Eskom

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Date:
10 March 2025

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Dear Ms. Nompumelelo Simelane

Ref: Kendal Power Station AEL (17/4/AEL/MP312/11/15)

RE-SUBMISSION OF KENDAL POWER STATION'S EMISSIONS REPORT FOR THE MONTH OF JUNE 2024.

This is a monthly report required in terms of Section 7.4 in the Kendal Power Station's Atmospheric Emission License. The emissions are for Eskom Kendal Power Station.

Re-submission is due to the surrogation values that must be recorded when the monitor has maxed out or giving erratic data for both PM and gases after the review of the initial Air Quality Reports.

Compiled by:

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ENVIRONMENTAL SENIOR ADVISOR- KENDAL POWER STATION
Date: 10/03/2025

Supported by:

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Date: 10/03/2025

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KENDAL POWER STATION'S EMISSIONS REPORT FOR THE MONTH OF JUNE 2024

Verified by:

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Approved by:

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Date: 17/03/2025

Eskom

JUNE 2024

KENDAL POWER STATION MONTHLY EMISSIONS REPORT

Atmospheric Emission License 17/4/AEL/MP312/11/15

1 RAW MATERIALS AND PRODUCTS

Raw Materials and Products	Raw Material Type	Units	Maximum Permitted Consumption Rate	Consumption Rate Jun-2024
	Coal	Tons	2 260 000	802 319
	Fuel Oil	Tons	5 000	6764.120
Production Rates	Product / By-Product Name	Units	Maximum Production Capacity Permitted	Indicative Production Rate Jun-2024
	Energy	GWh	2 963.520	1 128.228
	Ash	Tons	770 000	254 816.514
	RE Ash	kg/MWh	not specified	0.529

Note: Maximum energy rate is as per the maximum capacity stated in the AEL: [4 116 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	16-24 (MJ/kg)	18.750
Sulphur Content	%	<1 (%)	0.830
Ash Content	%	40 (%)	31.760

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 Jun-2024	Technology Type	SO_3 Utilization Jun-2024
Unit 1	*ESP + SO_3*	*99.731%*	*SO_3*	*86.7%*
Unit 2	*ESP + SO_3*	*99.211%*	*SO_3*	*90.0%*
Unit 3	*ESP + SO_3*	*99.827%*	*SO_3*	*80.0%*
Unit 4	*ESP + SO_3*	*99.778%*	*SO_3*	*76.7%*
Unit 5	*ESP + SO_3*	*Off-line*	*SO_3*	*Off-line*
Unit 6	*ESP + SO_3*	*Off-line*	*SO_3*	*Off-line*

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

There is no Sulphur fluw value for SO3 utilization due to switch failure on the server, however DCS signals used for its tripping alarms were used to get its utilization values. Sulfur flow will be available once we have commissioned the new PI system.

5 MONITOR RELIABILITY (%)

Associated Unit/Stack	PM	SO_2	NO	O_2
Unit 1	*91.5*	*58.9*	*58.9*	*99.7*
Unit 2	*81.5*	*68.6*	*68.6*	*99.9*
Unit 3	*92.0*	*0.0*	*100.0*	*95.3*
Unit 4	*100.0*	*100.0*	*98.8*	*0.0*
Unit 5	*Off*	*Off*	*Off*	*Off*
Unit 6	*Off*	*Off*	*Off*	*Off*

Note: NOx emissions is measured as NO in PPM. Final NOx value is expressed as total NO_2

6 EMISSION PERFORMANCE

Table 6.1: Monthly tonnages for the month of June 2024

Associated Unit/Stack	PM (tons)	SO_2 (tons)	NO_x (tons)
Unit 1	110.3	3 009	1 381
Unit 2	321.6	2 620	1 364
Unit 3	75.9	2 850	691
Unit 4	88.6	3 145	747
Unit 5	Off	Off	Off
Unit 6	Off	Off	Off
SUM	596.39	11 625	4 182

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

Associated Unit/Stack	Normal	Grace	Section 30	Contravention	Total Exceedance	Average PM (mg/Nm³)
Unit 1	23	2	0	2	4	78.9
Unit 2	5	5	0	17	22	223.0
Unit 3	22	1	0	1	2	52.9
Unit 4	23	3	0	0	3	58.3
Unit 5	Off	Off	Off	Off	Off	Off
Unit 6	Off	Off	Off	Off	Off	Off
SUM	73	11	0	20	31	

Table 6.3: Operating days in compliance to SO_2 AEL Limit - June 2024

Associated Unit/Stack	Normal	Grace	Section 30	Contravention	Total Exceedance	Average SO_2 (mg/Nm³)
Unit 1	28	0	0	0	0	1 858.7
Unit 2	28	0	0	0	0	1 696.3
Unit 3	25	0	0	0	0	1 788.8
Unit 4	27	0	0	0	0	1 986.4
Unit 5	Off	Off	Off	Off	Off	Off
Unit 6	Off	Off	Off	Off	Off	Off
SUM	108	0	0	0	0	

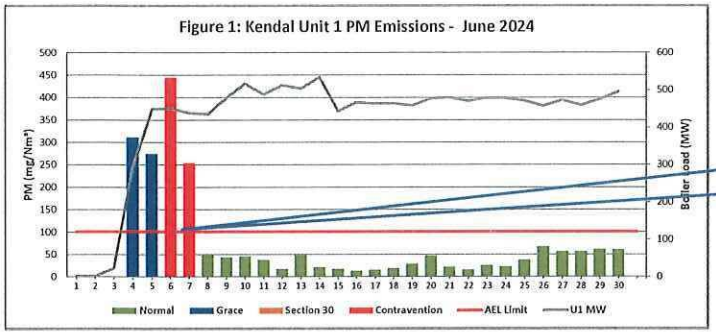
Table 6.4: Operating days in compliance to NOx AEL Limit - June 2024

Associated Unit/Stack	Normal	Grace	Section 30	Contravention	Total Exceedance	Average NOx (mg/Nm³)
Unit 1	28	0	0	0	0	852.0
Unit 2	28	0	0	0	0	869.5
Unit 3	25	0	0	0	0	431.9
Unit 4	27	0	0	0	0	463.5
Unit 5	Off	Off	Off	Off	Off	Off
Unit 6	Off	Off	Off	Off	Off	Off
SUM	108	0	0	0	0	

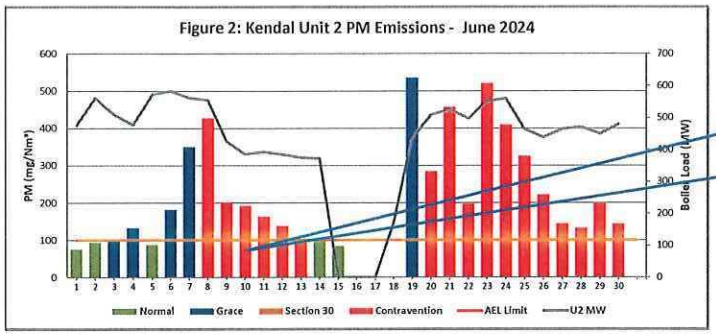
Note: NOx emissions is measured as NO in PPM. Final NOx value is expressed as total NO_2

Table 6.5: Legend Description

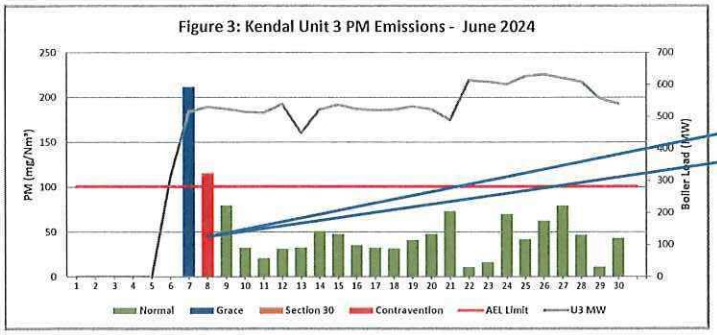
Condition	Colour	Description
Normal	GREEN	Emissions below Emission Limit Value (ELV)
Grace	BLUE	Emissions above the ELV during grace period
Section 30	ORANGE	Emissions above ELV during a NEMA S30 incident
Contravention	RED	Emissions above ELV but outside grace or S30 incident conditions



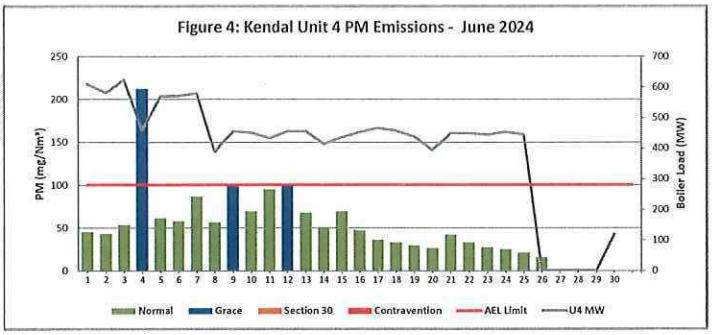
High emissions can be attributed to the DHP that was Standing due to compartment high levels, Light up condition - Hot start, So3 injection rate was also at 0 ppm and also due to Field 35 high primary current.

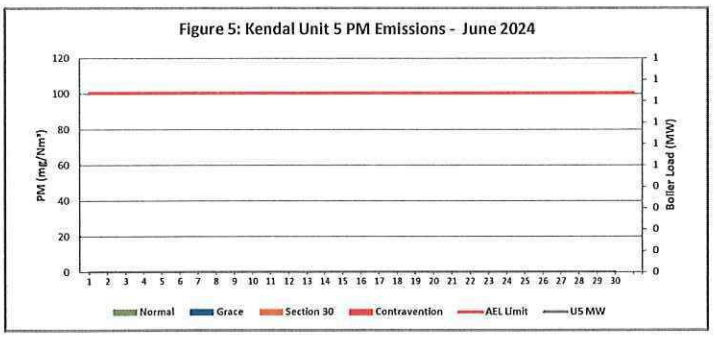


High emissions can be attributed to F11 internal structural problem, F13,27,31 secondary voltage was low, F44 was on permit, DHP standing due to compartment high levels and Precip conveyor 13 was standing, F12,22,32,42 CE Rapper 2 LH & RH was tripping on overload , F11 internal structural problem, F13,27,31,41 secondary voltage was low and F44 was on permit.



High emissions can be attributed to light up conditions- Hot start and also due to unit 3 having adopted new correlation curves after backfitting.





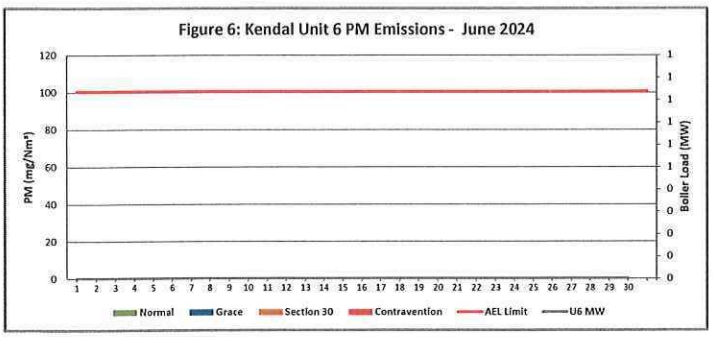


Figure 7: Kendal Unit 1 SO_2 Emissions - June 2024

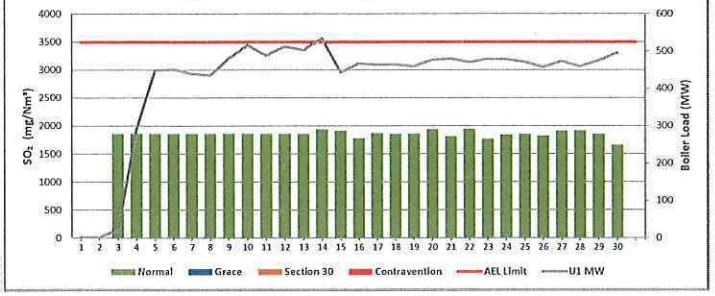


Figure 8: Kendal Unit 2 SO_2 Emissions - June 2024

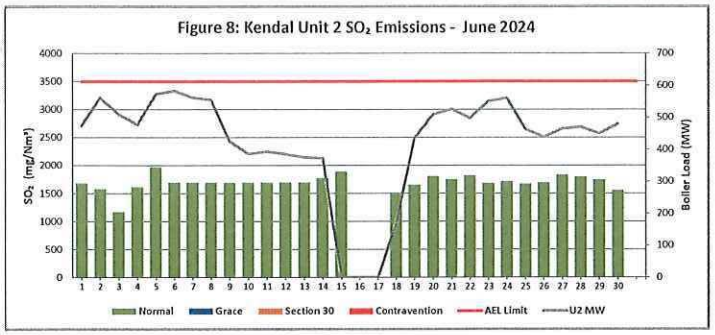


Figure 9: Kendal Unit 3 SO_2 Emissions - June 2024

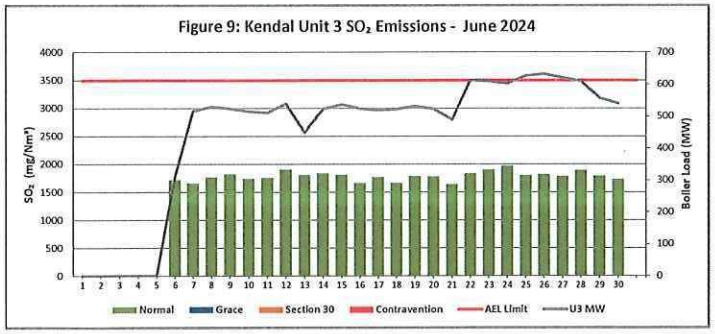


Figure 10: Kendal Unit 4 SO_2 Emissions - June 2024

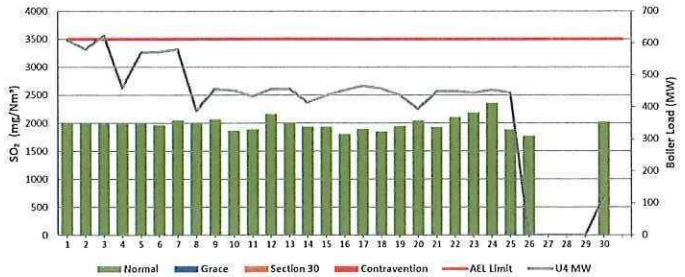


Figure 11: Kendal Unit 5 SO_2 Emissions - June 2024

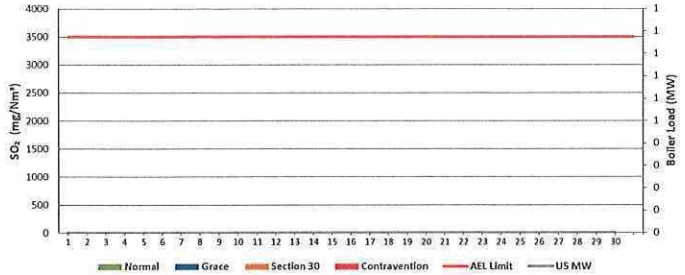


Figure 12: Kendal Unit 6 SO_2 Emissions - June 2024

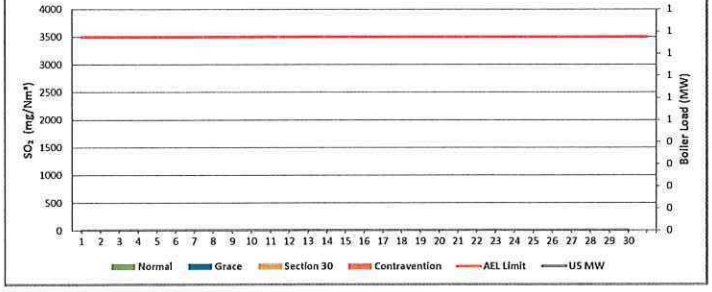


Figure 13: Kendal Unit 1 NOx Emissions - June 2024

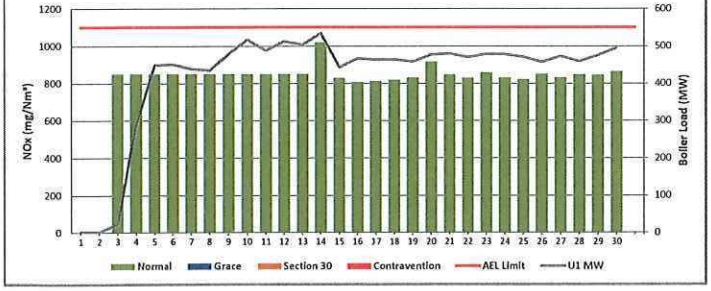


Figure 14: Kendal Unit 2 NOx Emissions - June 2024

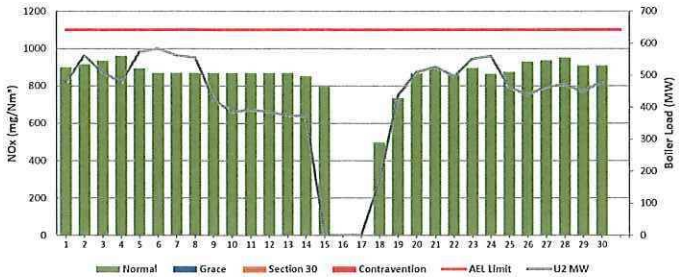


Figure 15: Kendal Unit 3 NOx Emissions - June 2024

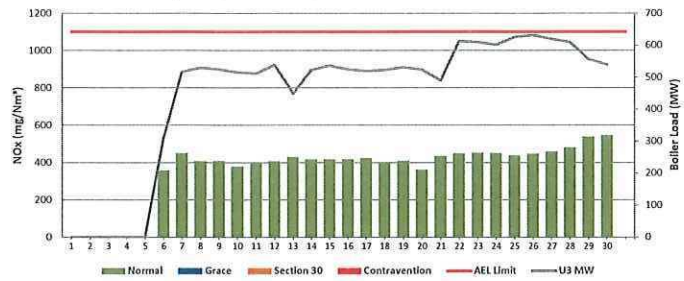


Figure 16: Kendal Unit 4 NOx Emissions - June 2024

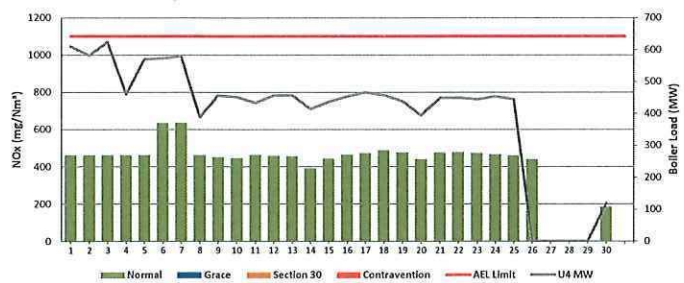


Figure 17: Kendal Unit 5 NOx Emissions - June 2024

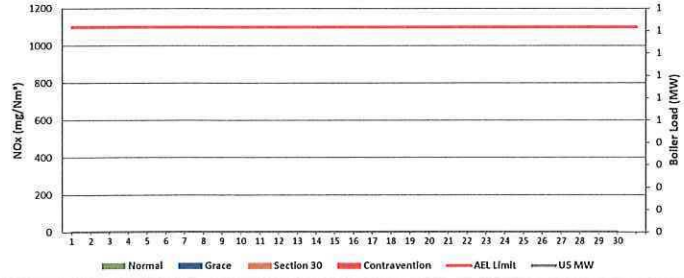
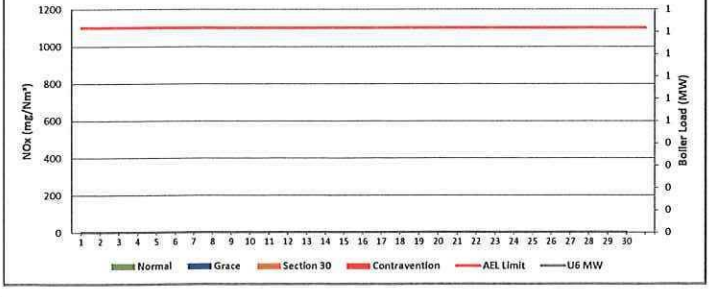


Figure 18: Kendal Unit 6 NOx Emissions - June 2024



7 COMPLAINTS

There were no complaints for this months

Source Code / Name	Root Cause Analysis	Calculation of Impacts / emissions associated	Dispersion modeling of pollutants where applicable	Measures implemented to prevent reoccurrence

Abatement Technology-Table 4

In order to achieve the required operational dust removal efficiency based on measured values, several assumptions such as
- Coal ash content (%) and burnt rate mass
- Fly : Coarse ash ratio of 80:20 - 80% of fly-ash mass obtained from burnt coal goes to ESP
- Measurement of dust emission by Dust Monitor over a period of time (monthly)

Operational Dust Removal Efficiency

$\eta = (1 - (Output/Input)) \times 100$

$$\eta = 1 - \frac{(DustEmissionFromAQR\ ReportDustMonitor(tons)}{(CoalBurnt(tons) * \%AshContent * 80\%)} \times 100$$

Monitor Reliability-Table 5

In terms of the minimum emissions standard, the requirement is that a monitor should be 80% reliable on a monthly average.
The **monitor reliability** refers to **data reliability** because the assumed value of 99.325% reliability is compared to the dust concentration signal. If the dust concentration signal is above 99.325% opacity,the data information is no longer reliable because the monitor reading is out of its maximum reading range. The data reliability looks at how many times did the dust concentration signal go above 98% over a period of time e.g 24hours
The formula is as follows:
= (1 – (count hours above 99.325%/24hours))x 100

Emissions Performance:

- Average velocity values from the latest correlation report were used on the gaseous emissions on the units due to defective CEMS monitors and velocity correction factors were set M=1 and C=0
- Unit 1 and 2 maxed out, meaning the emissions were higher than what the monitor was correlated for, in which case we use surrogate values. This is attributed to abnormal plant conditions.
- Please note that the reported figures in tonnage calculation are the figures after the station used the maxing out quantification exercise which is the use of "surrogate values" on days when the monitor maxed out.
- Dust monitor for units 1 and 2 in some of the days were not reliable and maxed out and PM values were surrogated.
- Correlation curves for units 1,4 and 5 were changed to suite changes of the data signals from *AAA* to *HME* data values because of the damaged cables for *AAA* signal giving values that were not reliable.
- Surrogation values were recalculated after updating raw data based on curves update.
- Unit 1 Nox and SOX, Temperature and Pressure were not reading from the 30th of May to the 14th of June at 11:35.
- Power failed on stack 2 (Unit 4 to 6) and after recovery of the power it was found that the module on GM32 was damaged and the module was replaced.
- Unit 2 NOX and SOX, Temperature and pressure from 5 June at 17:10 to 14 June at 11:40 were not reading because the Power failed and after recovery of the power it was found that the module on GM32 was damaged and the module was replaced.
- Unit 3 O2 and flow from the 1st of June to the 5th June at 17:40 was not reading due to O2 that was faulty.
- Flow was not working on unit 6 for the whole month due to corroded flow sensor caused by the transducer that was damaged and the transduser was then replaced.
- Correlation curves for units 1,4 and 5 were changed to suite changes of the data signals from *AAA* to *HME* data values because of the damaged cables for *AAA* signal giving vaues that were not reliable.
- Surrogation values were recalculated after updating raw data based on curves update.

- The QAL 2 average values for gaseous were used as raw data in cases where the monitor had an error and as surrogation values.

- Unit 1
- Findings: The high emissions can be attributed to
- Resolution: Plant repaired

- Unit 2
- Findings: The high emissions can be attributed to
- Resolution: Plant repaired.

- Unit 3

Findings: The high PM emissions can be attributed light up conditions-Hot start and also due to unit 3 having adopted new correlation curves after backfitting.
- Resolution: Plant repaired.

- Unit 4
- Unit 4 was compliant.

- Unit 5
- Unit was off

- Unit 6

Unit was off