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		<b>Review Date</b>	<b>September2024</b>		

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Date: 2023/12/31

Enquiries: MF Dikgale  
Tel: 014 762 6820

Ref: H16/1/13-AEL/M1/R1 – December 2023

Dear Mr Koenaitse

### **MEDUPI POWER STATION MONTHLY EMISSIONS REPORT FOR THE MONTH OF DECEMBER 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 December 2023 only.

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


**TABLE 1: QUANTITY OF RAW MATERIALS AND PRODUCTS CONSUMPTION IN DECEMBER 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 – December2023</b>
	Coal	Tons/month	1 875 000	836 553.0
	Fuel Oil	Tons/month	20 000	2412
<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 December 2023</b>
	Energy	GWh	3 571.2	1773.95
	Ash Emitted	Tons/month	not specified	134.90

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Date	Daily Reportable Hours of Operation						Coal usage	Production rate (MW)					
	U1	U2	U3	U4	U5	U6		U1	U2	U3	U4	U5	U6
01-Dec	0.0	24.0	24.0	0.0	24.0	24.0	28928	Off	703	650	Off	665	698
02-Dec	0.0	24.0	24.0	0.0	24.0	24.0	28541	Off	704	623	Off	687	696
03-Dec	0.0	24.0	24.0	0.0	24.0	24.0	26957	Off	671	614	Off	640	617
04-Dec	0.0	24.0	24.0	0.0	24.0	24.0	29393	Off	734	621	Off	677	678
05-Dec	0.0	24.0	24.0	0.0	24.0	24.0	28432	Off	740	612	Off	666	674
06-Dec	0.0	24.0	24.0	0.0	24.0	16.0	26627	Off	736	634	Off	678	689
07-Dec	0.0	24.0	24.0	0.0	24.0	0.0	26037	Off	675	647	Off	638	556
08-Dec	0.0	24.0	24.0	0.0	24.0	19.9	29010	Off	675	647	Off	628	722
09-Dec	0.0	24.0	24.0	0.0	24.0	24.0	27695	Off	723	621	Off	560	706
10-Dec	0.0	24.0	24.0	0.0	24.0	24.0	25608	Off	732	625	Off	571	647
11-Dec	0.0	21.3	24.0	0.0	24.0	24.0	27180	Off	733	669	Off	680	659
12-Dec	0.0	0.0	24.0	0.0	24.0	24.0	19518	Off	Off	640	Off	638	663
13-Dec	0.0	0.0	24.0	0.0	18.8	24.0	17698	Off	Off	645	Off	426	698
14-Dec	0.0	0.0	24.0	0.0	0.0	24.0	19945	507	Off	654	Off	Off	684
15-Dec	10.2	0.0	24.0	0.0	0.0	24.0	24052	601	Off	686	Off	408	700
16-Dec	0.0	0.0	24.0	0.0	23.7	24.0	26296	570	Off	664	Off	687	697
17-Dec	8.1	0.0	24.0	0.0	24.0	24.0	25835	612	Off	639	Off	628	658
18-Dec	24.0	0.0	24.0	0.0	24.0	24.0	26401	609	Off	623	Off	679	663
19-Dec	24.0	0.0	24.0	0.0	24.0	24.0	27038	645	Off	634	Off	682	652
20-Dec	24.0	0.0	24.0	0.0	24.0	24.0	27910	609	Off	623	Off	672	590
21-Dec	24.0	0.0	24.0	0.0	24.0	24.0	28039	733	Off	615	Off	615	590
22-Dec	24.0	0.0	24.0	0.0	24.0	24.0	32884	740	474	614	Off	690	590
23-Dec	24.0	19.9	24.0	0.0	24.0	24.0	33436	634	704	573	Off	664	547
24-Dec	24.0	24.0	24.0	0.0	24.0	24.0	33518	683	625	605	Off	678	574
25-Dec	24.0	24.0	24.0	0.0	23.2	24.0	30501	688	619	622	Off	431	557
26-Dec	24.0	14.3	24.0	0.0	0.0	24.0	24509	619	582	586	Off	Off	560
27-Dec	24.0	5.8	24.0	0.0	0.0	24.0	24565	669	613	632	Off	Off	475
28-Dec	24.0	24.0	24.0	0.0	0.0	24.0	25885	692	743	599	Off	Off	550
29-Dec	24.0	24.0	24.0	0.0	0.0	24.0	28546	740	716	653	Off	Off	550
30-Dec	24.0	24.0	24.0	0.0	0.0	24.0	28141	755	680	659	Off	Off	550
31-Dec	24.0	24.0	24.0	0.0	0.0	24.0	27428	775	678	658	Off	Off	550

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

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## 2. Abatement Technology

Table 2: Abatement Equipment Control Technology efficiency for month of December2023

Associated Unit/Stack	Technology Type	Efficiency	FFP Utilization
Unit 1	Fabric Filter Plant (FFP)	99.964%	100%
Unit 2	Fabric Filter Plant (FFP)	99.921%	100%
Unit 3	Fabric Filter Plant (FFP)	99.894%	100%
Unit 4	Fabric Filter Plant (FFP)	Off	off
Unit 5	Fabric Filter Plant (FFP)	99.945%	100%
Unit 6	Fabric Filter Plant (FFP)	99.980%	100%

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

## 3. Energy Source Characteristics

TABLE 3: ENERGY SOURCE MATERIAL CHARACTERISTICS FOR THE MONTH OF DECEMBER 2023

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	1.42
<b>Ash Content</b>	35 - 39	35.14

TABLE 4: ENERGY SOURCE MATERIAL CHARACTERISTICS FOR THE MONTH OF DECEMBER 2023

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	0.03

## 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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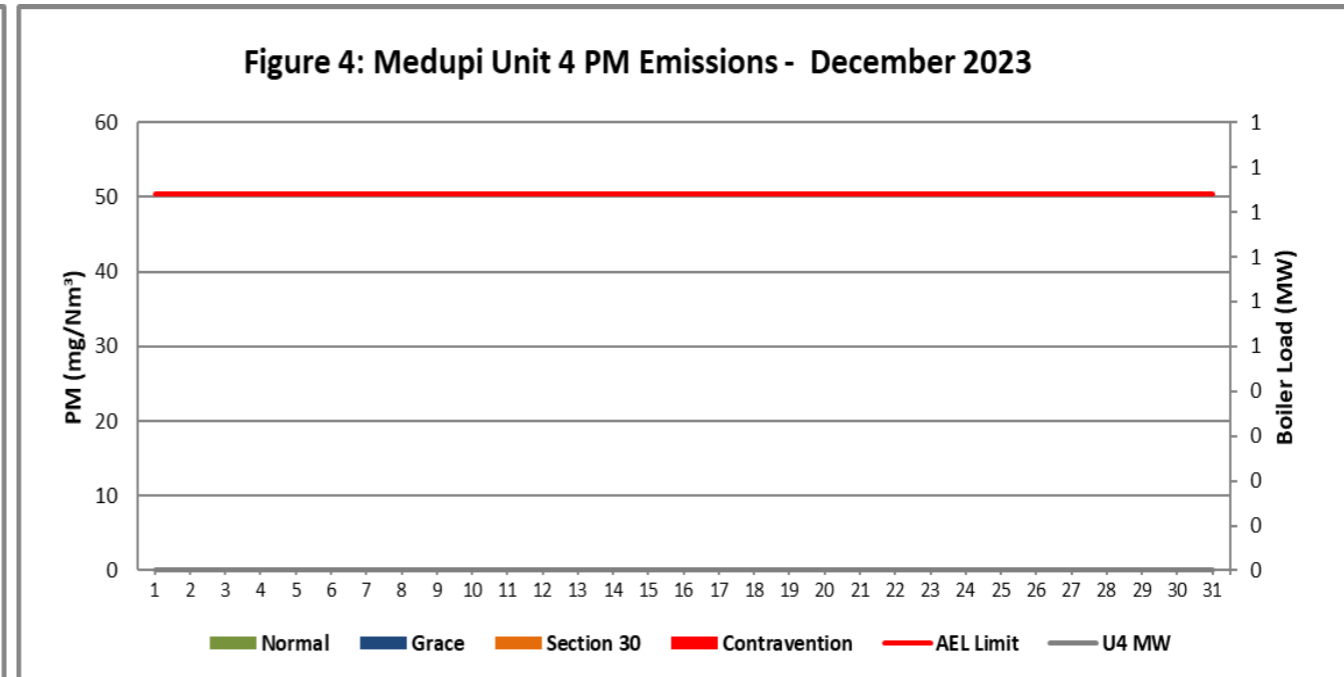
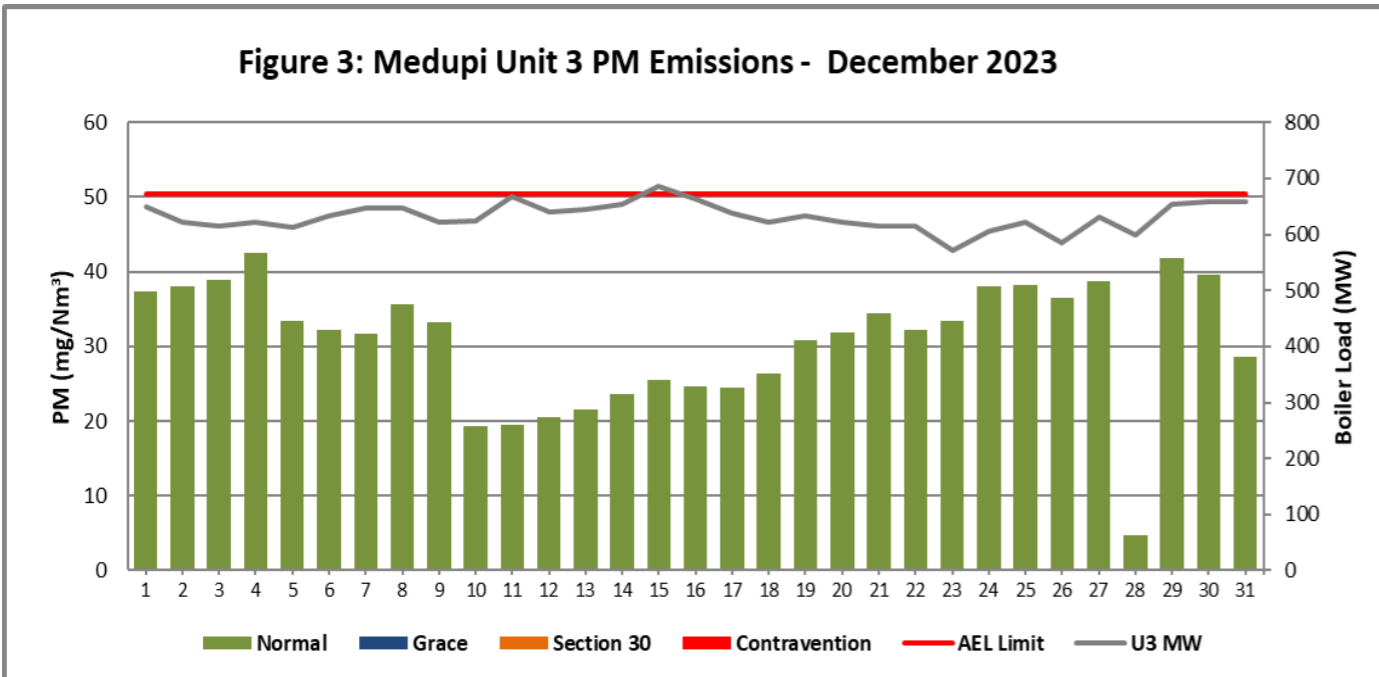
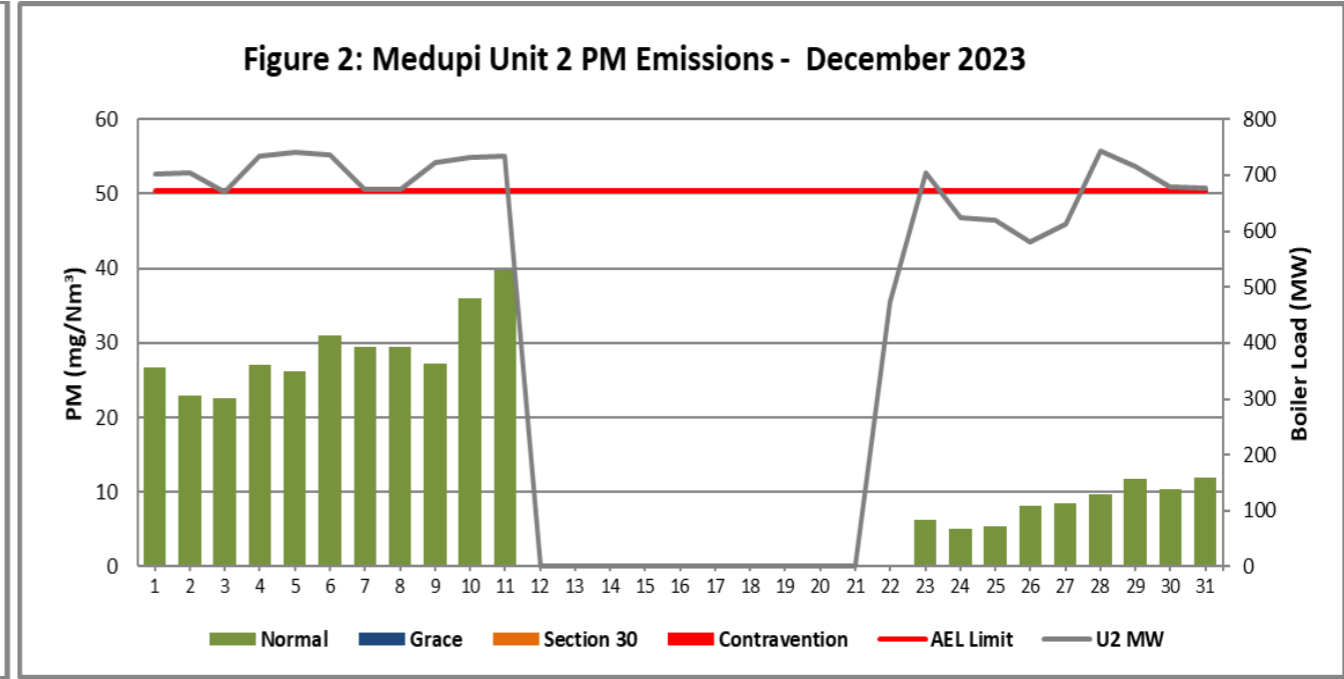
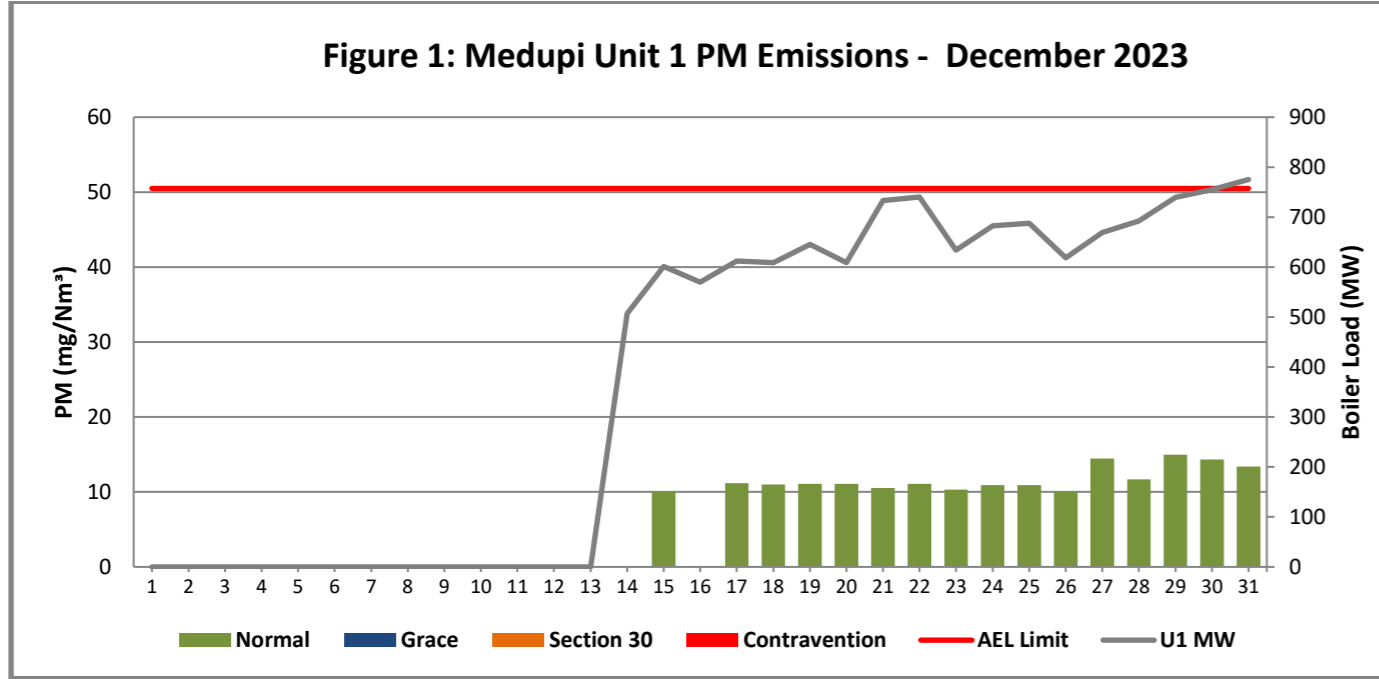
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## 4.1 PM Daily Averages



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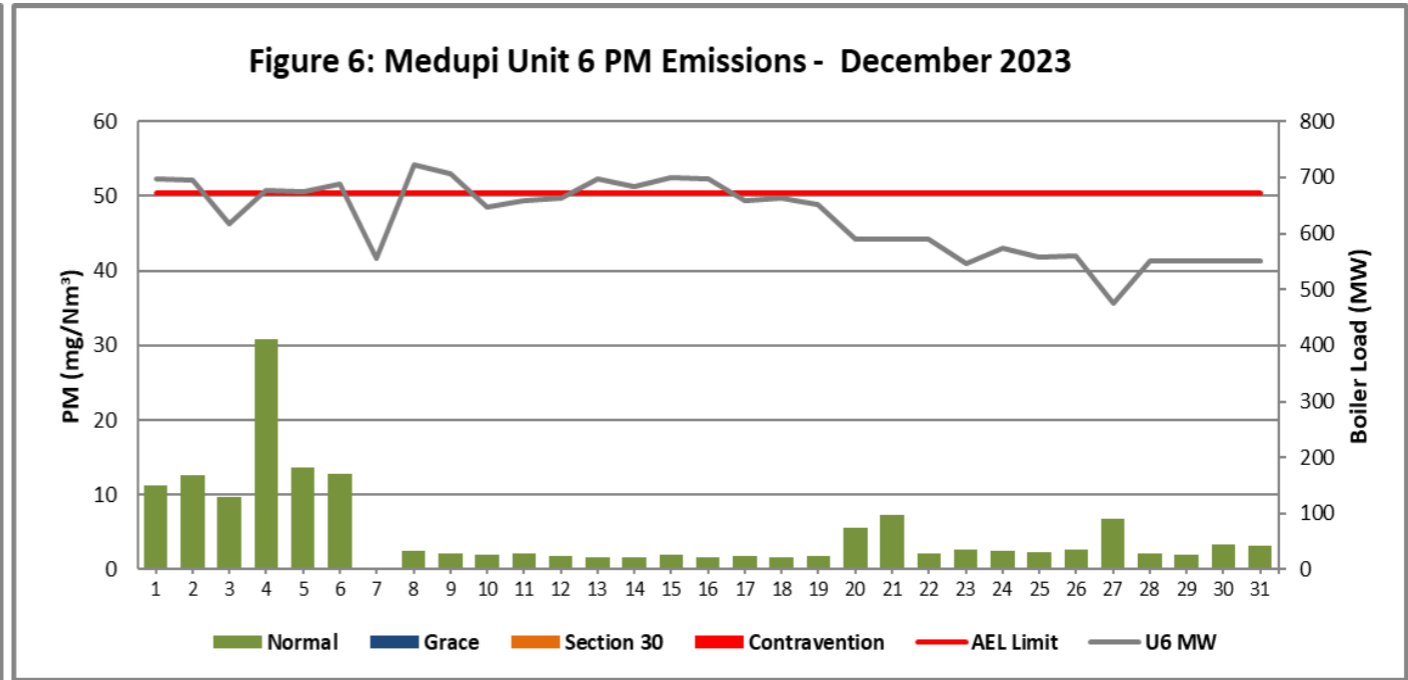
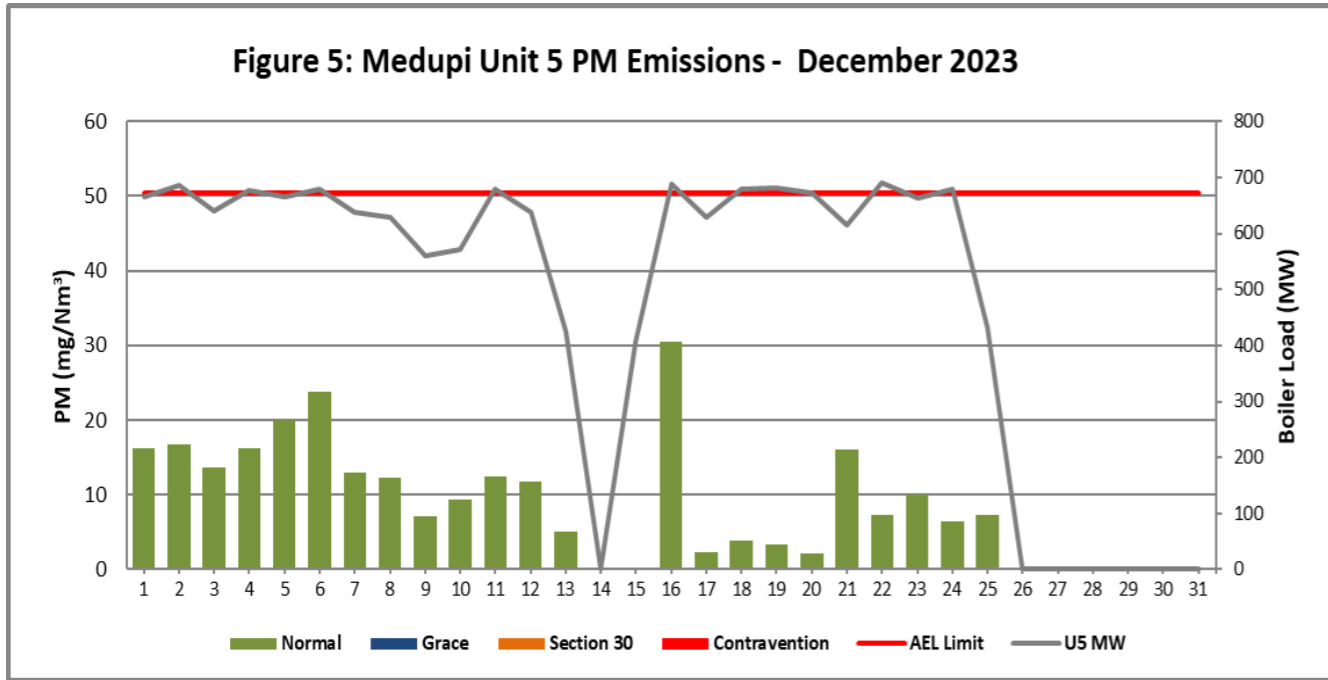
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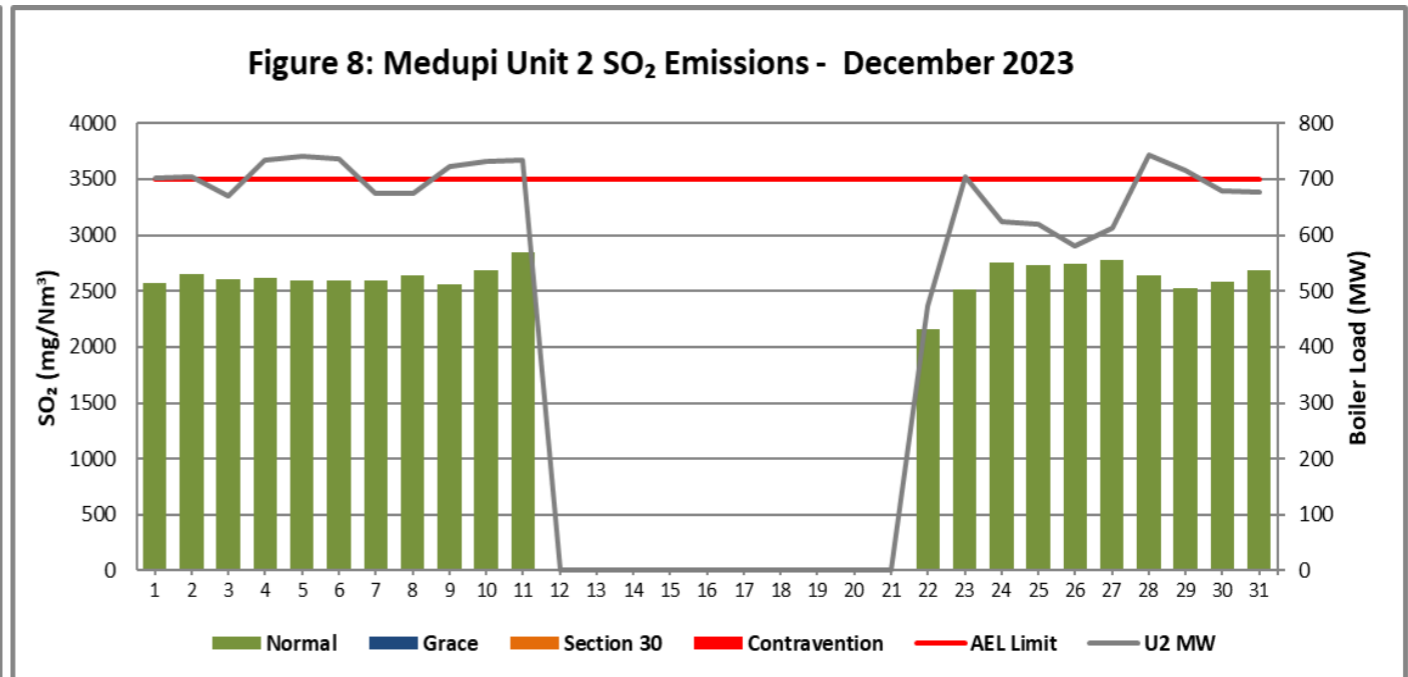
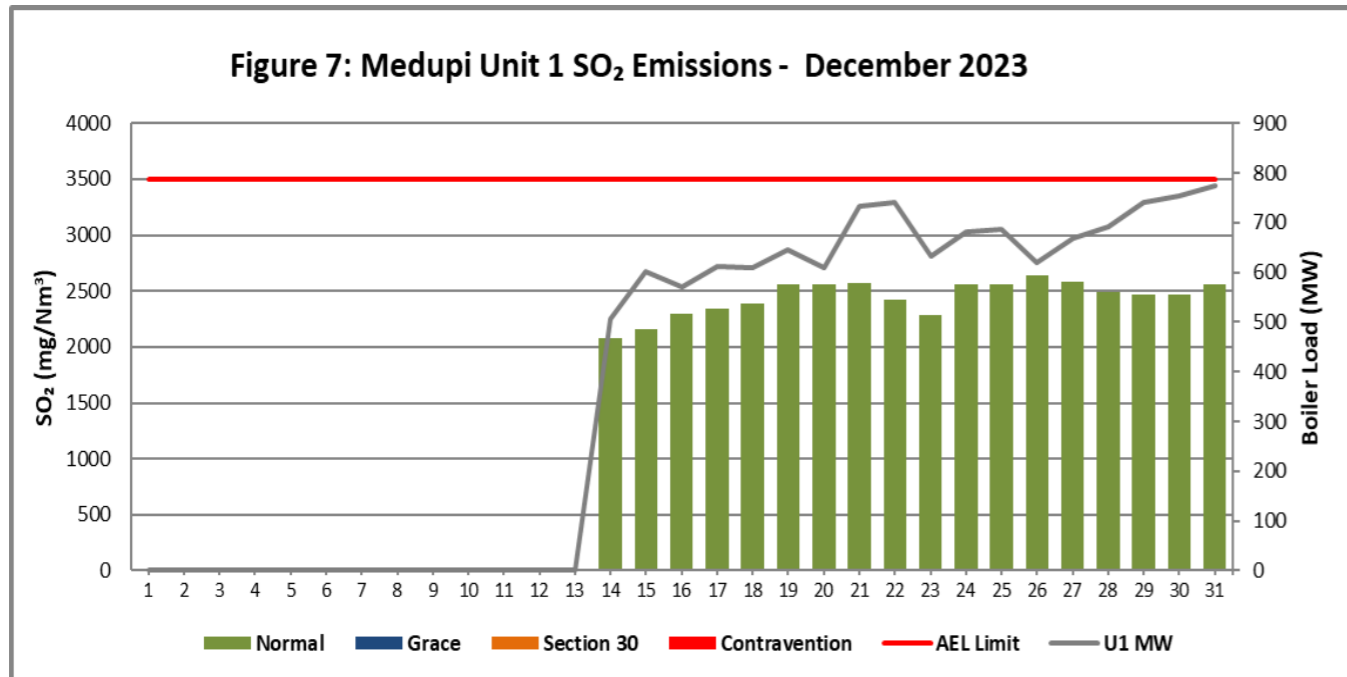


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#### 4.2 SOx Daily Averages



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Figure 9: Medupi Unit 3 SO<sub>2</sub> Emissions - December 2023

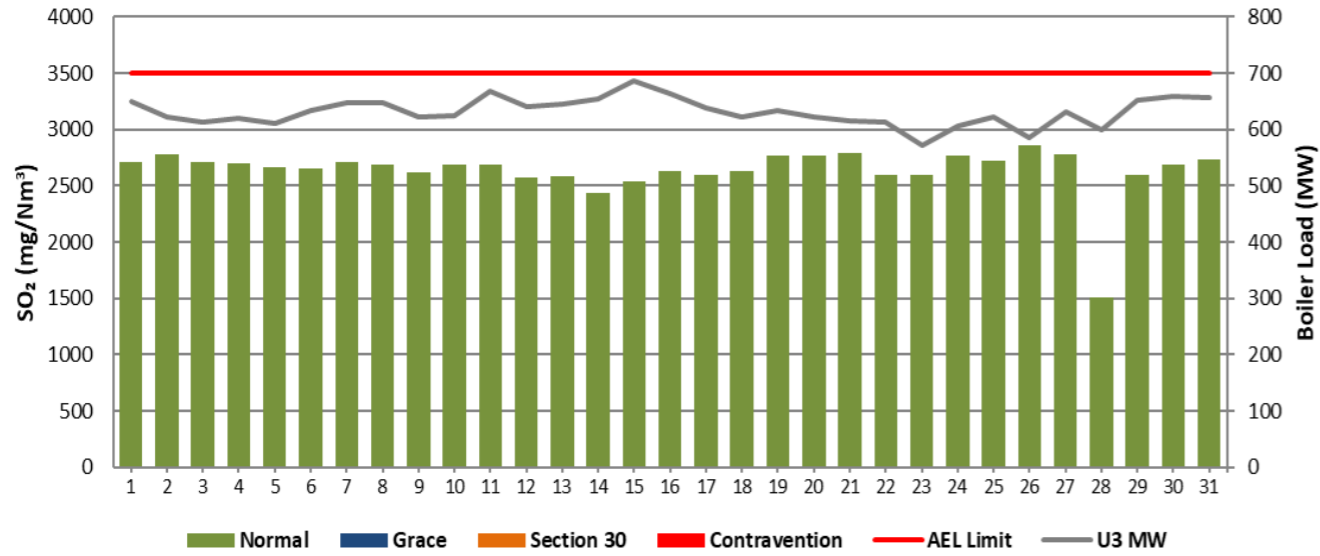


Figure 10: Medupi Unit 4 SO<sub>2</sub> Emissions - December 2023

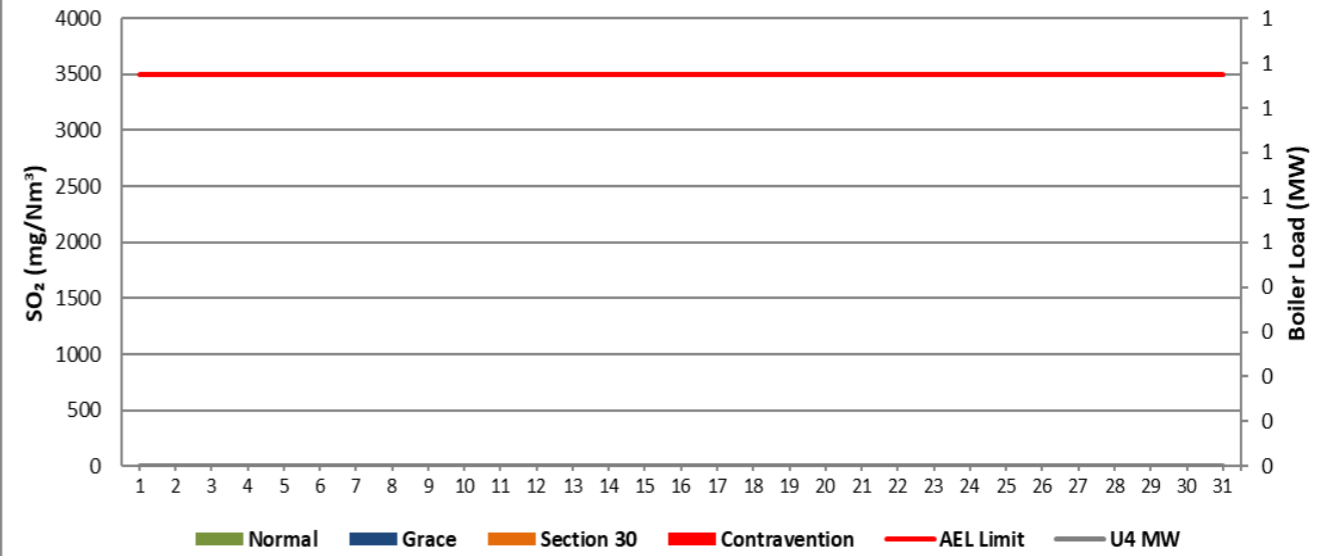


Figure 11: Medupi Unit 5 SO<sub>2</sub> Emissions - December 2023

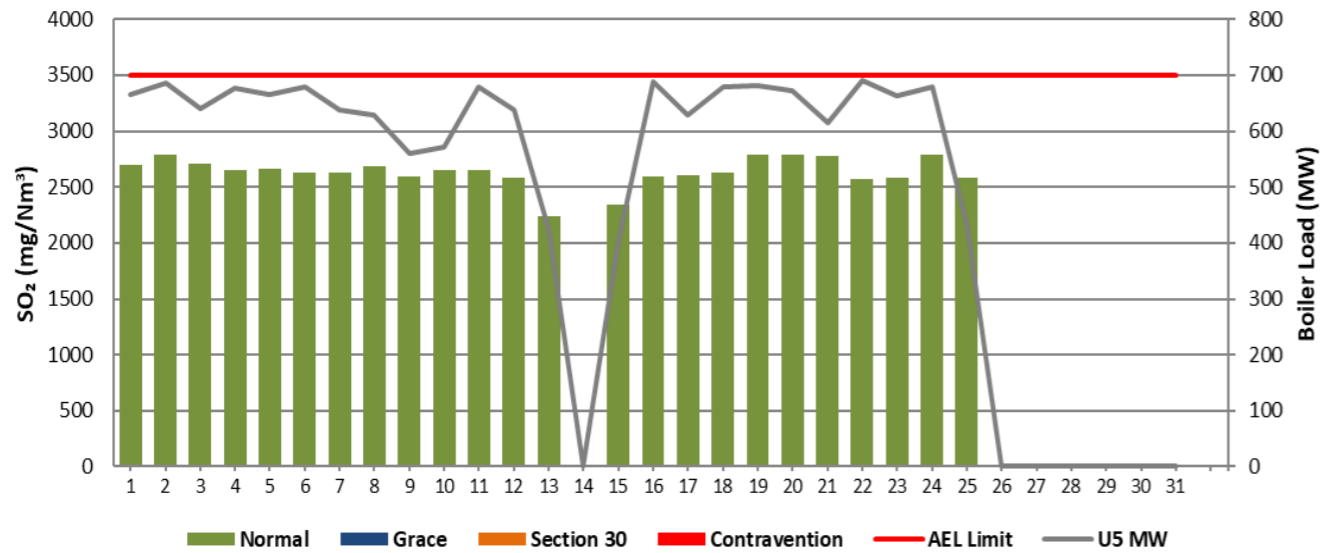
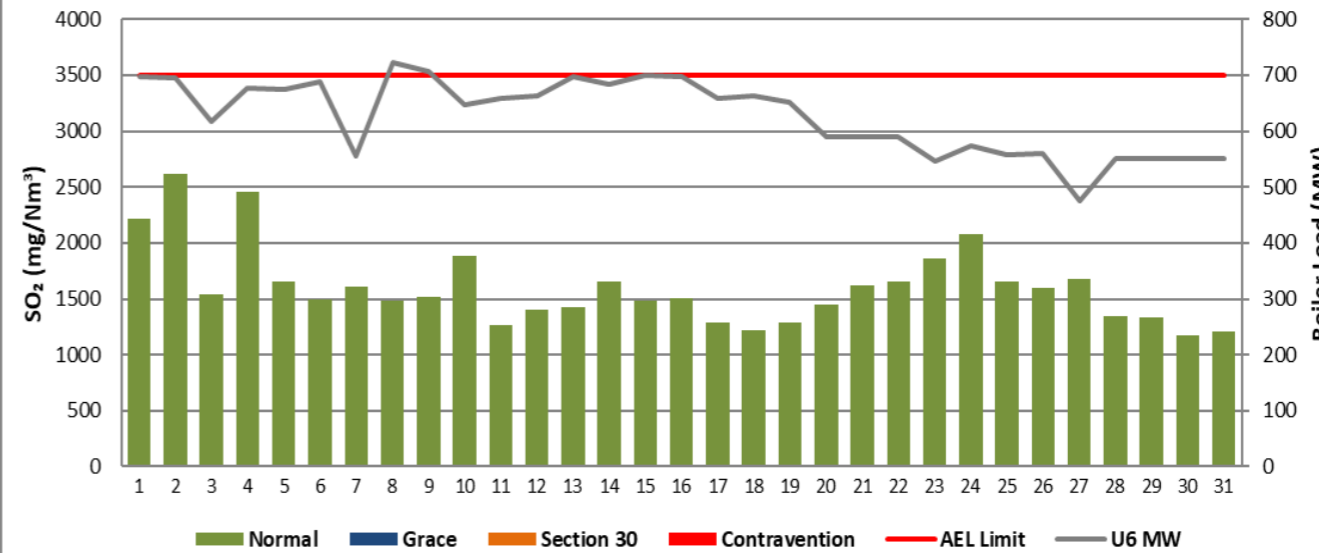


Figure 12: Medupi Unit 6 SO<sub>2</sub> Emissions - December 2023



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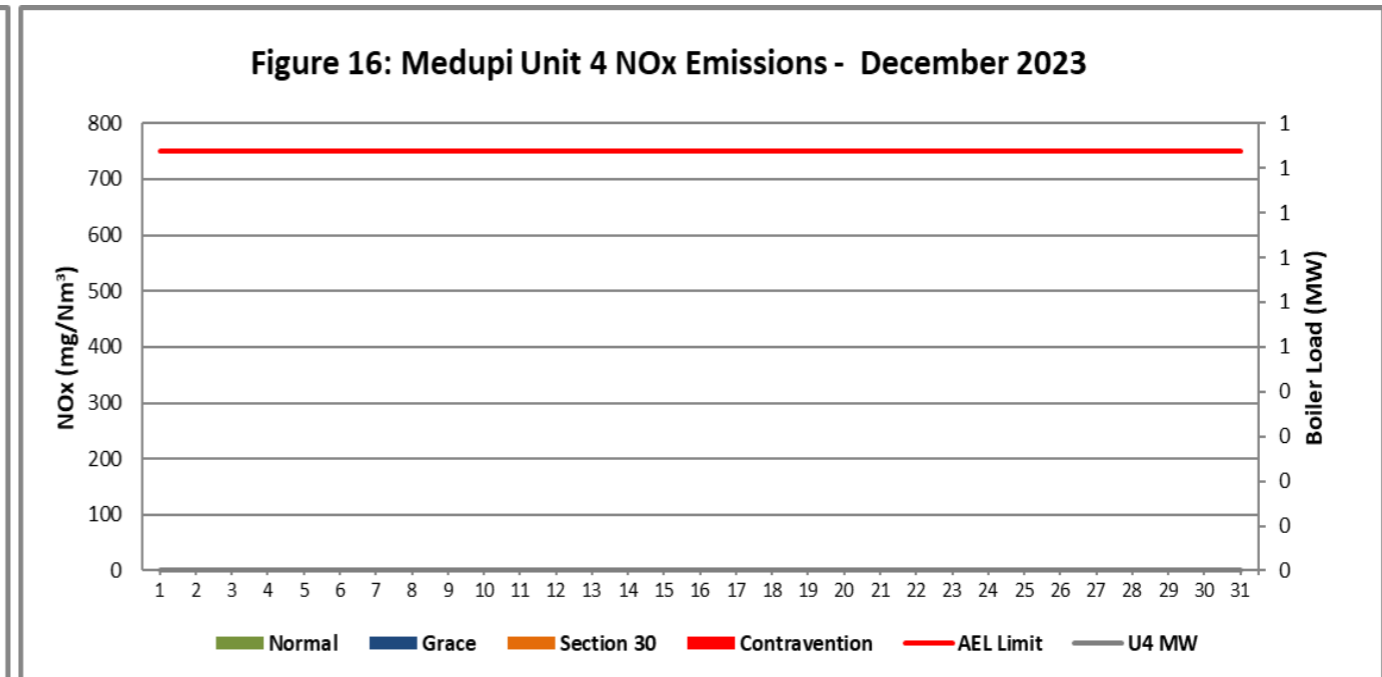
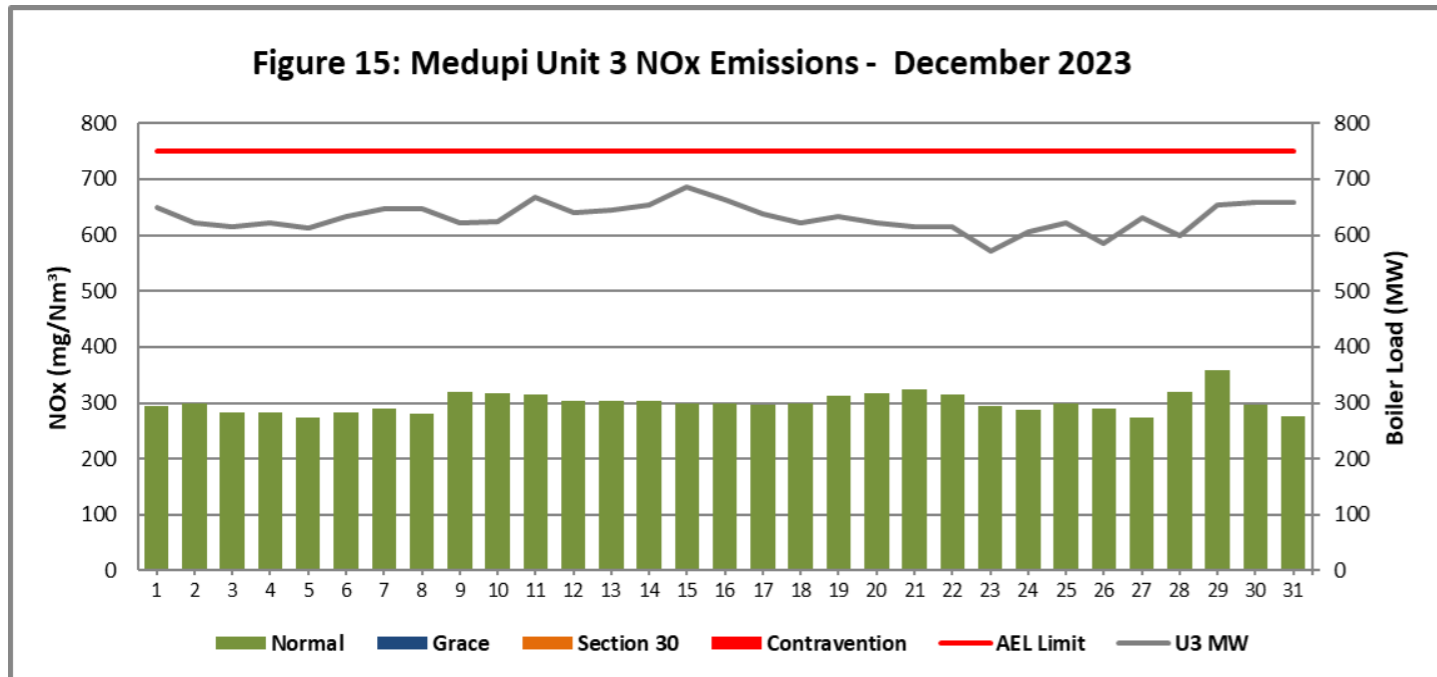
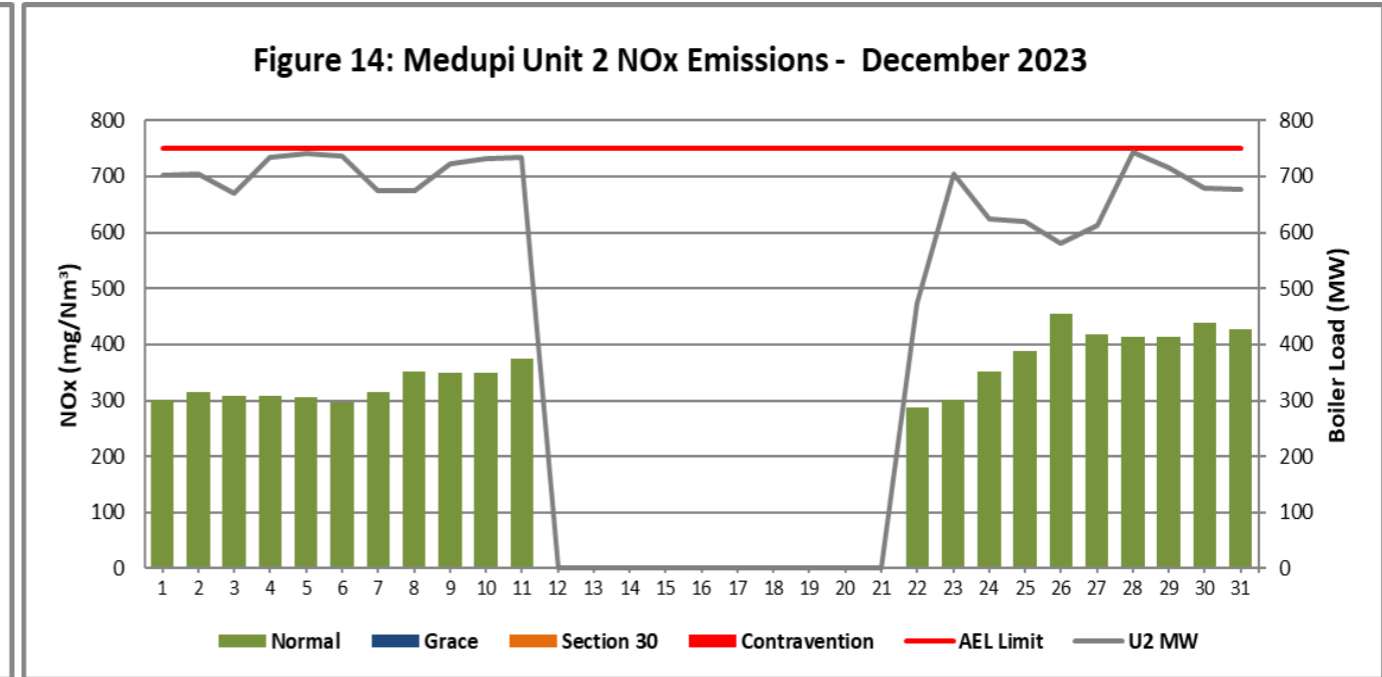
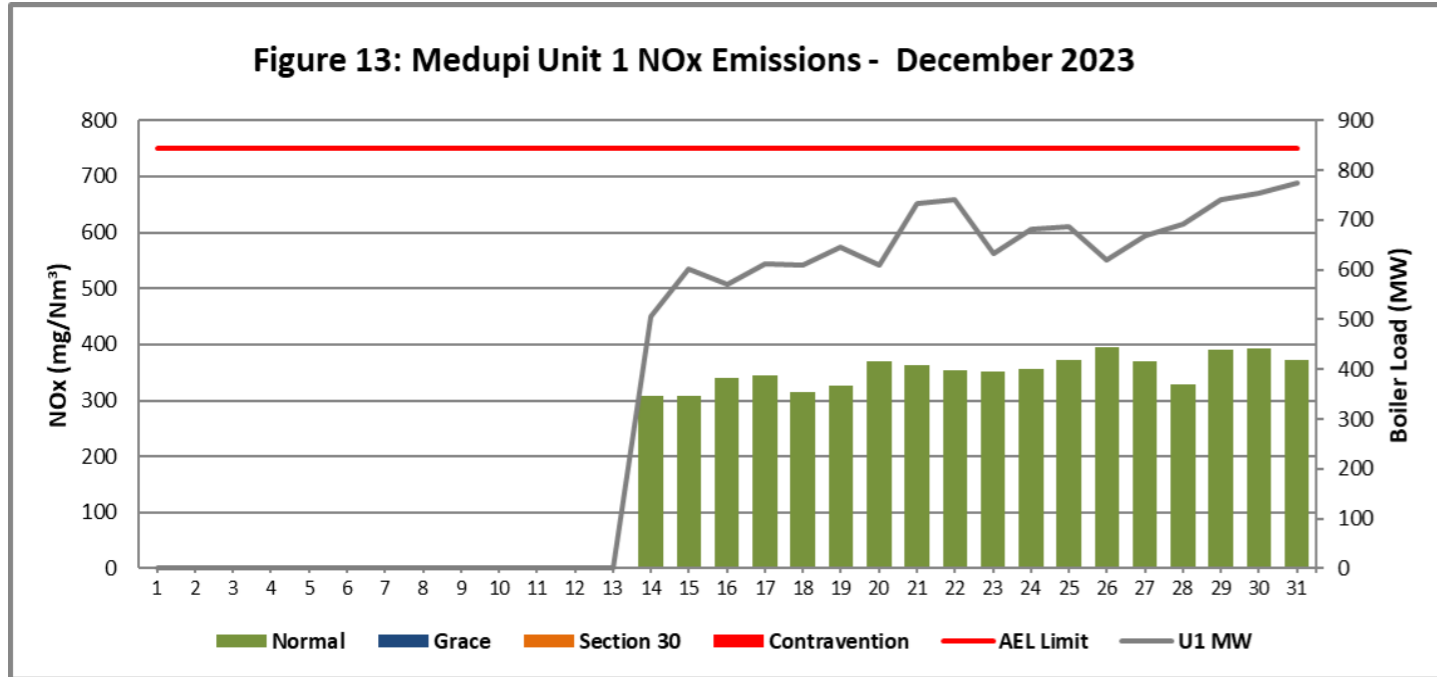
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#### 4.3 NOx Daily Averages



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Figure 17: Medupi Unit 5 NOx Emissions - December 2023

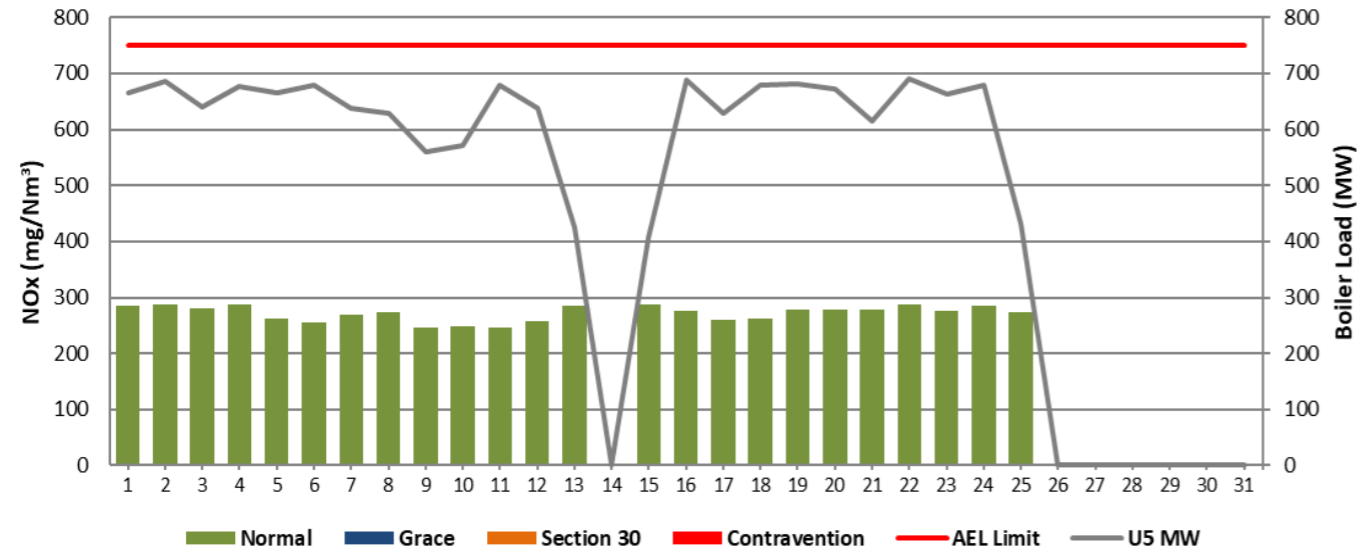
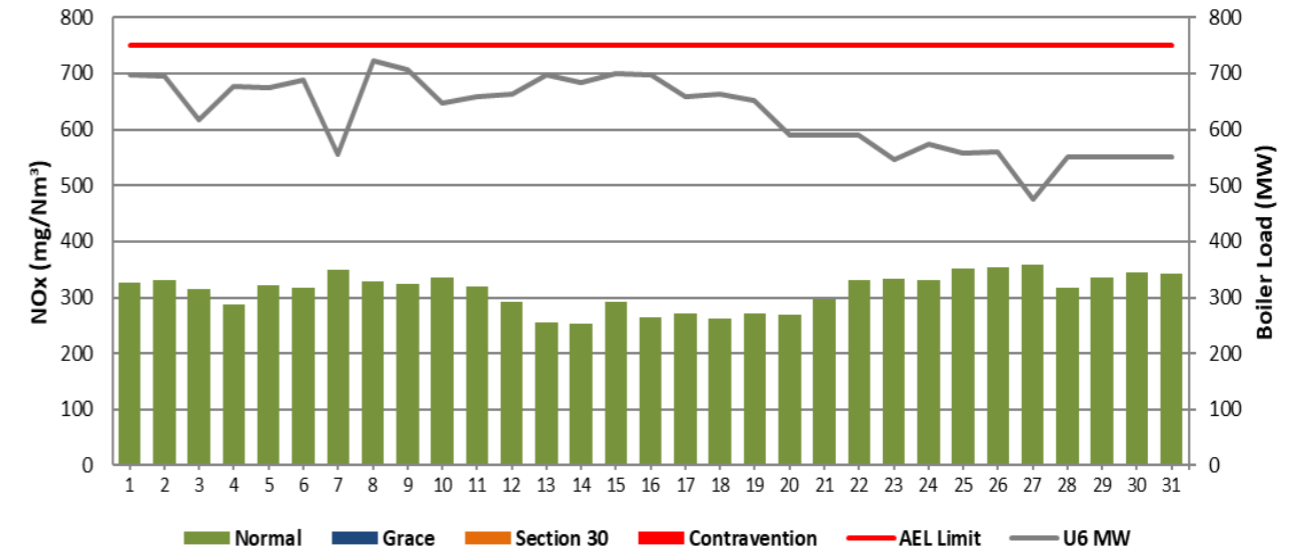


Figure 18: Medupi Unit 6 NOx Emissions - December 2023




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

Associated Unit/Stack	PM	SO <sub>2</sub>	NO <sub>2</sub>
Unit 1	11.9	2 850.2	412.2
Unit 2	32.2	4 466.6	603.6
Unit 3	58.5	5 000.8	567.4
Unit 4	Off	Off	Off
Unit 5	22.0	5 087.8	522.6
Unit 6	10.3	3 297.1	633.9
<b>SUM (Tons)</b>	<b>134.9</b>	<b>20 702.4</b>	<b>2 739.6</b>

**TABLE 7: MONTHLY AVERAGES FOR THE MONTH OF DECEMBER 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	11.7	2 444.9	353.3
Unit 2	19.8	2 622.1	355.7
Unit 3	30.9	2 639.2	300.2
Unit 4	Off	Off	Off
Unit 5	11.6	2 632.8	271.8
Unit 6	5.2	1 602.5	312.0

## 5. 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. However, there were days where the monitors were faulty and reading incorrect values. Table 8


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

Date	CEMS status	Comments
17-20 Dec 2023	Unit 5	Unit 5 experienced CEMS issues for 3 days from 17 - 20 December 2023. The CEMS issues were resolved before the Unit went on Outage on 25 December 2023.

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08 – 31 Dec 2023	Unit 6	Unit 6 experienced CEMS issues with the monitor reading low figures. The station is conducting a detailed investigation to determine the rootcause of the faulty monitor.
------------------	--------	---

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

Associated Unit/Stack	PM	SO <sub>2</sub>	NO <sub>2</sub>	O <sub>2</sub>
Unit 1	93.8	100.0	100.0	99.2
Unit 2	100.0	99.7	99.5	99.9
Unit 3	100.0	0	0	0
Unit 4	Off	Off	Off	Off
Unit 5	100.0	100.0	99.8	99.4
Unit 6	100.0	97.0	99.9	80.0

*Notes: SO<sub>2</sub>, O<sub>2</sub> and NO was Changed to a Unity Factor (1) for accurate reporting, there was a step change in the performance of the Unit 3 gas Monitor.*

## 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 December2023 was e-mailed to the Licensing Authority.

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## 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.


**TABLE 10: TOTAL VOLATILE ORGANIC COMPOUND (TVOC) FOR DECEMBER 2023**

		
<b>CALCULATION OF EMISSIONS OF TOTAL VOLATILE COMPOUNDS FROM FUEL OIL STORAGE TANKS*</b>		
<b>Date:</b>	Sunday, 31 December 2023	
<b>Station:</b>	Medupi Power Station	
<b>Province:</b>	Limpopo Province	
<b>Tank no.</b>	1-2	
<b>Description:</b>	Outdoor fuel oil storage tank	
<b>Tank Type:</b>	Vertical fixed roof (vented to atmosphere)	
<b>Material stored:</b>	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> <b>IMPORTANT: Do not change <i>any</i> other cells without consulting the AQ CoE</b>		
<b>MONTH:</b>	<b>December</b>	
<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:	<b>2412</b>	tons/month
Molecular weight of the fuel oil:		Lb/lb-mole
<b>METEROLOGICAL DATA FOR THE MONTH</b>		
	<b>Data</b>	<b>Unit</b>
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 <sup>2</sup> /day
Tank paint colour	<b>Aluminum/Specular</b>	NA
Tank paint solar absorbance	0.39	NA
<b>FINAL OUTPUT:</b>		
	<b>Result</b>	<b>Unit</b>
<b>Breathing losses:</b>	<b>0.69 kg/month</b>	
<b>Working losses:</b>	<b>0.07 kg/month</b>	
<b>TOTAL LOSSES (Total TVOC Emissions for the month):</b>	<b>0.76 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, 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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## 9. Air quality improvements initiatives and public education and awareness campaigns

### No awareness campaign for December 2023

On 16 November 2023, Steenbokpan Township (Leseding Hall) was visited by the Medupi Team for an Air Quality Management Awareness and Education session. The target audiences were the community Members of Steenbokpan.


Information shared on the day included the following:

- Electricity generation process from coal fired Power Stations
- Primary pollutants associated with coal fired Power Station (SO<sub>x</sub>, NO<sub>x</sub>, CO<sub>2</sub>, PM, CO)
- Emissions Control Technologies
- Legal Requirements
- Consequences of non-compliance (penalties)
- Ways of reducing emissions within our daily lives including our homes.

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		<b>Document Identifier</b>	<b>240-88543153</b>	<b>Rev</b>	<b>2</b>
		<b>Effective Date</b>	<b>September2022</b>		
		<b>Review Date</b>	<b>September2024</b>		

## 10. Complaints Register


TABLE 5: COMPLAINTS FOR THE MONTH OF DECEMBER 2023

Name/ Source Code	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	N/A	N/A	N/A	N/A	N/A

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**Compiled by:** Lutendo Murovhi Nemutankhanya Date: 30 January 2024  
**Environmental Officer**

**Verified by:** Malose Langa [Signature] Date: 2024/01/31  
**System Engineer Boiler**

**Verified by:** Shu Mpangase [Signature] Date: 2024/01/31  
**System Engineer C&I**

**Supported by:** Mokgadi Dikgale [Signature] Date: 2024/01/31  
**Environmental Manager**

**Supported by:** Jabulani Mkhathshwa [Signature] Date: 2024/01/31  
**Engineering Group Manager**

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

Yours sincerely

  
 \_\_\_\_\_  
 Zweli Witbooi

Date: 2024/01/31

**GENERAL MANAGER: MEDUPI POWER STATION**

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