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Date:
22 January 2021

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Ref: (12/4/12L-W4/A3)

Dear Mrs Thivhafuni

MATIMBA POWER STATION'S MONTHLY EMISSIONS REPORT FOR THE MONTH OF DECEMBER 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	970 494
	Fuel Oil	Tons/month	1 200	796,527
Production Rates	Product/ By-Product Name	Unit	Maximum Production Capacity Permitted (Quantity)	Production Rate
	Energy	GWh	4 212.6	1 771,232

Abatement Technology

Table 2: Abatement Equipment Control Technology utilise.

Associated Unit	Technology Type	Actual Utilisation (%)
Unit 1	Electrostatic Precipitator	99,95%
Unit 2	Electrostatic Precipitator	99,94%
Unit 3	Electrostatic Precipitator	99,89%
Unit 4	Electrostatic Precipitator	Unit Off-line
Unit 5	Electrostatic Precipitator	99,93%
Unit 6	Electrostatic Precipitator	99,87%

Associated Unit	Technology Type	Actual Utilisation (%)
Unit 1	SO ₃ Plant	94
Unit 2	SO ₃ Plant	100
Unit 3	SO ₃ Plant	94
Unit 4	SO ₃ Plant	Unit off load
Unit 5	SO ₃ Plant	90
Unit 6	SO ₃ Plant	90

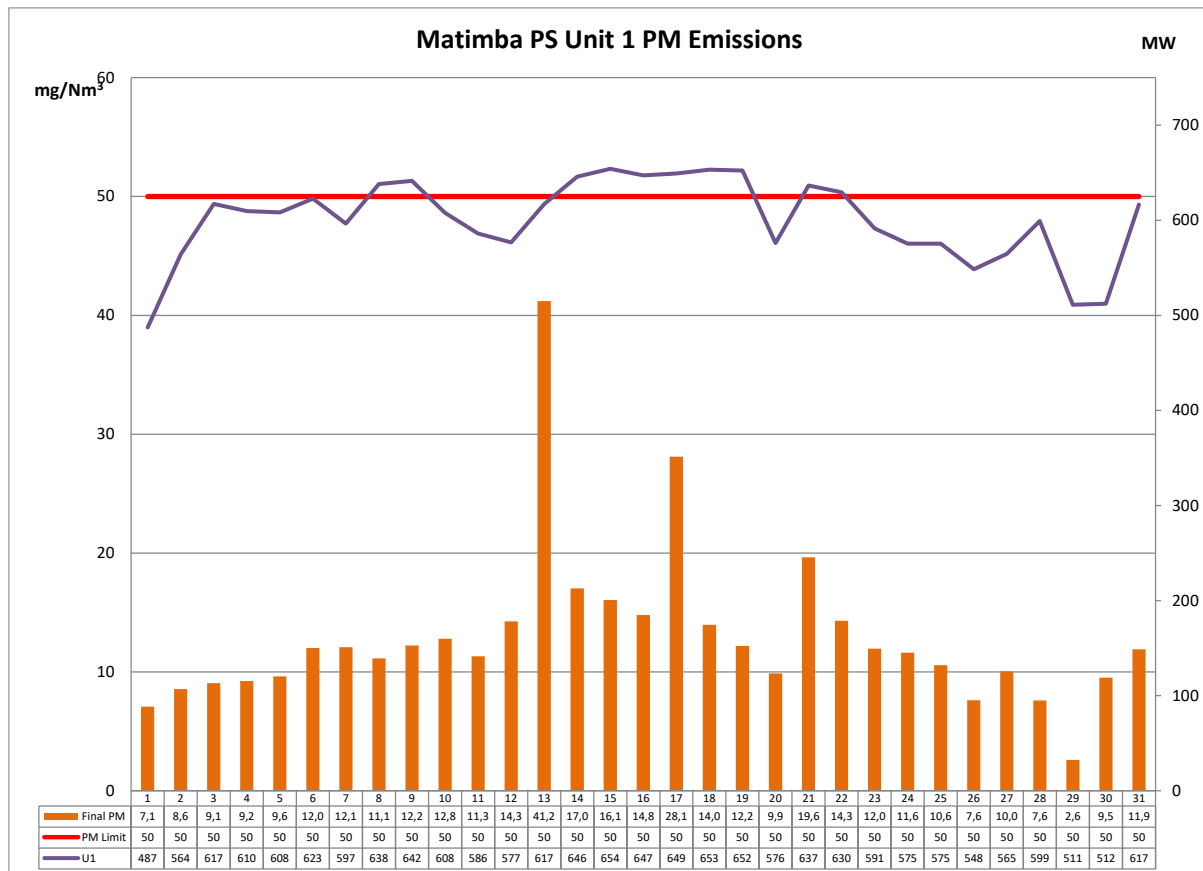
Energy Source Characteristics

Table 3: Energy Source Material Characteristics.

	Characteristic	Stipulated Range (Unit)	Monthly Average Content
Coal burned	Sulphur Content	0.8-1.6%	1.234%
	Ash Content	30-40%	34,016%

Emissions Reporting

Unit 1 particulate emissions

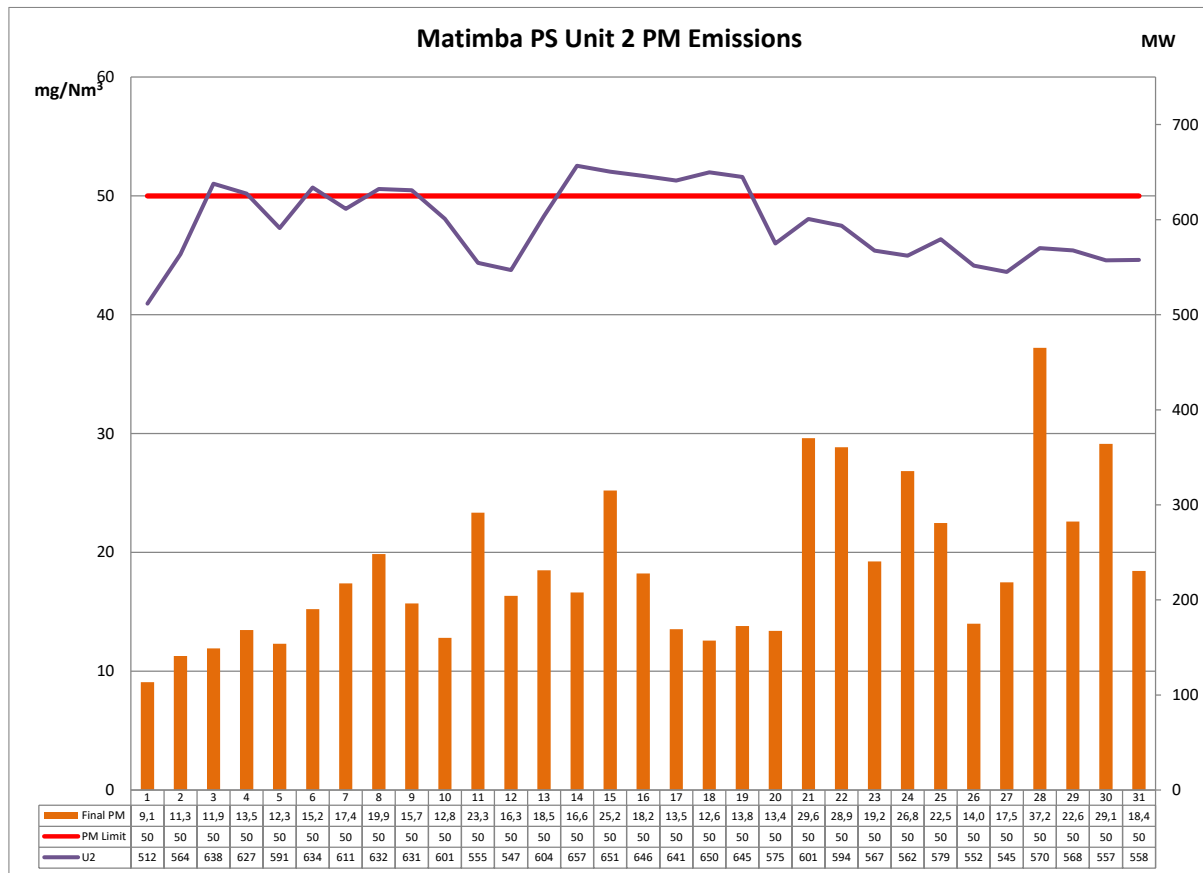


Graph 1: Particulate matter daily average emissions against emission limit for unit 1 for the month of December 2020

Interpretation:

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

Unit 2 particulate emissions

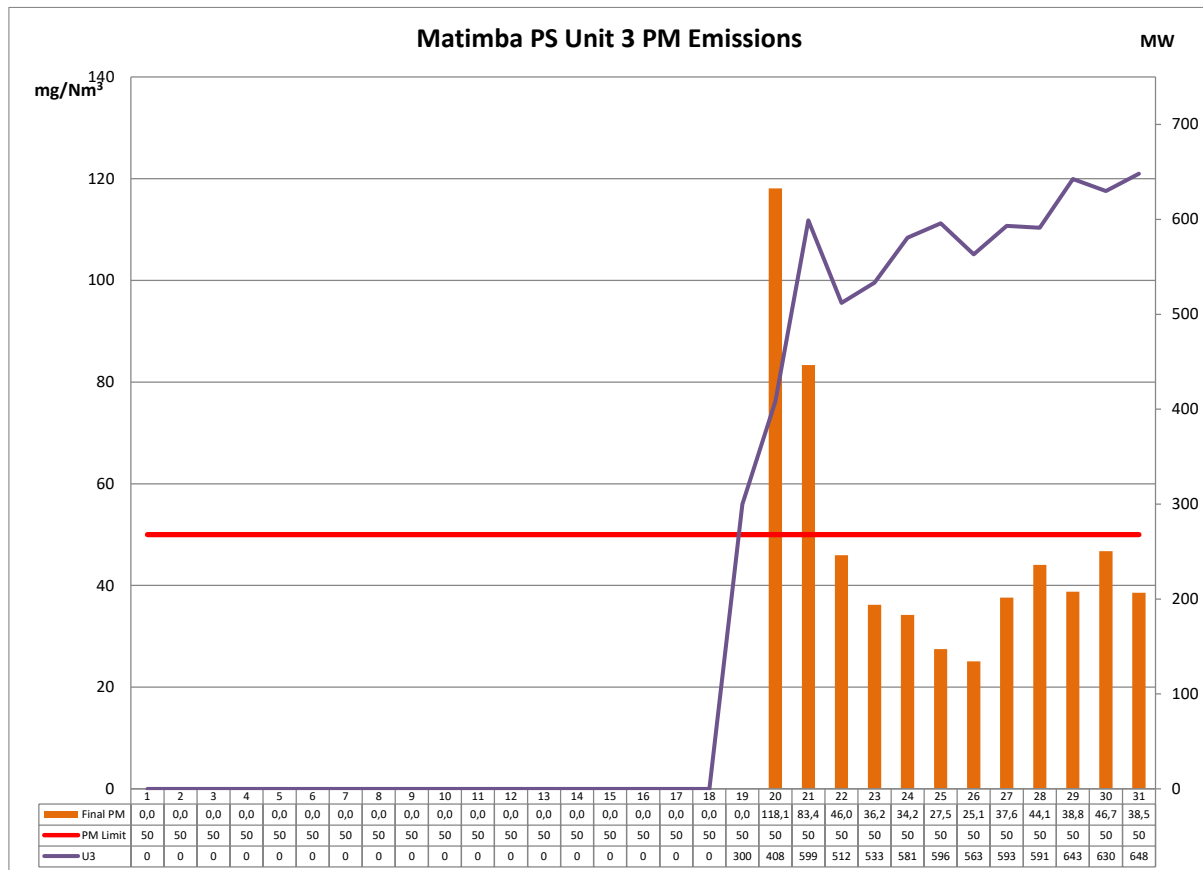


Graph 2: Particulate matter daily average emissions against emission limit for unit 2 for the month of December 2020

Interpretation:

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

Unit 3 particulate emissions

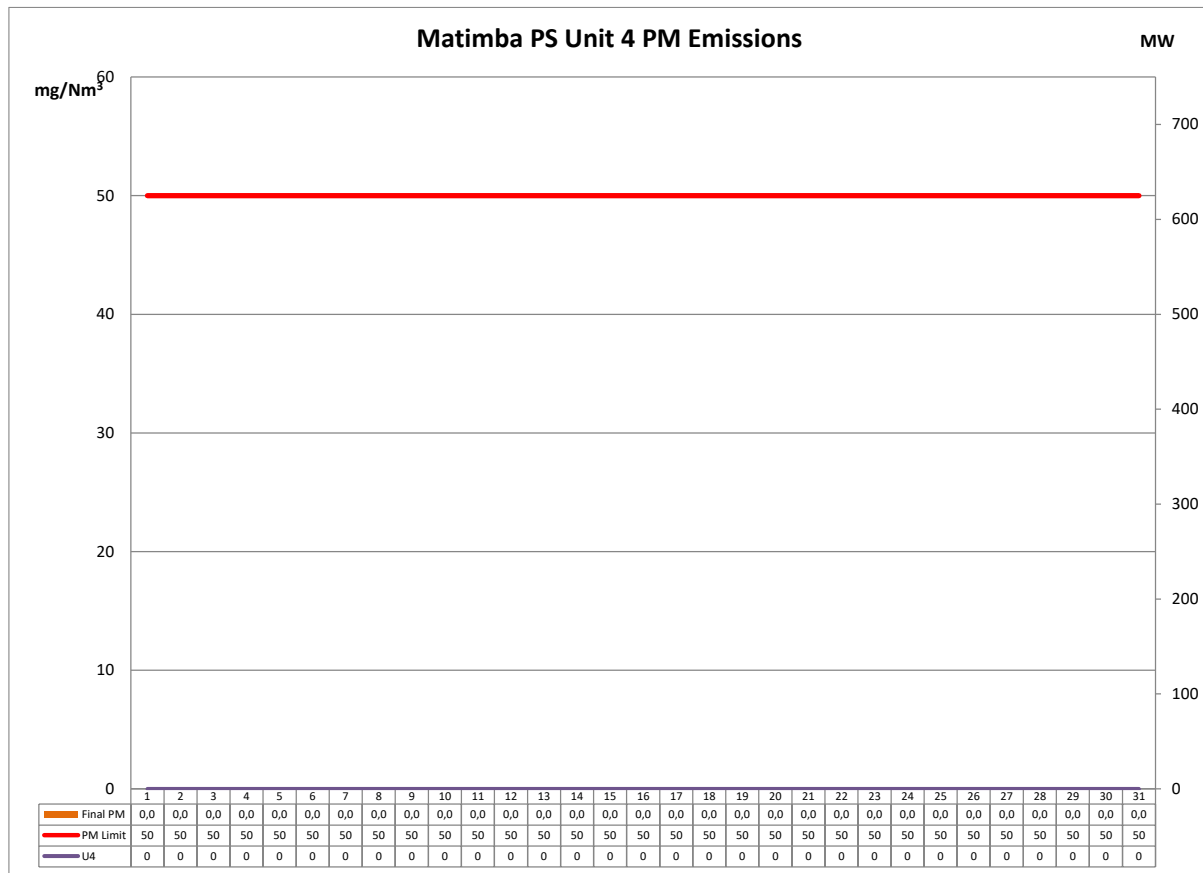


Graph 3: Particulate matter daily average emissions against emission limit for unit 3 for the month of December 2020

Interpretation:

Unit 3 exceeded the particulate emission limit of 50 mg/Nm³ on the 20th and 21st of December 2020. The exceedances did not exceed the 48hour grace period.

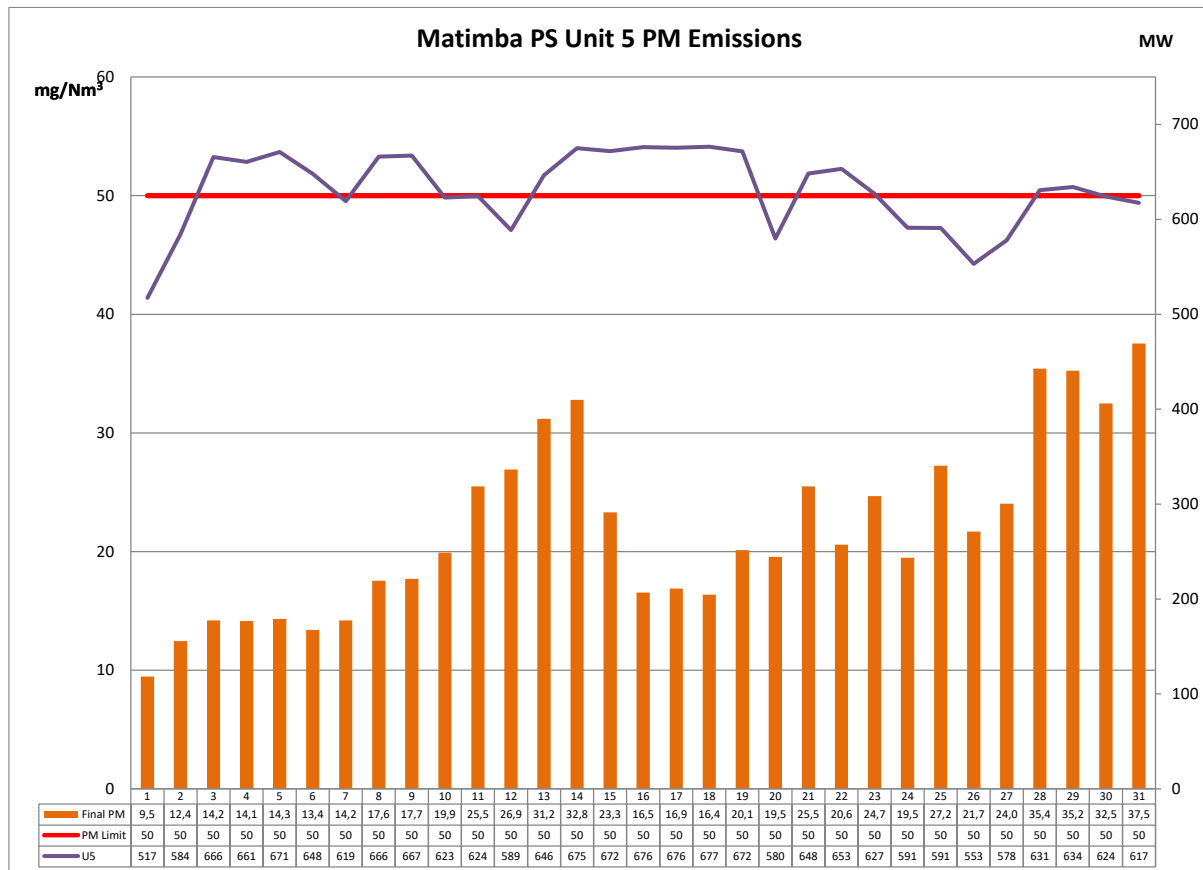
Unit 4 particulate emissions



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

Interpretation:
Unit off load.

Unit 5 particulate emissions

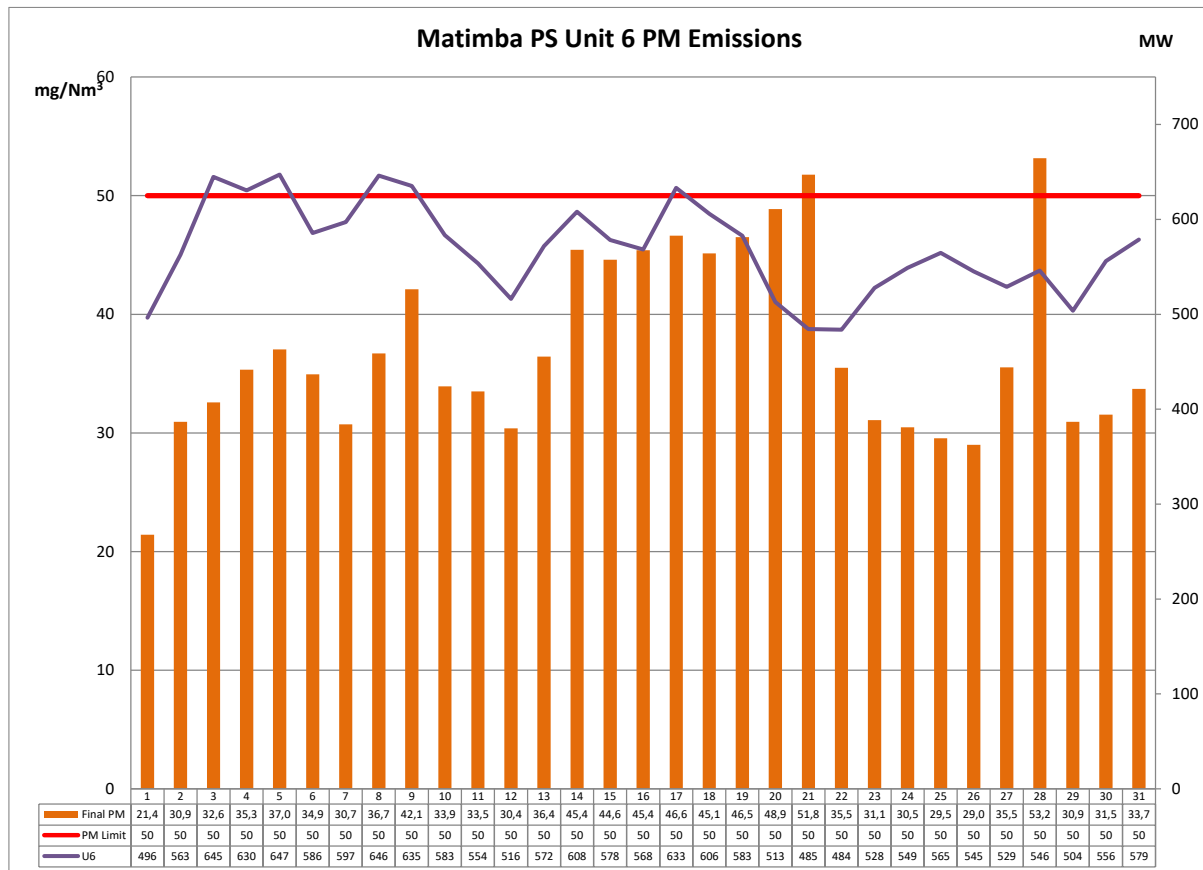


Graph 5: Particulate matter daily average emissions against emission limit for unit 5 for the month of December 2020

Interpretation:

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

Unit 6 particulate emissions

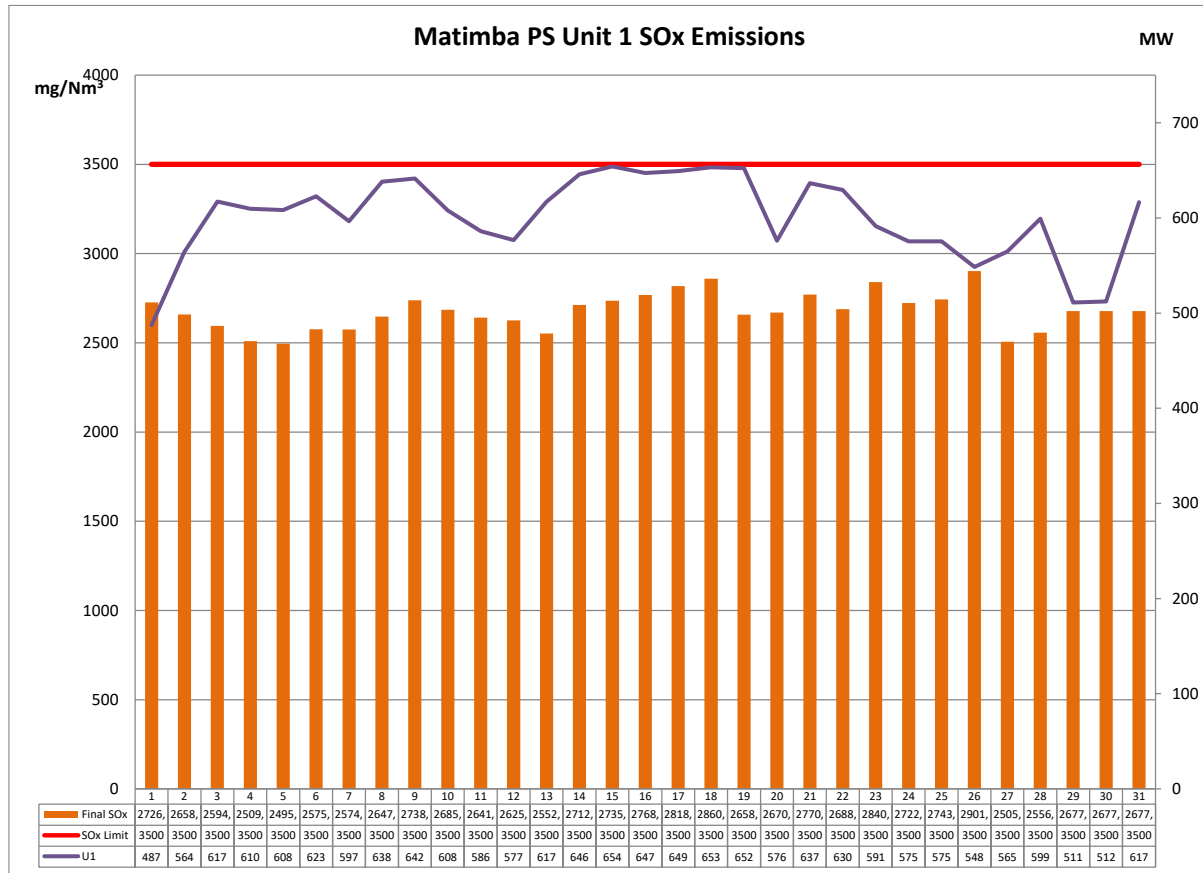


Graph 6: Particulate matter daily average emissions against emission limit for unit 6 for the month of December 2020

Interpretation:

Unit 6 exceeded the particulate emission limit of 50 mg/Nm³ on the 21st and 28th of December 2020 due to unplanned breakdowns on the sulphur plant. The plant was repaired and the exceedances did not exceed the 48hour grace period.

Unit 1 SO₂ emissions

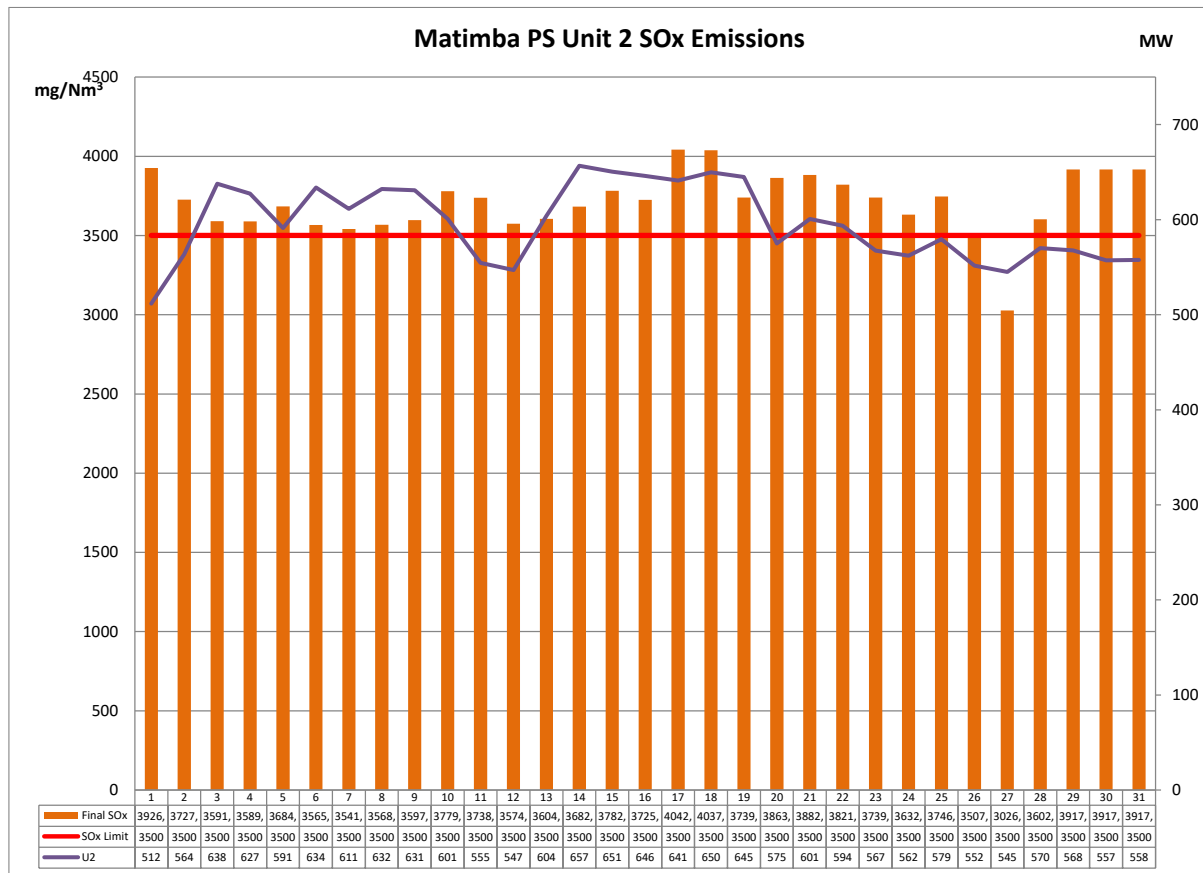


Graph 7: SO₂ daily average emissions against emission limit for unit 1 for the month of December 2020

Interpretation:

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

Unit 2 SO₂ emissions

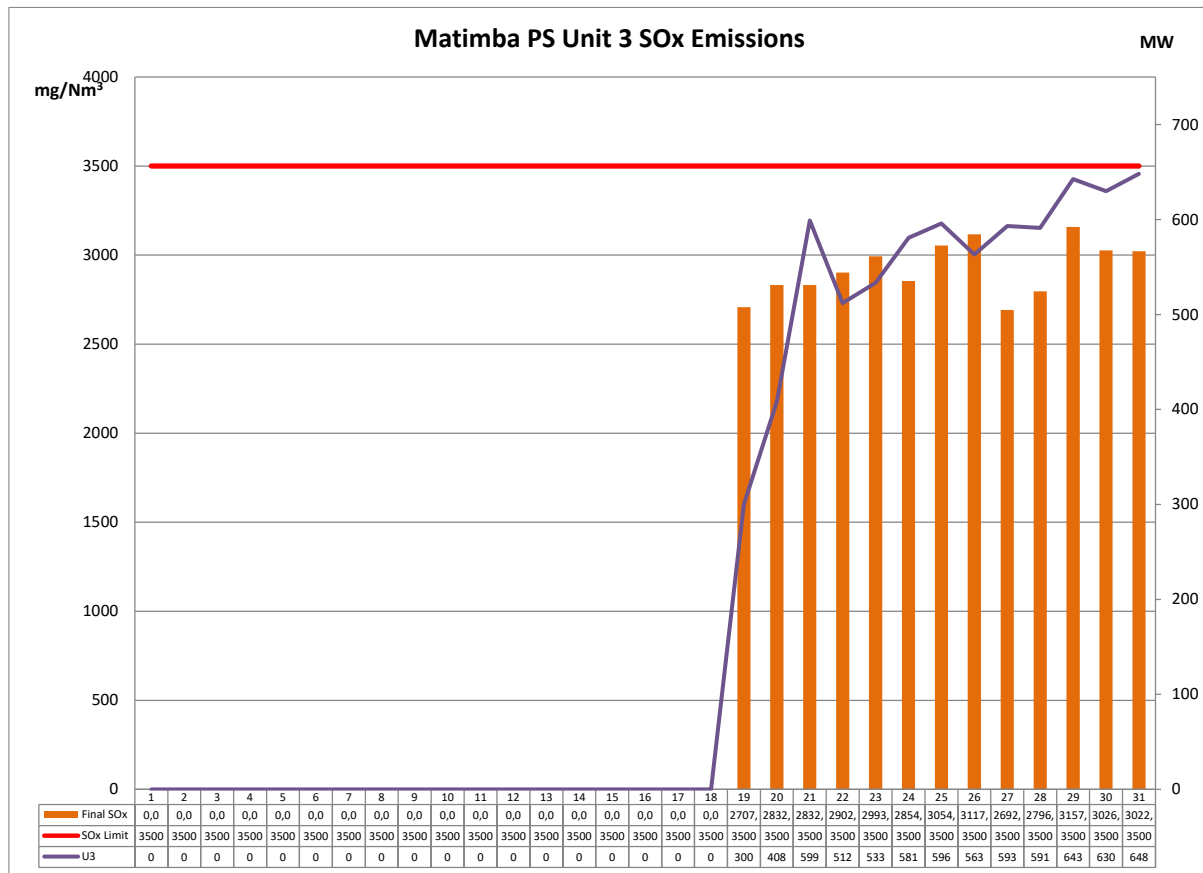


Graph 8: SO₂ daily average emissions against emission limit for unit 2 for the month of December 2020

Interpretation:

After implementing updated QAL 2 curves it was noted that Unit 2 exceeded the monthly limit of 3500mg/Nm³. The exceedance will be investigated and measures will be taken to prevent re-occurrence.

Unit 3 SO₂ emissions

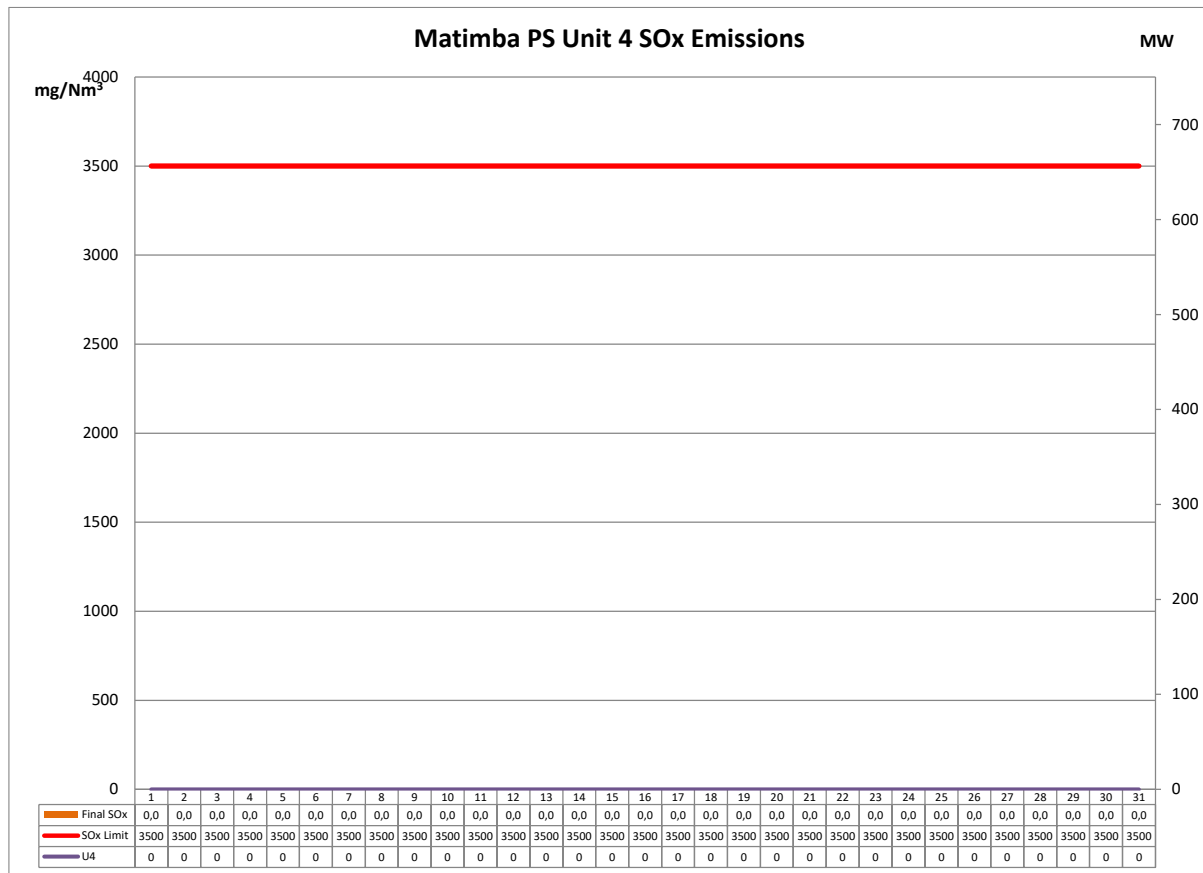


Graph 9: SO₂ daily average emissions against emission limit for unit 3 for the month of December 2020

Interpretation:

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

Unit 4 SO₂ emissions

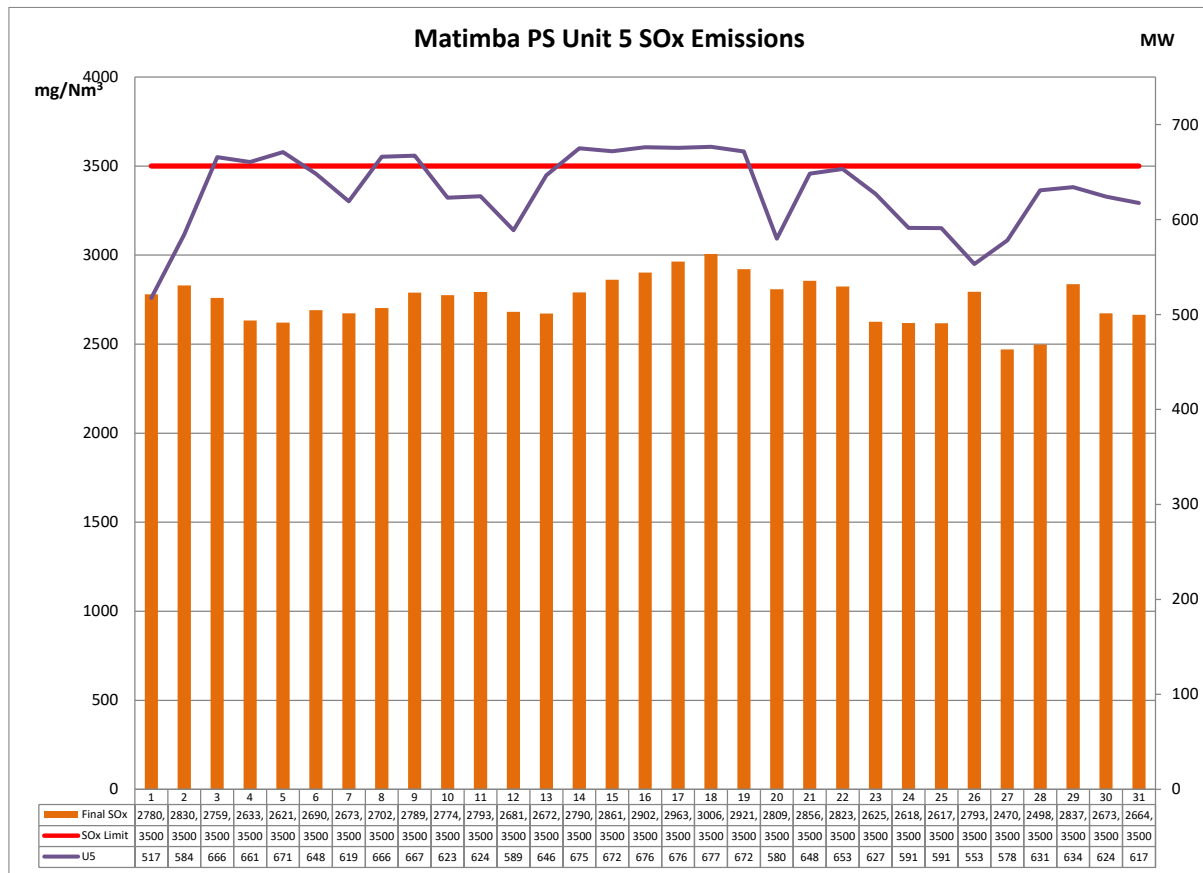


Graph 10: SO₂ daily average emissions against emission limit for unit 4 for the month of December 2020

Interpretation:

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

Unit 5 SO₂ emissions

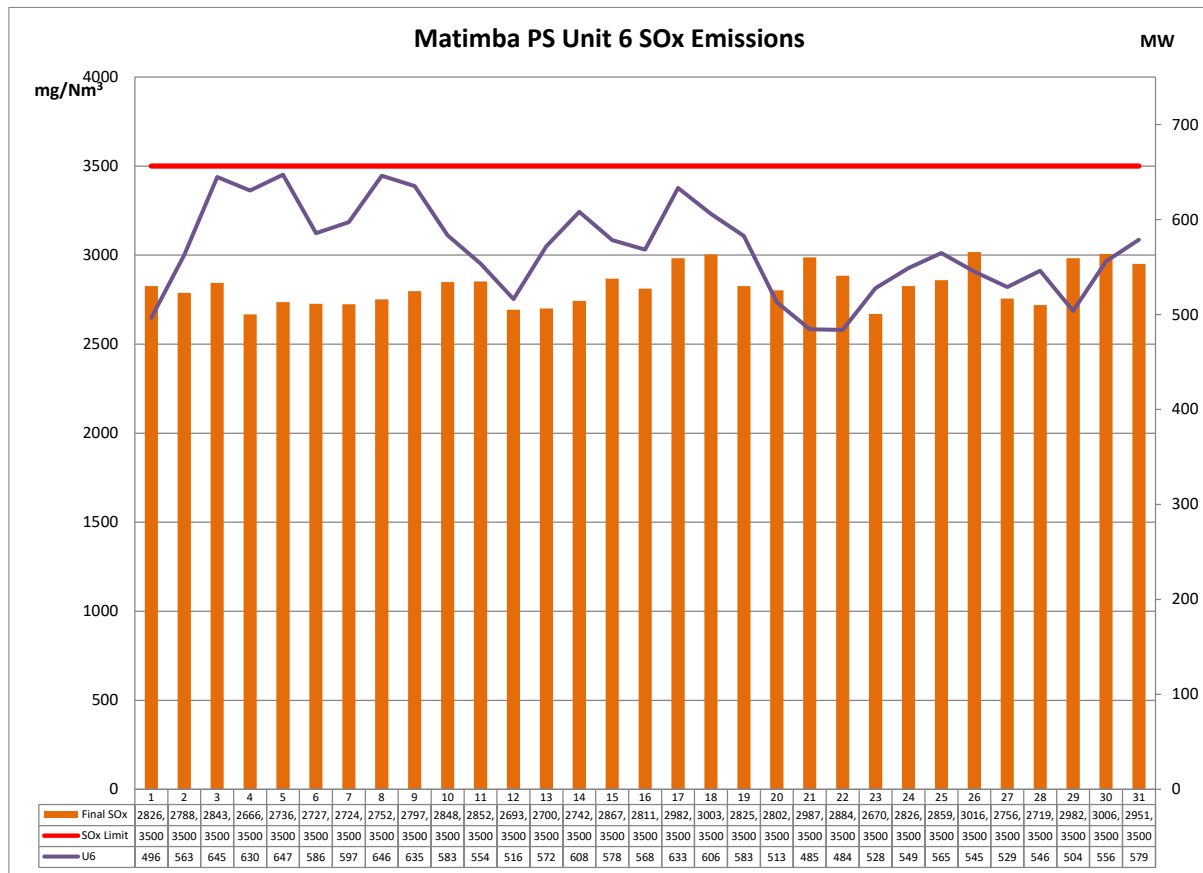


Graph 11: SO₂ daily average emissions against emission limit for unit 5 for the month of December 2020

Interpretation:

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

Unit 6 SO₂ emissions

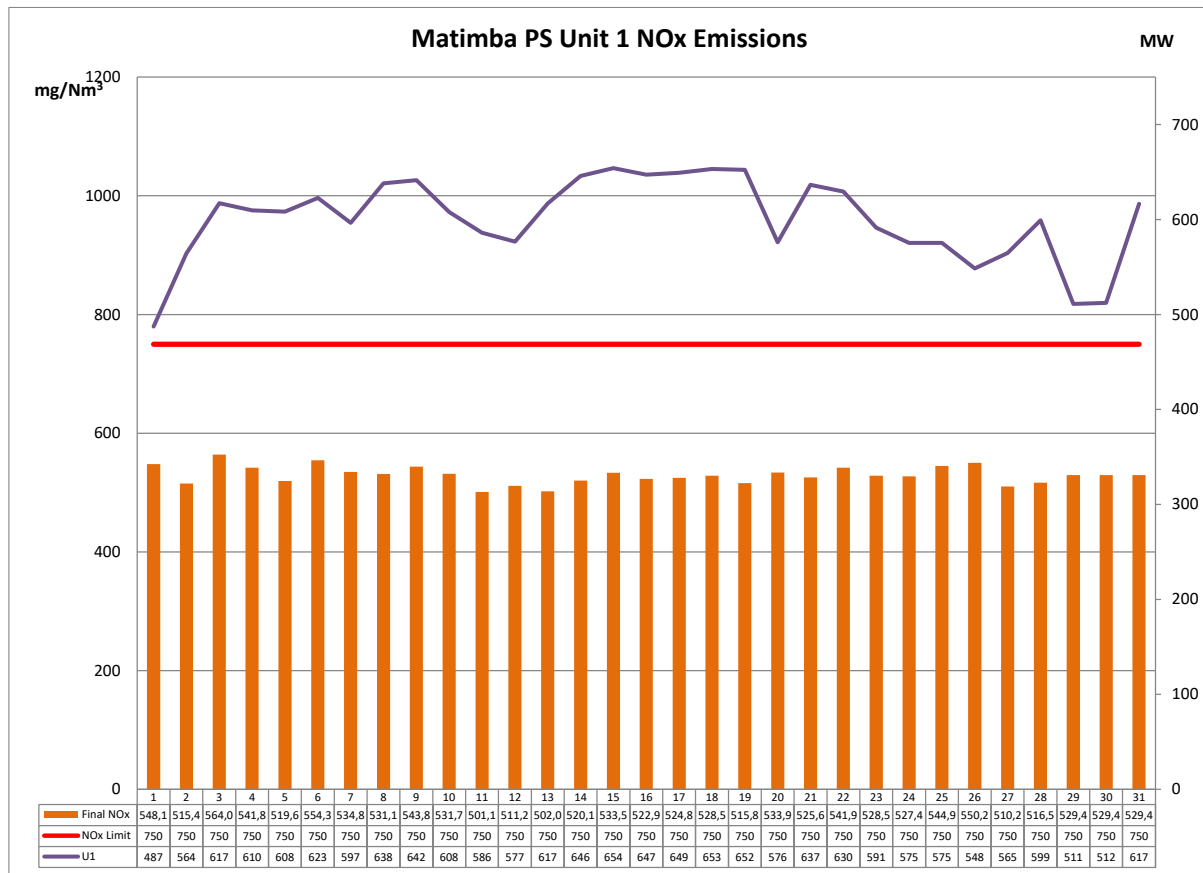


Graph 12: SO₂ daily average emissions against emission limit for unit 6 for the month of December 2020

Interpretation:

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

Unit 1 NO_x emissions

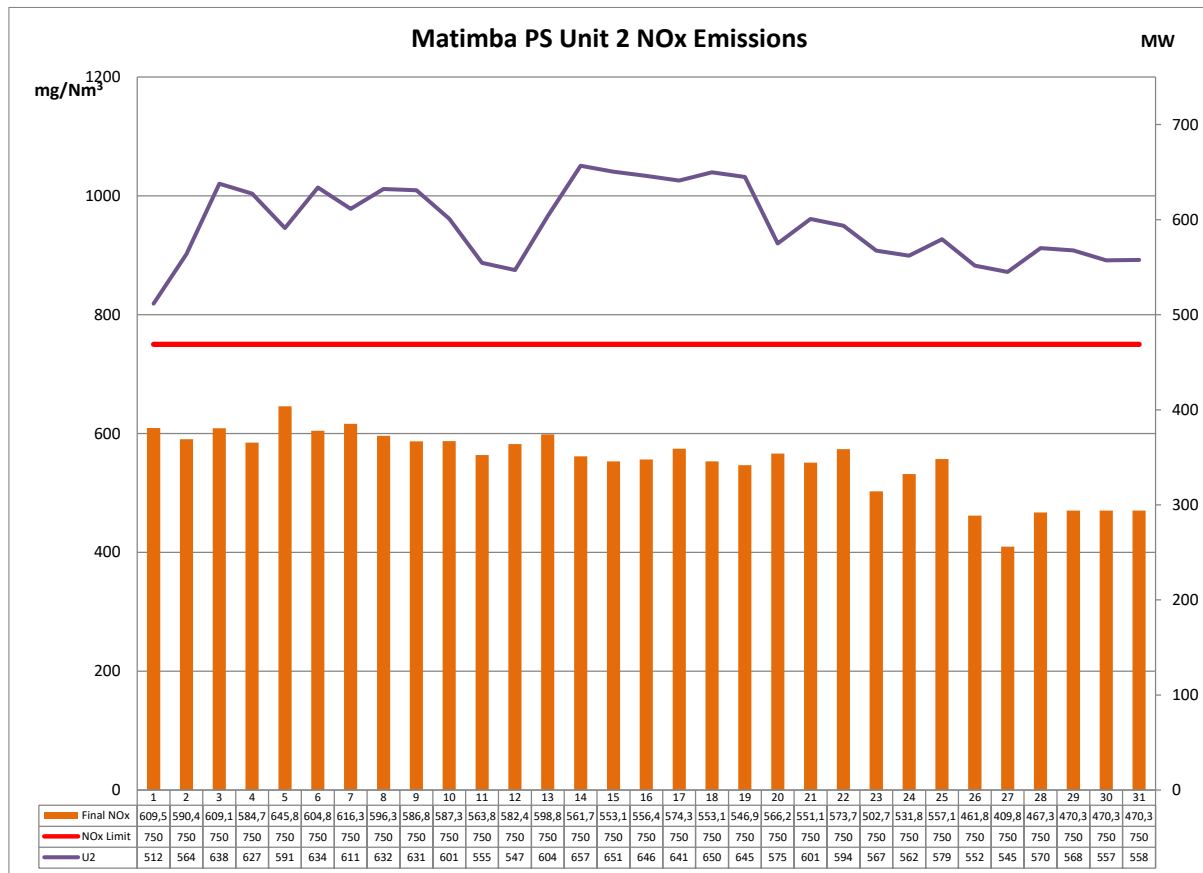


Graph 13: NO_x daily average emissions against emission limit for unit 1 for the month of December 2020

Interpretation:

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

Unit 2 NO_x emissions

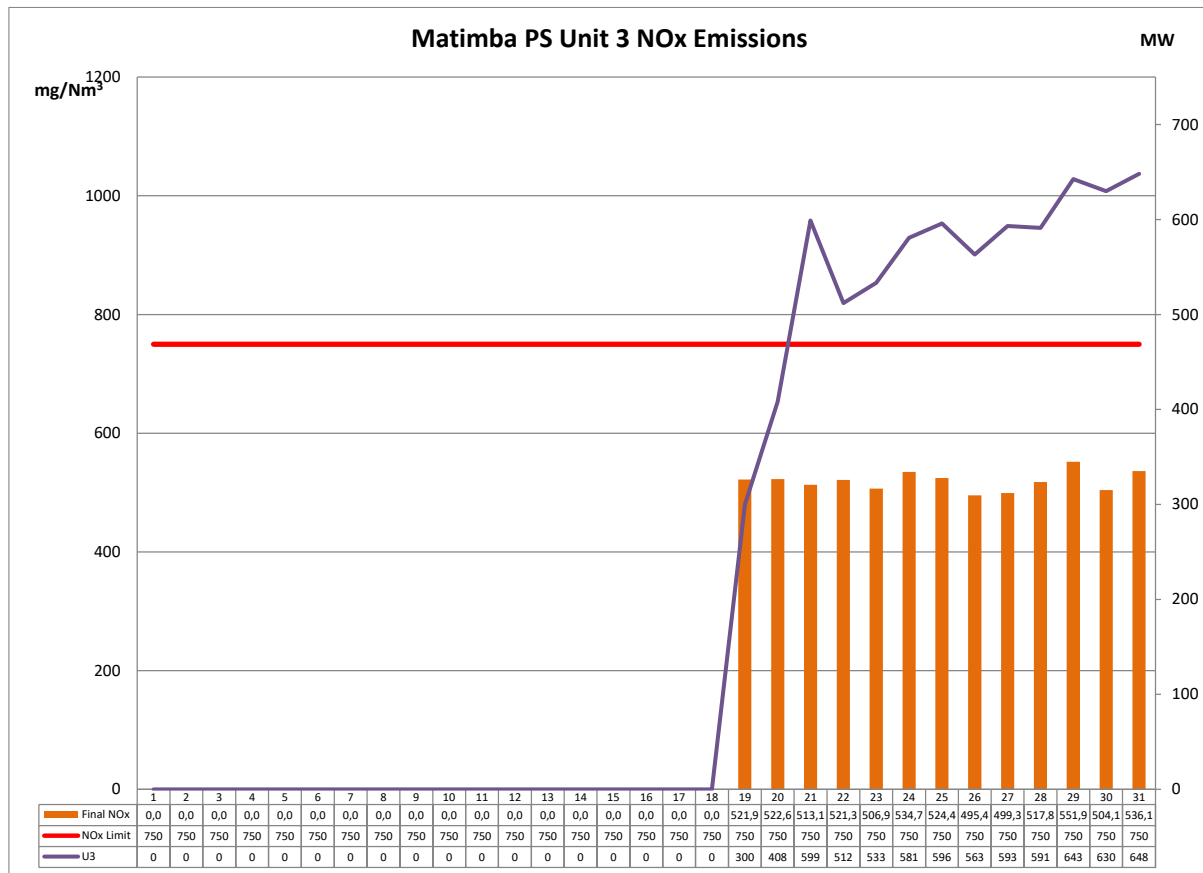


Graph 14: NO_x daily average emissions against emission limit for unit 2 for the month of December 2020

Interpretation:

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

Unit 3 NO_x emissions

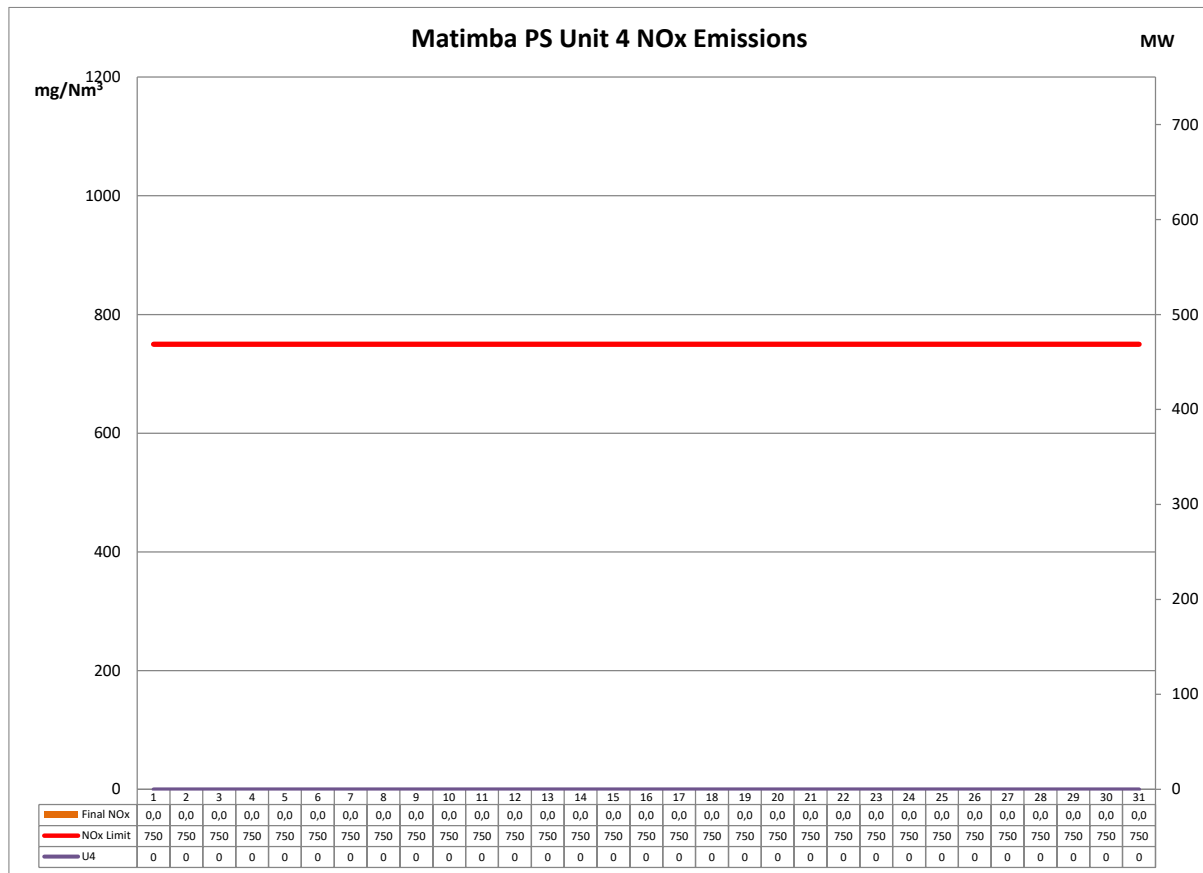


Graph 15: NO_x daily average emissions against emission limit for unit 3 for the month of December 2020

Interpretation:

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

Unit 4 NO_x emissions

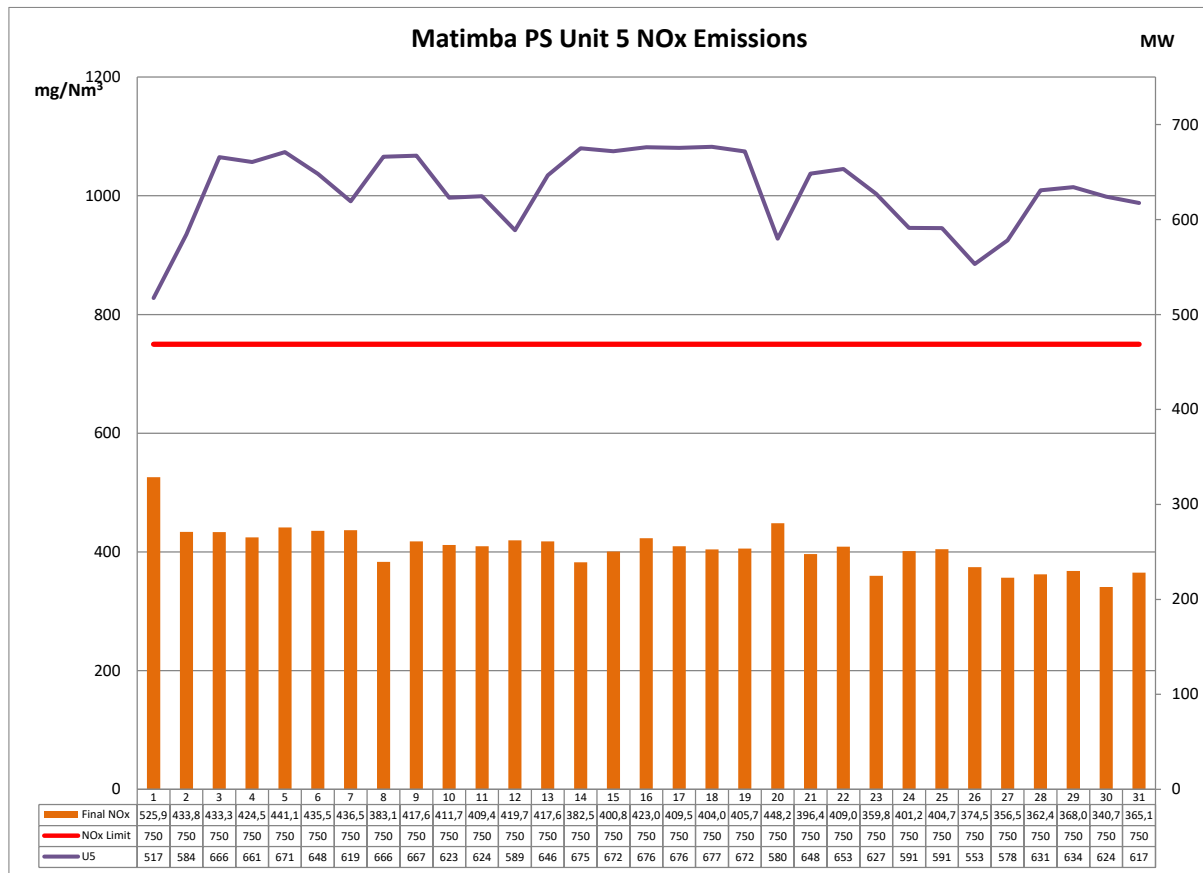


Graph 16: NO_x daily average emissions against emission limit for unit 4 for the month of December 2020

Interpretation:

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

Unit 5 NO_x emissions

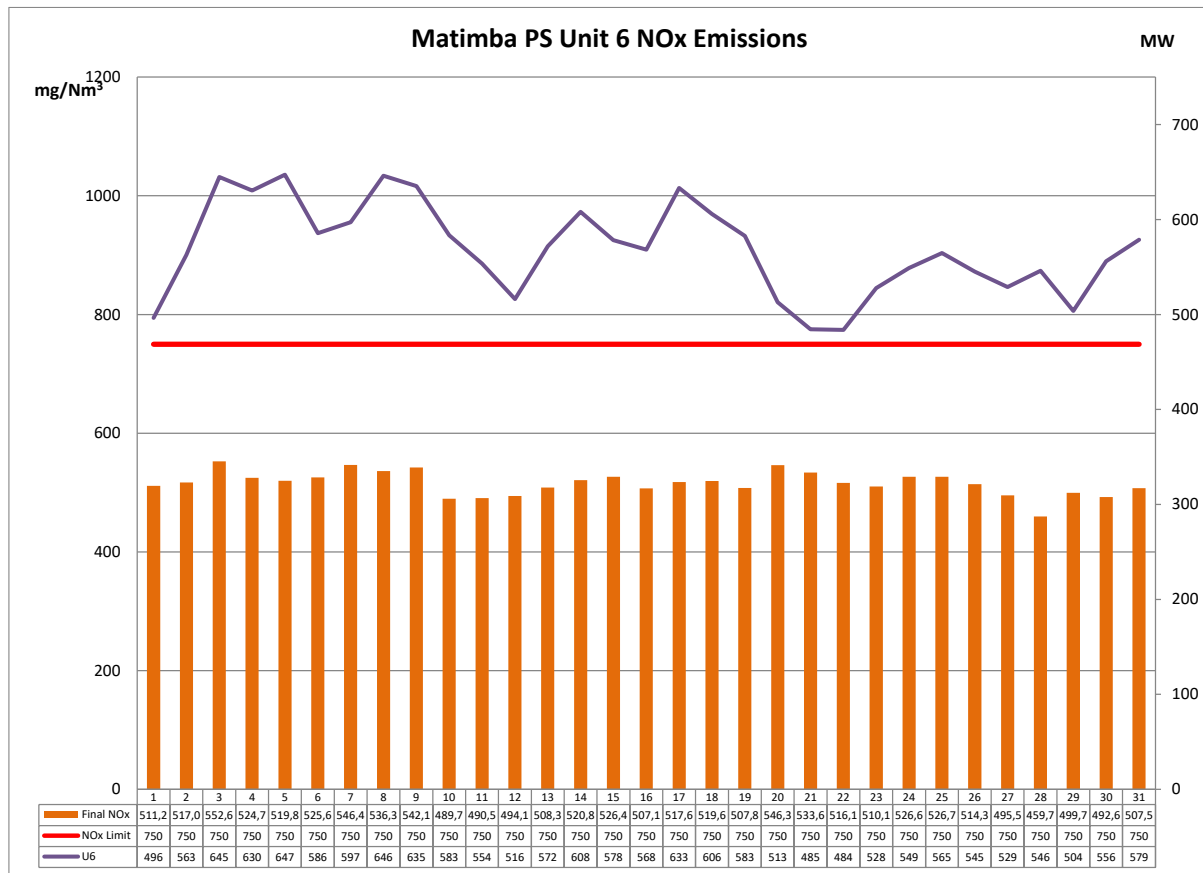


Graph 17: NO_x daily average emissions against emission limit for unit 5 for the month of December 2020

Interpretation:

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

Unit 6 NO_x emissions



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

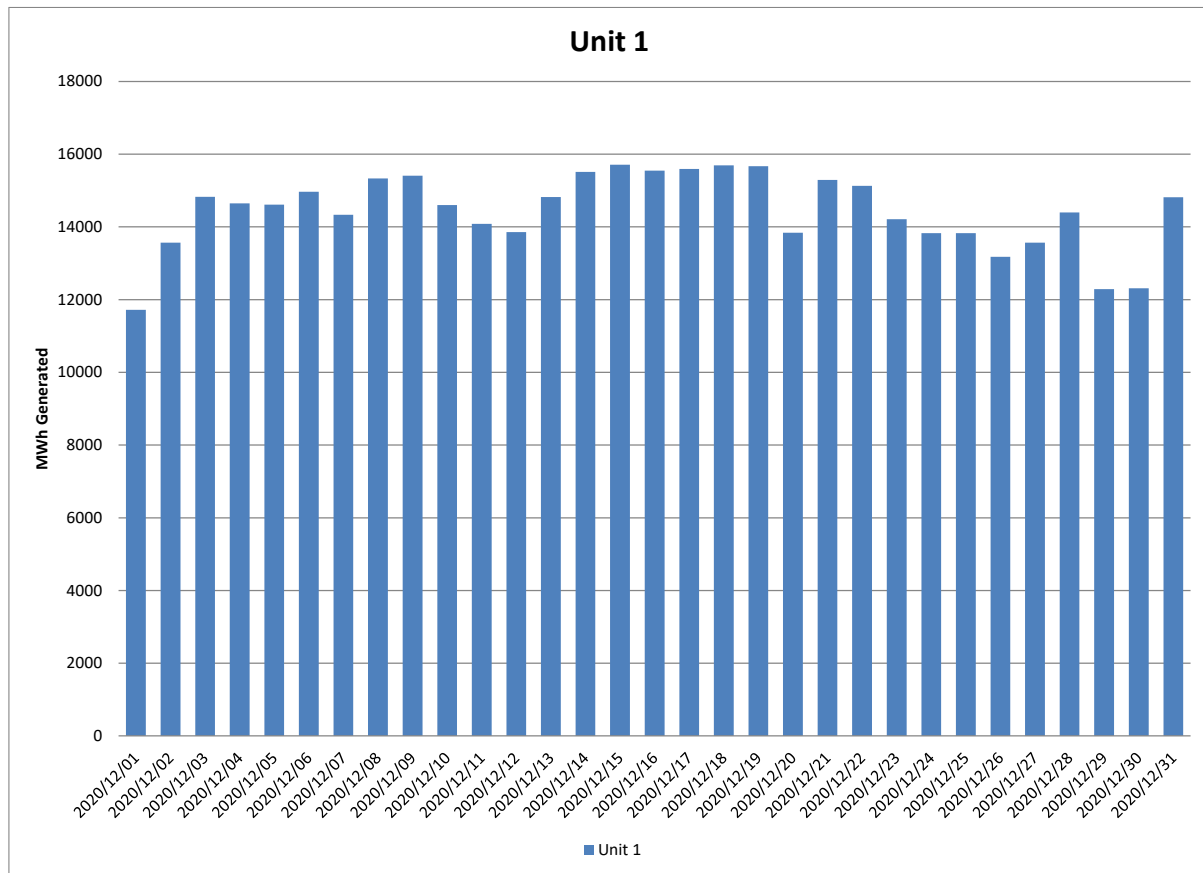
Interpretation:

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

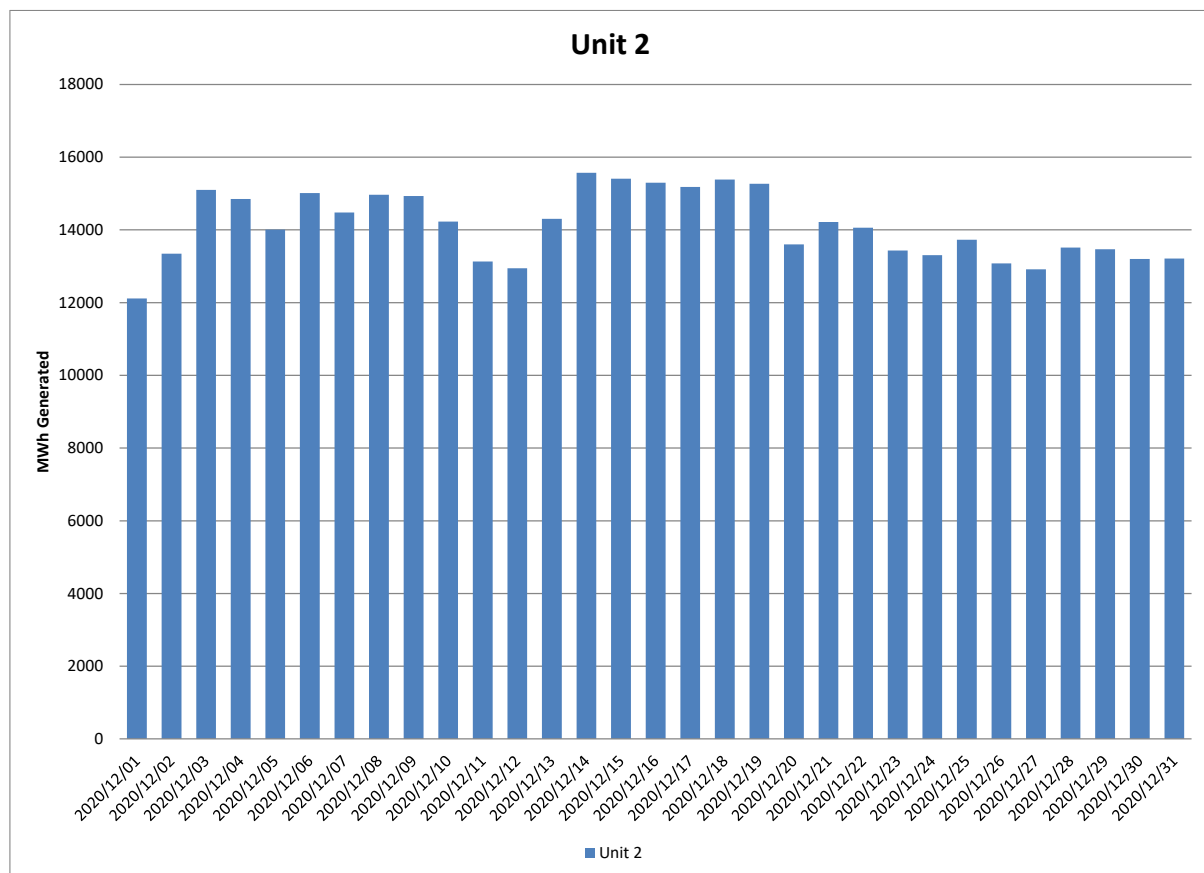
Table 4: Daily power generated per unit in MWh for the month of December 2020

Date	Unit 1	Unit 2	Unit 3	Unit 4	Unit 5	Unit 6
2020/12/01	11718,7	12110,9	0	0	12316,5	11850,5
2020/12/02	13564,5	13342,6	0	0	13902,8	13442,9
2020/12/03	14827,4	15097,4	0	0	15836,9	15404,9
2020/12/04	14647,7	14849,9	0	0	15713,3	15065,2
2020/12/05	14614,1	14006,8	0	0	15959	15456,5
2020/12/06	14967,7	15013,8	0	0	15421	13988,4
2020/12/07	14334,6	14478,1	0	0	14730	14269
2020/12/08	15329,1	14964,7	0	0	15848	15401,5
2020/12/09	15409,7	14933,9	0	81,13	15870,7	15166,3
2020/12/10	14599,5	14230,5	0	0	14820,4	13920,8
2020/12/11	14082,7	13132	0	0	14853,3	13213,1
2020/12/12	13855,2	12944,1	0	0	14006,9	12302
2020/12/13	14823,3	14305,7	0	0	15378,9	13661,7
2020/12/14	15513,7	15568,7	0	0	16057,6	14526,4
2020/12/15	15711,8	15404,7	0	0	15985,1	13801,9
2020/12/16	15548,3	15296	0	0	16085,5	13583,3
2020/12/17	15592,5	15181,9	0	0	16070,9	15103,5
2020/12/18	15693,5	15383,6	0	0	16093	14438,1
2020/12/19	15670,5	15268,3	3550,6	0	15977,9	13896,9
2020/12/20	13836,7	13602,9	9734,2	0	13796,2	12247,5
2020/12/21	15292,5	14216,6	14294,5	0	15417,3	11574,5
2020/12/22	15125,7	14058	12217,7	0	15536,8	11546,1
2020/12/23	14210,1	13430,1	12731,3	0	14911,7	12600,5
2020/12/24	13829,8	13305,9	13863,9	0	14062,9	13102,6
2020/12/25	13829,9	13725,7	14226,3	0	14060,9	13484,6
2020/12/26	13177,3	13075,3	13444,1	0	13160,6	13014,1
2020/12/27	13567,9	12913,1	14165	0	13751,1	12620,4
2020/12/28	14393,8	13513,3	14117,3	0	15000,8	13034,7
2020/12/29	12288,5	13466,5	15345,4	0	15080,2	12021,5
2020/12/30	12312,4	13201,9	15042,3	0	14843,6	13268,7
2020/12/31	14814,6	13214,1	15477,4	0	14683,8	13793,8

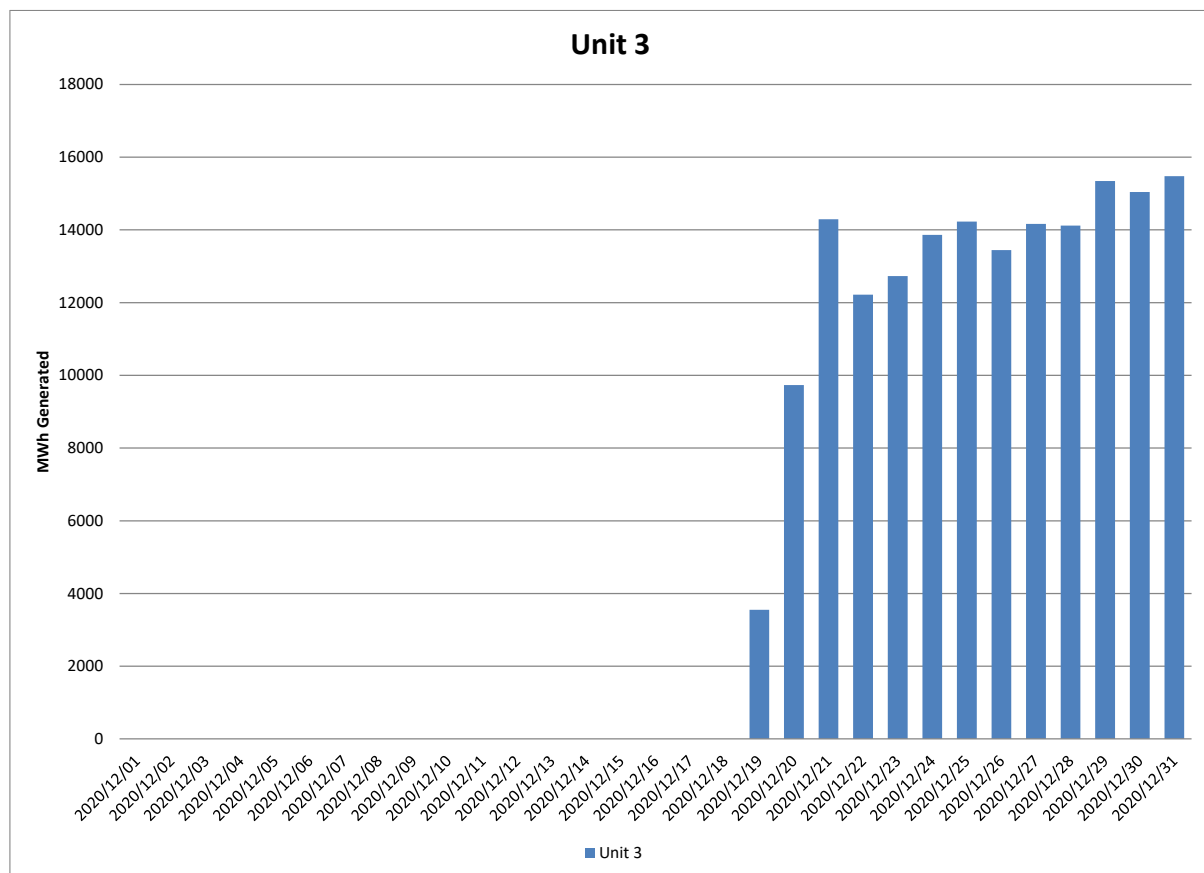
Graph 19: Unit 1 daily generated power in MWh for the month of December 2020



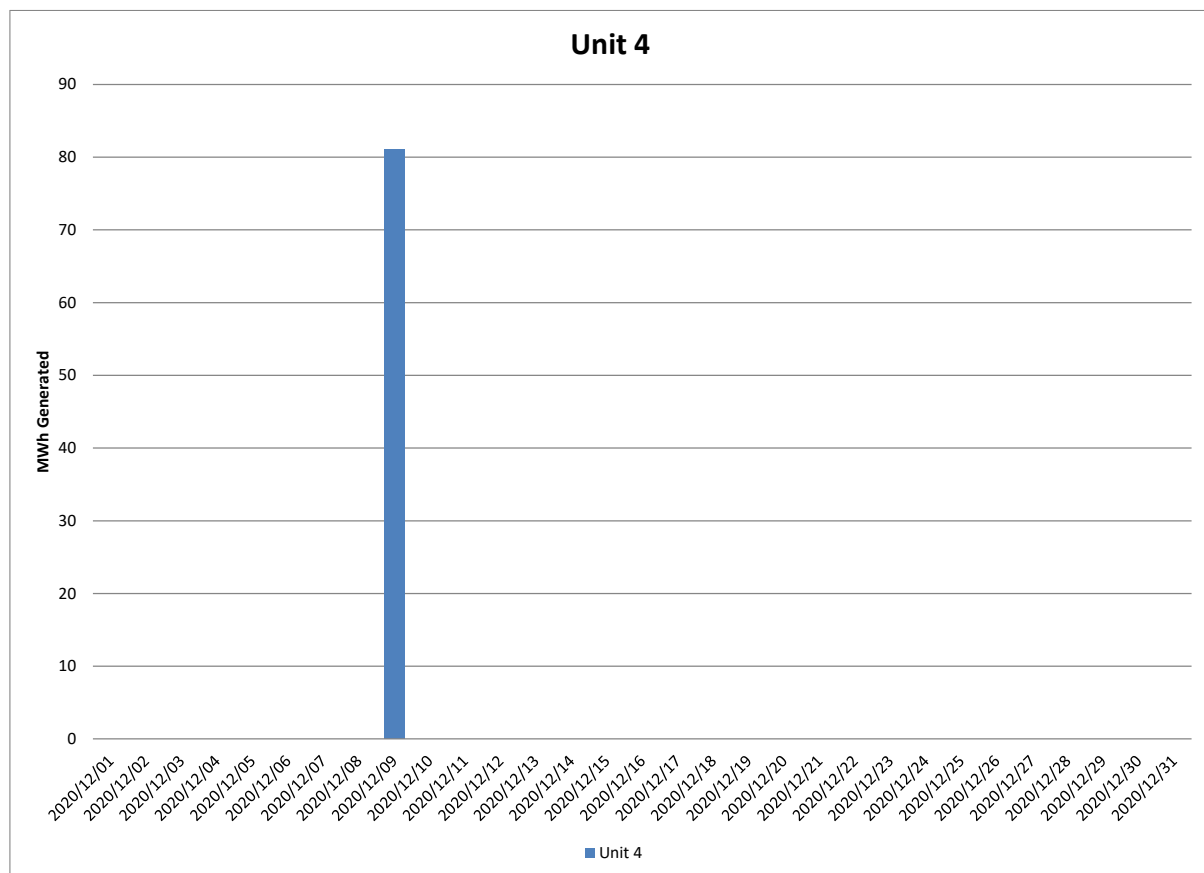
Graph 20: Unit 2 daily generated power in MWh for the month of December 2020



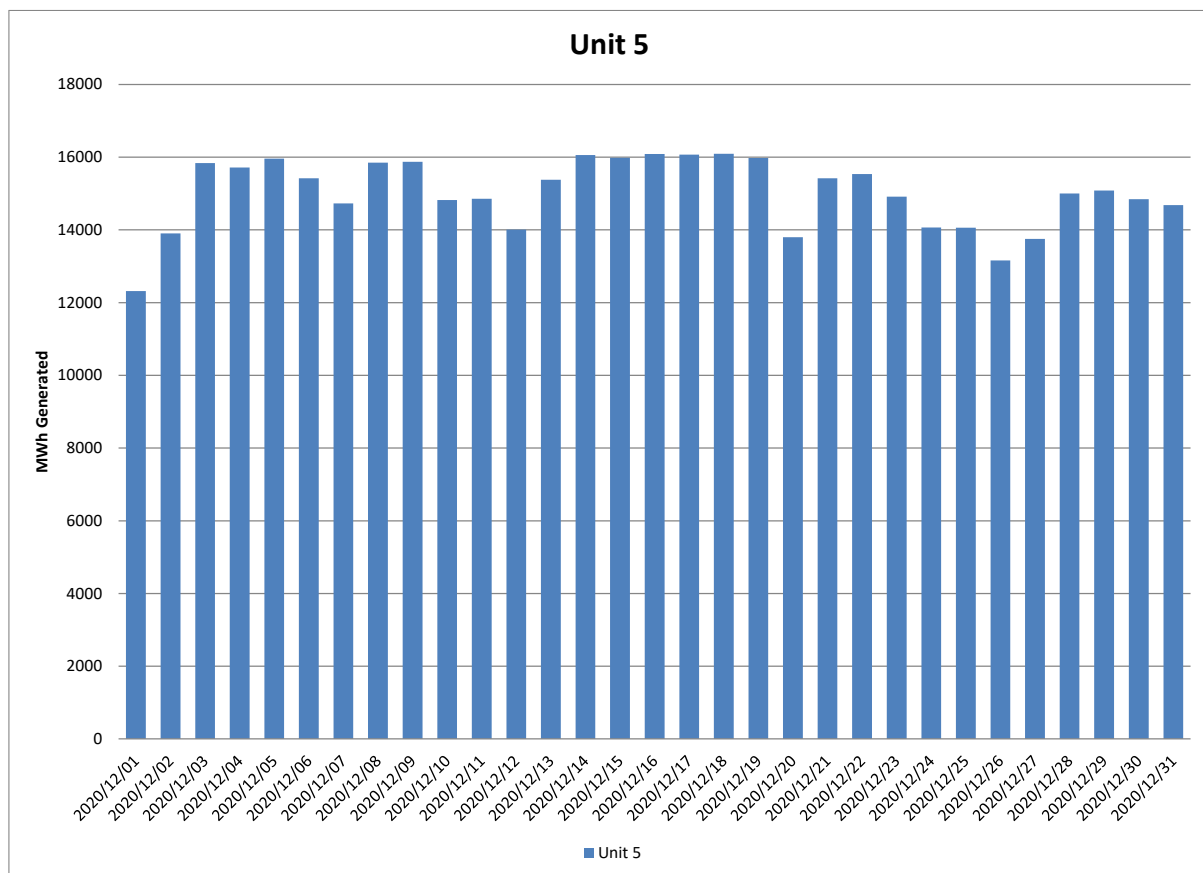
Graph 21: Unit 3 daily generated power in MWh for the month of December 2020



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



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



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

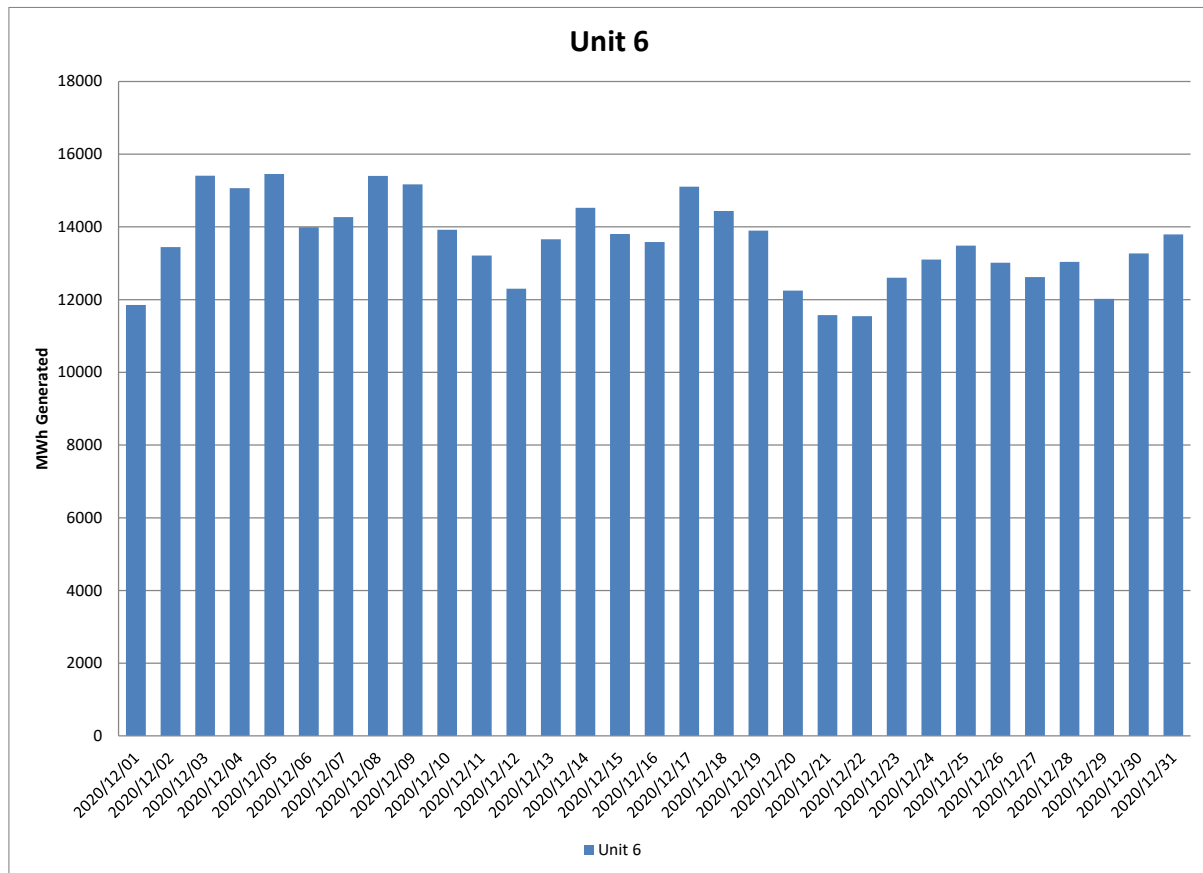


Table 5: Pollutant tonnages for the month of December 2020

Unit	PM (tons)	SO ₂ (tons)	NO ₂ (tons)
1	32,130	6 075,549	1 212,818
2	40,075	9 780,248	1 456,439
3	34,737	2 773,940	490,354
4	0,000	0,000	0,000
5	49,192	6 452,255	952,312
6	78,969	6 297,247	1 149,633
SUM	235,103	31 379,240	5 261,556

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	%	8,01	8,91	6,94		7,86	8,21
Moisture	%	5,30	5,38	6,29		5,34	4,51
Velocity	m/s	29,1	35,9	27,6		29,5	29,0
Temperature	°C	142,5	134,3	132,3		130,3	121,4
Pressure	mBar	930,1	930,6	916,0		926,8	889,8

Start-up information.**Table 7:** Start-up information

Unit	3	
Fires in	03h33	2020-12-19
Synchronization with Grid	12h06	2020-12-19
Emissions below limit	16h00	2020-12-19
Fires in to synchronization	8.55	HOURS
Synchronization to < Emission limit	3.9	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	482	482	165	0	482	482
Emergency Hours declared including hours after stand down	493	493	167	0	493	493
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:	Friday, 29 January 2021	
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:	December	
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:	796,527	tons/month
Molecular weight of the fuel oil:	166,00	Lb/lb-mole
METEROLOGICAL DATA FOR THE MONTH	Data	Unit
Daily average ambient temperature	27,35	°C
Daily maximum ambient temperature	33,26	°C
Daily minimum ambient temperature	21,97	°C
Daily ambient temperature range	11,30	°C
Daily total insolation factor	6,12	kWh/m²/day
Tank paint colour	Grey/medium	NA
Tank paint solar absorbance	0,68	NA
FINAL OUTPUT:	Result	Unit
Breathing losses:	0,57	kg/month
Working losses:	0,02	kg/month
TOTAL LOSSES (Total TVOC Emissions for the month):	0,59	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, Tritech 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 December 2020.

Associated Unit/Stack	PM	SO ₂	NO	CO ₂
Unit 1	100,0	99,9	99,9	100,0
Unit 2	100,0	99,9	99,9	100,0
Unit 3	100,0	99,7	99,7	100,0
Unit 4				
Unit 5	100,0	99,9	99,9	99,9
Unit 6	100,0	100,0	100,0	100,0

Ambient Air quality Monitoring

Finalized December Ambient air quality report not available at the time of publishing the Emission report. December ambient air quality report will be submitted as soon as it is finalized.

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. S23⁰ 40' 2.8" E027⁰ 36' 34.8" 175m from ground level and 75m from the top.
 - b. Gas:
 - i. S23⁰ 40' 2.8" E027⁰ 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. S23⁰ 40' 14.8" E027⁰ 36' 47.5" 175m from ground level and 75m from the top.
 - b. Gas:
 - i. S23⁰ 40' 14.8" E027⁰ 36' 47.5" 100m from ground level and 150m from the top.
 - c. Stack height
 - i. 250 meter consist of 3 flues

Unit 1

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

Unit 2

1. All precipitator fields in service.
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. Unit off load

Unit 5

1. All precipitator fields in service.
2. No abnormalities on the SO₃ plant. Preventative maintenance done during the month.

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

Awareness campaigns were conducted in December 2020. These included:

- Radio station advertisement – see attached proof of advertisement being read on the radio station as well as the content shared.
- A newspaper advertisement promoting the protection of air quality. See attached proof of advertisement in the local newspaper.

Sampling dates and times

1. Continuous

Attachments

Radio advertisement

Newspaper advertisement

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