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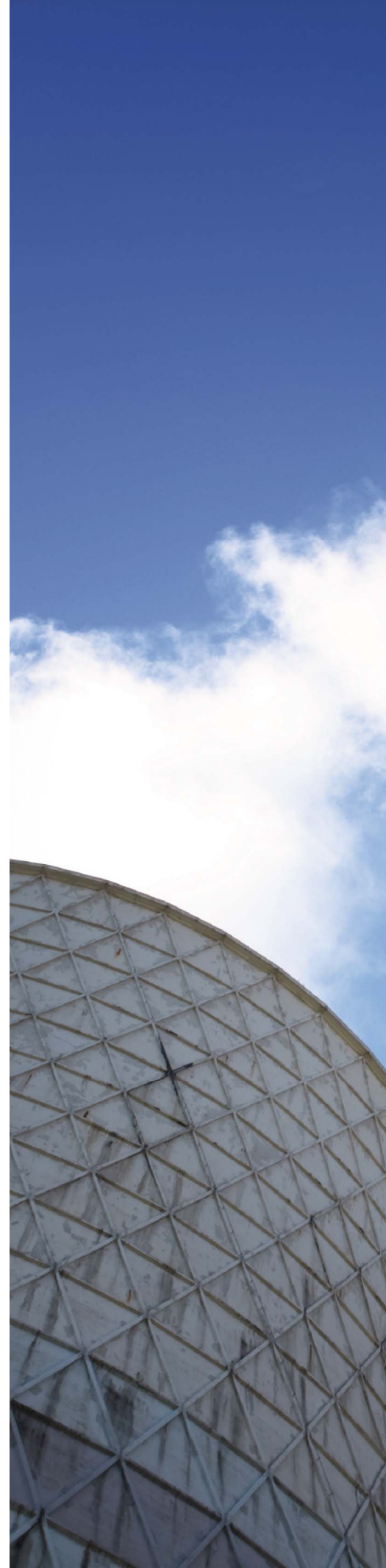
## REPORT

### DURALIE COAL MINE PRP U3 MONITORING PLAN – OVERBURDEN HANDLING IN ADVERSE WEATHER

Duralie Coal Pty Ltd

Job No: 7933

31 May 2013



**PROJECT TITLE:** Duralie Coal Mine PRP U3 Monitoring Plan – Overburden Handling in Adverse Weather

**JOB NUMBER:** 7933

**PREPARED FOR:** Duralie Coal Pty Ltd

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DOCUMENT CONTROL			
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## 1 INTRODUCTION

In June 2011 the NSW Environmental Protection Agency (EPA) published the draft best practice document 'NSW Coal Mining Benchmarking Study: International Best Practice Measures to Prevent and/or Minimise Emissions of Particulate Matter from Coal Mining' (OEHL, 2011a).

Following on from the Benchmarking Study the EPA developed a series of 'Pollution Reduction Programs' (PRPs) for coal mines. The PRPs required Duralie Coal Pty Ltd (DCPL) to prepare a report on the practicability of implementing best practice measures to reduce particle emissions from mining operations at their Duralie Coal Mine (DCM).

On 21 March 2013, the Environmental Protection Licence (EPL) for DCM (no. 11701) was modified to include three new PRPs related to Particulate Matter Control, as follows:

- U2: Particulate Matter Control Best Practice Implementation - Wheel Generated Dust
- U3: Particulate Matter Control Best Practice Implementation - Disturbing and Handling Overburden under Adverse Weather Conditions
- U4: Particulate Matter Control Best Practice Implementation - Trial of Best Practice Measures for Disturbing and Handling Overburden

Condition U3 (*Particulate Matter Control Best Practice Implementation - Disturbing and Handling Overburden under Adverse Weather Conditions*) states that DCM must alter or cease the use of equipment on overburden and loading dumping overburden during adverse weather conditions. U3 also requires the licensee to prepare a Monitoring Program to assess compliance with this condition.

This document presents the proposed Monitoring Program for Condition U3 (reproduced in full in **Appendix A**).

### 1.1 Definitions

Definitions of some of the terms used in this Report are provided below:

Adverse conditions	Conditions calculated as being likely to cause adverse dust emissions beyond the mine lease boundary.
BPM	Best Practice Measure.
Critical Locations	Areas of the site identified as being at highest risk of potentially generating adverse dust emissions beyond the mine lease boundary due to overburden handling activities.
Key Performance Indicator (KPI)	A metric to determine compliance
Resultant Dust Levels	Monitoring data at the most applicable monitor collected in the period after which activities were altered/ceased due to adverse weather conditions
TSP	Total Suspended Particulates

## 2 IDENTIFICATION OF ADVERSE CONDITIONS

The following sections outline the steps that will be taken to complete the Monitoring Program required by Condition U3.

With respect to dust generation by overburden handling, adverse conditions would be identified by a combination of critical overburden handling locations and adverse meteorological conditions.

### 2.1 Critical locations

Identify critical locations where overburden (OB) handling and loading/dumping activities may, under adverse meteorological conditions, result in elevated dust concentrations at or beyond the site boundary.

Critical locations would be identified based on distance of activity to boundary, intensity of activity and prevailing wind directions.

### 2.2 Adverse meteorological conditions

The meteorological conditions that are mostly likely to result adverse conditions will be determined through a screening dispersion modelling exercise, as follows:

- Estimate TSP emissions from dozers on OB and loading and dumping of OB. Emissions would be estimated using the US EPA AP-42 emissions factors outlined in Box 1. Inputs required include the quantity of material (OB) handled and material properties (silt and moisture content).
- For the locations and activities identified in **Section 2.1**, use a screening level atmospheric dispersion model to predict dust plume behaviour under various meteorological conditions (using one year of site representative data).
- Short term (1 hour) boundary concentrations will be predicted for each location identified in **Section 2.1**, and ranked from highest to lowest.
- The highest concentrations (at say the 99<sup>th</sup> percentile level) will be matched to meteorological conditions for that hour and these conditions will be defined as "adverse".
- Adverse conditions may be a combination of parameters, for example:
  - wind speed is greater than 5 m/s; and
  - wind direction is from the NW; and
  - rainfall in last 12 hours less than 2mm
- Different conditions may be identified for the different locations identified in Section 2.1 and there may be more than one adverse condition identified for each location.

#### Box 1: AP-42 Emission Factors for Overburden Operations

##### Equipment (bulldozers) on overburden

$$\text{TSP emissions (kg/h)} = 2.6 \times \frac{s^{1.2}}{M^{1.3}}$$

##### Loading and unloading of overburden

$$\text{TSP emissions (kg/t)} = 0.74 \times 0.0016 \times \left( \frac{\left( \frac{U}{2.2} \right)^{1.3}}{\left( \frac{M}{2} \right)^{1.4}} \right)$$

Where:

M = material moisture content (%)  
s = material silt content (%)  
U = wind speed (m/s)

### 3 PARAMETERS TO BE MONITORED

#### 3.1 Meteorological conditions

Measurement will be made at the existing onsite meteorological station and used to identify adverse conditions, as identified in **Section 2.2**. The parameters that are measured along with units, frequency and methods are outlined in **Table 3.1**.

**Table 3.1: Meteorological parameters**

Parameter	Units	Frequency	Averaging Period	Sampling Method
Air temperature	°C	Continuous	1 hour	AM-4
Wind speed	m/s		15 minute	AM-2 and AM4
Wind direction	Degrees			AM-2 and AM4
Sigma theta	Degrees			AM-2 and AM4
Rainfall	mm			AM-4
Relative Humidity	%		1 hour	AM-4
Temperature lapse rate over a minimal vertical height of 50m	°C		1 hour	AM-4

Note: AM refers to "Approved Method" as outlined in EPA (2005)

Measurements of wind speed and direction will be critical components of the adverse conditions identified in **Section 2.2**. Rainfall will be used to determine the risk level associated with adverse condition (e.g. low risk if adverse conditions are identified but significant rainfall occurred in previous 24-hours).

The location of the meteorological station is outlined in the Duralie Coal Mine Air Quality and Greenhouse Gas Management Plan (**DCM, 2012**).

#### 3.2 Operational activities

Following identification of adverse conditions, the locations and intensity of overburden handling and loading and unloading operational activities will be monitored and recorded and compared with the intensity levels and distance to boundary used to determine the critical locations in **Section 2.1**.

Information recorded will include number of dozers operating for that location, amount of overburden material loaded/unloaded and distance of activity from site boundary. This operation information will be used to determine if adverse conditions will result in unacceptable dust levels beyond the site boundary, based on what was determined as a critical location.

The frequency of monitoring will be determined by the onset of adverse conditions.

#### 3.3 Dust concentration

Dust concentration will be measured (as PM<sub>10</sub>) at a location north of the mine lease, identified as Point 33 in the EPL. The monitoring method for PM<sub>10</sub> concentration follows AM-22 and provides continuous measurements of PM<sub>10</sub> concentration using a TEOM.

Measurements of dust concentration at the TEOM will be used to determine if adverse conditions are resulting in elevated dust concentrations beyond the boundary and also to determine the resultant dust levels following alteration / cessation of activities during adverse conditions (for activities relevant to this location).

## 4 DOCUMENTATION OF CHANGES TO OPERATIONAL ACTIVITIES

A Trigger Action Response Plan (TARP) would be developed for periods of adverse conditions. Adverse conditions will be determined based on the monitoring described in **Section 3**.

A Response Log will be developed to track the periods of time when adverse conditions were recorded and the subsequent action and response (i.e. alteration/cessation of operations). Measured concentrations of PM<sub>10</sub> from the TEOM would also be recorded during periods of adverse conditions.

## 5 KEY PERFORMANCE INDICATORS (KPI)

The success of the monitoring program described above would be determined by the following:

- Effective identification of adverse meteorological conditions.
- Effective alteration of overburden handling activities during identified adverse meteorological conditions.
- Minimisation of dust emissions from overburden handling activities during adverse conditions.

The success of the monitoring program would be measured by compliance with relevant air quality criteria at receiver locations. This (i.e. compliance with criteria) would be the primary KPI for the monitoring program, and would be measured by the existing monitoring network, in particular the TEOM (**Section 3.3**).

A secondary KPI for the monitoring program would be a reduction in PM<sub>10</sub> concentrations during the alteration / cessation of activities during adverse conditions. Under relevant meteorological conditions, this would be measured by PM<sub>10</sub> concentrations recorded by the TEOM. This KPI would be refined (i.e. reduction in PM<sub>10</sub> concentrations quantified) by data recorded for the Response Log.

**Table 5.1: KPIs**

KPI	Description	Specific	Measurable	Attainable	Relevant	Time-bound
To achieve compliance with air quality criteria	<ul style="list-style-type: none"> <li>• Air quality criteria are specified in EPL</li> <li>• Measured using existing monitoring network</li> <li>• Attainable, and required by EPL conditions</li> <li>• Relevant to compliance with requirements of Condition U3.1</li> <li>• Timing to meet KPI is ongoing</li> </ul>	✓	✓	✓	✓	✓
To achieve a measurable reduction in PM <sub>10</sub> concentrations during identified adverse conditions	<ul style="list-style-type: none"> <li>• Reduction in PM<sub>10</sub> concentrations is specific. However, quantification of reduction to be defined by ongoing data collection</li> <li>• Measured using existing monitoring network for relevant meteorological conditions</li> <li>• Attainable, and required by Condition U3.1</li> <li>• Relevant to compliance with requirements of Condition U3.1</li> <li>• Timing to meet KPI is during identified adverse weather conditions</li> </ul>	✓	✓	✓	✓	✓

The KPIs above would be used to meet the requirements of Condition U3.1, which states that the licensee must alter or cease the use of equipment on overburden and the loading and dumping of overburden during adverse weather conditions to minimise the generation of particulate matter.

## 6 REFERENCES

OEH (2011a). NSW Coal Mining Benchmarking Study: International Best Practice Measures to Prevent and/or Minimise Emissions of Particulate Matter from Coal Mining.

EPA (2005). Approved Methods for Sampling and Analysis of Air Pollutants in NSW. NSW Environment Protection Authority, August 2005.

DCM (2012). Duralie Coal Mine Air Quality and Greenhouse Gas Management Plan, March 2012.



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**Appendix A PRP CONDITION**

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**U3 Particulate Matter Control Best Practice Implementation - Disturbing and Handling Overburden under Adverse Weather Conditions**

U3.1 The licensee must alter or cease the use of equipment on overburden and the loading and dumping of overburden during adverse weather conditions to minimise the generation of particulate matter from 22 March 2013.

U3.2 The Licensee must prepare a Monitoring Program to assess its compliance with Condition U3.1. The Monitoring Program must detail the following:

- parameters to be monitored;
- methods to be used to monitor each parameter;
- locations where each parameter will be monitored;
- frequency at which each parameter will be monitored;
- way in which changes to operational activities will be documented;
- Key Performance Indicators that will be used to determine compliance with Condition U3.1; and
- detailed justification for each parameter and Key Performance Indicator selected.

As a guide, the EPA anticipates that the following parameters will be monitored:

- wind speed and direction;
- temperature;
- rainfall/humidity;
- evaporation rate;
- solar radiation;
- operational activities; and
- dust levels.

The Monitoring Program must be submitted by the Licensee to the Environment Protection Authority Regional Manager Hunter, at PO Box 488G, NEWCASTLE by 31 May 2013.

The EPA intends to require the licensee to implement the Monitoring Program once it is approved by the EPA.

U3.3 The Licensee must submit a written report to the EPA providing the results of the Monitoring Program.

The report must detail the following:

- weather conditions during which activities were ceased or altered;
- changes made to operational activities as a result of adverse weather; and
- resultant dust levels when activities were altered or ceased.

The report must be submitted by the Licensee to the Environment Protection Authority Regional Manager Hunter, at PO Box 488G, NEWCASTLE by 15 August 2014.