



Generation

Nkangala District Municipality
P O Box 437
Middleburg
1050

Attention:

Mr V Mahlangu

AND

Directorate: Air Quality Management
Services
The Chief Director:
Mr S S Maluleka
Department of Environmental Services
Private Bag X447
PRETORIA
0001
Tel: (012) 310 3263
Fax: (012) 320 0488

Date: 2023/03/27

Enquiries: Duvha Environmental
Management
☎ +27 13 690 0445
☎ +27 66 212 2105

Enquiries: Ms Simthandile Nhlapo
☎ +27 13 690 0445
☎ +27 66 212 2105

Total number of pages:18

Total number of annexes:1

DUVHA POWER STATION

Atmospheric Emission License 17/4/AEL/MP312/11/07

GENERAL MANAGER

2023/04/17

DATE

DUVHA POWER STATION MONTHLY EMISSIONS REPORT

Atmospheric Emission License 17/4/AEL/MP312/11/07



1 RAW MATERIALS AND PRODUCTS

Raw Materials and Products	Raw Material Type	Units	Maximum Permitted Consumption Rate	Consumption Rate Feb-2023
	Coal	Tons	1 400 000	430 929.44
Fuel Oil	Tons	5 000	5876.12	

Production Rates	Product / By-Product Name	Units	Maximum Production Capacity Permitted	Production Rate Feb-2023
	Energy	GWh	3600	709.87
	Ash	Tons	not specified	115 876.93
	RE Ash	kg/MWh	not specified	

2 ENERGY SOURCE CHARACTERISTICS

Coal Characteristic	Units	Stipulated Range	Monthly Average Content
Sulphur Content	%	0.6 TO >1.2	0.85
Ash Content	%	27 TO 30	26.89

3 EMISSION LIMITS (mg/Nm³)

Associated Unit/Stack	PM	SO ₂	NO _x
Unit 1	100	3500	1100
Unit 2	100	3500	1100
Unit 3	100	3500	1100
Unit 4	100	3500	1100
Unit 5	100	3500	1100
Unit 6	100	3500	1100

4 ABATEMENT TECHNOLOGY (%)

Associated Unit/Stack	Technology Type	Efficiency Feb-2023	Technology Type	SO ₃ Utilization Feb-2023
Unit 1	FFP	99.9%	n/a	n/a
Unit 2	FFP	99.9%	n/a	n/a
Unit 4	ESP + SO ₃	99.7%	SO ₃	100.0%
Unit 5	ESP + SO ₃	99.5%	SO ₃	99.4%
Unit 6	ESP + SO ₃	99.4%	SO ₃	99.5%

Note: ESP and FFP plants do not have bypass mode operation, hence plants 100% Utilised.

5 MONITOR RELIABILITY (%)

Associated Unit/Stack	PM	SO ₂	NO
Unit 1	97.7	83.8	83.8
Unit 2	88.9	48.8	48.8
Unit 4	93.6	97.5	100.0
Unit 5	97.3	95.1	94.9
Unit 6	98.7	100.0	97.8

Note: NO_x emissions is measured as NO in PPM. Final NO_x value is expressed as total NO₂

6 EMISSION PERFORMANCE

Table 6.1: Monthly tonnages for the month of February 2023

Associated Unit/Stack	PM (tons)	SO ₂ (tons)	NO _x (tons)
Unit 1	8.8	1 881	1 068
Unit 2	2.9	612	241
Unit 4	67.2	2 177	972
Unit 5	119.3	1 669	801
Unit 6	151.2	2 258	1 077
SUM	349.45	8 598	4 159

Table 6.2: Operating days in compliance to PM AEL Limit - February 2023

Associated Unit/Stack	Normal	Grace	Section 30	Contravention	Total Exceedance	Average PM (mg/Nm ³)
Unit 1	16	0	0	0	0	9.2
Unit 2	6	0	0	0	0	10.7
Unit 4	14	3	0	0	3	60.9
Unit 5	9	10	0	1	11	131.4
Unit 6	17	6	0	3	9	113.3
SUM	62	19	0	4	23	

Table 6.3: Operating days in compliance to SO₂ AEL Limit - February 2023

Associated Unit/Stack	Normal	Grace	Section 30	Contravention	Total Exceedance	Average SO ₂ (mg/Nm ³)
Unit 1	20	0	0	0	0	1 596.8
Unit 2	7	0	0	0	0	1 928.8
Unit 4	23	0	0	0	0	1 901.5
Unit 5	22	0	0	0	0	1 697.3
Unit 6	27	0	0	0	0	1 724.3
SUM	99	0	0	0	0	

Table 6.4: Operating days in compliance to NO_x AEL Limit - February 2023

Associated Unit/Stack	Normal	Grace	Section 30	Contravention	Total Exceedance	Average NO _x (mg/Nm ³)
Unit 1	20	0	0	0	0	884.4
Unit 2	7	0	0	0	0	756.9
Unit 4	23	0	0	0	0	872.0
Unit 5	22	0	0	0	0	809.2
Unit 6	27	0	0	0	0	822.2
SUM	99	0	0	0	0	

Note: NO_x emissions is measured as NO in PPM. Final NO_x value is expressed as total NO₂

Table 6.5: Legend Description

Condition	Colour	Description
Normal		Emissions below Emission Limit Value (ELV)
Grace		Emissions above the ELV during grace period
Section 30		Emissions above ELV during a NEMA S30 incident
Contravention		Emissions above ELV but outside grace or S30 incident conditions

Figure 1: Duvha Unit 1 PM Emissions - February 2023

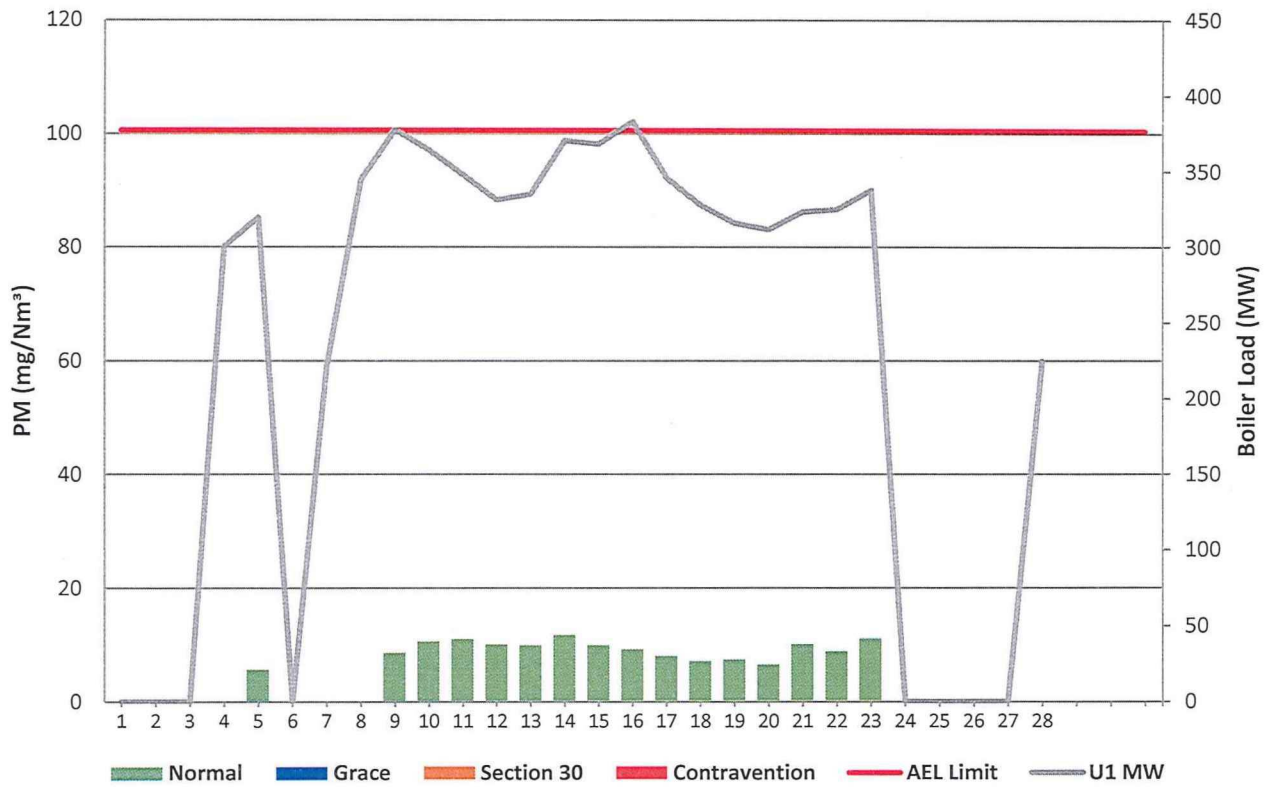


Figure 2: Duvha Unit 2 PM Emissions - February 2023

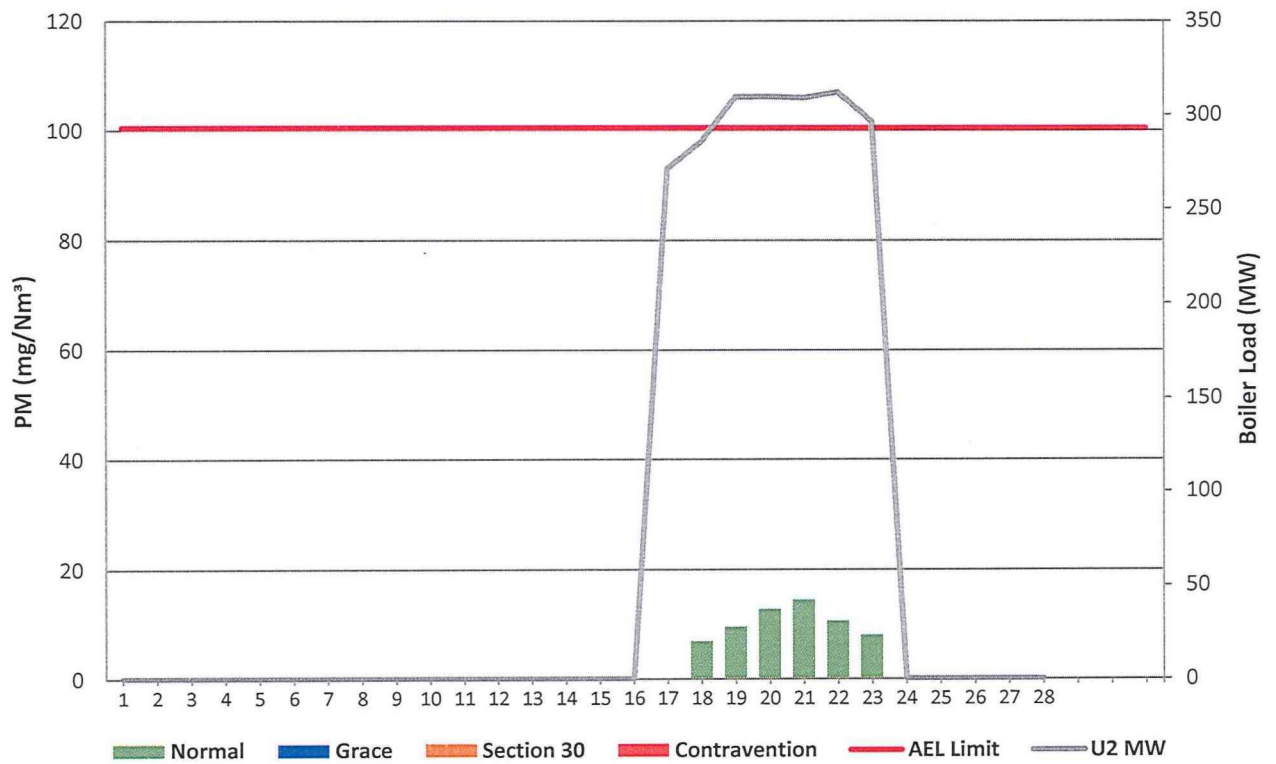


Figure 3: Duvha Unit 4 PM Emissions - February 2023

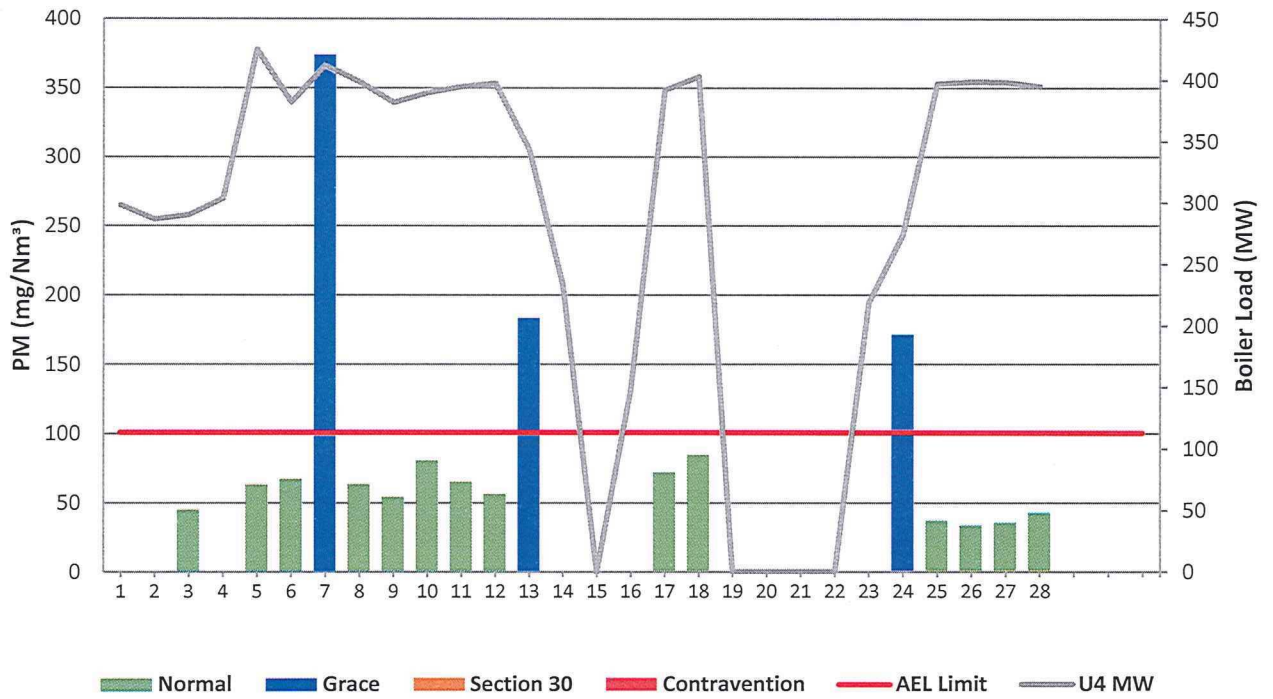


Figure 4: Duvha Unit 5 PM Emissions - February 2023

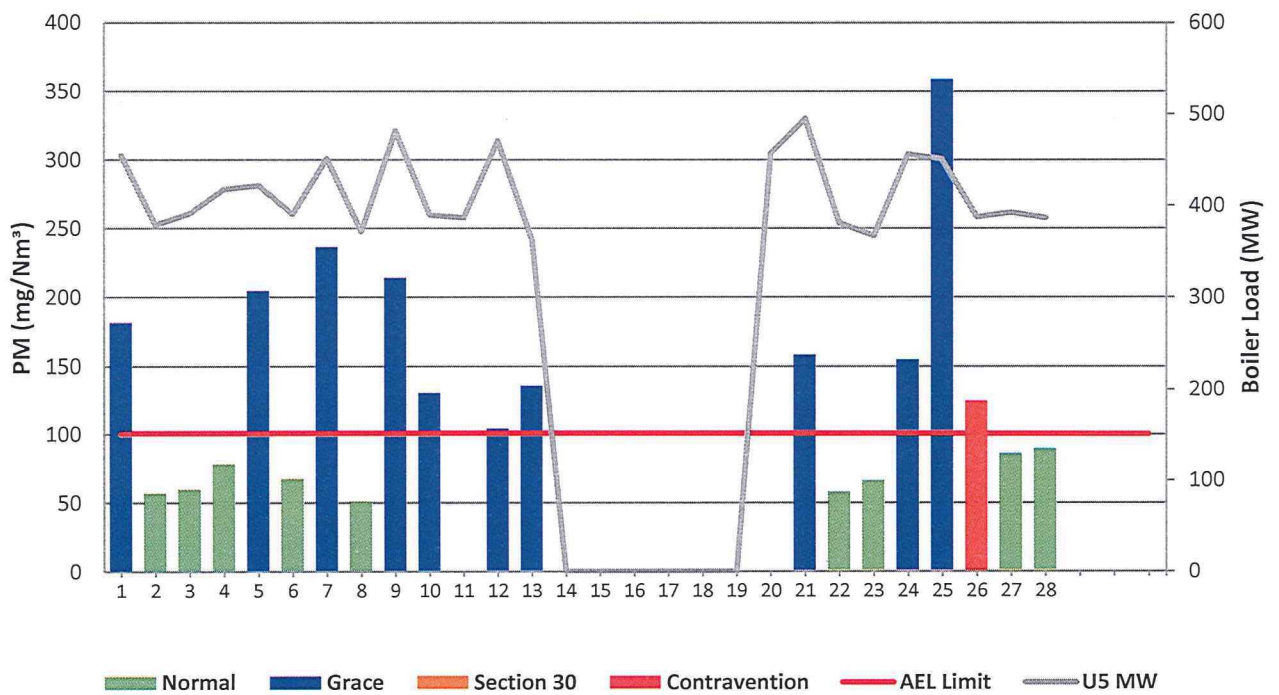


Figure 5: Duvha Unit 6 PM Emissions - February 2023

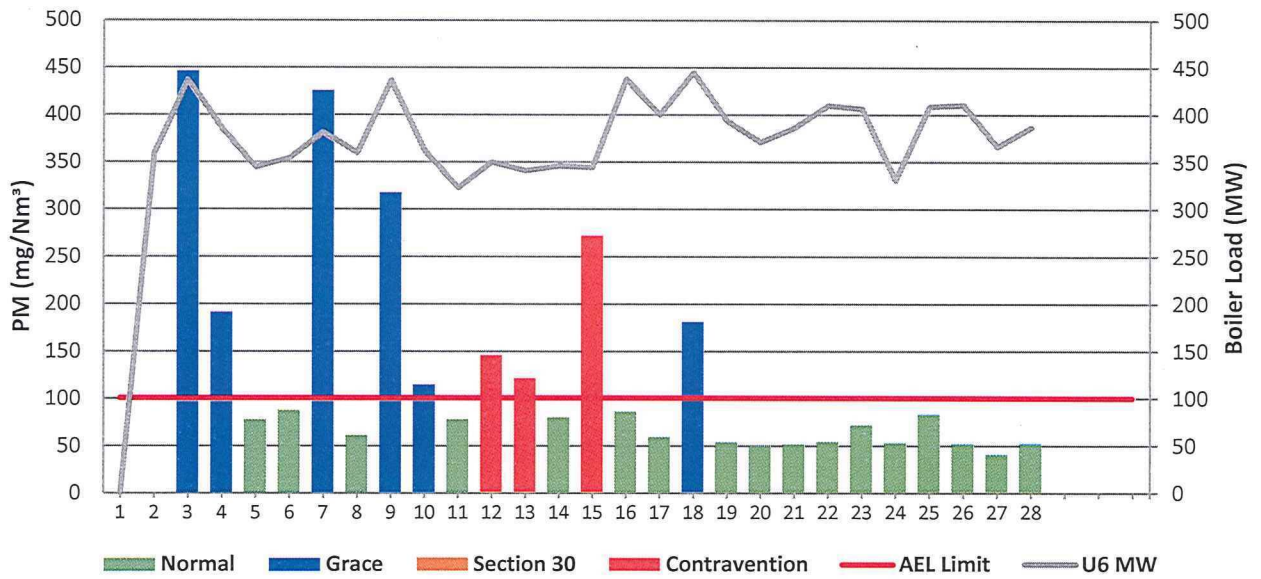


Figure 6: Duvha Unit 1 SO₂ Emissions - February 2023

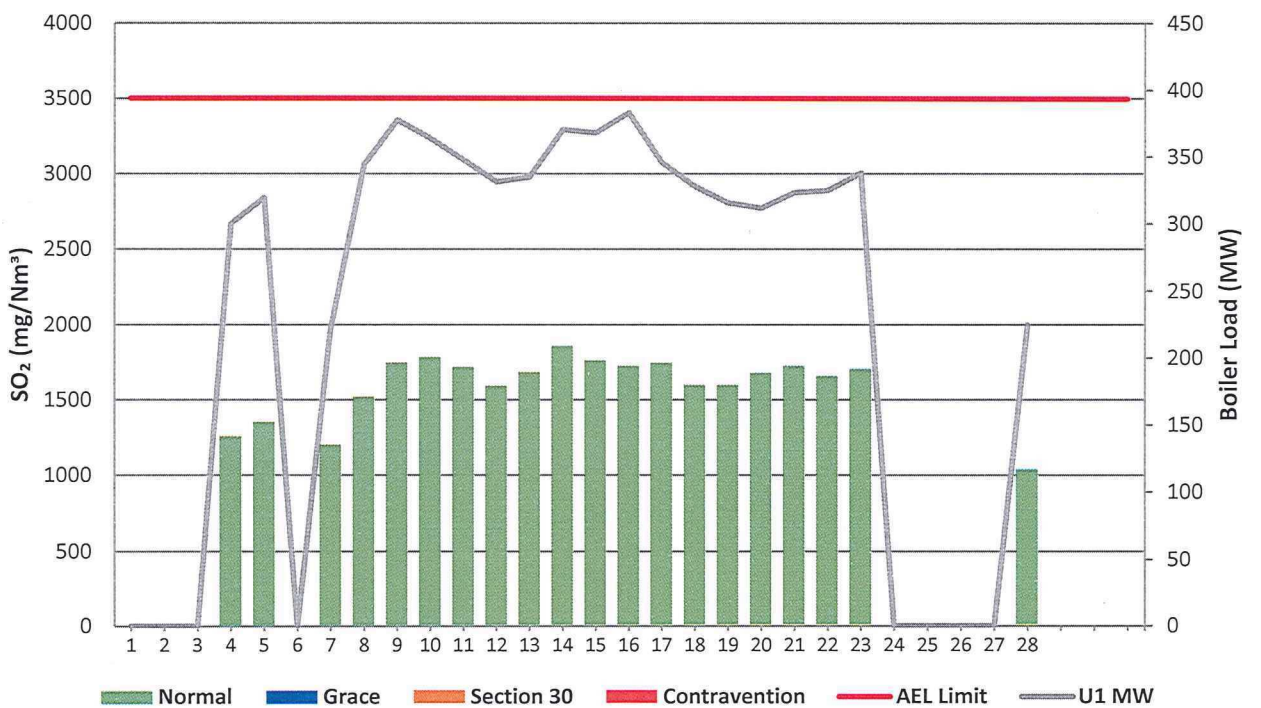


Figure 7: Duvha Unit 2 SO₂ Emissions - February 2023

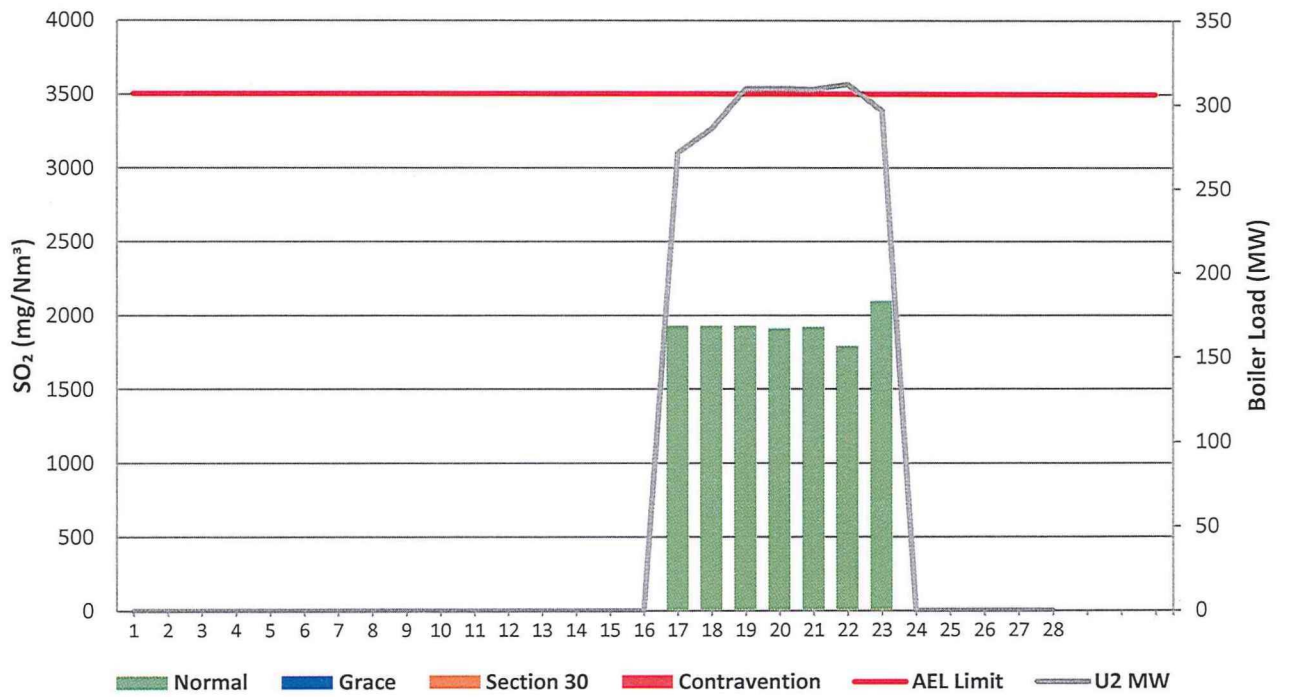


Figure 8: Duvha Unit 4 SO₂ Emissions - February 2023

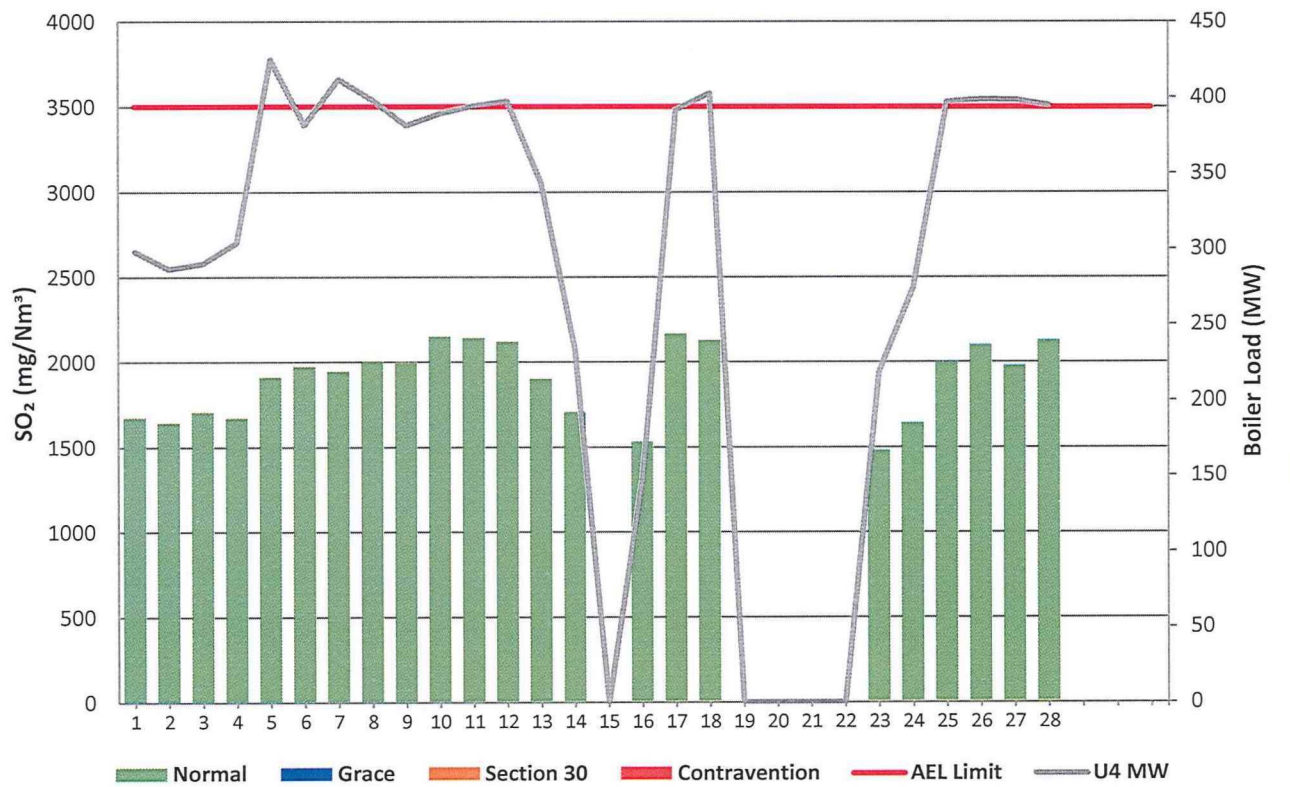


Figure 9: Duvha Unit 5 SO₂ Emissions - February 2023

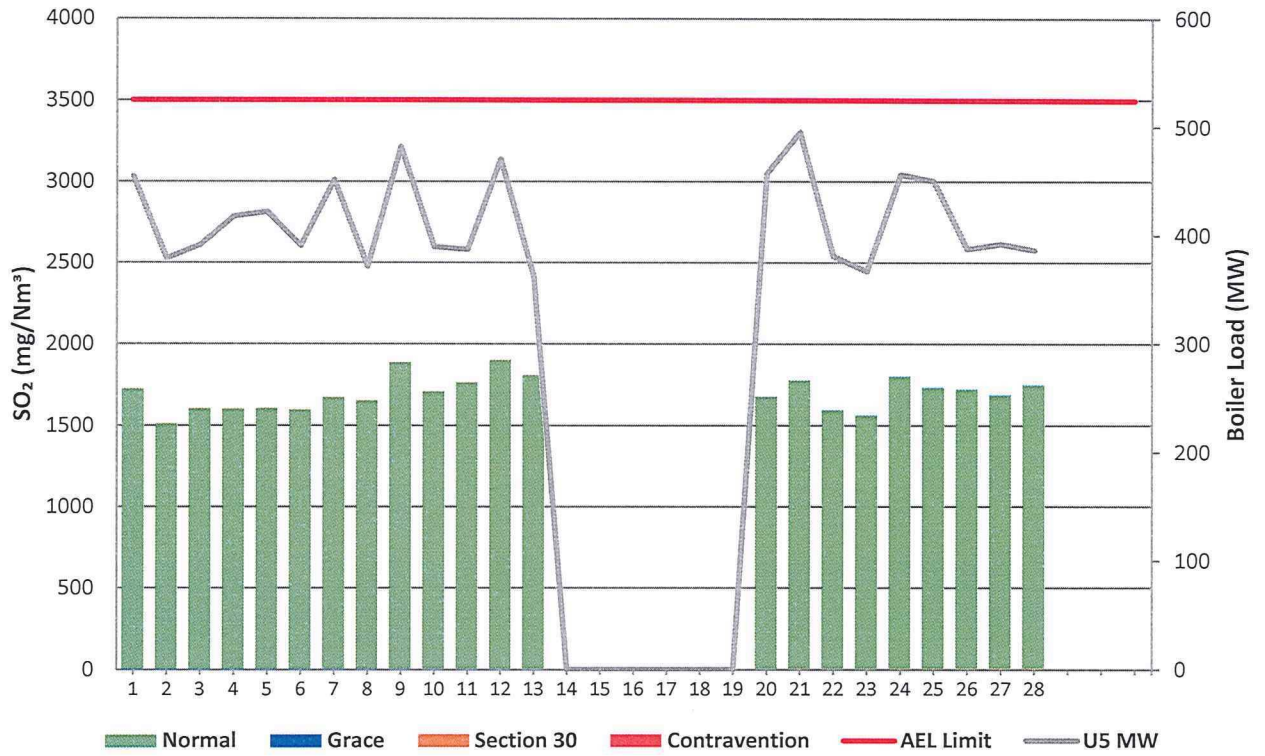


Figure 10: Duvha Unit 6 SO₂ Emissions - February 2023

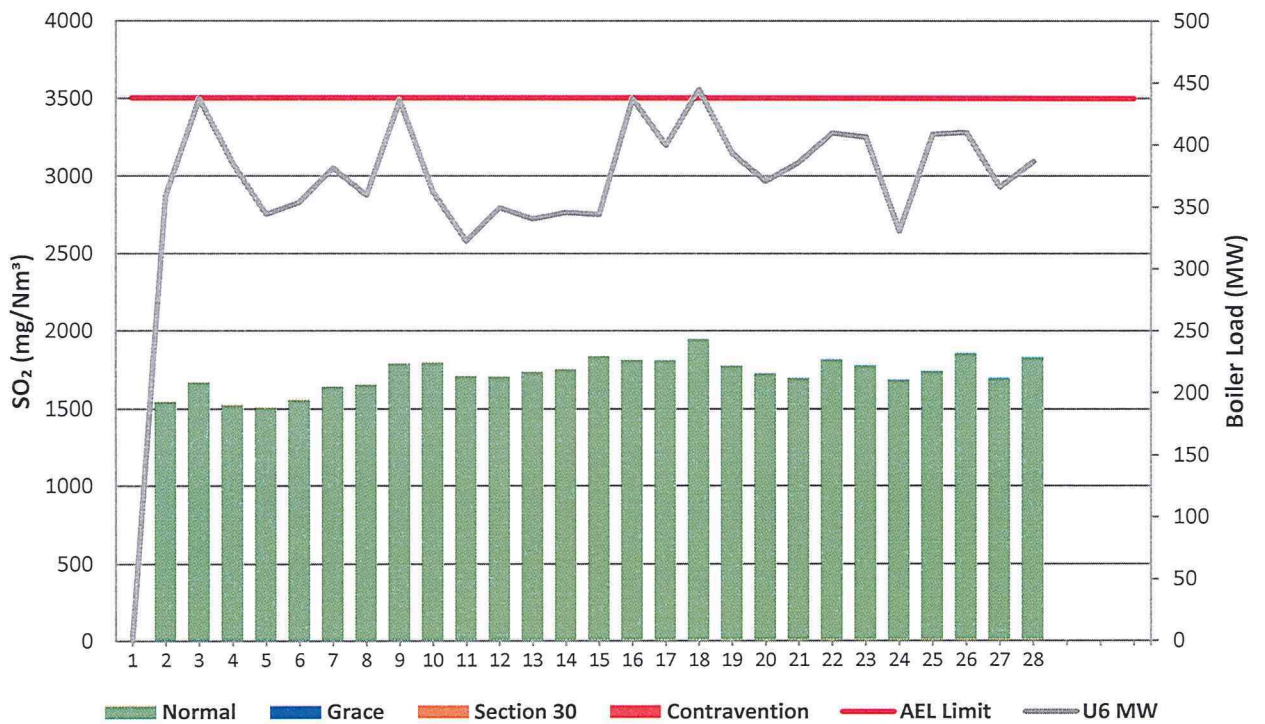


Figure 11: Duvha Unit 1 NOx Emissions - February 2023

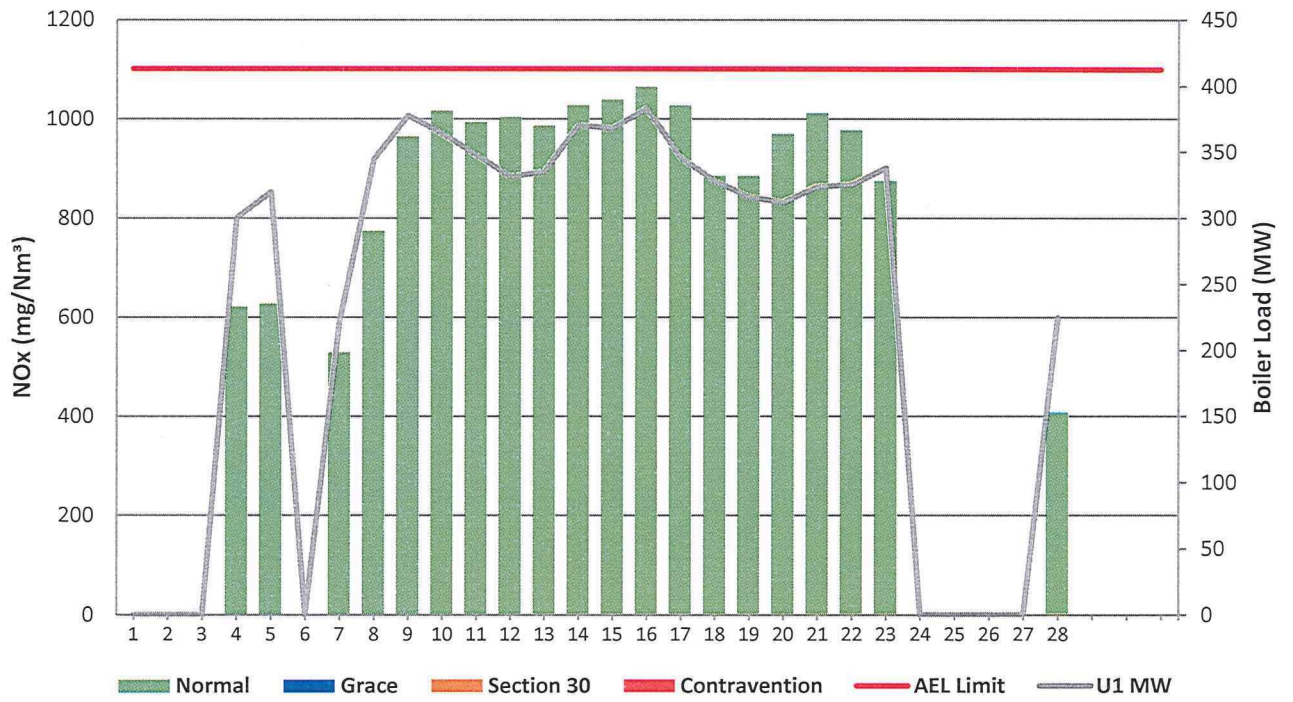


Figure 12: Duvha Unit 2 NOx Emissions - February 2023

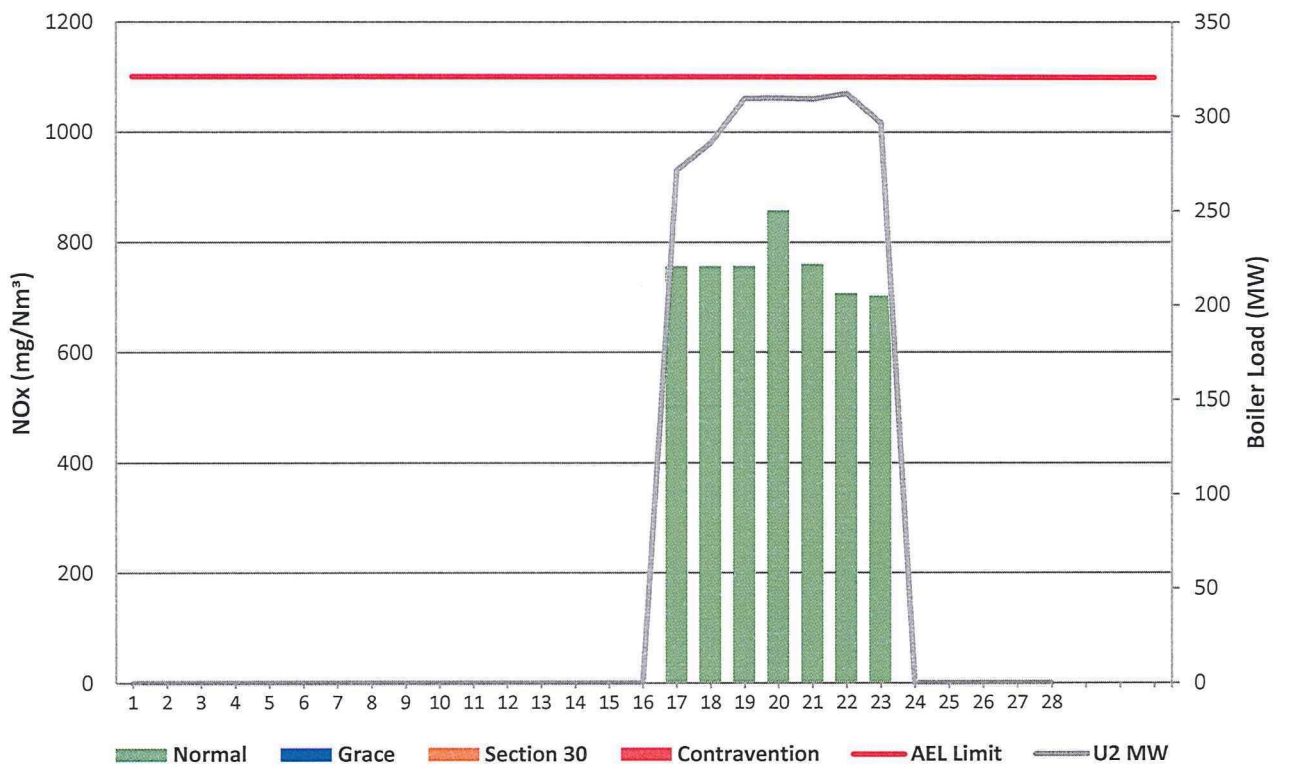


Figure 13: Duvha Unit 4 NOx Emissions - February 2023

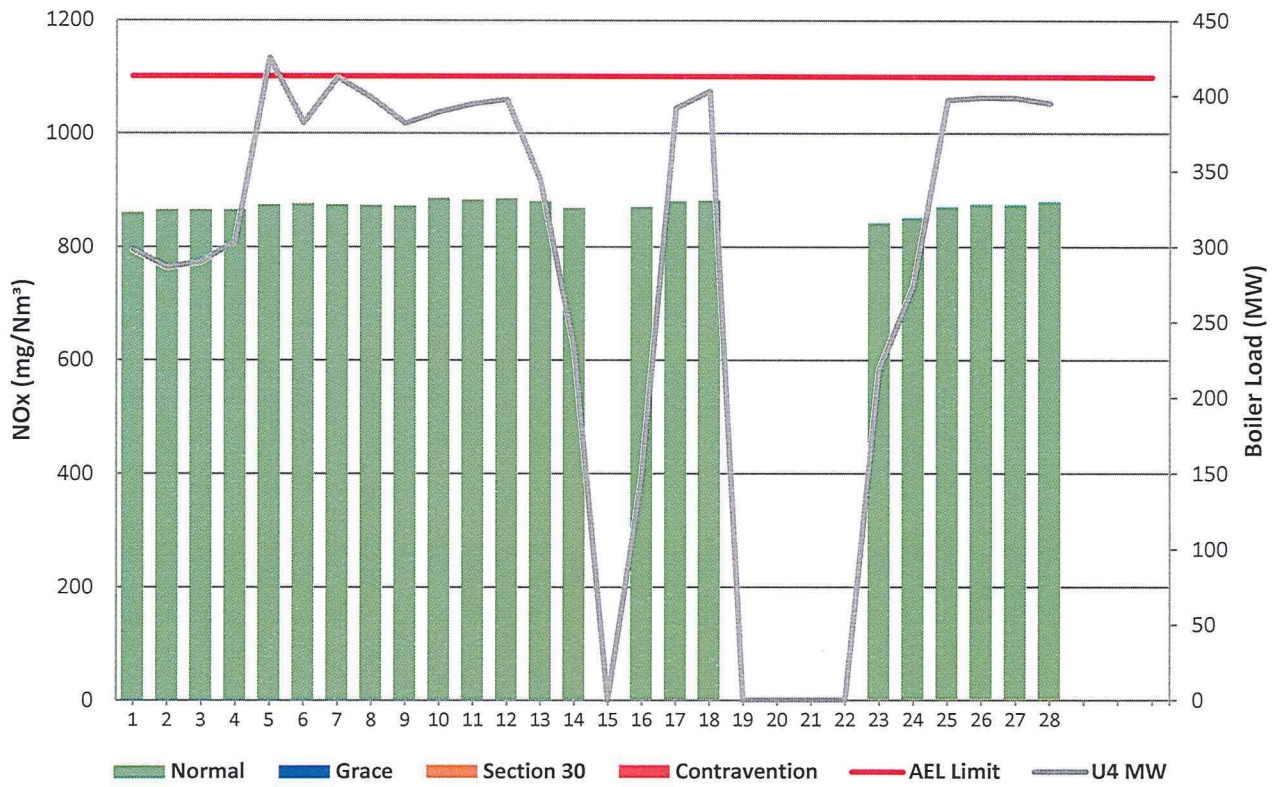


Figure 14: Duvha Unit 5 NOx Emissions - February 2023

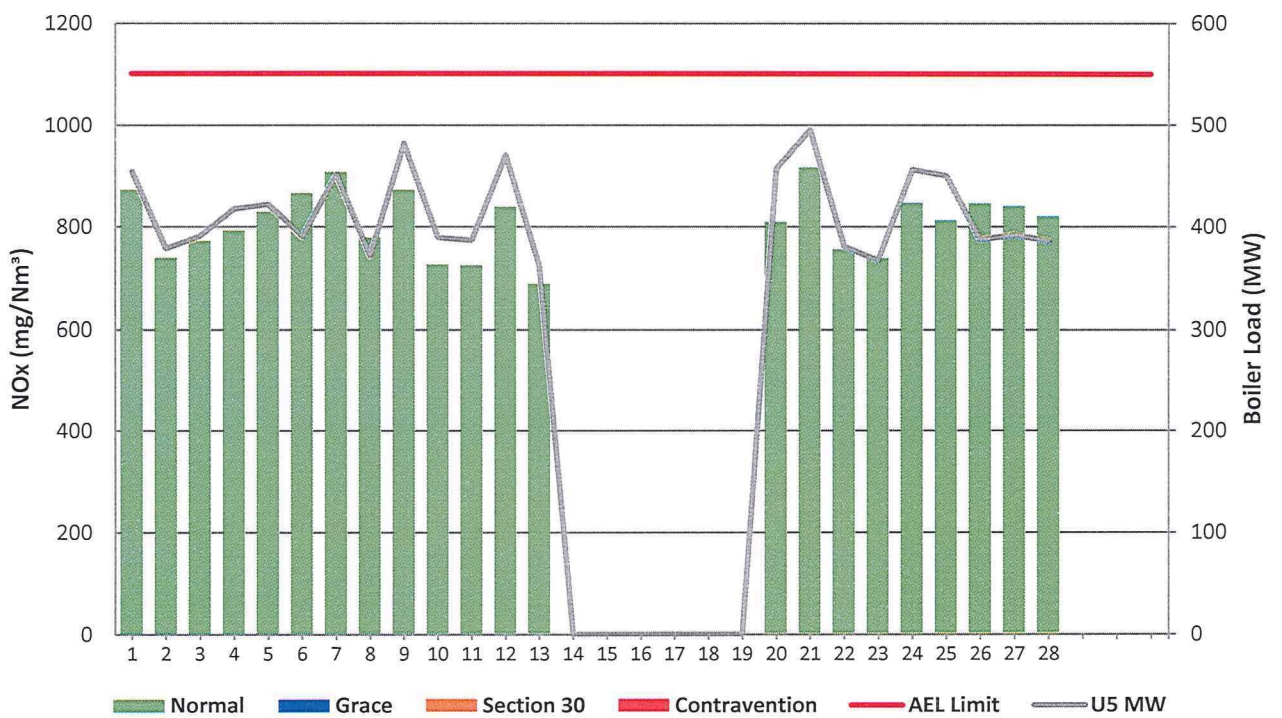
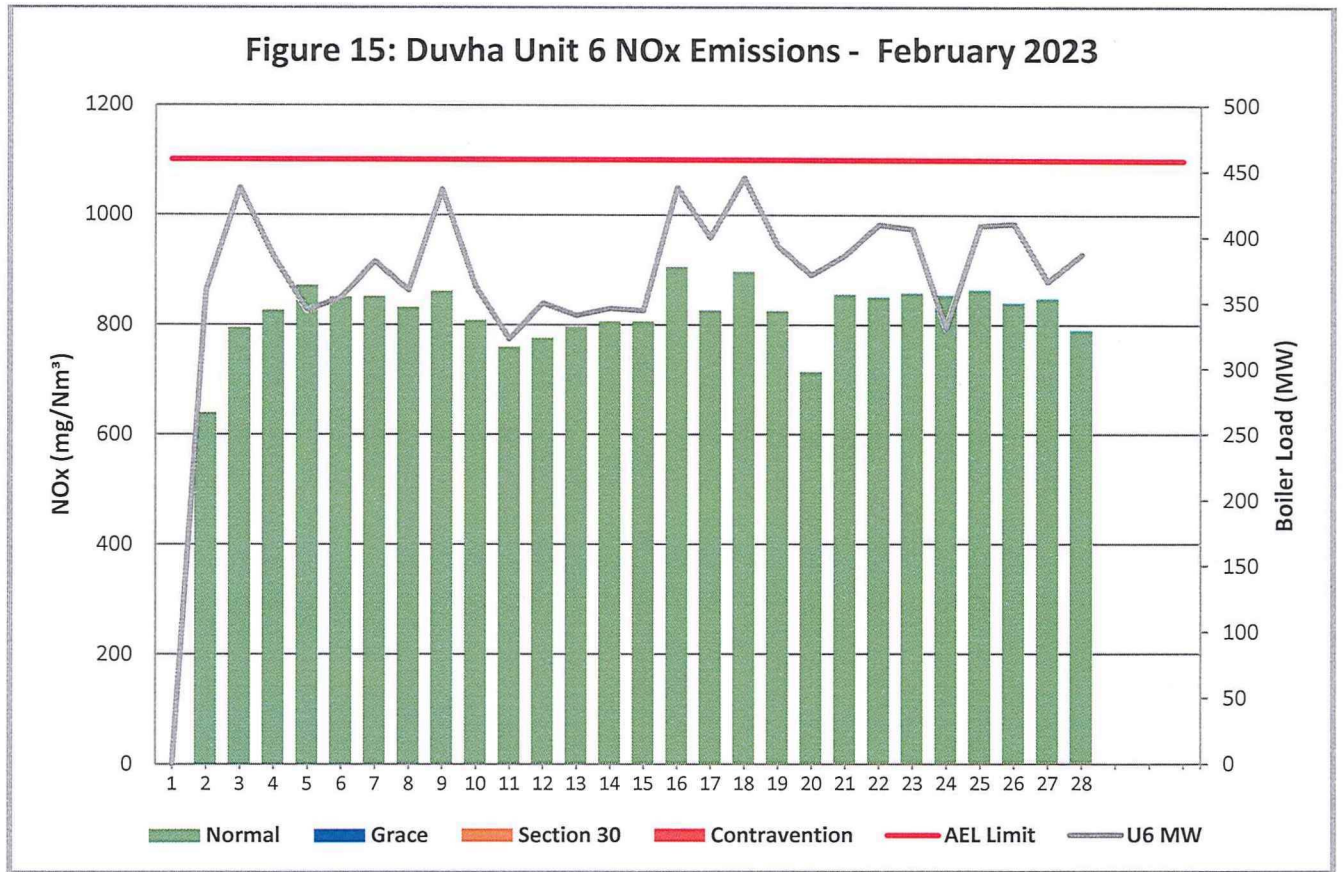


Figure 15: Duvha Unit 6 NOx Emissions - February 2023



7 SHUT DOWN AND LIGHT UP INFORMATION

Tables 7.1: Shut-down and light-up information for the month of February 2023

Unit No.1	Event 1		Event 2		Event 3		Event 4	
Breaker Open (BO)	BO previously	BO previously	8:05 am	2023/02/05	BO previously	BO previously	11:25 am	2023/02/23
Draught Group (DG) Shut Down (SD)	n/a	n/a	10:15 pm	2023/02/05	n/a	n/a	1:15 am	2023/02/24
BO to DG SD (duration)	n/a	DD:HH:MM	00:14:10	DD:HH:MM	n/a	DD:HH:MM	00:13:50	DD:HH:MM
Fires in time	12:15 pm	2023/02/03			3:35 pm	2023/02/07		
Synch. to Grid (or BC)	2:30 am	2023/02/04			3:35 pm	2023/02/08		
Fires in to BC (duration)	00:14:15	DD:HH:MM		DD:HH:MM	01:00:00	DD:HH:MM		DD:HH:MM
Emissions below limit from BC (end date)	not > limit	not > limit			not > limit	not > limit		
Emissions below limit from BC (duration)	n/a	DD:HH:MM		DD:HH:MM	n/a	DD:HH:MM		DD:HH:MM

Unit No.2	Event 1		Event 2	
Breaker Open (BO)	<i>BO previously</i>	<i>BO previously</i>	<i>7:15 pm</i>	<i>2023/02/23</i>
Draught Group (DG) Shut Down (SD)	<i>n/a</i>	<i>n/a</i>	<i>9:15 am</i>	<i>2023/02/24</i>
BO to DG SD (duration)	<i>n/a</i>	DD:HH:MM	<i>00:14:00</i>	DD:HH:MM
Fires in time	<i>12:45 am</i>	<i>2023/02/17</i>		
Synch. to Grid (or BC)	<i>3:30 pm</i>	<i>2023/02/17</i>		
Fires in to BC (duration)	<i>00:14:45</i>	DD:HH:MM		DD:HH:MM
Emissions below limit from BC (end date)	<i>not > limit</i>	<i>not > limit</i>		
Emissions below limit from BC (duration)	<i>n/a</i>	DD:HH:MM		DD:HH:MM

Unit No.4	Event 1		Event 2		Event 3		Event 4	
Breaker Open (BO)	<i>BO previously</i>	<i>BO previously</i>	<i>3:25 pm</i>	<i>2023/02/03</i>	<i>BO previously</i>	<i>BO previously</i>	<i>11:55 am</i>	<i>2023/02/13</i>
Draught Group (DG) Shut Down (SD)	<i>n/a</i>	<i>n/a</i>	<i>5:30 pm</i>	<i>2023/02/03</i>	<i>n/a</i>	<i>n/a</i>	<i>6:15 pm</i>	<i>2023/02/13</i>
BO to DG SD (duration)	<i>n/a</i>	DD:HH:MM	<i>00:02:05</i>	DD:HH:MM	<i>n/a</i>	DD:HH:MM	<i>00:06:20</i>	DD:HH:MM
Fires in time	<i>2:20 am</i>	<i>2023/02/01</i>			<i>1:05 am</i>	<i>2023/02/04</i>		
Synch. to Grid (or BC)	<i>7:15 am</i>	<i>2023/02/02</i>			<i>9:40 am</i>	<i>2023/02/04</i>		
Fires in to BC (duration)	<i>01:04:55</i>	DD:HH:MM		DD:HH:MM	<i>00:08:35</i>	DD:HH:MM		DD:HH:MM
Emissions below limit from BC (end date)	<i>3:25 pm</i>	<i>2023/02/03</i>			<i>12:00 am</i>	<i>2023/02/05</i>		
Emissions below limit from BC (duration)	<i>01:15:25</i>	DD:HH:MM		DD:HH:MM	<i>01:00:00</i>	DD:HH:MM		DD:HH:MM

Unit No.5	Event 1		Event 2		Event 3		Event 4	
Breaker Open (BO)	<i>5:35 am</i>	<i>2023/02/10</i>	<i>BO previously</i>	<i>BO previously</i>	<i>11:30 pm</i>	<i>2023/02/13</i>	<i>BO previously</i>	<i>BO previously</i>
Draught Group (DG) Shut Down (SD)	<i>9:10 am</i>	<i>2023/02/10</i>	<i>n/a</i>	<i>n/a</i>	<i>2:10 pm</i>	<i>2023/02/14</i>	<i>n/a</i>	<i>n/a</i>
BO to DG SD (duration)	<i>00:03:35</i>	DD:HH:MM	<i>n/a</i>	DD:HH:MM	<i>00:14:40</i>	DD:HH:MM	<i>n/a</i>	DD:HH:MM
Fires in time			<i>3:05 am</i>	<i>2023/02/11</i>			<i>6:25 pm</i>	<i>2023/02/19</i>
Synch. to Grid (or BC)			<i>7:10 am</i>	<i>2023/02/11</i>			<i>12:35 am</i>	<i>2023/02/20</i>
Fires in to BC (duration)		DD:HH:MM	<i>00:04:05</i>	DD:HH:MM		DD:HH:MM	<i>00:06:10</i>	DD:HH:MM
Emissions below limit from BC (end date)			<i>3:00 pm</i>	<i>2023/02/12</i>			<i>12:00 am</i>	<i>2023/02/22</i>
Emissions below limit from BC (duration)		DD:HH:MM	<i>01:07:50</i>	DD:HH:MM		DD:HH:MM	<i>01:23:25</i>	DD:HH:MM

8 GENERAL

Exceedances:

Unit 4:

07/02/2023

- Faulty Electrostatic Precipitator fields communication.

Unit 5:

01/02/2023

- Cold unit light up.

05/02/2023

- High Back-end temps after soot blowing conducted. This is due to low sootblower reliability.

07/02/2023

- Faulty Electrostatic Precipitator fields communication.

09-10/02/2023

- SO3 plant tripped on sulphur burner airblock valve not opening,
- Electrostatic Precipitator fields screens faulty

12-13/02/2023

- Cold unit light up.

21/02/2023

- Dust Handling plant row 4 left hand side was blocked
- Full dust hoppers

24-26/02/2023

- Contravention Incident: The 48 Hours allowable for upset conditions were exceeded on Duvha's unit 5 on the 26th of February 2023. A detailed investigation report with root cause and preventative actions will be submitted to your office once the investigation is completed.

Unit 6:

03-04/02/2023

- Cold unit light up.

07/02/2023

- The SO3 plant sulphur injection rate kept fluctuating and the plant tripped.
- A total of five Electrostatic Precipitator fields were not in service.

09-10/02/2023

- Electrostatic Precipitator fields communication screen failure due to PLC/Gateway faulty,
- Electrostatic Precipitator field 2.3 pilot relay faulty,
- Plate rapper no 2 not rapping,
- Dust Handling plant rows 1 and 2 blocked

12-15/02/2023

- Contravention Incident: The 48 Hours allowable for upset conditions were exceeded on Duvha's unit 6 from the 13th of February 2023. A detailed investigation report with root cause and preventative actions will be submitted to your office once the investigation is completed.

18/02/2023

- Cold unit light up.

Unit 2 gaseous emissions monitors reliability for the month of February 2023 were less than 80% due to the power supply trip which tripped the monitors. The power supply was restored to the monitors.

The particulate matter and gaseous emissions monitors for units 4 to 6 reliabilities for below 80% on the 24th and 25th of February 2023 due to the monitors that tripped when there was loss of power supply to the monitors.

The fuel oil usage for the month of February 2023 exceeded the permitted consumption rate due to the following reasons:




- A high number of units light ups
- Units running at half loads due to the unavailability of B Electric Feed pumps and Boiler Feed Pump Turbine

The averages Oxygen(O₂) and Carbon Dioxide (CO₂) data from the QAL 2 tests reports were used for reporting for Units 1, 2, 4, 5, and 6 due to poor performance of the O₂ and CO₂ gaseous monitors. These poor performances of the gaseous monitors were identified to be caused by the incorrect installation of O₂ analyser. An action is being implemented to relocate all the units' O₂ monitors to their own measurement port. The monitors have been relocated successfully and are being verified.

The rest of the information demonstrating compliance with the emission license conditions is supplied in the annual emission report which will be sent to your office

9 Complaints and 10 S30 Incidents Register

Refer to addendum A

 Boiler Plant Engineering Manager	<u>31 March 2023</u> Date	 Environmental Manager	<u>12/04/2023</u> Date
 Engineering Manager	<u>12/04/2023</u> Date		

Compiled by: Environmental Officer

For: Nkangala District Municipality Air Quality Officer

Copies: Generation Environmental Management D Herbst
B Mccourt

Generation Compliance Management R Rampiar
Generation Asset Management E Patel

Duvha Power Station: Engineering Manager
Operating Manager
Maintenance Manager
Production Manager
Boiler Engineering Manager
System Engineer
Environmental Manager

9 COMPLAINTS REGISTER

Table 9. Complaints for the month of February 2023

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

10 S30 INCIDENT OR LEGAL CONTRAVENTION REGISTER

To be completed in the case of a S30 incident or a legal contravention:

Unit no	Incident Start Date	Incident End Date	Incident Cause	Remedial action	S30 initial notification sent	Date S30 investigation report sent	Date DEA Acknowledgment	Date DEA Acceptable	Comments / Reference No.
Unit 6	12/02/2023	15/02/2023	Incident still under investigation	Contravention incident not reported as a Section 30. Final investigation report will be submitted once investigation completed			N/A	N/A	Contravention Incident: The 48 Hours allowable for upset conditions were exceeded on Duvha's unit 6 from the 12 th of February 2023. A detailed investigation report with root cause and preventative actions will be submitted to your

							office once the investigation is completed.
Unit 5	26/02/2023	26/02/2023	Incident still under investigation	Contravention incident not reported as a Section 30. Final investigation report will be submitted once investigation completed	N/A	N/A	Contravention Incident: The 48 Hours allowable for upset conditions were exceeded on Duvha's unit 5 on the 26 th of February 2023. A detailed investigation report with root cause and preventative actions will be submitted to your office once the investigation is completed.