Eskom

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

Date
18 April 2023

Enquiries S Chokoe
Tel +27 13 647 6970

Dear Ms Nompumelelo Simelane

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

KENDAL POWER STATION'S EMISSIONS REPORT FOR THE MONTH OF FEBRUARY 2023.

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:

Irene Motswenyane
ENVIRONMENTAL OFFICER- KENDAL POWER STATION

Supported by:

Solly Chokoe
ENVIRONMENTAL MANAGER- KENDAL POWER STATION

Generation Division (Cluster 1)
(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 FEBRUARY 2023

Verified by:

Jacob Zwane
BOILER ENGINEERING: SENIOR SYSTEM ENGINEER- KENDAL POWER STATION

Validated by:

p.p
Tendani Rasivhetshele
BOILER ENGINEERING MANAGER-KENDAL POWER STATION

Supported by:

Malibongwe Mabizela
ENGINEERING MANAGER-KENDAL POWER STATION

Approved by:

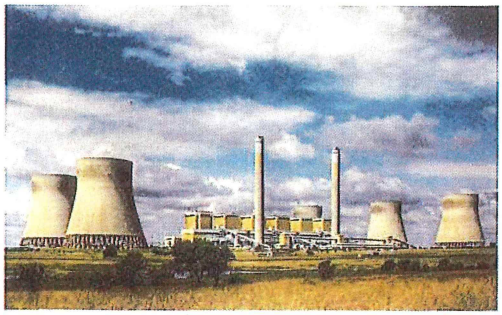
Kobus Steyn
GENERAL MANAGER-KENDAL POWER STATION

Eskom

FEBRUARY 2023

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 Feb-2023
	Coal	Tons	2 269 000	517 704
	Fuel Oil	Tons	5 000	5047.43
Production Rates	Product / By-Product Name	Units	Maximum Production Capacity Permitted	Production Rate Feb-2023
	Energy	GWh(MW)	(3,153,600)4380	947 543.60
	Ash	Tons	770 000	171 049.4
	RE Ash	kg/MWh	not specified	3.810

2 ENERGY SOURCE CHARACTERISTICS

Coal Characteristic	Units	Stipulated Range	Monthly Average Content
Sulphur Content	%	<1 (%)	0.890
Ash Content	%	40 (%)	33.040

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 Feb-2023	Technology Type	SO_2 Utilization Feb-2023
Unit 1	$ESP + SO_3$	95.874%	SO_3	81.4%
Unit 2	$ESP + SO_3$	95.884%	SO_3	70.7%
Unit 3	$ESP + SO_3$	95.300%	SO_3	73.1%
Unit 4	$ESP + SO_3$	Off-line	SO_3	Off-line
Unit 5	$ESP + SO_3$	97.201%	SO_3	45.4%
Unit 6	$ESP + SO_3$	99.120%	SO_3	85.6%

U2,3 and 4 SO3 Utilization is low due to:
SO3 plant on hold mode due to low temp
SO3 plant trip
No sulphur flow

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	21.8	98.9	97.8	94.6
Unit 2	81.9	97.4	77.4	100.0
Unit 3	79.2	0.0	0.0	29.2
Unit 4	Off-line	Off-line	Off-line	Off-line
Unit 5	98.8	100.0	100.0	100.0
Unit 6	100.0	100.0	99.9	100.0

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

Note: Unit 1,2 and 3 dust monitors realiability is low due to monitors maxing out. Unit 3 SO2, Nox and O2 defective monitors,Unit 2 NOx monitor reliability low due to defective monitor.

6 EMISSION PERFORMANCE

Table 6.1: Monthly tonnages for the month of February 2023

Associated Unit/Stack	PM (tons)	SO_2 (tons)	NO_x (tons)
Unit 1	1 314.3	2 410	1 035
Unit 2	1 791.9	2 250	987
Unit 3	84.3	0	0
Unit 4	Off-line	Off-line	Off-line
Unit 5	1 294.6	1 957	789
Unit 6	118.0	791	233
SUM	4 603.05	7 408	3 043

Table 6.2: Operating days in compliance to PM AEL Limit - February 2023

Associated Unit/Stack	Normal	Grace	Section 30	Contravention	Total Exceedance	Average PM (mg/Nm³)
Unit 1	2	4	0	3	7	1 270.8
Unit 2	0	2	0	25	27	1 087.6
Unit 3	0	0	0	2	2	1 025.6
Unit 4	Off-line	Off-line	Off-line	Off-line	Off-line	Off-line
Unit 5	Off-line	0	0	28	28	745.3
Unit 6	0	3	0	11	14	243.2
SUM	2	9	0	69	78	

Table 6.3: Operating days in compliance to SO_2 AEL Limit - February 2023

Associated Unit/Stack	Normal	Grace	Section 30	Contravention	Total Exceedance	Average SO_2 (mg/Nm³)
Unit 1	23	0	0	0	0	1 758.8
Unit 2	28	0	0	0	0	1 453.3
Unit 3	0	0	0	0	0	
Unit 4	Off-line	Off-line	Off-line	Off-line	Off-line	Off-line
Unit 5	28	0	0	0	0	1 659.5
Unit 6	15	0	0	0	0	1 656.9
SUM	94	0	0	0	0	

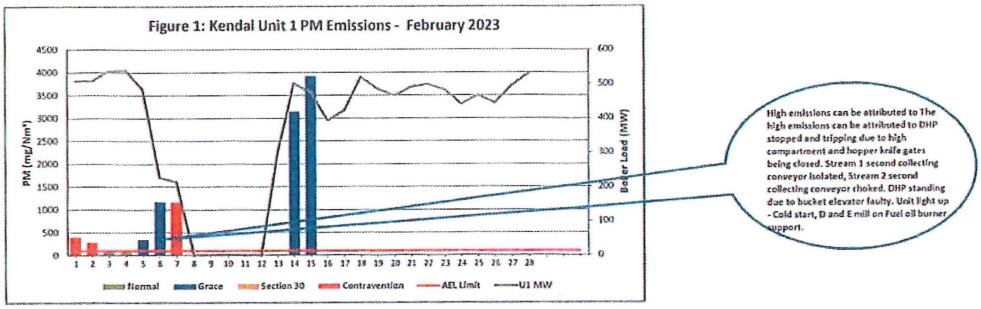
Table 6.4: Operating days in compliance to NOx AEL Limit - February 2023

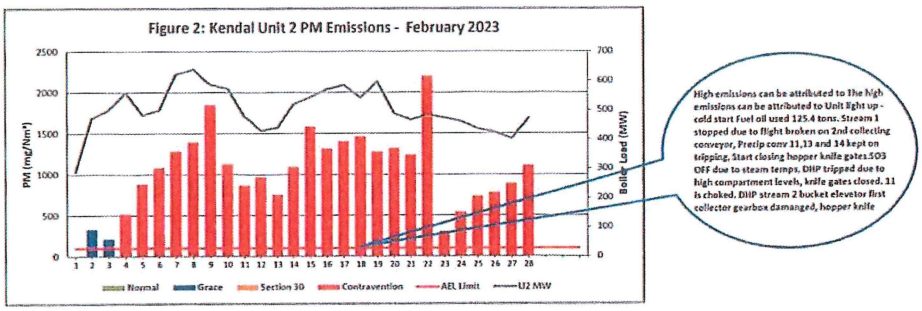
Associated Unit/Stack	Normal	Grace	Section 30	Contravention	Total Exceedance	Average NOx (mg/Nm³)
Unit 1	23	0	0	0	0	738.2
Unit 2	28	0	0	0	0	627.4
Unit 3	0	0	0	0	0	
Unit 4	Off-line	Off-line	Off-line	Off-line	Off-line	Off-line
Unit 5	28	0	0	0	0	669.1
Unit 6	15	0	0	0	0	491.1
SUM	94	0	0	0	0	

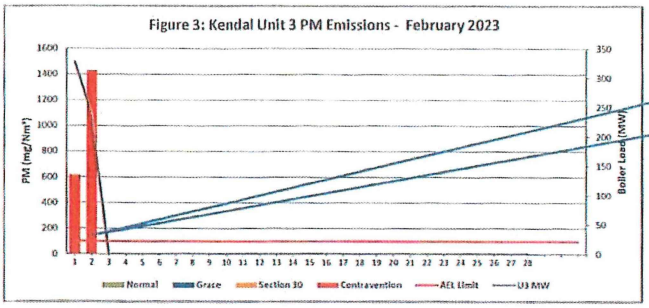
Note: NOx emissions is measured as NO in PPM. Final NOx value is expressed as total NO_2

Table 6.5: Legend Description

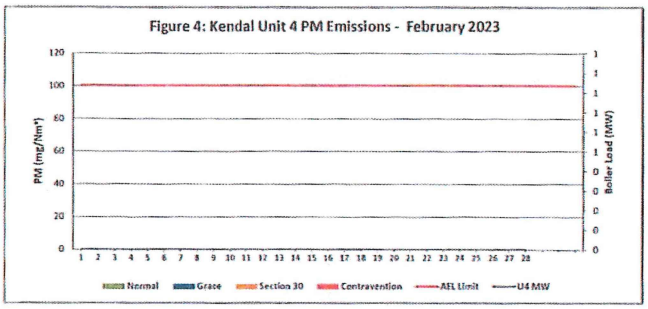
Condition	Colour	Description
Normal		Emissions below Emission Limit Value (ELV)
Grace		Emissions above the ELV during grace period
Section 30		Emissions above ELV during a NEMA S30 incident
Contravention		Emissions above ELV but outside grace or S30 incident conditions

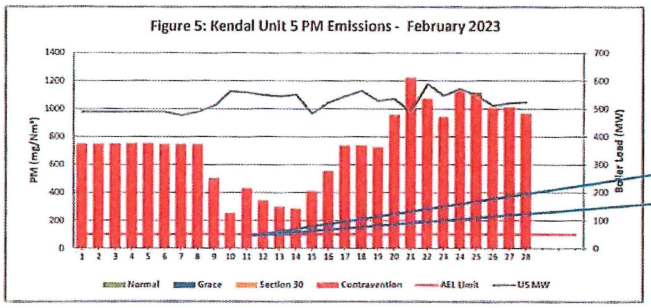






High PM emissions can be attributed to The high PM emissions can be attributed to stream 2 stopped due to second collecting conveyor plumber clock that was damaged. Precip conveyor 22, 24 kept on tripping. SO3 plant on hold due to steam temp low. Precipt 24 fails to start due to ash accumulation on the sprocket.





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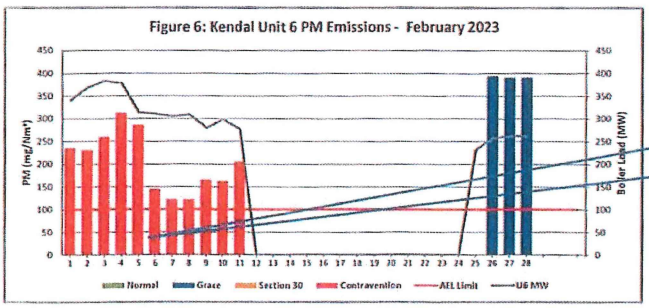


High PM emissions can be attributed to High PM emissions can be attributed to SO3 plant tripped to hold mode due to the aux steam temperature that dropped, Stream 1 bucket elevator triped, SO3 plant tripped to hold mode due to the aux steam temp that dropped.

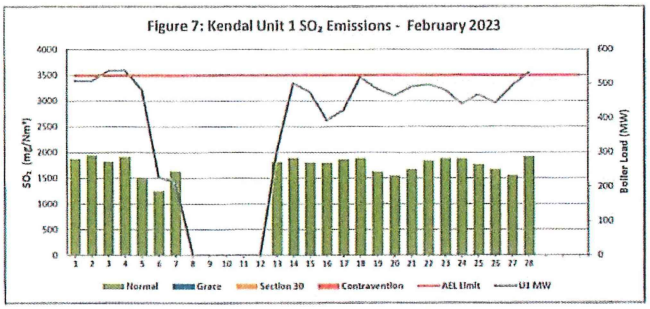


Figure 7: Kendal Unit 1 SO_2 Emissions - February 2023
SO_2 (mg/Nm³)
Boiler Load (MW)
Normal
Grace
Section 30
Contravention
AEL Limit
U1 MW

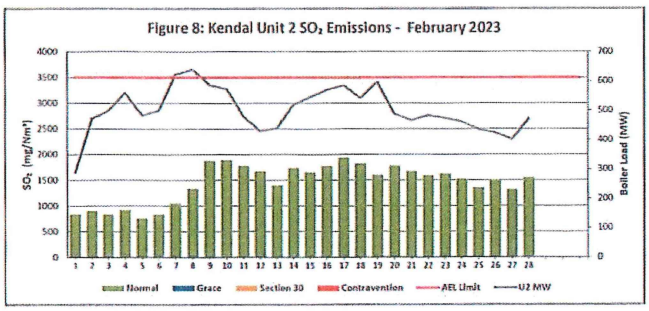


Figure 8: Kendal Unit 2 SO_2 Emissions - February 2023
SO_2 (mg/Nm³)
Boiler Load (MW)
Normal
Grace
Section 30
Contravention
AEL Limit
U2 MW

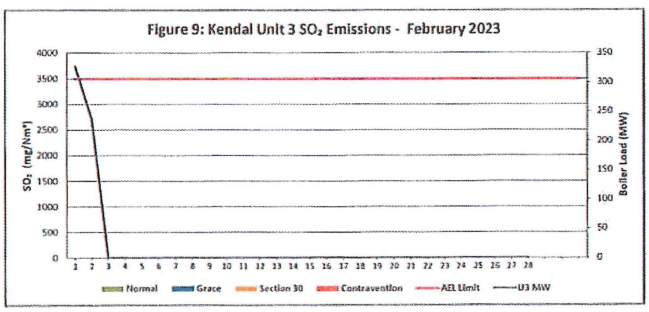


Figure 9: Kendal Unit 3 SO_2 Emissions - February 2023
SO_2 (mg/Nm³)
Boiler Load (MW)
Normal
Grace
Section 30
Contravention
AEL Limit
U3 MW

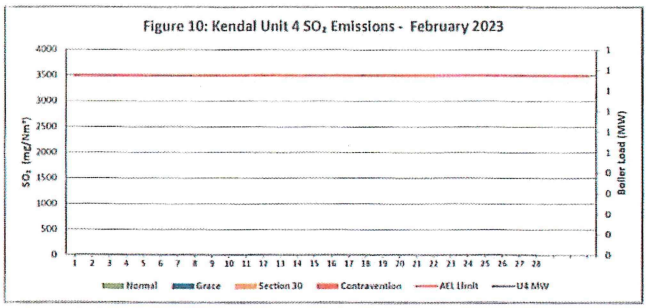


Figure 10: Kendal Unit 4 SO_2 Emissions - February 2023
SO_2 (mg/Nm³)
Boiler Load (MW)
Normal
Grace
Section 30
Contravention
AEL Limit
U4 MW

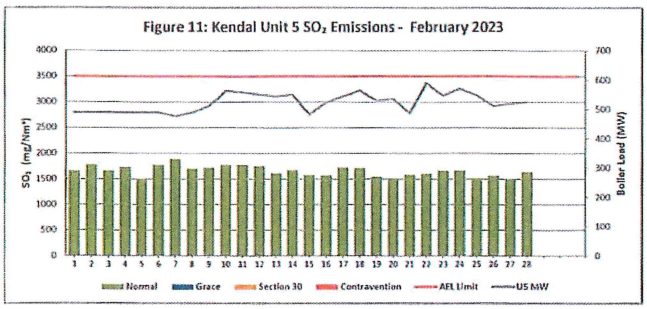


Figure 11: Kendal Unit 5 SO_2 Emissions - February 2023
SO_2 (mg/Nm³)
Boiler Load (MW)
Normal
Grace
Section 30
Contravention
AEL Limit
U5 MW

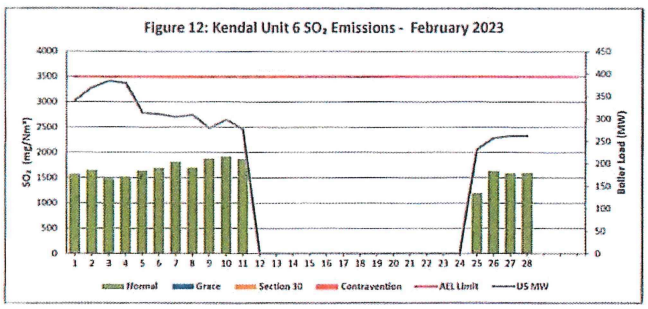


Figure 12: Kendal Unit 6 SO_2 Emissions - February 2023
SO_2 (mg/Nm³)
Boiler Load (MW)
Normal
Grace
Section 30
Contravention
AEL Limit
U5 MW

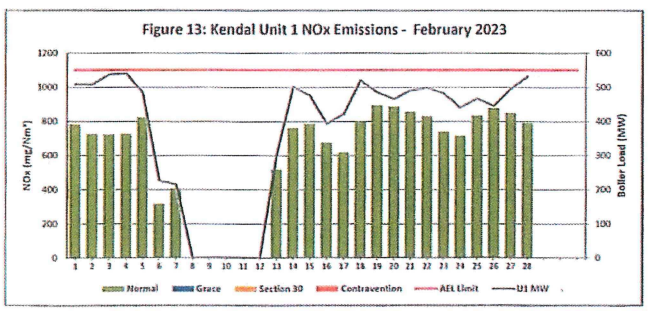


Figure 13: Kendal Unit 1 NOx Emissions - February 2023
NOx (mg/Nm³)
Boiler Load (MW)
Normal
Grace
Section 30
Contravention
AEL Limit
U1 MW

Figure 14: Kendal Unit 2 NOx Emissions - February 2023

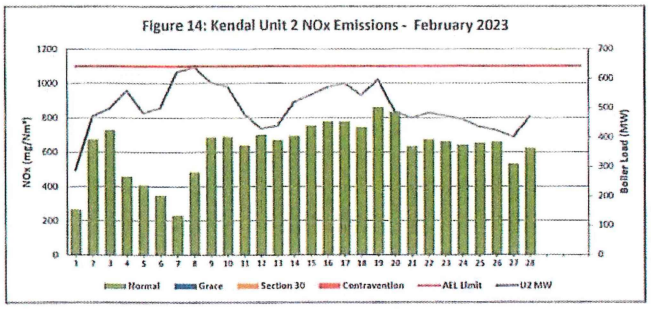


Figure 15: Kendal Unit 3 NOx Emissions - February 2023

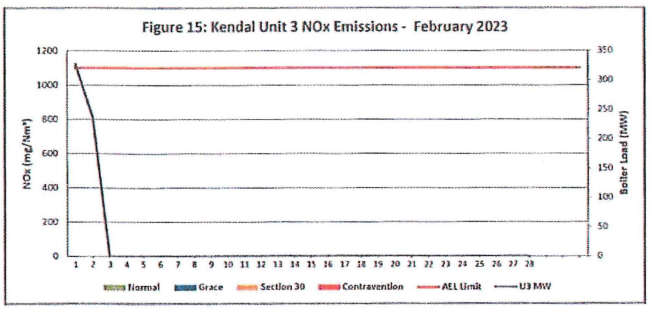


Figure 16: Kendal Unit 4 NOx Emissions - February 2023

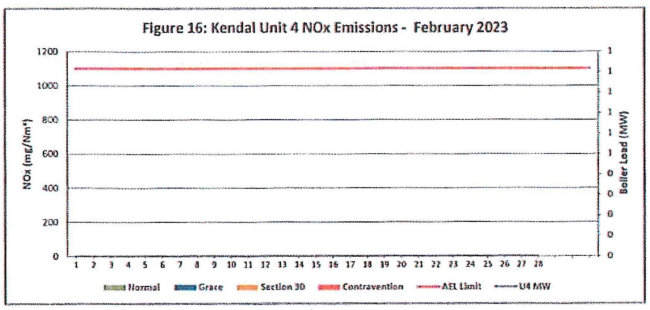


Figure 17: Kendal Unit 5 NOx Emissions - February 2023

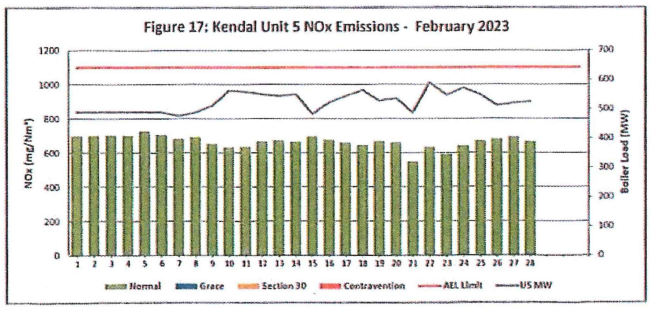
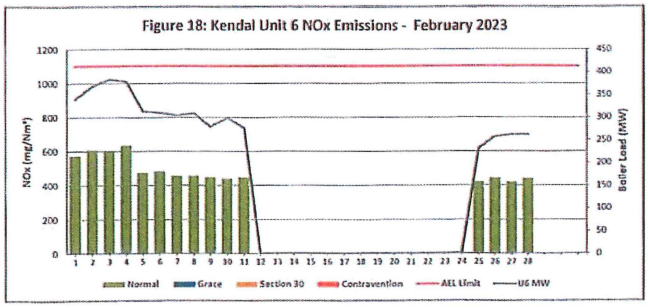


Figure 18: Kendal Unit 6 NOx Emissions - February 2023



7 COMPLAINTS

There were no complaints for this months

Source Code / Name	Root Cause Analysis	Calculation of Impacts / emissions associated	Dispersion modelling 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, 7,4,5 &6 due to defective CEMS monitors and velocity correction factors were set M=1 and C=0
- Unit 5 Monitor still using the old monitor correlation After new correlations are done, new correlation factors will be implemeted and backfitted to the date of monitor installation
- Avarage emissions for Unit 5 CO2 and O2 from the 09th to the 28th were used from the QAL 2 report as the monitors were defective
- Avarage emissions for Unit 2 and 6 CO2 and O2 were taken from QAL2 report for the whole month as the monitors were not operating adequately
-
- Unit 1
- Findings The high emissions can be attributed to DHP stopped and tripping due to high compartment and hopper knife gates being closed Stream 1 second collecting conveyor isolated, Stream 2 second collecting conveyor choked DHP standing due to bucket elevator faulty Unit light up Cold start, D and E mill on Fuel oil burner support
- Resolution Plant repaired

- Unit 2
- Findings The high emissions can be attributed to Unit light up cold start Fuel oil used 125 4 tons Stream 1 stopped due to flight broken on 2nd collecting conveyor, Precip conv 11,13 and 14 kept on tripping, Start closing hopper knife gates SO3 OFF due to steam temps DHP tripped due to high compartment levels, knife gates closed 11 is choked DHP stream 2 bucket elevetor first collector gearbox damanged, hopper knife gates closed
- Resolution Plant repaired

- Unit 3
- Findings The high PM emissions can be attributed to
- Resolution Palnt repaired

- Unit 5
- Findings The high PM emissions can be attributed to stream 2 stopped due to second collecting conveyor plumber clock that was damaged Precip conveyor 22, 24 kept on tripping SO3 plant on hold due to steam temp low Precipt 24 fails to start due to ash accumulation on the sprocket
- Resolution Plant repaired

- Unit 6
- Findings High PM emissions can be attributed to SO3 plant tripped to hold mode due to the aux steam temperature that dropped, Stream 1 bucket elevator triped SO3 plant tripped to hold mode due to the aux steam temp that dropped
- Resolution Plant repaired