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Date:
15 October 2020

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Ref: (12/4/12L-W4/A4)

Dear Mrs Thivhafuni

MATIMBA POWER STATION'S MONTHLY EMISSIONS REPORT FOR THE MONTH OF AUGUST 2020

This serves as the monthly report required in terms of Section 7.7.1 in Matimba Power Station's Atmospheric Emission License 12/4/12L-W4/A4.



Raw Materials and Products

Table 1: Quantity of Raw Materials and Products used/produced for the month.

Raw Materials and Products used	Raw Material Type	Unit	Maximum Permitted Consumption Rate (Quantity)	Consumption Rate
	Coal	Tons/month	1 500 000	1195092
	Fuel Oil	Tons/month	1 200	541.067
Production Rates	Product/ By-Product Name	Unit	Maximum Production Capacity Permitted (Quantity)	Production Rate
	Energy	GWh	4 212.6	2 249.976

Abatement Technology

Table 2: Abatement Equipment Control Technology utilise.

Associated Unit	Technology Type	Actual Utilisation (%)
Unit 1	Electrostatic Precipitator	99.967%
Unit 2	Electrostatic Precipitator	99.956%
Unit 3	Electrostatic Precipitator	99.932%
Unit 4	Electrostatic Precipitator	99.937%
Unit 5	Electrostatic Precipitator	99.969%
Unit 6	Electrostatic Precipitator	99.922%

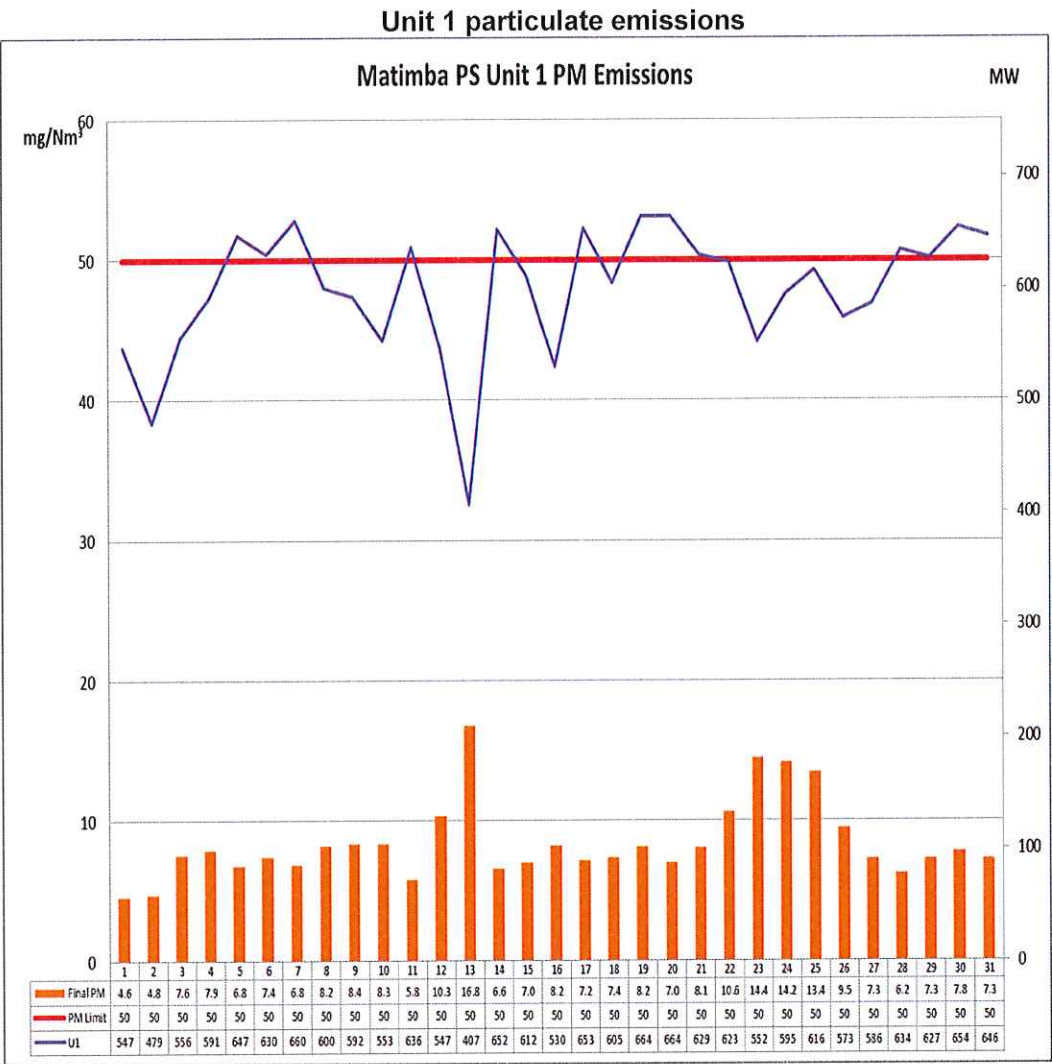
Associated Unit	Technology Type	Actual Utilisation (%)
Unit 1	SO ₃ Plant	97
Unit 2	SO ₃ Plant	96
Unit 3	SO ₃ Plant	97
Unit 4	SO ₃ Plant	87
Unit 5	SO ₃ Plant	84
Unit 6	SO ₃ Plant	85

Energy Source Characteristics

Table 3: Energy Source Material Characteristics.

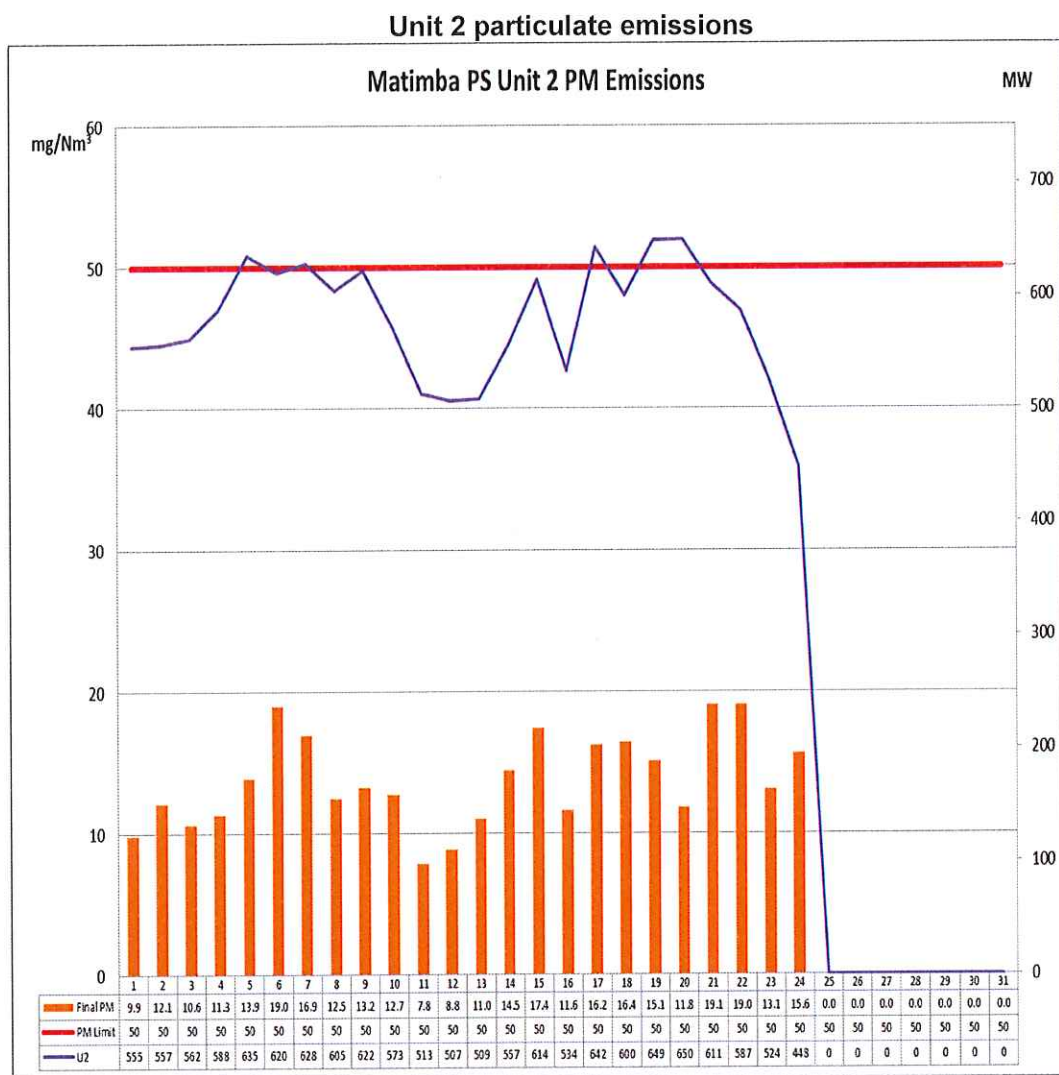
	Characteristic	Stipulated Range (Unit)	Monthly Average Content
Coal burned	Sulphur Content	0.8-1.6%	1.25
	Ash Content	30-40%	32.17

Emissions Reporting



Graph 1: Particulate matter daily average emissions against emission limit for unit 1 for the month of August 2020

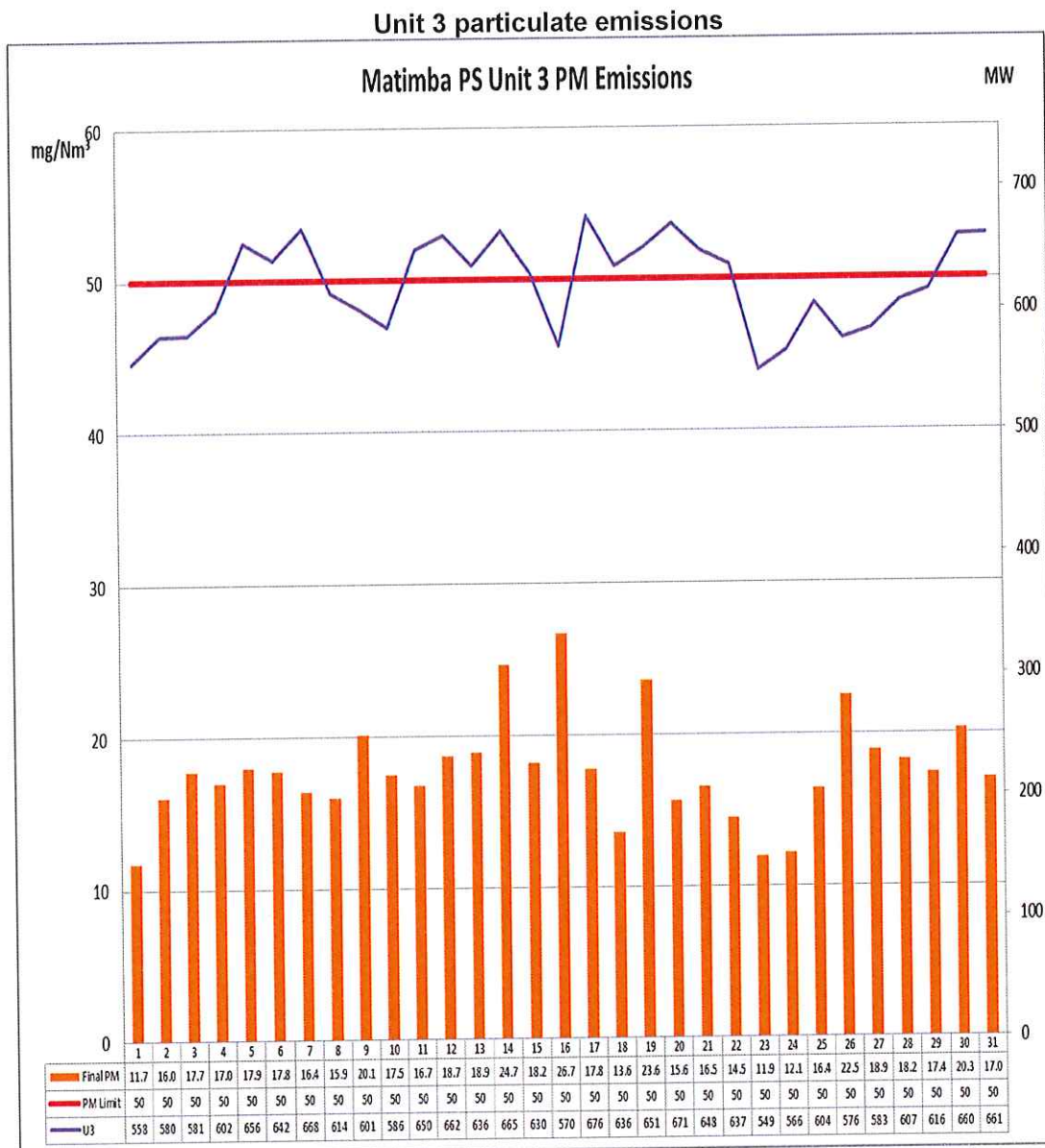
Interpretation:
All daily averages below particulate emission limit of 50 mg/Nm³.



Graph 2: Particulate matter daily average emissions against emission limit for unit 2 for the month of August 2020

Interpretation:

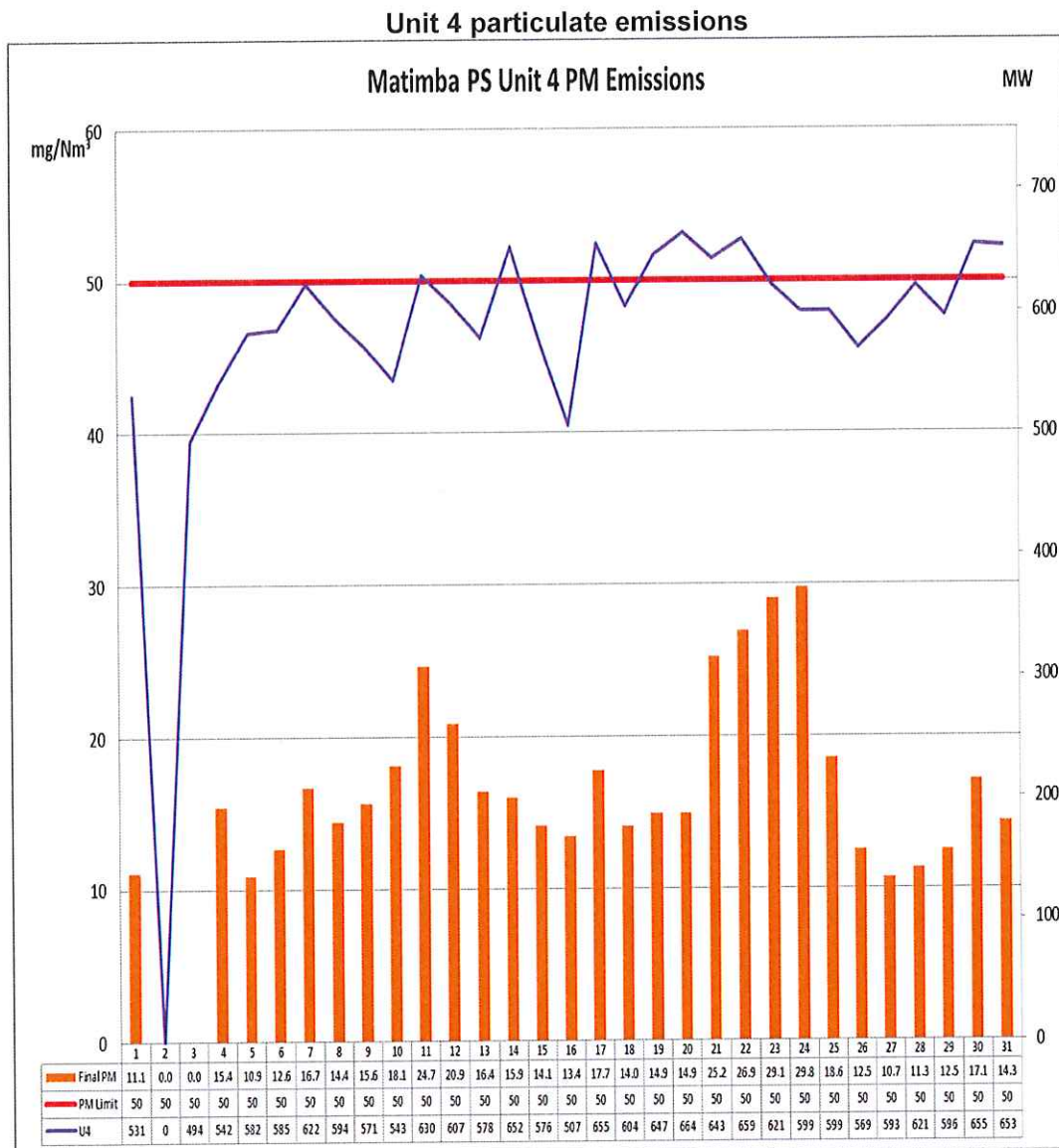
All daily averages below particulate emission limit of 50 mg/Nm³.



Graph 3: Particulate matter daily average emissions against emission limit for unit 3 for the month of August 2020

Interpretation:

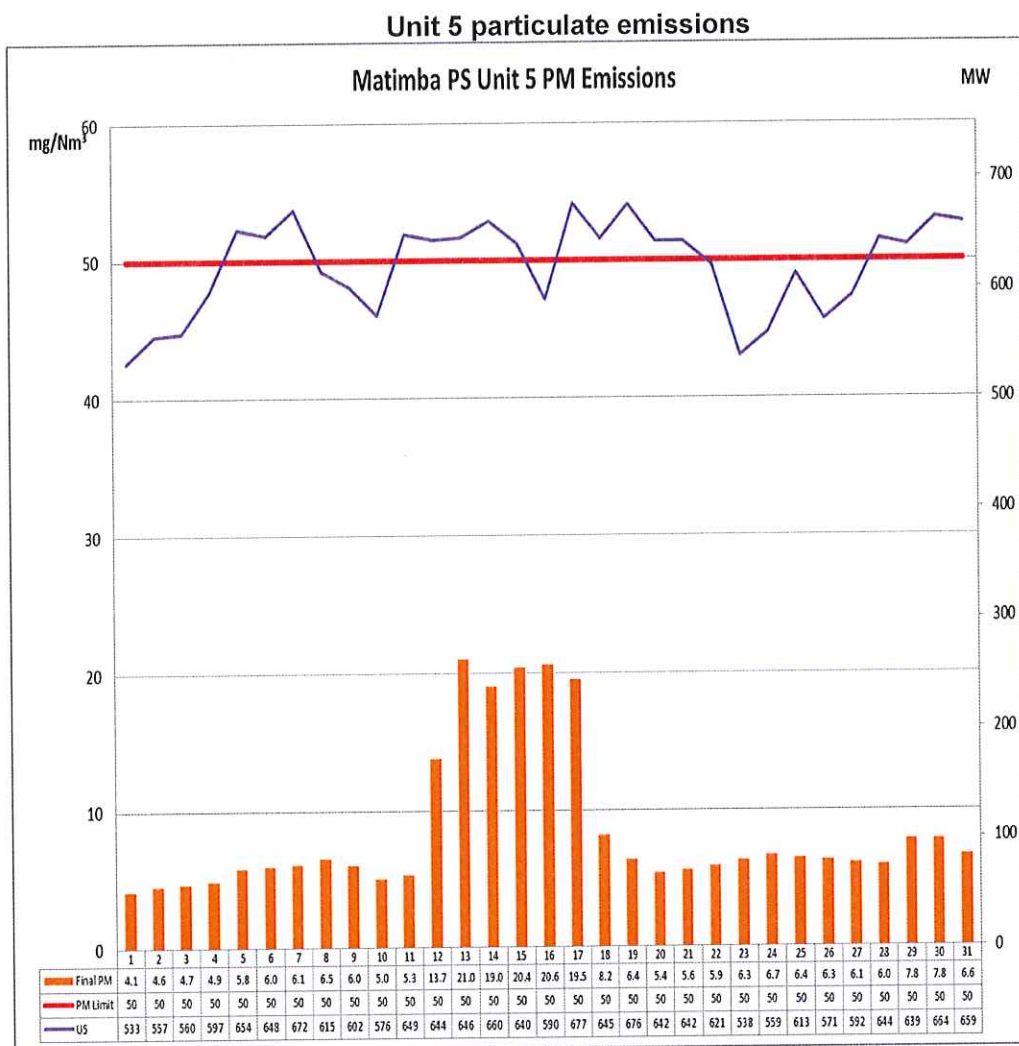
All daily averages below particulate emission limit of 50 mg/Nm³.



Graph 4: Particulate matter daily average emissions against emission limit for unit 4 for the month of August 2020

Interpretation:

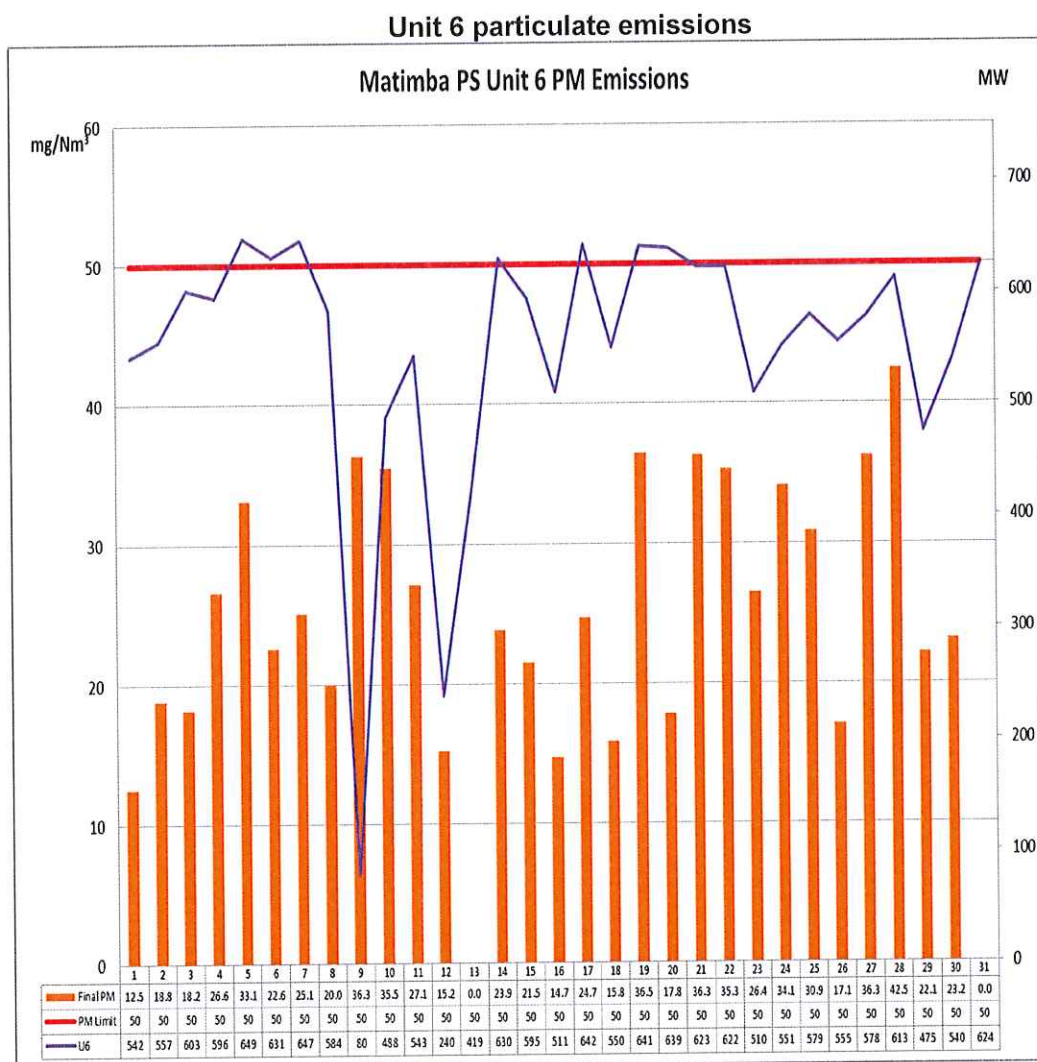
All daily averages below particulate emission limit of 50 mg/Nm³.



Graph 5: Particulate matter daily average emissions against emission limit for unit 5 for the month of August 2020

Interpretation:

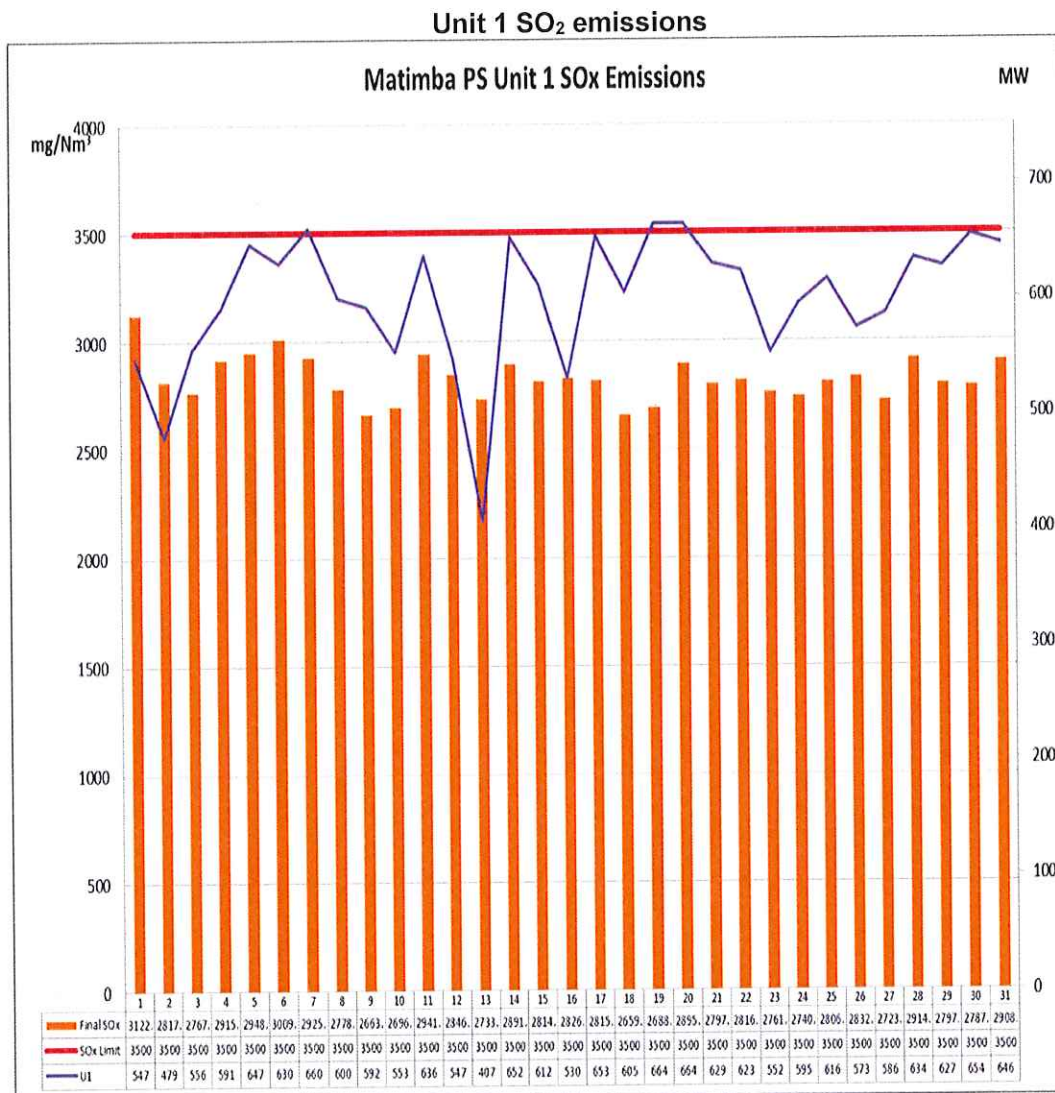
All daily averages below particulate emission limit of 50 mg/Nm³.



Graph 6: Particulate matter daily average emissions against emission limit for unit 6 for the month of August 2020

Interpretation:

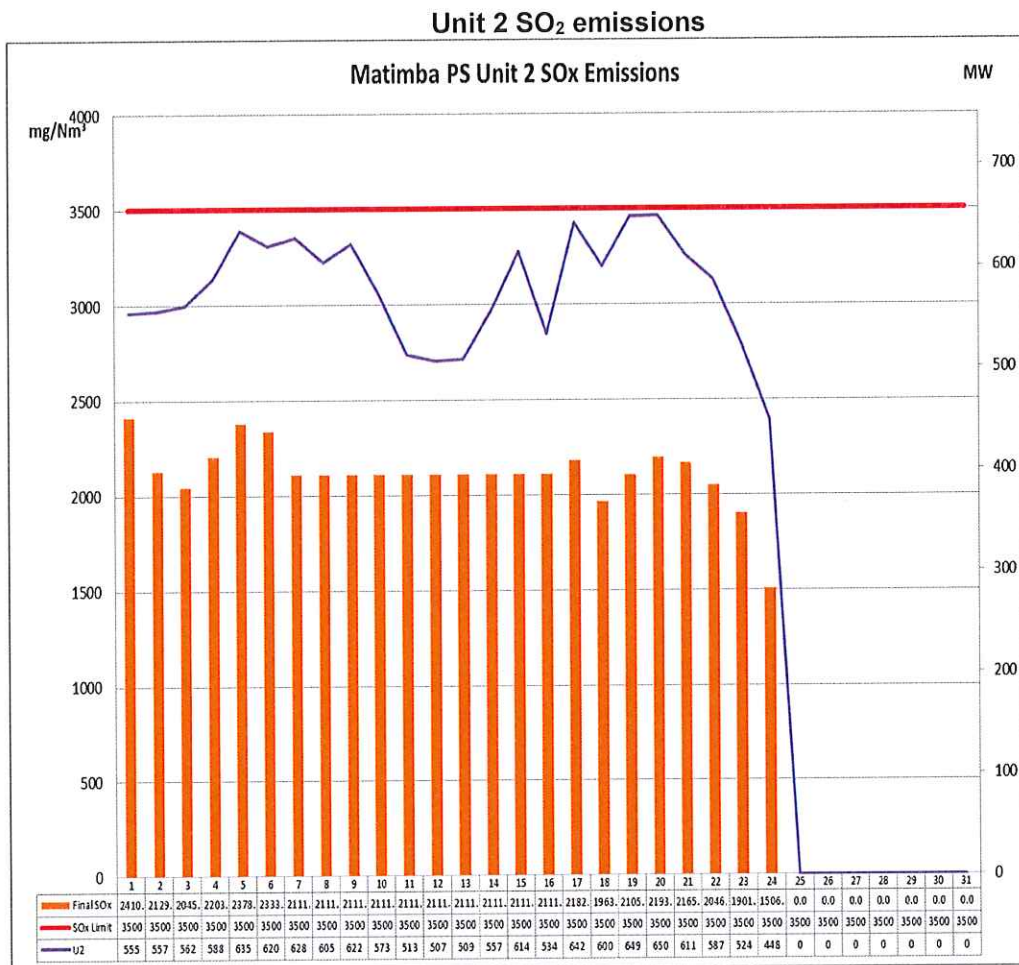
All daily averages below particulate emission limit of 50 mg/Nm³.



Graph 7: SO₂ daily average emissions against emission limit for unit 1 for the month of August 2020

Interpretation:

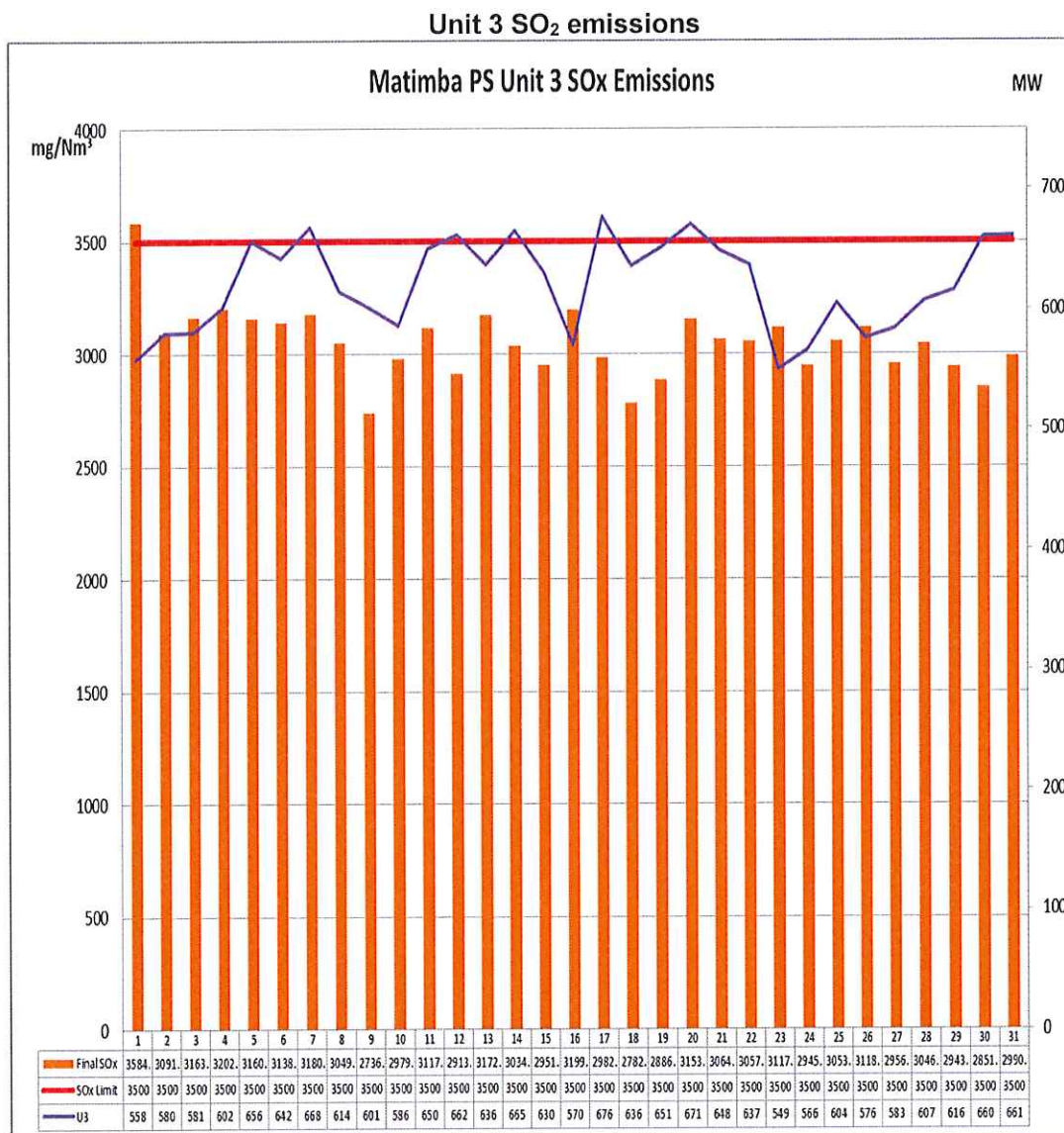
All daily averages below SO₂ emission limit of 3500 mg/Nm³.



Graph 8: SO₂ daily average emissions against emission limit for unit 2 for the month of August 2020

Interpretation:

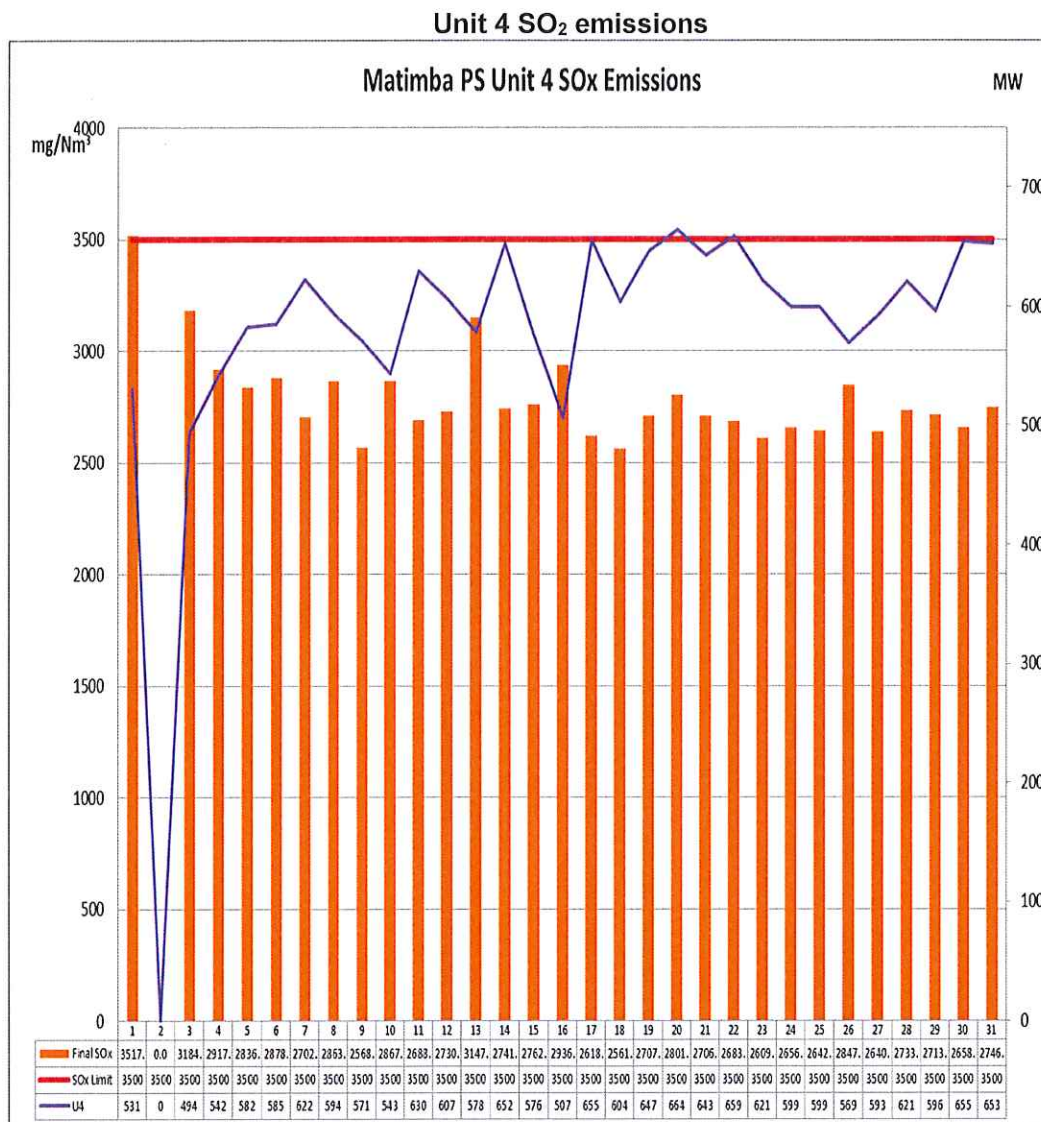
Monthly average below SO₂ emission limit of 3500 mg/Nm³.



Graph 9: SO₂ daily average emissions against emission limit for unit 3 for the month of August 2020

Interpretation:

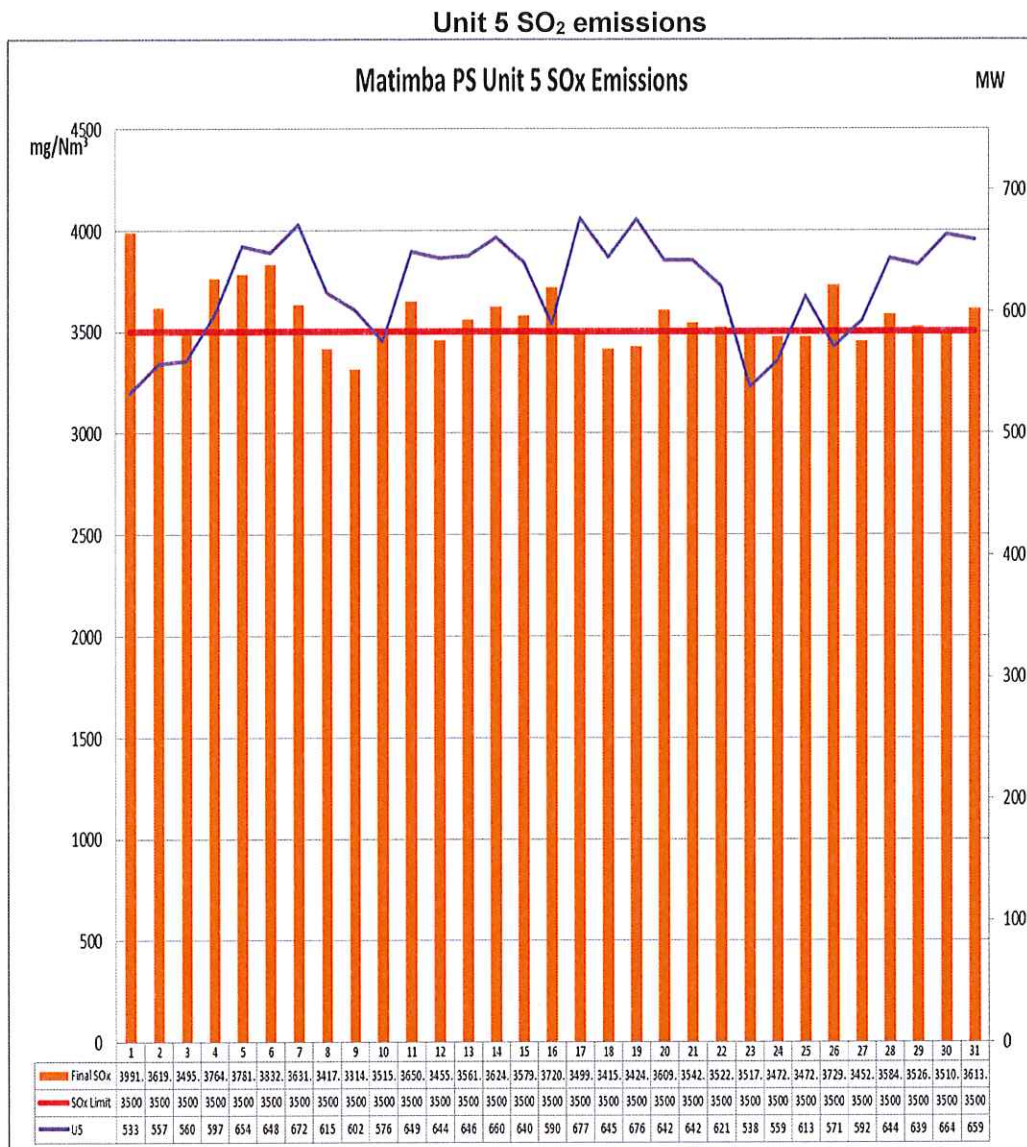
Monthly average below SO₂ emission limit of 3500 mg/Nm³. Emissions increased on the 1st of August 2020 to 3584 mg/Nm³ due to an increased amount of sulphur content of coal burnt. Monthly average emissions were 3052 mg/Nm³



Graph 10: SO₂ daily average emissions against emission limit for unit 4 for the month of August 2020

Interpretation:

Monthly average below SO₂ emission limit of 3500 mg/Nm³. Emissions increased on the 1st of August 2020 to 3517mg/Nm³ due to an increased amount of sulphur content of coal burnt. Monthly average emissions were 2789 mg/Nm³

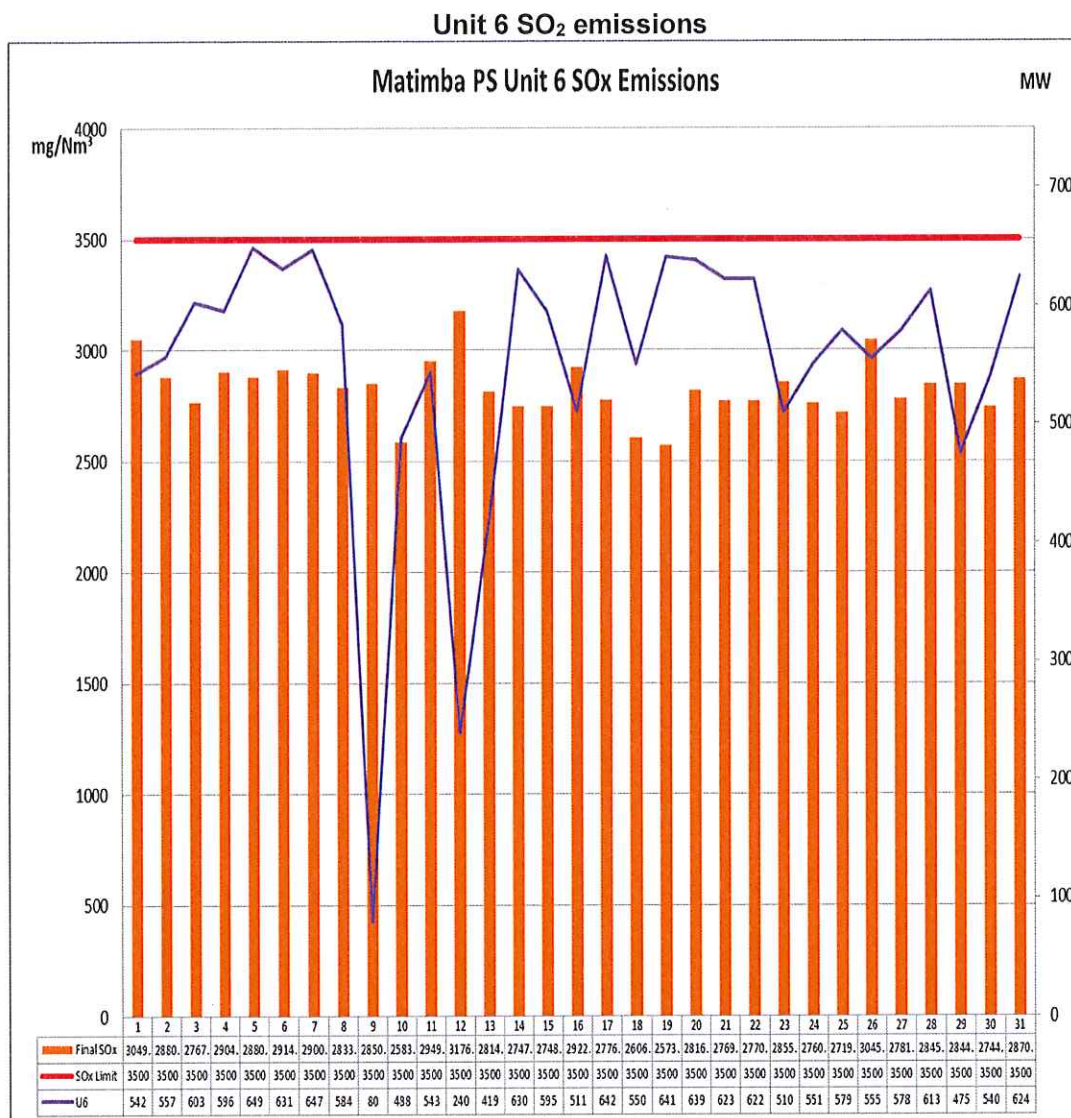


Graph 11: SO₂ daily average emissions against emission limit for unit 5 for the month of August 2020

Interpretation:

The SO₂ daily average of 3500mg/Nm³ was exceeded from the 1st until the 2nd, from 4th until the 07th, from the 10th until the 11th, from 13 until 16th, from the 20th until the 23rd and 26th, and from 28th until 31st of August 2020. This lead to a monthly average of 3576 mg/Nm³ which exceeds the monthly average limit of 3500mg/Nm³.

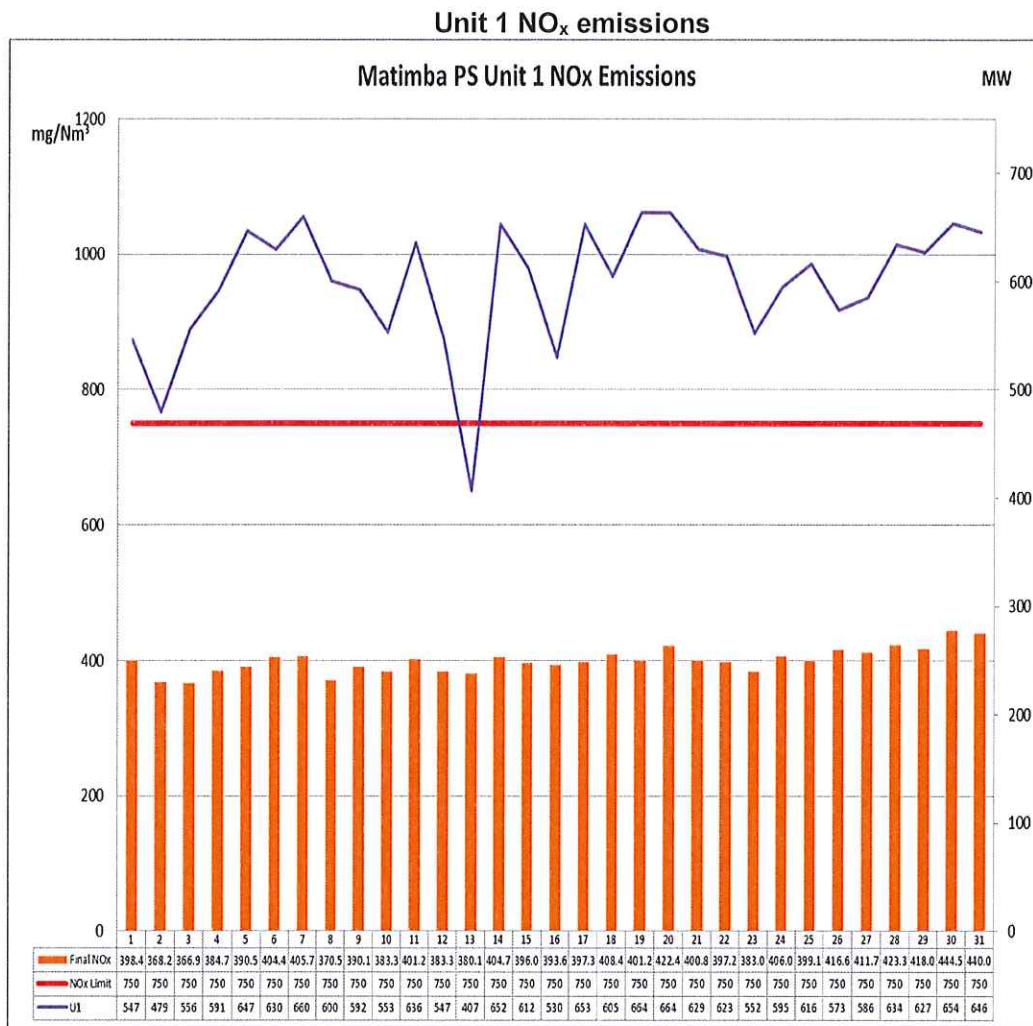
It is suspected that the exceedances are due to an increase in the sulphur content of the coal used in the combustion process. The exceedances will be thoroughly investigated to determine the root cause.



Graph 12: SO₂ daily average emissions against emission limit for unit 6 for the month of August 2020

Interpretation:

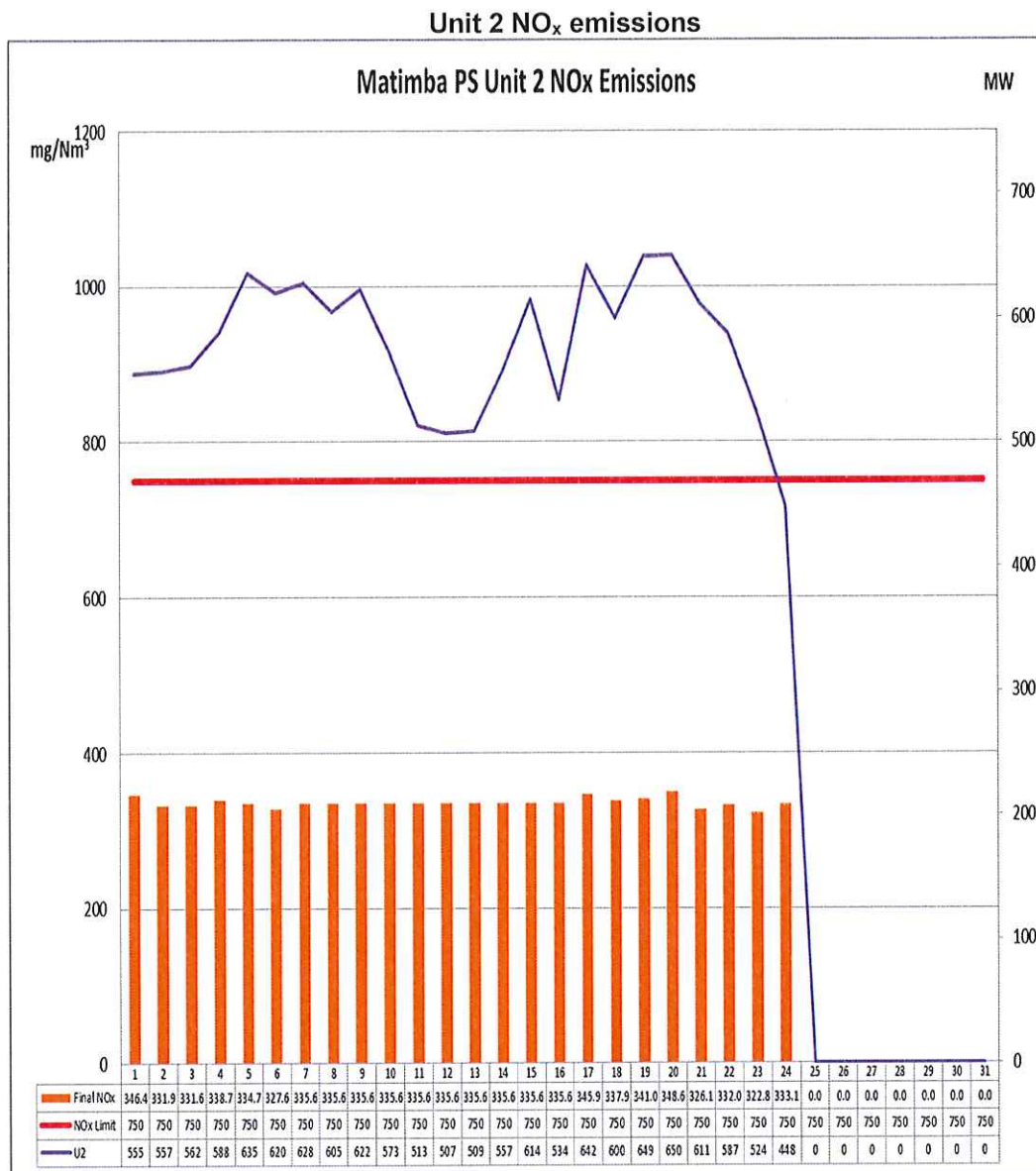
Monthly averages below SO₂ emission limit of 3500 mg/Nm³.



Graph 13: NO_x daily average emissions against emission limit for unit 1 for the month of August 2020

Interpretation:

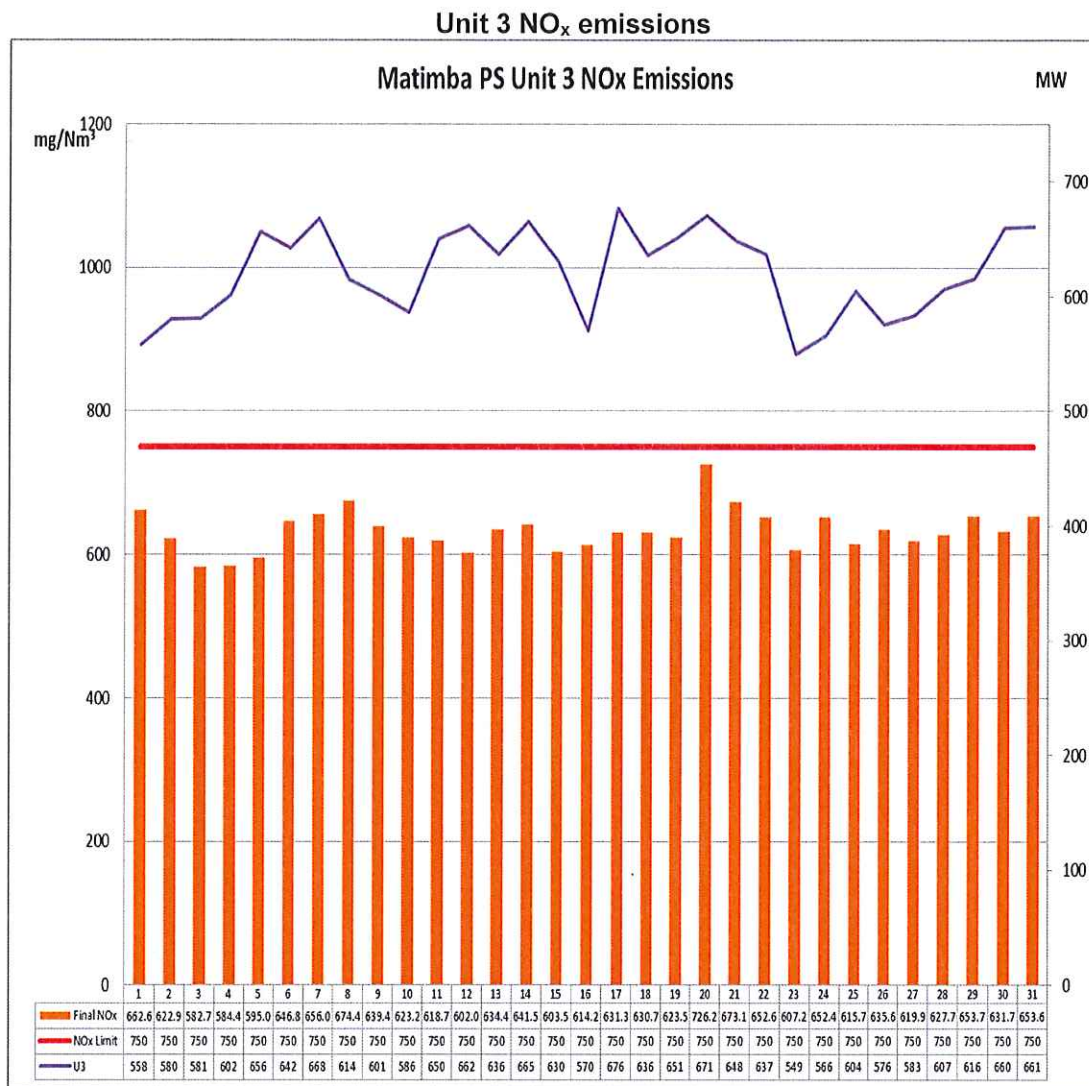
All daily averages below NO_x emission limit of 750 mg/Nm³.



Graph 14: NO_x daily average emissions against emission limit for unit 2 for the month of August 2020

Interpretation:

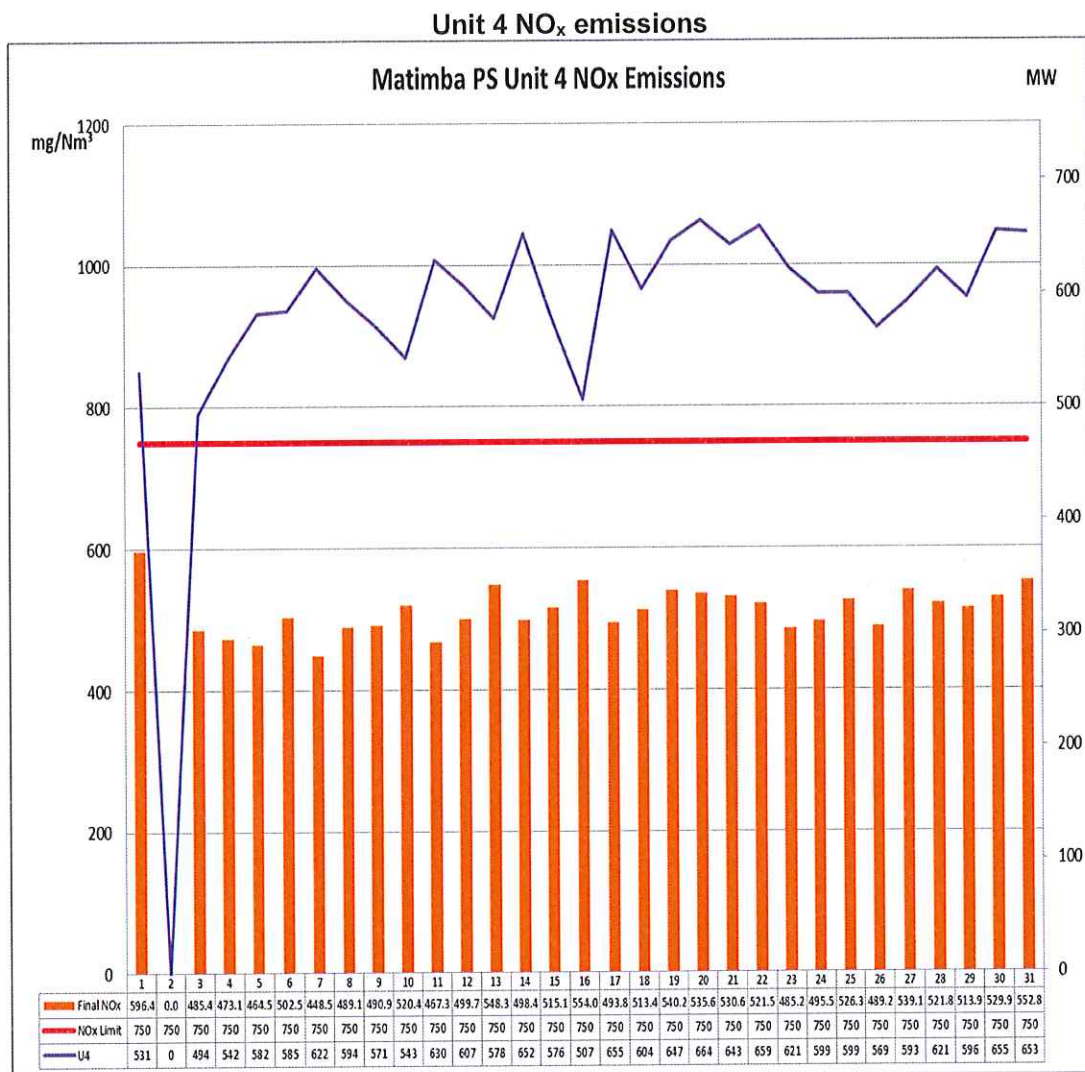
All daily averages below NO_x emission limit of 750 mg/Nm³.



Graph 15: NO_x daily average emissions against emission limit for unit 3 for the month of August 2020

Interpretation:

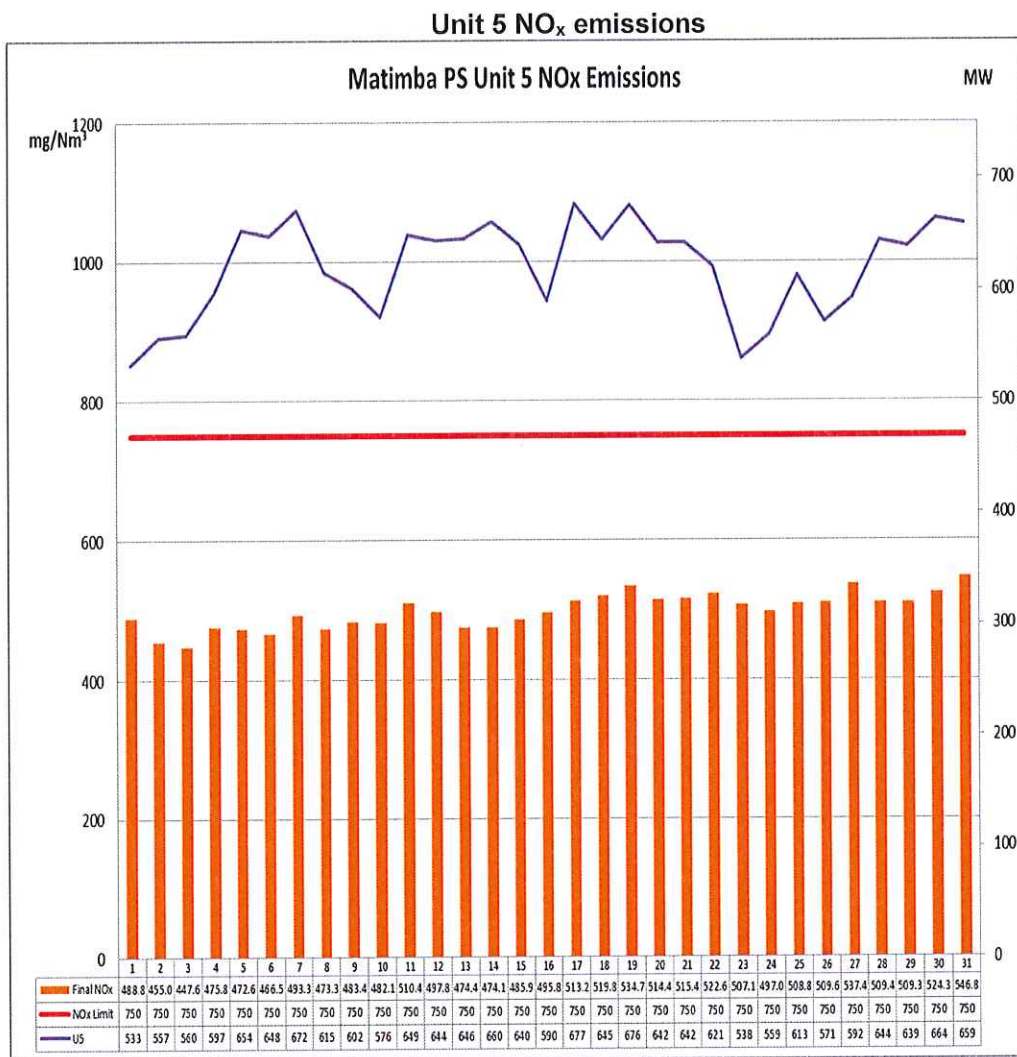
All daily averages below NO_x emission limit of 750 mg/Nm³.



Graph 16: NO_x daily average emissions against emission limit for unit 4 for the month of August 2020

Interpretation:

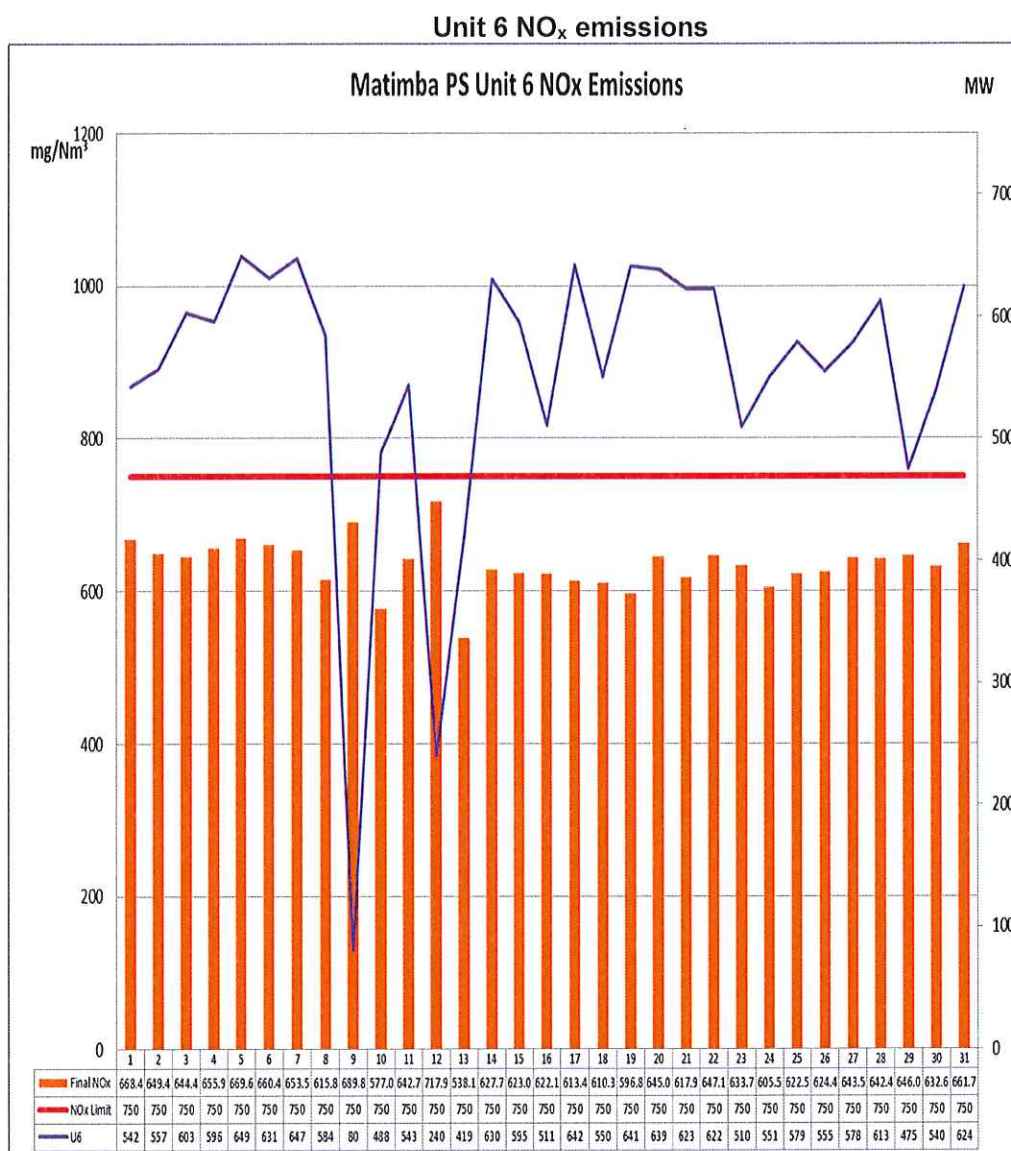
All daily averages below NO_x emission limit of 750 mg/Nm³.



Graph 17: NO_x daily average emissions against emission limit for unit 5 for the month of August 2020

Interpretation:

All daily averages below NO_x emission limit of 750 mg/Nm³.



Graph 18: NO_x daily average emissions against emission limit for unit 6 for the month of August 2020

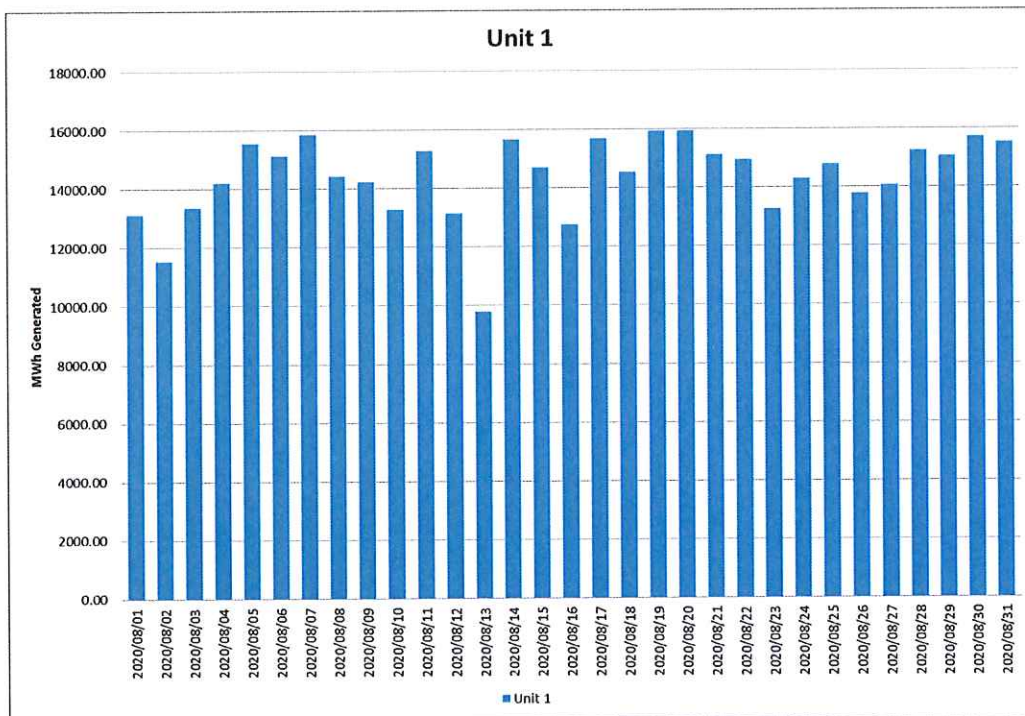
Interpretation:

All daily averages below NO_x emission limit of 750 mg/Nm³.

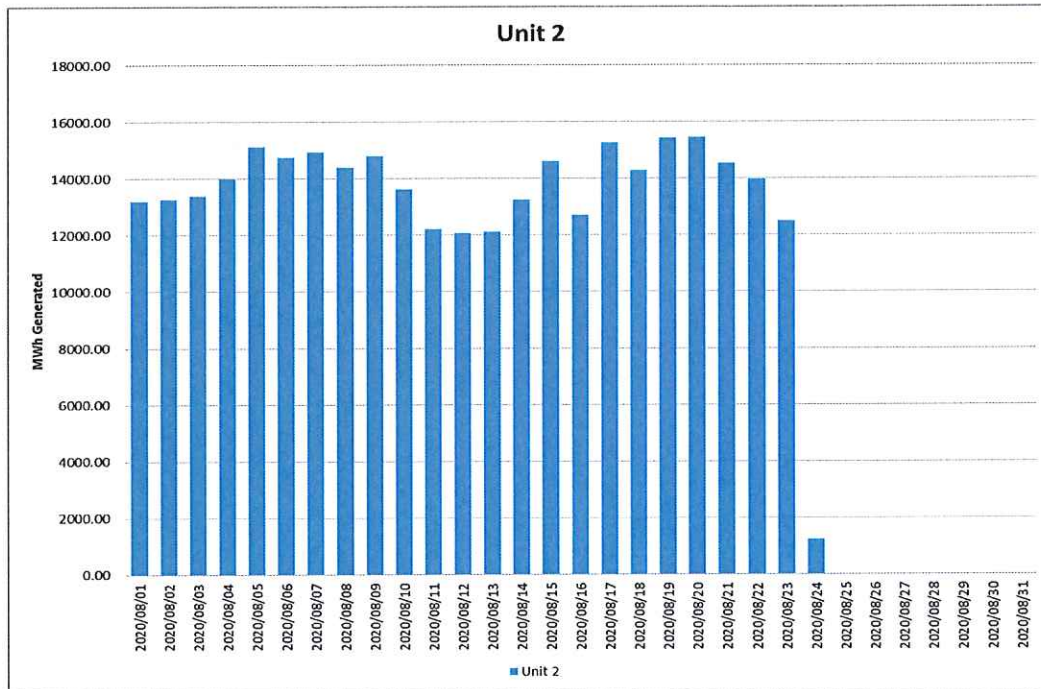
Table 4: Daily power generated per unit in MWh for the month of August 2020

Date	Unit 1	Unit 2	Unit 3	Unit 4	Unit 5	Unit 6
2020/08/01	13135.00	13205.13	13306.47	11380.73	12678.90	12893.47
2020/08/02	11523.53	13256.80	13834.27	0.00	13263.60	13236.73
2020/08/03	13355.67	13372.93	13851.47	9967.93	13328.30	14336.87
2020/08/04	14207.87	13987.67	14344.40	11913.73	14206.90	14168.47
2020/08/05	15537.53	15112.20	15643.20	13915.53	15558.00	15438.20
2020/08/06	15134.40	14748.33	15322.47	13971.13	15428.70	15019.33
2020/08/07	15853.00	14935.13	15923.00	14869.80	15987.60	15400.93
2020/08/08	14419.80	14387.73	14642.73	14187.33	14649.40	13889.67
2020/08/09	14226.27	14798.40	14326.00	13645.73	14316.40	571.00
2020/08/10	13300.93	13628.80	13966.80	12981.47	13708.10	11625.60
2020/08/11	15284.33	12207.73	15491.67	15043.87	15453.20	12916.33
2020/08/12	13139.53	12072.33	15788.67	14500.47	15332.30	79.00
2020/08/13	9775.80	12104.00	15177.80	13826.20	15368.70	5325.33
2020/08/14	15673.13	13250.67	15856.40	15594.33	15719.00	14988.53
2020/08/15	14693.67	14610.53	15035.20	13762.87	15234.00	14139.67
2020/08/16	12748.20	12702.40	13587.73	12110.73	14039.20	12144.27
2020/08/17	15682.93	15268.47	16131.67	15665.33	16101.80	15282.07
2020/08/18	14533.13	14266.67	15164.60	14434.93	15350.90	13079.80
2020/08/19	15945.73	15437.20	15516.53	15455.13	16092.90	15248.93
2020/08/20	15940.73	15459.87	16020.00	15869.67	15285.00	15197.33
2020/08/21	15118.87	14532.00	15476.00	15364.27	15285.20	14804.40
2020/08/22	14968.40	13966.60	15214.80	15758.73	14776.00	14802.60
2020/08/23	13270.80	12480.33	13121.47	14852.40	12819.60	10261.87
2020/08/24	14290.40	1223.93	13518.47	14316.20	13312.40	13120.47
2020/08/25	14801.40	0.00	14434.60	14317.00	14584.60	13767.07
2020/08/26	13780.53	0.00	13748.00	13610.40	13585.20	13189.53
2020/08/27	14070.93	0.00	13926.47	14167.27	14091.80	13738.33
2020/08/28	15229.73	0.00	14487.73	14833.13	15313.30	14570.13
2020/08/29	15064.60	0.00	14699.13	14243.73	15199.40	11294.87
2020/08/30	15708.67	0.00	15761.93	15649.13	15798.40	12677.33
2020/08/31	15512.27	0.00	15772.87	15593.40	15688.50	12467.40

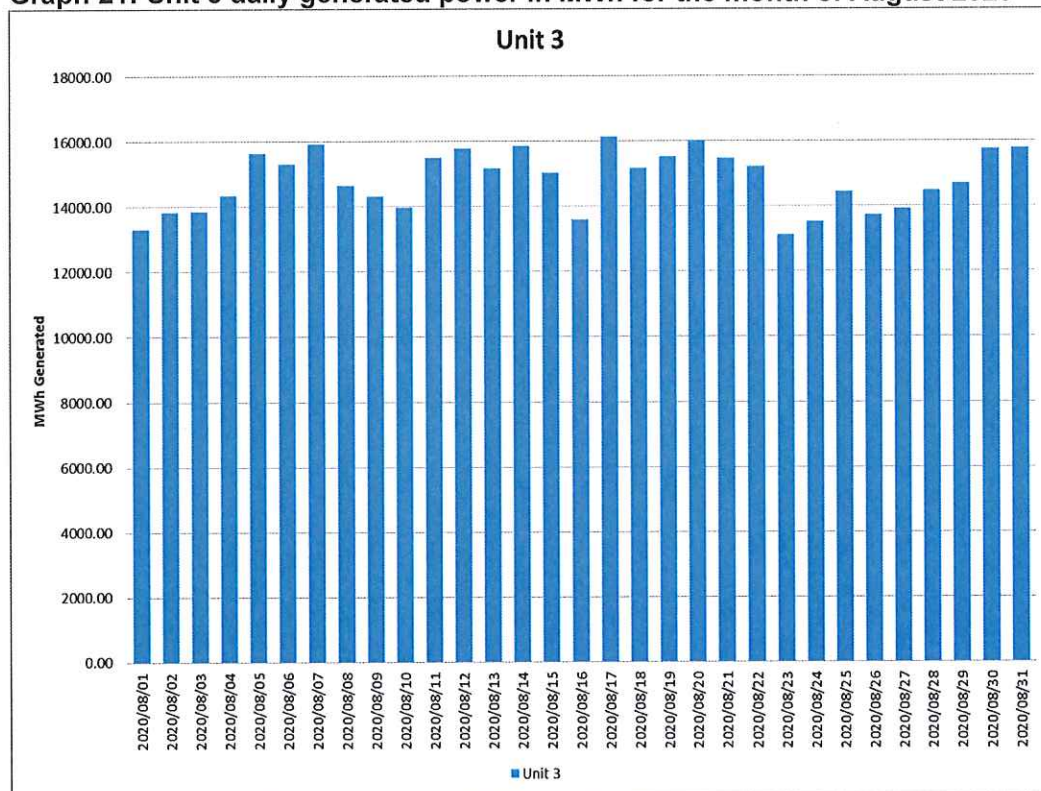
Graph 19: Unit 1 daily generated power in MWh for the month of August 2020



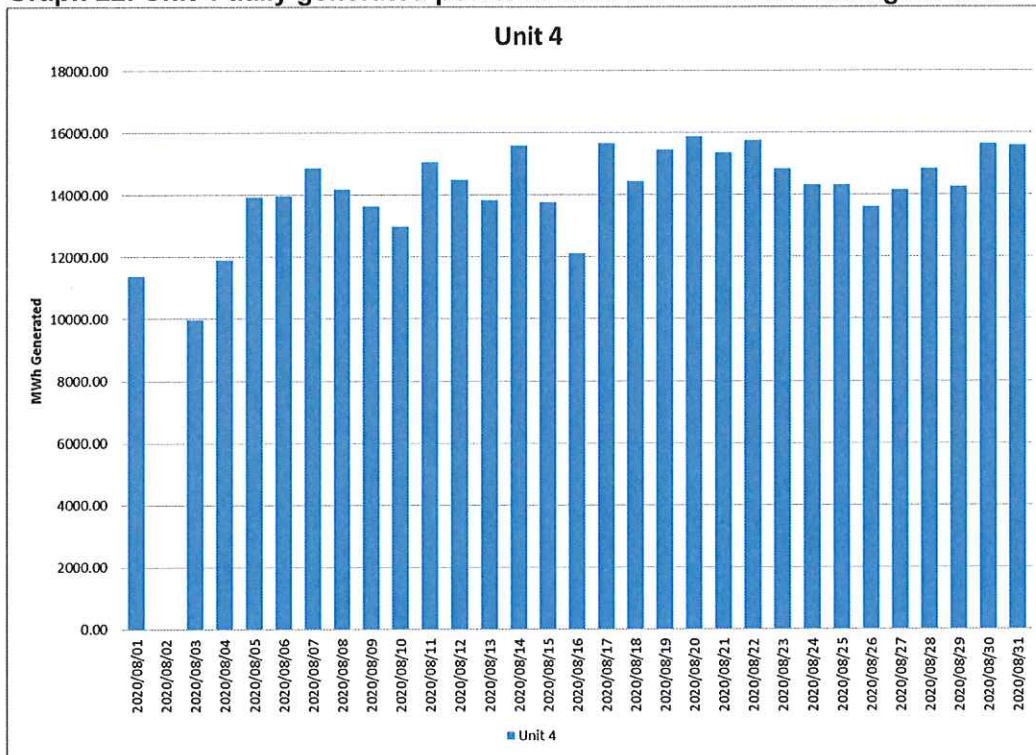
Graph 20: Unit 2 daily generated power in MWh for the month of August 2020



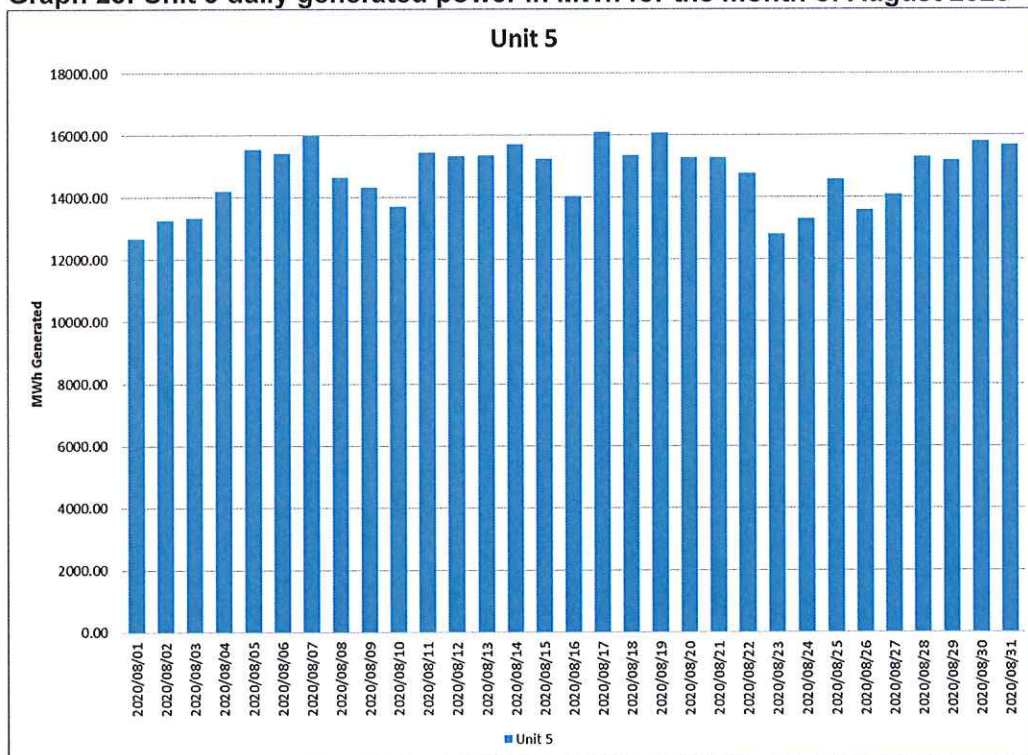
Graph 21: Unit 3 daily generated power in MWh for the month of August 2020



Graph 22: Unit 4 daily generated power in MWh for the month of August 2020



Graph 23: Unit 5 daily generated power in MWh for the month of August 2020



Graph 24: Unit 6 daily generated power in MWh for the month of August 2020

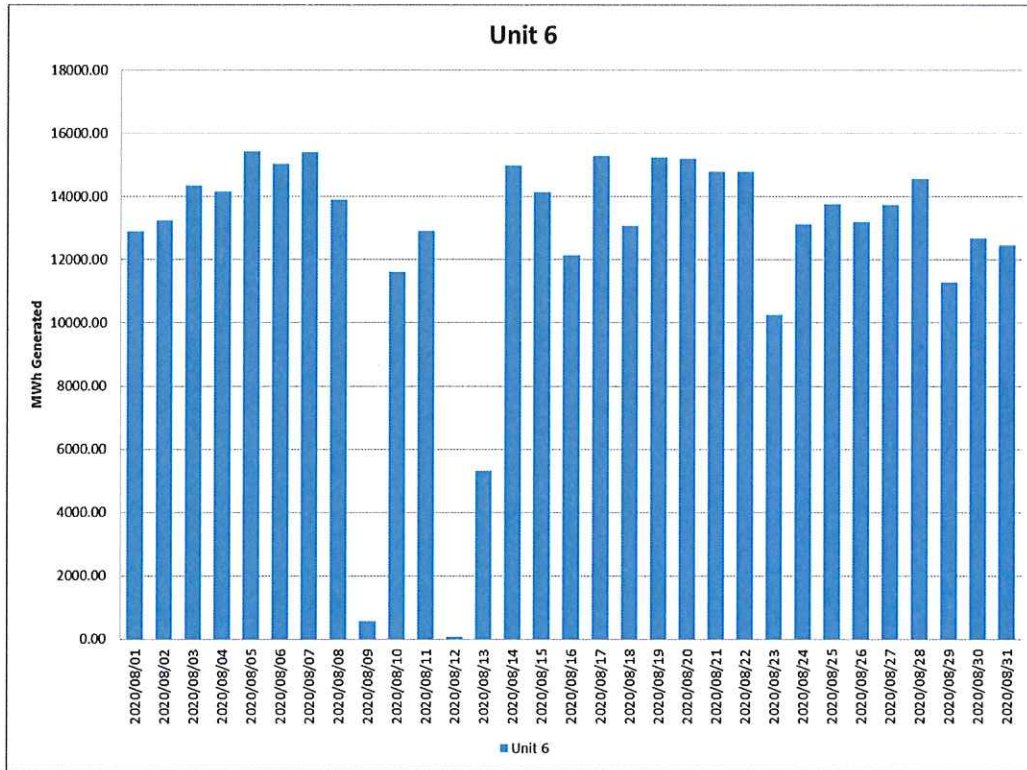


Table 5: Pollutant tonnages for the month of August 2020

Associated Unit/Stack	PM (tons)	SO ₂ (tons)	NO _x (tons)	CO ₂ (tons)
Unit 1	19.5	6 651.6	941.8	365 182
Unit 2	19.3	4 765.8	748.8	328 205
Unit 3	48.1	4 908.1	1 021.0	349 743
Unit 4	35.2	6 120.2	1 126.5	374 389
Unit 5	18.9	7 801.1	1 088.3	415 679
Unit 6	41.8	5 164.5	1 161.5	375 749
SUM	182.8	35 411.4	6 087.9	2 208 947

Table 6: Reference values for data provided.

Compound / Parameter	Units of Measure	Unit 1	Unit 2	Unit 3	Unit 4	Unit 5	Unit 6
Oxygen	%	6.51	5.74	9.29	7.68	7.71	9.09
Moisture	%	4.51	3.51	3.68	5.07	4.05	4.09
Velocity	m/s	26.2	30.4	22.5	28.2	26.4	27.1
Temperature	°C	138.0	125.2	139.1	127.4	126.9	121.6
Pressure	mBar	936.3	939.8	929.5	925.9	929.9	891.3

Start-up information.

Table 7: Start-up information

Unit	4	
Fires in	17H11	2020-08-04
Synchronization with Grid	19H08	2020-08-04
Emissions below limit	19H08	2020-08-04
Fires in to synchronization	1.95	Hours
Synchronization to < Emission limit	0	Hours

Unit	6	
Fires in	17H40	2020-08-09
Synchronization with Grid	22H56	2020-08-09
Emissions below limit	00H15	2020-08-10
Fires in to synchronization	5.267	Hours
Synchronization to < Emission limit	1.317	Hours

Unit	6	
Fires in	05H03	2020-08-13
Synchronization with Grid	11H07	2020-08-13
Emissions below limit	13H25	2020-08-13
Fires in to synchronization	6.067	Hours
Synchronization to < Emission limit	2.3	Hours

Unit	6	
Fires in	11H02	2020-08-23
Synchronization with Grid	14H46	2020-08-23
Emissions below limit	14H46	2020-08-23
Fires in to synchronization	3.733	Hours
Synchronization to < Emission limit	0	Hours

Unit	6	
Fires in	23H41	2020-08-30
Synchronization with Grid	03H53	2020-08-31
Emissions below limit	03H53	2020-08-31
Fires in to synchronization	4.2	Hours
Synchronization to < Emission limit	0	Hours

Emergency Generation

Table 8: Emergency Generation.

	Unit 1	Unit 2	Unit 3	Unit 4	Unit 5	Unit 6
Emergency Generation hours declared by national Control	304	257	304	297	304	283
Emergency Hours declared including hours after stand down	336	282	336	328	336	313
Days over the Limit during Emergency Generation	0	0	0	0	0	0

Complaints Register

Table 9: Complaints.

Source Code/ Name	Root Cause Analysis	Calculation of Impacts/ emissions associated with the incident	Dispersion modeling of pollutants where applicable	Measures implemented to prevent reoccurrence	Date by which measure will be implemented
None					

Table 10: Total volatile compound estimates.

		
CALCULATION OF EMISSIONS OF TOTAL VOLATILE COMPOUNDS FROM FUEL OIL STORAGE TANKS		
Date:	12 October 2020	
Station:	Matimba Power Station	
Province:	Limpopo Province	
Tank no.	1-4	
Description:	Outdoor fuel oil storage tank	
Tank Type:	Vertical fixed roof (vented to atmosphere)	
Material stored:	Fuel Oil 150	
MONTHLY INPUT DATA FOR THE STATION Please only insert relevant monthly data inputs into the <u>blue cells</u> below Choose from a dropdown menu in the <u>green cells</u> The total VOC emissions for the month are in the <u>red cells</u> IMPORTANT: Do not change <u>any</u> other cells without consulting the AQ CoE		
MONTH:	August	
GENERAL INFORMATION:	Data	Unit
Total number of fuel oil tanks:	4	NA
Height of tank:	13.34	m
Diameter of tank:	9.53	m
Net fuel oil throughput for the month:	541.067	tons/month
Molecular weight of the fuel oil:	166.00	Lb/lb-mole
METEROLOGICAL DATA FOR THE MONTH	Data	Unit
Daily average ambient temperature	20.46	°C
Daily maximum ambient temperature	28.86	°C
Daily minimum ambient temperature	12.76	°C
Daily ambient temperature range	16.09	°C
Daily total insolation factor	4.23	kWh/m²/day
Tank paint colour	Grey/medium	NA
Tank paint solar absorbance	0.68	NA
FINAL OUTPUT:	Result	Unit
Breathing losses:	0.56	kg/month
Working losses:	0.02	kg/month
TOTAL LOSSES (Total TVOC Emissions for the month):	0.58	kg/month
*Calculations performed on this spreadsheet are taken from the USEPA AP-42- Section 7.1 Organic Liquid Storage Tanks - January 1996. This spreadsheet is derived from materials provided by Jimmy Peress, PE, Trittech Consulting Engineers, 85-93 Chevy Chase Street, Jamaica, NY 11432 USA, Tel - 718-454-3920, Fax - 718-454-6330, e-mail - PeressJ@nyc.rr.com.		

Table 11: Average % availability of monitors for the month of August 2020.

Associated Unit/Stack	PM	SO ₂	NO	CO ₂
Unit 1	100,0	100,0	100,0	100,0
Unit 2	100,0	54,9	54,9	54,9
Unit 3	100,0	100,0	100,0	100,0
Unit 4	100,0	99,9	99,9	98,8
Unit 5	100,0	100,0	100,0	100,0
Unit 6	96,6	96,6	96,6	96,6

Ambient Air quality Monitoring

Three (3) exceedances of the PM_{2.5} national daily limit and five (5) exceedance of the PM₁₀ national daily limit were recorded in August 2020. No other parameters exceeded the set limits during the monitoring period.

Ambient PM_{2.5}, PM₁₀ and NO₂ concentrations at Marapong monitoring site show influence of emissions from low level sources in the area while SO₂ concentrations show influence of emissions from both tall stack emitters and low level sources.

The average data recovery for the period was 79.7% and the station availability was 98.7%.

Detailed results can be found in Attachment 1, "Marapong air quality monthly report for August 2020".

General

Name and reference number of the monitoring method used:

1. Particulate and gas monitoring according to standards
 - a. BS EN 14181:2004 - Quality Assurance of Automated Measuring Systems
 - b. ESKOM internal standard 240-56242363 Emissions Monitoring and Reporting Standard

Sampling locations:

1. Stack one
 - a. Particulates:
 - i. S23° 40' 2.8" E027° 36' 34.8" 175m from ground level and 75m from the top.
 - b. Gas:
 - i. S23° 40' 2.8" E027° 36' 34.8" 100m from ground level and 150m from the top.
 - c. Stack height
 - i. 250 meter consist of 3 flues
2. Stack two
 - a. Particulates:
 - i. S23° 40' 14.8" E027° 36' 47.5" 175m from ground level and 75m from the top.
 - b. Gas:
 - i. S23° 40' 14.8" E027° 36' 47.5" 100m from ground level and 150m from the top.
 - c. Stack height

Unit 1

1. 0 out of 32 precipitator fields is out of service.
1. No abnormalities on the SO₃ plant. Preventative maintenance done during the month.

Unit 2

1. 4 out of 32 precipitator fields is out of service. Repairs will be done during the next opportunity outage.
2. No abnormalities on the SO₃ plant. Preventative maintenance done during the month.

Unit 3

1. 2 out of 32 precipitator fields is out of service. Repairs will be done during the next opportunity outage.
2. No abnormalities on the SO₃ plant. Preventative maintenance done during the month.

Unit 4

1. All precipitator fields in service.
2. No abnormalities on the SO₃ plant.

Unit 5

1. All precipitator fields in service.
2. No abnormalities on the SO₃ plant.

Unit 6

1. 3 out of 32 precipitator fields is out of service. Repairs will be done during the next opportunity outage.
2. No abnormalities on the SO₃ plant. Preventative maintenance done during the month.

SO₃ common plant

1. No abnormalities on the sulphur storage plant.

CEMs

1. No adjustments done on the CEMs. Calibration is done every second week.

Particulate monitors

2. No downtime or repairs done on the particulate monitors.

Air quality improvements

1. None

Social responsibility conducted

No campaigns conducted in August 2020

Sampling dates and times

1. Continuous

Attachments

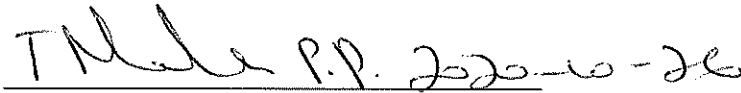
Marapong Ambient air quality report August 2020

The rest of the information demonstrating compliance with the emission license conditions is supplied in the annual emission report sent to your office.

Hoping the above will meet your satisfaction.

I hereby declare that the information in this report is correct.

Yours sincerely



GENERAL MANAGER: MATIMBA POWER STATION