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Date: 11 August 2023

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## MAJUBA POWER STATION'S MONTHLY EMISSIONS REPORT FOR THE MONTH OF JULY 2023

This serves as the monthly report required in terms of Majuba Power Station's Atmospheric Emission License (MPS/0014/2019/F03) under section 7 routine reporting and record keeping. The emissions are for the month of July 2023. Verified emissions of particulates are included. SO<sub>2</sub> and NO<sub>x</sub> (as NO<sub>2</sub>) emissions are included for all units. Greenhouse gasses are excluded as per the agreement reached between Eskom and the Department of Environmental, Forestry and Fisheries in the first quarter of 2017/18 financial year's MINTEC and MINMEC management meeting.

### Raw Materials and Products

**Table 1. Quantity of Raw Materials and Products used/produced for the month of July 2023**

Raw Materials and Products used	Raw Material Type	Unit	Maximum Permitted Consumption/ Rate (Quantity)	Consumption/ Rate in Month of July 2023
	Coal	Tons/month	1 800 000	950 439.0
	Fuel Oil	Tons/month	6 000	14 565.5
Production Rates	Product/ By-Product Name	Unit	Maximum Production Rate Permitted (Quantity)	Production Rate in Month of July 2023
	Energy	*GWh	*3 058	1 668.31
	Ash	Tons/month	Not stated in the license	282 565.5

\*Majuba AEL stipulates a maximum production capacity of 4110 MW. This equates to a production rate of 3058 GWh per month when converted, as indicated above. This is to align to the monthly production rates reported.

### Abatement Technology

**Table 2. Abatement Equipment Control Technology for the month of July 2023**

Associated Unit	Technology Type	Actual Utilisation (%) for the month of July 2023	*Minimum Control Efficiency (%)
Unit 1	Fabric Filter Plant	100	99.94
Unit 2	Fabric Filter Plant	100	99.92
Unit 3	Fabric Filter Plant	100	99.84
Unit 4	Fabric Filter Plant	100	99.97
Unit 5	Fabric Filter Plant	100	99.84
Unit 6	Fabric Filter Plant	100	99.87

Generation Division (Operating Unit Coal 2)  
 Majuba Power Station  
 Between Amersfoort and Volksrust  
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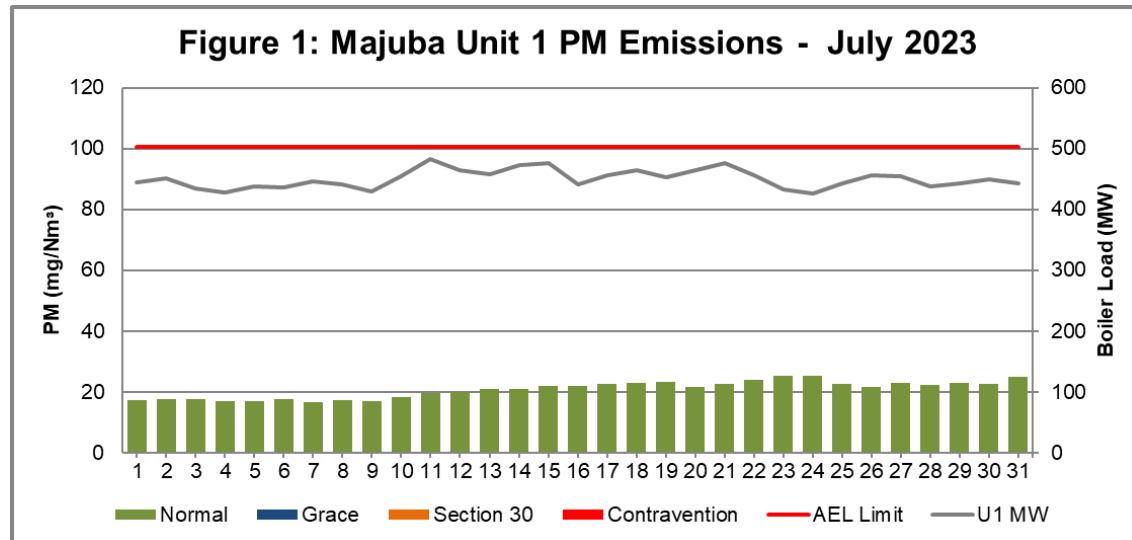
\*Calculated from the assumption of 90% fly ash to 10% bottom ash and percentage ash as measured in coal.

### Energy Source Characteristics

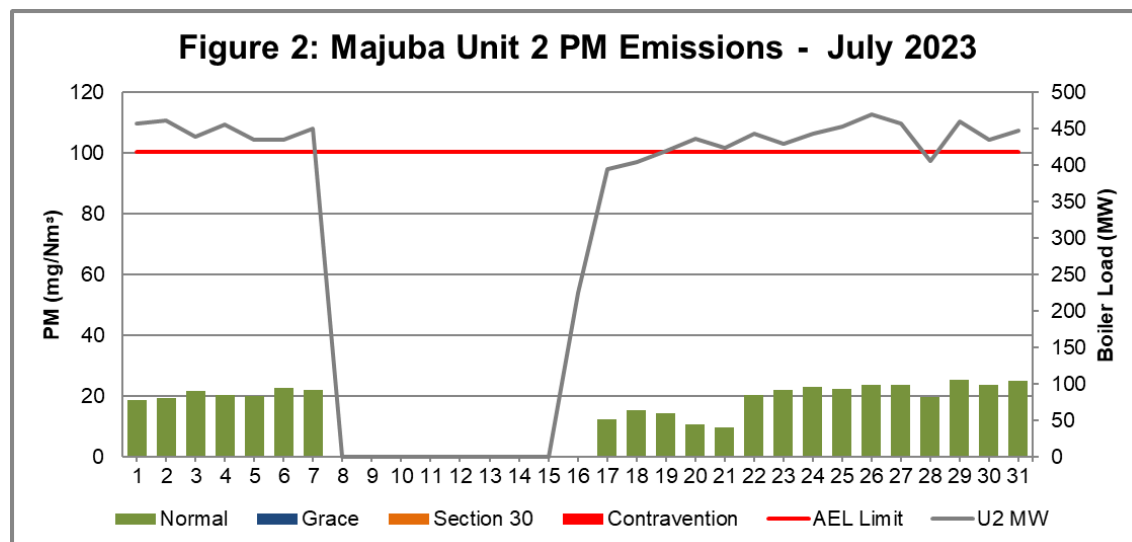
**Table 3. Energy Source Material Characteristics for the month of July 2023**

Characteristic	Stipulated Limit (Unit)	Monthly Average Content
Sulphur Content	0.94%	0.76
Ash Content	30%	29.73

### Emissions Reporting



**Figure 1. Particulate Matter emissions (daily averages) for the month of July 2023 against emission limit for Unit 1.**



**Figure 2. Particulate Matter emissions (daily averages) for the month of July 2023 against emission limit for Unit 2.**

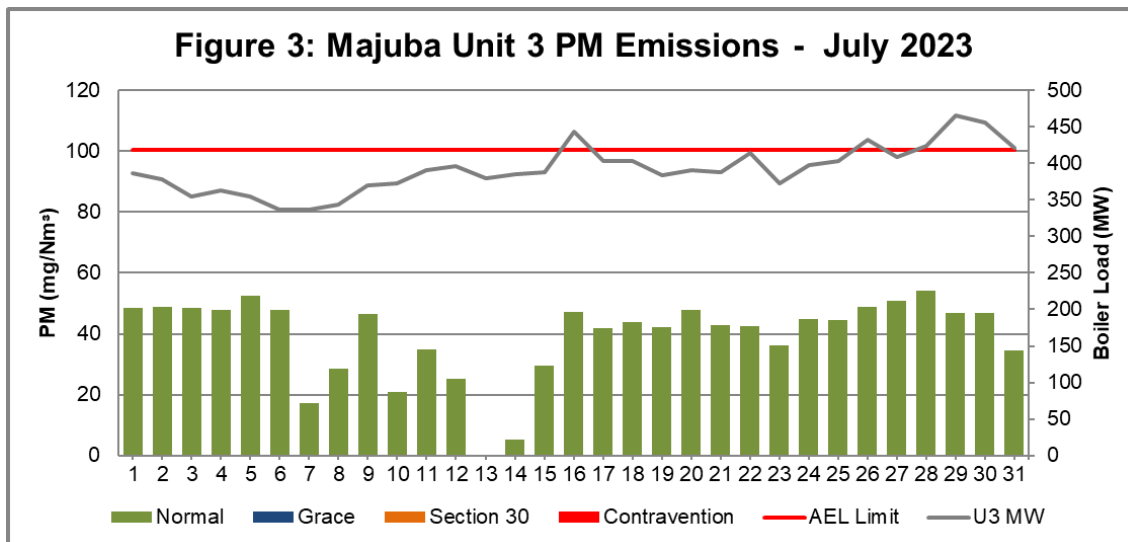


Figure 3. Particulate Matter emissions (daily averages) for the month of July 2023 against emission limit for Unit 3.

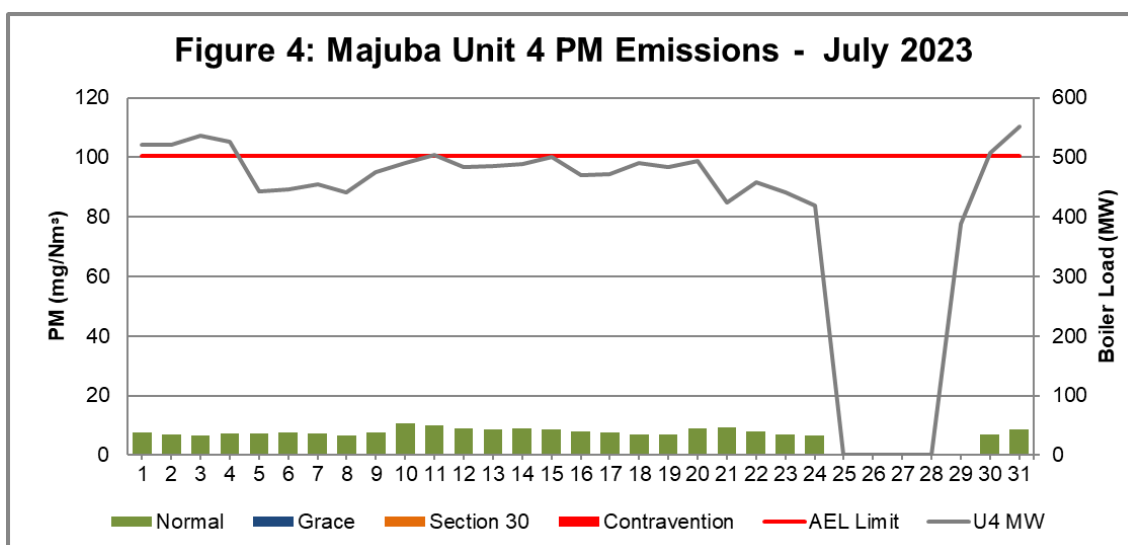


Figure 4. Particulate Matter emissions (daily averages) for the month of July 2023 against emission limit for Unit 4.

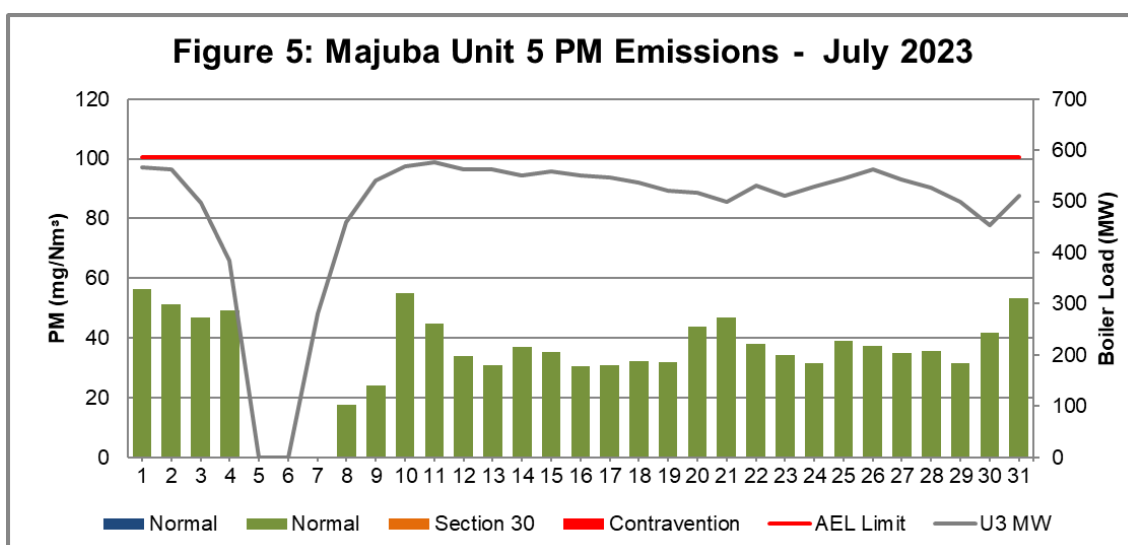


Figure 5. Particulate Matter emissions (daily averages) for the month of July 2023 against emission limit for Unit 5.

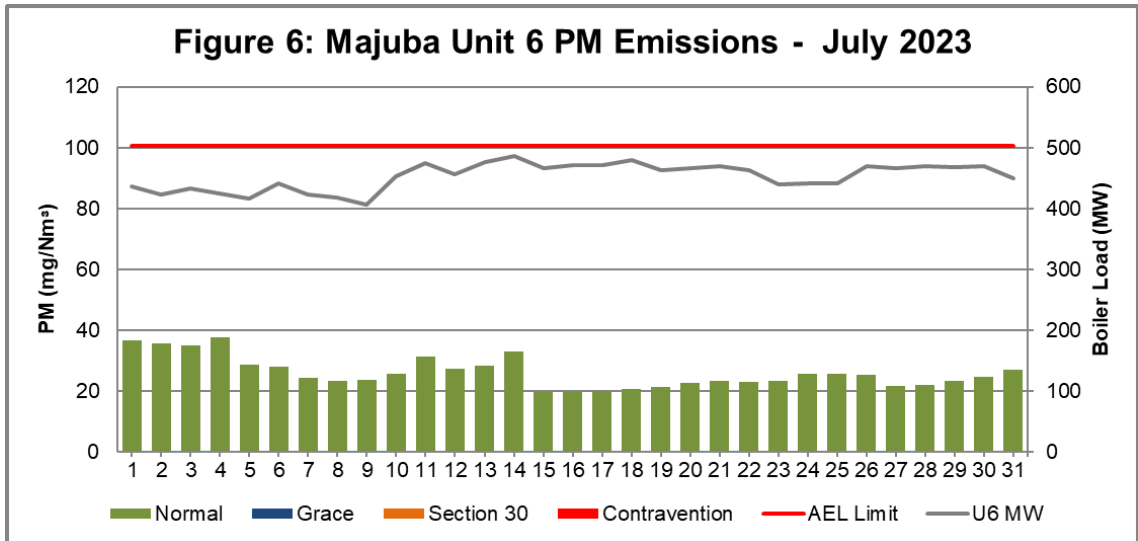


Figure 6. Particulate Matter emissions (daily averages) for the month of July 2023 against emission limit for Unit 6.

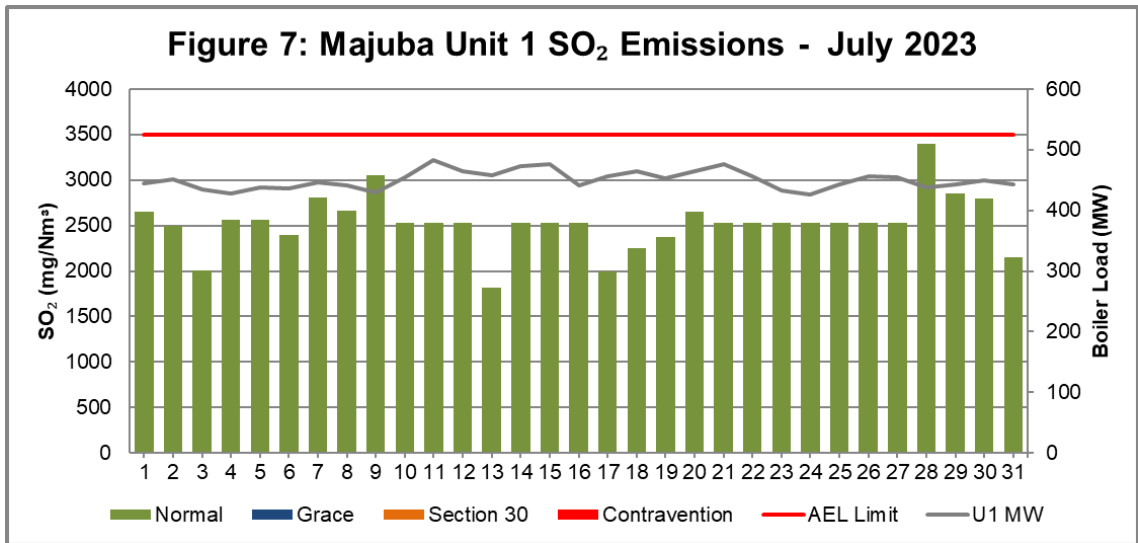


Figure 7. SO<sub>2</sub> emissions (daily averages) for the month of July 2023 against emission limit for Unit 1.

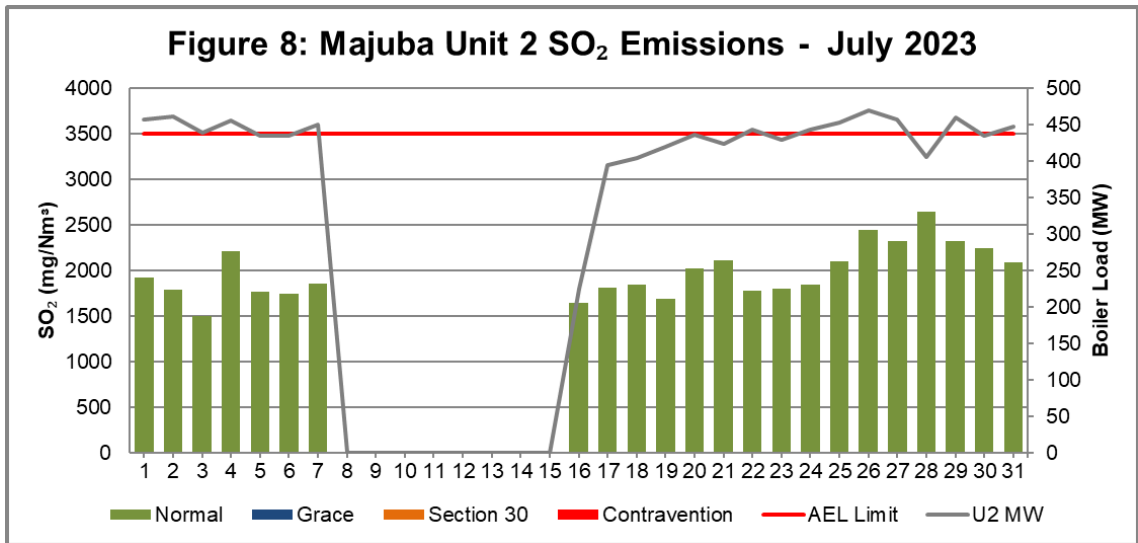
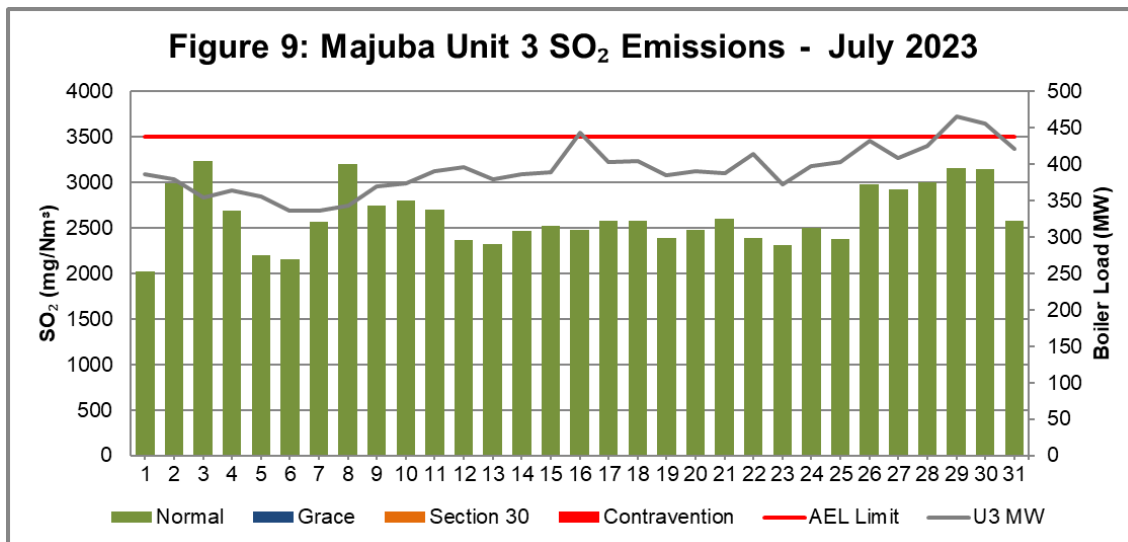
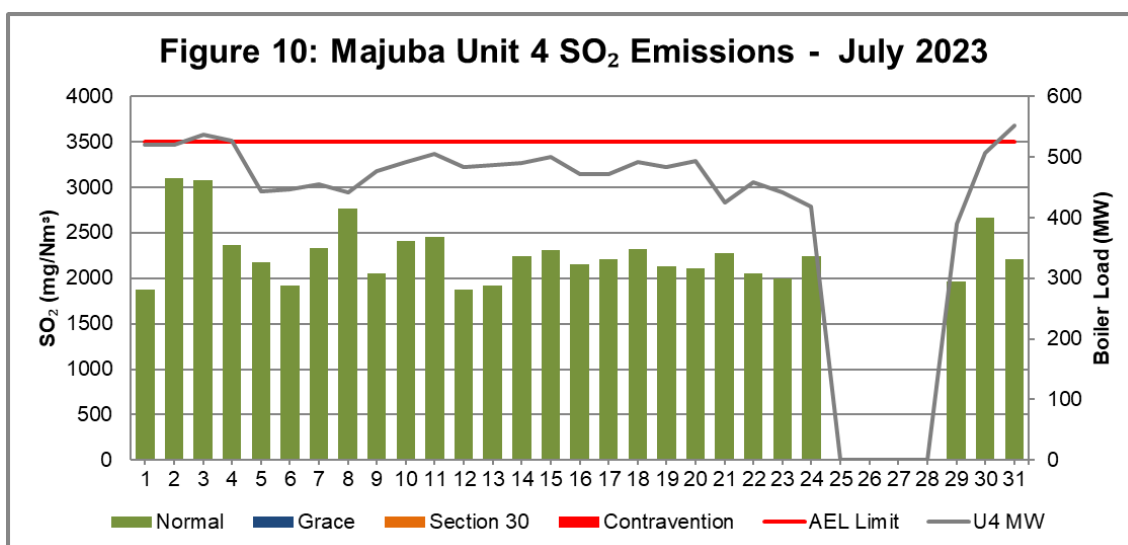


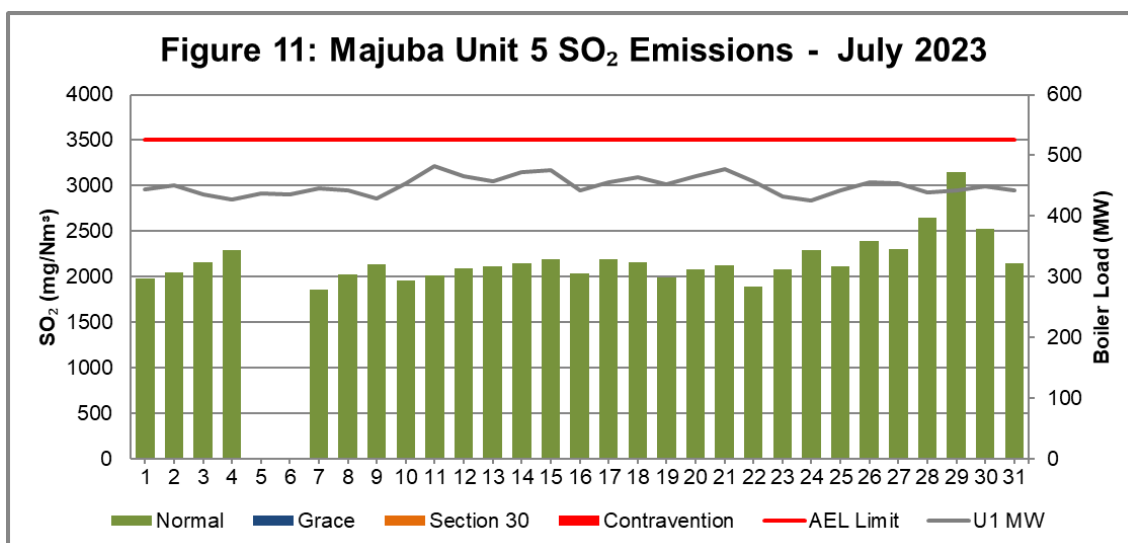
Figure 8. SO<sub>2</sub> emissions (daily averages) for the month of July 2023 against emission limit for Unit 2.



**Figure 9. SO<sub>2</sub> emissions (daily averages) for the month of July 2023 against emission limit for Unit 3.**



**Figure 10. SO<sub>2</sub> emissions (daily averages) for the month of July 2023 against emission limit for Unit 4.**



**Figure 11. SO<sub>2</sub> emissions (daily averages) for the month of July 2023 against emission limit for Unit 5**

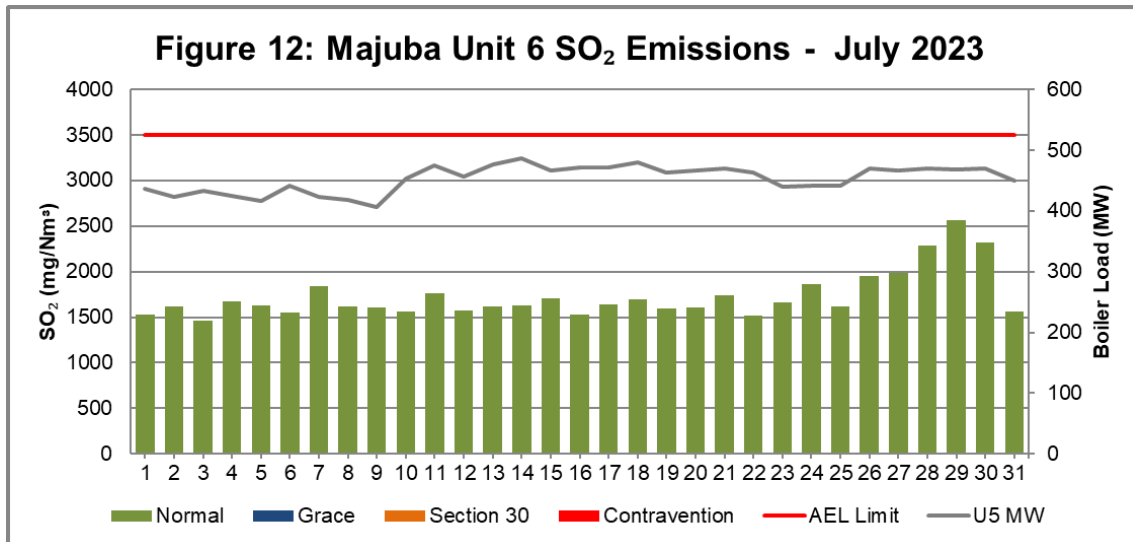


Figure 12. SO<sub>2</sub> emissions (daily averages) for the month of July 2023 against emission limit for Unit 6.

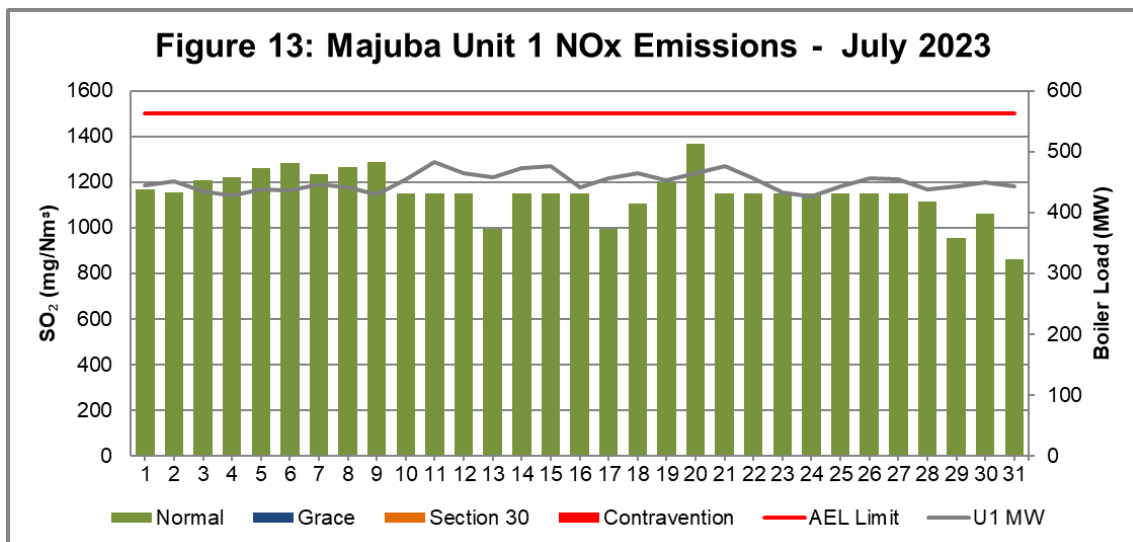


Figure 13. NO<sub>x</sub> emissions (daily averages) for the month of July 2023 against emission limit for Unit 1.

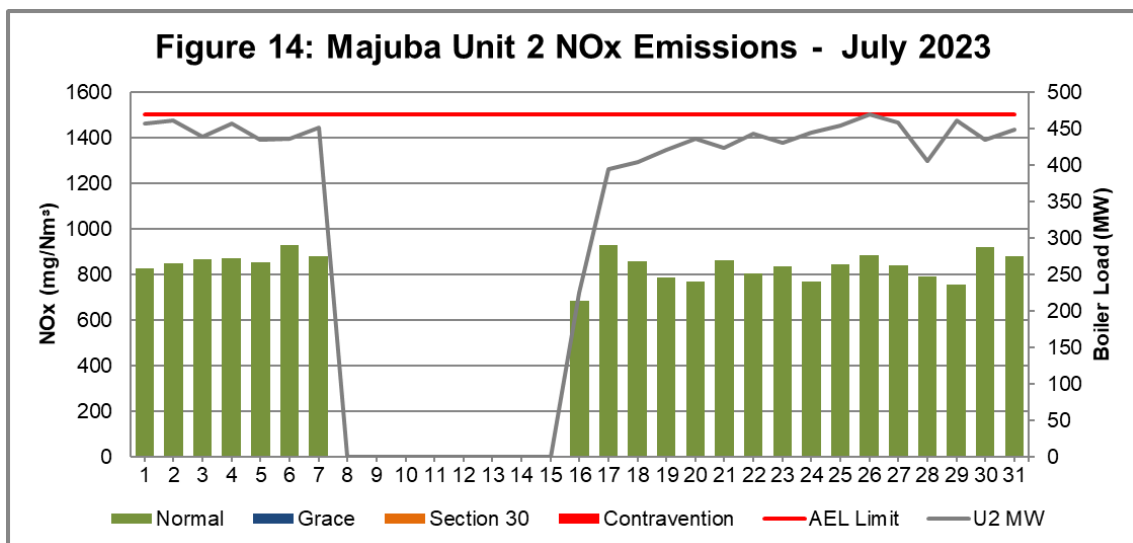


Figure 14. NO<sub>x</sub> emissions (daily averages) for the month of July 2023 against emission limit for Unit 2.

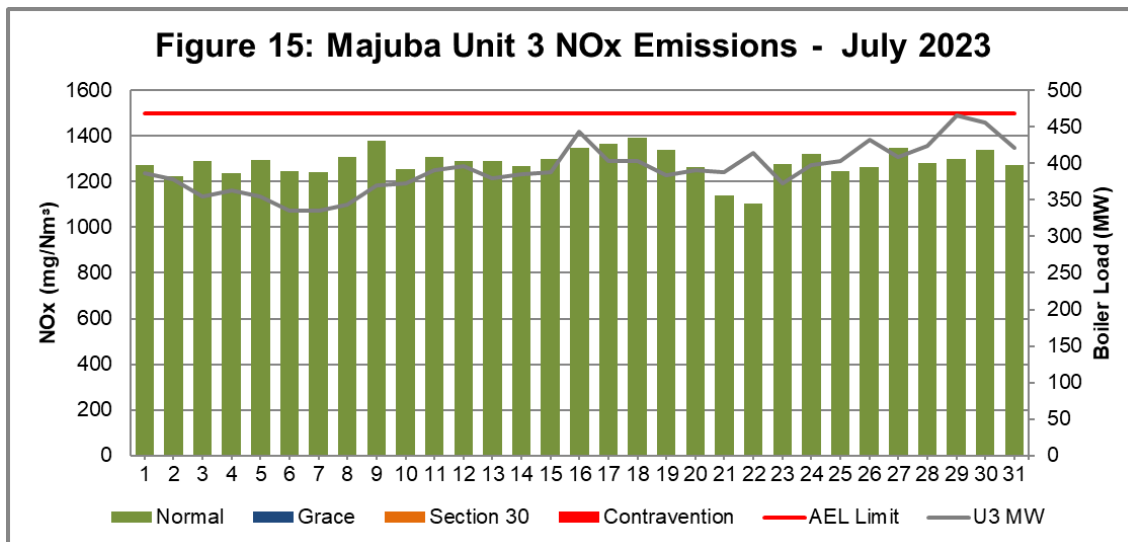


Figure 15. NOx emissions (daily averages) for the month of July 2023 against emission limit for Unit 3.

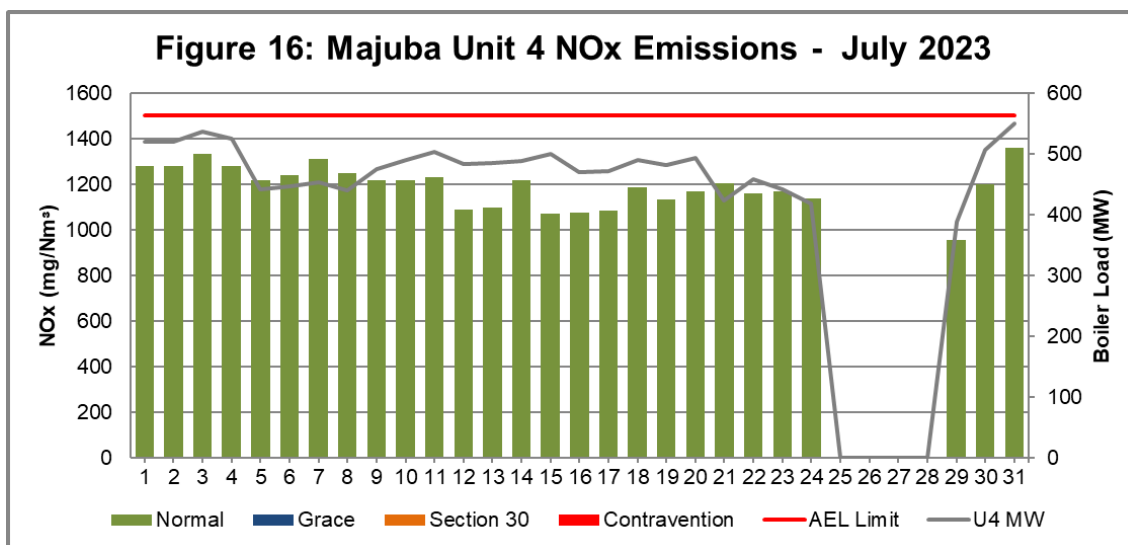


Figure 16. NOx emissions (daily averages) for the month of July 2023 against emission limit for Unit 4

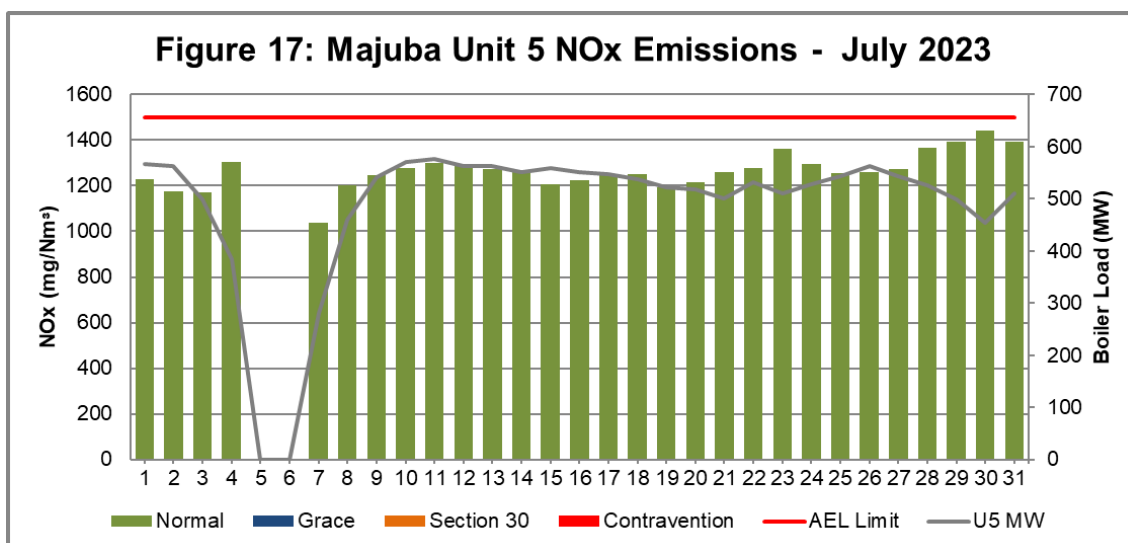


Figure 17. NOx emissions (daily averages) for the month of July 2023 against emission limit for Unit 5

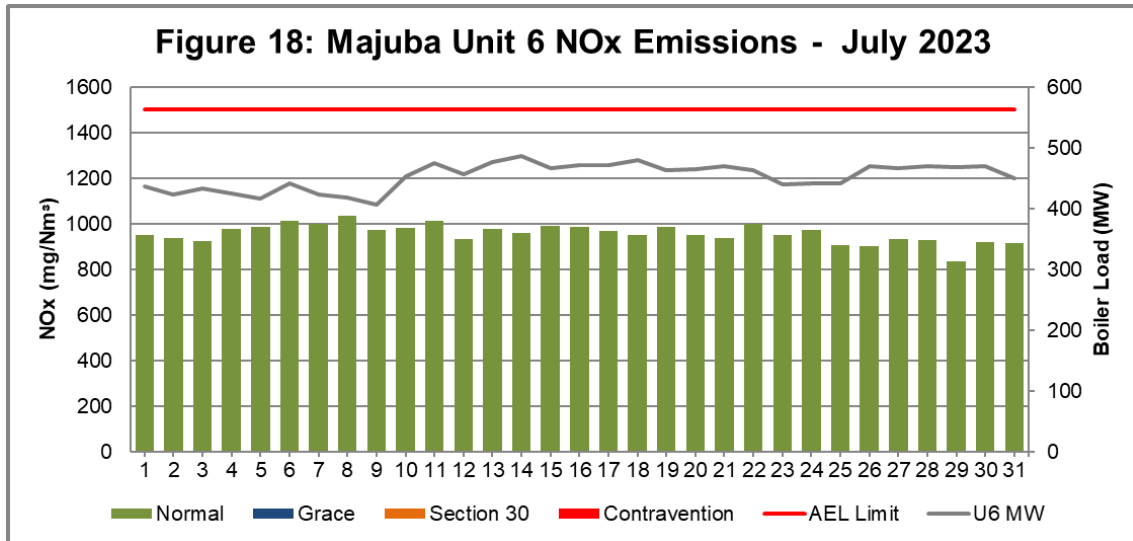


Figure 18. NOx emissions (daily averages) for the month July 2023 against emission limit for Unit 6

Table 4: Monthly tonnages for the month of July 2023

Unit	PM (tons)	SO <sub>2</sub> (tons)	NOx (tons)
Unit 1	28.9	3 488	1 587
Unit 2	27.2	2 863	1 212
Unit 3	68.6	4 562	2 226
Unit 4	13.8	4 207	2 221
Unit 5	73.0	4 458	2 596
Unit 6	58.0	3 859	2 138

Table 5: Average monthly concentrations (mg/Nm<sup>3</sup>) for the month of July 2023

Unit	PM (Mg/Nm <sup>3</sup> )	SO <sub>2</sub> (Mg/Nm <sup>3</sup> )	NOx (Mg/Nm <sup>3</sup> )
1	20.8	2 525.7	1 151.8
2	20.2	1 979.8	838.6
3	39.3	2 626.6	1 284.2
4	8.0	2 264.8	1 192.0
5	38.7	2 178.4	1 265.2
6	26.0	1 726.0	957.6

Table 6: Each unit and respective days operating in compliance to the AEL Emission Limits (SO<sub>2</sub>, NOx, and PM)

Associated Unit/Stack	Normal	Grace	Section 30	Contravention	Total Exceedance
Unit 1	31	0	0	0	0
Unit 2	23	0	0	0	0
Unit 3	31	0	0	0	0
Unit 4	26	0	0	0	0
Unit 5	28	0	0	0	0
Unit 6	31	0	0	0	0



**Table 7: MONITOR RELIABILITY (%)**

Associated Unit/Stack	PM	SO <sub>2</sub>	NO	O <sub>2</sub>
Unit 1	100.0	94.5	100.0	38.7
Unit 2	99.9	100.0	100.0	98.8
Unit 3	95.8	100.0	100.0	99.3
Unit 4	100.0	100.0	99.6	88.4
Unit 5	99.9	99.9	99.9	99.9
Unit 6	100.0	100.0	100.0	100.0

**Table 8: CO<sub>2</sub> and O<sub>2</sub> deviations of the Month of July 2023**

\*Blank spaces indicate that the unit was offline during that period

**CO<sub>2</sub> and O<sub>2</sub> Relationship**

Date	CO <sub>2</sub> (Actual Dry %)						Final O <sub>2</sub> CEMS Data (%)						SUM CO <sub>2</sub> + O <sub>2</sub> CEMS Data (%)					
	U1	U2	U3	U4	U5	U6	U1	U2	U3	U4	U5	U6	U1	U2	U3	U4	U5	U6
2023/06/29	8.6	9.4	8.2	9.6	11.6	8.5	12.9	10.4	12.2	11.1	8.6	10.0	21.5	19.8	20.4	20.7	20.2	18.5
2023/06/30	8.6	9.3	8.5	9.5	11.6	8.5	12.7	10.6	11.9	11.4	8.5	10.7	21.3	19.9	20.4	20.9	20.1	19.2
2023/07/01	8.5	9.2	8.3	9.4	11.0	8.5	13.1	10.8	12.3	11.6	9.2	10.5	21.6	20.0	20.6	21.0	20.3	19.1
2023/07/02	8.5	9.1	8.5	9.7	9.5	8.5	13.3	10.7	12.0	11.2	10.8	10.5	21.8	19.8	20.5	20.9	20.3	19.1
2023/07/03	8.6	9.0	8.6	8.5		8.5	13.6	10.6	11.8	12.5		10.8	22.1	19.6	20.4	21.0		19.3
2023/07/04	8.6	8.6	8.0	8.5		8.4	13.8	11.3	12.5	12.2		10.6	22.4	19.9	20.5	20.8		19.0
2023/07/05	8.7	8.7	8.1	8.8	8.2	8.5	13.6	10.9	12.4	12.2	10.9	10.9	22.3	19.6	20.5	21.0	19.1	19.3
2023/07/06	8.7		8.0	8.8	9.9	8.5	13.7		12.6	12.1	9.7	10.9	22.4		20.6	20.9	19.6	19.4
2023/07/07	8.6		8.5	9.2	11.3	8.5	14.1		12.0	11.5	8.8	10.9	22.7		20.5	20.7	20.1	19.4
2023/07/08	8.7		8.0	9.4	11.5	8.4	12.8		12.4	11.4	8.9	10.1	21.5		20.4	20.8	20.4	18.5
2023/07/09	8.7		8.5	9.4	11.4	8.3	12.8		11.8	11.3	8.9	9.6	21.5		20.4	20.8	20.4	18.0
2023/07/10	8.7		8.7	9.3	11.4	8.3	12.8		11.7	10.2	9.0	10.2	21.5		20.3	19.5	20.4	18.5
2023/07/11	8.5		8.7	9.4	11.5	8.4	11.3		11.9	10.3	8.8	10.0	19.9		20.6	19.7	20.4	18.5
2023/07/12	8.7		8.7	9.4	11.4	8.4	12.8		11.7	11.5	9.0	9.8	21.5		20.4	20.9	20.4	18.2
2023/07/13	8.7		8.7	9.5	11.7	8.4	12.8		11.7	11.2	8.6	9.9	21.5		20.4	20.7	20.2	18.3
2023/07/14	8.7	6.9	9.1	9.6	11.6	8.4	12.8	13.0	11.3	11.1	8.7	9.9	21.5	19.9	20.4	20.7	20.2	18.4
2023/07/15	8.6	7.5	8.7	9.6	11.4	8.5	11.2	11.5	11.9	11.2	8.8	9.7	19.8	19.0	20.5	20.8	20.2	18.2
2023/07/16	8.6	8.3	8.6	9.3	11.2	8.5	12.1	11.1	11.9	11.5	9.0	9.8	20.7	19.4	20.5	20.9	20.2	18.3
2023/07/17	8.6	8.3	8.4	9.4	11.2	8.6	13.1	11.1	12.1	11.4	8.9	10.1	21.7	19.4	20.5	20.8	20.1	18.6
2023/07/18	8.4	8.5	8.8	9.5	11.0	8.4	14.2	11.0	11.6	11.3	9.3	9.8	22.6	19.5	20.4	20.8	20.3	18.2
2023/07/19	8.7	8.3	8.4	8.6	10.8	8.2	12.8	11.3	12.0	12.0	9.8	9.8	21.5	19.6	20.4	20.6	20.6	18.0
2023/07/20	8.7	8.4	9.1	9.2	11.3	8.4	12.8	11.0	11.2	11.6	9.1	9.9	21.5	19.4	20.3	20.8	20.5	18.3
2023/07/21	8.7	8.5	8.5	9.1	10.9	8.4	12.8	11.4	11.8	11.7	9.6	10.0	21.5	19.9	20.3	20.8	20.5	18.5
2023/07/22	8.7	8.8	8.6	8.9	11.2	8.5	12.8	10.7	11.7	11.9	9.1	9.8	21.5	19.5	20.3	20.8	20.3	18.3
2023/07/23	8.7	8.9	8.6		11.4	8.4	12.8	10.8	11.6		8.9	10.0	21.5	19.8	20.2		20.3	18.4
2023/07/24	8.7	9.0	9.1		11.4	8.5	12.8	11.2	11.1		9.1	9.9	21.5	20.2	20.2		20.4	18.4
2023/07/25	8.7	8.6	8.8		11.2	8.5	12.8	11.2	11.5		9.1	10.0	21.5	19.8	20.3		20.3	18.4
2023/07/26	8.6	7.8	8.9		10.9	8.5	12.9	11.6	11.4		9.2	10.1	21.5	19.4	20.3		20.1	18.7
2023/07/27	8.5	8.6	9.5	8.3	10.5	8.6	11.9	10.8	10.6	11.5	9.8	10.1	20.4	19.4	20.2	19.8	20.3	18.7
2023/07/28	8.4	7.6	9.1	9.4	9.8	8.5	12.5	12.1	11.1	11.5	10.8	10.0	20.9	19.7	20.3	20.9	20.6	18.4
2023/07/29	8.4	8.6	8.7	9.7	10.4	8.4	11.1	11.5	11.6	11.5	10.1	10.2	19.4	20.1	20.4	21.2	20.4	18.6
2023/07/30	<b>8.6</b>	<b>8.5</b>	<b>8.6</b>	<b>9.2</b>	<b>11.0</b>	<b>8.5</b>	<b>12.8</b>	<b>11.2</b>	<b>11.8</b>	<b>11.5</b>	<b>9.3</b>	<b>10.1</b>	<b>21.4</b>	<b>19.7</b>	<b>20.4</b>	<b>20.7</b>	<b>20.2</b>	<b>18.6</b>

Calculation: CO<sub>2</sub>% + O<sub>2</sub>% = 19.5-21.5%

## Emergency Generation

**Table 9: Emergency Generation for the month of July 2023**

	Unit 1	Unit 2	Unit 3	Unit 4	Unit 5	Unit 6
Emergency Generation hours declared by national Control	0	0	0	0	0	0
Emergency Hours declared including hours after stand down	0	0	0	0	0	0
Hours over the Limit during Emergency Generation	0	0	0	0	0	0

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

#### UNIT 1

The unit base loaded for all of the days during the month. Sixteen fabric filter bags were replaced during the month.

#### UNIT 2

The unit base loaded for most of the days during the month and off for eight days. Thirty fabric filter bags were replaced during the month.

#### UNIT 3

The unit base loaded for all of the days during the month. Twenty fabric filter bags were replaced during the month.

#### UNIT 4

The unit base loaded for most of the days during the month and off for four days. Twenty-four fabric filter bags were replaced during the month.

#### UNIT 5

The unit base loaded for most of the days during the month and off for two days. Eight fabric filter bags were replaced during the month.

#### UNIT 6

The unit base loaded for all of the days during the month. Twenty-seven fabric filter bags were replaced during the month.

### Complaints Register

**Table 10: Complaints for the month of July 2023**

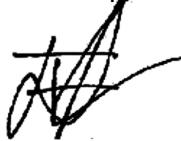
Source Code/ Name	Root Cause Analysis	Calculation of Impacts/ emissions associated with the incident	Dispersion modelling of pollutants where applicable	Measures implemented to prevent reoccurrence	Date by which measure will be implemented
	No complaints were received during the month of July 2023.				

#### General

Fuel oil consumption for the month of July 2023 exceeded the AEL limit of 6000 tons and the station will send an updated action during the month addressing the high fuel oil consumption. The investigation report for the March, May and June exceedances has not been finalized because of parallel tests that needed to be carried out to identify the root cause. After the station concludes the parallel tests and receives the reports the investigation will be concluded and shared with the authorities.

Yours sincerely

Report compiled by:



Faith Kagoda  
**ENVIRONMENTAL MANAGER: (MAJUBA)**

Date 10/08/2023

Report verified by:



Lindani Madonsela  
**BOILER ENGINEERING MANAGER: (MAJUBA)**

Date 11/08/2023

Report approved by:



Johan Swanepoel  
**ENGINEERING MANAGER: (MAJUBA)**

Date 2023/08/11