



Mr. Chakane Sibaya  
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27 September 2023

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**LRP02PLA000 \_0365/20230907**

Dear Mr. Sibaya

**LETHABO POWER STATION EMISSION MONTHLY REPORT FOR AUGUST 2023**

Please find attached Lethabo Power Station emission report for the month of August 2023.

Also attached are the Ambient Air Quality Monitoring Report, Complaints Register and the Fugitive Dust Fallout Monitoring Report for August 2023.

For any additional information please do not hesitate to contact us.

Yours sincerely

**Karabo Rakgolela**  
**GENERAL MANAGER**

**Generation Division (Cluster 1)**  
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Eskom Holdings SOC Ltd Reg No 2002/015527/30



Report

Lethabo Power Station

Report name: **Lethabo Power Station  
August 2023  
Emission Report**

Reference number: **LRP02PLA000\_0365/20230907**  
Document Type: **Report**  
Area of Applicability: **Environment**  
Report Date: **September-2023**  
Classification: **Controlled Disclosure**

Signatures

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System Engineer


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**LETHABO POWER STATION MONTHLY EMISSIONS REPORT**

Atmospheric Emission License FDDM-MET-2011-08-P1


**1. RAW MATERIALS AND PRODUCTS**

Raw Materials and Products	Raw Material Type	Units	Maximum Permitted Consumption Rate	Consumption Rate Aug-2023
	Coal	Tons	2 000 000	1 527 423
	Fuel Oil	Tons	1 700	968.64

Production Rates	Product / By-Product Name	Units	Maximum Production Capacity Permitted	Indicative Production Rate Aug-2023
	Energy	GWh	2834.64	2 191.24
	Ash	Tons	770 000	570 339.7
	RE Ash	kg/MWh	Not Specified	0.48

**2. ENERGY SOURCE CHARACTERISTICS**

Coal Characteristic	Units	Stipulated Range	Monthly Average Content
<b>Sulphur Content</b>	%	0.656 (Standard)	0.650
<b>Ash Content</b>	%	37.37 (Standard)	37.340

\*Please note the "standard" is not necessary a limit, but merely a optimum indication, it will fluctuate as the coal quality changes. The Stipulated Range are the Station acceptance test values.

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

Associated Unit/Stack	PM	SO <sub>2</sub>	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 Aug-2023	Technology Type	SO <sub>3</sub> Utilization Aug-2023
Unit 1	<i>Electrostatic Precipitator (ESP)</i>	99.91%	SO <sub>3</sub>	99.3%
Unit 2	<i>Electrostatic Precipitator (ESP)</i>	99.71%	SO <sub>3</sub>	95.6%
Unit 3	<i>Electrostatic Precipitator (ESP)</i>	99.72%	SO <sub>3</sub>	100.0%
Unit 4	<i>Electrostatic Precipitator (ESP)</i>	99.82%	SO <sub>3</sub>	97.5%
Unit 5	<i>Electrostatic Precipitator (ESP)</i>	99.82%	SO <sub>3</sub>	100.0%
Unit 6	<i>Electrostatic Precipitator (ESP)</i>	99.77%	SO <sub>3</sub>	100.0%

Note: ESP plant does not have bypass mode operation, hence plant 100% Utilised.

### 5. MONITOR RELIABILITY (%)

Associated Unit/Stack	PM	SO <sub>2</sub>	NO
Unit 1	99.7	100.0	100.0
Unit 2	92.3	99.8	99.8
Unit 3	99.2	100.0	100.0
Unit 4	98.9	99.9	100.0
Unit 5	97.8	100.0	100.0
Unit 6	98.8	100.0	100.0

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

## 6. EMISSION PERFORMANCE

Table 6.1: Monthly tonnages for the month of August 2023

Associated Unit/Stack	PM (tons)	SO <sub>2</sub> (tons)	NO <sub>x</sub> (tons)
Unit 1	82.6	3 143	1 814
Unit 2	188.6	2 573	1 103
Unit 3	242.2	3 501	1 639
Unit 4	158.8	2 916	1 801
Unit 5	172.7	3537	1359
Unit 6	200.7	3 520	1 759
<b>SUM</b>	<b>1 045.5</b>	<b>19 191</b>	<b>9 475</b>

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

Associated Unit/Stack	Normal	Grace	Section 30	Contravention	Total Exceedance	Average PM (mg/Nm <sup>3</sup> )
Unit 1	30	1	0	0	1	42.6
Unit 2	19	4	0	0	4	159.6
Unit 3	18	12	0	0	12	125.0
Unit 4	24	5	0	0	5	88.9
Unit 5	25	6	0	0	6	95.7
Unit 6	22	9	0	0	9	103.4
<b>SUM</b>	<b>138</b>	<b>37</b>	<b>0</b>	<b>0</b>	<b>37</b>	

Table 6.3: Operating days in compliance to SO<sub>2</sub> AEL Limit - August 2023

Associated Unit/Stack	Normal	Grace	Section 30	Contravention	Total Exceedance	Average SO <sub>2</sub> (mg/Nm <sup>3</sup> )
Unit 1	31	0	0	0	0	1 592.6
Unit 2	25	0	0	0	0	1 706.8
Unit 3	31	0	0	0	0	1 755.8
Unit 4	30	0	0	0	0	1 547.8
Unit 5	31	0	0	0	0	1 778.0
Unit 6	31	0	0	0	0	1 819.6
<b>SUM</b>	<b>179</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	

Table 6.4: Operating days in compliance to NOx AEL Limit - August 2023

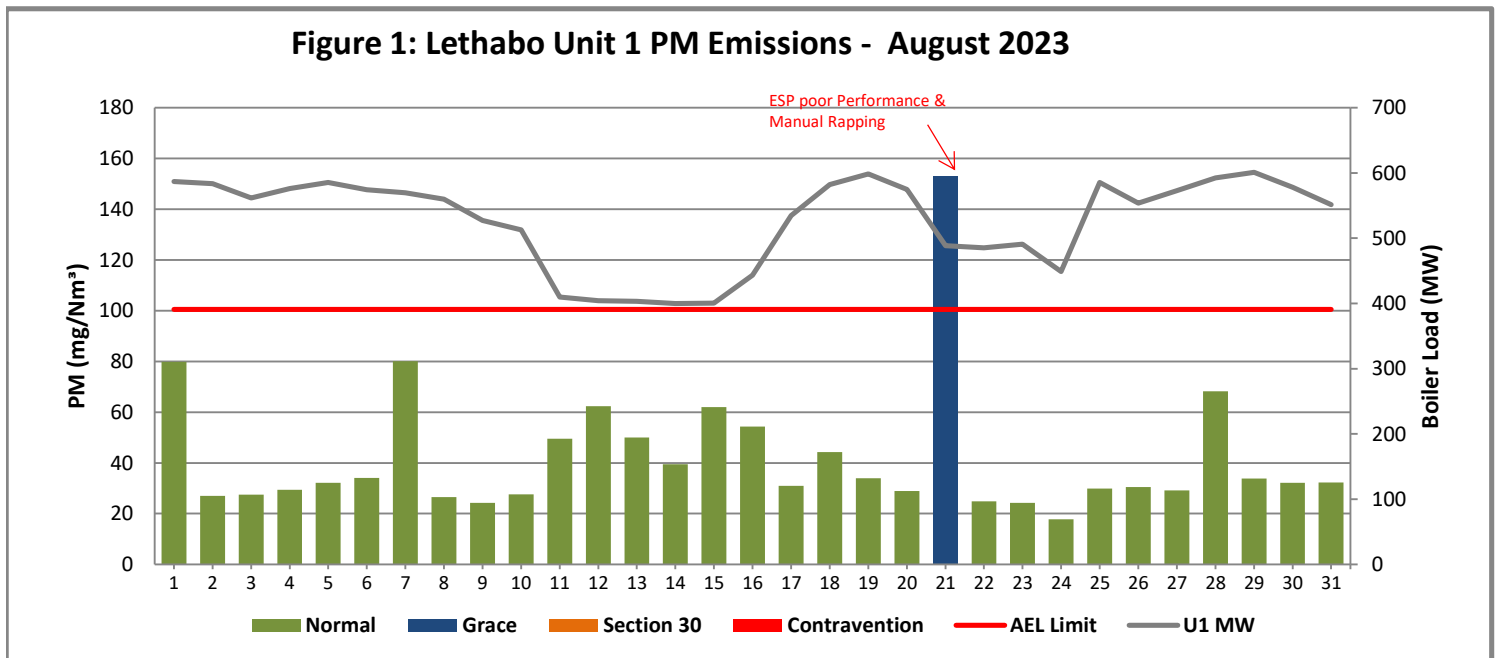
Associated Unit/Stack	Normal	Grace	Section 30	Contravention	Total Exceedance	Average NOx (mg/Nm <sup>3</sup> )
Unit 1	31	0	0	0	0	915.6
Unit 2	25	0	0	0	0	729.7
Unit 3	31	0	0	0	0	819.3
Unit 4	30	0	0	0	0	948.6
Unit 5	31	0	0	0	0	683.0
Unit 6	31	0	0	0	0	908.7
<b>SUM</b>	<b>179</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	

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

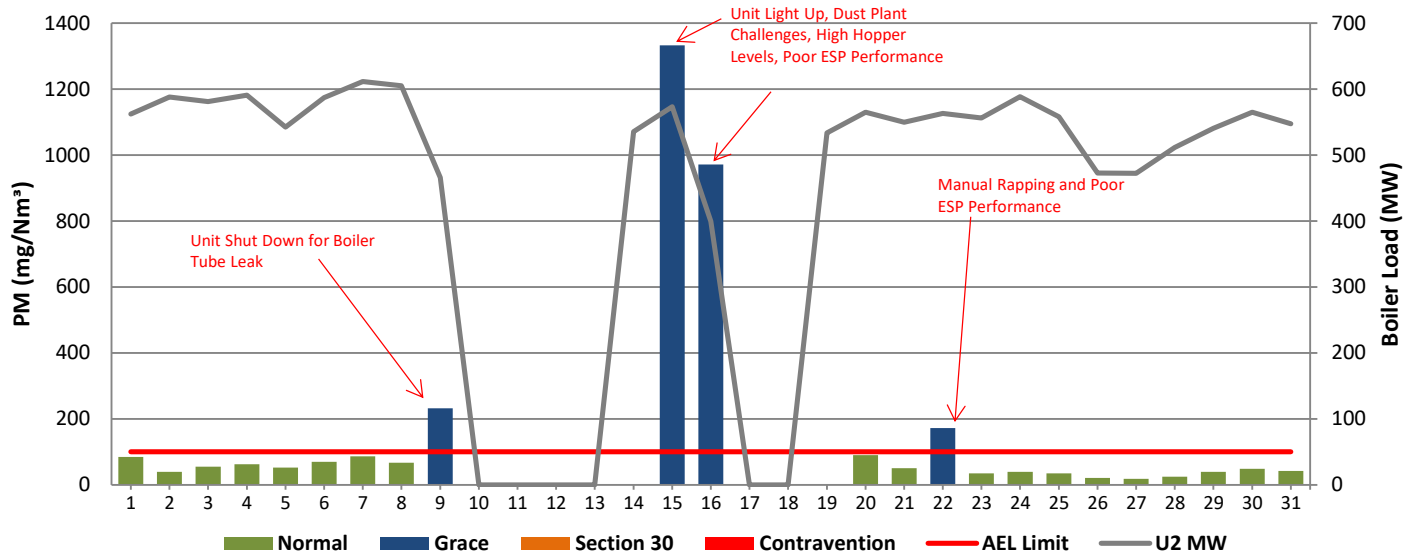
Table 6.5: Legend Description

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

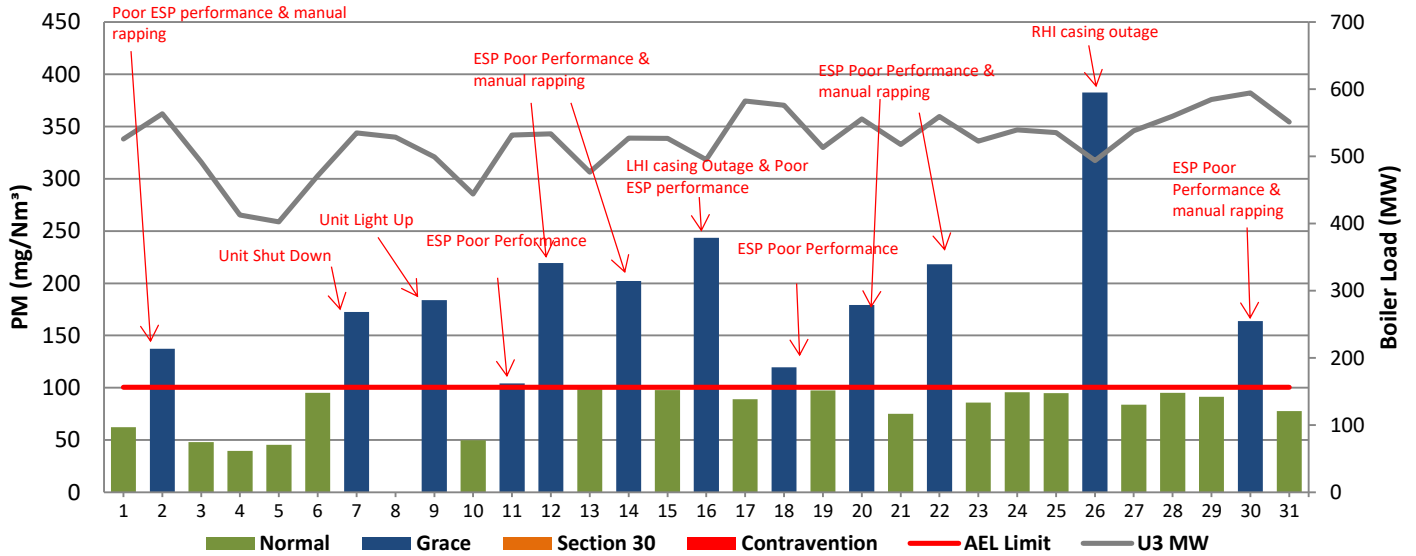
Figure 1: Lethabo Unit 1 PM Emissions - August 2023



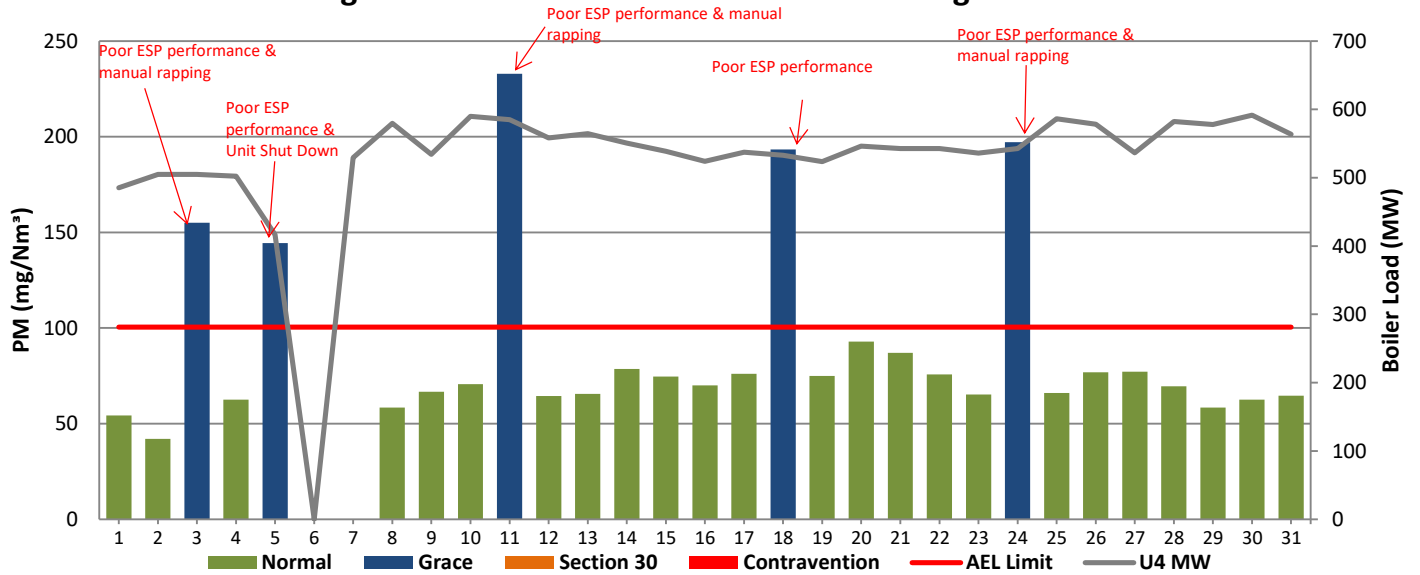
**Figure 2: Lethabo Unit 2 PM Emissions - August 2023**



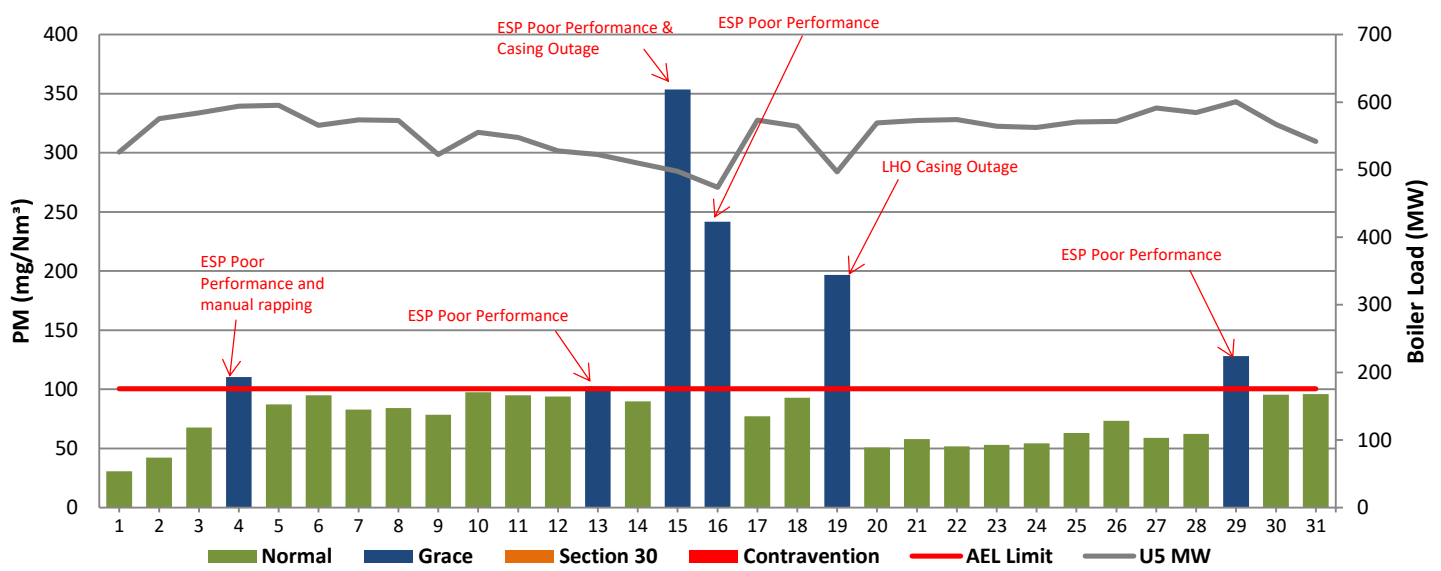
**Figure 3: Lethabo Unit 3 PM Emissions - August 2023**



**Figure 4: Lethabo Unit 4 PM Emissions - August 2023**

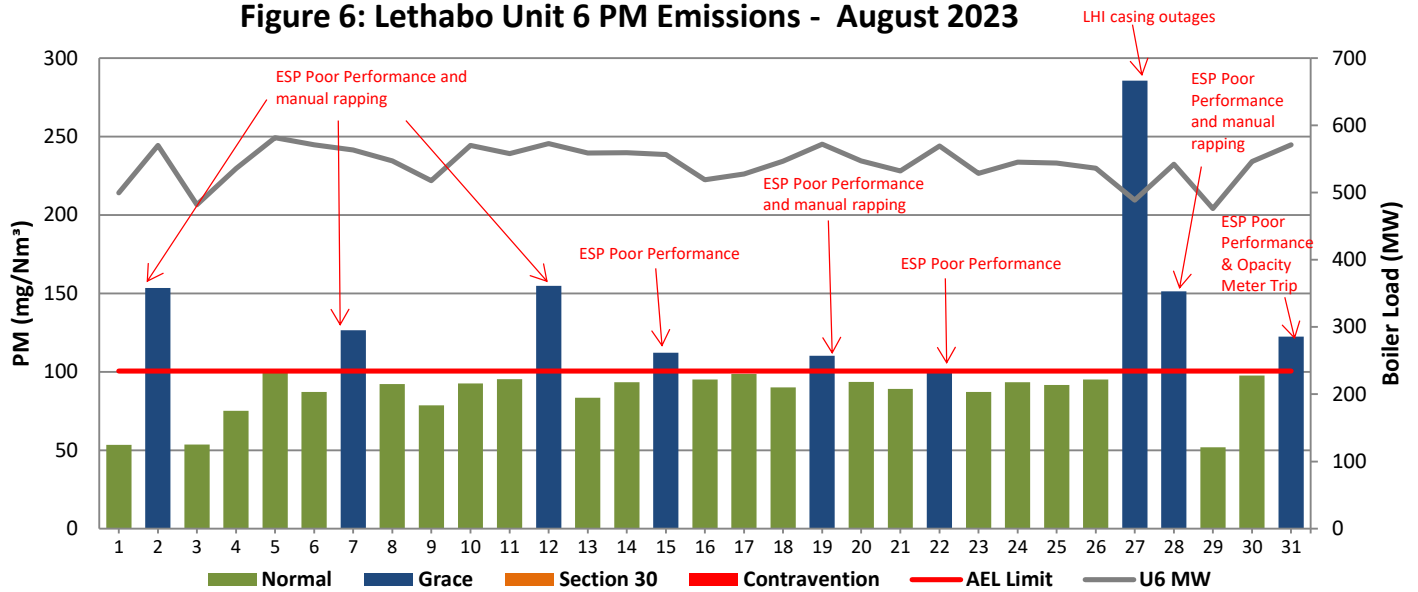


**Figure 5: Lethabo Unit 5 PM Emissions - August 2023**

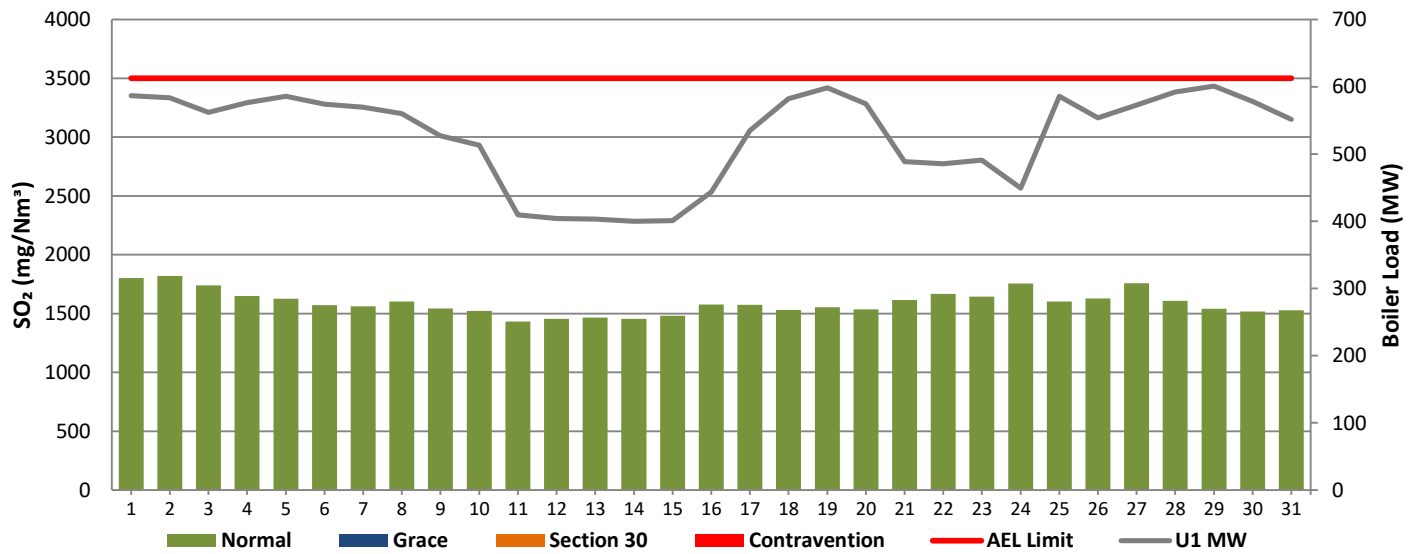




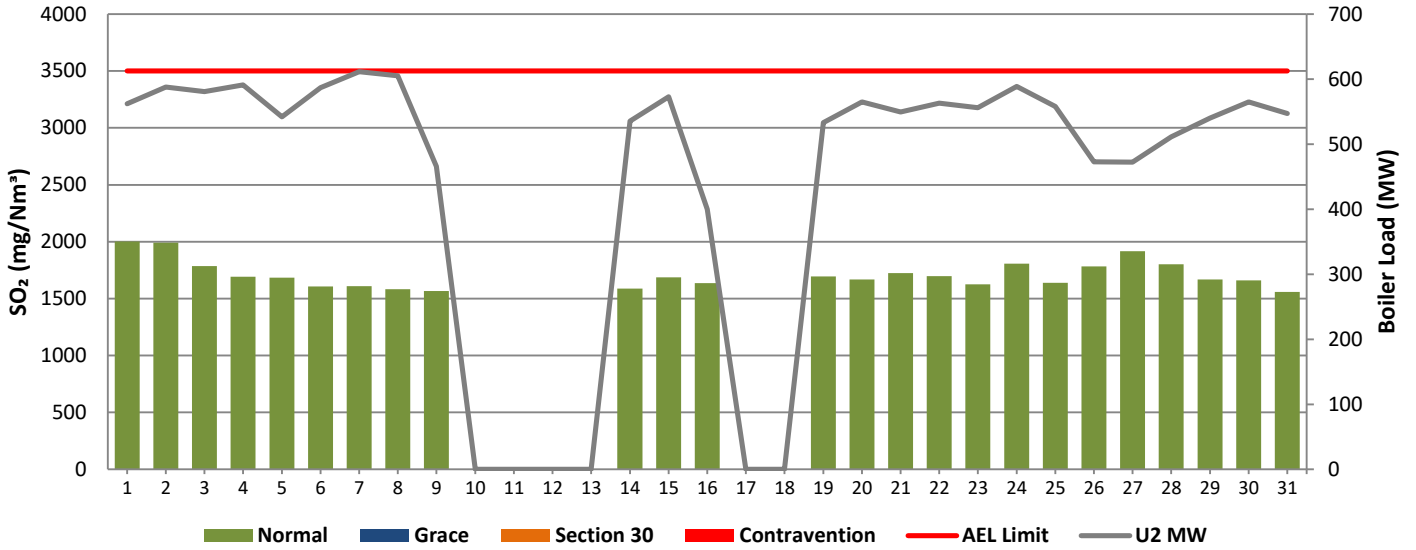
**Figure 6: Lethabo Unit 6 PM Emissions - August 2023**



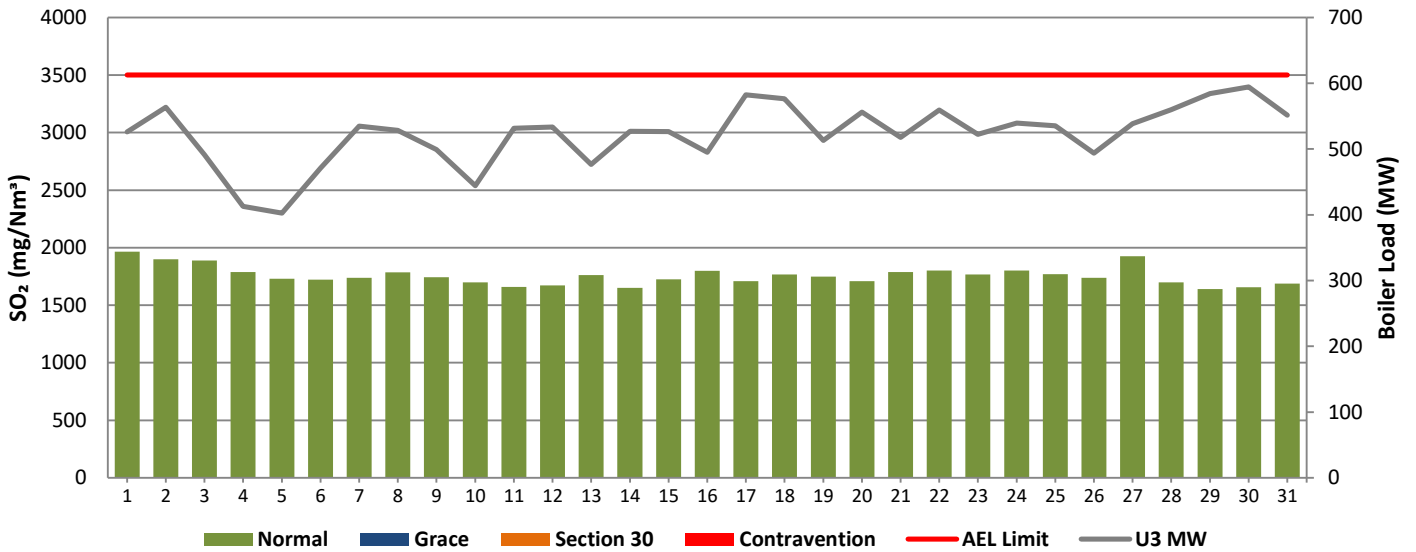
**Figure 7: Lethabo Unit 1 SO<sub>2</sub> Emissions - August 2023**



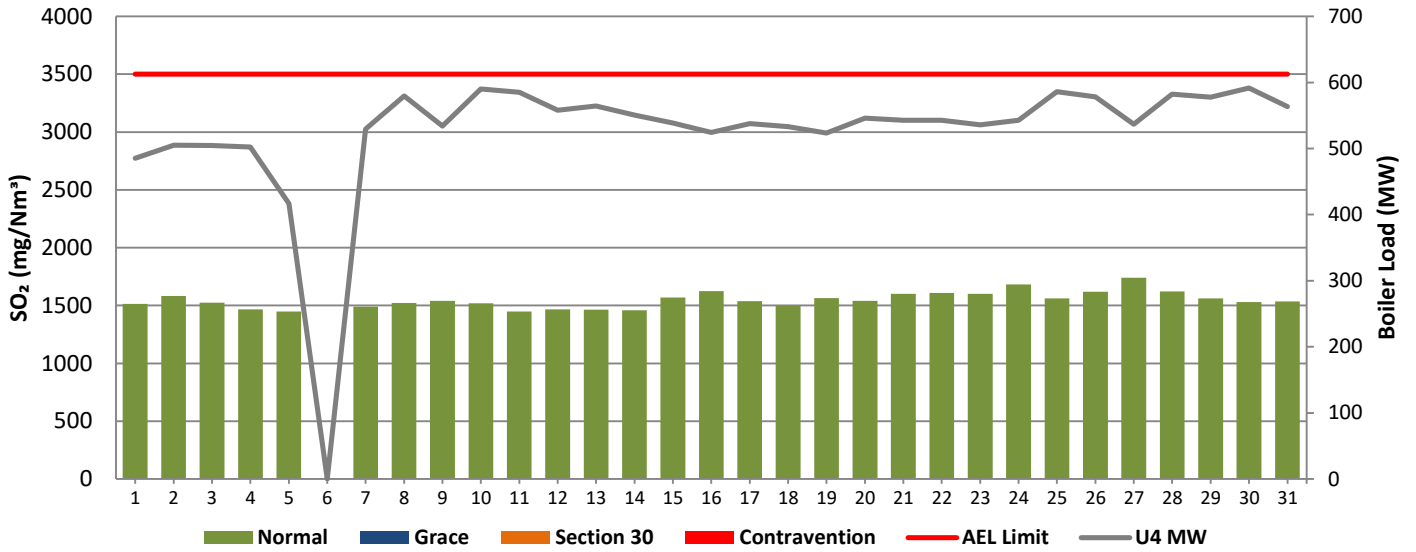
**Figure 8: Lethabo Unit 2 SO<sub>2</sub> Emissions - August 2023**



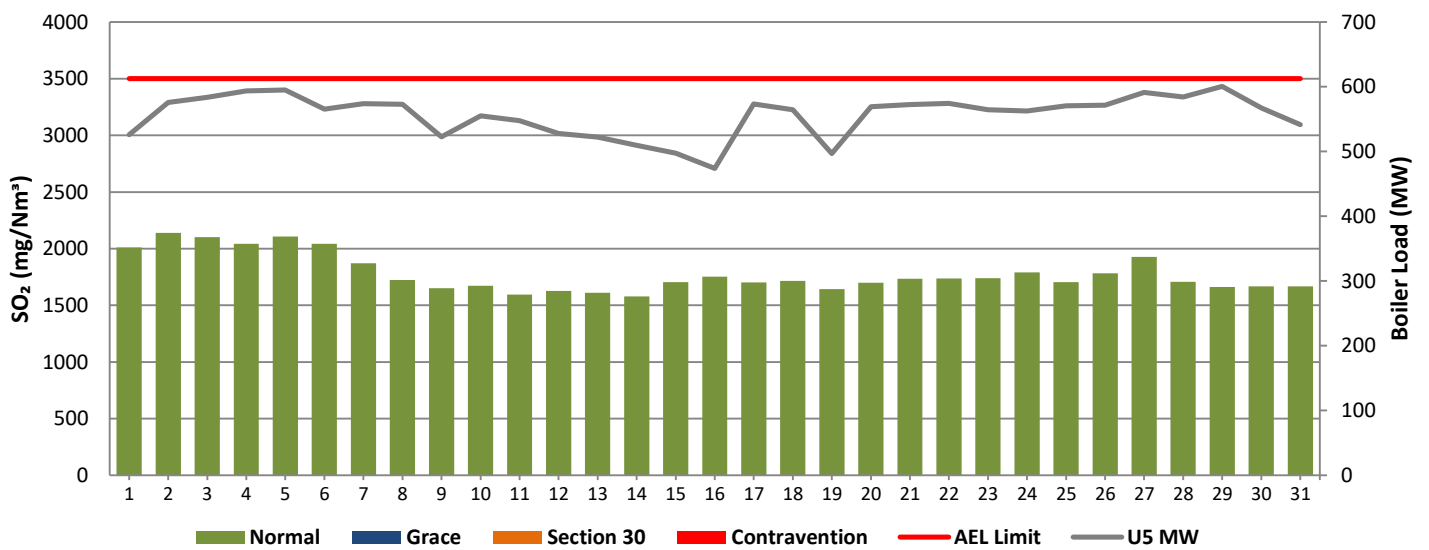
**Figure 9: Lethabo Unit 3 SO<sub>2</sub> Emissions - August 2023**



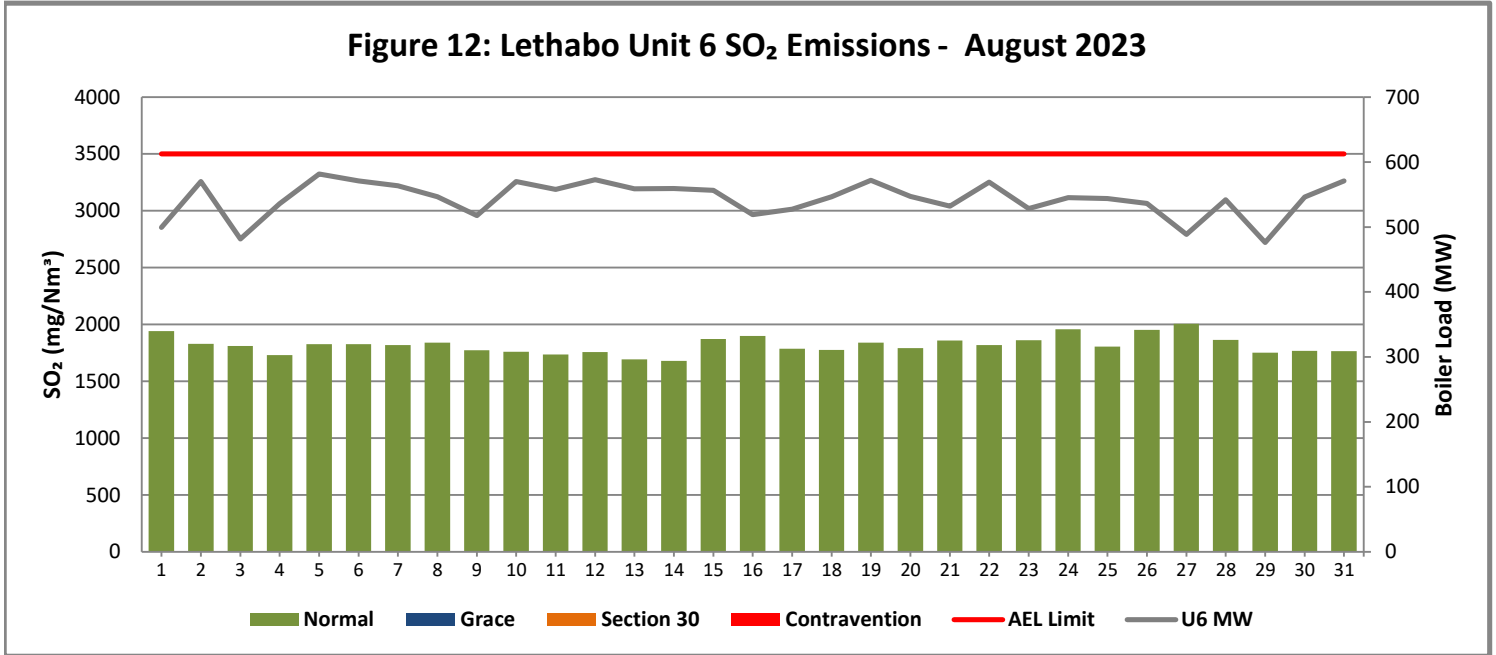
**Figure 10: Lethabo Unit 4 SO<sub>2</sub> Emissions - August 2023**



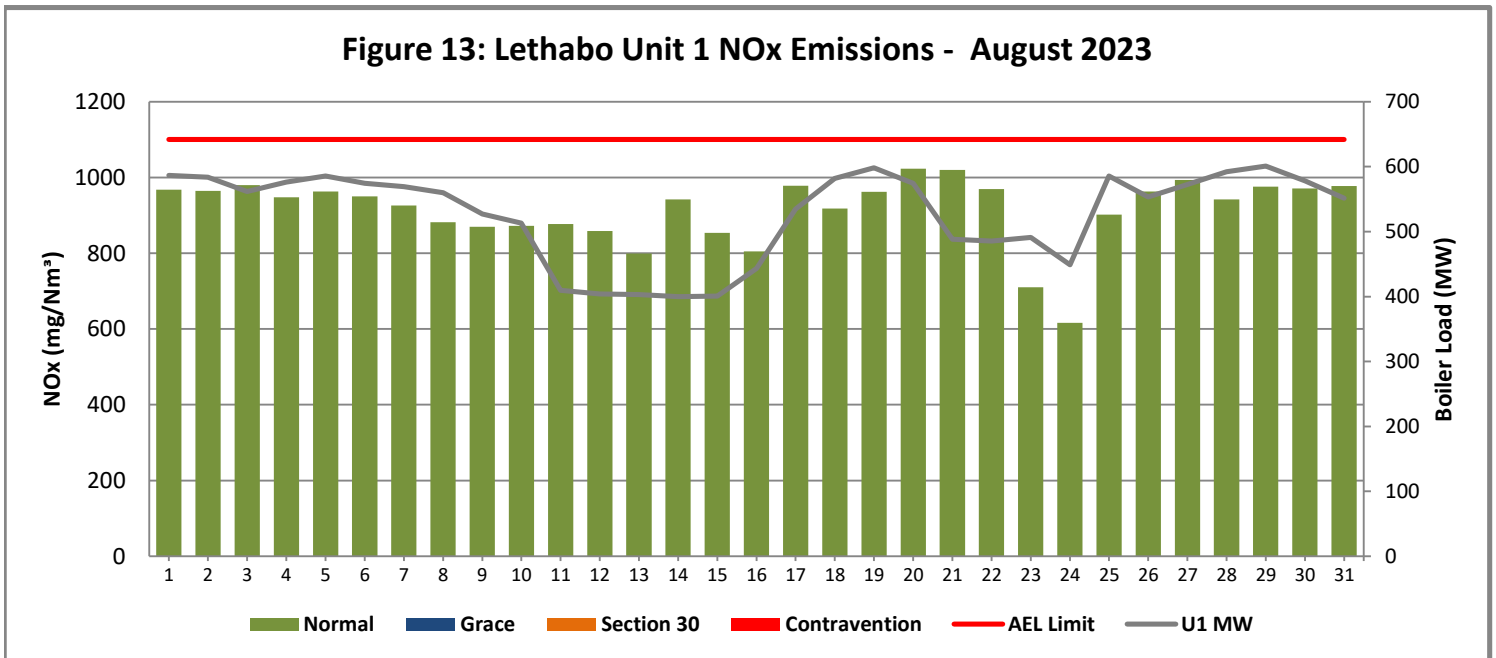
**Figure 11: Lethabo Unit 5 SO<sub>2</sub> Emissions - August 2023**



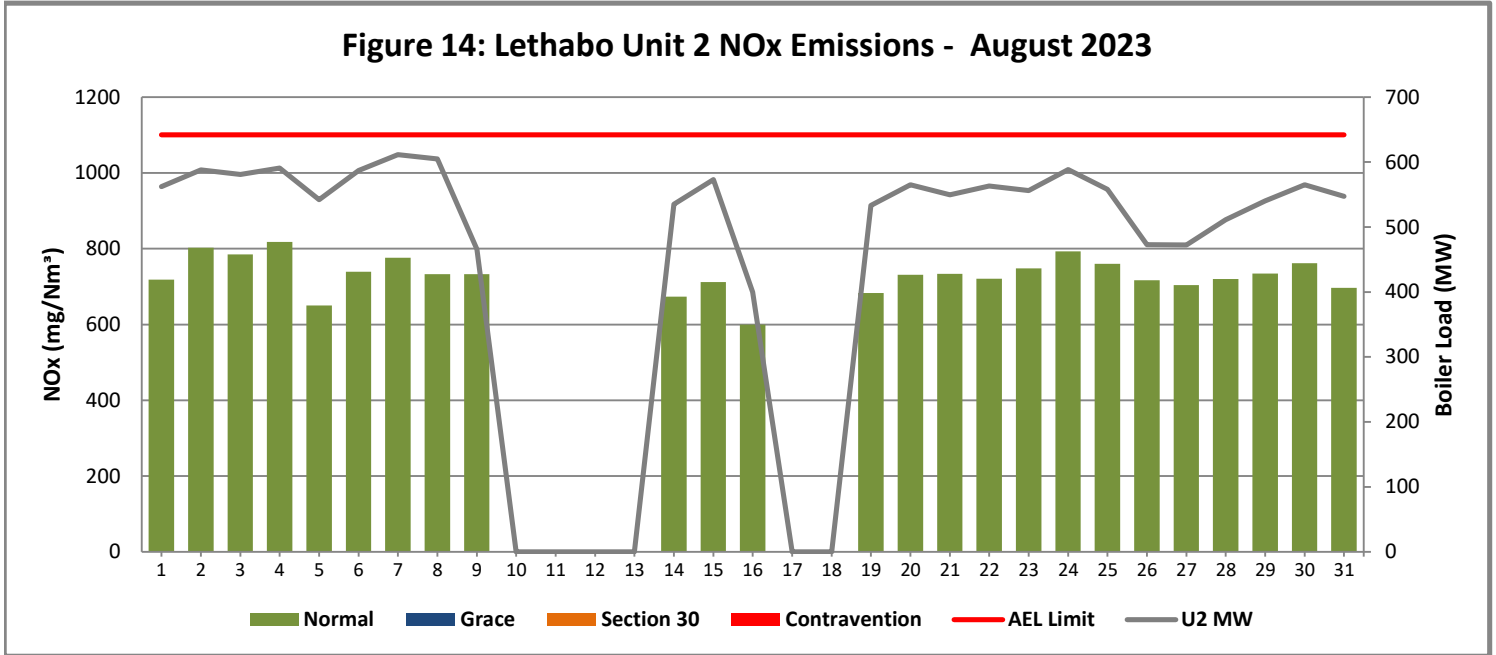
**Figure 12: Lethabo Unit 6 SO<sub>2</sub> Emissions - August 2023**



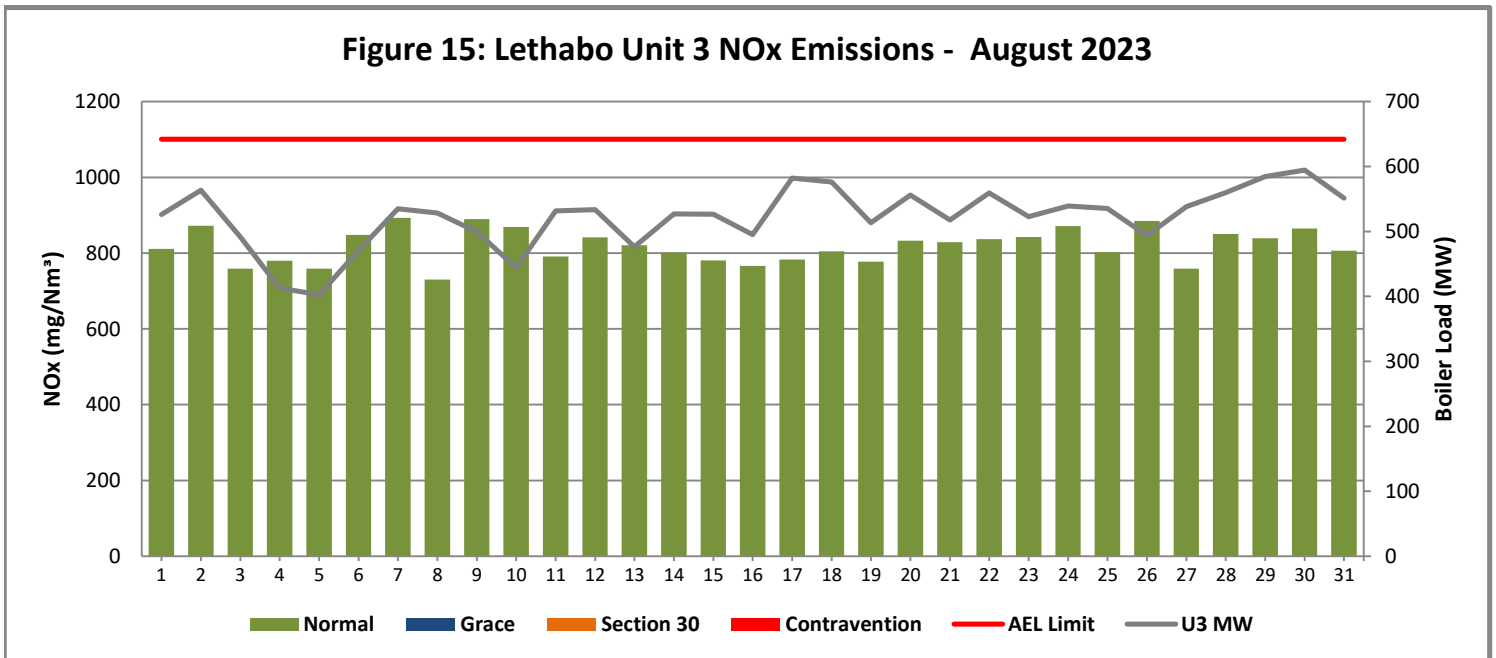
**Figure 13: Lethabo Unit 1 NO<sub>x</sub> Emissions - August 2023**



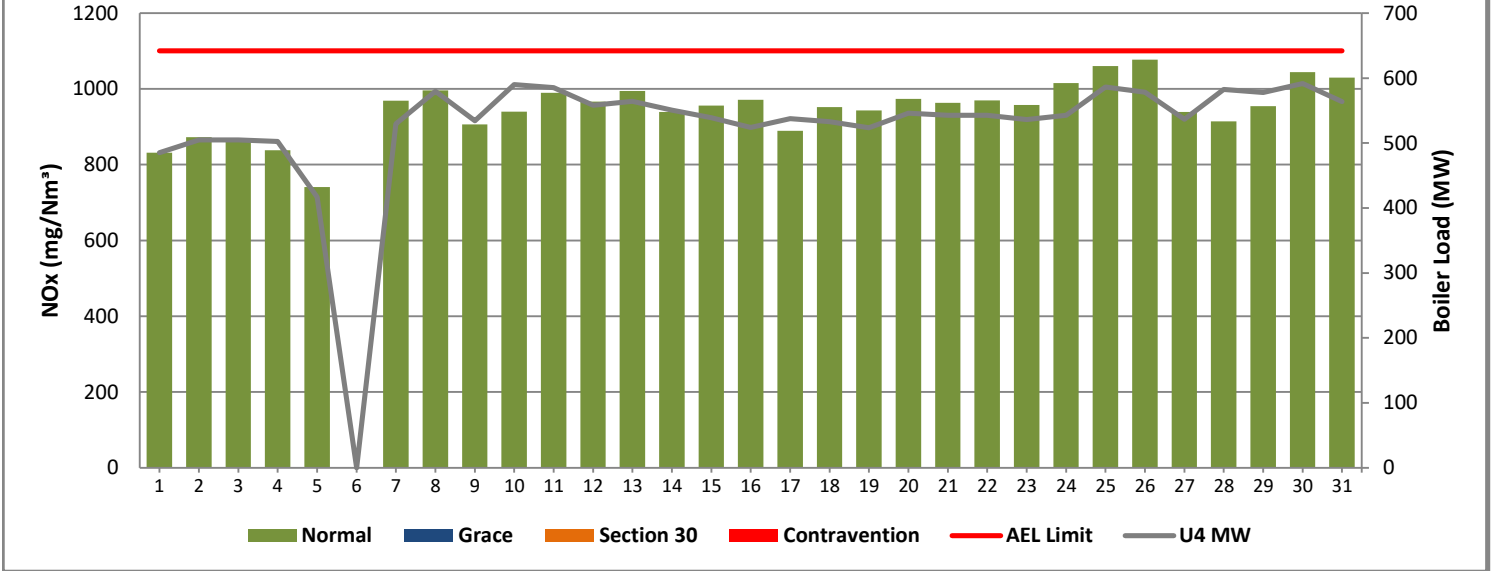
**Figure 14: Lethabo Unit 2 NOx Emissions - August 2023**



**Figure 15: Lethabo Unit 3 NOx Emissions - August 2023**



**Figure 16: Lethabo Unit 4 NOx Emissions - August 2023**



**Figure 17: Lethabo Unit 5 NOx Emissions - August 2023**

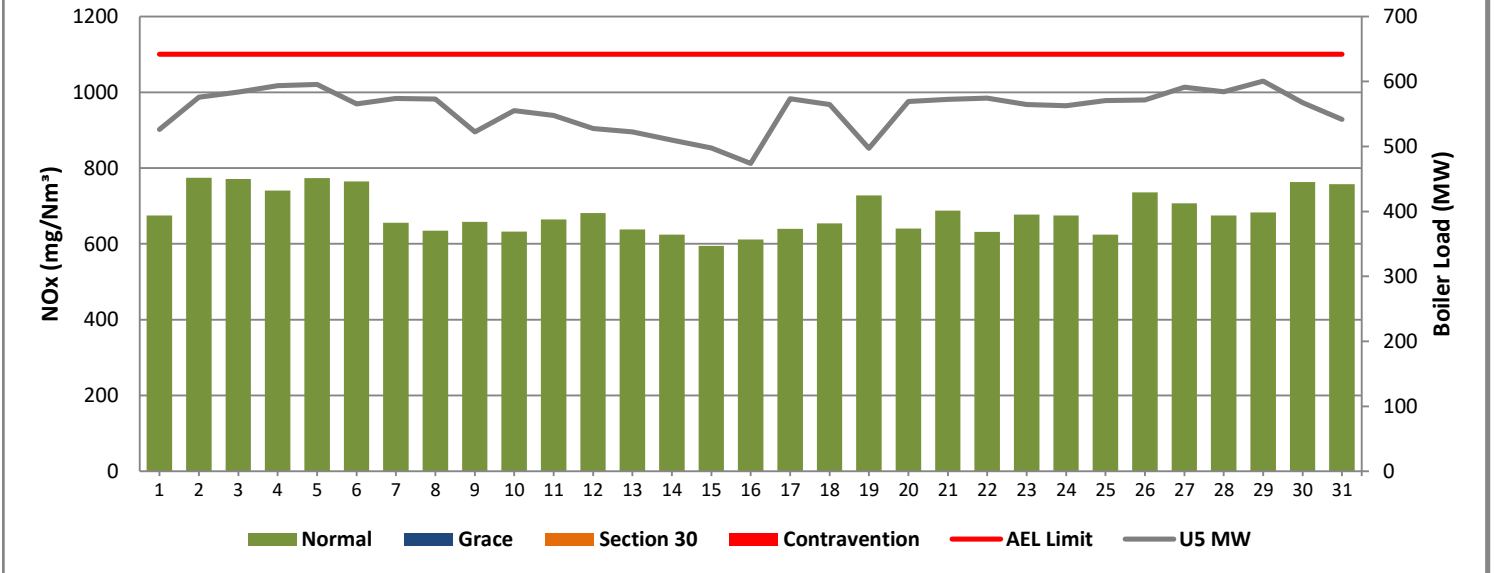
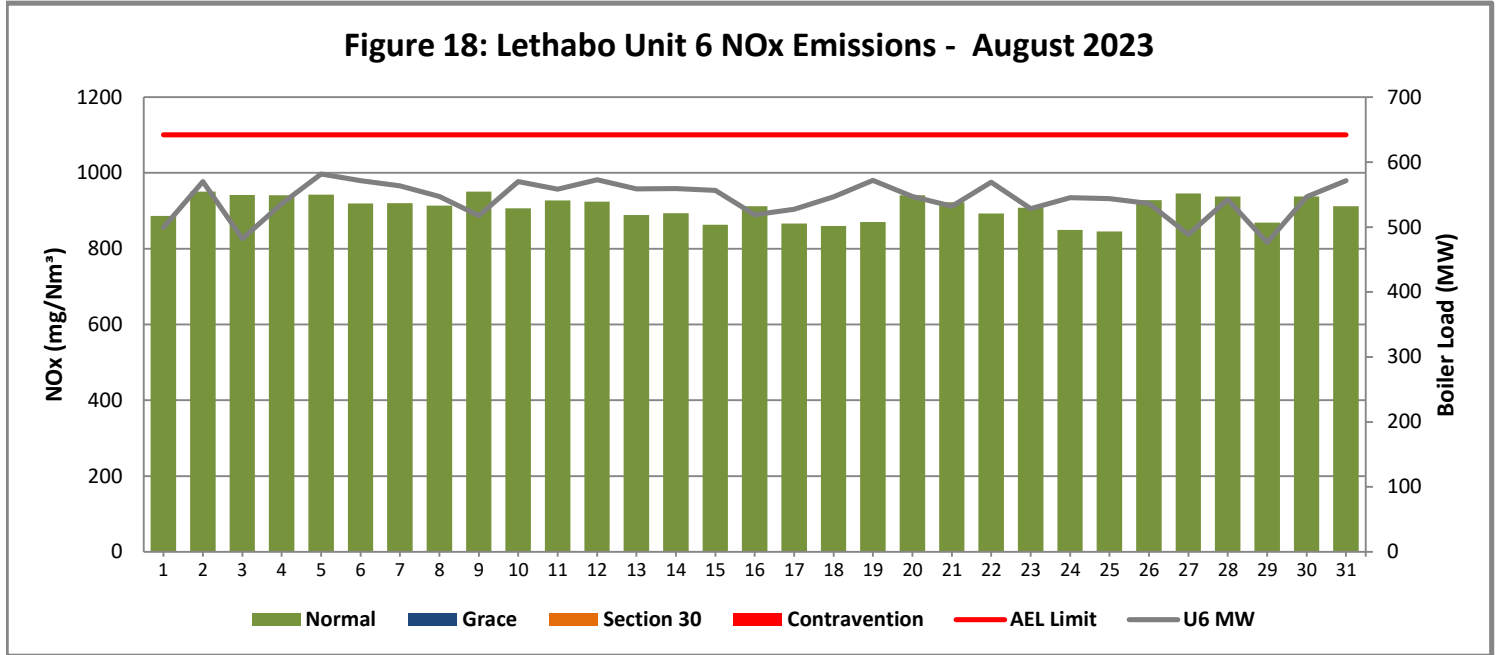


Figure 18: Lethabo Unit 6 NOx Emissions - August 2023



## 7 SHUT DOWN AND LIGHT UP INFORMATION

Table 7.1: PM Start-up information for the month of August 2023

<b>Unit No.1</b>							
<b>Breaker Open (BO)</b>							
<b>Draught Group (DG) Shut Down (SD)</b>							
<b>BO to DG SD (duration)</b>		DD:HH:MM		DD:HH:MM		DD:HH:MM	DD:HH:MM
<b>Fires in time</b>							
<b>Synch. to Grid (or BC)</b>							
<b>Fires in to BC (duration)</b>		DD:HH:MM		DD:HH:MM		DD:HH:MM	DD:HH:MM
<b>Emissions below limit from BC (end date)</b>							
<b>Emissions below limit from BC (duration)</b>		DD:HH:MM		DD:HH:MM		DD:HH:MM	DD:HH:MM

<b>Unit No.2</b>	<i>Boiler tube leak repairs / SSC full of fuel oil.</i>		<i>Dust plant repairs</i>		<i>380V unit board A power loss.</i>		
<b>Breaker Open (BO)</b>	8:09 AM	2023/08/09	10:26 PM	2023/08/16	12:22 PM	2023/08/30	
<b>Draught Group (DG) Shut Down (SD)</b>	8:55 PM	2023/08/09	8:06 AM	2023/08/17	DG did not trip or SD	DG did not trip or SD	
<b>BO to DG SD (duration)</b>	00:12:46	DD:HH:MM	00:09:40	DD:HH:MM	n/a	DD:HH:MM	DD:HH:MM
<b>Fires in time</b>	4:05 AM	2023/08/14	5:26 AM	2023/08/19	3:23 PM	2023/08/30	
<b>Synch. to Grid (or BC)</b>	4:23 AM	2023/08/14	5:55 AM	2023/08/19	4:35 PM	2023/08/30	
<b>Fires in to BC (duration)</b>	00:00:18	DD:HH:MM	00:00:29	DD:HH:MM	00:01:12	DD:HH:MM	DD:HH:MM
<b>Emissions below limit from BC (end date)</b>	10:35 PM	2023/08/16	2:00 AM	2023/08/21	not > limit	not > limit	
<b>Emissions below limit from BC (duration)</b>	02:18:12	DD:HH:MM	01:20:05	DD:HH:MM	n/a	DD:HH:MM	DD:HH:MM



<b>Unit No.3</b>	<i>Shutdown for Main turbine FRF IP ESV no4 flexible pipe leaking</i>						
<b>Breaker Open (BO)</b>	<i>10:26 PM</i>	<i>2023/08/07</i>					
<b>Draught Group (DG) Shut Down (SD)</b>	<i>DG did not trip or SD</i>	<i>DG did not trip or SD</i>					
<b>BO to DG SD (duration)</b>	<i>n/a</i>	<i>DD:HH:MM</i>		<i>DD:HH:MM</i>		<i>DD:HH:MM</i>	<i>DD:HH:MM</i>
<b>Fires in time</b>	<i>2:14 AM</i>	<i>2023/08/08</i>					
<b>Synch. to Grid (or BC)</b>	<i>6:25 AM</i>	<i>2023/08/08</i>					
<b>Fires in to BC (duration)</b>	<i>00:04:11</i>	<i>DD:HH:MM</i>		<i>DD:HH:MM</i>		<i>DD:HH:MM</i>	<i>DD:HH:MM</i>
<b>Emissions below limit from BC (end date)</b>	<i>9:00 AM</i>	<i>2023/08/11</i>					
<b>Emissions below limit from BC (duration)</b>	<i>03:02:35</i>	<i>DD:HH:MM</i>		<i>DD:HH:MM</i>		<i>DD:HH:MM</i>	<i>DD:HH:MM</i>

<b>Unit No.4</b>	<i>For boiler safety v/v repairs.</i>						
<b>Breaker Open (BO)</b>	<i>1:34 AM</i>	<i>2023/08/05</i>					
<b>Draught Group (DG) Shut Down (SD)</b>	<i>12:44 PM</i>	<i>2023/08/05</i>					
<b>BO to DG SD (duration)</b>	<i>00:11:10</i>	<i>DD:HH:MM</i>		<i>DD:HH:MM</i>		<i>DD:HH:MM</i>	<i>DD:HH:MM</i>
<b>Fires in time</b>	<i>4:24 AM</i>	<i>2023/08/07</i>					
<b>Synch. to Grid (or BC)</b>	<i>4:55 AM</i>	<i>2023/08/07</i>					
<b>Fires in to BC (duration)</b>	<i>00:00:31</i>	<i>DD:HH:MM</i>		<i>DD:HH:MM</i>		<i>DD:HH:MM</i>	<i>DD:HH:MM</i>
<b>Emissions below limit from BC (end date)</b>	<i>5:00 AM</i>	<i>2023/08/09</i>					
<b>Emissions below limit from BC (duration)</b>	<i>02:00:05</i>	<i>DD:HH:MM</i>		<i>DD:HH:MM</i>		<i>DD:HH:MM</i>	<i>DD:HH:MM</i>

<b>Unit No.5</b>	<i>Main turbine overspeed test</i>		<i>Islanding test / Turbine tripped on top and botom casing protection</i>					
<b>Breaker Open (BO)</b>	12:20 AM	2023/08/16	5:44 AM	2023/08/16				
<b>Draught Group (DG) Shut Down (SD)</b>	<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>				
<b>BO to DG SD (duration)</b>	<i>n/a</i>	DD:HH:MM	<i>n/a</i>	DD:HH:MM		DD:HH:MM		DD:HH:MM
<b>Fires in time</b>	2:24 AM	2023/08/16						
<b>Synch. to Grid (or BC)</b>	4:15 AM	2023/08/16						
<b>Fires in to BC (duration)</b>	00:01:51	DD:HH:MM		DD:HH:MM		DD:HH:MM		DD:HH:MM
<b>Emissions below limit from BC (end date)</b>	12:25 AM	2023/08/16						
<b>Emissions below limit from BC (duration)</b>		DD:HH:MM		DD:HH:MM		DD:HH:MM		DD:HH:MM

<b>Unit No.6</b>								
<b>Breaker Open (BO)</b>								
<b>Draught Group (DG) Shut Down (SD)</b>								
<b>BO to DG SD (duration)</b>		DD:HH:MM		DD:HH:MM		DD:HH:MM		DD:HH:MM
<b>Fires in time</b>								
<b>Synch. to Grid (or BC)</b>								
<b>Fires in to BC (duration)</b>		DD:HH:MM		DD:HH:MM		DD:HH:MM		DD:HH:MM
<b>Emissions below limit from BC (end date)</b>								
<b>Emissions below limit from BC (duration)</b>		DD:HH:MM		DD:HH:MM		DD:HH:MM		DD:HH:MM

**7.2: Point Source emissions released during start-up (fires-in) and Shut-down (SD) for the month of August 2023 in mg/Nm³**

## 8. MAINTENANCE

<b>Unit 1</b>				
<b>Beginning of</b>				
<b>Reason for Maintenance</b>				
<b>End (Time):</b>				
<b>Duration</b>	0:00:00	0:00:00		

<b>Unit 2</b>				
<b>Beginning of</b>				
<b>Reason for Maintenance</b>				
<b>End (Time):</b>				
<b>Duration</b>				

<b>Unit 3</b>				
<b>Beginning of</b>	2023/08/16 00:09:00	2023/08/25 23:45		
<b>Reason for Maintenance</b>	LHI CASING OUTAGE	RHI CASING OUTAGE		
<b>End (Time):</b>	2023/08/17 00:00:00	2023/08/26 21:43		
<b>Duration</b>	23:51:00	21:58:00		

<b>Unit 4</b>				
<b>Beginning of</b>				
<b>Reason for Maintenance</b>				
<b>End (Time):</b>				
<b>Duration</b>				

<b>Unit 5</b>				
<b>Beginning of</b>	2023/08/19 00:17:00			
<b>Reason for Maintenance</b>	RHI CASING OUTAGE			
<b>End (Time):</b>	2023/08/19 23:06:00			
<b>Duration</b>	22:49:00			

<b>Unit 6</b>				
<b>Beginning of</b>	2023/08/27 00:00:00			
<b>Reason for Maintenance</b>	LHO CASING OUTAGE			
<b>End (Time):</b>	2023/08/28 02:14:00			
<b>Duration</b>	26:14:00			

## 9. GENERAL

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### Unit 2 Monitor Reliability

16/01/2023: Monitor Reliability low (79.2%) due to monitors reading maximum

29/01/2023: Monitor Reliability Low (4.6%) due to unit light up

### Unit 5:

The daily emissions average limit was exceeded from the 11th January to the 15th January 2023. This was not reported as a Section 30. This exceedance is being investigated with head office regarding insertion of max emission values. The reading in the S30 tab of the Emissions Reporting Tool was not accounting for the insertion of the max Emission values. It was found that there was a referencing issue on the Emissions Reporting Tool. These exceedances were true and missed by the station as a result. A flash report was sent out and will be reported as a legal contravention.

It is noted that the Emissions reporting tool was rectified promptly by head office and the new version of the tool is now in use by the Station.

### CO2 and Velocity Monitors Low Reliability Units 1-6:

Due to correction of bad data as per internal emission data integrity review actions in 2021 and 2022. Bad Velocity data and Bad CO2 data were corrected/removed as per the review actions and findings.

**ADDENDUM TO MONTHLY EMISSIONS REPORT**

**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.

**11. PARTICULATE EMISSIONS**

**EMISSION RATE (ACTUAL EMISSION/MWh GENERATED - kg/MWh)**

MONTH	UNIT 1	UNIT 2	UNIT 3	UNIT 4	UNIT 5	UNIT 6	STATION
Sep-22	0.40	0.24	0.31	0.80	0.33	0.40	0.42
Oct-22	0.54	0.39	0.44	0.40	0.47	0.44	0.44
Nov-22	0.62	0.39	0.33	0.59	0.59	0.57	0.52
Dec-22	0.58	0.67	0.58	OFF	0.94	0.50	0.65
Jan-23	0.40	0.69	0.59	OFF	0.74	0.45	0.57
Feb-23	0.51	0.48	0.53	OFF	0.83	0.63	0.59
Mar-23	0.51	0.37	0.52	0.54	0.63	0.39	0.50
Apr-23	OFF	0.29	0.61	0.35	0.86	OFF	0.56
May-23	OFF	0.48	0.46	0.32	0.79	0.41	0.50
Jun-23	0.13	0.64	0.47	0.30	0.46	0.30	0.36
Jul-23	0.21	0.27	0.42	0.27	0.25	0.32	0.30
Aug-23	0.21	0.60	0.63	0.42	0.42	0.50	0.46

**ADDENDUM TO MONTHLY EMISSIONS REPORT**

**12. DAILY EMISSIONS FIGURES**

**Final Dust Concentration (mg/Nm<sup>3</sup>)**

Date	U1	U2	U3	U4	U5	U6	Limit
01-Aug	80	85	62	54	31	54	100
02-Aug	27	40	137	42	42	153	100
03-Aug	28	55	48	155	68	54	100
04-Aug	29	63	40	63	110	75	100
05-Aug	32	53	46	144	87	100	100
06-Aug	34	70	95	OFF	95	87	100
07-Aug	80	87	173	OFF	83	127	100
08-Aug	27	68	OFF	58	84	92	100
09-Aug	24	232	184	67	79	79	100
10-Aug	28	OFF	50	71	97	93	100
11-Aug	50	OFF	104	233	95	95	100
12-Aug	62	OFF	219	65	94	155	100
13-Aug	50	OFF	99	66	102	84	100
14-Aug	39	OFF	202	79	90	93	100
15-Aug	62	1333	98	75	354	112	100
16-Aug	54	971	244	70	242	95	100
17-Aug	31	OFF	89	76	77	99	100
18-Aug	44	OFF	119	193	93	90	100
19-Aug	34	OFF	98	75	197	110	100
20-Aug	29	90	179	93	51	94	100
21-Aug	153	51	75	87	58	89	100
22-Aug	25	173	218	76	52	101	100
23-Aug	24	35	86	65	53	87	100
24-Aug	18	40	96	197	54	93	100
25-Aug	30	35	95	66	63	92	100
26-Aug	31	22	382	77	73	95	100
27-Aug	29	19	84	77	59	286	100
28-Aug	68	25	95	70	62	151	100
29-Aug	34	40	91	58	128	52	100
30-Aug	32	49	164	63	95	98	100
31-Aug	32	38	78	65	96	122	100

**ADDENDUM TO MONTHLY EMISSIONS REPORT**

**Final SOx Concentration (mg/Nm<sup>3</sup>)**

Date	U1	U2	U3	U4	U5	U6	Limit
01-Aug	1803	2001	1964	1514	2011	1943	3500
02-Aug	1821	1991	1900	1583	2140	1829	3500
03-Aug	1741	1784	1889	1524	2101	1812	3500
04-Aug	1648	1691	1789	1466	2043	1732	3500
05-Aug	1626	1685	1730	1448	2108	1827	3500
06-Aug	1572	1608	1721	OFF	2044	1826	3500
07-Aug	1562	1610	1738	1490	1871	1818	3500
08-Aug	1603	1583	1785	1522	1723	1841	3500
09-Aug	1544	1567	1745	1539	1651	1774	3500
10-Aug	1522	OFF	1698	1520	1672	1761	3500
11-Aug	1433	OFF	1658	1449	1595	1735	3500
12-Aug	1455	OFF	1672	1466	1626	1758	3500
13-Aug	1466	OFF	1761	1463	1612	1693	3500
14-Aug	1455	1588	1652	1460	1579	1680	3500
15-Aug	1482	1687	1724	1569	1706	1873	3500
16-Aug	1576	1635	1800	1624	1754	1899	3500
17-Aug	1573	OFF	1708	1537	1703	1787	3500
18-Aug	1532	OFF	1767	1494	1716	1775	3500
19-Aug	1553	1694	1748	1563	1643	1840	3500
20-Aug	1535	1668	1709	1541	1698	1791	3500
21-Aug	1616	1723	1788	1602	1733	1860	3500
22-Aug	1667	1697	1800	1608	1737	1819	3500
23-Aug	1643	1625	1767	1600	1740	1862	3500
24-Aug	1755	1808	1801	1683	1791	1958	3500
25-Aug	1602	1637	1770	1562	1704	1806	3500
26-Aug	1629	1782	1737	1619	1782	1952	3500
27-Aug	1759	1915	1926	1740	1928	2007	3500
28-Aug	1607	1801	1697	1621	1708	1863	3500
29-Aug	1541	1668	1641	1561	1661	1752	3500
30-Aug	1519	1660	1657	1531	1668	1769	3500
31-Aug	1528	1560	1687	1536	1668	1765	3500

**ADDENDUM TO MONTHLY EMISSIONS REPORT**

**Final NOx Concentration (mg/Nm<sup>3</sup>)**

Date	U1	U2	U3	U4	U5	U6	Limit
01-Aug	968	718	811	831	675	886	1100
02-Aug	965	803	872	872	774	950	1100
03-Aug	980	785	759	863	772	942	1100
04-Aug	948	817	780	838	741	941	1100
05-Aug	963	650	759	741	773	942	1100
06-Aug	950	739	848	OFF	765	920	1100
07-Aug	926	776	893	969	656	920	1100
08-Aug	882	733	730	996	635	913	1100
09-Aug	870	732	890	906	658	950	1100
10-Aug	872	OFF	869	940	633	907	1100
11-Aug	877	OFF	791	990	665	928	1100
12-Aug	859	OFF	841	967	682	924	1100
13-Aug	799	OFF	821	994	638	889	1100
14-Aug	942	673	802	939	624	893	1100
15-Aug	854	712	781	956	595	863	1100
16-Aug	805	600	766	971	611	912	1100
17-Aug	978	OFF	783	889	639	867	1100
18-Aug	918	OFF	805	952	654	860	1100
19-Aug	962	683	777	943	728	870	1100
20-Aug	1023	731	833	974	640	941	1100
21-Aug	1020	734	829	963	688	922	1100
22-Aug	970	721	837	970	631	893	1100
23-Aug	710	748	843	958	677	908	1100
24-Aug	616	793	871	1015	675	850	1100
25-Aug	902	760	803	1061	624	845	1100
26-Aug	963	717	885	1078	736	928	1100
27-Aug	994	704	759	939	707	946	1100
28-Aug	942	720	851	914	675	938	1100
29-Aug	976	735	839	954	683	869	1100
30-Aug	971	761	865	1045	764	937	1100
31-Aug	977	697	806	1030	757	912	1100



**ADDENDUM TO MONTHLY EMISSIONS REPORT**

**13. AVAILABILITY**

ESP utilisation

Availability												
Month	Unit 1	Days Affected	Unit 2	Days Affected	Unit 3	Days Affected	Unit 4	Days Affected	Unit 5	Days Affected	Unit 6	Days Affected
Sep-22	98.86%	1.4	100.00%	0.0	100.00%	0.0	99.27%	0.9	98.44%	1.9	99.20%	1.0
Oct-22	98.80%	1.5	98.86%	1.4	100.00%	0.0	100.00%	0.0	99.24%	0.9	100.00%	0.0
Nov-22	99.29%	0.9	100.00%	0.0	100.00%	0.0	100.00%	0.0	98.86%	1.4	98.56%	1.7
Dec-22	99.29%	0.9	98.58%	1.8	98.66%	1.7	OFF	OFF	99.36%	0.8	98.46%	1.9
Jan-23	98.91%	1.3	99.90%	0.1	97.59%	3.0	OFF	OFF	99.23%	1.0	98.42%	2.0
Feb-23	99.19%	0.9	100.00%	0.0	96.88%	3.5	OFF	OFF	100.00%	0.0	99.16%	0.9
Mar-23	99.30%	0.9	99.19%	1.0	99.22%	1.0	100.00%	0.0	98.57%	1.8	99.19%	1.0
Apr-23	OFF	OFF	100.00%	0.0	97.91%	2.5	100.00%	0.0	99.24%	0.9	OFF	OFF
May-23	OFF	OFF	98.56%	1.8	99.36%	0.8	100.00%	0.0	96.91%	3.8	100.00%	0.0
Jun-23	100.00%	0.0	100.00%	0.0	99.41%	0.7	98.31%	2.0	98.52%	1.8	100.00%	0.0
Jul-23	100.00%	0.0	100.00%	0.0	99.19%	1.0	100.00%	0.0	100.00%	0.0	99.22%	1.0
Aug-23	100.00%	0.0	100.00%	0.0	98.46%	1.9	100.00%	0.0	99.23%	1.0	99.12%	1.1

SO<sub>3</sub> plant utilisation

Availability												
Month	Unit 1	Days Affected	Unit 2	Days Affected	Unit 3	Days Affected	Unit 4	Days Affected	Unit 5	Days Affected	Unit 6	Days Affected
Sep-22	100.00%	0.0	99.58%	0.1	100.00%	0.0	94.27%	1.7	97.92%	0.6	100.00%	0.0
Oct-22	89.39%	3.3	100.00%	0.0	82.41%	5.5	99.73%	0.1	79.69%	6.3	100.00%	0.0
Nov-22	100.00%	0.0	100.00%	0.0	97.21%	0.8	88.86%	3.3	100.00%	0.0	100.00%	0.0
Dec-22	85.12%	4.6	98.28%	0.5	99.88%	0.0	OFF	OFF	62.90%	11.5	100.00%	0.0
Jan-23	90.05%	3.1	93.82%	1.9	100.00%	0.0	OFF	OFF	91.52%	2.6	100.00%	0.0
Feb-23	89.39%	3.0	100.00%	0.0	82.41%	4.9	OFF	OFF	79.69%	5.7	100.00%	0.0
Mar-23	100.00%	0.0	98.89%	0.3	95.16%	1.5	95.50%	1.4	99.33%	0.2	95.00%	1.6
Apr-23	OFF	OFF	99.66%	0.1	100.00%	0.0	98.93%	0.3	94.58%	1.6	OFF	OFF
May-23	OFF	OFF	100.00%	0.0	99.89%	0.0	99.33%	0.2	100.00%	0.0	90.67%	2.9
Jun-23	85.96%	4.2	81.82%	5.5	96.56%	1.0	97.86%	0.6	86.81%	4.0	97.50%	0.8
Jul-23	97.98%	0.6	97.83%	0.7	100.00%	0.0	97.85%	0.7	99.67%	0.1	100.00%	0.0
Aug-23	90.05%	3.1	93.82%	1.9	100.00%	0.0	0.00%	31.0	91.52%	2.6	100.00%	0.0

**ADDENDUM TO MONTHLY EMISSIONS REPORT**

Particulate Emission Monitors

Availability						
	Unit 1	Unit 2	Unit 3	Unit 4	Unit 5	Unit 6
Sep-22	98.69%	100.00%	92.89%	96.01%	99.31%	99.17%
Oct-22	96.61%	97.27%	99.38%	100.00%	95.14%	98.66%
Nov-22	94.72%	95.66%	97.08%	98.85%	98.92%	97.64%
Dec-22	99.09%	93.78%	98.73%	OFF	67.20%	98.66%
Jan-23	99.46%	90.07%	98.79%	OFF	96.28%	98.39%
Feb-23	99.11%	96.87%	98.72%	OFF	93.83%	96.29%
Mar-23	99.68%	98.75%	99.06%	97.17%	97.33%	99.12%
Apr-23	OFF	99.43%	98.61%	99.57%	94.31%	OFF
May-23	OFF	97.07%	99.85%	99.46%	95.56%	99.50%
Jun-23	99.23%	95.11%	99.19%	98.33%	99.03%	99.86%
Jul-23	98.92%	100.00%	99.60%	99.73%	98.33%	99.87%
Aug-23	99.73%	92.28%	99.22%	98.85%	97.85%	98.79%

## Gaseous Emission Monitors

Availability												
Month	Unit 1		Unit 2		Unit 3		Unit 4		Unit 5		Unit 6	
	SO <sub>x</sub>	NO <sub>x</sub>	SO <sub>x</sub>	NO <sub>x</sub>	SO <sub>x</sub>	NO <sub>x</sub>	SO <sub>x</sub>	NO <sub>x</sub>	SO <sub>x</sub>	NO <sub>x</sub>	SO <sub>x</sub>	NO <sub>x</sub>
Sep-22	100.00%	100.00%	100.00%	100.00%	99.62%	100.00%	93.83%	93.83%	94.86%	94.86%	94.86%	94.86%
Oct-22	98.95%	78.72%	99.87%	100.00%	99.86%	99.86%	100.00%	100.00%	99.86%	99.86%	99.87%	99.87%
Nov-22	99.86%	99.86%	99.72%	99.86%	99.81%	99.81%	100.00%	100.00%	99.72%	99.72%	99.44%	99.44%
Dec-22	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	OFF	OFF	100.00%	99.87%	99.87%	100.00%
Jan-23	97.85%	97.85%	99.69%	99.69%	100.00%	100.00%	OFF	OFF	99.85%	99.85%	99.60%	99.60%
Feb-23	99.85%	99.85%	100.00%	100.00%	100.00%	100.00%	OFF	OFF	100.00%	99.28%	100.00%	100.00%
Mar-23	100.00%	100.00%	100.00%	100.00%	99.87%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
Apr-23	OFF	OFF	100.00%	100.00%	99.86%	99.86%	99.95%	99.95%	100.00%	100.00%	OFF	OFF
May-23	OFF	OFF	100.00%	100.00%	100.00%	100.00%	99.60%	99.87%	99.73%	99.87%	99.52%	99.68%
Jun-23	99.70%	99.85%	99.58%	100.00%	99.71%	100.00%	100.00%	100.00%	100.00%	100.00%	99.86%	100.00%
Jul-23	98.39%	98.39%	98.08%	97.95%	98.12%	98.39%	98.39%	98.25%	97.92%	97.92%	98.25%	98.39%
Aug-23	100.00%	100.00%	99.83%	99.83%	100.00%	100.00%	99.86%	100.00%	100.00%	100.00%	100.00%	100.00%

Oxygen Monitor Availability						
	Unit 1	Unit 2	Unit 3	Unit 4	Unit 5	Unit 6
Sep-22	99.72%	99.71%	99.62%	93.67%	94.72%	94.44%
Oct-22	99.27%	99.87%	99.57%	99.73%	99.72%	99.60%
Nov-22	99.72%	99.72%	99.62%	98.82%	99.44%	99.58%
Dec-22	99.65%	99.72%	99.72%	OFF	99.87%	99.87%
Jan-23	97.45%	99.04%	99.87%	OFF	99.70%	99.73%
Feb-23	100.00%	100.00%	100.00%	OFF	99.51%	100.00%
Mar-23	100.00%	100.00%	100.00%	86.16%	99.87%	99.81%
Apr-23	OFF	99.83%	99.86%	99.83%	99.86%	OFF
May-23	OFF	100.00%	100.00%	100.00%	99.87%	99.84%
Jun-23	100.00%	99.55%	99.86%	99.68%	100.00%	100.00%
Jul-23	98.12%	97.76%	98.12%	98.25%	100.00%	97.72%
Aug-23	100.00%	99.83%	99.87%	99.72%	99.60%	99.60%

### ADDENDUM TO MONTHLY EMISSIONS REPORT

#### 14. EFFICIENCY

ESP Efficiency (%)						
	Unit 1	Unit 2	Unit 3	Unit 4	Unit 5	Unit 6
Sep-22	99.834%	99.888%	99.868%	99.660%	99.857%	99.815%
Oct-22	99.772%	99.814%	99.807%	99.826%	99.795%	99.796%
Nov-22	99.761%	99.828%	99.859%	99.769%	99.752%	99.756%
Dec-22	99.788%	99.724%	99.768%	OFF	99.637%	99.799%
Jan-23	99.848%	99.709%	99.766%	OFF	99.702%	99.813%
Feb-23	99.808%	99.800%	99.785%	OFF	99.669%	99.733%
Mar-23	99.797%	99.858%	99.780%	99.780%	99.745%	99.831%
Apr-23	OFF	99.893%	99.731%	99.854%	99.646%	OFF
May-23	OFF	99.812%	99.802%	99.868%	99.667%	99.822%
Jun-23	99.948%	99.717%	99.787%	99.864%	99.796%	99.858%
Jul-23	99.904%	99.864%	99.793%	99.869%	99.879%	99.837%
Aug-23	99.912%	99.715%	99.715%	99.816%	99.818%	99.770%

15. REMARKS

UNIT	MWLOSS	REASON	ACTUALSTARTDATE	ACTUALENDDATE
1	200	dust plant standing (01WX12 chain broken and 01WX22 blocked hoppers)	2023/08/10 10:56:00	2023/08/10 17:14:00
1	179	AM: High hopper levels due to 01WX12 chain broken	2023/08/10 22:51:00	2023/08/11 04:30:00
1	101	AM: High hopper levels	2023/08/11 04:30:00	2023/08/11 05:36:00
1	186	AM: High hopper levels due to 01WX12 chain broken	2023/08/11 05:36:00	2023/08/16 17:17:00
2	593	AM: Boiler tube leak repairs	2023/08/09 08:09:00	2023/08/13 14:54:00
2	593	SSC full of fuel oil.	2023/08/13 14:54:00	2023/08/14 04:23:00
2	297	System Generated Ramp Event for Event id : 1844365	2023/08/14 04:23:00	2023/08/14 07:23:00
2	264	AM: Hi ash hopper levels	2023/08/14 07:23:00	2023/08/14 09:11:00
2	213	AM: Hi ash hopper levels.	2023/08/15 22:05:00	2023/08/16 22:26:00
2	593	AM: Dust plant repairs	2023/08/16 22:26:00	2023/08/19 05:55:00
2	297	System Generated Ramp Event for Event id : 1846831	2023/08/19 05:55:00	2023/08/19 08:55:00
2	46	EF: High stack emissions	2023/08/20 20:26:00	2023/08/21 00:03:00
2	100	12WX22 ash conveyer standing.	2023/08/28 23:24:00	2023/08/29 02:16:00
2	150	12WX22 ash conveyer standing	2023/08/29 02:16:00	2023/08/29 05:09:00
2	100	High hopper levels.	2023/08/29 12:15:00	2023/08/29 17:07:00
2	593	380V unit board A power loss.	2023/08/30 12:22:00	2023/08/30 16:35:00
2	297	System Generated Ramp Event for Event id : 1851536	2023/08/30 16:35:00	2023/08/30 18:05:00
3	593	Shutdown for Main turbine FRF IP ESV no4 flexible pipe leaking	2023/08/07 22:26:00	2023/08/08 06:25:00
3	297	System Generated Ramp Event for Event id : 1843949	2023/08/08 06:25:00	2023/08/08 07:55:00
3	55	EF: High stack emissions	2023/08/11 14:02:00	2023/08/11 17:00:00
3	60	High stack emissions.	2023/08/11 20:29:00	2023/08/12 06:13:00
3	70	High stack emissions.	2023/08/13 19:20:00	2023/08/14 05:17:00
3	85	Stack emissions.	2023/08/14 08:05:00	2023/08/14 14:51:00
3	88	AM: High stack emissions.	2023/08/14 22:58:00	2023/08/15 04:44:00
3	90	EF: High stack emissions	2023/08/15 09:14:00	2023/08/15 17:02:00
3	90	AM: High stack emissions.	2023/08/15 19:47:00	2023/08/16 00:09:00
3	90	AM: LHI Precip casing repairs	2023/08/16 00:09:00	2023/08/17 00:00:00
3	94	High stack emissions.	2023/08/18 10:27:00	2023/08/18 16:46:00
3	99	High stack emissions	2023/08/19 00:32:00	2023/08/19 01:05:00
3	198	High stack emissions	2023/08/19 01:05:00	2023/08/19 06:18:00
3	96	High stack emissions.	2023/08/19 11:43:00	2023/08/19 16:46:00
3	35	High stack emissions	2023/08/19 16:46:00	2023/08/19 17:22:00
3	78	Ef: High stack emissions	2023/08/19 19:32:00	2023/08/20 00:09:00
3	74	High stack emissions.	2023/08/20 10:55:00	2023/08/20 15:09:00
3	187	EF: High stack emissions	2023/08/21 00:20:00	2023/08/21 05:19:00
3	20	High stack Emissions.	2023/08/23 04:54:00	2023/08/23 16:48:00
3	66	for high stack emissions.	2023/08/23 19:36:00	2023/08/24 04:29:00
3	98	EF: High stack emissions	2023/08/24 14:40:00	2023/08/24 17:00:00
3	104	High stack emissions.	2023/08/24 19:22:00	2023/08/24 20:08:00
3	114	High stack emissions.	2023/08/24 20:08:00	2023/08/25 06:31:00
3	86	RHI precips casing repairs	2023/08/25 23:45:00	2023/08/26 21:43:00
3	100	High stack emission	2023/08/28 13:58:00	2023/08/28 16:58:00
3	100	Emissions test	2023/08/31 00:50:00	2023/08/31 04:51:00
4	593	For boiler safety v/v repairs.	2023/08/05 01:34:00	2023/08/07 04:55:00
4	297	System Generated Ramp Event for Event id : 1843111	2023/08/07 04:55:00	2023/08/07 07:55:00
5	117	For high stack emissions.	2023/08/06 19:37:00	2023/08/07 01:55:00
5	100	AM: High stack emissions.	2023/08/10 19:45:00	2023/08/11 00:23:00
5	10	high stack emissions	2023/08/11 12:27:00	2023/08/11 14:06:00
5	60	EF: High stack emissions	2023/08/11 14:06:00	2023/08/11 16:57:00
5	109	High stack emissions.	2023/08/11 20:29:00	2023/08/12 00:28:00
5	198	EF: High stack emissions	2023/08/12 14:31:00	2023/08/12 17:59:00
5	99	high stack emissions.	2023/08/12 17:59:00	2023/08/13 05:31:00
5	64	High emissions.	2023/08/13 11:11:00	2023/08/13 16:59:00
5	88	High stack emissions.	2023/08/13 19:13:00	2023/08/14 17:03:00
5	50	EF: High stack emissions	2023/08/14 20:27:00	2023/08/15 00:30:00
5	50	AM: RHI Precip. repairs.	2023/08/15 00:30:00	2023/08/16 00:20:00

UNIT	MWLOSS	REASON	ACTUALSTARTDATE	ACTUALENDDATE
5	593	AM: Main turbine overspeed test.	2023/08/16 00:20:00	2023/08/16 04:15:00
5	299	System Generated Ramp Event for Event id : 1846484 (Recalculated)	2023/08/16 04:15:00	2023/08/16 05:44:00
5	593	Islanding test	2023/08/16 05:44:00	2023/08/16 06:15:00
5	451	System Generated Ramp Event for Event id : 1846591 (Recalculated)	2023/08/16 06:15:00	2023/08/16 06:58:00
5	593	Turbine tripped on top and bottom casing protection	2023/08/16 06:58:00	2023/08/16 07:49:00
5	297	System Generated Ramp Event for Event id : 1846602	2023/08/16 07:49:00	2023/08/16 09:19:00
5	100	High stack emissions.	2023/08/18 11:49:00	2023/08/18 16:52:00
5	50	AM: Hi stack emissions.	2023/08/18 21:18:00	2023/08/18 22:24:00
5	98	AM: Hi stack emissions.	2023/08/18 22:24:00	2023/08/18 23:04:00
5	198	AM: High stack emissions.	2023/08/18 23:04:00	2023/08/19 00:17:00
5	100	RHI casing repairs	2023/08/19 00:17:00	2023/08/19 23:06:00
5	50	High stack emissions.	2023/08/30 20:09:00	2023/08/30 21:12:00
5	100	High stack emissions.	2023/08/30 21:12:00	2023/08/30 21:46:00
5	200	High stack emissions	2023/08/30 21:46:00	2023/08/31 00:50:00
5	100	High stack emissions	2023/08/31 00:50:00	2023/08/31 02:24:00
5	100	High stack emissions.	2023/08/31 19:32:00	2023/08/31 21:31:00
5	200	High stack emissions.	2023/08/31 21:31:00	2023/08/31 23:59:59
6	115	AM: High stack emissions.	2023/08/07 10:29:00	2023/08/07 16:32:00
6	118	EF: High stack emissions	2023/08/08 00:02:00	2023/08/08 04:46:00
6	118	EF:High stack emissions.	2023/08/08 11:02:00	2023/08/08 16:50:00
6	65	EF: High stack emissions	2023/08/08 22:01:00	2023/08/09 16:44:00
6	90	EM:High stack emissions.	2023/08/11 20:24:00	2023/08/12 00:24:00
6	85	High stack emissions.	2023/08/13 01:23:00	2023/08/13 04:39:00
6	88	EF: High stack emissions	2023/08/14 21:23:00	2023/08/15 03:15:00
6	45	EF: High stack emissions	2023/08/16 11:14:00	2023/08/16 16:41:00
6	181	EF: High stack emissions	2023/08/16 20:00:00	2023/08/17 03:34:00
6	50	AM: High stack emissions.	2023/08/17 13:58:00	2023/08/17 17:07:00
6	80	EF: High stack emissions	2023/08/17 20:06:00	2023/08/17 21:30:00
6	131	EF: High stack emissions	2023/08/17 21:30:00	2023/08/17 22:34:00
6	180	EF: High stack emissions	2023/08/17 22:34:00	2023/08/18 04:02:00
6	80	High stack emissions.	2023/08/19 14:46:00	2023/08/19 16:47:00
6	53	Ef: High stack emissions	2023/08/20 20:30:00	2023/08/21 00:03:00
6	81	EF: High stack emissions	2023/08/23 09:07:00	2023/08/23 16:46:00
6	83	High stack emissions.	2023/08/23 19:29:00	2023/08/24 04:17:00
6	80	EF: High stack emissions	2023/08/24 14:31:00	2023/08/24 16:52:00
6	83	for high stack emissions.	2023/08/24 19:29:00	2023/08/25 03:39:00
6	35	High stack emissions.	2023/08/25 09:47:00	2023/08/25 16:59:00
6	82	High stack emissions	2023/08/25 20:12:00	2023/08/26 00:05:00
6	34	High stack emissions.	2023/08/26 14:17:00	2023/08/26 17:03:00
6	135	High stack emissions	2023/08/26 20:03:00	2023/08/27 00:00:00
6	83	LHO Precip Casing repairs	2023/08/27 00:00:00	2023/08/28 02:14:00
5	187	EF: High stack emissions	2023/01/28 14:57:00	2023/01/28 17:08:00
5	593	AM: Boiler tube leak.	2023/01/28 23:39:00	2023/01/31 23:59:59
6	118	High stack emissions	2023/01/07 19:33:00	2023/01/07 23:57:00
6	118	Manual rapping	2023/01/08 21:26:00	2023/01/09 00:26:00
6	69	High stack emissions.	2023/01/13 22:24:00	2023/01/14 00:17:00
6	118	EF: High stack emissions	2023/01/28 20:26:00	2023/01/28 21:48:00
6	168	EF: High stack emissions	2023/01/28 21:48:00	2023/01/28 22:14:00
6	217	EF: High stack emissions	2023/01/28 22:14:00	2023/01/29 00:27:00
6	118	EF: High stack emissions	2023/01/29 00:27:00	2023/01/29 02:46:00
6	118	EF: High stack emissions	2023/01/29 13:31:00	2023/01/29 16:32:00
6	118	EF: High stack emissions	2023/01/29 19:42:00	2023/01/30 02:09:00
6	118	High stack emissions	2023/01/30 22:16:00	2023/01/31 03:16:00

PM Exceedances		
U1.	ESP Poor Performance and Manual Rapping	21-Aug
U2.	Unit Shut Down For Boiler Tube Leak Repairs	09-Aug
U2.	The unit synchronised on 2023/08/14 @ 04:23, the emissions need to be below the limit by 2023/08/17 @ 04:23 and remain below the limit until at least 2023/08/18 @ 23:59	14-Aug
U2.	Unit Light Up 36 high hopper levels, due to plant failures on the 2A bucket elevators and the transfer conveyor kept on tripping. The LHI casing was isolated to improve backlogging. Dust Plant Challenges	15-Aug
U2.	Unit Light Up DHP Challenges High Hopper Levels Poor ESP Performance	16-Aug
U2.	The unit synchronised on 2023/08/19 @ 07:00, and the emissions should be below the limit by 2023/08/22 @ 07:00 and remain below the limit until 2023/08/23 @ 23:59	20-Aug
U2.	ESP Poor Performance and Manual Rapping	22-Aug
U3.	ESP Poor Performance and Manual Rapping	02-Aug
U3.	Unit shutdown for main turbine FRF IP ESV no 4 flexible pipe leaking	07-Aug
U3.	The unit synchronised on 2023/08/08 @ 06:25, the emissions need to be below the limit by 2023/08/11 @ 06:25 and remain below the limit until at least 2023/08/12 @ 23:59	08-Aug
U3.	Unit Light Up	09-Aug
U3.	ESP Poor Performance	11-Aug
U3.	ESP Poor Performance and Manual Rapping	12-Aug
U3.	ESP Poor Performance and Manual Rapping	14-Aug
U3.	LHI casing Outage ESP poor Performance	16-Aug
U3.	ESP Poor Performance	18-Aug
U3.	ESP Poor Performance and Manual Rapping	20-Aug
U3.	ESP Poor Performance and Manual Rapping	22-Aug
U3.	RHI Casing Outage	26-Aug
U3.	ESP Poor Performance & Manual Rapping	30-Aug
U4.	ESP Poor Performance and Manual Rapping	03-Aug
U4.	Unit Shut Down for Safety Valve Discharge Pipe Repair	05-Aug
U4.	The unit synchronised on 2023/08/07 @ 04:55, the emissions need to be below the limit by 2023/08/10 @ 04:55 and remain below the limit until at least 2023/08/11 @ 23:59	07-Aug
U4.	ESP Poor Performance and Manual Rapping	11-Aug
U4.	ESP Poor Performance	18-Aug
U4.	ESP Poor Performance and Manual Rapping	24-Aug