

# Monthly Environmental Data August 2016

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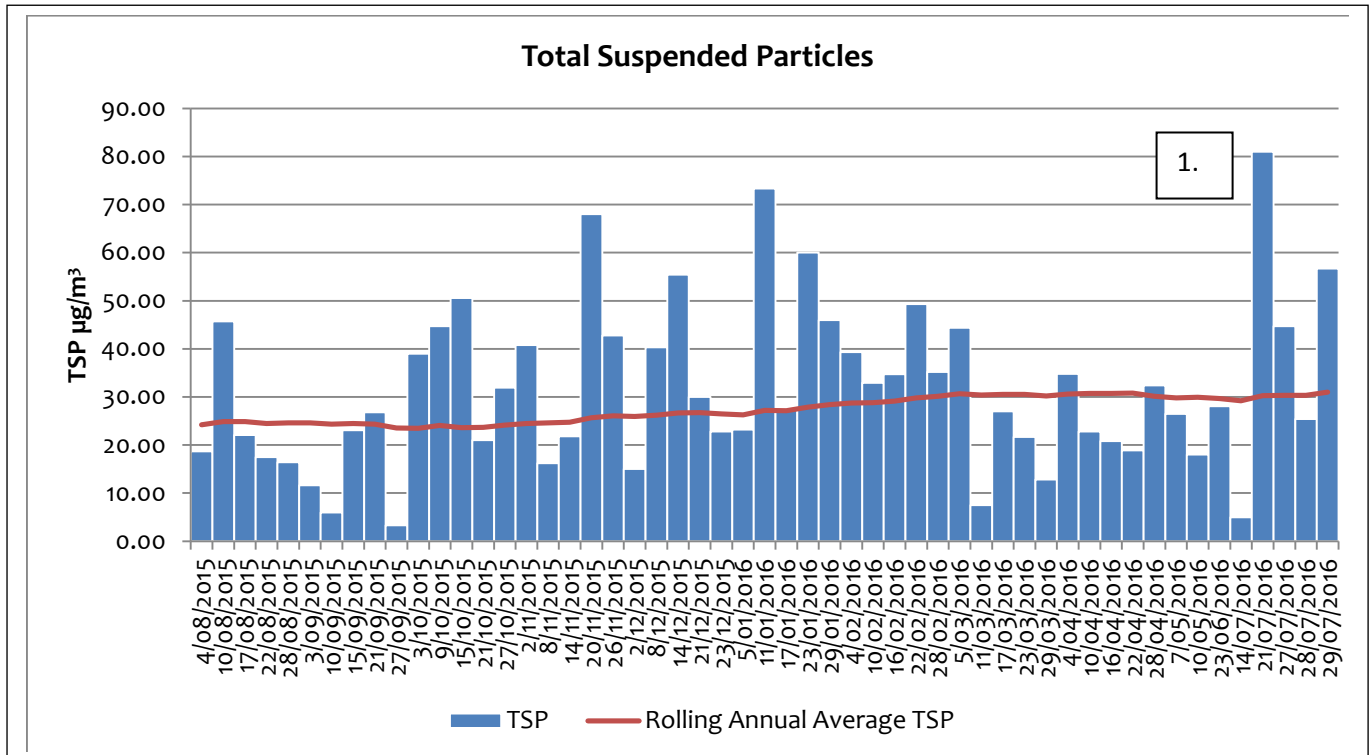
# **1 Air Quality**

## **1.1 High Volume Air Samplers**

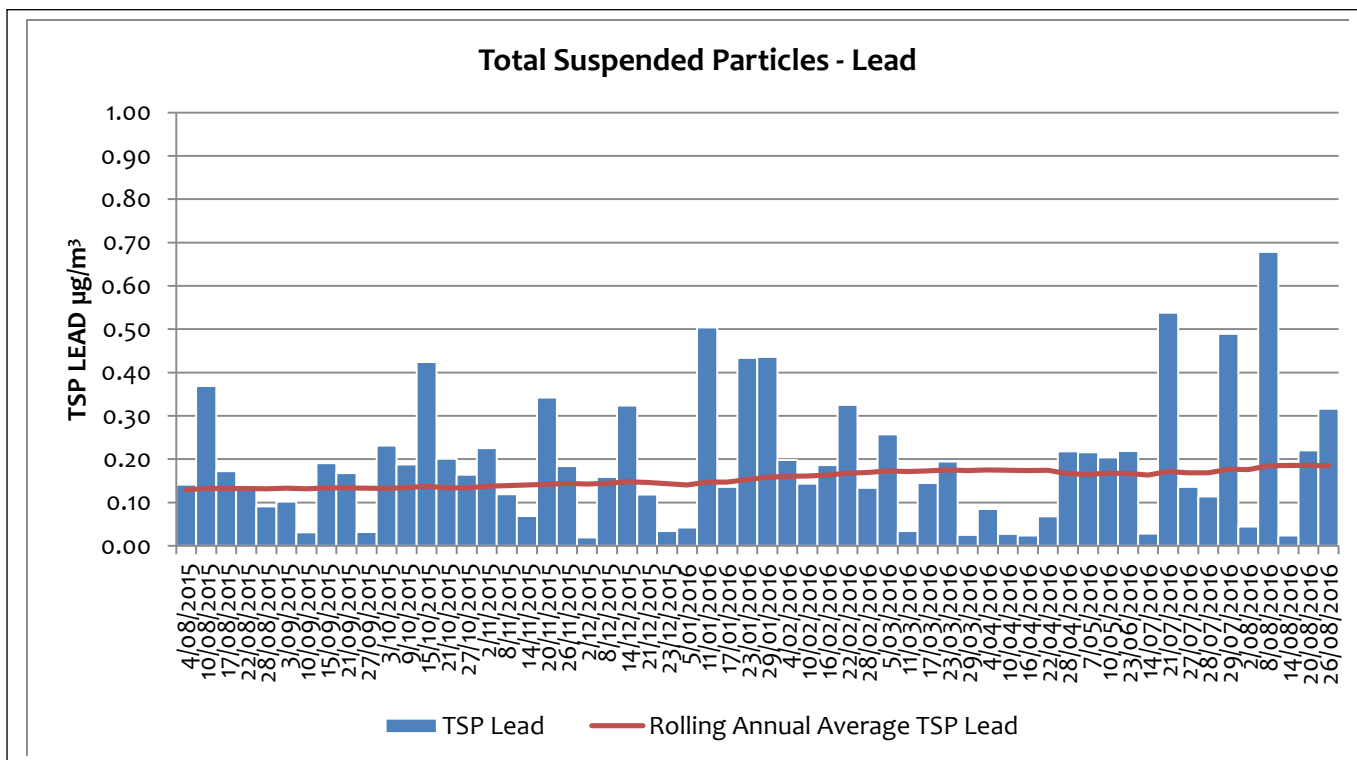
High volume air samplers at Silver Tank both failed calibration during May 2016. Both units were sent back to Ecotech in Melbourne for repair. The units were underservice for the duration of May. In early June the transformer located at Silver Tank failed thus rendering the local power source for high volume samplers 1 and 2 under service. A back up genset was put in place to power the samplers however heavy diesel particulate contamination was found on the resulting filters. The EPA were approached on the 29 June proposing to shift the monitors to the closest operational switchboard near the change rooms. The EPA indicated their preferred option would be to leave the hi vols in situ and run a sufficient lead to them to provide power and avoid contamination (provided it can be done safely). Longer leads were put in place however subsequent samples found the genset was faulting under high voltage. The load on the genset was increased in an attempt to mitigate the high voltage faults and the supply was run through two separate UPS units but the problem persisted. Diagnosis was a possible fault with the genset. With all of the available gensets already in use the next alternative was to pair the high volume samplers with another genset close by. Another unit was in place operating at the essential communications hut adjacent the weather station. The high volume units are currently being trialled here. The first samples collected have again shown signs of diesel contamination even with 10 meters of separation between the genset and the samplers. Currently the ETA of the new transformer is 20 November 2016 as it will have to be engineered and custom built.

# EPL10 - SILVER TANK HI VOL TSP - ON SITE

DATE	TSP ( $\mu\text{g}/\text{m}^3$ )	Lead ( $\mu\text{g}/\text{m}^3$ )
2/08/2016	11.00	0.04
8/08/2016	59.70	0.68
14/08/2016	11.70	0.02
20/08/2016	28.80	0.22
26/08/2016	28.20	0.32

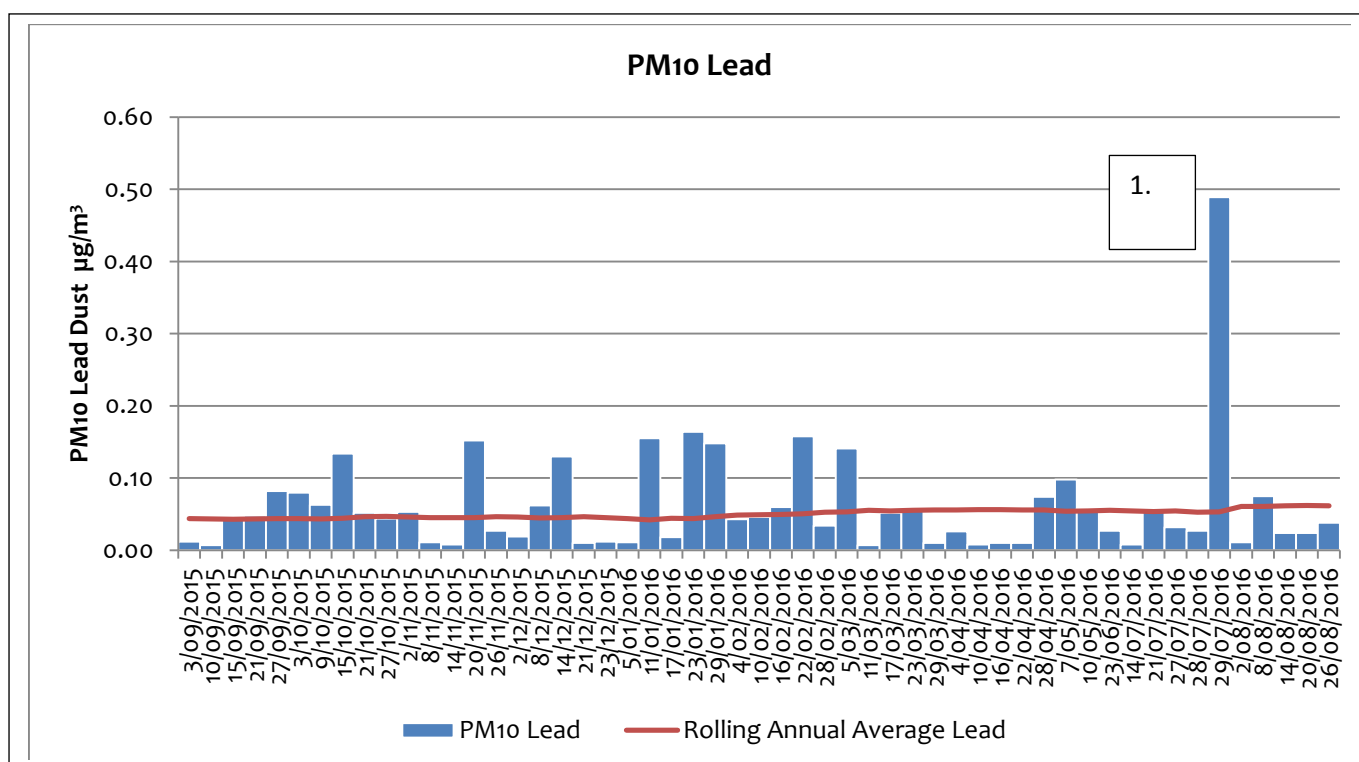
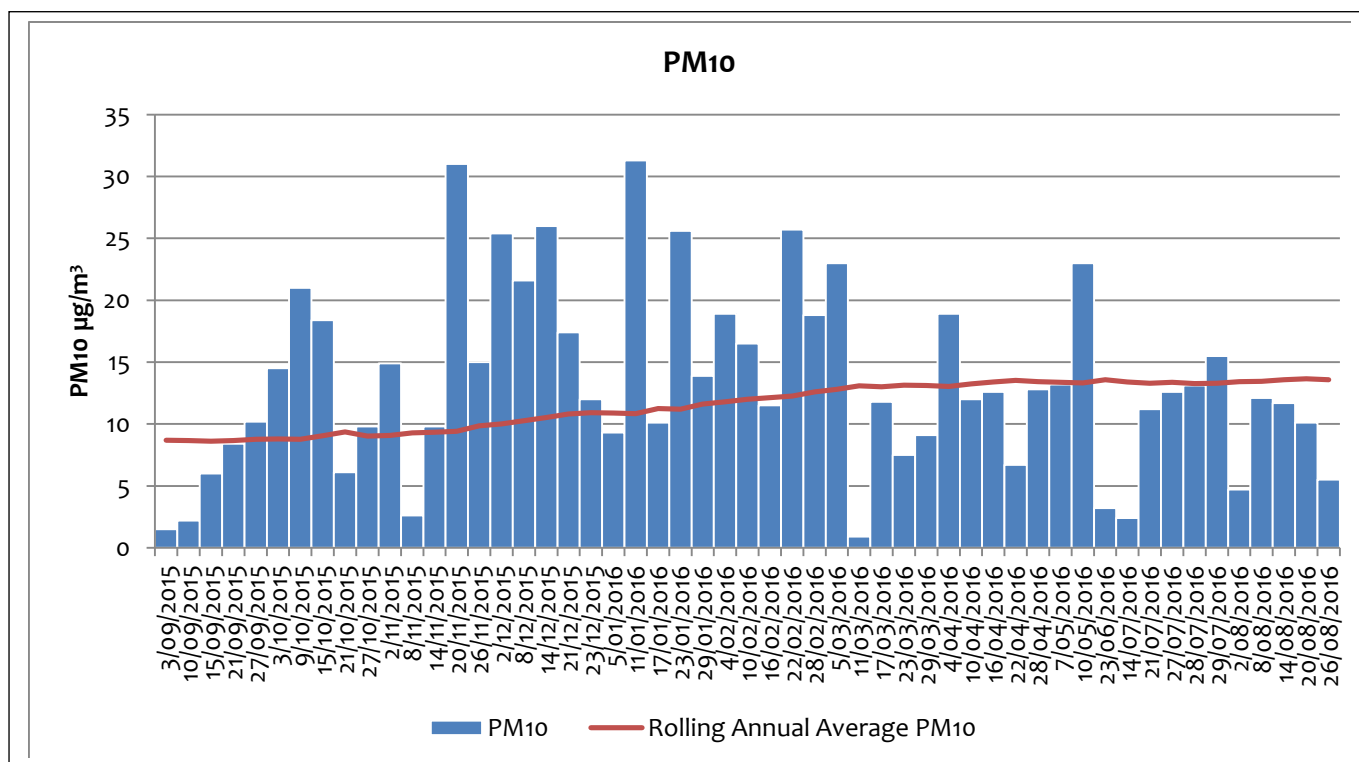


1. The spike on the 21<sup>st</sup> of July coincided with maintenance being performed on a genset from which the high volume samplers were powered. Some diesel contamination was found on the filters as a result of the diesel generator running nearby approximately 10m away. Values are still well below the Environment Protection Licence limit of 90 $\mu\text{g}/\text{m}^3$  as an annual average.



#### ***EPL11 - Silver Tank Hi Vol PM10 - On Site***

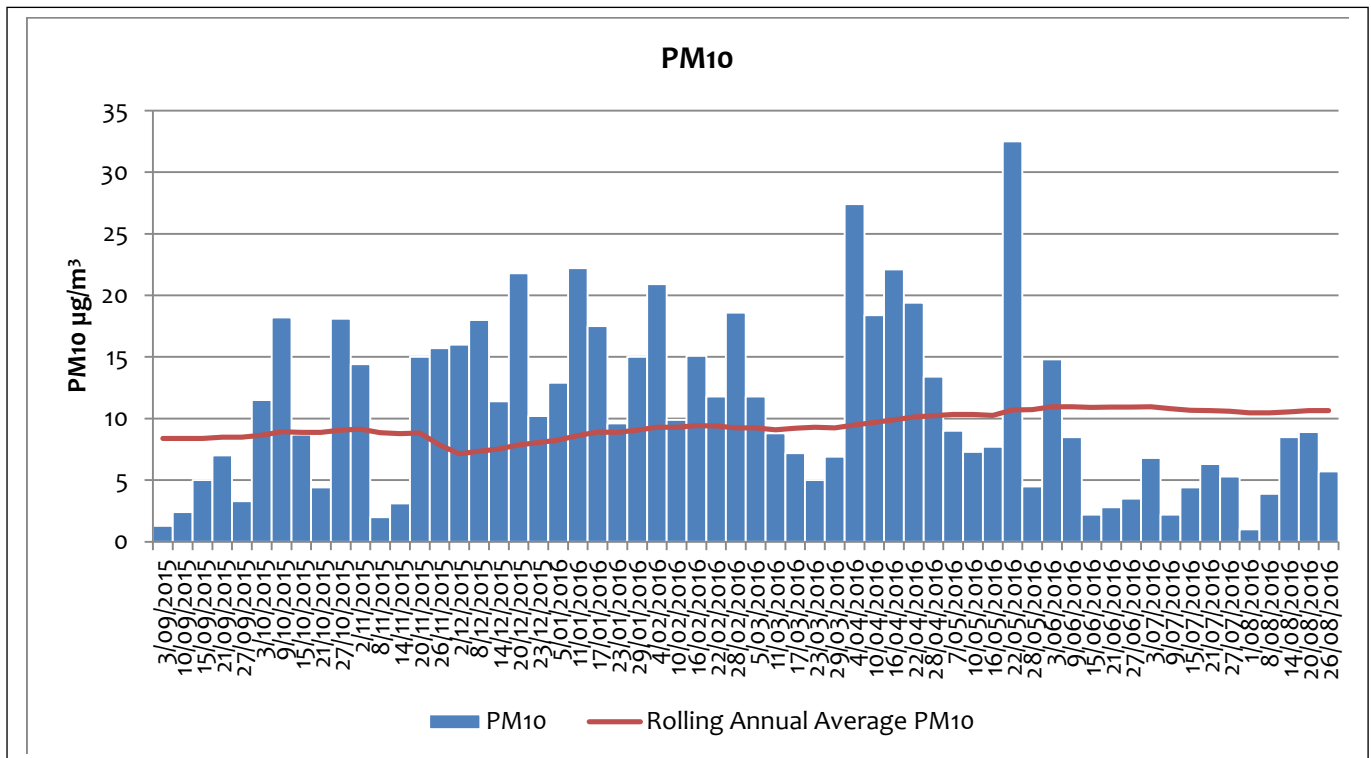
DATE	PM10 ( $\mu\text{g}/\text{m}^3$ )	Lead ( $\mu\text{g}/\text{m}^3$ )
2/08/2016	4.70	0.01
8/08/2016	12.10	0.08
14/08/2016	11.70	0.02
20/08/2016	10.10	0.02
26/08/2016	5.50	0.04



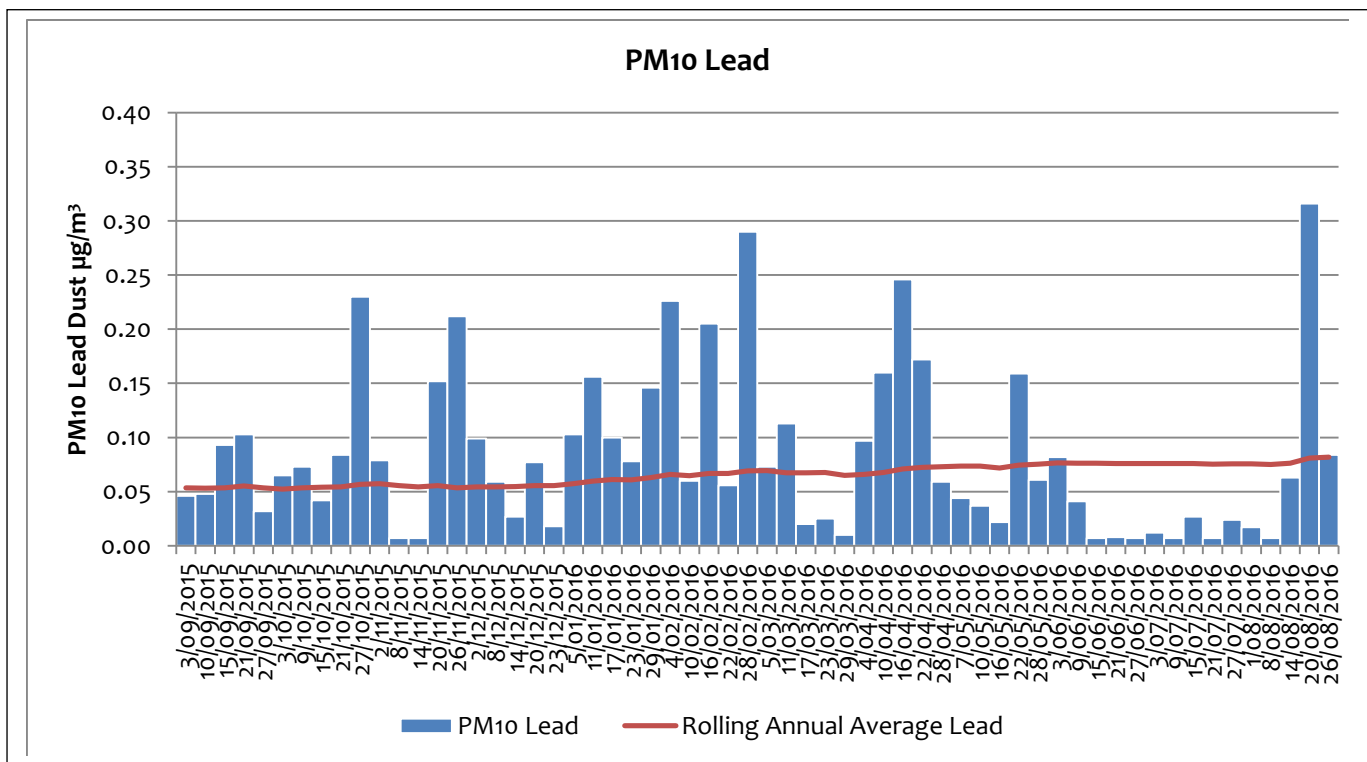
1. A spike in lead concentration occurred on July 29. A concentration of 0.49  $\mu\text{g}/\text{m}^3$  was recorded which may have been due to vehicles passing close by during servicing of a diesel genset which was powering the high volume sampler. Values are still below the Environment Protection Licence limit of 0.50  $\mu\text{g}/\text{m}^3$  averaged over 1 year.

## EPL12 - Blackwoods Pit Hi Vol PM10 – On Site

DATE	PM10 ( $\mu\text{g}/\text{m}^3$ )	Lead ( $\mu\text{g}/\text{m}^3$ )
1/08/2016	1.00	0.02
8/08/2016	3.90	0.01
14/08/2016	8.50	0.06
20/08/2016	8.90	0.32
26/08/2016	5.70	0.08



Note: The Environment Protection Licence limit for PM10 is 50 $\mu\text{g}/\text{m}^3$  averaged over 1 day.



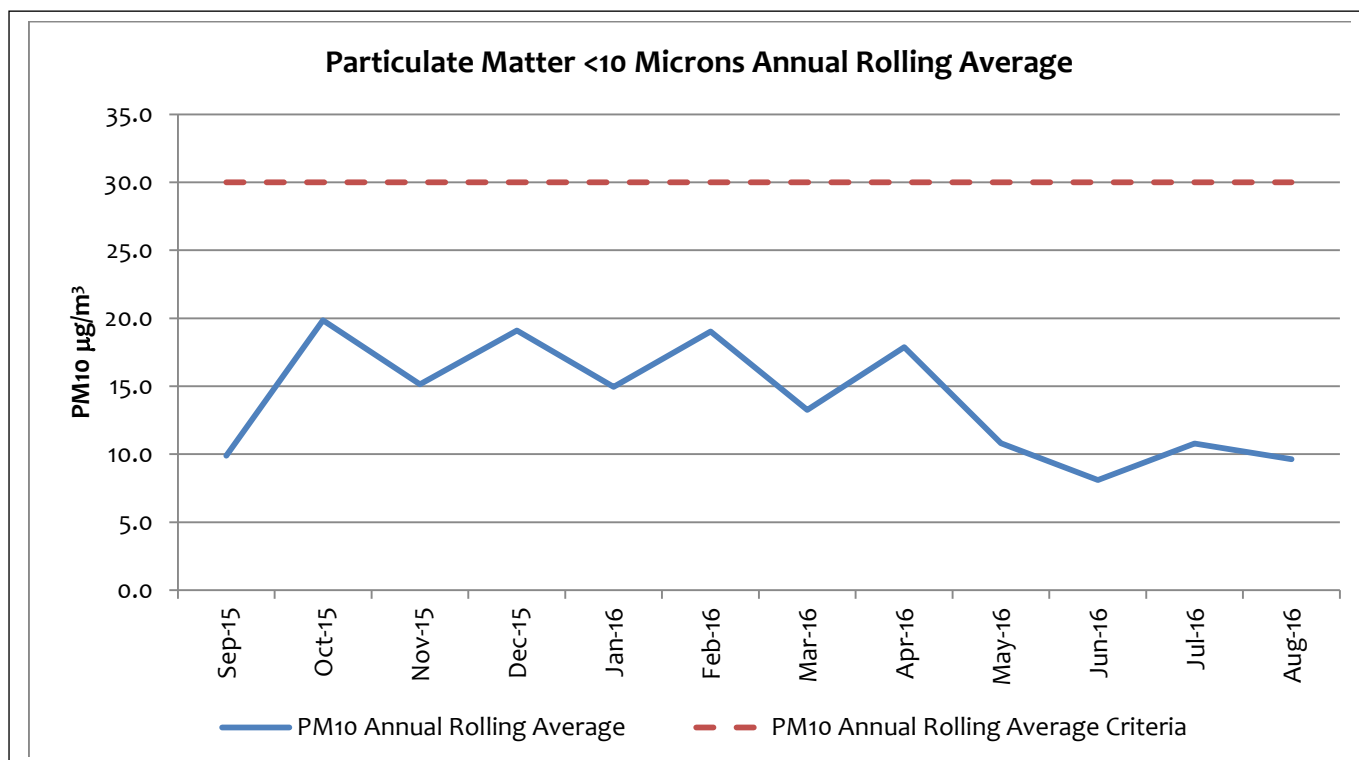
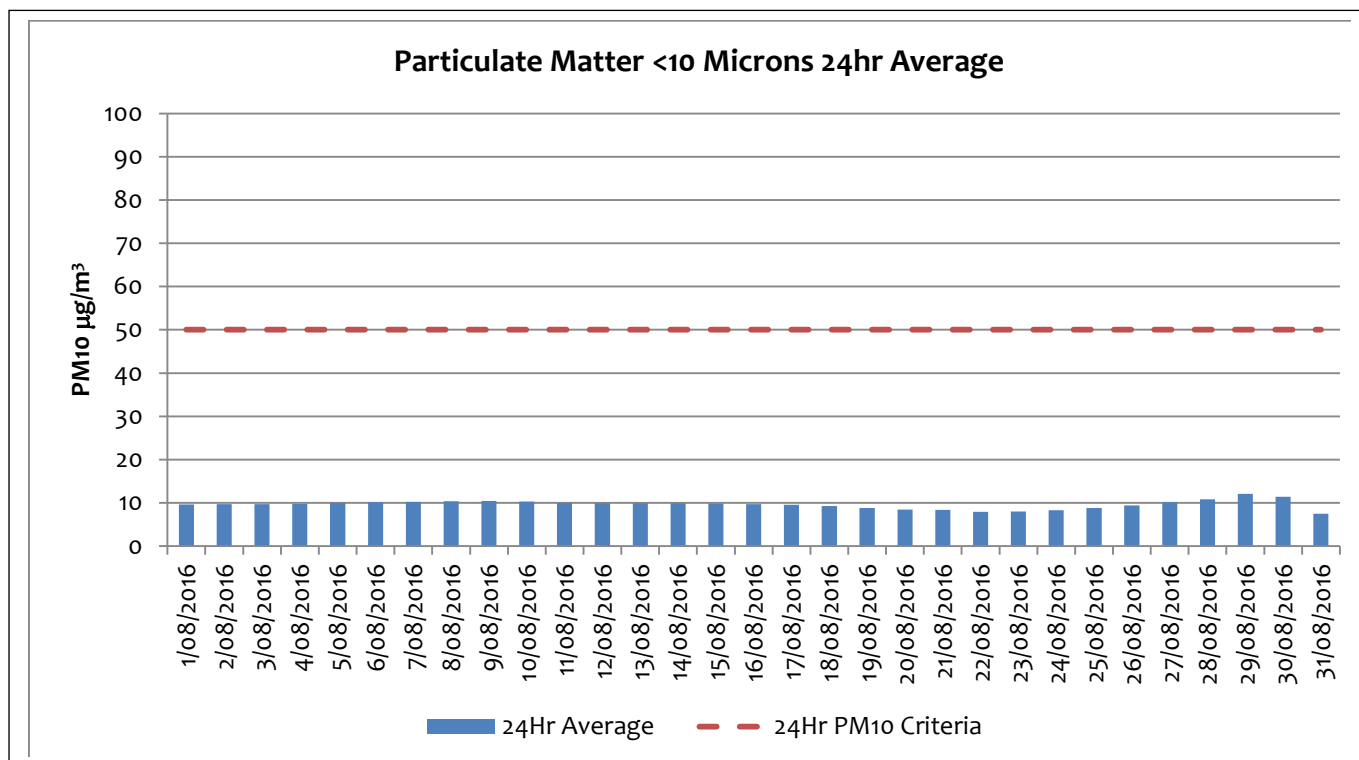
## 1.2 Tapered Element Oscillating Microbalance Sampling (TEOM)

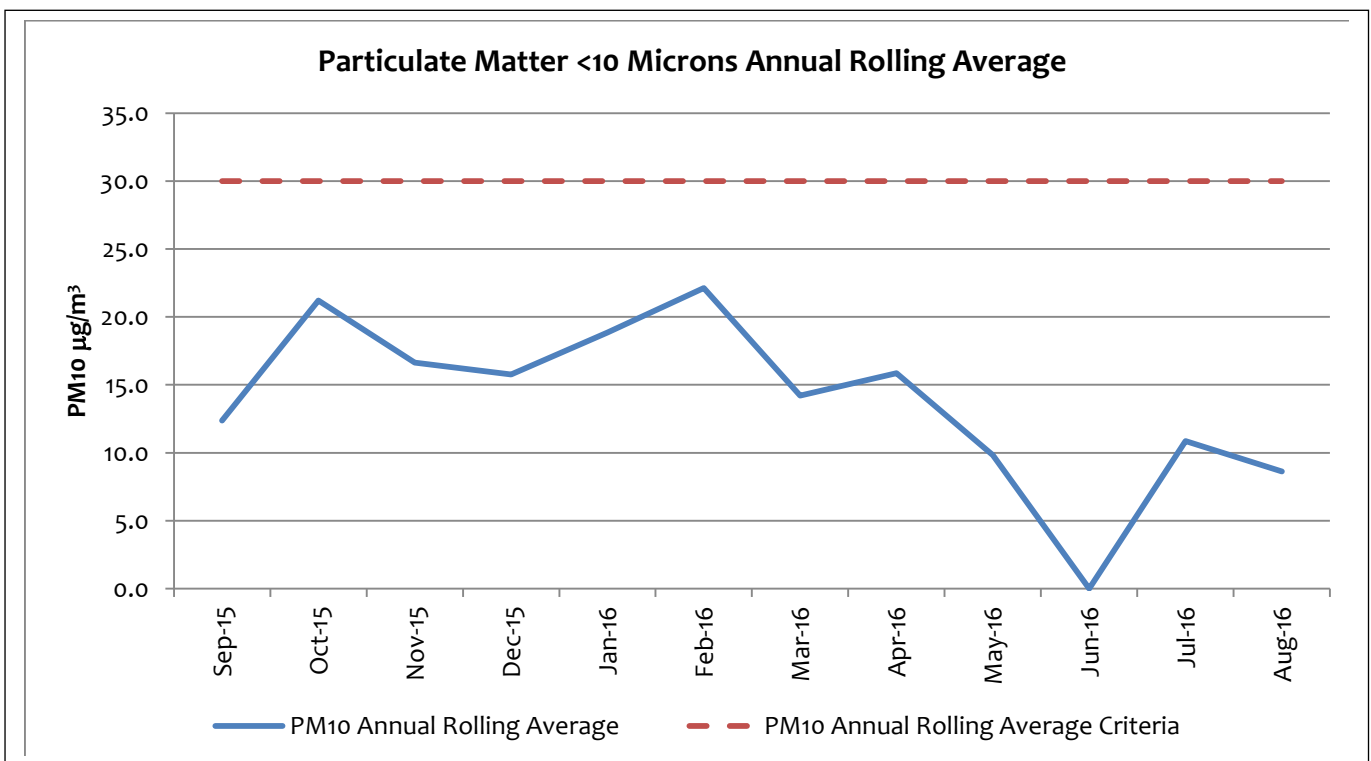
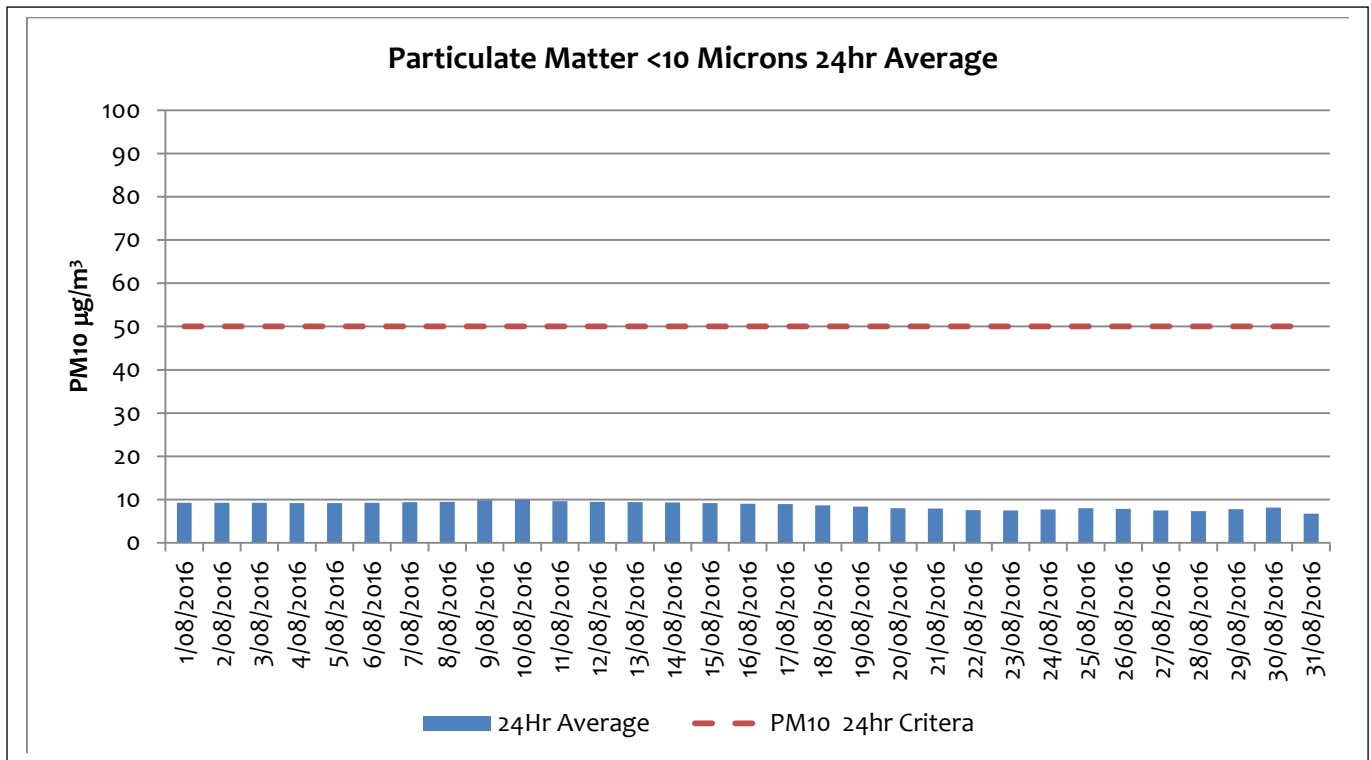
Particulate Matter <10 Microns 24Hr Average		
Date	TEOM 1 - EPL 13 ( $\mu\text{g}/\text{m}^3$ ) Essential Water – Off Site	TEOM 2 – EPL 14 ( $\mu\text{g}/\text{m}^3$ ) Blackwoods Pit – On Site
1/08/2016	9.65	9.25
2/08/2016	9.68	9.29
3/08/2016	9.73	9.27
4/08/2016	9.80	9.17
5/08/2016	9.98	9.22
6/08/2016	10.12	9.29
7/08/2016	10.25	9.41
8/08/2016	10.39	9.52
9/08/2016	10.48	9.82
10/08/2016	10.33	9.91
11/08/2016	10.00	9.60
12/08/2016	9.96	9.52
13/08/2016	9.91	9.38
14/08/2016	9.92	9.33
15/08/2016	9.85	9.17
16/08/2016	9.74	9.03
17/08/2016	9.55	8.94
18/08/2016	9.24	8.68
19/08/2016	8.81	8.37
20/08/2016	8.42	8.04
21/08/2016	8.35	7.93
22/08/2016	7.95	7.54
23/08/2016	7.97	7.50
24/08/2016	8.32	7.74
25/08/2016	8.83	8.01
26/08/2016	9.38	7.84
27/08/2016	10.12	7.48
28/08/2016	10.83	7.37
29/08/2016	12.08	7.78
30/08/2016	11.42	8.15
31/08/2016	7.52	6.72

PM10 $\mu\text{g}/\text{m}^3$ 12 Month Rolling Average												
	Sep-15	Oct-15	Nov-15	Dec-15	Jan-16	Feb-16	Mar-16	Apr-16	May-16	Jun-16	Jul-16	Aug-16
TEOM 1 EPL13 Essential Water Off Site	9.9	19.8	15.2	19.1	15.0	19.0	13.3	17.9	10.8	8.1	10.8	9.6
TEOM 2 EPL14 Blackwoods Pit On Site	12.4	21.2	16.6	15.8	18.8	22.1	14.2	15.9	9.8	0.0	10.9	8.6



## EPL13 – Essential Water – Off Site (TEOM1)

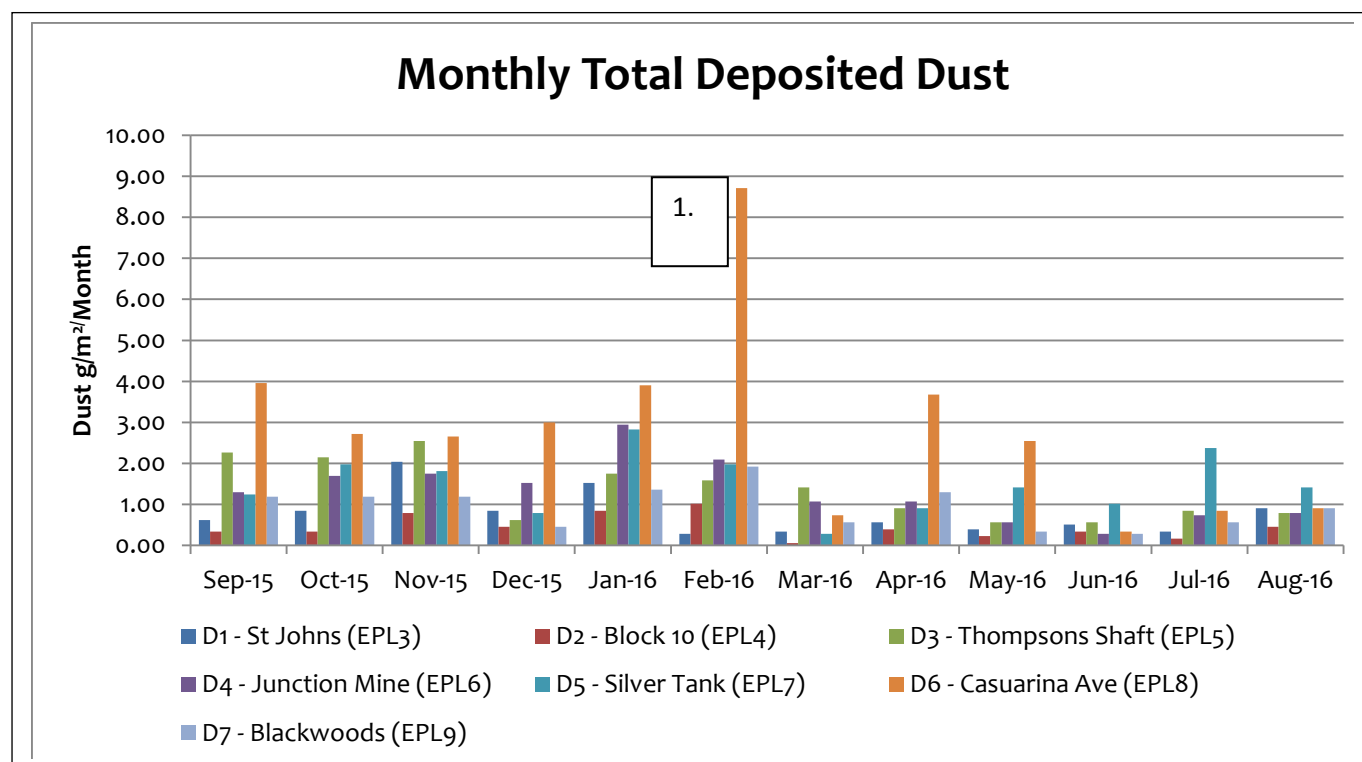




TEOM 2 was calibrated by an external manufacturer's technician on May 5. The technician failed to reset the machine, this lead to the machine failing to record data for the remainder of May and the whole of June. The error was found by the Environmental Officer during the monthly data download.

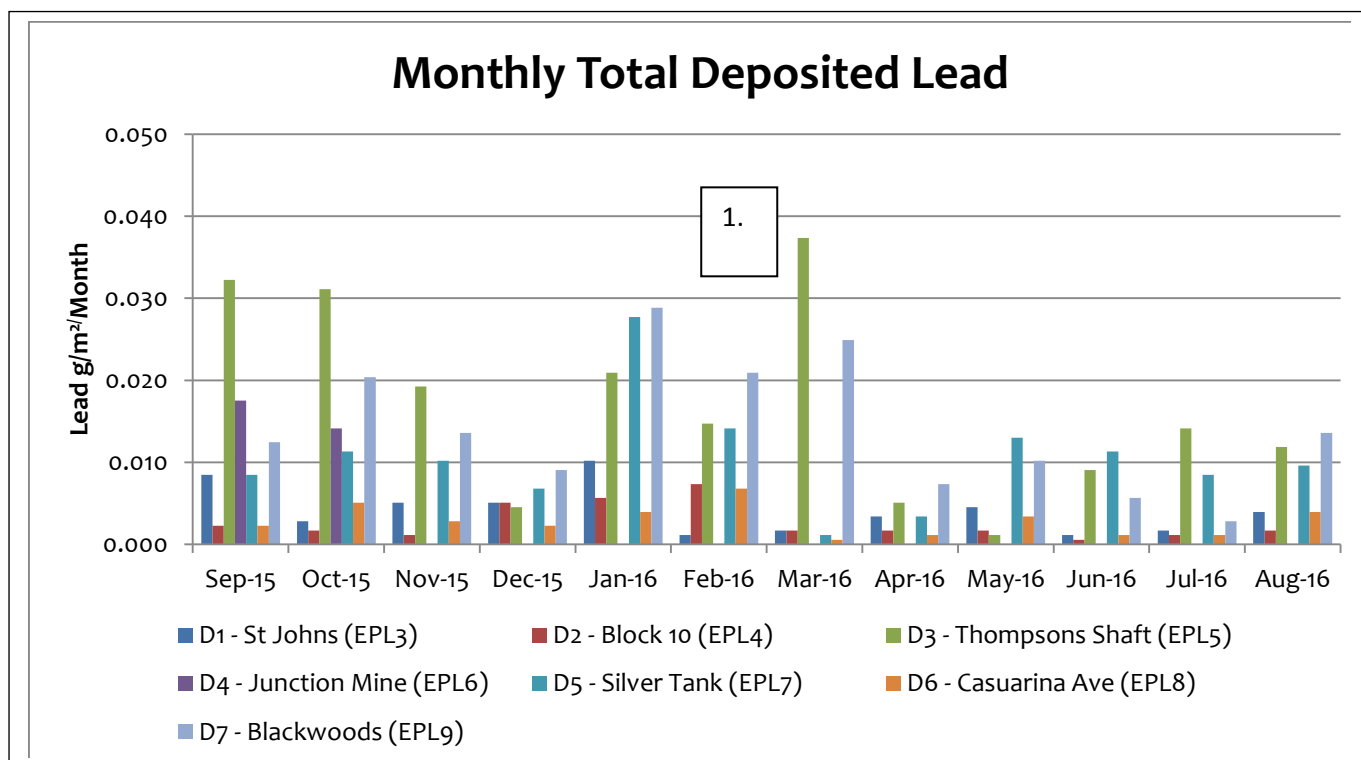
### 1.3 Dust Deposition Sampling

Total Deposited Dust (g/m <sup>2</sup> /Month)							
Date	D1 (off site)	D2	D3	D4	D5	D6 (off site)	D7
August 2016	0.91	0.45	0.79	0.79	1.41	0.91	0.91
Background Average	4.0	3.1	4.3	5.7	n/a	5.8	n/a



1. When the sample for February was collected 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. The maximum allowable total concentration of deposited dust is 4g/m<sup>2</sup>/month as per the site Environment Protection Licence.

Total Deposited Lead (g/m <sup>2</sup> /Month)							
Date	D1 (Off Site)	D2	D3	D4	D5	D6 (Off Site)	D7
August 2016	0.004	0.002	0.012	0.000	0.010	0.001	0.003
Background Average	0.0000	0.001	0.0018	0.0040	0.0010	0.004	0.014



1. Samples at Thompson's shaft spiked in lead concentration in September, October (2015) 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 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 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. The latest monthly results from April onwards have been much lower and coincide with the annual application of dust suppression chemical.

## 2 Blasting (Vibration and Overpressure)

**Note:** *Vibration is recorded in Peak Particle Velocity (ppv), Overpressure is recorded in Decibels (dBL)*

### **August Summary Block 7, Zinc Lode:**

- 1 production firings
- 9 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

### **12 Month Summary of Zinc Lode:**

- % of all blasts over 3mm/sec = **2.29%** (licence requirement <5%) calculated from 1<sup>st</sup> September 2015 until 31<sup>st</sup> August, 2016;
- % of production blasts over 3mm/sec = **3.24%** (licence pollution reduction plan target <5%) calculated from 1<sup>st</sup> September 2015 until 31<sup>st</sup> August, 2016.

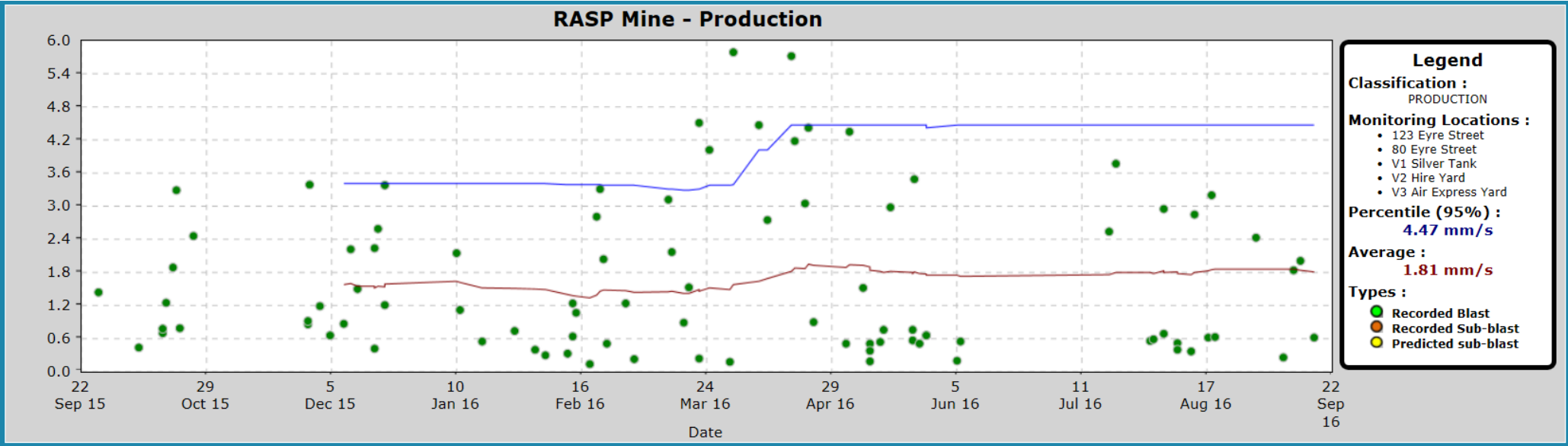
### **August Summary Rest of Mine, Western Mineralisation and Main Lode:**

- 16 production firings
- 157 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 = **0.38%** (licence requirement <5%) calculated from 1<sup>st</sup> September 2015 until 31<sup>st</sup> August, 2016;
- % of production blasts over 5mm/sec = **5.21%** (licence requirement <5%) calculated from 1<sup>st</sup> September 2015 until 31<sup>st</sup> August, 2016.
-

12 Month Production Blast Progress Chart



## Noise

Noise monitoring is undertaken as per the NSW Industrial Noise Policy at a higher frequency of once per annum. A noise assessment was conducted during July 2016. The data was analysed by EMM and a report was produced, the report found the mine operations satisfied the relevant noise limits at all measured locations. The conclusions of the report are 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 PA (PA 07\_0018). A review of the meteorological data from the site's weather station identified that noise limits were inapplicable for two of the 15 operator-attended measurements due to meteorological conditions. The monitoring assessment found that noise from RASP Mine operations satisfied the relevant noise limits at all locations. Furthermore, site noise was inaudible at three of the 15 locations. In summary, no non-compliances were observed during this session of monitoring.*

### 3 Water

#### 3.1 Ground/Surface Water Sampled 1/08/2016

		UG feed	Shaft 7	Location 1 downstream	Location 2 downstream
pH Value	pH Unit	6.38	6.39	6.99	7.53
Electrical Conductivity @ 25°C	µS/cm	10500	11500	109	200
Total Dissolved Solids @180°C	mg/L	10800	11900	83	133
Hydroxide Alkalinity as CaCO3	mg/L	<1	<1	<1	<1
Carbonate Alkalinity as CaCO3	mg/L	<1	<1	<1	<1
Bicarbonate Alkalinity as CaCO3	mg/L	14	24	21	84
Total Alkalinity as CaCO3	mg/L	14	24	21	84
Sulfate as SO4 - Turbidimetric	mg/L	4870	5020	29	13
Chloride	mg/L	1130	1300	11	9
Calcium	mg/L	484	538	9	18
Magnesium	mg/L	231	294	2	4
Sodium	mg/L	1250	1480	10	14
Cadmium	mg/L	2.21	2.49	0.005	0.0008
Lead	mg/L	17	2.84	0.222	0.032
Manganese	mg/L	350	438	0.345	0.04
Zinc	mg/L	1130	1150	1.1	0.149
Iron	mg/L	20.6	0.64	3.64	1.76



### 3.2 Quarterly GW Sampled 3/08/2016

		GW03	GW04	GW05	GW06	GW07	GW08	GW09	GW10	GW11	GW12
pH Value	pH Unit	5.95	6.87	6.25	6.31	6.21	6.15	7.51	6.98	6.92	6.18
Electrical Conductivity @ 25°C	µS/cm	14900	14000	16400	13500	12400	8940	11300	13300	4480	13300
Total Dissolved Solids @180°C	mg/L	13000	10300	16000	12200	11400	8540	6730	11200	3490	12000
Hydroxide Alkalinity as CaCO3	mg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Carbonate Alkalinity as CaCO3	mg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Bicarbonate Alkalinity as CaCO3	mg/L	7	194	148	58	35	15	388	235	105	87
Total Alkalinity as CaCO3	mg/L	7	194	148	58	35	15	388	235	105	87
Sulfate as SO4 - Turbidimetric	mg/L	4210	4030	6520	4280	4010	3150	2980	3870	1480	4990
Chloride	mg/L	2940	2560	2650	2340	1720	1310	1980	2320	465	1610
Calcium	mg/L	569	582	520	555	538	571	766	577	192	457
Magnesium	mg/L	391	483	673	450	345	230	557	512	151	567
Sodium	mg/L	2280	2240	2600	2080	1800	856	1320	2080	600	2000
Cadmium	mg/L	1.99	0.288	0.764	0.838	3.8	1.96	0.0142	0.54	0.0217	1.49
Lead	mg/L	4.08	0.385	2.31	1.22	0.2	1	0.025	0.048	0.131	0.109
Manganese	mg/L	382	110	411	351	388	498	0.179	37.2	47.9	73.5
Zinc	mg/L	385	36.6	374	212	370	667	1.31	51.2	37.7	192
Iron	mg/L	8.76	1.84	16	39.8	0.09	7.3	0.76	0.11	1.3	1.18

### 3.3 Surface Water Sample Record

#### *Surface Water Table Nov 2015 to Nov 2016*

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EPA Identification Number	Frequency	Comment
EPL29 (Federation Way culvert)	2 x Per year when contains water	Sampled 9/5/16 & 21/7/16
EPL31 (Ryan Street Dam)	2 x Per year when contains water	Sampled 9/5/16 & 21/7/16
EPL32 (S1-A adjacent olive grove)	2 x Per year when contains water	Sampled 9/5/16 & 21/7/16
EPL33 (Horwood Dam)	2 x Per year when contains water	Sampled 11/1/16, 10/2/16 & 9/5/16
EPL34 (Upstream Bonanza St)	2 x Per year when contains water	Sampled 1/8/16
EPL35 (Downstream Sydney Rd)	2 x Per year when contains water	Sampled 1/8/16

## 4 Weather Data

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](http://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 <sup>th</sup>		km/h	hPa	°C	%	g <sup>th</sup>		km/h	hPa
1	Mo						SSW	48	22:15				ENE	7	1015.3				W	20	1013.5
2	Tu						S	63	10:13				S	41	1021.7				SSW	43	1021.0
3	We						S	50	09:23				S	31	1026.7				S	31	1025.2
4	Th						SSE	39	09:50				SSE	26	1028.8				SSE	20	1026.8
5	Fr						NE	28	11:13				ENE	11	1030.2				NNE	13	1027.0
6	Sa						ENE	20	10:41				NE	9	1027.1				ENE	13	1024.1
7	Su						NE	20	09:02				NE	15	1026.3				ENE	9	1023.2
8	Mo						N	31	14:22				NNE	15	1024.0				NNW	19	1020.2
9	Tu						NNW	74	13:20				N	26	1015.8				NNW	37	1011.6
10	We						W	43	14:02				W	19	1018.6				WNW	28	1016.7
11	Th						SW	35	10:18				SW	17	1024.4				SW	17	1022.6
12	Fr						NNW	28	11:36				N	15	1024.3				NNW	17	1020.3
13	Sa						SW	30	13:23				NW	7	1025.5				WSW	15	1023.9
14	Su						ENE	28	08:38				ENE	20	1030.6				SSE	9	1027.6
15	Mo						NE	28	09:11				NE	19	1030.9				ENE	11	1026.9
16	Tu						N	52	11:33				NNE	17	1026.5				NNW	24	1022.2
17	We						N	31	02:46				N	15	1023.8				N	11	1020.4
18	Th						N	59	13:04				NNE	20	1019.1				N	31	1013.1
19	Fr						NW	63	05:02				W	22	1013.6				W	28	1013.0
20	Sa						SW	31	11:50				W	20	1022.1				WNW	19	1019.7
21	Su						NNE	28	12:32				NNE	17	1019.6				NNE	17	1015.2
22	Mo						SSE	30	11:51				SSE	17	1014.4				E	15	1012.6
23	Tu						ESE	28	13:34				ENE	9	1016.7				ESE	17	1014.1
24	We						SW	35	11:45				SSW	15	1015.2				WSW	17	1012.6
25	Th						SSW	30	14:44				S	13	1018.6				S	20	1017.5
26	Fr						SW	33	12:06				SSW	15	1025.0				SSW	22	1022.5
27	Sa						WNW	31	13:13				NNE	15	1025.4				NNW	17	1022.0
28	Su						N	39	10:42				NNW	24	1022.6				NNE	26	1018.2
29	Mo						NNE	39	08:54				NNE	28	1019.6				NE	24	1016.4
30	Tu						N	50	16:19				NNE	20	1017.8				N	26	1013.9
31	We						W	33	13:11				W	11	1020.0				WNW	22	1017.9
Statistics for August 2016																					
Mean														17	1022.3					20	1019.4
Lowest													#	7	1013.6				#	9	1011.6
Highest							NNW	74					S	41	1030.9				SSW	43	1027.6
Total																					

IDCJDW2020.201608 Prepared at 13:00 GMT on Wednesday 21 September 2016

### Legend

**Dir** = Direction, **Spd**=Wind Speed, **Temp**=Temperature, **RH**=Relative Humidity, **CLD**=Cloud, **MSLP**=Mean Sea Level Pressure

## 5 Data Log

Sample	Result Received	Date Published
Hi Volume Samples	8/9/2016	23/9/2016
TEOM	Real time	23/9/2016
Dust Deposition	14/9/2016	23/9/2016
Water	10/8/16	23/9/2016
Blast Vibration and overpressure	Real Time	23/9/2016

## 6 Correction Log

There are no corrections for the previous month

## 7 Attachments

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