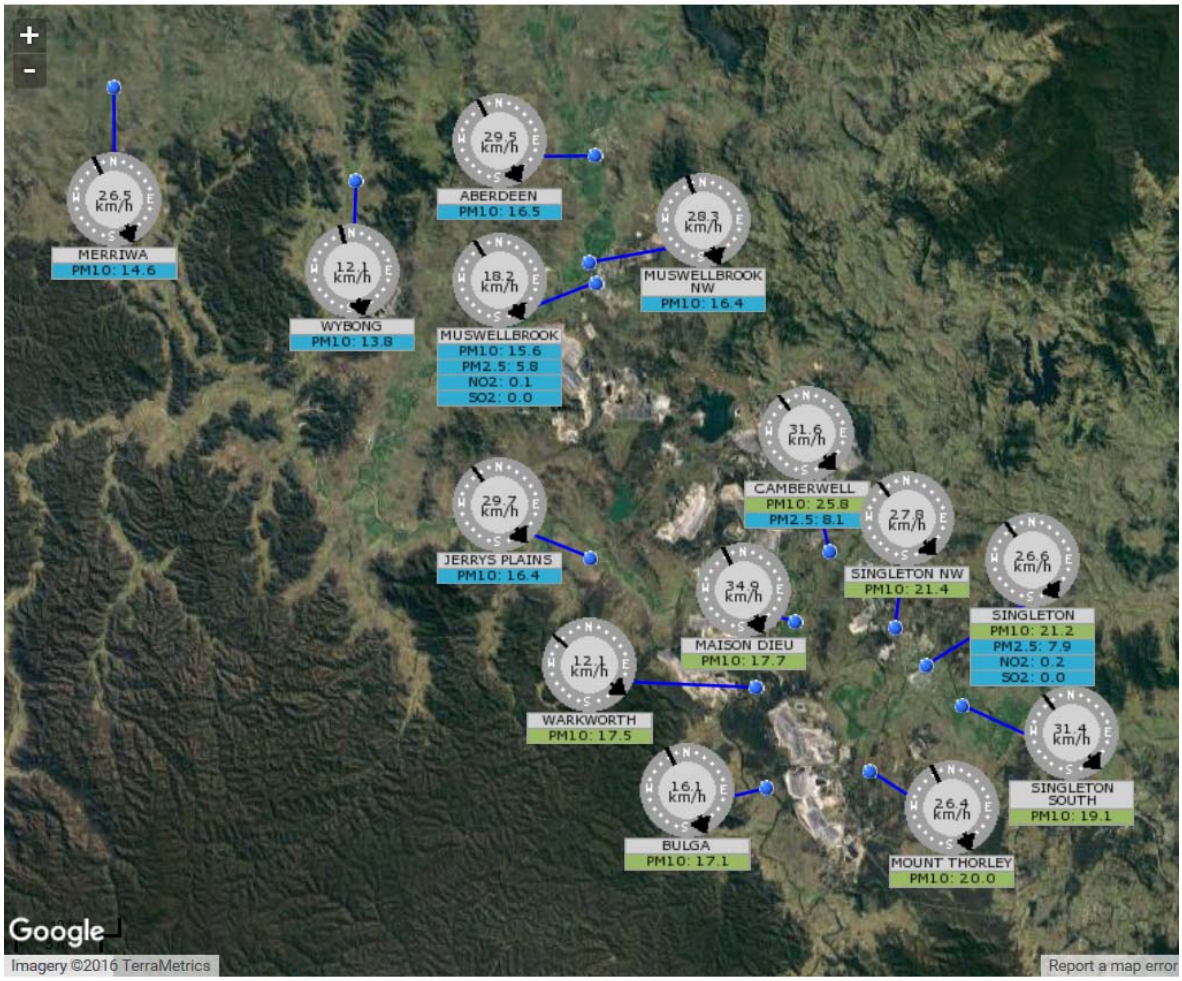


Figure 3: Upper Hunter Air Quality Monitoring Network

The 14 station network was completed in early 2012. Monitoring results are available on the OEH's website at http://www.environment.nsw.gov.au/AQMS/aqi.htm. Historical results are also available at http://www.environment.nsw.gov.au/AQMS/search.htm.

The closest PM10 monitoring sites to the Mine are Warkworth (East), Maison Dieu (North East) and Jerrys Plains (North West). The closest PM2.5 monitoring sites to the Mine are Camberwell (North East) and Singleton (East). Results for these monitoring sites are discussed in **Sections 2.2** and **2.3**.

2.2 Particulate Matter (as PM10)

Concentrations of PM10 have been measured at seven locations by Tapered Element Oscillating Microbalance (TEOM):

- Warkworth (UHAQMN);
- Maison Dieu (UHAQMN);
- Jerrys Plains (UHAQMN);
- AQ01 – Coralie (WCPL);
- AQ02 – Caban (WCPL);
- AQ03 – Thelander (WCPL - private residence); and
- AQ04 – Muller (WCPL - private residence).

TEOM monitoring locations are shown on **Figure 3** and **Figure 4**. Each TEOM records PM10 concentrations every 10 minutes to calculate a 24 hour average result.

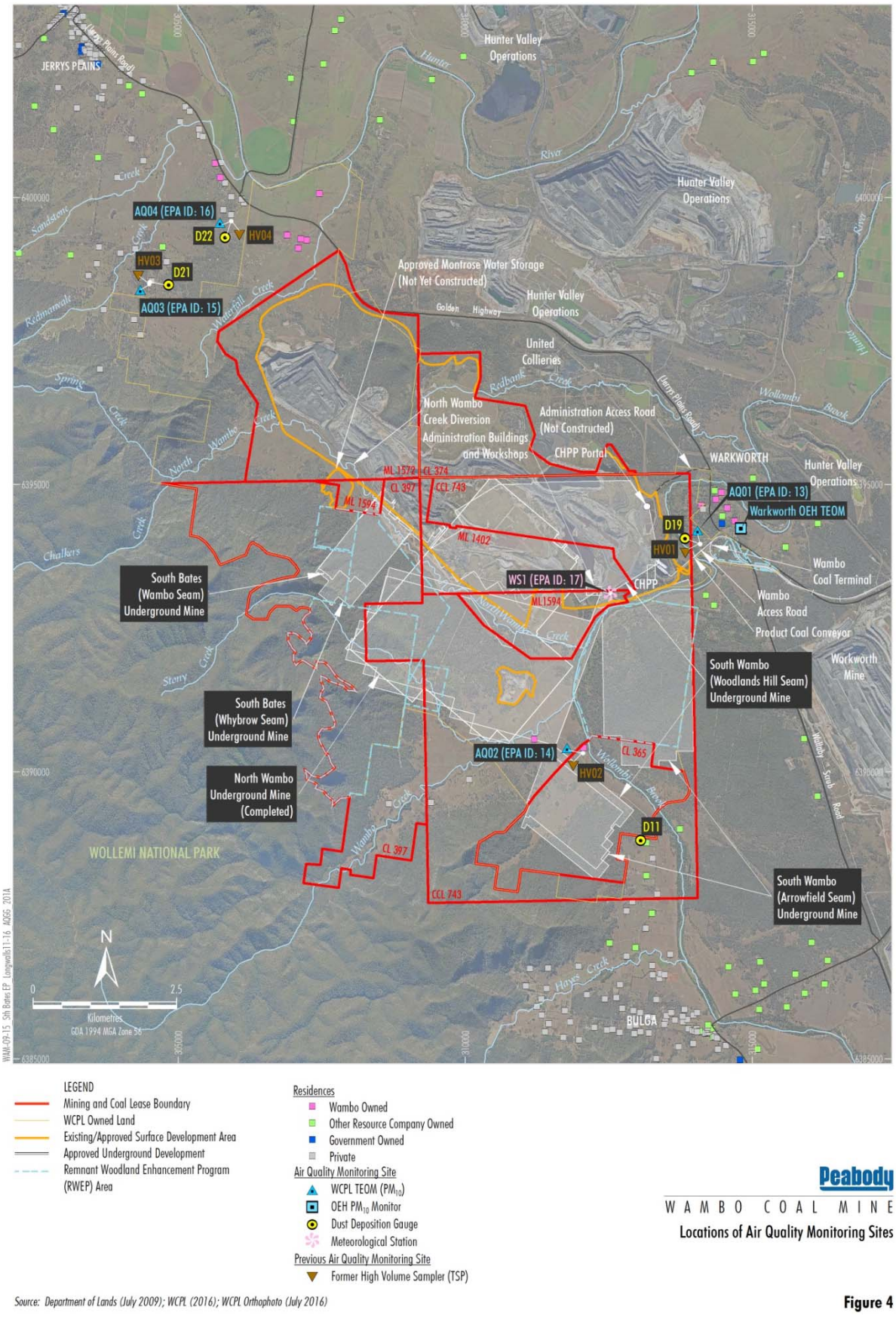


Figure 4: Air Quality and Meteorological Monitoring Locations

A summary of the PM10 concentration data for each site for the period 2011 – 2016 is provided in **Table 2**. The results show that measured annual average PM10 concentrations at all four WCPL TEOM locations are below the long term impact assessment criteria of 30µg/m^3 (**Section 3.1**).

Table 2: Summary of Measured PM10 Concentrations (2011-2016)[1]

Year	Jerrys Plains (OEH)	Maison Dieu (OEH)	Warkworth (OEH)	AQ01	AQ02	AQ03	AQ04	Criterion
Maximum 24 hour average in µg/m^3								
2011[2]	17	78	26	49	83	43	43	50
2012	44	88	50	47	76	47	45	
2013	63	84	65	65	97	71	65	
2014	64	64	68	55	70	51	56	
2015	70	77	68	52	55	43	71	
2016	43	48	42	49	49	39	44	
Number of days above 24 hour average criteria								
2011[2]	0	8	0	0	2	0	0	-
2012	0	20	0	0	7	0	0	
2013	6	28	8	4	20	1	3	
2014	6	6	3	2	2	1	1	
2015	1	5	3	1	3	0	2	
2016	0	0	0	0	0	0	0	
Annual average in µg/m^3								
2011[2]	13	22	20	17	17	15	15	30
2012	11	26	21	21	21	17	18	
2013	19	26	21	19	23	17	17	
2014	18	23	21	18	19	15	18	
2015	15	20	18	16	16	13	17	
2016	17	20	19	16	18	14	16	

Notes:

1. Source: United Wambo Open Cut Coal Mine Project Air Quality Impact Assessment (Umwelt, 2016)
2. Statistic based on an incomplete year of data

Figure 5 shows the measured 24 hour average PM10 concentrations from each TEOM monitoring site for data collected between 2011 and 2015. The EPA's PM10 24 hour (short term) air quality assessment criterion (50µg/m^3) has also been shown on the graphs.

Figure 5 and **Table 2** illustrate that all sites recorded at least one day above the 50µg/m^3 criterion in the past five years. There is a seasonal variation in the air quality conditions, with most exceedances occurring in spring. Analysis of these exceedances has been undertaken as part of Wambo's 2016 review of the air quality monitoring program (**Section 5.1**).

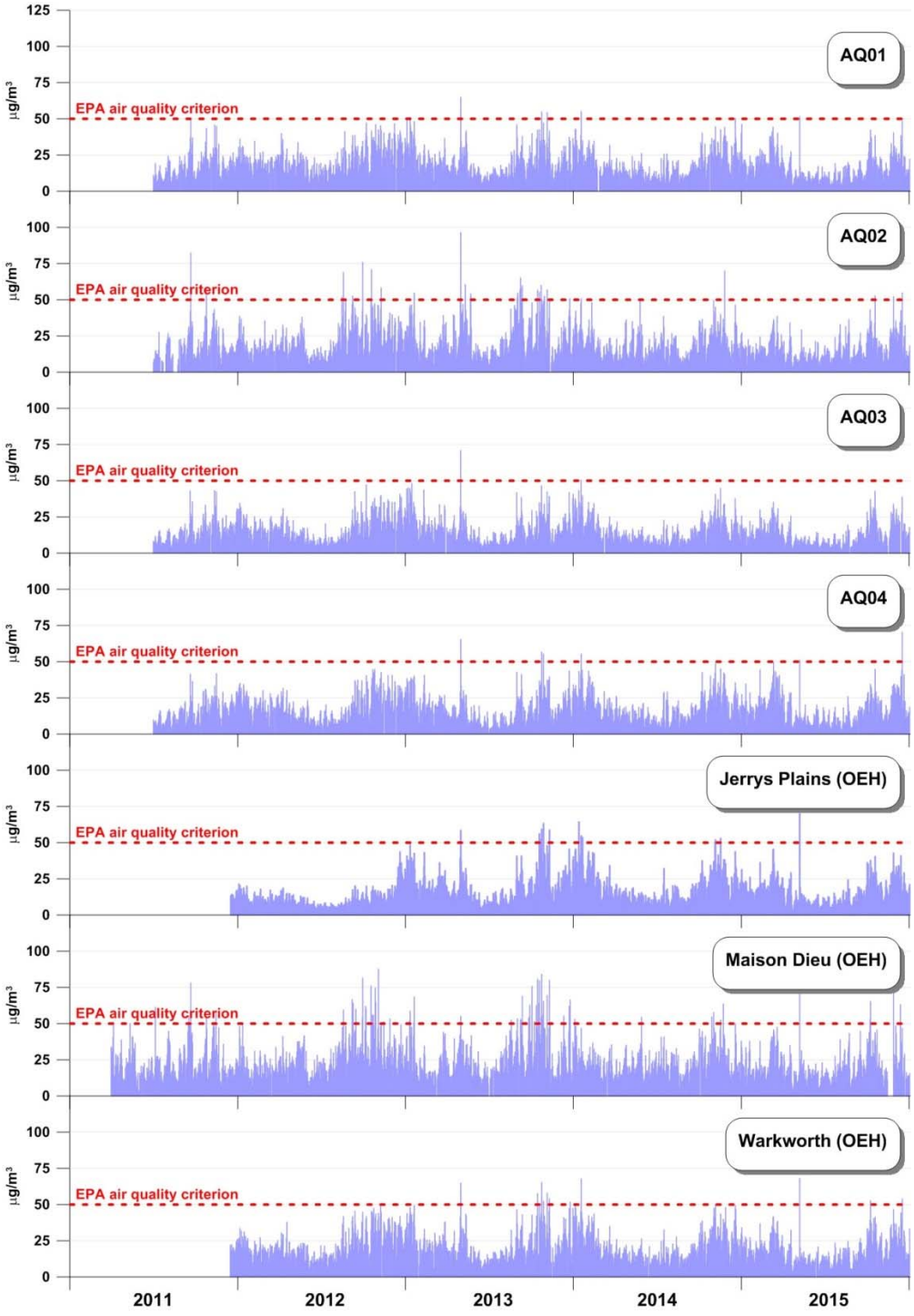


Figure 5: Measured 24 hour Average PM10 Concentrations (2011-2015)

2.3 Particulate Matter (as PM2.5)

The closest air quality monitoring stations which record concentrations of PM2.5 with publically available data are located at Singleton and Camberwell. These stations are operated by OEH and use Beta Attenuation Monitors (BAM) for the measurement of PM2.5. Results for these monitoring sites (and Newcastle, for comparison) for the period 2011-2016 are summarised in **Table 3**.

Table 3: UHAQMN Annual Average PM2.5 Concentration (2011-2016)[1]

Year	Camberwell (OEH)	Singleton (OEH)	Newcastle (OEH)	Advisory Reporting Goal
Maximum 24 hour average in µg/m^3				
2011	23[2]	22	-	25
2012	20	20	-	
2013	30	23	-	
2014	32	29	21	
2015	24	25	28	
2016	21	28	66	
Number of days above 24 hour average criteria				
2011	0[2]	0	-	-
2012	0	0	-	
2013	1	0	-	
2014	1	1	0	
2015	0	0	1	
2016	0	2	1	
Annual average in µg/m^3				
2011	8.5[2]	7.6	-	8
2012	7.5	8.0	-	
2013	8.2	7.9	-	
2014	7.8	7.8	8.1	
2015	7.2	7.6	7.8	
2016	7.5	7.9	7.8	

Notes:

1. Source: United Wambo Open Cut Coal Mine Project Air Quality Impact Assessment (Umwelt, 2016)
2. Partial dataset. Monitoring commenced at this location in late 2011.

The Upper Hunter Fine Particle Characterisation Study (CSIRO Marine & Atmospheric Research, 2013) investigated the factors which contributed to elevated PM2.5 concentrations in the Hunter Valley. This study identified a clear seasonal trend with higher PM2.5 concentrations occurring in the cooler months, and predominantly due to wood smoke. Specifically, in Singleton, wood smoke accounted for an average of approximately 14% of the total PM, peaking at around 38% in winter.

2.4 Total Suspended Particulate Matter (as TSP)

Concentrations of TSP have been measured at four locations by High Volume Samplers (HVAS) that were co-located with the TEOMs (**Section 2.2**):

- HV01 – Coralie (WCPL);
- HV02 – Caban (WCPL);
- HV03 – Thelander (WCPL - private residence); and
- HV04 – Muller (WCPL - private residence).

A summary of the TSP concentration data for each site for the period 2011 – 2016 is provided in **Table 4**. The results show that measured annual average TSP concentrations at all four WCPL HVAS locations was well below the long term impact assessment criteria of 90µg/m^3 (**Section 3.1**).

Table 4: Summary of Measured TSP Concentrations, Annual Average in µg/m^3 (2011-2016)[1]

Year	HV01	HV02	HV03	HV04	Criterion
2011	56.7	48.8	49.0	41.0	90
2012	64.8	61.4	38.9	58.6	
2013	61.5	61.5	40.9	48.8	
2014	66.6	68.1	48.3	62.3	
2015	54.8	51.5	40.6	60.6	
2016	47.8	47.7	39.5	56.6	

A study on co-located TSP and PM10 monitors conducted in the Hunter Valley by the NSW Minerals Council (2010) indicated that dust generated from predominately coal mining sources has long-term average PM10 concentrations that are 40% of the corresponding TSP concentration (or equivalently, TSP concentrations are approximately 2.5 times PM10 concentrations). This ratio was found to be reasonably accurate for long-term averages (e.g. annual averages).

The long-term average ratio of PM10 to TSP over the four co-located monitoring sites at the Mine over a six year period was 33% (or equivalently, TSP concentrations are approximately 3 times PM10 concentrations).

2.5 Dust Deposition

A summary of the dust deposition data for four dust deposition gauges (DDGs) for the period 2011 – 2016 is provided in **Table 5**.

Table 5: Dust Deposition Annual Averages (g/m^2/month) (2011-2016)

DDG	2011	2012	2013	2014	2015	2016
D11	2.0	2.2	2.2	2.5	2.2	2.3
D19	2.5	2.9	3.1	2.9	3.1	2.5
D21	1.2	1.4	1.9	1.9	2.0	1.7
D22	1.2	1.4	2.0	2.2	2.0	2.2

Note: Throughout the period of sampling it was noted some of the dust gauges contained various sources of foreign material including bird droppings, insects, sticks and other organic matter when analysed. Contamination was assessed based on field observations, laboratory observations, and historical data and wind patterns. All monthly dust results deemed to be contaminated were excluded from the annual average.

2.6 Meteorological Conditions

WCPL owns and operates a meteorological station (WS1) which is located within the project boundary approximately 350 m east of the WCPL administration building (**Figure 4**).

Temperature varies throughout the year, with cooler conditions in winter and warmer conditions in summer. Annual rainfall (2011-2016) has ranged from 430mm in 2012 to 787mm in 2011 (**Table 6**).

Table 6: Annual Rainfall (mm) (2011-2016)

2011	2012	2013	2014	2015	2016
787	430	635	559	738	721

Figure 6 shows the annual wind patterns for 2011 – 2015 for the Wambo meteorological monitoring station. It can be seen from these wind-roses that the most common winds in the area are from the south-southeast, southeast and west-northwest. This pattern of winds is common for many parts of the Hunter Valley and reflects the northwest-southeast alignment of the valley.

It is also clear from **Figure 6** that wind patterns were similar in all of the past five years. This suggests that wind patterns do not vary significantly from year to year.

2.7 Greenhouse Gas Emissions

Greenhouse gas emissions from WCPL's mining activities are estimated and reported on an annual basis in accordance with National Greenhouse and Energy Reporting (NGER) requirements. These estimates are also included in WCPL's Annual Review (**Section 8.2**). A summary of the estimates for the period 2009/2010-2014/2015 is included in **Table 7.**

Table 7: Greenhouse Gas Energy and Emissions Estimates (2009/2010-2014/2015)

Parameter	2009/2010	2010/2011	2011/2012	2012/2013	2013/2014	2014/2015
Scope 1 Emissions (tonnes CO_2-e)	814,520	970,781	975,989	769,254	795,032	915,520
Scope 2 Emissions (tonnes CO_2-e)	30,300	36,356	77,752	77,411	79,869	78,576
Energy Consumed Total (Gigajoules, GJ)	1,066,519	1,620,613	2,142,916	1,881,237	2,081,909	1,724,379
Energy Produced (Gigajoules, GJ)	133,085,133	153,369,531	149,925,148	124,431,258	132,267,726	124,801,226

Figure 6: Annual Wind-Roses (2011-2015)

3.0 Air Quality Compliance Requirements

Air quality compliance requirements are detailed in WCPL's DA's and EPL. Requirements relate to air quality assessment criteria, the emission of odour and greenhouse gas from the Mine, cumulative impacts and the implementation of Pollution Reduction Programs in accordance with EPL 529.

3.1 Air Quality Assessment Criteria

WCPL will ensure that all reasonable and feasible avoidance and mitigation measures are employed so that particulate matter emissions generated by the Mine do not exceed the criteria listed in **Table 8** at any residence on privately owned land, or on more than 25 percent of any privately owned land.

Table 8: Air Quality Impact Assessment Criteria

Pollutant	Averaging Period	[d] Criterion	[e] Purpose
Total Suspended Particulate (TSP) Matter	Annual	[a] 90 µg/m^3	Compliance and Acquisition
Particulate Matter <10µm (PM10)	Annual	[a] 30 µg/m^3	Compliance and Acquisition
	24 hour	[a] 50 µg/m^3	Compliance
		[a] 150 µg/m^3	Acquisition
		[b] 50 µg/m^3	Acquisition
[c] Deposited Dust	Annual	[b] 2g/m^2/month (maximum increase)	Compliance and Acquisition
		[a] 4g/m^2/month (maximum total)	Compliance and Acquisition

Notes:

a. Total impact (i.e. incremental increase in concentrations due to the development plus background concentrations due to all other sources).
b. Incremental impact (i.e. incremental increase in concentrations due to the development on its own).
c. Deposited dust is to be assessed as insoluble solids as defined by Standards Australia, AS/NZS 3580.10.1:2003: Methods for Sampling and Analysis of Ambient Air - Determination of Particulate Matter - Deposited Matter - Gravimetric Method.
d. Excludes extraordinary events such as bushfires, prescribed burning, dust storms, sea fog, fire incidents or any other activity agreed by the Secretary.
e. Upon written request for acquisition from a landowner listed in Schedule 4, Condition 1 of DA305-7-2003 (refer **Appendix A**), WCPL shall acquire the land in accordance with the procedures in Schedule 5, Conditions 9 to 11 of DA305-7-2003.

3.2 Mine Owned Land

WCPL will ensure that particulate matter emissions generated by the Mine do not exceed the criteria in **Table 8** at any occupied residence on any mine-owned land (including land owned by adjacent mines) unless:

- The tenants and landowner have been notified of health risks in accordance with the notification requirements under Schedule 5 of DA305-7-2003 and outlined in the WA-ENV-PRO-508.1 Landholder Notification Procedure (**Appendix D**);
- The tenant on land owned by WCPL can terminate their tenancy agreement without penalty, subject to giving reasonable notice, and WCPL uses its best endeavours to provide assistance with relocation and sourcing of alternative accommodation;
- Air mitigation measures (such as air filters, a first flush roof water drainage system and/or air conditioning) are installed at the residence, if requested by the tenant and landowner (where owned by another mine other than WCPL);
- Particulate matter air quality monitoring is undertaken to inform the tenant and landowner of potential health risks; and

- Monitoring data is presented to the tenant in an appropriate format, for a medical practitioner to assist the tenant in making an informed decision on the health risks associated with occupying the property, to the satisfaction of the Secretary of DP&E.

3.3 Cumulative Impacts

WCPL is required to co-ordinate air quality management at the Wambo Mining Complex with the air quality management at nearby mines (HVO South, HVO North and Mount Thorley Warkworth mines) and develop a protocol in consultation with these mines to minimise the cumulative air quality impacts of these mines and the Wambo Mining Complex (**Sections 4.4** and **5.2.8**).

3.4 Odour

WCPL will ensure that no offensive odours, as defined under the POEO Act, are emitted from the Wambo Mining Complex. This is achieved through the implementation of WCPL's Spontaneous Combustion Management Plans (prepared under the *Work Health and Safety (Mines and Petroleum Sites) Regulation 2014*) and Waste Management Plan (an internal management plan that has not been reviewed by DP&E).

3.5 Greenhouse Gas Emissions

WCPL will implement all reasonable and feasible measures to minimise the release of greenhouse gas emissions from the Wambo Mining Complex (**Section 4.2**).

WCPL will also:

- Monitor the greenhouse gas emissions generated by the development (**Section 5.3**);
- Investigate ways to reduce greenhouse gas emissions generated by the development (**Section 4.2**); and
- Report on greenhouse gas monitoring and abatement measures in the Annual Review (**Section 8.2**).

3.6 Pollution Reduction Programs

In 2010, the NSW EPA commissioned a detailed review of particulate matter emissions from coal mining operations in the Greater Metropolitan Region (GMR) of NSW. The study was completed in 2011 and is known as the NSW Coal Mining Benchmarking Study: International Best Practice Measures to Prevent and/or minimise Emissions of Particulate Matter from Coal Mining (hereafter 'the Best Practice report') (Katestone, 2011).

Following on from key recommendations in the study, the NSW EPA introduced Pollution Reduction Programs (PRPs) which required coal mines in NSW to provide a report examining in detail the potential measures which could be employed to further reduce particulate emissions from the mine. A part of WCPL's PRP was to complete a site audit to identify the current dust control measures and best practice measures implemented on-site. A summary of these dust management measures are outlined in **Section 4.1.4.**

In addition to the site audit, WCPL was also required to submit a number of reports to the EPA to address the PRP conditions in EPL 529. These reports included:

- Coal Mine Pollution Reduction Program Condition U3 Assessment (Pacific Environment Ltd, 2014a);
- Wambo Coal Mine PRP U3: Monitoring Results – Wheel Generated Dust (Pacific Environment Ltd, 2014b);

- Supporting Study for Wambo Mines Pollution Reduction Program U2: Coal Mine Wind Erosion of Exposed land Assessment (Pacific Environment Ltd, 2015); and
- Wambo Coal Mine: Monitoring Results – Wheel Generated Dust (Pacific Environment Ltd, 2016).

4.0 Mitigation and Management Measures

4.1 Air Quality Mitigation and Management Measures

A range of air quality mitigation and management measures will be implemented by WCPL to minimise off-site odour, fume and dust emissions from the Mine. These measures are based on current procedures developed at the Mine and industry best practice measures.

4.1.1 Predictive Meteorological Forecasting

WCPL has developed and implemented a predictive meteorological forecasting and real-time air dispersion modelling module for the Mine. This module, together with WCPL's real-time air quality monitoring system, guides site operational personnel and planners in the day to day planning of mining operations and implementation of both proactive and reactive air quality mitigation measures.

The Environment and Community Manager (E&C Manager), Production Superintendent Open Cut and Drill and Blast Superintendent receive detailed 7 day meteorological forecasts from Weatherzone. The meteorological forecasts are reviewed for upcoming predicted temperatures and wind speeds that may trigger operational responses, in particular:

- predicted temperatures above 30°C or 35°C; and/or
- predicted wind speeds above 6 m/s (~22 km/h) or 8 m/s (~29 km/h).

In addition to the predictive forecasts, actual measured temperature and wind speeds from the WCPL meteorological station (WS1) are monitored to identify if operational responses may be required. SMS alarm notifications messages are sent to the E&C Manager, Production Superintendent Open Cut and Drill and Blast Superintendent when the wind or temperature triggers are exceeded.

The Production Superintendent Open Cut is responsible for communicating meteorological forecasts to relevant operation unit managers in Pre-Start-Information (PSI) sessions.

The air dispersion modelling module is linked to the WCPL meteorological station (WS1) and provides operational personnel with a visual tool to examine the direction and estimated concentration of dust emissions from the Mine that can be used to guide operational responses and interpret monitoring data. The air dispersion modelling module is a web-based application that is available to all WCPL operational personnel.

4.1.2 Proactive Air Quality Management Protocol

WCPL has developed a Proactive Air Quality Management Protocol to facilitate the day-to-day management of dust emissions from WCPL's activities. Dust mitigation measures will be actively carried out as a standard operating procedure utilising techniques outlined in **Section 4.1.4**. The implementation of the Proactive Air Quality Management Protocol will be the responsibility of the Environment and Community Manager (E&C Manager) and relevant mining operations managers and supervisors as required.

The Proactive Air Quality Management Protocol comprises four stages:

1. Source Identification;
2. Management Strategy;

3. Implementation; and
4. Review.

The Proactive Air Quality Management Protocol is summarised in **Table 9**.

Table 9: Proactive Air Quality Management Protocol

Stage	Description
Source Identification	This stage involves the identification of mining, development or construction activities with the potential for excessive dust generation. Consideration is given to the following: • Methods and types of equipment that will be used. • Timing of the activity. • Location of the activity (including surrounding topography and land-use). • The result of recent monitoring data. • Prevailing climatic conditions. The outcomes of the above process will determine whether there is the potential for exceedances of criteria and therefore if it is necessary to implement the management strategy phase.
Management Strategy	This stage involves the determination of either proactive or reactive dust control management measures that may be utilised to minimise air quality emissions, based on the results of the identification stage. Standard proactive management measures that will be implemented at the Mine are outlined in **Section 4.1.4.**
Implementation	This stage involves implementation of the dust control and management measures chosen in the management strategy process. The relevant mining operations manager will be responsible for the timely implementation of the selected measures.
Review	The final stage is the review of dust control and management measures. These will be assessed by comparing the results of the air quality monitoring program (**Section 5.0**) with the air quality criteria (**Section 3.1**). Where necessary, the management strategy phase of the protocol will be reviewed.

4.1.3 Reactive Air Quality Management Protocol

WCPL has developed a Reactive Air Quality Management Protocol that will be implemented should any exceedances of the air quality assessment criteria be experienced and/or if unexpected adverse or extraordinary meteorological events are experienced at the Mine.

The Reactive Air Quality Management Protocol comprises four stages:

1. Determination of an Air Quality Exceedance;
2. Management of an Air Quality Exceedance;
3. Implementation of Air Quality Mitigation and Management Measures; and
4. Review of Air Quality Mitigation and Management Measures Employed.

The Reactive Air Quality Management Protocol is summarised in **Table 10**.

Table 10: Reactive Air Quality Management Protocol

Stage	Description
Determination of an Air Quality Exceedance	In the event of an exceedance of the air quality criteria presented in **Section 3.1** an assessment will be conducted to determine the validity of the exceedance by: • Investigating if any potential contamination of sample may have occurred and if the monitoring results are validated. • Investigating the timing of the exceedance(s). • Investigating the general location of the exceedance(s).

Stage	Description
Determination of an Air Quality Exceedance (Cont.)	• Investigating the potential contributing factors (e.g. can the exceedance be attributed directly to the Mine). This will include consideration of: o The methods and type of equipment being used by the Mine at the time of the exceedance(s) and proximity to the locations at which the exceedance(s) was recorded. o The location of non-WCPL mining activities or agricultural activities and proximity to the locations at which the exceedance(s) was recorded. o Comparing the upwind, downwind and regional monitoring data for the same period. • Investigating the meteorological data for the relevant period to determine dominant wind direction, average wind speeds, percentage calm conditions (< 0.5 m/s) and significant periods of moderate winds (> 5.4 m/s). • In the case of adverse weather conditions and/or extraordinary events, the following reactive responses are implemented where appropriate; o Review and assess PM10 real-time dust levels from monitoring network o Review and assess regional Upper Hunter Air Quality Monitoring network o Review and assess upwind and downwind monitor results to determine possible contribution and or emission source in relation to mining operations o Conduct a visual inspection of operations and assess visually any potential offsite impact o Discontinue or modify operational activities in areas where increased potential emissions are possible due to adverse and/or extraordinary meteorological conditions o Ensure availability of water carts and prioritise and direct to areas of immediate concern o Automated wind triggers will be activated via the predictive weather forecasting module when winds reach 8m/s requiring visual inspection by operational personnel. If identification of unacceptable visible dust is detected, operations are to be modified accordingly o Immediate reactive mitigating measures may also include reviewing the elevation and wind exposure of mining and dumping locations, and where feasible, relocate operations to lower and/or sheltered locations o Review predictive meteorological forecasting module for verification and assist in planning proactive and reactive responses o If predictive forecasting module confirms continuing adverse meteorological conditions, scheduling of amended working hours or working locations during these unfavourable conditions is to be investigated The real time air quality management system will provide a data repository for all data required for the compliance evaluation, including monitoring data, meteorological data and activity and operational response logs. Based on the above assessment, if the exceedance is determined to be due to WCPL's operations, the Environmental and Community Manager (or delegate) will determine appropriate management strategies in consultation with relevant mining operations personnel. These will be in addition to those implemented as part of normal operations (including modifications to operation methodologies, if necessary) to reduce air quality emissions. Any validated exceedances of criteria attributed to WCPL mining activities will be reported to the relevant landowner(s) (**Section 4.3.1**), DP&E compliance officers, the Wambo Community Consultative Committee (CCC) and the EPA as outlined in **Section 8.5.**
Management of an Air Quality Exceedance	The management strategy determining the air quality mitigation and management measures that will be adopted will be based on the results of the air quality monitoring assessment stage of the protocol. Air quality mitigation and management measures are presented in **Section 4.1.4.** This stage will be conducted in consultation with the relevant mining operation managers. Air quality mitigation and management measures will be selected with consideration of: • The location of the exceedance of the criteria and the proximity to the Mine's activities. • Possible reasons for the exceedance of the criteria (including consideration of meteorological factors). • The likely effectiveness and feasibility of the mitigation/management measures.
Implementation of Air Quality Mitigation and Management Measures	This stage of the protocol involves the implementation of the air quality mitigation and management measures selected in the management strategy process. The relevant mining operations manager will be responsible for the timely implementation of the selected measures.

Stage	Description
Review of Air Quality Mitigation and Management Measures Employed	The effectiveness of the adopted measures will be assessed against the relevant criteria (**Section 3.1**). The management strategy phase of the protocol will be revisited as required. In addition, the Environmental and Community Manager (or delegate) will note any trends in the monitoring data that may emerge in regards to particular operating scenarios or meteorological conditions. The outcomes of the Reactive Air Quality Management Protocol will be reported in the Annual Review (**Section 8.2**).

4.1.3.1 Procedures for Dealing with Landowners

Schedule 5 of DA305-7-2003 details additional procedures to be implemented for air quality management, including:

- Notifying landowners of an exceedance of the air quality impact assessment criteria (as outlined in the WA-ENV-PRO-508.1 Landholder Notification Procedure in Appendix D);
- A landowners right to an Independent Review of the air pollution impacts on his/her dwelling and the requirements of that Independent Review (triggered by a formal request by a landowner); and
- Details of the Land Acquisition process (triggered by a formal request by a landowner, noting there is only one non-resource company owned dwelling with acquisition upon request rights).

The specific conditions of Schedule 5 are provided in **Appendix A**.

4.1.4 Dust Management Measures

A summary of the dust management measures employed at the Mine are outlined in **Table 11.**

Table 11: Dust Management Practices Employed at the Mine

Action	Timing	Proactive / Reactive Response	Performance Indicator	Responsibility for Implementation
Induction training	Ongoing as required	Proactive	WCPL employees and contractors receive training	E&C Manager
Continually review road management practices (e.g. speed limits and dust suppression) throughout production period to manage emissions	Ongoing	Proactive / Reactive	Road management is effective in reducing dust impacts	Production Superintendent Open Cut/ E&C Manager
Review water cart management – Maintenance Schedule – ensure maintenance works are scheduled in periods of least demand	Ongoing	Proactive	Water cart management is effective in reducing dust impacts	Production Superintendent Open Cut
Modification of operations (including blasting) in unfavourable weather conditions in accordance with **Section 6.1**	Daily	Proactive	No exceedances of dust criteria and no complaints from nearby residents	Production Superintendent Open Cut
Reduce speed limits from 60 km/h to 40 km/h in accordance with prevailing conditions (temperatures above 35°C and/or wind speeds above 8 m/s and/or sustained visible dust on unsealed roads observed above tray height)	Daily	Proactive / Reactive	No exceedances of dust criteria and no complaints from nearby residents	Production Superintendent Open Cut and All Operations Personnel
Rehabilitation of disturbed land within the earliest possible timeframe Temporary stabilisation or revegetation of areas not yet available for final rehabilitation	Each new phase of operation and as reported in the Mining Operations Plan	Proactive	Disturbed land revegetated or stabilised where appropriate	E&C Manager
Minimising disturbed areas through mine planning and Life of Mine (LOM) planning processes	Each new phase of operation	Proactive	Disturbed land revegetated where appropriate	Open Cut Technical Services Superintendent
Revegetation of topsoil stockpiles as new stockpiles are created	Each new phase of operation	Proactive	Disturbed land revegetated where appropriate	E&C Manager
Wet dust suppression and dust skirts on drills	Daily	Proactive	No exceedances of dust criteria and no complaints from nearby residents	Drill and Blast Superintendent
Blast hole stemming	Daily	Proactive	No exceedances of dust criteria and no complaints from nearby residents	Drill and Blast Superintendent

Action	Timing	Proactive / Reactive Response	Performance Indicator	Responsibility for Implementation
Haul road watering (increasing where temperatures are above 35°C and/or wind speeds are above 8 m/s and/or sustained visible dust on unsealed roads is observed above tray height)	Daily	Proactive / Reactive	No exceedances of dust criteria and no complaints from nearby residents	Production Superintendent Open Cut
Minimise and clearly define the number of active haul roads	Ongoing as required	Proactive	The mine plan is operating effectively in reducing dust impacts	Production Superintendent Open Cut
Use of additional water trucks as required around the CHPP, Administration and auxiliary access roads where sustained visible dust on unsealed roads is observed	As required	Proactive / Reactive	No exceedances of dust criteria and no complaints from nearby residents	CHPP Manager
Operation of sufficient truck fill points	Daily	Proactive	Water carts are operating effectively in reducing dust impacts	Production Superintendent Open Cut
Water sprays on ROM dump hopper and stockpiles	Daily	Proactive	No exceedances of dust criteria and no complaints from nearby residents	CHPP Manager
Cleaning up coal spillage at CHPP	Daily	Proactive / Reactive	No exceedances of dust criteria and no complaints from nearby residents	CHPP Manager
Minimise dust emissions from coal transportation by rail through: - inherent moisture content (~10%) - volumetric loading from an overhead bin with a telescopic chute - partial enclosure of the loading point - use of a profiler to manage overloading	Ongoing	Proactive	No exceedances of dust criteria and no complaints from nearby residents	CHPP Manager
Constructing minor roads used regularly for access so as to minimise dust generation (using well-compacted select material) and watering as required	As construction is required	Proactive	Water/dust suppression techniques applied	Production Superintendent Open Cut

Action	Timing	Proactive / Reactive Response	Performance Indicator	Responsibility for Implementation
Review dust impacts of construction activities during the Surface Disturbance Process using the Proactive Air Quality Management Protocol (**Table 9**) and implement the following measures: - minimise areas of disturbance - minimise vehicle access to soil stockpiles (if relevant) - minimise drop heights (if relevant) - construct any access roads so as to minimise dust generation (using well-compacted select material) - use dust suppression where required to minimise visible off-site air pollution or meet the dust criteria	As construction is required	Proactive	No exceedances of dust criteria and no complaints from nearby residents	Senior Environmental Advisor / Environmental Advisor
Two remote field cameras installed for real-time monitoring footage located in the Montrose and South Bates Open cut pits Where visible dust on unsealed roads is observed on the field cameras above tray height and is sustained, operations will be modified by the Open Cut Manager /Open Cut Operations Manager to reduce dust (e.g. reduced speed and/or additional dust suppression).	As required	Proactive / Reactive	Operating conditions	E&C Manager Open Cut Manager /Open Cut Operations Manager
Review and summarise monitoring data on a monthly basis and during periods of extraordinary meteorological events	Monthly	Proactive / Reactive	Summary in Annual Review / As needed	Senior Environmental Advisor / Environmental Advisor
Review and assess PM10 monitoring network and UHAQMN during periods of extraordinary meteorological events and/or as a response to trigger alarms being activated	As required	Reactive	As required	Senior Environmental Advisor / Environmental Advisor

Action	Timing	Proactive / Reactive Response	Performance Indicator	Responsibility for Implementation
Conduct off-site visual inspections to verify any potential offsite amenity impacts	As required	Reactive	No visible impact on offsite receivers	Senior Environmental Advisor / Environmental Advisor
Discontinue or modify operational activities in areas where increased potential off-site emissions are possible due to adverse and/or extraordinary meteorological conditions	As required	Reactive	No visible emissions from area are recorded	Open Cut Manager /Open Cut Operations Manager
Automated wind triggers activated via predictive weather forecasting module when winds reach 8m/s requiring visual inspection by operational personnel	As required	Proactive / Reactive	No visible impact from operations – management of operations in controlling potential emission is effective	Open Cut Manager /Open Cut Operations Manager
Review predictive meteorological forecasting module on a daily basis for verification of meteorological conditions and assist in planning both proactive and reactive management strategies	Daily	Proactive / Reactive	Predictive model confirms meteorological conditions – management actions implemented where required	Drill and Blast Superintendent
Pre-Start-Information (PSI) sessions to highlight current and predicted meteorological conditions and possible effects on operations	Twice Daily	Proactive / Reactive	Predictive model confirms meteorological conditions – management actions implemented where required	Production Superintendent Open Cut
Develop Wambo Coal Environmental Guide (Educational Handbook) for all site personnel and deliver training package	Annual	Proactive	Roll out of Environmental Educational Handbook and Training Package	E&C Manager

4.2 Greenhouse Gas Mitigation and Management Measures

The main sources of greenhouse gases generated by the Mine are:

- Methane liberated during mining of coal;
- Fugitive emissions from coal once mined;
- Fuel combustion associated with the use of plant and equipment;
- Indirect emissions associated with electricity use; and
- Indirect emissions associated with the transport of product coal.

Greenhouse gas management for the Mine will focus on emissions management and reductions associated with these sources. All reasonable and feasible measures to minimise the release of greenhouse gas emissions from the site will be implemented. A summary of the measures used to manage and minimise greenhouse gas emissions at the Mine are listed in **Table 12**.

It is noted that WCPL does not currently utilise pre or post gas drainage methods, which would liberate high concentrations of methane from the underground workings, as such, flaring is not currently a potential way to reduce greenhouse gas emissions from the mine.

Section 5.3 presents details of monitoring that will take place to measure greenhouse gas emissions.

Table 12: Greenhouse Gas Management Practices Employed at the Mine

Action	Timing	Performance Indicator	Responsibility for Implementation
Consider ways to reduce energy consumption during project planning phases and consider practicality of more energy efficient alternatives	As new phases of planning begin	Energy use is reduced	Peabody Energy Australia
Participation in the Federal Government's Energy Efficiency Opportunities (EEO) program which included a review of energy usage and identified areas for potential energy efficiency improvement	Current and ongoing	Identify areas for potential energy efficiency improvement	Peabody Energy Australia
Participation in NGERs reporting	Current and ongoing	Identify areas for potential energy efficiency improvement	Peabody Energy Australia
Regular scheduled maintenance of equipment and plant	Ongoing	Energy efficiency is maximised	Open Cut Maintenance Superintendent
Enterprise-wide strategy for managing methane emissions	Unknown	Implementation of strategy and reduction in greenhouse gas emissions and energy use	Peabody Energy Australia
Real-time gas (methane and carbon dioxide), temperature, pressure and volumetric flow rate monitoring at the ventilation shafts to allow accurate measurement of ventilation to allow further feasibility assessment of reuse options	Ongoing	Data collected to 90% completeness	Ventilation Officer

Action	Timing	Performance Indicator	Responsibility for Implementation
Completed longwall panels will be sealed, to reduce methane emissions from the goaf.	Ongoing – at completion of each panel	Completed longwall goafs sealed	Ventilation Officer
Whenever possible direct loading of coal haulage trucks will be undertaken in preference of stockpiling and reclaiming.	All hours of operation	Direct loading will be undertaken from the product coal bin	Production Superintendent Open Cut
Ensure maintenance, calibration and record keeping is undertaken on the main ventilation shaft and fans to allow calculation of greenhouse gas emissions.	Monthly	Report annually	Ventilation Officer
Maintain records of monthly electricity use and monthly ROM coal production to allow calculation of greenhouse gas emissions	Monthly	Report annually	Commercial Manager
Avoid idle running of conveyors	Daily	Energy efficiency is maximised	CHPP Manager/ Underground Mine Manager
Turn off unnecessary lighting around the mine site	Daily	Energy efficiency is maximised	All Personnel

4.3 Blast Fume Management

Monitoring requirements for blasting are outlined in WA-ENV-MNP-507, Wambo Coal Blast Management Plan (BMP). The BMP also includes a Pre-Blast Meteorological Assessment, to assess dust and fume risks associated with each blast, and a Blast Fume Management Strategy (WA-ENV-MNP-507.1), that details fume minimisation measures for all surface blasts.

4.4 Cumulative Impacts

To prevent cumulative blasting impacts with surrounding mines, WCPL includes the Drill & Blast Supervisors from Bulga Operations, Mount Thorley Operations, Warkworth Operations, and Hunter Valley Operations on all blast email notifications.

In the event of a blast event being rescheduled, further e-mail notification is made alerting neighbouring mining operations of the change.

5.0 Air Quality and Greenhouse Gas Monitoring Program

5.1 2016 Monitoring Program Review

In July 2016 the DP&E requested that WCPL review its air quality monitoring program and identify potentially redundant air quality monitoring, following the establishment of the UHAQMN and discussions between the DP&E and EPA regarding rationalisation of the existing dust monitoring network within the Hunter Valley airshed. EPA's optimisation proposal involves airshed monitoring upstream and downstream of mine sites. DP&E supports this proposal provided that the conditions of approval for individual mine sites continue to be met.

On 13 September 2016 WCPL received correspondence from the NSW EPA detailing their proposal for changes to the air quality monitoring requirements for coal mines in the Hunter Valley. The proposal included the following key features:

- Emission rather than receiver monitoring i.e. monitoring at the Mine's operational boundary not at receiver locations;
- Focus on continuous monitoring i.e. removal of monthly dust deposition and 6-daily total suspended solids monitoring; and
- Focus on predominant wind directions i.e. locating monitoring equipment in the north-west or south-west directions to match predominant winds.

A draft EPL variation was also issued for review. The revised EPL includes the following changes:

- Condition P1.1 - Removal of monitoring points 5 (dust deposition), 6 (TSP) and 8 (PM10) and addition of monitoring points 13, 14, 15 and 16 (PM10, to enable continuous monitoring of upwind and downwind PM10 concentrations);
- Condition M2.2 – Removal of monitoring points 5, 6 and 8 and addition of monitoring points 13, 14, 15 and 16;
- Condition M4 – Weather monitoring station is now licensed monitoring point 17 and includes standard parameters and sampling methods; and
- Condition M9.4 – Addition of a condition requiring monitoring data to be recorded in ten minute intervals.

WCPL responded to the draft EPL variation on 19 October 2016. A copy of all relevant correspondence is included in **Appendix B**.

In September 2016 WCPL engaged Jacobs to undertake a review of WCPL's current PM10 air quality monitoring network to ensure that the number and location of WCPL's PM10 monitors (**Figure 4**) are appropriate to allow for the determination of WCPL's contribution to off-site air quality (Jacobs, 2016). As part of the review monitoring data from 31 Dec 2011 - 31 Dec 2015 was analysed and each exceedance of the 24 hour PM10 criteria recorded during that period was investigated. The outcome of the analysis suggested that the existing PM10 monitors provide adequate coverage to allow for clear explanation of exceedances and no changes to the current PM10 monitoring locations would be required.

In response to comments from DP&E, dust deposition gauges have been included in the monitoring program for the purposes of the Development Consent requirements only. A protocol has been developed to determine TSP concentrations and exceedances of the TSP criteria.

WCPL's revised air quality monitoring program is summarised in **Section 5.2.**

5.2 Air Quality Monitoring Program

WCPL's Air Quality Monitoring Program includes continuous monitoring of PM10 concentrations at the Mine boundaries and onsite meteorological monitoring. Data from the UHAQMN will also be incorporated into the monitoring program to allow for the assessment of WCPL's compliance with the air quality impact assessment criteria (**Section 3.1**).

It is noted that, whilst the EPA has proposed to remove monitoring of dust deposition and Total Suspended Particulate (TSP) matter from EPL 529 as part of the latest EPL draft licence variation (refer **Section 5.1**) WCPL is still required to meet air quality assessment criteria for dust deposition and TSP in DA305-7-2003 and DA177-8-2004 (**Section 3.1**).

5.2.1 Meteorological Monitoring

WCPL maintains a continuous on-site meteorological monitoring station that complies with the requirements of the *Approved Methods for the Sampling and Analysis of Air Pollutants in New South Wales* (DEC, 2007). The station has been sited in accordance with sampling method AM-1 i.e. AS 2922-1987 Ambient Air – Guide for the Siting of Sampling Units. The location of the station is identified on **Figure 4.**

The meteorological station is routinely calibrated and maintained by appropriately accredited technicians. Meteorological monitoring will be undertaken in accordance with Condition M4 of EPL 529, as summarised in **Table 13**.

Table 13: Meteorological Monitoring

Parameter	Sampling Method[1]	Units of Measure	Averaging Period[2]	Frequency
Rainfall	AM-4	mm	1 hour	Continuous
Wind Speed at 10 metres	AM-2 & AM-4	m/s	15 minutes	Continuous
Wind Direction at 10 metres	AM-2 & AM-4	Degrees	15 minutes	Continuous
Temperature at 2 metres and 10 metres	AM-4	Celsius	15 minutes	Continuous
Sigma Theta (at 10 metres)	AM-2 & AM-4	Degrees	15 minutes	Continuous
Total Solar Radiation (at 10 metres)	AM-4	Watts/m^2	15 minutes	Continuous
Lapse Rate[3]	-	ºC /100m	-	-

Notes:

1. DEC, 2007. *Approved Methods for the Sampling and Analysis of Air Pollutants in NSW.*
2. For the purposes of assessing air quality consistent with the PM monitoring, meteorological data will be recorded in 10 minute intervals. However, 1 hourly averages will also be calculated as per Condition 10, Schedule 4 of DA305-7-2003.
3. Lapse rate (required to be calculated in accordance with Schedule 4, Condition 10 of DA305-7-2003) will be calculated from measurements made at 2m and 10m.

WCPL also maintains a mobile weather station to the north of the operation to provide localised weather readings for blast events. These readings will be used in addition to the weather readings taken from the meteorological station approved under the EPL 529. Meteorological data from both weather stations will be used during the Pre-Blast Meteorological Assessment to assess dust and fume risks associated with each blast.

5.2.2 PM10 Monitoring

Four real-time TEOMs monitor PM10 concentrations at WCPL. WCPL will also monitor PM10 concentrations at OEH's Warkworth UHAQMN location. Monitoring locations for PM10 are shown in **Table 14** and **Figure 4.**

Table 14: Air Quality and Meteorological Monitoring Sites

Monitoring Site	Parameter	Owner	Easting	Northing	Justification
AQ01 – Coralie (EPA ID: 13)	PM10	WCPL	314097	6393962	Located to the east of the Mine. Direction to WCPL's mining activities – between 255-300 degrees from true north i.e. downwind monitor when wind from north west, upwind monitor when wind is from the south east.
AQ02 – Caban (EPA ID: 14)	PM10	WCPL	312055	6390321	Located to the south east of the Mine. Direction to WCPL's mining activities – between 320-10 degrees from true north i.e. downwind monitor when wind from north west, upwind monitor when wind is from the south east.
AQ03 – Thelander (EPA ID: 15)	PM10	WCPL	304502	6398490	Located to the north west of the Mine. Direction to WCPL's mining activities – between 110-140 degrees from true north i.e. downwind monitor when wind from south east, upwind monitor when wind is from the north west.
AQ04 – Muller (EPA ID: 16)	PM10	WCPL	305928	6399587	Located to the north west of the Mine. Direction to WCPL's mining activities – between 130-180 degrees from true north i.e. downwind monitor when wind from south east, upwind monitor when wind is from the north west.
Warkworth	PM10	OEH	314810	6394230	Located to the east of the Mine in the village of Warkworth.
D11	DDG	WCPL	313066	6388799	Located to the south east of the Mine.
D19	DDG	WCPL	314096	6393963	Located to the east of the Mine.
D21	DDG	WCPL	304510	6398522	Located to the north west of the Mine.
D22	DDG	WCPL	305932	6399586	Located to the north west of the Mine.
WS1 (EPA ID: 17)	Weather	WCPL	312536	6393108	EPL Meteorological Station

The TEOM monitors are sited in accordance with AM-1 i.e. AS 2922-1987 Ambient Air – Guide for the Siting of Sampling Units.

WCPL's TEOMs will be operated in accordance with AS3580.9.8 – 2002, Method for Sampling and Analysis of Ambient Air – Determination of Suspended Particulate Matter – PM10 Continuous Direct Mass Method using a Tapered Element Oscillating Microbalance Analyser. Each TEOM measures PM10 concentrations every 10 minutes to calculate a 24 hour average result.

5.2.3 PM2.5 Monitoring

Schedule 4, Condition 5C (f) of DA305-7-2003 requires WCPL to include PM2.5 monitoring in the Mine's air quality monitoring program.

The regional UHAQMN includes a Beta Attenuation Monitor (BAM) monitoring real-time 24 hour average PM2.5 concentrations at Singleton. This station is the closest to the Mine and is located approximately 18 km to the east (**Figure 3**).

It is noted that PM2.5 concentrations do not vary as much as PM10 concentrations as they are smaller in size and therefore remain longer in the air and over space. This makes PM2.5 monitoring more regional and homogenous spatially. For this reason, the PM2.5 monitoring at the UHAQMN's Singleton site is deemed representative of PM2.5 concentrations in the region surrounding the Mine. Data from this site will be used as input into WCPL's management program and annual reporting. This data will be used as per the Mine's PM10 data, to inform mitigation measures and management protocols as outlined in **Section 4.0.**

5.2.4 Dust Deposition Monitoring

Four dust deposition gauges will monitor dust deposition levels surrounding the Mine (**Table 14** and **Figure 4**). These dust deposition gauges will be located near the closest receivers to the north-west (D21 and D22), to the east (D19) and to the south-east (D11).

Each dust deposition gauge will monitor insoluble soils and ash residue on a monthly basis. The dust deposition gauges will operate in accordance with AS3580.10.1:2003 Methods for Sampling and Analysis of Ambient Air and national Association of Testing Authorities (NATA) requirements.

5.2.5 TSP Matter Monitoring

Annual average TSP concentrations will be estimated from PM10 monitoring data based on the relationship that 33% of TSP is PM10 (**Section 2.4**).

5.2.6 Targeted Dust Deposition, TSP Matter and PM10 Monitoring

If required, additional targeted monitoring of dust deposition, TSP matter or PM10 will be undertaken in response to a landholder or community complaint. Details of this monitoring, including location of monitoring equipment and duration and frequency of monitoring, will be determined in consultation with the complainant, WCPL's air quality monitoring consultants and OEH (if required).

In accordance with Schedule 4, Condition 5C(f) WCPL will also undertake targeted monitoring of occupied mine-owned residences and residences on air quality affected land listed in Schedule 4, Condition 1 of DA305-7-2003, as required, and subject to the agreement of the tenant.

Results of this targeted monitoring will be compared to the air quality impact assessment criteria (**Section 3.1**) to determine WCPL's compliance with the conditions of consent. All results will be reported in the Annual Review.

5.2.7 Remote Camera Monitoring

WCPL has installed remote field cameras to capture real time footage of operating conditions in the Montrose and South Bates open cut pits. Cameras transmit live feed to assist where possible with the identification of changing meteorological and operational conditions and thus enhance real-time response to the implementation of controls if and where required.

5.2.8 Cumulative Impact Protocol

In accordance with Schedule 4 Condition 5C(g) of DA305-7-2003 WCPL will monitor real-time air quality monitoring network stations located in the vicinity of neighbouring mines (HVO South, HVO North and Mount Thorley Warkworth Mines).

If the real time monitor records a trigger level 3 as per **Table 17** (Risk/Response Matrix for 24hr PM10 Concentrations), then, upon investigation and validation of the alarm criteria and source of propagation, WCPL will provide notification to the above operations outlining WCPL actions to minimise cumulative air quality impacts on neighbouring mines.

5.3 Greenhouse Gas Monitoring

Greenhouse gas monitoring throughout the year will be undertaken primarily through the monitoring of the main ventilation stream at the ventilation shaft site, but also other parameters that lead to greenhouse gas emissions, including, diesel use, oil and grease use, ROM coal mined and electricity use for Scope 1 and 2 emissions.

Monitoring will be undertaken in accordance with the requirements of the *National Greenhouse and Energy Reporting Act 2007* (NGER Act) and the *National Greenhouse and Energy Reporting Regulations 2008.*

As a result of reporting under the NGER Act, emissions data will be made publically available via the Department of Environment and Energy website: www.environment.gov.au.

Table 15 lists the greenhouse gas related monitoring that will be completed at the Mine.

Table 15: Greenhouse Gas Monitoring

Parameter	Monitoring Point	Frequency of Monitoring	Emissions Calculated	Comments
Methane	Main ventilation shaft	Real-time continuous	Emission factor to convert from tonnes to CH_4 to tonnes of CO_2-e	Includes real-time, continuous monitoring of temperature, pressure and volumetric flow to accurately calculate emissions
Carbon Dioxide	Main ventilation shaft	Real-time continuous	Tonnes of CO_2-e	
Diesel Use	Calculated from invoices	Annually	Emission factor to convert kL use to tonnes of CO_2-e	Reported from invoices. *Opening Stock* and *Deliveries* minus *Closing Stock* equals usage
Oil Use	Calculated from invoices	Annually	Emission factor to convert kL use to tonnes of CO_2-e	
Grease Use	Calculated from invoices	Annually	Emission factor to convert kL use to tonnes of CO_2-e	
Electricity Use	Calculated from invoices	Annually	Emission factor to convert kWh use to tonnes of CO_2-e	Usage on invoice is from metered records in kWh
ROM Coal	Calculated from	Monthly	Fugitive emissions	Final annual production in

Parameter	Monitoring Point	Frequency of Monitoring	Emissions Calculated	Comments
Production	weight metre and survey		factor based on ROM production	tonnes taken from annual coal royalty return

5.4 Blast Fume Monitoring

WCPL monitors all blasts in accordance with WA-ENV-MNP-507 Wambo Coal Blast Management Plan (BMP). All surface blasts are fume rated and video recorded to capture the post blast environment. For further details of WCPL's blast monitoring program, refer to the BMP.

5.5 Monitoring Records

Monitoring records will be maintained in accordance with Condition M1 of EPL 529 i.e.

- 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.

The following records must be kept in respect of any samples required to be collected for the purposes of EPL 529:

- 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.

5.6 Data Handling

Data collected from the air quality monitoring stations will be handled in accordance with the procedures described in **Table 16**.

Table 16: Data Handling Methodology

Parameter	Procedure
Meteorology	• Summary data obtained from the monitoring instrumentation on a daily basis. • Data entered into an electronic database (or similar) for analysis and tracking.
PM10	• Summary data obtained from the TEOMs on a daily basis. • Data entered into an electronic database (or similar) for comparison with relevant air quality criteria (**Section 3.1**). • Data compared with relevant criteria and any exceedances noted and investigated.
PM2.5	• Summary data obtained from the Singleton based monitoring station of the UHAQMN on a daily basis • Data entered into an electronic database (or similar) for analysis and tracking.

Parameter	Procedure
TSP	• Samples retrieved from the monitoring instrumentation on a six day cycle. • Samples sent to a laboratory for analysis. • Data entered into an electronic database (or similar) for comparison with relevant air quality criteria (**Section 3.1**). • Data compared with relevant criteria and any exceedances noted and investigated.
Dust Deposition	• Samples retrieved from the monitoring instrumentation on a monthly basis. • Samples sent to a laboratory for analysis. • Data entered into an electronic database (or similar) for comparison with relevant air quality criteria (**Section 3.1**). • Data compared with relevant criteria and any exceedances noted and investigated.

5.7 Evaluation of Compliance

Compliance with the air quality assessment criteria (**Section 3.1**) will be assessed using the monitoring program described in **Section 5.2**.

Monitoring results above the air quality assessment criteria (**Section 3.1**) are not exceedances until the results have been verified and assessed as valid.

An assessment will be conducted to determine the validity of the exceedance by investigating:

- the timing of the exceedance(s);
- the general location of the exceedance(s).
- if any potential contamination of sample(s) may have occurred;
- if there were any extraordinary events (e.g. bushfires, prescribed burning, dust storms, sea fog, fire incidents or any other extraordinary activity or event);
- the methods and type of equipment being used by the Mine at the time of the exceedance(s) and proximity to the locations at which the exceedance(s) was recorded;
- the location of non-WCPL mining activities, agricultural activities and/or other land use activities and proximity to the locations at which the exceedance(s) was recorded;
- meteorological data for the relevant period to determine dominant wind direction, average wind speeds, percentage calm conditions (< 0.5 m/s) and significant periods of moderate winds (> 5.4 m/s);
- upwind, downwind and regional monitoring data for the same period; and
- the operation of the monitor (e.g. providing reliable data and in calibration).

A non-compliance is deemed to have occurred where an exceedance is caused by particulate matter being generated from the Mine.

Compliance with 24 hour PM10 air quality impact assessment criteria (**Section 3.1**) will be determined based on 24 hour rolling averages from each of the PM10 monitors which are reviewed on a regular basis by the Environmental Advisor.

Dust deposition and PM10 data from the TEOMs will be assessed monthly by the Senior Environmental Advisor / Environmental Advisor on the rolling annual average against the annual average dust deposition and PM10 air quality impact assessment criteria, respectively, in **Section 3.1**.

Compliance with annual average TSP air quality impact assessment criteria (**Section 3.1**) will be assessed monthly by the Senior Environmental Advisor / Environmental Advisor based on the rolling annual average of PM10 and adopting the relationship that TSP concentrations are approximately 3 times PM10 concentrations (**Section 2.4**).

6.0 Adaptive Management

WCPL will assess and manage project-related risks to ensure that there are no exceedances of the criteria and/or performance measures in **Section 3.0**.

If an exceedance or breach of the criteria and/or performance measures occurs, WCPL will:

- Take all reasonable and feasible steps to ensure that the exceedance ceases and does not recur;
- Consider all reasonable and feasible options for remediation (where relevant) and submit a report to the DP&E describing those options and any preferred remediation measures or other course of action; and
- Implement remediation measures as directed by the Secretary of DP&E.

6.1 Contingency Plan to Manage Unpredicted Impacts

WCPL has developed a contingency plan to manage any unpredicted air quality impacts associated with the Mine. This contingency plan includes a Trigger Level and SMS Alarm System and Risk/Response Matrix.

6.1.1 Trigger Level and SMS Alarm System

The Mine currently operates a reactive alarm system which utilises a SMS Alarm Function to alert the Open Cut Examiner (OCE), Open Cut Operations Manager and Environmental team members of a possible exceedance of PM10 criteria. The SMS Alarms are based on 10-minute average PM10 concentration measured in µg/m³. The 10-minute average data is filtered for wind direction to minimise the potential for non Wambo activities being the source of the alarm. The alarm is active 24 hours per day.

The reactive alarm for episodic dust events is set to trigger when any ***two consecutive 10-minute average readings of >100 µg/m³*** are reached. This alarm is a trigger for operational and environmental staff to increase surveillance of the operation and to alter or suspend operations as required.

Directly relevant to this alarm function is the ability to monitor real-time PM10 and weather trends via a web based link to the monitors.

In the event that a dust trigger level is reached, meteorological data such as wind direction and speed may be accessed from the on-site meteorological station to assist in determining the source of the high concentrations. The response to any such events will be determined based on the proactive/reactive protocols outlined in **Sections 4.1.2** and **4.1.3**.

WCPL are able to then keep a log of such events to determine whether there are any patterns over time and if there is a continuous connection between a specific meteorological condition and mining activities at a particular time or location on-site.

An external web page of continuous PM10 and meteorological data is maintained. This is currently updated every 5 minutes and is available for operational performance monitoring and immediate complaint investigation. This function allows data trending from short to long periods.

A standard daily run chart of 10-minute average PM10 concentrations, along with co-incident meteorological conditions, is received by email at 7:00am daily for the preceding 24 hour period. The chart includes a 24 hour rolling average trend line. In addition to the daily chart, a spread sheet of raw data is received for further analysis. Visual inspection of charts or spread sheets is carried out each morning by site Environmental staff to identify potential exceedances of assessment criteria for further investigation.

6.1.2 Risk/Response Matrix

Schedule 4, Condition 5C (d) of DA305-7-2003 requires the AQGGMP to include a risk/response matrix to codify mine operational responses to varying levels of risk results from weather conditions and specific mining activities.

Table 17 presents the risk/response matrix designed for the Mine. The matrix provides specific trigger levels ranging in severity and the corresponding consequence or response relating to the risk of the trigger level being reached. High risk level responses include determining the source of high concentrations as well as the meteorological conditions at the corresponding time that the trigger level was reached and then adopting appropriate strategies dependent upon the underlying risk and hazard. Details of the responses are outlined in **Sections 4.1.2** and **4.1.3**.

It is noted that this matrix is specifically currently designed for 24 hour average PM10 concentrations as WCPL operate four real-time TEOMs at the site. However, this matrix may be adapted to any metric in the future as the need arises.

Table 17: Risk/Response Matrix for 24 hour PM10 Concentrations

Trigger	Description	Response
Normal State - Monitored 24 hour concentrations are below 30 µg/m^3 - Wind Speeds < 4m/s Temperature <30^{0}C	Reasonable expected conditions in day-to-day operations.	No action required. Routine dust management continued.
Level 1 Triggers - Monitored 24 hour concentrations are below 30 µg/m^3 – change in weather conditions and/or Wind speeds >6m/s and Temperature >30^{0}C*	Change from normal indicating a potential risk.	Requires assessment of monitored data. Confirm all proactive mitigation measures are being implemented (**Table 11**). Open Cut Operations to monitor operating conditions and prepare operations to mitigate against potential excessive dust propagation and exceedance of criteria in line with the Proactive Air Quality Management Protocol.
Level 2 Triggers – 2 consecutive 10 min readings > 100 µg/m^3 and/or Wind speeds >8m/s and Temperature >35^{0}C*	High risk of dust related impacts occurring.	Confirm all proactive mitigation measures are being implemented (**Table 11**). Meteorological data and mining operations assessed to determine/validate trigger results and identify potential sources of emissions (**Section 5.7**). Visual inspection by operational personnel to ascertain if there are visible off-site impacts. Mining operations modified as required, such as reduced speed limits, additional dust suppression/haul road watering, relocation of fleet, review of blasting schedule (**Table 11**).

Trigger	Description	Response
Level 3 Triggers – 24 hour concentration exceeding the impact assessment criterion of 50 µg/m^3	Exceedance of the impact assessment criterion.	Confirm all proactive mitigation measures are being implemented (**Table 11**). Meteorological data and mining operations assessed to determine/validate trigger results and identify potential sources of emissions (**Section 5.7**). Visual inspection by operational personnel to ascertain if there are visible off-site impacts. Speed limits reduced. Further modification of mining operations, such as additional dust suppression/haul road watering, relocation of fleet, review of blasting schedule (**Table 11**). If the exceedance is caused by particulate matter being generated from the Mine report the exceedance in accordance with **Section 8.5**.

*Wind speed & temperature descriptors will be used as trigger levels in the predictive meteorological forecasting module (**Section 4.1.1**), with SMS alarm notifications messages sent to relevant operational personnel.

7.0 Community Complaint Response

All air quality related community complaints received by WCPL will be recorded within the Community Complaints Register. The E&C Manager will investigate the complaint, which will include, where possible, contacting the complainant within 24 hours to discuss the complaint. A review of the effectiveness of the corrective or preventative actions will be conducted within a month of the complaint and the relevant work procedures updated if required.

Preliminary investigations will commence as soon as practicable upon receipt of a complaint to establish if WCPL is responsible. All efforts will be made to determine the likely causes contributing to the complainants concerns using information such as the climatic conditions at the time of blast, the nature of activities taking place and recent monitoring results.

WCPL will attempt to address the complainants concerns such that a mutually acceptable outcome is achieved. However if required, the Independent Dispute Resolution Process would be referred to (**Appendix C**).

In the event that exceedances of the air quality criteria are detected, any affected landowner and/or tenant will be notified within fourteen days of the confirmation of the exceedance in accordance with the WA-ENV_PRO-508.1 Landholder Notification Procedure in Appendix D.

Details of all community complaints will be included in the Monthly Environment Monitoring Report. WCPL will retain a copy of the Community Complaints Register for at least four years. The E&C Manager will ensure the latest Community Complaints Register is posted on the WCPL website.

8.0 Review and Reporting

8.1 Review

The performance of the air quality and greenhouse gas monitoring and management programs outlined in the AQGGMP is to be reviewed annually by the E&C Manager. A complete review of the AQGGMP will occur:

- Every two years;
- When there are changes to consent or licence conditions relating to air quality or greenhouse gas management or monitoring;
- Following significant air quality related incidents at WCPL;
- Following an independent environmental audit which requires AQGGMP review; or
- If there is a relevant change in technology, practice or legislation.

The revised AQGGMP will be re-submitted to the Secretary for approval as required by Condition 20, Schedule 4 of DA305-7-2003.

8.2 Annual Review

Prior to the end of March each year, WCPL will review the environmental performance of the Mine and submit an Annual Review report to the DP&E. This report will:

- Describe the development (including any rehabilitation) that was carried out in the past year, and the development that is proposed to be carried out over the next year
- Include a comprehensive review of the monitoring results and complaints records of the Project over the past year, which includes a comparison of these results against the:
  - Relevant statutory requirements, limits or performance measures/criteria
  - Monitoring results of previous years; and
  - Relevant predictions in the EA;
- Identify any non-compliance over the last year, and describe what actions were (or are being) taken to ensure compliance
- Identify any trends in the monitoring data over the life of the Project
- Identify any discrepancies between the predicted and actual impacts of the Project, and analyse the potential cause of any significant discrepancies; and
- Describe what measures will be implemented over the next year to improve the environmental performance of the Project.

8.3 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 529 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.

8.4 Website Updates

A comprehensive summary of the air quality and greenhouse monitoring results will be made publicly available at WCPL's website:

https://www.peabodyenergy.com/Operations/Australia-Mining/New-South-Wales-Mining/Wambo-Approvals,-Plans-Reports

Information on the website will be updated regularly as required by DA305-7-2003.

WCPL will also ensure that any information relevant to air quality and greenhouse gas management is uploaded to the website (and kept up to date). This includes:

- Current statutory approvals
- Approved strategies, plans or programs required under the DA305-7-2003
- A community complaints register
- Minutes of Community Consultative Committee (CCC) meetings
- Annual Reviews
- A copy of any Independent Audits and WCPL's response to any recommendations in any audit; and
- Any other matter required by the Secretary.

8.4.1 Online Reporting

In accordance with Schedule 6 Condition 13 of DA305-7-2003, WCPL will make the following information publically available on its website, on a daily basis and in a clearly understandable form:

- Daily weather forecasts for the coming week;
- Proposed operational responses to these weather forecasts;
- Real-time air quality monitoring data (subject to any necessary caveats); and
- Any operational responses that were taken in response to the air quality monitoring data.

WCPL will make provision on its website for the provision of online and/or email comments by members of the community regarding this information.

8.5 Reportable Environmental Incidents

An 'incident' is a set of circumstances that causes or threatens to cause material harm to the environment; and/or breaches or exceeds the limits or performance measures/criteria in DA305-7-2003, DA177-8-2004 and/or EPL 529.

All reportable incidents will be reported via the EPA's Environmental Line on **131 555** by the E&C Manager in accordance with WCPL's Pollution Incident Response Management Plan (PIRMP).

In accordance with the PIRMP, WCPL must notify all relevant authorities (including EPA, DP&E and other relevant authorities) of incidents causing or threatening material harm to the environment **immediately** after the person becomes aware of the incident in accordance with the requirements of *Part 5.7* of the *POEO Act*.

For all other incidents that do not cause or threaten material harm to the environment associated with the Mine, WCPL will notify the Secretary and any other relevant agencies as soon as practicable after WCPL becomes aware of the incident.

Within 7 days of the date of the incident, WCPL will provide the Secretary and any relevant agencies with a detailed report on the incident to include:

- the cause, time and duration of the event
- Where possible the type, volume and concentration of every pollutant discharged as a result of the event
- the name, address and business hours telephone number of employees or agents of the licensee who witnessed the event
- the name, address and business hours telephone number of every other person (of whom the licensee is aware) who witnessed the event, unless the licensee has been unable to obtain that information after making reasonable effort
- action taken by the licensee in relation to the event, including any follow-up contact with any complainants
- implement remediation measures as directed by the Secretary, to the satisfaction of the Secretary
- details of any measure taken or proposed to be taken to prevent or mitigate against a recurrence of such an event; and
- any other relevant matters.

8.6 Community Consultative Committee (CCC) Briefings

In accordance with Schedule 4, Condition 5C (e), WCPL will provide summary reports and specific briefings at CCC meetings on issues arising from air quality monitoring, as and when required.

9.0 Responsibilities

Table 18 below summarises responsibilities documented in the AQGGMP. Responsibilities may be delegated as required.

Table 18: AQGGMP Responsibilities

No	Task	Responsibility	Timing
1	Coordinate air quality and greenhouse gas monitoring program in accordance with **Section 5.0**	Senior Environmental Advisor	Ongoing
2	Assess air quality data against relevant criteria outlined in **Section 3.1**	E&C Manager	Ongoing
3	Manage exceedances of air quality criteria in accordance with the Reactive Air Quality Management Protocol (**Section 4.1.3**)	E&C Manager	As required.
4	Implement the Proactive Air Quality and Greenhouse Gas Management Protocol (**Section 4.1.2**)	E&C Manager and other relevant operation unit managers	Ongoing
5	Implement the Dust Management Measures detailed in **Table 11** (**Section 4.1.4**)	Various (refer **Table 11**)	As required (refer **Table 11**)
6	Implement the Greenhouse Gas Management Practices detailed in **Table 12** (**Section 4.2**)	Various (refer **Table 12**)	As required (refer **Table 12**)
7	Respond to air quality complaints in accordance with **Section 7.0**	E&C Manager	As required.
8	Organise for independent reviews of air quality impacts at private dwellings as required.	E&C Manager	As requested by landowners.
9	Annual Review to include air quality and greenhouse gas monitoring results, complaints, mitigation measures undertaken and a review of the monitoring undertaken	E&C Manager	Annually.
10	Regulator review to be undertaken of the AQGGMP	E&C Manager	As required.

10.0 References

- CSIRO Marine & Atmospheric Research, 2013. Upper Hunter Fine Particle Characterisation Study. Final report, 17 September 2013. Prepared for Office of Environment and Heritage and NSW Department of Health. http://www.environment.nsw.gov.au/resources/aqms/UHFPCSFinal.pdf
- Development Consent (DA305-7-2003)
- Development Consent (DA177-8-2004)
- Environment Protection Licence (529)
- Environmental Planning and Assessment Act 1979
- Protection of the Environment Operations Act 1997
- Protection of the Environment Operations (Clean Air) Regulations 2010
- Protection of the Environment Operations (General) Regulation 2009 (Regulation)
- National Greenhouse and Energy Reporting Act 2007
- National Greenhouse and Energy Reporting Regulations 2008
- Department of Environment and Conservation (DEC), 2007. Approved Methods for the Sampling and Analysis of Air Pollutants in NSW
- Jacobs, 2016. Wambo Air Quality Monitoring Review – Letter Report, 12 October 2016.
- Katestone Environmental Pty Ltyd, 2011. NSW Coal Mining Benchmarking Study: International Best Practice Measures to Prevent and/or minimise Emissions of Particulate Matter from Coal Mining. Katestone Environmental Pty Ltd prepared for DECCW, 2011. http://www.epa.nsw.gov.au/air/coalminingnsw.htm
- NSW Minerals Council (2010) Technical Paper Particulate Matter and Mining Interim Report.
- Pacific Environment Ltd, 2014a. Coal Mine Pollution Reduction Program Condition U3 Assessment, 29 July 2014.
- Pacific Environment Ltd, 2014b. Wambo Coal Mine PRP U3: Monitoring Results – Wheel Generated Dust, 14 August 2014.
- Pacific Environment Ltd, 2015. Supporting Study for Wambo Mines Pollution Reduction Program U2: Coal Mine Wind Erosion of Exposed land Assessment, 4 June 2015
- Pacific Environment Ltd, 2016. Wambo Coal Mine: Monitoring Results – Wheel Generated Dust, 16 June 2016.
- Umwelt, 2016. United Wambo Open Cut Coal Mine Project Air Quality Impact Assessment.

APPENDIX A
AQGGMP STATUTORY REQUIREMENTS

<table>
<tr><th>Approval</th><th>Condition</th><th>Requirement</th><th>Section</th></tr>
<tr><td rowspan="3">DA305-7-2003</td><td>Schedule 4, Condition 1</td><td>Acquisition Upon Request
Upon receiving a written request for acquisition from the landowner of the land listed in Table 1, the Applicant must acquire the land in accordance with the procedures in conditions 9-11 of schedule 5:

Table 1: Land subject to acquisition upon request<table><tr><td>2 – Lambkin</td><td>23A & B – Kannar</td></tr><tr><td>13C – Skinner</td><td>31A, B, C & D – Fisher</td></tr><tr><td>19A & B – Kelly</td><td>51 – Hawkes</td></tr><tr><td>22 - Henderson</td><td>56 - Haynes</td></tr></table>Note:
For more information on the numbering and identification of properties used in this consent, see Attachment 1 of the EIS for the Wambo Development Project. Lands titled 23A & B – Kannar, 31A,B,C & D – Fisher, 51 – Hawkes and 56 – Haynes have been acquired and are now mine-owned.</td><td>3.1</td></tr>
<tr><td>Schedule 4, Condition 2</td><td>Odour
The Applicant must ensure that no offensive odours, as defined under the POEO Act, are emitted from the Wambo Mining Complex.</td><td>3.4</td></tr>
<tr><td>Schedule 4, Condition 3</td><td>Greenhouse Gas Emissions
The Applicant must implement all reasonable and feasible measures to minimise the release of greenhouse gas emissions from the Wambo Mining Complex to the satisfaction of the Secretary.</td><td>3.5</td></tr>
</table>

<table>
<tr><th>Approval</th><th>Condition</th><th>Requirement</th><th>Section</th></tr>
<tr><td></td><td>Schedule 4, Condition 4</td><td>

Air Quality Criteria

Except for the air quality affected land in Table 1, the Applicant must ensure that all reasonable and feasible avoidance and mitigation measures are employed so that particulate matter emissions generated by the Wambo Mining Complex do not exceed the criteria listed in Tables 2, 3 and 4 at any residence on privately owned land, or on more than 25 percent of any privately owned land.

Table 2: Long term impact assessment criteria for particulate matter

Pollutant	Averaging Period	[d] Criterion
Total suspended particulate (TSP) matter	Annual	[a] 90 µg/m^3
Particulate matter <10µm (PM10)	Annual	[a] 30 µg/m^3

Table 3: Short term impact assessment criterion for particulate matter

Pollutant	Averaging Period	[d] Criterion
Particulate matter <10µm (PM10)	24 hour	[a] 50 µg/m^3

Table 4: Long term impact assessment criteria for deposited dust

Pollutant	Averaging Period	Maximum increase in deposited dust level	Maximum total deposited dust level
[c] Deposited Dust	Annual	[b] 2g/m^2/month	[a] 4g/m^2/month

Notes to Tables 2-4:
a Total impact (i.e. incremental increase in concentrations due to the development plus background concentrations due to all other sources);
b Incremental impact (i.e. incremental increase in concentrations due to the development on its own);
c Deposited dust is to be assessed as insoluble solids as defined by Standards Australia, AS/NZS 3580.10.1:2003: Methods for Sampling and Analysis of Ambient Air - Determination of Particulate Matter - Deposited Matter - Gravimetric Method; and
d Excludes extraordinary events such as bushfires, prescribed burning, dust storms, sea fog, fire incidents or any other activity agreed by the Secretary.

</td><td>3.1</td></tr>
</table>

<table>
<tr><th>Approval</th><th>Condition</th><th>Requirement</th><th>Section</th></tr>
<tr><td></td><td>Schedule 4, Condition 5</td><td>

Air Quality Acquisition Criteria

If particulate matter emissions generated by the Wambo Mining Complex exceed the criteria in Tables 5, 6, and 7 at any residence on privately-owned land, or on more than 25 percent of any privately owned land, then upon written request for acquisition from the landowner, the Applicant must acquire the land in accordance with the procedures in conditions 9 - 11 of schedule 5.

Table 5: Long term impact acquisition criteria for particulate matter

Pollutant	Averaging Period	[d] Criterion
Total suspended particulate (TSP) matter	Annual	[a] 90 µg/m^3
Particulate matter <10µm (PM10)	Annual	[a] 30 µg/m^3

Table 6: Short term impact acquisition criteria for particulate matter

Pollutant	Averaging Period	[d] Criterion
Particulate matter <10µm (PM10)	24 hour	[a] 150 µg/m^3
Particulate matter <10µm (PM10)	24 hour	[b] 50 µg/m^3

Table 7: Long term impact acquisition criteria for deposited dust

Pollutant	Averaging Period	Maximum increase in deposited dust level	Maximum total deposited dust level
[c] Deposited Dust	Annual	[b] 2g/m^2/month	[a] 4g/m^2/month

Notes to Tables 5-7:
a Total impact (i.e. incremental increase in concentrations due to the development plus background concentrations due to all other sources);
b Incremental impact (i.e. incremental increase in concentrations due to the development on its own);
c Deposited dust is to be assessed as insoluble solids as defined by Standards Australia, AS/NZS 3580.10.1:2003: Methods for Sampling and Analysis of Ambient Air - Determination of Particulate Matter - Deposited Matter - Gravimetric Method; and
d Excludes extraordinary events such as bushfires, prescribed burning, dust storms, sea fog, fire incidents or any other activity agreed by the Secretary.

</td><td>3.1</td></tr>
</table>

Approval	Condition	Requirement	Section
	Schedule 4, Condition 5A	**Mine-owned Land** The Applicant must ensure that particulate matter emissions generated by the Wambo Mining Complex do not exceed the criteria listed in Tables 2, 3 and 4 at any occupied residence on any mine-owned land (including land owned by adjacent mines) unless: (a) the tenant and landowner has been notified of health risks in accordance with the notification requirements under schedule 5 of this consent; (b) the tenant on land owned by the Applicant can terminate their tenancy agreement without penalty, subject to giving reasonable notice, and the Applicant uses its best endeavours to provide assistance with relocation and sourcing of alternative accommodation; (c) air mitigation measures (such as air filters, a first flush roof water drainage system and/or air conditioning) are installed at the residence, if requested by the tenant and landowner (where owned by another mine other than the Applicant); (d) particulate matter air quality monitoring is undertaken to inform the tenant and landowner of potential health risks; and (e) monitoring data is presented to the tenant in an appropriate format, for a medical practitioner to assist the tenant in making an informed decision on the health risks associated with occupying the property, to the satisfaction of the Secretary.	3.2
	Schedule 4, Condition 5B	**Air Quality Operating Conditions** The Applicant must: (a) implement best management practice to minimise the off-site odour, fume and dust emissions from the Wambo Mining Complex, including best practice coal loading and profiling and other measures to minimise dust emissions from coal transportation by rail; (b) operate a comprehensive air quality management system at the Wambo Mining Complex that uses a combination of predictive meteorological forecasting, predictive and real time air dispersion modelling and real-time air quality monitoring data to guide the day to day planning of mining operations and implementation of both proactive and reactive air quality mitigation measures to ensure compliance with the relevant conditions of this consent; (c) manage PM2.5 levels in accordance with any requirements of any EPL; (d) minimise the air quality impacts of the Wambo Mining Complex during adverse meteorological conditions and extraordinary events (see note d above under Tables 5-7); (e) minimise any visible off-site air pollution; (f) minimise the surface disturbance of the site generated by the Wambo Mining Complex; and (g) co-ordinate air quality management at the Wambo Mining Complex with the air quality management at nearby mines (HVO South, HVO North and Mount Thorley Warkworth mines) to minimise the cumulative air quality impacts of these mines and the Wambo Mining Complex, to the satisfaction of the Secretary.	4.1 4.4 and 5.2.8

Approval	Condition	Requirement	Section
	Schedule 4, Condition 5C	**Air Quality and Greenhouse Gas Management Plan** The Applicant must prepare and implement a detailed Air Quality & Greenhouse Gas Management Plan for the Wambo Mining Complex to the satisfaction of the Secretary. This plan must: (a) be prepared in consultation with the EPA, and submitted to the Secretary for approval by the end of June 2013; (b) describe the measures that would be implemented to ensure: - best management practice is being employed; - the air quality impacts of the Wambo Mining Complex are minimised during adverse meteorological conditions and extraordinary events; and - compliance with the relevant conditions of this consent. (c) describe the proposed air quality management system; (d) include a risk/response matrix to codify mine operational responses to varying levels of risk resulting from weather conditions and specific mining activities; (e) include commitments to provide summary reports and specific briefings at CCC meetings on issues arising from air quality monitoring; (f) include an air quality monitoring program that: - uses a combination of real-time monitors and supplementary monitors to evaluate the performance of the development; - adequately supports the proactive and reactive air quality management system; - includes PM2.5 monitoring; - includes monitoring of occupied development-related residences and residences on air quality-affected land listed in Table 1, subject to the agreement of the tenant; - evaluates and reports on the effectiveness of the air quality management system; and - includes a protocol for determining any exceedances of the relevant conditions in this consent; and (g) include a protocol that has been prepared in consultation with the owners of nearby mines (HVO South, HVO North and Mount Thorley Warkworth mines) to minimise the cumulative air quality impacts of these mines and the Wambo Mining Complex. The Applicant must implement the approved management plan as approved from time to time by the Secretary.	This Plan 1.5 4.0 4.1 6.1.2 8.6 5.0 4.1.3 5.2.8

<table>
<tr><th>Approval</th><th>Condition</th><th>Requirement</th><th>Section</th></tr>
<tr><td></td><td>Schedule 4, Condition 10</td><td>Meteorological Monitoring
The Applicant must establish a permanent meteorological station at a location approved by the EPA and to the satisfaction of the Secretary, to monitor the parameters specified in Table 11, using the specified units of measure, averaging period, frequency, and sampling method in the table.

Table 11: Meteorological monitoring
<table>
<tr><th>Parameter</th><th>Units of Measure</th><th>Averaging Period</th><th>Frequency</th><th>Sampling Method[1]</th></tr>
<tr><td>Lapse rate</td><td>ºC /100m</td><td>1 hour</td><td>Continuous</td><td>Note[2]</td></tr>
<tr><td>Rainfall</td><td>mm/hr</td><td>1 hour</td><td>Continuous</td><td>AM-4</td></tr>
<tr><td>Sigma Theta @ 10 m</td><td>°</td><td>1 hour</td><td>Continuous</td><td>AM-2</td></tr>
<tr><td>Siting</td><td>-</td><td>-</td><td>-</td><td>AM-1</td></tr>
<tr><td>Temperature @ 10 m</td><td>K</td><td>1 hour</td><td>Continuous</td><td>AM-4</td></tr>
<tr><td>Temperature @ 2 m</td><td>K</td><td>1 hour</td><td>Continuous</td><td>AM-4</td></tr>
<tr><td>Total Solar Radiation @ 10m</td><td>W/m^2</td><td>1 hour</td><td>Continuous</td><td>AM-4</td></tr>
<tr><td>Wind Direction @ 10m</td><td>°</td><td>1 hour</td><td>Continuous</td><td>AM-2</td></tr>
<tr><td>Wind Speed @ 10m</td><td>m/s</td><td>1 hour</td><td>Continuous</td><td>AM-2</td></tr>
</table>
Notes to Table 11:
1 NSW EPA, 2001, Approved Methods for the Sampling and Analysis of Air Pollutants in NSW.
2 The Applicant must calculate lapse rate from measurements made at 2m and 10m.</td><td>5.2.1</td></tr>
<tr><td></td><td>Schedule 4, Condition 87</td><td>Greenhouse Gas
For the life of the development, the Applicant must:
(a) monitor the greenhouse gas emissions generated by the development;
(b) investigate ways to reduce greenhouse gas emissions generated by the development; and
(c) report on greenhouse gas monitoring and abatement measures in the Annual Review,
to the satisfaction of the Secretary</td><td>3.5
5.3
4.2
5.3 and 8.2</td></tr>
<tr><td></td><td>Schedule 5, Condition 1</td><td>Notify Landowners
If the air dispersion and/or noise model predictions in the documents listed in condition 2 of schedule 3 identify that the air pollution and/or noise generated by the development are likely to be greater than the air quality and/or noise impact assessment criteria in conditions 2 and 6 of schedule 4, then the Applicant must notify the relevant landowners and/or existing or future tenants (including tenants of mine-owned properties) accordingly before it carries out any development.</td><td>4.1.3.1</td></tr>
<tr><td></td><td>Schedule 5, Condition 2</td><td>If the results of the air quality and/or noise monitoring required in schedule 4 identify that the air pollution and/or noise generated by the development are greater than the air quality and/or noise impact assessment criteria in schedule 4, then the Applicant must notify the relevant landowners and/or existing or future tenants (including tenants of mine-owned properties) as soon as practicable after identifying the exceedance.</td><td>4.1.3.1</td></tr>
</table>

Approval	Condition	Requirement	Section
	Schedule 5, Condition 3	Before carrying out any development, the Applicant must develop a procedure in consultation with EPA and NSW Health and approved by the Secretary, for notifying landowners and tenants referred to in condition 1. This procedure must ensure that: (a) all existing and future tenants are advised in writing about: - air quality impacts likely to occur at the residence during the operational life of the mine; and - likely health and amenity impacts associated with exposure to particulate matter; (b) the written advice in (a) is based on current air quality monitoring data, dispersion modelling results, research and literature; and (c) there is an ongoing process for providing current air quality monitoring data, dispersion modelling results, research and literature to the tenants.	4.1.3.1
	Schedule 5, Condition 4	**Independent Review** If a landowner considers the development to be exceeding the air quality and/or noise impact assessment criteria listed in schedule 4 at his/her dwelling, or at any proposed dwelling on his/her vacant land, then he/she may ask the Applicant for an independent review of the air pollution and/or noise impacts of the development on his/her dwelling, or proposed dwelling. If the Secretary is satisfied that an independent review is warranted, the Applicant must: (a) consult with the landowner to determine his/her concerns; and (b) commission a suitably qualified person – whose appointment has been approved by the Secretary – to conduct air quality and/or noise monitoring at the relevant dwelling to determine whether the development is complying with the relevant impact assessment criteria, and identify the source(s) and scale of any air quality and/or noise impact at the dwelling, and the development's contribution to this impact. Within 14 days of receiving the results of this independent review, the Applicant must give a copy of these results to the Secretary and landowner.	4.1.3.1
	Schedule 5, Condition 5	If the independent review (referred to in condition 4) determines that the development is complying with the relevant impact assessment criteria listed in schedule 4 at the dwelling, then the Applicant may discontinue the independent review with the approval of the Secretary.	4.1.3.1

Approval	Condition	Requirement	Section
	Schedule 5, Condition 6	If the independent review (referred to in condition 4) determines that the development is not complying with the relevant impact assessment criteria listed in schedule 4 at the dwelling, and that the development is primarily responsible for this non-compliance, then the Applicant must: (a) take all practicable measures, in consultation with the landowner, to ensure that the development complies with the relevant impact assessment criteria; and conduct further air quality and/or noise monitoring at the dwelling to determine whether these measures ensure compliance; or (b) secure a written agreement with the landowner to allow exceedances of the air quality and/or noise impact assessment criteria listed in schedule 4. If the additional monitoring referred to above subsequently determines that the development is complying with the relevant impact assessment criteria listed in schedule 4 at the dwelling, then the Applicant may discontinue the independent review with the approval of the Secretary. If the measures referred to in (a) do not ensure compliance with the air quality and/or noise land acquisition criteria listed in schedule 4 at the dwelling, and the Applicant cannot secure a written agreement with the landowner to allow exceedances of the air quality and/or noise impact assessment criteria listed in schedule 4, then the Applicant must, upon receiving a written request from the landowner, acquire all or part of the landowner's land in accordance with the procedures in conditions 9-11 below.	4.1.3.1
	Schedule 5, Condition 7	If the independent review determines that the development is not complying with the air quality and/or noise impact assessment criteria listed in schedule 4 at the dwelling, but that several mines are responsible for this non-compliance, then the Applicant must, with the agreement of the landowner and other mine(s) prepare and implement a Cumulative Air Quality and/or Noise Impact Management Plan for the land to the satisfaction of the Secretary. This plan must provide the joint approach to be adopted by the Applicant and other mine(s) to manage cumulative air quality and/or noise impacts at the landowner's dwelling, and the acquisition of any land. If the Applicant is unable to finalise an agreement with the landowner and/or other mine(s), and/or prepare a Cumulative Air Quality and Noise Impact Management Plan, then the Applicant or landowner may refer the matter to the Secretary for resolution. If the matter cannot be resolved within 21 days, the Secretary shall refer the matter to an Independent Dispute Resolution Process. If, following the Independent Dispute Resolution Process, the Secretary decides that the Applicant must acquire all or part of the landowner's land, then the Applicant must acquire this land in accordance with the procedures in conditions 9-11 below.	4.1.3.1 (see also Appendix C for Dispute Resolution Process)

Approval	Condition	Requirement	Section
	Schedule 5, Condition 8	If the landowner disputes the results of the independent review (referred to in condition 4), either the Applicant or the landowner may refer the matter to the Secretary for resolution. If the matter cannot be resolved within 21 days, the Secretary shall refer the matter to an Independent Dispute Resolution Process	4.1.3.1 (see also Appendix C for Dispute Resolution Process)

Approval	Condition	Requirement	Section
	Schedule 5, Condition 9	**Land Acquisition** Within 6 months of receiving a written request from the landowner, the Applicant must pay the landowner: (a) the current market value of the landowner's interest in the land at the date of this written request, as if the land was unaffected by the development the subject of the DA, having regard to the: - existing and permissible use of the land, in accordance with the applicable planning instruments at the date of the written request; and - presence of improvements on the land and/or any approved building or structure which has been physically commenced at the date of the landowner's written request, and is due to be completed subsequent to that date; (b) the reasonable costs associated with: - relocating within the Singleton local government area, or to any other local government area determined by the Secretary; - obtaining legal advice and expert advice for determining the acquisition price of the land, and the terms upon which it is required; and (c) reasonable compensation for any disturbance caused by the land acquisition process. However, if within 6 months of receiving this written request, the Applicant and landowner cannot agree on the acquisition price of the land, and/or the terms upon which the land is to be acquired, then either party may refer the matter to the Secretary for resolution. Upon receiving such a request, the Secretary shall request the President of the NSW Division of the Australian Property Institute to appoint a qualified independent valuer or Fellow of the Institute, to consider submissions from both parties, and determine a fair and reasonable acquisition price for the land, and/or terms upon which the land is to be acquired. If either party disputes the independent valuer's determination, then the independent valuer must refer the matter back to the Secretary. Upon receiving such a referral, the Secretary shall appoint a panel to determine a fair and reasonable acquisition price for the land, and/or the terms upon which the land is to be acquired, comprising the: (i) appointed independent valuer, (ii) Secretary or nominee, and (iii) President of the Law Society of NSW or nominee. Within 14 days of receiving the panel's determination, the Applicant must make a written offer to purchase the land at a price not less than the panel's determination. If the landowner refuses to accept this offer within 6 months of the date of the Applicant's offer, the Applicant's obligations to acquire the land shall cease, unless otherwise agreed by the Secretary.	4.1.3.1
	Schedule 5, Condition 10	The Applicant must bear the costs of any valuation or survey assessment requested by the independent valuer, panel, or the Secretary and the costs of determination referred to in Condition 9.	4.1.3.1

Approval	Condition	Requirement	Section
	Schedule 5, Condition 11	If the Applicant and landowner agree that only part of the land should be acquired, then the Applicant must pay all reasonable costs associated with obtaining Council approval for any plan of subdivision, and registration of the plan at the Office of the Registrar-General	4.1.3.1
	Schedule 6, Condition 3	**Adaptive Management** The Applicant must assess and manage project-related risks to ensure that there are no exceedances of the criteria and/or performance measures in schedule 4. Any exceedance of these criteria and/or performance measures constitutes a breach of this consent and may be subject to penalty or offence provisions under the EP&A Act or EP&A Regulation. Where any exceedance of these criteria and/or performance measures has occurred, the Applicant must, at the earliest opportunity: (a) take all reasonable and feasible steps to ensure that the exceedance ceases and does not recur; (b) consider all reasonable and feasible options for remediation (where relevant) and submit a report to the Department describing those options and any preferred remediation measures or other course of action; and (c) implement remediation measures as directed by the Secretary, to the satisfaction of the Secretary.	6.0

Approval	Condition	Requirement	Section
	Schedule 6, Condition 4	**Management Plan Requirements** The Applicant must ensure that the management plans required under this consent are prepared in accordance with any relevant guidelines, and include: (a) detailed baseline data; (b) a description of: - the relevant statutory requirements (including any relevant consent, licence or lease conditions); - any relevant limits or performance measures/criteria; - the specific performance indicators that are proposed to be used to judge the performance of, or guide the implementation of, the project or any management measures; (c) a description of the measures that would be implemented to comply with the relevant statutory requirements, limits, or performance measures/ criteria; (d) a program to monitor and report on the: - impacts and environmental performance of the Wambo Mining Complex; - effectiveness of any management measures (see c above); (e) a contingency plan to manage any unpredicted impacts and their consequences; (f) a program to investigate and implement ways to improve the environmental performance of the Wambo Mining Complex over time; (g) a protocol for managing and reporting any: - incidents; - complaints; - non-compliances with statutory requirements; and - exceedances of the impact assessment criteria and/or performance criteria; and (h) a protocol for periodic review of the plan.	2.0 1.4 3.0 4.1.4 (Table 11) 4.2 (Table 12) 4.0 5.0 and 8.0 6.1 8.2 8.5 7.0 4.1.3 4.1.3 8.1
	Schedule 6, Condition 10	**Incident Reporting** The Applicant must notify at the earliest opportunity, the Secretary and any other relevant agencies of any incident that has caused, or threatens to cause, material harm to the environment. For any other incident associated with the project, the Applicant must notify the Secretary and any other relevant agencies as soon as practicable after the Applicant becomes aware of the incident. Within 7 days of the date of the incident, the Applicant must provide the Secretary and any relevant agencies with a detailed report on the incident, and such further reports as may be requested.	8.5
	Schedule 6, Condition 11	**Regular Reporting** The Applicant must provide regular reporting on the environmental performance of the development on its website, in accordance with the reporting arrangements in any plans or programs approved under the conditions of this consent.	8.4

Approval	Condition	Requirement	Section
	Schedule 6, Condition 12	**Access to Information** From the end of June 2011, the Applicant must: (a) make copies of the following publicly available on its website: - the documents referred to in Condition 2 of Schedule 3; - all current statutory consents for the development; - all approved strategies, plans and programs required under the conditions of this consent; - a comprehensive summary of the monitoring results of the development, reported in accordance with the specifications in any conditions of this consent, or any approved plans and programs; - a complaints register, updated on a monthly basis; - minutes of CCC meetings; - the annual reviews of the development; - any independent environmental audit of the development, and the Applicant's response to the recommendations in any audit; - any other matter required by the Secretary; and (b) keep this information up-to-date, to the satisfaction of the Secretary.	8.4
	Schedule 6, Condition 13	**Online Communication of Operational Responses and Noise and Air Quality Monitoring** The Applicant must, by the end of June 2013: (a) make the following information for the Wambo Mining Complex publicly available on its website, on a daily basis and in a clearly understandable form: - daily weather forecasts for the coming week; - proposed operational responses to these weather forecasts; - real-time noise and air quality monitoring data (subject to any necessary caveats); and - any operational responses that were taken in response to the noise and air quality monitoring data, and (b) make provision on its website for the provision of on-line and/or email comments by members of the community regarding this information, to the satisfaction of the Secretary.	8.4.1

<table>
<tr><th>Approval</th><th>Condition</th><th>Requirement</th><th>Section</th></tr>
<tr><td>DA177-8-2004</td><td>Schedule 4, Condition 14</td><td>
Air Quality Impact Assessment Criteria
The Applicant shall ensure that all reasonable and feasible avoidance and mitigation measures are employed so that particulate matter emissions generated by the Wambo Mining Complex do not exceed the criteria listed in tables 5, 6 or 7 at any residence on privately-owned land or on more than 25 percent of any privately-owned land, unless higher air quality criteria is specified in the consent for the Wambo Coal Mine (DA 305-7-2003).

Table 5: Long term impact assessment criteria for particulate matter
<table>
<tr><th>Pollutant</th><th>Averaging Period</th><th>[d] Criterion</th></tr>
<tr><td>Total suspended particulate (TSP) matter</td><td>Annual</td><td>[a] 90 µg/m^3</td></tr>
<tr><td>Particulate matter <10µm (PM10)</td><td>Annual</td><td>[a] 30 µg/m^3</td></tr>
</table>
Table 6: Short term impact assessment criterion for particulate matter
<table>
<tr><th>Pollutant</th><th>Averaging Period</th><th>[d] Criterion</th></tr>
<tr><td>Particulate matter <10µm (PM10)</td><td>24 hour</td><td>[a] 50 µg/m^3</td></tr>
</table>
Table 7: Long term impact assessment criteria for deposited dust
<table>
<tr><th>Pollutant</th><th>Averaging Period</th><th>Maximum increase in deposited dust level</th><th>Maximum total deposited dust level</th></tr>
<tr><td>[c] Deposited Dust</td><td>Annual</td><td>[b] 2g/m^2/month</td><td>[a] 4g/m^2/month</td></tr>
</table>
Notes to Tables 5-7:
a Total impact (i.e. incremental increase in concentrations due to the development plus background concentrations due to all other sources);
b Incremental impact (i.e. incremental increase in concentrations due to the development on its own);
c Deposited dust is to be assessed as insoluble solids as defined by Standards Australia, AS/NZS 3580.10.1:2003: Methods for Sampling and Analysis of Ambient Air - Determination of Particulate Matter - Deposited Matter - Gravimetric Method; and
d Excludes extraordinary events such as bushfires, prescribed burning, dust storms, sea fog, fire incidents or any other activity agreed by the Director-General in consultation with OEH.
</td><td>3.1</td></tr>
<tr><td></td><td>Schedule 4, Condition 15</td><td>
Operating Conditions
The Applicant shall:
(a) ensure any visible air pollution generated by the development is assessed regularly, and that operations are modified, and/or stopped as required to minimise air quality impacts on privately owned land;
(b) implement all practicable measures to minimise air pollutant emissions from the development; and
(c) report on the effectiveness of these measures in the Annual Review,
to the satisfaction of the Director-General
</td><td>4.0 and 8.2</td></tr>
</table>

<table>
<tr><th>Approval</th><th>Condition</th><th>Requirement</th><th>Section</th></tr>
<tr><td></td><td>Schedule 5, Condition 1</td><td>As soon as practicable following obtaining monitoring results showing an exceedance of the relevant criteria in schedule 4, the Applicant shall notify the affected landowner and/or tenants in writing of the exceedance, and provide regular monitoring results to each of these parties until the development is complying with the relevant criteria again.</td><td>4.1.3.1</td></tr>
<tr><td>EPL529</td><td>P1</td><td>Location of Monitoring/discharge points and areas
P1.1 The following points referred to in the table below are identified in this licence for the purposes of monitoring and/or the setting of limits for the emission of pollutants to the air from the point.

<table>
<tr><th>EPA ID no.</th><th>Type of Monitoring Point</th><th>Location Description</th></tr>
<tr><td>13</td><td>Particulate Matter Monitoring</td><td>Monitoring AQ01 at coordinates 314097 6393962 (Easting Northing) on plan titled “Wambo Air Quality and Meteorological Monitoring Locations” dated 18/10/2016, DOC16/527554.</td></tr>
<tr><td>14</td><td>Particulate Matter Monitoring</td><td>Monitoring AQ02 at coordinates 312055 6390321 (Easting Northing) on plan titled “Wambo Air Quality and Meteorological Monitoring Locations” dated 18/10/2016, DOC16/527554.</td></tr>
<tr><td>15</td><td>Particulate Matter Monitoring</td><td>Monitoring AQ03 at coordinates 304502 6398490 (Easting Northing) on plan titled “Wambo Air Quality and Meteorological Monitoring Locations” dated 18/10/2016, DOC16/527554.</td></tr>
<tr><td>16</td><td>Particulate Matter Monitoring</td><td>Monitoring AQ04 at coordinates 305928 6399587 (Easting Northing) on plan titled “Wambo Air Quality and Meteorological Monitoring Locations” dated 18/10/2016, DOC16/527554.</td></tr>
</table>
P1.4 The following point referred to in the table below is identified in this licence for the purposes of weather monitoring.
<table>
<tr><th>EPA ID no.</th><th>Type of Monitoring Point</th><th>Location Description</th></tr>
<tr><td>17</td><td>Meteorological Station</td><td>Monitoring location identified as “WCPL Weather Station” in the document titled “Wambo Air Quality and Meteorological Monitoring Locations” dated 18/10/2016, DOC16/527554.</td></tr>
</table></td><td>5.2.1, 5.2.2 and Figure 4</td></tr>
<tr><td></td><td>O3</td><td>Dust
O3.1 The premises must be maintained in a condition which minimises or prevents the emission of dust from the premises.
O3.2 All trafficable areas, coal storage areas and vehicle manoeuvring areas in or on the premises must be maintained, at all times, in a condition that will minimise the generation, or emission from the premises, of wind-blown or traffic generated dust.</td><td>4.1.4</td></tr>
</table>

<table>
<tr><th>Approval</th><th>Condition</th><th>Requirement</th><th>Section</th></tr>
<tr><td></td><td>M1</td><td>Monitoring Records
M1.1 The results of any monitoring required to be conducted by this licence or a load calculation protocol must be recorded and retained as set out in this condition.
M1.2 All records required to be kept by this licence must be:
a) in a legible form, or in a form that can readily be reduced to a legible form;
b) kept for at least 4 years after the monitoring or event to which they relate took place; and
c) produced in a legible form to any authorised officer of the EPA who asks to see them.
M1.3 The following records must be kept in respect of any samples required to be collected for the purposes of this licence:
a) the date(s) on which the sample was taken;
b) the time(s) at which the sample was collected;
c) the point at which the sample was taken; and
d) the name of the person who collected the sample.</td><td>5.5</td></tr>
<tr><td></td><td>M2</td><td>Requirement to monitor concentration of pollutants discharged
M2.1 For each monitoring/discharge point or utilisation area specified below (by the point number), the licensee must monitor (by sampling and obtaining results by analysis) the concentration of each pollutant specified in Column 1. The licensee must use the sampling method, units of measure, and sample at the frequency, specified opposite in the other columns:
M2.2 Air Monitoring Requirements
Point 13, 14, 15, 16
<table>
<tr><th>Pollutant</th><th>Units of Measure</th><th>Frequency</th><th>Sampling Method</th></tr>
<tr><td>PM10</td><td>Micrograms per cubic metre</td><td>Continuous</td><td>AM-22</td></tr>
</table></td><td>5.2.2</td></tr>
<tr><td></td><td>M3</td><td>Testing Methods – Concentration Limits
M3.1 Monitoring for the concentration of a pollutant emitted to the air required to be conducted by this licence must be done in accordance with:
a) any methodology which is required by or under the Act to be used for the testing of the concentration of the pollutant; or
b) if no such requirement is imposed by or under the Act, any methodology which a condition of this licence requires to be used for that testing; or
c) if no such requirement is imposed by or under the Act or by a condition of this licence, any methodology approved in writing by the EPA for the purposes of that testing prior to the testing taking place.

Note: The Protection of the Environment Operations (Clean Air) Regulation 2010 requires testing for certain purposes to be conducted in accordance with test methods contained in the publication "Approved Methods for the Sampling and Analysis of Air Pollutants in NSW".</td><td>5.0</td></tr>
</table>

<table>
<tr><th>Approval</th><th>Condition</th><th>Requirement</th><th>Section</th></tr>
<tr><td></td><td>M4</td><td>Weather Monitoring
M4.1 At the point(s) identified below, the licensee must monitor (by sampling and obtaining results by analysis) the parameters specified in Column 1 of the table below, using the corresponding sampling method, units of measure, averaging period and sample at the frequency, specified opposite in the Columns 2, 3, 4 and 5 respectively.

<table>
<tr><th>Parameter</th><th>Sampling Method</th><th>Units of Measure</th><th>Averaging Period</th><th>Frequency</th></tr>
<tr><td>Rainfall</td><td>AM-4</td><td>millimetres</td><td>1 hour</td><td>Continuous</td></tr>
<tr><td>Wind Speed at 10 metres</td><td>AM-2 & AM-4</td><td>metres per second</td><td>15 minutes</td><td>Continuous</td></tr>
<tr><td>Wind direction at 10 metres</td><td>AM-2 & AM-4</td><td>Degrees</td><td>15 minutes</td><td>Continuous</td></tr>
<tr><td>Temperature at 2 metres</td><td>AM-4</td><td>Celsius</td><td>15 minutes</td><td>Continuous</td></tr>
<tr><td>Temperature at 10 metres</td><td>AM-4</td><td>Celsius</td><td>15 minutes</td><td>Continuous</td></tr>
<tr><td>Sigma theta</td><td>AM-2 & AM-4</td><td>Degrees</td><td>15 minutes</td><td>Continuous</td></tr>
<tr><td>Total Solar Radiation</td><td>AM-4</td><td>Watts per square metre</td><td>15 minutes</td><td>Continuous</td></tr>
</table></td><td>5.2.1</td></tr>
<tr><td></td><td>M9</td><td>Other monitoring and recording conditions
M9.4 Requirement to Monitoring Particulate Matter
The Licensee must record the average PM10 concentration at Monitoring Points 13, 14, 15 and 16 at intervals of 10 minutes. This data must be made available upon request by any EPA Authorised Officer who requests to see it.</td><td>5.2.2</td></tr>
</table>

APPENDIX B
CORRESPONDENCE WITH REGULATORY AGENCIES

Planning Services
Resource Assessments
Contact: Melanie Hollis
Phone: 8217 2043
Email: melanie.hollis@planning.nsw.gov.au

Mr Steven Peart
Environment and Community Manager
Wambo Coal Pty Ltd
PMB 1
Singleton NSW 2330

Dear Mr Peart,

Wambo Coal Mine (DA 305-7-2003)
Air Quality and Greenhouse Gas Management Plan

I refer to your correspondence of 16 October 2017 requesting the Secretary's approval of an updated Air Quality and Greenhouse Gas Management Plan (Revision 5) for the Wambo Mining Complex (DA 305-07-2003).

The Department has reviewed the updated plan and is satisfied that the plan meets the requirements of condition 5C of Schedule 4 of DA 305-7-2003. As such, I wish to advise that the Secretary approves this plan.

Please ensure a finalised copy of this plan is made available on your website.

If you wish to discuss this matter further, please contact Melanie Hollis at the details listed above.

Yours sincerely

Howard Reed 11·12·17
Howard Reed
Director Resource Assessments
as the Secretary's nominee

Summary of Consideration of Comments Received on the AQGGMP from DPE

Comment	Consideration of Comment
Department of Planning and Environment – 5 July 2017	
There is no statement within this AQGGMP, or appended correspondence, to demonstrate that this plan has been submitted to the EPA for review.	This plan will be provided to the EPA for review in August 2017.
More detail is required on the predictive "meteorological forecasting and real-time dispersion modelling module" to allow an assessment of whether best management practice is being employed, especially with regards to pro active management of air quality. Further information required includes, but is not limited to: • Description of how the predictive meteorological forecasting and real-time air dispersion modelling data is made available; • Who predictive meteorological forecasting and real-time air dispersion modelling data is made available to (that is, roles and responsibilities); • Details of the forecasted meteorological triggers for specific actions; and • Any "early warning" triggers.	Additional detail has been included in Section 4.1.1.
The AQGGMP should also describe best management practices to manage wind blown dust sources (for example temporary vegetation prior to final rehabilitation).	Table 11 has been revised to reflect that WCPL undertakes temporary stabilisation or revegetation of areas not yet available for final rehabilitation.
The Proactive Air Quality Management Protocol requires more detail to demonstrate that the site is ensuring that air quality impacts are minimised. See comments above regarding employment of best management practice.	The Proactive Air Quality Management Protocol in Table 9 has been revised to clarify that standard proactive management measures that will be implemented at the Mine are outlined in Section 4.1.4 (Table 11). Table 11 has been revised to describe additional proactive management measures.
Also, review and revise the language describing proactive air quality management so it is clear what will be done, why, when it is going to done, and who is going to do it. For example, "consideration" of "prevailing climatic conditions" is not clear.	The language in Table 11 has been reviewed and revised to make it more specific.
Schedule 4 Condition 15 requires the Applicant "to ensure any visible air pollution generated by the development is assessed regularly, and that operations are modified, and/or stopped as required to minimise air quality impacts on privately owned land". Please the requirements of this condition are addressed in the relevant section of the AQGGMP.	Table 11 has been revised to further describe the responses to visible dust generation observed on the field cameras.

Comment	Consideration of Comment
Schedule 4 Condition 4 describes long term impact assessment criteria for deposited dust and Total suspended particulate (TSP) matter. Schedule 4 Condition 5C(f) requires a protocol for determining any exceedances of the relevant conditions in this consent to be included in the Air Quality and Greenhouse Gas Management Plan.	A new section has been included (Section 5.7) that describes the process for determining exceedances of the air quality impact assessment criteria, including criteria in relation to TSP and dust deposition.
Schedule 4, Condition 5B(a) requires "best practice coal loading and profiling and other measures to minimise dust emissions from coal transportation by rail". Coal loading and profiling and other measures to minimise dust emissions from coal transportation by rail are not addressed in this AQGGMP.	Table 11 has been revised to describe the measures implemented by WCPL to reduce dust emissions from coal transportation by rail.
The triggers and responses described in Table 15 do not relate specific mining activities to triggers for a high risk of dust impacts, or responses (i.e. specific mining activities that would need to be modified/halted to reduce risks). The "responses" in particular require more detail to demonstrate that risk of exceedance and air quality impacts are being minimised.	Table 15 has been revised to be more specific about the responses to Level 2 and 3 triggers.
Schedule 4 Condition 5 describes long term acquisition criteria for deposited dust and Total suspended particulate (TSP) matter. Schedule 4 Condition 5C(f) requires a protocol for determining any exceedances of the relevant conditions in this consent to be included in the Air Quality and Greenhouse Gas Management Plan.	A new section has been included (Section 5.7) that describes the process for determining exceedances of the air quality impact assessment criteria, including criteria in relation to TSP and dust deposition.
This AQGGMP should be updated to reflect October 2016 modification. For example, revise Table 1 to be consistent with October 2016 modification: "The Applicant may carry out mining operations at the Wambo Mining Complex until 1 March 2032".	The AQGGMP has been revised to incorporate MOD 12 (for example, Table 1 and Figure 2).
The South Wambo Underground Mine Modification Environmental Assessment Appendix I Air Quality and Greenhouse Gas Review (Appendix to the April 2016 Mod 12 EA) states that "To minimise dust generation and the potential for off-site impacts during the construction activities, appropriate operational and physical mitigation measures would be implemented in accordance with the Air Quality and Greenhouse Gas Management Plan". However, this AQGGMP does not describe any specific dust generation minimisation measures for construction activities. Ensure specific dust generation minimisation measures for construction activities are addressed.	Table 11 has been revised to describe dust management practices that would be employed for construction activities.
Wambo Coal's online reporting as described in Section 8.4.1 does not appear to be compliant with the requirements of Schedule 6 Condition 13 of DA305-7-2003. The Northern Region Compliance team has been notified of this issue.	WCPL is continuously working to improve its online reporting systems to the satisfaction of the Secretary.

Comment	Consideration of Comment
Requirements of Schedule 5 Conditions 1 to 11 regarding landholder notifications etc are not adequately addressed in Section 4.1.3.1. Section 4.1.3.1 only refers to these conditions but does not describe measures to ensure the requirements of these conditions are met.	The Landholder Notification Procedure previously approved by Department of Infrastructure, Planning and Natural Resources has been revised and included in Appendix D. Sections 4.1.3.1 and 7.0 have been revised to refer to Appendix D.
References to internal procedures (e.g. Spontaneous Combustion Management Plans and Waste Management Plan) must be caveated with a statement of assurance, such as 'Internal procedures have not been reviewed by DPE. WCPL takes responsibility for ensuring these procedures are in accordance with this management plan and generally in accordance with the development consent.	Section 3.4 of the AQGGMP has been revised to address this comment.
Review and revise the AQGGMP to ensure the language of the management plan is clear about what will be done, why, when it is going to done, and who is going to do it.	The AQGGMP has been reviewed, and commitments updated to be more specific.
Some of the hyperlinked cross references are incorrect.	All hyperlinks have been reviewed. The link to WCPL's website has been revised with a contemporary link.
Reporting of incidents to DPE in Section 8.5 requires clarification. "Incidents" require definition and the timeframe for reporting to DPE needs to be clarified.	A definition of 'incident' has been included in Section 8.5 that is consistent with DA305-7-2003 and DA177-8-2004. Incidents causing or threatening material harm to the environment will be reported to DP&E immediately after WCPL becomes aware For all other incidents that do not cause or threaten material harm to the environment associated with the Project, WCPL will notify the Secretary as soon as practicable after WCPL becomes aware of the incident. The exact timing would depend on the nature of the incident. A detailed report would be provided within 7 days (as described in Section 8.5).

DOC17/464525-01; EF13/3816

Wambo Coal Pty Ltd
PMB 1
SINGLETON NSW 2330

Attention: Merri Bartlett

Email: MBartlett@peabodyenergy.com

16 October 2017

Dear Ms Bartlett

WAMBO COAL NOISE AND AIR QUALITY MANAGEMENT PLAN

Reference is made to your emails dated 24 August 2017 and 11 September 2017 to the Environment Protection Authority ("EPA") and the documents titled *WA-Env-MNP 508 Air Quality and Greenhouse Gas Management Plan* and *Wambo Coal Noise Management Plan*.

The EPA encourages the development of such plans to ensure that proponents have met their statutory obligations and designated environmental objectives. However, the EPA does not review these documents as our role is to set environmental objectives for environmental/conservation management, not to be directly involved in the development of strategies to achieve those objectives.

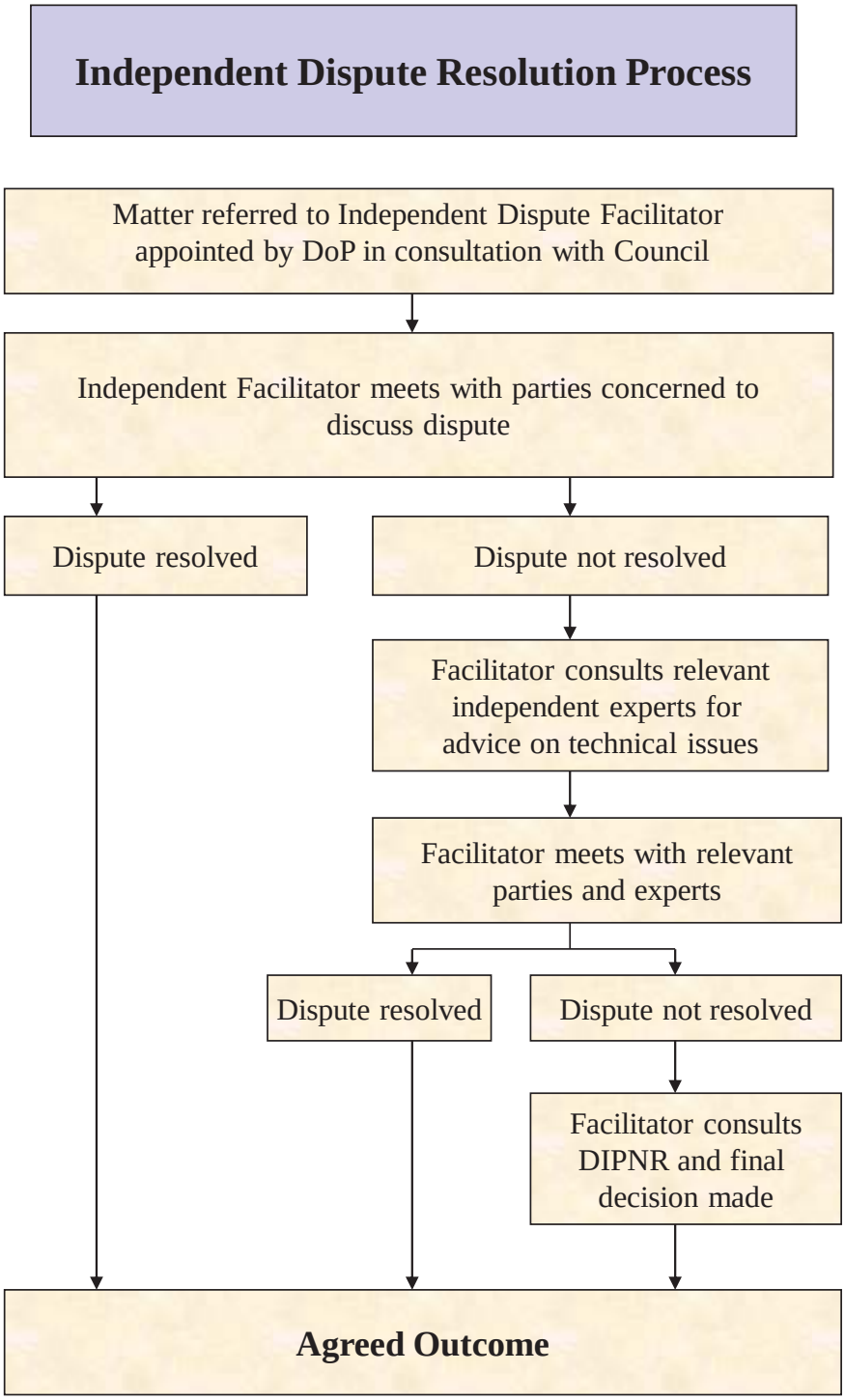
If you require any further information regarding this matter, please contact me on 4908 6833 or by email to hunter.region@epa.nsw.gov.au.

Yours sincerely

NATASHA RYAN
Regional Operations Officer - Hunter
Environment Protection Authority

Contact officer: NATASHA RYAN
(02) 4908 6833
hunter.region@epa.nsw.gov.au

APPENDIX C
INDEPENDENT DISPUTE RESOLUTION PROCESS


Independent Dispute Resolution Process
Matter referred to Independent Dispute Facilitator appointed by DoP in consultation with Council
Independent Facilitator meets with parties concerned to discuss dispute
Dispute resolved
Dispute not resolved
Facilitator consults relevant independent experts for advice on technical issues
Facilitator meets with relevant parties and experts
Dispute resolved
Dispute not resolved
Facilitator consults DIPNR and final decision made
Agreed Outcome

APPENDIX D
WA-ENV-PRO-508.1 LANDHOLDER NOTIFICATION PROCEDURE

WAMBO COAL
LANDHOLDER NOTIFICATION PROCEDURE

Document No. WA-ENV-PRO-508.1
July 2017

Document Control

Document No.	WA-ENV-PRO-508.1
Title	Landholder Notification Procedure
General Description	Procedure for requirements under Conditions 1 to 3, Schedule 5 of DA 305-7-2003
Document Owner	Environment & Community Manager

Revisions

Rev No	Date	Description	By	Checked	Signature
0	July 2005	Original Draft	Resource Strategies	JT/TS	
1	August 2005	Final Draft	Resource Strategies	JT/TS	
2	June 2008	Revision 1	Sarah Bailey	SB	
3	July 2017	Major revision including updated formatting	WCPL	SP	

CONTENTS

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LIST OF ATTACHMENTS

Attachment 1 Fact Sheet

1.0 Introduction

1.1 Background

The Wambo Coal Mine (the Mine) is situated approximately 15 kilometres west of Singleton, near the village of Warkworth, New South Wales (**Figure 1**). Wambo is owned and operated by Wambo Coal Pty Limited (WCPL), a subsidiary of Peabody Energy Australia Pty Limited.

A range of open cut and underground mine operations have been conducted at WCPL since mining operations commenced in 1969. Mining under the current Development Consent (DA 305-7-2003) commenced in 2004 and permits both open cut, underground operations and associated activities to be conducted. The approved run-of-mine (ROM) coal production rate is 14.7 million tonnes per annum and all product coal is transported from WCPL by rail.

1.2 Purpose and Scope

This Landholder Notification Procedure (LNP) has been prepared to outline the procedures that will be undertaken to comply with the Conditions 1 to 3, Schedule 5 of DA305-7-2003 and Condition 1, Schedule 5 of DA177-8-2004.

This Landholder Notification Procedure forms part of WCPL's Environmental Management System (EMS).

1.3 Statutory Requirements

WCPL received Development Consent (DA305-7-2003) in accordance with the *Environmental Planning & Assessment Act 1979* (EP&A Act) on 4 February 2004. Conditions within DA305-7-2003 relevant to landholder notifications at the Mine are summarised in **Table 1**.

WCPL received Development Consent (DA177-8-2004) in accordance with the EP&A Act on 16 December 2004. Conditions within DA177-8-2004 relevant to landholder notifications at the Mine are summarised in Table 1.

Table 1: Development Consent Requirements for Landholder Notifications

Schedule	Condition	Requirements	LNP Section
DA305-7-2003			
5	1	If the air dispersion and/or noise model predictions in the documents listed in condition 2 of schedule 3 identify that the air pollution and/or noise generated by the development are likely to be greater than the air quality and/or noise impact assessment criteria in conditions 2 and 6 of schedule 4, then the Applicant must notify the relevant landowners and/or existing or future tenants (including tenants of mine-owned properties) accordingly before it carries out any development.	**Section 3.1**
5	2	If the results of the air quality and/or noise monitoring required in schedule 4 identify that the air pollution and/or noise generated by the development are greater than the air quality and/or noise impact assessment criteria in schedule 4, then the Applicant must notify the relevant landowners and/or existing or future tenants (including tenants of mine-owned properties) as soon as practicable after identifying the exceedence.	**Section 3.3, AQGGMP, NMP**

Schedule	Condition	Requirements	LNP Section
5	3	Before carrying out any development, the Applicant must develop a procedure in consultation with EPA[1] and NSW Health and approved by the Secretary, for notifying landowners and tenants referred to in condition 1. This procedure must ensure that: (a) all existing and future tenants are advised in writing about: – air quality impacts likely to occur at the residence during the operational life of the mine; and – likely health and amenity impacts associated with exposure to particulate matter; (b) the written advice in (a) is based on current air quality monitoring data, dispersion modelling results, research and literature; and (c) there is an ongoing process for providing current air quality monitoring data, dispersion modelling results, research and literature to the tenants.	**Sections 1.4, 3.1 and 3.2**
DA177-8-2004			
5	1	As soon as practicable following obtaining monitoring results showing an exceedance of the relevant criteria in schedule 4, the Applicant shall notify the affected landowner and/or tenants in writing of the exceedance, and provide regular monitoring results to each of these parties until the development is complying with the relevant criteria again.	**Section 3.3, AQGGMP, NMP**

Notes:
1 Formerly Department of Environment and Conservation.

1.4 Consultation

Version 1 of this LNP was prepared in consultation with the Department of Environment and Conservation and NSW Health in August and September 2005. The Department of Infrastructure, Planning and Natural Resources (now Department of Planning and Environment, DP&E) approved the LNP in September 2005.

This version of the LNP (Version 3) has been prepared to contemporise the notification procedures and to include reference to the NSW Health fact sheet entitled “Mine Dust and You”.

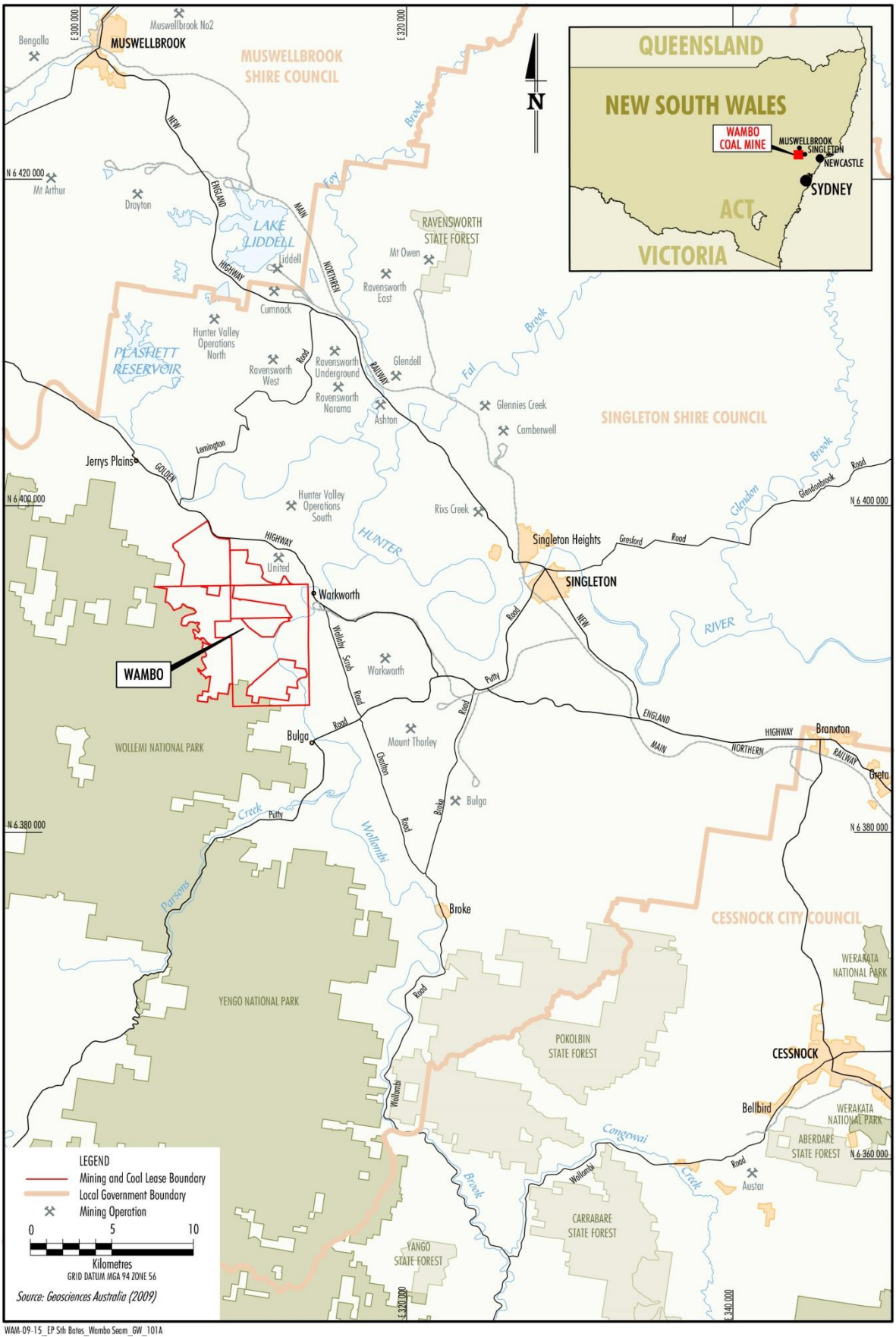

Figure 1: Wambo Coal Regional Location

2.0 Relevant Criteria

2.1 Air Quality Impact Assessment Criteria

WCPL will ensure that all reasonable and feasible avoidance and mitigation measures are employed so that particulate matter emissions generated by the Mine do not exceed the criteria listed in **Table 2** at any residence on privately owned land, or on more than 25 percent of any privately owned land.

Table 2: Air Quality Impact Assessment Criteria

Pollutant	Averaging Period	[d] Criterion	[e] Purpose
Total Suspended Particulate (TSP) Matter	Annual	[a] 90 µg/m^3	Compliance and Acquisition
Particulate Matter <10µm (PM_{10})	Annual	[a] 30 µg/m^3	Compliance and Acquisition
	24 hour	[a] 50 µg/m^3	Compliance
		[a] 150 µg/m^3	Acquisition
		[b] 50 µg/m^3	Acquisition
[c] Deposited Dust	Annual	[b] 2g/m^2/month (maximum increase)	Compliance and Acquisition
		[a] 4g/m^2/month (maximum total)	Compliance and Acquisition

Notes:

a. Total impact (i.e. incremental increase in concentrations due to the development plus background concentrations due to all other sources).
b. Incremental impact (i.e. incremental increase in concentrations due to the development on its own).
c. Deposited dust is to be assessed as insoluble solids as defined by Standards Australia, AS/NZS 3580.10.1:2003: Methods for Sampling and Analysis of Ambient Air - Determination of Particulate Matter - Deposited Matter - Gravimetric Method.
d. Excludes extraordinary events such as bushfires, prescribed burning, dust storms, sea fog, fire incidents or any other activity agreed by the Secretary.
e. Upon written request for acquisition from a landowner listed in Schedule 4, Condition 1 of DA305-7-2003 (refer **Appendix A**), WCPL shall acquire the land in accordance with the procedures in Schedule 5, Conditions 9 to 11 of DA305-7-2003.

2.2 Noise Impact Assessment Criteria

Condition 6, Schedule 4of DA305-7-2003 and Condition 3, Schedule 4 of DA177-8-2004 provide that WCPL must not exceed the noise impact assessment criteria. These noise impact assessment criteria are provided in **Table 3** (and detailed in the following notes):

Table 3: Noise Impact Assessment Criteria dBA

Day $L_{Aeq(15minute)}$	Evening/Night $L_{Aeq(15minute)}$	Night $L_{A1(1minute)}$	Land Number
35	41	50	94 - Curlewis[#]
35	40	50	3- Birrell
			4B – Circosta[#]
			15B – McGowen/Caslick
			16 – Cooper
			23C – Kannar[#]
			25 – Fenwick
			28A & B – Garland
			33 – Thelander/O'Neill
			39 – Northcote
			40 – Muller
			254A – Algie[#]

Day $L_{Aeq(15minute)}$	Evening/Night $L_{Aeq(15minute)}$	Night $L_{A1(1minute)}$	Land Number
35	39	50	5 – Strachan[#]
			6 – Merrick
			7 – Maizey
			37 – Lawry
			48 – Ponder
35	38	50	1 – Brosi
			17 – Carter
			18 – Denney[#]
			38 – Williams
			49 – Oliver
			63 – Abrocuff[#]
			75 – Barnes
			91 – Bailey
35	37	50	27 – Birralee[#]
			43 – Carmody
			137 – Woodruff
			163 – Rodger/Williams
			246 – Bailey
35	36	50	13B – Skinner
			178 – Smith
			188 – Fuller
			262A, B & C – Moses[#]
35	35	50	All other residential or sensitive receptors excluding those receptors listed in Condition 1, Schedule 3 of DA 305-7-2003.

Notes:

Noise generated by the Wambo Mining Complex is to be measured in accordance with the relevant requirements, and exemptions (including certain meteorological conditions), of the NSW Industrial Noise Policy

[#] These dwellings are now owned by mining companies (or their subsidiaries).

3.0 Notification of Landowners

3.1 Initial Notification

During November 2005, WCPL provided the landowners and tenants outlined in **Table 4** with a fact sheet developed by Holmes Air Sciences Pty Ltd that addressed the following:

- air quality impacts likely to occur at the residence during the operational life of the Mine; and
- likely health and amenity impacts associated with exposure to particulate matter.

Table 4: Properties that Received Notifications in November 2005

Dwellings
8B to 8H Warkworth Mining Limited[1]
11B to 11F and 21A Coal and Allied[1]
19A and 19B Kelly[1]
20 Jerrys Plains Coal Terminal[1]
22 Henderson[1#]
23A and 23B Kannar[1#]
31A and 31B WCPL-owned[2]
31C and 31D WCPL-owned[1,2]
40 Muller[1#]
51 C.M. Hawkes Pty Ltd[#]
56 Haynes[1#]
WD to WF WCPL-owned[1]
Private Vacant Land
14 Keys[1#]
23 Kannar[1#]
55 Burley[1]
Other
St Phillips Church[1]
215 Newcastle Gliding Club[1]

Source: Holmes Air Sciences (2003).

[1] Exceedance predicted due to cumulative effects with other mines and background levels.

[2] Formerly Owned by C.M. Fisher.

These dwellings are now owned by mining companies (or their subsidiaries).

There have been no revisions to the air dispersion and/or noise model predictions for the Mine since the initial notifications.

3.2 Notification of Future Tenants

The procedure outlined in this section will apply:

- to land owned by WCPL that is predicted to experience exceedances of the air quality criteria in **Section 2.0** (**Table 4**); and
- during the operational life of the mine.

Prior to entering into any future tenancy agreement, WCPL will advise the prospective tenants of the potential health and amenity impacts associated with living on the land, and give them a copy of the NSW Health fact sheet entitled “Mine Dust and You” (**Attachment 1**).

Annual monitoring data will be made available through the Annual Review (**Section 5.0**).

3.3 Notification of an Exceedance

In accordance with Conditions 1 to 3, Schedule 5 of DA305-7-2003 and Condition 1, Schedule 5 of DA177-8-2004, in the event that air quality and/or noise monitoring detects an exceedance of the relevant criteria (**Section 2**) at a property other than those listed in **Table 4**, the relevant landowner and/or tenant will be provided with the relevant monitoring results at the end of each quarter.

Where the exceedance relates to particulate matter, the landowner and/or tenant will also be provided with a copy of the NSW Health fact sheet entitled “Mine Dust and You”, unless it is has been previously provided in the preceding 12 months (**Attachment 1**).

4.0 Responsibilities

Table 5 below summarises responsibilities documented in the LNP, and should be read in conjunction with this document. Responsibilities may be delegated as required.

Table 5: Landholder Notification Procedure Responsibilities

No	Task	Responsibility	Timing
1	Initial notification to properties where an exceedance is expected	Environment and Community Manager	Complete
2	Notification of future tenants in accordance with Section 3.2	Environment and Community Manager	As required
3	Notification to properties other than those in Table 4 where monitoring indicates an exceedance	Environment and Community Manager	As required

5.0 Reporting and Review

Prior to the end of March each year, WCPL will review the environmental performance of the Mine and submit an Annual Review report to the DP&E. This report will:

- Describe the development (including any rehabilitation) that was carried out in the past year, and the development that is proposed to be carried out over the next year
- Include a comprehensive review of the air quality and noise monitoring results and complaints records of the Project over the past year, which includes a comparison of these results against the:
  - Relevant statutory requirements, limits or performance measures/criteria
  - Monitoring results of previous years; and
  - Relevant predictions in the EA;
- Identify any non-compliance over the last year, and describe what actions were (or are being) taken to ensure compliance
- Identify any trends in the monitoring data over the life of the Project
- Identify any discrepancies between the predicted and actual impacts of the Project, and analyse the potential cause of any significant discrepancies; and
- Describe what measures will be implemented over the next year to improve the environmental performance of the Project.

The Annual Review and a comprehensive summary of air quality and noise monitoring results will be made publicly available at WCPL's website:

https://www.peabodyenergy.com/Operations/Australia-Mining/New-South-Wales-Mining/Wambo-Approvals,-Plans-Reports

Information on the website will be updated regularly as required by DA305-7-2003.

ATTACHMENT 1

FACT SHEET

http://www.health.nsw.gov.au/environment/factsheets/Pages/mine-dust.aspx

Factsheet

Mine dust and you

People living near mine sites often ask about the effects of dust emissions in the air as a result of mining activities.

Last updated: 04 May 2017

What is this fact sheet?

People living near mine sites often ask about the effects of dust emissions in the air as a result of mining activities. This fact sheet has been prepared to explain the type of dust that is generated from mine sites and the potential risks from mine dust to health.

What is particulate matter?

Commonly called "dust," scientists and regulators refer to the term particulate matter (or PM) to describe the range of particles that exists in the air we breathe.

PM exists naturally in the atmosphere, eg sea-salt spray and pollens. PM can be increased due to human activities such as vehicle exhaust, industrial processes, power stations, mining, farming and wood heaters, or smoke from bushfires.

Exposure to PM can be associated with health and amenity impacts. The likely risk of these impacts depends on a range of factors including the size, structure and composition of the PM and the general health of the person.

Sizes of particulate matter

Just as the size of balls we can see ranges from marbles to basketballs, PM can be thought of as microscopic balls of varying sizes. Instead of measuring PM in centimetres as we do with balls, scientists use micrometres (sometimes called "microns") to measure the diameter of particles. A micrometre is one-millionth of a metre and its symbol is µm.

For environmental health purposes, particles are usually described by their size:

Particle size	Description
TSP	Total Suspended Particulate Matter (TSP) refers to the total of all particles suspended in the air. Even the largest of these particles is barely half the width of a human hair.
"larger than" PM10	A subset of TSP, and refers to all particles of size 10 µm in diameter and greater.
PM10	Also a subset of TSP, and includes all particles smaller than 10 µm in diameter (smaller than 1/7th of a hair width). Particles in the size range 2.5 µm to 10 µm in diameter are referred to as coarse particles (PM 2.5-10).
PM 2.5	A subset of both PM10 and TSP categories and refers to all particles less than 2.5µm in diameter. PM2.5 is referred to as fine particles and is mainly produced from combustion processes such as vehicle exhaust.

Particles levels in air are measured by the weight (micrograms) of particles per cubic metre of air (µg/m3). One (µg/m3) equals one millionth of a gram in a cubic metre of air. TSP can also be measured as the weight of dust falling on a given area over time ("dust deposition").

Particulate matter from mining

The vast majority of dust from mining activities consists of coarse particles (around 40 per cent) and particles larger than PM10, generated from natural activities such mechanical disturbance of rock and soil materials by dragline or shovel, bulldozing, blasting, and vehicles on dirt roads. Particles are also generated when wind blows over bare ground and different types of stockpiles. These larger particles can have amenity impacts as well as health impacts.

Fine particles from vehicle exhausts and mobile equipment are also produced at mine sites, though they only account for about 5 per cent of the particles emitted during the mining process. Fine particles produced at mine sites are manly from vehicle and mobile equipment exhausts.

Potential health impacts from PM

The human body's respiratory system has a number of defence mechanisms to protect against the harmful effects of PM. PM is often trapped in sticky mucus on the walls of the airways and can be removed by cilia, small hair-like objects which line the surface of the airways. This mucus can then be swallowed or coughed up.

PM exposure can leas to a variety of health effects. For example, numerous studies link particle levels to increased hospital admissions and emergency room visits and even to death from heart or lung diseases. Both long (over years) and short term (hours or days) particle exposure have been linked to health problems.

Generally, it is thought that fine particles below 2.5 µm in diameter may be of a greater health concern than larger particles as they can reach the air sacs deep in the lungs. However, coarse particles (PM 2.5-10) could also be associated with adverse health effects.

People who may be more susceptible to the health effects of fine and coarse particles are:

- infants, children and adolescents
- elderly
- people with respiratory conditions such as asthma, bronchitis and emphysema
- people with heart disease
- people with diabetes.

If health effects arise from exposure to coarse particles, such as from mining activities, the symptoms are likely to be:

- cough
- wheeze, or worsening of asthma
- increased need for medications (e.g. puffers, antibiotics)
- increased breathlessness.

Some recent research suggests that heart problems, such as angina and heart attacks may also be associated whith coarse particle pollution.

High levels of TSP may also cause coughing, sneezing or sore eyes.

Potential amenity impacts

Amenity impacts from dust are usually associated with coarse particles and particles larger than PM10. The

impact of dust from a nearby mine on local amenity depends on the distance from the mine site and climatic conditions such as wind.

Concerns about amenity from mine site dust often relate to "visibility" of dust plumes and dust sources. Visible dust is usually due to short-term episodes of high emissions, such as from blasting.

Other amenity impacts include dust depositing on fabrics (such as washing) or on house roofs, and the transport of dust from roofs to water tanks, during rain. NSW Health's Rainwater Tanks brochure provides advice on how to maintain water tanks for safe drinking. Strategies to reduce dust in water tanks include first flush devices and desludging.

Government regulations

In New South Wales, outdoor air quality is governed by both State and Commonwealth regulations. The National Environmental Protection Measure (Air NEPM) provides air quality standards that are applied in cities and large towns across Australia. NEPM standards apply to average concentrations across a region.

The NSW Environment Protection Authority (NSW EPA) also has regulatory criteria for assessing ambient air quality. Although consistent with the Air NEPM, these criteria are more comprehensive. NSW EPA Impact Assessment Criteria are used to assess PM in localised areas, close to the mine itself.

The standards imposed by the regulatory authorities take into account what we know about health effects on people with asthma, lung conditions, and heart disease. PM standards and criteria are set to control short (daily) and long term (average) levels. The table below summarises the relevant air quality standards and criteria for mines.

Table 1 - Air Quality Standards and Criteria for Particulate Matter

Pollutant and averaging period	Concentration Standard (µg/m3)	Agency
TSP - 1 year	90	NSW EPA Criterion
PM10 - 1 day	50	NSW EPA Criterion and NEPM Standard
PM10 - 1 year	25	NSW EPA Criterion and NEPM Standard
PM2.5 - 1 day	25	NSW EPA Criterion and NEPM Standard
PM2.5 - 1 year	8	NSW EPA Criterion and NEPM Standard
Dust deposition - 1 year	4 grams/m^2/month (maximum total)	NSW EPA Criterion
Dust deposition - 1 year	2 grams/m^2/month (maximum increase)	NSW EPA Criterion

How can you avoid mine dust?

Provided that mines are operated with proper dust controls it is unlikely that healthy adult residents would suffer any serious health effects from the expected exposure to particulate matter.

If you notice that dust levels are high, try to keep your windows and doors closed. People who have asthma or lung conditions should avoid outdoor activities at these times. An air-conditioner can reduce PM levels inside, but it is important to regularly clean the intake filter.

Residents experiencing the health symptoms outlined in this fact sheet should see their local doctor. For further information about potential health effects from PM see the related link on Air Pollution.

Related links

- **Air Pollution**
- **Air quality**
- **Air quality index fact sheet**
- **Bushfire smoke fact sheet**
- **Dust storms fact sheet**
- **Rainwater tanks brochure**

In NSW you can call 1300 066 055 to talk to your NSW Public Health Unit

Page Updated: Thursday 4 May 2017
Page Owner: **Environmental Health**