



Generation

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AND

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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-2024
	Coal	Tons	1 400 000	732 828.440
	Fuel Oil	Tons	5 000	5475.01
Production Rates	Product / By-Product Name	Units	Maximum Production Capacity Permitted	Indicative Production Rate Dec-2024
	Energy	GWh	2 678.400	1 157.470
	Ash	Tons	not specified	178 956.7
	RE Ash	kg/MWh	not specified	0.216

Note: Maximum energy rate is as per the maximum capacity stated in the AEL: [3 600 MW] x 24 hrs x days in Month/1000 to convert to GWh

2 ENERGY SOURCE CHARACTERISTICS

Coal Characteristic	Units	Stipulated Range	Monthly Average Content
CV Content	MJ/kg	18-24	22.04
Sulphur Content	%	0.6 TO >1.2	0.64
Ash Content	%	27 TO 30	24.42

3 EMISSION LIMITS (mg/Nm³)

Associated Unit/Stack	PM	SO ₂	NOx
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-2024	Technology Type	SO ₃ Utilization Dec-2024
Unit 1	FFP	99.9%	SO ₃	n/a
Unit 2	FFP	99.9%	SO ₃	n/a
Unit 3	FFP	Off	SO ₃	n/a
Unit 4	ESP + SO ₃	99.7%	SO ₃	96.4%
Unit 5	ESP + SO ₃	99.8%	SO ₃	99.7%
Unit 6	ESP + SO ₃	99.8%	SO ₃	99.8%
<i>Note: ESP plant does not have bypass mode operation, hence plant 100% Utilised.</i>				

5 MONITOR RELIABILITY (%)

Associated Unit/Stack	PM	SO ₂	NO	O ₂
Unit 1	100.0	100.0	100.0	100.0
Unit 2	100.0	100.0	100.0	100.0
Unit 3	Off	Off	Off	Off
Unit 4	99.9	42.6	42.6	42.6
Unit 5	100.0	52.8	52.8	56.0
Unit 6	100.0	100.0	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 December 2024

Associated Unit/Stack	PM (tons)	SO ₂ (tons)	NO _x (tons)
Unit 1	37.9	6 557	2 188
Unit 2	34.9	2 855	1 473
Unit 3	Off	Off	Off
Unit 4	72.8	1 922	861
Unit 5	59.6	1 287	545
Unit 6	45.1	1 628	993
SUM	250.24	14 249	6 061

Table 6.2: Operating days in compliance to PM AEL Limit - December 2024

Associated Unit/Stack	Normal	Grace	Section 30	Contravention	Total Exceedance	Average PM (mg/Nm³)
Unit 1	30	0	0	0	0	21.0
Unit 2	31	0	0	0	0	21.3
Unit 3	Off	Off	Off	Off	Off	Off
Unit 4	30	1	0	0	1	51.0
Unit 5	25	0	0	0	0	65.9
Unit 6	20	0	0	0	0	43.1
SUM	136	1	0	0	1	

Table 6.3: Operating days in compliance to SO₂ AEL Limit - December 2024

Associated Unit/Stack	Normal	Grace	Section 30	Contravention	Total Exceedance	Average SO ₂ (mg/Nm³)
Unit 1	10	0	0	21	21	3 530.9
Unit 2	31	0	0	0	0	1 679.2
Unit 3	Off	Off	Off	Off	Off	Off
Unit 4	31	0	0	0	0	1 296.6
Unit 5	25	0	0	0	0	1 314.0
Unit 6	20	0	0	0	0	1 447.1
SUM	117	0	0	21	21	

Table 6.4: Operating days in compliance to NO_x AEL Limit - December 2024

Associated Unit/Stack	Normal	Grace	Section 30	Contravention	Total Exceedance	Average NO _x (mg/Nm³)
Unit 1	5	0	0	26	26	1 170.2
Unit 2	31	0	0	0	0	866.4
Unit 3	Off	Off	Off	Off	Off	Off
Unit 4	31	0	0	0	0	580.9
Unit 5	25	0	0	0	0	551.4
Unit 6	20	0	0	0	0	878.9
SUM	112	0	0	26	26	

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 - December 2024

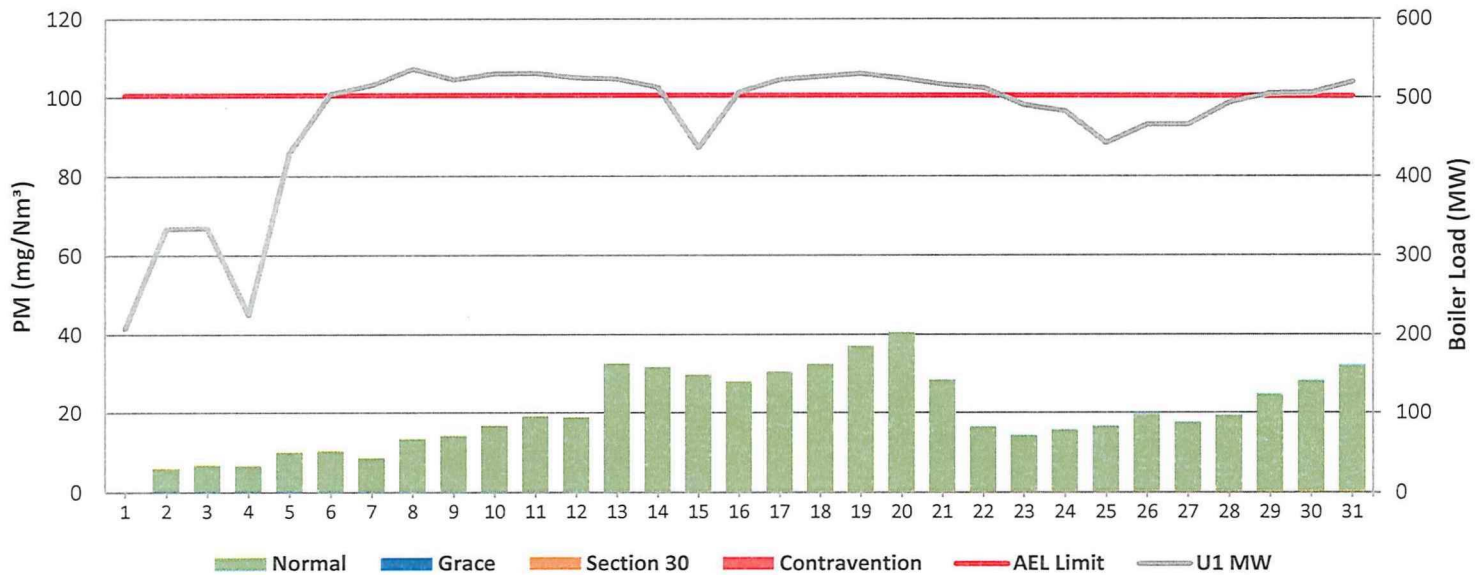


Figure 2: Duvha Unit 2 PM Emissions - December 2024

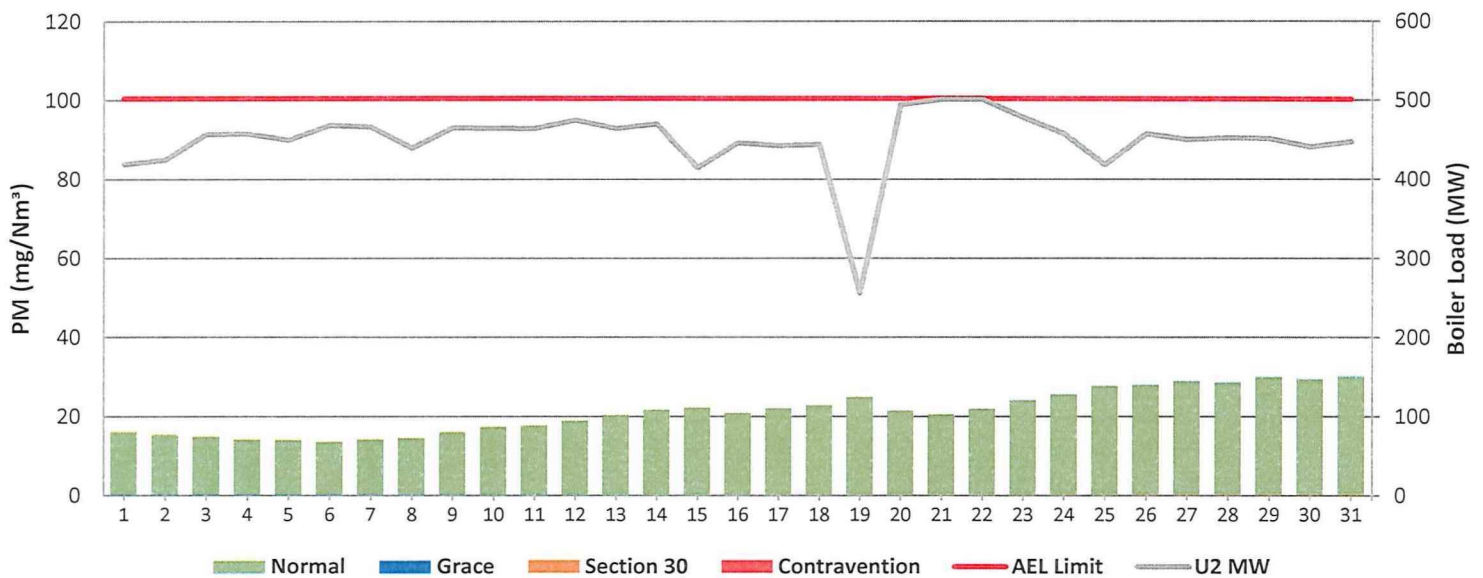


Figure 3: Duvha Unit 4 PM Emissions - December 2024

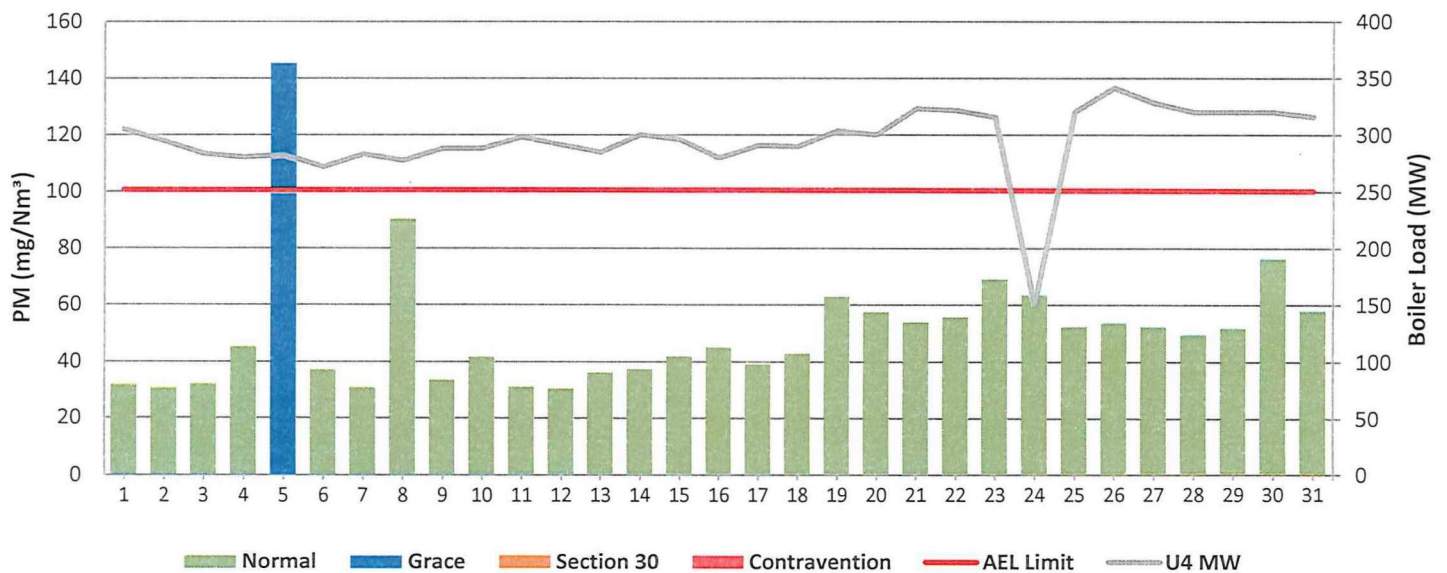


Figure 4: Duvha Unit 5 PM Emissions - December 2024

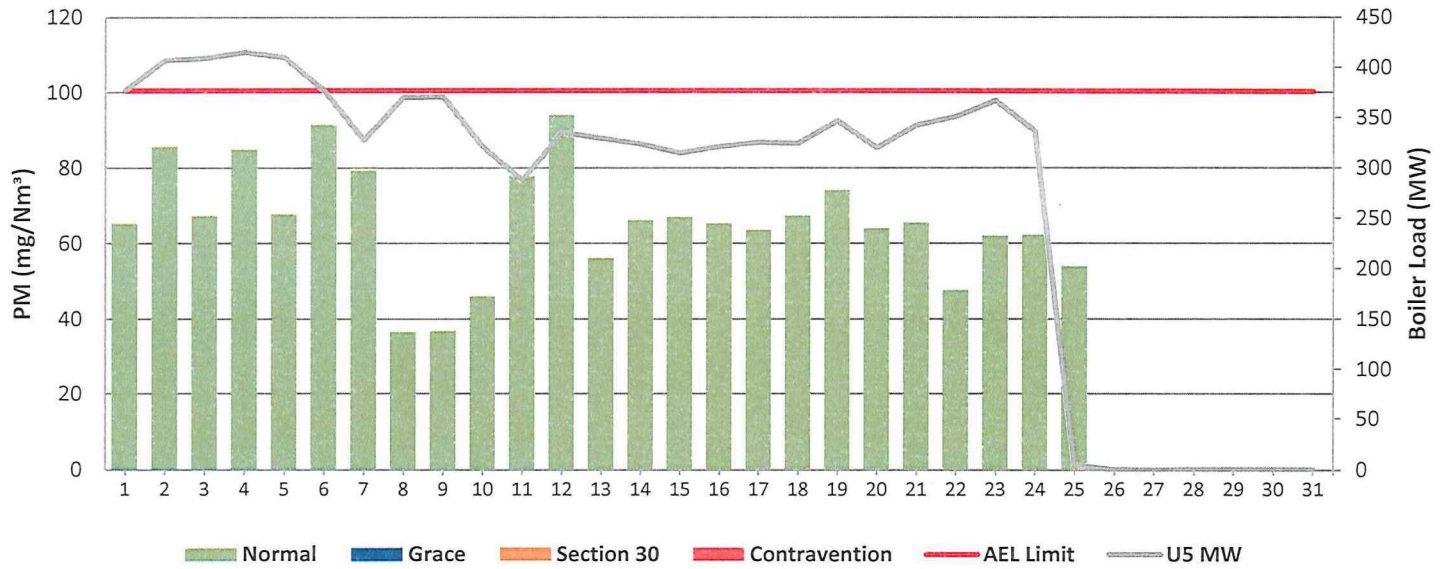


Figure 5: Duvha Unit 6 PM Emissions - December 2024

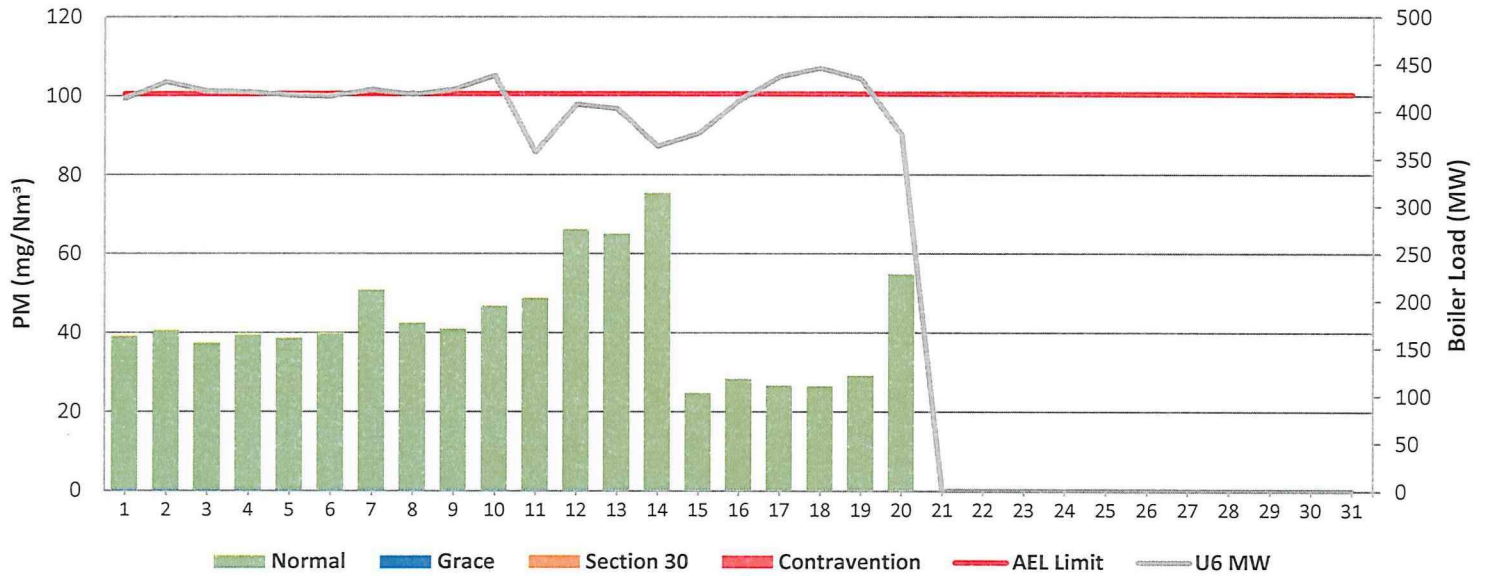


Figure 6: Duvha Unit 1 SO₂ Emissions - December 2024

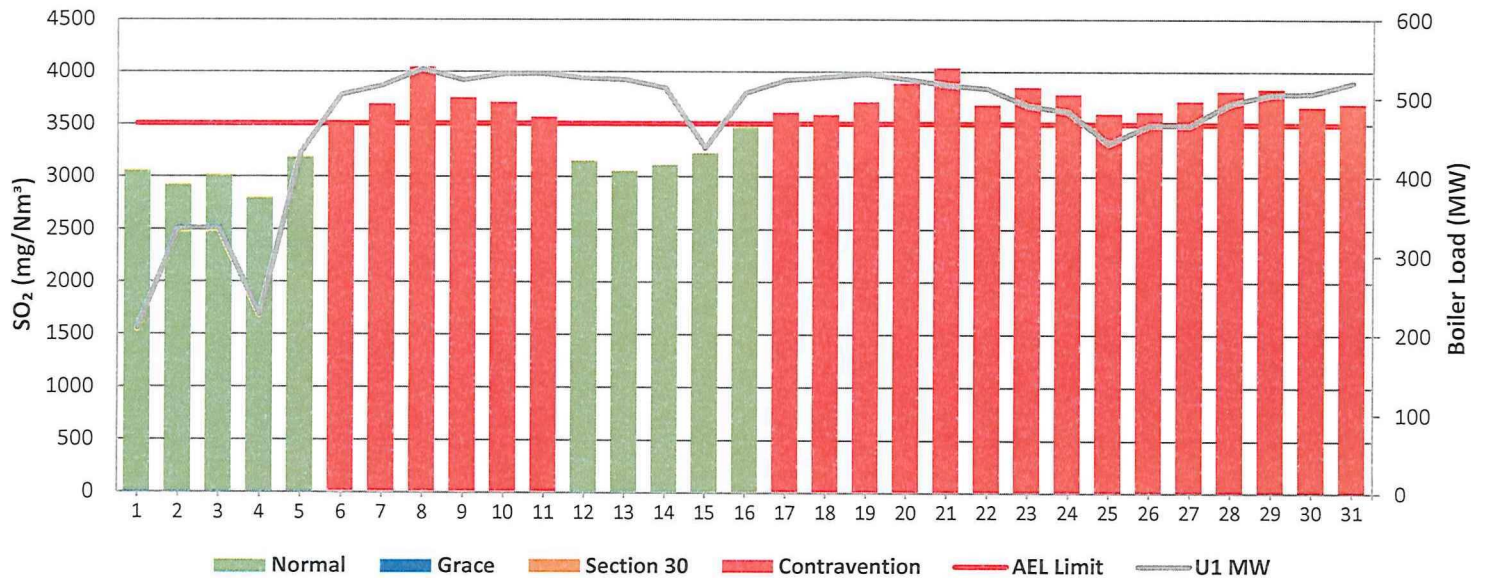


Figure 7: Duvha Unit 2 SO₂ Emissions - December 2024

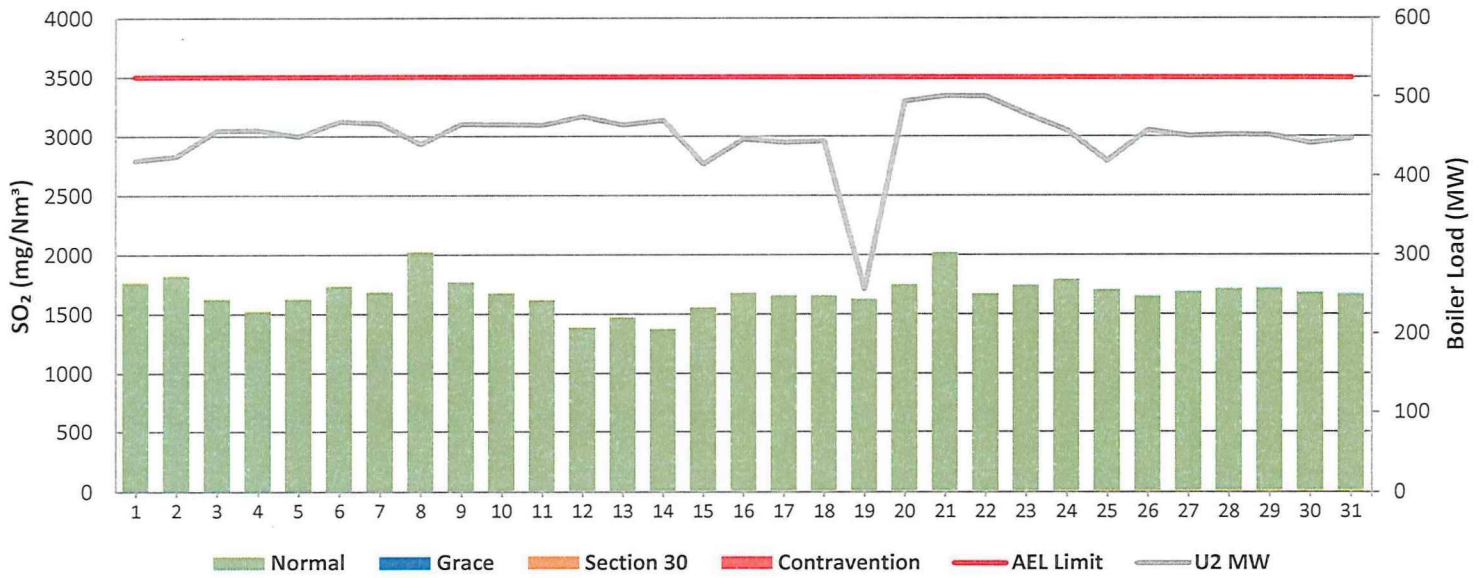


Figure 8: Duvha Unit 4 SO₂ Emissions - December 2024

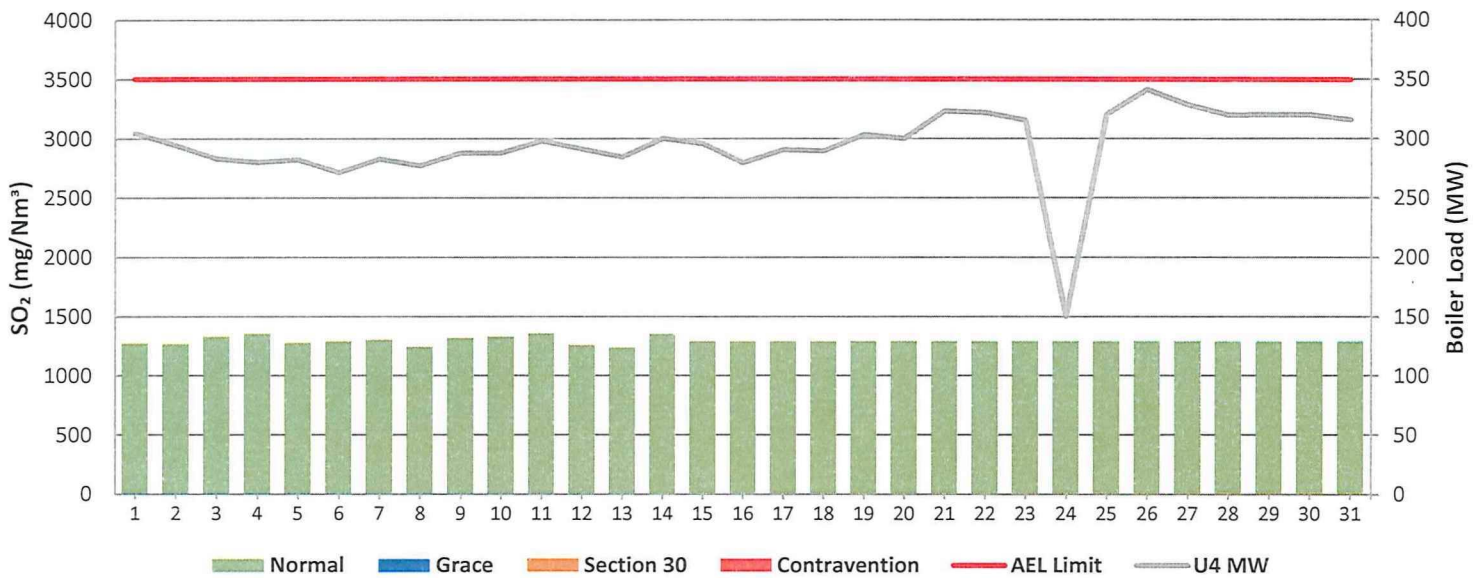


Figure 9: Duvha Unit 5 SO₂ Emissions - December 2024

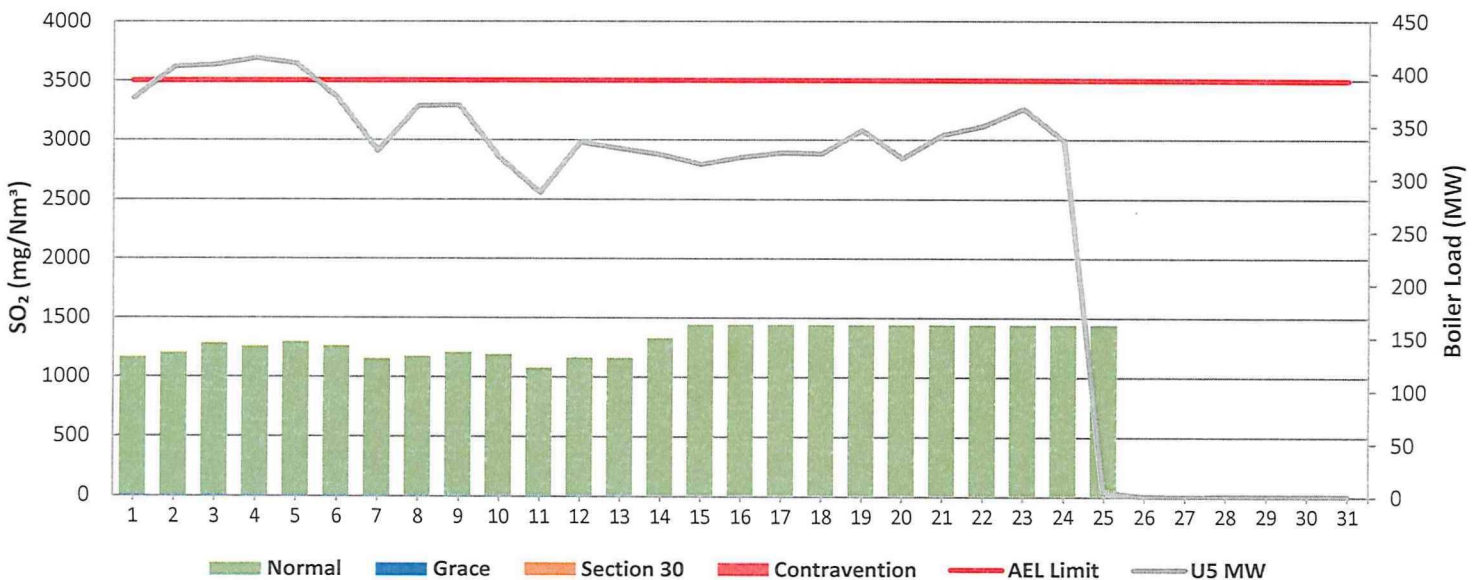


Figure 10: Duvha Unit 6 SO₂ Emissions - December 2024

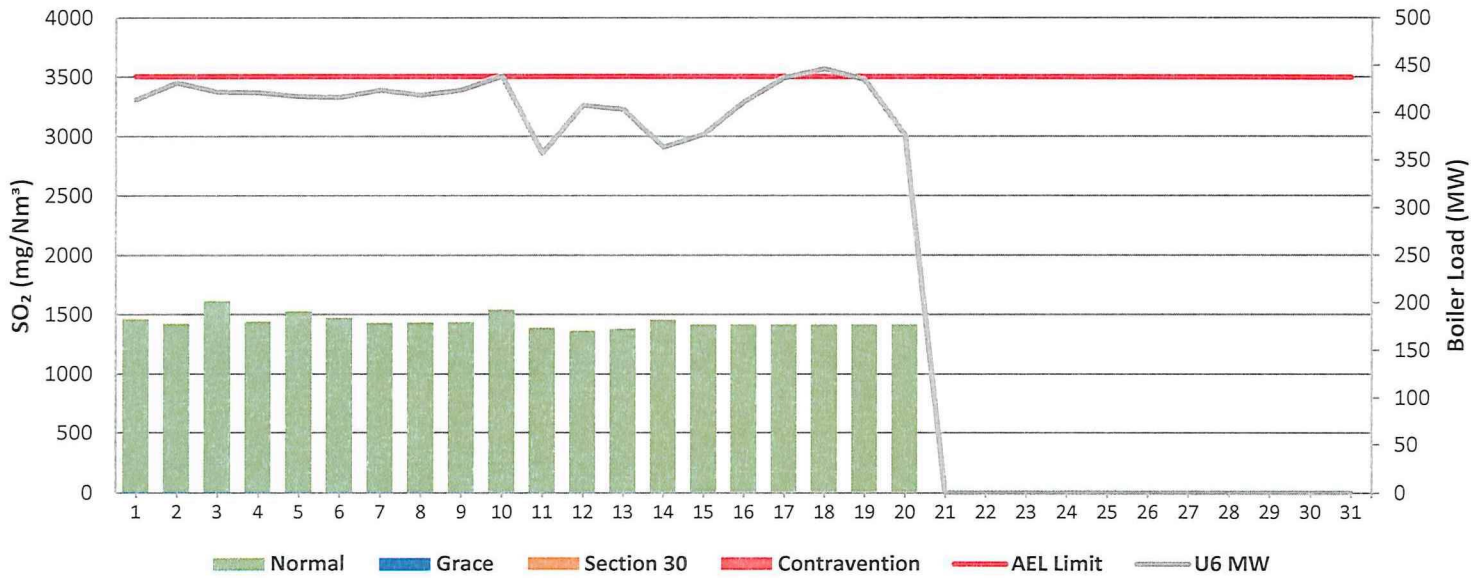


Figure 11: Duvha Unit 1 NO_x Emissions - December 2024

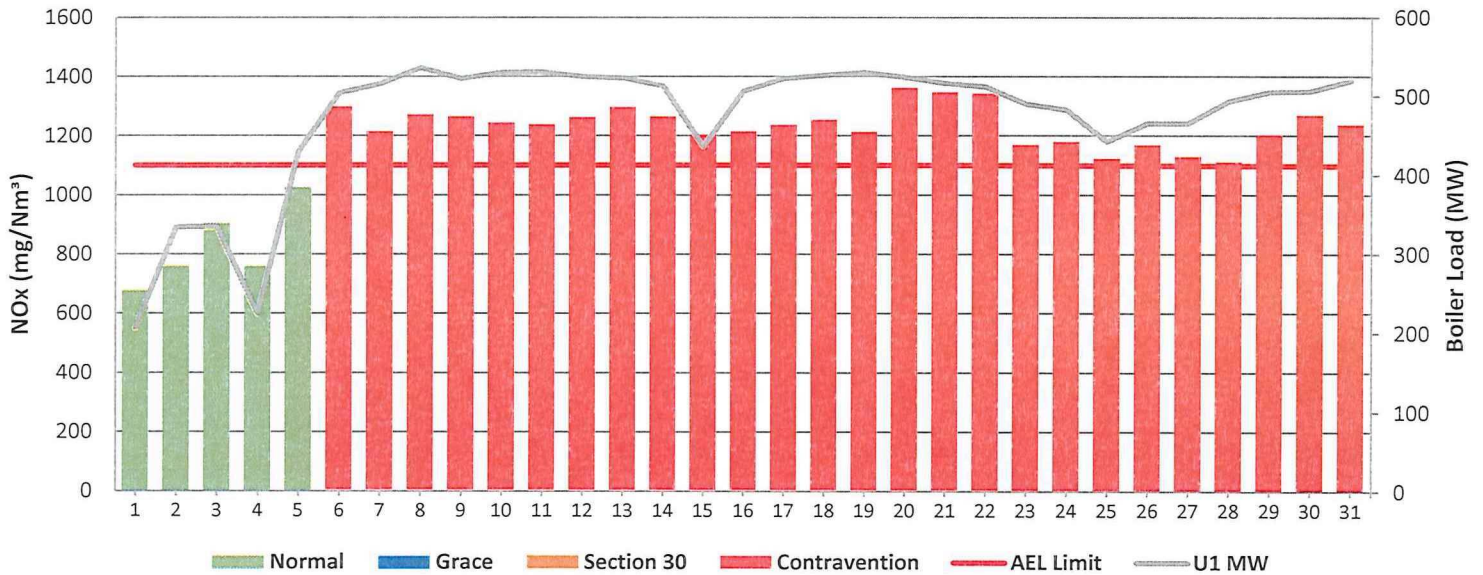


Figure 12: Duvha Unit 2 NO_x Emissions - December 2024

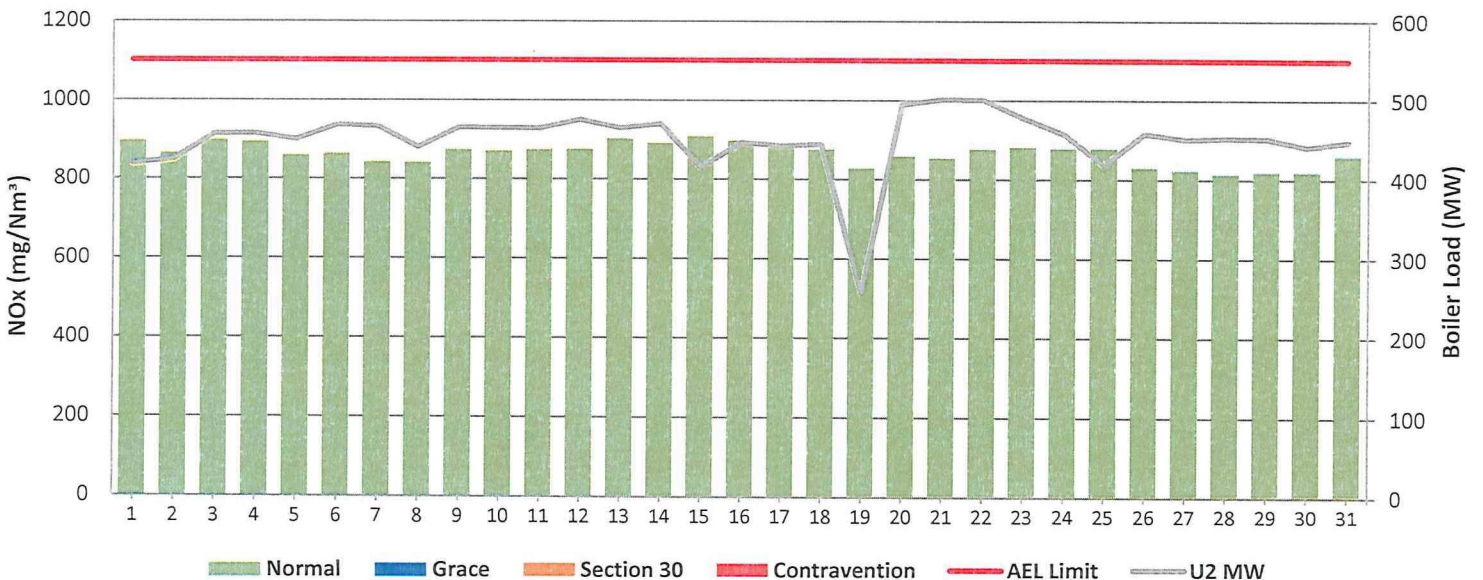


Figure 13: Duvha Unit 4 NOx Emissions - December 2024

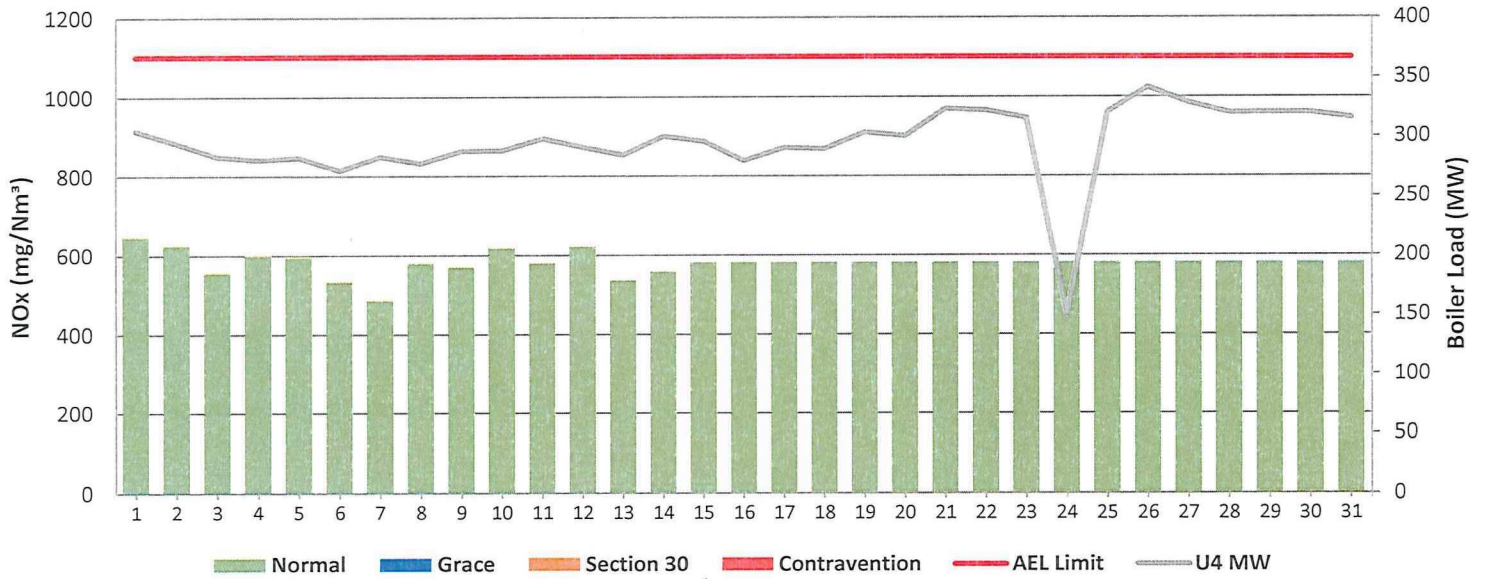


Figure 14: Duvha Unit 5 NOx Emissions - December 2024

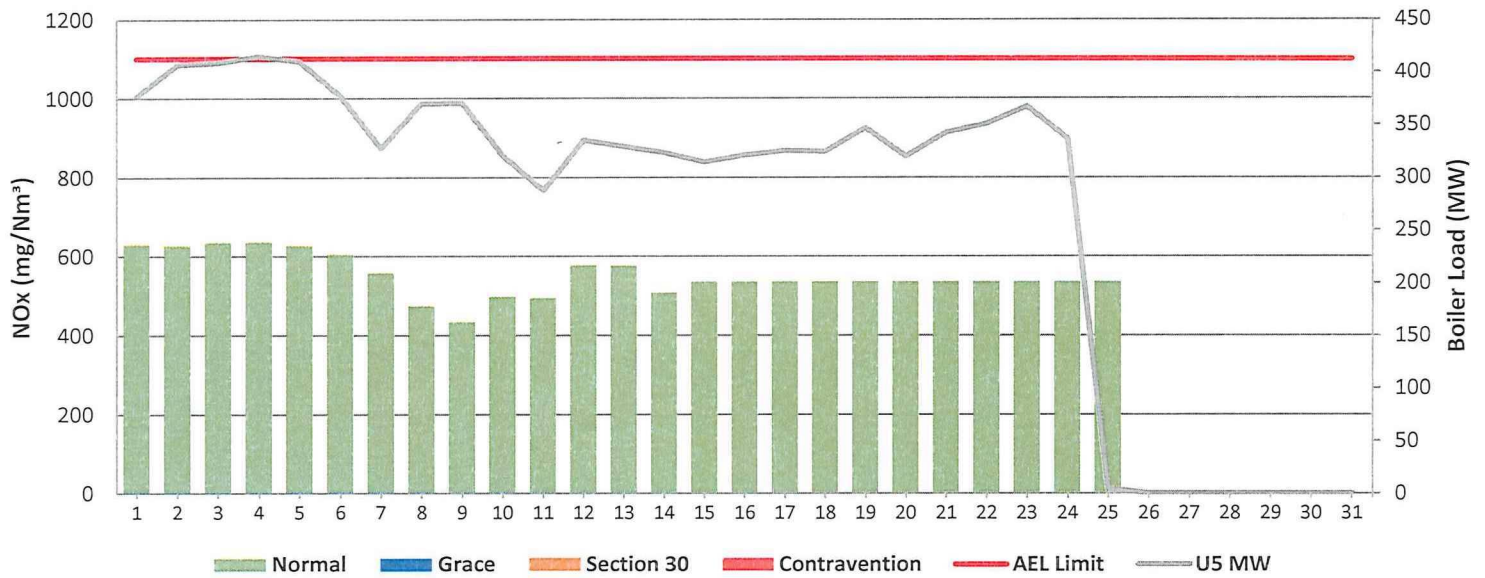
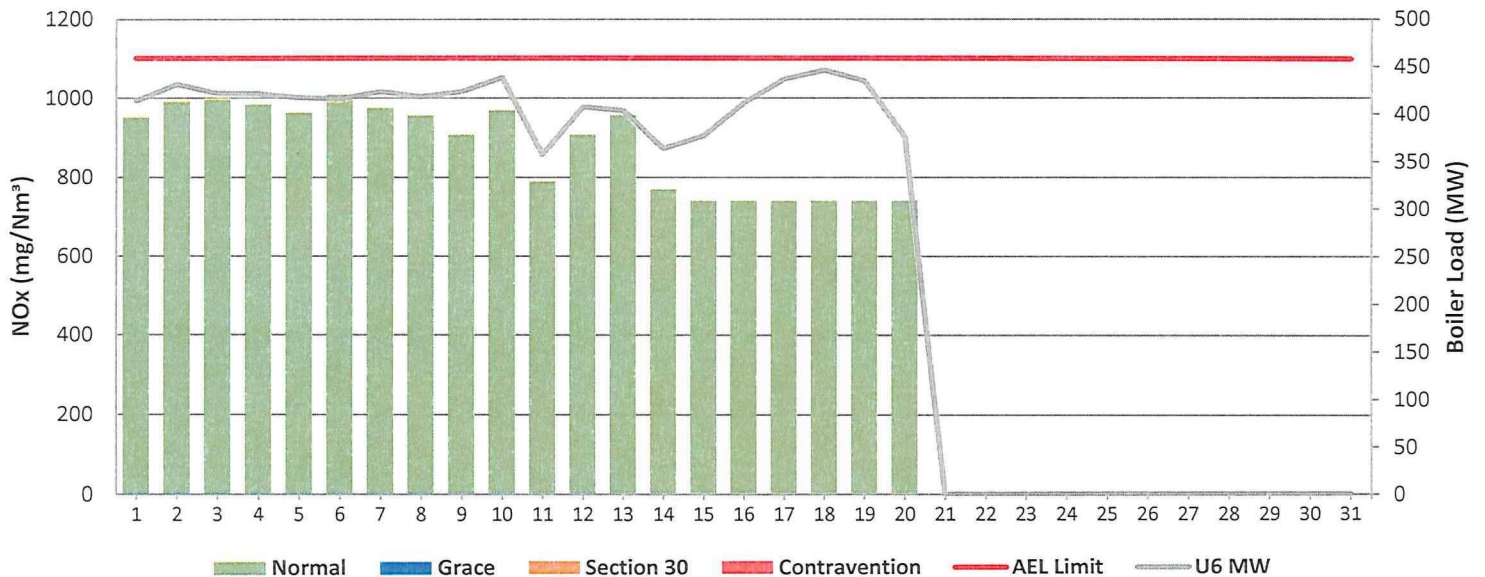


Figure 15: Duvha Unit 6 NOx Emissions - December 2024



Tables 7.1: Shut-down and light-up information for the month of December 2024

Unit No.1	<i>Event 1</i>		<i>Event 2</i>	
Breaker Open (BO)			<i>5:00 am</i>	<i>2024/12/04</i>
Draught Group (DG) Shut Down (SD)			<i>DG did not trip or SD</i>	<i>DG did not trip or SD</i>
BO to DG SD (duration)		DD:HH:MM	<i>n/a</i>	DD:HH:MM
Fires in time				
Synch. to Grid (or BC)	<i>11:00 am</i>	<i>2024/12/01</i>		
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

Unit No.2	<i>Event 1</i>	
Breaker Open (BO)	<i>11:25 am</i>	<i>2024/12/19</i>
Draught Group (DG) Shut Down (SD)	<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
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	<i>Event 1</i>	
Breaker Open (BO)	<i>9:15 am</i>	<i>2024/12/24</i>
Draught Group (DG) Shut Down (SD)	<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
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.5	Event 1		Event 2		Event 3	
Breaker Open (BO)	7:50 am	2024/12/07	6:45 am	2024/12/11	12:30 am	2024/12/25
Draught Group (DG) Shut Down (SD)	10:55 am	2024/12/07	DG did not trip or SD	DG did not trip or SD	3:25 am	2024/12/26
BO to DG SD (duration)	00:03:05	DD:HH:MM	n/a	DD:HH:MM	01:02:55	DD:HH:MM
Fires in time	3:30 pm	2024/12/07				
Synch. to Grid (or BC)	10:30 pm	2024/12/07				
Fires in to BC (duration)	00:07:00	DD:HH:MM		DD:HH:MM		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		DD:HH:MM		DD:HH:MM

Unit No.6	Event 1		Event 2	
Breaker Open (BO)	6:50 am	2024/12/14	5:40 pm	2024/12/20
Draught Group (DG) Shut Down (SD)	DG did not trip or SD	DG did not trip or SD	6:35 am	2024/12/23
BO to DG SD (duration)	n/a	DD:HH:MM	02:12:55	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 COMPLAINTS

There were no complaints for this month.

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

9 GENERAL

Exceedance: Particulate Matter.

Unit 4

05/12/2024

The process air fan-VSD was being replaced and as a safety precautionary measure to replace the process air fan-VSD, the SO₃ plant had to be shut down

Additionally, the reasons for the SO_x and NO_x gas exceedances for the month of December 2024 are attached in an investigation report as appendix A

The fuel oil usage for the month of December 2024 exceeded the permitted consumption rate due to the following reasons

Unit 1

- There was a hot unit light up on the 1st and 4th of December 2024
- There was a Half-load and 3 mills loading due to unavailability of EFP from the 1st to the 6th of December 2024. There was also a B EFP Repair in progress which was estimated to be completed on the 3rd but ended up being repaired on the 6th of December 2024
- There was a Support combustion while soot blowing the boiler
- There was a Mills swap on the unit

Unit 2

- There was a hot unit light up on the 19th of December 2024
- The unit was continuously supported with B row oil burners due to the ash plant not being available
- There was a support combustion while soot blowing the boiler
- There was a Mills swap on the unit

Unit 4

- The Unit was on half load with 3 mills loading due to high vacuum and unstable combustion,
- The unit was Continuously supported by B1&B4 oil burner support due to a low load due to the main condenser vacuum deteriorating
- The unit had a support combustion while ashing the boiler (D, B & E row of oil burners)
- The unit had a Support combustion while soot blowing the boiler on low load

Unit 5

- Mills were not available (there was continuously supporting unstable combustion)
- There was Support combustion while soot blowing the boiler
- There was a Hot unit Return to service on the 7th and 11th
- The unit ran on low load to preserve coal (the coal bunkers were low)

Unit 6

- The mills were shut down and the unit was left with two mills (A and C mills) that had no coal
- There was Support combustion while soot blowing the boiler
- The B mill was supported with oil burners due to the unstable bottom pyro

Lastly the averages for Oxygen (O2) and Carbon Dioxide (CO2) data from the QAL2 tests reports were used for reporting gaseous emissions for units 2, 4, 5 and 6 due to poor performance of the O2 and CO2 gaseous monitors. The poor performance of the monitors, on multiple units was because of the station's inability to conduct bi-weekly calibrations and preventative maintenance of the O2 analysers for an extended period of time.

The lack of preventative maintenance on the O2 Analysers is because the station historically did not have a long-term maintenance contract for this purpose. When a contract was eventually placed in October 2024, a fault-finding exercise conducted by the Service Provider (SI Analytics Pty Ltd) gave an indication that the lack of maintenance of this plant has resulted in a lot of issues with the equipment.

The Station has given the Service Provider time to resolve these issues identified with the monitors and the monitors are expected to perform at 80% reliability by 31 April 2025. The reasons for the delays are covered in Annexure A.

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.

10 S30 Incidents Register

There were no section 30 incidents for this month.


Boiler Plant Engineering Manager

31/01/2025
Date


Environmental Manager

30/01/2025
Date


Engineering Manager

2025-01-31
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
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Duvha Power Station

Engineering Manager
Operating Manager
Maintenance Manager
Production Manager
Boiler Engineering Manager
System Engineer
Environmental Manager



Duvha Power Station Environmental Incident One Pager Report

DUVHA POWER STATION UNIT 1 SO_x and NO_x EXCEEDANCE (DUVHA POWER STATION ATMOSPHERIC EMISSIONS LICENCE (AEL) NO. NDM/AEL/MP312/11/07 INCIDENT DATE: DECEMBER 2024.

BACKGROUND INFORMATION

Duvha Power station has gaseous Continuous Emissions Monitoring System (CEMS) installed at 150-metre level of all flue gas stacks. According to the Duvha Atmospheric Emissions License and Eskom Standard for Emission Monitoring & Reporting 240-56242363, the Gaseous CEMS must be calibrated bi-weekly and must have a minimum availability of 80%.

The Station's Gaseous emissions for SO_x and NO_x generally performs below the AEL limit of 1100mg/Nm³. However, during the month of December 2024 the Duvha U1 SO_x and NO_x CEMS recorded readings higher than the maximum allowable limit of 1100mg/Nm³. Figure 1 and 2 below depicts the number of days when the South Stack U1 SO_x and NO_x Gaseous CEMS exceeded the maximum allowable limit of 1100mg/Nm³. Essentially, from figure 1 and 2 it can be concluded that the exceedances occurred from the 6th till the 31st of December 2024.

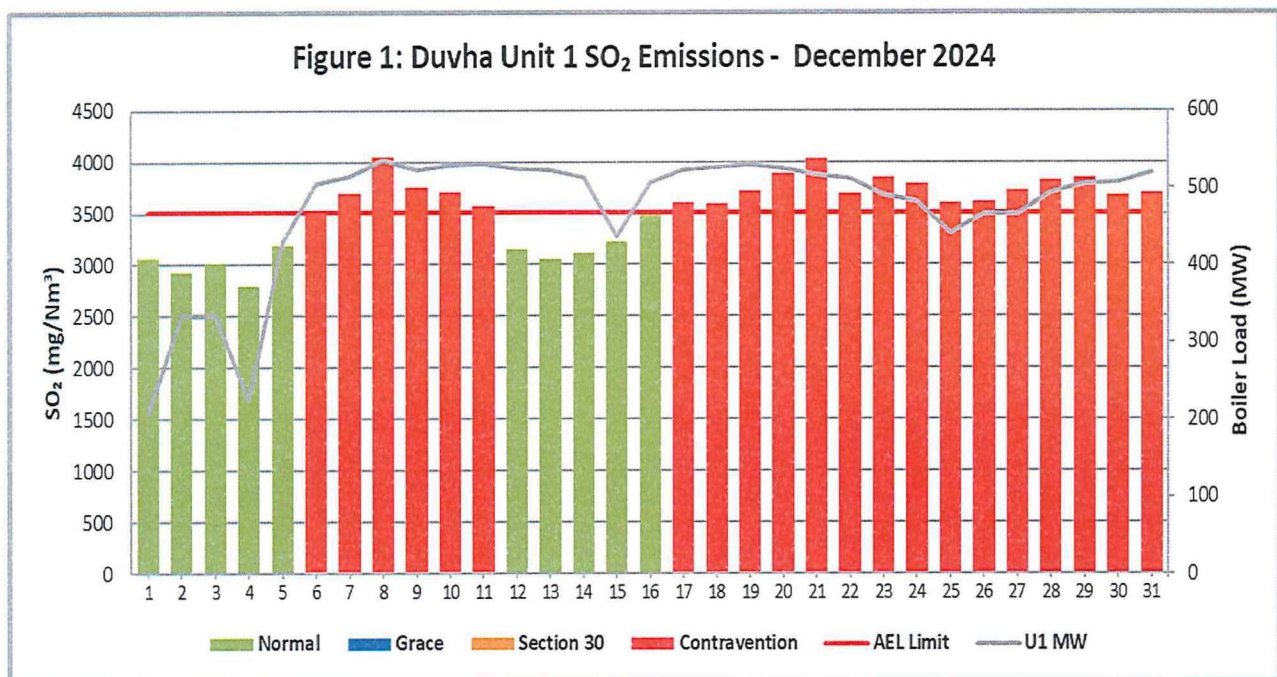



Figure 1: Duvha Unit 1 SO_x Emissions - October 2024

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		Document Identifier	<xxx-xxx>
		Doc Revision	<x.x>
		Next Review Date	May 2028
		Gx Engineering	Page 2 of 3

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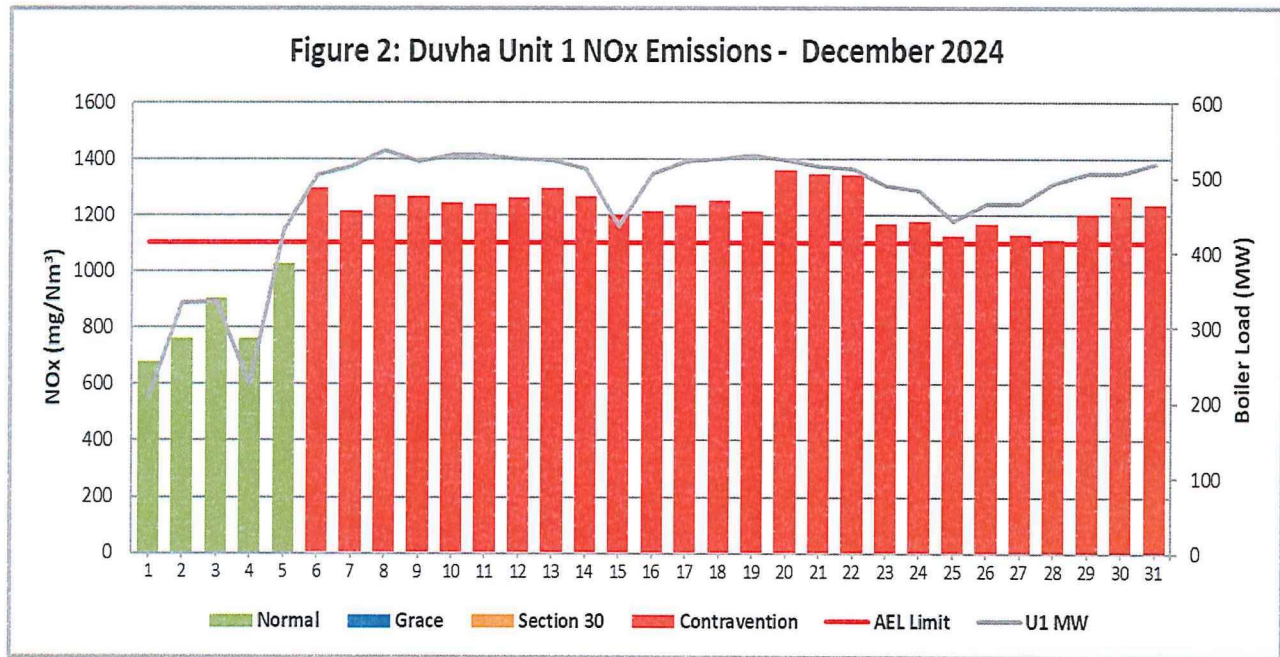



Figure 2: Duvha Unit 1 NOx Emissions - October 2024

The Unit 1 Gaseous CEMS was last calibrated on the 28th of November 2024, which means that the Gaseous CEMS have not been calibrated bi-weekly as per the requirement from Eskom Standard for Emission Monitoring & Reporting 240-56242363 due to the unavailability of the stack lifts. It can be concluded that the data integrity of the Duvha Gaseous CEMS is compromised and therefore the readings are not accurate. The smoke stack lifts are out of service due to the following reasons:

1. As per clause 6(2) of the Occupational Health and Safety act 85 OF 1993; Lift, Escalator and passenger Conveyor regulations, 2010; Published under Government Notice R828 in Government Gazette 33561 of 17 September 2010:
 - “If an inspection or test carried out by an inspection service provider on a lift, escalator or passenger conveyor shows that any defect or weakness exists whereby persons are endangered, the inspection service provider shall report such defect or weakness forthwith to the user, the competent lift service provider and the provincial director, and no person shall be conveyed or allowed to be conveyed in or on such lift, escalator or passenger conveyor until such defect has been rectified to the satisfaction of the inspection service provider.”
2. The lift inspection service provider deemed the lift safety device unsafe and required that it be calibrated or modernized such that it is marked at what speed it is tripping. This defect needs to be rectified.

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		Next Review Date	May 2028
		Gx Engineering	Page 3 of 3

To rectify this defect the Electrical Maintenance Department has conducted a plan to replace the smoke stack lifts Overspeed Governor. This process is at procurement stage and the expected completion date is 22 April 2025.

Compiled by:

Lethu Ndwandwe



C&I System Engineer

Approved by: Lungani Buthelezi



C&I Maintenance Manager

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