



**NARRABRI MINE
ENVIRONMENTAL
MANAGEMENT SYSTEM**

Document Owner:	Env. Manager
Revision Period:	2 years
Issue:	1
Last Revision Date:	3/12/2007
Date Printed:	19/01/2012

WHC_PLN_NAR_AIR QUALITY MONITORING PROGRAM

AIR QUALITY MONITORING PROGRAM

Edition	Rev.	Comments	Author	Authorised By	Date
1	0	Initial document	D Young	C Burgess	December 2007
1	1	Stage 2 Revision	J Johnson	S Pegg	November 2011



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ACRONYMS USED THROUGHOUT THIS DOCUMENT

AR	-	Annual Review
AQMP	-	Air Quality Monitoring Program
AS	-	Australian Standard
CCC	-	Community Consultative Committee
CHPP	-	Coal Handling and Preparation Plant
DP&I	-	Department of Planning and Infrastructure (formerly Department of Planning (DoP))
DRE	-	Division of Resources and Energy (part of the Department of Transport and Investment, Regional Infrastructure and Services (DTIRIS), formerly Industry and Investment NSW (I&I NSW))
EA	-	Environmental Assessment
EPL	-	Environment Protection Licence
HVAS	-	High Volume Air Sampler
Mtpa	-	Million tonnes per annum
NATA	-	National Association of Testing Authorities
NCOPL	-	Narrabri Coal Operations Pty Ltd
NSC	-	Narrabri Shire Council
OEH	-	Office of Environmental and Heritage (formerly Department of Environment, Climate Change and Water (DECCW))
PA	-	Project Approval
PM ₁₀	-	Particulate Matter with aerodynamic diameter less than 10µm
TSP	-	Total Suspended Particulate Matter



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1 INTRODUCTION

Narrabri Mine ("the mine") is located approximately 30km south-southeast of Narrabri, and 10km north-northwest of Baan Baa (see Figure 1). The mine is being developed by Narrabri Coal Operations Pty Ltd (NCOPL) as an underground mining operation.

The mine lies within a 5,213ha area covered by mining lease ML 1609 ("the mine site"), with an indicative mining area of approximately 3,630ha, and a surface facilities area of approximately 457ha. The mine operates under Environment Protection Licence (EPL) 12789.

The site operates under Project Approval (PA) 08_0144, which was granted by the Minister for Planning on the 26th July 2010 and incorporates:

- Underground longwall mining with an annual production rate of 8Mtpa;
- Mine ventilation and gas drainage;
- Mine dewatering;
- Processing, stockpiling and loading of coal, which includes construction of a Coal Handling and Preparation Plant (CHPP);
- Emplacement of processing reject and storage of saline water;
- Construction and use of a water pipeline from the Namoi River;
- Transportation of the coal from the mine site to Port Newcastle via train;
- Final rehabilitation of surface disturbance following completion of the project; and
- All ancillary and related activities.
- Underground longwall mining with an annual production rate of 8Mtpa;
- Mine ventilation and gas drainage;
- Mine dewatering;
- Processing, stockpiling and loading of coal, which includes construction of a Coal Handling and Preparation Plant (CHPP);
- Emplacement of processing reject and storage of saline water;
- Construction and use of a water pipeline from the Namoi River;
- Transportation of the coal from the mine site to Port Newcastle via train;
- Final rehabilitation of surface disturbance following completion of the project; and
- All ancillary and related activities.

The following list details the main activities that have been commenced or completed at the time of development of this plan:

- Kamlaroi Highway upgrade;



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- Site access and Kurrajong Creek road upgrade;
- Administration and industrial buildings (ie. workshop, store);
- Ventilation fans;
- 66kv transmission line as well as high and low voltage works;
- Rail loop;
- Sewage treatment plant;
- Box cut;
- Drift construction;
- Drift and skyline conveyors;
- Train loadout;
- CHPP (commenced but not completed);
- West Mains ventilation shaft (commenced but not completed); and
- Gas pre-drainage infrastructure (ongoing).

It is recognised that the operation of the mine has the potential to impact on the air quality within and beyond the boundaries of the mine site. In order to manage the potential impacts on local air quality, and in compliance with Condition 4(7) of PA 08_0144, this Air Quality Monitoring Program (AQMP) has been developed.

The AQMP has been prepared with reference to relevant legislation, approvals and guidelines, follows the management plan requirements specified in Condition 6(2) of PA 08_0144 and is consistent with the commitments in the following documents:

- Stage 2 Longwall Project Environmental Assessment – specifically sections 4B.8.
- Air Quality Assessment – included as Volume 2 (Part 7) of the Stage 2 Longwall Project Environmental Assessment Specialist Consultant Studies Compendium; and
- Final Statement of Commitments – specifically Section 11.

The AQMP presents the relevant conditions of the PA 08_0144 (see Section 2) and includes air quality controls and management procedures (Section 3) to assist with compliance with air quality criteria identified in Section 2. Section 4 presents the specific features of the AQMP including monitoring locations, parameters measured and frequency of monitoring whilst Section 5 includes procedures for addressing complaints, exceedances and non-compliances.

Section 4B.8.2 of the Stage 2 EA and the Air Quality Assessment which forms part of the Stage 2 EA Specialist Consultant Studies Compendium should be referred to for baseline air quality data.



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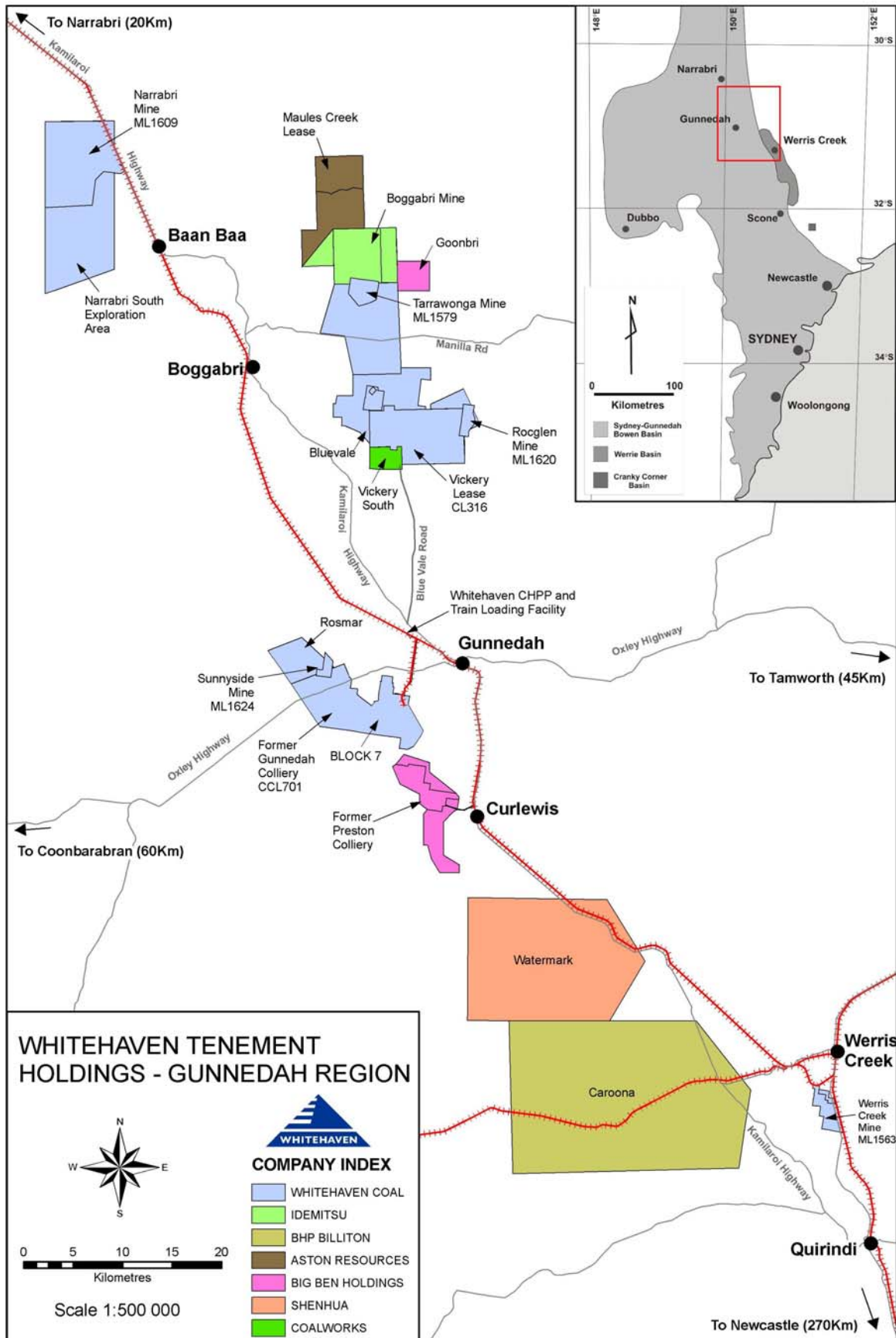


Figure 1 Narrabri Mine Location



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2 AIR QUALITY IMPACT ASSESSMENT CRITERIA

It is recognised that the operation of the mine has the potential to impact on the air quality within and beyond the boundaries of the mine site. In order to manage the potential impacts on local air quality, and in compliance with Condition 4(7) of PA 08_0144, this Air Quality Monitoring Program (AQMP) has been developed.

Air quality impact assessment criteria for the development were established in the Environmental Assessment using relevant OEH guidelines. These criteria have been incorporated in PA 08_0144 Condition 4(6) which states:

4(6) The Proponent shall ensure that dust emissions generated by the project do not cause additional exceedances of the criteria listed in Tables 4 to 6 at any residence on privately-owned land, or on more than 25 percent of any privately-owned land.

Table 4: Long term impact assessment criteria for particulate matter

Pollutant	Averaging period	Criterion
Total suspended particulate (TSP) matter	Annual	90 µg/m ³
Particulate matter <10 µm (PM ₁₀)	Annual	30 µg/m ³

Table 5: Short term impact assessment criteria for particulate matter

Pollutant	Averaging period	Criterion
Particulate matter <10 µm (PM ₁₀)	24 hour	50 µg/m ³

Table 6: Long term impact assessment criteria for deposited dust

Pollutant	Averaging period	Maximum increase in deposited dust level	Maximum total deposited dust level
Deposited dust	Annual	2 g/m ² /month	4 g/m ² /month

Note: 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 Particulates – Deposited Matter – Gravimetric Method.

The monitoring locations where the impact assessment criteria are assessed are specified in EPL 12789, as outlined in Section 4.1.2.



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3 AIR QUALITY CONTROLS AND MANAGEMENT PROCEDURES

The mine will adopt a range of design and operational safeguards and operational procedures for the mine to ensure that the effectiveness of the air quality controls are optimised throughout all stages of the mine's development and operation.

The controls have been selected largely based on their proven effectiveness at other mines.

Vegetation Clearing

- Cleared trees and branches will be retained on the margins of cleared areas for use in stabilising disturbed areas once they are no longer required.

Soil Stripping

- Where practicable, soil stripping would be undertaken at a time when there is sufficient soil moisture to prevent significant lift-off of dust.
- Stripping will be avoided in periods of high winds.
- Dust suppression by water application will be used to increase soil moisture, if required.

Continuous Miners and Longwall Unit

- Strategically located water sprays will be operational on all continuous miners, the longwall unit and the breaker feeder to minimise dust creation underground.

Coal Transfer, Crushing and Screening

- Notwithstanding the moist nature of the ROM coal, water will be applied to the coal at the feeder hopper, crusher, and at all conveyer transfer and discharge points.
- All conveyers will be fitted with appropriate cleaning and collection devices to minimise the amount of material falling from the return conveyer belts.
- The coal breaker will be enclosed.
- All surface conveyors will be partly enclosed to minimise dust lift-off.
- Some flexibility will exist to temporarily cease operation in the event of protracted dry periods, high winds, and significant dust generation and dispersal towards surrounding residences.

Construction of the Brine Storage Ponds

- When the prevailing winds are from the northwest quadrant, construction activities within the Brine Storage Area will cease.

Wind Erosion from Exposed Surfaces and Stockpiles

- Minimising the area of clearing/site preparation during site establishment including the campaigns to construct the area for reject emplacement.



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- Clear definition of all the site roads and the restriction of vehicles and equipment to the roads.
- Progressive rehabilitation of areas of disturbance including topsoil and subsoil stockpiles.
- Routine application of water sprayed onto stockpiles and hardstand areas.
- Construction of a perimeter amenity bund and windbreaks.

Coal Loading to Rail Wagons

- The coal loaded onto the conveyor to the rail load-out facility will be watered as required to maintain sufficient moisture content to prevent dust lift-off during loading – noting the wagons will be loaded within the rail cutting which provides protection from the wind.



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4 MONITORING AND REPORTING

This section outlines the monitoring and reporting requirements to measure the impacts and environmental performance of the mine and the effectiveness of air quality management measures.

4.1 Monitoring Program

4.1.1 Parameters Measured

Activities on the mine site will emit dust in various forms, namely total suspended particulate matter (TSP), particulate matter with aerodynamic diameters less than 10µm (PM₁₀) and deposited dust (which is assessed as insoluble solids as defined in Australian Standard AS 3580.10.1-2003 Methods for Sampling and Analysis of Ambient Air - Determination of Particulates - Deposited Matter - Gravimetric Method).

Section 2 presented the concentration or deposition rate (in the case of deposited dust) thresholds that must not be exceeded at any residence on, or on more than 25 percent of, any privately-owned land. Monitoring implemented to ensure compliance with these criteria will include monitoring of dust deposition rates and PM₁₀ concentrations at residences surrounding the mine site. No monitoring of TSP is proposed as PM₁₀ concentrations are considered of greater significance given its synergies with health-related issues.

A record of site activities undertaken and meteorological records during the period of recording would also be retained.

4.1.2 Monitoring Locations

Figure 2 presents the locations of the eight dust deposition gauges and two high volume air samplers (HVAS) for measuring PM₁₀ concentrations, as specified in Condition P1.1 of EPL 12789. The locations have been selected taking into account local meteorological conditions, the proximity of surrounding residences and the locations of likely dust emission sources from the mine site.

With the exception of the dust deposition gauge on "Bow Hills", all gauges are located on land owned by Narrabri Mine, often near the extremity of Narrabri Mine's land holding. Additional gauges will be established at residences more distant to the existing gauges in the event the gauges on Narrabri Mine's land exhibit regular exceedances attributable to the mine's operation.

HVAS units are located on the "Claremont" property (ND9) and the "Turrabaa" property (ND10).

Table 1 presents a summary of the air quality monitoring sites included in the AQMP.



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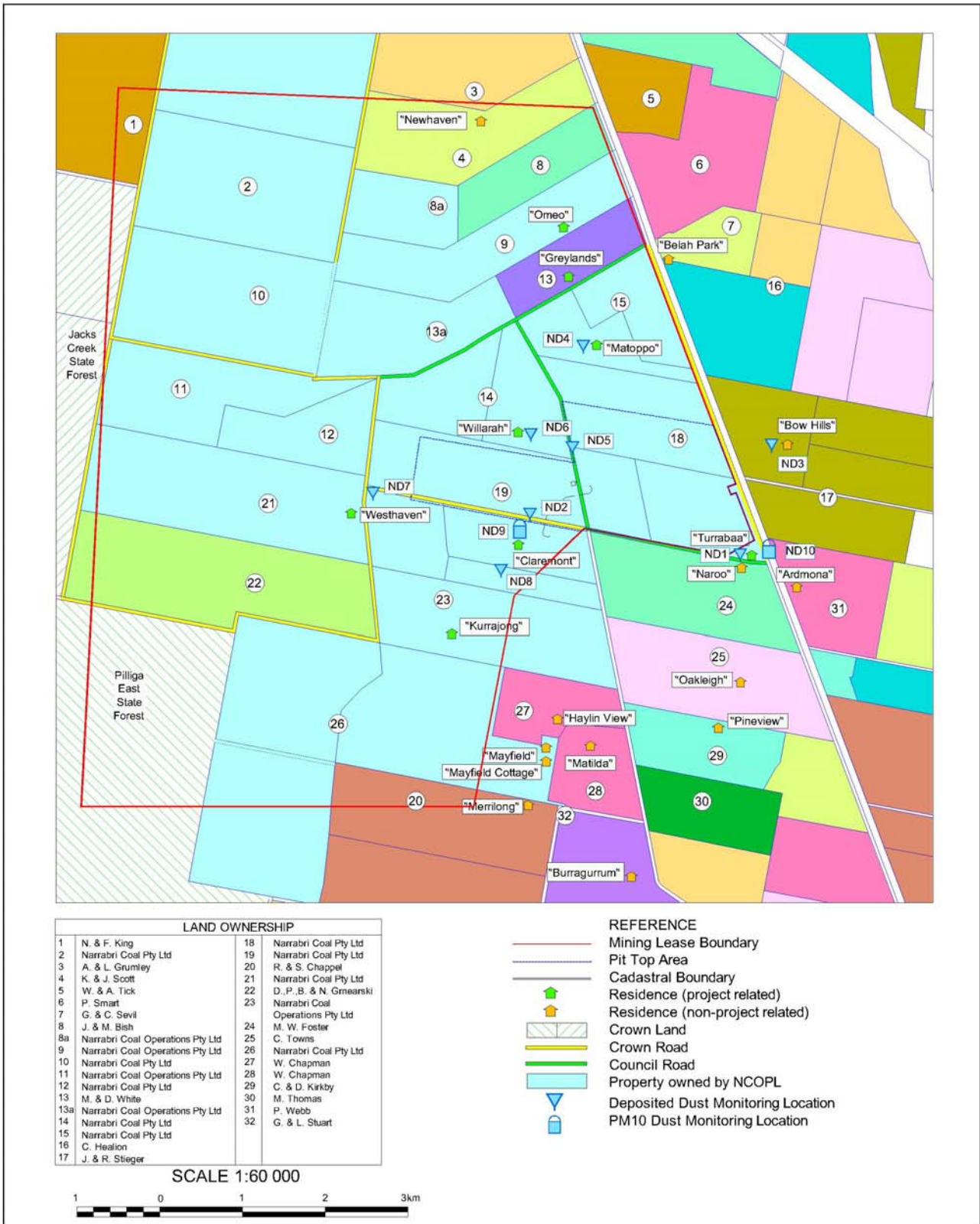


Figure 2 Air Quality Monitoring Locations



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Table 1 Air Quality Monitoring Locations

Reference*	Easting	Northing	Residence/Property	Deposited Dust	PM ₁₀
ND1	779661	6619348	"Turrabaa"	x	
ND2	777057	6619739	"Claremont"	x	
ND3	780000	6620698	"Bow Hills"	x	
ND4	777869	6621921	"Matoppo"	x	
ND5	777568	6620631	"Willarah"	x	
ND6	776955	6620780	"Willarah"	x	
ND7	775179	6620093	"Claremont"	x	
ND8	776755	6619159	"Claremont"	x	
ND9	777047	6619621	"Claremont"		x
ND10	779775	6619367	"Turrabaa"		x

* See Figure 2

4.1.3 Monitoring Frequency

The monitoring frequency, as specified in Condition M2.1 of EPL 12789, for deposited dust and PM₁₀ is as follows:

- Deposited dust – once per month (minimum of 4 weeks)
- PM₁₀ – every 6 days (in accordance with the OEH schedule for PM₁₀ monitoring).

4.1.4 Monitoring Summary

Table 2 summarises all relevant information for the Air Quality Monitoring Program.

Table 2 Air Quality Monitoring Program and Criteria

Purpose	Location*	Parameter to be Analysed	Criteria (Annual Average)	Frequency/Timing of Monitoring
Air quality compliance monitoring	ND1, ND2, ND3, ND4, ND5, ND6, ND7, ND8	Dust deposition	4.0g/m ² /month	Monthly
	ND9, ND10	Particulate Matter <10 µg/m ³	Annual Average - 30 µg/m ³ 24 hour maximum - 50 µg/m ³	Once every 6 days (OEH schedule)

* See Figure 2



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4.2 Monitoring Procedures, Data Recording and Reporting

4.2.1 Monitoring Procedures

Monitoring will be undertaken according to the DEC (2006) document *Approved Methods for the Sampling and Analysis of Air Pollutants in New South Wales 2006*. Specifically, monitoring will be conducted in accordance with the following Australian Standards:

- AS / NZS 3580:2007 “Methods for Sampling and Analysis of Ambient Air: Guide to Siting Air Monitoring Equipment” (NSW DEC Method AM-1).
- AS / NZS 3580.9.6 – 2003 “Methods for sampling and analysis of ambient air – Determination of suspended particulate matter PM₁₀ high volume sampler with size-selective inlet – Gravimetric Method”.
- AS 3580.10.1-2003 “Methods for Sampling and Analysis of Ambient Air - Determination of Particulates - Deposited Matter - Gravimetric Method” (NSW DEC Method AM-19).

4.2.2 Data Recording

For each dust monitoring location, once each month the glass container used to capture the deposited dust will be removed, replaced and sent to a NATA accredited laboratory for analysis. For the HVAS, the pre-weighed filter will be removed, replaced and sent to a NATA accredited laboratory for analysis generally in monthly batches to coincide with the despatch of the deposited dust samples.

Condition M1.3 of EPL 12789 requires the following records to be kept:

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

In addition to these requirements, any notable activities or conditions at or around the monitoring location should be noted at the time of sample collection. Site activities that could impact on air quality results as well as any relevant regional conditions (eg. bushfires, dust storms) should be noted when they occur.

4.2.3 Data Reporting

A summary of air quality monitoring results will be reported internally on a monthly basis as well as on a quarterly basis to the Community Consultative Committee (CCC) via the Environment Monitoring Report. This report will be periodically uploaded onto the company’s website (www.whitehavencoal.com.au).



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Each year, the results of air quality monitoring program will be summarised and presented in the Annual Review (AR) together with reference to the prevailing meteorological data and site activities during the measurement period(s). Reporting will also include an analysis of the monitoring results against the exceedance criteria, previous monitoring results and predictions made in the EA.

Dust monitoring results will be issued to OEHL via the Annual Return for EPL 12789.

Reporting requirements for exceedances, complaints and non-compliances are specified in Section 5. The extent of notification and reporting requirements depends on the severity of the issue but generally includes notification to DP&I and OEHL and/or the affected landholder as well as discussion in CCC Environment Monitoring Reports and the AR.

In addition to the reporting requirements listed above, air quality monitoring data will be made available to the public upon request.



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5 MANAGEMENT OF EXCEEDANCES, COMPLAINTS AND NON-COMPLIANCE

5.1 Air Quality Compliance Criteria Exceedance

On identification of an exceedance of the air quality compliance criteria presented in Section 2, the following response protocol is to be followed. It is noted that the response to an exceedance will vary depending on whether it is an exceedance of dust deposition or PM₁₀ criteria.

1. **Confirmation of Exceedance**

The analysing laboratory will be contacted to ensure no error has been made in storing, analysing or recording the sample or result. Should this investigation conclude the treatment, analysis and result recording for the sample are satisfactory, Narrabri Mine will proceed to response point 2.

2. **Notification (of exceedance)**

Monthly dust deposition exceedance (4g/m²/month): The Environmental Manager will be notified. It should be noted that the criteria for dust deposition is an annual average value and therefore a dust deposition value of >4g/m² for any given month is not strictly an exceedance, rather an indication that should there be no change to dust generating or suppression activities there is a high probability of an exceedance once the annual average is calculated.

Exceedance of 24 hour PM₁₀ criteria (50µg/m³): In the event that the PM₁₀ level recorded for a single 24 hour period exceeds 50µg/m³, the Environmental Manager will notify DP&I and OEH as to the nature of the exceedance(s) and all relevant records of activities and weather conditions during the 24 hour period. A single exceedance may be considered anomalous, however, repeated exceedances will require the preparation of a corrective action plan. PM₁₀ monitoring will include observations of general dust conditions, additional sources of dust generation, and a copy of the relevant weather details as obtained from the site weather station.

Annual Average exceedance of dust deposition (4g/m²/month) or PM₁₀ (30µg/m³): In the event that the annual average dust deposition recorded at any off-site monitoring location exceeds 4g/m²/month, or PM₁₀ exceeds 30µg/m³, the Environmental Manager will notify DP&I and OEH as to the nature of the exceedance(s). In consultation with DP&I and OEH, and following review of historical trends over prior annual periods, it will be determined if the annual exceedance is related to mining activities. If it is determined that mine related activities have caused the exceedance in annual average criteria, a corrective action plan will be developed in consultation with DP&I and OEH to address air quality improvements and ensure future compliance with the annual average criteria.



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3. Corrective Action Plan

The mine will prepare a corrective action plan to reduce dust generation and thereby reduce dust deposition and/or PM₁₀ concentrations around the mine site and return the operation to compliance. Preparation of the plan may require the assistance of a specialist air quality consultant. Details on the preparation of the corrective action plan will be included in the relevant AR and Environment Protection Licence Annual Return and provided to DP&I and OEH prior to implementation.

4. Re-assessment

Dust Deposition: In the event the annual average dust deposition level is exceeded in any calendar year, particular attention will be paid during the following 12 months to achieve compliance. The corrective action plan discussed above will be main control designed to lower the annual average dust deposition level.

In the event that the annual average does not comply in a second year, a revised corrective action plan (of Step 3) will be required, this time requiring the input of a specialist air quality consultant.

PM₁₀: Compliance with PM₁₀ concentration compliance criteria will be reassessed following the completion of the corrective action plan. In the event that a repeated non-compliant result is recorded, a revised corrective action plan (Step 3) will be implemented, this time requiring the input of a specialist air quality consultant.

5. Notification (of compliance)

The mine will notify OEH and other relevant government agency(ies) and local stakeholder(s) of the return to compliance following the successful completion of Step 4.

6. Independent Review and Land Acquisition

If the mine fails to establish compliance with the air quality criteria at surrounding residences, or on 25% of privately-owned land, or following a legitimate complaint from a resident / land owner of criteria exceedance, the mine will, following instruction from the Director-General, commission a suitably qualified person to conduct an independent review.

In the event that land acquisition is determined as appropriate, it will be conducted in accordance with PA 08_0144 Schedule 7, Conditions 5 – 7.

7. Reporting

The recorded exceedance, corrective actions and reassessment will be reported to the CCC and included in each relevant AR.



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5.2 Complaints

Community consultation was an important element throughout the planning and investigation stages into the Narrabri Mine. This program will continue throughout the life of the mine, with the mine addressing any concerns raised by the local community in a timely and efficient manner.

A Community Consultative Committee (CCC) was established in early 2008 upon approval to the Stage 1 Project (PA 05_0102). The committee has met on a quarterly basis since then to discuss issues associated with the mine and any community concerns. The CCC will continue to meet on a quarterly basis throughout the mine life, in accordance with Condition 6(9) of PA 08_0144.

Whilst all endeavours will be made by the mine to avoid adverse air quality impacts on local landowners / residents, it is acknowledged that from time to time such impacts may occur. In order to ensure an appropriate and consistent level of reporting, response and follow-up to any complaints is adopted by the mine, the following complaints management protocol will be followed:

- A publicly advertised telephone complaints line will be in place to receive complaints during operating hours and record complaints at other times.
- Each complaint received will be recorded on a Complaints Register, which will include the following details:
 - The date and time of complaint.
 - Any personal details the complainant wishes to provide or if no such details are provided a note to that effect.
 - The nature of the incident that led to the complaint, including the time of the dispersal and its duration.
 - The action taken by the mine in relation to the complaint, including any follow-up contact with the complainant.
 - If no action was taken by the mine, the reason why no action was taken.
- The Environmental Manager will be responsible for ensuring that an initial response is provided within 24 hours of receipt of a complaint (except in the event of complaints recorded when the mine is not operational).
- Data from the site weather station will be obtained for the time applicable to the complaint for use in determination of cause and identification of future remedial actions.
- Additional measures will be undertaken as required to address the complaint. This may include visiting the complainant, or inviting the complainant to the mine site.
- Once the identified measures are undertaken, the Environmental Manager will sign off on the relevant complaint within the Complaints Register.



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- If necessary, follow-up monitoring will take place to confirm the source of the complaint is adequately mitigated.
- A copy of the Complaints Register will be kept by the mine and made available to the CCC and the complainant (on request). A summary of complaints received every 12 months will be provided to DP&I, NSC, OEH, DRE and the CCC through the AR.

Based on the nature of individual complaints, specific contingency measures may be implemented to the (reasonable) satisfaction of the complainant. The Environmental Manager retains ultimate responsibility to ensure that complaints received are properly recorded and addressed appropriately.

5.3 Unpredicted Impact Protocol

It is considered unlikely that operation of the mine will result in any unpredicted or unforeseen impacts on local air quality. However, in the event that unpredicted or unforeseen air quality impacts are identified, the protocol outlined in Table 3 will be adopted.

Table 3 Unpredicted Impact Protocol

Step	Procedure
1	Review the unpredicted impact including consideration of: <ul style="list-style-type: none">• Any relevant monitoring data; and• Current mine activities as well as activities in the vicinity of the issue.
2	Commission an investigation by an appropriate specialist into the unpredicted impact, if considered appropriate.
3	Develop appropriate ameliorative measures based on the results of the above investigations, in consultation with relevant government departments.
4	Implement additional monitoring, where relevant, to measure the effectiveness of the improvement measures.



**NARRABRI MINE
ENVIRONMENTAL
MANAGEMENT SYSTEM**

Document Owner:	Env. Manager
Revision Period:	2 years
Issue:	1
Last Revision Date:	3/12/2007
Date Printed:	19/01/2012

WHC_PLN_NAR_AIR QUALITY MONITORING PROGRAM

6 DOCUMENT REVIEW AND CONTINUOUS IMPROVEMENT

This document will be reviewed at least every two years and following any significant changes (i.e. changes to consent/licence requirements or monitoring protocol). Each review will be undertaken in consultation with relevant stakeholders and will be submitted to the Director-General for approval.

The mine will investigate and implement ways to improve the environmental performance of the project over time. This will be achieved by keeping abreast of best practice in the industry for air quality controls and reporting on outcomes of air quality monitoring annually in the AR.



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7 RESPONSIBILITIES AND ACCOUNTABILITIES

During the operational phase, the mine will be managed by the General Manager who will have overall responsibility for ensuring contractors, employees and service providers comply with all laws, regulations, licences, approvals and conditions of the project approval.

All significant contractors will be required to undertake an environmental risk assessment and undertake site induction training prior to commencing works on site. At this time they will also be instructed in the environmental standards, procedures and processes applicable whilst they are on the site.



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Appendix 1

Agency Consultation

(No. of pages excluding this page = 1)

Steven Farrar

From: Turnbull Kharl [Kharl.Turnbull@environment.nsw.gov.au]
Sent: Thursday, 29 September 2011 3:00 PM
To: Steven Farrar
Cc: OHern Robert
Subject: Narrabri Mine Stage 2 Development Consent

Hi Steven

As just discussed, thank you for forwarding the following Management Plans for our records:

- Narrabri Mine Stage 2 Energy Savings Action Plan
- Narrabri Mine Stage 2 Landscape Management Plan
- Narrabri Mine Stage 2 Noise Management Plan
- Narrabri Mine Stage 2 Aboriginal Cultural Heritage Management Plan
- Narrabri Mine Stage 2 Air Quality Monitoring Plan
- Narrabri Mine Stage 2 Water Management Plan

The Office of Environment and Heritage (OEH) encourages the development of such plans to ensure that proponents have determined how they will meet their statutory obligations and designated environmental objectives. However, we do not approve or endorse these documents as our role is to set environmental objectives for environmental/conservation management, not to be directly involved in the development of strategies to achieve those objectives.

Should you have any further enquiries please do not hesitate to contact me.

Regards

Kharl Turnbull
Regional Programs Officer
Environment Protection and Regulation Group
Office of Environment and Heritage
Department of Premier and Cabinet
PO Box 494 (85 Faulkner St) | Armidale NSW 2350
Phone (02) 6773 7000 | Fax (02) 6772 2336

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PLEASE CONSIDER THE ENVIRONMENT BEFORE PRINTING THIS EMAIL