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

Dear Ms Nembilwi

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

Raw Materials and Products used	Raw Material Type	Units	Maximum Permitted Consumption / Rate (Quantity)	Consumption / Rate in Month of April 2021
	Coal	Tons/month	1 227 600	673 566.30
	Fuel Oil	Tons/month	5 000	4 335.25
Production Rates	Product/ By-Product Name	Unit	Maximum Production Capacity Permitted (Quantity)	Production Rate in Month of April 2021
	Ash	Tons/month	not specified	629.71
	RE PM	kg/MWh	not specified	0.58 (not yet verified)

1/...

Abatement Technology

Table 2: Abatement Equipment Control Technology for April 2021.

Associated Unit/Stack	Technology Type	Actual Efficiency (%)
		April 2021
Unit 1	ESP	99.10%
Unit 2	ESP	99.09%
Unit 3	ESP	98.92%
Unit 4	ESP	99.69%
Unit 5	ESP	99.71%
Unit 6	ESP	99.67%

Energy Source Characteristics

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




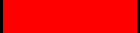
Characteristic	Stipulated Range (Unit)	Monthly Average Content
Sulphur Content	0.6-1.2 (%)	0.76
Ash Content	21-36 (%)	26.14

Monthly Monitor Reliability

Associated Unit/Stack	PM (%)	SO _x (%)	NO _x (%)
North	64.11	45.91	45.91
South	96.70	98.88	99.41

Emissions Reporting

Table 6.5: 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

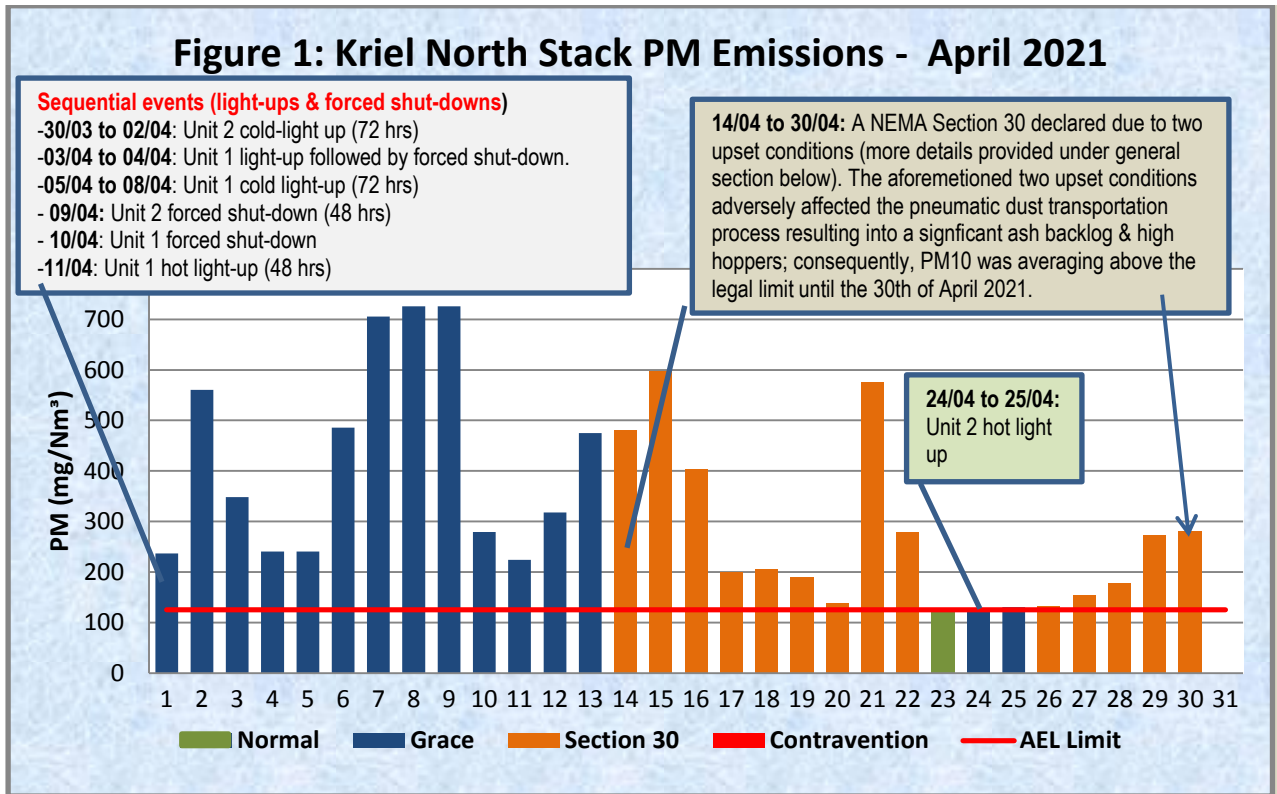


Figure 1: PM emissions (daily averages) for the month of April 2021 against emission limit for the North Stack

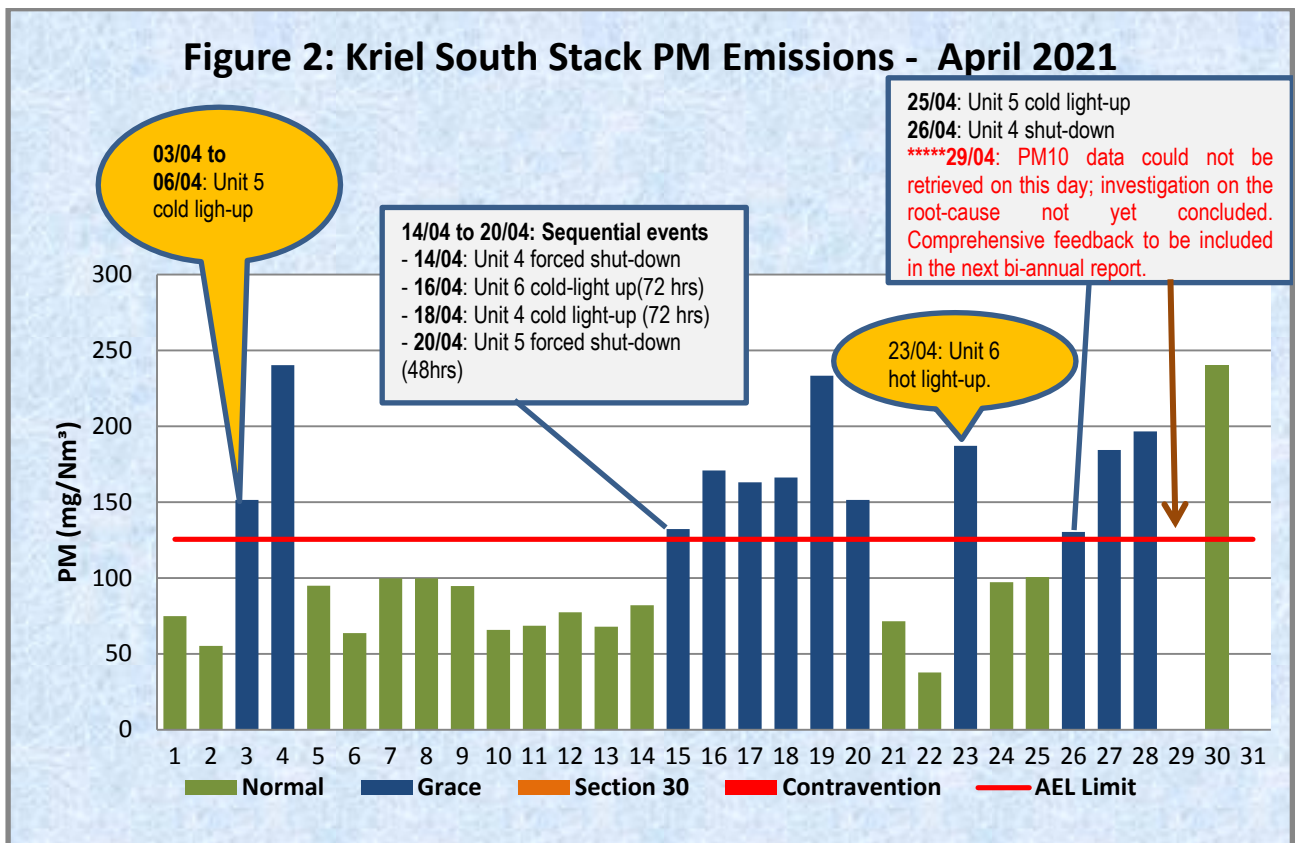


Figure 2: PM emissions (daily averages) for the month of April 2021 against emission limit for the South Stack

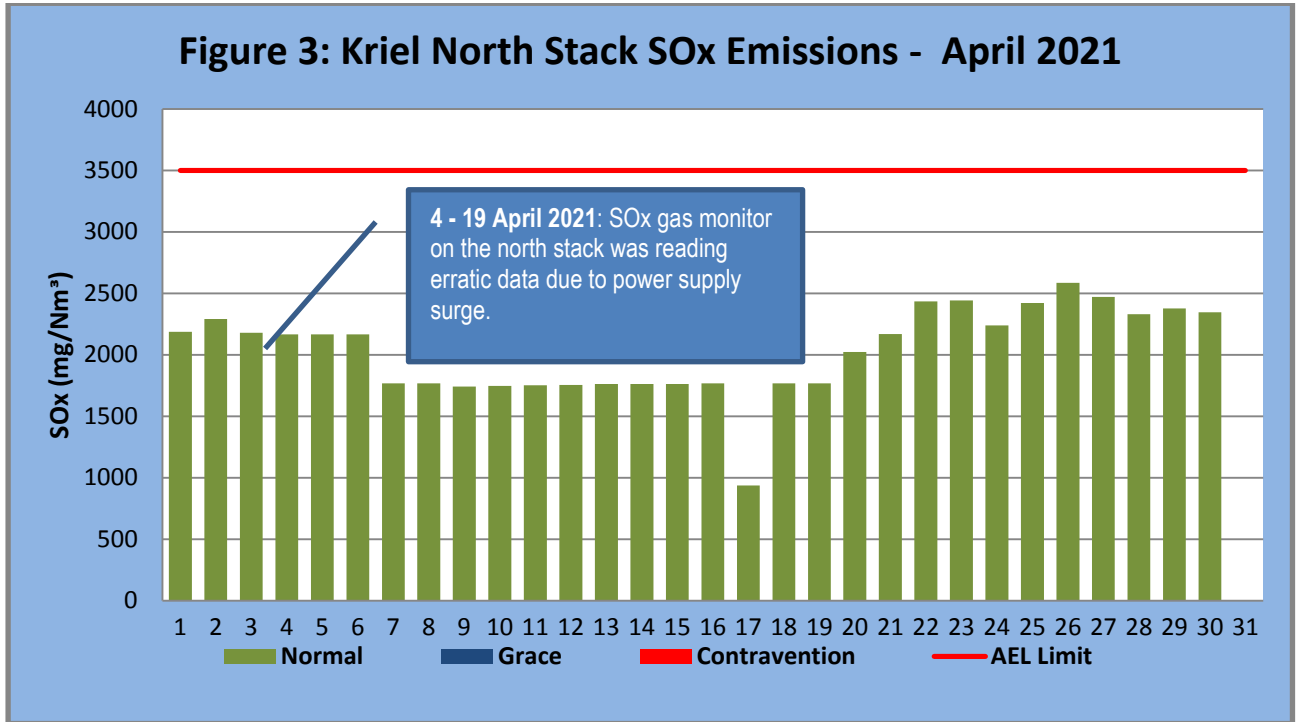


Figure 3. SO₂ emissions (daily averages) for the month of April 2021 against emission limit for the North Stack. The SO_x Limit is 3500mg/Nm³.

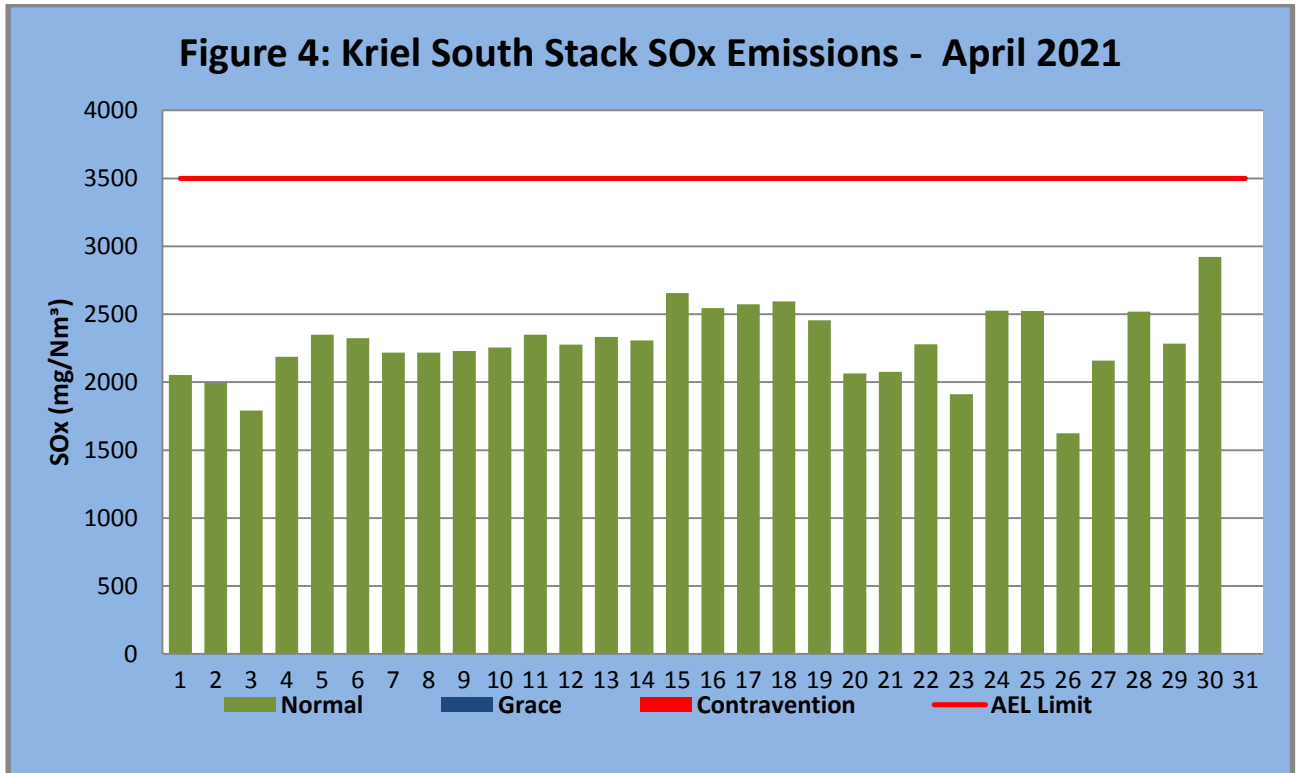


Figure 4. SO₂ emissions (daily averages) for the month of April 2021 against emission limit for the South Stack. The SO_x Limit is 3500mg/Nm³.

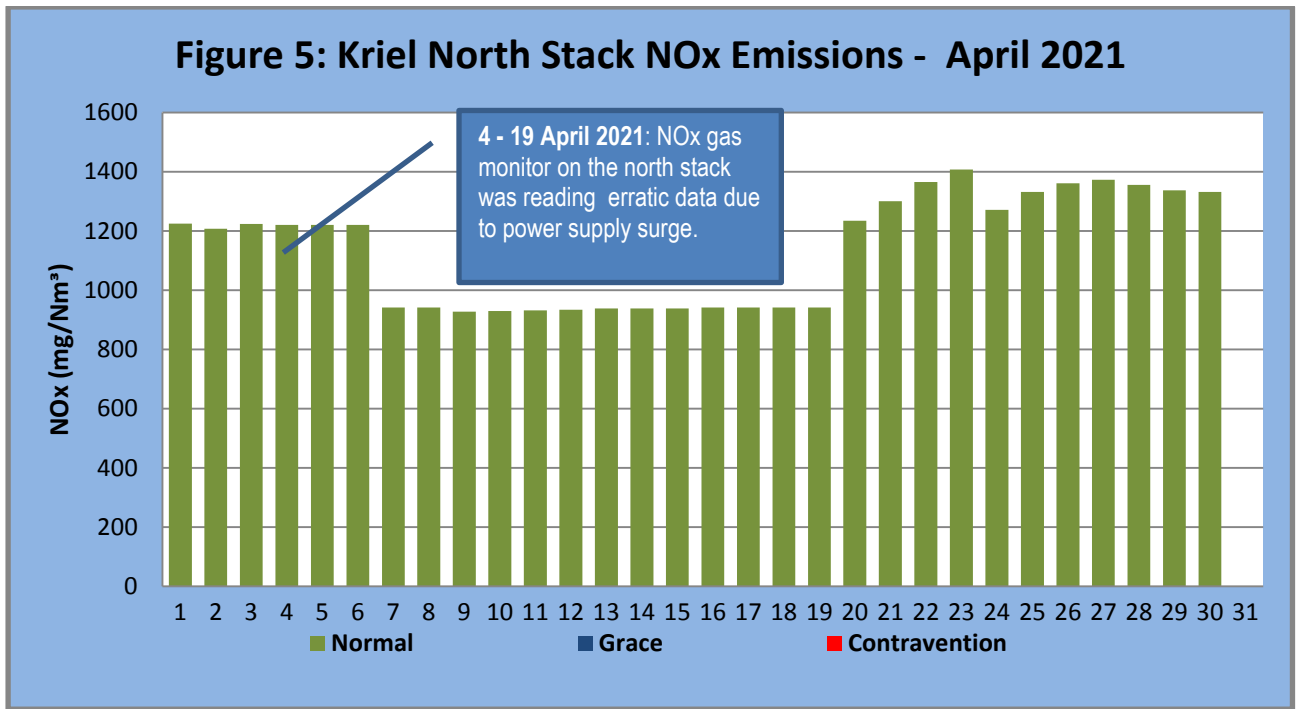


Figure 5. NO₂ emissions (daily averages) for the month of April 2021 against emission limit for the North Stack. The NO_x Limit is 1600mg/Nm³.

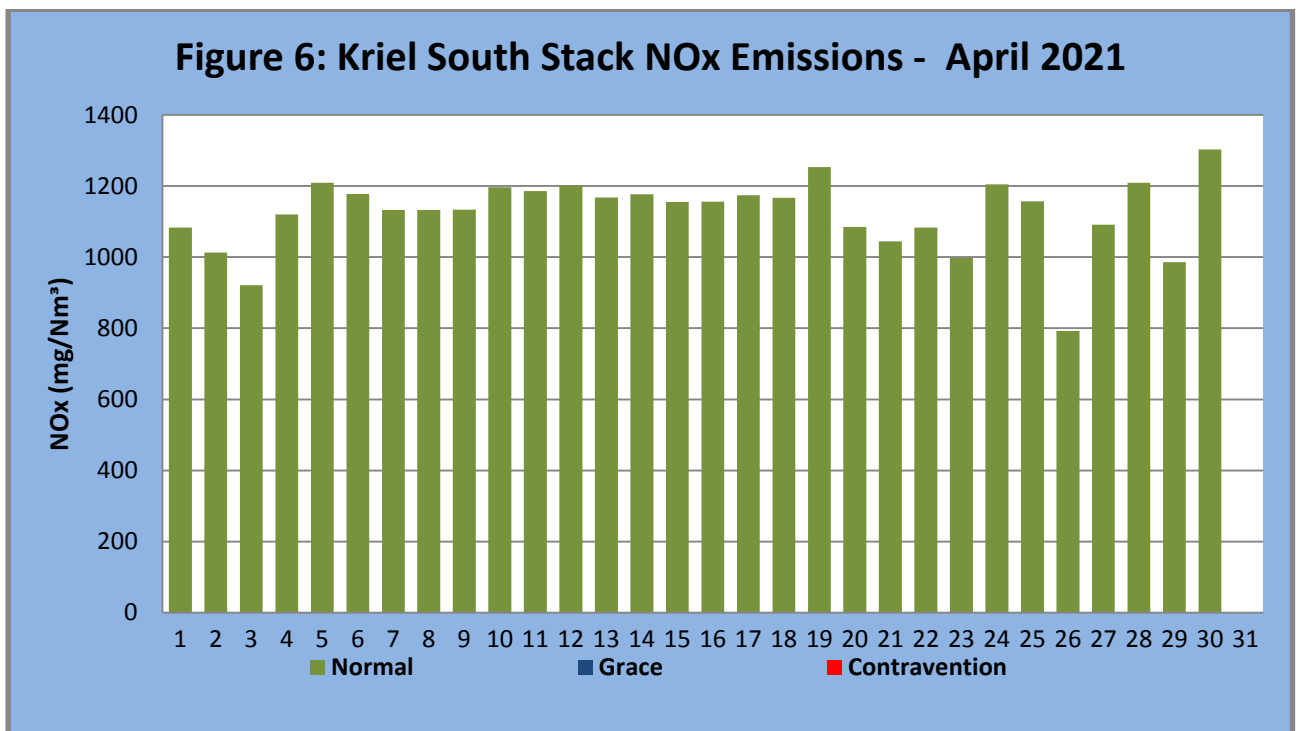


Figure 6. NO₂ emissions (daily averages) for the month of April 2021 against emission limit for the South Stack. The NO_x Limit is 1600mg/Nm³.

Table 4: Monthly tonnages for the month April 2021

Unit	PM (tons)	SO ₂ (tons)	NO ₂ (tons)
SUM	629.71	9539.3	4875.5

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 - April 2021

Associated Unit/Stack	Normal	Grace	Section 30	Contravention	Monthly Limit Exceedance	Average PM (mg/Nm ³)
North	1	15	14	0	1	334.4
South	17	12	0	0	0	119.4

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

Associated Unit/Stack	Normal	Grace	Section 30	Contravention	Total Exceedance	Average SOx (mg/Nm ³)
North	30	0	0	0	0	2 217.9
South	30	0	0	0	0	2 295.8

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

Associated Unit/Stack	Normal	Grace	Section 30	Contravention	Total Exceedance	Average NOx (mg/Nm ³)
North	30	0	0	0	0	1 291.8
South	30	0	0	0	0	1 126.3

Light up information

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

North Stack	Event 1		Event 2	
Unit No.	Unit 1		Unit 1	
Breaker Open (BO)			12:30 PM	2021/04/10
Draught Group (DG) Shut Down (SD)			9:25 AM	2021/04/11
BO to DG SD (duration)		DD:HH:MM	00:20:55	DD:HH:MM
Fires in time	5:40 AM	2021/04/03	3:00 PM	2021/04/11
Synch. to Grid (or BC)	11:25 AM	2021/04/05	7:35 PM	2021/04/11
Fires in to BC (duration)	02:05:45	DD:HH:MM	00:04:35	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
North Stack	Event 3		Event 4	
Unit No.	Unit 2		Unit 2	
Breaker Open (BO)	1:15 AM	2021/04/09	9:55 PM	2021/04/23
Draught Group (DG) Shut Down (SD)	2:35 AM	2021/04/10	10:20 PM	2021/04/23
BO to DG SD (duration)	01:01:20	DD:HH:MM	00:00:25	DD:HH:MM
Fires in time	8:55 PM	2021/04/13	2:10 PM	2021/04/24
Synch. to Grid (or BC)	10:25 AM	2021/04/14	6:25 PM	2021/04/24
Fires in to BC (duration)	00:13:30	DD:HH:MM	00:04:15	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	
Unit No.	Unit 4		Unit 6		Unit 5	
Breaker Open (BO)	10:50 AM	2021/04/14	9:55 PM	2021/04/13	11:35 PM	2021/04/03
Draught Group (DG) Shut Down (SD)	7:25 AM	2021/04/15	3:55 AM	2021/04/14	5:55 AM	2021/04/04
BO to DG SD (duration)	00:20:35	DD:HH:MM	00:06:00	DD:HH:MM	00:06:20	DD:HH:MM
Fires in time	9:00 PM	2021/04/17	10:55 AM	2021/04/16	2:50 PM	2021/04/06
Synch. to Grid (or BC)	4:15 AM	2021/04/18	4:15 PM	2021/04/16	8:55 PM	2021/04/08
Fires in to BC (duration)	00:07:15	DD:HH:MM	00:05:20	DD:HH:MM	02:06:05	DD:HH:MM
Emissions below limit from BC (end date)	not > limit	not > limit	12:00 AM	2021/03/26	not > limit	not > limit
Emissions below limit from BC (duration)	n/a	DD:HH:MM	n/a	DD:HH:MM	n/a	DD:HH:MM

Complaints Register

Table 7: Complaints for the month of April 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 April 2021.					

General

The particulate matter (PM10) emissions on the north common stack exceeded the monthly limit due to upset conditions (section 30) as well as sequential unit(s) light-ups and forced shut-downs events; south common stack was within the monthly limit. North stack recorded an averaged monthly PM10 emissions figure of **334.43 mg/Nm³** while south stack recorded an averaged monthly PM10 figure of **119.38 mg/Nm³**. The gaseous (NOx & SOx) emissions on the north and south common stack were within the **daily limit** during the month of April 2021; refer to graphs above.

Data Reliability – North Stack

- PM10 monitor:** particulate matter monitor for north stack was below the legal reliability threshold of 80% due to numerous events such as unit(s) light-ups, forced shut-downs and upset conditions which resulted into PM10 emissions averaging above 400mg/Nm³ for a couple of days during the month of April 2021. Thus, when the PM10 emissions exceeds a configured or calibrated monitor range (400mg/Nm), the monitor reliability also becomes compromised. Kriel Power Station has been taking necessary measures such as load reduction, plant maintenance, etc., to reduce the aforementioned PM10 emissions from its generating units; and more measures in this regard will continue to be taken to demonstrate the power station's duty of environmental care.
- Gas monitors (SOx & NOx):** From the 4th to the 19th of April 2021, gaseous emissions monitors (NOx and SOx) on the north stack were found to be reading erratic data. Subsequent to undertaking an investigation, it was found that the said monitor issue was caused by a power supply surge. The power supply issue was fixed and the OEM came to site on the 20th of April 2021 to repair, calibrate and restore the monitors to service. This

incident has certainly impacted adversely on Kriel Power Station’s statutory reporting requirements of gaseous emissions on the north stack. However, based on the investigation on maximum emissions release rate conducted at both north and south common stacks, gaseous emissions at Kriel Power Station cannot exceed the current legal limits during Plant Start-Up, Upset or Maintenance and Shutdown Conditions. Based on previous readings during normal operations, the gaseous emission limits have not been exceeded then either. Kriel Power Station is confident that gaseous emissions on the north stack have been within the limit during the period when the monitor was faulty. The days at which the monitor was properly functioning were used to measure compliance for the month of April 2021.

North Stack – NEMA Section 30 incident

- On Monday, 12 April 2021 (at around 05:05) Operating Department noted a sudden increase on north stack emissions performance, averaging above 125mg.Nm3.
- Maintenance team was called out to investigate the cause of high emissions. Maintenance Team discovered that high emissions on the North were because of ESP fields that were tripping and consequently performing below the desired efficiency of 99%. This was a result of ash accumulation on the ESP fields.
- Still on the 12th of April 2021, at around 08:50, operating Department noted that all the Main Silo conditioners were tripping. maintenance and Engineering team were called to investigate and assist resolve the issue
- The issue of mail Silo conditioners which were tripping was resolved by the 13h of April 2021
- On the 14th of April 2021, maintenance noted that some rappers at Unit 3 were not running this resulting to ash accumulation , and also reported that ash agitators are too stiff on most hoppers
- On Wednesday, 14 April 2021(at around08:46) Maintenance team had successfully revived up to 75% of the above-mentioned rappers that were stuck.
- Subsequently , Engineering Department discovered that fly ash in Unit 3 dust handling system could not pneumatically conveyed as the ash transportation line was blocked , upon further investigation , it was found that unit 3 ash transportation line was impacted by Unit 2 incident relating to the defect on the boiler combustion system , in particulate boiler pyrometer. The incident resulted into a sticky ash at Unit 2 which eventually affected Unit 3 ash transportation line as the routes are common used
- The aforementioned incident resulted into the ash transportation route being blocked resulting into ash accumulation on Unit 3
- On the 18th of April 2021, a decision was taken to shut down Unit 3 in order to address the issue with ash transportation and ash backlog
- On the 20th of April 2021 (11:30), north stack emissions were noted reading a daily average of around 95 mg/Nm3.
- On the 22nd of April 2021, the castlet ley system failed to de-isolate resulting into a left hand field ESP at Unit 3 dysfunctional. Upon investigation , it was found that the failure was caused by the dust ingress into the system
- NB: North Stack’s dry dust handling plants were maintained in the recent outages carried

Kriel Power Station’s List of NEMA Section 30 Incidents for 2021/2022 Financial Year

Month	Description of Section30 Incidents - including the reference number	Root Cause (s)	Status of S30 Incident with DEFF (open or closed)	Remarks
April – 2021	Upset condition I Unit 1,2 and 3 exceeded 48 hours Grace Period	1.Castlet Key System failure 2.Defective Pyrometers	Open	1 event reported