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		Effective Date	January 2021		
		Review Date	January 2024		

Phumudzo Thivhafuni

*Date: 2021/06/30*

Limpopo Dept. of Economic Development, Environment and Tourism

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Ref: 12/4/12L-W2/A3 – Aug 2020 Rev.1

Dear Phumudzo

## **MEDUPI POWER STATION MONTHLY EMISSIONS REPORT FOR THE MONTH OF AUGUST 2020**

This document serves as the monthly report required in terms of Section 7.7.1 of Medupi Power Station Provisional Atmospheric Emission License (AEL), 12/4/12L-W2/A3.

This report is a reflection of Unit 2, 3, 4, 5 and 6 gaseous and particulate emissions performance against the AEL limit for the month of August 2020 only.

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


**Table 1: Quantity of raw materials and products for Unit 2, 3, 4, 5 and 6 in August 2020**

Raw Materials and Products used	Raw Material Type	Unit	Maximum Permitted Consumption/ Rate (Quantity)	Unit 2, 3, 4, 5 and 6 consumption August 2020
	Coal	Tons/month	1 875 000	736 533
	Fuel Oil	Tons/month	40 000	3172
Production Rates	Product/ By-Product Name	Unit	Maximum Production Capacity Permitted (Quantity)	Unit 2, 3, 4, 5 and 6 Production Rate in Month of August 2020
	Energy	MW	4 800	2854
	Ash Emitted	Tons/month	not specified	248,6

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**Table 2: Daily consumption and production rates**

Date	Reportable hours of Operation					Coal usage	Production rate (MW)				
	Unit 2	Unit 3	Unit 4	Unit 5	Unit 6		U2	U3	U4	U5	U6
01-August- 20	24,0	7,3	24,0	24,0	0,0	22624	593	436	513	533	0,0
02-August- 20	24,0	24,0	24,0	24,0	0,0	22838	592	480	513	475	0,0
03-August- 20	24,0	22,1	24,0	24,0	0,0	24580	599	649	541	509	0,0
04-August- 20	24,0	0,0	15,0	24,0	0,0	21383	589	612	520	516	0,0
05-August- 20	24,0	20,3	0,0	24,0	0,0	21316	564	761	316	523	0,0
06-August- 20	24,0	24,0	2,8	24,0	0,0	26431	569	735	473	476	322
07-August- 20	24,0	24,0	0,0	24,0	12,3	27773	557	761	504	435	586
07-August- 20	24,0	24,0	0,0	24,0	24,0	28951	568	724	723	527	617
09-August- 20	24,0	24,0	0,0	24,0	24,0	24755	598	643	0,0	550	488
10-August- 20	24,0	24,0	0,0	24,0	24,0	25165	594	729	0,0	542	460
11-August- 20	24,0	24,0	0,0	24,0	24,0	23566	581	655	0,0	549	491
12-August- 20	24,0	24,0	0,0	24,0	24,0	25989	582	758	0,0	513	582
13-August- 20	24,0	24,0	0,0	24,0	24,0	27422	579	794	0,0	511	666
14-August- 20	24,0	24,0	0,0	24,0	15,5	24795	587	786	0,0	502	713
15-August- 20	24,0	24,0	0,0	24,0	0,0	24796	587	779	0,0	502	487
16-August- 20	24,0	24,0	0,0	20,5	22,3	25488	578	701	0,0	447	692
17-August- 20	24,0	0,8	0,0	0,0	24,0	15496	572	453	0,0	0,0	648
18-August- 20	24,0	0,0	0,0	0,0	24,0	17458	578	0,0	0,0	484	650
19-August- 20	24,0	0,0	0,0	19,9	24,0	18955	584	0,0	0,0	578	650
20-August- 20	24,0	0,0	0,0	24,0	24,0	18210	579	18	0,0	542	650
21-August- 20	24,0	0,0	0,0	24,0	24,0	21258	586	454	0,0	580	622
22-August- 20	24,0	0,0	0,0	24,0	24,0	20659	616	533	0,0	580	632
23-August- 20	24,0	7,7	0,0	24,0	24,0	25494	613	702	0,0	552	569
24-August- 20	24,0	24,0	0,0	24,0	24,0	25278	591	724	0,0	552	588
25-August- 20	24,0	24,0	0,0	24,0	24,0	23488	602	658	0,0	385	556
26-August- 20	24,0	24,0	0,0	24,0	24,0	26594	590	765	0,0	600	548
27-August- 20	24,0	24,0	0,0	24,0	24,0	25936	589	724	0,0	579	527
28-August- 20	24,0	24,0	0,0	24,0	24,0	26587	599	752	0,0	574	579
29-August- 20	24,0	24,0	0,0	24,0	24,0	25501	610	696	0,0	570	522
30-August- 20	24,0	24,0	0,0	24,0	24,0	25919	636	747	0,0	520	512
31-August- 20	24,0	24,0	0,0	11,9	24,0	21833	571	742	0,0	530	582

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## 2. Abatement Technology

Table 3: Abatement Equipment Control Technology efficiency for month of August 2020

Associated Unit/Stack	Technology Type	Efficiency
Unit 1	<i>Fabric Filter Plant (FFP)</i>	-
Unit 2	<i>Fabric Filter Plant (FFP)</i>	99,930%
Unit 3	<i>Fabric Filter Plant (FFP)</i>	99,930%
Unit 4	<i>Fabric Filter Plant (FFP)</i>	99,905%
Unit 5	<i>Fabric Filter Plant (FFP)</i>	99,873%
Unit 6	<i>Fabric Filter Plant (FFP)</i>	99,793%

## 3. Energy Source Characteristics

Table 4: Energy Source Material Characteristics for the month of August 2020

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	1.370
<b>Ash Content</b>	35 - 39	33.800

Table 5: Energy Source Material Characteristics for the month of August 2020

Characteristic	Stipulated Range (%)	Monthly Average Content (%)
<b>Oil</b>		
<b>Sulphur Content</b>	0.5 - 3.5	2.2
<b>Ash Content</b>	0.02 - 0.1	0.02

## 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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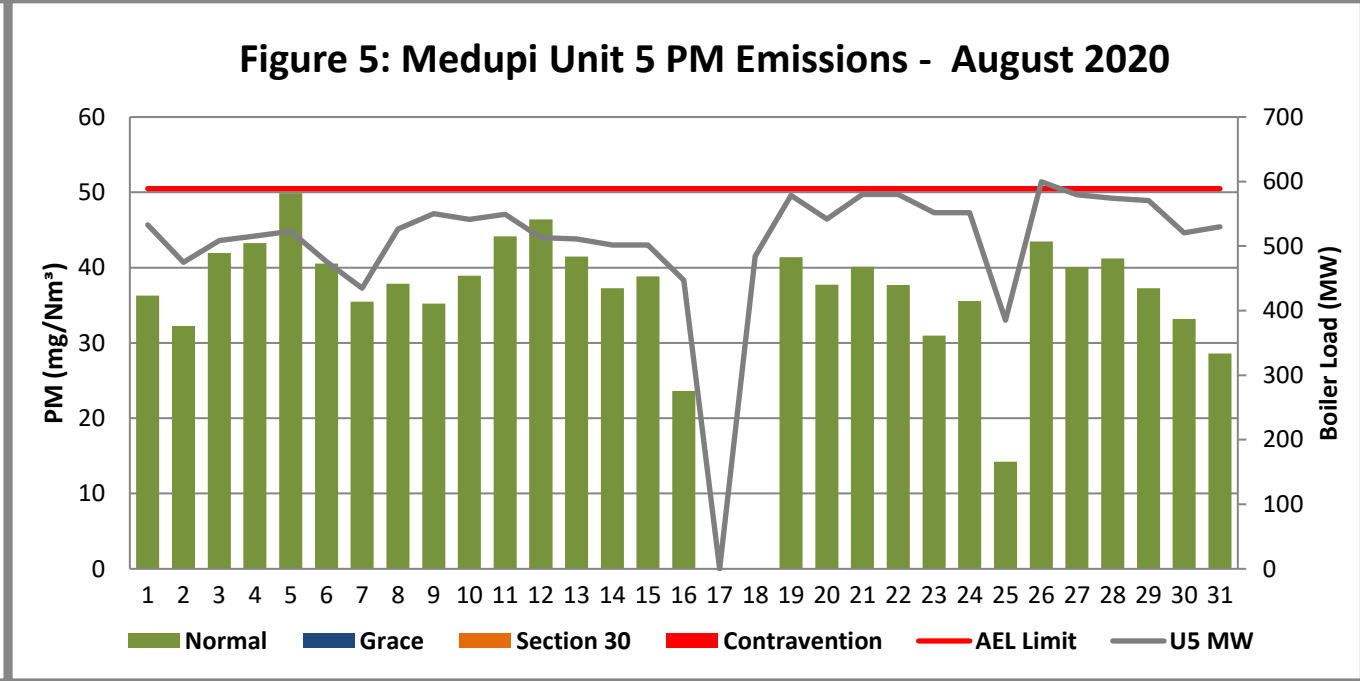
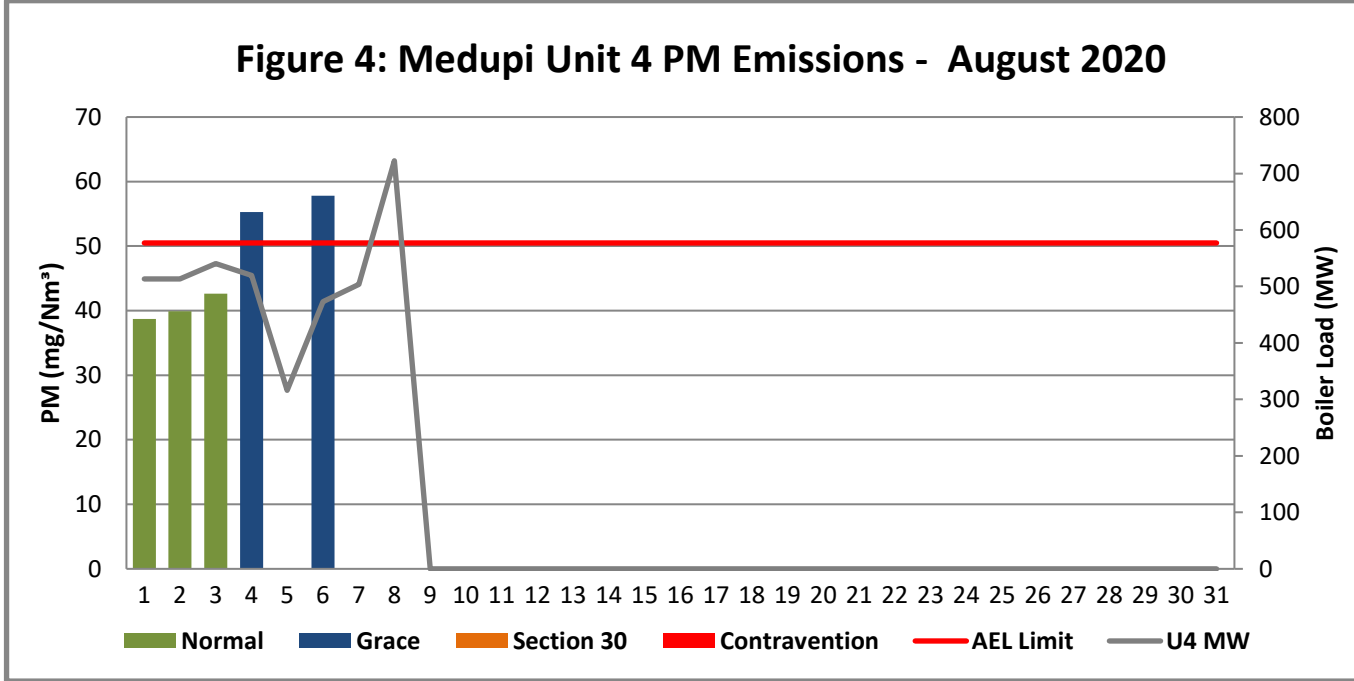
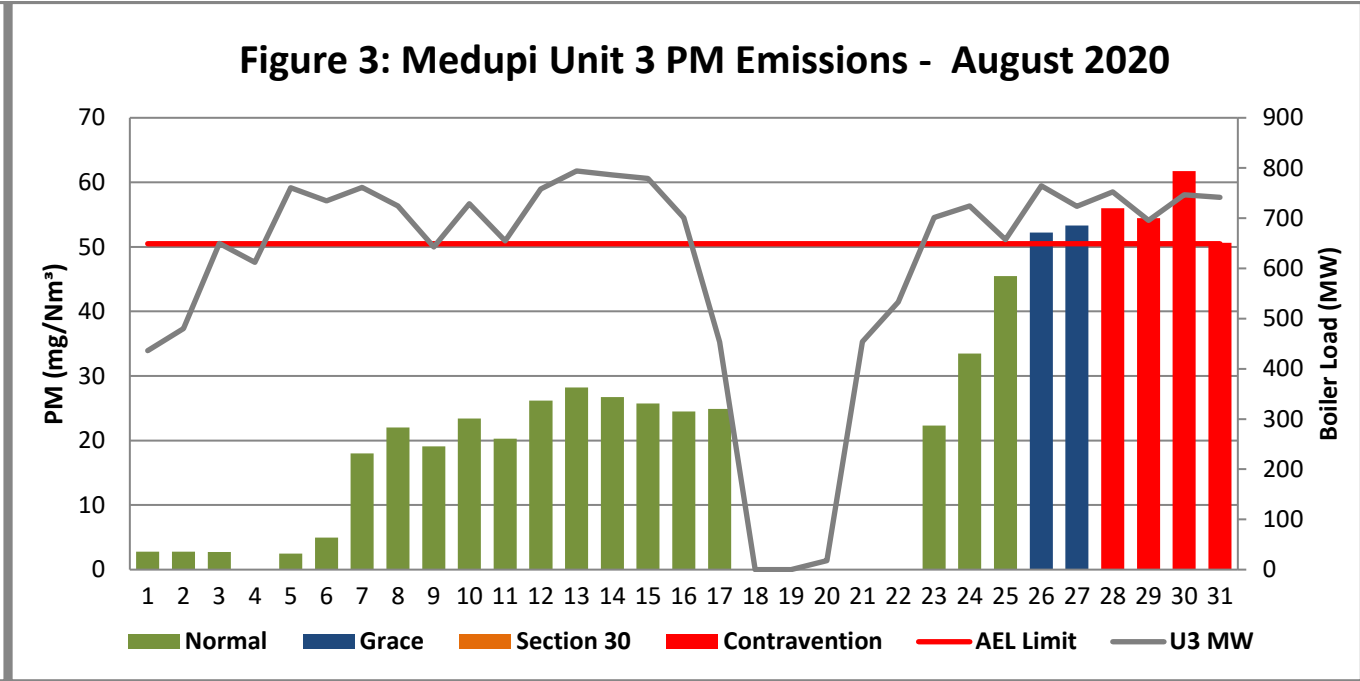
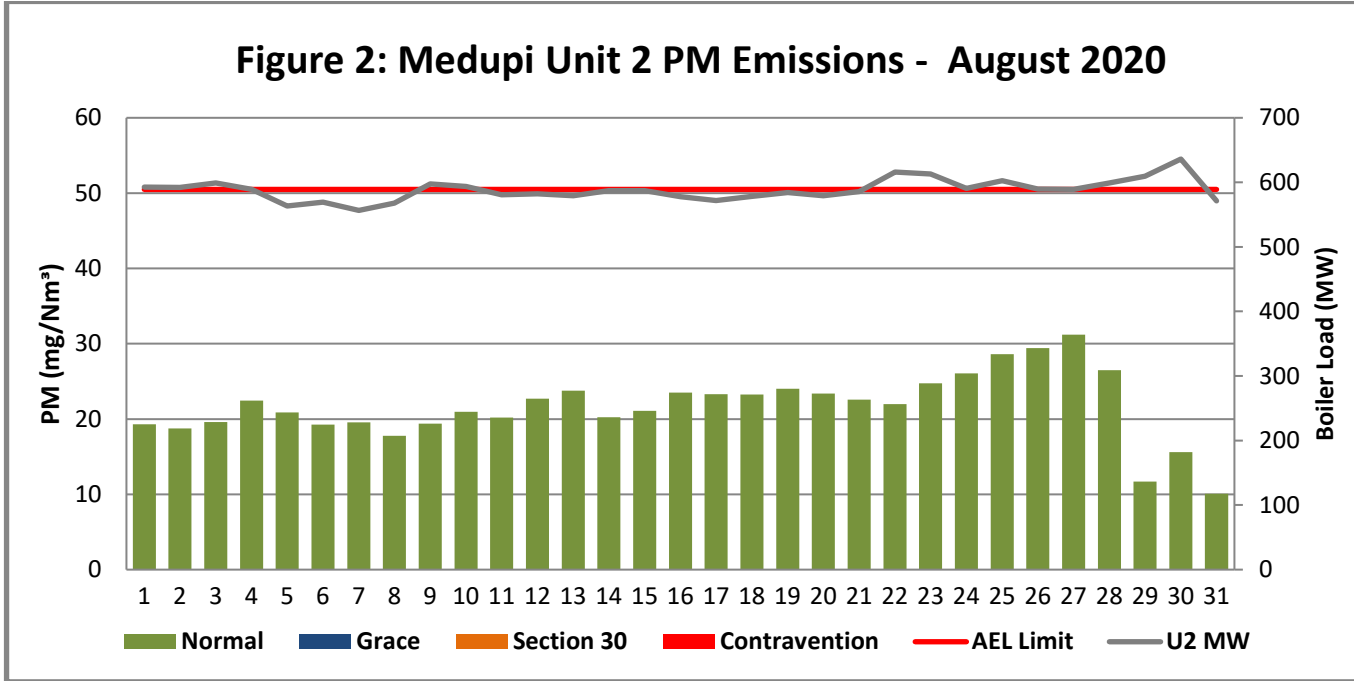
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Medupi Power Station graphical representation of the daily average emissions for particulates

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Figure 6: Medupi Unit 6 PM Emissions - August 2020

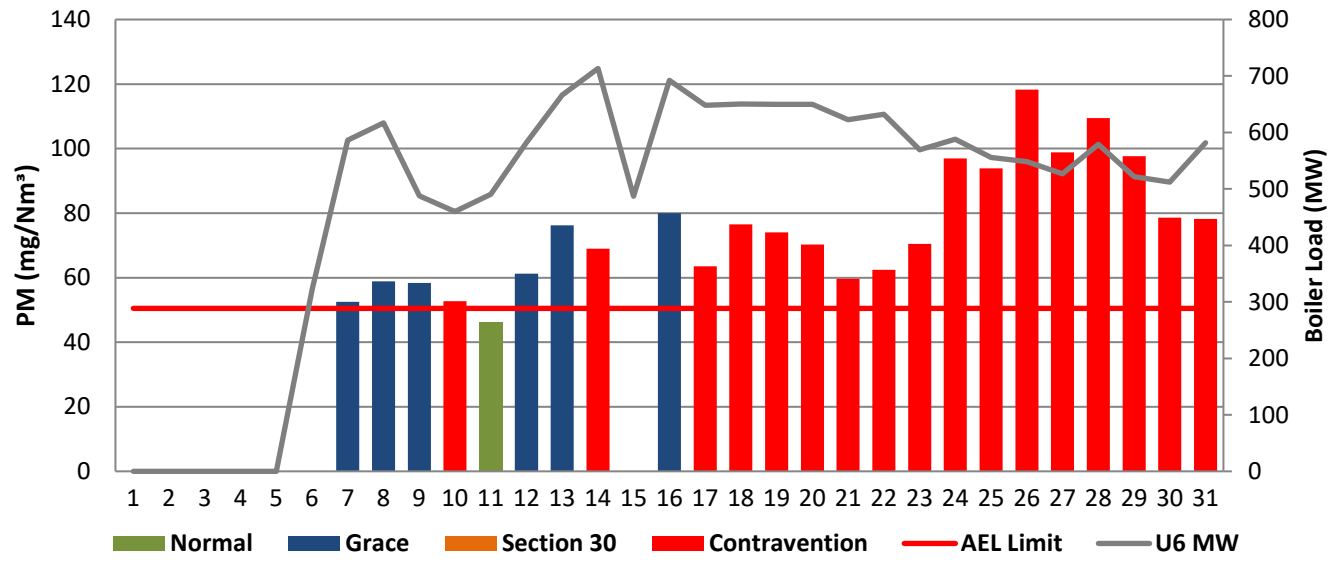


Figure 8: Medupi Unit 2 SOx Emissions - August 2020

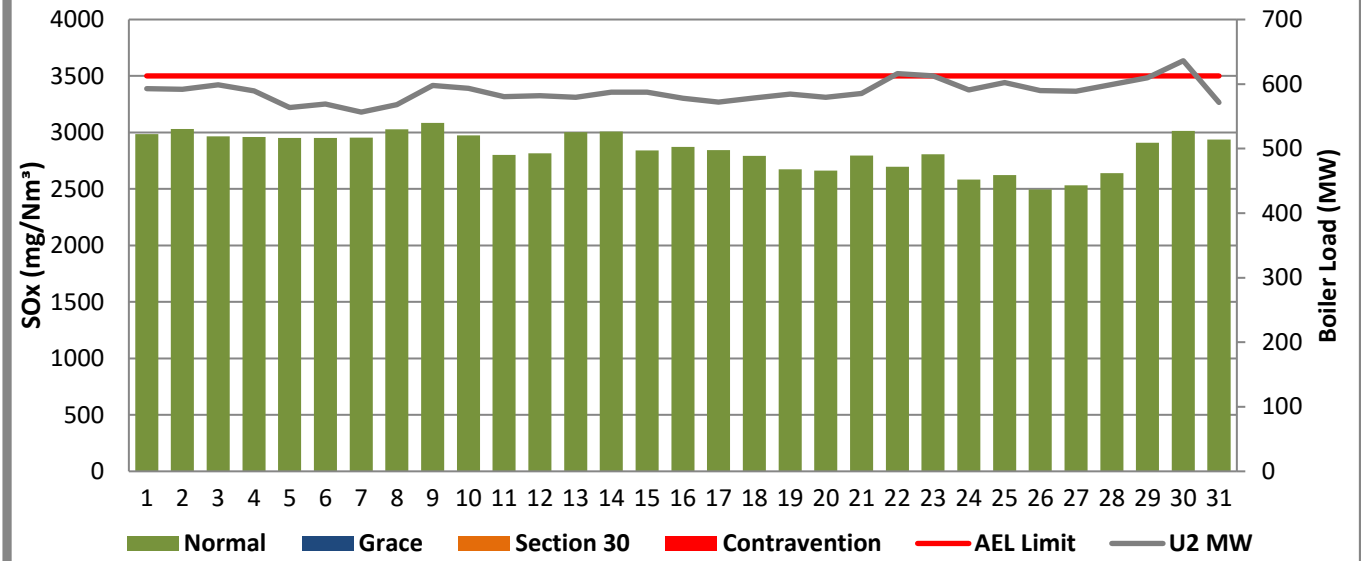


Figure 9: Medupi Unit 3 SOx Emissions - August 2020

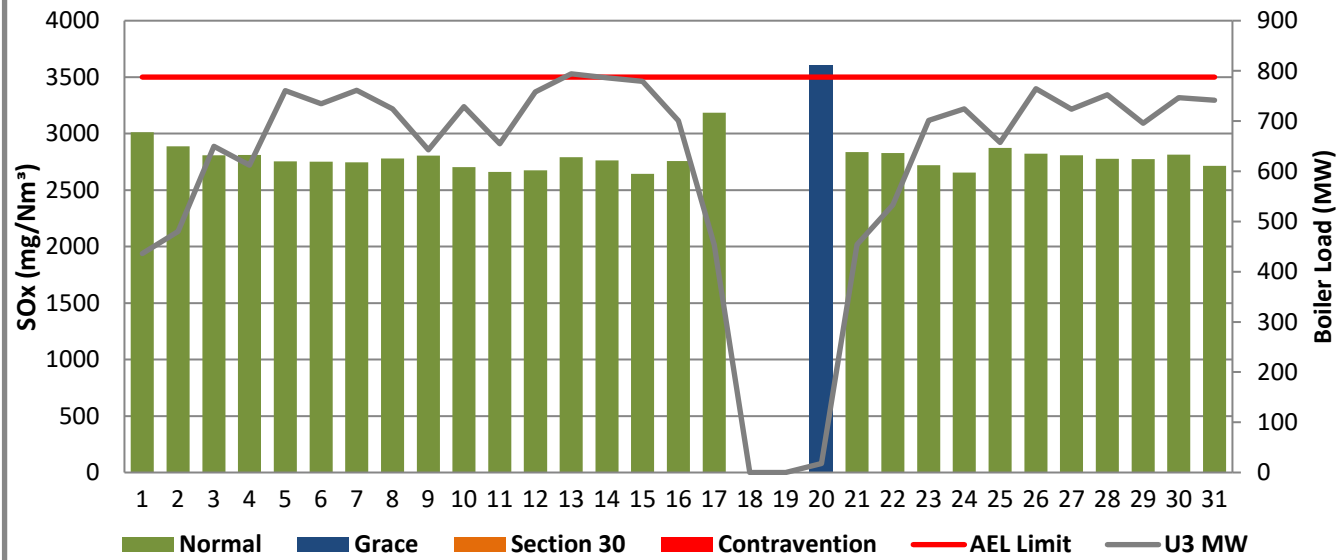
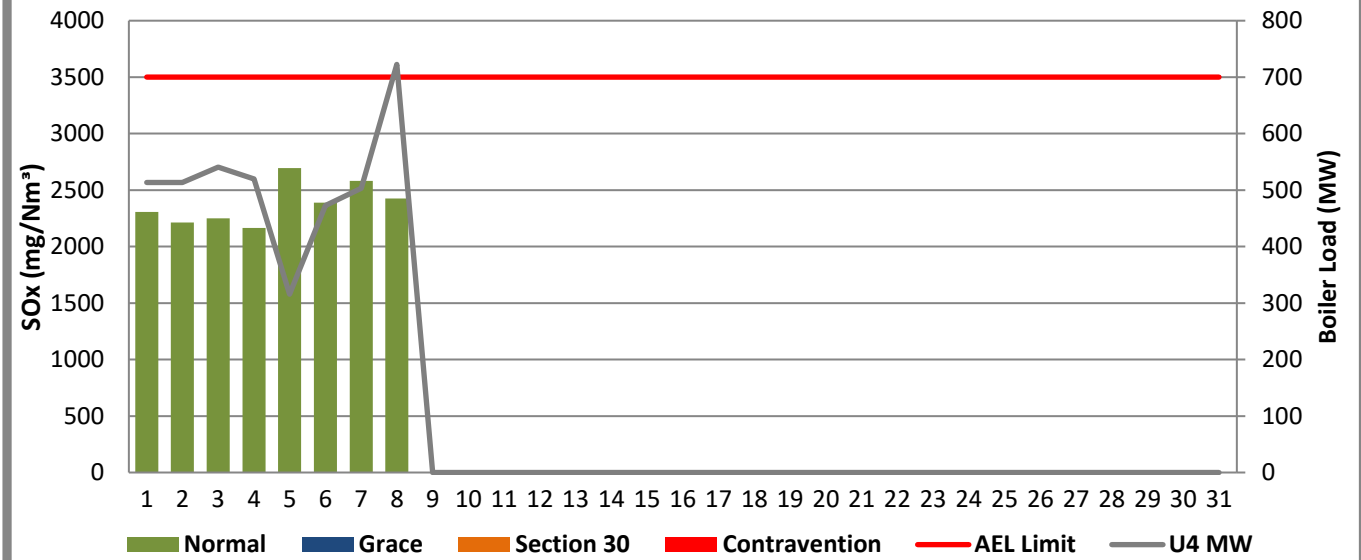


Figure 10: Medupi Unit 4 SOx Emissions - August 2020



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Figure 11: Medupi Unit 5 SOx Emissions - August 2020

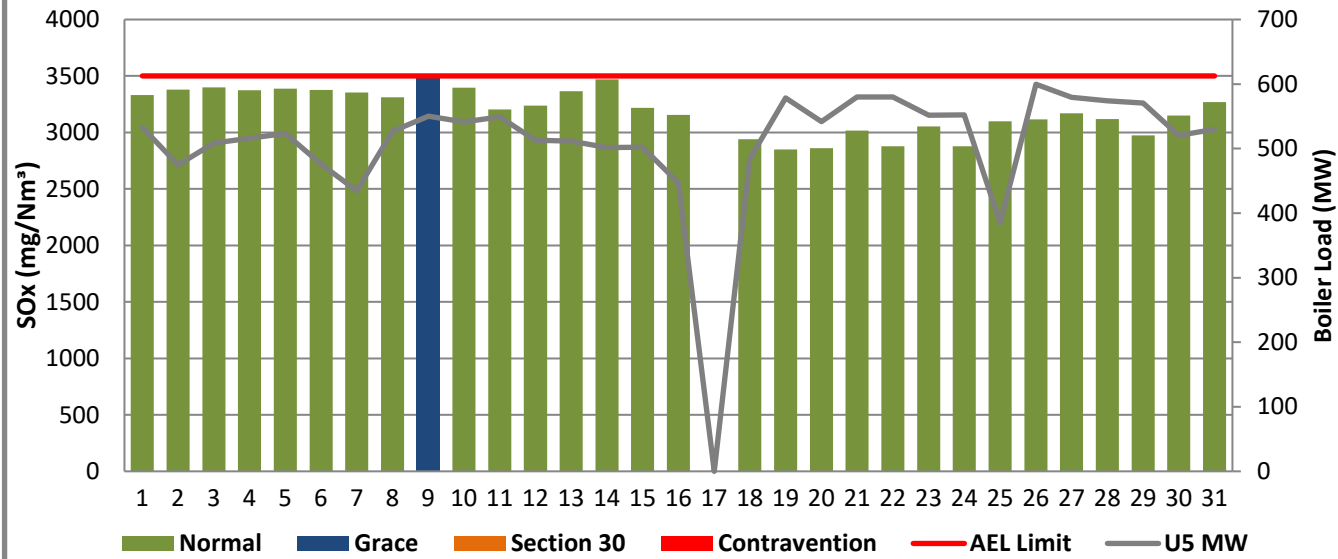


Figure 12: Medupi Unit 6 SOx Emissions - August 2020

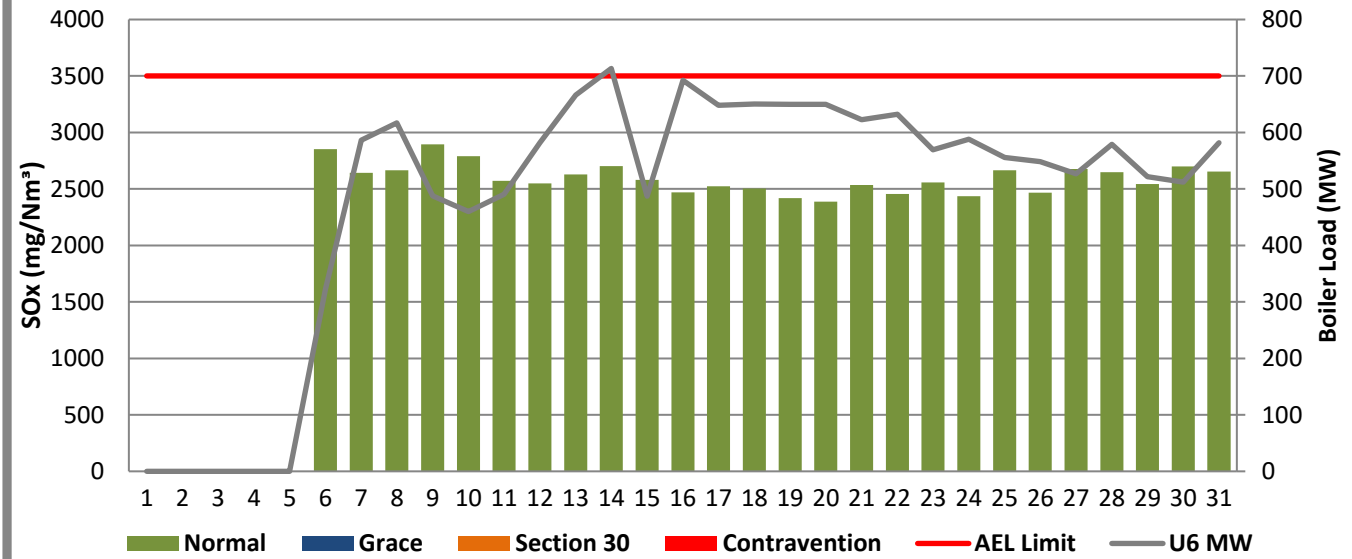


Figure 14: Medupi Unit 2 NOx Emissions - August 2020

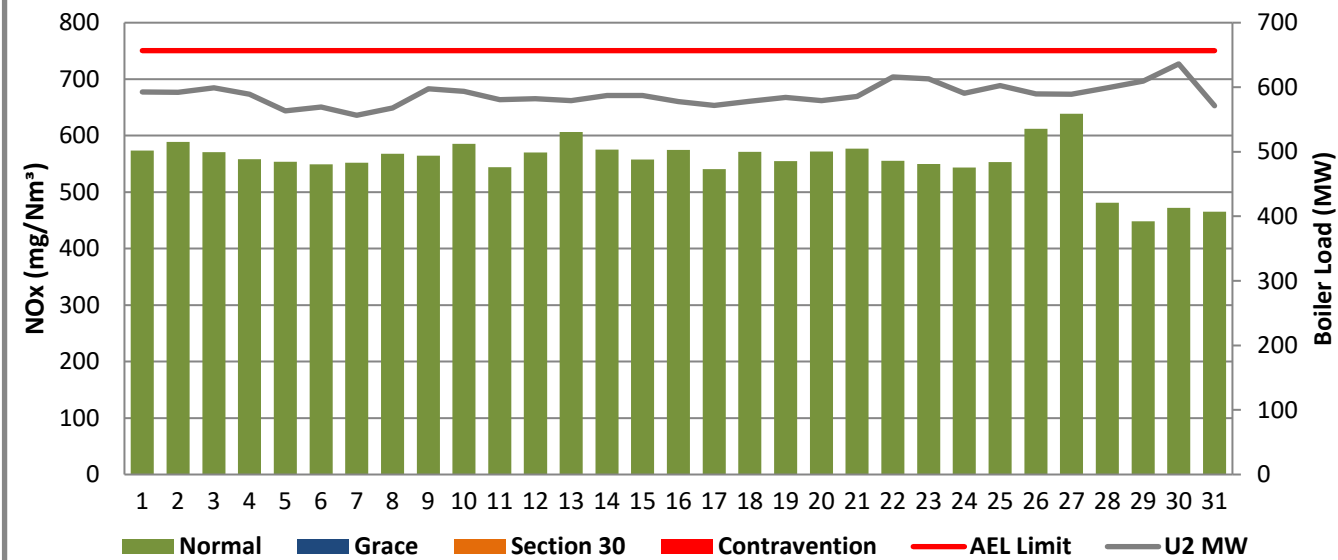
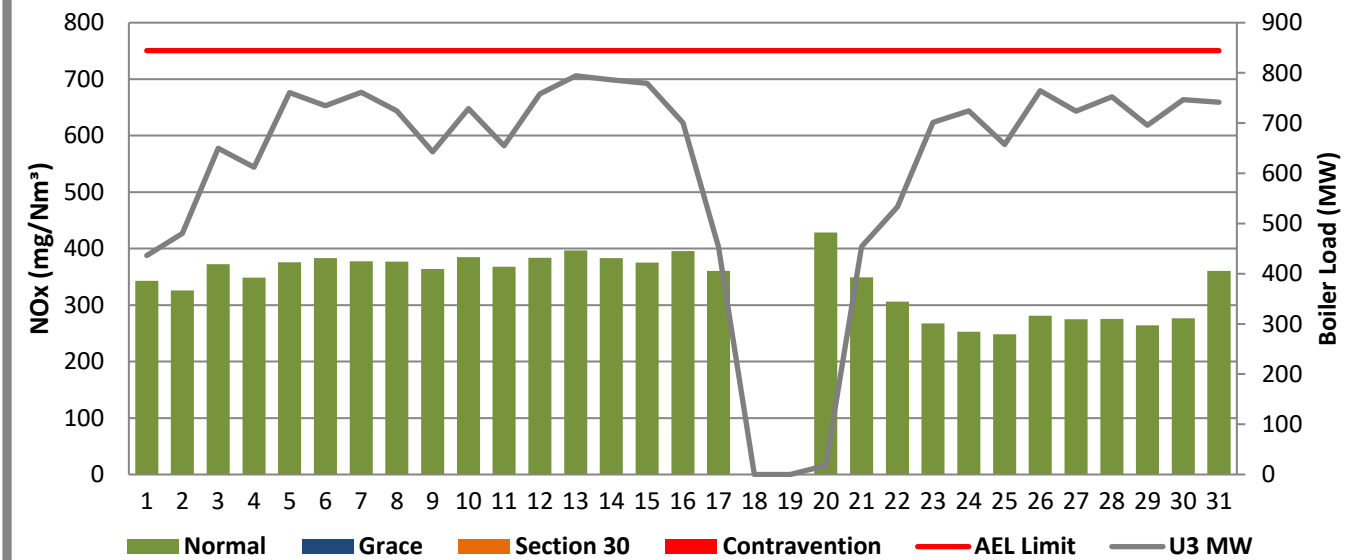


Figure 15: Medupi Unit 3 NOx Emissions - August 2020



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Figure 16: Medupi Unit 4 NOx Emissions - August 2020

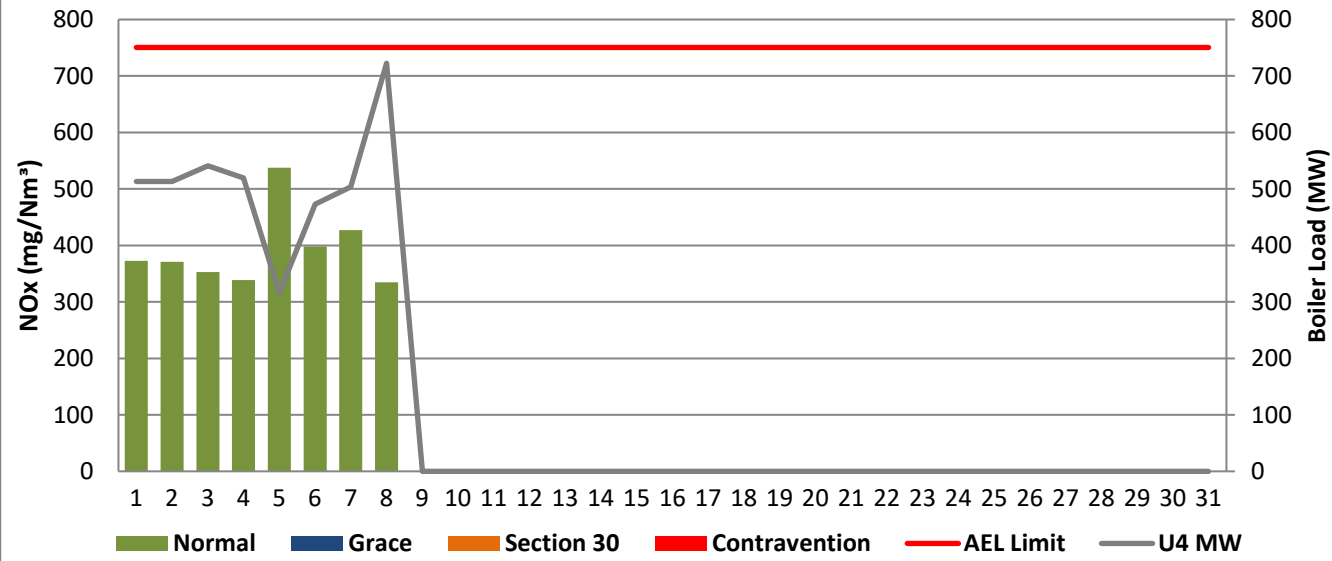


Figure 17: Medupi Unit 5 NOx Emissions - August 2020

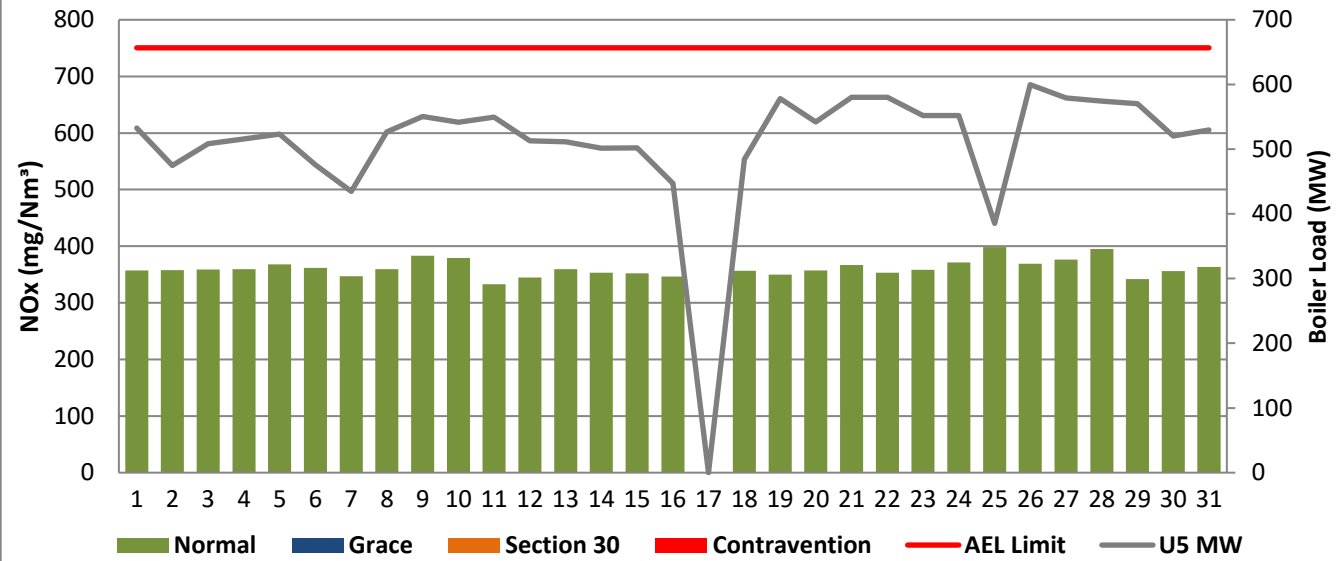
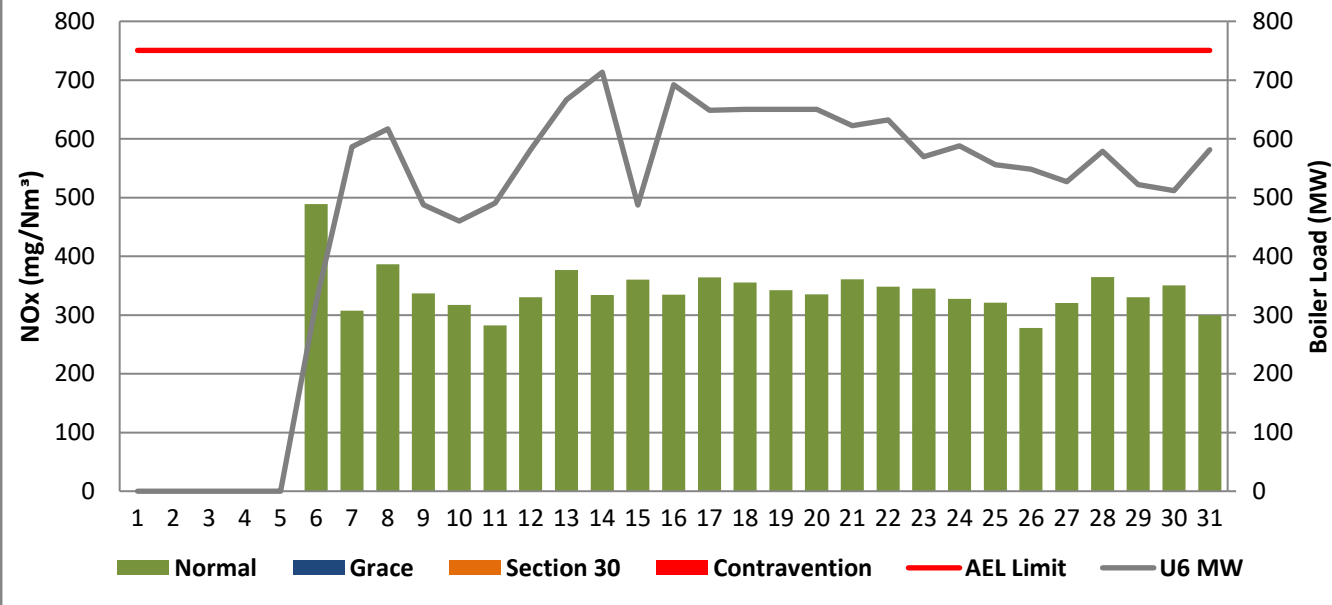


Figure 18: Medupi Unit 6 NOx Emissions - August 2020




Note: these graphs shall be read with table two in order to make sense of the days without emissions.

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**Table 6: Monthly tonnages for the month of August 2020**

Unit	PM (tons)	SO <sub>2</sub> (tons)	NO <sub>2</sub> (tons)	CO (tons)
1	0,0	0	0	0
2	43,4	5 721	1 115	26
3	41,0	3 733	451	91
4	9,1	576	93	27
5	62,1	5 400	611	35
6	93,0	3 149	414	32
<b>SUM</b>	<b>248,6</b>	<b>18 579</b>	<b>2 685</b>	<b>210</b>

## 5. Comments on the performance and availability of each unit

SO<sub>x</sub> and NO<sub>x</sub> emissions were within the limit in all the unit during the month of August 2020. PM Exceedances on unit 3 and 6 were due to bag damages in the PJFF Plant, the exceedances are reported as contraventions. Unit 4 was not available for most of the month due to outages.

## 6. Continuous Emission Monitoring Systems (CEMS)

Unit 2, 3, 4, 5 and 6 Continuous Emission Monitoring Systems were in operation at all times when the unit was on load.

**Table 7: Periods during which CEMS was inoperative**


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

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**Table 8: CEMS Monitor Reliability**

Associated Unit/Stack	PM	SO <sub>2</sub>	NO	O <sub>2</sub>
Unit 1	<i>n/a</i>	<i>n/a</i>	<i>n/a</i>	<i>n/a</i>
Unit 2	100,0	99,9	99,9	99,9
Unit 3	100,0	96,4	96,4	96,4
Unit 4	100,0	99,4	99,4	99,4
Unit 5	100,0	100,0	99,2	99,8
Unit 6	100,0	99,7	98,8	99,2

## 7. CEMS Calibration certificates and equipment used for calibration

See attached Appendix A

## 8. 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.

## 9. Visual inspection of the exterior walls of the fuel oil tanks, fuel oil inventory data 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 9: Total Volatile Organic Compound (TVOC) for August 2020

		
<b>CALCULATION OF EMISSIONS OF TOTAL VOLATILE COMPOUNDS FROM FUEL OIL STORAGE TANKS*</b>		
<b>Date:</b>	31 August 2020	
<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	
<p style="text-align: center;"> <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       </p>		
<b>MONTH:</b>	<b>August</b>	
<b>GENERAL INFORMATION:</b>		
	<b>Data</b>	<b>Unit</b>
<b>Total number of fuel oil tanks:</b>	2	NA
<b>Height of tank:*</b>	14.2	m
<b>Diameter of tank:</b>	12	m
<b>Net fuel oil throughput for the month:</b>	<b>3172</b>	tons/month
<b>Molecular weight of the fuel oil:</b>	166.00	Lb/lb-mole
<b>METEROLOGICAL DATA FOR THE MONTH</b>		
	<b>Data</b>	<b>Unit</b>
<b>Daily average ambient temperature</b>	20.46	°C
<b>Daily maximum ambient temperature</b>	28.86	°C
<b>Daily minimum ambient temperature</b>	12.76	°C
<b>Daily ambient temperature range</b>	16.09	°C
<b>Daily total insolation factor</b>	4.23	kWh/m <sup>2</sup> /day
<b>Tank paint colour</b>	<b>Aluminum/Specular</b>	NA
<b>Tank paint solar absorbance</b>	0.39	NA
<b>FINAL OUTPUT:</b>		
	<b>Result</b>	<b>Unit</b>
<b>Breathing losses:</b>	<b>0.72 kg/month</b>	
<b>Working losses:</b>	<b>0.09 kg/month</b>	
<b>TOTAL LOSSES (Total TVOC Emissions for the month):</b>	<b>0.82 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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## 10. Air quality improvements initiatives and public education and awareness campaigns

No awareness campaign.

## 11. Complaints Register


Table 10: Complaints for the month of August 2020

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:** Lufuno Tshidzumba   
**Senior Environmental Advisor**

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


**Supported by:** Sithokozile Hlongwa   
**Boiler Engineering Manager**

**Supported by:** Rosetta Rammutla   
**Environmental Manager**

**Supported by:** Jabulani Mkhathshwa   
**Engineering Group Manager**

I Dan Mashigo, declares that the information provided in this report is accurate and correct.


Yours sincerely

  
 \_\_\_\_\_  
 Dan Mashigo  
**GENERAL MANAGER: MEDUPI POWER STATION (Acting)**


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**APPENDIX 1: CEMS Calibration certificates**



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### CALIBRATION CERTIFICATE

						<b>CERTIFICATE NO:</b>	
						3641	
<b>CUSTOMER:</b>	Eskom Medupi			<b>JOB NO:</b>	SC1757		
<b>CONTACT NAME:</b>	Lerato Sehume			<b>TEL:</b>	078 012 9038		
<b>MODEL:</b>	Dr Fodisch MGA 23	<b>SERIAL NO:</b>	15711				
<b>AUXILIARY EQUIPMENT:</b>	Unit 2						



CHAN		PRIOR	FINAL	TEST GAS	TEST GAS VALUE	GAS CERTIFICATE NUMBER	EXPIRY DATE
CO	Zero	-1 ppm	0 ppm	Air	20.95 %	Air	N/A
	Span	837 ppm	835 ppm	CO	836.4 ppm	P20FO00332	2021-02-03
NO	Zero	-1 ppm	0 ppm	Air	20.95 %	Air	N/A
	Span	878 ppm	877 ppm	NO	876.7 ppm	P20FO00346	2021-01-21
SO2	Zero	-15 ppm	0	Air	20.95 %	Air	N/A
	Span	2203 ppm	2200 ppm	SO2	2200.0 ppm	P20FO00345	2021-02-21
O2	Zero	-0.08 %	0.00 %	N2	99.99 %	92520	2021-02-27
	Span	21.10 %	20.95 %	Air	20.95 %	Air	N/A


**REPORT:** Inspect all sample lines, filters and coolers, filter elements need to be change. Calibrate analyser with zero and span gas, calibration was done according to cylinder values, analyser was responding to all test gas.

**Date of Calibration:**  
18 Aug 2020

**Calibration Due Date:**  
Nov 2020

**Technician:**  
J. Faber

  
  
**SERVOMEX**  
A MEASURABLE ADVANTAGE  
Document Number: TH-PFC-002-F1 Rev 2

  
**TELEDYNE ANALYTICAL INSTRUMENTS**  
A Teledyne Technologies Company

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## Medupi Power Station Monthly Emissions Report

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



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### CALIBRATION CERTIFICATE

CERTIFICATE NO:

3642

CUSTOMER:	Eskom Medupi	JOB NO:	SC1757
CONTACT NAME:	Lerato Sehume	TEL:	078 012 9038
MODEL:	Dr Fodisch MGA 23	SERIAL NO:	15712
AUXILIARY EQUIPMENT:	Unit 3		

CHAN		PRIOR	FINAL	TEST GAS	TEST GAS VALUE	GAS CERTIFICATE NUMBER	EXPIRY DATE
CO	Zero	-2 ppm	0 ppm	Air	20.95 %	Air	N/A
	Span	839 ppm	835 ppm	CO	836.4 ppm	P20F000332	2021-02-03
NO	Zero	-3 ppm	0 ppm	Air	20.95 %	Air	N/A
	Span	882 ppm	877 ppm	NO	876.7 ppm	P20F000346	2021-01-21
SO2	Zero	0 ppm	0	Air	20.95 %	Air	N/A
	Span	2249 ppm	2200 ppm	SO2	2200.0 ppm	P20F000345	2021-02-21
O2	Zero	-0.05 %	0.00 %	N2	99.99 %	92520	2021-02-27
	Span	20.97 %	20.95 %	Air	20.95 %	Air	N/A

REPORT: Inspect all sample lines, filters and coolers, filter elements need to be change. Calibrate analyser with zero and span gas, calibration was done according to cylinder values, analyser was responding to all test gas.

Date of Calibration:  
18 Aug 2020  
Calibration Due Date:  
Nov 2020  
Technician:  
J. Faber



Document Number: TH-PFC-002-F1 Rev 2



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### Medupi Power Station Monthly Emissions Report

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Document Identifier	240-88543153	Rev	2
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## CALIBRATION CERTIFICATE

**CERTIFICATE NO:**

**3643**

<b>CUSTOMER:</b>	Eskom Medupi	<b>JOB NO:</b>	SC1757
<b>CONTACT NAME:</b>	Lerato Sehume	<b>TEL:</b>	078 012 9038
<b>MODEL:</b>	Dr Fodisch MGA 23	<b>SERIAL NO:</b>	13668
<b>AUXILIARY EQUIPMENT:</b>	Unit 4		

CHAN	PRIOR	FINAL	TEST GAS	TEST GAS VALUE	GAS CERTIFICATE NUMBER	EXPIRY DATE	
CO	Zero	0 ppm	0 ppm	Air	20.95 %	N/A	
	Span	833 ppm	835 ppm	CO	836.4 ppm	P20F000332	2021-02-03
NO	Zero	-2 ppm	0 ppm	Air	20.95 %	Air	N/A
	Span	878 ppm	877 ppm	NO	876.7 ppm	P20F000346	2021-01-21
SO2	Zero	-9 ppm	0	Air	20.95 %	Air	N/A
	Span	2257 ppm	2200 ppm	SO2	2200.0 ppm	P20F000346	2021-02-21
O2	Zero	0.12 %	0.00 %	N2	99.99 %	92520	2021-02-27
	Span	21.04 %	20.95 %	Air	20.95 %	Air	N/A

**REPORT:** Inspect all sample lines, filters and coolers, filter elements need to be change. Calibrate analyser with zero and span gas, calibration was done according to cylinder values, analyser was responding to all test gas.

**Date of Calibration:**  
17 Aug 2020  
**Calibration Due Date:**  
Nov 2020  
**Technician:**  
J. Faber



Document Number: TH-PFC-002-F1 Rev 2



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### Medupi Power Station Monthly Emissions Report

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**Elemental Analytics**  
Analyser Specialists

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### CALIBRATION CERTIFICATE

**CERTIFICATE NO:**  
3644

<b>CUSTOMER:</b>	Eskom Medupi	<b>JOB NO:</b>	SC1757
<b>CONTACT NAME:</b>	Lerato Sehume	<b>TEL:</b>	078 012 9038
<b>MODEL:</b>	Dr Fodisch MGA 23	<b>SERIAL NO:</b>	13670
<b>AUXILIARY EQUIPMENT:</b>	Unit 5		

CHAN	PRIOR	FINAL	TEST GAS	TEST GAS VALUE	GAS CERTIFICATE NUMBER	EXPIRY DATE	
CO	Zero	-25 ppm	0 ppm	Air	20.95 %	N/A	
	Span	815 ppm	835 ppm	CO	836.4 ppm	P20FO00332	2021-02-03
NO	Zero	-18 ppm	0 ppm	Air	20.95 %	N/A	
	Span	857 ppm	877 ppm	NO	876.7 ppm	P20FO00346	2021-01-21
SO2	Zero	-34 ppm	0	Air	20.95 %	N/A	
	Span	2236 ppm	2200 ppm	SO2	2200.0 ppm	P20FO00345	2021-02-21
O2	Zero	0.05 %	0.00 %	N2	99.99 %	92520	2021-02-27
	Span	21.13 %	20.95 %	Air	20.95 %	Air	N/A

**REPORT:** Inspect all sample lines, filters and coolers, filter elements need to be change. Calibrate analyser with zero and span gas, calibration was done according to cylinder values, analyser was responding to all test gas.

**Date of Calibration:**  
17 Aug 2020  
**Calibration Due Date:**  
Nov 2020  
**Technician:**  
J. Faber

**Baker + Lang**  
**SERVOMEX**  
A HEADSTARTER ADVANTAGE

**GMI**  
**TELEDYNE ANALYTICAL INSTRUMENTS**  
A Teledyne Technologies Company

Document Number: TH-PFC-002-F1 Rev 2

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### Medupi Power Station Monthly Emissions Report

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### CALIBRATION CERTIFICATE

**CERTIFICATE NO:**

3645

<b>CUSTOMER:</b>	Eskom Medupi	<b>JOB NO:</b>	SC1757
<b>CONTACT NAME:</b>	Lerato Sehume	<b>TEL:</b>	078 012 9038
<b>MODEL:</b>	Dr Fodisch MGA 23	<b>SERIAL NO:</b>	13669
<b>AUXILIARY EQUIPMENT:</b>	Unit 6		

CHAN	PRIOR	FINAL	TEST GAS	TEST GAS VALUE	GAS CERTIFICATE NUMBER	EXPIRY DATE	
CO	Zero	-5 ppm	0 ppm	Air	20.95 %	Air	N/A
	Span	831 ppm	835 ppm	CO	836.4 ppm	P20FO00332	2021-02-03
NO	Zero	-15 ppm	0 ppm	Air	20.95 %	Air	N/A
	Span	868 ppm	877 ppm	NO	876.7 ppm	P20FO00346	2021-01-21
SO2	Zero	-83 ppm	0	Air	20.95 %	Air	N/A
	Span	2389 ppm	2389 ppm	SO2	2200.0 ppm	P20FO00345	2021-02-21
O2	Zero	-0.36 %	0.00 %	N2	99.99 %	92520	2021-02-27
	Span	21.34 %	20.95 %	Air	20.95 %	Air	N/A

**REPORT:** Inspect all sample lines, filters and coolers, filter elements need to be change. SO2 cell diagnostics is low and cell does not calibrate on cylinder value, but cell is still reacting, and O2 cell sensitivity start to go down. Calibrate analyser with zero and span gas, calibration was done according to cylinder values, analyser was responding to all test gas.

**Date of Calibration:**  
17 Aug 2020  
**Calibration Due Date:**  
Nov 2020  
**Technician:**  
J. Faber



Document Number: TH-PFC-002-F1 Rev 2

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