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Date
28 June 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 MAY 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:

Tshiridzi Vilane
ENVIRONMENTAL OFFICER- KENDAL

Date: 28/06/2021

Supported by:

Solly Chokoe
ACTING ENVIRONMENTAL MANAGER- KENDAL

Date: 28/06/2021

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

Verified by:

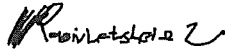


Hlono Malatsi

SENIOR TECHNICIAN BOILER ENGINEERING- KENDAL

Date: 29 June 2021

Validated by:

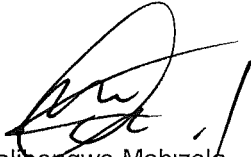


Tendani Rasivhetshela

ACTING BOILER ENGINEERING MANAGER-KENDAL

Date 29/06/2021

Supported by:



Malibongwe Mabizela

ACTING ENGINEERING MANAGER-KENDAL

Date 29/06/2021

Approved by:



Yangaphe Ngcash

GENERAL MANAGER-KENDAL

Date 2021.06.30

KENDAL POWER STATION MONTHLY EMISSIONS REPORT
 Atmospheric Emission License 17/4/AELMP312/11/15



1 RAW MATERIALS AND PRODUCTS

Raw Materials and Products	Raw Material Type	Units	Maximum Permitted Consumption rate	Consumption Rate May-2021
	Coal	Tons		2 280 000
Fuel Oil	Tons		5 000	1715,56

Production Rates	Product / By-Product Name	Units		Production Rate May-2021
	Energy	GWh(MW)		4380
Ash	Tons		Not specified	213 275,4
RE Ash	kg/MWh		Not specified	0,360

2 ENERGY SOURCE CHARACTERISTICS

Coal Characteristic	Units	Stipulated Range	Monthly Average Content
Sulphur Content	%	<1 (%)	0,750
Ash Content	%	40 (%)	31,970

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 May-2021	Technology Type	Utilization May-2021
Unit 1	ESP + SO ₃	99,9%	SO ₃	92,9%
Unit 2	ESP + SO ₃	99,7%	SO ₃	93,8%
Unit 3	ESP + SO ₃	99,7%	SO ₃	98,1%
Unit 4	ESP + SO ₃	99,7%	SO ₃	94,0%
Unit 5	ESP + SO ₃	Unit off	SO ₃	Unit off
Unit 6	ESP + SO ₃	Unit off	SO ₃	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	99,9	97,0	99,9
Unit 2	100,0	100,0	99,7	100,0
Unit 3	100,0	100,0	100,0	100,0
Unit 4	100,0	65,9	65,9	100,0
Unit 5	Unit off	Unit off	Unit off	Unit off
Unit 6	Unit off	Unit off	Unit off	Unit off

Note 1 : Unit 4 gaseous monitor reliability is low because monitor was faulty from the 01st until the 11th, average emissions for the available data for the month was used to report

6 EMISSION PERFORMANCE

Table 6.1: Monthly tonnages for the month of May 2021

Associated Unit/Stack	PM (tons)	SO ₂ (tons)	NO _x (tons)	CO ₂ (tons)
Unit 1	47,2	3 085	856	222 919
Unit 2	126,3	2 827	1 084	207 829
Unit 3	60,6	0	0	0
Unit 4	161,2	3 199	888	228 056
Unit 5	Unit off	Unit off	Unit off	Unit off
Unit 6	0,0	0	0	0
SUM	395,28	9 112	2 829	658 804

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

Associated Unit/Stack	Normal	Grace	Section 30	Contravention	Total Exceedance	Average PM (mg/Nm ³)
Unit 1	26	0	0	0	0	28,9
Unit 2	21	3	0	0	3	99,2
Unit 3	10	1	0	0	1	86,9
Unit 4	25	6	0	0	6	97,7
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	82	10	0	0	10	

Table 6.3: Operating days in compliance to SO_x AEL Limit - May 2021

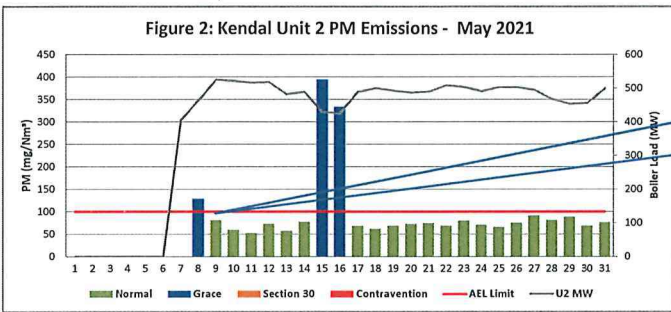
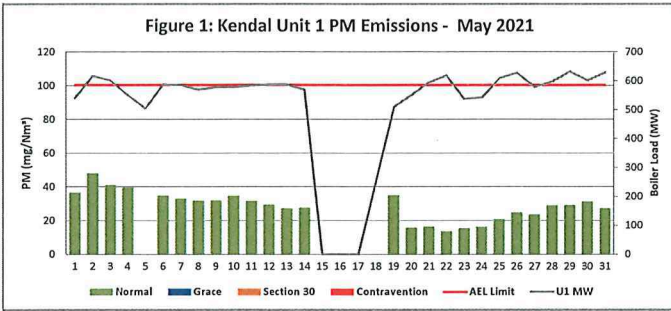
Associated Unit/Stack	Normal	Grace	Section 30	Contravention	Total Exceedance	Average SO _x (mg/Nm ³)
Unit 1	28	0	0	0	0	2 821,5
Unit 2	25	0	0	0	0	2 209,0
Unit 3	12	0	0	0	0	2 166,4
Unit 4	31	0	0	0	0	2 199,6
Unit 5	Unit off	Unit off	Unit off	Unit off	Unit off	Unit off
Unit 6	Unit off	Unit off	Unit off	Unit off	Unit off	Unit off
SUM	96	0	0	0	0	

Table 6.4: Operating days in compliance to NO_x AEL Limit - May 2021

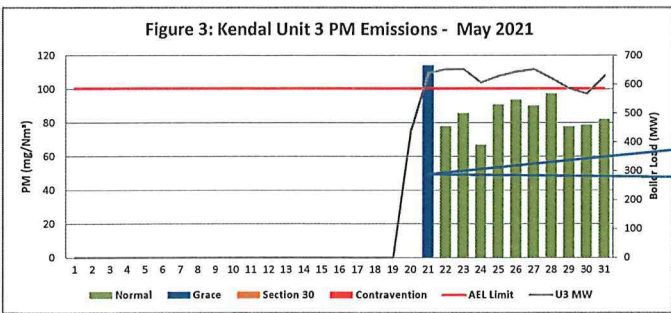
Associated Unit/Stack	Normal	Grace	Section 30	Contravention	Total Exceedance	Average NO _x (mg/Nm ³)
Unit 1	28	0	0	0	0	775,4
Unit 2	25	0	0	0	0	840,6
Unit 3	12	0	0	0	0	691,6
Unit 4	31	0	0	0	0	610,8
Unit 5	Unit off	Unit off	Unit off	Unit off	Unit off	Unit off
Unit 6	Unit off	Unit off	Unit off	Unit off	Unit off	Unit off
SUM	96	0	0	0	0	

Table 6.5: Legend Description

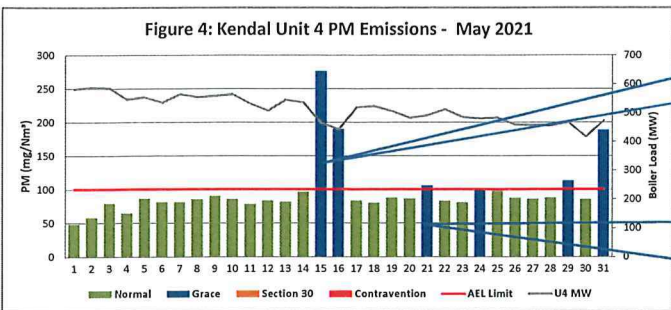
Condition	Colour	Description
Normal	Green	Emissions below Emission Limit Value (ELV)
Grace	Blue	Emissions above the ELV during grace period
Section 30	Orange	Emissions above ELV during a NEMA S30 incident
Contravention	Red	Emissions above ELV but outside grace or S30 incident conditions



High PM emissions on the 08th can be attributed to unit light-up and on 15&16 SO3 plant out of service due to no sulphur as a result of sulphur pumps repairs



Unit 3 high PM emissions on the 21st was high because of the unit light-up.



Unit 4 high PM emissions on the 15&16 can be attributed to SO3 plant on hold mode due to no sulphur as a result of sulphur pumps repairs

High PM emissions on 21 can be attributed to SO3 plant on hold mode due to flue gas temperature low and on 24 can be attributed to SO3 plant on hold mode due to no sulphur flow and precipitator chain conveyor 13 knife gates closed for chain replacement and on 29 can be attributed to left hand outer casing electrostatic precipitators underperforming and on the 31 can be attributed to left hand casing precip fields underperforming.

Figure 5: Kendal Unit 5 PM Emissions - May 2021

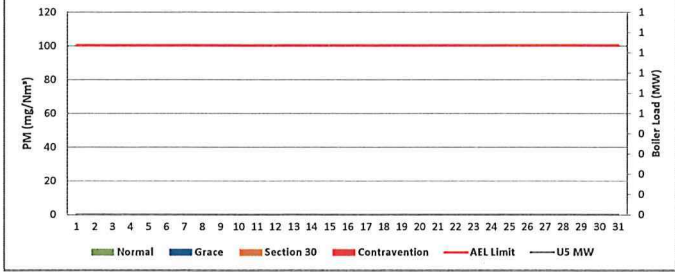


Figure 6: Kendal Unit 6 PM Emissions - May 2021

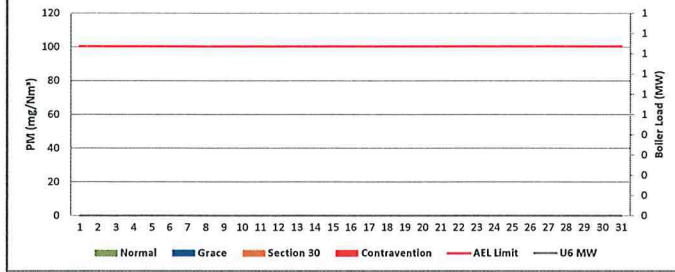


Figure 7: Kendal Unit 1 SOx Emissions - May 2021

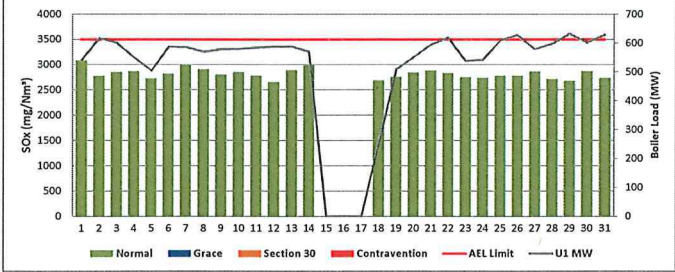
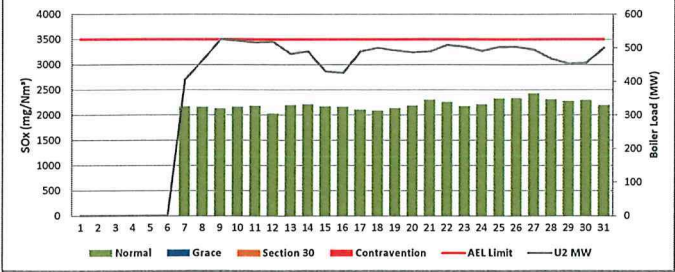
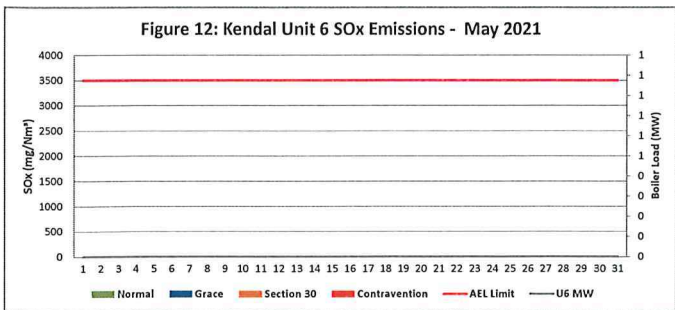
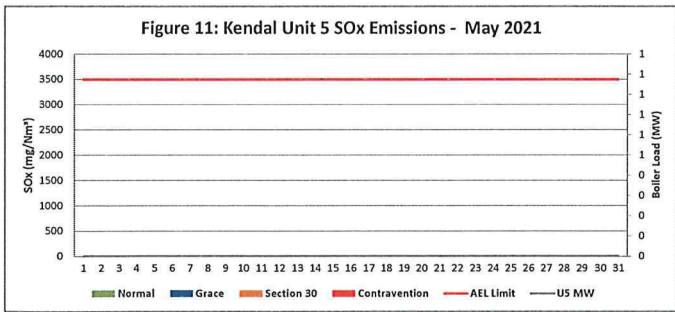
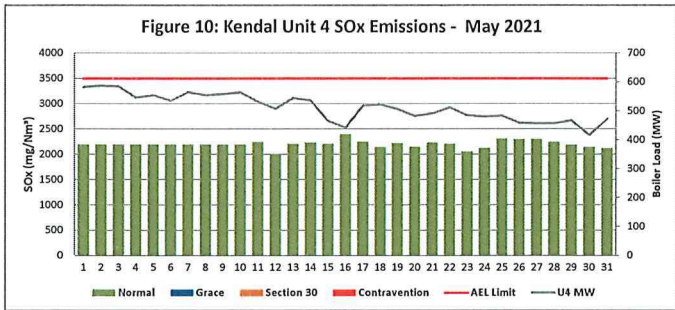
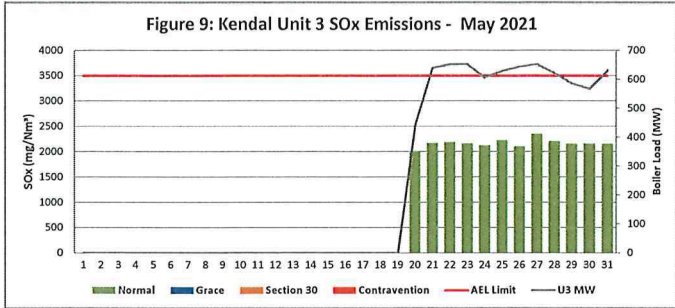


Figure 8: Kendal Unit 2 SOx Emissions - May 2021





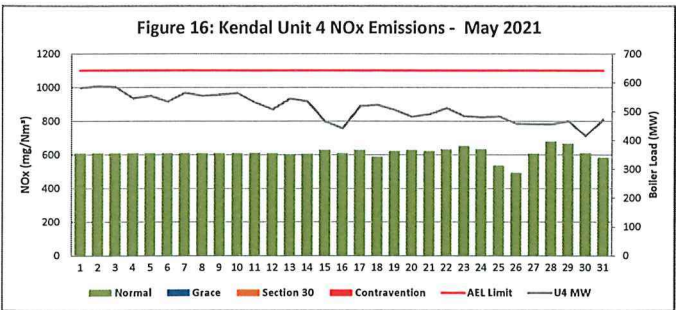
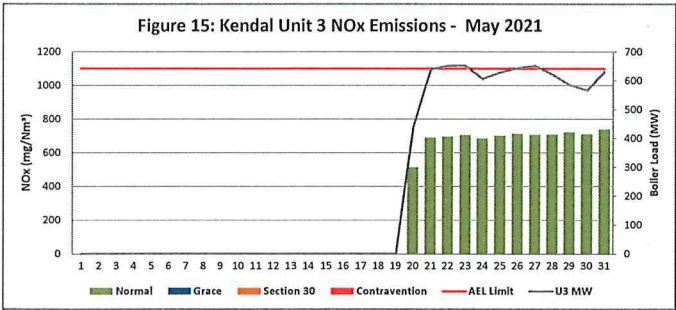
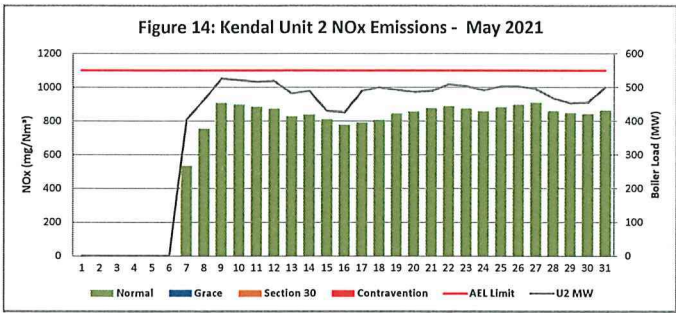
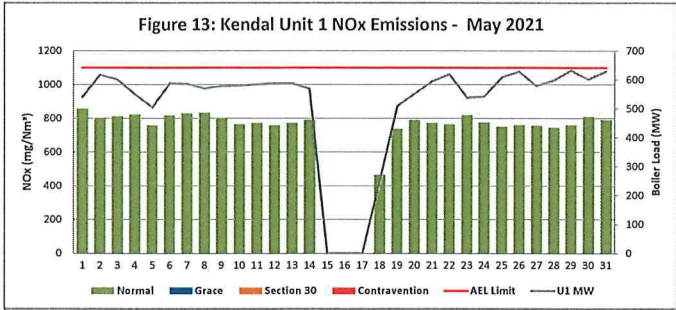


Figure 17: Kendal Unit 5 NOx Emissions - May 2021

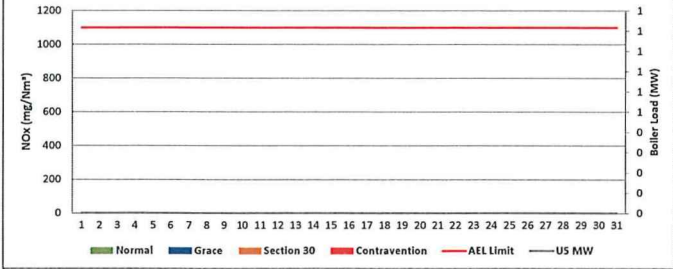
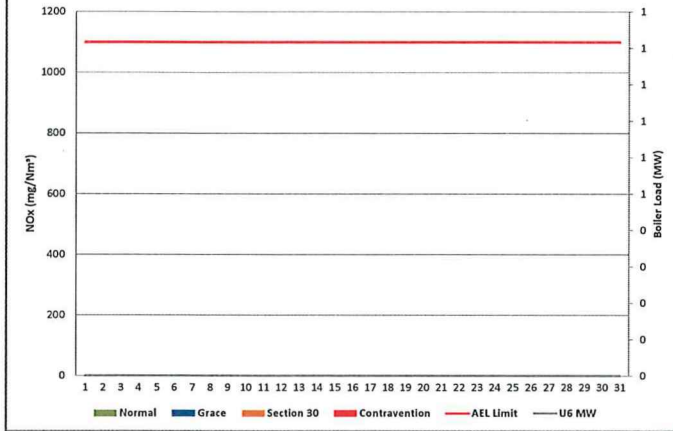


Figure 18: Kendal Unit 6 NOx Emissions - May 2021



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. 24 hours. The formula is as follows:

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

Emissions Performance

- 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 the 08th can be attributed to unit light up and on 15 & 16 SO3 plant out of service due to sulphur pumps repairs

Resolution SO3 plant was returned back to service after the fault was resolved

Unit 3 high PM emissions on the 21st was high because of the unit light up

Unit 4

Findings

Unit 4 high PM emissions on the 15&16 can be attributed to SO3 plant on hold mode due to no sulphur as a result of sulphur pumps repairs

Resolution SO3 plant was returned back to service after the sulphur pumps repairs

Unit 4

Findings High PM emissions on 21 can be attributed to SO3 plant on hold mode due to flue gas temperature low and on 24 can be attributed to SO3 plant on hold mode due to no sulphur flow and precipitator chain conveyor 13 knife gates closed for chain replacement and on 29 can be attributed to left hand outer casing electrostatic precipitators underperforming and on the 31 can be attributed to left hand casing precip fields 6 underperforming

Resolution SO3 plant was returned back to service after the sulphur flow was restored and electrostatic precipitators will be repaired during maintenance opportunity