



Ms Nompumelelo Simelane
Nkangala District
P.O Box 437
MIDDLEBERG
1050
By email: Simelanenl@nkangaladm.gov.za

Date:
10 March 2025
Enquiries: S Chokoe
Tel +27 13 647 6970

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 AUGUST 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.

Late submission is due to the surrogation values that had to 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:

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

Supported by:

Solly Chokoe
ENVIRONMENTAL MANAGER- KENDAL POWER STATION
Date: 10/03/2025

Generation Division
Kendal Power Station
N12 Balmoral Off Ramp, Emalahleni
Private Bag x7272, Emalahleni 1035 SA
Tel +27 13 647 6970 Fax +27 13 647 6904 www.eskom.co.za

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

Verified by:



Jacob Zwane

BOILER ENGINEERING: SENIOR SYSTEM ENGINEER- KENDAL POWER STATION

Date: 11/03/2025

Validated by:



Tendani Rasivhetshela

BOILER ENGINEERING MANAGER-KENDAL POWER STATION

Date: 11/03/2025

Supported by:



Phindile Takane

ACTING ENGINEERING MANAGER-KENDAL POWER STATION

Date: 12/03/2025

Approved by:



Tshepiso Temo

GENERAL MANAGER-KENDAL POWER STATION

Date: 11/03/2025

KENDAL POWER STATION MONTHLY EMISSIONS REPORT
Atmospheric Emission License 17/4/AEL/MP312/1 1/15



1 RAW MATERIALS AND PRODUCTS

Raw Materials and Products	Raw Material Type	Units	Maximum Permitted Consumption Rate	Consumption Rate Aug-2024
	Coal	Tons	2 260 000	1 208 517
	Fuel Oil	Tons	5 000	8992 980
Production Rates	Product / By-Product Name	Units	Maximum Production Capacity Permitted	Indicative Production Rate Aug-2024
	Energy	GWh	3 062 304	1 810 891
	Ash	Tons	770 000	386 121 182
	RE Ash	kg/MWh	not specified	0 965

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)	18 790
Sulphur Content	%	<1 (%)	0 860
Ash Content	%	40 (%)	31 950

3 EMISSION LIMITS (mg/Nm³)

Associated Unit/Stack	PM	SO ₂	NO _x
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-2024	Technology Type	SO ₂ Utilization Aug-2024
Unit 1	ESP + SO ₂	99.665%	SO ₂	77.4%
Unit 2	ESP + SO ₂	98.868%	SO ₂	71.0%
Unit 3	ESP + SO ₂	99.857%	SO ₂	96.8%
Unit 4	ESP + SO ₂	99.887%	SO ₂	99.4%
Unit 5	ESP + SO ₂	98.330%	SO ₂	77.4%
Unit 6	ESP + SO ₂	99.823%	SO ₂	90.3%

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

There is no Sulphur flow 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	95.7	80.1	77.7	0.0
Unit 2	67.4	100.0	100.0	0.0
Unit 3	84.4	0.0	0.0	72.4
Unit 4	100.0	100.0	0.0	0.0
Unit 5	55.1	0.0	46.4	100.0
Unit 6	89.5	99.9	99.9	99.9

Note: NOx emissions is measured as NO in PPM. Final NOx value is expressed as total NO₂.

6 EMISSION PERFORMANCE

Table 6.1: Monthly tonnages for the month of August 2024

Associated Unit/Stack	PM (tons)	SO ₂ (tons)	NO _x (tons)
Unit 1	141.6	2 869	1 324
Unit 2	485.0	2 435	1 242
Unit 3	84.2	3 057	1 309
Unit 4	60.1	3 572	1 361
Unit 5	871.0	3 197	1 559
Unit 6	105.8	3 759	1 853
SUM	1 747.63	18 887	8 649

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

Associated Unit/Stack	Normal	Grace	Section 30	Contraven-tion	Total Exceedance	Average PM (mg/Nm³)
Unit 1	16	3	0	6	9	117.6
Unit 2	1	3	0	18	21	485.1
Unit 3	30	0	0	0	0	49.0
Unit 4	31	0	0	0	0	34.1
Unit 5	5	2	0	20	22	511.0
Unit 6	29	0	0	0	0	52.5
SUM	112	8	0	44	52	

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

Associated Unit/Stack	Normal	Grace	Section 30	Contraven-tion	Total Exceedance	Average SO ₂ (mg/Nm³)
Unit 1	27	0	0	0	0	1 926.1
Unit 2	25	0	0	0	0	1 707.4
Unit 3	31	0	0	0	0	1 603.1
Unit 4	31	0	0	0	0	1 940.4
Unit 5	28	0	0	0	0	1 839.3
Unit 6	31	0	0	0	0	1 745.3
SUM	173	0	0	0	0	

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

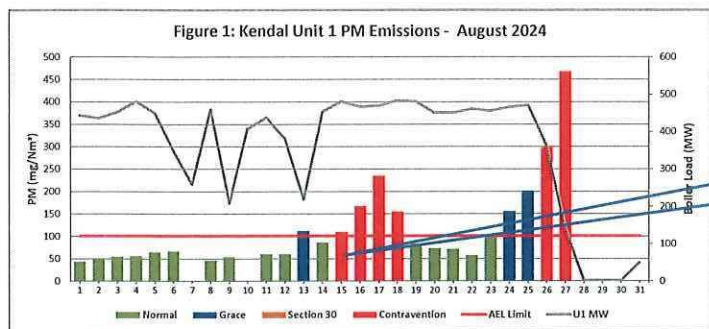
Associated Unit/Stack	Normal	Grace	Section 30	Contravention	Total Exceedance	Average NOx (mg/Nm³)
Unit 1	27	0	0	0	0	860.0
Unit 2	25	0	0	0	0	863.9
Unit 3	31	0	0	0	0	681.4
Unit 4	31	0	0	0	0	738.5
Unit 5	28	0	0	0	0	890.8
Unit 6	31	0	0	0	0	858.7
SUM	173	0	0	0	0	

Note: NOx emissions is measured as NO in PPM. Final NOx value is expressed as total NO₂.

Table 6.5: Legend Description

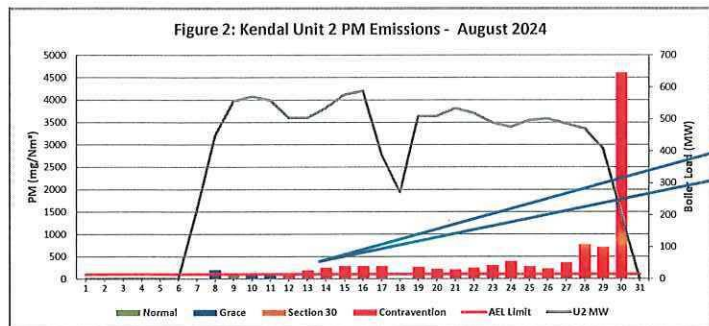
Condition	Colour	Description
Normal	GREEN	Emissions below Emission Limit Value (ELV)
Grace	BLUE	Emissions above the ELV during grace period
Section 30	ORANGE	Emissions above ELV during a NEMA S30 incident
Contravention	RED	Emissions above ELV but outside grace or S30 incident conditions

Figure 1: Kendal Unit 1 PM Emissions - August 2024



High emissions can be attributed to field 22 transformer that was faulty, DHP that was running with the first knife gates closed on PCP 11-24. The DHP was also standing due to compartment high levels.

Figure 2: Kendal Unit 2 PM Emissions - August 2024



High emissions can be attributed to the DHP that was standing with all kg's closed due to compartments high level, PCP 11 to 24 kg1&2 are still all shut. Field 44 transformer faulty.

Figure 3: Kendal Unit 3 PM Emissions - August 2024

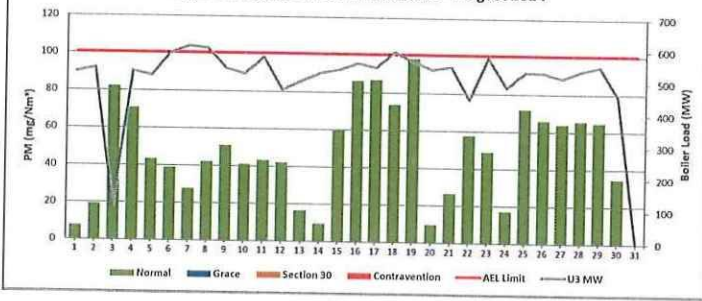


Figure 4: Kendal Unit 4 PM Emissions - August 2024

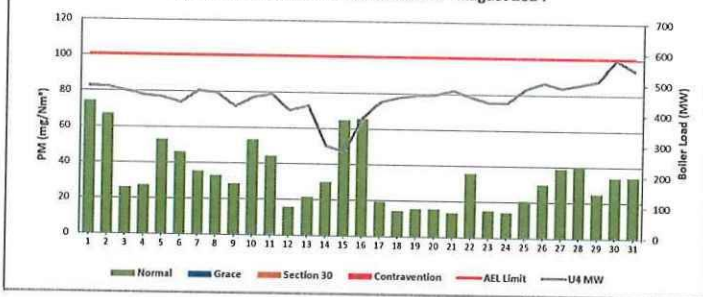
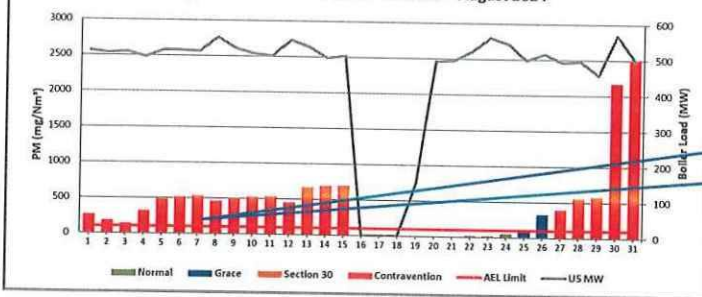


Figure 5: Kendal Unit 5 PM Emissions - August 2024



High PM emissions can be attributed to F42 that was tripping on CE Rapper Fault, SO3 plant injection lances 5,7 were also reading low, poor ESP field performance and lances fields were tripping. DHP was standing with all Knife gates closed due to compartments high level.

Figure 6: Kendal Unit 6 PM Emissions - August 2024

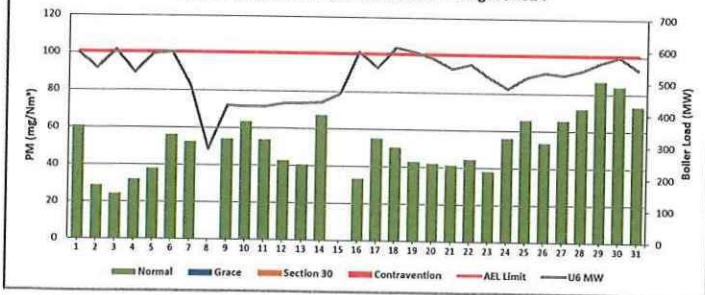


Figure 7: Kendal Unit 1 SO₂ Emissions - August 2024

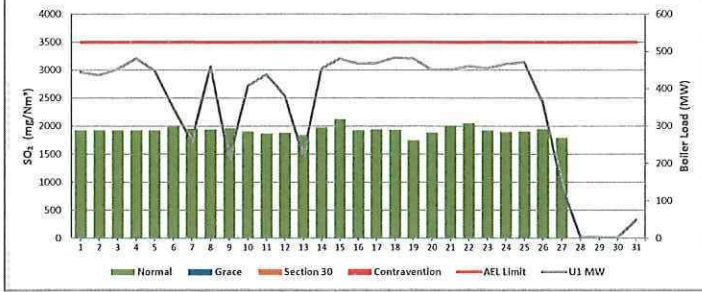


Figure 8: Kendal Unit 2 SO₂ Emissions - August 2024

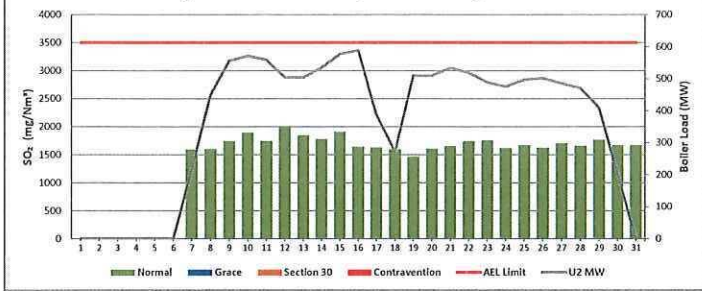


Figure 9: Kendal Unit 3 SO₂ Emissions - August 2024

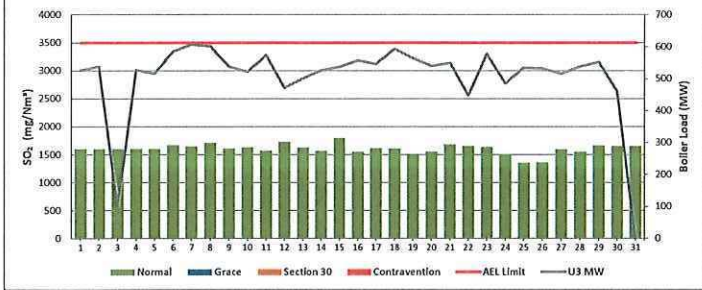


Figure 10: Kendal Unit 4 SO₂ Emissions - August 2024

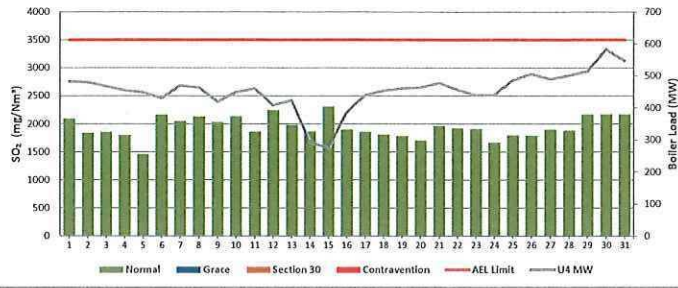


Figure 11: Kendal Unit 5 SO₂ Emissions - August 2024

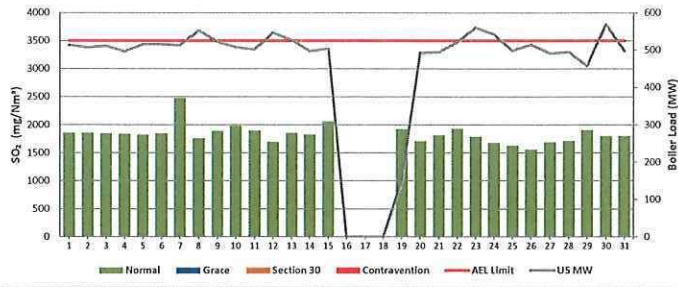


Figure 12: Kendal Unit 6 SO₂ Emissions - August 2024

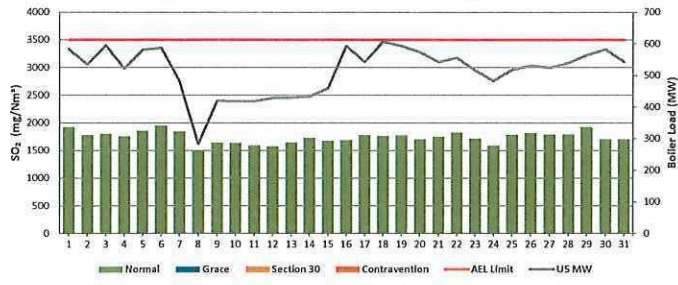


Figure 13: Kendal Unit 1 NO_x Emissions - August 2024

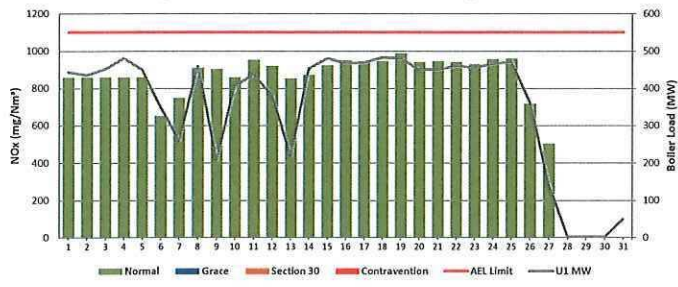


Figure 14: Kendal Unit 2 NOx Emissions - August 2024

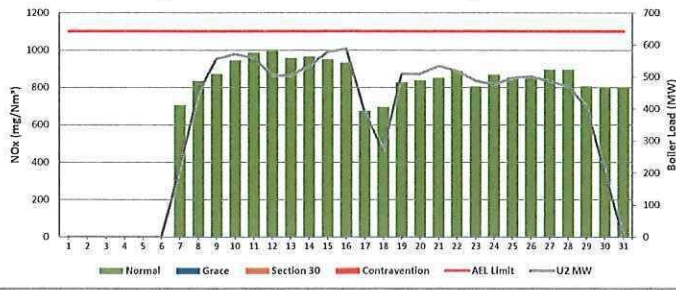


Figure 15: Kendal Unit 3 NOx Emissions - August 2024

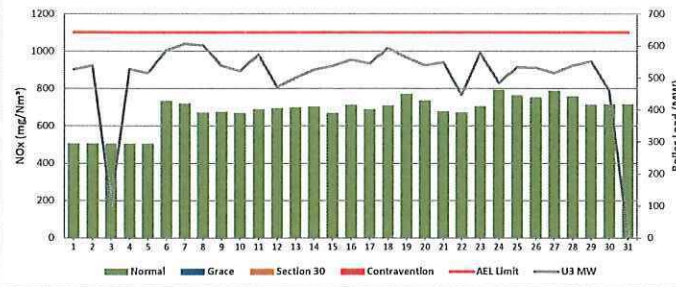


Figure 16: Kendal Unit 4 NOx Emissions - August 2024

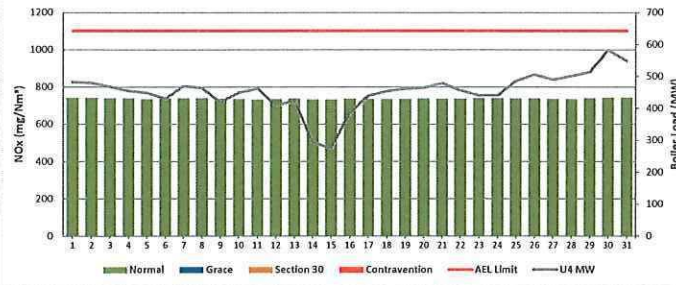


Figure 17: Kendal Unit 5 NOx Emissions - August 2024

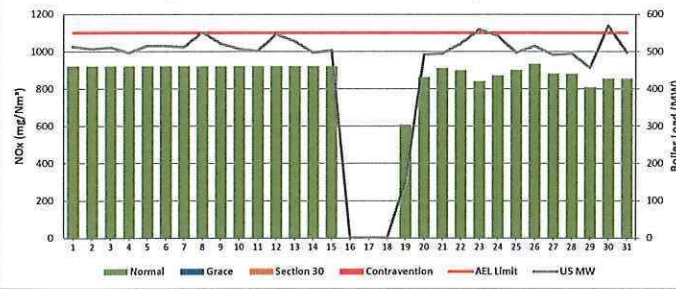
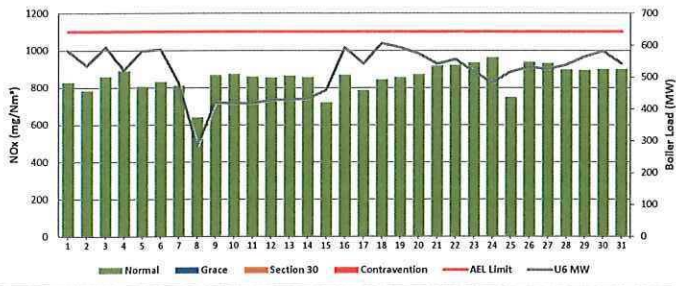


Figure 18: Kendal Unit 6 NOx Emissions - August 2024



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

ADDENDUM TO MONTHLY EMISSIONS REPORT

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

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

$$\eta = 1 - \frac{(\text{Dust Emission From AQR Report Dust Monitor (tons)} \times 100)}{(\text{Coal Burnt (tons)} \times \% \text{ Ash Content} \times 80\%)}$$

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 24 hours

The formula is as follows:

$$= (1 - (\text{count hours above 99.325\%/24 hours})) \times 100$$

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 2 and 5 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 Unit 2,3,5 and 6 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 values 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 surrogation values.
- Unit 1
Findings: field 22 transformer that was faulty, DHP that was running with the first knife gates closed on PCP 11-24. The DHP was also standing due to compartment high levels.
Resolution: Plant repaired
- Unit 2
Findings: the DHP that was standing will all kg's closed due to compartments high level. PCP 11 to 24 kg1&2 are still all shut. Field 44 transformer faulty.
Resolution: Plant repaired.
- Unit 3
Findings: Unit was compliant
- Unit 4
Findings: High PM emissions can be attributed to the SO3 plant that was off due to Back End Temperature Low, field 21 and 43 secondary voltage that was low, field 17 and 26 was faulty, DHP stopped due to ash spillages, unit was on Fuel oil support, SO3 was on hold mode due to no sulphur flow, DHP stream 2 second collecting conveyor tripped and RH precip fields 32,33,35 & 43 discharge emitter fault.
Resolution: Plant repaired.
- Unit 5
Findings: High PM emissions can be attributed unit on Light up - Cold Start, unit Fuel oil support and DHP was standing with all knife gates shut.
Resolution: Plant repaired.
- Unit 6
Findings: High PM emissions can be attributed to unit on Fuel oil support, the SO3 plant that was on hold mode due to low steam temperature, Field 16, 17, 26 27 DC Voltage was low, Precip 12 - 24 was not available and SO3 lance 8 was not available.
Resolution: Plant repaired.