



Medupi Power Station Monthly Emissions Report

Template Identifier	Document Identifier	Effective Date	Review Date
240-43921804	240-88543153	February 2021	February 2024
Rev 6	Rev 2		

Stanley Koenaitse

Waterberg District Municipality
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0510

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Ref: H16/1/13-AEL/M1/R1 – December 2021 rev 1

Dear Mr Koenaitse

MEDUPI POWER STATION MONTHLY EMISSIONS REPORT FOR THE MONTH OF DECEMBER 2021

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 reflects Unit 1, 2, 3, 5 and 6 gaseous and particulate emissions performance against the AEL limit for the month of December 2021 only. This report supersedes the previous submission made for the month on December 2021.

1. Raw Materials and Products

TABLE 1: QUANTITY OF RAW MATERIALS AND PRODUCTS CONSUMPTION IN DECEMBER 2021

Raw Materials and Products used	Raw Material Type	Unit	Maximum Permitted Consumption/Rate (Quantity)	Production Rates	
				Product/ By-Product Name	Ash Emitted
Coal	Tons/month	1 875 000	20 000	Energy	GWh
				Fuel Oil	Tons/month
Consumption – December 2021	Unit	784 154	2 126	Production Rate in Month of December 2021	Production Rate in Month of December 2021
				Maximum Production Capacity Permitted (Quantity)	not specified
				Maximum Permitted Consumption/Rate (Quantity)	not specified

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Date	Reportable hours of Operation						Coal usage	Production rate (MW)					
	U1	U2	U3	U4	U5	U6		U1	U2	U3	U4	U5	U6
01/12/21	24.0	24.0	24.0	24.0	24.0	24.0	32281	791	776	790	790	530	
02/12/21	24.0	24.0	24.0	24.0	24.0	24.0	29224	781	767	790	790	473	
03/12/21	24.0	24.0	24.0	24.0	24.0	24.0	29028	745	755	723	723	530	
04/12/21	11.1	3.8	24.0	24.0	24.0	24.0	22355	678	711	701	701	524	
05/12/21	3.8	24.0	21.3	24.0	24.0	24.0	27726	688	762	662	662	691	
06/12/21	24.0	24.0	0.0	24.0	24.0	24.0	25072	790	791	OFF	OFF	712	
07/12/21	24.0	24.0	0.0	24.0	24.0	24.0	23016	779	794	OFF	OFF	605	
08/12/21	24.0	24.0	0.0	24.0	24.0	24.0	20921	686	794	OFF	OFF	604	
09/12/21	24.0	24.0	0.0	24.0	24.0	24.0	20298	690	794	OFF	OFF	538	
10/12/21	24.0	24.0	0.0	24.0	24.0	24.0	21712	786	784	OFF	OFF	546	
11/12/21	24.0	24.0	0.0	24.0	24.0	24.0	24315	773	771	OFF	OFF	650	
12/12/21	1.2	13.6	0.0	24.0	0.0	24.0	19724	674	788	OFF	OFF	550	
13/12/21	13.6	24.0	0.0	24.0	24.0	24.0	22428	706	780	391	607	607	
14/12/21	24.0	24.0	19.5	24.0	24.0	24.0	29880	753	754	640	650	650	
15/12/21	24.0	24.0	24.0	24.0	24.0	24.0	27841	661	734	681	598	598	
16/12/21	24.0	24.0	24.0	24.0	24.0	24.0	27688	648	631	709	565	565	
17/12/21	7.8	24.0	24.0	24.0	24.0	24.0	19241	474	536	643	560	560	
18/12/21	6.1	24.0	24.0	24.0	24.0	24.0	28621	685	705	715	568	568	
19/12/21	24.0	24.0	24.0	24.0	24.0	24.0	31819	782	725	790	713	713	
20/12/21	24.0	24.0	24.0	24.0	24.0	24.0	29775	748	722	676	671	671	
21/12/21	24.0	24.0	2.0	24.0	24.0	24.0	27778	734	722	607	690	690	
22/12/21	14.3	24.0	16.3	24.0	24.0	24.0	27626	743	765	790	661	661	
23/12/21	0.0	23.8	24.0	24.0	24.0	24.0	22097	OFF	750	726	643	643	
24/12/21	0.0	0.0	0.0	24.0	24.0	24.0	14373	OFF	207	618	627	627	
25/12/21	0.0	9.2	24.0	24.0	24.0	24.0	15709	128	471	465	459	459	
26/12/21	1.7	24.0	24.0	24.0	24.0	24.0	20767	432	533	469	464	464	
27/12/21	24.0	24.0	24.0	24.0	24.0	24.0	26752	647	662	690	666	666	
28/12/21	24.0	24.0	24.0	24.0	24.0	24.0	25404	595	631	656	640	640	
29/12/21	24.0	24.0	24.0	24.0	24.0	24.0	25930	613	639	658	622	622	
30/12/21	24.0	24.0	24.0	24.0	24.0	24.0	24845	594	563	642	584	584	
31/12/21	24.0	24.0	24.0	24.0	24.0	24.0	28628	701	749	694	706	706	

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The emission limits are as follows:

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

4. Emissions Reporting

Characteristic	Stipulated Range (%)	Monthly Average Content (%)
Sulphur Content	0.5 - 3.5	2.3
Ash Content	0.02 - 0.1	0.020
Oil		

TABLE 5: ENERGY SOURCE MATERIAL CHARACTERISTICS FOR THE MONTH OF DECEMBER 2021

Characteristic	Stipulated Range (% by weight on a dry basis)	Monthly Average Content (% by weight on a dry basis)
Sulphur Content	1.3 - 2.2	1.49
Ash Content	35 - 39	34.78
Coal		

TABLE 4: ENERGY SOURCE MATERIAL CHARACTERISTICS FOR THE MONTH OF DECEMBER 2021

3. Energy Source Characteristics

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

Associated Unit/Stack	Technology Type	Efficiency
Unit 1	Fabric Filter Plant (FFP)	-
Unit 2	Fabric Filter Plant (FFP)	99.950%
Unit 3	Fabric Filter Plant (FFP)	99.925%
Unit 4	Fabric Filter Plant (FFP)	-
Unit 5	Fabric Filter Plant (FFP)	99.969%
Unit 6	Fabric Filter Plant (FFP)	99.878%


Table 3: Abatement Equipment Control Technology efficiency for month of December 2021

2. Abatement Technology

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SO₂ Monthly = 3500 mg/Nm³ Dust Daily = 50 mg/Nm³ NO₂ Daily = 750 mg/Nm³



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PM Daily Averages

Figure 1: Medupi Unit 1 PM Emissions - December 2021

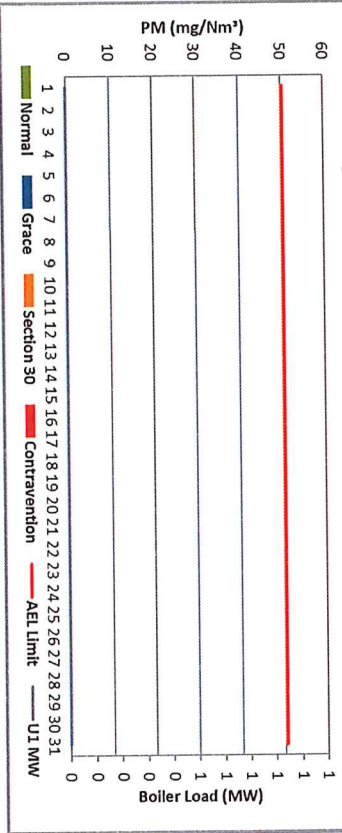


Figure 2: Medupi Unit 2 PM Emissions - December 2021

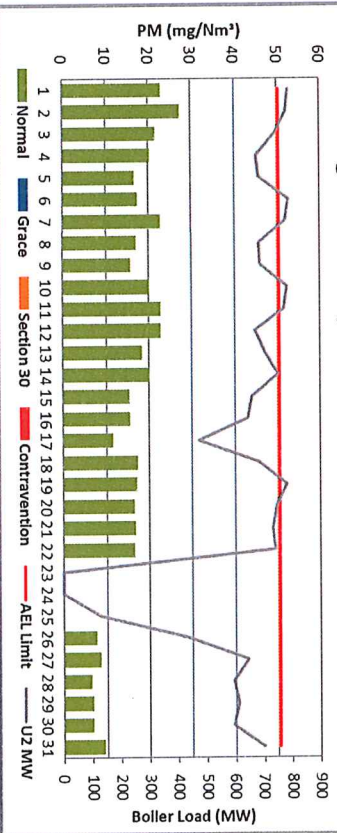


Figure 3: Medupi Unit 3 PM Emissions - December 2021

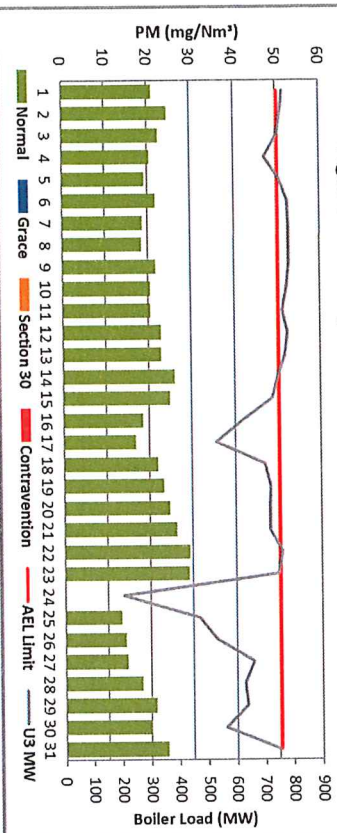
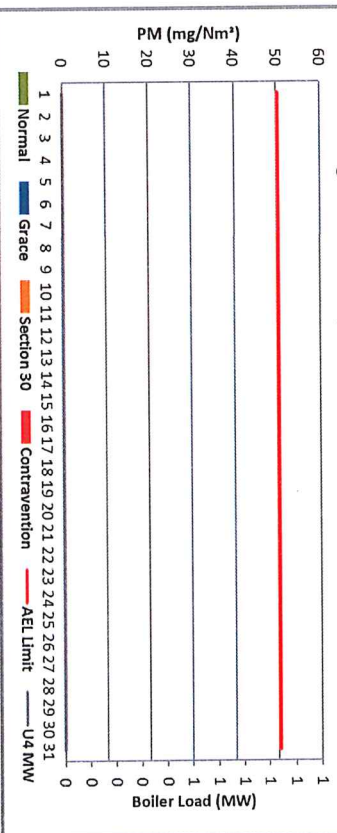


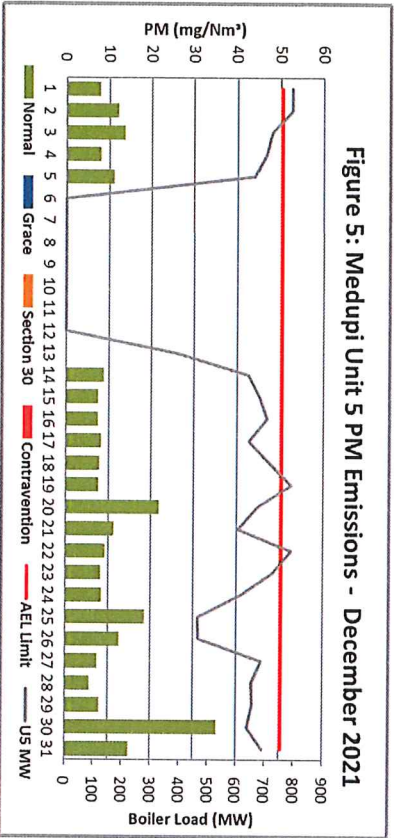
Figure 4: Medupi Unit 4 PM Emissions - December 2021



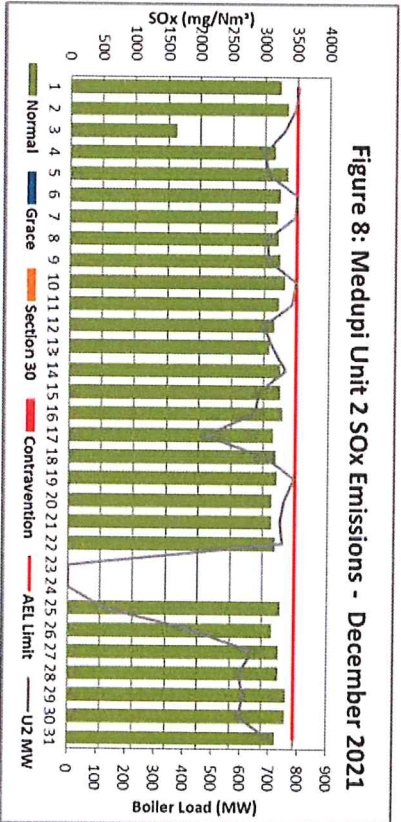
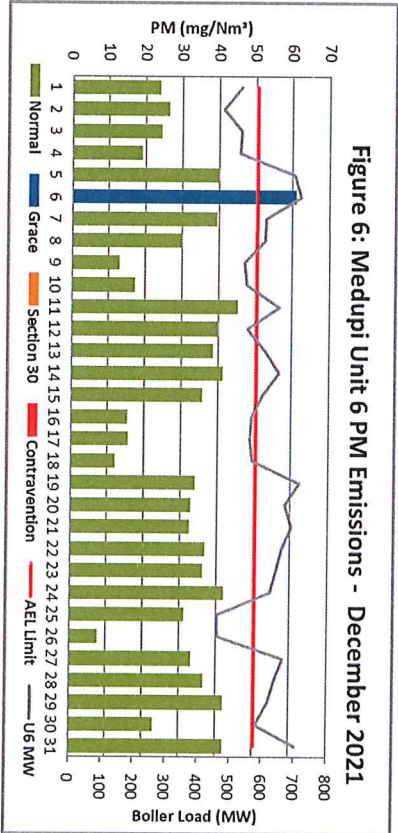
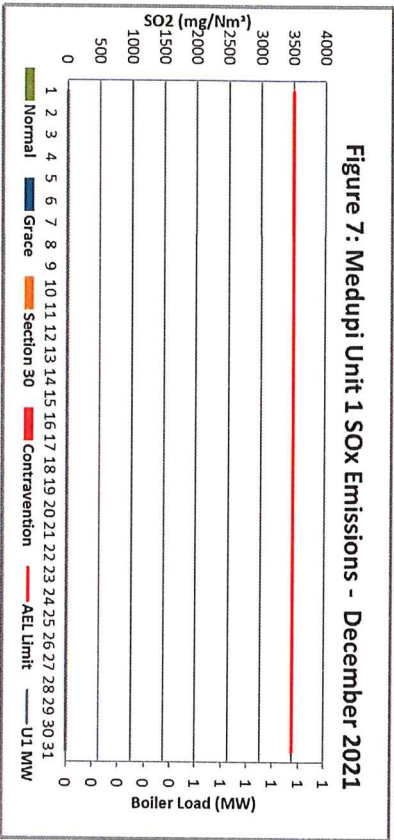
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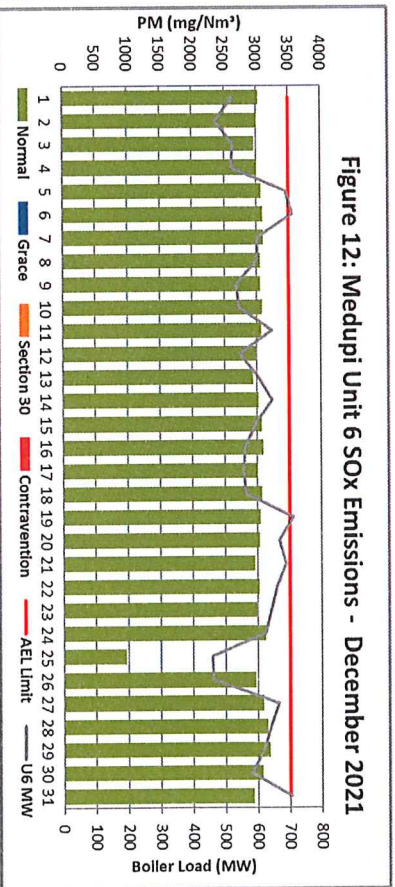
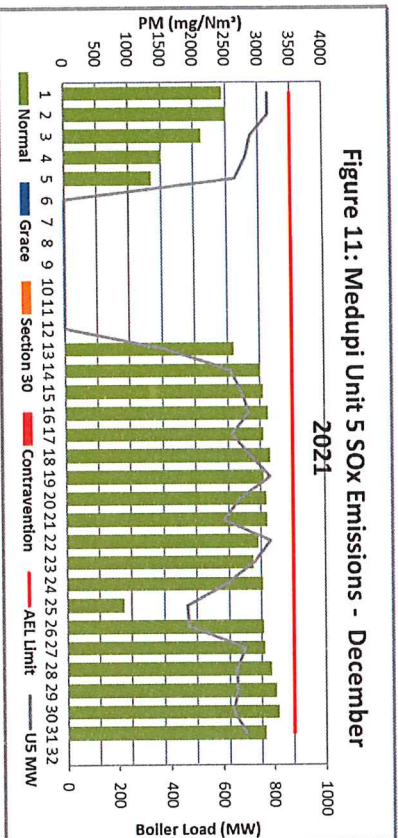
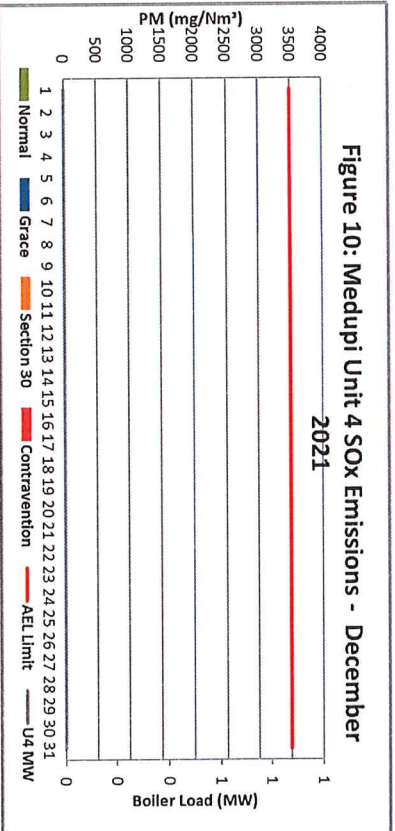
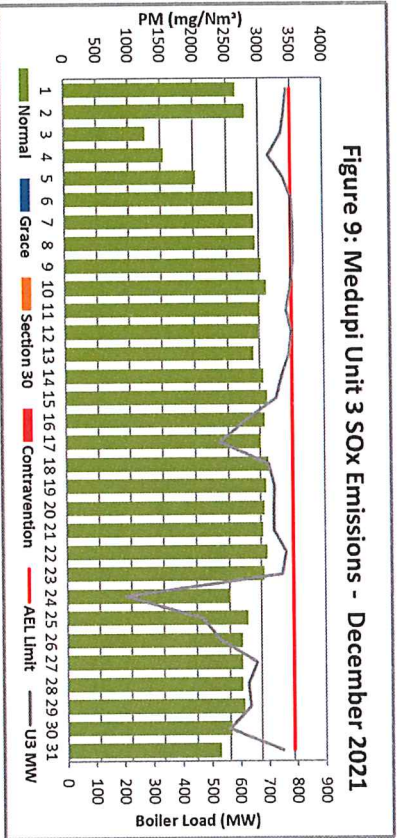
SO_x Daily Averages



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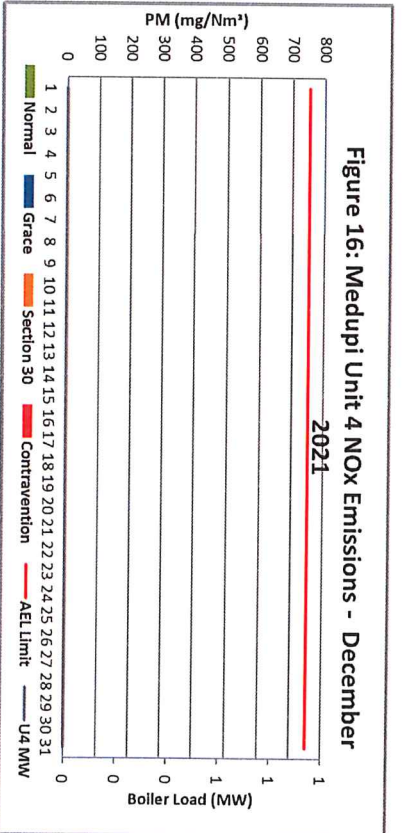
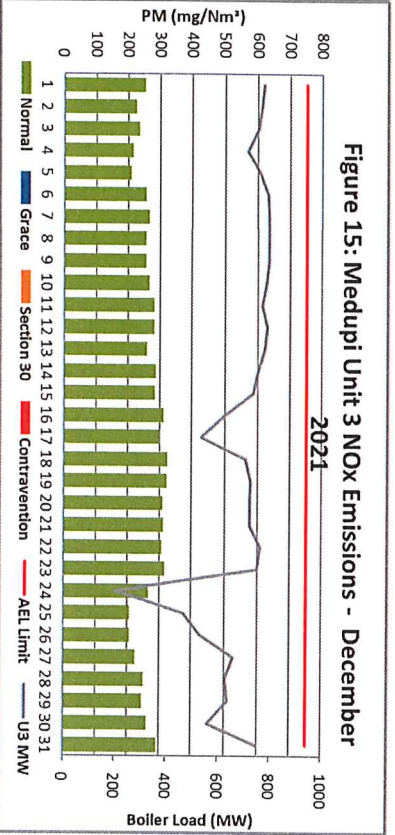
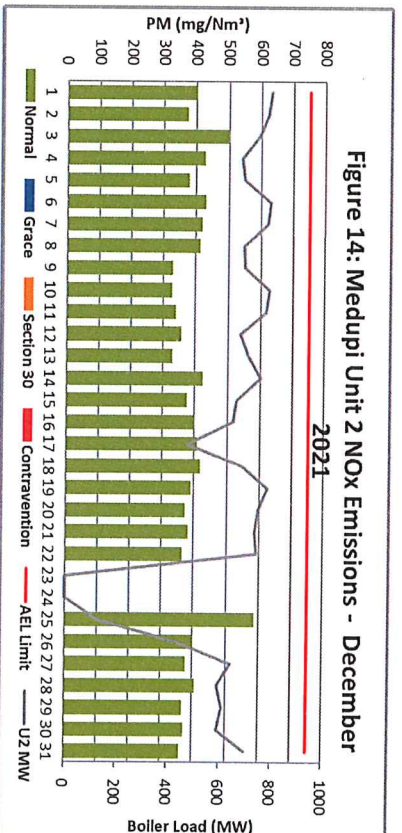
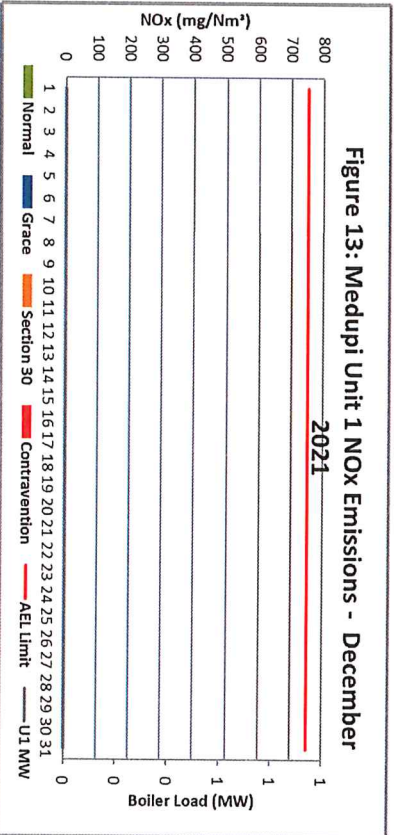
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NOx Daily Averages

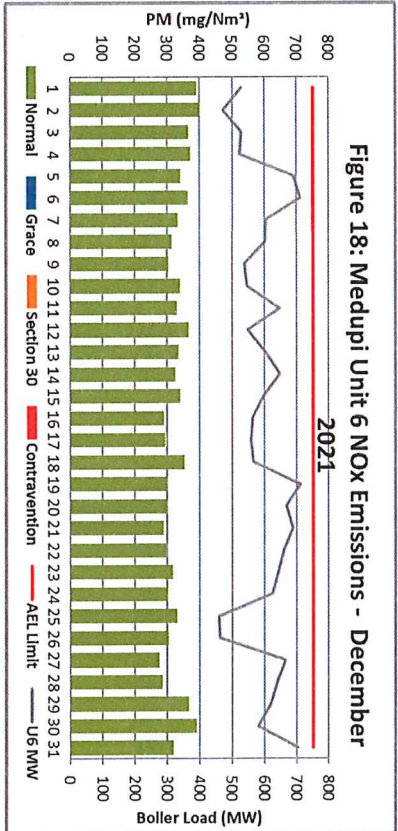
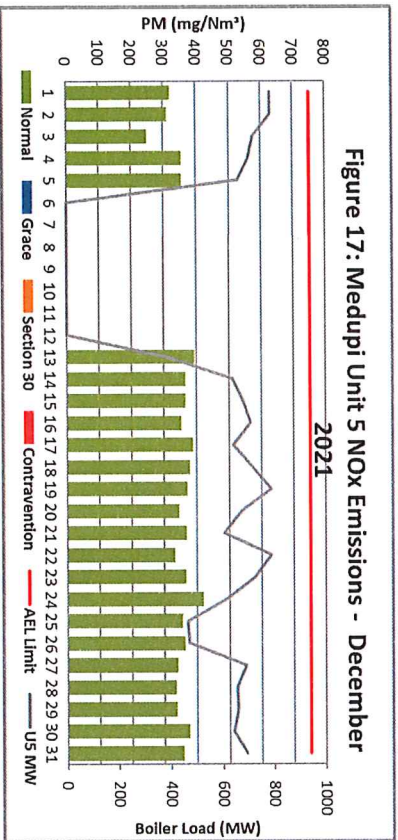


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Medupi Power Station graphical representation of the daily average emissions

Note: Unit 1 off for outage.

Note: Unit 4 off for recovery.

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TABLE 7: MONTHLY TONNAGES FOR THE MONTH OF DECEMBER 2021

Associated Unit/Stack	PM	SO ₂	NO ₂
Unit 1	31.6	6 927.1	845.8
Unit 2	51.5	6 701.3	646.0
Unit 3	15.6	4 299.1	537.7
Unit 4	73.2	7 053.6	761.0
Unit 5	171.9	24 981.1	2 790.5
Unit 6			
SUM			

5. 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.

TABLE 6: PERIODS DURING WHICH CEMS WAS INOPERATIVE

Date	Time	CEMS status	Comments
N/A	N/A	N/A	N/A

TABLE 7: CEMS MONITOR RELIABILITY

Associated Unit/Stack	PM	SO ₂	NO	O ₂
Unit 1	100.0	100.0	94.1	93.2
Unit 2	100.0	98.1	90.9	1.3
Unit 3	99.8	97.3	83.8	25.0
Unit 4	96.7	100.0	96.8	18.0
Unit 5				
Unit 6				

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6. 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.

7. Ambient Air Quality Monitoring Report

The Ambient Air Quality Monitoring and Dust fall-out report are emailed to the Licensing authority on a monthly basis.

8. 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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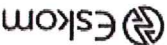

	
CALCULATION OF EMISSIONS OF TOTAL VOLATILE COMPOUNDS FROM FUEL OIL STORAGE TANKS*	
Date:	Friday, 31 December 2021
Station:	Medupi Power Station
Province:	Limpopo Province
Tank no.:	1-2
Description:	Outdoor fuel oil storage tank
Tank Type:	Vertical fixed roof (vented to atmosphere)
Material stored:	Fuel 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 A/C OE	
MONTH:	December
GENERAL INFORMATION:	
Total number of fuel oil tanks:	2
Height of tank:	14.2 m
Diameter of tank:	12 m
Net fuel oil throughput for the month:	2126 tons/month
Molecular weight of the fuel oil:	166.00 lb/lb-mole
METEOROLOGICAL DATA FOR THE MONTH	
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 insulation factor	6.12 kWhm ² /day
Tank paint colour	Aluminum/Specular
Tank paint solar absorbance	0.39
FINAL OUTPUT:	NA
Breathing losses:	0.78 kg/month
Working losses:	0.78 kg/month
TOTAL LOSSES (Total TVOC Emissions for the 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, Titech 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 8: TOTAL VOLATILE ORGANIC COMPOUND (TVOC) FOR DECEMBER 2021

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9. Air quality improvements initiatives and public education and awareness campaigns

No awareness campaign.

10. Complaints Register

TABLE 9: COMPLAINTS FOR THE MONTH OF DECEMBER 2021

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:

Thabo Khoza

Senior Environmental Advisor

Verified by:

Malose Langa

System Engineer Boiler

Supported by:

Mokgadi Dikgale

Environmental Manager

Supported by:

Jabulani Mkhatsywa

Engineering Group Manager

Yours sincerely

Zwelli Witbooi

GENERAL MANAGER: MEDUPI POWER STATION

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