



**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: 2023/01/24**

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: 20**

**Total number of annexes:1**

**DUVHA POWER STATION**

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

  
GENERAL MANAGER

  
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 Dec-2022
	Coal	Tons	1 400 000	416 334.41
	Fuel Oil	Tons	5 000	3710.35

Production Rates	Product / By-Product Name	Units	Maximum Production Capacity Permitted	Production Rate Dec-2022
	Energy	GWh	3600	724.13
	Ash	Tons	not specified	112 951.53

**2 ENERGY SOURCE CHARACTERISTICS**

Coal Characteristic	Units	Stipulated Range	Monthly Average Content
Sulphur Content	%	0.6 TO >1.2	0.87
Ash Content	%	27 TO 30	27.13

### 3 EMISSION LIMITS (mg/Nm<sup>3</sup>)

Associated Unit/Stack	PM	SO <sub>2</sub>	NO <sub>x</sub>
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 Dec-2022	Technology Type	SO <sub>3</sub> Utilization Dec-2022
Unit 1	FFP	99.90%	n/a	n/a
Unit 2	FFP	99.78%	n/a	n/a
Unit 4	ESP + SO <sub>3</sub>	95.23%	SO <sub>3</sub>	99.11%
Unit 5	ESP + SO <sub>3</sub>	99.18%	SO <sub>3</sub>	89.48%
Unit 6	ESP + SO <sub>3</sub>	98.74%	SO <sub>3</sub>	93.52%

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

### 5 MONITOR RELIABILITY (%)

Associated Unit/Stack	PM	SO <sub>2</sub>	NO
Unit 1	90.45	99.78	99.78
Unit 2	53.61	97.50	97.50
Unit 4	30.72	82.03	100.00
Unit 5	100.00	99.77	99.77
Unit 6	89.33	89.29	89.29

Note: NO<sub>x</sub> emissions is measured as NO in PPM. Final NO<sub>x</sub> value is expressed as total NO<sub>2</sub>

### 6 EMISSION PERFORMANCE

Table 6.1: Monthly tonnages for the month of December 2022

Associated Unit/Stack	PM (tons)	SO <sub>2</sub> (tons)	NO <sub>x</sub> (tons)
Unit 1	24.19	3 511	1 867
Unit 2	17.53	658	408
Unit 4	764.22	1 422	664
Unit 5	115.06	974	513
Unit 6	348.71	2 011	1 065
<b>SUM</b>	<b>1 269.71</b>	<b>8 576</b>	<b>4 517</b>

Table 6.2: Operating days in compliance to PM AEL Limit - December 2022

Associated Unit/Stack	Normal	Grace	Section 30	Contravention	Total Exceedance	Average PM (mg/Nm <sup>3</sup> )
Unit 1	24	0	0	0	0	14.05
Unit 2	7	2	0	0	2	57.08
Unit 4	0	5	9	0	14	1 047.28
Unit 5	0	5	10	0	15	242.07
Unit 6	12	8	6	1	15	219.03
<b>SUM</b>	<b>43</b>	<b>20</b>	<b>25</b>	<b>1</b>	<b>46</b>	

Table 6.3: Operating days in compliance to SO<sub>2</sub> AEL Limit - December 2022

Associated Unit/Stack	Normal	Grace	Section 30	Contravention	Total Exceedance	Average SO <sub>2</sub> (mg/Nm <sup>3</sup> )
Unit 1	27	0	0	0	0	1 843.40
Unit 2	10	0	0	0	0	1 293.88
Unit 4	16	0	0	0	0	1 699.82
Unit 5	18	0	0	0	0	1 422.21
Unit 6	28	0	0	0	0	1 463.19
<b>SUM</b>	<b>99</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	

Table 6.4: Operating days in compliance to NO<sub>x</sub> AEL Limit - December 2022

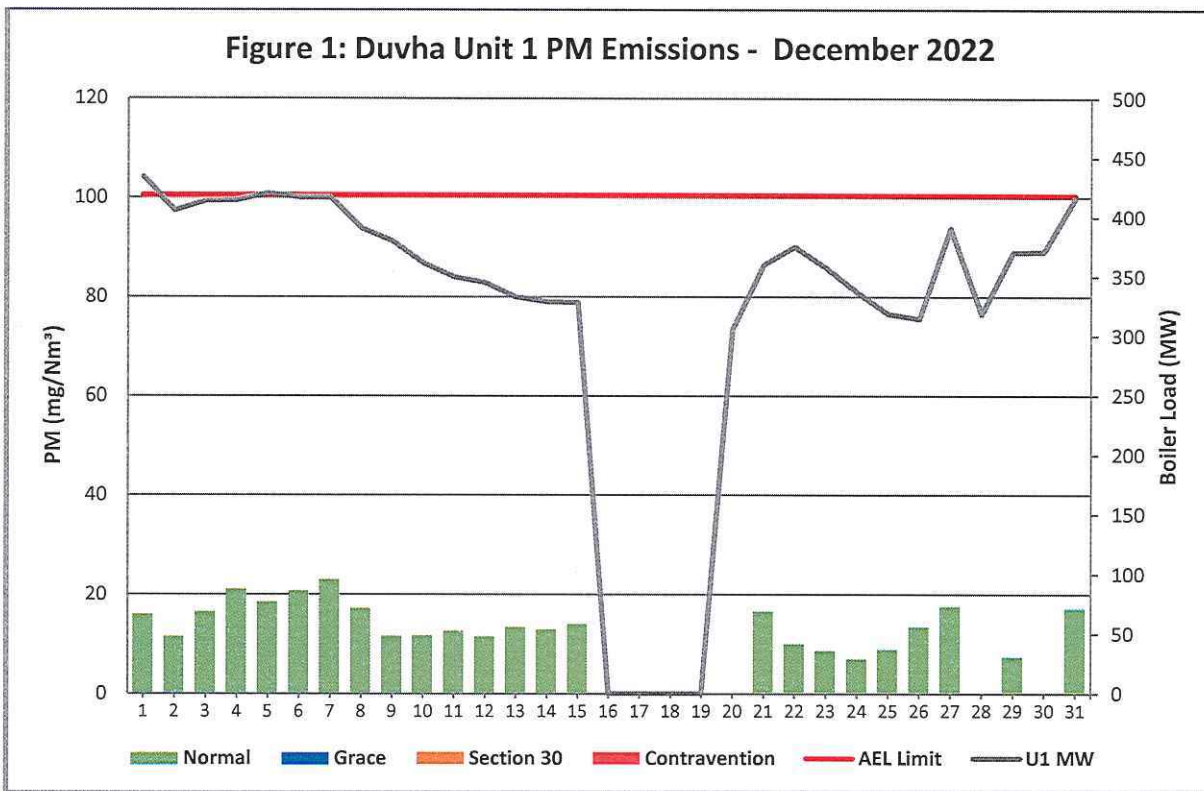
Associated Unit/Stack	Normal	Grace	Section 30	Contravention	Total Exceedance	Average NO <sub>x</sub> (mg/Nm <sup>3</sup> )
Unit 1	27	0	0	0	0	977.64
Unit 2	10	0	0	0	0	778.23
Unit 4	16	0	0	0	0	800.70
Unit 5	18	0	0	0	0	715.93
Unit 6	28	0	0	0	0	772.80
<b>SUM</b>	<b>99</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	

Note: NO<sub>x</sub> emissions is measured as NO in PPM. Final NO<sub>x</sub> value is expressed as total NO<sub>2</sub>

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 - December 2022**



**Figure 2: Duvha Unit 2 PM Emissions - December 2022**

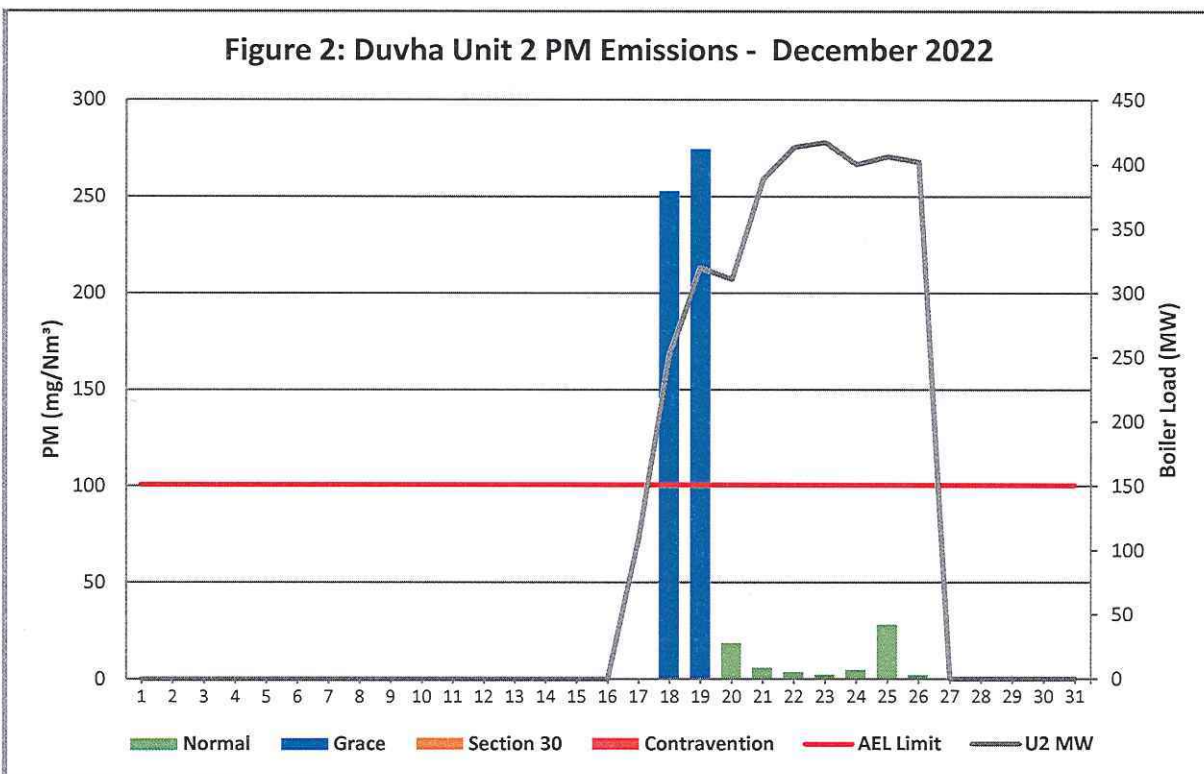


Figure 3: Duvha Unit 4 PM Emissions - December 2022

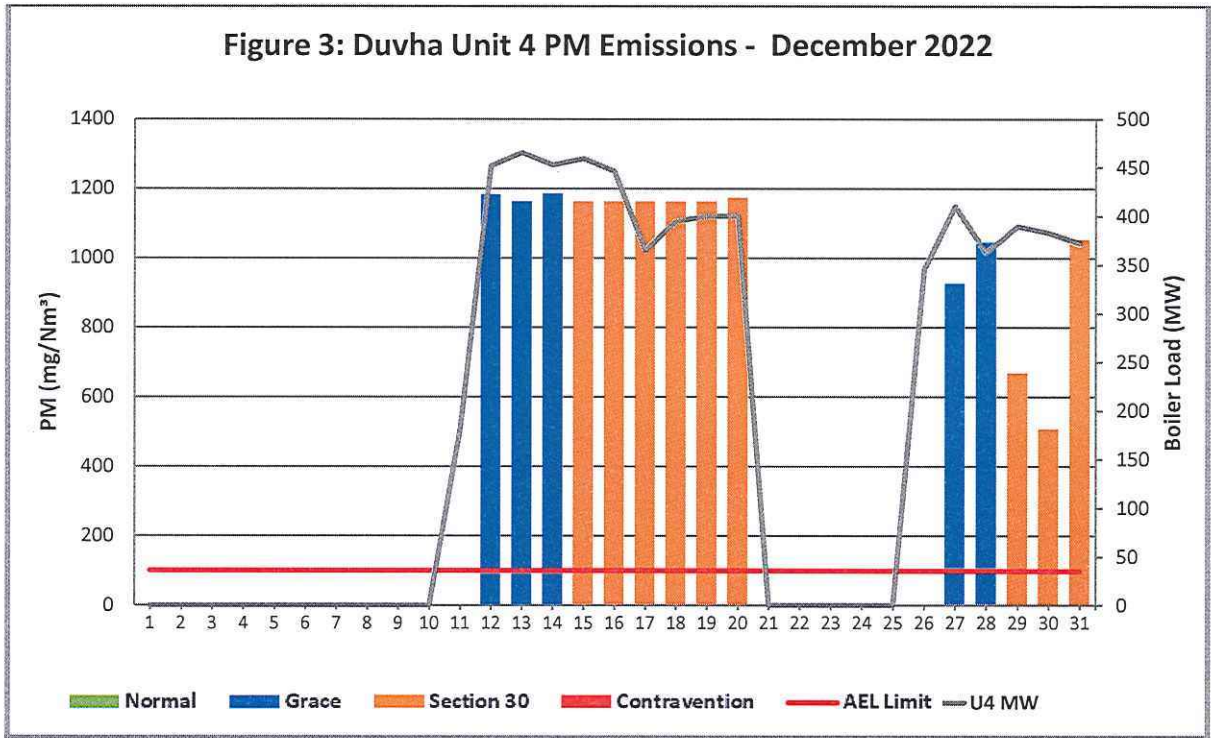


Figure 4: Duvha Unit 5 PM Emissions - December 2022

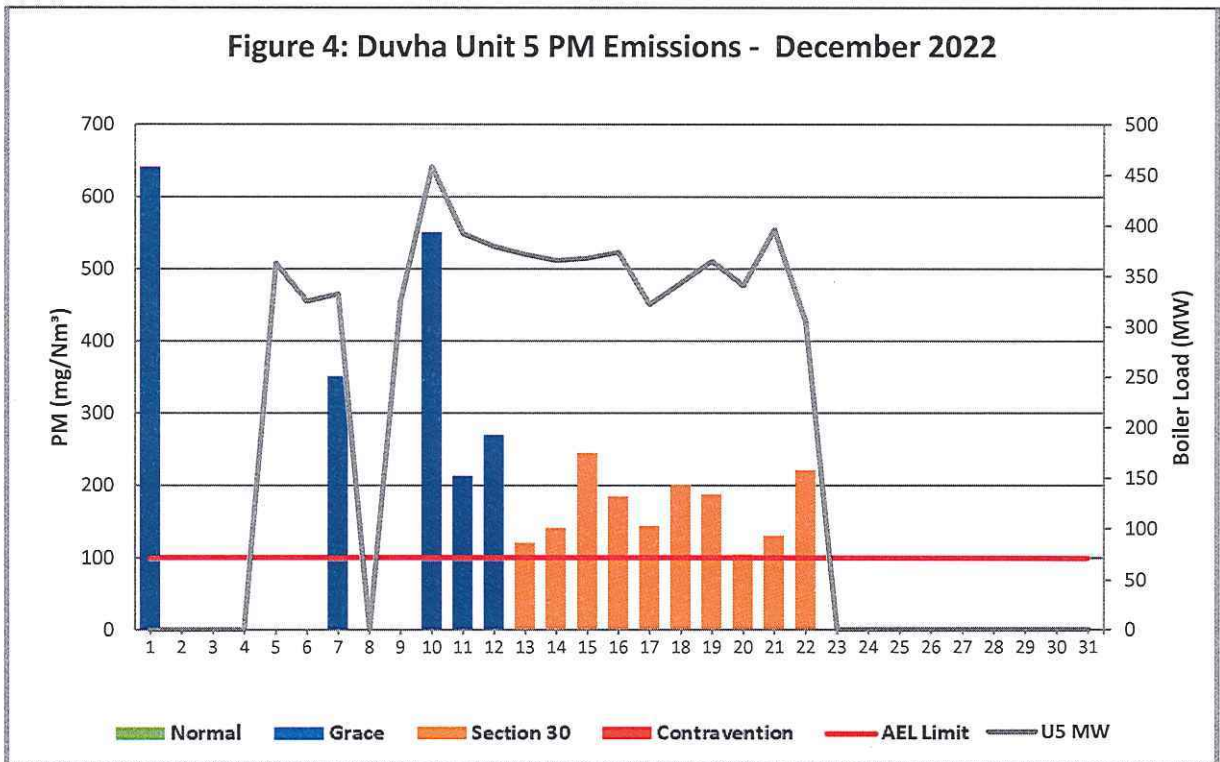


Figure 5: Duvha Unit 6 PM Emissions - December 2022

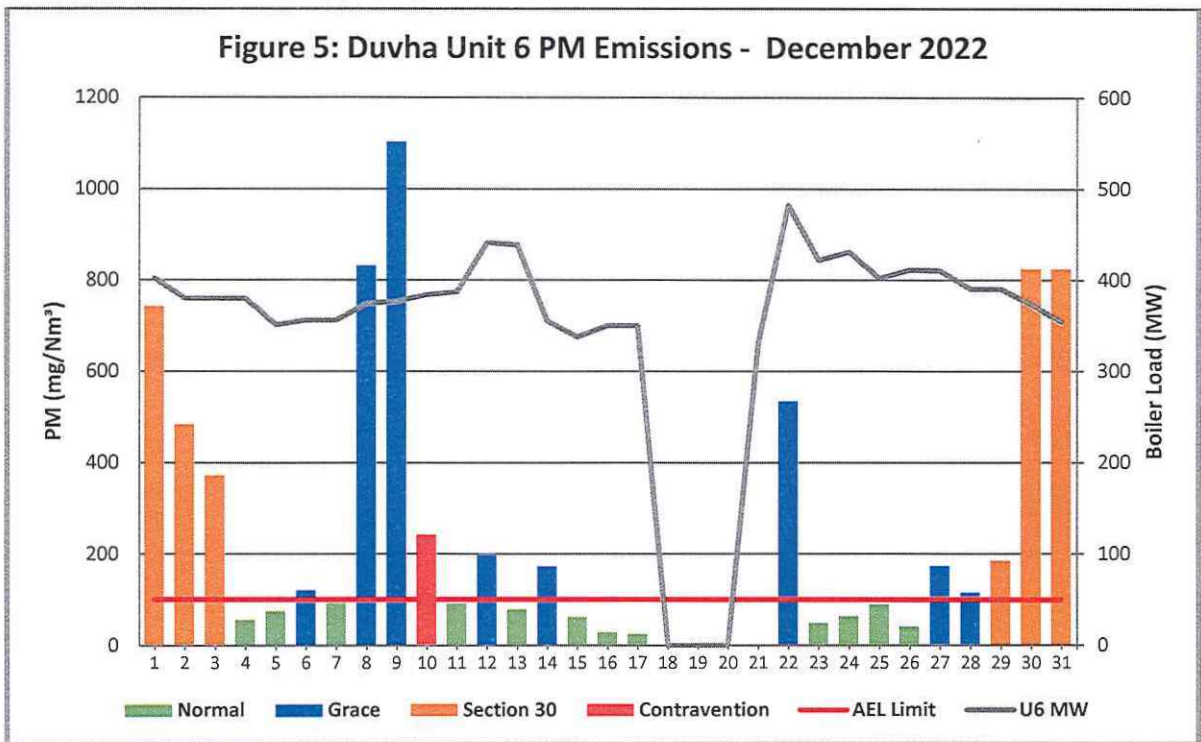


Figure 6: Duvha Unit 1 SO<sub>2</sub> Emissions - December 2022

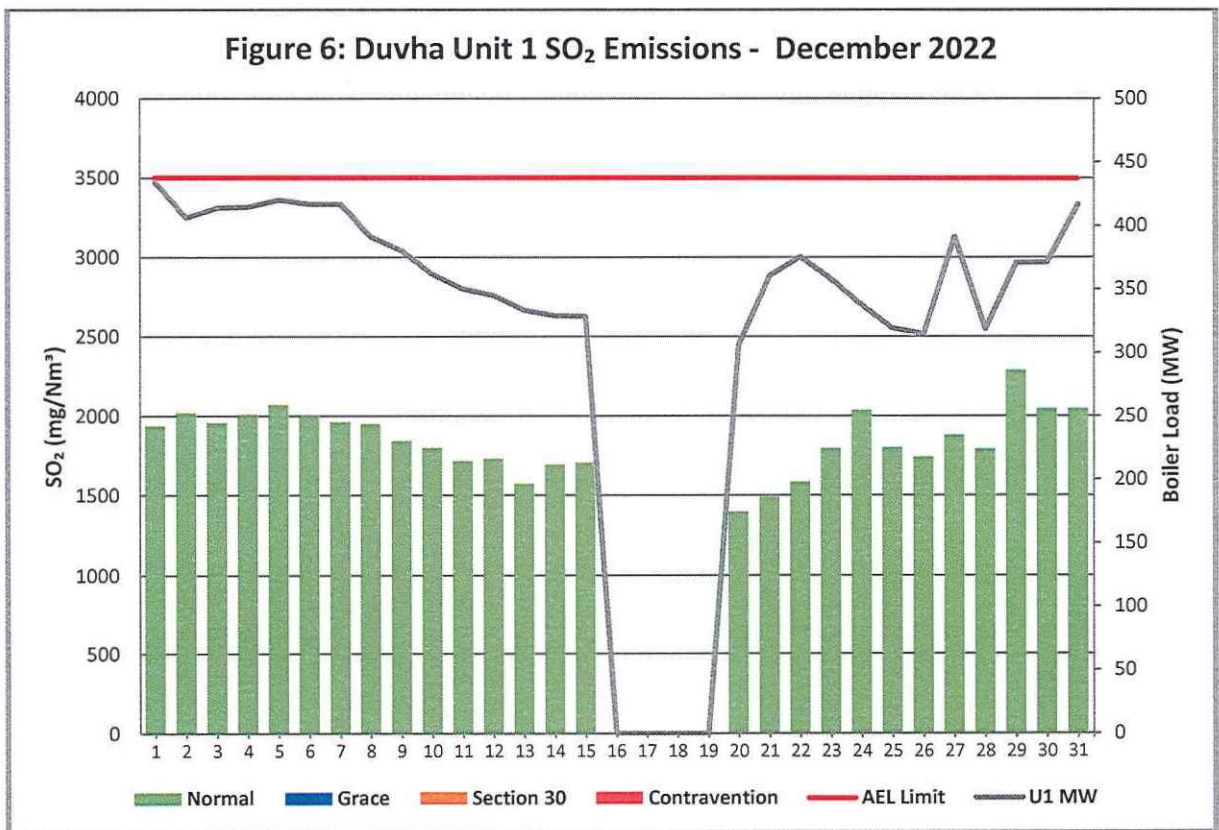


Figure 7: Duvha Unit 2 SO<sub>2</sub> Emissions - December 2022

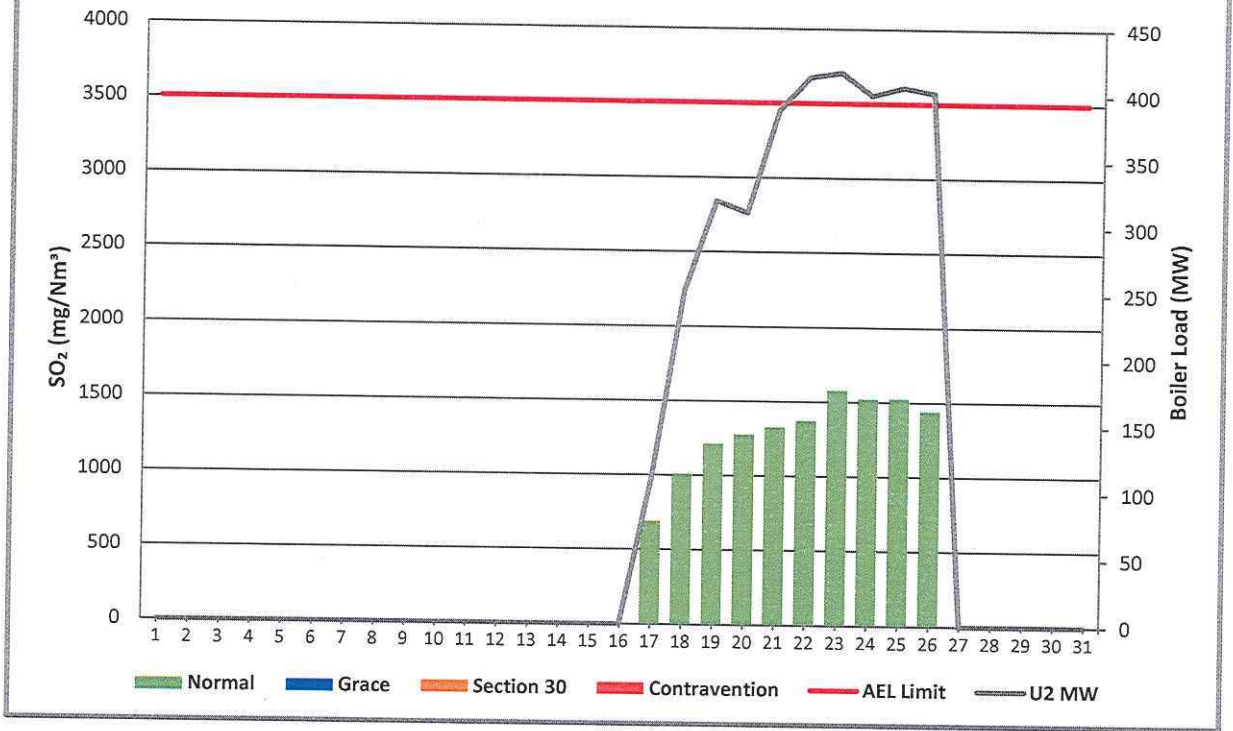


Figure 8: Duvha Unit 4 SO<sub>2</sub> Emissions - December 2022

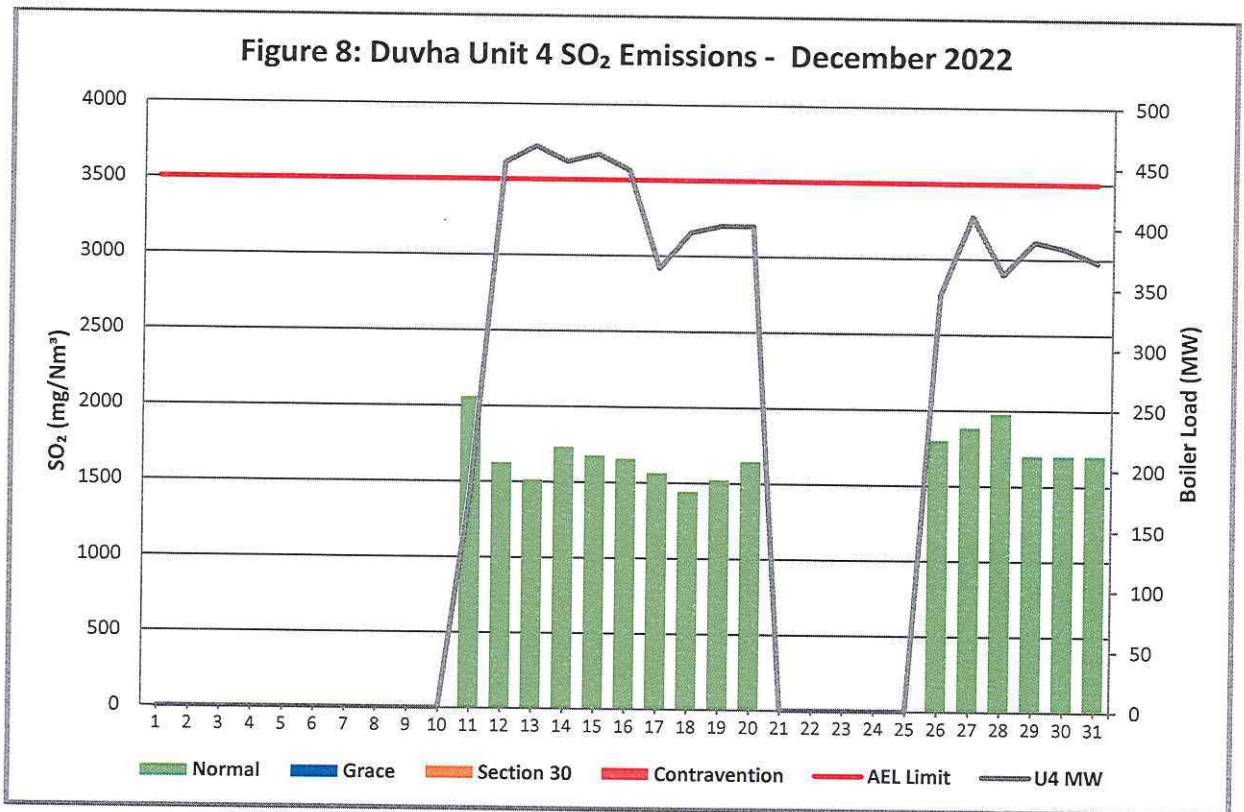




Figure 9: Duvha Unit 5 SO<sub>2</sub> Emissions - December 2022

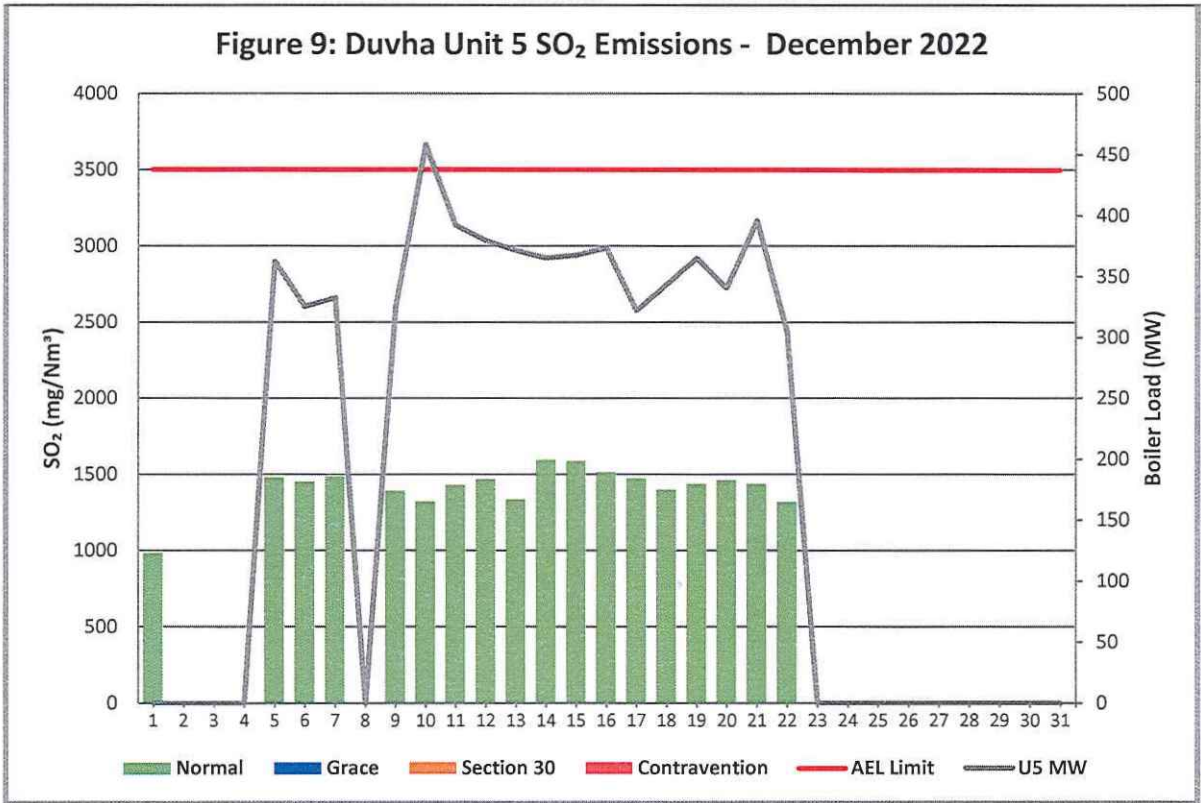


Figure 10: Duvha Unit 6 SO<sub>2</sub> Emissions - December 2022

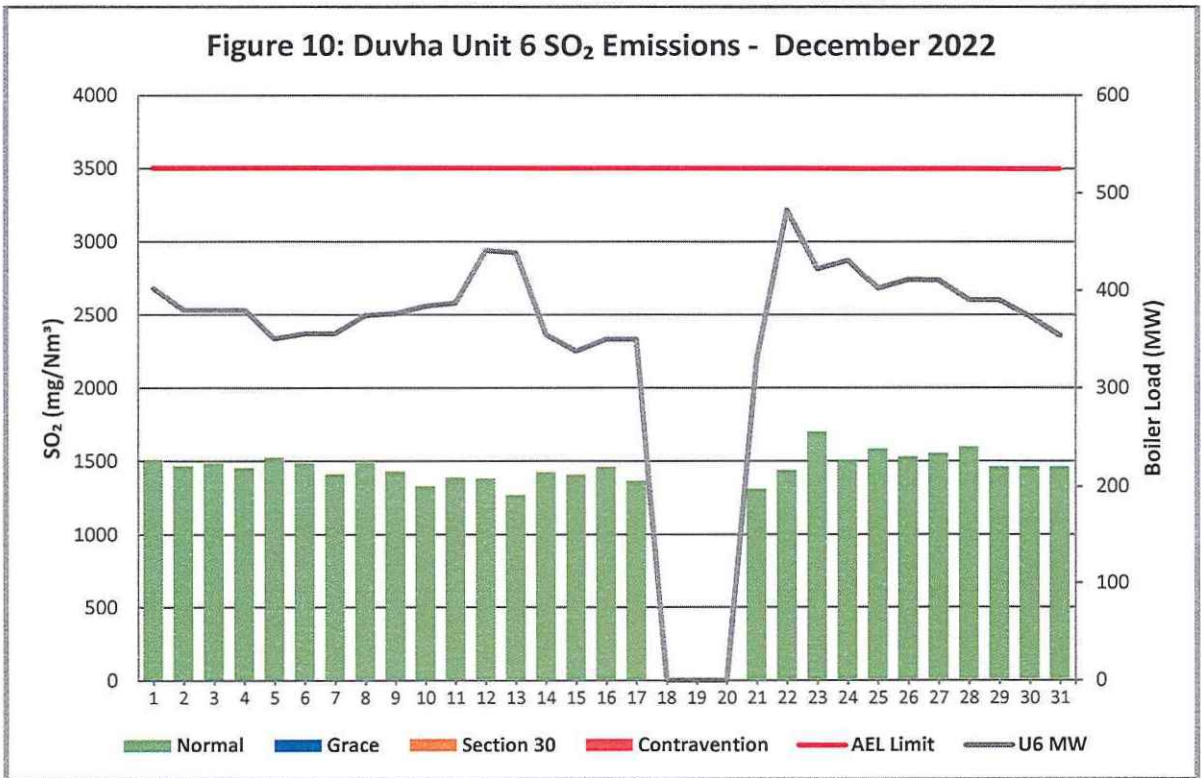


Figure 11: Duvha Unit 1 NOx Emissions - December 2022

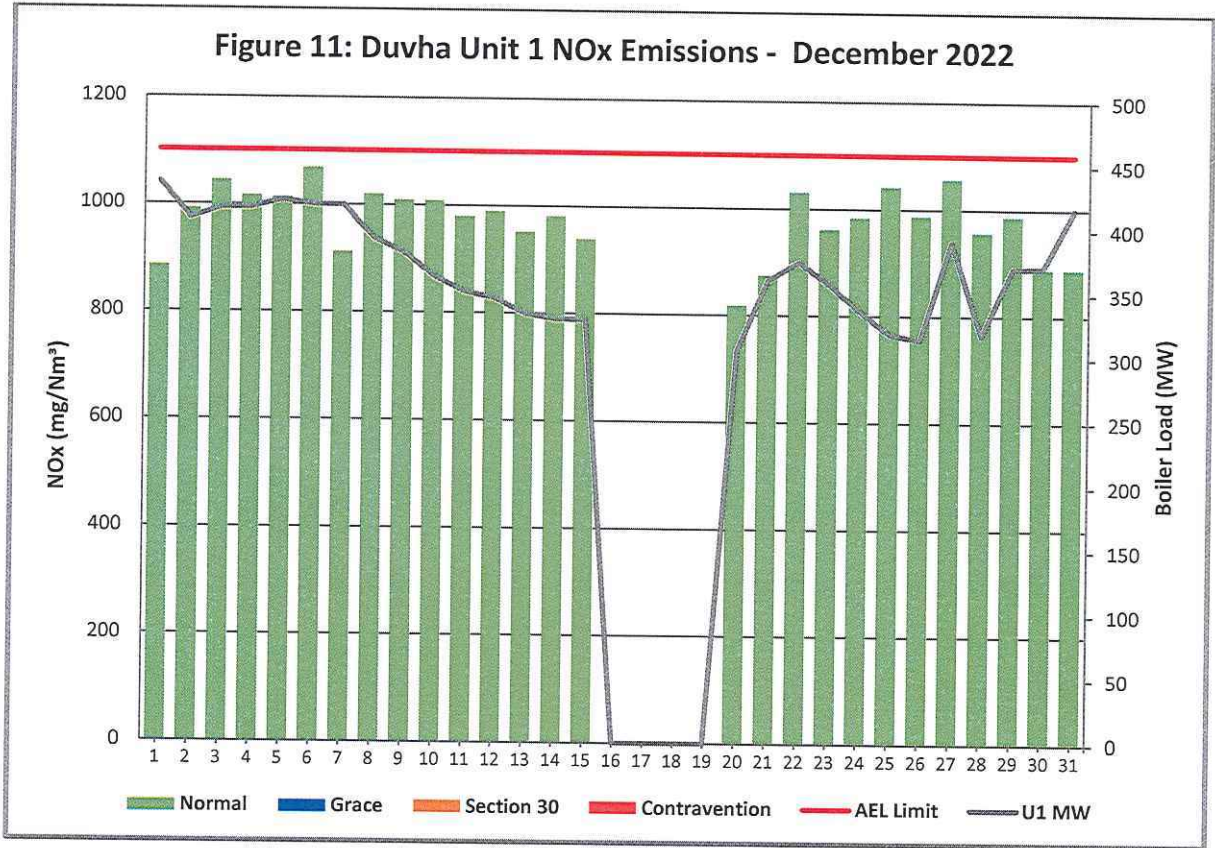


Figure 12: Duvha Unit 2 NOx Emissions - December 2022

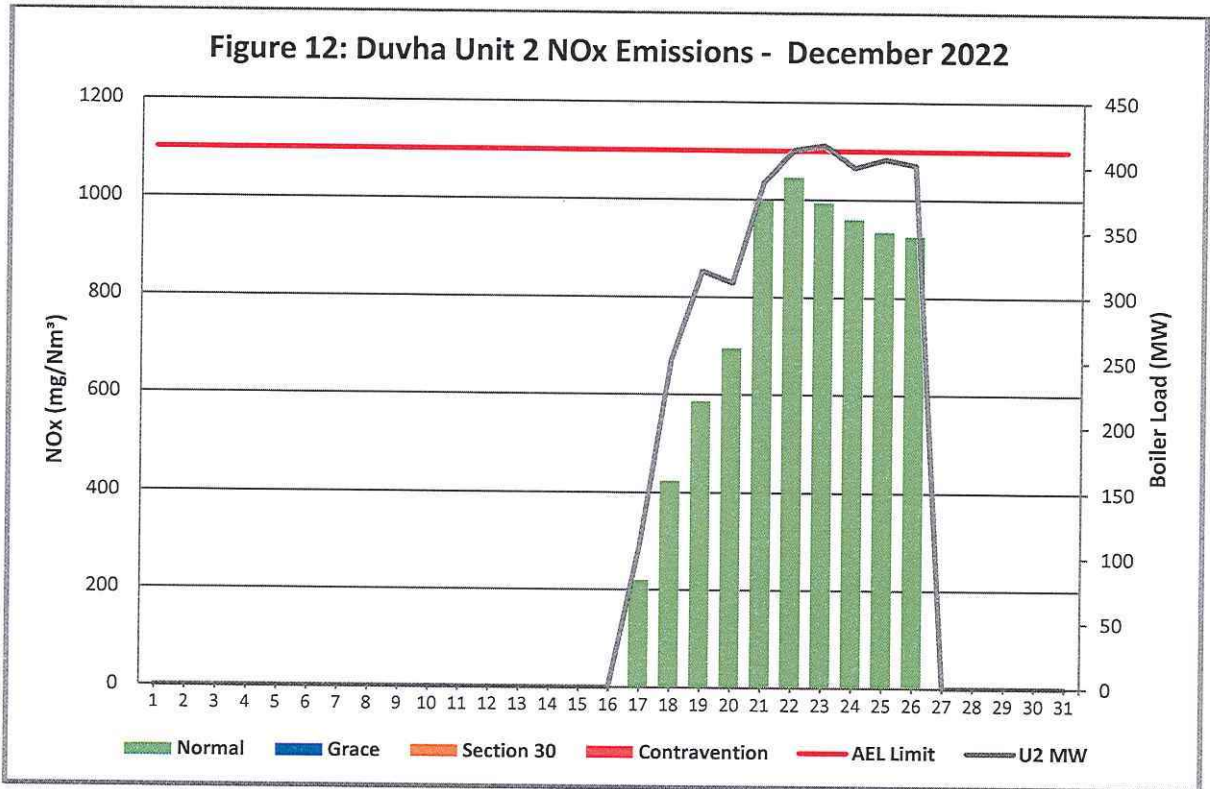


Figure 13: Duvha Unit 4 NOx Emissions - December 2022

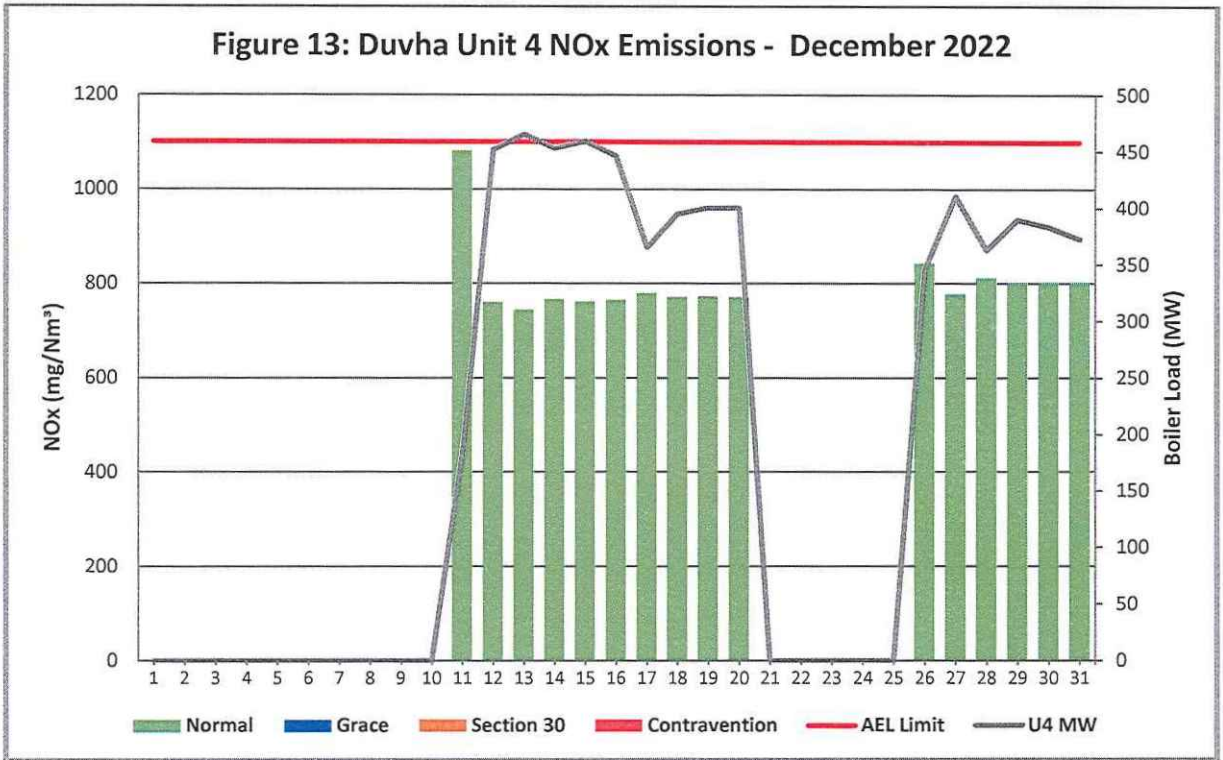
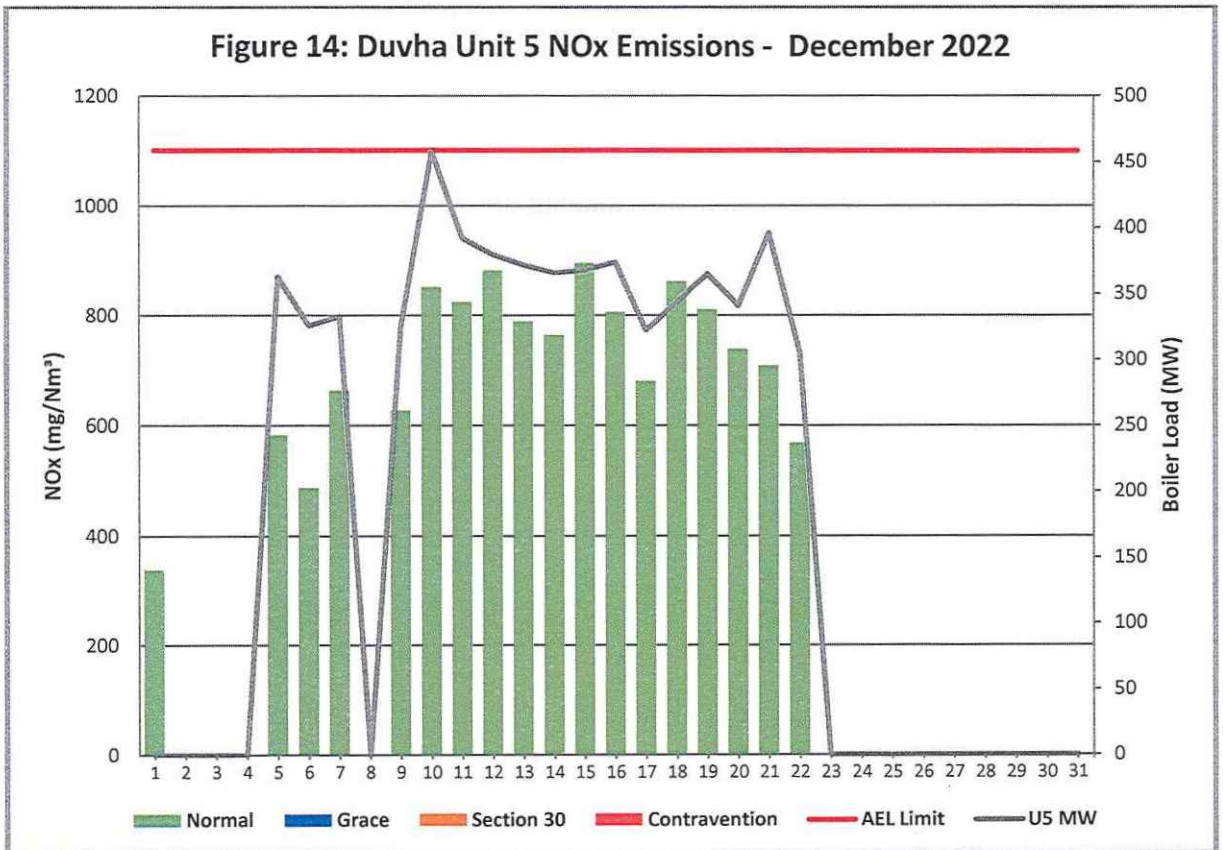
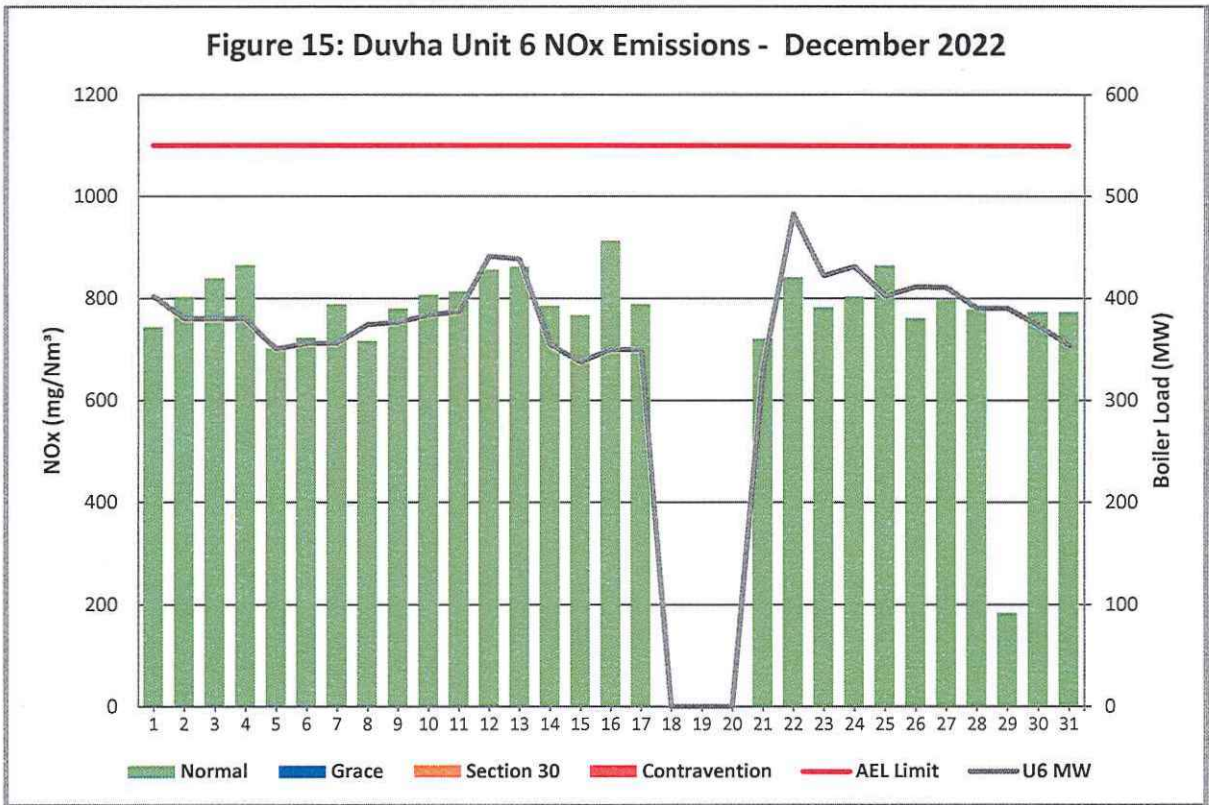


Figure 14: Duvha Unit 5 NOx Emissions - December 2022





**7 SHUT DOWN AND LIGHT UP INFORMATION**

Tables 7.1: Shut-down and light-up information for the month of December 2022

Unit No.1	Event 1		Event 2		Event 3	
Breaker Open (BO)	12:00 am	2022/12/16	2:45 pm	2022/12/27	1:50 pm	2022/12/29
Draught Group (DG) Shut Down (SD)	12:10 pm	2022/12/16	6:05 pm	2022/12/27	5:50 pm	2022/12/29
BO to DG SD (duration)	00:12:10	DD:HH:MM	00:03:20	DD:HH:MM	00:04:00	DD:HH:MM
Fires in time	9:00 pm	2022/12/19	11:50 pm	2022/12/27	8:00 pm	2022/12/29
Synch. to Grid (or BC)	6:55 am	2022/12/20	8:00 am	2022/12/28	7:05 am	2022/12/30
Fires in to BC (duration)	00:09:55	DD:HH:MM	00:08:10	DD:HH:MM	00:11:05	DD:HH:MM
Emissions below limit from BC (end date)	not > limit	not > limit	not > limit	not > limit	not > limit	not > limit
Emissions below limit from BC (duration)	n/a	DD:HH:MM	n/a	DD:HH:MM	n/a	DD:HH:MM

Unit No.2	Event 1		Event 2	
Breaker Open (BO)	<i>BO previously</i>	<i>BO previously</i>	<i>6:45 pm</i>	<i>2022/12/26</i>
Draught Group (DG) Shut Down (SD)	<i>n/a</i>	<i>n/a</i>	<i>8:15 pm</i>	<i>2022/12/26</i>
BO to DG SD (duration)	<i>n/a</i>	DD:HH:MM	<i>00:01:30</i>	DD:HH:MM
Fires in time	<i>4:40 pm</i>	<i>2022/12/17</i>		
Synch. to Grid (or BC)	<i>11:20 pm</i>	<i>2022/12/17</i>		
Fires in to BC (duration)	<i>00:06:40</i>	DD:HH:MM		DD:HH:MM
Emissions below limit from BC (end date)	<i>1:00 am</i>	<i>2022/12/20</i>		
Emissions below limit from BC (duration)	<i>02:01:40</i>	DD:HH:MM		DD:HH:MM

Unit No.4	Event 1		Event 2		Event 3	
Breaker Open (BO)	<i>BO previously</i>	<i>BO previously</i>	<i>7:25 am</i>	<i>2022/12/20</i>	<i>BO previously</i>	<i>BO previously</i>
Draught Group (DG) Shut Down (SD)	<i>n/a</i>	<i>n/a</i>	<i>2:55 pm</i>	<i>2022/12/20</i>	<i>n/a</i>	<i>n/a</i>
BO to DG SD (duration)	<i>n/a</i>	DD:HH:MM	<i>00:07:30</i>	DD:HH:MM	<i>n/a</i>	DD:HH:MM
Fires in time	<i>12:45 pm</i>	<i>2022/12/11</i>			<i>4:05 am</i>	<i>2022/12/25</i>
Synch. to Grid (or BC)	<i>9:05 pm</i>	<i>2022/12/14</i>			<i>9:05 pm</i>	<i>2022/12/14</i>
Fires in to BC (duration)	<i>00:05:50</i>	DD:HH:MM		DD:HH:MM	<i>01:00:00</i>	DD:HH:MM
Emissions below limit from BC (end date)	<i>7:25 am</i>	<i>2022/12/20</i>			<i>not &gt; limit</i>	<i>not &gt; limit</i>
Emissions below limit from BC (duration)	<i>05:10:20</i>	DD:HH:MM		DD:HH:MM	<i>n/a</i>	DD:HH:MM

Unit No.5	Event 1		Event 2		Event 3		Event 4	
Breaker Open (BO)	<i>12:10 am</i>	<i>2022/12/01</i>	<i>9:40 am</i>	<i>2022/12/07</i>	<i>BO previously</i>	<i>BO previously</i>	<i>1:45 am</i>	<i>2022/12/22</i>
Draught Group (DG) Shut Down (SD)	<i>1:55 am</i>	<i>2022/12/01</i>	<i>6:45 am</i>	<i>2022/12/08</i>	<i>n/a</i>	<i>n/a</i>	<i>5:15 pm</i>	<i>2022/12/22</i>
BO to DG SD (duration)	<i>00:01:45</i>	DD:HH:MM	<i>00:21:05</i>	DD:HH:MM	<i>n/a</i>	DD:HH:MM	<i>00:15:30</i>	DD:HH:MM
Fires in time			<i>4:45 am</i>	<i>2022/12/05</i>	<i>8:25 pm</i>	<i>2022/12/08</i>		
Synch. to Grid (or BC)			<i>6:35 am</i>	<i>2022/12/06</i>	<i>3:55 am</i>	<i>2022/12/09</i>		
Fires in to BC (duration)		DD:HH:MM	<i>01:01:50</i>	DD:HH:MM	<i>00:07:30</i>	DD:HH:MM		DD:HH:MM
Emissions below limit from BC (end date)			<i>1:45 am</i>	<i>2022/12/22</i>	<i>1:45 am</i>	<i>2022/12/22</i>		
Emissions below limit from BC (duration)		DD:HH:MM	<i>15:19:10</i>	DD:HH:MM	<i>12:21:50</i>	DD:HH:MM		DD:HH:MM

Unit No.6	Event 1		Event 2	
Breaker Open (BO)	3:40 pm	2022/12/14	11:10 pm	2022/12/17
Draught Group (DG) Shut Down (SD)	DG did not trip or SD	DG did not trip or SD	DG did not trip or SD	DG did not trip or SD
BO to DG SD (duration)	n/a	DD:HH:MM	n/a	DD:HH:MM
Fires in time				
Synch. to Grid (or BC)				
Fires in to BC (duration)		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

## 8 GENERAL

Unit 3 is offload permanently and the Station will not be reporting on it going forward.

### Exceedances:

#### Unit 2:

18-19/12/2022

- Cold unit light up.

#### Unit 4:

12-20/12/2022

- The 72 hours allowable for a cold unit light were exceeded from the 15<sup>th</sup> of December 2022 in unit 4. The final investigation report will be submitted to your office once the investigation is completed.

27-31/12/2022

- The 72 hours allowable for a cold unit light-up were exceeded from the 29<sup>th</sup> of December 2022 on unit 4. The final investigation report will be submitted to your office once the investigation is completed.

#### Unit 5:

01/12/2022

- Cold unit light up.

07/12/2022

- Cold unit light up.

10-22/12/2022

- The 72 hours allowable for a cold unit light-up were exceeded from the 13<sup>th</sup>

- of December 2022 on unit 5. The final investigation report will be submitted to your office once the investigation is completed.

**Unit 6:**

30/11/2022-03/12/2022

- The 72 hours allowable for a cold unit light-up were exceeded from the 13<sup>th</sup> of December 2022 on unit 5. The final investigation report will be submitted to your office once the investigation is completed.

06/12/2022

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

08-10/12/2022

- Contravention Incident: The 48 Hours allowable have been exceeded on Duvha's unit 6 on the 10th of December 2022. A detailed investigation report with root cause and preventative actions will be submitted to your office once the investigation is completed.

12/12/2022

- A total of three Electrostatic Precipitator fields were tripping on undervoltage.

14/12/2022

- Hot unit light up.

22/12/2022

- Cold unit light up.

27-30/12/2022

- The 48 hours allowable for upset conditions were exceeded from the 29<sup>th</sup> of December 2022 on unit 6. The final investigation report will be submitted to your office once the investigation is completed.

Units 2 and 4 PM emissions monitors reliability for the month of December 2022 were less than 80% due to the monitors maxing out. The correlation spot check surrogate values were used during the period the monitors maxed out.

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

Ndwelezi  
Boiler Plant Engineering  
Manager

01 Feb 2023  
Date

[Signature]  
Environmental  
Manager

2023/02/07  
Date

[Signature]  
Engineering Manager

07/02/2023  
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 December 2022

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 December 2022.					

## 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	30/11/2022	03/12/2022	Incident still under investigation		30/11/2022	Incident still under investigation	Not yet received	N/A	The 48 hours allowable for a hot unit light were exceeded from the 30th of November 2022 in unit 6. The final investigation report will be submitted to your office once the investigation is completed.

Unit 6	10/12/2022	10/12/2022	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 have been exceeded on Duvha's unit 6 on the 10 <sup>th</sup> of December 2022. A detailed investigation report with root cause and preventative actions will be submitted to your office once the investigation is completed.
Unit 5	13/12/2022	22/12/2022	Incident still under investigation	13/12/2022	Incident still under investigation	Not yet received	N/A	The 72 hours allowable for a cold unit light-up were exceeded from the 13 <sup>th</sup> of December 2022 on unit 5. The final investigation report will be submitted to your office once the investigation is completed.

Unit 4	15/12/2022	20/12/2022	Incident still under investigation	20/12/2022	Incident still under investigation	Not yet received.	N/A	The 72 hours allowable for a cold unit light were exceeded from the 15 <sup>th</sup> of December 2022 in unit 4. The final investigation report will be submitted to your office once the investigation is completed.
Unit 4	29/12/2022	13/01/2023	Incident still under investigation	03/01/2023	Incident still under investigation	Not yet received	N/A	The 72 hours allowable for a cold unit light-up were exceeded from the 29 <sup>th</sup> of December 2022 on unit 4. The final investigation report will be submitted to your office once the investigation is completed.
Unit 6	29/12/2022	30/12/2022	Incident still under investigation	03/01/2023	Incident still under investigation	Not yet received	N/A	The 48 hours allowable for upset conditions were exceeded from the 29 <sup>th</sup> of December 2022 on unit 6. The final

							investigation report will be submitted to your office once the investigation is completed.
--	--	--	--	--	--	--	--