



DURALIE
COAL

DURALIE COAL MINE
AIR QUALITY MONITORING PROGRAM
(INCORPORATING AIR QUALITY MANAGEMENT)

DISTRIBUTION/ISSUE DESCRIPTION SUMMARY

Copy sent to:	Revision	Date	Purpose
Duralie Coal Pty Ltd	Version D	17 January 2007	Review
Department of Planning	Version D	17 January 2007	Review and Approval
EPA	Version D	17 January 2007	Consultation
Duralie Coal Pty Ltd	Version E	11 May 2007	Input DoP Comment
Department of Planning	Version E	11 May 2007	Review to Finalise

TABLE OF CONTENTS

<u>Section</u>		<u>Page</u>
	LIST OF FIGURES	i
1	INTRODUCTION	2
	1.1 OBJECTIVES AND PURPOSE	2
	1.2 AIR QUALITY CRITERIA	2
2	POTENTIAL DUST SOURCES	4
3	DUST MANAGEMENT AND CONTROL MEASURES	5
	3.1 PROACTIVE MANAGEMENT AND CONTROL MEASURES	5
	3.2 RESPONSIVE MANAGEMENT AND CONTROL MEASURES	6
4	AIR QUALITY MONITORING PROGRAM	7
	4.1 WIND SPEED AND WIND DIRECTION	7
	4.2 DUST DEPOSITION	7
	4.3 CONCENTRATION OF PARTICULATE MATTER	7
	4.4 REVIEW OF MONITORING RESULTS	8
5	DUST MANAGEMENT PROTOCOLS	9
	5.1 STANDARD PROTOCOL	9
	5.2 COMPLAINT RESPONSE PROTOCOL	10
	5.3 AMENITY PROTOCOL	16
6	LAND ACQUISITION	18
7	STAKEHOLDER CONSULTATION AND REPORTING	20
8	REFERENCES	21

LIST OF TABLES

Table 1	Long Term Impact Assessment Criteria for Deposited Dust
Table 2	Long Term Impact Assessment Criteria for Particulate Matter
Table 3	Short Term Impact Assessment Criteria for Particulate Matter
Table 4	Control Procedures for Wind Blown Dust Sources
Table 5	Control Procedures for Mining Generated Dust Sources
Table 6	Dust Control Equipment
Table 7	Short Term Land Acquisition Criteria for Particulate Matter

LIST OF FIGURES

Figure AQMP-C-1	Duralie Coal Mine Air Quality Monitoring Sites
-----------------	--

1 INTRODUCTION

Duralie Coal Pty Ltd (DCPL), a wholly owned subsidiary of Gloucester Coal Limited, operates the Duralie Coal Mine (the Project). The Project is located on the Mammy Johnsons River approximately five kilometres north of the small settlement of Stroud Road in an area of cleared grazing land east of The Bucketts Way, New South Wales (NSW) (AQMP-C/Figure1).

1.1 OBJECTIVES AND PURPOSE

This Air Quality Management Program (AQMP) has been prepared in accordance with the Modified Development Consent (2006) Schedule 3 Condition 21.

The primary objective of this AQMP is to conduct a successful dust management strategy by:

- complying with relevant air quality criteria;
- undertaking proactive and responsive dust management and control measures;
- maintaining dust management protocols;
- undertaking an air quality monitoring program;
- providing adequate stakeholder consultation; and
- appropriate reporting and review.

1.2 AIR QUALITY CRITERIA

The Modified Development Consent (2006) Schedule 3 Condition 18 stipulates the following impact assessment criteria:

Dust Deposition

Table 1 – Long Term Impact Assessment Criteria for Deposited Dust

Averaging Period	Maximum Increase in Deposited Dust Level	Maximum Total Deposited Dust Level
Annual	2 g/m ² /month	4 g/m ² /month

Note that deposited dust is assessed as insoluble solids as defined by Standards Australia, 2003, AS 3580.10.1-2003: Methods for Sampling and Analysis of Ambient Air – Determination of Particulates – Deposited Matter – Gravimetric Method.

Total Suspended Particulates**Table 2 – Long Term Impact Assessment Criteria for Particulate Matter**

Pollutant	Averaging Period	Criterion
Total Suspended Particulate (TSP) Matter	Annual	90 $\mu\text{g}/\text{m}^3$
Particulate Matter < 10 μm (PM ₁₀)	Annual	30 $\mu\text{g}/\text{m}^3$

Table 3 – Short Term Impact Assessment Criteria for Particulate Matter

Pollutant	Averaging Period	Criterion
Particulate Matter < 10 μm (PM ₁₀)	24 hours	50 $\mu\text{g}/\text{m}^3$

Note that Total Suspended Particulate Matter is assessed by a methodology described within Standards Australia AS 2724.3-1984: Ambient Air – Particulate Matter Part 3: Determination of Total Suspended Particulates (TSP) – High Volume Sampler Gravimetric Method.

2 POTENTIAL DUST SOURCES

Variations in visible and measured dust levels in the Gloucester valley are generated by a range of activities including agriculture, road construction, mining activities and regional vehicular traffic on paved and unpaved roads. The nature of mining involves ground disturbance, the removal and handling of soils, overburden and coal, and the subsequent hauling, dumping, sizing, conveying, and loading of coal onto trains. Mining emissions also include particles from diesel exhausts.

Potential sources of dust emissions include:

- areas disturbed by mining activity, including the open cut, overburden placement areas and active surfaces exposed to wind;
- coal and waste rock handling and stockpiling activities (including loading and unloading, spreading and shaping of waste emplacements);
- movement of vehicles on unsealed roads for both haulage of coal and waste rock and general mining activities;
- topsoil stripping and stockpiling;
- drilling and blasting; and
- sizing, conveying and loading of coal onto trains.

Control measures to minimise significant dust emissions are presented in Section 3.

3 DUST MANAGEMENT AND CONTROL MEASURES

DCPL manage dust emissions proactively in a manner that minimises the potential air quality impacts of the Project.

3.1 PROACTIVE MANAGEMENT AND CONTROL MEASURES

The following procedures are adopted for the management of dust emissions from the Project. The aim of these procedures is to minimise uncontrolled dust generated from the following sources:

- (i) wind blown dust from exposed areas; and
- (ii) dust generated from mining activities.

Tables 4 and 5 list the control procedures for sources of wind blown and mining generated dust, respectively.

Table 4 - Control Procedures for Wind Blown Dust Sources

Source	Control Procedures
Areas Disturbed by Mining	Only the minimum area necessary for mining will be disturbed. Exposed areas will be reshaped, topsoiled and revegetated as soon as practicable.
Overburden Emplacement Areas	Active waste emplacement surfaces that are hauled on will be watered to suppress dust. Progressive rehabilitation (ie. reshaping, topsoil placement and revegetation) of waste emplacement areas will continue throughout the life of the Project.
Run of Mine Coal Handling	Run of mine coal handling areas will be kept in a moist state using water carts to minimise wind blown and traffic generated dust. Any temporary stockpiles of ROM coal will be kept to a minimum size and for a limited time.

Table 5 - Control Procedures for Mining Generated Dust Sources

Source	Control procedures
Haul Road Dust	All roads and trafficked areas will be watered using a water cart to minimise the generation of dust. Obsolete roads will be ripped and re-vegetated.
Minor roads	Development of minor roads will be limited and the locations of these will be clearly defined. Regularly used minor roads will be watered as required. Obsolete roads will be ripped and re-vegetated.
Topsoil Stripping	Access tracks used for topsoil stripping during the loading and unloading cycle will be watered.
Topsoil Stockpiling	Long term topsoil stockpiles will be revegetated with a cover crop.
Overburden Tipping	When wind speeds exceed 10 m/s (5 minute average) overburden will not be tipped on a face exposed to the wind if excessive dust generation is occurring.
Drilling	Dust aprons will be lowered during drilling. Water injection or dust suppression sprays will be used on drilling equipment when the potential for high levels of dust generation is identified.
Conveyors	Water sprays are utilised at the ROM dump hopper and on all coal transfer points between the ROM dump hopper and the train loading bin, including the rotary breaker.
Train Loading	A flooding loading type chute delivers product coal from the train loading bin into the wagons. A water spray operates at the chute delivery point.

Table 6 presents the equipment available to minimise Project dust generation.

Table 6 - Dust Control Equipment

Type	Typical Control Area
Water Trucks	<ul style="list-style-type: none"> • Haul roads and exposed trafficked surfaces, waste emplacements and coal handling areas.
Water Sprays	<ul style="list-style-type: none"> • ROM dump hopper, coal conveyor transfer points and train loading bin chute.
Dust Collection System	<ul style="list-style-type: none"> • Drilling equipment.

Further to the above controls, rehabilitation works are undertaken progressively as mining proceeds.

3.2 RESPONSIVE MANAGEMENT AND CONTROL MEASURES

The implementation of the measures listed in Section 3.1 will minimise dust generation and the need for responsive management measures. In instances where proactive management measures, as described in Tables 2 and 3, fail to prevent significant dust generation, the following steps will be taken:

1. The Mine Manager and/or Environmental Officer will determine if excessive dust is being generated.
2. The Mine Manager and/or Environmental Officer will issue an instruction for the particular mining activity causing the excessive generation of dust to cease immediately.
3. The Environmental Officer will assess what additional mitigation measures can be applied, including intensive watering of the exposed or active surfaces, reducing the intensity of the activity (e.g. less vehicle movements and/or reduced vehicle speed and/or utilising a travel surface less prone to producing dust) or installation of mechanical measures (e.g. dust extractors on drill rigs). This assessment will include consideration of wind speed and direction in relation to receptors.
4. If the Environmental Officer is not satisfied that the additional measures will reduce dust emissions to an acceptable level (due to the prevailing weather conditions) the activity will not recommence until the additional measures have been implemented and/or more favourable weather conditions occur.
5. The Environmental Officer will be responsible for monitoring the activity once it recommences to measure the effectiveness of control measures and to ensure dust emissions are acceptable.
6. In the event of the Environmental Officer being absent from site, the Environmental Officer based at the nearby Stratford Coal Mine would travel to the Duralie site and coordinate the necessary control measures.

4 AIR QUALITY MONITORING PROGRAM

The air quality monitoring program is used to assess the performance of the dust management strategies and compliance with relevant air quality criteria (Section 1.2). The program involves the monitoring of meteorological conditions, dust deposition and TSP (PM₁₀) levels, and subsequent review of results which are described in the following subsections.

4.1 WIND SPEED AND WIND DIRECTION

Wind speed and wind direction are monitored at the existing automated meteorological monitoring station on the Project site (AQMP-C/Figure1). The meteorological station also monitors rainfall, temperature, solar radiation and humidity. The monitoring data is typically downloaded on a weekly basis.

The wind speed and direction data can be used in conjunction with dust deposition and TSP (PM₁₀) data to provide information useful for review of the effectiveness of dust management practices and further minimise the potential for emissions.

4.2 DUST DEPOSITION

A network of five dust gauges (D1 to D5) is used to monitor dust deposition in the vicinity of the Project (AQMP-C/Figure1) under operations.

Monthly samples are collected from the dust deposition gauges and analysed for insoluble matter and ash/combustible matter content. Dust deposition monitoring is conducted in accordance with the *Approved Methods for Sampling and Analysis of Air Pollutants in New South Wales* (EPA, 2000). All monitoring and analysis would be conducted in accordance with the relevant Australian Standard (AS) 3580.10.1-1991.

4.3 CONCENTRATION OF PARTICULATE MATTER

Two high volume samplers (Hi-Vol 1 & Hi-Vol 2) monitor PM₁₀ concentrations. These are also referred to as “High Noon” and “Twin Houses” respectively and shown in AQMP-C/Figure1.

PM₁₀ concentrations is measured on a continuous basis at each site – on a six day cycle.

Monitoring methods are conducted in accordance with the *Approved Methods for Sampling and Analysis of Air Pollutants in New South Wales* (EPA, 2000). All monitoring equipment/procedures are maintained/conducted in accordance with Australian Standard (AS) 2724.3-1984.

The two high volume samplers, combined with the network of five dust deposition gauges are considered adequate to provide for the comprehensive measurement of Project related dust emissions. Alterations to the monitoring network to accommodate the northerly advance of mining activities will be made when it is considered that the nominated monitoring regime is no longer sufficient.

4.4 REVIEW OF MONITORING RESULTS

The results of the meteorological, dust deposition and PM₁₀ monitoring are maintained in a database for assessment. This data will be available to investigate relationships between short-term variations in dust levels, and the number and distribution of dust-related complaints (if any). Results of any investigation would then be used in the review of the monitoring program in consultation with relevant stakeholders (Section 6).

In addition to PM₁₀ monitoring results, estimates of total suspended particulates (TSP) concentrations will be calculated. Estimates will utilise the relationship between PM₁₀ and TSP concentrations determined during a field trial undertaken at the Stratford Coal Mine in 2001. During this trial, PM₁₀ concentrations were found to account for 42.9% of TSP concentrations. The soil, subsoil, clay and rock types and relative proportions at the Duralie Mine are not dissimilar to those found at the Stratford Mine and hence the Stratford derived TSP/PM₁₀ relationship would generally be considered to be transferable between the sites.

5 DUST MANAGEMENT PROTOCOLS

The dust management protocols outlined below have been formulated to facilitate the proactive and responsive management of dust emissions from the mine.

5.1 STANDARD PROTOCOL

The objective of the Standard Protocol is to facilitate the day-to-day management of dust emissions from activities. Dust control will be actively carried out as a standard operating procedure to facilitate a safe working environment utilising techniques outlined in Section 3. The Standard Protocol will be the responsibility of the Environmental Officer.

The Standard Protocol can be broken into four steps as follows:

1. Source Identification.
2. Management Strategy.
3. Implementation.
4. Review.

Source Identification

The first step of the protocol involves identification of the mining activities with the potential for dust generation. Consideration is given to the following:

- methods and types of equipment that will be used;
- timing of the activity;
- location of the activity (including surrounding topography and landuse); and
- prevailing climatic conditions.

Management Strategy

The management strategy component involves determination of the dust control and management measures that will be utilised to minimise dust emissions, based on the results of the identification stage. Potential dust control and management measures are presented in Section 3.

Implementation

This stage involves implementation of the dust control and management measures chosen in the management strategy process.

Review

An important component of the protocol is the review of dust control and management measures. These will be assessed by comparing the results of the air quality monitoring program detailed in Section 4 with the air quality criteria outlined in Section 1.2. Where necessary, the Environmental Officer will return to the management strategy phase of the protocol.

5.2 COMPLAINT RESPONSE PROTOCOL

The objective of the Complaint Response Protocol is to facilitate prompt and comprehensive responses to community concerns that relate to dust.

Complaint

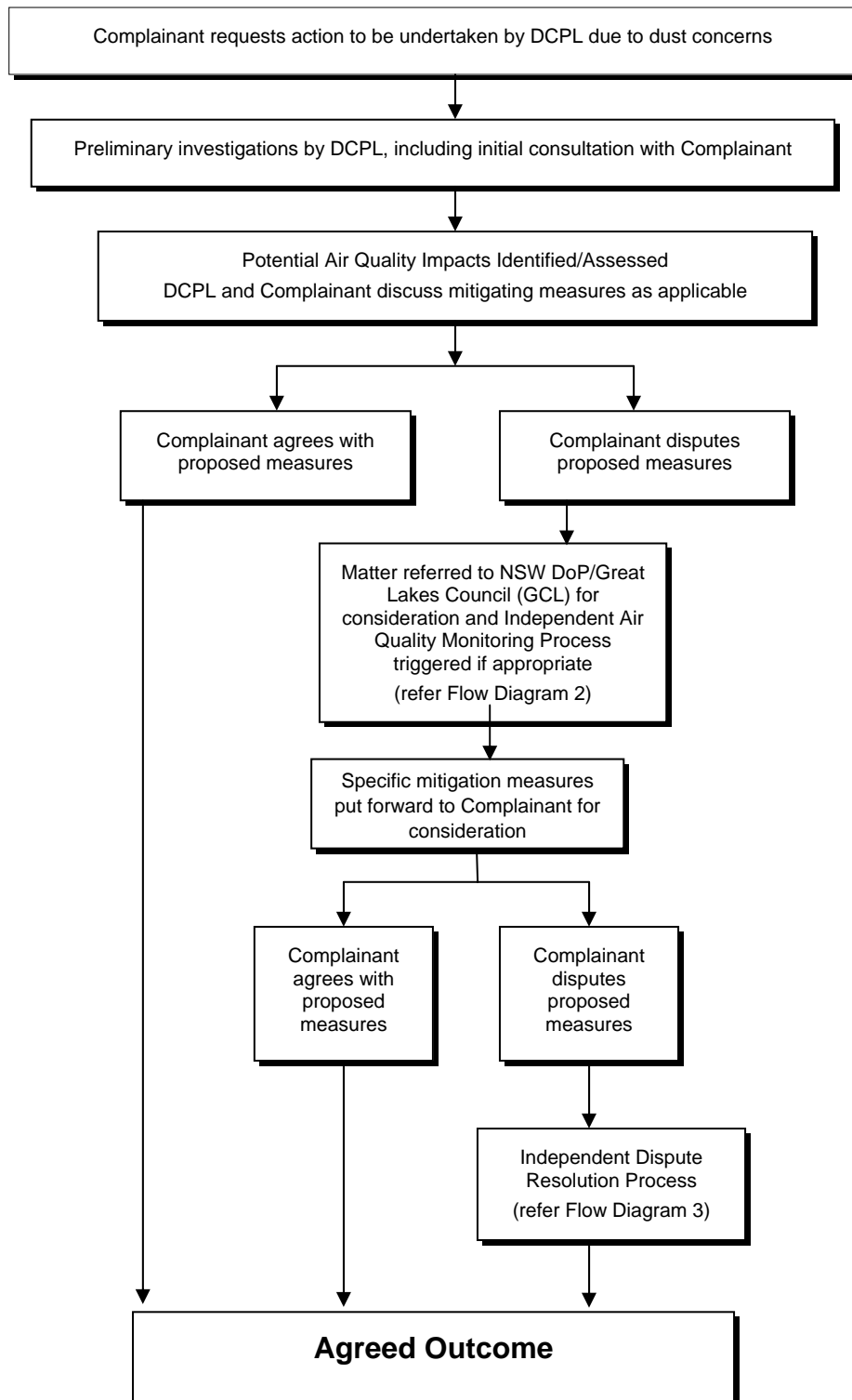
A complaint handling and response protocol was established by DCPL in 2002 at the time of mine construction. A Community Complaints Register records the name of the complainant, the time, date and nature of the complaint and the subsequent response. The Community Complaints Register is presented at each Community Consultative Committee (CCC). Complaints and associated details are also reported annually in the AEMR.

The Environmental Officer manages complaint receipt and resolution. Members of the community that wish to make a complaint are advised to call the mine's "Complaints Line" by telephoning 016 301 970. The "Complaints Line" is a 24 hour service that directs complaints to either the Environmental Officer inside normal office hours and or to a responsible staff member outside of normal office hours. The response staff concerned are informed of the complaint and undertake appropriate action dependent on the nature of the complaint.

The process for the management of complaints relating to potential dust impacts would be as shown on Flow Diagram 1.

The nature of the complaint and the outcome of each step in the process would drive timing for the above process. However, DCPL commit to commencing preliminary investigations into any complaint within 48 hours of its receipt. The outcome of these preliminary investigations and associated proposed mitigation measures will then be presented to the complainant within seven working days.

Flow Diagram 1
Process for the Management of Complaints Relating to Potential Air Quality Impacts

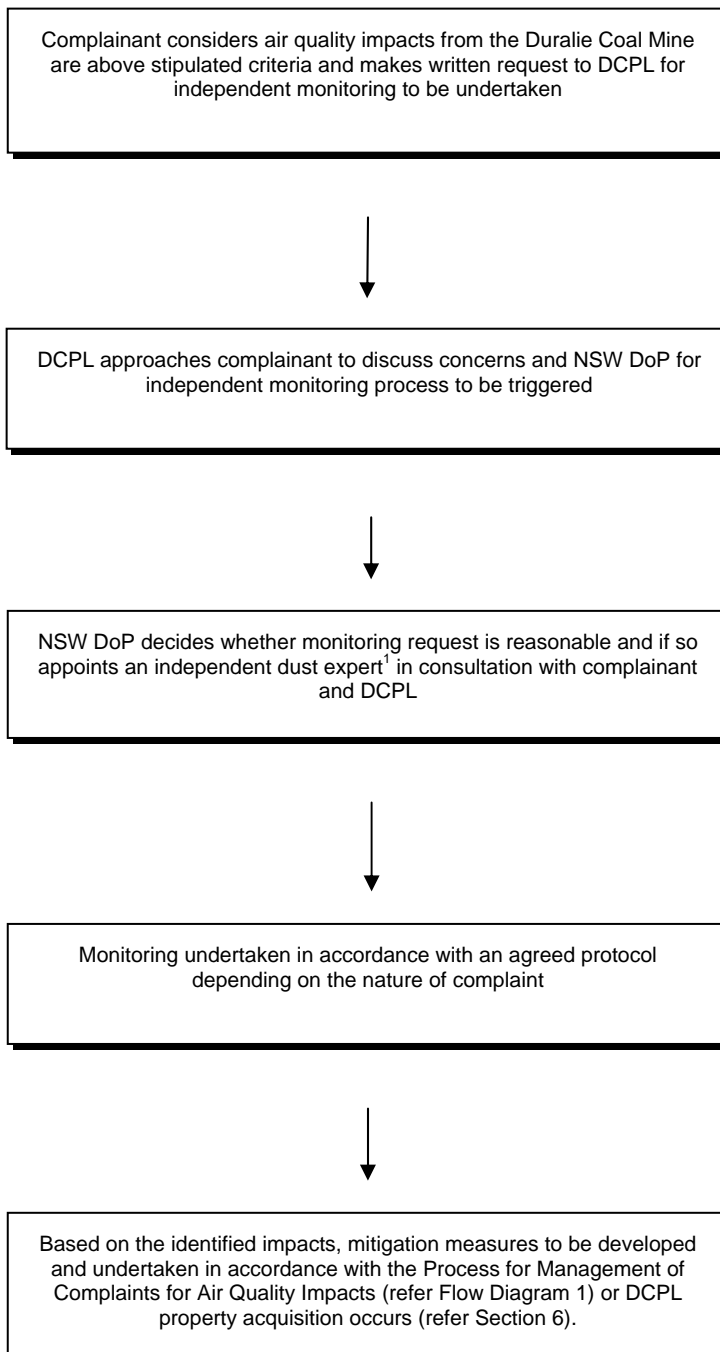


Assessment

Preliminary investigations would commence within 48 hours of the complaint receipt to determine likely causes of the complaint using information regarding prevailing climatic conditions, the nature of mining activities taking place and recent air quality monitoring results.

This preliminary investigation would be used to develop specific mitigation measures which would be presented to the complainant for consideration (refer Flow Diagram 1). If the complainant is not satisfied with the proposed measures, the matter would be referred to NSW Department of Planning (DoP) and Great Lakes Council (GLC) for consideration. If necessary an Independent Air Quality Monitoring Process would be triggered. The Environmental Officer in consultation with NSW DoP, GLC and the complainant would manage this process. An Independent Air Quality Management Process is presented in Flow Diagram 2.

Flow Diagram 2
Independent Air Quality Monitoring Process



¹ Based on the studies undertaken for the Project EIS, DCPL's nominated dust expert would be Holmes Air Sciences Pty Ltd. However, DCPL recognises that NSW DoP would need to be satisfied with this selection.

The results of the process described in Flow Diagram 2 would be reported simultaneously to NSW DoP and DCPL for review prior to finalisation. During this review NSW DoP and DCPL would agree on the technical validity of the assessment results and the feasibility/practicality of any proposed mitigation measures. Any feedback to the independent dust expert would be made jointly by NSW DoP and DCPL.

Implementation of Mitigation Measures

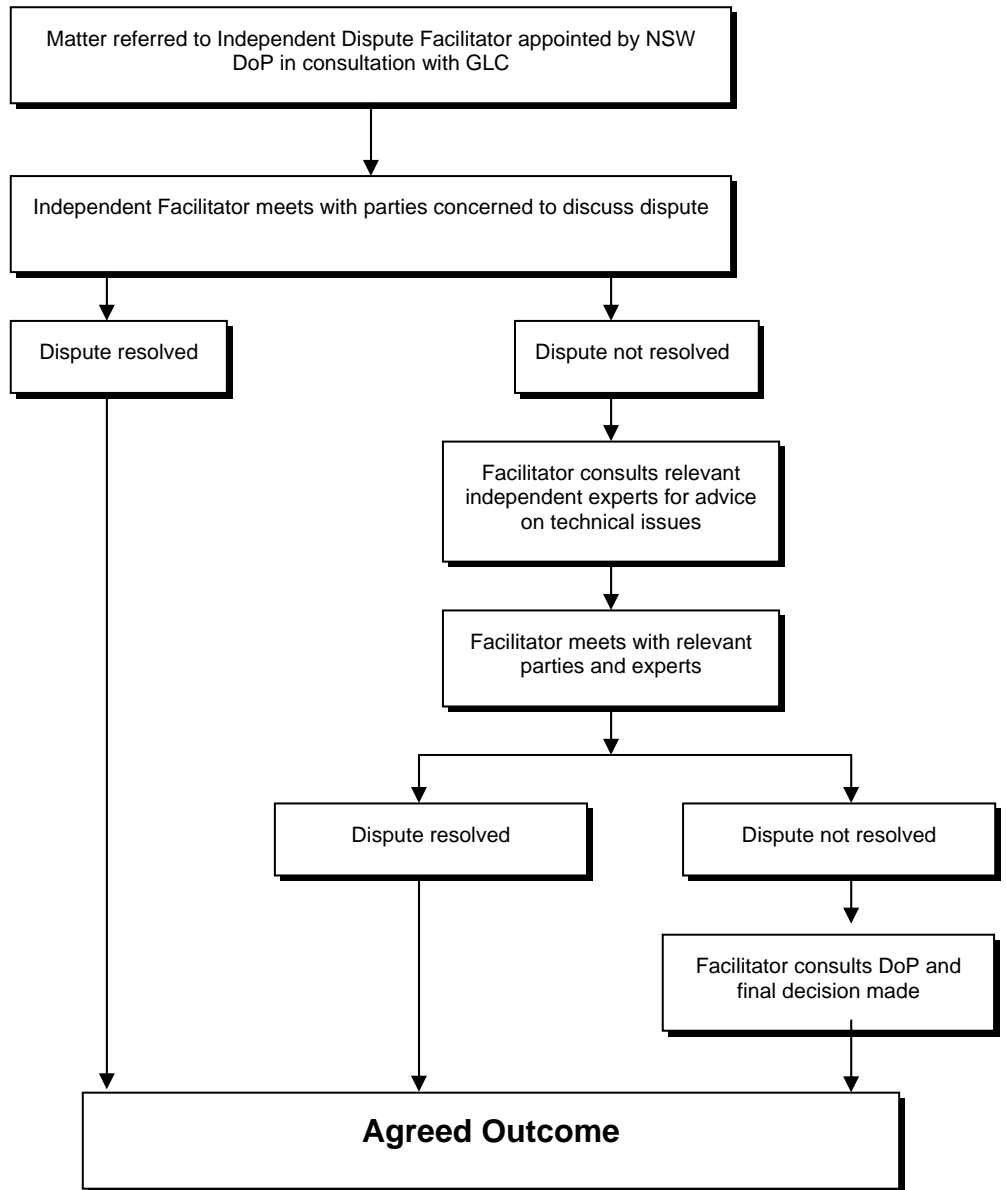
Those mitigation measures developed as a result of the processes shown in Flow Diagrams 1 and 2 would be implemented by the Environmental Officer. Where possible, these mitigation measures would be implemented within seven days of their development and agreement by the relevant stakeholders.

Following implementation, monitoring would further assess the effectiveness of the additional dust control measures. An air quality assessment would be conducted annually utilising the results of the monitoring program and reported in the AEMR (Section 7).

Complaints Demonstrated to be Below Criteria

In the event of a complaint where dust levels are demonstrated to be below the relevant criteria (Section 1.2), the resolution process will be one of informed discussion involving the complainant and the Environmental Officer. The complainant will be made fully aware of the monitoring and reporting procedures used for the Project. In the event that the complainant is still unsatisfied the matter may be referred to the CCC for consideration of further measures. Every effort will be made to ensure that concerns are addressed in a manner that results in a mutually acceptable outcome. If necessary, the Independent Dispute Resolution Process (Flow Diagram 3) would be entered into.

**Flow Diagram 3
Independent Dispute Resolution Process**



5.3 AMENITY PROTOCOL

The objective of the Amenity Protocol is to facilitate the identification of longer term strategies for mitigating dust levels if EPA amenity criteria for dust deposition are exceeded at properties located beyond property owned by DCPL and the affected landowner does not wish to invoke the Development Consent condition relating to land acquisition.

Amenity Assessment

The results of the dust deposition monitoring program will be assessed against EPA amenity or dust deposition criteria (Section 1.2) and reported in the AEMR. In the event that the EPA amenity criteria for dust deposition (i.e. a mean annual increment of 2 g/m²/month as the maximum acceptable increase over the existing levels) is exceeded, an assessment will be conducted to determine:

- timing of elevated dust levels;
- general location of the elevated dust levels;
- climatic conditions at the time of the elevated dust levels;
- potential contributing factors to the elevated dust levels; and
- whether the elevated dust levels are attributable to Project activities.

Management Strategy

This component involves determination of the dust control and management measures (Section 3) that will be utilised to minimise dust emissions in the short term and long term, based on the results of the assessment stage of the protocol.

Dust control and management measures to be adopted will be selected with consideration of:

- mine activities scheduled for the next phase of operation;
- possible reasons for elevated dust levels;
- additional control measures that could be adopted;
- equipment to be utilised; and
- location of mine activities.

Implementation

The results of the Amenity Assessment and Management Strategy stages will be reported to the CCC, GLC, EPA and NSW DoP. The Environmental Officer will be responsible for the implementation of the dust control and management measures selected in the management strategy process.

Review

The effectiveness of the dust control and management measures adopted will be assessed against the EPA amenity criteria for dust deposition (Section 1.2). An air quality assessment will be conducted annually utilising the results of the monitoring program and reported in the AEMR (Section 7).

6 LAND ACQUISITION

If dust emissions generated by the Project exceed the criteria stated within Tables 1, 2, 3 (Section 1.2) and 7 (provided below) at any residence on, or on more than 25% of, any private land DCPL will, upon receiving a written request of acquisition from the landowner, acquire the land in accordance with the Modified Development Consent (2006) Schedule 4 Conditions 8, 9 and 10 (see below).

Table 7 – Short Term Land Acquisition Criteria for Particulate Matter

Pollutant	Averaging Period	Criterion	Percentile ¹	Basis
Particulate matter < 10µm (PM ₁₀)	24 hours	150 µg/m ³	99 ²	Total ³
Particulate matter < 10µm (PM ₁₀)	24 hours	50 µg/m ³	98.6	Increment ⁴

¹ Based on the number of block 24 hour averages in an annual period.

² Excludes extraordinary events such as bushfires, prescribed burning, dust storms, sea fog, fire incidents, illegal activities or any other activity agreed by the Director-General in consultation with the EPA/DEC.

³ Background PM10 concentrations due to all other sources plus the incremental increase in PM10 concentrations due to the mine alone.

⁴ Incremental increase in PM10 concentrations due to the mine alone.

Modified Development Consent (2006) Schedule 4 Conditions 8, 9 and 10.

8. *Within 3 months of receiving a written request from a landowner with acquisition rights, the Applicant shall make a binding written offer to the landowner based on:*

(a) *the current market value of the landowner's interest in the property at the date of this written request, as if the property was unaffected by the development the subject of the development application, having regard to the:*

- *existing and permissible use of the land, in accordance with the applicable planning instruments at the date of the written request; and*
- *presence of improvements on the property and/or any approved building or structure which has been physically commenced at the date of the landowner's request, and is due to be completed subsequent to that date, but excluding any improvements that have resulted from the implementation of condition 4 of schedule 3;*

(b) *the reasonable costs associated with:*

- *relocating within the Great Lakes, Gloucester and Dungog local government areas, or to any other local government area determined by the Director-General;*
- *obtaining legal advice and expert advice for determining the acquisition price of the land, and the terms upon which it is required; and*

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

However, if at the end of this period, the Applicant and landowner cannot agree on the acquisition price of the land, and/or the terms upon which the land is to be acquired, then either party may refer the matter to the Director-General for resolution.

Upon receiving such a request, the Director-General shall request the President of the NSW Division of the Australian Property Institute to appoint a qualified independent valuer or Fellow of

the Institute, to consider submissions from both parties, and determine a fair and reasonable acquisition price for the land, and/or terms upon which the land is to be acquired.

Within 14 days of receiving the independent valuer's determination, the Applicant shall make a written offer to purchase the land at a price not less than the independent valuer's determination.

If the landowner refuses to accept this offer within 6 months of the date of the Applicant's offer, the Applicant's obligations to acquire the land shall cease, unless otherwise agreed by the Director-General.

9. The Applicant shall bear the costs of any valuation or survey assessment requested by the independent valuer, or the Director-General and the costs of determination referred above.

10. If the Applicant and landowner agree that only part of the land shall be acquired, then the Applicant shall pay all reasonable costs associated with obtaining Council approval for any plan of subdivision, and registration of the plan at the Office of the Registrar-General.

7 STAKEHOLDER CONSULTATION AND REPORTING

Consultation will primarily be via the CCC. The CCC comprises representatives of DCPL, local government and the community.

Monitoring information (dust deposition and PM10 particulate) is provided by DCPL for each CCC meeting.

Minutes of CCC meetings are to be placed on the GCL website (www.gloucestercoal.com.au).

The CCC also provides opportunities on request for members of the community who are not on the Committee to attend CCC meetings to discuss specific issues relevant to them, including dust-related issues.

The Annual Environmental Management Report (AEMR) prepared for the Project also presents results of air quality monitoring.

The AEMR is made available to CCC members in printed format and the current AEMR is to be placed on the GCL website (www.gloucestercoal.com.au) commencing with the 2006 document.

8 REFERENCES

Department of Planning (DoP) (2006) *Modified Development Consent for Duralie Coal Mine.*

New South Wales Environment Protection Authority (NSW EPA) (2000) *Approved Methods for the Sampling and Analysis of Air Pollutants in New South Wales.*

Standards Australia (1984) *AS2724.3-1984: Ambient Air – Particulate Matter – Determination of Total Suspended Particulates (TSP) – High Volume Sampler Gravimetric Method.*

Standards Australia (1990) *AS3580.9.6-1990: Methods for Sampling and Analysis of Ambient Air - Determination of Suspended Particulate Matter - PM₁₀ High Volume Sampler with Size-Selective Inlet - Gravimetric Method.*

Standards Australia (1991) *AS3580.10.1-1991: Methods for Sampling and Analysis of Ambient Air - Determination of Particulates - Deposited Matter - Gravimetric Method.*