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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 | $y=36.5087*x-149.378$ | $y=28.627*x-111.67$ |

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- 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> | <ol style="list-style-type: none"> O₂ Data: <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. NO and SO₂ Data: <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. SO₂ Data: <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. |

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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_0210/20201111 Rev 01

Dear Mr. Sibaya

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

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

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

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

Yours sincerely




Karabo Rakgolela
GENERAL MANAGER

| | | |
|---|---------------|----------------------------------|
|  | Report | Lethabo Power Station |
|---|---------------|----------------------------------|

| | | | |
|--------------|--|------------------------|---|
| Report name: | Lethabo Power Station May 2020 Emission Report - Resubmission | Reference number: | LRP03PLA000 _0210/20201111 Rev01 |
| | | Document Type: | Report |
| | | Area of Applicability: | Environment |
| | | Report Date: | November 2020 |
| | | Classification: | Controlled Disclosure |

Signatures:

Compiled by:



 P Parag
System Engineer

Verified by :



 W de Klerk
Environmental Officer

Reviewed by:



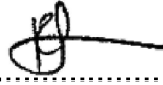
 N Mazibuko
BPE Manager

Date: 27/11/2020

Date: 2020-11-26

Date: 27/11/2020

Reviewed by:




 C Govinden
PE Manager

Reviewed by:



 L Nel
C&I Manager

Reviewed by:



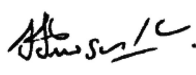
 M Hariram
Environmental Manager

Date: 27/11/2020

Date: 2020-11-30

Date: 2020-12-03

Approved by:



 H Sewsunker
Engineering Manager

Date: 2020/12/03

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LETHABO POWER STATION MONTHLY EMISSIONS REPORT

Atmospheric Emission License FDDM-MET-2011-08-P1


1. RAW MATERIALS AND PRODUCTS

| Raw Materials and Products | Raw Material Type | Units | Maximum Permitted Consumption Rate | Consumption Rate May-2020 |
|----------------------------|---------------------------|--------|---------------------------------------|---------------------------|
| | Coal | Tons | 2 000 000 | 1 290 371 |
| | Fuel Oil | Tons | 1 700 | 801.47 |
| Production Rates | Product / By-Product Name | Units | Maximum Production Capacity Permitted | Production Rate May-2020 |
| | Energy | GWh | 2834.64 | 1 945.26 |
| | Ash | Tons | 770 000 | 503 890.0 |
| | RE Ash | kg/MWh | not specified | 259.03 |

2. ENERGY SOURCE CHARACTERISTICS

| Coal Characteristic | Units | Stipulated Range | Monthly Average Content |
|---------------------|-------|------------------|-------------------------|
| Sulphur Content | % | 0.55 (Standard) | 0.920 |
| Ash Content | % | 36.89 (Standard) | 39.050 |

3. EMISSION LIMITS (mg/Nm³)

| Associated Unit/Stack | PM | SO _x | NO _x |
|-----------------------|-----|-----------------|-----------------|
| Unit 1 | 100 | 3500 | 1100 |
| Unit 2 | 100 | 3500 | 1100 |
| Unit 3 | 100 | 3500 | 1100 |
| Unit 4 | 100 | 3500 | 1100 |
| Unit 5 | 100 | 3500 | 1100 |
| Unit 6 | 100 | 3500 | 1100 |

4. ABATEMET TECHNOLOGY (%)

| Associated Unit/Stack | Technology Type | Efficiency May-2020 |
|-----------------------|---|---------------------|
| Unit 1 | <i>Electrostatic Precipitator (ESP)</i> | 99.65% |
| Unit 2 | <i>Electrostatic Precipitator (ESP)</i> | 99.85% |
| Unit 3 | <i>Electrostatic Precipitator (ESP)</i> | 99.76% |
| Unit 4 | <i>Electrostatic Precipitator (ESP)</i> | 99.91% |
| Unit 5 | <i>Electrostatic Precipitator (ESP)</i> | 99.91% |
| Unit 6 | <i>Electrostatic Precipitator (ESP)</i> | 99.81% |

5. MONITOR RELIABILITY (%)

| Associated Unit/Stack | PM | SO ₂ | NO | CO ₂ |
|-----------------------|-------|-----------------|-------|-----------------|
| Unit 1 | 88.9 | 94.7 | 94.7 | 94.7 |
| Unit 2 | 99.2 | 100.0 | 100.0 | 99.9 |
| Unit 3 | 99.2 | 99.9 | 100.0 | 99.9 |
| Unit 4 | 100.0 | 99.8 | 99.8 | 99.8 |
| Unit 5 | 100.0 | 93.5 | 93.6 | 48.5 |
| Unit 6 | 98.2 | 90.9 | 90.9 | 91.2 |

6. EMISSION PERFORMANCE

Table 6.1: Monthly tonnages for the month of May 2020

| Associated Unit/Stack | PM (tons) | SO ₂ (tons) | NO _x (tons) |
|-----------------------|--------------|------------------------|------------------------|
| Unit 1 | 158.2 | 1 409 | 681 |
| Unit 2 | 122.5 | 3 255 | 1 365 |
| Unit 3 | 194.6 | 3 025 | 1 497 |
| Unit 4 | 75.8 | 4 039 | 1 898 |
| Unit 5 | 76.2 | 2 726 | 1 283 |
| Unit 6 | 152.2 | 3 313 | 1 618 |
| SUM | 779.4 | 17 768 | 8 343 |

Table 6.2: Operating days in compliance to PM AEL Limit - May 2020

| Associated Unit/Stack | Normal | Grace | Section 30 | Contra-vention | Total Exceedance | Average PM (mg/Nm ³) |
|-----------------------|------------|-----------|------------|----------------|------------------|----------------------------------|
| Unit 1 | 10 | 8 | 0 | 0 | 8 | 190.6 |
| Unit 2 | 29 | 2 | 0 | 0 | 2 | 74.2 |
| Unit 3 | 11 | 10 | 0 | 10 | 20 | 119.5 |
| Unit 4 | 30 | 0 | 0 | 0 | 0 | 41.1 |
| Unit 5 | 31 | 0 | 0 | 0 | 0 | 50.7 |
| Unit 6 | 16 | 7 | 0 | 4 | 11 | 106.2 |
| SUM | 127 | 27 | 0 | 14 | 41 | |

*** Please Note Conventions found in the month of May 2020 were due to new exceedances determined during the Back fitting of valid correlation factors (Please refer to General Notes)**

Table 6.3: Operating days in compliance to SO_x AEL Limit - May 2020

| Associated Unit/Stack | Normal | Grace | Section 30 | Contra-vention | Total Exceedance | Average SO _x (mg/Nm ³) |
|-----------------------|------------|----------|------------|----------------|------------------|---|
| Unit 1 | 19 | 0 | 0 | 0 | 0 | 1 658.7 |
| Unit 2 | 31 | 0 | 0 | 0 | 0 | 1 968.9 |
| Unit 3 | 31 | 0 | 0 | 0 | 0 | 1 861.5 |
| Unit 4 | 31 | 0 | 0 | 0 | 0 | 2 015.5 |
| Unit 5 | 31 | 0 | 0 | 0 | 0 | 1 829.9 |
| Unit 6 | 30 | 0 | 0 | 0 | 0 | 1 938.3 |
| SUM | 173 | 0 | 0 | 0 | 0 | |

Table 6.4: Operating days in compliance to NOx AEL Limit - May 2020

| Associated Unit/Stack | Normal | Grace | Section 30 | Contra-vention | Total Exceedance | Average NOx (mg/Nm³) |
|-----------------------|------------|----------|------------|----------------|------------------|----------------------|
| Unit 1 | 19 | 0 | 0 | 0 | 0 | 772.1 |
| Unit 2 | 31 | 0 | 0 | 0 | 0 | 824.8 |
| Unit 3 | 31 | 0 | 0 | 0 | 0 | 920.4 |
| Unit 4 | 30 | 0 | 0 | 1 | 1 | 942.2 |
| Unit 5 | 31 | 0 | 0 | 0 | 0 | 861.4 |
| Unit 6 | 29 | 0 | 0 | 1 | 1 | 935.9 |
| SUM | 171 | 0 | 0 | 2 | 2 | |

Table 6.5: Legend Description

| Condition | Colour | Description |
|----------------|-------------|--|
| Normal | Light Green | Emissions below Emission Limit Value (ELV) |
| Grace | Dark Blue | Emissions above the ELV during grace period |
| Section 30 | Dark Green | Emissions above ELV during a NEMA S30 incident |
| Contra-vention | Red | Emissions above ELV but outside grace or S30 incident conditions |

Figure 1: Lethabo Unit 1 PM Emissions - May 2020

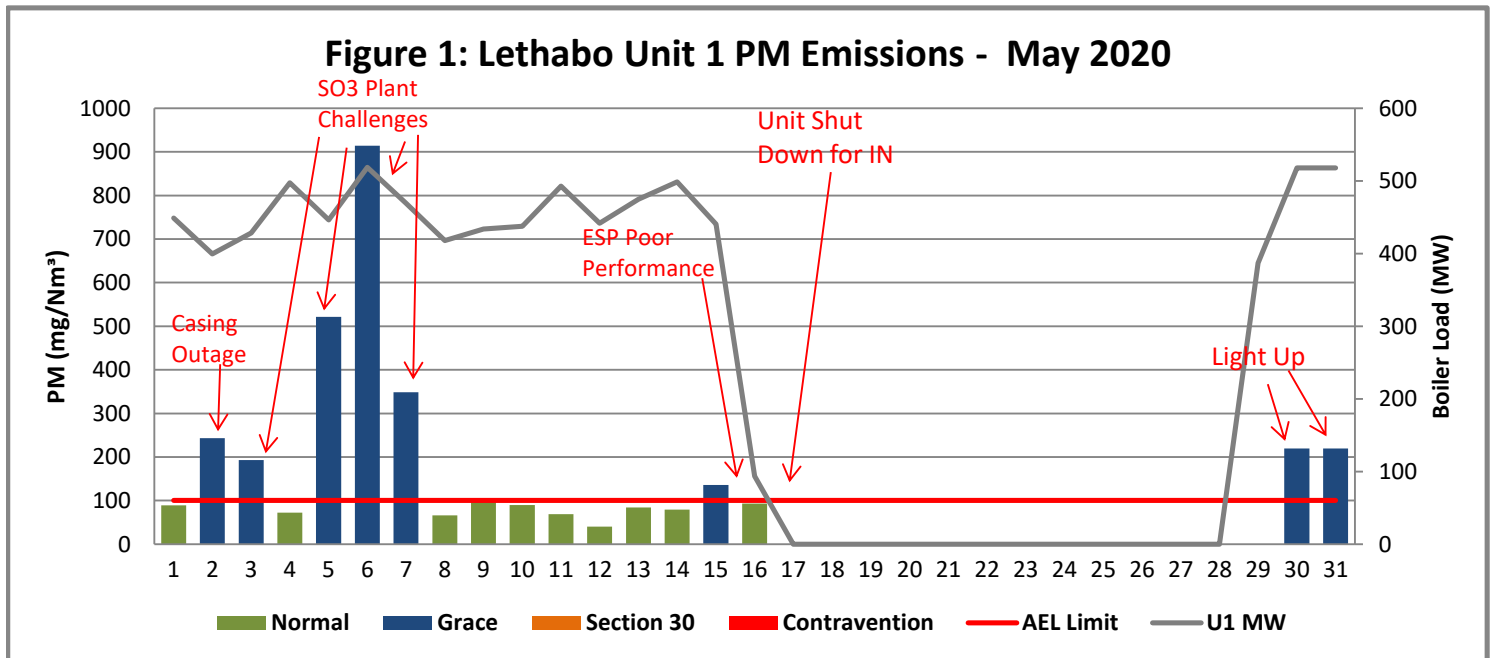


Figure 2: Lethabo Unit 2 PM Emissions - May 2020

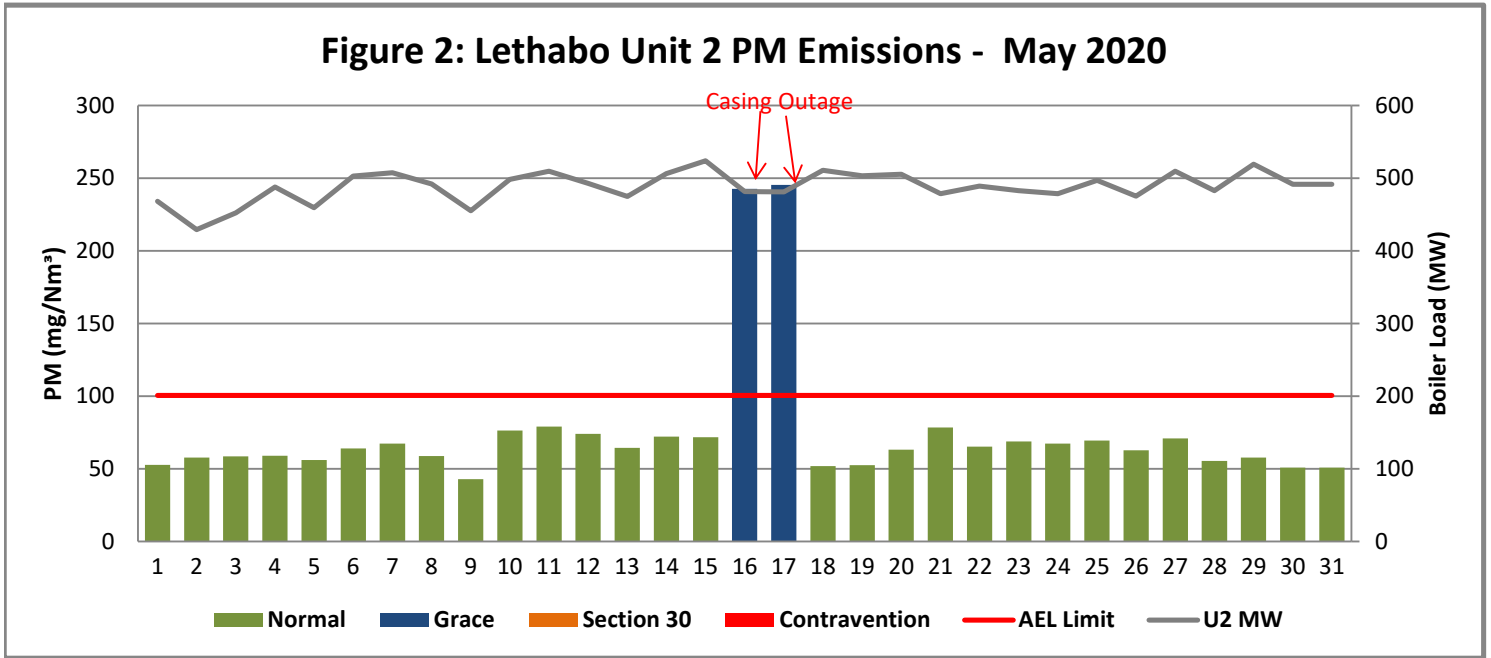


Figure 3: Lethabo Unit 3 PM Emissions - May 2020

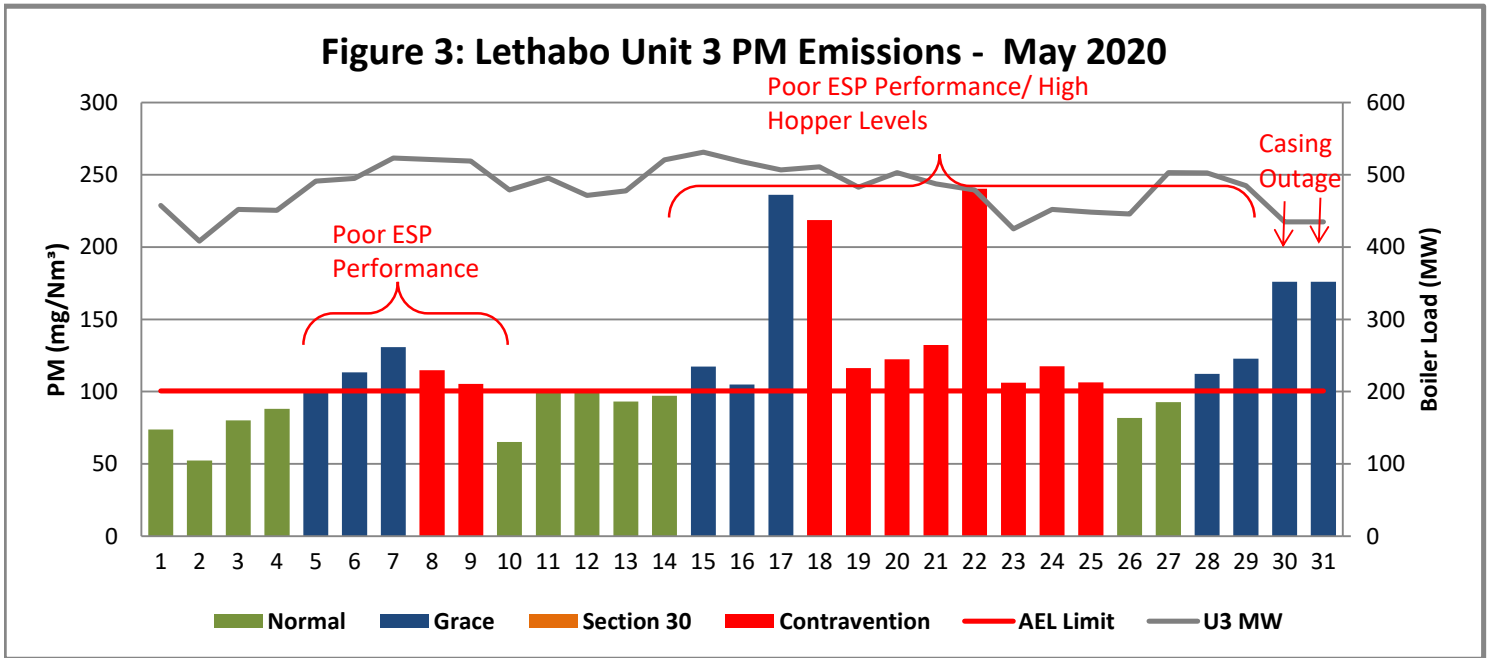


Figure 4: Lethabo Unit 4 PM Emissions - May 2020

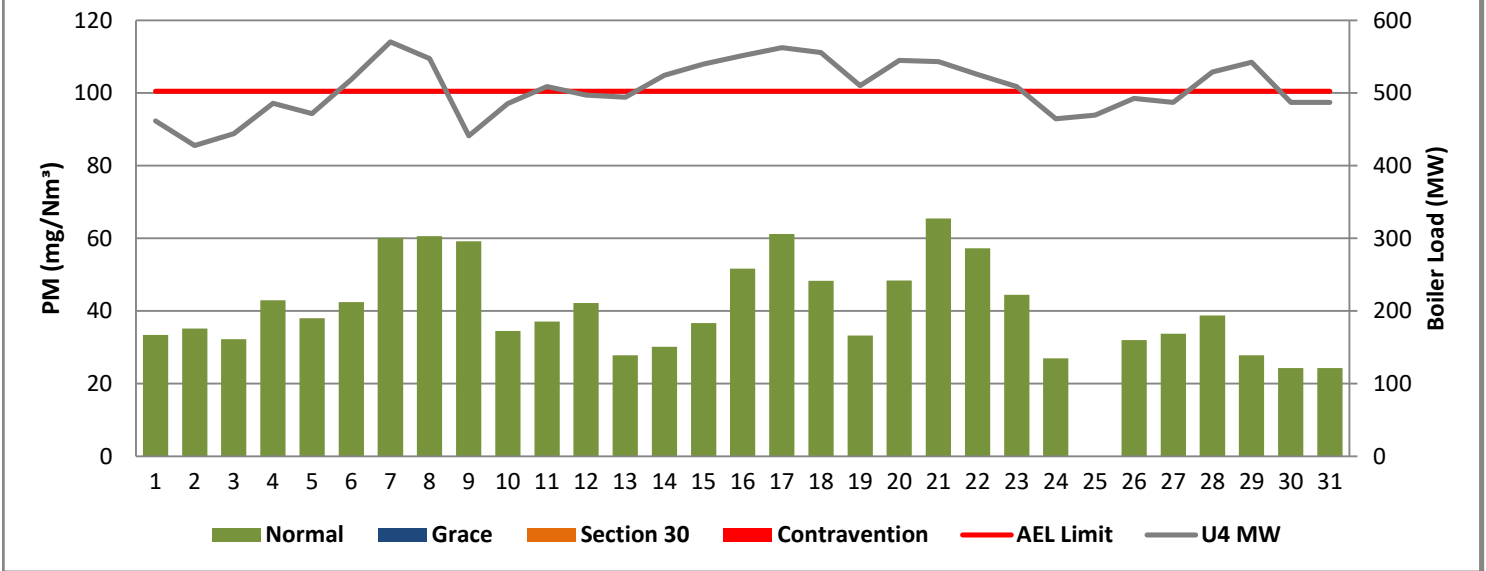


Figure 5: Lethabo Unit 5 PM Emissions - May 2020

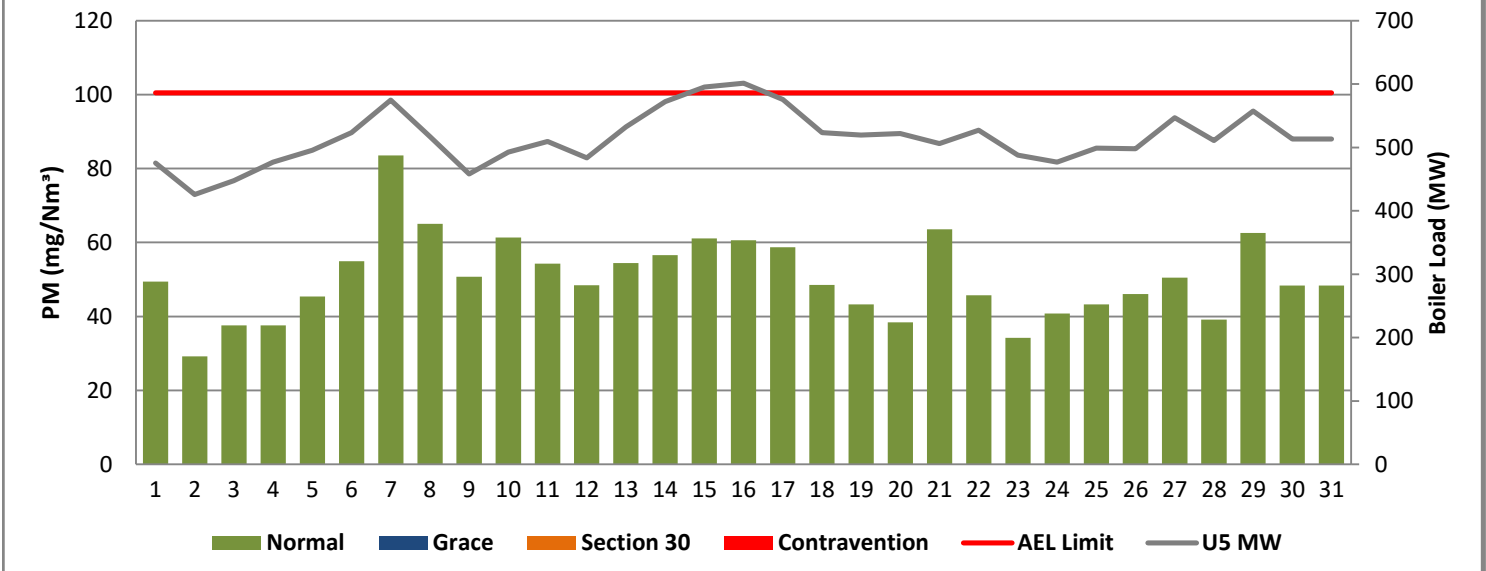


Figure 6: Lethabo Unit 6 PM Emissions - May 2020

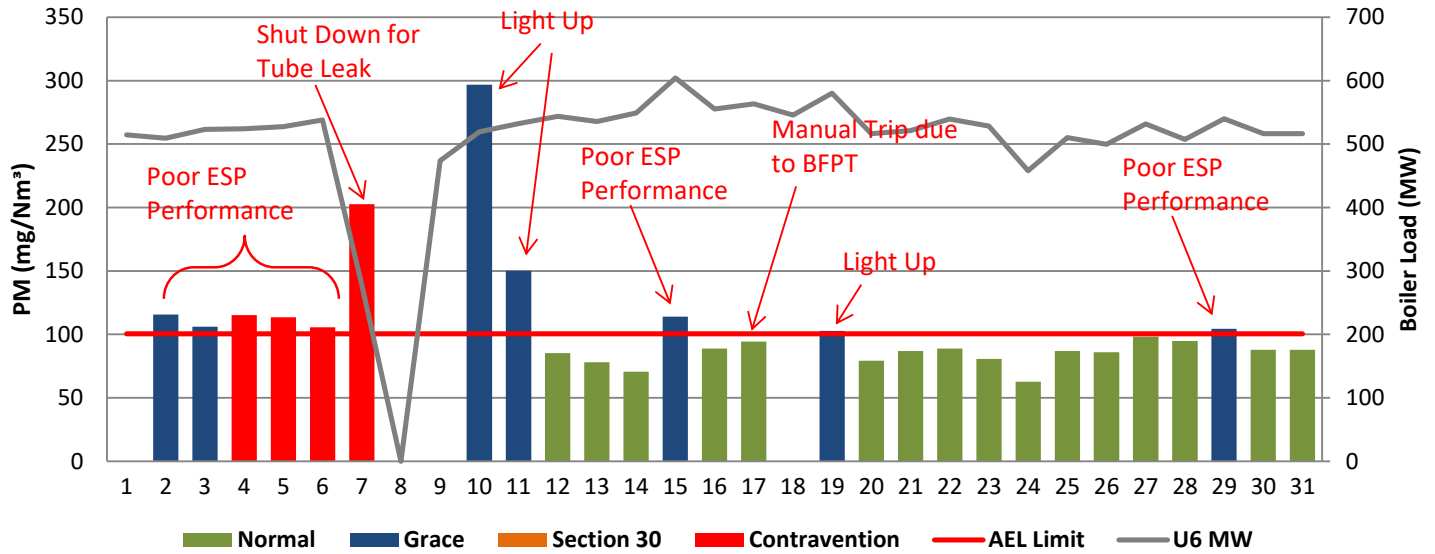


Figure 7: Lethabo Unit 1 SOx Emissions - May 2020

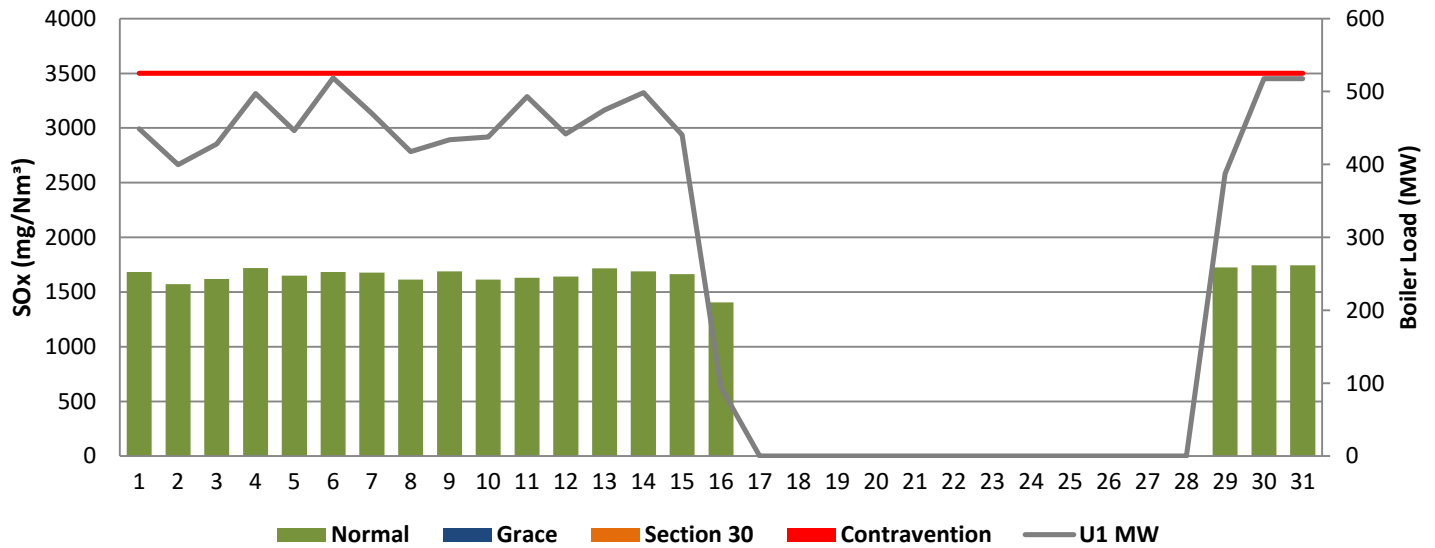


Figure 8: Lethabo Unit 2 SOx Emissions - May 2020

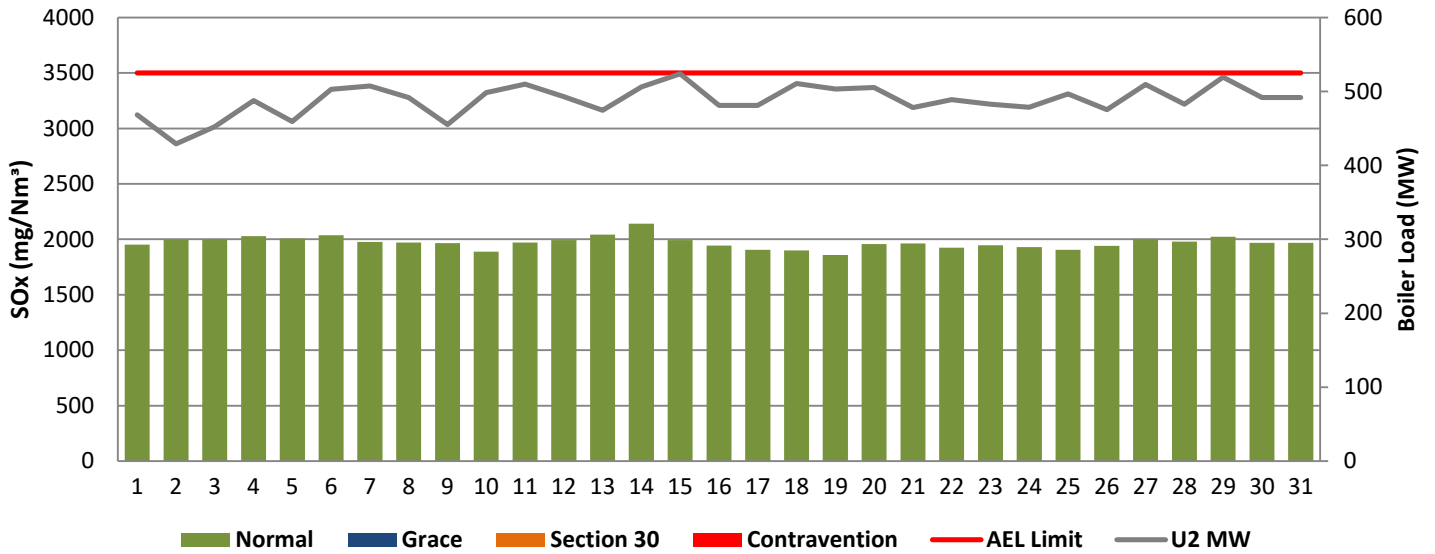


Figure 9: Lethabo Unit 3 SOx Emissions - May 2020

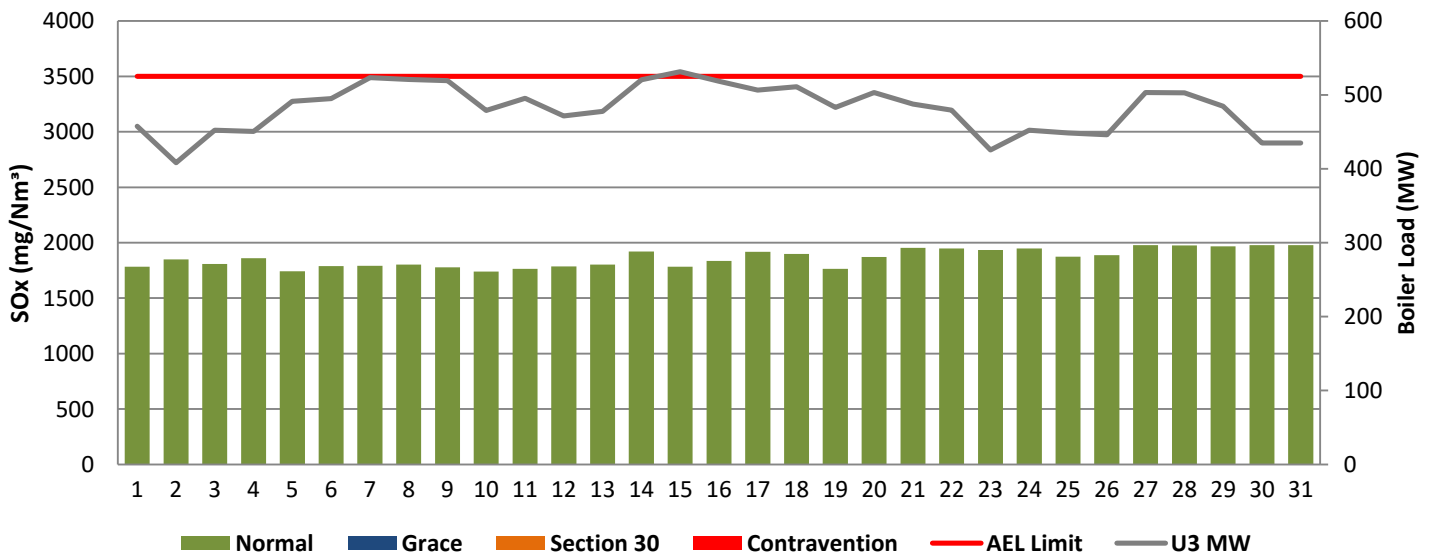


Figure 10: Lethabo Unit 4 SOx Emissions - May 2020

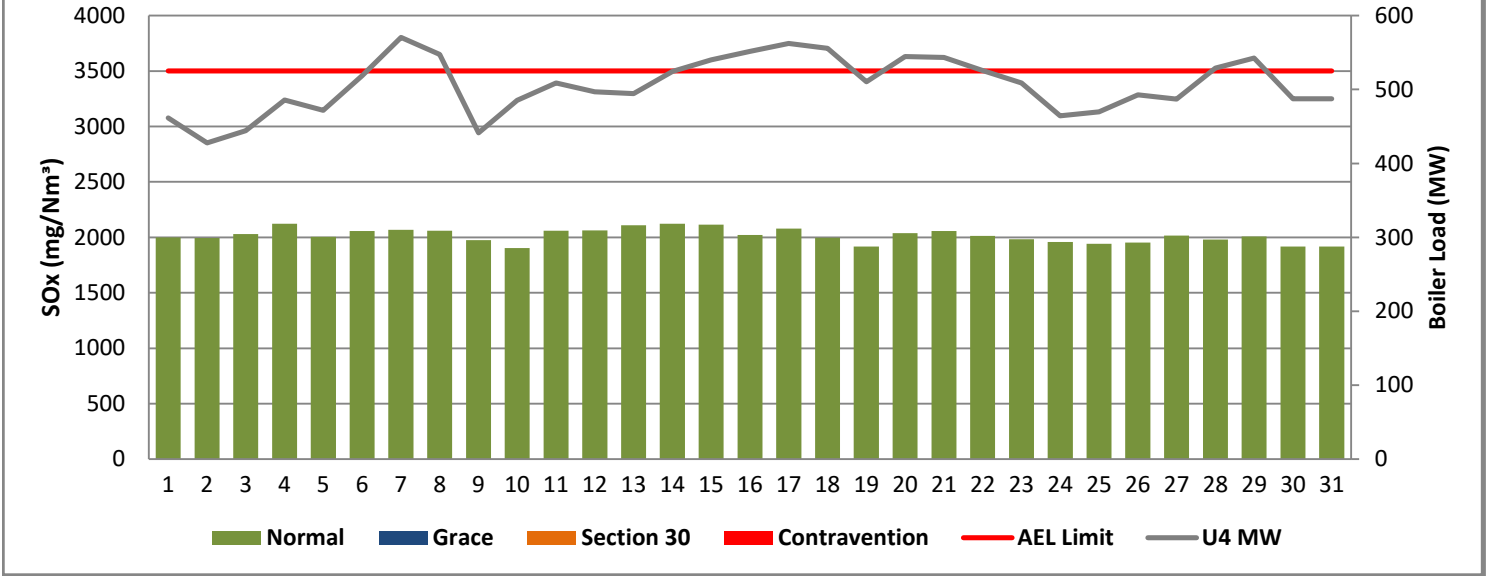


Figure 11: Lethabo Unit 5 SOx Emissions - May 2020

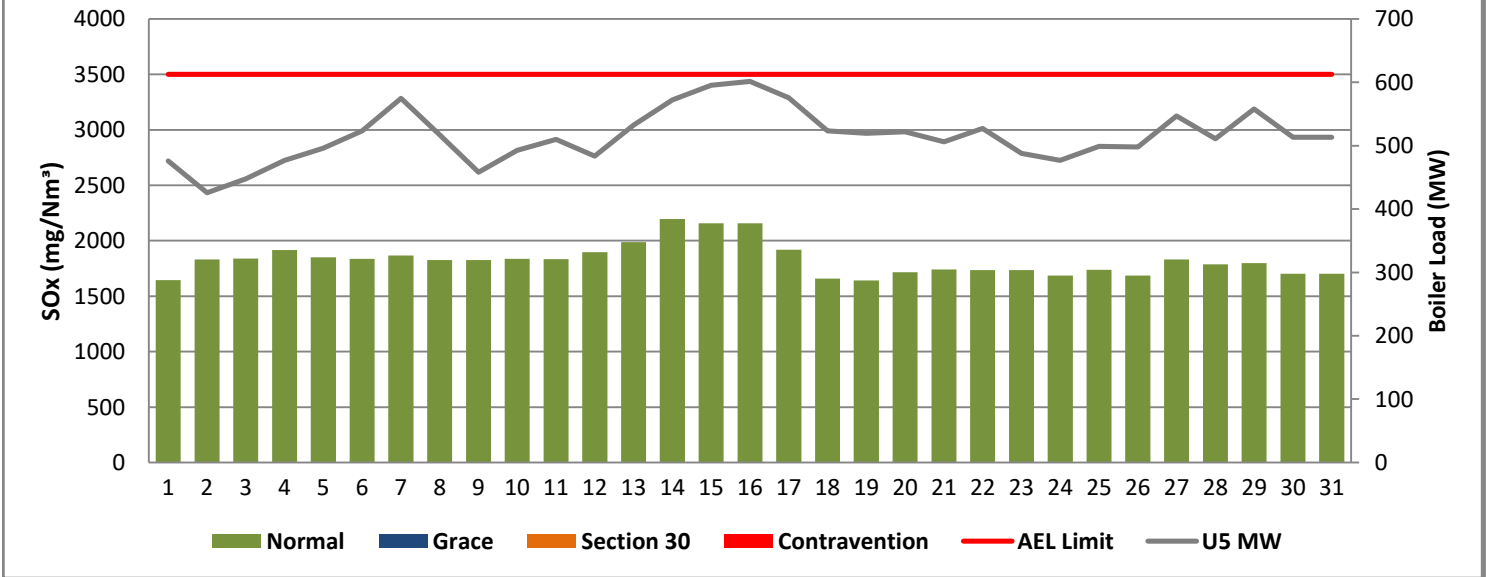


Figure 12: Lethabo Unit 6 SOx Emissions - May 2020

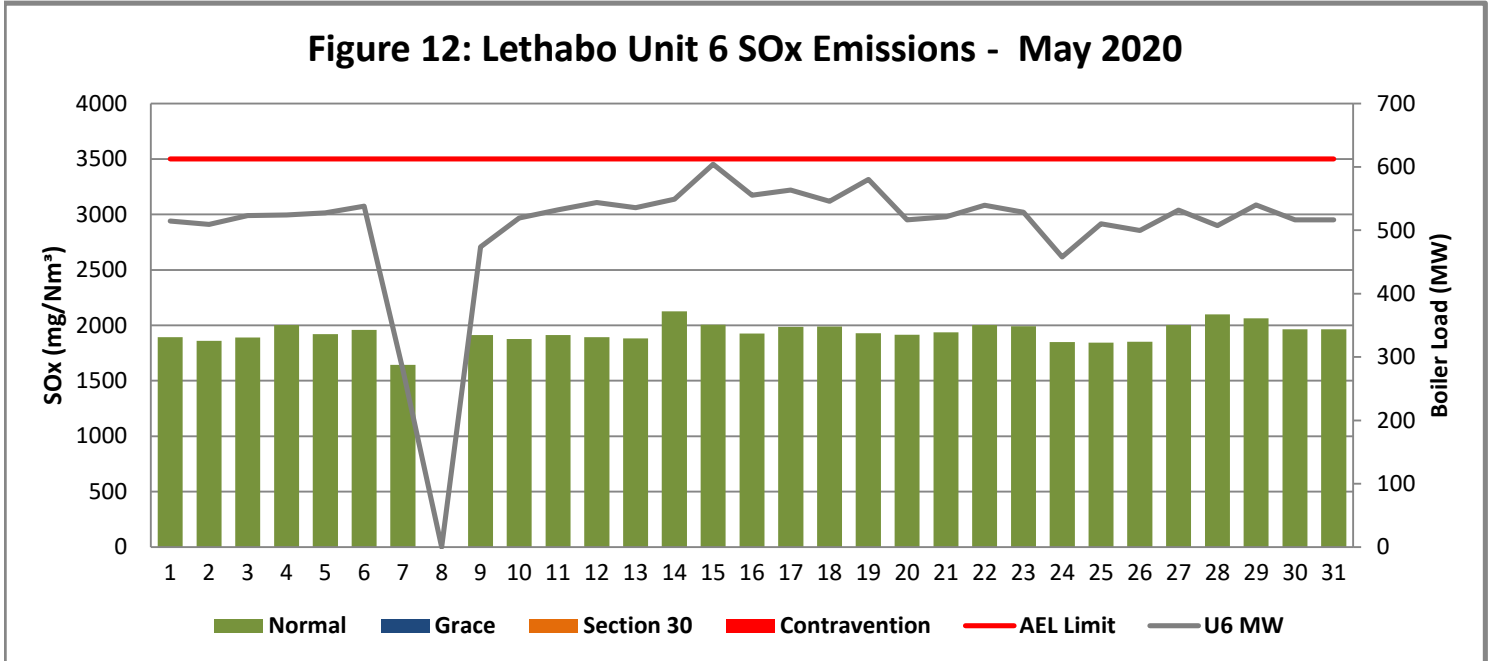


Figure 13: Lethabo Unit 1 NOx Emissions - May 2020

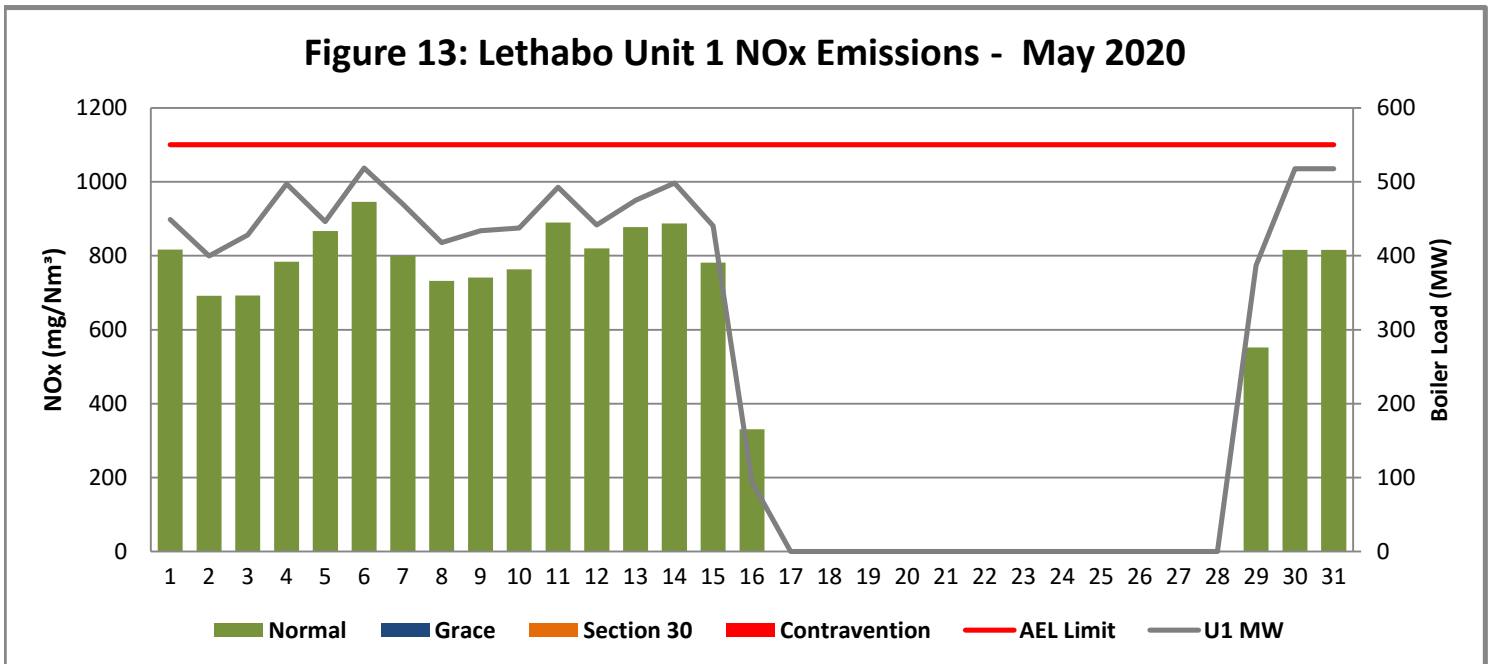


Figure 14: Lethabo Unit 2 NOx Emissions - May 2020

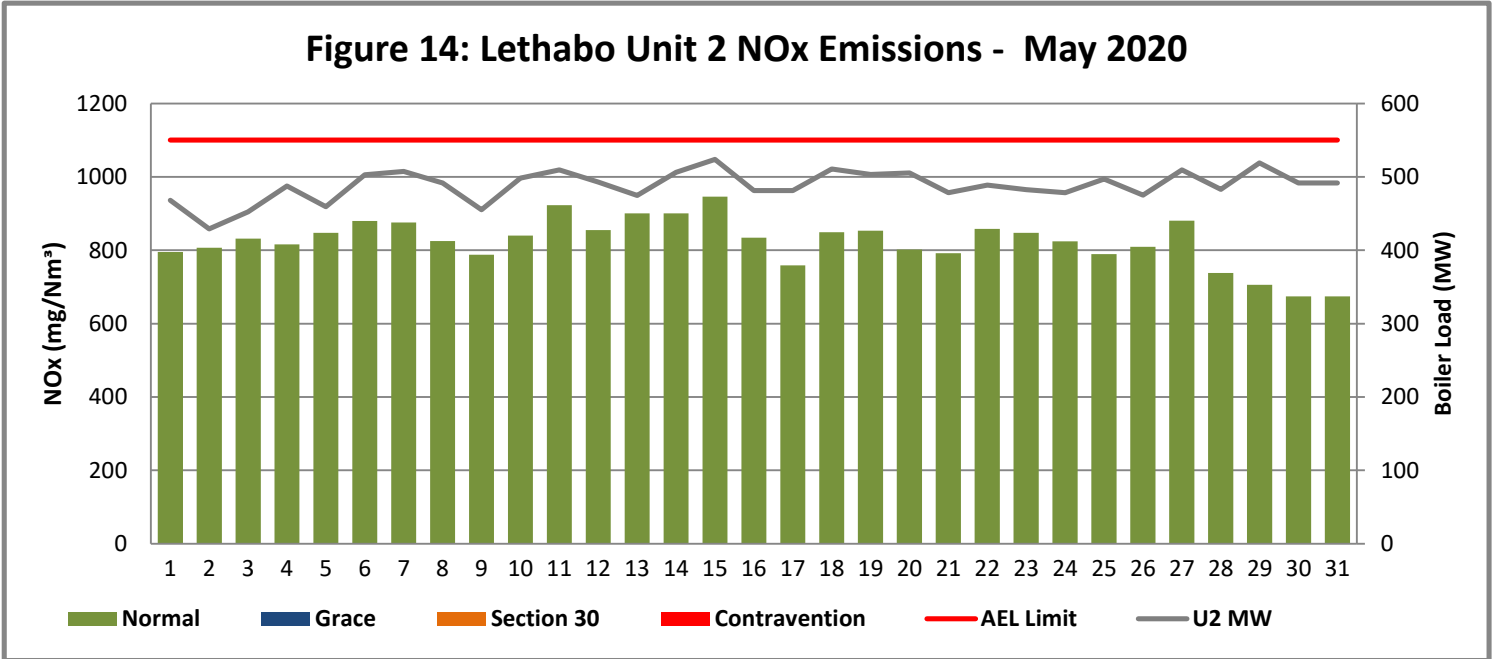


Figure 15: Lethabo Unit 3 NOx Emissions - May 2020

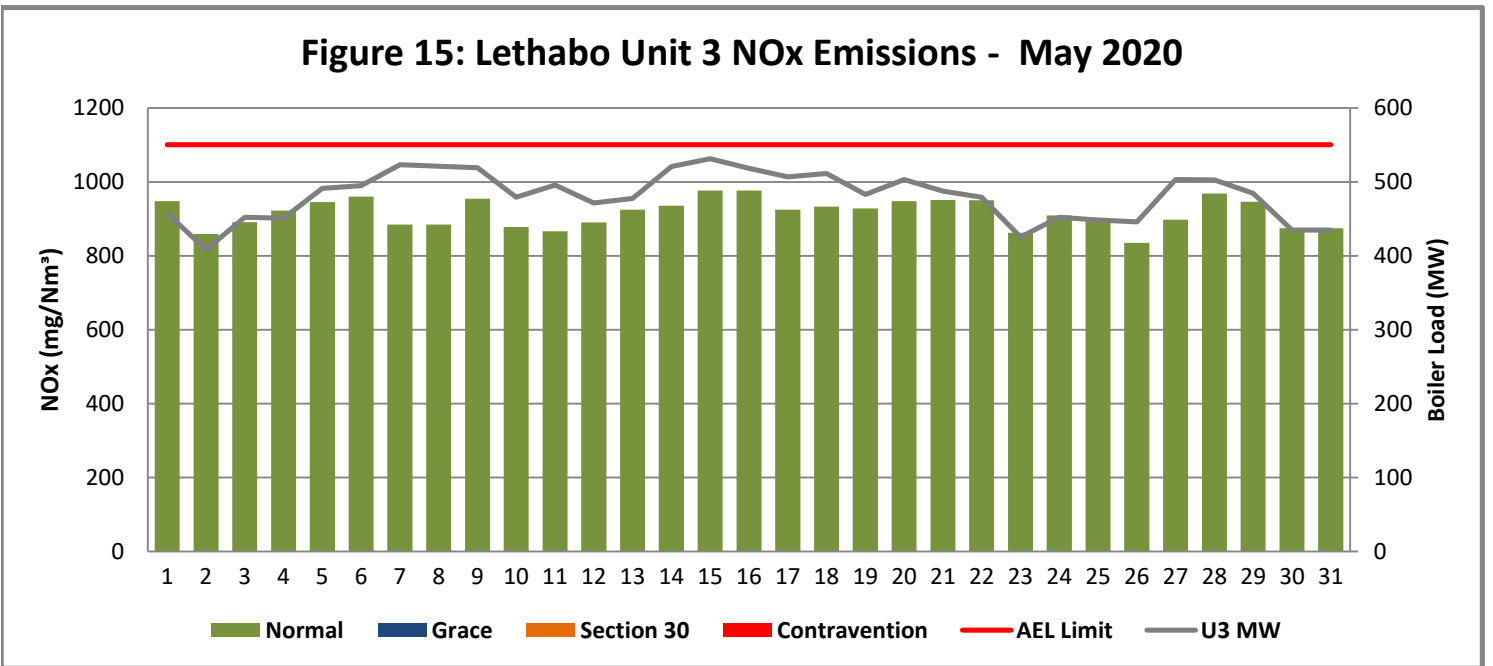


Figure 16: Lethabo Unit 4 NOx Emissions - May 2020

Monitor unreliability / Refurbishment of all 36 burners and two top mills in operation.

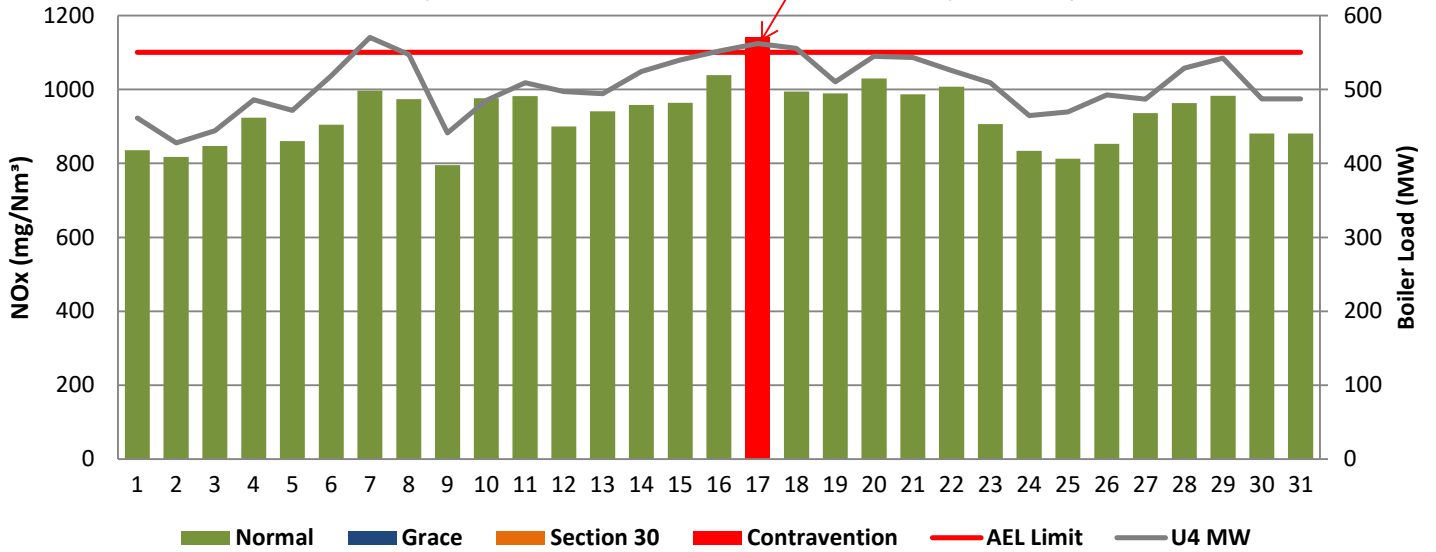


Figure 17: Lethabo Unit 5 NOx Emissions - May 2020

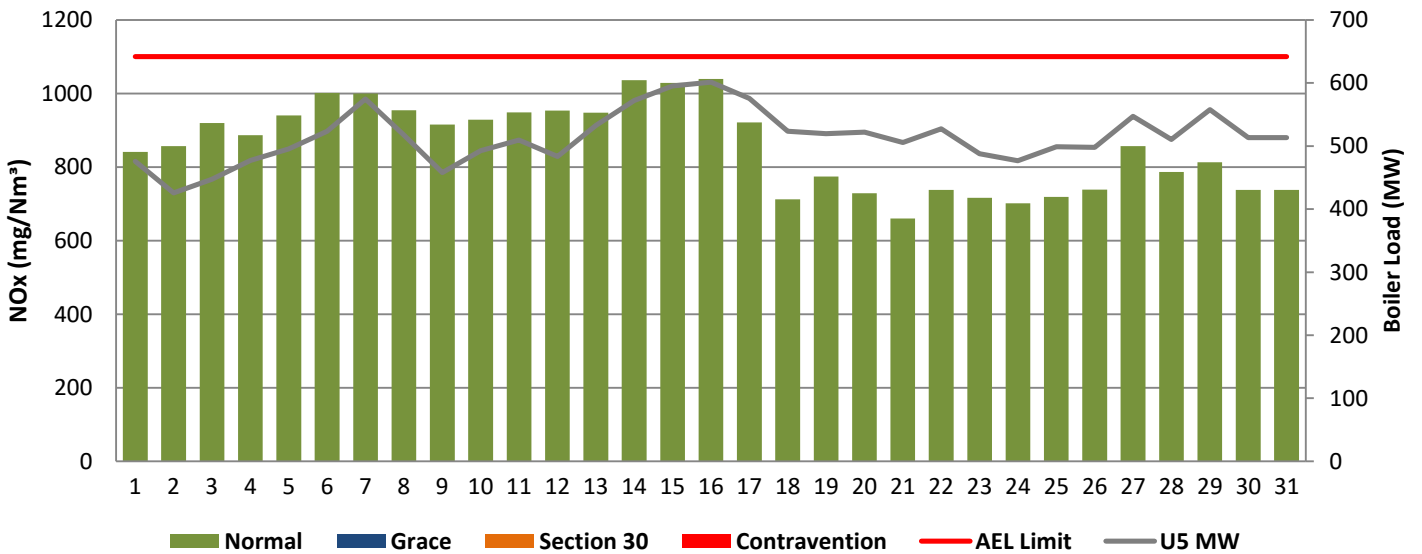
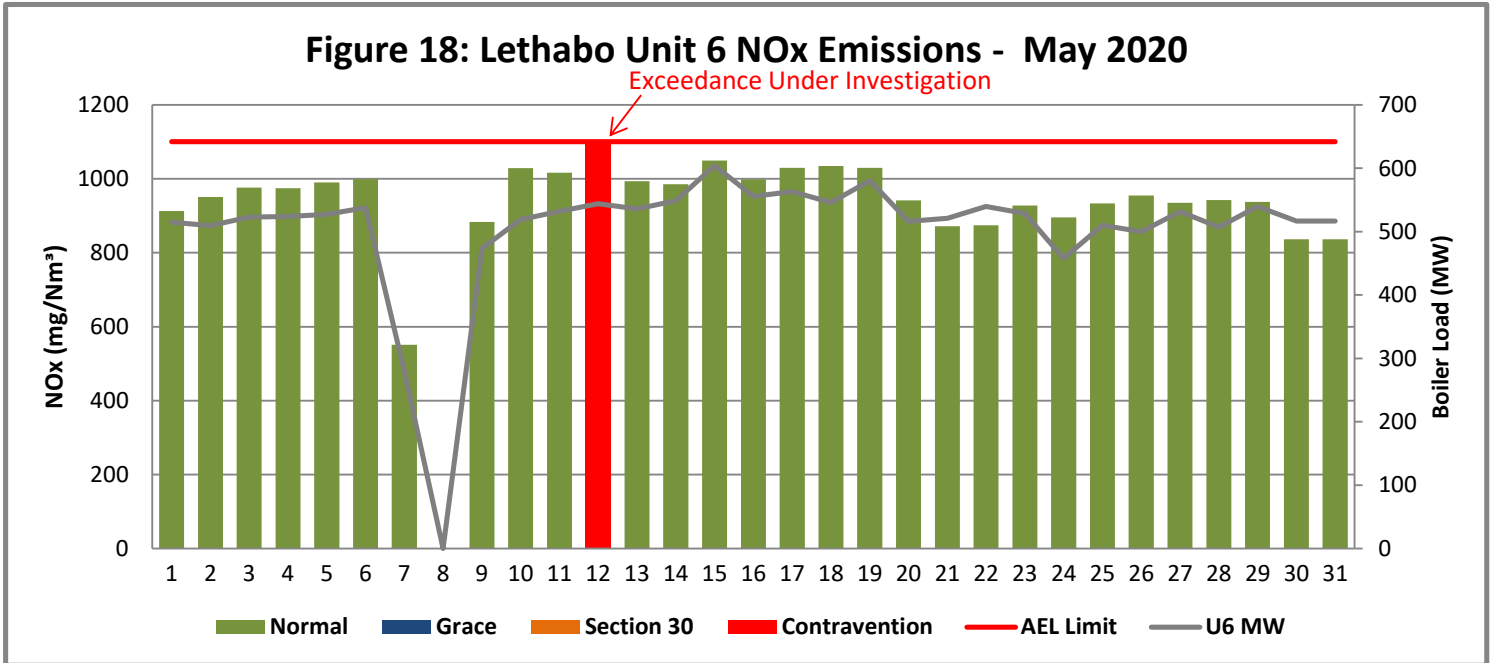


Figure 18: Lethabo Unit 6 NOx Emissions - May 2020



7. SHUT DOWN AND LIGHT UP INFORMATION

Table 7.1: PM Start-up information for the month of May 2020

| Unit No.1 | Inspection | | | | | | |
|--|------------|------------|--|--|--|--|--|
| Breaker Open (BO) | 12:05 AM | 2020/05/16 | | | | | |
| Draught Group (DG) Shut Down (SD) | 8:55 AM | 2020/05/17 | | | | | |
| BO to DG SD (duration) | 01:08:50 | DD:HH:MM | | | | | |
| Fires in time | 12:55 PM | 2020/05/29 | | | | | |
| Synch. to Grid (or BC) | 3:25 PM | 2020/05/29 | | | | | |
| Fires in to BC (duration) | 00:02:30 | DD:HH:MM | | | | | |
| Emissions below limit from BC (end date) | 12:00 PM | 2020/05/31 | | | | | |
| Emissions below limit from BC (duration) | 01:20:35 | DD:HH:MM | | | | | |

| | | | | | | | | |
|---|--|--|--|--|--|--|--|--|
| Unit No.2 | | | | | | | | |
| Breaker Open (BO) | | | | | | | | |
| Draught Group (DG) Shut Down (SD) | | | | | | | | |
| BO to DG SD (duration) | | | | | | | | |
| Fires in time | | | | | | | | |
| Synch. to Grid (or BC) | | | | | | | | |
| Fires in to BC (duration) | | | | | | | | |
| Emissions below limit from BC (end date) | | | | | | | | |
| Emissions below limit from BC (duration) | | | | | | | | |

| | | | | | | | | |
|---|--|--|--|--|--|--|--|--|
| Unit No.3 | | | | | | | | |
| Breaker Open (BO) | | | | | | | | |
| Draught Group (DG) Shut Down (SD) | | | | | | | | |
| BO to DG SD (duration) | | | | | | | | |
| Fires in time | | | | | | | | |
| Synch. to Grid (or BC) | | | | | | | | |
| Fires in to BC (duration) | | | | | | | | |
| Emissions below limit from BC (end date) | | | | | | | | |
| Emissions below limit from BC (duration) | | | | | | | | |

| Unit No.4 | Load rejection test | | MT speed controler adjustment | | Islanding test | | | |
|--|---------------------|------------|-------------------------------|-----------------------|----------------|------------|--|--|
| | | | | | | | | |
| Breaker Open (BO) | 12:15 AM | 2020/05/09 | 11:00 PM | 2020/05/24 | 1:40 AM | 2020/05/30 | | |
| Draught Group (DG) Shut Down (SD) | 12:15 AM | 2020/05/09 | DG did not trip or SD | DG did not trip or SD | 1:40 AM | 2020/05/30 | | |
| BO to DG SD (duration) | | DD:HH:MM | n/a | DD:HH:MM | | DD:HH:MM | | |
| Fires in time | 3:20 AM | 2020/05/09 | | | 2:40 AM | 2020/05/30 | | |
| Synch. to Grid (or BC) | 5:30 AM | 2020/05/09 | | | 5:21 AM | 2020/05/30 | | |
| Fires in to BC (duration) | 00:02:10 | DD:HH:MM | | DD:HH:MM | 00:02:41 | DD:HH:MM | | |
| Emissions below limit from BC (end date) | 2:00 AM | 2020/05/10 | | | 10:00 AM | 2020/05/30 | | |
| Emissions below limit from BC (duration) | 00:20:30 | DD:HH:MM | | DD:HH:MM | 00:04:39 | DD:HH:MM | | |

| Unit No.5 | | | | | | | | |
|--|--|--|--|--|--|--|--|--|
| | | | | | | | | |
| Breaker Open (BO) | | | | | | | | |
| Draught Group (DG) Shut Down (SD) | | | | | | | | |
| BO to DG SD (duration) | | | | | | | | |
| Fires in time | | | | | | | | |
| Synch. to Grid (or BC) | | | | | | | | |
| Fires in to BC (duration) | | | | | | | | |
| Emissions below limit from BC (end date) | | | | | | | | |
| Emissions below limit from BC (duration) | | | | | | | | |

| Unit No.6 | <i>Physical over speed test</i> | | <i>Cold Reserve/ Boiler Tube Leak</i> | | <i>Unit 6 was manually tripped due to the loss of BFPT and EFP A unable to cut in</i> | | | |
|--|---------------------------------|----------|---------------------------------------|------------|---|-----------------------|--|--|
| Breaker Open (BO) | | | 12:40 AM | 2020/05/07 | 10:20 PM | 2020/05/17 | | |
| Draught Group (DG) Shut Down (SD) | | | 1:20 AM | 2020/05/07 | DG did not trip or SD | DG did not trip or SD | | |
| BO to DG SD (duration) | | DD:HH:MM | 00:00:40 | DD:HH:MM | n/a | DD:HH:MM | | |
| Fires in time | | | 7:00 AM | 2020/05/09 | | | | |
| Synch. to Grid (or BC) | | | 9:00 AM | 2020/05/09 | | | | |
| Fires in to BC (duration) | | DD:HH:MM | | DD:HH:MM | | DD:HH:MM | | |
| Emissions below limit from BC (end date) | | | 5:00 AM | 2020/05/12 | | | | |
| Emissions below limit from BC (duration) | | DD:HH:MM | 02:20:00 | DD:HH:MM | | DD:HH:MM | | |

7.2: Point Source emissions released during start-up (fires-in) and Shut-down (SD) for the month of May 2020 in mg/Nm³

8. MAINTENANCE

| | | | | |
|-------------------------------|----------------------------|-------------------------------|--|--|
| Unit 1 | | | | |
| Beginning of | 2020/05/02 00:00 | 2020/05/03 00:00:00 | | |
| Reason for Maintenance | LHI precip casing repairs. | LHO precip casing repairs | | |
| End (Time): | 2020/05/02 20:15 | 2020/05/03 17:39:00 | | |
| Duration | 20:15:00 | 17:39:00 | | |
| Unit 2 | | | | |
| Beginning of | 2020/05/16 00:00:00 | 2020/05/17 00:00:00 | | |
| Reason for Maintenance | RHO precip casing repairs | LHI Precip casing maintenance | | |
| End (Time): | 2020/05/16 18:21:00 | 2020/05/17 17:56:00 | | |
| Duration | 18:21:00 | 17:56:00 | | |
| Unit 3 | | | | |
| Beginning of | 2020/05/30 00:00:00 | 2020/05/31 00:00:00 | | |
| Reason for Maintenance | RHO precip casing repairs. | LHI precips casing repairs | | |
| End (Time): | 2020/05/30 17:17:00 | 2020/05/31 16:20:00 | | |
| Duration | 17:17:00 | 16:20:00 | | |
| Unit 4 | | | | |
| Beginning of | | | | |
| Reason for Maintenance | | | | |
| End (Time): | | | | |
| Duration | | | | |
| Unit 5 | | | | |
| Beginning of | | | | |
| Reason for Maintenance | | | | |
| End (Time): | | | | |
| Duration | | | | |
| Unit 6 | | | | |
| Beginning of | | | | |
| Reason for Maintenance | | | | |
| End (Time): | | | | |
| Duration | | | | |

9. GENERAL

Unit 2:

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. This was corrected with the back fitting exercise after the correlation tests were redone. This resulted in most of the previously reported NO_x and SO_x exceedances to no longer be exceedances

Unit 4: NO_x Exceedances,

Calibrations were not done because of unavailability of calibration gas and unverified gas therefore the oxygen values were questionable and had to be adjusted. An average oxygen value of 7.13% was used from 1-31 May based on verifications done by Research, Testing & Development division (RT&D).

Exceedances on 17 May 2020

Additional contributors besides 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 NO_x produced.

The OEM performed an assessment on the burners to determine the amount of NO_x produced after the refurbishment. The results from the assessment indicates that the expected NO_x could vary between 904mg/Nm³ and 1166mg/Nm³ which is already higher than the limit of 1100mg/Nm³.

The production of NO_x is increased when operating with high air flows and high temperatures. When the units are operated with top mills in service, the already high NO_x (from after the refurbishment) is further increased which results in exceedance of the NO_x limit of 1100mg/Nm³. The unit operated with two top mills in service.

Unit 2,4,5 and 6:

RT&D did verification test during late April 2020.

Unit5

Calibrations were not done because of unavailability of calibration gas and unverified gas therefore the oxygen values were questionable and had to be adjusted. An average oxygen value of 6.8% was used for the whole of May 2020.

Unit 6

Calibrations were not done because of unavailability of calibration gas and unverified gas therefore the oxygen values were questionable and had to be adjusted. An average oxygen value of 6.13% was applied from 1 - 27 May 2020 as a calibration was done on 27 May.

There was a problem with the heater on the gas analyser that started on 16 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 happens all the gas values drop to zero. It mainly happened during early morning hours when ambient temperatures were low. The following dates and times are when that happened and will be removed from the reported data:

- 16 May 06:37-09:13 (2.6 hours)
- 24 May 06:58-12:33 (5.58 hours)
- 26 May 06:53-11:37 (5.73 hours)
- 27 May 03:56-10:11 (6.25 hours)
- 28 May 00:48-10:41 (9.88 hours)
- 29 May 03:09-09:17 (6.13 hours)

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.

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 exceedance 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 exceedances and associated contraventions are noted:

Unit 3 PM Exceedance on the 5th-6th May 2020 and 8th-9th May 2020 was found to be an exceedance after the back fitting of the correlation curves were done.

Unit 3 PM Exceedance on the 15th-16th May 2020, 19th-20th May 2020 and 23rd-25th May 2020 was found to be an exceedance after the back fitting of the correlation curves were done.

Unit 6 PM Exceedance on the 2nd-6th May 2020 was found to be an exceedance after the back fitting of the correlation curves were done.

ADDENDUM TO MONTHLY EMISSIONS REPORT

10. S30 INCIDENT OR LEGAL CONTRAVENTION REGISTER

To be completed in the case of a S30 incident or a legal contravention:

| Unit no | Incident Start Date | Incident End Date | Incident Cause | Remedial action | S30 initial notification sent | Date S30 investigation report sent | Date DEA Acknowledgment | Date DEA Acceptable | Comments / Reference No. |
|---------|---------------------|-------------------|----------------|-----------------|-------------------------------|------------------------------------|-------------------------|---------------------|--------------------------|
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |

11. PARTICULATE EMISSIONS

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

| MONTH | UNIT 1 | UNIT 2 | UNIT 3 | UNIT 4 | UNIT 5 | UNIT 6 | STATION |
|----------|--------|--------|--------|--------|--------|--------|---------|
| 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 |
| APR '20 | 0.54 | 0.36 | 0.69 | 0.21 | 0.18 | 0.64 | 0.41 |
| MAY '20 | 0.83 | 0.34 | 0.54 | 0.20 | 0.20 | 0.42 | 0.38 |

ADDENDUM TO MONTHLY EMISSIONS REPORT

12. DAILY EMISSIONS FIGURES

Final Dust Concentration (mg/Nm³) (Back Fitted Emissions)

| Date | U1 | U2 | U3 | U4 | U5 | U6 | Limit |
|--------|-----|-----|-----|-----|----|-----|-------|
| 01-May | 89 | 53 | 74 | 33 | 49 | OFF | 100 |
| 02-May | 243 | 58 | 52 | 35 | 29 | 116 | 100 |
| 03-May | 193 | 59 | 80 | 32 | 38 | 106 | 100 |
| 04-May | 72 | 59 | 88 | 43 | 38 | 111 | 100 |
| 05-May | 521 | 56 | 101 | 38 | 45 | 113 | 100 |
| 06-May | 914 | 64 | 113 | 42 | 55 | 106 | 100 |
| 07-May | 349 | 67 | 131 | 60 | 84 | 203 | 100 |
| 08-May | 66 | 59 | 115 | 61 | 65 | OFF | 100 |
| 09-May | 100 | 43 | 105 | 59 | 51 | OFF | 100 |
| 10-May | 90 | 76 | 65 | 35 | 61 | 297 | 100 |
| 11-May | 69 | 79 | 99 | 37 | 54 | 150 | 100 |
| 12-May | 40 | 74 | 100 | 42 | 48 | 85 | 100 |
| 13-May | 84 | 64 | 93 | 28 | 54 | 78 | 100 |
| 14-May | 79 | 72 | 97 | 30 | 57 | 71 | 100 |
| 15-May | 136 | 72 | 117 | 37 | 61 | 114 | 100 |
| 16-May | 93 | 243 | 105 | 52 | 61 | 89 | 100 |
| 17-May | OFF | 245 | 236 | 61 | 59 | 94 | 100 |
| 18-May | OFF | 52 | 219 | 48 | 49 | OFF | 100 |
| 19-May | OFF | 53 | 116 | 33 | 43 | 103 | 100 |
| 20-May | OFF | 63 | 122 | 48 | 38 | 79 | 100 |
| 21-May | OFF | 79 | 132 | 65 | 64 | 87 | 100 |
| 22-May | OFF | 65 | 240 | 57 | 46 | 89 | 100 |
| 23-May | OFF | 69 | 106 | 44 | 34 | 81 | 100 |
| 24-May | OFF | 67 | 118 | 27 | 41 | 63 | 100 |
| 25-May | OFF | 70 | 106 | OFF | 43 | 87 | 100 |
| 26-May | OFF | 63 | 82 | 32 | 46 | 86 | 100 |
| 27-May | OFF | 71 | 93 | 34 | 50 | 98 | 100 |
| 28-May | OFF | 55 | 112 | 39 | 39 | 95 | 100 |
| 29-May | OFF | 58 | 123 | 28 | 63 | 104 | 100 |
| 30-May | 220 | 51 | 176 | 24 | 48 | 88 | 100 |
| 31-May | 71 | 42 | 184 | 26 | 59 | 76 | 100 |

Final Dust Concentration (mg/Nm³) (Pre-Back Fitting)

| Date | U1 | U2 | U3 | U4 | U5 | U6 | Limit |
|--------|-----|-----|-----|-----|-----|-----|-------|
| 01-May | 89 | 53 | 60 | 32 | 56 | OFF | 100 |
| 02-May | 243 | 58 | 43 | 34 | 30 | 58 | 100 |
| 03-May | 193 | 59 | 65 | 31 | 41 | 54 | 100 |
| 04-May | 72 | 59 | 71 | 40 | 41 | 56 | 100 |
| 05-May | 521 | 56 | 82 | 36 | 51 | 56 | 100 |
| 06-May | 914 | 64 | 90 | 40 | 63 | 54 | 100 |
| 07-May | 349 | 67 | 105 | 54 | 100 | 127 | 100 |
| 08-May | 66 | 59 | 92 | 55 | 76 | OFF | 100 |
| 09-May | 100 | 43 | 84 | 54 | 58 | OFF | 100 |
| 10-May | 90 | 76 | 53 | 33 | 71 | 205 | 100 |
| 11-May | 69 | 79 | 79 | 35 | 62 | 82 | 100 |
| 12-May | 40 | 74 | 80 | 40 | 55 | 50 | 100 |
| 13-May | 84 | 64 | 75 | 28 | 62 | 38 | 100 |
| 14-May | 79 | 72 | 78 | 30 | 65 | 34 | 100 |
| 15-May | 136 | 72 | 94 | 35 | 71 | 55 | 100 |
| 16-May | 93 | 243 | 84 | 47 | 70 | 45 | 100 |
| 17-May | OFF | 245 | 173 | 55 | 68 | 47 | 100 |
| 18-May | OFF | 52 | 162 | 45 | 55 | OFF | 100 |
| 19-May | OFF | 53 | 92 | 32 | 48 | 48 | 100 |
| 20-May | OFF | 63 | 97 | 45 | 42 | 39 | 100 |
| 21-May | OFF | 79 | 105 | 59 | 74 | 41 | 100 |
| 22-May | OFF | 65 | 179 | 52 | 51 | 42 | 100 |
| 23-May | OFF | 69 | 85 | 41 | 37 | 42 | 100 |
| 24-May | OFF | 67 | 93 | 27 | 45 | 37 | 100 |
| 25-May | OFF | 70 | 85 | OFF | 48 | 47 | 100 |
| 26-May | OFF | 63 | 66 | 31 | 51 | 46 | 100 |
| 27-May | OFF | 71 | 75 | 32 | 57 | 50 | 100 |
| 28-May | OFF | 55 | 90 | 37 | 43 | 46 | 100 |
| 29-May | OFF | 58 | 98 | 28 | 73 | 50 | 100 |
| 30-May | 220 | 51 | 133 | 25 | 55 | 42 | 100 |
| 31-May | 71 | 42 | 137 | 26 | 69 | 40 | 100 |

ADDENDUM TO MONTHLY EMISSIONS REPORT

Final SOx Concentration (mg/Nm³) (Back Fitted Emissions)

| Date | U1 | U2 | U3 | U4 | U5 | U6 | Limit |
|--------|------|------|------|------|------|------|-------|
| 01-May | 1684 | 1952 | 1785 | 2000 | 1645 | 1894 | 3500 |
| 02-May | 1573 | 1995 | 1849 | 1993 | 1830 | 1861 | 3500 |
| 03-May | 1621 | 2001 | 1808 | 2030 | 1840 | 1891 | 3500 |
| 04-May | 1719 | 2027 | 1860 | 2123 | 1917 | 2003 | 3500 |
| 05-May | 1651 | 2008 | 1743 | 2006 | 1850 | 1920 | 3500 |
| 06-May | 1682 | 2037 | 1790 | 2056 | 1836 | 1958 | 3500 |
| 07-May | 1678 | 1976 | 1793 | 2067 | 1868 | 1642 | 3500 |
| 08-May | 1612 | 1971 | 1804 | 2060 | 1825 | OFF | 3500 |
| 09-May | 1690 | 1966 | 1777 | 1975 | 1826 | 1911 | 3500 |
| 10-May | 1613 | 1890 | 1740 | 1904 | 1837 | 1877 | 3500 |
| 11-May | 1630 | 1971 | 1765 | 2059 | 1833 | 1912 | 3500 |
| 12-May | 1642 | 1992 | 1786 | 2062 | 1897 | 1893 | 3500 |
| 13-May | 1717 | 2042 | 1803 | 2109 | 1988 | 1883 | 3500 |
| 14-May | 1689 | 2142 | 1921 | 2123 | 2195 | 2127 | 3500 |
| 15-May | 1663 | 1993 | 1783 | 2116 | 2156 | 2006 | 3500 |
| 16-May | 1406 | 1943 | 1835 | 2021 | 2157 | 1926 | 3500 |
| 17-May | OFF | 1907 | 1917 | 2078 | 1920 | 1987 | 3500 |
| 18-May | OFF | 1899 | 1900 | 1997 | 1657 | 1989 | 3500 |
| 19-May | OFF | 1859 | 1765 | 1918 | 1642 | 1929 | 3500 |
| 20-May | OFF | 1956 | 1871 | 2037 | 1715 | 1914 | 3500 |
| 21-May | OFF | 1963 | 1954 | 2057 | 1741 | 1936 | 3500 |
| 22-May | OFF | 1924 | 1948 | 2012 | 1736 | 2002 | 3500 |
| 23-May | OFF | 1946 | 1934 | 1982 | 1735 | 1992 | 3500 |
| 24-May | OFF | 1931 | 1948 | 1957 | 1686 | 1850 | 3500 |
| 25-May | OFF | 1905 | 1873 | 1942 | 1737 | 1844 | 3500 |
| 26-May | OFF | 1941 | 1889 | 1953 | 1687 | 1852 | 3500 |
| 27-May | OFF | 2005 | 1978 | 2016 | 1830 | 2003 | 3500 |
| 28-May | OFF | 1979 | 1977 | 1980 | 1788 | 2098 | 3500 |
| 29-May | 1724 | 2023 | 1967 | 2008 | 1797 | 2064 | 3500 |
| 30-May | 1744 | 1969 | 1978 | 1918 | 1703 | 1963 | 3500 |
| 31-May | 1776 | 1923 | 1965 | 1922 | 1852 | 2020 | 3500 |

Final SOx Concentration (mg/Nm³) (Pre-Back Fitting)

| Date | U1 | U2 | U3 | U4 | U5 | U6 | Limit |
|--------|------|------|------|------|------|------|-------|
| 01-May | 1684 | 2749 | 1785 | 1927 | 1645 | 1894 | 3500 |
| 02-May | 1573 | 2800 | 1849 | 1921 | 1716 | 1861 | 3500 |
| 03-May | 1621 | 2875 | 1808 | 1956 | 1840 | 1891 | 3500 |
| 04-May | 1719 | 2830 | 1860 | 2046 | 1917 | 2003 | 3500 |
| 05-May | 1651 | 2864 | 1743 | 1933 | 1850 | 1920 | 3500 |
| 06-May | 1682 | 2871 | 1790 | 1980 | 1836 | 1958 | 3500 |
| 07-May | 1678 | 2771 | 1793 | 1990 | 1868 | 1642 | 3500 |
| 08-May | 1612 | 2803 | 1804 | 1984 | 1825 | OFF | 3500 |
| 09-May | 1690 | 2802 | 1777 | 1903 | 1826 | 1911 | 3500 |
| 10-May | 1613 | 2653 | 1740 | 1836 | 1837 | 1877 | 3500 |
| 11-May | 1630 | 2760 | 1765 | 1983 | 1833 | 1912 | 3500 |
| 12-May | 1642 | 2795 | 1786 | 1987 | 1897 | 1893 | 3500 |
| 13-May | 1717 | 2926 | 1803 | 2031 | 1838 | 1883 | 3500 |
| 14-May | 1689 | 3003 | 1921 | 2046 | 2035 | 2127 | 3500 |
| 15-May | 1663 | 2790 | 1783 | 2038 | 2001 | 2006 | 3500 |
| 16-May | 1406 | 2504 | 1835 | 1949 | 2001 | 1926 | 3500 |
| 17-May | OFF | 2536 | 1917 | 2000 | 1755 | 1987 | 3500 |
| 18-May | OFF | 2574 | 1900 | 1924 | 1481 | 1989 | 3500 |
| 19-May | OFF | 2528 | 1765 | 1848 | 1467 | 1929 | 3500 |
| 20-May | OFF | 2641 | 1871 | 1962 | 1533 | 1914 | 3500 |
| 21-May | OFF | 2703 | 1954 | 1981 | 1561 | 1936 | 3500 |
| 22-May | OFF | 2646 | 1948 | 1938 | 1554 | 2002 | 3500 |
| 23-May | OFF | 2706 | 1934 | 1911 | 1548 | 1992 | 3500 |
| 24-May | OFF | 2670 | 1948 | 1888 | 1505 | 1850 | 3500 |
| 25-May | OFF | 2599 | 1873 | 1873 | 1553 | 1844 | 3500 |
| 26-May | OFF | 2685 | 1889 | 1883 | 1506 | 1852 | 3500 |
| 27-May | OFF | 2759 | 1978 | 1893 | 1590 | 2003 | 3500 |
| 28-May | OFF | 2741 | 1977 | 1908 | 1599 | 2098 | 3500 |
| 29-May | 1724 | 2759 | 1967 | 1934 | 1611 | 2064 | 3500 |
| 30-May | 1744 | 2710 | 1978 | 1849 | 1523 | 1963 | 3500 |
| 31-May | 1776 | 2653 | 1965 | 1853 | 1658 | 2020 | 3500 |

ADDENDUM TO MONTHLY EMISSIONS REPORT

Final NOx Concentration (mg/Nm³) (Back Fitted Emissions)

| Date | U1 | U2 | U3 | U4 | U5 | U6 | Limit |
|--------|-----|-----|-----|------|------|------|-------|
| 01-May | 817 | 796 | 948 | 835 | 841 | 913 | 1100 |
| 02-May | 800 | 876 | 884 | 997 | 1000 | 551 | 1100 |
| 03-May | 693 | 832 | 891 | 847 | 920 | 976 | 1100 |
| 04-May | 784 | 816 | 922 | 923 | 886 | 975 | 1100 |
| 05-May | 867 | 847 | 945 | 860 | 941 | 990 | 1100 |
| 06-May | 946 | 880 | 960 | 905 | 1001 | 999 | 1100 |
| 07-May | 800 | 876 | 884 | 997 | 1000 | 551 | 1100 |
| 08-May | 732 | 826 | 884 | 974 | 954 | OFF | 1100 |
| 09-May | 741 | 788 | 955 | 795 | 916 | 883 | 1100 |
| 10-May | 764 | 840 | 878 | 976 | 929 | 1029 | 1100 |
| 11-May | 890 | 923 | 866 | 982 | 949 | 1016 | 1100 |
| 12-May | 820 | 855 | 890 | 899 | 953 | 1103 | 1100 |
| 13-May | 878 | 900 | 925 | 941 | 948 | 994 | 1100 |
| 14-May | 888 | 901 | 935 | 958 | 1036 | 985 | 1100 |
| 15-May | 781 | 946 | 977 | 964 | 1029 | 1050 | 1100 |
| 16-May | 331 | 834 | 976 | 1039 | 1040 | 999 | 1100 |
| 17-May | OFF | 759 | 925 | 1142 | 921 | 1029 | 1100 |
| 18-May | OFF | 849 | 933 | 994 | 712 | 1035 | 1100 |
| 19-May | OFF | 854 | 928 | 990 | 774 | 1030 | 1100 |
| 20-May | OFF | 802 | 948 | 1029 | 729 | 942 | 1100 |
| 21-May | OFF | 792 | 951 | 987 | 660 | 872 | 1100 |
| 22-May | OFF | 858 | 950 | 1007 | 738 | 875 | 1100 |
| 23-May | OFF | 848 | 862 | 907 | 717 | 928 | 1100 |
| 24-May | OFF | 824 | 909 | 834 | 701 | 895 | 1100 |
| 25-May | OFF | 790 | 897 | 813 | 719 | 933 | 1100 |
| 26-May | OFF | 809 | 835 | 853 | 739 | 955 | 1100 |
| 27-May | OFF | 881 | 898 | 936 | 857 | 935 | 1100 |
| 28-May | OFF | 739 | 968 | 963 | 787 | 943 | 1100 |
| 29-May | 552 | 706 | 946 | 983 | 813 | 938 | 1100 |
| 30-May | 816 | 675 | 875 | 881 | 738 | 836 | 1100 |
| 31-May | 771 | 651 | 987 | 993 | 754 | 917 | 1100 |

Final NOx Concentration (mg/Nm³) (Pre-Back Fitting)

| Date | U1 | U2 | U3 | U4 | U5 | U6 | Limit |
|--------|-----|------|-----|------|------|------|-------|
| 01-May | 817 | 1121 | 948 | 809 | 841 | 913 | 1100 |
| 02-May | 800 | 1228 | 884 | 972 | 1000 | 551 | 1100 |
| 03-May | 693 | 1195 | 891 | 821 | 920 | 976 | 1100 |
| 04-May | 784 | 1139 | 922 | 899 | 886 | 975 | 1100 |
| 05-May | 867 | 1208 | 945 | 835 | 941 | 990 | 1100 |
| 06-May | 946 | 1239 | 960 | 879 | 1001 | 999 | 1100 |
| 07-May | 800 | 1228 | 884 | 972 | 1000 | 551 | 1100 |
| 08-May | 732 | 1173 | 884 | 949 | 954 | OFF | 1100 |
| 09-May | 741 | 1121 | 955 | 769 | 916 | 883 | 1100 |
| 10-May | 764 | 1180 | 878 | 953 | 929 | 1029 | 1100 |
| 11-May | 890 | 1292 | 866 | 958 | 949 | 1016 | 1100 |
| 12-May | 820 | 1199 | 890 | 874 | 953 | 1103 | 1100 |
| 13-May | 878 | 1291 | 925 | 916 | 977 | 994 | 1100 |
| 14-May | 888 | 1261 | 935 | 934 | 1071 | 985 | 1100 |
| 15-May | 781 | 1323 | 977 | 939 | 1064 | 1050 | 1100 |
| 16-May | 331 | 1082 | 976 | 1017 | 1075 | 999 | 1100 |
| 17-May | OFF | 1010 | 925 | 1119 | 939 | 1029 | 1100 |
| 18-May | OFF | 1150 | 933 | 971 | 709 | 1035 | 1100 |
| 19-May | OFF | 1160 | 928 | 966 | 771 | 1030 | 1100 |
| 20-May | OFF | 1081 | 948 | 1006 | 727 | 942 | 1100 |
| 21-May | OFF | 1089 | 951 | 963 | 660 | 872 | 1100 |
| 22-May | OFF | 1179 | 950 | 983 | 737 | 875 | 1100 |
| 23-May | OFF | 1176 | 862 | 882 | 713 | 928 | 1100 |
| 24-May | OFF | 1137 | 909 | 809 | 698 | 895 | 1100 |
| 25-May | OFF | 1077 | 897 | 787 | 717 | 933 | 1100 |
| 26-May | OFF | 1119 | 835 | 827 | 735 | 955 | 1100 |
| 27-May | OFF | 1211 | 898 | 864 | 750 | 935 | 1100 |
| 28-May | OFF | 1023 | 968 | 939 | 784 | 943 | 1100 |
| 29-May | 552 | 962 | 946 | 958 | 813 | 938 | 1100 |
| 30-May | 816 | 928 | 875 | 856 | 736 | 836 | 1100 |
| 31-May | 771 | 897 | 987 | 970 | 752 | 917 | 1100 |

ADDENDUM TO MONTHLY EMISSIONS REPORT

13. 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 |
| 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 | 98.39% | 2 | 97.58% | 3 | 100.00% | 0 | 100.00% | 0 | OFF LOAD | 0 |
| Apr-20 | 98.33% | 2 | 95.00% | 6 | 100.00% | 0 | 100.00% | 0 | 100.00% | 0 | 100.00% | 0 |
| May-20 | 98.39% | 2 | 98.39% | 2 | 98.39% | 2 | 100.00% | 0 | 100.00% | 0 | 100.00% | 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 |
| Jun-19 | 100.00% | 0 | 100.00% | 0 | 98.00% | 1 | 100.00% | 0 | OFF LOAD | OFF LOAD | 100.00% | 0 |
| Jul-19 | 100.00% | 0 | 100.00% | 0 | 100.00% | 0 | 100.00% | 0 | OFF LOAD | OFF LOAD | 93.54% | 2 |
| Aug-19 | 100.00% | 0 | 100.00% | 0 | 100.00% | 0 | 100.00% | 0 | OFF LOAD | OFF LOAD | 100.00% | 0 |
| Sep-19 | 100.00% | 0 | 100.00% | 0 | 100.00% | 0 | OFF LOAD | OFF LOAD | OFF LOAD | OFF LOAD | 94.60% | 2 |
| Oct-19 | 100.00% | 0 | 100.00% | 0 | 100.00% | 0 | OFF LOAD | OFF LOAD | OFF LOAD | OFF LOAD | 96.77% | 1 |
| Nov-19 | 100.00% | 0 | 100.00% | 0 | 96.67% | 1 | OFF LOAD | OFF LOAD | OFF LOAD | OFF LOAD | 93.33% | 2 |
| Dec-19 | 100.00% | 0 | 100.00% | 0 | 100.00% | 0 | OFF LOAD | OFF LOAD | OFF LOAD | OFF LOAD | 96.77% | 1 |
| Jan-20 | 100.00% | 0 | 100.00% | 0 | 100.00% | 0 | 100.00% | 0 | OFF LOAD | OFF LOAD | 100.00% | 0 |
| Feb-20 | 100.00% | 0 | 100.00% | 0 | 93.33% | 1 | 100.00% | 0 | 83.33% | 4 | OFF LOAD | OFF LOAD |
| Mar-20 | 100.00% | 0 | 93.55% | 2 | 87.10% | 4 | 100.00% | 0 | 64.52% | 11 | OFF LOAD | OFF LOAD |
| Apr-20 | 100.00% | 0 | 100.00% | 0 | 100.00% | 0 | 100.00% | 0 | 100.00% | 0 | 90.00% | 3 |
| May-20 | 93.55% | 2 | 100.00% | 0 | 100.00% | 0 | 100.00% | 0 | 100.00% | 0 | 100.00% | 0 |

ADDENDUM TO MONTHLY EMISSIONS REPORT

Particulate Emission Monitors

| Availability | | | | | | |
|---------------------|---------------|---------------|---------------|---------------|---------------|---------------|
| | Unit 1 | Unit 2 | Unit 3 | Unit 4 | Unit 5 | Unit 6 |
| 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 |
| Apr-20 | 91.26% | 96.53% | 98.53% | 98.66% | 96.22% | 95.18% |
| May-20 | 88.89% | 99.19% | 99.19% | 100.00% | 100.00% | 98.25% |

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 |
| 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 |
| Apr-20 | 100.00% | 99.86% | 100.00% | 100.00% | 96.68% | 96.68% | 99.83% | 99.97% | 99.96% | 99.96% | 67.82% | 67.82% |
| May-20 | 94.74% | 94.74% | 100.00% | 100.00% | 99.87% | 100.00% | 99.84% | 99.84% | 93.47% | 93.61% | 90.89% | 90.89% |

ADDENDUM TO MONTHLY EMISSIONS REPORT

| Oxygen Monitor Availability | | | | | | |
|------------------------------------|---------------|---------------|---------------|---------------|---------------|---------------|
| | Unit 1 | Unit 2 | Unit 3 | Unit 4 | Unit 5 | Unit 6 |
| 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 |
| Apr-20 | 51.08% | 100.00% | 97.35% | 0.00% | 0.00% | 0.00% |
| May-20 | 89.69% | 100.00% | 100.00% | 0.00% | 0.00% | 13.33% |

14. EFFICIENCY

| ESP Efficiency (%) | | | | | | |
|---------------------------|---------------|---------------|---------------|---------------|---------------|---------------|
| | Unit 1 | Unit 2 | Unit 3 | Unit 4 | Unit 5 | Unit 6 |
| 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 |
| Apr-20 | 99.777% | 99.838% | 99.695% | 99.909% | 99.914% | 99.707% |
| May-20 | 99.652% | 99.847% | 99.757% | 99.912% | 99.909% | 99.805% |

ADDENDUM TO MONTHLY EMISSIONS REPORT

15. REMARKS

| UNIT | MWLOSS | REASON | ACTUALSTARTDATE | ACTUALENDDATE |
|-------------|---------------|--|------------------------|----------------------|
| 1 | 179 | AM: LHI precip casing repairs | 2020/05/02 00:00:00 | 2020/05/02 20:15:00 |
| 1 | 180 | AM: LHO precip casing repairs | 2020/05/03 00:00:00 | 2020/05/03 17:39:00 |
| 1 | 80 | EF:High stack emissions | 2020/05/07 06:37:00 | 2020/05/08 05:37:00 |
| 1 | 180 | EF:High stack emissions | 2020/05/08 05:37:00 | 2020/05/08 16:58:00 |
| 1 | 78 | EF: High stack emissions | 2020/05/08 18:25:00 | 2020/05/08 18:47:00 |
| 1 | 181 | EF:High stack emissions. | 2020/05/08 18:47:00 | 2020/05/09 17:28:00 |
| 1 | 177 | High stack emissions. | 2020/05/10 13:42:00 | 2020/05/11 05:50:00 |
| 1 | 593 | Inspection | 2020/05/16 00:00:00 | 2020/05/29 15:26:00 |
| 2 | 149 | Dust plant standing. | 2020/05/09 09:42:00 | 2020/05/09 17:22:00 |
| 2 | 50 | RHO precip casing repairs | 2020/05/16 00:00:00 | 2020/05/16 18:21:00 |
| 2 | 50 | LHI Precip casing maintenance | 2020/05/17 00:00:00 | 2020/05/17 17:56:00 |
| 3 | 148 | High stack emissions. | 2020/05/23 06:23:00 | 2020/05/23 18:23:00 |
| 3 | 50 | RHO precip casing repairs. | 2020/05/30 00:00:00 | 2020/05/30 17:17:00 |
| 3 | 50 | LHI precip casing repairs | 2020/05/31 00:00:00 | 2020/05/31 16:20:00 |
| 4 | 593 | Load rejection test | 2020/05/09 00:06:00 | 2020/05/09 05:31:00 |
| 4 | 0 | MT speed controler adjustment | 2020/05/24 22:53:00 | 2020/05/25 04:43:00 |
| 4 | 593 | Islanding test | 2020/05/30 01:30:00 | 2020/05/30 05:21:00 |
| 5 | 117 | AM: Correlation tests | 2020/05/18 21:37:00 | 2020/05/19 03:23:00 |
| 5 | 218 | AM; Correlation tests | 2020/05/19 21:46:00 | 2020/05/20 03:39:00 |
| 6 | 593 | Physical over sped test | 2020/05/01 00:00:00 | 2020/05/01 00:04:00 |
| 6 | 0 | Cold Reserve (Shift) | 2020/05/07 00:31:00 | 2020/05/07 09:39:00 |
| 6 | 593 | Boiler tube leak repairs | 2020/05/07 09:39:00 | 2020/05/08 16:35:00 |
| 6 | 0 | Cold Reserve | 2020/05/08 16:35:00 | 2020/05/09 09:00:00 |
| 6 | 593 | Unit 6 was manually tripped due to the loss of BFPT and EFP A unable to cut in | 2020/05/17 22:15:00 | 2020/05/18 02:00:00 |
| 6 | 119 | AM: Correlation tests | 2020/05/26 20:04:00 | 2020/05/27 03:02:00 |
| 6 | 219 | AM:Correlation test | 2020/05/27 22:17:00 | 2020/05/28 04:23:00 |
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| PM Exceedances | | |
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| U1. | LHI was on Permit on Saturday for casing outage, all hoppers were inspected and cleared RHO has three internal faults SO3 has a blockage on the converter SO3 Plant tripped due to combustion chamber high temperature | 02-May |
| U1. | LHI Hoppers blocked RHO has three internal faults SO3 has a blockage on the converter LHO 4 fields off SO3 Plant tripped due to combustion chamber high temperature | 03-May |
| U1. | SO3 Plant off load LHO F6 & 7 OFF; F5 CE RAPPER FAULT LHI F1 OFF; F4 & 5 POOR PERFORMANCE; F3 CE RAPPER FAULT; F7 DE RAPPER FAULT RHI F1 DE RAPPER FAULTY; F7 OFF RHO F4,5 & 7 OFF; F3 UNDERVOLTAGE TRIP | 05-May |
| U1. | 11:15 SO3 PLANT START UP IN PROGRESS, AS REQUESTED BY OPS MANAGER, SO3 PLANT HAS LEAK ON LHI & LHO PIPE SUPPLYING THE LANCES @14:41 SO3 plant tripped LHO F6 & F5 CE RAPPER FAULT LHI F1 OFF; F4 & 5 POOR PERFORMANCE; F3 CE RAPPER FAULT; F7 DE RAPPER FAULT RHI F1 DE RAPPER FAULTY; F7 OFF RHO F4,5 & 7 OFF; F3 UNDERVOLTAGE TRIP | 06-May |
| U1. | Started dosing at 10kg/hr @ 06:20 @20:01 SO3 PLANT TRIP ON MIXING CHAMBER OUTLET TEMP HIGH. @20:10 plant started again ESP Poor performance: LHO F2 OFF; F6 & 7 Arcing and Sparking LHI- F1 off; F4 Poor Performance; F7 DE rappers faulty RHI - F1 De rapper fault; F7 off; F4& 5 poor performance RHO F5 & 7 off; F3 Undervoltage trip | 07-May |
| U1. | SO3 Plant Tripped twice ESP Poor performance: LHO F2 OFF; F6 & 7 Arcing and Sparking LHI- F1 off; F4 Poor Performance; RHI - F1 De rapper fault; F7 off; F4& 5 poor performance RHO F5 & 7 off | 09-May |
| U1. | ESP Poor performance: LHO F2 OFF; F4,6 & 7 Arcing and Sparking LHI- F1 off; F4 Poor Performance; F5 CE rappers faulty RHI - F1 De rapper fault; F7 off; F4 poor performance RHO F5 & 7 off Split in airheater outlet temperatures LH & RH | 15-May |
| U1. | Unit 1 Shut down for IN | 16-May |
| U1. | Unit Light Up | 30-May |
| U2. | RHO precip Casing Outage | 16-May |
| U2. | LHI Precip Casing outage | 17-May |
| U3. | LHO: F7 - Off (MCS to be reprogrammed) LHI: F3 - Communication fault; F5 OFF RHI: F4 - DE Rapper faulty RHO: F6- Tripping on underVoltage | 05-May |
| U3. | LHO: F7 - Off (MCS to be reprogrammed);F4- Comms Fault LHI: F3 - Communication fault; F5 OFF; F4- Comms Fault & Higher hopper Level RHI: F4 - DE Rapper faulty RHO: F6- Tripping on underVoltage | 06-May |

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| U3. | <p>RHO no.4 filed keeps on tripping fails to start RHO F5 ARCING AND SPARKING LHI no.3 field keeps on tripping LHI no.5 filed keeps on tripping and fails to start LHI F1,2 &3 ARCING AND SPARKING RHO no.6 field keeps on tripping LHO no.7 tripped and failed to start LHO F2 & 5 DE RAPPER FAULT; F3 ARCING AND SPARKING</p> <p>@12:43 emission increased more after 'both top mills were running to test run "f" mill</p> | 07-May |
| U3. | <p>LHO: F7 - Off (MCS to be reprogrammed) LHI: F3 - Communication fault; F5 - Off RHI: F4 - DE Rapper faulty RHO: F4 - Communication fault; F6- Tripping on underVoltage</p> | 08-May |
| U3. | <p>LHO: F7 - Off (MCS to be reprogrammed) LHI: F3 - Communication fault; F5 - Off RHI: F4 - DE Rapper faulty RHO: F4 - Communication fault; F6- Tripping on underVoltage</p> | 09-May |
| U3. | <p>LHO: F7 - Off (MCS to be reprogrammed); F5 - Communication Fault LHI: F3 - Communication fault; F5 - Off RHI: F4 - DE Rapper faulty RHO: F4 - Communication fault; F6- Tripping on underVoltage</p> | 15-May |
| U3. | <p>High hopper levels RHO F1 Comms fault, EMS noted EMS to inspect all HFT filters, Several fields tripped (17-May) LHI F5 transformer was changed but Three LHO F1, RHI 2, and RHO F2 are not rapping</p> <p>LHO: F7 - Off (MCS to be reprogrammed) LHI: F3 - Communication fault; F5 - Off RHI: F4 - DE Rapper faulty RHO: F4 - Communication fault; F6- Tripping on underVoltage; F1 - Communication fault</p> | 16-May |
| U3. | <p>Two high hopper levels HFT filters to be checked, Several fields tripped. Precip poor performance: LHO: F7 OFF; LHI: F3 COMMS FAULT; F5 OFF; RHI: F4 DE RAPPER FAULT RHO: F1 & 4 COMMS FAULT; F6 TRIPPING ON UNDERVOLTAGE;</p> <p>LHO F1, RHI F2, and RHO F2 are not rapping</p> | 17-May |

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| U3. | <p>Issues were on the internal fields, RHO casing fields tripped.</p> <p>HF transformer filters to be cleaned.</p> <p>RHO F1 Cooling pump faulty.</p> <p>LHO F7, Reprogramming issues</p> <p>03WX11 unreliable, due to tripping on under speed, C&I to attend.</p> <p>High hopper levels contributed to high emissions.</p> <p>23WX41 Hopper 1 and 3 have false indications, and Fields will trip automatically on protection if high hopper levels are indicated for prolonged period.</p> <p>Precip poor performance: LHO: F7 OFF; LHI: F3 COMMS FAULT; F5 OFF; RHI: F4 DE RAPPER FAULT RHO: F1 & 4 COMMS FAULT; F6 TRIPPING ON UNDERVOLTAGE;</p> | 18-May |
| U3. | <ul style="list-style-type: none"> • Issues were on the internal fields, RHO casing fields tripped. Elec Eng attended to the issue and managed to restore the fields. • EMS to start cleaning HF transformer filters today. • RHO F1 Cooling pump faulty, EMS is checking spares for replacement. • LHP F7, Reprogramming issues as there are faults with the laptop. • 03WX11 unreliable, due to tripping on under speed, C&I to attend. • High hopper levels contributed to yesterday's high emissions, and it is continuing today. <p>23WX41 Hopper 1 and 3 have false indications, Ops reported. Fields will trip automatically on protection if high hopper levels are indicated for prolonged period.</p> | 19-May |
| U3. | <ul style="list-style-type: none"> • High hopper levels • LHO F4 • LHI F4 & F7 • RHO F3-F7 • LHO F7 Reprogramming, planned for today. • LHO F1 not rapping • RHI F3 not rapping • RHO F2 not rapping • RHO F1 Comms fault, due to cooling pump, not spares available. | 20-May |
| U3. | <p>LHO: F6 & 7 OFF; F1 NOT RAPPING; LHI: F3 COMMS FAULT; F5 OFF; RHI: F4 DE RAPPER FAULTY; F2 NOT RAPPING RHO: F1 & 4 COMMS FAULT; F6 TRIPPING ON UNDERVOLTAGE; F2 NOT RAPPING</p> <p>RHI F1 AWAITING SPARES FOR COOLING PUMP</p> <p>Emissions were high between 16:00 to 00:00, Ops reported numerous issues with ESP fields, including casing LHI casing being off for inspection</p> <p>LHI F1 Communication fault High hopper levels: LHO F4 LHI F4 & 7 RHI 3 & 4 RHO 3, 4 & 7</p> | 21-May |

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| U3. | LHI & RHO Casing outages could not be accommodated during the week, need to manage it over the weekend. And will be planned. LHO: F7 off (MCS to be re-programmed), F6 off LHI: F1 & F3 communication fault; F5 off RHI: F4 DE Rapper Faulty RHO: F1 & F4 Communication Fault; F6 Tripping on undervoltage | 22-May |
| U3. | <ul style="list-style-type: none"> • High hopper levels • Unit needs require casing outage for LHI & RHO • LHO F7 not in service. | 23-May |
| U3. | <ul style="list-style-type: none"> • High hopper levels • Unit needs require casing outage for LHI & RHO • LHO F7 not in service. | 24-May |
| U3. | <ul style="list-style-type: none"> • High hopper levels: LHI F3 RHI F3 RHO F3, F4 and F7 Ops reported flap indication was faulty and therefor high hopper levels were indicated, defects were corrected. • Unit needs require casing outage for LHI & RHO • Elec Eng requested one person from EMS to check on LHO F7 and attempt to get it in service. | 25-May |
| U3. | <ul style="list-style-type: none"> • Elec Eng raised concern regarding RHO casing which is constantly having high hopper levels, OPS to check what is wrong on the casing • LHI F3, Comms fault, EMS will address. • Casing outages will be confirmed today | 28-May |
| U3. | <ul style="list-style-type: none"> • High hopper levels: LHI F4, RHI F4 and RHO F5-7 • RHI F3 comms fault | 29-May |
| U3. | RHO Casing Outage | 30-May |
| U3. | LHI Casings was taken on outage LHO F1 Off, EMS to attend. Hopper levels was faulty indications and was cleared | 31-May |
| U5. | RHI and LHI precip casings that is not performing LHO F7 POOR PERFORMANCE LHI F2 ARCING AND SPARKING; F4 & 6 POOR PERFORMANCE RHI F4 POOR PERFORMANCE RHO F7 ON LOCAL | 07-May |
| U6. | LHO: F2 - CE rapper faulty LHI: F1 - Local (Off);F6 - On Local (Off) RHI: F1 - Arcing & sparking - Not performing RHO: F2 & F3 - Arcing & sparking; F4 - CE rappers faulty | 02-May |
| U6. | LHO: F2 - CE rapper faulty LHI: F1 - Local (Off);F6 - On Local (Off) RHI: F1 - Arcing & sparking - Not performing RHO: F2 & F3 - Arcing & sparking; F4 - CE rappers faulty | 03-May |
| U6. | LHO: F2 - CE rapper faulty LHI: F1 - Local (Off);F6 - On Local (Off) RHI: F1 - Arcing & sparking - Not performing RHO: F2 & F3 - Arcing & sparking; F4 - CE rappers faulty | 04-May |
| U6. | LHI: F3 - DE rapper faulty; F6 - On Local (Off); F1 - Local (Off) RHI: F1 - Arcing & sparking - Not perofring RHO: F2 & F3 - Arcing & sparking; F4 - CE rappers faulty | 05-May |

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| U6. | LHI: F1 - Local (Off); F6 - On Local (Off) RHI: F4 - F1 - Arcing & sparking - Not performing RHO: F2 & F3 - Arcing & sparking; F4 - CE rappers faulty | 06-May |
| U6. | Unit Shut down for Boiler Tube Leak | 07-May |
| U6. | Light Up, Synchronized 2020-05-09 @ 09:00: | 10-May |
| U6. | Light Up LHO: F2 - Off LHI: F1 - Local (Off) RHI: F1 - Arcing & sparking - Not performing RHO: F4 - CE rappers faulty | 11-May |
| U6. | LHO: F2 - Off; F7 - Poorly performing LHI: F1 - Local (Off); F6 - Invalid program RHI: F1 - Arcing & sparking - Not performing RHO: F4 - Undervoltage fault | 15-May |
| U6. | Unit 6 tripped manually due to BFPT trip 22:15 | 17-May |
| U6. | Unit 6 Syncroised on load @ 02:01 | 18-May |
| U6. | Unit Light Up | 19-May |
| U6. | LHO: F2 Tripped on UnderVoltage; F7 - Poorly performing LHI: F1 Off and On LOCAL RHI: F1 Performing Poorly - Excessive Sparking | 29-May |
| NOX Exceedances | | |
| U4. | Additional contributors besides monitor unreliability - the simultaneous refurbishment of all 36 burners and two top mills in operation. | 17-May |
| U6. | Exceedance Under Investigation | 12-May |
| SOX Exceedances | | |
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