	<b>Medupi Power Station Monthly Emissions Report</b>	Template Identifier	240-43921804	Rev	6
		Document Identifier	240-88543153	Rev	2
		Effective Date	January 2021		
		Review Date	January 2024		

Phumudzo Thivhafuni

*Date: 2021/06/30*

Limpopo Dept. of Economic Development, Environment and Tourism

*Enquiries: TR. Rammutla*

Private Bag 9484  
POLOKWANE  
0700

*Tel: 014 762 6375*

[ThivhafuniPO@ledet.gov.za](mailto:ThivhafuniPO@ledet.gov.za)

Ref: 12/4/12L-W2/A3 – July 2020 Rev.1

Dear Phumudzo

## **MEDUPI POWER STATION MONTHLY EMISSIONS REPORT FOR THE MONTH OF JULY 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 July 2020 only.

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


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

Raw Materials and Products used	Raw Material Type	Unit	Maximum Permitted Consumption/ Rate (Quantity)	Unit 2,3, 4, 5 and 6 consumption July 2020
	Coal	Tons/month	1 875 000	877 748
	Fuel Oil	Tons/month	40 000	1289
Production Rates	Product/ By-Product Name	Unit	Maximum Production Capacity Permitted (Quantity)	Unit 2, 3, 4, 5 and 6 Production Rate in Month of July 2020
	Energy	MW	4 800	2993
	Ash Emitted	Tons/month	not specified	247

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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>January 2021</b>			
		<b>Review Date</b>	<b>January 2024</b>			


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

Date	Reportable hours of Operation					Production (MW)					Coal Consumption				
	Unit					Unit					Unit				
	2	3	4	5	6	2	3	4	5	6	2	3	4	5	6
01 Jul -19	24,0	24,0	24,0	24,0	24,0	649	758	475	688	610	7308	8127	5234	7008	6389
02 Jul -19	24,0	24,0	24,0	24,0	24,0	658	682	477	552	610	7547	7496	5175	5653	6274
03 Jul -19	24,0	24,0	24,0	22,4	24,0	706	600	524	551	610	8267	6840	5878	5569	6628
04 Jul -19	24,0	24,0	24,0	0,0	24,0	622	529	551	457	610	7075	5864	5945	1408	6414
05 Jul -19	24,0	24,0	24,0	0,0	24,0	635	664	564	0,0	610	7233	7268	6160		6545
06 Jul -19	24,0	24,0	24,0	0,0	24,0	672	767	521	0,0	610	7529	8161	5656		6300
07 Jul -19	24,0	16,3	10,8	0,0	24,0	685	637	502	0,0	523	7987	5375	5488		5982
08 Jul -19	24,0	1,2	4,3	0,0	24,0	682	724	487	0,0	611	7974	8043	4228		6566
09 Jul -19	24,0	24,0	2,1	0,0	24,0	658	594	519	0,0	567	7528	6507	5706		6045
10 Jul -19	24,0	24,0	24,0	0,0	24,0	675	695	538	0,0	600	7757	7625	5920		6438
11 Jul -19	24,0	24,0	24,0	0,0	24,0	662	747	501	0,0	600	7727	8274	5691		6483
12 Jul -19	24,0	24,0	24,0	0,0	24,0	662	771	570	0,0	600	7649	8489	6314		6363
13 Jul -19	24,0	24,0	24,0	0,0	24,0	623	734	504	0,0	600	6911	7833	5469		6266
14 Jul -19	24,0	24,0	24,0	0,0	24,0	633	762	334	212	600	7272	8137	3670	663	6281
15 Jul -19	24,0	24,0	11,7	6,3	24,0	633	785	490	680	600	7133	8409	3590	6891	6079
16 Jul -19	24,0	24,0	5,3	24,0	24,0	645	681	488	739	600	7442	7438	5309	7630	6406
17 Jul -19	24,0	24,0	24,0	24,0	24,0	627	739	517	741	589	7111	7837	5573	7571	6253
18 Jul -19	24,0	24,0	12,3	24,0	24,0	622	723	461	679	583	7113	7793	2910	6975	6226
19 Jul -19	24,0	24,0	1,3	24,0	24,0	640	702	515	676	600	7357	7555	5600	6854	6231
20 Jul -19	24,0	24,0	24,0	24,0	24,0	615	704	574	665	580	6915	7627	6161	6682	6056
21 Jul -19	24,0	24,0	24,0	24,0	24,0	623	688	567	687	545	6744	7143	5862	6760	5662
22 Jul -19	24,0	24,0	7,5	24,0	24,0	633	619	496	639	538	6928	6541	3469	6433	5659
23 Jul -19	24,0	24,0	8,6	24,0	24,0	659	564	564	661	543	7254	6076	5847	6600	5663
24 Jul -19	24,0	24,0	24,0	24,0	24,0	631	568	583	662	539	6997	5939	6093	6654	5638
25 Jul -19	5,0	0,5	24,0	24,0	24,0	507	361	494	638	468	2304	125	5147	6469	4757
26 Jul -19	0,0	0,0	24,0	24,0	24,0	504	0,0	490	639	506	5493		5264	6603	5417
27 Jul -19	23,6	0,0	24,0	24,0	24,0	606	0,0	513	627	600	6827		5552	6607	6398
28 Jul -19	24,0	0,0	24,0	24,0	24,0	577	0,0	558	603	600	6790		5980	6183	6284
29 Jul -19	24,0	0,0	24,0	24,0	24,0	560	0,0	557	606	615	6489		5930	6291	6421
30 Jul -19	24,0	0,0	24,0	24,0	22,5	545	0,0	580	549	632	5959		6066	5564	6061
31 Jul -19	24,0	0,0	24,0	24,0	0,0	588	196	560	489	0,0	6782	565	6048	5053	22

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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	January 2021			
		Review Date	January 2024			

## 2. Abatement Technology

Table 3: Abatement Equipment Control Technology utilisation for month of July 2020

Associated Unit/Stack	Technology Type	Efficiency
Unit 1	<i>Fabric Filter Plant (FFP)</i>	-
Unit 2	<i>Fabric Filter Plant (FFP)</i>	99,951%
Unit 3	<i>Fabric Filter Plant (FFP)</i>	99,949%
Unit 4	<i>Fabric Filter Plant (FFP)</i>	99,863%
Unit 5	<i>Fabric Filter Plant (FFP)</i>	99,874%
Unit 6	<i>Fabric Filter Plant (FFP)</i>	99,896%

## 3. Energy Source Characteristics

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

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	1.38
Ash Content	35 - 39	34.5

## 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>

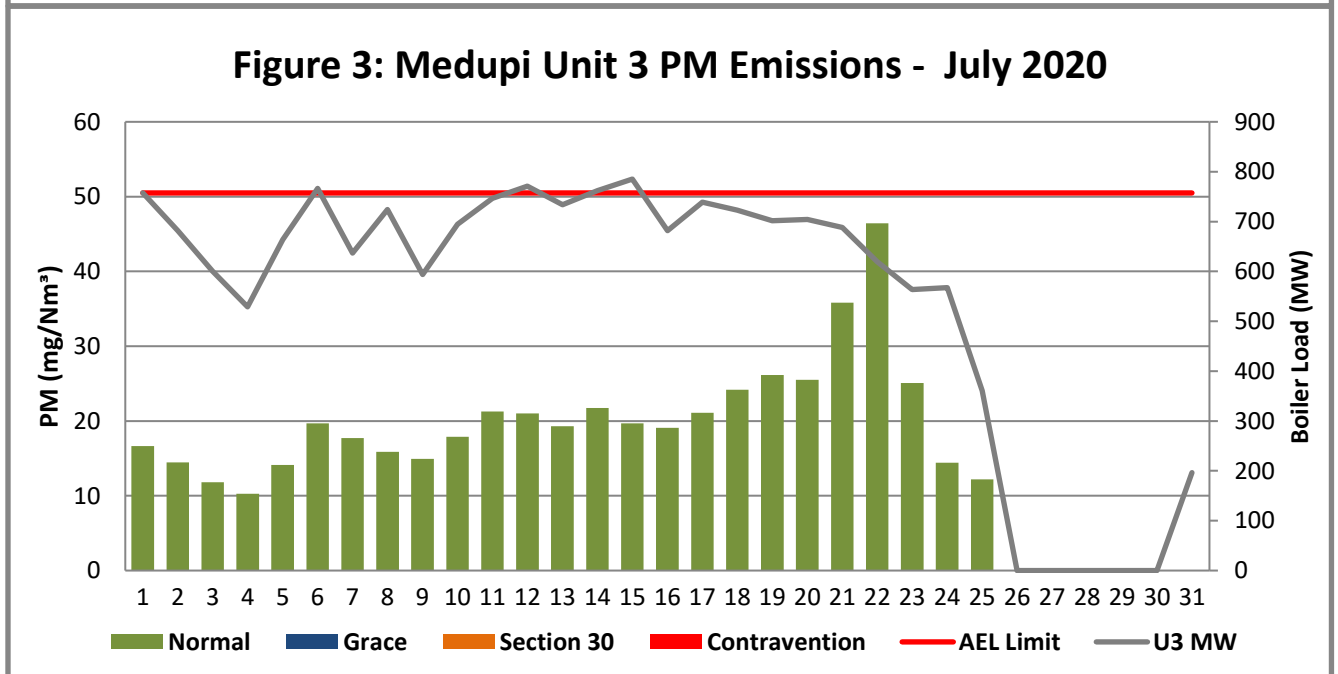
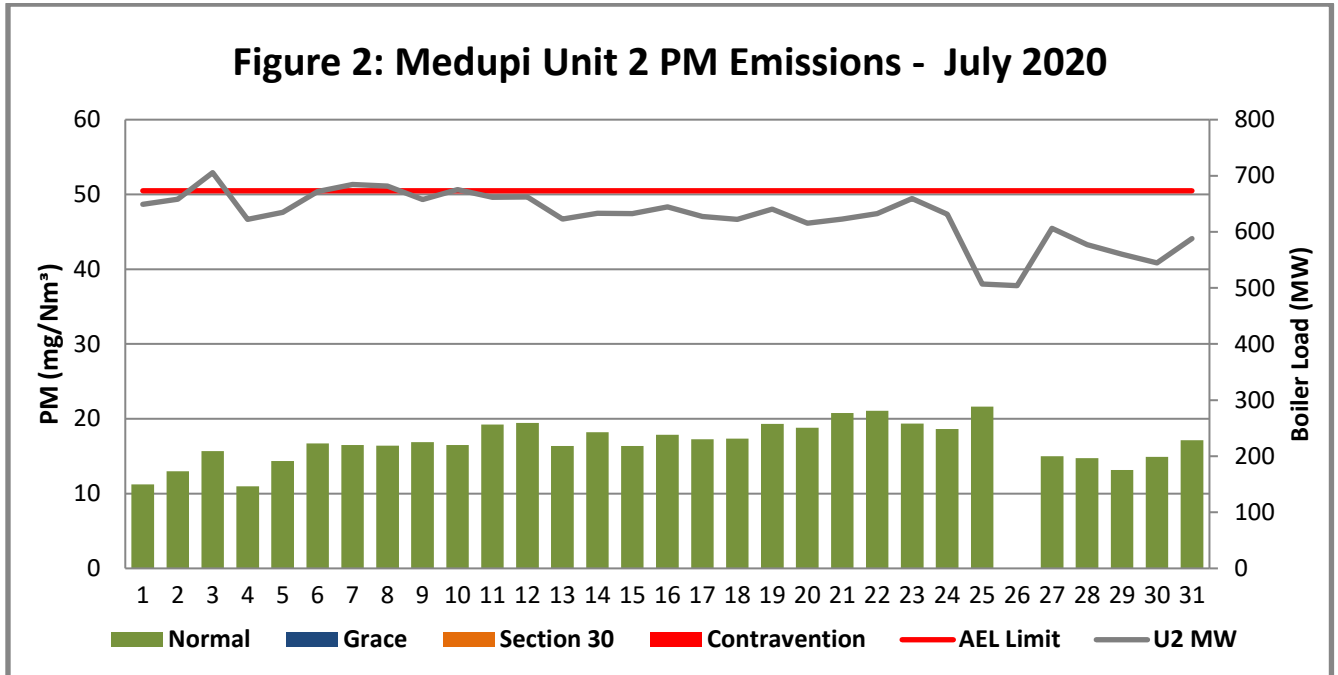
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		<b>Document Identifier</b>	<b>240-88543153</b>	<b>Rev</b>	<b>2</b>
		<b>Effective Date</b>	<b>January 2021</b>		
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Medupi Power Station graphical representation of emissions data



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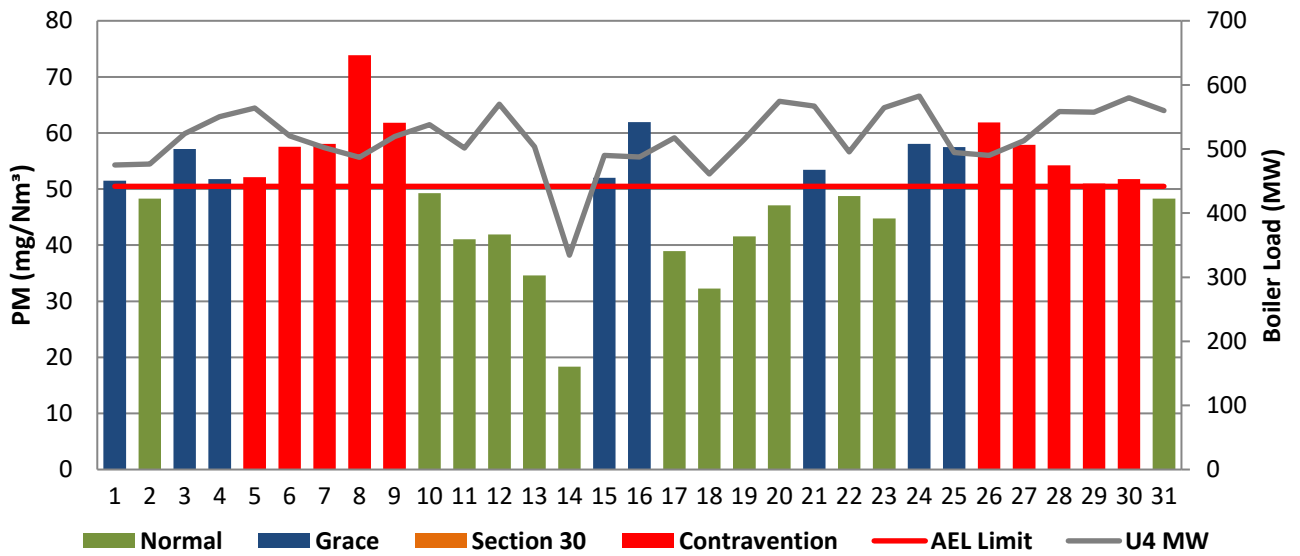
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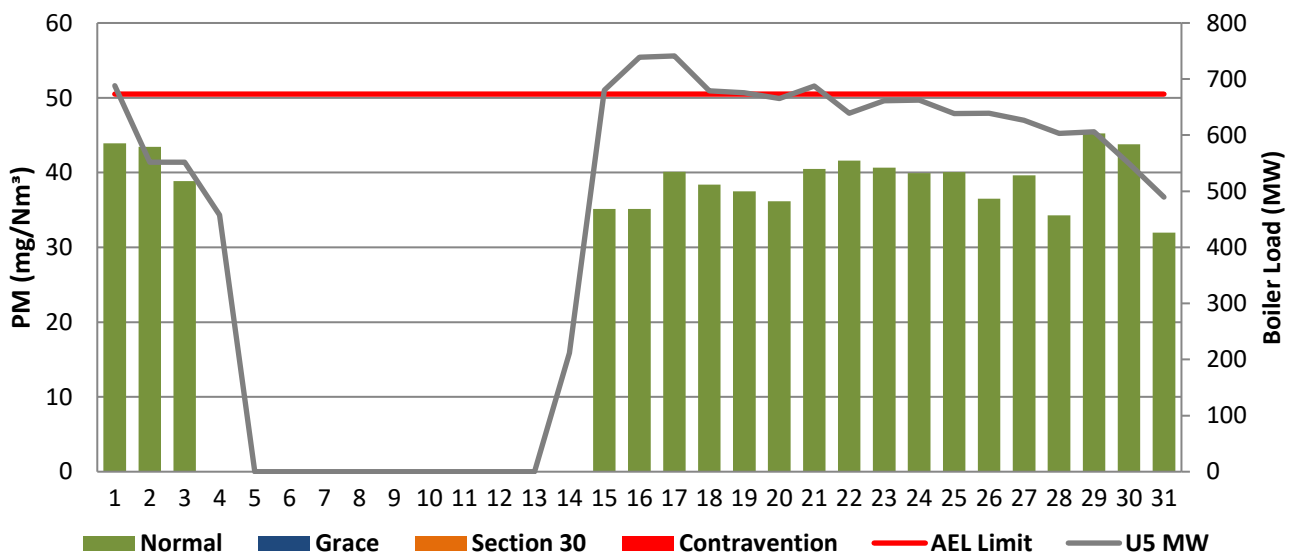
## Medupi Power Station Monthly Emissions Report

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

### Figure 4: Medupi Unit 4 PM Emissions - July 2020



### Figure 5: Medupi Unit 5 PM Emissions - July 2020



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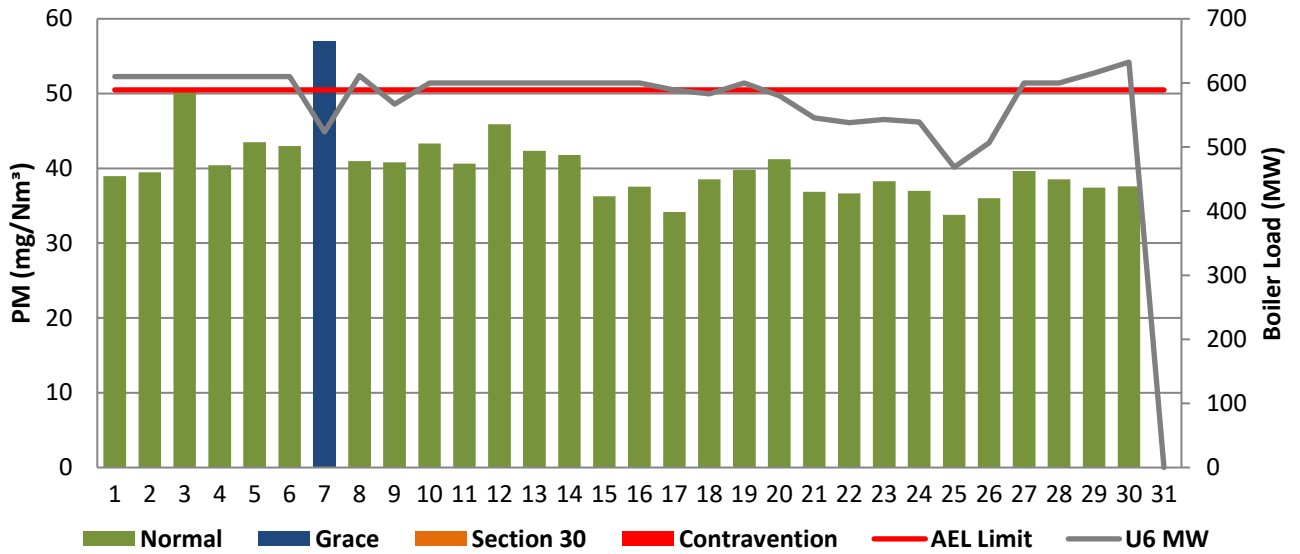
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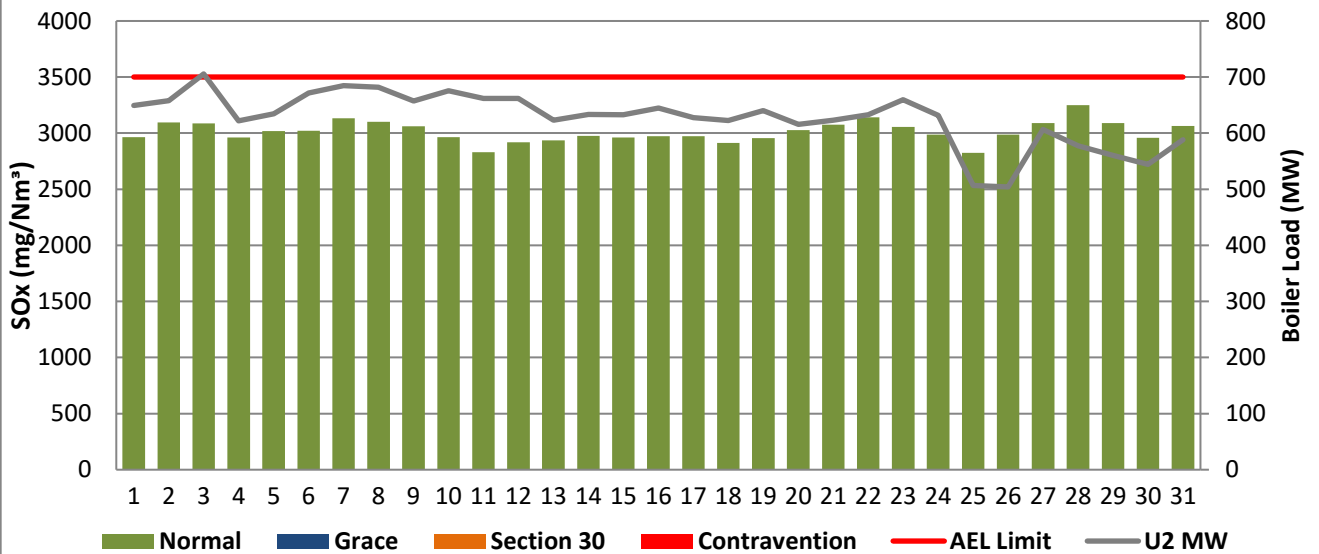
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Template Identifier	240-43921804	Rev	6
Document Identifier	240-88543153	Rev	2
Effective Date	January 2021		
Review Date	January 2024		

### Figure 6: Medupi Unit 6 PM Emissions - July 2020



### Figure 8: Medupi Unit 2 SOx Emissions - July 2020



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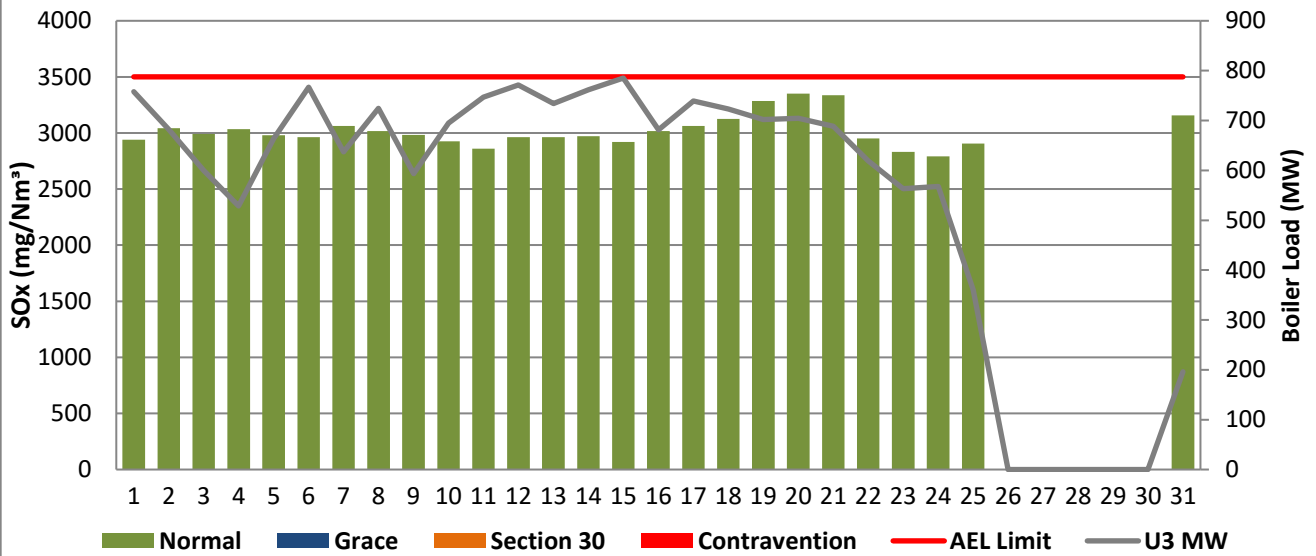
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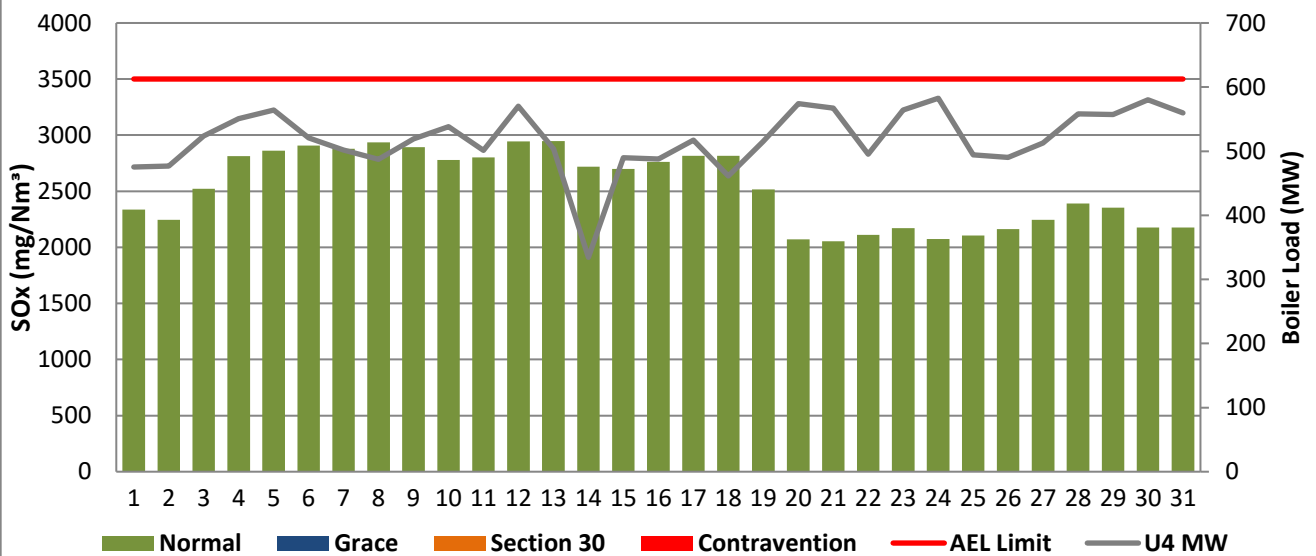
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Template Identifier	240-43921804	Rev	6
Document Identifier	240-88543153	Rev	2
Effective Date	January 2021		
Review Date	January 2024		

### Figure 9: Medupi Unit 3 SOx Emissions - July 2020



### Figure 10: Medupi Unit 4 SOx Emissions - July 2020



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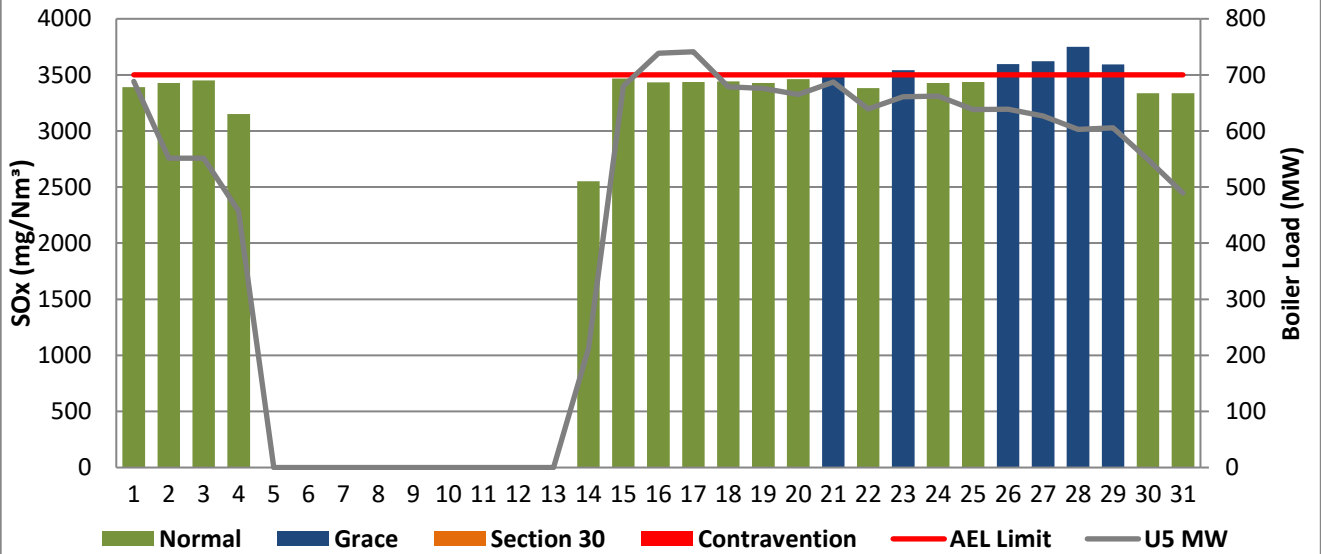
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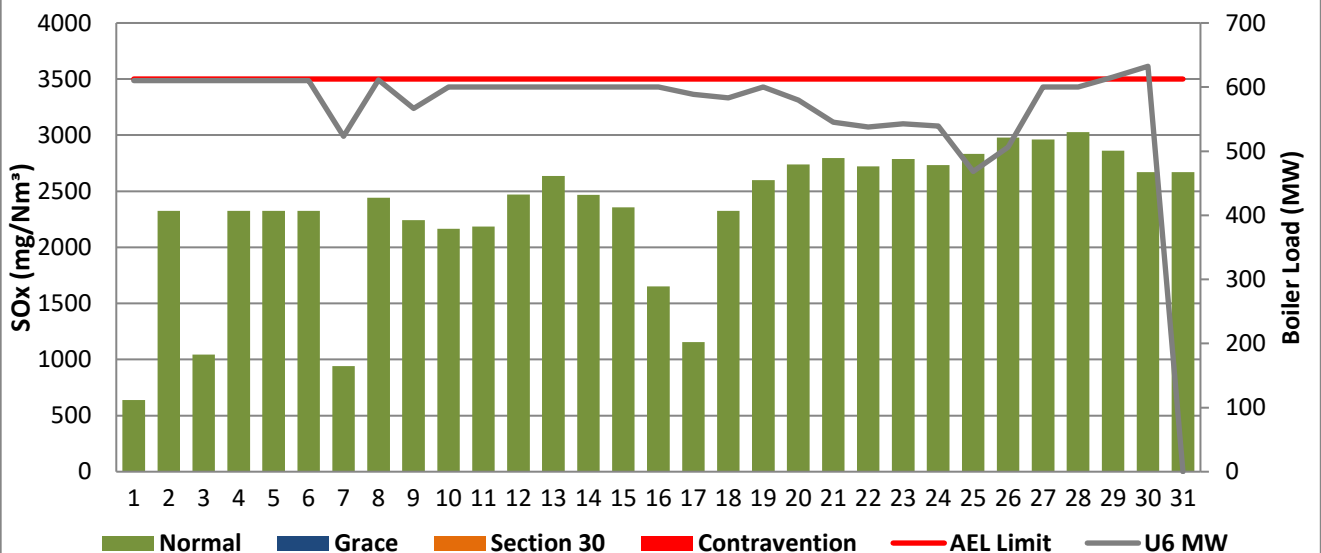
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Template Identifier	240-43921804	Rev	6
Document Identifier	240-88543153	Rev	2
Effective Date	January 2021		
Review Date	January 2024		

#### Figure 11: Medupi Unit 5 SOx Emissions - July 2020



#### Figure 12: Medupi Unit 6 SOx Emissions - July 2020



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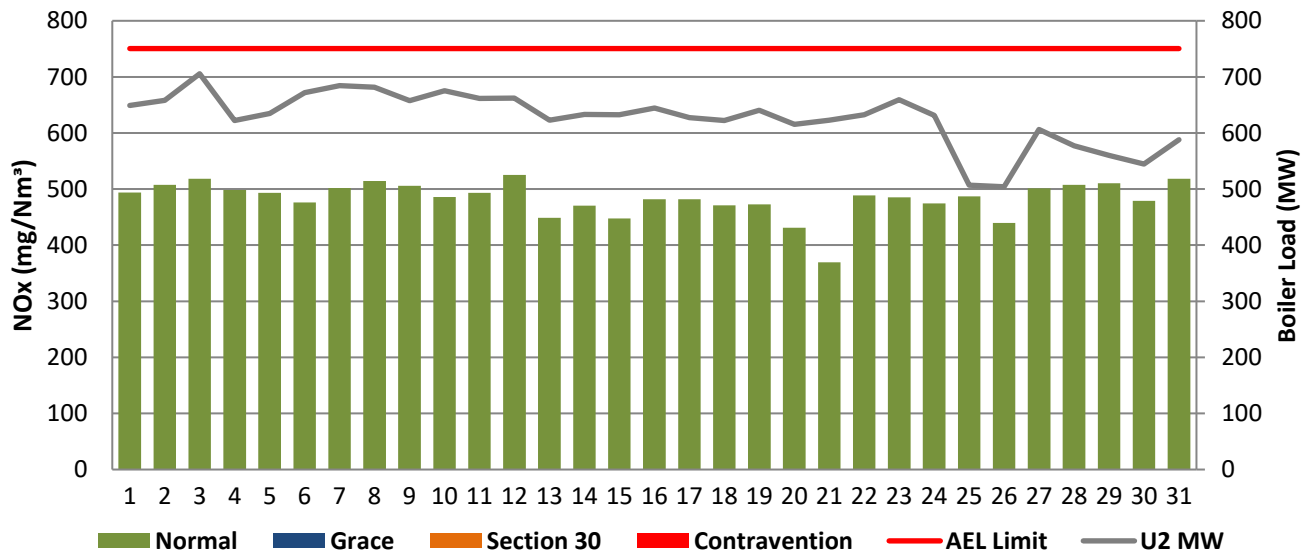




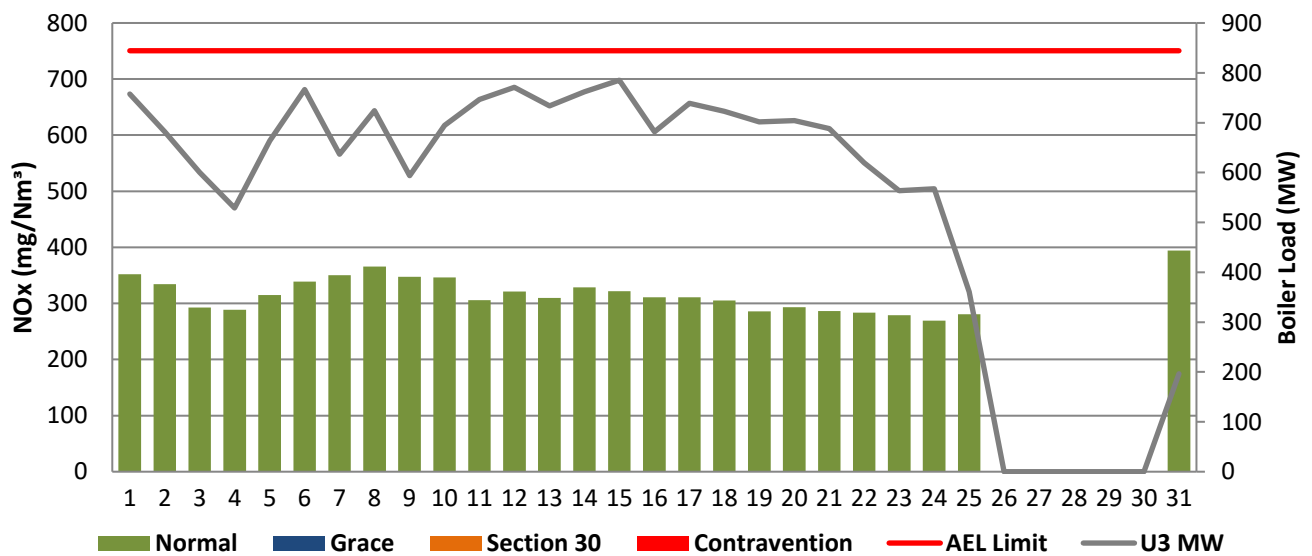
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Template Identifier	240-43921804	Rev	6
Document Identifier	240-88543153	Rev	2
Effective Date	January 2021		
Review Date	January 2024		

#### Figure 14: Medupi Unit 2 NOx Emissions - July 2020



#### Figure 15: Medupi Unit 3 NOx Emissions - July 2020



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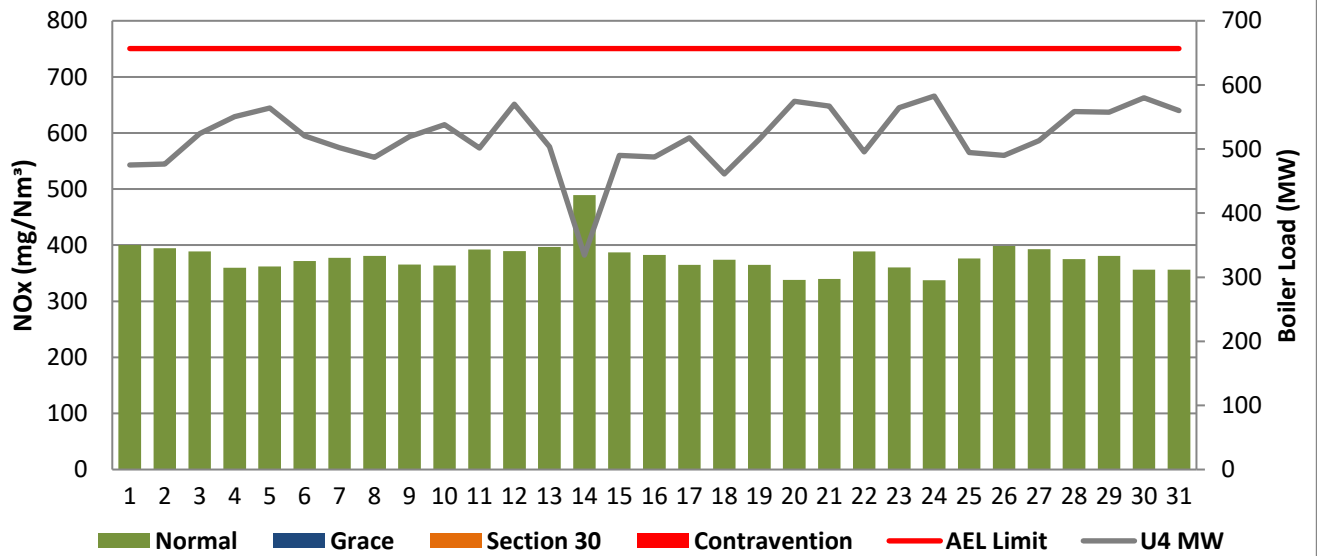
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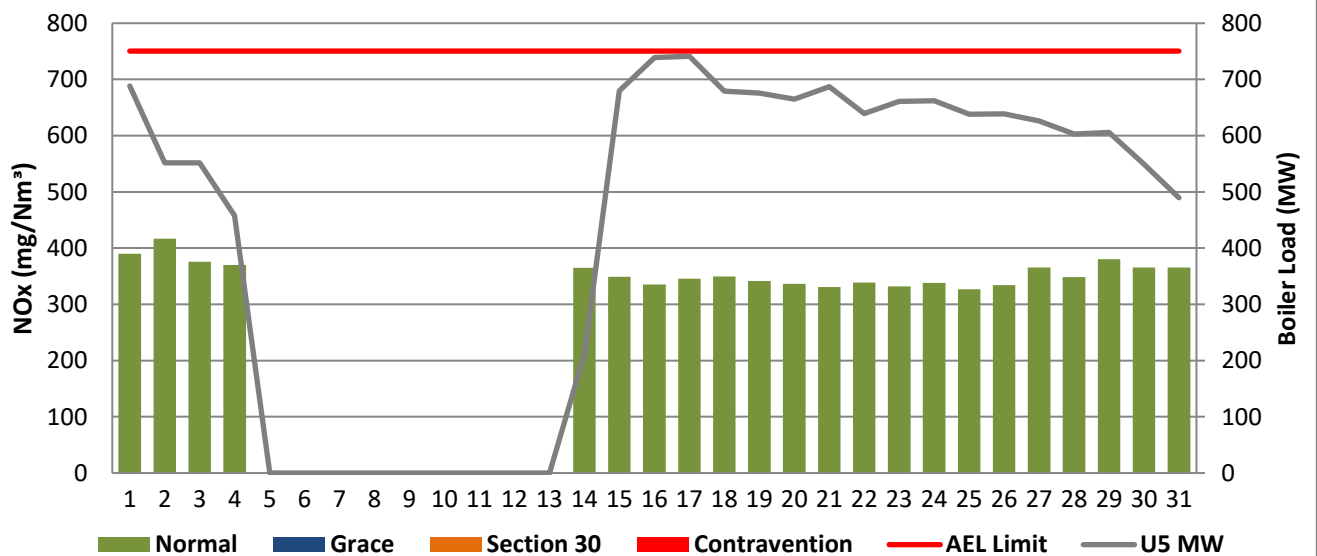
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Template Identifier	240-43921804	Rev	6
Document Identifier	240-88543153	Rev	2
Effective Date	January 2021		
Review Date	January 2024		

#### Figure 16: Medupi Unit 4 NOx Emissions - July 2020



#### Figure 17: Medupi Unit 5 NOx Emissions - July 2020



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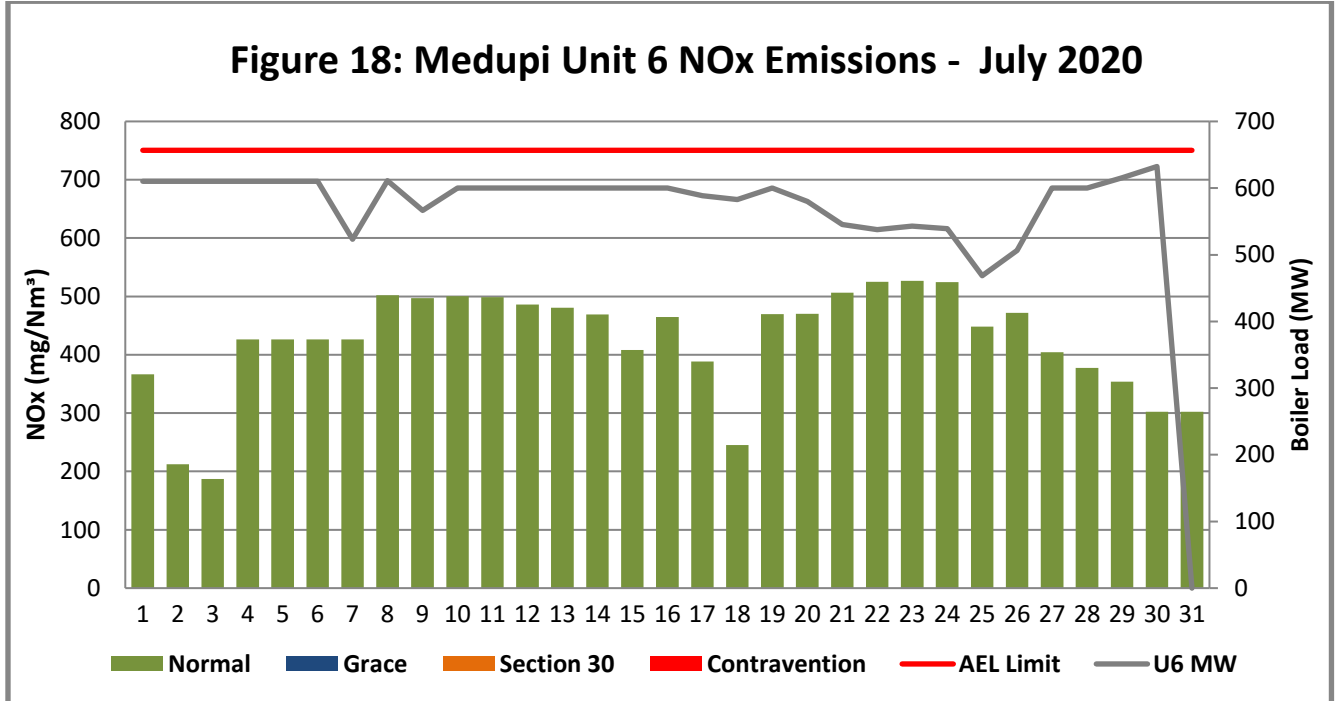
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**Medupi Power Station Monthly Emissions Report**

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



**Table 5: Monthly tonnages for the month of July 2020**

Associated Unit/Stack	PM	SO <sub>2</sub>	NO <sub>2</sub>	CO
Unit 1	0.0	0	0	0
Unit 2	33,8	6 113	982	30
Unit 3	28,5	4 382	461	105
Unit 4	72,1	4 401	654	71
Unit 5	52,4	4 903	500	64
Unit 6	60,3	3 497	637	16
<b>SUM</b>	<b>247,0</b>	<b>23 296</b>	<b>3 235</b>	<b>286</b>


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

All units were within the limit for gaseous emissions as prescribed by the Medupi AEL. There were PM exceedances recorded on unit 4 as depicted in the figures above. SO<sub>2</sub> emissions performance for unit 5 was exceeded the internal daily limit set by the station for internal monitoring on several days.

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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>January 2021</b>		
		<b>Review Date</b>	<b>January 2024</b>		

However, when averaged for 31 days of the month to measure against the AEL, emissions were found to be within the limit of 3500mg/Nm<sup>3</sup>

## 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 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 <sub>2</sub>	NO <sub>x</sub>	O <sub>2</sub>
Unit 2	100,0	100,0	100,0	100,0
Unit 3	100,0	99,8	99,8	99,2
Unit 4	100,0	99,0	98,9	98,8
Unit 5	99,9	98,5	98,5	97,1
Unit 6	100,0	67,5	76,1	85,8

## 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.

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		<b>Document Identifier</b>	<b>240-88543153</b>	<b>Rev</b>	<b>2</b>
		<b>Effective Date</b>	<b>January 2021</b>		
		<b>Review Date</b>	<b>January 2024</b>		

## 9. 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	January 2021		
		Review Date	January 2024		


Table 8: Total Volatile Organic Compound (TVOC) for July 2020

		
<b>CALCULATION OF EMISSIONS OF TOTAL VOLATILE COMPOUNDS FROM FUEL OIL STORAGE TANKS*</b>		
Date:	31 July 2020	
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	
<p align="center"><b>MONTHLY INPUT DATA FOR THE STATION</b></p> <p align="center">Please only insert relevant monthly data inputs into the <i>blue cells</i> below</p> <p align="center">Choose from a dropdown menu in the <i>green cells</i></p> <p align="center">The total VOC emissions for the month are in the <i>red cells</i></p> <p align="center">IMPORTANT: Do not change <i>any</i> other cells without consulting the AQ CoE</p>		
MONTH:	July	
<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:	1289	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	17.66	°C
Daily maximum ambient temperature	25.87	°C
Daily minimum ambient temperature	10.47	°C
Daily ambient temperature range	15.40	°C
Daily total insolation factor	3.47	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:	0.69	kg/month
Working losses:	0.04	kg/month
<b>TOTAL LOSSES (Total TVOC Emissions for the month):</b>	<b>0.73</b>	<b>kg/month</b>
<p><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></p>		

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		<b>Document Identifier</b>	<b>240-88543153</b>	<b>Rev</b>	<b>2</b>
		<b>Effective Date</b>	<b>January 2021</b>		
		<b>Review Date</b>	<b>January 2024</b>		

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

No awareness campaign.

## 11. Complaints Register


Table 9: Complaints for the month of July 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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		<b>Document Identifier</b>	<b>240-88543153</b>	<b>Rev</b>	<b>2</b>
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		<b>Review Date</b>	<b>January 2024</b>		

**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 Mkhathswa   
**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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		<b>Document Identifier</b>	<b>240-88543153</b>	<b>Rev</b>	<b>2</b>	
		<b>Effective Date</b>	<b>January 2021</b>			
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### APPENDIX 1: CEMS Calibration certificates



**Elemental Analytics**  
Analyse. Specify. Solve.

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---

## CALIBRATION CERTIFICATE

**CERTIFICATE NO:**  
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





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





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		<b>Document Identifier</b>	<b>240-88543153</b>	<b>Rev</b>	<b>2</b>	
		<b>Effective Date</b>	<b>January 2021</b>			
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## CALIBRATION CERTIFICATE

				<b>CERTIFICATE NO:</b>	
				<b>3642</b>	
<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>	15712		
<b>AUXILIARY EQUIPMENT:</b>	Unit 3				


CHAN	PRIOR	FINAL	TEST GAS	TEST GAS VALUE	GAS CERTIFICATE NUMBER	EXPIRY DATE	
CO	Zero	-2 ppm	0 ppm	Air	20.95 %	N/A	
	Span	839 ppm	835 ppm	CO	836.4 ppm	P20FO00332	2021-02-03
NO	Zero	-3 ppm	0 ppm	Air	20.95 %	N/A	
	Span	882 ppm	877 ppm	NO	876.7 ppm	P20FO00346	2021-01-21
SO2	Zero	0 ppm	0	Air	20.95 %	N/A	
	Span	2249 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	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





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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	Air	20.95 %	Air	N/A
	Span	833 ppm	835 ppm	CO	836.4 ppm	P20FO00332
NO	Zero	-2 ppm	Air	20.95 %	Air	N/A
	Span	878 ppm	877 ppm	NO	876.7 ppm	P20FO00346
SO2	Zero	-9 ppm	Air	20.95 %	Air	N/A
	Span	2257 ppm	2200 ppm	SO2	2200.0 ppm	P20FO00345
O2	Zero	0.12 %	N2	99.99 %	92520	2021-02-27
	Span	21.04 %	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





**Bieler + Lang**  
**SERVOMEX**  
A MEASURABLE ADVANTAGE

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<b>CERTIFICATE NO:</b>					
<b>3644</b>					
<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 %	Air	N/A
	Span	815 ppm	835 ppm	CO	836.4 ppm	P20FO00332	2021-02-03
NO	Zero	-18 ppm	0 ppm	Air	20.95 %	Air	N/A
	Span	857 ppm	877 ppm	NO	876.7 ppm	P20FO00346	2021-01-21
SO2	Zero	-34 ppm	0	Air	20.95 %	Air	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






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<b>CERTIFICATE NO:</b>					
<b>3645</b>					
<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	P20F000332	2021-02-03
NO	Zero	-15 ppm	0 ppm	Air	20.95 %	Air	N/A
	Span	868 ppm	877 ppm	NO	876.7 ppm	P20F000346	2021-01-21
SO2	Zero	-83 ppm	0	Air	20.95 %	Air	N/A
	Span	2389 ppm	2389 ppm	SO2	2200.0 ppm	P20F000345	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





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