

Mount Pleasant Operation Monthly Environmental Monitoring Report

October 2020

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 October 2020
Reporting Period End Date	31 October 2020
Date All Data Received	27 November 2020

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 Air Quality Monitoring 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 suitably qualified and experienced person(s).

The MPO Environmental Monitoring Network is shown in the following figures:

- **Figure 2-1** shows MPO attended noise monitoring assessment groups and monitoring locations;
- **Figure 2-2** shows the MPO Air Quality Monitoring network;
- **Figure 2-3** shows the MPO Blast Monitoring Locations;
- **Figure 2-4** shows the MPO Groundwater Monitoring network; and
- **Figure 2-5** shows the MPO Surface Water Monitoring network.

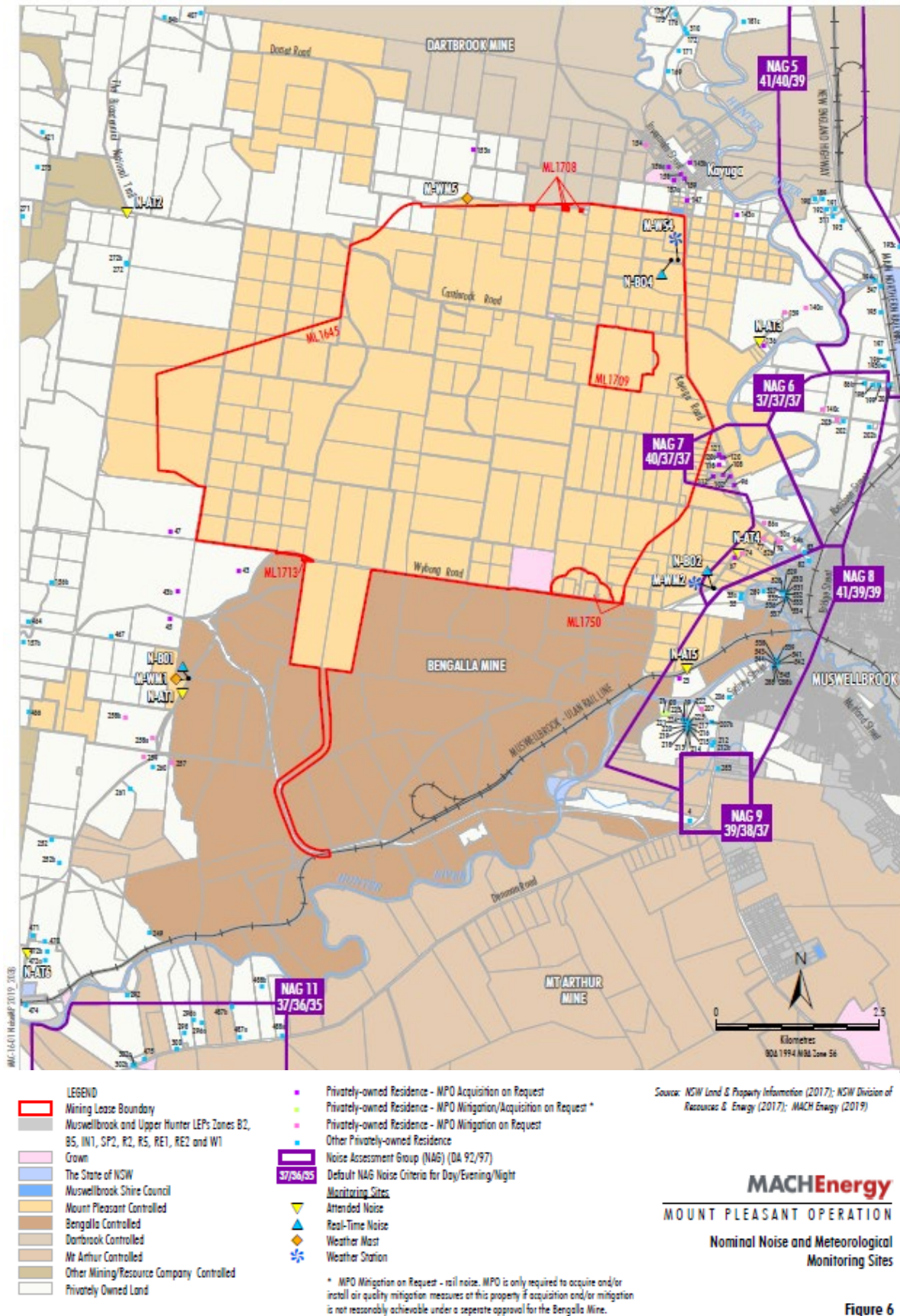


Figure 6

Figure 2-1 – MPO Attended Noise Monitoring Assessment Groups and Locations



Figure 5

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



Figure 2

MACHEnergy
MOUNT PLEASANT OPERATION
Augmentations to the
Groundwater Monitoring Network

Figure 2-4 – MPO Groundwater Monitoring Network

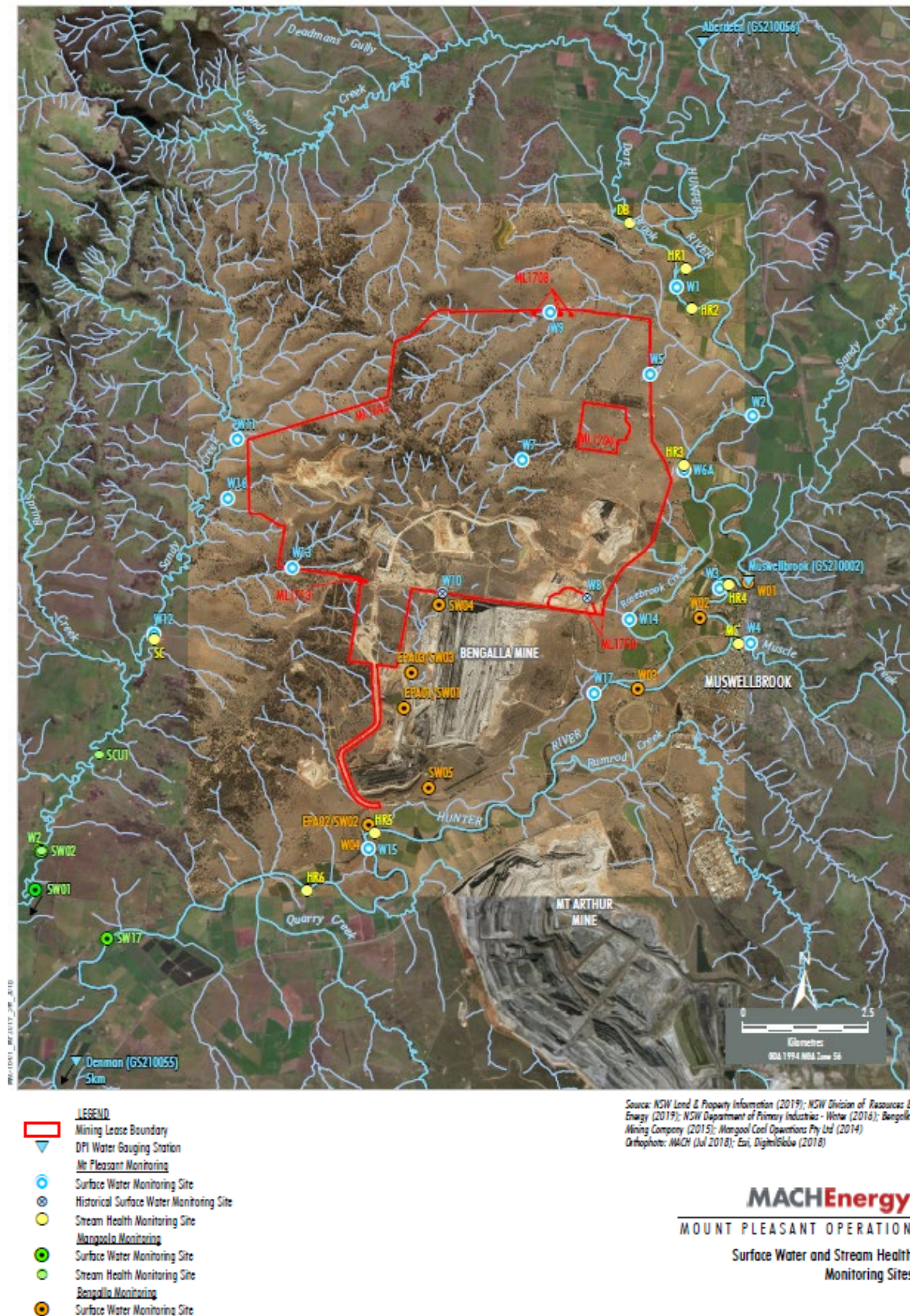


Figure 3

Figure 2-5 – MPO Surface Water Monitoring Network

3. Meteorological Monitoring

Weather data is measured continuously at the Kayuga Road (M-WS4) and the Wybong Road (M-WS2) meteorological stations. In addition to air quality parameters, the weather stations measure 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 at M-WS2 (>97.0%) during the October 2020 monitoring period, with the exception of solar radiation (91.0%). The majority of meteorological data was captured at M-WS4 (>96.5%) during the October 2020 monitoring period with the exception of particulate matter (PM_{2.5} and PM₁₀) (88.9%).

Throughout October 2020, there was 96.4 and 94.8mm of rainfall recorded at M-WS2 and M-WS4, respectively.

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 18 September 2020. Sample collection was undertaken on 19 and 20 October 2020 by AECOM with sample analysis performed by SRT, a NATA accredited laboratory. Results are summarised in **Table 4-1**. Annual rolling averages for October 2020 have been provided as an indication of performance between October 2019 – October 2020 and does not represent annual average results for 2020 as per Schedule 3, Condition 20 of DA 92/97.

Table 4-1: Dust Depositional Results – October 2020

Location	YTD Insoluble Solids (g/m ² .month)	Insoluble Solids Annual Rolling Average (g/m ² .month)
D1	2.7	2.9
D3a	2.4	***
D4	2.7	2.8
D5	3.1	3.3
D6^	3.4	4.2
D7a ¹	6.3	5.9
D8	4.8	4.7
D9	2.0	***
D10	1.6	1.7
D11	3.4	3.6
D12	2.3	2.3
D13	4.2	4.3
D14	3.2	3.2
Criterion	-	4
<p><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> <i>*** annual rolling average not available as new site location</i></p>		

Note 1: Site D7a 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.

* No data due to dust gauge removed during construction activities

^ Elevated results due to earthworks in the vicinity of D6 commencing 13 January 2020 which are not subject to DA 92/97 or EPL 20850.

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 D6 (4.2 g/m².month); D7a (5.9 g/m².month); D8 (4.7 g/m².month); and D13 (4.3 g/m².month).

Site D7a is located within close proximity to the northern boundary of a neighbouring mining operation and thus can be influenced by this site. D7a 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 and D14. Whilst these sites do not represent residence(s) on privately-owned land, they will continue to be monitored

in accordance with the MPO Air Quality and Greenhouse Gas Management Plan (MACH Energy, 2019).

Field notes from the October 2020 sampling event noted that all the gauges contained insects. The results of D3a and D9 were determined to be contaminated due to impact from localised construction work in the immediate vicinity of the gauge and the result was subsequently not included in the annual rolling average.

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

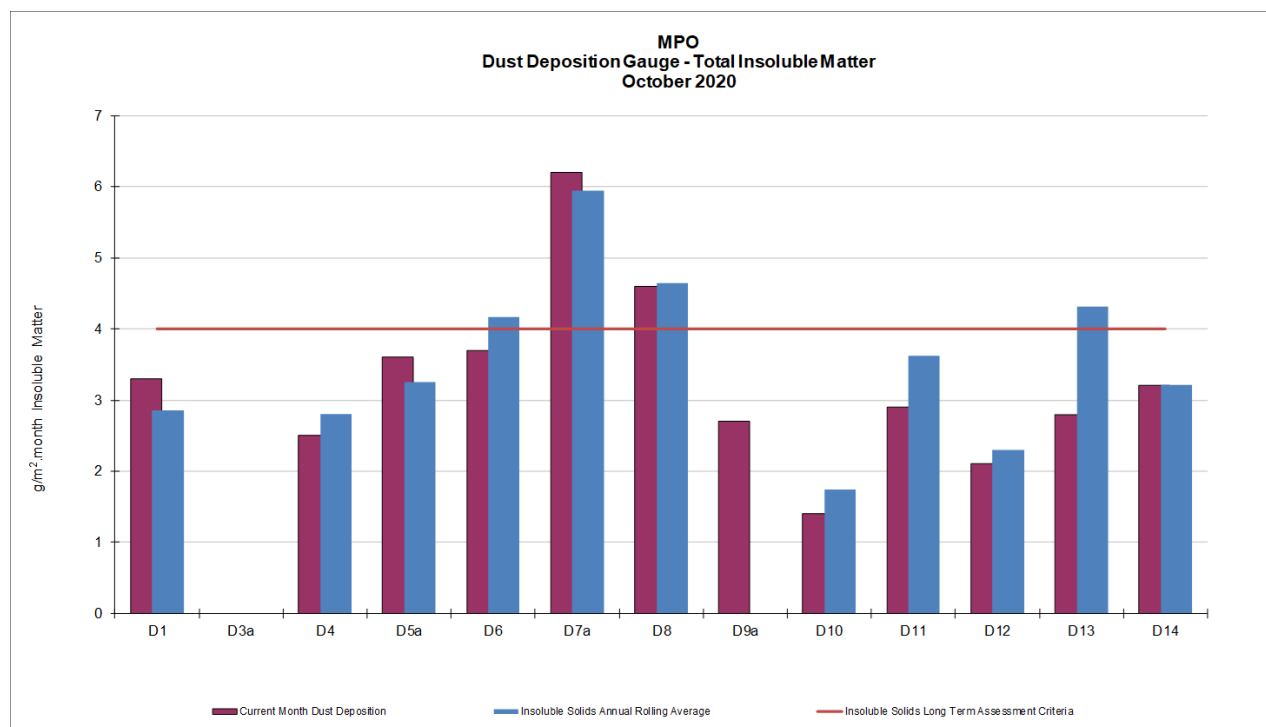


Figure 4-1: MPO Dust Deposition Monthly Results and Annual Rolling Average – October 2020

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 5-1** 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 project contribution plus background criterion of 90 µg/m³.

5.2 Results

In October 2020 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 5-2**. Annual rolling averages for October 2020 have been provided as an indication of performance between October 2019 – October 2020 and do not represent annual average results for 2020 as per Schedule 3, Condition 20 of DA 92/97.

Table 5-2 Total Suspended Particulate Monitoring Data – October 2020

Run Date	Assessment Criterion	TSP µg/m ³		
		HVAS A-PF2	HVAS M-WS4	HVAS A-PF5
5/10/2020	-	51	29	24
11/10/2020	-	59	37	25
17/10/2020	-	131	51	58
23/10/2020	-	51	46	33
29/10/2020	-	28	28	24
Monthly Mean	-	64	38	33
Annual Rolling Average	90	74	49	53

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 October 2020.

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} 12-month rolling averages for October 2020 have been provided in Section 6.2 and 6.4 respectively, as an indication of performance between October 2019 – October 2020 and do not represent annual average results for 2020 as per Schedule 3, Condition 20 of DA 92/97.

6.1 PM₁₀ Results – 24 hour rolling average

There were no elevated PM₁₀ measurements reported at MPO throughout October 2020. The Muswellbrook NW monitor was operational during all days of October 2020. Real time PM₁₀ 24 hour rolling average results for October 2020 are presented in **Table 6-1**.

Table 6-1: MPO Palas Fidas PM₁₀ Data – October 2020

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					
1/10/2020	21	9	7	23	44	50
2/10/2020	20	12	7	28	44	50
3/10/2020	16	12	9	20	44	50
4/10/2020	20	13	9	25	44	50
5/10/2020	18	14	9	21	44	50
6/10/2020	19	17	11	24	44	50
7/10/2020	18	18	11	20	44	50
8/10/2020	-	19	12	32	44	50
9/10/2020	-	7	6	18	44	50
10/10/2020	16	11	6	18	44	50
11/10/2020	17	11	7	18	44	50
12/10/2020	25	31	13	27	44	50
13/10/2020	26	33	16	31	44	50
14/10/2020	26	22	14	36	44	50
15/10/2020	25	18	9	25	44	50
16/10/2020	41	19	13	44	44	50
17/10/2020	32	17	12	36	44	50
18/10/2020	14	-	6	14	44	50
19/10/2020	16	-	9	18	44	50
20/10/2020	20	-	12	20	44	50
21/10/2020	21	-	16	22	44	50
22/10/2020	15	10	8	16	44	50
23/10/2020	17	14	14	21	44	50

24/10/2020	11	9	7	9	44	50
25/10/2020	10	7	7	6	44	50
26/10/2020	7	5	6	5	44	50
27/10/2020	9	7	7	8	44	50
28/10/2020	10	9	7	10	44	50
29/10/2020	12	12	10	11	44	50
30/10/2020	12	11	9	15	44	50
31/10/2020	19	11	8	20	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 October 2020.

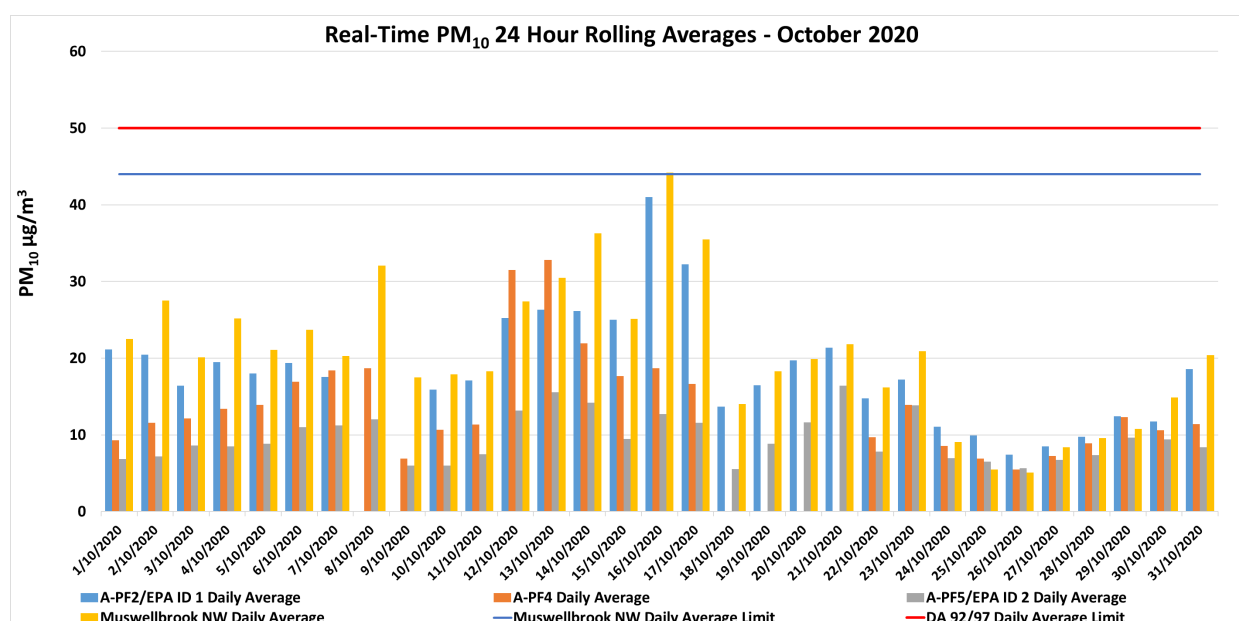


Figure 6-1: Real-time PM₁₀ 24 hour rolling average results for October 2020.

6.2 PM₁₀ Results – Annual rolling average

There were no elevated PM₁₀ measurements reported at MPO for the October 2020 annual rolling average. Real time PM₁₀ annual rolling averages for October 2020 are presented in **Figure 6-2** below.

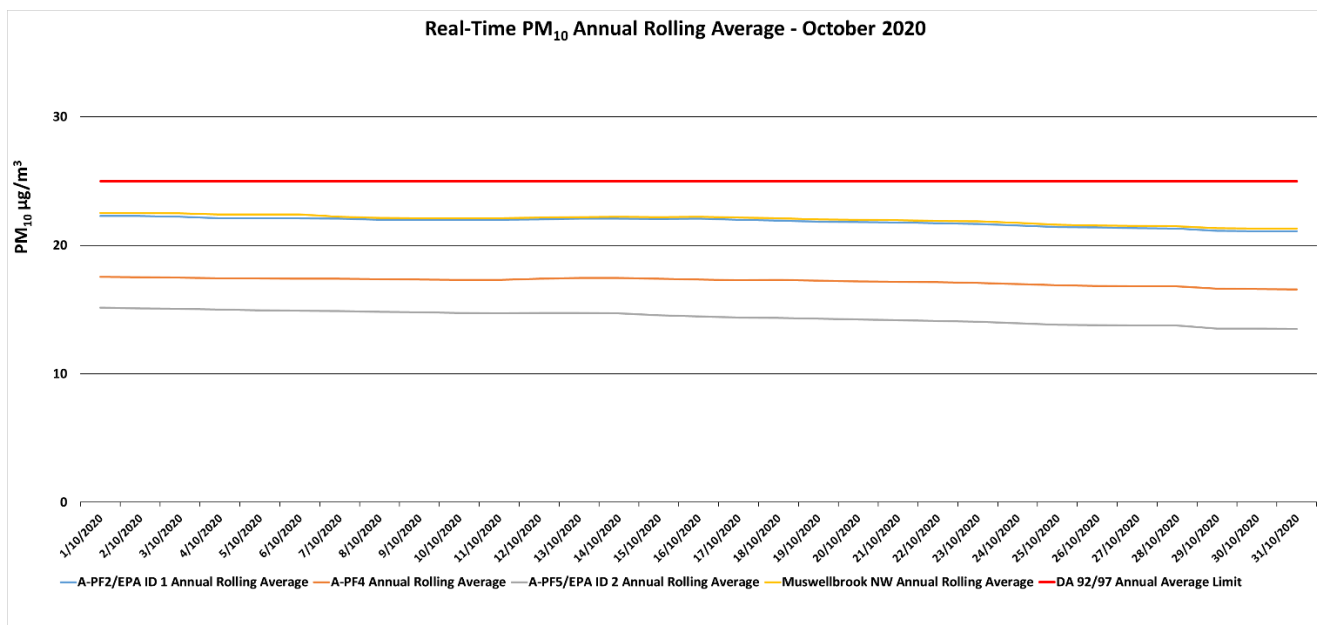


Figure 6-2: Real-time PM₁₀ Annual Rolling average results for October 2020.

6.3 PM_{2.5} Results – 24 hour rolling average

There were no elevated PM_{2.5} measurements reported throughout October 2020. Real time PM_{2.5} 24 hour rolling average results for October 2020 are presented in **Table 6-2**.

Table 6-2: MPO Palas Fidas PM_{2.5} Data – October 2020

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			
1/10/2020	6	4	3	25
2/10/2020	5	4	3	25
3/10/2020	6	5	4	25
4/10/2020	7	6	4	25
5/10/2020	6	6	4	25
6/10/2020	8	8	5	25
7/10/2020	8	9	6	25
8/10/2020	-	8	5	25
9/10/2020	-	3	2	25
10/10/2020	4	3	3	25
11/10/2020	4	3	3	25
12/10/2020	6	7	5	25
13/10/2020	6	7	5	25
14/10/2020	9	9	6	25
15/10/2020	9	7	4	25
16/10/2020	8	6	4	25
17/10/2020	7	6	5	25
18/10/2020	4	-	3	25
19/10/2020	5	-	4	25

20/10/2020	6	-	4	25
21/10/2020	6	-	5	25
22/10/2020	4	4	3	25
23/10/2020	5	5	4	25
24/10/2020	5	4	3	25
25/10/2020	4	3	3	25
26/10/2020	4	3	3	25
27/10/2020	4	3	3	25
28/10/2020	4	4	4	25
29/10/2020	5	6	4	25
30/10/2020	5	4	4	25
31/10/2020	5	4	3	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 October 2020 are presented in **Figure 6-3** below.

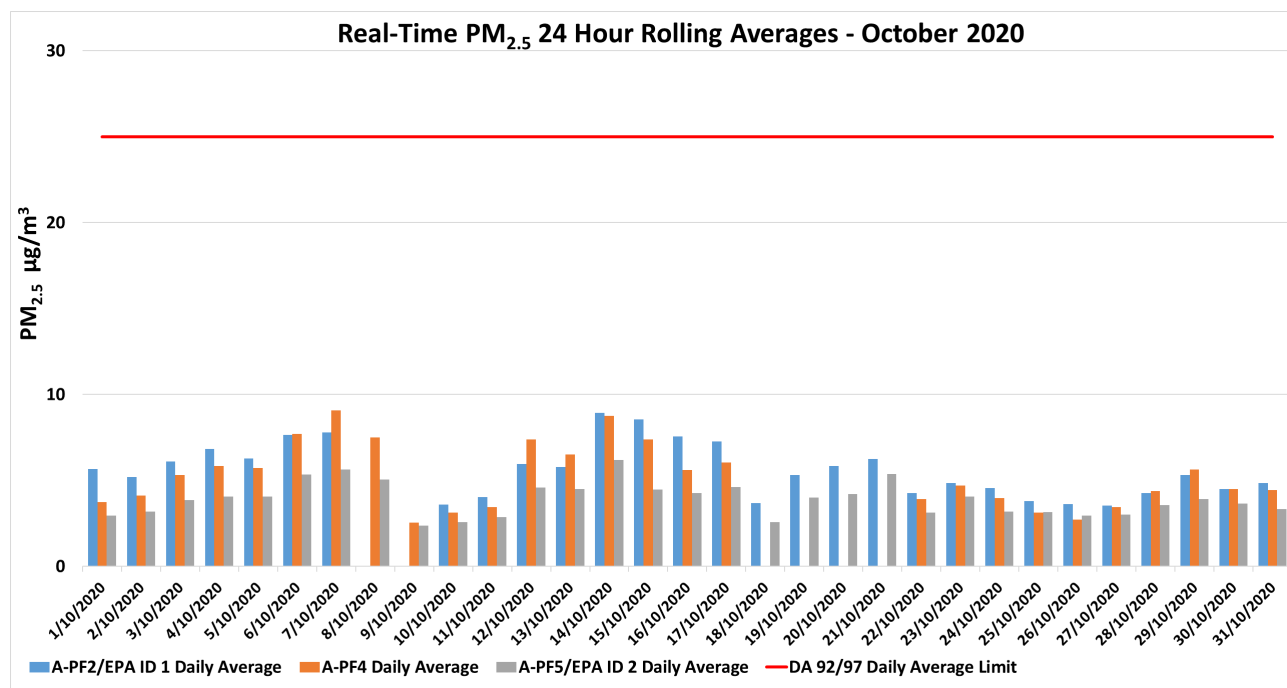


Figure 6-3: Real-time PM_{2.5} 24 hour rolling average results for October 2020.

6.4 PM_{2.5} Results - Annual rolling average

The requirement of the annual rolling average of PM_{2.5} data was incepted during MOD 3 of DA 92/97, dated 24 August 2018. Elevated readings have been measured for the annual rolling average of PM_{2.5} data collected during October 2020. Wider regional air quality events, including dust storms and bushfires in late 2019, have contributed to elevated rolling PM_{2.5} average levels.

Real time PM_{2.5} annual rolling averages for October 2020 are presented in **Figure 6-4** below.

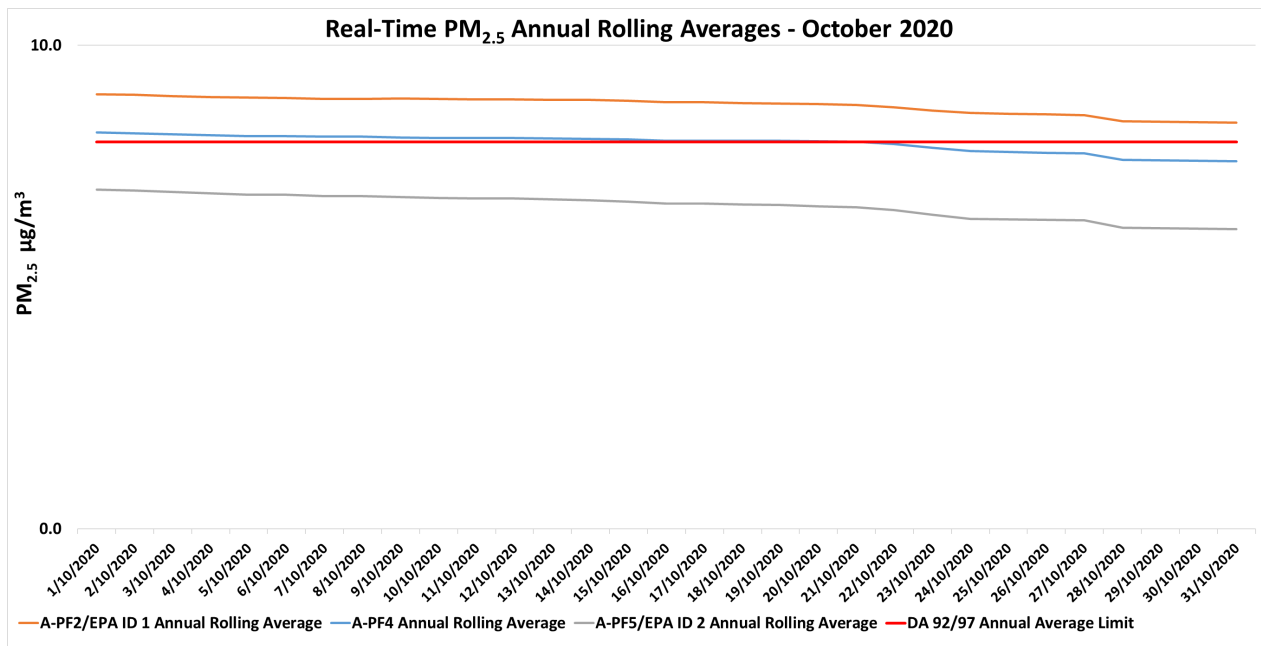


Figure 6-4: Real-time PM_{2.5} Annual Rolling average results for October 2020.

7. Surface Water Monitoring

7.1 Methodology

Surface water quality is monitored at 15 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 as per the MPO Water Management Plan (MACH Energy, 2019) 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 25 October 2020. Laboratory analysis was performed by SRT; SGS; and ALS, all of which are 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 – 25 October 2020

Station	pH	Electrical Conductivity (EC) (µs/cm) ¹	Total Suspended Solids (TSS) (mg/L)	Total Dissolved Solids (TDS) (mg/L)
W1	^	^	^	^
W2	^	^	^	^
W3	7.7	430	23	249
W4	7.5	690	18	404
W5	*	*	*	*
W6A	7.9	880	51	533
W7	*	*	*	*
W9	*	*	*	*
W11	^	^	^	^
W12	7.7	4100	6	2530
W13	*	*	*	*
W14	*	*	*	*
W15	7.8	540	30	344
W16	7.4	170	462	130**
W17	^	^	^	^

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

*Dry or insufficient water to sample.

** TDS result calculated due to high TSS containing colloidal clay particles which have interfered with the Laboratory TDS result.

^ 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).

*** Calculated result due to interference from colloidal material interfering with laboratory result.

Nine of the fifteen monitoring locations were found to be dry or were not safely accessible on 25 October 2020. All sites sampled were below or inside the trigger level values with the exception of W6A. An investigation into the elevated measurement will be triggered if this occurs for three consecutive sampling events in accordance MPO Water Management Plan (MACH Energy, 2019).

8. Groundwater Monitoring

Quarterly groundwater monitoring was not undertaken during October 2020. The next scheduled monitoring event is in November 2020.

9. Noise Monitoring

Attended noise monitoring was undertaken during the night period of 7 October 2020 at 6 monitoring locations as per the MPO Noise Management Plan (MACH Energy, 2019) 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 October 2020 against noise criteria is shown in **Table 9-1**; **Table 9-2**; and **Table 9-3**.

Table 9-1 – $L_{A1,1min}$ Generated by MPO: Attended Night Monitoring – 7 October 2020

Location	Start Date and Time	Wind Speed m/s	Stability Class	Criterion dB	Criterion Applies ¹	MPO Only $L_{A1,1min}$ dB ^{2,4}	Exceedance dB ^{3,4}
N-AT1	07/10/20 23:24	2.2	D	45	Yes	IA	Nil
N-AT2	07/10/20 22:06	2.0	F	45	Yes	28	Nil
N-AT3	07/10/20 23:09	2.0	D	45	Yes	32	Nil
N-AT4	07/10/20 23:39	1.8	D	45	Yes	IA	Nil
N-AT5	08/10/20 00:06	1.5	F	45	Yes	IA	Nil
N-AT6	07/10/20 22:39	1.5	E	45	Yes	IA	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 $L_{A1,1minute}$ 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; and
4. Bold results indicate exceedance of criteria.

Table 9-2 – $L_{Aeq,15min}$ Generated by MPO: Attended Night Monitoring – 7 October 2020

Location	Start Date and Time	Wind Speed m/s	Stability Class	Criterion dB	Criterion Applies ¹	MPO Only L_{Aeq} dB ^{2,4}	Exceedance dB ^{3,4}
N-AT1	07/10/20 23:24	2.2	D	43	Yes	IA	Nil
N-AT2	07/10/20 22:06	2.0	F	36	Yes	<25	Nil
N-AT3	07/10/20 23:09	2.0	D	41	Yes	<30	Nil
N-AT4	07/10/20 23:39	1.8	D	42	Yes	IA	Nil
N-AT5	08/10/20 00:06	1.5	F	40	Yes	IA	Nil
N-AT6	07/10/20 22:39	1.5	E	35	Yes	IA	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; and
4. Bold results indicate exceedance of criteria.

Table 9-3 – $L_{Aeq,period}$ Cumulative Noise: Attended Night Monitoring – 7 October 2020

Location	Start Date and Time	Cumulative Noise Criterion L_{Aeq} dB	Measured Mining Only $L_{Aeq,period}$ dB ^{1,2}	Exceedance dB
N-AT1	07/10/20 23:24	40	Nil	Nil
N-AT2	07/10/20 22:06	40	Nil	Nil
N-AT3	07/10/20 23:09	40	Nil	Nil
N-AT4	07/10/20 23:39	40	Nil	Nil
N-AT5	08/10/20 00:06	40	Nil	Nil
N-AT6	07/10/20 22:39	40	Nil	Nil

Notes:

1. These are the results for MPO and all other mining sources. 15-minute measurements have been assumed to apply across the entire night period as a conservative measure and to represent “worst case” results; and
2. By definition, cumulative noise refers to two or more noise sources. If only one other source of mining is audible, or if MPO is inaudible, the measured cumulative noise defined here is ‘Nil’.

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

MPO Noise Management Plan (MACH Energy, 2019). Noise levels from MPO complied with noise limits at all monitoring locations during the October 2020 monitoring period.

10. Blast Monitoring

There were 6 blast events during October (a total of 60 blasts YTD). Results for October 2020 are presented in **Table 10-1**. All blast results during the October 2020 monitoring period were below the criteria in Schedule 3, Condition 10 of DA 92/97 and EPL 20850 and thus the MPO remains compliant in 2020 YTD.

Table 10-1 – MPO Blast Monitoring Results – October 2020

Day & Date Fired	Time Fired	Vibration (mm/s) BVOA	Overpressure (dBL) BVOA	Vibration (mm/s) BVOC	Overpressure (dBL) BVOC	Vibration (mm/s) BVO2	Overpressure (dBL) BVO2	Blast Fume Compliant
Thursday 1/10/2020	13:09	2.00	104.1	1.10	107.6	1.59	104.6	Y
Friday 9/10/2020	13:33	0.510	99.9	0.430	94.3	0.790	109.4	Y
Tuesday 20/10/2020	13:58	0.350	104.7	0.350	104.7	0.820	98.3	Y
Thursday 22/10/2020	13:04	0.240	105.6	0.150	94	0.200	99	Y
Wednesday 28/10/2020	12:36	0.880	101.9	0.360	99.4	0.630	103.6	Y
Friday 30/10/2020	12:19	0.850	95.3	0.290	88.2	0.710	96.9	Y