





1 January to 31 March 2018 - Quarter 1 Environmental Monitoring Results Summary

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

Reviewed by	Nathan Jones
Title	Senior Environmental Advisor
Date	22/6/18
Signature	
Approved by	Chase Dingle
Title	A/Manager – People, Safety and Environment
Date	22/06/18
Signature	

1. SCOPE OF REPORT

This report provides a summary of monitoring results for the period from 1 January 2018 to 31 March 2018. This monitoring is undertaken in accordance with the Environmental Monitoring Program (available at 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 PM₁₀ (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 PM₁₀ 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), is >30 µg/m³ for the annual average and >50 µg/m³ for a 24-hour monitoring period.

During the reporting period there were three elevated 24hr criteria readings recorded at all monitoring locations on March 18th & on March 19th at Milpose & Hubberstone. These abnormally higher results triggered an internal investigation which determined that the large dust storm that passed through the district during that period to be the most likely contributing factor and that the air borne emissions were most likely not generated by the project. The missing data for Hubberstone was due to a power surge damaging the monitoring equipment, which required to be sent back to the manufacturer for replacement.

The annual average PM₁₀ levels recorded at all PM₁₀ monitoring locations are below the predicted levels within the EA (20 µg/m³).

Hubberstone PM10 Results for Q1 2018

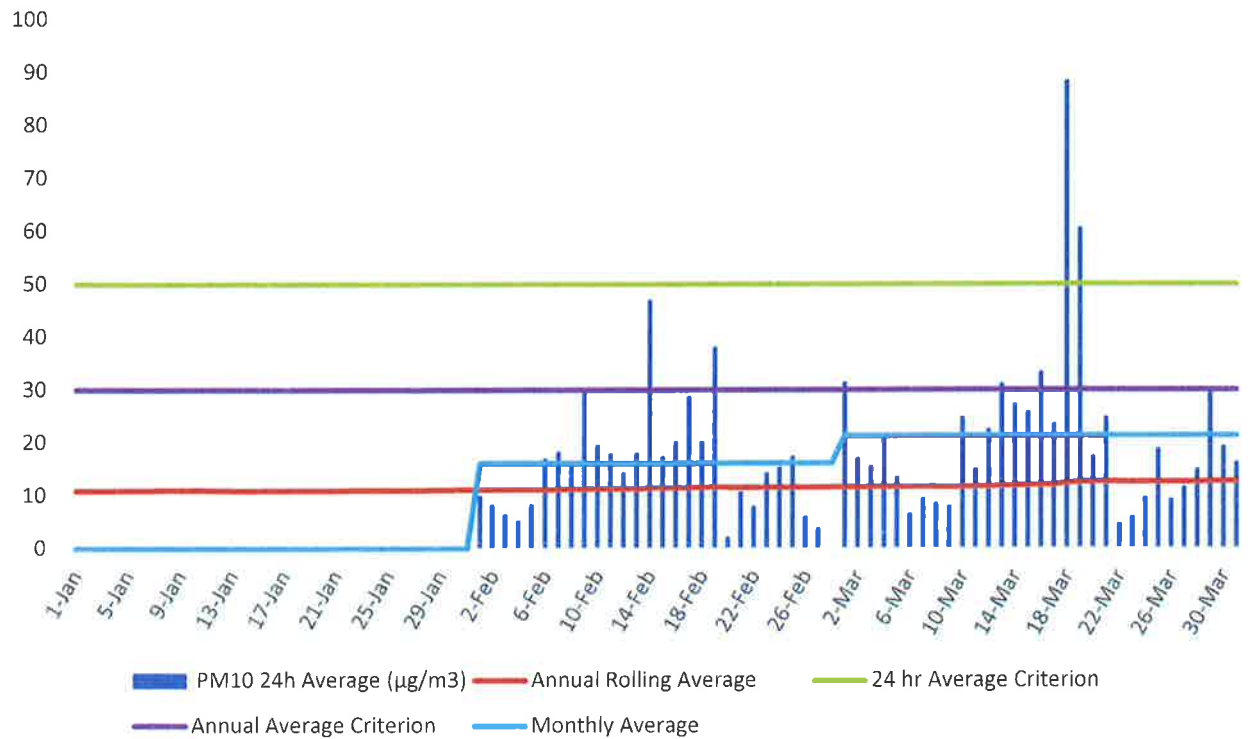


Figure 1: Hubberstone

Milpose PM10 Results for Q1 2018

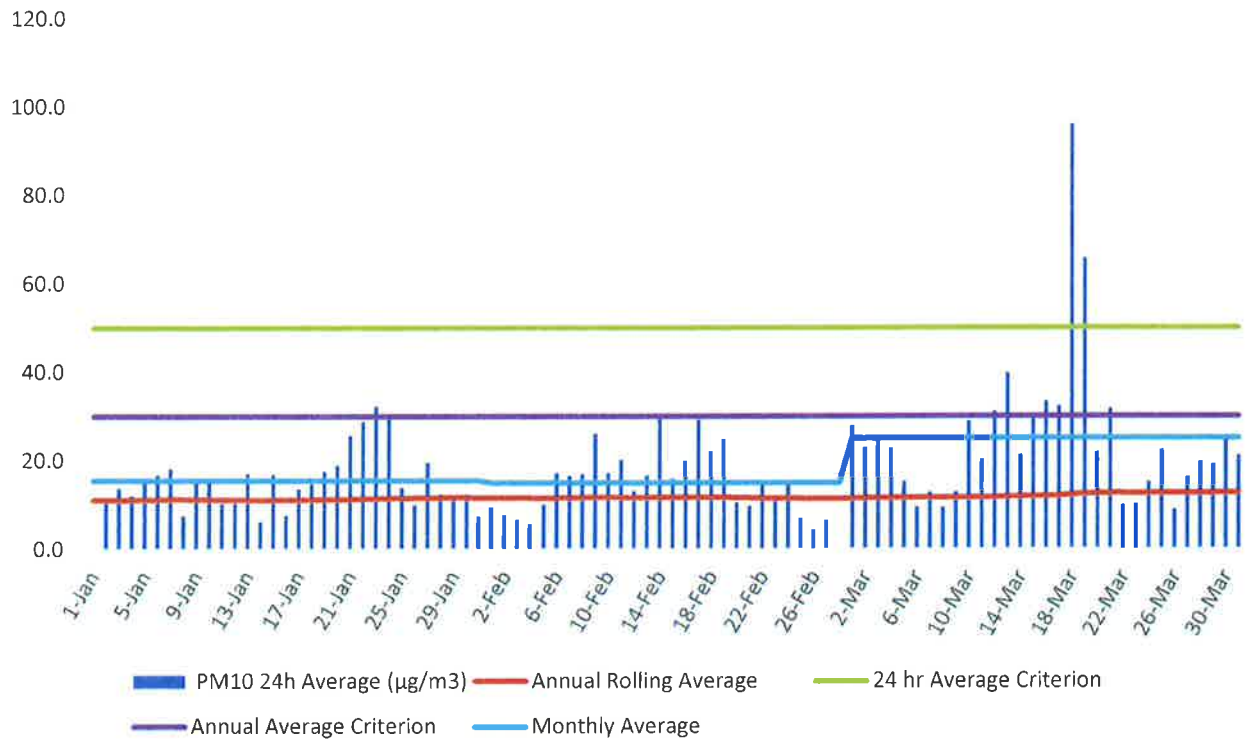


Figure 2: Milpose

Hillview PM10 Results for Q1 2018

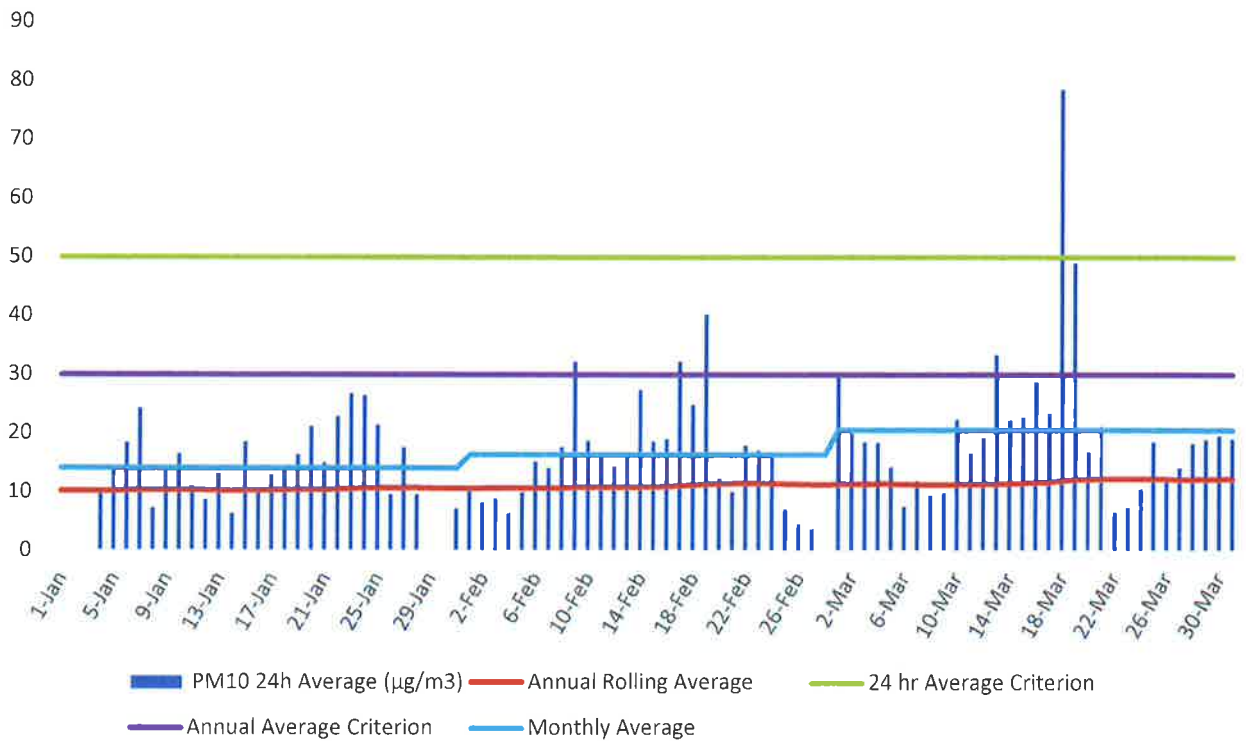


Figure 3: Hillview

2.2 TSP

All recorded dust levels at all TSP monitoring locations were under the required annual criteria set by the Approval ($90 \mu\text{g}/\text{m}^3$) for the Q1 2018 monitoring period. Results are presented in Figure 4, Figure 5 and Figure 6 respectively. The annual average TSP dust levels recorded at all TSP monitoring locations are below the predicted levels within the EA ($50 \mu\text{g}/\text{m}^3$). The missing data for Milpose and Hubberstone are due to localised power outages.

Hubberstone Q1 2018 TSP results

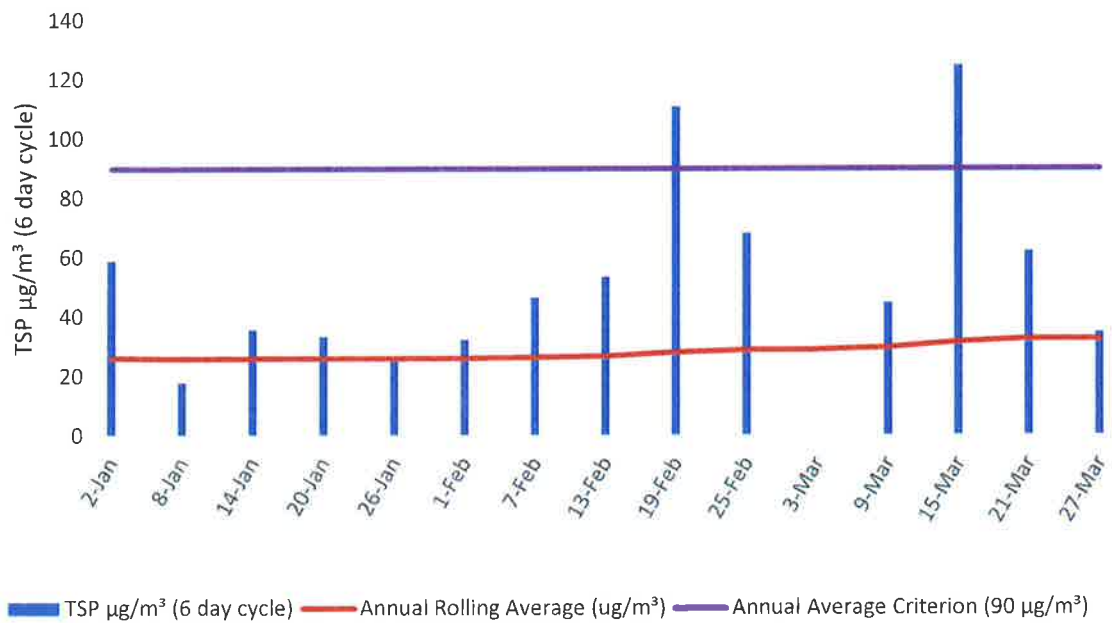


Figure 4: Hubberstone

Milpose Q1 2018 TSP results

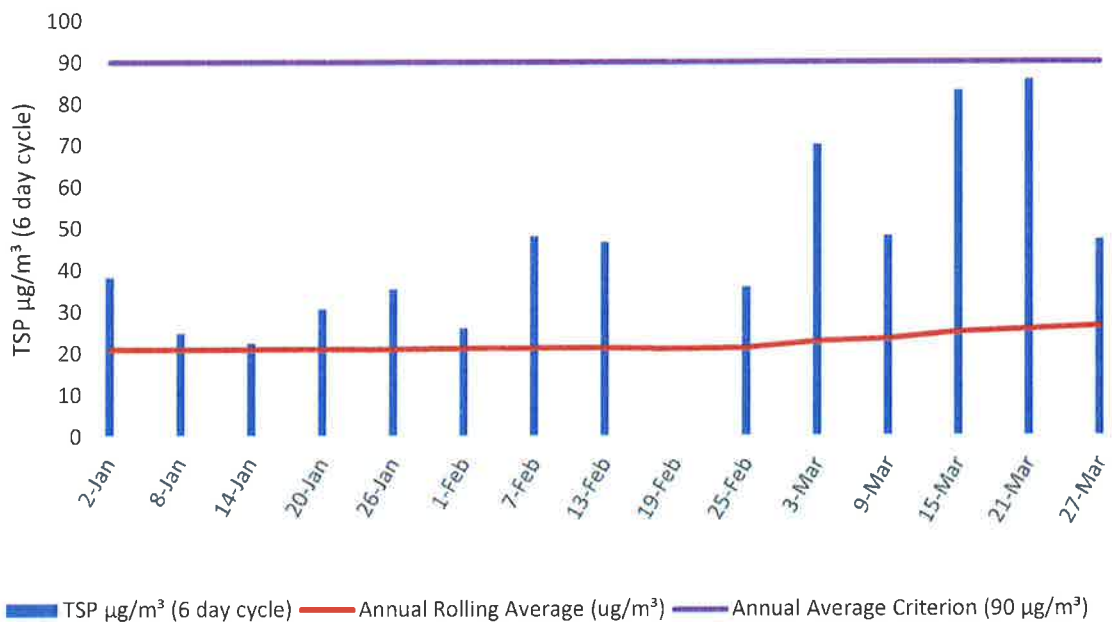


Figure 5: Milpose

Hillview Q1 2018 TSP results

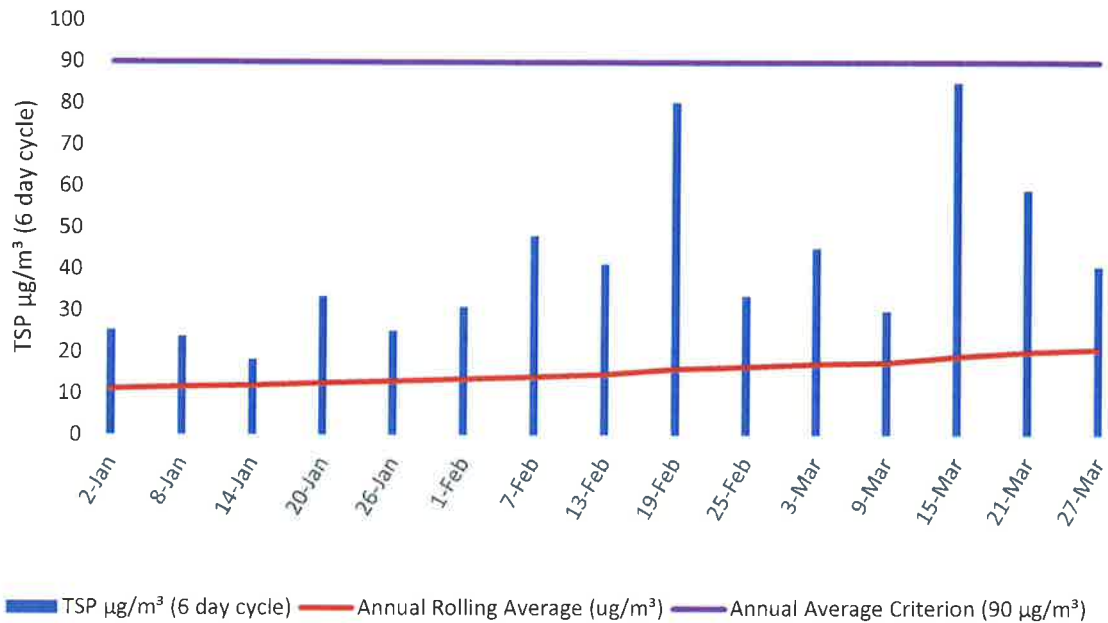


Figure 6: Hillview

2.3 Depositional Dust

Depositional dust gauges record the total of deposited dust for a month long period and are a useful 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 in Figure 7, Figure 8 and Figure 9 respectively,

The indicative annual average for all locations are below the long-term impact assessment criteria, complying with the conditions of the Approval.

Monitoring location TDE is located adjacent to seasonal cropping paddocks, which during agricultural activities (weed seed burning, sowing and harvesting), generally experiences higher than average depositional dust levels. The two higher results during the reporting period coincided with these practices.

Depositional Dust Results for January 2018

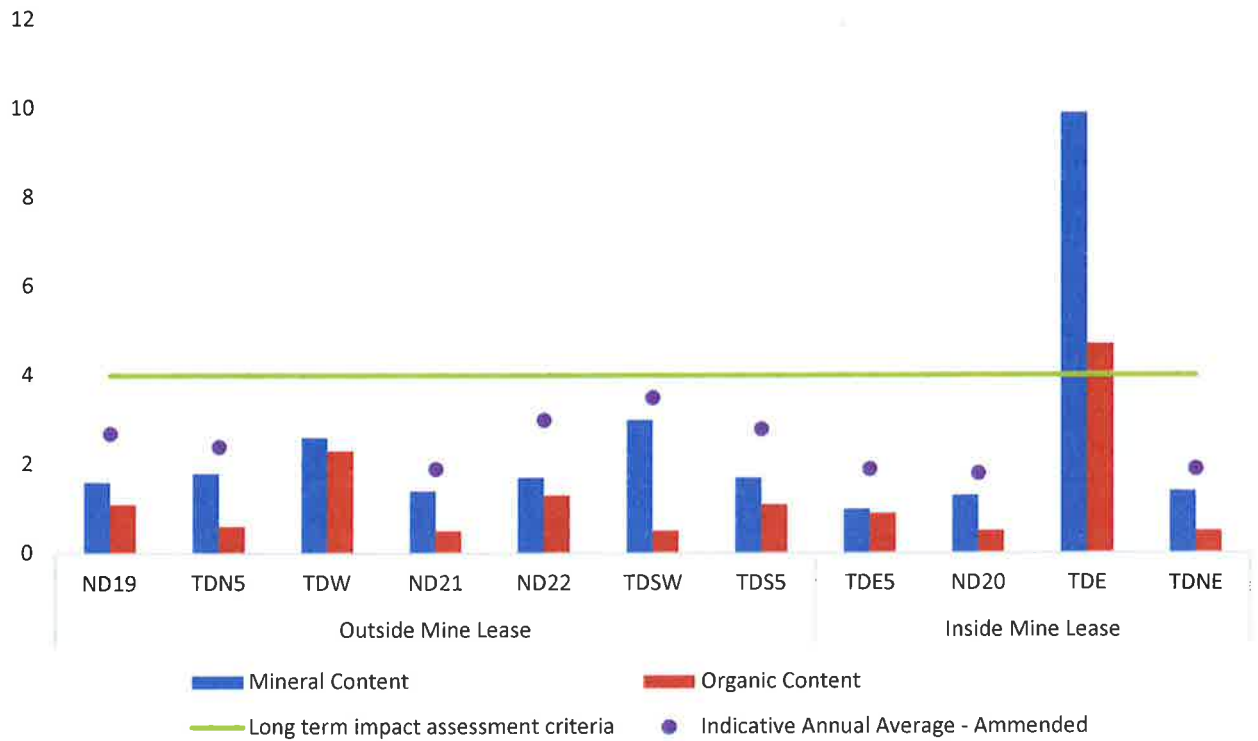


Figure 7: January depositional dust results for all locations

Depositional Dust Results for February 2018

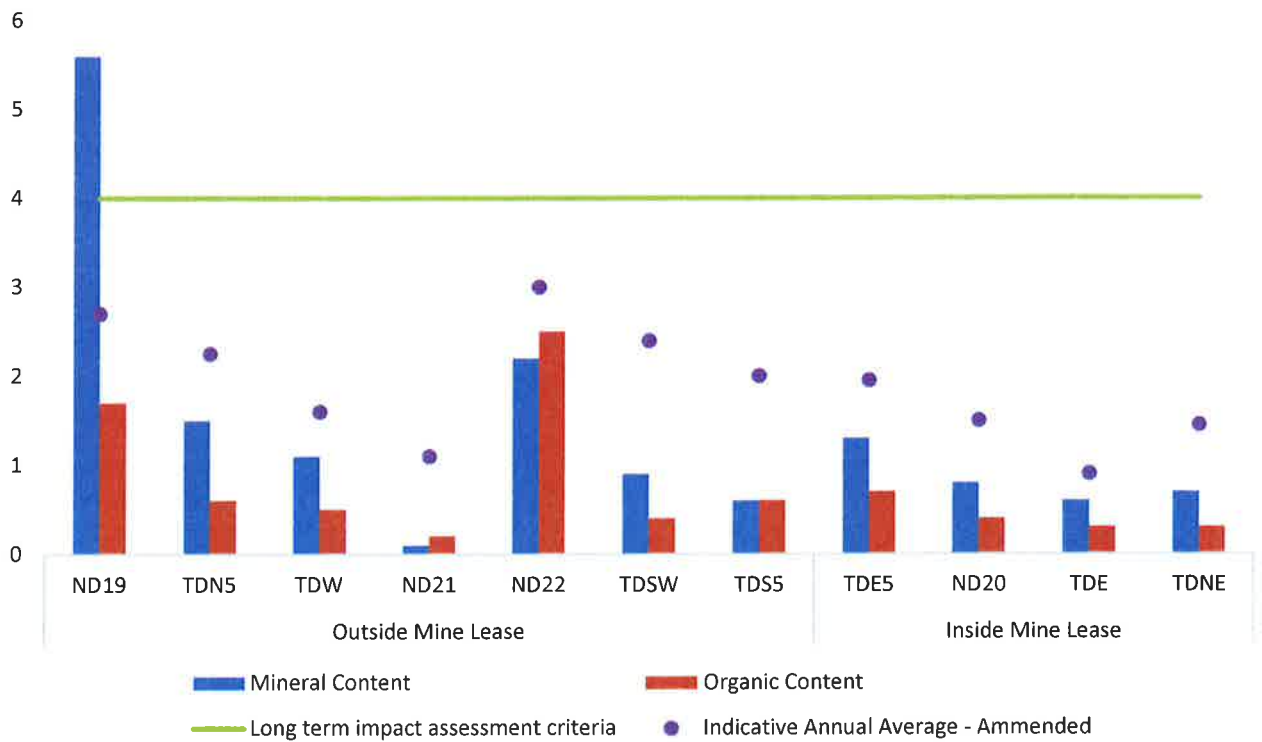


Figure 8: February depositional dust results for all locations

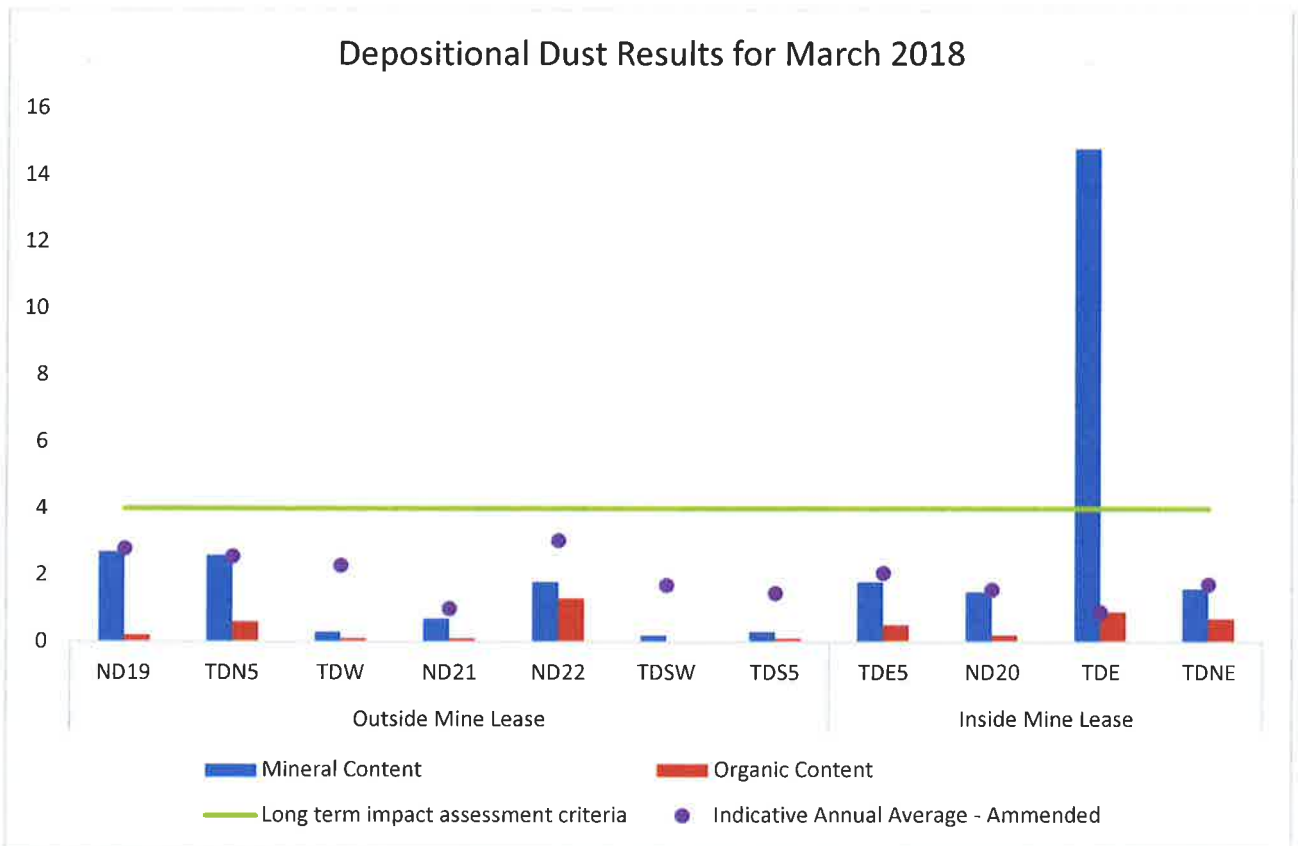


Figure 9: March depositional dust results for all locations

3. WATER

3.1 Overview

Water management at Northparkes is undertaken in accordance with approved management plans, prepared in accordance with 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.

CMOC's groundwater monitoring program 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 successfully carried out for the reporting period with no significant changes to the pH, 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 sampled location are presented in Tables 1-8 below.

Table 1: Process Water System

	RP1	RP2	RP3	RP5	RP09	RP15	RP21	RP27	RP32	RP33	GT1	GT2	PWD	SD2	CALOOLA PIT
pH	8.18	8.07	7.95	7.77	7.47	7.67	8.14	8.22	8.21	8.34	8.09	7.87	7.66	7.49	9.21
EC (uS/cm)	504.4	2681.5	5134	7.77	5046.2	4710	2552.1	4734.6	1377	304	2894.4	457.2	2718	10318	2614
Cu (mg/L)	0.036	0.018	0.09	0.013	0.014	0.045	0.02	0.016	0.02	0.008	0.064	-	-	0.114	0.01

Table 2: Sediment Ponds

	SP3	SP10
pH	7.89	8.19
EC (uS/cm)	2218	4265
Cu (mg/L)	0.008	0.008

Table 3: Watercourses

	WC12
pH	7.89
EC (uS/cm)	292.4
Cu (mg/L)	0.002

Table 4: Farm Dams

	FD4	FD5	FD6	FD7	FD11	FD16	FD18	FD21	FD25	FD26	FD27
pH	8.14	8.31	8.2	8.36	7.9	8.27	7.7	8.43	6.5	8	8.19
EC (uS/cm)	466	171	263	191	500	250	2662	605	371	690	548
Cu (mg/L)	0.01	0.02	0.02	0.01	0	0.04	0	0.01	0	0	0.01

Table 5: TSF Bores

	MB1	MB2	MB3	MB5	MB6b	W26	W27	W28	W30	W31	W32
pH	7.18	7.37	6.36	6.69	7.87	6.74	11.65	8.33	8.29	8.59	11.44
EC (us/cm)	5024	9593	21489	24437	12776	15800	20738	17239	1930	709	2414
Cu (mg/L)	0.001	<0.001	0.011	0.007	0.006	0.015	0.009	0.022	0.004	0.009	0.003

Table 6: Opencut Bores

	MB10	MB12	MB13	MB14	MB16	W14	W19	W20	W21	W22	W23	W24	W25
pH	6.96	7.16	7.02	7.14	6.71	7.46	8.69	6.29	7.12	6.73	7.26	8	8.32
EC (us/cm)	14208	4326	22561	2224	15538	9692	679	13754	13571	16978	15731	1970	1441
Cu (mg/L)	0.001	0.002	0.031	0.01	0.014	0.011	0.011	0.001	0.002	0.012	0.023	0.01	0.015

Table 7: Underground Bores

	P101	P102	P103	P139	P145	P149	MB17	MB18	MB19	MB20
pH	6.6	6.64	7.58	7.09	6.46	6.76	7.92	7.91	7.35	7.51
EC (us/cm)	11287	27880	27125	28861	118.2	28284	976.8	417	13115	11002
Cu (mg/L)	<0.001	0.002	<0.001	0.006	0.01	0.007	0.008	0.12	0.01	0.018

Table 8: Regional Bores

	Far Hillier	Wright	Moss
pH	5.85	6.24	6.25
EC (us/cm)	424.9	759.8	2381.9
Cu (mg/L)	<0.001	0.012	0.002

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 definition of the roles and responsibilities for noise management.

4.1 Overview

CMOC undertakes a noise monitoring program at four locations on privately owned properties outside the mining leases. The program 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 from the 21st to the 23rd of March 2018. Weather conditions for the day monitoring were not favourable and adequate noise measurements could not be obtained during this period. Weather conditions for the evening and night were within range with all results indicating compliance at all locations with the project approval criteria. A summary of the monitoring results at each monitoring location are presented in Tables 9-11 below.

Table 9: Attended noise monitoring results (daytime)

<i>Location</i>	<i>Date and Time</i>	<i>L_{A1} dB</i>	<i>L_{A10} dB</i>	<i>L_{Aeq} dB</i>	<i>L_{A90} dB</i>	<i>Compliance?</i>	<i>Notes</i>
Hillview	21/03/2018 15:30	52.3	48.3	46.3	42.9	NA	Wind gust continually in excess of 3m/s Mine inaudible
	21/03/2018 15:45	52.8	48.7	46.7	43.7	NA	
	21/03/2018 16:00	56.5	49.8	48.2	42.1	NA	
Hubberstone	21/03/2018 16:50	55.1	48.2	45.6	38.8	NA	Wind gust continually in excess of 3m/s Mine inaudible
	21/03/2018 17:05	55.9	48.9	46.3	38.5	NA	
	21/03/2018 17:20	53.3	48.2	45.0	38.6	NA	

Milpose	21/03/2018 14:28	52.2	45.7	42.9	35.7	NA	Wind gust continually in excess of 3m/s Mine inaudible
	21/03/2018 14:43	51.1	44.0	40.7	31.8	NA	
	21/03/2018 14:58	45.0	39.0	36.6	30.7	NA	
Lonepine	21/03/2018 13:25	59.3	56.1	53.5	49.8	NA	Wind gust continually in excess of 3m/s Mine inaudible
	21/03/2018 13:40	60.2	56.7	53.3	47.3	NA	
	21/03/2018 13:55	62.5	56.9	53.9	45.8	NA	

Table 10: Attended noise monitoring results (evening)

Location	Date and Time	L_{A1} dB	L_{A10} dB	L_{Aeq} dB	L_{A90} dB	Compliance?	Notes
Hillview	22/03/2018 18:55	41.0	36.2	34.1	30.5	Yes	Wildlife Noise Mine inaudible
	22/03/2018 19:10	44.8	36.4	34.9	30.9	Yes	
	22/03/2018 19:25	42.5	35.3	34.3	30.2	Yes	
Hubberstone	21/03/2018 18:00	61.4	54.5	51.4	44.1	NA	Wind gust continually in excess of 3m/s Mine inaudible
	21/03/2018 15:15	60.3	54.6	51.7	45.9	NA	
	21/03/2018 18:30	60.3	53.8	50.8	44.3	NA	
Milpose	22/03/2018 20:00	48.9	47.7	28.3	36.9	Yes (adj)	Frogs and insects from adjacent pond – due to this adjustment made to L _{Aeq} Mine slightly audible
	22/03/2018 20:15	48.0	47.4	28.2	36.4	Yes (adj)	
	22/03/2018 20:30	50.2	47.8	29.1	36.4	Yes (adj)	

Lonepine	22/03/2018 21:00	37.3	31.3	30.5	25.5	Yes	Insect noise necessitating adjustment Dogs barking Wind noise Mine inaudible
	22/03/2018 21:15	41.4	53.3	28.5	32.9	Yes	
	22/03/2018 21:30	49.0	45.1	34.4	36.4	Yes (adj)	

Table 11: Attended noise monitoring results (night)

Location	Date and Time	L_{A1} dB	L_{A10} dB	L_{Aeq} dB	L_{A90} dB	Compliance?	Notes
Hillview	23/03/2018 01:25	33.3	30.5	28.2	23.5	Yes	
	23/03/2018 01:40	34.8	32.2	32.2	27.4	Yes	Mine inaudible
	23/03/2018 01:55	34.5	31.0	29.6	25.3	Yes	
Hubberstone	23/03/2018 00:22	20.6	37.0	34.5	29.0	Yes (adj)	
	23/03/2018 00:37	41.0	34.3	32.0	27.9	Yes	Sheep bleating Mine inaudible
	23/03/2018 00:52	41.1	34.9	32.9	26.4	Yes	
Milpose	22/03/2018 23:00	47.9	40.7	29.3	28.4	Yes (adj)	
	22/03/2018 23:15	40.7	37.6	33.9	28.3	Yes	Insects Mine slightly audible
	22/03/2018 23:30	47.3	43.7	34.8	28.4	Yes (adj)	
Lonepine	22/03/2018 22:00	50.8	43.7	34.8	38.1	Yes (adj)	
	22/03/2018 22:15	50.7	48.2	33.7	40.6	Yes (adj)	Dogs barking windy Mine inaudible
	22/03/2018 22:30	50.4	47.3	33.9	38.6	Yes (adj)	

