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 OCTOBER 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: 10/05/2025

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

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Date: 17/03/2025

Eskom

OCTOBER 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 Oct-2024
	Coal	Tons	2 260 000	1 015 729
	Fuel Oil	Tons	5 000	6947.220
Production Rates	Product / By-Product Name	Units	Maximum Production Capacity Permitted	Indicative Production Rate Oct-2024
	Energy	GWh	3 062.304	1 626.138
	Ash	Tons	770 000	343 519.548
	RE Ash	kg/MWh	not specified	2.401

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)	18.010
Sulphur Content	%	<1 (%)	0.760
Ash Content	%	40 (%)	33.820

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 Oct-2024	Technology Type	SO_3 Utilization Oct-2024
Unit 1	$ESP + SO_3$	99.100%	SO_3	93.5%
Unit 2	$ESP + SO_3$	99.783%	SO_3	67.7%
Unit 3	$ESP + SO_3$	99.691%	SO_3	93.5%
Unit 4	$ESP + SO_3$	99.806%	SO_3	83.9%
Unit 5	$ESP + SO_3$	94.512%	SO_3	77.4%
Unit 6	$ESP + SO_3$	97.855%	SO_3	77.4%

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	87.6	100.0	100.0	0.0
Unit 2	100.0	100.0	100.0	99.9
Unit 3	80.6	0.0	100.0	72.2
Unit 4	100.0	0.0	100.0	0.0
Unit 5	63.6	0.0	100.0	100.0
Unit 6	67.7	95.5	95.5	100.0

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 October 2024

Associated Unit/Stack	PM (tons)	SO_2 (tons)	NO_x (tons)
Unit 1	447.0	2 900	1 638
Unit 2	70.3	1 713	924
Unit 3	192.5	2 972	1 220
Unit 4	91.1	2 688	1 321
Unit 5	2 150.6	2 018	899
Unit 6	953.5	3 072	1 589
SUM	3 905.03	15 363	7 592

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

Associated Unit/Stack	Normal	Grace	Section 30	Contravention	Total Exceedance	Average PM (mg/Nm³)
Unit 1	3	2	0	26	28	255.1
Unit 2	19	3	0	1	4	74.2
Unit 3	15	11	0	3	14	103.9
Unit 4	24	2	0	0	2	61.5
Unit 5	3	4	0	17	21	1 842.0
Unit 6	3	12	0	10	22	1 068.3
SUM	67	34	0	57	91	

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

Associated Unit/Stack	Normal	Grace	Section 30	Contravention	Total Exceedance	Average SO_2 (mg/Nm³)
Unit 1	31	0	0	0	0	1 651.3
Unit 2	26	0	0	0	0	1 467.1
Unit 3	31	0	0	0	0	1 492.0
Unit 4	27	0	0	0	0	1 657.7
Unit 5	25	0	0	0	0	1 549.9
Unit 6	27	0	0	0	0	1 769.5
SUM	167	0	0	0	0	

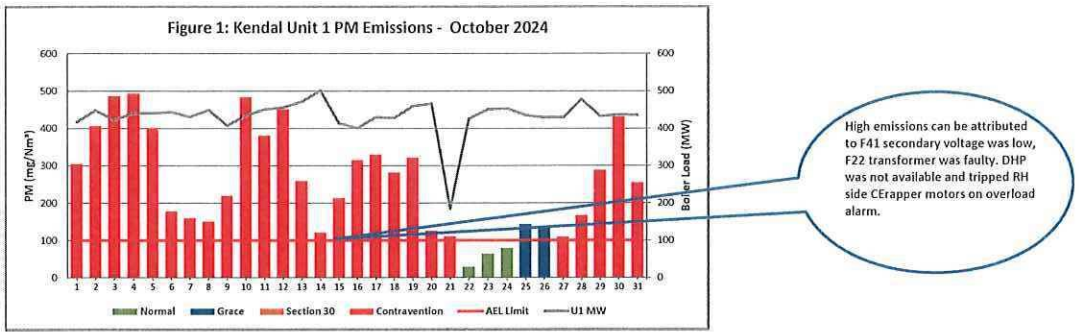
Table 6.4: Operating days in compliance to NOx AEL Limit - October 2024

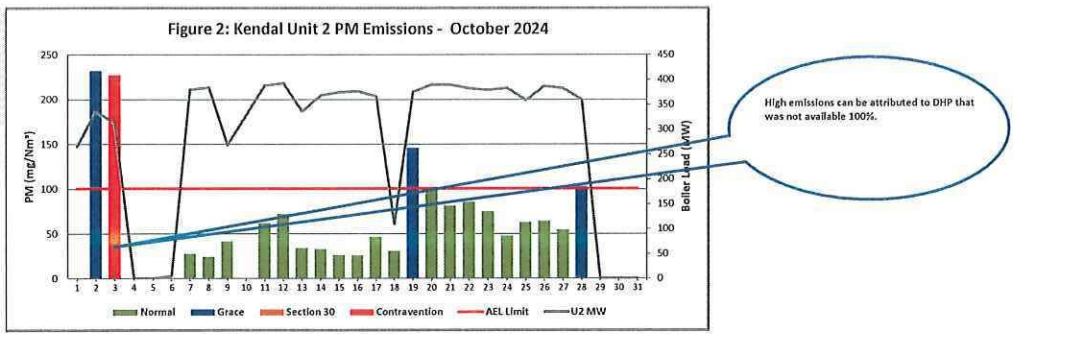
Associated Unit/Stack	Normal	Grace	Section 30	Contravention	Total Exceedance	Average NOx (mg/Nm³)
Unit 1	31	0	0	0	0	930.1
Unit 2	26	0	0	0	0	769.5
Unit 3	31	0	0	0	0	612.1
Unit 4	27	0	0	0	0	801.0
Unit 5	25	0	0	0	0	669.0
Unit 6	27	0	0	0	0	903.3
SUM	167	0	0	0	0	

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





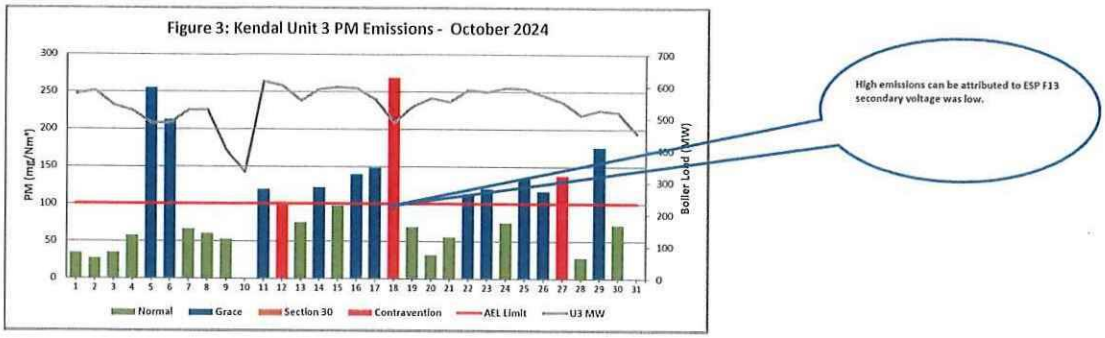


Figure 3: Kendal Unit 3 PM Emissions - October 2024
PM (mg/Nm³)
Boiler Load (MW)
Normal
Grace
Section 30
Contravention
AEL Limit
U3 MW
High emissions can be attributed to ESP F13 secondary voltage was low.

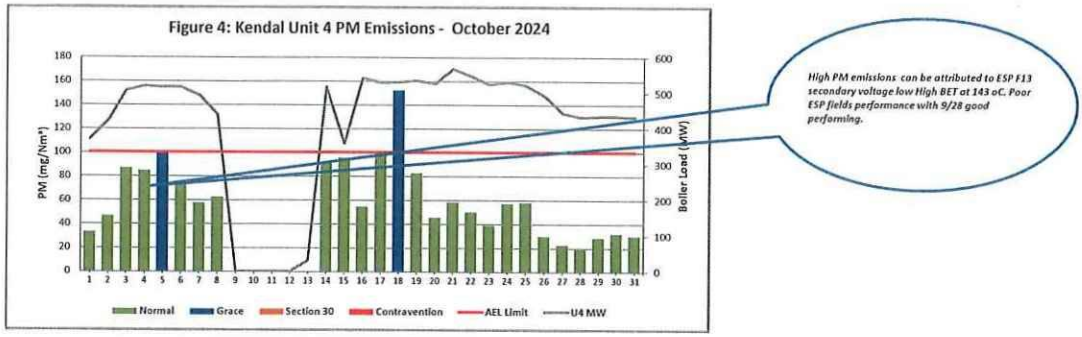


Figure 4: Kendal Unit 4 PM Emissions - October 2024
PM (mg/Nm³)
Boiler Load (MW)
Normal
Grace
Section 30
Contravention
AEL Limit
U4 MW
High PM emissions can be attributed to ESP F13 secondary voltage low High BET at 143 oC. Poor ESP fields performance with 9/28 good performing.

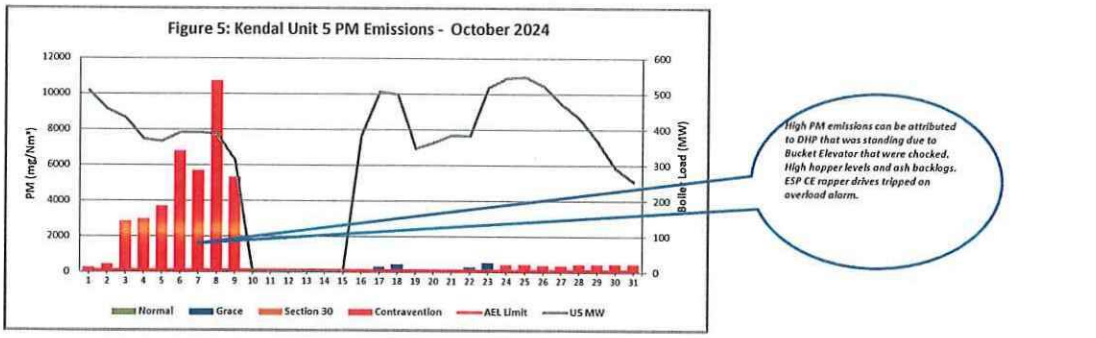


Figure 5: Kendal Unit 5 PM Emissions - October 2024
PM (mg/Nm³)
Boiler Load (MW)
Normal
Grace
Section 30
Contravention
AEL Limit
U5 MW
High PM emissions can be attributed to DHP that was standing due to Bucket Elevator that were chocked. High hopper levels and ash backlogs. ESP CE rapper drives tripped on overload alarm.

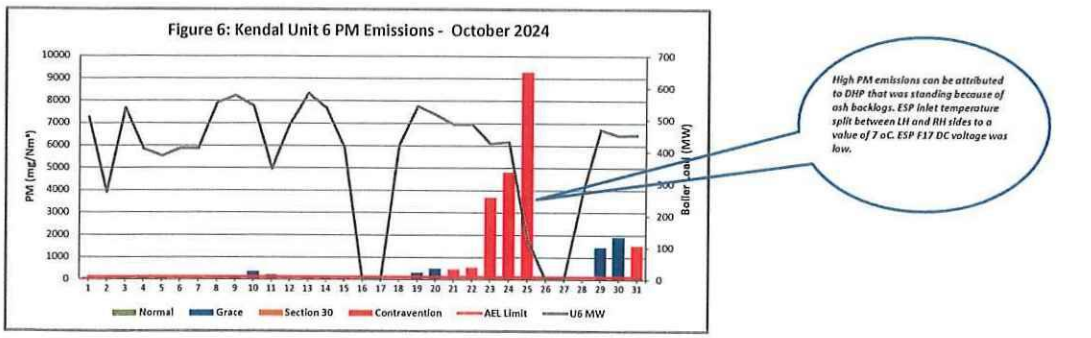


Figure 6: Kendal Unit 6 PM Emissions - October 2024
PM (mg/Nm³)
Boiler Load (MW)
Normal
Grace
Section 30
Contravention
AEL Limit
U6 MW
High PM emissions can be attributed to DHP that was standing because of ash backlogs. ESP inlet temperature split between LH and RH sides to a value of 7 oC. ESP F17 DC voltage was low.

Figure 7: Kendal Unit 1 SO_2 Emissions - October 2024

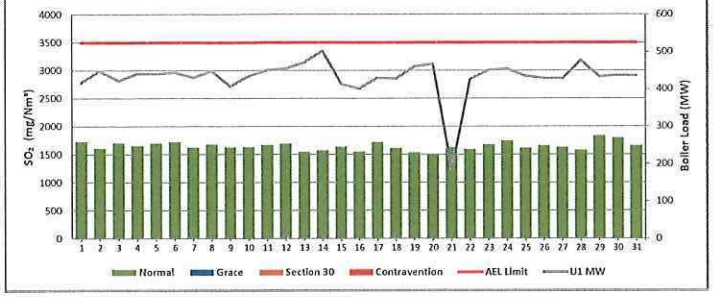


Figure 8: Kendal Unit 2 SO_2 Emissions - October 2024

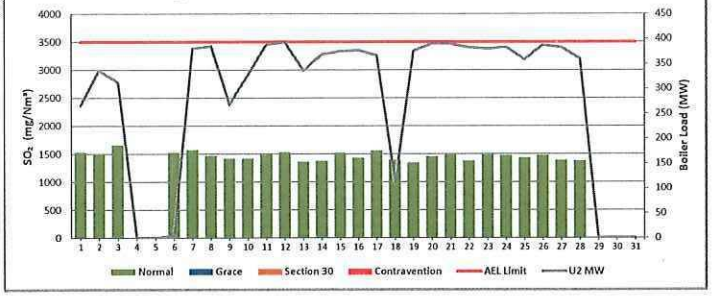


Figure 9: Kendal Unit 3 SO_2 Emissions - October 2024

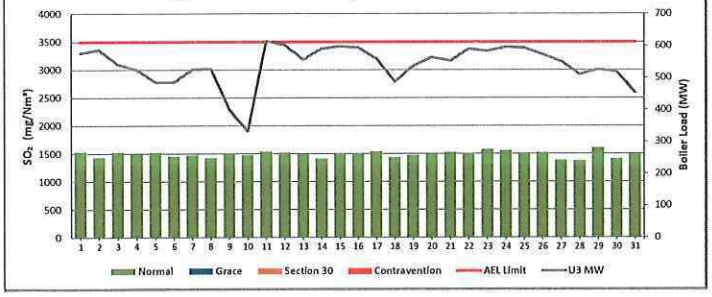


Figure 10: Kendal Unit 4 SO_2 Emissions - October 2024

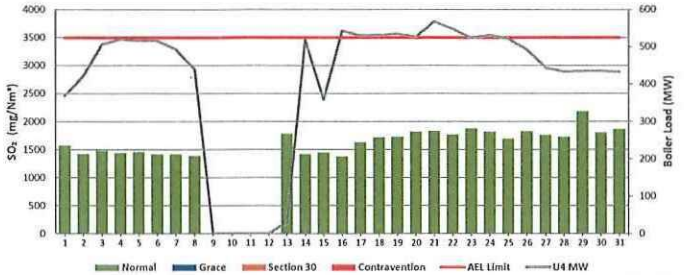


Figure 11: Kendal Unit 5 SO_2 Emissions - October 2024

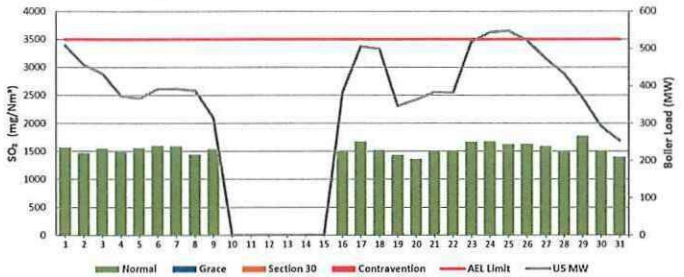


Figure 12: Kendal Unit 6 SO_2 Emissions - October 2024

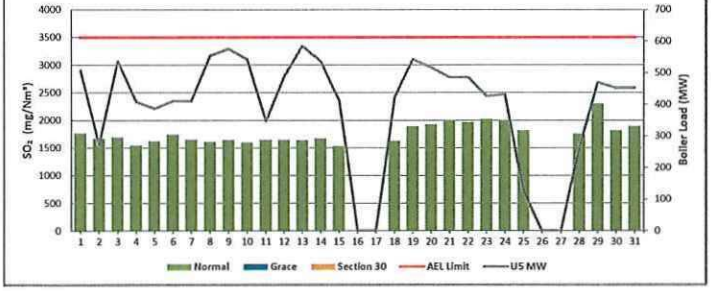


Figure 13: Kendal Unit 1 NOx Emissions - October 2024

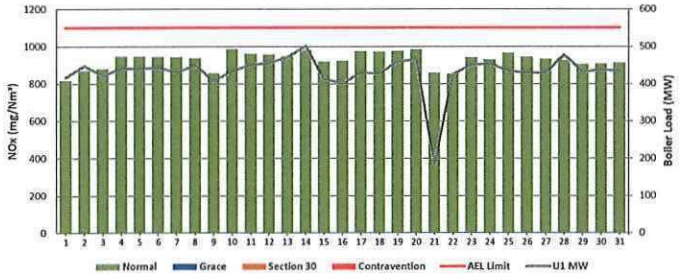


Figure 14: Kendal Unit 2 NOx Emissions - October 2024

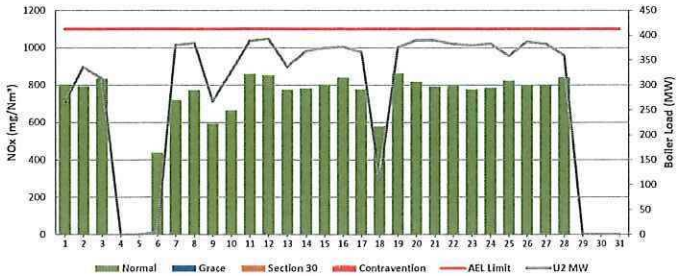


Figure 15: Kendal Unit 3 NOx Emissions - October 2024

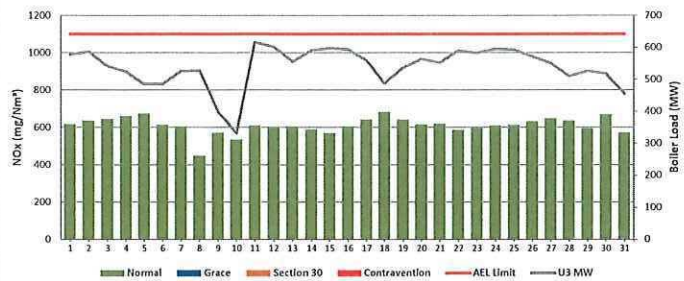


Figure 16: Kendal Unit 4 NOx Emissions - October 2024

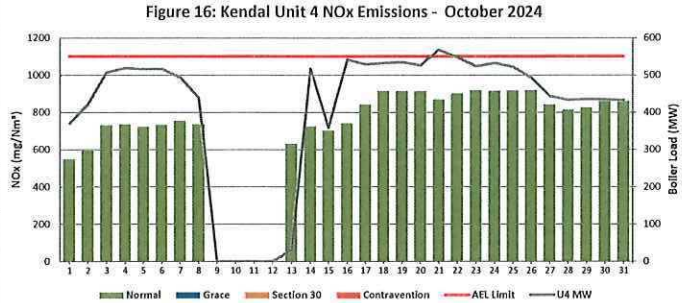


Figure 17: Kendal Unit 5 NOx Emissions - October 2024

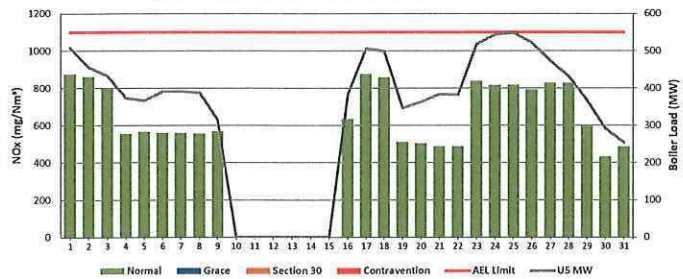
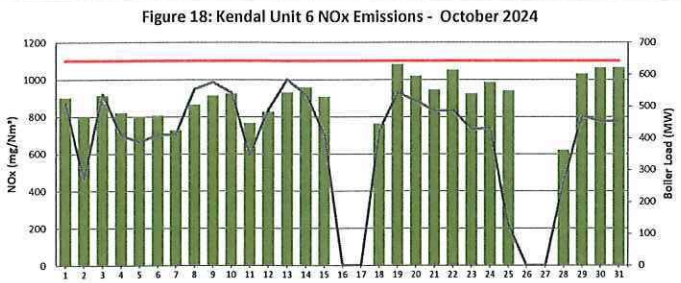


Figure 18: Kendal Unit 6 NOx Emissions - October 2024



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 Units due to defective CEMS monitors and velocity correction factors were set M=1 and C=0
- Unit 1,5 and 56maxed 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 usd 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: F41 secondary voltage was low, F22 transformer was faulty. DHP was not available and tripped RH side CErapper motors on overload alarm.
- Resolution: Plant repaired

- Unit 2

Findings: DHP that was not available 100%.
Resolution: Plant repaired.

- Unit 3
- Findings: ESP F13 secondary voltage was low.Unit was compliant
- Resolution: Plant was repaired

- Unit 4
- Findings: ESP F13 secondary voltage low High BET at 143 oC. Poor ESP fields performance with 9/28 good performing.
- Resolution: Plant repaired.

- Unit 5
- Findings: Bucket Elevator that were chocked. High hopper levels and ash backlogs. ESP CE rapper drivers tripped on overload alarm.
- Resolution: Plant repaired.

- Unit 6
- Findings: DHP that was standing because of ash backlogs. ESP inlet temperature split between LH and RH sides to a value of 7 oC. ESP F17 DC volatge was low.
- Resolution: Plant repaired.