
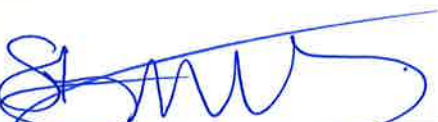




# 1 January to 31 March 2019 - Quarter 1 Environmental Monitoring Results Summary

<b>Name of Mine</b>	Northparkes Mines
<b>Name of Leaseholder and Mine Operator</b>	CMOC Mining Pty Ltd
<b>Mining Leases</b>	ML 1247, ML 1367, ML 1641 and 1743
<b>Environment Protection Licence</b>	EPL 4784
<b>Development Consent</b>	PA11-0060, (as modified)

<b>Reviewed by</b>	<b>Chase Dingle</b>
<b>Title</b>	Superintendent – Environment, Community and Farms
<b>Date</b>	
<b>Signature</b>	26 July 2019.
<b>Approved by</b>	<b>Stacey Kelly</b>
<b>Title</b>	Manager – People, Safety and Environment
<b>Date</b>	26 July 2019
<b>Signature</b>	

## 1. SCOPE OF REPORT

This report provides a summary of monitoring results for the period from 1 January 2019 to 31 March 2019. This monitoring is undertaken in accordance with the Environmental Monitoring Program (available at [www.northparkes.com.au](http://www.northparkes.com.au)). Details of air quality, noise and water monitoring locations are available in the Environmental Monitoring Program.

## 2. AIR QUALITY

The air quality monitoring program utilises PM<sub>10</sub> (beta attenuated monitors), TSP's (high volume air samplers (HVAS)) and depositional dust gauges. Monitoring locations are strategically positioned around the mine lease and neighbouring properties. TSP and PM<sub>10</sub> monitoring has been undertaken at three nearby farm residences Hubberstone, Milpose and Hillview. A summary of the monitoring results are provided below.

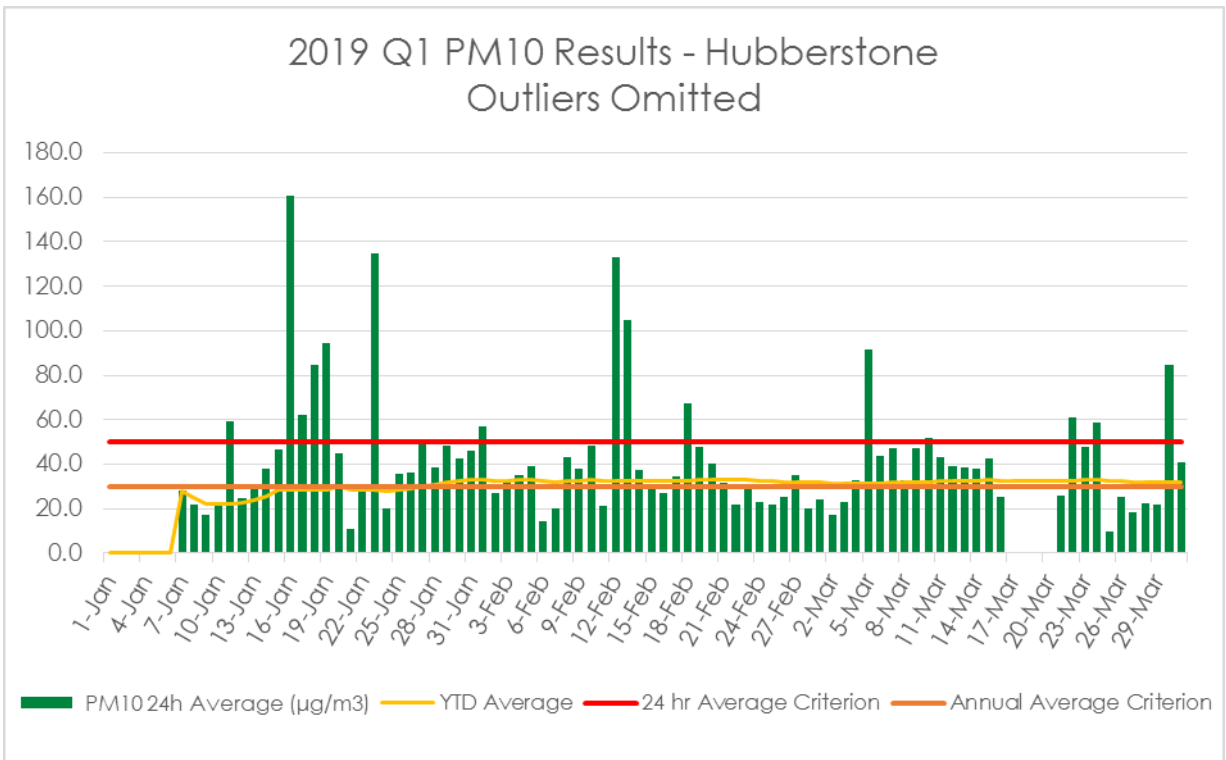
### 2.1 PM10

PM10 monitoring results for the 'Hubberstone', 'Milpose' and 'Hillview' monitoring locations, for the reporting period, are displayed in Figure 1, Figure 2 and Figure 3 respectively. The criteria for exceedances (as nominated in the Approval), are >30 µg/m<sup>3</sup> for the annual average and >50 µg/m<sup>3</sup> for a 24-hour monitoring period.

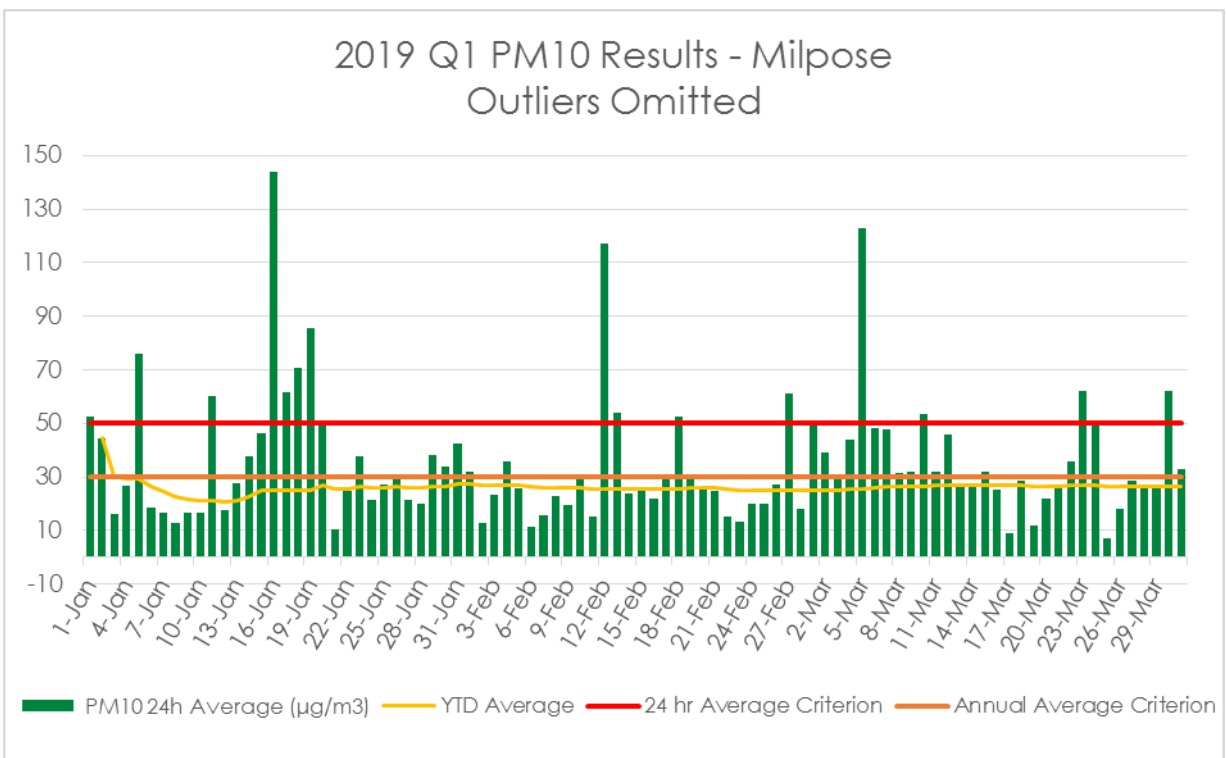
During the reporting period there were forty elevated 24hr criteria readings recorded across the three monitoring locations, with the Milpose property recording 17, Hillview 8 and Hubberstone 15. All recordings triggered the internal investigation process and were found to be caused by external factors and deemed non-mine related. The investigations identified that all elevated readings were found to be caused by either increased particulate matter from regional dust events or generated by agricultural activities. During the reporting period multiple observations were made by the Environment Team identifying high levels of airborne particulates within local district and wider region. The increased frequency of dust storms can be attributed to prolonged drought conditions.

Annual averages recorded at Hillview and Milpose monitoring locations are currently below the approval criteria of 30 µg/m<sup>3</sup>, recording 22.1 µg/m<sup>3</sup> and 26.4 µg/m<sup>3</sup> respectively. Hubberstone monitoring location is currently recording slightly above the approval criteria at 32.0 µg/m<sup>3</sup>, and will continue to be monitored throughout the remainder of the year.

The missing data for Hubberstone (1 – 7 January and 17 – 21 March) was due power supply issues.



**Figure 1:** Hubberstone



**Figure 2:** Milpose

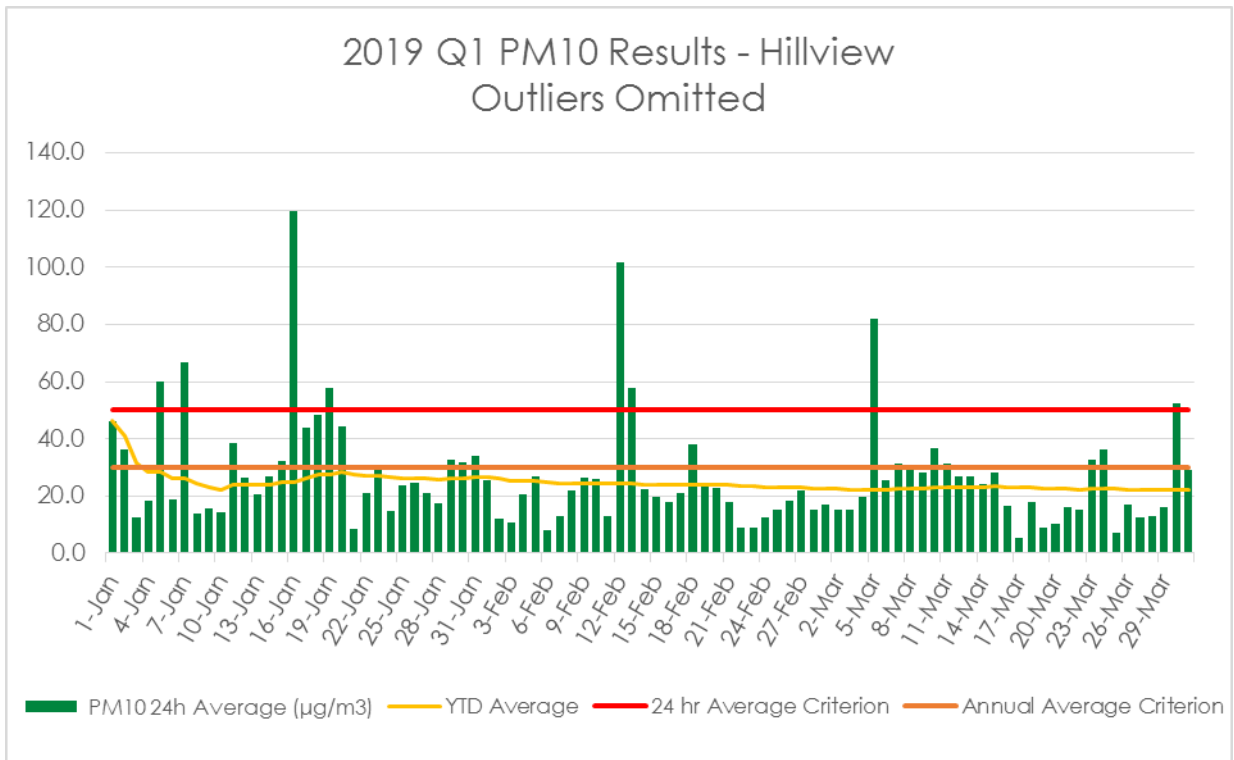


Figure 3: Hillview

## 2.2 TSP

All recorded dust levels at all TSP monitoring locations were under the required average annual criteria set by the Approval ( $90 \mu\text{g}/\text{m}^3$ ) for the Q1 2019 monitoring period. The elevated result for all locations on 10 March was the result of a severe dust storm occurring in the local and wider region.  $\text{PM}_{10}$  results for the period show all three monitoring locations simultaneously recording high levels of particulate matter, determining the elevated readings were non-mine related. Milpose recorded additional elevated results on 4 March, 22 March and 28 March. Following an internal investigation, it was determined the results were due to a combination of localised dust storms and animal husbandry activities, deeming them non-mine related.

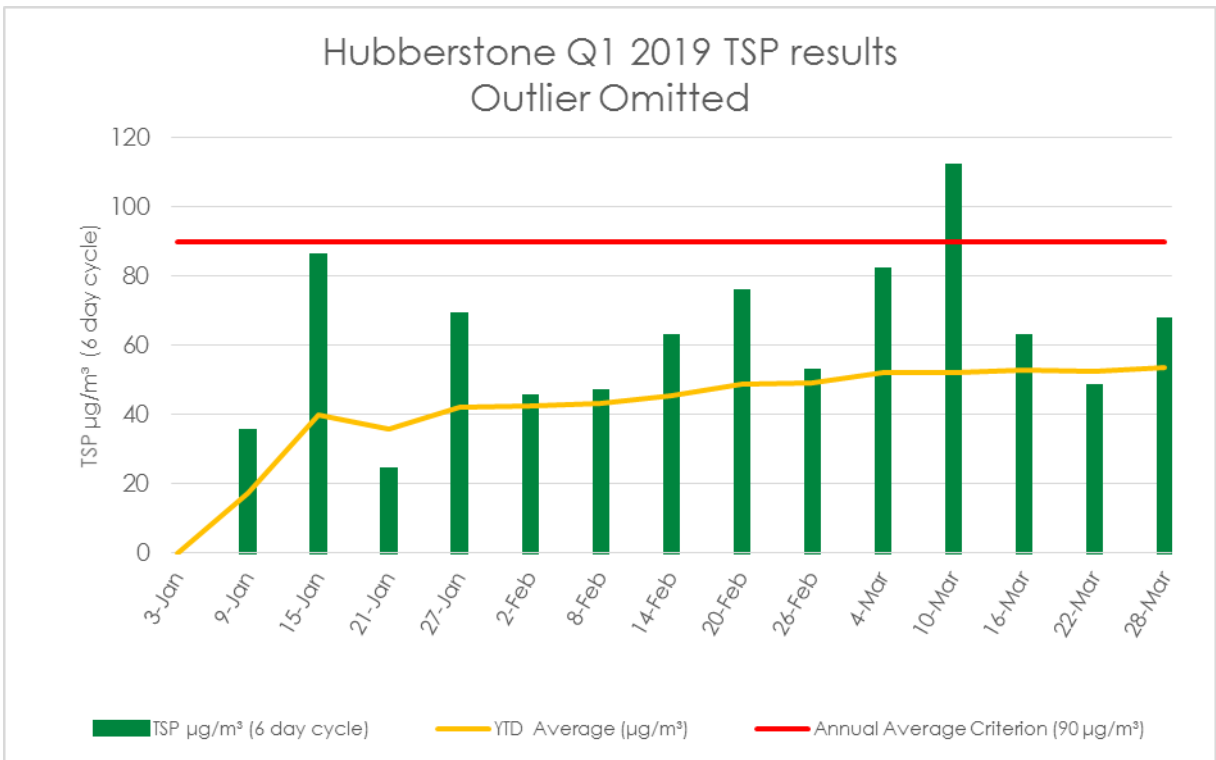


Figure 4: Hubberstone

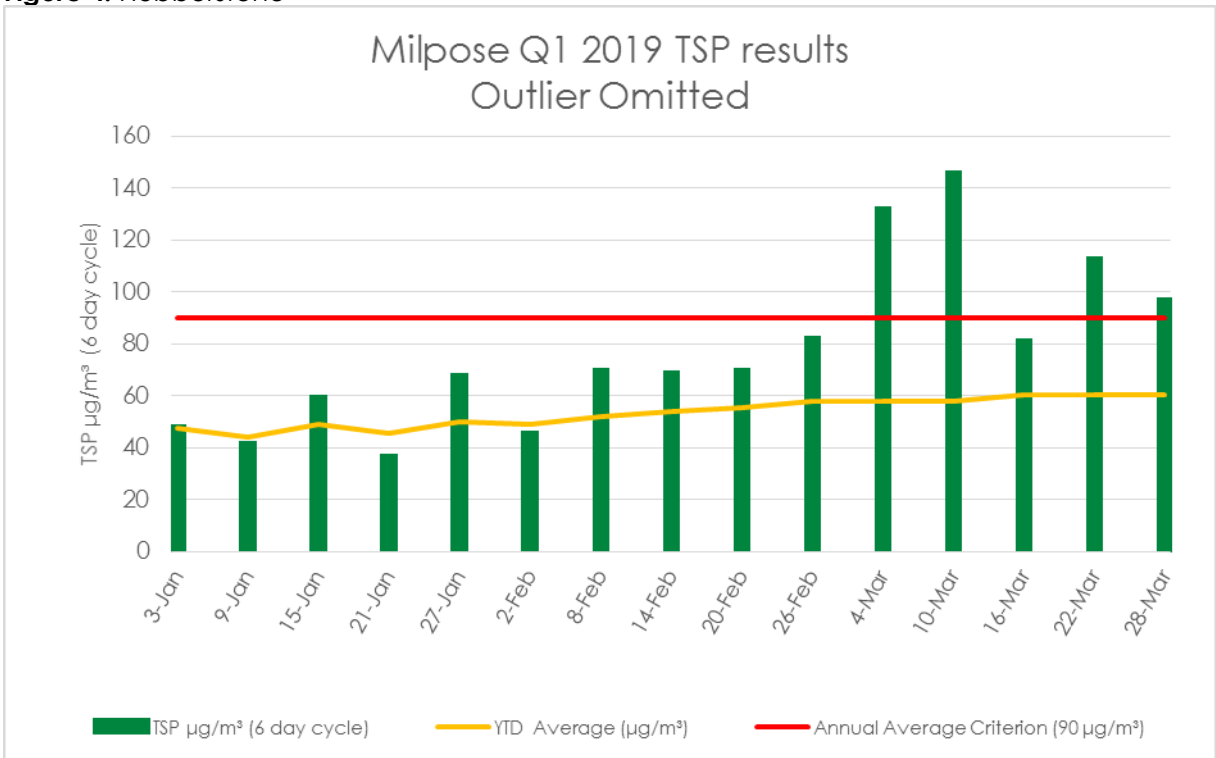


Figure 5: Milpose

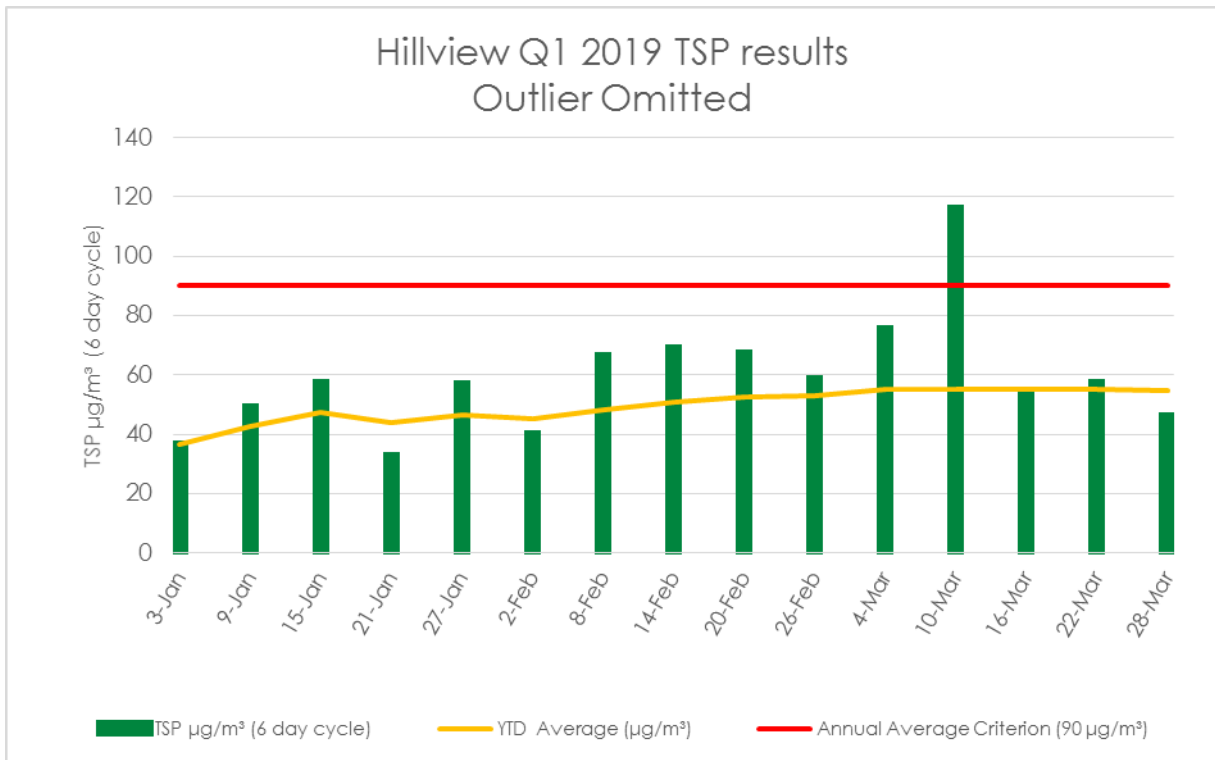


Figure 6: Hillview

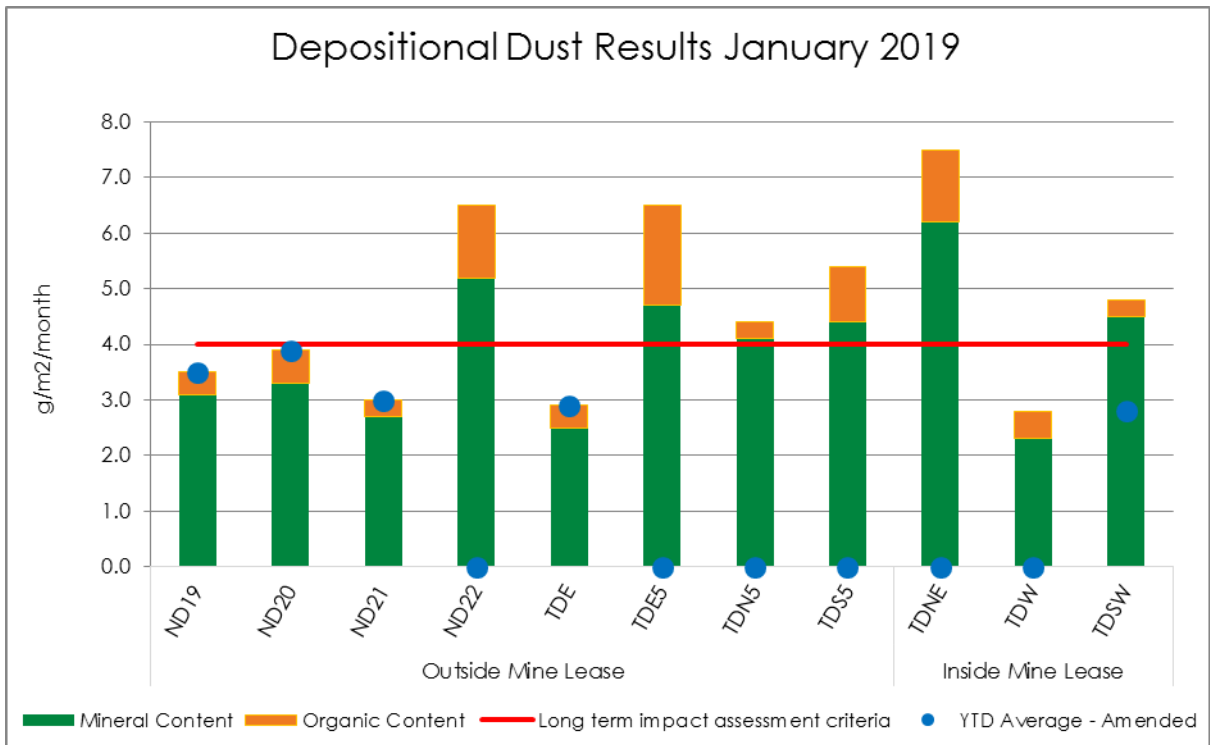
### 2.3 Depositional Dust

Depositional dust gauges record the total of deposited dust for a month long period and are a measure of broad scale changes to the local air quality.

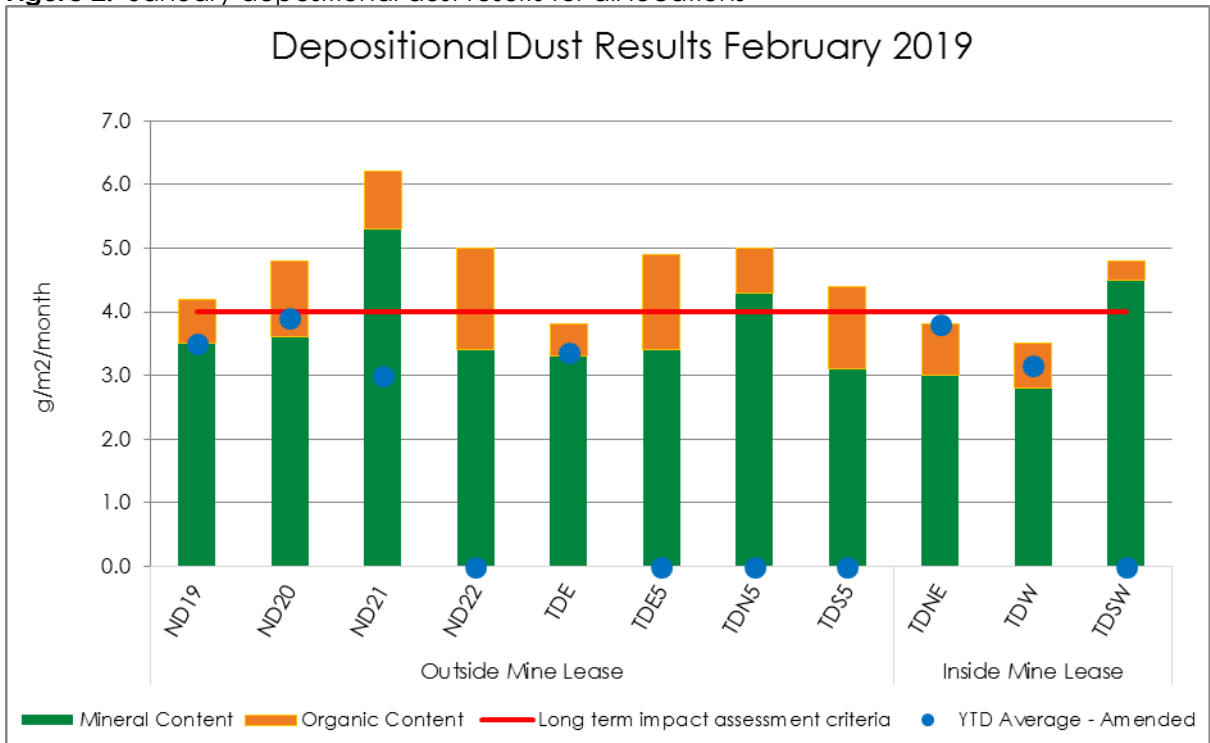
Eleven depositional dust gauges are located across the mining lease and neighbouring residential properties to monitor atmospheric dust. A summary of the monthly monitoring results at each monitoring location are presented the figures below. Please be advised that only monitoring locations ND19, ND20, ND21 & ND22 are regulated by the criteria stated in the approval, as there are the only depositional dust gauges that are at a residence on privately-owned land. All other depositional dust gauges are used to inform operational activities.

The indicative annual average for all locations are below the long-term impact assessment criteria (4 g/m<sup>2</sup>/month), complying with the conditions of the Approval.

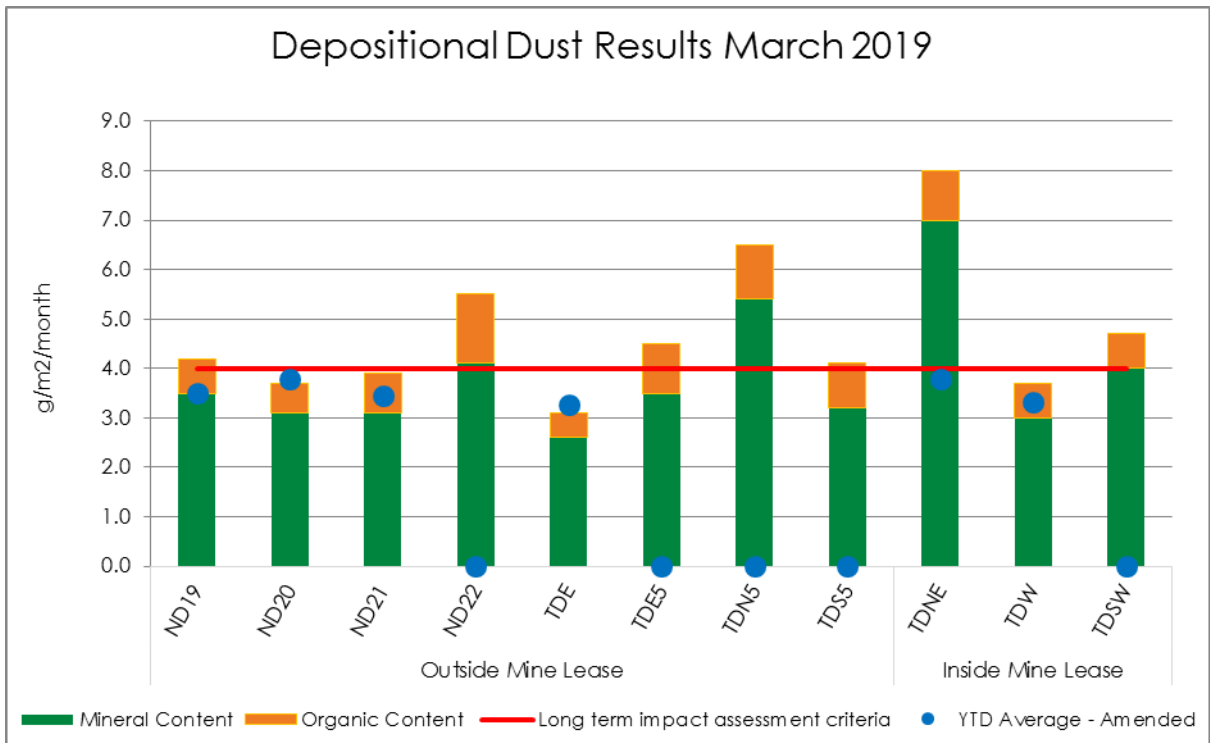
Twenty-one elevated results were recorded over the January, February and March monitoring periods as a result of increased dust storm frequency in the local and wider region. Multiple observations made by the Environment Team identified several events containing high levels of airborne particulates and are believed to be the main contributor to the high depositional results. The NSW Office of Environment and Heritage (OEH) DustWatch Report stated that recorded levels of airborne particulates for January, February and March respectively, to be the highest in DustWatch records since 2005.



**Figure 2:** January depositional dust results for all locations



**Figure 8:** February depositional dust results for all locations



**Figure 9:** March depositional dust results for all locations



## 3. WATER

### 3.1 Overview

Water management at Northparkes is undertaken in accordance with approved management plans, prepared in accordance with the Approval. All water samples are analysed at an independent National Association of Testing Authorities (NATA) accredited laboratory.

Surface water quality monitoring is undertaken at Northparkes specifically within the three defined water management systems of;

- Clean water management system, which includes farm dams and watercourses;
- Dirty water management system, which includes settlement ponds; and
- Contaminated water management system, which includes all aspects of ore processing, and retention ponds.

The groundwater monitoring program at Northparkes aims to identify any changes to the natural groundwater system as a result of mining operations and ensure compliance with the Approval. It focuses on potential impacts to environmental assets and groundwater users in the area surrounding Northparkes.

Monitoring results are assessed and interpreted utilising historical trend analysis and internal water quality criteria and trigger levels to identify potential changes.

### 3.2 Quarterly Monitoring Analysis

Water quality monitoring was carried out generally in accordance with the Approval, with no significant changes to the EC or copper concentrations for all locations. Due to below average rainfall prior to monitoring, many locations were deemed dry and unable to be sampled. A summary of the monitoring results at each location sampled are presented in Tables 1-7 below.

**Table 1: Process Water System**

	RP1	RP2	RP3	RP09	RP13	RP15	RP21	RP25	RP27	RP33	GT1	GT2	PWD	SD2	CALOOOLA PIT
pH	8.78	8.09	8.2	8.35	7.63	8.2	7.85	7.75	8.12	9.32	8.32	7.69	7.93	7.77	9.04
EC (uS/cm)	979	4421	7073	4877	926.6	3171	3718	667.6	8515	403.5	2653	2634	3129	12453	12533.3
Cu (mg/L)	0.03	0.023	0.098	0.009	0.095	0.051	0.011	0.051	0.016	0.013	0.118	0.218	0.048	0.296	0.002

**Table 2: Watercourses**

	WC12
pH	7.55
EC (uS/cm)	137
Cu (mg/L)	0.017

**Table 3: Farm Dams**

	FD4	FD5	FD7	FD11	FD16	FD25	FD26
pH	9.08	9.07	7.96	8.95	8.54	7.89	9.07
EC (uS/cm)	1349	395.7	545.8	1844	438.9	613.8	3581
Cu (mg/L)	0.033	0.015	0.02	0.025	0.032	0.027	0.025

**Table 4: TSF Bores**

	MB1	MB2	MB3	MB5	MB6B	W26	W27	W28	W29	W30	W31	W32
pH	7.02	6.98	5.89	6.6	6.75	6.76	11.34	6.58	12.83	7.09	7.41	11.72
EC (uS/cm)	6202	11337	26215	27771	16619	17891	20068	19529	24211	2396	933.4	2466
Cu (mg/L)	0.008	0.009	0.045	0.008	0.001	0.012	0.007	0.024	0.017	0.011	0.028	0.012

**Table 5: Opencut Bores**

	MB10	MB13	MB14	MB16	W14	W19	W20	W21	W22	W23	W24	W25
pH	6.82	6.66	7.09	6.41	7.08	7.38	6.89	10.67	6.84	6.83	7.56	7.9
EC (uS/cm)	16141	26568	2565	19489	9722	6634	15605	15832	19670	21317	2300	1614
Cu (mg/L)	0.033	0.017	0.009	0.017	0.01	0.014	0.008	0.019	0.009	0.058	0.007	0.019

**Table 6: Underground Bores**

	P101	P102	P103	P139	P145	MB17	MB18	MB19	MB20
pH	7.06	6.77	8.93	5.97	6.99	7.75	9.91	7.38	7.47
EC (uS/cm)	12812	32203	29188	32889	220.9	1023	1534	16318	14181
Cu (mg/L)	0.004	0.004	0.007	0.04	0.004	0.014	0.042	0.007	0.039

**Table 7: Regional Bores**

	Far Hillier	Wright	Moss
pH	6.85	7.3	7.05
EC (uS/cm)	563	980	2645
Cu (mg/L)	0.009	0.026	0.017

## 4. NOISE AND VIBRATION

Operational noise is managed by CMOC in accordance with the approved Noise Management Plan (NMP). The NMP covers all operational activities with the potential to generate noise at Northparkes. It details specific noise management and mitigation measures, outlines monitoring and reporting requirements and provides clear definitions of the roles and responsibilities for noise management.

### 4.1 Overview

CMOC undertakes a noise monitoring program that consists of both operator-attended and unattended surveys at the four nearest occupied residences 'Hubberstone', 'Milpose', 'Lone Pine' and 'Hillview'.

Operator-attended noise measurements and recordings are undertaken outside the mining leases in order to quantify the intrusive noise emissions from construction and of general mine activity as well as the overall level of ambient noise. This noise monitoring was undertaken by an independent and suitably qualified noise professional.

### 4.2 Quarterly Monitoring Analysis

Attended noise monitoring was undertaken between 6<sup>th</sup> and 8<sup>th</sup> of March 2019. Weather conditions during monitoring were very windy. The majority of the measurements could not be obtained within the specified range of allowable conditions for this period. Where measurements were successful during milder weather, attended noise monitoring results indicate noise emissions from the mine site comply with the Project Approval criteria during all monitoring periods. A summary of the monitoring results at each monitoring location are presented in Tables 8-10 below.

### 4.3 Weather

The monitoring event was conducted between the hours of 1230 and 1930 on the 6<sup>th</sup> of March, and from 2000 on the 7<sup>th</sup> March to 0130 on the 8<sup>th</sup> of March. During the first monitoring period wind speeds averaged 5.2 m/s from a Southerly direction (190 degrees), with a maximum recorded speed of 7.0 m/s. Wind speeds during the second monitoring period averaged 6.6 m/s from a North Easterly direction (46 degrees) with a maximum of 9.4 m/s being recorded.

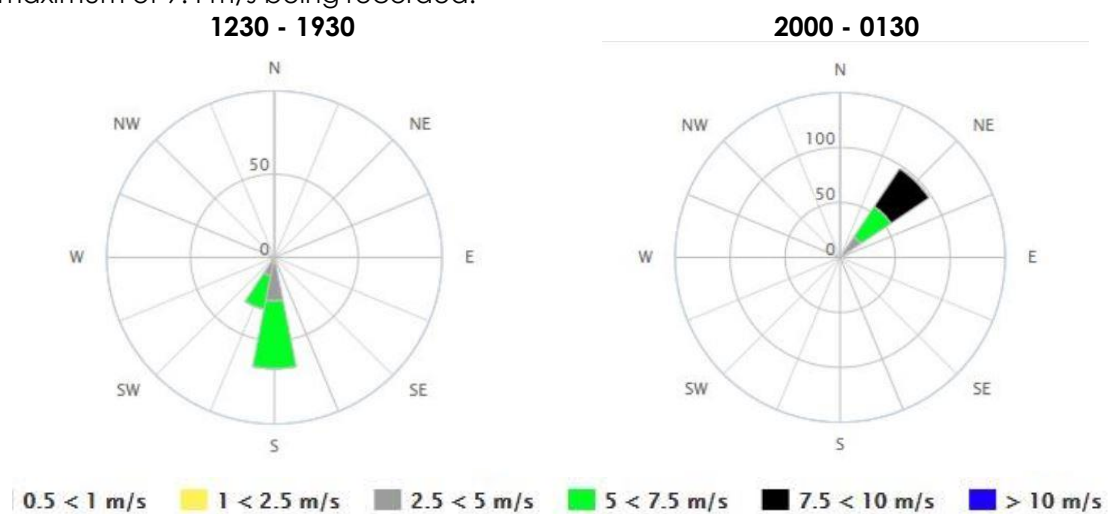


Figure 10: Wind speed and direction during the attended monitoring sessions.

**Table 8:** Attended noise monitoring results (daytime)

<i>Location</i>	<i>Date and Time</i>	<i>L<sub>A1</sub> dB</i>	<i>L<sub>A10</sub> dB</i>	<i>L<sub>Aeq</sub> dB</i>	<i>L<sub>A90</sub> dB</i>	<i>Compliance?</i>	<i>Notes</i>
<b>Hillview</b>	06/03/2019 15:55	41.9	37.1	34.9	28	Yes	
	06/03/2019 16:10	46.5	44	41.3	37	NA	Traffic noise, wind noise. Mine inaudible.
	06/03/2019 16:25	46.1	41	39.2	36.1	NA	
<b>Hubberstone</b>	06/03/2019 14:55	45.7	41	39.1	35.2	NA	
	06/03/2019 15:10	45.3	41.8	39.5	34.2	NA	Goat noise, wind noise. Mine inaudible.
	06/03/2019 15:25	47.7	43.8	42.6	36.5	NA	
<b>Milpose</b>	06/03/2019 12:40	37.9	32.9	30	23.6	Yes	
	06/03/2019 12:55	43.8	37.2	34.9	27.7	Yes	Bird noise, rain noise, wind noise. Mine inaudible.
	06/03/2019 13:10	43.9	37.1	35	27.8	Yes	
<b>Lonepine</b>	06/03/2019 13:55	42.2	32.1	31.5	25.9	Yes	
	06/03/2019 14:10	40.6	36.5	33.8	26.6	Yes	Bird noise, wind noise. Mine inaudible.
	06/03/2019 14:25	44.6	42.4	38.5	33.8	NA	

**Table 9:** Attended noise monitoring results (evening)

<i>Location</i>	<i>Date and Time</i>	<i>L<sub>A1</sub> dB</i>	<i>L<sub>A10</sub> dB</i>	<i>L<sub>Aeq</sub> dB</i>	<i>L<sub>A90</sub> dB</i>	<i>Compliance?</i>	<i>Notes</i>
<b>Hillview</b>	06/03/2019 15:55	41.9	37.1	34.9	28	Yes	Traffic noise, wind noise. Mine inaudible.
	06/03/2019 16:10	46.5	44	41.3	37	NA	
	06/03/2019 16:25	46.1	41	39.2	36.1	NA	
<b>Hubberstone</b>	06/03/2019 14:55	45.7	41	39.1	35.2	NA	Goat noise, wind noise. Mine inaudible.
	06/03/2019 15:10	45.3	41.8	39.5	34.2	NA	
	06/03/2019 15:25	47.7	43.8	42.6	36.5	NA	
<b>Milpose</b>	06/03/2019 12:40	37.9	32.9	30	23.6	Yes	Bird noise, rain noise, wind noise. Mine inaudible.
	06/03/2019 12:55	43.8	37.2	34.9	27.7	Yes	
	06/03/2019 13:10	43.9	37.1	35	27.8	Yes	
<b>Lonepine</b>	06/03/2019 13:55	42.2	32.1	31.5	25.9	Yes	Bird noise, wind noise. Mine inaudible.
	06/03/2019 14:10	40.6	36.5	33.8	26.6	Yes	
	06/03/2019 14:25	44.6	42.4	38.5	33.8	NA	

**Table 10:** Attended noise monitoring results (night)

<i>Location</i>	<i>Date and Time</i>	<i>L<sub>A1</sub> dB</i>	<i>L<sub>A10</sub> dB</i>	<i>L<sub>Aeq</sub> dB</i>	<i>L<sub>A90</sub> dB</i>	<i>Compliance?</i>	<i>Notes</i>
<b>Hillview</b>	08/03/2019 1:00	46.1	42.2	41.1	39.5	NA	
	08/03/2019 1:15	54.8	48.8	45.8	41.1	NA	High wind. Mine inaudible.
	08/03/2019 1:30	48.9	45	42.5	39.1	NA	
<b>Hubberstone</b>	08/03/2019 0:00	56.3	51.1	47.2	38.7	NA	
	08/03/2019 0:15	52.8	46.1	43.9	38	NA	High wind. Mine inaudible.
	08/03/2019 0:30	51.9	45.9	42.7	37	NA	
<b>Milpose</b>	07/03/2019 23:00	48.3	45.5	43.7	41.5	NA	
	07/03/2019 23:15	50.8	47.6	44.8	41.4	NA	High wind. Mine inaudible.
	07/03/2019 23:30	50.5	45.4	43.6	39.7	NA	
<b>Lonepine</b>	07/03/2019 22:00	59.3	57.7	55.8	53	NA	
	07/03/2019 22:15	61.2	58.5	56.9	55.2	NA	High wind. Mine inaudible.
	07/03/2019 22:30	60.3	59.4	57.8	56.2	NA	