

Monthly Environmental Data August 2014

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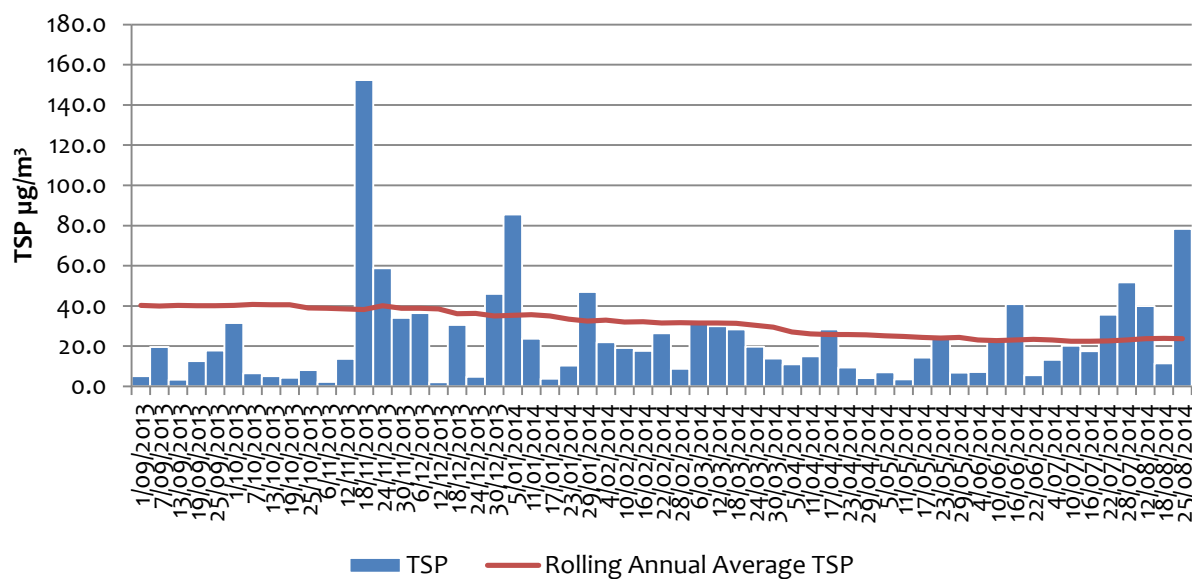
1 Air Quality

1.1 High Volume Air Samplers

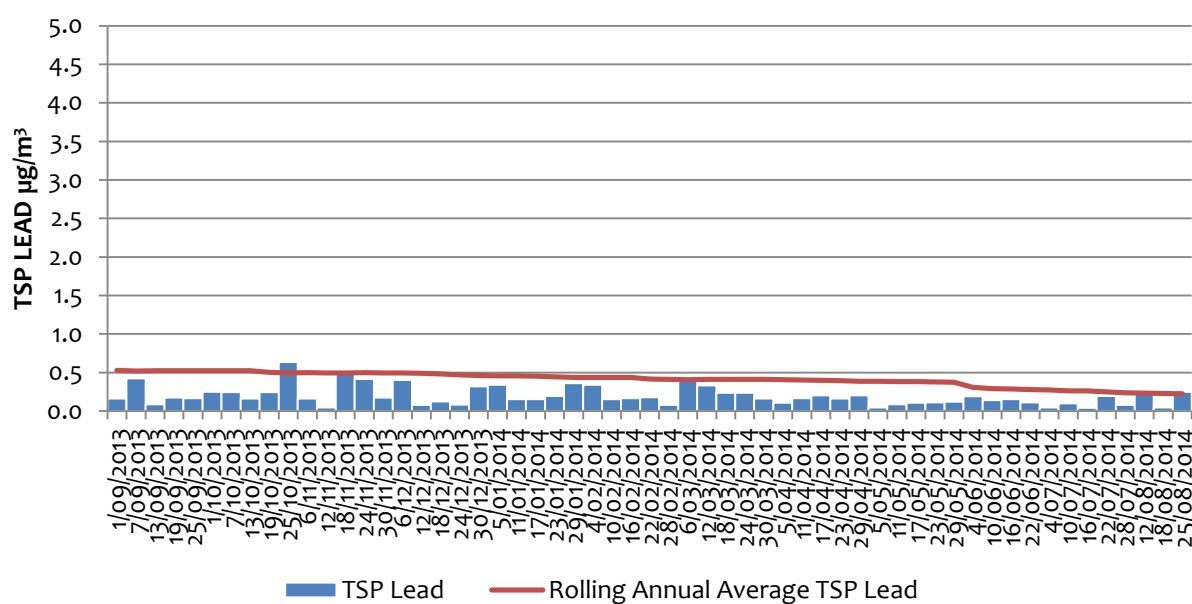
EPL10 - SILVER TANK - ON SITE

DATE	TSP ($\mu\text{g}/\text{m}^3$)	Lead ($\mu\text{g}/\text{m}^3$)
12/8/14	40	0.26
18/8/14	12	0.05
25/8/14	78	0.25

Total Suspended Particles

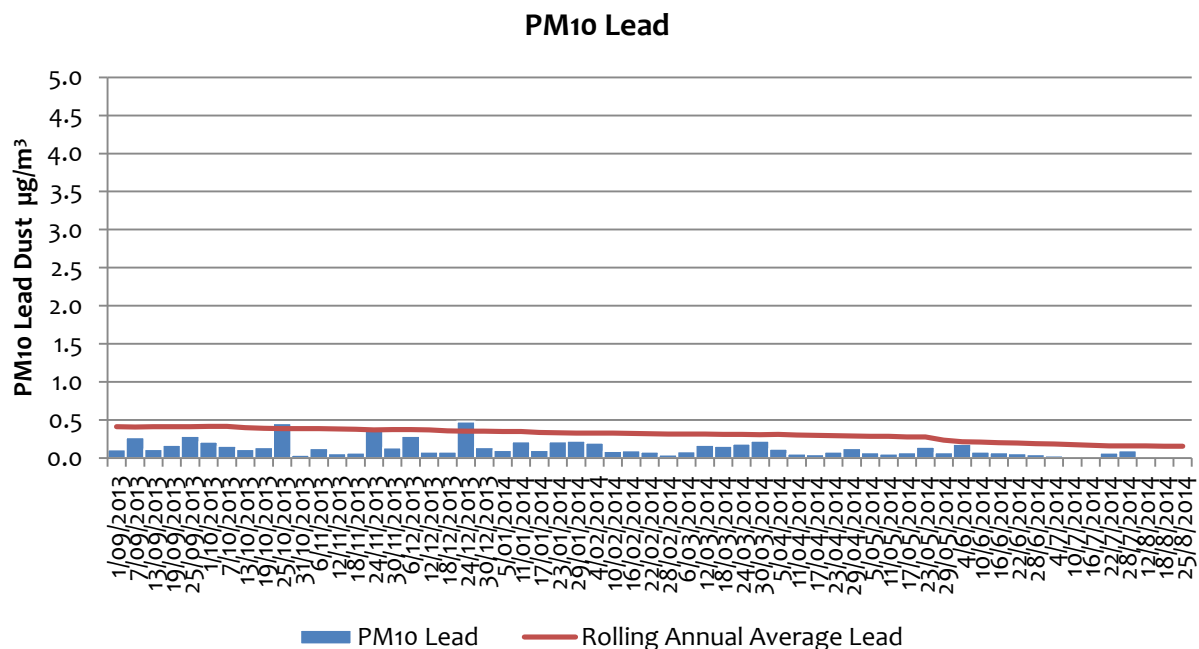
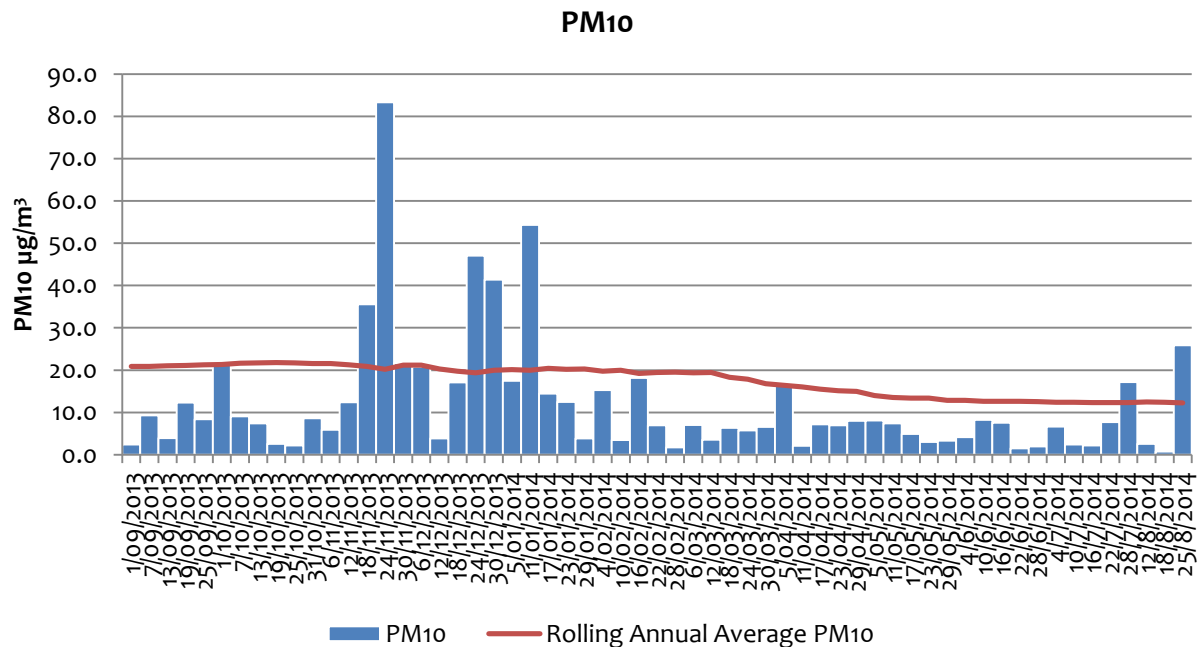


Total Suspended Particles - Lead



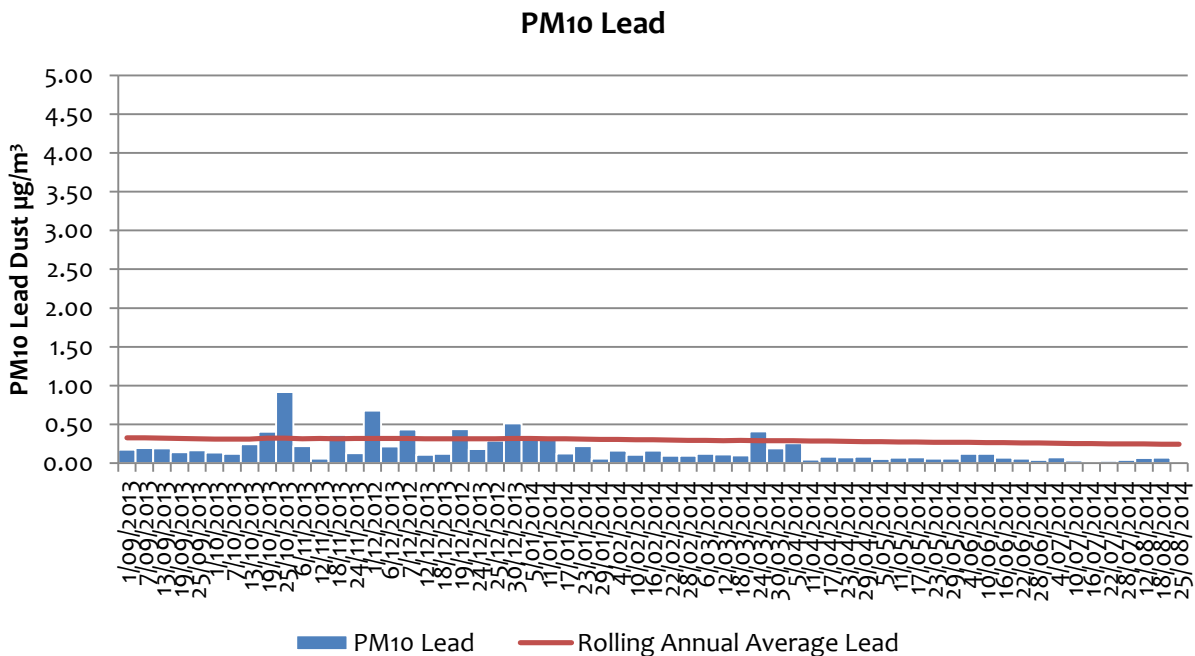
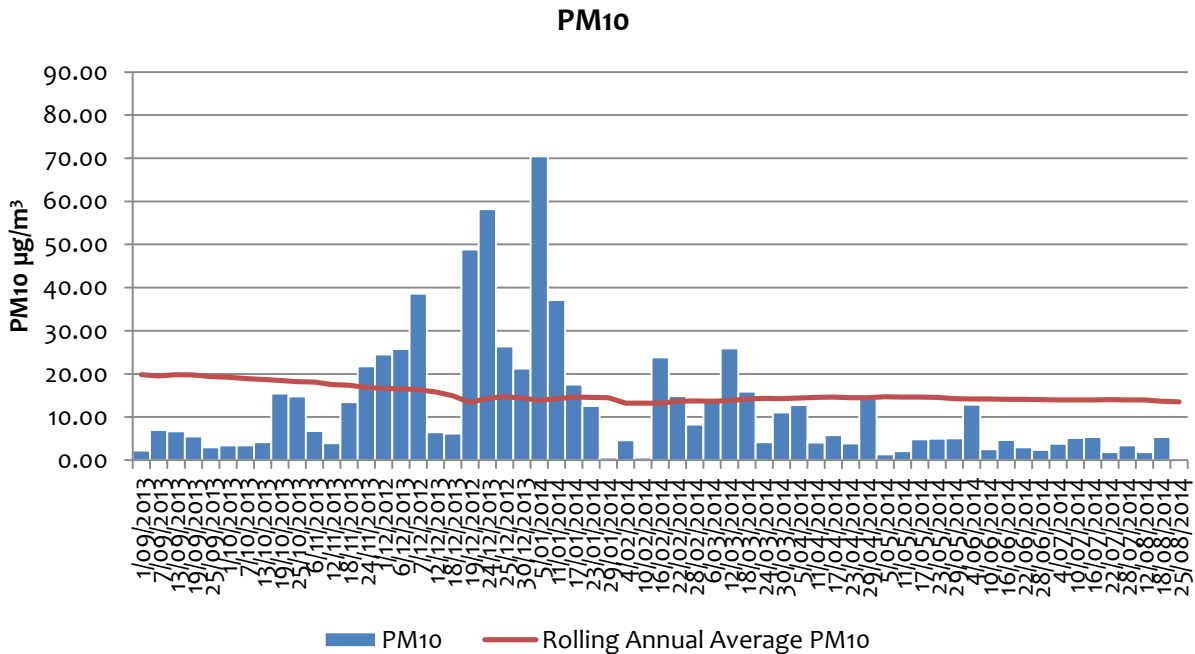
EPL11 - Silver Tank - On Site

DATE	PM10 (µg/m³)	Lead (µg/m³)
12/8/14	3	<0.01
18/8/14	1	<0.01
25/8/14	26	<0.01



EPL12 - Blackwoods Pit – On Site

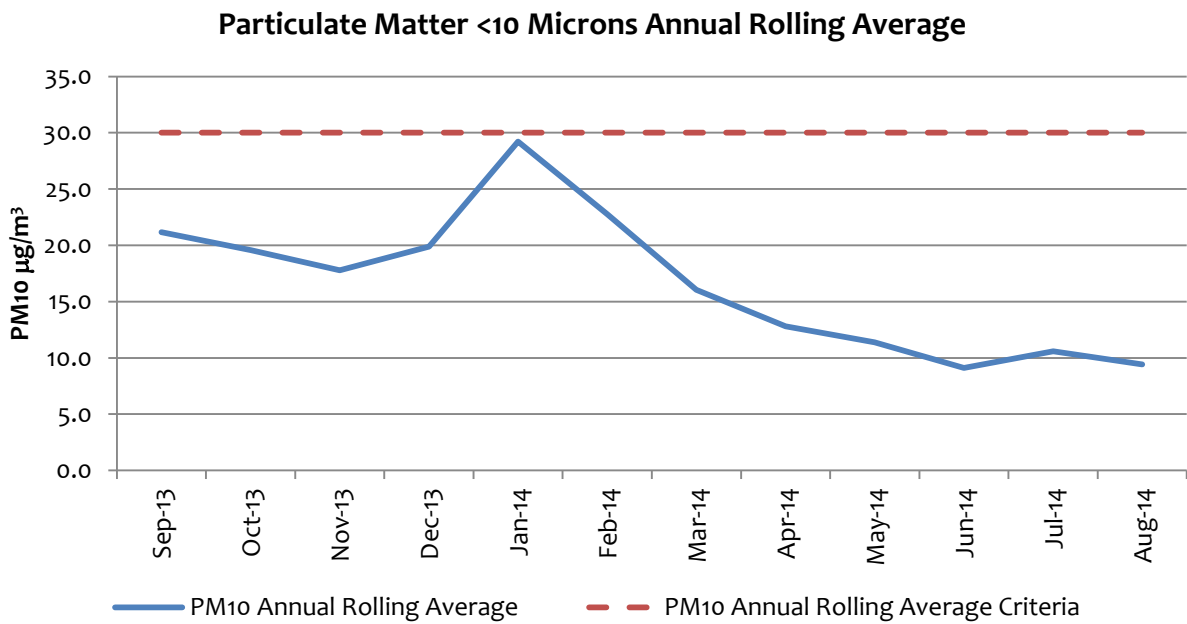
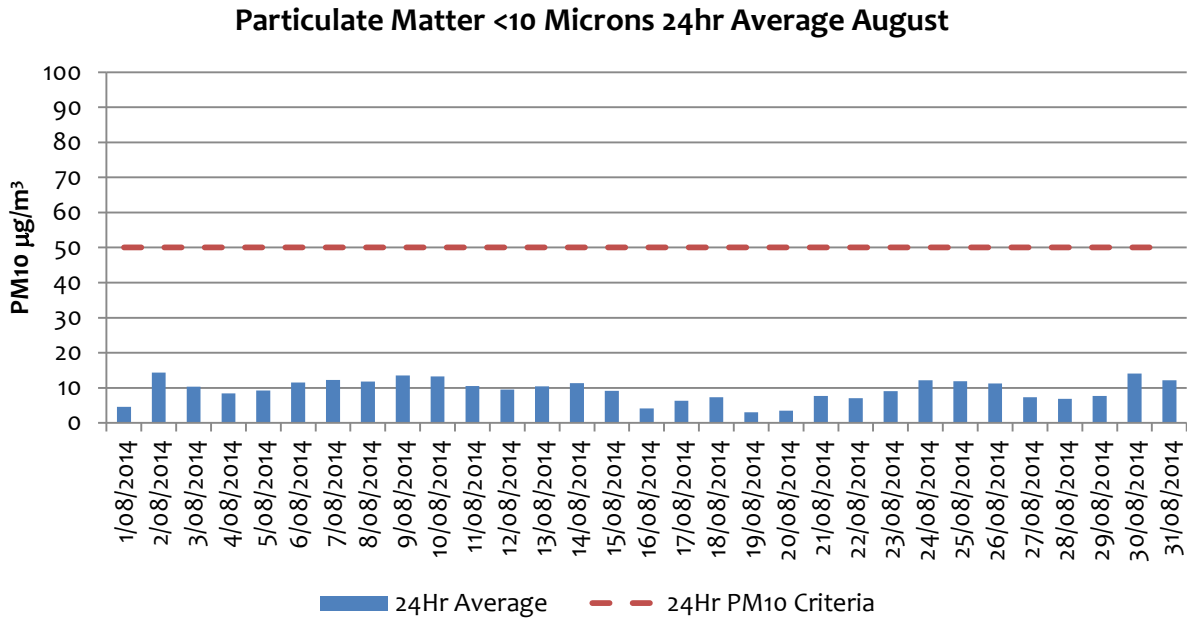
DATE	PM10 ($\mu\text{g}/\text{m}^3$)	Lead ($\mu\text{g}/\text{m}^3$)
12/8/14	1.8	0.06
18/8/14	5.3	0.07
25/8/14	0.2	0.005

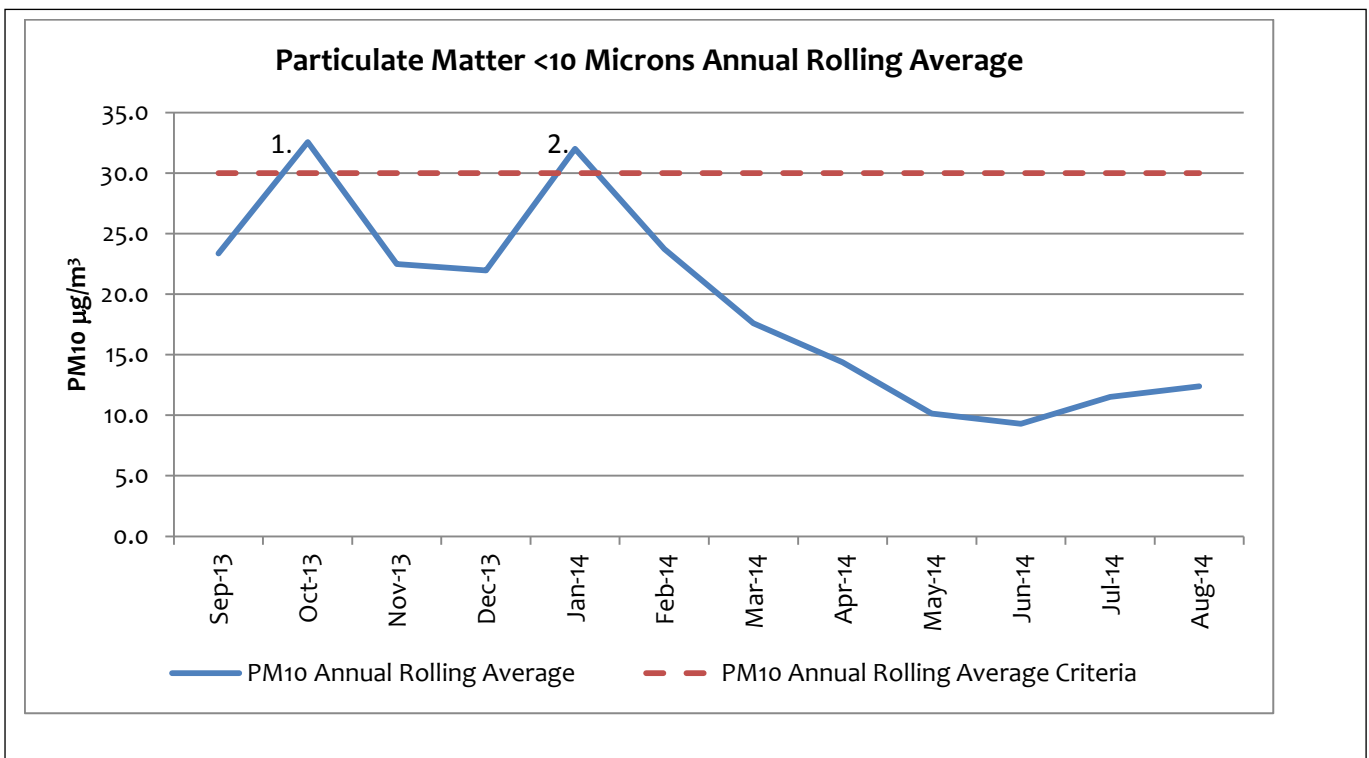
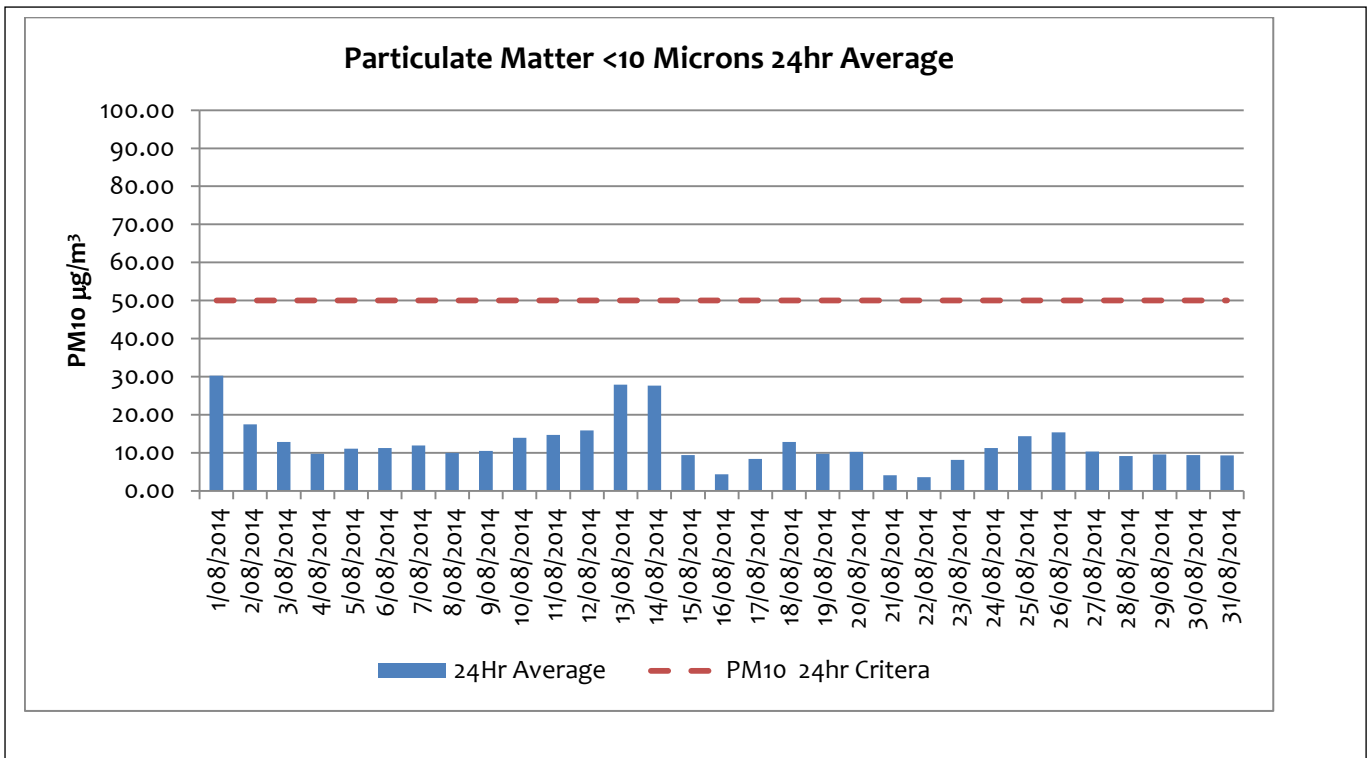


1.2 Tapered Element Oscillating Microbalance Sampling (TEOM)

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
1/08/2014	4.59	30.24
2/08/2014	14.35	17.46
3/07/2014	10.37	12.83
4/07/2014	8.38	9.70
5/07/2014	9.24	11.09
6/07/2014	11.5	11.21
7/07/2014	12.27	11.88
8/07/2014	11.81	10.00
9/07/2014	13.52	10.52
10/07/2014	13.25	13.91
11/07/2014	10.56	14.71
12/07/2014	9.53	15.89
13/07/2014	10.4	27.87
14/07/2014	11.38	27.65
15/07/2014	9.15	9.39
16/07/2014	4.1	4.31
17/07/2014	6.32	8.40
18/07/2014	7.35	12.83
19/07/2014	3.04	9.70
20/07/2014	3.54	10.24
21/07/2014	7.72	4.06
22/07/2014	7.01	3.57
23/07/2014	9.06	8.12
24/07/2014	12.15	11.28
25/07/2014	11.92	14.35
26/07/2014	11.21	15.38
27/07/2014	7.36	10.30
28/07/2014	6.84	9.09
29/07/2014	7.73	9.55
30/07/2014	14.08	9.37
31/07/2014	12.18	9.27

PM10 $\mu\text{g}/\text{m}^3$ 12 Month Rolling Average												
	Aug-13	Sep-13	Oct-13	Nov-13	Dec-13	Jan-14	Feb-14	Mar-14	Apr-14	May-14	June-14	Jul-14
TEOM 1 EPL13 Essential Water Off Site	21.2	19.6	17.8	19.9	29.2	22.7	16.0	12.8	11.4	9.1	10.6	9.4
TEOM 2 EPL14 Blackwoods Pit On Site	23.4	32.6	22.5	22.0	32.0	23.7	17.6	14.4	10.2	9.3	11.5	12.4





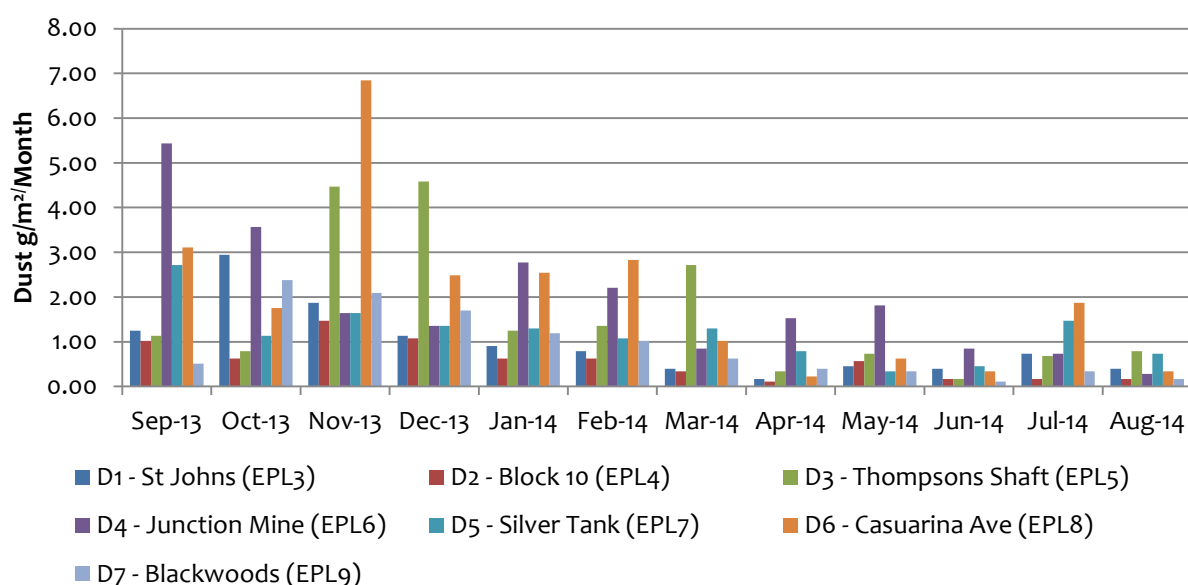
1. SW Winds of up to 81Km/h During the month of October 2013 with an Average Temp o 27°C .
2. S Winds of up to 72km/h during the month of January 2014 with an average Temperature of 36°C
Dust suppression was reapplied during the month of January 2013.

1.3 Dust Deposition Sampling

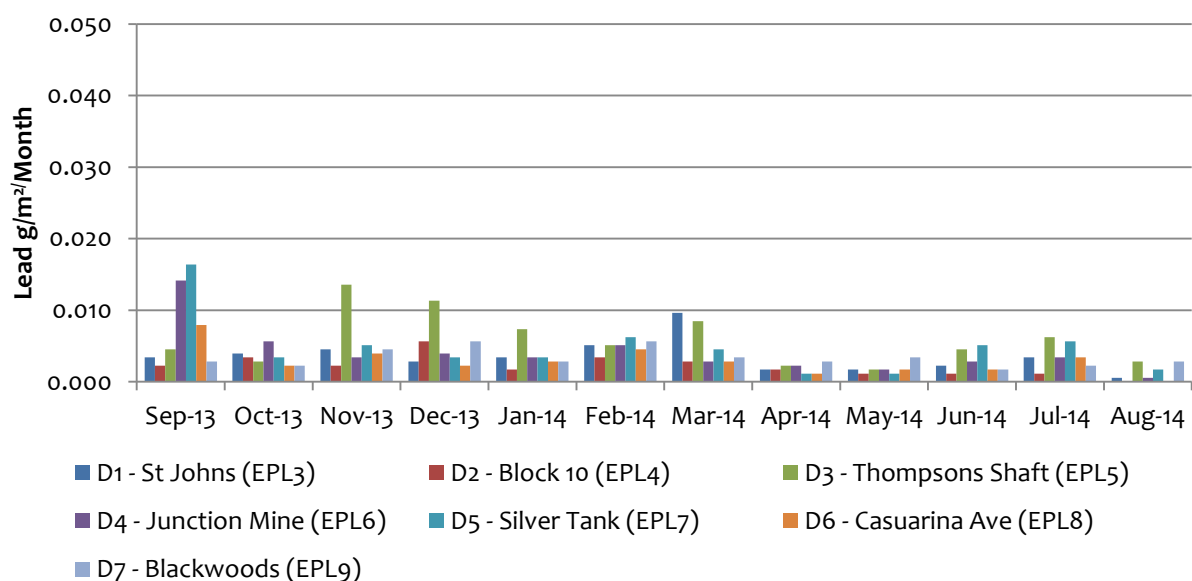
Total Deposited Dust (g/m ² /Month)							
Date	D1 (off site)	D2	D3	D4	D5	D6 (off site)	D7
August 2014	0.40	0.17	0.79	0.28	0.74	0.34	0.17
Background Average	4.0	3.1	4.3	5.7	n/a	5.8	n/a

Total Deposited Lead (g/m ² /Month)							
Date	D1 (Off Site)	D2	D3	D4	D5	D6 (Off Site)	D7
August 2014	0.001	0.000	0.003	0.001	0.002	0.000	0.003
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 August blasting occurred daily, there was a total number of blasts 174 of which 8 were production firings all inside licensing criteria.
- 166 blasts were below a ppv of 0.75mm/s and did not trigger an event
- 0 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)
1/08/2014	1.36	91.5
V1	Did not trigger	Did not trigger
V2	Did not trigger	Did not trigger
V3	1.36	91.5
2/08/2014	0.939	88
V1	Did not trigger	Did not trigger
V2	Did not trigger	Did not trigger
V3	0.939	88
7/08/2014	1.04	91.5
V1	Did not trigger	Did not trigger
V2	Did not trigger	Did not trigger
V3	1.04	91.5
8/08/2014	2.25	95.9
V1	Did not trigger	Did not trigger
V2	Did not trigger	Did not trigger
V3	2.25	95.9
20/08/2014	3.86	105.5
V1	Did not trigger	Did not trigger
V2	3.86	105.5
V3	1.59	95.9
21/08/2014	6.61	105.5
V1	Did not trigger	Did not trigger
V2	6.61	105.5
V3	2.94	95.9
27/08/2014	4.67	101.9
V1	Did not trigger	Did not trigger
V2	4.67	101.9
V3	2.06	94
31/08/2014	1.78	94
V1	Did not trigger	Did not trigger
V2	Did not trigger	Did not trigger
V3	1.78	94

3 Noise

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

4 Water

4.1 Ground Water

Date of sample	29/7/14	29/7/14
Sample ID	U/G Supply	Shaft #7
pH Value (pH)	6.82	6.44
Electrical conductivity (uS/cm)	12200	11400
Total Dissolved Solids (mg/L)	8950	12700
Hydroxide Alkalinity as CaCO ₃ (mg/L)	0.5	0.5
Carbonate Alkalinity CaCO ₃ (mg/L)	0.5	0.5
Bicarbonate Alkalinity as CaCO ₃ (mg/L)	33	10
Total Alkalinity (mg/L)	33	10
Sulphate as SO ₄ (mg/L)	5270	5600
Chloride (mg/L)	1250	1030
Calcium (mg/L)	634	621
Magnesium (mg/L)	441	361
Sodium (mg/L)	2300	1960
Cadmium (mg/L)	2.9	4.19
Manganese (mg/L)	413	486
Lead (mg/L)	2.02	1
Zinc (mg/L)	951	1410
Iron (mg/L)	0.05	0.08

Groundwater Table

Date of sample	29/07/2014	29/07/2014	29/07/2014	29/07/2014	29/07/2014	29/07/2014
Sample ID	GW01	GW03	GW04	GW05	GW06	GW07
pH Value (pH)	5.71	5.12	7.38	6.75	6.74	6.63
Electrical conductivity (uS/cm)	12300	15300	14700	16900	14400	13200
Total Dissolved Solids (mg/L)	10500	13600	12100	15700	12800	11700
Hydroxide Alkalinity as CaCO3 (mg/L)	0.5	0.5	0.5	0.5	0.5	0.5
Carbonate Alkalinity CaCO3 (mg/L)	0.5	0.5	0.5	0.5	0.5	0.5
Bicarbonate Alkalinity as CaCO3 (mg/L)	2	2	271	124	53	33
Total Alkalinity (mg/L)	2	2	271	124	53	33
Sulphate as SO4 (mg/L)	5140	4900	4920	6450	4990	4690
Chloride (mg/L)	1240	2940	2680	2760	2560	1690
Calcium (mg/L)	369	628	580	550	516	593
Magnesium (mg/L)	681	555	549	861	490	472
Sodium (mg/L)	2380	3460	2730	3770	2300	2710
Cadmium (mg/L)	0.266	1.64	0.0621	0.862	0.853	4.27
Manganese (mg/L)	352	418	43.1	334	316	323
Lead (mg/L)	1.1	3.32	0.021	0.194	0.155	1.34
Zinc (mg/L)	307	365	21.5	319	216	349
Iron (mg/L)	0.05	0.05	0.05	0.05	0.05	0.05

Date of sample	29/07/2014	29/07/2014	29/07/2014	29/07/2014	29/07/2014
Sample ID	GW08	GW09	GW10	GW11	GW12
pH Value (pH)	6.65	7	7.45	7.54	6.72
Electrical conductivity (uS/cm)	9790	10300	13100	2840	13500
Total Dissolved Solids (mg/L)	8440	8420	10700	1850	10200
Hydroxide Alkalinity as CaCO ₃ (mg/L)	0.5	0.5	0.5	0.5	0.5
Carbonate Alkalinity CaCO ₃ (mg/L)	0.5	0.5	0.5	0.5	0.5
Bicarbonate Alkalinity as CaCO ₃ (mg/L)	14	291	226	99	75
Total Alkalinity (mg/L)	14	291	226	99	75
Sulphate as SO ₄ (mg/L)	3560	3650	4620	1020	5180
Chloride (mg/L)	1520	1530	1680	270	1450
Calcium (mg/L)	702	828	568	95	455
Magnesium (mg/L)	348	571	496	93	608
Sodium (mg/L)	1010	1290	2360	472	2660
Cadmium (mg/L)	2.4	0.0259	0.493	0.0022	1.04
Manganese (mg/L)	421	0.958	44.2	17.5	46.9
Lead (mg/L)	1.33	0.011	0.138	0.009	0.01
Zinc (mg/L)	570	2.31	74.5	17.3	153
Iron (mg/L)	0.05	0.05	0.05	0.16	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	Due for sample
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 August.

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

Most observations from Broken Hill (Patten Street), but some from Broken Hill Airport.

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	Fr	3.7	14.2	0			WSW	61	12:59	7.2	68	0	W	33	1018.9	13.1	29	3	SW	37	1020.3
2	Sa	0.1	12.6	0			SSE	35	13:30	4.2	79	1	S	15	1032.2	11.7	35	1	ESE	22	1030.1
3	Su	1.7	13.9	0			SE	31	15:51	7.2	53	0	NE	17	1033.0	12.7	31	0	S	19	1029.7
4	Mo	0.9	15.4	0			SE	35	11:18	7.2	47	0	SE	19	1033.0	14.6	28	0	SE	17	1030.3
5	Tu	2.0	16.2	0			SE	30	11:21	8.2	50	1	SSE	15	1035.2	15.6	29	0	SE	20	1032.7
6	We	4.1	20.7	0			NW	28	12:52	10.9	41	0	ENE	15	1034.6	19.7	33	0	W	9	1030.6
7	Th	3.2	19.7	0			E	20	09:42	10.1	51	0	E	13	1032.9	18.1	29	0	SE	9	1029.2
8	Fr	4.4	21.2	0			NNE	20	08:45	10.4	54	0	NNE	17	1031.5	20.3	30	1	SSW	9	1028.4
9	Sa	5.8	21.4	0			NW	31	11:07	13.4	43	1	N	11	1030.4	21.1	24	2	WSW	15	1026.8
10	Su	7.7	16.4	0			S	48	12:43	11.8	71	3	S	31	1028.7	15.2	47	2	S	20	1026.8
11	Mo	1.1	12.3	0			S	39	13:55	4.1	84	1	SSE	20	1031.3	11.6	38	1	S	26	1028.5
12	Tu	3.2	11.3	0			SSW	50	14:15	5.8	62	8	SSE	19	1031.5	11.1	30	2	S	30	1028.9
13	We	4.8	15.6	0			SE	54	15:05	6.7	56	7	S	28	1032.0	14.3	38	5	SE	33	1028.8
14	Th	4.3	18.7	2.2			ESE	56	14:37	6.2	89	5	SE	24	1031.2	17.4	39	7	E	31	1026.7
15	Fr	5.1	10.1	4.2			ESE	44	12:09	9.8	93	8	E	24	1024.6	9.6	100	8	ESE	28	1019.5
16	Sa	7.3	14.1	24.0			S	46	19:15	8.8	100	8	SSE	11	1015.2	12.3	94	8	SSE	19	1012.2
17	Su	7.2	14.7	8.6			SSW	54	11:11	8.7	95	7	SSW	30	1016.5	14.1	43	1	SW	35	1015.4
18	Mo	3.8	13.4	0.4			S	48	10:30	6.2	93	1	SSW	31	1021.7	12.9	49	1	SSW	33	1019.6
19	Tu	2.0	14.9	0			SSW	31	12:08	7.8	70	0	SSW	17	1024.4	13.7	57	4	SSW	15	1022.2
20	We	4.9	18.3	0			SSE	28	21:30	9.3	92	1	SE	15	1025.6	16.7	55	6	SSE	13	1023.2
21	Th	7.1	18.8	0			E	35	11:06	11.7	69	3	NE	26	1026.7	18.1	39	2	SE	22	1023.6
22	Fr	6.7	20.4	0			NE	33	12:33	12.1	65	1	NE	13	1027.5	19.2	40	2	E	17	1024.0
23	Sa	8.1	22.8	0			SW	33	22:53	15.1	55	1	NNE	17	1027.1	22.3	33	1	NNW	19	1024.8
24	Su	5.8	19.4	0			SSW	28	15:05	10.7	80	1	SSE	20	1030.5	18.7	39	1	SSW	15	1027.8
25	Mo	3.8	17.9	0			SSW	33	11:26	8.6	80	1	SSE	19	1031.1	16.9	42	0	SW	20	1026.7
26	Tu	3.9	18.1	0.2			SSE	35	13:24	8.5	87	1	S	15	1027.0	17.2	44	1	SE	20	1023.2
27	We	5.9	20.4	0			SE	39	13:03	11.5	71	0	S	11	1026.4	19.8	43	1	ESE	20	1024.7
28	Th	8.8	20.9	0			ESE	35	11:28	14.2	54	1	E	20	1029.3	20.2	37	1	ESE	20	1027.3
29	Fr	10.1	23.3	0			ESE	26	11:19	16.4	50	1	SW	6	1029.0	22.1	29	1	SE	11	1025.5
30	Sa	9.4	24.7	0			NNW	26	13:18	17.2	46	0	NW	6	1025.3				NE	11	1021.0
31	Su	9.2	24.6	0			NNW	39	11:24	18.3	32	2	N	22	1020.2	24.2	21	4	NNW	22	1015.5
Statistics for August 2014																					
Mean		5.0	17.6							9.9	67	2		18	1027.9	16.5	40	2		20	1025.0
Lowest		0.1	10.1	0						4.1	32	0	#	6	1015.2	9.6	21	0	#	9	1012.2
Highest		10.1	24.7	24.0			WSW	61		18.3	100	8	W	33	1035.2	24.2	100	8	SW	37	1032.7
Total				39.6																	

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	2/10/14	14/10/14	17/10/14
TEOM	Real time	N/A	17/10/14
Dust Deposition	2/10/14	14/10/14	17/10/14
Water	04/8/14	08/8/14	17/10/14
Blast Vibration and overpressure	Real Time	N/A	17/10/14

7 Correction Log

No corrections for last month