



**Licensee:** Perilya Broken Hill Limited

**Environmental Protection Licenses:** 2688 and 2683

**Locations:** Southern, Northern and Potosi Operations

## **Air Quality Monitoring**

### ***Methods***

#### **High Volume Air Sampler**

Four HVAS are placed within the Southern, Northern and Potosi Operations to allow assessment of dust and associated lead levels. The HVAS collect a sample of air during a 24 hour period every sixth day and is designed to collect all particles less than 50µm. The sample collected is heavily influenced by weather conditions and nearby activities. This sampling method is consistent with the Australian/New Zealand Standard: AS/NZS 3580.9.3:2003.

In accordance with EPLs 2688 and 2683 the reportable annual averaged level of lead is 0.5µg/m<sup>3</sup> and total suspended particulates (TSP) is 90µg/m<sup>3</sup>. This report presents all data collected during the month. At times levels may be elevated due to isolated occurrences. However, the results are assessed on an annual basis as per the National Environment Protection Council requirements. PBHL has been advised to report these incidences to the EPA although the measurement of TSP, dust and lead is on an annual basis rather than monthly. Given this advice, it is reasonable to expect that levels will occasionally be elevated while not being in breach of license conditions.

#### **Dust Gauges**

Perilya Broken Hill Limited (PBHL) has 19 Standard Deposit Dust Gauges (SDDG) that are strategically placed around Broken Hill. These gauges monitor dust and lead for 30 days, at which time the matter collected in the bottles is analysed by a NATA accredited laboratory. This method of sample collection is consistent with the Australian/New Zealand Standard: AS/NZS 3580.10.1:2003.

SDDG are used primarily to establish long term trends and to investigate localised dust fall. The sample collected is not restricted in particle size, everything that falls within the funnel reports to the collection bottle. This dust is categorised as nuisance dust. This procedure has been widely used in Australia for over 40 years. The data collected using SDDG is not directly comparable to data obtained with High Volume Air Samplers (HVAS) (Standards Australia

2003) because the SDDG is assessing nuisance dust whereas the HVAS collect dust of a much smaller micron that has different health impacts.

In accordance with EPLs 2688 and 2683 the upper limit for dust levels on an annual basis is 6 g/m<sup>2</sup>/month. The following report shows monthly results as well as annual reportable levels of dust levels. Analysis of results on a monthly or weekly basis per site can show isolated occurrences of elevated dust levels however this data is reported upon annually. Isolated occurrences of elevated levels require attention but must be considered on an annual basis.

## **Results**

### ***HVAS***

Table 1 presents the TSP and the total lead for June 2012. All TSP results were below the allowable 90 µg/m<sup>3</sup>. Total lead was above the allowable 0.5 µg/m<sup>3</sup> on two occasions.

The elevated lead results were sampled at point 13 on the 12/06/2012 and the 24/06/2012 and recorded 0.82 and 0.93 µg/m<sup>3</sup> respectively. This is most likely due to the HVAS being located approximately two meters from a road that is frequently used by heavy vehicles. The road is on a levy above the sampler causing any generated dust to be easily drawn into the HiVol.

Despite some results being outside of license conditions for the month, the reportable level is based upon the previous 12 months of data that shows the average lead level to be 0.23 µg/m<sup>3</sup>. Figure 1 and Figure 2 show the monthly averages for TSP and total lead for the previous 12 months.

**Table 1. TSP and total lead results from the HVAS for June 2012 and for the period July 2011-June 2012**

Sampling Point	Method	Monitoring frequency required by licence	Sampling Dates	Pollutant	Unit	Limit	Measurement	
12	High Volume Air Sampler	6 day cycles	6/06/2012	Total suspended particulates	$\mu\text{g}/\text{m}^3$	90	10	
			12/06/2012	Total suspended particulates	$\mu\text{g}/\text{m}^3$	90	14	
			18/06/2012	Total suspended particulates	$\mu\text{g}/\text{m}^3$	90	13	
			24/06/2012	Total suspended particulates	$\mu\text{g}/\text{m}^3$	90	11	
			30/06/2012	Total suspended particulates	$\mu\text{g}/\text{m}^3$	90	33	
			6/06/2012	Total Lead	$\mu\text{g}/\text{m}^3$	0.5	0.01	
			12/06/2012	Total Lead	$\mu\text{g}/\text{m}^3$	0.5	0.06	
			18/06/2012	Total Lead	$\mu\text{g}/\text{m}^3$	0.5	0.10	
			24/06/2012	Total Lead	$\mu\text{g}/\text{m}^3$	0.5	0.22	
			30/06/2012	Total Lead	$\mu\text{g}/\text{m}^3$	0.5	0.23	
		<b>Averaged reporting period required by National Environment Protection Council</b>						
		Annual	July 2011 - June 2012	Total Lead	$\mu\text{g}/\text{m}^3$	0.5	0.21	

**Table 1 cont.**

Sampling Point	Method	Monitoring frequency required by licence	Sampling Dates	Pollutant	Unit	Limit	Measureme		
13	High Volume Air Sampler	6 day cycles	6/06/2012	Total suspended particulates	$\mu\text{g}/\text{m}^3$	90	10		
			12/06/2012	Total suspended particulates	$\mu\text{g}/\text{m}^3$	90	22		
			18/06/2012	Total suspended particulates	$\mu\text{g}/\text{m}^3$	90	9		
			24/06/2012	Total suspended particulates	$\mu\text{g}/\text{m}^3$	90	25		
			30/06/2012	Total suspended particulates	$\mu\text{g}/\text{m}^3$	90	12		
			6/06/2012	Total Lead	$\mu\text{g}/\text{m}^3$	0.5	0.05		
			12/06/2012	Total Lead	$\mu\text{g}/\text{m}^3$	0.5	0.82		
			18/06/2012	Total Lead	$\mu\text{g}/\text{m}^3$	0.5	0.05		
			24/06/2012	Total Lead	$\mu\text{g}/\text{m}^3$	0.5	0.93		
			30/06/2012	Total Lead	$\mu\text{g}/\text{m}^3$	0.5	0.05		
		<b>Averaged reporting period required by National Environment Protection Council</b>							
		Annual	July 2011 - June 2012	Total Lead	$\mu\text{g}/\text{m}^3$	0.5	0.23		

**Table 1 cont.**

Sampling Point	Method	Monitoring frequency required by licence	Sampling Dates	Pollutant	Unit	Limit	Measurement	
26	High Volume Air Sampler	6 day cycles	6/06/2012	Total suspended particulates	µg/m <sup>3</sup>	90	7	
			12/06/2012	Total suspended particulates	µg/m <sup>3</sup>	90	19	
			18/06/2012	Total suspended particulates	µg/m <sup>3</sup>	90	14	
			24/06/2012	Total suspended particulates	µg/m <sup>3</sup>	90	22	
			30/06/2012	Total suspended particulates	µg/m <sup>3</sup>	90	17	
			6/06/2012	Total Lead	µg/m <sup>3</sup>	0.5	0.01	
			12/06/2012	Total Lead	µg/m <sup>3</sup>	0.5	0.03	
			18/06/2012	Total Lead	µg/m <sup>3</sup>	0.5	0.04	
			24/06/2012	Total Lead	µg/m <sup>3</sup>	0.5	0.05	
			30/06/2012	Total Lead	µg/m <sup>3</sup>	0.5	0.02	
		<b>Averaged reporting period required by National Environment Protection Council</b>						
		Annual	July 2011 - June 2012	Total Lead	µg/m <sup>3</sup>	0.5	0.08	

**Table 1 cont.**

Sampling Point	Method	Monitoring frequency required by licence	Sampling Dates	Pollutant	Unit	Limit	Measurement	
27	High Volume Air Sampler	6 day cycles	6/06/2012	Total suspended particulates	µg/m <sup>3</sup>	90	6	
			12/06/2012	Total suspended particulates	µg/m <sup>3</sup>	90	52	
			18/06/2012	Total suspended particulates	µg/m <sup>3</sup>	90	15	
			24/06/2012	Total suspended particulates	µg/m <sup>3</sup>	90	13	
			30/06/2012	Total suspended particulates	µg/m <sup>3</sup>	90	15	
			6/06/2012	Total Lead	µg/m <sup>3</sup>	0.5	0.01	
			12/06/2012	Total Lead	µg/m <sup>3</sup>	0.5	0.16	
			18/06/2012	Total Lead	µg/m <sup>3</sup>	0.5	0.06	
			24/06/2012	Total Lead	µg/m <sup>3</sup>	0.5	0.06	
			30/06/2012	Total Lead	µg/m <sup>3</sup>	0.5	0.02	
		<b>Averaged reporting period required by National Environment Protection Council</b>						
		Annual	July 2011 - June 2012	Total Lead	µg/m <sup>3</sup>	0.5	0.15	

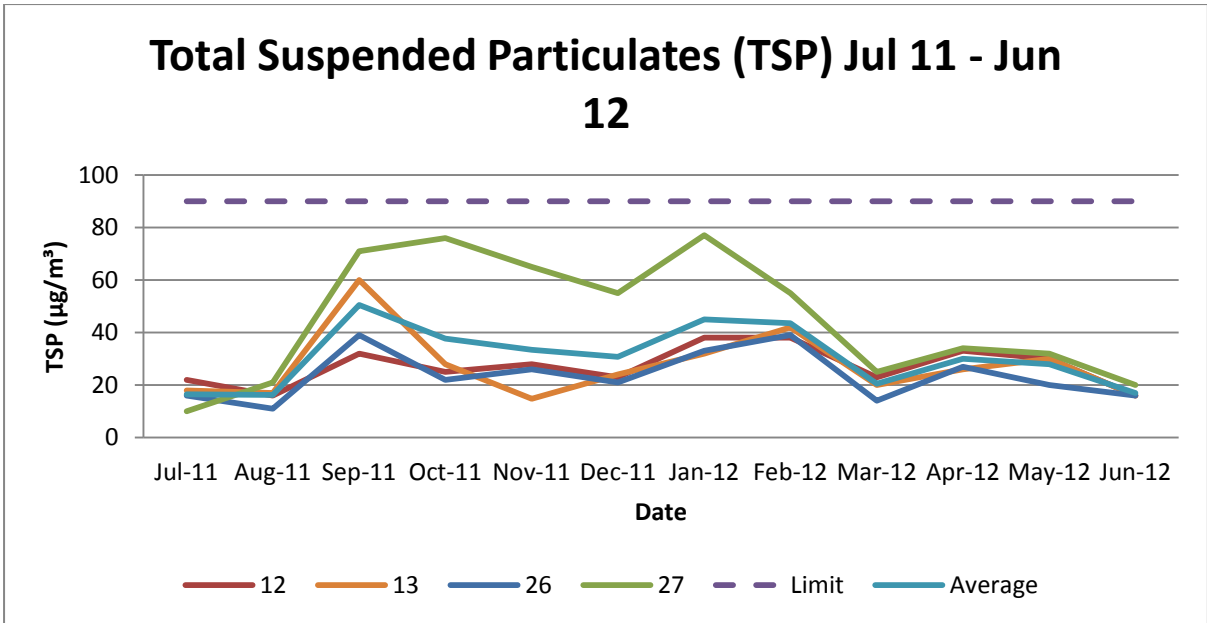


Figure 1 TSP results from the HVAS for the previous 12 months.

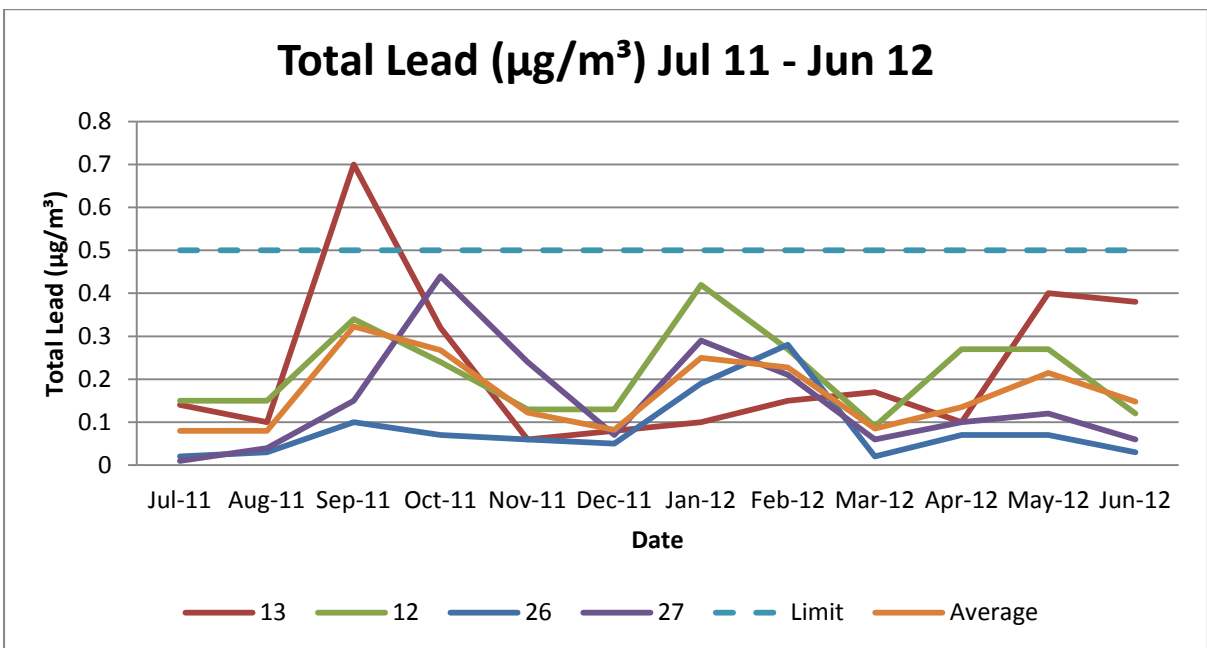


Figure 2 Total lead results from the HVAS for the previous 12 months.

## ***Dust Deposition Gauges***

All results were below the license requirement of 6 g/m<sup>2</sup>/month for the annual period. The highest result was 5.6 g/m<sup>2</sup>/month which was recorded at point 15.

On a monthly basis, all results were within the license conditions (<6 g/m<sup>2</sup>/month) specified in EPL 2688 (Table 1) and 2683 (Table 4) for particulates-deposited matter as sampled by the dust deposition gauges for June 2012. The highest result for the month was 1.8 g/m<sup>2</sup>/month sampled at point 24. Table 2 and Table 4 also present the particulate matter for the previous 12 months.

**Table 2 Results from the dust deposition gauges for June 2012 and the previous 12 months as per EPL 2688**

<b>Sampling Point</b>	<b>Method</b>	<b>Monitoring frequency required by licence</b>	<b>Pollutant</b>	<b>Unit</b>	<b>Limit</b>	<b>Measurement</b>
4	Dust gauge	Monthly	Particulates - deposited matter	g/m <sup>2</sup> /month	6	0.7
5	Dust gauge	Monthly	Particulates - deposited matter	g/m <sup>2</sup> /month	6	0.6
6	Dust gauge	Monthly	Particulates - deposited matter	g/m <sup>2</sup> /month	6	1.2
7	Dust gauge	Monthly	Particulates - deposited matter	g/m <sup>2</sup> /month	6	0.2
8	Dust gauge	Monthly	Particulates - deposited matter	g/m <sup>2</sup> /month	6	1.1
9	Dust gauge	Monthly	Particulates - deposited matter	g/m <sup>2</sup> /month	6	1.1
10	Dust gauge	Monthly	Particulates - deposited matter	g/m <sup>2</sup> /month	6	0.7
11	Dust gauge	Monthly	Particulates - deposited matter	g/m <sup>2</sup> /month	6	0.5



**Table 3 cont.**

<b>Sampling Point</b>	<b>Method</b>	<b>Reporting frequency required by licence</b>	<b>Pollutant</b>	<b>Unit</b>	<b>Limit</b>	<b>Measurement</b>
4	Dust gauge	Annual	Particulates - deposited matter	g/m2/month	6	1.7
5	Dust gauge	Annual	Particulates - deposited matter	g/m2/month	6	3.4
6	Dust gauge	Annual	Particulates - deposited matter	g/m2/month	6	1.7
7	Dust gauge	Annual	Particulates - deposited matter	g/m2/month	6	1.4
8	Dust gauge	Annual	Particulates - deposited matter	g/m2/month	6	3.6
9	Dust gauge	Annual	Particulates - deposited matter	g/m2/month	6	4.7
10	Dust gauge	Annual	Particulates - deposited matter	g/m2/month	6	5
11	Dust gauge	Annual	Particulates - deposited matter	g/m2/month	6	1.9

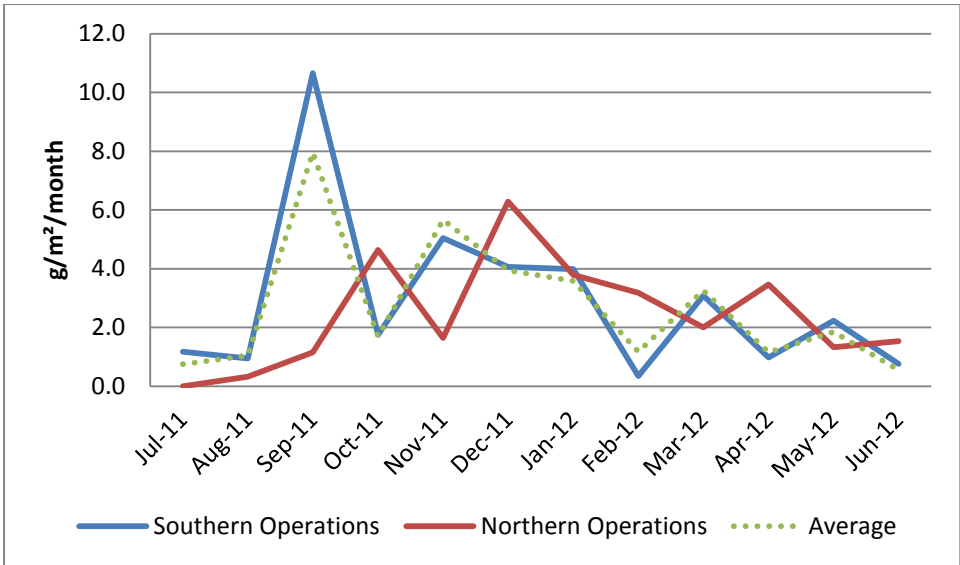
**Table 4. Dust gauge results for June 2012 and the previous 12 months as per EPL 2683.**

Sampling Point	Method	Monitoring frequency required by licence	Pollutant	Unit	Limit	Measurement
15	Dust gauge	Monthly	Particulates - deposited matter	g/m <sup>2</sup> /month	6	<0.1
16	Dust gauge	Monthly	Particulates - deposited matter	g/m <sup>2</sup> /month	6	0.2
17	Dust gauge	Monthly	Particulates - deposited matter	g/m <sup>2</sup> /month	6	0.1
18	Dust gauge	Monthly	Particulates - deposited matter	g/m <sup>2</sup> /month	6	0.1
19	Dust gauge	Monthly	Particulates - deposited matter	g/m <sup>2</sup> /month	6	0.2
20	Dust gauge	Monthly	Particulates - deposited matter	g/m <sup>2</sup> /month	6	0.2
21	Dust gauge	Monthly	Particulates - deposited matter	g/m <sup>2</sup> /month	6	<0.1
22	Dust gauge	Monthly	Particulates - deposited matter	g/m <sup>2</sup> /month	6	NR
23	Dust gauge	Monthly	Particulates - deposited matter	g/m <sup>2</sup> /month	6	0.2
24	Dust gauge	Monthly	Particulates - deposited matter	g/m <sup>2</sup> /month	6	1.8
25	Dust gauge	Monthly	Particulates - deposited matter	g/m <sup>2</sup> /month	6	0.3

**Table 3 cont.**

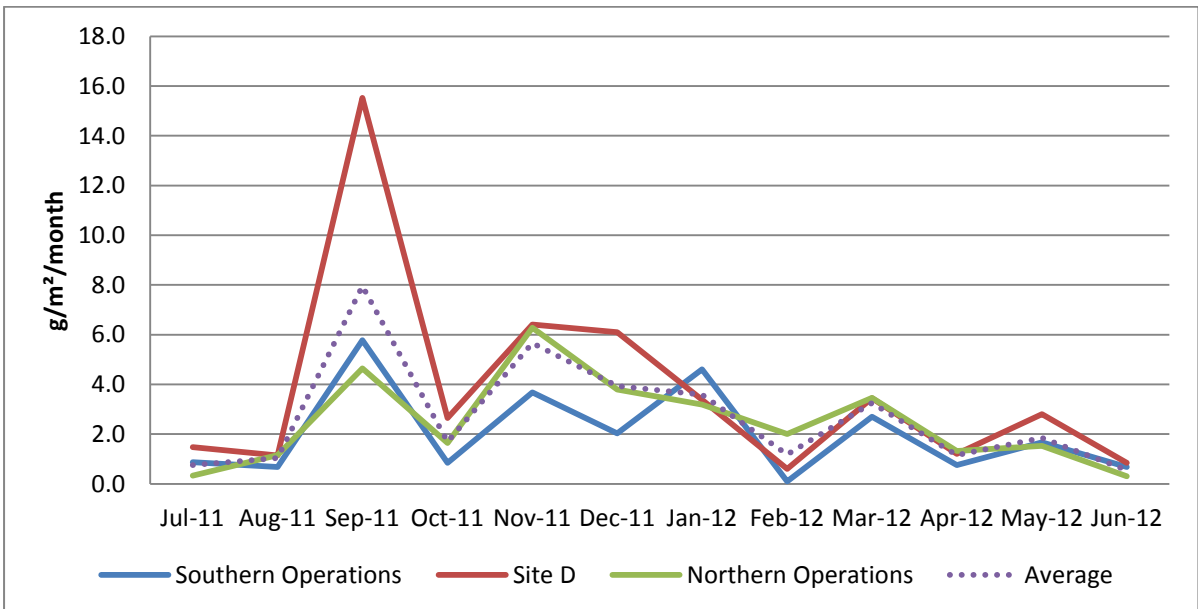
Sampling Point	Method	Reporting frequency required by licence	Pollutant	Unit	Limit	Measurement
15	Dust gauge	Annual	Particulates - deposited matter	g/m <sup>2</sup> /month	6	5.6
16	Dust gauge	Annual	Particulates - deposited matter	g/m <sup>2</sup> /month	6	3.7
17	Dust gauge	Annual	Particulates - deposited matter	g/m <sup>2</sup> /month	6	1.9
18	Dust gauge	Annual	Particulates - deposited matter	g/m <sup>2</sup> /month	6	1.8
19	Dust gauge	Annual	Particulates - deposited matter	g/m <sup>2</sup> /month	6	2.9
20	Dust gauge	Annual	Particulates - deposited matter	g/m <sup>2</sup> /month	6	1.9
21	Dust gauge	Annual	Particulates - deposited matter	g/m <sup>2</sup> /month	6	2.7
22	Dust gauge	Annual	Particulates - deposited matter	g/m <sup>2</sup> /month	6	1
23	Dust gauge	Annual	Particulates - deposited matter	g/m <sup>2</sup> /month	6	1.4
24	Dust gauge	Annual	Particulates - deposited matter	g/m <sup>2</sup> /month	6	1.7
25	Dust gauge	Annual	Particulates - deposited matter	g/m <sup>2</sup> /month	6	1.9

The annual results have been further analyzed in Figure 3. The gauges have been combined based on which EPL they are identified in. The combined data shows that the average deposited particulate matter collected from all sites was 7.9 g/m<sup>2</sup>/month in September. The highest result came from the Southern Operations gauges (10.7 g/m<sup>2</sup>/month) and can be correlated with high wind speeds in September. This can be seen in the weather data reported separately.



**Figure 3** The average monthly deposited particulate matter as sampled by the dust deposition gauges. The data has been combined into EPL 2688 (Southern Operations) and 2683 (Northern Operations).

In mitigating dust from the Southern Operations, measures are being taken to control dust generated from the Site D tailings dam, a significant contributing factor to the results seen in the gauges (Figure 4). This has involved using a dust suppressant plus there is the installation of dust capturing fencing and applying a clay cap. It is expected that this will significantly reduce the deposited matter collected by the gauges surrounding the facility. This will hopefully become evident from the results in upcoming months.



**Figure 4** The average monthly deposited particulate matter as sampled by the dust deposition gauges. The data has been combined into EPL 2688 (Southern Operations) with the gauges in close proximity to the tailings surface facility separated (Site D) and 2683 (Northern Operations).