	<b>Medupi Power Station Monthly Emissions Report</b>	<b>Template Identifier</b>	240-43921804	Rev	6	
		<b>Document Identifier</b>	240-88543153	Rev	2	
		<b>Effective Date</b>	February 2022			
		<b>Review Date</b>	February 2024			

Stanley Koenaitse

Waterberg District Municipality  
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Modimolle  
0510

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Date: 2022/09/30

Enquiries: MF Dikgale  
Tel: 014 762 6820

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

Dear Mr Koenaitse

### MEDUPI POWER STATION MONTHLY EMISSIONS REPORT FOR THE MONTH OF SEPTEMBER 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 September 2022 only.

## 1. Raw Materials and Products


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

Raw Materials and Products used	Raw Material Type	Unit	Maximum Permitted Consumption/ Rate (Quantity)	Consumption – September 2022
	Coal	Tons/month	1 875 000	965 108
	Fuel Oil	Tons/month	20 000	833
Production Rates	Product/ By-Product Name	Unit	Maximum Production Capacity Permitted (Quantity)	Production Rate in Month of September 2022
	Energy	GWh	3 571.2	2 218
	Ash Emitted	Tons/month	not specified	226.4

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	<b>Medupi Power Station Monthly Emissions Report</b>	<b>Template Identifier</b>	240-43921804	Rev	6	
		<b>Document Identifier</b>	240-88543153	Rev	2	
		<b>Effective Date</b>	February 2022			
		<b>Review Date</b>	February 2024			

**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-Sep	24.0	24.0	24.0		24.0	24.0	35898	550	638	725		630	600
02-Sep	24.0	23.8	24.0		24.0	24.0	34264	571	594	690		618	672
03-Sep	24.0	0.0	24.0		24.0	24.0	36722	600	637	763		746	701
04-Sep	24.0	22.2	24.0		24.0	24.0	35711	572	706	727		788	770
05-Sep	24.0	24.0	24.0		15.6	24.0	32469	549	633	726		613	704
06-Sep	24.0	1.7	24.0		0.0	24.0	27190	590	485	785		491	651
07-Sep	24.0	5.3	24.0		20.5	24.0	38472	613	741	782		788	684
08-Sep	24.0	24.0	24.0		24.0	24.0	36963	670	675	765		697	713
09-Sep	24.0	24.0	24.0		24.0	24.0	36014	626	735	595		787	648
10-Sep	24.0	24.0	24.0		24.0	24.0	34932	672	736	619		706	606
11-Sep	24.0	24.0	24.0		24.0	24.0	37560	670	675	765		635	622
12-Sep	24.0	24.0	24.0		24.0	24.0	38407	713	688	697		706	656
13-Sep	24.0	24.0	24.0		24.0	24.0	32204	774	630	676		785	637
14-Sep	24.0	5.6	24.0		24.0	24.0	29716	774	630	676		785	637
15-Sep	24.0	0.0	24.0		24.0	24.0	28909	725	Off	788		758	651
16-Sep	24.0	0.0	24.0		24.0	24.0	29823	747	Off	741		674	657
17-Sep	24.0	0.0	24.0		24.0	24.0	31278	715	Off	792		610	686
18-Sep	24.0	0.0	24.0		24.0	24.0	32269	758	Off	793		783	706
19-Sep	24.0	0.0	24.0		24.0	24.0	31225	740	Off	757		733	705
20-Sep	24.0	0.0	24.0		24.0	24.0	30520	727	Off	778		755	740
21-Sep	24.0	0.0	24.0		24.0	24.0	31064	776	Off	782		783	748
22-Sep	24.0	0.0	24.0		24.0	24.0	32100	752	Off	723		789	768
23-Sep	24.0	0.0	24.0		24.0	24.0	30597	774	Off	609		794	770
24-Sep	24.0	0.0	24.0		24.0	24.0	30566	746	Off	620		776	769
25-Sep	24.0	0.0	24.0		24.0	24.0	30625	708	Off	620		794	751
26-Sep	24.0	0.0	24.0		24.0	24.0	30760	748	Off	620		789	733
27-Sep	24.0	0.0	24.0		24.0	24.0	31140	728	Off	615		794	770
28-Sep	24.0	0.0	24.0		24.0	24.0	30794	767	Off	608		793	762
29-Sep	24.0	0.0	24.0		24.0	24.0	31451	752	Off	620		783	770
30-Sep	24.0	0.0	24.0		24.0	24.0	31344	696	Off	725		736	721

NB: reportable hours less than 24 highlighted in pink

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	<b>Medupi Power Station Monthly Emissions Report</b>	<b>Template Identifier</b>	<b>240-43921804</b>	<b>Rev</b>	<b>6</b>
		<b>Document Identifier</b>	<b>240-88543153</b>	<b>Rev</b>	<b>2</b>
		<b>Effective Date</b>	<b>February 2022</b>		
		<b>Review Date</b>	<b>February 2024</b>		

## 2. Abatement Technology

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

Associated Unit/Stack	Technology Type	Efficiency	FFP Utilization
Unit 1	Fabric Filter Plant (FFP)	99.93%	100%
Unit 2	Fabric Filter Plant (FFP)	100.00%	100%
Unit 3	Fabric Filter Plant (FFP)	99.92%	100%
Unit 4	Fabric Filter Plant (FFP)		
Unit 5	Fabric Filter Plant (FFP)	99.93%	100%
Unit 6	Fabric Filter Plant (FFP)	99.91%	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 SEPTEMBER 2022

Characteristic	Stipulated Range (% by weight on a dry basis)	Monthly Average Content (% by weight on a dry basis)
<b>Coal</b>		
<b>Sulphur Content</b>	1.3 - 2.2	1.27
<b>Ash Content</b>	35 - 39	35.12

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

Characteristic	Stipulated Range (%)	Monthly Average Content (%)
<b>Oil</b>		
<b>Sulphur Content</b>	0.5 - 3.5	2.4
<b>Ash Content</b>	0.02 - 0.1	0.010

## 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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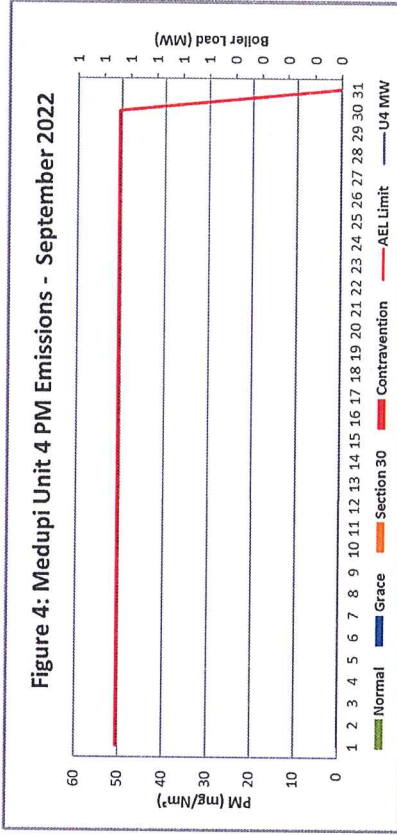
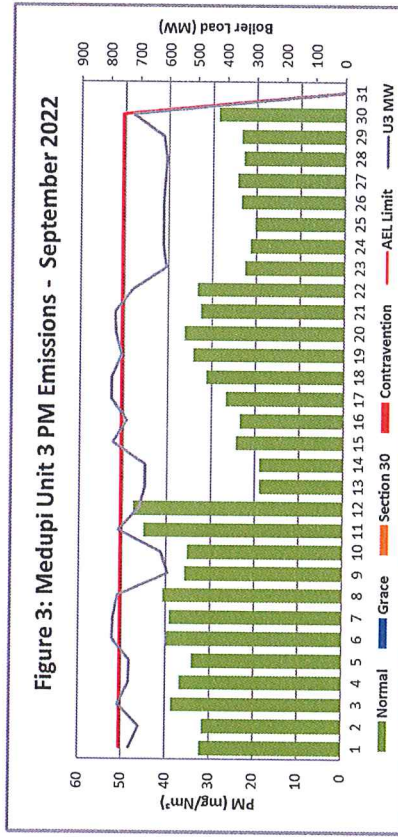
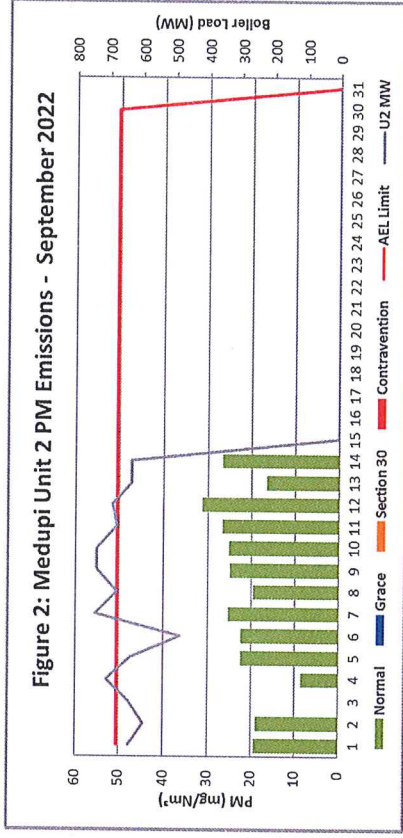
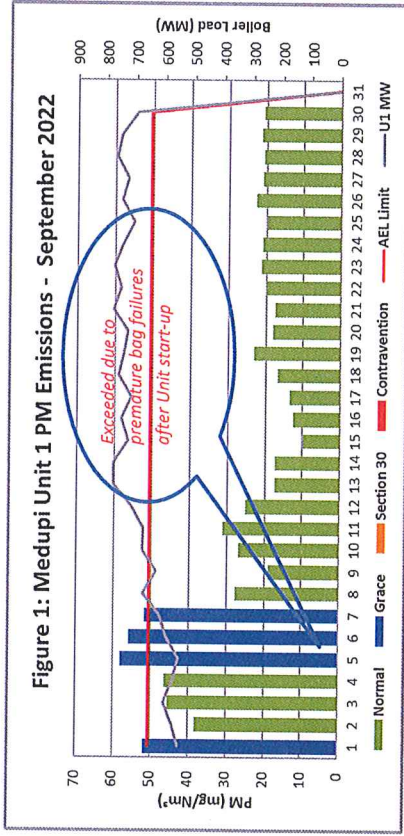
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Medupi Power Station Monthly Emissions Report

Template Identifier	240-43921804	Rev	6
Document Identifier	240-88543153	Rev	2
Effective Date	February 2022		
Review Date	February 2024		

PM Daily Averages



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Medupi Power Station Monthly Emissions Report

Template Identifier	240-43921804	Rev	6
Document Identifier	240-88543153	Rev	2
Effective Date	February 2022		
Review Date	February 2024		

Figure 5: Medupi Unit 5 PM Emissions - September 2022

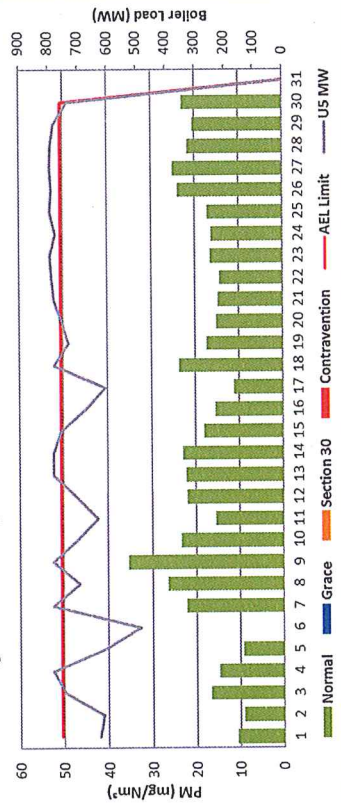
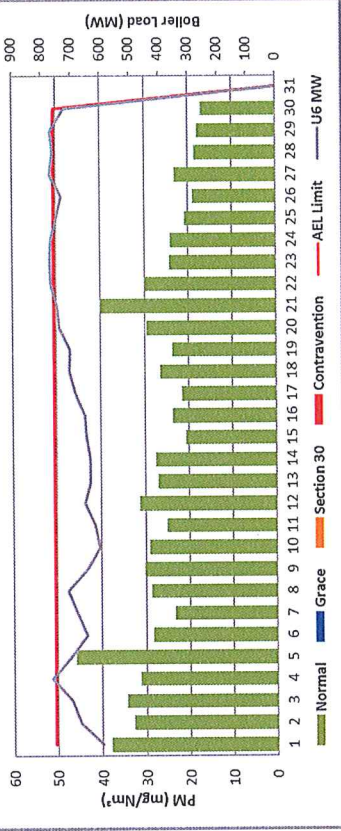


Figure 6: Medupi Unit 6 PM Emissions - September 2022



SOx Daily Averages

Figure 7: Medupi Unit 1 SOx Emissions - September 2022

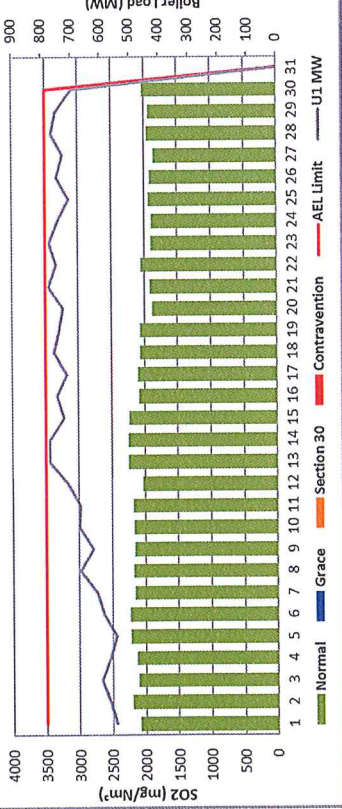
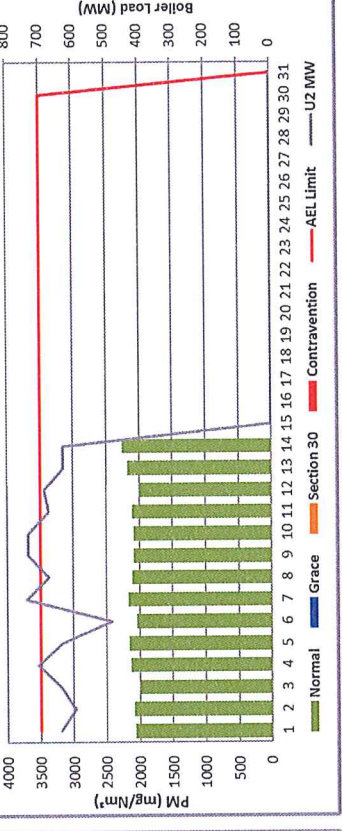


Figure 8: Medupi Unit 2 SOx Emissions - September 2022



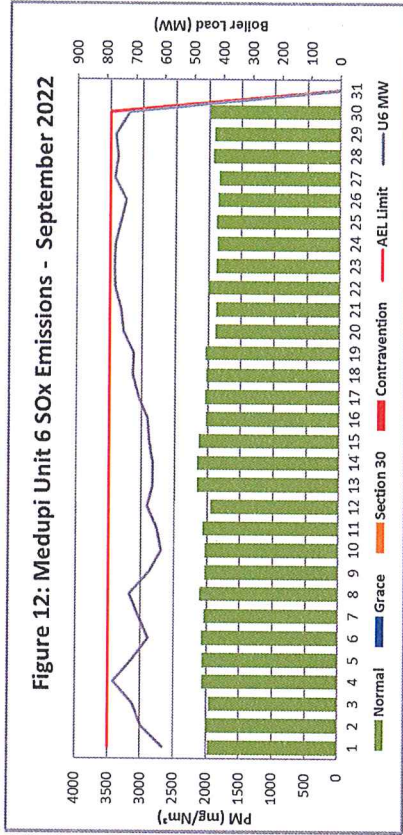
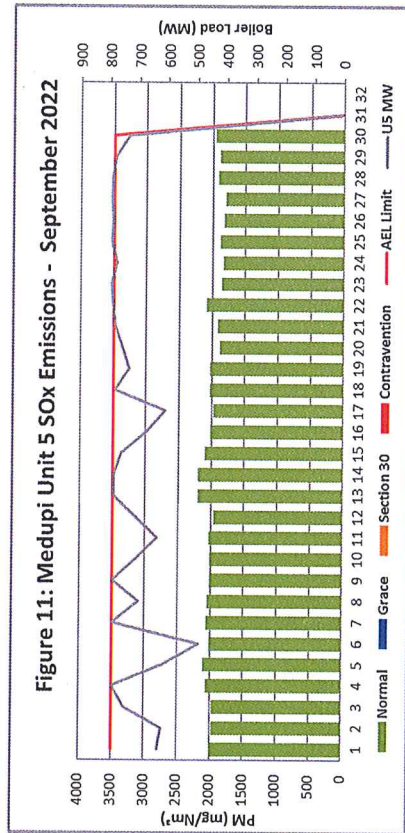
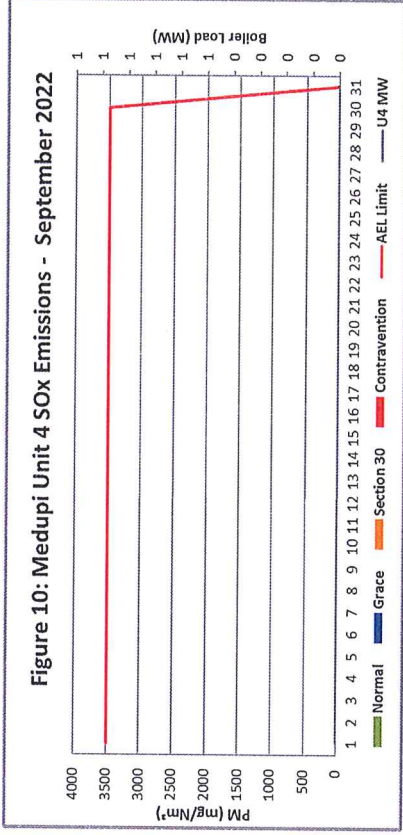
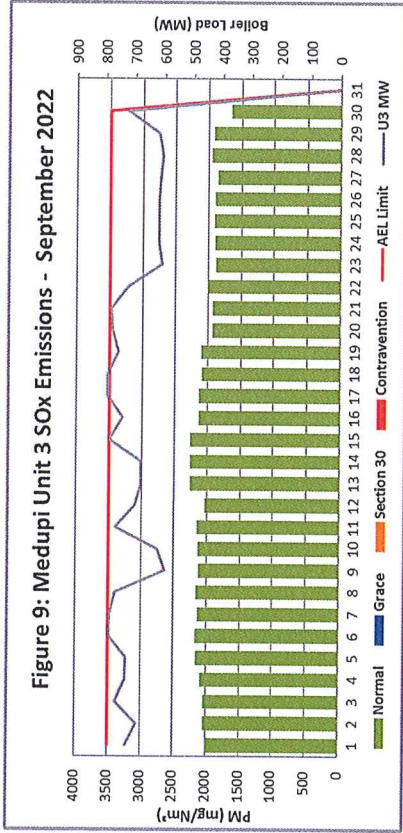
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Medupi Power Station Monthly Emissions Report

Template Identifier	240-43921804	Rev	6
Document Identifier	240-88543155	Rev	2
Effective Date	February 2022		
Review Date	February 2024		



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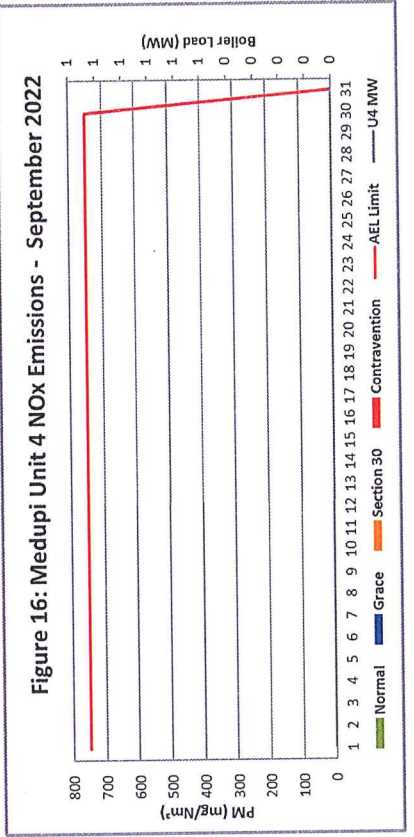
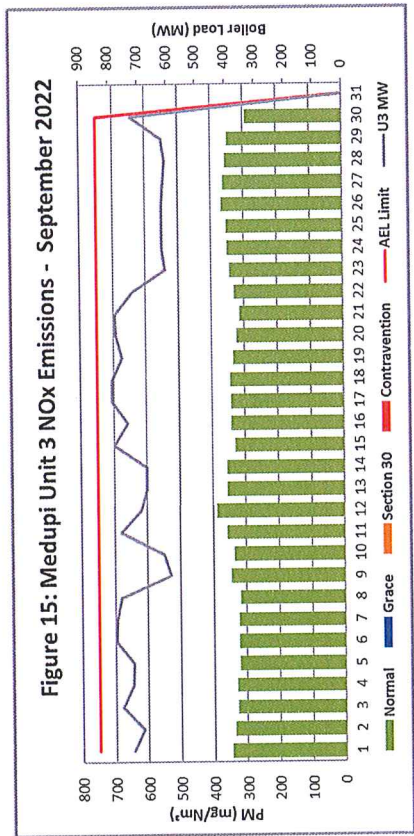
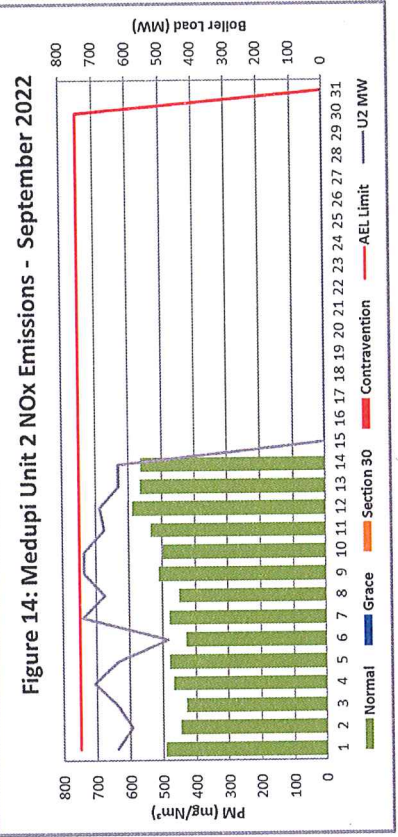
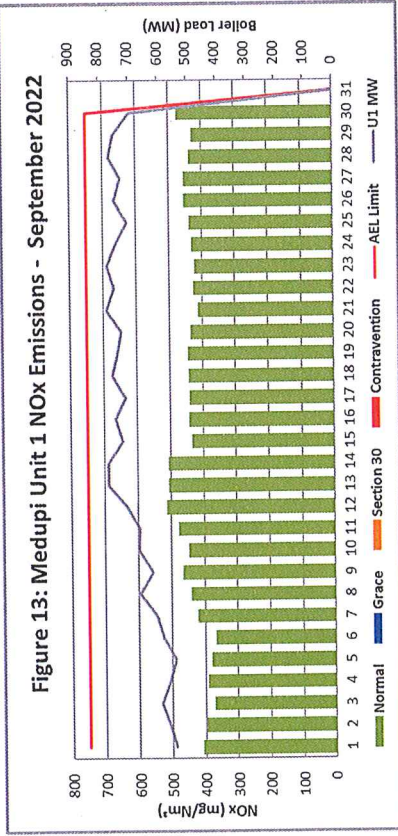
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Medupi Power Station Monthly Emissions Report

Template Identifier	240-43921804	Rev	6
Document Identifier	240-88543153	Rev	2
Effective Date	February 2022		
Review Date	February 2024		

4.2 NOx Daily Averages



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Medupi Power Station Monthly Emissions Report

Template Identifier	240-43921804	Rev	6
Document Identifier	240-88543153	Rev	2
Effective Date	February 2022		
Review Date	February 2024		

Figure 17: Medupi Unit 5 NOx Emissions - September 2022

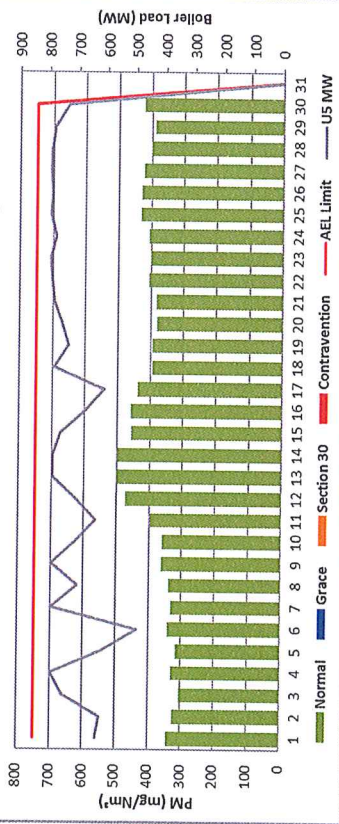
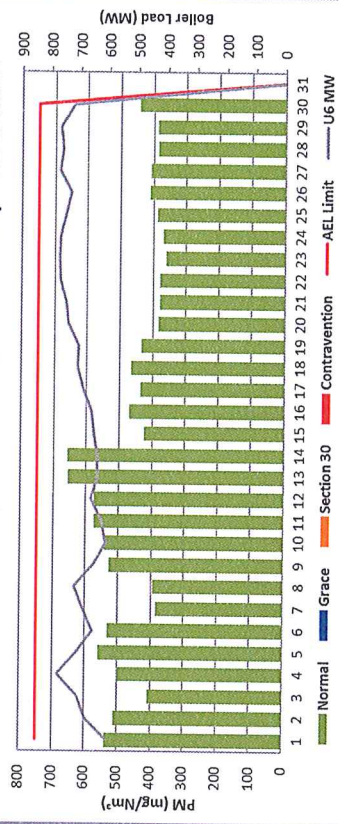



Figure 18: Medupi Unit 6 NOx Emissions - September 2022



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	<b>Medupi Power Station Monthly Emissions Report</b>	Template Identifier	240-43921804	Rev	6
		Document Identifier	240-88543153	Rev	2
		Effective Date	February 2022		
		Review Date	February 2024		

**TABLE 6: MONTHLY TONNAGES FOR THE MONTH OF SEPTEMBER 2022**

Associated Unit/Stack	PM	SO <sub>2</sub>	NO <sub>2</sub>
Unit 1	53.2	4 272.7	909.2
Unit 2	0.0	0.0	0.0
Unit 3	60.6	3 986.6	661.5
Unit 4			
Unit 5	48.9	5 244.8	1 045.9
Unit 6	63.6	4 674.9	1 074.8
SUM	226.4	18 179.1	3 691.4

**TABLE 7: MONTHLY AVERAGES FOR THE MONTH OF SEPTEMBER 2022**

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	27.0	2 074.0	437.3
Unit 2	22.1	2 108.0	495.6
Unit 3	30.8	2 044.2	340.5
Unit 4			
Unit 5	18.8	1 991.6	394.9
Unit 6	27.1	1 998.1	462.7

## 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. For days where the CEMS were readings incorrectly are indicated on the performance graphs above.


**TABLE 8: PERIODS DURING WHICH CEMS WAS INOPERATIVE**

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

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		<b>Document Identifier</b>	240-88543153	Rev	2	
		<b>Effective Date</b>	February 2022			
		<b>Review Date</b>	February 2024			

**TABLE 9: CEMS MONITOR RELIABILITY**

Associated Unit/Stack	PM	SO <sub>2</sub>	NO	CO <sub>2</sub>	O <sub>2</sub>
Unit 1	99.2	99.2	99.2	99.2	99.2
Unit 2	100.0	94.9	94.9	94.9	94.9
Unit 3	99.2	99.2	99.2	96.0	99.2
Unit 4					
Unit 5	98.9	98.6	98.6	96.9	98.6
Unit 6	98.9	98.9	98.9	8.2	98.9

## 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. 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.

## 7. Ambient Air Quality Monitoring Report

The Ambient Air Quality Monitoring and Dust fall-out report for September 2022 was emailed to the Licensing Authority.

## 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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	<b>Medupi Power Station Monthly Emissions Report</b>	Template Identifier	240-43921804	Rev	6
		Document Identifier	240-88543153	Rev	2
		Effective Date	February 2022		
		Review Date	February 2024		


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

		
<b>CALCULATION OF EMISSIONS OF TOTAL VOLATILE COMPOUNDS FROM FUEL OIL STORAGE TANKS*</b>		
Date:	Friday, 30 September 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	
<b>MONTHLY INPUT DATA FOR THE STATION</b> 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:	September	
<b>GENERAL INFORMATION:</b>		
	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:	833	tons/month
Molecular weight of the fuel oil:	166.00	Lb/lb-mole
<b>METEOROLOGICAL DATA FOR THE MONTH</b>		
	Data	Unit
Daily average ambient temperature	23.43	°C
Daily maximum ambient temperature	31.06	°C
Daily minimum ambient temperature	16.52	°C
Daily ambient temperature range	14.54	°C
Daily total insolation factor	4.41	kWh/m <sup>2</sup> /day
Tank paint colour	Aluminum/Specular	NA
Tank paint solar absorbance	0.39	NA
<b>FINAL OUTPUT:</b>		
	Result	Unit
Breathing losses:	0.69 kg/month	
Working losses:	0.02 kg/month	
<b>TOTAL LOSSES (Total TVOC Emissions for the month):</b>	<b>0.72 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 - PeressJ@nyc.rr.com.</small>		

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	<b>Medupi Power Station Monthly Emissions Report</b>	<b>Template Identifier</b>	240-43921804	Rev	6	
		<b>Document Identifier</b>	240-88543153	Rev	2	
		<b>Effective Date</b>	February 2022			
		<b>Review Date</b>	February 2024			

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

No awareness campaigns for this month.

## 10. Complaints Register


TABLE 6: COMPLAINTS FOR THE MONTH OF SEPTEMBER 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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	<b>Medupi Power Station Monthly Emissions Report</b>	<b>Template Identifier</b>	<b>240-43921804</b>	<b>Rev</b>	<b>6</b>
		<b>Document Identifier</b>	<b>240-88543153</b>	<b>Rev</b>	<b>2</b>
		<b>Effective Date</b>	<b>February 2022</b>		
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Compiled by:  Thabo Khoza  
**Senior Environmental Advisor**

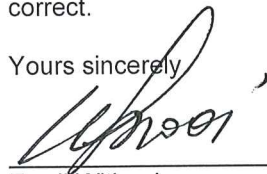
Verified by:  Malose Langa  
**System Engineer Boiler**

Supported by:  Mokgadi Dikgale  
**Environmental Manager**

Supported by:  Jabulani Mkhathswa  
**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**

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