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)

SUBMISSION OF KENDAL POWER STATION'S EMISSIONS REPORT FOR THE MONTH OF JANUARY 2025.

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.

Compiled by:

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

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Eskom

JANUARY 2025

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 Jan-2025
	Coal	Tons	2 260 000	687 119
	Fuel Oil	Tons	5 000	9445.700
Production Rates	Product / By-Product Name	Units	Maximum Production Capacity Permitted	Indicative Production Rate Jan-2025
	Energy	GWh	3 082.304	1 112.330
	Ash	Tons	770 000	221 939.437
	RE Ash	kg/MWh	not specified	1.948

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)	18.500
Sulphur Content	%	<1 (%)	0.760
Ash Content	%	40 (%)	32.300

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 Jan-2025	Technology Type	SO_3 Utilization Jan-2025
Unit 1	*ESP + SO_3*	*99.068%*	*SO_3*	*64.5%*
Unit 2	*ESP + SO_3*	*Off-line*	*SO_3*	*Off-Line*
Unit 3	*ESP + SO_3*	*98.566%*	*SO_3*	*83.0%*
Unit 4	*ESP + SO_3*	*99.538%*	*SO_3*	*35.5%*
Unit 5	*ESP + SO_3*	*98.783%*	*SO_3*	*71.0%*
Unit 6	*ESP + SO_3*	*98.243%*	*SO_3*	*61.3%*

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	*85.4*	*98.9*	*98.7*	*100.0*
Unit 2	*Off*	*Off*	*Off*	*Off*
Unit 3	*39.3*	*100.0*	*100.0*	*100.0*
Unit 4	*98.6*	*100.0*	*100.0*	*100.0*
Unit 5	*98.6*	*100.0*	*100.0*	*100.0*
Unit 6	*77.8*	*0.0*	*0.0*	*54.7*

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 January 2025

Associated Unit/Stack	PM (tons)	SO_2 (tons)	NO_x (tons)
Unit 1	360.0	2 509	1 141
Unit 2	Off	Off	Off
Unit 3	713.1	2 069	862
Unit 4	96.9	1 594	516
Unit 5	456.5	2 165	1 095
Unit 6	540.0	2 298	1 043
SUM	2 166.48	10 635	4 657

Table 6.2: Operating days in compliance to PM AEL Limit - January 2025

Associated Unit/Stack	Normal	Grace	Section 30	Contravention	Total Exceedance	Average PM (mg/Nm³)
Unit 1	1	2	0	19	21	269.5
Unit 2	Off	Off	Off	Off	Off	Off
Unit 3	1	3	0	22	25	456.7
Unit 4	7	5	0	6	11	143.6
Unit 5	2	2	0	22	24	392.3
Unit 6	5	6	0	9	15	678.6
SUM	16	18	0	78	96	

Table 6.3: Operating days in compliance to SO_2 AEL Limit - January 2025

Associated Unit/Stack	Normal	Grace	Section 30	Contravention	Total Exceedance	Average SO_2 (mg/Nm³)
Unit 1	25	0	0	0	0	1 609.3
Unit 2	Off	Off	Off	Off	Off	Off
Unit 3	28	0	0	0	0	1 166.3
Unit 4	21	0	0	0	0	1 931.2
Unit 5	28	0	0	0	0	1 454.3
Unit 6	25	0	0	0	0	1 909.1
SUM	127	0	0	0	0	

Table 6.4: Operating days in compliance to NOx AEL Limit - January 2025

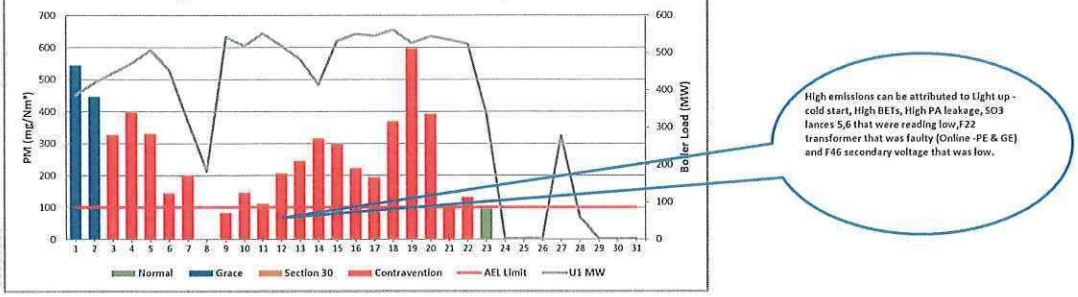
Associated Unit/Stack	Normal	Grace	Section 30	Contravention	Total Exceedance	Average NOx (mg/Nm³)
Unit 1	25	0	0	0	0	737.9
Unit 2	Off	Off	Off	Off	Off	Off
Unit 3	28	0	0	0	0	480.3
Unit 4	21	0	0	0	0	602.7
Unit 5	28	0	0	0	0	730.4
Unit 6	25	0	0	0	0	827.1
SUM	127	0	0	0	0	

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

Table 6.5: Legend Description

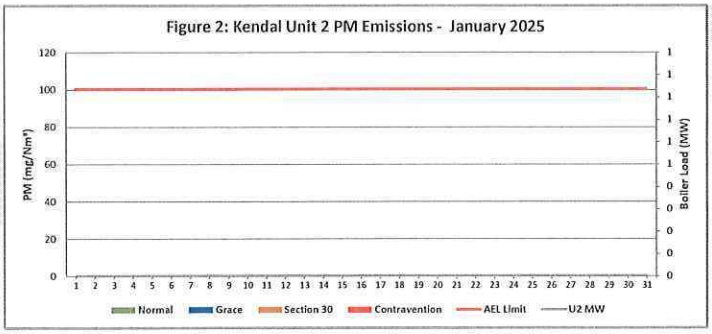
Condition	Colour	Description
Normal	GREEN	Emissions below Emission Limit Value (ELV)
Grace	BLUE	Emissions above the ELV during grace period
Section 30	ORANGE	Emissions above ELV during a NEMA S30 incident
Contravention	RED	Emissions above ELV but outside grace or S30 incident conditions

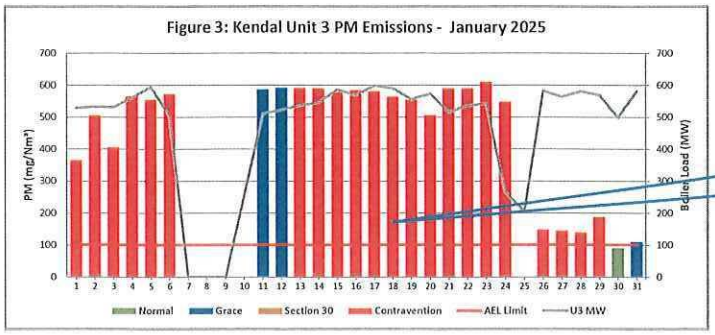
Figure 1: Kendal Unit 1 PM Emissions - January 2025



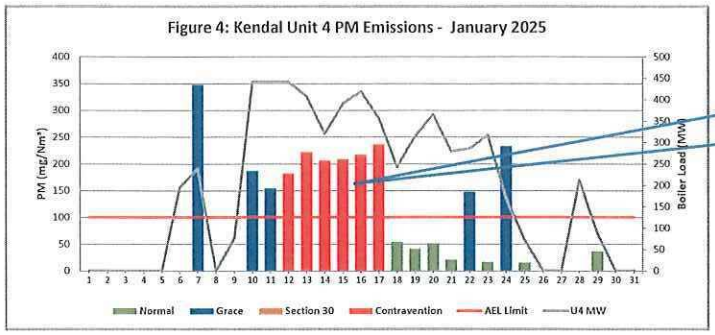
High emissions can be attributed to Light up - cold start, High BETs, High PA leakage, SO3 lances 5,6 that were reading low,F22 transformer that was faulty (Online -PE & GE) and F46 secondary voltage that was low.

Figure 2: Kendal Unit 2 PM Emissions - January 2025

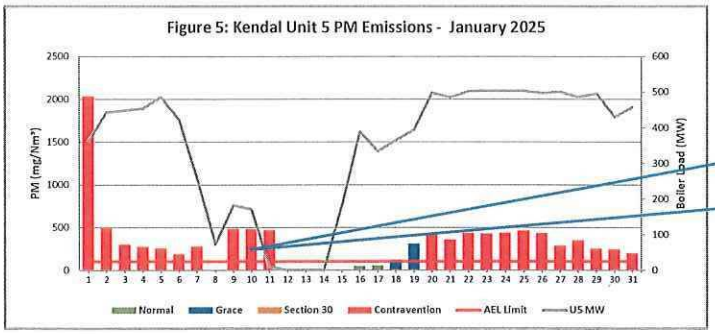




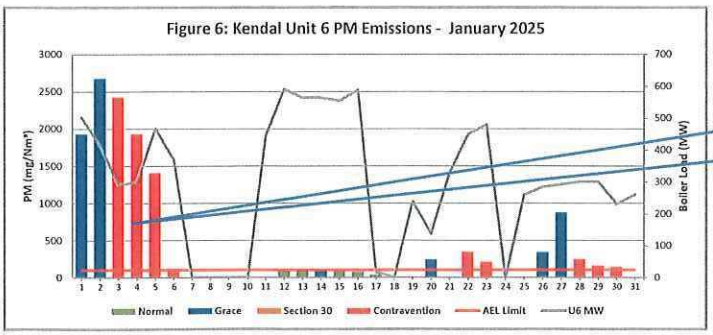
High emissions can be attributed Ash backlogs.



High PM emissions can be attributed to F11,21,A6 that was tripping on under voltage, Ash backlogs and due SO3 lances 1,7 that was reading low .



High PM emissions can be attributed to Poor ESP performance, SO3 plant not in service due to flow meter replacement



High PM emissions can be attributed to Poor ESP performance and the SO3 plant not in service due to flow meter replacement.

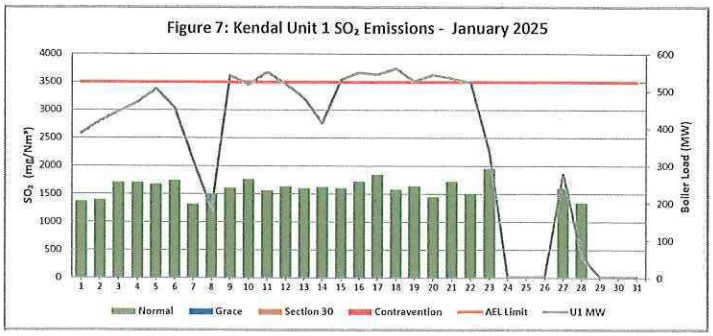


Figure 7: Kendal Unit 1 SO_2 Emissions - January 2025
SO_2 (mg/Nm³)
Boiler Load (MW)
Normal
Grace
Section 30
Contravention
AEL Limit
U1 MW

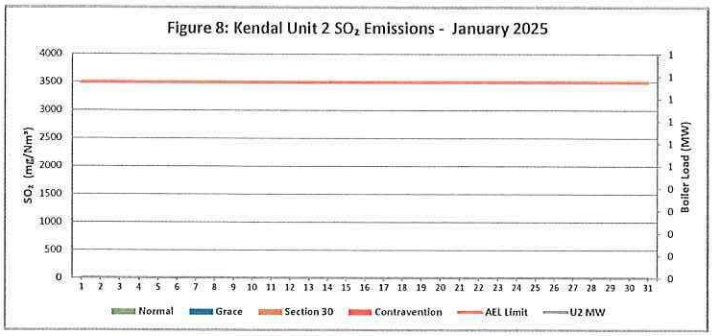


Figure 8: Kendal Unit 2 SO_2 Emissions - January 2025
SO_2 (mg/Nm³)
Boiler Load (MW)
Normal
Grace
Section 30
Contravention
AEL Limit
U2 MW

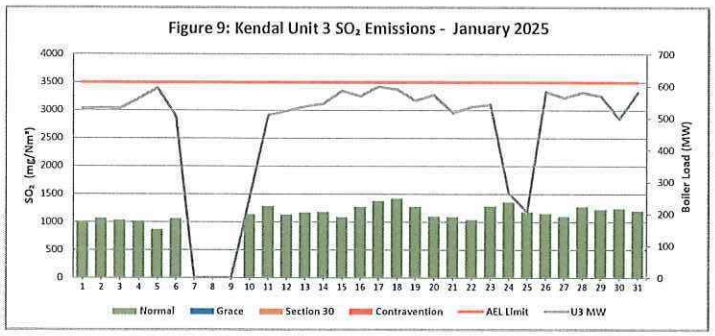


Figure 9: Kendal Unit 3 SO_2 Emissions - January 2025
SO_2 (mg/Nm³)
Boiler Load (MW)
Normal
Grace
Section 30
Contravention
AEL Limit
U3 MW

Figure 10: Kendal Unit 4 SO_2 Emissions - January 2025

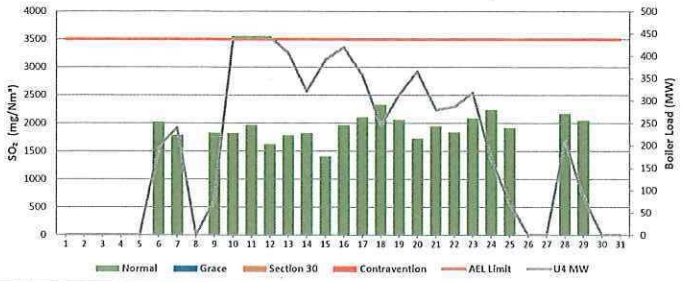


Figure 11: Kendal Unit 5 SO_2 Emissions - January 2025

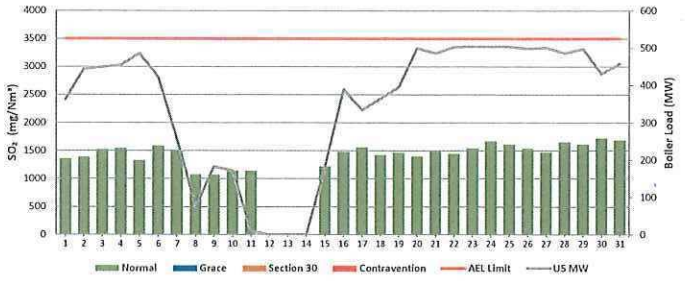


Figure 12: Kendal Unit 6 SO_2 Emissions - January 2025

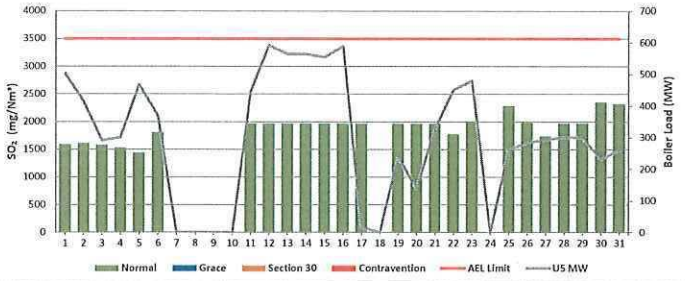


Figure 13: Kendal Unit 1 NOx Emissions - January 2025

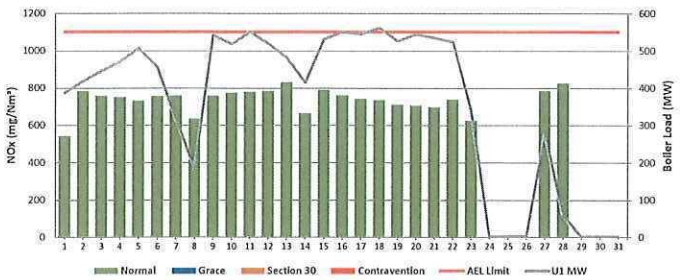


Figure 14: Kendal Unit 2 NOx Emissions - January 2025

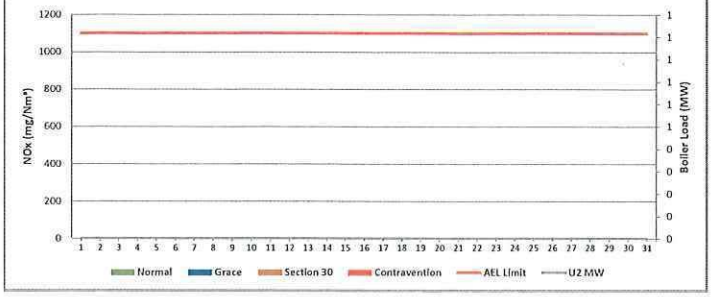


Figure 15: Kendal Unit 3 NOx Emissions - January 2025

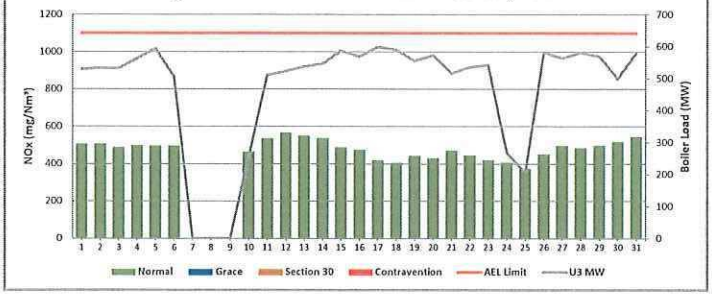


Figure 16: Kendal Unit 4 NOx Emissions - January 2025

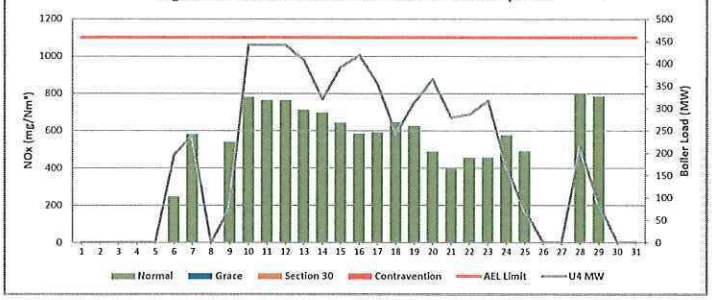


Figure 17: Kendal Unit 5 NOx Emissions - January 2025

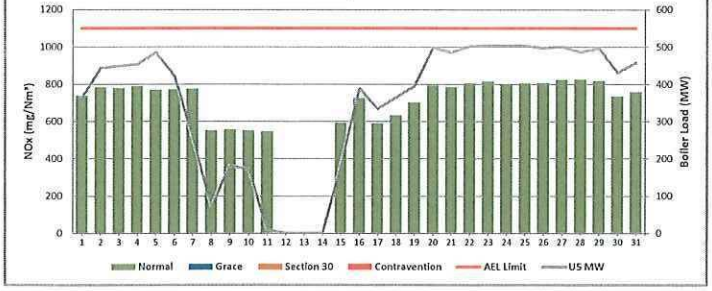
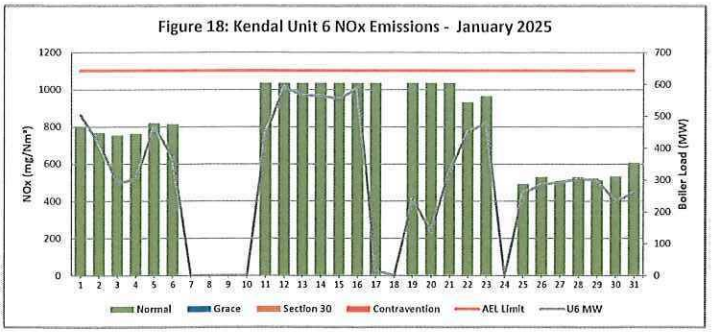


Figure 18: Kendal Unit 6 NOx Emissions - January 2025



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 Units due to defective CEMS monitors and velocity correction factors were set M=1 and C=0
- Unit 1,3,5 and 6 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.
- Flow was not working for the whole month because of sensors that are faulty and the sensors have to be replaced on all the units. The process for procuring new sensors is in progress.
- 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, were used as surogation values.

- Unit 1
- Findings: Light up - cold start, High BETs, High PA leakage, SO3 lances 5,6 that were reading low,F22 transformer that was faulty (Online - PE & GE) and F46 secondary voltage that was low.
- Resolution: Plant repaired

- Unit 2
- Unit was off.

- Unit 3
- Findings: High emissions can be attributed to the Dust Handling Plant that was off resulting in ash backlogs.
- Resolution: Plant repaired

- Unit 4
- Resolution: Plant repaired
- Findings: High PM emissions can be attributed to F11,21,46 that was tripping on under voltage, Ash backlogs and due SO3 lances 1,7 that was reading low.

Unit 5
Findings: High PM emissions can be attributed to Poor ESP performance, SO3 plant not in service due to flow meter replacement .
Resolution: Plant repaired.

- Unit 6
- Findings: Poor ESP performance and the SO3 plant not in service due to flow meter replacement.
- Resolution: Plant repaired.