



Generation

Nkangala District Municipality
P O Box 437
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Mr V Mahlangu

AND

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Services
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Total number of pages:18

Total number of annexes:1

DUVHA POWER STATION

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


GENERAL MANAGER

2023/07/07

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 May-2023
	Coal	Tons	1 400 000	587 325.04
	Fuel Oil	Tons	5 000	8511.36
Production Rates	Product / By-Product Name	Units	Maximum Production Capacity Permitted	Production Rate May-2023
	Energy	GWh	3600	1 001.36
	Ash	Tons	not specified	160 222.27
	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	0.77
Ash Content	%	27 TO 30	27.28

3 EMISSION LIMITS (mg/Nm³)

Associated Unit/Stack	PM	SO ₂	NO _x
Unit 1	100	3500	1100
Unit 2	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 May-2023	Technology Type	SO ₃ Utilization May-2023
Unit 1	FFP	99.8%	SO ₃	n/a
Unit 2	FFP	99.8%	SO ₃	n/a
Unit 4	ESP + SO ₃	99.2%	SO ₃	94.6%
Unit 5	ESP + SO ₃	99.6%	SO ₃	94.8%
Unit 6	ESP + SO ₃	99.5%	SO ₃	93.9%

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

5 MONITOR RELIABILITY (%)

Associated Unit/Stack	PM	SO ₂	NO
Unit 1	100.0	97.8	97.8
Unit 2	87.0	97.5	94.0
Unit 4	92.5	98.0	94.3
Unit 5	100.0	97.7	97.5
Unit 6	100.0	99.7	99.6

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 May 2023

Associated Unit/Stack	PM (tons)	SO ₂ (tons)	NO _x (tons)
Unit 1	53.9	3 161	1 503
Unit 2	45.9	2 230	961
Unit 4	219.8	2 418	1 266
Unit 5	86.2	1 600	650
Unit 6	106.6	1 606	651
SUM	512.33	11 014	5 030

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

Associated Unit/Stack	Normal	Grace	Section 30	Contravention	Total Exceedance	Average PM (mg/Nm ³)
Unit 1	31	0	0	0	0	23.9
Unit 2	25	0	0	0	0	36.7
Unit 4	12	8	0	4	12	189.3
Unit 5	13	6	0	1	7	111.0
Unit 6	10	9	0	2	11	142.2
SUM	91	23	0	7	30	

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

Associated Unit/Stack	Normal	Grace	Section 30	Contravention	Total Exceedance	Average SO ₂ (mg/Nm ³)
Unit 1	31	0	0	0	0	1 375.4
Unit 2	28	0	0	0	0	1 580.2
Unit 4	27	0	0	0	0	1 773.4
Unit 5	22	0	0	0	0	1 627.7
Unit 6	26	0	0	0	0	1 346.9
SUM	134	0	0	0	0	

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

Associated Unit/Stack	Normal	Grace	Section 30	Contravention	Total Exceedance	Average NO _x (mg/Nm ³)
Unit 1	31	0	0	0	0	650.2
Unit 2	28	0	0	0	0	671.1
Unit 4	27	0	0	0	0	919.8
Unit 5	22	0	0	0	0	660.9
Unit 6	26	0	0	0	0	534.1
SUM	134	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 - May 2023

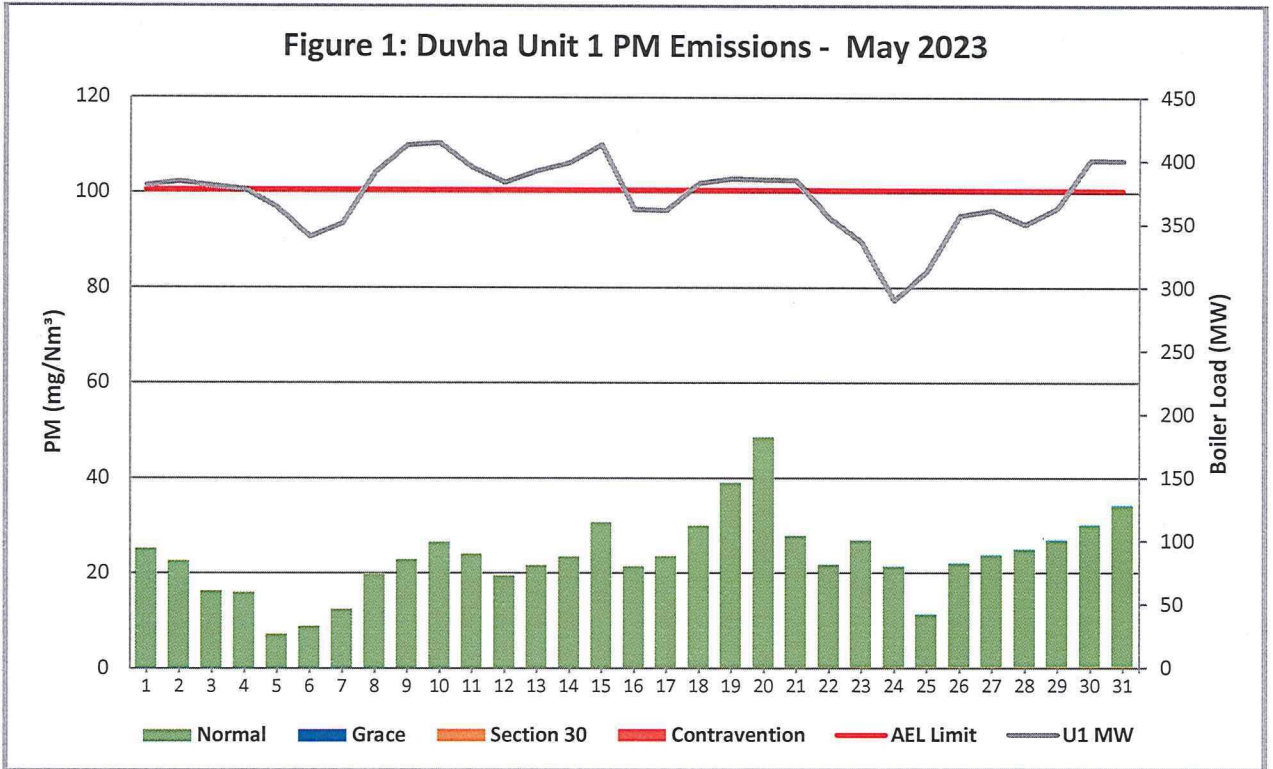


Figure 2: Duvha Unit 2 PM Emissions - May 2023

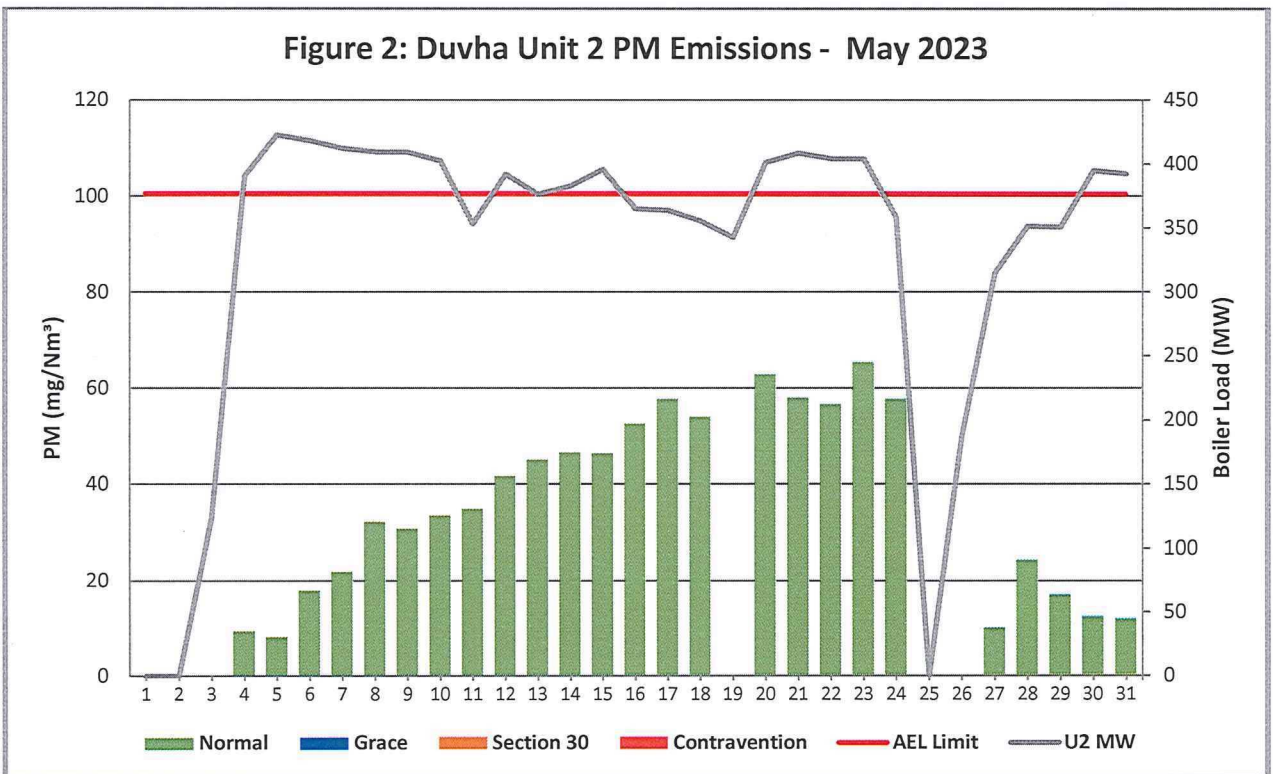


Figure 3: Duvha Unit 4 PM Emissions - May 2023

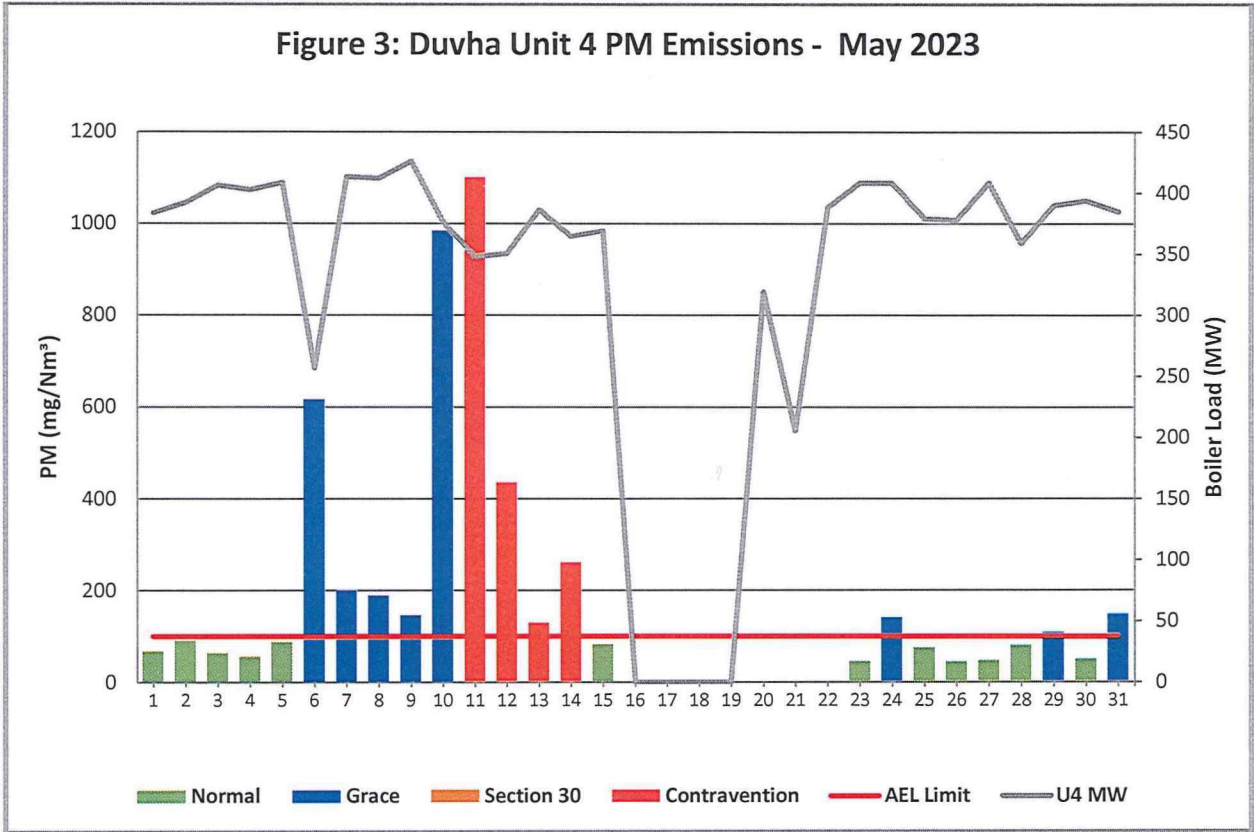


Figure 4: Duvha Unit 5 PM Emissions - May 2023

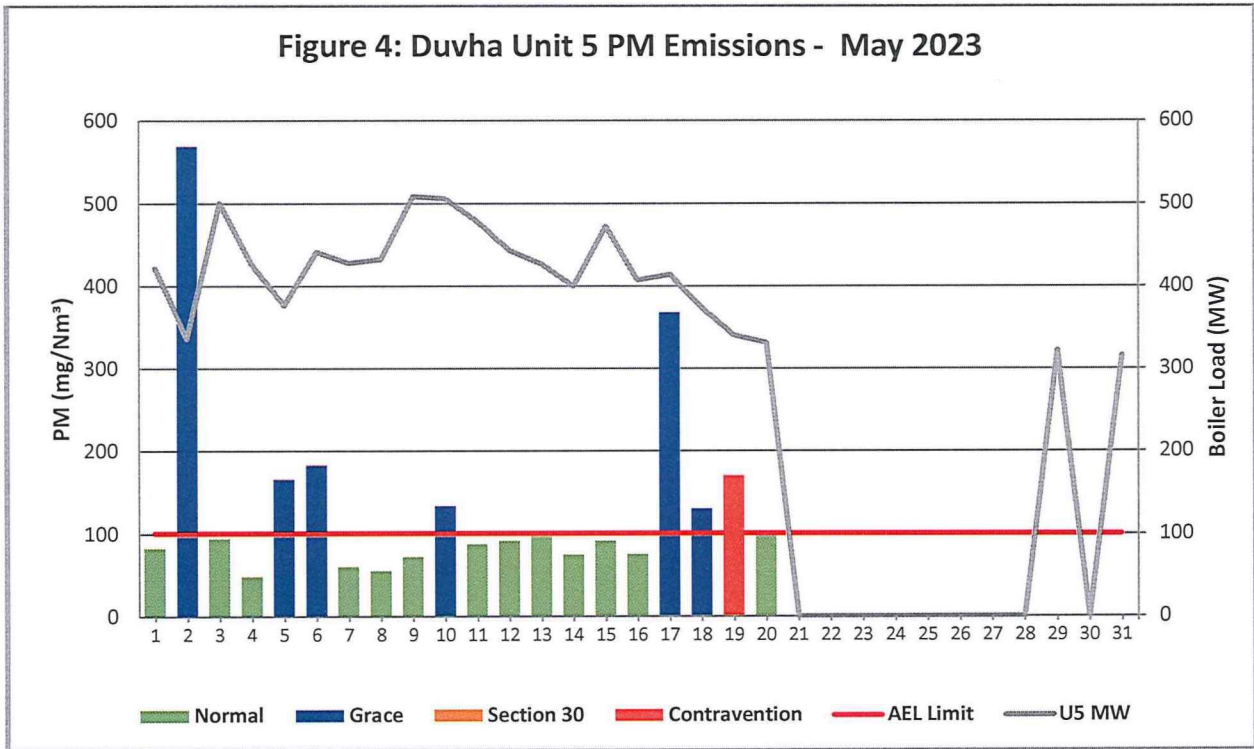


Figure 5: Duvha Unit 6 PM Emissions - May 2023

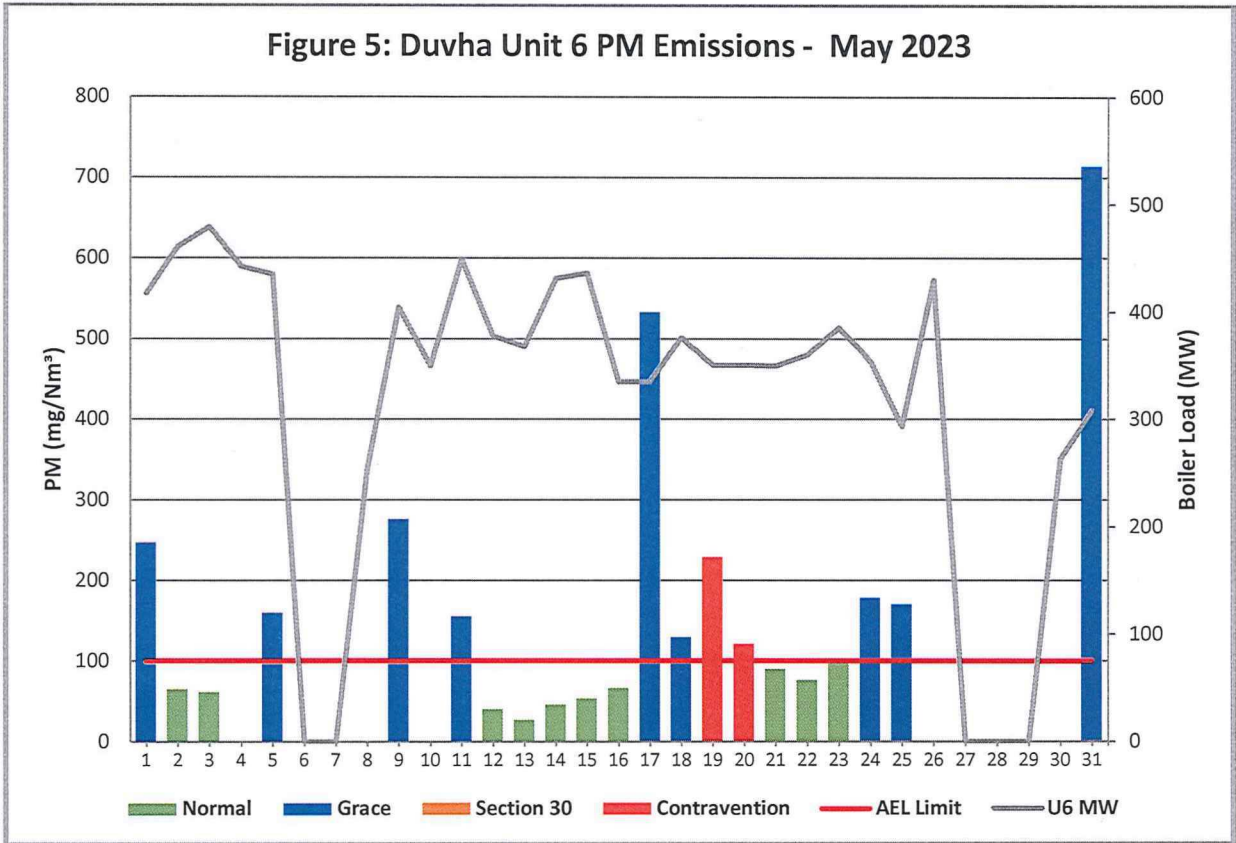


Figure 6: Duvha Unit 1 SO₂ Emissions - May 2023

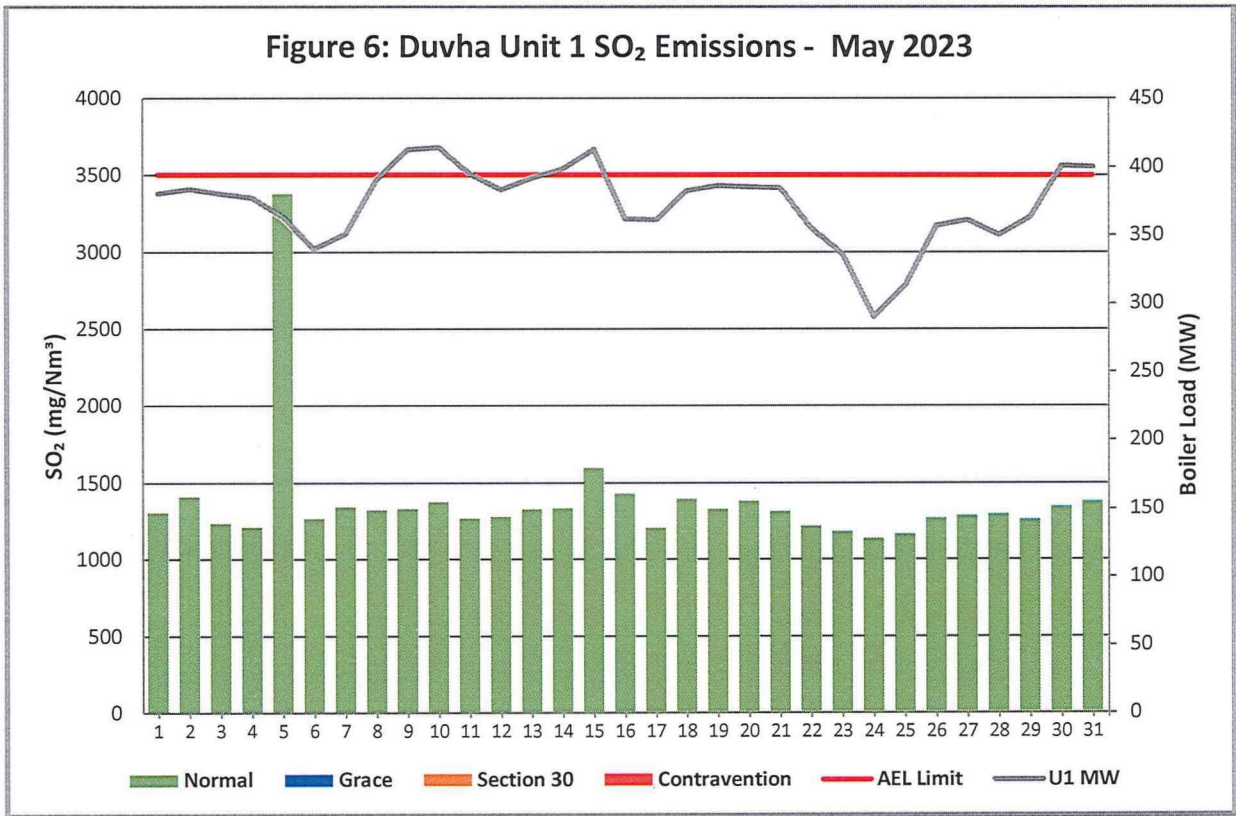


Figure 7: Duvha Unit 2 SO₂ Emissions - May 2023

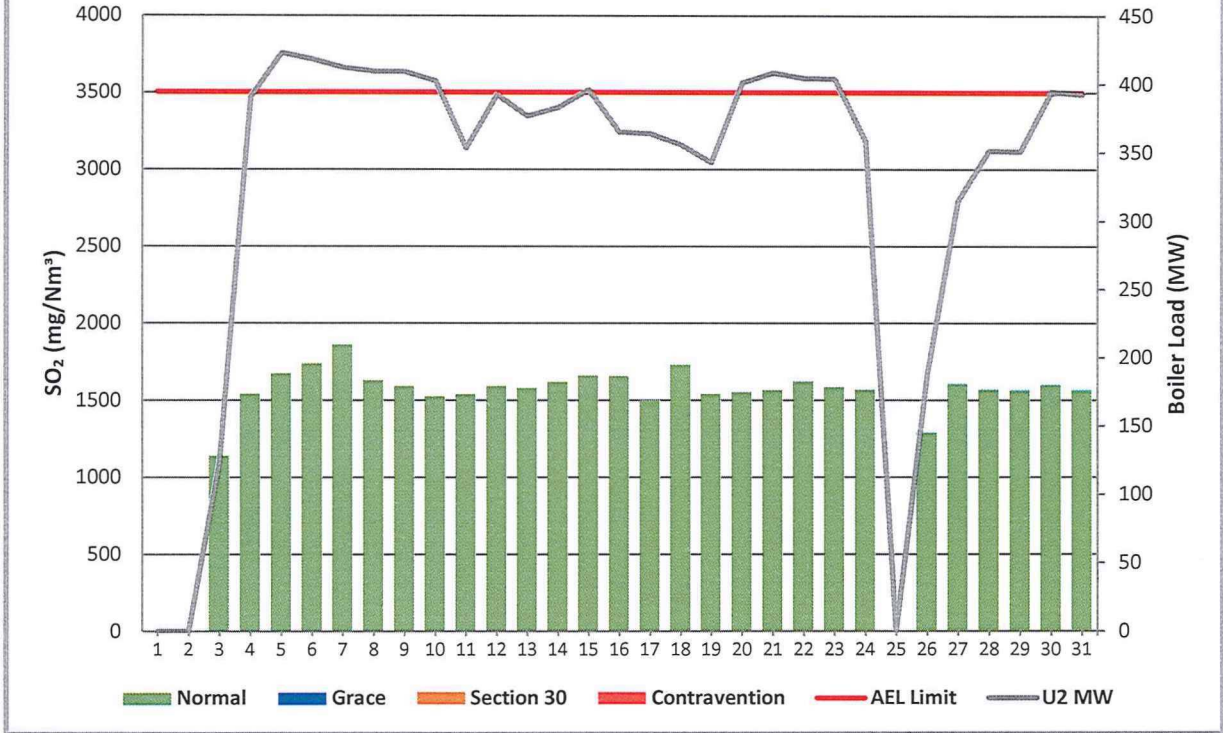


Figure 8: Duvha Unit 4 SO₂ Emissions - May 2023

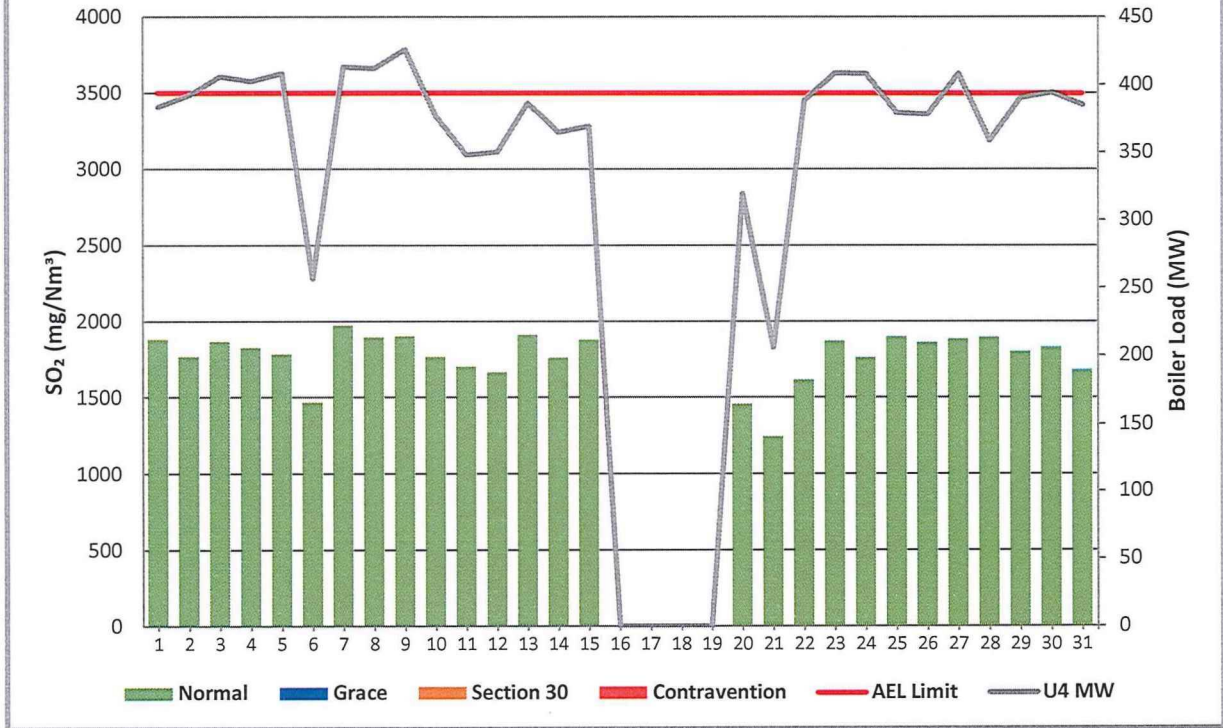


Figure 9: Duvha Unit 5 SO₂ Emissions - May 2023

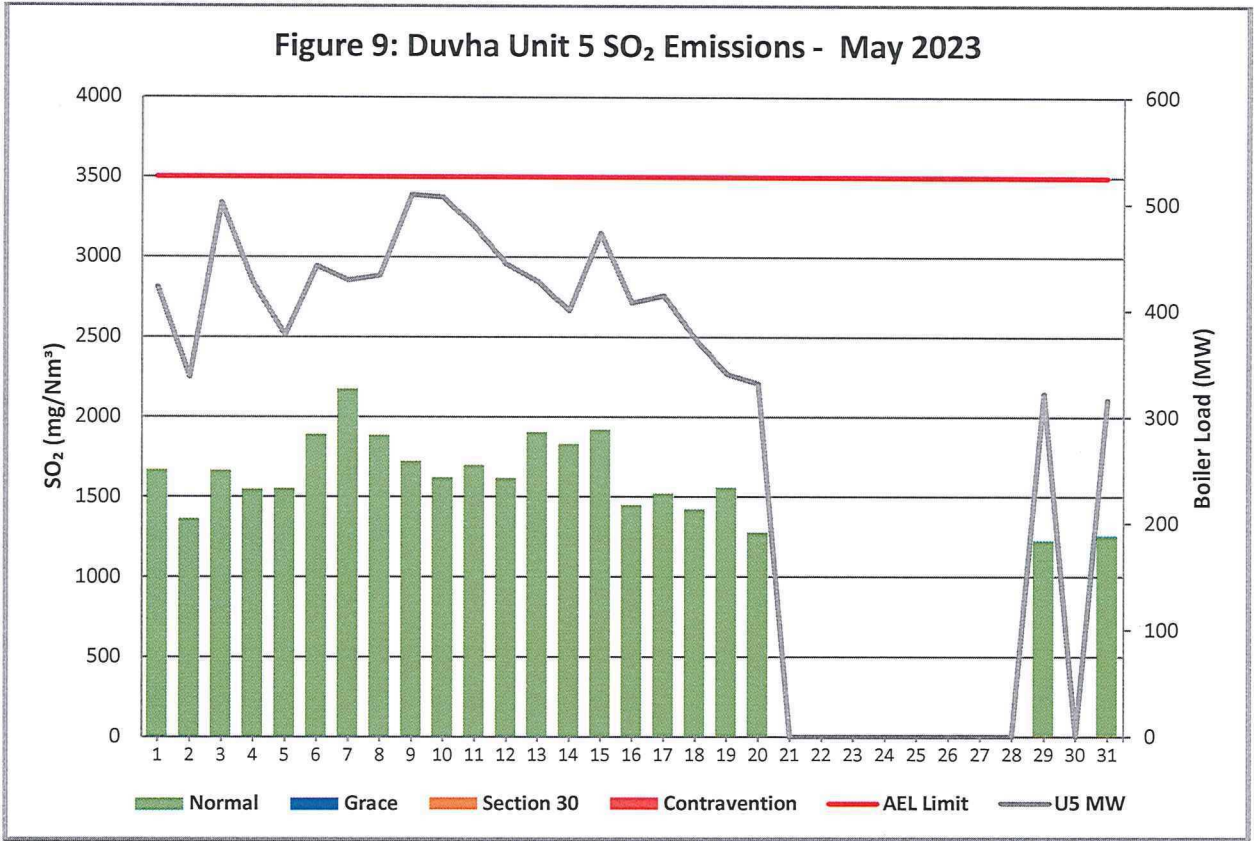


Figure 10: Duvha Unit 6 SO₂ Emissions - May 2023

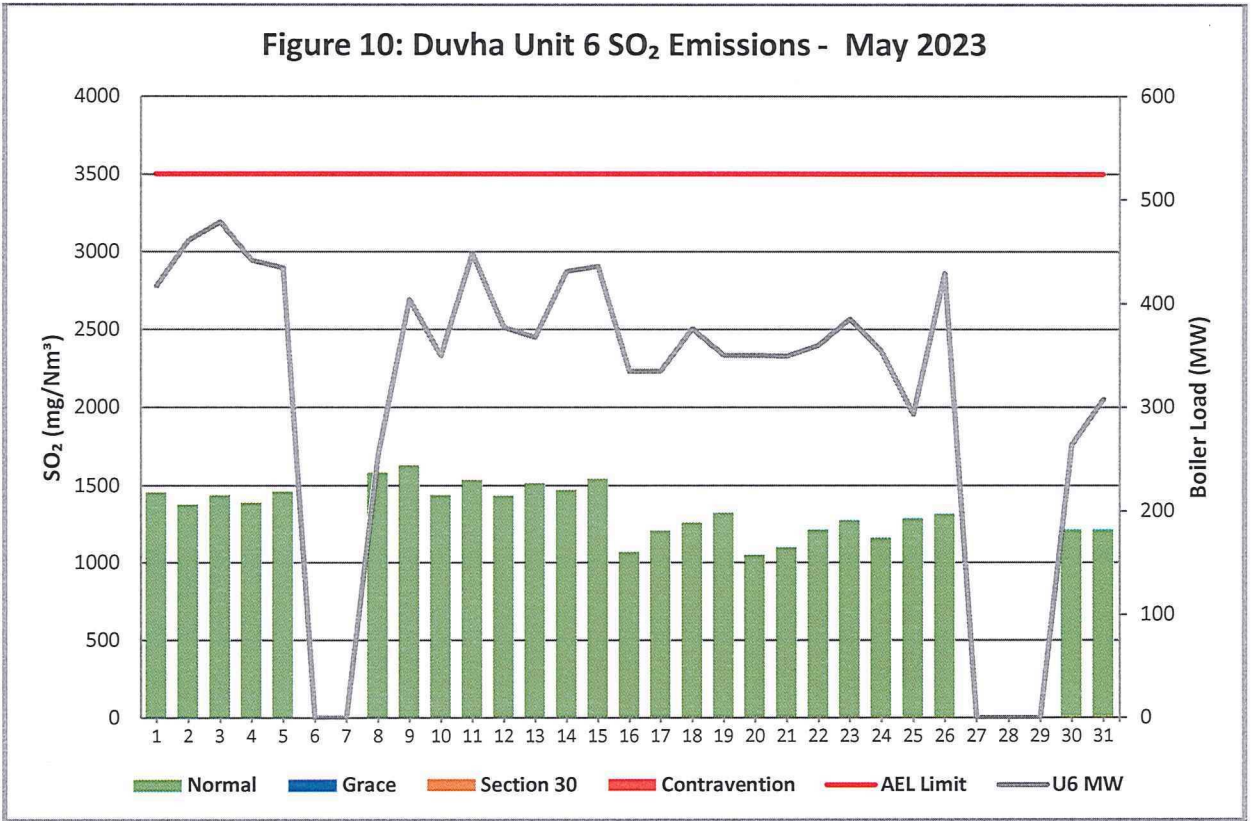


Figure 11: Duvha Unit 1 NOx Emissions - May 2023

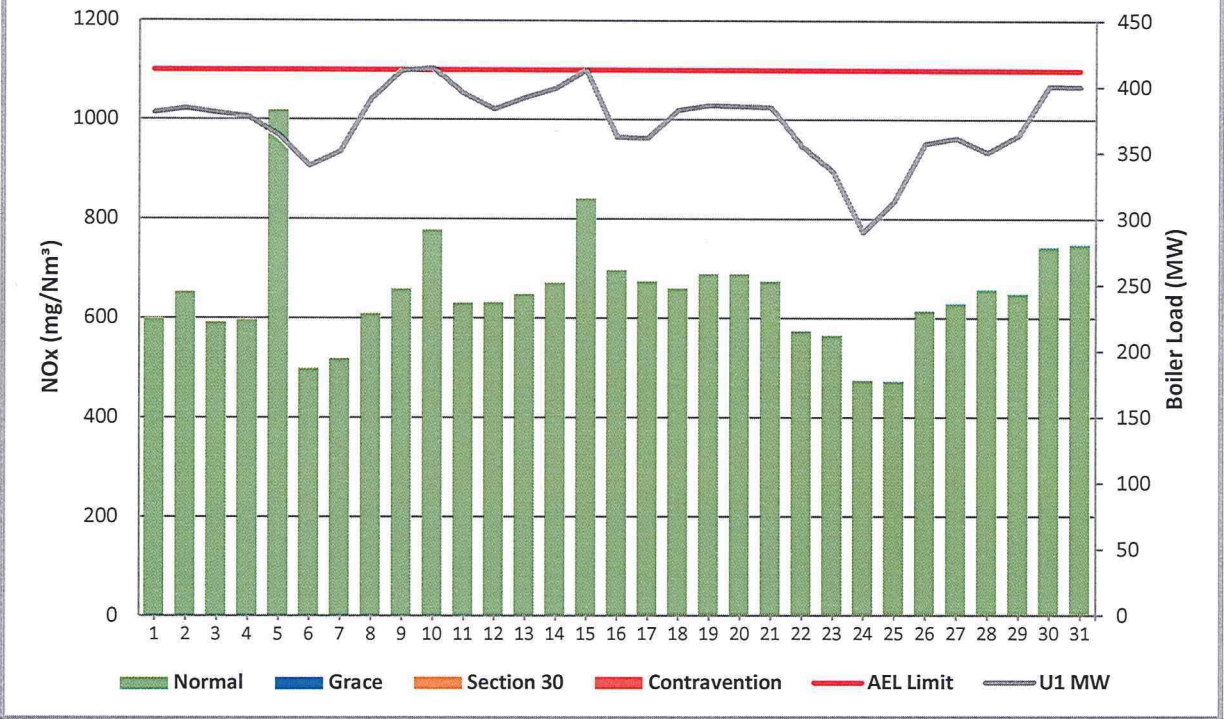


Figure 12: Duvha Unit 2 NOx Emissions - May 2023

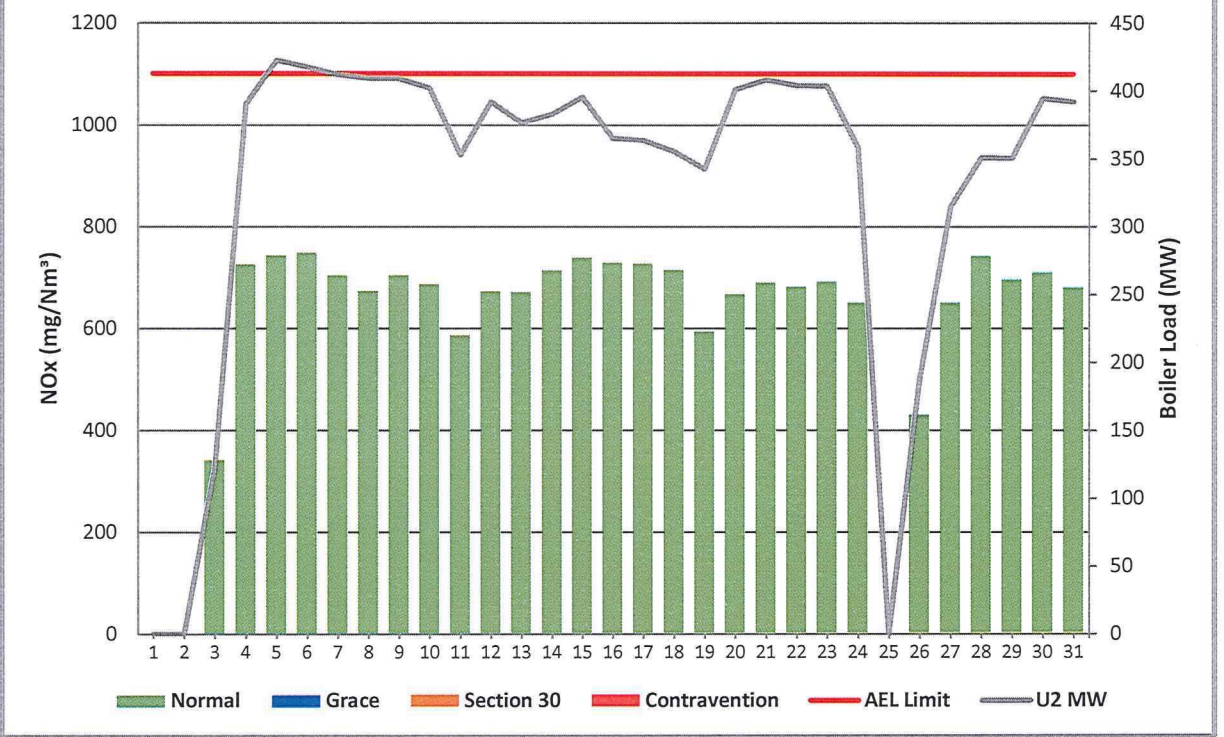


Figure 13: Duvha Unit 4 NOx Emissions - May 2023

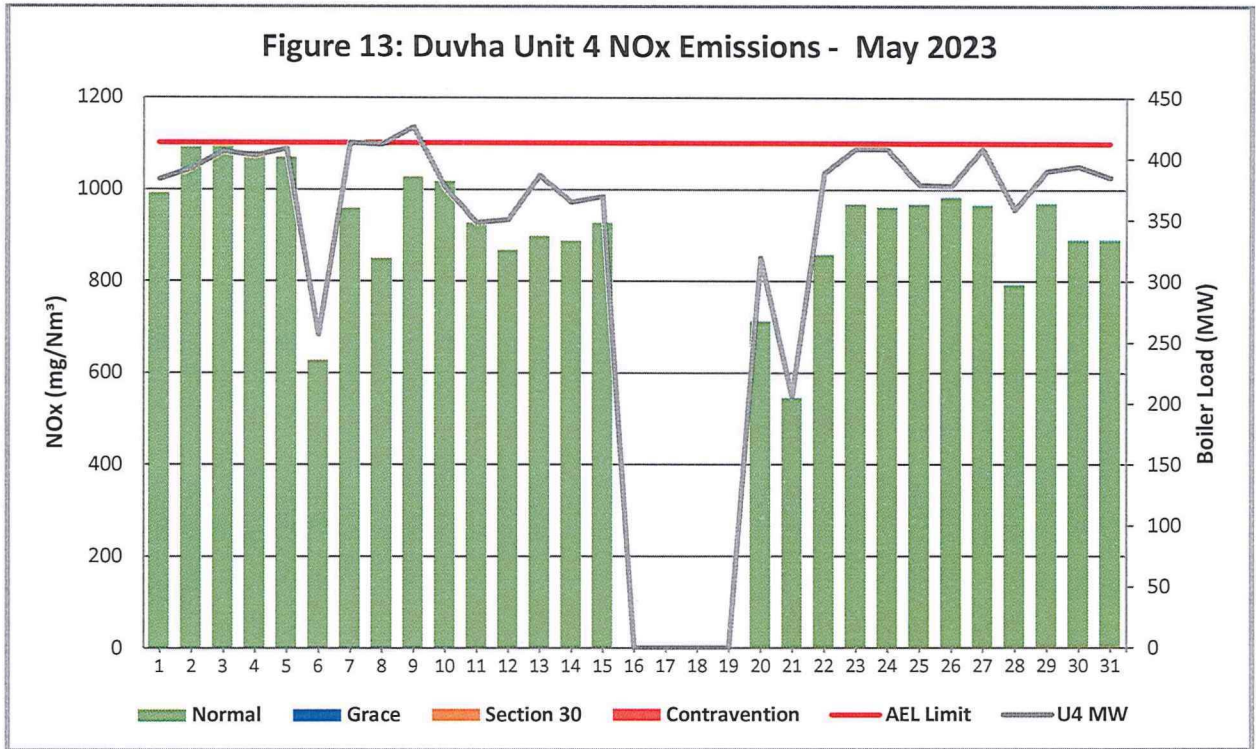


Figure 14: Duvha Unit 5 NOx Emissions - May 2023

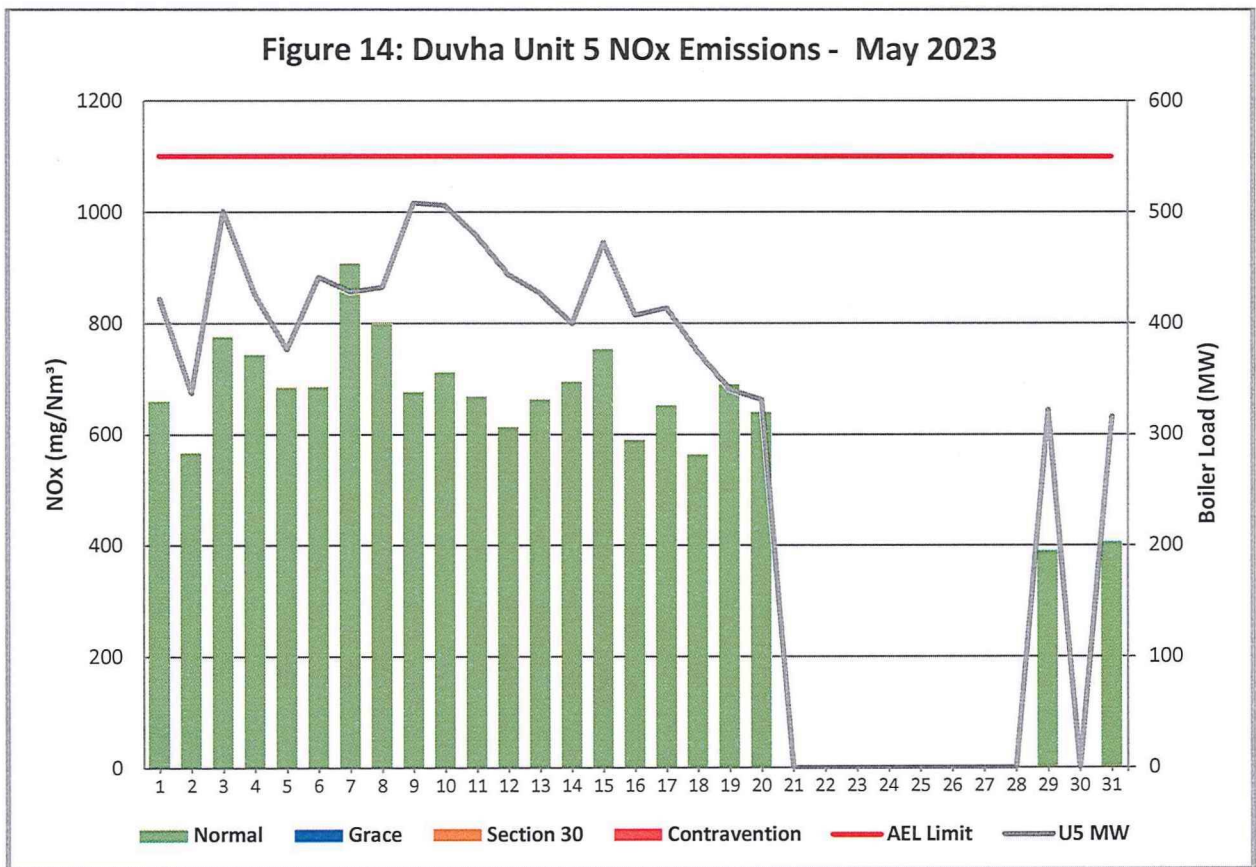
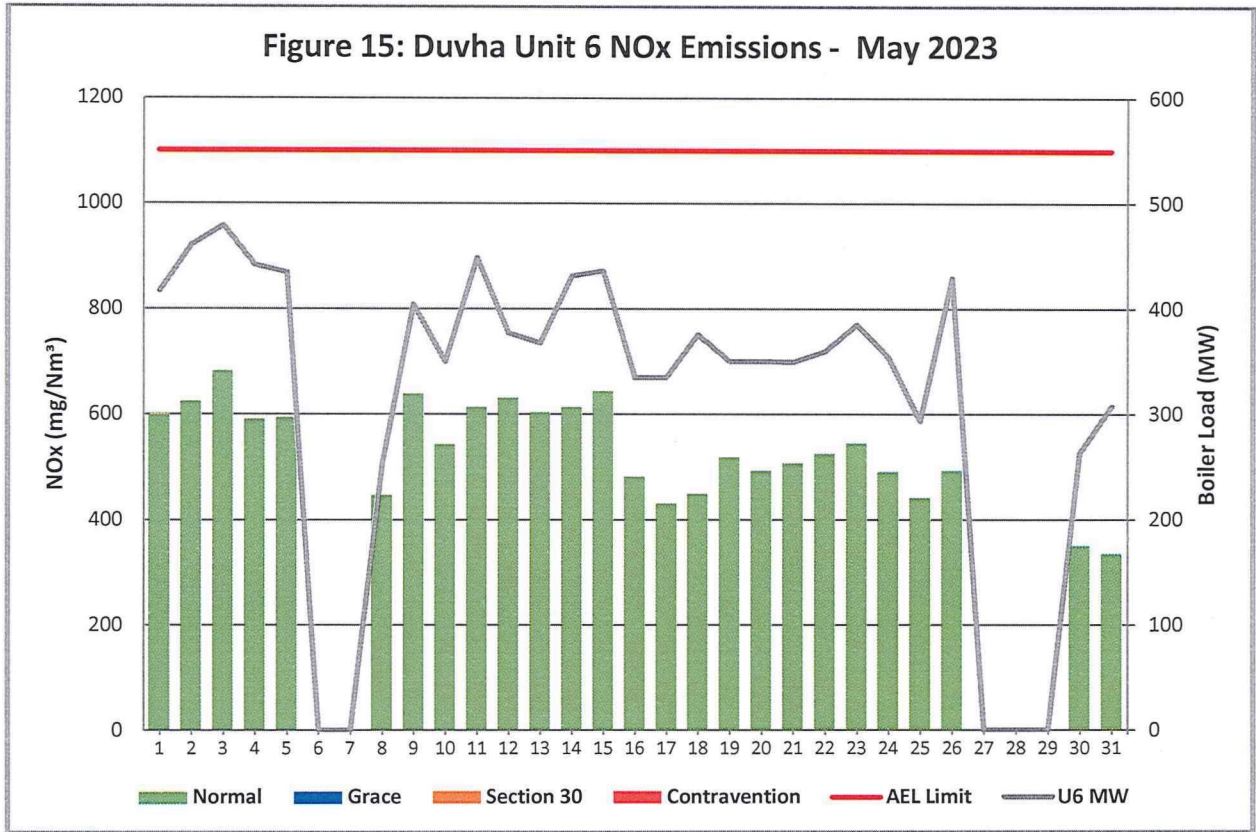


Figure 15: Duvha Unit 6 NOx Emissions - May 2023



7 SHUT DOWN AND LIGHT UP INFORMATION

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

Unit No.1	Event 1	
Breaker Open (BO)	8:00 am	2023/05/24
Draught Group (DG) Shut Down (SD)	9:50 am	2023/05/24
BO to DG SD (duration)	00:01:50	DD:HH:MM
Fires in time	2:45 pm	2023/05/24
Synch. to Grid (or BC)	11:15 pm	2023/05/24
Fires in to BC (duration)	00:08:30	DD:HH:MM
Emissions below limit from BC (end date)	not > limit	not > limit
Emissions below limit from BC (duration)	n/a	DD:HH:MM

Unit No.2	Event 1		Event 2		Event 3	
Breaker Open (BO)	BO previously	BO previously	5:00 pm	2023/05/18	7:35 am	2023/05/24
Draught Group (DG) Shut Down (SD)	n/a	n/a	DG did not trip or SD	DG did not trip or SD	9:05 am	2023/05/24
BO to DG SD (duration)	n/a	DD:HH:MM	n/a	DD:HH:MM	00:01:30	DD:HH:MM
Fires in time	6:35 pm	2023/05/03			8:15 am	2023/05/26
Synch. to Grid (or BC)	11:15 pm	2023/05/03			6:00 pm	2023/05/26
Fires in to BC (duration)	00:04:40	DD:HH:MM		DD:HH:MM	00:09:45	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

Unit No.4	Event 1		Event 2		Event 3	
Breaker Open (BO)	3:10 am	2023/05/06	1:55 pm	2023/05/08	10:30 pm	2023/05/15
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	6:05 pm	2023/05/16
BO to DG SD (duration)	n/a	DD:HH:MM	n/a	DD:HH:MM	00:19:35	DD:HH:MM
Fires in time					6:15 am	2023/05/22
Synch. to Grid (or BC)					10:10 am	2023/05/22
Fires in to BC (duration)		DD:HH:MM		DD:HH:MM	00:03:55	DD:HH:MM
Emissions below limit from BC (end date)					not > limit	not > limit
Emissions below limit from BC (duration)		DD:HH:MM		DD:HH:MM	n/a	DD:HH:MM

Unit No.5	Event 1		Event 2		Event 3	
Breaker Open (BO)	12:50 am	2023/05/02	1:30 pm	2023/05/05	7:45 am	2023/05/20
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	8:55 am	2023/05/20
BO to DG SD (duration)	n/a	DD:HH:MM	n/a	DD:HH:MM	00:01:10	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
Emissions below limit from BC (end date)						
Emissions below limit from BC (duration)		DD:HH:MM		DD:HH:MM		DD:HH:MM

Unit No.6	Event 1		Event 2		Event 3		Event 4	
Breaker Open (BO)	10:40 pm	2023/05/03	1:25 pm	2023/05/05	2:05 pm	2023/05/09	5:55 pm	2023/05/16
Draught Group (DG) Shut Down (SD)	DG did not trip or SD	DG did not trip or SD	10:30 am	2023/05/07	3:20 pm	2023/05/09	DG did not trip or SD	DG did not trip or SD
BO to DG SD (duration)	n/a	DD:HH:MM	01:21:05	DD:HH:MM	00:01:15	DD:HH:MM	n/a	DD:HH:MM
Fires in time			7:30 am	2023/05/08	7:30 am	2023/05/10		
Synch. to Grid (or BC)			12:50 pm	2023/05/08	10:50 am	2023/05/10		
Fires in to BC (duration)		DD:HH:MM	00:05:20	DD:HH:MM	00:03:20	DD:HH:MM		DD:HH:MM
Emissions below limit from BC (end date)			2:05 pm	2023/05/09	2:00 am	2023/05/12		
Emissions below limit from BC (duration)		DD:HH:MM	01:01:15	DD:HH:MM	01:15:10	DD:HH:MM		DD:HH:MM

8 GENERAL

Exceedances:

Unit 4:

06-07/05/2023

- Cold unit light up.

08-14/05/2023

- Contravention Incident: The 48 Hours allowable for a hot unit light up were exceeded on Duvha's unit 4 from the 11th to 14th of May 2023. A detailed investigation report with root cause and preventative actions will be submitted to your office once the investigation is completed.

24/05/2023

- Cold unit light up.

29/05/2023

- Backlog on the Dust Handling plant (DHP).

31/05/2023

- The SO3 plant kept tripping.

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:

02/05/2023

- Cold unit light up.

05 -06/05/2023

- Cold unit light up.

10/05/2023

- The Dust Handling plant (DHP) left hand row No 4 was blocked.

17-19/05/2023

- Contravention Incident: The 48 Hours allowable for upset conditions were exceeded on Duvha's unit 5 on the 19th of May 2023. A detailed investigation report with root cause and preventative actions will be submitted to your office once the investigation is completed.

Unit 6:

01/05/2023

- SO3 plant kept tripping.

05/05/2023

- Hot unit light up.

09/05/2023

- Cold unit light up.

11/05/2023

- Cold unit light up.

17-20/05/2023

- Contravention Incident: The 48 Hours allowable for a hot unit light up were exceeded on Duvha's unit 6 from the 19th to 20th of May 2023. A detailed investigation report with root cause and preventative actions will be submitted to your office once the investigation is completed.

24/05/2023

- SO3 plant injection rate was fluctuating.
- ESPs fields were switched off for scouring,
- ESP field 2.3 had communication fault,
- DHP R\H row 2 was blocked

25/05/2023

- Cold unit light up.

31/05/2023

- Cold unit light up.

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. The monitors have been relocated successfully and verified. The Station is now conducting new Parallel tests required after relocation of the monitors.

Unit 2 Particulate Matter Emissions monitor:

27/05/2023 -31/05/2023


- Monitor reliability below 80% due to the virtual machine (duvsrv22) was in a transitioning/rebooting state and thus was down. This VM is responsible for the OPC link to the DCS and VA. The VM was restarted and the OPC link was restored.

The fuel oil usage for the month of May 2023 exceeded the permitted consumption rate. A detailed investigation report with root cause and preventative actions will be submitted to your office once the investigation is completed.

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

29/06/2023
Date


Environmental
Manager

29/06/2023
Date


Engineering Manager

2023-05-30
Date

Compiled by:

Environmental Officer

For:

Nkangala District
Municipality

Air Quality Officer

Copies:

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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 May 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 May 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 4	11/05/2023	14/05/2023	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 up were exceeded on Duvha's unit 4 from the 11 th to 14 th of May 2023. A detailed investigation report with root cause and preventative actions will be submitted to your office once the investigation is completed.
Unit 5	19/05/2023	19/05/2023	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 19 th of May 2023. A detailed investigation report with root

							cause and preventative actions will be submitted to your office once the investigation is completed.
Unit 6	19/05/2023	20/05/2023	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 up were exceeded on Duvha's unit 6 from the 19 th to 20 th of May 2023. A detailed investigation report with root cause and preventative actions will be submitted to your office once the investigation is completed.