Eskom

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MAJUBA POWER STATION'S MONTHLY EMISSIONS REPORT FOR THE MONTH OF JANUARY 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 January 2023. Verified emissions of particulates are included. SO_2 and NO_x (as NO_2) 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 January 2023

Raw Materials and Products used	Raw Material Type	Unit	Maximum Permitted Consumption/ Rate (Quantity)	Consumption/ Rate in Month of January 2023
	Coal	Tons/month	1 800 000	768 948
	Fuel Oil	Tons/month	6 000	10 292.4
Production Rates	**Product/ By-Product Name**	**Unit**	**Maximum Production Capacity Permitted (Quantity - MW)**	**Production Rate in Month of January 2023**
	Energy	GWh	4 110	1219.5
	Ash	Tons/month	Not stated in the license	242 295.51

Abatement Technology

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

Associated Unit	Technology Type	Actual Utilisation (%) for the month of January 2023	*Minimum Control Efficiency (%)
Unit 1	Fabric Filter Plant	100	99.93
Unit 2	Fabric Filter Plant	100	99.88
Unit 3	Fabric Filter Plant	100	99.99
Unit 4	Fabric Filter Plant	100	99.92
Unit 5	Fabric Filter Plant	100	99.88
Unit 6	Fabric Filter Plant	100	99.94

*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 January 2023

Characteristic	Stipulated Range (Unit)	Monthly Average Content
Sulphur Content	*0.6 to >0.94%*	*0.59*
Ash Content	*28 to >30%*	*31.51*

Emissions Reporting

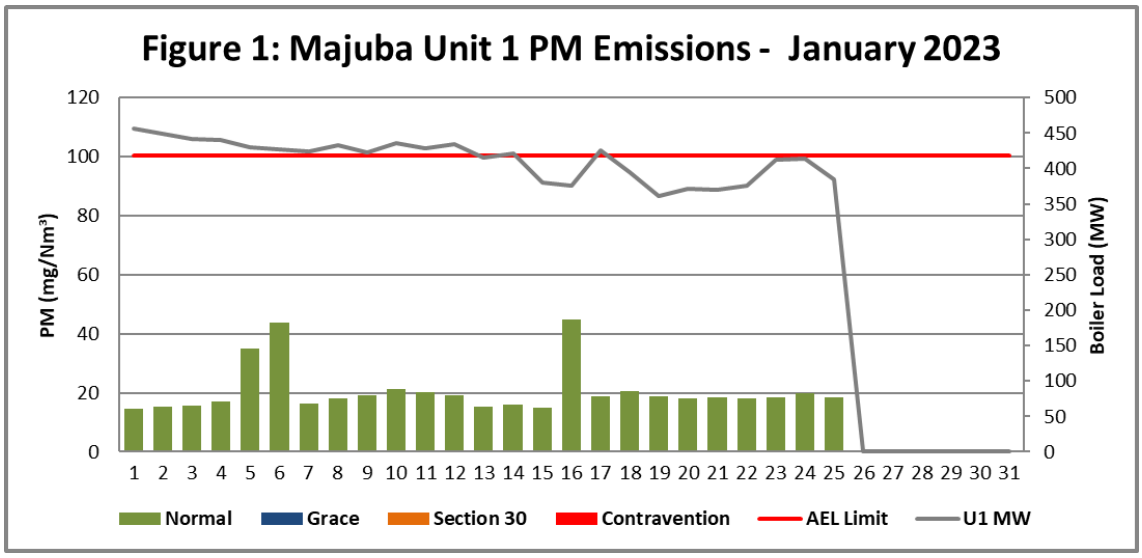

Figure 1. Particulate Matter emissions (daily averages) for the month of January 2023 against emission limit for Unit 1.

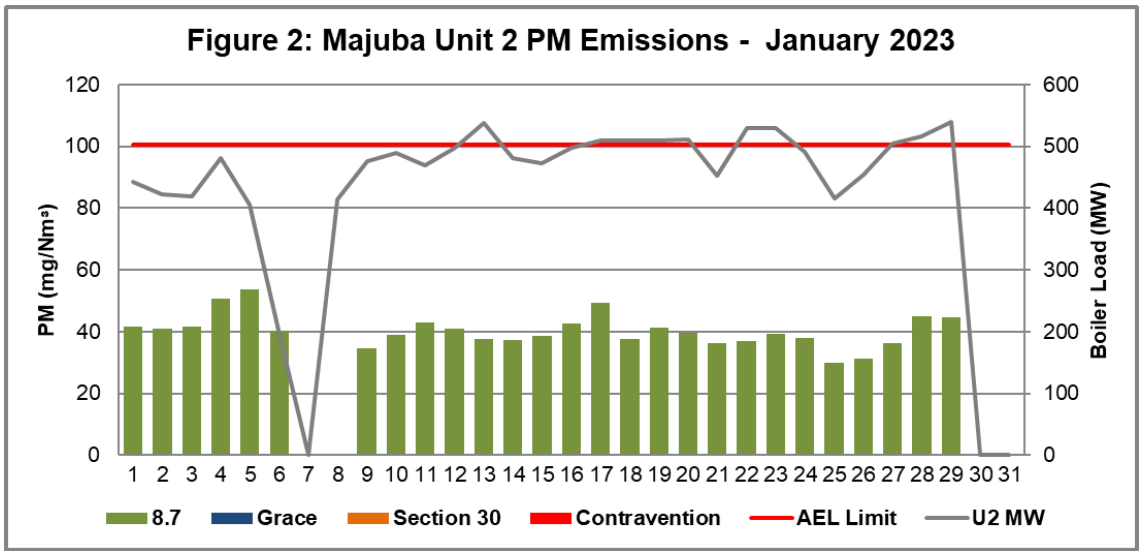

Figure 2. Particulate Matter emissions (daily averages) for the month of January 2023 against emission limit for Unit 2.

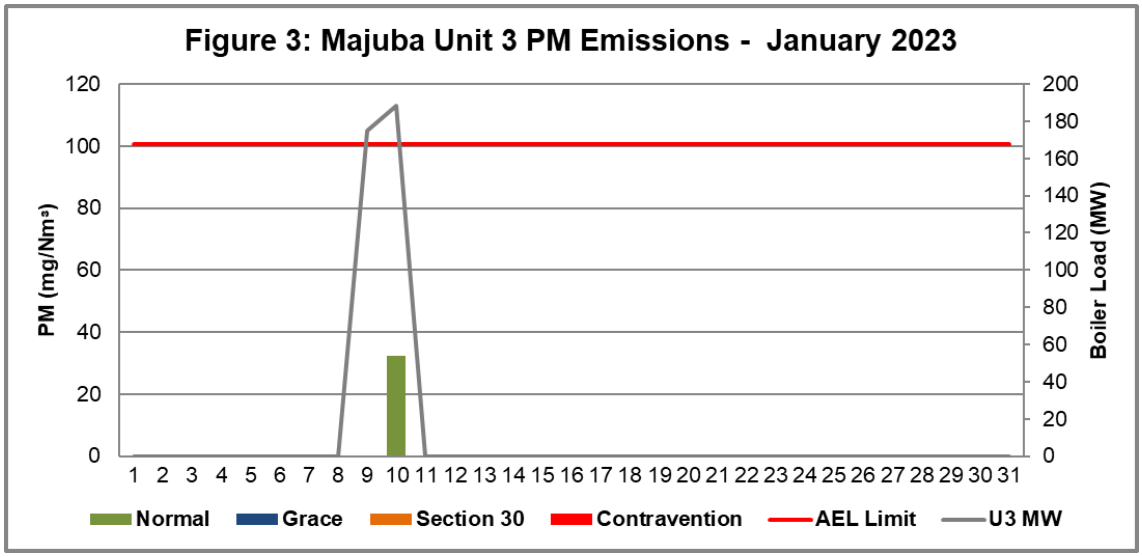

Figure 3. Particulate Matter emissions (daily averages) for the month of January 2023 against emission limit for Unit 3.

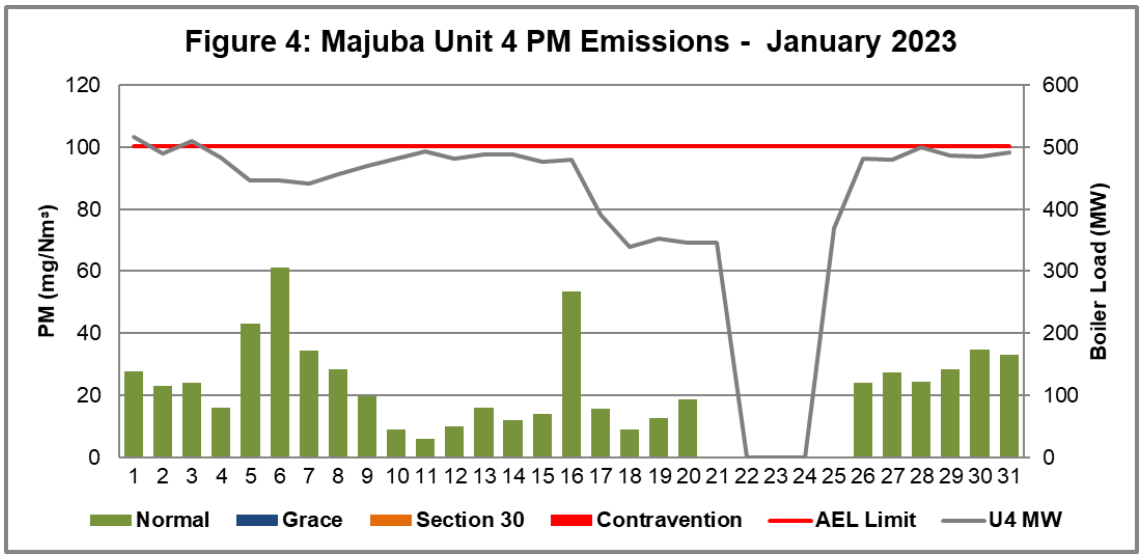

Figure 4. Particulate Matter emissions (daily averages) for the month of January 2023 against emission limit for Unit 4.

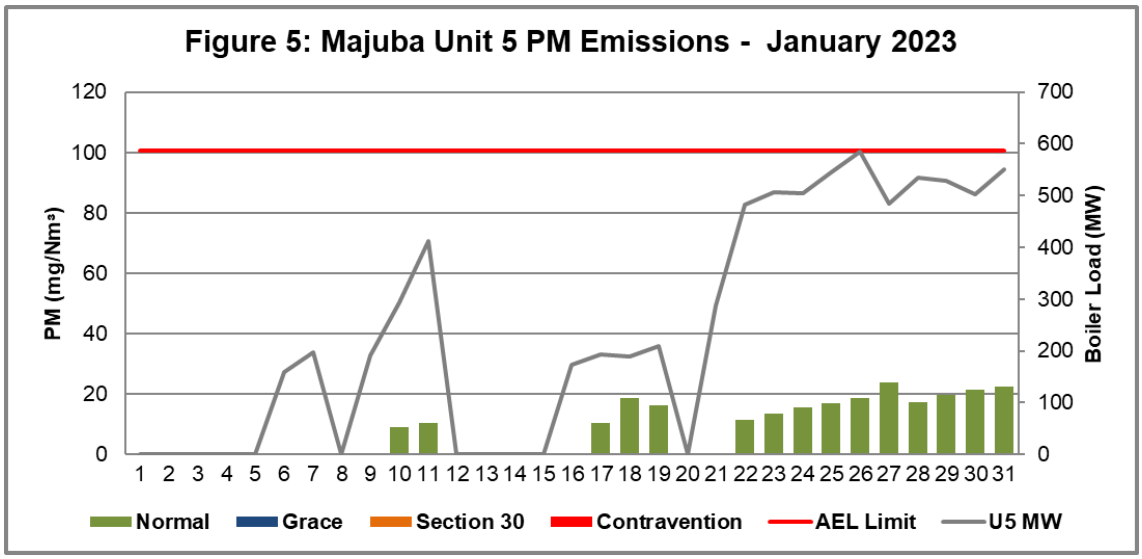

Figure 5. Particulate Matter emissions (daily averages) for the month of January 2023 against emission limit for Unit 5.

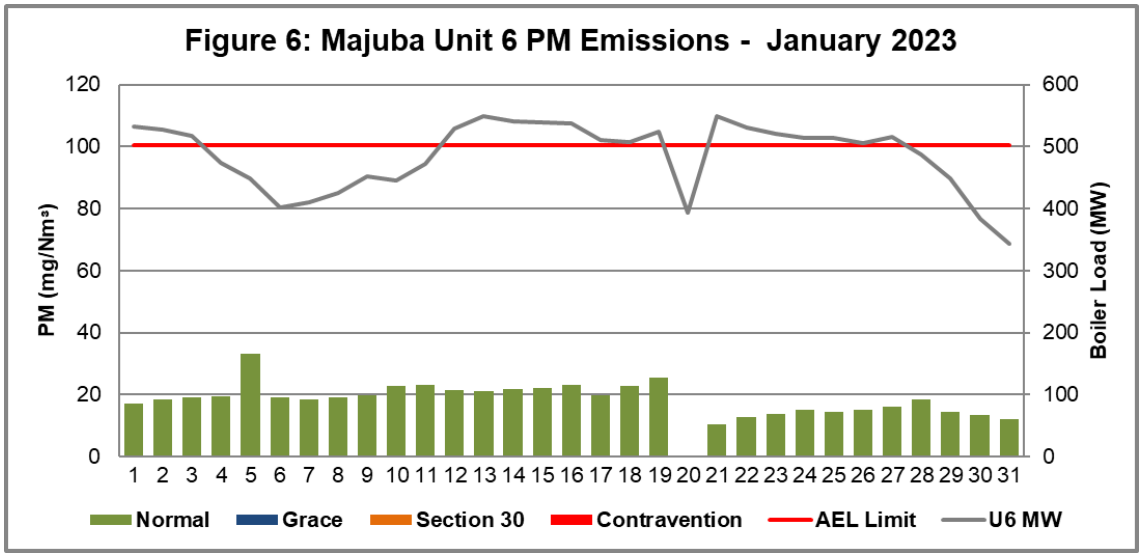

Figure 6. Particulate Matter emissions (daily averages) for the month of January 2023 against emission limit for Unit 6.

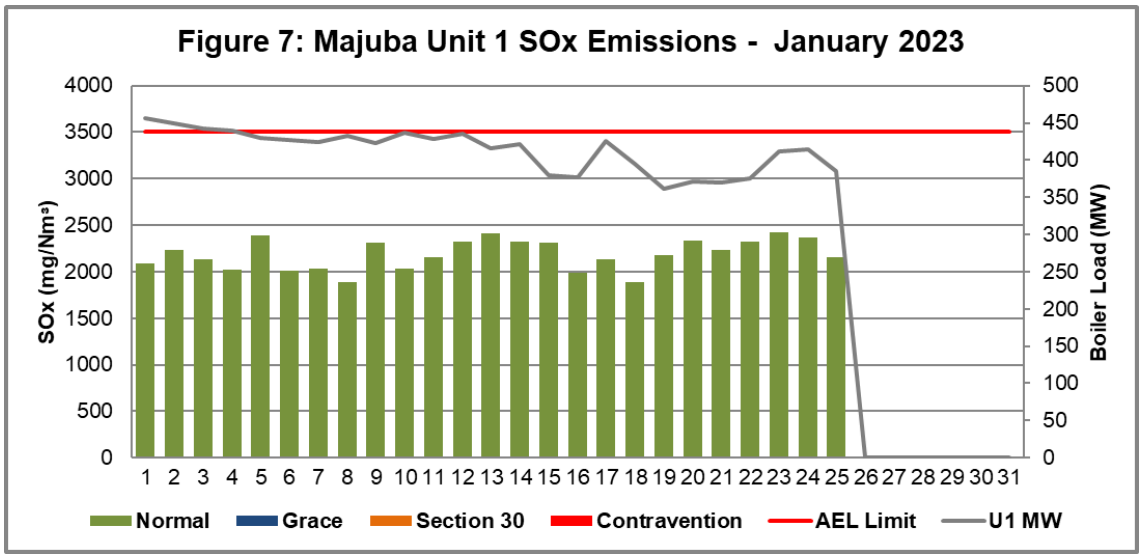

Figure 7. Sox emissions (daily averages) for the month of January 2023 against emission limit for Unit 1.

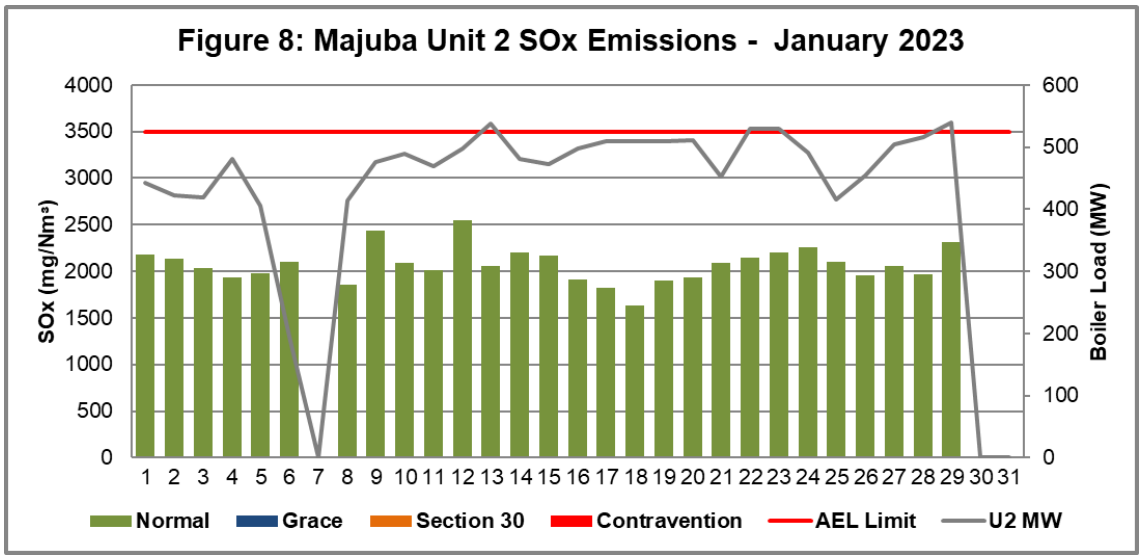

Figure 8. Sox emissions (daily averages) for the month of January 2023 against emission limit for Unit 2.

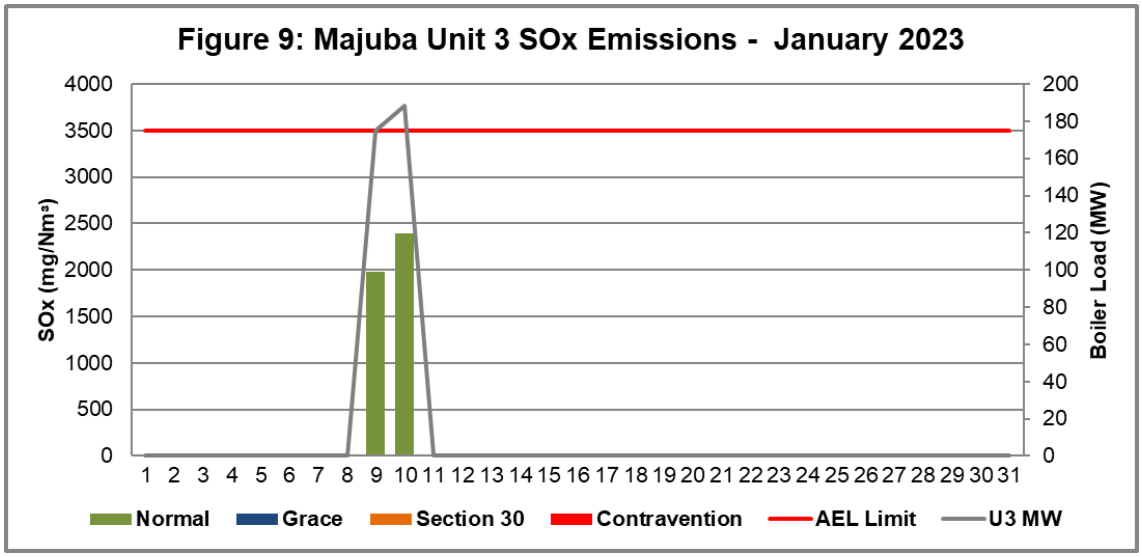

Figure 9. Sox emissions (daily averages) for the month of January 2023 against emission limit for Unit 3.

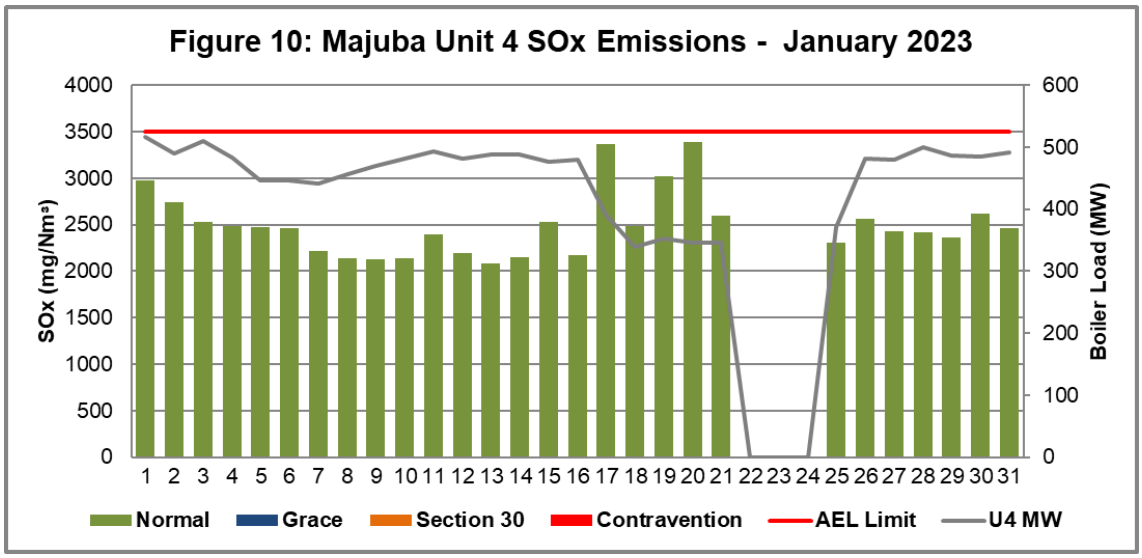

Figure 10. Sox emissions (daily averages) for the month of January 2023 against emission limit for Unit 4.

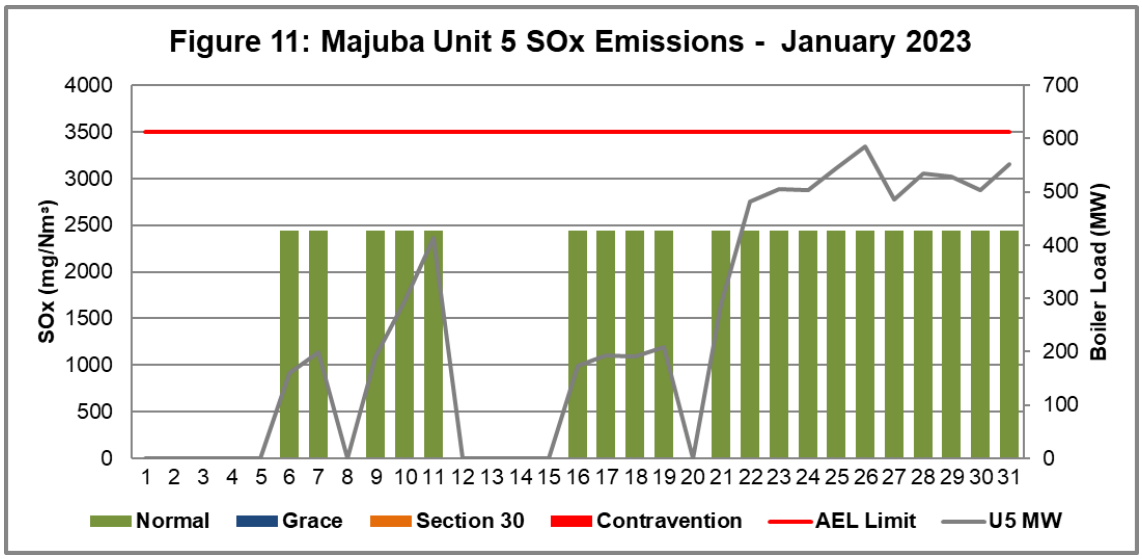

Figure 11. Sox emissions (daily averages) for the month of January 2023 against emission limit for Unit 5.

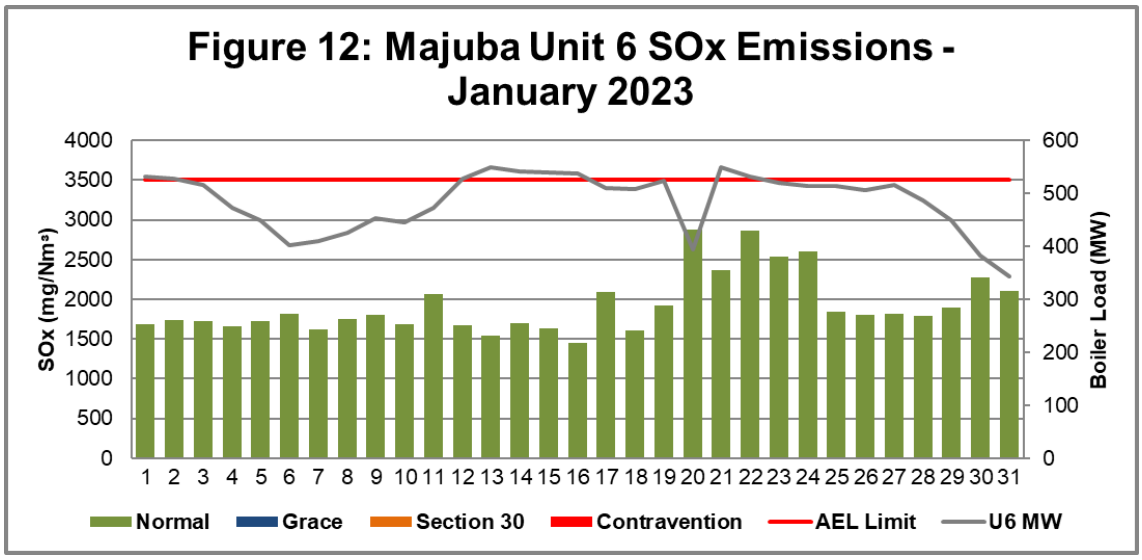

Figure 12. Sox emissions (daily averages) for the month of January 2023 against emission limit for Unit 6.

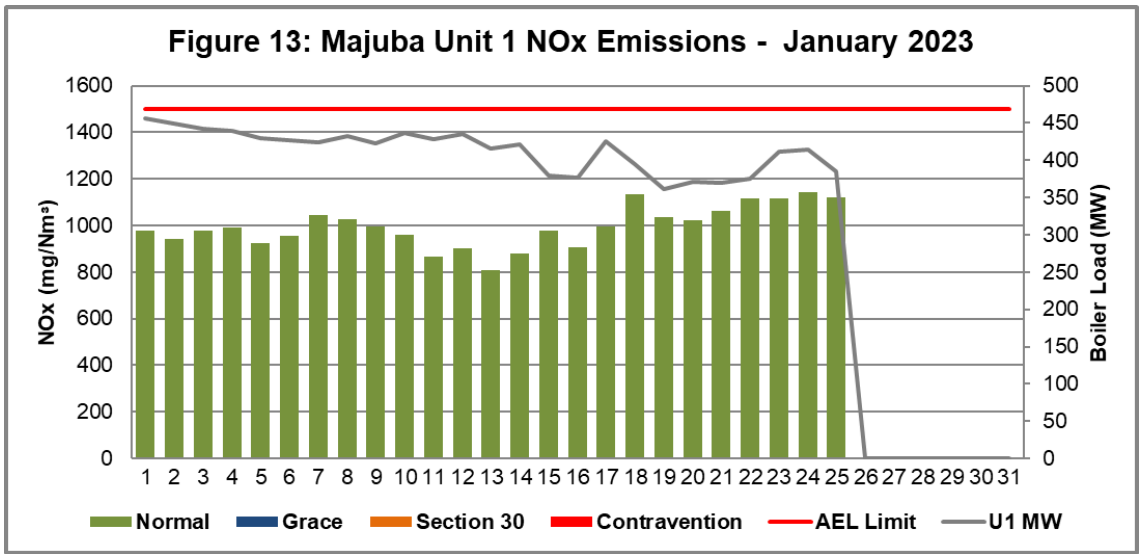

Figure 13. Nox emissions (daily averages) for the month of January 2023 against emission limit for Unit 1.

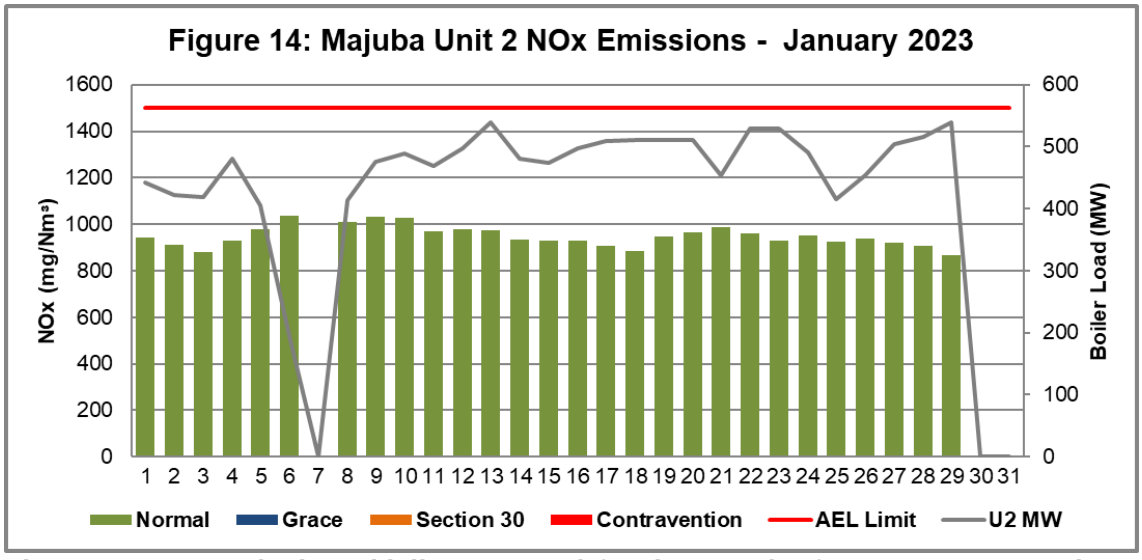

Figure 14. Nox emissions (daily averages) for the month of January 2023 against emission limit for Unit 2.

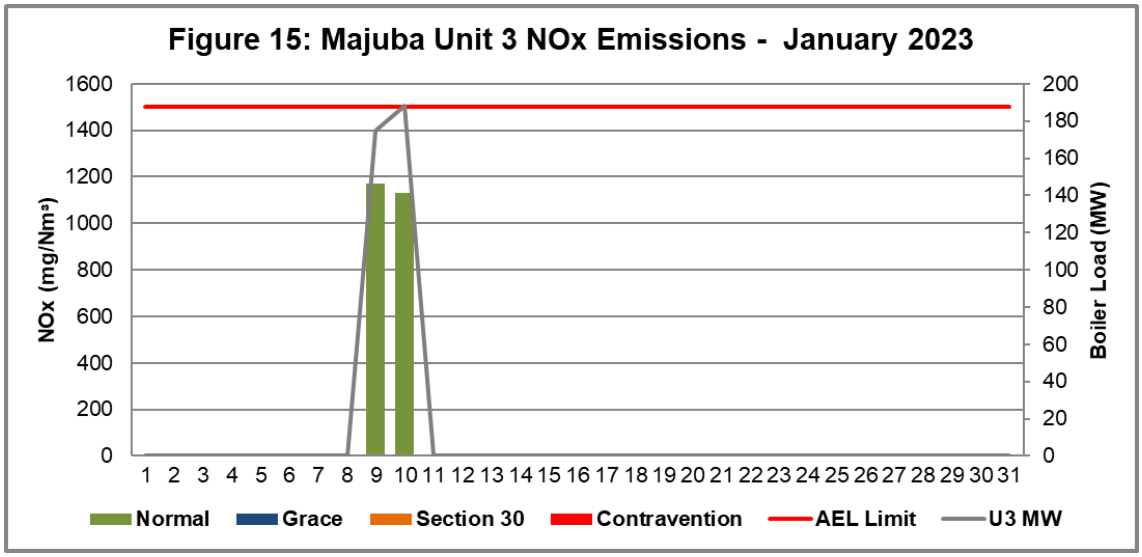

Figure 15. Nox emissions (daily averages) for the month of January 2023 against emission limit for Unit 3.

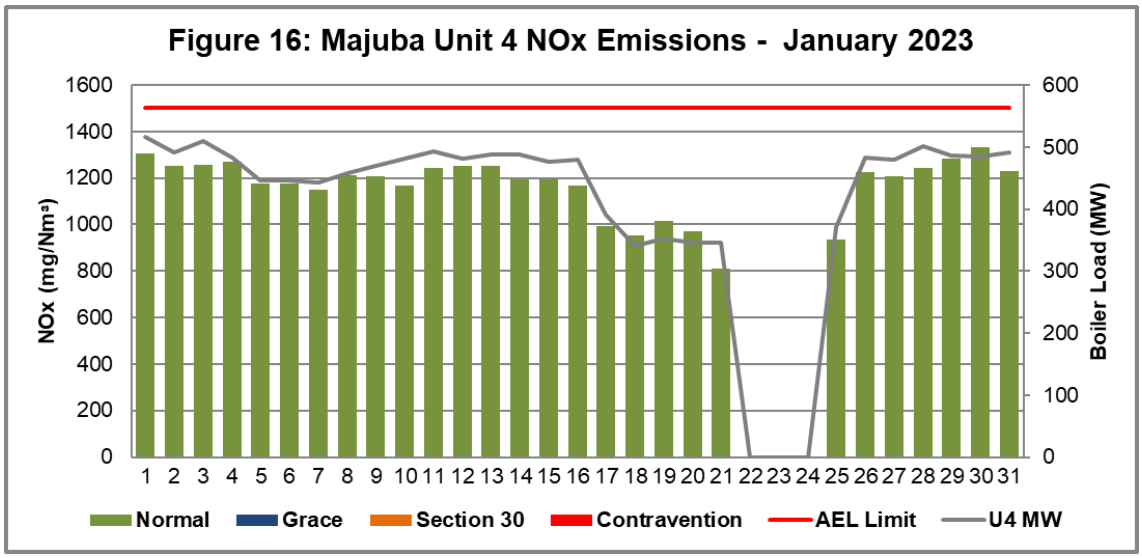

Figure 16. Nox emissions (daily averages) for the month of January 2023 against emission limit for Unit 4

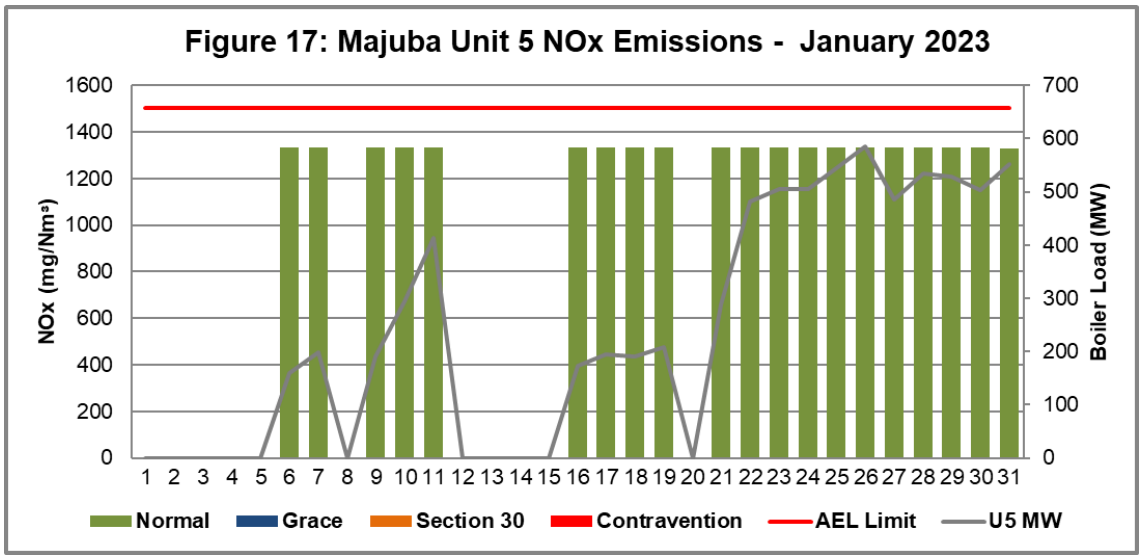

Figure 17. Nox emissions (daily averages) for the month of January 2023 against emission limit for Unit 5

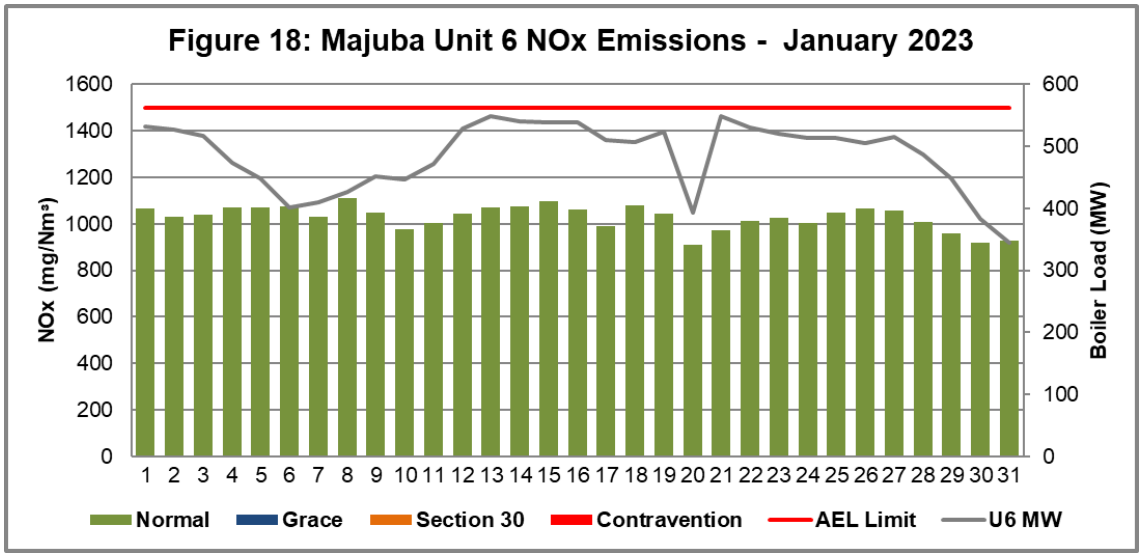

Figure 18. Nox emissions (daily averages) for the month January 2023 against emission limit for Unit 6

Table 4: Monthly tonnages for the month of January 2023

Unit	PM (tons)	SO2 (tons)	NOx (tons)
Unit 1	29.2	3 085	1 398
Unit 2	60.5	3 334	1 528
Unit 3	0.2	71	37
Unit 4	34.1	3 712	1 789
Unit 5	12.1	2 337	1 272
Unit 6	35.8	3 969	2 119

Table 5: Average monthly concentrations (mg/Nm^3) for the month of January 2023

Unit	PM (Mg/Nm^3)	SO_2 (Mg/Nm^3)	NO_2 (Mg/Nm^3)
1	20.6	2 187.2	995.2
2	40.3	2 071.8	948.4
3	32.4	2 187.7	1 151.0
4	24.1	2 492.5	1 166.6
5	16.4	2 444.7	1 330.9
6	18.7	1 924.9	1 028.4

Table 6: Each unit and respective days operating in compliance to the AEL Emission Limits (SO_x, NO_x and PM)

Associated Unit/Stack	Normal	Grace	Section 30	Contravention	Total Exceedance
Unit 1	25	0	0	0	0
Unit 2	27	0	0	0	0
Unit 3	1	0	0	0	0
Unit 4	26	0	0	0	0
Unit 5	15	0	0	0	0
Unit 6	30	0	0	0	0

Table 7: MONITOR RELIABILITY (%)

Associated Unit/Stack	PM	SO_2	NO	CO_2
Unit 1	95.3	100.0	100.0	83.7
Unit 2	93.5	100.0	100.0	24.3
Unit 3	100.0	100.0	92.6	100.0
Unit 4	95.8	100.0	100.0	99.7
Unit 5	91.1	2.1	2.1	25.0
Unit 6	97.8	99.6	99.6	97.2

CO_2 and O_2 Relationship

	Final Average CO_2 (%)						Final Average O_2 (%)						Final Average CO_2 + O_2 (%)					
Date	U1	U2	U3	U4	U5	U6	U1	U2	U3	U4	U5	U6	U1	U2	U3	U4	U5	U6
01-Jan	9.0			9.9		10.9	10.4	11.9		11.5		9.4	19.4	11.9		21.4		20.2
02-Jan	8.9			9.7		11.1	10.6	12.0		11.5		8.9	19.4	12.0		21.1		20.0
03-Jan	8.7			9.7		11.0	10.8	12.2		11.5		9.1	19.6	12.2		21.3		20.1
04-Jan	8.9			9.5		10.6	10.7	10.7		11.8		9.6	19.5	10.7		21.3		20.2
05-Jan	8.9			9.1		10.4	10.6	11.1		11.9		10.0	19.5	11.1		21.1		20.3
06-Jan	9.0			9.0	7.2	9.7	10.7	12.0		12.1	12.2	10.7	19.6	12.0		21.1	19.4	20.5
07-Jan				8.9	7.5	10.0	10.9			11.8	12.2	10.4	10.9			20.7	19.7	20.4
08-Jan				9.0		10.1	10.5	11.4		12.1		10.3	10.5	11.4		21.1		20.3
09-Jan			7.4	9.2	8.0	10.2	10.8	11.3	14.2	11.9	12.2	10.1	10.8	11.3	21.6	21.1	20.2	20.3
10-Jan	9.2	10.1	7.4	9.6	9.1	10.2	10.2	10.6	14.0	11.4	12.4	10.0	19.4	20.7	21.3	21.0	21.5	20.2
11-Jan	9.2			9.5	9.9	10.3	10.3	10.6		11.9	12.9	9.9	19.5	10.6		21.4	22.8	20.2
12-Jan	9.0			9.4		11.2	10.5	11.0		11.8		8.8	19.5	11.0		21.2		20.0
13-Jan	8.5			9.4		11.5	11.1	10.1		11.8		8.5	19.6	10.1		21.3		19.9
14-Jan	8.4			9.6		11.3	11.1	10.8		11.6		8.7	19.6	10.8		21.2		20.0
15-Jan	8.0			9.3		11.5	11.6	10.7		12.0		8.6	19.5	10.7		21.3		20.1
16-Jan	8.9	9.6		9.3	7.2	11.5	10.7	10.5		11.8	12.6	8.6	19.6	20.1		21.1	19.8	20.1
17-Jan	8.9			8.5	7.9	10.7	11.0	10.1		12.3	12.6	9.4	19.9	10.1		20.8	20.4	20.1
18-Jan	8.1			8.4	7.1	10.6	11.6	10.1		12.3	12.2	9.4	19.6	10.1		20.7	19.3	19.9
19-Jan	7.6			8.5		10.7	12.1	10.2		12.5	12.2	9.1	19.7	10.2		20.9	12.2	19.7
20-Jan	7.7			8.5		9.2	11.9	10.5		12.4		11.1	19.6	10.5		20.8		20.3
21-Jan	7.7			8.0		10.6	11.9	11.5		12.2	13.2	8.5	19.6	11.5		20.2	13.2	19.1
22-Jan	7.7					10.2	11.8	9.9			11.5	8.8	19.5	9.9			11.5	19.1
23-Jan	8.2	10.9				10.3	11.4	9.8			12.1	8.9	19.6	20.7			12.1	19.1
24-Jan	8.2	11.1				10.4	11.5	10.9			11.8	8.9	19.6	22.0			11.8	19.2
25-Jan	8.1	10.9		8.3		10.4	11.7	12.4		11.0	10.9	8.9	19.8	23.3		19.3	10.9	19.3
26-Jan		10.9		9.2		10.1		11.4		12.0	9.8	9.3		22.4		21.2	9.8	19.5
27-Jan		11.1		9.3		10.3		10.7		11.8	10.7	9.1		21.8		21.1	10.7	19.3
28-Jan		11.2		9.5		9.8		10.1		11.8	10.6	9.7		21.3		21.3	10.6	19.5
29-Jan		11.2		9.0		8.9		9.8		12.5	10.6	10.7		21.0		21.5	10.6	19.7
30-Jan				8.9		8.3				12.7	10.8	11.3				21.6	10.8	19.6
31-Jan				9.1	10.6	8.1				12.0	10.0	11.5				21.1	20.6	19.6
Totals	**8.5**	**10.8**	**7.4**	**9.1**	**8.3**	**10.3**	**11.0**	**10.9**	**14.1**	**11.9**	**11.7**	**9.5**	**19.5**	**21.6**	**21.5**	**21.0**	**19.9**	**19.9**

Calculation: CO_2% + O_2% = 19.5-21.5%

Table 8: CO_2 and O_2 deviations of the Month of January 2023

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

Emergency Generation
Table 9: Emergency Generation for the month of January 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 most of the days during the month and off for six days. Twenty 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 two days. Thirty-five fabric filter bags were replaced during the month.

UNIT 3

The unit was on extended outage for the entire month. No 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 three days. Twenty-one 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 eleven days. Seven fabric filter bags were replaced during the month.

UNIT 6

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

Complaints Register

Table 10: Complaints for the month of January 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 January 2023.				

General

Fuel oil consumption for the month of January 2023 exceeded the AEL limit of 6000 tons and the station is currently implementing an action plan to address the high fuel oil consumption associated with mills capability support. In addition, the ash content for the month of January 2023 exceeded the AEL limit of 30%, and the station will be investigating the cause.

Yours sincerely

Report compiled by:

Faith Kagoda Date 09/02/2023
ENVIRONMENTAL MANAGER: (MAJUBA)

Report verified by:

Lindani Madonsela Date : 09/02/2023
BOILER ENGINEERING MANAGER: (MAJUBA)

Report approved by:

Johan Swanepoel Date 2023/02/10
ENGINEERING MANAGER : (MAJUBA)