

Monthly Environmental Data March 2016

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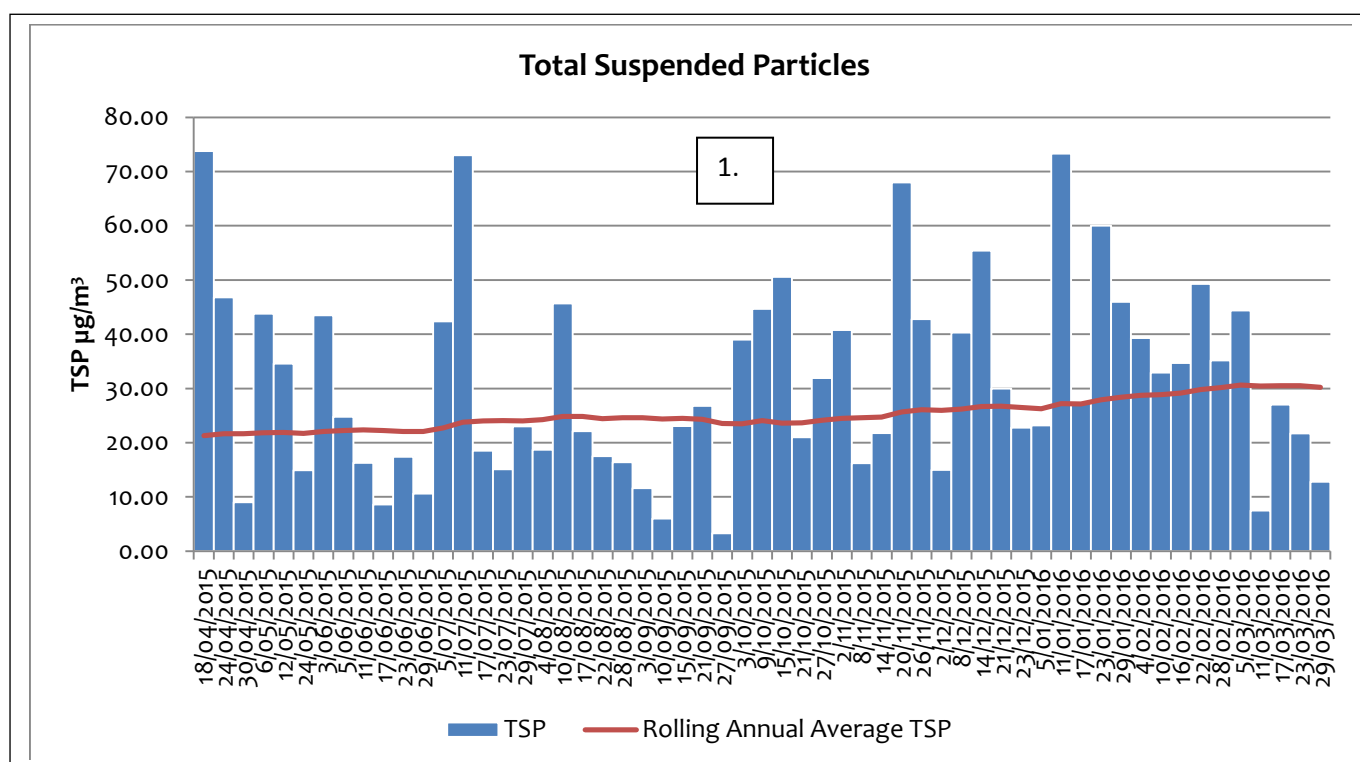
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1 Air Quality

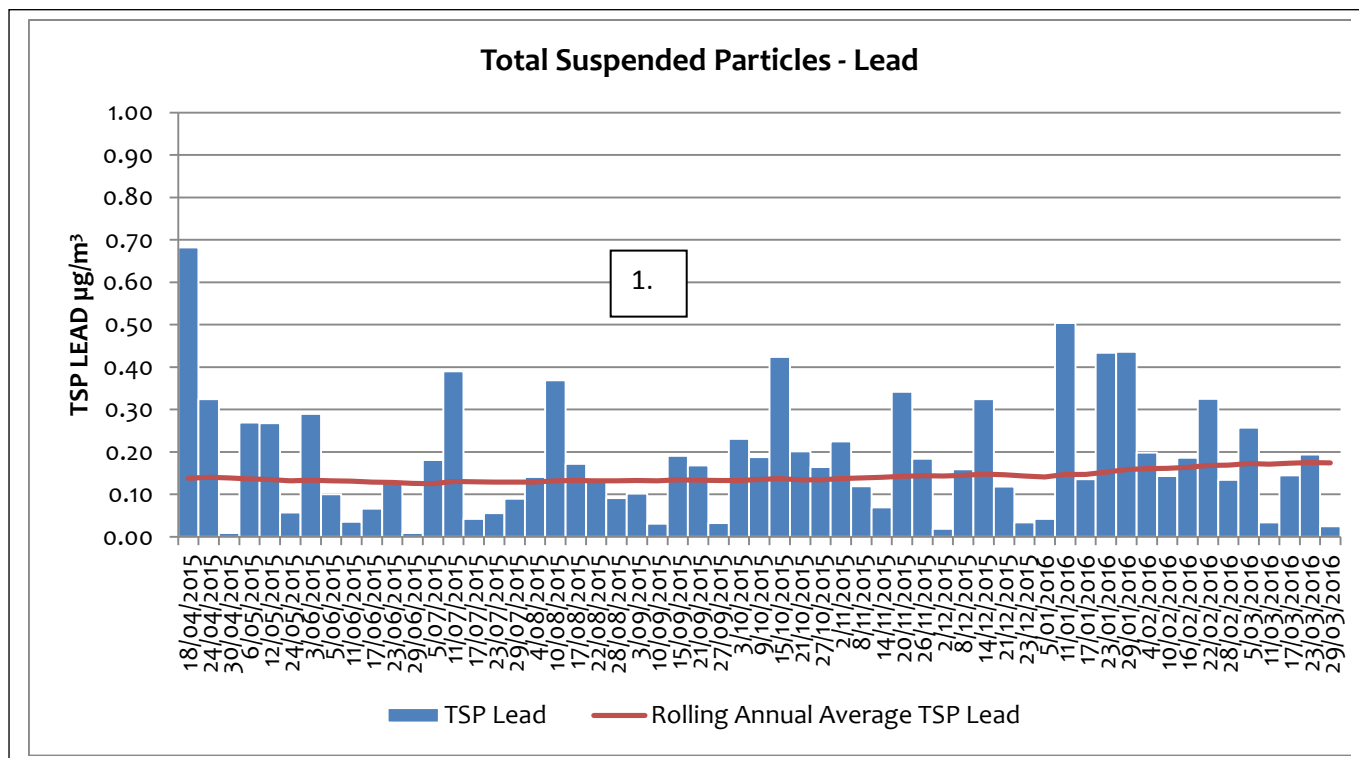
1.1 High Volume Air Samplers

EPL10 - SILVER TANK - ON SITE

DATE	TSP ($\mu\text{g}/\text{m}^3$)	Lead ($\mu\text{g}/\text{m}^3$)
5/03/2016	44.40	0.26
11/03/2016	7.50	0.03
17/03/2016	27.00	0.15
23/03/2016	21.70	0.19
29/03/2016	12.80	0.03



1. Spike on the 18th April 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. The spike on the 11th July also occurred when conditions were considered normal with 15km/h winds from a SE direction. Lab QC was okay, this may have been due to earthmoving activity (grading) in the local area. The spike on the 20th November coincides with 70kmh gusts coming from a westerly direction. On the 11th January gusts were recorded up to 65km/h in a WSW direction.

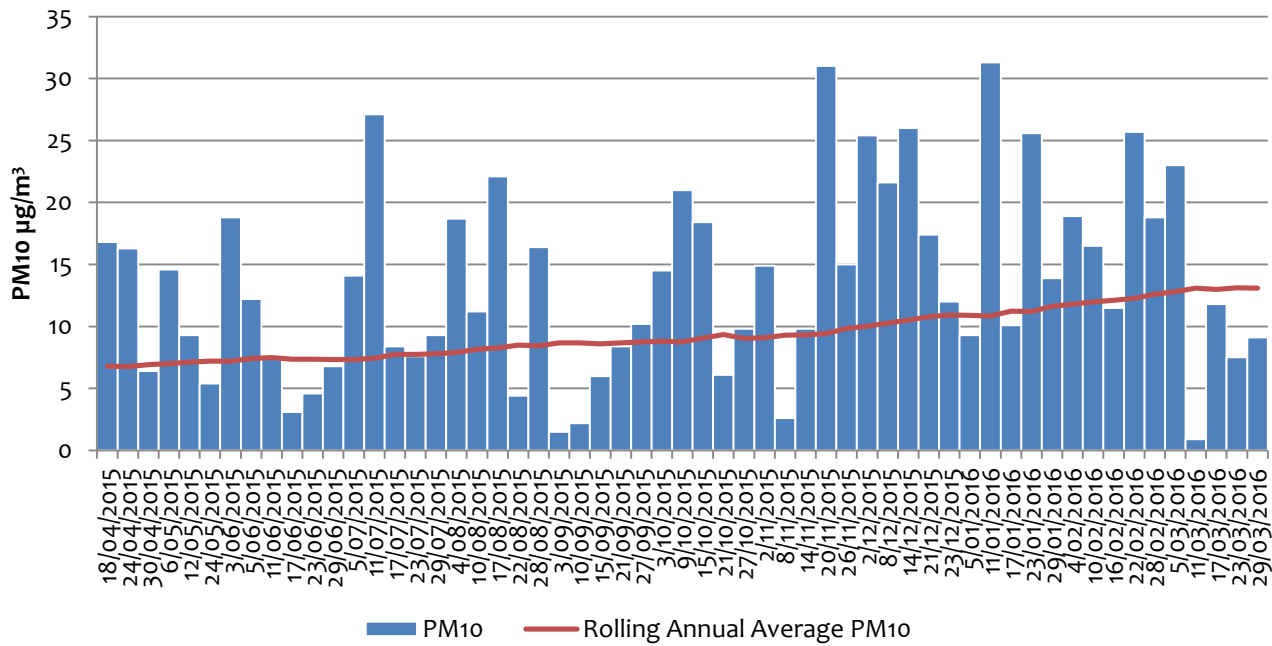


2. Spike on the 18th April was investigated. Lab QC was okay with no evidence of lab contamination. Wind conditions were not extraordinary and it rained. Field sampling methods have been checked to prevent any sample contamination.

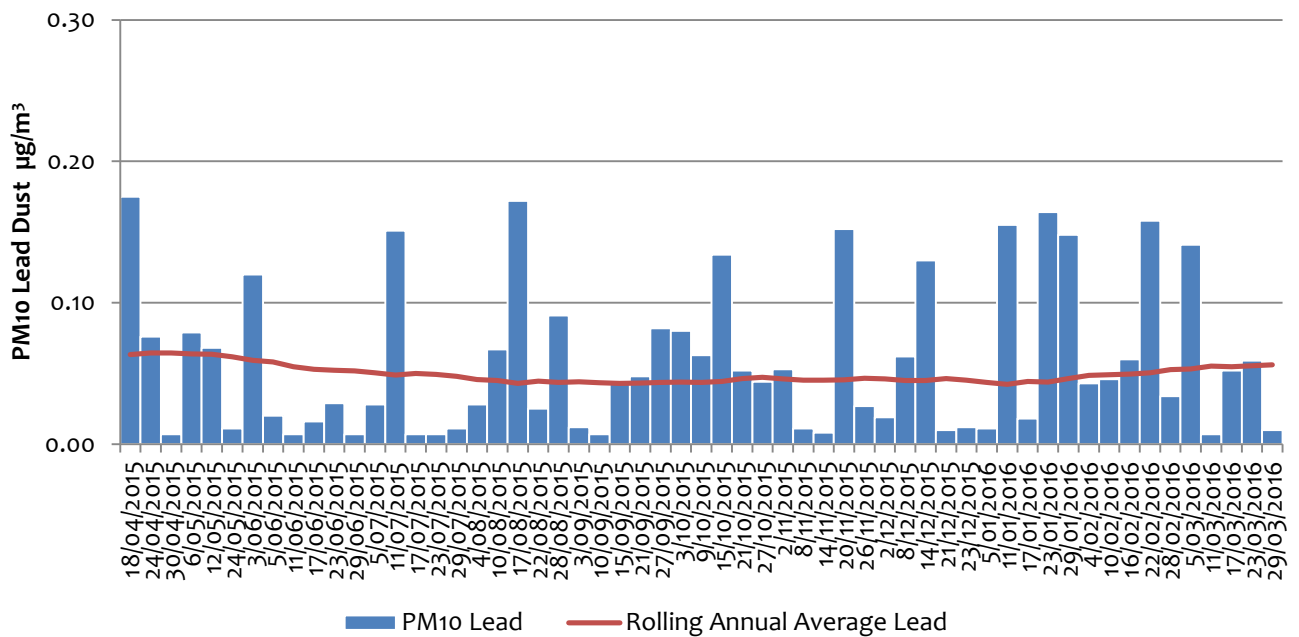
EPL11 - Silver Tank - On Site

DATE	PM10 ($\mu\text{g}/\text{m}^3$)	Lead ($\mu\text{g}/\text{m}^3$)
5/03/2016	23.00	0.14
11/03/2016	0.90	0.01
17/03/2016	11.80	0.05
23/03/2016	7.50	0.06
29/03/2016	9.10	0.01

PM10

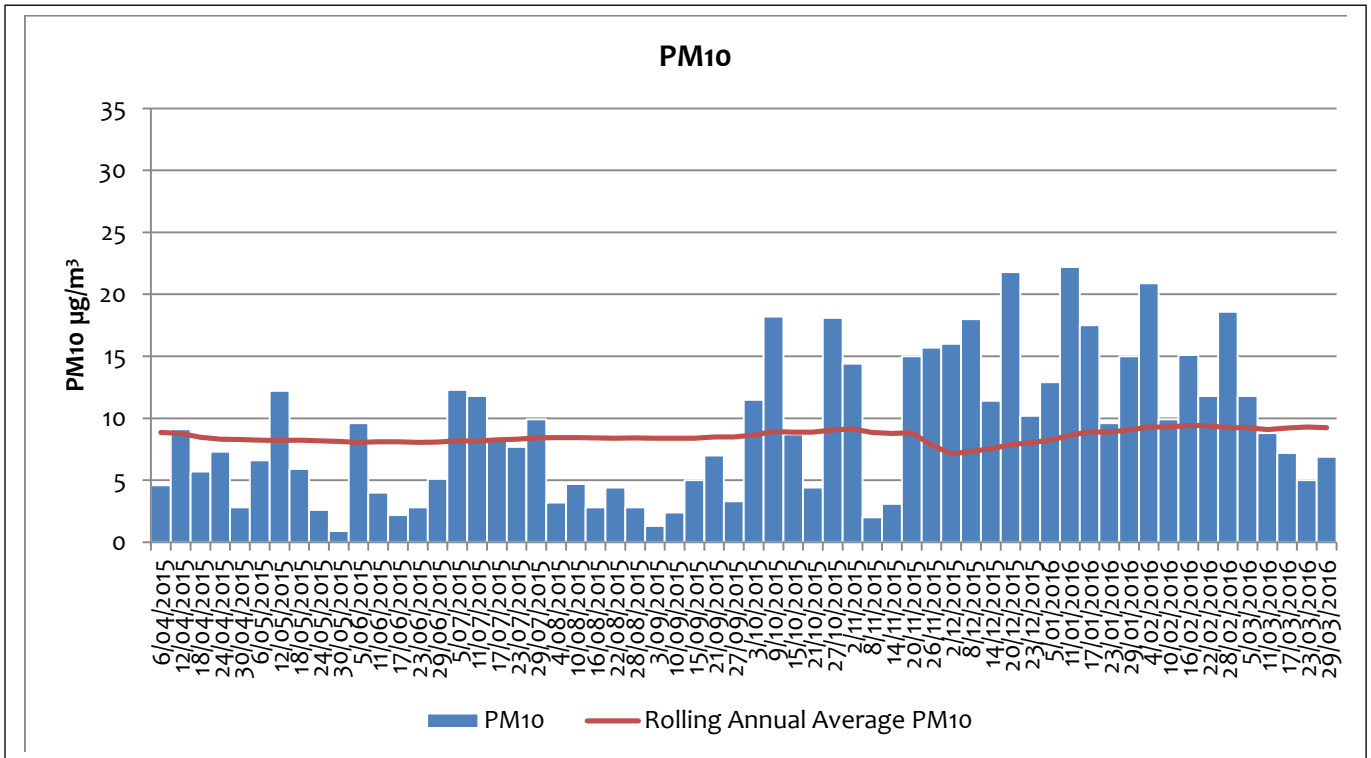


PM10 Lead

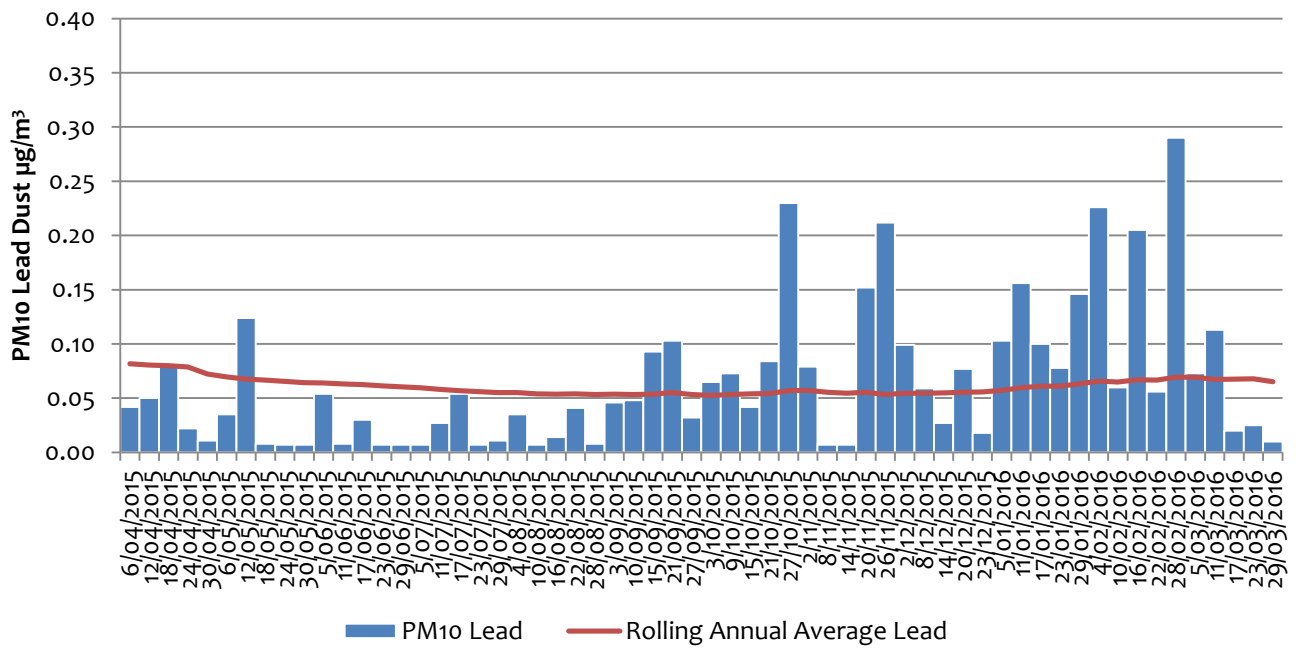


EPL12 - Blackwoods Pit – On Site

DATE	PM10 ($\mu\text{g}/\text{m}^3$)	Lead ($\mu\text{g}/\text{m}^3$)
5/03/2016	11.80	0.07
11/03/2016	8.80	0.11
17/03/2016	7.20	0.02
23/03/2016	5.00	0.03
29/03/2016	6.90	0.01



PM10 Lead

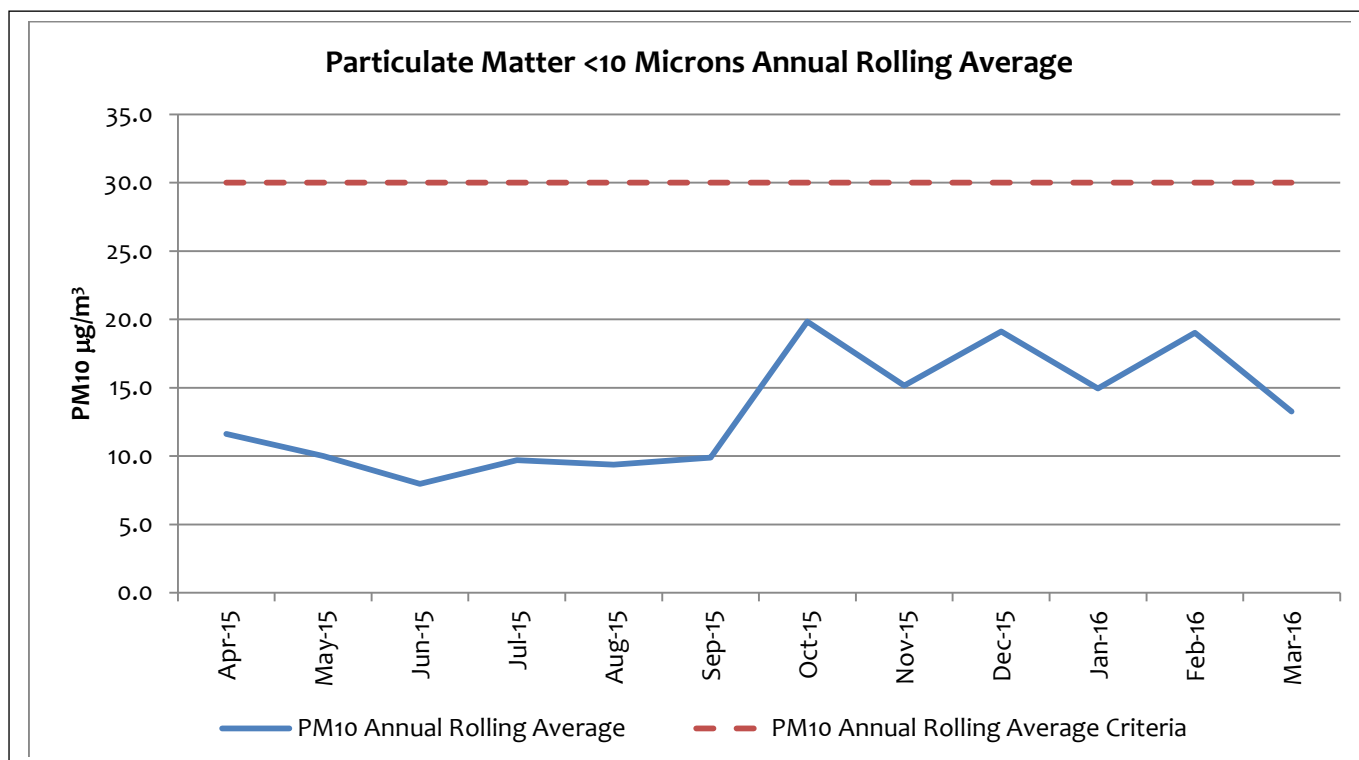
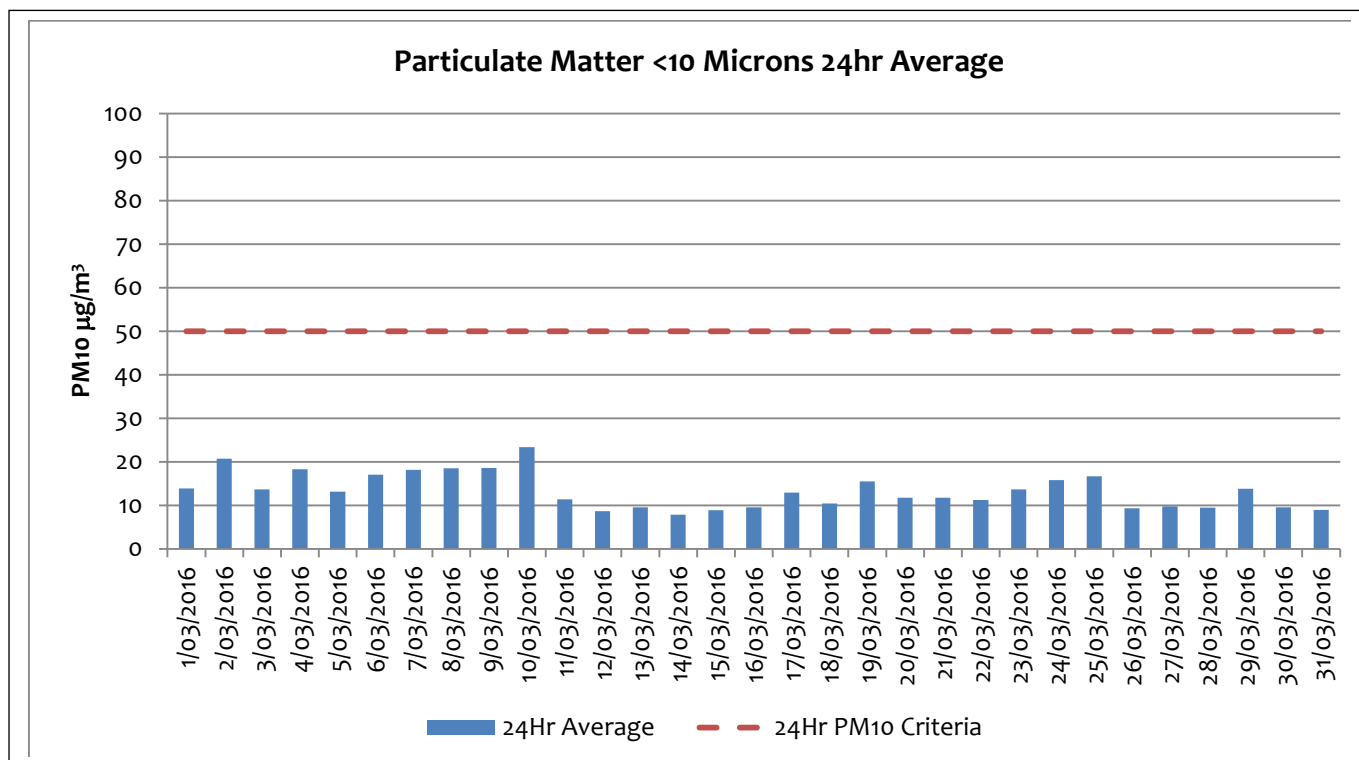


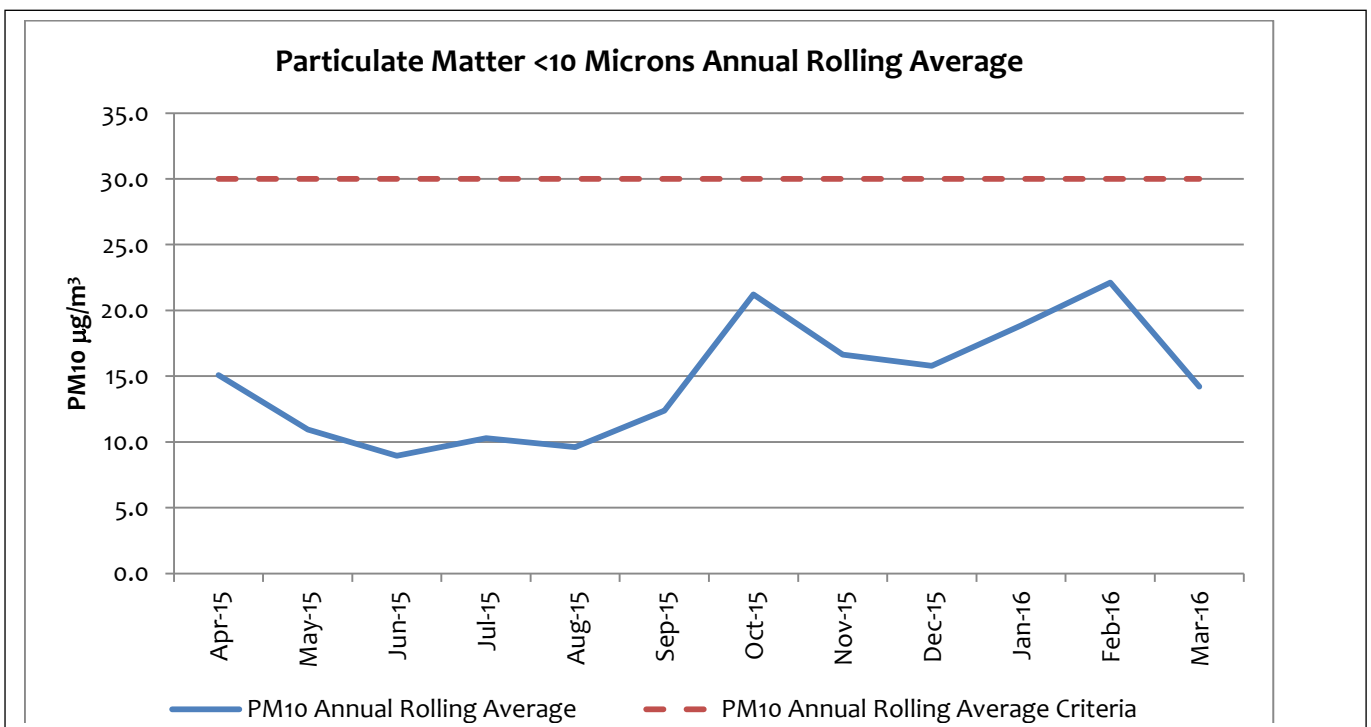
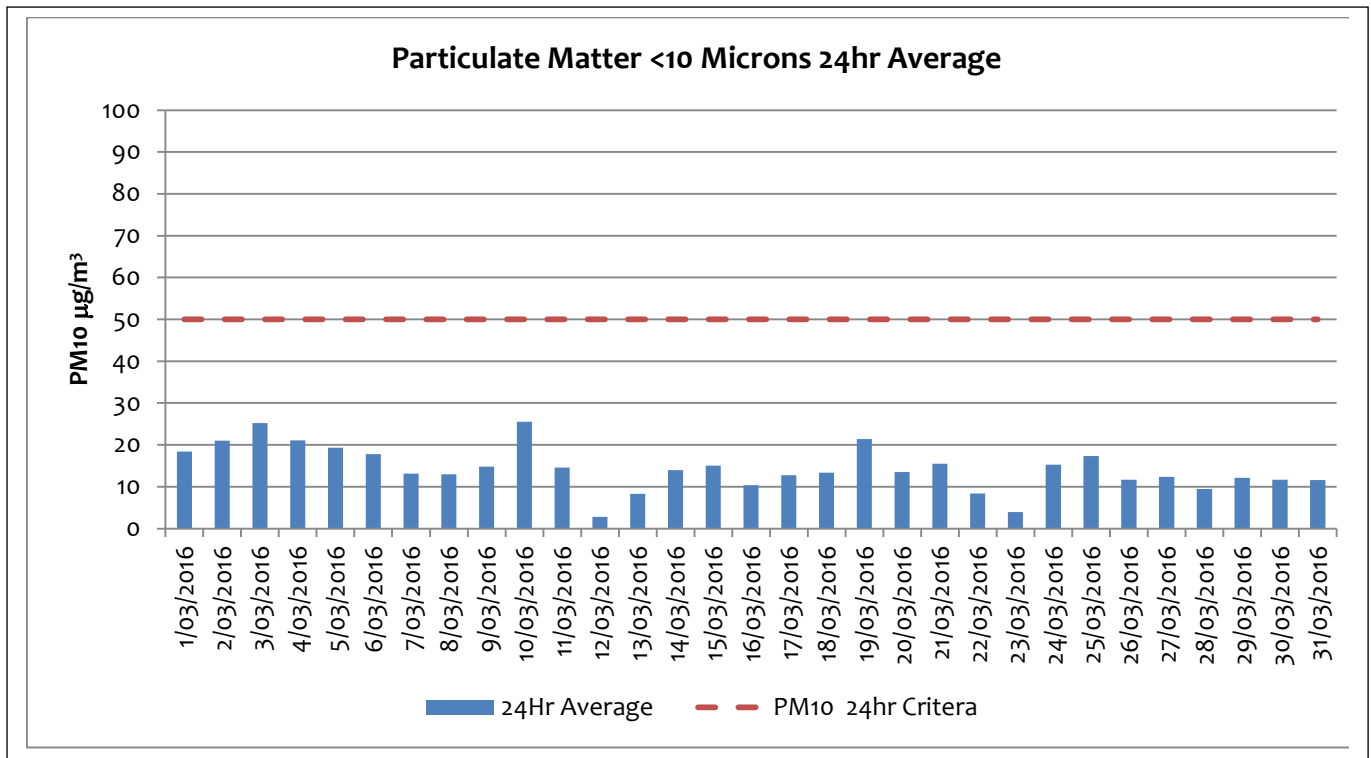
1.2 Tapered Element Oscillating Microbalance Sampling (TEOM)

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
1/03/16	13.89	18.37
2/03/16	20.70	20.98
3/03/16	13.61	25.20
4/03/16	18.26	21.08
5/03/16	13.12	19.30
6/03/16	17.02	17.83
7/03/16	18.09	13.16
8/03/16	18.51	12.97
9/03/16	18.55	14.78
10/03/16	23.38	25.52
11/03/16	11.35	14.58
12/03/16	8.67	2.77
13/03/16	9.55	8.31
14/03/16	7.81	13.98
15/03/16	8.85	15.06
16/03/16	9.55	10.39
17/03/16	12.90	12.73
18/03/16	10.41	13.35
19/03/16	15.51	21.43
20/03/16	11.71	13.52
21/03/16	11.70	15.51
22/03/16	11.23	8.36
23/03/16	13.65	3.98
24/03/16	15.75	15.30
25/03/16	16.63	17.31
26/03/16	9.30	11.68
27/03/16	9.72	12.40
28/03/16	9.43	9.44
29/03/16	13.80	12.17
30/03/16	9.50	11.68
31/03/16	8.97	11.62

PM10 $\mu\text{g}/\text{m}^3$ 12 Month Rolling Average												
	Apr-15	May-15	Jun-15	Jul-15	Aug-15	Sep-15	Oct-15	Nov-15	Dec-15	Jan-16	Feb-16	Mar-16
TEOM 1 EPL13 Essential Water Off Site	11.6	10.0	8.0	9.7	9.4	9.9	19.8	15.2	19.1	15.0	19.0	13.3
TEOM 2 EPL14 Blackwoods Pit On Site	15.1	10.9	9.0	10.3	9.6	12.4	21.2	16.6	15.8	18.8	22.1	14.2

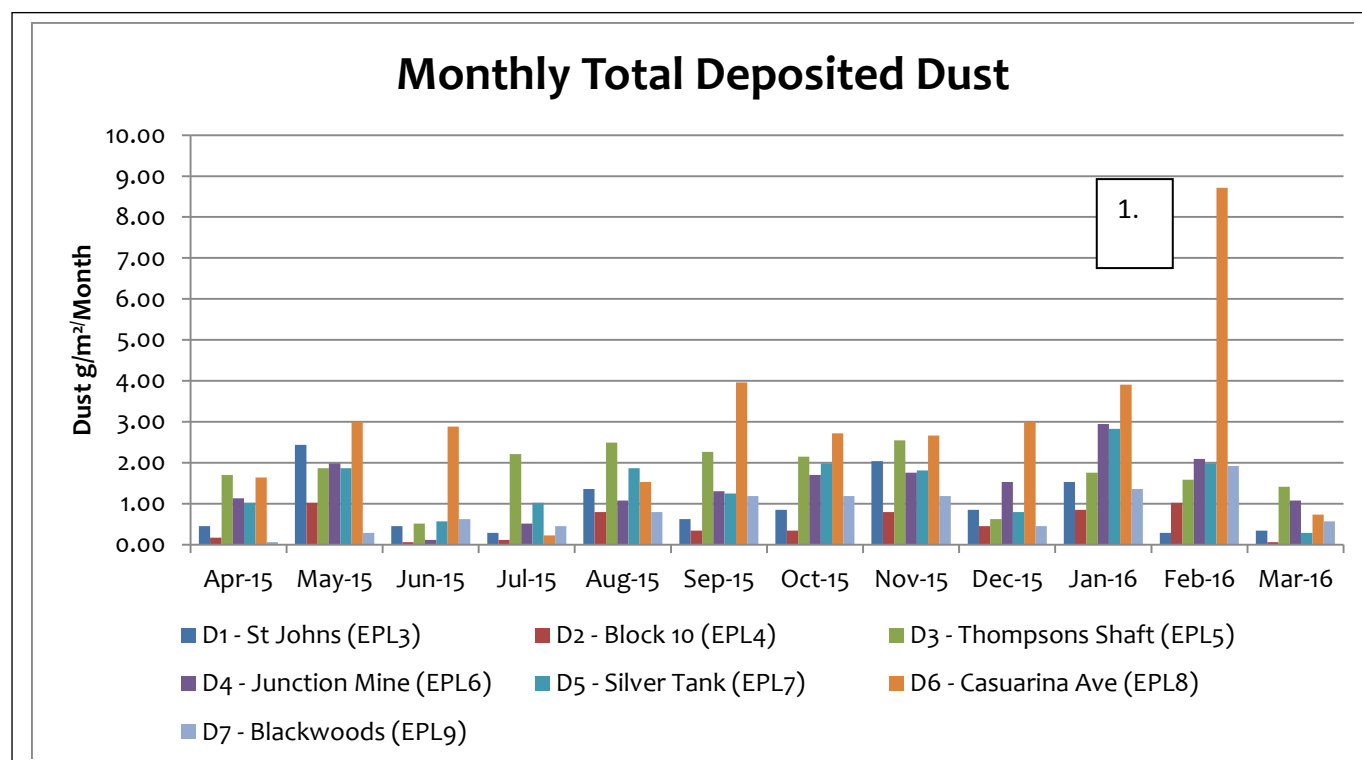
EPL13 – Essential Water – Off Site





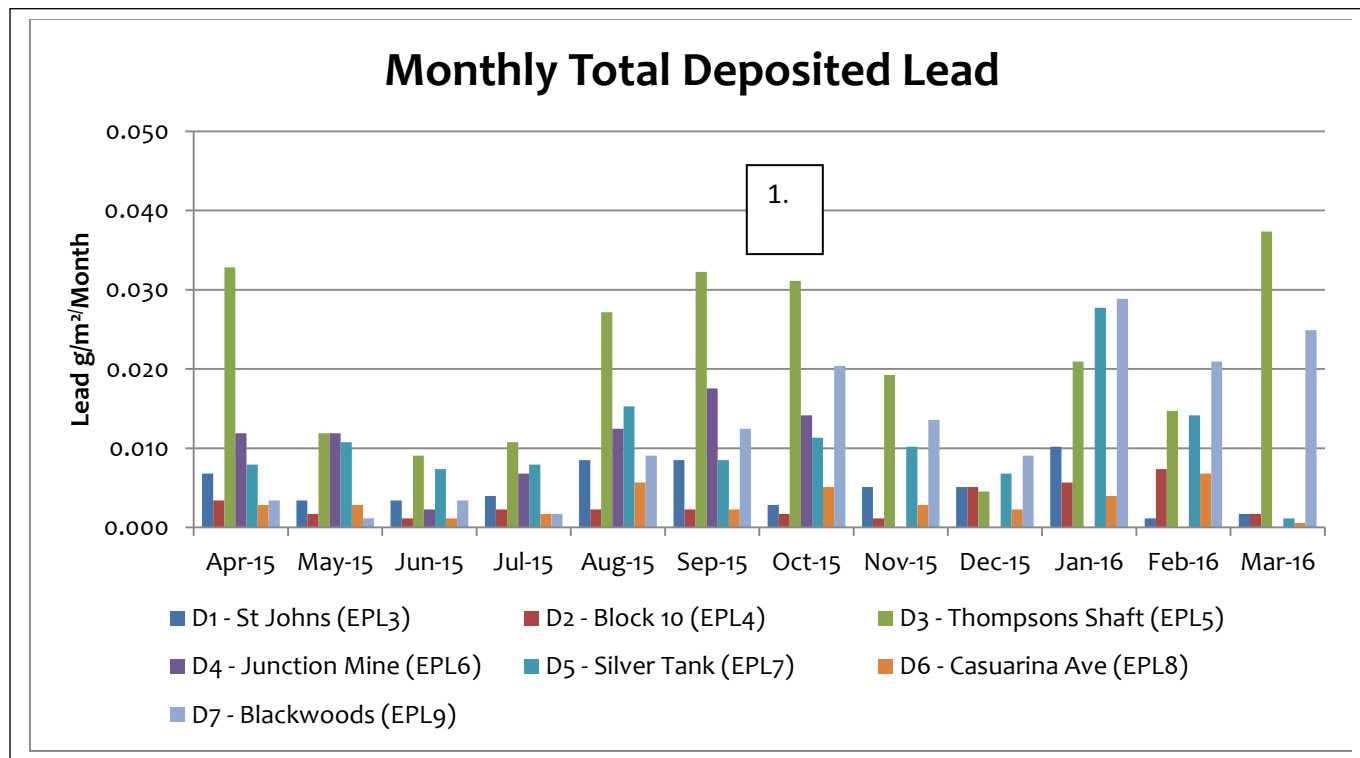
1.3 Dust Deposition Sampling

Total Deposited Dust (g/m ² /Month)							
Date	D1 (off site)	D2	D3	D4	D5	D6 (off site)	D7
March 2016	0.34	0.06	1.41	1.08	0.28	0.74	0.57
Background Average	4.0	3.1	4.3	5.7	n/a	5.8	n/a



1. When the sample was picked up the sample stand had been relocated within the back yard of the residence. The resident was asked to move the stand back to its original location. Contamination from a nearby greenhouse is suspected.

Total Deposited Lead (g/m ² /Month)							
Date	D1 (Off Site)	D2	D3	D4	D5	D6 (Off Site)	D7
March 2016	0.002	0.002	0.037	0.000	0.001	0.001	0.025
Background Average	0.0000	0.001	0.0018	0.0040	0.0010	0.0020	0.0100



1. Samples at Thompson's shaft spiked in lead concentration in April, August, September and again in March. Nearby vegetation and buildings have been identified as potential sources. Nearby vegetation was removed in September and October. A clean up of the haul road adjacent Thompsons shaft was carried out in September. The haul road will continue to be monitored. Further investigation is required with regard to nearby buildings, it is suspected the paint on the buildings contains lead and is in poor condition. There is also exposed remnant ore body at the surface in this location which may also contribute as a slightly higher than background influence. The dust bottle location was moved approximately 10m away from the buildings and has delivered a lower total deposited lead reading for December however levels are slightly higher again in January. Essential Water were performing earth works near the western boundary of the site during January which may have contributed in some way. Additionally some lead shipping containers were cleaned during January at the rail load out.

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 2016, therefore no calculation on percentage of blasts over 5mm/sec can be given (it is based on an annual calculation).

March Summary Block 7, Zinc Lode:

- 2 production firings
- 25 development firings
- 1 Blast recorded a ppv of >3mm/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

March Summary Rest of Mine, Western Mineralisation and Main Lode:

- 13 production firings
- 139 development firings
- 1 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

12 Month Summary Rest of Mine, Western Mineralisation and Main Lode:

- % of all blasts over 5mm/sec = **0.44%** (licence requirement <5%) calculated from 1st April 2015 until 31st March, 2016.

3 Noise

Quarterly noise monitoring is now complete as per the Pollution Reduction Program (PRP) on EPL 12559. Four noise assessments have been undertaken since November 2014. EMGA Mitchell McLennan Pty Limited (EMM) completed the analysis for all assessments.

A final summary report was produced by EMM for submission to the EPA. A licence variation was sought from the EPA and the PRP was removed from the licence on 18/3/2016.

Future noise monitoring will be undertaken as per the NSW Industrial Noise Policy.

4 Water

4.1 Ground Water Sampled 10/3/2016

		UG FEED	SHAFT 7
pH Value	pH Unit	6.65	6.85
Electrical Conductivity @ 25°C	μS/cm	9940	11800
Total Dissolved Solids @180°C	mg/L	10300	11300
Hydroxide Alkalinity as CaCO ₃	mg/L	<1	<1
Carbonate Alkalinity as CaCO ₃	mg/L	<1	<1
Bicarbonate Alkalinity as CaCO ₃	mg/L	22	28
Total Alkalinity as CaCO ₃	mg/L	22	28
Sulfate as SO ₄ - Turbidimetric	mg/L	5050	6390
Chloride	mg/L	1140	1370
Calcium	mg/L	504	549
Magnesium	mg/L	228	330
Sodium	mg/L	1270	1540
Cadmium	mg/L	2.63	2.8
Lead	mg/L	0.304	2.73
Manganese	mg/L	285	511
Zinc	mg/L	951	1210
Iron	mg/L	<0.05	<0.05

4.2 Surface Water

Insufficient rainfall for opportunistic surface water sampling during March 2016

Surface Water Table Nov 2015 to Nov 2016

EPA Identification Number	Frequency	Comment
EPL29 (Federation Way culvert)	2 x Per year when contains water	No sample - dry
EPL30	Sample point removed from licence	
EPL31 (Ryan Street Dam)	2 x Per year when contains water	No sample - dry
EPL32 (S1-A)	2 x Per year when contains water	No sample - dry
EPL33 (Horwood Dam)	2 x Per year when contains water	No sample – low water
EPL34 (Upstream Bonanza St)	2 x Per year when contains water	No sample - dry
EPL35 (Downstream Sydney Rd)	2 x Per year when contains water	No sample - dry

5 Weather Data

BHOP – Automatic Weather Station was unavailable for June. The new weather station was installed on June 15. The weather station continuously monitors the following parameters as per point 55 of the Environmental Protection Licence.

POINT 55

Parameter	Sampling method	Units of measure	Averaging period	Frequency
Temperature at 10 metres	AM-4	degrees Celsius	15 minutes	Continuous
Wind Direction at 10 metres	AM-4	Degrees in a clockwise direction from True North	15 minutes	Continuous
Wind Speed at 10 metres	AM-4	metres per second	15 minutes	Continuous
Rainfall	AM-4	millimetres	1 hour	Continuous
Sigma theta	AM-2 & AM-4	Degrees	15 minutes	Continuous

The continuous data can be viewed at any time at the following web site using the username and password.

www.loggermonitor.com/login

user: CBHAdmin

pass: brokenhill

Summary reports for all licence parameters are available from the website however due to the 15 minute data being very large daily summary data was also obtained from the Bureau of Meteorology Broken Hill on the following page:

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	Mo						SW	43	14:13				NNE	4	1006.7				WSW	28	1003.7
2	Tu						NNE	61	07:59				NNE	39	1001.4				NW	37	998.7
3	We						SSW	69	07:37				SSW	46	1007.9				SSW	41	1008.7
4	Th						S	57	14:53				S	39	1014.2				S	33	1011.1
5	Fr						SE	63	12:03				SE	30	1013.1				SE	33	1010.2
6	Sa						SE	39	12:40				E	26	1012.6				ESE	24	1010.1
7	Su						S	50	15:21				SSW	15	1014.8				SE	22	1012.9
8	Mo						SSE	50	16:47				SSW	26	1018.3				S	26	1015.3
9	Tu						ESE	35	14:07				S	22	1017.2				SSE	20	1013.7
10	We						SSW	41	13:19				N	9	1013.0				SW	24	1009.5
11	Th						S	39	10:31				S	20	1011.6				E	13	1008.8
12	Fr						S	35	17:42				SSW	20	1012.9				ESE	9	1009.3
13	Sa						S	48	21:42				SSW	11	1010.9				SSW	22	1007.9
14	Su						S	48	00:28				SSE	26	1012.9				S	33	1010.2
15	Mo						SW	43	14:01				S	26	1014.7				SW	22	1011.9
16	Tu						S	70	13:54				SSW	31	1016.2				SSW	31	1013.9
17	We						SSW	52	15:45				SSE	26	1016.5				S	26	1012.8
18	Th						SSW	33	13:40				S	19	1012.2				W	11	1008.9
19	Fr						SSE	41	21:49				S	19	1012.7				NW	20	1010.4
20	Sa						SSE	44	09:30				SSE	31	1019.0				SE	20	1017.3
21	Su						E	39	08:21				E	24	1020.7				E	9	1017.1
22	Mo						N	43	11:01				NE	26	1018.6				N	17	1015.8
23	Tu						N	48	08:21				N	26	1014.8				N	17	1011.6
24	We						NNW	56	14:58				NNW	9	1010.2				NNW	33	1006.8
25	Th						SSW	52	20:01				S	20	1012.3				SW	17	1011.3
26	Fr						S	50	01:53				S	33	1019.1				SSW	26	1016.5
27	Sa						SSE	41	11:03				S	28	1019.9				SSE	24	1016.4
28	Su						SSE	54	12:59				S	30	1019.0				SSE	30	1016.0
29	Mo						SSE	39	10:52				S	24	1019.0				SSE	22	1015.7
Statistics for February 2016																					
Mean														24	1014.2					23	1011.5
Lowest													NNE	4	1001.4				#	9	998.7
Highest							S	70					SSW	46	1020.7				SSW	41	1017.3
Total																					

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	2/3/2016	1/3/2016	26/4/2016
TEOM	Real time	-	26/4/2016
Dust Deposition	11/3/2016	18/3/2016	26/4/2016
Water	11/2/2016 & 25/2/2016	17/2/2016 & 2/3/2016	26/4/2016
Blast Vibration and overpressure	Real Time	-	26/4/2016

7 Correction Log March 2016

Averaging period of data for hi vol rolling average was at 62 data points rather than 60. This has been corrected.

8 Attachments

Field monitoring data for March has been entered in to google forms. There are no attachments.