

1 January to 31 March 2017 - 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, (Mod 1-3)

1. SCOPE OF REPORT

This report provides a summary of monitoring results for the period from 1 January 2017 to 31 March 2017. 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.

Monitoring results for all three locations, were under the air quality criteria required by the approval. The missing data for each of the locations was attributed to power surges, most likely the result of nearby lightning strikes, damaging equipment and/or equipment failure due to aging equipment.

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

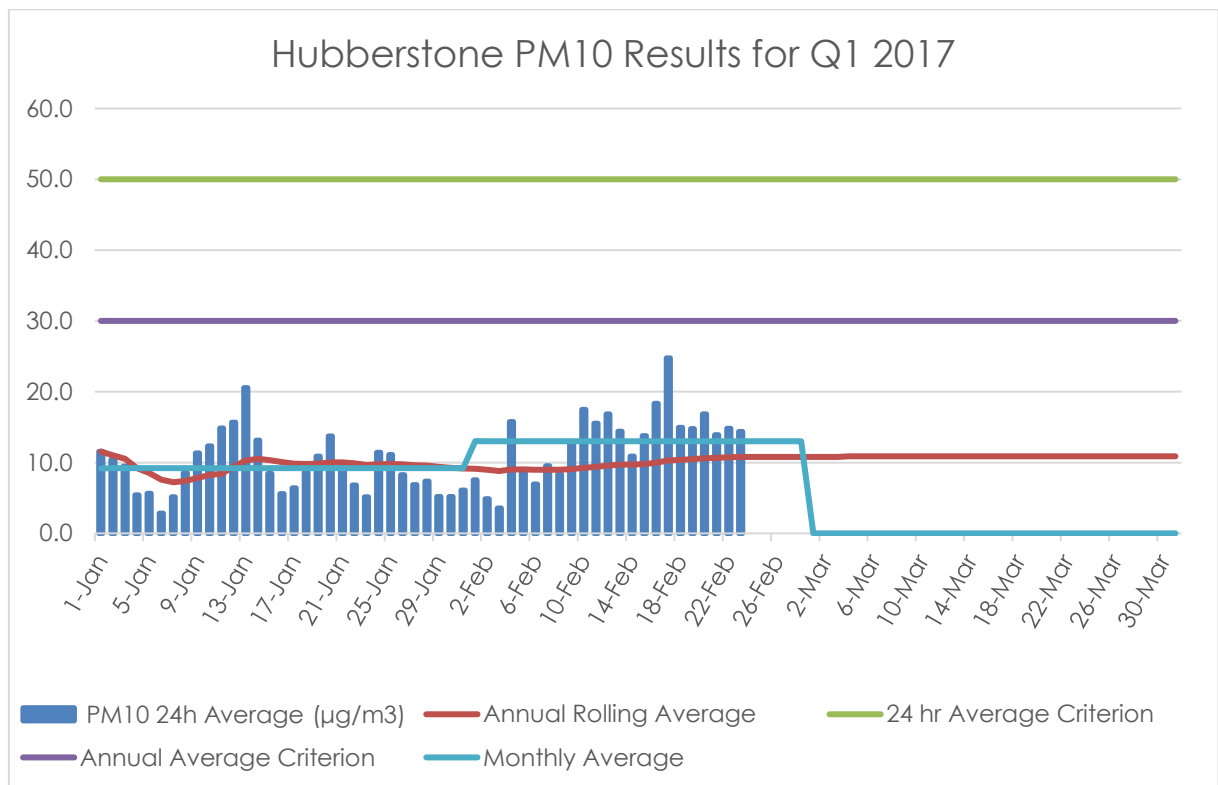


Figure 1: Hubberstone

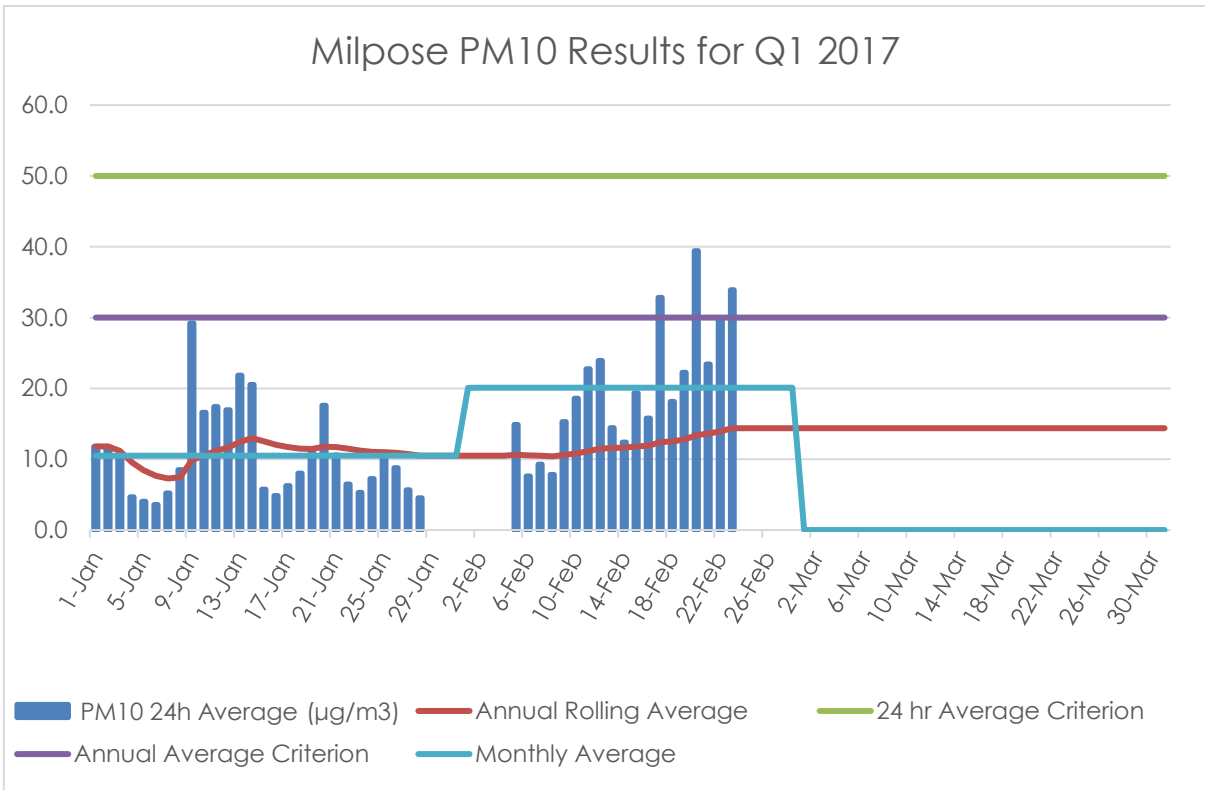


Figure 2: Milpose

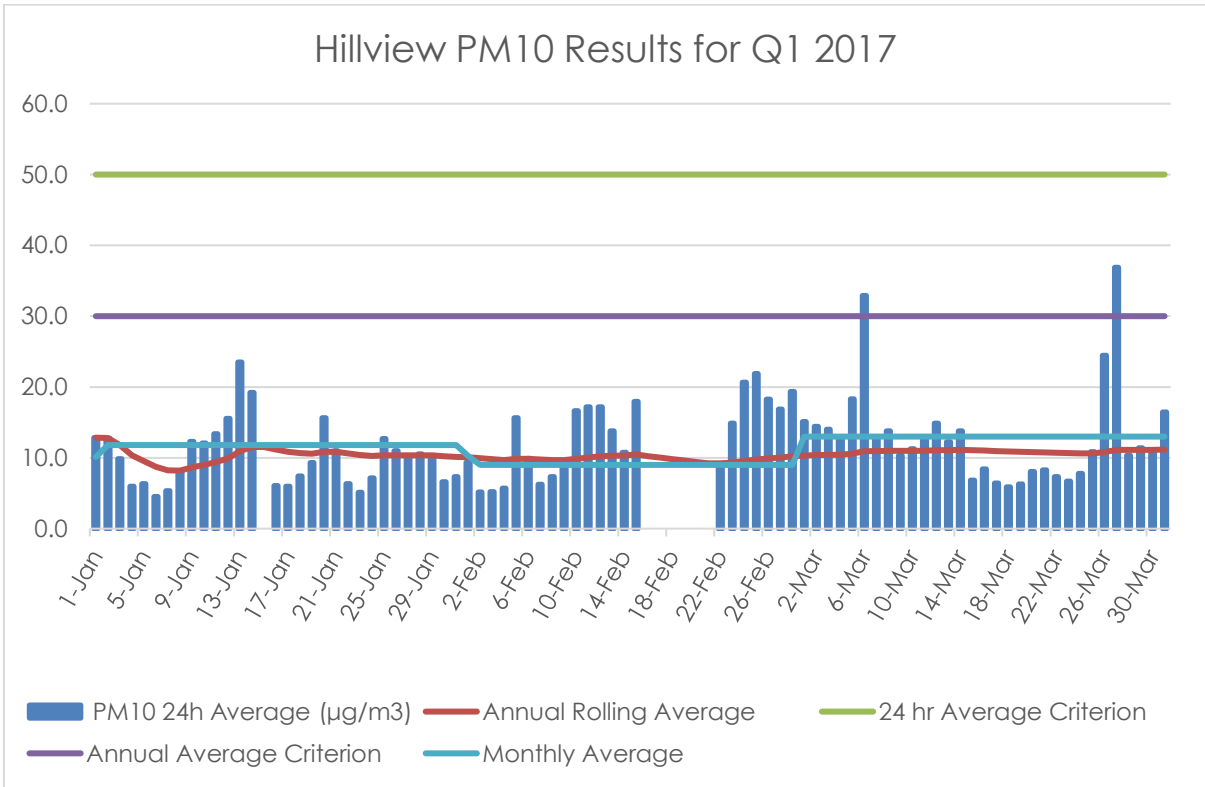


Figure 3: Hillview

2.2 TSP

All recorded dust levels at all TSP monitoring locations were under the required criteria set by the Approval (90 µg/m³) for the Q1 2017 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 µg/m³).

The missing data for each of the locations was attributed to power surges, most likely the result of nearby lightning strikes, damaging equipment and/or equipment failure due to aging equipment.

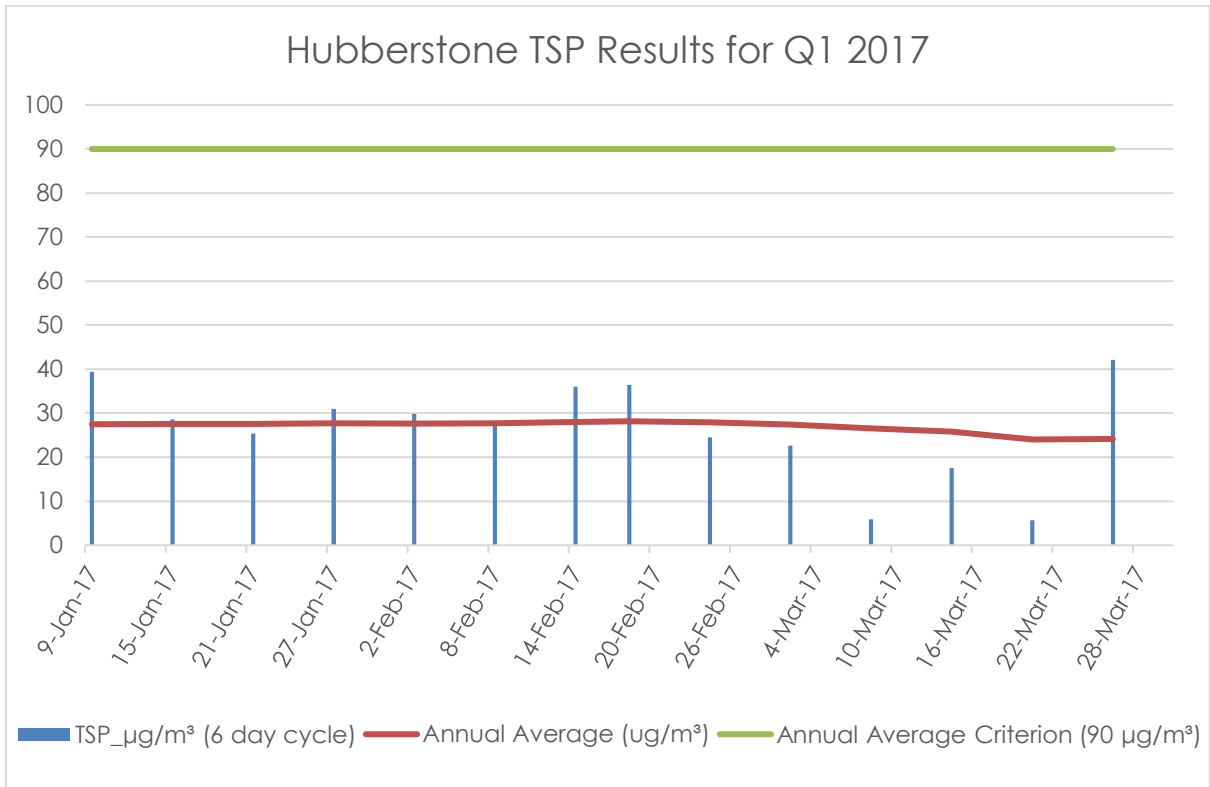


Figure 4: Hubberstone

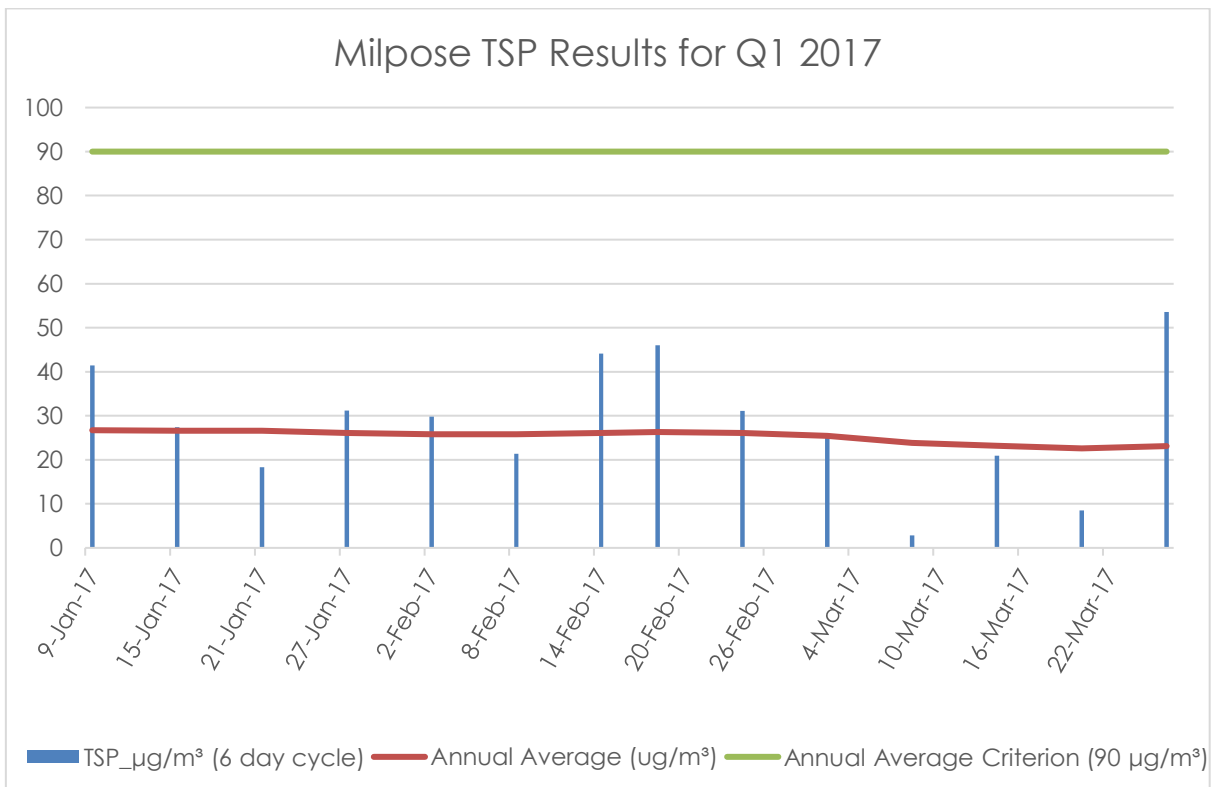


Figure 5: Milpose

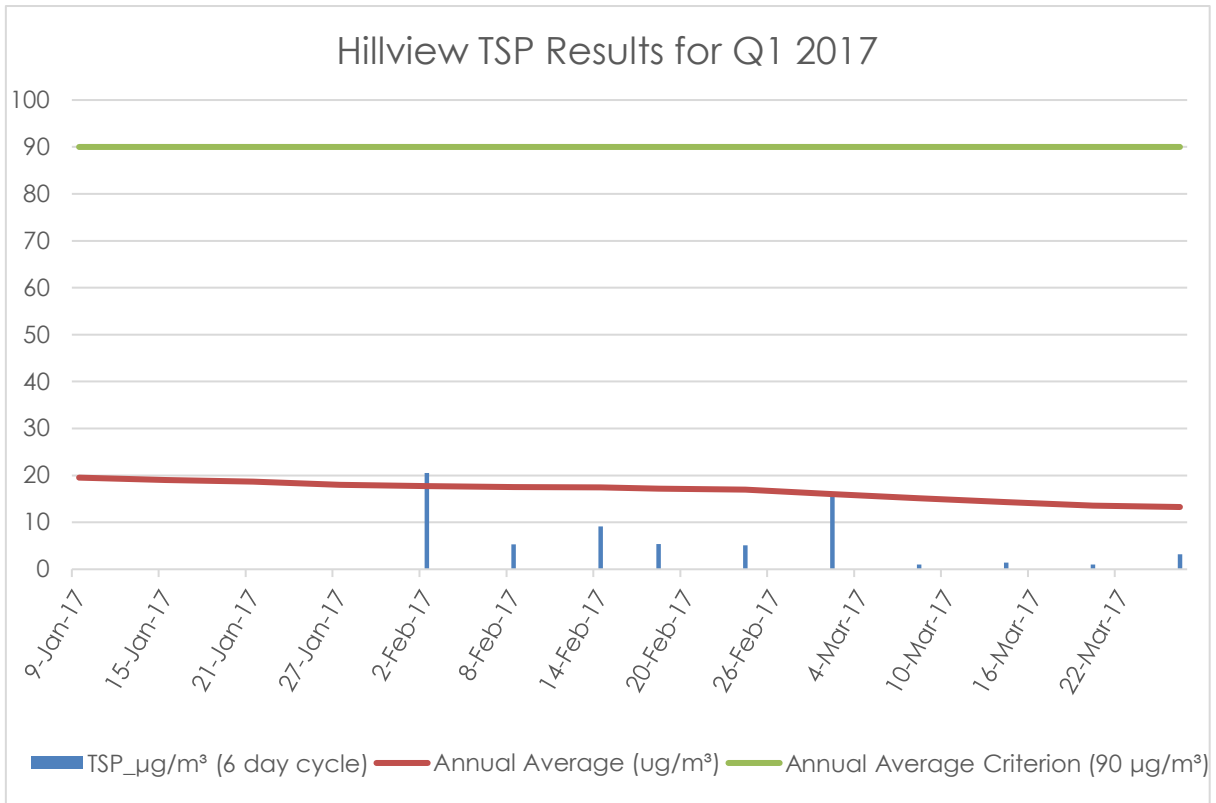


Figure 6: Hillview

2.3 Depositional Dust

Depositional dust gauges record the total of deposited dust for a month long period and are a 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,

Although the indicative rolling average for the TDE location was slightly above the specified criteria for both February and March, investigations determined that the location is consistently impacted by extraneous sources and does not represent Project generated dust, these months also coincide with an increase of localised agricultural activity. All other dust results remain below the criteria specified in the Approval.

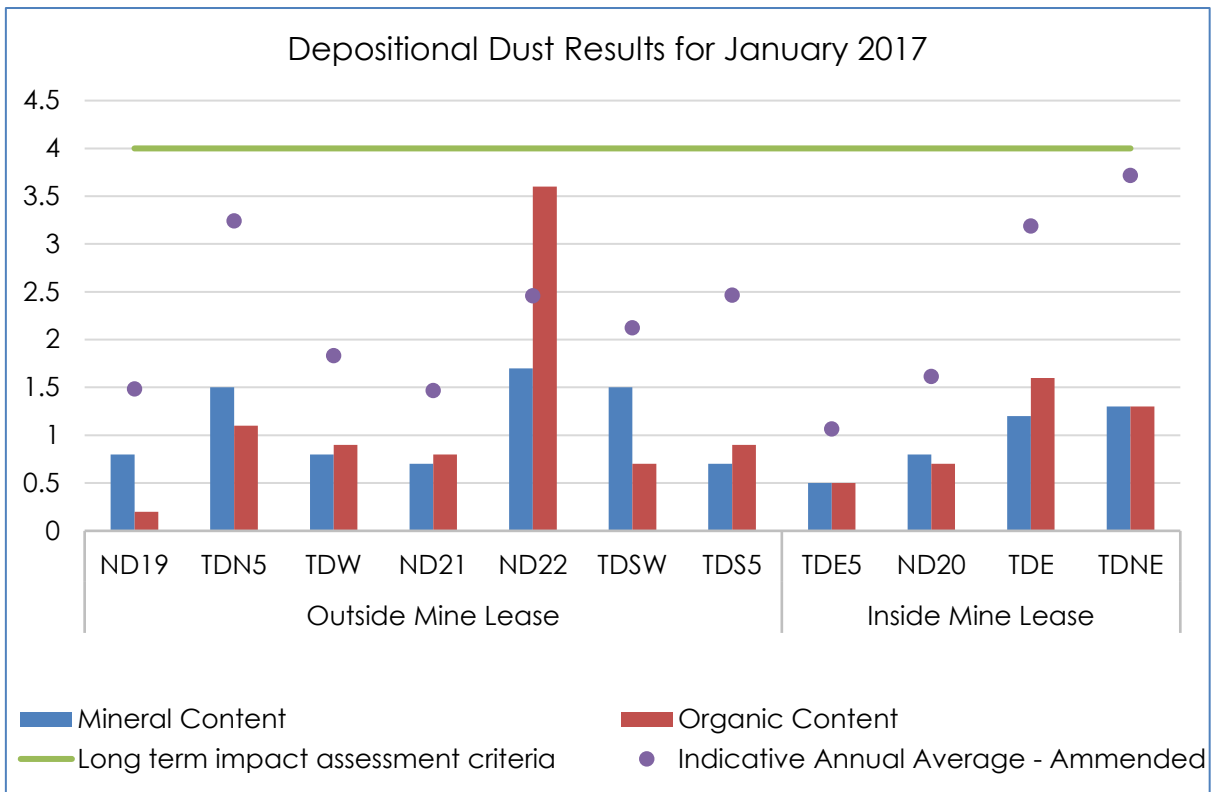


Figure 7: January depositional dust results for all locations

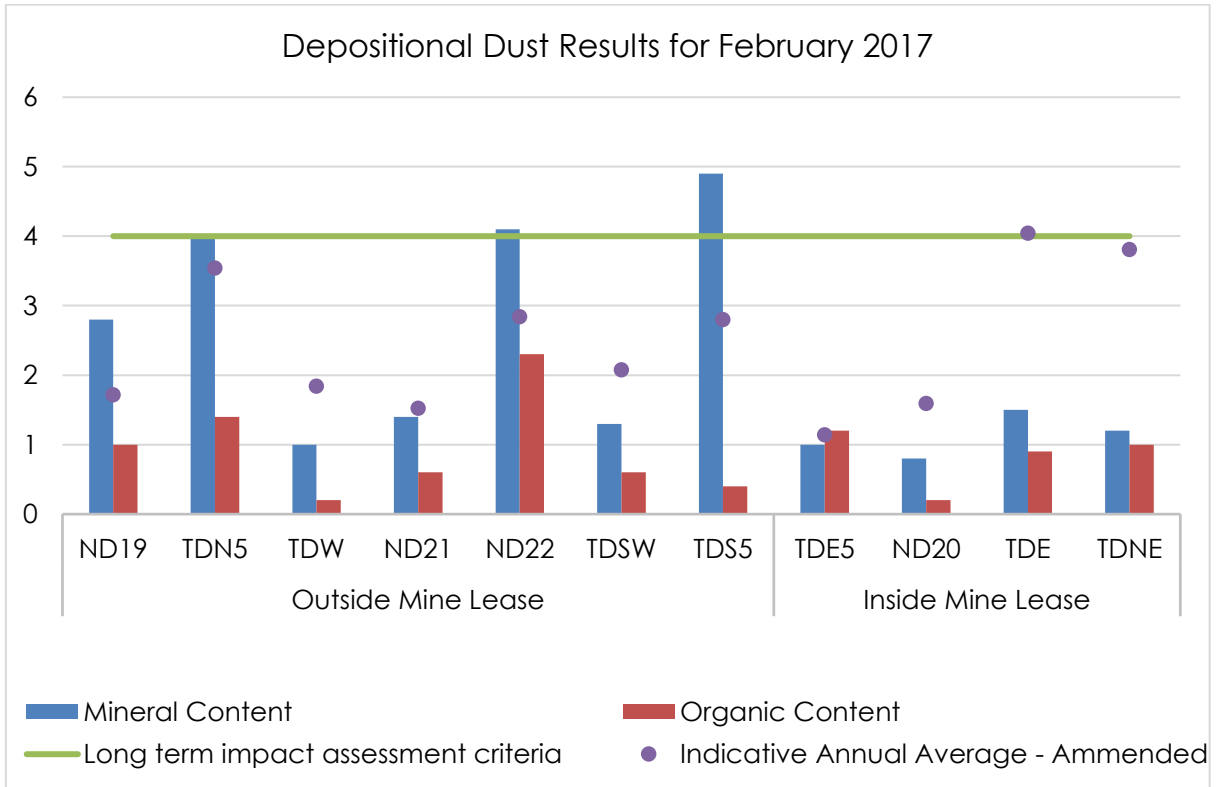


Figure 8: February depositional dust results for all locations

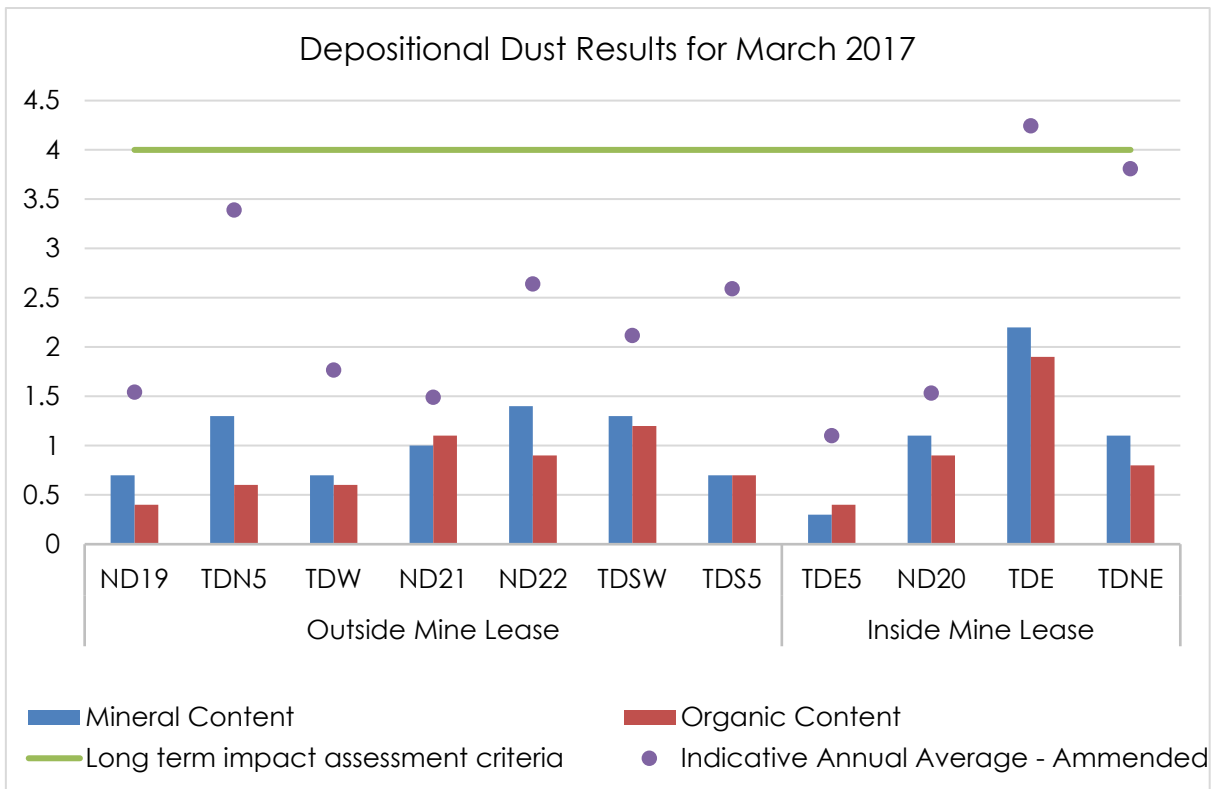


Figure 9: March depositional dust results for all locations

3. WATER

3.1 Overview

Water management at Northparkes is undertaken in accordance with approved management plans, prepared in accordance with 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	RP6	RP8	RP09	RP10	RP12	RP13	RP15	RP19	RP20
pH	8.25	8.65	7.5	9.85	8.25	7.56	8.85	8.35	8.64	7.99	9.35	9.4	8.7
EC (uS/cm)	546	3211	1540	810	825	1875	1785	860	360	950	1450	4120	5875
Cu (mg/L)	0.01	0.018	0.005	0.025	0.015	0.034	0.016	0.015	0.008	0.008	0.075	0.027	0.046

	RP23	RP25	RP26	RP28	RP31	RP32	GT1	GT2	PWD	DD	SCT	SD1	SD2	CALoola PIT
pH	8.1	7.58	7.1	8.26	6.74	7.58	7.19	7.76	8.01	7.65	7.6	7.45	8.1	8.3
EC (uS/cm)	1840	350	360	610	3152	289	1650	2010	4580	1950	685	8650	7020	6580
Cu (mg/L)	0.035	0.017	0.028	0.014	0.021	0.02	0.024	0.056	0.091	0.024	0.009	0.25	0.31	0.003

Table 2: Sediment ponds

	SP3	SP4	SP10	SP15
pH	6.9	8.12	7.01	7.41
EC (uS/cm)	2468	1452	982	622
Cu (mg/L)	0.001	0.002	0.008	0.016
TDS (mg/L)	78	42	21	35

Table 3: Watercourses

	WC1	WC2	WC3	WC4	WC5	WC7	WC11	WC13	WC14
pH	7.54	8.1		7.96	6.71	7.98	6.4	7.56	
EC (uS/cm)	265	452		264	452	654	852	540	365
Cu (mg/L)	0	0.05		0.007	0.01	0	0.04	0.021	0.004
TDS (mg/L)	212	222	156		144			784	

Table 4: Farm dams

	FD4	FD5	FD6	FD7	FD8	FD11	FD12	FD13	FD14	FD15	FD16	FD18	FD21	FD25	FD26	FD27
pH	7.54	8.1		7.96	6.7		7.98	6.4		7.56						
EC (uS/cm)	268	165	264	195		1542		452	265	278	384	1895	450	165	654	782
Cu (mg/L)	0		0.005			0							0.01			
TDS (mg/L)	48	85	48	65		85		40	24	62	47	75	56	51	87	154

Table 5: TSF bores

	MB1	MB2	MB3	MB4	MB5	MB6b	W26	W27	W28	W29	W30	W31	W32
pH													
EC (uS/cm)	5285	9800	20150	1786	19700	8510	1386	1685	1752	2314	1741	1005	1265
Cu (mg/L)	0.01	0.001	0.003	0.021	0.001	0.048	0.019	0.009	0.004	0.005	0.001	0.002	0.01

Table 6: Opencut bores

	W14	W19	W20	W21	W22	W23	W24	W25
pH	7.85	8.3	7.95	9.9		8.4		9.17
EC (uS/cm)	13050	6450	16750	14650		17210		1410
Cu (mg/L)	0.038	0.003	0.024	0.019	0.004	0.001	0.002	0.001

Table 7: Underground bores

	P71	P100	P101	P102	P103	P104	P139	P145	P149	MB17	MB18	MB19	MB20
pH	7.85					8.3	7.95	9.9		8.4		9.17	
EC (uS/cm)	13050					6450	16750	14650		17210		1410	
Cu (mg/L)	0.05	0.02	0.015	0.024	0.001	0.004	0.018	0.014	0.009	0.004	0.002	0.004	0.004

Table 8: Regional bores

	Far Hillier	Wright	Moss	Long Paddock
pH	7.54	7.15	7.65	8.24
EC (uS/cm)	724	954	3145	1175
Cu (mg/L)	0.004	0.001	0.006	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 at four locations on privately owned properties 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 8th to the 10th of March 2017 during favourable atmospheric conditions. Several measurements were impacted by non-NPM related noise, specifically, insect noise. Nevertheless, attended noise monitoring results indicate that noise emissions from the mine site comply with the development consent and 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>
Milpose	8/03/2017 16:00	40	30	29	23	Yes	Occasional low wind. Machinery from direction opposite to mine. Mine audible.
	8/03/2017 16:15	37	31	29	22	Yes	
	8/03/2017 16:30	39	33	31	25	Yes	
Lone Pine	8/03/2017 14:55	41	32	30	22	Yes	Occasional wind. Insect noise. Leaf rustling. Bird noise. Mine just audible.
	8/03/2017 15:10	38	35	32	25	Yes	
	8/03/2017 15:25	45	37	33	23	Yes	
Hubberstone	8/03/2017 14:00	43	35	34	29	Yes	Significant bird noise. Gusting wind towards end of measurement period. Mine inaudible.
	8/03/2017 14:15	42	36	33	27	Yes	
	8/03/2017 14:30	43	35	32	27	Yes	
Hillview	8/03/2017 13:15	41	37	35	28	Yes	Occasional low winds. Mine inaudible.
	8/03/2017 13:30	42	34	33	27	Yes	
	8/03/2017 13:45	41	35	33	26	Yes	

Table 10: Attended noise monitoring results (evening)

<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>
Milpose	8/03/2017 18:00	39	33	32	25	Yes	No wind. Some insect & bird noise.
	8/03/2017 18:15	39	35	34	27	Yes	Machinery noise from opposite direction to mine. Mine inaudible.
	8/03/2017 18:30	39	33	30	25	Yes	
Lone Pine	9/03/2017 21:00	46	45	28	39	Yes (adj.)	Continuous insect noise necessitating adjustment. Dogs barking. Mine audible.
	9/03/2017 21:15	46	45	28	42	Yes (adj.)	
	9/03/2017 21:30	46	45	28	41	Yes (adj.)	
Hubberstone	9/03/2017 20:00	41	36	33	30	Yes	No wind. Continuous & periodically modulating low frequency noise audible (perhaps diesel water pump @ mine). Mine clearly audible.
	9/03/2017 20:15	37	34	32	30	Yes	
	9/03/2017 20:30	37	34	33	31	Yes	
Hillview	8/03/2017 18:55	36	32	29	23	Yes	No wind. Significant bird noise.
	8/03/2017 19:10	42	36	33	25	Yes	Road traffic Noise from house. Mine inaudible.
	8/03/2017 19:25	45	34	33	25	Yes	

Table 11: Attended noise monitoring results (night)

<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>
Milpose	10/03/2017 0:50	33	27	29	23	Yes	
	10/03/2017 1:05	32	27	26	23	Yes	No wind. Mine audible.
	10/03/2017 1:20	32	28	26	23	Yes	
Lone Pine	9/03/2017 22:00	43	42	41	40	Yes (adj.)	Continuous insect noise necessitating adjustment. Dogs barking. Mine audible.
	9/03/2017 22:15	43	42	41	40	Yes (adj.)	
	9/03/2017 22:30	44	43	42	41	Yes (adj.)	
Hubberstone	9/03/2017 22:55	39	36	34	30	Yes	Alarm from mine audible. Mine audible.
	9/03/2017 23:10	37	34	33	30	Yes	
	9/03/2017 23:25	38	34	31	28	Yes	
Hillview	9/03/2017 23:55	33	30	29	27	Yes	
	10/03/2017 0:10	34	29	28	25	Yes	No wind. Mine inaudible.
	10/03/2017 0:25	29	26	25	24	Yes	