

Monthly Environmental Data July 2014

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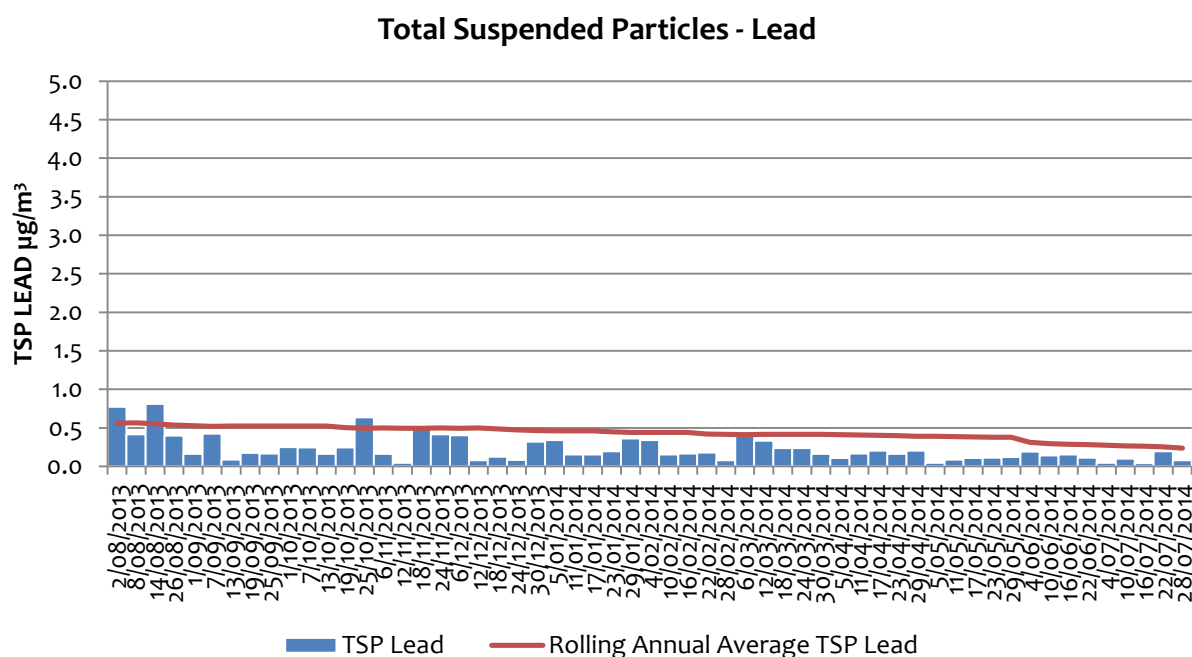
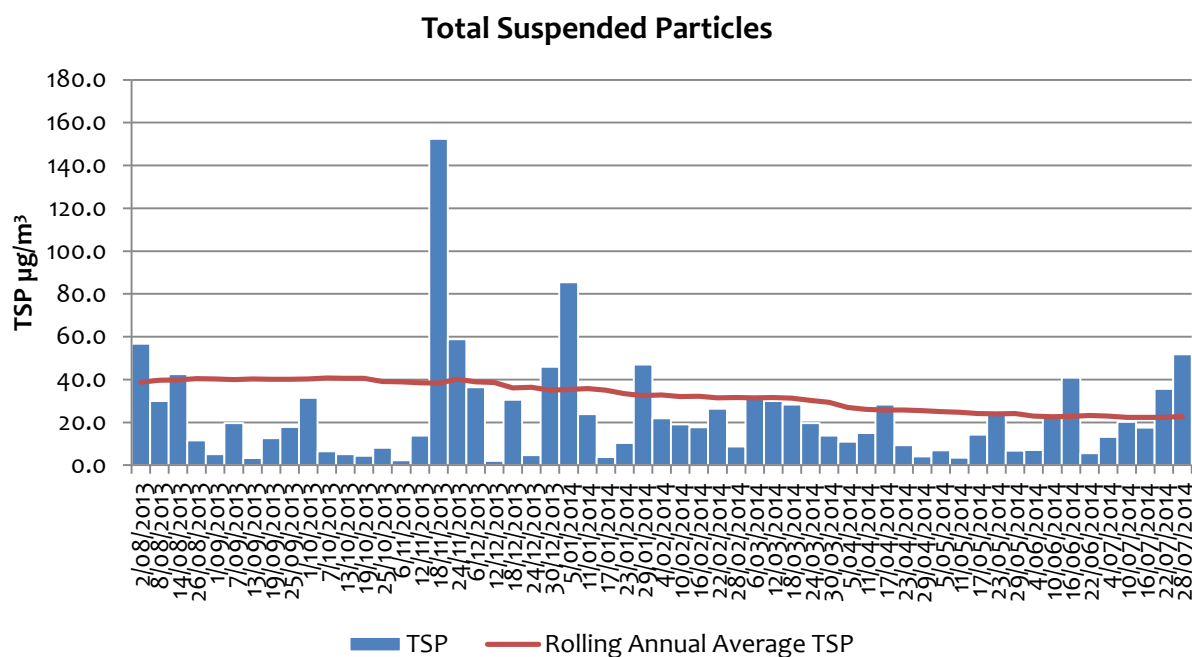
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1 Air Quality

1.1 High Volume Air Samplers

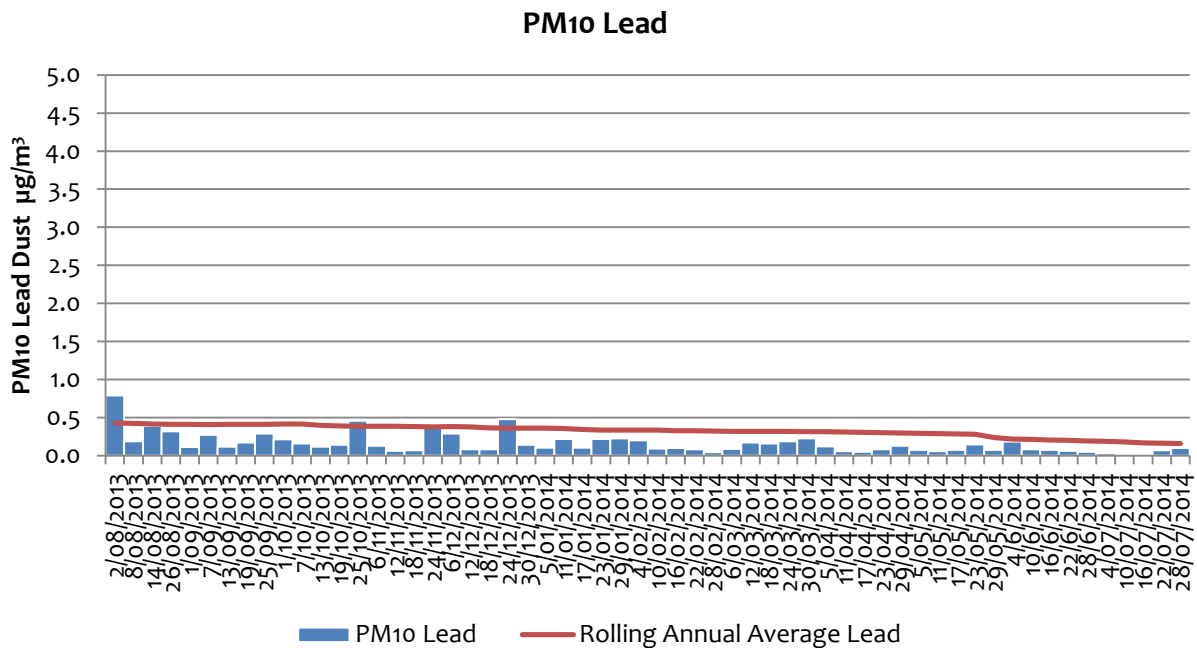
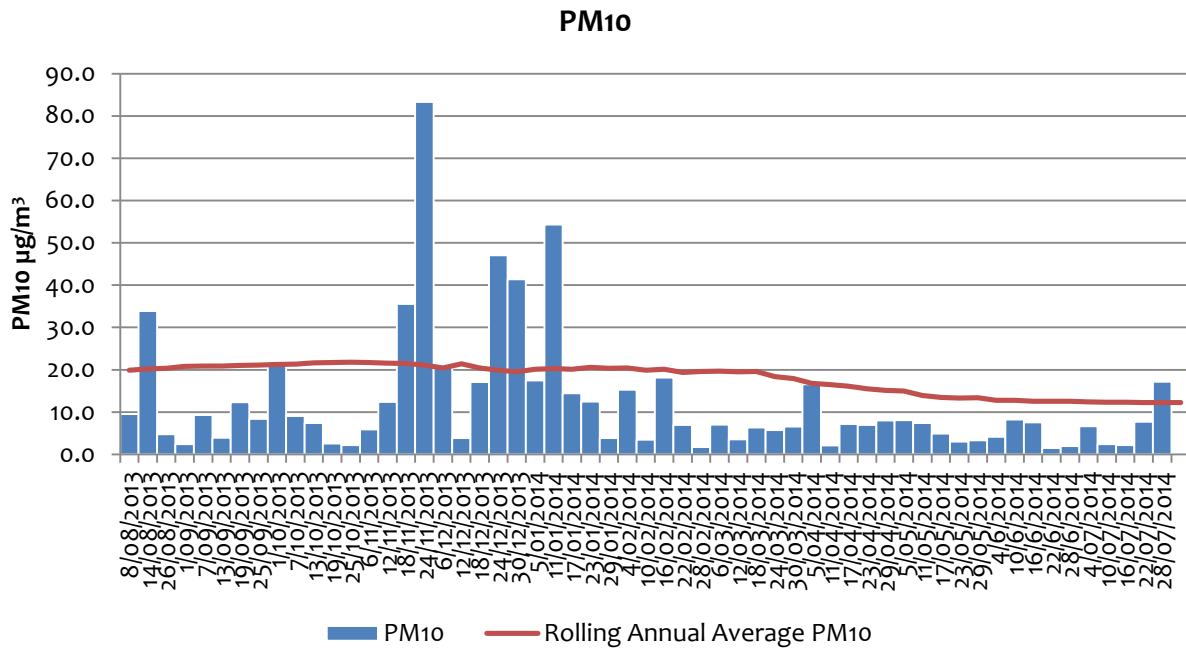
EPL10 - SILVER TANK - ON SITE

DATE	TSP ($\mu\text{g}/\text{m}^3$)	Lead ($\mu\text{g}/\text{m}^3$)
4-Jul-14	13	0.05
10-Jul-14	20	0.10
16-Jul-14	18	0.04
22-Jul-14	36	0.20
28-Jul-14	52	0.08



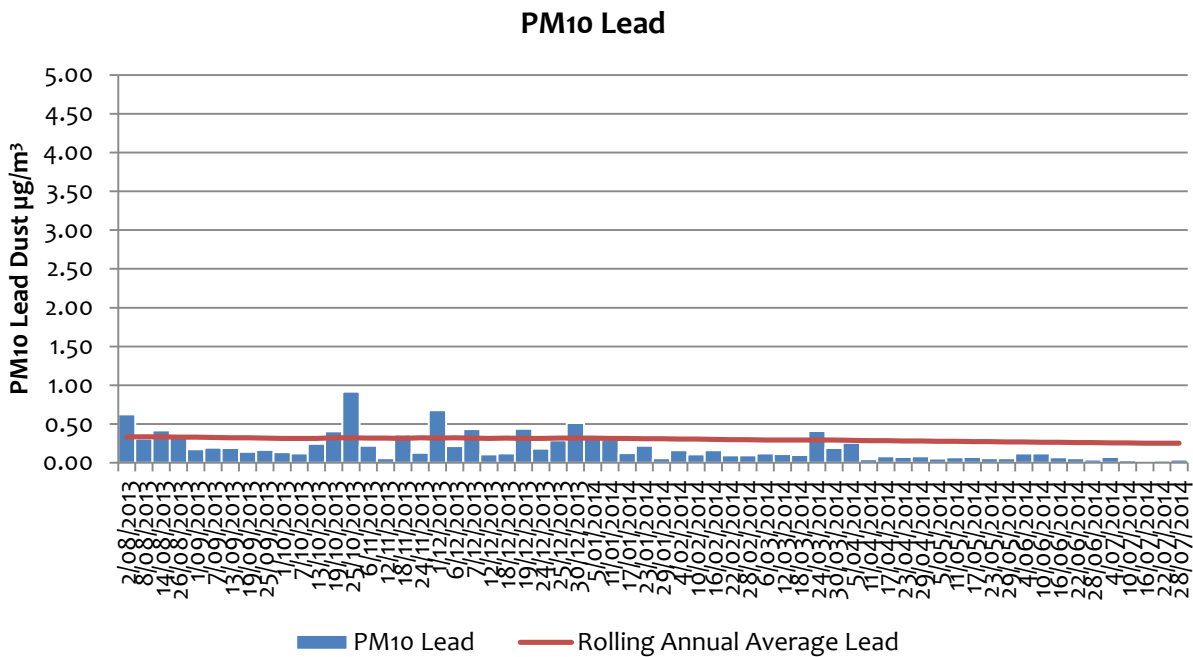
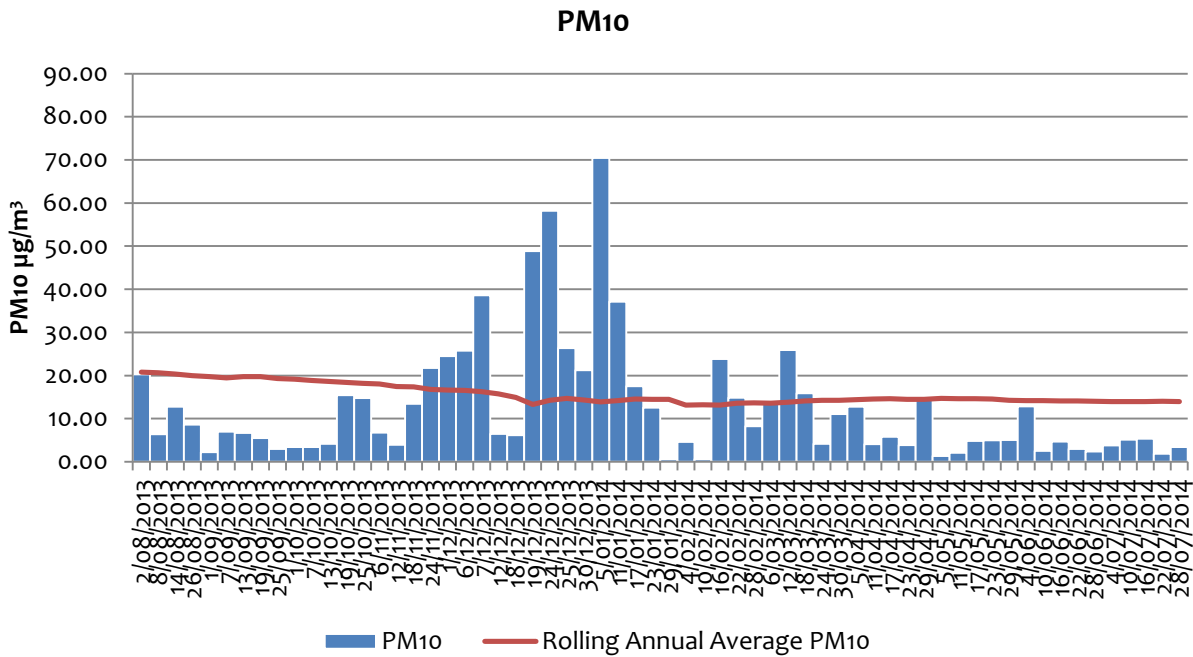
EPL11 - Silver Tank - On Site

DATE	PM10 ($\mu\text{g}/\text{m}^3$)	Lead ($\mu\text{g}/\text{m}^3$)
04/07/04	7	0.04
10/07/10	2	0.02
16/07/16	2	0.02
22/07/22	8	0.07
28/07/28	17	0.10



EPL12 - Blackwoods Pit – On Site

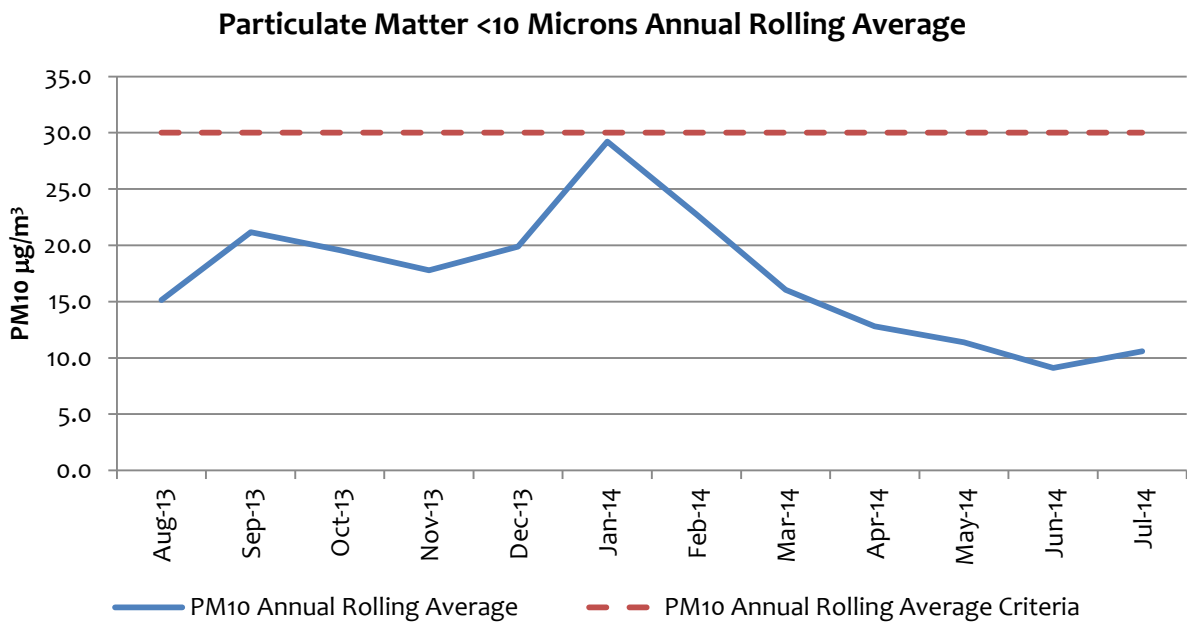
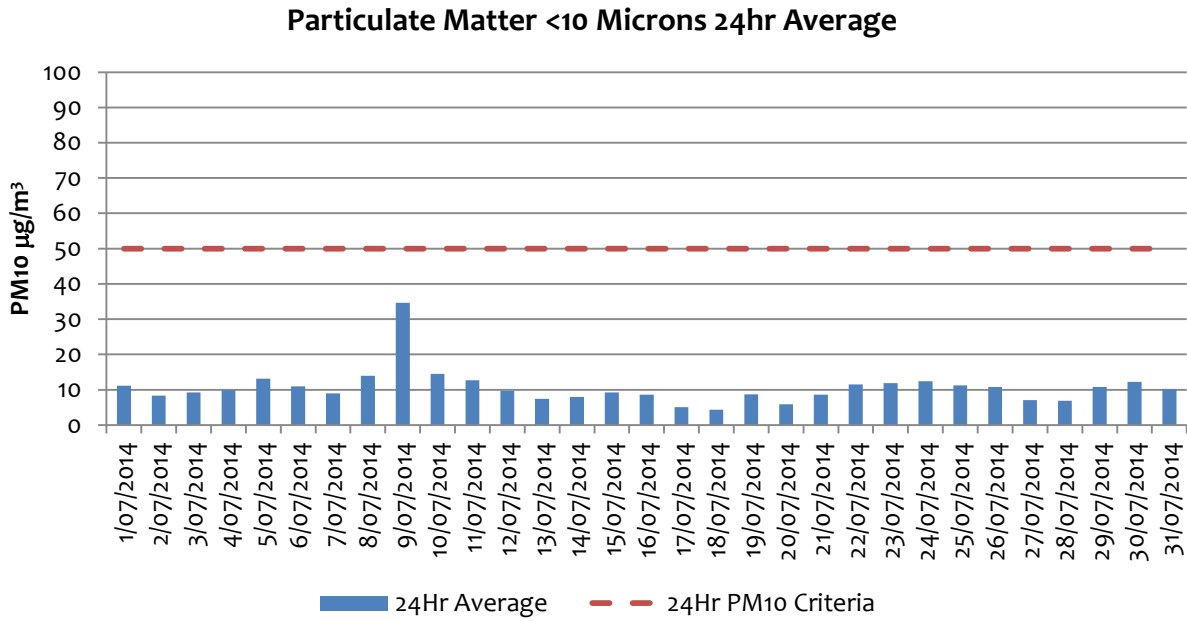
DATE	PM10 ($\mu\text{g}/\text{m}^3$)	Lead ($\mu\text{g}/\text{m}^3$)
4/07/2014	3.8	0.08
10/07/2014	5.12	0.04
16/07/2014	5.36	0.02
22/07/2014	1.85	0.03
28/07/2014	3.45	0.04

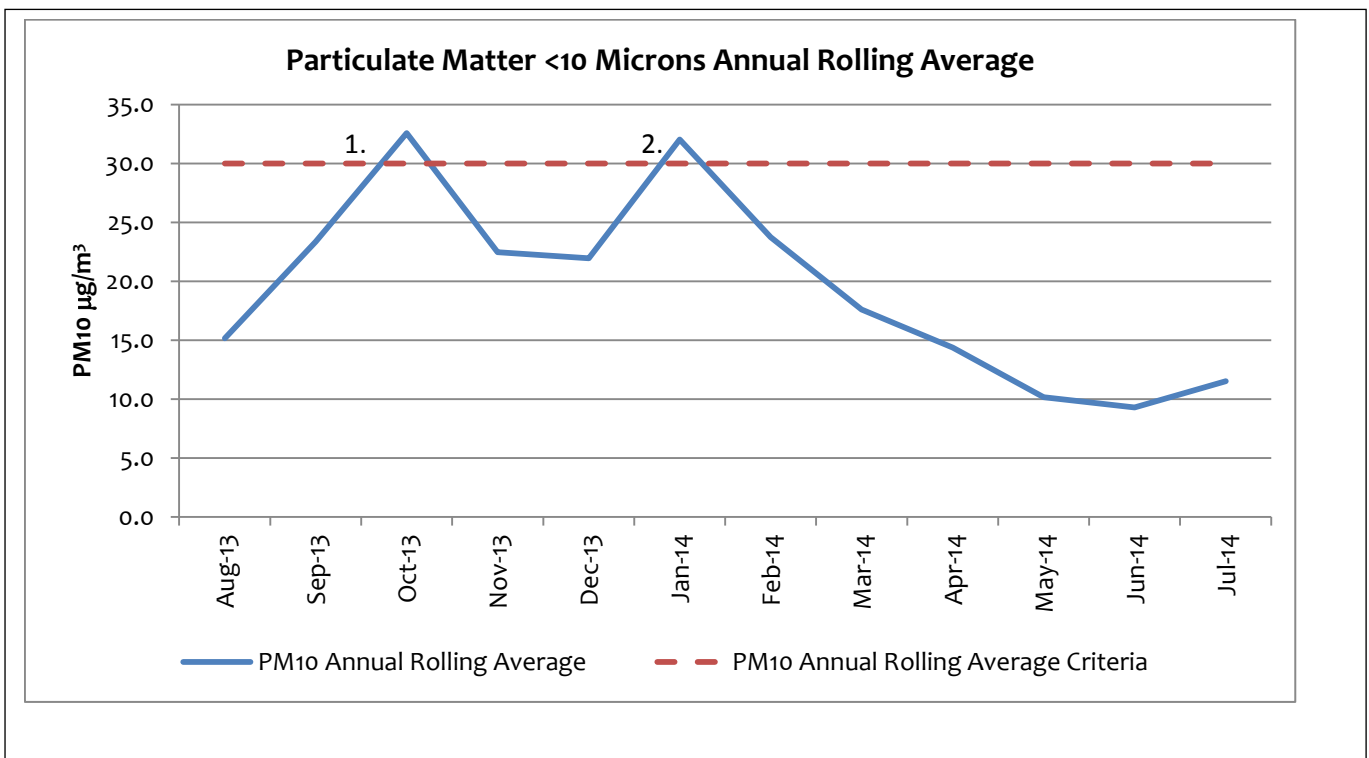
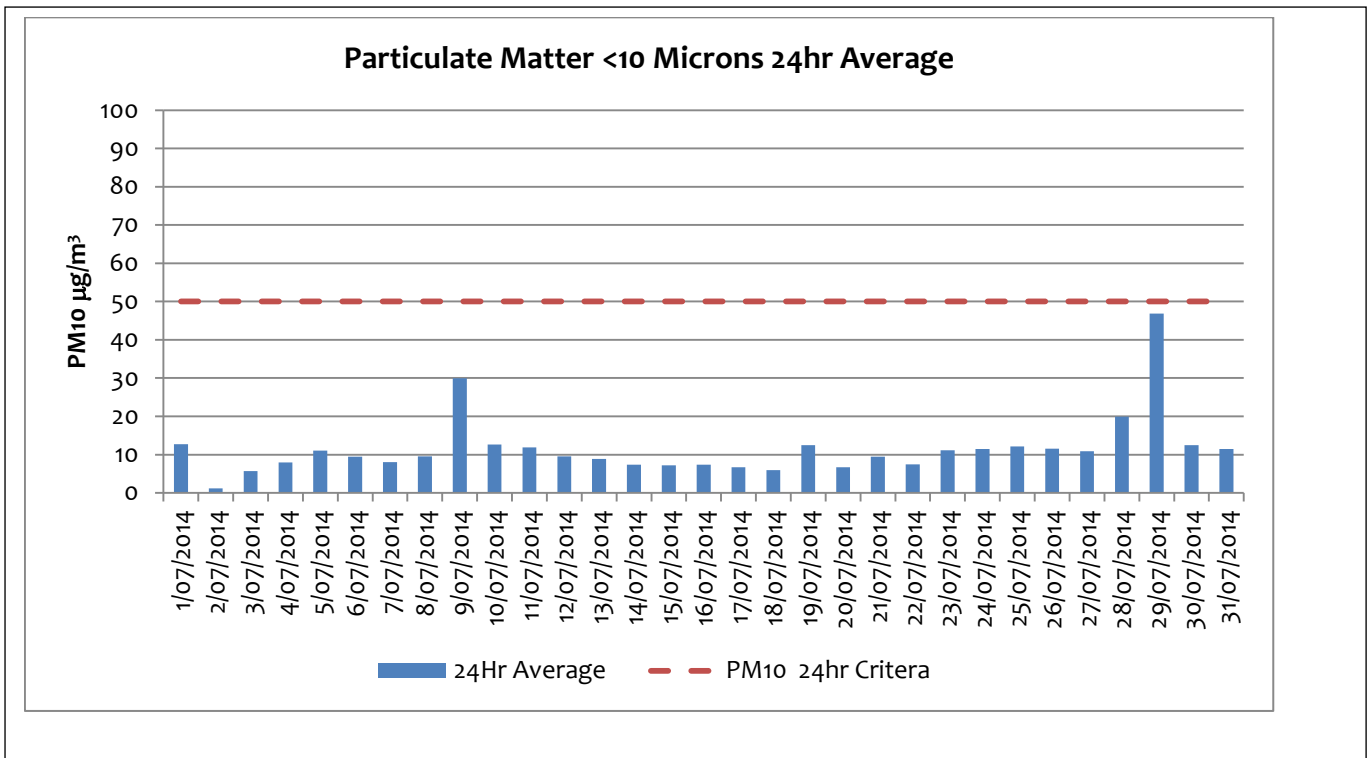


1.2 Tapered Element Oscillating Microbalance Sampling (TEOM)

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
1/07/2014	11.13	12.70
2/07/2014	8.29	1.15
3/07/2014	9.28	5.69
4/07/2014	9.85	7.94
5/07/2014	13.18	11.02
6/07/2014	10.93	9.46
7/07/2014	8.98	8.01
8/07/2014	13.97	9.55
9/07/2014	34.68	29.92
10/07/2014	14.54	12.61
11/07/2014	12.71	11.93
12/07/2014	9.66	9.56
13/07/2014	7.42	8.84
14/07/2014	7.97	7.34
15/07/2014	9.25	7.22
16/07/2014	8.62	7.38
17/07/2014	5.02	6.71
18/07/2014	4.37	5.98
19/07/2014	8.66	12.44
20/07/2014	5.87	6.68
21/07/2014	8.64	9.46
22/07/2014	11.50	7.45
23/07/2014	11.85	11.14
24/07/2014	12.42	11.44
25/07/2014	11.27	12.16
26/07/2014	10.82	11.59
27/07/2014	7.09	10.85
28/07/2014	6.88	19.88
29/07/2014	10.78	46.85
30/07/2014	12.25	12.49
31/07/2014	10.16	11.45

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	15.1	21.2	19.6	17.8	19.9	29.2	22.7	16.0	12.8	11.4	9.1	10.6
TEOM 2 EPL14 Blackwoods Pit On Site	15.2	23.4	32.6	22.5	22.0	32.0	23.7	17.6	14.4	10.2	9.3	11.5





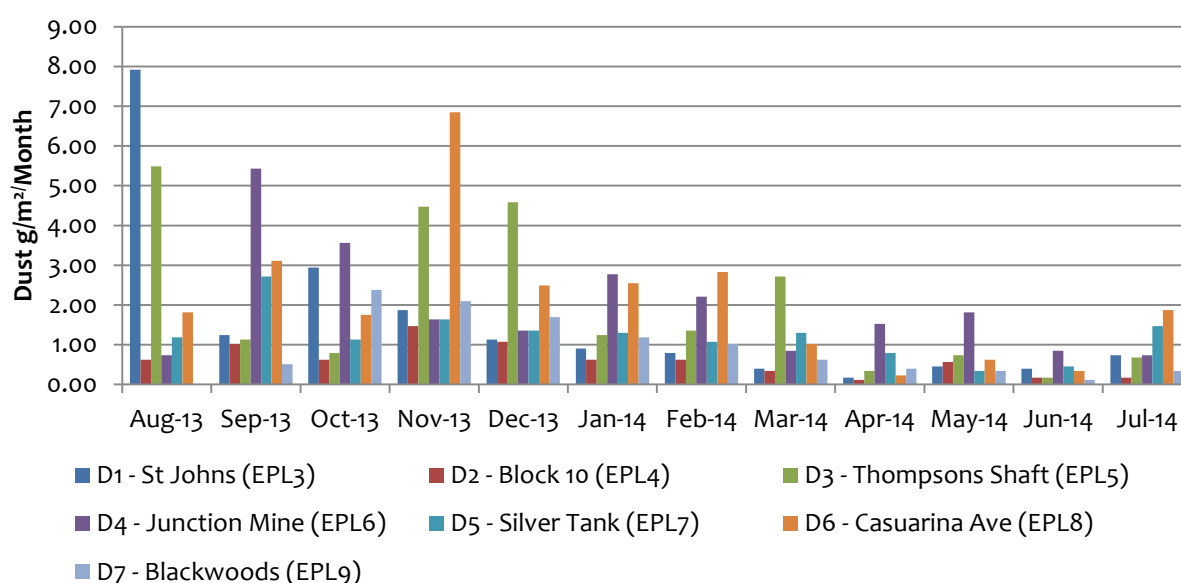
1. SW Winds of up to 81Km/h During the month of October 2013 with an Average Temp o 27°C .
2. S Winds of up to 72km/h during the month of January 2014 with an average Temperature of 36°C
Dust suppression was reapplied during the month of January 2013.

1.3 Dust Deposition Sampling

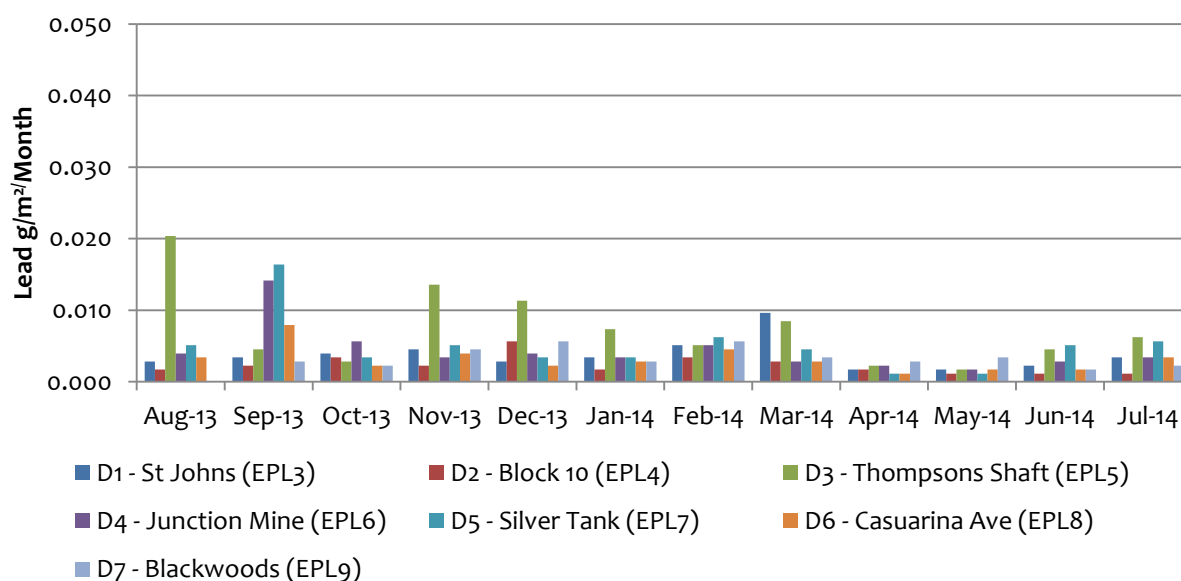
Total Deposited Dust (g/m ² /Month)							
Date	D1 (off site)	D2	D3	D4	D5	D6 (off site)	D7
July 2014	0.74	0.17	0.68	0.74	1.47	1.87	0.34
Background Average	4.0	3.1	4.3	5.7	n/a	5.8	n/a

Total Deposited Lead (g/m ² /Month)							
Date	D1 (Off Site)	D2	D3	D4	D5	D6 (Off Site)	D7
July 2014	0.003	0.001	0.006	0.003	0.006	0.003	0.002
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 blasts 158 of which were production firings all inside licensing criteria.
- 145 blasts were below a ppv of 0.75mm/s and did not trigger an event
- 2 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)
04/07/2014	9.56	104.9
V1	Did not Trigger	Did not Trigger
V2	2.19	97.5
V3	9.56	104.9
06/07/2014	1.94	91.5
V1	Did not Trigger	Did not Trigger
V2	Did not Trigger	Did not Trigger
V3	1.94	91.5
10/07/2014	0.8	88
V1	Did not Trigger	Did not Trigger
V2	Did not Trigger	Did not Trigger
V3	0.8	88
12/07/2014	1.07	94
V1	Did not Trigger	Did not Trigger
V2	Did not Trigger	Did not Trigger
V3	1.07	94
13/07/2014	3.5	100
V1	Did not Trigger	Did not Trigger
V2	0.96	95.9
V3	3.5	100
15/07/2014	4.69	101.9
V1	Did not Trigger	Did not Trigger
V2	1.78	91.5
V3	4.69	101.9
17/07/2014	1.22	109.2
V1	Did not Trigger	Did not Trigger
V2	0.5	109.2
V3	1.22	97.5
18/07/2014	1.96	94
V1	Did not Trigger	Did not Trigger
V2	1.96	94
V3	Did not Trigger	Did not Trigger
21/07/2014	6.24	104.2
V1	Did not Trigger	Did not Trigger
V2	1.7	94
V3	6.24	104.2
23/07/2014	1.33	91.5
V1	Did not Trigger	Did not Trigger
V2	0.6	91.5
V3	1.33	91.5
24/07/2014	1.89	94
V1	Did not Trigger	Did not Trigger
V2	0.8	91.5
V3	1.89	94
30/07/2014	2.0	94
V1	Did not Trigger	Did not Trigger
V2	0.9	91.5
V3	2.0	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	29/7/2014	29/7/2014	29/7/2014	29/7/2014	29/7/2014	29/7/2014
Sample ID	GW07	GW06	GW05	GW04	GW03	GW01
pH Value (pH)	6.63	6.74	6.75	7.38	5.12	5.71
Electrical conductivity (uS/cm)	13200	14400	16900	14700	15300	12300
Total Dissolved Solids (mg/L)	11700	12800	15700	12100	13600	10500
Hydroxide Alkalinity as CaCO ₃ (mg/L)	0.5	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	0.5
Bicarbonate Alkalinity as CaCO ₃ (mg/L)	33	53	124	271	2	2
Total Alkalinity (mg/L)	33	53	124	271	2	2
Sulphate as SO ₄ (mg/L)	4690	4990	6450	4920	4900	5140
Chloride (mg/L)	1690	2560	2760	2680	2940	1240
Calcium (mg/L)	593	516	550	580	628	369
Magnesium (mg/L)	472	490	861	549	555	681
Sodium (mg/L)	2710	2300	3770	2730	3460	2380
Cadmium (mg/L)	4.27	0.853	0.862	0.0621	1.64	0.266
Manganese (mg/L)	323	316	334	43.1	418	352
Lead (mg/L)	1.34	0.155	0.194	0.021	3.32	1.1
Zinc (mg/L)	349	216	319	21.5	365	307
Iron (mg/L)	0.05	0.05	0.05	0.05	0.05	0.05

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

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				mm	mm	hours	km/h	local	°C	%	g th	km/h	hPa	°C	%	g th	km/h	hPa
1	Tu	5.6	14.7	0.2			SE	20	22:22	7.6	99	7	SSW	7	1031.9	13.4	69	7	SSW	9	1030.4
2	We	5.5	14.2	0			SE	24	12:28	8.1	80	1	ENE	11	1031.8	13.6	51	0	ESE	9	1028.2
3	Th	0.9	16.8	0			N	37	11:18	7.6	79	1	NNE	13	1026.3	16.2	41	0	NNW	19	1021.8
4	Fr	7.0	17.4	0			WNW	41	13:50	10.0	58	2	NW	15	1021.0	16.7	37	1	WNW	24	1018.3
5	Sa	5.4	14.4	0			SW	43	13:58	9.3	78	6	WSW	22	1024.1	13.9	51	4	WSW	24	1021.9
6	Su	6.6	14.4	0			W	35	11:51	7.7	87	7	WNW	15	1021.6	12.2	81	6	WSW	19	1019.3
7	Mo	4.2	16.9	0.2			NNW	35	15:08	7.2	84	6	N	4	1019.8	16.1	44	1	NW	20	1015.7
8	Tu	7.2	17.6	0			NW	76	23:17	9.1	56	1	N	26	1011.8	17.1	27	1	N	30	1004.7
9	We	7.9	13.4	0.4			WNW	72	11:52	9.1	41	1	NW	37	1003.8	12.1	44	3	WNW	44	1005.2
10	Th	3.9	14.9	0.2			WSW	46	09:25	6.6	82	1	WSW	24	1017.1	13.7	48	4	WSW	28	1018.5
11	Fr	2.1	15.4	0			NW	39	12:45	4.5	83	2	NNW	19	1023.3	14.8	44	1	WNW	24	1021.1
12	Sa	4.5	13.7	0			S	39	14:51	9.2	74	6	WSW	22	1025.7	13.2	53	5	SSW	22	1025.3
13	Su	2.0	11.4	0			SE	35	12:05	5.1	74	2	ESE	22	1032.3	10.7	42	7	SE	20	1030.1
14	Mo	3.9	10.3	0			ESE	31	00:05	4.5	76	7	NE	17	1029.1	10.2	53	8	ENE	15	1023.5
15	Tu	4.4	12.7	0.6			N	41	11:20	7.2	97	8	NNE	15	1017.2	12.2	60	7	NW	19	1013.4
16	We	5.8	15.9	2.4			WNW	46	14:08	7.0	99	2	WNW	17	1017.8	15.1	55	6	WNW	28	1016.4
17	Th	6.6	15.1	0.2			WNW	57	15:40	8.6	80	1	W	26	1020.4	14.6	41	4	WNW	35	1018.4
18	Fr	2.7	12.5	0.4			SSW	46	10:31	4.1	93	1	SSW	22	1028.4	11.7	43	1	S	26	1027.3
19	Sa	2.6	12.7	0			S	26	13:29	5.1	84	5	SE	19	1031.2	11.7	47	6	SSE	17	1028.3
20	Su	4.6	14.8	0.2			E	24	07:08	5.8	97	6	ENE	11	1028.6	13.5	42	6	E	15	1024.3
21	Mo	5.9	18.1	0			NNE	28	11:03	9.7	61	5	NE	13	1024.6	17.2	35	1	NW	7	1021.4
22	Tu	6.6	18.8	0			ENE	20	16:20	10.1	63	0	ENE	13	1025.3	17.7	35	0	ENE	9	1022.5
23	We	8.6	18.5	0			NNE	46	23:19	9.3	71	8	NE	15	1021.4	17.5	35	7	NNE	20	1015.8
24	Th	6.3	17.7	0.4			WNW	52	14:01	10.9	58	1	NW	28	1013.5	17.2	49	2	WNW	31	1013.0
25	Fr	5.7	19.1	0.2			WNW	33	14:24	10.7	75	1	N	11	1021.5	18.5	39	3	NW	19	1019.9
26	Sa	7.1	18.7	0.2			W	28	14:32	9.8	86	1	SW	9	1028.5	17.5	45	2	WSW	17	1026.4
27	Su	6.8	19.8	0			WNW	35	12:12	11.3	69	1	N	11	1028.0	19.3	31	1	WNW	15	1024.0
28	Mo	10.5	21.7	0			NNW	46	10:36	13.1	42	1	NNW	26	1022.4	21.3	24	1	NW	22	1018.9
29	Tu	10.3	21.4	0			NW	54	13:01	13.0	63	4	NW	15	1021.1	20.8	29	1	WNW	31	1019.3
30	We	9.2	21.6	0			NNE	43	12:18	12.8	66	0	NW	17	1022.8	21.2	31	0	WNW	22	1018.7
31	Th	11.1	23.4	0			WNW	74	13:08	14.9	38	0	NNW	26	1014.0	22.5	21	0	NW	43	1008.1
Statistics for July 2014																					
Mean		5.9	16.4							8.7	73	3		17	1022.8	15.6	43	3		22	1020.0
Lowest		0.9	10.3	0						4.1	38	0	N	4	1003.8	10.2	21	0	NW	7	1004.7
Highest		11.1	23.4	2.4			NW	76		14.9	99	8	NW	37	1032.3	22.5	81	8	WNW	44	1030.4
Total				5.6																	

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	22/8/14	04/9/14	1/10/14
TEOM	Real time	1/8/14	1/10/14
Dust Deposition	22/8/14	04/9/14	1/10/14
Water	29/7/14	26/9/14	1/10/14
Blast Vibration and overpressure	Real Time	1/8/14	1/10/14

7 Correction Log for all Raw Data Records to 30th June 2014

Sample ID	Original Data			Corrected Data	Reason
EPL5	04/2011	Lead	0.008	0	Missing formula in this cell of the monitoring data spreadsheet.
EPL5	07/2011	Lead	0.013	0.0040	Missing formula in this cell of the monitoring data spreadsheet.
EPL5	11/2011	Lead	1.013	0.0062	Missing formula in this cell of the monitoring data spreadsheet.
EPL5	12/2011	Lead	0.059	0.0028	Missing formula in this cell of the monitoring data spreadsheet.
EPL8	10/2008	Lead	0.002	0.0032	Missing formula in this cell of the monitoring data spreadsheet.
EPL10	04/12/2010	TSP	NC	04/12/2010	Wrong date inserted, no change to values.
EPL10	10/12/2010	TSP	NC	10/12/2010	Wrong date inserted, no change to values.
EPL10	16/12/2010	TSP	NC	16/12/2010	Wrong date inserted, no change to values.
EPL10	22/12/2010	TSP	NC	22/12/2010	Wrong date inserted, no change to values.
EPL10	28/12/2010	TSP	NC	28/12/2010	Wrong date inserted, no change to values.
EPL10	31/10/2013	TSP	Missing	37.74	Data had the incorrect year of 2014 instead of 2013.
		Lead	Missing	0.119	
EPL10	30/11/2013	TSP	Missing	57.26	Data had the incorrect year of 2014 instead of 2013.
		Lead	Missing	0.292	
EPL11	27/06/2011	PM10	NC	29/06/2011	Wrong date inserted, no change to values.
EPL11	31/10/2013	PM10	Missing	14.464	Data had the incorrect year of 2014 instead of 2013.
		Lead	Missing	0.071	
EPL11	30/11/2013	PM10	Missing	36.31	Data had the incorrect year of 2014 instead of 2013.
		Lead	Missing	0.238	
EPL12	01/12/2013	PM10	NC	01/12/2012	Wrong date inserted, no change to values.
		Lead			
EPL12	07/12/2013	PM10	NC	07/12/2012	Wrong date inserted, no change to values.
		Lead			

Sample ID	Original Data		Corrected Data		Reason
EPL12	19/12/2013	PM10	NC	19/12/2012	Wrong date inserted, no change to values.
		Lead			
EPL12	25/12/2013	PM10	NC	25/12/2012	Wrong date inserted, no change to values.
		Lead			
EPL12	03/6/2013	PM10	4.35	11.43	Data for July was incorrectly used for June.
		Lead	0.52	0.6845	
EPL12	09/6/2013	PM10	3.21	5.2976	Data for July was incorrectly used for June.
		Lead	0.13	0.25	
EPL12	15/6/2013	PM10	5.36	2.8571	Data for July was incorrectly used for June.
		Lead	0.13	0.244	
EPL12	21/6/2013	PM10	3.87	3.0952	Data for July was incorrectly used for June.
		Lead	0.10	0.4762	
EPL12	27/6/2013	PM10	9.64	3.2738	Data for July was incorrectly used for June.
		Lead	0.10	0.25	
EPL12	31/10/2013	PM10	Missing	2.62	Data had the incorrect year of 2014 instead of 2013.
		Lead	Missing	0.066	Data had the incorrect year of 2014 instead of 2013.
EPL12	30/11/2013	PM10	Missing	55.95	Data had the incorrect year of 2014 instead of 2013.
		Lead	Missing	0.357	Data had the incorrect year of 2014 instead of 2013.
EPL12	06/03/2014	Lead	0.12	0.113	Formula in data sheet was calling column D instead of Column C when converting to µg/m3.
EPL12	12/03/2014	Lead	0.11	0.202	Formula in data sheet was calling column D instead of Column C when converting to µg/m3.
EPL12	18/03/2014	Lead	0.10	0.113	Formula in data sheet was calling column D instead of Column C when converting to µg/m3.
EPL12	24/03/2014	Lead	0.41	0.119	Formula in data sheet was calling column D instead of Column C when converting to µg/m3.
EPL12	30/03/2014	Lead	0.19	0.149	Formula in data sheet was calling column D instead of Column C when converting to µg/m3.

Data review completed by Pacific Environment September 2014.