

Monthly Environmental Data December 2015

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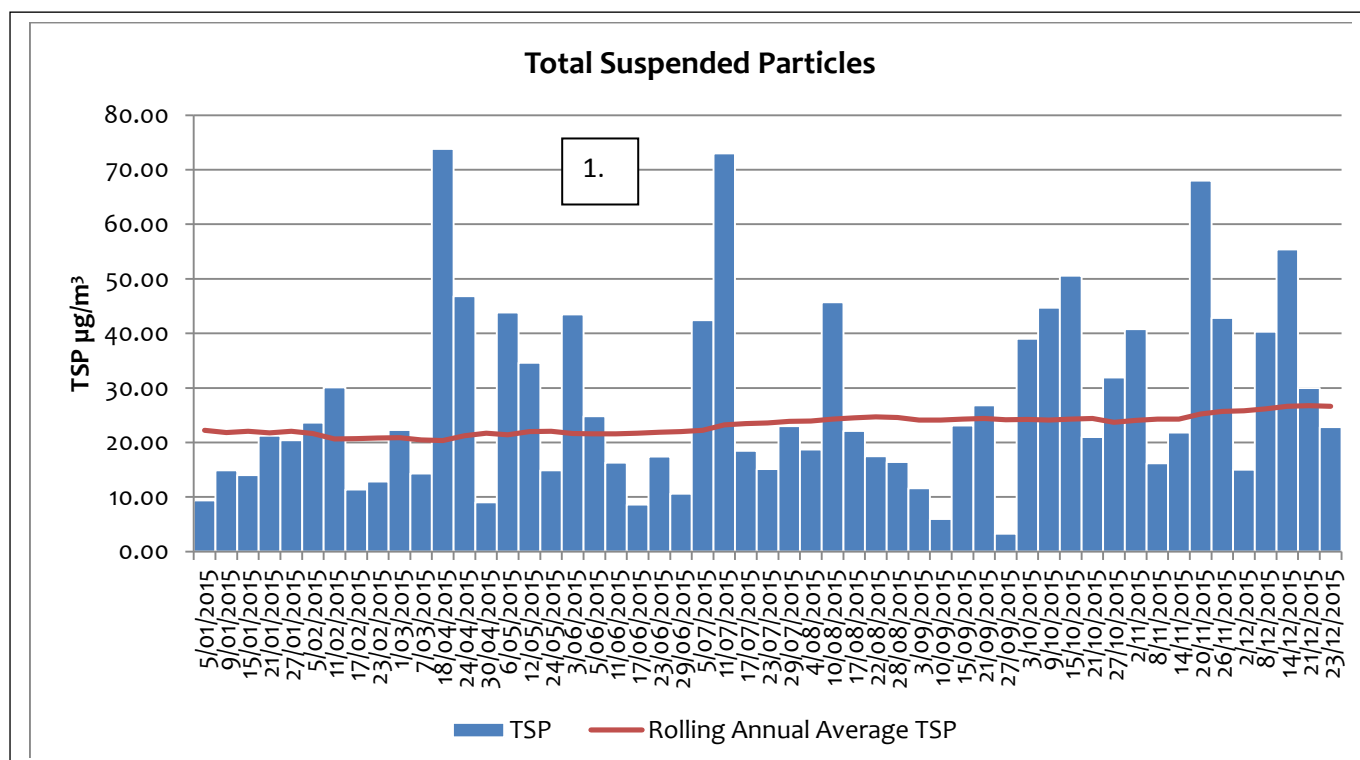
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1 Air Quality

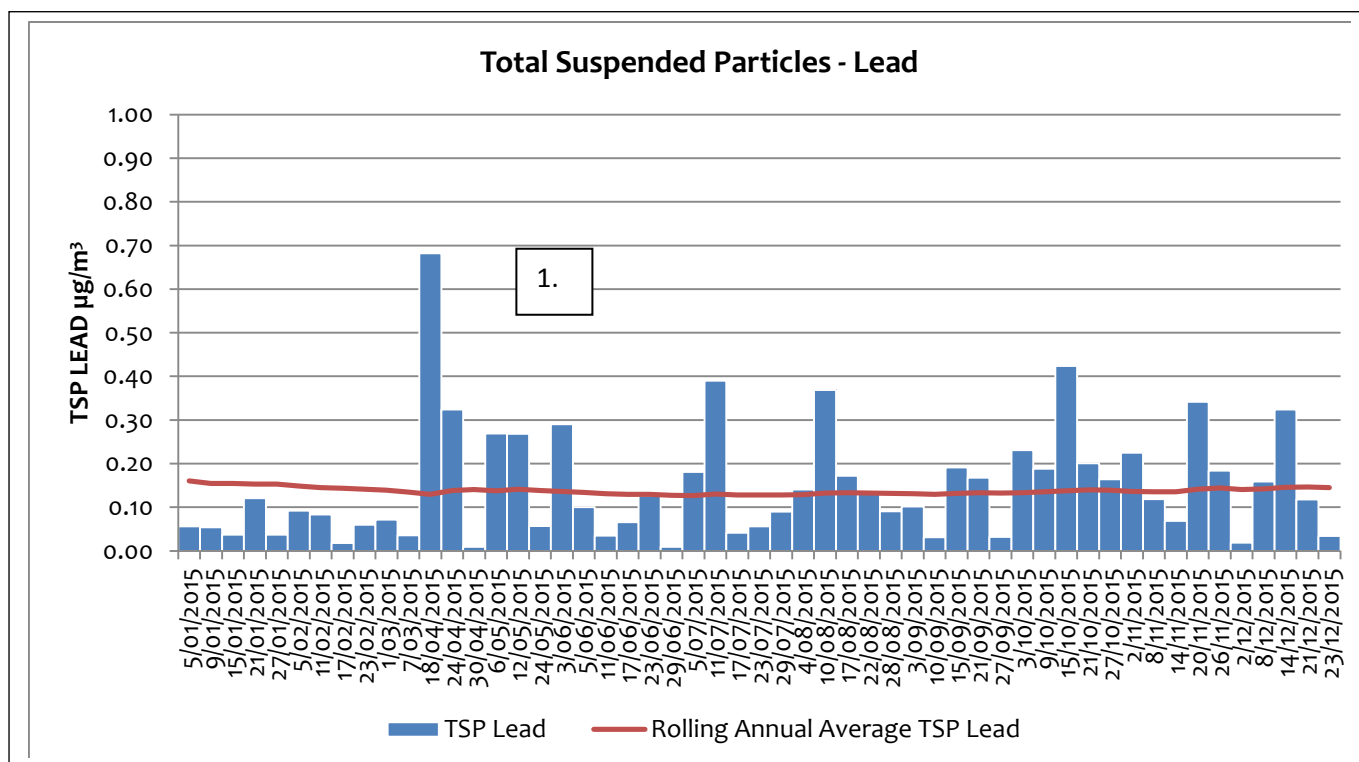
1.1 High Volume Air Samplers

EPL10 - SILVER TANK - ON SITE

DATE	TSP ($\mu\text{g}/\text{m}^3$)	Lead ($\mu\text{g}/\text{m}^3$)
2/12/2015	15.00	0.02
8/12/2015	40.30	0.16
14/12/2015	55.40	0.32
21/12/2015	30.00	0.12
23/12/2015	22.80	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.

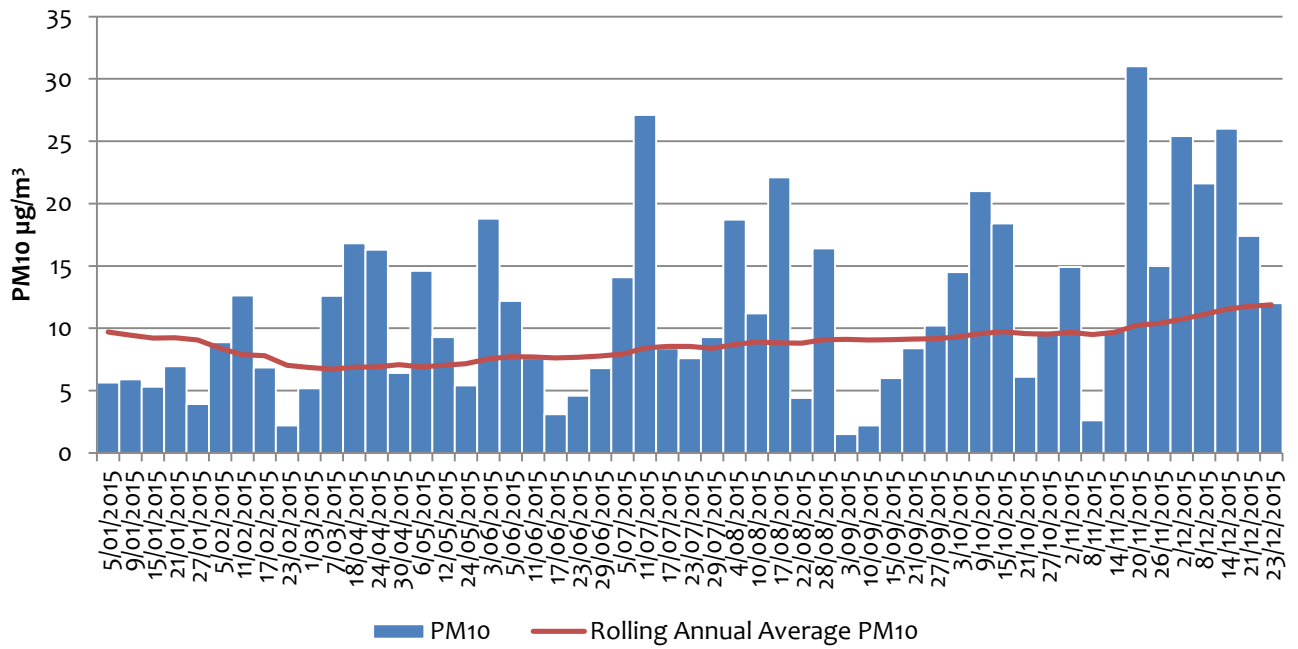


2. Spike on the 18th April was investigated. Lab QC was okay with no evidence of lab contamination. Wind conditions were not extraordinary and it rained. Field sampling methods have been checked to prevent any sample contamination.

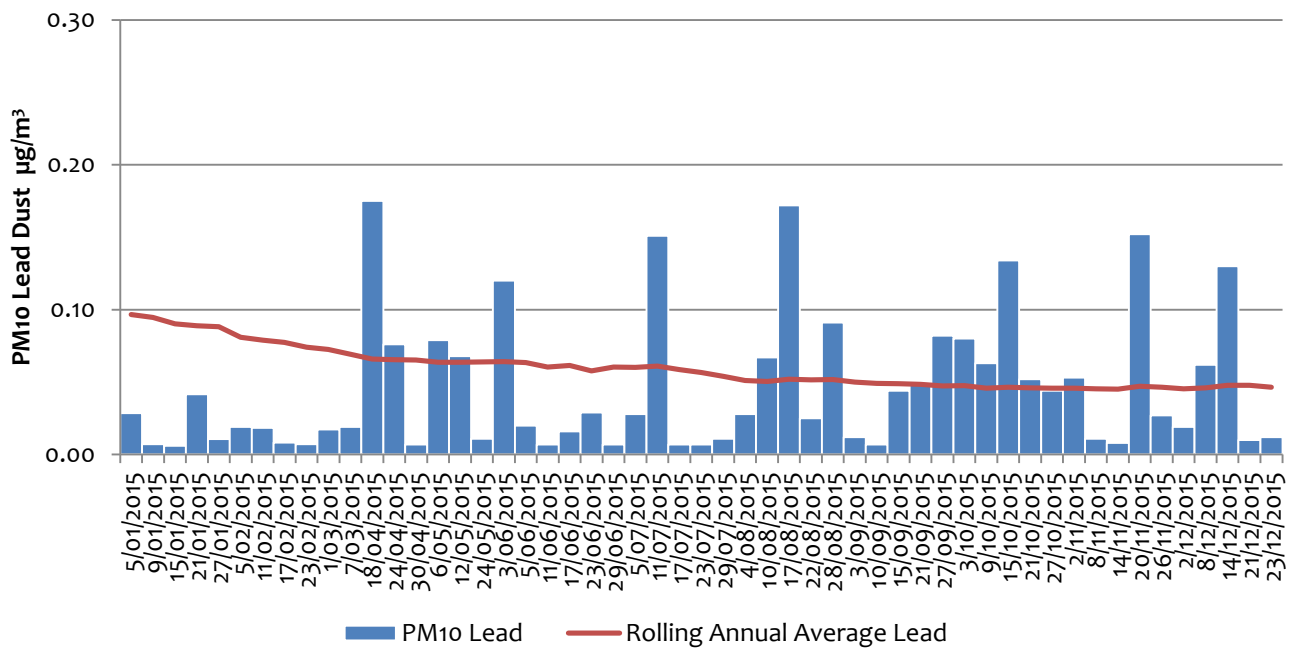
EPL11 - Silver Tank - On Site

DATE	PM10 (µg/m ³)	Lead (µg/m ³)
2/12/2015	25.40	0.02
8/12/2015	21.60	0.06
14/12/2015	26.00	0.13
21/12/2015	17.40	0.01
23/12/2015	12.00	0.01

PM10

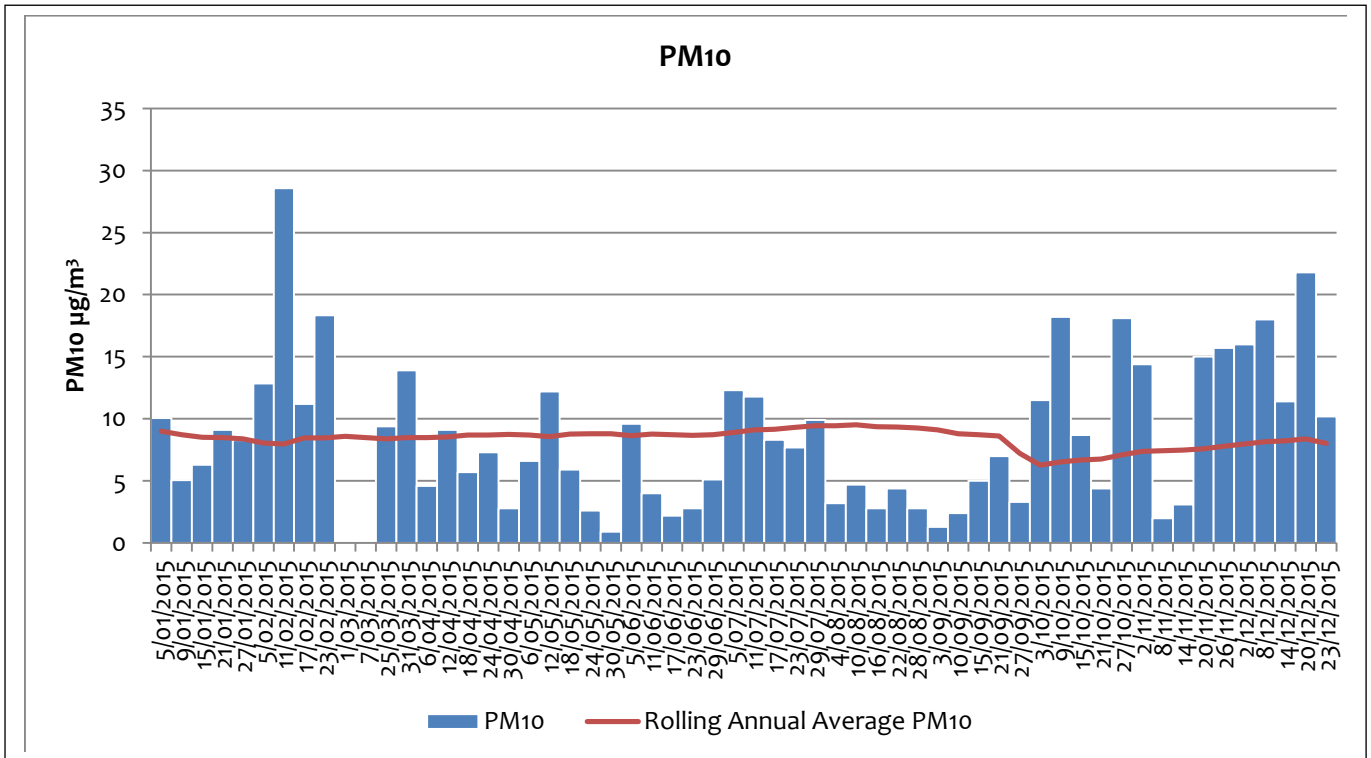


PM10 Lead

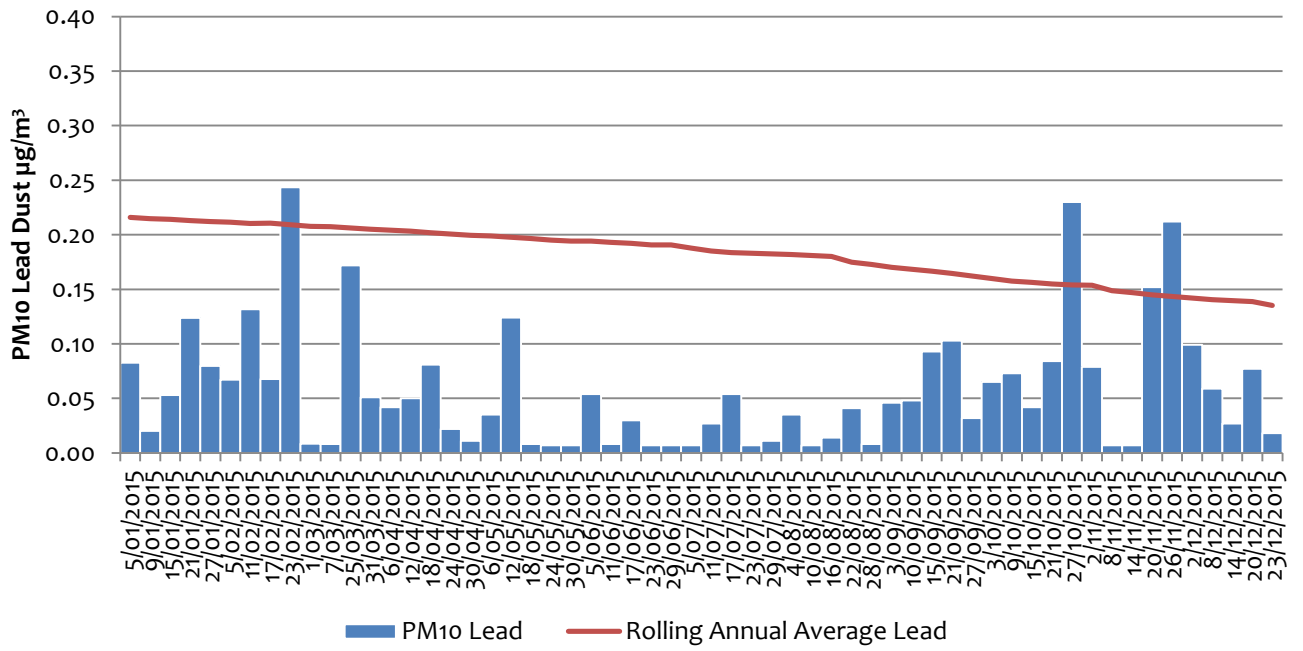


EPL12 - Blackwoods Pit – On Site

DATE	PM10 ($\mu\text{g}/\text{m}^3$)	Lead ($\mu\text{g}/\text{m}^3$)
2/12/2015	16.00	0.10
8/12/2015	18.00	0.06
14/12/2015	11.40	0.03
20/12/2015	21.80	0.08
23/12/2015	10.20	0.02



PM10 Lead

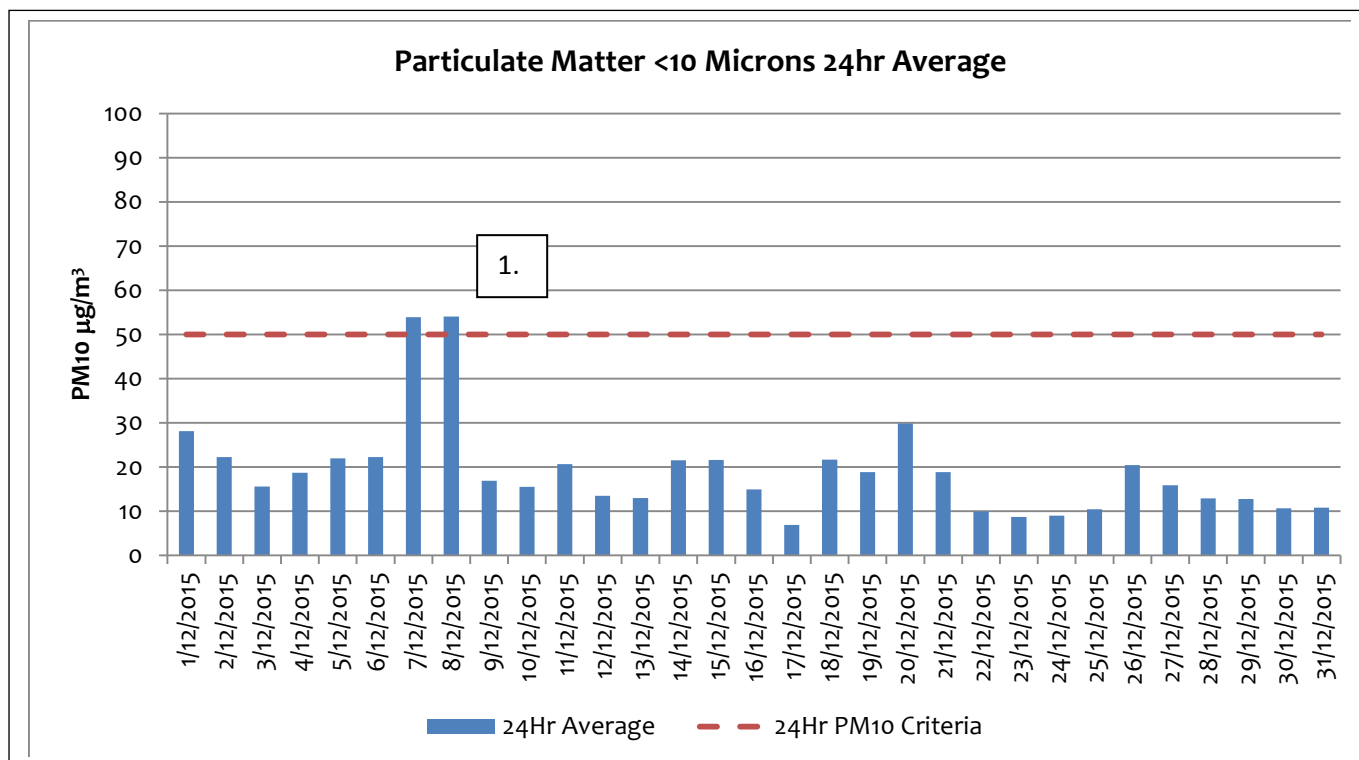


1.2 Tapered Element Oscillating Microbalance Sampling (TEOM)

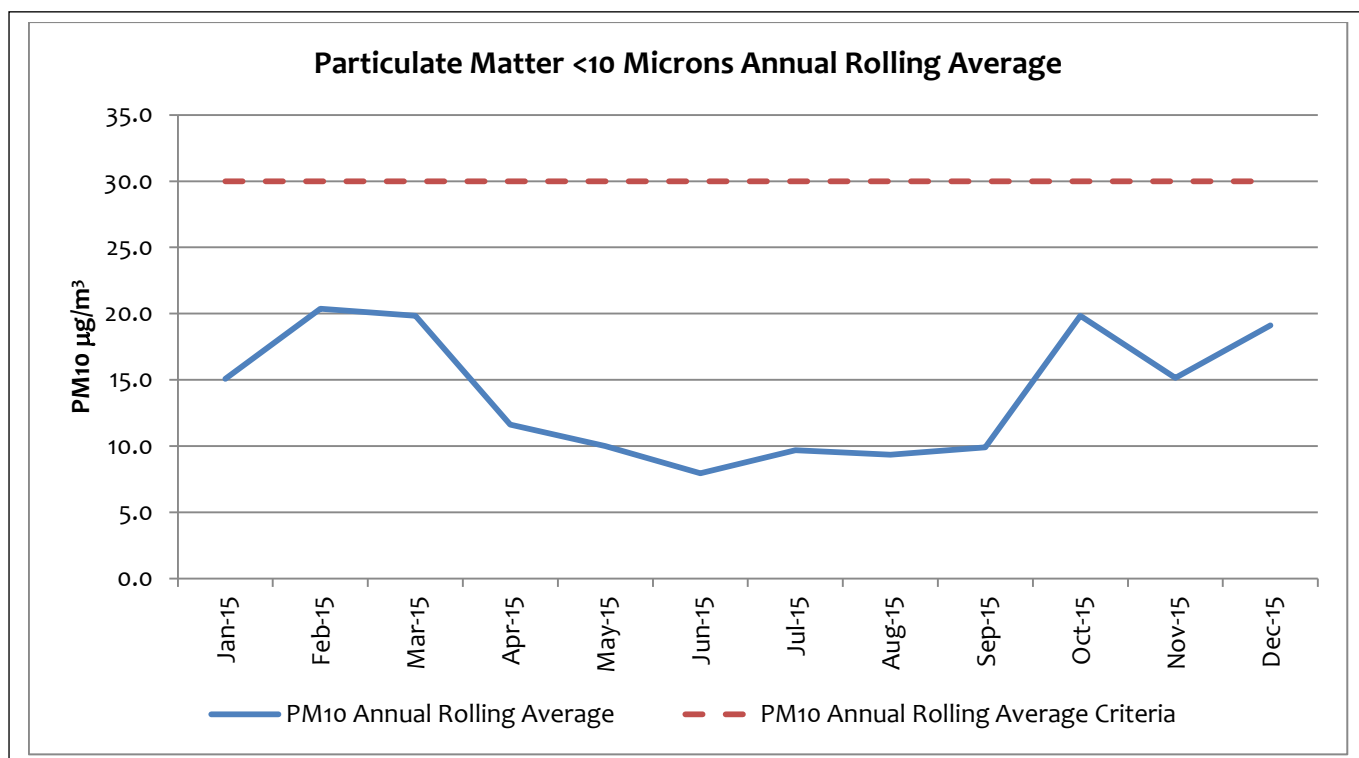
Particulate Matter <10 Microns 24Hr Average		
Date	TEOM 1 - EPL 13 ($\mu\text{g}/\text{m}^3$) Essential Water – Off Site	TEOM 2 – EPL 14 ($\mu\text{g}/\text{m}^3$) Blackwoods Pit – On Site
1/12/2015	28.16	27.73
2/12/2015	22.24	5.54
3/12/2015	15.63	22.31
4/12/2015	18.73	18.13
5/12/2015	21.98	3.54
6/12/2015	22.27	23.39
7/12/2015	53.88	2.07
8/12/2015	54.04	0.21
9/12/2015	16.92	19.19
10/12/2015	15.55	18.10
11/12/2015	20.66	25.48
12/12/2015	13.46	17.36
13/12/2015	12.97	13.49
14/12/2015	21.57	15.53
15/12/2015	21.60	24.54
16/12/2015	14.96	22.34
17/12/2015	6.90	6.94
18/12/2015	21.69	25.38
19/12/2015	18.88	16.31
20/12/2015	29.86	27.81
20/12/2015	18.84	19.58
22/12/2015	9.93	11.46
23/12/2015	8.72	13.40
24/12/2015	8.98	12.61
25/12/2015	10.47	11.06
26/12/2015	20.42	24.24
27/12/2015	15.88	23.62
28/12/2015	12.89	14.95
29/12/2015	12.80	13.59
30/12/2015	10.69	10.43
31/12/2015	10.80	10.64

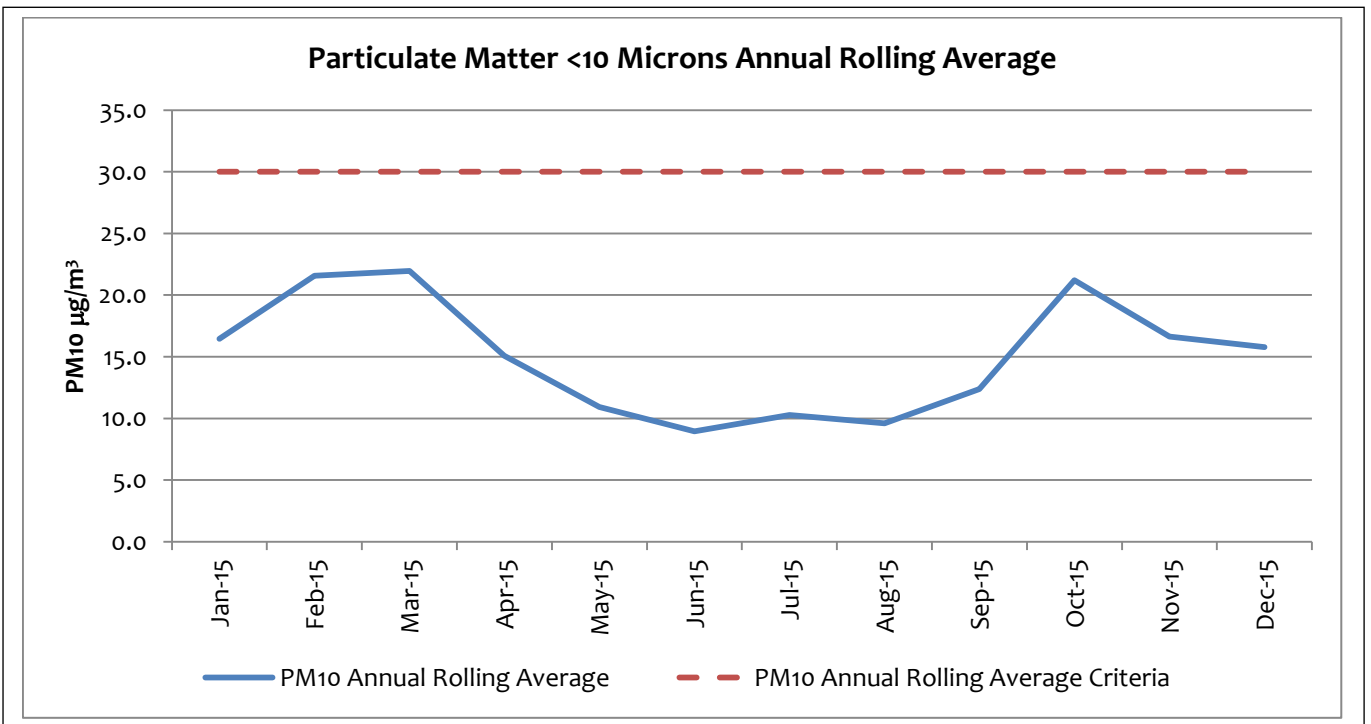
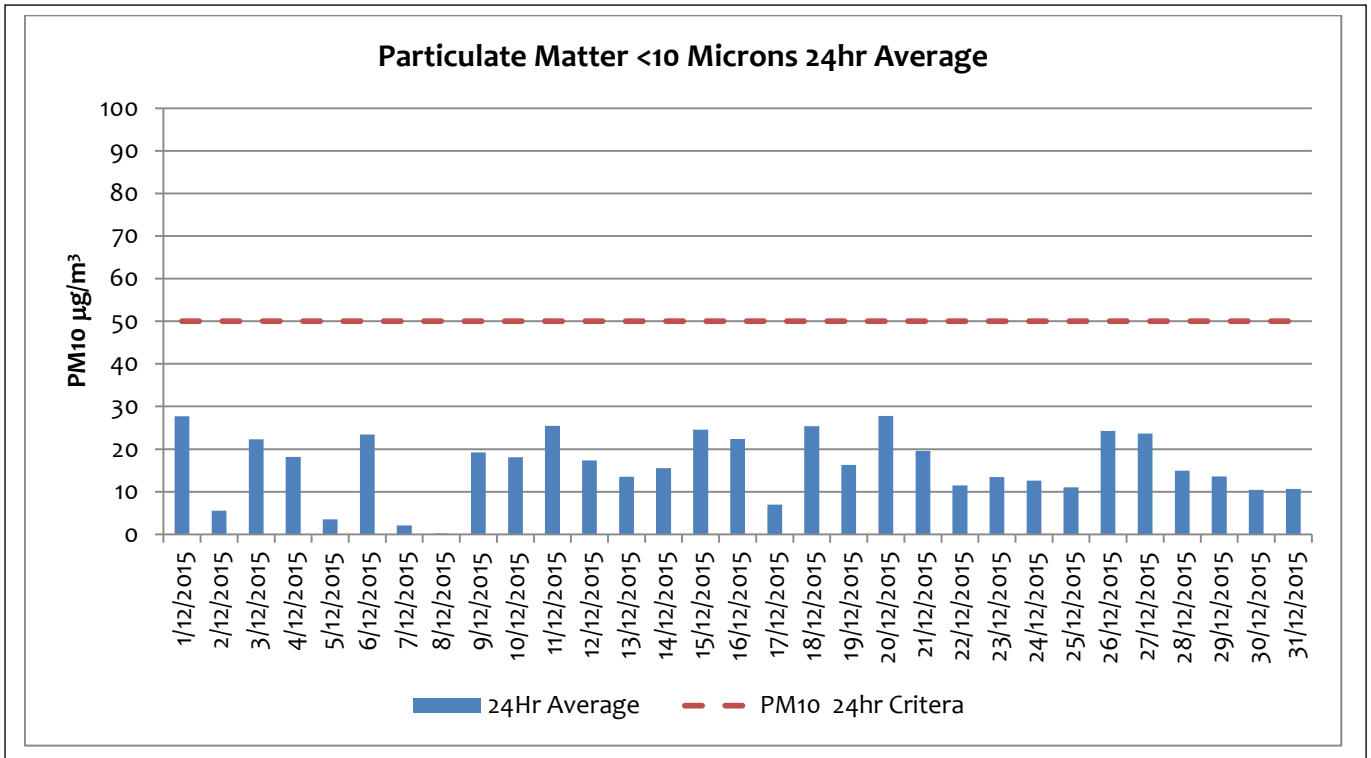
PM10 $\mu\text{g}/\text{m}^3$ 12 Month Rolling Average												
	Jan-15	Feb-15	Mar-15	Apr-15	May-15	Jun-15	Jul-15	Aug-15	Sep-15	Oct-15	Nov-15	Dec-15
TEOM 1 EPL13 Essential Water Off Site	15.1	20.4	19.8	11.6	10.0	8.0	9.7	9.4	9.9	19.8	15.2	19.1
TEOM 2 EPL14 Blackwoods Pit On Site	16.5	21.6	22.0	15.1	10.9	9.0	10.3	9.6	12.4	21.2	16.6	15.8

EPL13 – Essential Water – Off Site



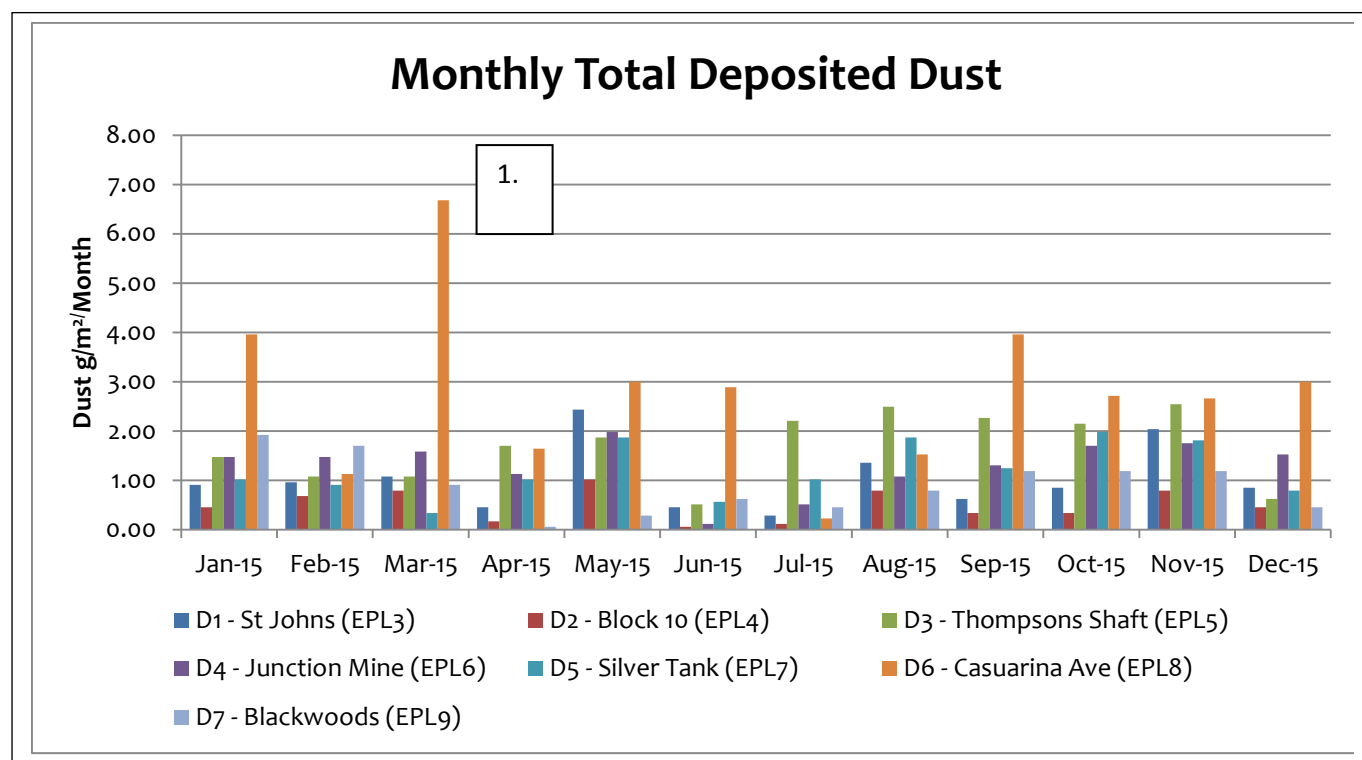
1. High winds from a North West and Westerly direction were recorded on December 7 and 8. External sources including the neighbouring quarry are likely to have influenced the result.





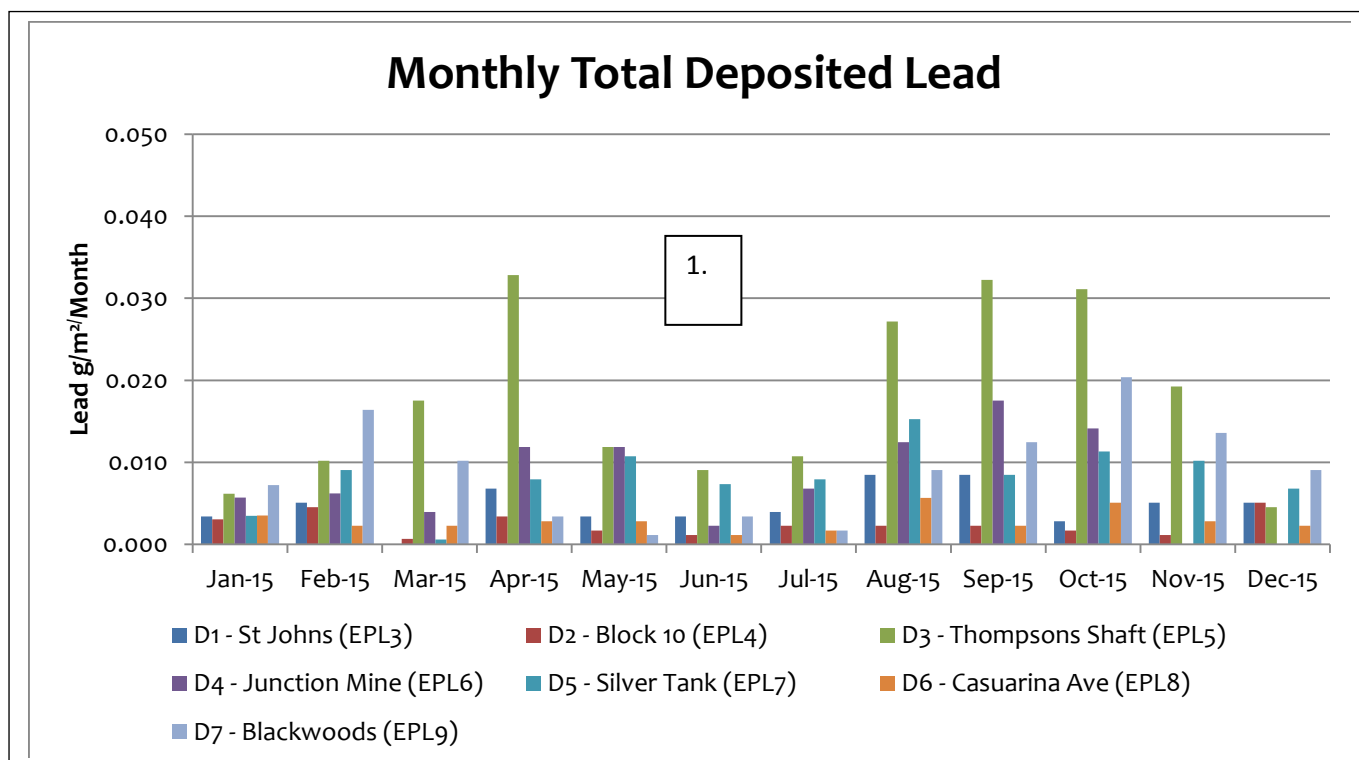
1.3 Dust Deposition Sampling

Total Deposited Dust (g/m ² /Month)							
Date	D1 (off site)	D2	D3	D4	D5	D6 (off site)	D7
Dec 2015	0.85	0.45	0.62	1.53	0.79	3.00	0.45
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 March 2015. This sample had a large volume of water present when collected.

Total Deposited Lead (g/m ² /Month)							
Date	D1 (Off Site)	D2	D3	D4	D5	D6 (Off Site)	D7
Dec 2015	0.005	0.005	0.005	0.000	0.007	0.002	0.009
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 and September. Nearby vegetation and buildings have been identified as potential sources. Nearby vegetation was removed in September. A clean up of the haul road adjacent Thompsons shaft was also 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 much lower total deposited lead reading for December.

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.

December Summary Block 7, Zinc Lode:

- 0 production firings
- 34 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
- 0 Blasts recorded an over pressure above 120dBL

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

- 13 production firings
- 154 development firings
- 0 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 February 2015 until January 20, 2016.

3 Noise

Quarterly noise monitoring is now complete as per the Pollution Reduction Program 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 has been produced by EMM for submission to the EPA. The submission is planned for late January 2016.

4 Water

4.1 Ground Water Sampled 3/12/2015

		UG FEED	SHAFT 7
pH Value	pH Unit	6.39	6.52
Electrical Conductivity @ 25°C	µS/cm	10400	11300
Total Dissolved Solids @180°C	mg/L	11600	12400
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	10	23
Total Alkalinity as CaCO ₃	mg/L	10	23
Sulfate as SO ₄ - Turbidimetric	mg/L	4720	5260
Chloride	mg/L	1250	1360
Calcium	mg/L	514	529
Magnesium	mg/L	246	270
Sodium	mg/L	1340	1410
Cadmium	mg/L	1.99	1.67
Lead	mg/L	0.359	1.82
Manganese	mg/L	224	373
Zinc	mg/L	613	814
Iron	mg/L	0.67	0.18

4.2 Surface Water

Insufficient rainfall for opportunistic surface water sampling during December 2015

Surface Water Table Nov 2015 to Nov 2016

EPA Identification Number	Frequency	Comment
EPL29	2 x Per year when contains water	No sample - dry
EPL30	2 x Per year when contains water	No sample - dry
EPL31	2 x Per year when contains water	No sample - dry
EPL32	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	2 x Per year when contains water	No sample - dry
EPL35 Downstream	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				mm	mm	hours	km/h	local	°C	%	g th	km/h	hPa	°C	%	g th	km/h	hPa
1	Tu						SW	70	18:35				SSW	24	1012.0				W	20	1010.7
2	We						SSE	59	15:55				SSE	33	1022.6				S	30	1021.4
3	Th						SE	43	09:53				SE	24	1024.7				ESE	13	1020.9
4	Fr						NE	48	10:43				NE	26	1019.2				SSE	11	1015.3
5	Sa						NE	37	07:49				NE	30	1016.1				SW	6	1012.1
6	Su						NNE	54	07:45				NNE	37	1013.5				NNE	20	1009.4
7	Mo						NNW	70	13:21				NNE	41	1008.4				NNW	41	1006.1
8	Tu						W	59	11:08				NW	31	1010.1				W	26	1008.1
9	We						W	44	13:15				SSE	19	1016.9				WNW	22	1013.6
10	Th						W	70	14:58				S	20	1014.9				WNW	30	1010.6
11	Fr						S	41	21:45				SSW	28	1014.2				SW	22	1013.7
12	Sa						S	43	00:16				SE	24	1018.0				SSE	9	1014.8
13	Su						NNW	41	12:13				NNE	24	1015.1				NNW	11	1012.1
14	Mo						N	37	14:05				NNE	20	1012.8				NNE	11	1010.8
15	Tu						WNW	54	12:08				SSW	9	1011.8				WSW	6	1010.0
16	We						SSW	37	14:47				ENE	7	1011.6				ESE	19	1009.1
17	Th						ESE	39	14:08				NE	22	1010.8				W	9	1008.4
18	Fr						NNE	44	07:00				N	28	1010.8				NNE	15	1007.8
19	Sa						NNE	61	14:41				NNE	30	1009.3				NE	20	1004.8
20	Su						NW	59	11:46				SSW	19	1007.3				N	35	1007.7
21	Mo						S	39	09:25				SSE	28	1017.6				SE	15	1018.1
22	Tu						SE	46	15:25				ESE	20	1017.7				SE	19	1014.8
23	We						S	52	14:33				SSW	17	1014.7				SE	19	1011.6
24	Th						E	48	09:56				NE	20	1012.3				E	28	1008.7
25	Fr						NW	59	22:32				NE	31	1007.5				NNW	17	1002.1
26	Sa						SSW	61	06:03				S	37	1009.9				SSW	28	1010.4
27	Su						SSE	50	08:36				SSE	33	1020.9				SE	28	1018.7
28	Mo						SSE	50	14:51				ESE	28	1021.0				S	30	1018.4
29	Tu						SE	44	15:53				E	26	1018.9				E	19	1015.9
30	We						NNE	33	07:34				NNE	24	1015.5				N	15	1012.4
31	Th						NNE	37	10:41				NNE	20	1012.5				NNE	20	1011.0
Statistics for December 2015																					
Mean														25	1014.5					19	1011.9
Lowest													ENE	7	1007.3				#	6	1002.1
Highest							#	70					NNE	41	1024.7				NNW	41	1021.4
Total																					

10015145000 20151231 Received at 10:00 GMT on Thursday 14 January 2016

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	29/12/2015	7/1/2016	21/1/2016
TEOM	Real time	-	21/1/2016
Dust Deposition	8/1/2016	18/1/2016	21/1/2016
Water	4/12/2015	11/12/2015	21/1/2016
Blast Vibration and overpressure	Real Time	-	21/1/2016

7 Correction Log November 2015

There are no data corrections for November 2015.