Northparkes Mines
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## 1 January to 31 March 2020 - 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** | DC11_0060, (as modified) |

| | |
|---|---|
| **Reviewed by** | **Chris Higgins** |
| **Title** | Superintendent – Environment and Farms |
| **Date** | 28 May 2020 |
| **Signature** | |
| **Approved by** | **Stacey Kelly** |
| **Title** | Manager – People, Safety and Environment |
| **Date** | 28 MAY 2020 |
| **Signature** | |

# 1. SCOPE OF REPORT

This report provides a summary of monitoring results for the period from 1 January 2020 to 31 March 2020. 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 $PM_{10}$ (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 $PM_{10}$ monitoring have 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 Development Consent DC11_0060, known as the Consent), are >30 µg/m$^3$ for the annual average and >50 µg/m$^3$ for a 24-hour monitoring period. Refer to Appendix A for map of all PM10 monitoring locations.

During the reporting period there were 97 elevated 24hr criteria readings recorded across the three monitoring locations, with the Milpose property recording 38, Hillview 19 and Hubberstone 40. 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 during the months of January and February, all elevated readings were found to be caused by either increased particulate matter from regional dust events or smoke from bushfires. Agricultural and animal husbandry activities were the found to be the source of all elevated dust results in the March monitoring period. During the reporting period multiple observations were made by the Environment Team identifying high levels of smoke within local district and wider region. Data not detailed in Figures 1-3 was found to be impacted on by non-mining related activities and removed as outliers.

Annual averages recorded at all monitoring locations are below the Consent criteria of 30 µg/m$^3$, recording 23.1 µg/m$^3$ at Hubberstone, 26.4 µg/m$^3$ at Milpose, and 19.9 at Hillview.

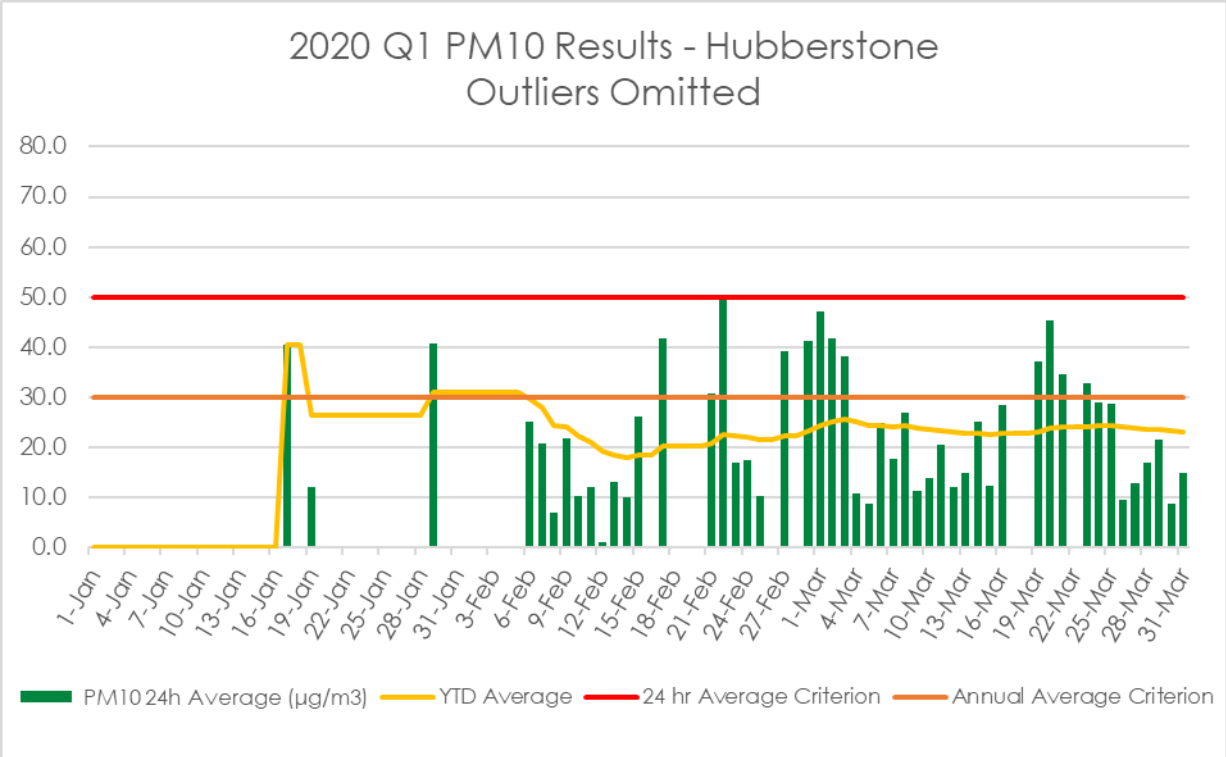


**Figure 1:** Hubberstone

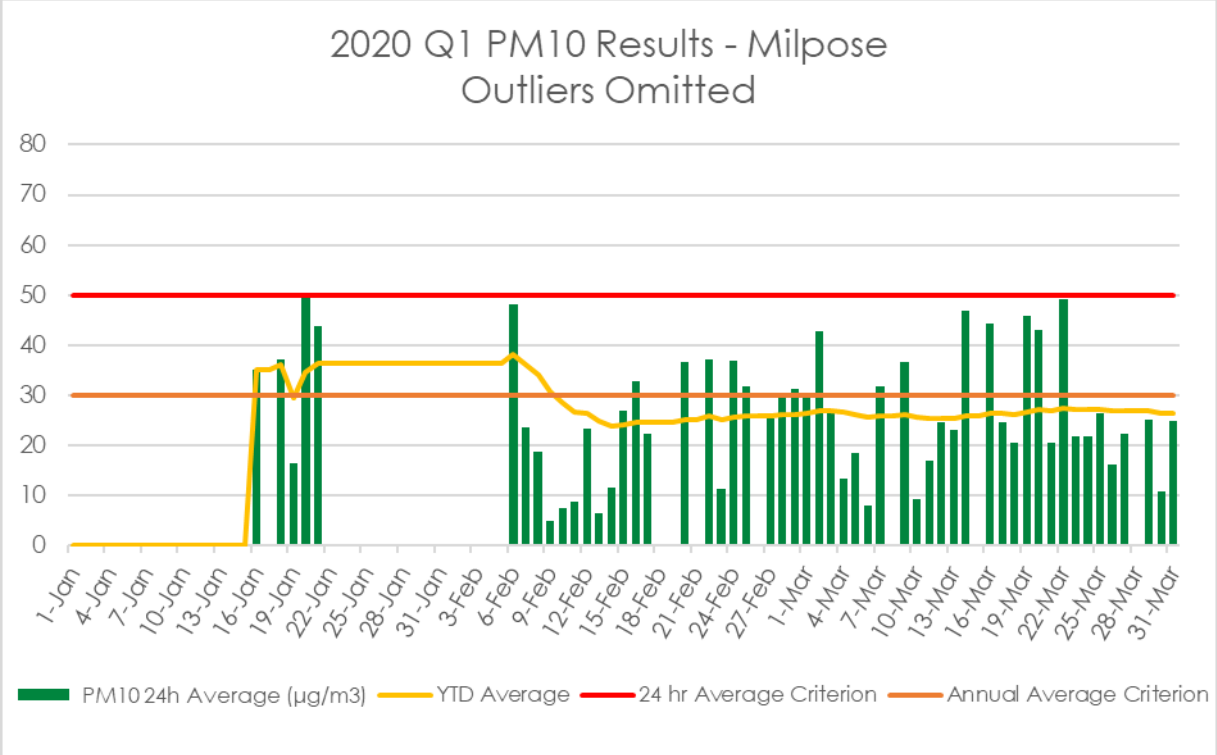


**Figure 2:** Milpose

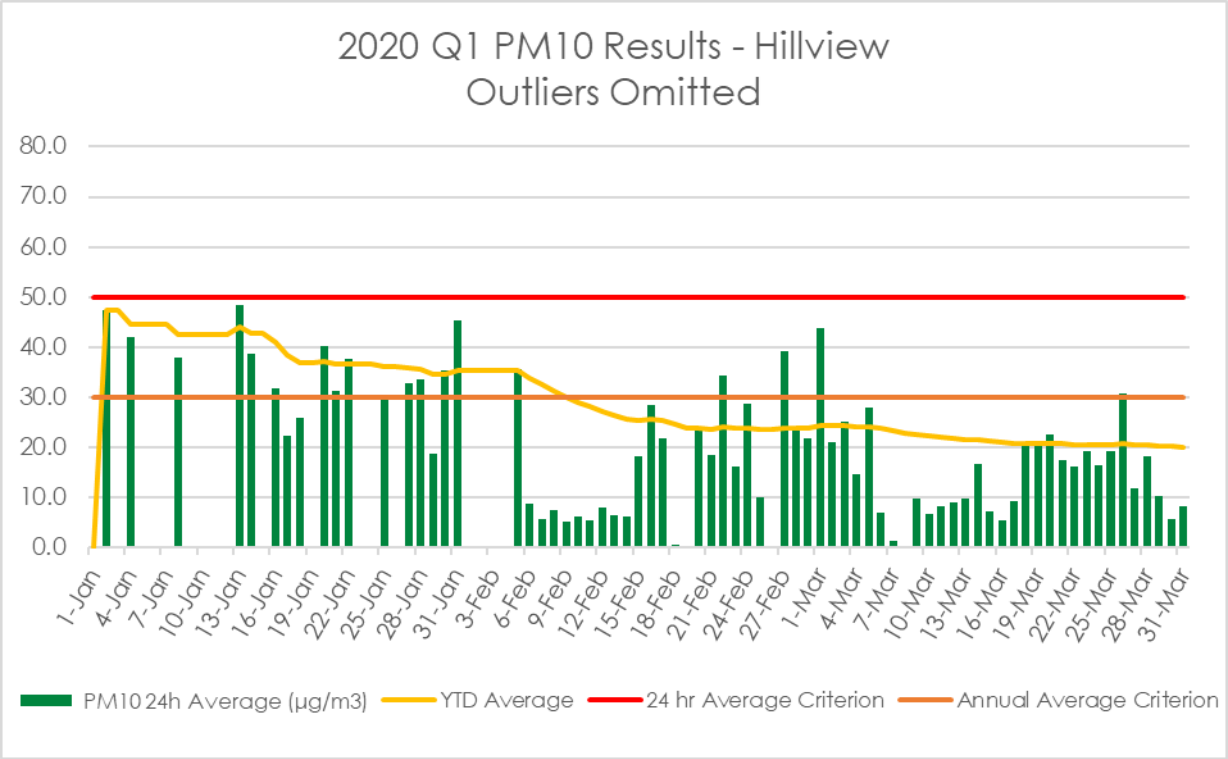


**Figure 3:** Hillview

## 2.2 TSP

All recorded dust levels at all TSP monitoring locations were under the required average annual criteria set by the Consent (90 µg/m$^3$) for the Q1 2020 monitoring period. Refer to Appendix A for map of all TSP monitoring locations.

During the reporting period there were 14 elevated results recorded across the three monitoring locations with Hubberstone recording 3, Milpose 7 and Hillview recording 4. All recordings triggered the internal investigation process and were found to be caused by external factors and deemed non-mine related. The increased frequency of dust storms and bushfire smoke was found to be the main contributors to the increased level of airborne particulates during the reporting period.

The missing data for Hubberstone on January 28 and February 27, and Milpose on 4 March was due to power supply issues. All other data not detailed in Figures 4-6 was found to be impacted on by non-mining related activities and removed as outliers.

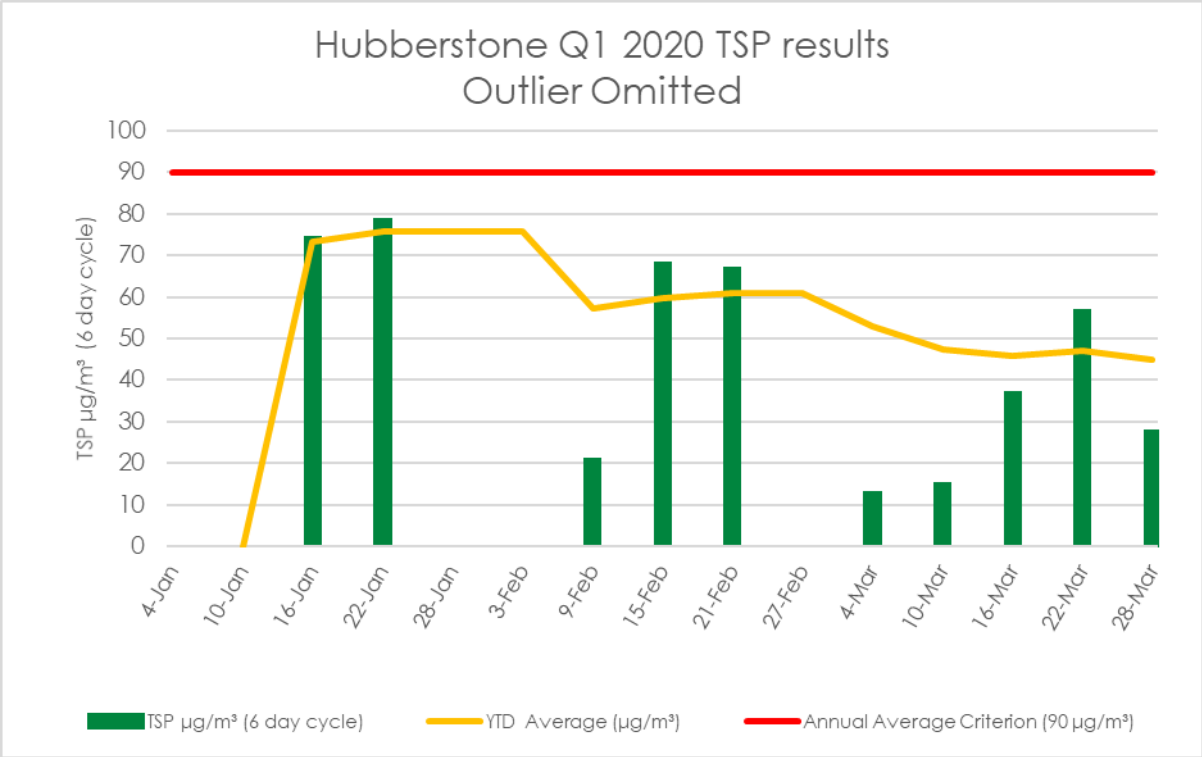


**Figure 4:** Hubberstone

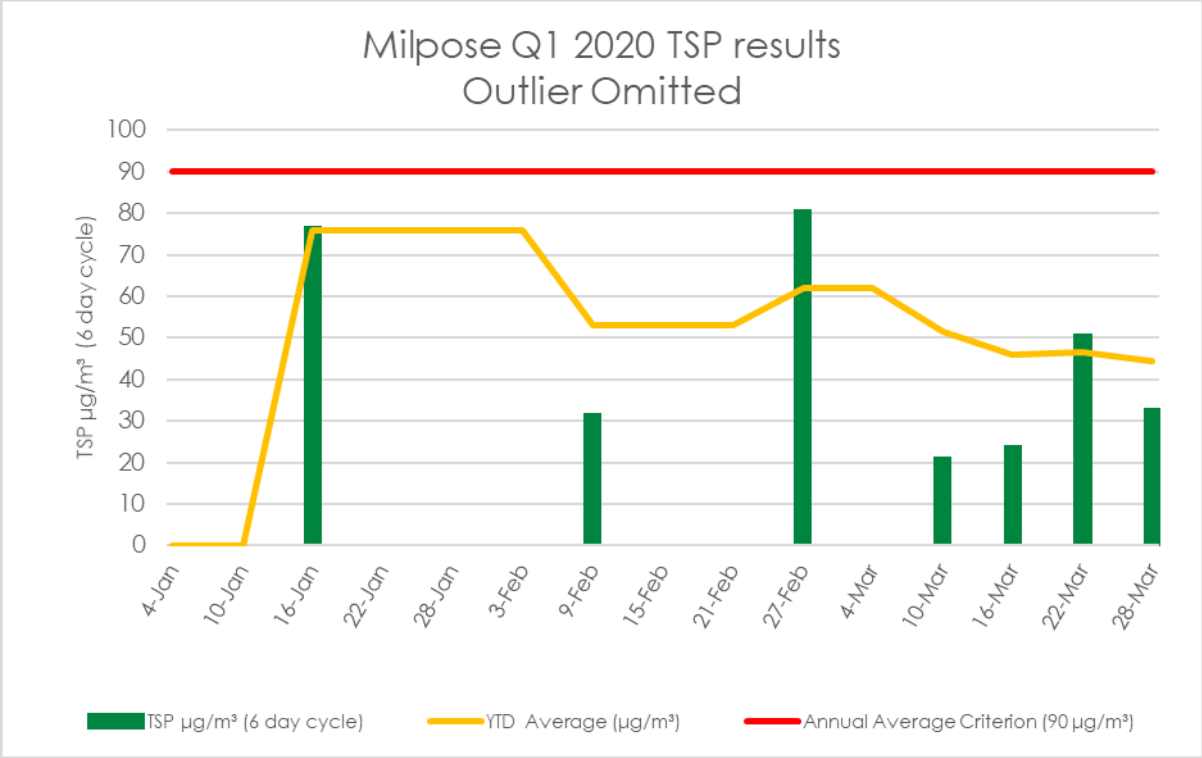


**Figure 5:** Milpose

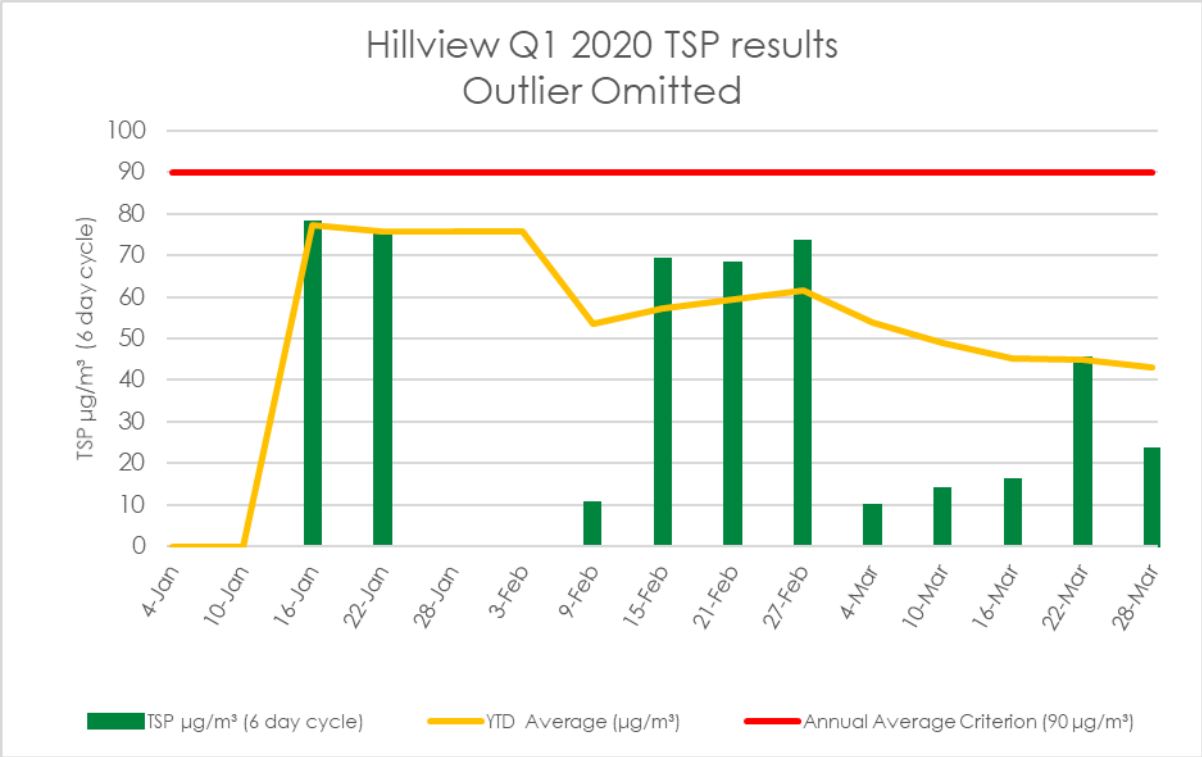


**Figure 6:** Hillview

## 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 Consent, as they 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. Refer to Appendix B for map of all depositional dust monitoring locations.

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

During the months of January and February all depositional dust gauges (with the exception of TDE5 for February) exceeded the criteria of the Consent indicating a broad scale change to the local air quality. Multiple observations were made by the Environment Team throughout the reporting period identifying high levels of airborne particulates within the local district and wider region. The increased frequency of dust storms can be attributed to lack of groundcover determining that the elevated readings were the cause of prolonged drought conditions and not mine related. During the March reporting period only TDE and TDNE recorded above the Consent criteria, though their accompanying neighbouring gauges recorded well below the Criteria and long-term data.

Missing data for TDE5 in March was caused by vehicle damage to the monitoring gauge. This location is adjacent to the Bogan Road and frequently used by the public as a travelling stock route. The monitoring location has since been reinstated.

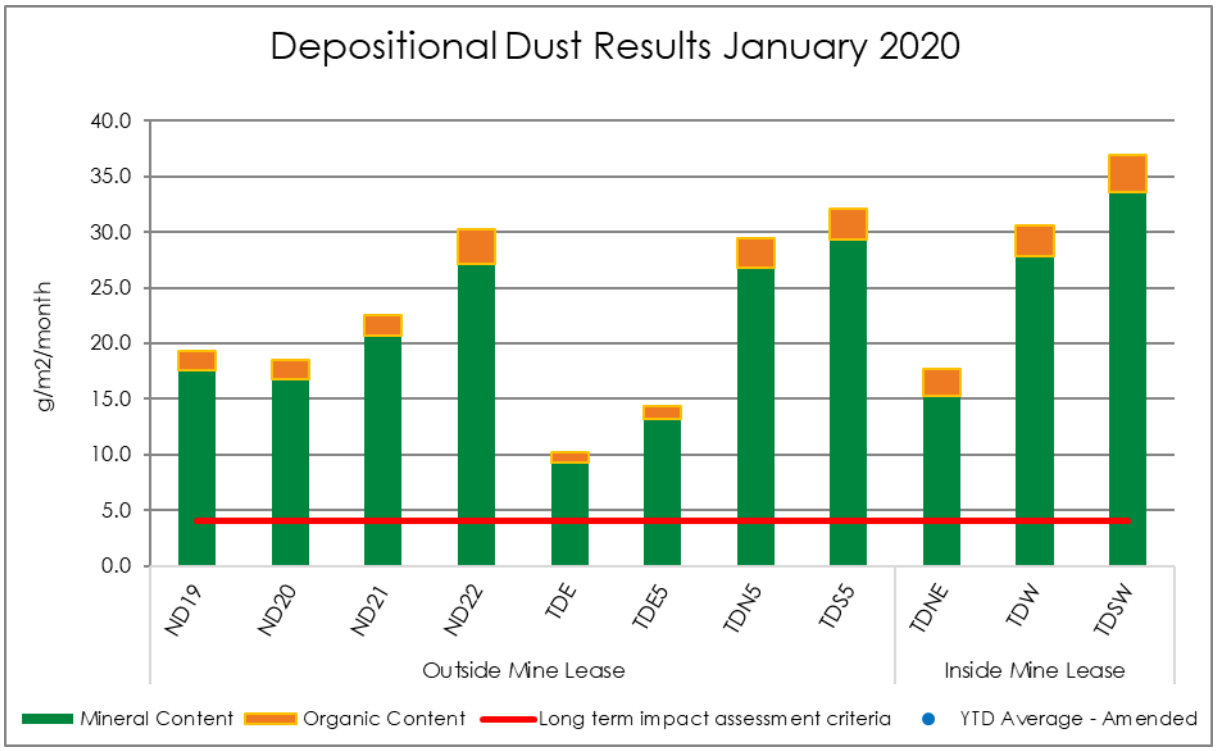


**Figure 7:** January depositional dust results for all locations

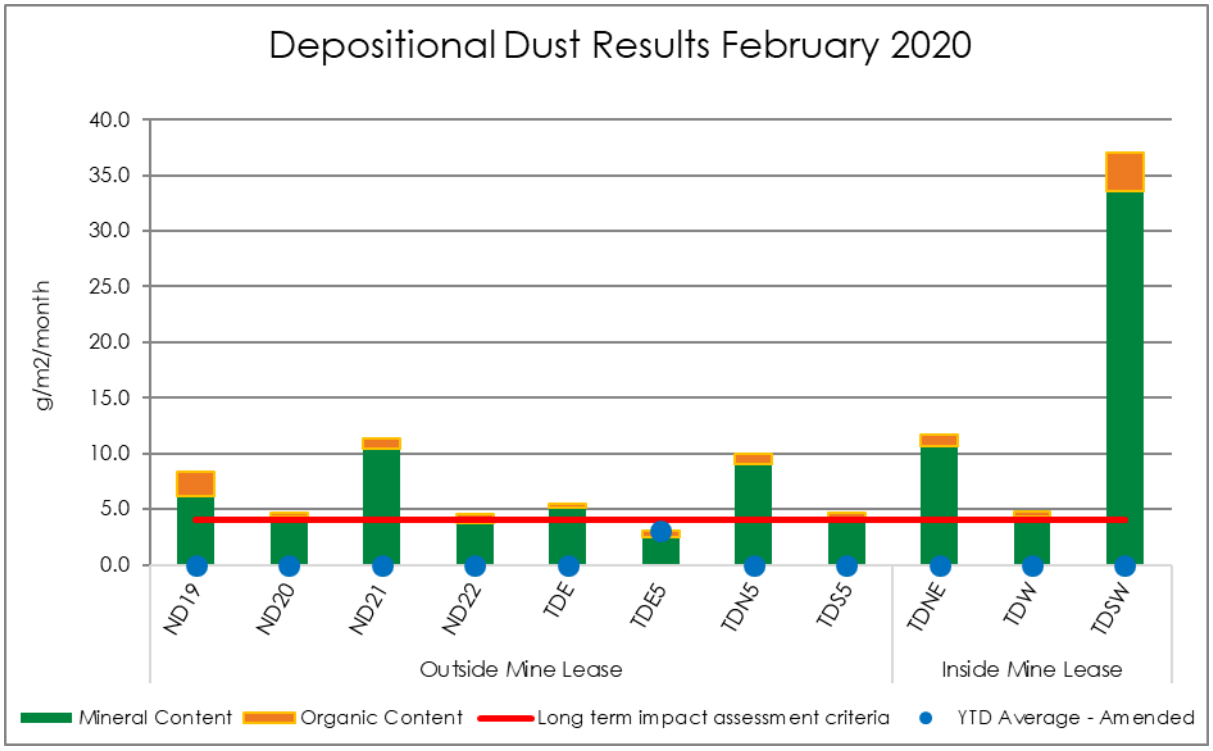


**Figure 8:** February depositional dust results for all locations

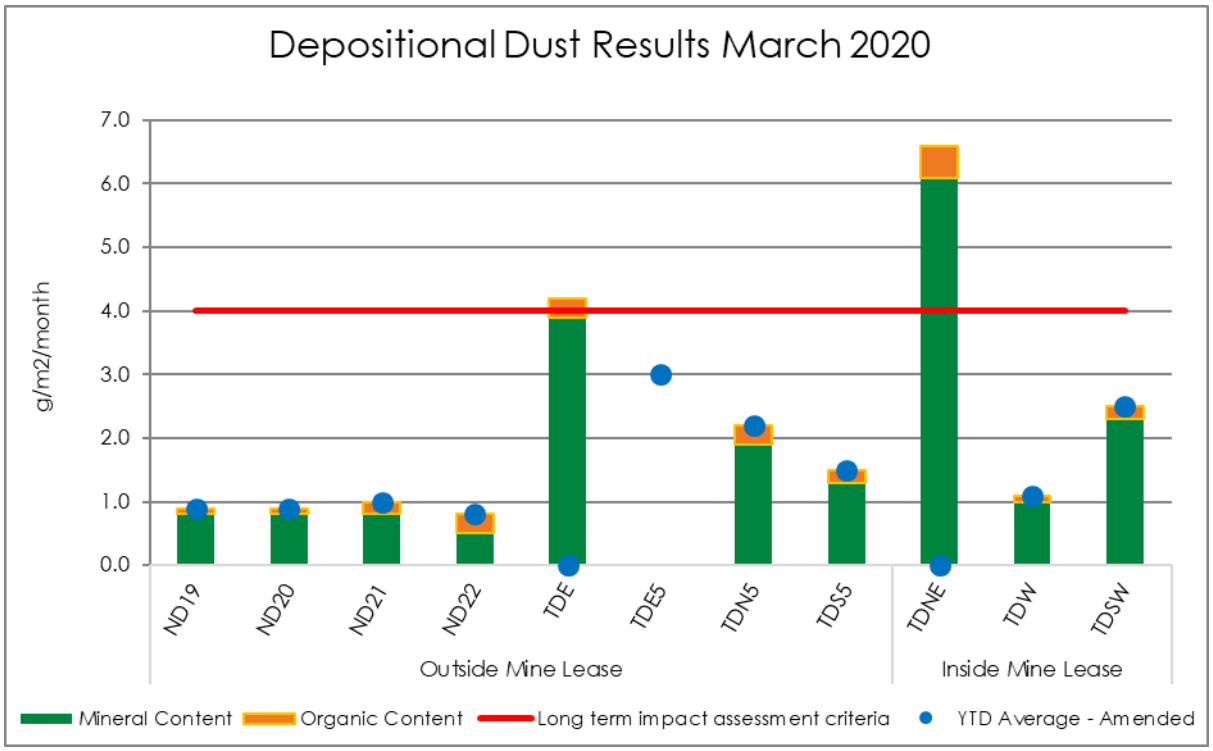


**Figure 9:** March depositional dust results for all locations

# 3. WATER

## 3.1 Overview

Water management at Northparkes is undertaken in accordance with approved management plans, prepared in accordance with the Consent. 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 Consent. 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. Refer to Appendix C & D for map of all surface and groundwater dust monitoring locations.

## 3.2 Quarterly Monitoring Analysis

Water quality monitoring was carried out generally in accordance with the Consent, 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 location sampled are presented in Tables 1-6 below.

**Table 1:** Process Water System

| | RP1 | RP2 | RP3 | RP09 | RP13 | RP20 | RP21 | RP22 | RP27 | RP32 | RP33 | GT1 | GT2 | PWD | SD1 | Caloola Dam |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **pH** | 8.6 | 7.8 | 8.8 | 7.5 | 8.8 | 8.0 | 8.3 | 7.8 | 7.8 | 8.4 | 8.0 | 8.9 | 8.3 | 8.3 | 9.3 | 7.6 |
| **EC (uS/cm)** | 362 | 2636 | 2180 | 1367 | 5334 | 1014 | 4261 | 1717 | 911 | 4940 | 523 | 3792 | 540 | 7476 | 1551 | 2719 |
| **Cu (mg/L)** | 0.060 | 0.056 | 0.036 | 0.021 | 0.014 | 0.091 | 0.029 | 0.050 | 0.035 | 0.024 | 0.018 | 0.052 | 0.027 | 0.112 | 0.109 | 0.069 |

**Table 2:** Farm Dams

| | FD11 | FD12 | FD16 | FD27 |
|---|---|---|---|---|
| **pH** | 9.0 | 8.6 | 8.1 | 8.3 |
| **EC (uS/cm)** | 1998 | 409 | 538 | 680 |
| **Cu (mg/L)** | 0.016 | 0.011 | 0.008 | 0.004 |

**Table 3:** TSF Bores

| | MB1 | MB2 | MB3 | MB5 | MB6B | W26 | W27 | W28 | W29 | W30 | W31 | W32 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **pH** | 7.2 | 6.9 | 5.9 | 6.7 | 6.7 | 6.9 | 11.1 | 6.6 | 13.2 | 7.2 | 7.6 | 12.1 |
| **EC (uS/cm)** | 5807 | 9497 | 23852 | 24518 | 15978 | 14434 | 16623 | 16861 | 21504 | 2137 | 902 | 1993 |
| **Cu (mg/L)** | 0.02 | 0.02 | 0.03 | 0.012 | 0.01 | 0.012 | 0.008 | 0.012 | 0.029 | 0.011 | 0.038 | 0.018 |

**Table 4:** Opencut Bores

| | MB10 | MB13 | MB14 | MB16 | W14 | W19 | W20 | W21 | W22 | W23 | W24 | W25 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **pH** | 6.9 | 6.7 | 7.2 | 6.5 | 7.3 | 8.1 | 7.0 | 10.9 | 7.0 | 6.9 | 7.4 | 8.3 |
| **EC (uS/cm)** | 14212 | 23655 | 2465 | 17668 | 7792 | 5914 | 13505 | 13787 | 16360 | 18035 | 1979 | 1702 |
| **Cu (mg/L)** | 0.036 | 0.014 | 0.006 | 0.012 | 0.005 | 0.018 | 0.023 | 0.015 | 0.004 | 0.014 | 0.006 | 0.014 |

**Table 5:** Underground Bores

| | P101 | P102 | P139 | P145 | P149 | MB17 | MB18 | MB19 | MB20 |
|---|---|---|---|---|---|---|---|---|---|
| **pH** | 7.1 | 6.9 | 6.1 | 6.9 | 6.7 | 7.9 | 10.5 | 7.5 | 7.7 |
| **EC (uS/cm)** | 10782 | 28957 | 28998 | 24 | 28285 | 871 | 2118 | 1549 | 12981 |
| **Cu (mg/L)** | 0.01 | 0.008 | 0.007 | 0.019 | 0.012 | 0.007 | 0.025 | 0.021 | 0.068 |

**Table 6:** Regional Bores

| | Far Hillier | Wright | Moss | Long Paddock |
|---|---|---|---|---|
| **pH** | 6.4 | 7.1 | 6.7 | 8.8 |
| **EC (uS/cm)** | 620 | 960 | 2427 | 1049 |
| **Cu (mg/L)** | 0.021 | 0.027 | 0.023 | 0.022 |

# 4. NOISE

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'. Refer to Appendix E for map of all attended noise monitoring locations.

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 9th and 10th of March 2020.
The assessment was completed to quantify site noise emissions against relevant noise criteria pertaining to NPM operations in accordance with Conditions 1 to 5 of Schedule 3 of the NSW Development Consent Conditions (DC11_110060), Northparkes Noise Management Plan (NMP, 2019) and Traffic Management Plan (TMP, 2019).

Road noise monitoring identified that concentrate trucks (where present) and light vehicle movements associated with shift change generate levels below the relevant road noise criteria specified in the TMP and NMP.

Attended monitoring has identified that operational emissions generated by NPM comply with relevant statutory noise criteria at all monitoring locations for all assessment periods. Furthermore, project related noise emissions generally remain inaudible at monitoring locations. Extraneous non-mine sources such as farm machinery, traffic, wind in trees, livestock, birds, aircraft, dogs barking and insects were audible during the monitoring period. A summary of the monitoring results at each monitoring location are presented in Tables 7-11 below.

**Table 7: Attended noise monitoring results for Hubberstone**

| Date/Time (hrs) | Noise Descriptor (dBA re 20 µPa) | | | Meteorology | Description and SPL, dBA |
|---|---|---|---|---|---|
| | LAmax | LAeq | LA90 | | |
| **Day** | | | | | |
| 10/03/2020 16:06 | 56 | 39 | 25 | WD: E<br>WS: 1.5m/s<br>Stab Class: D | Traffic 24-48<br>Wind 22-53<br>Birds 26-53<br>Farm Machinery/Vehicles 22-68<br>Livestock 20-32<br>Dogs 50-91<br>Aircraft 26-54<br>NPM Not Audible |
| 10/03/2020 16:21 | 91 | 56 | 24 | | |
| 10/03/2020 16:36 | 60 | 41 | 27 | | |
| Site $L_{Aeq(15min)}$ Contribution | | | | | <25 |
| Site $L_{A1(1min)}$ Contribution | | | | | <35 |
| **Evening** | | | | | |
| 09/03/2020 18:42 | 50 | 34 | 25 | WD: SE<br>WS: 2.5m/s<br>Stab Class: D | Birds 21-54<br>Livestock 21-25<br>Aircraft 24-27<br>Traffic 23-42<br>Wind 22-59<br>Insects 18-22<br>NPM Not Audible |
| 09/03/2020 18:57 | 58 | 45 | 36 | | |
| 09/03/2020 19:12 | 59 | 45 | 38 | | |
| Site $L_{Aeq(15min)}$ Contribution | | | | | <30 |
| Site $L_{A1(1min)}$ Contribution | | | | | <40 |
| **Night** | | | | | |
| 10/03/2020 00:06 | 49 | 32 | 27 | WD: NE<br>WS: 1.5m/s<br>Stab Class: D | Wind 20-50<br>Insects 20-31<br>NPM Not Audible |
| 10/03/2020 00:21 | 50 | 29 | 25 | | |
| 10/03/2020 00:36 | 41 | 27 | 24 | | |
| Site $L_{Aeq(15min)}$ Contribution | | | | | <25 |
| Site $L_{A1(1min)}$ Contribution | | | | | <35 |

**Table 8: Attended noise monitoring results for Lone Pine**

| Date/Time (hrs | Noise Descriptor (dBA re 20 µPa) LAmax | LAeq | LA90 | Meteorology | Description and SPL, dBA |
|---|---|---|---|---|---|
| **Day** | | | | | |
| 10/03/2020 15:08 | 61 | 41 | 25 | WD: E<br>WS: 1.5m/s<br>Stab Class: A | Wind 21-53<br>Birds 24-60<br>Traffic 25-67<br>Aircraft 25-30<br>NPM Not Audible |
| 10/03/2020 15:23 | 53 | 33 | 23 | | |
| 10/03/2020 15:38 | 67 | 43 | 23 | | |
| Site $L_{Aeq(15min)}$ Contribution | | | | | <25 |
| Site $L_{A1(1min)}$ Contribution | | | | | <35 |
| **Evening** | | | | | |
| 09/03/2020 19:41 | 60 | 47 | 42 | WD: NE<br>WS: 2.0m/s<br>Stab Class: D | Birds 37-57<br>Wind 37-60<br>Dogs <34-40<br>Insects <32<br>NPM Not Audible |
| 09/03/2020 19:56 | 60 | 52 | 48 | | |
| 09/03/2020 20:11 | 56 | 49 | 46 | | |
| Site $L_{Aeq(15min)}$ Contribution | | | | | <35 |
| Site $L_{A1(1min)}$ Contribution | | | | | <40 |
| **Night** | | | | | |
| 09/03/2020 23:04 | 54 | 31 | 25 | WD: NE<br>WS: 1.5m/s<br>Stab Class: D | Insects 23-28<br>Dogs 26-46<br>Wind 23-44<br>Birds 30-54<br>NPM Hum <20 |
| 09/03/2020 23:19 | 45 | 35 | 31 | | |
| 09/03/2020 23:34 | 51 | 36 | 32 | | |
| Site $L_{Aeq(15min)}$ Contribution | | | | | <25 |
| Site $L_{A1(1min)}$ Contribution | | | | | <35 |

**Table 9: Attended noise monitoring results for Milpose**

| Date/Time (hrs | Noise Descriptor (dBA re 20 µPa) | | | Meteorology | Description and SPL, dBA |
|---|---|---|---|---|---|
| | LAmax | LAeq | LA90 | | |
| **Day** | | | | | |
| 10/03/2020 14:07 | 51 | 33 | 28 | WD: E<br>WS: 1.0m/s<br>Stab Class: A | Farm Machinery 27-49<br>Birds 20-57<br>Wind 20-39<br>NPM Not Audible |
| 10/03/2020 14:22 | 57 | 36 | 24 | | |
| 10/03/2020 14:37 | 56 | 34 | 27 | | |
| Site $L_{Aeq(15min)}$ Contribution | | | | | <25 |
| Site $L_{A1(1min)}$ Contribution | | | | | <35 |
| **Evening** | | | | | |
| 09/03/2020 20:48 | 58 | 39 | 33 | WD: N<br>WS: 1.5m/s<br>Stab Class: E | Wind 22-58<br>Birds 34-38<br>Insects 22-30<br>NPM Hum 20-26 |
| 09/03/2020 21:03 | 52 | 31 | 29 | | |
| 09/03/2020 21:18 | 42 | 28 | 25 | | |
| Site $L_{Aeq(15min)}$ Contribution | | | | | <30 |
| Site $L_{A1(1min)}$ Contribution | | | | | <40 |
| **Night** | | | | | |
| 09/03/2020 22:00 | 33 | 27 | 25 | WD: N<br>WS: <0.5m/s<br>Stab Class: D | Insects 20-33<br>Birds 24-30<br>Farm Vehicle 30-65<br>Aircraft 28-34<br>NPM Vehicles 25-32<br>(3 minute duration)<br>NMP Hum 20-24 |
| 09/03/2020 22:15 | 56 | 34 | 25 | | |
| 09/03/2020 22:30 | 66 | 39 | 24 | | |
| Site $L_{Aeq(15min)}$ Contribution | | | | | <25 |
| Site $L_{A1(1min)}$ Contribution | | | | | <35 |

**Table 10: Attended noise monitoring results for Hillview**

| Date/Time (hrs) | Noise Descriptor (dBA re 20 µPa) | | | Meteorology | Description and SPL, dBA |
|---|---|---|---|---|---|
| | LAmax | LAeq | LA90 | | |
| **Day** | | | | | |
| 10/03/2020 12:49 | 61 | 39 | 23 | WD: NE<br>WS: 0.5m/s<br>Stab Class: C | Traffic 20-61<br>Birds 25-44<br>Wind 20-41<br>NPM Not Audible |
| 10/03/2020 13:04 | 54 | 35 | 23 | | |
| 10/03/2020 13:19 | 51 | 31 | 22 | | |
| Site $L_{Aeq(15min)}$ Contribution | | | | | <25 |
| Site $L_{A1(1min)}$ Contribution | | | | | <35 |
| **Evening** | | | | | |
| 10/03/2020 18:01 | 68 | 42 | 31 | WD: SE<br>WS: 1.5m/s<br>Stab Class: D | Traffic 24-56<br>Wind 24-41<br>Birds 26-68<br>NPM Not Audible |
| 10/03/2020 18:16 | 53 | 42 | 32 | | |
| 10/03/2020 18:31 | 59 | 44 | 32 | | |
| Site $L_{Aeq(15min)}$ Contribution | | | | | <30 |
| Site $L_{A1(1min)}$ Contribution | | | | | <35 |
| **Night** | | | | | |
| 10/03/2020 01:06 | 49 | 33 | 24 | WD: NE<br>WS: 2.0m/s<br>Stab Class: D | Wind 17-53<br>Insects 17-22<br>Traffic 32-64<br>NPM Not Audible |
| 10/03/2020 01:21 | 52 | 37 | 31 | | |
| 10/03/2020 01:36 | 64 | 40 | 20 | | |
| Site $L_{Aeq(15min)}$ Contribution | | | | | <25 |
| Site $L_{A1(1min)}$ Contribution | | | | | <35 |

**Table 11: Attended road noise survey results**

| Time (hrs) | Noise Descriptor (re 20 µPa) dB $L_{Aeq}$ | Meteorology | Criteria dB $L_{Aeq(1hr)}$ | Description and SPL dBA |
|---|---|---|---|---|
| 10/03/2020 12:49 (Day) | 36 | WD: NE<br>WS: 0.5m/s<br>Stab Class: | 55 | Traffic 20-61<br>Birds 26-44<br>Wind 20-41 |
| 10/03/2020 17:46 (Evening) | 51 | WD: SE<br>WS: 1.5m/s<br>Stab Class: | 55 | Traffic 24-56<br>Wind 24-41<br>Birds 26-68<br>(Vehicles Exiting/Entering Site Approx 50) |