AIR QUALITY MANAGEMENT PLAN

Version	Issue Date	Section Revised	Reason for Revision	Review Team
1	Mar 2010	All	Original Air Quality Management Plan	S. Peart
2	June 2013	All	Updated to include OC2 and OC3	MCO
3	July 2015	All	Includes management and mitigation measures for both Stage 1 and Stage 2 of the Project	MCO, Todoroski Air Sciences
4	November 2017	All	To incorporate approved modifications to Stage 1 (MOD 11 & MOD 12) and Stage 2 (MOD 1 & MOD 2) of the Project	MCO
5	April 2020	All	To incorporate approved modifications to Stage 1 (MOD 14) and Stage 2 (Mod 3) of the Project	MCO

Approved:_____Date:_____

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF APPENDICES

1.0 INTRODUCTION

The Moolarben Coal Complex is located approximately 40 kilometres (km) north of Mudgee in the Western Coalfield of New South Wales (NSW) (Figure 1).

Moolarben Coal Operations Pty Ltd (MCO) is the operator of the Moolarben Coal Complex on behalf of the Moolarben Joint Venture (Moolarben Coal Mines Pty Ltd [MCM], Sojitz Moolarben Resources Pty Ltd and a consortium of Korean power companies). MCO and MCM are wholly owned subsidiaries of Yancoal Australia Limited (Yancoal).

Mining operations at the Moolarben Coal Complex are currently approved until 31 December 2038 and would continue to be carried out in accordance with NSW Project Approval (05_0117) (Moolarben Coal Project Stage 1) as modified and NSW Project Approval (08_0135) (Moolarben Coal Project Stage 2) as modified.

Mining operations at the Moolarben Coal Complex are undertaken in accordance with the various approvals under the Commonwealth *Environmental Protection and Biodiversity Conservation Act 1999* (EPBC Act).

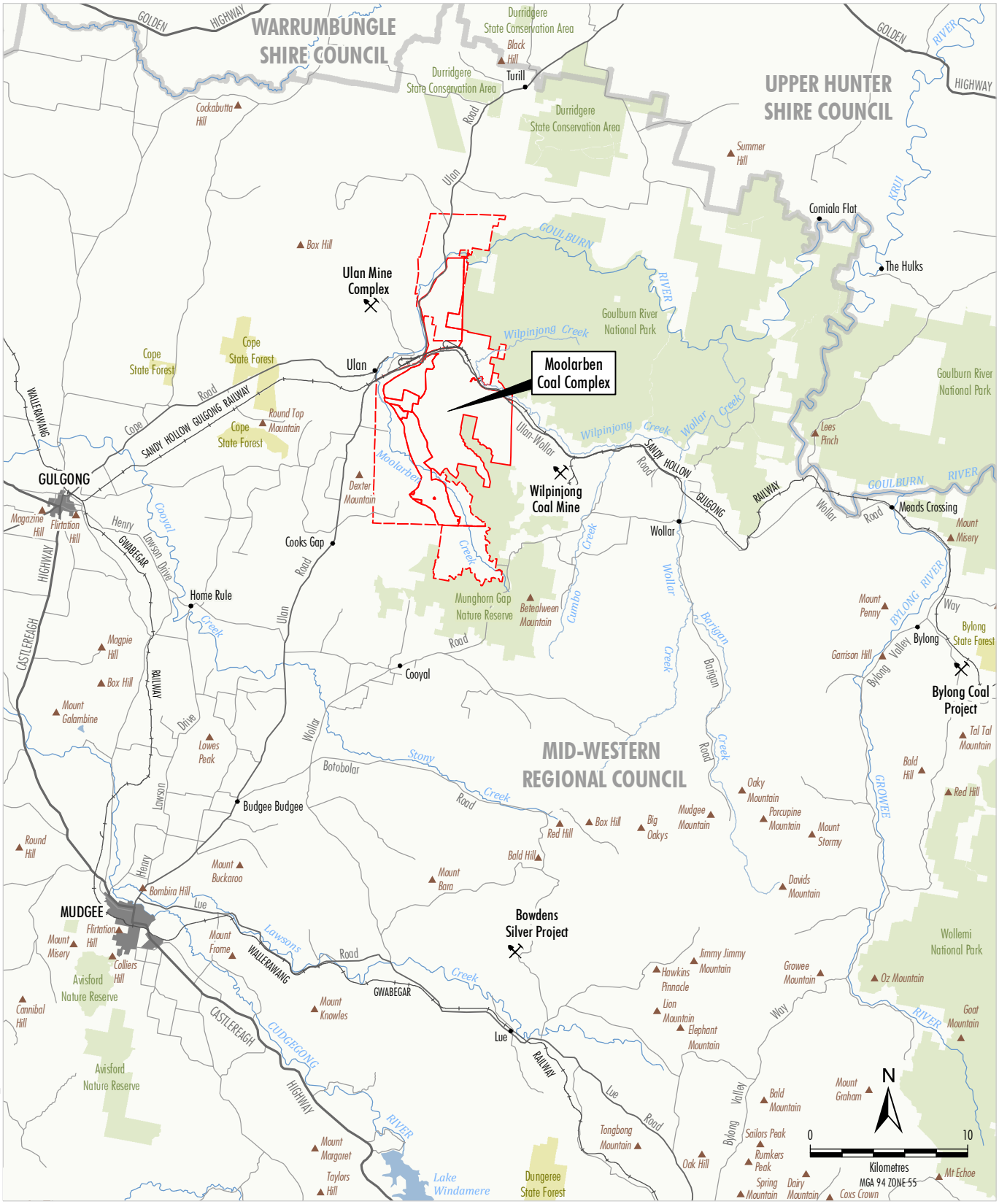
The current mining operations at the Moolarben Coal Complex are conducted in accordance with the conditions of Mining Lease (ML) 1605, ML 1606, ML 1628, ML 1691 and ML 1715 granted under the *Mining Act 1992*.

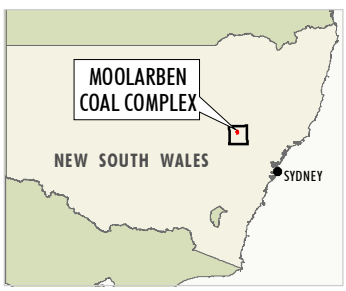
Stage 1 at the Moolarben Coal Complex has been operating for several years and at full development will comprise three open cut mines (OC1, OC2, and OC3), a longwall underground mine (UG4), and mining related infrastructure (including coal processing and transport facilities) (Figure 2).

Stage 2 at the Moolarben Coal Complex has commenced and at full development will comprise one open cut mine (OC4), two longwall underground mines (UG1 and UG2), and mining related infrastructure (Figure 2).

Stages 1 and 2 at the Moolarben Coal Complex operate concurrently in accordance with the limits stipulated in NSW Project Approval (05_0117) and NSW Project Approval (08_0135), and are summarised as follows:

- The total run-of-mine (ROM) coal extracted from the Moolarben Coal Complex (open cut and underground mining) is no more than 24 million tonnes in any calendar year, comprising:
    - No more than 16 million tonnes of ROM coal from the open cut mining operations in any calendar year, considering:
        - No more than 10 million tonnes of ROM coal from Stage 1 open cut mining operations in any calendar year.
        - No more than 16 million tonnes of ROM coal from Stage 2 open cut mining operations in any calendar year.





LEGEND
- State Forest
- NSW National Parks and Wildlife Service
- Local Government Boundary
- Exploration Licence Boundary
- Mining Lease Boundary
- Mining Operation

Source: NSW Land & Property Information (2017); NSW Department of Industry (2017); Office of Environment and Heritage NSW (2017)

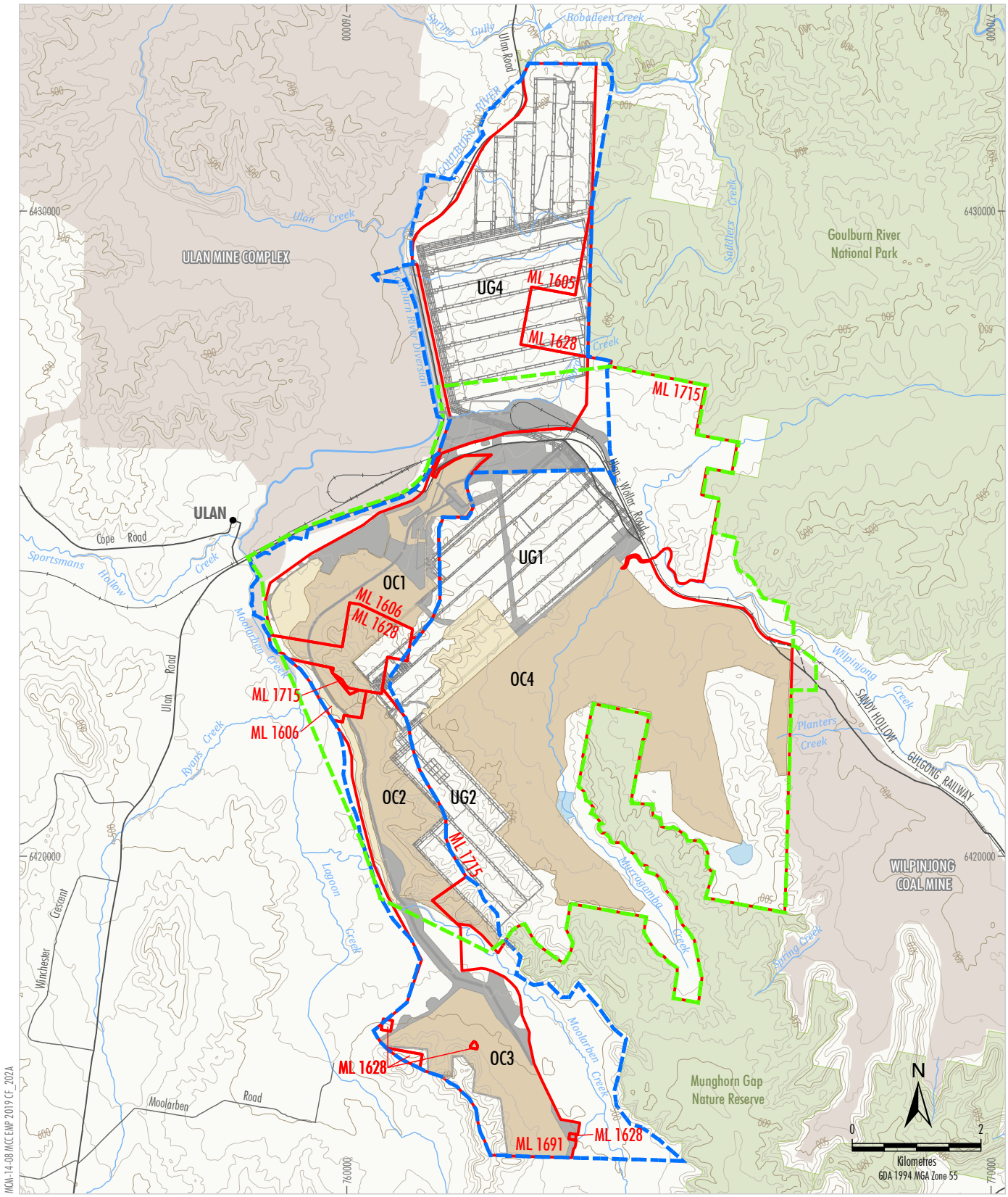
MOOLARBENCOAL

MOOLARBEN COAL COMPLEX

Regional Location

Figure 1

MCM-14-08 MCC EMP 2019 CF_201A



LEGEND

- NSW National Parks and Wildlife Service
- Other Mining Operations
- Mining Lease Boundary

Existing/Approved Development

- Open Cut Mining Area
- Out-of-pit Emplacement
- Surface Infrastructure Area
- Clean Water Diversion Infrastructure
- Underground Longwall Layout
- Haul Road
- Road Realignment (not yet constructed)
- Approved Stage 1 Project Boundary
- Approved Stage 2 Project Boundary

Source: MCO (June 2017); NSW Dept of Industry (2017); NSW Land & Property Information (2017); Office of Environment and Heritage NSW (2017)

MCM-14-08 MCC EMP 2019 CF_202A

MOOLARBENCOAL

MOOLARBEN COAL COMPLEX

Approved Moolarben Coal Project (Stage 1 and Stage 2) General Arrangement

Figure 2

- No more than 8 million tonnes of ROM coal from the underground mining operations in any calendar year.

I. No more than 16 million tonnes of coal from the Moolarben Coal Complex can be processed (washed) in any calendar year.

II. No more than 22 million tonnes of coal can be transported from the Moolarben Coal Complex in any calendar year.

III. All product coal is transported from the Moolarben Coal Complex by rail with:

- No more than 8 laden trains leaving the site each day (on average when calculated over any calendar year); and
- No more than 11 laden trains leaving the site each day.

1.1 OPERATIONAL STATUS

Open cut and underground mines are in operation with activities focused in OC1, OC2, OC3, OC4 and UG1 (Figure 2). The mining will progress to other approved mines in the future.

Construction/development activities are currently focused on works to facilitate open cut mining progression and development and progression of underground mining operations of the Moolarben Coal Complex.

Construction works in support of open cut mining progression include mine infrastructure areas, offices, water management works, haul roads, diversions, water storages, exploration within ML areas and other ancillary works.

Construction in support of underground mining progression include mine infrastructure areas, materials handling and processing, water management infrastructure, exploration within ML areas and underground mining surface facilities.

1.2 SCOPE AND PURPOSE

This Air Quality Management Plan (AQMP) has been prepared by MCO (with input from experienced and qualified air quality experts [Todoroski Air Sciences]) to satisfy the requirements under NSW Project Approval (05_0117) (as modified) and the requirements of NSW Project Approval (08_0135) (as modified).

The purpose of the AQMP is to describe the management of air quality at the Moolarben Coal Complex in accordance with the above listed Project Approvals.

Upon approval, this AQMP will supersede the previously approved AQMP dated November 2017 (MCO, 2017).

In accordance with Condition 20A(a) of Schedule 3 of the NSW Project Approval (05_0117) (as modified) and Condition 22(a) of Schedule 3 of the NSW Project Approval (08_0135) (as modified), this AQMP has been prepared in consultation with the Environment Protection Authority.

1.3 STRUCTURE OF THIS AIR QUALITY MANAGEMENT PLAN

The remainder of the AQMP is structured as follows:

Section 2: Outlines the statutory requirements applicable to the AQMP.
Section 3: Outlines the dust generating activities relevant to Moolarben Coal Complex operations.
Section 4: Outlines the relevant dust criteria applicable to Moolarben Coal Complex operations.
Section 5: Provides baseline data.
Section 6: Outlines dust management measures.
Section 7: Outlines the dust monitoring program components.
Section 8: Outlines the compliance protocols.
Section 9: Provides a contingency plan to manage any unprecedented impacts and their consequences.
Section 10: Provides details for the review and improvement of the environmental performance process.
Section 11: Describes the management and reporting of incidents, complaints and non-compliances.
Section 12: Provides the references cited in the AQMP.

2.0 STATUTORY AND PROJECT APPROVAL REQUIREMENTS

MCO's statutory obligations are contained in:

- the conditions of the Project Approvals (05_0117) (as modified) and (08_0135) as modified);
- relevant licences and permits, including conditions attached to the Environment Protection Licence (EPL) 12932 and mining leases; and
- other relevant legislation.

Obligations relevant to this AQMP are described below.

A comprehensive list of all conditions in the NSW Project Approvals relevant to air quality management, and a description of where they are referenced in this AQMP, is provided in Appendix A.

2.1 EP&A ACT PROJECT APPROVALS

2.1.1 Air Quality Management Plan

Condition 20A, Schedule 3 and Condition 22, Schedule 3 the Project Approval (05_0117 and 08_0135, respectively) require the preparation of an AQMP for the Moolarben Coal Complex. Condition 20A, Schedule 3 of Project Approval (05_0117) states:

Air Quality Management Plan

20A. The Proponent shall prepare and implement an Air Quality Management Plan for the project to the satisfaction of the Secretary. This plan must:

a) be prepared in consultation with the EPA and be submitted to the Secretary for approval by 31 March 2015;

b) describe the measures that would be implemented to ensure compliance with the relevant air quality criteria and operating conditions of this approval:

c) describe the air quality management system;

d) include an air quality monitoring program that:

- *uses a combination of real-time and supplementary monitors, including a real-time $PM_{2.5}$ monitor, to evaluate the performance of the project against the air quality criteria in this approval;*
- *adequately supports the air quality management system;*
- *evaluates and reports on the:*
  - *the effectiveness of the air quality management system; and*
  - *compliance against the air quality operating conditions;*
- *defines what constitutes an air quality incident, and includes a protocol for identifying and notifying the Department and relevant stakeholders of any air quality incidents.*

Condition 22, Schedule 3 of Project Approval (08_0135) states:

Air Quality Management Plan

22. The Proponent shall prepare and implement an Air Quality Management Plan for the project to the satisfaction of the Secretary. This plan must:

a) be prepared in consultation with the EPA, and submitted to and approved by the Secretary prior to the commencement of any development on site;

b) describe the measures that would be implemented to ensure compliance with the relevant air quality criteria and operating conditions of this approval:

c) describe the air quality management system;

d) include an air quality monitoring program that:

- *uses a combination of real-time and supplementary monitors to evaluate the performance of the project against the air quality criteria in this approval;*
- *adequately supports the air quality management system;*
- *evaluates and reports on the:*
  - *the effectiveness of the air quality management system;*
  - *compliance with the air quality criteria;*
  - *compliance with the air quality operating conditions; and*
- *defines what constitutes an air quality incident, and includes a protocol for identifying and notifying the Department and relevant stakeholders of any air quality incidents.*

2.1.2 Other Management Plan Requirements

Condition 3, Schedule 5 and Condition 3, Schedule 6 of the Project Approval (05_0117 and 08_0135, respectively) outline general management plan requirements that are applicable to the preparation of the AQMP. Table 1 presents these requirements and indicates where they are addressed within this AQMP.

Table 1: Management Plan Requirements

NSW Project Approval Condition	AQMP Section
3. *The Proponent shall ensure that the management plans required under this approval are prepared in accordance with any relevant guidelines, and include:*	
(a) detailed baseline data;	Section 5.0
(b) a description of:	
• *the relevant statutory requirements (including any relevant approval, licence or lease conditions);*	Section 2.0
• *any relevant limits or performance measures/criteria;*	Section 4.0
• *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;*	Section 4.3
(c) a description of the measures that would be implemented to comply with the relevant statutory requirements, limits, or performance measures/criteria;	Section 6.0
(d) a program to monitor and report on the:	
• *impacts and environmental performance of the project;*	Sections 7.0 and 11.0
• *effectiveness of any management measures (see c above);*	Sections 8.0 and 11.0
(e) a contingency plan to manage any unpredicted impacts and their consequences;	Section 9.0
(f) a program to investigate and implement ways to improve the environmental performance of the project over time;	Section 10.0
(g) a protocol for managing and reporting any:	
• *incidents;*	
• *complaints;*	Section 11.0
• *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.	Section 10.2

2.2 LICENCES, PERMITS AND LEASES

In addition to the NSW Project Approvals (05_0117 and 08_0135) and Commonwealth Approvals (EPBC 2007/3297, 2013/6926, 2017/7974 and 2008/4444), all activities at the MCO will be conducted in accordance with a number of licences, permits and leases including:

- Environment Protection Licence (EPL) 12932 issued under Part 3 of the NSW *Protection of the Environment Operations Act 1997* by the NSW Environment Protection Authority (EPA).
- Mining Operations Plan approved by the Resource Regulator as amended from time to time.

3.0 AIR QUALITY

The substances considered in this plan are those identified in the Project Approvals that have potential to affect the general health and amenity of the community and the surrounding environment. This includes particulate matter, which refers to particles of varying size and composition that are defined in four classes.

- Total Suspended Particulate matter (TSP) which refers to the total dust particles that are suspended in the air and nominally defined with an upper size range of 30 micrometres (µm).
- PM_{10} which refers to particulate matter with an aerodynamic diameter less than 10 µm.
- $PM_{2.5}$ which refers to particulate matter with an aerodynamic diameter less than 2.5 µm.
- Deposited dust which relates to the largest dust particles in the air. These particles rarely travel far from the source as they rapidly settle under gravity.

Other relevant air quality sources considered in this plan are odour and fume. The primary potential odour and fume sources at the Moolarben Coal Complex are from spontaneous combustion and blasting.

3.1 NATURE OF DUST EMISSIONS

To understand how mining activities may affect air quality four factors should be considered:

- the generation of dust from mining activities;
- the dispersion in the air of the dust generated;
- how various size fractions of dust behave in the air; and
- the prevailing background dust levels.

The generation of dust emissions from open cut mine activities can be considered in three distinct categories:

- wind generated emissions, such as wind erosion of exposed surfaces, including stockpiles, overburden dumps and active pit areas, among others;
- wind sensitive emissions, such as loading, dumping, emplacement, (essentially wherever material falls through the air); and
- wind insensitive emissions, such as wheel generated dust from hauling, and dust from blasting and drilling (where the amount of dust does not predominantly depend on the wind speed at the time).

On windy days, particularly during prolonged dry periods, wind generated emissions and wind sensitive emissions will increase.

The prevailing atmospheric stability conditions affect the dispersion of generated dust emissions in the air. The degree of atmospheric dispersion has a large effect on the concentration of dust in the air at a distance away from the source.

The various size fractions of dust generated by mining activity will remain entrained in the air for different periods due to gravitational settling. The smaller dust fractions need lower wind speeds to settle than the larger fractions. It is important to note that the further the dust travels, the more dispersion will occur, and therefore, the lower the concentration will be.

The impact of mining dust is a function of the generation of emissions in the first place and also the effective dispersion of emissions in the air that arrives at the receptor.

Overall, there are two distinct weather conditions under which most short term dust impacts will occur:

- Hot, high wind conditions, especially where winds are relatively constant – under these conditions the quantity of dust emissions (e.g. from wind erosion of exposed areas) from an operation can be high.
- Stable atmospheric conditions where there is little vertical mixing of the air – under these conditions there is poor dispersion of dust emissions (e.g. from haul roads which are not related to wind erosion) resulting in relatively higher concentrations.

Background dust levels will naturally vary considerably in the wider area around a mine, and from day-to-day. The background levels at a monitoring site are affected by localised sources of dust including dirt roads, activities on dirt surfaces, wind erosion of exposed or grazed agricultural land, burning, particles from urban areas, wood heating in winter and pollens. In addition, background levels will include the effects due to regional events, such as extremely dry windy conditions, dust storms and bushfires.

Dust is of concern for nuisance and health reasons. Dust deposition on surfaces causes nuisance impacts, whereas existing evidence suggests that health effects from exposure to airborne particulate matter predominately arise from effects on the respiratory and cardiovascular systems. The potential health impacts are most closely associated with finer particles (PM_{10} and below).

3.2 SOURCES OF DUST EMISSIONS

The sources of dust emissions at the Moolarben Coal Complex are associated with the following activities:

- hauling of materials along unsealed roads;
- loading and unloading of materials;
- dozers operating on material;
- wind erosion from exposed areas;
- topsoil and subsoil stripping;
- wind erosion from stockpiles;
- drilling and blasting of materials;

- exploration activities (e.g. drilling and vehicle movements) (short term only);
- grading roads;
- construction works, and
- processing and handling of coal.

Figure 3 presents a breakdown of the typical annual average source contributions based on the emission inventories presented in the most recent air quality assessment (Todoroski Air Sciences, 2017). The top four source contributors to particulate matter emissions are identified as hauling of material along unsealed roads, wind erosion from exposed areas, loading and unloading of material and dozers operating on material.

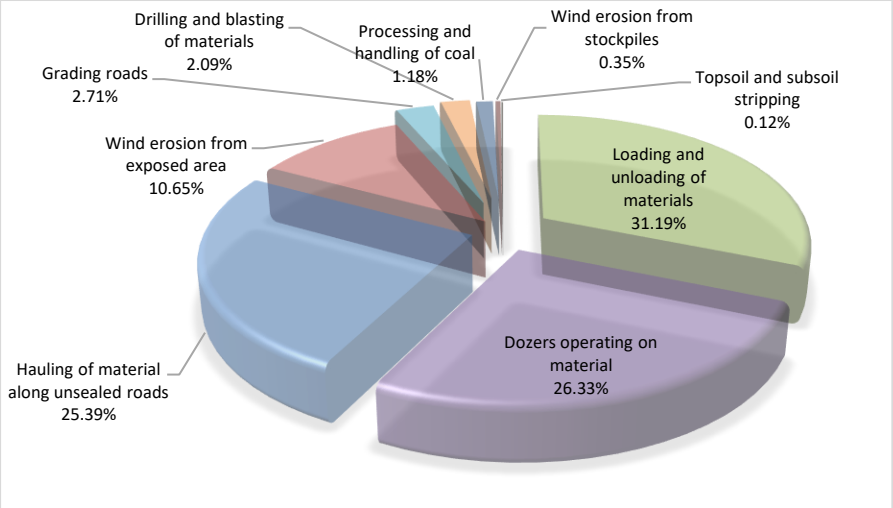


Figure 3: Average Emission Source Contribution

Note that sources of dust may be small on an annual average basis but still have high emission rates for short periods, for example dust from a blast event or topsoil stripping. Thus, all sources of dust need to be carefully considered.

4.0 AIR QUALITY CRITERIA AND PERFORMANCE

4.1 NSW PROJECT APPROVAL CONDITIONS

Air quality criteria and air quality acquisition criteria are provided in Condition 17 and Condition 19, Schedule 3 and Condition 18 and Condition 20, Schedule 3 of the NSW Project Approvals (05_0117 and 08_0135, respectively) (Appendix A), and summarised below in Table 2 (a and b).

Table 2a: Air Quality Impact Assessment Criteria

Pollutant	Averaging Period	Criterion
TSP[1]	Annual	[a, d] 90 µg/m³
PM_{10}	Annual	[a, d] 25 µg/m³
	24 hour	[b, d] 50 µg/m³
$PM_{2.5}$	Annual	[a, d] 8 µg/m³
	24 hour	[b, d] 25 µg/m³
[c] Deposited dust	Annual	[b] 2 g/m²/month (max. increase)
		[a] 4 g/m²/month (max. total)

Notes:

[a] *Cumulative impact (i.e. incremental increase in concentrations due to the Moolarben mine complex plus background concentrations due to all other sources).*

b *Incremental impact (i.e. incremental increase in concentrations due to the Moolarben mine complex on its own) with up to 5 allowable exceedances over the life of the project.*

c *Deposited dust is to be assessed as insoluble solids as defined 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, fire incidents, illegal activities or any other activity agreed by the Secretary.*

Table 2b: Air Quality Land Acquisition Criteria

Pollutant	Averaging Period	Criterion
TSP	Annual	[a, d] 90 µg/m³
PM_{10}	Annual	[a, d] 25 µg/m³
	24 hour	[b, d] 50 µg/m³
$PM_{2.5}$	Annual	[a, d] 8 µg/m³
	24 hour	[b, d] 25 µg/m³
[d] Deposited dust	Annual	[b] 2 g/m²/month (max. increase)
		[a] 4 g/m²/month (max. total)

Notes:

[a] *Cumulative impact (i.e. incremental increase in concentrations due to the Moolarben mine complex plus background concentrations due to all other sources).*

[b.] *Incremental impact (i.e. incremental increase in concentrations due to the Moolarben mine complex on its own) with up to 5 allowable exceedances over the life of the project.*

[c] *Deposited dust is to be assessed as insoluble solids as defined 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, fire incidents, illegal activities or any other activity agreed by the Secretary.*

[1] TSP is determined from PM_{10} assuming 40% of TSP is PM10.

4.2 ENVIRONMENT PROTECTION LICENCE 12932

The air quality monitoring requirements of EPL 12932 remain consistent with the NSW Project Approvals (05_0117 and 08_0135). Pollution studies and reduction programs have also been completed in accordance with EPL 12932, including:

- Particulate Matter Control Best Practice Implementation – Wheel Generated Dust;
- Particulate Matter Control Best Practice Implementation – Disturbing and Handling Overburden in Adverse Weather Conditions; and
- Particulate Matter Control Best Practice Implementation – Trial of Best Practice Measures for Disturbing and Handling Overburden.

4.3 MINING OPERATIONS PLAN

The Mining Operations Plan (MOP) approved by the Resources Regulator describes the measures implemented across the Moolarben Coal Complex to manage air quality consistent with this Air Quality Management Plan. The MOP will be amended or replaced from time to time to maintain consistency with project approvals and operations.

4.4 AIR QUALITY PERFORMANCE

The performance of air quality management at the Moolarben Coal Complex will be assessed against:

- the criteria in Table 2 (a and b) above; and
- this plan,

as measured by a combination of real time and supplementary dust monitors at locations representative of sensitive receptors (refer Table 5, Section 7). This includes use of real time investigation triggers for ongoing performance assessment, which will inform pre-emptive management actions to maintain compliance with the above criteria (refer Table 4, Section 6.1.4).

5.0 BASELINE DATA

Baseline environmental air quality data have been obtained from the most recent air quality assessment (Todoroski Air Sciences, 2017) for the Moolarben Coal Complex. The data provide an indication of the air quality conditions prior to the commencement of Stage 2 operations and during Stage 1 operations.

5.1 DUST MONITORING DATA

Figure 4 and Figure 5 present a graphical summary of the measured 24-hour average PM_{10} concentrations from various locations during 2011 to 2016. The data indicates levels below the 24-hour average criterion of 50 micrograms per cubic metre (µg/m³). Seasonal trends are apparent in both figures which indicate levels are nominally highest in the spring and summer months with warmer weather raising the potential for drier ground and elevating the level of windblown dust, the occurrence of bushfires and pollen levels.

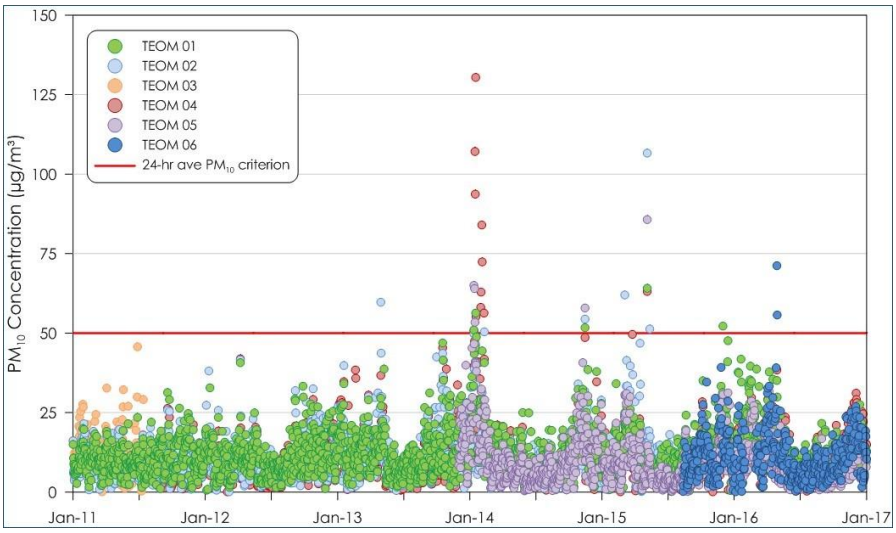


Figure 4: Tapered Element Oscillating Microbalance (TEOM) 24-hour average PM_{10} concentrations

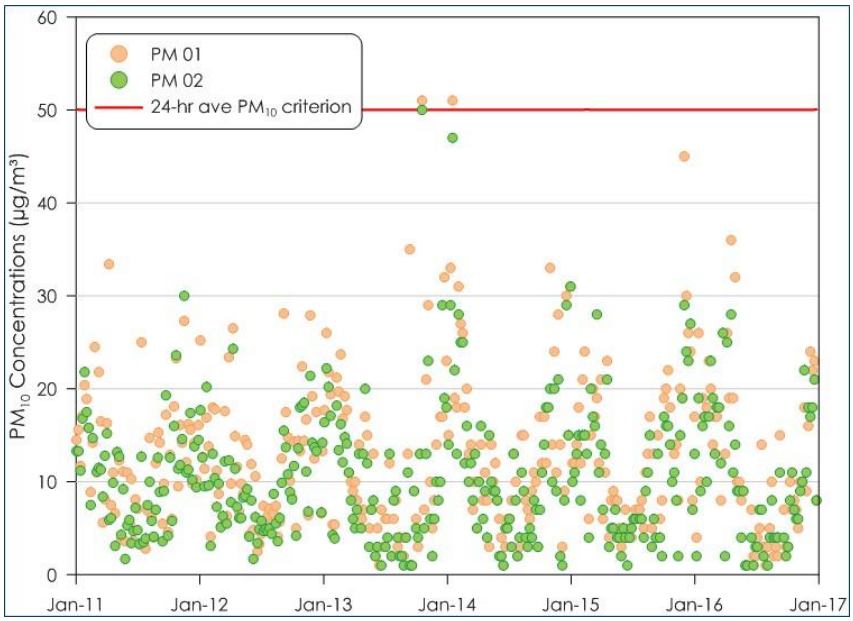


Figure 5: High Volume Air Sampler (HVAS) 24-hour average PM_{10} concentrations

5.2 METEOROLOGICAL MONITORING

Meteorological monitoring is undertaken at MCO, in accordance with NSW Project Approval and EPL requirements. MCO has an Automatic Weather Station (AWS) (Figure 6) located on a property on Ulan Road and is referred to as WS3. WS3 is linked into the real-time monitoring system and is the main weather station for reporting purposes. Additional weather stations may be used to supplement weather data as required.

5.3 SENSITIVE RECEPTORS

Receptors sensitive to air quality impacts from operational activities associated with the Moolarben Coal Complex are shown on Figure 6. This includes all residences on privately-owned land as well as tenanted residences on mine owned land.

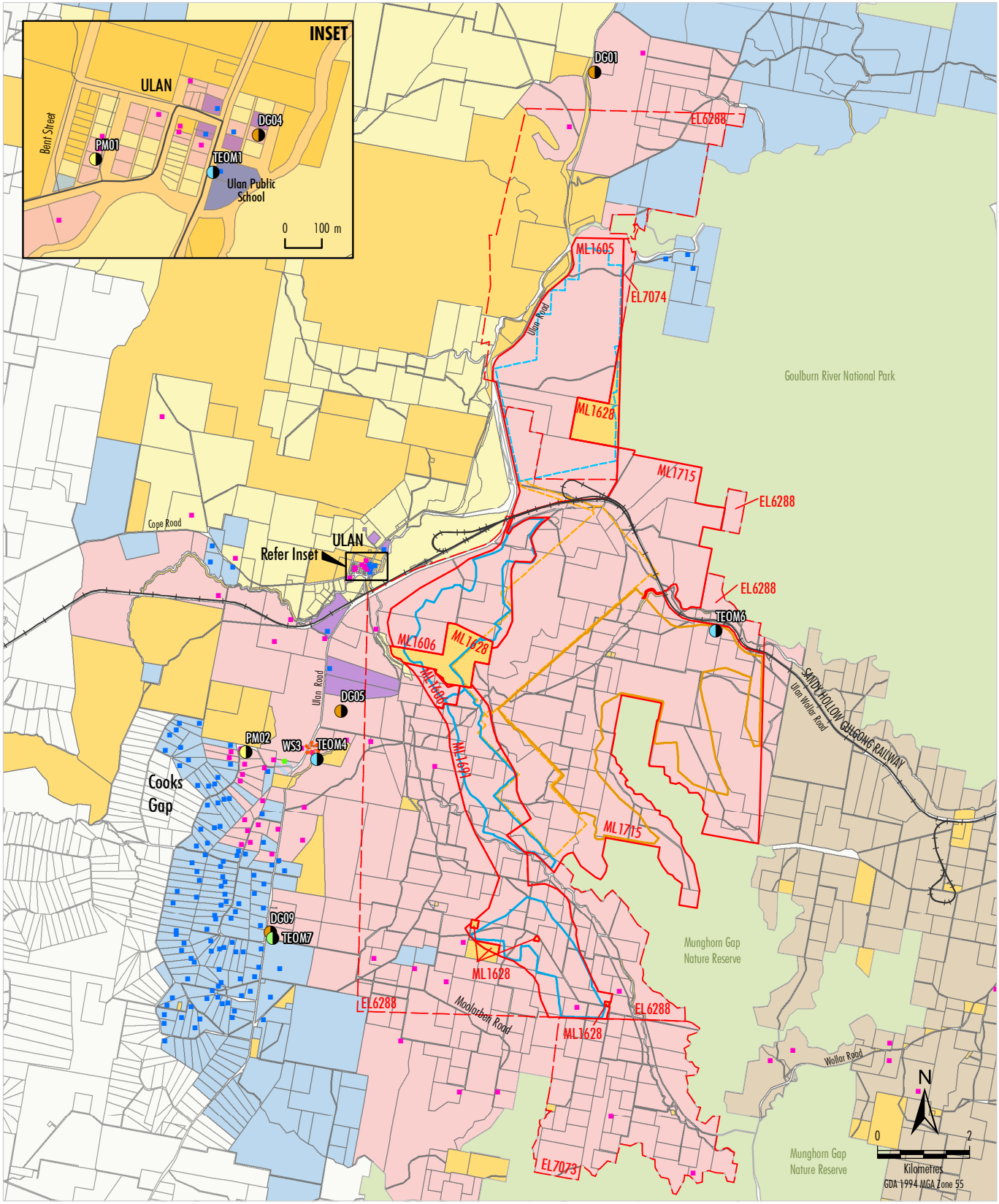
For the purposes of air quality management, sensitive receptors are defined as the location of occupied residential dwellings and schools located in the vicinity of the Moolarben Coal Complex that may experience potentially adverse air quality effects due to the operation. Sensitive receptors also include Ulan School and mine owned properties that are leased and occupied (as set out in the conditions of approval (05_0117).

Sensitive receptors include Ulan village and residences in the Cooks Gap, Cope Road and Moolarben Road areas.

In addition, air quality land acquisition criteria applies to land on which a dwelling could be built under existing planning controls and where dust impacts exceed the relevant criteria on more than 25% of that land.

There are no sensitive receptors that would be affected by dust emissions from the Moolarben Coal Complex to the east of the site.

Air quality impacts have been modelled as a component of the environmental assessments for the Moolarben Coal Project Stage 1 and Moolarben Coal Project Stage 2, including the most recent *Air Quality Assessment Moolarben Coal Complex OC Optimisation Modification* (Todoroski Air Sciences, 2017).



LEGEND

- NSW National Parks and Wildlife Service
- Railway
- Exploration Licence Boundary
- Mining Lease Boundary
- Stage 1 Open Cut Mining Area
- Stage 1 Underground Mining Area
- Stage 2 Open Cut Mining Area
- Stage 2 Underground Mining Area
- Road Realignment (not yet constructed)

Environmental Monitoring

- Dust Deposition Gauge
- HVAS - PM_{10} Monitoring Site
- Real-time TEOM PM_{10} and $PM_{2.5}$ Monitoring Site
- Real-time TEOM PM_{10} Monitoring Site
- Meteorological Station

Land Ownership

- Moolarben Coal Operations Pty Ltd
- Moolarben Coal Operations Pty Ltd – Under Contract/Purchase Agreement
- Ulan Coal Mines Limited
- Wilpinjong Coal Mine
- Commercial
- Minister for Education
- Crown/State of NSW
- Privately Owned
- Unidentified Land
- Mine Owned Receiver
- Private Receiver (Under Contract to MCO)
- Private Receiver

Source: MCC (2019); NSW Department of Planning, Industry and Environment (2019)

MOOLARBENCOAL

MOOLARBEN COAL COMPLEX

Air Quality Monitoring Sites

Figure 6

6.0 MANAGEMENT MEASURES

6.1 AIR QUALITY

The air quality management measures described in this section are designed to minimise the impact on the surrounding environment due to on-site activities. The measures will be continually revised and updated as required based on operational changes and advancements in technologies.

6.1.1 Adverse Weather Conditions

MCO has undertaken studies into best practice control implementation for wheel generated dust and for disturbing and handling overburden in adverse (i.e. dust enhancing) weather conditions as part of a series of completed Pollution Reduction Programs (PRPs) imposed by the EPA during previous versions of the EPL 12932.

The pollution reduction studies conducted at the Moolarben Coal Complex show there are no weather parameters (or combinations of such measurable parameters) that are correlated with increased dust impacts at receptors. (Note that low winter temperatures correlate with residential wood heater use affecting fine particulate levels at sensitive receptors).

The primary factor affecting dust impacts offsite (and hence at sensitive receptors) is poor air dispersion[2]. Air dispersion (and hence dust dispersion) is affected by the complex interaction of meteorological parameters such as temperature, relative humidity, wind speed and direction and atmospheric mixing conditions (amongst many others). This dynamic interaction makes it impractical to reasonably or accurately define specific measurable weather conditions that are associated with increased dust impacts. For example, high wind conditions (e.g. one-hour average wind speeds > 8m/s) can increase visible dust emissions at the source, but these conditions will predominantly also increase air dispersion and will generally result in lower off-site dust levels (even if there is an increased release of dust at the source). Hence there is no definable wind speed threshold or set of conditions that can be measured that will correlate with increased dust levels.

On a practical level, the only definable weather situation where the operation of the Moolarben Coal Complex may affect dust levels at sensitive receptors is the presence of winds towards receptors (i.e. wind direction NE to SE [45 to 135 degrees]) along with poor air dispersion conditions prevailing at the time of heightened dust emissions from the operation.

Hence, adverse weather conditions are defined as any weather condition which results in a difference between the monitored upwind and downwind ambient dust level being greater than 25µg/m³ when the wind blows across the Moolarben Coal Complex towards a sensitive receptor location.

Adverse weather conditions conducive to increased levels of dust emissions from the Moolarben Coal Complex may cause measured dust levels to exceed the prescribed criteria at sensitive receptors. Consideration of adverse conditions that may affect dust impacts at sensitive receptors is included Table 3 and Table 4.

[2] Note that there may be up to about a 10-fold difference in the level of dust emitted between best case controlled (e.g. 90% control for haul roads) and worst case dust generating activity. However this is a small factor relative to the approx. >100-fold differences that can arise due to poor air dispersion conditions (e.g. maximum downwind dust levels due to a mine are typically >100-fold greater than the lower downwind dust levels due to the mine that occur up to 20% of the time for the same prevailing wind conditions). Hence poor air dispersion (not wind condition, and not dust emission) is the primary factor affecting off-site dust levels.

6.1.2 Dust Mitigation Measures

The primary measures to control dust emissions are summarised in Table 3 and include measures identified as part of the PRPs. The effectiveness of these controls is described in the report, *Moolarben Coal Particulate Matter Control Best Practice Pollution Reduction Program* (PAE Holmes, 2012).

MCO will complete a review of particulate emission controls at the Moolarben Coal Complex against industry best practice on a three yearly basis and report the findings in the relevant Annual Review. The most recent review (Todoroski, 2018) has investigated the range of potential best practice dust controls applicable for MCC. The dust control measures summarised in Table 3 can be considered to be equivalent with industry best practice (Todoroki, 2018).

MCO will ensure that all reasonable and feasible avoidance and mitigation measures are employed at the Moolarben Coal Complex in accordance with Condition 18, Schedule 3 and Condition 19, Schedule 3 of the NSW Project Approvals (05_0117 and 08_0135, respectively).

Table 3: Dust Control Measures

Activity	Dust Controls	Responsibility
General	• Include air quality requirements in site inductions to ensure employee awareness of potential dust impacts. • Review, mining operations in adverse weather conditions, or when 1-hour average wind speeds are >8m/s in a direction from the mine to sensitive receptor locations and modify relocate and/or pause dust generating activities where required. • Visual surveillance of dust plumes.	Environment and Community Manager/Safety and Training Manager Area Supervisor/Open Cut Examiner (OCE)
Exposed and disturbed areas	• Disturbance of only the minimum area necessary for mining. • Adoption of progressive rehabilitation of mining operations, to minimise exposed soils. • Design of overburden emplacements to minimise the disturbance area and minimise out-of-pit dumping as far as practicable. • Use of temporary cover crops to stabilise rehabilitation areas. • Use of cleared trees and branch material for stabilising rehabilitated landforms. • Application of interim stabilisation. • Active maintenance of vegetation.	Area Supervisor Mining Manager Technical Services Manager Environment and Community Manager
Handling of materials	• Avoidance or postponement of ripping of overburden during adverse weather conditions, or when 1-hour average wind speeds are >8m/s in a direction from the mine to sensitive receptor locations. • Minimisation of spillage from loading/unloading and clean-up of any spillage as soon as practicable. • Relocation/rescheduling of activities known to produce excessive visible dust plumes, or when 1-hour average wind speeds are >8m/s in a direction from the mine to sensitive receptor locations, where practicable. • Use of sheltered dumping during adverse weather conditions. • Minimisation of fall distance of materials.	Area Supervisor Mine Manager (assistance can be sought from the Environmental Department)

Activity	Dust Controls	Responsibility
	• Modification of operations during periods of adverse weather conditions. • Enclosure of dump hopper and water sprays. • Adoption of slower, more precise, low drop height loading during adverse weather conditions. • Minimisation of dozer travel speeds during adverse weather.	
Trafficked areas and Haul roads	• Use of water carts as necessary and practicable on all trafficked areas to minimise excessive visible dust. • Use of chemical suppression if necessary. • Use of constructed roads only, minimisation of access roads and removal of obsolete access roads. • Watering of access tracks used by topsoil stripping equipment. • Enforcement of speed limits. • Rehabilitation of disused roads as soon as practicable. • Construction of roads to achieve a compact, stable and durable surface using material with a low silt/fines content. • Regular maintenance of haul roads to maintain a smooth surface, define road edges and removal of excessively fine/silty material. • Clear definition of edges of haul roads with marker posts or equivalent to control their locations, especially when crossing large overburden emplacement areas. • Minimisation of material spillage on haul roads. • Optimisation of fleet to reduce vehicle kilometres travelled.	Area Supervisor (assistance can be sought from the Environmental Department)
Material stockpiles	• Use of water carts and/or sprays on all coal-handling and stockpile areas to minimise dust generations as necessary and practicable. • Revegetation of long-term topsoil stockpiles (i.e. those not used for over six months). • Progressive reshaping of topsoil and overburden emplacement areas. • Use of remotely operated water sprays during high winds.	Area Supervisor (assistance can be sought from the Environmental Department)
Drilling and blasting	• Use of dust aprons during drilling. • Use of water injection systems on all drills. • Adherence to all measures outlined in the Blast Management Plan with consideration given to prevailing wind conditions and residential receivers. • Use of adequate stemming in drill holes at all times. • Limitation of blasting during adverse weather conditions as described in the Blast Management Plan. • Application of water on areas prone to excessive dust lift off prior to drilling. • Application of water on areas prone to excessive dust lift off (including drill fines) post drilling, where safe and practicable.	Area Supervisor Mine Manager Drill and Blast Superintendent
CHPP	• Employing appropriate dust suppression methods at the coal handling facilities.	Area Supervisor CHPP Manager (assistance can be sought from the Environmental Department)

Activity	Dust Controls	Responsibility
	• Fitting, inspection and maintenance of dust suppression systems to stationary plant (such as dump hopper and transfer stations). • Partial enclosure of raw coal transfer and rejects conveyors where possible. • Fitting of all conveyors with appropriate cleaning and collection devices. • Use of enclosed conveyor transfers. • Regular cleaning of areas where spilt material can build up. • Use of enclosed chutes. • Loading of rail wagons with a streamlined and consistent profile, where possible. • Minimisation of spillage during loading. • Regular collection and disposal of coal spillage.	

In accordance with Condition 20C, Schedule 3 and Condition 23, Schedule 3 of the NSW Project Approvals (05_0117 and 08_0135, respectively) MCO will consult with the NSW Department of Education and Communities (DEC) and, if requested:

- implement agreed reasonable and feasible measures to ameliorate potential noise and/or dust impacts to Ulan Public School; or
- on a reasonable basis relating to the adverse effect of noise and/or dust from the project, contribute to or meet reasonable costs toward relocating the school.

6.1.3 Proactive Dust Mitigation Measures

A comprehensive air quality management system including predictive meteorological forecasting, predictive air quality forecasting and real-time air quality monitoring data (i.e. real-time response triggers) has been implemented at the Moolarben Coal Complex.

The system assists MCO to manage air emissions and mitigate potential impacts from the Moolarben Coal Complex and aims to provide a framework for dealing with cumulative impacts in the local air-shed in cooperation with adjacent mines.

The predictive air quality forecasting system uses predicted meteorological data and exposed operational areas to predict the risk of dust dispersion as a result of operations at the Moolarben Coal Complex.

The predictive air quality forecasting system is primarily used as an alert of possible elevated dust levels due to the operations, allowing MCO to temporarily modify proposed operations where relevant to minimise the risk of elevated dust dispersion.

The predictive meteorological and air quality forecasting system is available at any time to environmental employees and shift supervisors. Forecasts are reviewed at the start of each shift by the Mine Production Environmental Assistant and reported to the shift supervisor. The data is also reviewed each morning (weekdays only) by the Environment and Community Coordinator.

6.1.4 Reactive Measures

Real-time air quality monitoring data is used to identify when ambient levels of PM_{10} in the surrounding environment are elevated and require contingency action. Dust real-time response triggers (Table 4) have been established and are designed to provide a system to warn operational personnel (via SMS) of levels that are approaching a relevant criterion and to provide management/control actions. SMS notifications are automatically sent to the Mine Production and Environmental Assistant (MPEA) and OCE identifying the relevant trigger level as described in Table 4. The dust alarm triggers and positions of real-time air quality monitoring locations will be reviewed annually (i.e. as mining progresses) or as part of a contingency response, if required.

Table 4: Real-Time Response Triggers

No	Trigger	Management/Control Actions	Responsibility

1	Winds from NE to SE (45 to 135 degrees) and 24-hour average PM_{10} >38µg/m³ *** at receptor monitoring locations (TEOM4, TEOM7 and TEOM1) NW to SW of the operations
	
	Or
	
	When winds blow towards sensitive receptors NE to SE (45 to 135 degrees) and the vector difference in 1-hour average ambient dust levels (over six [6] consecutive 1-hour periods) between upwind and downwind monitors is >25µg/m³ *
		• SMS sent automatically to OCE and MPEA
		• Following SMS notification:
		  ○ Review weather data and trends (e.g. wind direction, speed and regional events).
		  ○ Review weather predictions.
		  ○ Review current operations and locations of dust generating activities.
		  ○ Review current dust controls.
		  ○ Check that standard mitigation measures are in place.
		  ○ Continue to monitor PM_{10} until decreasing trend observed.
			Area Supervisor
			(assistance can be sought from the Environmental Department)

2	Winds from NE to SE (45 to 135 degrees) and 24-hour average PM_{10} >45µg/m³ *** at monitoring locations (TEOM4, TEOM7 and TEOM1) NW to SW of the operations Or When winds blow towards sensitive receptors NE to SE (45 to 135 degrees), and the vector difference in 1-hour average ambient dust levels (over six [6] consecutive 1-hour periods) between upwind and downwind monitors is >35µg/m³	• SMS sent automatically to OCE and MPEA • Actions as per Trigger 1. • Mine Production Environmental Assistant to inspect and monitor downwind areas for dust and report to supervisor. • Ensure relevant dust control measures (refer Table 3) are in place and performing effectively. • Make temporary operational changes as appropriate (e.g. relocate overburden dumping to wind protected locations; increase haul road watering rate; ensure operators using best endeavours to minimise dust lift off during loading; or selectively shutting down mobile fleet or diggers). • Temporarily pause and modify any activity generating excessive visible dust plumes.	Area Supervisor (assistance can be sought from the Environmental Department)

No	Trigger	Management/Control Actions	Responsibility
3	Winds from NE to SE (45 to 135 degrees) and two consecutive 15 minute average PM_{10} readings >50µg/m^3 *** at monitoring locations (TEOM4, TEOM7 and TEOM1) NW to SW of the operations of the operations Or When winds blow towards sensitive receptors NE to SE (45 to 135 degrees) and the vector difference in 1-hour average ambient dust levels (over three [3] consecutive 1-hour periods) between upwind and downwind monitors is >40µg/m^3 *	• SMS sent automatically to OCE and MPEA • Actions as per Trigger 1. • Actions as per Trigger 2. • Make operational changes (including temporarily shutting down mobile fleet and diggers where appropriate) until decreasing PM_{10} trend observed**.	Area Supervisor (assistance can be sought from the Environmental Department)

* The vector difference is the difference between downwind and upwind PM_{10} levels, along a vector from the upwind monitor to the downwind monitor (representing sensitive receptor locations), approximating the wind vector from mine to receiver.

** Where PM10 exceedances are due to regional events (i.e. determined by consistently elevated PM10 levels at up and down wind air quality monitoring locations – see Section 8.2) operations will also be reviewed to reduce site contributions.

*** Trigger based on total particulate matter concentration.

Triggers are reported to the area supervisor and actions are recorded.

Validation of the triggers has been undertaken since the commencement of mining in OC4, to determine if the current trigger levels are appropriate. The validation exercise found that the current trigger levels are suitable for controlling potential air quality impacts (i.e. using the current trigger levels, there have been no exceedances of the prescribed criteria [Table 2] attributable to Moolarben Coal Complex since the commencement of mining in OC4). If further monitoring identifies that the trigger levels need to be adjusted, this will be included in subsequent revisions of this AQMP.

6.2 MANAGEMENT OF ODOUR AND FUME

In accordance with Condition 16, Schedule 3 and Condition 17, Schedule 3 of the NSW Project Approvals (05_0117 and 08_0135, respectively) MCO will ensure no offensive odours will be emitted from site.

The primary potential odour and fume sources at the Moolarben Coal Complex are from spontaneous combustion and from blasting. Secondary sources include potential odour emissions from hydrocarbons and effluent discharge areas.

The four main areas of Spontaneous Combustion risk are:

- burial of rejects and carbonaceous material in the overburden dumps;
- ROM coal stockpiles;
- product coal stockpiles; and
- boreholes.

Operational processes for MCO to prevent odour from Spontaneous Combustion include:

- Dumping of rejects to occur only in designated areas as directed by the mining supervisor.

- Rejects, carbonaceous parting and LOX coal are to be dumped at least 5m below the final rehabilitated surface and more than 20m from the rehabilitated edge.
- Rejects must not be dumped in a layer thicker than 5m.
- Manage of coal stockpile turn-over.
- Sealing of extracted underground areas.
- Monitoring of air quality underground.
- Monitoring of overburden emplacement areas, stockpiles, exposed coal faces and stowage areas by area supervisors for signs of potential spontaneous combustion (visual and odour)

Operational processes for MCO to manage odour from Spontaneous Combustion may include:

- Review risk to personnel, environment, community and operations from spontaneous combustion and management activities;
- Water applied to cool excessive heating or fire;
- digging out the heated material, applying further watering and then compaction and burial;
- Track rolling and reshaping;
- Spread out and track roll/compact;
- Installation of monitoring equipment;
- Barricade area;
- Where practicable full column cementing of boreholes at the completion of drilling and geological investigations;
- Monitoring of areas where actions have been implemented.

Condition 13(a), Schedule 3 and Condition 14(a), Schedule 3 of the NSW Project Approvals (05_0117 and 08_0135, respectively), also require MCO to minimise fume emissions from blasting. Details on blast fume management at the Moolarben Coal Complex are described in the Blast Management Plan (MCO_ENV_PLN_0023).

MCO will also manage its hydrocarbon stores and effluent discharge to minimise the potential for offsite emissions of offensive odour (as defined under the POEO Act). The primary controls for these secondary odour sources include separation from sensitive receptors and efficient operation and maintenance of potential odour generating facilities. (Note the closest sensitive receptors are in Ulan village located more than 1.5 km from these potential odour sources).

6.3 GREENHOUSE GAS EMISSIONS

The MCO Greenhouse Gas Minimisation Plan outlines reasonable and feasible measures to minimise the release of greenhouse gas emissions from the Moolarben Coal Complex in accordance with Conditions 71 and 72, Schedule 3 and Conditions 9 and 10, Schedule 4 of the NSW Project Approvals (05_0117 and 08_0135).

In accordance with Condition 20(b), Schedule 3 and Condition 21(b), Schedule 3 of the NSW Project Approvals (05_0117 and 08_0135, respectively), MCO will implement all reasonable and feasible measures to minimise the release of greenhouse gas emissions from the Moolarben Coal Complex.

MCO reports on its hydrocarbon use and Greenhouse Gas Emissions annually through the National Pollution Inventory and National Greenhouse and Energy Reporting Scheme.

6.4 TRAINING

Prior to commencing any work duties on site, all personnel will undergo a site specific induction. The site specific induction includes a detailed summary of the Moolarben Coal Complex operation as well as associated health, safety, environment and community requirements. The induction also includes details of the Moolarben Coal Complex environmental impacts and aspects with a focus on the relevant legislation and legal responsibilities applicable to site.

Where required, training in specific environmental management duties (i.e. use of air quality monitoring equipment, or use of real-time response protocols) is provided to relevant employees and contractors.

Further details on training are included in Section 5.6 of the Environmental Management Strategy.

6.5 ROLES AND RESPONSIBILITIES

A description of the roles and responsibilities for environmental management (including air quality management) at the Moolarben Coal Complex is provided in Section 5.1 of the Environmental Management Strategy. This includes the responsibility of all employees (including contractors) to environmental management of the Moolarben Coal Complex.

The Environment and Community Manager (or delegate) has direct oversight of developing, implementing, and reviewing air quality management and monitoring procedures (including this plan) in conjunction with other senior management team personnel. The Environment and Community Manager (or delegate) also has direct responsibility for responding to community complaints (Section 11) and reporting management and monitoring outcomes (Sections 10 and 11). The day to day responsibility of responding to real-time dust triggers (including forecast weather conditions) is outlined in Tables 3 and 4 above.

7.0 AIR QUALITY MONITORING PROGRAM

To assess compliance with the approval criteria, and to meet the monitoring requirement of EPL 12932, ambient air quality monitoring will be conducted at various locations that are considered representative of residential receivers in the areas that may potentially be influenced by mining operations. The air quality and meteorological monitoring locations are shown in Figure 6 and detailed in Table 5.

Additional air quality monitoring data is available to MCO under a data sharing agreement from both the neighbouring Ulan and Wilpinjong mines, with data made accessible upon request from MCO. The monitoring program will be reviewed if there is a change in location of residences on privately owned land. Any monitoring changes will be included during Management Plan reviews outlined in Section 10.2

7.1 AIR QUALITY MONITORING METHODS

7.1.1 Dust Deposition

Dust deposition is monitored at four locations around the Moolarben Coal Complex (Figure 6 and Table 5). Deposited dust is 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.

7.1.2 PM_{10} – High Volume Air Sampler

Two HVAS monitors measuring PM_{10} will be operated by MCO, one at Ulan Village (PM01) and one south-west of OC1 and west of OC2 (PM02) to monitor impacts on the Ridge Road area (Figure 6). PM_{10} is assessed as defined by *Standards Australia AS/NZS 3580.9.6:2003: Methods for sampling and analysis of ambient air – Determination of suspended particulate matter – PM_{10} high volume sampler with size selective inlet – Gravimetric method*.

7.1.3 PM_{10} – Real-Time Monitoring

PM_{10} is indirectly measured using a Tapered Element Oscillating Microbalance (TEOM) at four locations around the Moolarben Coal Complex (Figure 6). PM_{10} is assessed for the purpose of real-time environmental management as defined by *Standards Australia AS/NZS 3580.9.8.2008: Methods for sampling and analysis of ambient air – PM_{10} continuous direct mass method using a tapered element oscillating microbalance analyser*.

7.1.4 $PM_{2.5}$ – Real-Time Monitoring

$PM_{2.5}$ is indirectly measured using a TEOM in close proximity to private landowners South- East of Cooks Gap. $PM_{2.5}$ is assessed for the purpose of real-time environmental management.
A baseline $PM_{2.5}$ data set is being compiled. Following the collection of two years of data, $PM_{2.5}$ monitoring results will be reviewed and assessed to determine what/if any suitable real-time response triggers are appropriate for the management of mine related activities.

7.1.5 TSP

TSP is calculated from the monitored PM_{10} level based on the relationship that 40% of the TSP is PM_{10} and that 90µg/m³ of TSP is equivalent to 4g/m²/month of dust deposition (Note, this relationship of TSP to

PM_{10} is based on a study of co-located TSP and PM_{10} monitors conducted in the Hunter Valley [Todoroski Air Sciences 2013]).

7.1.6 Meteorological Monitoring

Meteorological monitoring is undertaken at MCO, in accordance with NSW Project Approval and EPL requirements. MCO has an Automatic Weather Station (AWS) which measures a full meteorological complement (Table 5). The AWS WS3 is linked into the real-time monitoring system and is the main weather station for reporting purposes. Other weather stations are used to supplement weather data as required. WS3 is located on a property on Ulan Road (Figure 6). The AWSs comply with the requirements in the Approved Methods for Sampling of Air Pollutants in NSW. Further information on meteorological monitoring and reporting is included in the Noise Management Plan.

7.2 ASSESSMENT OF DATA VALIDITY

Where monitoring indicates elevated dust readings above the prescribed criteria (Table 2), MCO will initiate an assessment of the data to determine the validity of the elevated reading and whether an exceedance or a non-compliance event has occurred. In addition to this event driven validation process, a review of monitoring data will be undertaken monthly for dust deposition monitors and quarterly for HVAS and TEOM monitoring locations.

Data validation will be assessed according to the following escalating review and assessment process and will include consideration of prevailing meteorological conditions and extraordinary events such as bushfires, prescribed burning, dust storms, fire incidents and local (non-mining) dust sources (e.g. road works) at the time, where relevant (note Level 2 and 3 validation assessment will be applied as necessary).

Level 1: First pass data review and evaluation. For example, using a plot of the last month's data on a trend line spanning at least 12 months (where the data is available) or similar other simple and effective means to identify potentially erroneous or outlier data (e.g. wind roses for meteorological data), or tables showing variability and deviation from the average.

Level 2: Where data is assessed to be potentially invalid, an analysis of the available data (e.g. field records, laboratory notes, calibrations etc.) shall be made by the Environmental Coordinator. This may require a site inspection of the monitoring equipment to determine it is not damaged, dirty, corroded or compromised by insects, spider webs etc. and thus that the data is valid.

Level 3: Where anomalous or potentially invalid data is found and the issue is significant (e.g. may indicate an exceedance or equipment fault) and a Level 1 or 2 evaluation cannot determine the cause, engage a professional air quality expert to examine the issue.

Table 5: Location of Monitoring Equipment

Location	Site ID	Parameters	Frequency	Justification
Bobadeen	DG01	Dust Deposition	Every 30 days ± 2 days	Background monitoring north of the Moolarben Coal Complex.
Ulan Village	DG04	Dust Deposition	Every 30 days ± 2 days	Representative of nearest non-mine owned residences to the north-west of the Moolarben Coal Complex.
Glenmoor	DG05	Dust Deposition	Every 30 days ± 2 days	Representative of nearest non-mine owned residences to the south-west and west of the Moolarben Coal Complex.
Wilga	DG09	Dust Deposition	Every 30 days ± 2 days	Representative of non-mine owned residences to the south-west and west of the Moolarben Coal Complex.
Ulan Village	PM01	HVAS-PM_{10}	Every 6 days	Indicative of potential impacts to nearest non-mine owned residences to the north-west of the Moolarben Coal Complex.
Ridge Road	PM02	HVAS-PM_{10}	Every 6 days	Background monitoring south-west west of the Moolarben Coal Complex.
Ulan School	TEOM01	Real Time PM_{10}	Continuous**	Real time monitoring at Ulan Public School.
Mobile	TEOM04	Real Time PM_{10}	Continuous**	Real-time monitoring representative of nearest non-mine owned residences to the south-west and west the Moolarben Coal Complex. Unit available for additional PM_{10} monitoring and complaint investigation as required.
Ulan-Wollar Road	TEOM06	Real Time PM_{10}	Continuous**	Real time monitoring representative of mine owned land to the east of Moolarben Coal Complex and indicator of background air quality when wind in direction of sensitive receivers. (Note there are no residences on private or mine owned land in the vicinity of the monitor and the air quality criteria do not apply).
Ulan Road	TEOM07	Real Time PM_{10} Real Time $M_{2.5}$	Continuous**	Real time monitoring representative of non-mine owned residences to the south-west and west of the Moolarben Coal Complex.
Ulan Road	Weather Station (WS3)*	Full Meteorological complement	Continuous***	Permanent meteorological station representative of conditions near non-mine owned residences to the south-west of the Moolarben Coal Complex.

* Full Meteorological compliment consists of sensors and calculations that provide the following:

- wind speed at 10m;

- wind direction at 10m;
- standard deviation of wind direction (sigma-theta) at 10m;
- temperature at 2m and 10m;
- relative humidity at 2m;
- temperature difference between 2m and 10m; and
- rainfall (gauge at ground-level).

** For PM 10 and PM2.5 monitoring, "continuous' refers to the capture of relevant data for the duration of the reporting period. Data capture rates across the reporting period do not apply under the following situations of equipment breakdown, power loss, scheduled maintenance. Performance specification testing and vandalism.

*** For weather monitoring, "continuous' refers to the capture of relevant data for the duration of the reporting period. Data capture rates across the reporting period do not apply under the following situations of equipment breakdown, power loss, scheduled maintenance. Performance specification testing and vandalism.

8.0 COMPLIANCE PROTOCOL

Compliance monitoring will be assessed using the air quality monitoring program described in Section 7. Compliance with the impact assessment criteria and land acquisition criteria requires either direct or indirect assessment of the measured results.

8.1 NON-COMPLIANCE VIA DIRECT MEASUREMENT

A non-compliance with the criteria in Table 2 can be determined when monitoring data representative of sensitive receptors (Section 7) exceeds the prescribed criteria and an assessment of the validity of the data (Section 7.2) and relevant exclusions (e.g. bushfires, prescribed burning, dust storms, fire incidents and local [non-mining] dust sources) has been undertaken. Non-compliances will be reported in accordance with incident reporting requirements in Section 11.2.

8.2 COMPLIANCE VIA INDIRECT METHODS

Compliance with the criteria in Table 2 is demonstrated where the measured level is below the criteria. However, dust from extraordinary events (e.g. bushfires, prescribed burning, dust storms, fire incidents or local [non-mining] dust sources) may lead to dust levels above these criteria being recorded. These events are excluded from relevant air quality criteria levels (refer to Tables 2a and 2b). MCO uses a comparative approach between upwind and downwind monitors to validate and determine the effect of extraordinary events.

It is not a non-compliance of the Project Approval air quality criteria if an exceedance of a criteria level recorded by a monitor (e.g. TEOM) is the result of an extraordinary event.

For deposited dust, 24-hour average $PM_{10,}$ or for 24-hour average $PM_{2.5}$, compliance can be inferred indirectly if, for example, measured dust levels at a monitoring location between a sensitive receptor and the mine are below the criteria in Table 2.

The mine-only increment 24-hour average PM_{10} and $PM_{2.5}$ dust level may be inferred as the difference between the upwind and downwind measured 24-hour average PM_{10} levels, however, the following may also require consideration:

- Whether prevailing winds were occurring in a relatively constant direction.
- The effects of intervening topography.
- The time a parcel of air took to travel across the Project site, pick up dust particles and arrive at a receptor.

Additional assessment of air quality monitoring results will be undertaken by a qualified air quality specialist if the following occurs:

- An exceedance against the impact assessment and/or land acquisition criteria cannot be reasonably determined by the Environment and Community Coordinator using the methods described above.
- A request for acquisition is received from a privately owned residence, and/or in relation to potential affectation of 25% of any privately owned land.

As described in Section 7.2 above, initial review and validation of air quality monitoring data is carried out by the Environment and Community Coordinator. Where there are difficulties in validating data or complexities arising from application of the above processes, then MCO will engage a professional air quality expert to review the data and provide guidance on its interpretation.

9.0 CONTINGENCY PLAN

In the event that an air quality criteria detailed in Section 4 is exceeded and confirmed to be a non-compliance, MCO will implement the following Contingency Plan:

- MCO will report the non-compliance of the air quality criteria to the EPA and the Department of Planning, Industry and Environment (DPIE)immediately.
- MCO will identify an appropriate course of action with respect to the identified impact(s), in consultation with relevant specialists, DPIE and the EPA, as necessary. For example, contingency measures, such as, but not limited to, those described in Section 9.1 of this AQMP.
- MCO will, on request, submit the proposed course of action to the DPIE for approval.
- MCO will implement the approved course of action to the satisfaction of the DPIE.

9.1 POTENTIAL CONTINGENCY MEASURES

Key potential contingency measures to be implemented (following the non-compliance of air quality criteria) may include the following:

- MCO will notify affected landholders and/or tenants of a non-compliance as soon as practicable and provide them with regular air quality monitoring results, until the results show that MCO is complying with the air quality criteria.
- MCO will, on request, implement air mitigation measures in accordance with Condition 18(c), Schedule 3 and Condition 19(c), Schedule 3 of the NSW Project Approvals (05_0117 and 08_0135, respectively) (such as a first flush system on rain water tanks).
- MCO will investigate strategic long term pit design to provide alternative dump locations and review long term operational sequencing with a view to minimise dust emissions, if air quality monitoring results indicate this is required.
- MCO will acquire affected properties on request in accordance with Condition 19, Schedule 3 and Condition 20, Schedule 3 of the NSW Project Approvals (05_0117 and 08_0135, respectively).
- MCO will review effectiveness of performance indicators and associated management responses.

Contingency measures will be reviewed during revisions of this AQMP.

10.0 ANNUAL REVIEW AND IMPROVEMENT OF AIR QUALITY MANAGEMENT

10.1 ANNUAL REVIEW

In accordance with Condition 4, Schedule 5 and Condition 4, Schedule 6 of the Project Approvals (05_0117 and 08_0135, respectively) MCO will conduct an annual review of MCO operations prior to 31 March for the preceding calendar year.

This annual review will specifically address the following aspects of Condition 4, which directly relate to air quality:

- include a comprehensive review of the monitoring results and complaints records of MCO operations over the previous calendar 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 Environmental Assessment;
- 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; and
- identify any discrepancies between the predicted and actual impacts of MCO operations, and analyse the potential cause of any significant discrepancies.

The annual review will be made publicly available on the Moolarben Coal website upon approval from the DP&E in accordance with Condition 11, Schedule 5 and Condition 11, Schedule 6 of the Project Approvals (05_0117 and 08_0135, respectively).

MCO also reports particulate matter emissions annually as part of its National Pollutant Inventory reporting requirements and its greenhouse gas emissions and energy use as part of its Commonwealth National Greenhouse and Energy Reporting System reporting requirements. A summary of the greenhouse gas emissions for the Moolarben Coal Complex will be provided in the Annual Review.

Moolarben Coal will complete a review of particulate emission controls implemented at the MCC against industry best practice on a three yearly basis and report the findings in the relevant Annual Review.

10.2 AIR QUALITY MANAGEMENT PLAN REVIEW

In accordance with Condition 5, Schedule 5 and Condition 5, Schedule 6 of the Project Approvals (05_0117 and 08_0135, respectively) this AQMP will be reviewed, and if necessary revised to the satisfaction of the Secretary, within 3 months of the submission of:

a) an Annual Review in accordance with Condition 4, Schedule 5 and Condition 4, Schedule 6 of the Project Approvals (05_0117 and 08_0135, respectively);

b) an incident report in accordance with Condition 7, Schedule 5 and Condition 7, Schedule 6 of the Project Approvals (05_0117 and 08_0135, respectively);

c) an audit in accordance with Condition 9, Schedule 5 and Condition 9, Schedule 6 of the Project Approvals (05_0117 and 08_0135, respectively);

d) any modification to the conditions of the Project Approvals.

This AQMP will be made publicly available on the Moolarben Coal website, in accordance with Condition 11, Schedule 5 and Condition 11, Schedule 6 of the Project Approvals (05_0117 and 08_0135, respectively).

11.0 REPORTING AND COMMUNICATION

In accordance with Condition 3, Schedule 5 and Condition 3, Schedule 6 of the Project Approvals (05_0117 and 08_0135, respectively), MCO has developed protocols for managing and reporting the following:

- complaints;
- incidents;
- exceedances of the impact assessment criteria which are confirmed to be non-compliances (i.e. when considering extraordinary events such as bushfires, prescribed burning, dust storms, fire incidents or local [non-mining] dust sources) (Section 7.2); and
- non-compliances with statutory requirements.

11.1 COMPLAINTS HANDLING

MCO maintains a Community Response Line (Phone Number 1800 556 484) that is dedicated to the receipt of community complaints. The Community Response Line is publicly advertised and operates 24 hours per day, seven days a week, to receive any complaints from neighbouring residents or other stakeholders. The Community Response Line is advertised in the local media and is also available on the Moolarben Coal Website and in the community newsletters.

Investigations will commence within 24 hours of the receipt of a complaint to determine the likely cause of the complaint (i.e. meteorological conditions and nature of mining activities). This investigation will be used to develop appropriate mitigation measures which will be presented to the complainant.

Further details on complaints handling are included in Section 5.4 of the Environmental Management Strategy.

11.2 INCIDENT REPORTING

An incident is defined as 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 the NSW Project Approvals due to MCO's authorised activities.

In the event that an incident associated with the Moolarben Coal Complex occurs, which causes or threatens to cause material harm to the environment, the incident will be managed in accordance with relevant regulatory approvals and statutory obligations.

The reporting of incidents will be conducted in accordance with Condition 7, Schedule 5 and Condition 7, Schedule 6 of the NSW Project Approvals (05_0117 and 08_0135, respectively). MCO will notify the Secretary of the DP&E, and any other relevant agencies immediately after MCO becomes aware of the incident which causes or threatens to cause material harm to the environment. For any other incident associated with the project, MCO will notify the Secretary and any other relevant agencies as soon as practicable after becoming aware of the incident. Further details regarding incidents are contained in the Management Plans (Table 4).

In the event of a pollution incident, notification will also be conducted as per the process outlined in the PIRMP (prepared as part of MCO's holding of EPL 12932), in accordance with the protocol for industry notification of pollution incidents under Part 5.7 of the NSW *Protection of the Environment Operations Act 1997*.

Within seven days of the date of the incident, MCO will provide the Secretary of the DP&E and any relevant agencies with a detailed report on the incident. The report will:

- describe the date, time and nature of the exceedance/incident;
- identify the cause (or likely cause) of the exceedance/incident;
- describe what action has been taken to date; and
- describe the proposed measures to address the exceedance/incident.

MCO will also provide regular monitoring results to DP&E, EPA and affected landowners until the results show that the project is complying with relevant criteria.

Further details on incident reporting is included in Sections 6.2 and 6.3 of the Environmental Management Strategy.

11.3 NOTIFICATION

MCO will undertake notification of landowners/tenants in accordance with the requirements of Conditions 1 to 3, Schedule 4 and Conditions 1 to 3, Schedule 5 of the NSW Project Approvals (05_0117 and 08_0135, respectively).

MCO will notify the EPA if any continuous monitoring is unavailable for a period of time greater than 48 hours.

11.4 COMMUNICATIONS

MCO provides information on its environmental performance (including air quality) through various reporting and communication mechanisms such as through the Community Consultative Committee (CCC), annual review and on its website, as required by the conditions of NSW Project Approvals (05_0117 and 08_0135).

Further details on communications are included in Section 5.3 of the Environmental Management Strategy.

12.0 REFERENCES

Todoroski Air Sciences (2013) "Moolarben Coal Project Stage 1 Optimisation Modification Air Quality and Greenhouse Gas Assessment". Prepared by Todoroski Air Sciences for EMGA Mitchell McLennan, May 2013.

Todoroski Air Sciences (2015) "*Air Quality Assessment Moolarben Coal Complex UG1 Optimisation Modification*". Prepared by Todoroski Air Sciences, May 2015.

Todoroski Air Sciences (2017) "Air Quality Assessment Moolarben Coal Project OC Optimisation Modification". Prepared by Todoroski Air Sciences, October 2017.

Todoroski Air Sciences (2018) "Review of Coal Complex Particulate Emission Controls" Prepared by Todorisko Air Sciences, July 2018

Appendix A - Relevant NSW Project Approval Conditions (05_0117 and 08_0135)

Table A-1: Air Quality Management Plan Requirements

NSW Project Approval Condition	AQMP Section
Air Quality Management Plan	
20A. The Proponent shall prepare and implement an Air Quality Management Plan for the project to the satisfaction of the Secretary. This plan must:	
e) *be prepared in consultation with the EPA and be submitted to the Secretary for approval by 31 March 2015;*	Section 1.2
f) describe the measures that would be implemented to ensure compliance with the relevant air quality criteria and operating conditions of this approval:	Section 6.0
g) describe the air quality management system;	Section 6.0
h) include an air quality monitoring program that:	Section 7.1
• *uses a combination of real-time and supplementary monitors, including a real-time $PM_{2.5}$ monitor to evaluate the performance of the project against the air quality criteria in this approval;*	
• *adequately supports the air quality management system;*	Section 7.1
– *evaluates and reports on the: the effectiveness of the air quality management system; and*	Section, 10.0
– *compliance against the air quality operating conditions;*	Section 6.0 and Section 11.0
• *defines what constitutes an air quality incident, and includes a protocol for identifying and notifying the Department and relevant stakeholders of any air quality incidents.*	Section 11.2

Table A-2: Air Quality Management Plan Requirements

NSW Project Approval Condition	AQMP Section
Air Quality Management Plan	
22. The Proponent shall prepare and implement an Air Quality Management Plan for the project to the satisfaction of the Secretary. This plan must:	
a) *be prepared in consultation with the EPA, and submitted to and approved by the Secretary prior to the commencement of any development on site;*	Section 1.2
b) describe the measures that would be implemented to ensure compliance with the relevant air quality criteria and operating conditions of this approval:	Section 6.0
c) describe the air quality management system;	Section 6.0
• *include an air quality monitoring program that: uses a combination of real-time and supplementary monitors to evaluate the performance of the project against the air quality criteria in this approval;*	Section 7.1
• *adequately supports the air quality management system;*	Section 7.1
– *evaluates and reports on the: the effectiveness of the air quality management system;*	Section 7.0 and Section 11.0
– *compliance with the air quality criteria;*	Sections 4.0, 8.0 & 11.0
– *compliance with the air quality operating conditions; and*	Section 6.0 and Section 11.0
• *defines what constitutes an air quality incident, and includes a protocol for identifying and notifying the Department and relevant stakeholders of any air quality incidents.*	Section 11.2

Table A-3: Summary of NSW Project Approval Conditions Relevant to Air Quality Management

<table>
<tr><th>NSW Project Approval (05_0117)</th><th>NSW Project Approval (08_0135)</th><th>AQMP Section</th></tr>
<tr><td>Schedule 3</td><td>Schedule 3</td><td></td></tr>
<tr><td>AIR QUALITY</td><td>AIR QUALITY</td><td></td></tr>
<tr><td>Odour
16. The Proponent shall ensure that no offensive odours, as defined under the POEO Act, are emitted from the site.</td><td>Odour
17. The Proponent shall ensure that no offensive odours, as defined under the POEO Act, are emitted from the site.</td><td>Section 6.2</td></tr>
<tr><td>Air Quality Criteria
17. The Proponent shall ensure that all reasonable and feasible avoidance and mitigation measures are employed so that particulate matter emissions generated by the Moolarben mine complex do not cause exceedances of the criteria listed in Tables 5, 6 and 7 at any residence on privately owned land
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 < 10 µm (PM_{10})</td><td>Annual</td><td>[a] 25 µg/m^3</td></tr><tr><td>Particulate matter < 2.5 µm ($PM_{2.5}$)</td><td>Annual</td><td>[a,d] 8 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 < 10 µm (PM_{10})</td><td>24 hour</td><td>[a] 50 µg/m^3</td></tr><tr><td>Particulate matter < 2.5 µm ($PM_{2.5}$)</td><td>24 hour</td><td>[b] 25 µg/m^3</td></tr></table></td><td>Air Quality Criteria
18. The Proponent shall ensure that all reasonable and feasible avoidance and mitigation measures are employed so that particulate matter emissions generated by the Moolarben mine complex do not cause exceedances of the criteria listed in Tables 8, 9 and 10 at any residence on privately-owned land.
Table 8: 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 < 10 µm (PM_{10})</td><td>Annual</td><td>[a,d] 30 µg/m^3</td></tr><tr><td>Particulate matter < 2.5 µm ($PM_{2.5}$)</td><td>Annual</td><td>[a,d] 8 µg/m^3</td></tr></table>Table 9: 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 < 10 µm (PM_{10})</td><td>24 hour</td><td>[a] 50 µg/m^3</td></tr><tr><td>Particulate matter < 2.5 µm ($PM_{2.5}$)</td><td>24 hour</td><td>[b] 25 µg/m^3</td></tr></table></td><td>Section 6.1</td></tr>
</table>

<table>
<tr><th>NSW Project Approval (05_0117)</th><th>NSW Project Approval (08_0135)</th><th>AQMP Section</th></tr>
<tr><td>

Table 7: 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	[d] 2 g/m^2/month	[a] 4 g/m^2/month

Notes to Tables 5-7:

a. Cumulative (i.e. incremental increase in concentrations due to the Moolarben mine complex plus background concentrations due to all other sources);

b Incremental impact (i.e. incremental increase in concentrations due to the Moolarben mine complex on its own) with up to 5 allowable exceedances over the life of the project;

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, fire incidents, illegal activities or any other activity agreed by the Secretary.

Mine-owned Land

18. The Proponent shall ensure that all reasonable and feasible avoidance and mitigation measures are employed so that particulate matter emissions generated by the Moolarben mine complex do not cause exceedances of the criteria listed in Tables 8, 9 and 10 at any occupied residence on mine-owned land (including land owned by another mine) unless:

    (a) the tenant and landowner has been notified of any health risks associated with such exceedances in accordance with the notification requirements under Schedule 4 of this approval;

    (b) the tenant of any land owned by the Proponent can terminate their tenancy agreement without penalty at any time, subject to giving reasonable notice, and the Proponent uses its best endeavours to provide assistance with relocation and sourcing of alternative accommodation;

</td><td>

Table 10: 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	[d] 2 g/m^2/month	[a] 4 g/m^2/month

Notes to Tables 8-10:

a. Total impact (i.e. incremental increase in concentrations due to the complex plus background concentrations due to all other sources);

b. Incremental impact (i.e. incremental increase in concentrations due to the complex on its own with up to 5 allowable exceedances over the life of the project;

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, fire incidents, illegal activities or any other activity agreed by the Secretary.

Mine-owned Land

19. The Proponent shall ensure that all reasonable and feasible avoidance and mitigation measures are employed so that particulate matter emissions generated by the Moolarben mine complex do not cause exceedances of the criteria listed in Tables 11, 12 and 13 at any occupied residence on mine-owned land (including land owned by another mining company) unless:

    (a) the tenant and landowner (if the residence is owned by another mining company) have been notified of any health risks associated with such exceedances in accordance with the notification requirements under Schedule 5 of this approval;

    (b) the tenant of any land owned by the Proponent can terminate their tenancy agreement without penalty at any time, subject to giving reasonable notice;

</td><td>Section 6.1</td></tr>
</table>

<table>
<tr><th>NSW Project Approval (05_0117)</th><th>NSW Project Approval (08_0135)</th><th>AQMP Section</th></tr>
<tr><td>(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 (if the residences is owned by another mine);

(d) particulate matter air quality monitoring is regularly undertaken to inform the tenant and landowner of the actual particulate emissions; and</td><td>(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 (if the residence is owned by another mining company);

(d) air quality monitoring is regularly undertaken to inform the tenant and landowner (if the residence is owned by another mining company) of the actual particulate emissions at the residence; and</td><td></td></tr>
<tr><td>(e) data from this monitoring is presented to the tenant in an appropriate format, for a medical practitioner to assist the tenant in making informed decisions on the health risks associated with occupying the property,

to the satisfaction of the Secretary.</td><td>(e) data from this monitoring is presented to the tenant and landowner in an appropriate format for a medical practitioner to assist the tenant and landowner in making informed decisions on the health risks associated with occupying the property,

to the satisfaction of the Secretary.</td><td></td></tr>
<tr><td>Air Quality Acquisition Criteria</td><td>Air Quality Acquisition Criteria</td><td></td></tr>
<tr><td>19. If particulate matter emissions generated by the Moolarben mine complex exceed the incremental criteria, or contribute to an exceedance of the relevant cumulative criteria, in Tables 8, 9 and 10 at any residence on privately-owned land or on more than 25% of any privately-owned land (and a dwelling could be built on that land under existing planning controls), then upon receiving a written request for acquisition from the landowner, the Proponent shall acquire the land in accordance with the procedures in conditions 10-11 of Schedule 4.

Table 8: Long term land acquisition 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 < 10 µm (PM_{10})</td><td>Annual</td><td>[a,d] 25 µg/m^3</td></tr><tr><td>Particulate matter < 2.5 µm ($PM_{2.5}$)</td><td>Annual</td><td>[a,d] 8 µg/m^3</td></tr></table></td><td>20. If particulate matter emissions generated by the Moolarben mine complex exceed the incremental criteria, or contribute an exceedance of the relevant cumulative criteria, in Tables 11, 12 and 13 at any residence on privately-owned land or on more than 25% of any privately-owned land (and a dwelling could be built on that land under existing planning controls), then upon receiving a written request for acquisition from the landowner, the Proponent shall acquire the land in accordance with the procedures in conditions 5 and 6 of Schedule 5.

Table 11: Long term land acquisition 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 < 10 µm (PM_{10})</td><td>Annual</td><td>[a,d] 25 µg/m^3</td></tr><tr><td>Particulate matter < 2.5 µm ($PM_{2.5}$)</td><td>Annual</td><td>[a,d] 8 µg/m^3</td></tr></table></td><td>Section 4.0</td></tr>
</table>

<table>
<tr><th>NSW Project Approval (05_0117)</th><th>NSW Project Approval (08_0135)</th><th>AQMP Section</th></tr>
<tr><td>

Table 9: Short term land acquisition criteria for particulate matter

Pollutant	*Averaging period*	*[d] Criterion*	*Basis*
Particulate matter < 10 µm (PM_{10})	24 hour	[b] 50 µg/m^3	Increment [b]
Particulate matter < 2.5 µm ($PM_{2.5}$)	24 hour	[b] 25 µg/m^3	Increment [b]

Table 10: Long term land acquisition criteria for deposited dust

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

</td><td>

Table 12: Short term land acquisition criteria for particulate matter

Pollutant	*Averaging period*	*[d] Criterion*	*Basis*
Particulate matter < 10 µm (PM_{10})	24 hour	[b] 50 µg/m^3	Increment [b]
Particulate matter < 2.5 µm ($PM_{2.5}$)	24 hour	[b] 25 µg/m^3	Increment [b]

Table 13: Long term land acquisition criteria for deposited dust

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

</td><td></td></tr>
<tr><td>

Notes to Tables 8-10:

a. Cumulative (i.e. incremental increase in concentrations due to the Moolarben mine complex plus background concentrations due to all other sources);

b. Incremental impact (i.e. incremental increase in concentrations due to the Moolarben mine complex on its own) with up to 5 allowable exceedances over the life of the project;

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, fire incidents, illegal activities or any other activity agreed by the Secretary.

</td><td>

Notes to Tables 11-13:

a. Cumulative impact (i.e. incremental increase in concentrations due to the complex plus background concentrations due to all other sources);

b. Incremental impact (i.e. incremental increase in concentrations due to the complex on its own) with up to 5 allowable exceedances over the life of the project;

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, fire incidents, illegal activities or any other activity agreed by the Secretary.

</td><td>Section 4.0</td></tr>
<tr><td>**Operating Conditions**</td><td>**Operating Conditions**</td><td></td></tr>
<tr><td>

20. The Proponent shall:

(a) implement best management practice to minimise the off-site odour, fume and dust emissions of the project;

(b) implement all reasonable and feasible measures to minimise the release of greenhouse gas emissions from the site;

(c) minimise any visible off-site air pollution generated by the project;

</td><td>

21. The Proponent shall:

(a) implement best management practice to minimise the off-site odour, fume and dust emissions of the project;

(b) implement all reasonable and feasible measures to minimise the release of greenhouse gas emissions from the site;

(c) minimise any visible off-site air pollution generated by the project;

</td><td>

Section 6.0

Section 6.3

Section 6.1

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

NSW Project Approval (05_0117)	NSW Project Approval (08_0135)	AQMP Section
(d) minimise the surface disturbance of the site;	(d) minimise the surface disturbance of the site;	Section 6.1
(e) operate a comprehensive air quality management system that uses a combination of predictive meteorological forecasting and real-time air quality monitoring data to guide the day to day planning of mining operations and the implementation of both proactive and reactive air quality mitigation measures to ensure compliance with the relevant conditions of this approval;	(e) operate a comprehensive air quality management system that uses a combination of predictive meteorological forecasting and real-time air quality monitoring data to guide the day to day planning of mining operations and the implementation of both proactive and reactive air quality mitigation measures to ensure compliance with the relevant conditions of this approval;	Section 6.1
(f) minimise the air quality impacts of the project during adverse meteorological conditions and extraordinary events (see Note d under Table 9); and	(f) minimise the air quality impacts of the project during adverse meteorological conditions and extraordinary events (see Note d under Table 13); and	Section 6.1
(g) co-ordinate the air quality management on site with the air quality management at the Ulan and Wilpinjong mines to minimise cumulative air quality impacts,	(g) co-ordinate the air quality management at the Moolarben mine complex with the air quality management at the Ulan and Wilpinjong mines to minimise cumulative air quality impacts,	Section 6.1
to the satisfaction of the Secretary.	to the satisfaction of the Secretary.	
Meteorological Monitoring	**Meteorological Monitoring**	
20B. For the life of the project, the Proponent shall ensure that there is a meteorological station in the vicinity of the site that:	24. For the life of the project, the Proponent shall ensure that there is a meteorological station in the vicinity of the site that:	Section 7.1.6
(a) complies with the requirements in the Approved Methods for Sampling of Air Pollutants in New South Wales guideline; and	(a) complies with the requirements in the Approved Methods for Sampling of Air Pollutants in New South Wales guideline;	
...	...	
Ulan Public School	**Ulan Public School**	
20C. The Proponent shall consult with DEC and, if requested:	23. The Proponent shall consult with DEC and, if requested:	
(a) implement agreed reasonable and feasible measures to ameliorate potential noise and/or dust impacts to Ulan Public School; or	a) implement agreed reasonable and feasible measures to ameliorate potential noise and/or dust impacts to Ulan Public School; or	Section 6.1.2
(b) on a reasonable basis relating to the adverse effect of noise and/or dust from the project, contribute to or meet reasonable costs toward relocating the school.	b) on a reasonable basis relating to the adverse effect of noise and/or dust from the project, contribute to or meet reasonable costs toward relocating the school.	

NSW Project Approval (05_0117)	NSW Project Approval (08_0135)	AQMP Section
Schedule 4	**Schedule 5**	
NOTIFICATION OF LANDOWNERS/TENANTS	**NOTIFICATION OF LANDOWNERS/TENANTS**	
2. Prior to entering into any tenancy agreement for any land owned by the Proponent that is predicted to experience exceedances of the recommended dust and/or noise criteria, or for any of the land listed in Table 3 that is subsequently purchased by the Proponent, the Proponent shall: (a) 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" (as may be updated from time to time); and (b) advise the prospective tenants of the rights they would have under this approval, to the satisfaction of the Secretary.	2. Prior to entering into any tenancy agreement for any land owned by the Proponent that is predicted to experience exceedances of the recommended dust and/or noise criteria, or for any of the land listed in Table 3 that is subsequently purchased by the Proponent, the Proponent shall: (a) 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" (as may be updated from time to time); and (b) advise the prospective tenants of the rights they would have under this approval, to the satisfaction of the Secretary.	Section 11.3
3. As soon as practicable after obtaining monitoring results showing: (a) (a) an exceedance of any relevant criteria in Schedule 3, the Proponent shall notify affected landowners in writing of the exceedance, and provide regular monitoring results to each affected landowner until the project is again complying with the relevant criteria; and (b) (b) an exceedance of the relevant air quality criteria in Schedule 3, the Proponent shall send a copy of the NSW Health fact sheet entitled "Mine Dust and You" (as may be updated from time to time) to the affected landowners and/or existing tenants of the land (including the tenants of any mine-owned land).	3. As soon as practicable after obtaining monitoring results showing: (a) an exceedance of any relevant criteria in Schedule 3, the Proponent shall notify affected landowners in writing of the exceedance, and provide regular monitoring results to each affected landowner until the project is again complying with the relevant criteria; and (b) an exceedance of the relevant air quality criteria in Schedule 3, the Proponent shall send a copy of the NSW Health fact sheet entitled "Mine Dust and You" (as may be updated from time to time) to the affected landowners and/or existing tenants of the land (including the tenants of any mine-owned land).	Section 11.3

Table A-4 Relevant Commitments Relating to Air Quality in Appendix 3 of Stage 1 NSW Project Approval Conditions

Stage 1 - NSW Project Approval (05_0117)	AQMP Section
Appendix 3: Statement of Commitments	
(18) Additional Management and Mitigation – Modification of Stage 1	
• *Management and monitoring of air quality will continue to be undertaken in accordance with the best management practices set out in an approved Air Quality Management Plan.*	Section 6.1
• *Dust control measures will be used on internal haul roads.*	Section 6.1
• *Raw coal transfer and rejects conveyors will be partially enclosed.*	Section 6.1
• *Dust sprays will be fitted to the dump hopper.*	Section 6.1
• *Water carts will be used to minimise dust generation from unsealed access tracks and construction areas, where required.*	Section 6.1
• *A TEOM will be located to the southwest of the project to enable pro-active dust management and compliance monitoring for private residences to the south of the project prior to mining in Open Cut 2.*	Figure 6
• *Use of a TEOM located to the northeast of the project for measuring background dust levels.*	Figure 6
• *MCO will continue to report annually in the AEMR, the total amount of greenhouse gas emissions from the MCP and the effectiveness of measures implemented to achieve energy savings.*	Section 11

Table A-5 Relevant Commitments Relating to Air Quality in Appendix 3 of Stage 2 NSW Project Approval Conditions

Stage 2 - NSW Project Approval (08_0135)	AQMP Section
Appendix 3: Statement of Commitments	
4. MCM will revise the Stage 1 Environmental Management System to incorporate the MCC Stage 2 project in consultation with relevant regulators and stakeholders (where appropriate). This may require revision or preparation of monitoring and management plans as prescribed by the Project Approval, such as (where relevant): • *Environmental Monitoring Program;* • *Air Quality and Greenhouse Gas Management Plan (including energy savings actions);* • *Spontaneous Combustion Management Plan;* • *Noise Management Plan;* • *Blast Management Plan;* • *Water Management Plan (including groundwater and surface water);* • *Creek and Aquatic Rehabilitation Plan;* • *Rehabilitation Management Plan;* • *Biodiversity Management Plan;* • *Subsidence Management Plan;* • *Aboriginal Cultural Heritage Management Plan;* • *Non Aboriginal Heritage Management Plan;* • *Erosion and Sediment Control Plan;* • *Social Engagement and Issue Response Strategy;* • *Bushfire Management Plan; and* • *Waste Management Plan.* *(Note where applicable or appropriate some of these plans may be combined).*	This AQMP and the Greenhouse Gas Minimisation Plan
5. MCM will use its best endeavours to implement industry best practice air quality management initiatives to minimise the air quality impacts of the MCC.	Section 6.1.1
6. The revised MCC Air Quality Management Plan (and future variations) will include a validation exercise of the real time response triggers.	Section 6.1.2
7. MCM will complete a review of particulate emission controls implemented at the MCC against industry best practice on a three yearly basis and report the findings in the relevant Annual Review. *...* *9. Where air quality impacts are predicted to exceed criteria at private residences in the PPR due to MCC operations, MCM will install a first flush system to the rain water tanks upon written request of the landholder.*	Section 6.1.1 Section 9.1