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Date:  
 14 March 2019

Enquiries:

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

Dear Mr Mahlangu

### **KRIEL POWER STATION'S MONTHLY STACK EMISSIONS REPORT FOR THE MONTH OF DECEMBER 2018**

This serves as the monthly report required in terms of Section 7.2.1 in Kriel Power Station's Atmospheric Emission License 17/4/AEL/MP312/11/09. The emissions are for the month of December 2018. Verified emissions of particulates matter, SO<sub>2</sub> and NO<sub>x</sub> (as NO<sub>2</sub>) are also included.

#### **Raw Materials and Products**

**Table 1:** Quantity of Raw Materials and Products used/produced for the month of December 2018

Raw Materials and Products used	Raw Material Type	Units	Maximum Permitted Consumption/ Rate (Quantity)	Consumption/ Rate in Month of December 2018
	Coal	Tons/month	1 227 600	595 625
	Fuel Oil	Tons/month	5 000	1 043.84
Production Rates	Product/ By-Product Name	Unit	Maximum Production Capacity Permitted (Quantity)	Production Rate in Month of December 2018
	Ash	Tons/month	not specified	625.62
	RE PM	kg/MWh	not specified	0.51

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## Abatement Technology

**Table 2:** Abatement Equipment Control Technology for December 2018

Associated Unit/Stack	Technology Type	Actual Utilisation (%)
		December 2018
Unit 1	ESP	100%
Unit 2	ESP	Outage
Unit 3	ESP	100%
Unit 4	ESP	90%
Unit 5	ESP	100%
Unit 6	ESP	92.5%

## Energy Source Characteristics



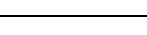
**Table 3:** Energy Source Material Characteristics for the month of December 2018

Characteristic	Stipulated Range (Unit)	Monthly Average Content
CV Content	18-24 (MJ/kg)	
Sulphur Content	0.6-1.2 (%)	0.81
Ash Content	27-32 (%)	26.40

## Monthly Monitor Reliability

Associated Unit/Stack	PM (%)	SO <sub>x</sub> (%)	NO <sub>x</sub> (%)
North	99.7	92.5	92.5
South	98.3	94.0	94.0

## Emissions Reporting

GRAPH LEGEND	
	Final daily emissions average in mg/Nm <sup>3</sup> released within a particular day
	Final monthly emissions average in mg/Nm <sup>3</sup> released within the whole month
	Emissions limit as per the AEL

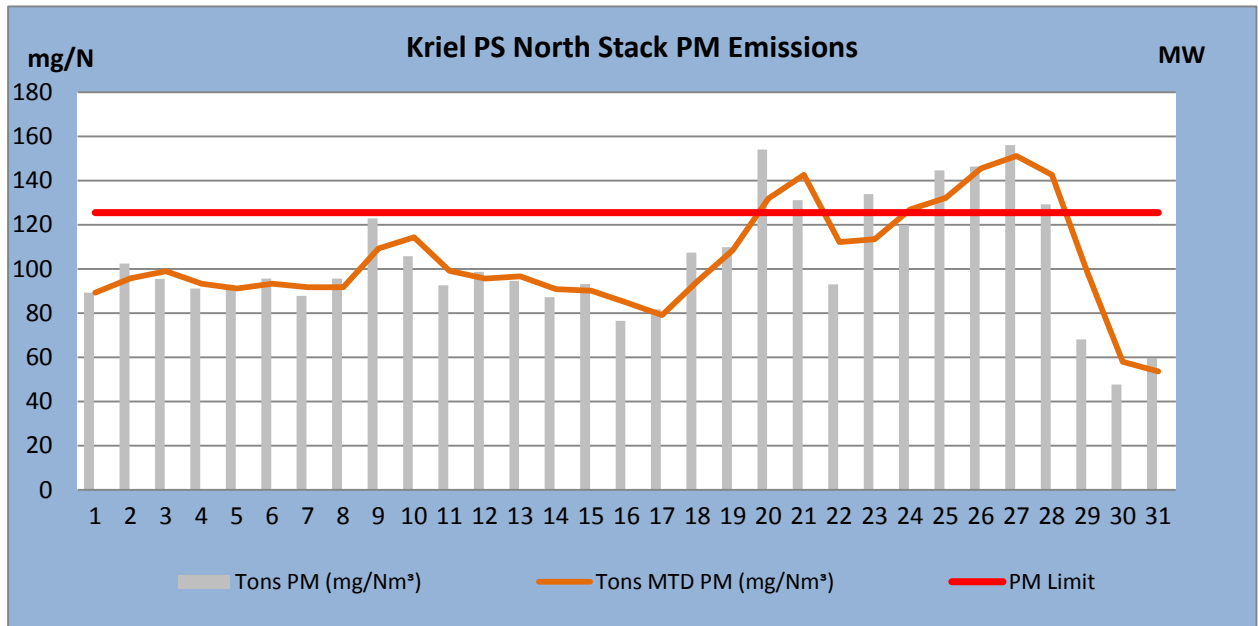


Figure 1: PM emissions (daily averages) for the month of December 2018 against emission limit for the North Stack

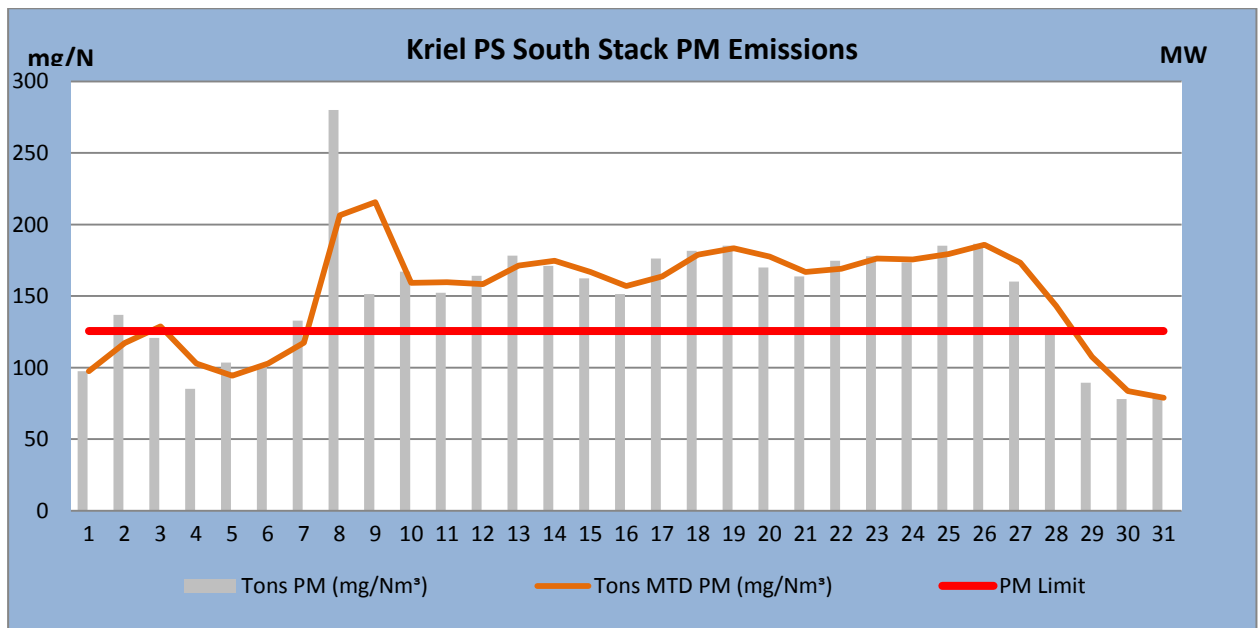


Figure 2: PM emissions (daily averages) for the month of December 2018 against emission limit for the South Stack

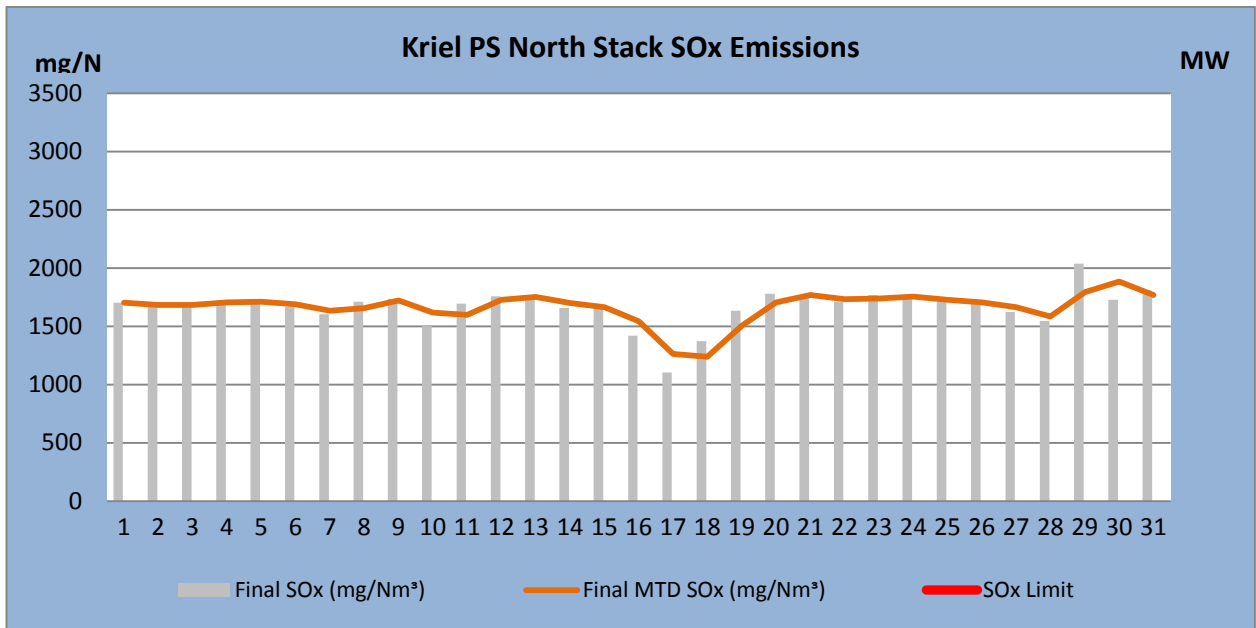
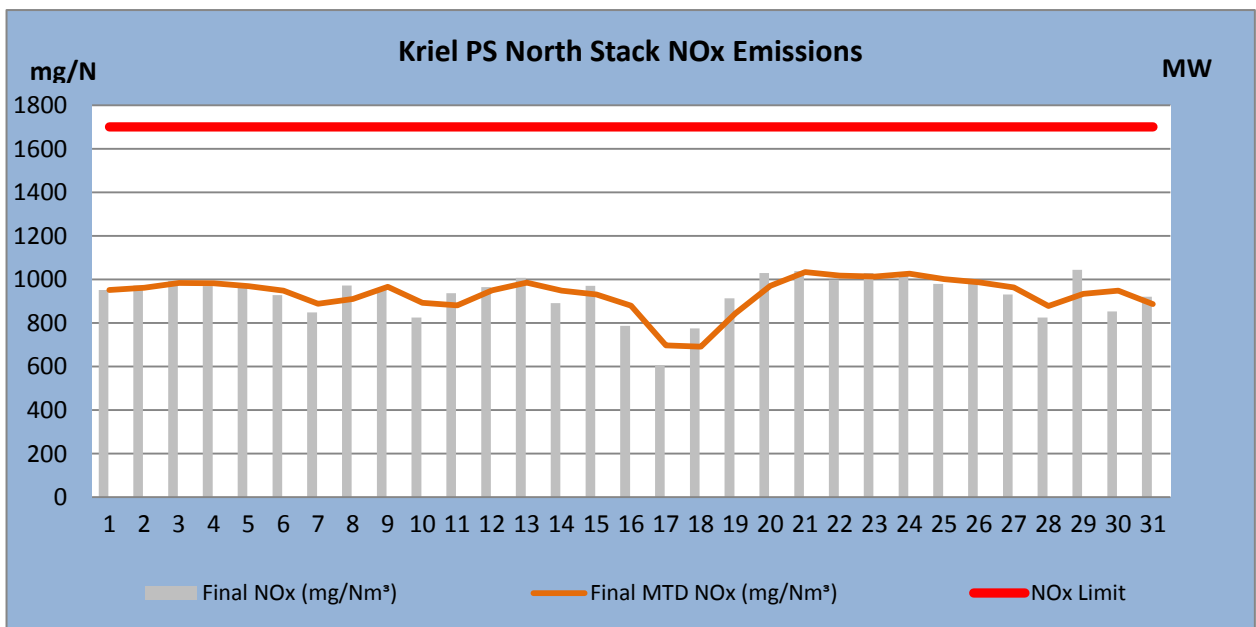


Figure 3. SO<sub>2</sub> emissions (daily averages) for the month of December 2018 against emission limit for the North Stack. SO<sub>x</sub> permitted maximum release rate is 3 500mg/Nm<sup>3</sup>



4. NO<sub>2</sub> emissions (daily averages) for the month of December 2018 against emission limit for the North Stack. NO<sub>x</sub> permitted maximum release rate is 1 600mg/Nm<sup>3</sup>

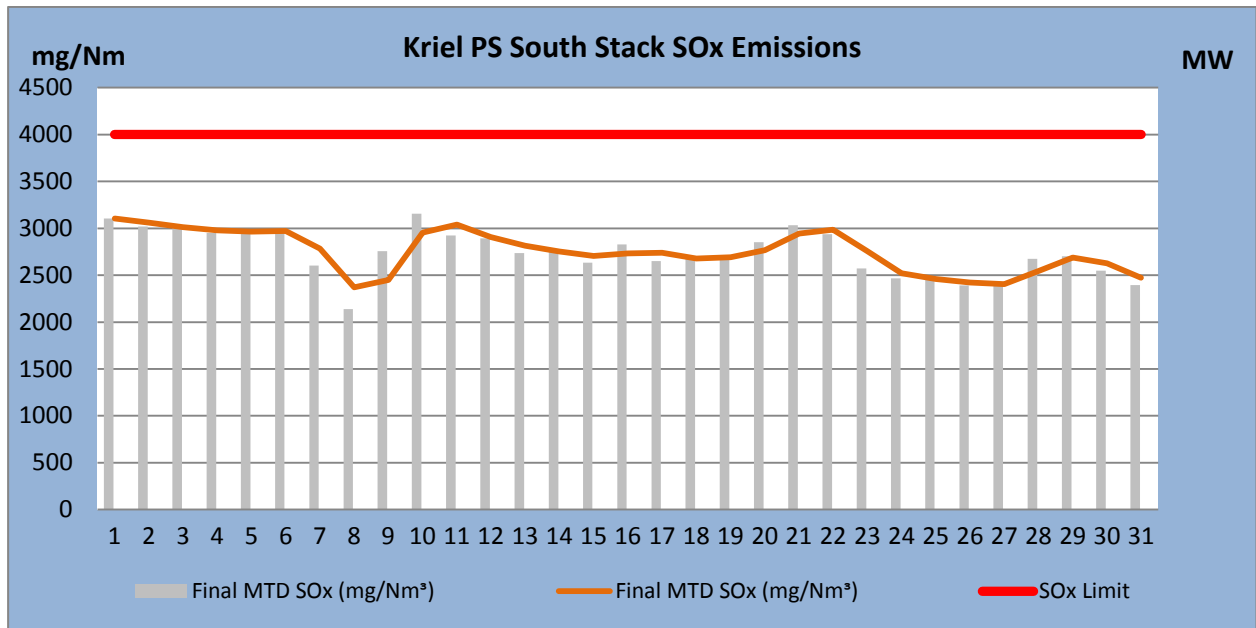


Figure 5. SO<sub>2</sub> emissions (daily averages) for the month of December 2018 against emission limit for the South Stack. SO<sub>x</sub> permitted maximum release rate is 3 500mg/Nm<sup>3</sup>

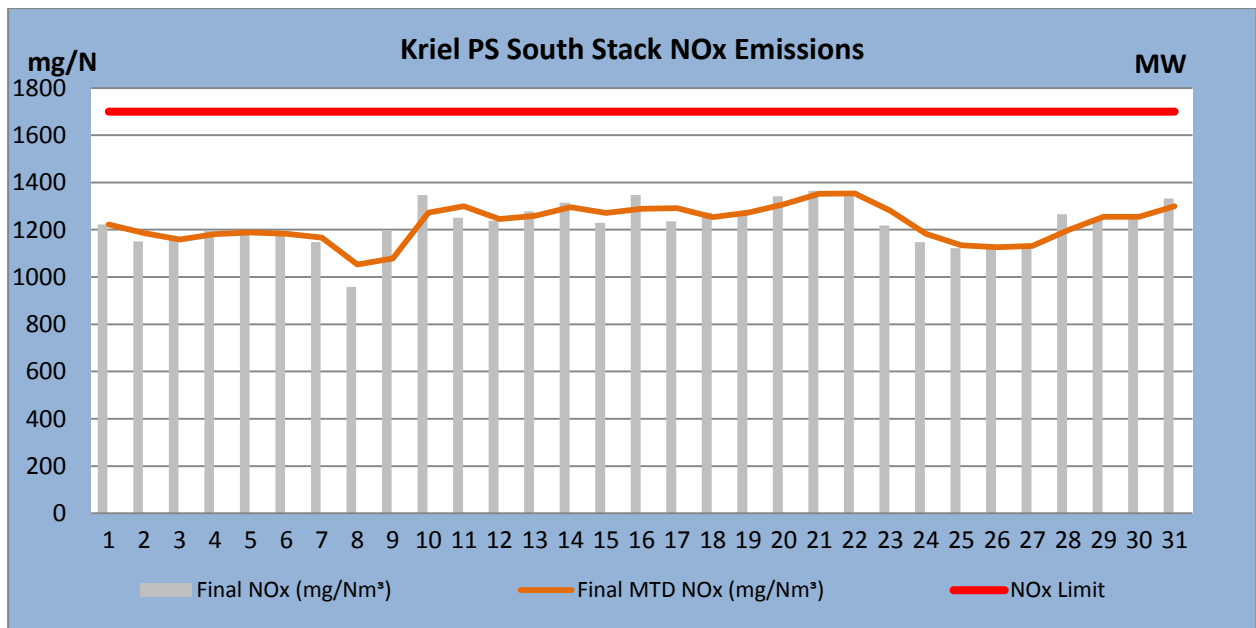


Figure 6. NO<sub>2</sub> emissions (daily averages) for the month of December 2018 against emission limit for the South Stack. NO<sub>x</sub> permitted maximum release rate is 1 600mg/Nm<sup>3</sup>

Table 4: Monthly tonnages for the month December 2018

Unit	PM (tons)	SO <sub>2</sub> (tons)	NO <sub>2</sub> (tons)	CO <sub>2</sub> (tons)
1	87.1	1 519.6	851.3	
2	0.0	0.0	0.0	
3	95.3	1 572.2	890.0	
4	154.6	3 030.8	1 378.4	
5	124.2	2 453.9	1 149.5	
6	164.4	3 252.5	1 442.9	
SUM	625.6	11 828.9	5 712.0	

<b>Operating Days (DD:HH:MM)</b>				
<b>Unit</b>	<b>Normal operation</b>	<b>In grace period</b>	<b>Under S 30</b>	<b>Unit off load</b>
<b>1</b>	23:14:40	00:00:00	00:00:00	07:09:20
<b>2</b>	00:00:00	00:00:00	00:00:00	31:00:00
<b>3</b>	23:22:30	00:00:00	00:00:00	07:01:30
<b>4</b>	22:17:40	00:00:00	00:00:00	08:06:20
<b>5</b>	21:04:00	00:00:00	00:00:00	09:20:00
<b>6</b>	24:09:40	00:00:00	00:00:00	06:14:20

**Table 6: PM Start-up information for the month of December 2018**

<b>North Stack</b>	<b>Event 2</b>		<b>Event 3</b>		<b>Event 5</b>		<b>Event 6</b>	
<b>Unit No.</b>	<b>Unit 3</b>		<b>Unit 1</b>		<b>Unit 1</b>		<b>Unit 3</b>	
<b>Fires in</b>	1:10 PM	05/12/2018	4:35 PM	17/11/2018	5:05 AM	03/12/2018	6:10 PM	23/12/2018
<b>Synchronisation with Grid</b>	4:50 PM	05/12/2018	1:05 AM	18/11/2018	4:50 PM	05/12/2018		
<b>Emissions below limit from Sync (Date and Time)</b>								
<b>Fires in to synchronisation</b>	00:03:40		00:08:30		02:11:45			
<b>Synchronisation to &lt; limit (Duration)</b>	did not go above limit		did not go above limit		did not go above limit		did not go above limit	

<b>South Stack</b>	<b>Event 2</b>		<b>Event 3</b>		<b>Event 4</b>		<b>Event 5</b>		<b>Event 6</b>	
<b>Unit No.</b>	<b>Unit 4</b>		<b>Unit 5</b>		<b>Unit 5</b>		<b>Unit 4</b>		<b>Unit 6</b>	
<b>Fires in</b>	1:15 PM	04/12/2018	4:55 AM	06/12/2018	12:05 AM	12/12/2018	6:45 PM	21/12/2018	8:10 PM	17/12/2018
<b>Synchronisation with Grid</b>	3:30 AM	05/12/2018	12:10 PM	06/12/2018	6:05 AM	12/12/2018	7:45 AM	22/12/2018	3:15 PM	18/12/2018
<b>Emissions below limit from Sync</b>										
<b>Fires in to synchronisation</b>	00:14:15		00:07:15		00:06:00		00:13:00		00:19:05	
<b>Synchronisation to &lt; limit</b>	did not go above limit		did not go above limit		did not go above limit		did not go above limit		did not go above limit	

Table 7. Point Source emissions released during start-up (fires-in) for the month of December 2018 in mg/Nm<sup>3</sup>

North Stack Emission Average from Fires-in to Synchronisation (Date and Time)							
Unit	Fires-In		Synchronisation		PM	SO <sub>2</sub>	NO <sub>x</sub>
Unit 3	05/12/2018	1:10 PM	05/12/2018	4:50 PM	362.0	1173.9	588.9
Unit 1	17/12/2018	1:15 AM	17/12/2018	8:50 AM	255.7	882.3	452.8
Unit 1	03/12/2018	5:05 AM	05/12/2018	4:50 PM	90.7	1478.8	836.4
Unit 3	23/12/2018	6:10 PM	23/12/2018	9:55 PM	395.7	1289.7	686.7

South Stack Emission Average from Fires-in to Synchronisation (Date and Time)							
Unit	Fires-In		Synchronisation		PM	SO <sub>2</sub>	NO <sub>x</sub>
Unit 4	04/12/2018	1:15 PM	05/12/2018	3:30 AM	163.2	2901.7	1160.7
Unit 5	06/12/2018	4:55 AM	06/12/2018	12:10 PM	185.3	2586.4	1087.1
Unit 5	12/12/2018	12:05 AM	12/12/2018	6:05 AM	282.5	1029.3	340.1
Unit 4	21/12/2018	6:45 PM	22/12/2018	7:45 AM	315.8	2448.7	1076.0
Unit 6	17/12/2018	8:10 PM	18/12/2018	3:15 PM	428.9	1661.3	626.2

Table 8. Point Source emissions released during Shut-down (SD) for the month of December 2018 in mg/Nm<sup>3</sup>

North Stack Emission Average Breaker Open (BO) to Draft Group Shut Down (SD) (Date & Time)						
Unit	Breaker Open	DG SD	PM	SO <sub>2</sub>	NO <sub>x</sub>	
Unit 3	03/12/2018	03/12/2018	81.1	1176.4	661.3	
Unit 1	09/12/2018	10/12/2018	141.1	1268.5	716.6	
Unit 1	11/12/2018	12/12/2018	174.0	1453.5	798.3	
Unit 3	23/12/2018	23/12/2018	157.8	1283.4	693.3	
Unit 3	28/12/2018	28/12/2018	64.9	947.6	512.1	

South Stack Emission Average Breaker Open (BO) to Draft Group Shut Down (SD) (Date & Time)							
Unit	Breaker Open		DG SD		PM	SO <sub>2</sub>	NO <sub>x</sub>
Unit 4	02/12/2018	8:30 PM	03/12/2018	6:55 PM	251.6	2547.8	992.2
Unit 5	08/12/2018	11:40 AM	08/12/2018	2:40 PM	286.0	1493.8	655.9
Unit 4	17/12/2018	3:30 PM	18/12/2018	5:20 AM	420.0	1448.5	548.4
Unit 6	11/12/2018	11:45 PM	12/12/2018	12:30 PM	248.9	1419.9	536.9



**Complaints Register**

**Table 9:** Complaints for the month of December 2018

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 December 2018					

General

The particulate matter emissions for the North Common Stacks were within the limit for the month of December 2018 however on the South Common Stack was above the limit during the month of December 2018. The Sequence of events that were experienced was as follows:

- On the 22<sup>nd</sup> of December 2018 Unit 04 was returned to service (cold light up) and was synchronized to the grid (at around (Time: 03:36) the following);
- On the 24<sup>th</sup> of December 2018 (Time:12:10), Subsequent to unit 04 light up, unit 5 dry dust plant suffered a setback when 5.1 blow tank was noted to be transporting slowly; maintenance team was immediately called out to site to resolve the issue. During the period between the 24<sup>th</sup> of December 2018 (Time:12:10) and the 26<sup>th</sup> of December 2018 (estimated time 12:00), numerous failures on 5.1 and 5.2 blow tanks at unit 05 were experienced resulting into ash transportation challenges and backlog.
- On the 24<sup>th</sup> of December 2018 (at around 08:22), ash transportation from unit 5 was negatively affected as result of conditioner 5B coupling which got damaged and overland conveyor belt 18A which kept on tripping. Maintenance team was immediately called out to site to attend to the defect which they successfully resolved around 11:15 the very same day. This issue significantly resulted into high hopper levels (22 hopper alarms recorded); the said high hopper levels directly impact on the precipitator performance and takes approximately 10 to 16 hours to clear them.
- On the 25<sup>th</sup> of December 2018 (Time:03:00), the SO<sub>3</sub> plant heater at Unit 06 tripped due to heatsink malfunctioning affecting the electrostatic precipitator trapping efficiency (temperatures read between 125 – 174 degrees Celsius); the heatsink defect started on the 25<sup>th</sup> of December 2018 (Time:15:00) and it was eventually resolved on the 26<sup>th</sup> of December 2018 (Time:21:34). The SO<sub>3</sub> plant heater was returned to service with temperatures rising (temperatures reading between 280 – 339 degrees Celsius);
- Unit 05 tripped (at around 08:42 pm) and was returned to service on the 27<sup>th</sup> of December 2018 (at around 04:52 am).

The monthly gaseous emissions (NO<sub>x</sub> & SO<sub>x</sub>) were also within the limit for both stacks;

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