	<b>Medupi Power Station Annual Emissions Report</b>	Template Identifier	240-43921804	Rev	6
		Document Identifier	240-88543153	Rev	1
		Effective Date	January 2018		
		Review Date	January 2021		

Phumudzo Thivhafuni

Date: 2018/04/30

Limpopo Dept. of Economic Development, Environment and Tourism

Enquiries:

Private Bag 9484  
POLOKWANE  
0700

Ref: 12/4/12L-W2/A3 – Mar 2018

Dear Phumudzo

**MEDUPI POWER STATION MONTHLY EMISSIONS REPORT FOR THE MONTH OF MARCH 2018**

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 4, 5 and 6 gaseous and particulate emissions performance against the AEL limit for the month of March 2018 only.

**1. Raw Materials and Products**


**Table 1: Quantity of raw materials and products used/produced for Unit 4, 5 and 6 in March 2018**

Raw Materials and Products used	Raw Material Type	Unit	Maximum Permitted Consumption/ Rate (Quantity)	Unit 4, 5 and 6 consumption March 2018
	Coal	Tons/month	1 875 000	568 346
	Fuel Oil	Tons/month	40 000	701.134
Production Rates	Product/ By-Product Name	Unit	Maximum Production Capacity Permitted (Quantity)	Unit 4, 5 and 6 Production Rate in Month of March 2018
	Energy	MW	4800	2128
	Ash Emitted	Tons/month	not specified	154.4

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

	Reportable hours of Operation			Fuel Consumption (tons)				Production rate (MW)		
	Unit 4	Unit 5	Unit 6	Oil			Coal	U4	U5	U6
				Aux Boiler	Unit 4, 5 & 6	Total	Unit 4, 5 & 6)			
01-Mar-18	24.0	24.0	24.0	0.00	7	7.00	21623	762	735	746
02-Mar-18	24.0	24.0	24.0	0.00	0	0.00	23528	770	743	693
03-Mar-18	24.0	24.0	24.0	0.00	16	16.00	24686	785	767	668
04-Mar-18	24.0	24.0	24.0	0.00	0	0.00	23829	758	785	634
05-Mar-18	24.0	24.0	24.0	0.00	0	0.00	23521	758	755	653
06-Mar-18	24.0	24.0	24.0	0.00	26	26.00	23524	743	760	650
07-Mar-18	24.0	24.0	24.0	0.00	0	0.00	23867	719	777	690
08-Mar-18	24.0	24.0	24.0	0.00	66	66.00	24825	766	772	722
09-Mar-18	24.0	13.0	24.0	1.02	3	4.02	20545	766	721	736
10-Mar-18	24.0	0.0	24.0	0.00	16	16.00	15268	769		657
11-Mar-18	24.0	0.0	24.0	0.00	0	0.00	15198	768		653
12-Mar-18	24.0	0.0	24.0	0.00	8	8.00	16247	749		734
13-Mar-18	24.0	0.0	24.0	9.58	2	11.58	15685	779		675
14-Mar-18	24.0	0.0	24.0	0.78	0	0.78	16240	772		719
15-Mar-18	24.0	0.0	24.0	2.16	1	3.16	15770	790		650
16-Mar-18	24.0	0.0	24.0	1.17	0	1.17	15616	759	312	625
17-Mar-18	24.0	5.3	24.0	0.00	137	137.00	21779	740	720	601
18-Mar-18	24.0	24.0	24.0	0.00	0	0.00	21351	733	730	601
19-Mar-18	24.0	24.0	24.0	7.41	0	7.41	21710	681	724	648
20-Mar-18	23.9	24.0	10.9	0.00	18	18.00	19165	748	762	654
21-Mar-18	0.0	24.0	0.0	0.00	48	48.00	14087	672	778	
22-Mar-18	19.3	24.0	0.0	0.00	27	27.00	15829	761	767	
23-Mar-18	24.0	24.0	0.0	0.00	0	0.00	14637	765	728	
24-Mar-18	24.0	24.0	0.0	0.00	11	11.00	14395	722	750	
25-Mar-18	24.0	24.0	0.0	0.00	10	10.00	13344	627	684	
26-Mar-18	24.0	24.0	0.0	0.00	183	183.00	18700	752	735	474
27-Mar-18	24.0	24.0	0.0	0.00	63	63.00	15265	770	775	
28-Mar-18	24.0	24.0	0.0	0.00	0	0.00	15437	754	783	
29-Mar-18	24.0	24.0	0.0	0.00	24	24.00	15416	738	768	
30-Mar-18	24.0	24.0	0.0	0.00	13	13.00	14220	667	708	
31-Mar-18	23.9	23.9	0.0	0.00	0	0.00	13039	611	611	

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## 2. Abatement Technology

Table 3: Abatement Equipment Control Technology utilisation for month of March 2018

Associated Unit/Stack	Technology Type	Actual Utilisation (%) for the month of March 2018
Unit 4,5 and 6	Low NO <sub>x</sub> Burners	100
	Pulse Jet Fabric Filter Plant	100

## 3. Energy Source Characteristics

Table 4: Energy Source Material Characteristics for the month of March 2018

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	1.4
Ash Content	35 - 39	33.78

Table 5: Energy Source Material Characteristics for the month of March 2018

Characteristic	Stipulated Range (%)	Monthly Average Content (%)
<b>Oil</b>		
Sulphur Content	0.5 - 3.5	2.1
Ash Content	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 daily emission limits are as follows:

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

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

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

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Table 6: Daily averages emissions for the month of March 2018

Days	PM (mg/Nm <sup>3</sup> )			SO <sub>2</sub> (mg/Nm <sup>3</sup> )			NO <sub>x</sub> (mg/Nm <sup>3</sup> )			CO (mg/Nm <sup>3</sup> )			Temp (°C)			Press (kPa)			Velocity (m/s)			O <sub>2</sub> (%)					
	Unit	4	5	6	4	5	6	4	5	6	4	5	6	4	5	6	4	5	6	4	5	6	4	5	6		
01-Mar-18	20.96	30.76	17.19	3523.8	3816.0	3550.5	602.8	375.0	379.7	6.8	7.5	2.0		137.0	137.0	84.7	89.4	89.4				26.4	38.5	6.5	5.9	5.7	
02-Mar-18	29.16	35.41	20.15	3470.3	3629.9	3378.0	678.7	397.6	402.5	9.5	7.5	2.7		138.5	138.5	87.1	89.4	89.4				26.2	38.0	6.7	6.1	5.9	
03-Mar-18	32.34	43.17	29.82	3165.6	3306.3	3077.8	676.0	426.5	431.3	8.0	7.5	1.6		139.7	139.7	87.7	89.4	89.4				27.6	40.9	6.8	6.5	6.3	
04-Mar-18	28.54	31.81	25.24	3217.1	3609.3	3359.8	620.5	407.9	413.1	9.0	7.5	1.4		139.5	139.5	87.1	89.3	89.3				27.4	40.5	6.7	6.0	5.8	
05-Mar-18	33.10	34.37	18.42	3029.8	3140.6	2926.2	608.1	408.6	413.3	8.3	7.5	5.8		139.3	139.3	89.5	89.4	89.4				27.2	40.2	6.9	6.4	6.2	
06-Mar-18	36.99	61.98	30.18	2954.7	3030.4	2823.7	578.4	398.5	402.8	6.6	6.1	9.5		142.6	142.6	89.6	89.5	89.5				27.9	41.7	6.8	6.6	6.4	
07-Mar-18	33.39	88.88	68.92	3005.6	3164.2	2945.7	610.9	361.8	365.7	9.0	10.5	21.5		146.6	146.6	89.5	89.4	89.4				28.9	43.6	7.5	6.7	6.5	
08-Mar-18	46.98	53.84	104.87	3137.5	3228.2	3008.2	666.1	371.0	375.4	7.7	6.3	8.7		147.1	147.1	89.3	89.1	89.1				29.2	44.3	6.9	6.7	6.7	
09-Mar-18	47.21	61.39	47.77	3100.9	3361.6	2916.3	631.7	411.7	458.7	6.3	5.6	8.4		145.1	136.9	89.2	89.1	89.2				28.4	35.9	6.8	6.3	6.6	
10-Mar-18	43.70		4.24	2756.9		2916.3	636.9		458.7	12.1	7.5	8.4			136.9	89.5		89.2					35.9	7.0		6.6	6.6
11-Mar-18	43.00		18.31	2929.9		2916.3	616.6		458.7	6.5	7.5	8.4			138.1	89.7		89.7					18.4	7.0		6.6	6.6
12-Mar-18	38.48		10.20	3008.4		2916.3	678.8		458.7	8.4	7.5	8.4			138.1	89.9		89.9					14.0	7.0		6.6	6.6
13-Mar-18	34.56		13.48	3050.8		2916.3	687.9		458.7	18.9	7.5	8.4			138.1	90.1		90.0					14.0	6.9		6.6	6.6
14-Mar-18	41.19		20.28	3178.0		2916.3	697.0		458.7	14.6	7.5	8.4			138.1	89.7		90.2					14.0	6.8		6.6	6.6
15-Mar-18	42.13		14.92	3186.7		2916.3	671.9		458.7	10.0	7.5	8.4			138.1	89.4		89.9					14.0	6.8		6.6	6.6
16-Mar-18	42.24		10.32	3039.1		2916.3	705.4		458.7	10.9	7.5	8.4				138.1	89.4	89.5	89.6				20.5	14.0	6.9	8.1	7.2
17-Mar-18	25.18	42.36	15.38	3090.0	3237.7	2132.8	661.2	353.9	406.1	9.0	6.7	14.9		132.1	128.0	89.8	89.7	89.5				25.2	16.8	7.1	6.3	7.2	
18-Mar-18	29.76	55.33	45.76	3076.8	3298.9	2985.1	629.8	342.5	386.5	12.5	7.0	3.4		131.0	132.1	89.6	89.6	89.7				25.2	35.9	6.8	6.1	6.1	
19-Mar-18	25.69	49.64	59.25	3083.4	3255.6	3072.9	651.0	405.1	346.6	12.1	7.6	2.0		133.3	131.0	89.5	89.5	89.6				25.4	36.0	7.5	6.3	5.9	
20-Mar-18	34.84	49.52	61.75	2945.6	3094.6	2977.9	625.5	467.0	365.0	10.0	7.5	0.8		138.9	129.7	89.5	89.4	89.6				26.4	35.6	7.2	6.3	6.2	
21-Mar-18		71.93			2927.4		478.5			7.7				140.3		89.5							26.9			6.1	
22-Mar-18	26.47	75.44		2789.7	3006.1		614.4			6.9	7.7			135.7		89.6	89.5					26.5			7.1	6.1	
23-Mar-18	20.35	58.36		3333.8	3549.1		611.4	411.7		11.0	7.8			129.8		89.4	89.4					25.2			6.9	6.2	
24-Mar-18	26.29	45.14		3092.5	3386.4		569.3	340.2		6.6	7.6			133.8		89.4	89.3					25.5			7.4	5.9	
25-Mar-18	17.47	37.85		3324.0	3504.7		571.7	357.1		8.6	7.7			130.0		89.5	89.5					24.6			8.0	6.4	
26-Mar-18	24.93	44.62		3361.2	3517.1		587.9	440.0		8.1	7.8			133.5		89.8	89.7					25.6			7.2	6.2	
27-Mar-18	23.14	55.54		3168.0	3446.6		660.5	447.8		6.3	7.7			133.8		90.0	89.9					26.2			7.1	6.0	
28-Mar-18	11.70	48.11		3364.9	3588.1		677.8	453.2		10.8	8.7			135.6		89.9	89.8					26.4			7.3	6.1	
29-Mar-18	35.89	55.90		3117.6	3301.8		753.1	463.2		6.8	7.6			136.0		89.7	89.6					26.1			7.1	6.1	
30-Mar-18	34.43	43.44		3270.1	3575.2		724.3	447.0		8.6	7.7			134.0		89.7	89.6					25.2			7.5	6.4	
31-Mar-18	25.95	36.08		3329.2	3703.1		704.8	449.5		8.9	8.0			131.3		89.7	89.7					23.8			7.6	7.0	

Note: Unit 4 temperature and velocity meters are faulty. A notification has been loaded for the maintenance team to fix the instrument. There is no reportable data on areas shaded black. The days wherein EL1 was declared is highlighted in green

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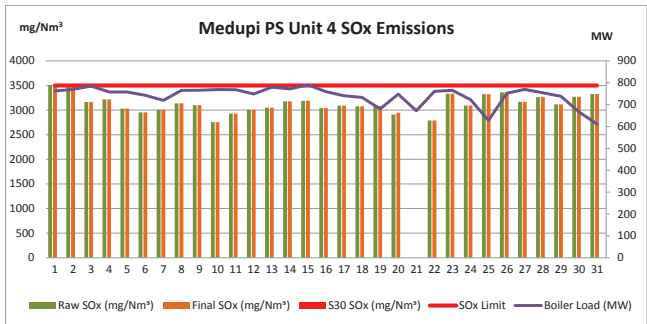
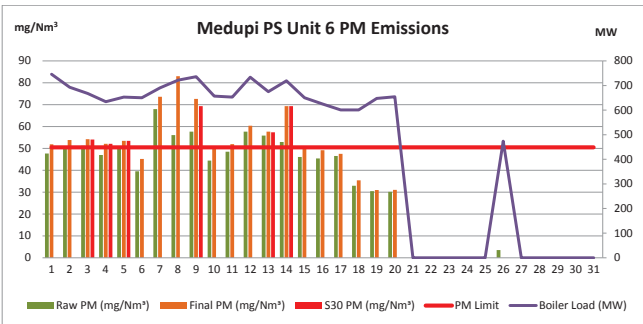
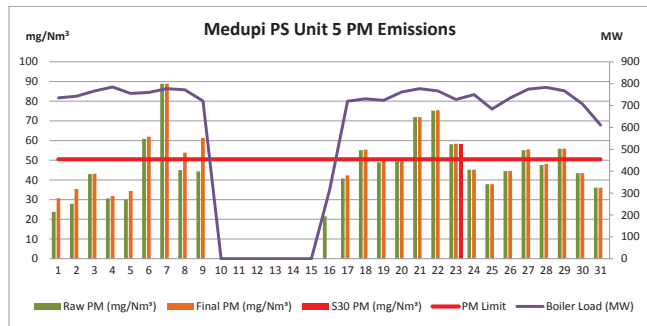
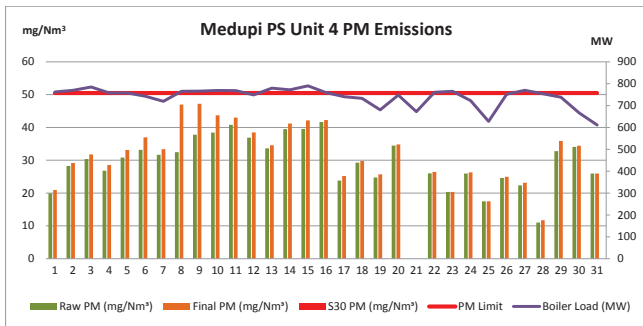
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Figure 1: Daily average emissions for the March 2018



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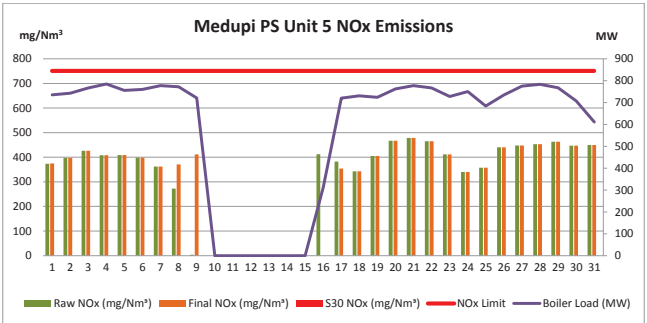
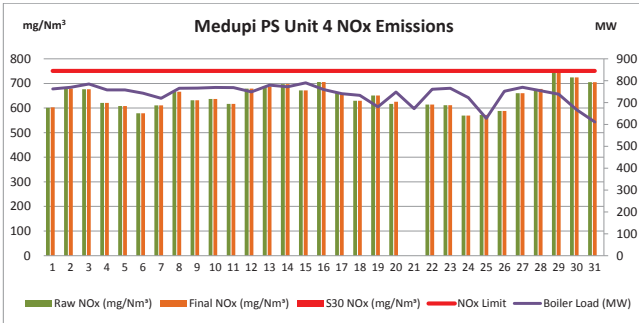
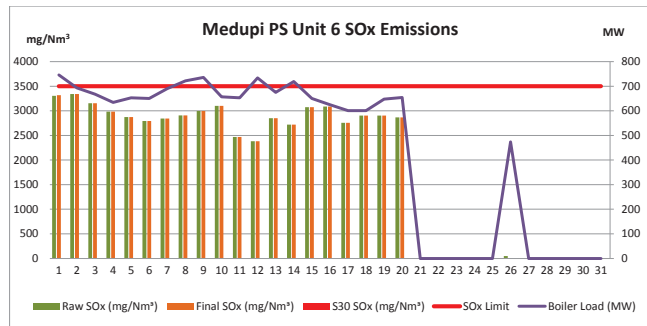
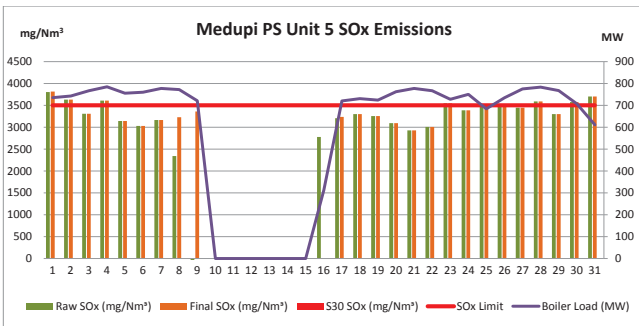
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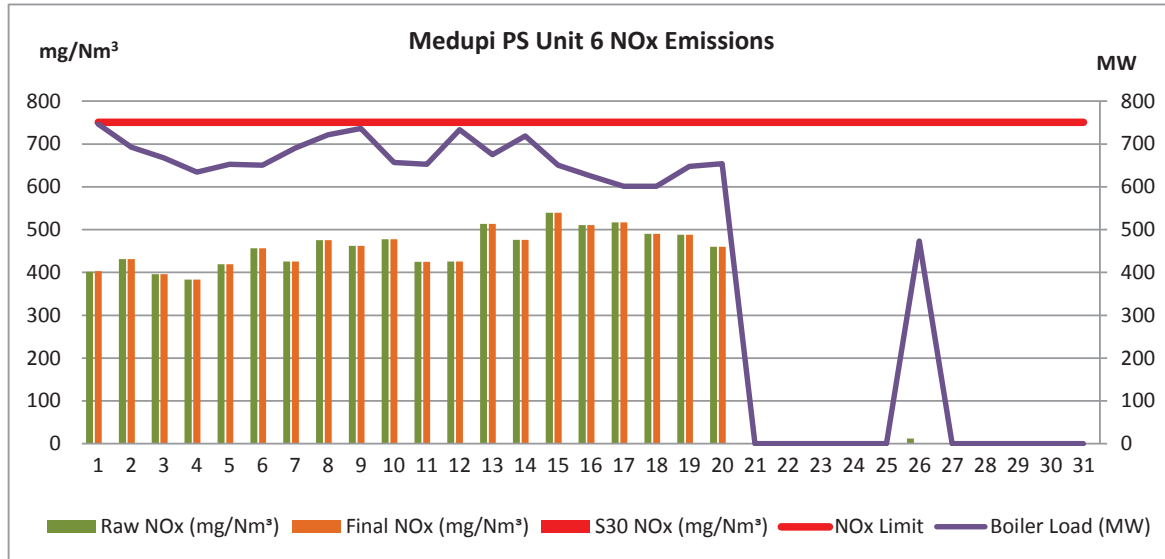
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**Table 7: Monthly tonnages for the month of March 2018**

Unit	PM (tons)	SO <sub>2</sub> (tons)	NO <sub>2</sub> (tons)	CO (tons)	CO <sub>2</sub> (tons)
1					
2					
3					
4	0.0	11 285	2 329	34	
5	91.7	6 071	748	12	
6	108.6	5 777	906	17	
<b>SUM</b>	<b>155.2</b>	<b>12 243</b>	<b>1 545</b>	<b>25</b>	

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Note: Unit 4 tonnages are not calculated due to unavailability of flow and temperature meter

## 5. Shutdown/start-up information

**Table 8: Days operating under normal operation, days in grace period and section 30 days respectively**

Unit	Operating Days (DD:HH:MM)			
	Normal operation	In grace period	Under S 30	Unit off load
1	00:00:00	00:00:00	00:00:00	31:00:00
2	00:00:00	00:00:00	00:00:00	31:00:00
3	00:00:00	00:00:00	00:00:00	31:00:00
4	30:19:05	00:00:00	00:00:00	00:04:55
5	19:18:15	04:00:00	00:00:00	07:05:45
6	14:07:00	06:00:00	00:00:00	10:17:00

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


- Unit 4 was available more than 30 days in this reporting period and was off load for a period less than 5 hours, the unit operated well within the limit in terms of Particulates, however there was a single incident reported for SO<sub>2</sub> and NO<sub>x</sub> emissions. On 20 March Unit 4 tripped due to HP heater level BFP Trip.
- Unit 5 was on Outage for Boiler Tube Leak Repair for 7 days during the reporting period, there were four (4) days wherein the unit was operating in grace. Although load reduction and bag replacements were initiated, Unit5 exceeded the average daily emission for particulates on 10 occasions; there were 8 emissions incidents for SO<sub>x</sub> during the reporting period.
- Unit 6 was off for more than 10 days for Unit off load for GAH leak repairs, the unit operated for two days in grace. There were 4 particulates and 1 SO<sub>x</sub> incident for the reporting period.

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## 7. Light up information

Table 9: PM Start-up information for the month of March

Event No.	Event 1	
Unit 5	Unit 5	
Fires in	01:20 PM	2018/03/16
Synchronisation with Grid	06:35 PM	2018/03/16
Emissions below limit from Sync (Date and Time)	12:00 AM	2018/03/19
Fires in to synchronization	00:05:15	Hrs (dd:hh:mm)
Synchronization to < limit (Duration	00:11:00	Hrs (dd:hh:mm)

Table 10: Emission Average from Fires-in to Synchronisation

Emission Average from Fires-in to Synchronisation (Date and Time)							
Unit	Fires-In		Synchronisation		PM	SO <sub>2</sub>	NO <sub>x</sub>
4	2018/03/21	01:00 AM	2018/03/21	04:40 AM	0	0	0
5	2018/03/16	01:20 PM	2018/03/16	06:35 PM	2.2	1264.4	248.1


Table 11: Point Source emissions released during Shut-down

Emission Average Breaker Open (BO) to Draft Group Shut Down (SD) (Date & Time)							
Unit	Breaker Open		DG SD		PM	SO <sub>2</sub>	NO <sub>x</sub>
4	2018/03/20	11:55 PM	2018/03/20	11:55 PM	14.9	1669.9	371.7
5	2018/03/09	01:00 PM	2018/03/10	07:25 AM	0.8	0	5.6

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## 8. Continuous Emission Monitoring Systems (CEMS)

Unit 4, 5 and 6 Continuous Emission Monitoring Systems were in operation at all times when the unit was on load. CEMS CO<sub>2</sub> monitor verification test not yet conducted, the Licencing Authority will be notified prior to conducting the test. The Department will be notified of the exact date for the test.

**Table 12: Periods during which CEMS was inoperative**

Date	Time	Duration	Nature of Repair/Adjustment
N/A	N/A	N/A	N/A

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

See attached Appendix A

## 10. Continuous Emission Monitoring Systems (CEMS)


**Table 13: CEMS Monitor Reliability**

Variable	Unit 4	Unit 5	Unit 6
Dust	100.0	100.0	100.0
SO <sub>2</sub>	100.0	94.8	100.0
NO <sub>x</sub>	99.9	94.6	100.0
CO	100	100	100.0
O <sub>2</sub>	99.9	94.4	100.0
Temperature	100.0	100.0	100.0
Pressure	0.0	100.0	100.0
Velocity	0.0	100.0	100.0
CO <sub>2</sub>	0.0	0.0	0.0

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## 11. Ambient Air Quality Monitoring Report

The Ambient Air Quality Monitoring and Dust fall-out report for the month of March 2018 will be emailed to the Licensing authority as an attachment to this report. See Appendix 2 for executive summary.


## 12. 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 detected on the exterior walls of the fuel oil tanks. See attached appendix 3

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<b>CALCULATION OF EMISSIONS OF TOTAL VOLATILE COMPOUNDS FROM FUEL OIL STORAGE TANKS*</b>		
Date:	31 March 2018	
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:	2160.343	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>0.74 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>		

**Table 14: Total Volatile Organic Compound (TVOC) for March 2018**

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### 13. Air quality improvements Initiatives and Public education and awareness campaigns

There were no activities planned for the month of March 2018. Medupi Power Station is currently in talks with Matimba Power Station and Exxaro Grootgeluk mine to hold a joint awareness campaign within Lephalale.

### 14. Complaints Register


Table 15: Complaints for the month of March 2018

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:

Senior Environmental Advisor

Reviewed by:

Boiler System Engineer

Supported by:

Environmental Manager

Supported by:

Boiler Engineering Manager

Supported by:

Engineering Group Manager (Acting)

I Rudi van der Wal declares that the information provided in this report is accurate and correct.


Yours sincerely

GENERAL MANAGER: MEDUPI POWER STATION

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## APPENDIX 1

CEMS Calibration certificates

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## Annexure 2


Ambient Air Quality Monitoring report

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### Appendix 3

Visual inspection of the exterior walls of the fuel oil tank bund wall

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