

Monthly Environmental Monitoring Report

January 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 Project Approval 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
Reporting Period Start Date	1 st January 2019
Reporting Period End Date	31 st January 2019
Date Data Received	1 st March 2019

To view MPO EPL 20850 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 a suitability qualified and experienced person. The MPO Environmental Monitoring Network is shown in **Figure 2-1**.



- 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)

MACH Energy
 MOUNT PLEASANT OPERATION
 Air Quality and Meteorological
 Monitoring Sites

Figure 2-1 – MPO Environmental Monitoring Network

3. Dust Depositional Monitoring

Dust deposition was monitored according to the Environment Protection Agency'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).

3.1 Results

The dust deposition exposure period for all gauges commenced on 19 November 2018. Sample collection was undertaken on 17 January 2019 by AECOM with sample analysis performed by SRT NATA accredited laboratory. Results are summarised in **Table 3-1**.

Table 3-1: Dust Depositional Results – January 2019

Location	YTD Insoluble Solids (g/m ² .month)	Insoluble Solids Annual Rolling Average (g/m ² .month)
D1	2.9	1.8
D3	3.6	3.1
D4	1.6	1.9
D5	2.6	2.5
D6	5.9	3.5
D7 ¹	4.9	7.8
D8	4.5	4.0
D9	**	2.0
D10	**	1.5
D11	1.9	2.1
D12	1.4	1.6
D13	3.7	3.0
D14	4.7	4.0
Criterion	-	4
<p><i>Note: Results in bold indicate elevated reading of adopted assessment criteria</i> <i>**Indicates result unavailable due to contaminated depositional dust gauges for YTD</i></p>		

Note 1: Site D7 is located within close proximity to the northern boundary of Bengalla Mine main pit and is heavily influenced by Bengalla Mine operations. This site will continue to be monitored however, will not be used to assess compliance or to represent residential receivers in the area.

Sites D6, D8 and D14 also resulted in elevated readings for January. These sites are also located in close proximity to MPO mining and construction activities as shown in figure 2-1.

Contaminated results are not included in the 12 month rolling average. Year to date insoluble solid results are unavailable at depositional dust gauges D9 and D10 as both dust gauges were deemed contaminated for January 2019. Field notes from the January sampling event noted that all the gauges contained insects.

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 Results – January 2019

Note : Site D7 is located within close proximity to the northern boundary of Bengalla Mine main pit and is heavily influenced by Bengalla Mine operations. This site will continue to be monitored however, will not be used to assess compliance or to represent residential receivers in the area.

Sites D6, D8 and D14 also resulted in elevated readings for January. These sites are also located in close proximity to MPO mining and construction activities as shown in figure 2-1.

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.

Table 4-1 Total suspended Particulate Monitoring Sites

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

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 EPA specifies an annual average criterion of 90 mg/m³.

4.2 Results

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

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

Run Date	Assessment Criterion	TSP µg/m ³		
		HVAS A-PF2	HVAS M-WS4	HVAS A-PF5
2/01/2019	-	91	67	*
8/01/2019	-	84	65	*
14/01/2019	-	71	60	*
20/01/2019	-	50	37	*
26/01/2019	-	110	78	70
Monthly Mean	-	81	61	70
Annual Rolling Average	90	87	46	42

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

*Indicates no sample due to power failure at machine. Make up runs for the four run dates in January will be undertaken in February.

5. Real Time PM₁₀ Monitoring

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

The EPA identification numbers 1 and 2 refer to Palas Fidas units installed on Wybong Road (A-PF2) and Castlerock Road (A-PF5) respectively. In addition, a third unit (A-PF4) is installed on Kayuga Road with data used for management purposes only. The third unit at A-PF4 is currently under maintenance, and has been temporarily replaced by a TEOM unit for the January 2019 monitoring period.

5.1 Results

On 16, 17 and 30 January 2019, monitoring location A-PF2 resulted in elevated readings in line with the EPL condition limit of 50 µg/m³ for the 24 hour rolling average. These high PM₁₀ levels on the mentioned dates were associated with wider regional air quality events and adverse weather conditions (hot and windy) and were not directly related to MPO.

As a result, MPO executed shut down procedures of all dust generating activities on the 16, 25, 26, 27, 30, and 31 January 2019 as a response to the adverse air quality conditions over these days. For example, the total time of machinery shutdown hours for 16 January and 30 January were 16.7 hours and 28.5 hours respectively.

Real time PM₁₀ daily average results and annual rolling averages for January 2019 are presented in **figure 5-1** below.

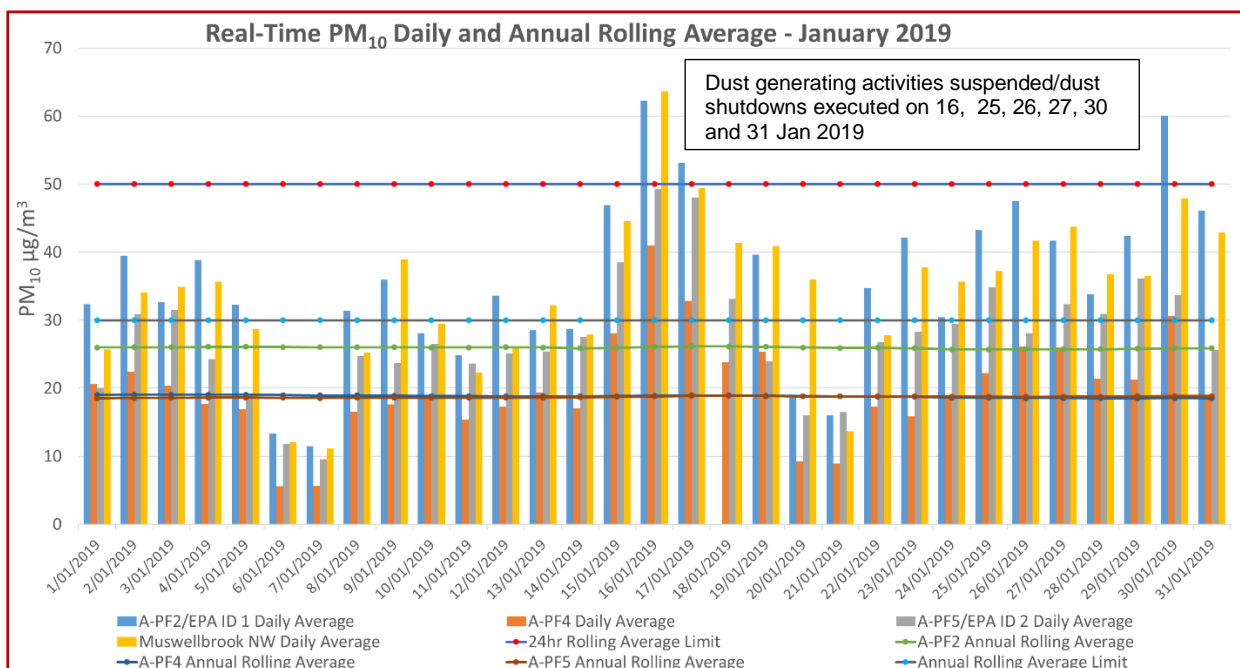


Figure 5-1 Real-time PM₁₀ daily and annual rolling average results for January 2019.

Real time PM₁₀ daily average results for January 2019 are presented in **Table 5- 1**.

Table 5-1: MPO Palas Fidas Data – January 2019

Date	A-PF2/EPA ID 1	A-PF4	A-PF5/EPA ID 2	Muswellbrook NW	24 Hour Average Limit (µg/m ³)
	24 hour Average Result				
1/01/2019	32	21	20	26	50
2/01/2019	39	22	31	34	50
3/01/2019	33	20	32	35	50
4/01/2019	39	18	24	36	50
5/01/2019	32	17	19	29	50
6/01/2019	13	6	12	12	50
7/01/2019	11	6	10	11	50
8/01/2019	31	17	25	25	50
9/01/2019	36	18	24	39	50
10/01/2019	28	19	27	30	50
11/01/2019	25	15	24	22	50
12/01/2019	34	17	25	26	50
13/01/2019	29	19	25	32	50
14/01/2019	29	17	27	28	50
15/01/2019	47	28	39	45	50
16/01/2019	62	41	49	64	50
17/01/2019	53	33	48	49	50
18/01/2019		24	33	41	50
19/01/2019	40	25	24	41	50
20/01/2019	19	9	16	36	50
21/01/2019	16	9	17	14	50
22/01/2019	35	17	27	28	50
23/01/2019	42	16	28	38	50
24/01/2019	30	19	29	36	50
25/01/2019	43	22	35	37	50
26/01/2019	47	26	28	42	50
27/01/2019	42	26	32	44	50
28/01/2019	34	21	31	37	50
29/01/2019	42	21	36	37	50
30/01/2019	60	31	34	48	50
31/01/2019	46	19	26	43	50

*Note: Results in **bold** indicate elevated readings. As a result, MPO executed dust delays/shutdowns of operations and a halt to dust generating activities on the 16, 25, 26, 27, 30, and 31, of January 2019.*

6. Surface Water Monitoring

6.1 Assessment Criteria

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 Results

Monthly surface water monitoring was conducted by AECOM on 30 January 2019. Laboratory analysis was performed by SRT and SGS NATA accredited laboratories. Monthly monitoring results for pH, EC, TSS and TDS are presented in **Table 6-1**.

Five of the thirteen monitoring locations were found to be dry on 30 January 2019. All sites sampled were below or inside the trigger level values during January 2019.

Table 6-1 – MPO Monthly Surface Water Monitoring Results – 30 January 2019

Station	pH	Electrical Conductivity (EC) ($\mu\text{s}/\text{cm}$) ¹	Total Suspended Solids (TSS) (mg/L)	Total Dissolved Solids (TDS) (mg/L)
W1	8.2	370	10	215
W2	8.1	370	4	243
W3	7.9	390	6	236
W4	7.8	1200	9	703
W5	*	*	*	*
W6	8.1	370	5	229
W7	*	*	*	*
W9	*	*	*	*
W11	7.8	7150	6	4250
W12	8.1	5650	52	3430
W13	*	*	*	*
W14	*	*	*	*
W15	7.9	400	18	299

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).

7. Groundwater Monitoring

Groundwater monitoring did not occur during January 2019. The next sampling quarterly monitoring event is scheduled for February 2019.

8. Noise Monitoring

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

8.1 Results

The results for day time and night time attended noise monitoring for noise generated by MPO in January against noise criteria is shown in **Table 8-1** and **Table 8-2** respectively.

Table 8-1 – $L_{Aeq,15min}$ Generated by MPO Day Time Monitoring - January 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	29/01/19 15:45	2.0	B	40	Yes	Inaudible	Nil
N-AT2	29/01/19 16:24	2.2	B	36	Yes	Inaudible	Nil
N-AT3	29/01/19 17:25	2.1	C	35	Yes	Inaudible	Nil
N-AT4	30/01/19 10:35	3.0	A	43	Yes	Inaudible	Nil
N-AT5	30/01/19 10:12	4.4	C	40	No	Inaudible	N/A
N-AT6	29/01/19 15:17	1.5	A	35	Yes	Inaudible	Nil
N-AT7	29/01/2019 16:55	2.7	D	40	Yes	Inaudible	Nil

Notes:

1. Noise emission limits do not apply during wind speeds greater than 3m/s at 10 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 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.

Table 8-1 – $L_{Aeq, 15min}$ Generated by MPO Night Time Monitoring - January 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	30/01/19 00:24	2.2	D	40	Yes	Inaudible	Nil
N-AT2	29/01/19 23:43	2.3	E	36	Yes	Inaudible	Nil
N-AT3	29/01/19 23:13	2.2	D	35	Yes	Inaudible	Nil
N-AT4	29/01/19 22:22	2.5	D	42	Yes	Inaudible	Nil
N-AT5	29/01/19 22:00	2.4	D	40	Yes	Inaudible	Nil
N-AT6	30/01/19 00:51	2.5	D	35	Yes	Non Measurable	Nil
N-AT7	29/01/19 22:48	2.2	D	40	Yes	Inaudible	Nil

Notes:

5. *Noise emission limits do not apply during wind speeds greater than 3m/s at 10 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;*
6. *Estimated or measured $L_{Aeq, 15minute}$ attributed to MPO;*
7. *NA in exceedance column means atmospheric conditions outside those specified in the project approval and so criterion is not applicable; and*
8. *Bold results in red indicate exceedance of criteria.*

The noise survey purpose is to quantify and describe the existing acoustic environment around the mine project and compare results with relevant limits.

Noise levels from MPO complied with noise limits at all monitoring locations during the January 2019 monitoring period.

9. Blast Monitoring

Results for January 2019 are presented in **Table 9-1**.

Table 9-1 – MPO Blast Monitoring Results – January 2019

Date Fired	Time Fired	Vibration BVOA	Overpressure BVOA	Vibration BVOC	Overpressure BVOC	Vibration BVO2	Overpressure BV02	Wind Direction	Wind Speed
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	79 deg	3.8 m/s
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	114 deg	3 m/s
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	154 deg	1.2 m/s
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	116 deg	0.7 m/s
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	142 deg	3 m/s
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	259 deg	2.6 m/s

Blast results complied with all criteria at each monitoring site.

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 data was captured during January 2019.