

Monthly Environmental Data October 2014

Contents

1	AIR QUALITY	1
1.1	HIGH VOLUME AIR SAMPLERS	1
1.2	TAPERED ELEMENT OSCILLATING MICROBALANCE SAMPLING (TEOM).....	4
1.3	DUST DEPOSITION SAMPLING	8
2	BLASTING (VIBRATION AND OVERPRESSURE)	9
3	NOISE	10
4	WATER	11
4.1	GROUND WATER	11
4.2	SURFACE WATER.....	13
5	WEATHER DATA	14
6	DATA LOG	15
7	CORRECTION LOG 1ST JULY 2013 TO 30TH JUNE 2014.....	15

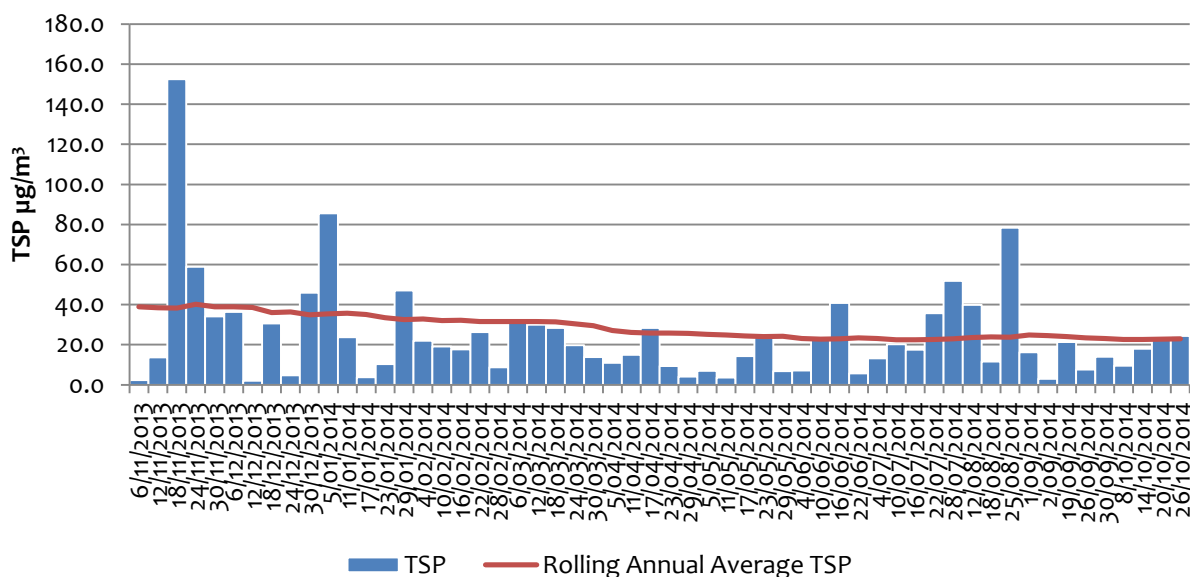
1 Air Quality

1.1 High Volume Air Samplers

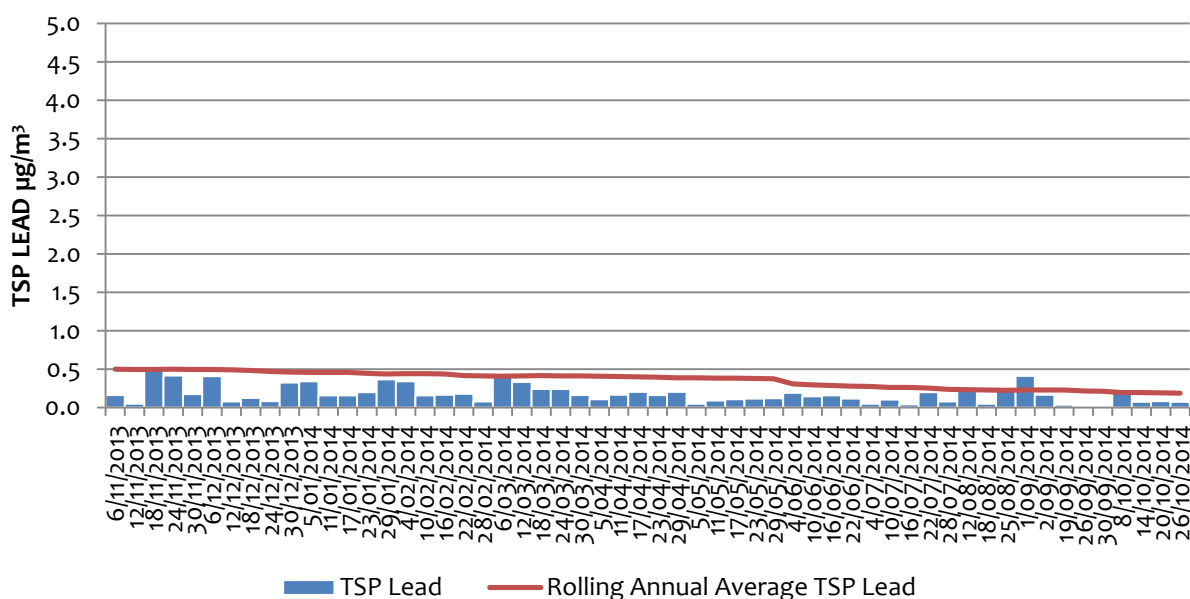
EPL10 - SILVER TANK - ON SITE

DATE	TSP ($\mu\text{g}/\text{m}^3$)	Lead ($\mu\text{g}/\text{m}^3$)
8/10/2014	10	0.22
14/10/2014	18	0.07
20/10/2014	24	0.08
26/10/2014	24	0.07

Total Suspended Particles

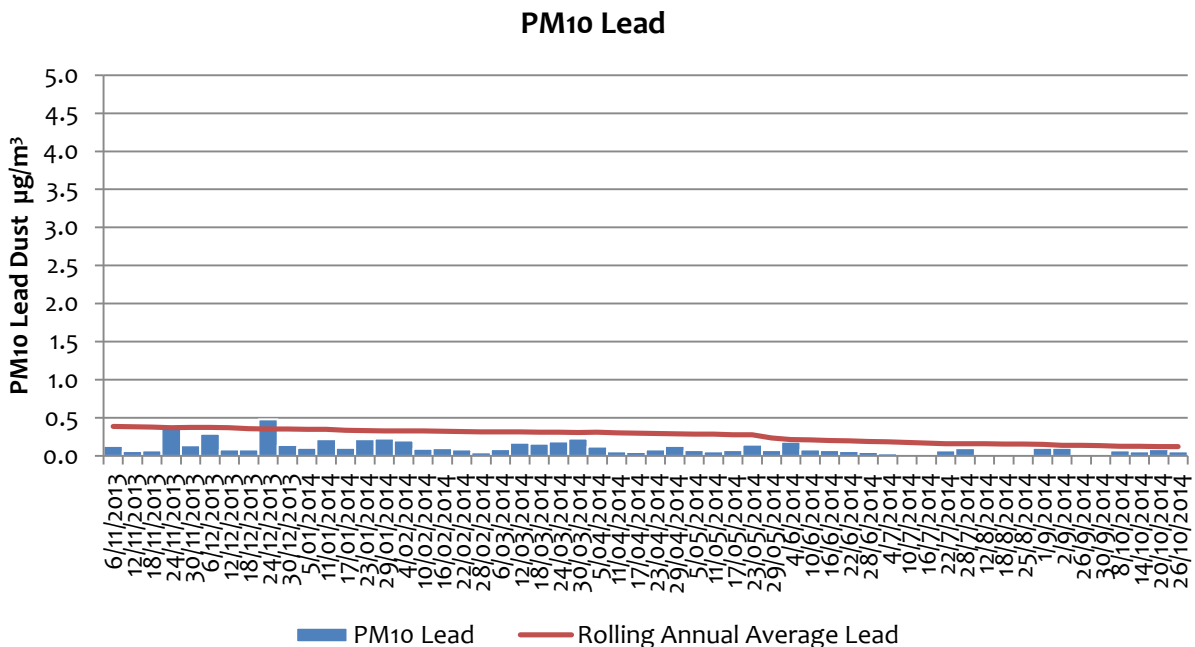
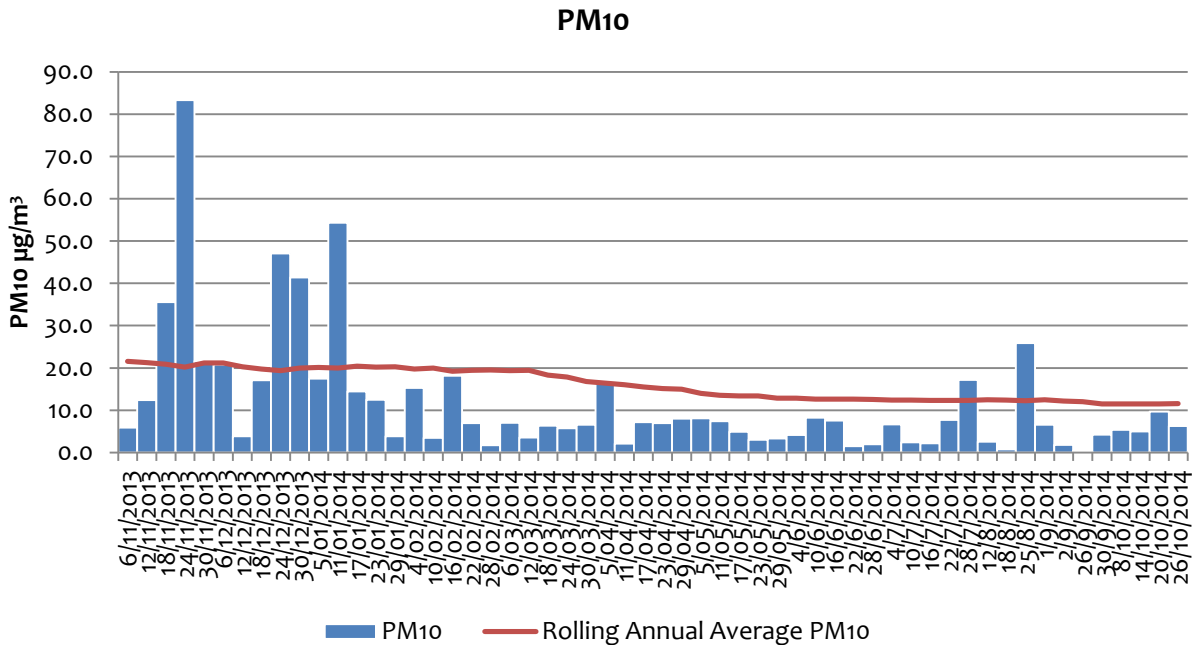


Total Suspended Particles - Lead



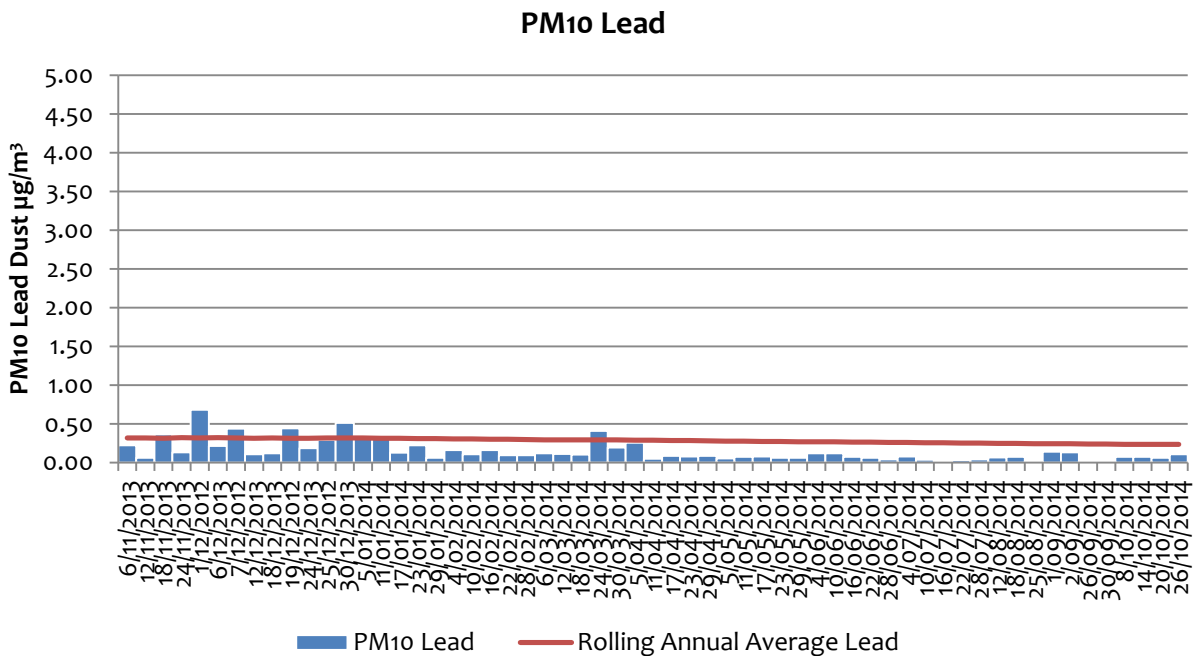
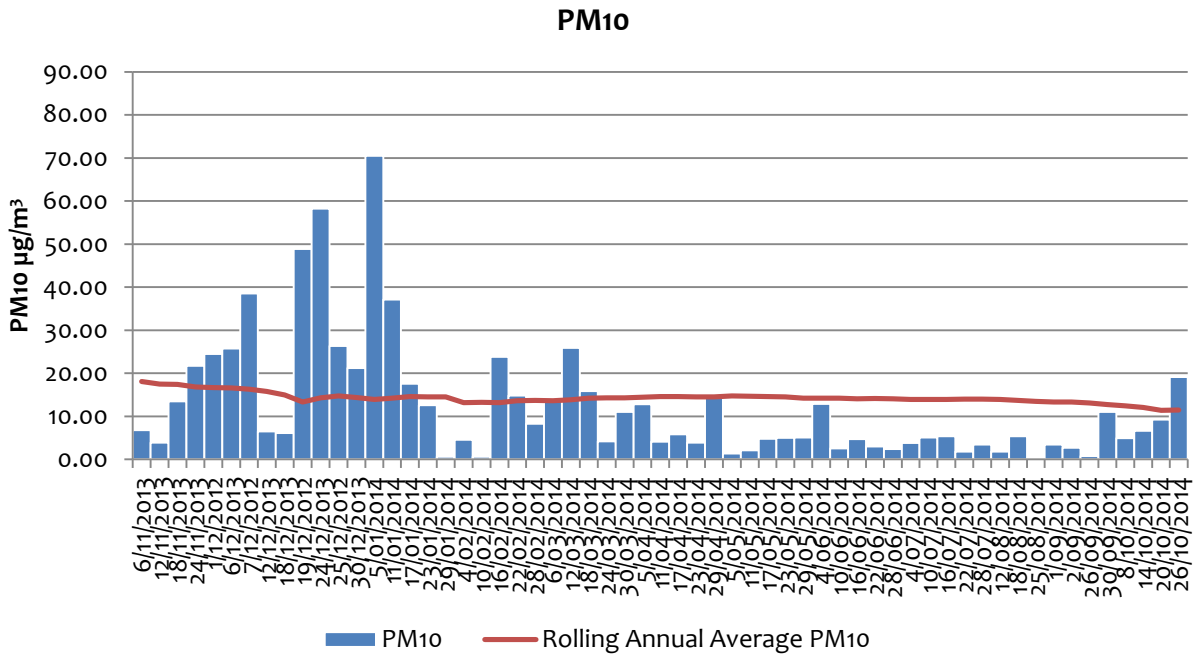
EPL11 - Silver Tank - On Site

DATE	PM10 ($\mu\text{g}/\text{m}^3$)	Lead ($\mu\text{g}/\text{m}^3$)
8/10/2014	5	0.07
14/10/2014	5	0.06
20/10/2014	10	0.09
26/10/2014	6	0.06



EPL12 - Blackwoods Pit – On Site

DATE	PM10 ($\mu\text{g}/\text{m}^3$)	Lead ($\mu\text{g}/\text{m}^3$)
8/10/2014	4.94	0.07
14/10/2014	6.67	0.07
20/10/2014	9.23	0.06
26/10/2014	19.17	0.11



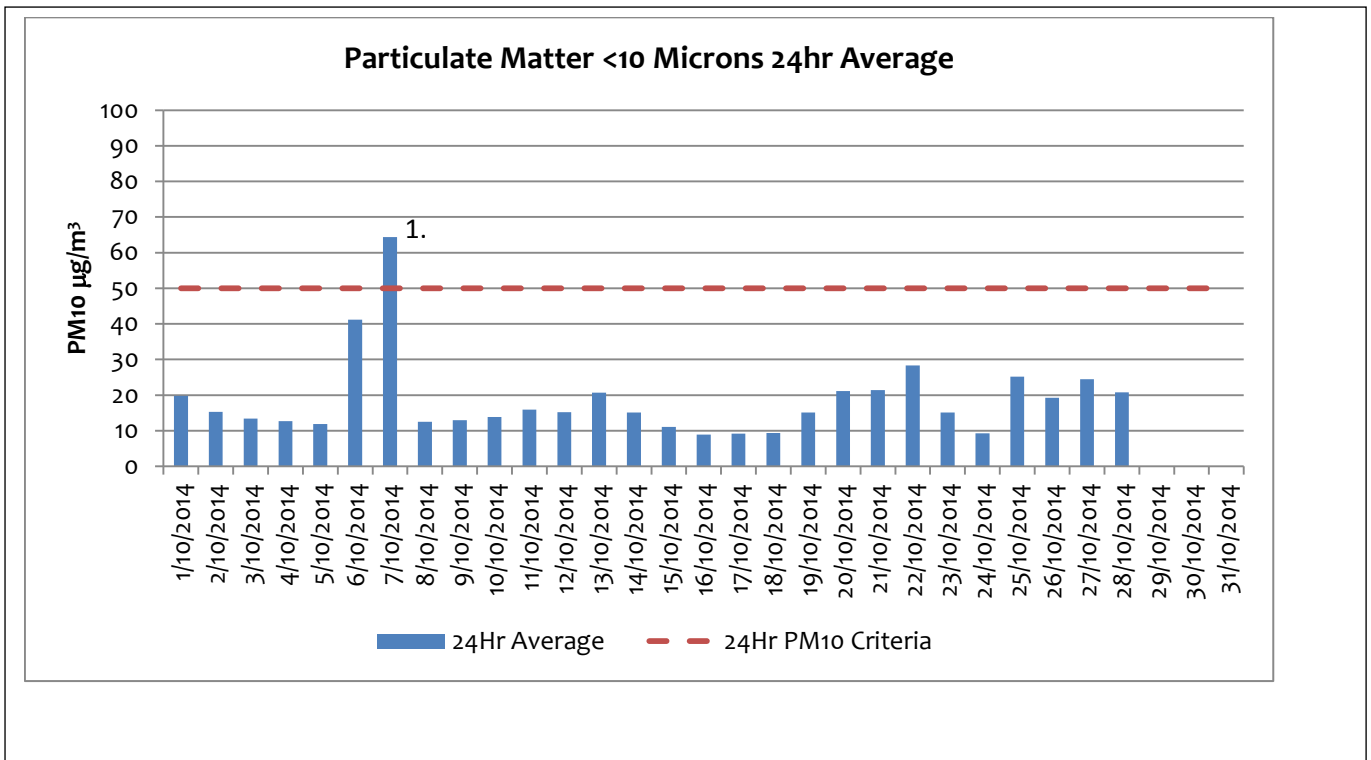
1.2 Tapered Element Oscillating Microbalance Sampling (TEOM)

Particulate Matter <10 Microns 24Hr Average		
Date	TEOM 1 - EPL 13 ($\mu\text{g}/\text{m}^3$) Essential Water – Off Site	TEOM 2 – EPL 14 ($\mu\text{g}/\text{m}^3$) Blackwoods Pit – On Site
1/10/2014	19.81	13.08
2/10/2014	15.32	19.44
3/10/2014	13.37	15.47
4/10/2014	12.65	11.18
5/10/2014	11.91	11.71
6/10/2014	41.16	34.54
7/10/2014	64.39	70.49
8/10/2014	12.47	18.28
9/10/2014	12.91	11.86
10/10/2014	13.81	9.45
11/10/2014	15.93	14.6
12/10/2014	15.19	17.49
13/10/2014	20.72	35.42
14/10/2014	15.07	29.75
15/10/2014	11.04	17.49
16/10/2014	8.86	12.94
17/10/2014	9.19	11.59
18/10/2014	9.34	9.45
19/10/2014	15.1	13.47
20/10/2014	21.09	18.25
21/10/2014	21.42	18.31
22/10/2014	28.29	18.87
23/10/2014	15.1	no data
24/10/2014	9.25	no data
25/10/2014	25.16	no data
26/10/2014	19.24	no data
27/10/2014	24.45	28.05
28/10/2014	20.75	24.19
29/10/2014	no data	no data
30/10/2014	no data	no data
31/10/2014	no data	no data

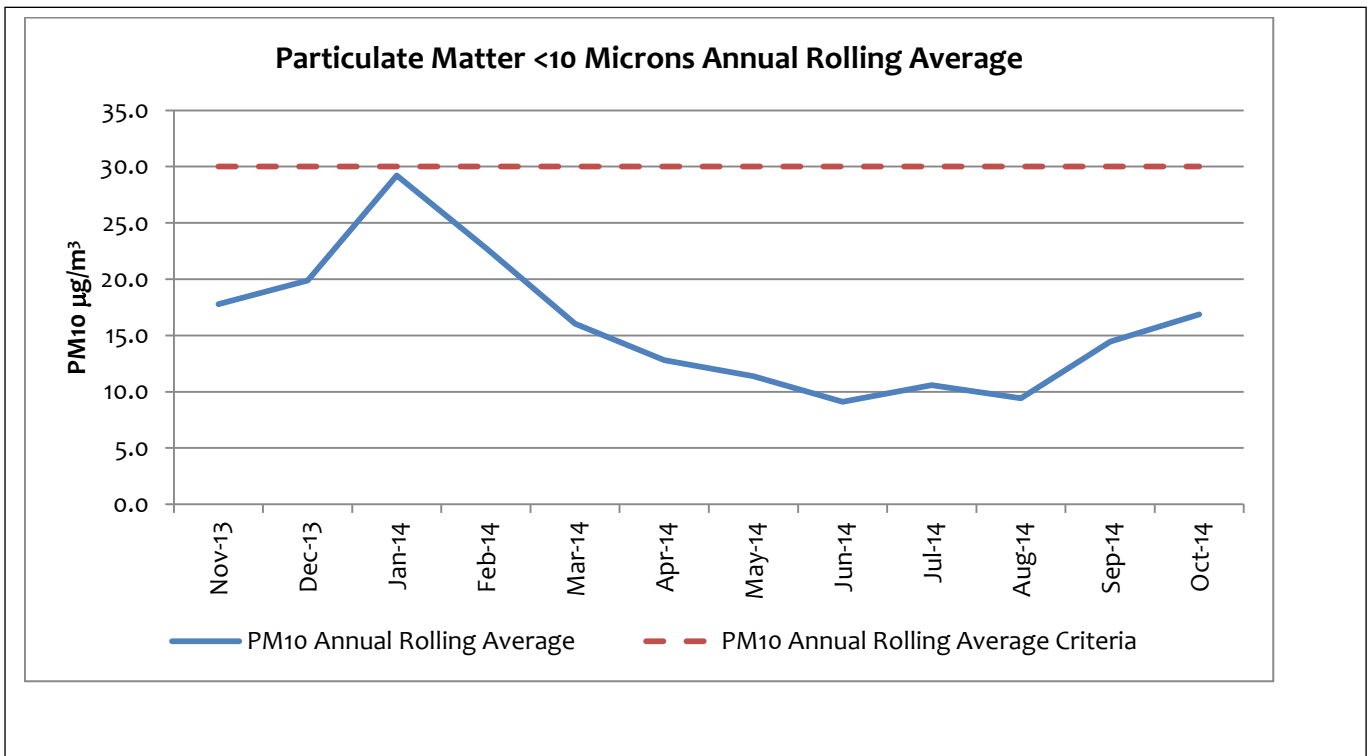
Data was not recorded at TEOM 2 between the 23/10 and the 26/10 due to damage to a power cable.

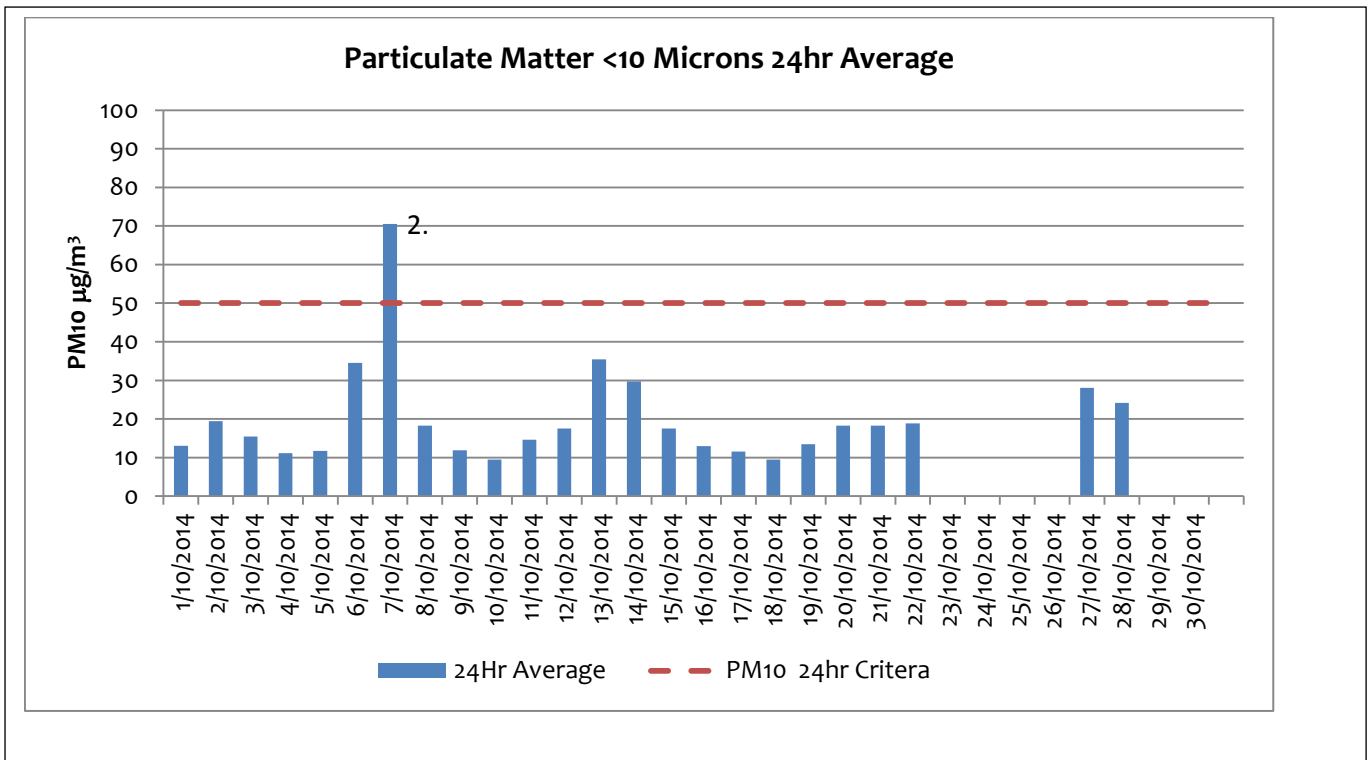
Data was not recorded at either TEOM from the 29/10 to the 31/10 due to a power outage. Essential energy performed service work on a power pole adjacent one of the TEOMs which shut down the sampling unit and the relay modem.

PM10 µg/m ³ 12 Month Rolling Average												
	Nov-13	Dec-13	Jan-14	Feb-14	Mar-14	Apr-14	May-14	Jun-14	Jul-14	Aug-14	Sep-14	Oct-14
TEOM 1 EPL13												
Essential Water												
Off Site	17.8	19.9	29.2	22.7	16.0	12.8	11.4	9.1	10.6	9.4	14.4	16.9
TEOM 2 EPL14												
Blackwoods Pit												
On Site	22.5	22.0	32.0	23.7	17.6	14.4	10.2	9.3	11.5	12.4	33.0	15.7

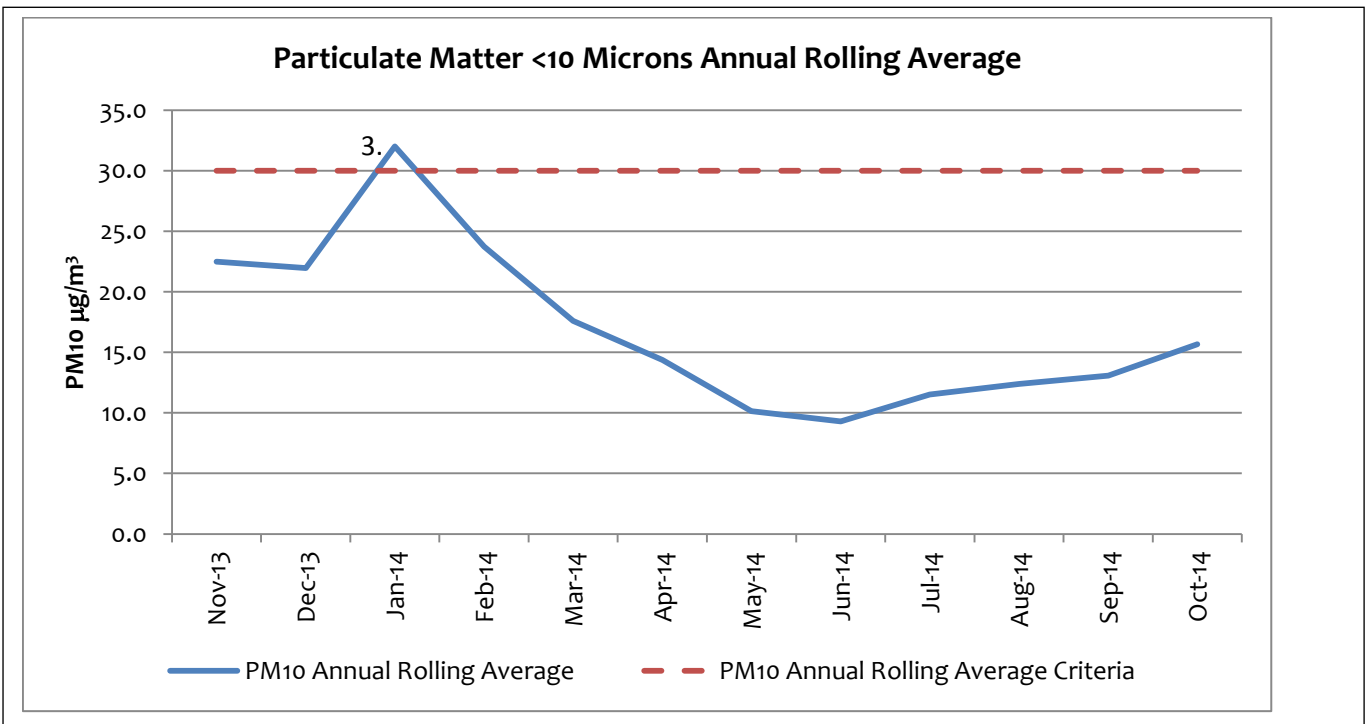


1. SW winds 39km/h max gust 56km/h





2. SW winds 39km/h max gust 56km/h



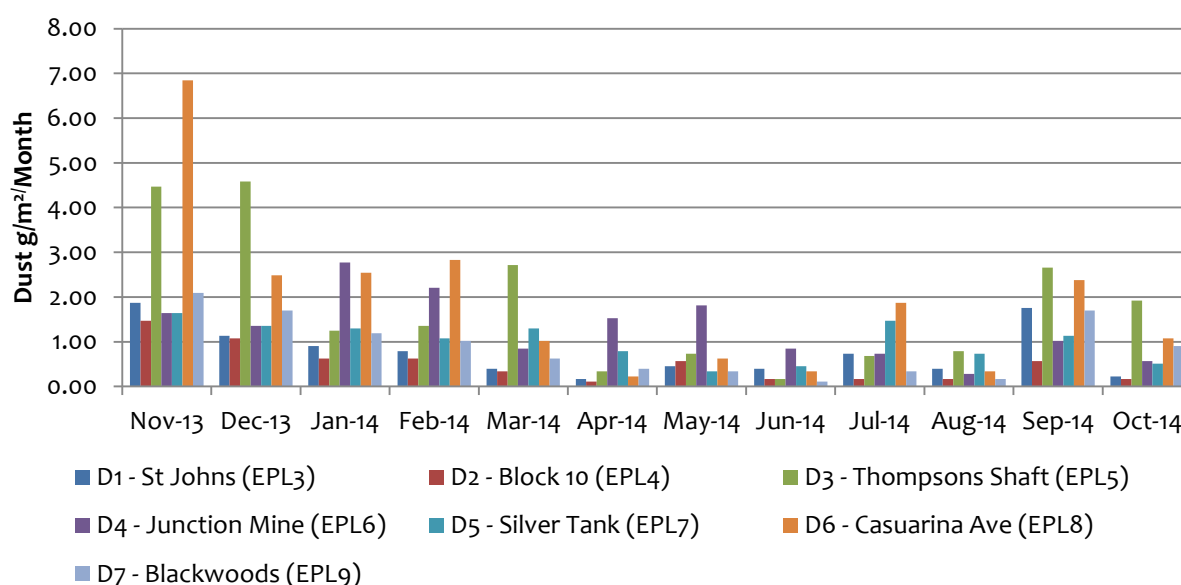
3. S Winds of up to 72km/h during the month of January 2014 with an average Temperature of 36°C
Dust suppression was reapplied during the month of January 2013.

1.3 Dust Deposition Sampling

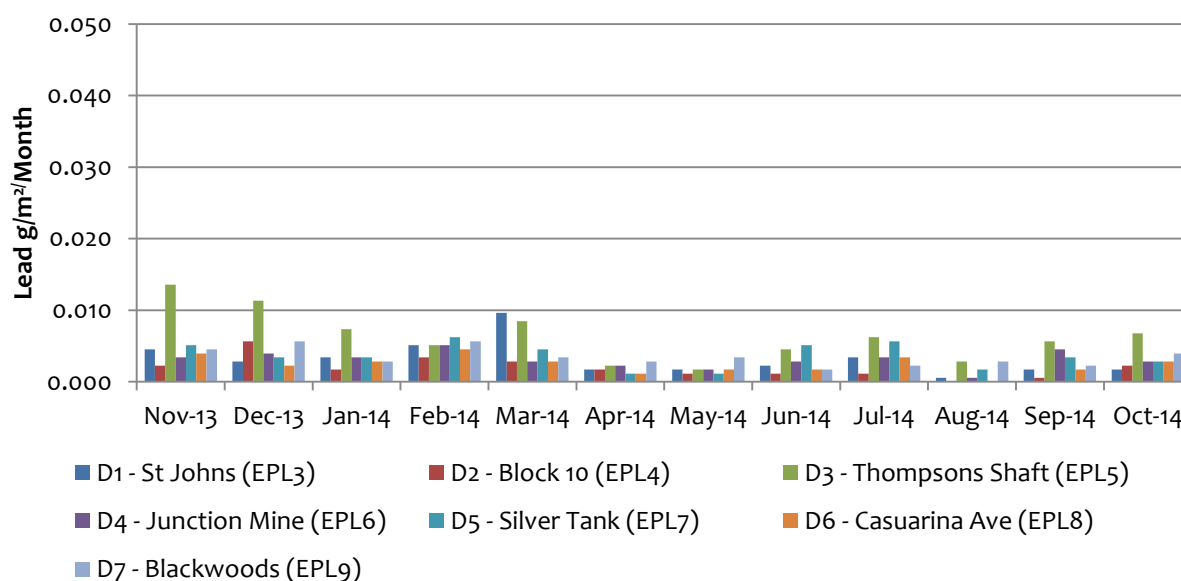
Total Deposited Dust (g/m ² /Month)							
Date	D1 (off site)	D2	D3	D4	D5	D6 (off site)	D7
October 2014	0.23	0.17	1.92	0.57	0.51	1.08	0.91
Background Average	4.0	3.1	4.3	5.7	n/a	5.8	n/a

Total Deposited Lead (g/m ² /Month)							
Date	D1 (Off Site)	D2	D3	D4	D5	D6 (Off Site)	D7
October 2014	0.002	0.002	0.007	0.003	0.003	0.003	0.004
Background Average	0.0034	0.0045	0.0046	0.0060	n/a	0.0036	n/a

Monthly Total Deposited Dust



Monthly Total Deposited Lead



2 Blasting (Vibration and Overpressure)

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

- During the month of July blasting occurred daily, there was a total number of 158 blasts, 5 of which were production firings all inside licensing criteria.
- 153 blasts were below a ppv of 0.75mm/s and did not trigger an event
- 1 Blasts recorded a ppv of >5mm/s
- 0 Blasts recorded a ppv of >10mm/s
- All overpressure readings were inside limits.

Date / Location	Peak Vibration (PPV mm/s)	Peak Over Pressure (dBL)
3/10/2014	3.41	95.9
V1	Did not trigger	Did not trigger
V2	3.41	95.9
V3	1.93	94
4/10/2014	3.92	97.5
V1		
V2	3.92	97.5
V3	1.65	94
8/10/2014	2.04	104.2
V1	Did not trigger	Did not trigger
V2	1.2	104.2
V3	2.04	94
10/10/2014	3.29	97.5
V1	Did not trigger	Did not trigger
V2	3.29	97.5
V3	2.99	97.5
16/10/2014	0.882	101.9
V1	Did not trigger	Did not trigger
V2	Did not trigger	Did not trigger
V3	0.882	101.9
17/10/2014	0.791	88
V1	Did not trigger	Did not trigger
V2	Did not trigger	Did not trigger
V3	0.791	88
19/10/2014	2.56	98.8
V1	Did not trigger	Did not trigger
V2	2.56	98.8
V3	2.22	97.5
20/10/2014	1.9	95.9
V1	Did not trigger	Did not trigger
V2	1.9	95.9
V3	Did not trigger	Did not trigger
23/10/2014	2.19	97.5
V1	Did not trigger	Did not trigger
V2	2.19	97.5
V3	1.87	95.9
28/10/2014	4.8	107.5
V1	Did not trigger	Did not trigger
V2	4.8	107.5
V3	4.64	101.9

3 Noise

- *No noise monitoring was scheduled for the month of September 2014*
- *Last sampled March 2014 by EMM consultants for crusher project approval modification*

4 Water

4.1 Ground Water

Date of sample	21/10/2014	18/10/2014	18/10/2014	11/10/2014	8/10/2014	11/10/2014	11/10/2014
Sample ID	HORWOODS	Shaft #7	U/G Supply	GW12	GW11	GW10	GW09
pH Value (pH)	6.32	5.69	6.73	6.33	7.21	7.15	7.49
Electrical conductivity (uS/cm)	14900	10900	11300	13500	2870	13300	10300
Total Dissolved Solids (mg/L)	14500	12000	9730	11900	1900	11000	8210
Hydroxide Alkalinity as CaCO ₃ (mg/L)	1	1	1	1	1	1	1
Carbonate Alkalinity CaCO ₃ (mg/L)	1	1	1	1	1	1	1
Bicarbonate Alkalinity as CaCO ₃ (mg/L)	5	3	41	63	80	187	249
Total Alkalinity (mg/L)	5	3	41	63	80	187	249
Sulphate as SO ₄ (mg/L)	8000	6320	5990	5940	950	4240	3150
Chloride (mg/L)	1880	1130	1230	1610	288	2450	1740
Calcium (mg/L)	674	584	634	415	85	470	601
Magnesium (mg/L)	446	287	284	548	82	457	486
Sodium (mg/L)	2440	1570	1760	2000	348	1720	927
Cadmium (mg/L)	4.92	2.56	2.64	1.24	0.004	0.588	0.0151
Manganese (mg/L)	636	489	405	46.9	18.2	49.3	0.275
Lead (mg/L)	1.2	1.13	1.08	0.008	0.002	0.061	0.008
Zinc (mg/L)	1550	1340	1060	156	17.2	75.9	1.85
Iron (mg/L)	0.05	6.21	0.05	0.05	0.05	0.05	0.05

4.2 Surface Water

Insufficient water was available for samples at surface water locations.

Surface Water Table

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	Insufficient water for sample
EPL32	2 x Per year when contains water	Insufficient water for sample
EPL33 Horwood Dam	2 x Per year when contains water	Sample due in December
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 the month of September.

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					km/h	local	°C	%	g th		km/h	hPa	°C	%	g th		km/h	hPa
1	We	8.4	19.4	0			SSE	50	07:44	12.3	57	1	SSE	35	1026.5	18.3	30	1	SE	19	1023.7
2	Th	7.2	22.3	0			SSE	35	15:43	13.9	46	0	SE	17	1026.4	21.7	32	0	SSE	17	1022.4
3	Fr	9.3	26.8	0			WSW	28	12:59	17.9	39	0	E	15	1021.5	25.1	24	0	SSW	7	1016.7
4	Sa	14.9	31.5	0			NNW	31	14:21	23.2	29	1	NNE	13	1017.9	30.8	18	1	W	15	1014.6
5	Su	18.9	34.9	0			N	43	11:27	24.2	28	0	N	15	1017.0	34.4	11	0	N	20	1012.7
6	Mo	22.4	34.0	0			NNW	83	16:17	25.8	26	4	N	30	1010.0	33.6	18	7	NNW	43	1005.5
7	Tu	9.9	22.6	0			SW	56	23:10	11.9	79	1	S	39	1017.2	21.5	34	1	SSW	22	1016.6
8	We	7.2	23.7	0			SE	31	11:52	12.3	59	1	SSE	24	1023.5	21.7	60	3	SSE	22	1020.9
9	Th	8.5	28.4	0			NE	35	13:19	17.7	68	0	NE	19	1022.5	27.1	45	0	NE	19	1017.5
10	Fr	12.2	31.7	0			NW	35	11:13	21.9	51	3	NNE	20	1014.7	31.2	32	3	ENE	7	1011.0
11	Sa	12.4	32.0	0			SSW	33	07:57	16.6	67	1	SSW	28	1015.1	31.3	25	0	NE	13	1011.6
12	Su	13.5	34.8	0			SSW	52	21:52	19.2	64	0	SSW	17	1010.6	34.2	26	1	SE	11	1006.5
13	Mo	9.6	18.5	0			SSW	67	15:58	12.2	72	5	S	46	1015.9	17.2	41	3	SSW	41	1016.4
14	Tu	4.6	18.9	0			S	63	09:26	8.7	67	1	SSW	39	1023.4	17.7	34	0	SSW	28	1021.0
15	We	5.1	20.9	0			SSW	43	10:51	9.1	69	0	SSE	15	1024.1	20.1	35	1	SW	22	1020.3
16	Th	6.6	24.4	0			S	43	16:47	11.3	62	0	S	13	1023.4	24.4	29	1	WSW	15	1020.6
17	Fr	9.6	26.7	0			E	35	07:35	16.2	53	0	E	26	1025.4	25.5	27	0	SSE	19	1022.3
18	Sa	13.7	30.3	0			NNE	33	07:46	19.7	31	0	NNE	26	1025.0	29.0	12	1	NNE	13	1021.5
19	Su	16.4	34.0	0			NNE	35	08:37	22.7	21	5	NNE	22	1023.3	33.4	12	3	E	9	1020.2
20	Mo	15.9	34.7	0			S	44	09:55	19.6	44	7	SSW	17	1024.3	33.4	10	6	SE	17	1020.9
21	Tu	18.8	38.2	0			NE	37	08:59	26.3	20	1	NE	26	1021.8	36.7	11	4	NNW	9	1018.4
22	We	23.9	38.3	0			WSW	61	12:29	29.0	26	3	NW	19	1018.1	36.7	12	6	WSW	26	1015.4
23	Th	17.1	36.6	0			WNW	44	15:38	20.2	57	2	SSW	13	1016.6	35.1	17	1	WNW	22	1012.7
24	Fr	19.0	35.7	0			NW	39	12:51	25.3	39	6	N	7	1015.8	33.8	16	7	WNW	22	1014.2
25	Sa	23.2	38.2	0			SW	56	14:18	25.3	36	1	W	13	1015.3	37.8	16	2	W	20	1013.1
26	Su	17.2	31.5	0			ENE	50	22:34	24.5	31	2	ENE	20	1013.5	30.3	24	6	SE	13	1013.3
27	Mo	16.1	27.1	0.2			SSW	67	08:23	17.1	58	7	SW	48	1014.2	26.2	20	1	SW	35	1012.9
28	Tu	9.8	27.1	0			SSW	39	08:34	14.2	50	2	SSW	26	1020.2	25.2	26	1	SW	19	1017.2
29	We	12.8	31.2	0			SSW	39	12:36	17.8	53	1	ESE	17	1020.5	30.0	23	0	W	9	1016.1
30	Th	17.1	34.3	0			NW	35	11:42	20.7	46	4	SSW	9	1016.1	33.7	14	1	W	19	1011.8
31	Fr	19.9	38.2	0			WNW	54	13:42	24.8	21	7	NNE	15	1009.5	36.7	12	4	NW	30	1004.2
Statistics for October 2014																					
Mean		13.6	29.9							18.8	47	2		22	1019.0	28.8	24	2		19	1015.9
Lowest		4.6	18.5	0						8.7	20	0	N	7	1009.5	17.2	10	0	#	7	1004.2
Highest		23.9	38.3	0.2			NNW	83		29.0	79	7	SW	48	1026.5	37.8	60	7	NNW	43	1023.7
Total				0.2																	

IDCJDW2020.201410 Prepared at 13:00 UTC on Friday 14 November 2014

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	N/A	13/11/2014	
TEOM	Real time	31/10/2014	
Dust Deposition	N/A	13/11/2014	
Water	03/10/2014	30/10/2014	
Blast Vibration and overpressure	Real Time	31/10/2014	

7 Correction Log September 2014

Sample dates in the three tables in section 1.1 should read 2/09/14, 8/09/14, 14/09/14, 20/09/14 and 26/09/14

Average data for September TEOM2 Blackwoods Pit (EPL14) had a formula error in the database, this was corrected which eliminated the previous spike for this month at this location.