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Stanley Koenaitse

Waterberg District Municipality
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Modimolle
0510

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Date: 2022/12/31

Enquiries: MF Dikgale

Tel: 014 762 6820

Ref: H16/1/13-AEL/M1/R1 – December 2022

Dear Mr Koenaitse

MEDUPI POWER STATION MONTHLY EMISSIONS REPORT FOR THE MONTH OF DECEMBER 2022

This document serves as the monthly emissions report required in terms of Section 7.7.1 of Medupi Power Station Provisional Atmospheric Emission License (AEL), H16/1/13-AEL/M1/R1.

This report is a reflection of Unit 1, 2, 3, 5 and 6 gaseous and particulate emissions performance against the AEL limit for the month of December 2022 only.

1. Raw Materials and Products

TABLE 1: QUANTITY OF RAW MATERIALS AND PRODUCTS CONSUMPTION IN DECEMBER 2022

Raw Materials and Products used	Raw Material Type	Unit	Maximum Permitted Consumption/ Rate (Quantity)	Consumption – December 2022
	Coal	Tons/month	1 875 000	892 288.0
	Fuel Oil	Tons/month	20 000	1003
Production Rates	Product/ By-Product Name	Unit	Maximum Production Capacity Permitted (Quantity)	Production Rate in Month of December 2022
	Energy	GWh	3 571.2	1961.79
	Ash Emitted	Tons/month	not specified	284.18

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TABLE 2: DAILY CONSUMPTION AND PRODUCTION RATES


Date	Reportable hours of Operation						Coal usage	Production rate (MW)					
	U1	U2	U3	U4	U5	U6		U1	U2	U3	U4	U5	U6
01-Dec	24.0	24.0	24.0	0.0	24.0	24.0	37875	0	792	777	off	682	699
02-Dec	24.0	24.0	24.0	0.0	24.0	24.0	37558	764	770	762	off	706	731
03-Dec	24.0	24.0	24.0	0.0	24.0	4.6	32014	768	747	759	off	733	661
04-Dec	24.0	24.0	24.0	0.0	24.0	0.0	30965	773	763	768	off	720	off
05-Dec	24.0	22.8	24.0	0.0	24.0	0.0	30550	754	767	791	off	746	off
06-Dec	24.0	0.0	24.0	0.0	24.0	0.0	27662	767	652	772	off	706	off
07-Dec	17.5	19.0	24.0	0.0	24.0	0.0	26946	767	768	758	off	691	off
08-Dec	0.0	24.0	24.0	0.0	24.0	0.0	28800	709	760	794	off	682	off
09-Dec	21.5	24.0	24.0	0.0	24.0	0.0	30553	755	768	769	off	764	off
10-Dec	24.0	24.0	24.0	0.0	24.0	0.0	30598	773	750	761	off	771	off
11-Dec	24.0	24.0	24.0	0.0	24.0	0.0	30882	766	766	794	off	778	off
12-Dec	24.0	24.0	24.0	0.0	24.0	0.0	30458	756	747	766	off	772	off
13-Dec	24.0	24.0	24.0	0.0	24.0	0.0	31109	775	747	772	off	794	off
14-Dec	24.0	24.0	24.0	0.0	24.0	0.0	31251	771	735	763	off	794	off
15-Dec	24.0	24.0	24.0	0.0	24.0	0.0	31762	766	760	794	off	748	off
16-Dec	24.0	24.0	24.0	0.0	24.0	0.0	31224	763	764	794	off	731	off
17-Dec	24.0	24.0	24.0	0.0	24.0	0.0	30860	761	755	794	off	714	off
18-Dec	24.0	24.0	24.0	0.0	24.0	0.0	31398	767	755	780	off	723	off
19-Dec	24.0	24.0	24.0	0.0	24.0	0.0	31976	766	762	748	off	694	off
20-Dec	24.0	24.0	24.0	0.0	24.0	0.0	31193	763	759	697	off	697	off
21-Dec	24.0	24.0	24.0	0.0	24.0	0.0	31135	719	763	759	off	744	off
22-Dec	24.0	1.4	24.0	0.0	24.0	0.0	23198	757	575	744	off	720	off
23-Dec	24.0	0.0	24.0	0.0	24.0	0.0	27047	738	469	686	off	683	off
24-Dec	24.0	20.3	24.0	0.0	24.0	0.0	30133	767	743	677	off	671	off
25-Dec	24.0	24.0	24.0	0.0	24.0	0.0	29188	740	724	638	off	653	off
26-Dec	24.0	24.0	24.0	0.0	24.0	0.0	20866	617	641	666	off	off	off
27-Dec	24.0	24.0	3.2	0.0	24.0	0.0	21032	761	764	631	off	off	off
28-Dec	24.0	24.0	11.7	0.0	24.0	0.0	24777	772	780	710	off	off	off
29-Dec	24.0	24.0	24.0	0.0	24.0	0.0	27697	748	792	674	off	off	off
30-Dec	24.0	21.0	24.0	0.0	24.0	0.0	31581	752	750	679	off	704	off
	24.0	0.0	1.0	0.0	24.0	0.0	17254	753	376	539	off	688	off

NB: reportable hours less than 24 highlighted in pink

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2. Abatement Technology

Table 3: Abatement Equipment Control Technology efficiency for month of December 2022

Associated Unit/Stack	Technology Type	Efficiency	FFP Utilization
Unit 1	Fabric Filter Plant (FFP)	99.900%	100%
Unit 2	Fabric Filter Plant (FFP)	99.957%	100%
Unit 3	Fabric Filter Plant (FFP)	99.863%	100%
Unit 4	Fabric Filter Plant (FFP)	off	off
Unit 5	Fabric Filter Plant (FFP)	99.856%	100%
Unit 6	Fabric Filter Plant (FFP)	99.852%	100%

Note: FFP does not have bypass mode operation, hence plant 100% Utilised.

3. Energy Source Characteristics

TABLE 4: ENERGY SOURCE MATERIAL CHARACTERISTICS FOR THE MONTH OF DECEMBER 2022

Characteristic	Stipulated Range (% by weight on a dry basis)	Monthly Average Content (% by weight on a dry basis)
Coal		
Sulphur Content	1.3 - 2.2	1.33
Ash Content	35 - 39	33.70

TABLE 5: ENERGY SOURCE MATERIAL CHARACTERISTICS FOR THE MONTH OF DECEMBER 2022

Characteristic	Stipulated Range (%)	Monthly Average Content (%)
Oil		
Sulphur Content	0.5 - 3.5	2
Ash Content	0.02 - 0.1	0.025

4. Emissions Reporting

Medupi Power Station uses Continuous Emission Monitoring System which uses the extractive method for analysis.

The emission limits are as follows:

SO₂ Monthly = 3500 mg/Nm³

Dust Daily= 50 mg/Nm³

NO₂ Daily= 750 mg/Nm³

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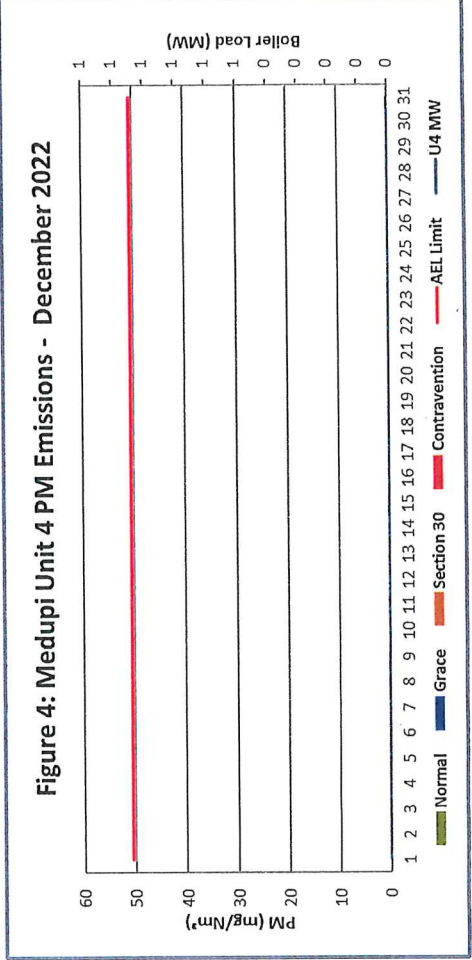
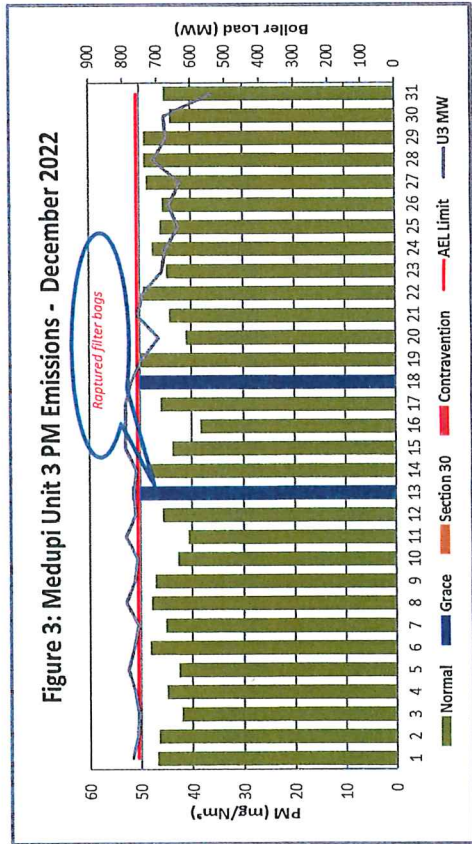
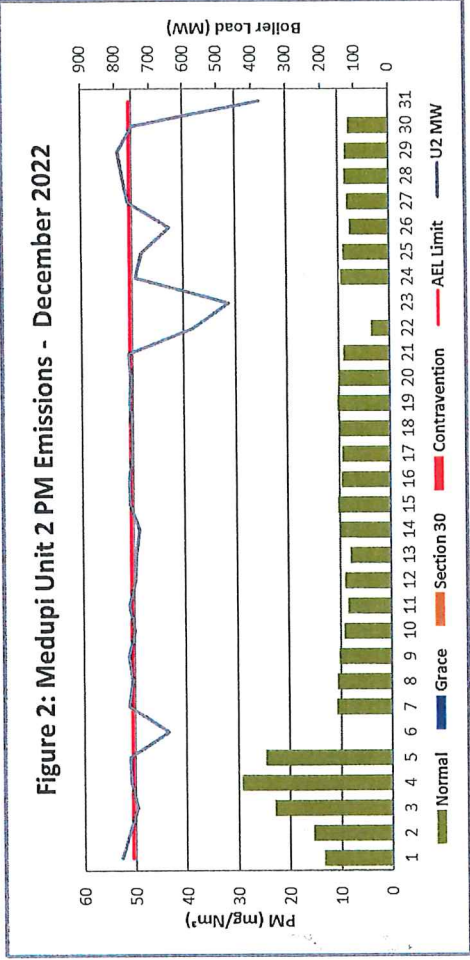
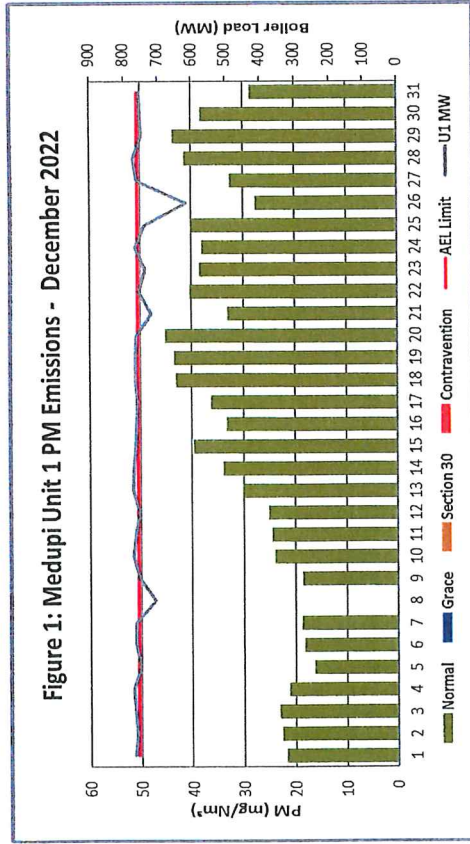
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4.1 PM Daily Averages



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Figure 5: Medupi Unit 5 PM Emissions - December 2022

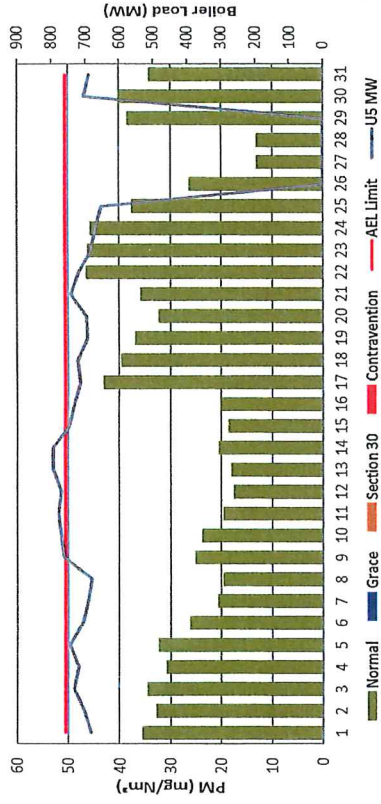
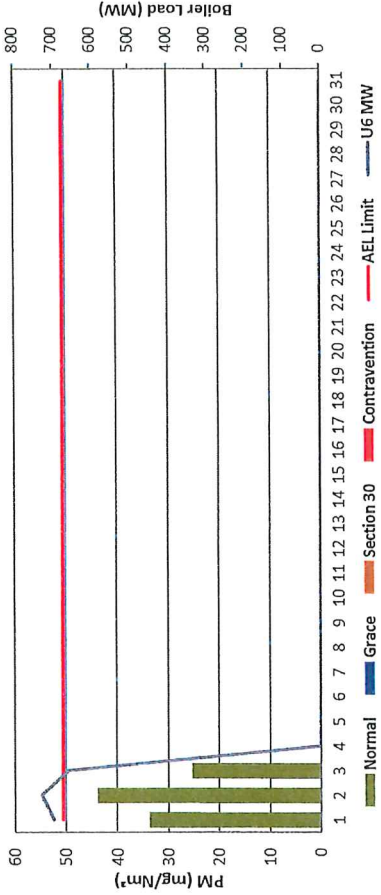


Figure 6: Medupi Unit 6 PM Emissions - December 2022



4.2 SOx Daily Averages

Figure 7: Medupi Unit 1 SOx Emissions - December 2022

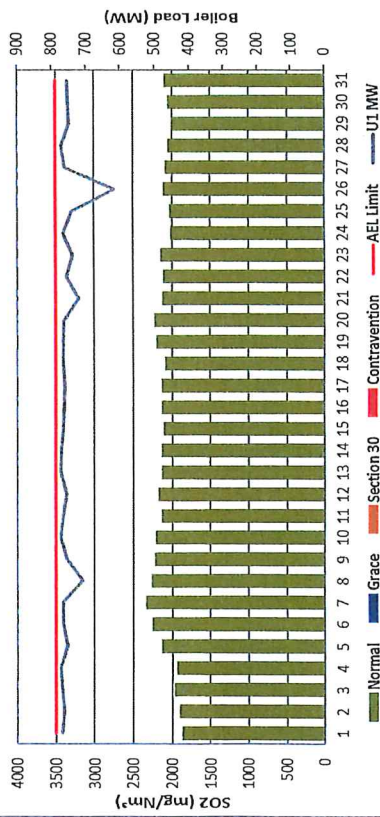
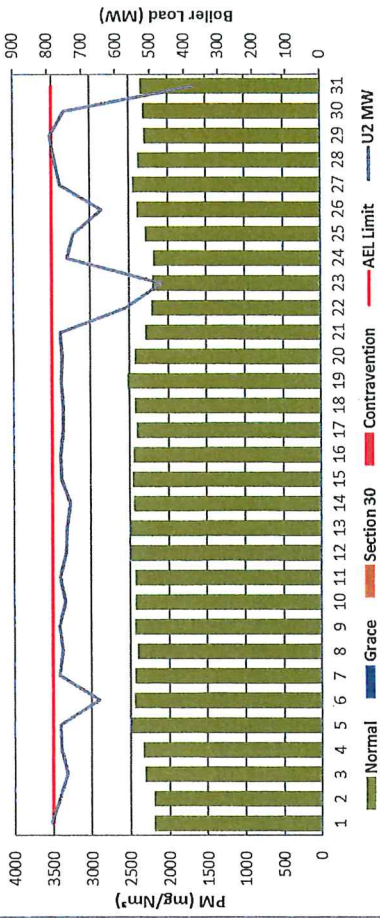


Figure 8: Medupi Unit 2 SOx Emissions - December 2022



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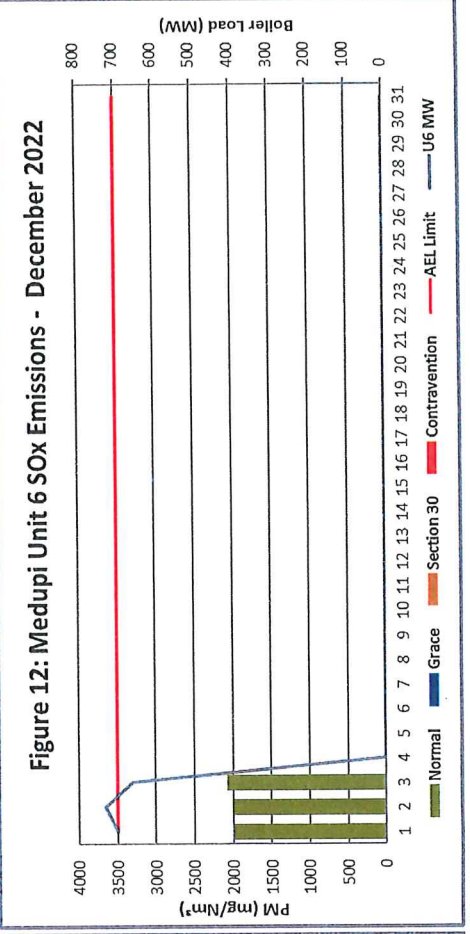
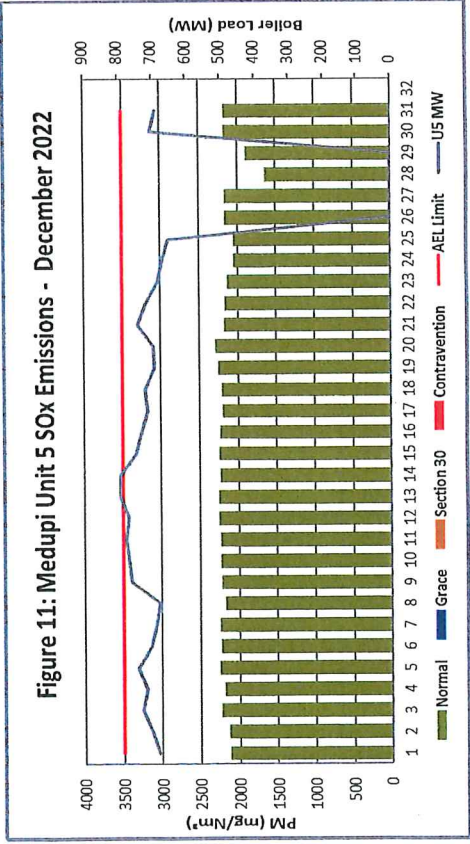
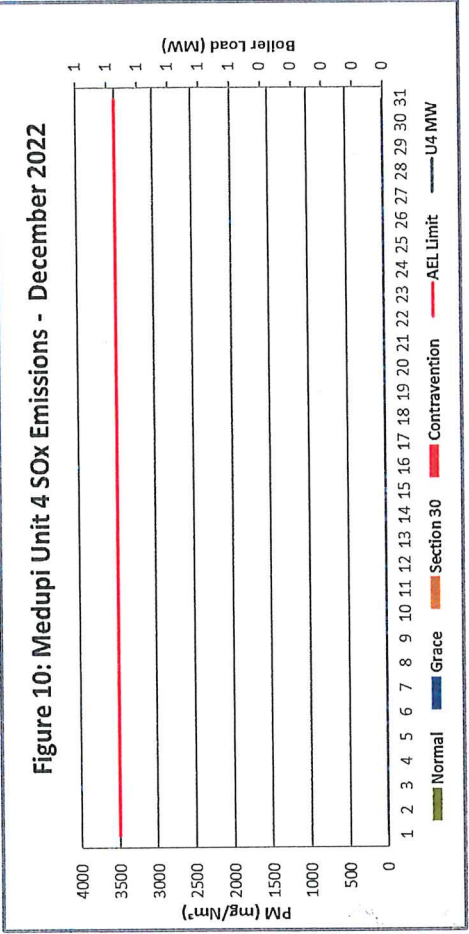
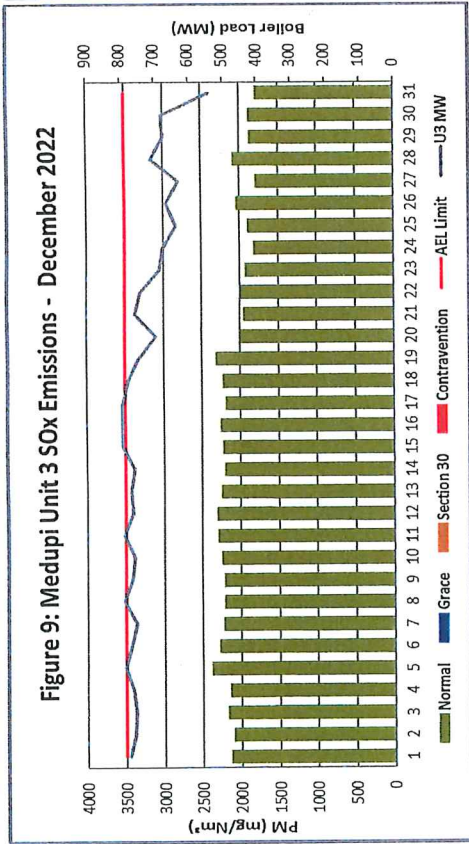
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4.3 NOx Daily Averages

Figure 13: Medupi Unit 1 NOx Emissions - December 2022

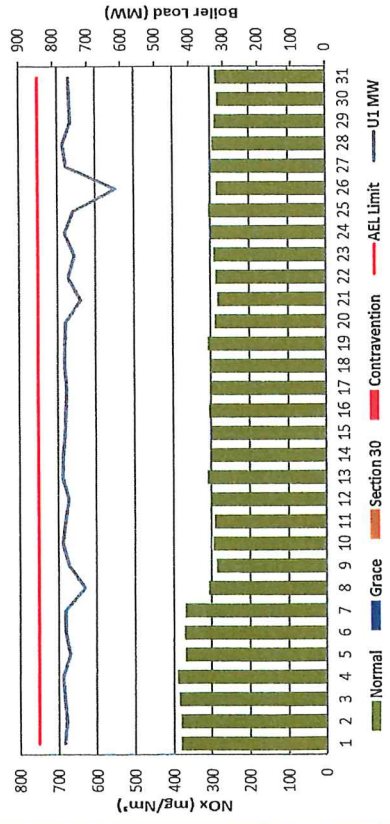


Figure 14: Medupi Unit 2 NOx Emissions - December 2022

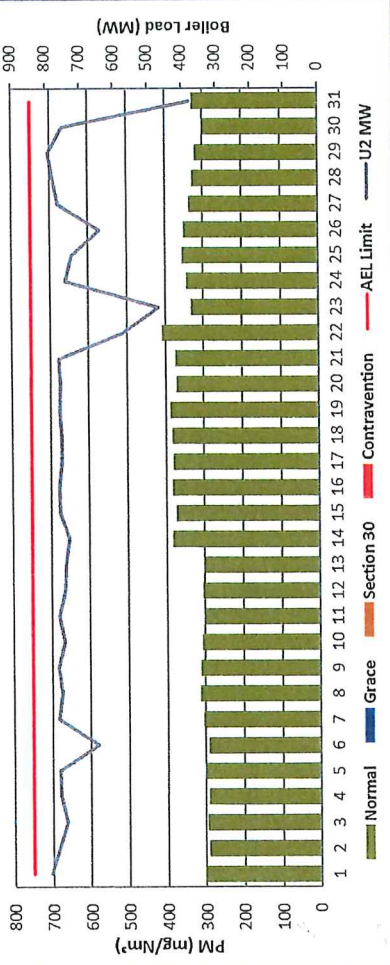


Figure 15: Medupi Unit 3 NOx Emissions - December 2022

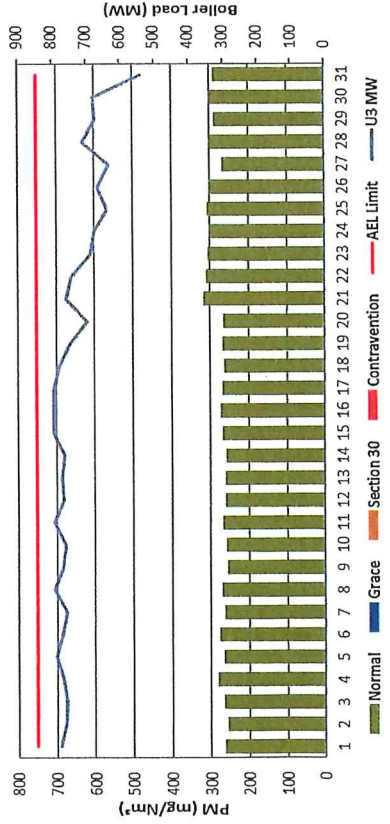
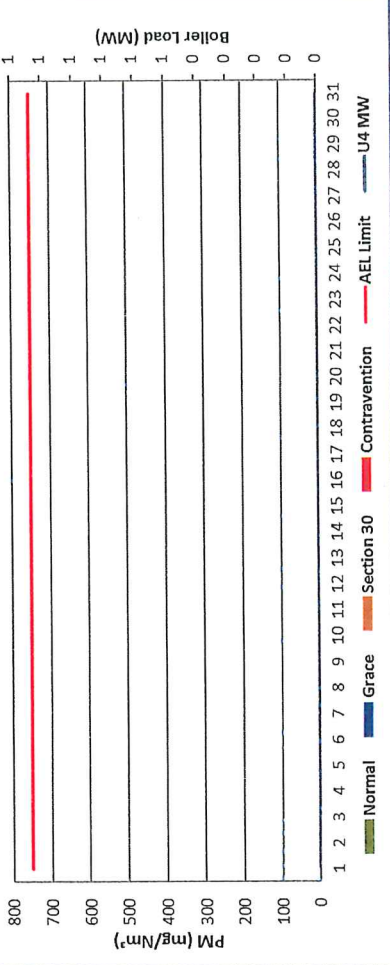


Figure 16: Medupi Unit 4 NOx Emissions - December 2022

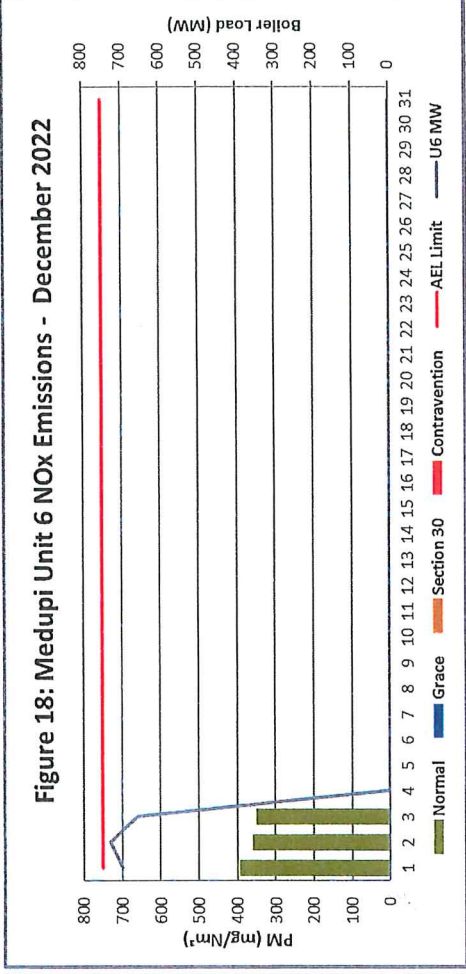
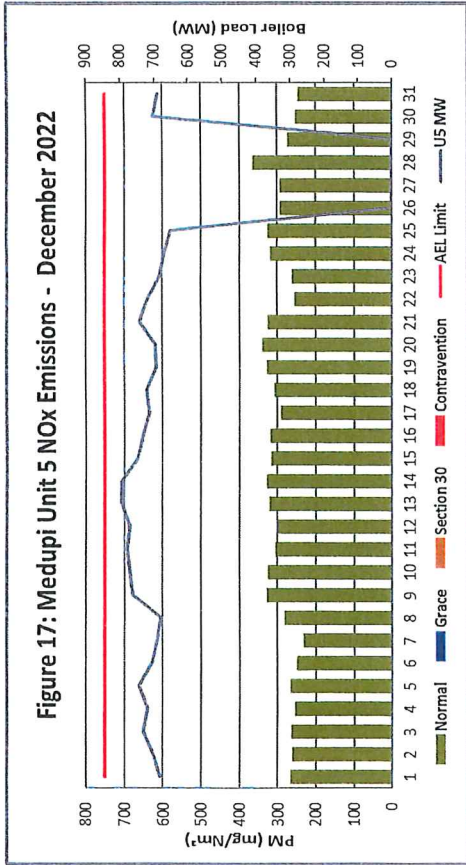


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TABLE 6: MONTHLY TONNAGES FOR THE MONTH OF DECEMBER 2022

Associated Unit/Stack	PM	SO ₂	NO ₂
Unit 1	70.6	4 874.9	727.4
Unit 2	29.4	6 530.9	911.2
Unit 3	96.3	4 626.6	602.0
Unit 4	0.0	0.0	0.0
Unit 5	81.0	5 945.7	804.1
Unit 6	6.8	359.1	67.1
SUM	284.2	22 337.1	3 111.8

TABLE 7: MONTHLY AVERAGES FOR THE MONTH OF DECEMBER 2022

Associated Unit/Stack	Average PM (mg/Nm ³)	Average SOx (mg/Nm ³)	Average NOx (mg/Nm ³)
Unit 1	31.4	2 111.4	314.8
Unit 2	11.3	2 377.6	334.5
Unit 3	46.0	2 113.4	278.2
Unit 4	Unit Off	Unit Off	Unit off
Unit 5	29.9	2 172.5	293.6
Unit 6	34.3	2 025.5	368.5

4 Continuous Emission Monitoring Systems (CEMS)

Unit 1, 2, 3, 5 and 6 Continuous Emission Monitoring Systems were in operation at all times when the unit was on load. For days where the CEMS were readings incorrectly are indicated on the performance graphs above.

TABLE 8: PERIODS DURING WHICH CEMS WAS INOPERATIVE

Date	CEMS status	Comments
No CEMS issues recorded		

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TABLE 9: CEMS MONITOR RELIABILITY PERCENTAGE (%)

Associated Unit/Stack	PM	SO ₂	NO	CO ₂	O ₂
Unit 1	98.9	98.7	98.7	67.9	98.7
Unit 2	99.4	98.6	98.4	98.3	98.3
Unit 3	98.9	98.7	98.7	97.7	1.3
Unit 4	Unit Off	Unit off	Unit off	Unit off	Unit off
Unit 5	98.9	91.5	90.9	90.3	90.2
Unit 6	95.8	95.8	95.8	0.0	95.8

5 CEMS Calibration certificates and equipment used for calibration

A service provider was appointed to calibrate CEMS equipment at Medupi Power Station, calibration certificates to be made available upon request. The service appointed for the CEMS calibration is in a process of obtaining SANAS accreditation. Verification of the CEMS after calibration is conducted internally by Eskom.

6 Ambient Air Quality Monitoring Report

The Ambient Air Quality Monitoring and Dust fall-out report for December 2022 was e-mailed to the Licensing Authority.

7 Visual inspection of the exterior walls of the fuel oil tanks and TVOC Estimation

Visual inspection was conducted and there were no leaks observed on the exterior walls of the fuel oil tanks.

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TABLE 10: TOTAL VOLATILE ORGANIC COMPOUND (TVOC) FOR DECEMBER 2022

		
CALCULATION OF EMISSIONS OF TOTAL VOLATILE COMPOUNDS FROM FUEL OIL STORAGE TANKS*		
Date:	Saturday, 31 December 2022	
Station:	Medupi Power Station	
Province:	Limpopo Province	
Tank no.	1-2	
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 blue cells below Choose from a dropdown menu in the green cells The total VOC emissions for the month are in the red cells IMPORTANT: Do not change any other cells without consulting the AQ CoE		
MONTH:	December	
GENERAL INFORMATION:	Data	Unit
Total number of fuel oil tanks:	2	NA
Height of tank:*	14.2	m
Diameter of tank:	12	m
Net fuel oil throughput for the month:	1003	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	Aluminum/Specular	NA
Tank paint solar absorbance	0.39	NA
FINAL OUTPUT:	Result	Unit
Breathing losses:	0.69 kg/month	
Working losses:	0.03 kg/month	
TOTAL LOSSES (Total TVOC Emissions for the month):	0.72 kg/month	
<small>*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.</small>		

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8 Air quality improvements initiatives and public education and awareness campaigns

No awareness campaigns for this month.

9 Complaints Register


TABLE 6: COMPLAINTS FOR THE MONTH OF DECEMBER 2022

Source Code/ Name	Air pollution complaints received	Calculation of Impacts/ emissions associated with the incident	Date of complaint and date of response by the license holder	Results of investigation	Action taken to resolve the complaint
N/A	No complaints received	N/A	N/A	N/A	N/A

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Compiled by: Lutendo Murovhi Nemutamba At. Date: 2023/01/30
Environmental Officer

Verified by: Malose Langa [Signature] Date: 2023/01/30
System Engineer Boiler

Verified by: Kevin Mathebula [Signature] Date: 2023/01/30
System Engineer C&I

Supported by: Mokgadi Dikgale [Signature] Date: 2023/01/31
Environmental Manager

Supported by: Jabulani Mkhathshwa [Signature] p.p Date: 2023-01-31
Engineering Group Manager

I Zweli Witbooi, declares that the information provided in this report is accurate and correct.

Yours sincerely



Zweli Witbooi
GENERAL MANAGER: MEDUPI POWER STATION

Date: 2023/01/31

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