# Monthly Environmental Data June 2015

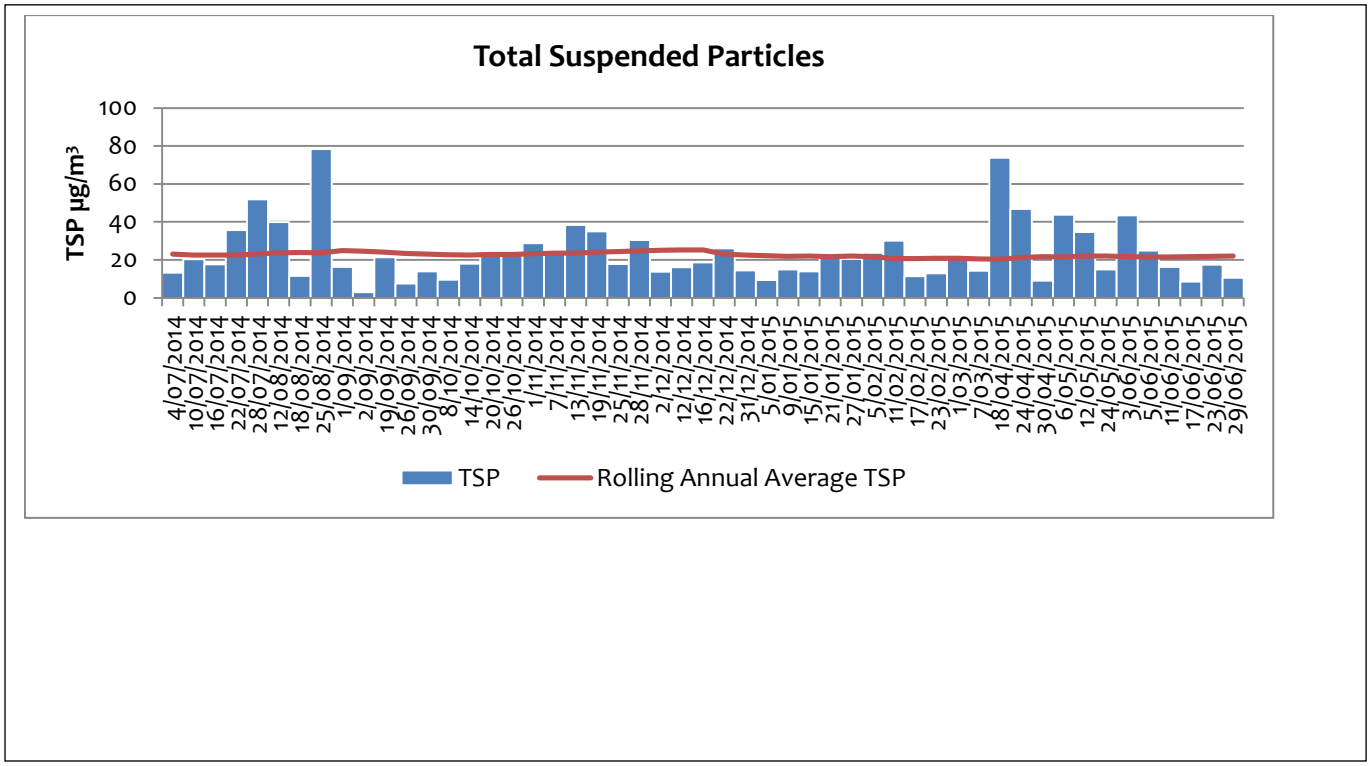
## Contents

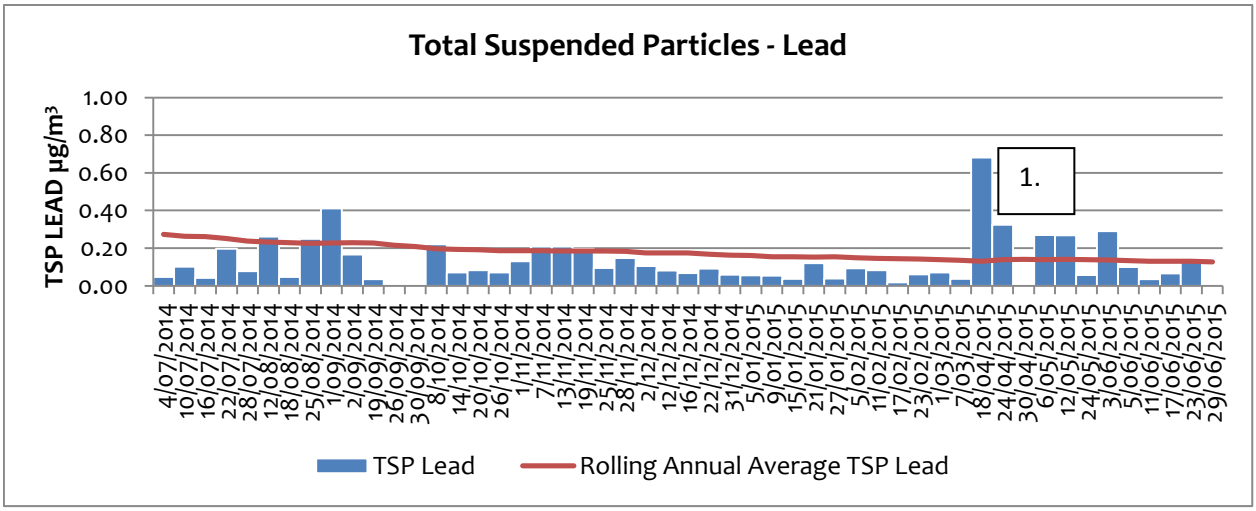
# 1 Air Quality

## 1.1 High Volume Air Samplers

### *EPL10 - SILVER TANK - ON SITE*

| DATE | TSP (µg/m$^3$) | Lead (µg/m$^3$) |
|---|---|---|
| 3/06/2015 | 43.50 | 0.29 |
| 5/06/2015 | 24.80 | 0.10 |
| 11/06/2015 | 16.30 | 0.04 |
| 17/06/2015 | 8.60 | 0.07 |
| 23/06/2015 | 17.40 | 0.13 |
| 29/06/2015 | 10.60 | 0.01 |

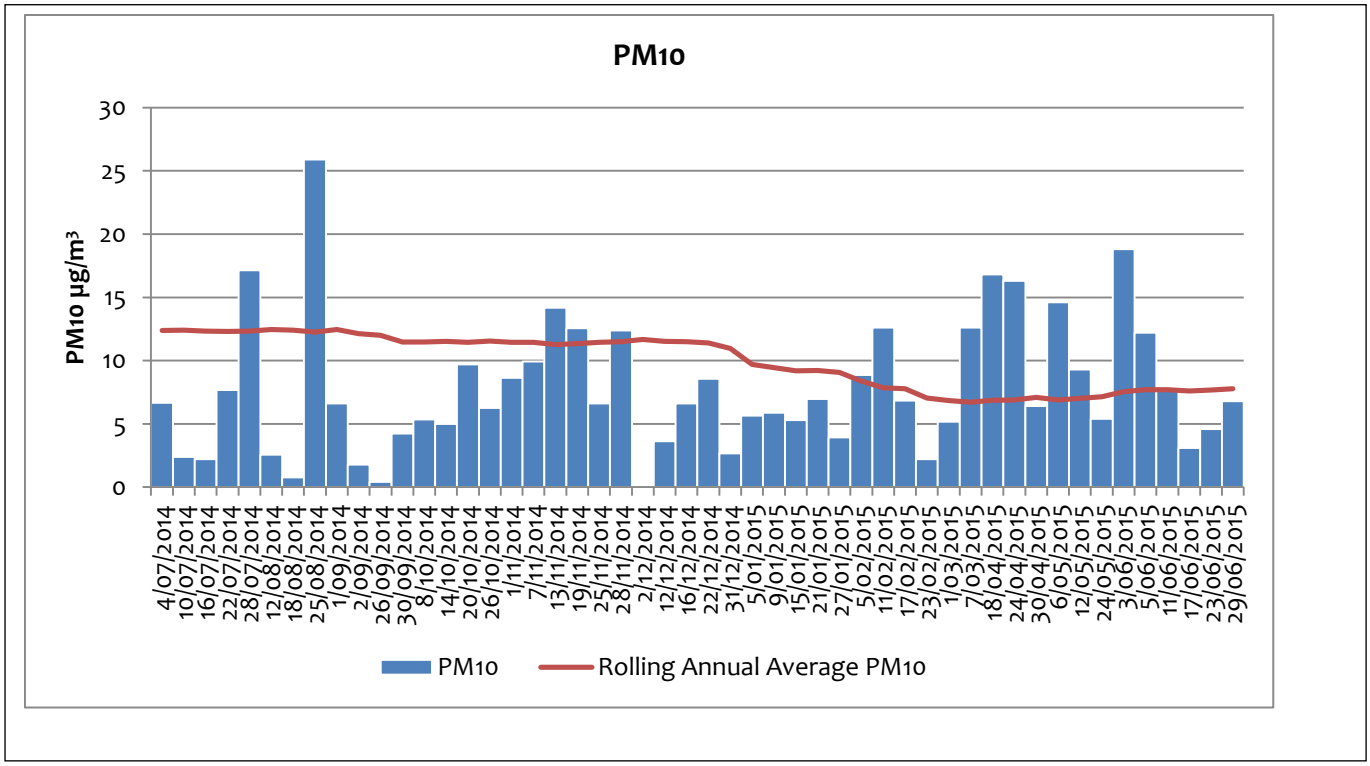


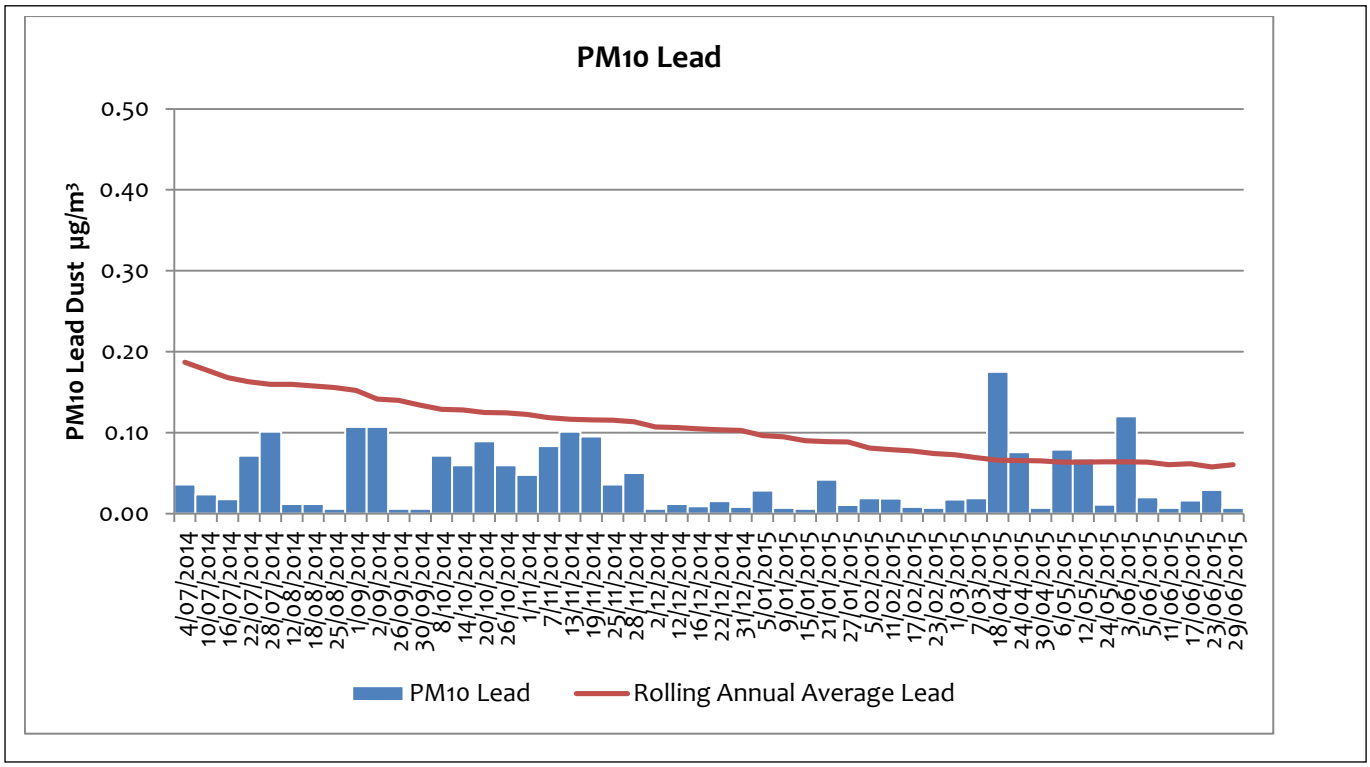



1. Spike on the 18th was investigated. Lab QC was okay with no evidence of lab contamination. Wind conditions were not extraordinary and it rained. Field sampling methods have been checked to prevent any sample contamination.

### *EPL11 - Silver Tank - On Site*

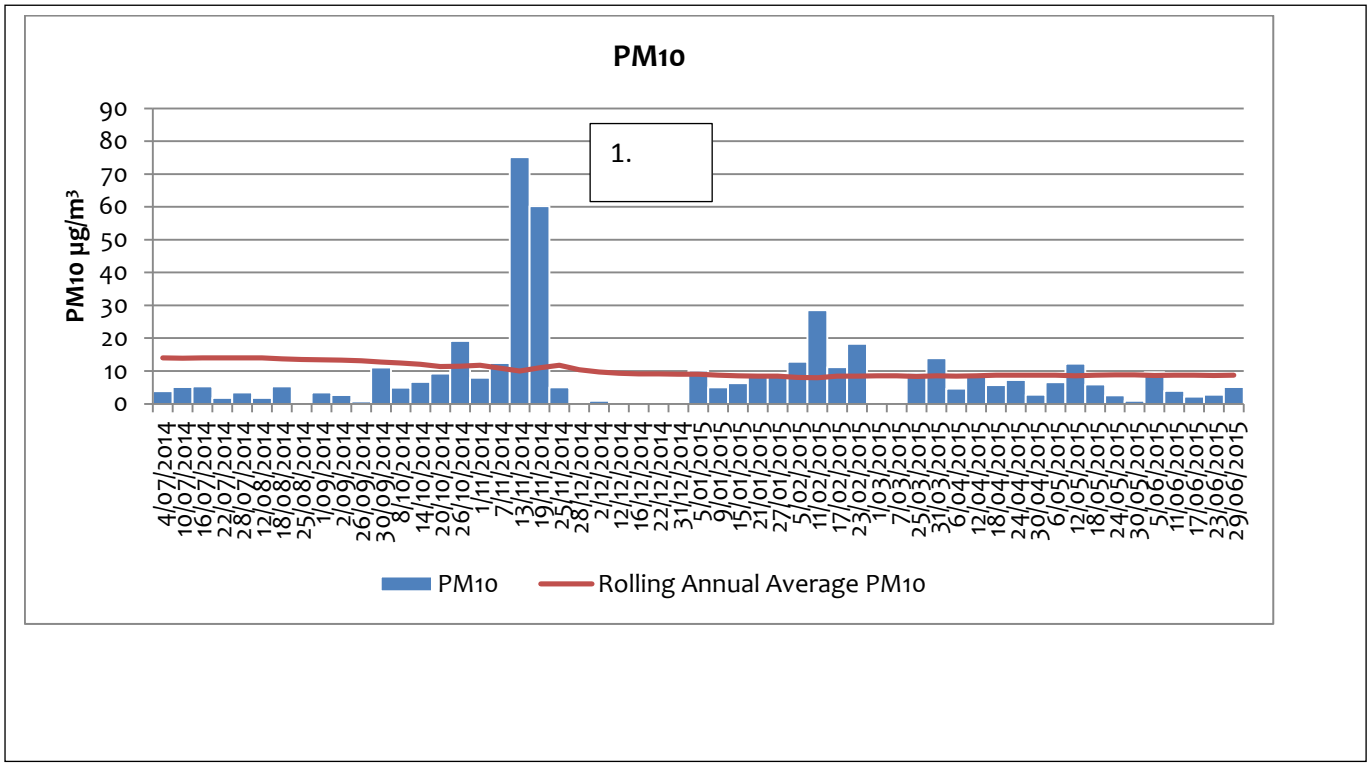
| DATE | PM10 (µg/m³) | Lead (µg/m³) |
|---|---|---|
| 3/06/2015 | 18.80 | 0.12 |
| 5/06/2015 | 12.20 | 0.02 |
| 11/06/2015 | 7.60 | 0.01 |
| 17/06/2015 | 3.10 | 0.02 |
| 23/06/2015 | 4.60 | 0.03 |
| 29/06/2015 | 6.80 | 0.01 |


PM10
PM10 µg/m³
30
25
20
15
10
5
0
4/07/2014
10/07/2014
16/07/2014
22/07/2014
28/07/2014
12/08/2014
18/08/2014
25/08/2014
1/09/2014
2/09/2014
26/09/2014
30/09/2014
8/10/2014
14/10/2014
20/10/2014
26/10/2014
1/11/2014
7/11/2014
13/11/2014
19/11/2014
25/11/2014
28/11/2014
2/12/2014
12/12/2014
16/12/2014
22/12/2014
31/12/2014
5/01/2015
9/01/2015
15/01/2015
21/01/2015
27/01/2015
5/02/2015
11/02/2015
17/02/2015
23/02/2015
1/03/2015
7/03/2015
18/04/2015
24/04/2015
30/04/2015
6/05/2015
12/05/2015
24/05/2015
3/06/2015
5/06/2015
11/06/2015
17/06/2015
23/06/2015
29/06/2015
PM10
Rolling Annual Average PM10

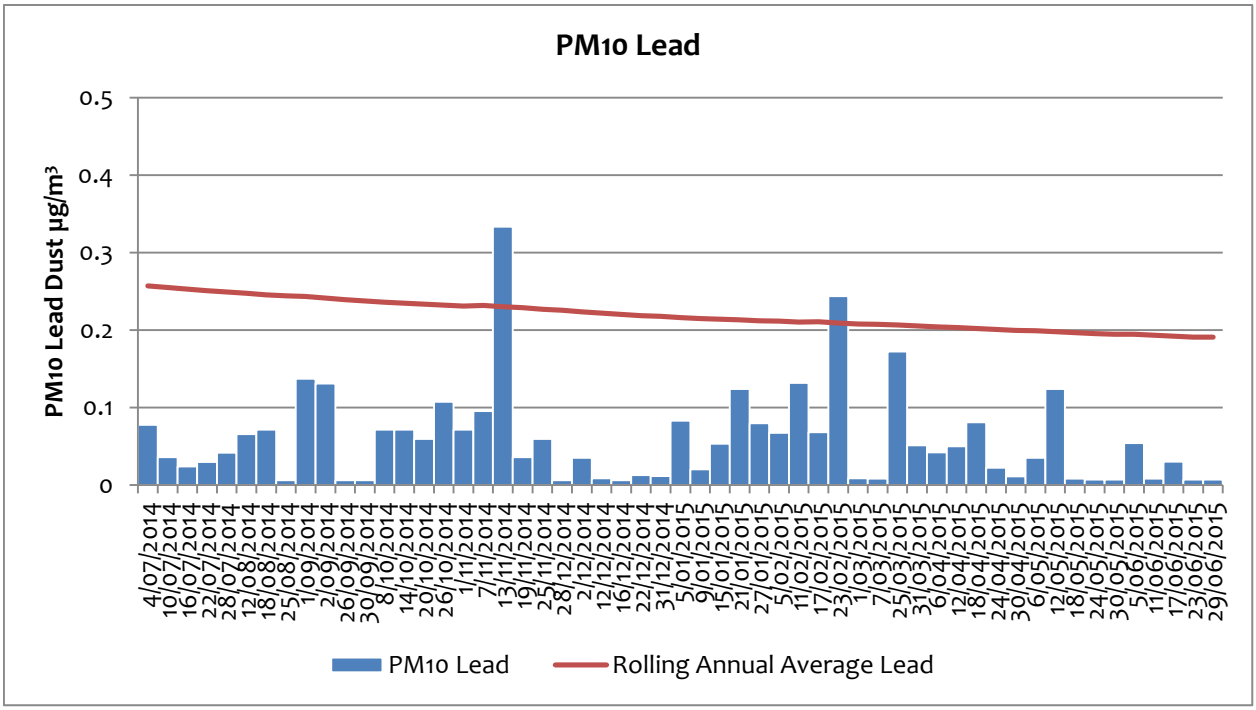

PM10 Lead
PM10 Lead Dust µg/m³
0.50
0.40
0.30
0.20
0.10
0.00
4/07/2014
10/07/2014
16/07/2014
22/07/2014
28/07/2014
12/08/2014
18/08/2014
25/08/2014
1/09/2014
2/09/2014
26/09/2014
30/09/2014
8/10/2014
14/10/2014
20/10/2014
26/10/2014
1/11/2014
7/11/2014
13/11/2014
19/11/2014
25/11/2014
28/11/2014
2/12/2014
12/12/2014
16/12/2014
22/12/2014
31/12/2014
5/01/2015
9/01/2015
15/01/2015
21/01/2015
27/01/2015
5/02/2015
11/02/2015
17/02/2015
23/02/2015
1/03/2015
7/03/2015
18/04/2015
24/04/2015
30/04/2015
6/05/2015
12/05/2015
24/05/2015
3/06/2015
5/06/2015
11/06/2015
17/06/2015
23/06/2015
29/06/2015
PM10 Lead
Rolling Annual Average Lead

## *EPL12 - Blackwoods Pit – On Site*

| DATE | PM10 (µg/m$^3$) | Lead (µg/m$^3$) |
|---|---|---|
| **5/06/2015** | 9.60 | 0.054 |
| **11/06/2015** | 4.00 | 0.008 |
| **17/06/2015** | 2.20 | 0.03 |
| **23/06/2015** | 2.80 | 0.007 |
| **29/06/2015** | 5.10 | 0.007 |




1. High dust values in November coincide with road works that were carried out by Broken Hill City Council on Federation Way in the vicinity of Blackwoods Pit.

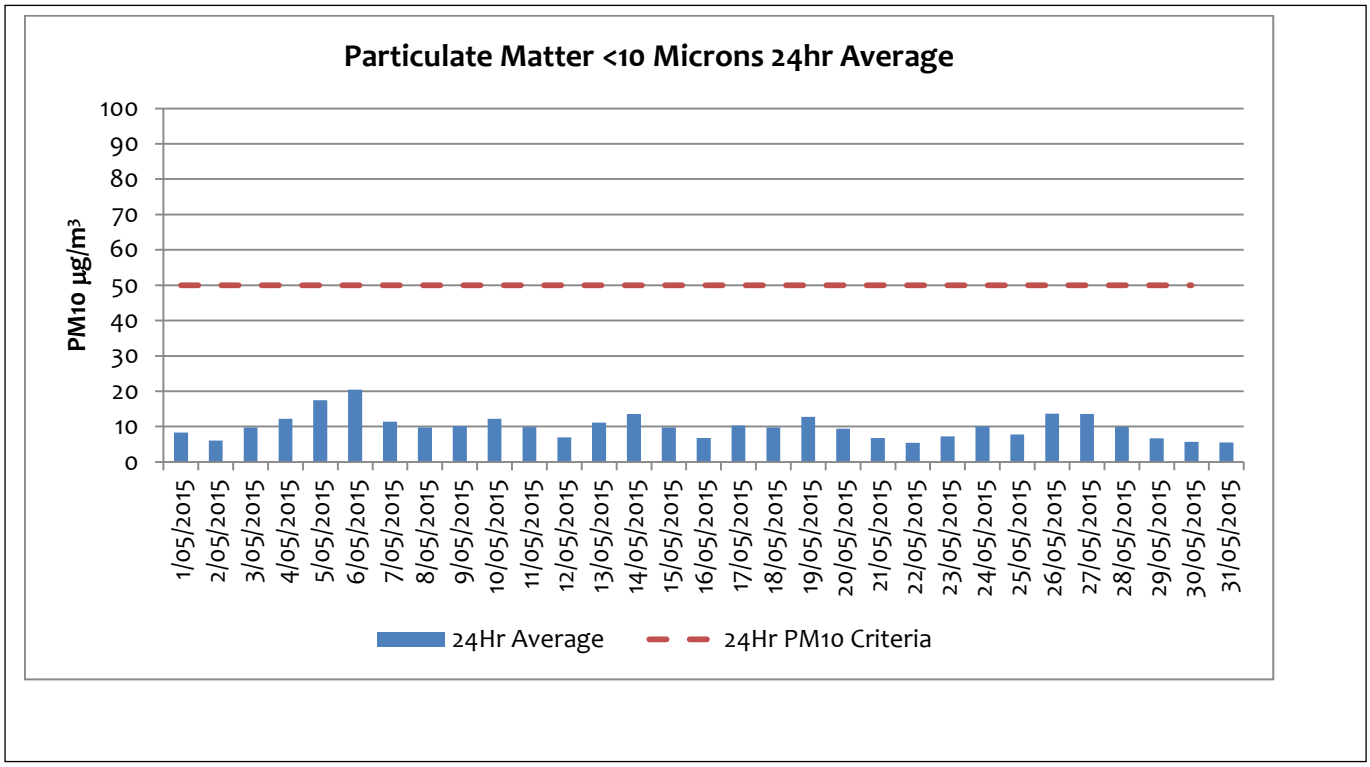

PM10 Lead
PM10 Lead Dust µg/m³
0.5
0.4
0.3
0.2
0.1
0
4/07/2014
10/07/2014
16/07/2014
22/07/2014
28/07/2014
12/08/2014
18/08/2014
25/08/2014
1/09/2014
2/09/2014
26/09/2014
30/09/2014
8/10/2014
14/10/2014
20/10/2014
26/10/2014
1/11/2014
7/11/2014
13/11/2014
19/11/2014
25/11/2014
28/12/2014
2/12/2014
12/12/2014
16/12/2014
22/12/2014
31/12/2014
5/01/2015
9/01/2015
15/01/2015
21/01/2015
27/01/2015
5/02/2015
11/02/2015
17/02/2015
23/02/2015
1/03/2015
7/03/2015
25/03/2015
31/03/2015
6/04/2015
12/04/2015
18/04/2015
24/04/2015
30/04/2015
6/05/2015
12/05/2015
18/05/2015
24/05/2015
30/05/2015
5/06/2015
11/06/2015
17/06/2015
23/06/2015
29/06/2015
PM10 Lead
Rolling Annual Average Lead

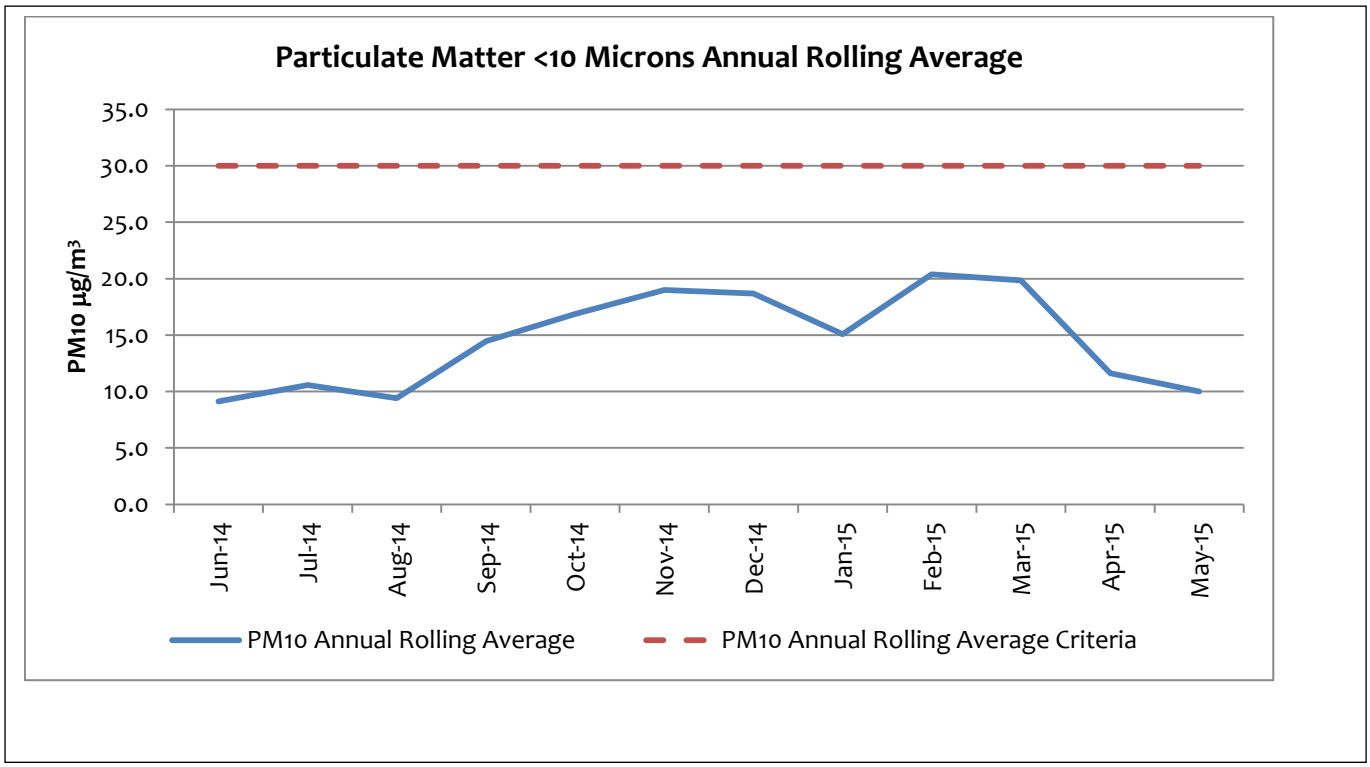
## 1.2 Tapered Element Oscillating Microbalance Sampling (TEOM)

| Particulate Matter <10 Microns 24Hr Average | | |
|---|---|---|
| **Date** | TEOM 1 - EPL 13 (μg/m$^3$) Essential Water – Off Site | TEOM 2 – EPL 14 (μg/m$^3$) Blackwoods Pit – On Site |
| **1/06/2015** | 8.29 | 10.99 |
| **2/06/2015** | 9.36 | 16.31 |
| **3/06/2015** | 9.56 | 11.54 |
| **4/06/2015** | 11.92 | 11.84 |
| **5/06/2015** | 19.08 | 20.01 |
| **6/06/2015** | 12.35 | 14.00 |
| **7/06/2015** | 5.76 | 6.48 |
| **8/06/2015** | 6.91 | 7.91 |
| **9/06/2015** | 8.82 | 8.91 |
| **10/06/2015** | 8.89 | 11.18 |
| **11/06/2015** | 10.87 | 12.28 |
| **12/06/2015** | 12.58 | 12.15 |
| **13/06/2015** | 8.72 | 7.29 |
| **14/06/2015** | 7.85 | 7.25 |
| **15/06/2015** | 6.85 | 7.76 |
| **16/06/2015** | 4.68 | 6.38 |
| **17/06/2015** | 4.69 | 4.69 |
| **18/06/2015** | 7.89 | 8.10 |
| **19/06/2015** | 6.54 | 8.14 |
| **20/06/2015** | 5.47 | 7.46 |
| **21/06/2015** | 5.71 | 6.16 |
| **22/06/2015** | 6.59 | 6.63 |
| **23/06/2015** | 8.28 | 7.07 |
| **24/06/2015** | 8.31 | 8.82 |
| **25/06/2015** | 5.83 | 8.88 |
| **26/06/2015** | 5.91 | 9.14 |
| **27/06/2015** | 5.91 | 6.87 |
| **28/06/2015** | 5.23 | 5.63 |
| **29/06/2015** | 4.66 | 4.95 |
| **30/06/2015** | 5.23 | 5.85 |

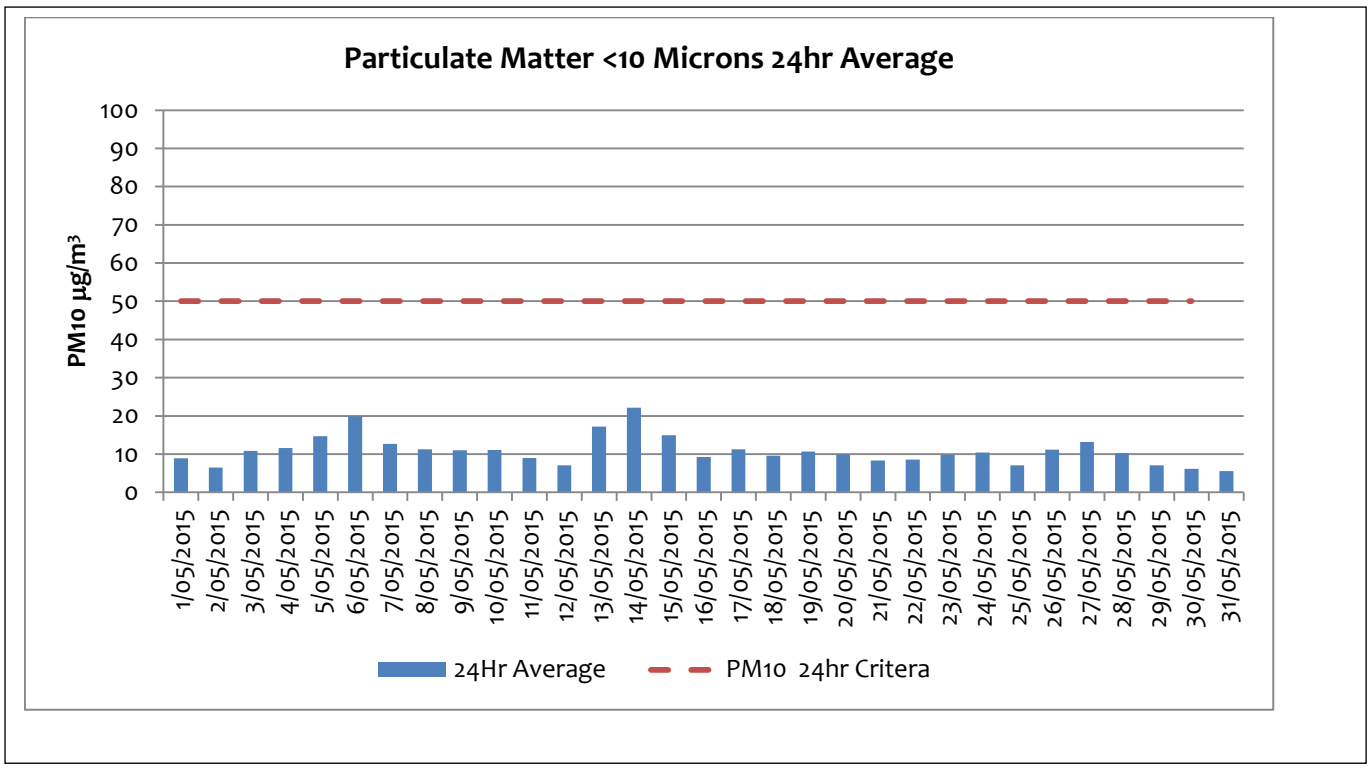
| PM10 μg/m$^3$ 12 Month Rolling Average | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Jul-14 | Aug-14 | Sep-14 | Oct-14 | Nov-14 | Dec-14 | Jan-15 | Feb-15 | Mar-15 | Apr-15 | May-15 | Jun-15 |
| **TEOM 1 EPL13 Essential Water Off Site** | 10.6 | 9.4 | 14.4 | 16.9 | 19.0 | 18.7 | 15.1 | 20.4 | 19.8 | 11.6 | 10.0 | 8.0 |
| **TEOM 2 EPL14 Blackwoods Pit On Site** | 11.5 | 12.4 | 27.2 | 15.7 | 20.8 | 27.4 | 16.5 | 21.6 | 22.0 | 15.1 | 10.9 | 9.0 |

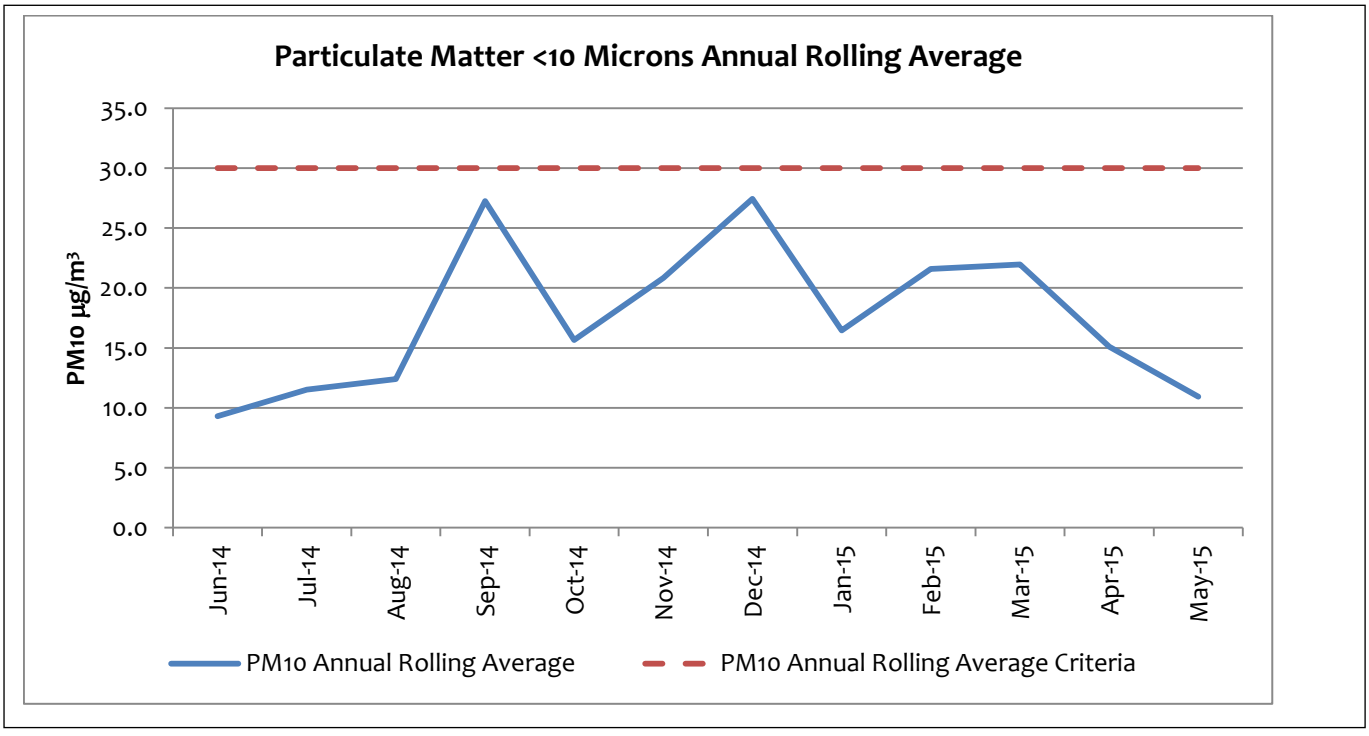
***EPL13 – Essential Water – Off Site***



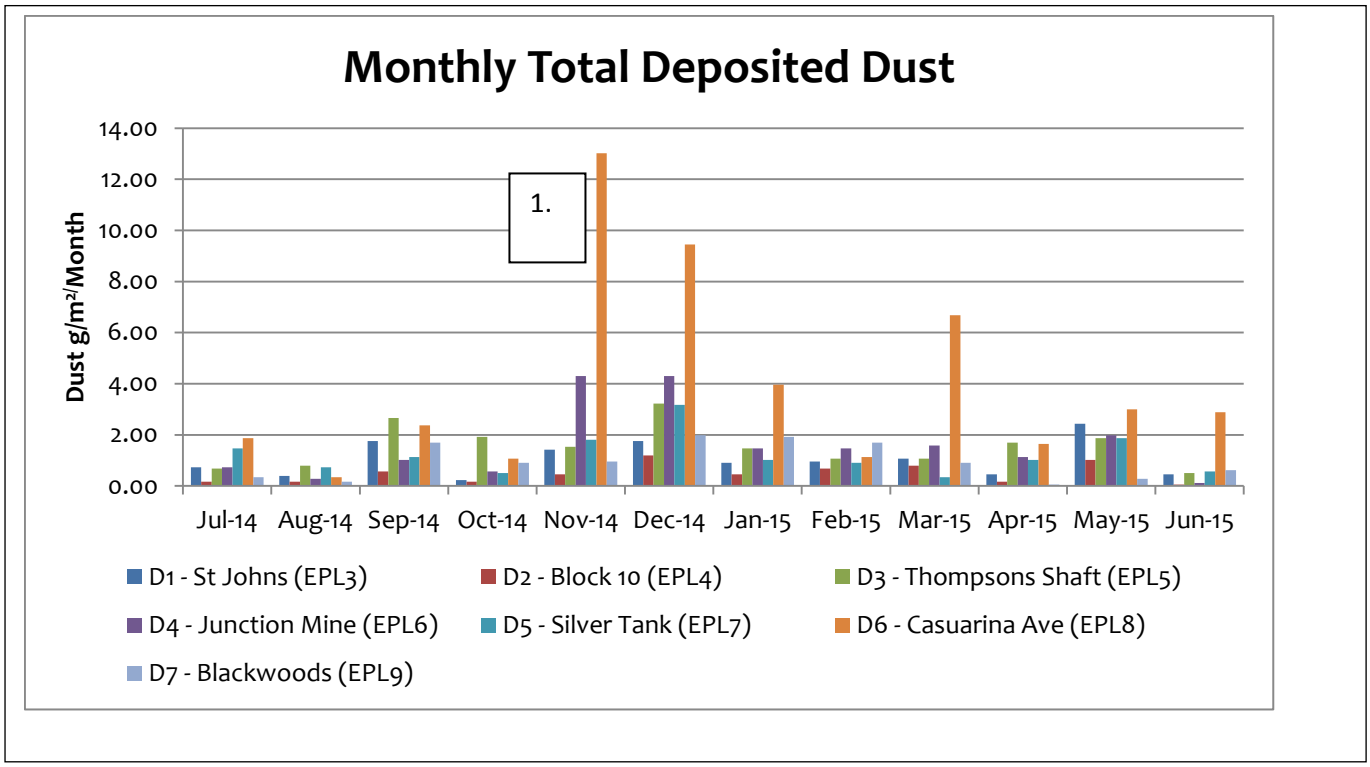
***EPL14 – Blackwoods Pit – On Site***



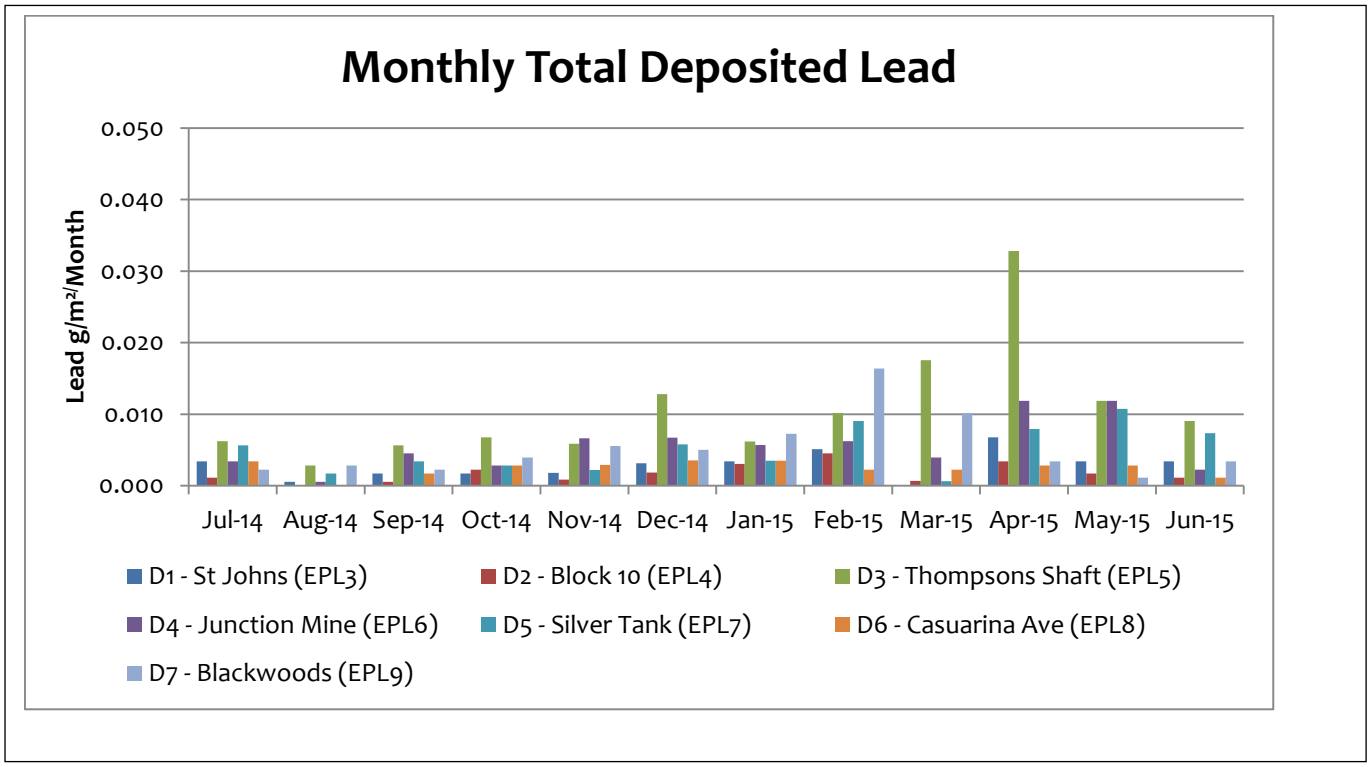
## 1.3 Dust Deposition Sampling

| Total Deposited Dust (g/m$^{2/}$Month) | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Date** | D1 (off site) | D2 | D3 | D4 | D5 | D6 (off site) | D7 |
| **June 2015** | 0.45 | 0.06 | 0.51 | 0.11 | 0.57 | 2.89 | 0.62 |
| **Background Average** | 4.0 | 3.1 | 4.3 | 5.7 | n/a | 5.8 | n/a |




1. Samples at Casuarina Ave appear to have been tampered with in November and December 2014 as well as March 2015. These jars when picked up had large volumes of water present.

| Total Deposited Lead (g/m$^{2/}$Month) | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Date** | D1 (Off Site) | D2 | D3 | D4 | D5 | D6 (Off Site) | D7 |
| **June 2015** | 0.003 | 0.001 | 0.009 | 0.002 | 0.007 | 0.001 | 0.003 |
| **Background Average** | 0.0000 | 0.001 | 0.0018 | 0.0040 | 0.0010 | 0.0020 | 0.0100 |



# 2 Blasting (Vibration and Overpressure)

***Note:** Vibration is recorded in Peak Particle Velocity (ppv), Overpressure is recorded in Decibels (dBL)*

**Block 7 will not have 12 months of data until May next year, therefore no calculation on percentage of blasts over 5mm/sec can be given.**

**June Summary Block 7, Zinc Lode:**

- 0 production firings
- 45 development firings
- 0 Blasts recorded a ppv of >3mm/s
- 0 Blasts recorded a ppv of >10mm/s
- 0 Blasts recorded an over pressure level over 115dBL
- 1 Blasts recorded an over pressure above 120dBL (123dBL). The blast was a morning development blast. Other monitors located on Eyre Street and at the core shed all recorded dBL levels at 101dBL or lower. Analysis of the waveform shows there was a single spike recorded at the monitor during the blast at around 3 seconds. The spike is very sharp and appears to be interference with the microphone.

**June Summary Rest of Mine, Western Mineralisation and Main Lode:**

- 7 production firings
- 136 development firings
- 3 Blasts recorded a ppv of >5mm/s
- 0 Blasts recorded a ppv of >10mm/s
- 0 Blasts recorded an over pressure level over 115dBL
- 0 Blasts recorded an over pressure above 120dBL
- % of all blasts over 5mm/sec **0.48%** (licence requirement <5%) calculated from 1st August 2014 until July 24, 2015.

# 3 Noise

Quarterly noise monitoring is continuing as per the Pollution Reduction Program on EPL 12559. Two noise assessments have been undertaken since November last year. EMGA Mitchell McLennan Pty Limited (EMM) completed the analysis for both assessments. The latest report concluded as follows:

"EMM has completed a noise monitoring assessment of operational noise from RASP Mine activities as per the site's EPL (12559). The monitoring assessment for this second quarterly survey found that noise limits were inapplicable due to meteorological conditions, notwithstanding noise from RASP Mine operations (including the crushing plant) were below the noise limits at most locations, and for most measurements. Subsequent additional attended measurements identified site noise to be below the relevant noise limits hence reaffirming compliance at all locations."

The report is published in full on the CBH website. The next monitoring round is scheduled for July.

# 4 Water

## 4.1 Ground Water Sampled 9/6/2015

| | | UG FEED | SHAFT 7 |
|---|---|---|---|
| Analyte grouping/Analyte | Units | | |
| pH Value | pH Unit | 6.3 | 6.55 |
| Electrical Conductivity @ 25°C | µS/cm | 10400 | 12500 |
| Total Dissolved Solids @180°C | mg/L | 10500 | 12700 |
| Hydroxide Alkalinity as CaCO3 | mg/L | <1 | <1 |
| Carbonate Alkalinity as CaCO3 | mg/L | <1 | <1 |
| Bicarbonate Alkalinity as CaCO3 | mg/L | 8 | 10 |
| Total Alkalinity as CaCO3 | mg/L | 8 | 10 |
| Sulfate as SO4 - Turbidimetric | mg/L | 5370 | 6240 |
| Chloride | mg/L | 1070 | 1380 |
| Calcium | mg/L | 502 | 554 |
| Magnesium | mg/L | 218 | 308 |
| Sodium | mg/L | 1140 | 1430 |
| Cadmium | mg/L | 2.34 | 2.04 |
| Lead | mg/L | 0.414 | 0.742 |
| Manganese | mg/L | 383 | 508 |
| Zinc | mg/L | 1280 | 1210 |
| Iron | mg/L | 0.5 | <0.05 |

## 4.2 Surface Water

Insufficient rainfall for opportunistic surface water sampling during June 2015

***Surface Water Table Nov 2014 to Nov 2015***

| EPA Identification Number | Frequency | Comment |
|---|---|---|
| **EPL29** | 2 x Per year when contains water | Insufficient water for sample |
| **EPL30** | 2 x Per year when contains water | Insufficient water for sample |
| **EPL31** | 2 x Per year when contains water | Sampled during January |
| **EPL32** | 2 x Per year when contains water | Insufficient water for sample |
| **EPL33 Horwood Dam** | 2 x Per year when contains water | Sampled in May |
| **EPL34 Upstream** | 2 x Per year when contains water | Insufficient water for sample |
| **EPL35 Downstream** | 2 x Per year when contains water | Insufficient water for sample |

# 5 Weather Data

BHOP – Automatic Weather Station was unavailable for June. The new weather station was installed on June 15.

The following data was obtained from the Bureau of Meteorology Broken Hill

| Date | Day | Temps | | Rain | Evap | Sun | Max wind gust | | | 9 am | | | | | | 3 pm | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Min | Max | | | | Dir | Spd | Time | Temp | RH | Cld | Dir | Spd | MSLP | Temp | RH | Cld | Dir | Spd | MSLP |
| | | °C | °C | mm | mm | hours | | km/h | local | °C | % | 8th | | km/h | hPa | °C | % | 8th | | km/h | hPa |
| 1 | Mo | 7.1 | 11.8 | 0.2 | | | | | | 8.1 | 86 | 1 | | | 1026.5 | 11.2 | 34 | 0 | SSE | 22 | 1026.0 |
| 2 | Tu | 1.8 | 12.2 | 0 | | | SE | 20 | 09:40 | 4.9 | 63 | 6 | | Calm | 1030.7 | 10.9 | 45 | 1 | S | 13 | 1026.6 |
| 3 | We | 4.1 | 14.4 | 0 | | | S | 19 | 12:59 | 6.3 | 71 | 5 | SE | 7 | 1025.5 | 13.3 | 43 | 0 | NE | 6 | 1022.7 |
| 4 | Th | 5.8 | 16.9 | 0 | | | NW | 52 | 12:41 | 9.4 | 59 | 5 | NNW | 19 | 1022.6 | 16.3 | 47 | 1 | NW | 33 | 1018.8 |
| 5 | Fr | 7.1 | 15.4 | 0 | | | SSW | 43 | 10:16 | 8.7 | 87 | 0 | SW | 24 | 1025.5 | 14.5 | 58 | 7 | SSW | 20 | 1025.4 |
| 6 | Sa | 7.0 | 17.6 | 0 | | | ESE | 22 | 13:14 | 10.3 | 81 | 1 | ENE | 13 | 1031.4 | 16.5 | 52 | 1 | NE | 11 | 1028.3 |
| 7 | Su | 5.7 | 17.7 | 0.2 | | | NNW | 37 | 10:59 | 9.6 | 86 | 3 | N | 15 | 1028.1 | 17.2 | 51 | 4 | NNW | 20 | 1024.3 |
| 8 | Mo | 7.9 | 20.0 | 0 | | | WNW | 39 | 12:27 | 11.1 | 73 | 1 | NNW | 15 | 1024.4 | 19.3 | 37 | 1 | NW | 20 | 1021.5 |
| 9 | Tu | 9.8 | 18.4 | 0 | | | SSW | 39 | 15:18 | 12.6 | 76 | 1 | WSW | 15 | 1026.5 | 17.7 | 56 | 7 | S | 22 | 1025.4 |
| 10 | We | 4.2 | 13.4 | 0 | | | SE | 43 | 12:28 | 5.8 | 94 | 1 | SE | 26 | 1033.3 | 13.0 | 42 | 1 | SE | 26 | 1031.4 |
| 11 | Th | 2.2 | 15.6 | 0 | | | SE | 26 | 01:29 | 4.0 | 89 | 2 | SE | 15 | 1032.5 | 14.3 | 45 | 4 | ESE | 9 | 1030.2 |
| 12 | Fr | 3.9 | 20.1 | 0 | | | ENE | 39 | 13:50 | 10.9 | 73 | 7 | ENE | 19 | 1030.7 | 18.7 | 57 | 7 | ENE | 20 | 1027.2 |
| 13 | Sa | 10.3 | 20.4 | 0 | | | NE | 37 | 10:16 | 14.7 | 64 | 5 | NE | 20 | 1027.2 | 19.1 | 44 | 7 | ENE | 17 | 1024.0 |
| 14 | Su | 10.4 | 18.7 | 0 | | | NE | 24 | 03:02 | 13.1 | 77 | 5 | NE | 13 | 1024.2 | 18.2 | 62 | 7 | ESE | 13 | 1021.3 |
| 15 | Mo | 11.2 | 18.7 | 1.6 | | | SW | 24 | 16:26 | 11.7 | 92 | 7 | SSW | 6 | 1020.8 | 16.8 | 98 | 7 | S | 13 | 1018.3 |
| 16 | Tu | 10.1 | 15.7 | 1.0 | | | W | 48 | 14:36 | 11.5 | 100 | 8 | E | 9 | 1018.0 | 13.8 | 100 | 8 | W | 24 | 1014.3 |
| 17 | We | 10.5 | 13.8 | 20.8 | | | SSW | 28 | 09:37 | 10.7 | 99 | 8 | SSW | 17 | 1016.6 | 12.9 | 86 | 8 | SW | 11 | 1016.3 |
| 18 | Th | 9.6 | 12.9 | 1.0 | | | SW | 37 | 19:42 | 9.8 | 97 | 8 | SW | 19 | 1019.6 | 12.4 | 84 | 8 | SSW | 26 | 1018.8 |
| 19 | Fr | 7.5 | 12.6 | 0.6 | | | SSW | 37 | 04:28 | 7.9 | 97 | 8 | S | 28 | 1024.7 | 12.4 | 61 | 5 | S | 22 | 1023.8 |
| 20 | Sa | 6.4 | 11.6 | 0 | | | SSE | 31 | 10:36 | 7.3 | 69 | 7 | SSE | 17 | 1027.9 | 10.2 | 58 | 3 | SE | 19 | 1025.6 |
| 21 | Su | 0.0 | 13.1 | 0 | | | N | 20 | 09:29 | 5.5 | 86 | 1 | N | 9 | 1028.0 | 12.2 | 53 | 1 | NNE | 9 | 1024.8 |
| 22 | Mo | 4.9 | 16.7 | 0 | | | N | 44 | 10:01 | 8.1 | 73 | 5 | NNE | 20 | 1024.1 | 15.9 | 43 | 1 | N | 20 | 1020.5 |
| 23 | Tu | 8.0 | 19.4 | 0 | | | NNW | 35 | 12:49 | 14.2 | 55 | 4 | N | 15 | 1019.9 | 17.8 | 53 | 7 | NNW | 15 | 1017.3 |
| 24 | We | 7.7 | 14.4 | 2.8 | | | SSW | 35 | 12:47 | 8.9 | 96 | 5 | SSW | 19 | 1022.7 | 12.8 | 74 | 7 | SSW | 24 | 1022.9 |
| 25 | Th | 7.3 | 12.9 | 0.4 | | | S | 44 | 05:52 | 7.3 | 90 | 8 | S | 26 | 1031.4 | 12.2 | 65 | 1 | S | 22 | 1031.0 |
| 26 | Fr | 5.9 | 15.3 | 0 | | | SSE | 28 | 02:13 | 7.4 | 91 | 1 | S | 9 | 1034.7 | 14.5 | 54 | 1 | ESE | 6 | 1032.1 |
| 27 | Sa | 5.2 | 15.9 | 0.2 | | | E | 19 | 10:39 | 8.4 | 87 | 1 | NE | 9 | 1034.5 | 14.7 | 56 | 1 | ESE | 7 | 1032.0 |
| 28 | Su | 4.7 | 14.2 | 0.2 | | | ESE | 26 | 11:01 | 6.9 | 96 | 0 | ENE | 13 | 1034.4 | 12.3 | 68 | 1 | ESE | 15 | 1032.2 |
| 29 | Mo | 2.3 | 12.9 | 0.4 | | | ESE | 26 | 10:12 | 4.7 | 100 | 1 | SE | 7 | 1032.9 | 12.0 | 59 | 1 | SE | 15 | 1029.6 |
| 30 | Tu | 4.9 | 13.3 | 1.0 | | | SE | 26 | 12:43 | 6.3 | 93 | 7 | | Calm | 1030.8 | | | | SSE | 13 | 1028.2 |
| **Statistics for June 2015** | | | | | | | | | | | | | | | | | | | | | |
| Mean | | 6.5 | 15.5 | | | | | | | 8.9 | 83 | 4 | | 14 | 1027.0 | 14.6 | 58 | 3 | | 17 | 1024.7 |
| Lowest | | 0.0 | 11.6 | 0 | | | | | | 4.0 | 55 | 0 | | Calm | 1016.6 | 10.2 | 34 | 0 | # | 6 | 1014.3 |
| Highest | | 11.2 | 20.4 | 20.8 | | | NW | 52 | | 14.7 | 100 | 8 | S | 28 | 1034.7 | 19.3 | 100 | 8 | NW | 33 | 1032.2 |
| Total | | | | 30.4 | | | | | | | | | | | | | | | | | |

***Legend***

**Dir** = Direction, **Spd**=Wind Speed, **Temp**=Temperature, **RH**=Relative Humidity, **CLD**=Cloud, **MSLP**=Mean Sea Level Pressure

# 6 Data Log

| Sample | Date sent to lab | Result Received | Date Published |
|---|---|---|---|
| **Hi Volume Samples** | 2/7/2015 | 10/7/2015 | 24/7/2015 |
| **TEOM** | Real time | - | 24/7/2015 |
| **Dust Deposition** | 1/7/2015 | 9/7/2015 | 24/7/2015 |
| **Water** | 9/6/2015 | 15/6/2015 | 24/7/2015 |
| **Blast Vibration and overpressure** | Real Time | - | 24/7/2015 |

# 7 Correction Log June 2015

There are no data corrections for June 2015. However there have been some improvements in the reported data. Concentrations of dust and lead as a component of dust in the hi vol analysis are now NATA accredited. Concentration was previously calculated in house from reported totals on the filter papers.