

Monthly Environmental Data October 2015

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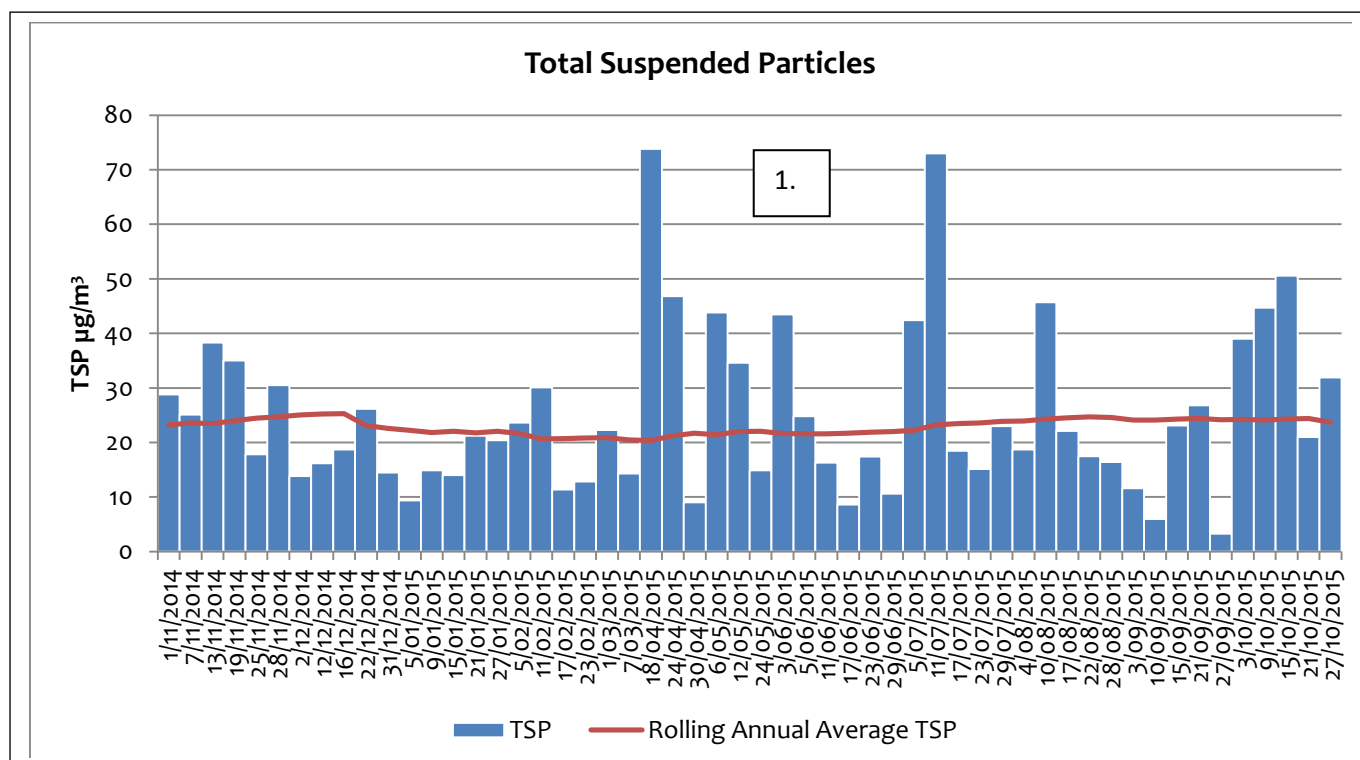
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1 Air Quality

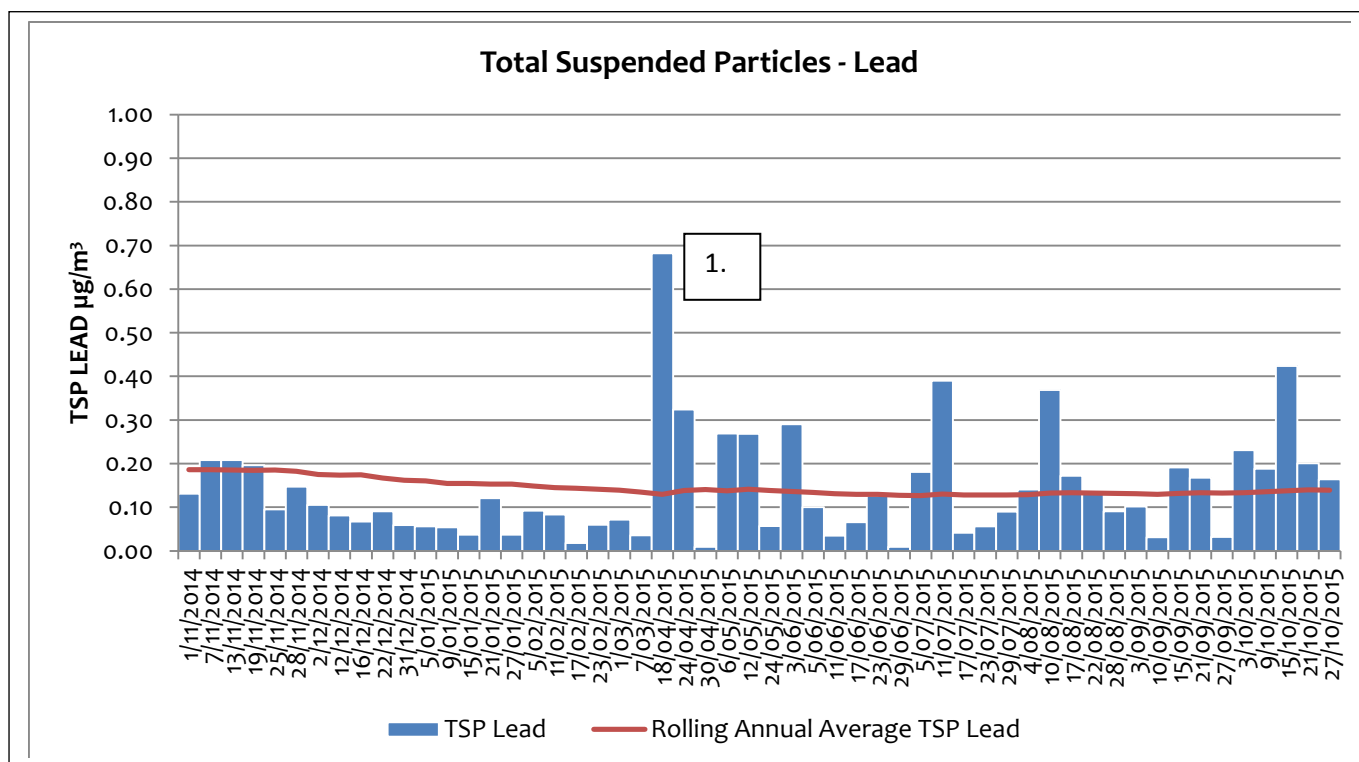
1.1 High Volume Air Samplers

EPL10 - SILVER TANK - ON SITE

DATE	TSP ($\mu\text{g}/\text{m}^3$)	Lead ($\mu\text{g}/\text{m}^3$)
3/10/2015	39.00	0.23
9/10/2015	44.70	0.19
15/10/2015	50.60	0.42
21/10/2015	21.00	0.20
27/10/2015	31.90	0.16



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.

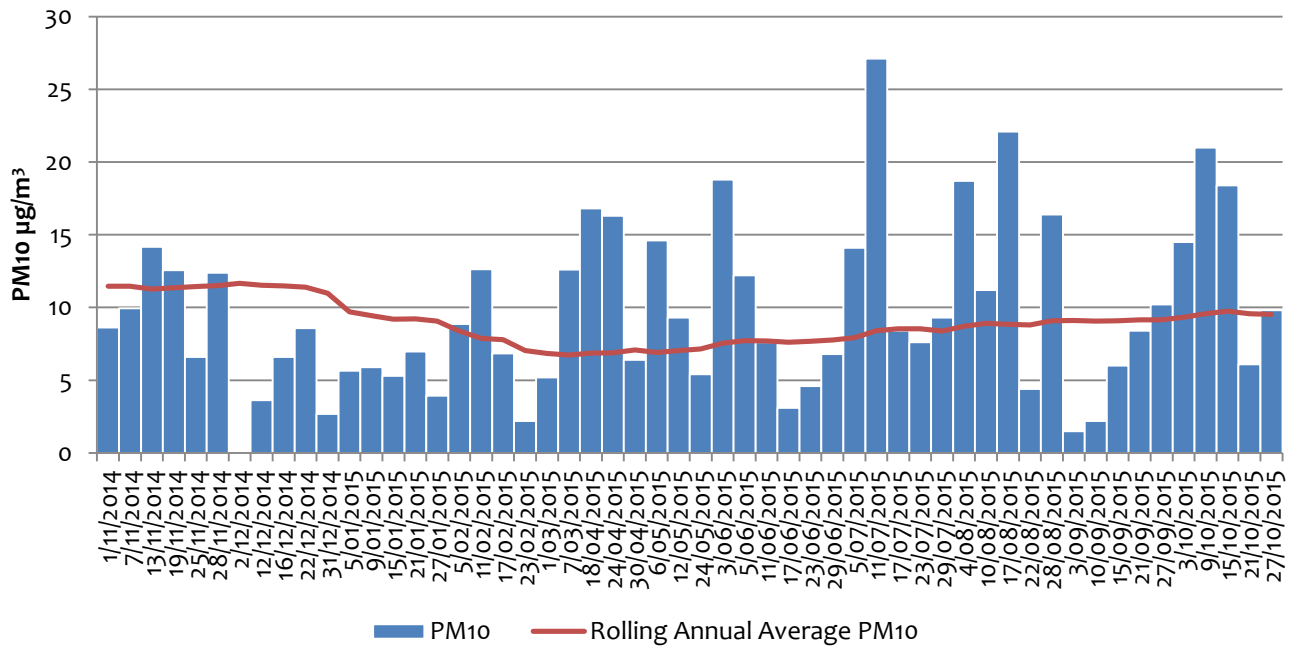


2. Spike on the 18th April was investigated. Lab QC was okay with no evidence of lab contamination. Wind conditions were not extraordinary and it rained. Field sampling methods have been checked to prevent any sample contamination.

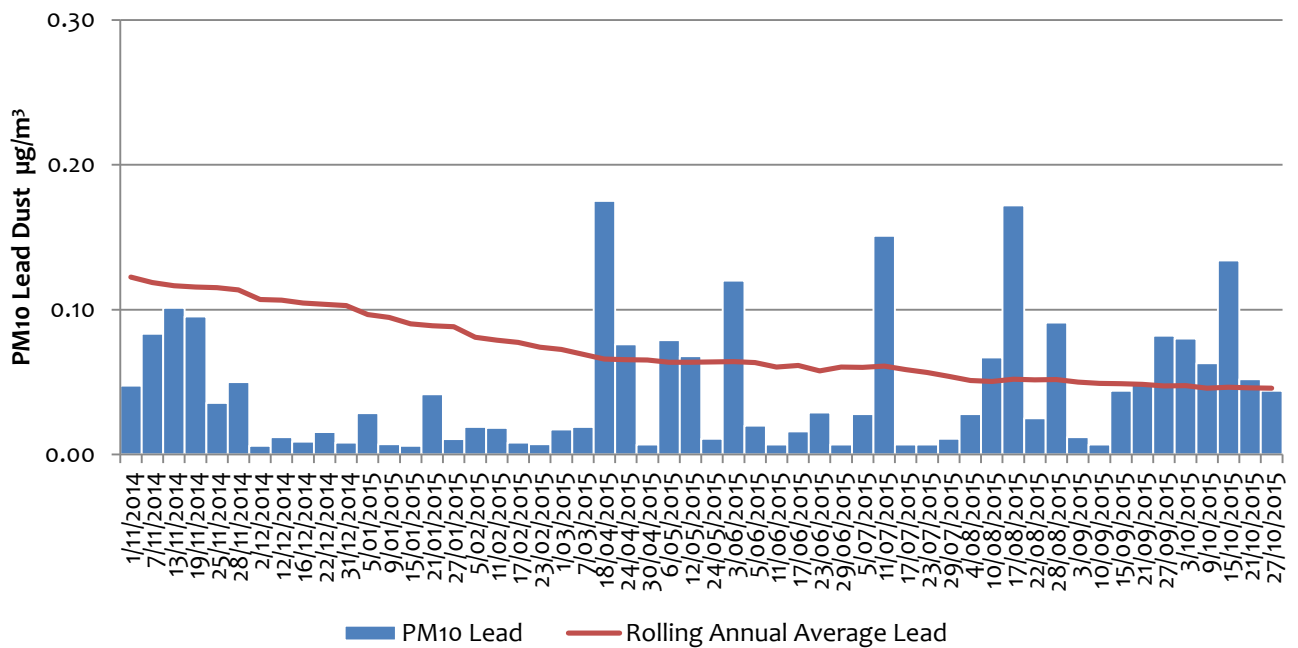
EPL11 - Silver Tank - On Site

DATE	PM10 (µg/m ³)	Lead (µg/m ³)
3/10/2015	14.50	0.08
9/10/2015	21.00	0.06
15/10/2015	18.40	0.13
21/10/2015	6.10	0.05
27/10/2015	9.80	0.04

PM10

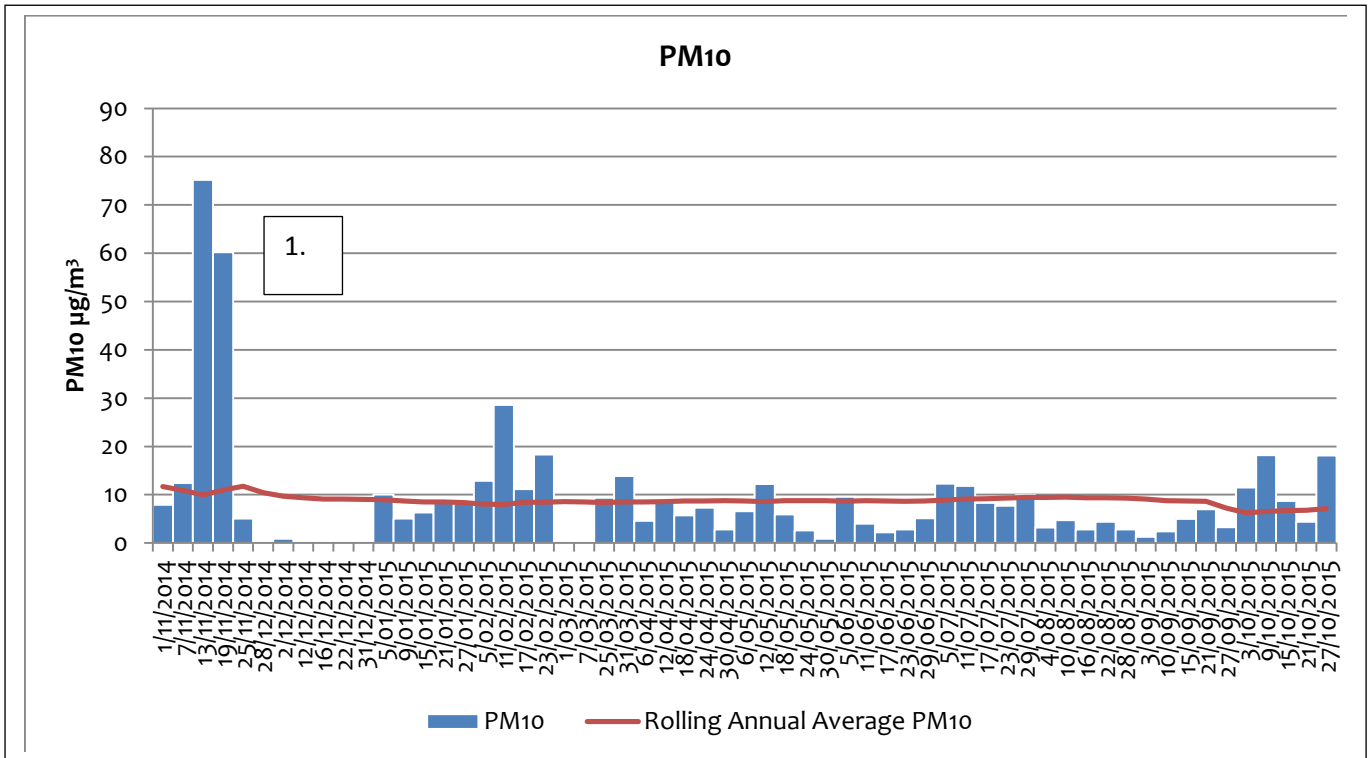


PM10 Lead



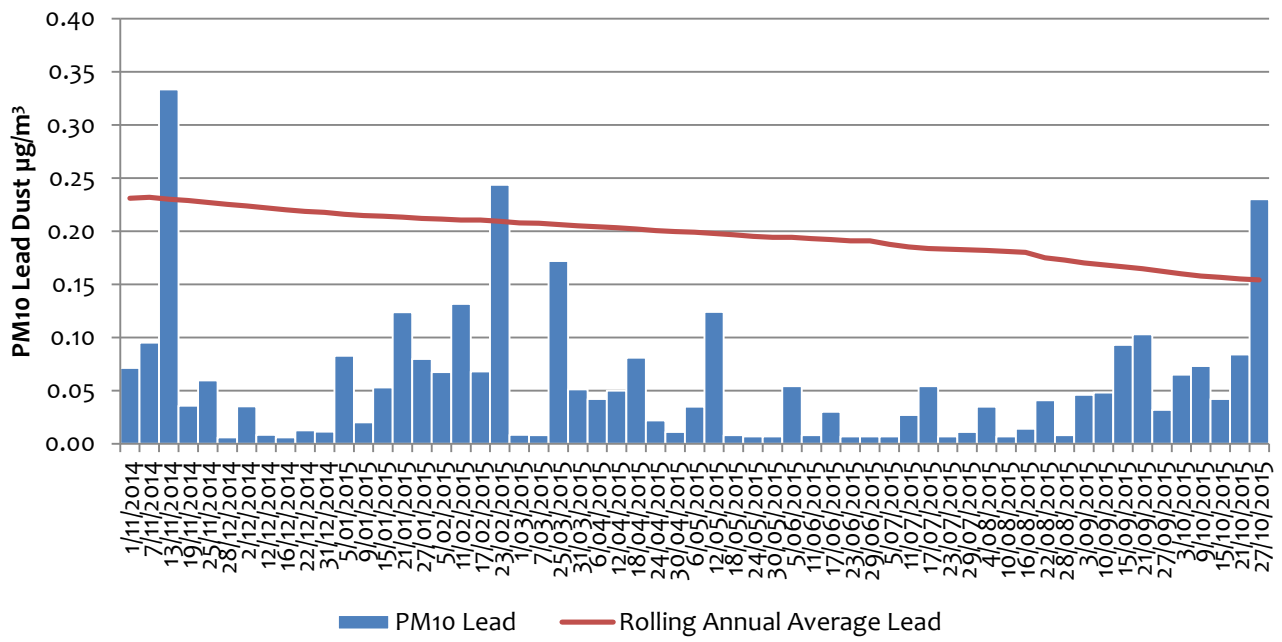
EPL12 - Blackwoods Pit – On Site

DATE	PM10 ($\mu\text{g}/\text{m}^3$)	Lead ($\mu\text{g}/\text{m}^3$)
3/10/2015	11.50	0.065
9/10/2015	18.20	0.073
15/10/2015	8.70	0.042
21/10/2015	4.40	0.084
27/10/2015	18.10	0.23



1. High dust values in November coincide with road works that were carried out by Broken Hill City Council on Federation Way in the vicinity of Blackwoods Pit.

PM10 Lead

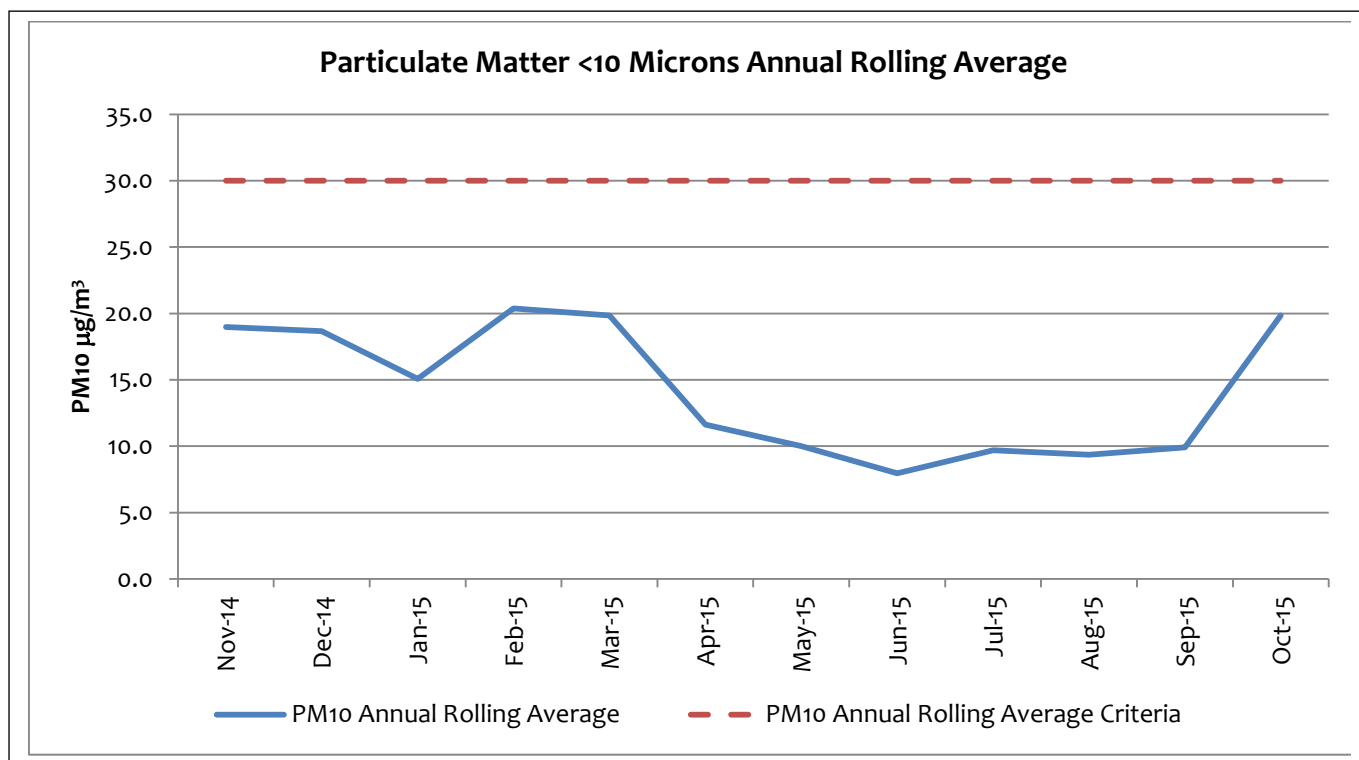
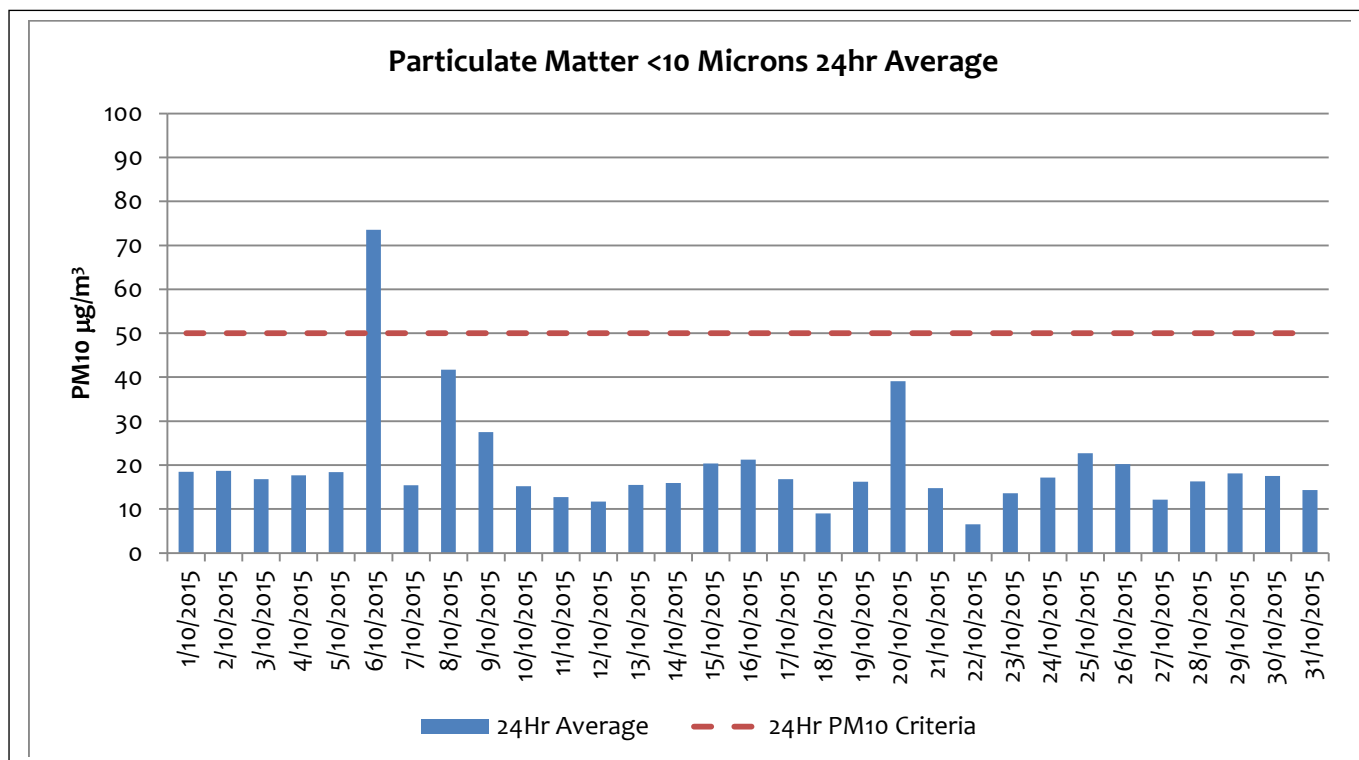


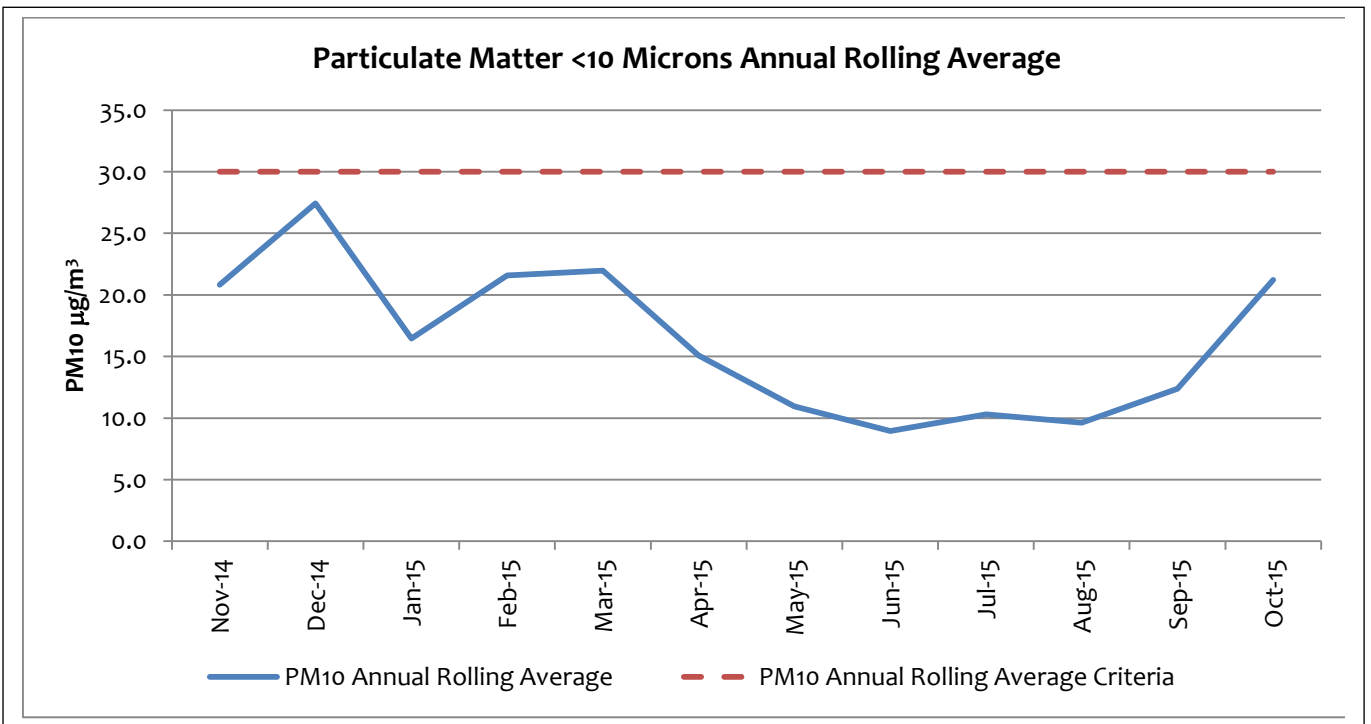
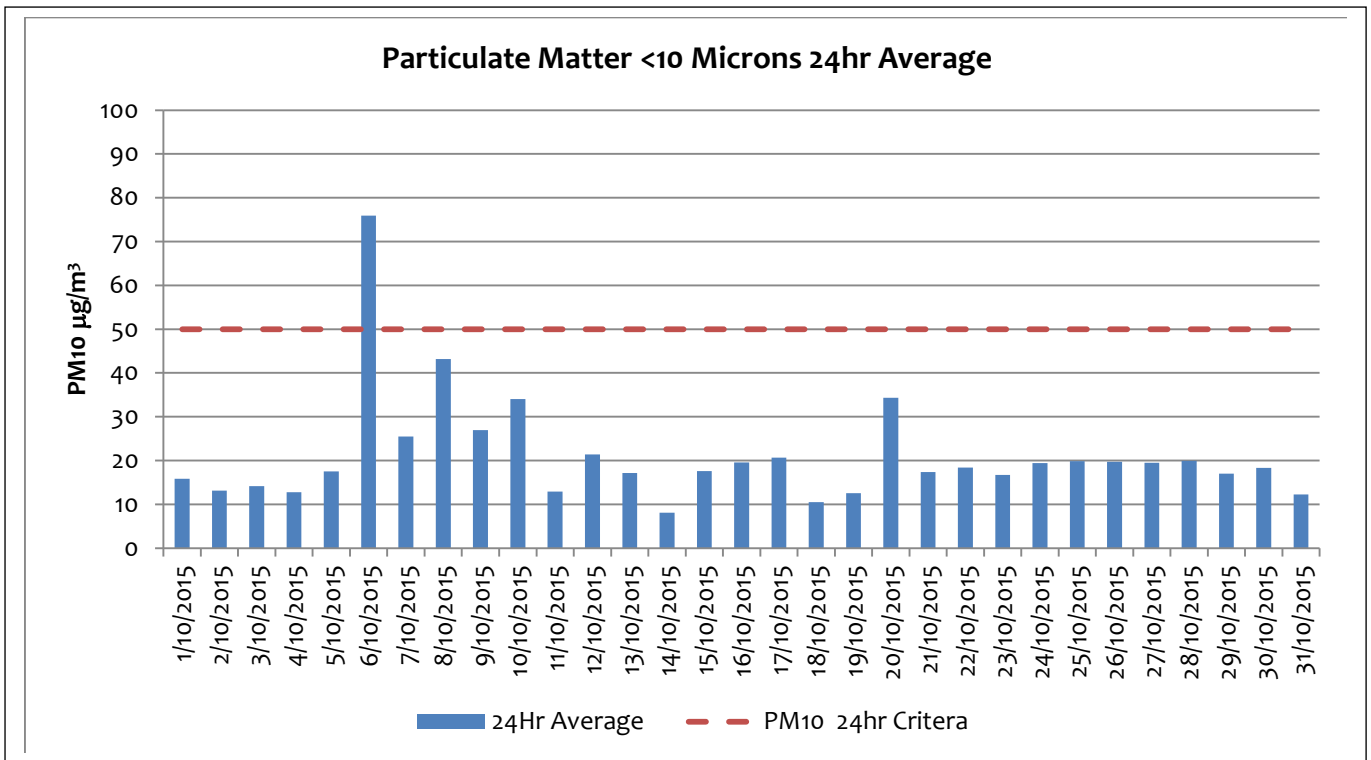
1.2 Tapered Element Oscillating Microbalance Sampling (TEOM)

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
1/10/2015	18.44	15.84
2/10/2015	18.66	13.13
3/10/2015	16.81	14.18
4/10/2015	17.66	12.78
5/10/2015	18.43	17.50
6/10/2015	73.53	75.95
7/10/2015	15.44	25.50
8/10/2015	41.74	43.17
9/10/2015	27.49	26.92
10/10/2015	15.21	34.06
11/10/2015	12.73	12.93
12/10/2015	11.68	21.39
13/10/2015	15.50	17.16
14/10/2015	15.89	8.12
15/10/2015	20.40	17.59
16/10/2015	21.23	19.56
17/10/2015	16.81	20.63
18/10/2015	9.02	10.50
19/10/2015	16.21	12.52
20/10/2015	39.05	34.34
21/10/2015	14.79	17.40
22/10/2015	6.51	18.40
23/10/2015	13.60	16.74
24/10/2015	17.17	19.44
25/10/2015	22.68	19.84
26/10/2015	20.20	19.70
27/10/2015	12.11	19.49
28/10/2015	16.32	19.94
29/10/2015	18.14	17.01
30/10/2015	17.51	18.35
31/10/2015	14.34	12.27

PM10 $\mu\text{g}/\text{m}^3$ 12 Month Rolling Average												
	Nov-14	Dec-14	Jan-15	Feb-15	Mar-15	Apr-15	May-15	Jun-15	Jul-15	Aug-15	Sep-15	Oct-15
TEOM 1 EPL13 Essential Water Off Site	19.0	18.7	15.1	20.4	19.8	11.6	10.0	8.0	9.7	9.4	9.9	19.8
TEOM 2 EPL14 Blackwoods Pit On Site	20.8	27.4	16.5	21.6	22.0	15.1	10.9	9.0	10.3	9.6	12.4	21.2

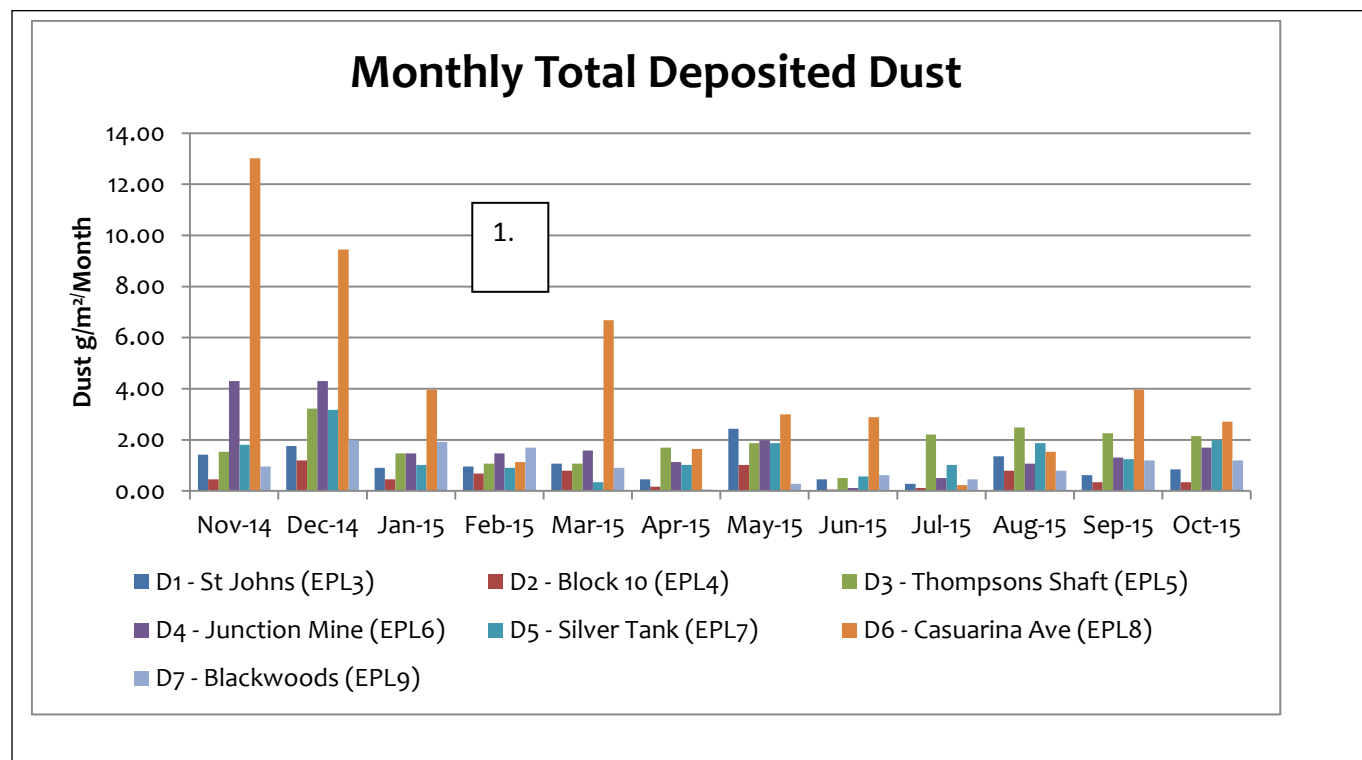
EPL13 – Essential Water – Off Site





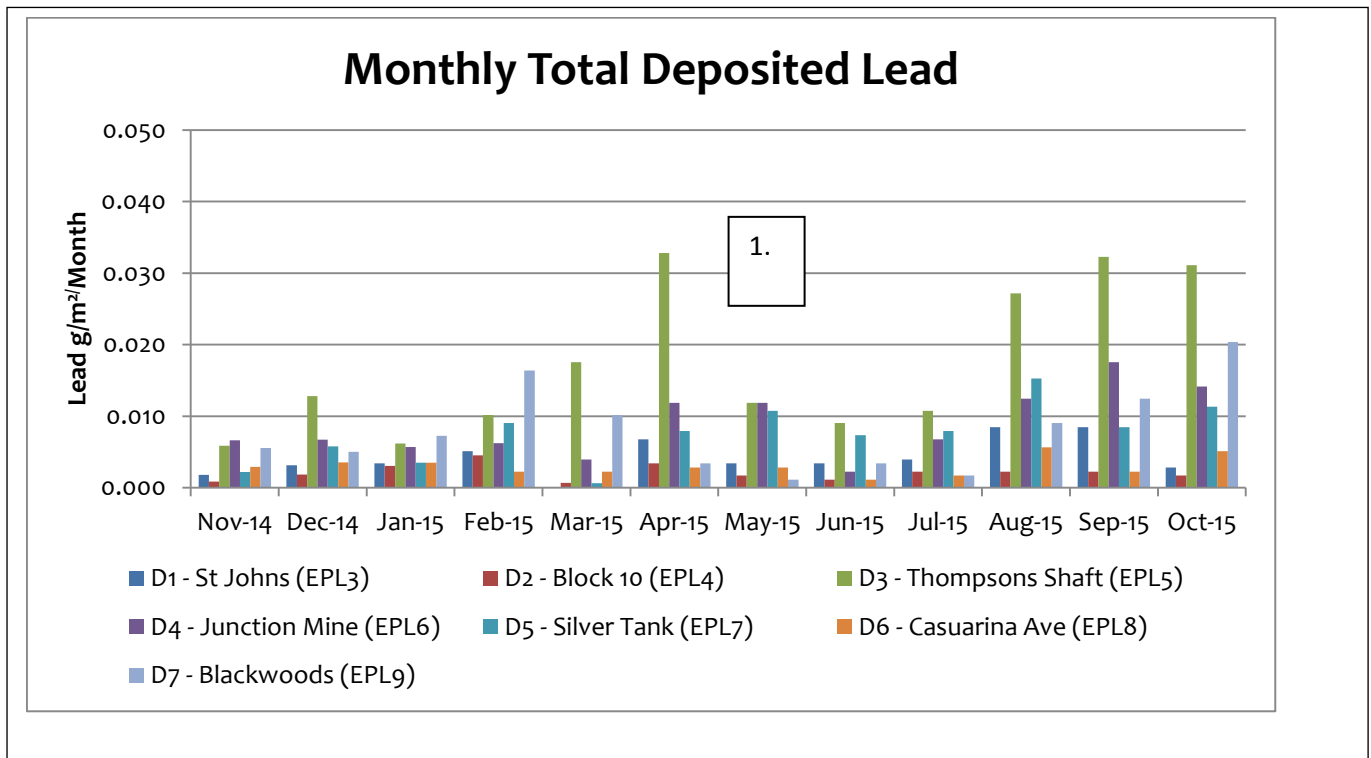
1.3 Dust Deposition Sampling

Total Deposited Dust (g/m ² /Month)							
Date	D1 (off site)	D2	D3	D4	D5	D6 (off site)	D7
Oct 2015	0.85	0.34	2.15	1.70	1.98	2.72	1.19
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 November and December 2014 as well as March 2015. These jars had large volumes of water present when collected.

Total Deposited Lead (g/m ² /Month)							
Date	D1 (Off Site)	D2	D3	D4	D5	D6 (Off Site)	D7
Oct 2015	0.003	0.002	0.031	0.014	0.011	0.005	0.020
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.

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.

October Summary Block 7, Zinc Lode:

- 0 production firings
- 38 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

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

- 13 production firings
- 147 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 = **0.36%** (licence requirement <5%) calculated from 1st December 2014 until November 30, 2015.

3 Noise

Quarterly noise monitoring is continuing as per the Pollution Reduction Program on EPL 12559. Four noise assessments have been undertaken since November last year. EMGA Mitchell McLennan Pty Limited (EMM) completed the analysis for all assessments. The latest report concluded as follows:

EMM has completed a noise monitoring assessment of operational noise from RASP Mine activities at 15 assessment locations as per the site's EPL (12559). A review of the meteorological data from the site's weather station identified that noise limits were inapplicable for one of the 18 operator-attended measurements due to meteorological conditions as per the site's EPL. The monitoring assessment for this fourth survey found that noise from RASP Mine operations (including the crushing plant) satisfied the relevant night-time noise limits at all locations. Furthermore, site noise was inaudible at two of the 15 locations. The monitoring results showed that where site noise was audible, the total $L_{Aeq(15-min)}$ noise levels (all source) satisfied the relevant night-time noise limits for five of the measurements, and hence reaffirming compliance at the relevant locations. In summary, no non-compliances were observed during this session of monitoring.

A final summary report will be produced by EMM for submission to the EPA by January 31 2016.

4 Water

4.1 Ground Water Sampled 12/10/2015

		UG FEED	SHAFT 7
pH Value	pH Unit	6.47	6.58
Electrical Conductivity @ 25°C	µS/cm	10900	11000
Total Dissolved Solids @180°C	mg/L	11000	11400
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	9	23
Total Alkalinity as CaCO ₃	mg/L	9	23
Sulfate as SO ₄ - Turbidimetric	mg/L	4750	4970
Chloride	mg/L	494	1370
Calcium	mg/L	553	520
Magnesium	mg/L	250	252
Sodium	mg/L	1390	1270
Cadmium	mg/L	2.02	1.6
Lead	mg/L	3	1.65
Manganese	mg/L	293	385
Zinc	mg/L	758	852
Iron	mg/L	0.9	0.21

4.2 Surface Water

Insufficient rainfall for opportunistic surface water sampling during October 2015

Surface Water Table Nov 2014 to Nov 2015

EPA Identification Number	Frequency	Comment
EPL29	2 x Per year when contains water	Sampled 24/8/15
EPL30	2 x Per year when contains water	Sampled 24/8/15
EPL31	2 x Per year when contains water	Sampled during January and August
EPL32	2 x Per year when contains water	Sampled 24/8/15
EPL33 Horwood Dam	2 x Per year when contains water	Sampled in May and August
EPL34 Upstream	2 x Per year when contains water	Sampled 24/8/15
EPL35 Downstream	2 x Per year when contains water	Sampled 24/8/15

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	Th						S	37	15:57				S	9	1028.5				SSE	20	1026.9
2	Fr						E	30	13:34				ENE	13	1032.9				E	13	1029.1
3	Sa						NW	44	12:50				N	17	1029.6				NW	24	1024.2
4	Su						W	48	11:17				NNW	20	1025.7				WNW	19	1022.5
5	Mo						NW	46	11:14				N	15	1023.5				N	24	1019.4
6	Tu						NW	67	12:18				NNW	24	1019.2				NW	35	1017.7
7	We						S	61	23:29				SSE	39	1029.7				SSE	28	1028.4
8	Th						SE	33	07:33				ESE	22	1029.8				SE	19	1026.4
9	Fr						N	50	17:39				ESE	13	1029.6				N	13	1025.0
10	Sa						SW	65	17:51				NE	30	1025.4				NW	26	1020.5
11	Su						WSW	50	15:51				NNE	28	1019.7				NW	33	1015.7
12	Mo						S	46	05:26				S	35	1019.9				S	20	1017.3
13	Tu						S	33	11:13				SE	20	1022.7				SSW	15	1019.8
14	We						NE	28	14:25				ESE	15	1021.9				NE	9	1018.7
15	Th						N	54	08:32				N	26	1019.1				NNW	22	1015.8
16	Fr						NW	43	10:58				N	22	1019.5				NW	19	1017.0
17	Sa						S	46	10:19				S	31	1023.1				S	31	1022.5
18	Su						E	37	08:44				ESE	20	1025.3				E	15	1022.5
19	Mo						E	35	08:04				ENE	28	1021.4				NE	9	1016.9
20	Tu						W	87	18:07				NNE	13	1015.7				NNE	26	1011.1
21	We						WSW	54	13:23				SW	33	1015.1				SW	35	1014.1
22	Th						S	52	16:04				S	28	1020.0				SSW	30	1018.1
23	Fr						S	30	11:47				SE	15	1022.2				SSW	9	1018.4
24	Sa						NW	30	12:31				NE	15	1020.4				S	13	1017.0
25	Su						SW	63	22:51				N	19	1017.2				WNW	24	1014.0
26	Mo						S	54	14:29				S	37	1019.5				SSE	30	1017.4
27	Tu						S	39	11:05				S	20	1021.3				SSE	22	1018.3
28	We						S	37	12:55				SSE	17	1019.0				SW	15	1016.4
29	Th						WNW	44	13:39				NE	17	1017.6				NW	24	1014.7
30	Fr						NW	61	16:09				NNE	4	1015.3				WNW	17	1011.4
31	Sa						NNW	41	13:04				NNE	24	1013.1				N	9	1009.5
Statistics for October 2015																					
Mean														21	1022.0					20	1018.9
Lowest													NNE	4	1013.1				#	9	1009.5
Highest							W	87					SSE	39	1032.9				#	35	1029.1
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	2/11/2015	9/11/2015	30/11/2015
TEOM	Real time	-	30/11/2015
Dust Deposition	10/11/2015	18/11/2015	30/11/2015
Water	12/10/2015	19/10/2015	30/11/2015
Blast Vibration and overpressure	Real Time	-	30/11/2015

7 Correction Log September 2015

There are no data corrections for September 2015.