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Date
19 March 2021

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Dear Mrs Mpho Nembilwi

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

KENDAL POWER STATION'S EMISSIONS REPORT FOR THE MONTH OF FEBRUARY 2021.

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:


Tshilidzi Vilane
ENVIRONMENTAL OFFICER- KENDAL

Date: 19/03/2021

Supported by:


Solly Chokoe
ACTING ENVIRONMENTAL MANAGER- KENDAL

Date: 25/03/2021

KENDAL POWER STATION'S EMISSIONS REPORT FOR THE MONTHS OF FEBRUARY 2021.

Verified by:

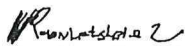


Hono Malatsi

SENIOR TECHNICIAN BOILER ENGINEERING- KENDAL

Date: 24/03/2021

Validated by:



Tendani Rasivhetshela

ACTING BOILER ENGINEERING MANAGER-KENDAL

Date 25/03/2021

Supported by:



Malibongwe Mabizela

ACTING ENGINEERING MANAGER-KENDAL

Date 25/03/2021

Approved by:



Yangaphe Ngcashi

ACTING GENERAL MANAGER-KENDAL

2021/03/25
Date

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-2021
	Coal	Tons	2 260 000	637 813
	Fuel Oil	Tons	5 000	1239.82
Production Rates	Product / By-Product Name	Units		Production Rate Feb-2021
	Energy	GWh	4380	1 092.58
	Ash	Tons	Not specified	203 462.3
	RE Ash	kg/MWh	Not specified	0.280

2 ENERGY SOURCE CHARACTERISTICS

Coal Characteristic	Units	Stipulated Range	Monthly Average Content
Sulphur Content	%	0.7 TO >1 (%)	0.810
Ash Content	%	30 TO >40 (%)	31.900

3 EMISSION LIMITS (mg/Nm³)

Associated Unit/Stack	PM	SO _x	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 ABATEMET TECHNOLOGY (%)

Associated Unit/Stack	Technology Type	Efficiency Feb-2021	Technology Type	Utilization Feb-2021
Unit 1	ESP + SO ₂	99.9%	SO ₂	100.0%
Unit 2	ESP + SO ₂	99.8%	SO ₂	99.0%
Unit 3	ESP + SO ₂	99.7%	SO ₂	51.7%
Unit 4	ESP + SO ₂	99.7%	SO ₂	98.3%
Unit 5	ESP + SO ₂	Unit off	SO ₂	Unit off
Unit 6	ESP + SO ₂	Unit off	SO ₂	Unit off

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	100.0	0.0	0.0	0.0
Unit 2	80.2	0.0	0.0	0.0
Unit 3	100.0	0.0	0.0	0.0
Unit 4	99.5	0.0	0.0	0.0
Unit 5	Unit off	Unit off	Unit off	Unit off
Unit 6	Unit off	Unit off	Unit off	Unit off

Note 1: Unit 2 monitor reliability is at 80.2% because the PI server was not available from the 7th to 15th so an average for both the load and PM dust for the available data was used for those days.

Note 2: Gaseous Monitor's readings are available but parallel test not yet completed since the repairs thus previous parallel tests data was used

Note 3: Parallel test on unit 3 is completed and factors were used however monitor data is not available hence the reliability is also at 0%

6 EMISSION PERFORMANCE

Table 6.1: Monthly tonnages for the month of February 2021

Associated Unit/Stack	PM (tons)	SO ₂ (tons)	NO _x (tons)	CO ₂ (tons)
Unit 1	42.5	3 993	1 419	411 537
Unit 2	56.9	3 247	1 435	251 795
Unit 3	80.2	2 563	943	241 931
Unit 4	117.8	4 019	1 381	292 502
Unit 5	Unit off	Unit off	Unit off	Unit off
Unit 6	0.0	0	0	0
SUM	297.51	13 822	5 177	1 197 766

Table 6.2: Operating days in compliance to PM AEL Limit - February 2021

Associated Unit/Stack	Normal	Grace	Section 30	Contravention	Total Exceedance	Average PM (mg/Nm ³)
Unit 1	27	0	0	0	0	25.0
Unit 2	23	1	0	0	1	49.6
Unit 3	15	5	0	0	5	92.1
Unit 4	15	7	0	2	9	135.5
Unit 5	Unit off	Unit off	Unit off	Unit off	Unit off	Unit off
Unit 6	Unit off	Unit off	Unit off	Unit off	Unit off	Unit off
SUM	80	13	0	2	15	

Table 6.3: Operating days in compliance to SOx AEL Limit - February 2021

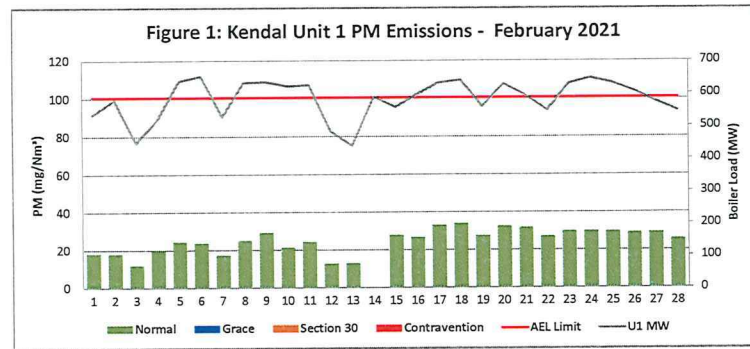
Associated Unit/Stack	Normal	Grace	Section 30	Contravention	Total Exceedance	Average SOx (mg/Nm ³)
Unit 1	28	0	0	0	0	1 920.2
Unit 2	25	0	0	0	0	2 467.7
Unit 3	21	0	0	0	0	1 953.3
Unit 4	28	0	0	0	0	2 718.3
Unit 5	Unit off	Unit off	Unit off	Unit off	Unit off	Unit off
Unit 6	Unit off	Unit off	Unit off	Unit off	Unit off	Unit off
SUM	102	0	0	0	0	

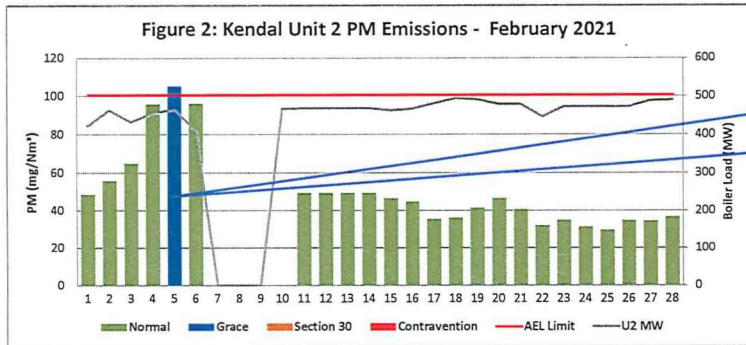
Table 6.4: Operating days in compliance to NOx AEL Limit - February 2021

Associated Unit/Stack	Normal	Grace	Section 30	Contravention	Total Exceedance	Average NOx (mg/Nm ³)
Unit 1	28	0	0	0	0	682.1
Unit 2	25	0	0	0	0	1 090.5
Unit 3	21	0	0	0	0	718.4
Unit 4	28	0	0	0	0	934.0
Unit 5	Unit off	Unit off	Unit off	Unit off	Unit off	Unit off
Unit 6	Unit off	Unit off	Unit off	Unit off	Unit off	Unit off
SUM	102	0	0	0	0	

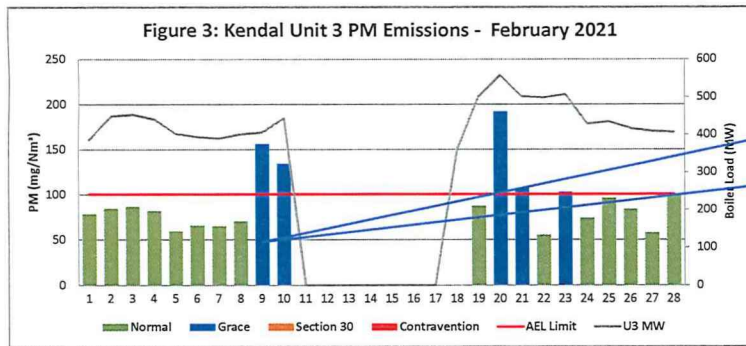
Table 6.5: Legend Description

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

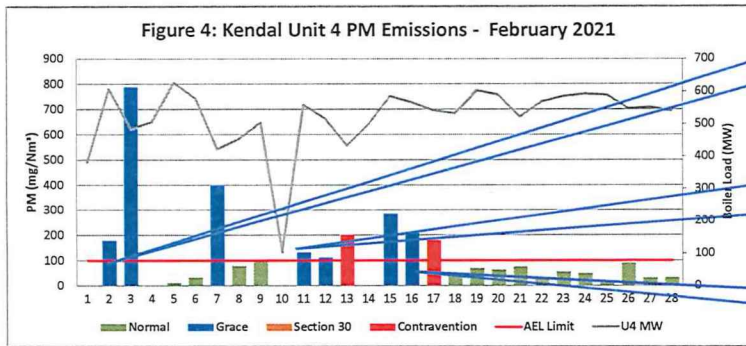




High PM emissions can be attributed to unit shutdown



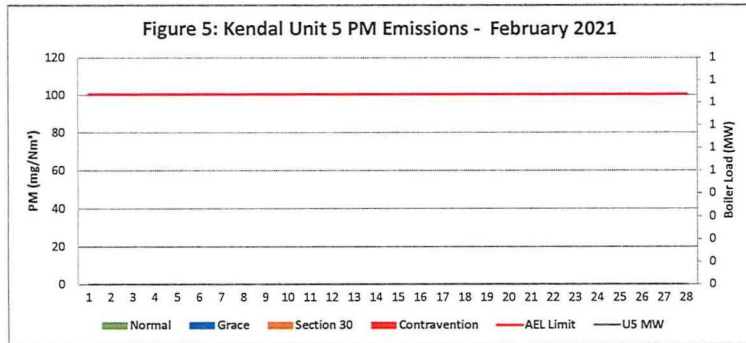
Unit 3 high PM emissions on the 9th-10th was due to unit trip on the 9th and was synchronised on the same day. Unit 3 high PM emissions on 20, 21 & 23 can be attributed to six ESP fields and precipitator chain conveyor 21 tripping, high back end temperatures and to low Fuel Factor.

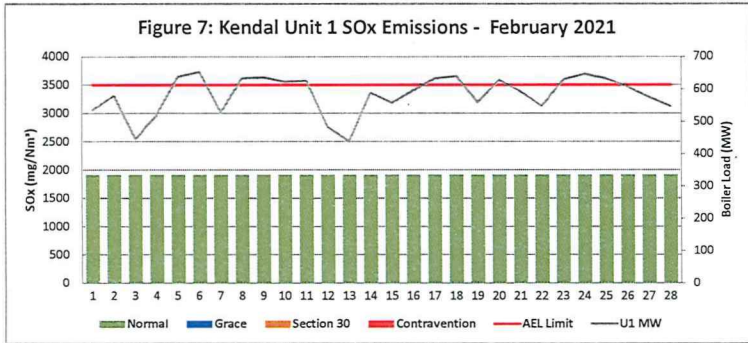
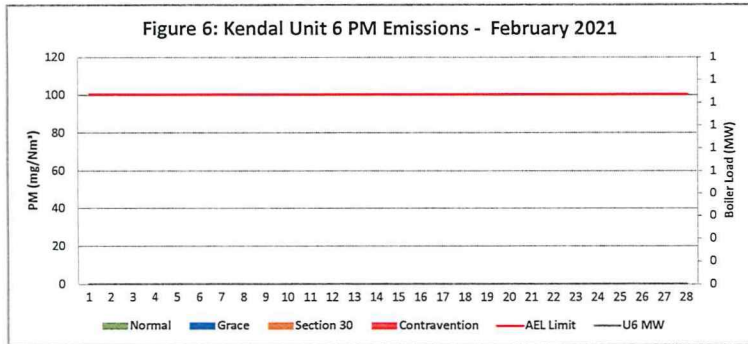


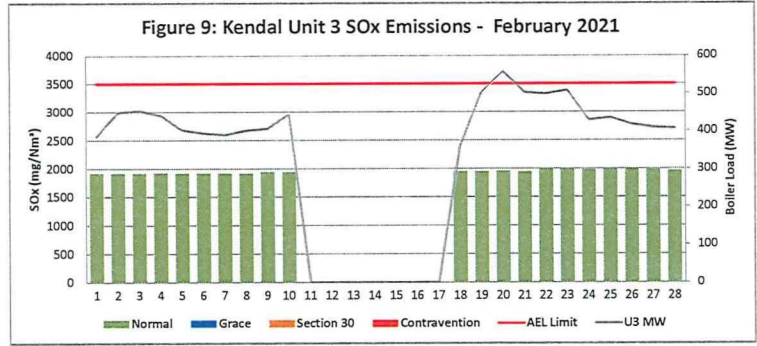
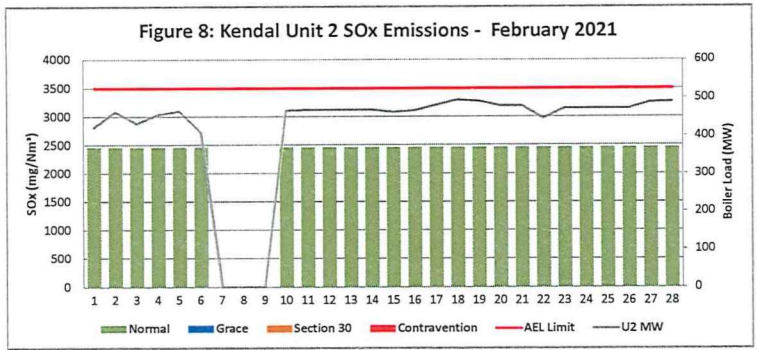
Unit 4 high PM emissions can be attributed to unit light-ups and shut downs.

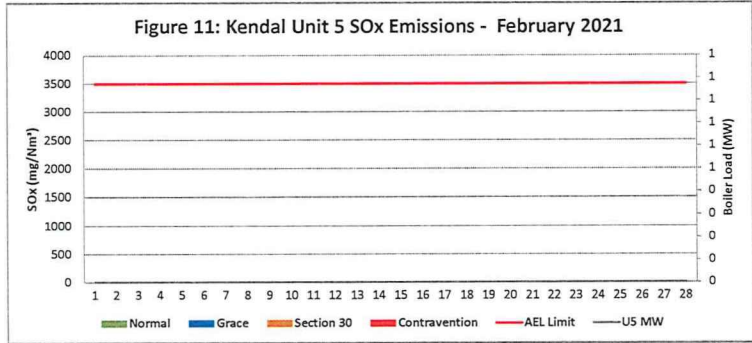
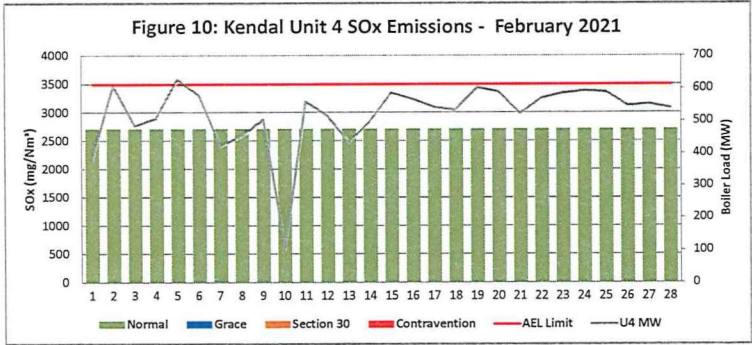
The unit was synchronised on the 10/02/2021 at 23:40 and tripped on the 13/02/2021 at 15:27 on control air pressure low due to compressor tripped. The unit was synchronised again on the same day at 21:15. Therefore the 13th should not be a contravention.

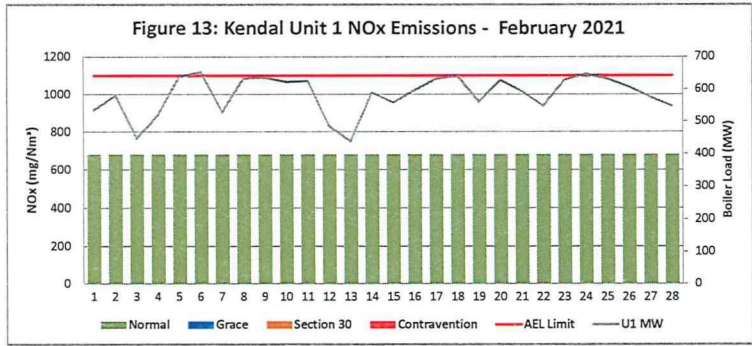
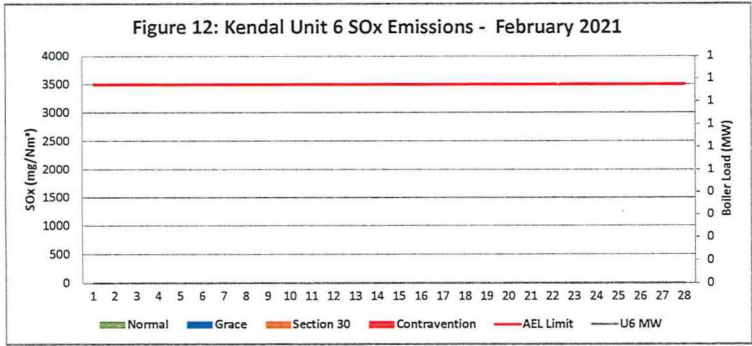
Unit 4 high PM emissions can be attributed to ash backlogs which resulted in the poor performance of the ESP.

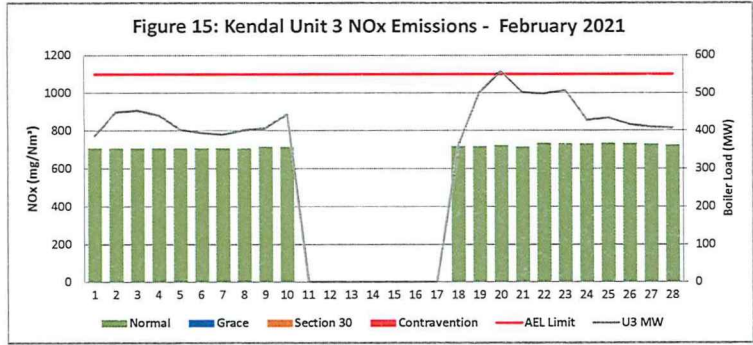
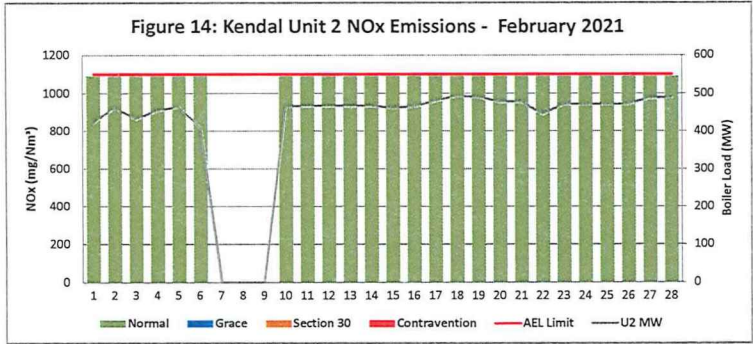


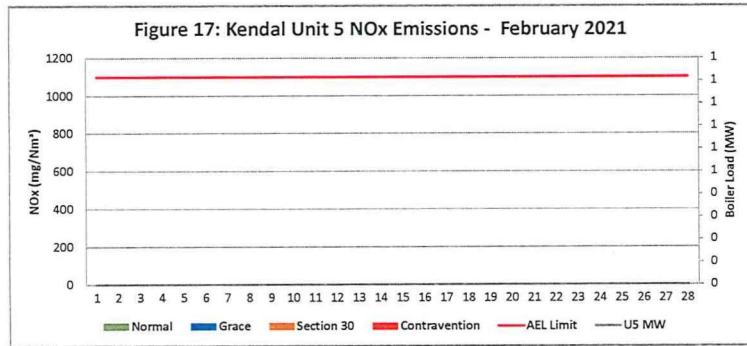
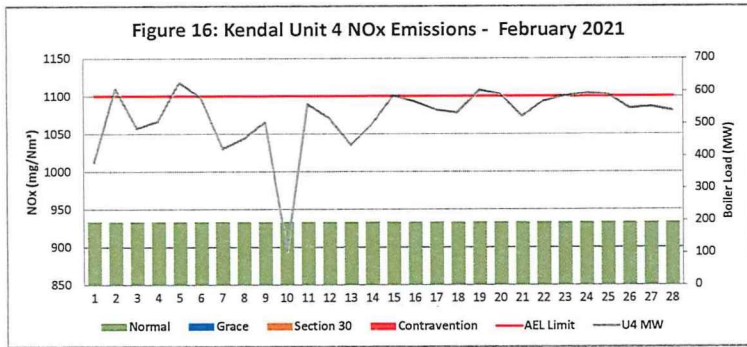


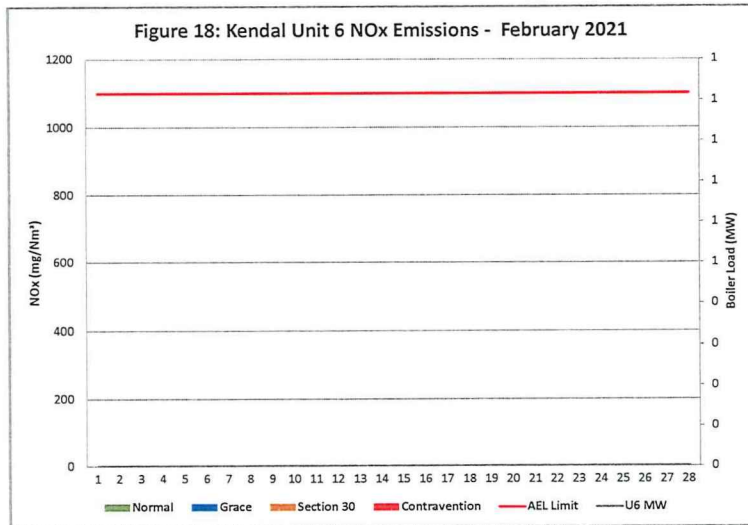












7 COMMENTS

There were no complaints for this months

Source Code / Name	Root Cause Analysis	Calculation of impacts / emissions associated with the incident	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 98% reliability is compared to the dust concentration signal. If the dust concentration signal is above 98% 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:

$$= (1 - (\text{count hours above 98\%/24hours})) \times 100$$

Emissions Performance:

- Note that gaseous emissions were manually entered using Independent third party QAL2 parallel test reports due to the unreliability of the CEMS monitors data, awaiting parallel tests to be completed.
- Unit 4 Parallel test was performed and completed between 15-18 February 2021, we await report currently estimated for 04/04/2021.
- Unit 2 Parallel test was performed and completed between 22-25 February 2021, we await report currently estimated for 04/04/2021.
- Unit 1 Parallel test was performed and completed between 25-28 February 2021, we await report currently estimated for 04/04/2021
- Average velocity values from the latest correlation report were used on the gaseous emissions on Unit 1, 2, 3 & 4 due to defective CEMS monitors and velocity correction factors were set M=1 and C=0
- Units 5 & 6 were offload during this month for repairs to address emissions issues.

Unit 2

Findings:

High PM emissions on 05 can be attributed to unit shutdown.

Unit 3

Unit 3 high PM emissions on the 9th-10th was due to unit trip on the 9th and was synchronised on the same day. On 20,21 & 23 can be attributed to six ESP fields and precipitator chain conveyor 21 tripping, high back end temperatures and to low Fuel Factor.

Resolution: ESP to be repaired during opportunity maintenance and conveyor was repaired.

Unit 4: Unit 4 high PM emissions can be attributed to unit light-ups and shut downs.

Unit 4 PM correlation tests were conducted during February 2021 and once the correlation report is received from the contractor, the new curve will be implemented and the emissions report will be re-submitted.