

**Mount Pleasant Operation
Monthly Environmental Monitoring Report**

August 2019

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1. Introduction

The Mount Pleasant Operation (MPO) is located in the Upper Hunter Valley of New South Wales, approximately three kilometres (km) north-west of Muswellbrook and approximately 50 km north-west of Singleton. The villages of Aberdeen and Kayuga are located 12 km north-northeast and 3 km north of the operations, respectively.

The purpose of this report is to provide a monthly update of monitoring data in accordance with the requirements of NSW Environmental Protection Licence (EPL) 20850, Section 66(6) of the *Protection of the Environment Operations Act 1997* (POEO Act) and the MPO Development Approval (DA 92/97).

Table 1-1 – Mount Pleasant Operation

Name of Operation	Mount Pleasant Operation
Name of Licensee	MACH Energy Australia Pty Ltd
Environmental Protection Licence	20850
Project Approval	DA 92/97
Reporting Period Start Date	1 August 2019
Reporting Period End Date	31 August 2019
Date Data Received	20 September 2019

To view MPO EPL 20850 or DA 92/97 in full please refer to the link below.

<https://machenergyaustralia.com.au/mount-pleasant/documentation/>

2. Monitoring Requirements

The MPO EPL 20850 specifically requires the monitoring of:

- 2 x Palas Fidas sites;
- Noise monitoring;
- Blast monitoring; and
- Meteorological monitoring.

Monitoring of sites not required by the EPL are carried out in accordance with MPO Environmental Monitoring Program (EMP) and Project Approval (DA 92/97).

All monitoring is undertaken by suitability qualified and experienced person(s).

The MPO Environmental Monitoring Network is shown in **Figure 2-1, Figure 2-2, Figure 2-3 and Figure 2-4.**

Figure 2-1 shows MPO attended noise monitoring assessment groups. **Figure 2-2** shows the MPO air quality monitoring network. **Figure 2-3** shows the MPO groundwater monitoring network. **Figure 2-4** shows the MPO surface water monitoring network.



- LEGEND**
- Mining Lease Boundary
 - Mine Owned
 - Privately-owned Residence - MPO Acquisition on Request
 - Privately-owned Residence - MPO Mitigation on Request
 - Other Privately-owned Residence
 - Noise Assessment Group (NAG) (DA 92/97)
 - Monitoring Site
 - ▼ Attended Noise
 - ▲ Real-Time Noise
 - ◆ Weather Mast
 - ✱ Weather Station

Source: NSW Land & Property Information (2017); NSW Division of Resources & Energy (2017); MACH Energy (2017)
Orthophoto: MACH Energy (August 2016)

MACHEnergy
MOUNT PLEASANT OPERATION
Nominal Noise and Meteorological
Monitoring Sites

Figure 2-1 – MPO Attended Noise Monitoring Assessment Groups



- LEGEND**
- Mining Lease Boundary
 - Mine Owned
 - Privately-owned Residence - MPO Acquisition on Request
 - Privately-owned Residence - MPO Mitigation on Request
 - Other Privately-owned Residence
 - Monitoring Sites**
 - Air Quality - High Volume Sampler
 - Air Quality - Palas Fidas
 - Dust Deposition Gauge
 - Upper Hunter Air Quality Monitoring Network
 - Weather Mast
 - ✱ Weather Station

Source: NSW Land & Property Information (2017); NSW Division of Resources & Energy (2017); MACH Energy (2017)
Orthophoto: MACH Energy (Aug 2016)

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MOUNT PLEASANT OPERATION
Air Quality and Meteorological
Monitoring Sites

Figure 2-2 – MPO Air Quality and Meteorological Monitoring Network

Note: Refer Figure 3 for geology legend

MOUNT PLEASANT OPERATION

Augmentations to the Groundwater Monitoring Network

Figure 2-3 – MPO Groundwater Monitoring Network

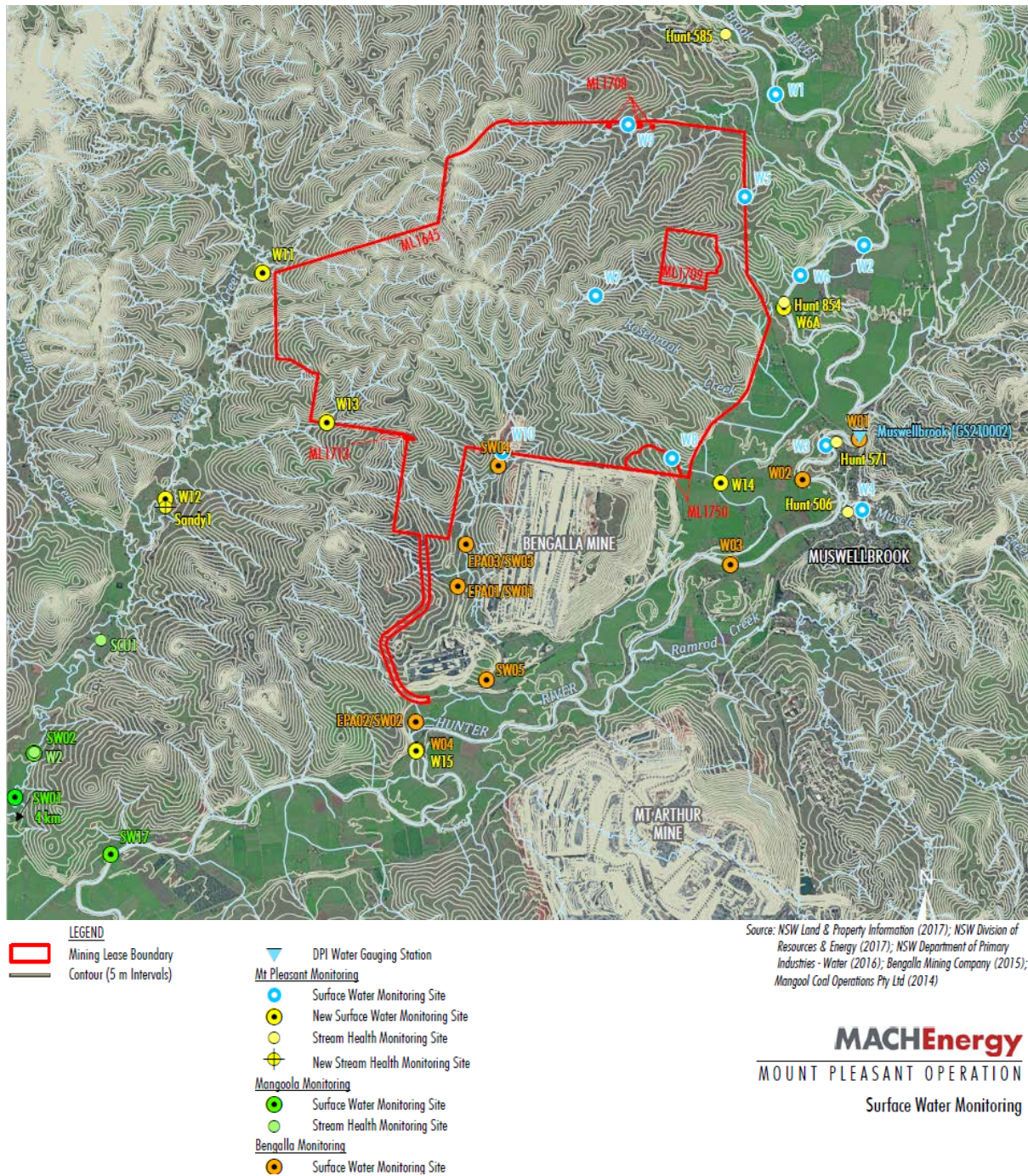


Figure 2-4 – MPO Surface Water Monitoring Network

3. Meteorological Monitoring

Weather data is measured continuously at the Kayuga Road meteorological station (M-WS4). In addition to air quality parameters, the weather station also measures wind speed and direction, temperature (at 2 m and 10 m), solar radiation, relative humidity, rainfall, atmospheric pressure, and sigma theta. The majority of meteorological data was captured (>98.5%) during the August 2019 monitoring period, with the exception of minor temperature data loss (79.9%) due to maintenance and a fault. There was 18mm of rainfall recorded at MPO during August 2019.

4. Dust Depositional Monitoring

4.1 Methodology

Dust deposition was monitored according to the OEH's Approved Methods for the Sampling and Analysis of Air Pollutants in New South Wales (DECC 2007), which references Australian Standard (AS)/New Zealand Standard (NZS) 3580.10.1:2016 Methods for Sampling and Analysis of Ambient Air: Determination of particulate matter – Deposited matter – Gravimetric Method. The dust deposition monitoring network comprises of 13 dust deposition gauges (DDG). Details of the monitoring locations are shown in **Figure 2-2**.

DDG samples can be contaminated by a variety of means, notably by the presence of insects and bird droppings. Results for contaminated gauges were not included in the calculation of the annual averages as this would result in skewed or misleading results for the purpose of dust deposition assessment. The Australian Standard does not provide criteria for the determination of contamination of a DDG. A gauge sample is determined by AECOM to be contaminated only after reference to field observation sheets, historical monitoring location data, laboratory notes and results, prevailing atmospheric conditions and feedback from field technicians. For example, a gauge sample with a statistically abnormally high insoluble solids result, a low ash residue result (indicating a high level of organic matter) and field notation that bird droppings or insects were present is likely to be considered contaminated.

4.2 Results

The dust deposition exposure period for all gauges commenced on 17 July 2019. Sample collection was undertaken on 16 August 2019 by AECOM with sample analysis performed by SRT, a NATA accredited laboratory. Results are summarised in **Table 4-1**.

Table 4-1: Dust Depositional Results – August 2019

Location	YTD Insoluble Solids (g/m ² .month)	Insoluble Solids Annual Rolling Average (g/m ² .month)
D1	2.1	2.1
D3	3.2	3.3
D4	2.5	2.4
D5	3.2	3.1
D6	3.7	3.4
D7 ¹	8.2	8.0
D8	4.8	4.6
D9	4.0	3.3
D10	1.5	1.6
D11	2.8	2.6
D12	1.5	1.8
D13	2.5	3.1
D14	3.7	4.0
Criterion	-	4.0
<i>Note: Results in bold indicate an elevated measurement of adopted assessment criteria</i> <i>**Indicates result unavailable due to contaminated depositional dust gauges for YTD</i>		

Note 1: Site D7 is located within close proximity to the northern boundary of a neighbouring mining company's main pit and thus is heavily influenced by this. This site will continue to be monitored, however will not be used to assess compliance or to represent residential receivers in the area.

Contaminated results are not included in the 12 month rolling average. An elevated reading above the annual average criterion for dust deposition (insoluble solids) was recorded at site D7a (8.0 g/m².month) and D8 (4.6 g/m².month).

Site D7 is located within close proximity to the northern boundary of a neighbouring mining operation and thus can be influenced by this site. D7 will continue to be monitored, however will not be used to assess compliance or to represent residential receivers in the area. Furthermore, there are no privately-owned receivers in the vicinity of D8. Whilst this site does not represent residence(s) on privately-owned land, it will continue to be monitored in accordance with the MPO Air Quality and Greenhouse Gas Management Plan (MACH Energy, 2019).

Field notes from the August sampling event noted that all the gauges contained insects and 9 contained bird droppings.

Figure 4-1 compares the monthly insoluble solids results to the annual averages for each dust gauge and the assessment criterion.

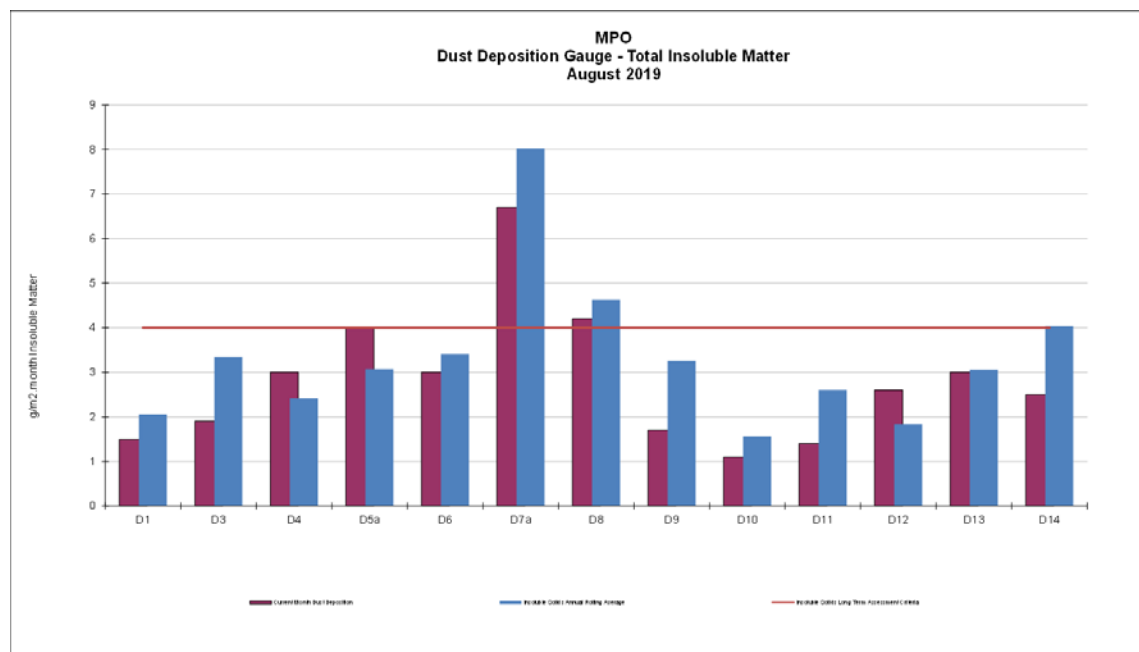


Figure 4-1: MPO Dust Deposition Monthly Result and Annual Rolling Average – August 2019

5. Total Suspended Particulates

All High Volume Air Samplers (HVAS) are run for 24 hours every six days in accordance with AM-15 of Approved Methods for the Sampling and Analysis of Air Pollutants in New South Wales (DECC, 2007), referencing AS/NZS 3580.9.3:2015 Methods for sampling and analysis of ambient air – Determination of suspended particulate matter – Total suspended particulate matter (TSP) - High volume sampler gravimetric method, for the monitoring of TSP.

Three TSP HVAS units are included in the MPO air quality monitoring network and are displayed in **Table 4-1** below. These units were commissioned in March 2017.

Table 5-1 Total suspended Particulate Monitoring Sites

ID	Description
A-PF2	Reilly's
M-WS4	Kayuga Road Met Station
A-PF5	Athlone

5.1 Assessment Criteria

TSP is assessed against the guidelines defined in the EPA Approved Methods for the Modelling and Assessment of Air Pollutants in New South Wales (EPA 2016) and Project Approval DA 92/97. The DA 92/97 specifies an annual average criterion of 90 µg/m³.

5.2 Results

In August 2019 sample collection was undertaken by AECOM with sample analysis performed by SRT, a NATA accredited laboratory. TSP results for the monitoring period are provided in Table 4-2.

Table 5-2 Total Suspended Particulate Monitoring Data – August 2019

Run Date	Assessment Criterion	TSP µg/m ³		
		HVAS A-PF2	HVAS M-WS4	HVAS A-PF5
6/08/2019	-	64	24	20
12/08/2019	-	61	13	10
18/08/2019	-	73	40	40
24/08/2019	-	114	46	43
30/08/2019	-	51	48	48
Monthly Mean	-	73	34	32
Annual Rolling Average	90	85	48	49

Note: Results in **bold** indicate an elevated reading

5.3 Discussion

For the reporting period, the annual rolling average TSP data at all sites was below the annual average criterion of 90 µg/m³.

6. Real Time Air Quality Monitoring

Continuous particulate matter less than 10 µm (PM₁₀) and particulate matter less than 2.5 µm (PM_{2.5}) monitoring was conducted by three Palas Fidas (one utilised for management only) units at MPO during August 2019.

The EPA identification numbers 1 and 2 refer to Palas Fidas units installed on Wybong Road (A-PF2) and Dorset Road (A-PF5), respectively. In addition, a third unit (A-PF4) is installed on Kayuga Road with data used for management purposes only.

Real time PM₁₀ and PM_{2.5} annual rolling averages for August 2019 have been provided in Section 5.2 and 5.4 respectively, as an indication of annual performance between August 2018 – August 2019 and do not represent annual average results for 2019 as per Schedule 3, Condition 20 of DA 92/97.

6.1 PM₁₀ Results – 24 hour rolling average

In accordance with the DA 92/97 limit of 50 µg/m³ for the 24 hour rolling average, there were elevated readings measured on 8, 23 and 25 August 2019. These high PM₁₀ levels on the

aforementioned dates were associated with wider regional air quality events and are not suspected to be an incremental increase as a result of mining operations at MPO.

There were elevated readings measured at the Muswellbrook NW monitor in accordance with EPL 20850 for 'adverse dust conditions' ($44 \mu\text{g}/\text{m}^3$) for the 24 hour rolling average on 8, 9, 19, 23 and 25 August 2019. The Muswellbrook NW monitor was operational during all days of August 2019. During this period, 289 total machinery hours were lost due to dust delays / shutdowns executed at MPO.

Real time PM_{10} 24 hour rolling average results for August 2019 are presented in **Table 6-1**.

Table 6-1: MPO Palas Fidas PM_{10} Data – August 2019

Date	A-PF2/EPA ID 1	A-PF4	A-PF5/EPA ID 2	Muswellbrook NW	Muswellbrook NW 24 Hour Average Limit (µg/m³)	A-PF2, A-PF4, A-PF5 24 Hour Average Limit (µg/m³)
	24 hour Average Result					
1/08/2019	26	23	26	20	44	50
2/08/2019	20	15	16	18	44	50
3/08/2019	24	13	12	23	44	50
4/08/2019	33	22	27	27	44	50
5/08/2019	31	23	27	28	44	50
6/08/2019	30	15	14	24	44	50
7/08/2019	35	17	14	34	44	50
8/08/2019	58	22	23	65	44	50
9/08/2019	37	27	25	51	44	50
10/08/2019	21	9	8	23	44	50
11/08/2019	19	7	6	20	44	50
12/08/2019	10	5	-	9	44	50
13/08/2019	19	8	6	14	44	50
14/08/2019	26	9	6	20	44	50
15/08/2019	27	9	8	22	44	50
16/08/2019	33	11	10	34	44	50
17/08/2019	26	19	21	24	44	50
18/08/2019	27	19	22	21	44	50
19/08/2019	43	29	33	54	44	50
20/08/2019	28	8	8	20	44	50
21/08/2019	35	9	9	31	44	50
22/08/2019	33	12	14	26	44	50
23/08/2019	56	51	45	47	44	50
24/08/2019	37	23	23	32	44	50
25/08/2019	62	24	27	46	44	50
26/08/2019	42	27	33	33	44	50
27/08/2019	27	22	25	24	44	50
28/08/2019	44	21	19	40	44	50
29/08/2019	31	17	19	30	44	50
30/08/2019	12	12	10	9	44	50
31/08/2019	9	9	10	8	44	50

Note: Results in bold indicate elevated readings during adverse weather conditions. Results with “-” indicate dates where data was affected by maintenance or servicing (scheduled and unscheduled)

Figure 6-1 below shows the results of real-time PM₁₀ 24 hour rolling average results at MPO air quality monitoring sites for August 2019.

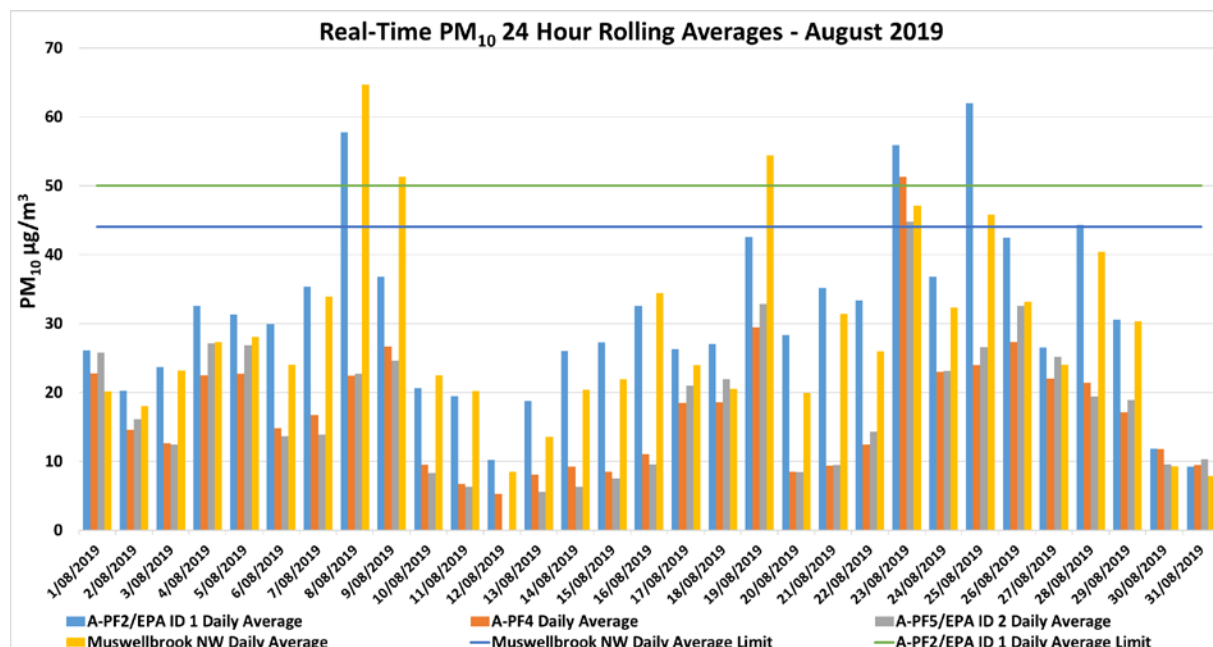


Figure 6-1: Real-time PM₁₀ 24 hour rolling average results for August 2019.

6.2 PM₁₀ Results – Annual rolling average

Elevated readings have been measured for the annual rolling average of PM₁₀ data collected since the amendment of the limit from 30 µg/m³ to 25 µg/m³ during approval of Modification 3 (MOD 3) of DA 92/97, dated 24 August 2018. MPO is currently in the process of undergoing a validation and compliance review of this data, the findings of which will be reported following the completion of all data collection for the 2019 annual reporting period.

Real time PM₁₀ annual rolling averages for August 2019 are presented in **Figure 6-2** below.

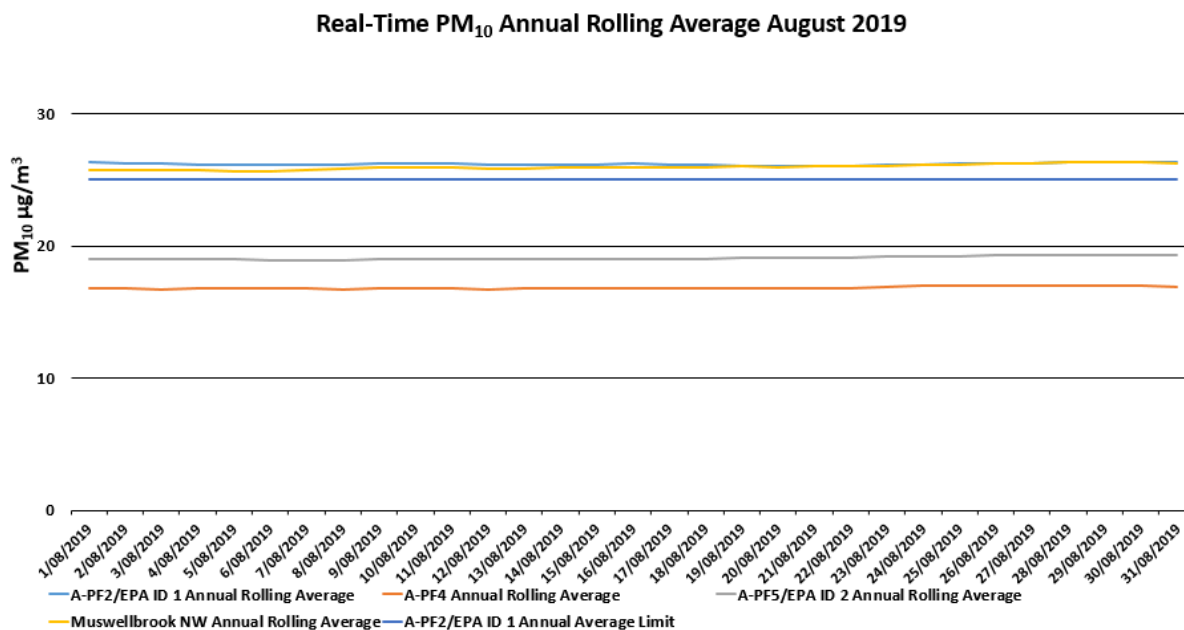


Figure 6-2: Real-time PM₁₀ Annual Rolling average results for August 2019.

6.3 PM_{2.5} Results – 24 hour rolling average

During the August 2019 monitoring period there were no elevated readings measured in accordance with the DA 92/97 limit of 25 µg/m³ for the 24 hour rolling average.

Real time PM_{2.5} 24 hour rolling average results for August 2019 are presented in **Table 6-2**.

Table 6-2: MPO Palas Fidas PM_{2.5} Data – August 2019

Date	A-PF2/EPA ID 1	A-PF4	A-PF5/EPA ID 2	A-PF2, A-PF4, A-PF5 24 Hour Average Limit (µg/m³)
	24 hour Average Result			
1/08/2019	11	9	9	25
2/08/2019	10	8	8	25
3/08/2019	10	8	8	25
4/08/2019	11	9	9	25
5/08/2019	13	11	13	25
6/08/2019	10	7	6	25
7/08/2019	10	7	6	25
8/08/2019	13	8	8	25
9/08/2019	9	8	8	25
10/08/2019	6	5	5	25
11/08/2019	6	4	4	25
12/08/2019	5	4	-	25
13/08/2019	7	5	4	25
14/08/2019	8	5	4	25
15/08/2019	8	5	4	25
16/08/2019	8	5	5	25
17/08/2019	9	7	7	25
18/08/2019	10	9	9	25

19/08/2019	10	9	9	25
20/08/2019	7	5	5	25
21/08/2019	7	5	5	25
22/08/2019	8	6	7	25
23/08/2019	15	14	13	25
24/08/2019	13	10	10	25
25/08/2019	15	10	11	25
26/08/2019	15	14	15	25
27/08/2019	10	11	11	25
28/08/2019	12	9	9	25
29/08/2019	9	7	7	25
30/08/2019	5	5	4	25
31/08/2019	7	7	6	25

Note: Results in **bold** indicate elevated readings during adverse weather conditions. Results with “-” indicate dates where data was affected by maintenance or servicing (scheduled and unscheduled)

Real time PM_{2.5} 24 hour average results for August 2019 are presented in **Figure 6-3** below.

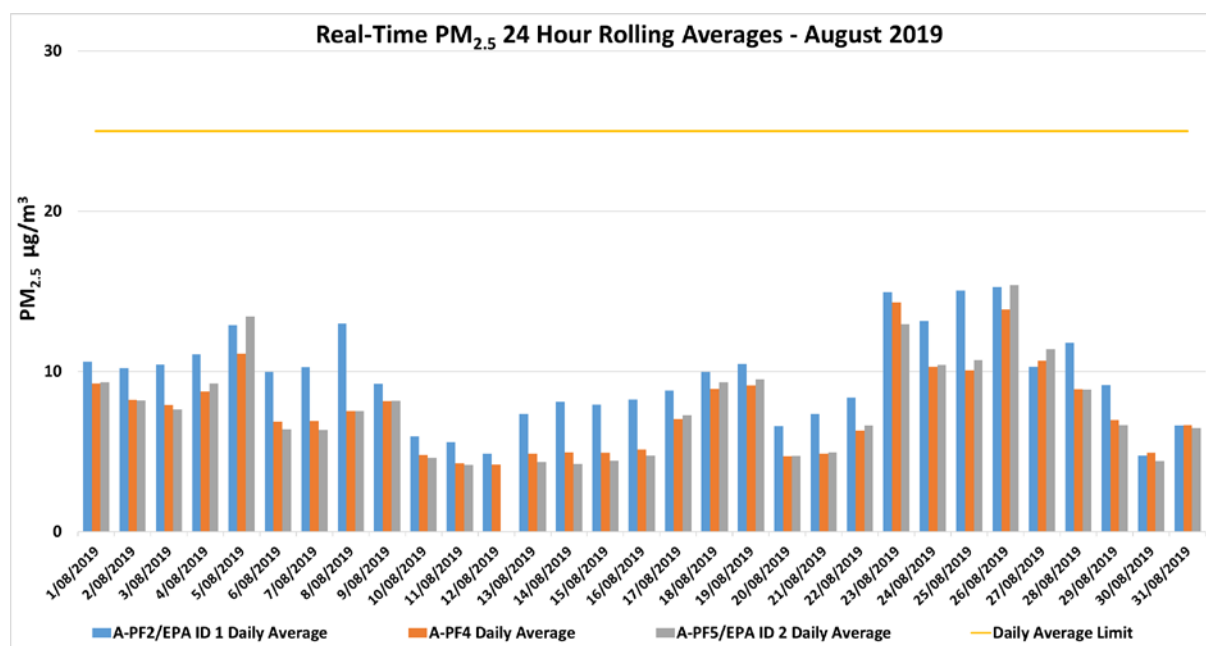


Figure 6-3: Real-time PM_{2.5} 24 hour rolling average results for August 2019.

6.4 PM_{2.5} Results - Annual rolling average

The requirement of annual rolling average of PM_{2.5} data was inceptioned during MOD 3 of DA 92/97, dated 24 August 2018. MPO is currently in the process of undergoing a validation and compliance review of this data, the findings of which will be reported following the completion of all data collection for the 2019 annual reporting period.

Real time PM_{2.5} annual rolling averages for August 2019 are presented in **Figure 6-2** below.

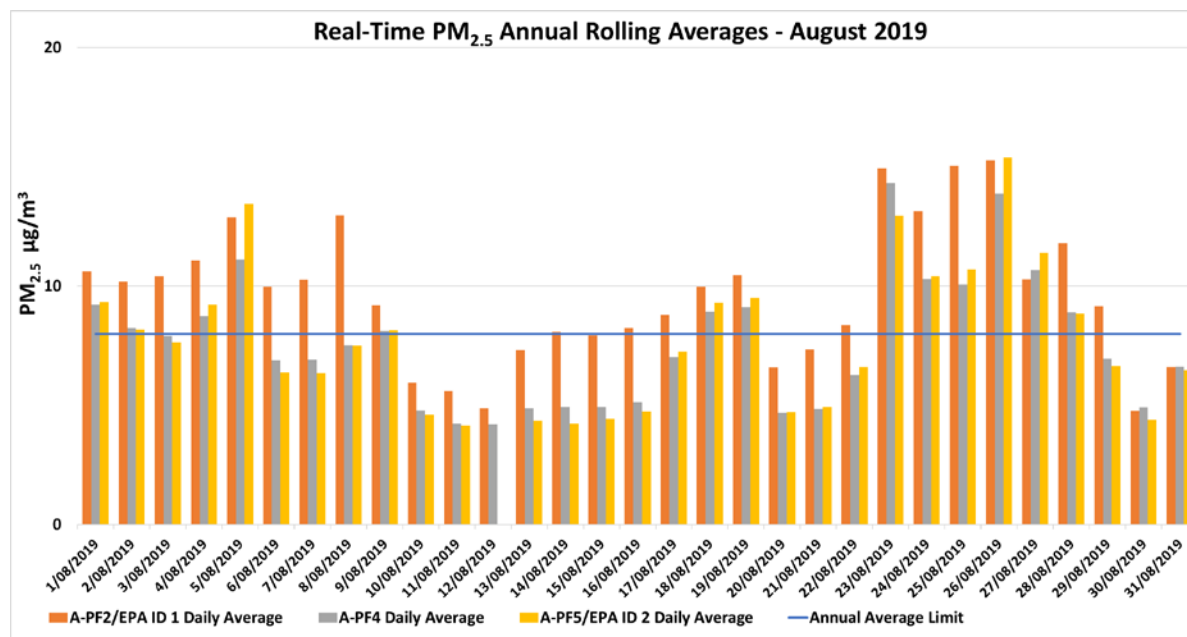


Figure 6-4: Real-time PM_{2.5} Annual Rolling average results for August 2019.

7. Surface Water Monitoring

7.1 Methodology

Surface water quality is monitored at 13 sites on a monthly basis, with additional monitoring conducted if triggered by a rain event. A comprehensive suite of analysis is performed at these sites on a quarterly basis.

7.2 Assessment Criteria

Surface waters were assessed in accordance with site specific trigger values that have been developed using the ANZECC (2000) guidelines for sites that contain a minimum of two years of monthly data. Sites with insufficient data are assessed on default trigger values adopted from ANZECC (2000) guidelines.

7.3 Results

Monthly and rain event surface water monitoring was conducted by AECOM on 28 August 2019. Laboratory analysis was performed by SRT and SGS, both NATA accredited laboratories. Monthly monitoring results for pH, EC, TSS and TDS are presented in **Table 7-1**.

Table 7-1 – MPO Monthly Surface Water Monitoring Results – 28 August 2019

Station	pH	Electrical Conductivity (EC) (µs/cm) ¹	Total Suspended Solids (TSS) (mg/L)	Total Dissolved Solids (TDS) (mg/L)
W1	8.1	400	8	208
W2	8.0	400	5	223
W3	8.0	400	13	233
W4	7.8	1900	10	1150

Station	pH	Electrical Conductivity (EC) (µs/cm) ¹	Total Suspended Solids (TSS) (mg/L)	Total Dissolved Solids (TDS) (mg/L)
W5	*	*	*	*
W6	8.2	390	4	230
W7	*	*	*	*
W9	*	*	*	*
W11	7.2	7100	9	4000
W12	7.5	6800	30	3990
W13	*	*	*	*
W14	*	*	*	*
W15	7.9	440	21	291

Note: Results in **bold** indicate elevated reading of adopted assessment criteria.

*Dry or insufficient water to sample.

** Indicates no safe access due to wet weather conditions

¹ Results have been rounded in accordance with the In-house method Q4AN(EV)-332-WI3 (pH) and In-house method Q4AN(EV)-332-WI2 (EC).

Five of the thirteen monitoring locations were found to be dry on 28 August 2019. All sites sampled were below or inside the trigger level values. An investigation will be triggered if this occurs for three consecutive sampling events in accordance MPO Water Management Plan (MACH Energy, 2018).

8. Groundwater Monitoring

Quarterly groundwater monitoring was conducted during 8 and 9 August 2019. Water level results for the groundwater bores are presented in **Table 8-1**. The quarterly pH and EC results are presented in **Table 8-2** and **Table 8-3**, respectively.

Table 8-1 - MPO Quarterly Groundwater Water Level Results

Monitoring Location/ ID	Water Level Trigger Range		Current Month Water Level (DTW)	May 2019 Water Level (DTW)	Triggered (Yes/No)
	80 th Percentile (DTW)	Trigger			
WRA1L	-	± 0.5m	5.92	6.06	
WRA1U	-	± 0.5m	*	*	
WRA3L	-	± 0.5m	15.93	16.56	
WRA3U	-	± 0.5m	4.48	4.03	
WRA5L***	-	± 0.5m	0.00	0.00	
WRA5U***	-	± 0.5m	0.43	0.71	
WRA6L	-	± 0.5m	2.55	2.34	
WRA6U	-	± 0.5m	4.10	3.93	
MPBH1	9.71	10.70	10.00	9.79	No
MPBH2	12.20	14.20	12.47	12.46	No

Monitoring Location/ ID	Water Level Trigger Range		Current Month Water Level (DTW)	May 2019 Water Level (DTW)	Triggered (Yes/No)
	80 th Percentile (DTW)	Trigger			
MPBH3b	12.00	Dry (or 13.6m)	12.39	12.36	No
MPBH4	-	± 0.5m	12.38	11.17	
MPBH5	-	± 0.5m	*	*	
3500C500 (L)	-	± 0.5m	57.44	57.31	
3500C500 (S)	-	± 0.5m	26.05	26.10	
4500F000	-	± 0.5m	28.31	28.90	
5000D000	-	± 0.5m	90.85	85.92	
5500D000	-	± 0.5m	**	68.97	
6500F500L	-	± 0.5m	52.86	52.81	
6500F500M	-	± 0.5m	54.48	54.43	
6500F500U	-	± 0.5m	*	*	
6500F625	-	± 0.5m	16.33	15.70	
Melody	-	± 0.5m	12.75	12.35	
7000D000L	-	± 0.5m	**	19.05	
7000D000U	-	± 0.5m	**	6.04	
7500F000	-	± 0.5m	36.21	36.16	

* Dry/insufficient water to sample

** Bore appeared to be blocked

*** New site

An investigation is triggered when the water levels in any alluvial bores exceed the 80th percentile and/or trigger level. Results shown in **bold** indicate that the bore has exceeded the adopted assessment criterion for changes in standing water level of ± 0.5m from the previous measurement.

Table 8-2 - MPO Quarterly Groundwater pH results

Monitoring Location/ ID	pH Trigger Range		Current Month pH	May 2019 pH	Feb 2019 pH	Triggered (Yes/No)
	20 th Percentile	80 th Percentile				
WRA1L	7.30	7.74	7.1	6.9	6.9	Yes
WRA1U	^	^	*	*	*	
WRA3L	6.60	6.90	6.8	6.8	6.6	No
WRA3U	7.10	7.60	7.2	7.2	7.4	No
WRA5L ***	7.1	7.8	7.3	7.3	-	-
WRA5U ***	7.1	7.4	7.4	7.4	-	-
WRA6L	7.20	7.70	7.0	6.9	6.9	Yes
WRA6U	6.80	7.00	6.9	6.9	6.7	No
MPBH1	6.80	7.10	7.1	6.9	7.0	No

Monitoring Location/ ID	pH Trigger Range		Current Month pH	May 2019 pH	Feb 2019 pH	Triggered (Yes/No)
	20 th Percentile	80 th Percentile				
MPBH2	6.80	7.10	6.9	6.7	6.9	No
MPBH3b	7.40	7.60	8.1	7.5	7.7	No
MPBH4	^	^	7.0	6.8	7.0	-
MPBH5	^	^	*	*	*	-
3500C500 (L)	7.28	7.50	7.5	7.3	7.3	No
3500C500 (S)	^	^	7.0	7.0	6.9	No
4500F000	6.50	6.90	6.8	6.8	6.8	No
5000D000	6.60	6.98	6.9	6.9	6.9	No
5500D000	6.30	6.80	**	7.0	7.0	No
6500F500L	6.52	6.80	7.5	7.1	7.2	Yes
6500F500M	6.90	7.20	7.3	7.1	7.1	No
6500F500U	6.82	6.98	*	*	*	No
6500F625	6.8	7.1	7.1	6.8	6.9	No
Melody	^	^	7.1	6.9	7.1	No
7000D000L	6.60	6.80	**	6.7	6.7	No
7000D000U	6.60	7.70	**	6.5	6.6	No
7500F000	6.70	7.20	7.8	7.6	7.7	Yes

* Dry/insufficient water to sample

** Bore appeared to be blocked

*** New site

- indicated no trigger limit identified

An investigation is triggered when pH values are recorded outside the baseline range (20th – 80th percentile) for three consecutive readings. Results outside this range are shown in **bold**.

Results have been rounded in accordance with the In-house method Q4AN(EV)-332-WI3 (pH) and In-house method Q4AN(EV)-332-WI2 (EC).

Table 8-3 - MPO Quarterly Groundwater EC results

Monitoring Location/ ID	EC Trigger Range		Current Month EC	Feb 2019 EC	Nov 2018 EC	Triggered (Yes/No)
	80 th Percentile	Maximum Beneficial Use Trigger				
WRA1L	4500	7800	4400	4150	4500	No
WRA1U	^	^	*	*	*	
WRA3L	16710	22000	16100	15800	16600	No
WRA3U	9032	22000	6800	7200	4700	No
WRA5L	7038	7800	2750	2700	-	-
WRA5U	4772	7800	2750	2450	-	-
WRA6L	5950	7800	5600	6050	5700	No
WRA6U	11140	22000	10800	11000	10900	No

Monitoring Location/ ID	EC Trigger Range		Current Month EC	Feb 2019 EC	Nov 2018 EC	Triggered (Yes/No)
	80 th Percentile	Maximum Beneficial Use Trigger				
MPBH1	590	800	450	450	460	No
MPBH2	930	930	800	810	810	No
MPBH3b	4544	7800	3650	3400	3750	No
MPBH4	^	^	5550	5200	5150	-
MPBH5	^	^	*	*	*	-
3500C500 (L)	4478	7800	3950	4000	4100	No
3500C500 (S)	^	^	4700	4600	4500	No
4500F000	3646	7800	9300	9400	8800	Yes
5000D000	710	800	820	790	760	No
5500D000	1099	2350	**	3900	4000	No
6500F500L	1406	2350	3750	3500	3650	Yes
6500F500M	1918	2350	3000	2800	2950	Yes
6500F500U	5814	7800	*	*	*	No
6500F625	^	^	2850	3150	3950	No
Melody	^	^	940	1000	2600	No
7000D000L	1146	2350	**	2000	1550	No
7000D000U	6688	7800	**	5850	6150	No
7500F000	3908	7800	6350	6250	6300	No

* Dry/insufficient water to sample

** Bore appeared to be blocked

*** New site

^ indicated no trigger limit identified

An investigation is triggered when EC values recorded exceed the beneficial use quality range (as described in the GWMP) for three successive monitoring rounds. Results outside this range are shown in **bold**.

Results have been rounded in accordance with the In-house method Q4AN(EV)-332-WI3 (pH) and In-house method Q4AN(EV)-332-WI2 (EC).

Several groundwater monitoring sites were outside of the EC and/or pH triggers. A preliminary investigation into groundwater trigger levels at MPO was conducted in 2018, with results submitted on 3 May 2018 in accordance MPO Water Management Plan (MACH Energy, 2018). Groundwater triggers have been revised in the MPO Water Management Plan (MACH Energy, 2019). This plan is awaiting final approval.

The next quarterly monitoring event is scheduled for November 2019.

9. Noise Monitoring

Attended noise monitoring was undertaken during the night period of 28 August 2019 at 7 monitoring locations as per the MPO Noise Management Plan (MACH Energy, 2018) in accordance with DA 92/97 and EPL 20850.

9.1 Results

The results for night time attended noise monitoring for noise generated by MPO in August 2019 against noise criteria is shown in **Table 9-1**.

Table 9-1 – $L_{Aeq,15min}$ Generated by MPO Night-Time Monitoring – 28 August 2019

Location	Start Date and Time	Wind Speed m/s	Stability Class	Criterion dB	Criterion Applies ¹	MPO Only L_{Aeq} dB ^{2,4,5}	Exceedance dB ^{3,4}
N-AT1	28/08/19 23:41	1.2	F	43	Yes	Inaudible	Nil
N-AT2	28/08/19 22:00	2.7	D	36	Yes	Inaudible	Nil
N-AT3	28/08/19 22:57	1.2	D	35	Yes	< 30	Nil
N-AT4	28/08/19 23:50	1.7	G	42	No	< 25	NA
N-AT5	28/08/19 23:25	0.5	F	40	Yes	< 30	Nil
N-AT6	28/08/19 22:37	1.8	D	35	Yes	Inaudible	Nil
N-AT7 ⁵	28/08/19 22:32	2.0	F	40	Yes	Inaudible	Nil

Notes:

1. As per Condition L2.3 of EPL 20850, noise emission limits do not apply during wind speeds greater than 3m/s at 10m above ground level, or stability category F temperature inversion conditions and wind speeds greater than 2m/s at 10m above ground level, or stability category G temperature inversion conditions;
2. Estimated or measured $L_{Aeq,15minute}$ attributed to MPO;
3. NA in exceedance column means meteorological conditions outside those specified in Condition L2.3 of EPL 20850 and thus criterion is not applicable;
4. Bold results indicate exceedance of criteria;
5. Temporary monitoring at N-AT7 commenced in January 2019 in order to better represent receptors north of the site. This location is not required in accordance with the approved MPO Noise Management Plan (MACH Energy, 2018) and is used for management purposes only.

The purpose of the noise monitoring is to quantify and describe the existing acoustic environment around the mining operation and compare results with relevant limits as per the Noise Management Plan (MACH Energy, 2018). Noise levels from MPO complied with noise limits at all monitoring locations during the August 2019 monitoring period.

10. Blast Monitoring

There were 6 blasts during August (a total of 44 blasts YTD). Results for August 2019 are presented in **Table 10-1**. All blast results during the August 2019 monitoring period and YTD are compliant with criteria at each monitoring site.

Table 10-1 – MPO Blast Monitoring Results – August 2019

Date Fired	Time Fired	Vibration BVOA	Overpressure BVOA	Vibration BVOC	Overpressure BVOC	Vibration BVO2	Overpressure BV02
12/08/19	13:12	0.840 mm/s	98.6 DBL	0.390 mm/s	90.8 DBL	1.500 mm/s	114.3DBL
15/08/19	13:09	0.650 mm/s	98 DBL	0.300 mm/s	103.5 DBL	1.310 mm/s	106.5 DBL
20/08/19	09:05	0.470 mm/s	98.1 DBL	0.130 mm/s	92.5 DBL	0.680 mm/s	106.1 DBL
23/08/19	12:56	1.43 mm/s	98.9 DBL	0.86 mm/s	94.9 DBL	1.86 mm/s	111.0 DBL
27/08/19	13:03	0.50 mm/s	98.2 DBL	0.40 mm/s	98.7 DBL	0.63 mm/s	95.7 DBL
29/08/19	15:07	0.21 mm/s	100.6 DBL	0.06 mm/s	102.3 DBL	0.14 mm/s	102.9 DBL