# Rasp Mine
# Monthly Environmental Monitoring Report
# October 2022

## 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 pollutants as listed in the Project Approval (DA 07_0018 MOD6 March 2022) are required to be monitored in EPL 12559:

**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**

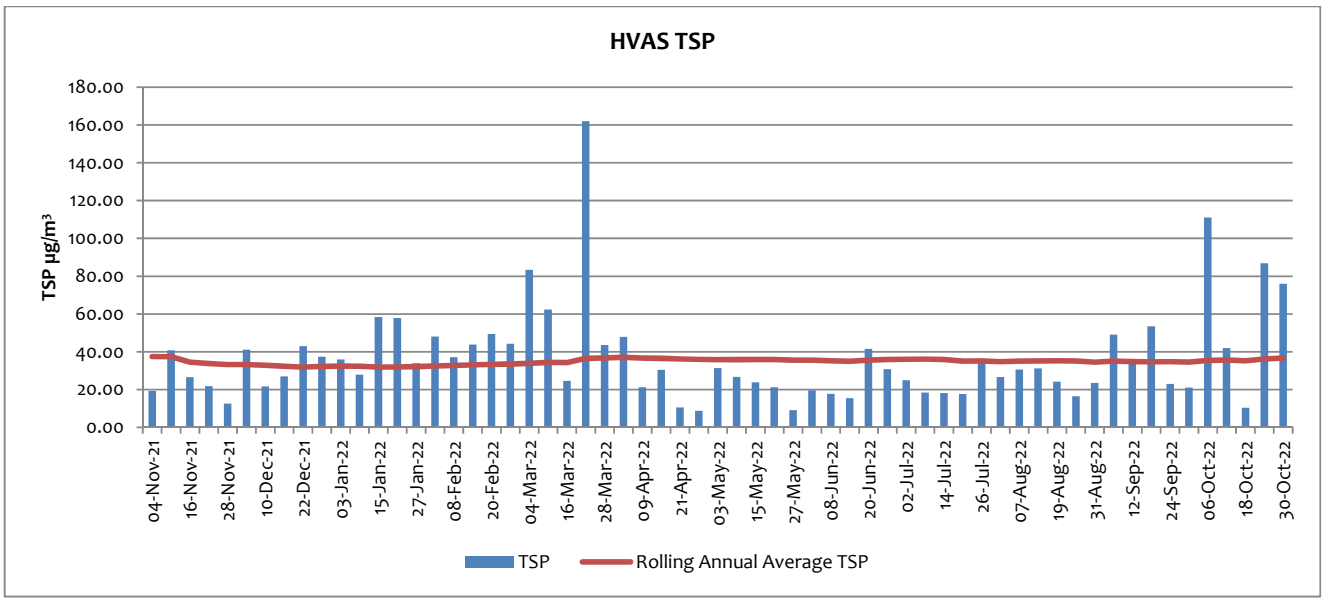
| Pollutant | Averaging Period | Maximum Project Contribution | Maximum Total Deposited Dust Level |
|---|---|---|---|
| Deposited dust | Annual | 2 g/m$^2$/month | 4 g/m$^2$/month |

## 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 ($PM_{10}$) and lead dust.

### *HVAS (EPL10) - Silver Tank (On Site) Results for October 2022*

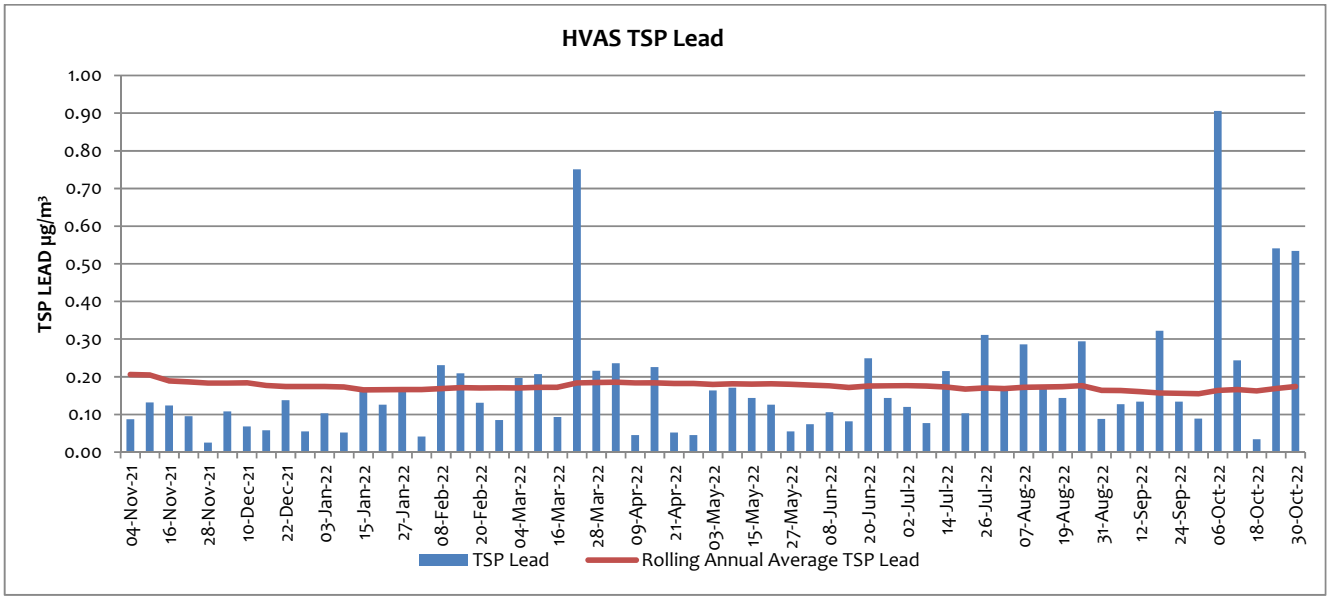
| DATE | TSP (µg/m$^3$) | Lead (µg/m$^3$) |
|---|---|---|
| **06-October-22** | 111.00 | 0.91 |
| **12-October-22** | No sample | |
| **18-October-22** | 10.40 | 0.03 |
| **24-October-22** | 86.80 | 0.54 |
| **30-October-22** | 76.00 | 0.53 |




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 for the month of October were higher than previous months. The highest TSP level for October was 111.00 µg/m$^3$ on 6 October when winds were predominantly from the NW, suggesting that the dust has originated on-site, potentially as result of fill being placed in Little Kintore Pit. Water carts apply water to site roads daily and dust suppressant is applied to free areas and unsealed roads. The annual rolling average for TSP at this location is 36.67 µg/m$^3$ at the end of October, higher than the average at the beginning of November 2021 which was 37.59 µg/m$^3$.

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



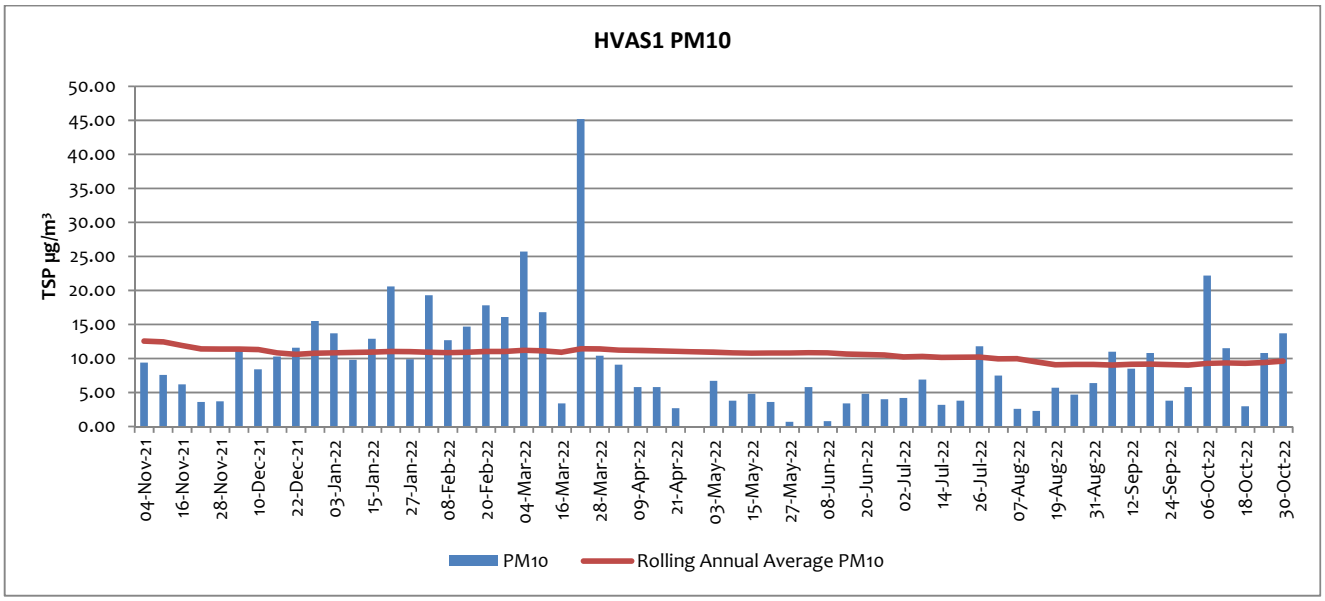
TSP Lead dust results at HVAS for the month of October higher than results seen in previous months. The highest TSP Lead level for October was 0.91 µg/m$^3$ on 6 October when winds were predominately from the NW, suggesting that the dust has originated on-site, potentially as result of fill being placed in Little Kintore Pit. Water carts apply water to site roads daily and dust suppressant is applied to free areas and unsealed roads. The rolling annual average for TSP Lead in October 2022 was 0.17 µg/m$^3$ which is lower than the rolling annual average of 0.21 µg/m$^3$ for TSP Lead in November 2021.

Due to an electricity supply issue on 12 October 2022, HVAS was not able to complete its full 24-hour runtime, resulting in a void sample.

### *HVAS1 (EPL11) - Silver Tank (On Site) Results for October 2022*

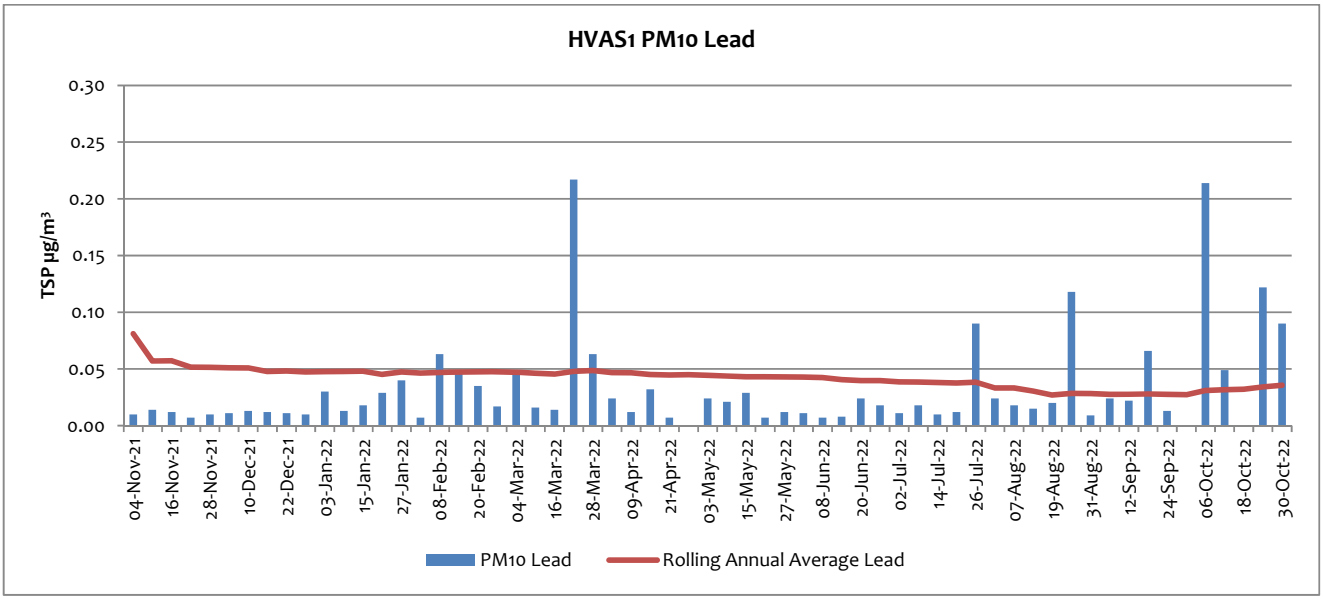
| DATE | $PM_{10}$ (µg/m$^3$) | $PM_{10}$ Lead (µg/m$^3$) |
|---|---|---|
| **06-October-22** | 22.20 | 0.21 |
| **12-October-22** | No sample | |
| **18-October-22** | 3.00 | <0.007 |
| **24-October-22** | 10.80 | 0.12 |
| **30-October-22** | 13.70 | 0.09 |

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.




$PM_{10}$ dust results at HVAS1 for month of October were elevated compared with previous months. The highest $PM_{10}$ dust level for October was 22.20 µg/m$^3$ on 6 October when winds were predominantly from the NW, suggesting that the dust has originated on-site, potentially from fill being deposited in Little Kintore Pit. Water carts apply water to site roads daily and dust suppressant is applied to free areas and unsealed roads. The annual rolling average for $PM_{10}$ dust at this location is 9.6 µg/m$^3$ at the end of October 2022, lower than the annual rolling average at the

beginning of November 2021 which was 12.6 µg/m$^3$. External and extreme dust events are recorded in measurements.




$PM_{10}$ Lead dust results at HVAS1 were high in the month of October compared to previous months. The highest Lead $PM_{10}$ result for October was 0.21 µg/m$^3$ on 6 October when winds were predominantly from the NW, suggesting that the dust has originated on-site, potentially as a result of filling Little Kintore Pit. Water carts apply water to site roads daily and dust suppressant is applied to free areas and unsealed roads. Water carts apply water to site roads daily and dust suppressant is applied to free areas and unsealed roads. The rolling annual average for $PM_{10}$ Lead in October was 0.04 µg/m$^3$, down from 0.08 µg/m$^3$ in November 2021.

Due to an electricity supply issue on 12 October 2022, HVAS1 was not able to complete its full 24-hour runtime, resulting in a void sample.

### *HVAS 2 (EPL12) - Blackwood Pit (On Site) Results for October 2022*

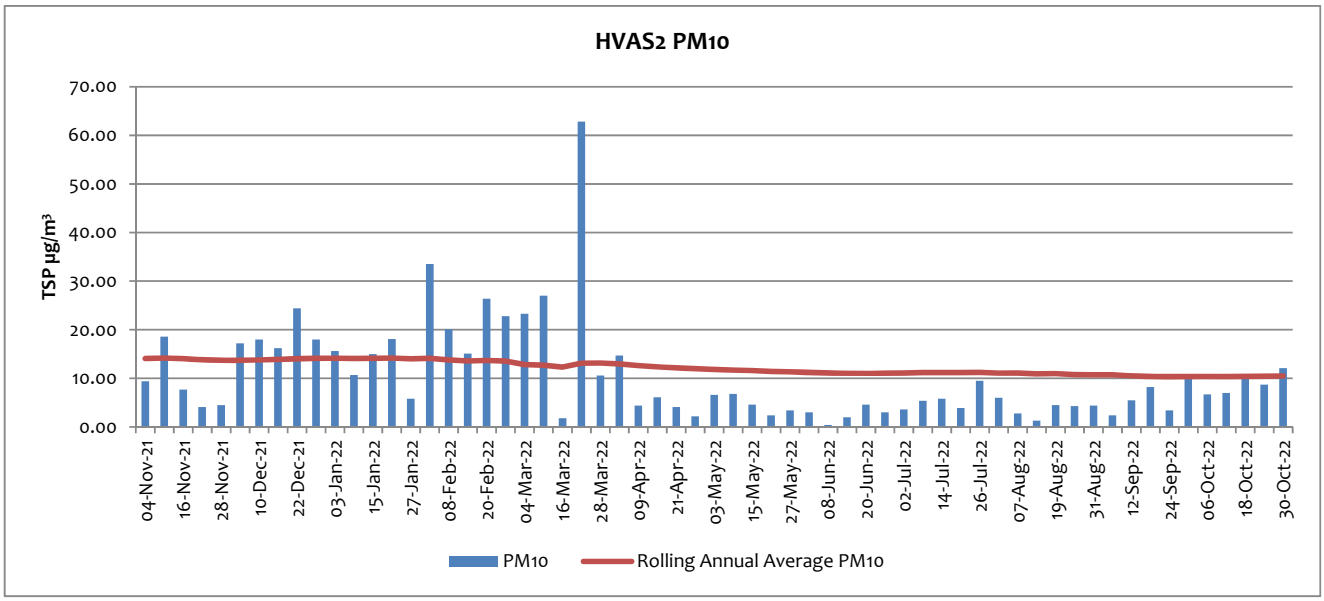
| DATE | $PM_{10}$ (µg/m$^3$) | $PM_{10}$ Lead (µg/m$^3$) |
|---|---|---|
| **06-October-22** | 6.70 | 0.04 |
| **12-October-22** | 7.00 | 0.10 |
| **18-October-22** | 10.10 | 0.06 |
| **24-October-22** | 8.70 | 0.03 |
| **30-October-22** | 12.10 | 0.09 |

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.

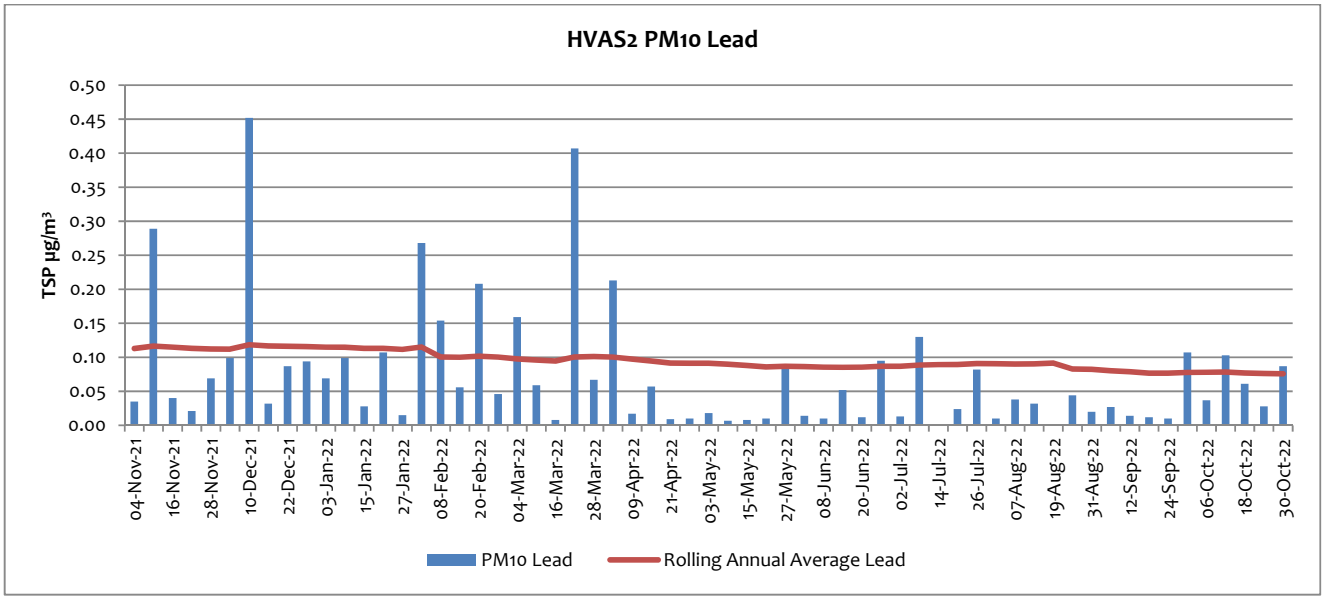
In October $PM_{10}$ levels at HVAS2 remained consistent with previous months. The highest recorded $PM_{10}$ dust reading for October was 12.10 µg/m$^3$ on the 30 October when winds were from the East suggesting Blackwoods TSF2 was

the source of the dust. The surface of Blackwoods TSF2 is treated with dust suppressant and the TSF spray system is under construction. The annual rolling average for $PM_{10}$ dust at this location is 10.50 µg/m$^3$ at the end of October 2022, down from 14.09 µg/m$^3$ in November 2021.

The annual rolling average for $PM_{10}$ dust is determined using data with extreme dust events included.




$PM_{10}$ lead levels in October were consistent with previous months despite there being little change in wind activity in the area. The highest recorded $PM_{10}$ Lead dust reading for October was 0.10 µg/m$^3$ on the 12 October when winds were from the South suggesting Blackwoods TSF2 was the source of the dust. The surface of Blackwoods TSF2 is treated with dust suppressant and the TSF spray system is under construction. The rolling annual average for $PM_{10}$ Lead in October 2022 was 0.08 µg/m$^3$ down from 0.11 µg/m$^3$ in November 2021.



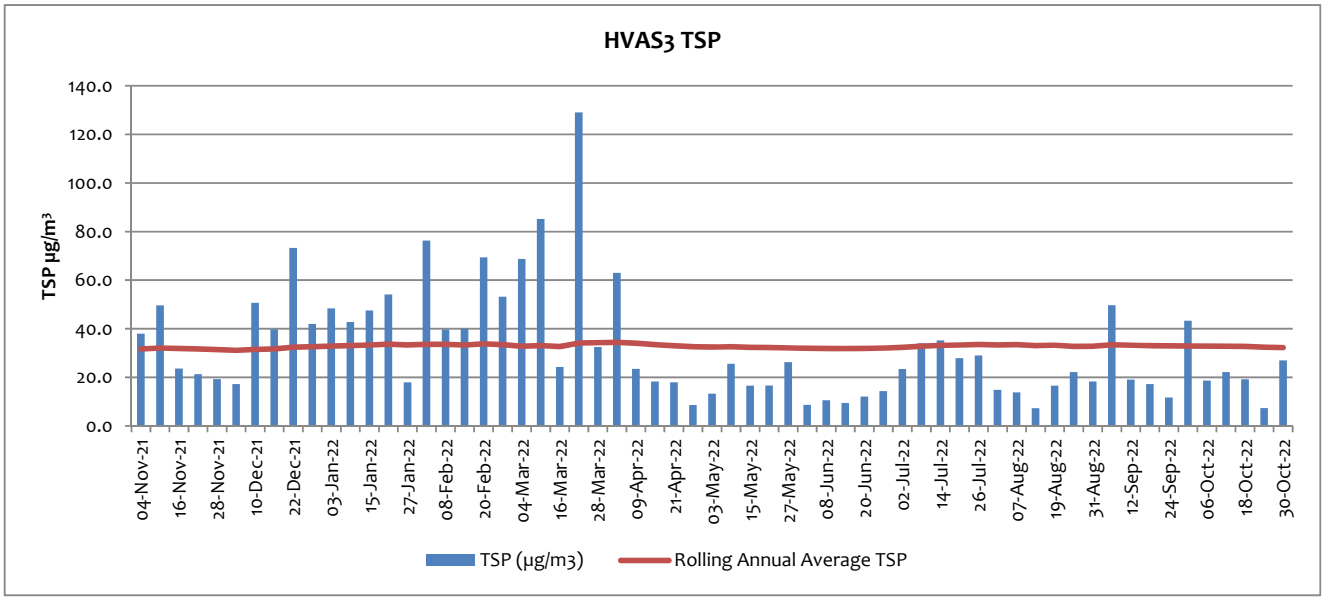
## *HVAS 3 (EPL57) - Blackwood Pit (On Site) Results for October 2022*

| DATE | TSP ($\mu g/m^3$) | Lead ($\mu g/m^3$) |
|---|---|---|
| **06-October-22** | 18.70 | 0.09 |
| **12-October-22** | 22.20 | 0.31 |
| **18-October-22** | 19.20 | 0.18 |
| **24-October-22** | 7.40 | 0.03 |
| **30-October-22** | 27.00 | 0.22 |

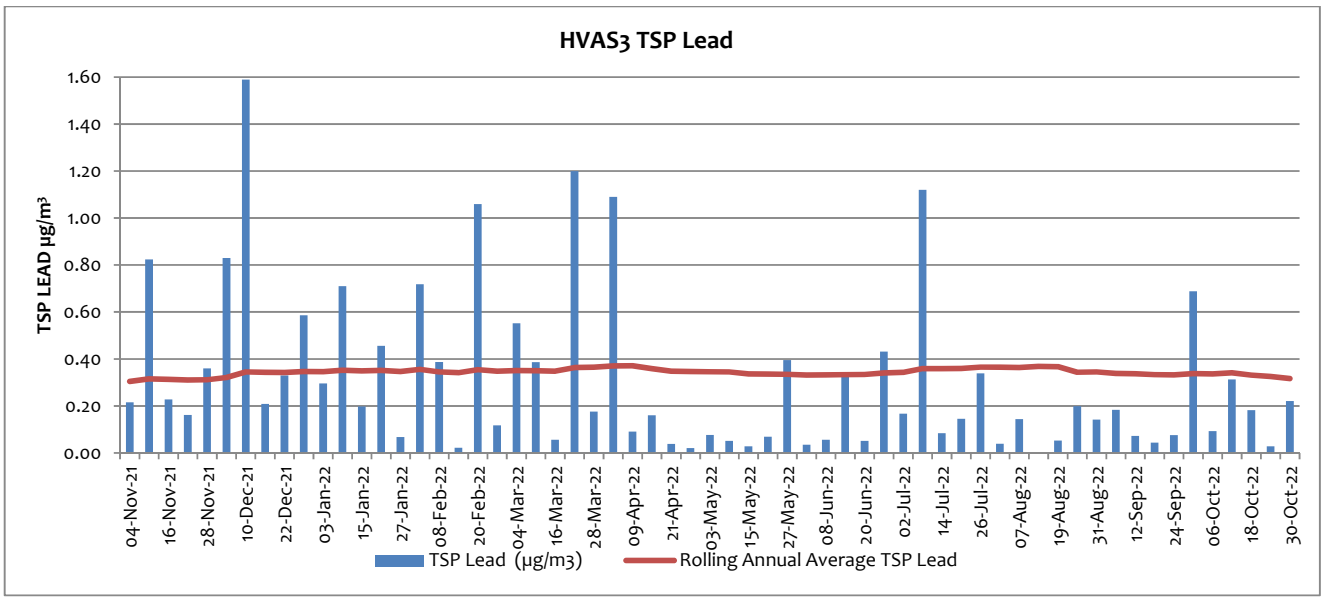
HVAS3 (EPL57) was included in EPL 12559 on 14 March 2019 to provide for monitoring of TSP Dust on the northern boundary of the site at Blackwoods Pit TSF2.

TSP levels at HVAS3 were highest on 30 October with a result of 27.00 $\mu g/m^3$, when winds fluctuated from all directions, meaning it is likely that there was contribution from both on and off site. The surface of Blackwoods TSF2 is treated with dust suppressant and the TSF spray system is under construction. The annual rolling average for TSP dust at this location is 32.25 $\mu g/m^3$ at the end of October 2022, up from 31.68 $\mu g/m^3$ in November 2021.

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




TSP Lead levels in October were consistent with previous months, with the highest result of 0.31 $\mu g/m^3$ recorded on 12 October when winds were predominantly from the South suggesting contribution from Blackwoods TSF2. The rolling annual average for TSP Lead in October was 0.32 $\mu g/m^3$, up from 0.30 $\mu g/m^3$in November 2021. A sprinkler system is currently being installed on the TSF.




## 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 ($PM_{10}$) 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/$m^3$ and an annual average criteria of 25 ug/$m^3$.

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 October 2022*

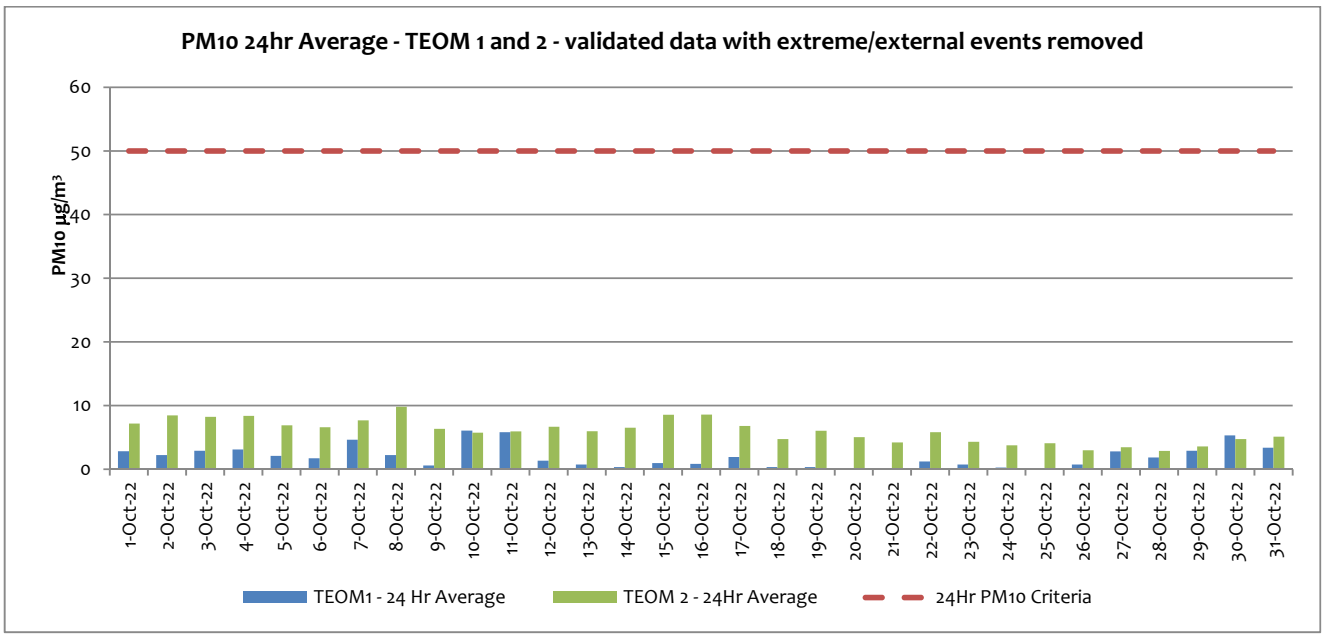
| Particulate Matter <10 Microns 24Hr Average | | | | |
|---|---|---|---|---|
| Date | TEOM 1 (µg/m$^3$) | Compliant with 50µg/m$^3$ 24hr average? | TEOM 2 (µg/m$^3$) | Compliant with 50µg/m$^3$ 24hr average? |
| 1-Oct-22 | 2.8 | Y | 7.2 | Y |
| 2-Oct-22 | 2.2 | Y | 8.5 | Y |
| 3-Oct-22 | 2.9 | Y | 8.2 | Y |
| 4-Oct-22 | 14.8 | Y | 8.4 | Y |
| 5-Oct-22 | 2.1 | Y | 6.9 | Y |
| 6-Oct-22 | 1.7 | Y | 6.6 | Y |
| 7-Oct-22 | 4.6 | Y | 7.7 | Y |
| 8-Oct-22 | 2.2 | Y | 9.8 | Y |
| 9-Oct-22 | 0.6 | Y | 6.3 | Y |
| 10-Oct-22 | 6.1 | Y | 5.7 | Y |
| 11-Oct-22 | 9.2 | Y | 5.9 | Y |
| 12-Oct-22 | 1.3 | Y | 6.7 | Y |
| 13-Oct-22 | 0.8 | Y | 6.0 | Y |
| 14-Oct-22 | 0.3 | Y | 6.5 | Y |
| 15-Oct-22 | 1.0 | Y | 8.6 | Y |
| 16-Oct-22 | 0.8 | Y | 8.6 | Y |
| 17-Oct-22 | 1.9 | Y | 6.8 | Y |
| 18-Oct-22 | 0.4 | Y | 4.7 | Y |
| 19-Oct-22 | 0.3 | Y | 6.1 | Y |
| 20-Oct-22 | 0.1 | Y | 5.0 | Y |
| 21-Oct-22 | 0.1 | Y | 4.2 | Y |
| 22-Oct-22 | 1.2 | Y | 5.8 | Y |
| 23-Oct-22 | 0.7 | Y | 4.3 | Y |
| 24-Oct-22 | 0.2 | Y | 3.8 | Y |
| 25-Oct-22 | 0.1 | Y | 4.1 | Y |
| 26-Oct-22 | 0.7 | Y | 3.0 | Y |
| 27-Oct-22 | 2.8 | Y | 3.4 | Y |
| 28-Oct-22 | 1.8 | Y | 2.9 | Y |
| 29-Oct-22 | 2.9 | Y | 3.6 | Y |
| 30-Oct-22 | 5.3 | Y | 4.8 | Y |
| 31-Oct-22 | 3.4 | Y | 5.1 | Y |

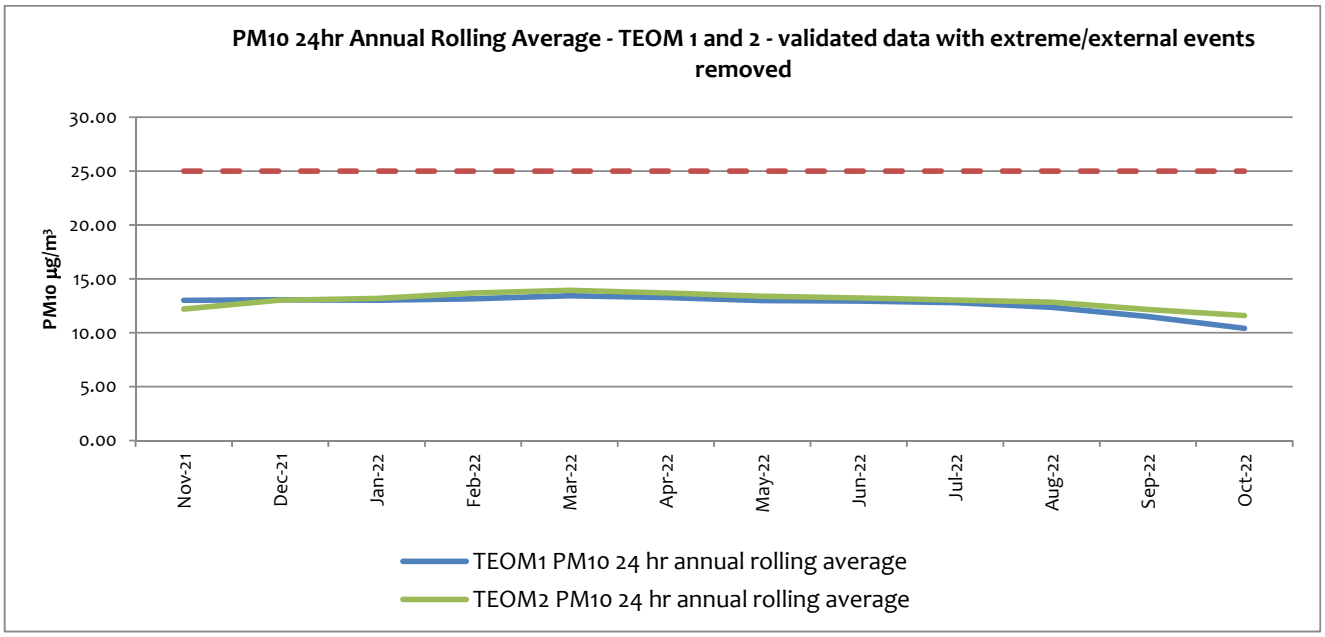
$PM_{10}$ dust levels at both TEOM units were low in the month of October, with neither site recording a daily average over the limit of 50 µg/m$^3$.

The rolling annual average for PM10 at TEOM1 with external dust events removed for the period November 2021 to October 2022 is 10.41 µg/m$^3$, down from 13.01 µg/m$^3$ at the beginning of the reporting period.

The rolling annual average for PM10 at TEOM2 with external dust events removed for the period November 2021 to October 2022 is 11.60 µg/m$^3$, below the rolling annual average of 12.21 µg/m$^3$ at the beginning of the reporting period.

The $PM_{10}$ 24-hour rolling annual average for both TEOM sites remain below the annual average criteria of 25 ug/m$^3$.



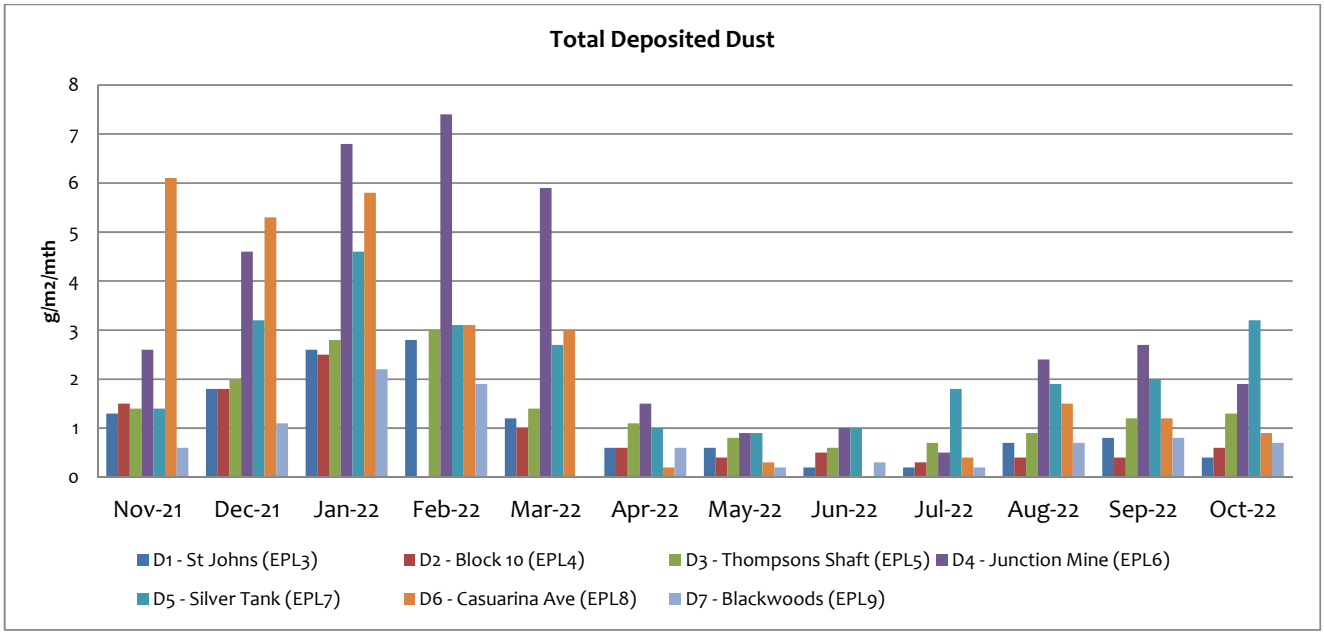
## 1.3 Dust Deposition Sampling

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.

### *Dust Deposition Gauges D1 (EPL3) to D7 (EPL9) – Results for October 2022*

| Total Deposited Dust (g/m$^{2/}$Month) | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Sample Period** | D1 (off site) | D2 (off site) | D3 (on site) | D4 (off site) | D5 (on site) | D6 (off site) | D7 (on site) |
| **October 2022** | 0.4 | 0.6 | 1.3 | 1.9 | 3.2 | 0.9 | 0.7 |
| **Annual Rolling Average** | 1.10 | 0.91 | 1.43 | 3.18 | 2.23 | 2.53 | 0.85 |
| **Background (2010)** | 4.0 | 3.1 | 4.3 | 5.7 | -1 | 5.8 | -1 |

**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 October 2022 were consistent with previous months. The highest dust levels were recorded in the D5 Silver Tank gauge. The predominant wind direction for October was from the South as shown in the Wind Rose in Section 4, suggesting contribution from off-site sources.

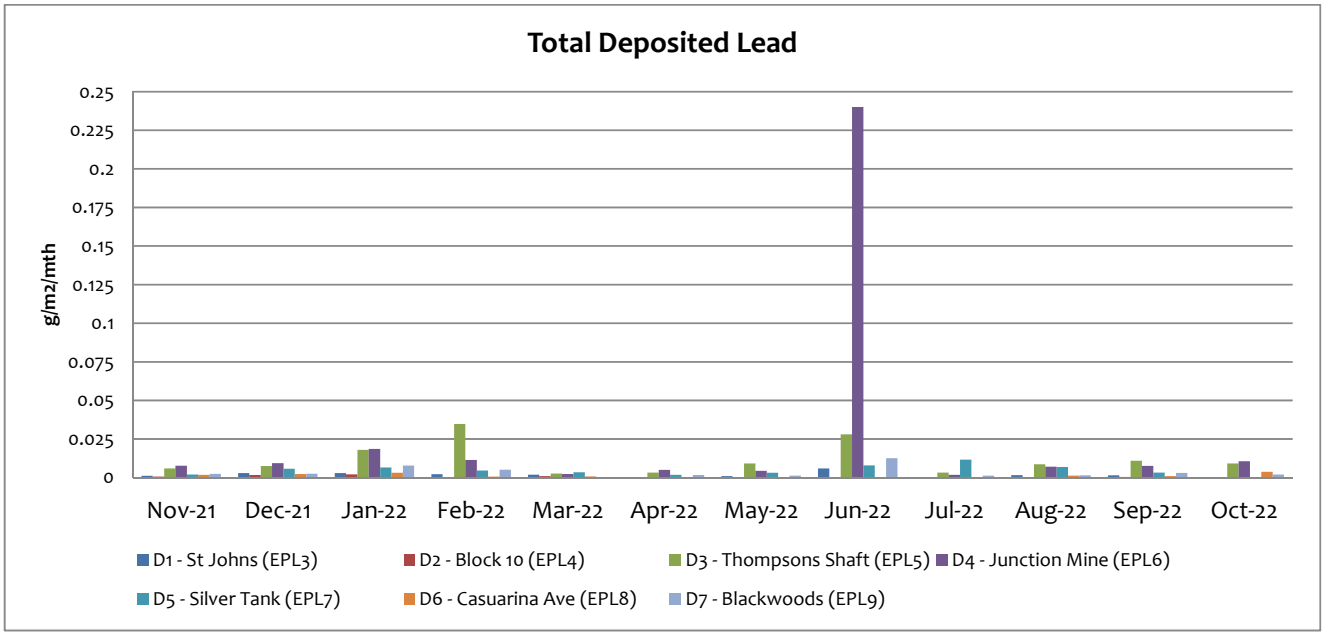
Dust Deposition Gauges that are located off-site must adhere to criteria of annually averaged deposited dust of 4 g/m$^2$ /month. All off-site Dust Deposition Gauges were compliant in the reporting period.

| 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) |
| **October 2022** | <0.00101 | <0.00101 | 0.0092 | 0.0106 | <0.00101 | 0.00378 | 0.00203 |
| **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 October 2022 were highest in the D4 Junction Mine gauge. The prominent wind direction for the month of October was from the South, suggesting there is a possibility site activities were contributing lead dust.

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 October 2022*

Monitoring was conducted at the Primary Vent Shaft (EPL1) and the Crusher Baghouse (EPL2) on 6 September 2022. The monitoring results for the Primary Vent Shaft and the Crusher Baghouse from this monitoring event were below the licence criteria.

# 2 Noise

## 2.1 Blasting (Vibration and Overpressure)

There are five compliance vibration monitors at various locations measuring for vibration and overpressure from blast firings. These include V1 to V5 which are located on-site and off-site. 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, Italio (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 October 2022 (annual period)***

**Total Blasts:**

- 0 production blasts occurred before 6.45 am or after 7.15 pm
- The number of Production blasts averaged 2.15 per week over the previous calendar year
- The number of Development blasts averaged 24.71 per week over the previous calendar year

**Western Mineralisation and Main Lodes (excluding Block 7):**

- 0 Blast 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 = 0%

**Block 7:**

- 1 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 =100%

The have been no production blasts in the Western Mineralisation and Main Lodes producing vibration at monitors over 5 mm/sec for the 12-month period.

There has been one production blasts in Block 7 for the 12-month period and this blast produced vibration at one monitor of over 3 mm/sec.

## 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 27 to 29 October 2022.

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.

**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 (SO4), 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 October 2022*

| Sample Point | pH | EC ($\mu S/cm^2$) | TDS (mg/l) | Alkalinity ($CaCO_3$) (mg/l) | SO4 (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)** | 5.74 | 12400 | 14100 | 9 | 5860 | 1740 | 503 | 290 | 1660 | 2.86 | 2 | 361 | 1070 | 0.38 |
| **Kintore Pit (EPL54)** | 5.42 | 14400 | 16800 | 5 | 7090 | 2250 | 528 | 346 | 1930 | 4.04 | 2.08 | 498 | 1460 | <0.05 |

### *Groundwater Bores (EPL37 - EPL52) Results for October 2022*

No groundwater monitoring was scheduled in October 2022.

## 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.

Results for most locations were consistent with previous samples except for S34 Horwood Dam which returned reduced values for Lead, Sodium, Magnesium, TDS and Electrical Conductivity, which was likely due to the surface rainfall runoff transferred to the dam from surface storages.

## 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 (SO4), 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 14 October 2022*

| Sample Point | pH | EC (µS/cm$^2$) | TDS (mg/l) | Alkalinity ($CaCO_3$) (mg/l) | SO4 (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) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **S9B-2 (EPL 33)** | 6.86 | 264 | 196 | 7 | 86 | 14 | 29 | 4 | 13 | 0.0995 | 0.341 | 1.3 | 7.42 | <0.05 |
| **S31-1 (EPL 29)** | 6.43 | 944 | 894 | 5 | 473 | 16 | 90 | 8 | 20 | 1.1 | 0.694 | 30.2 | 109 | <0.05 |
| **S1A (EPL 32)** | 6.83 | 212 | 168 | 11 | 74 | 4 | 32 | 2 | 4 | 0.054 | 0.058 | 1.41 | 6.23 | <0.05 |
| **Upstream (EPL 35)** | 7.06 | 276 | 192 | 79 | 34 | 17 | 39 | 4 | 12 | 0.0026 | <0.001 | 0.008 | 0.747 | <0.05 |
| **Downstream (EPL 36)** | 7.13 | 323 | 239 | 70 | 32 | 35 | 25 | 6 | 28 | 0.0007 | 0.001 | 0.003 | 0.098 | <0.05 |
| **S49 (EPL 31)** | 6.58 | 651 | 524 | 4 | 297 | 7 | 78 | 6 | 9 | 0.331 | 0.173 | 13.7 | 45.7 | <0.05 |
| **S44 (EPL 30)** | 6.83 | 300 | 218 | 17 | 91 | 16 | 37 | 4 | 12 | 0.152 | 0.276 | 0.8 | 4.77 | <0.05 |
| **Horwood Dam (EPL 34)** | 6.4 | 5840 | 5120 | 8 | 2280 | 839 | 328 | 138 | 704 | 2.18 | 1.7 | 134 | 265 | <0.05 |

# 4 Weather Data

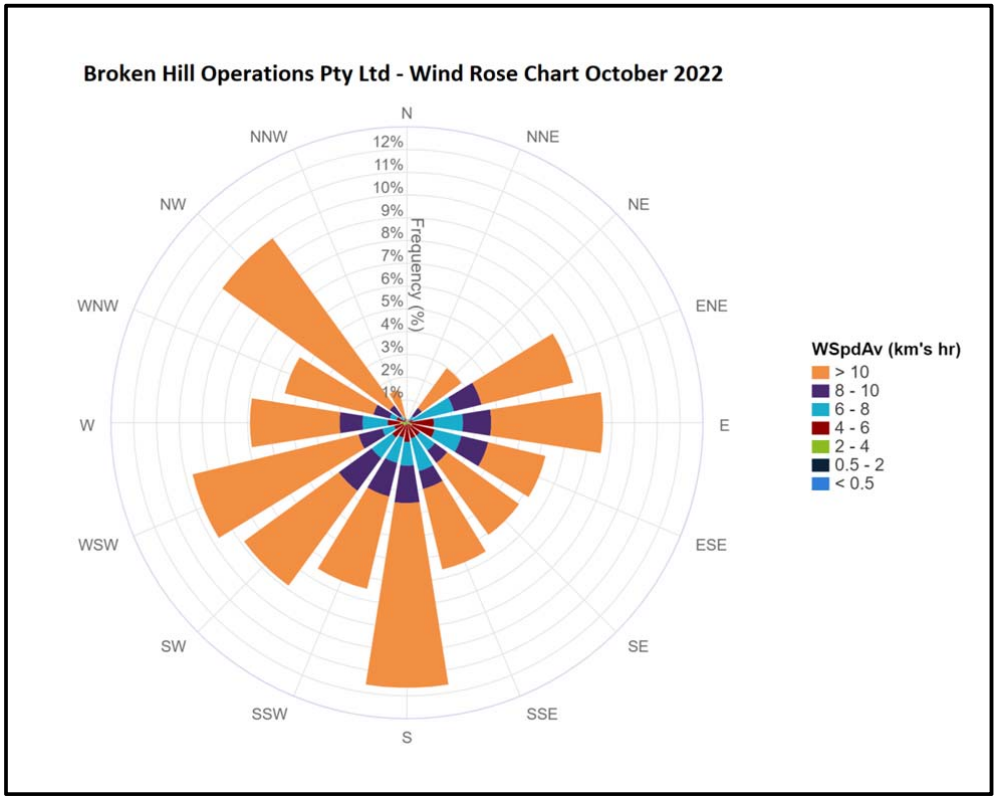
The weather station continuously monitors the following parameters as per Point 55 of the Environmental Protection Licence.

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 wind rose provided below indicates that the prominent wind direction for the month of October was from the South.



*Weather Data Summary for October 2022*

| Date | Temperature @ 10m (°C) | | Wind Speed @ 10m (km/hr) | | Predominant Wind Direction @ 10m | | Rainfall (mm) |
|---|---|---|---|---|---|---|---|
| | Min | Max | Min | Max | Cardinal | Degree | Total |
| 01-Oct-22 | 11.1 | 21.3 | 2.8 | 23.0 | SE | 136 | 0.00 |
| 02-Oct-22 | 12.6 | 21.2 | 2.5 | 26.5 | ENE | 68 | 0.00 |
| 03-Oct-22 | 13.6 | 23.3 | 3.0 | 25.1 | ENE | 69 | 0.00 |
| 04-Oct-22 | 14.5 | 25.9 | 5.9 | 34.2 | ENE | 67 | 7.30 |
| 05-Oct-22 | 14.4 | 25.5 | 0.5 | 31.0 | NW | 311 | 0.00 |
| 06-Oct-22 | 15.5 | 26.7 | 0.6 | 26.1 | WNW | 294 | 0.00 |
| 07-Oct-22 | 13.9 | 22.6 | 3.2 | 27.0 | SSW | 202 | 2.00 |
| 08-Oct-22 | 8.4 | 16.6 | 6.7 | 30.3 | South | 179 | 0.00 |
| 09-Oct-22 | 5.7 | 17.3 | 3.5 | 16.1 | South | 182 | 0.00 |
| 10-Oct-22 | 11.1 | 19.6 | 4.9 | 23.3 | NE | 46 | 0.00 |
| 11-Oct-22 | 13.1 | 22.8 | 3.3 | 22.3 | NE | 44 | 0.00 |
| 12-Oct-22 | 14.2 | 23.3 | 4.5 | 26.3 | NE | 41 | 18.60 |
| 13-Oct-22 | 10.0 | 14.2 | 3.0 | 37.1 | South | 179 | 15.60 |
| 14-Oct-22 | 9.0 | 18.2 | 3.8 | 26.9 | NW | 310 | 0.00 |
| 15-Oct-22 | 10.6 | 18.5 | 1.7 | 15.1 | South | 179 | 0.00 |
| 16-Oct-22 | 13.7 | 21.4 | 2.8 | 14.6 | ENE | 65 | 0.00 |
| 17-Oct-22 | 12.5 | 21.5 | 5.4 | 19.9 | East | 92 | 0.00 |
| 18-Oct-22 | 12.8 | 17.6 | 3.2 | 25.9 | ENE | 67 | 0.90 |
| 19-Oct-22 | 12.5 | 15.7 | 7.5 | 31.0 | SSE | 159 | 3.80 |
| 20-Oct-22 | 13.6 | 21.8 | 4.1 | 24.4 | South | 180 | 2.20 |
| 21-Oct-22 | 15.5 | 22.5 | 2.4 | 22.3 | SW | 228 | 0.00 |
| 22-Oct-22 | 16.0 | 24.7 | 2.3 | 16.9 | SW | 226 | 0.00 |
| 23-Oct-22 | 14.7 | 18.8 | 3.2 | 18.6 | ESE | 113 | 16.50 |
| 24-Oct-22 | 13.6 | 18.5 | 4.1 | 31.5 | NW | 312 | 0.00 |
| 25-Oct-22 | 12.7 | 21.5 | 6.0 | 34.2 | WNW | 293 | 0.00 |
| 26-Oct-22 | 15.0 | 23.7 | 2.1 | 24.3 | SSW | 204 | 0.10 |
| 27-Oct-22 | 11.5 | 20.4 | 3.7 | 31.3 | SW | 225 | 0.00 |
| 28-Oct-22 | 12.6 | 20.0 | 4.4 | 29.3 | SW | 227 | 0.00 |
| 29-Oct-22 | 11.8 | 22.1 | 1.5 | 25.3 | NW | 311 | 0.00 |
| 30-Oct-22 | 16.2 | 21.8 | 2.3 | 21.8 | ENE | 69 | 0.00 |
| 31-Oct-22 | 11.1 | 22.6 | 2.3 | 21.8 | WNW | 292 | 6.30 |

Rainfall of 73.3mm in October 2022.

# 5 Data Log

| Sample | Result Received |
|---|---|
| Hi Volume Samples | 18-11-2022 |
| TEOM | 7-12-2022 |
| Dust Deposition | 29-11-2022 |
| Vents & Bag House | 07-10-2022 |
| Noise | 5-12-2021 |
| Water | 08-11-2022 |
| Blast vibration and overpressure | 07-11-2022 |
| Weather | 17-11-2022 |
| Date posted to web site | 23-8-2023 |

# 6 Correction Log

No corrections.