

Rasp Mine
Monthly Environmental Monitoring Report
December 2020



INTRODUCTION

Broken Hill Operations Pty Ltd (BHOP) [a wholly owned subsidiary of CBH Resources Limited (CBH)] owns and operates the Rasp Mine (the Mine), which is located centrally within the City of Broken Hill on Consolidated Mine Lease 7 (CML7).

Mining has been undertaken within CML7 since 1885. The existing operations at the Rasp Mine include underground mining operations, a processing plant producing zinc and lead concentrates and a rail siding for concentrate dispatch. These operations are undertaken in accordance with Project Approval 07_0018 granted 31 January 2011, under Part3A of the Environmental Planning and Assessment Act 1979 (EP&A Act).

As the holder of an Environmental Protection Licence, 12559, BHOP is required, under Section 66(6) of the NSW *Protection of the Environment Operations Act 1997*, to publish pollution monitoring data. In addition BHOP is required to publish data in accordance with its Project Approval 07_0018 Schedule 4 Condition 9. These documents can be found on the Rasp Mine web site.

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1 Air Quality

The following criteria as listed in the Project Approval (DA 07_0018 MOD7 July 2019) apply to air quality monitoring:

Long Term Criteria for Particulate Matter

Pollutant	Averaging Period	Criterion
Total solid particles (TSP)	Annual	90 µg/m ³
Particulate matter < 10 µm (PM ₁₀)	Annual	25 µg/m ³

Short Term Criterion for Particulate Matter

Pollutant	Averaging Period	Criterion
Particulate matter < 10 µm (PM ₁₀)	24 hour	50 µg/m ³

Long Term Criteria for Deposited Dust

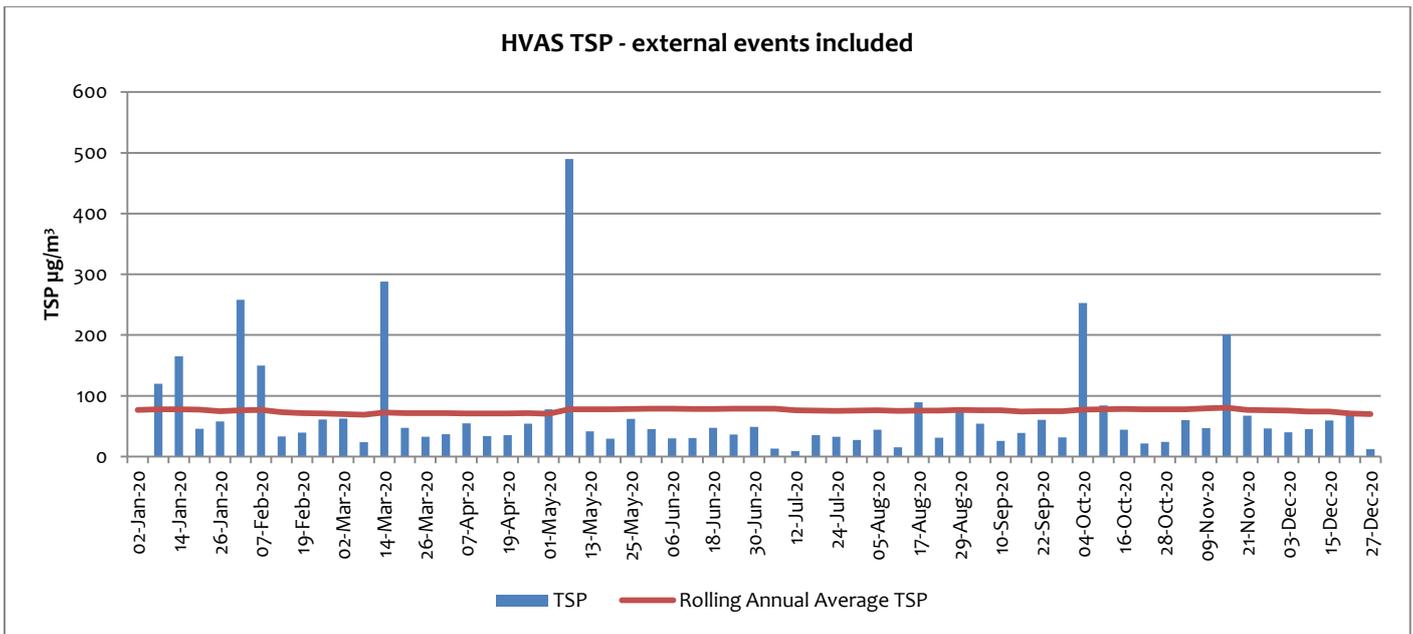
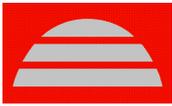
Pollutant	Averaging Period	Maximum Project Contribution	Maximum Total Deposited Dust Level
Deposited dust	Annual	2 g/m ² /month	4 g/m ² /month

1.1 High Volume Air Samplers

There are four high volume air samplers used to measure ambient air quality at the Rasp Mine – HVAS (EPL10) and HVAS1 (EPL11) are located at the Silver Tank, central and to the south of the mine lease, and HVAS2 (EPL12) and HVAS3 (EPL57) are located adjacent to and north of Blackwood Pit. A map indicating these locations can be found on the Rasp Mine web site. HVAS and HVAS3 sample for total suspended particulates (TSP) and lead dust, and HVAS1 and HVAS2 sample for particulate matter less than 10 microns (PM₁₀) and lead dust.

HVAS (EPL10) - Silver Tank (On Site) Results for December

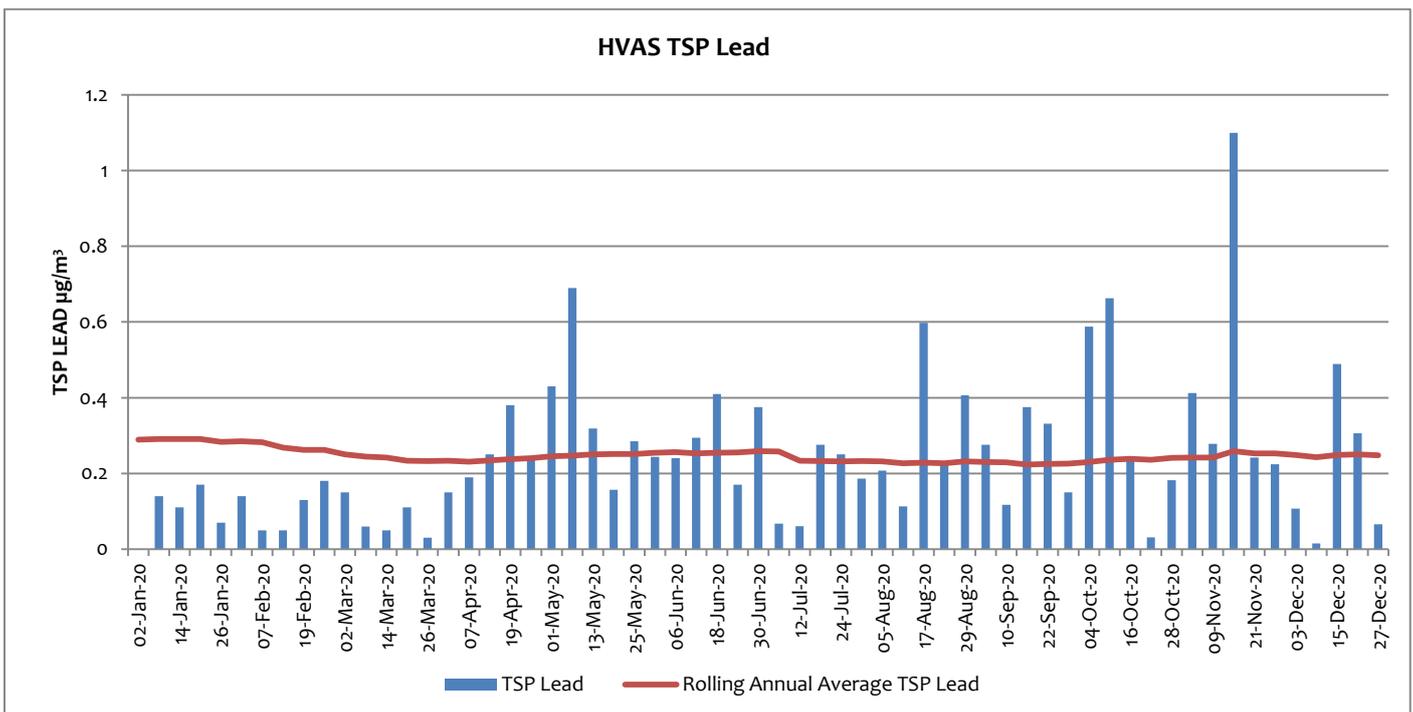
DATE	TSP (µg/m ³)	Lead (µg/m ³)
3-12-2020	40.10	0.011
9-12-2020	45.20	0.02
15-12-2020	59.20	0.49
21-12-2020	72.90	0.31
27-12-2020	12.30	0.07



HVAS (EPL10) is located on the southern boundary of Rasp Mine and while limit criteria do not apply at this point, they do apply at the closest residential location.

TSP dust results at HVAS were low for the month of December compared to previous months. The annual rolling average for TSP at this location is $69.95 \mu\text{g}/\text{m}^3$ at the end of December, significantly lower than the average at the beginning of January 2020 which was $76.37 \mu\text{g}/\text{m}^3$. Minor rainfall and fewer extreme dust events than the previous year contributed to the low dust levels measured in December.

The annual rolling average for TSP is determined using data with extreme dust events included.





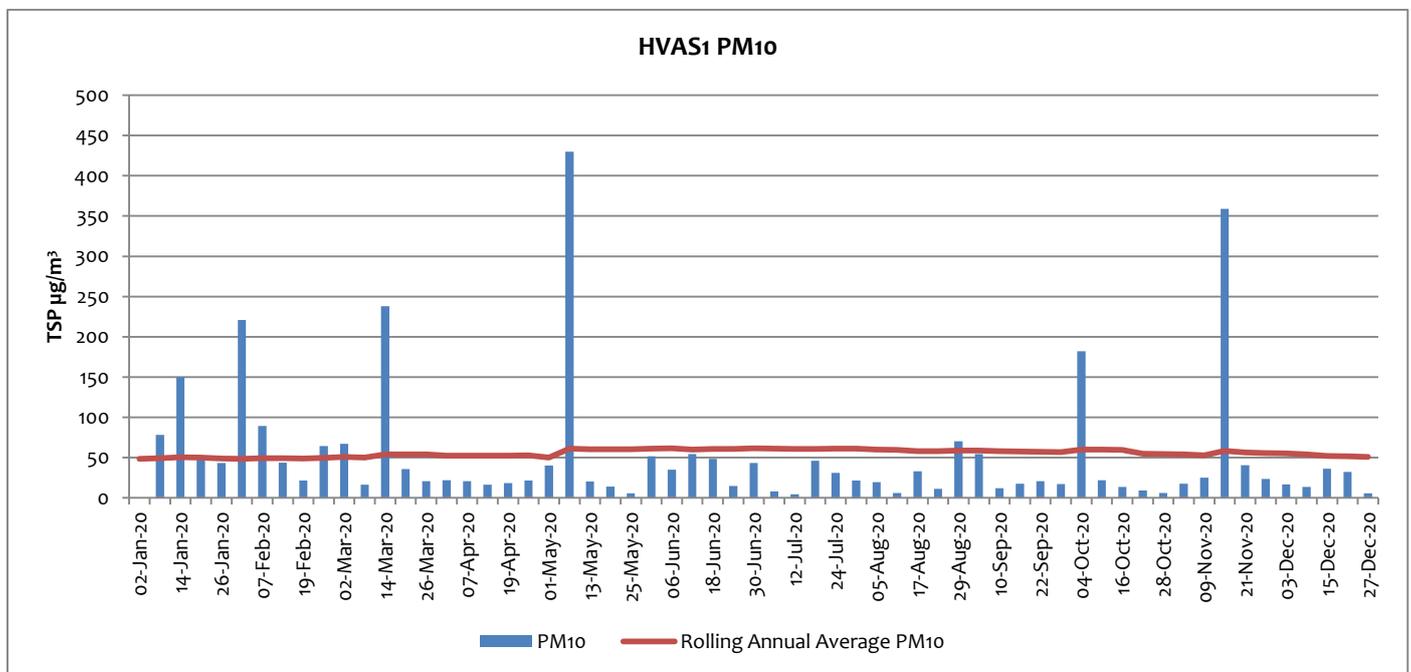
There were elevated TSP Lead levels of 0.489 $\mu\text{g}/\text{m}^3$ on 15 December and 0.489 $\mu\text{g}/\text{m}^3$ on 21 December. The predominant wind directions on 15 December from the South/SSE which suggests there was contribution of lead dust from off-site sources. The rolling annual average for TSP Lead in December 2020 was 0.25 $\mu\text{g}/\text{m}^3$, down from 0.29 $\mu\text{g}/\text{m}^3$ in January 2020.

Dust is controlled on site using the application of dust suppressant on free (unused) areas and side tracks, and from the frequent watering of haul roads.

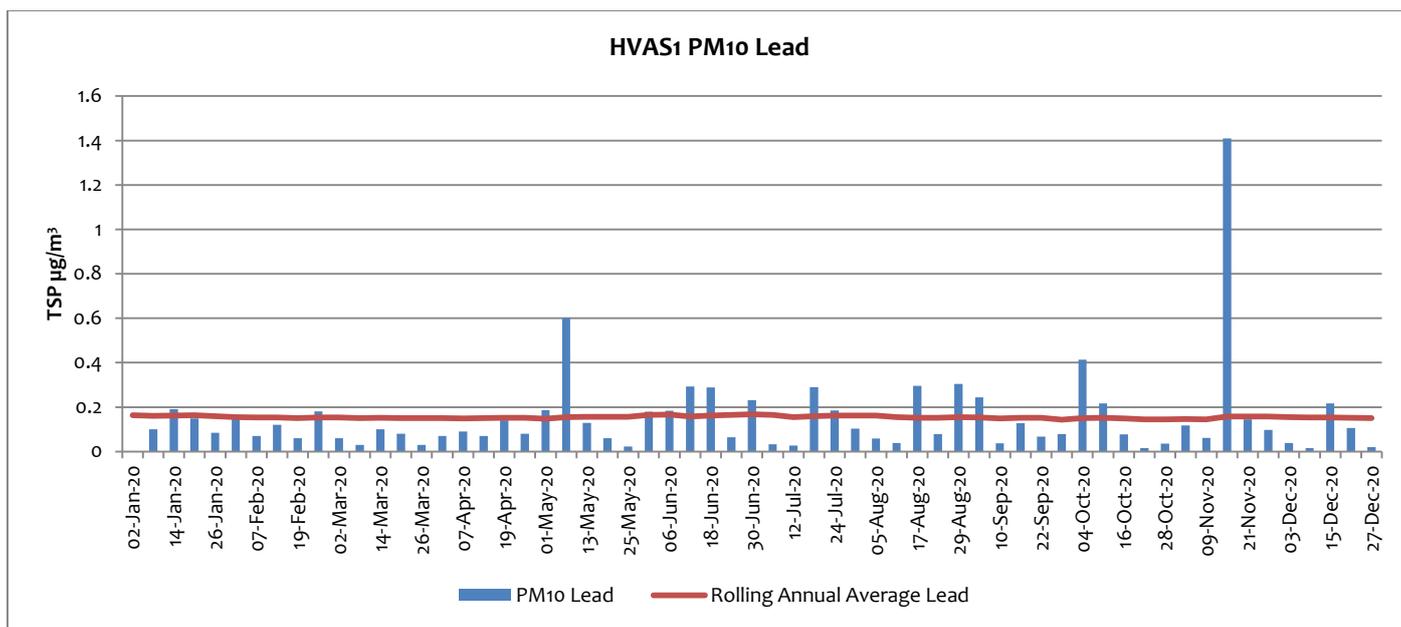
HVAS1 (EPL11) - Silver Tank (On Site) Results for December

DATE	PM ₁₀ ($\mu\text{g}/\text{m}^3$)	PM ₁₀ Lead ($\mu\text{g}/\text{m}^3$)
3-12-2020	16.70	0.04
9-12-2020	13.50	0.02
15-12-2020	35.90	0.22
21-12-2020	32.20	0.11
27-12-2020	5.60	0.02

HVAS1 (EPL11) is located on the southern boundary of Rasp Mine and while limit criteria do not apply at this point, they do apply at the closest residential location.



PM₁₀ dust results at HVAS1 were low for the month of December compared to previous months. The annual rolling average for PM₁₀ dust at this location is 50.7 $\mu\text{g}/\text{m}^3$ at the end of December, slightly higher than the average at the beginning of January 2020 which was 48.1 $\mu\text{g}/\text{m}^3$.



There were elevated PM₁₀ lead levels of 0.216 µg/m³ on 15 December. The predominant wind directions on 15 December were from the South/SSE which suggests there was contribution of lead dust from off-site sources. The rolling annual average for PM₁₀ Lead in December 2020 was 0.15 µg/m³, down from 0.16 µg/m³ in January 2020.

HVAS 2 (EPL12) - Blackwood Pit (On Site) Results for December

HVAS2 (EPL12) is located on the northern boundary of Rasp Mine and while limit criteria do not apply at this point, they do apply at the closest residential location. HVAS2 has been decommissioned since June 2019 while Embankment 2 TSF2 construction works are undertaken. A real-time PM₁₀ monitor is in place adjacent to the HVAS2 location.

HVAS 3 (EPL57) - Blackwood Pit (On Site) Results for December

HVAS3 (EPL57) is located on the northern boundary of Rasp Mine and while limit criteria do not apply at this point, they do apply at the closest residential location. HVAS3 (EPL57) was included in EPL 12559 on 14 March 2019 to provide for monitoring of TSP Dust on the northern boundary of the site at Blackwoods Pit TSF2. HVAS3 has been decommissioned since June 2019 while Embankment 2 TSF2 construction works are undertaken. A real-time PM₁₀ monitor is in place adjacent to the HVAS2 location.



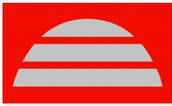
1.2 Tapered Element Oscillating Microbalance Sampling (TEOM)

There are two Tapered Element Oscillating Microbalance (TEOM) sampling units used to measure ambient air quality at the Rasp Mine – TEOM1 (EPL13) is located off-site within the perimeter fence of Essential Water south of the mine lease, and TEOM2 (EPL14) is located on-site adjacent to Blackwood Pit to the north of the mine lease. A map indicating these locations can be found on the Rasp Mine web site. TEOM1 and TEOM2 are designed to operate continuously and sample for particulate matter less than 10 microns (PM₁₀) in size.

TEOM2 was temporarily decommissioned in 19 June 2019 due to Embankment 2 TSF2 construction works. The decommissioning is in accordance with dust management strategies agreed with the EPA which includes the operation of a real-time PM10 monitor north of the construction works. Both Project Approval and Environment Protection Licence criteria exclude dust storms and other extraordinary events.

Project Approval 07_0018 criteria apply at TEOM1 and TEOM2, with two criteria listed for PM10, a 24 hour average criteria of 50 ug/m³ and an annual average criteria of 25 ug/m³.

TEOM data is validated by third party consultants using Australian Standards and internal procedures, and is used to populate the table of TEOM monthly data provided below.



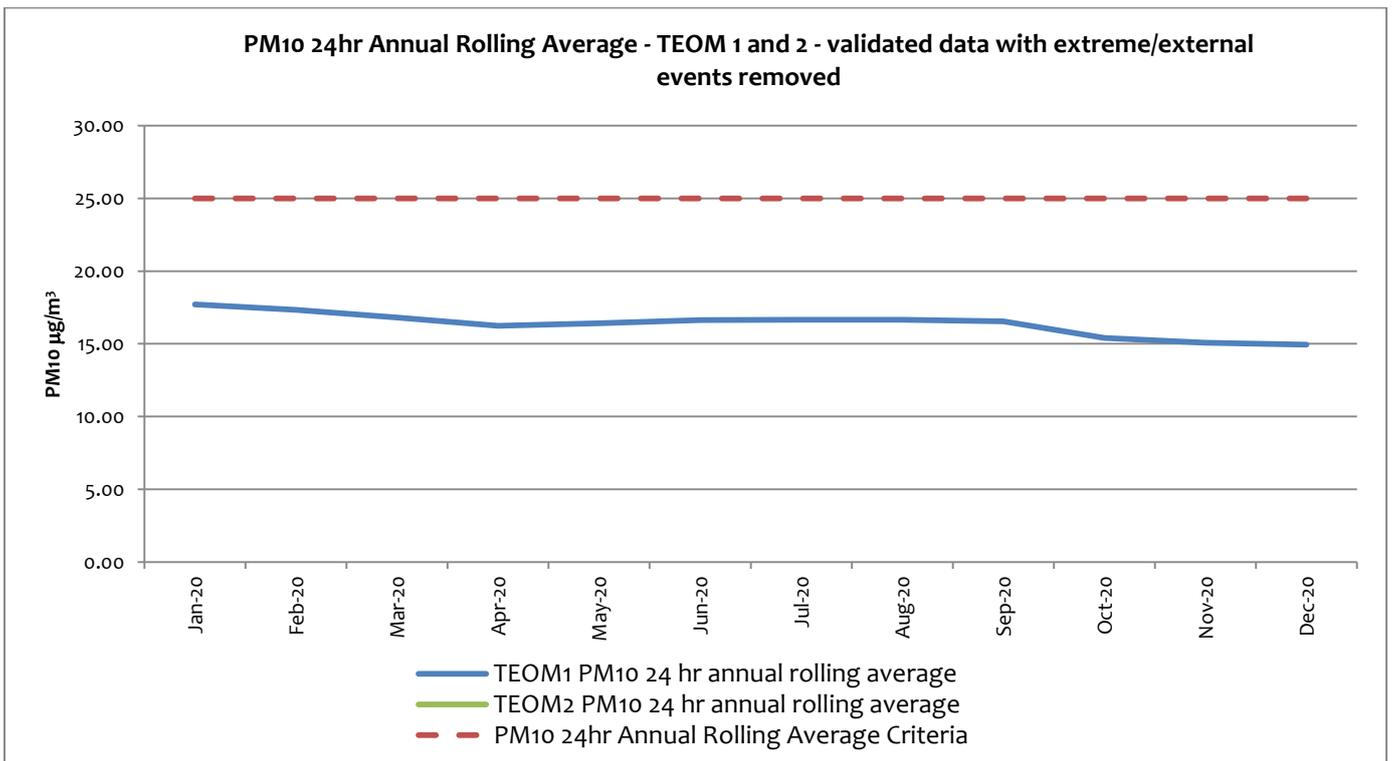
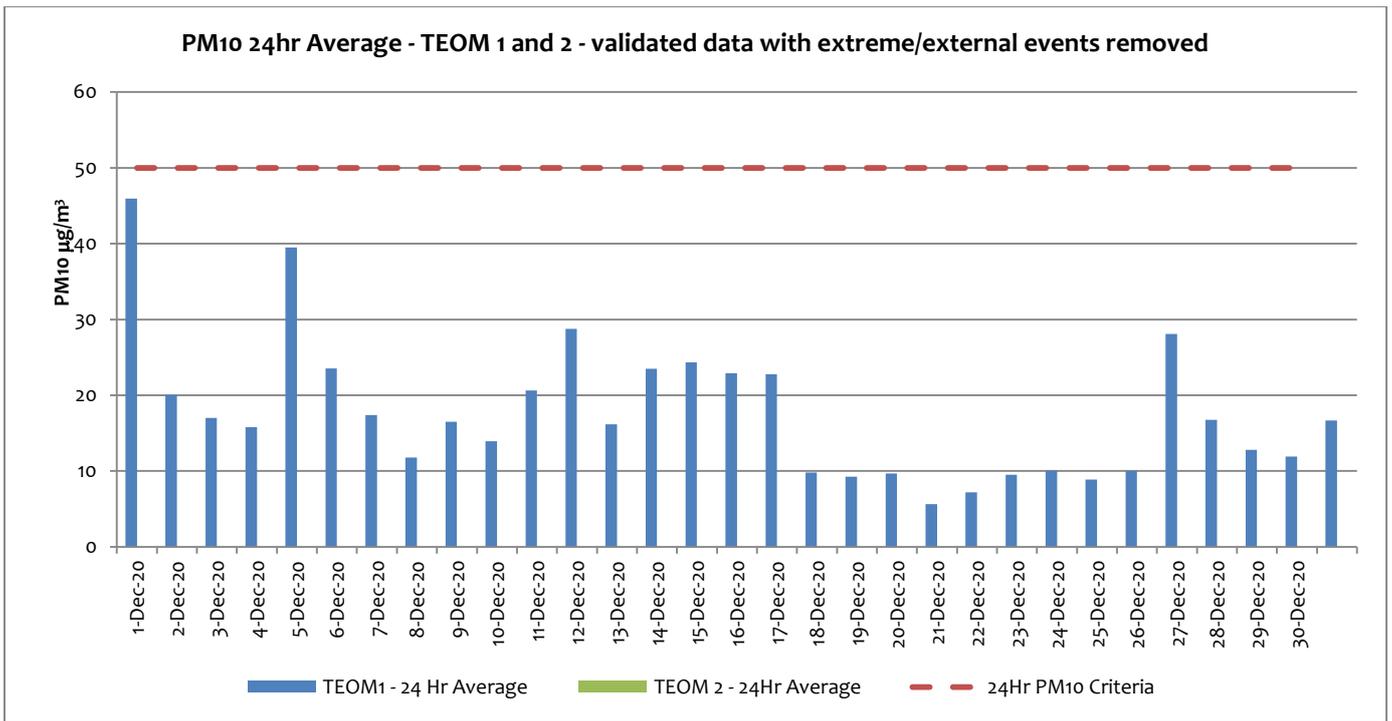
TEOM1 (EPL13) (Off Site) and TEOM2 (EPL14) (On Site) Validated Results for December

Particulate Matter <10 Microns 24Hr Average				
Date	TEOM 1 ($\mu\text{g}/\text{m}^3$)	Compliant with 50 $\mu\text{g}/\text{m}^3$ 24hr average?	TEOM 2 ($\mu\text{g}/\text{m}^3$)	Compliant with 50 $\mu\text{g}/\text{m}^3$ 24hr average?
1-Dec-20	46.0	Y	NS	Y
2-Dec-20	20.0	Y	NS	Y
3-Dec-20	17.0	Y	NS	Y
4-Dec-20	15.8	Y	NS	Y
5-Dec-20	89.3	Y	NS	Y
6-Dec-20	23.5	Y	NS	Y
7-Dec-20	17.4	Y	NS	Y
8-Dec-20	11.8	Y	NS	Y
9-Dec-20	16.5	Y	NS	Y
10-Dec-20	13.9	Y	NS	Y
11-Dec-20	20.6	Y	NS	Y
12-Dec-20	28.7	Y	NS	Y
13-Dec-20	16.2	Y	NS	Y
14-Dec-20	23.5	Y	NS	Y
15-Dec-20	24.4	Y	NS	Y
16-Dec-20	22.9	Y	NS	Y
17-Dec-20	22.8	Y	NS	Y
18-Dec-20	9.8	Y	NS	Y
19-Dec-20	9.2	Y	NS	Y
20-Dec-20	9.7	Y	NS	Y
21-Dec-20	5.6	Y	NS	Y
22-Dec-20	7.2	Y	NS	Y
23-Dec-20	9.5	Y	NS	Y
24-Dec-20	10.1	Y	NS	Y
25-Dec-20	8.9	Y	NS	Y
26-Dec-20	10.0	Y	NS	Y
27-Dec-20	28.1	Y	NS	Y
28-Dec-20	16.8	Y	NS	Y
29-Dec-20	12.8	Y	NS	Y
30-Dec-20	11.9	Y	NS	Y
31-Dec-20	16.7	Y	NS	Y

NS¹ – no sample collected due to temporary decommissioning of TEOM unit.

There was a minor dust storm in Broken Hill on 5 December and the 24-hour average level for the day as provided in the above table includes the results recorded during the dust storm.

The PM₁₀ 24-hour rolling annual average for data with external elevated dust events removed at December 2020 is 14.95 $\mu\text{g}/\text{m}^3$ for TEOM1. The PM₁₀ 24-hour rolling annual average for both TEOM sites remain below the annual average criteria of 25 $\mu\text{g}/\text{m}^3$.





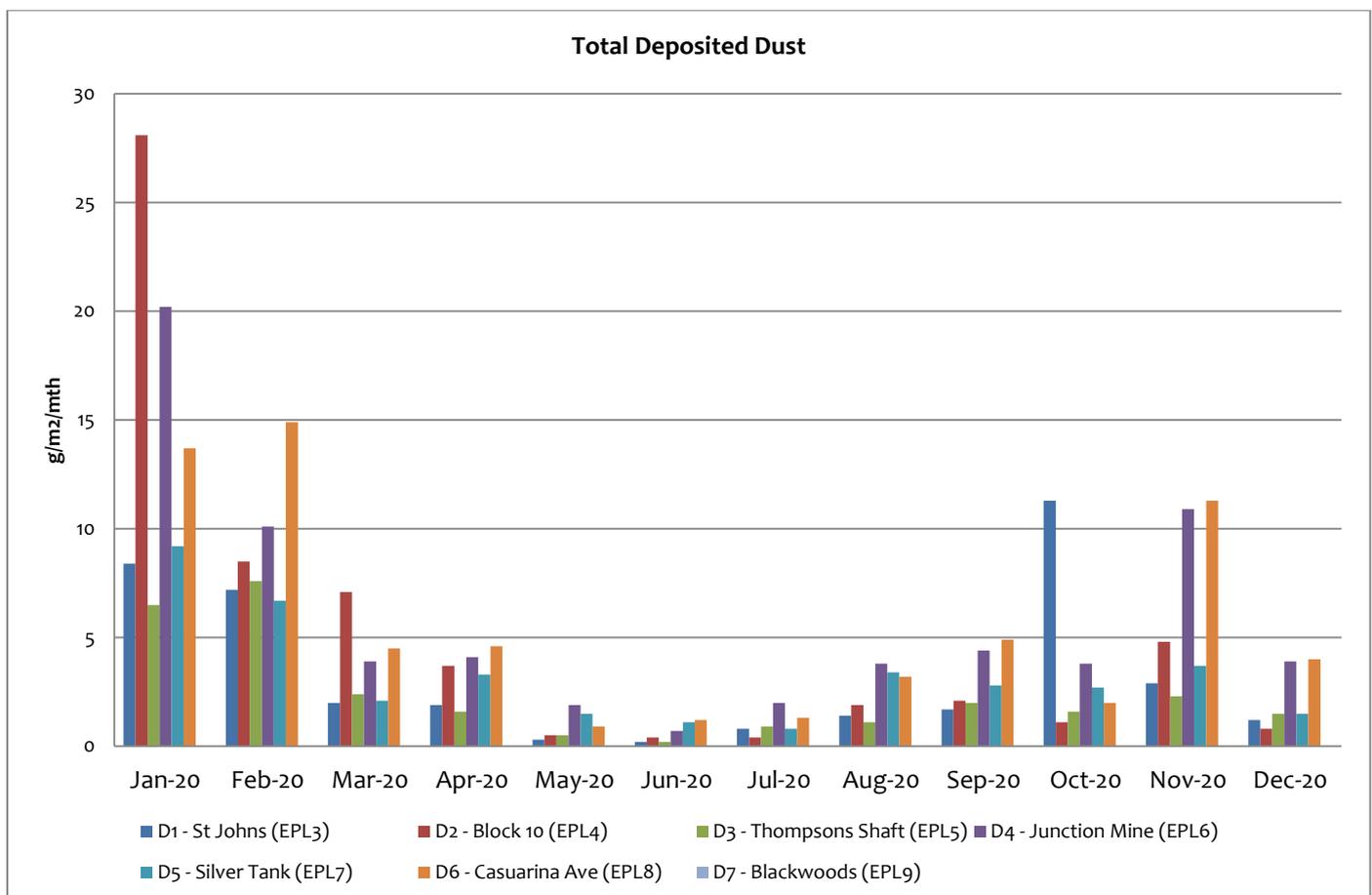
1.3 Dust Deposition Sampling

There are seven dust deposition gauges to measure ambient air quality at the Rasp Mine – D1 to D7. D1 and D6 are located off-site, D1 near the St Johns training facility north of the Rasp Mine and D6 in Casuarina Avenue south of the Rasp Mine. D2 to D5 and D7 are located on the mine lease in various locations. A map indicating these locations can be found on the Rasp Mine web site. Dust samples are collected monthly and analysed for total deposited dust and deposited lead dust. DDG7 was decommissioned from June 2019 to January 2021 due to works on TSF Embankment 2.

Dust Deposition Gauges D1 (EPL3) to D7 (EPL9) – Results for December

Total Deposited Dust (g/m ² /Month)							
Sample Period	D1 (off site)	D2 (on site)	D3 (on site)	D4 (on site)	D5 (on site)	D6 (off site)	D7 (on site)
December 2020	1.2	0.8	1.5	3.90	1.5	4	NS
Background (2010)	4.0	3.1	4.3	5.7	⁻¹	5.8	⁻¹
Compliant?	Y	N/A	N/A	N/A	N/A	Y	N/A

Note: “1”= background not available, N/A = not applicable as dust deposition unit is located on site, NS = No sample



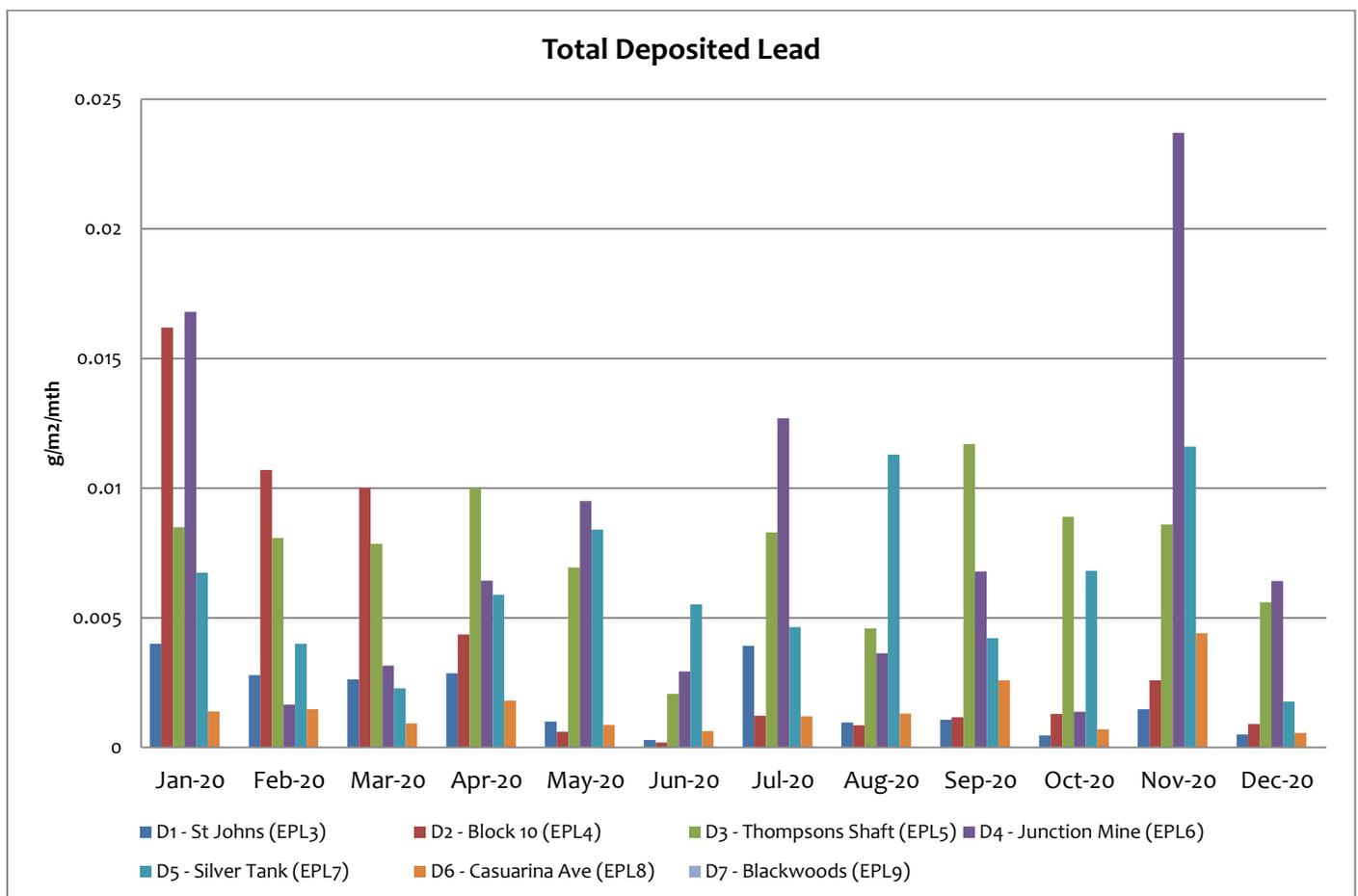
The dust levels recorded in Dust Gauges in December are low compared to previous months. The highest dust levels were recorded in the D4 Junction Mine and D6 Casuarina Avenue gauges. The predominant wind direction for December was from the South as shown in the Wind Rose in Section 4. The D4 Junction Mine site is north of the site



and impacted by both on-site and off-site activities. Much of the area around the gauge is bare of cover and characterised by historical mining activities. D6 Casuarina Avenue is a control site in the southern residential area of Broken Hill and impacted by regional dust storms and local activities. Both off-site locations D1 St Johns and D6 Casuarina Ave are compliant with dust levels of 4 g/m²/month for the month of December.

Total Deposited Lead (g/m ² /Month)							
Sample Period	D1 (off Site)	D2 (on site)	D3 (on site)	D4 (on site)	D5 (on site)	D6 (off Site)	D7 (on site)
December 2020	0.0005	0.0009	0.0056	0.006	0.00177	0.00056	NS
Background (2010)	0.0034	0.005	0.005	0.006	⁻¹	0.004	⁻¹

Note: "⁻¹"= background not available, NS = No sample



There are no guidelines for deposited lead dust. Lead results in December 2020 were highest in the D3 Thompsons Shaft and D4 Junction Mine gauges. The predominant wind direction for December was from the South as shown in the Wind Rose in Section 4. Site activities around the Rail Loadout area may contribute to elevated Lead levels at D3 Thompsons Shaft, but only minimally, as the concentrate containers are loaded with concentrate in an enclosed shed under negative pressure, and the loading area alongside the train is a concrete pad which is regularly swept and watered. A water cart will also attend to the haul road between the concentrate loading shed at the Mill and the rail loadout area when concentrate containers are being transported on site. The D4 Junction Mine site is north of the site and impacted by both on-site and off-site activities. Much of the area around the D3 and D4 gauges is bare of cover and characterised by historical mining activities.



Dust suppressant is applied to unsealed areas of the site and roads are frequently watered using water carts in an attempt to control dust emissions. The waste dump adjacent to the rail loadout is treated with dust suppressant to capture any loose dust accumulating on the lower batters and on the upper surface.

1.4 Ventilation Outlets and Bag House Monitoring

There are two locations to measure pollutants from exhausts or stacks; these include the Primary Ventilation Shaft, measuring pollutants from underground firings, and the Baghouse Stack at the crusher measuring dust. Each are located on site; the Primary Ventilation Shaft is located centrally and to the north of the mine lease and the Primary Crusher Baghouse Stack is located within the area of the processing plant to the east of the lease. Shaft 6 (EPL56) was removed as a monitoring location with the variation of EPL12559 in March 2019 as it became an intake rather than an exhaust in April 2018. A map indicating these locations can be found on the Rasp Mine web site. Samples are collected quarterly and analysed for a number parameters listed in below. Reference to the item required in the Rasp Mine Environment Protection Licence (EPL) is provided below. Emissions monitoring is conducted quarterly.

The following criteria apply:

Primary Ventilation Shaft (EPL1)

	Unit	Criteria
Nitrogen Oxides	mg/m ³	350
Volatile Organic Compounds	mg/m ³	40

Primary Ventilation Shaft (EPL1) and Crusher Baghouse (EPL2)

	Unit	Criteria
Total Suspended particles (TSP)	mg/m ³	20
Type 1 and Type 2 ¹	mg/m ³	1

Note 1: "Type 1 substance" means the elements antimony, arsenic, cadmium, lead or mercury or any compound containing one or more of those elements.

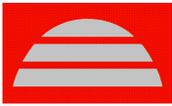
"Type 2 substance" means the elements beryllium, chromium, cobalt, manganese, nickel, selenium, tin or vanadium or any compound containing one or more of those elements.

Primary Vent Shaft (EPL1) and Crusher Baghouse (EPL2) Results for December

Monitoring was conducted at the Primary Vent Shaft (EPL1) on 8 December 2020, and the Crusher Baghouse (EPL2) on 9 December 2020. The monitoring results for the Primary Vent Shaft from this monitoring event were below the licence criteria while the Crusher Baghouse results of 58.9 mg/m³ of TSP and 4.32 mg/m³ of Type 1 and 2 Substances exceeded the criteria for TSP (20 mg/m³) and Type 1 and 2 Substances (1 mg/m³). Monitoring of the Crusher Baghouse in November 2020 returned results of 19.2 mg/m³ of TSP and 0734 mg/m³ of Type 1 and 2 Substances.

After receiving the December monitoring event report in January 2021 the Crusher was shut down and the filter bags in the baghouse were inspected for tears and holes. Four bags with damage were identified and removed with one containing a large tear. Follow-up monitoring was conducted shortly after the repairs were affected and emissions were well under criteria limits.

An investigation was conducted and findings actions taken to ensure the occurrence of such an event is minimised in the future was communicated to relevant regulatory bodies. Environmental harm from the exceeding event was



considered to be negligible as the baghouse exhaust is in a deeply sheltered position which is likely to have limited the dust drift, and any dust from the baghouse exhaust would have fallen in the tailings facility to the North of the baghouse due to the predominant wind direction being from the South for the period of the exceeding event. The PM₁₀ dust monitors located at the Rasp Lookout and adjacent to Blackwoods Tailing Facility, both to the north of the baghouse, recorded reduced dust levels for the period of the event.

	Unit	Primary Vent Shaft (EPL1)	Crusher Baghouse (EPL2)
Dry Gas Density	Kg/m ³	1.29	1.29
Moisture	%	1.9	1.9
Molecular weight of stack gases	g/m ³	1,287	1,288
Temperature	°C	23	18
Nitrogen Oxides	mg/m ³	7.07	NA
Volatile Organic Compounds	mg/m ³	0.477	NA
Total Suspended particles	mg/m ³	4.31	58.9
Type 1 and Type 2	mg/m ³	0.037	4.32
Velocity	m/sec	14.8	20.5
Volumetric Flowrate	m ³ /sec	253	8.35

2 Noise

2.1 Blasting (Vibration and Overpressure)

There are 6 vibration monitors at various locations to measure for vibration and overpressure from blast firings. These include V1 to V5 which are located off-site and V6 which is located on-site near Shaft 4. A map indicating these locations can be found on the Rasp Mine web site. In addition, there are a number of roving monitors which may be used to monitor vibration and overpressure at particular locations as required. Monitors operate continuously and are automatically triggered to record when a blast occurs. The following conditions apply as listed in the PA 07_0018 and EPL 12559:-

Blasting Criteria (Western Mineralisation and Main Lodes excluding Block 7)

Location	Airblast Overpressure (dB(Lin Peak))	Ground Vibration (mm/s)	Allowable Exceedance (for production and development blasts)
Residence on privately owned land (7am-7pm)	115	5	5% of the total number of blasts over a 12-month period ¹
(7am-7pm)	120	10	0%
(7pm-10pm)	105	-	-
(10pm-7am)	95	-	-
Public Infrastructure	-	100	0%

Note 1: Does not apply until completion of Pollution Reduction Program on the EPL at the end of 2018. Applies to EPL criteria in the period for the Annual Return 3 Nov to 2 Nov the following year and to DPE criteria in the reporting period 1 Jul to 30 Jun each year.



Blasting Criteria (Block 7)

Location	Airblast Overpressure (dB(Lin Peak))	Ground Vibration (mm/s)	Allowable Exceedance (for production and development blasts)
Residence on privately owned land (7am-7pm)	115	3 (interim)	5% of the total number of blasts over a 12-month period ¹
(7am-7pm)	120	10	0%
(7pm-10pm)	105	-	-
(10pm-7am)	95	-	-
Broken Hill Bowling Club, Italo (Bocce) Club, Heritage Items within CML7	-	50	0%
Perilya Southern Operations	-	100	0%
Public Infrastructure	-	100	0%

Note 1: Applies to EPL criteria in the period for the Annual Return 3 Nov to 2 Nov the following year and to DPE criteria in the reporting period 1 Jul to 30 Jun each year.

In addition the following conditions also apply:-

- Production blasts may occur between 6.45 am and 7.15 pm on any day
- 1 production blast per day, with 6 per week averaged over a calendar year
- 6 development blasts per day, with 42 per week averaged over a calendar year

Blasting Data Summary Results for December

Total Blasts:

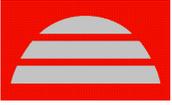
- 0 production blasts occurred before 6.45 am or after 7.15 pm
- The number of Production blasts averaged 3.413 per week over the previous calendar year
- The number of Development blasts averaged 28.21 per week over the previous calendar year

Western Mineralisation and Main Lodes (excluding Block 7):

- 0 Blasts recorded >5 mm/s
- 0 Blasts recorded >10 mm/s
- 0 development blasts recorded an over pressure level over 95 dBL (10pm to 7am)
- 0 development blasts recorded an over pressure level over 105 dBL (7pm to 10pm)
- 0 Blasts recorded an over pressure level over 115dBL (7am to 7pm)
- 0 Blasts recorded an over pressure level over or 120 dBL at any time
- Percentage of development blasts over 5 mm/sec for the annual period = 0%
- Percentage of production blasts over 5 mm/sec for the annual period = 5.7%

Block 7:

- 0 Blasts recorded >3 mm/s
- 0 Blasts recorded >10 mm/s
- 0 Blasts recorded >50 mm/s at V6
- 0 development blasts recorded an over pressure level over 95 dBL (10pm to 7am)
- 0 development blasts recorded an over pressure level over 105 dBL (7pm to 10pm)
- 0 Blasts recorded an over pressure level over 115 dBL (7am to 7pm)
- 0 Blasts recorded an over pressure level over or 120 dBL at any time
- Percentage of development blasts over 3mm/sec for the annual period = 0%
- Percentage of production blasts over 3mm/sec for the annual period = 0%



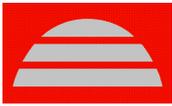
The percentage of production blasts in the Western Mineralisation and Main Lodes producing vibration at monitors over 5 mm/sec for the 12-month period is 5.7%.

The percentage of production blasts over 3 mm/sec in Block 7 for the 12-month period is below the licence limit of 5%. There were no production blasts in Block 7 in the previous 12 months.

2.2 Noise

Noise monitoring is undertaken as per the NSW Noise Policy for Industry at a frequency of once per annum. Annual noise monitoring was conducted during two consecutive night-time periods from 15 to 17 December 2020.

The monitoring assessment found that site LAeq, 15min noise contributions satisfied the relevant limits during the measurements at all assessment locations.



3 Water

3.1 Groundwater

There are eighteen sampling locations for groundwater. GW01 (EPL37) to GW16 (EPL52) are piezometers installed at various locations around the mine site and are sampled quarterly. There are also two sampling locations for water pumped from underground mining, Shaft 7 (EPL53) and Kintore Pit (EPL54), which are sampled monthly. A map indicating these locations can be found on the Rasp Mine web site. Groundwater monitoring is scheduled for completion in March, June, September and December. No limits are applied in the EPL to the results from groundwater monitoring.

After a decrease in EC levels in August and September 2020, levels have risen to normal levels for Shaft 7 and Kintore in November and December. No sample was collected for Shaft 7 in December as no water was pumped from Shaft 7.

Groundwater results from December 2020 were consistent with previous quarterly sampling results.

Groundwater Monitoring Requirements

EPA Identification Number	Frequency	Parameters to be analysed
Shaft 7 EPL53	Monthly	alkalinity (calcium carbonate (CaCO ₃)), cadmium (Cd), calcium (Ca), chloride (Cl), electrical conductivity (EC), iron (Fe), lead Pb), magnesium (Mg), manganese (Mn), pH, sodium (Na), sulphate (SO ₄), total dissolved solids (TDS) and zinc (Zn)
Kintore Pit (U/G dewatering) EPL54	Monthly	
Piezometers EPL37 (GW01) to EPL52 (GW16)	Quarterly	

Shaft 7 (EPL53) and Kintore Pit (EPL54) Results for December

Sample Point	pH	EC (µS/cm ²)	TDS (mg/l)	Alkalinity (CaCO ₃) (mg/l)	SO ₄ (mg/l)	Cl (mg/l)	Ca (mg/l)	Mg (mg/l)	Na (mg/l)	Cd (mg/l)	Pb (mg/l)	Mn (mg/l)	Zn (mg/l)	Fe (mg/l)
Shaft 7 (EPL53)	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
Kintore Pit (EPL54)	6.09	13000	15000	2	6900	1700	518	293	1780	4.28	2.2	432	1340	0.62

Groundwater Bores (EPL37 - EPL52) Results for December

Sample Point	pH	EC (µS/cm ²)	TDS (mg/l)	Alkalinity (CaCO ₃) (mg/l)	SO ₄ (mg/l)	Cl (mg/l)	Ca (mg/l)	Mg (mg/l)	Na (mg/l)	Cd (mg/l)	Pb (mg/l)	Mn (mg/l)	Zn (mg/l)	Fe (mg/l)
GW01 (EPL37)	-Bore Dry-													
GW02 (EPL38)	-Bore Dry-													
GW03 (EPL39)	5.48	13700	12800	<1	4660	2690	571	347	2250	1.09	0.679	269	229	0.32



Sample Point	pH	EC (µS/cm ²)	TDS (mg/l)	Alkalinity (CaCO ₃) (mg/l)	SO ₄ (mg/l)	Cl (mg/l)	Ca (mg/l)	Mg (mg/l)	Na (mg/l)	Cd (mg/l)	Pb (mg/l)	Mn (mg/l)	Zn (mg/l)	Fe (mg/l)
GW04 (EPL40)	6.53	13700	12000	239	4670	2390	583	530	2360	0.066	0.002	39.6	19.4	0.05
GW05 (EPL41)	5.69	15600	15400	99	6920	2590	517	626	2520	0.642	0.225	358	299	0.05
GW06 (EPL42)	6.73	13400	12800	51	4800	2390	538	451	2120	0.944	0.109	323	206	0.05
GW07 (EPL43)	5.96	12000	11500	34	4250	2160	548	302	1800	2.31	0.101	265	285	0.05
GW08 (EPL44)	5.62	12900	13900	23	4980	2360	546	316	1810	1.54	0.93	618	600	0.05
GW09 (EPL45)	6.06	11400	10600	60	4430	2080	625	506	1480	1.86	0.006	140	202	0.05
GW10 (EPL46)	6.5	13400	11500	258	4370	2430	608	520	2140	0.181	0.006	5.67	26.6	0.05
GW11 (EPL47)	6.68	5650	4800	77	2540	622	332	190	766	0.209	0.101	33.7	54.8	0.05
GW12 (EPL48)	5.76	12900	12200	81	5720	1860	490	574	2080	1.53	0.009	77.3	189	0.05
GW13 (EPL49)	-Bore Dry-													
GW14 (EPL50)	-Bore Dry-													
GW15 (EPL51)	-Bore Dry-													
GW16 (EPL52)	-Bore Dry-													

3.2 Surface Water Sample Record

There are seven sampling locations for surface water, these include surface water basins located on the mine lease to capture and retain rainfall and two locations up and down stream of an ephemeral creek located south of the mine lease boundary. A map indicating these locations can be found on the Rasp Mine web site. Based on historical data, sampling is most likely to be undertaken in October (highest rainfall month as recorded by Bureau of Meteorology) and April.

Surface Water Monitoring Requirements

Description	Frequency	Parameters to be Analysed
Federation Way Culvert EPL29/S31-1	2 x per year, six months apart	cadmium (Cd), chloride (Cl), electrical conductivity (EC), lead Pb), manganese (Mn), pH, sodium (Na), sulphate (SO ₄), total dissolved solids (TDS) and zinc (Zn)
Ryan Street Dam EPL31/S49	2 x per year, six months apart	
Adjacent Olive Grove EPL32/S1A	2 x per year, six months apart	
Adjacent Bowls Club EPL33 /S9-B2	2 x per year, six months apart	
Horwood Dam EPL34/S34	2 x per year, six months apart	
Upstream Bonanza St EPL35	2 x per year, six months apart	
Downstream Sydney Rd EPL36	2 x per year, six months apart	



Surface Water Monitoring Results for December

No sampling was conducted in December as there was insufficient rainfall in the month. Previously sampling was conducted in September after 29.4mm fell on 19 September. Surface water results for the September sampling event are provided in the September report.



4 Weather Data

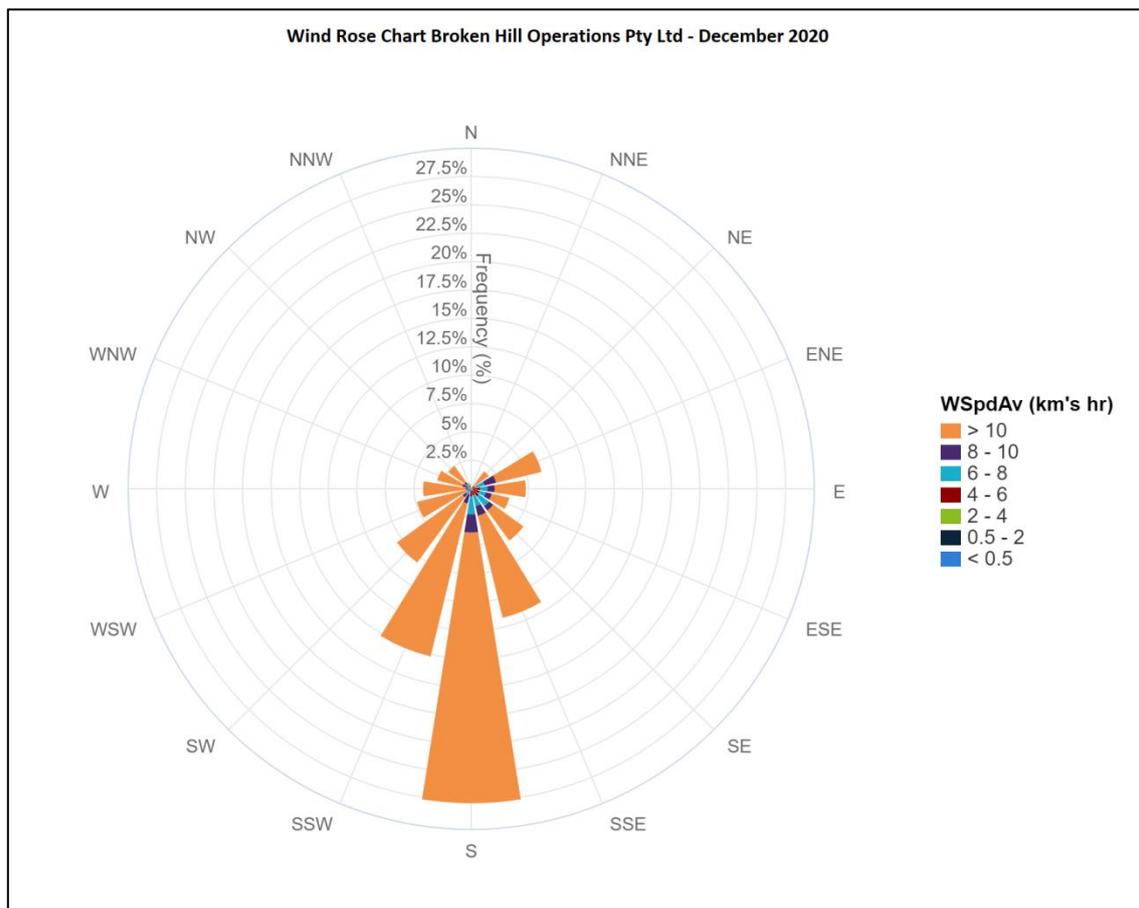
The weather station continuously monitors the following parameters as per Point 55 of the Environmental Protection Licence.

The following parameters are required to be recorded each month as listed in the EPL 12559:-

Rasp Mine Weather Station (EPL55) Monitoring Requirements

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 windrose provided below indicates the main wind direction for the month of December was from the South.





Weather Data Summary for December

Date	Temperature @ 10m (°C)		Wind Speed @ 10m (km/hr)		Predominant Wind Direction @ 10m		Rainfall (mm)
	Min	Max	Min	Max	Cardinal	Degree	Total
01-Dec-19	15.6	31.9	11.6	46.8	SW	222	0.00
02-Dec-19	12.7	22.0	3.9	40.8	SSE	156	0.50
03-Dec-19	18.1	28.3	0.8	24.1	SSE	159	0.00
04-Dec-19	16.9	32.6	2.5	19.4	East	88	0.00
05-Dec-19	13.8	31.8	10.5	47.1	SW	223	2.50
06-Dec-19	12.1	23.7	7.7	33.5	SW	225	0.00
07-Dec-19	11.4	21.4	6.0	36.9	WSW	249	0.00
08-Dec-19	9.4	21.8	4.7	32.8	South	180	0.00
09-Dec-19	14.0	26.8	0.6	17.2	South	179	0.00
10-Dec-19	16.1	28.0	5.6	31.0	South	178	0.00
11-Dec-19	16.2	29.4	5.0	28.1	SE	135	0.00
12-Dec-19	23.0	31.2	7.7	33.9	ENE	67	0.00
13-Dec-19	22.3	31.3	7.1	34.8	NE	47	0.00
14-Dec-19	24.9	33.9	3.8	21.4	NE	45	0.00
15-Dec-19	26.5	35.2	1.2	32.6	SSE	159	0.00
16-Dec-19	20.0	33.4	8.4	26.7	South	181	0.00
17-Dec-19	15.6	32.6	3.7	40.3	SSW	202	0.00
18-Dec-19	12.5	24.1	6.4	40.9	South	178	0.00
19-Dec-19	14.5	26.8	4.1	23.9	South	181	0.00
20-Dec-19	20.0	26.9	2.1	23.8	South	181	0.00
21-Dec-19	14.8	20.6	2.6	26.2	SSW	205	7.80
22-Dec-19	11.9	22.2	5.5	33.3	SSW	199	0.00
23-Dec-19	12.6	24.1	0.9	18.2	South	180	0.00
24-Dec-19	15.2	27.0	4.6	28.6	South	178	0.00
25-Dec-19	16.9	28.6	4.3	23.8	South	178	0.00
26-Dec-19	22.5	33.9	3.4	19.4	West	270	0.00
27-Dec-19	15.6	35.1	5.6	45.3	South	185	0.00
28-Dec-19	12.2	22.6	12.6	38.2	South	177	0.00
29-Dec-19	12.1	24.3	6.2	32.7	SSE	159	0.00
30-Dec-19	15.2	28.8	6.3	30.7	SSE	158	0.00
31-Dec-19	18.2	31.8	1.3	30.9	South	179	0.00

Rainfall of 10.8mm fell in December.



5 Data Log

Sample	Result Received
Hi Volume Samples	15-01-2021
TEOM	28-01-2021
Dust Deposition	27-01-2021
Vents & Bag House	4-01-2021
Water	24-12-2020
Blast vibration and overpressure	1-01-2021
Weather	11-01-2021
Date posted to web site	17-02-2021

6 Correction Log

Total deposited dust for DG1 was incorrectly labelled as non-compliance against the criteria for deposited dust, corrected and analysis of compliance added to discussion in Section 1.3.