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Date: 2023/03/31

Enquiries: MF Dikgale  
Tel: 014 762 6820

Ref: H16/1/13-AEL/M1/R1 – March 2023

Dear Mr Koenaitse

### **MEDUPI POWER STATION MONTHLY EMISSIONS REPORT FOR THE MONTH OF MARCH 2023**

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 March 2023 only.

## **1. Raw Materials and Products**


**TABLE 1: QUANTITY OF RAW MATERIALS AND PRODUCTS CONSUMPTION IN MARCH 2023**

<b>Raw Materials and Products used</b>	<b>Raw Material Type</b>	<b>Unit</b>	<b>Maximum Permitted Consumption/ Rate (Quantity)</b>	<b>Consumption – March 2023</b>
	Coal	Tons/month	1 875 000	915 162
	Fuel Oil	Tons/month	20 000	2 280
<b>Production Rates</b>	<b>Product/ By-Product Name</b>	<b>Unit</b>	<b>Maximum Production Capacity Permitted (Quantity)</b>	<b>Production Rate in Month of March 2023</b>
	Energy	GWh	3 571.2	1 911
	Ash Emitted	Tons/month	not specified	299.3

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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-Mar	24.0	24.0	24.0	0.0	24.0	0.0	28358	639	794	562	Off	664	Off
02-Mar	24.0	24.0	24.0	0.0	24.0	0.0	28120	655	786	589	Off	663	Off
03-Mar	24.0	24.0	24.0	0.0	24.0	0.0	28936	643	794	656	Off	666	Off
04-Mar	24.0	24.0	24.0	0.0	24.0	0.0	27820	629	705	621	Off	669	Off
05-Mar	24.0	24.0	24.0	0.0	24.0	0.0	28992	633	771	613	Off	669	Off
06-Mar	24.0	24.0	24.0	0.0	24.0	0.0	29292	632	794	600	Off	678	Off
07-Mar	24.0	24.0	24.0	0.0	24.0	0.0	30011	679	795	628	Off	631	Off
08-Mar	24.0	24.0	24.0	0.0	24.0	0.0	30147	668	793	639	Off	648	Off
09-Mar	24.0	24.0	24.0	0.0	24.0	0.0	30500	665	793	630	Off	655	Off
10-Mar	24.0	24.0	24.0	0.0	24.0	0.0	30246	618	763	669	Off	655	Off
11-Mar	24.0	24.0	24.0	0.0	24.0	0.0	29403	600	736	718	Off	653	Off
12-Mar	24.0	24.0	24.0	0.0	24.0	0.0	24738	636	544	694	Off	652	Off
13-Mar	24.0	24.0	24.0	0.0	24.0	0.0	26844	623	568	658	Off	639	Off
14-Mar	24.0	24.0	24.0	0.0	24.0	0.0	28505	632	620	695	Off	649	Off
15-Mar	24.0	24.0	24.0	0.0	24.0	0.0	30109	651	762	725	Off	632	Off
16-Mar	24.0	24.0	24.0	0.0	24.0	0.0	27129	650	612	662	Off	629	Off
17-Mar	24.0	24.0	24.0	0.0	24.0	0.0	30961	633	794	702	Off	652	Off
18-Mar	24.0	24.0	24.0	0.0	24.0	0.0	29494	639	754	559	Off	617	Off
19-Mar	24.0	24.0	24.0	0.0	24.0	0.0	30099	608	787	650	Off	648	Off
20-Mar	24.0	24.0	24.0	0.0	24.0	0.0	29131	554	754	673	Off	648	Off
21-Mar	24.0	24.0	24.0	0.0	24.0	0.0	29972	658	720	698	Off	662	Off
22-Mar	24.0	24.0	24.0	0.0	24.0	0.0	30937	677	745	746	Off	657	Off
23-Mar	24.0	24.0	24.0	0.0	24.0	0.0	29482	735	780	756	Off	462	Off
24-Mar	24.0	24.0	24.0	0.0	24.0	0.0	31393	722	758	751	Off	660	Off
25-Mar	24.0	24.0	24.0	0.0	24.0	0.0	31789	734	762	767	Off	660	Off
26-Mar	24.0	24.0	24.0	0.0	24.0	0.0	31363	701	793	739	Off	667	Off
27-Mar	24.0	24.0	24.0	0.0	24.0	0.0	30425	682	741	723	Off	659	Off
28-Mar	24.0	24.0	24.0	0.0	24.0	0.0	32053	741	785	761	Off	659	Off
29-Mar	24.0	24.0	24.0	0.0	24.0	0.0	33012	749	785	735	Off	673	Off
30-Mar	24.0	24.0	24.0	0.0	24.0	0.0	34187	730	785	727	Off	642	292
31-Mar	24.9	24.0	24.0	0.0	24.0	0.0	36628	730	785	727	Off	648	524

NB: Reportable hours less than 24 highlighted in pink; Unit OFF highlighted in Red

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## 2. Abatement Technology

Table 3: Abatement Equipment Control Technology efficiency for month of March 2023

Associated Unit/Stack	Technology Type	Efficiency	FFP Utilization
Unit 1	Fabric Filter Plant (FFP)	99.871%	100%
Unit 2	Fabric Filter Plant (FFP)	99.895%	100%
Unit 3	Fabric Filter Plant (FFP)	99.904%	100%
Unit 4	Fabric Filter Plant (FFP)	Off	Off
Unit 5	Fabric Filter Plant (FFP)	99.925%	100%
Unit 6	Fabric Filter Plant (FFP)	100.000%	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 MARCH 2023

Characteristic	Stipulated Range (% by weight on a dry basis)	Monthly Average Content (% by weight on a dry basis)
	<b>Coal</b>	
Sulphur Content	1.3 - 2.2	1.5
Ash Content	35 - 39	35.3

TABLE 5: ENERGY SOURCE MATERIAL CHARACTERISTICS FOR THE MONTH OF MARCH 2023

Characteristic	Stipulated Range (%)	Monthly Average Content (%)
	<b>Oil</b>	
Sulphur Content	0.5 - 3.5	2.4
Ash Content	0.02 - 0.1	0.020

## 4. Emissions Reporting

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

The emission limits are as follows:

SO<sub>2</sub> Monthly = 3500 mg/Nm<sup>3</sup>

Dust Daily= 50 mg/Nm<sup>3</sup>

NO<sub>2</sub> Daily= 750 mg/Nm<sup>3</sup>

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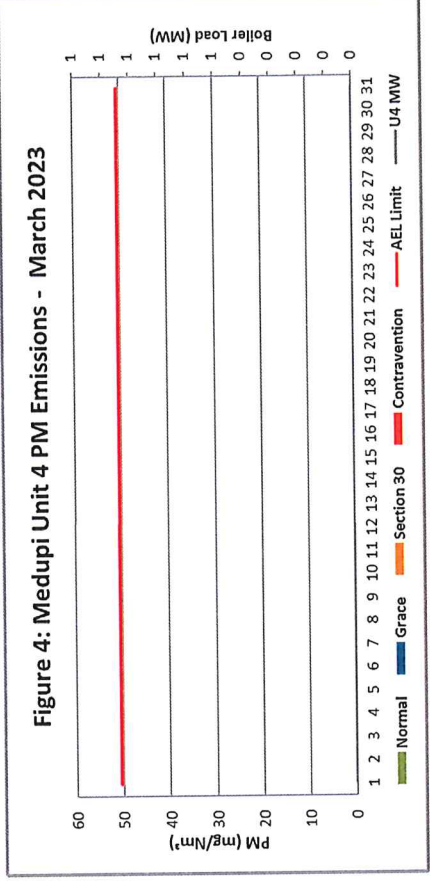
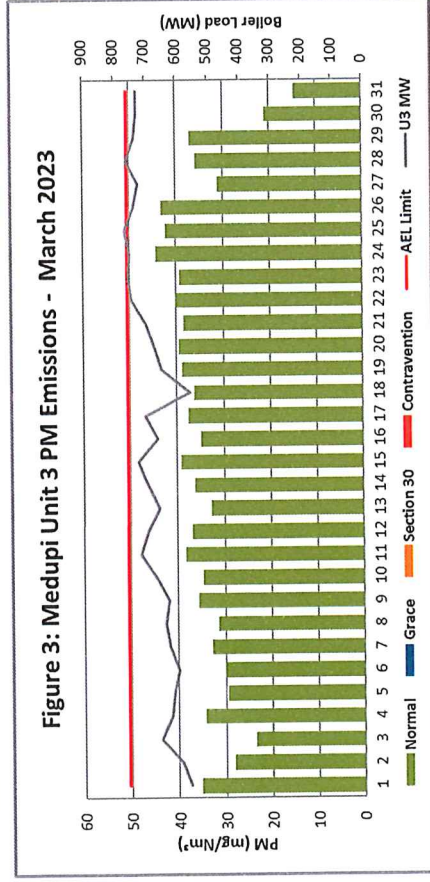
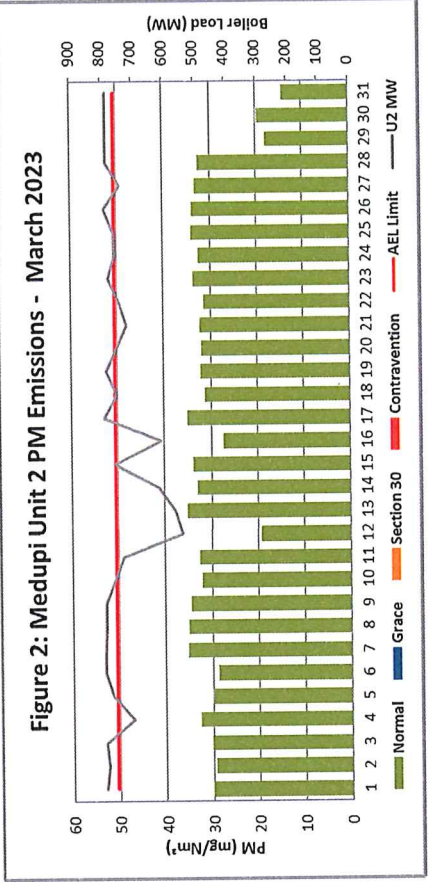
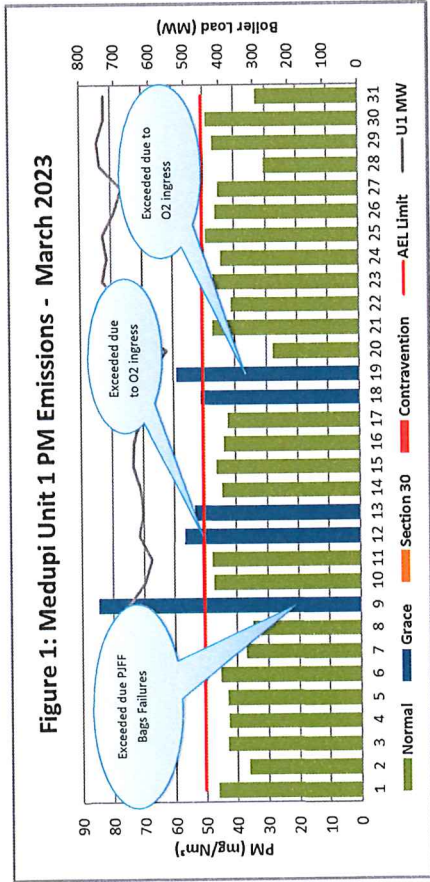
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4.1 PM Daily Averages



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Figure 5: Medupi Unit 5 PM Emissions - March 2023

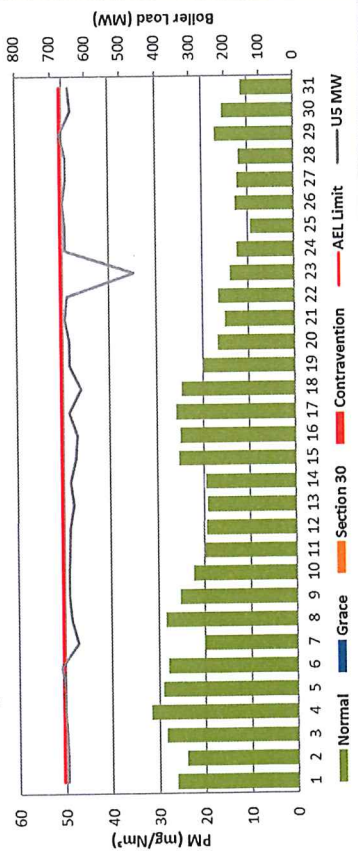


Figure 6: Medupi Unit 6 PM Emissions - March 2023

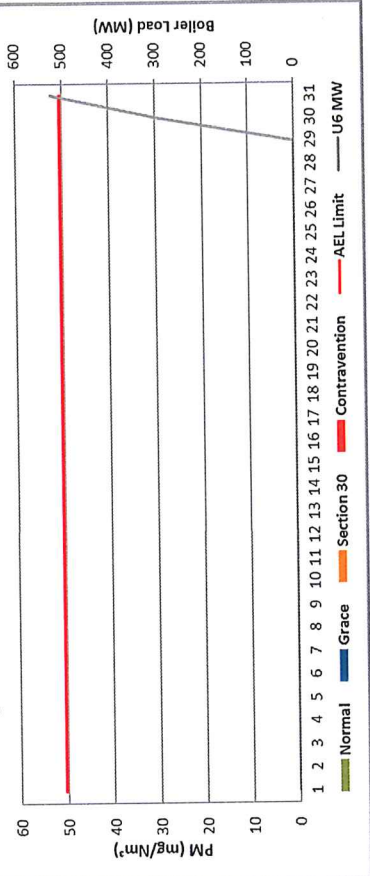


Figure 7: Medupi Unit 1 SOx Emissions - March 2023

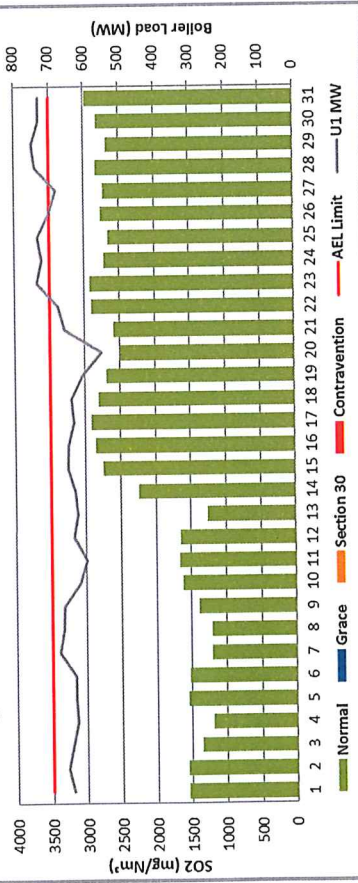
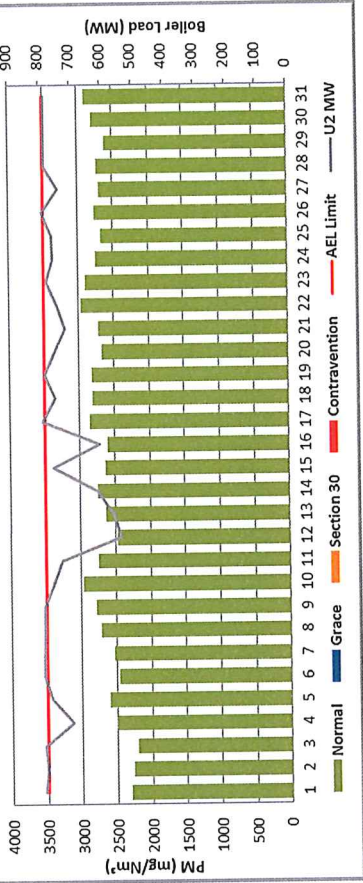


Figure 8: Medupi Unit 2 SOx Emissions - March 2023



4.2 SOx Daily Averages

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Figure 9: Medupi Unit 3 SOx Emissions - March 2023

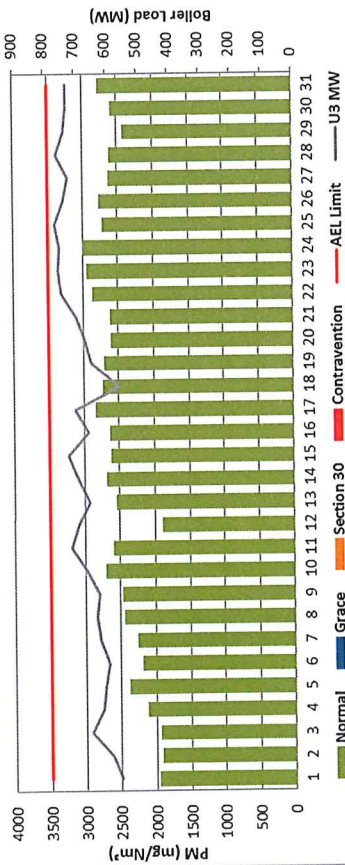


Figure 10: Medupi Unit 4 SOx Emissions - March 2023



Figure 11: Medupi Unit 5 SOx Emissions - March 2023

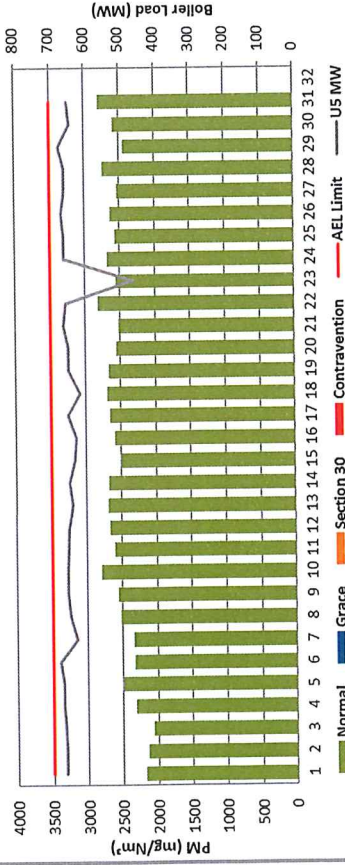
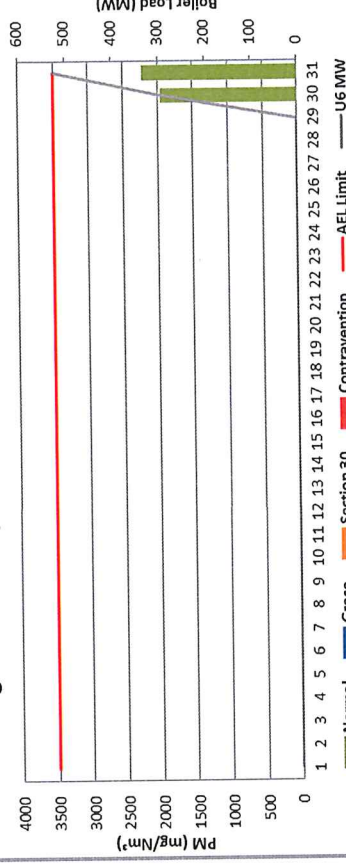


Figure 12: Medupi Unit 6 SOx Emissions - March 2023



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4.3 NOx Daily Averages

Figure 13: Medupi Unit 1 NOx Emissions - March 2023

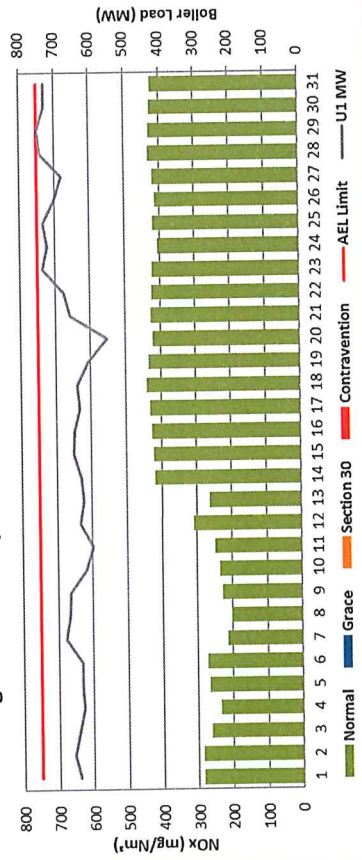


Figure 14: Medupi Unit 2 NOx Emissions - March 2023

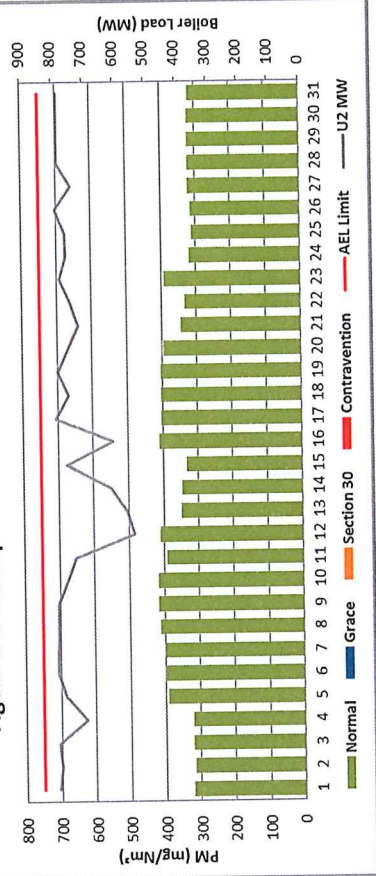


Figure 15: Medupi Unit 3 NOx Emissions - March 2023

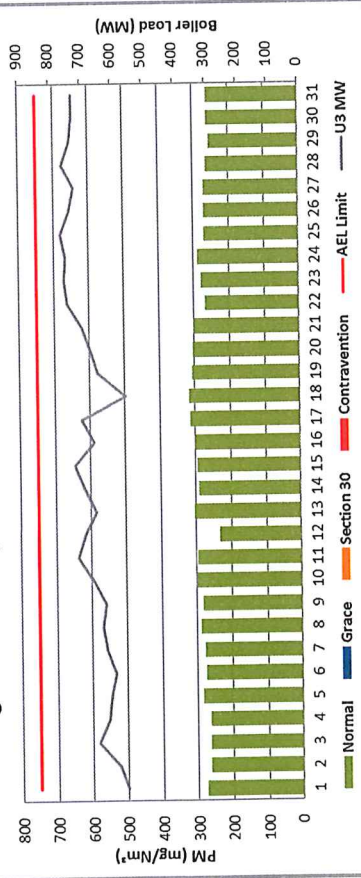
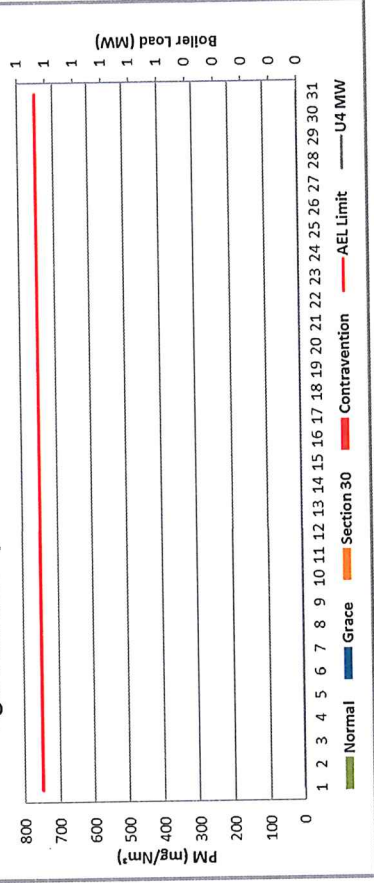


Figure 16: Medupi Unit 4 NOx Emissions - March 2023



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Figure 17: Medupi Unit 5 NOx Emissions - March 2023

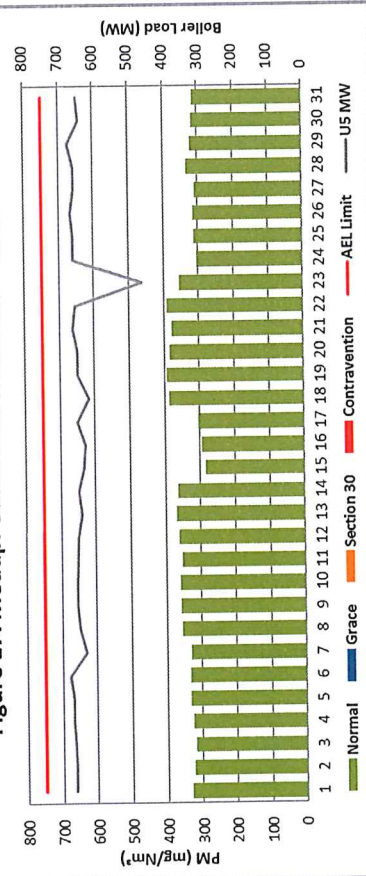
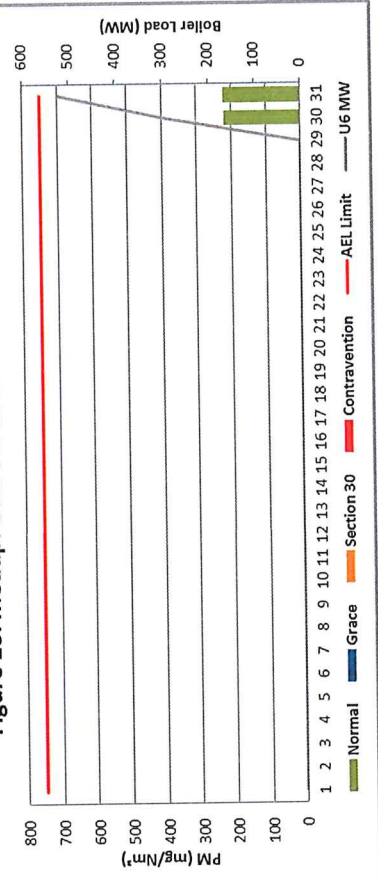



Figure 18: Medupi Unit 6 NOx Emissions - March 2023



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**TABLE 6: MONTHLY TONNAGES FOR THE MONTH OF MARCH 2023**

Associated Unit/Stack	PM	SO <sub>2</sub>	NO <sub>2</sub>
Unit 1	94.2	4 533.1	727.4
Unit 2	84.4	7 380.1	994.9
Unit 3	71.4	5 223.2	581.3
Unit 4	0.0	0.0	0.0
Unit 5	49.2	6 178.5	823.7
Unit 6	0.0	148.5	15.2
<b>SUM (Tons)</b>	<b>299.3</b>	<b>23 463.4</b>	<b>3 142.5</b>

**TABLE 7: MONTHLY AVERAGES FOR THE MONTH OF MARCH 2023**

Associated Unit/Stack	Average PM (mg/Nm <sup>3</sup> )	Average SO <sub>x</sub> (mg/Nm <sup>3</sup> )	Average NO <sub>x</sub> (mg/Nm <sup>3</sup> )
Unit 1	45.7	2 196.9	353.2
Unit 2	30.5	2 674.4	361.0
Unit 3	34.7	2 523.7	281.9
Unit 4	Off	Off	Off
Unit 5	20.2	2 547.4	339.6
Unit 6	-	2 096.0	222.5

## 4 Continuous Emission Monitoring Systems (CEMS)

Unit 1, 2, 3, 5 and 6 Continuous Emission Monitoring Systems were always in operation 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
12, 13, 18, 19 Unit 1	O <sub>2</sub> ingress into the monitor	Formal investigation in progress as this resulted in exceedances on the daily PM limit

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**TABLE 9: CEMS MONITOR RELIABILITY PERCENTAGE (%)**

Associated Unit/Stack	PM	SO <sub>2</sub>	NO <sub>2</sub>	CO <sub>2</sub>	O <sub>2</sub>
Unit 1	98.7	95.1	94.6	100.0	100.0
Unit 2	98.7	96.9	96.4	96.5	96.4
Unit 3	98.7	94.4	94.4	39.9	30.8
Unit 4	Off	Off	Off	Off	Off
Unit 5	98.7	99.5	99.3	99.2	99.2
Unit 6	-	100.0	100.0	71.4	100.0

## 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 March 2023 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 MARCH 2023

			
<b>CALCULATION OF EMISSIONS OF TOTAL VOLATILE COMPOUNDS FROM FUEL OIL STORAGE TANKS*</b>			
Date:	Friday, 31 March 2023		
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		
<b>MONTHLY INPUT DATA FOR THE STATION</b> Please only insert relevant monthly data inputs into the <b>blue cells</b> below Choose from a dropdown menu in the <b>green cells</b> The total VOC emissions for the month are in the <b>red cells</b> IMPORTANT: Do not change <b>any</b> other cells without consulting the AQ CoE			
MONTH:	March		
<b>GENERAL INFORMATION:</b>		<b>Data</b>	<b>Unit</b>
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:	2280		tons/month
Molecular weight of the fuel oil:	166.00		Lb/lb-mole
<b>METEROLOGICAL DATA FOR THE MONTH</b>		<b>Data</b>	<b>Unit</b>
Daily average ambient temperature	23.67		°C
Daily maximum ambient temperature	30.21		°C
Daily minimum ambient temperature	17.89		°C
Daily ambient temperature range	12.31		°C
Daily total insolation factor	5.08		kWh/m <sup>2</sup> /day
Tank paint colour	Aluminum/Specular		NA
Tank paint solar absorbance	0.39		NA
<b>FINAL OUTPUT:</b>		<b>Result</b>	<b>Unit</b>
Breathing losses:		0.68 kg/month	
Working losses:		0.06 kg/month	
<b>TOTAL LOSSES (Total TVOC Emissions for the month):</b>		<b>0.75 kg/month</b>	
<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, Trittech Consulting Engineers, 85-93 Chevy Chase Street, Jamaica, NY 11432 USA, Tel - 718-454-3920, Fax - 718-454-6330, e-mail - Peress.J@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 MARCH 2023

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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		<b>Effective Date</b>	<b>March 2022</b>		
		<b>Review Date</b>	<b>March 2024</b>		

**Compiled by:** Thabo Khoza \_\_\_\_\_ Date: 31 March 2023  
**Senior Environmental Advisor**

**Verified by:** Malose Langa \_\_\_\_\_ Date: 2023/04/17  
**System Engineer Boiler**

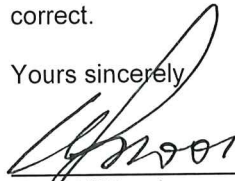
**Verified by:** Kevin Mathebula \_\_\_\_\_ Date: 2023/04/17  
**System Engineer C&I**

**Supported by:** Mokgadi Dikgale \_\_\_\_\_ Date: 2023/04/17  
**Environmental Manager**

**Supported by:** Jabulani Mkhathswa \_\_\_\_\_ Date: 2023/04/17  
**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: 2023/04/17

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