Report No. 737/04

Appendix 2

Monthly Dust and Meteorological Reports

This appendices is presented on the CD included on the inside front cover of this report.

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Donaldson Monitoring Dust and Meteorological Data Monthly Report

June 2008

Prepared for Donaldson Coal

by Holmes Air Sciences

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1. INTRODUCTION

As part of their Air Quality Management Plan Donaldson operate a dust monitoring network in the vicinity of the mining lease and a meteorological station on site. This report has been prepared in order to bring together the various data collected throughout the network during June 2008 and to summarise the information.

The dust network includes continuous monitoring, high volume air sampling and dust deposition monitoring. The continuous monitoring network consists of two DustTrak monitors measuring PM₁₀ at two sites and a GRIMM monitor which is used for one week each quarter to measure PM₂₅ and PM₁₀ simultaneously.

There are two locations which use high volume air samplers to determine concentrations of PM₁₀ and TSP. These operate on a six-day cycle in line with similar measurements made by the NSW Department of Environment and Climate Change (DECC) at other locations throughout the state.

In addition to concentration measurements, monthly levels of dust deposition are also measured using eleven gauges placed at various locations in the area of the mine. The locations of each of these monitors and gauges are shown in Figure 1. Table 1 lists the monitors used and pollutants measured at these locations.

Instruments Used Pollutant Monitored Monitoring Location HVAS Beresfield PM₁₀ Blackhill **HVAS** PM10 HVAS TSP DustTrak PM₁₀ Grimm (1 week per quarter) PM10, PM2.5 Weakleys Drive **DustTrak** PM₁₀ DG1 - DG11 **Deposition Gauges Dust Deposition**

Table 1. Summary of monitoring locations and instruments

The meteorological station is situated at the site of the office buildings and measures the following parameters:

- wind speed
- wind direction
- sigma theta
- temperature
- solar radiation
- relative humidity, and
- rainfall

These parameters are measured every 5 seconds and then 10-minute averages are recorded, except in the case of rainfall where the 10-minute total is recorded. The data are downloaded at various intervals by Donaldson and then forwarded to Holmes Air Sciences for processing.

2. HIGH VOLUME AIR SAMPLING

High Volume Air Sampling (HVAS) was carried out at Beresfield and Blackhill by Metford Laboratories. PM₁₀ is measured at both sites while TSP is only measured at Blackhill. The data collected during June 2008 are summarised in **Table 2**. A graph consisting of all the data collected to date is shown in **Figure 2**.

Table 2. High volume air sampling from Beresfield and Blackhill for June 2008

Date	Beresfield PM10 (µg/m³)	Blackhill PM10 (µg/m³)	Blackhill TSP (µg/m³)
4/06/2008	11	8	11
10/06/2007	12	15	54
16/06/2008	13	8	14
22/06/2008	10	7	12
28/06/2008	22	9	18
Annual average	20	12	25

These measurements will include all background sources relevant to that location, including contributions from the Donaldson mining operations.

On the days that the instruments were monitoring, the highest 24-hour average PM₁₀ concentration in June 2008 was 22 µg/m³, measured on the 28th at the Beresfield site. On no occasion did the measured PM₁₀ concentrations exceed the 50 µg/m³ 24-hour NEPM goal.

TSP measurements from the Blackhill site show that concentrations were below the NHMRC 90 $\mu g/m^3$ annual average TSP goal. It should be noted that the NHMRC goal refers to an annual average and not a 24-hour average as measured by the high volume air sampler. The annual average TSP concentration for the 12 months to June 2008 was 25 $\mu g/m^3$.

Figure 2 shows a seasonal trend in PM₁₀ concentrations, peaking during the warmer months and decreasing during autumn and winter. This is a common trend and is seen consistently in the Hunter Valley.

The annual average PM₁₀ concentrations for Beresfield and Blackhill were 20 μg/m³ and 12 μg/m³ respectively for the 12 months to June 2008. These are below the DECC's annual average PM₁₀ air quality criterion of 30 μg/m³.

3. CONTINUOUS MONITORING

3.1 DustTrak Monitoring at Blackhill

Figure 3 shows a time series of the PM₁₀ data collected from the DustTrak monitor at the Blackhill site. The flow to the DustTrak was obstructed on the 26th of June causing significant loss of data for the month of June, following the pervious obstruction being rectified on the 13th of June. Of the available data, the measured 24-hour average PM₁₀ concentrations were below the NEPM goal of 50 μg/m³. The maximum 24-hour average PM₁₀ concentration was recorded on the 19th of June at 18.9 μg/m³.

3.2 DustTrak Monitoring at Weakleys Drive

A time series of the PM $_{10}$ data collected from the Weakleys Drive site is shown in Figure 4. The DustTrak monitoring for the Weakleys Drive site is available from the 13th to the 15th of June 2008. The available data show that 24-hour average PM $_{10}$ concentration were below the NEPM goal of 50 μ g/m 3 . The maximum 24-hour average PM $_{10}$ concentration was 2 μ g/m 3 , recorded on the 14th of June.

3.3 Grimm Monitoring

No Grimm monitoring was scheduled for June 2008.

4. DUST DEPOSITION MONITORING

Dust deposition monitoring is carried out each month via a network consisting of eleven (11) gauges. The results for June 2008 are shown in Table 3, in conjunction with results for the previous eleven months in order to provide an annual average for that period. A table showing the complete data set from July 2000 in provided in Appendix A.

Table 3. Dust deposition monitoring for the 12-month period to June 2008

Month	Monthly dust deposition rate (g/m²/month)												
wonth	DG1	DG2	DG3	DG4	DG5A	DG6	DG7	DG8	DG9	DG10	DG11		
Jul-07	0.5	0.4	0.6	2.1	0.5	0.8	0.6	0.6	0.4	0.5	0.7		
Aug-07	1.5	0.4	0.7	1	0.7	0.7	0.5	1	0.6	0.6	0.7		
Sep-07	1.3	0.5	1.8	1	0.7	0.9	0.9	1.3	1	0.7	1.6		
Oct-07	4.2	0.9	1.1	1.4	1.1	1.7	1.8	1.7	1.6	1.4	2.2		
Nov-07	0.8	0.8	1.1	0.9	1.1	1.1	1.1	1.7	0.6	0.8	1.5		
Dec-07	1.3	0.8	3	0.7	0.5	8.0	0.5	1.1	0.3	8.0	0.6		
Jan-08	2.6	8.0	3.7	0.5	0.5	0.5	0.4	2.2	0.8	0.3	8.0		
Feb-08	0.4	0.1	14*	0.1	0.1	0.3	0.1	0.3	0.2	0.2	0.3		
Mar-08	4.5	0.6	9.2	0.6	2.9	2.1	0.6	1.5	0.5	1	0.9		
April-08	0.4 "	0.4 *	0.8	0.4 ′	0.4 "	0.8 *	1.1 ′	1.7 *	1.2	1.1 *	1.1 ′		
May-08	1.1	2.4 "	0.9	1.4	0.9	0.9	0.7	2.7	1'	1.1	1.3 *		
Jun-08	0.2	0.4	0.1	0.5	0.1 *	0.1	0.3	0.5 *	0.1	0.8	0.2		
Annual Average	1.6	0.6	1.4	0.9	0.8	0.9	0.7	1.4	0.6	0.7	0.9		

Data supplied by Metford Laboratories. * Insects/bird droppings reported. * Invalid (excess bird droppings).

The highest dust deposition measurement in June 2008 was 0.8 g/m²/month at DG10, the accompanying laboratory report showed that the sample was not contaminated with insects. The contaminated readings have been removed when calculating the annual average.

The annual average deposition rates were low and below 2 g/m²/month at all gauges, indicating good air quality with respect to dust deposition.

5. METEOROLOGICAL MONITORING

Monthly plots of the temperature, solar radiation, wind speed and rainfall data collected in June 2008 are shown in Figure 6 and a windrose is shown in Figure 7.

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The graphs shown in Figure 6 indicate that the instruments were recording appropriately. Data maximums and minimums all appeared to be sensible for this site during May. Total rainfall for the month was 105.4 mm.

A windrose (see Figure 7) created from the available 10-minute average wind data shows that winds were predominantly from the west and the westnorthwest quadrants. The site recorded calms (wind speed less than or equal to 0.5 m/s) for approximately 41.1% of the time. This is quite a high percentage but is similar to the value for June 2007.

APPENDIX A ALL DUST DEPOSITION DATA

Dust deposition (g/m²/month)

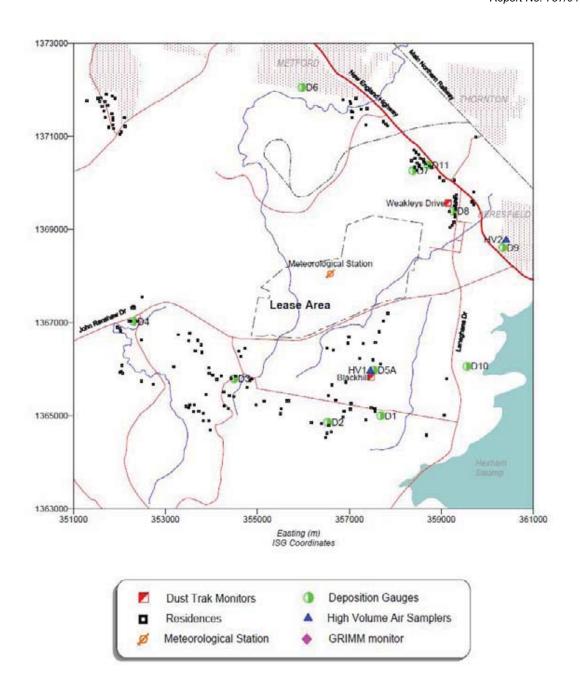
Month	D1	D2	D3	D4	D5A	D6	D7	D8	D9	D10	D11
May-00	0.4	0.4		0.7	0.9	0.6	3.6	1.6	0.5	1.8	
Jun-00	0.7	0.5	0.5	0.7	8.0	0.4	3.8	3.2	0.5	0.7	
Jut-00	0.4	0.4	0.5	0.7	0.8	0.5	0.8	1.5	0.4	0.4	
Aug-00	0.9	0.6	1.0	1.2	1.1	1.0	3.4	0.7	0.7	0.6	
Sep-00	0.8	0.9	1.1	0.9	1.3	1.0	2.2	1.0	1.0	0.8	
Oct-00	0.4	0.6	1.1	0.9	0.9	0.8	5.3	0.9	0.6	0.5	
Nov-00	5.2	0.7	1.4	0.8	1.0	0.4	24.1	9.4	1.1	0.6	1.0
Dec-00	2.8	1.4	1.9	1.3	1.1	0.8	2.1	2.5	0.9	0.9	7,91
Jan-01	0.7	1.7	1.4	1.8	0.7	1.3	1.1	2.4	1.1	0.6	-
Feb-01	0.9	3.1	2.0	0.5	0.9	0.7	0.7	6.7	1.3	0.5	1.0
Mar-01	0.8	2.1	1.3	0.6	0.7	0.6	0.6	5.5	0.6	0.6	1.5
Apr-01	0.8	0.7	1.3	0.5	0.7	0.4	0.3	5.1	0.7	0.6	0.8
May-01	0.2	0.2	0.4	0.4	0.3	0.3	0.6	1.8	0.6	0.8	0.9
Jun-01	0.5	0.4	0.5	1.0	1.0	0.4	0.4	8.8	0.7	0.6	0.6
Jul-01	0.5	0.3	1.8	0.5	0.8		16.3	4.9	0.9	0.7	0.7
Aug-01	0.4	0.4	0.8	0.8	1.0	1.7	1.0		1.0	1.8	1.1
Sep-01	0.7	1.0	1.7	1.1	1.7	0.7	-	6.0	1.1	1.3	1.7
Oct-01	1.1	0.6	4.6	0.9	0.7	0.9	1.2	1.9	0.9	0.6	1.7
Nov-01	0.9	1.0	1.1	1.1	0.8	1.1	6.0	5.5	1.3	1.9	2.3
Dec-01	4.9	0.9	4.2	0.9	1.3	1.9	1.2	3.1	1.2	9.7	1.8
Jan-02	0.8	1.0	1.5	1.3	1.1	1.4	1.3	1.5	1.1	0.9	1.5
Feb-02	1.1	1.1	0.9	0.3	0.4	0.5	3.1	5.1	0.5	0.5	0.9
Mar-02	1.7	2.1	1.6	0.7	0.7	8.0	1.0	18	1.0	0.9	1.7
Apr-02	1.0	0.4	1.0	0.8	0.8	0.6	0.9	10.1	0.5	0.7	1.0
May-02	0.6	0.6	6.0	0.7	0.4	1.2	0.9	3.1	0.7	0.2	1.0
Jun-02	1.4	0.4	1.7	0.6	0.5	0.8	0.6	2.1	0.6	0.5	1.0
Jul-02	0.7	0.7	19-	0.8	0.8	0.7	1.2	1-1:	1.1	0.5	1.0
Aug-02	1.3	0.8	1.4	1.2	1.1	1.2	1.5		1.5	0.9	1.6
Sep-02	0.5	1.2	1.1	0.8	0.5	0.7	5.1	9.3	1.6	0.6	1.0
Oct-02	2.2	1.4	5.2	1.5	1.5	1.4	1.4	3.4		1.5	3.1
Nov-02	2.8	1.8	3.7	1.6	0.1	1.8	2.1	3.5	2.1	2	1.9
Dec-02	2.0	8 00	2.5	1.5	3.0	1.5	1.8	4.1	1.6	1.2	1.9
Jan-03	2.1	1.5	2.7	1.5	1.0	1.9	2.2	2.5	1.1	1.0	1.6
Feb-03	1.4	1.1	2.6	1.1	0.9	1.2	1.7	5.9	1.2	1.0	1.5
Mar-03	0.8	0.5	1.2	1.2	0.6	2.1	1.5	3.4	- 3	3.6	9.5
Apr-03	0.5	1.0	0.6	1.0	0.7	0.5	1.1	8.0		2.0	1.0
May-03	0.5	0.4	0.6	0.2	0.2	0.6	1.3	1.6	0.5	0.8	1.2
Jun-03	0.5	0.6	8.0	0.8	0.4	0.6	0.8	0.7	0.9	0.7	0.7
Jut-03	0.3	0.4	0.4	0.6	0.4	0.5	0.7	0.5	0.5	0.5	0.7
Aug-03	0.8	0.2	0.7	1.1	0.5	1.3	1.8	2.1	1.3	0.7	0.9
Sep-03	0.6	0.7	1.1	0.7	0.8	1.7	1.4	1.3	2.5	0.9	1.3
Oct-03		0.9	1.4	0.9	0.7	1.9	1.0	1.4	0.6	0.8	1.3
Nov-03	2.6	8.0	1.0	1.1	0.4	1.3	1.5	1.5	(8)	8.0	1.3
Dec-03	1.0	1.0	1.4	1.3	1.1	1.5	1.6	2.0	1.8	0.9	1.4
lan-04	8.5	1.5	2.1	1.5	1.3	2.6	1.4	2.2	1.7	1.5	1.7
Feb-04	1.2	1.0	1.7	1.4	0.7	3.1	1.6	2.2		1.5	2.3
Mar-04	0.4	0.6	6.6	1.2	0.7	1.9	1.1	12.1	4.8	1.5	1.1
Apr-04	0.6	1.0	0.8	0.8	0.6	1.9	0.8	1.4	0.9	1.2	1.1
May-04	0.2	0.9	2.2	0.9	0.8	0.7	0.9	1.4	1.2	0.9	1.5
Jun-04	0.4	0.6	0.7	0.9	0.6	1.4	1.0	0.9	1.0	1.0	0.8
Jul-04	0.4	0.6	5.3#	0.6	0.5	2.9	1.0	1.1	0.9	0.6	1.2
Aug-04	0.5	0.5	0.5	1.3	0.7	1.1	1.1	1.4	•	1.0	1.0
Sep-04	0.6	0.6	0.8	2.2	1.0	1.0	0.9	4.4	0.9	16.7	1.1
Oct-04	0.7	0.9	1.2	0.9	8.0	1.4	1.0	10.5	1.0	1.0	0.8
Nov-04	0.8	0.7	1.3	1.9	0.7	0.9	1.0	3.0	1.1	1.1	1.6
Dec-04	2.0	1.4	3.6	1.5	1.3	2.2	3.2	7.9	1.8	5.5	2.5
Jan-05	1.2	1.0	3.7	1.6	1.4	4.0	2.3	2.7	2.6	2.5	2.8
Feb-05	1.2	1.2	1.8	1.6	1.3	2.0	1.7	3 9	2.3	1.5	2.3
Mar-05	1.3	0.9	1.4	0.9	0.9	3.0	1.2	7.7	14	8.0	1.3
Apr-05	1.1	0.7	0.9	0.8	0.7	0.9	1.4	3.3	1.1	0.8	0.9

Month	D1	D2	D3	D4	D5A	D6	D7	D8	D9	D10	D11
May-05	0.7	8.6	1,1	0.8	0.7	0.8	0.9	4.4	1.2	0.8	1.1
Jun-05	1.3	0.8	1.3	1.3	0.8	1.2	1.2	1.3	1.5	2.5	0.9
Jul-05	1.0	0.5	0.5	0.7	0.4	1.6	0.7	1.2	0.8	4.3	1.1
Aug-05	0.6	0.6	0.8	1.0	0.8	0.9	0.7	1.0	0.9	1.0	0.9
Sep-05	0.6	0.7	0.8	0.7	0.7	1.2	1.3	1.3	1.0	0.9	1.1
Oct-05	0.8	0.9	1.3	0.9	0.8	1.4	1.2	1.9	1.3	1.1	1.3
Nov-05		2.3	2.3	2.0	1.7	1.2	2.0	3.2	1.6	1.4	2.2
Dec-05	1.9	3.2	2.3	3.3	2.6	3.4	2.3		1.3	2.1	3.9
Jan-06	1.0	2.1	1.7	1.0	23.	3.5		2.7	1.1	7-72	1.5
Feb-06	2.2	1.0	0.9	1.2	1.1	1.7	1.1	2.9		2.3	1.8
Mar-06	0.7	0.6	2.3	0.7	0.6	0.9	1.0	1.4	0.7	0.8	1.5
Apr-06	0.6	0.7	1.1	0.8	0.6	1.1	0.8	1.0	1.0	1.8	1.5
May-06	1.0	3.1	1.0		1.1	1.4	1.1	4.1		7.0	1.5
lun-06	0.4	0.3	0.7	0.5	0.4	0.6	0.7	0.8	0.6	0.9	0.9
Jul-06	0.3	0.3	1	1.3	0.4	0.7	0.7	2.7	1	0.6	0.6
Aug-06	0.9	0.6	0.8	0.7	0.7	0.8	0.7	1.7		3.7	0.9
Sep-06	1.6	0.7	1.1	1.7	0.7	1	0.9	1.3	1.2	0.8	1.6
Oct-06	2	1.4	1.6	1.8	0.9	1.8	1.2	1.8	1.5	1.8	1.9
Nov-06	4.3	2.2	3	2.3	2.3	5.3	2.4	3.3	2.3	2.3	2.9
Dec-06	1.2	3.4	1.9	2.3	2.3		2.1	2.1	1	4.9	3.9
Jan-07	2	0.9	1.5	0.7	0.7	1.7	1.1		1.2	1.7	0.9
Feb-07	1.7	0.9	1.6	0.7	0.6	1	1.8	1.7	1.1	1.2	1.7
Mar-07	1.3	0.9	1.7	0.8	1.2	0.6	2.2	1.7	1	0.9	1.7
Apr-07	0.5	0.7	0.9	0.6	4.8	1.2	0.5	2.7	0.5	0.8	0.9
May-07	0.8	0.5	0.6	1.2	0.6	0.6	0.7	1.9	0.5	0.7	0.8
Jun-07	0.6	0.5	0.7	1.1	0.1	0.5	0.1	0.5	0.1	0.4	0.3
Jut-07	0.5	0.4	0.6	2.1	0.5	0.8	0.6	0.6	0.4	0.5	0.7
Aug-07	1.5	0.4	0.7	1	0.7	0.7	0.5	1	0.6	0.6	0.7
Sep-07	1.3	0.5	1.8	1	0.7	0.9	0.9	1.3	1	0.7	1.6
Oct-07	4.2	0.9	1.1	1.4	1.1	1.7	1.8	1.7	1.6	1.4	2.2
Nov-07	0.8	0.8	1.1	0.9	1.1	1.1	1.1	1.7	0.6	0.8	1.5
Dec-07	1,3	0.8	3	0.7	0.5	0.8	0.5	1.1	0.3	0.8	0.6
Jan-08	2.6	0.8	3.7	0.5	0.5	0.5	0.4	2.2	0.8	0.3	0.8
Feb-08	0.4	0.1	14	0.1	0.1	0.3	0.1	0.3	0.2	0.2	0.3
Mar-08	4.5	0.6	9.2+	0.6	2.9	2.1	0.6	1.5	0.5	1	0.9
April-08	0.4"	0.4"	0.8"	0.4	0.4"	0.8"	1.1'	1.7"	1.2	1.1'	1.1
May-08	1.1	2.4"	0.9	1.4	0.9	0.9	0.7	2.7	1'	1.1	1.3
June-08	0.2	0.4"	0.1	0.5	0.1"	0.1	0.3	0.5"	0.1	0.8	0.2

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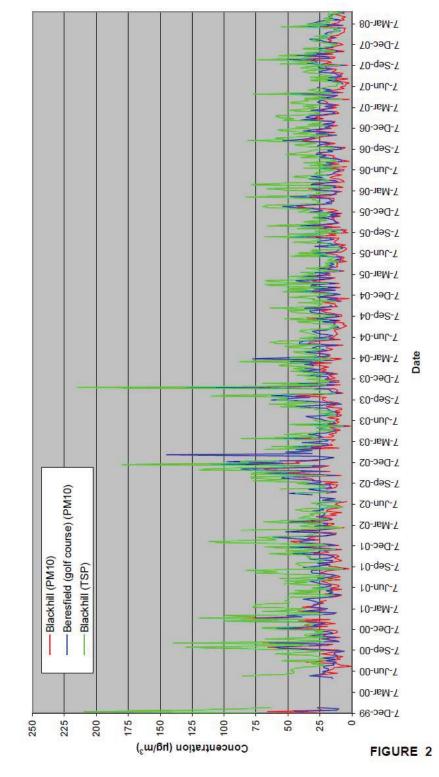
FIGURES

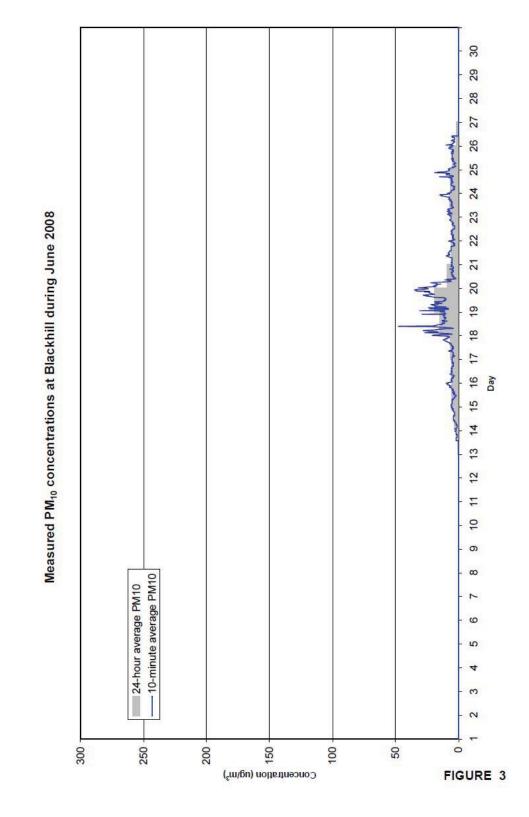


Location of Project Area

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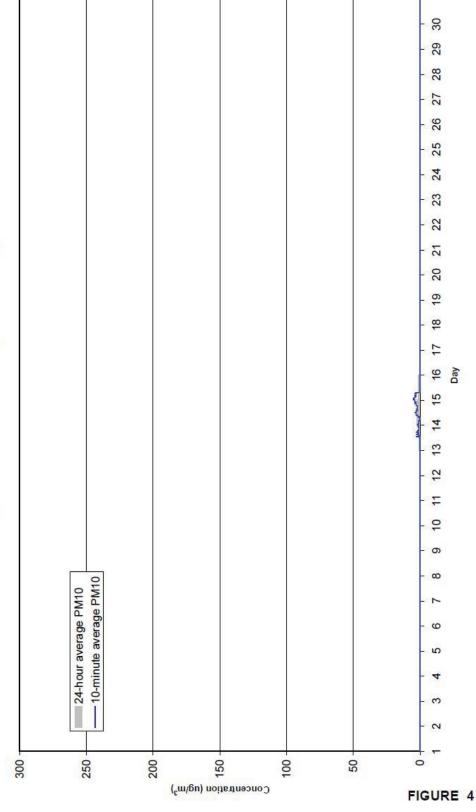
High Volume Air Sampling data recorded at Beresfield and Blackhill from December 1999 to June 2008





DONALDSON COAL PTY LTD Abel Underground Coal Mine Report No. 737/04



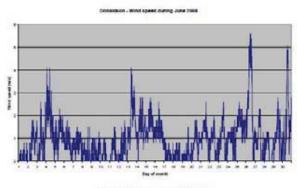


2008/2009 ANNUAL ENVIRONMENTAL
MANAGEMENT REPORT

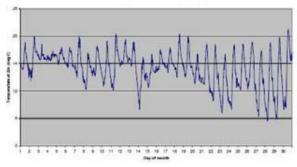
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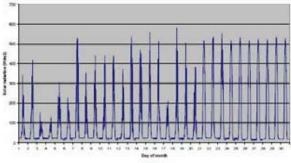
DONALDSON COAL PTY LTD Abel Underground Coal Mine Report No. 737/04

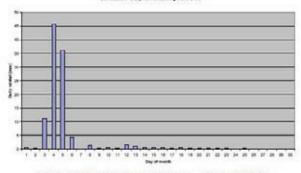
[No Grimm monitoring was scheduled for this month]





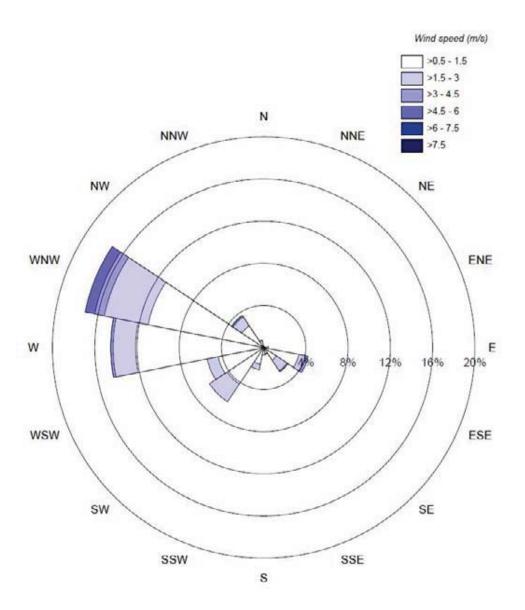






Meteorological conditions - June 2008

Windrose for Donaldson June 2008



Calms = 41.1%

FIGURE 7

Abel Underground Coal Mine Report No. 737/04

Donaldson Monitoring Dust and Meteorological Data Monthly Report

July 2008

Prepared for Donaldson Coal

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1. INTRODUCTION

As part of their Air Quality Management Plan Donaldson operate a dust monitoring network in the vicinity of the mining lease and a meteorological station on site. This report has been prepared in order to bring together the various data collected throughout the network during July 2008 and to summarise the information.

The dust network includes continuous monitoring, high volume air sampling and dust deposition monitoring. The continuous monitoring network consists of two DustTrak monitors measuring PM₁₀ at two sites and a GRIMM monitor which is used for one week each quarter to measure PM₂₅ and PM₁₀ simultaneously.

There are two locations which use high volume air samplers to determine concentrations of PM_{10} and TSP. These operate on a six-day cycle in line with similar measurements made by the NSW Department of Environment and Climate Change (DECC) at other locations throughout the state.

In addition to concentration measurements, monthly levels of dust deposition are also measured using eleven gauges placed at various locations in the area of the mine. The locations of each of these monitors and gauges are shown in Figure 1. Table 1 lists the monitors used and pollutants measured at these locations.

Instruments Used Pollutant Monitored Monitoring Location Beresfield HVAS PM₁₀ Blackhill **HVAS** PM10 HVAS TSP DustTrak PM₁₀ Grimm (1 week per quarter) PM10, PM2.5 Weakleys Drive **DustTrak** PM10 DG1 - DG11 Deposition Gauges **Dust Deposition**

Table 1. Summary of monitoring locations and instruments

The meteorological station is situated at the site of the office buildings and measures the following parameters:

- wind speed
- · wind direction
- sigma theta
- temperature
- solar radiation
- · relative humidity, and
- rainfall

These parameters are measured every 5 seconds and then 10-minute averages are recorded, except in the case of rainfall where the 10-minute total is recorded. The data are downloaded at various intervals by Donaldson and then forwarded to Holmes Air Sciences for processing.

2. HIGH VOLUME AIR SAMPLING

High Volume Air Sampling (HVAS) was carried out at Beresfield and Blackhill by Metford Laboratories. PM₁₀ is measured at both sites while TSP is only measured at Blackhill. The data collected during July 2008 are summarised in Table 2. A graph consisting of all the data collected to date is shown in Figure 2.

Table 2. High volume air sampling from Beresfield and Blackhill for July 2008

Date	Beresfield PM ₁₀ (µg/m³)	Blackhill PM10 (µg/m³)	Blackhill TSP (µg/m³)
4/07/2008	10	24	28
10/07/2007	12	21	28
16/07/2008	10	18	16
22/07/2008	10	18	28
28/07/2008	1	4	3
Annual average	19	13	25

These measurements will include all background sources relevant to that location, including contributions from the Donaldson mining operations.

On the days that the instruments were monitoring, the highest 24-hour average PM $_{10}$ concentration in July 2008 was 24 μ g/m 3 , measured on the 4 th at the Blackhill site. On no occasion did the measured PM $_{10}$ concentrations exceed the 50 μ g/m 3 24-hour NEPM goal.

TSP measurements from the Blackhill site show that concentrations were below the NHMRC 90 μg/m³ annual average TSP goal. It should be noted that the NHMRC goal refers to an annual average and not a 24-hour average as measured by the high volume air sampler. The annual average TSP concentration for the 12 months to July 2008 was 25 μg/m³.

Figure 2 shows a seasonal trend in PM₁₀ concentrations, peaking during the warmer months and decreasing during autumn and winter. This is a common trend and is seen consistently in the Hunter Valley.

The annual average PM_{10} concentrations for Beresfield and Blackhill were 19 $\mu g/m^3$ and 13 $\mu g/m^3$ respectively for the 12 months to July 2008. These are below the DECC's annual average PM_{10} air quality criterion of 30 $\mu g/m^3$.

3. CONTINUOUS MONITORING

3.1 DustTrak Monitoring at Blackhill

Figure 3 shows a time series of the PM₁₀ data collected from the DustTrak monitor at the Blackhill site. Unfortunately due to a possible power failure to the DustTrak monitor only five days of PM₁₀ data has been collected at this site. Of the available data, the measured 24-hour average PM₁₀ concentrations were below the NEPM goal of 50 μg/m³. The maximum 24-hour average PM₁₀ concentration was recorded on the 7th of June at 12.5 μg/m³.

3.2 DustTrak Monitoring at Weakleys Drive

A time series of the PM₁₀ data collected from the Weakleys Drive site is shown in Figure 4. The DustTrak monitoring for the Weakleys Drive site is available from the 3rd to the 31st of July 2008. The available data show that 24-hour average PM₁₀ concentration was above the NEPM goal of 50 μg/m³ on one occasion. The maximum 24-hour average PM₁₀ concentration was 87.7 μg/m³, recorded on the 18th of June.

3.3 Grimm Monitoring

No Grimm monitoring was scheduled for July 2008.

4. DUST DEPOSITION MONITORING

Dust deposition monitoring is carried out each month via a network consisting of eleven (11) gauges. The results for July 2008 are shown in Table 3, in conjunction with results for the previous eleven months in order to provide an annual average for that period. A table showing the complete data set from July 2000 in provided in Appendix A.

Table 3. Dust deposition monitoring for the 12-month period to July 2008

Mount	Monthly dust deposition rate (g/m²/month)											
Month	DG1	DG2	DG3	DG4	DG5A	DG6	DG7	DG8	DG9	DG10	DG11	
Aug-07	1.5	0.4	0.7	1	0.7	0.7	0.5	1	0.6	0.6	0.7	
Sep-07	1.3	0.5	1.8	1	0.7	0.9	0.9	1.3	1	0.7	1.6	
Oct-07	4.2	0.9	1.1	1.4	1.1	1.7	1.8	1.7	1.6	1.4	2.2	
Nov-07	0.8	0.8	1.1	0.9	1.1	1.1	1.1	1.7	0.6	0.8	1.5	
Dec-07	1.3	0.8	3	0.7	0.5	0.8	0.5	1.1	0.3	0.8	0.6	
Jan-08	2.6	0.8	3.7	0.5	0.5	0.5	0.4	2.2	0.8	0.3	0.8	
Feb-08	0.4	0.1	14*	0.1	0.1	0.3	0.1	0.3	0.2	0.2	0.3	
Mar-08	4.5	0.6	9.2*	0.6	2.9	2.1	0.6	1.5	0.5	1	0.9	
April-08	0.4 '	0.4	0.8 *	0.4 "	0.4 *	0.8 "	1.1 4	1.7 '	1.2	1.1 *	1.1 *	
May-08	1.1	2.4 *	0.9	1.4	0.9	0.9	0.7	2.7	1/	1.1	1.3 /	
Jun-08	0.2	0.4 *	0.1	0.5	0.1 *	0.1	0.3	0.5 *	0.1	0.8	0.2	
Jul-08	0.4	0.7 *	1.3 /	0.6 *	0.8	0.9	0.8	1	0.7	0.5	1.1	
Annual Average	1.6	0.6	1.4	0.9	0.9	0.9	0.7	1.4	0.7	0.7	1.0	

Data supplied by Metford Laboratories. * Insects/bird droppings reported. * Invalid (excess bird droppings).

The highest dust deposition measurement in July 2008 was 1.1 g/m²/month at DG11, the accompanying laboratory report showed that the sample was not contaminated with insects. The contaminated readings have been removed when calculating the annual average.

The annual average deposition rates were low and below 2 g/m²/month at all gauges, indicating good air quality with respect to dust deposition.

5. METEOROLOGICAL MONITORING

Monthly plots of the temperature, solar radiation, wind speed and rainfall data collected in July 2008 are shown in Figure 6 and a windrose is shown in Figure 7.

The graphs shown in Figure 6 indicate that the instruments were recording appropriately. Data maxima and minima all appeared to be sensible for this site during July. Total rainfall for the month was 17.4 mm.

A windrose (see Figure 7) created from the available 10-minute average wind data shows that winds were predominantly from the west. The site recorded calms (wind speed less than or equal to 0.5 m/s) for approximately 41.6% of the time. This is quite a high percentage but is similar to the value for July 2007.

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APPENDIX A ALL DUST DEPOSITION DATA

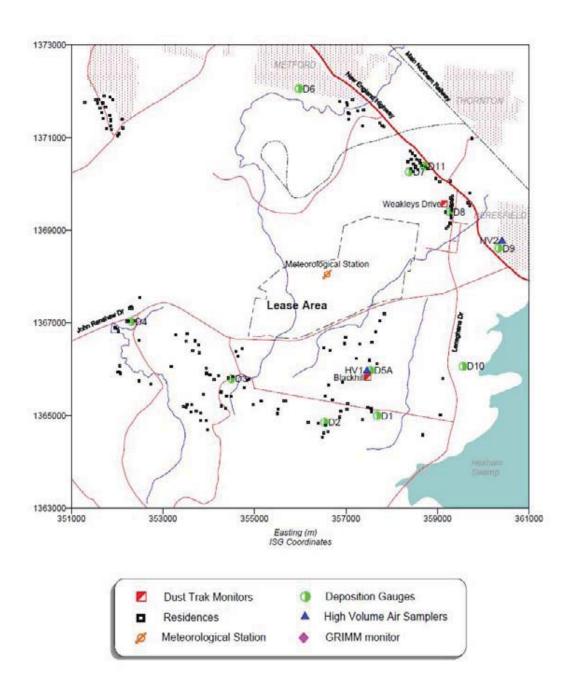
Dust deposition (g/m²/month)

Month	D1	Dz	D3	D4	D5A	D6	D7	D8	D9	D10	D11
May-00	0.4	0.4		0.7	0.9	0.6	3.6	1.6	0.5	1.8	
Jun-00	0.7	0.5	0.5	0.7	0.8	0.4	3.8	3.2	0.5	0.7	*
Jul-00	0.4	0.4	0.5	0.7	0.8	0.5	0.8	1.5	0.4	0.4	-1
Aug-00	0.9	0.6	1.0	1.2	1.1	1.0	3.4	0.7	0.7	0.6	
Sep-00	0.8	0.9	1.1	0.9	1.3	1.0	2.2	1.0	1.0	0.8	
Oct-00	0.4	0.6	1.1	0.9	0.9	0.8	5.3	0.9	0.6	0.5	20
Nov-00	5.2	0.7	1.4	0.8	1.0	0.4	24.1	9.4	1.1	0.6	
Dec-00	2.8	1.4	1.9	1.3	1.1	0.8	2.1	2.5	0.9	0.9	
Jan-01	0.7	1.7	1.4	1.8	0.7	1.3	1.1	2.4	1.1	0.6	140
Feb-01	0.9	3.1	2.0	0.5	0.9	0.7	0.7	6.7	1.3	0.5	1.0
Mar-01	0.8	2.1	1.3	0.6	0.7	0.6	0.6	5.5	0.6	0.6	1.5
Apr-01	0.8	0.7	1.3	0.5	0.7	0.4	0.3	5.1	0.7	0.6	0.8
May-01	0.2	0.2	0.4	0.4	0.3	0.3	0.6	1.8	0.6	0.8	0.9
Jun-01	0.5	0.4	0.5	1.0	1.0	0.4	0.4	8.8	0.7	0.6	0.6
lut-01	0.5	0.3	1.8	0.5	0.8		16.3	4.9	0.9	0.7	0.7
Aug-01	0.4	0.4	0.8	0.8	1.0	1.7	1.0	- 4	1.0	1.8	1.1
Sep-01	0.7	1.0	1.7	1.1	1.7	0.7	(-)	6.0	1.1	1.3	1.7
Oct-01	1.1	0.6	4.6	0.9	0.7	0.9	1.2	1.9	0.9	0.6	1.7
Nov-01	0.9	1.0	1.1	1.1	0.8	1.1	6.0	5.5	1.3	1.9	2.3
Dec-01	4.9	0.9	4.2	0.9	1.3	1.9	1.2	3.1	1.2	9.7	1.8
Jan-02	0.8	1.0	1.5	1.3	1.1	1.4	1.3	1.5	1.1	0.9	1.5
Feb-02	1.1	1.1	0.9	0.3	0.4	0.5	3.1	5.1	0.5	0.5	0.9
Mar-02	1.7	2.1	1.6	0.7	0.7	0.8	1.0	18	1.0	0.9	1.7
Apr-02	1.0	0.4	1.0	0.8	0.8	0.6	0.9	10.1	0.5	0.7	1.0
May-02	0.6	0.6	6.0	0.7	0.4	1.2	0.9	3.1	0.7	0.2	1.0
Jun-02	1.4	0.4	1.7	0.6	0.5	0.8	0.6	2.1	0.6	0.5	1.0
Jul-02	0.7	0.7	- 4	0.8	0.8	0.7	1.2		1.1	0.5	1.0
Aug-02	1.3	0.8	1.4	1.2	1.1	1.2	1.5		1.5	0.9	1.6
Sep-02	0.5	1.2	1.1	0.8	0.5	0.7	5.1	9.3	1.6	0.6	1.0
Oct-02	2.2	1.4	5.2	1.5	1.5	1.4	1.4	3.4		1.5	3.1
Nov-02	2.8	1.8	3.7	1.6	0.1	1.8	2.1	3.5	2.1	2	1.9
Dec-02	2.0		2.5	1.5	3.0	1.5	1.8	4.1	1.6	1.2	1.9
Jan-03	2.1	1.5	2.7	1.5	1.0	1.9	2.2	2.5	1.1	1.0	1.6
Feb-03	1.4	1.1	2.6	1.1	0.9	1.2	1.7	5.9	1.2	1.0	1.5
Mar-03	0.8	0.5	1.2	1.2	0.6	2.1	1.5	3.4	5.0	3.6	9.5
Apr-03	0.5	1.0	0.6	1.0	0.7	0.5	1.1	8.0		2.0	1.0
May-03	0.5	0.4	0.6	0.2	0.2	0.6	1.3	1.6	0.5	0.8	1.2
Jun-03	0.5	0.6	0.8	0.8	0.4	0.6	0.8	0.7	0.9	0.7	0.7
Jul-03	0.3	0.4	0.4	0.6	0.4	0.5	0.7	0.5	0.5	0.5	0.7
Aug-03	0.8	0.2	0.7	1.1	0.5	1.3	1.8	2.1	1.3	0.7	0.9
Sep-03	0.6	0.7	1.1	0.7	0.8	1.7	1.4	1.3	2.5	0.9	1.3
Oct-03	520	0.9	1.4	0.9	0.7	1.9	1.0	1.4	0.6	0.8	1.3
Nov-03	2.6	0.8	1.0	1.1	0.4	1.3	1.5	1.5		0.8	1.3
Dec-03	1.0	1.0	1.4	1.3	1.1	1.5	1.6	2.0	1.8	0.9	1.4
Jan-04	8.5	1.5	2.1	1.5	1.3	2.6	1.4	2.2	1.7	1.5	1.7
Feb-04	1.2	1.0	1.7	1.4	0.7	3.1	1.6	2.2		1.5	2.3
Mar-04	0.4	0.6	6.6	1.2	0.7	1.9	1.1	12.1	4.8	1.5	1.1
Apr-04	0.6	1.0	0.8	0.8	0.6	1.9	0.8	1.4	0.9	1.2	1.1
May-04	0.2	0.9	2.2	0.9	0.8	0.7	0.9	1.4	1.2	0.9	1.5
Jun-04	0.4	0.6	0.7	0.9	0.6	1.4	1.0	0.9	1.0	1.0	0.8
Jut-04	0.4	0.6	5.3#	0.6	0.5	2.9	1.0	1.1	0.9	0.6	1.2
Aug-04	0.5	0.5	0.5	1.3	0.7	1.1	1.1	1.4		1.0	1.0
Sep-04	0.6	0.6	0.8	2.2	1.0	1.0	0.9	4.4	0.9	16.7	1.1
Oct-04	0.7	0.9	1.2	0.9	0.8	1.4	1.0	10.5	1.0	1.0	0.8
Nov-04	0.8	0.7	1.3	1.9	0.7	0.9	1.0	3.0	1.1	1.1	1.6
Dec-04	2.0	1.4	3.6	1.5	1.3	2.2	3.2	7.9	1.8	5.5	2.5
Jan-05	1.2	1.0	3.7	1.6	1.4	4.0	2.3	2.7	2.6	2.5	2.8
Feb-05	1.2	1.2	1.8	1.6	1.3	2.0	1.7		2.3	1.5	2.3
Mar-05	1.3	0.9	1.4	0.9	0.9	3.0	1.2	7.7		0.8	1.3
	1.1	0.7	0.9	0.8	0.7	0.9	1.4	3.3		0.8	

Month	D1	D2	D3	D4	D5A	D6	D7	D8	D9	D10	D11
May-05	0.7	8.6	1.1	0.8	0.7	0.8	0.9	4.4	1.2	0.8	1.1
Jun-05	1.3	0.8	1.3	1.3	0.8	1.2	1.2	1.3	1.5	2.5	0.9
Jut-05	1.0	0.5	0.5	0.7	0.4	1.6	0.7	1.2	0.8	4.3	1.1
Aug-05	0.6	0.6	0.8	1.0	0.8	0.9	0.7	1.0	0.9	1.0	0.9
Sep-05	0.6	0.7	0.8	0.7	0.7	1.2	1.3	1.3	1.0	0.9	1.1
Oct-05	0.8	0.9	1.3	0.9	0.8	1.4	1.2	1.9	1.3	1,1	1.3
Nov-05		2.3	2.3	2.0	1.7	1.2	2.0	3.2	1.6	1.4	2.2
Dec-05	1.9	3.2	2.3	3.3	2.6	3.4	2.3		1.3	2.1	3.9
Jan-06	1.0	2.1	1.7	1.0	23.	3.5		2.7	1.1	- 4	1.5
Feb-06	2.2	1.0	0.9	1.2	1.1	1.7	1.1	2.9		2.3	1.8
Mar-06	0.7	0.6	2.3	0.7	0.6	0.9	1.0	1.4	0.7	0.8	1.5
Apr-06	0.6	0.7	1.1	0.8	0.6	1.1	0.8	1.0	1.0	1.8	1.5
May-06	1.0	3.1	1.0		1.1	1.4	1.1	4.1	- 14°	7.0	1.5
Jun-06	0.4	0.3	0.7	0.5	0.4	0.6	0.7	0.8	0.6	0.9	0.9
Jul-06	0.3	0.3	1	1.3	0.4	0.7	0.7	2.7	194	0.6	0.6
Aug-06	0.9	0.6	0.8	0.7	0.7	0.8	0.7	1.7		3.7	0.9
Sep-06	1.6	0.7	1.1	1.7	0.7	1	0.9	1.3	1.2	8.0	1.6
Oct-06	2	1.4	1.6	1.8	0.9	1.8	1,2	1.8	1.5	1.8	1.9
Nov-06	4.3	2.2	3	2.3	2.3	5.3	2.4	3.3	2.3	2.3	2.9
Dec-06	1.2	3.4	1.9	2.3	2.3		2.1	2.1	-	4.9	3.9
Jan-07	2	0.9	1.5	0.7	0.7	1.7	1.1	4	1.2	1.7	0.9
Feb-07	1.7	0.9	1.6	0.7	0.6	1	1.8	1.7	1.1	1.2	1.7
Mar-07	1.3	0.9	1.7	0.8	1.2	0.6	2.2	1.7	1	0.9	1.7
Apr-07	0.5	0.7	0.9	0.6	4.8	1.2	0.5	2.7	0.5	0.8	0.9
May-07	0.8	0.5	0.6	1.2	0.6	0.6	0.7	1.9	0.5	0.7	0.8
Jun-07	0.6	0.5	0.7	1.1	0.1	0.5	0.1	0.5	0.1	0.4	0.3
Jul-07	0.5	0.4	0.6	2.1	0.5	8.0	0.6	0.6	0.4	0.5	0.7
Aug-07	1.5	0.4	0.7	1	0.7	0.7	0.5	i 1	0.6	0.6	0.7
Sep-07	1.3	0.5	1.8	1	0.7	0.9	0.9	1.3	1	0.7	1.6
Oct-07	4.2	0.9	1.1	1.4	1.1	1.7	1.8	1.7	1.6	1.4	2.2
Nov-07	0.8	0.8	1.1	0.9	1.1	1.1	1.1	1.7	0.6	0.8	1.5
Dec-07	1.3	0.8	3	0.7	0.5	8.0	0.5	1.1	0.3	0.8	0.6
Jan-08	2.6	0.8	3.7	0.5	0.5	0.5	0.4	2.2	0.8	0.3	0.8
Feb-08	0.4	0.1	14	0.1	0.1	0.3	0.1	0.3	0.2	0.2	0.3
Mar-08	4.5	0.6	9.2+	0.6	2.9	2.1	0.6	1.5	0.5	1	0.9
April-08	0.4"	0.4"	0.8"	0.4'	0.4'	0.8	1.1'	1.7'	1.2	1.1"	1.1
May-08	1.1	2.4"	0.9	1.4	0.9	0.9	0.7	2.7	1'	1.1	1.3
June-08	0.2	0.4"	0.1	0.5	0.1	0.1	0.3	0.5"	0.1	0.8	0.2
July-08	0.4	0.7'	1.3'	0.6	0.8'	0.9	0.8	1	0.7	0.5	1.1

FIGURES

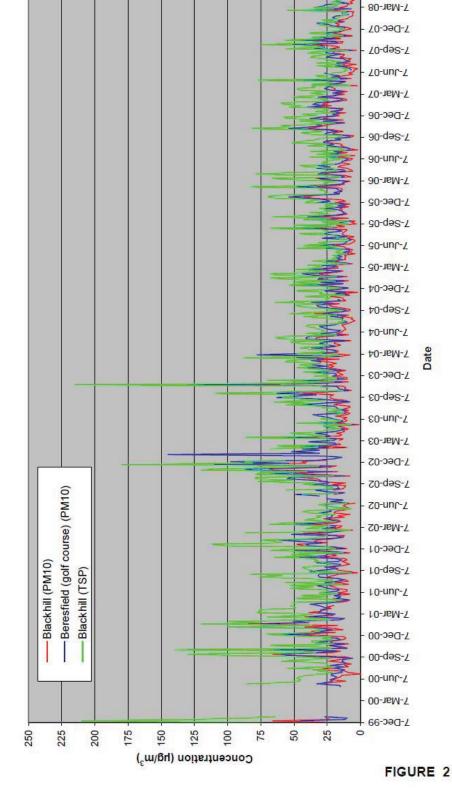
Abel Underground Coal Mine Report No. 737/04



Location of Project Area

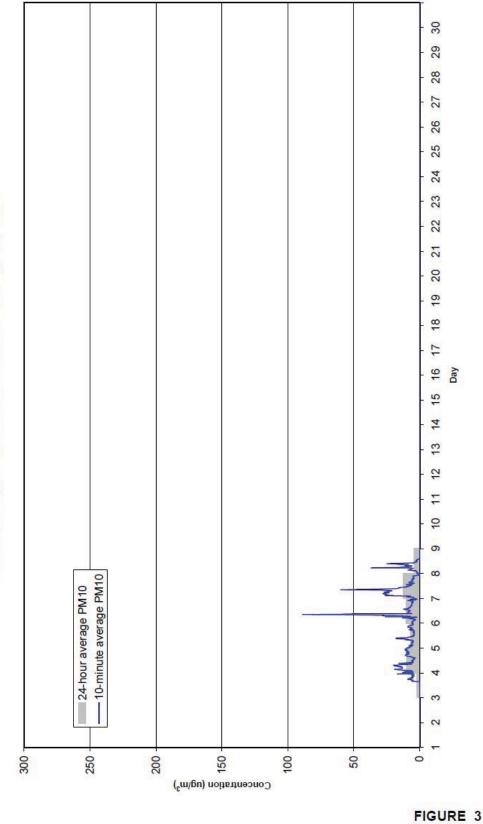
FIGURE 1

High Volume Air Sampling data recorded at Beresfield and Blackhill from December 1999 to July 2008



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Measured PM₁₀ concentrations at Blackhill during July 2008



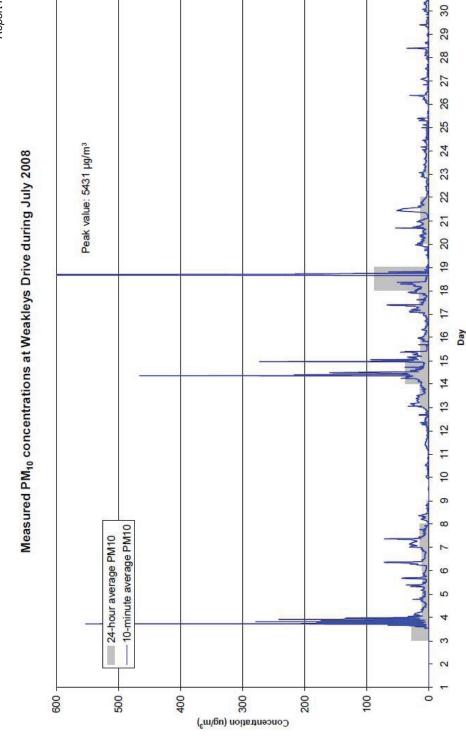


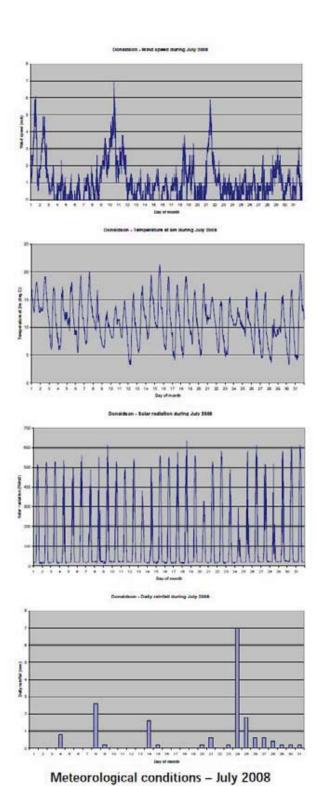
FIGURE 4

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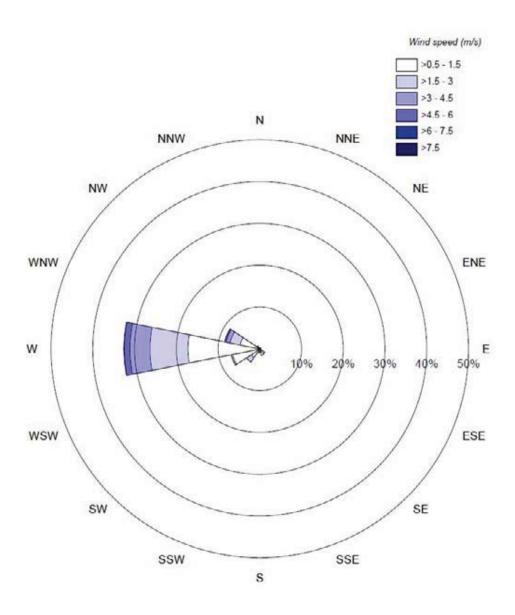
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2008/2009 ANNUAL ENVIRONMENTAL MANAGEMENT REPORT

[No Grimm monitoring was scheduled for this month]



Windrose for Donaldson July 2008



Calms = 41.6%

Donaldson Monitoring Dust and Meteorological Data Monthly Report

August 2008

Prepared for Donaldson Coal

by Holmes Air Sciences

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1. INTRODUCTION

As part of their Air Quality Management Plan Donaldson operate a dust monitoring network in the vicinity of the mining lease and a meteorological station on site. This report has been prepared in order to bring together the various data collected throughout the network during August 2008 and to summarise the information.

The dust network includes continuous monitoring, high volume air sampling and dust deposition monitoring. The continuous monitoring network consists of two DustTrak monitors measuring PM10 at two sites and a GRIMM monitor which is used for one week each quarter to measure PM2.5 and PM10 simultaneously.

There are two locations which use high volume air samplers to determine concentrations of PM₁₀ and TSP. These operate on a six-day cycle in line with similar measurements made by the NSW Department of Environment and Climate Change (DECC) at other locations throughout the state.

In addition to concentration measurements, monthly levels of dust deposition are also measured using eleven gauges placed at various locations in the area of the mine. The locations of each of these monitors and gauges are shown in Figure 1. Table 1 lists the monitors used and pollutants measured at these locations.

Instruments Used Monitoring Location Pollutant Monitored Beresfield HVAS PM₁₀ Blackhill **HVAS** PM₁₀ TSP HVAS **DustTrak** PM10 Grimm (1 week per quarter) PM10, PM2.5 Weakleys Drive **DustTrak** PM₁₀ DG1 - DG11 **Deposition Gauges Dust Deposition**

Table 1. Summary of monitoring locations and instruments

The meteorological station is situated at the site of the office buildings and measures the following parameters:

- wind speed
- wind direction
- sigma theta
- temperature
- solar radiation
- relative humidity, and
- rainfall

These parameters are measured every 5 seconds and then 10-minute averages are recorded, except in the case of rainfall where the 10-minute total is recorded. The data are downloaded at various intervals by Donaldson and then forwarded to Holmes Air Sciences for processing.

2. HIGH VOLUME AIR SAMPLING

High Volume Air Sampling (HVAS) was carried out at Beresfield and Blackhill by Metford Laboratories. PM10 is measured at both sites while TSP is only measured at Blackhill. The data collected during August 2008 are summarised in Table 2. A graph consisting of all the data collected to date is shown in Figure 2.

Table 2. High volume air sampling from Beresfield and Blackhill for August 2008

Date	Beresfield PM10 (µg/m³)	Blackhill PM10 (µg/m³)	Blackhill TSP (µg/m³)
3/08/2008	11	11	20
9/08/2008	14	14	22
15/08/2008	28	28	52
21/08/2008	43	43	56
27/08/2008	25	25	34
Annual average	20	13	25

These measurements will include all background sources relevant to that location, including contributions from the Donaldson mining operations.

On the days that the instruments were monitoring, the highest 24-hour average PM₁₀ concentration in August 2008 was 43 μg/m³; measured on the 21st at both the Beresfield and Blackhill site. On no occasion did the measured PM₁₀ concentrations exceed the 50 μg/m³ 24-hour NEPM goal.

TSP measurements from the Blackhill site show that concentrations were below the NHMRC 90 $\mu g/m^3$ annual average TSP goal. It should be noted that the NHMRC goal refers to an annual average and not a 24-hour average as measured by the high volume air sampler. The annual average TSP concentration for the 12 months to August 2008 was 25 $\mu g/m^3$.

Figure 2 shows a seasonal trend in PM₁₀ concentrations, peaking during the warmer months and decreasing during autumn and winter. This is a common trend and is seen consistently in the Hunter Valley.

The annual average PM_{10} concentrations for Beresfield and Blackhill were $20~\mu g/m^3$ and $13~\mu g/m^3$ respectively for the 12 months to August 2008. These are below the DECC's annual average PM_{10} air quality criterion of $30~\mu g/m^3$.

3. CONTINUOUS MONITORING

3.1 DustTrak Monitoring at Blackhill

Figure 3 shows a time series of the PM₁₀ data collected from the DustTrak monitor at the Blackhill site. During the month of August, the DustTrak monitor located at the Blackhill site experienced a power failure. The effect of this was that no data were recorded for the month of August. The DustTrak returned to normal functioning on the 8th of September 2008.

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3.2 DustTrak Monitoring at Weakleys Drive

A time series of the PM₁₀ data collected from the Weakleys Drive site is shown in Figure 4. The DustTrak monitoring for the Weakleys Drive site is available from the 1st to the 31st of August 2008. The available data show that 24-hour average PM₁₀ concentration were below the NEPM goal of 50 μg/m³. The maximum 24-hour average PM₁₀ concentration was 32.6 μg/m³, recorded on the 29th of August.

3.3 Grimm Monitoring

No Grimm monitoring was scheduled for August 2008.

4. DUST DEPOSITION MONITORING

Dust deposition monitoring is carried out each month via a network consisting of eleven (11) gauges. The results for August 2008 are shown in Table 3, in conjunction with results for the previous eleven months in order to provide an annual average for that period. A table showing the complete data set from July 2000 in provided in Appendix A.

Table 3. Dust deposition monitoring for the 12-month period to June 2008

	Monthly dust deposition rate (g/m²/month)													
Month	DG1	DG2	DG3	DG4	DG5A	DG6	DG7	DG8	DG9	DG10	DG11			
Sep-07	1.3	0.5	1.8	1	0.7	0.9	0.9	1.3	1	0.7	1.6			
Oct-07	4.2	0.9	1.1	1.4	1,1	1.7	1.8	1.7	1.6	1.4	2.2			
Nov-07	0.8	0.8	1.1	0.9	1.1	1.1	1.1	1.7	0.6	0.8	1.5			
Dec-07	1.3	0.8	3	0.7	0.5	0.8	0.5	1.1	0.3	0.8	0.6			
Jan-08	2.6	0.8	3.7	0.5	0.5	0.5	0.4	2.2	0.8	0.3	0.8			
Feb-08	0.4	0.1	14*	0.1	0.1	0.3	0.1	0.3	0.2	0.2	0.3			
Mar-08	4.5	0.6	9.2+	0.6	2.9	2.1	0.6	1.5	0.5	1_	0.9			
April-08	0.4 *	0.4"	0.8 ′	0.4 '	0.4 *	0.8	1.1 1	1.7 ′	1.2	1.1 *	1.1 ′			
May-08	1.1	2.4 *	0.9	1.4	0.9	0.9	0.7	2.7	17	1.1	1.3 ′			
Jun-08	0.2	0.4 "	0.1	0.5	0.1 *	0.1	0.3	0.5 *	0.1	0.8	0.2			
Jut-08	0.4	0.7	1.3'	0.6	0.8'	0.9	0.8	1	0.7	0.5	1.1			
Aug-08	1'	0.5*	0.7*	0.6'	0.5	1.9'	0.8"	1'	1′	0.9"	1.4			
Annual Average	1.5	0.7	1.5	0.7	0.8	1.0	0.8	1.4	0.8	0.8	1.1			

Data supplied by Metford Laboratories. * Insects/bird droppings reported. * Invalid (excess bird droppings).

The highest dust deposition measurement in August 2008 was 1.4 g/m²/month at DG11, the accompanying laboratory report showed that the sample was not contaminated with insects. The contaminated readings have been removed when calculating the annual average.

The annual average deposition rates were low and below 2 g/m²/month at all gauges, indicating good air quality with respect to dust deposition.

5. METEOROLOGICAL MONITORING

Monthly plots of the temperature, solar radiation, wind speed and rainfall data collected in August 2008 are shown in Figure 6 and a windrose is shown in Figure 7.

The graphs shown in Figure 6 indicate that the instruments were recording appropriately. Data maxima and minima all appeared to be sensible for this site during August. Total rainfall for the month was 13.4 mm.

A windrose (see Figure 7) created from the available 10-minute average wind data shows that winds were predominantly from the west. The site recorded calms (wind speed less than or equal to 0.5 m/s) for approximately 31.8% of the time. This is quite a high percentage but is similar to the value for August 2007.

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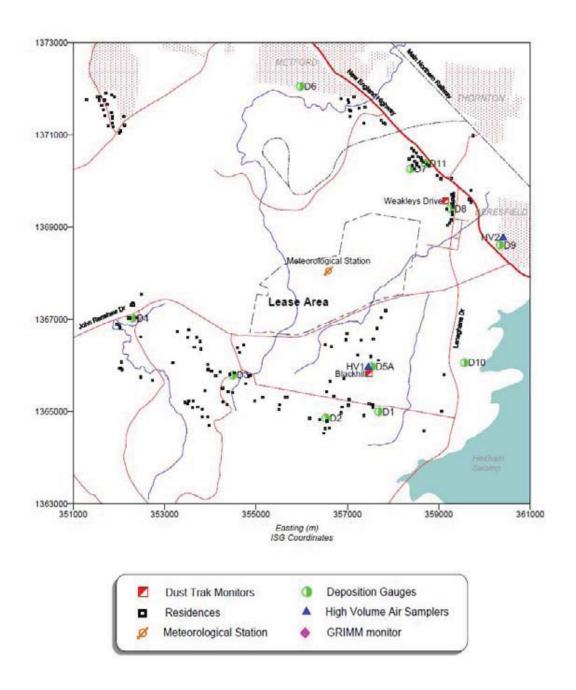
APPENDIX A
ALL DUST DEPOSITION DATA

Dust deposition (g/m²/month)

Month	D1	D2	D3	D4	D5A	D6	D7	D8	D9	D10	D11
May-00	0.4	0.4	9.5	0.7	0.9	0.6	3.6	1.6	0.5	1.8	•
Jun-00	0.7	0.5	0.5	0.7	0.8	0.4	3.8	3.2	0.5	0.7	*
lut-00	0.4	0.4	0.5	0.7	0.8	0.5	0.8	1.5	0.4	0.4	
Aug-00	0.9	0.6	1.0	1.2	1.1	1.0	3.4	0.7	0.7	0.6	
Sep-00	0.8	0.9	1.1	0.9	1.3	1.0	2.2	1.0	1.0	0.8	- 20
Oct-00	0.4	0.6	1.1	0.9	0.9	0.8	5.3	0.9	0.6	0.5	
Nov-00	5.2	0.7	1.4	0.8	1.0	0.4	24.1	9.4	1.1	0.6	
Dec-00	2.8	1.4	1.9	1.3	1.1	0.8	2.1	2.5	0.9	0.9	
Jan-01	0.7	1.7	1.4	1.8	0.7	1.3	1.1	2.4	1.1	0.6	- 2
Feb-01	0.9	3.1	2.0	0.5	0.9	0.7	0.7	6.7	1.3	0.5	1.0
Mar-01	0.8	2.1	1.3	0.6	0.7	0.6	0.6	5.5	0.6	0.6	1.5
Apr-01	0.8	0.7	1.3	0.5	0.7	0.4	0.3	5.1	0.7	0.6	0.8
May-01	0.2	0.2	0.4	0.4	0.3	0.3	0.6	1.8	0.6	0.8	0.9
Jun-01	0.5	0.4	0.5	1.0	1.0	0.4	0.4	8.8	0.7	0.6	0.6
lut-01	0.5	0.3	1.8	0.5	0.8		16.3	4.9	0.9	0.7	0.7
Aug-01	0.4	0.4	0.8	0.8	1.0	1.7	1.0		1.0	1.8	1.1
Sep-01	0.7	1.0	1.7	1.1	1.7	0.7	-	6.0	1.1	1.3	1.7
Oct-01	1.1	0.6	4.6	0.9	0.7	0.9	1.2	1.9	0.9	0.6	1.7
Nov-01	0.9	1.0	1.1	1.1	0.8	1.1	6.0	5.5	1.3	1.9	2.3
Dec-01	4.9	0.9	4.2	0.9	1.3	1.9	1.2	3.1	1.2	9.7	1.8
Jan-02	0.8	1.0	1.5	1.3	1.1	1.4	1.3	1.5	1.1	0.9	1.5
Feb-02	1.1	1.1	0.9	0.3	0.4	0.5	3.1	5.1	0.5	0.5	0.9
Mar-02	1.7	2.1	1.6	0.7	0.7	0.8	1.0	18	1.0	0.9	1.7
Apr-02	1.0	0.4	1.0	0.8	0.8	0.6	0.9	10.1	0.5	0.7	1.0
May-02	0.6	0.6	6.0	0.7	0.4	1.2	0.9	3.1	0.7	0.2	1.0
Jun-02	1.4	0.4	1.7	0.6	0.4	0.8	0.6	2.1	0.6	0.5	1.0
	0.7							_			_
Jut-02	1.3	0.7	• • •	1.2	0.8	1.2	1.2		1.1	0.5	1.0
Aug-02	0.5	8.0	1.4		0.5	0.7	1.5 5.1	0.2	1.5	0.9	1.6
Sep-02		1.2	1.1	0.8				9.3	1.6	0.6	1.0
Oct-02	2.2	1.4	5.2	1.5	1.5	1.4	1.4	3.4		1.5	3.1
Nov-02	2.8	1.8	3.7	1.6	0.1	1.8	2.1	3.5	2.1	2	1.9
Dec-02	2.0		2.5	1.5	3.0	1.5	1.8	4.1	1.6	1.2	1.9
Jan-03	2.1	1.5	2.7	1.5	1.0	1.9	2.2	2.5	1.1	1.0	1.6
Feb-03	1.4	1.1	2.6	1.1	0.9	1.2	1.7	5.9	1.2	1.0	1.5
Mar-03	0.8	0.5	1.2	1.2	0.6	2.1	1.5	3.4		3.6	9.5
Apr-03	0.5	1.0	0.6	1.0	0.7	0.5	1.1	8.0		2.0	1.0
May-03	0.5	0.4	0.6	0.2	0.2	0.6	1.3	1.6	0.5	8.0	1.2
Jun-03	0.5	0.6	0.8	0.8	0.4	0.6	0.8	0.7	0.9	0.7	0.7
Jul-03	0.3	0.4	0.4	0.6	0.4	0.5	0.7	0.5	0.5	0.5	0.7
Aug 03	8.0	0.2	0.7	1.1	0.5	1.3	1.8	2.1	1.3	0.7	0.9
Sep-03	0.6	0.7	1.1	0.7	0.8	1.7	1.4	1.3	2.5	0.9	1.3
Oct-03		0.9	1.4	0.9	0.7	1.9	1.0	1.4	0.6	8.0	1.3
Nov-03	2.6	0.8	1.0	1.1	0.4	1.3	1.5	1.5		0.8	1.3
Dec-03	1.0	1.0	1.4	1.3	1.1	1.5	1.6	2.0	1.8	0.9	1.4
Jan-04	8.5	1.5	2.1	1.5	1.3	2.6	1.4	2.2	1.7	1.5	1.7
Feb-04	1.2	1.0	1.7	1.4	0.7	3.1	1.6	2.2		1.5	2.3
Mar-04	0.4	0.6	6.6	1.2	0.7	1.9	1.1	12.1	4.8	1.5	1.1
Apr-04	0.6	1.0	0.8	0.8	0.6	1.9	0.8	1.4	0.9	1.2	1.1
May-04	0.2	0.9	2.2	0.9	0.8	0.7	0.9	1.4	1.2	0.9	1.5
Jun-04	0.4	0.6	0.7	0.9	0.6	1.4	1.0	0.9	1.0	1.0	0.8
Jul-04	0.4	0.6	5.3#	0.6	0.5	2.9	1.0	1.1	0.9	0.6	1.2
Aug-04	0.5	0.5	0.5	1.3	0.7	1.1	1.1	1.4	14	1.0	1.0
Sep-04	0.6	0.6	0.8	2.2	1.0	1.0	0.9	4.4	0.9	16.7	1,1
Oct-04	0.7	0.9	1.2	0.9	0.8	1.4	1.0	10.5	1.0	1.0	0.8
Nov-04	0.8	0.7	1.3	1.9	0.7	0.9	1.0	3.0	1.1	1.1	1,6
Dec-04	2.0	1.4	3.6	1.5	1.3	2.2	3.2	7.9	1.8	5.5	2.5
Jan-05	1.2	1.0	3.7	1.6	1.4	4.0	2.3	2.7	2.6	2.5	2.8
Feb-05	1.2	1.2	1.8	1.6	1.3	2.0	1.7		2.3	1.5	2.3
Mar-05	1.3	0.9	1.4	0.9	0.9	3.0	1.2	7.7		0.8	1.3
Apr-05	1.1	0.7	0.9	0.8	0.7	0.9	1.4	3.3	1.1	0.8	0.9

Month	D1	D2	D3	D4	D5A	D6	D7	D8	D9	D10	D11
May-05	0.7	8.6	1.1	0.8	0.7	0.8	0.9	4.4	1.2	0.8	1.1
Jun-05	1.3	0.8	1.3	1.3	0.8	1.2	1.2	1.3	1.5	2.5	0.9
Jul-05	1.0	0.5	0.5	0.7	0.4	1.6	0.7	1.2	0.8	4.3	1.1
Aug-05	0.6	0.6	0.8	1.0	0.8	0.9	0.7	1.0	0.9	1.0	0.9
Sep-05	0.6	0.7	0.8	0.7	0.7	1.2	1.3	1.3	1.0	0.9	1.1
Oct-05	0.8	0.9	1.3	0.9	0.8	1.4	1.2	1.9	1.3	1.1	1.3
Nov-05	-	2.3	2.3	2.0	1.7	1.2	2.0	3.2	1.6	1.4	2.2
Dec-05	1.9	3.2	2.3	3.3	2.6	3.4	2.3		1.3	2.1	3.9
Jan-06	1.0	2.1	1.7	1.0	23.	3.5		2.7	1.1		1.5
Feb-06	2.2	1.0	0.9	1.2	1.1	1.7	1.1	2.9	4	2.3	1.8
Mar-06	0.7	0.6	2.3	0.7	0.6	0.9	1.0	1.4	0.7	0.8	1.5
Apr-06	0.6	0.7	1.1	0.8	0.6	1.1	0.8	1.0	1.0	1.8	1.5
May-06	1.0	3.1	1.0		1.1	1.4	1.1	4.1		7.0	1.5
Jun-06	0.4	0.3	0.7	0.5	0.4	0.6	0.7	0.8	0.6	0.9	0.9
Jul-06	0.3	0.3	1	1.3	0.4	0.7	0.7	2.7		0.6	0.6
Aug-06	0.9	0.6	0.8	0.7	0.7	0.8	0.7	1.7		3.7	0.9
Sep-06	1.6	0.7	1.1	1.7	0.7	1	0.9	1.3	1.2	0.8	1.6
Oct-06	2	1.4	1.6	1.8	0.9	1.8	1.2	1.8	1.5	1.8	1.9
Nov-06	4.3	2.2	3	2.3	2.3	5.3	2.4	3.3	2.3	2.3	2.5
Dec-06	1.2	3.4	1.9	2.3	2.3	- 9	2.1	2.1		4.9	3.9
Jan-07	2	0.9	1.5	0.7	0.7	1.7	1.1		1.2	1.7	0.9
Feb-07	1.7	0.9	1.6	0.7	0.6	1	1.8	1.7	1.1	1.2	1.7
Mar-07	1.3	0.9	1.7	0.8	1.2	0.6	2.2	1.7	1	0.9	1.7
Apr-07	0.5	0.7	0.9	0.6	4.8	1.2	0.5	2.7	0.5	0.8	0.9
May-07	0.8	0.5	0.6	1.2	0.6	0.6	0.7	1.9	0.5	0.7	0.8
Jun-07	0.6	0.5	0.7	1.1	0.1	0.5	0.1	0.5	0.1	0.4	0.3
Jut-07	0.5	0.4	0.6	2.1	0.5	0.8	0.6	0.6	0.4	0.5	0.7
Aug-07	1.5	0.4	0.7	1	0.7	0.7	0.5	1	0.6	0.6	0.7
Sep-07	1.3	0.5	1.8	1	0.7	0.9	0.9	1.3	1	0.7	1.6
Oct-07	4.2	0.9	1.1	1.4	1.1	1.7	1.8	1.7	1.6	1.4	2.7
Nov-07	0.8	0.8	1.1	0.9	1.1	1.1	1.1	1.7	0.6	0.8	1.5
Dec-07	1.3	0.8	3	0.7	0.5	0.8	0.5	1.1	0.3	0.8	0.6
lan-08	2.6	0.8	3.7	0.5	0.5	0.5	0.4	2.2	0.8	0.3	0.8
Feb-08	0.4	0.1	14	0.1	0.1	0.3	0.1	0.3	0.2	0.2	0.3
Mar-08	4.5	0.6	9.2+	0.6	2.9	2.1	0.6	1.5	0.5	1	0.9
April-08	0.4"	0.4'	0.8'	0.4"	0.4"	0.8"	1.1'	1.7'	1.2	1.1'	1.1
May-08	1.1	2.4'	0.9	1.4	0.9	0.9	0.7	2.7	1'	1.1	1.3
June-08	0.2	0.4"	0.1	0.5	0.1"	0.1	0.3	0.5"	0.1	0.8	0.2
July-08	0.4	0.7'	1.3"	0.6	0.8"	0.9	0.8	1	0.7	0.5	1.1
Aug-08	1"	0.5'	0.7*	0.6	0.5	1.9'	0.8*	1'	1'	0.9'	1.4

FIGURES

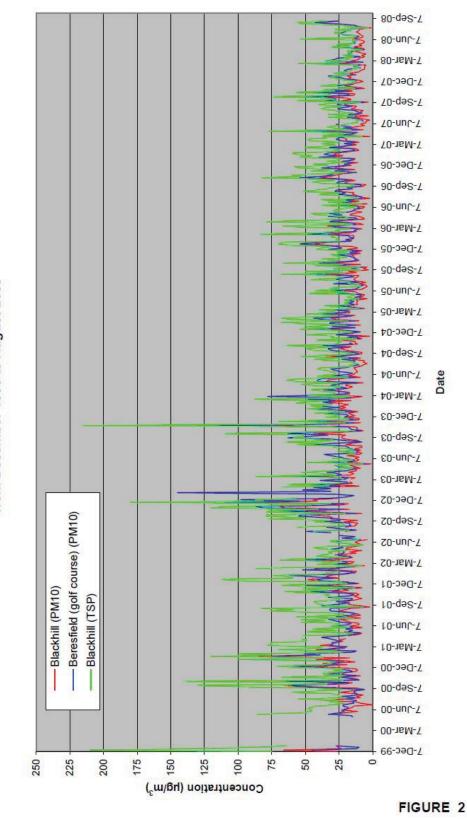


Location of Project Area

FIGURE 1

DONALDSON COAL PTY LTD Abel Underground Coal Mine Report No. 737/04

High Volume Air Sampling data recorded at Beresfield and Blackhill from December 1999 to August 2008



Measured PM₁₀ concentrations at Blackhill during August 2008

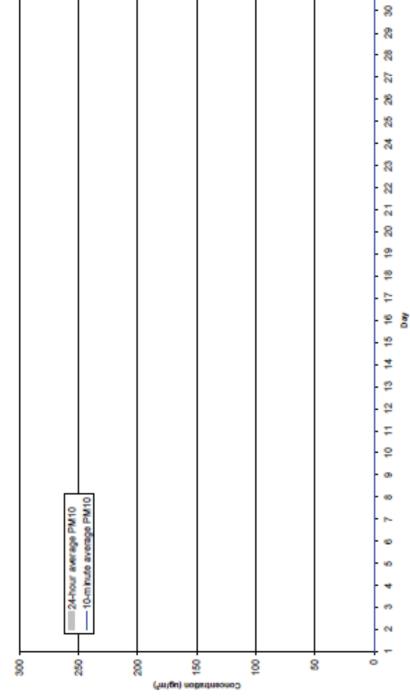
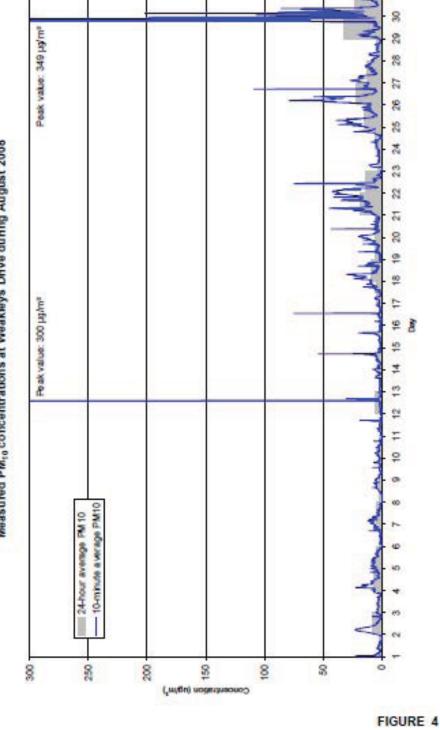


FIGURE 3

Measured PM₁₀ concentrations at Weakleys Drive during August 2008

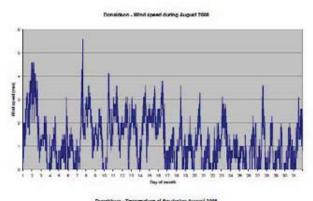


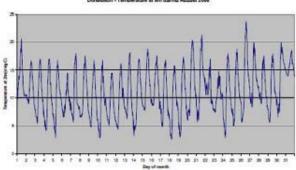
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MANAGEN	IENT DEC	OPT	

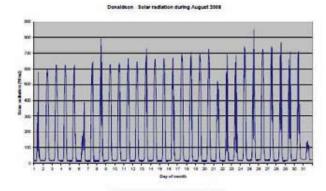
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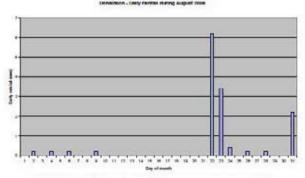
DONALDSON COAL PTY LTD Abel Underground Coal Mine Report No. 737/04

[No Grimm monitoring was scheduled for this month]



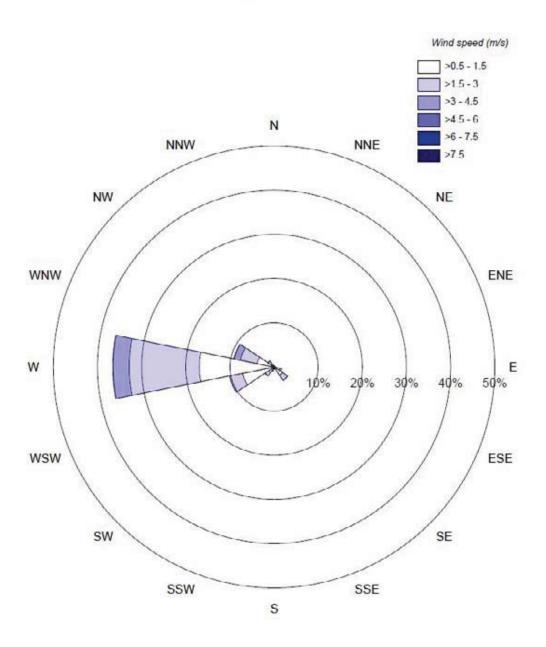






Meteorological conditions - August 2008

Windrose for Donaldson August 2008



Calms = 31.8%

Abel Underground Coal Mine Report No. 737/04

Donaldson Monitoring Dust and Meteorological Data Monthly Report

September 2008

Prepared for Donaldson Coal

by Holmes Air Sciences

Suite 2B, 14 Glen St Eastwood NSW 2122 Phone : (02) 9874 8644 Fax : (02) 9874 8904

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Abel Underground Coal Mine Report No. 737/04

1. INTRODUCTION

As part of their Air Quality Management Plan Donaldson operate a dust monitoring network in the vicinity of the mining lease and a meteorological station on site. This report has been prepared in order to bring together the various data collected throughout the network during September 2008 and to summarise the information.

The dust network includes continuous monitoring, high volume air sampling and dust deposition monitoring. The continuous monitoring network consists of two DustTrak monitors measuring PM₁₀ at two sites and a GRIMM monitor which is used for one week each quarter to measure PM_{2.5} and PM₁₀ simultaneously.

There are two locations which use high volume air samplers to determine concentrations of PM₁₀ and TSP. These operate on a six-day cycle in line with similar measurements made by the NSW Department of Environment and Climate Change (DECC) at other locations throughout the state.

In addition to concentration measurements, monthly levels of dust deposition are also measured using eleven gauges placed at various locations in the area of the mine. The locations of each of these monitors and gauges are shown in Figure 1. Table 1 lists the monitors used and pollutants measured at these locations.

Monitoring Location Instruments Used Pollutant Monitored Beresfield **HVAS** PM10 Blackhill HVAS PM₁₀ HVAS TSP PM10 DustTrak Grimm (1 week per quarter) PM10, PM2.5 Weakleys Drive **DustTrak** PM₁₀ DG1 - DG11 **Deposition Gauges Dust Deposition**

Table 1. Summary of monitoring locations and instruments

The meteorological station is situated at the site of the office buildings and measures the following parameters:

- wind speed
- wind direction
- sigma theta
- temperature
- solar radiation
- · relative humidity, and
- rainfall

These parameters are measured every 5 seconds and then 10-minute averages are recorded, except in the case of rainfall where the 10-minute total is recorded. The data are downloaded at various intervals by Donaldson and then forwarded to Holmes Air Sciences for processing.

2. HIGH VOLUME AIR SAMPLING

High Volume Air Sampling (HVAS) was carried out at Berestield and Blackhill by Metford Laboratories. PM10 is measured at both sites while TSP is only measured at Blackhill. The data collected during September 2008 are summarised in Table 2. A graph consisting of all the data collected to date is shown in Figure 2.

Table 2. High volume air sampling from Beresfield and Blackhill for September 2008

Date	Beresfield PM ₁₀ (µg/m³)	Blackhill PM10 (µg/m³)	Blackhill TSP (µg/m³)
2/09/2008	18	12	22
8/09/2007	15	9	19
14/09/2008	19	16	34
20/09/2008	55	41	85
26/09/2008	29	21	47
Annual average	21	13	26

These measurements will include all background sources relevant to that location, including contributions from the Donaldson mining operations.

On the days that the instruments were monitoring, the highest 24-hour average PM₁₀ concentration in September 2008 was 55 µg/m³, measured on the 20th at the Beresfield site. On this occasion the measured PM₁₀ concentration exceeded the 50 µg/m³ 24-hour NEPM goal.

TSP measurements from the Blackhill site show that concentrations were below the NHMRC 90 $\mu g/m^3$ annual average TSP goal. It should be noted that the NHMRC goal refers to an annual average and not a 24-hour average as measured by the high volume air sampler. The annual average TSP concentration for the 12 months to September 2008 was 26 $\mu g/m^3$.

Figure 2 shows a seasonal trend in PM₁₀ concentrations, peaking during the warmer months and decreasing during autumn and winter. This is a common trend and is seen consistently in the Hunter Valley.

The annual average PM $_{10}$ concentrations for Beresfield and Blackhill were 21 $\mu g/m^3$ and 13 $\mu g/m^3$ respectively for the 12 months to September 2008. These are below the DECC's annual average PM $_{10}$ air quality criterion of 30 $\mu g/m^3$.

3. CONTINUOUS MONITORING

3.1 DustTrak Monitoring at Blackhill

Figure 3 shows a time series of the PM₁₀ data collected from the DustTrak monitor at the Blackhill site. The power to the DustTrak was unavailable until the 8th of September causing loss of data for the month of September, following the pervious month of August where significant loss of data was incurred. Of the available data, the measured 24-hour average PM₁₀ concentrations were below the NEPM goal of 50 μg/m³. The maximum 24-hour average PM₁₀ concentration was recorded on the 19th of September at 27 μg/m³.

3.2 DustTrak Monitoring at Weakleys Drive

A time series of the PM₁₀ data collected from the Weakleys Drive site is shown in Figure 4. The DustTrak monitoring for the Weakleys Drive site is available from the 1st to the 30th of September 2008. The available data show that 24-hour average PM₁₀ concentration were below the NEPM goal of 50 μg/m³. The maximum 24-hour average PM₁₀ concentration was 31.6 μg/m³, recorded on the 20th of June.

3.3 Grimm Monitoring

Grimm monitoring was carried out between 18th and 26th of September 2008 and the data are presented in Figure 5. The measurements show that there was an exceedance of the 24-hour average NEPM goal of 50 μg/m³ during this period. It should be noted that the exceedance measured on the 20th of September is consistent with the HVAS measurement for this day at the Beresfield site; the Blackhill site recorded a measurement of 41 μg/m³. The average PM_{2.5} fraction in the PM₁₀ was calculated from the measurements as 0.3. This suggests that the PM₁₀ is predominantly coarse particles and the measurement is consistent with windblown dust.

4. DUST DEPOSITION MONITORING

Dust deposition monitoring is carried out each month via a network consisting of eleven (11) gauges. The results for September 2008 are shown in Table 3, in conjunction with results for the previous eleven months in order to provide an annual average for that period. A table showing the complete data set from May 2000 in provided in Appendix A.

Table 3. Dust deposition monitoring for the 12-month period to September 2008

*****		Monthly dust deposition rate (g/m²/month)													
Month	DG1	DG2	DG3	DG4	DG5A	DG6	DG7	DG8	DG9	DG10	DG11				
Oct-07	4.2	0.9	1.1	1.4	1.1	1.7	1.8	1.7	1.6	1.4	2.2				
Nov-07	0.8	0.8	1.1	0.9	1.1	1.1	1.1	1.7	0.6	0.8	1.5				
Dec-07	1.3	0.8	3	0.7	0.5	0.8	0.5	1.1	0.3	0.8	0.6				
Jan-08	2.6	0.8	3.7	0.5	0.5	0.5	0.4	2.2	0.8	0.3	0.8				
Feb-08	0.4	0.1	14+	0.1	0.1	0.3	0.1	0.3	0.2	0.2	0.3				
Mar-08	4.5	0.6	9.2"	0.6	2.9	2.1	0.6	1.5	0.5	1	0.9				
April-08	0.4 '	0.4 "	0.8 ′	0.4	0.4 ′	0.8 "	1.1 ′	1.7 '	1.2	1.1 ′	1.1 '				
May-08	1.1	2.4 "	0.9	1.4	0.9	0.9	0.7	2.7	1.	1.1	1.3 *				
Jun-08	0.2	0.4 *	0.1	0.5	0.1 *	0.1	0.3	0.5 *	0.1	0.8	0.2				
Jul-08	0.4	0.7"	1.3'	0.6	0.8'	0.9	0.8	1	0.7	0.5	1.1				
Aug-08	1'	0.5*	0.7'	0.6"	0.5	1.9"	0.8	1'	1'	0.9"	1.4				
Sep-08	0.6"	1"	1.3'	0.7*	0.6"	0.9"	0.6	0.9	0.9"	0.9'	1.8*				
Annual Average	1.5	0.8	1.4	0.7	0.8	1.0	0.7	1.4	0.7	0.8	1.1				

Data supplied by Metford Laboratories. * Insects/bird droppings reported. * Invalid (excess bird droppings).

The highest dust deposition measurement in August 2008 was 0.9 g/m²/month at DG8, the accompanying laboratory report showed that the sample was not contaminated with insects. The contaminated readings have been removed when calculating the annual average.

The annual average deposition rates were low and below 2 g/m²/month at all gauges, indicating good air quality with respect to dust deposition.

5. METEOROLOGICAL MONITORING

Monthly plots of the temperature, solar radiation, wind speed and rainfall data collected in September 2008 are shown in Figure 6 and a windrose is shown in Figure 7.

The graphs shown in Figure 6 indicate that the instruments were recording appropriately. Data maxima and minima all appeared to be sensible for this site during September. Total rainfall for the month was 27.2 mm.

A windrose (see Figure 7) created from the available 10-minute average wind data shows that the winds were predominantly from the west and west-north-west; changing direction to the south-east. The site recorded calms (wind speed less than or equal to 0.5 m/s) for approximately 41.2% of the time. This is quite a high percentage but is similar to the value for September 2007.

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2008/2009 ANNUAL ENVIRONMENTAL MANAGEMENT REPORT

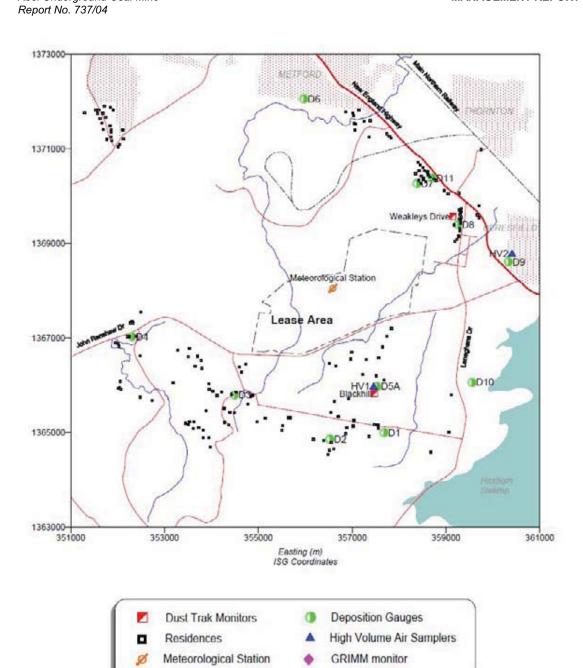
APPENDIX A ALL DUST DEPOSITION DATA

Dust deposition (g/m²/month)

Month	D1	D2	D3	D4	D5A	D6	D7	D8	D9	D10	D11
May-00	0.4	0.4		0.7	0.9	0.6	3.6	1.6	0.5	1.8	93
Jun-00	0.7	0.5	0.5	0.7	0.8	0.4	3.8	3.2	0.5	0.7	*
Jul-00	0.4	0.4	0.5	0.7	0.8	0.5	0.8	1.5	0.4	0.4	- 1
Aug-00	0.9	0.6	1.0	1.2	1.1	1.0	3.4	0.7	0.7	0.6	
Sep-00	0.8	0.9	1.1	0.9	1.3	1.0	2.2	1.0	1.0	0.8	
Oct-00	0.4	0.6	1.1	0.9	0.9	0.8	5.3	0.9	0.6	0.5	*
Nov-00	5.2	0.7	1.4	8.0	1.0	0.4	24.1	9.4	1.1	0.6	
Dec-00	2.8	1.4	1.9	1.3	1.1	0.8	2.1	2.5	0.9	0.9	
Jan-01	0.7	1.7	1.4	1.8	0.7	1.3	1.1	2.4	1.1	0.6	
Feb-01	0.9	3.1	2.0	0.5	0.9	0.7	0.7	6.7	1.3	0.5	1.0
Mar-01	0.8	2.1	1.3	0.6	0.7	0.6	0.6	5.5	0.6	0.6	1.5
Apr-01	0.8	0.7	1.3	0.5	0.7	0.4	0.3	5.1	0.7	0.6	0.8
May-01	0.2	0.2	0.4	0.4	0.3	0.3	0.6	1.8	0.6	8.0	0.9
Jun-01	0.5	0.4	0.5	1.0	1.0	0.4	0.4	8.8	0.7	0.6	0.6
Jul-01	0.5	0.3	1.8	0.5	0.8		16.3	4.9	0.9	0.7	0.7
Aug-01	0.4	0.4	0.8	8.0	1.0	1.7	1.0		1.0	1.8	1.1
Sep-01	0.7	1.0	1.7	1.1	1.7	0.7		6.0	1.1	1.3	1.7
Oct-01	1.1	0.6	4.6	0.9	0.7	0.9	1.2	1.9	0.9	0.6	1.7
Nov-01	0.9	1.0	1.1	1.1	0.8	1.1	6.0	5.5	1.3	1.9	2.3
Dec-01	4.9	0.9	4.2	0.9	1.3	1.9	1.2	3.1	1.2	9.7	1.8
Jan-02	0.8	1.0	1.5	1.3	1.1	1.4	1.3	1.5	1.1	0.9	1.5
Feb-02	1.1	1.1	0.9	0.3	0.4	0.5	3.1	5.1	0.5	0.5	0.9
Mar-02	1.7	2.1	1.6	0.7	0.7	0.8	1.0	18	1.0	0.9	1.7
Apr-02	1.0	0.4	1.0	0.8	0.8	0.6	0.9	10.1	0.5	0.7	1.0
May-02	0.6	0.6	6.0	0.7	0.4	1.2	0.9	3.1	0.7	0.2	1.0
Jun-02	1.4	0.4	1.7	0.6	0.5	0.8	0.6	2.1	0.6	0.5	1.0
Jut-02	0.7	0.7		0.8	0.8	0.7	1.2	- 4	1.1	0.5	1.0
Aug-02	1.3	0.8	1.4	1.2	1.1	1.2	1.5		1.5	0.9	1.6
Sep-02	0.5	1.2	1.1	0.8	0.5	0.7	5.1	9.3	1.6	0.6	1.0
Oct-02	2.2	1.4	5.2	1.5	1.5	1.4	1.4	3.4		1.5	3.1
Nov-02	2.8	1.8	3.7	1.6	0.1	1.8	2.1	3.5	2.1	2	1.9
Dec-02	2.0		2.5	1.5	3.0	1.5	1.8	4.1	1.6	1.2	1.9
Jan-03	2.1	1.5	2.7	1.5	1.0	1.9	2.2	2.5	1.1	1.0	1.6
Feb-03	1.4	1.1	2.6	1.1	0.9	1.2	1.7	5.9	1.2	1.0	1.5
Mar-03	0.8	0.5	1.2	1.2	0.6	2.1	1.5	3.4	(4)	3.6	9.5
Apr-03	0.5	1.0	0.6	1.0	0.7	0.5	1.1	8.0		2.0	1.0
May-03	0.5	0.4	0.6	0.2	0.2	0.6	1.3	1.6	0.5	0.8	1.2
Jun-03	0.5	0.6	0.8	0.8	0.4	0.6	0.8	0.7	0.9	0.7	0.7
Jut-03	0.3	0.4	0.4	0.6	0.4	0.5	0.7	0.5	0.5	0.5	0.7
Aug-03	0.8	0.2	0.7	1.1	0.5	1.3	1.8	2.1	1.3	0.7	0.9
Sep-03	0.6	0.7	1.1	0.7	0.8	1.7	1.4	1.3	2.5	0.9	1.3
Oct-03	2.6	0.9	1.4	0.9	0.7	1.9	1.0	1.4	0.6	0.8	1.3
Nov-03	2.6	0.8	1.0	1.1	0.4	1.3	1.5	1.5	***	0.8	1.3
Dec-03	1.0	1.0	1.4	1.3	1.1	1.5	1.6	2.0	1.8	0.9	1.4
Jan-04	8.5	1.5	2.1	1.5	1.3	2.6	1.4	2.2	1.7	1.5	1.7
Feb-04	1.2	1.0	1.7	1.4	0.7	3.1	1.6	2.2	4.0	1.5	2.3
Mar-04	0.4	0.6	0.8	0.8	0.7	1.9	0.8	12.1	4.8	1.5	1.1
Apr-04	-	1.0	1774740		10.00		100			1000	
May-04	0.2	0.9	2.2	0.9	0.8	0.7	0.9	1.4	1.2	0.9	1.5
Jun-04	0.4	0.6	0.7	0.9	0.6	1.4	1.0	0.9	1.0	1.0	0.8
Jul-04 Aug-04	0.4	0.6	5.3#	0.6	0.5	2.9	1.0	1.1	0.9	0,6	1.2
	0.5	0.5	0.5	1.3	0.7	1.1	1.1	1.4		1.0	1.0
Sep-04	0.6	0.6	0.8	2.2	1.0	1.0	0.9	4.4	0.9	16.7	1.1
Oct-04	0.7	0.9	1.2	0.9	0.8	1.4	1.0	10.5	1.0	1.0	0.8
Nov-04	0.8	0.7	1.3	1.9	0.7	0.9	1.0	3.0	1.1	1.1	1.6
Dec-04	2.0	1.4	3.6	1.5	1.3	2.2	3.2	7.9	1.8	5.5	2.5
Jan-05 Feb-05	1.2	1.0	3.7	1.6	1.4	4.0	2.3	2.7	2.6	2.5	2.8
	1.2	1.2	1.8	1.6	1.3	2.0	1.7		2.3	1.5	2.3
Mar-05	1.3	0.9	1.4	0.9	0.9	3.0	1.2	7.7		0.8	1.3

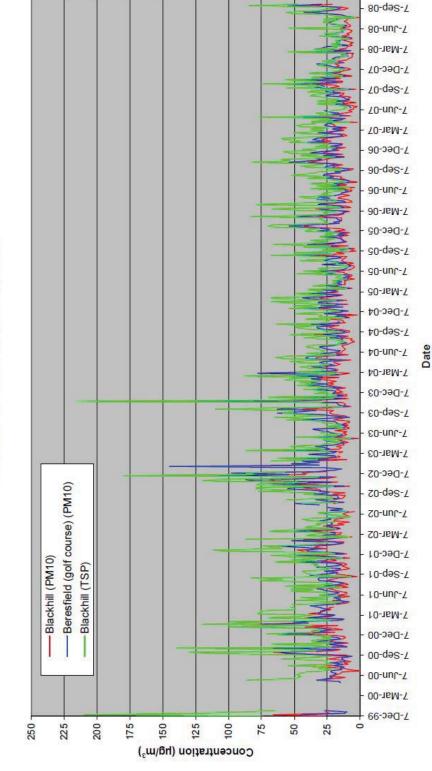
Month	D1	D2	D3	D4	D5A	D6	D7	D8	D9	D10	D11
May-05	0.7	8.6	1.1	0.8	0.7	0.8	0.9	4.4	1.2	0.8	1.1
Jun-05	1.3	0.8	1.3	1.3	0.8	1.2	1.2	1.3	1.5	2.5	0.9
Jut-05	1.0	0.5	0.5	0.7	0.4	1.6	0.7	1.2	0.8	4.3	1.1
Aug-05	0.6	0.6	0.8	1.0	0.8	0.9	0.7	1.0	0.9	1.0	0.9
Sep-05	0.6	0.7	0.8	0.7	0.7	1.2	1.3	1.3	1.0	0.9	1.1
Oct-05	0.8	0.9	1.3	0.9	0.8	1.4	1.2	1.9	1.3	1.1	1.3
Nov-05		2.3	2.3	2.0	1.7	1.2	2.0	3.2	1.6	1.4	2.2
Dec-05	1.9	3.2	2.3	3.3	2.6	3.4	2.3	5 Dr 3	1.3	2.1	3.9
Jan-06	1.0	2.1	1.7	1.0	23.	3.5		2.7	1.1		1.5
Feb-06	2.2	1.0	0.9	1.2	1,1	1.7	1.1	2.9	+	2.3	1.8
Mar-06	0.7	0.6	2.3	0.7	0.6	0.9	1.0	1.4	0.7	8.0	1.5
Apr-06	0.6	0.7	1.1	0.8	0.6	1.1	0.8	1.0	1.0	1.8	1.5
May-06	1.0	3.1	1.0		1.1	1.4	1.1	4.1		7.0	1.5
Jun-06	0.4	0.3	0.7	0.5	0.4	0.6	0.7	0.8	0.6	0.9	0.9
Jut-06	0.3	0.3	1	1.3	0.4	0.7	0.7	2.7		0.6	0.6
Aug-06	0.9	0.6	0.8	0.7	0.7	0.8	0.7	1.7		3.7	0.9
Sep-06	1.6	0.7	1.1	1.7	0.7	1	0.9	1.3	1.2	0.8	1.6
Oct-06	2	1.4	1.6	1.8	0.9	1.8	1.2	1.8	1.5	1.8	1,9
Nov-06	4.3	2.2	3	2.3	2.3	5.3	2.4	3.3	2.3	2.3	2.9
Dec-06	1.2	3.4	1.9	2.3	2.3	1000000	2.1	2.1		4.9	3.9
Jan-07	2	0.9	1.5	0.7	0.7	1.7	1.1	1890	1.2	1.7	0.9
Feb-07	1.7	0.9	1.6	0.7	0.6	1	1.8	1.7	1.1	1.2	1.7
Mar-07	1.3	0.9	1.7	0.8	1.2	0.6	2.2	1.7	1	0.9	1.7
Apr-07	0.5	0.7	0.9	0.6	4.8	1.2	0.5	2.7	0.5	0.8	0.9
May-07	0.8	0.5	0.6	1.2	0.6	0.6	0.7	1.9	0.5	0.7	0.8
Jun-07	0.6	0.5	0.7	1.1	0.1	0.5	0.1	0.5	0.1	0.4	0.3
Jul-07	0.5	0.4	0.6	2.1	0.5	0.8	0.6	0.6	0.4	0.5	0.7
Aug-07	1.5	0.4	0.7	1	0.7	0.7	0.5	1	0.6	0.6	0.7
Sep-07	1.3	0.5	1.8	1	0.7	0.9	0.9	1.3	1	0.7	1.6
Oct-07	4.2	0.9	1.1	1.4	1.1	1.7	1.8	1.7	1.6	1.4	2.2
Nov-07	0.8	0.8	1.1	0.9	1.1	1.1	1.1	1.7	0.6	0.8	1.5
Dec-07	1.3	8.0	3	0.7	0.5	0.8	0.5	1.1	0.3	8.0	0.6
Jan-08	2.6	0.8	3.7	0.5	0.5	0.5	0.4	2.2	0.8	0.3	0.8
Feb-08	0.4	0.1	14	0.1	0.1	0.3	0.1	0.3	0.2	0.2	0.3
Mar-08	4.5	0.6	9.2+	0.6	2.9	2.1	0.6	1.5	0.5	1	0.9
April-08	0.4	0.4"	0.8'	0.4"	0.4"	0.8"	1.1'	1.7'	1.2	1.1"	1.1
May-08	1.1	2.4"	0.9	1.4	0.9	0.9	0.7	2.7	1'	1.1	1.3
June-08	0.2	0.4"	0.1	0.5	0.1"	0.1	0.3	0.5"	0.1	0.8	0.2
July-08	0.4	0.7'	1.3'	0.6	0.8*	0.9	0.8	1	0.7	0.5	1.1
Aug-08	1'	0.5"	0.7'	0.6"	0.5	1.9"	0.8	1'	1'	0.9"	1.4
Sep-08	0.6*	1'	1.3'	0.7"	0.6*	0.9"	0.6	0.9	0.9*	0.9'	1.8

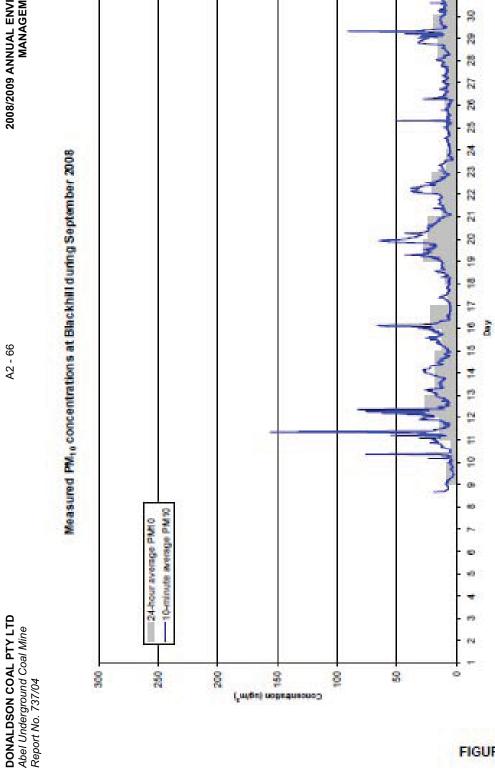
FIGURES



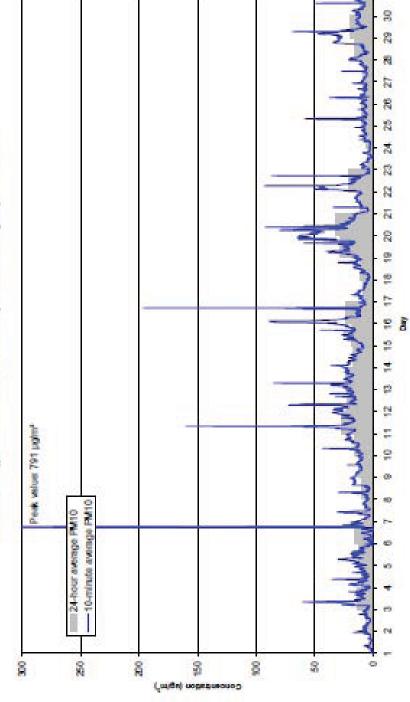
Location of Project Area

High Volume Air Sampling data recorded at Beresfield and Blackhill from December 1999 to September 2008





Measured PM₁₀ concentrations at Weakleys Drive during Septmeber 2008



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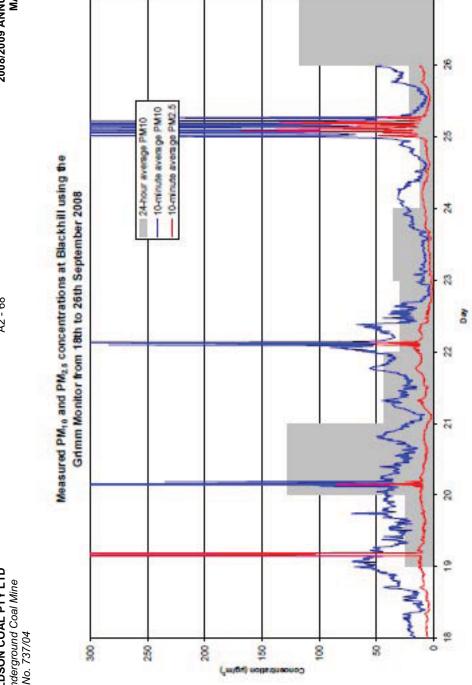
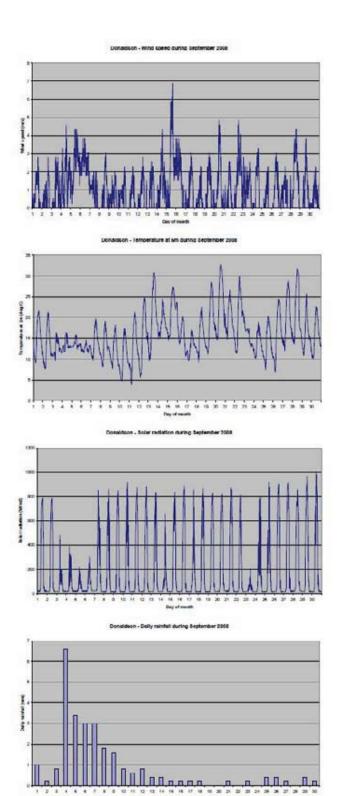
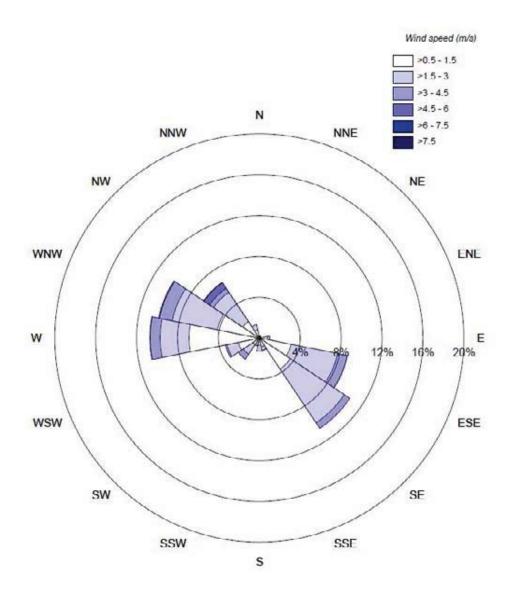


FIGURE 5



Meteorological conditions – September Windrose for Donaldson September 2008



2008 Calms = 41.2%

Donaldson Monitoring Dust and Meteorological Data Monthly Report

October 2008

Prepared for Donaldson Coal

by Holmes Air Sciences

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1. INTRODUCTION

As part of their Air Quality Management Plan Donaldson operate a dust monitoring network in the vicinity of the mining lease and a meteorological station on site. This report has been prepared in order to bring together the various data collected throughout the network during October 2008 and to summarise the information.

The dust network includes continuous monitoring, high volume air sampling and dust deposition monitoring. The continuous monitoring network consists of two DustTrak monitors measuring PM10 at two sites and a GRIMM monitor which is used for one week each quarter to measure PM2.5 and PM10 simultaneously.

There are two locations which use high volume air samplers to determine concentrations of PM₁₀ and TSP. These operate on a six-day cycle in line with similar measurements made by the NSW Department of Environment and Climate Change (DECC) at other locations throughout the state.

In addition to concentration measurements, monthly levels of dust deposition are also measured using eleven gauges placed at various locations in the area of the mine. The locations of each of these monitors and gauges are shown in Figure 1. Table 1 lists the monitors used and pollutants measured at these locations.

Monitoring Location Instruments Used Pollutant Monitored Beresfield **HVAS** PM10 Blackhill HVAS PM₁₀ HVAS TSP PM₁₀ **DustTrak** PM10, PM2.5 Grimm (1 week per quarter) PM₁₀ DustTrak Weakleys Drive DG1 - DG11 **Deposition Gauges Dust Deposition**

Table 1. Summary of monitoring locations and instruments

The meteorological station is situated at the site of the office buildings and measures the following parameters:

- wind speed
- wind direction
- sigma theta
- temperature
- solar radiation
- · relative humidity, and
- rainfall

These parameters are measured every 5 seconds and then 10-minute averages are recorded, except in the case of rainfall where the 10-minute total is recorded. The data are downloaded at various intervals by Donaldson and then forwarded to Holmes Air Sciences for processing.

2. HIGH VOLUME AIR SAMPLING

High Volume Air Sampling (HVAS) was carried out at Beresfield and Blackhill by Metford Laboratories. PM₁₀ is measured at both sites while TSP is only measured at Blackhill. The data collected during October 2008 are summarised in Table 2. A graph consisting of all the data collected to date is shown in Figure 2.

Table 2. High volume air sampling from Beresfield and Blackhill for October 2008

Date	Beresfield PM ₁₀ (µg/m ³)	Blackhill PM10 (µg/m³)	Blackhill TSP (µg/m³)	
2/10/2008	55	36	88	
8/10/2007	19	10	23	
14/10/2008	21	16	25 60	
20/10/2008	43	38		
26/10/2008	21	19	29	
Annual average	21	13	26	

These measurements will include all background sources relevant to that location, including contributions from the Donaldson mining operations.

On the days that the instruments were monitoring, the highest 24-hour average PM $_{10}$ concentration in October 2008 was 55 μ g/m 3 , measured on the 2 nd at the Beresfield site. On this occasion the measured PM $_{10}$ concentration exceeded the 50 μ g/m 3 24-hour NEPM goal. The cause of this event has not been determined and will be investigated.

TSP measurements from the Blackhill site show that concentrations were below the NHMRC 90 $\mu g/m^3$ annual average TSP goal. It should be noted that the NHMRC goal refers to an annual average and not a 24-hour average as measured by the high volume air sampler. The annual average TSP concentration for the 12 months to October 2008 was 26 $\mu g/m^3$.

Figure 2 shows a seasonal trend in PM₁₀ concentrations, peaking during the warmer months and decreasing during autumn and winter. This is a common trend and is seen consistently in the Hunter Valley.

The annual average PM $_{10}$ concentrations for Beresfield and Blackhill were 21 $\mu g/m^3$ and 13 $\mu g/m^3$ respectively for the 12 months to October 2008. These are below the DECC's annual average PM $_{10}$ air quality criterion of 30 $\mu g/m^3$.

3. CONTINUOUS MONITORING

3.1 DustTrak Monitoring at Blackhill

Figure 3 shows a time series of the PM₁₀ data collected from the DustTrak monitor at the Blackhill site. The DustTrak monitoring for the Blackhill site is available from the 1st to the 29th of October. Of the available data, the measured 24-hour average PM₁₀ concentrations were below the NEPM goal of 50 μg/m³. The maximum 24-hour average PM₁₀ concentration was recorded on the 13th of October at 38.44 μg/m³.

3.2 DustTrak Monitoring at Weakleys Drive

A time series of the PM $_{10}$ data collected from the Weakleys Drive site is shown in Figure 4. The DustTrak monitoring for the Weakleys Drive site is available from the 1st to the 31st of October 2008. However the data from October 7st indicates that the instrument was not in working order over this period. The available data show that 24-hour average PM $_{10}$ concentration were below the NEPM goal of 50 μ g/m 3 . The maximum 24-hour average PM $_{10}$ concentration was 25.1 μ g/m 3 , recorded on the 2sd of October.

3.3 Grimm Monitoring

No Grimm monitoring was scheduled for October 2008.

4. DUST DEPOSITION MONITORING

Dust deposition monitoring is carried out each month via a network consisting of eleven (11) gauges. The results for October 2008 are shown in Table 3, in conjunction with results for the previous eleven months in order to provide an annual average for that period. A table showing the complete data set from July 2000 in provided in Appendix A.

Table 3. Dust deposition monitoring for the 12-month period to October 2008

Month		Monthly dust deposition rate (g/m²/month)											
Month	DG1	DG2	DG3	DG4	DG5A	DG6	DG7	DG8	DG9	DG10	DG11		
Nov-07	0.8	0.8	1.1	0.9	1.1	1.1	1.1	1.7	0.6	0.8	1.5		
Dec-07	1.3	0.8	3	0.7	0.5	0.8	0.5	1.1	0.3	0.8	0.6		
Jan-08	2.6	0.8	3.7	0.5	0.5	0.5	0.4	2.2	0.8	0.3	0.8		
Feb-08	0.4	0.1	14*	0.1	0.1	0.3	0.1	0.3	0.2	0.2	0.3		
Mar-08	4.5	0.6	9.2*	0.6	2.9	2.1	0.6	1.5	0.5	1	0.9		
April-08	0.4 *	0.4	0.8 *	0.4 *	0.4 *	0.8	1.1 *	1.7 *	1.2	1.1 *	1.17		
May-08	1.1	2.4	0.9	1.4	0.9	0.9	0.7	2.7	1'	1.1	1.3 *		
Jun-08	0.2	0.4	0.1	0.5	0.1 '	0.1	0.3	0.5 *	0.1	0.8	0.2		
Jul-08	0.4	0.7 *	1.3 *	0.6	0.8 *	0.9	0.8	1	0.7	0.5	1.1		
Aug-08	11	0.5 *	0.7	0.6 *	0.5	1.9 *	0.8 *	1.	1.1	0.9 *	1.4		
Sep-08	0.6 *	1/	1.3 *	0.7 *	0.6 /	0.9 *	0.6	0.9	0.9 *	0.9 *	1.8 /		
Oct-08	1'	0.5 *	11	1.3 ′	1.3 '	1.2	1'	1.4 *	0.8 *	1.6 *	1.8		
Annual Average	1.2	0.8	1.4	0.7	0.8	1.0	0.7	1.3	0.7	0.8	1.1		

Data supplied by Metford Laboratories. * Insects/bird droppings reported. * Invalid (excess bird droppings).

The highest dust deposition measurement in October 2008 was 1.8 g/m²/month at DG11, the accompanying laboratory report showed that the sample was contaminated with insects. The contaminated readings determined to be invalid have been removed when calculating the annual average.

The annual average deposition rates were low and below 2 g/m²/month at all gauges, indicating good air quality with respect to dust deposition.

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2008/2009 ANNUAL ENVIRONMENTAL MANAGEMENT REPORT

5. METEOROLOGICAL MONITORING

Monthly plots of the wind speed, temperature, solar radiation, and rainfall data collected in October 2008 are shown in Figure 6 and a windrose is shown in Figure 7.

The graphs shown in Figure 6 indicate that the instruments were recording appropriately. Data maxima and minima all appeared to be sensible for this site during October. Total rainfall for the month was 8.4 mm.

A windrose (see Figure 7) created from the available 10-minute average wind data shows that winds were predominantly from the southeast. The site recorded calms (wind speed less than or equal to 0.5 m/s) for approximately 45.3% of the time. This is quite a high percentage but is similar to the value for October 2007.

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APPENDIX A
ALL DUST DEPOSITION DATA

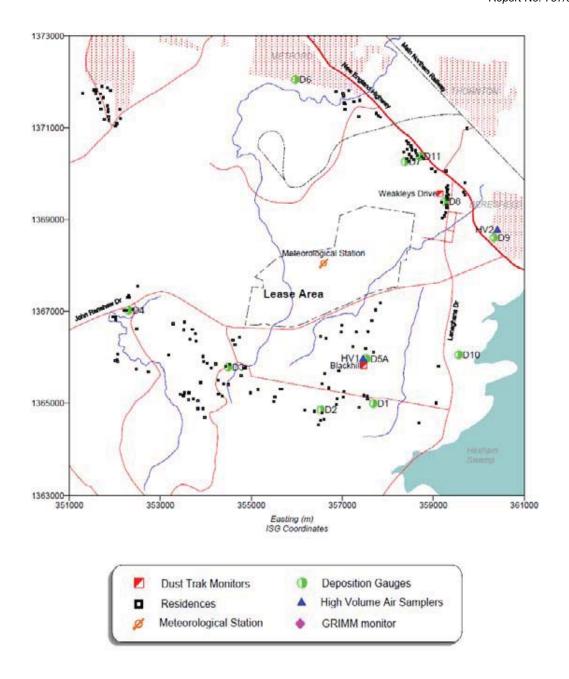
Dust deposition (g/m²/month)

Month	D1	D2	D3	D4	D5A	D6	D7	D8	D9	D10	D11
May-00	0.4	0.4	3.4	0.7	0.9	0.6	3.6	1.6	0.5	1.8	(Œ
lun-00	0.7	0.5	0.5	0.7	0.8	0.4	3.8	3.2	0.5	0.7	25
Jul-00	0.4	0.4	0.5	0.7	0.8	0.5	0.8	1.5	0.4	0.4	132
Aug-00	0.9	0.6	1.0	1.2	1.1	1.0	3.4	0.7	0.7	0.6	- *-
Sep-00	0.8	0.9	1.1	0.9	1.3	1.0	2.2	1.0	1.0	0.8	112
Oct-00	0.4	0.6	1.1	0.9	0.9	0.8	5.3	0.9	0.6	0.5	
Nov-00	5.2	0.7	1.4	0.8	1.0	0.4	24.1	9.4	1.1	0.6	
Dec-00	2.8	1.4	1.9	1.3	1.1	0.8	2.1	2.5	0.9	0.9	1 84
Jan-01	0.7	1.7	1.4	1.8	0.7	1.3	1.1	2.4	1.1	0.6	-04
Feb-01	0.9	3.1	2.0	0.5	0.9	0.7	0.7	6.7	1.3	0.5	1.0
Mar-01	0.8	2.1	1.3	0.6	0.7	0.6	0.6	5.5	0.6	0.6	1.5
Apr-01	0.8	0.7	1.3	0.5	0.7	0.4	0.3	5.1	0.7	0.6	0.8
May-01	0.2	0.2	0.4	0.4	0.3	0.3	0.6	1.8	0.6	0.8	0.9
Jun-01	0.5	0.4	0.5	1.0	1.0	0.4	0.4	8.8	0.7	0.6	0.6
Jul-01	0.5	0.3	1.8	0.5	0.8	.+:	16.3	4.9	0.9	0.7	0.7
Aug-01	0.4	0.4	0.8	0.8	1.0	1.7	1.0	8.00	1.0	1.8	1.1
Sep-01	0.7	1.0	1.7	1.1	1.7	0.7		6.0	1.1	1.3	1.7
Oct-01	1.1	0.6	4.6	0.9	0.7	0.9	1.2	1.9	0.9	0.6	1.7
Nov-01	0.9	1.0	1.1	1.1	0.8	1.1	6.0	5.5	1.3	1.9	2.3
Dec-01	4.9	0.9	4.2	0.9	1.3	1.9	1.2	3.1	1.2	9.7	1.8
Jan-02	0.8	1.0	1.5	1.3	1.1	1.4	1.3	1.5	1.1	0.9	1.5
Feb-02	1.1	1.1	0.9	0.3	0.4	0.5	3.1	5.1	0.5	0.5	0.9
Mar-02	1.7	2.1	1.6	0.7	0.7	0.8	1.0	18	1.0	0.9	1.7
Apr-02	1.0	0.4	1.0	0.8	0.8	0.6	0.9	10.1	0.5	0.7	1.0
May-02	0.6	0.6	6.0	0.7	0.4	1.2	0.9	3.1	0.7	0.2	1.0
Jun-02	1.4	0.4	1.7	0.6	0.5	0.8	0.6	2.1	0.6	0.5	1.0
Jul-02	0.7	0.7	-	0.8	0.8	0.7	1.2		1.1	0.5	1.0
Aug-02	1.3	0.8	1.4	1.2	1.1	1.2	1.5	200	1.5	0.9	1.6
Sep-02	0.5	1.2	1.1	0.8	0.5	0.7	5.1	9.3	1.6	0.6	1.0
Oct-02	2.2	1.4	5.2	1.5	1.5	1.4	1.4	3.4	1.0	1.5	3.1
Nov-02	2.8	1.8	3.7	1.6	0.1	1.8	2.1	3.5	2.1	2	1.9
Dec-02	2.0		2.5	1.5	3.0	1.5	1.8	4.1	1.6	1.2	1.9
Jan-03	2.1	1.5	2.7	1.5	1.0	1.9	2.2	2.5	1.1	1.0	1.6
Feb-03	1.4	1.1	2.6	1.1	0.9	1.2	1.7	5.9	1.2	1.0	1.5
Mar-03	0.8	0.5	1.2	1.2	0.6	2.1	1.5	3.4		3.6	9.5
Apr-03	0.5	1.0	0.6	1.0	0.7	0.5	1.1	8.0	-	2.0	1.0
May-03	0.5	0.4	0.6	0.2	0.2	0.6	1.3	1.6	0.5	0.8	1.2
Jun-03	0.5	0.6	0.8	0.8	0.4	0.6	0.8	0.7	0.9	0.7	0.7
Jul-03	0.3	0.4	0.4	0.6	0.4	0.5		0.5	0.5	100000000000000000000000000000000000000	0.7
Aug-03	0.3	0.4	0.4	1.1	0.4	1.3	1.8	2.1	1.3	0.5	0.9
Sep-03	0.6	0.7	1.1	0.7	0.8	1.7	1.4	1.3	2.5	0.7	1.3
Oct-03	0.6	0.9	1.4	0.9	0.8	1.9	1.0	1.4	0.6	0.9	1.3
Nov-03	2.6	0.9	1.4	1.1	0.7	1.3	1.0	1.4	0.0	0.8	1.3
Dec-03	1.0	1.0	1.4	1.3	1.1	1.5	1.6	2.0	10	0.9	1.4
Jan-04	8.5	1.5	2.1	1.5	1.3	2.6	1.4	2.0	1.8	1.5	1.7
Feb-04	1.2	1.0	1.7	1.4	0.7	3.1	1.6	2.2	1.7		2.3
Mar-04					0.7	1.9			4.8	1.5	
	0.4	0.6	6.6	1.2	0.7	1.9	0.8	12.1	0.9		1.1
Apr-04 May-04	0.6	0.9	2.2	0.9	0.8	0.7	0.8	1.4	1.2	0.9	1.1
						1.4					
Jul-04	0.4	0.6	0.7 5.3#	0.9	0.6	2.9	1.0	0.9	0.9	0.6	1.2
											_
Aug-04	0.5	0.5	0.5	1.3	0.7	1.1	1.1	1.4		1.0	1.0
Sep-04	0.6	0.6	0.8	2.2	1.0	1.0	0.9	4.4	0.9	16.7	1.1
Oct-04	0.7	0.9	1.2	0.9	0.8	1.4	1.0	10.5	1.0	1.0	0.8
Nov-04	0.8	0.7	1.3	1.9	0.7	0.9	1.0	3.0	1.1	1,1	1.6
Dec-04	2.0	1.4	3.6	1.5	1.3	2.2	3.2	7.9	1.8	5.5	2.5
Jan-05	1.2	1.0	3.7	1.6	1.4	4.0	2.3	2.7	2.6	2.5	2.8
Feb-05	1.2	1.2	1.8	1.6	1.3	2.0	1.7		2.3	1.5	2.3
Mar-05	1.3	0.9	1.4	0.9	0.9	3.0	1.2	7.7	*	0.8	1.3
Apr-05	1.1	0.7	0.9	0.8	0.7	0.9	1.4	3.3	1.1	0.8	0.9

Month	D1	D2	D3	D4	D5A	D6	D7	D8	D9	D10	D11
May-05	0.7	8.6	1.1	0.8	0.7	0.8	0.9	4.4	1.2	0.8	1.1
Jun-05	1.3	0.8	1.3	1.3	0.8	1.2	1.2	1.3	1.5	2.5	0.9
Jul-05	1.0	0.5	0.5	0.7	0.4	1.6	0.7	1.2	0.8	4.3	1.1
Aug-05	0.6	0.6	0.8	1.0	0.8	0.9	0.7	1.0	0.9	1.0	0.9
Sep-05	0.6	0.7	0.8	0.7	0.7	1.2	1.3	1.3	1.0	0.9	1.1
Oct-05	0.8	0.9	1.3	0.9	0.8	1.4	1.2	1.9	1.3	1.1	1.3
Nov-05		2.3	2.3	2.0	1.7	1.2	2.0	3.2	1.6	1.4	2.2
Dec-05	1.9	3.2	2.3	3.3	2.6	3.4	2.3		1.3	2.1	3.9
Jan-06	1.0	2.1	1.7	1.0	23.	3.5		2.7	1.1		1.5
Feb-06	2.2	1.0	0.9	1.2	1.1	1.7	1.1	2.9	-	2.3	1.8
Mar-06	0.7	0.6	2.3	0.7	0.6	0.9	1.0	1.4	0.7	0.8	1.5
Apr-06	0.6	0.7	1.1	0.8	0.6	1.1	0.8	1.0	1.0	1.8	1.5
May-06	1.0	3.1	1.0		1.1	1.4	1.1	4.1		7.0	1.5
Jun-06	0.4	0.3	0.7	0.5	0.4	0.6	0.7	0.8	0.6	0.9	0.9
Jul-06	0.3	0.3	1	1.3	0.4	0.7	0.7	2.7		0.6	0.6
Aug-06	0.9	0.6	0.8	0.7	0.7	0.8	0.7	1.7	-	3.7	0.9
Sep-06	1.6	0.7	1.1	1.7	0.7	1	0.9	1.3	1.2	0.8	1.6
Oct-06	2	1.4	1.6	1.8	0.9	1.8	1.2	1.8	1.5	1.8	1.9
Nov-06	4.3	2.2	3	2.3	2.3	5.3	2.4	3.3	2.3	2.3	2.9
Dec-06	1.2	3.4	1.9	2.3	2.3		2.1	2.1		4.9	3.9
Jan-07	2	0.9	1.5	0.7	0.7	1.7	1.1		1.2	1.7	0.9
Feb-07	1.7	0.9	1.6	0.7	0.6	1	1.8	1.7	1.1	1.2	1.7
Mar-07	1.3	0.9	1.7	0.8	1.2	0.6	2.2	1.7	1	0.9	1.7
Apr-07	0.5	0.7	0.9	0.6	4.8	1.2	0.5	2.7	0.5	0.8	0.9
May-07	8.0	0.5	0.6	1.2	0.6	0.6	0.7	1.9	0.5	0.7	0.8
Jun-07	0.6	0.5	0.7	1.1	0.1	0.5	0.1	0.5	0.1	0.4	0.3
Jul-07	0.5	0.4	0.6	2.1	0.5	0.8	0.6	0.6	0.4	0.5	0.7
Aug-07	1.5	0.4	0.7	1	0.7	0.7	0.5	1	0.6	0.6	0.7
Sep-07	1.3	0.5	1.8	1	0.7	0.9	0.9	1.3	1	0.7	1.6
Oct-07	4.2	0.9	1.1	1.4	1.1	1.7	1.8	1.7	1.6	1.4	2.2
Nov-07	0.8	0.8	1.1	0.9	1.1	1.1	1.1	1.7	0.6	0.8	1.5
Dec-07	1.3	0.8	3	0.7	0.5	0.8	0.5	1.1	0.3	0.8	0.6
Jan-08	2.6	0.8	3.7	0.5	0.5	0.5	0.4	2.2	0.8	0.3	0.8
Feb-08	0.4	0.1	14	0.1	0.1	0.3	0.1	0.3	0.2	0.2	0.3
Mar-08	4.5	0.6	9.2+	0.6	2.9	2.1	0.6	1.5	0.5	1	0.9
April-08	0.4"	0.4"	0.8"	0.4"	0.4"	0.8"	1.1"	1.7"	1.2	1.1"	1.1
May-08	1.1	2.4"	0.9	1.4	0.9	0.9	0.7	2.7	1'	1.1	1.3
June-08	0.2	0.4"	0.1	0.5	0.1"	0.1	0.3	0.5"	0.1	0.8	0.2
luty-08	0.4	0.7*	1.3'	0.6	0.8"	0.9	0.8	1	0.7	0.5	1.1
Aug-08	1	0.5	0.7	0.6	0.5	1.9	0.8	1	1	0.9	1.4
Sep-08	0.6	1	1.3	0.7	0.6	0.9	0.6	0.9	0.9	0.9	1.8
Oct-08	1	0.5	1	1.3	1.3	1.2	1	1.4	0.8	1.6	1.8

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FIGURES



Location of Project Area

High Volume Air Sampling data recorded at Beresfield and Blackhill from December 1999 to October 2008

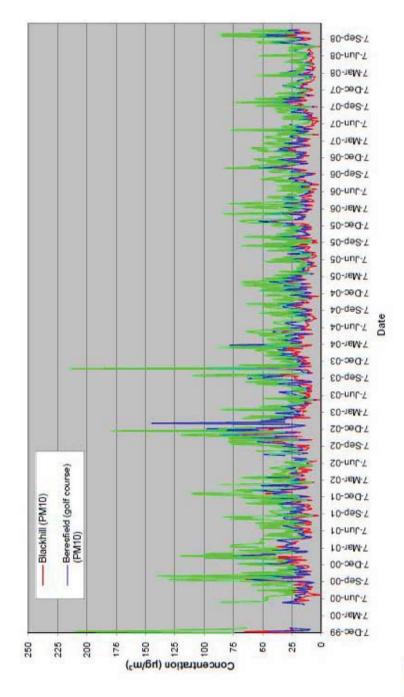


Figure 2

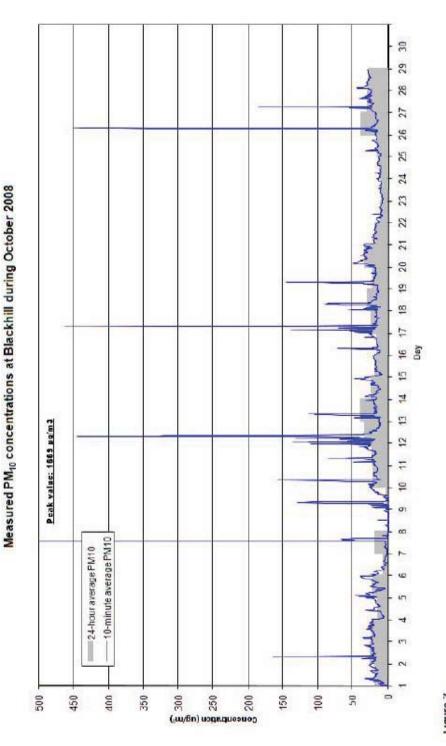


Figure 3

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Measured PM₁₀ concentrations at Weakleys Drive during October 2008

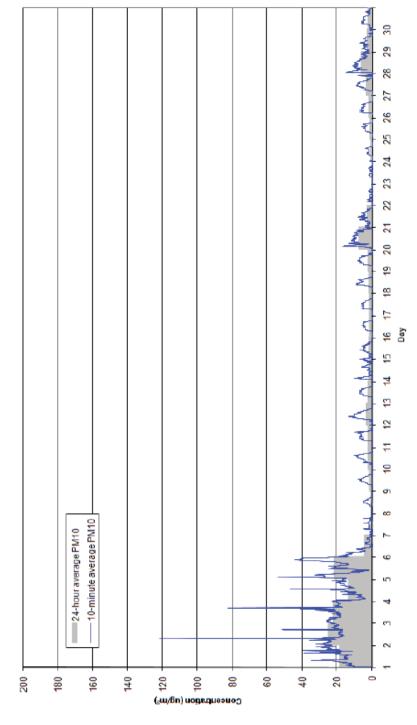


Figure 4

DONALDSON COAL PTY LTD Abel Underground Coal Mine Report No. 737/04

[No Grimm monitoring was scheduled for this month]

Figure 5

Holmes Air Sciences

DONALDSON COAL PTY LTDAbel Underground Coal Mine
Report No. 737/04

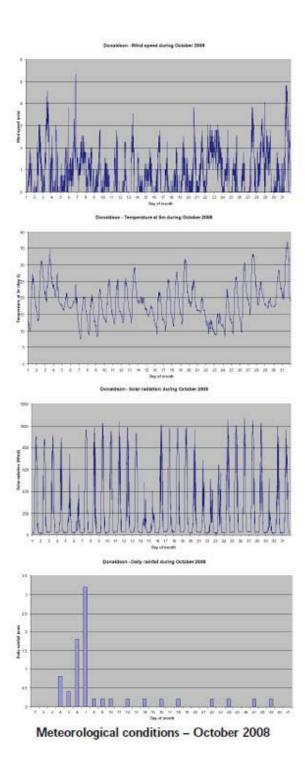
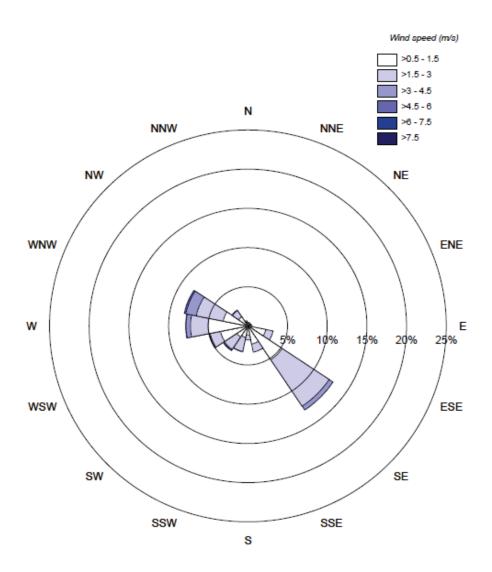


Figure 6

Windrose for Donaldson October 2008



Calms = 45.3%

Figure 7

Abel Underground Coal Mine Report No. 737/04

Donaldson Monitoring Dust and Meteorological Data Monthly Report

November 2008

Prepared for Donaldson Coal

Holmes Air Sciences

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1. INTRODUCTION

As part of their Air Quality Management Plan Donaldson operate a dust monitoring network in the vicinity of the mining lease and a meteorological station on site. This report has been prepared in order to bring together the various data collected throughout the network during November 2008 and to summarise the information.

The dust network includes continuous monitoring, high volume air sampling and dust deposition monitoring. The continuous monitoring network consists of two DustTrak monitors measuring PM₁₀ at two sites and a GRIMM monitor which is used for one week each quarter to measure PM_{2.5} and PM₁₀ simultaneously.

There are two locations which use high volume air samplers to determine concentrations of PM₁₀ and TSP. These operate on a six-day cycle in line with similar measurements made by the NSW Department of Environment and Climate Change (DECC) at other locations throughout the state.

In addition to concentration measurements, monthly levels of dust deposition are also measured using eleven gauges placed at various locations in the area of the mine. The locations of each of these monitors and gauges are shown in Figure 1. Table 1 lists the monitors used and pollutants measured at these locations.

Monitoring Location Instruments Used Pollutant Monitored Beresfield HVAS PM₁₀ Blackhill **HVAS** PM₁₀ TSP HVAS **DustTrak** PM₁₀ Grimm (1 week per quarter) PM10, PM25 Weakleys Drive DustTrak PM₁₀ DG1 - DG11 **Deposition Gauges Dust Deposition**

Table 1. Summary of monitoring locations and instruments

The meteorological station is situated at the site of the office buildings and measures the following parameters:

- wind speed
- wind direction
- · sigma theta
- temperature
- solar radiation
- relative humidity, and
- rainfall

These parameters are measured every 5 seconds and then 10-minute averages are recorded, except in the case of rainfall where the 10-minute total is recorded. The data are downloaded at various intervals by Donaldson and then forwarded to Holmes Air Sciences for processing.

2. HIGH VOLUME AIR SAMPLING

High Volume Air Sampling (HVAS) was carried out at Beresfield and Blackhill by Metford Laboratories. PM₁₀ is measured at both sites while TSP is only measured at Blackhill. The data collected during November 2008 are summarised in Table 2. A graph consisting of all the data collected to date is shown in Figure 2.

Table 2. High volume air sampling from Beresfield and Blackhill for November 2008

Date	Beresfield PM ₁₀ (µg/m³)	Blackhill PM10 (µg/m³)	Blackhill TSP (ug/m³)	
4/11/2008	22	15	45	
7/11/2008	40	35	55	
13/11/2008	69	13	20	
19/11/2008	10	9	14	
25/11/2008	24	17	36	
Annual average	22	14	26	

These measurements will include all background sources relevant to that location, including contributions from the Donaldson mining operations.

On the days that the instruments were monitoring, the highest 24-hour average PM $_{10}$ concentration in November 2008 was 69 μ g/m 3 , measured on the 13 th at the Beresfield site. On this occasion the measured PM $_{10}$ concentration exceeded the 50 μ g/m 3 24-hour NEPM goal. The cause of this event has not been determined and will be investigated.

TSP measurements from the Blackhill site show that concentrations were below the NHMRC 90 $\mu g/m^3$ annual average TSP goal. It should be noted that the NHMRC goal refers to an annual average and not a 24-hour average as measured by the high volume air sampler. The annual average TSP concentration for the 12 months to November 2008 was 26 $\mu g/m^3$.

Figure 2 shows a seasonal trend in PM₁₀ concentrations, peaking during the warmer months and decreasing during autumn and winter. This is a common trend and is seen consistently in the Hunter Valley.

The annual average PM $_{10}$ concentrations for Berestield and Blackhill were 22 $\mu g/m^3$ and 14 $\mu g/m^3$ respectively for the 12 months to Novmeber 2008. These are below the DECC's annual average PM $_{10}$ air quality criterion of 30 $\mu g/m^3$.

3. CONTINUOUS MONITORING

3.1 DustTrak Monitoring at Blackhill

Figure 3 shows a time series of the PM₁₀ data collected from the DustTrak monitor at the Blackhill site. The DustTrak monitoring for the Blackhill site is unavailable for the month of November due to a power failure on the 29th October. The problem has since been rectified.

3.2 DustTrak Monitoring at Weakleys Drive

A time series of the PM₁₀ data collected from the Weakleys Drive site is shown in Figure 4. The DustTrak monitoring for the Weakleys Drive site is available from the 1st to the 22nd of November 2008. However the data for the month of November indicates that the instrument was not in working order over this period. The reason for this was a malfunction with the DustTrak monitor which has been replaced.

The available data show that 24-hour average PM $_{10}$ concentration were below the NEPM goal of 50 μ g/m 3 . The maximum 24-hour average PM $_{10}$ concentration was 14.7 μ g/m 3 , recorded on the 21 st of November.

3.3 Grimm Monitoring

Grimm monitoring was carried out between 26th of November and 2nd of December 2008, the data are presented in Figure 5. The measurements show that there were no exceedances of the 24-hour average NEPM goal of 50 µg/m³ during this period.

The average PM_{2.5} fraction in the PM₁₀ was calculated from the measurements as 0.44. This suggests that the PM₁₀ is predominantly coarse particles and the measurement is consistent with windblown dust.

4. DUST DEPOSITION MONITORING

Dust deposition monitoring is carried out each month via a network consisting of eleven (11) gauges. The results for November 2008 are shown in Table 3, in conjunction with results for the previous eleven months in order to provide an annual average for that period. A table showing the complete data set from July 2000 in provided in Appendix A.

Table 3. Dust deposition monitoring for the 12-month period to November 2008

				Month	ly dust de	position r	rate (g/m²	(g/m²/month)					
Month	DG1	DG2	DG3	DG4	DG5A	DG6	DG7	DG8	DG9	DG10	DG11		
Dec-07	1.3	0.8	3	0.7	0.5	0.8	0.5	1.1	0.3	0.8	0.6		
Jan-08	2.6	8.0	3.7	0.5	0.5	0.5	0.4	2.2	8.0	0.3	8.0		
Feb-08	0.4	0.1	14+	0.1	0.1	0.3	0.1	0.3	0.2	0.2	0.3		
Mar-08	4.5	0.6	9.2+	0.6	2.9	2.1	0.6	1.5	0.5	1	0.9		
April-08	0.4 ′	0.4	0.8	0.4 *	0.4 *	0.8	1.1.1	1.7 '	1.2	1.1.1	1.1 1		
May-08	1.1	2.4 "	0.9	1.4	0.9	0.9	0.7	2.7	1'	1.1	1.3 *		
Jun-08	0.2	0.4 *	0.1	0.5	0.1 '	0.1	0.3	0.5 *	0.1	0.8	0.2		
Jul-08	0.4	0.7 *	1.3 '	0.6	0.8 *	0.9	0.8	1	0.7	0.5	1.1		
Aug-08	1'	0.5*	0.7 *	0.6 *	0.5	1.9 *	0.8 *	1'	1'	0.9 *	1.4		
Sep-08	0.6	11	1.3 *	0.7 *	0.6 *	0.9 *	0.6	0.9	0.9	0.9 *	1.8 *		
Oct-08	1'	0.5	1'	1.3 '	1.3 '	1.2	1'	1.4 '	0.8	1.6 '	1.8 '		
Nov-08	0.8'	1.4'	2.7'	2.5"	0.9"	1.2"	0.8'	2.4'	1.11	1′	1.7'		
Annual Average	1.2	1.2	1.6	0.8	0.8	1.0	0.6	1.4	0.7	0.9	1.1		

Data supplied by Metford Laboratories. * Insects/bird droppings reported. * Invalid (excess bird droppings).

The highest dust deposition measurement in November 2008 was 2.7 g/m²/month at DG3; the accompanying laboratory report showed that the sample was contaminated with bird droppings. The contaminated readings determined to be invalid have been removed when calculating the annual average.

The annual average deposition rates were low and below 2 g/m²/month at all gauges, indicating good air quality with respect to dust deposition.

5. METEOROLOGICAL MONITORING

Monthly plots of the wind speed, temperature, solar radiation, and rainfall data collected in November 2008 are shown in Figure 6 and a windrose is shown in Figure 7.

The graphs shown in Figure 6 indicate that the instruments were recording appropriately. Data maxima and minima all appeared to be sensible for this site during October. Total rainfall for the month was 73.3 mm.

A windrose (see Figure 7) created from the available 15-minute average wind data shows that winds were predominantly from the southeast. The site recorded calms (wind speed less than or equal to 0.5 m/s) for approximately 46.8% of the time. This is quite a high percentage but is similar to the value for November 2007.

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APPENDIX A ALL DUST DEPOSITION DATA

Dust deposition (g/m²/month)

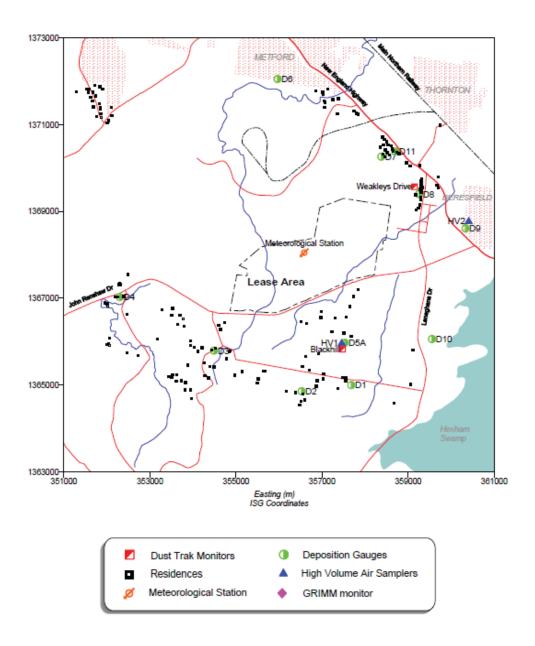
Month	D1	D2	D3	D4	D5A	D6	D7	D8	D9	D10	D11
May-00	0.4	0.4		0.7	0.9	0.6	3.6	1.6	0.5	1.8	
Jun-00	0.7	0.5	0.5	0.7	0.8	0.4	3.8	3.2	0.5	0.7	- 20
Jul-00	0.4	0.4	0.5	0.7	0.8	0.5	0.8	1.5	0.4	0.4	
Aug-00	0.9	0.6	1.0	1.2	1.1	1.0	3.4	0.7	0.7	0.6	
Sep-00	0.8	0.9	1.1	0.9	1.3	1.0	2.2	1.0	1.0	0.8	- 8
Oct-00	0.4	0.6	1.1	0.9	0.9	0.8	5.3	0.9	0.6	0.5	
Nov-00	5.2	0.7	1.4	0.8	1.0	0.4	24.1	9.4	1.1	0.6	*
Dec-00	2.8	1.4	1.9	1.3	1.1	0.8	2.1	2.5	0.9	0.9	
Jan-01	0.7	1.7	1.4	1.8	0.7	1.3	1.1	2.4	1.1	0.6	-2
Feb-01	0.9	3.1	2.0	0.5	0.9	0.7	0.7	6.7	1.3	0.5	1.0
Mar-01	0.8	2.1	1.3	0.6	0.7	0.6	0.6	5.5	0.6	0.6	1.5
Apr-01	0.8	0.7	1.3	0.5	0.7	0.4	0.3	5.1	0.7	0.6	0.8
May-01	0.2	0.2	0.4	0.4	0.3	0.3	0.6	1.8	0.6	0.8	0.9
Jun-01	0.5	0.4	0.5	1.0	1.0	0.4	0.4	8.8	0.7	0.6	0.6
Jul-01	0.5	0.3	1.8	0.5	0.8		16.3	4.9	0.9	0.7	0.7
Aug-01	0.4	0.4	0.8	0.8	1.0	1.7	1.0		1.0	1.8	1.1
Sep-01	0.7	1.0	1.7	1.1	1.7	0.7		6.0	1.1	1.3	1.7
Oct-01	1.1	0.6	4.6	0.9	0.7	0.9	1.2	1.9	0.9	0.6	1.7
Nov-01	0.9	1.0	1.1	1.1	0.8	1.1	6.0	5.5	1.3	1.9	2.3
Dec-01	4.9	0.9	4.2	0.9	1.3	1.9	1.2	3.1	1.2	9.7	1.8
Jan-02	0.8	1.0	1.5	1.3	1.1	1.4	1.3	1.5	1.1	0.9	1.5
Feb-02	1.1	1.1	0.9	0.3	0.4	0.5	3.1	5.1	0.5	0.5	0.9
Mar-02	1.7	2.1	1.6	0.7	0.7	0.8	1.0	18	1.0	0.9	1.7
Apr-02	1.0	0.4	1.0	0.8	0.8	0.6	0.9	10.1	0.5	0.7	1.0
May-02	0.6	0.6	6.0	0.7	0.4	1.2	0.9	3.1	0.7	0.2	1.0
Jun-02	1.4	0.4	1.7	0.6	0.5	0.8	0.6	2.1	0.6	0.5	1.0
Jul-02	0.7	0.7		0.8	0.8	0.7	1.2		1.1	0.5	1.0
Aug-02	1.3	0.8	1.4	1.2	1.1	1.2	1.5		1.5	0.9	1.6
Sep-02	0.5	1.2	1.1	0.8	0.5	0.7	5.1	9.3	1.6	0.6	1.0
Oct-02	2.2	1.4	5.2	1.5	1.5	1.4	1.4	3.4		1.5	3.1
Nov-02	2.8	1.8	3.7	1.6	0.1	1.8	2.1	3.5	2.1	2	1.9
Dec-02	2.0		2.5	1.5	3.0	1.5	1.8	4.1	1.6	1.2	1.9
Jan-03	2.1	1.5	2.7	1.5	1.0	1.9	2.2	2.5	1.1	1.0	1.6
Feb-03	1.4	1.1	2.6	1.1	0.9	1.2	1.7	5.9	1.2	1.0	1.5
Mar-03	0.8	0.5	1.2	1.2	0.6	2.1	1.5	3.4	-	3.6	9.5
Apr-03	0.5	1.0	0.6	1.0	0.7	0.5	1.1	8.0	- :	2.0	1.0
May-03	0.5	0.4	0.6	0.2	0.2	0.6	1.3	1.6	0.5	0.8	1.2
lun-03	0.5	0.6	0.8	0.8	0.4	0.6	0.8	0.7	0.9	0.7	0.7
lui-03	0.3	0.4	0.4	0.6	0.4	0.5	0.7	0.5	0.5	0.5	0.7
Aug-03	0.8	0.2	0.7	1.1	0.5	1.3	1.8	2.1	1.3	0.7	0.9
Sep-03	0.6	0.7	1.1	0.7	0.8	1.7	1.4	1.3	2.5	0.9	1.3
Oct-03	0.0	0.7	1.4	0.7	0.7	1.9	1.0	1.4	0.6	0.8	1.3
Nov-03	2.6	0.8	1.0	1.1	0.4	1.3	1.5	1.5	0.0	0.8	1.3
Dec-03	1.0	1.0	1.4	1.3	1.1	1.5	1.6	2.0	1.8	0.9	1.4
Jan-04	8.5	1.5	2.1	1.5	1.3	2.6	1.4	2.2	1.7	1.5	1.7
Feb-04	1.2	1.0	1.7	1.4	0.7	3.1	1.6	2.2	1.1	1.5	2.3
Mar-04	0.4	0.6	6.6	1.2	0.7	1.9	1.1	12.1	4.8	1.5	1.1
Apr-04	0.4	1.0	0.8	0.8	0.6	1.9	0.8	1.4	0.9	1.2	1.1
May-04	0.2	0.9	2.2	0.9	0.8	0.7	0.9	1.4	1.2	0.9	1.5
Jun-04 Jul-04	0.4	0.6	0.7 5.3#	0.9	0.6	1.4	1.0	0.9	1.0	1.0	0.8
		0.6		0.6		2.9		1.1	0.9	0.6	1.2
Aug-04	0.5	0.5	0.5	1.3	0.7	1.1	1.1	1.4		1.0	1.0
Sep-04	0.6	0.6	0.8	2.2	1.0	1.0	0.9	4.4	0.9	16.7	1.1
Oct-04	0.7	0.9	1.2	0.9	8.0	1.4	1.0	10.5	1.0	1.0	0.8
Nov-04	8.0	0.7	1.3	1.9	0.7	0.9	1.0	3.0	1.1	1.1	1.6
Dec-04	2.0	1.4	3.6	1.5	1.3	2.2	3.2	7.9	1.8	5.5	2.5
Jan-05	1.2	1.0	3.7	1.6	1.4	4.0	2.3	2.7	2.6	2.5	2.8
Feb-05	1.2	1.2	1.8	1.6	1.3	2.0	1.7		2.3	1.5	2.3
Mar-05	1.3	0.9	1.4	0.9	0.9	3.0	1.2	7.7		0.8	1.3

Month	D1	D2	D3	D4	D5A	D6	D7	D8	D9	D10	D11
May-05	0.7	8.6	1.1	0.8	0.7	0.8	0.9	4.4	1.2	0.8	1.1
Jun-05	1.3	0.8	1.3	1.3	0.8	1.2	1.2	1.3	1.5	2.5	0.9
Jul-05	1.0	0.5	0.5	0.7	0.4	1.6	0.7	1.2	0.8	4.3	1.1
Aug-05	0.6	0.6	0.8	1.0	0.8	0.9	0.7	1.0	0.9	1.0	0.9
Sep-05	0.6	0.7	0.8	0.7	0.7	1.2	1.3	1.3	1.0	0.9	1.1
Oct-05	0.8	0.9	1.3	0.9	0.8	1.4	1.2	1.9	1.3	1.1	1.3
Nov-05		2.3	2.3	2.0	1.7	1.2	2.0	3.2	1.6	1.4	2.2
Dec-05	1.9	3.2	2.3	3.3	2.6	3.4	2.3		1.3	2.1	3.9
Jan-06	1.0	2.1	1.7	1.0	23.	3.5		2.7	1.1		1.5
Feb-06	2.2	1.0	0.9	1.2	1.1	1.7	1.1	2.9	-	2.3	1.8
Mar-06	0.7	0.6	2.3	0.7	0.6	0.9	1.0	1.4	0.7	0.8	1.5
Apr-06	0.6	0.7	1.1	0.8	0.6	1.1	0.8	1.0	1.0	1.8	1.5
May-06	1.0	3.1	1.0	-	1.1	1.4	1.1	4.1		7.0	1.5
Jun-06	0.4	0.3	0.7	0.5	0.4	0.6	0.7	0.8	0.6	0.9	0.9
Jul-06	0.3	0.3	1	1.3	0.4	0.7	0.7	2.7		0.6	0.6
Aug-06	0.9	0.6	0.8	0.7	0.7	0.8	0.7	1.7		3.7	0.9
Sep-06	1.6	0.7	1.1	1.7	0.7	1	0.9	1.3	1.2	0.8	1.6
Oct-06	2	1.4	1.6	1.8	0.9	1.8	1.2	1.8	1.5	1.8	1.9
Nov-06	4.3	2.2	3	2.3	2,3	5.3	2.4	3.3	2.3	2.3	2.9
Dec-06	1.2	3.4	1.9	2.3	2.3		2.1	2.1		4.9	3.9
Jan-07	2	0.9	1.5	0.7	0.7	1.7	1.1		1.2	1.7	0.9
Feb-07	1.7	0.9	1.6	0.7	0.6	1	1.8	1.7	1.1	1.2	1.7
Mar-07	1.3	0.9	1.7	0.8	1.2	0.6	2.2	1.7	1	0.9	1.7
Apr-07	0.5	0.7	0.9	0.6	4.8	1.2	0.5	2.7	0.5	0.8	0.9
May-07	0.8	0.5	0.6	1.2	0.6	0.6	0.7	1.9	0.5	0.7	0.8
Jun-07	0.6	0.5	0.7	1.1	0.1	0.5	0.1	0.5	0.1	0.4	0.3
Jul-07	0.5	0.4	0.6	2.1	0.5	0.8	0.6	0.6	0.4	0.5	0.7
Aug-07	1.5	0.4	0.7	1	0.7	0.7	0.5	1	0.6	0.6	0.7
Sep-07	1.3	0.5	1.8	1	0.7	0.9	0.9	1.3	1	0.7	1.6
Oct-07	4.2	0.9	1.1	1.4	1.1	1.7	1.8	1.7	1.6	1.4	2.2
Nov-07	0.8	0.8	1.1	0.9	1.1	1.1	1.1	1.7	0.6	0.8	1.5
Dec-07	1.3	0.8	3	0.7	0.5	0.8	0.5	1.1	0.3	0.8	0.6
Jan-08	2.6	0.8	3.7	0.5	0.5	0.5	0.4	2.2	0.8	0.3	0.8
Feb-08	0.4	0.1	14	0.1	0.1	0.3	0.1	0.3	0.2	0.2	0.3
Mar-08	4.5	0.6	9.2+	0.6	2.9	2.1	0.6	1.5	0.5	1	0.9
April-08	0.4"	0.4"	0.8"	0.4"	0.4"	0.8"	1.1"	1.7"	1.2	1.1'	1.1
May-08	1.1	2.4'	0.9	1.4	0.9	0.9	0.7	2.7	11	1.1	1.3
June-08	0.2	0.4"	0.1	0.5	0.1"	0.1	0.3	0.5"	0.1	0.8	0.2
July-08	0.4	0.7*	1.3'	0.6	0.8'	0.9	0.8	1	0.7	0.5	1.1
Aug-08	1	0.5	0.7	0.6	0.5	1.9	0.8	1	1	0.9	1.4
Sep-08	0.6	1	1.3	0.7	0.6	0.9	0.6	0.9	0.9	0.9	1.8
Oct-08	1	0.5	1	1.3	1.3	1.2	1	1.4	0.8	1.6	1.8
Nov-08	0.8	1.4	2.7	2.5	0.9	1.2	0.8	2.4	1.1	1	1.7

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FIGURES

Abel Underground Coal Mine Report No. 737/04



Location of Project Area

Figure 1

Hoimes Air Sciences

High Volume Air Sampling data recorded at Beresfield and Blackhill from December 1999 to November 2008

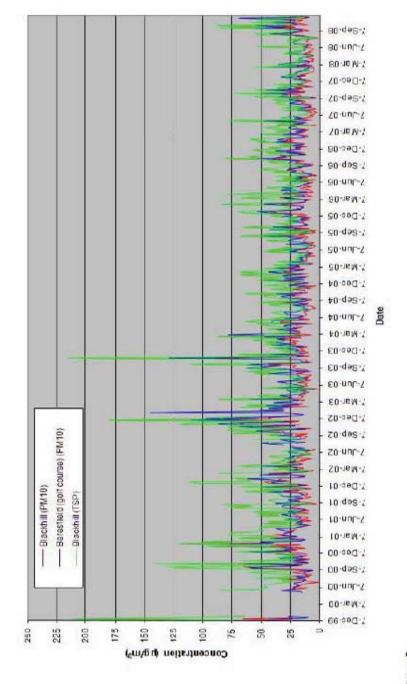


Figure 2

DONALDSON COAL PTY LTD Abel Underground Coal Mine Report No. 737/04

Measured PM₁₀ concentrations at Blackhill during November 2008

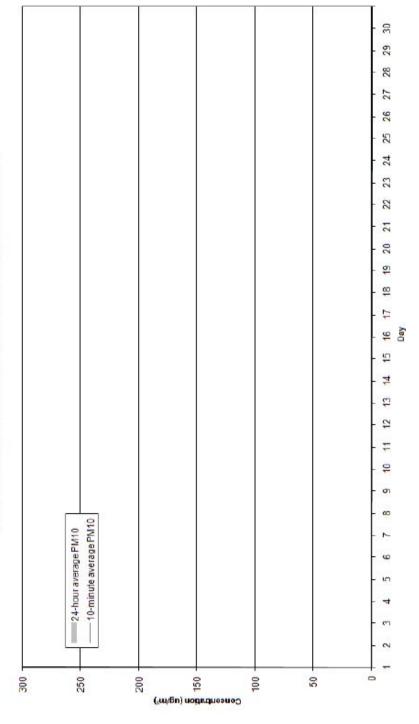


Figure 3

Measured PM₁₀ concentrations at Weakleys Drive during November 2008

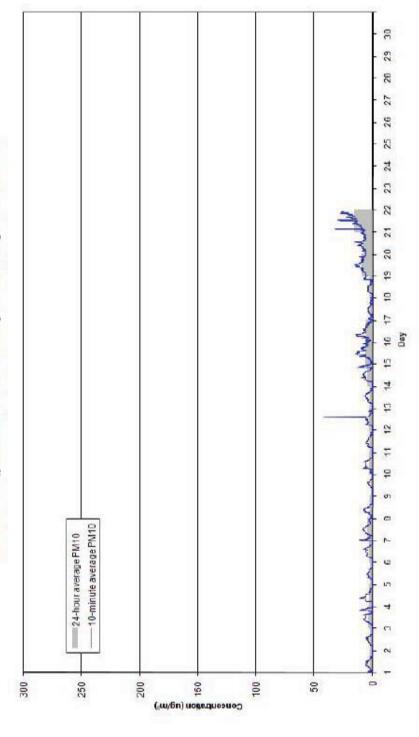


Figure 4

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Measured PM₁₀ and PM_{2.5} concentrations at Blackhill using the Grimm Monitor from 26 Nov to 2 Dec 2008

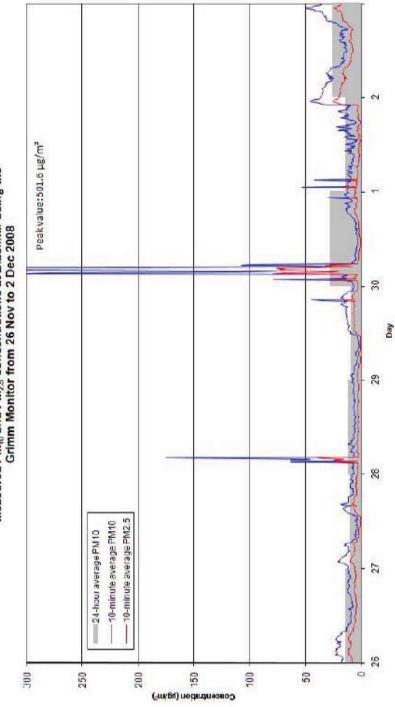


Figure 5

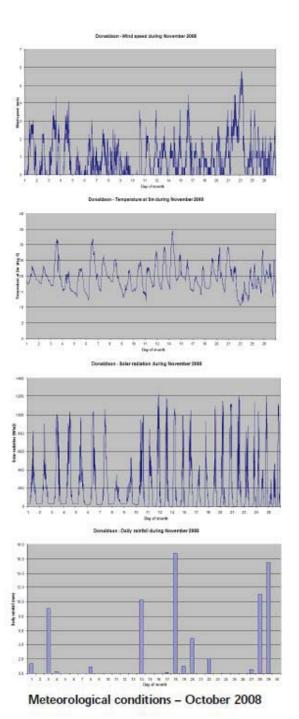
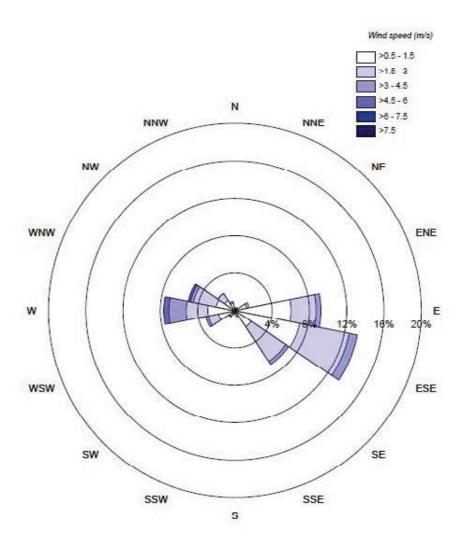


Figure 6

toport rio. For ro

Windrose for Donaldson November 2008



Calms = 46.8%

Figure 7



DONALDSON MONITORING

DUST AND METEOROLOGICAL DATA DECEMBER 2008 REPORT

Donaldson Coal

Job No: 2815

02 March 2009



A PEL Company

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2008/2009 ANNUAL ENVIRONMENTAL MANAGEMENT REPORT

Abel Underground Coal Mine Report No. 737/04



PROJECT TITLE: DUST AND METEOROLOGICAL DATA

DECEMBER 2008 REPORT

JOB NUMBER: 2815

PREPARED FOR: Phil Brown

DONALDSON COAL

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1 INTRODUCTION

As part of their Air Quality Management Plan Donaldson operate a dust monitoring network in the vicinity of the mining lease and a meteorological station on site. This report has been prepared in order to bring together the various data collected throughout the network during December 2008 and to summarise the information.

The dust network includes continuous monitoring, high volume air sampling and dust deposition monitoring. The continuous monitoring network consists of two DustTrak monitors measuring PM_{10} at two sites and a GRIMM monitor which is used for one week each quarter to measure $PM_{2.5}$ and PM_{10} simultaneously.

There are two locations which use high volume air samplers to determine concentrations of PM₁₀ and TSP. These operate on a six-day cycle in line with similar measurements made by the NSW Department of Environment and Climate Change (DECC) at other locations throughout the state.

In addition to concentration measurements, monthly levels of dust deposition are also measured using eleven gauges placed at various locations in the area of the mine. The locations of each of these monitors and gauges are shown in Figure 1.

Table 1 lists the monitors used and pollutants measured at these locations.

Table 1: Summary of monitoring locations and instruments

Monitoring Location	Instruments Used	Pollutant Monitored		
Beresfield	HVAS	PM ₁₀		
Blackhill	HVAS	PM ₁₀		
	HVAS DustTrak	TSP PM ₁₀		
	Grimm (1 week per quarter)	PM10, PM2.5		
Weakleys Drive	DustTrak	PM ₁₀		
DG1 - DG11	Deposition Gauges	Dust Deposition		

The meteorological station is situated at the site of the office buildings and measures the following parameters:

- wind speed
- wind direction
- · sigma theta
- temperature
- solar radiation
- · relative humidity, and
- rainfall

These parameters are measured every 5 seconds and then 10-minute averages are recorded, except in the case of rainfall where the 10-minute total is recorded. The data are downloaded at various intervals by Donaldson and then forwarded to Holmes Air Sciences for processing.



2 HIGH VOLUME AIR SAMPLING

High Volume Air Sampling (HVAS) was carried out at Beresfield and Blackhill by Metford Laboratories. PM₁₀ is measured at both sites while TSP is only measured at Blackhill. The data collected during November 2008 are summarised in **Table 2**. A graph consisting of all the data collected to date is shown in Figure 2.

Table 2: HVAS from Beresfield and Blackhill for December 2008

Date	Beresfield PM ₁₈ (µg/m³)	Blackhill PM _{in} (µg/m³)	Blackhill TSP (μg/m³)
1/12/2008	27	34	65
7/12/2007	25	17	36
13/12/2008	23	15	37
19/12/2008	27	19	33
25/12/2008	19	13	28
31/12/2008	59	42	95
Annual average	23	15	29

These measurements will include all background sources relevant to that location, including contributions from the Donaldson mining operations.

On the days that the instruments were monitoring, the highest 24-hour average PM_{10} concentration in December 2008 was 59 $\mu g/m^3$, measured on the 31st at the Beresfield site. On this occasion the measured PM_{10} concentration exceeded the 50 $\mu g/m^3$ 24-hour NEPM goal. The cause of this event has not been determined and will be investigated. The correlation of TSP and pm_{10} at Blackhill are also relatively high on that day.

TSP measurements from the Blackhill site show that concentrations were below the NHMRC 90 $\mu g/m^3$ annual average TSP goal. It should be noted that the NHMRC goal refers to an annual average and not a 24-hour average as measured by the high volume air sampler. The annual average TSP concentration for the 12 months to December 2008 was 29 $\mu g/m^3$.

Figure 2 shows a seasonal trend in PM_{10} concentrations, peaking during the warmer months and decreasing during autumn and winter. This is a common trend and is seen consistently in the Hunter Valley.

The annual average PM_{10} concentrations for Beresfield and Blackhill were 23 $\mu g/m^3$ and 15 $\mu g/m^3$ respectively for the 12 months to December 2008. These are below the DECC's annual average PM_{10} air quality criterion of 30 $\mu g/m^3$.

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3 CONTINUOUS MONITORING

3.1 DustTrak Monitoring at Blackhill

Figure 3 shows a time series of the PM_{10} data collected from the DustTrak monitor at the Blackhill site. The DustTrak monitoring for the Blackhill site is available from the 7^{th} to the 19^{th} of December. Of the available data, the measured 24-hour average PM_{10} concentrations were below the NEPM goal of $50\mu g/m^3$. The maximum 24-hour average PM_{10} concentration was recorded on the 18^{th} of December at $15.8 \mu g/m^3$.

A power failure at the Blackhill monitoring site on the 19th December caused a loss of data for the rest of the month. The problem has since been rectified.

3.2 DustTrak Monitoring at Weakleys Drive

A time series of the PM_{10} data collected from the Weakleys Drive site is shown in Figure 4. The DustTrak monitoring for the Weakleys Drive site is available from the 7^{th} to the 9^{th} of December 2008. The available data show that 24-hour average PM_{10} concentration were below the NEPM goal of 50 μ g/m³. The maximum 24-hour average PM_{10} concentration was 11.3μ g/m³, recorded on the 8^{th} of December.

The loss of data for the month of December was caused by water flooding the DustTrak monitor. The monitor has since been replaced.

3.3 Grimm Monitoring

No Grimm monitoring was scheduled for December.



4 DUST DEPOSITION MONITORING

Dust deposition monitoring is carried out each month via a network consisting of eleven (11) gauges. The results for December 2008 are shown in Table 3, in conjunction with results for the previous eleven months in order to provide an annual average for that period. A table showing the complete data set from July 2000 in provided in Appendix A.

Table 3: Dust deposition monitoring for the 12-month period to December 2008

				ionthly	dust dep	osition	rate (q/	m²/mo	nth)		
Month	DG1	DG2	DG3	DG4	DG5A	DG6	DG7	DG8	DG9	DG10	DG11
Jan-08	2.6	0.8	3.7	0.5	0.5	0.5	0.4	2.2	8.0	0.3	0.8
Feb-08	0.4	0.1	14*	0.1	0.1	0.3	0.1	0.3	0.2	0.2	0.3
Mar-08	4.5	0.6	9.2*	0.6	2.9	2.1	0.6	1.5	0.5	1	0.9
April-08	0.4 *	0.4 *	0.8 *	0.4 #	0.4 #	0.8 *	1.1 "	1.7 *	1.2	1.1	1.1 "
May-08	1.1	2.4 *	0.9	1.4	0.9	0.9	0.7	2.7	1'	1.1	1.3 "
Jun-08	0.2	0.4 *	0.1	0.5	0.1 *	0.1	0.3	0.5 *	0.1	0.8	0.2
Jul-08	0.4	0.7 #	1.3 /	0.6	0.8	0.9	0.8	1	0.7	0.5	1.1
Aug-08	1 "	0.5 "	0.7	0.6 "	0.5	1.9 "	0.8 "	1 "	1"	0.9 "	1.4
Sep-08	0.6 "	1 "	1.3 *	0.7 *	0.6 "	0.9 *	0.6	0.9	0.9 "	0.9 *	1.8 "
Oct-08	1'	0.5 "	1."	1.3 *	1.3 "	1.2	1'	1.4 "	0.8 "	1.6 "	1.8 "
Nov-08	0.8 4	1.4 *	2.7 4	2.5	0.9 *	1.2 *	0.8	2.4 *	1.1 *	1 4	1.7 *
Dec-08	0.4 *	0.4 *	0.6	0.5 *	0.3 *	1.1 *	0.6 #	15*	0.9 *	0.7 *	1.2 *
Annual Average	1.1	1.1	1.3	0.8	0.8	1.0	0.7	1.4	0.8	0.8	1.1

Data supplied by Metford Laboratories. * Insects/bird droppings reported. *Invalid (excess bird droppings).

The highest dust deposition measurement in December 2008 was 1.2 g/m²/month at DG11; the accompanying laboratory report showed the sample was contaminated with insects. The contaminated readings determined to be invalid have been removed when calculating the annual average. The annual average deposition rates were low and below 2 g/m²/month at all gauges, indicating good air quality with respect to dust deposition.

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5 METEOROLOGICAL MONITORING

Monthly plots of the wind speed, temperature, solar radiation, and rainfall data collected in December 2008 are shown in <u>Figure 6</u> and a windrose is shown in <u>Figure 7</u>.

The graphs shown in <u>Figure 6</u> indicate that the instruments were recording appropriately. Data maxima and minima all appeared to be sensible for this site during December. Total rainfall for the month was 62.6 mm.

A windrose (see <u>Figure 7</u>) created from the available 15-minute average wind data shows that winds were predominantly from the southeast. The site recorded calms (wind speed less than or equal to 0.5 m/s) for approximately 34% of the time. This is quite a high percentage but is similar to the value for December 2007.

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APPENDIX A

ALL DUST DEPOSITION DATA



				Dust de	position	(g/m²/	month)				
Month	D1	D2	D3	D4	D5A	Dő	D7	D8	D9	D10	D11
May-00	0.4	0.4	<u> </u>	0.7	0.9	0.6	3.6	1.6	0.5	1.8	40
Jun-00	0.7	0.5	0.5	0.7	0.8	0.4	3.8	3.2	0.5	0.7	-
Jul-00	0.4	0.4	0.5	0.7	0.8	0.5	0.8	1.5	0.4	0.4	-1
Aug-00	0.9	0.6	1.0	1.2	1.1	1.0	3.4	0.7	0.7	0.6	-
Sep-00	0.8	0.9	1.1	0.9	1.3	1.0	2.2	1.0	1.0	0.8	-
Oct-00	0.4	0.6	1.1	0.9	0.9	0.8	5.3	0.9	0.6	0.5	-
Nov-00	5.2	0.7	1.4	0.8	1.0	0.4	24.1	9.4	1.1	0.6	-
Dec-00	2.8	1.4	1.9	1.3	1.1	0.8	2.1	2.5	0.9	0.9	+
Jan-01	0.7	1.7	1.4	1.8	0.7	1.3	1.1	2.4	1.1	0.6	+
Feb-01	0.9	3.1	2.0	0.5	0.9	0.7	0.7	6.7	1.3	0.5	1.0
Mar-01	8.0	2.1	1.3	0.6	0.7	0.6	0.6	5.5	0.6	0.6	1.5
Apr-01	0.8	0.7	1.3	0.5	0.7	0.4	0.3	5.1	0.7	0.6	0.8
May-01	0.2	0.2	0.4	0.4	0.3	0.3	0.6	1.8	0.6	0.8	0.9
Jun-01	0.5	0.4	0.5	1.0	1.0	0.4	0.4	8.8	0.7	0.6	0.6
Jul-01	0.5	0.3	1.8	0.5	0.8		16.3	4.9	0.9	0.7	0.7
Aug-01	0.4	0.4	0.8	0.8	1.0	1.7	1.0	-	1.0	1.8	1.1
Sep-01	0.7	1.0	1.7	1.1	1.7	0.7	-	6.0	1.1	1.3	1.7
Oct-01	1.1	0.6	4.6	0.9	0.7	0.9	1.2	1.9	0.9	0.6	1.7
Nov-01	0.9	1.0	1.1	1,1	0.8	1.1	6.0	5.5	1.3	1.9	2.3
Dec-01	4.9	0.9	4.2	0.9	1.3	1.9	1.2	3.1	1.2	9.7	1.8
Jan-02	0.8	1.0	1.5	1.3	1.1	1.4	1.3	1.5	1.1	0.9	1.5
Feb-02	1.1	1.1	0.9	0.3	0.4	0.5	3.1	5.1	0.5	0.5	0.9
Mar-02	1.7	2.1	1.6	0.7	0.7	0.8	1.0	18	1,0	0.9	1.7
Apr-02	1.0	0.4	1.0	0.8	0.8	0.6	0.9	10.1	0.5	0.7	1.0
May-02	0.6	0.6	6.0	0.7	0.4	1.2	0.9	3.1	0.7	0.2	1.0
Jun-02	1.4	0.4	1.7	0.6	0.5	0.8	0.6	2.1	0.6	0.5	1.0
Jul-02	0.7	0.7	72	0.8	0.8	0.7	1.2	2	1.1	0.5	1.0
Aug-02	1.3	0.8	1.4	1.2	1.1	1.2	1.5	2.0	1.5	0.9	1.6
Sep-02	0.5	1.2	1.1	8.0	0.5	0.7	5.1	9.3	1.6	0.6	1.0
Oct-02	2.2	1.4	5.2	1.5	1.5	1.4	1.4	3.4	-	1.5	3.1
Nov-02	2.8	1.8	3.7	1.6	0.1	1.8	2.1	3.5	2.1	2	1.9
Dec-02	2.0	-	2.5	1.5	3.0	1.5	1.8	4.1	1.6	1.2	1.9
Jan-03	2.1	1.5	2.7	1.5	1.0	1.9	2.2	2.5	1.1	1.0	1.6
Feb-03	1,4	1.1	2.6	1.1	0.9	1.2	1.7	5.9	1,2	1.0	1.5
Mar-03	0.8	0.5	1.2	1.2	0.6	2.1	1.5	3.4	4	3.6	9.5
Apr-03	0.5	1.0	0.6	1.0	0.7	0.5	1.1	8.0		2.0	1.0
Мау-03	0.5	0.4	0.6	0.2	0.2	0.6	1.3	1.6	0.5	0.8	1.2
Jun-03	0.5	0.6	8.0	0.8	0.4	0.6	8.0	0.7	0.9	0.7	0.7
Jul-03	0.3	0.4	0.4	0.6	0.4	0.5	0.7	0.5	0.5	0.5	0.7
Aug-03	0.8	0.2	0.7	1.1	0.5	1.3	1.8	2.1	1.3	0.7	0.9
Sep-03	0.6	0.7	1.1	0.7	8.0	1.7	1.4	1.3	2.5	0.9	1.3
Oct-03		0.9	1.4	0.9	0.7	1.9	1.0	1.4	0.6	0.8	1.3
Nov-03	2,6	0.8	1.0	1.1	0.4	1.3	1.5	1.5	12.0	0.8	1.3
Dec-03	1.0	1.0	1.4	1.3	1.1	1.5	1.6	2.0	1.8	0.9	1.4
Jan-04	8.5	1.5	2.1	1.5	1.3	2.6	1.4	2.2	1.7	1.5	1.7
Feb-04	1.2	1.0	1.7	1.4	0.7	3.1	1.6	2.2	-	1.5	2.3



											1 1
Apr-04	0.6	1.0	0.8	0.8	0.6	1.9	0.8	1.4	0.9	1.2	1.1
May-04	0.2	0.9	2.2	0.9	0.8	0.7	0.9	1.4	1.2	0.9	1.5
Jun-04	0.4	0.6	0.7	0.9	0.6	1.4	1.0	0.9	1.0	1.0	0.8
Jul-04	0.4	0.6	5.3#	0.6	0.5	2.9	1.0	1.1	0.9	0.6	1.2
Aug-04	0.5	0.5	0.5	1.3	0.7	1.1	1.1	1.4		1.0	1.0
Sep-04	0.6	0.6	0.8	2.2	1.0	1.0	0.9	4.4	0.9	16.7	1.1
Oct-04	0.7	0.9	1.2	0.9	0.8	1.4	1.0	10.5	1.0	1.0	0.8
Nov-04	0.8	0.7	1.3	1.9	0.7	0.9	1.0	3.0	1.1	1.1	1.6
Dec-04	2.0	1.4	3.6	1.5	1.3	2.2	3.2	7.9	1.8	5.5	2.5
Jan-05	1.2	1.0	3.7	1.6	1.4	4.0	2.3	2.7	2.6	2.5	2.8
Feb-05	1.2	1.2	1.8	1.6	1.3	2.0	1.7		2.3	1.5	2.3
Mar-05	1.3	0.9	1.4	0.9	0.9	3.0	1.2	7.7		0.8	1.3
Apr-05	1.1	0.7	0.9	0.8	0.7	0.9	1.4	3.3	1.1	0.8	0.9
May-05	0.7	8.6	1.1	0.8	0.7	0.8	0.9	4.4	1.2	0.8	1.1
Jun-05	1.3	0.8	1.3	1.3	0.8	1.2	1.2	1.3	1.5	2.5	0.9
Jul-05	1.0	0.5	0.5	0.7	0.4	1.6	0.7	1.2	0.8	4.3	1.1
Aug-05	0.6	0.6	0.8	1.0	0.8	0.9	0.7	1.0	0.9	1.0	0.9
Sep-05	0.6	0.7	0.8	0.7	0.7	1.2	1.3	1.3	1.0	0.9	1.1
Oct-05	0.8	0.9	1.3	0.9	0.8	1.4	1.2	1.9	1.3	1.1	1.3
Nov-05	-	2.3	2.3	2.0	1.7	1.2	2.0	3.2	1.6	1.4	2.2
Dec-05	1.9	3.2	2.3	3.3	2.6	3.4	2.3	-	1.3	2.1	3.9
Jan-06	1.0	2.1	1.7	1.0	23.	3.5	-3	2.7	1.1		1.5
Feb-06	2.2	1.0	0.9	1.2	1.1	1.7	1.1	2.9		2.3	1.8
Mar-06	0.7	0.6	2.3	0.7	0.6	0.9	1.0	1.4	0.7	0.8	1.5
Apr-06	0.6	0.7	1.1	0.8	0.6	1.1	0.8	1.0	1.0	1.8	1.5
May-06	1.0	3.1	1.0	-	1.1	1.4	1.1	4.1	-	7.0	1.5
Jun-06	0.4	0.3	0.7	0.5	0.4	0.6	0.7	0.8	0.6	0.9	0.9
Jul-06	0.3	0.3	1	1,3	0.4	0.7	0.7	2.7	-	0.6	0.6
Aug-06	0.9	0.6	0.8	0.7	0.7	0.8	0.7	1.7	12	3.7	0.9
Sep-06	1.6	0.7	1.1	1.7	0.7	1	0.9	1.3	1.2	0.8	1.6
Oct-06	2	1.4	1.6	1.8	0.9	1.8	1.2	1.8	1.5	1.8	1.9
Nov-06	4.3	2.2	3	2.3	2.3	5.3	2.4	3.3	2.3	2.3	2.9
Dec-06	1.2	3.4	1.9	2.3	2.3	-	2.1	2.1	1	4.9	3.9
Jan-07	2	0.9	1.5	0.7	0.7	1.7	1.1		1.2	1.7	0.9
Feb-07	1.7	0.9	1.6	0.7	0.6	1	1.8	1.7	1.1	1.2	1.7
Mar-07	1.3	0.9	1.7	0.8	1.2	0.6	2.2	1.7	1	0.9	1.7
Apr-07	0.5	0.7	0.9	0.6	4.8	1.2	0.5	2.7	0.5	0.8	0.9
May-07	0.8	0.5	0.6	1.2	0.6	0.6	0.7	1.9	0.5	0.7	0.8
Jun-07	0.6	0.5	0.7	1,1	0.1	0.5	0.1	0.5	0.1	0.4	0.3
Jul-07	0.5	0.4	0.6	2.1	0.5	0.8	0.6	0.6	0.4	0.5	0.7
Aug-07	1.5	0.4	0.7	1	0.7	0.7	0.5	1	0.6	0.6	0.7
Sep-07	1.3	0.5	1.8	1	0.7	0.9	0.9	1.3	1	0.7	1.6
Oct-07	4.2	0.9	1.1	1.4	1.1	1.7	1.8	1.7	1.6	1.4	2.2
Nov-07	0.8	0.8	1.1	0.9	1.1	1.1	1.1	1.7	0.6	0.8	1.5
Dec-07	1.3	0.8	3	0.7	0.5	0.8	0.5	1.1	0.3	0.8	0.6
Jan-08	2.6	0.8	3.7	0.5	0.5	0.5	0.4	2.2	0.8	0.3	0.8
Feb-08	0.4	0.1	14	0.1	0.1	0.3	0.1	0.3	0.2	0.2	0.3
Mar-08	4.5	0.6	9.2+	0.6	2.9	2.1	0.6	1.5	0.5	1	0.9
April-08	0.4	0.4	0.8"	0.4	0.4"	0.8"	1.1"	1.7	1.2	1.1	1.1'

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May-08	1.1	2.4	0.9	1.4	0.9	0.9	0.7	2.7	1"	1.1	1.3
June-08	0.2	0.4"	0.1	0.5	0.1"	0.1	0.3	0.5"	0.1	0.8	0.2
July-08	0.4	0.7"	1.3"	0.6	0.8	0.9	8.0	1	0.7	0.5	1.1
Aug-08	1	0.5	0.7	0.6	0.5	1.9	0.8	1	1	0.9	1.4
Sep-08	0.6	1	1.3	0.7	0.6	0.9	0.6	0.9	0.9	0.9	1.8
Oct-08	1	0.5	1	1.3	1.3	1.2	1	1.4	0.8	1.6	1.8
Nov-08	0.8	1.4	2.7	2.5	0.9	1.2	0.8	2.4	1.1	1	1.7
Dec-08	0.4	0.4	0.6	0.5	0.3	1.1	0.6	15	0.9	0.7	1.2

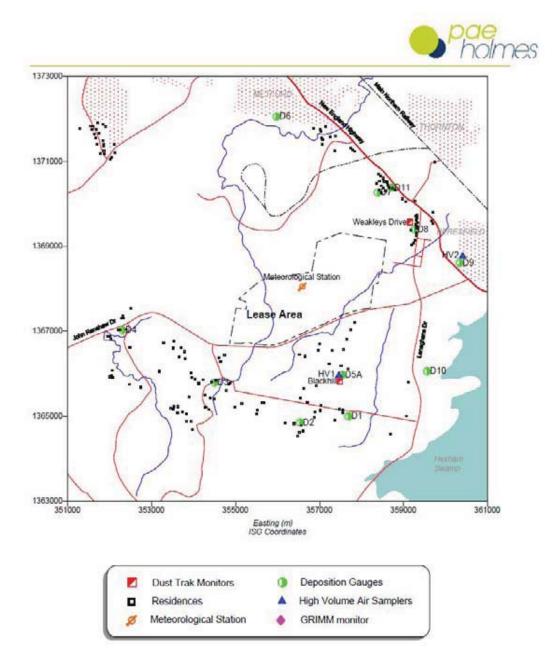
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FIGURES	FI	G	U	R	E	S
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Location of Project Area

Figure 1: Project Location



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Abel Underground Coal Mine
Report No. 737/04

High Volume Air Sampling data recorded at Berestield and Blackhill from December 1999 to December 2008

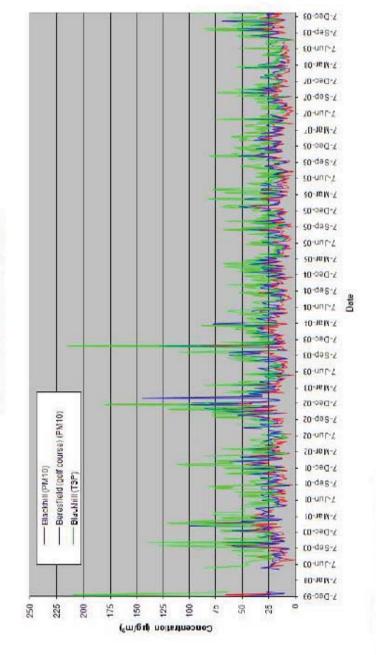


Figure 2: High Volume Air Sampling data

December 2008 Report Donaldson December 2008 Report V2.docx Dust and Meteorological Data Donaldson Coal | PAEHolmes Job 2815

DONALDSON COAL PTY LTD Abel Underground Coal Mine Report No. 737/04



Measured PM₁₀ concentrations at Blackhill during December 2008

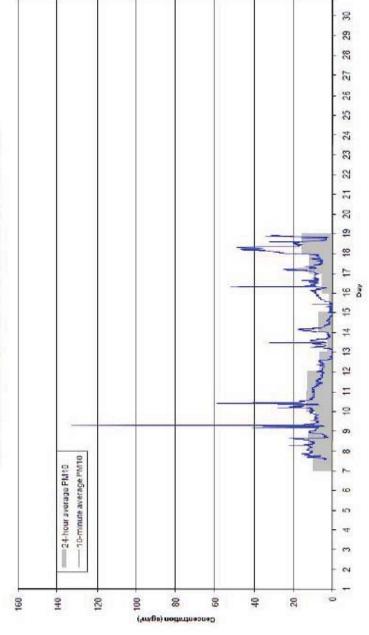


Figure 3: DustTrak sampling data, Blakchill site



Measured PM₁₀ concentrations at Weakleys Drive during December 2008

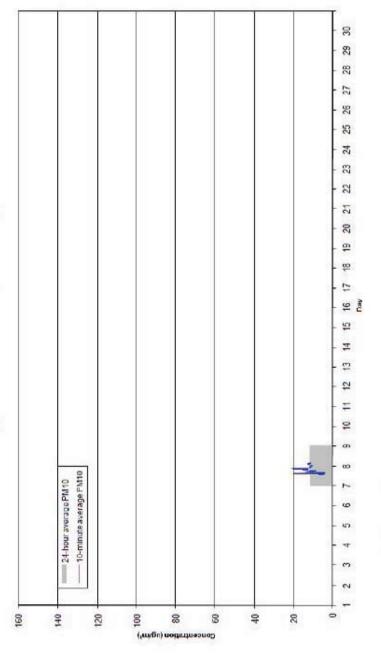


Figure 4: DustTrak sampling data, Weakleys Drive site

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[No Grimm monitoring was scheduled for this month]



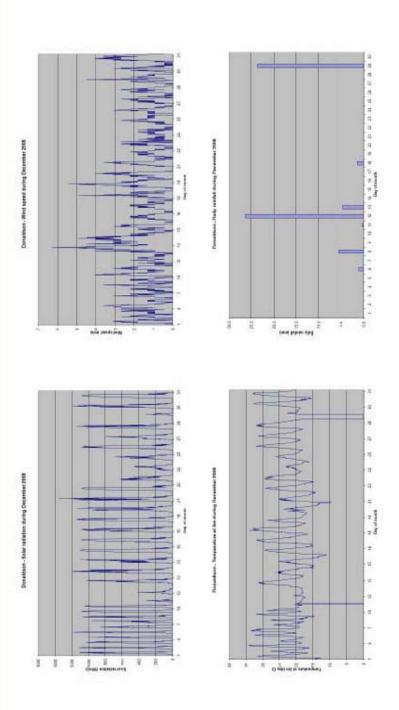
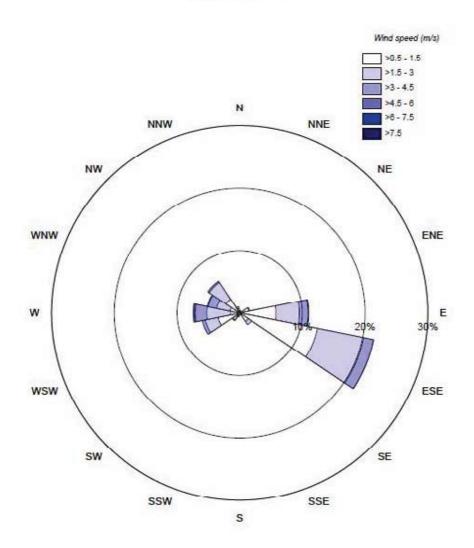


Figure 6: Meteorological conditions



Windrose for Donaldson December 2008



Calms = 34.0%



DONALDSON MONITORING

DUST AND METEOROLOGICAL DATA JANUARY 2009 REPORT

Donaldson Coal

Job No: 2815

24 March 2009



A PEL Company

2008/2009 ANNUAL ENVIRONMENTAL **MANAGEMENT REPORT**

Abel Underground Coal Mine Report No. 737/04



PROJECT TITLE: DUST AND METEOROLOGICAL DATA

JANUARY 2009 REPORT

JOB NUMBER: 2815

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1 INTRODUCTION

As part of their Air Quality Management Plan Donaldson operate a dust monitoring network in the vicinity of the mining lease and a meteorological station on site. This report has been prepared in order to bring together the various data collected throughout the network during January 2009 and to summarise the information.

The dust network includes continuous monitoring, high volume air sampling and dust deposition monitoring. The continuous monitoring network consists of two DustTrak monitors measuring PM₁₀ at two sites and a GRIMM monitor which is used for one week each quarter to measure PM_{2.5} and PM₁₀ simultaneously.

There are two locations which use high volume air samplers to determine concentrations of PM₁₀ and TSP. These operate on a six-day cycle in line with similar measurements made by the NSW Department of Environment and Climate Change (DECC) at other locations throughout the state

In addition to concentration measurements, monthly levels of dust deposition are also measured using eleven gauges placed at various locations in the area of the mine. The locations of each of these monitors and gauges are shown in <u>Figure 1</u>.

Table 1 lists the monitors used and pollutants measured at these locations.

Table 1: Summary of monitoring locations and instruments

Monitoring Location	Instruments Used	Pollutant Monitored		
Beresfield	HVAS	PM ₁₀		
Blackhill	HVAS HVAS DustTrak Grimm (1 week per quarter)	PM ₁₀ TSP PM ₁₀ PM ₁₀ , PM _{2.5}		
Weakleys Drive	DustTrak	PM ₁₀		
DG1 - DG11	Deposition Gauges	Dust Deposition		

The meteorological station is situated at the site of the office buildings and measures the following parameters:

- wind speed
- · wind direction
- sigma theta
- temperature
- solar radiation
- · relative humidity, and
- rainfall

The data are downloaded at various intervals by Donaldson and then forwarded to PAEHolmes for processing.



2 HIGH VOLUME AIR SAMPLING

High Volume Air Sampling (HVAS) was carried out at Beresfield and Blackhill by Metford Laboratories. PM_{10} is measured at both sites while TSP is only measured at Blackhill. The data collected during January 2009 are summarised in **Table 2**. A graph consisting of all the data collected to date is shown in Figure 2.

Table 2: HVAS from Beresfield and Blackhill for January 2009

Date	Beresfield PM ₁₀ (µg/m²)	Blackhill PM ₁₀ (µg/m³)	Blackhill TSP (µg/m³)
6/1/2009	65	34	67
12/1/2009	27	13	32
18/1/2009	22	13	28
24/1/2009	45	26	54
30/1/2009	30	15	30
Annual average	24	15	31

These measurements will include all background sources relevant to that location, including contributions from the Donaldson mining operations.

On the days that the instruments were monitoring, the highest 24-hour average PM_{10} concentration in January 2009 was 65 $\mu g/m^3$, measured on the 6^{th} at the Beresfield site. On this occasion the measured PM_{10} concentration exceeded the 50 $\mu g/m^3$ 24-hour NEPM goal. The cause of this event has not been determined and will be investigated. The measured concentration of TSP and PM_{10} at Blackhill are also relatively high on that day.

TSP measurements from the Blackhill site show that concentrations were below the NHMRC 90 $\mu g/m^3$ annual average TSP goal. It should be noted that the NHMRC goal refers to an annual average and not a 24-hour average as measured by the high volume air sampler. The annual average TSP concentration for the 12 months to January 2009 was 31 $\mu g/m^3$.

Figure 2 shows a seasonal trend in PM_{10} concentrations, peaking during the warmer months and decreasing during autumn and winter. This is a common trend and is seen consistently in the Hunter Valley.

The annual average PM_{10} concentrations for Beresfield and Blackhill were 24 $\mu g/m^3$ and 15 $\mu g/m^3$ respectively for the 12 months to January 2009. These are below the DECC's annual average PM_{10} air quality criterion of 30 $\mu g/m^3$.

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3 CONTINUOUS MONITORING

3.1 DustTrak Monitoring at Blackhill

Figure 3 shows a time series of the PM₁₀ data collected from the DustTrak monitor at the Blackhill site. No valid data were collected for the month of January.

A power failure at the Blackhill monitoring site is suspected as the main cause for no data being recorded.

3.2 DustTrak Monitoring at Weakleys Drive

A time series of the PM_{10} data collected from the Weakleys Drive site is shown in Figure 4. No valid data were collected for the month of January 2009.

The loss of data was caused by a malfunctioning DustTrak monitor. The monitor has since been replaced.

3.3 Grimm Monitoring

No Grimm monitoring was scheduled for January.



4 DUST DEPOSITION MONITORING

Dust deposition monitoring is carried out each month via a network consisting of eleven (11) gauges. The results for January 2009 are shown in Table 3, in conjunction with results for the previous eleven months in order to provide an annual average for that period. A table showing the complete data set from July 2000 in provided in Appendix A.

Table 3: Dust deposition monitoring for the 12-month period to January 2009

	Monthly dust deposition rate (q/m²/month)												
Month	DG1	DG2	DG3	DG4	DG5A	DG6	DG7	DG8	DG9	DG10	DG11		
Feb-08	0.4	0.1	14*	0.1	0.1	0.3	0.1	0.3	0.2	0.2	0.3		
Mar-08	4.5	0.6	9.2*	0.6	2.9	2.1	0.6	1.5	0.5	1	0.9		
April-08	0.4 "	0.4 "	0.8 "	0.4 "	0.4 "	0.8	1.1 "	1.7 "	1.2	1.1 "	1.1 "		
May-08	1.1	2.4 "	0.9	1.4	0.9	0.9	0.7	2.7	1 "	1.1	1.3 "		
Jun-08	0.2	0.4 "	0.1	0.5	0.1	0.1	0.3	0.5 "	0.1	0.8	0.2		
Jul-08	0.4	0.7	1.3 "	0.6	0.8 #	0.9	0.8	1	0.7	0.5	1.1		
Aug-08	1 "	0.5 "	0.7	0.6 *	0.5	1.9 "	0.8	1 "	1 *	0.9 "	1.4		
Sep-08	0.6	1 "	1.3 "	0.7 "	0.6 "	0.9 *	0.6	0.9	0.9 *	0.9 "	1.8 "		
Oct-08	1'	0.5 "	1"	1.3 "	1.3 "	1.2	1 "	1.4 "	0.8	1.6	1.8 "		
Nov-08	0.8	1.4 "	2.7 *	2.5	0.9 #	1.2 *	0.8	2.4	1.1 "	1'	1.7 *		
Dec-08	0.4	0.4	0.6 *	0.5	0.3 *	1.1 "	0.6	15+	0.9 *	0.7 *	1.2 *		
Jan-09	1.1 "	3 ,	1.6	0.8	0.9 *	1.4	0.7	1.5 "	0.9 *	0.9 *	5+		
Annual Average	1.0	1.3	1.1	0.8	0.8	1.1	0.7	1.4	0.8	0.9	1.2		

Data supplied by Metford Laboratories. * Insects/bird droppings reported. *Invalid (excess bird droppings / animals present).

The highest dust deposition measurement in January 2009 was 1.6 g/m 2 /month at DG3; the accompanying laboratory report showed the sample was contaminated with insects. The contaminated readings determined to be invalid have been removed when calculating the annual average. The annual average deposition rates were low and below 2 g/m 2 /month at all gauges, indicating good air quality with respect to dust deposition.



5 METEOROLOGICAL MONITORING

Monthly plots of the wind speed, temperature, solar radiation, and rainfall data collected in January 2009 are shown in <u>Figure 6</u> and a windrose is shown in <u>Figure 7</u>.

The graphs shown in <u>Figure 6</u> indicate that the instruments were recording appropriately. Data maxima and minima all appeared to be sensible for this site during January. Total rainfall for the month was 11.3 mm.

A windrose (see Figure 7) created from the available 30-minute average wind data shows that winds were predominantly from the east-southeast. The site recorded calms (wind speed less than or equal to 0.5 m/s) for approximately 30.6% of the time. This is quite a high percentage but is similar to the value for January 2008.

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APPENDIX A

ALL DUST DEPOSITION DATA



											TIL
Dust deposition (q/m²/month)											
Month		D2	0.3	D4	DSA	D6	D7	DS		D10	D11
May-00	0.4	0.4		0.7	0.9	0.6	3.6	1.6	0.5	1.8	
Jun-00	0.7	0.5	0.5	0.7	0.8	0.4	3.8	3.2	0.5	0.7	-
Jul-00	0.4	0.4	0.5	0.7	0.8	0.5	0.8	1.5	0.4	0.4	-
Aug-00	0.9	0.6	1.0	1.2	1.1	1.0	3.4	0.7	0.7	0.6	-
Sep-00	0.8	0.9	1.1	0.9	1.3	1.0	2.2	1.0	1.0	0.8	-
Oct-00	0.4	0.6	1.1	0.9	0.9	0.8	5.3	0.9	0.6	0.5	
Nov-00	5.2	0.7	1.4	8.0	1.0	0.4	24.1	9.4	1.1	0.6	
Dec-00	2.8	1.4	1.9	1.3	1.1	0.8	2.1	2.5	0.9	0.9	-
Jan-01	0.7	1.7	1.4	1.8	0.7	1.3	1.1	2.4	1.1	0.6	-
Feb-01	0.9	3.1	2.0	0.5	0.9	0.7	0.7	6.7	1.3	0.5	1.0
Mar-01	0.8	2.1	1.3	0.6	0.7	0.6	0.6	5.5	0.6	0.6	1.5
Apr-01	0.8	0.7	1.3	0.5	0.7	0.4	0.3	5.1	0.7	0.6	0.8
May-01	0.2	0.2	0.4	0.4	0.3	0.3	0.6	1.8	0.6	0.8	0.9
Jun-01	0.5	0.4	0.5	1.0	1.0	0.4	0.4	8.8	0.7	0.6	0.6
Jul-01	0.5	0.3	1.8	0.5	0.8	-	16.3	4.9	0.9	0.7	0.7
Aug-01	0.4	0.4	0.8	0.8	1.0	1.7	1.0		1.0	1.8	1.1
Sep-01	0.7	1.0	1.7	1.1	1.7	0.7		6.0	1.1	1.3	1.7
Oct-01	1.1	0.6	4.6	0.9	0.7	0.9	1.2	1.9	0.9	0.6	1.7
Nov-01	0.9	1.0	1.1	1.1	0.8	1.1	6.0	5.5	1.3	1.9	2.3
Dec-01	4.9	0.9	4.2	0.9	1.3	1.9	1.2	3.1	1.2	9.7	1.8
Jan-02	0.8	1.0	1.5	1.3	1.1	1.4	1.3	1.5	1.1	0.9	1.5
Feb-02	1.1	1.1	0.9	0,3	0.4	0.5	3.1	5.1	0.5	0.5	0.9
Mar-02	1.7	2.1	1.6	0.7	0.7	0.8	1.0	18	1.0	0.9	1.7
Apr-02	1.0	0.4	1.0	8.0	0.8	0.6	0.9	10.1	0.5	0.7	1.0
May-02	0.6	0.6	6.0	0.7	0.4	1.2	0.9	3.1	0.7	0.2	1.0
Jun-02	1.4	0.4	1.7	0.6	0.5	0.8	0.6	2.1	0.6	0.5	1.0
Jul-02	0.7	0.7	-	8.0	0.8	0.7	1.2	-	1.1	0.5	1.0
Aug-02	1.3	0.8	1.4	1.2	1.1	1.2	1.5	4	1.5	0.9	1.6
Sep-02	0.5	1.2	1.1	0.8	0.5	0.7	5.1	9.3	1.6	0.6	1.0
Oct-02	2.2	1.4	5.2	1.5	1.5	1.4	1.4	3.4	-	1.5	3.1
Nov-02	2.8	1.8	3.7	1.6	0.1	1.8	2.1	3.5	2,1	2	1.9
Dec-02	2.0		2.5	1.5	3.0	1.5	1.8	4.1	1.6	1.2	1.9
Jan-03	2.1	1.5	2,7	1.5	1.0	1.9	2.2	2.5	1.1	1.0	1.6
Feb-03	1.4	1.1	2,6	1.1	0.9	1.2	1.7	5.9	1.2	1.0	1.5
Mar-03	0.8	0.5	1.2	1.2	0.6	2.1	1.5	3.4	-	3.6	9.5
Apr-03	0.5	1.0	0.6	1.0	0.7	0.5	1.1	8.0	*	2.0	1.0
May-03	0.5	0.4	0.6	0.2	0.2	0.6	1.3	1.6	0.5	0.8	1.2
Jun-03	0.5	0.6	0.8	0.8	0.4	0.6	0.8	0.7	0.9	0.7	0.7
Jul-03	0.3	0.4	0.4	0.6	0.4	0.5	0.7	0.5	0.5	0.5	0.7
Aug-03	0.8	0.2	0.7	1.1	0.5	1.3	1.8	2.1	1.3	0.7	0.9
Sep-03	0.6	0.7	1.1	0.7	0.8	1.7	1.4	1.3	2.5	0.9	1.3
Oct-03	2	0.9	1.4	0.9	0.7	1.9	1.0	1.4	0.6	0.8	1.3
Nov-03	2.6	0.8	1.0	1.1	0.4	1.3	1.5	1.5	-	0.8	1.3
Dec-03	1.0	1.0	1.4	1.3	1.1	1.5	1.6	2.0	1.8	0.9	1.4
Jan-04	8.5	1,5	2.1	1.5	1.3	2.6	1.4	2.2	1.7	1.5	1.7
Feb-04	1.2	1.0	1.7	1.4	0.7	3.1	1.6	2.2	-	1.5	2.3
Mar-04	0.4	0.6	6.6	1.2	0.7	1.9	1.1	12.1	4.8	1.5	1.1



										_	IK
Apr-04	0.6	1.0	0.8	0.8	0.6	1.9	0.8	1.4	0.9	1.2	1.1
May-04	0.2	0.9	2.2	0.9	0.8	0.7	0.9	1.4	1.2	0.9	1.5
Jun-04	0.4	0.6	0.7	0.9	0.6	1.4	1.0	0.9	1.0	1.0	0.8
Jul-04	0.4	0.6	5.3#	0.6	0.5	2.9	1.0	1.1	0.9	0.6	1.2
Aug-04	0.5	0.5	0.5	1.3	0.7	1.1	1.1	1.4		1.0	1.0
Sep-04	0.6	0.6	0.8	2.2	1.0	1.0	0.9	4.4	0.9	16.7	1.1
Oct-04	0.7	0.9	1.2	0.9	0.8	1.4	1.0	10.5	1.0	1.0	0.8
Nov-04	0.8	0.7	1.3	1.9	0.7	0.9	1.0	3.0	1.1	1.1	1.6
Dec-04	2.0	1.4	3.6	1.5	1.3	2.2	3.2	7.9	1.8	5.5	2.5
Jan-05	1.2	1.0	3.7	1.6	1.4	4.0	2.3	2.7	2.6	2.5	2.8
Feb-05	1.2	1.2	1.8	1.6	1.3	2.0	1.7	-	2.3	1.5	2.3
Mar-05	1.3	0.9	1.4	0.9	0.9	3.0	1.2	7.7		0.8	1.3
Apr-05	1.1	0.7	0.9	0.8	0.7	0.9	1.4	3.3	1.1	0.8	0.9
May-05	0.7	8.6	1.1	0.8	0.7	0.8	0.9	4.4	1.2	0.8	1.1
Jun-05	1.3	0.8	1.3	1.3	0.8	1.2	1.2	1.3	1.5	2.5	0.9
Jul-05	1.0	0.5	0.5	0.7	0.4	1.6	0.7	1.2	0.8	4.3	1.1
Aug-05	0.6	0.6	0.8	1.0	0.8	0.9	0.7	1.0	0.9	1.0	0.9
Sep-05	0.6	0.7	0.8	0.7	0.7	1.2	1.3	1.3	1.0	0.9	1.1
Oct-05	0.8	0.9	1.3	0.9	0.8	1.4	1.2	1.9	1.3	1.1	1.3
Nov-05	- 0.0	1250000	2.3	2.0	1.7	1.2	2.0	3.2	1000	1.4	2.2
14.00	13085	2.3	CALCOL.	-	1000000	The state of	2000	3,2	1.6	625Ga	50,360
Dec-05 Jan-06	1.0	2.1	1.7	3.3	2.6	3.4	2.3	2.7	1.3	2.1	1.5
Feb-06	2.2	- Billion	7,133300	1.0	3.327	10000	1-0.01	1 (22)	-	7900	100.0
W. San Street	1 13 62	1.0	0.9	1.2	1.1	1.7	1.1	2.9	unicon	2.3	1.8
Mar-06	0.7	0.6	2.3	0.7	0.6	0.9	1.0	1.4	0.7	0.8	1.5
Apr-06	0.6	0.7	1.1	8.0	0.6	1.1	8.0	1.0	1.0	1.8	1.5
May-06	1.0	3.1	1.0	-202	1.1	1.4	1.1	4.1	1863	7.0	1.5
Jun-06	0.4	0.3	0.7	0.5	0.4	0.6	0.7	0.8	0.6	0.9	0.9
Jul-06	0.3	0.3	1	1.3	0.4	0.7	0.7	2.7	-	0.6	0.6
Aug-06	0.9	0.6	0.8	0.7	0.7	0.8	0.7	1.7	-	3.7	0.9
Sep-06	1.6	0.7	1.1	1.7	0.7	1	0.9	1.3	1.2	0.8	1.6
Oct-06	2	1.4	1.6	1.8	0.9	1.8	1.2	1.8	1.5	1.8	1.9
Nov-06	4.3	2,2	3	2,3	2.3	5.3	2.4	3.3	2,3	2.3	2.9
Dec-06	1.2	3.4	1.9	2,3	2.3	100.00000	2.1	2.1	2776	4.9	3.9
Jan-07	2	0.9	1.5	0.7	0.7	1.7	1.1	Table Street	1.2	1.7	0.9
Feb-07	1.7	0.9	1.6	0.7	0.6	1	1.8	1.7	1.1	1.2	1.7
Mar-07	1.3	0.9	1.7	0.8	1.2	0.6	2.2	1.7	1	0.9	1.7
Apr-07	0.5	0.7	0.9	0.6	4.8	1.2	0.5	2.7	0.5	0.8	0.9
May-07	0.8	0.5	0.6	1,2	0.6	0.6	0.7	1.9	0.5	0.7	0.8
Jun-07	0.6	0.5	0.7	1.1	0.1	0.5	0.1	0.5	0.1	0.4	0.3
Jul-07	0.5	0.4	0.6	2.1	0.5	0.8	0.6	0.6	0.4	0.5	0.7
Aug-07	1.5	0.4	0.7	1	0.7	0.7	0.5	1	0.6	0.6	0.7
Sep-07	1.3	0.5	1.8	1	0.7	0.9	0.9	1.3	1	0.7	1.6
Oct-07	4.2	0.9	1.1	1.4	1.1	1.7	1.8	1.7	1.6	1.4	2.2
Nov-07	0.8	0.8	1.1	0.9	1.1	1.1	1.1	1.7	0.6	0.8	1.5
Dec-07	1.3	0.8	3	0.7	0.5	0.8	0.5	1.1	0.3	0.8	0.6
Jan-08	2.6	0.8	3.7	0.5	0.5	0.5	0.4	2.2	0,8	0.3	0.8
Feb-08	0.4	0.1	14	0.1	0.1	0.3	0.1	0.3	0.2	0.2	0.3
Mar-08	4.5	0.6	9.2+	0.6	2.9	2.1	0.6	1.5	0.5	1	0.9
April-08	0.4#	0.4#	0.8#	0.4#	0.4#	0.8#	1.1=	1.7#	1.2	1.1=	1.1

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Report No. 737/04



May-08	1.1	2.4#	0.9	1.4	0.9	0.9	0.7	2.7	1#	1.1	1.3#
June-08	0.2	0.4#	0.1	0.5	0.1#	0.1	0.3	0.5#	0.1	0.8	0.2
July-08	0.4	0.7#	1.3#	0.6	0.8#	0.9	0.8	1	0.7	0.5	1.1
Aug-08	1	0.5	0.7	0.6	0.5	1.9	0.8	1	1	0.9	1.4
Sep-08	0.6	1	1.3	0.7	0.6	0.9	0.6	0.9	0.9	0.9	1,8
Oct-08	1	0.5	1	1.3	1.3	1.2	1	1.4	0.8	1.6	1.8
Nov-08	0.8	1.4	2.7	2.5	0.9	1.2	0.8	2.4	1.1	1	1.7
Dec-08	0.4	0.4	0.6	0.5	0.3	1.1	0.6	15	0.9	0.7	1.2
Jan-09	1.1	3=	1.6	0.8	0.9	1.4	0.7	1.5	0.9	0.9	5#

^{- -} sample contaminated

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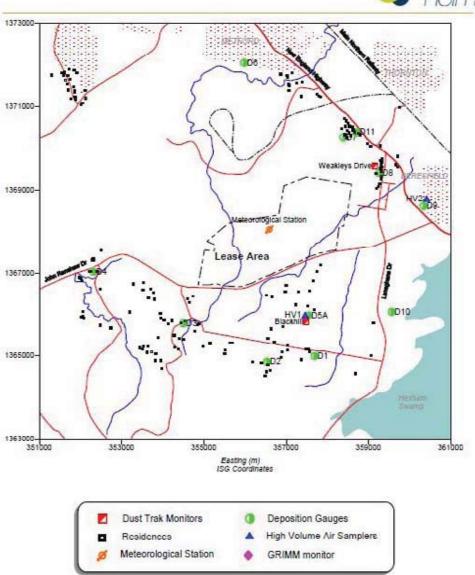
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Location of Project Area

Figure 1: Project Location



High Volume Air Sampling data recorded at Beresfield and Blackhill from December 1999 to January 2009

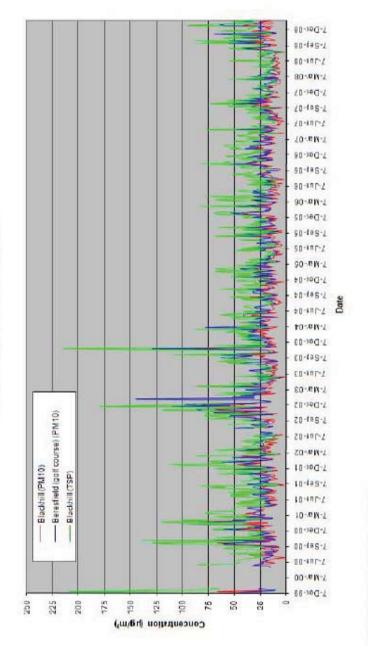


Figure 2: High Volume Air Sampling data

January 2009 Report Donaldson January 2009 Report dock Dust and Meteorological Data Donaldson Coal | PAEHolmes Job 2815

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Measured PM₁₀ concentrations at Blackhill during January 2009

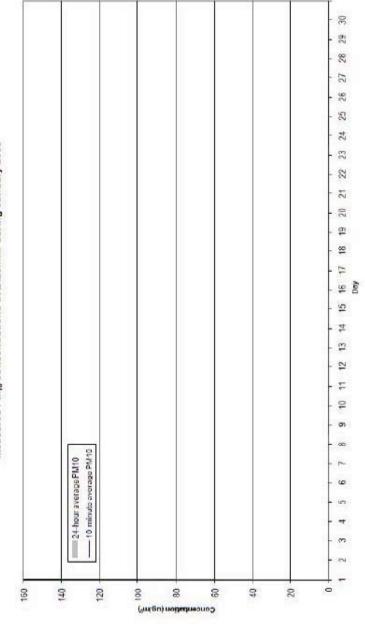


Figure 3: DustTrak sampling data, Blakchill site



Measured PM₁₆ concentrations at Weakleys Drive during January 2009

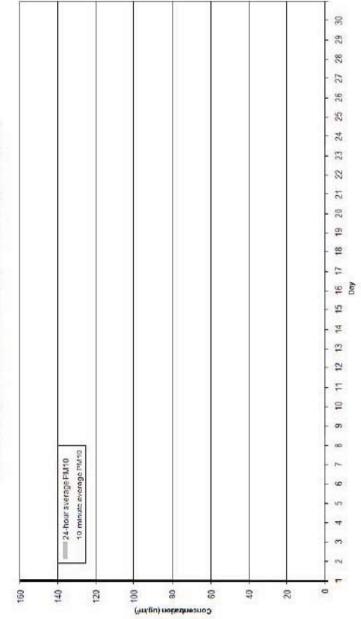


Figure 4: DustTrak sampling data, Weakleys Drive site

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[No Grimm monitoring was scheduled for this month]



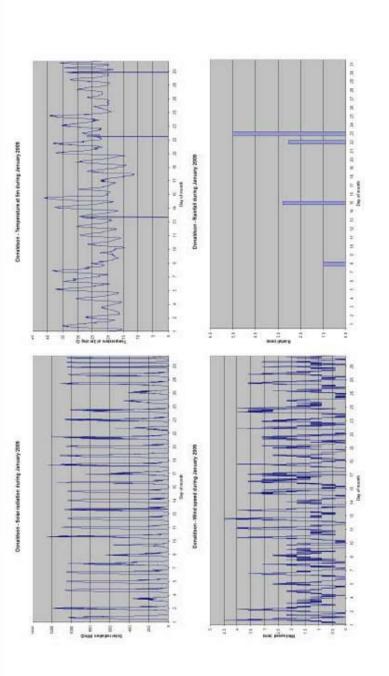
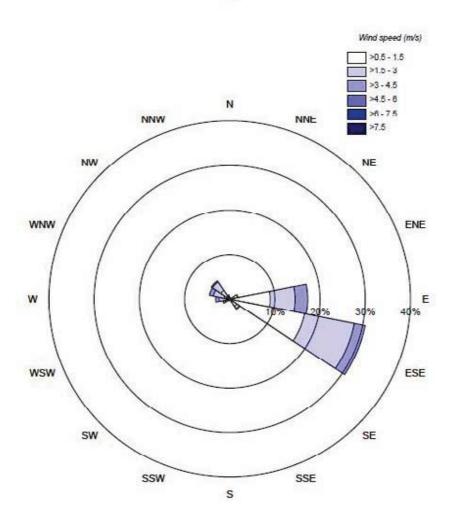


Figure 6: Meteorological conditions



Windrose for Donaldson January 2009



Calms - 30.6%

Figure /: Windrose



DONALDSON MONITORING

DUST AND METEOROLOGICAL DATA FEBRUARY 2009 REPORT

Donaldson Coal

Job No: 2815

24 March 2009



A PEL Company



PROJECT TITLE: DUST AND METEOROLOGICAL DATA

FEBRUARY 2009 REPORT

JOB NUMBER: 2815

PREPARED FOR: Phil Brown

DONALDSON COAL

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1 INTRODUCTION

As part of their Air Quality Management Plan Donaldson operate a dust monitoring network in the vicinity of the mining lease and a meteorological station on site. This report has been prepared in order to bring together the various data collected throughout the network during February 2009 and to summarise the information.

The dust network includes continuous monitoring, high volume air sampling and dust deposition monitoring. The continuous monitoring network consists of two DustTrak monitors measuring PM_{10} at two sites and a GRIMM monitor which is used for one week each quarter to measure $PM_{2.5}$ and PM_{10} simultaneously.

There are two locations which use high volume air samplers to determine concentrations of PM₁₀ and TSP. These operate on a six-day cycle in line with similar measurements made by the NSW Department of Environment and Climate Change (DECC) at other locations throughout the state.

In addition to concentration measurements, monthly levels of dust deposition are also measured using eleven gauges placed at various locations in the area of the mine. The locations of each of these monitors and gauges are shown in Figure 1.

Table 1 lists the monitors used and pollutants measured at these locations.

Table 1: Summary of monitoring locations and instruments

Monitoring Location	Instruments Used	Pollutant Monitored
Beresfield	HVAS	PM ₁₀
Blackhill	HVAS HVAS DustTrak Grimm (1 week per quarter)	PM ₁₀ TSP PM ₁₀ PM ₁₀ , PM _{2.5}
Weakleys Drive	DustTrak	PM ₁₀
DG1 - DG11	Deposition Gauges	Dust Deposition

The meteorological station is situated at the site of the office buildings and measures the following parameters:

- wind speed
- wind direction
- sigma theta
- temperature
- solar radiation
- · relative humidity, and
- rainfall

The data are downloaded at various intervals by Donaldson and then forwarded to PAEHolmes for processing.

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2 HIGH VOLUME AIR SAMPLING

High Volume Air Sampling (HVAS) was carried out at Beresfield and Blackhill by Metford Laboratories. PM₁₀ is measured at both sites while TSP is only measured at Blackhill. The data collected during February 2009 are summarised in Table 2. A graph consisting of all the data collected to date is shown in Figure 2.

Table 2: HVAS from Beresfield and Blackhill for February 2009

Date	Beresfield PM ₁₀ (µg/m³)	Blackhill PM ₁₀ (µg/m³)	Blackhill TSP (µg/m³)
5/02/2009	33	21	39
11/02/2009	25	26	30
17/02/2009	38	11	24
23/02/2009	18	18	35
Annual average	25	16	32

These measurements will include all background sources relevant to that location, including contributions from the Donaldson mining operations.

On the days that the instruments were monitoring, the highest 24-hour average PM_{10} concentration in February 2009 was 38 $\mu g/m^3$, measured on the 17^{th} at the Beresfield site. On this occasion the measured PM_{10} concentration did not exceed the 50 $\mu g/m^3$ 24-hour NEPM goal.

TSP measurements from the Blackhill site show that concentrations were below the NHMRC 90 $\mu g/m^3$ annual average TSP goal. It should be noted that the NHMRC goal refers to an annual average and not a 24-hour average as measured by the high volume air sampler. The annual average TSP concentration for the 12 months to February 2009 was 32 $\mu g/m^3$.

Figure 2 shows a seasonal trend in PM_{10} concentrations, peaking during the warmer months and decreasing during autumn and winter. This is a common trend and is seen consistently in the Hunter Valley.

The annual average PM_{10} concentrations for Beresfield and Blackhill were 25 $\mu g/m^3$ and 16 $\mu g/m^3$ respectively for the 12 months to February 2009. These are below the DECC's annual average PM_{10} air quality criterion of 30 $\mu g/m^3$.



3 CONTINUOUS MONITORING

3.1 DustTrak Monitoring at Blackhill

Figure 3 shows a time series of the PM_{10} data collected from the DustTrak monitor at the Blackhill site. No data were collected for the month of February.

A power failure at the Blackhill monitoring site caused a loss of data for the rest of the month. The problem has since been rectified.

3.2 DustTrak Monitoring at Weakleys Drive

A time series of the PM_{10} data collected from the Weakleys Drive site is shown in <u>Figure 4</u>. The DustTrak monitoring for the Weakleys Drive site is available from the 26^{th} to the 28^{th} of February 2009. The available data show that 24-hour average PM_{10} concentration were below the NEPM goal of 50 $\mu g/m^3$. The maximum 24-hour average PM_{10} concentration was 25 $\mu g/m^3$, recorded on the 28^{th} of February.

The lack of data for the month of February was caused by water flooding the DustTrak monitor. The monitor was replaced on the $26^{\rm th}$ of February.

3.3 Grimm Monitoring

No Grimm monitoring was scheduled for February.



4 DUST DEPOSITION MONITORING

Dust deposition monitoring is carried out each month via a network consisting of eleven (11) gauges. The results for February 2009 are shown in Table 3, in conjunction with results for the previous eleven months in order to provide an annual average for that period. A table showing the complete data set from July 2000 in provided in Appendix A.

Table 3: Dust deposition monitoring for the 12-month period to February 2009

	Monthly dust deposition rate (q/m²/month)											
Month	DG1	DG2	DG3	DG4	DG5A	DG6	DG7	DG8	DG9	DG10	DG11	
Mar-08	4.5	0.6	9.2*	0.6	2.9	2.1	0.6	1.5	0.5	1	0.9	
April-08	0.4 "	0.4 "	0.8 "	0.4 *	0.4 *	0.8 *	1.1 *	1.7 *	1.2	1.1 *	1.1 *	
May-08	1.1	2.4 *	0.9	1.4	0.9	0.9	0.7	2.7	1.	1.1	1.3 "	
Jun-08	0.2	0.4 "	0.1	0.5	0.1 "	0.1	0.3	0.5 "	0.1	0.8	0.2	
Jul-08	0.4	0.7 *	1.3 "	0.6	0.8 "	0.9	0.8	1	0.7	0.5	1.1	
Aug-08	1 "	0.5 "	0.7 *	0.6 "	0.5	1.9 *	0.8 *	1 *	1"	0.9 *	1.4	
Sep-08	0.6 "	1'	1.3 "	0.7 '	0.6 "	0.9 *	0.6	0.9	0.9 "	0.9 *	1.8 "	
Oct-08	1 *	0.5 "	1 *	1.3 *	1.3 *	1.2	1 "	1.4 *	0.8	1.6 *	1.8 *	
Nov-08	0.8 *	1.4 *	2.7 *	2.5	0.9 *	1.2 *	0.8 *	2.4 *	1.1 *	1 *	1.7 *	
Dec-08	0.4 *	0.4 *	0.6 *	0.5 *	0.3 *	1.1 *	0.6	15*	0.9 *	0.7	1.2 *	
Jan-09	1.1 *	3 *	1.6 *	0.8 *	0.9 #	1.4	0.7 *	1.5 *	0.9 *	0.9 *	5 +	
Feb-09	0.4 *	4.4 *	1.5 *	1.1 *	0.9	1.6 *	0.8	1.2	1.4	2.5 *	1.2	
Annual Average	1.0	1.7	1.1	0.9	0.9	1.2	0.7	1.4	0.9	1.1	1.2	

Data supplied by Metford Laboratories. * Insects/bird droppings reported. *Invalid (excess bird droppings).

The highest dust deposition measurement in February 2009 was 4.4 g/m²/month at DG2; the accompanying laboratory report showed the sample was contaminated with insects. The contaminated readings determined to be invalid have been removed when calculating the annual average. The annual average deposition rates were low and below 2 g/m²/month at all gauges, indicating good air quality with respect to dust deposition.



5 METEOROLOGICAL MONITORING

Monthly plots of the wind speed, temperature, solar radiation, and rainfall data collected in February 2009 are shown in <u>Figure 6</u> and a windrose is shown in <u>Figure 7</u>.

The graphs shown in <u>Figure 6</u> indicate that the instruments were recording appropriately. Data maxima and minima all appeared to be sensible for this site during February. Total rainfall for the month was 340.7 mm.

A windrose (see Figure 7) created from the available 30-minute average wind data shows that winds were predominantly from the east-southeast. The site recorded calms (wind speed less than or equal to 0.5 m/s) for approximately 25.1% of the time. This is quite a low percentage and is less than the value for February 2008.

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APPENDIX A

ALL DUST DEPOSITION DATA



				Dust deposition (g/m²/month)							
Month	D1	D2		D4	DSA	D6	D7	D8	D9	D10	D11
May-00	0.4	0.4	-	0.7	0.9	0.6	3.6	1.6	0.5	1.8	(4)
Jun-00	0.7	0.5	0.5	0.7	0.8	0.4	3.8	3.2	0.5	0.7	(+)
Jul-00	0.4	0.4	0.5	0.7	0.8	0.5	0.8	1.5	0.4	0.4	-
Aug-00	0.9	0.6	1.0	1.2	1.1	1.0	3.4	0.7	0.7	0.6	+1
Sep-00	0.8	0.9	1.1	0.9	1.3	1.0	2.2	1.0	1.0	0.8	-
Oct-00	0.4	0.6	1.1	0.9	0.9	0.8	5.3	0.9	0.6	0.5	-
Nov-00	5.2	0.7	1.4	0.8	1.0	0.4	24.1	9.4	1.1	0.6	
Dec-00	2.8	1.4	1.9	1.3	1.1	0.8	2.1	2,5	0.9	0.9	-
Jan-01	0.7	1.7	1.4	1.8	0.7	1.3	1.1	2.4	1.1	0.6	-
Feb-01	0.9	3.1	2.0	0.5	0.9	0.7	0.7	6.7	1.3	0.5	1.0
Mar-01	0.8	2.1	1.3	0.6	0.7	0.6	0.6	5.5	0.6	0.6	1.5
Apr-01	0.8	0.7	1.3	0.5	0.7	0.4	0.3	5.1	0.7	0.6	0.8
May-01	0.2	0.2	0.4	0.4	0.3	0.3	0.6	1.8	0.6	0.8	0.9
Jun-01	0.5	0.4	0.5	1.0	1.0	0.4	0.4	8.8	0.7	0.6	0.6
Jul-01	0.5	0.3	1.8	0.5	0.8	-	16.3	4.9	0.9	0.7	0.7
Aug-01	0.4	0.4	0.8	0.8	1.0	1.7	1.0		1.0	1.8	1.1
Sep-01	0.7	1.0	1.7	1.1	1.7	0.7	12	6.0	1.1	1.3	1.7
Oct-01	1.1	0.6	4.6	0.9	0.7	0.9	1.2	1.9	0.9	0.6	1.7
Nov-01	0.9	1.0	1.1	1.1	0.8	1.1	6.0	5.5	1.3	1.9	2.3
Dec-01	4.9	0.9	4.2	0.9	1.3	1.9	1.2	3.1	1.2	9.7	1.8
Jan-02	0.8	1.0	1.5	1.3	1.1	1.4	1,3	1.5	1.1	0.9	1.5
Feb-02	1.1	1.1	0.9	0.3	0.4	0.5	3.1	5.1	0.5	0.5	0.9
Mar-02	1.7	2,1	1.6	0.7	0.7	0.8	1.0	18	1.0	0.9	1.7
Apr-02	1.0	0.4	1.0	0.8	0.8	0.6	0.9	10.1	0.5	0.7	1.0
May-02	0.6	0.6	6.0	0.7	0.4	1.2	0.9	3.1	0.7	0.2	1.0
Jun-02	1.4	0.4	1.7	0.6	0.5	0.8	0.6	2.1	0.6	0.5	1.0
Jul-02	0.7	0.7	+1	0.8	0.8	0.7	1.2	-	1.1	0.5	1.0
Aug-02	1.3	0.8	1.4	1.2	1.1	1.2	1.5	-	1.5	0.9	1.6
Sep-02	0.5	1.2	1.1	0.8	0.5	0.7	5.1	9.3	1.6	0.6	1.0
Oct-02	2.2	1.4	5.2	1.5	1.5	1.4	1.4	3.4	-	1.5	3.1
Nov-02	2.8	1.8	3.7	1.6	0.1	1.8	2.1	3.5	2.1	2	1.9
Dec-02	2.0		2.5	1.5	3.0	1.5	1.8	4.1	1.6	1.2	1.9
Jan-03	2.1	1.5	2.7	1.5	1.0	1.9	2.2	2.5	1.1	1.0	1.6
Feb-03	1.4	1.1	2.6	1.1	0.9	1.2	1.7	5.9	1.2	1.0	1.5
Mar-03	0.8	0.5	1.2	1.2	0.6	2.1	1.5	3.4	-	3.6	9.5
Apr-03	0.5	1.0	0.6	1.0	0.7	0.5	1.1	8.0		2.0	1.0
May-03	0.5	0.4	0.6	0.2	0.2	0.6	1.3	1.6	0.5	0.8	1.2
Jun-03	0.5	0.6	0.8	0.8	0.4	0.6	0.8	0.7	0.9	0.7	0.7
Jul-03	0.3	0.4	0.4	0.6	0.4	0.5	0.7	0.5	0.5	0.5	0.7
Aug-03	0.8	0.2	0.7	1.1	0.5	1.3	1.8	2.1	1.3	0.7	0.9
Sep-03	0.6	0.7	1.1	0.7	0.8	1.7	1.4	1.3	2.5	0.9	1.3
Oct-03	-	0.9	1.4	0.9	0.7	1.9	1.0	1.4	0.6	0.8	1.3
Nov-03	2.6	0.8	1.0	1.1	0.4	1.3	1.5	1.5	-	0.8	1.3
Dec-03	1.0	1.0	1.4	1.3	1.1	1.5	1.6	2.0	1.8	0.9	1.4
Jan-04	8.5	1.5	2.1	1.5	1.3	2.6	1.4	2.2	1.7	1.5	1.7
Feb-04	1.2	1.0	1.7	1.4	0.7	3.1	1.6	2.2	-	1.5	2.3
Mar-04	0.4	0.6	6.6	1.2	0.7	1.9	1.1	12.1	4.8	1.5	1.1



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Apr-04	0.6	1.0	0.8	0.8	0.6	1.9	0.8	1.4	0.9	1.2	1.1
May-04	0.2	0.9	2.2	0.9	0.8	0.7	0.9	1.4	1.2	0.9	1.5
Jun-04	0.4	0.6	0.7	0.9	0.6	1.4	1.0	0.9	1.0	1.0	0.8
Jul-04	0.4	0.6	5.3#	0.6	0.5	2.9	1.0	1.1	0.9	0.6	1.2
Aug-04	0.5	0.5	0.5	1.3	0.7	1.1	1.1	1.4		1.0	1.0
Sep-04	0.6	0.6	0.8	2.2	1.0	1.0	0.9	4.4	0.9	16.7	1.1
Oct-04	0.7	0.9	1.2	0.9	0.8	1.4	1.0	10.5	1.0	1.0	0.8
Nov-04	0.8	0.7	1.3	1.9	0.7	0.9	1.0	3.0	1.1	1.1	1.6
Dec-04	2.0	1.4	3.6	1.5	1.3	2.2	3.2	7.9	1.8	5.5	2.5
Jan-05	1.2	1.0	3.7	1.6	1.4	4.0	2.3	2.7	2.6	2.5	2.8
Feb-05	1.2	1.2	1.8	1.6	1.3	2.0	1.7	_	2.3	1.5	2.3
Mar-05	1.3	0.9	1.4	0.9	0.9	3.0	1.2	7.7		0.8	1.3
Apr-05	1.1	0.7	0.9	0.8	0.7	0.9	1.4	3.3	1.1	0.8	0.9
May-05	0.7	8.6	1.1	0.8	0.7	0.8	0.9	4.4	1.2	0.8	1.1
Jun-05	1.3	0.8	1.3	1.3	0.8	1.2	1.2	1.3	1.5	2.5	0.9
Jul-05	1.0	0.5	0.5	0.7	0.4	1.6	0.7	1.2	0.8	4.3	1.1
Aug-05	0.6	0.6	0.8	1.0	0.8	0.9	0.7	1.0	0.9	1.0	0.9
Sep-05	0.6	0.7	0.8	0.7	0.7	1.2	1.3	1.3	1.0	0.9	1.1
Oct-05	0.8	0.9	1.3	0.9	0.8	1.4	1.2	1.9	1.3	1.1	1.3
Nov-05	-	2.3	2.3	2.0	1.7	1.2	2.0	3.2	1.6	1.4	2.2
Dec-05	1.9	3.2	2.3	3.3	2.6	3.4	2.3	-	1.3	2.1	3.9
Jan-06	1.0	2.1	1.7	1.0	23.	3.5	-	2.7	1.1	-	1.5
Feb-06	2.2	1.0	0.9	1.2	1.1	1.7	1.1	2.9	1000	2.3	1.8
Mar-06	0.7	0.6	2.3	0.7	0.6	0.9	1.0	1.4	0.7	0.8	1.5
Apr-06	0.6	0.7	1.1	0.8	0.6	1.1	0.8	1.0	1.0	1.8	1.5
May-06	1.0	3.1	1.0		1.1	1.4	1.1	4.1		7.0	1,5
Jun-06	0.4	0.3	0.7	0.5	0.4	0.6	0.7	0.8	0.6	0.9	0.9
Jul-06	0.3	0.3	1	1.3	0.4	0.7	0.7	2.7	(C)	0.6	0.6
Aug-06	0.9	0.6	0.8	0.7	0.7	0.8	0.7	1.7	2	3.7	0.9
Sep-06	1.6	0.7	1.1	1.7	0.7	1	0.9	1.3	1.2	0.8	1.6
Oct-06	2	1.4	1.6	1.8	0.9	1.8	1.2	1.8	1.5	1.8	1.9
Nov-06	4.3	2.2	3	2.3	2.3	5.3	2.4	3.3	2.3	2.3	2.9
Dec-06	1.2	3.4	1.9	2.3	2.3		2.1	2.1		4.9	3.9
Jan-07	2	0.9	1.5	0.7	0.7	1.7	1.1		1.2	1.7	0.9
Feb-07	1.7	0.9	1.6	0.7	0.6	1	1.8	1.7	1.1	1.2	1.7
Mar-07	1.3	0.9	1.7	0.8	1.2	0.6	2.2	1.7	1	0.9	1.7
Apr-07	0.5	0.7	0.9	0.6	4.8	1.2	0.5	2.7	0.5	0.8	0.9
May-07	0.8	0.5	0.6	1.2	0.6	0.6	0.7	1.9	0.5	0.7	0.8
Jun-07	0.6	0.5	0.7	1.1	0.1	0.5	0.1	0.5	0.1	0.4	0.3
Jul-07	0.5	0.4	0.6	2.1	0.5	0.8	0.6	0.6	0.4	0.5	0.7
Aug-07	1.5	0.4	0.7	1	0.7	0.7	0.5	1	0.6	0.6	0.7
Sep-07	1.3	0.5	1.8	1	0.7	0.9	0.9	1.3	1	0.7	1.6
Oct-07	4.2	0.9	1.1	1.4	1.1	1.7	1.8	1.7	1.6	1.4	2.2
Nov-07	0.8	0.8	1.1	0.9	1.1	1.1	1.1	1.7	0.6	0.8	1.5
Dec-07	1.3	0.8	3	0.7	0.5	0.8	0.5	1.1	0.3	0.8	0.6
Jan-08	2.6	0.8	3.7	0.5	0.5	0.5	0.4	2.2	0.8	0.3	0.8
Feb-08	0.4	0.1	14	0.1	0.1	0.3	0.1	0.3	0.2	0.2	0.3
Mar-08	4.5	0.6	9.2+	0.6	2,9	2.1	0.6	1.5	0.5	1	0.9
April-08	0.4"	0.4"	0.8"	0.4"	0.4"	0.8"	1.1"	1.7*	1.2	1.1"	1.1"



May-08	1.1	2.4*	0.9	1.4	0.9	0.9	0.7	2.7	1"	1.1	1.3
June-08	0.2	0.4"	0.1	0.5	0.1"	0.1	0.3	0.5*	0.1	0.8	0.2
July-08	0.4	0.7*	1.3*	0.6	0.8*	0.9	0,8	1	0.7	0.5	1.1
Aug-08	1	0.5	0.7	0.6	0.5	1.9	0.8	1	1	0.9	1.4
Sep-08	0.6	1	1.3	0.7	0.6	0.9	0.6	0.9	0.9	0.9	1.8
Oct-08	1	0.5	1	1.3	1.3	1.2	1	1.4	0.8	1.6	1.8
Nov-08	0.8	1.4	2.7	2.5	0.9	1.2	0.8	2.4	1.1	1	1.7
Dec-08	0.4	0.4	0.6	0.5	0.3	1.1	0.6	15	0.9	0.7	1.2
Jan-09	1.1	3"	1.6	0.8	0.9	1.4	0.7	1.5	0.9	0.9	5#
Feb-09	0.4	4.4	1.5	1.1	0.9	1.6	0.8	1.2	1.4	2.5	1.2

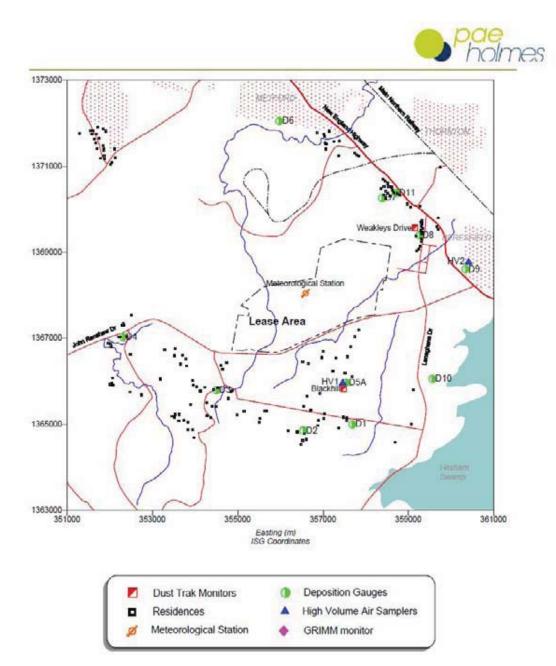
 ⁻ sample contaminated

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Location of Project Area

Figure 1: Project Location



High Volume Air Sampling data recorded at Beresfield and Blackhill from December 1999 to February 2009

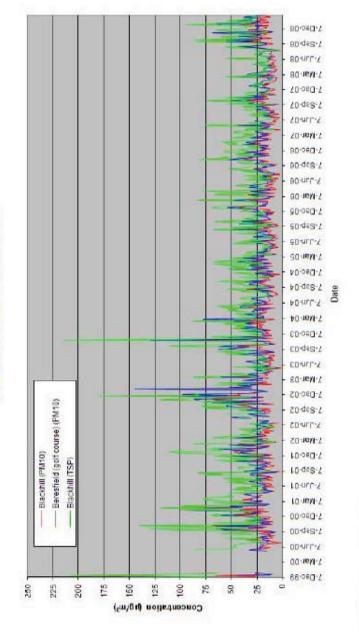


Figure 2: High Volume Air Sampling data

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Measured PM₁₀ concentrations at Blackhill during February 2009

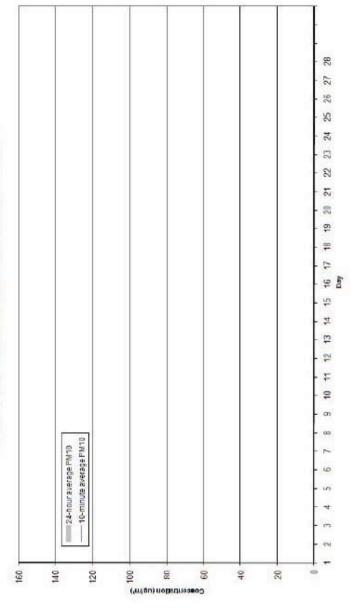


Figure 3: DustTrak sampling data, Blakchill site



Measured PM₁₀ concentrations at Weakleys Drive during February 2009

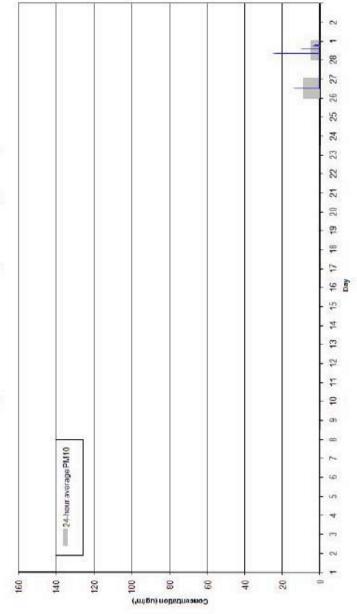


Figure 4: DustTrak sampling data, Weakleys Drive site

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[No Grimm monitoring was scheduled for this month]

Figure 5: Grimm monitoring data

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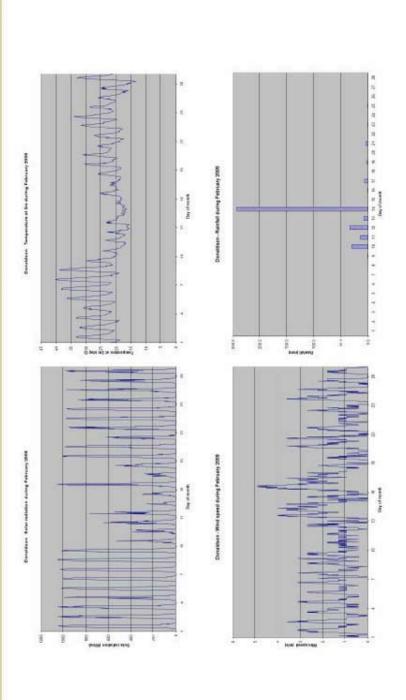
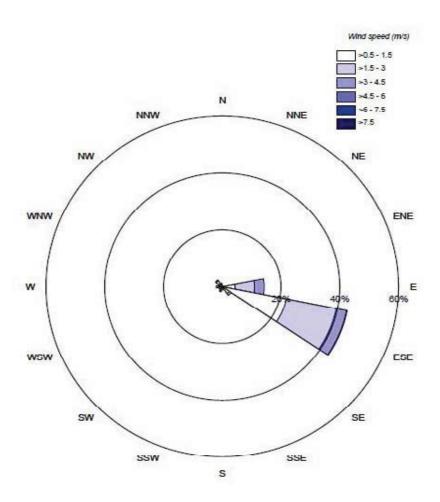


Figure 6: Meteorological conditions



Windrose for Donaldson February 2009



Calms = 25.1%

Figure 7: Windrose



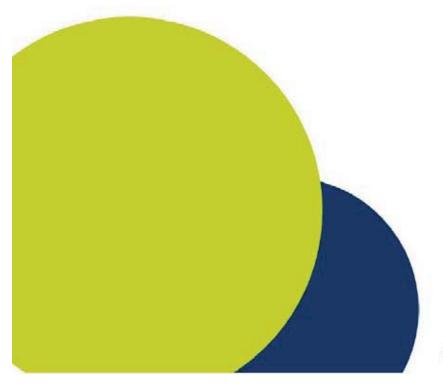
DONALDSON MONITORING

DUST AND METEOROLOGICAL DATA MARCH 2009 REPORT

Donaldson Coal

Job No: 2815

April 2009



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2008/2009 ANNUAL ENVIRONMENTAL MANAGEMENT REPORT

Abel Underground Coal Mine Report No. 737/04



PROJECT TITLE: DUST AND METEOROLOGICAL DATA

MARCH 2009 REPORT

JOB NUMBER: 2815

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1 INTRODUCTION

As part of their Air Quality Management Plan Donaldson operate a dust monitoring network in the vicinity of the mining lease and a meteorological station on site. This report has been prepared in order to bring together the various data collected throughout the network during March 2009 and to summarise the information.

The dust network includes continuous monitoring, high volume air sampling and dust deposition monitoring. The continuous monitoring network consists of two DustTrak monitors measuring PM_{10} at two sites and a GRIMM monitor which is used for one week each quarter to measure $PM_{2.5}$ and PM_{10} simultaneously.

There are two locations which use high volume air samplers to determine concentrations of PM_{10} and TSP. These operate on a six-day cycle in line with similar measurements made by the NSW Department of Environment and Climate Change (DECC) at other locations throughout the state.

In addition to concentration measurements, monthly levels of dust deposition are also measured using eleven gauges placed at various locations in the area of the mine. The locations of each of these monitors and gauges are shown in Figure 1.

Table 1 lists the monitors used and pollutants measured at these locations.

Table 1: Summary of monitoring locations and instruments

Monitoring Location	Instruments Used	Pollutant Monitored
Beresfield	HVAS	PM ₁₀
Blackhill	HVAS HVAS	PM ₁₀ TSP
1	DustTrak Grimm (1 week per quarter)	PM ₁₀ , PM _{2.5}
Weakleys Drive	DustTrak	PM ₁₀
DG1 - DG11	Deposition Gauges	Dust Deposition

The meteorological station is situated at the site of the office buildings and measures the following parameters:

- · wind speed
- wind direction
- temperature
- solar radiation
- rainfall

The data are downloaded at various intervals by Donaldson and then forwarded to PAEHolmes for processing.



2 HIGH VOLUME AIR SAMPLING

High Volume Air Sampling (HVAS) was carried out at Beresfield and Blackhill by Metford Laboratories. PM₁₀ is measured at both sites while TSP is only measured at Blackhill. The data collected during March 2009 are summarised in **Table 2**. A graph consisting of all the data collected to date is shown in <u>Figure 2</u>.

Table 2: HVAS from Beresfield and Blackhill for March 2009

Date	Beresfield PM ₁₈ (µg/m³)	Blackhill PM ₁₀ (µg/m³)	Blackhill TSP (µg/m³)
1/03/2009	22	14	33
7/03/2009	34	26	47
13/03/2009	23	14	31
19/03/2009	24	20	37
25/03/2009	26	21	40
31/03/2009	20	18	30
Annual average	25	17	33

These measurements will include all background sources relevant to that location, including contributions from the Donaldson mining operations.

On the days that the instruments were monitoring, the highest 24-hour average PM_{10} concentration in March 2009 was 34 $\mu g/m^3$, measured on the 7^{th} at the Beresfield site. On this occasion the measured PM_{10} concentration did not exceed the 50 $\mu g/m^3$ 24-hour NEPM goal.

TSP measurements from the Blackhill site show that concentrations were below the NHMRC 90 $\mu g/m^3$ annual average TSP goal. It should be noted that the NHMRC goal refers to an annual average and not a 24-hour average as measured by the high volume air sampler. The annual average TSP concentration for the 12 months to March 2009 was 33 $\mu g/m^3$.

Figure 2 shows a seasonal trend in PM₁₀ concentrations, peaking during the warmer months and decreasing during autumn and winter. This is a common trend and is seen consistently in the Hunter Valley.

The annual average PM_{10} concentrations for Beresfield and Blackhill were 25 $\mu g/m^3$ and 17 $\mu g/m^3$ respectively for the 12 months to March 2009. These are below the DECC's annual average PM_{10} air quality criterion of 30 $\mu g/m^3$.

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3 CONTINUOUS MONITORING

3.1 DustTrak Monitoring at Blackhill

<u>Figure 3</u> shows a time series of the PM₁₀ data collected from the DustTrak monitor at the Blackhill site. During the month of March, the DustTrak monitor located at the Blackhill site experienced a power failure. The problem was rectified and the DustTrak returned to normal functioning on the 17th of March 2009. The DustTrak monitoring for the Blackhill site is available from the 17th to the 31st of March 2009.

Of the available data, the measured 24-hour average PM_{10} concentrations were below the NEPM goal of 50 μ g/m³. The maximum 24-hour average PM_{10} concentration was recorded on the 27th of March at 29 μ g/m³.

3.2 DustTrak Monitoring at Weakleys Drive

A time series of the PM_{10} data collected from the Weakleys Drive site is shown in Figure 4. The DustTrak monitoring for the Weakleys Drive site is available from the 1^{st} to the 31^{st} of March 2009. The available data show that 24-hour average PM_{10} concentration were below the NEPM goal of 50 μ g/m³. The maximum 24-hour average PM_{10} concentration was 23 μ g/m³, recorded on the 31^{st} of March.

3.3 Grimm Monitoring

Grimm monitoring was carried out between 22^{nd} and 30^{th} of March 2009 and the data are presented in <u>Figure 5</u>. The measurements show that there were a number of exceedances of the 24-hour average NEPM goal of $50~\mu g/m^3$ during this period. Exceedances occurred on the 22^{nd} , 23^{rd} , 26^{th} and 29^{th} of March 2009. These measurements are not reflected in the HVAS monitors as no measurement occurred during these days.

Both DustTrak monitors were operational during this period and recorded a similar trend measured by the Grimm although measured values were low. The trend shows spikes in the measurements occurring during morning periods. Instruments which measure dust using optical techniques are prone to be affected by high moisture content in the air. The observed spikes are most likely due to this effect, resulting in falsely high measurements which in turn affect the result for the 24-hour average.

The average $PM_{2.5}$ fraction in the PM_{10} was calculated from the measurements as 0.3. This suggests that the PM_{10} is predominantly coarse particles and the measurement is consistent with windblown dust.



4 DUST DEPOSITION MONITORING

Dust deposition monitoring is carried out each month via a network consisting of eleven (11) gauges. The results for March 2009 are shown in Table 3, in conjunction with results for the previous eleven months in order to provide an annual average for that period. A table showing the complete data set from July 2000 in provided in Appendix A.

Table 3: Dust deposition monitoring for the 12-month period to March 2009

100 (0)	Monthly dust deposition rate (g/m³/month)												
Month	DG1	DG2	DG3	DG4	DG5A	DG6	DG7	DG8	DG9	DG10	DG11		
April-08	0.4 *	0.4 *	0.8 "	0.4 "	0.4 "	0.8 *	1.1 "	1.7 *	1.2	1.1 "	1.1 "		
May-08	1.1	2.4 *	0.9	1.4	0.9	0.9	0.7	2.7	1 *	1.1	1.3 "		
Jun-08	0.2	0.4 *	0.1	0.5	0.1	0.1	0.3	0.5 *	0.1	0.8	0.2		
Jul-08	0.4	0.7 *	1.3 "	0.6	0.8 *	0.9	0.8	1	0.7	0.5	1,1		
Aug-08	1 "	0.5 *	0.7 *	0.6 "	0.5	1.9 "	0.8 *	1 "	1 *	0.9 "	1.4		
Sep-08	0.6	1 "	1.3 *	0.7 *	0.6 *	0.9 #	0.6	0.9	0.9 #	0.9 *	1.8 *		
Oct-08	1 "	0.5 *	1 *	1.3 "	1.3 *	1.2	1'	1.4 *	0.8	1.6 *	1.8 *		
Nov-08	0.8	1.4	2.7 8	2.5	0.9 *	1.2 *	0.8	2.4 *	1.1 "	1 *	1.7 *		
Dec-08	0.4 "	0.4 "	0.6 "	0.5 "	0.3 #	1.1 "	0.6 "	15+	0.9 "	0.7 "	1.2 *		
Jan-09	1.1 "	3 "	1.6 *	0.8 "	0.9 "	1.4 "	0.7 *	1.5 "	0.9 *	0.9 "	5 +		
Feb-09	0.4	4.4 4	1.5 "	1.1 "	0.9	1.6 "	0.8	1.2	1.4	2.5 *	1.2		
Mar-09	2.8 *	5.8 "	2.7 *	2.4 "	1.9 "	2.1 "	2.5 '	2.4 "	2.3 *	5.7 *	2.7 *		
Annual Average	0.9	2.1	1.3	1.1	0.8	1.2	0.9	1.5	1.0	1.5	1.4		

Data supplied by Metford Laboratories. * Insects/bird droppings reported. *Invalid (excess bird droppings).

The highest dust deposition measurement in March 2009 was 5.8 g/m²/month at DG2; the accompanying laboratory report showed the sample was contaminated with insects. The contaminated readings determined to be invalid have been removed when calculating the annual average. The annual average deposition rates for the gauges in the network were low and significantly below the amount goal of 4 g/m²/month, indicating good air quality with respect to dust deposition.

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5 METEOROLOGICAL MONITORING

Monthly plots of the wind speed, temperature, solar radiation, and rainfall data collected in March 2009 are shown in <u>Figure 6</u> and a windrose is shown in <u>Figure 7</u>

The graphs shown in <u>Figure 6</u> indicate that the instruments were recording appropriately. Data maxima and minima all appeared to be sensible for this site during March. Total rainfall for the month was 136.5 mm.

A windrose (see <u>Figure 7</u>) created from the available 30-minute average wind data shows that winds were predominantly from the east-southeast. The site recorded calms (wind speed less than or equal to 0.5 m/s) for approximately 42.3% of the time. This is quite a low percentage and is less than the value for March 2008.

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APPENDIX A

ALL DUST DEPOSITION DATA

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				Dust de	position	(q/m²/	month)				
Month		D2	D3	D4	D5A	D6	D7	D8	B9	D10	DII
May-00	0.4	0.4	-	0.7	0.9	0.6	3.6	1.6	0.5	1.8	-
Jun-00	0.7	0.5	0.5	0.7	0.8	0.4	3.8	3.2	0.5	0.7	-
Jul-00	0.4	0.4	0.5	0.7	0.8	0.5	0.8	1.5	0.4	0.4	
Aug-00	0.9	0.6	1.0	1.2	1.1	1.0	3.4	0.7	0.7	0.6	-
Sep-00	0.8	0.9	1.1	0.9	1.3	1.0	2.2	1.0	1.0	0.8	-
Oct-00	0.4	0.6	1.1	0.9	0.9	0.8	5.3	0.9	0.6	0.5	-
Nov-00	5.2	0.7	1.4	0.8	1.0	0.4	24.1	9.4	1.1	0.6	
Dec-00	2.8	1.4	1.9	1.3	1.1	0.8	2.1	2.5	0.9	0.9	12
Jan-01	0.7	1.7	1.4	1.8	0.7	1.3	1.1	2.4	1.1	0.6	-
Feb-01	0.9	3.1	2.0	0.5	0.9	0.7	0.7	6.7	1.3	0.5	1.0
Mar-01	0.8	2.1	1.3	0.6	0.7	0.6	0.6	5.5	0.6	0.6	1.5
Apr-01	0.8	0.7	1.3	0.5	0.7	0.4	0.3	5.1	0.7	0.6	0.8
May-01	0.2	0.2	0.4	0.4	0.3	0.3	0.6	1.8	0.6	0.8	0.9
Jun-01	0.5	0.4	0.5	1.0	1.0	0.4	0.4	8.8	0.7	0.6	0.6
Jul-01	0.5	0.3	1.8	0.5	0.8	-	16.3	4.9	0.9	0.7	0.7
Aug-01	0.4	0.4	0.8	0.8	1.0	1.7	1.0	2.3	1.0	1.8	1.1
Sep-01	0.7	1.0	1.7	1.1	1.7	0.7	25	6.0	1.1	1.3	1.7
Oct-01	1.1	0.6	4.6	0.9	0.7	0.9	1.2	1.9	0.9	0.6	1.7
Nov-01	0.9	1.0	1.1	1.1	0.8	1.1	6.0	5.5	1.3	1.9	2.3
Dec-01	4.9	0.9	4.2	0.9	1.3	1.9	1.2	3.1	1.2	9.7	1.8
Jan-02	0.8	1.0	1.5	1.3	1.1	1.4	1.3	1.5	1.1	0.9	1.5
Feb-02	1.1	1.1	0.9	0.3	0.4	0.5	3.1	5.1	0.5	0.5	0.9
Mar-02	1.7	2.1	1.6	0.7	0.7	0.8	1.0	18	1.0	0.9	1.7
Apr-02	1.0	0.4	1.0	0.8	0.8	0.6	0.9	10.1	0.5	0.7	1.0
May-02	0.6	0.6	6.0	0.7	0.4	1.2	0.9	3.1	0.7	0.2	1.0
Jun-02	1.4	0.4	1.7	0.6	0.5	0.8	0.6	2.1	0.6	0.5	1.0
Jul-02	0.7	0.7	2	0.8	0.8	0.7	1.2	-	1.1	0.5	1.0
Aug-02	1.3	0.8	1.4	1.2	1.1	1.2	1.5	2	1.5	0.9	1.6
Sep-02	0.5	1.2	1.1	0.8	0.5	0.7	5.1	9.3	1.6	0.6	1.0
Oct-02	2.2	1.4	5.2	1.5	1.5	1.4	1.4	3.4	-	1.5	3.1
Nov-02	2.8	1.8	3.7	1.6	0.1	1.8	2.1	3.5	2.1	2	1.9
Dec-02	2.0	-	2.5	1.5	3.0	1.5	1.8	4.1	1.6	1.2	1.9
Jan-03	2.1	1.5	2.7	1.5	1.0	1.9	2.2	2.5	1.1	1.0	1.6
Feb-03	1.4	1.1	2.6	1.1	0.9	1.2	1.7	5.9	1.2	1.0	1.5
Mar-03	0.8	0.5	1.2	1.2	0.6	2.1	1.5	3.4	-	3.6	9.5
Apr-03	0.5	1.0	0.6	1.0	0.7	0.5	1.1	8.0	-	2.0	1.0
May-03	0.5	0.4	0.6	0.2	0.2	0.6	1.3	1.6	0.5	0.8	1.2
Jun-03	0.5	0.6	0.8	0.8	0.4	0.6	0.8	0.7	0.9	0.7	0.7
Jul-03	0.3	0.4	0.4	0.6	0.4	0.5	0.7	0.5	0.5	0.5	0.7
Aug-03	0.8	0.2	0.7	1.1	0.5	1.3	1.8	2.1	1.3	0.7	0.9
Sep-03	0.6	0.7	1.1	0.7	0.8	1.7	1.4	1.3	2.5	0.9	1.3
Oct-03	-	0.9	1.4	0.9	0.7	1.9	1.0	1.4	0.6	0.8	1.3
Nov-03	2.6	0.8	1.0	1.1	0.4	1.3	1.5	1.5	-	0.8	1.3
Dec-03	1.0	1.0	1.4	1.3	1.1	1.5	1.6	2.0	1.8	0.9	1.4
Jan-04	8.5	1.5	2.1	1.5	1.3	2.6	1.4	2.2	1.7	1.5	1.7
Feb-04	1.2	1.0	1.7	1.4	0.7	3.1	1.6	2.2	+	1.5	2.3
Mar-04	0.4	0.6	6.6	1.2	0.7	1.9	1.1	12.1	4.8	1.5	1.1



											11
Apr-04	0.6	1.0	0.8	0.8	0.6	1.9	0.8	1.4	0.9	1.2	1.1
May-04	0.2	0.9	2.2	0.9	0.8	0.7	0.9	1.4	1.2	0.9	1.5
Jun-04	0.4	0.6	0.7	0.9	0.6	1.4	1.0	0.9	1.0	1.0	0.8
Jul-04	0.4	0.6	5.3#	0.6	0.5	2.9	1.0	1.1	0.9	0.6	1.2
Aug-04	0.5	0.5	0.5	1.3	0.7	1.1	1.1	1.4	-	1.0	1.0
Sep-04	0.6	0.6	0.8	2.2	1.0	1.0	0.9	4.4	0.9	16.7	1.1
Oct-04	0.7	0.9	1.2	0.9	0.8	1.4	1.0	10.5	1.0	1.0	0.8
Nov-04	0.8	0.7	1.3	1.9	0.7	0.9	1.0	3.0	1.1	1.1	1.6
Dec-04	2.0	1.4	3.6	1.5	1.3	2.2	3.2	7.9	1.8	5.5	2.5
Jan-05	1.2	1.0	3.7	1.6	1.4	4.0	2.3	2.7	2.6	2.5	2.8
Feb-05	1.2	1.2	1.8	1.6	1.3	2.0	1.7	-	2.3	1.5	2.3
Mar-05	1.3	0.9	1.4	0.9	0.9	3.0	1.2	7.7	2	0.8	1.3
Apr-05	1.1	0.7	0.9	0.8	0.7	0.9	1.4	3,3	1.1	0.8	0.9
May-05	0.7	8.6	1.1	0.8	0.7	0.8	0.9	4.4	1.2	0.8	1.1
Jun-05	1.3	0.8	1.3	1.3	0.8	1.2	1.2	1.3	1.5	2.5	0.9
Jul-05	1.0	0.5	0.5	0.7	0.4	1.6	0.7	1.2	0.8	4.3	1.1
Aug-05	0.6	0.6	0.8	1.0	0.8	0.9	0.7	1.0	0.9	1.0	0.9
Sep-05	0.6	0.7	0.8	0.7	0.7	1.2	1.3	1.3	1.0	0.9	1.1
Oct-05	0.8	0.9	1.3	0.9	0.8	1.4	1.2	1.9	1.3	1.1	1.3
Nov-05	-	2.3	2.3	2.0	1.7	1.2	2.0	3.2	1.6	1.4	2.2
Dec-05	1.9	3.2	2.3	3.3	2.6	3.4	2.3	-	1.3	2.1	3.9
Jan-06	1.0	2.1	1.7	1.0	23.	3.5	-	2.7	1.1	-	1.5
Feb-06	2.2	1.0	0.9	1.2	1.1	1.7	1.1	2.9		2.3	1.8
Mar-06	0.7	0.6	2.3	0.7	0.6	0.9	1.0	1.4	0.7	0.8	1.5
Apr-06	0.6	0.7	1.1	0.8	0.6	1.1	0.8	1.0	1.0	1.8	1.5
May-06	1.0	3.1	1.0		1.1	1.4	1.1	4.1	-	7.0	1.5
Jun-06	0.4	0.3	0.7	0.5	0.4	0.6	0.7	0.8	0.6	0.9	0.9
Jul-06	0.3	0.3	1	1.3	0.4	0.7	0.7	2.7	-	0.6	0.6
Aug-06	0.9	0.6	0.8	0.7	0.7	0.8	0.7	1.7		3.7	0.9
Sep-06	1.6	0.7	1.1	1.7	0.7	1	0.9	1.3	1.2	0.8	1.6
Oct-06	2	1.4	1.6	1.8	0.9	1.8	1.2	1.8	1.5	1.8	1.9
Nov-06	4.3	2.2	3	2.3	2.3	5.3	2.4	3.3	2.3	2.3	2.9
Dec-06	1.2	3.4	1.9	2.3	2.3	3.3	2.1	2.1	2.0	4.9	3.9
Jan-07	2	0.9	1.5	0.7	0.7	1.7	1.1	212	1.2	1.7	0.9
Feb-07	1.7	0.9	1.6	0.7	0.6	1	1.8	1.7	1.1	1.2	1.7
Mar-07	1.3	0.9	1.7	0.8	1.2	0.6	2.2	1.7	1	0.9	1.7
Apr-07	0.5	0.7	0.9	0.6	4.8	1.2	0.5	2.7	0.5	0.8	0.9
May-07	0.8	0.5	0.6	1.2	0.6	0.6	0.7	1.9	0.5	0.7	0.8
Jun-07	0.6	0.5	0.7	1.1	0.1	0.5	0.1	0.5	0.1	0.4	0.3
Jul-07	0.5	0.4	0.6	2.1	0.5	0.8	0.6	0.6	0.4	0.5	0.7
Aug-07	1.5	0.4	0.7	1	0.7	0.7	0.5	1	0.6	0.6	0.7
Sep-07	1.3	0.5	1.8	1	0.7	0.9	0.9	1.3	1	0.7	1.6
					1.1.5						
Oct-07 Nov-07	4.2	0.9	1.1	1.4	1.1	1.7	1.8	1.7	1.6	1.4	2.2
	0.8	0.8	1.1	0.9	1.1	1.1	1.1	1.7	0.6	0.8	1.5
Dec-07	1.3	0.8	3	0.7	0.5	0.8	0.5	1.1	0.3	0.8	0.6
Jan-08	2.6	0.8	3.7	0.5	0.5	0.5	0.4	2.2	0.8	0.3	0.8
Feb-08	0.4	0.1	14	0.1	0.1	0.3	0.1	0.3	0.2	0.2	0.3
Mar-08 April-08	4.5 0.4	0.6	9.2*	0.6	0.4*	0.8	0.6	1.7*	1.2	1.1"	0.9



May-08	1.1	2.4	0.9	1.4	0.9	0.9	0.7	2.7	1"	1.1	1.3
June-08	0.2	0.4"	0.1	0.5	0.1"	0.1	0.3	0.5"	0.1	0.8	0.2
July-08	0.4	0.7*	1.3"	0.6	0.8"	0.9	0.8	1	0.7	0.5	1.1
Aug-08	1	0.5	0.7	0.6	0.5	1.9	0.8	1	1	0.9	1.4
Sep-08	0.6	1	1.3	0.7	0.6	0.9	0.6	0.9	0.9	0.9	1.8
Oct-08	1	0.5	1	1.3	1.3	1.2	1	1.4	8.0	1.6	1.8
Nov-08	0.8	1.4	2.7	2.5	0.9	1.2	0.8	2.4	1.1	1	1.7
Dec-08	0.4	0.4	0.6	0.5	0.3	1.1	0.6	15	0.9	0.7	1.2
Jan-09	1.1	3#	1.6	0.8	0.9	1.4	0.7	1.5	0.9	0.9	5'
Feb-09	0.4	4.4	1.5	1.1	0.9	1.6	0.8	1.2	1.4	2.5	1.2
Mar-09	2.8	5.8	2.7	2.4	1.9	2.1	2.5	2.4	2.3	5.7	2.7

^{* -} sample contaminated

^{+ -} sample invalid

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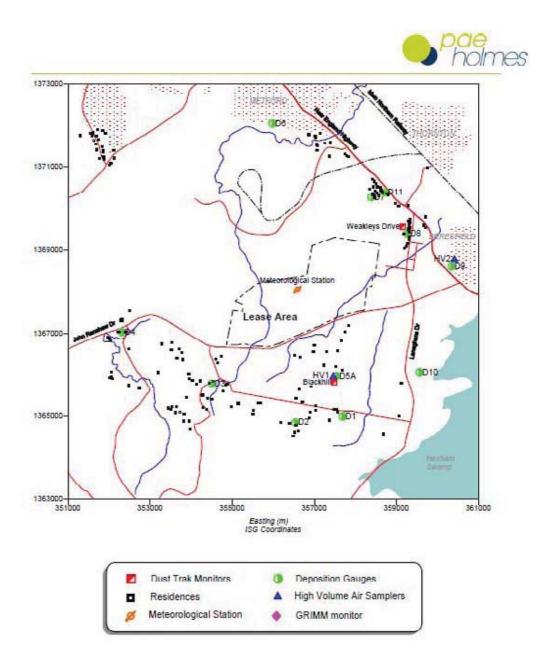
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r	1	G	v	K	c	9	

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Location of Project Area

March 2009 Report

Figure 1: Project Location



High Volume Air Sampling data recorded at Beresfield and Blackhill from December 1999 to March 2009

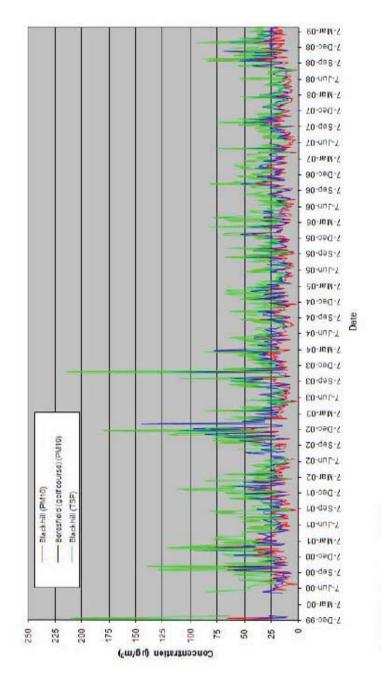


Figure 2: High Volume Air Sampling data

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Dust and Meteorological Data
Donaldson Coal | PAEHolmes 10b 2815



Measured PM₁₀ concentrations at Blackhill during March 2009

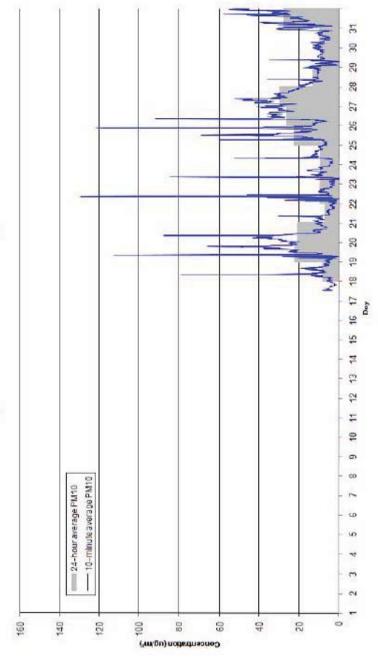


Figure 3: DustTrak sampling data, Blakchill site

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Measured PM₁₀ concentrations at Weakleys Drive during March 2009

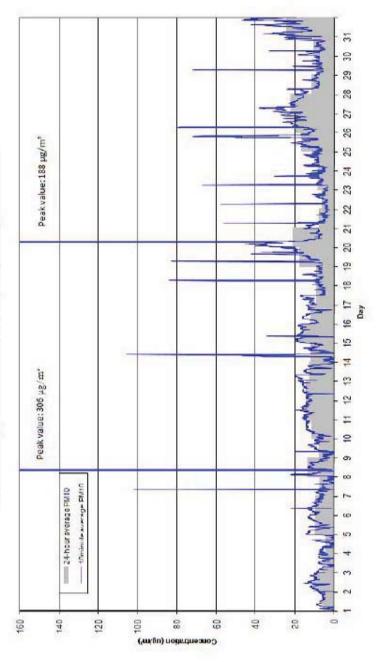


Figure 4: DustTrak sampling data, Weakleys Drive site

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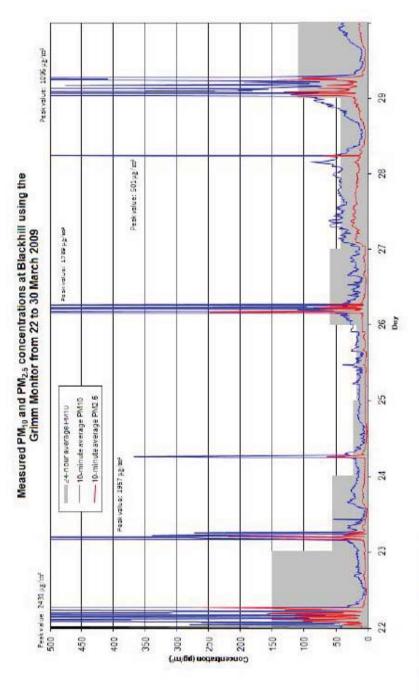


Figure 5: Grimm monitoring data

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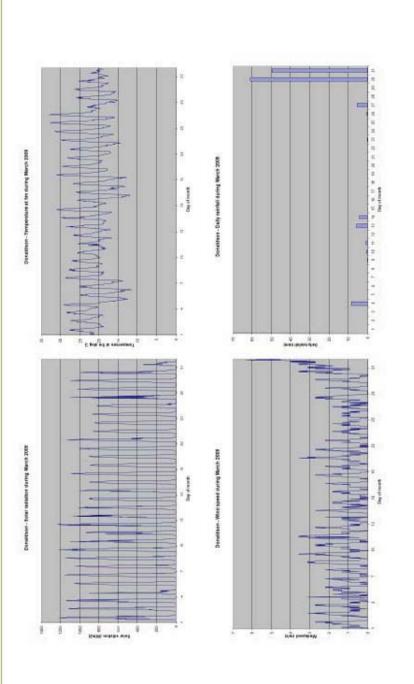
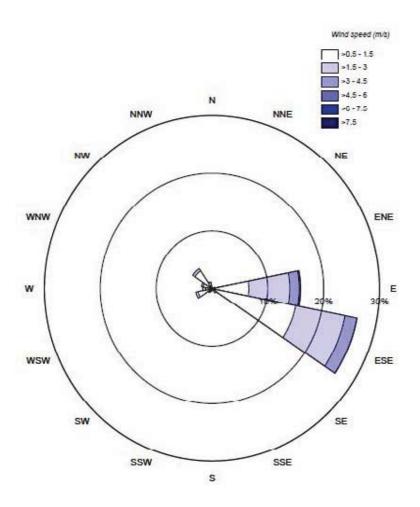


Figure 6: Meteorological conditions

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Windrose for Donaldson March 2009



Calms = 42.3%

Figure 7: Windrose



DONALDSON MONITORING

DUST AND METEOROLOGICAL DATA APRIL 2009 REPORT

Donaldson Coal

Job No: 2815

May 2009



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2008/2009 ANNUAL ENVIRONMENTAL **MANAGEMENT REPORT**

Abel Underground Coal Mine Report No. 737/04



PROJECT TITLE: DUST AND METEOROLOGICAL DATA

APRIL 2009 REPORT

JOB NUMBER: 2815

PREPARED FOR: Phil Brown

DONALDSON COAL

PREPARED BY: Philip Henschke

QA PROCEDURES CHECKED BY: Aleks Todoroski

Aleks Todoroski APPROVED FOR RELEASE BY:

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VERSION	DATE	PREPARED BY	REVIEWED BY
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1 INTRODUCTION

As part of their Air Quality Management Plan Donaldson Coal operate a dust monitoring network in the vicinity of the mining lease and a meteorological station on site. This report has been prepared in order to bring together the various data collected throughout the network during April 2009 and to summarise the information.

The dust network includes continuous monitoring, high volume air sampling and dust deposition monitoring. The continuous monitoring network consists of two DustTrak monitors measuring PM_{10} at two sites and a GRIMM monitor which is used for one week each quarter to measure $PM_{2.5}$ and PM_{10} simultaneously.

There are two locations which use high volume air samplers to determine concentrations of PM₁₀ and TSP. These operate on a six-day cycle in line with similar measurements made by the NSW Department of Environment and Climate Change (DECC) at other locations throughout the state.

In addition to concentration measurements, monthly levels of dust deposition are also measured using eleven gauges placed at various locations in the area of the mine. The locations of each of these monitors and gauges are shown in Figure 1.

Table 1 lists the monitors used and pollutants measured at these locations.

Table 1: Summary of monitoring locations and instruments

Monitoring Location	Instruments Used	Pollutant Monitored
Beresfield	HVAS	PM ₁₀
Blackhill	HVAS	PM ₁₀
	HVAS	TSP
	DustTrak	PM ₁₀
	Grimm (1 week per quarter)	PM ₁₀ , PM _{2.5}
Weakleys Drive	DustTrak	PM ₁₀
DG1 - DG11	Deposition Gauges	Dust Deposition

The meteorological station is situated at the site of the office buildings and measures the following parameters:

- · wind speed
- wind direction
- temperature
- solar radiation
- rainfall

The data are downloaded at various intervals by Donaldson and then forwarded to PAEHolmes for processing.



2 HIGH VOLUME AIR SAMPLING

High Volume Air Sampling (HVAS) was carried out at Beresfield and Blackhill by Metford Laboratories. PM_{10} is measured at both sites while TSP is only measured at Blackhill. The data collected during April 2009 are summarised in Table 2. A graph consisting of all the data collected to date is shown in Figure 2.

Table 2: HVAS from Beresfield and Blackhill for April 2009

Date	Berestield PM ₁₀ (µg/m³)	Blackhill PM ₁₀ (µg/m³)	Blackhill ISP (µg/m³)
6/04/2009	16	16	33
12/04/2009	14	14	24
18/04/2009	16	20	40
24/04/2009	8	6	27
30/04/2009	12	9	16
Annual average	25	17	34

These measurements will include all background sources relevant to that location, including contributions from the Donaldson mining operations.

On the days that the instruments were monitoring, the highest 24-hour average PM_{10} concentration recorded in April 2009 was 20 $\mu g/m^3$, measured on the 18^{th} at the Blackhill site. On this occasion the measured PM_{10} concentration did not exceed the 50 $\mu g/m^3$ 24-hour NEPM goal.

TSP measurements from the Blackhill site show that concentrations were below the NHMRC 90 $\mu g/m^3$ annual average TSP goal. It should be noted that the NHMRC goal refers to an annual average and not a 24-hour average as measured by the high volume air sampler. The annual average TSP concentration for the 12 months to April 2009 was 34 $\mu g/m^3$.

Figure 2 shows a seasonal trend in PM_{10} concentrations, peaking during the warmer months and decreasing during autumn and winter. This is a common trend and is seen consistently in the Hunter Valley.

The annual average PM_{10} concentrations for Beresfield and Blackhill were 25 $\mu g/m^3$ and 17 $\mu g/m^3$ respectively for the 12 months to April 2009. These values are below the DECC's annual average PM_{10} air quality criterion of 30 $\mu g/m^3$.



3 CONTINUOUS MONITORING

3.1 DustTrak Monitoring at Blackhill

Figure 3 shows a time series of the PM₁₀ data collected from the DustTrak monitor at the Blackhill site. During the month of April, the DustTrak monitor located at the Blackhill site experienced an anomaly due to excessive rainfall. Data collected during the first 7 days of April was considered erroneous. The problem was rectified and the DustTrak returned to normal functioning on the 17th of April 2009. The DustTrak monitoring for the Blackhill site is available from the 17th to the 23rd of April 2009, when the DustTrak was subject to another power failure.

Of the available data, the measured 24-hour average PM_{10} concentrations were below the NEPM goal of 50 $\mu g/m^3$. The maximum 24-hour average PM_{10} concentration was recorded on the 18^{2h} of April at $13 \mu g/m^3$.

3.2 DustTrak Monitoring at Weakleys Drive

A time series of the PM_{10} data collected from the Weakleys Drive site is shown in Figure 4. The DustTrak monitoring for the Weakleys Drive site is available from the 1st to the 9th of April 2009. The available data show that 24-hour average PM_{10} concentrations were below the NEPM goal of 50 μ g/m³. The maximum 24-hour average PM_{10} concentration was 21 μ g/m³, recorded on the 1st of April.

3.3 Grimm Monitoring

No Grimm monitoring was scheduled for April 2009.



4 DUST DEPOSITION MONITORING

Dust deposition monitoring is carried out each month via a network consisting of eleven (11) gauges. The results for April 2009 are shown in Table 3, in conjunction with results for the previous eleven months in order to provide an annual average for that period. A table showing the complete data set from July 2000 in provided in Appendix A.

Table 3: Dust deposition monitoring for the 12-month period to April 2009

	Monthly dust deposition rate (g/m³/month)												
Month	DG1	DG2	DG3	DG4	DG5A	DG6	DG7	DG8	DG9	DG10	DG11		
May-08	1.1	2.4 *	0.9	1.4	0.9	0.9	0.7	2.7	1.0 "	1.1	1.3 "		
Jun-08	0.2	0.4 "	0.1	0.5	0.1 "	0.1	0.3	0.5 *	0.1	0.8	0.2		
Jul-08	0.4	0.7 "	1.3 "	0.6	0.8 *	0.9	0.8	1.0	0.7	0.5	1.1		
Aug-08	1.0 "	0.5 "	0.7 *	0.6 *	0.5	1.9 "	0.8 *	1.0 "	1.0 *	0.9 "	1.4		
Sep-08	0.6 "	1.0 "	1.3 "	0.7 *	0.6 "	0.9 "	0.6	0.9	0.9 "	0.9 "	1.8 "		
Oct-08	1.0 "	0.5 *	1.0 "	1.3 "	1.3 *	1.2	1.0 *	1.4 "	0.8	1.6 *	1.8 "		
Nov-08	0.8 #	1.4 "	2.7 *	2.5	0.9 *	1.2 *	0.8 *	2.4 *	1.1 *	1.0 *	1.7 *		
Dec-08	0.4	0.4 "	0.6 *	0.5	0.3 "	1.1 3	0.6	15+	0.9	0.7 *	1.2 "		
Jan-09	1.1 *	3.0 "	1.6 *	0.8	0.9 "	1.4	0.7 *	1.5 *	0.9	0.9	5.0 +		
Feb-09	0.4 "	4.4 *	1.5 "	1.1 "	0.9	1.6 *	0.8	1.2	1.4	2.5 *	1.2		
Mar-09	2.8 *	5.8	2.7 *	2.4 "	1.9 "	2.1 *	2.5 *	2.4 "	2.3 "	5.7 "	2.7 *		
Apr-09	2.0 *	0.8 *	0.8	0.6 "	0.6 "	3.2 *	1.1 "	1.1 "	1.0 #	0.6	0.9 "		
Annual Average	1.0	2.2	1.3	1.1	0.8	1.4	0.9	1.5	1.0	1.4	1.4		

Data supplied by Metford Laboratories. * Insects/bird droppings reported. *Invalid (excess bird droppings).

The highest dust deposition measurement recorded in April 2009 was 3.2 g/m²/month at DG6; the accompanying laboratory report showed the sample was contaminated with insects. The contaminated readings determined to be invalid have been removed when calculating the annual average. The annual average deposition rates for the gauges in the network were low and significantly below the amount goal of 4 g/m²/month, indicating good air quality with respect to dust deposition.



5 METEOROLOGICAL MONITORING

Monthly plots of the wind speed, temperature, solar radiation, and rainfall data collected in April 2009 are shown in <u>Figure 6</u> and a windrose plot is shown in <u>Figure 7</u>

The graphs shown in <u>Figure 6</u> indicate that the instruments were recording appropriately. Data maxima and minima all appeared to be sensible for this site during April. Total rainfall for the month was 189 mm.

A windrose (see Figure 7) created from the available 30-minute average wind data shows that winds were predominantly from the east-southeast. The site recorded calms (wind speed less than or equal to 0.5 m/s) for approximately 48.2% of the time. This is quite a high percentage and is less than the value for April 2008. The relatively large fraction of clam winds may arise from the generally forested area and the specific location of the weather station.

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APPENDIX A

ALL DUST DEPOSITION DATA



											110
			1.3	Dust de	position	(g/m²/	(month)	1			
Month	D1	D2		D4	D5A	D6	D7	DB	D9	D10	D11
May-00	0.4	0.4		0.7	0.9	0.6	3.6	1.6	0.5	1.8	4
Jun-00	0.7	0.5	0.5	0.7	0.8	0.4	3.8	3.2	0.5	0.7	-
Jul-00	0.4	0.4	0.5	0.7	0.8	0.5	0.8	1.5	0.4	0.4	
Aug-00	0.9	0.6	1.0	1.2	1.1	1.0	3.4	0.7	0.7	0.6	
Sep-00	0.8	0.9	1.1	0.9	1.3	1.0	2.2	1.0	1.0	0.8	-
Oct-00	0.4	0.6	1.1	0.9	0.9	0.8	5.3	0.9	0.6	0.5	
Nov-00	5.2	0.7	1.4	0.8	1.0	0.4	24.1	9.4	1.1	0.6	-
Dec-00	2.8	1.4	1.9	1.3	1.1	0.8	2.1	2.5	0.9	0.9	-
Jan-01	0.7	1.7	1.4	1.8	0.7	1.3	1.1	2.4	1.1	0.6	-
Feb-01	0.9	3.1	2.0	0.5	0.9	0.7	0.7	6.7	1.3	0.5	1.0
Mar-01	0.8	2.1	1.3	0.6	0.7	0.6	0.6	5.5	0.6	0.6	1.5
Apr-01	0.8	0.7	1.3	0.5	0.7	0.4	0.3	5.1	0.7	0.6	0.8
May-01	0.2	0.2	0.4	0.4	0.3	0.3	0.6	1.8	0.6	0.8	0.9
Jun-01	0.5	0.4	0.5	1.0	1.0	0.4	0.4	8.8	0.7	0.6	0.6
Jul-01	0.5	0.3	1.8	0.5	0.8	-	16.3	4.9	0.9	0.7	0.7
Aug-01	0.4	0.4	0.8	0.8	1.0	1.7	1.0	-	1.0	1.8	1.1
Sep-01	0.7	1.0	1.7	1.1	1.7	0.7	-	6.0	1.1	1.3	1.7
Oct-01	1.1	0.6	4.6	0.9	0.7	0.9	1.2	1.9	0.9	0.6	1.7
Nov-01	0.9	1.0	1.1	1.1	0.8	1.1	6.0	5.5	1.3	1.9	2.3
Dec-01	4.9	0.9	4.2	0.9	1.3	1.9	1.2	3.1	1.2	9.7	1.8
Jan-02	0.8	1.0	1.5	1.3	1.1	1.4	1.3	1.5	1.1	0.9	1.5
Feb-02	1.1	1.1	0.9	0.3	0.4	0.5	3.1	5.1	0.5	0.5	0.9
Mar-02	1.7	2.1	1.6	0.7	0.7	0.8	1.0	18	1.0	0.9	1.7
Apr-02	1.0	0.4	1.0	0.8	0.8	0.6	0.9	10.1	0.5	0.7	1.0
May-02	0.6	0.6	6.0	0.7	0.4	1.2	0.9	3.1	0.7	0.2	1.0
Jun-02	1.4	0.4	1.7	0.6	0.5	0.8	0.6	2.1	0.6	0.5	1.0
Jul-02	0.7	0.7	-	0.8	0.8	0.7	1.2	2.1	1.1	0.5	1.0
Aug-02	1.3	0.8	1.4	1.2	1.1	1.2	1.5	+ :	1.5	0.9	1.6
Sep-02	0.5	1.2	1.1	0.8	0.5	0.7	5.1	9.3	1.6	0.6	1.0
Oct-02	2.2	1.4	5.2	1.5	1.5	1.4	1.4	3.4	1,0	1.5	3.1
Nov-02	2.8	1.8	3.7	1.6	0.1	1.8	2.1	3.5	2.1	2	1.9
		-			1000						
Dec-02	2.0	1222	2.5	1.5	3.0	1.5	1.8	2.5	1.6	1.2	1.9
Jan-03 Feb-03		1.5		1.5	1.0	1.9	2.2		1.1	1.0	1.6
Mar-03	0.8	0.5	1.2	1.1	0.9	2.1	1.7	3.4	1.2	3.6	9.5
Apr-03	0.5	1.0	0.6	1.0	0.7	0.5	1.1	8.0		2.0	1.0
May-03	0.5	0.4	0.6	0.2	0.2	0.6	1.3	1.6	0.5	0.8	1.2
SON ALLES				0.000	10000	1000	0.00	1000000	7.5	100000	1500000
Jun-03	0.5	0.6	0.8	0.8	0.4	0.6	0.8	0.7	0.9	0.7	0.7
Jul-03	0.3	0.4	0.4	0.6	0.4	0.5	0.7	0.5	0.5	0.5	0.7
Aug-03	0.8	0.2	0.7	1.1	0.5	1.3	1.8	2.1	1.3	0.7	0.9
Sep-03	0.6	0.7	1.1	0.7	0.8	1.7	1.4	1.3	2.5	0.9	1.3
Oct-03	- AND I	0.9	1.4	0.9	0.7	1.9	1.0	1.4	0.6	0.8	1.3
Nov-03	2.6	0.8	1.0	1.1	0.4	1.3	1.5	1.5		0.8	1.3
Dec-03	1.0	1.0	1,4	1.3	1.1	1.5	1.6	2.0	1.8	0.9	1.4
Jan-04	8.5	1.5	2.1	1.5	1.3	2.6	1.4	2.2	1.7	1.5	1.7
Feb-04	1.2	1.0	1.7	1.4	0.7	3.1	1.6	2.2	100	1.5	2.3
Mar-04	0.4	0.6	6.6	1.2	0.7	1.9	1.1	12.1	4.8	1.5	1.1



											1 1
Apr-04	0.6	1.0	0.8	0.8	0.6	1.9	0.8	1.4	0.9	1.2	1.1
May-04	0.2	0.9	2.2	0.9	0.8	0.7	0.9	1.4	1.2	0.9	1.5
Jun-04	0.4	0.6	0.7	0.9	0.6	1.4	1.0	0.9	1.0	1.0	0.8
Jul-04	0.4	0.6	5.3#	0.6	0.5	2.9	1.0	1.1	0.9	0.6	1.2
Aug-04	0.5	0.5	0.5	1.3	0.7	1.1	1.1	1.4		1.0	1.0
Sep-04	0.6	0.6	0.8	2.2	1.0	1.0	0.9	4.4	0.9	16.7	1.1
Oct-04	0.7	0.9	1.2	0.9	0.8	1.4	1.0	10.5	1.0	1.0	0.8
Nov-04	0.8	0.7	1.3	1.9	0.7	0.9	1.0	3.0	1.1	1.1	1.6
Dec-04	2.0	1.4	3.6	1.5	1.3	2.2	3.2	7.9	1.8	5.5	2.5
Jan-05	1.2	1.0	3.7	1.6	1.4	4.0	2.3	2.7	2.6	2.5	2.8
Feb-05	1.2	1.2	1.8	1.6	1.3	2.0	1.7	-	2.3	1.5	2.3
Mar-05	1.3	0.9	1.4	0.9	0.9	3.0	1.2	7.7	-	0.8	1.3
Apr-05	1.1	0.7	0.9	0.8	0.7	0.9	1.4	3.3	1.1	0.8	0.9
May-05	0.7	8.6	1.1	0.8	0.7	0.8	0.9	4.4	1.2	0.8	1.1
Jun-05	1.3	0.8	1.3	1,3	0.8	1,2	1.2	1.3	1.5	2.5	0.9
Jul-05	1.0	0.5	0.5	0.7	0.4	1,6	0.7	1.2	0.8	4.3	1.1
Aug-05	0.6	0.6	0.8	1.0	0.8	0.9	0.7	1.0	0.9	1.0	0.9
Sep-05	0.6	0.7	0.8	0.7	0.7	1.2	1.3	1.3	1.0	0.9	1.1
Oct-05	0.8	0.9	1.3	0.9	0.8	1.4	1.2	1.9	1.3	1.1	1.3
Nov-05	-	2.3	2.3	2.0	1.7	1.2	2.0	3.2	1.6	1.4	2.2
Dec-05	1.9	3.2	2.3	3.3	2.6	3.4	2.3	128	1.3	2.1	3.9
Jan-06	1.0	2.1	1.7	1.0	23.	3.5	-	2.7	1.1		1.5
Feb-06	2.2	1.0	0.9	1.2	1.1	1.7	1.1	2.9		2.3	1.8
Mar-06	0.7	0.6	2.3	0.7	0.6	0.9	1.0	1.4	0.7	0.8	1.5
Apr-06	0.6	0.7	1.1	0.8	0.6	1.1	0.8	1.0	1.0	1.8	1.5
May-06	1.0	3.1	1.0	-	1.1	1.4	1.1	4.1		7.0	1.5
Jun-06	0.4	0.3	0.7	0.5	0.4	0.6	0.7	0.8	0.6	0.9	0.9
Jul-06	0.3	0.3	1	1.3	0.4	0.7	0.7	2.7	-	0.6	0.6
Aug-06	0.9	0.6	0.8	0.7	0.7	0.8	0.7	1.7	(4)	3.7	0.9
Sep-06	1.6	0.7	1.1	1.7	0.7	1	0.9	1.3	1.2	0.8	1.6
Oct-06	2	1.4	1.6	1.8	0.9	1.8	1.2	1.8	1.5	1.8	1.9
Nov-06	4.3	2.2	3	2.3	2.3	5.3	2.4	3.3	2.3	2.3	2.9
Dec-06	1.2	3.4	1.9	2.3	2.3		2.1	2.1		4.9	3.9
Jan-07	2	0.9	1.5	0.7	0.7	1.7	1.1		1.2	1.7	0.9
Feb-07	1.7	0.9	1.6	0.7	0.6	1	1.8	1.7	1.1	1.2	1.7
Mar-07	1.3	0.9	1.7	0.8	1.2	0.6	2.2	1.7	1	0.9	1.7
Apr-07	0.5	0.7	0.9	0.6	4.8	1.2	0.5	2.7	0.5	0.8	0.9
May-07	0.8	0.5	0.6	1.2	0.6	0.6	0.7	1.9	0.5	0.7	0.8
Jun-07	0.6	0.5	0.7	1.1	0.1	0.5	0.1	0.5	0.1	0.4	0.3
Jul-07	0.5	0.4	0.6	2.1	0.5	0.8	0.6	0.6	0.4	0.5	0.7
Aug-07	1.5	0.4	0.7	1	0.7	0.7	0.5	1	0.6	0.6	0.7
Sep-07	1.3	0.5	1.8	1	0.7	0.9	0.9	1.3	1	0.7	1.6
Oct-07	4.2	0.9	1.1	1.4	1.1	1.7	1.8	1.7	1.6	1.4	2.2
Nov-07	0.8	0.8	1.1	0.9	1.1	1.1	1.1	1.7	0.6	0.8	1.5
Dec-07	1.3	0.8	3	0.7	0.5	0.8	0.5	1.1	0.3	0.8	0.6
Jan-08	2.6	0.8	3.7	0.5	0.5	0.5	0.4	2.2	0.8	0.3	0.8
Feb-08	0.4	0.1	14	0.1	0.1	0.3	0.1	0.3	0.2	0.2	0.3
Mar-08	4.5	0.6	9.2	0.6	2.9	2.1	0.6	1.5	0.5	1	0.9
April-08	0.4*	0.4	0.8"	0.4"	0.4"	0.8"	1.1"	1.7*	1.2	1.1"	1.1



May-08	1.1	2.4*	0.9	1.4	0.9	0.9	0.7	2.7	1*	1.1	1.3*
June-08	0.2	0.4*	0.1	0.5	0.1"	0.1	0.3	0.5"	0.1	0.8	0.2
July-08	0.4	0.7*	1.3"	0.6	0.8*	0.9	0.8	1	0.7	0.5	1.1
Aug-08	1	0.5	0.7	0.6	0.5	1.9	0.8	1	1	0.9	1.4
Sep-08	0.6	1	1.3	0.7	0.6	0.9	0.6	0.9	0.9	0.9	1.8
Oct-08	1	0.5	1	1.3	1.3	1.2	1	1.4	0.8	1.6	1.8
Nov-08	0.8	1.4	2.7	2.5	0.9	1.2	0.8	2.4	1.1	1	1.7
Dec-08	0.4	0.4	0.6	0.5	0.3	1.1	0.6	15	0.9	0.7	1.2
Jan-09	1.1	3"	1.6	0.8	0.9	1.4	0.7	1.5	0.9	0.9	5+
Feb-09	0.4	4.4	1.5	1.1	0.9	1.6	0.8	1.2	1.4	2.5	1.2
Mar-09	2.8	5.8	2.7	2.4	1.9	2.1	2.5	2.4	2.3	5.7	2.7
Apr-09	2	0.8	0.8	0.6	0.6	3.2	1.1	1.1	1	0.6	0.9

^{* -} sample contaminated

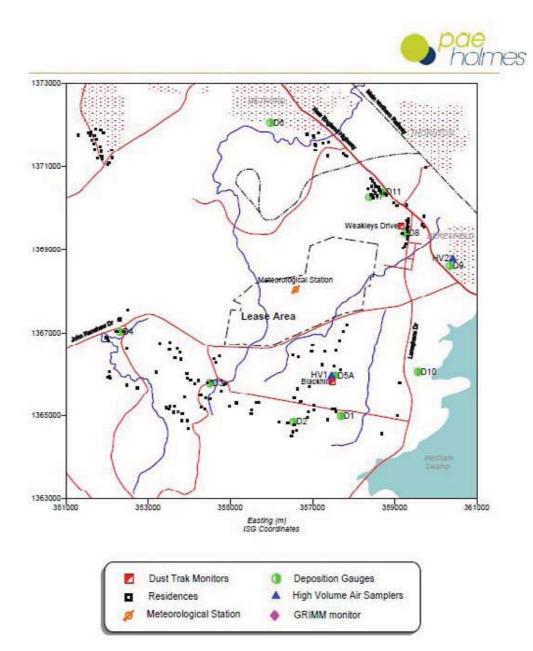
^{+ -} sample invalid

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FIGURES



Location of Project Area

Figure 1: Project Location



High Volume Air Sampling data recorded at Beresfield and Blackhill from December 1999 to April 2009

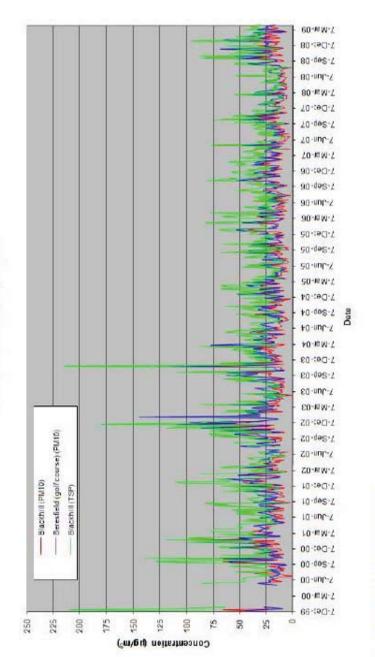


Figure 2: High Volume Air Sampling data

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April 2009 Report

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Measured PM₁₉ concentrations at Blackhill during April 2009

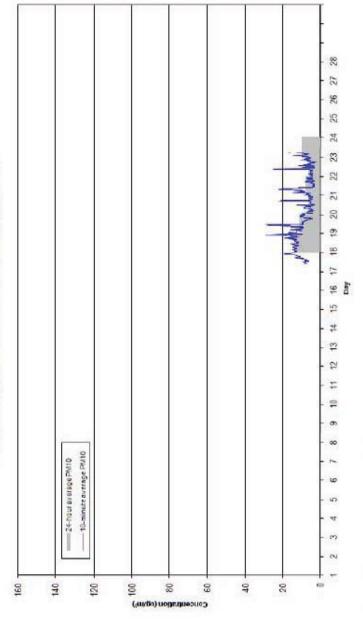


Figure 3: DustTrak sampling data, Blakchill site

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April 2009 Report



Measured PM₁₀ concentrations at Weakleys Drive during April 2009

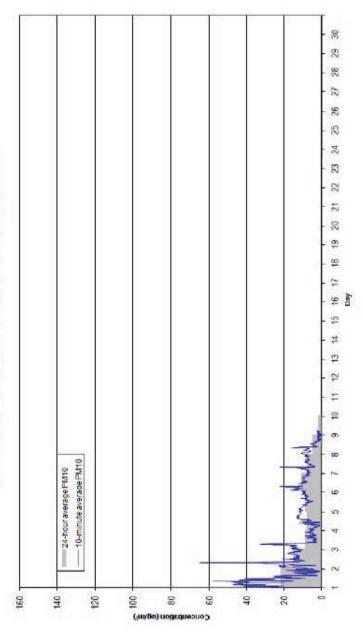


Figure 4: DustTrak sampling data, Weakleys Drive site

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Dust and Meteorological Data
Donaldson Coal | PAEHolines 10b 2815



No Grimm monitoring was scheduled for April 2009

Figure 5: Grimm monitoring data

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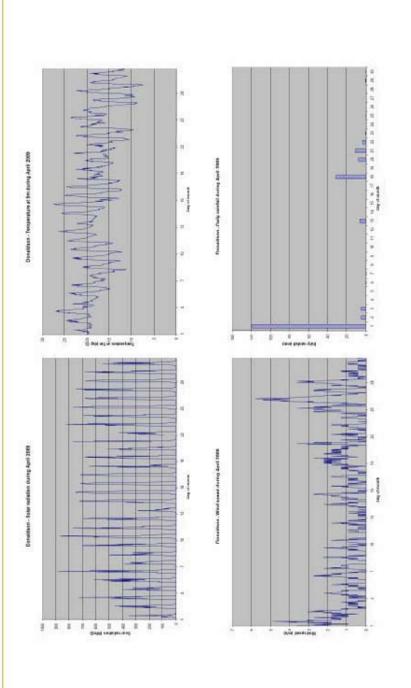


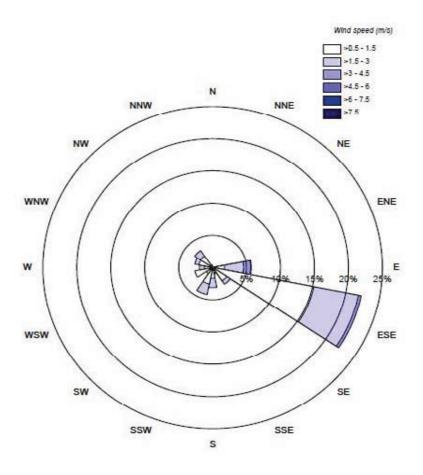
Figure 6: Meteorological conditions

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Windrose for Donaldson April 2009



Calms = 48.2%

Figure 7: Windrose



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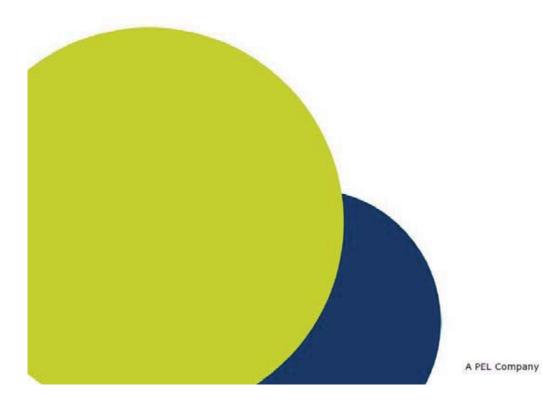
DONALDSON MONITORING

DUST AND METEOROLOGICAL DATA MAY 2009 REPORT

Donaldson Coal

Job No: 2815

August 2009





PROJECT TITLE: DUST AND METEOROLOGICAL DATA

MAY 2009 REPORT

JOB NUMBER: 2815

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1 INTRODUCTION

As part of their Air Quality Management Plan Donaldson Coal operate a dust monitoring network in the vicinity of the mining lease and a meteorological station on site. This report has been prepared in order to bring together the various data collected throughout the network during May 2009 and to summarise the information.

The dust network includes continuous monitoring, high volume air sampling and dust deposition monitoring. The continuous monitoring network consists of two DustTrak monitors measuring PM_{10} at two sites and a GRIMM monitor which is used for one week each quarter to measure $PM_{2.5}$ and PM_{10} simultaneously.

There are two locations which use high volume air samplers to determine concentrations of PM₁₀ and TSP. These operate on a six-day cycle in line with similar measurements made by the NSW Department of Environment, Climate Change and Water (DECCW) at other locations throughout the state.

In addition to concentration measurements, monthly levels of dust deposition are also measured using eleven gauges placed at various locations in the area of the mine. The locations of each of these monitors and gauges are shown in Figure 1.

Table 1 lists the monitors used and pollutants measured at these locations.

Table 1: Summary of monitoring locations and instruments

Monitoring Location	Instruments Used	Pollutant Monitored
Beresfield	HVAS	PM ₁₀
Blackhill	HVAS HVAS DustTrak Grimm (1 week per quarter)	PM ₁₀ TSP PM ₁₀ PM ₁₀ , PM _{2.5}
Weakleys Drive	DustTrak	PM ₁₀
DG1 - DG11	Deposition Gauges	Dust Deposition

The meteorological station is situated at the site of the office buildings and measures the following parameters:

- wind speed
- wind direction
- temperature
- solar radiation
- rainfall

The data are downloaded at various intervals by Donaldson and then forwarded to PAEHolmes for processing.



2 HIGH VOLUME AIR SAMPLING

High Volume Air Sampling (HVAS) was carried out at Beresfield and Blackhill by Metford Laboratories. PM₁₀ is measured at both sites while TSP is only measured at Blackhill. The data collected during May 2009 are summarised in **Table 2**. A graph consisting of all the data collected to date is shown in <u>Figure 2</u>.

Table 2: HVAS from Beresfield and Blackhill for May 2009

Date	Beresfield PM ₁₈ (µg/m³)	Blackhill PM ₁₈ (µg/m³)	Blackhill TSP (µg/m³)
6/05/2009	10	7	13
12/05/2009	13	17	27
18/05/2009	14	16	37
28/05/2009	10	17	26
30/05/2009	8	7	13
Annual average	24	18	35

These measurements will include all background sources relevant to that location, including contributions from the Donaldson mining operations.

On the days that the instruments were monitoring, the highest 24-hour average PM_{10} concentration recorded in May 2009 was 17 $\mu g/m^3$, measured on the 12^{th} and 28^{th} at the Blackhill site. On this occasion the measured PM_{10} concentration did not exceed the 50 $\mu g/m^3$ 24-hour NEPM goal.

TSP measurements from the Blackhill site show that concentrations were below the NHMRC 90 $\mu g/m^3$ annual average TSP goal. It should be noted that the NHMRC goal refers to an annual average and not a 24-hour average as measured by the high volume air sampler. The annual average TSP concentration for the 12 months to May 2009 was 35 $\mu g/m^3$.

Figure 2 shows a seasonal trend in PM_{10} concentrations, peaking during the warmer months and decreasing during autumn and winter. This is a common trend and is seen consistently in the Hunter Valley.

The annual average PM_{10} concentrations for Beresfield and Blackhill were 24 $\mu g/m^3$ and 18 $\mu g/m^3$ respectively for the 12 months to May 2009. These values are below the DECCW's annual average PM_{10} air quality criterion of 30 $\mu g/m^3$.



3 CONTINUOUS MONITORING

3.1 DustTrak Monitoring at Blackhill

<u>Figure 3</u> shows a time series of the PM₁₀ data collected from the DustTrak monitor at the Blackhill site. During the month of May, the DustTrak monitor located at the Blackhill site experienced a power failure. The DustTrak monitoring for the Blackhill site is available from the 12th to the 20th of May 2009, when the DustTrak was subject to another power failure.

Of the available data, the measured 24-hour average PM_{10} concentrations were below the NEPM goal of 50 $\mu g/m^3$. The maximum 24-hour average PM_{10} concentration was recorded on the 14^{th} of May at 18 $\mu g/m^3$.

3.2 DustTrak Monitoring at Weakleys Drive

A time series of the PM_{10} data collected from the Weakleys Drive site is shown in <u>Figure 4</u>. The DustTrak monitoring for the Weakleys Drive site is available from the 12^{th} to the 30^{th} of May 2009. The available data show that 24-hour average PM_{10} concentrations were below the NEPM goal of 50 μ g/m³. The maximum 24-hour average PM_{10} concentration was 18 μ g/m³, recorded on the 23^{rd} of May.

3.3 Grimm Monitoring

No Grimm monitoring was scheduled for May 2009.



4 DUST DEPOSITION MONITORING

Dust deposition monitoring is carried out each month via a network consisting of eleven (11) gauges. The results for May 2009 are shown in **Table 3**, in conjunction with results for the previous eleven months in order to provide an annual average for that period. A table showing the complete data set from July 2000 in provided in **Appendix A**.

Table 3: Dust deposition monitoring for the 12-month period to May 2009

O 14	Monthly dust deposition rate (q/m²/month)											
Month	DG1	DG2	DG3	DG4	DG5A	DG6	DG7	DG8	DG9	DG10	DG11	
Jun-08	0.2	0.4 "	0.1	0.5	0.1	0.1	0.3	0.5	0.1	0.8	0.2	
Jul-08	0.4	0.7 *	1.3 *	0.6	0.8 *	0.9	0.8	1.0	0.7	0.5	1.1	
Aug-08	1.0 "	0.5 *	0.7 *	0.6 "	0.5	1.9 *	0.8	1.0 *	1.0 *	0.9	1.4	
Sep-08	0.6	1.0 "	1.3 "	0.7 "	0.6	0.9 "	0.6	0.9	0.9 "	0.9 "	1.8 "	
Oct-08	1.0 "	0.5 "	1.0 "	1.3 "	1.3 "	1.2	1.0 "	1.4 "	0.8 *	1.6 "	1.8 "	
Nov-08	0.8 #	1.4 #	2.7 *	2.5	0.9 *	1.2 *	0.8 #	2.4 *	1.1 *	1.0 #	1.7 *	
Dec-08	0.4 "	0.4 "	0.6 "	0.5 *	0.3 *	1.1 "	0.6 *	15+	0.9 *	0.7 *	1.2 *	
Jan-09	1.1 *	3.0 "	1.6 *	0.8 #	0.9 "	1.4 *	0.7 *	1.5 *	0.9 *	0.9 *	5.0 +	
Feb-09	0.4 *	4.4 *	1.5 *	1.1 *	0.9	1.6 *	0.8	1.2	1.4	2.5 *	1.2	
Mar-09	2.8 *	5.8 *	2.7 *	2.4 *	1.9 "	2.1 *	2.5 *	2.4 *	2.3 *	5.7 *	2.7 *	
Apr-09	2.0 *	0.8 "	0.8 "	0.6 "	0.6 "	3.2 *	1.1 *	1.1 *	1.0 "	0.6	0.9 *	
May-09	0.6 *	1.6 *	0.8	2.4	0.9 *	5.6 +	1.4 *	1.1	1.3	0.7 *	1.5 *	
Annual Average	0.9	2.1	1.3	1.2	0.8	1.4	1.0	1.3	1.0	1.4	1.4	

Data supplied by Metford Laboratories. * Insects/bird droppings reported. *Invalid (excess bird droppings).

The highest dust deposition measurement recorded in May 2009 was 5.6 g/m²/month at DG6; however the accompanying laboratory report showed the sample was contaminated with bird droppings. The contaminated readings determined to be invalid have been removed when calculating the annual average. The annual average deposition rates for the gauges in the network were low and significantly below the amount goal of 4 g/m²/month, indicating nuisance dust in the vicinity of the mine is not an issue.

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5 METEOROLOGICAL MONITORING

Monthly plots of the wind speed, temperature, solar radiation, and rainfall data collected in May 2009 are shown in Figure 6 and a windrose plot is shown in Figure 7

The graphs shown in <u>Figure 6</u> indicate that the instruments were recording appropriately. Data maxima and minima all appeared to be sensible for this site during May. Total rainfall for the month was 125.7 mm.

A windrose (see <u>Figure 7</u>) created from the available 30-minute average wind data shows that winds were predominantly from the east and west. The site recorded calms (wind speed less than or equal to 0.5 m/s) for approximately 57.5% of the time. This is quite a high percentage and is less than the value for May 2008. The relatively large fraction of clam winds may arise from the generally forested area and the specific location of the weather station.

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APPENDIX A

ALL DUST DEPOSITION DATA

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										10000	110
Dust deposition (q/m²/month)											
Month		D2	D3	D4	D5A	D6	D7	D8	D9	D10	D11
May-00	0.4	0.4		0.7	0.9	0.6	3.6	1.6	0.5	1.8	-
Jun-00	0.7	0.5	0.5	0.7	0.8	0.4	3.8	3.2	0.5	0.7	-
Jul-00	0.4	0.4	0.5	0.7	0.8	0.5	0.8	1.5	0.4	0.4	-
Aug-00	0.9	0.6	1.0	1.2	1.1	1.0	3.4	0.7	0.7	0.6	-
Sep-00	0.8	0.9	1.1	0.9	1.3	1.0	2.2	1.0	1.0	0.8	-
Oct-00	0.4	0.6	1.1	0.9	0.9	0.8	5.3	0.9	0.6	0.5	12
Nov-00	5.2	0.7	1.4	0.8	1.0	0.4	24.1	9.4	1.1	0.6	4
Dec-00	2.8	1.4	1.9	1.3	1.1	0.8	2.1	2.5	0.9	0.9	-
Jan-01	0.7	1.7	1.4	1.8	0.7	1.3	1.1	2.4	1.1	0.6	4
Feb-01	0.9	3.1	2.0	0.5	0.9	0.7	0.7	6.7	1.3	0.5	1.0
Mar-01	0.8	2.1	1.3	0.6	0.7	0.6	0.6	5.5	0.6	0.6	1.5
Apr-01	0.8	0.7	1.3	0.5	0.7	0.4	0.3	5.1	0.7	0.6	0.8
May-01	0.2	0.2	0.4	0.4	0.3	0.3	0.6	1.8	0.6	0.8	0.9
Jun-01	0.5	0.4	0.5	1.0	1.0	0.4	0.4	8.8	0.7	0.6	0.6
Jul-01	0.5	0.3	1.8	0.5	0.8	-	16.3	4.9	0.9	0.7	0.7
Aug-01	0.4	0.4	0.8	0.8	1.0	1.7	1.0		1.0	1.8	1.1
Sep-01	0.7	1.0	1.7	1.1	1.7	0.7	-	6.0	1.1	1.3	1.7
Oct-01	1.1	0.6	4.6	0.9	0.7	0.9	1.2	1.9	0.9	0.6	1.7
Nov-01	0.9	1.0	1.1	1.1	0.8	1.1	6.0	5.5	1.3	1.9	2.3
Dec-01	4.9	0.9	4.2	0.9	1.3	1.9	1.2	3.1	1.2	9.7	1.8
Jan-02	0.8	1.0	1.5	1.3	1.1	1.4	1.3	1.5	1.1	0.9	1.5
Feb-02	1.1	1.1	0.9	0.3	0.4	0.5	3.1	5.1	0.5	0.5	0.9
Mar-02	1.7	2.1	1.6	0.7	0.7	0.8	1.0	18	1.0	0.9	1.7
Apr-02	1.0	0.4	1.0	0.8	0.8	0.6	0.9	10.1	0.5	0.7	1.0
May-02	0.6	0.6	6.0	0.7	0.4	1.2	0.9	3.1	0.7	0.2	1.0
Jun-02	1.4	0.4	1.7	0.6	0.5	0.8	0.6	2.1	0.6	0.5	1.0
Jul-02	0.7	0.7	-	0.8	0.8	0.7	1,2	-	1.1	0.5	1.0
Aug-02	1.3	0.8	1.4	1.2	1.1	1.2	1.5	-	1.5	0.9	1.6
Sep-02	0.5	1.2	1.1	0.8	0.5	0.7	5.1	9.3	1.6	0.6	1.0
Oct-02	2.2	1.4	5.2	1.5	1.5	1.4	1.4	3.4	1.0	1.5	3.1
Nov-02	2.8	1.8	3.7	1.6	0.1	1.8	2.1	3.5	2.1	2	1.9
Dec-02	2.0	-	2.5	1.5	3.0	1.5	1.8	4.1	1.6	1.2	1.9
Jan-03	2.1	1.5	2.7	1.5	1.0	1.9	2.2	2.5	1.1	1.0	1.6
Feb-03	1.4	1.1	2.6	1.1	0.9	1.2	1.7	5.9	1.2	1.0	1.5
Mar-03	0.8	0.5	1.2	1.2	0.6	2.1	1.5	3.4	-	3.6	9.5
Apr-03	0.5	1.0	0.6	1.0	0.7	0.5		10000		2.0	1.0
District Control							1.1	8.0		11 10 10 10 10 10	
May-03	0.5	0.4	0.6	0.2	0.2	0.6	1.3	1.6	0.5	0.8	1.2
Jun-03	0.5	0.6	0.8	0.8	0.4	0.6	0.8	0.7	0.9	0.7	0.7
Jul-03	0.3	0.4	0.4	0.6	0.4	0.5	0.7	0.5	0.5	0.5	0.7
Aug-03	0.8	0.2	0.7	1.1	0.5	1.3	1.8	2.1	1.3	0.7	0.9
Sep-03	0.6	0.7	1.1	0.7	0.8	1.7	1.4	1.3	2.5	0.9	1.3
Oct-03	-	0.9	1.4	0.9	0.7	1.9	1.0	1.4	0.6	0.8	1.3
Nov-03	2.6	0.8	1.0	1.1	0.4	1.3	1.5	1.5		0.8	1.3
Dec-03	1.0	1.0	1.4	1.3	1.1	1.5	1.6	2.0	1.8	0.9	1.4
Jan-04	8.5	1.5	2.1	1.5	1.3	2.6	1.4	2.2	1.7	1.5	1.7
Feb-04	0.4	0.6	6.6	1.4	0.7	1.9	1.6	12.1	4.8	1.5	2.3

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											1 10
Apr-04	0.6	1.0	0.8	0.8	0.6	1.9	0.8	1.4	0.9	1.2	1.1
May-04	0.2	0.9	2,2	0.9	0.8	0.7	0.9	1.4	1.2	0.9	1.5
Jun-04	0.4	0.6	0.7	0.9	0.6	1.4	1.0	0.9	1.0	1.0	0.8
Jul-04	0.4	0.6	5.3#	0.6	0.5	2.9	1.0	1.1	0.9	0.6	1.2
Aug-04	0.5	0.5	0.5	1.3	0.7	1.1	1.1	1.4	-	1.0	1.0
Sep-04	0.6	0.6	0.8	2.2	1.0	1.0	0.9	4.4	0.9	16.7	1.1
Oct-04	0.7	0.9	1.2	0.9	0.8	1.4	1.0	10.5	1.0	1.0	0.8
Nov-04	0.8	0.7	1.3	1.9	0.7	0.9	1.0	3.0	1.1	1.1	1.6
Dec-04	2.0	1.4	3.6	1.5	1.3	2.2	3.2	7.9	1.8	5.5	2.5
Jan-05	1.2	1.0	3.7	1.6	1.4	4.0	2.3	2.7	2.6	2.5	2.8
Feb-05	1.2	1.2	1.8	1.6	1.3	2.0	1.7		2.3	1.5	2.3
Mar-05	1.3	0.9	1.4	0.9	0.9	3.0	1.2	7.7	-	0.8	1.3
Apr-05	1.1	0.7	0.9	0.8	0.7	0.9	1.4	3.3	1.1	0.8	0.9
May-05	0.7	8.6	1.1	0.8	0.7	0.8	0.9	4.4	1.2	0.8	1.1
Jun-05	1.3	8.0	1.3	1.3	0.8	1.2	1.2	1.3	1.5	2.5	0.9
Jul-05	1.0	0.5	0.5	0.7	0.4	1.6	0.7	1.2	0.8	4.3	1.1
Aug-05	0.6	0.6	0.8	1.0	0.8	0.9	0.7	1.0	0.9	1.0	0.9
Sep-05	0.6	0.7	0.8	0.7	0.7	1.2	1.3	1,3	1.0	0.9	1.1
Oct-05	0.8	0.9	1.3	0.9	0.8	1.4	1.2	1.9	1.3	1.1	1.3
Nov-05	-	2.3	2.3	2.0	1.7	1.2	2.0	3.2	1.6	1.4	2.2
Dec-05	1.9	3.2	2.3	3.3	2.6	3.4	2.3	-	1.3	2.1	3.9
Jan-06	1.0	2.1	1.7	1.0	23.	3.5	-	2.7	1.1	140	1.5
Feb-06	2.2	1.0	0.9	1.2	1.1	1.7	1.1	2.9	12	2.3	1.8
Mar-06	0.7	0.6	2.3	0.7	0.6	0.9	1.0	1.4	0.7	0.8	1.5
Apr-06	0.6	0.7	1.1	0.8	0.6	1.1	0.8	1.0	1.0	1.8	1.5
May-06	1.0	3.1	1.0	-	1.1	1.4	1.1	4.1		7.0	1.5
Jun-06	0.4	0.3	0.7	0.5	0.4	0.6	0.7	0.8	0.6	0.9	0.9
Jul-06	0.3	0.3	1	1.3	0.4	0.7	0.7	2.7	-	0.6	0.6
Aug-06	0.9	0.6	0.8	0.7	0.7	0.8	0.7	1.7	4	3.7	0.9
Sep-06	1.6	0.7	1.1	1.7	0.7	1	0.9	1.3	1.2	0.8	1.6
Oct-06	2	1.4	1.6	1.8	0.9	1.8	1.2	1.8	1.5	1.8	1.9
Nov-06	4.3	2.2	3	2.3	2.3	5.3	2.4	3.3	2.3	2.3	2.9
Dec-06	1.2	3.4	1.9	2.3	2.3		2.1	2.1	10000	4.9	3.9
Jan-07	2	0.9	1.5	0.7	0.7	1.7	1.1		1.2	1.7	0.9
Feb-07	1.7	0.9	1.6	0.7	0.6	1	1.8	1.7	1.1	1.2	1.7
Mar-07	1.3	0.9	1.7	0.8	1.2	0.6	2.2	1.7	1	0.9	1.7
Apr-07	0.5	0.7	0.9	0.6	4.8	1.2	0.5	2.7	0.5	0.8	0.9
May-07	0.8	0.5	0.6	1.2	0.6	0.6	0.7	1.9	0.5	0.7	0.8
Jun-07	0.6	0.5	0.7	1.1	0.1	0.5	0.1	0.5	0.1	0.4	0.3
Jul-07	0.5	0.4	0.6	2.1	0.5	0.8	0.6	0.6	0.4	0.5	0.7
Aug-07	1.5	0.4	0.7	1	0.7	0.7	0.5	1	0.6	0.6	0.7
Sep-07	1.3	0.5	1.8	1	0.7	0.9	0.9	1.3	1	0.7	1.6
Oct-07	4.2	0.9	1.1	1.4	1.1	1.7	1.8	1.7	1.6	1.4	2.2
Nov-07	0.8	0.8	1.1	0.9	1.1	1.1	1.1	1.7	0.6	0.8	1.5
Dec-07	1.3	0.8	3	0.7	0.5	0.8	0.5	1.1	0.3	0.8	0.6
Jan-08	2.6	0.8	3.7	0.5	0.5	0.5	0.4	2.2	0.8	0.3	0.8
Feb-08	0.4	0.1	14	0.1	0.1	0.3	0.1	0.3	0.2	0.2	0.3
Mar-08	4.5	0.6	9.21	0.6	2.9	2.1	0.6	1.5	0.5	1	0.9
April-08	0.4"	0.4"	0.8"	0.4"	0.4"	0.8"	1.1"	1.7"	1.2	1.1"	1.1



May-08	1.1	2.4*	0.9	1.4	0.9	0.9	0.7	2.7	1*	1.1	1.3
June-08	0.2	0.4*	0.1	0.5	0.1"	0.1	0.3	0.5	0.1	0.8	0,2
July-08	0.4	0.7	1.3"	0.6	0.8	0.9	0.8	1	0.7	0.5	1.1
Aug-08	1	0.5	0.7	0.6	0.5	1.9	0.8	1	1	0.9	1.4
Sep-08	0.6	1	1.3	0.7	0.6	0.9	0.6	0.9	0.9	0.9	1.8
Oct-08	1	0.5	1	1.3	1.3	1.2	1	1.4	0.8	1.6	1.8
Nov-08	0.8	1.4	2.7	2.5	0.9	1.2	0.8	2.4	1.1	1	1.7
Dec-08	0.4	0.4	0.6	0.5	0.3	1.1	0.6	15	0.9	0.7	1.2
Jan-09	1.1	30	1.6	0.8	0.9	1.4	0.7	1.5	0.9	0.9	5+
Feb-09	0.4	4.4	1.5	1.1	0.9	1.6	8.0	1.2	1.4	2.5	1.2
Mar-09	2.8	5.8	2.7	2.4	1.9	2.1	2.5	2.4	2.3	5.7	2.7
Apr-09	2	0.8	0.8	0.6	0.6	3.2	1.1	1.1	1	0.6	0.9
May-09	0.6	1.6	0.8	2.4	0.9	5.6 *	1.4	1.1	1.3	0.7	1.5

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[&]quot; - sample contaminated

^{+ -} sample invalid

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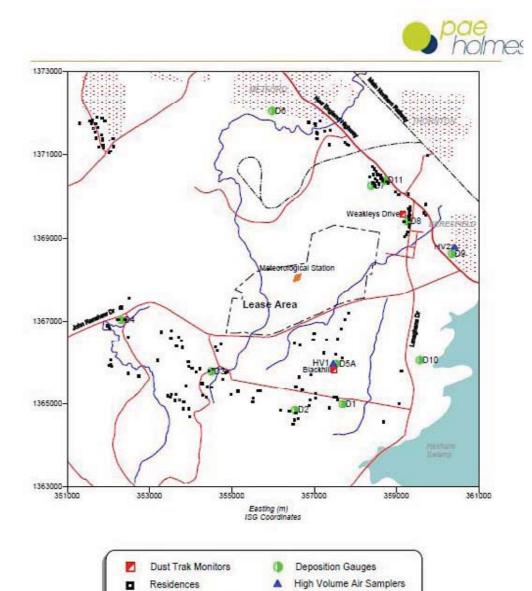
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Location of Project Area

GRIMM monitor

Figure 1: Project Location

Meteorological Station

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High Volume Air Sampling data recorded at Beresfield and Blackhill from December 1999 to May 2009

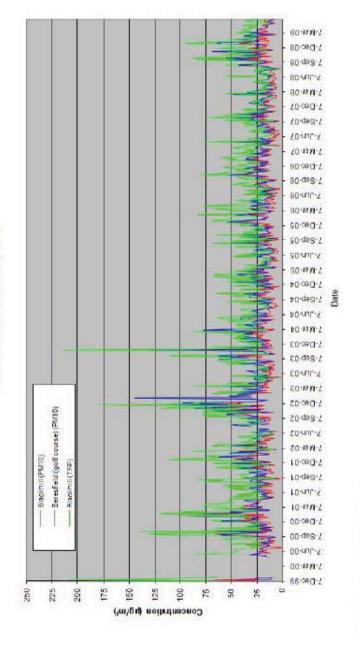


Figure 2: High Volume Air Sampling data

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Measured PM.o concentrations at Blackhill during May 2009

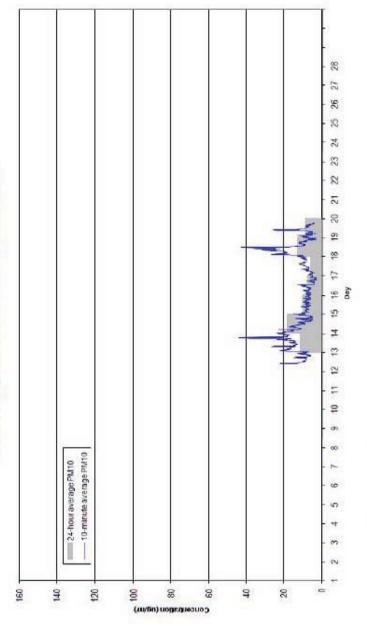


Figure 3: DustTrak sampling data, Blackhill site



Measured PM₁₀ concentrations at Weakleys Drive during May 2009

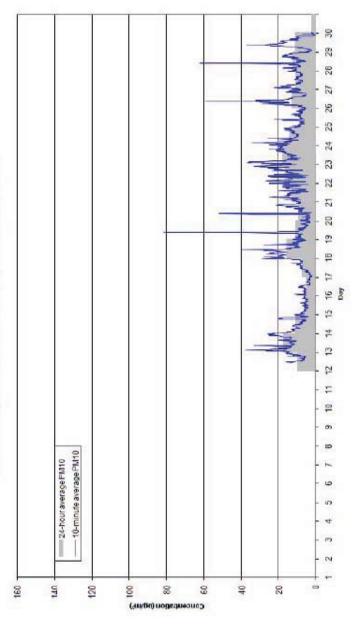


Figure 4: DustTrak sampling data, Weakleys Drive site

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No Grimm monitoring was scheduled for May 2009

Figure 5: Grimm monitoring data



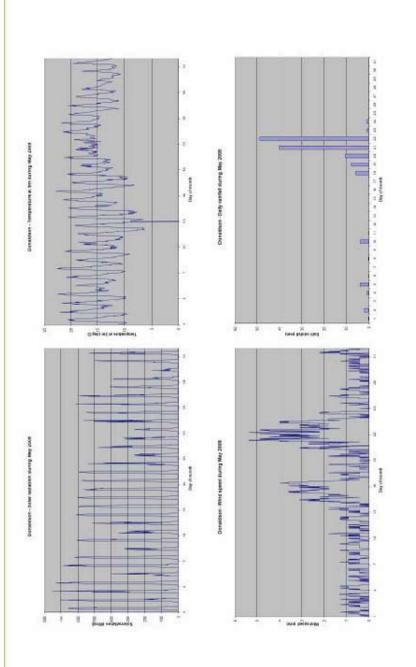


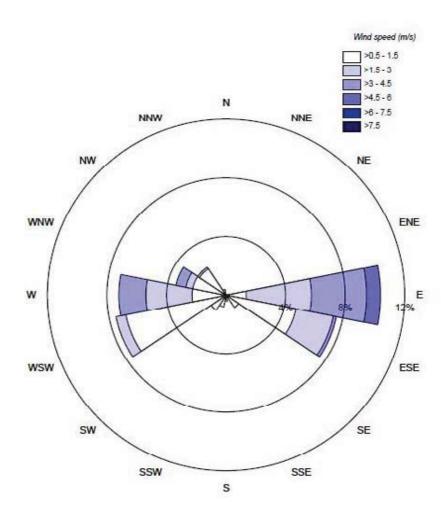
Figure 6: Meteorological conditions

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Windrose for Donaldson May 2009



Calms = 57.5%

Figure 7: Windrose

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