Eskom

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

Date:
30 April 2024

Enquiries: S Chokoe
Tel +27 13 647 6970

Dear Ms. Nompumelelo Simelane

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

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

The report is late due to the engineering's analysis that the station made on the reports to utilize Deutsch efficiency equation where monitors maxed out to get the surrogation value. The final decision to implement the surrogation exercise was made in February 2024 and the station had to implement the exercise on the April 2023 to March 2024 Air Quality reports.

Compiled by:

Tsakani Holeni
ENVIRONMENTAL SENIOR ADVISOR- KENDAL POWER STATION
Date: 30.04.2024

Supported by:

Solly Chokoe
ENVIRONMENTAL MANAGER- KENDAL POWER STATION
Date: 30.04.2024

Generation Division
(Kendal Power Station)
N12 Balmoral Off Ramp, Emalahleni
Private Bag x7272, Emalahlani 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 JANUARY 2024

Verified by:

Jacob Zwane
BOILER ENGINEERING: SENIOR SYSTEM ENGINEER- KENDAL POWER STATION
Date: 30/04/2024

Validated by:

Tendani Rasivhetshele
BOILER ENGINEERING MANAGER-KENDAL POWER STATION
Date: 30/04/2024

Supported by:

Malibongwe Mabizela
ENGINEERING MANAGER-KENDAL POWER STATION
Date: 2024/05/02

Approved by:

Tshepiso Temo
GENERAL MANAGER-KENDAL POWER STATION
Date: 2024/05/08

Eskom

JANUARY 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 Jan-2024
	Coal	Tons	2 260 000	665 958
	Fuel Oil	Tons	5 000	9871.960
Production Rates	Product / By-Product Name	Units	Maximum Production Capacity Permitted	Indicative Production Rate Jan-2024
	Energy	GWh	3 062.304	1 181.675
	Ash	Tons	770 000	233 751.258
	RE Ash	kg/MWh	not specified	1.115

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)	18.400
Sulphur Content	%	<1 (%)	0.760
Ash Content	%	40 (%)	35.100

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-2024	Technology Type	SO_3 Utlization Jan-2024
Unit 1	*ESP + SO_3*	*99.160%*	*SO_3*	*0.0%*
Unit 2	*ESP + SO_3*	*99.339%*	*SO_3*	*0.0%*
Unit 3	*ESP + SO_3*	*Off-line*	*SO_3*	*0.0%*
Unit 4	*ESP + SO_3*	*99.235%*	*SO_3*	*0.0%*
Unit 5	*ESP + SO_3*	*99.405%*	*SO_3*	*0.0%*
Unit 6	*ESP + SO_3*	*Off-line*	*SO_3*	*Off-line*

There is no value for SO3 utilizatiob due to switch failure on the server however Kendal Suphur utilization database will be ready once the new Pi systen have been commitioned.

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

5 MONITOR RELIABILITY (%)

Associated Unit/Stack	PM	SO_2	NO	O_2
Unit 1	*96.4*	*31.3*	*32.5*	*94.2*
Unit 2	*61.2*	*76.3*	*95.4*	*90.1*
Unit 3	*0.0*	*0.0*	*0.0*	*0.0*
Unit 4	*100.0*	*84.7*	*81.7*	*26.7*
Unit 5	*96.2*	*74.9*	*73.1*	*80.8*
Unit 6	*Off*	*Off*	*Off*	*Off*

Note: NOx emissions is measured as NO in PPM. Final NOx value is expressed as total NO_2
Unit 1 Sox ans Nox Monitor was defective, Unit 2 PM Monitor and unit 4 O2 monitor was defective.

6 EMISSION PERFORMANCE

Table 6.1: Monthly tonnages for the month of January 2024

Associated Unit/Stack	PM (tons)	SO_2 (tons)	NO_x (tons)
Unit 1	344.9	2 571	1 151
Unit 2	296.2	2 323	797
Unit 3	0.0	0	0
Unit 4	338.1	1 994	968
Unit 5	338.7	2 873	1 281
Unit 6	Off	Off	Off
SUM	1 317.82	9 760	4 197

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

Associated Unit/Stack	Normal	Grace	Section 30	Contravention	Total Exceedance	Average PM (mg/Nm³)
Unit 1	13	4	0	9	13	194.0
Unit 2	0	2	0	28	30	224.7
Unit 3	0	0	0	0	0	
Unit 4	15	9	0	7	16	337.3
Unit 5	10	10	0	0	10	183.4
Unit 6	Off	Off	Off	Off	Off	Off
SUM	38	25	0	44	69	

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

Associated Unit/Stack	Normal	Grace	Section 30	Contravention	Total Exceedance	Average SO_2 (mg/Nm³)
Unit 1	31	0	0	0	0	1 445.5
Unit 2	31	0	0	0	0	1 610.9
Unit 3	0	0	0	0	0	
Unit 4	31	0	0	0	0	1 618.8
Unit 5	31	0	0	0	0	1 578.2
Unit 6	Off	Off	Off	Off	Off	Off
SUM	124	0	0	0	0	

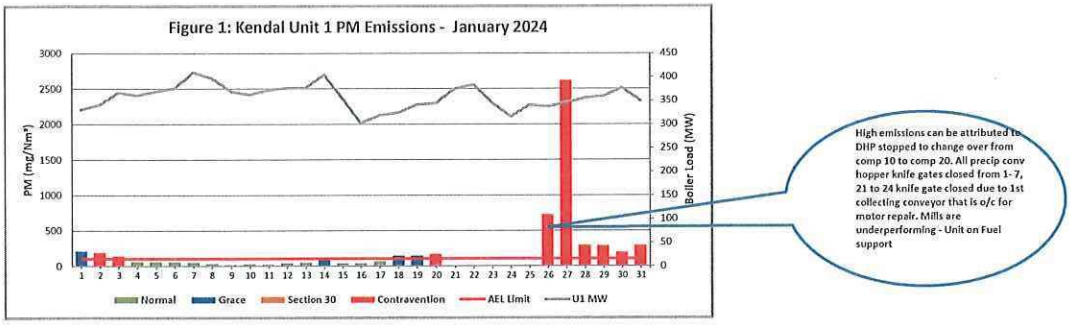
Table 6.4: Operating days in compliance to NOx AEL Limit - January 2024

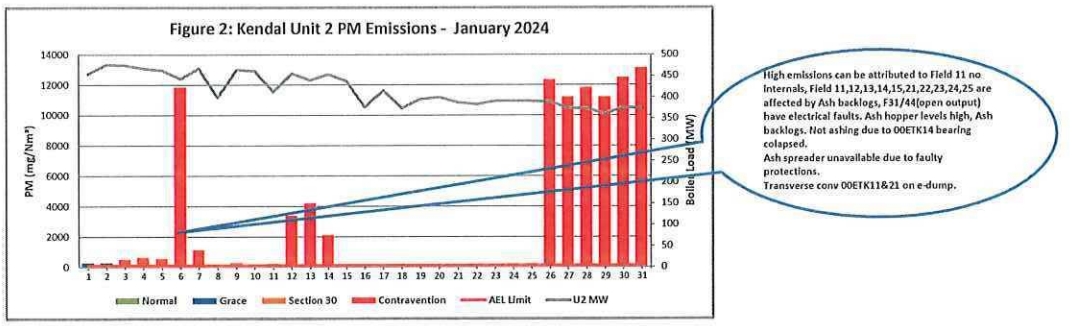
Associated Unit/Stack	Normal	Grace	Section 30	Contravention	Total Exceedance	Average NOx (mg/Nm³)
Unit 1	31	0	0	0	0	647.3
Unit 2	31	0	0	0	0	540.9
Unit 3	0	0	0	0	0	
Unit 4	31	0	0	0	0	784.3
Unit 5	31	0	0	0	0	714.6
Unit 6	Off	Off	Off	Off	Off	Off
SUM	124	0	0	0	0	

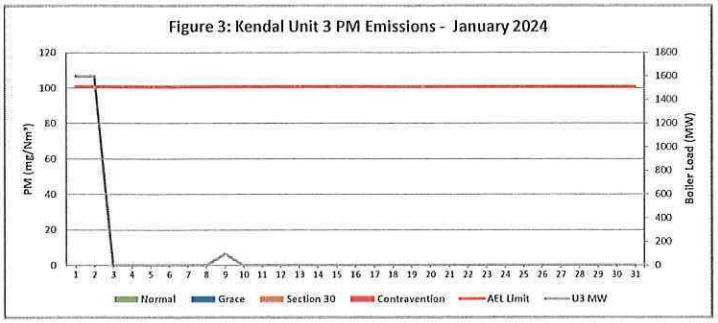
Note: NOx emissions is measured as NO in PPM. Final NOx value is expressed as total NO_2

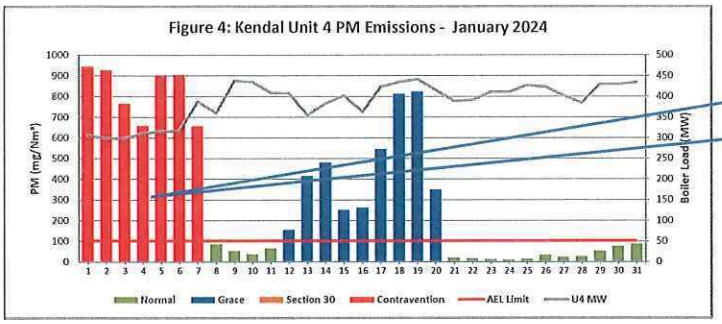
Table 6.5: Legend Description

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

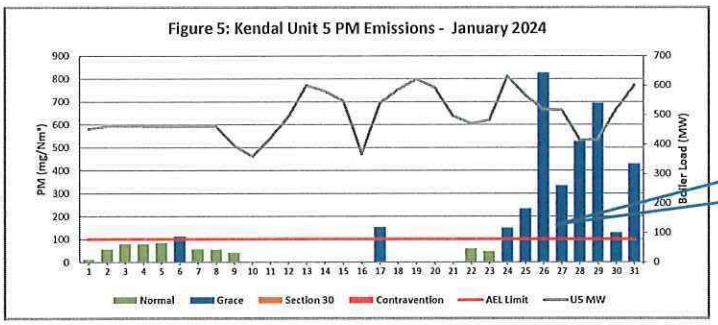




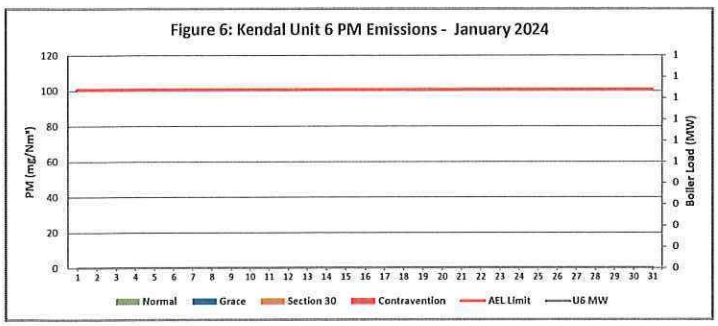




High PM emissions can be attributed to Stream 1 O\C
High ash backlogs
LH draught group that was off
DHP tripped - Stream 2 tripped on bucket elevator speed switch fault.
SO3plant was off, LH google flange was removed.



High PM emissions can be attributed to DHP standing with all knife gate shut. 2nd collector tripped due to gearbox failure.



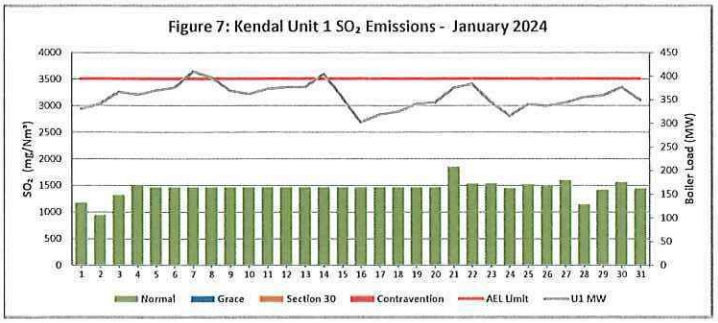


Figure 7: Kendal Unit 1 SO_2 Emissions - January 2024
SO_2 (mg/Nm³)
Boiler Load (MW)
Normal
Grace
Section 30
Contravention
AEL Limit
U1 MW

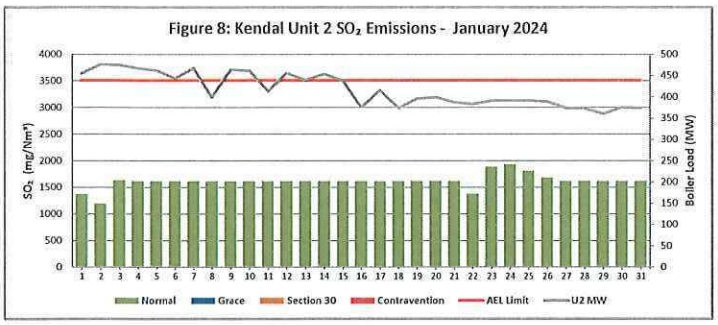


Figure 8: Kendal Unit 2 SO_2 Emissions - January 2024
SO_2 (mg/Nm³)
Boiler Load (MW)
Normal
Grace
Section 30
Contravention
AEL Limit
U2 MW

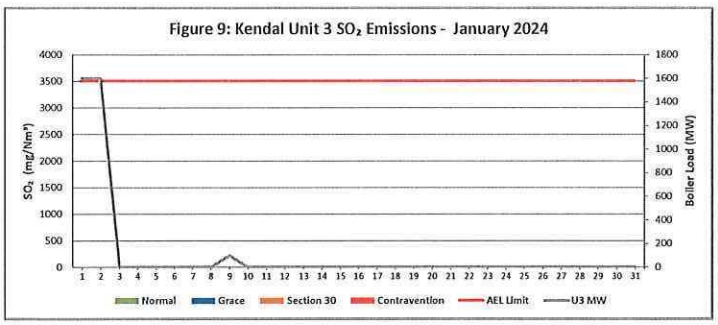


Figure 9: Kendal Unit 3 SO_2 Emissions - January 2024
SO_2 (mg/Nm³)
Boiler Load (MW)
Normal
Grace
Section 30
Contravention
AEL Limit
U3 MW

Figure 10: Kendal Unit 4 SO_2 Emissions - January 2024

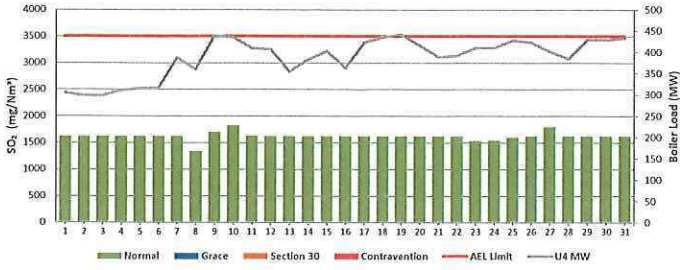


Figure 11: Kendal Unit 5 SO_2 Emissions - January 2024

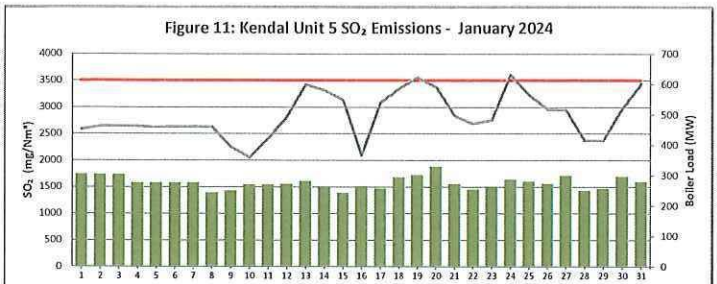


Figure 12: Kendal Unit 6 SO_2 Emissions - January 2024

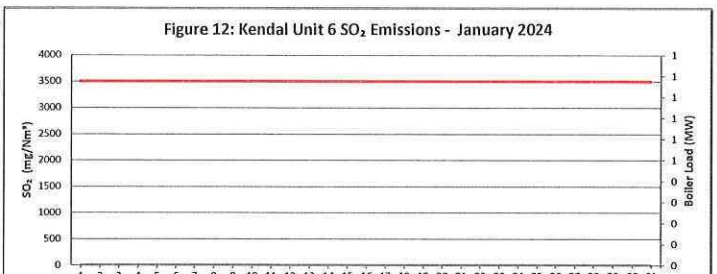


Figure 13: Kendal Unit 1 NOx Emissions - January 2024

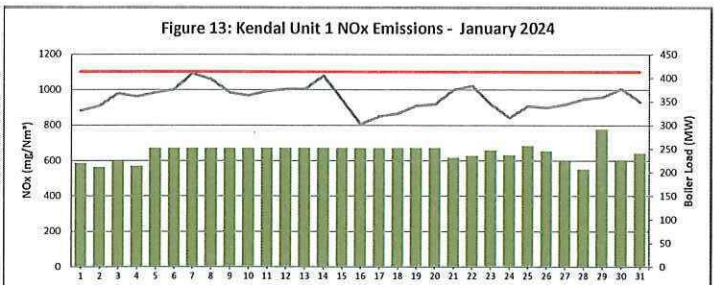


Figure 14: Kendal Unit 2 NOx Emissions - January 2024

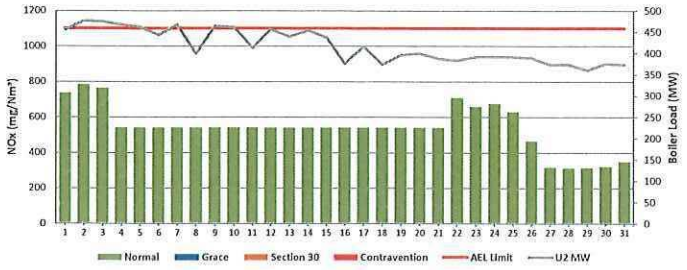


Figure 15: Kendal Unit 3 NOx Emissions - January 2024

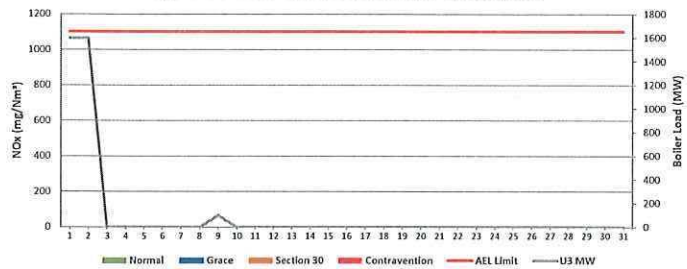


Figure 16: Kendal Unit 4 NOx Emissions - January 2024

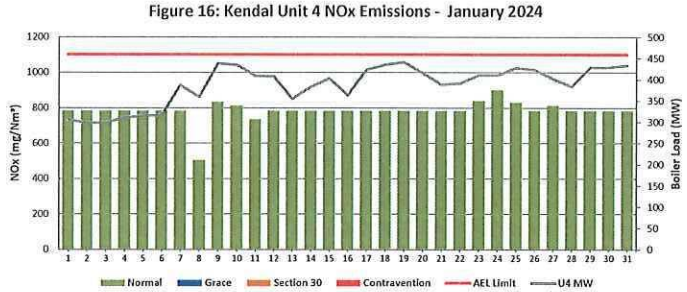


Figure 17: Kendal Unit 5 NOx Emissions - January 2024

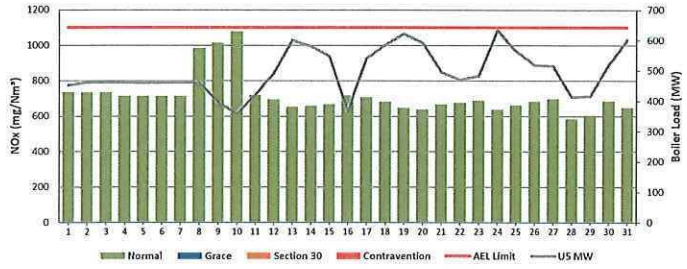
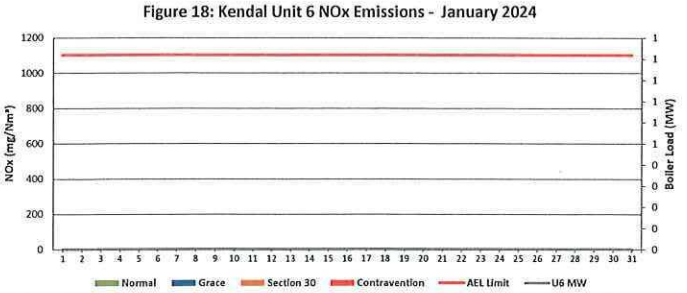


Figure 18: Kendal Unit 6 NOx Emissions - January 2024



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

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

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

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 Unit 1, 2,4,5 &6 due to defective CEMS monitors and velocity correction factors were set M=1 and C=0
- Unit 5 Monitor now using the new monitor correlation. New correlation factors were implemeted and backfitted to the date of monitor installation.
- Unit 1 and 2 monitors maxed out, meaning the emissions were higher than what the monitor was correlated for. In which case we use surrogate values.
- Please note that the reported figures in tonnage calculation are the figures after the station used the maxing out PM monitor quantification exercise which is the use of "surrogate values" on days when the monitor maxed out. The following are the days when the monitor was maxing out. Unit 1 on the 27th, Unit 2 on the 1st to 9th, 12th to 14th and 26th to 31st.

- Unit 1

-Findings: The high emissions can be attributed to the DHP that stopped to change over from comp 10 to comp 20.
- All precip conv hopper knife gates were closed from 1- 7 and also due to 21 to 24 knife gates that closed due to 1st collecting conveyor that was o/c for motor repair.
- Mills are underperforming - Unit was on Fuel support
- Ash backlogs on PC13,23,24,
- Resolution: Plant repaired

- Unit 2

- Findings: The high emissions can be attributed to Field 11 no internals.
- Field 11,12,13,14,15,21,22,23,24,25 were affected by Ash backlogs
- F31/44 (open output) had electrical faults.
- Ash hopper levels were high.
- Ash backlogs. Not ashing due to 00ETK14 bearing that collapsed.
- Ash spreader unavailable due to faulty protections.
- Transverse conv 00ETK11&21 on e-dump.
- Resolution: Plant repaired.

- Unit 3 is on outage.

- Unit 4

Findings: High PM emissions can be attributed to Stream 1 O\C, High ash backlogs, LH draught group was off
DHP tripped - and Stream 2 tripped on bucket elevator speed switch fault. SO3plant was off, LH google flange was removed.
- Resolution: Plant repaired.

- Unit 5
- Findings: High PM emissions can be attributed to DHP standing with all knife gates shut. 2nd collector tripped due to gearbox failure.
- Resolution: Plant repaired.

- Unit 6 was on outage