



Generation

Nkangala District Municipality
P O Box 437
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1050

Attention:

Mr V Mahlangu

AND

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Services
The Chief Director:
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DUVHA POWER STATION

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

GENERAL MANAGER

2023/07/07

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 Apr-2023
	Coal	Tons	1 400 000	623 694.86
Fuel Oil	Tons	5 000	5743.68	

Production Rates	Product / By-Product Name	Units	Maximum Production Capacity Permitted	Production Rate Apr-2023
	Energy	GWh	3600	1 068.86
Ash	Tons	not specified	167 524.44	
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	0.76
Ash Content	%	27 TO 30	26.86

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 Apr-2023	Technology Type	SO ₃ Utilization Apr-2023
Unit 1	FFP	99.9%	n/a	n/a
Unit 2	FFP	99.9%	n/a	n/a
Unit 4	ESP + SO ₃	99.6%	SO ₃	100.0%
Unit 5	ESP + SO ₃	99.6%	SO ₃	91.9%
Unit 6	ESP + SO ₃	99.6%	SO ₃	95.7%

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

5 MONITOR RELIABILITY (%)

Associated Unit/Stack	PM	SO ₂	NO
Unit 1	100.0	99.9	99.7
Unit 2	99.8	100.0	100.0
Unit 4	99.8	90.3	90.2
Unit 5	100.0	100.0	100.0
Unit 6	99.0	100.0	100.0

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 April 2023

Associated Unit/Stack	PM (tons)	SO ₂ (tons)	NO _x (tons)
Unit 1	31.2	3 310	1 768
Unit 2	15.8	1 794	865
Unit 4	118.7	2 642	1 511
Unit 5	133.9	2 119	839
Unit 6	110.9	2 628	1 196
SUM	410.53	12 494	6 178

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

Associated Unit/Stack	Normal	Grace	Section 30	Contravention	Total Exceedance	Average PM (mg/Nm ³)
Unit 1	24	0	0	0	0	18.7
Unit 2	20	0	0	0	0	14.0
Unit 4	19	7	0	0	7	83.4
Unit 5	18	6	0	0	6	112.2
Unit 6	22	7	0	1	8	84.8
SUM	103	20	0	1	21	

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

Associated Unit/Stack	Normal	Grace	Section 30	Contravention	Total Exceedance	Average SO ₂ (mg/Nm ³)
Unit 1	26	0	0	0	0	1 833.4
Unit 2	21	0	0	0	0	1 524.9
Unit 4	28	0	0	0	0	1 709.7
Unit 5	26	0	0	0	0	1 666.2
Unit 6	30	0	0	0	0	1 673.3
SUM	131	0	0	0	0	

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

Associated Unit/Stack	Normal	Grace	Section 30	Contravention	Total Exceedance	Average NO _x (mg/Nm ³)
Unit 1	26	0	0	0	0	964.8
Unit 2	21	0	0	0	0	731.2
Unit 4	28	0	0	0	0	971.1
Unit 5	26	0	0	0	0	654.0
Unit 6	30	0	0	0	0	757.7
SUM	131	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 - April 2023

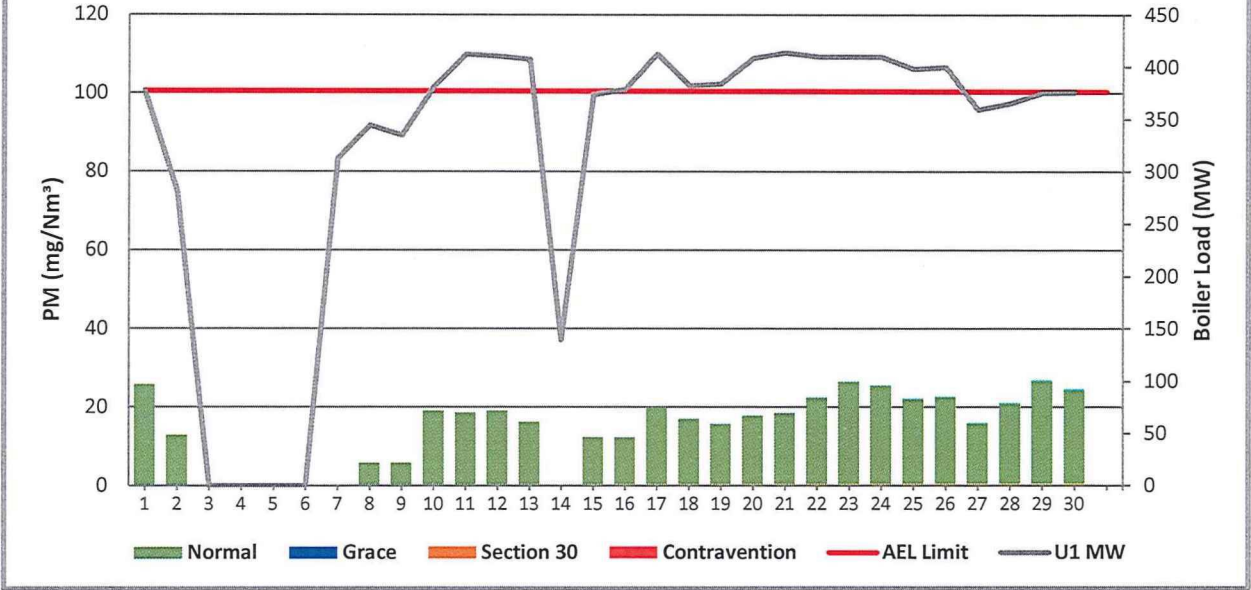


Figure 2: Duvha Unit 2 PM Emissions - April 2023

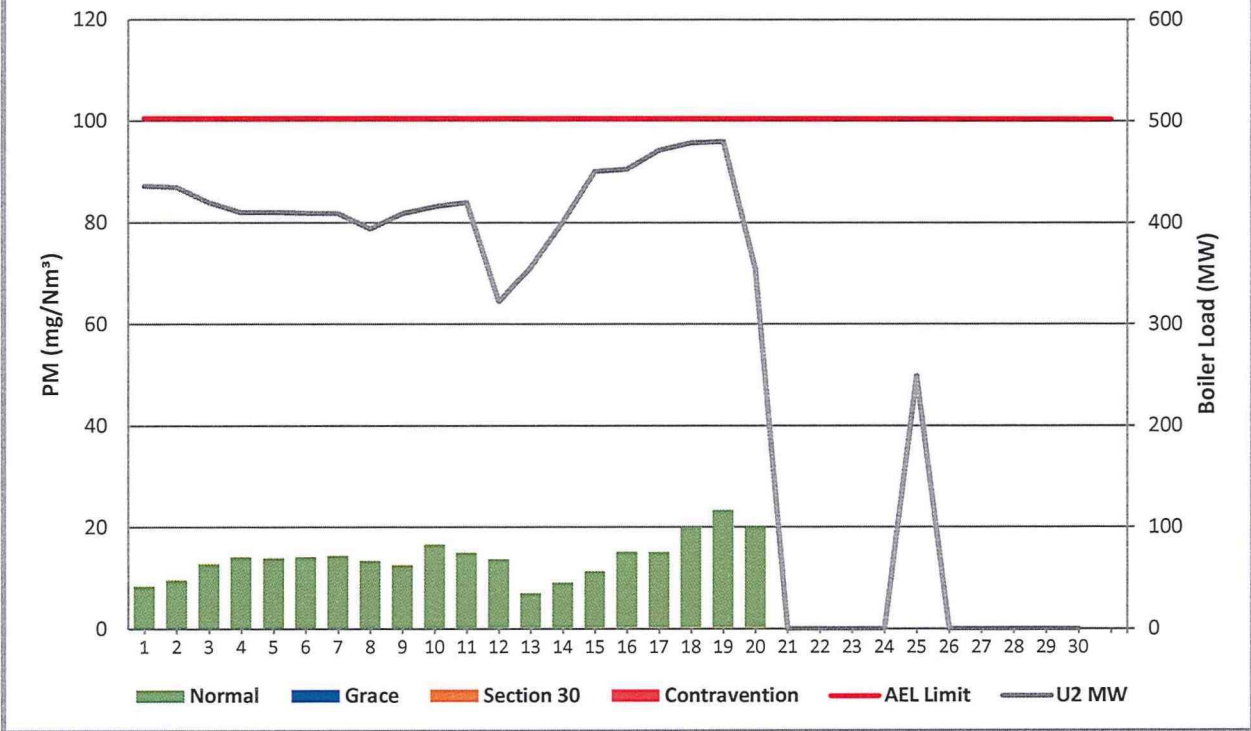


Figure 4: Duvha Unit 4 PM Emissions - April 2023

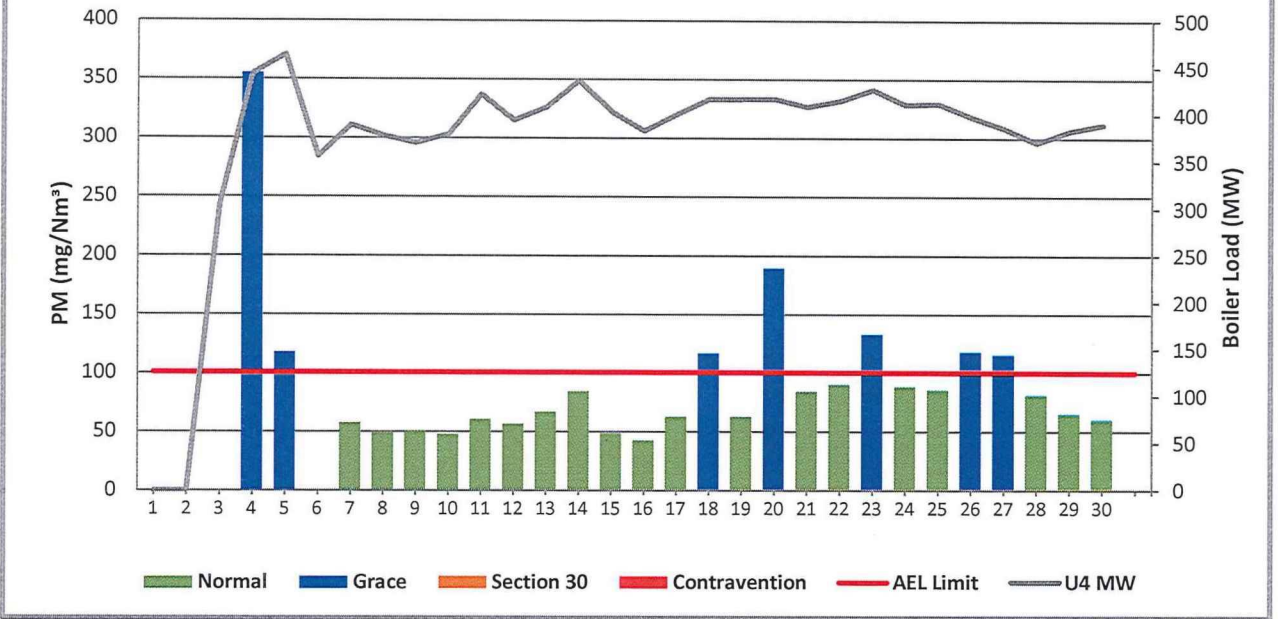


Figure 5: Duvha Unit 5 PM Emissions - April 2023

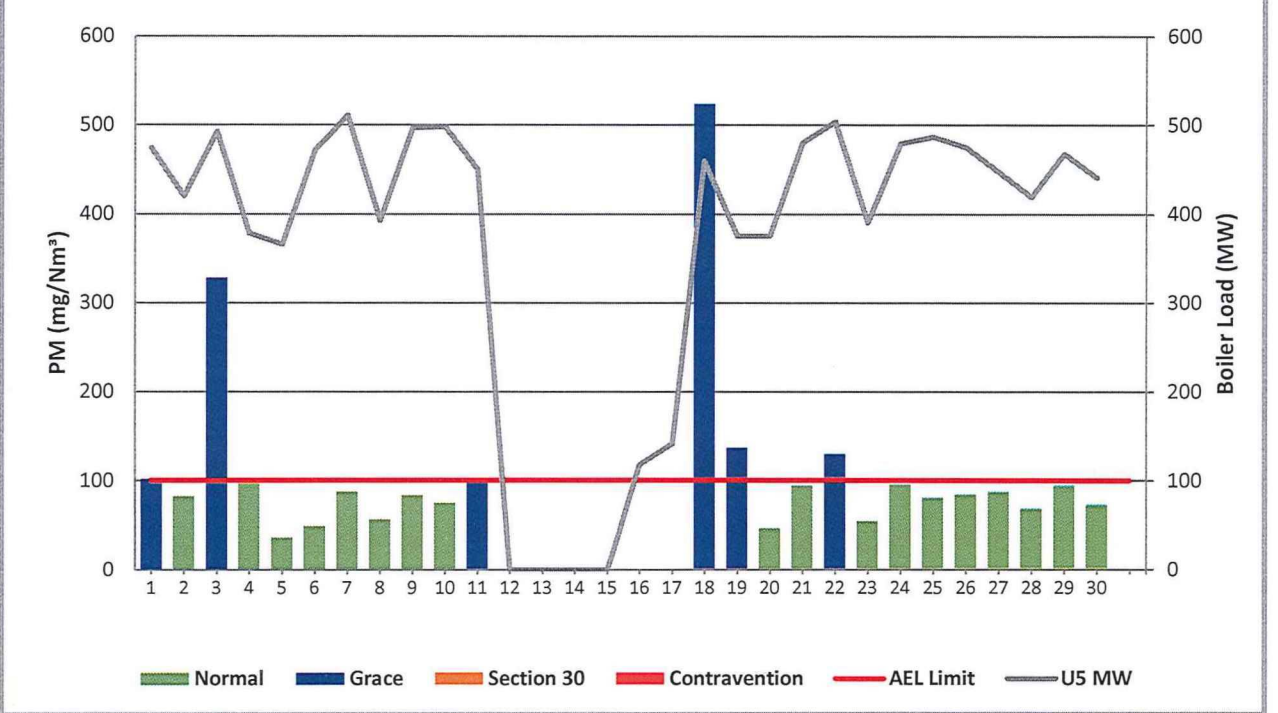


Figure 6: Duvha Unit 6 PM Emissions - April 2023

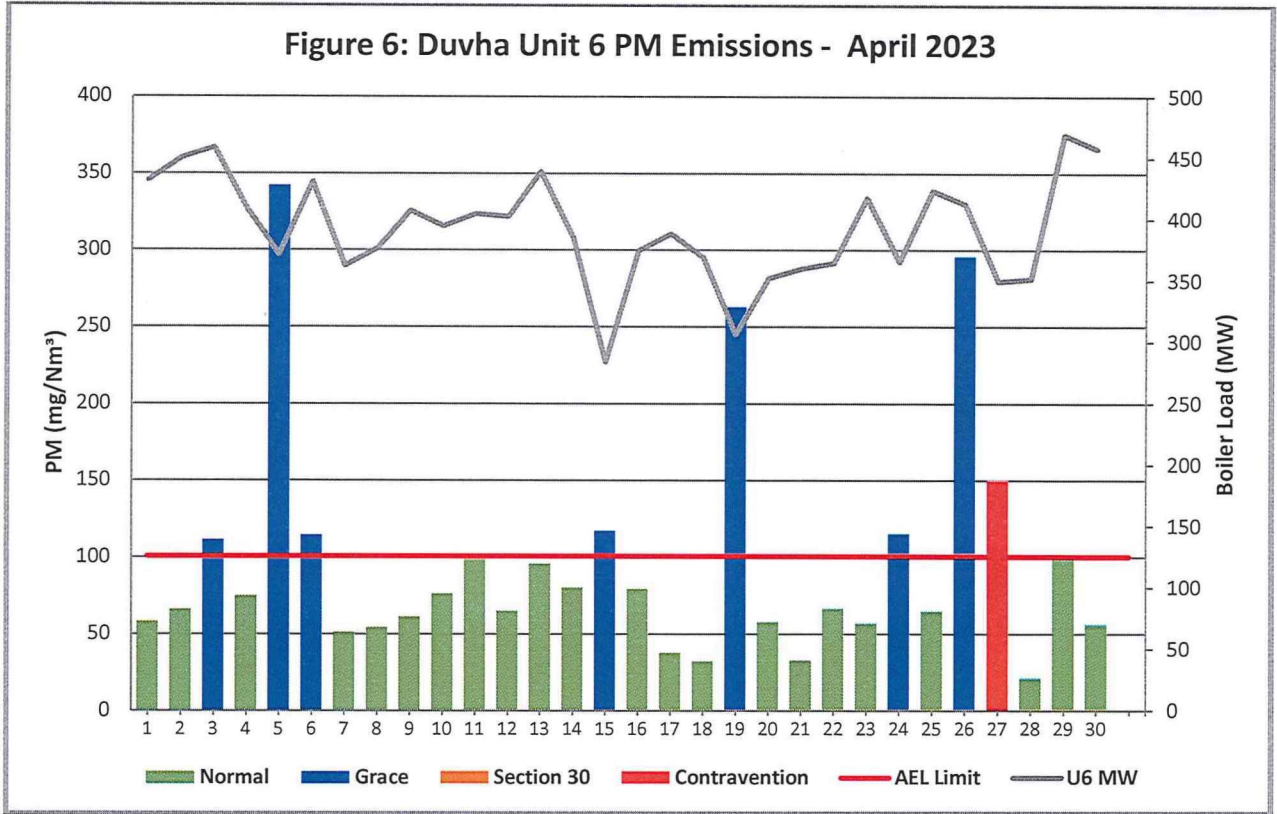
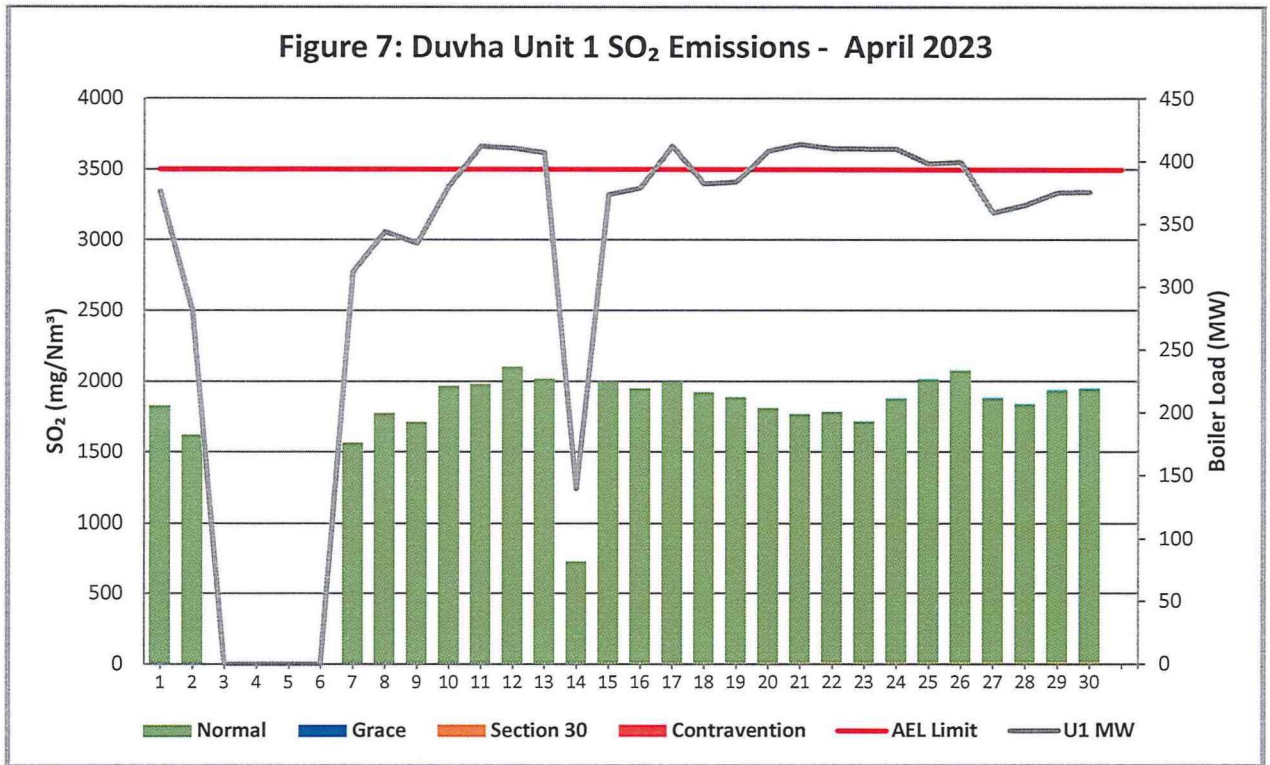


Figure 7: Duvha Unit 1 SO₂ Emissions - April 2023



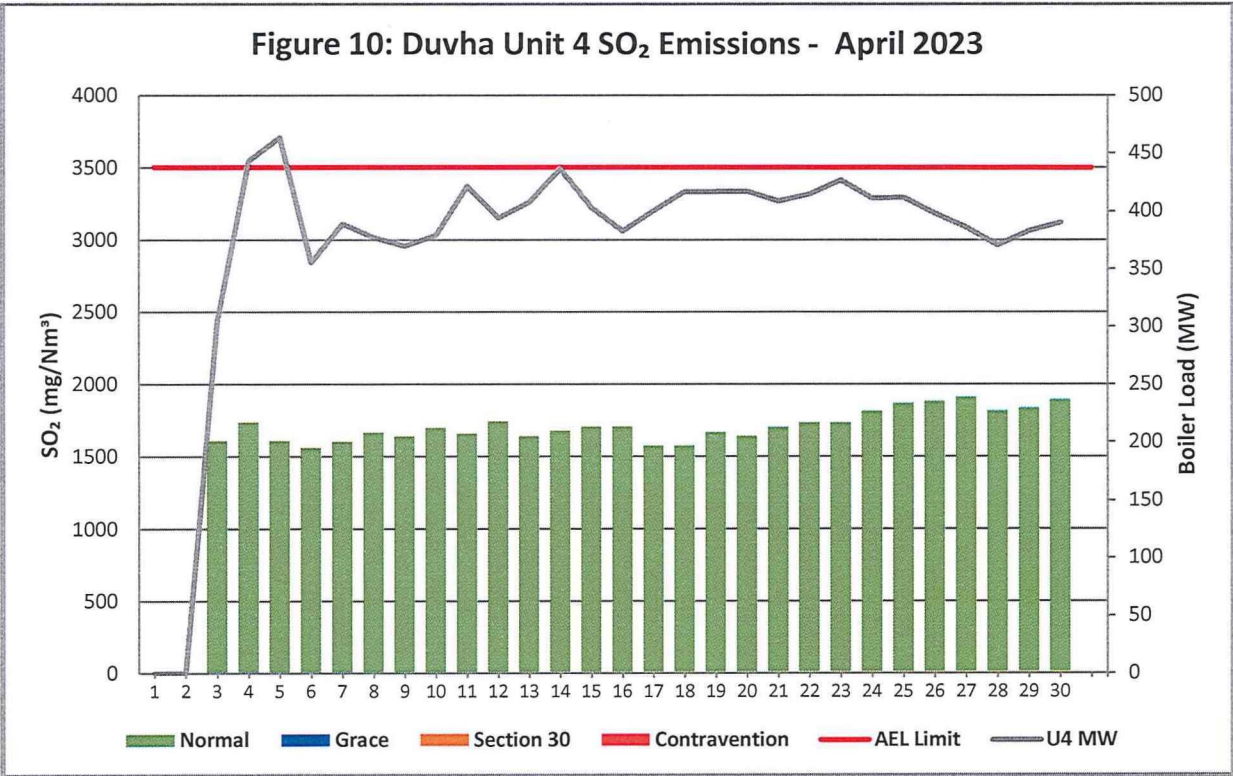
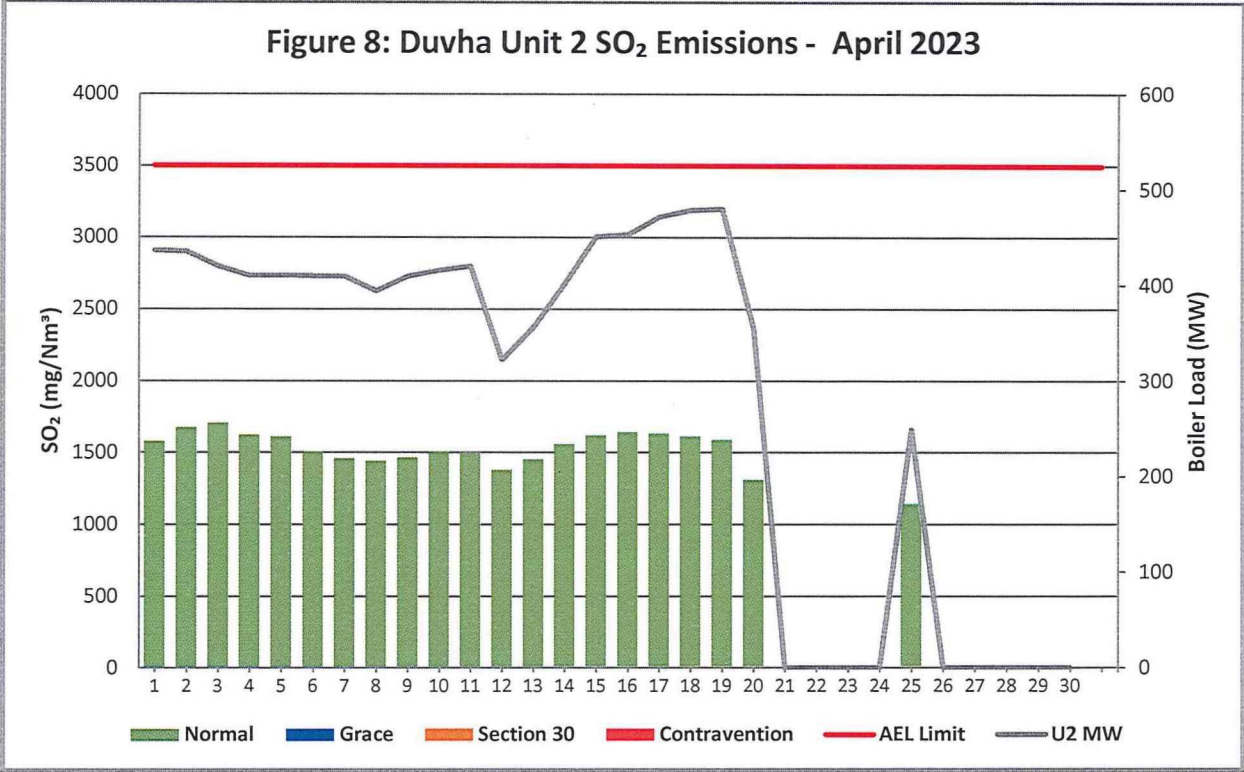


Figure 11: Duvha Unit 5 SO₂ Emissions - April 2023

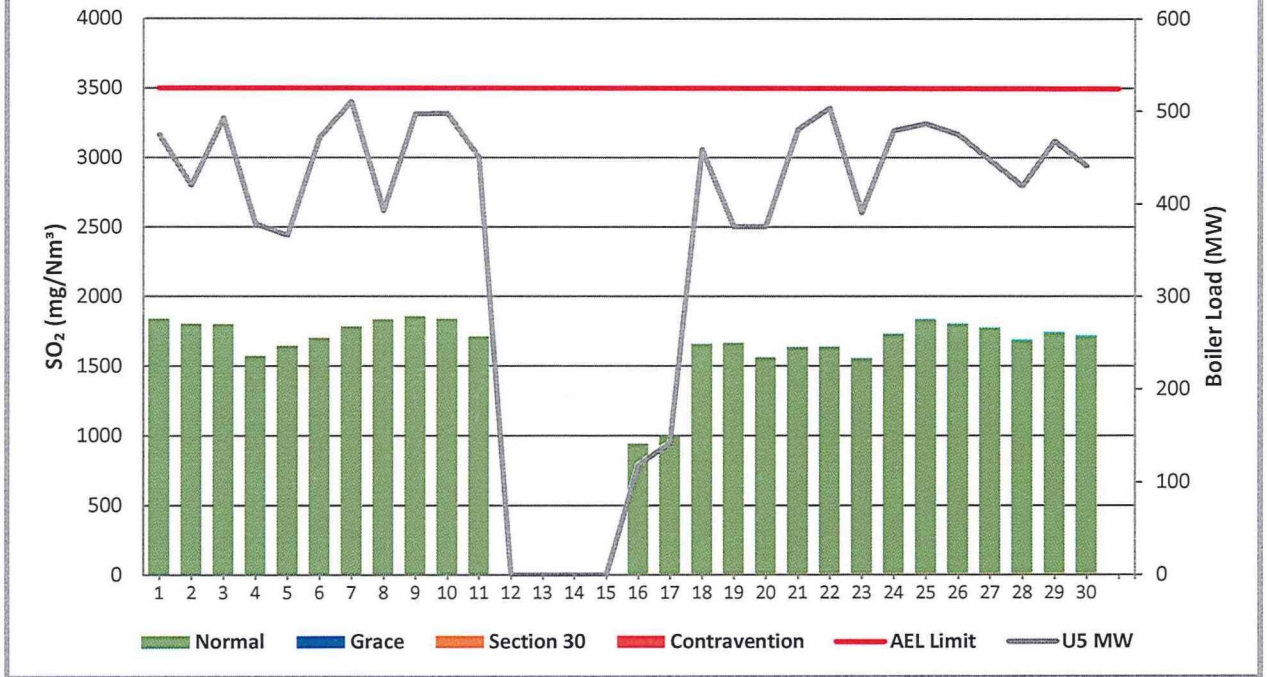


Figure 12: Duvha Unit 6 SO₂ Emissions - April 2023

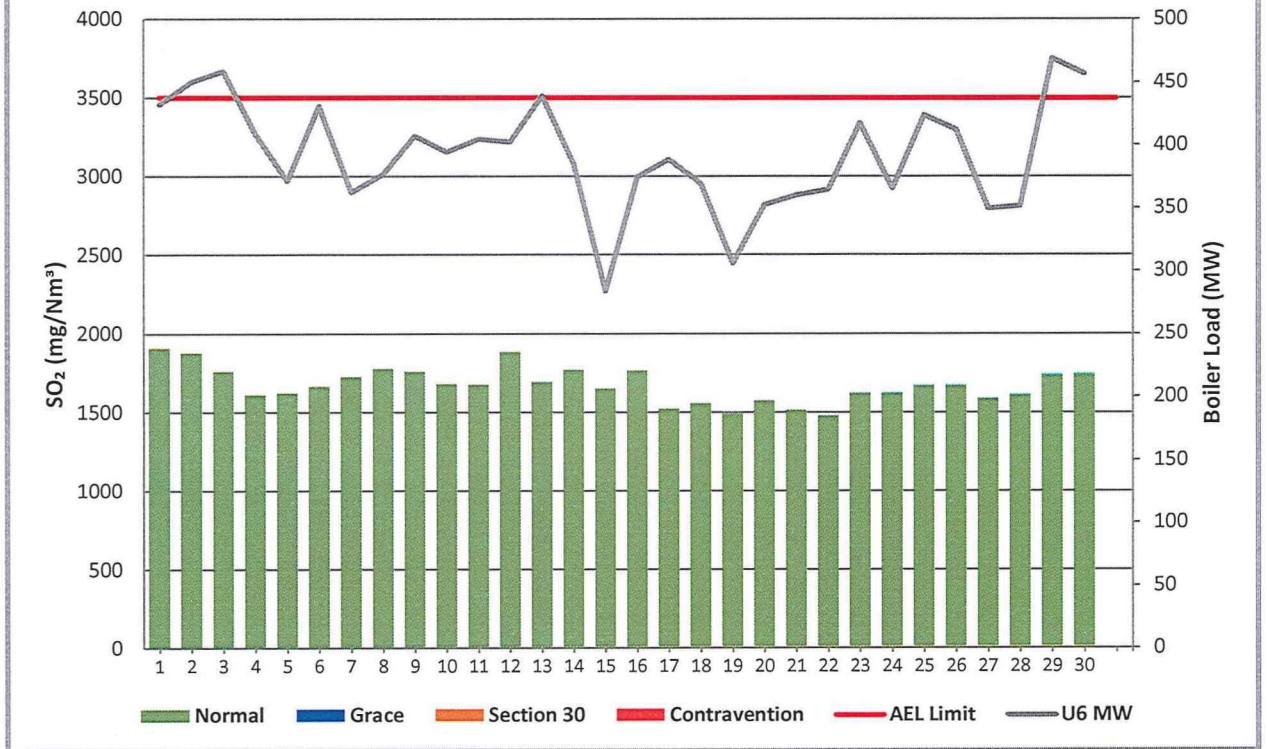


Figure 13: Duvha Unit 1 NOx Emissions - April 2023

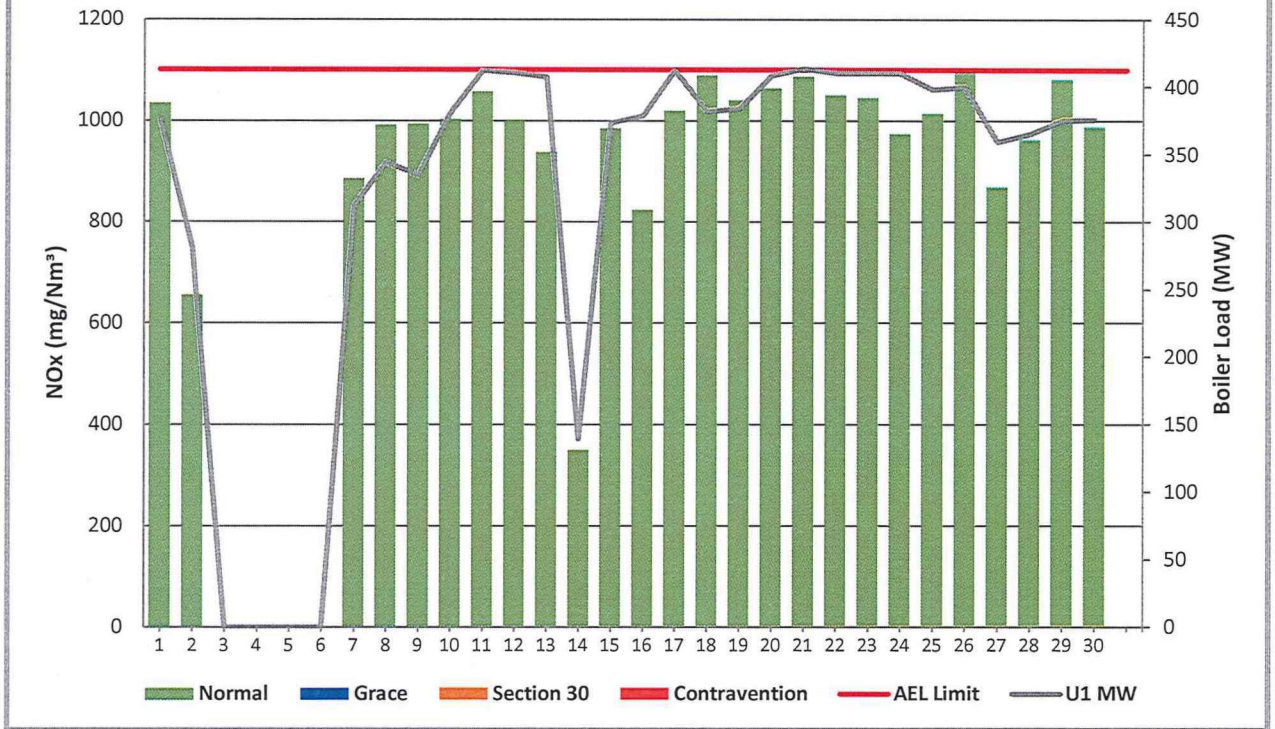


Figure 14: Duvha Unit 2 NOx Emissions - April 2023

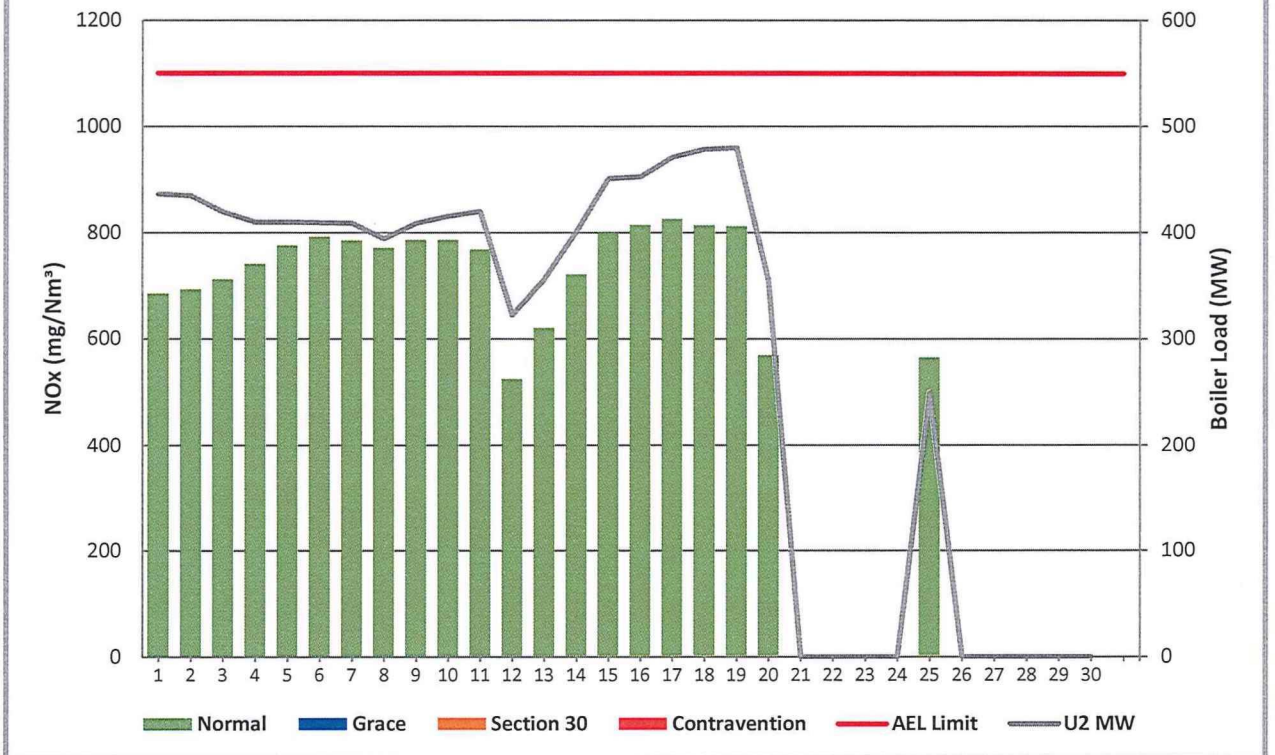


Figure 16: Duvha Unit 4 NOx Emissions - April 2023

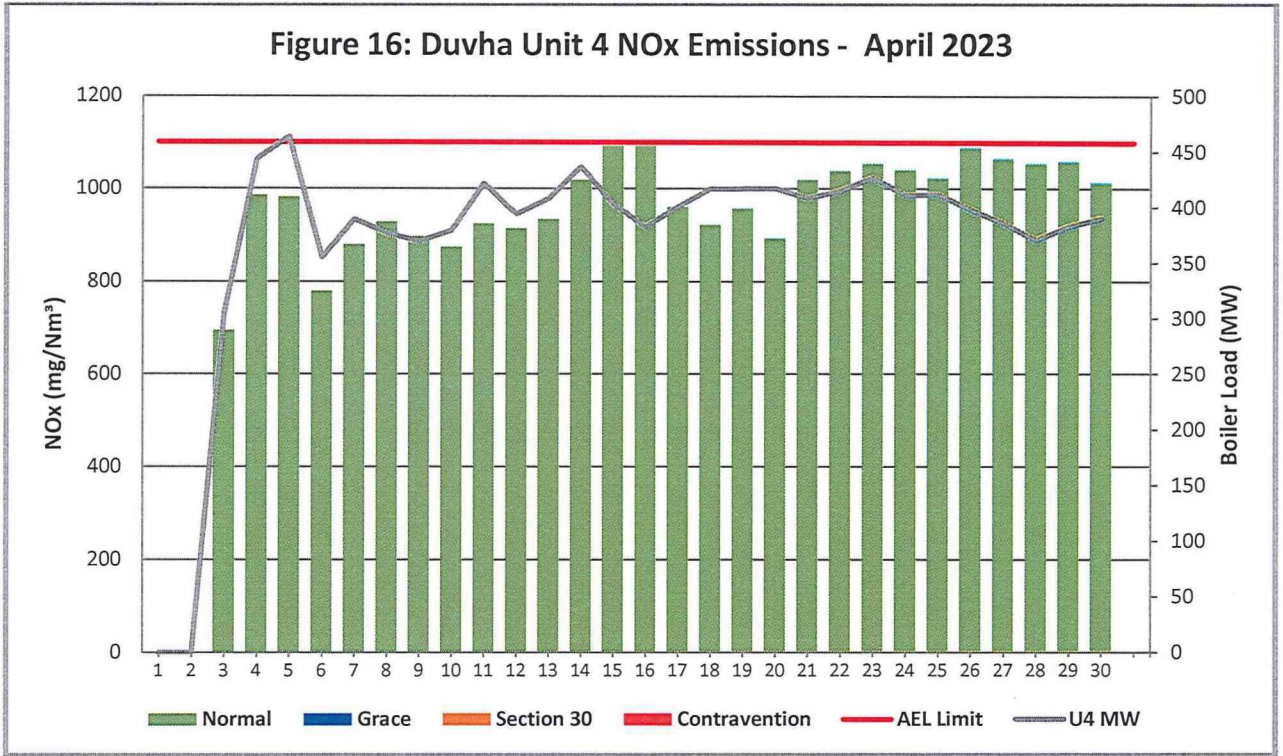
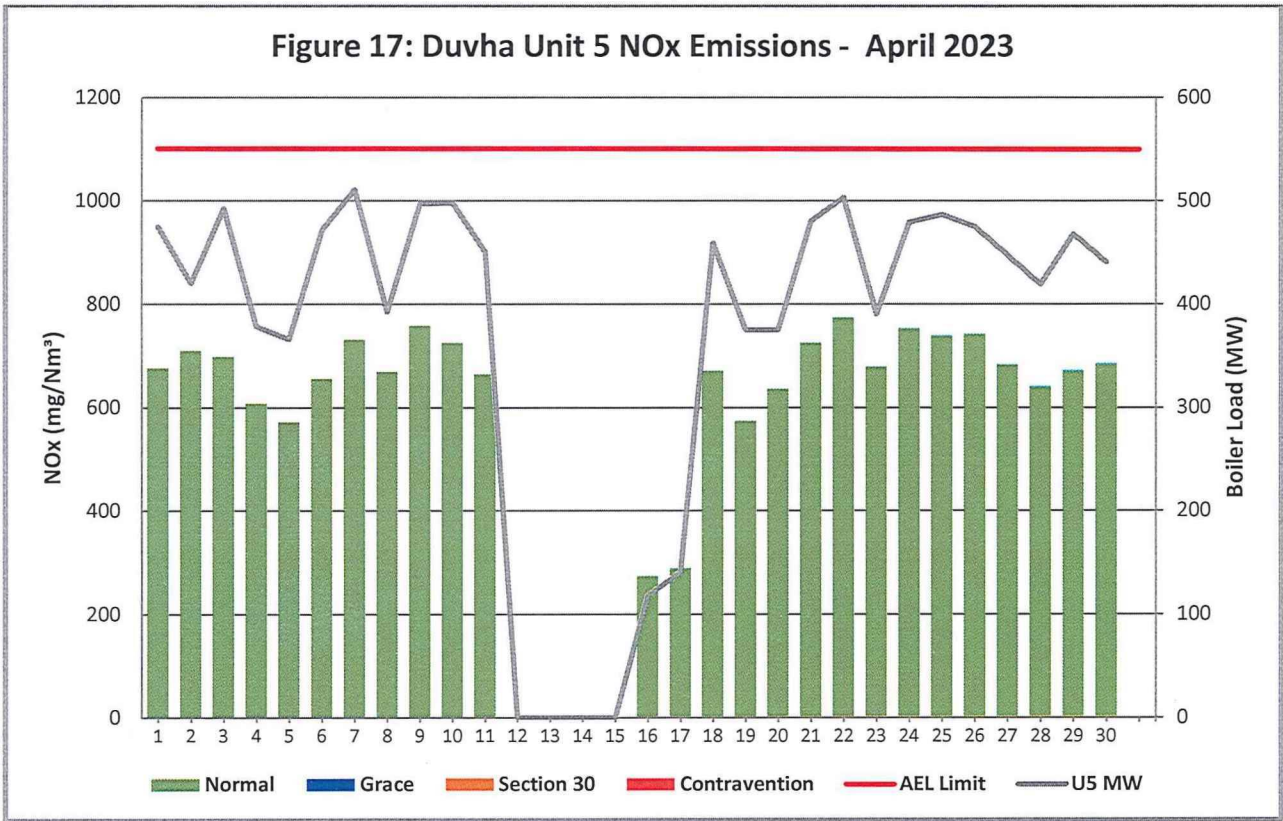
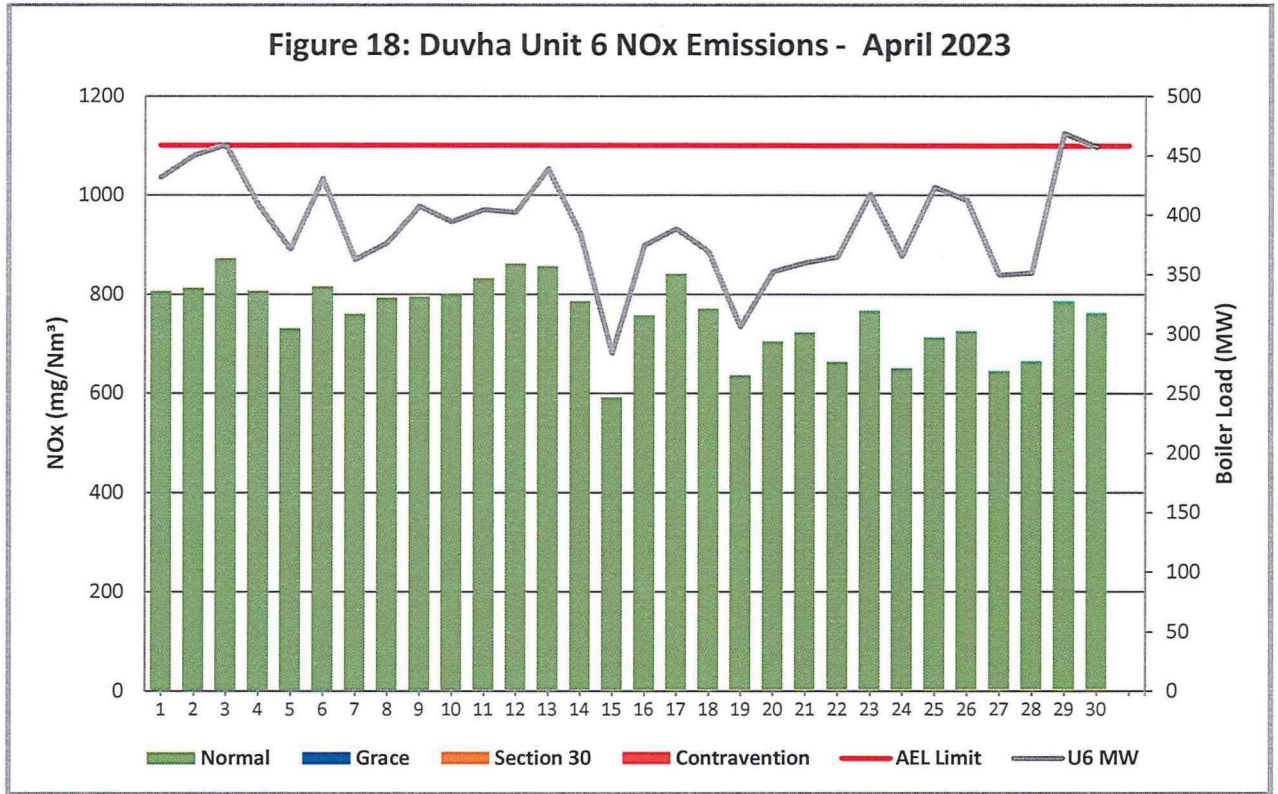


Figure 17: Duvha Unit 5 NOx Emissions - April 2023





7 SHUT DOWN AND LIGHT UP INFORMATION

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

Unit No.1	Event 1		Event 2		Event 3	
Breaker Open (BO)	1:30 am	2023/04/02	BO previously	BO previously	1:20 am	2023/04/13
Draught Group (DG) Shut Down (SD)	1:40 pm	2023/04/02	n/a	n/a	8:05 am	2023/04/13
BO to DG SD (duration)	00:12:10	DD:HH:MM	n/a	DD:HH:MM	00:06:45	DD:HH:MM
Fires in time			3:25 am	2023/04/07	2:50 pm	2023/04/14
Synch. to Grid (or BC)			7:25 am	2023/04/07	11:05 pm	2023/04/14
Fires in to BC (duration)		DD:HH:MM	00:04:00	DD:HH:MM	00:08:15	DD:HH:MM
Emissions below limit from BC (end date)			not > limit	not > limit	not > limit	not > limit
Emissions below limit from BC (duration)		DD:HH:MM	n/a	DD:HH:MM	n/a	DD:HH:MM

Unit No.2	Event 1	
Breaker Open (BO)	2:05 am	2023/04/20
Draught Group (DG) Shut Down (SD)	11:45 am	2023/04/20
BO to DG SD (duration)	00:09:40	DD:HH:MM
Fires in time		
Synch. to Grid (or BC)		
Fires in to BC (duration)		DD:HH:MM

Emissions below limit from BC (end date)		
Emissions below limit from BC (duration)		DD:HH:MM

Unit No.4	Event 1		Event 2	
Breaker Open (BO)	<i>BO previously</i>	<i>BO previously</i>	<i>3:40 pm</i>	<i>2023/04/05</i>
Draught Group (DG) Shut Down (SD)	<i>n/a</i>	<i>n/a</i>	<i>8:05 pm</i>	<i>2023/04/05</i>
BO to DG SD (duration)	<i>n/a</i>	DD:HH:MM	<i>00:04:25</i>	DD:HH:MM
Fires in time	<i>9:20 am</i>	<i>2023/04/03</i>	<i>6:20 am</i>	<i>2023/04/06</i>
Synch. to Grid (or BC)	<i>1:35 pm</i>	<i>2023/04/03</i>	<i>9:45 am</i>	<i>2023/04/06</i>
Fires in to BC (duration)	<i>00:04:15</i>	DD:HH:MM	<i>00:03:25</i>	DD:HH:MM
Emissions below limit from BC (end date)	<i>12:00 am</i>	<i>2023/04/07</i>	<i>12:00 am</i>	<i>2023/04/07</i>
Emissions below limit from BC (duration)	<i>04:00:00</i>	DD:HH:MM	<i>01:00:00</i>	DD:HH:MM

Unit No.5	Event 1		Event 2	
Breaker Open (BO)	<i>8:40 pm</i>	<i>2023/04/11</i>	<i>BO previously</i>	<i>BO previously</i>
Draught Group (DG) Shut Down (SD)	<i>3:25 pm</i>	<i>2023/04/12</i>	<i>n/a</i>	<i>n/a</i>
BO to DG SD (duration)	<i>00:18:45</i>	DD:HH:MM	<i>n/a</i>	DD:HH:MM
Fires in time			<i>6:50 am</i>	<i>2023/04/16</i>
Synch. to Grid (or BC)			<i>3:20 am</i>	<i>2023/04/17</i>
Fires in to BC (duration)		DD:HH:MM	<i>00:20:30</i>	DD:HH:MM
Emissions below limit from BC (end date)			<i>9:00 pm</i>	<i>2023/04/21</i>
Emissions below limit from BC (duration)		DD:HH:MM	<i>04:17:40</i>	DD:HH:MM

Unit No.6	Event 1		Event 2		Event 3		Event 4	
Breaker Open (BO)	<i>7:40 am</i>	<i>2023/04/05</i>	<i>12:45 pm</i>	<i>2023/04/15</i>	<i>10:10 am</i>	<i>2023/04/19</i>	<i>9:15 am</i>	<i>2023/04/24</i>
Draught Group (DG) Shut Down (SD)	<i>DG did not trip or SD</i>	<i>DG did not trip or SD</i>	<i>DG did not trip or SD</i>	<i>DG did not trip or SD</i>	<i>DG did not trip or SD</i>	<i>DG did not trip or SD</i>	<i>DG did not trip or SD</i>	<i>DG did not trip or SD</i>
BO to DG SD (duration)	<i>n/a</i>	DD:HH:MM	<i>n/a</i>	DD:HH:MM	<i>n/a</i>	DD:HH:MM	<i>n/a</i>	DD:HH:MM
Fires in time								
Synch. to Grid (or BC)								
Fires in to BC (duration)		DD:HH:MM		DD:HH:MM		DD:HH:MM		DD:HH:MM
Emissions below limit from BC (end date)								
Emissions below limit from BC (duration)		DD:HH:MM		DD:HH:MM		DD:HH:MM		DD:HH:MM

8 GENERAL

Exceedances:

Unit 4:

04 -05/03/2023

- Cold unit light up.

18/04/2023

- Electrostatic Precipitators (ESP) fields 1.1, 3.3 and 3.5 were off, Full dust hoppers (Left hand number 1, 6, 11 and 16).

20/04/2023

- High back end temperatures due to low sootblowers availability,
- ESP field 1.2 has tripped on pilot relay.

23/05/2023

- Electrostatic Precipitators fields 1.1, 3.3 and 3.5 were not in service.
- High back-end temperatures due to low sootblowers availability.

26-27/04/2023

- Electrostatic Precipitators fields 1.1, 3.3 and 3.5 were not in service.
- High back-end temperatures due to low sootblowers availability.

Unit 4 gaseous emissions monitors reliability was below the 80% threshold on the 14th to 17th of April 2023 due to the monitors freezing. The monitors were reset.

Unit 5:

01/04/2023

- Dust Handling plant (DHP) row 4 left hand side was blocked

03/04/2023

- Full dust hoppers (Left hand side 1, 7, 11, 16, 17 and Right hand side 2, 11, 12, 16, 17).
- SO3 Plant tripped due to the SO2 tank pumps that tripped.

11/04/2023

- High dust silo level due to faulty silo level probe.
- First Row ESP Fields were switch off due to DHP backlog.

18-19/04/2023

- Cold unit light up.

22/04/2023

- High back-end temperatures due to low sootblowers availability.

Unit 6:

03/04/2023

- SO3 plant went on hold due to the SO3 common plant pumps that went off after disturbance on the lights.
- High back-end temperatures due to low sootblowers availability.

05-06/04/2023

- Hot unit light up.

16/04/2023

- Hot unit light up.

19/04/2023

- Hot unit light up.

24/04/2023

- Hot unit light up.

26-27/04/2023

- Contravention Incident: The 48 Hours allowable for a hot unit light up were exceeded on Duvha's unit 6 on the 27th of April 2023. A detailed investigation report with root cause and preventative actions will be submitted to your office once the investigation is completed.

Lastly 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 in the process of being verified.

The fuel oil usage for the month of April 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 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

M. Gwembe P.P.
Boiler Plant Engineering
Manager

29/06/2023
Date

[Signature] P.P.
Environmental
Manager

29/06/2023
Date

[Signature]
Engineering Manager

2023-05-30
Date

Compiled by:

Environmental Officer

For:

Nkangala District
Municipality

Air Quality Officer

Copies:

Generation Environmental
Management

D Herbst
B
Mccourt

Generation Compliance Management
Generation Asset
Management

R
Rampiar
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 April 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 April 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	27/04/2023	27/04/2023	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 a hot unit light were exceeded on Duvha's unit 6 on the 27 th of April 2023. A detailed investigation report with root cause and preventative actions will be submitted to your office once the investigation is completed.