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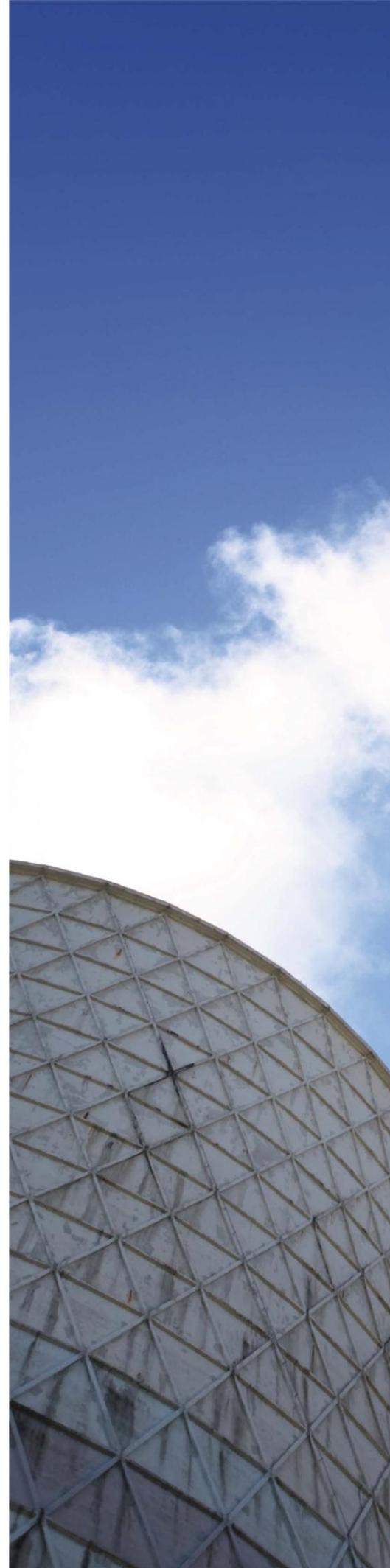
## REPORT

### DURALIE COAL MINE PRP – U3 OVERBURDEN HANDLING IN ADVERSE WEATHER – REPORT ON ACTIONS AND RESULTS

Duralie Coal Pty Ltd

Job No: 8444

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**PROJECT TITLE:** Duralie Coal Mine PRP – U3 Overburden handling in Adverse Weather – Report on actions and results

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**PREPARED FOR:** Duralie Coal Pty Ltd

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## 1 INTRODUCTION

Duralie Coal Pty Ltd (DCPL) holds Environmental Protection Licence (EPL) 11701 for the Duralie Coal Mine (DCM). Condition U3 (*Particulate Matter Control Best Practice Implementation - Disturbing and Handling Overburden under Adverse Weather Conditions*) requires DCM to alter or cease the use of equipment on overburden and loading dumping overburden during adverse weather conditions. The licence must:

- Monitor operational activities (location and intensity of overburden handling activities) to determine if adverse conditions will result in unacceptable dust levels beyond the site boundary.
- Measure the dust (PM<sub>10</sub>) concentration at Monitoring Point 33 to determine if adverse conditions are resulting in elevated dust concentrations beyond the site boundary and also to determine if the alteration / cessation decreased these dust levels.
- Document the actions taken and the resultant dust levels.

The purpose of this report is to report on actions completed by DCM under “adverse conditions” and the resultant dust levels beyond the site boundary.

This is achieved as follows:

- Review meteorological data and identify when adverse conditions occurred (based on trigger levels being breached).
- Review procedural response for adverse conditions.
- Review continuous monitoring data (TEOM) during adverse weather and after the procedural response.
- Determine if adverse conditions are resulting in unacceptable dust levels beyond the site boundary.

## 2 REVIEW OF ADVERSE CONDITIONS

Adverse conditions for unacceptable dust levels beyond the site boundary were identified in **Duralie Coal (2013)** as follows:

- Investigation Level - wind speed  $\geq 5$  m/s
- Action Level - wind speed  $\geq 7$  m/s.

These trigger levels are used in a Trigger Action Response Plan (TARP) for overburden handling activities in critical locations of DCM. During the period from the 22 March 2013 to the 30 June 2014 the two trigger levels were exceeded on an hourly average basis approximately 5 % of the time (see **Table 2.1**).

**Table 2.1: Percentage of trigger level wind speed occurrence**

Trigger level	Percentage of period
Investigation ( $\geq 5$ m/s)	4.1%
Action ( $\geq 7$ m/s)	0.9%

**Figure 2-1** shows the distribution of the winds per hour for the analysis period. It is apparent that lower winds occur more frequently during night and higher wind speeds are almost non-existent.

The analysis shows that the wind speed trigger levels are typically reached during afternoon periods.

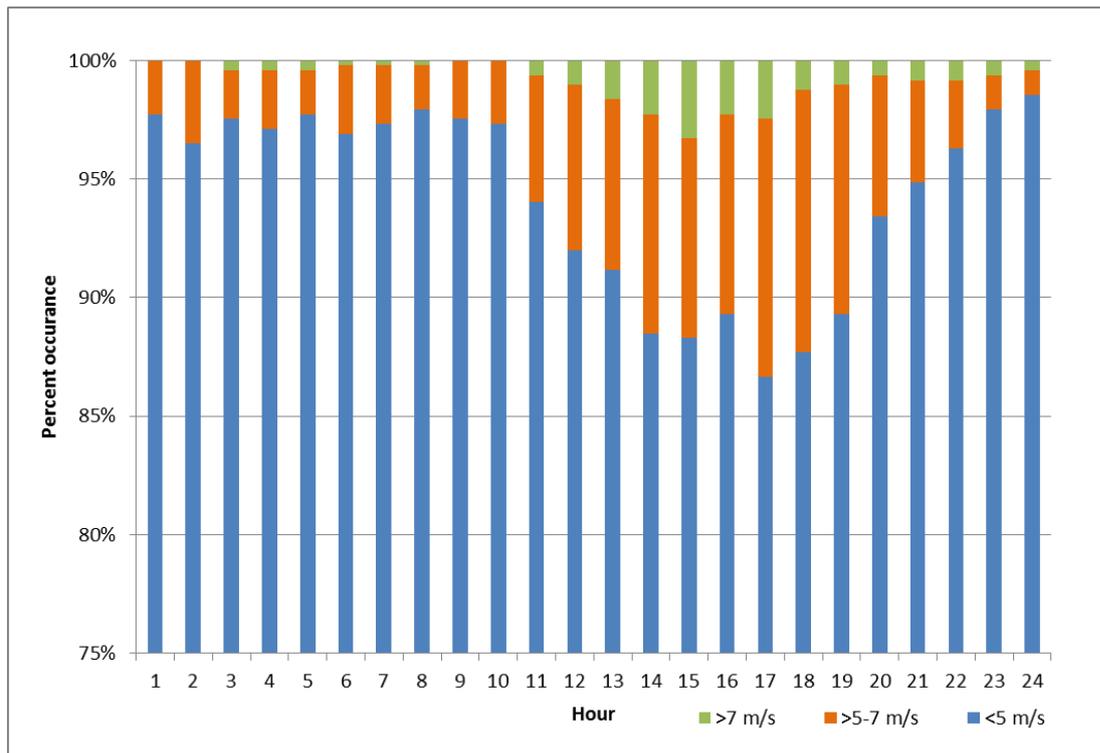


Figure 2-1: Diurnal distribution of wind speeds for the period – 22/03/2013 – 30/06/2014

### 3 RESULTANT DUST CONCENTRATION

The dust concentration during adverse conditions is measured at the TEOM located to the north of DCM. A time series of the 1-hour average PM<sub>10</sub> concentration, during adverse conditions, is presented in **Figure 3-1**. The period of analysis in **Figure 3-1** qualifies under adverse conditions, shown by the corresponding plotted hourly wind speeds, all of which are >7m/s. Periods when winds >7m/s are blowing from the DCM towards the TEOM are shown with a blue dot. A number of clear spikes are apparent in the data, some of which correspond to winds blowing from the DCM towards the TEOM (the blue dots).

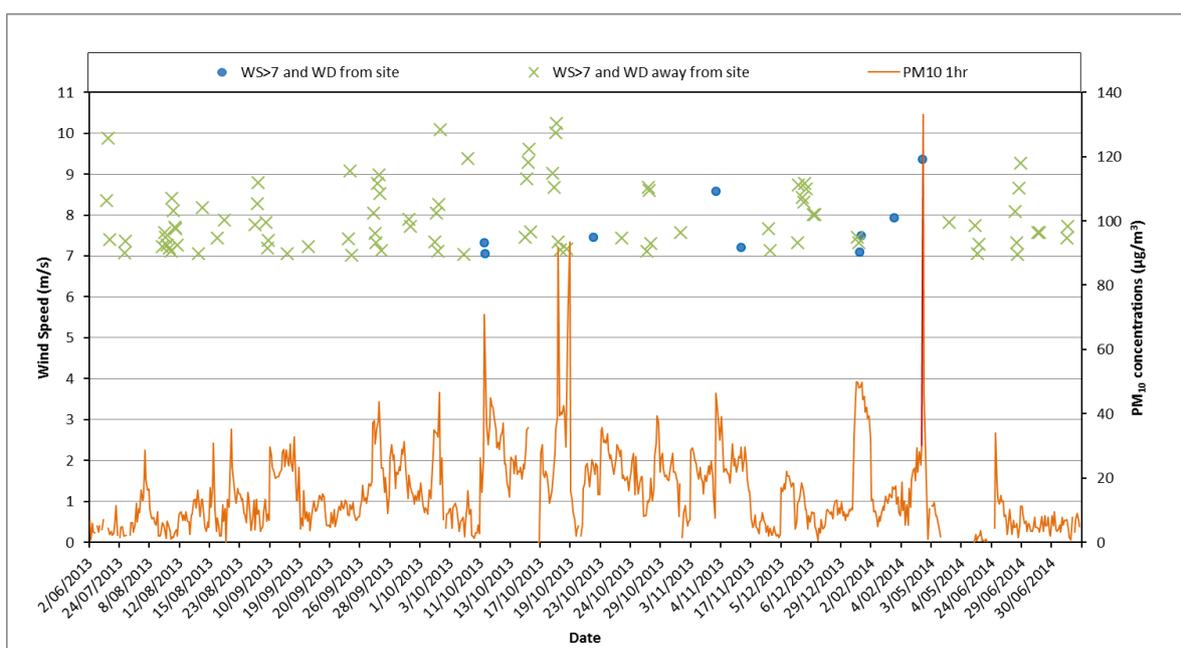
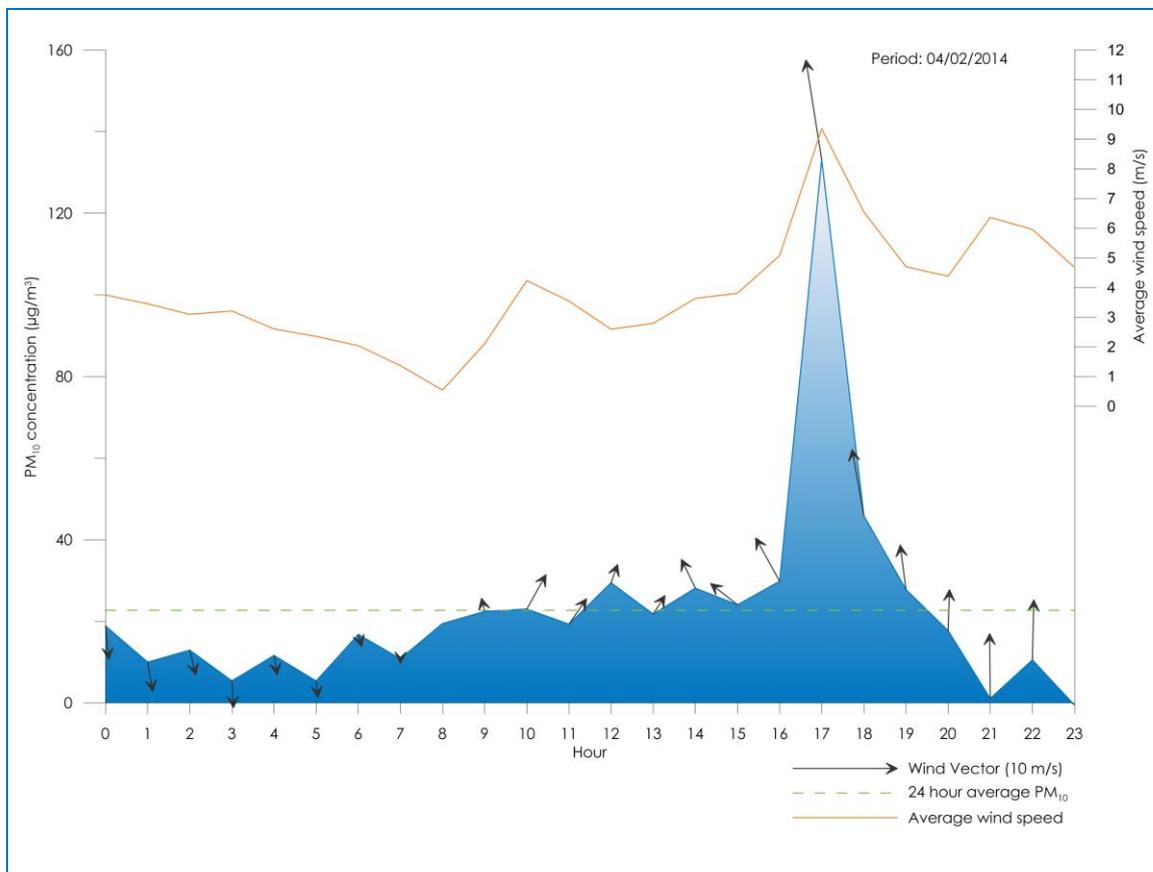


Figure 3-1: Wind speed and PM<sub>10</sub> concentrations for day when the wind speed exceeded 7 m/s

Further analysis of four days where the PM<sub>10</sub> concentrations peaked and winds were >7m/s are presented in below. Three of these days investigated had wind blowing from the DCM operations towards the TEOM.

The largest peak occurred on 4 February 2014. On this day winds were blowing from DCM towards the TEOM. **Figure 3-2** shows a time series for this day, showing the vector wind direction (direction to), wind speed and PM<sub>10</sub> concentration. The peak 1 hour PM<sub>10</sub> concentrations correspond to a >7m/s wind blowing from the DCM towards the TEOM, as shown by the wind vector arrow. However, 1 hour PM<sub>10</sub> concentrations then fall, despite wind continuing to blow in the similar direction, although wind speeds also drop. It is noted that on the previous day, a grass fire started near the Wards River Station residence on Martins Crossing Road. The fire burned up to and around the TEOM enclosure causing high levels of smoke to be recorded by the TEOM. It is likely that as winds picked up on 4 February 2014, ash from the fire contributed to the recorded PM<sub>10</sub> concentrations. It is also noted that SCM has a change of shift from 5 to 5:30 pm and no operations, including overburden handling, were happening at time of peak 1-hour PM<sub>10</sub> concentration. The resultant 24-hour PM<sub>10</sub> concentration was 22.7 µg/m<sup>3</sup> (green dashed line).



**Figure 3-2: Daily variations of PM<sub>10</sub> concentration and winds across day when action level was triggered - 04/02/2014**

The second largest peak occurred on 17 October 2013. **Figure 3-3** shows a time series for this day, showing the vector wind direction, wind speed and PM<sub>10</sub> concentration. On this day winds were blowing from the north - northwest (i.e. the recorded PM<sub>10</sub> concentrations are not a result of operations at DCM). There was heavy smoke in the valley on 17 October 2013 due to bushfires. Also, on the evening of 17 October 2013 a southerly change caused heavy smoke from the Medowie bushfires to blow north into the Gloucester Valley with smoke remaining in the valley for most of the following day (18 October 2013). This can be seen in the plot, showing increased 1-hour PM<sub>10</sub> concentration towards the end of the day, associated with a southerly wind vector. The resultant 24-hour PM<sub>10</sub> concentration was 36.7 µg/m<sup>3</sup> (green line).

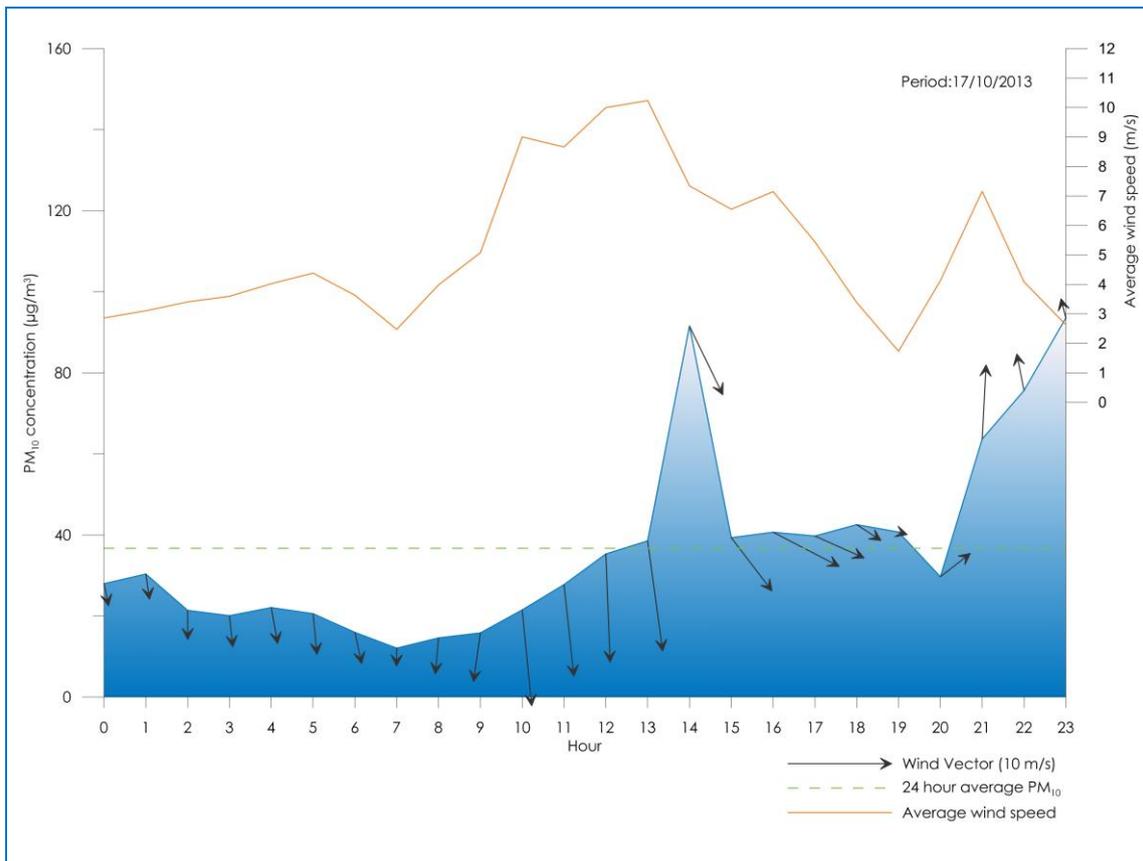
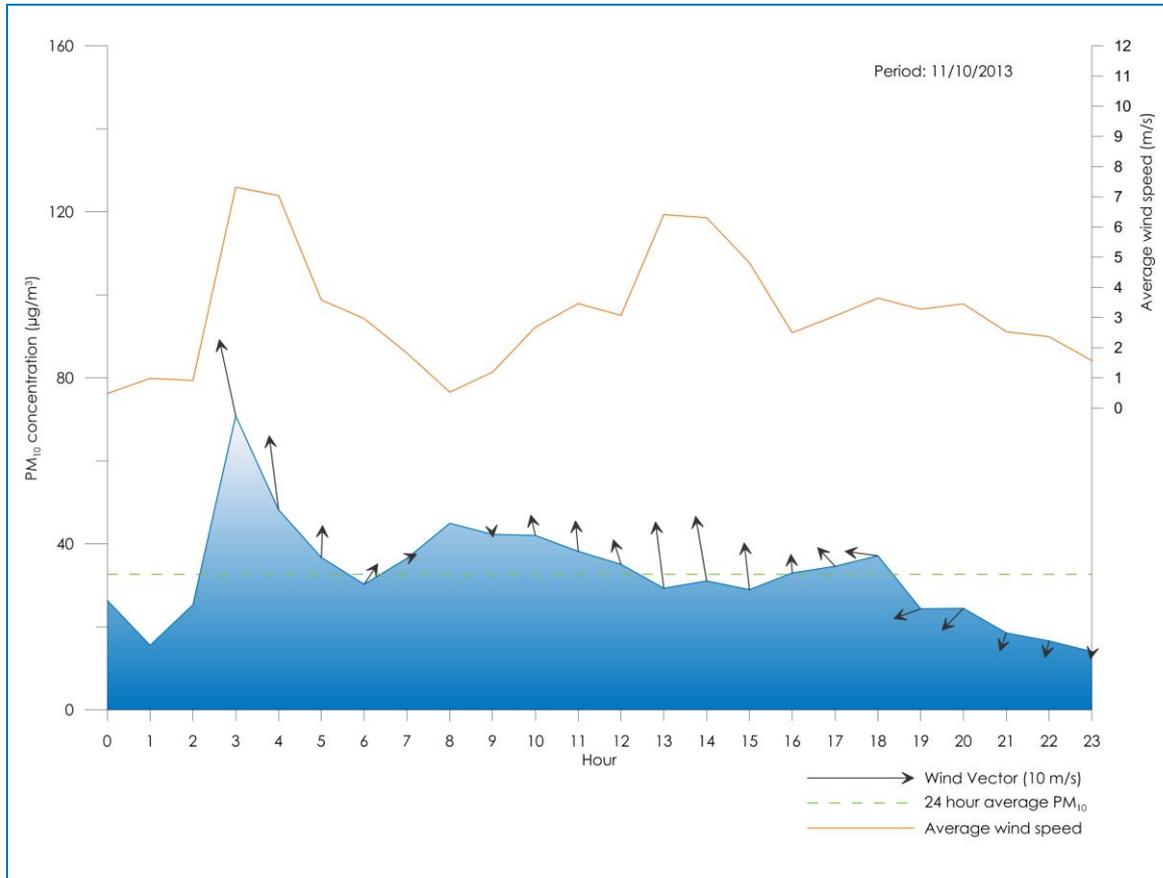


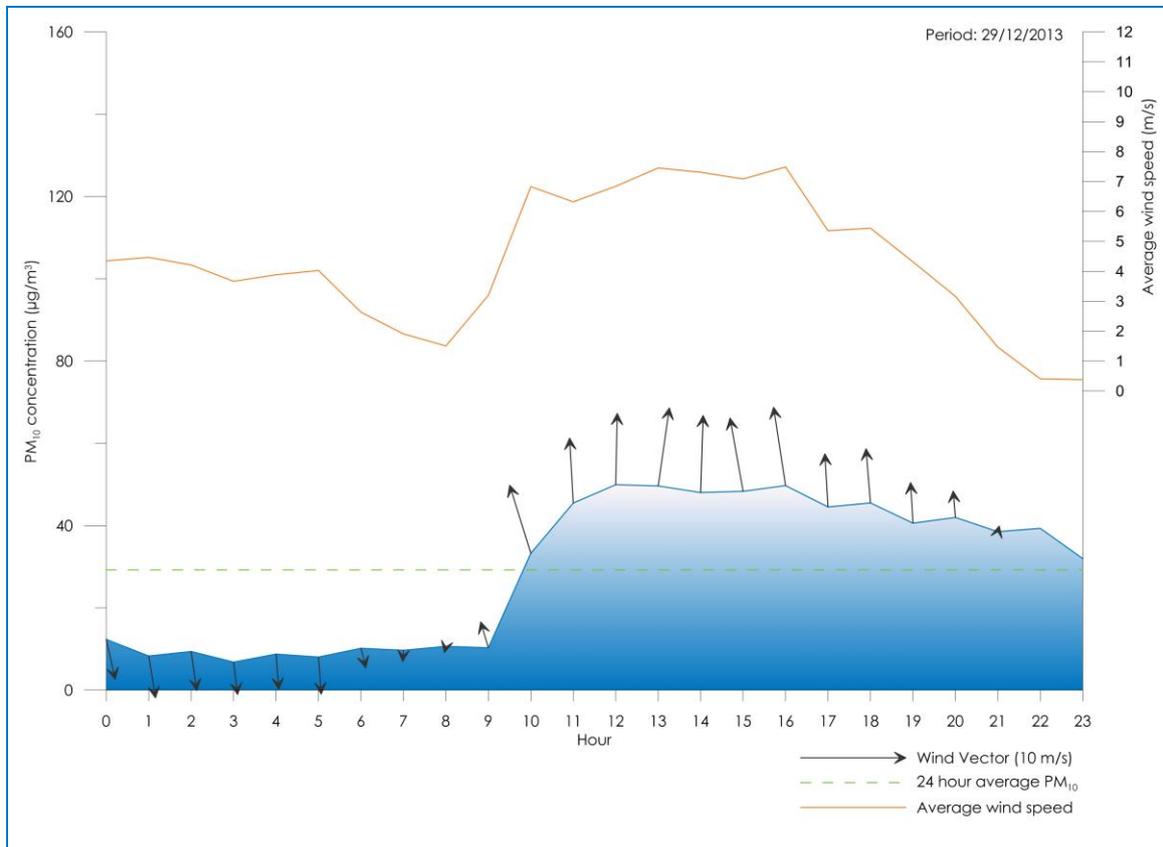
Figure 3-3: Daily variations of PM<sub>10</sub> concentration and winds across day when action level was triggered – 17/10/2013

Another peak occurred on 11 October 2013. On this day winds were blowing from DCM towards the TEOM. **Figure 3-4** shows a time series for this day, showing the vector wind direction, wind speed and PM<sub>10</sub> concentration. The peak 1 hour PM<sub>10</sub> concentrations correspond to a >7m/s wind blowing from the DCM towards the TEOM, as shown by the wind vector arrow. Another peak in the winds speeds occurred later in the day and the winds were again blowing from DCM towards the monitors, however the 1 hour PM<sub>10</sub> concentrations did not peak. The 1 hour PM<sub>10</sub> concentrations then fall when the winds changed direction and wind speeds dropped slightly. The resultant 24-hour PM<sub>10</sub> concentration was 32.7 µg/m<sup>3</sup> (green dashed line).



**Figure 3-4: Daily variations of PM<sub>10</sub> concentration and winds across day when action level was triggered - 11/10/2013**

The last peak occurred on 29 December 2013. On this day winds were blowing from DCM towards the TEOM during the latter half of the day. **Figure 3-5** shows a time series for this day, showing the vector wind direction, wind speed and PM<sub>10</sub> concentration. A peak 1 hour PM<sub>10</sub> concentrations corresponds to a period where the winds were blowing at >7m/s from DCM towards the TEOM, as shown by the wind vector arrows. The 1 hour PM<sub>10</sub> concentrations stayed elevated for a number of hours then fall, despite wind continuing to blow in the same direction (although wind speeds drop slightly). The resultant 24-hour PM<sub>10</sub> concentration was 29.2 µg/m<sup>3</sup> (green dashed line).



**Figure 3-5: Daily variations of PM<sub>10</sub> concentration and winds across day when action level was triggered - 29/12/2013**

## 4 ACTIONS TAKEN DURING ADVERSE CONDITIONS

As outlined in the Air Quality and Greenhouse Gas Management Plan (**Duralie Coal, 2013**), DCM has a number of reactive measures for dust control, based on a “medium” risk performance indicator identified by dust monitoring or by visual observation.

The same reactive measures for overburden handling are used in response to an “adverse weather” trigger and include the following steps:

- The Mine Manager and/or Environmental Officer will determine if excessive dust is being generated.
- The Mine Manger and/or Environmental Officer will issue an instruction for the particular mining activity causing the excessive generation of dust to cease immediately.
- The Environmental Officer will assess what additional mitigation measures can be applied, including intensive watering of the exposed or active surfaces, reducing the intensity of the activity. This assessment will include consideration of direction in relation to receptors and off-site impacts.
- If the Environmental Officer is not satisfied that the additional measures will reduce dust emissions to an acceptable level (due to the prevailing weather conditions) the activity will not recommence until the additional measures have been implemented and/or more favourable weather conditions occur.
- The Environmental Officer will be responsible for monitoring the activity once it recommences to measure the effectiveness of control measures and to ensure dust emissions are acceptable.

Based on the resultant dust concentrations recorded by the TEOM (24-hour average) the actions taken by DCM, in response to adverse weather are considered appropriate.

## 5 CONCLUSION

A review of meteorological data for DCM identifies a small percentage of time when adverse conditions for overburden handling occur. A review of the resultant dust levels during these conditions indicate that although short term peaks are observed, concentrations generally decrease immediately afterwards and the resultant 24-hour average PM<sub>10</sub> concentration does not exceed compliance criteria. Many of the short term peaks can be attributed to factors external to DCM operations.

The procedural dust mitigation measures implemented at DCM are generally effective in controlling unacceptable dust beyond the site boundary.

Going forward, DCM will document the procedural response measures, undertaken during adverse conditions, as part of the TARP for overburden handling during adverse weather.

## 6 REFERENCES

Duralie Coal (2013). Duralie Coal Mine Air Quality and Greenhouse Management Plan, September 2013.

Pacific Environment, (2013), Duralie Coal Mine PRP U3 – Identification of adverse weather conditions for overburden handling, Duralie Coal Pty Ltd.