

Boggabri Coal Operations Pty Ltd

Air Quality and Greenhouse Gas Management Plan

July 2018 Revision No. 6

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Rev No	Original	1	2	3	4	5	6
Revision Date	December 2012	May 2014	September 2014	January 2015	June 2015	July 2017	July 2018
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Abbreviations

Abbreviation	Term
AEMR	Annual Environmental Management Report
AQMS	Air Quality Management Strategy
AQGHGMP	Air Quality and Greenhouse Gas Management Plan
BCM	Boggabri Coal Mine
BCOPL	Boggabri Coal Operations Pty Ltd
BTM Complex	Boggabri-Tarrawonga-Maules Creek Complex
CCC	Community Consultative Committee
CHPP	Coal Handling Preparation Plant
DoEE	Federal Department of Environment and Energy (Formerly - Department of Sustainability, Environment, Water, Population and Communities)
DP&E	NSW Department of Planning and Environment
DRE	NSW Division of Resources and Energy
EET	Emission Estimation Technique
EA	Environmental Assessment
EPA	Environment Protection Authority
EP&A Act	Environmental Planning and Assessment Act 1979 (NSW)
EPL	Environment Protection Licence under the POEO Act
GHG	Greenhouse Gas
HVAS	High Volume Air Sampler
IAR	Idemitsu Australian Resources
MET	Meteorological Monitoring Station
Mtpa	Million Tonnes Per Annum
NGER	National Greenhouse and Energy Reporting
NGER Act	National Greenhouse and Energy Reporting Act 2007 (Cth)
NOx	Nitrogen Oxides
NPI	National Pollutant Inventory
OEH	NSW Office of Environment and Heritage
PAC	NSW Planning Assessment Commission
Part 3A	Part 3A of the EP&A Act
PCI	Pulverised Coal Injected
$PM_{2.5}$	Particulate matter < 2.5 µm
PM_{10}	Particulate matter < 10 µm
POEO Act	Protection of the Environment Operations Act 1997 (NSW)
PRP	Pollution Reduction Program
ROM	Run of Mine
TARP	Trigger Action Response Plan
TCM	Tarrawonga Coal Mine
TEOM	Tapered Element Oscillating Microbalance
TSP	Total Suspended Particulates

1. Introduction

1.1 Overview

This Air Quality Greenhouse Gas Management Plan (AQGHGMP) has been developed for Boggabri Coal Operations Pty Ltd (BCOPL), a wholly owned subsidiary of Idemitsu Australia Resources (IAR) Pty Limited (80%), Chugoku Electric Power Australia Resources Pty. Ltd (10%) and NS Boggabri Pty Limited (10%).

Boggabri Coal Mine (BCM) is located 15km north-east of the township of Boggabri in north-western New South Wales. BCM is an open cut coal mine that has been operating since 2006. Truck and excavator operations are used to mine a run-of-mine (ROM) coal which, is crushed and screened to produce a thermal coal product or washed in the Coal Handling Preparation Plant (CHPP) to produce Coking or Pulverised Coal Injected (PCI) product. Product coal is loaded onto trains via a train loading facility at the mine site and transported by rail for overseas consumption via the Port of Newcastle.

BCM is managed by BCOPL who also operate the CHPP. BCOPL engages a mining operator to undertake open cut mining activities.

Project Approval number 09_0182 for the Boggabri Coal Mine (BCM), granted by the NSW Planning Assessment Commission (PAC) under Part 3A of the *Environmental Planning and Assessment Act* 1979 (EP&A Act) on 18 July 2012, and as modified from time to time, (Project Approval) allows BCOPL to extend its mining operations for a further 21 years, and increase its production rate to 7 Mtpa of ROM coal from a total resource of 145 Mt.

Schedule 3, Condition 31 of the Project Approval requires the preparation of an AQGHGMP. This plan has been prepared in fulfilment of the requirements. Consultation with the Boggabri Coal Community Consultative Committee (CCC) and the Environment Protection Authority of NSW (EPA) was undertaken during preparation of the AQGHGMP (refer to Section 2).

All BCOPL staff and contractors working at the BCM are required to operate in accordance with this AQGHGMP.

1.2 Purpose of this AQGHGMP

The purpose of the AQGHGMP is to comply with Schedule 3, Condition 31 of the Project Approval and, in doing so, facilitate compliance with the air quality and greenhouse gas management conditions in the Project Approval.

1.3 Application of this AQGHGMP

This AQGHGMP applies to BCOPL employees and contractors at the BCM and covers all areas within the ‘Project Boundary’ as defined in the Project Approval. A figure showing the extent of these areas is provided in Appendix A.

2. Statutory requirements

Schedule 3, Condition 31 of the Project Approval requires the preparation of an AQGHGMP. The specific requirements of the AQGHGMP are set out in Table 2.1 together with a reference to where each condition is addressed in this document.

Additional conditions of the Project Approval relevant to air quality and greenhouse gas management are provided in Appendix B.

Table 2.1 Project Approval AQGHGMP conditions

Applicable Condition	Requirement of Project Approval	AQGHGMP Reference
Schedule 3, Condition 31	The Proponent shall prepare and implement an Air Quality and Greenhouse Gas Management Plan for the project to the satisfaction of the Secretary	Whole AQGHGMP
Schedule 3, Condition 31(a)	This plan must be prepared in consultation with the EPA and the CCC, and be submitted to the Secretary for approval within 6 months from the date of project approval	Appendix F
Schedule 3, Condition 31(b)	This plan must integrate the recommendations of a Site Specific Best Management Determination and Reactive Dust Management Strategy prepared to the satisfaction of the EPA	Section 5.2 and 5.3.
Schedule 3, Condition 31(c)	This plan must describe the measures that would be implemented to ensure: • best management practice is being employed, consistent with the development of the site specific best management determination and reactive dust management strategy; • the air quality impacts of the project are minimised during adverse meteorological conditions and extraordinary events; and • compliance with the relevant conditions of this consent.	 Section 5.2 and 5.3 Section 5.5 and 5.6 Entire AQGHGMP document
Schedule 3, Condition 31(d)	This plan must describe the proposed air quality management system	Entire AQGHGMP document
Schedule 3, Condition 31(e)	This plan must include a risk/response matrix to codify mine operational responses to varying levels of risk resulting from weather conditions and specific mining activities	Section 5.4 and Appendix E
Schedule 3, Condition 31(f)	This plan must include commitments to provide summary reports and specific briefings at CCC meetings on issues arising from air quality monitoring	Section 7.3
Schedule 3, Condition 31(g)	This plan must include an air quality monitoring program that: • uses a combination of real-time monitors and supplementary monitors to evaluate the performance of the project; • adequately supports the proactive and reactive air quality management system; • includes $PM_{2.5}$ monitoring; • includes monitoring of occupied project-related residences and residences on air-affected land listed	 Section 6 Section 6 Section 6.1 Section 6.1

Applicable Condition	Requirement of Project Approval	AQGHGMP Reference
	Table 3.1 subject to the agreement of the tenant and/or landowner; • evaluates and reports on the effectiveness of the air quality management system; • includes a protocol for determining any exceedances of the relevant conditions in this approval	Section 7.1 Section 8
Schedule 3, Condition 31(h)	This plan must include a Leard Forest Mining Precinct Air Quality Management Strategy that has been prepared in consultation with other coal mines in the Precinct to minimise the cumulative air quality impacts of all mines within the Precinct.	Refer to the Boggabri-Tarrawonga-Maules Creek Complex (BTM Complex) Air Quality Management Strategy.

Notes:

- *The requirement for regionally based control sites can be further reviewed if a regional air monitoring network is implemented and operated by the EPA as recommended in the draft Strategic Regional Land Use Plan for New England North West.*
- *The Leard Forest Mining Precinct Air Quality Management Strategy can be developed in stages and will need to be subject to ongoing review dependent on this determination and commencement of other mining projects in the area.*

3. Existing environment

3.1 Background Air Quality

To assess the effects of particulate emissions (dust) on existing air quality from operating activities at BCM, dispersion model predictions (Hansen Baily, 2010) from the four indicative worst case modelled years (Year 1, Year 5, Year 10 and Year 21) have been conducted to identify sensitive receptors as described in Section 3.2.

3.2 Sensitive receptors

Sensitive receptors to dust generated from the BCM were identified during the preparation of the EA (Hansen Bailey, 2010) for the Project Approval, and included in the BTM Complex AQMS. Each sensitive receptor identified is listed in Table 3.1. A figure showing the location of sensitive receptors relative to the BCM is provided in Appendix A.

Table 3.1 Sensitive receptor location and ownership

ID (from EA)	Property name	Ownership	Lot/Plan
2	N/a	Private	111 DP755470
3	N/a	Private	110 DP755470
4	N/a	Private	109 DP755470
N/a	Springfield	BCOPL	150 DP755475
N/a	The Rock	BCOPL	2 DP748046
23	Cooboobindi	BCOPL	1 DP754926
27	Cooboobindi	BCOPL	41 DP754926
32	Billabong	Private	1 DP1099042
33	Brighton	Private	1 DP1092050
35	Belleview	BCOPL	60 DP754948
43	Roma	Private	1 DP509312
44	Glenhope	Private	11 DP775513
52	Jeralong	BCOPL	2 DP716002
54	Tarrawonga	Mine Joint Owned	121 DP754926
N/a	Old School House	Whitehaven Mining	45 DP754953
N/a	Greenhills	Whitehaven Mining	86 DP754953
67	Goonbri	BCOPL	3 DP754927
68	Goonbri	BCOPL	3 DP754927
69	Wirrilah	BCOPL	12 DP754927
79	Northam	BCOPL	132 DP754926
85	Ambardo	Whitehaven Mining	A DP367991
86	Kyalla	Whitehaven Mining	2 DP1131282
88	Pine Grove	Whitehaven Mining	1 DP1015921
90	Barbers Lagoon	Private	143 DP754926
94	Callandar	Mine Joint Owned	149 DP754926
98	Flixton	Whitehaven Mining	65 DP754953

ID (from EA)	Property name	Ownership	Lot/Plan
100	Bailey Park	Whitehaven Mining	A DP100331
115	Hazeldene	Private	168 DP755475
140	Sylvania	Private	17 DP754953
147	Sylvania	Private	1 DP509031
148	Sylvania	Private	49 DP754953
153	Sylvania	Private	44 DP754953
155	Sylvania	Private	6 DP754927

3.3 Predicted impacts on sensitive receptors

Dust dispersion modelling was completed for the EA (Hanson Bailey 2010), including PM10 (µg/m3), TSP (µg/m3) and Dust Deposition (g/m2/month).

This modelling identified two privately owned sensitive receptor properties (refer to Appendix A) that may experience exceedances of BCOPL's air quality assessment criteria over the life of the mine.

- Ambardo, EA ID 85
- Tarrawonga, EA ID 54.

Since the EA (Hansen Bailey, 2010) was prepared, both of the above properties have been acquired by mines within the Boggabri-Tarrawonga-Maules Creek Complex (BTM Complex) and are consequently no longer considered sensitive receptors.

Particulate matter levels at all other privately owned sensitive receptors were predicted to fall within EA (Hanson Baily, 2010) air quality assessment criteria.

3.4 Neighbouring mining operations and exploration activities

BCM is located within an existing mining precinct centred within and around the Leard State Forest, known as the BTM Complex (formerly referred to as Leard State Forest Precinct). In addition to the BCM, the BTM Complex includes the existing Tarrawonga Coal Mine (TCM) to the south and Maules Creek Coal Mine to the northwest.

Tarrawonga Coal Pty Ltd , a subsidiary of Whitehaven Coal, currently operates the TCM, which is an open cut mining operation located southeast of and adjacent to the BCM. The mine has been in operation since June 2006.

The Maules Creek Coal Mine, also owned by Whitehaven Coal, received Project Approval under the EP&A Act in October 2012 and commenced mining operations in 2014.

A figure showing the locations of neighbouring mining operations is provided in Appendix A.

Further detail on the Tarrawonga Coal Mine and Maules Creek Coal Mine cumulative air quality impacts are detailed in the BTM Complex AQMS and that document should be referred to for details on the management of cumulative air quality and greenhouse gas impacts.

3.5 Prevalent meteorological conditions

Summer months at the BCM are mostly hot and winter periods are relatively short with frequent frosts. January is typically the hottest month, reaching an average maximum temperature of 34°C. July is typically the coolest month, reaching an average maximum temperature of 16.9^{o}C.

Temperature inversions are most common in winter months, forming in late afternoon and reaching maximum resistance at dawn. Summer months have higher mean rainfall (approx. 80 mm) compared to winter months (50 mm). There is potential for poor dispersion during inversion conditions.

The mine receives wind from the south-east in summer and the north-west in winter. Winds in autumn and spring months are more variable. Autumn is typically the windiest season. Air quality risk that could affect sensitive receptors to the South and South East of BCM, during high winds will be managed by BCOPL though the implementation of the dust mitigation measures outline in section 5.3.

3.6 Other air quality considerations

NOx emissions emitted from mobile fleet exhausts and blast fumes were assessed in the EA (Hanson Baily, 2010). NOx emissions from these sources were assessed to be minimal and no further modelling was required as, there impacts are considered to be negligible.

There have been minimal spontaneous combustion issues over the life of the mine to date and the EA assessed the spontaneous combustion impact on air quality to be a low risk. The risk of spontaneous combustion will be managed in accordance with the BCOPL Spontaneous Combustion Management Plan.

4. Air quality criteria

4.1 Air quality assessment criteria

BCOPL's air quality assessment criteria, as outlined in Schedule 3, Condition 27 of the Project Approval, are shown in Table 4.1, Table 4.2 and Table 4.3 below.

Table 4.1 Long term criteria for particulate matter

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

[a] *Excludes extraordinary events such as bushfires, prescribed burning, dust storms, fire incidents, or any other activity as agreed by the Secretary.*
[b] *Total impact (i.e. incremental increase in concentrations due to the Project plus background concentrations due to other sources);*

Table 4.2 Short term criteria for particulate matter

Pollutant	Averaging Period	[a] Criterion
Particulate matter < 10 µm (PM_{10})	24 hour	[b] 50 µg/m^3

[a] *Excludes extraordinary events such as bushfires, prescribed burning, dust storms, fire incidents, or any other activity as agreed by the Secretary.*
[b] *Total impact (i.e. incremental increase in concentrations due to the Project plus background concentrations due to other sources);*

Table 4.3 Long term criteria for deposited dust

Pollutant	Averaging Period	Maximum Increase in Deposited Dust Level	Maximum Total Deposited Dust Level
[a] Deposited Dust	Annual	[b] 2 g/m^2/month	[c] 4 g/m^2/month

Notes to Tables 4.1 to 4.3:
[a] *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.*
[b] *Incremental impact (i.e. incremental increase in concentrations due to the Project on its own);*
[c] *Total impact (i.e. incremental increase in concentrations due to the Project plus background concentrations due to other sources);*

4.1.1 Privately owned land

As detailed in the Project Approval, the criteria listed in Table 4.1, Table 4.2 and Table 4.3 apply at any residences on privately owned land or on more than 25% of any privately owned land.

4.1.2 Mine owned residences

BCOPL must ensure that particulate matter emissions generated by the BCM do not exceed the criteria listed in Tables 4-1, 4-2 and 4-3, at any occupied residence on any mine owned land (including land owned by adjacent mines) unless:

(a) all reasonable and feasible avoidance and mitigation measures have been employed to prevent exceedance of the criteria;

(b) The tenant and landowner (where owned by a mine other than BCM), are to be notified of health risks in accordance with the notification requirements under Schedule 4 of the Project Approval.

(c) The tenant on BCOPL owned land can terminate their tenancy agreement without penalty, subject to giving reasonable notice, and BCOPL uses its best endeavours to provide assistance with relocation and sourcing of alternative accommodation.

(d) 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 a mine other than BCM).

(e) Particulate matter air quality monitoring is undertaken to inform the tenant and landowner (where owned by a mine other than BCM) of potential health risks.

(f) The monitoring data are provided 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.

If required, these commitments must be met to the satisfaction of the Secretary.

4.2 Air quality acquisition criteria

As required by Schedule 3, Condition 29 of the Project Approval, if particulate matter emissions generated by the BCM exceed, or contribute to an exceedance of the relevant cumulative criteria in Table 4.4, Table 4.5 or Table 4.6 at any residence on privately-owned land or on more than 25% of any privately-owned land, then on receiving a written request for acquisition from the landowner, BCOPL is required to acquire the land in accordance with the procedures in Project Approval Conditions 8 and 9 of Schedule 4.

Table 4.4 Long term acquisition criteria for particulate matter

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

[a] *Excludes extraordinary events such as bushfires, prescribed burning, dust storms, fire incidents, or any other activity as agreed by the Secretary.*
[b] *Total impact (i.e. incremental increase in concentrations due to the Project plus background concentrations due to other sources);*

Table 4.5 Short term acquisition criteria for particulate matter

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

[a] *Excludes extraordinary events such as bushfires, prescribed burning, dust storms, fire incidents, or any other activity as agreed by the Secretary.*
[b] *Total impact (i.e. incremental increase in concentrations due to the Project plus background concentrations due to other sources);*
[c] *Incremental impact (i.e. incremental increase in concentrations due to the Project on its own);*

Table 4.6 Long term acquisition criteria for deposited dust

Pollutant	Averaging Period	Maximum Increase in Deposited Dust Level	Maximum Total Deposited Dust Level
[a] Deposited Dust	Annual	[b] 2 g/m^2/month	[c] 4 g/m^2/month

[a] 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.
[b] Incremental impact (i.e. incremental increase in concentrations due to the Project on its own);
[c] Total impact (i.e. incremental increase in concentrations due to the Project plus background concentrations due to other sources);

5. Management measures

5.1 General management measures

The following general management measures will be applied by all BCOPL employees and contractors.

5.1.1 Approved hours of work

Operational activities will be undertaken within the hours specified in Table 5.1.

Table 5.1 Approved hours

Activity	Monday to Friday	Saturdays	Sundays and Public Holidays
Operational activities	24 hours	24 hours	24 hours
Blasting*	9:00 am to 5:00 pm	9:00 am to 5:00 pm	No time**

NNote: * Blasting is limited to one blast per day (unless an additional blast is required following a blast misfire) and no more than 4 blasts per week, averaged over a calendar year ** Without the written approval of the Secretary.

5.1.2 Speed limits

Speed limits will continue to apply within the project boundary specified in the Project Approval, to minimise wheel generated dust. Operators are required to drive to road conditions and the speed limits nominated in various parts of BCM by signs to control vehicle speed in those areas. In areas not signposted, the speed limits within the main trafficable areas listed in Table 5.2 apply.

Table 5.2 Speed limits

Area	Speed limit
Mine areas and haul roads	60km/hr
Mine infrastructure area unsealed roads	40km/hr
Around workshop, product stockpiles and park-up areas	20km/hr

Note: speed limits may also be changed in response to adverse weather conditions, air quality monitoring results or other factors.

5.2 Pollution reduction programs

Pollution Reduction Programs (PRPs) have previously been included in the BCM EPL (12407), that are relevant to air quality include:

1. PRP Coal Mine Particulate Matter Control Best Practice, completed 29 June 2012
2. PRP Wheel Generated Dust, completed 15 August 2014,
3. PRP Disturbing and Handling Overburden under Adverse Conditions, completed 15 August 2014,
4. PRP Trial of Best Practice Measures for Disturbing and Handling Overburden completed 14 April 2014,

5. PRP Coal Mine Wind Erosion of Exposed Land Assessment Completed 14 July 2015

The control measures from the relevant PRP's (1, 2 & 3) have been considered in sections 5.3 and 5.4 this AQGHGMP.

5.3 Air quality mitigation measures

The air quality and greenhouse gas mitigation measures to be implemented for the various activities within the BCM are outlined in Table 5.3. While BCOPL is ultimately responsible for managing air quality and greenhouse gas impacts from the BCM, this responsibility is shared by all entities undertaking activities at BCM. The mitigation measures outlined in Table 5.3 are therefore, separated by activity and by the relevant entity that shares responsibility for implementation.

Table 5.3 Air quality mitigation measures for operational activities

Activity/ Risk	Air quality mitigation measures	Responsibility for implementation	
		BCOPL	Mining operator
Adverse conditions	• Undertake visual assessment of mining areas to identify dominant sources of air emissions and modify operations as required. • Use real time data from the tapered element oscillating microbalance (TEOM), meteorological station and forecasts in order to predict: ▪ weather ▪ dust levels. • Review measured data to determine if operations are a significant contributor to recorded dust levels.	•	•
Procurement	Consider the potential for air emissions when purchasing new equipment. Where practical NO_X and GHG performance will be included as part of the options analysis for new equipment.	•	•
Maintenance	Undertake regular maintenance on all mobile equipment to minimise air quality impacts and greenhouse gas emissions.	•	•
Drilling	• Fit all drill rigs with dust suppression equipment. • Drill operators are to inspect the dust suppression system on drill rigs at the start of each shift to ensure it is fully operational before commencing work. • Refill drill rig water tanks where required.		•
Blasting	• Stem blast holes to prevent venting explosion gases. • Design blasts to avoid venting of explosive force. • Postpone blasting during adverse meteorological conditions (i.e. wind speed > 7m/s, low cloud cover, during temperature inversions stability class G or higher). • Further detail and mitigation measures in the BCOPL Blast Management Plan (including measures to minimise blast fumes and NO_X generation).		•
Disturbance	• Minimise the amount of ground disturbance where practicable. • Revegetate disturbed areas as soon as practical after disturbance. • Where required undertake water cart dust suppression on unsealed roads and trafficable areas.	•	•
Haul Road Management	• Minimise overburden and ROM coal haulage distances through mine planning. • Maximise water cart efficiency through planning. • Track water cart utilisation and modify operations as required.		•

Activity/ Risk	Air quality mitigation measures	Responsibility for implementation	
		BCOPL	Mining operator
	• Assign high water cart priority to grader routes and freshly graded haul roads. • Establish 1-2m windrows where practicable on all haul roads and around ROM stockpiles to minimise the generation of wind-blown dust.		
Loading/ unloading ROM coal and overburden	• Avoid ripping softer overburden during periods of higher winds (i.e. > 7 m/s).. • Minimise spillage from truck loading, unloading and cleaning up as soon as practical. • Where required minimise drop heights when loading/unloading coal and overburden. • Consider relocating dumping to areas that minimise the potential for dust during adverse weather conditions (refer to **Error! Reference source not found.**).		•
Topsoil stripping	• Where possible, use machinery that minimises the generation of dust during topsoil stripping. • Relocate/reschedule stripping, handling and emplacement of topsoil during high winds		•
Topsoil Stockpiling	• Revegetate longer-term topsoil stockpiles to prevent wind-blown dust in accordance with Soil Management Protocol.	•	•
Rehabilitation	• Topsoiled areas are to be revegetated as soon as practicable after spreading to minimise the generation of wind-blown dust. • Undertake rehabilitation of overburden dumps as soon as practicable.	•	
Coal Handling Plant	• Use dust suppression on product coal stockpiles to minimise dust generation where required. • *Use covers on ROM coal conveyors (i.e. dry coal) and bin enclosures on these conveyor transfer points. • ROM bin use sprinklers for dust suppression. • Aim to have choked feeds on all bins.	•	
	• Consider increasing the rate of watering of the ROM bin and product stockpiles during visible dust emissions. • Maintain minimum drop heights from stackers to stockpiles. • Aim to load trains with the loading chute at lowest practical position to minimise dust generation. • Minimise and clean up spills during loading/unloading of coal. • Undertake regular inspections and maintenance of dust suppression equipment.	•	
	• Where appropriate, maintain windrows and wind-barriers around ROM coal stockpiles to minimise wind-blown dust.	•	•
Maximising	• Identify energy efficiency opportunities and implement actions to improve efficiency.	•	•

Activity/ Risk	Air quality mitigation measures	Responsibility for implementation	
		BCOPL	Mining operator
energy efficiency	• Lighting and heating are only used when required. • Consider using alternative fuels (e.g. biodiesel, solar panels and solar hot water systems) where economically and practically feasible.		

- * Product coal conveyors (i.e. tripper style stackers) are uncovered allow stacking of coal on the product coal stockpile. Reject coal is sufficiently wet (i.e. 22% moisture) to minimise dust emissions from conveyors and transfer points.

5.4 Risk response matrix

BCOPL will use the real time Tapered Element Oscillating Microbalances (TEOMs) located at Tarrawonga and Wilberoi East and the portable real time mobile air quality monitors[1] located at mine owned properties or nearby the mine, as shown in Figure 1 (see Appendix A), to respond to elevated dust levels or adverse meteorological conditions. These monitors provide BCOPL with the ability to initiate dust mitigation measures based on a predetermined trigger level to manage the risks of dust generating activities or adverse meteorological conditions at BCM.

Appendix E provides an example of the risk response matrix implemented at BCM to manage the risk of dust emissions from mining activities. Where the real time TEOM or portable air-quality monitors record dust levels over the 'investigate and prepare' trigger levels or adverse meteorological conditions are recorded, a 'dust investigation alert' will be issued and the dust investigate response measures will be considered. In the event dust levels or meteorological conditions are recorded above the 'action trigger' in Appendix E and it is identified the dust emissions are increased due to BCM operations, then the dust action response measures will be considered by BCOPL and implemented where necessary. Dust preparation and action response measures include:

Preparation actions

- Reviewing monitoring data to identify appropriate preparation responses.
- Investigating potential causes of elevated dust or areas that are most at risk of dust generation during adverse weather conditions.
- Observing whether appropriate levels of dust suppression are being applied.
- Preparing sites for actions to reduce dust emissions.
- Ensuring dust suppression equipment on drill rigs is functional.
- Preparing for additional watering of product coal stockpiles and conveyor transfer points.
- Preparing for water cart reallocations to dust generating areas.
- Preparing to reschedule blasting activities during adverse meteorological conditions.
- Preparing to increase the use of water carts on haul roads, ROM stockpiles, and ancillary areas.
- Preparing to relocate trucks, dozers and graders away from high risk dust areas.
- Planning for the rescheduling of topsoil stripping, handling and emplacement.

Response actions

- Amending working hours or working locations during unfavourable dust dispersion conditions.
- Temporary rescheduling of work within an area that is identified as a likely contributor to dust emissions until acceptable controls are implemented. This includes rescheduling drilling, topsoil handling, overburden handling, coal handling, or blasting activities.

[1] *BTM Complex Plan allows for the staged implementation of real time air quality monitors to verify the number of samplers required to achieve the monitoring outcomes for BCM. Locations shown in figure 1 are indicative.*

- Increasing spraying of water to managed dust on windrows, stockpiles and batters
- Modifying coal, topsoil or overburden handling operations
- Reallocating or supply additional water carts to dusty areas.

5.5 Additional air quality mitigation

Properties referred to under Schedule 3, Condition 26 of the Project Approval have since been acquired by mine owners within the BTM Complex and therefore procedures for additional air quality mitigation by request are not relevant to this plan.

5.6 Extraordinary external dust events

Should an unforeseen extraordinary external dust event occur, BCOPL will initiate responses in accordance with the risk response matrix, as described in section 5.4. The specific response actions taken will be commensurate with the magnitude of impact, as identified through monitoring.

6. Monitoring

6.1 Air quality monitoring

BCOPL is responsible for undertaking air quality monitoring for the BCM as required by the Project Approval and the EPL. Monitoring is to be undertaken in accordance with the document '*Approved Methods for Sampling and Analysis of Ambient Air Pollutants in NSW*' (EPA, 2006). The approved sampling methods to be followed for the various types of air quality monitoring at the BCM are provided in Appendix C.

The air quality monitoring network for the BCM comprises a combination of licensed and unlicensed monitoring sites. Only licensed monitoring sites (those that occur in the EPL) are used to assess compliance with the air quality criteria outlined in Section 4.1. The current air quality monitoring network includes, two high volume air sampler (HVAS), a tapered element oscillating microbalance (TEOM), three deposited dust gauges, and will include up to four portable real-time PM_{10} monitors (e-samplers or equivalent), the details of which are provided in Table 6.1. A figure showing the location of each air quality monitoring sites is provided in Appendix A.

Table 6.1 Air quality monitoring sites

Site ID	EPL ID	To be used for compliance monitoring?	Type	Units	Frequency	Method *
D4	24	Yes	Deposited dust	g/m^2/month	Monthly	AM-19
D5	25	Yes	Deposited dust	g/m^2/month	Monthly	AM-19
D6	26	Yes	Deposited dust	g/m^2/month	Monthly	AM-19
Roma	N/A	Yes	HVAS (PM_{10})	$\mu g/m^3$	Every 6 days	AM-18
Merriown	45	Yes[&]	HVAS (PM_{10})	$\mu g/m^3$	Every 6 days	AM-18
Tarrawonga	N/A	No	TEOM (PM_{10})	$\mu g/m^3$	Continuous	AM-22
Wilberoi East	N/A	Yes	TEOM (PM_{10} & $PM_{2.5}$)	$\mu g/m^3$	Continuous	AM-22
BTM Complex Portable Samplers (x4)[^]	N/A	No	TEOM (PM_{10} & $PM_{2.5}$)	$\mu g/m^3$	Continuous	AM-22

Note: * refer to appendix C for approved sampling methods.
N/A not nominated in EPL12407(May 2018)
[^]staged installation of portable samples coordinated with BTM complex operators
[&]Merriown EPL monitoring point will be removed from the EPL as the monitor is located on Mine owned property. The PA and EPL air quality criteria are not applicable at this location.

PM_{10} HVA Samplers are located at the "Roma" and "Merriown" properties to the southwest of the BCM.

6.1.1 Real-time monitoring

The BCM real-time monitoring system is to be managed by BCOPL. The Tarrawonga Tapered Element Oscillating Microbalance (TEOM) and meteorological station (MET) provide monitoring data to an internal website (http://www.novecom.net/sentinex/) in real-time. Nominated BCOPL employees and contractors are provided with a login to the website,

allowing them to investigate dust levels and meteorological conditions and respond as outlined in the risk response matrix provided in Appendix E.

The real-time monitoring system will send automated text message(s) (SMS) notifying to nominated employees and contractors when elevated dust levels or adverse meteorological conditions are recorded above trigger levels specified in risk response matrix (refer to Appendix E) and once notified the response measures in the matrix will be considered.

6.1.2 BTM Complex monitoring network

The BTM Complex monitoring network integrates and coordinates the monitoring efforts of all three mines (Boggabri, Tarrawonga and Maules Creek).

In addition to the BCOPL managed monitoring sites listed in Table 6.1, BCOPL will also use data from the BTM Complex air quality monitoring network to monitor compliance and assist with on-site dust management. Details of the BTM Complex air quality monitoring network are provided in the BTM Complex AQMS, developed jointly between Maules Creek Coal, TCPL and BCOPL.

The following items from the BTM Complex AQMS are particularly relevant to the BCM:

- Predictive and portable real-time air quality monitoring will be integrated between all three sites, whereby data will be received and processed from weather stations and air quality monitoring equipment in the entire BTM Complex network.
- The BTM Complex operators will install where required portable real-time PM10 monitors (e-samplers or equivalent) initially for day to day dust management. The conceptual monitoring locations shown in Appendix A will allow for the analysis of upwind PM10 concentrations along the north/south and southeast/northwest axis that correspond to the prevailing wind directions to identify contributing dust sources. The portable monitoring locations will move periodically as BTM Complex mining operations progress.

6.2 Meteorological monitoring

The Project Approval requires that a permanent meteorological station (MET) is installed and maintained to continuously measure and record wind speed, wind direction, temperature, solar radiation and rainfall at BCM. A figure showing the location of the BCOPL meteorological monitoring station (MET) is provided in Appendix A.

The BCM meteorological monitoring station provides real-time data to BCOPL employees and contractors. Meteorological data is used for:

- assessing compliance
- guiding the management of dust generating activities (refer to Appendix E)
- reporting requirements.

The parameters recorded by the meteorological monitoring station as specified in the EPL and the method by which they must be sampled are outlined in Table 6.2.

Table 6.2 Meteorological monitoring requirements

Parameter	Units	Frequency	Averaging Period	Method*
Temperature at 2 m	^{o}C	Continuous	15 minute	AM-4
Temperature at 10 m	^{o}C	Continuous	15 minute	AM-4
Wind direction at 10 m	^{o}	Continuous	15 minute	AM-2 & AM-4
Sigma theta at 10 m	^{o}	Continuous	15 minute	AM-2 & AM-4
Rainfall	mm/hr.	Continuous	1 hour	AM-4
Solar radiation	W/m^2	Continuous	15 minute	AM-4
Additional requirements: - Siting & Measurement	N/a	N/a	N/a	AM-1 & AM-2 AM-2 and AM-4

Note: * refer to appendix C for approved sampling methods.

6.3 Offensive odours

In accordance with Schedule 3, Condition 23 of the Project Approval and section 129 of the POEO Act 1997, BCOPL is required to manage offensive odours. A potential source of odour is the spontaneous combustion coal and NO_x from blast fumes. BCOPL will minimise the potential for NO_x emission by implementing the control measures in the Blast Management Plan. If material prone to spontaneous combustion is identified, any odours resulting from spontaneous combustion events will be managed as outlined in the BCOPL Spontaneous Combustion Management Plan. :

6.4 Notification to landholders and the community

If monitoring indicates an exceedance of the air quality assessment criteria listed in Section 4 as a result of BCM operations, BCOPL will notify in writing, those privately owned affected landowners (refer to Table 3.1). The written notification will be prepared by the BCOPL Environment Superintendent and will include the following information:

- details of the exceedance (i.e. date, time, location, dust levels)
- a copy of relevant air quality monitoring data for the month leading up to and including the date of the exceedance
- the NSW Health fact sheet entitled “Mine Dust and You”.

Details of exceedances with the air quality criteria in will also be presented to CCC meetings, as required.

7. Reporting

The air quality and greenhouse gas reporting requirements for the BCM are outlined in the following subsections.

7.1 Annual Review

The Annual Review will review the results of air quality monitoring and evaluate the effectiveness of the air quality management system for the previous calendar year. As per the requirements of Schedule 5, Condition 4 of the Project Approval, the Annual Review will:

- Include a comprehensive review of the monitoring results and complaints records 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.

7.2 Real-time monitoring reports

In accordance with Schedule 5, Condition 13 of the Project Approval, BCOPL is required to publish validated real-time air quality monitoring data on the BCOPL website (https://www.idemitsu.com.au/operations/boggabri-coal/operational-information/).The published monitoring data will:

- be presented in a clearly understandable form
- include identification of mine operational responses to monitoring data and weather forecasts
- include provision for on-line input/response by members of the community and real-time engagement with regionally based regulatory compliance staff.

Preliminary (i.e. not validated) data will be made available daily for viewing via the BCOPL website, as is undertaken by other mines in the BTM Complex. Validated data will be provided on the BCOPL website for viewing monthly. Monthly real-time monitoring reports will be made available within 2 weeks of the previous month's monitoring data being received by BCOPL.

The proposed timeframe for the implementation of real time air quality monitoring system is outlined in Section 6 of the BTM Complex AQMS.

7.3 Briefings to CCC

During meetings with CCC, members will be briefed on relevant issues arising from air quality monitoring and where required be provided with a summary of any air quality reports.

8. Incident and complaint management

All environmental incidents, complaints, non-conformance or exceedance of air quality performance criteria identified by monitoring or reporting will be managed as per the BCOPL Incident Management Standard. All environment incidents will be reported to the BCOPL HSEC Manager using the BCOPL Incident Report Form. Following an incident, the BCOPL HSEC Manager is responsible for assigning any corrective or preventative actions.

In accordance with Schedule 5, Conditions 2, and 8 of the Project Approval, and the relevant conditions of the EPL, BCOPL will notifiy, at the earliest opportunity, the Department of Planning and Environment and any other relevant agencies of any incident that has cause, or threatens to cause, material harm to the environment. For any other incident associated with the project, BCOPL will notify the Department of Planning and Environment and any other agencies as soon as practicable after BCOPL becomes aware of the incident. Within 7 days of the date of the incident, BCOPL will provide the Department of Planning and Environment and any other relevant agencies with a detailed report on the incident, and such further reports as may be requested.

Where an exceedance of criteria and/or performance measure(s) has occurred, BCOPL will, at the earliest opportunity:

- 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 Department of Planning and Environment describing those options and any preferred remediation measures or other courses of action; and
- Implement remediation measures as directed by the Department of Planning and Environment,

to the satisfaction of the Department of Planning and Environment.

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9. Corrective and preventative actions

Contractors and BCOPL employees are to be involved in implementation of corrective and preventative actions at the BCM.

9.1 Preventative actions

Preventative actions will be managed as follows:

- A preventative action may be identified without an environmental incident, non-conformance or non-compliance occurring.
- Preventative actions will be identified and agreed with BCOPL management prior to being implemented.
- Preventative actions may include physical works or changes to plans or procedures, training or other requirements.

9.2 Non-compliances and corrective actions

Non-compliances and non-conformances will be detected through verifications processes such as monitoring, inspections and audits. Corrective actions will be managed as follows:

- When a non-compliance / non-conformance issue is detected, corrective actions will be identified, communicated, agreed on with BCOPL management, and implemented.
- Relevant contractors will be notified immediately of any non-compliant activities that present a risk of causing material environmental harm.
- Where necessary, corrective actions will include a review of relevant plans and procedures.
- Where the non-conformance or non-compliance issue is identified through an inspection, audit or monitoring event, any subsequent corrective actions will be linked to the record of that event.
- Non-compliance / non-compliance reports will be reviewed on a regular basis to ensure actions are progressed appropriately.

10. Roles and responsibilities

The roles and responsibilities for implementation of the AQGHGMP are presented in Table Table 10.1: Roles and Responsibilities.

Table 10.1: Roles and Responsibilities

Role	Responsibility
BCOPL General Manager Operations	• Provide sufficient environmental resources for effective implementation of this management plan. • If required negotiate with affected parties to resolve ongoing complaints.
BCOPL Operations Manager	• Mining and air quality mitigation measures are to be undertaken in accordance with this plan.
BCOPL Health, Safety, Environment and Community (HSEC) Manager	• Provide sufficient environmental resources for effective implementation of this management plan. • Mining and air quality mitigation measures are to be undertaken in accordance with this management plan.
BCOPL CHPP Manager	• Mining and air quality mitigation measures are to be undertaken in accordance with this plan.
BCOPL Environment Superintendent	• All air quality monitoring is to be undertaken according to the requirements of this management plan and relevant Australian standards. • Respond to community complaints. • Liaise with regulatory authorities regarding air quality and greenhouse gas management. • Schedule additional air quality monitoring at the site of a sensitive receptor if required, in accordance this management plan. • Exceedances are reported to the relevant regulatory authority in accordance this management plan. • Coordinate the site's real-time air quality and meteorological monitoring system. • Coordinate reviews of this management plan. • Make employees and contractors aware of their obligations under this management plan.
Mining operator	• Implement air quality mitigation measures in accordance this plan. • Develop and implementing specific procedures for the employees and subcontractors under their responsibility to facilitate compliance with this management plan. • Employees and subcontractors under their control are to be aware of their obligations under this management plan. • Provide relevant environmental data to assist BCOPL with their reporting requirements, in accordance this plan.
All BCOPL employees and contractors	• Undertake activities, as required, in accordance with this management plan under instruction from their supervisor. • Inform their Supervisor or the BCOPL Environment Superintendent of any air quality related issues as they arise.

11. Review

Review of the AQGHGMP will be undertaken by BCOPL in accordance with Project Approval Schedule 5 condition 5, within 3 months of the submitting the following:

- the Annual Review under condition 4, Schedule 5 of the Project Approval;
- incident report under condition 8, Schedule 5 of the Project Approval;
- independent audit under condition 10, Schedule 5 of the Project Approval; and
- any relevant modification to the Project Approval.

Where this review results in revisions to any such document, then within 4 weeks of the completion of the revision, unless the Secretary agrees otherwise, the revised document will be submitted to the Secretary for approval.

12. References

12.1 Internal

- BCOPL Blast Management Plan
- BCOPL Incident Management Standard
- BCOPL Spontaneous Combustion Management Plan
- BCOPL, PRP Assessment of Coal Mine Particulate Matter Control Best Practice Pollution Reduction Program, 2012.
- BCOPL, PRP Wheel Generated Dust.
- BCOPL, PRP Disturbing and Handling Overburden under Adverse Conditions.
- BCOPL, PRP Trial of Best Practice Measures for Disturbing and Handling Overburden.
- BCOPL, PRP Coal Mine Wind Erosion of Exposed Land Assessment.

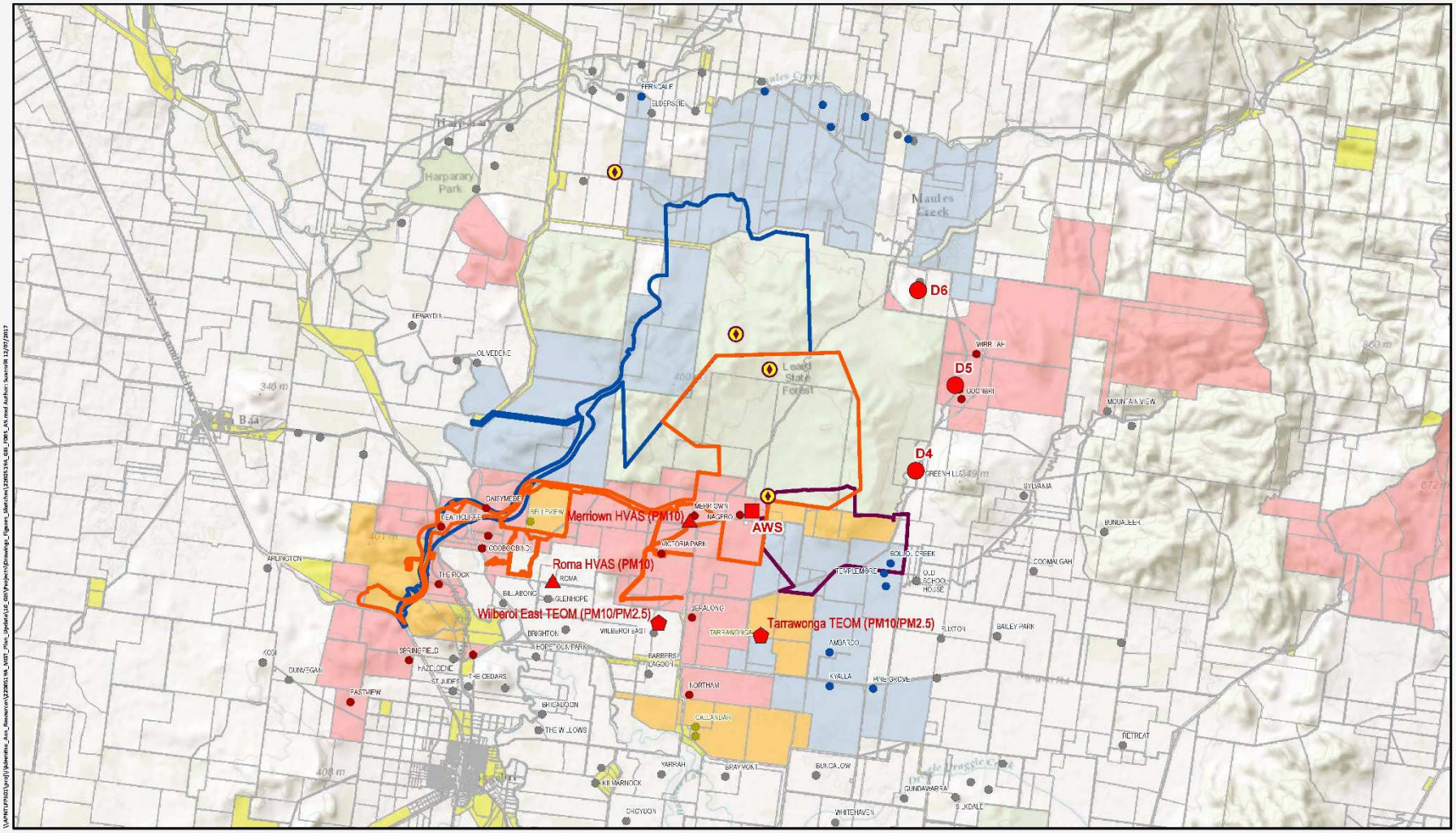
12.2 External

- Australian Standard 2923-1987. *Ambient Air - Guide for Measurement of Horizontal Wind for Air Quality Applications*
- Australian Standard AS/NZS 35080.9.6:2003: *Methods for Sampling and Analysis of Ambient Air – Determination of Suspended Particulate Matter – PM_{10} High Volume Sampler with Size Selective Inlet – Gravimetric Method*.
- Australian Standard AS/NZS 3580.10.1:2003: *Methods for Sampling and Analysis of Ambient Air – Determination of Particulate Matter – Deposited Matter – Gravimetric Method*
- Australian Standard 2922-1987. *Ambient Air-Guide for Siting of Sampling Units*
- Australian Standard 2924.1-1984 *Ambient Air - Particulate Matter Part 1 - Determination of Deposited Matter Expressed as Insoluble Solids, Ash, Combustible Matter, Soluble Solids and Total Solid*
- DEDIM Spontaneous Combustion Management Plan.
- EPA (2006) *Approved Methods of the Sampling and Analysis of Air Pollutants in NSW*
- Hansen Bailey (2010) *Continuation of Boggabri Coal Mine Environmental Assessment*. Singleton, NSW
- Hansen Bailey (2011) *Continuation of Boggabri Coal Mine Environmental Assessment – Residual Matters Report*. Singleton, NSW
- Holmes Air Sciences (2005) *Air Quality Assessment: Boggabri Coal Mine*
- Holmes Air Sciences (2009) *Air Quality Assessment: Boggabri Coal Open Cut Mine*
- Pacific Environment Limited (2014) *Boggabri PRP Identification of Adverse Weather Conditions for Overburden Handling*

- PAEHolmes (2011) *Review and Recommendations for Boggabri/Tarrawonga/Maules Creek Cumulative Air Quality Monitoring*. Prepared for Boggabri Coal Pty Ltd, Tarrawonga Coal Pty Ltd, Maules Creek Project. South Brisbane, QLD
- PAEHolmes (2011) *Continuation of Boggabri Coal Mine Air Quality Assessment.* Prepared for Hansen Bailey on behalf of Boggabri Coal Pty Ltd, Tarrawonga Coal Pty Ltd, Maules Creek Project. South Brisbane, QLD
- Protection of the Environment Operations (Clean Air) Regulation 2010 (as amended)

Appendix A

Air quality monitoring and locality plan



\\APNTLFPS01\proj\I\Idemitsu_Aus_Resources\2200519A_MGT_Plan_Update\10_GIS\Projects\Drawings_Figures_Sketches\2200519A_GIS_F005_A9.mxd Author: SuansriR 12/07/2017

Figure 1
Air quality monitoring locations
and sensitive receivers

Appendix B

Property acquisition requirements

Property Acquisition

If the air quality generated by BCPL causes short term exceedances of the criteria in **Table 4.5** at any residence on privately-owned land or on more than 25% of any privately-owned land, then on receiving a written request for acquisition from the landowner, BCPL shall acquire the land in accordance with the procedures in Project Approval Schedule 4 Condition 8 and 9 (summarised below).

If the air quality generated by BCPL causes sustained long term exceedances of the criteria in **Table 4.4** and **Table 4.6** at any residence on privately-owned land or on more than 25% of any privately-owned, then on receiving a written request for acquisition from the landowner, BCPL shall acquire the land in accordance with the procedures in Project Approval Schedule 4 Condition 8 and 9 (summarised below).

Project Approval Schedule 4 Condition 8

Within 3 months of receiving a written request from a landowner with acquisition rights, Boggabri Coal shall make a binding written offer to the landowner based on:

(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, 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, but excluding any improvements that have resulted from the implementation of the additional mitigation measures required under conditions 3 and 26 of schedule 3;*

(b) the reasonable costs associated with:

- *relocating within the Tamworth, Narrabri, Gunnedah or Moree local government area, or to any other local government area determined by the Secretary; and*
- *obtaining legal advice and expert advice for determining the acquisition price of the land, and the terms upon which it is to be acquired; and*

(c) reasonable compensation for any disturbance caused by the land acquisition process.

However, if at the end of this period, Boggabri Coal 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 to:

- *consider submissions from both parties;*
- *determine a fair and reasonable acquisition price for the land and/or the terms upon which the land is to be acquired, having regard to the matters referred to in paragraphs (a)-(c) above;*
- *prepare a detailed report setting out the reasons for any determination; and*
- *provide a copy of the report to both parties.*

Within 14 days of receiving the independent value/s report, Boggabri Coal shall make a binding written offer to the landowner to purchase the land at a price not less than the independent value/s determination.

However, if either party disputes the independent valuer's determination, then within 14 days of receiving the independent value/s report, they may refer the matter to the Secretary for review. Any request for a review must be accompanied by a detailed report setting out the reasons why the party disputes the independent value/s determination. Following consultation with the independent valuer and both parties, the Secretary will determine a fair and reasonable acquisition price for the land, having regard to the matters referred to in paragraphs (a)-(c) above, the independent value/s report, the detailed report of the party that disputes the independent value/s determination and any other relevant submissions.

Within 14 days of this determination, Boggabri Coal shall make a binding written offer to the landowner to purchase the land at a price not less than the Secretary's determination.

If the landowner refuses to accept the Boggabri Coal's binding written offer under this condition within 6 months of the offer being made, then Boggabri Coal's obligations to acquire the land shall cease, unless the Secretary determines otherwise.

Project Approval Schedule 4 Condition 9

Boggabri Coal shall pay all reasonable costs associated with the land acquisition process described in condition 6 above, including the costs associated with obtaining Council approval for any plan of subdivision (where permissible), and registration of this plan at the Office of the Registrar-General.

Appendix C

Approved methods for air quality monitoring

Table E outlines the relevant EPA approved methods for air quality monitoring at the Boggabri Coal Mine, as defined in '*Approved Methods for Sampling and Analysis of Ambient Air Pollutants in NSW*' (EPA, 2006).

Table 12.1 Relevant approved air quality monitoring methods

Method no.	Parameter measured	Method
AM-1	Guide for the siting of sampling units	AS 2922-1987
AM-2	Guide for the measurement of horizontal wind for air quality applications	AS 2923-1987
AM-3	Preparation of reference test atmospheres	AS 3580.2.1-1990 or AS 3580.2.2-1990 (as appropriate)
AM-4	Meteorological monitoring guidance for regulatory modelling applications	USEPA (2000) EPA 454/R-99-005
AM-18	Particulate matter – PM10 – high volume air sampler with size selective inlet	AS 3580.9.6-1990
AM-19	Particulates – deposited matter – gravimetric method	AS 3580.10.1-1991
AM-22	Particulate matter – PM10 – TEOM	AS 3580.9.8-2001

Appendix D

Record of stakeholder consultation

Table 12.2 Record of Consultation Specific to BCM AQGHGMP

Consultation	Date	Details	Response
Boggabri Coal CCC Meeting April 2013	30.04.2013	The AQMS was presented to the CCC for comment.	The AQMS presentation was received by the CCC. General comments regarding air quality were considered in the revision of the AQMS. CCC members were invited to review the document and provide further input if desired. No further comment was received.
Air Quality and Greenhouse Gas Management Plan for Boggabri Coal Mine sent to EPA for comment	28.01.2014	The management plan contains details of the proposed AQMS for the BTM Complex	The EPA received the management plan and responded on 12.02.2014 that "the Environment Protection Authority (EPA) encourages the development of such plans to ensure that proponents have determined how they will meet their statutory obligations and designated environmental objectives. However, we do not approve or endorse 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"
Air Quality and Greenhouse Gas Management Plan for Boggabri Coal Mine sent to DP&E for comment	19.5.2014	The management plan contains details of the proposed AQMS for the BTM Complex	DP&E provided comments on the management plan on 5.08.2014, including: ▪ some government agency names need to be updated ▪ some sensitive receivers have changed ownership ▪ clarification of data to be received from mobile monitoring units ▪ comments relating to the risk response procedures ▪ comments relating to monitoring sites ▪ comments relating to publication of data and notification of incidents.
Air Quality and Greenhouse Gas Management Plan sent to CCC and EPA for comment	29.04.2015	Revised dust triggers levels and control measures. Updated dust monitoring locations. Revision throughout document to wording for consistency with Project Approval conditions.	
Air Quality and Greenhouse Gas Management Plan sent to CCC and EPA for comment	July 2016	Revised dust triggers levels and control measures. Updated dust monitoring locations. Revision throughout document to wording for consistency with Project Approval conditions.	Comments related to: ▪ TARP ▪ Weather forecasting ▪ Real-time monitoring
Air Quality and Greenhouse Gas Management Plan lodged with DPE for review and approval	October 2017	Updated mitigation measures, monitoring.	Minor review comments received from DPE. The Plan was updated to address comments and re-issued for approval in July 2018.

Appendix E

Risk Response Matrix

Table 12.3 Risk response matrix

	Dust Risk Level		
	Normal operating Conditions	**Investigate and prepare**	**Action required**
TRIGGER LEVEL	• Alarm generated notifying conditions reverted to below trigger levels in 'Investigate' or 'Action' alarms	• Six continuous (5 min readings) PM10 concentration above 100 µg/m^3 over 30 minutes; OR • A 1-hour average PM10 concentration above 45 µg/m^3; OR • Four continuous average 5 min wind speeds of between 6 m/sec to 7 m/sec (i.e. 20 to 25 km/hr) over any 30 minutes; OR • Four continuous average 5 min wind speeds of <1 m/second and four continuous temperature difference between 60 m to 10 m is positive =>3^0 C	• Six continuous (5 min readings) PM10 concentration above 150 µg/m3 over 30 minutes; OR • A 1-hour average PM10 concentration above 50 µg/m3; OR • Four continuous average 5 min wind speeds > 7m/sec (i.e. > 25 km/hr) over any 30 minutes
DUST ALERT LEVEL	'Normal operating dust controls' alert by SMS or email to Supervisors	'Investigation' dust alert by SMS or email to supervisors	'Action' dust alert level by SMS or email to supervisors
VISUAL INSPECTIONS	Routine visual dust inspections of BCM activities and note any off-site dust emissions sources.	Conduct visual inspections to identify BCM dust generating activities and note any off-site dust emission sources. Record inspection and consider Table 12.4 response measures.	Conduct visual inspections to identify BCM dust generating activities and note any off-site dust emissions sources. Record inspection and consider Table 12.4 response measures

Table 12.4 Risk response actions

Boggabri Coal dust generating activities	Required Normal Operating Controls	Dust Preparation Response	Dust Action Response
General operations	Undertake routine inspections to identify the dust sources requiring dust controls.	Review dust monitoring and meteorological conditions to identify appropriate preparation responses. Investigate potential causes of elevated dust, or areas that are most at risk of dust generation during adverse weather conditions. Prepare sites for actions to reduce dust emissions.	Review dust monitoring and meteorological conditions to identify appropriate actions. Consider amended working hours working locations during unfavourable dust dispersion conditions. Consider changing, altering or modifying operations. Consider temporary rescheduling of work within an area that is identified as a likely contributor to dust emissions until acceptable controls are implemented.
Drilling (production and exploration)	Fit all drill rigs with dust suppression equipment. Drill operators inspect the dust suppression system on drill rigs at the start of each shift to ensure it is fully operational before commencing work. Refill drill rig water tanks where required.	Dust suppression equipment on drill rigs is to be functional. Prepare for water truck to relocate to the drill bench.	Consider rescheduling of drilling outside of pit. Consider implementing temporary rescheduling of dust generating activities until acceptable controls are put in place.
Blasting	Undertake blasting as per the measures in the BCOPL Blast Management Plan.	Prepare to rescheduling blasting works, including postponement during adverse meteorological conditions.	Consider rescheduling of blast activity until acceptable controls are implemented.

Boggabri Coal dust generating activities	Required Normal Operating Controls	Dust Preparation Response	Dust Action Response
Disturbance and overburden handling	Minimise the amount of ground disturbance where practicable. Revegetate disturbed areas as soon as practical after disturbance Where required undertake water cart dust suppression on unsealed roads and trafficable areas.	Observe whether appropriate level dust suppression is being applied. Prepare to increase the use of water carts to suppress dust operating on haul roads and ancillary roads. Plan for relocation of overburden dumping away from exposed areas. Prepare to relocate dozers and graders.	Consider increasing spraying of water to manage dust on windrows, fill stockpiles and batters. Consider changing, altering or modifying overburden handling operations. Consider rescheduling overburden dumping to locations to minimise dust. Consider managing dozer and grading operations including temporary rescheduling of this activity.
Haul Road Management	Minimise overburden and ROM coal haulage distances through mine planning. Maximise water cart efficiency through planning. Track water cart utilisation and modify operations as required.	Observe if an appropriate level of dust suppression is being applied to all utilised unsealed roads and trafficable areas. Prepare to increase utilisation of water carts for dust suppression activities.	Drive to road conditions to minimise dust & close ancillary roads. Consider allocated water carts and/or increase the rate of water applied to unsealed roads and trafficable areas. Consider rescheduling non-essential grader and dozer operations.
Topsoil stripping	Where possible, use machinery that minimises the generation of dust during topsoil stripping.	Plan for rescheduling of topsoil stripping, handling and emplacement.	Consider rescheduling topsoil stripping, handling and emplacement until acceptable weather conditions.
ROM coal stockpiles	Where possible provide for dust suppression by water cart on ROM coal stockpiles haulage routes.	Plan for additional water carts to suppress dust ROM stockpile haulage routes.	Consider additional water carts to suppress dust on ROM stockpile haulage routes.

Boggabri Coal dust generating activities	Required Normal Operating Controls	Dust Preparation Response	Dust Action Response
Product coal handling	Maintain minimum drop heights from stackers to stockpiles. Aim to load trains with the loading chute at lowest practical position to minimise dust generation. Minimise and clean up spills during loading/unloading of coal. ROM bin use sprinklers for dust suppression.	Prepare for additional watering of product coal stockpile and conveyor transfer points.	Consider additional watering of product coal stockpile and conveyor transfer points.

Appendix F

BTM Complex Air Quality Management

Strategy