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Date:
15 January 2019

Enquiries:

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E-mail:

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Lephalale Local Municipality
E-mail:

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

Dear Mrs Thivhafuni

MATIMBA POWER STATION'S MONTHLY EMISSIONS REPORT FOR THE MONTH OF DECEMBER 2018

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/A3.

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	1 147 178
	Fuel Oil	Tons/month	1 200	390.746
Production Rates	Product/ By-Product Name	Unit	Maximum Production Capacity Permitted (Quantity)	Production Rate
	Energy	GWh	4 212.6	2 218.047

Abatement Technology

Table 2: Abatement Equipment Control Technology utilise.

Associated Unit	Technology Type	Actual Utilisation (%)
Unit 1	Electrostatic Precipitator	99.9
Unit 2	Electrostatic Precipitator	99.9
Unit 3	Electrostatic Precipitator	99.9
Unit 4	Electrostatic Precipitator	99.9
Unit 5	Electrostatic Precipitator	100
Unit 6	Electrostatic Precipitator	100

Associated Unit	Technology Type	Actual Utilisation (%)
Unit 1	SO ₃ Plant	99
Unit 2	SO ₃ Plant	98
Unit 3	SO ₃ Plant	99
Unit 4	SO ₃ Plant	97
Unit 5	SO ₃ Plant	99
Unit 6	SO ₃ Plant	99

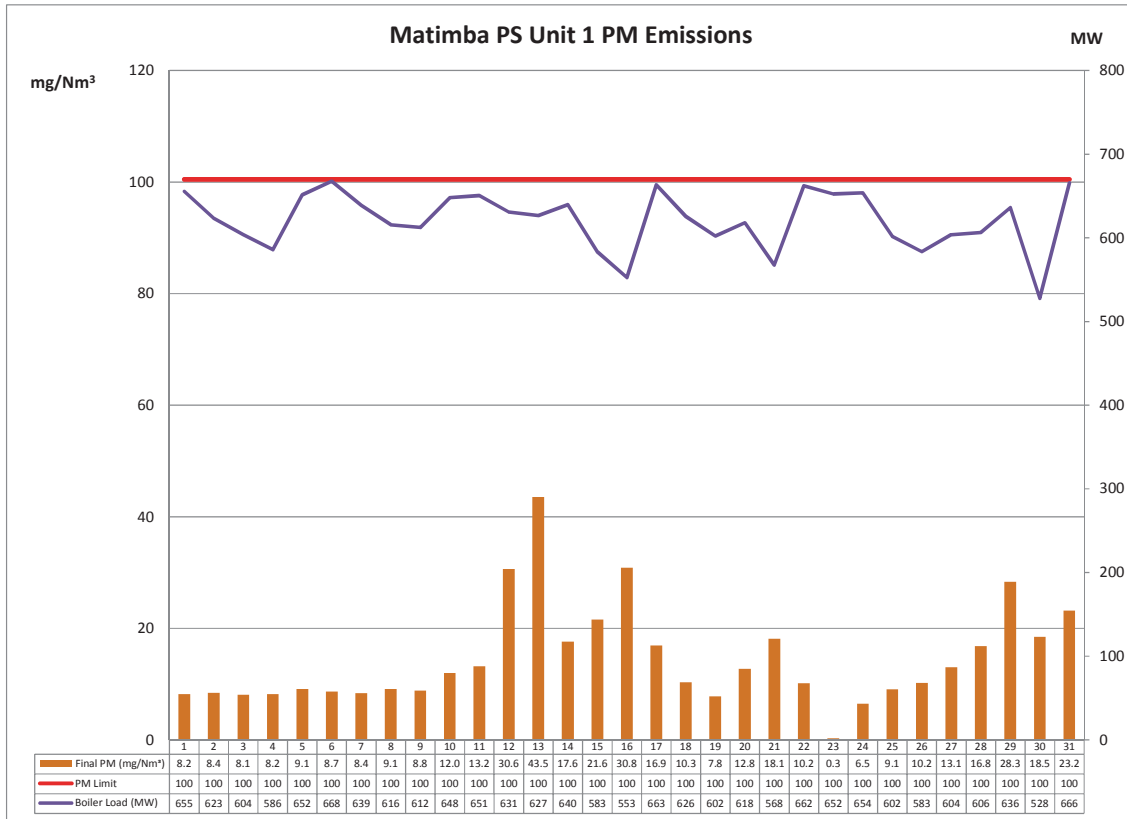
Energy Source Characteristics

Table 3: Energy Source Material Characteristics.

	Characteristic	Stipulated Range (Unit)	Monthly Average Content
Coal burned	Sulphur Content	0.8-1.6%	1.32
	Ash Content	30-40%	32.62

Emissions Reporting

Unit 1 particulate emissions

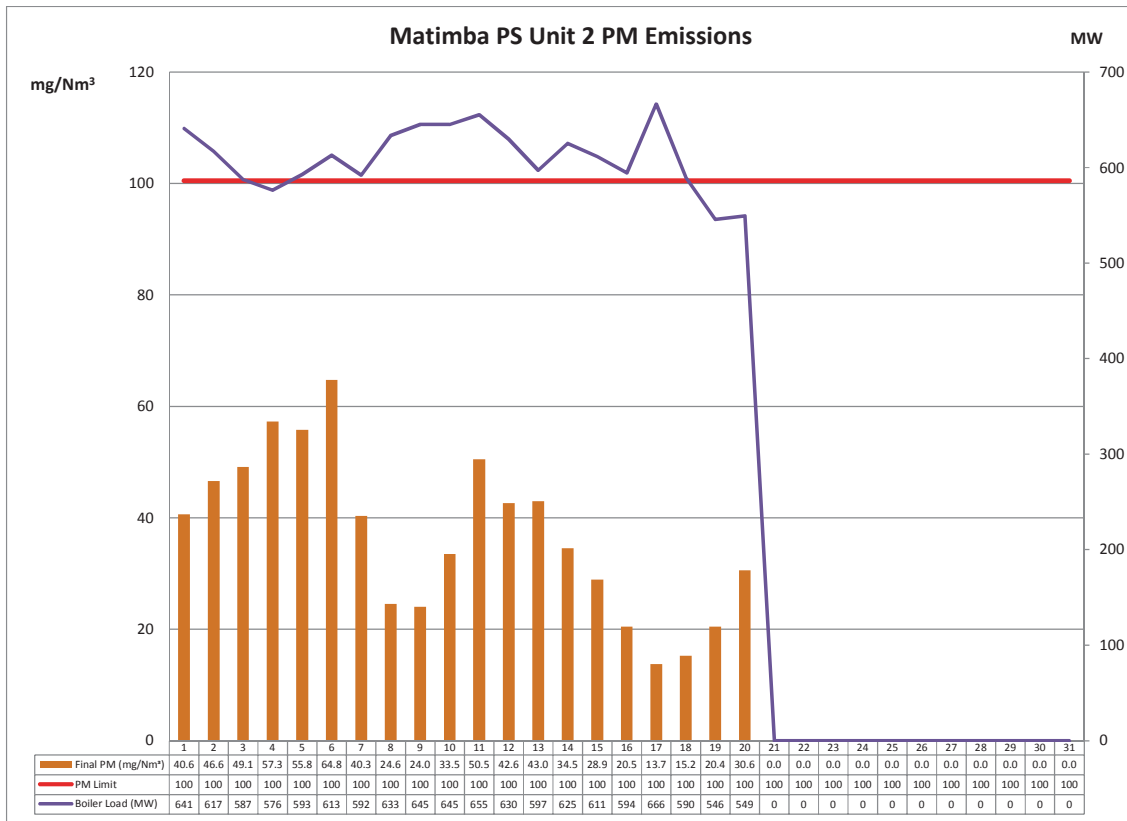


Graph 1: Particulate matter daily average emissions against emission limit for unit 1 for the month of December 2018

Interpretation:

All daily averages below particulate emission limit of 100 mg/Nm³.

Unit 2 particulate emissions

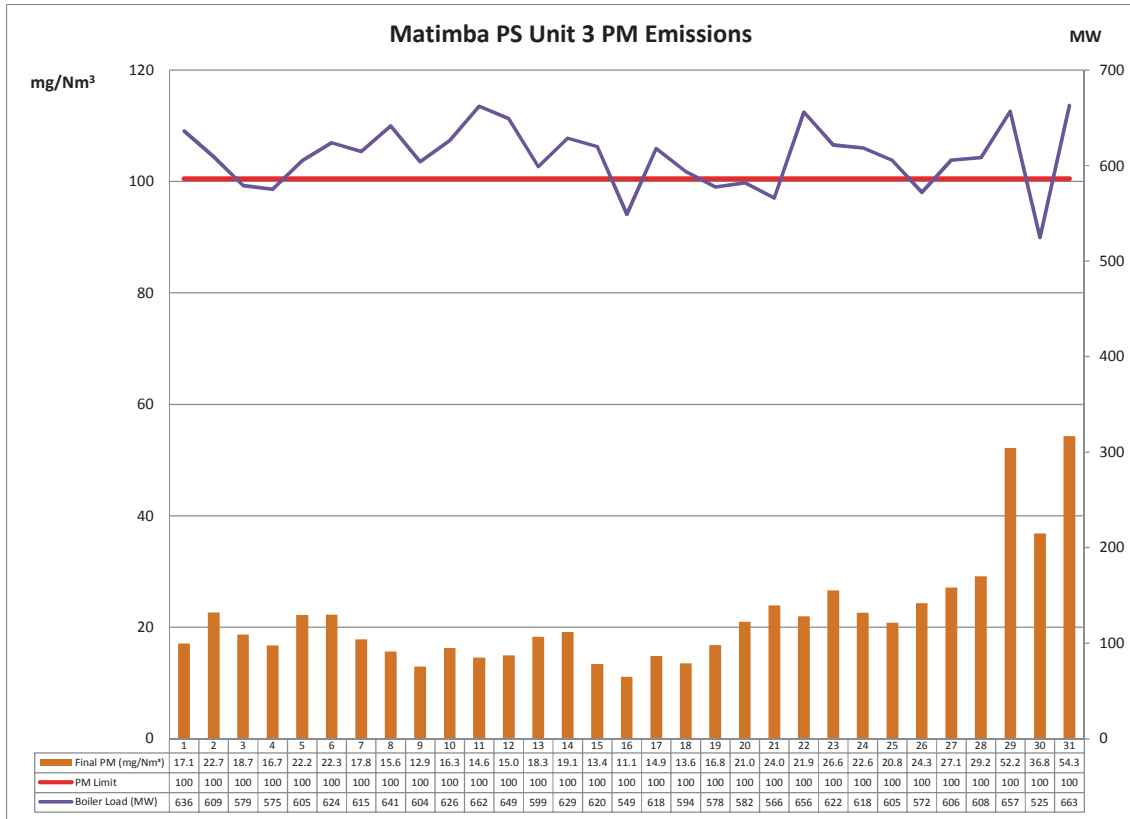


Graph 2: Particulate matter daily average emissions against emission limit for unit 2 for the month of December 2018

Interpretation:

All daily averages below particulate emission limit of 100 mg/Nm³.

Unit 3 particulate emissions

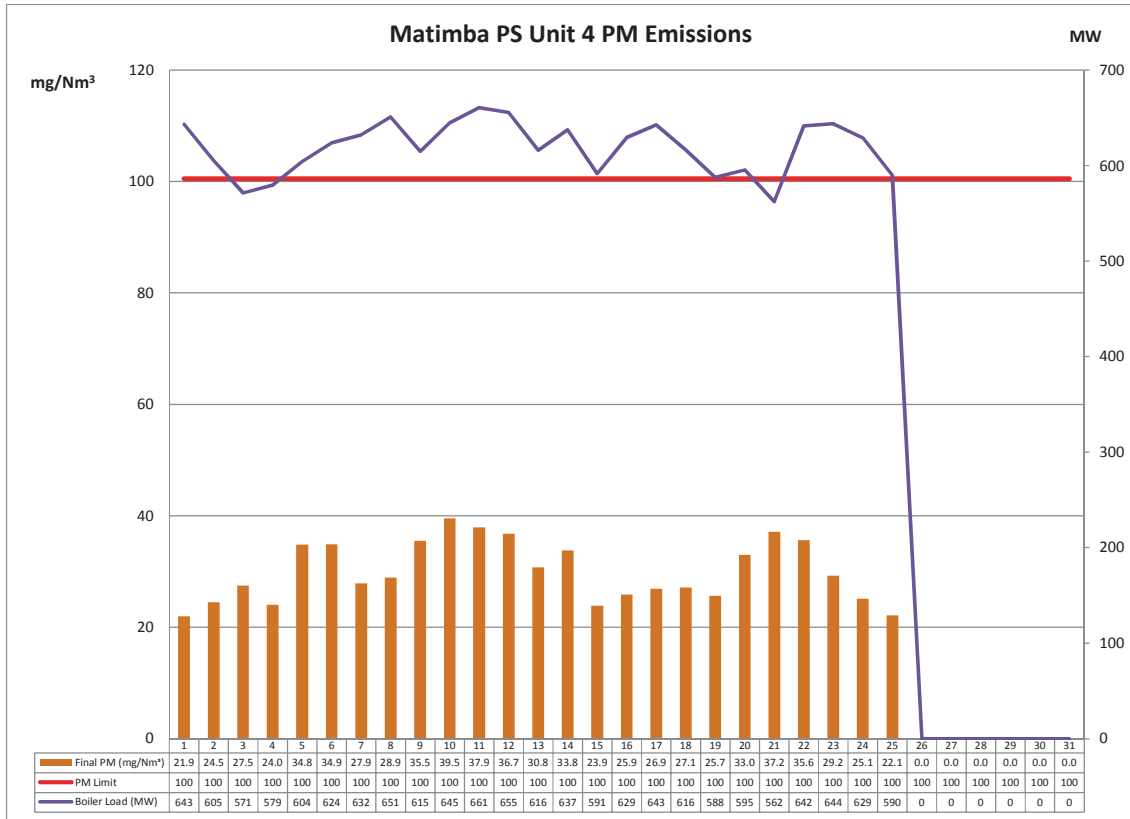


Graph 3: Particulate matter daily average emissions against emission limit for unit 3 for the month of December 2018

Interpretation:

All daily averages below particulate emission limit of 100 mg/Nm³.

Unit 4 particulate emissions

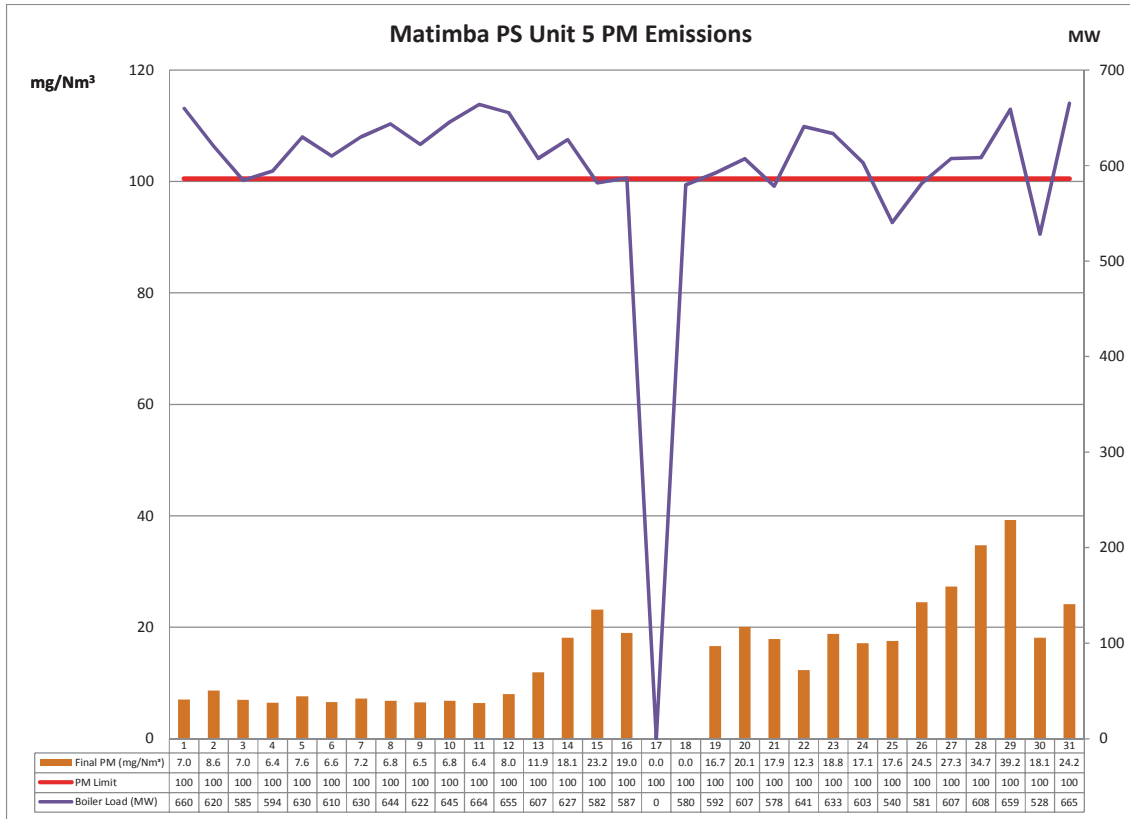


Graph 4: Particulate matter daily average emissions against emission limit for unit 4 for the month of December 2018

Interpretation:

All daily averages below particulate emission limit of 100 mg/Nm³.

Unit 5 particulate emissions

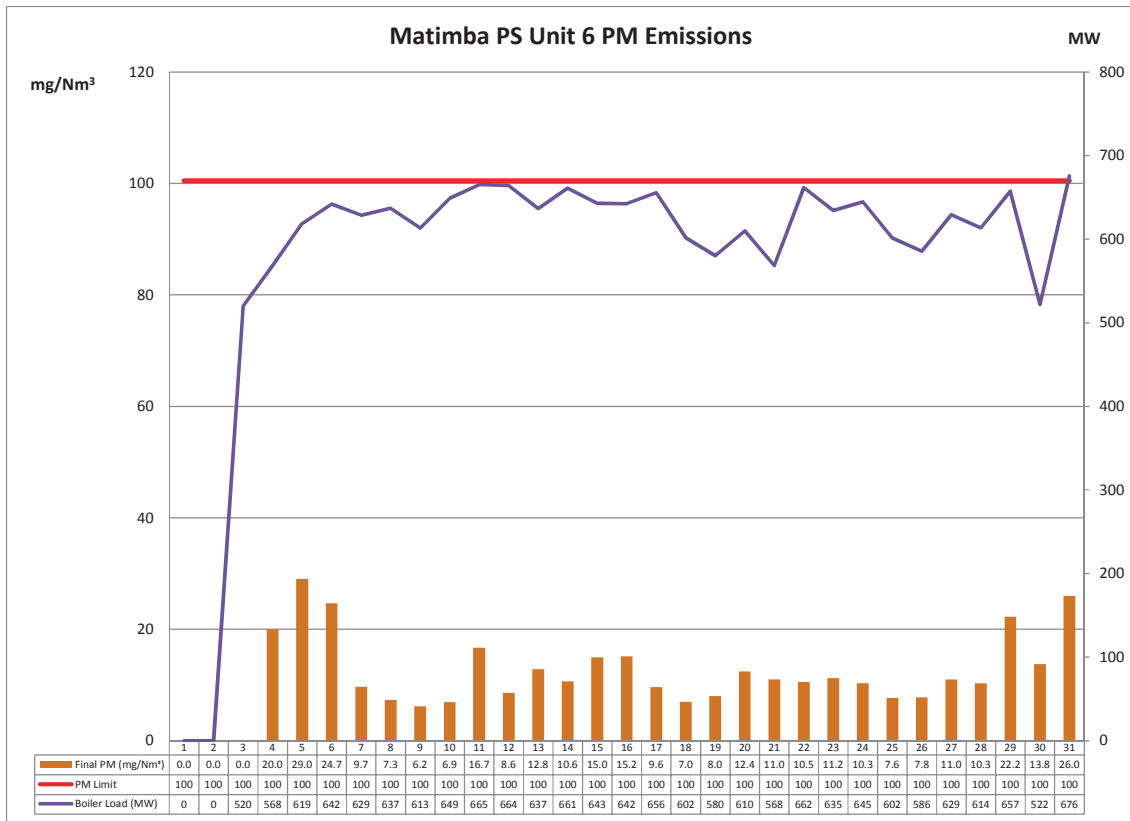


Graph 5: Particulate matter daily average emissions against emission limit for unit 5 for the month of December 2018

Interpretation:

All daily averages below particulate emission limit of 100 mg/Nm³.

Unit 6 particulate emissions

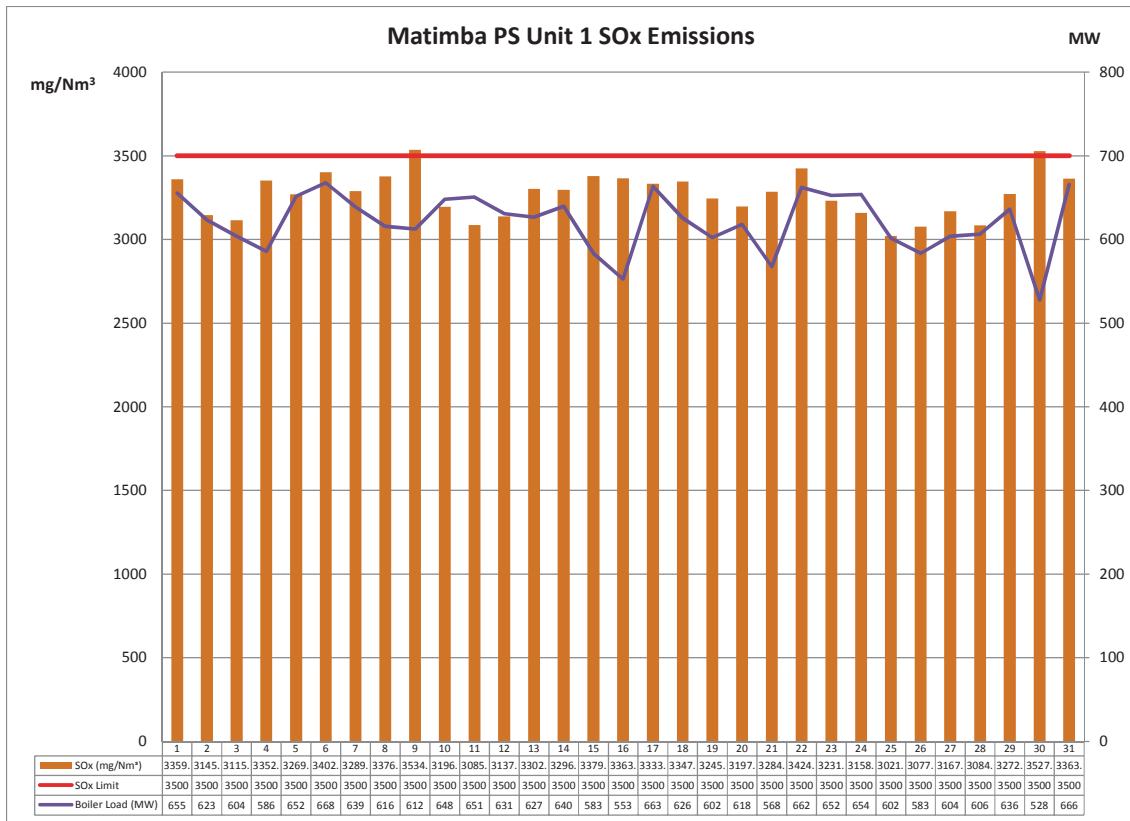


Graph 6: Particulate matter daily average emissions against emission limit for unit 6 for the month of December 2018

Interpretation:

All daily averages below particulate emission limit of 100 mg/Nm³.

Unit 1 SO₂ emissions



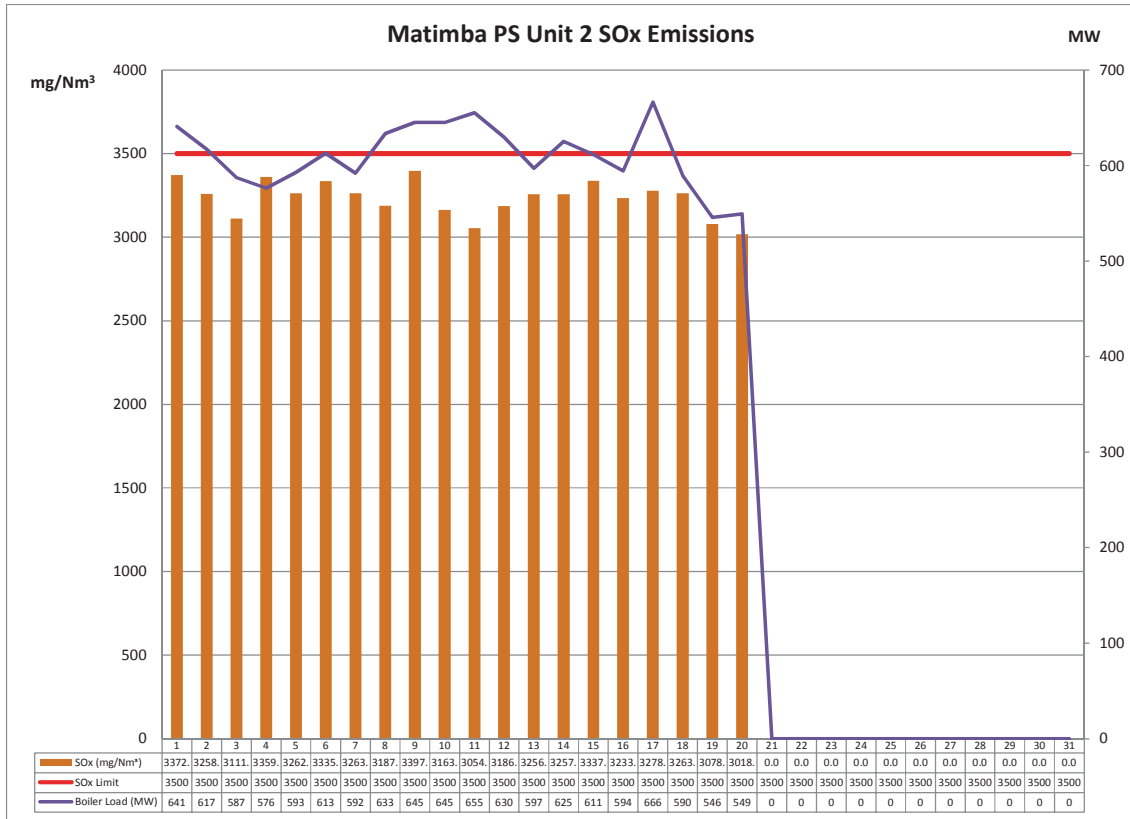
Graph 7: SO₂ daily average emissions against emission limit for unit 1 for the month of December 2018

Interpretation:

Limit was exceeded on day 9 and 30. After investigation it was determined that the exceedance noted on the 9th was due to increased sulphur content in the coal. On the 30th of December load was reduced leading to increased oxygen, higher than average sulphur content from the coal resulted in an exceedance of the SO₂ limit.

Further investigation by comparing the impact of increased O₂ against the impact of increased sulphur parts per million confirmed that the root cause for both of these exceedances was the high sulphur content in the coal burnt.

Unit 2 SO₂ emissions

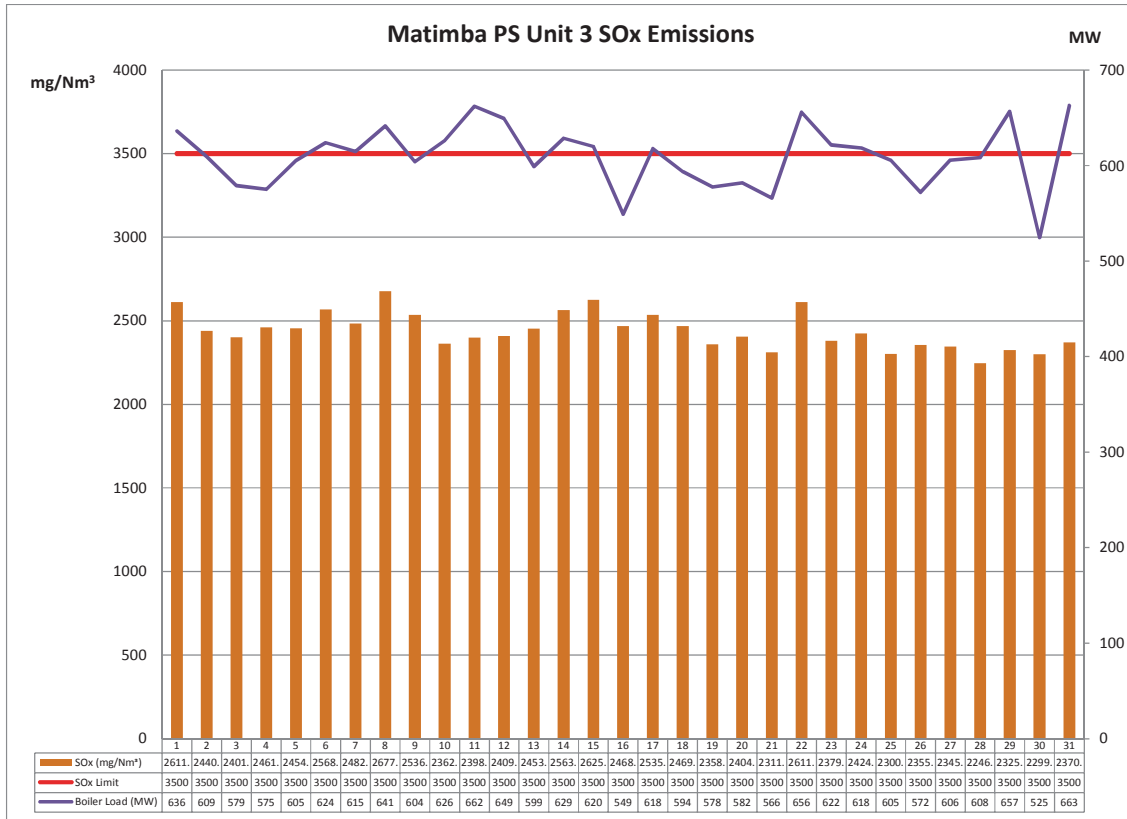


Graph 8: SO₂ daily average emissions against emission limit for unit 2 for the month of December 2018

Interpretation:

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

Unit 3 SO₂ emissions

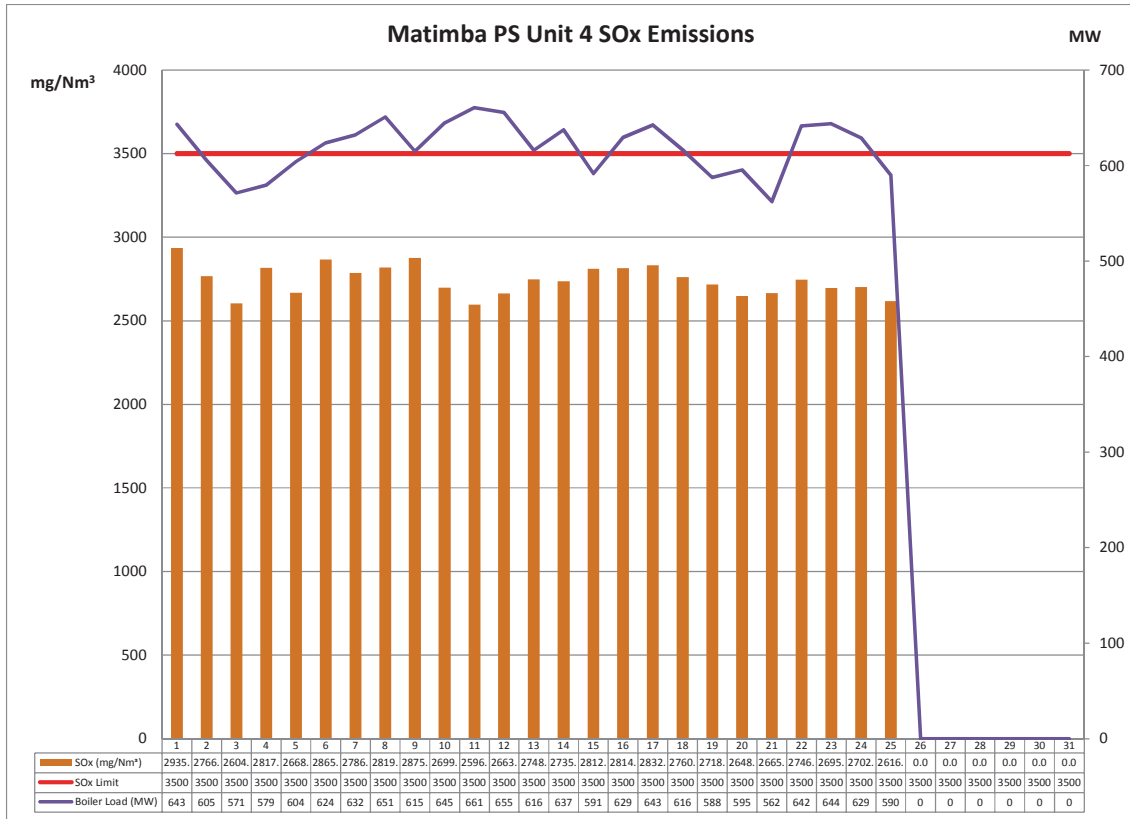


Graph 9: SO₂ daily average emissions against emission limit for unit 3 for the month of December 2018

Interpretation:

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

Unit 4 SO₂ emissions

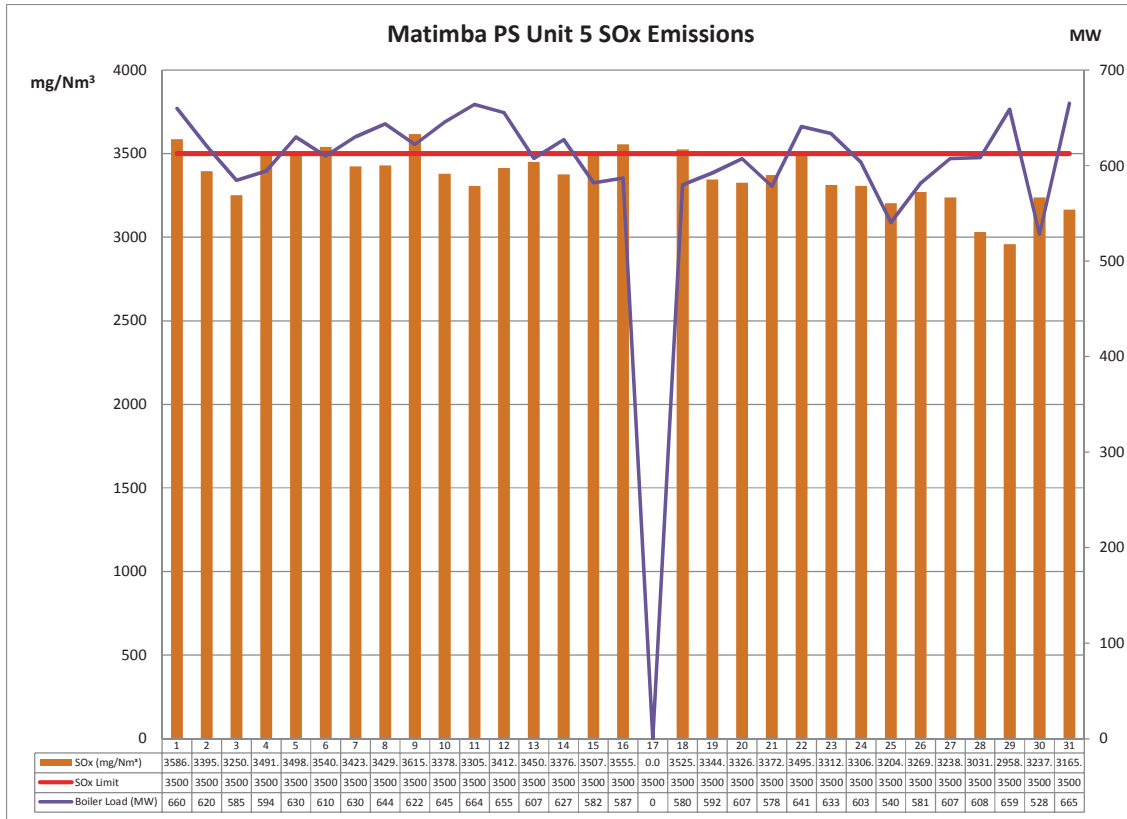


Graph 10: SO₂ daily average emissions against emission limit for unit 4 for the month of December 2018

Interpretation:

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

Unit 5 SO₂ emissions

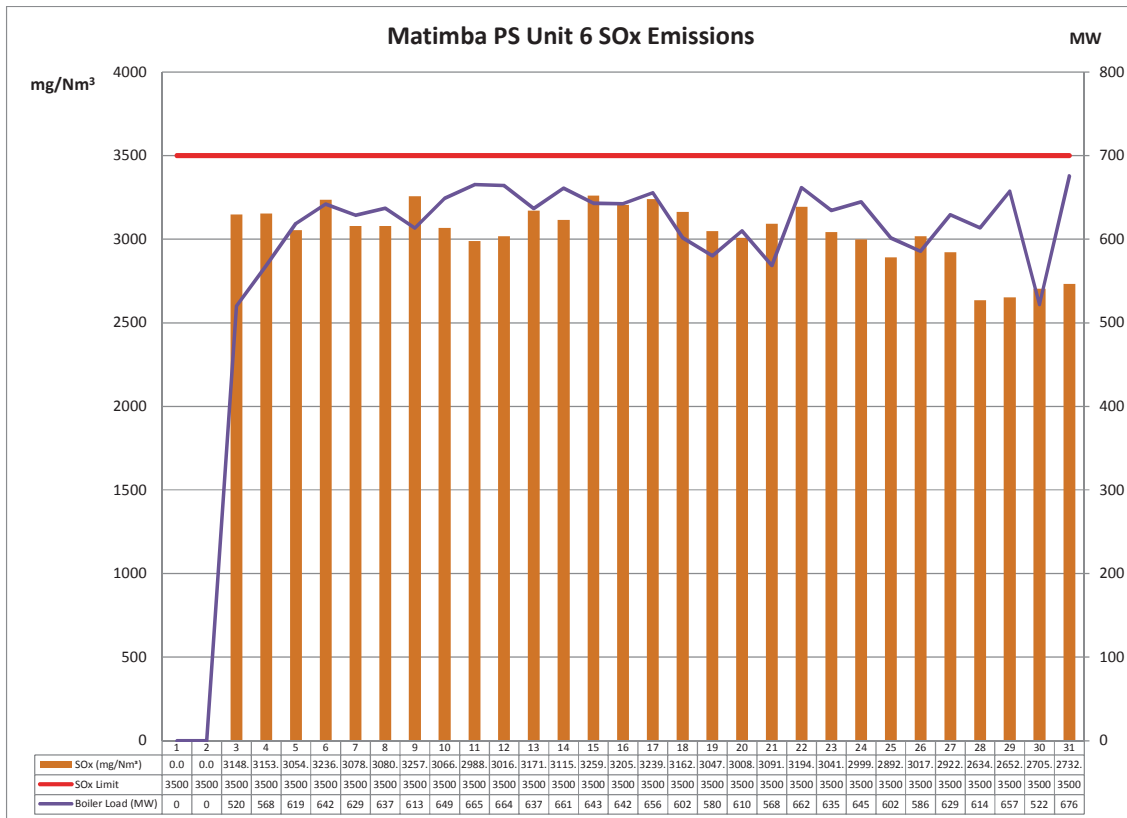


Graph 11: SO₂ daily average emissions against emission limit for unit 5 for the month of December 2018

Interpretation:

Limit was exceeded on day 1, 6, 9, 15, 16, and 18. After investigation it was confirmed that the root cause for the above mentioned exceedances was the high sulphur content in the coal burnt.

Unit 6 SO₂ emissions

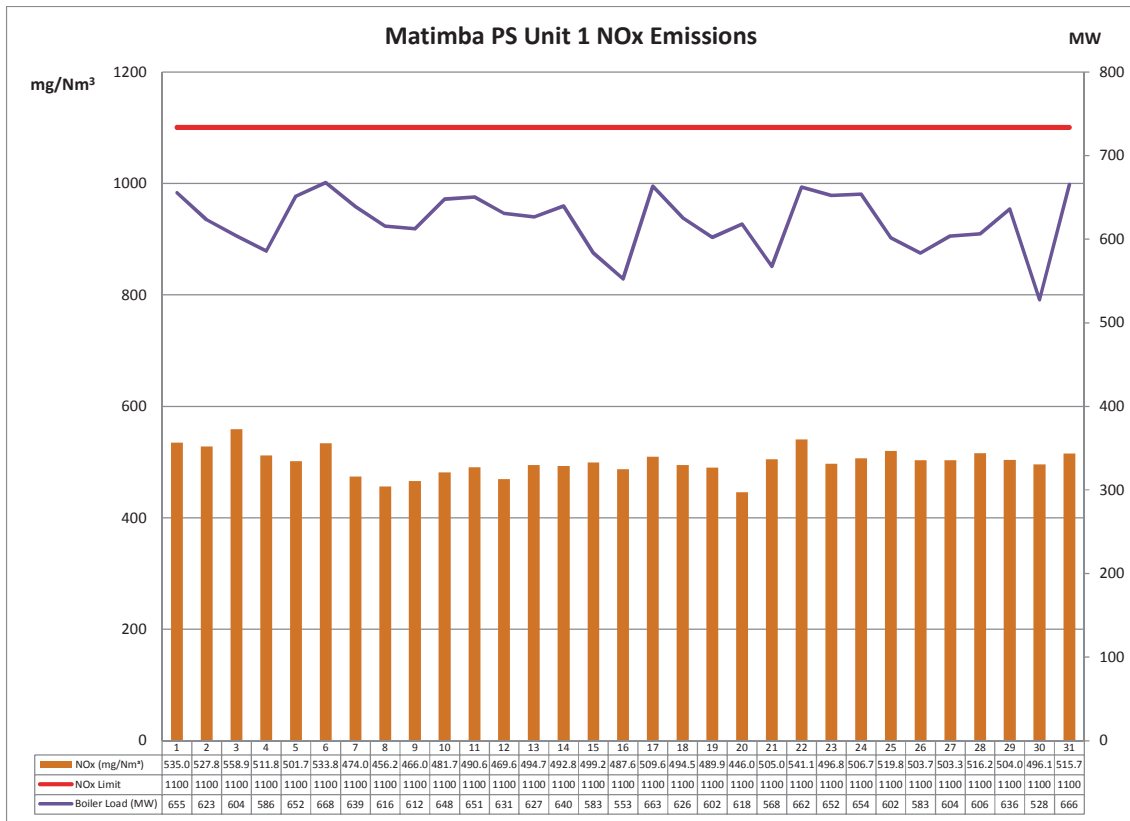


Graph 12: SO₂ daily average emissions against emission limit for unit 6 for the month of December 2018

Interpretation:

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

Unit 1 NO_x emissions

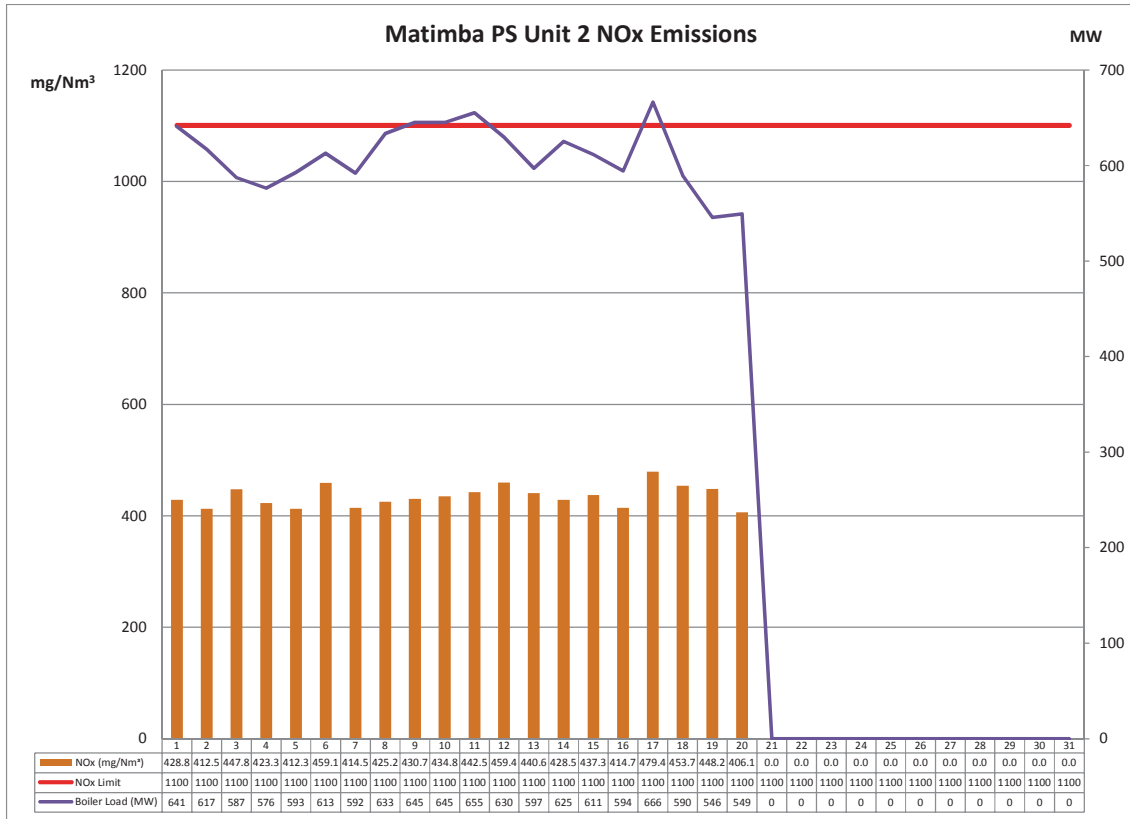


Graph 13: NO_x daily average emissions against emission limit for unit 1 for the month of December 2018

Interpretation:

All daily averages below NO_x emission limit of 1100 mg/Nm³.

Unit 2 NO_x emissions

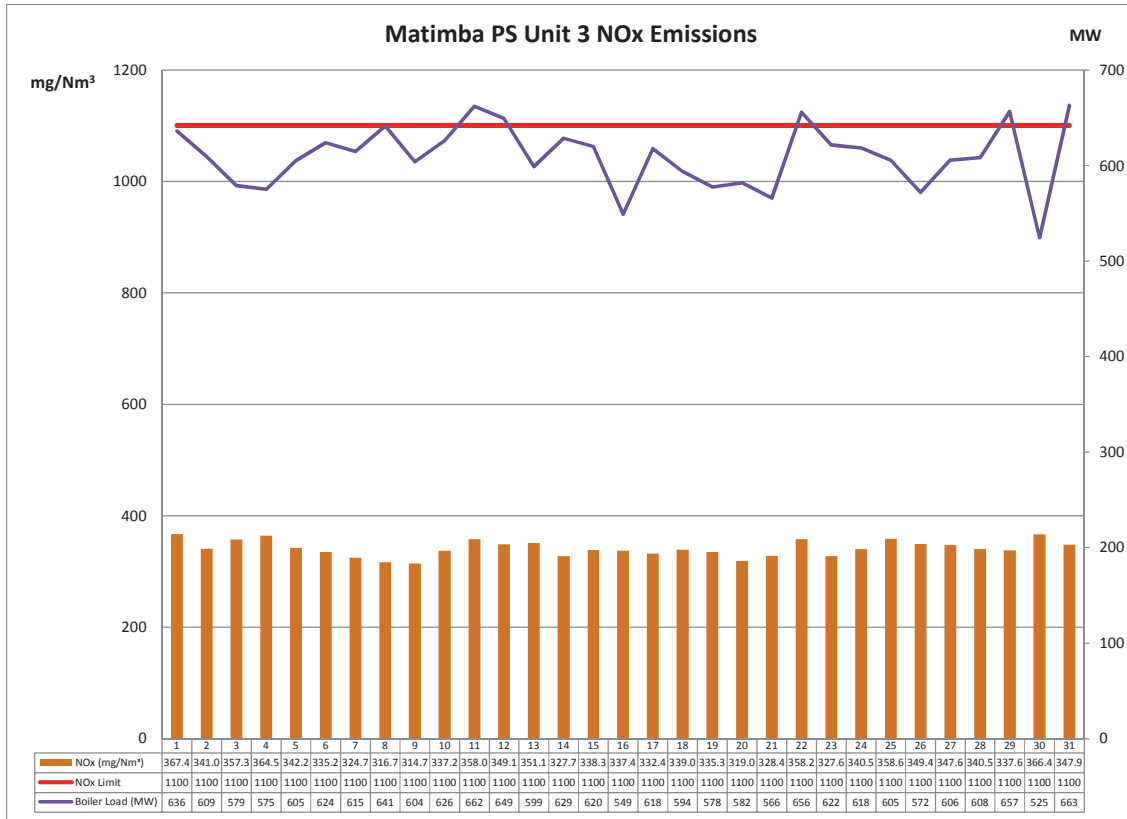


Graph 14: NO_x daily average emissions against emission limit for unit 2 for the month of December 2018

Interpretation:

All daily averages below NO_x emission limit of 1100 mg/Nm³.

Unit 3 NO_x emissions

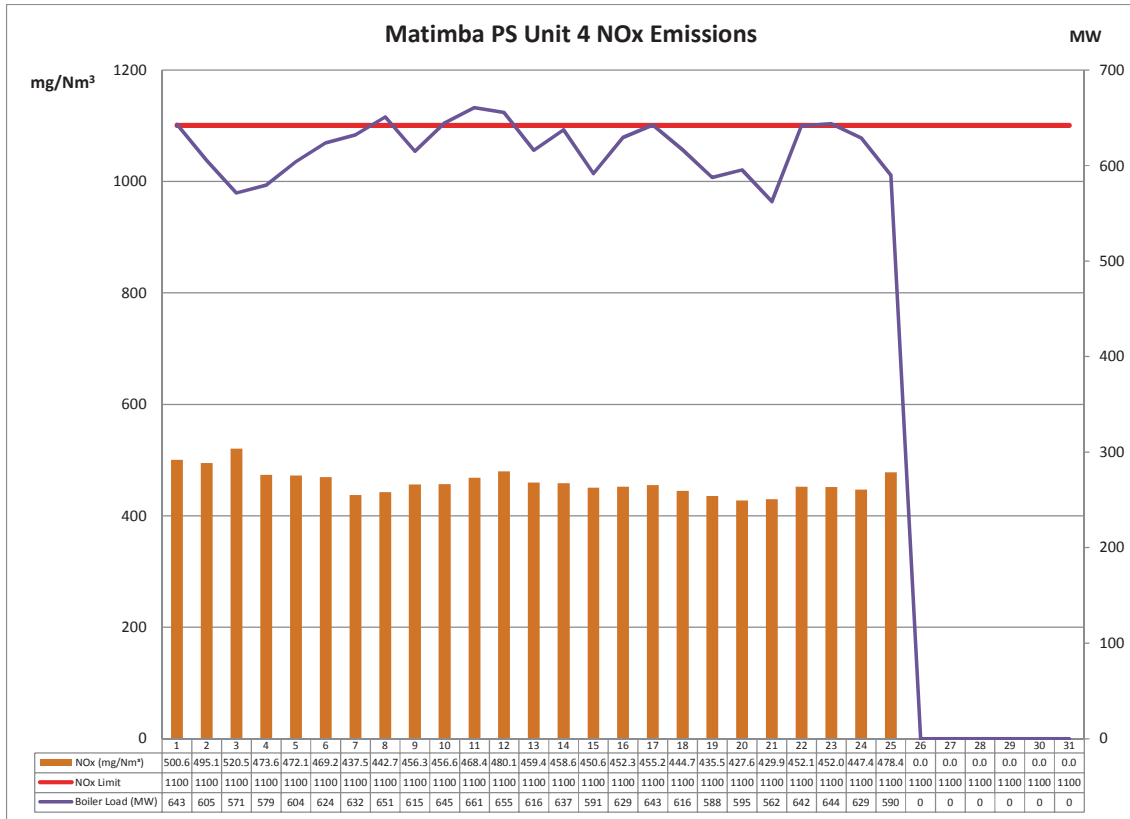


Graph 15: NO_x daily average emissions against emission limit for unit 3 for the month of December 2018

Interpretation:

All daily averages below NO_x emission limit of 1100 mg/Nm³.

Unit 4 NO_x emissions

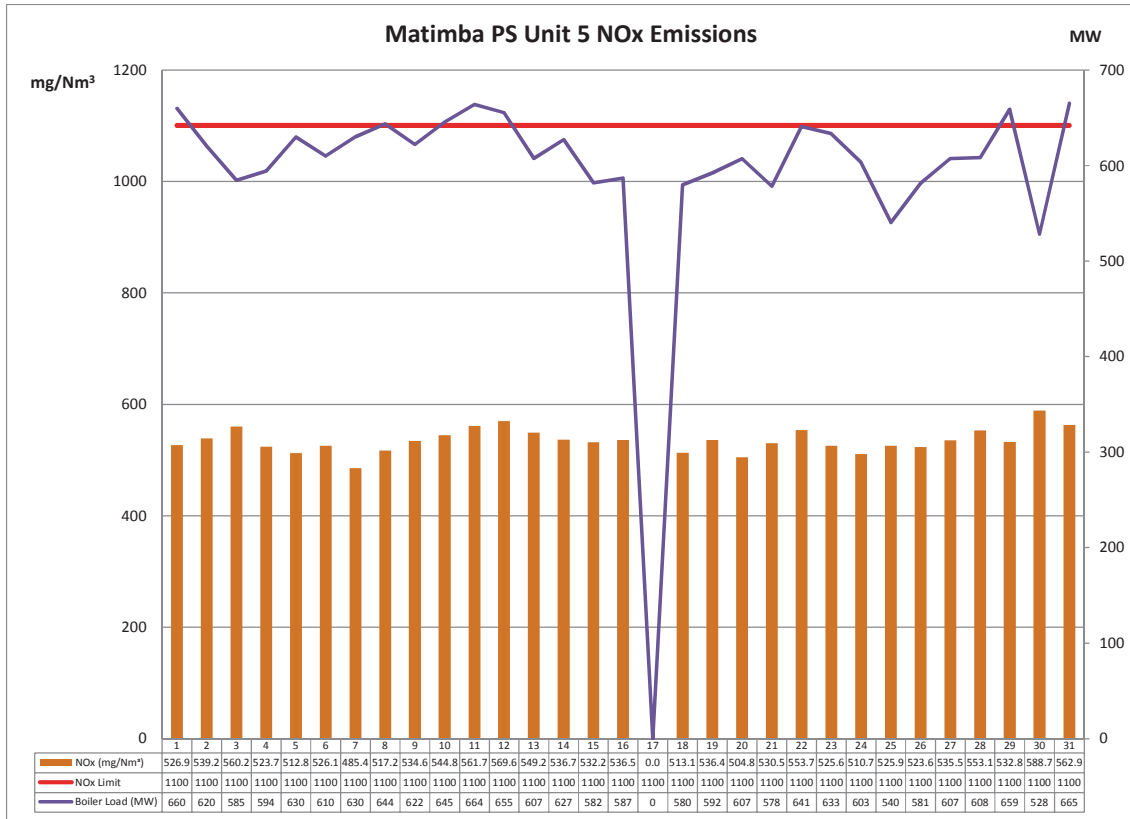


Graph 16: NO_x daily average emissions against emission limit for unit 4 for the month of December 2018

Interpretation:

All daily averages below NO_x emission limit of 1100 mg/Nm³.

Unit 5 NO_x emissions

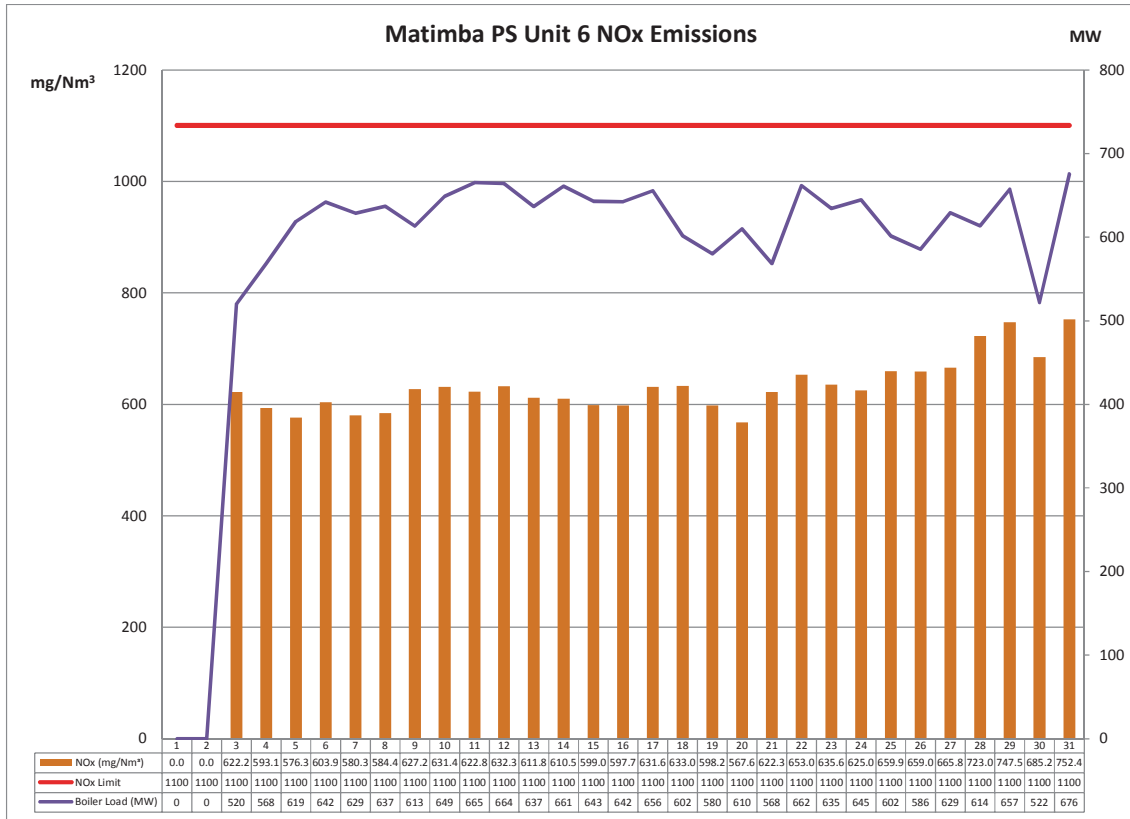


Graph 17: NO_x daily average emissions against emission limit for unit 5 for the month of December 2018

Interpretation:

All daily averages below NO_x emission limit of 1100 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 2018

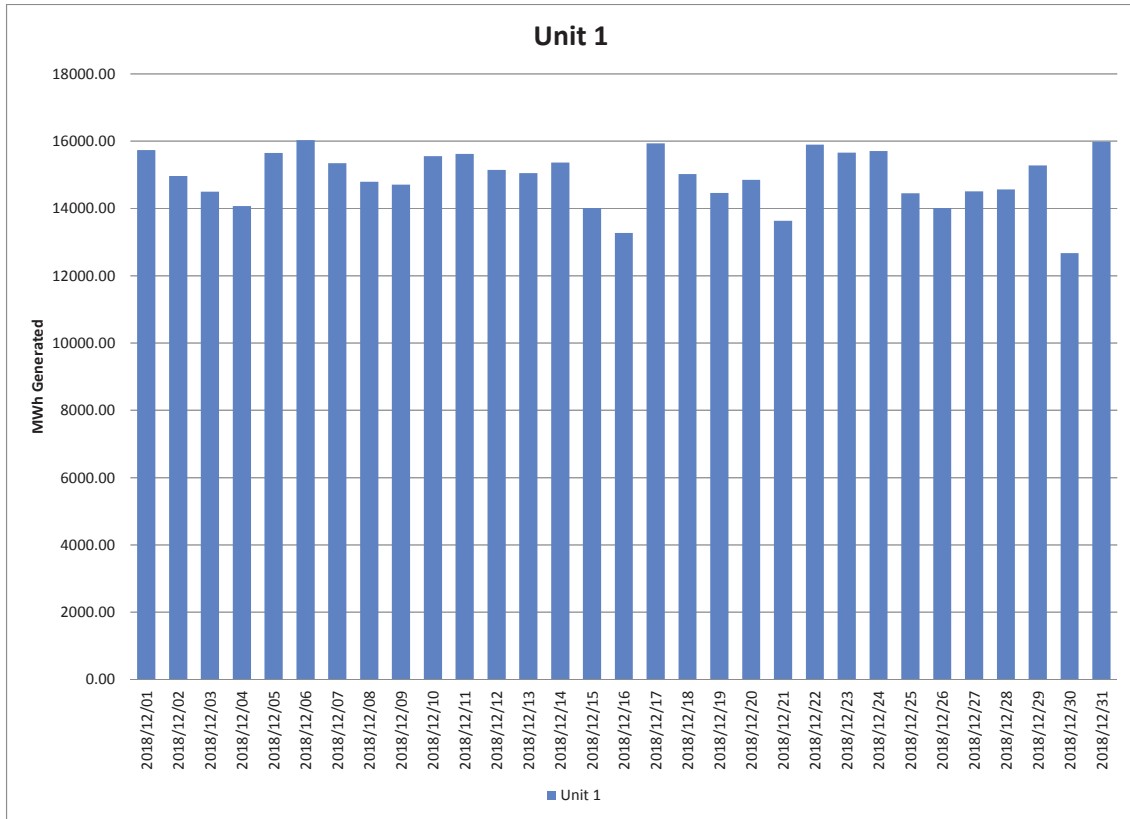
Interpretation:

All daily averages below NO_x emission limit of 1100 mg/Nm³.

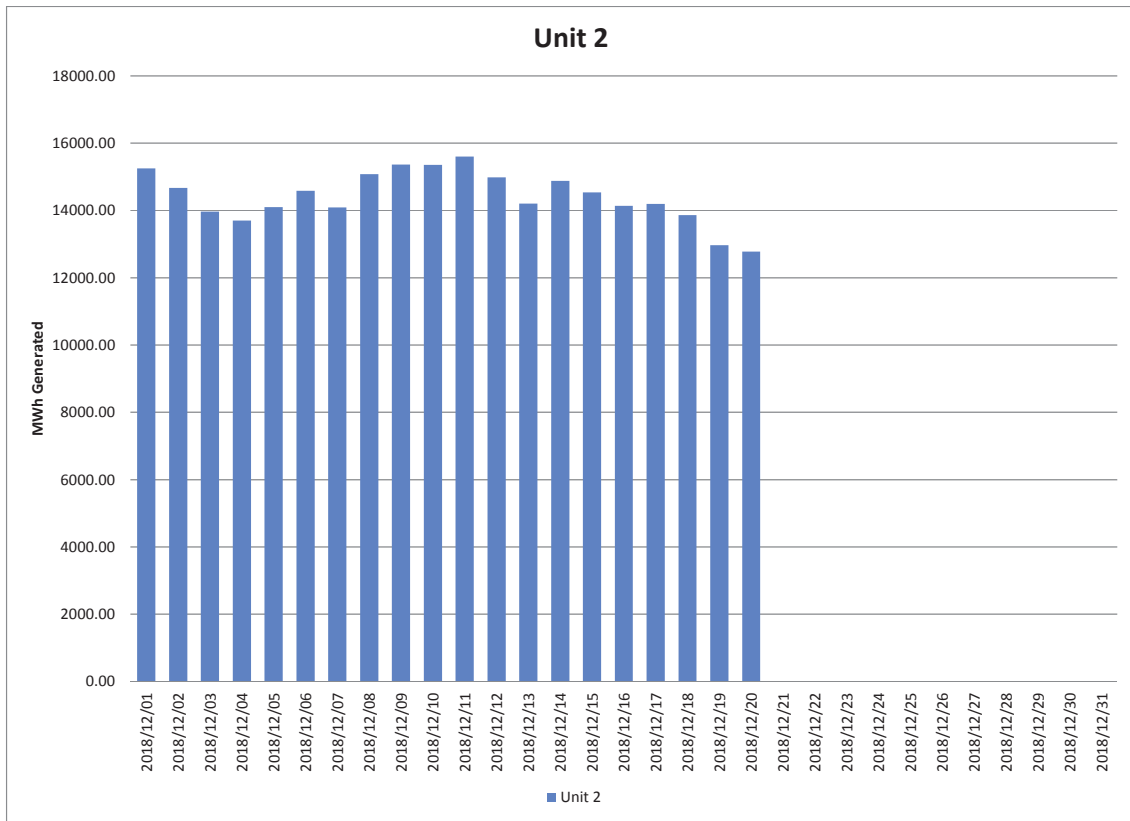
Table 4: Daily power generated per unit in MWh for the month of December 2018

Date	Unit 1	Unit 2	Unit 3	Unit 4	Unit 5	Unit 6
2018/12/01	15739.07	15254.33	15222.60	15364.27	15694.30	0.00
2018/12/02	14968.60	14672.80	14582.27	14463.07	14758.20	0.00
2018/12/03	14500.87	13968.13	13856.73	13650.07	13908.00	9802.40
2018/12/04	14067.47	13700.47	13766.27	13840.53	14132.00	13513.53
2018/12/05	15648.93	14098.20	14487.13	14430.07	14982.10	14726.67
2018/12/06	16035.87	14586.47	14931.27	14895.00	14507.70	15270.00
2018/12/07	15347.33	14087.40	14715.47	15102.07	14988.00	14957.40
2018/12/08	14791.53	15077.47	15353.87	15549.20	15309.30	15164.07
2018/12/09	14712.33	15362.40	14458.73	14689.13	14800.00	14610.80
2018/12/10	15560.27	15356.87	14989.47	15402.60	15351.50	15448.53
2018/12/11	15621.60	15601.13	15843.67	15779.20	15790.90	15833.93
2018/12/12	15144.13	14988.00	15538.47	15654.20	15589.00	15808.47
2018/12/13	15047.33	14198.93	14333.33	14710.73	14448.50	15147.07
2018/12/14	15361.93	14878.07	15046.07	15219.60	14913.20	15728.20
2018/12/15	14009.67	14538.73	14833.00	14123.93	13842.50	15303.93
2018/12/16	13267.93	14134.40	13139.60	15033.00	12944.70	15294.07
2018/12/17	15933.07	14196.53	14788.27	15347.80	0.00	15606.87
2018/12/18	15024.07	13864.33	14211.60	14718.93	12301.50	14331.33
2018/12/19	14459.33	12965.40	13825.07	14028.53	14083.60	13813.53
2018/12/20	14844.73	12774.00	13930.80	14217.60	14437.60	14522.53
2018/12/21	13635.07	0.00	13547.07	13426.07	13752.90	13522.33
2018/12/22	15901.20	0.00	15700.00	15320.33	15238.90	15751.20
2018/12/23	15664.20	0.00	14877.00	15370.20	15060.50	15102.87
2018/12/24	15705.20	0.00	14802.33	15020.47	14348.10	15346.47
2018/12/25	14455.20	0.00	14491.27	12620.53	12853.30	14316.07
2018/12/26	14013.93	0.00	13689.80	0.00	13828.10	13947.73
2018/12/27	14504.60	0.00	14495.93	0.00	14444.40	14964.73
2018/12/28	14564.40	0.00	14560.27	0.00	14465.10	14598.13
2018/12/29	15274.13	0.00	15717.73	0.00	15667.60	15646.20
2018/12/30	12673.87	0.00	12554.80	0.00	12563.10	12414.60
2018/12/31	15983.07	0.00	15866.67	0.00	15814.10	16081.13

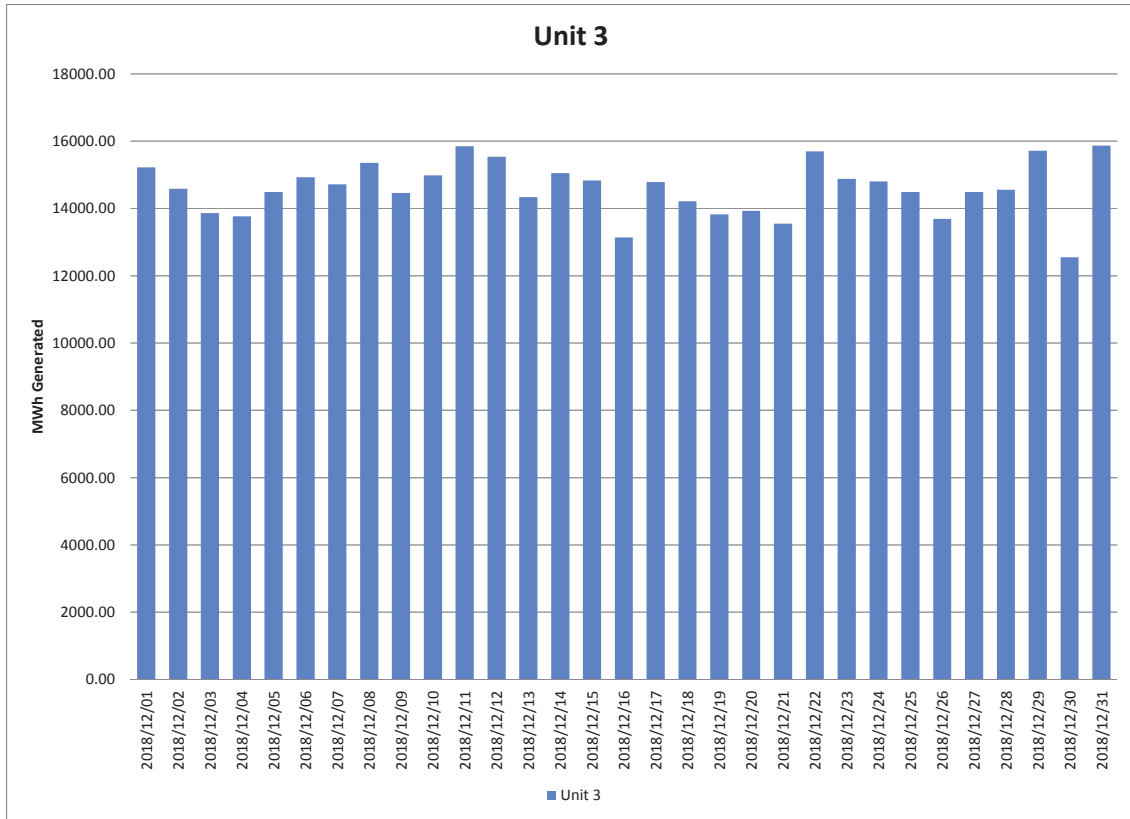
Graph 19: Unit 1 daily generated power in MWh for the month of December 2018



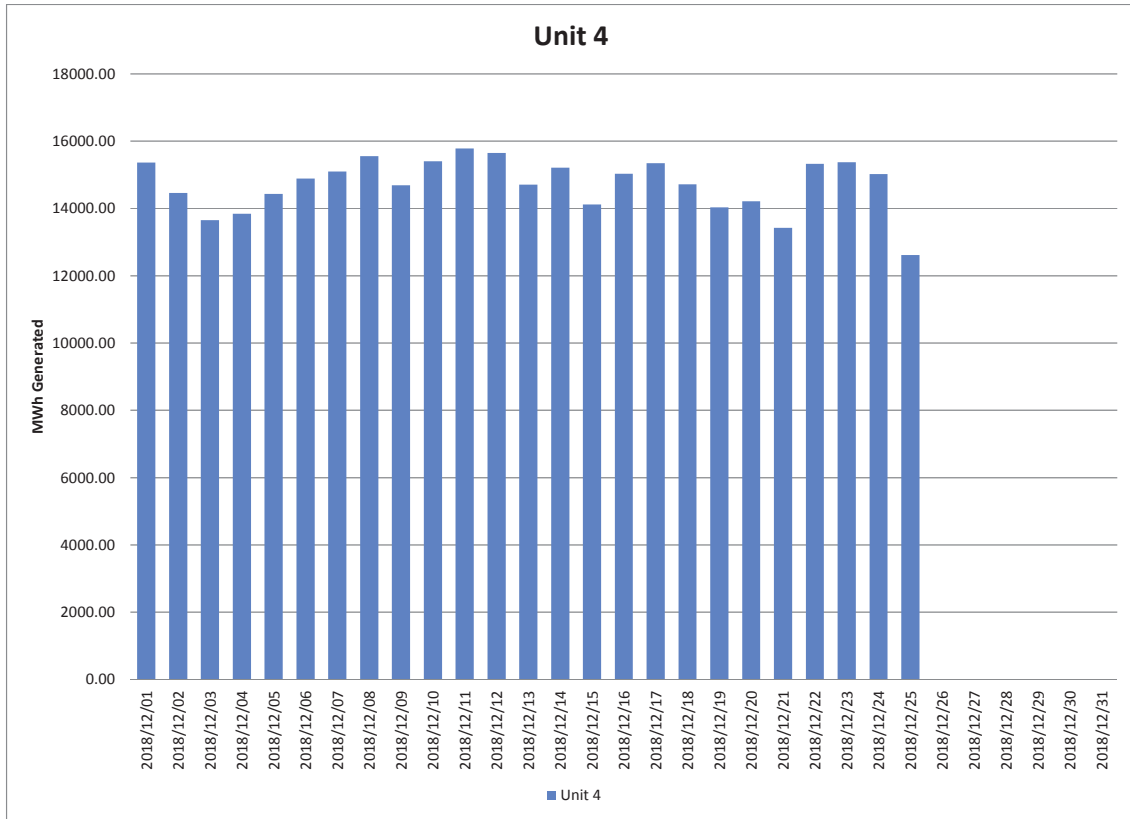
Graph 20: Unit 2 daily generated power in MWh for the month of December 2018



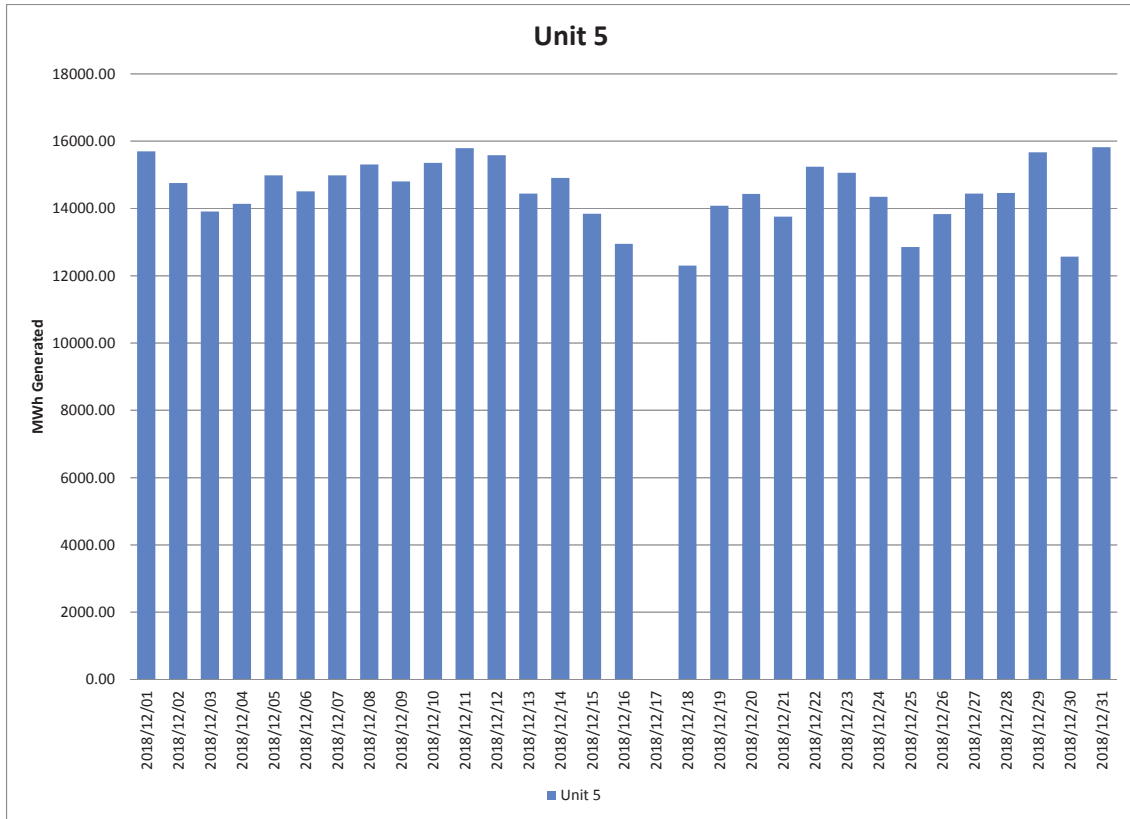
Graph 21: Unit 3 daily generated power in MWh for the month of December 2018



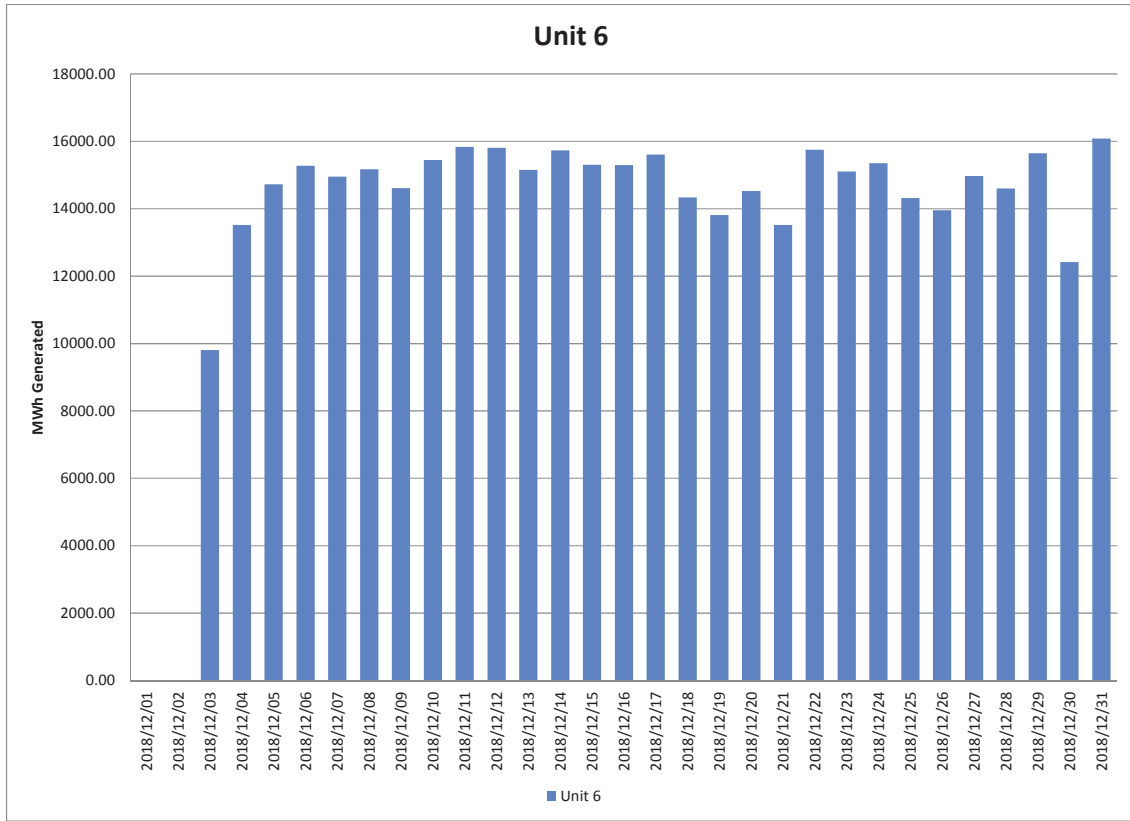
Graph 22: Unit 4 daily generated power in MWh for the month of December 2018



Graph 23: Unit 5 daily generated power in MWh for the month of December 2018



Graph 24: Unit 6 daily generated power in MWh for the month of December 2018



Graph 25: Unit 1 daily average CO₂ emission concentration for the month of December 2018

Graph 26: Unit 2 daily average CO₂ emission concentration for the month of December 2018

Graph 27: Unit 3 daily average CO₂ emission concentration for the month of December 2018

Graph 28: Unit 4 daily average CO₂ emission concentration for the month of December 2018

Graph 29: Unit 5 daily average CO₂ emission concentration for the month of December 2018

Graph 30: Unit 6 daily average CO₂ emission concentration for the month of December 2018

Table 5: Pollutant tonnages for the month of December 2018

Unit	PM (tons)	SO ₂ (tons)	NO ₂ (tons)	CO (tons)	CO ₂ (tons)
1	33.532	8 020.997	1 230.202	10.233	
2	55.618	6 937.249	935.019	4.506	
3	44.621	6 396.208	894.984	70.092	
4	47.337	5 470.391	918.202	5.512	
5	30.204	6 960.920	1 106.020	64.506	
6	25.939	6 352.338	1 320.738	8.900	
SUM	237.253	40 138.102	6 405.165	163.750	

Table 6: Reference values for data provided.

Reference value measured in stack.	Unit of measure	Monthly average values					
		Unit 1	Unit 2	Unit 3	Unit 4	Unit 5	Unit 6
Flue gas oxygen	%	6.743	6.143	4.654	4.565	8.255	6.657
Flue gas moisture	%	5.499	5.412	3.803	5.191	5.153	5.950
Flue gas velocity	m/s	28.858	36.980	26.119	24.785	27.885	26.106
Flue gas temperature	°C	141.039	131.752	132.968	127.594	128.943	132.863
Flue gas pressure	mBar	919.842	918.381	920.824	922.353	919.326	928.187

Start-up information.

Table 7: Start-up information

Unit	6	
Fires in	01H56	2018-12-03
Synchronization with Grid	04H57	2018-12-03
Emissions below limit	05H18	2018-12-03
Fires in to synchronization	3.017	Hours
Synchronization to < limit	0.35	Hours

Unit	5	
Fires in	22H38	2018-12-17
Synchronization with Grid	02H33	2018-12-18
Emissions below limit	04H07	2018-12-18
Fires in to synchronization	3.917	Hours
Synchronization to < limit	1.567	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	278	247	278	257	252	218
Emergency Hours declared including hours after stand down	296	262	296	274	268	233
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 recurrence	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:	29 January 2019	
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 <i>blue cells</i> below Choose from a dropdown menu in the <i>green cells</i> The total VOC emissions for the month are in the <i>red cells</i> IMPORTANT: Do not change <i>any</i> 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:	390.746	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/m ² /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:	0.01 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, 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 2018.

Unit	SO ₂	NO _x	PM	CO ₂
1	100.0	100.0	100.0	
2	100.0	99.6	100.0	
3	100.0	100.0	100.0	
4	100.0	100.0	100.0	
5	100.0	99.9	100.0	
6	100.0	100.0	100.0	

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
 - i. 250 meter consist of 3 flues

Unit 1

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

Unit 2

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

Unit 3

1. Three 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 are in service. Repairs were done during the outage.
2. No abnormalities on the SO₃ plant. Preventative maintenance done during the month.

Unit 5

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

Unit 6

1. One out of 32 precipitator fields are 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.

CEMs

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

Particulate monitors

1. No downtime, repairs or adjustments done on the particulate monitors.

Air quality improvements

1. None

Social responsibility conducted

No campaigns conducted in December 2018

Sampling dates and times

1. Continuous

Attachments

1. Matimba have not received the Marapong air quality monthly report for December 2018. As soon as the report is received it will be send separately.

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