

Mount Pleasant Operation Monthly Environmental Monitoring Report

June 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 Environmental Protection Licence (EPL) 20850, Section 66(6) of the *Planning 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 June 2019
Reporting Period End Date	30 June 2019
Date Data Received	30 July 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 or TEOM Particulate Monitor PM₁₀ 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 ground water monitoring network. **Figure 2-4** shows the MPO surface water monitoring network.

June 2019



Figure 2-1 – MPO Attended Noise Monitoring Assessment Groups



MOUNT PLEASANT OPERATION Air Quality and Meteorological Monitoring Sites

- Air Quality Palas Fidas
 Dust Deposition Gauge
- Upper Hunter Air Quality Monitoring Network
- Weather Mast
 Weather Station

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



Note: Refer Figure 3 for geology legend

MACHEnergy

MOUNT PLEASANT OPERATION

Augmentations to the Groundwater Monitoring Network



Standpipe - Alluvium

Standpipe - Historical

Standpipe - Coal Seam

Standpipe - Interburden

Vibrating Wire Piezometer

Standpipe - Alluvium Bengalla Monitoring

Standpipe

Planned Mount Pleasant Monitoring

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Figure 2-4 – MPO Surface Water Monitoring Network

3. Dust Depositional Monitoring

3.1 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.

3.2 Results

The dust deposition exposure period for all gauges commenced on 17 May 2019. Sample collection was undertaken on 17 June 2019 by AECOM with sample analysis performed by SRT, a NATA accredited laboratory. Results are summarised in **Table 3-1**.

Location	YTD Insoluble Solids (g/m².month)	Insoluble Solids Annual Rolling Average (g/m².month)
D1	2.2	1.9
D3	3.6	3.3
D4	2.4	2.1
D5	2.9	2.7
D6	4.0	3.4
D7 ¹	8.2	7.5
D8	4.9	4.4
D9	5.6	3.2

Table 3-1:	Dust Depo	sitional	Results -	– April	2019

Location	YTD Insoluble Solids (g/m².month)	Insoluble Solids Annual Rolling Average (g/m².month)				
D10	1.7	1.6				
D11	3.2	2.8				
D12	1.4	1.7				
D13	2.6	2.8				
D14	4.0	4.1				
Criterion	-	4				
Note: Results in bold indicate elevated reading of adopted assessment criteria **Indicates result unavailable due to contaminated depositional dust gauges for YTD						

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 EPA annual average criterion for dust deposition (insoluble solids) was recorded at site D7a (7.5 g/m2.month), D8 (4.4 g/m2.month), and D14 (4.1 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. Sites D8 and D14 are located within close proximity to the MPO and can be influenced by activities within this area. These sites will continue to be monitored, however they do not represent residence(s) on privately-owned land and therefore are not used to assess compliance with Condition 20, Schedule 3 of DA 92/97.

Field notes from the June sampling event noted that all the gauges contained insects, four contained bird droppings, and seven contained vegetation matter.

Figure 3-1 compares the monthly insoluble solids results to the annual averages for each dust gauge and the assessment criterion.



Figure 3-1: MPO Dust Deposition Monthly Result and Annual Rolling Average – June 2019

The results from **Figure 3-1** show an elevated reading of dust deposition annual rolling averages at sites D7a, D8, and D14 for June 2019. These results are due to the location of these monitors. Figure 2-2 shows these sites are within close proximity to a neighbouring mining operation and current Mount Pleasant operations, and do not represent residential receptors. The dust deposition monitoring program is currently under review and may potentially be updated based on this review.

4. 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.

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

Table 4-1 Total suspended Particulate Monitoring Sites

4.1 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 mg/m³.

4.2 Results

In June 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**.

Run Data	Assessment	TSP μg/m³				
Kun Dale	Criterion	HVAS A-PF2	HVAS M-WS4	HVAS A-PF5		
01/06/2019	-	106	45	54		
07/06/2019	-	82	55	21		
13/06/2019	-	92	14	23		
19/06/2019	-	51	45	19		
25/06/2019	-	23	18	16		
Monthly Mean	-	71	35	27		
Annual Rolling Average	90	90	46	47		

Table 4-2 Total Suspended Particulate Monitoring Data – June 2019

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

4.3 Discussion

For the reporting period, the annual rolling average TSP data at all sites were meeting or below the annual average criterion of 90 μ g/m3.

5. Real Time PM₁₀ Monitoring

Continuous particulate matter less than 10 μ m (PM₁₀) and particulate matter less than 2.5 μ m (PM_{2.5}) monitoring was conducted by three Palas Fidas (one utilised for management only) units at MPO during June 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. This unit (A-PF4) was under maintenance and was temporarily replaced by a TEOM unit up until 25 June 2019.

5.1 **PM**₁₀ Results – 24 hour rolling average

During the June 2019 monitoring period there were no elevated readings measured in accordance with the DA 92/97 limit of 50 μ g/m³ for the 24 hour rolling average, nor were there elevated readings measured at the Muswellbrook NW monitor in accordance with EPL 20850 for 'adverse dust conditions' (44 μ g/m³) for the 24 hour rolling average. The Muswellbrook NW monitor was operational during all days of June with the exception of 5 and 6 June during scheduled maintenance.

Real time PM_{10} 24 hour rolling average results for June 2019 are presented in **Figure 5-1** below.



Figure 5-1: Real-time PM₁₀ 24 hour rolling average results for June 2019.

Figure 5-1 shows the results of real-time PM_{10} 24 hour rolling average results at MPO air quality monitoring sites for June 2019.

Real time PM₁₀ 24 hour rolling average results for June 2019 are presented in Table 5-1.

Date	A-PF2/EPA ID 1	A-PF4	A-PF5/EPA ID 2	Muswellbrook NW	A-PF2 24 Hour	Muswellbrook NW 24 Hour
Date		24 hou	r Average Res	(µg/m ³)	Average Limit (µg/m ³)	
1/06/2019	41	20	22	26	44	50
2/06/2019	43	32	35	33	44	50
3/06/2019	20	6	8	14	44	50
4/06/2019	12	13	10	11	44	50
5/06/2019	23	21	25	-	44	50
6/06/2019	19	10	14	-	44	50
7/06/2019	32	20	25	29	44	50
8/06/2019	38	30	37	30	44	50
9/06/2019	16	8	10	12	44	50
10/06/2019	17	7	8	12	44	50
11/06/2019	18	9	9	17	44	50
12/06/2019	19	12	10	17	44	50
13/06/2019	26	10	10	29	44	50
14/06/2019	25	19	18	22	44	50

Table 5-1: MPO Palas Fidas PM₁₀ Data – June 2019

15/06/2019	31	16	19	26	44	50
16/06/2019	38	24	29	38	44	50
17/06/2019	23	21	19	22	44	50
18/06/2019	20	9	10	12	44	50
19/06/2019	16	11	11	15	44	50
20/06/2019	22	16	18	22	44	50
21/06/2019	-	17	17	24	44	50
22/06/2019	21	15	16	19	44	50
23/06/2019	-	18	19	25	44	50
24/06/2019	-	13	13	13	44	50
25/06/2019	10	10	11	9	44	50
26/06/2019	14	10	12	11	44	50
27/06/2019	15	13	15	11	44	50
28/06/2019	18	15	16	12	44	50
29/06/2019	16	15	13	15	44	50
30/06/2019	22	13	12	25	44	50

Note: Results in bold indicate elevated readings during adverse weather conditions. MPO was not required to execute dust delays/shutdowns of operations and a halt to dust generating activities under the EPL 20850 or DA 92/97 consent conditions in June 2019.

Results with "-" indicate dates where data was affected by maintenance or servicing (scheduled and unscheduled)

5.2 PM₁₀ Results – Annual rolling average

Elevated readings have been measured for annual rolling average of PM_{10} 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 data validation and compliance review of this data for the 2019 calendar year.

Real time PM₁₀ annual rolling averages for June 2019 are presented in Figure 5-2 below.



June 2019

Figure 5-2: Real-time PM₁₀ Annual Rolling average results for June 2019.

5.3 PM_{2.5} Results – 24 hour rolling average

During the June 2019 monitoring period there were no elevated readings measured in accordance with the DA 92/97 limit of $25 \,\mu\text{g/m}^3$ for the 24 hour rolling average, with the exception of 2 June 2019 at A-PF2 / EPA ID 1 (27 $\mu\text{g/m}^3$).

In accordance with Condition 20, Schedule 3 of DA 92/97, this elevated reading is not considered to be an incremental increase due to the development (MPO) on its own, and thus not a reportable exceedance. This has been determined based upon regional PM_{2.5} background conditions being affected during this day, indicated by the daily average wind direction of 244° and a 24 hour rolling average of 22 μ g/m³ at A-PF5 / EPA ID 2, located in the northern portion of the site (refer **Figure 2-2**).

Real time PM_{2.5} daily average results for June 2019 are presented in Figure 5-3 below.



Figure 5-3: Real-time PM_{2.5} Daily Rolling average results for June 2019.

5.4 PM_{2.5} Results - Annual rolling average

The requirement of annual rolling average of $PM_{2.5}$ data was incepted during MOD 3 of DA 92/97, dated 24 August 2018. Insufficient data as of June 2019 has been collected to calculate the annual rolling average.

6. Surface Water Monitoring

6.1 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.

6.2 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.

6.3 Results

Monthly and rain event surface water monitoring was conducted by AECOM on 27 June 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 6-1**.

Station	рН	Electrical Conductivity (EC) (μs/cm) ¹	Total Suspended Solids (TSS) (mg/L)	Total Dissolved Solids (TDS) (mg/L)
W1	8.0	402	4	273
W2	7.9	425	5	283
W3	7.8	471	8	294
W4	7.5	1758	10	1030
W5	*	*	*	*
W6	7.9	436	3	322
W7	*	*	*	*
W9	*	*	*	*
W11	7.6	7010	9	4130
W12	7.6	6420	6	3800
W13	*	*	*	*
W14	*	*	*	*
W15	7.8	535	10	358

 Table 6-1 – MPO Monthly Surface Water Monitoring Results – 27 June 2019

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 27 June 2019. All sites sampled were below or inside the trigger level values.

7. Groundwater Monitoring

Groundwater monitoring did not occur in June 2019. The next quarterly monitoring event is scheduled for August 2019.

8. Noise Monitoring

Attended noise monitoring was undertaken during the night period of 6 June 2019 at seven monitoring locations in accordance with the EPL and MPO Noise Management Plan.

8.1 Results

The results for night time attended noise monitoring for noise generated by MPO in June 2019 against noise criteria is shown in **Table 8-1**.

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	06/06/19 23:38	2.2	F	43	No	<30	NA
N-AT2	06/06/19 22:00	2.3	F	36	No	Inaudible	NA
N-AT3	06/06/19 22:53	2.7	F	35	No	<30	NA
N-AT4	06/06/19 23:46	2.4	F	42	No	42	NA
N-AT5	06/06/19 23:19	2.4	F	40	No	<30	NA
N-AT6	06/06/19 22:50	2.5	F	35	No	Inaudible	NA
N-AT7⁵	06/06/19 22:28	2.4	D	40	Yes	<35	Nil

 Table 8-1 – LAeq,15min Generated by MPO Night-Time Monitoring – 6 June 2019

Notes:

- 1. 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 LAeq, 15minute attributed to MPO;
- 3. NA in exceedance column means atmospheric conditions outside those specified in the project approval and so criterion is not applicable; and
- 4. Bold results in red 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 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. Noise levels from MPO complied with noise limits at all monitoring locations during the June 2019 monitoring period.

9. Blast Monitoring

Results for June 2019 are presented in Table 9-1.

Date Fired	Time Fired	Vibratio n BVOA	Overpressure BVOA	Vibration BVOC	Overpressure BVOC	Vibration BVO2	Overpressure BV02
4/1/19	13:28	0.900 mm/s	90.9 DBL	0.280 mm/s	98.9 DBL	0.390 mm/s	99 DBL
9/1/19	15:15	0.730 mm/s	97.4 DBL	0.420 mm/s	92.6 DBL	0.510 mm/s	100.9 DBL
10/1/19	14:30	0.07 mm/s	107.9 DBL	0.03 mm/s	102.9 DBL	0.51 mm/s	99.3 DBL
16/1/19	14:30	2.660 mm/s	100.3 DBL	1.480 mm/s	93 DBL	1.860 mm/s	102.9 DBL
18/1/19	10:15	3.700 mm/s	101.4 DBL	2.480 mm/s	99.2 DBL	0.280 mm/s	85.5 DBL
23/1/19	13:52	0.670 mm/s	99.3 DBL	0.380 mm/s	103.6 DBL	0.880 mm/s	107.9 DBL
01/02/19	13:14	1.350 mm/s	106 DBL	0.970 mm/s	114.9 DBL	1.190 mm/s	105.1 DBL
07/02/19	13:00	0.600 mm/s	97.4 DBL	0.320 mm/s	87.5 DBL	0.630 mm/s	105 DBL
13/02/19	13:01	1.590 mm/s	100.5 DBL	0.550 mm/s	90.9 DBL	1.910 mm/s	103.5 DBL
21/02/19	15:01	0.390 mm/s	105.2 DBL	0.440 mm/s	96.9 DBL	1.020 mm/s	105.8 DBL
28/02/19	15:21	1.270 mm/s	98.1 DBL	0.800 mm/s	97.6 DBL	2.050 mm/s	104.0 DBL
8/03/2019	10:13	0.920 mm/s	101.2 DBL	0.460 mm/s	94.6 DBL	0.580 mm/s	110.2 DBL
15/03/19	13:16	1.240 mm/s	108 DBL	0.760 mm/s	99.2 DBL	1.510 mm/s	111.3 DBL
20/03/19	13:06	1.100 mm/s	99 DBL	0.320 mm/s	95.2 DBL	0.700 mm/s	104.5 DBL
22/03/19	12:48	0.950 mm/s	92.7 DBL	0.650 mm/s	91.4 DBL	0.890 mm/s	101 DBL

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29/03/19 09:36		0.340 mm/s	96.5 DBL	0.140 mm/s	95.5 DBL	0.710 mm/s	106.3 DBL
4/04/2019	13:00	0.320 mm/s	107.6 DBL	0.110 mm/s	104.8 DBL	0.360 mm/s	109 DBL
11/04/2019	13:01	0.460 mm/s	99.6 DBL	0.290 mm/s	99.4 DBL	0.820 mm/s	100.5 DBL
17/04/2019	13:06	0.780 mm/s	96.5 DBL	0.800 mm/s	92.9 DBL	3.820 mm/s	107 DBL
2/5/2019	13:06	0.740 mm/s	101.6 DBL	0.650 mm/s	94.2 DBL	3.070 mm/s	113.4 DBL
3/5/2019	11:05	0.920 mm/s	95.3 DBL	0.950 mm/s	90.9 DBL	2.720 mm/s	106.9 DBL
9/5/2019	13:15	0.910 mm/s	95 DBL	0.730 mm/s	92.6 DBL	1.760 mm/s	103.4 DBL
14/5/2019	13:26	0.360 mm/s	99.3 DBL	0.310 mm/s	101.8 DBL	1.110 mm/s	109.5 DBL
22/5/2019	13:05	0.170 mm/s	97.2 DBL	0.220 mm/s	93.4 DBL	0.380 mm/s	100.3 DBL
23/5/2019	13:02	0.100 mm/s	85.5 DBL	0.050 mm/s	86.8 DBL	0.270 mm/s	93.6 DBL
28/5/2019	09:37	1.170 mm/s	103.2 DBL	0.460 mm/s	103.6 DBL	0.810 mm/s	109.8 DBL
30/5/2019	13:14	0.580 mm/s	101.1 DBL	0.200 mm/s	106.4 DBL	1.070 mm/s	104 DBL
6/06/2019	13:11	0.360 mm/s	99.3 DBL	0.180 mm/s	98.3 DBL	0.630 mm/s	104.8 DBL
13/06/19	13:05	0.630 mm/s	111.1 DBL	0.210 mm/s	111.2 DBL	0.740 mm/s	113.3 DBL
14/06/19	13:09	0.340 mm/s	96.2 DBL	0.160 mm/s	90 DBL	0.680 mm/s	106.1 DBL
21/06/19	13:59	0.830 mm/s	106.3 DBL	0.380 mm/s	102 DBL	1.460 mm/s	117.3 DBL
26/06/19	13:04	0.280 mm/s	99.9 DBL	0.100 mm/s	98.4 DBL	0.300 mm/s	103.1 DBL

Blast results during the June 2019 monitoring period complied with criteria at each monitoring site. Whilst a blast event was measured to be elevated beyond 115 DBL on 21 June 2019, the airblast overpressure was within 120 dB and is expected to fall within the 5% of total blasts over the period of 12 months, in accordance with Table 7 of Condition 10, Schedule 3, DA 92/97.

10. 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. All meteorological data was captured during the June 2019 monitoring period, with the exception of minor data loss on 19 June due to maintenance.