

Ms Mpho Nembilwi
 Nkangala District Municipality
 PO BOX 437
 MIDDLEBURG
 1050

Date:
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Enquiries:
 Livhuwani Tshilate
 017 615 2317

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

Dear Ms Nembilwi

KRIEL POWER STATION'S MONTHLY STACK EMISSIONS REPORT FOR THE MONTH OF SEPTEMBER 2021

This serves as the monthly report required in terms of Section 7.4 in Kriel Power Station's Atmospheric Emission License 17/4/AEL/MP312/11/09. The emissions are for the month of September 2021. Verified emissions of particulates matter, SO₂ and NO_x (as NO₂) are also included.

Raw Materials and Products

Table 1: Quantity of Raw Materials and Products used/produced for the month of September 2021

Raw Materials and Products used	Raw Material Type	Units	Maximum Permitted Consumption / Rate (Quantity)	Consumption / Rate in Month of September 2021
	Coal	Tons/month	1 227 600	536 590
	Fuel Oil	Tons/month	5 000	4 992.61
Production Rates	Product/ By-Product Name	Unit	Maximum Production Capacity Permitted (Quantity)	Production Rate in Month of September 2021
	Ash	Tons/month	not specified	588.4
	RE PM	kg/MWh	not specified	0.65

1/...

Abatement Technology

Table 2: Abatement Equipment Control Technology for September 2021.

Associated Unit/Stack	Technology Type	Actual Efficiency (%)
		September 2021
Unit 1	ESP	Outage
Unit 2	ESP	99.64%
Unit 3	ESP	99.54%
Unit 4	ESP	99.47%
Unit 5	ESP	99.34%
Unit 6	ESP	99.44%

Energy Source Characteristics

Table 3: Energy Source Material Characteristics for the month of September 2021





Characteristic	Stipulated Range (Unit)	Monthly Average Content
Sulphur Content	0.6-1.2 (%)	0.66
Ash Content	21-36 (%)	23.53

Monthly Monitor Reliability

Associated Unit/Stack	PM (%)	SOx (%)	NOx (%)
North	92.20	84.88	85.99
South	92.17	98.75	98.75

Emissions Reporting

Graph 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

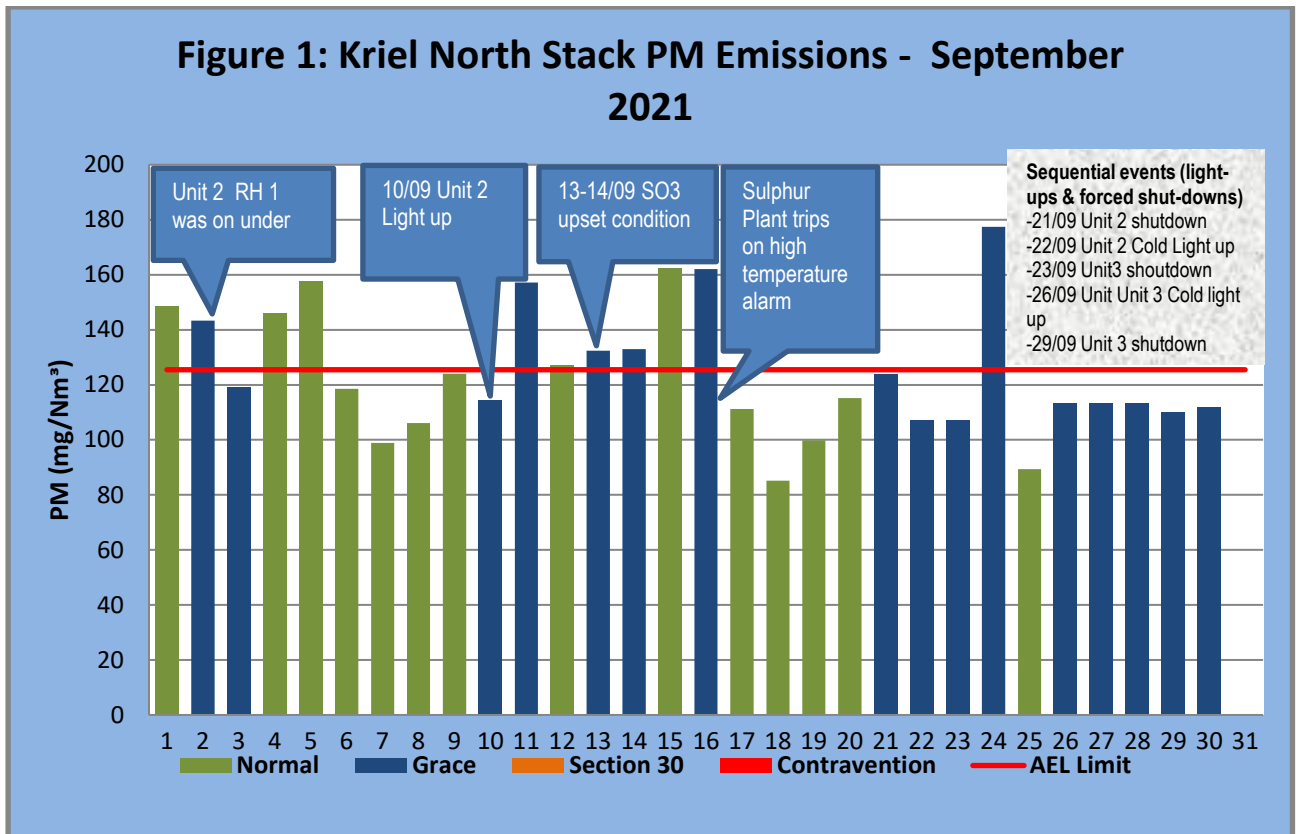


Figure 1: PM emissions for the month of September 2021 against emission limit for the North Stack. Monthly average was 124.3 mg/Nm³

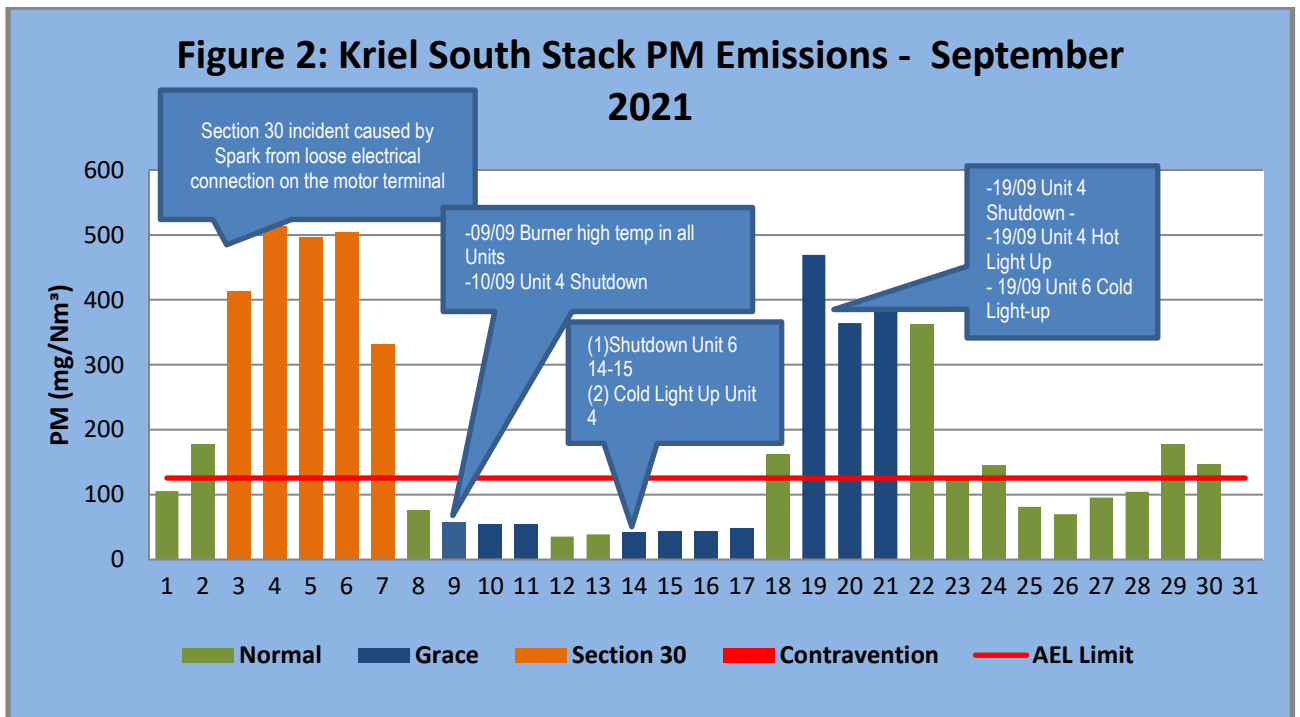


Figure 2: PM emissions for the month of September 2021 against emission limit for the South Stack. Monthly average was 191 mg/Nm³

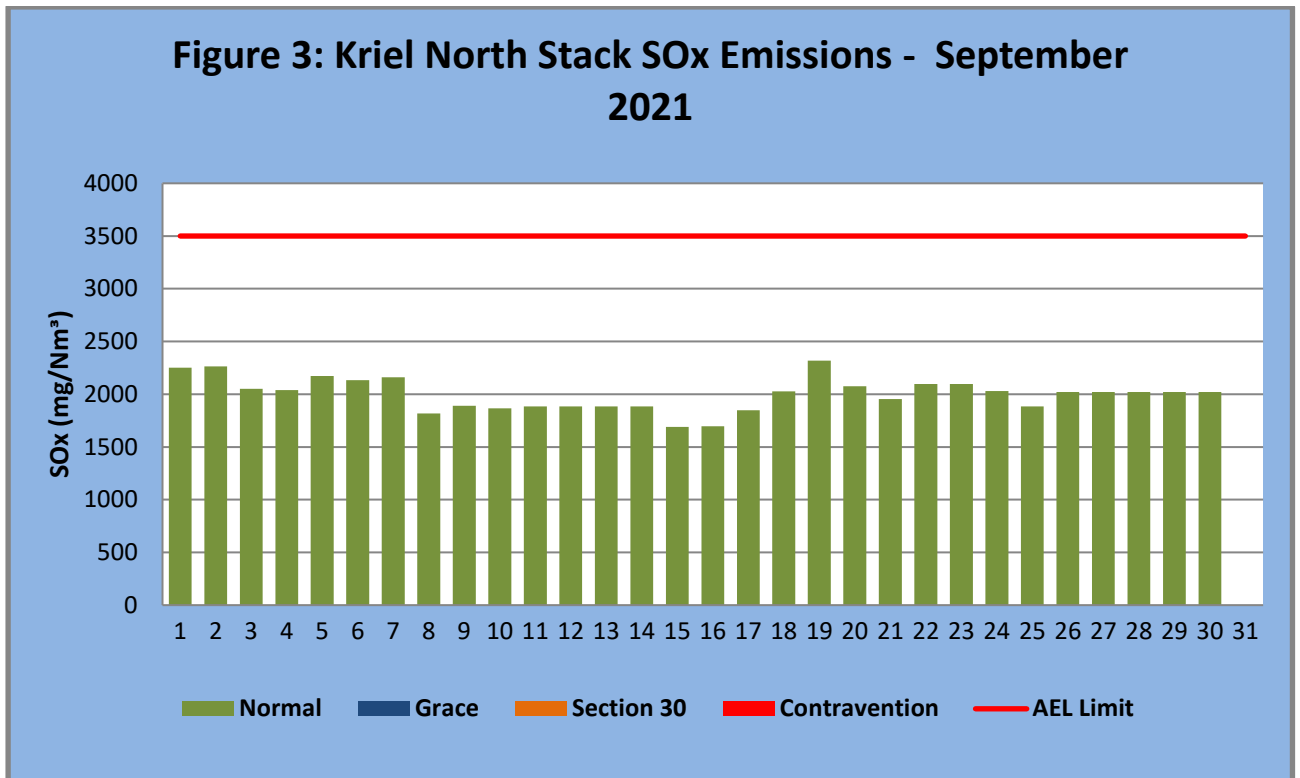


Figure 3. SO₂ emissions for the month of September 2021 against emission limit for the North Stack. The SO_x Limit is 3500mg/Nm³.

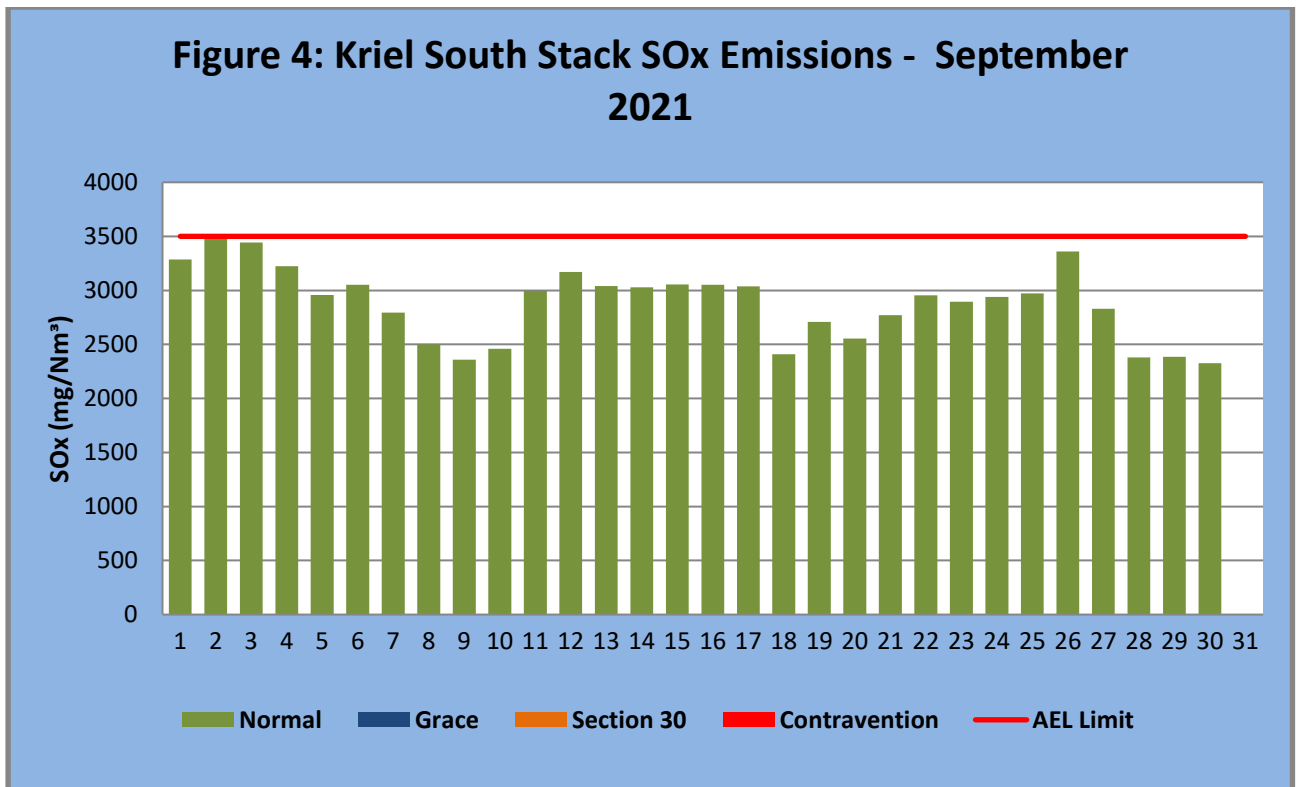


Figure 4. SO₂ emissions for the month of September 2021 against emission limit for the South Stack. The SO_x Limit is 3500mg/Nm³.

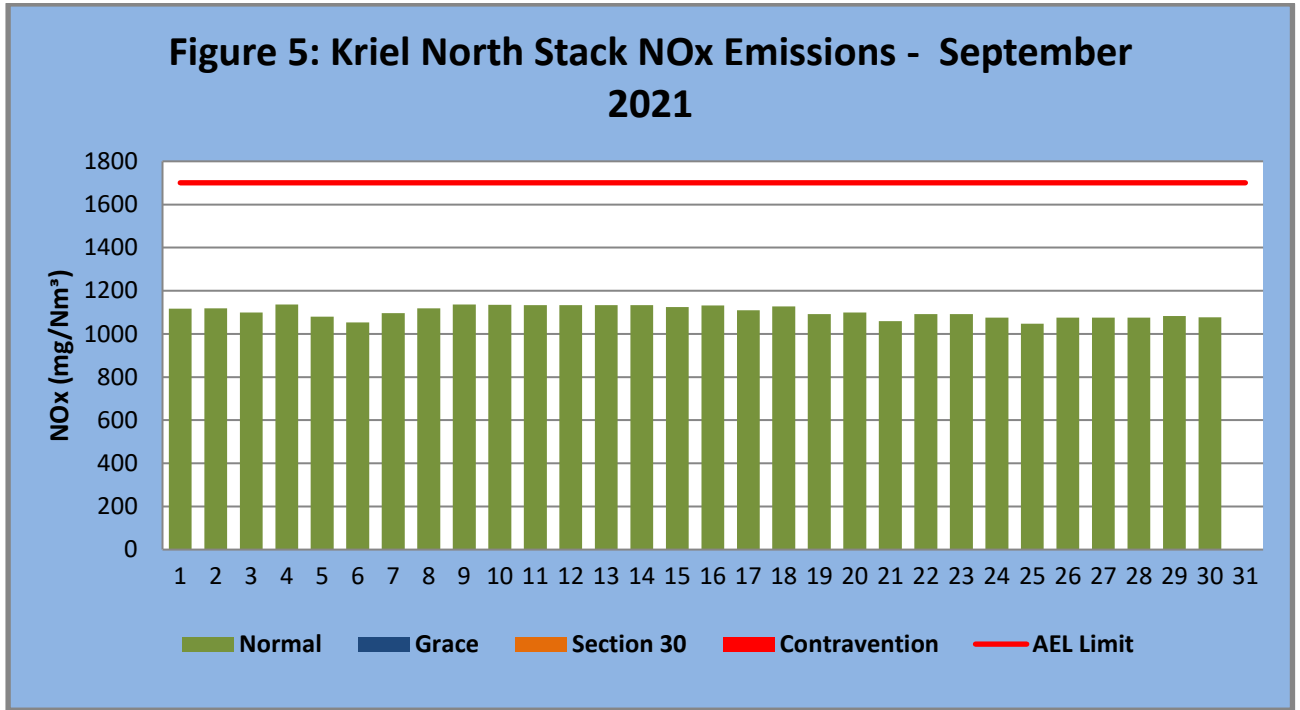


Figure 5. NO₂ emissions for the month of September 2021 against emission limit for the North Stack. The NO_x Limit is 1600mg/Nm³.

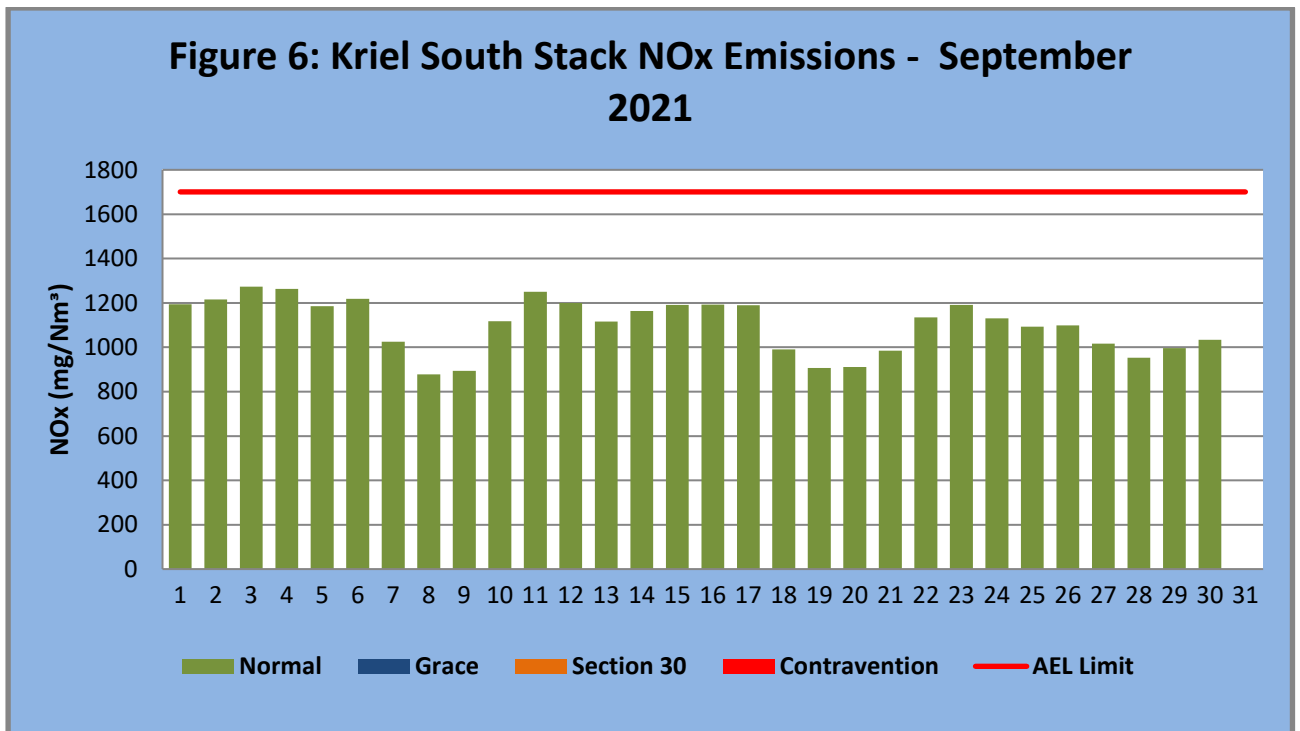


Figure 6. NO₂ emissions for the month of September 2021 against emission limit for the South Stack. The NO_x Limit is 1600mg/Nm³.

Table 4: Monthly tonnages for the month September 2021

Unit	PM (tons)	SO ₂ (tons)	NO ₂ (tons)
SUM	588.4	10 095.7	4 400.4

Table 5: Each unit and respective days operating under normal operation and section 30 days respectively

Table 5.1: Operating days in compliance to PM AEL Limit - September 2021

Associated Unit/Stack	Normal	Grace	Section 30	Contravention	Monthly Limit Exceedance	Average PM (mg/Nm ³)
North	14	16	0	0	0	124.3
South	15	10	5	0	1 (NEMA section30)	191.0

Table 5.2: Operating days in compliance to SOx AEL Limit - September 2021

Associated Unit/Stack	Normal	Grace	Section 30	Contravention	Total Exceedance	Average SOx (mg/Nm ³)
North	30	0	0	0	0	2 000.2
South	30	0	0	0	0	2 881.1

Table 5.3: Operating days in compliance to NOx AEL Limit - September 2021

Associated Unit/Stack	Normal	Grace	Section 30	Contravention	Total Exceedance	Average NOx (mg/Nm ³)
North	30	0	0	0	0	1 101.9
South	30	0	0	0	0	1 100.2

Light up information

Table 6: PM Start-up information for the month of fabricate September 2021

North Stack	Event 1		Event 2	
Unit No.	Unit 2		Unit	
Breaker Open (BO)	9:45 AM	2021/09/10	11:10 PM	2021/09/12
Draught Group (DG) Shut Down (SD)	DG did not trip or SD	DG did not trip or SD	11:10 PM	2021/09/14
BO to DG SD (duration)	n/a	DD:HH:MM	02:00:00	DD:HH:MM
Fires in time	9:45 AM	2021/09/10		
Synch. to Grid (or BC)	2:55 PM	2021/09/10		
Fires in to BC (duration)	00:05:10	DD:HH:MM		DD:HH:MM
Emissions below limit from BC (end date)	12:00 AM	2021/08/25		
Emissions below limit from BC (duration)		DD:HH:MM		DD:HH:MM

North Stack	Event 3		Event 4		Event 4	
Unit No.	Unit 2		Unit		Unit 3	
Breaker Open (BO)	7:45 AM	2021/09/21	1:10 AM	2021/09/02	11:55 PM	2021/09/23
Draught Group (DG) Shut Down (SD)	8:20 AM	2021/09/21	6:10 AM	2021/09/03	2:35 PM	2021/09/24
BO to DG SD (duration)	00:00:35	DD:HH:MM	01:05:00	DD:HH:MM	00:14:40	DD:HH:MM
Fires in time	10:10 AM	2021/09/21			10:15 PM	2021/09/25
Synch. to Grid (or BC)	4:50 PM	2021/09/23			11:00 AM	2021/09/28
Fires in to BC (duration)	02:06:40	DD:HH:MM		DD:HH:MM	02:12:45	DD:HH:MM
Emissions below limit from BC (end date)	not > limit	not > limit			not > limit	not > limit
Emissions below limit from BC (duration)	n/a	DD:HH:MM	n/a	DD:HH:MM		

South Stack	Event 1		Event 2		Event 3		Event 4	
Unit No.	Unit 4		Unit 5		Unit 4		Unit 6	
Breaker Open (BO)	7:40 PM	2021/09/04	11:15 PM	2021/09/03	9:40 PM	2021/09/10	8:30 PM	2021/09/14
Draught Group (DG) Shut Down (SD)	8:35 PM	2021/09/04	11:55 AM	2021/09/04	12:20 PM	2021/09/11	10:15 AM	2021/09/15
BO to DG SD (duration)	00:00:55	DD:HH:MM	00:12:40	DD:HH:MM	00:14:40	DD:HH:MM	00:13:45	DD:HH:MM
Fires in time	11:00 AM	2021/09/05	4:50 AM	2021/09/06	8:15 AM	2021/09/14	11:20 PM	2021/09/19
Synch. to Grid (or BC)	4:15 PM	2021/09/05	10:15 AM	2021/09/06	10:45 PM	2021/09/16	1:25 PM	2021/09/20
Fires in to BC (duration)	00:05:15	DD:HH:MM	00:05:25	DD:HH:MM	02:14:30	DD:HH:MM	00:14:05	DD:HH:MM
Emissions below limit from BC (end date)	not > limit	not > limit	12:00 AM	2021/08/25	12:00 AM	2021/08/25	12:00 AM	2021/08/25
Emissions below limit from BC (duration)	n/a	DD:HH:MM		DD:HH:MM		DD:HH:MM		DD:HH:MM

South Stack	Event 5		Event 6	
Unit No.	Unit 4		Unit	
Breaker Open (BO)	3:10 PM	2021/09/19	10:45 AM	2021/09/09
Draught Group (DG) Shut Down (SD)	4:05 PM	2021/09/19	1:25 AM	2021/09/10
BO to DG SD (duration)	00:00:55	DD:HH:MM	00:14:40	DD:HH:MM
Fires in time	8:20 PM	2021/09/19		
Synch. to Grid (or BC)	2:00 AM	2021/09/20		
Fires in to BC (duration)	00:05:40	DD:HH:MM		DD:HH:MM
Emissions below limit from BC (end date)	not > limit	not > limit		
Emissions below limit from BC (duration)	n/a	DD:HH:MM		DD:HH:MM

Complaints Register

Table 7: Complaints for the month of September 2021.

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	Date by which measure will be implemented
There was no complaint related to air quality received during the month of September 2021.					

General

The particulate matter (PM10) emissions on the North Common Stack were within the **monthly limit**; North stack recorded the monthly PM10 average emissions figure of **124.3 mg/Nm³** while south stack exceeded the **monthly limit** and recorded PM10 monthly average figure of **191 mg/Nm³**. The north stack's PM10 exceedance was caused by an upset condition which was reported in terms of

section 30 of NEMA (more details below). The gaseous (NOx & SOx) emissions on the north and south common stacks were also within the **daily limit** during the month of September 2021; refer to graphs above.

NEMA Section 30 - South Common Stack Upset Condition

- On Friday, 3 September 2021 (at around 12:00) , Operating Department activated a call for Emergency Response Team (ERT) as well as the Electrical Maintenance Department (EMD) to report to site after a fire was noted at the South Common Sulphur Plant.
- ERT immediately arrived on site (at around 12:05) and managed to extinguish the fire; and EMD also managed to isolate the electrical supply to the plant on the very same day.
- It was later discovered that the said fire had damaged some SO3 plant components resulting into a dysfunctional SO3 system at the south common sulphur plant (unit 4, 5 & 6). The damaged components included SO3 dosing pumps power cables, sulphur offloading pump power cable and a burnt SO3 dosing pump at Unit 6, which is where the reported fire had started.
- Upon detailed investigation it was discovered that the fire was caused by a spark from loose electrical connection on the motor terminal at the south SO3 pump house resulting into flashover. There was a sulphur leak on the SO3 pump house filter box which aggravated the aforementioned fire.
- Consequently, the SO3 system on the south side was offline resulting into Electrostatic Precipitators (ESPs) performing below the desired efficiency of 99%. This resulted into particulate matter (PM10) emissions on the south stack averaging above 300mg/Nm3 from the 3rd to the 7th of September 2021.

NB: The rest of the information demonstrating compliance with the emission license conditions is supplied in the annual emission reports sent to your office.

Table 8: Kriel Power Station's List of NEMA Section 30 Incidents for 2021/2022 Financial Year

Month	Description of Section30 Incidents	Root Cause (s)	Status of S30 Incident with DEFF (open or closed)	Remarks
April 2021	North Stack: Upset condition Unit 1,2 and 3 exceeded 48 hours Grace Period	1.Castlet Key System failure 2.Defective Pyrometers	Open	1 Event reported
May 2021	None			
June 2021	None			
July 2021	None			
Aug 2021	None			
Sep 2021	South Stack: Upset condition in Unit 4,5 &5 exceeded 48 hours grace period	Spark from loose electrical connection on the motor terminal at the South SO3 pump house resulting into flashover	Open	1 Event reported
Oct 2021				
Nov 2021				
Dec 2021				
Jan 2022				
Feb 2022				
Mar 2022				