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Date:
07 December 2020

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Ref: LRP03PLA000 _0218/20201126

Dear Mr. Sibaya

RESUBMISSION OF LETHABO POWER STATION MONTHLY EMISSIONS REPORTS

Lethabo Power Station has resubmitted the monthly emissions reports for the period from November 2019 to September 2020. This letter serves as explanation for the need to resubmit the reports and key factors to be considered when interpreting the attached reports.

Replacement of Particulate Matter Monitors

As part of a capital project, Lethabo Power Station replaced the emissions monitors for Particulate Matter (PM) during November 2019. Due to the Original Equipment Manufacturer (OEM) support which expired at the end of 2019. The exact dates of monitor replacements are as follow:

Unit	Monitor Replacement Date	Period Without PM Emissions Data
Unit 1	18 November 2019	18 November 2019 at 09:20, until 19 November 2019 at 14:50
Unit 2		
Unit 3		
Unit 4	14 November 2019	N/A – Unit was off during the time of replacement
Unit 5		
Unit 6		14 November 2019 at 09:54 until 16:19

Since the replacement dates above, the new monitors have been used for reporting purposes and the previous correlation curves were still valid at the time of monitor replacement. Although it was advised to have new correlation curves generated for the new monitors and correlation tests had to be redone. After the valid correlation curves were received the data had to be back fitted with valid correlation factors. It was noted in original monthly reports, as well as the Lethabo Power Station Annual Emissions Report for 2020 Financial Year, that the correlation tests used previously are invalid since the monitor replacement.

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Conducting Correlation Tests and Implementation

The correlation test for Unit 1 and 2 were completed in December 2019 and the results were received on 27 February 2020 (Unit 1) and 2 March 2020 (Unit 2). Units 3 and 4 correlation tests were conducted in February 2020, and the reports were received in 23 May 2020 (Unit 3) and 27 June (Unit 4).

The correlation test for Unit 5 and Unit 6 took place in May 2020 and results for both Units were received on 30 June 2020. Delays in the correlation tests for Units 5 and 6 were attributed to the Units being off for outages for extended periods until February 2020 and April 2020 respectively. Thereafter COVID-19 lockdown restrictions caused additional delays to the test being conducted.

During verification of the correlation curves it was determined that the Units 4 and 6 correlations curves were not acceptable due to the coefficient factor not being within specification. Additionally, defects were identified on the new PM monitors and a decision was made redo to all PM correlations for all six units. The correlation tests were redone in July and August 2020 and the reports for second round of correlation tests were finalized and implemented in October 2020. Once the correlation tests were finalized, the station commenced with back fitting the data with valid curves.

Gaseous Emissions Investigations

Challenges were experienced with gaseous monitor reliability since February 2020, mainly due to calibration gas not being available intermittently. The lack of calibration gas meant that proper calibration of the monitors could not occur as planned. The challenge of procuring calibration gas was experienced by multiple Eskom sites; however, the station was able to place a temporary order for the procurement of calibration gas to do calibration on the monitors. Numerous investigations have been launched to determine which times have been affected by the monitors that were not properly calibrated. The findings from these investigation results have been actioned and the affected data was corrected as recommended.

Correlation Curve Validity and Back Fitting Rationale:

The table below reflects the previous and present gaseous and PM correlation dates and validity.

	PM and Gaseous Correlation Curves Validity and Implementation as at 26 October 2020					
	Unit 1	Unit 2	Unit 3	Unit 4	Unit 5	Unit 6
Correlation 1 PM	02/07/2018	17/08/2018	31/10/2019	22/06/2019	13/05/2018	22/06/2019
Expiry	02/07/2020	17/08/2020	31/10/2021	22/06/2021	13/05/2020	22/06/2021
Validity	Not Valid Due to PM Monitor change (Nov-19)	Not Valid Due to PM Monitor change (Nov-19)	Not Valid Due to PM Monitor change (Nov-19)	Not Valid Due to PM Monitor change (Nov-19)	Not Valid Due to PM Monitor change (Nov-19)	Not Valid Due to PM Monitor change (Nov-19)
Implemented	31/08/2018	05/10/2018	20/11/2019	31/07/2019	04/07/2018	12/07/2019
Reference	RSL285	RSL286	RSL345	RSL324	RSL274	RSL323

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Correlation 2 PM	10/12/2019	15/12/2019	20/02/2020	22/06/2019	20/05/2020	22/06/2019
Expiry	10/12/2022	15/12/2022	20/02/2022	22/06/2021	20/05/2022	22/06/2021
Validity	Valid	Valid	Valid	Not Valid Due to PM Monitor change (Nov-19)	Valid	Not Valid Due to PM Monitor change (Nov-19)
Implemented 1	12/03/2020	12/03/2020	-	-	-	-
Implemented 2	15/07/2020 (Reviewed curves using Eskom's Tool)	15/07/2020 (Reviewed curves using Eskom's Tool)	15/07/2020 (Reviewed curves using Eskom's Tool)		15/07/2020 (Reviewed curves using Eskom's Tool)	
Reference	RGND020(0)	RGND021(0)	RGND026(0)	RSL324	RGND031(0)	RSL323

Correlation 1 Gaseous	01/07/2018	16/08/2018	14/08/2018	24/04/2018	13/05/2018	10/06/2018
Expiry	01/07/2020	16/08/2020	14/08/2020	24/04/2020	13/05/2020	10/06/2020
Validity	Not Valid	Not Valid	Not Valid	Not Valid	Not Valid	Not Valid
Implemented	30/07/2018	29/10/2018	12/11/2018	04/06/2018	25/06/2018	20/08/2018
Reference	RSL282	RSL288	RSL290	RSL269	RSL272	RSL276

Correlation 3 PM	15/08/2020	07/08/2020	01/08/2020	26/07/2020	16/07/2020	21/07/2020
Expiry	15/08/2022	07/08/2022	01/08/2022	26/07/2022	16/07/2022	21/07/2022
Validity	Valid	Valid	Valid	Valid	Valid	Valid
Implemented	08/10/2020	08/10/2020	08/10/2020	08/10/2020	16/10/2020	08/10/2020
Reference	RSL370	RSL367	RSL365R1	RSL363R1	RSL359R3	RSL361R1

Correlation 2 Gaseous	15/08/2020	07/08/2020	01/08/2020	26/07/2020	16/07/2020	21/07/2020
Expiry	15/08/2022	07/08/2022	01/08/2022	26/07/2022	16/07/2022	21/07/2022
Validity	Valid	Valid	Valid	Valid	Valid	Valid
Implemented	16/10/2020	07/10/2020	07/10/2020	07/10/2020	07/10/2020	07/10/2020
Reference	RSL371	RSL368	RSL366	RSL364	RSL360	RSL362

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Based on the above implementation dates and change of monitors the following back fitting exercise was undertaken to ensure reported data is correlated correctly:

- Unit 1 Gaseous curves back fitted from 01/07/2020 to 16/10/2020 (09:55 AM) using curves from RSL371.

Reports affected: July 2020; August 2020; September 2020; October 2020)

Item	Old Curve	New Curve
Oxides of Nitrogen	$y=1.2185*x-32.5304$	$y=0.9811*x+34.305$
Sulphur Dioxide	$y=1.0503*x$	$y=1.026*x$
Carbon Monoxide	$y=1.1671*x+3.8652$	$y=0.9948*x-0.0062$
Carbon Dioxide	$y=0.9119*x$	$y=1.0156*x$
Oxygen	$y=0.9487*x$	$y=1.0698*x$
Velocity	$y=x$	$y=0.6706*x+7.9232$
Moisture	$y=x$	$y=0.9339*x$

- Unit 2 Oxygen curves back fitted from 01/11/20219 to 07/10/2020 (15:15 PM) using curves from RSL368. Due to issues with the Oxygen correlation curves it is recommended that back fitting of Oxygen data be done using curves from RSL368.

Reports affected: November 2019, December 2019; January 2020; February 2020; March 2020; April 2020; May 2020; June 2020; July 2020; August 2020; September 2020; October 2020

Item	Old Curve	New Curve
Oxygen	$y=1.408*x$	$y=1.0583*x$

- Unit 2 Gaseous curves back fitted from 16/08/2020 to 07/10/2020 (15:15 PM) using curves from RSL368.

Reports affected: August 2020; September 2020; October 2020

Item	Old Curve	New Curve
Oxides of Nitrogen	$y=1.0425*x+49.3013$	$y=1.0079*x+29.1776$
Sulphur Dioxide	$y=1.0354*x$	$y=1.0316*x$
Carbon Monoxide	$y=1.3611*x-28.5933$	$y=1.1025*x+26.3043$
Carbon Dioxide	$y=1.0698*x$	$y=1.0903*x$
Velocity	$y=x$	$y=1.4539*x-1.8744$
Moisture	$y=x$	$y=1.2962*x$

- Unit 3 Gaseous curves back fitted from 14/08/2020 to 07/10/2020 (15:15 PM) using curves from RSL366.

Reports affected: August 2020; September 2020; October 2020

Item	Old Curve	New Curve
Oxides of Nitrogen	$y=0.8459*x+35.4541$	$y=1.0646*x+19.9141$
Sulphur Dioxide	$y=0.9883x$	$y=1.0605*x$
Carbon Monoxide	$y=x$	$y=1.0364*x+7.0817$
Carbon Dioxide	$y=1.0225*x$	$y=0.9455*x$
Oxygen	$y=1.0002*x$	$y=1.0505*x$
Velocity	$y=x$	$y=0.4851*x+14.6883$
Moisture	$y=x$	$y=1.1852*x$

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- Unit 4 Gaseous curves back fitted from 24/04/2020 to 07/10/2020 using curves from RSL364. Reports affected: April 2020; May 2020; June 2020; July 2020; August 2020; September 2020; October 2020

Item	Old Curve	New Curve
Oxides of Nitrogen	$y=1.183*x-26.2333$	$y=1.1474*x-3.4711$
Sulphur Dioxide	$y=1.0051*x$	$y=1.0282*x$
Carbon Monoxide	$y=1.0699*x-13.504$	$y=1.2766*x-25.9368$
Carbon Dioxide	$y=0.9542*x$	$y=1.0822*x$
Oxygen	$y=1.1686*x$	$y=1.0236*x$
Velocity	$y=x$	$y=1.6122*x-11.3395$
Moisture	$y=x$	$y=1.1819*x$

- Unit 5 Gaseous curves back fitted from 13/05/2020 to 07/10/2020 using curves from RSL360. It is noted that the Moisture curve was incorrect and inflated during the time of the correlation. It was determined that an average of (6.4% H₂O) will be used from the point of curve expiry until the test is redone. The order has already been place to redo this correlation. Reports affected: May 2020; June 2020; July 2020; August 2020; September 2020; October 2020

Item	Old Curve	New Curve
Oxides of Nitrogen	$y=1.0708*x$	$y=1.0025*x$
Sulphur Dioxide	$y=0.9824*x$	$y=1.0251*x$
Carbon Monoxide	$y=0.9084*x-3.1968$	$y=1.5634*x+15.3230$
Carbon Dioxide	$y=1.0039*x$	$y=1.015*x$
Oxygen	$y=1.1186*x$	$y=1.0698*x$
Velocity	$y=x$	$y=0.3782*x+17.909$
Moisture	$y=x$	$y=3.2336*x+0.0349$

- Unit 6 Oxygen curves back fitted from 01/11/2020 to 07/10/2020 (15:15 PM) using curves from RSL362. Due to issues with the Oxygen instrument was changed soon after the previous QAL 2 tests were done. The recommendation was to utilize a calculated curve due to this. For this reason, it was recommended that back fitting of Oxygen data be done using curves from RSL362. Reports affected: November 2019, December 2019; January 2020; February 2020; March 2020; April 2020; May 2020; June 2020; July 2020; August 2020; September 2020; October 2020

Item	Old Curve	New Curve
Oxygen	$y=x$	$y=1.1686x$

- Unit 6 Gaseous curves back fitted from 10/06/2020 to 07/10/2020 (15:15 PM) using curves from RSL362. Reports affected: June 2020; July 2020; August 2020; September 2020; October 2020

Item	Old Curve	New Curve
Oxides of Nitrogen	$y=1.4129*x+114.035$	$y=1.0959*x+0.6585$
Sulphur Dioxide	$y=1.0505*x$	$y=1.0105*x$
Carbon Monoxide	$y=x$	$y=x$
Carbon Dioxide	$y=1.0383*x$	$y=1.1272*x$
Velocity	$y=x$	$y=1.2482*x-2.8833$
Moisture	$y=x$	$y=1.1184*x$

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- Unit 1 PM curves back fitted from 18/11/2020 to 12/03/2020 (08:20 AM) using curves from RGND020(0) (Implementation 1).

Reports affected: November 2019, December 2019; January 2020; February 2020; March 2020

Item	Old Curve	New Curve
Output 1	$y=6.0444*x-21.3859$	$y=10.2387*x-52.91$
Output 2	$y=40.2962*x-158.393$	$y=68.2582*x-284.99$

- Unit 2 PM curves back fitted from 18/11/2019 to 12/03/2020 (08:20 AM) using curves from RGND021(0) (Implementation 1).

Reports affected: November 2019, December 2019; January 2020; February 2020; March 2020

Item	Old Curve	New Curve
Output 1	$y=6.708*x-26.9533$	$y=11.4509*x-39.52$
Output 2	$y=33.54*x-134.281$	$y=57.2545*x-222.74$

- Unit 3 PM curves back fitted from 18/11/2019 to 19/11/2020 using curves from RGND026(0).

Reports affected: November 2019

Item	Old Curve	New Curve
Output 1	$y=11.8552*x-42.9435$	$y=16.57*x-68.913$
Output 2	$y=39.5172*x-153.592$	$y=54.3377*x-219.96$

- Unit 3 PM curves back fitted from 20/11/2020 to 15/07/2020 (10:10 AM) using curves from RGND026(0).

Reports affected: November 2019, December 2019; January 2020; February 2020; March 2020; April 2020; May 2020; June 2020; July 2020

Item	Old Curve	New Curve
Output 1	$y=13.1908*x-52.7815$	$y=16.57*x-68.913$
Output 2	$y=37.1843*x-141.2112$	$y=54.3377*x-219.96$

- Unit 4 PM curves back fitted from 14/11/2019 to 08/10/2020 (10:00 AM) using curves from RSL363R1. (Note after the monitor change, the correlation test did not meet the requirements and could not be used. Due to this the back fitting was done from November 2019 to the next curve implementation)

Reports affected: November 2019, December 2019; January 2020; February 2020; March 2020; April 2020; May 2020; June 2020; July 2020; August 2020; September 2020; October 2020

Item	Old Curve	New Curve
Output 1	$y=7.8865*x-27.5857$	$y=9.5164*x-38.7168$
Output 2	$y=26.2883*x-101.193$	$y=31.7214*x-127.5366$

- Unit 5 PM curves back fitted from 14/11/2020 to 15/07/2020 (10:40 AM) using curves from RGND031(0).

Reports affected: November 2019, December 2019; January 2020; February 2020; March 2020; April 2020; May 2020; June 2020; July 2020

Item	Old Curve	New Curve
Output 1	$y=10.9526*x-47.1537$	$y=8.6012*x-31.658$
Output 2	$y=36.5087*x-149.378$	$y=28.627*x-111.67$

RESUBMISSION OF LETHABO POWER STATION MONTHLY EMISSIONS REPORTS

- Unit 6 PM curves back fitted from 14/11/2020 to 08/10/2020 (10:00 AM) using curves from RSL362. (Note after the monitor change, the correlation test did not meet the requirements and was not used. Due to this the back fitting was done from November 2019 to the next curve implementation)

Reports affected: November 2019, December 2019; January 2020; February 2020; March 2020; April 2020; May 2020; June 2020; July 2020; August 2020; September 2020; October 2020

Item	Old Curve	New Curve
Output 1	$y=4.9333*x-19.2737$	$y=11.2651*x-46.9329$
Output 2	$y=25.1964*x-94.9214$	$y=37.5503*x-152.0737$

Other factors that affected the gaseous data especially include corrective actions stemming from investigations done on site relating to data integrity issues related to gaseous emissions. These findings and actions are summarized below:

	Finding	Action
Unit 4	<p>SO₂ and NO data: On 25th January 2020 the gas readings dropped to zero and it was later discovered that the air purge valve was closed on the common airline at the bottom of the smoke stack. The monitor does an auto zero correction every 12 hours and if the air is closed it will cause the values to drop to zero. It was rectified on 27th January 2020. The time frame where this happened is from 25th January 2020 12:11 to 27th January 2020 11:15.</p> <p>On 29th January a faulty gas calibration was done. The SO₂ made a big upward step and caused a few exceedances consequently. Due to the lack of available calibration gas the problem could only be rectified on 7th March 2020.</p> <p>Oxygen data: When Eskom Research Training and Development (RT&D) did O₂ verifications in January they found the O₂'s higher than what it is supposed to be and therefore their average of 6.18% were used from 29th January to 24th April. On 24th April RT&D did a verification again and their average of 7.12% was used from then. Due to the unavailability of calibration gas and unverified gas the oxygen had to be corrected with the verified values.</p>	<p>1. O₂ Data:</p> <ul style="list-style-type: none"> 29th January to 24th April 2020 use 6.18% O₂; 25th April to 31st May 2020 use 7.12% O₂. <p>2. NO and SO₂ Data:</p> <ul style="list-style-type: none"> The NO and SO₂ values should be removed from 25th January 2020 12:11 to 27th January 2020 11:15 due to the air purge valve that was closed. <p>3. SO₂ Data:</p> <ul style="list-style-type: none"> For 29th-31st January 2020 use the average for 1-28 January 2020; For 1st-29th February 2020 use the average of January and March which is 1st-28th January and 8th-31st March 2020. For 1st-7th March use the average of 8th-31st March 2020

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	Finding	Action
Unit 5	<p>Oxygen adjustments: On 23rd April 2020 RT&D did gas verifications and saw that the O₂ readings were too high. An average of their values were calculated and it was 6.8%. Therefore, this value will be used from 1st April 2020 to 13th May 2020. Calibrations were not done as frequently as supposed to due to the lack of calibration gas. The monitors were calibrated on 13th May and QAL 2 tests were completed on the 16th July 2020</p>	<p>O₂ Data: The QAL2 test was due and was finished on 16th July 2020, therefore 6.8% is used from 1 April 2020 until 16th July 2020</p>
Unit 6	<p>SO₂ and NO adjustments: On 3rd April 2020 Unit 6 came back from an outage, but the gas monitor was removed during the outage to be used on Unit 3 that had a problem at the time. On 6th April 2020 the monitor was moved back to Unit 6. Therefore, no gas values were available from 3rd to 6th April 2020. It must be noted that only on 11th April 2020 the calibration coefficients were changed and therefore the monthly averages from the 12th April 2020 to 30th April 2020 must be used for the SO₂ and NO.</p> <p>There was a problem with the heater on the gas analyser that started on 16th May 2020. There was a loose wire on the SSR (solid state relay) that switched the heater off. That caused the process gas temperature values to go below 110°C which caused the monitor to go into a purge mode. When that happened all the gas values dropped to zero. It mainly happened during early morning hours when ambient temperatures were low. On 9th June the loose wire was found and corrected and that rectified the problem. The following dates and times are when that happened and will be removed from the reported data:</p> <p>Oxygen adjustments: When RT&D did verifications on 22nd April they discovered that the O₂ measurements were reading higher and therefore the average of 6.13% was used for the period where no valid calibration was done due to the lack of calibration gas. This value is used from 3rd April to 27 May 2020.</p>	<p>O₂ Data:</p> <ul style="list-style-type: none"> • Use 6.13% O₂ for 3 April 2020 to 27 May 2020 <p>NO and SO₂ Data</p> <ul style="list-style-type: none"> • A monthly average for SO₂ and NO should be used for 3rd-11th April 2020. That means an average from 12th-30th April 2020 will replace the SO₂ and NO values for 3rd-11th April 2020. • Also, the heater tube had a loose wire that caused the heater to operate intermittently and therefore the following dates and times must be removed when these occurrences happened. <ul style="list-style-type: none"> ○ 16 May 2020, 06:37-09:13; ○ 24 May 2020, 06:58-12:33; ○ 26 May 2020, 06:53-11:37; ○ 27 May 2020, 03:56-10:11; ○ 28 May 2020, 00:48-10:41; ○ 29 May 2020, 03:09-09:17; ○ 3 June 2020, 05:08-07:32; ○ 4 June 2020, 02:41-10:58; ○ 6 June 2020, 03:28-11:01; ○ 7 June 2020, 01:08-13:18; ○ 8 June 2020, 01:09-10:25; ○ 9 June 2020, 03:24-11:56.

RESUBMISSION OF LETHABO POWER STATION MONTHLY EMISSIONS REPORTS

Note on use of average for gaseous emission values, where it was required to utilize averages, it is the view of the station to take it as monitor unavailability (even if the monitor was reading and available, but the data was not reliable). This would ultimately adversely affect the percentage availability of the various monitors for that period, therefore the monitor availability for respective months were affected.

Backfitting Results

A significant reduction of gaseous exceedances was observed after the back fitting exercise and the remaining exceedances are being investigated diligently.

Numerous additional PM exceedances were picked up during the back fitting exercise, some of which result in the station exceeding the 72 hours grace period during upset, maintenance, start up and shut down conditions. However, it should be noted the station was not observing the correct emission figures at the time as the monitors were not correlated for the monitors in use, as such the station could not act on emission excursion incurred during this period, as it was under the impression that the emissions were within acceptable limits. If the station was aware of such exceedances, it would have acted immediately to intervene with these emissions exceedances.

Lethabo Power Station remains committed to minimize emissions and continue to operate within the confine of legislative requirements.

Yours sincerely



Karabo Rakgolela
GENERAL MANAGER

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04 December 2020

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Ref: LRP03PLA000 _0183/20200422 Rev 01

Dear Mr. Sibaya

**LETHABO POWER STATION EMISSION MONTHLY REPORT FOR MARCH 2020
RESUBMISSION**

Please find attached Lethabo Power Station emission report for the month of March 2020.


Also attached ambient air quality monitoring report, complaints register and the fugitive dust fallout monitoring report for March 2020.

For any additional information please do not hesitate to contact us.

Yours sincerely




Karabo Rakgolela
GENERAL MANAGER

	Report	Lethabo Power Station
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Report name:	Lethabo Power Station March 2020 Emission Report – Resubmission	Reference number:	LRP03PLA000 _0183/20200422 Rev01
		Document Type:	Report
		Area of Applicability:	Environment
		Report Date:	November 2020
		Classification:	Controlled Disclosure

Signatures:

Compiled by:


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System Engineer

Verified by :


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W de Klerk
Environmental Officer

Reviewed by:

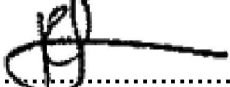

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N Mazibuko
BPE Manager

Date: 26/11/2020
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Date: 2020-11-26
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Date: 26/11/2020
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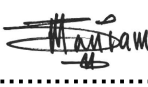
Reviewed by:


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C Govinden
PE Manager

Reviewed by:


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L Nel
C&I Manager

Reviewed by:

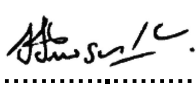

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Date: 26/11/2020
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Date: 2020-11-27
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Date: 2020-12-03
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Approved by:


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H Sewsunker
Engineering Manager

Date: 2020/12/03
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STACK EMISSIONS REPORT
LETHABO POWER STATION
Mar-20

1 **PARTICULATE EMISSIONS**

EMISSION RATE (ACTUAL EMISSION/MWh GENERATED - kg/MWh)

MONTH	UNIT 1	UNIT 2	UNIT 3	UNIT 4	UNIT 5	UNIT 6	STATION
APR '19	0.18	0.23	0.51	0.38	OFF	0.45	0.34
MAY '19	0.23	0.24	0.81	0.34	OFF	0.33	0.37
JUNE '19	0.30	0.27	0.41	0.33	OFF	0.36	0.33
JULY '19	0.40	0.31	0.47	0.34	OFF	0.36	0.38
AUG '19	0.30	0.19	0.49	0.23	OFF	0.38	0.33
SEPT '19	0.31	0.17	0.46	OFF	OFF	0.35	0.32
OCT '19	0.35	0.24	0.48	OFF	OFF	0.45	0.38
NOV '19	0.31	0.47	0.37	OFF	OFF	0.59	0.43
DEC '19	0.58	0.48	0.51	OFF	OFF	0.77	0.59
JAN '20	0.42	0.52	0.62	0.25	OFF	0.73	0.49
FEB '20	0.56	0.46	0.67	0.29	0.27	OFF	0.47
MAR '20	0.37	0.58	0.72	0.26	0.33	OFF	0.45

March-2020

Unit	Month Average (mg/Nm3)	Stack Average (mg/Nm3)	Limit (mg/Nm3)
UNIT 1	87.7	135.3	100
UNIT 2	128.8		100
UNIT 3	189.5		100
UNIT 4	48.5	68.1	100
UNIT 5	87.8		100
UNIT 6	OFF		100

LIGHT UP	1	2	3	3	4	4	5	5
Fires in (Time):	2020/03/01 05:10	2020/03/16 11:05	2020/03/04 05:50	2020/03/07 15:45	2020/03/22 21:10	2020/03/31 10:20	2020/03/11 16:15	2020/03/12 10:34
Synchronisation (Time):	2020/03/01 11:21:00	2020/03/16 13:31	2020/03/04 12:09	2020/03/07 18:09	2020/03/23 00:54	2020/03/31 14:25	2020/03/11 18:05	2020/03/12 11:17
Emissions below limit(Time):	2020/03/01 21:45	2020/03/18 02:15	2020/03/09 20:15	2020/03/09 20:15	2020/03/23 02:30	2020/03/31 23:10	2020/03/11 20:30	2020/03/12 13:55
Hours: Fires in to synchronisation	6:11:00	2:26:00	6:19:00	2:24:00	3:44:00	4:05:00	1:50:00	0:42:16
Hours: Synchronisation to < Limit:	10:24:00	36:44:00	128:06:00	50:06:00	1:36:00	8:45:00	2:25:00	2:38:00

SHUTDOWN	2	3	3	4	4	5	5
Beginning of Shutdown - Load < 300 MW (Time):	2020/03/13 21:03:11	2020/03/01 23:15:32	2020/03/07 14:02:21	2020/03/20 23:50:31	2020/03/27 17:42:55	2020/03/11 02:41:51	2020/03/12 08:37:50
Shutdown (Time):	2020/03/13 21:11:00	2020/03/01 23:49:00	2020/03/07 14:18:00	2020/03/20 23:52:00	2020/03/27 18:05:00	2020/03/11 02:52:00	2020/03/12 08:39:00
Duration (hh:mm:ss)	0:07:49	0:33:28	0:15:39	0:01:29	0:22:05	0:10:09	0:01:10
Reason	SSC & L/H PA fan repairs.	SSC repairs	High stack emissions	Boiler tube leak.	Boiler tube leak. & 20/11Kv unit transformer diff protection fault	low coal levels in bunkers.	Main turbine FRF level low

Maintenance	1	2	2	3	3	3
Beginning of Maintenance (Time):	2020/03/22 00:02:00	2020/03/24 00:00:00	2020/03/24 06:12:00	2020/03/07 23:23:00	2020/03/14 02:40:00	2020/03/15 00:12:00
Reason for Maintenance	LHI precip casing repairs	RHI precip casing repairs	RHI precip casing repairs	RHO precip casing repairs	LHO precip casing repairs	LHI precip casing repairs
End (Time):	2020/03/22 17:41:00	2020/03/24 06:12:00	2020/03/25 04:53:00	2020/03/09 03:41:00	2020/03/14 21:24:00	2020/03/15 17:34:00
Duration	17:39:00	6:12:00	22:41:00	28:18:00	18:44:00	17:22:00

3 FUEL BURNT

	FUEL OIL	FUEL	COAL	COAL	UNITS	BURN
MONTH	BURNT	LIMIT	BURNT	LIMIT	GEN	RATE
	kT	kT	kT	kT	MWh	(kg/GEN)
APR '19	0.80	1.70	1106.98	2000	1662547.47	0.71
MAY '19	0.61	1.70	1190.67	2000	1828616.05	0.69
JUNE '19	0.34	1.70	1238.50	2000	1927881.61	0.68
JULY '19	0.46	1.70	1218.87	2000	1940766.10	0.66
AUG '19	0.52	1.70	984.18	2000	1604078.50	0.65
SEP '19	0.32	1.70	956.74	2000	1544561.03	0.65
OCT '19	0.18	1.70	1040.58	2000	1606075.12	0.68
NOV '19	0.30	1.70	986.57	2000	1516280.88	0.69
DEC '19	1.09	1.70	997.58	2000	1498774.18	0.71
JAN '20	1.08	1.70	1039.34	2000	1570187.37	0.71
FEB '20	1.03	1.70	1001.47	2000	1549398.31	0.69
MAR '20	1.05	1.70	1210.72	2000	1812600.28	0.71

Particulate Emissions (Back Fitted Emissions)

Note: Nm³ is at 273 K and 101.3 kPa, referenced to 10% O₂ on a dry basis

Date	U1	U2	U3	U4	U5	U6	Limit
01-Mar	OFF	132	73	51	103	OFF	100
02-Mar	107	103	OFF	48	169	OFF	100
03-Mar	76	93	OFF	52	70	OFF	100
04-Mar	110	110	OFF	63	161	OFF	100
05-Mar	202	98	835	60	50	OFF	100
06-Mar	518	95	810	48	48	OFF	100
07-Mar	62	105	271	45	58	OFF	100
08-Mar	54	140	461	58	76	OFF	100
09-Mar	55	118	214	50	254	OFF	100
10-Mar	50	89	100	43	42	OFF	100
11-Mar	42	81	148	42	11	OFF	100
12-Mar	38	82	106	42	OFF	OFF	100
13-Mar	92	87	119	37	233	OFF	100
14-Mar	47	OFF	313	37	74	OFF	100
15-Mar	63	OFF	195	42	129	OFF	100
16-Mar	80	OFF	88	47	166	OFF	100
17-Mar	77	166	91	100	106	OFF	100
18-Mar	111	465	119	42	88	OFF	100
19-Mar	114	84	117	44	136	OFF	100
20-Mar	74	149	213	45	56	OFF	100
21-Mar	85	82	277	OFF	132	OFF	100
22-Mar	130	95	69	OFF	72	OFF	100
23-Mar	73	76	86	OFF	149	OFF	100
24-Mar	67	624	122	62	38	OFF	100
25-Mar	75	200	103	55	51	OFF	100
26-Mar	38	20	48	33	17	OFF	100
27-Mar	42	18	69	20	51	OFF	100
28-Mar	43	43	66	OFF	19	OFF	100
29-Mar	31	132	64	OFF	27	OFF	100
30-Mar	38	84	77	OFF	28	OFF	100
31-Mar	37	36	49	OFF	23	OFF	100

Particulate Emissions (Pre-Back Fitting)

Note: Nm³ is at 273 K and 101.3 kPa, referenced to 10% O₂ on a dry basis

Date	U1	U2	U3	U4	U5	U6	Limit
01-Mar	OFF	73	59	46	124	OFF	100
02-Mar	73	57	OFF	44	210	OFF	100
03-Mar	55	50	OFF	47	82	OFF	100
04-Mar	75	61	OFF	57	197	OFF	100
05-Mar	129	54	582	54	58	OFF	100
06-Mar	316	52	564	44	55	OFF	100
07-Mar	37	58	199	42	67	OFF	100
08-Mar	40	78	328	52	90	OFF	100
09-Mar	39	65	164	46	318	OFF	100
10-Mar	21	48	81	40	49	OFF	100
11-Mar	25	44	117	39	20	OFF	100
12-Mar	29	73	87	39	OFF	OFF	100
13-Mar	95	91	97	35	290	OFF	100
14-Mar	49	OFF	227	35	88	OFF	100
15-Mar	66	OFF	149	39	158	OFF	100
16-Mar	83	OFF	72	43	204	OFF	100
17-Mar	77	175	74	88	195	OFF	100
18-Mar	112	488	96	39	72	OFF	100
19-Mar	117	89	93	41	169	OFF	100
20-Mar	76	157	160	42	73	OFF	100
21-Mar	86	88	203	OFF	169	OFF	100
22-Mar	136	101	55	OFF	89	OFF	100
23-Mar	74	81	71	OFF	181	OFF	100
24-Mar	69	659	97	56	45	OFF	100
25-Mar	77	213	83	50	92	OFF	100
26-Mar	38	20	40	32	20	OFF	100
27-Mar	45	20	56	21	98	OFF	100
28-Mar	44	46	54	OFF	17	OFF	100
29-Mar	33	138	53	OFF	27	OFF	100
30-Mar	38	87	63	OFF	30	OFF	100
31-Mar	40	39	40	OFF	29	OFF	100

Gaseous Emissions (Back Fitted Emissions)

	Unit 1		Unit 2		Unit 3		Unit 4		Unit 5		Unit 6		Limit	
	Nox	Sox	Nox	Sox	Nox	SOx	Nox	Sox	Nox	Sox	Nox	SOx	Nox	SOx
01-Mar	806	2177	1093	2722	708	2514	975	1436	872	1637	OFF	OFF	1100	3500
02-Mar	870	2198	1121	2727	OFF	OFF	998	1438	907	1700	OFF	OFF	1100	3500
03-Mar	888	2126	936	2752	OFF	OFF	1000	1435	878	1757	OFF	OFF	1100	3500
04-Mar	959	2152	726	2110	841	2623	1021	1436	917	1520	OFF	OFF	1100	3500
05-Mar	934	2132	732	2094	813	2737	922	1428	898	1595	OFF	OFF	1100	3500
06-Mar	916	2116	776	1998	854	2846	984	1427	909	1657	OFF	OFF	1100	3500
07-Mar	954	2136	819	1809	791	2840	981	1423	922	1569	OFF	OFF	1100	3500
08-Mar	959	2197	848	1773	877	2887	1007	1884	1017	1658	OFF	OFF	1100	3500
09-Mar	896	2155	745	1865	869	2851	1109	1962	996	1638	OFF	OFF	1100	3500
10-Mar	870	2047	699	1787	762	2654	1090	1883	879	1480	OFF	OFF	1100	3500
11-Mar	876	2145	686	1770	787	2745	1103	1912	733	1565	OFF	OFF	1100	3500
12-Mar	815	2138	720	1773	875	2700	1118	1892	873	1567	OFF	OFF	1100	3500
13-Mar	822	2024	650	1783	846	2814	1049	1901	1068	1586	OFF	OFF	1100	3500
14-Mar	693	2003	OFF	OFF	719	2425	1008	1929	948	1722	OFF	OFF	1100	3500
15-Mar	762	1691	OFF	OFF	583	1546	1055	1888	933	1642	OFF	OFF	1100	3500
16-Mar	726	1454	510	1680	632	1591	1153	1863	929	1648	OFF	OFF	1100	3500
17-Mar	820	1449	724	1790	632	1657	1131	1962	874	1645	OFF	OFF	1100	3500
18-Mar	824	1474	695	1720	665	1678	1107	1996	906	1714	OFF	OFF	1100	3500
19-Mar	678	1539	453	1785	628	1705	1087	1964	902	1811	OFF	OFF	1100	3500
20-Mar	750	1514	764	1834	622	1706	1077	2037	989	1796	OFF	OFF	1100	3500
21-Mar	698	1510	690	2008	561	1720	OFF	OFF	1038	1755	OFF	OFF	1100	3500
22-Mar	649	1481	792	1940	586	1697	OFF	OFF	976	1627	OFF	OFF	1100	3500
23-Mar	733	1445	743	1916	615	1648	912	2069	987	1657	OFF	OFF	1100	3500
24-Mar	728	1472	776	1886	624	1647	1116	2049	996	1670	OFF	OFF	1100	3500
25-Mar	733	1420	724	1877	601	1698	1045	2026	1031	1674	OFF	OFF	1100	3500
26-Mar	649	1498	633	1880	527	1669	903	1852	868	1698	OFF	OFF	1100	3500
27-Mar	755	1499	535	2013	560	1717	758	1817	889	1688	OFF	OFF	1100	3500
28-Mar	719	1474	639	1938	569	1694	OFF	OFF	918	1737	OFF	OFF	1100	3500
29-Mar	749	1432	761	1956	570	1684	OFF	OFF	929	1679	OFF	OFF	1100	3500
30-Mar	715	1496	767	1939	612	1742	OFF	OFF	877	1779	OFF	OFF	1100	3500
31-Mar	734	1480	691	2020	561	1787	OFF	OFF	987	1762	OFF	OFF	1100	3500

Gaseous Emissions (Pre-Back Fitting)

	Unit 1		Unit 2		Unit 3		Unit 4		Unit 5		Unit 6		Limit	
	Nox	Sox	Nox	Sox	Nox	SOx	Nox	Sox	Nox	Sox	Nox	SOx	Nox	SOx
01-Mar	806	2177	1454	3620	708	2514	1069	3053	872	1637	OFF	OFF	1100	3500
02-Mar	870	2198	1498	3643	OFF	OFF	1089	3121	907	1700	OFF	OFF	1100	3500
03-Mar	888	2126	1247	3669	OFF	OFF	1096	3094	878	1757	OFF	OFF	1100	3500
04-Mar	959	2152	961	2791	841	2623	1127	2974	917	1520	OFF	OFF	1100	3500
05-Mar	934	2132	962	2754	813	2737	1020	3036	898	1595	OFF	OFF	1100	3500
06-Mar	916	2116	1033	2655	854	2846	1118	3023	909	1657	OFF	OFF	1100	3500
07-Mar	954	2136	1091	2410	791	2839	1069	2420	922	1569	OFF	OFF	1100	3500
08-Mar	959	2197	1121	2346	877	2887	1123	2100	1017	1658	OFF	OFF	1100	3500
09-Mar	896	2155	979	2447	869	2851	1194	2110	996	1638	OFF	OFF	1100	3500
10-Mar	870	2047	911	2327	762	2654	1167	2016	879	1480	OFF	OFF	1100	3500
11-Mar	876	2145	895	2311	787	2745	1158	2006	733	1565	OFF	OFF	1100	3500
12-Mar	815	2138	952	2341	875	2700	1204	2037	873	1567	OFF	OFF	1100	3500
13-Mar	822	2024	852	2333	846	2814	1135	2068	1082	1586	OFF	OFF	1100	3500
14-Mar	693	2003	OFF	OFF	709	2395	1099	2103	949	1718	OFF	OFF	1100	3500
15-Mar	762	1691	OFF	OFF	542	1437	1146	2055	933	1642	OFF	OFF	1100	3500
16-Mar	726	1454	322	1063	632	1591	1240	2003	929	1648	OFF	OFF	1100	3500
17-Mar	821	1450	919	2250	631	1654	1214	2101	874	1645	OFF	OFF	1100	3500
18-Mar	824	1475	908	2247	665	1678	1157	2084	906	1714	OFF	OFF	1100	3500
19-Mar	678	1539	626	2478	628	1705	1147	2073	902	1811	OFF	OFF	1100	3500
20-Mar	750	1514	1021	2449	622	1706	1123	2127	989	1796	OFF	OFF	1100	3500
21-Mar	698	1510	942	2742	561	1720	OFF	OFF	1038	1755	OFF	OFF	1100	3500
22-Mar	649	1481	1075	2631	586	1697	OFF	OFF	976	1627	OFF	OFF	1100	3500
23-Mar	734	1448	1042	2681	615	1648	934	2121	987	1657	OFF	OFF	1100	3500
24-Mar	728	1473	1020	2464	624	1647	1152	2114	996	1670	OFF	OFF	1100	3500
25-Mar	733	1420	1000	2593	601	1698	1030	1994	1031	1674	OFF	OFF	1100	3500
26-Mar	649	1498	896	2662	527	1669	998	2032	868	1698	OFF	OFF	1100	3500
27-Mar	755	1499	748	2811	560	1717	909	2081	889	1688	OFF	OFF	1100	3500
28-Mar	719	1474	913	2770	569	1694	OFF	OFF	918	1737	OFF	OFF	1100	3500
29-Mar	749	1432	1093	2820	570	1684	OFF	OFF	929	1679	OFF	OFF	1100	3500
30-Mar	715	1496	1076	2720	612	1742	OFF	OFF	877	1779	OFF	OFF	1100	3500
31-Mar	734	1480	990	2900	561	1787	OFF	OFF	987	1762	OFF	OFF	1100	3500

REMARKS

UNIT	MWLOSS	REASON	ACTUALSTARTDATE	ACTUALENDDATE
1	230	AM: Precip transformer 1A tripped on winding temp	2020/03/06 09:28:00	2020/03/06 12:27:00
1	593	AM: Boiler tube leak.	2020/03/01 00:00:00	2020/03/01 11:21:00
1	167	AM; High hopper levels	2020/03/01 21:25:00	2020/03/02 06:33:00
1	167	Dust plant high hopper levels.	2020/03/02 12:18:00	2020/03/02 18:35:00
1	167	Dust plant high hopper levels.	2020/03/02 21:06:00	2020/03/03 05:54:00
1	100	EF: High hopper levels	2020/03/03 08:56:00	2020/03/03 12:34:00
1	167	EF: High hopper level	2020/03/03 12:34:00	2020/03/03 18:00:00
1	180	Dust plant standing	2020/03/14 01:03:00	2020/03/14 05:01:00
1	180	Dust plant standing.	2020/03/14 05:55:00	2020/03/14 13:57:00
1	230	Dust plant standing	2020/03/14 13:57:00	2020/03/15 05:33:00
1	130	AM: High ash hoppers	2020/03/16 03:30:00	2020/03/16 06:03:00
1	80	EF:High stack emissions.	2020/03/19 00:46:00	2020/03/19 05:22:00
1	180	High stack emission.	2020/03/20 00:08:00	2020/03/20 05:19:00
1	80	High stack emissions	2020/03/20 05:19:00	2020/03/20 23:14:00
1	80	EF:High stack emissions.	2020/03/21 12:13:00	2020/03/22 00:02:00
1	80	LHI Precip casing repairs.	2020/03/22 00:02:00	2020/03/22 17:41:00
2	593	AM: SSC & L/H PA fan repairs.	2020/03/13 21:11:00	2020/03/16 09:10:00
2	593	System Generated Slip Event linked to PCLF Event : 1411810	2020/03/16 09:10:00	2020/03/16 13:31:00
2	180	EF:High stack emissions.	2020/03/19 01:34:00	2020/03/19 02:59:00
2	215	EF:High stack emissions.	2020/03/19 02:59:00	2020/03/19 17:13:00
2	140	Ef: High stack emissions	2020/03/19 17:13:00	2020/03/19 18:21:00
2	90	EF: High stack emissions	2020/03/19 18:21:00	2020/03/20 01:11:00
2	48	EF:High stack emissions.	2020/03/21 10:20:00	2020/03/21 13:13:00
2	148	EF:high stack emissions.	2020/03/21 13:13:00	2020/03/21 18:02:00
2	48	Ef: High stack emissions	2020/03/21 18:02:00	2020/03/22 02:28:00
2	70	High stack emissions.	2020/03/22 13:53:00	2020/03/22 16:47:00
2	70	High stack emissions.	2020/03/22 21:24:00	2020/03/23 05:21:00
2	120	EF: High stack emissions	2020/03/23 09:02:00	2020/03/24 00:00:00
2	120	RHI precip casing repairs	2020/03/24 00:00:00	2020/03/24 06:12:00
2	90	RHI precip casing repairs	2020/03/24 06:12:00	2020/03/25 04:53:00
3	171	EF: High stack emissions	2020/03/01 00:17:00	2020/03/01 14:28:00
3	71	High stack emissions	2020/03/01 14:28:00	2020/03/01 16:31:00
3	593	SSC repairs	2020/03/01 23:49:00	2020/03/04 12:09:00
3	150	EF: High stack emissions.	2020/03/07 00:04:00	2020/03/07 11:26:00
3	200	EF: High stack emissions	2020/03/07 11:26:00	2020/03/07 14:18:00
3	593	High stack emissions	2020/03/07 14:18:00	2020/03/07 18:09:00
3	68	AM: High stack emissions	2020/03/07 21:32:00	2020/03/08 11:38:00
3	50	AM: RHO Precip casing repairs	2020/03/07 23:23:00	2020/03/09 03:41:00
3	118	High stack emissions	2020/03/09 11:12:00	2020/03/10 05:02:00

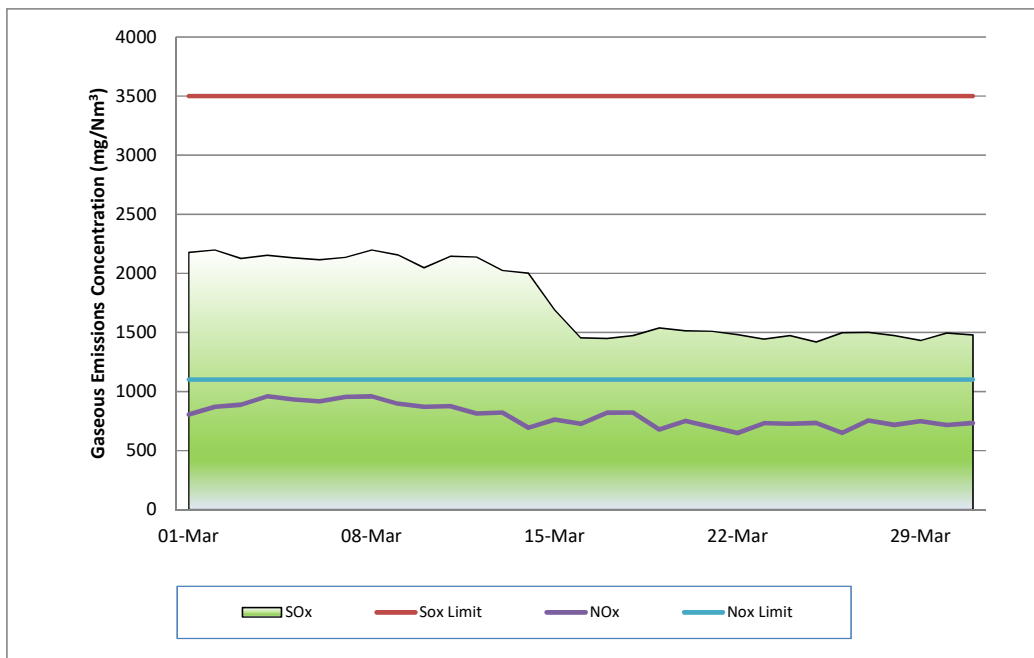
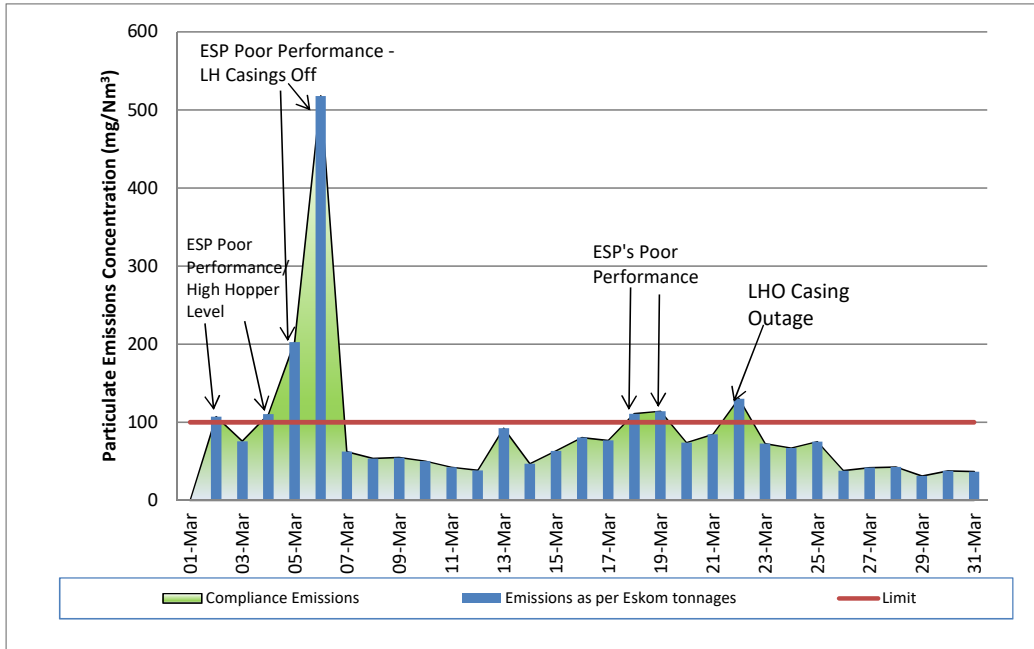
3	218	EF:High stack emissions	2020/03/10 00:13:00	2020/03/10 05:02:00
3	160	High stack emission.	2020/03/10 08:51:00	2020/03/11 04:57:00
3	50	EF: High stack emissions	2020/03/13 20:25:00	2020/03/14 01:14:00
3	118	LHO precip casing repairs	2020/03/14 02:40:00	2020/03/14 21:24:00
3	118	AM: LHI precip casing repairs	2020/03/15 00:12:00	2020/03/15 17:34:00
3	150	High stack emissions	2020/03/16 00:09:00	2020/03/16 04:52:00
3	150	High stack emissions.	2020/03/21 00:51:00	2020/03/21 02:46:00
3	50	High stack emissions.	2020/03/21 02:46:00	2020/03/21 06:28:00
3	150	High stack emissions	2020/03/22 01:01:00	2020/03/22 05:12:00
3	50	High stack emission.	2020/03/22 05:12:00	2020/03/23 00:01:00
3	100	EF:High stack emissions	2020/03/24 20:54:00	2020/03/25 04:53:00
4	593	Boiler tube leak repairs.	2020/03/20 23:52:00	2020/03/23 00:54:00
4	593	Boiler tube leak repairs	2020/03/27 18:05:00	2020/03/31 14:25:00
4	593	20/11Kv unit transformer diff protection fault	2020/03/31 14:25:00	2020/03/31 23:59:59
5	218	High stack emissions.	2020/03/03 00:38:00	2020/03/03 05:23:00
5	118	High stack emission.	2020/03/03 05:23:00	2020/03/04 06:01:00
5	218	High stack emissions	2020/03/05 02:03:00	2020/03/05 05:24:00
5	218	EF:High stack emissions	2020/03/10 00:36:00	2020/03/10 05:02:00
5	593	low coal levels in bunkers.	2020/03/11 02:52:00	2020/03/11 18:05:00
5	593	Main turbine FRF level low	2020/03/12 08:39:00	2020/03/12 11:17:00
5	218	EF:High stack emissions.	2020/03/14 01:55:00	2020/03/14 05:01:00
5	218	EF:High stack emissions	2020/03/14 05:55:00	2020/03/14 13:47:00
5	268	High stack emissions	2020/03/14 13:47:00	2020/03/15 05:33:00
5	218	EF:High stack emissions.	2020/03/17 01:46:00	2020/03/17 05:28:00
5	238	AM: High stack emissions.	2020/03/17 08:39:00	2020/03/18 04:36:00
5	218	High stack emissions	2020/03/18 04:36:00	2020/03/18 13:26:00
5	118	EF:High stack emissions.	2020/03/18 13:26:00	2020/03/18 17:37:00
5	68	High stack emission.	2020/03/18 17:37:00	2020/03/19 00:28:00
5	118	High stack emission.	2020/03/20 01:50:00	2020/03/20 05:22:00
5	118	High stack emissions.	2020/03/21 01:51:00	2020/03/21 02:38:00
5	68	High stack emissions.	2020/03/21 02:38:00	2020/03/21 06:28:00
5	218	High stack emissions.	2020/03/22 00:28:00	2020/03/22 05:12:00
5	118	High stack emission.	2020/03/22 05:12:00	2020/03/23 05:05:00
6	593	IR	2020/03/01 00:00:00	2020/03/26 04:29:00
6	593	System Generated Slip Event linked to PCLF Event : 1391756	2020/03/26 04:29:00	2020/03/31 23:59:59

PM Exceedances		
U1.	Both left hand side casings off	05-Mar
U1.	Both left hand side casings off	06-Mar
U1.	LHI & LHO ESP poor performances Two high hopper indications	18-Mar
U1.	ESP Poor Performance	19-Mar
U1.	LHO Casing outage	22-Mar
U2.	Unit light up - Unit synchronized on 2020/03/16 @ 13:30 after SSC repairs.	17-Mar
U2.	Unit light up - Unit synchronized on 2020/03/16 @ 13:30 after SSC repairs.	18-Mar
U2.	RHI and RHO precip casings not performing	20-Mar
U2.	Opacity meter maintenance	22-Mar
U2.	SO3 Plant troubleshooting with low sulphur flow, communication failure. RHI Casing repair	24-Mar
U2.	Unit two that clean rapping will perform @ 22h00 until 23h00	25-Mar
U2.	SO3 plant on PTW for SO3 Plant challenges	29-Mar
U3.	Unit Light Up	05-Mar
U3.	Unit light up - Unit synchronized on 2020-03-04 @ 12:09 SO3 plant Challenges RHO casing performing very poor	06-Mar
U3.	Unit Shut Down and Unit light up - Unit synchronized on 2020-03-07 @ 18:09	07-Mar
U3.	Unit light up - Unit light up synchronized on 2020-03-07 @ 18:09	08-Mar
U3.	LHO & RHO ESP Poor performance Dust handling Plant front transfer covers are open and B stream in service – can cause higher emissions Rear transfer conveyors tripped over the weekend	09-Mar
U3.	ESP Poor Performance	11-Mar
U3.	LHO CASING OUTAGE	14-Mar
U3.	LHI CASING OUTAGE	15-Mar
U3.	SO3 skid plant tripped due to mixing outlet temp high Plant fails to start, air purge valve fault fails to reset	20-Mar
U3.	SO3 plant challenges	21-Mar
U5.	Gasket failed due to combustion chamber being flooded during start up. SO3 plant off load	01-Mar
U5.	SO3 plant challenges	02-Mar
U5.	SO3 plant: not dosing yet, combustion chamber not at correct temperature yet, excess Sulphur is still burning off from the chamber, BPE will monitor closely and give instruction to Ops when dosing can commence	04-Mar
U5.	RHI poor performance SO3 Plant tripped.	09-Mar
U5.	Unit synchronized on 2020-03-12 @ 11:18 - after FRF oil leak repairs. SO3 plant is off	13-Mar
U5.	SO3 plant is ramping up, but heaters keep on tripping. Struggling to reach temperatures.	15-Mar
U5.	SO3 Plant out of service LHO ESP poor performance Hopper heaters out of service.	16-Mar

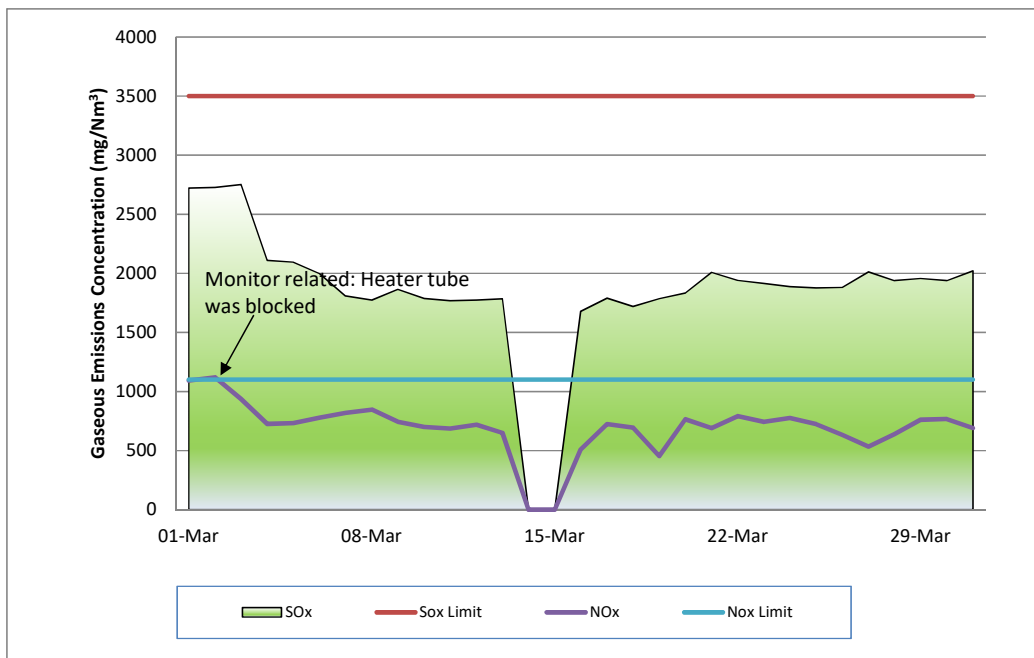
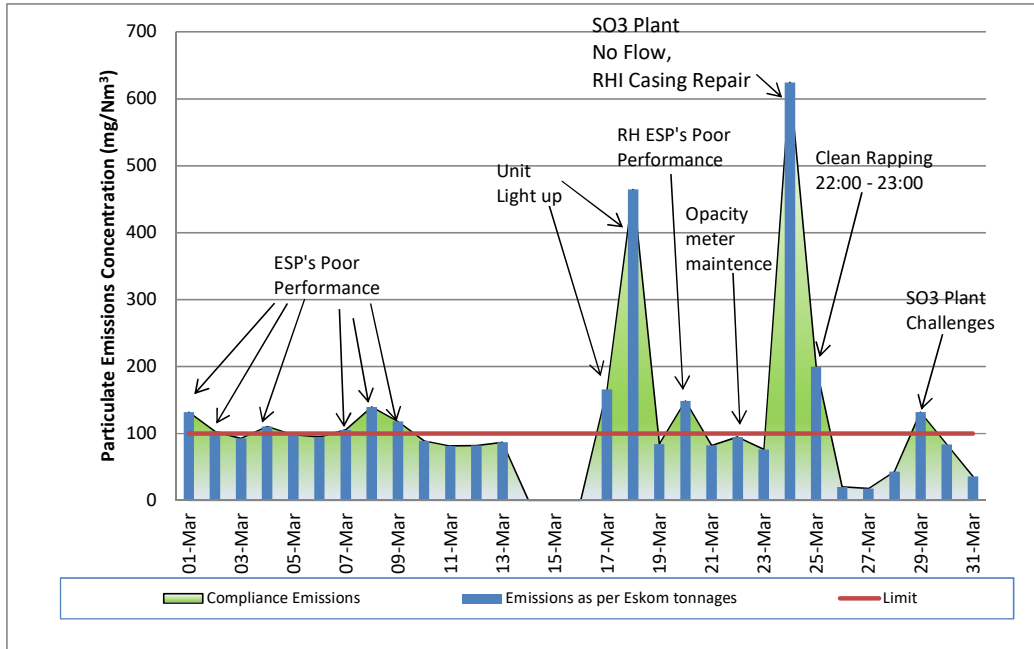
U5.	Unit 5 to be kept at half load until SO3 plant issues are resolved. SO3 plant VSD problem,	17-Mar
U5.	Unit 5 to be kept at half load until SO3 plant issues are resolved. RHO & RHI ESP poor performance	19-Mar
U5.	SO3 plant shut down	21-Mar
U5.	SO3 plant ramping up RHO ESP poor performance	23-Mar
U1.	ESP Poor Performance / High Hopper Levels	02-Mar
U1.	LHI <ul style="list-style-type: none"> • F2 off • RHI • F2 not rapping, • Total 9 high hopper levels, some are false indication • DHP backlogging 	04-Mar
U2.	<ul style="list-style-type: none"> • LHI • F1, F4, F7 off • F2 poor performance • RHI • F7 off – Program invalid, 	01-Mar
U2.	LHO <ul style="list-style-type: none"> • F5 Arcing and sparking LHI <ul style="list-style-type: none"> • F1,2&3 arcing and sparking RHI <ul style="list-style-type: none"> • F2 trip on undervoltage RHO <ul style="list-style-type: none"> • DE rapper faulty 	02-Mar
U2.	LHI <ul style="list-style-type: none"> • F1 off • Two high hopper levels reported 	04-Mar
U2.	ESP Poor Performance	07-Mar
U2.	ESP Poor Performance	08-Mar
U2.	ESP Poor Performance	09-Mar

U3.	2 ESP Casing performing poorly Dust Handling Plant Issues contributing to higher emissions. LHI • F5 Comms fault RHO • F5 under voltage fault, EMS to follow up • high hopper levels - 23WX41 Hopper 2 has an obstruction(suspected foreign material)	12-Mar
U3.	LHI & LHO ESP poor performance	13-Mar
U3.	LHO • F6 invalid program • LHI • F5 has a communication fault • On all casings field number 7: fields rap normally but not during clean rapping, Program to be verified	18-Mar
U3.	ESP Poor Performance / High Hopper Levels	19-Mar
U3.	LHO: F2 - Communication fault LHI: F3 - Arcing & sparking RHI: F7 - Arcing & sparking - Undervoltage trip	24-Mar
U3.	LHO: F2 - Communication fault LHI: F3 - Arcing & sparking RHI: F7 - Arcing & sparking - Undervoltage trip RHO: F6- DE Rapper Fault	25-Mar
NOX Exceedances		
U2.	Monitor related: heater tube was blocked resulting in falsely inflated readings.	02-Mar
U4.	Additional contributors besides monitor unreliability - the simultaneous refurbishment of all 36 burners and two top mills in operation.	09-Mar
U4.	Additional contributors besides monitor unreliability - the simultaneous refurbishment of all 36 burners and two top mills in operation.	11-Mar
U4.	Additional contributors besides monitor unreliability - the simultaneous refurbishment of all 36 burners and two top mills in operation.	12-Mar
U4.	Additional contributors besides monitor unreliability - the simultaneous refurbishment of all 36 burners and two top mills in operation.	16-Mar
U4.	Additional contributors besides monitor unreliability - the simultaneous refurbishment of all 36 burners and two top mills in operation.	17-Mar
U4.	Additional contributors besides monitor unreliability - the simultaneous refurbishment of all 36 burners and two top mills in operation.	18-Mar
U4.	Additional contributors besides monitor unreliability - the simultaneous refurbishment of all 36 burners and two top mills in operation.	24-Mar
SOX Exceedances		

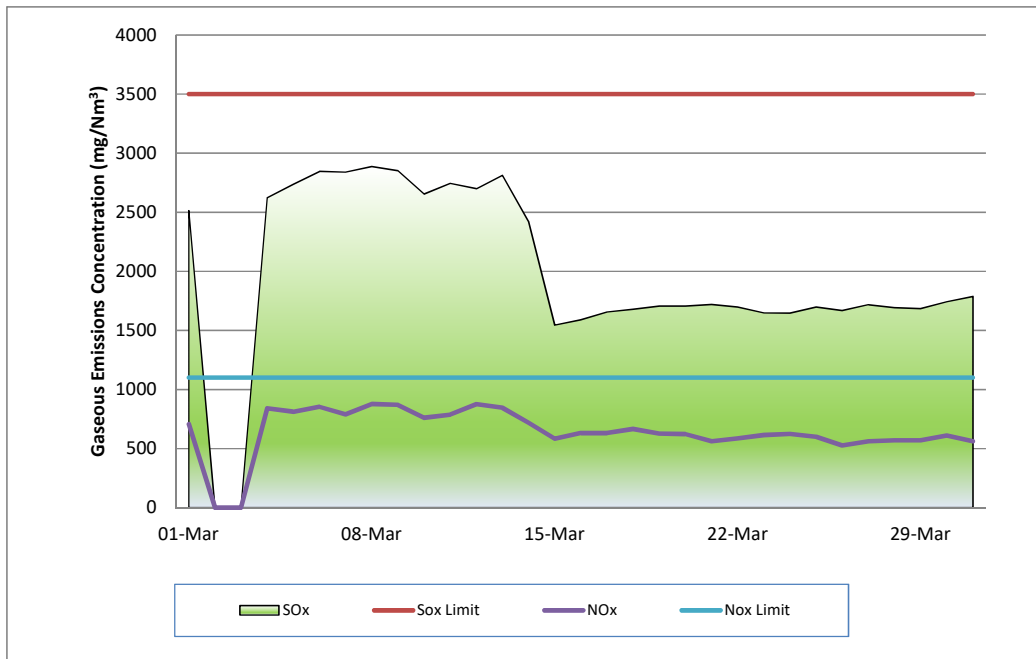
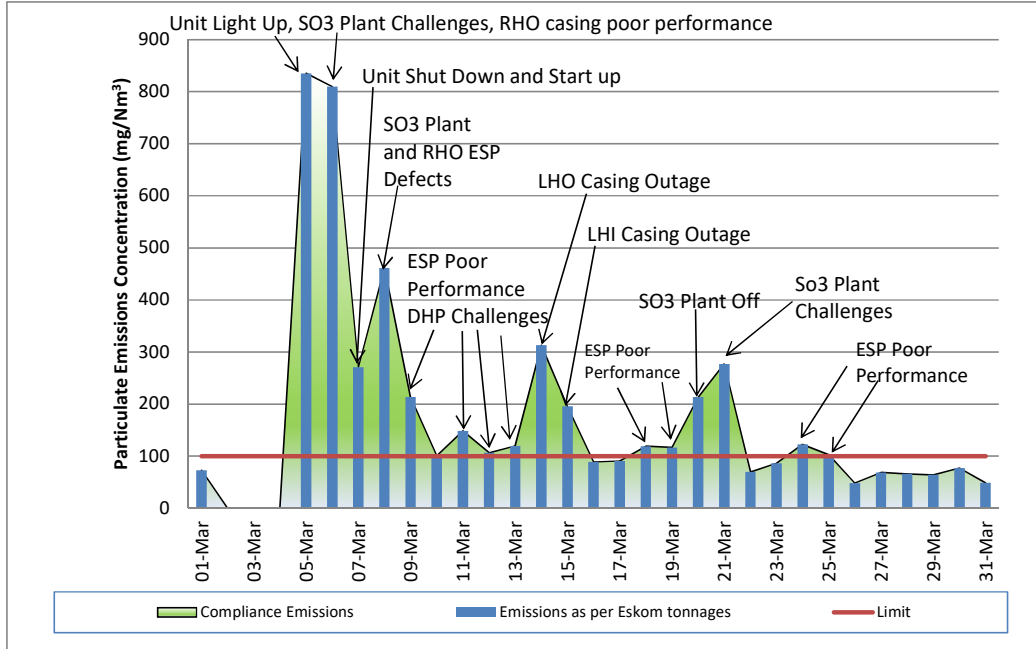
UNIT 1 Particulate Matter and Gaseous Emission Performance March-2020



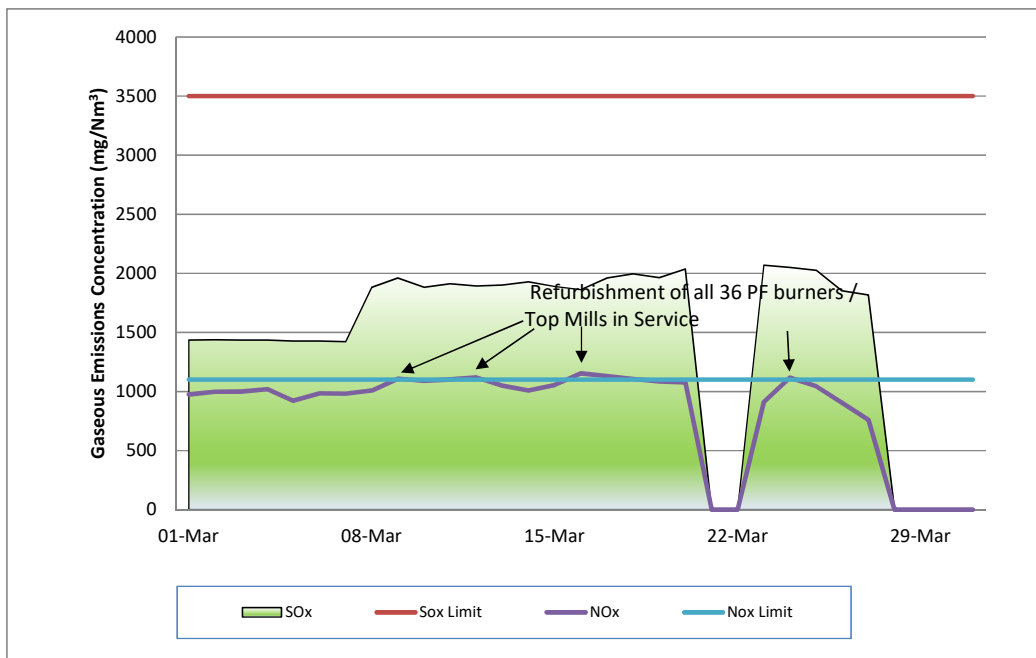
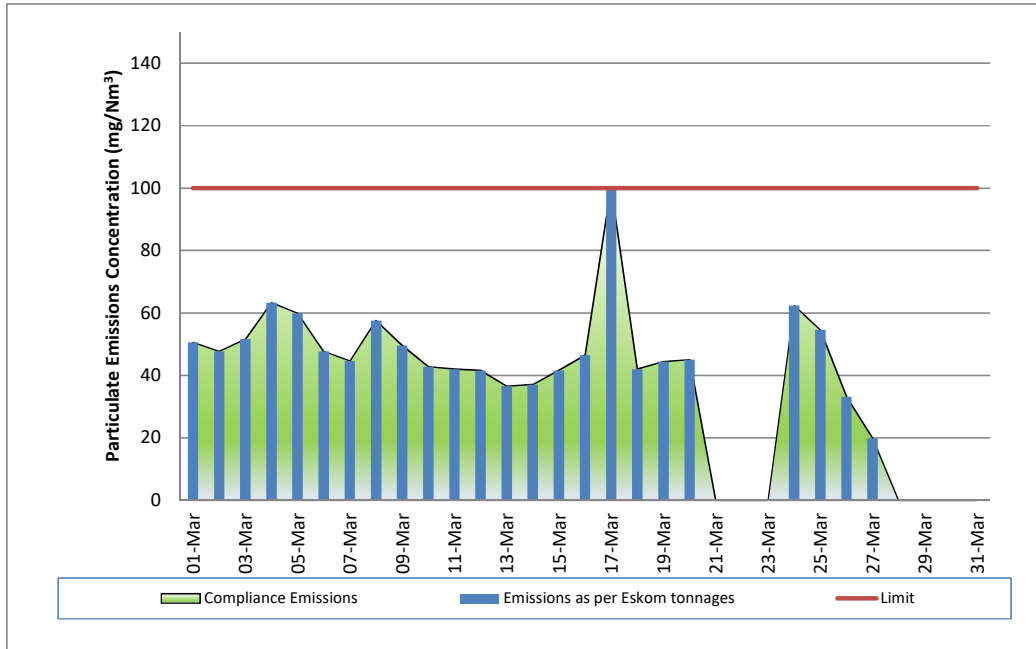
UNIT 2 Particulate Matter and Gaseous Emission Performance March-2020



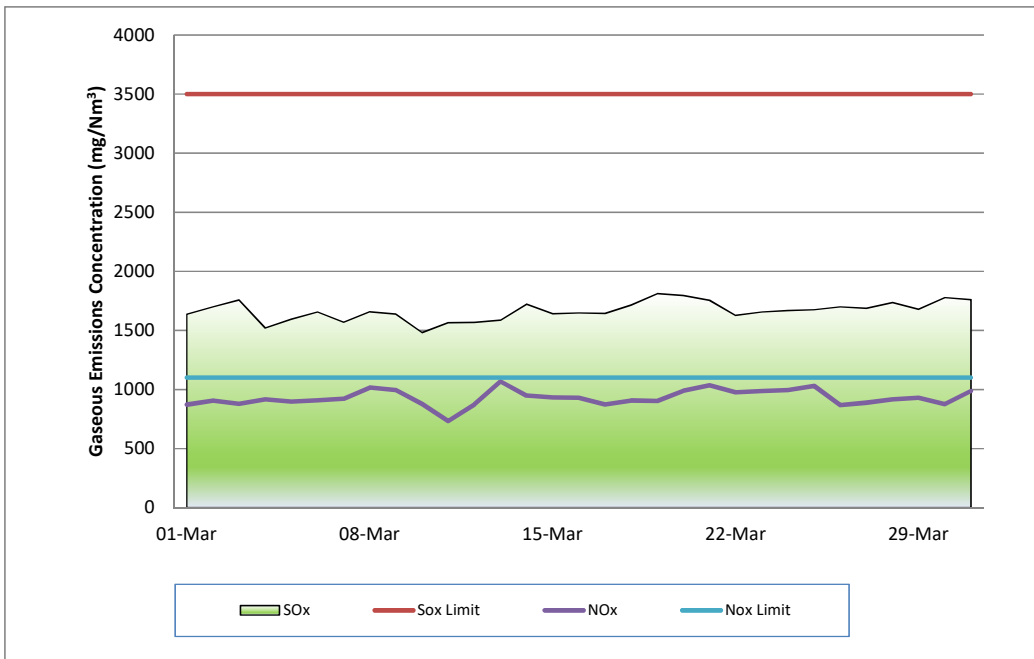
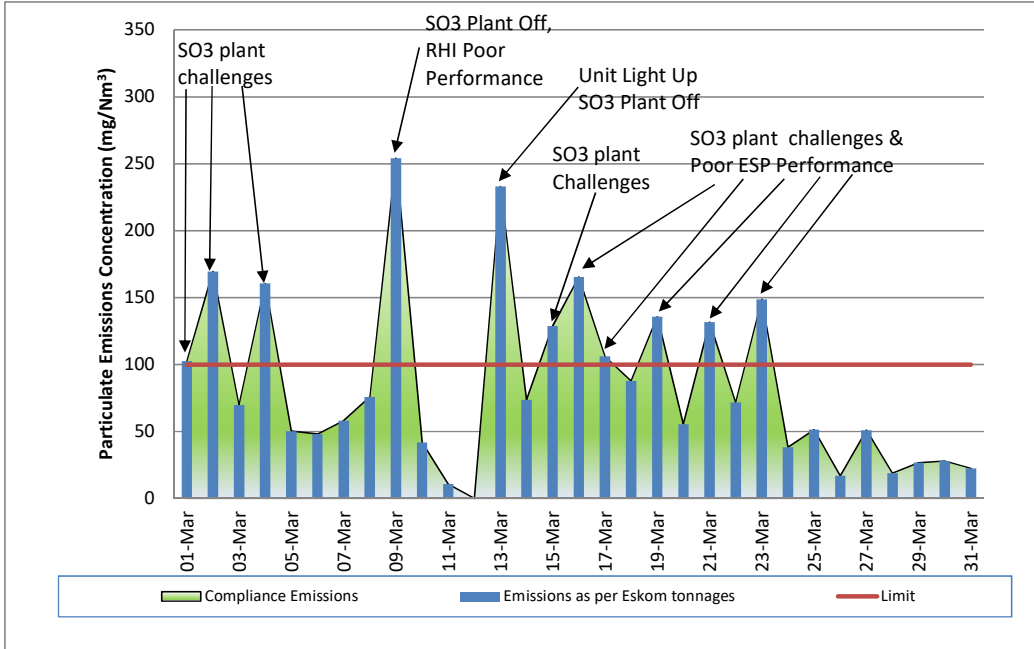
UNIT 3 Particulate Matter and Gaseous Emission Performance March-2020



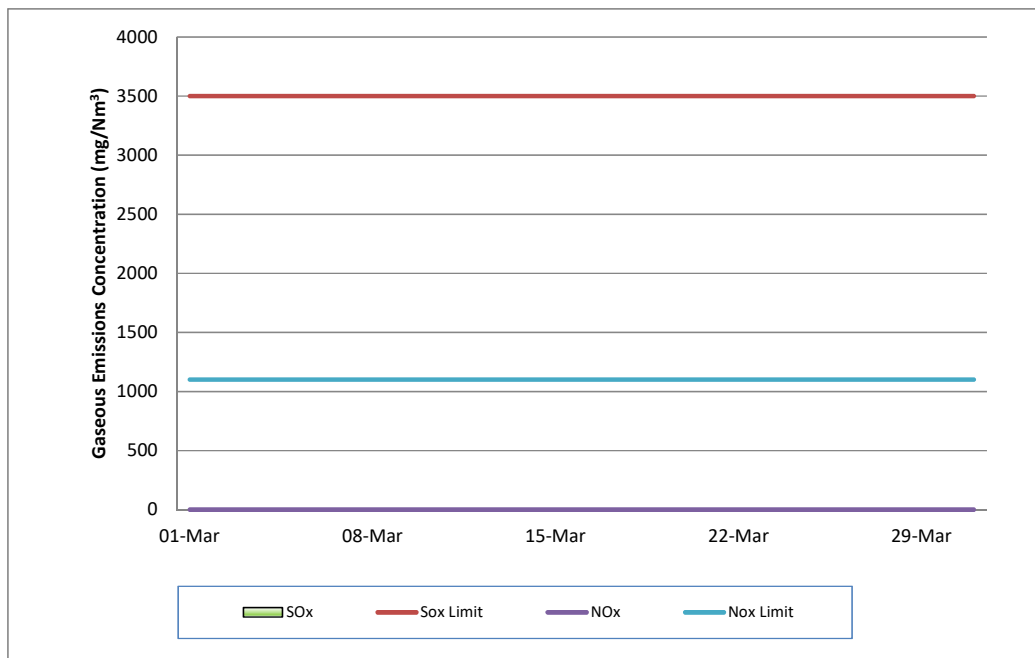
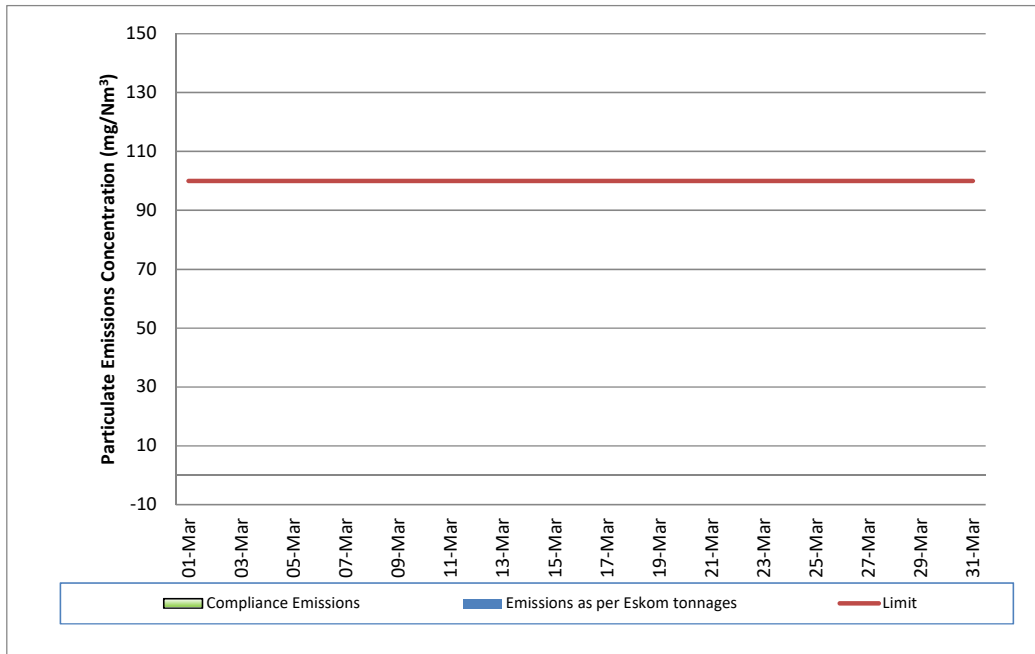
UNIT 4 Particulate Matter and Gaseous Emission Performance March-2020



UNIT 5 Particulate Matter and Gaseous Emission Performance March-2020



**UNIT 6 Particulate Matter and Gaseous Emission Performance
March-2020**



Availability

ESP utilisation

Availability												
Month	Unit 1	Days Affected	Unit 2	Days Affected	Unit 3	Days Affected	Unit 4	Days Affected	Unit 5	Days Affected	Unit 6	Days Affected
Apr-19	100.00%	0	100.00%	0	100.00%	0	100.00%	0	OFF LOAD	0	100.00%	0
May-19	100.00%	0	100.00%	0	100.00%	0	100.00%	0	OFF LOAD	0	100.00%	0
Jun-19	100.00%	0	100.00%	0	100.00%	0	100.00%	0	OFF LOAD	0	100.00%	0
Jul-19	100.00%	0	100.00%	0	100.00%	0	100.00%	0	OFF LOAD	0	100.00%	0
Aug-19	100.00%	0	100.00%	0	100.00%	0	100.00%	0	OFF LOAD	0	100.00%	0
Sep-19	100.00%	0	100.00%	0	100.00%	0	OFF LOAD	0	OFF LOAD	0	100.00%	0
Oct-19	100.00%	0	100.00%	0	100.00%	0	OFF LOAD	0	OFF LOAD	0	100.00%	0
Nov-19	98.33%	2	99.17%	1	100.00%	0	OFF LOAD	0	OFF LOAD	0	100.00%	0
Dec-19	98.39%	2	100.00%	0	100.00%	0	OFF LOAD	0	OFF LOAD	0	99.19%	1
Jan-20	95.16%	6	99.19%	1	100.00%	0	100.00%	0	OFF LOAD	0	100.00%	0
Feb-20	94.17%	3	100.00%	0	93.33%	4	100.00%	0	100.00%	0	OFF LOAD	0
Mar-20	99.19%	1	98%	2	97.58%	3	100.00%	0	100.00%	0	OFF LOAD	0

SO₃ plant utilisation

Availability												
Month	Unit 1	Days Affected	Unit 2	Days Affected	Unit 3	Days Affected	Unit 4	Days Affected	Unit 5	Days Affected	Unit 6	Days Affected
Apr-19	100.00%	0	100.00%	0	98.33%	1	93.33%	2	OFF	OFF	93.33%	3
May-19	100.00%	0	100.00%	0	67.74%	10	93.55%	2	OFF	OFF	100.00%	0
Jun-19	100.00%	0	100.00%	0	98.00%	1	100.00%	0	OFF	OFF	100.00%	0
Jul-19	100.00%	0	100.00%	0	100.00%	0	100.00%	0	OFF	OFF	93.54%	2
Aug-19	100.00%	0	100.00%	0	100.00%	0	100.00%	0	OFF	OFF	100.00%	0
Sep-19	100.00%	0	100.00%	0	100.00%	0	OFF	OFF	OFF	OFF	94.60%	2
Oct-19	100.00%	0	100.00%	0	100.00%	0	OFF	OFF	OFF	OFF	96.77%	1
Nov-19	100.00%	0	100.00%	0	96.67%	1	100.00%	0	OFF	OFF	93.33%	2
Dec-19	100.00%	0	100.00%	0	100.00%	0	OFF	OFF	OFF	OFF	96.77%	1
Jan-20	100.00%	0	100.00%	0	100.00%	0	100.00%	0	OFF	OFF	100.00%	0
Feb-20	100.00%	0	100.00%	0	93.33%	1	100.00%	0	83.33%	4	0.00%	OFF
Mar-20	100.00%	0	93.55%	2	87.10%	4	100.00%	0	64.52%	11	0.00%	OFF

Particulate Emission Monitors

Availability						
	Unit 1	Unit 2	Unit 3	Unit 4	Unit 5	Unit 6
Apr-19	99.31%	99.20%	98.69%	100.00%	OFF	100.00%
May-19	100.00%	100.00%	99.79%	100.00%	OFF	100.00%
Jun-19	99.86%	99.85%	98.47%	100.00%	OFF	97.27%
Jul-19	96.91%	97.08%	98.28%	97.70%	OFF	99.46%
Aug-19	98.19%	99.85%	100.00%	92.42%	OFF	98.26%
Sep-19	95.99%	99.28%	98.75%	OFF	OFF	98.51%
Oct-19	98.07%	100.00%	99.87%	OFF	OFF	98.66%
Nov-19	95.14%	95.00%	95.83%	OFF	OFF	77.98%
Dec-19	91.40%	100.00%	96.61%	OFF	OFF	68.55%
Jan-20	91.53%	98.92%	98.73%	99.81%	OFF	63.53%
Feb-20	75.98%	99.43%	98.42%	98.91%	99.68%	OFF
Mar-20	86.67%	96.97%	96.20%	99.44%	96.84%	OFF

Gaseous Emission Monitors

Availability												
Month	Unit 1		Unit 2		Unit 3		Unit 4		Unit 5		Unit 6	
	SO _x	NO _x	SO _x	NO _x	SO _x	NO _x	SO _x	NO _x	SO _x	NO _x	SO _x	NO _x
Apr-19	99.86%	100.00%	99.84%	100.00%	99.84%	99.53%	100.00%	100.00%	OFF	OFF	100.00%	99.75%
May-19	99.19%	99.60%	99.31%	99.58%	0.00%	0.00%	99.70%	99.85%	OFF	OFF	99.86%	99.86%
Jun-19	99.72%	99.86%	97.84%	97.84%	43.19%	43.19%	100.00%	100.00%	OFF	OFF	95.69%	95.69%
Jul-19	96.55%	96.41%	96.37%	96.37%	98.06%	98.06%	96.94%	96.94%	OFF	OFF	99.87%	99.87%
Aug-19	96.10%	95.97%	99.55%	99.55%	99.87%	99.87%	85.98%	85.98%	OFF	OFF	93.75%	93.91%
Sep-19	95.98%	96.13%	99.17%	99.31%	99.31%	99.31%	OFF	OFF	OFF	OFF	90.95%	90.80%
Oct-19	97.41%	97.41%	100.00%	100.00%	100.00%	100.00%	OFF	OFF	OFF	OFF	100.00%	100.00%
Nov-19	98.75%	98.75%	98.61%	98.75%	99.79%	96.45%	OFF	OFF	OFF	OFF	99.81%	99.81%
Dec-19	99.33%	99.33%	99.13%	99.13%	99.23%	99.23%	OFF	OFF	OFF	OFF	92.61%	92.61%
Jan-20	99.64%	99.64%	100.00%	100.00%	100.00%	99.90%	78.95%	90.79%	OFF	OFF	100.00%	99.20%
Feb-20	99.84%	99.84%	96.55%	98.71%	98.85%	98.71%	0.00%	99.49%	85.71%	85.71%	0.00%	0.00%
Mar-20	99.73%	99.73%	98.80%	98.80%	99.68%	99.68%	71.12%	98.45%	98.79%	98.92%	OFF	OFF

Oxygen						
	Unit 1	Unit 2	Unit 3	Unit 4	Unit 5	Unit 6
Apr-19	100.00%	99.73%	99.84%	100.00%	OFF	100.00%
May-19	84.81%	99.44%	100.00%	99.70%	OFF	99.86%
Jun-19	99.86%	97.84%	99.58%	100.00%	OFF	95.42%
Jul-19	96.41%	96.24%	98.19%	97.08%	OFF	99.73%
Aug-19	96.77%	99.26%	99.87%	85.98%	OFF	93.91%
Sep-19	96.28%	99.17%	99.31%	OFF	OFF	90.95%
Oct-19	97.41%	100.00%	100.00%	OFF	OFF	99.46%
Nov-19	98.75%	100.00%	99.79%	OFF	OFF	99.81%
Dec-19	99.19%	98.94%	99.10%	OFF	OFF	100.00%
Jan-20	99.64%	99.19%	100.00%	82.95%	OFF	99.20%
Feb-20	99.84%	99.07%	98.85%	0.00%	67.86%	0.00%
Mar-20	100.00%	99.80%	97.24%	0.00%	99.19%	OFF

Notes**Unit 2: NOx and SOx exceedances:**

Maintenance on the PROCAL monitor was done by the C&I Maintenance section on 4 March 2020 after which a reduction was observed in both the SOx and the NOx. The exceedances on the first three days of March was therefore monitor related, as a combination of the inflated oxygen values due to the correction factor and also the heater tube that was blocked. The exceedance on the 8th of March was only due to the high oxygen correction factor. No SOx exceedances were experienced after maintenance was done on the 4th of March. The OEM did further maintenance and serviced the monitor on the 6th of March after which another reduction was observed in the SOx and NOx.

The correction factor applied to the stack oxygen values on Unit 2 was very high due to the correlation curve that was determined from a faulty monitor. When the correlation was done, the oxygen analyser was only reading values of around 3%. This resulted in the correction factor being very high, which therefore falsely elevated the corrected oxygen values. The curve is $y=1.41x$, where x is the raw values and y is the Distributed Control System (DCS) values. From this it is clear that all the raw values are increased by 41%. The oxygen analyser was later replaced with a new analyser, but the same old inflated correction factor was still being applied to the new monitor. As these values are used in the calculation of NOx and SOx, these values are also falsely inflated.

The issue of the correlation curve has been resolved and data back fitted accordingly, this resulted in most of the NOx and SOx exceedances no longer being exceedances. The remaining exceedance on 2nd March 2020 are seen as exceedances (under investigation) and will be reported as a contravention.

Unit 3: PM Exceedances 07 - 09 March 2020

Particulate matter (PM) exceedances for 07 - 09 March 2020 were reported as a NEMA Section 30 incident and the Emergency Incident Report (EIR) was submitted on 23 March 2020

Unit 4:

The following Adjustments were made:

For O2:

- 1st March 2020 to 31st March 2020 used a value 6.18% O2 based on verifications done by Research, Testing and Development division. This was due to the monitor being calibrated incorrectly resulting in questionable readings during this period.

For SO2

- For 1-7 March 2020 the average of March 2020 (8-31 March 2020) was used.

This resulted in the removal of a number of NOx exceedances on Unit 4. The remaining NOx exceedances that were noted are on the 9th March 2020; 11th - 12th March 2020; 16th - 18th March 2020 and 24th March 2020.

Note on the use of average values:

It is noted that, where it was required to utilize averages, it is the view of the station to take it as monitor unavailability (even if the monitor was reading and available, but the data was not reliable). This would ultimately adversely affect the percentage availability of the various monitors for that period.

The additional contributors besides the monitor unreliability:

All 36 PF burners were refurbished on Unit 4 during its outage to improve combustion. The refurbishment of all the burners simultaneously has a major impact on the combustion process, which improves the heat released and absorbed in the furnace. This directly influences the NOx produced. The OEM performed an assessment on the burners to determine the amount of NOx produced after the refurbishment. The results from the assessment indicates that the expected NOx could vary between 904mg/Nm³ and 1166mg/Nm³ which is already higher than the limit of 1100mg/Nm³. The production of NOx is increased when operating with high air flows and high temperatures. When the units are operated with top mills in service, the already high NOx (from after the refurbishment) is further increased which results in exceedance of the NOx limit of 1100mg/Nm³. The unit operated with two top mills in service on these days"

Unit 1-6: Back Fitting of Valid Correlated Data

Correlation Tests have been redone and implemented. Back Fitting was required based on correlation validity and implementation for the 2020 calendar year. Based on the back fitting exercise new exceedances in some cases would be added and some existing exceedances would be removed. This was the case for both Gaseous and Particulate matter emissions.

It is also noted that if the number of new exceedance days add up to greater than the allowable grace periods, it will be reported as contraventions. These would not have been reported and investigated as Section 30 incidents as the events were not known to the station at the time. These new Contraventions will be reported and investigated promptly. The following contraventions are noted:

Unit 3: 11th - 15th March 2020 and 18th - 21st March 2020. PM Exceedances lasting more than 72 hours

ESP Efficiency (%)						
	Unit 1	Unit 2	Unit 3	Unit 4	Unit 5	Unit 6
Apr-19	99.999%	99.999%	99.998%	99.998%	OFF	99.998%
May-19	99.999%	99.999%	99.996%	99.998%	OFF	99.998%
Jun-19	99.999%	99.999%	99.998%	99.998%	OFF	99.998%
Jul-19	99.998%	99.998%	99.998%	99.998%	OFF	99.998%
Aug-19	99.998%	99.999%	99.997%	99.999%	OFF	99.998%
Sep-19	99.998%	99.999%	99.998%	OFF	OFF	99.998%
Oct-19	99.998%	99.999%	99.998%	OFF	OFF	99.998%
Nov-19	99.868%	99.785%	99.833%	OFF	OFF	99.729%
Dec-19	99.767%	99.787%	99.782%	OFF	OFF	99.654%
Jan-20	99.825%	99.768%	99.727%	99.086%	OFF	99.662%
Feb-20	99.998%	99.999%	99.997%	99.999%	99.998%	OFF
Mar-20	99.851%	99.749%	99.698%	99.892%	99.851%	OFF

