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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 MAY 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 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

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

Verified by:



Jacob Zwane

BOILER ENGINEERING: SENIOR SYSTEM ENGINEER- KENDAL POWER STATION

Date: 11/03/2025

Validated by:

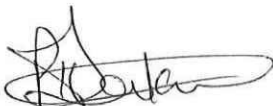


Tendani Rasivhetshela

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: 17/03/2025



MAY 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 May-2024
	Coal	Tons	2 260 000	863 238
	Fuel Oil	Tons	5 000	9695 250
Production Rates	Product / By-Product Name	Units	Maximum Production Capacity Permitted	Indicative Production Rate May-2024
	Energy	GWh	3 062 304	1 466 868
	Ash	Tons	770 660	280 811 321
	RE Ash	kg/MWh	not specified	1 460

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 (%)	0 860
Ash Content	%	40 (%)	32 530

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 May-2024	Technology Type	SO ₂ Utilization May-2024
Unit 1	ESP + SO ₂	98.715%	SO ₂	54.8%
Unit 2	ESP + SO ₂	98.747%	SO ₂	48.4%
Unit 3	ESP + SO ₂	99.735%	SO ₂	98.8%
Unit 4	ESP + SO ₂	99.743%	SO ₂	80.9%
Unit 5	ESP + SO ₂	97.184%	SO ₂	54.8%
Unit 6	ESP + SO ₂	99.285%	SO ₂	64.5%

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

There is no Sulphur flow value for SO₂ utilization due to switch failure on the server, however DSC signals used for its tripping alarms were used to get its utilization values. Sulphur 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	77.3	100.0	100.0	9.1
Unit 2	86.0	98.5	99.8	99.3
Unit 3	99.7	0.0	99.7	85.0
Unit 4	99.9	99.9	99.6	0.0
Unit 5	47.8	0.0	65.5	0.2
Unit 6	97.3	99.8	99.8	0.0

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 May 2024

Associated Unit/Stack	PM (tons)	SO ₂ (tons)	NO _x (tons)
Unit 1	395.3	2 118	1 091
Unit 2	347.0	1 715	791
Unit 3	131.9	3 236	851
Unit 4	122.3	4 398	1 122
Unit 5	874.3	1 922	749
Unit 6	270.6	2 948	1 416
SUM	2 141.44	16 338	6 021

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

Associated Unit/Stack	Normal	Grace	Section 30	Contraven- tion	Total Exceedance	Average PM (mg/Nm³)
Unit 1	0	0	0	22	22	348.8
Unit 2	8	3	0	6	9	398.9
Unit 3	24	4	0	2	6	75.3
Unit 4	21	5	0	3	8	77.2
Unit 5	3	5	0	15	20	851.6
Unit 6	8	3	0	12	15	220.7
SUM	64	20	0	60	80	

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

Associated Unit/Stack	Normal	Grace	Section 30	Contraven- tion	Total Exceedance	Average SO ₂ (mg/Nm³)
Unit 1	22	0	0	0	0	1 831.4
Unit 2	19	0	0	0	0	1 649.0
Unit 3	30	0	0	0	0	1 870.1
Unit 4	31	0	0	0	0	2 419.9
Unit 5	24	0	0	0	0	1 647.5
Unit 6	26	0	0	0	0	1 816.2
SUM	152	0	0	0	0	

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

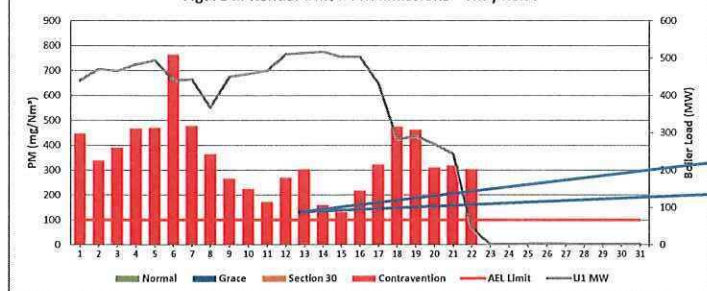
Associated Unit/Stack	Normal	Grace	Section 30	Contravention	Total Exceedance	Average NOx (mg/Nm³)
Unit 1	22	0	0	0	0	895.2
Unit 2	19	0	0	0	0	754.4
Unit 3	30	0	0	0	0	489.3
Unit 4	31	0	0	0	0	611.0
Unit 5	24	0	0	0	0	589.0
Unit 6	26	0	0	0	0	851.2
SUM	152	0	0	0	0	

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

Table 6.5: Legend Description

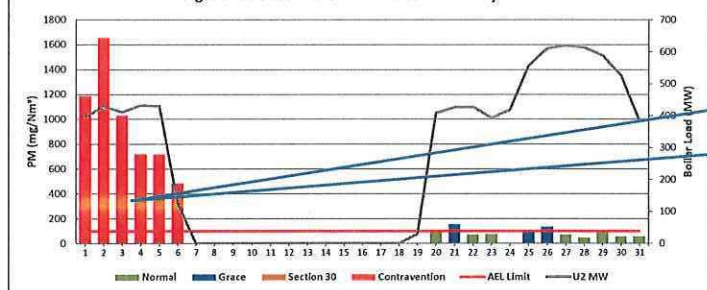
Condition	Colour	Description
Normal	GREEN	Emissions below Emission Limit Value (ELV)
Grace	BLUE	Emissions above the ELV during grace period
Section 30	ORANGE	Emissions above ELV during a NEMA S30 incident
Contravention	RED	Emissions above ELV but outside grace or S30 incident conditions

Figure 1: Kendal Unit 1 PM Emissions - May 2024

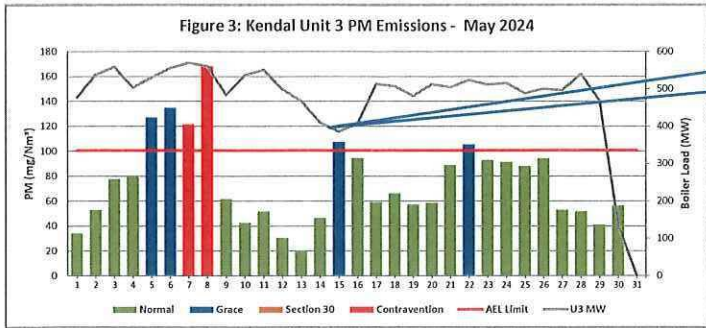


High emissions can be attributed to DHP stream 2 first collecting conveyor gearbox that was removed, Precip fields of/c no 15, 23, 35, 37 and 46 not was not performing, Primary conveyor 14 that choked, unit was on fuel oil support, SO3 plant was on hold mode due to LH back end temperature that was too low. Dust monitor maxed out and PM values were surrogated

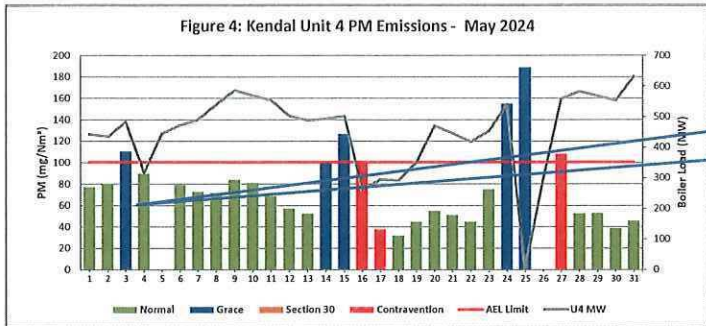
Figure 2: Kendal Unit 2 PM Emissions - May 2024



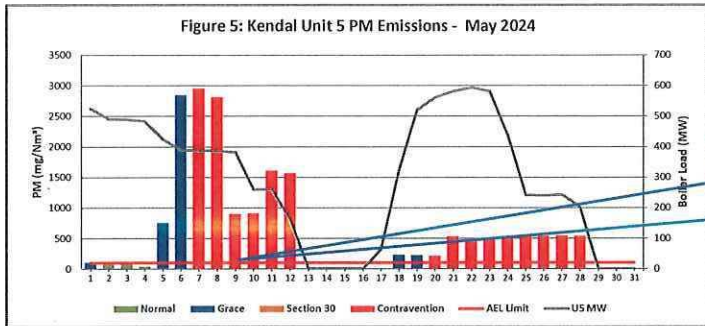
High emissions can be attributed to unit 2 on Fuel oil support, DHP that stopped due compartment high levels, DHP - precip conveyer 11 that tripped, Precip Fields that were not performing, L/H Field 11 - communication bus that was faulty, Field 13 - coolant liquid level was low, R/H Field 31 - communication bus was faulty and Field 34 - Secondary voltage was low. Dust monitor maxed out and PM values were surrogated



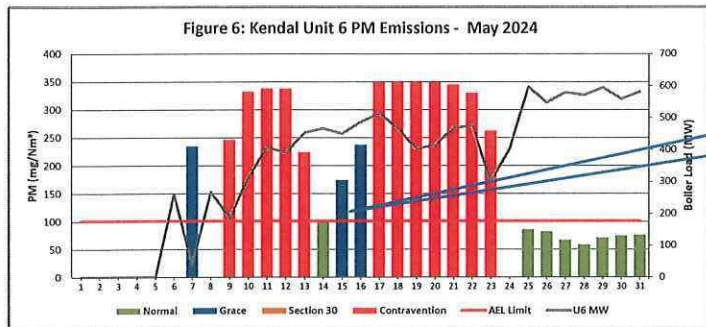
High emissions can be attributed to unit 3 having adopted new correlation curves after data back fitting.



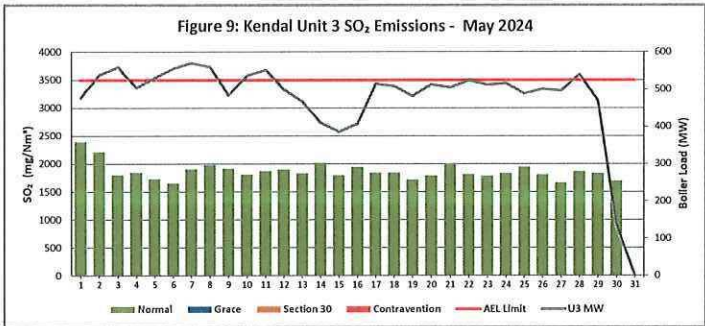
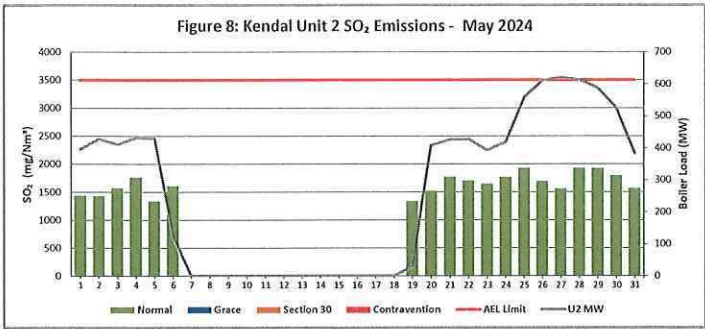
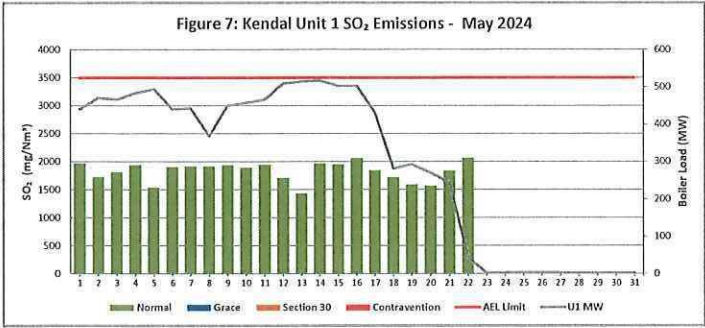
High PM emissions can be attributed to DHP that standing, 1st two knife gates shut on pcp11 to 24 and PCP 23 unit 4 tripped on the process of resetting rapper, Pcp 23 kg 1-6 are closed kg 30% and Pcp 24 kg 1 were closed.

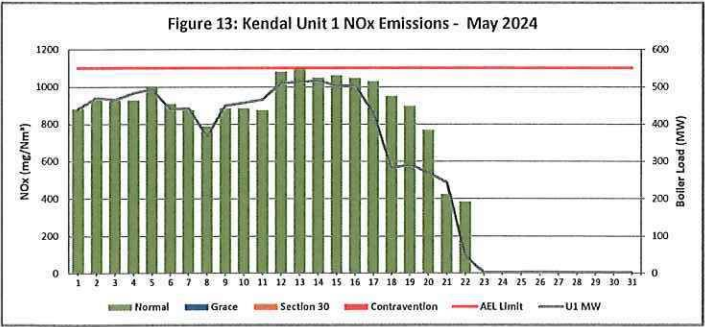
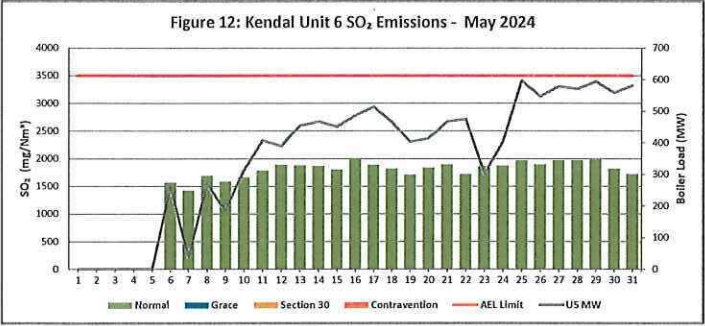
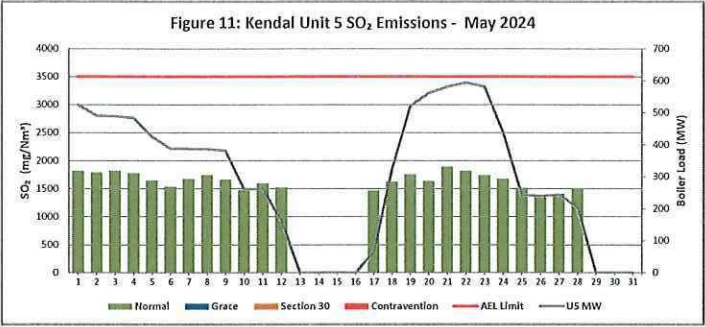
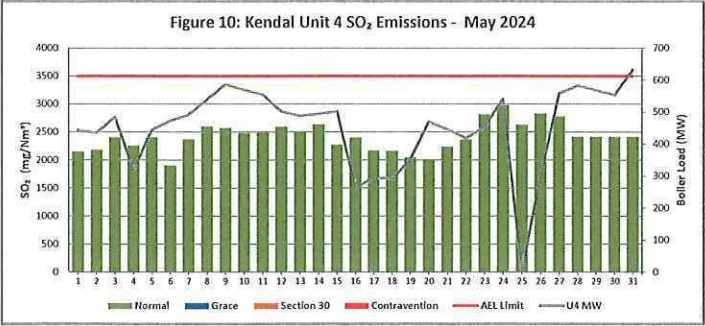


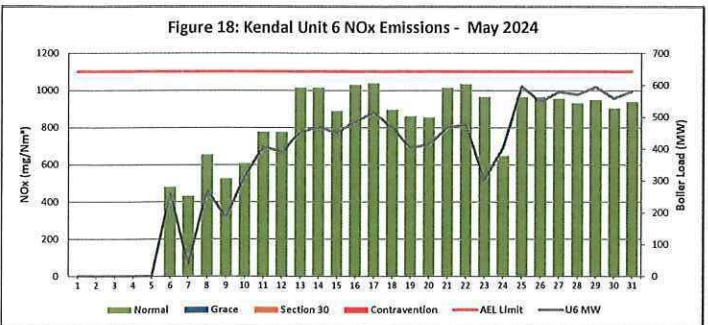
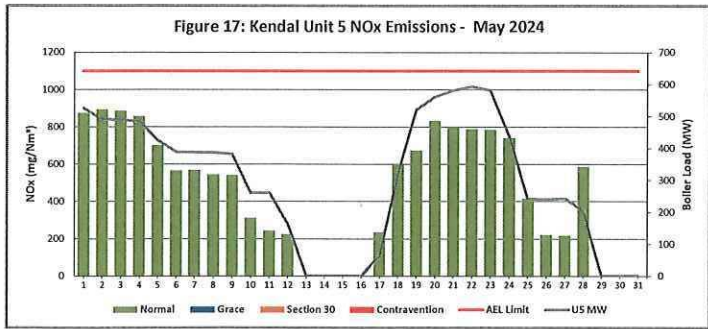
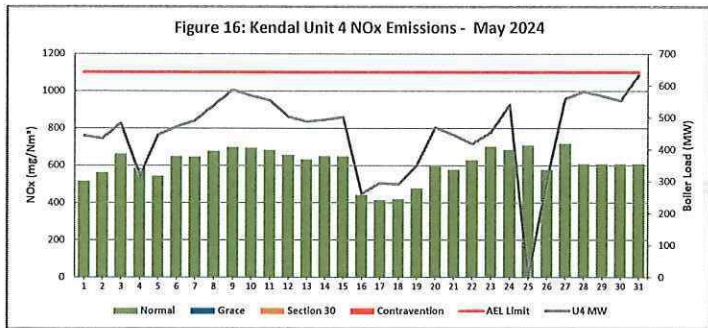
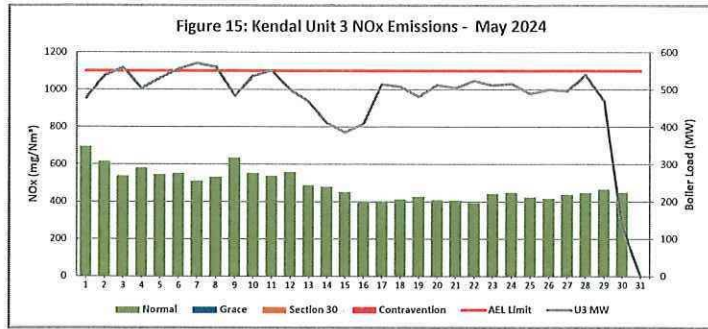
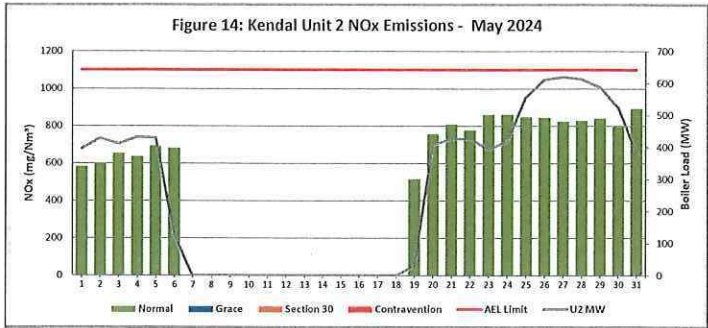
High PM emissions can be attributed to the DHP that stopped due to badly leaking steam 1 bucket elevator, DHP stream 1 2nd collecting precip conveyor was tripping due to overloaded bucket elevator, DHP Stream 1 bucket elevator choked, DHP was off - Str 1 B/Elev couple buckets were missing, drawing max amps, SO3 PLANT was on hold made due to IH back end temps low at 104 degrees celcius, So3 flow at 0kg/h and the unit was on fuel oil support. Dust monitor maxed out and PM values were surrogated



High PM emissions can be attributed to Unit tight up - cold start, Precip conveyor 13 and 21 was also off due to stream 2 chutes being blocked and SO3 plant was also shut for 12 hours on the 25th of May.







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 some units due to defective CEMS monitors and velocity correction factors were set M=1 and C=0
- Unit 1, 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 OM quantification exercise which is the use of "surrogate values" on days when the monitor maxed out.
- Dust monitor for units 1, 2 and 5 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.
- 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: High emissions can be attributed to DHP stream 2 first collecting conveyor gearbox that was removed, Precip fields o/c no 15, 23, 35, 37 and 46 not was not performing, Primary conveyor 14 that choked, unit was on fuel oil support, SO3 plant was on hold mode due to LH back end temperature that was too low.

Dust monitor maxed out and PM values were surrogated

➤ Resolution: Plant repaired

➤ Unit 2

Findings: High emissions can be attributed to unit 2 on Fuel oil support, DHP that stopped due compartment high levels, DHP - precip conveyor 11 that tripped, Precip Fields that were not performing, L/H Field 11 - communication bus that was faulty, Field 13 - coolant liquid level was low, R/H Field 31 - communication bus was faulty and Field 34 - Secondary voltage was low.

Dust monitor maxed out and PM values were surrogated

➤ Resolution: Plant repaired.

➤ Unit 3

Findings: High emissions can be attributed to unit 3 having adopted new correlation curves and data back fitting was done.

Resolution: Plant repaired

➤ Unit 4

Findings: High PM emissions can be attributed to DHP that standing, 1st two knife gates shut on pcp11 to 24 and PCP 23 unit 4 tripped on the process of resetting rapper, Pcp 23 kg kg 1-6 are closed kg 30% and Pcp 24 kg 1 were closed.

Dust monitor maxed out and PM values were surrogated

Resolution: Plant Repaired

➤ Unit 5

Findings: High PM emissions can be attributed to the DHP that stopped due to badly leaking steam 1 bucket elevator, DHP stream 1 2nd collecting precip conveyor was tripping due to overloaded bucket elevator, DHP Stream 1 bucket elevator choked, DHP was off - Str 1 B/Elev couple buckets were missing, drawing max amps, SO3 PLANT was on hold mode due to LH back end temps low at 104 degrees celcius, So3 flow at 0kg/h and the unit was on Fuel oil support. Dust monitor maxed out and PM values were surrogated.

Resolution: Plant repaired.

➤ Unit 6

Findings: High PM emissions can be attributed to Unit light up - cold start, Precip conveyor 13 and 21 was also off due to stream 2 chutes being blocked and So3 was also shut for 12 hours on the 25th of May.

➤ Resolution: Plant repaired.