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Date  
 30 May 2024

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Ref 17/4/AEL/MP312/11/09

Dear Mandlenkosi Mahlalela

### KRIEL POWER STATION'S ANNUAL EMISSIONS REPORT FOR FY 2023/24

This serves as the annual report required in terms of Section 7.6 in Kriel Power Station's Atmospheric Emission License and the Minimum Emission Standards (section 17 and 18). The emissions are for Eskom's 2023/24 financial year which is from 1 April 2023 to 31 March 2024. Verified emissions of particulates, SO<sub>2</sub> and NO<sub>x</sub> (as NO<sub>2</sub>) and N<sub>2</sub>O are also included.

#### 1. Pollutant emission trends

Particulate emissions are measured at all power stations with opacity monitors, which are correlated to obtain emission concentrations. Gaseous emissions (N<sub>2</sub>O, SO<sub>2</sub> and NO<sub>x</sub>) are calculated from mass balance for SO<sub>2</sub>, from station-specific emission factors for NO<sub>x</sub> and from a generic emission factor for N<sub>2</sub>O.

The emissions in the table below are that of the 2023/2024 financial year.

Table 1: Total emissions at Kriel Power Station 2023/2024

Power Station	Coal-fired emissions (tons/annum)	Fuel-oil emissions (tons/annum)	Total (tons/annum)
Kriel Power Station	N <sub>2</sub> O: 52 643	N <sub>2</sub> O: not calculated	N <sub>2</sub> O: 52 643
	PM: 37 891.09	PM: not calculated	PM: 37 891.09
	SO <sub>2</sub> : 96 355.1	SO <sub>2</sub> : 768.95	SO <sub>2</sub> : 768.95
	NO <sub>x</sub> : 49 769.4	NO <sub>x</sub> : not calculated	NO <sub>x</sub> : 49 769.4

**KRIEL POWER STATION'S ANNUAL EMISSIONS REPORT FOR FY 2023/24**  
Date: 30 May 2024

Table 2. Pollutant Emission Trends for 2023/2024

Month	PM (tons)	SO <sub>2</sub> (tons)	NOx (tons)	N <sub>2</sub> O (tons)
April 2023	2843.42	7177.0	4152.8	4.913
May 2023	7089.08	11168.5	5515.8	5.844
June 2023	6007.38	11669.8	6464.3	6.211
July 2023	3553.61	8238.2	4070.6	5.169
August 2023	905.09	3137.3	4241.1	4.996
September 2023	2493.16	10605.3	4720.0	4.387
October 2023	1677.09	6778.0	3120.2	3.145
November 2023	3295.11	7065.8	2677.7	3.722
December 2023	2397.08	6078.7	2557.8	2.945
January 2024	898.14	8253.4	3546.3	3.437
February 2024	2178.67	7760.4	3968.9	3.685
March 2024	4563.25	8422.7	4733.9	4.188

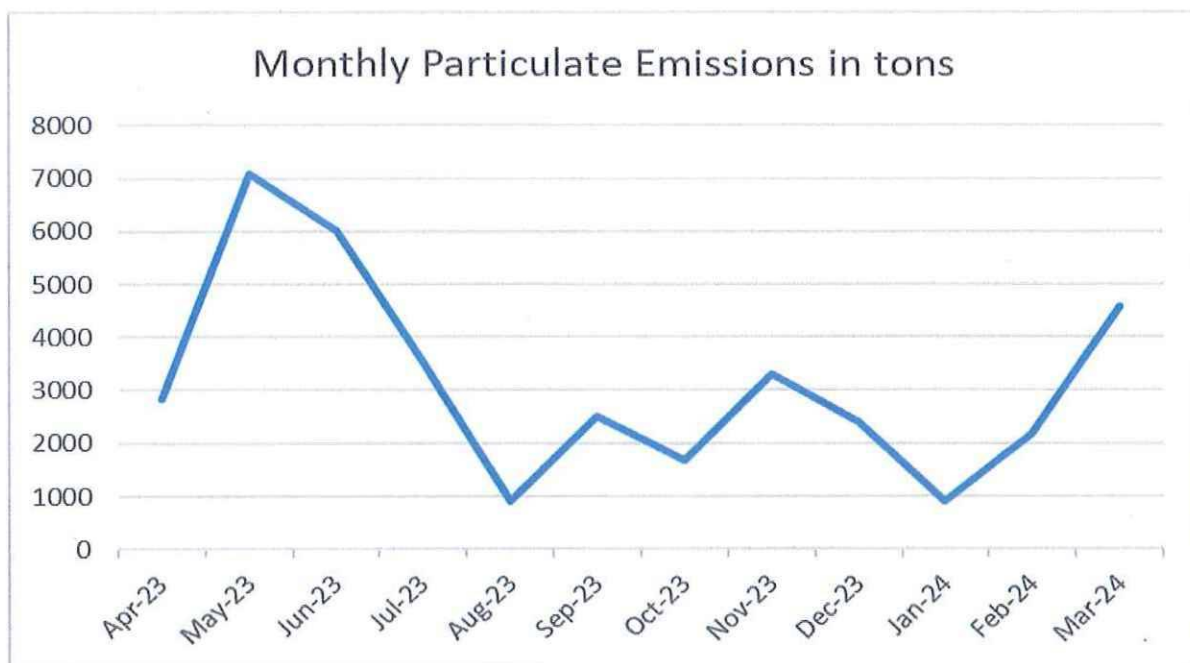


Figure 1. Monthly Particulate Emissions in tons from Kriel Power Station 2023/2024

**KRIEL POWER STATION'S ANNUAL EMISSIONS REPORT FOR FY 2023/24**  
Date: 30 May 2024

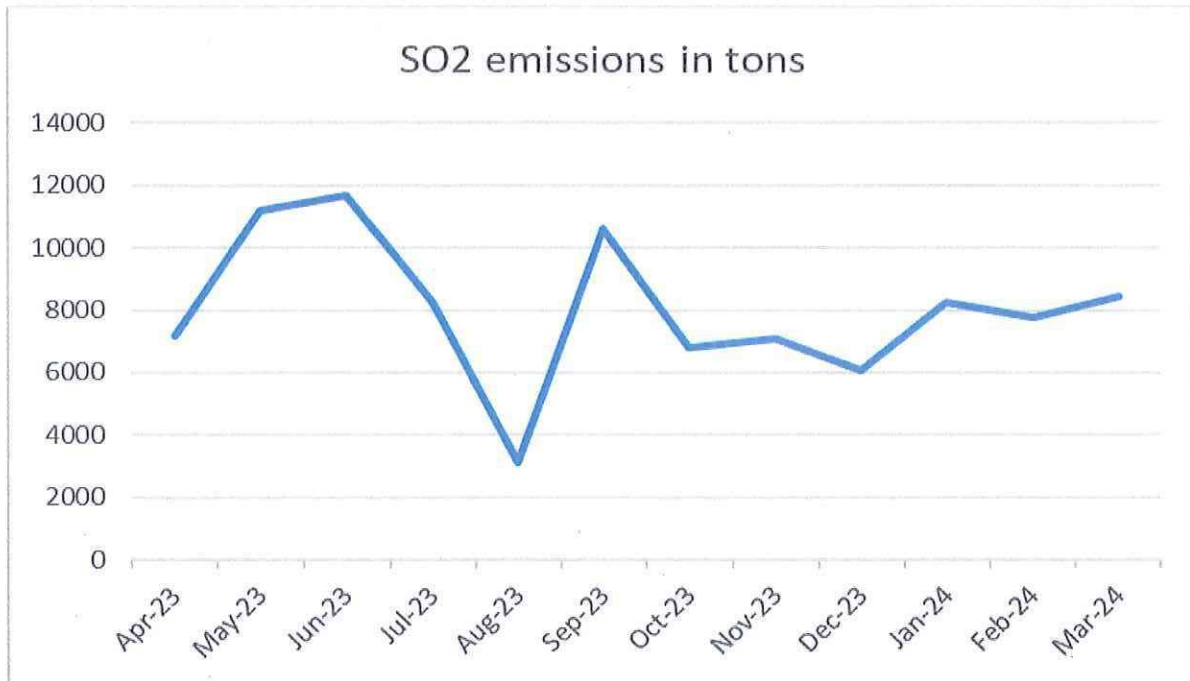


Figure 2. Monthly SO<sub>2</sub> emissions in tons from Kriel Power Station 2023/2024

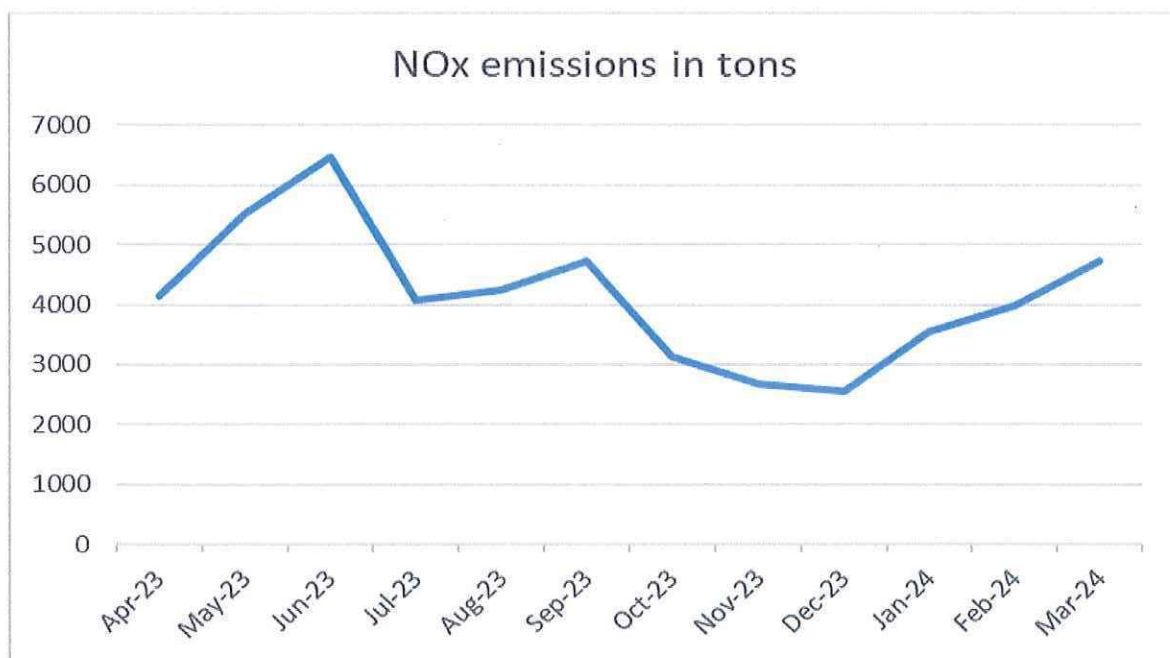


Figure 3. Monthly NO<sub>2</sub> emissions in tons from Kriel Power Station 2023/2024



Figure 4. Monthly N<sub>2</sub>O emissions in tons from Kriel Power Station 2023/2024

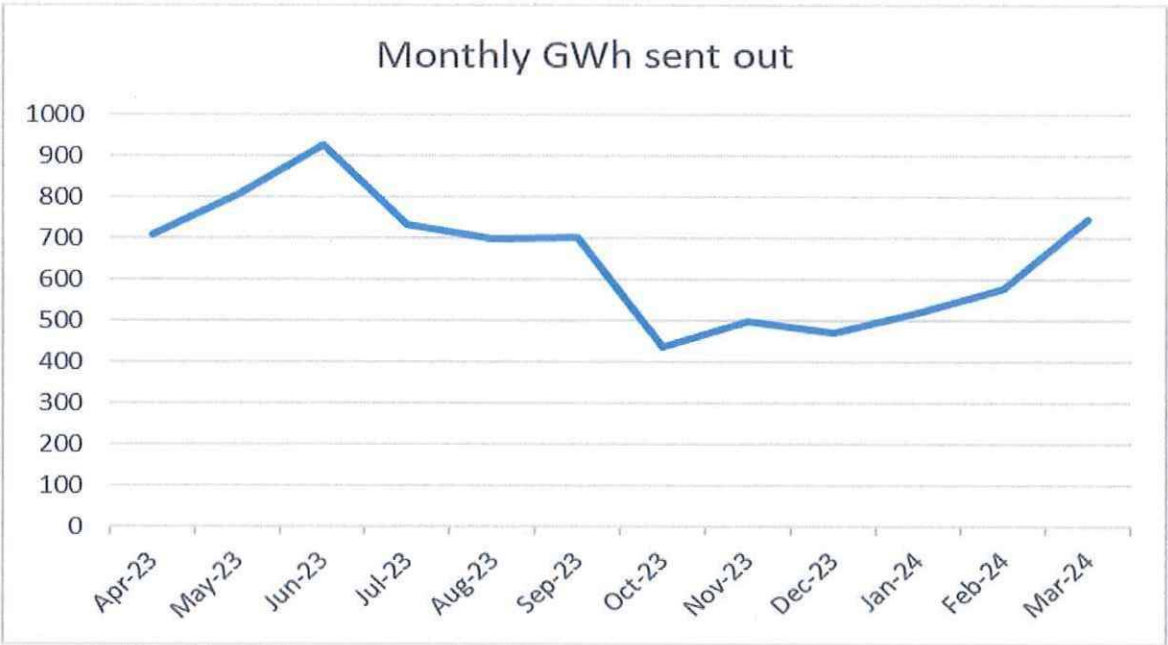


Figure 5. Monthly GWh sent out at Kriel Power Station 2023/2024

**KRIEL POWER STATION'S ANNUAL EMISSIONS REPORT FOR FY 2023/24**

Date: 30 May 2024

**2. Explanation of instances where MES were exceeded**

All average exceedances are reported and outlined in the monthly emission reports sent to your offices. A summary of the NEMA Section 30 incidents reported to the DFFE has been included below.

Month	Description of Section 30 Incidents - including the reference number	Root Cause (s)	Status of S30 Incident with DFFE (open or closed)	Remarks
April-2023	South Stack High Emissions	Unit 4 A EFP plant breakdown causing half load conditions, which calls for operating the unit with fuel oil support to badly impacting the stack emissions	Open	
May - 2023	North Stack High Emissions	Unit 4 A EFP plant breakdown causing half load conditions which calls for operating the unit with fuel oil support to badly impacting the stack emissions	Open	
May - 2023	South Stack High Emissions	Unit 4 A EFP plant breakdown causing half load conditions which calls for operating the unit with fuel oil support to badly impacting the stack emissions	Open	
June – 2023	North Stack High Emissions	Units operating at half load conditions which affects the sulphur dosing and causes the plant to operate with fuel oil support because of high turbine back pressure, low final feedwater temperature, high works power loss from high usage of electric feed pump and dust handling plant because of dust transportation resulting in high stack emissions	Open	



**KRIEL POWER STATION'S ANNUAL EMISSIONS REPORT FOR FY 2023/24**

Date: 30 May 2024

June - 2023	South Stack High Emissions	Units operating at half load conditions which affects the sulphur dosing and causes the plant to operate with fuel oil support because of high turbine back pressure, low final feedwater temperature, high works power loss from high usage of electric feed pump and dust handling plant because of dust transportation resulting in high stack emissions	Open	
July - 2023	North Stack High Emissions	The north stack emissions daily average has significantly reduced as results of shutting of unit 2 outage for the planned GO outage. However, due to the isolation of cooling tower number 2 for the cooling tower fills replacement project, unit 3 is operating at low loads to condenser vacuum high. The half load conditions mean supporting the unit with oil burners to support combustion and sulphur trioxide (SO <sub>3</sub> ) not in service. The south stack PM emission daily average has significantly reduced since synchronisation of units from half station shutdown.	Open	
Aug - 2023	North Stack High Emissions	The north stack emissions exceedance was due to RH1 and RH2 poor field performance (high spark rates) which resulted in ESP reduced collection efficiency. The reduced	Open	

# KRIEL POWER STATION'S ANNUAL EMISSIONS REPORT FOR FY 2023/24

Date: 30 May 2024

		field performance on the first field was as results of high hoppers, which resulted from an ash backlog on the dust handling plant.		
Sep - 2023	North Stack High Emissions	The North Stack emissions exceedance was due the increase of hopper alarms to 24 on Unit 1 due to blow tanks which were not available. Blow tank 1 2 discharge seal was damaged and blow tank 1 2 was leaking on the vent. Consequently, the electrostatic precipitators (ESP) performance decreased because of accumulation inside the fields.	Open	
Oct - 2023	North Stack high Emissions	Requested grace period to exceed the limit after the installation of New Abatement Technology HFTs. The station will undertake new Correlation curve and back fit accordingly and report accurately.	Open	
Oct - 2023	South Stack High Emissions	The ESP fields performance continued to deteriorate, with the collection efficiency below 40%. It was noted that there was significant drop in fields performance on the RHS only. The RHS poor fields performance was as results of the failure of the DE rapping system. During commissioning of the 5B transformer which was replaced on the 29th of September 2023, the phasing was not verified, and motor directions	Open	

# KRIEL POWER STATION'S ANNUAL EMISSIONS REPORT FOR FY 2023/24

Date: 30 May 2024

		<p>checks were not conducted thereafter. This then resulted in motor rotating in the wrong directions and consequently the failure of torque insulators which rendered most DE rappers not available. It should be noted there were other causes that contributed to the high emissions, this includes the saturation of the ID fans and poor dust handling plant availability as results of failure of the overland conveyors and blow tanks.</p>		
Nov - 2023	North High Stack Emissions	<p>It was due to the loss of two main electric conveying air compressors, namely Demag 5 &amp; 6. Both compressors experienced rotor crushing and bearing seizure due to inadequate oil in the mechanical components during operation. Due to a decrease in the volumetric flow rate from the compressors, the dry dust pipes and collecting vessels experienced blockages.</p>	Open	
Nov - 2023	South High Stack Emissions	<p>PM emissions daily average increased due to hopper alarms which resulted from unstable conveying air from time to time. The effect of unstable conveying air resulted in sustained hopper alarms that failed to clear. As result there was a high ash</p>	Open	



# KRIEL POWER STATION'S ANNUAL EMISSIONS REPORT FOR FY 2023/24

Date: 30 May 2024

		<p>accumulation and hang ups inside the fields. The hang ups bridged the Discharge electrode and Collecting Electrodes plates which results in arcing and undervoltage trips. The high ash accumulation further affected the CE rapping system. The ash accumulation and hang ups resulted in a drop in ESP collection efficiency to below 30 % and consequently high PM emissions.</p>		
Dec - 2023	North High Stack Emissions	<p>Accumulation of hopper levels when the ash discharge rate from the fly ash hopper is lower than the rate at which ash accumulates within the fly ash hopper. This issue stemmed from the loss of two main electric conveying air compressors, namely Demag 5 &amp; 6.</p>	Open	
Dec - 2023	South High Stack Emissions	<p>Compressors experienced rotor crushing and bearing seizure due to inadequate oil in the mechanical components during operation. Due to a decrease in the volumetric flow rate from the compressors, the dry dust pipes and collecting vessels experienced blockages.</p>	Open	
Jan - 2024	North High Stack Emissions	<p>Reduced ESP collection efficiency due to fly ash accumulation inside the fields, Dust accumulation of the Discharge electrodes resulting in high spark</p>	Open	

# KRIEL POWER STATION'S ANNUAL EMISSIONS REPORT FOR FY 2023/24

Date: 30 May 2024

		rates and field tripping on undervoltage, and		
Jan - 2024	South High Stack Emissions	Failure of the 18A and 18B conveyor belt & failure of blow tanks to start due to ESP fields poor performance due to ash accumulation that occurred as results of high hopper alarms.	Open	
Feb - 2024	North and South High Stack Emissions	Due to the fluctuation of conveying and service air. Units 2,3,5 and 6 were on load with hopper alarms, 17, 13,14 and 17 due compressor fluctuation and mobile compressor kept on tripping on low diesel. The compressor has been unstable for a while as we had lost a lot of electric compressors due to damage. Hopper alarms went up to 19, 19 and 30 on Unit 3, 5 and 6 on load the hopper alarms went up to 19, 19 and 30 due to unstable Demag Pressure and compressors tripping.	Open	
Mar - 2024	North and South High Stack Emissions	Due unavailability of SO3 plant and unavailability of HP pumps and overland conveyor belts due to ESP fields poor performance leading to ash accumulation that occurred as results of high hopper alarms.	Open	

## 3. Emission monitoring information

Table 3. Overview of dates of last conducted CEMS verification tests for PM, SO<sub>2</sub> and NO<sub>x</sub> (Please see attached Correlations Reports)

## KRIEL POWER STATION'S ANNUAL EMISSIONS REPORT FOR FY 2023/24

Date: 30 May 2024

Activity	Test Completion Date	Validity
Parallel test for gas monitors	North Stack 26/01/2024	2 years
	South Stack 26/01/2024	
Correlations tests for PM <sub>10</sub> monitors	North Stack 23/11/2023	2 years
	South Stack 23/11/2023	

### 4. Compliance Audit Report(s):

Atmospheric Emission License Internal Audit and ISO 14001 Surveillance Audit were undertaken as part of compliance in the 2023/24 financial year (see the attached Audit Reports).

### 5. Major upgrades projects:

Cooling Tower (CT) fill replacement project, three (3) CT 1, 2 and 4 are completed. CT3 is in execution. High Frequency Transformer (HFT) project, the project is currently in execution, three (3) Units completed and three (3) will be executed in the next financial year. Last project that is going to be executed in the next financial year is the replacement of the mills gearboxes.

### 6. Fugitive dust management

All average exceedances are reported and outlined in the monthly fugitive dust emission reports and dust management plans sent to your offices.

### 7. Participation in priority area programmes

Kriel Power Station participates in the Nkangala District Municipality Implementation Task Team (ITT) for implementation of the Highveld Priority Area Quality Management Plan

### 8. Air Quality offset programme

Air quality offsets are implemented as per the Eskom Air Quality Offset Plans. Last scale rollout is in progress since 2023 until 2028.

## KRIEL POWER STATION'S ANNUAL EMISSIONS REPORT FOR FY 2023/24

Date 30 May 2024

### 9. General

Kriel Power Station submitted its annual report on the NAEIS system by the 31<sup>st</sup> of March 2024

The rest of the information demonstrating compliance with the emission license conditions are supplied in the monthly emission reports sent to your office

Hoping the above will meet your satisfaction

Yours sincerely

A handwritten signature in black ink, appearing to read 'Morongwe Raphasha', with a large, stylized initial 'M'.

Morongwe Raphasha

**KRIEL POWER STATION: GENERAL MANAGER**