| Eskom | Matimba Power Station Emissions report | Matimba Power Station |
|---|---|---|

| | | | |
|---|---|---|---|
| Title: | **Matimba Power Station November 2021 emissions report** | Document Identifier: | **RP/247/015** |
| | | Plant Location: | **Emission management** |
| | | Area of Applicability: | **Matimba Power Station** |
| | | Functional Area Applicability: | **Environment** |
| | | Revision: | **1** |
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| **Compiled by** | **Functional Responsibility** | **Authorized by** |
|---|---|---|
| **WC Mocke** | **MC Mamabolo** | **JL Janse van Rensburg** |
| **Environmental Officer** | **Environmental Manager** | **General Manager** |
| Date: 2021/12/23 | Date: 23/12/2021 | Date: 2021-12-23 |

# Content

**Figures**

## 1. Report Summary

Matimba Power Station was issued with an Atmospheric Emission License (12/4/12L-W4/A4) in March 2020. Condition 7.7.1 of the License requires the license holder to submit monthly reports to the Department. This report contains the required information as specified in condition 7.7.1 for November 2021.

During the period under review, Matimba experienced 35 exceedances of the daily particulate matter emission limit (50mg/Nm$^3$) 6 of these exceedances occurred outside of the 48 hour grace period and were reported as section 30 incidents. No exceedances of the monthly $SO_x$ limit (3500mg/Nm$^3$) or the daily $NO_x$ limit (750 mg/Nm$^3$) occurred.

The monthly fuel oil usage limit of 1200 tons/month was exceeded with a monthly consumption rate of 3 473,2 tons for November 2021. The exceedance was due to multiple unit start-ups on units 1 to 6.

Issues mentioned above are discussed further under the respective sections within the report.

# 2. Emission information

## 2.1 Raw materials and products

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

| Raw Materials and Products used | Raw Material Type | Unit | Maximum Permitted Consumption Rate (Quantity) | Consumption Rate |
|---|---|---|---|---|
| | Coal | Tons/month | 1 500 000 | 952 980 |
| | Fuel Oil | Tons/month | 1 200 | 3 473,2 |
| | | | | |
| **Production Rates** | **Product/ By-Product Name** | **Unit** | **Maximum Production Capacity Permitted (Quantity)** | **Production Rate** |
| | Energy | GWh | 4 212.6 | 1 673,644 |

The coal consumption rate for the month of November 2021 were within the permitted maximum limit. Fuel oil usage exceeded the maximum permitted consumption rate in November 2021. The exceedance was due to multiple units start-up across all the 6 units and the mill performance challenges experienced during light-up of unit 1.

## 2.2 Abatement technology

**Table 2:** Abatement Equipment Control Technology Utilised

| Associated Unit | Technology Type | Minimum utilisation (%) | Efficiency (%) |
|---|---|---|---|
| Unit 1 | Electrostatic Precipitator | 100% | 99,87% |
| Unit 2 | Electrostatic Precipitator | 100% | 99,9% |
| Unit 3 | Electrostatic Precipitator | 100% | 99,81% |
| Unit 4 | Electrostatic Precipitator | 100% | 99,89% |
| Unit 5 | Electrostatic Precipitator | 100% | 99,93% |
| Unit 6 | Electrostatic Precipitator | 100% | 99,93% |
| **Associated Unit** | **Technology Type** | **Minimum utilisation (%)** | **Actual Utilisation (%)** |
| Unit 1 | $SO_3$ Plant | 100% | 96,67% |
| Unit 2 | $SO_3$ Plant | 100% | 100% |
| Unit 3 | $SO_3$ Plant | 100% | 93,33% |
| Unit 4 | $SO_3$ Plant | 100% | 100% |
| Unit 5 | $SO_3$ Plant | 100% | 100% |
| Unit 6 | $SO_3$ Plant | 100% | 100% |

Fluegas conditioning plant availability was below the required 100% for unit 1 and unit 3 due to unexpected breakdowns.

## 2.3 Energy source characteristics

**Table 3:** Energy Source Material Characteristics.

| | Characteristic | Stipulated Range (Unit) | Monthly Average Content |
|---|---|---|---|
| **Coal burned** | **Sulphur Content** | 1.6% | 1,24% |
| | **Ash Content** | 40% | 34,96% |

Energy source characteristics remained within the ranges stipulated in the license.

## 2.4 Emissions reporting

### 2.4.1 Particulate Matter Emissions

**Unit 1 Particulate Emissions**

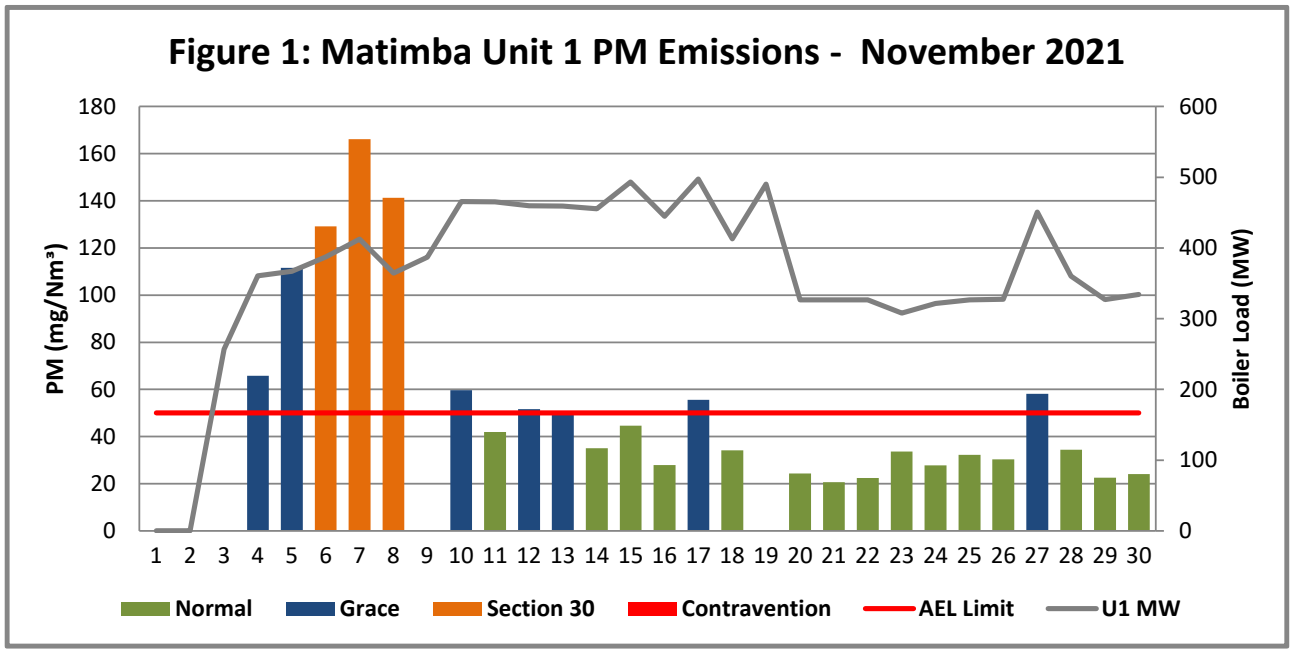


**Figure 1: Particulate matter daily average emissions against emission limit for unit 1 for the month of November 2021**

**Interpretation:**

Unit 1 exceeded the 50mg/Nm$^3$ emission limit on 4,5,6,7,8,10,12,13,17 and 27 November 2021. The exceedances that occurred from 4-8 November 2021 and 27 November 2021 were due to the unavailability of the flue gas conditioning plant due to low load conditions and unexpected breakdowns. The exceedances that occurred on 10, 12, 13 and 17 November 2021 occurred due to ash build-up within the flue gas stream after a breakdown on the dust handling plant occurred. The 48 hour grace period was exceeded on 06 November 2021 and a section 30 incident was reported. All other exceedances remained within the 48 hour grace period

**Unit 2 Particulate Emissions**

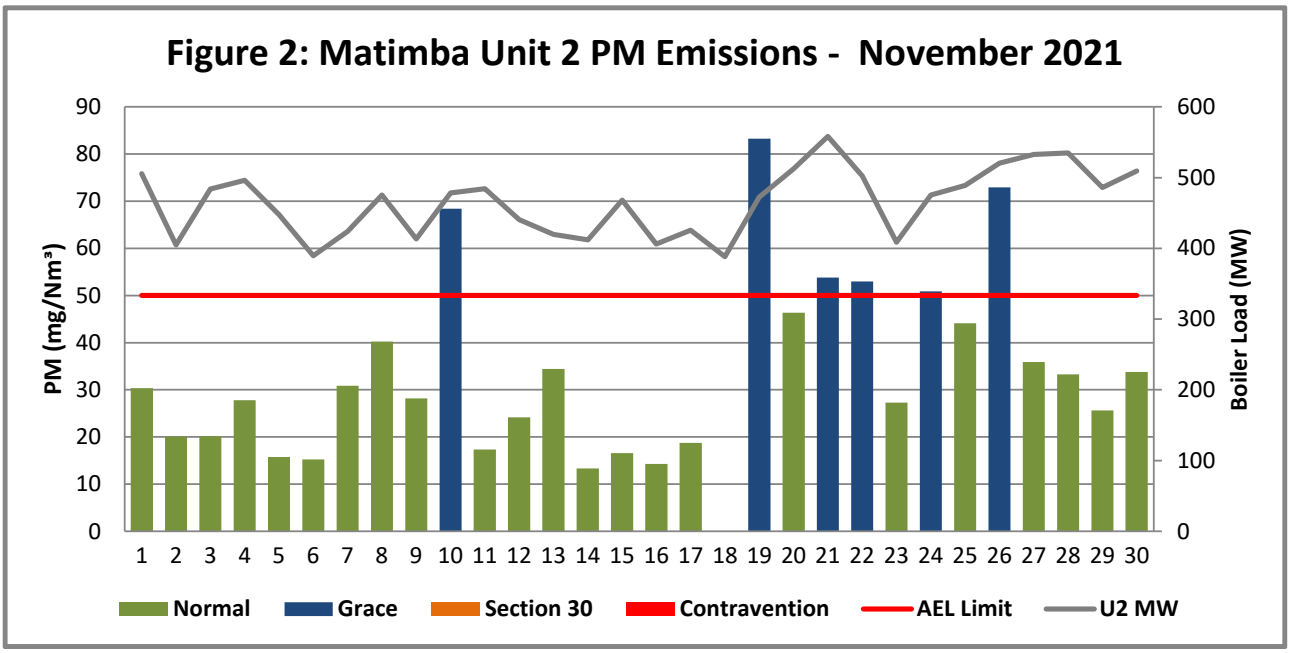


**Figure 2: Particulate matter daily average emissions against emission limit for unit 2 for the month of November 2021**

**Interpretation:**

Unit 2 exceeded the 50mg/Nm$^3$ emission limit on 10, 19, 21, 22, 24 and 26 November 2021. The exceedances that occurred on 10 and 24 November 2021 was due to breakdowns experienced within the dust handling plant, and exceedances that occurred on 21, 22 and 26 November 2021 occurred due to breakdowns experienced on the ash conveyancing system. These breakdowns led to ash build-up within the flue gas cleaning stream which reduced the efficiency of the precipitator fields. The exceedance that occurred on 10 November 2021 was due to the unavailability of the Sulphur plant due to operating at low loads. All exceedances remained within the 48 hour grace period.

**Unit 3 Particulate Emissions**

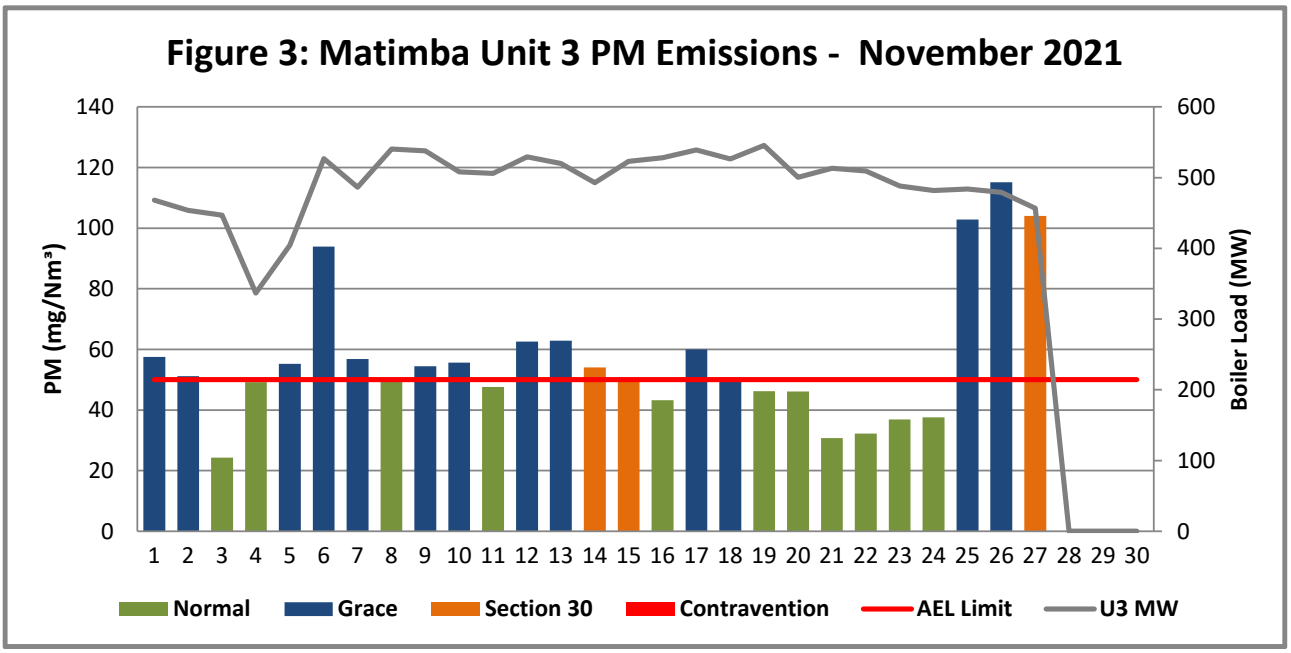


**Figure 3: Particulate matter daily average emissions against emission limit for unit 3 for the month of November 2021**

**Interpretation:**

Unit 3 exceeded the daily limit of 50mg/Nm$^3$ on 1, 2, 5-7, 9, 10, 12-15, 17, 18 and 25-27 November 2021. The exceedances were due to failure of multiple precipitator fields due to damage incurred from increased ash in the flue gas cleaning system. The ash build-up was due to unplanned breakdowns on the dust handling and ash conveyancing plants. The unit was shut down on 27 November 2021 in order to do necessary repairs on the precipitator plant. The 48 hour grace period was exceeded on 14 November 2021 and 27 November 2021, section 30 notices were submitted for these incidents.

**Unit 4 Particulate Emissions**

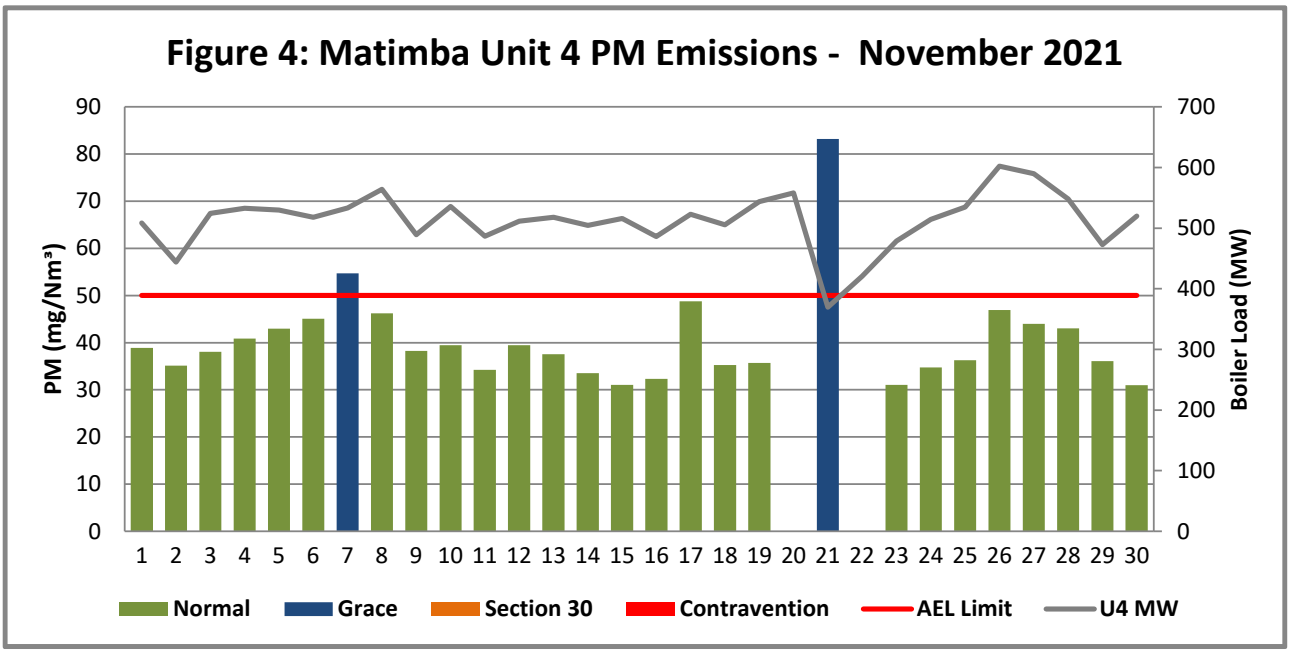


**Figure 4: Particulate matter daily average emissions against emission limit for unit 4 for the month of November 2021**

**Interpretation:**

Unit 4 exceeded the daily limit of 50mg/Nm$^3$ on 7 and 21 November 2021. The exceedances were due to damaged precipitator fields. The damages occurred due to increased ash build-up after unexpected breakdowns on the dust handling and ash conveyancing plants. All exceedances remained within the 48 hour grace period.

**Unit 5 Particulate Emissions**

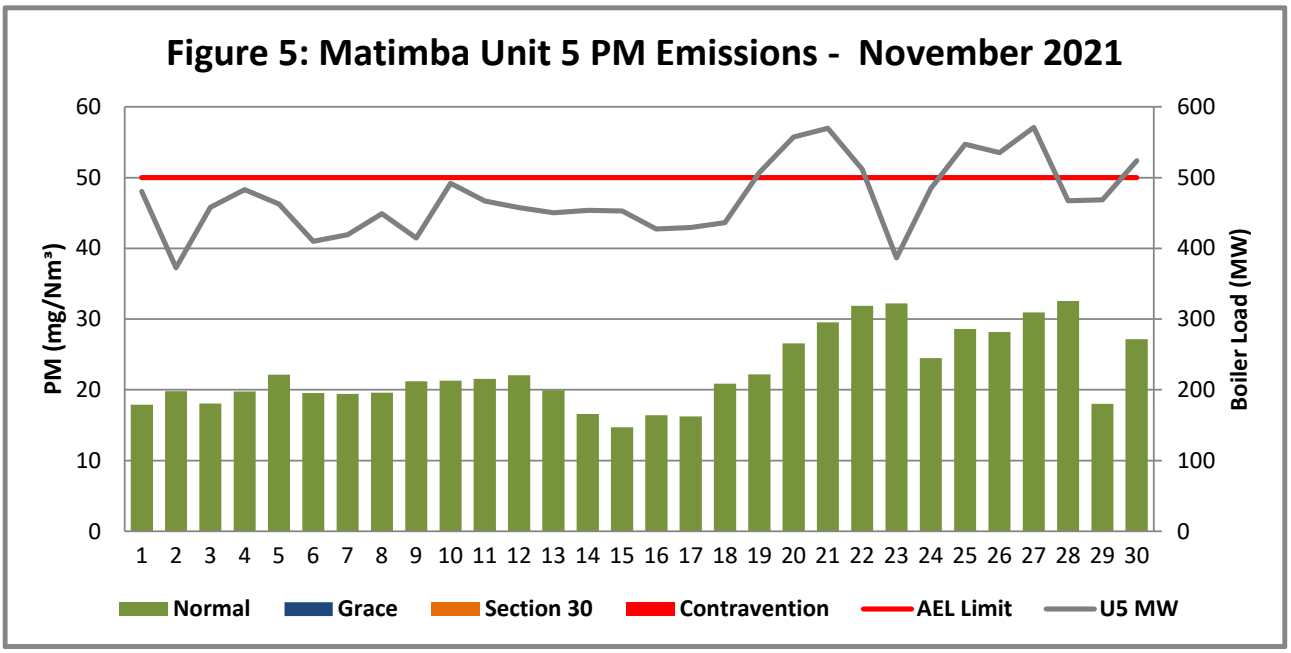


**Figure 5: Particulate matter daily average emissions against emission limit for unit 5 for the month of November 2021**

**Interpretation:**

All daily averages below particulate emission limit of 50 mg/Nm$^3$.

**Unit 6 Particulate Emissions**

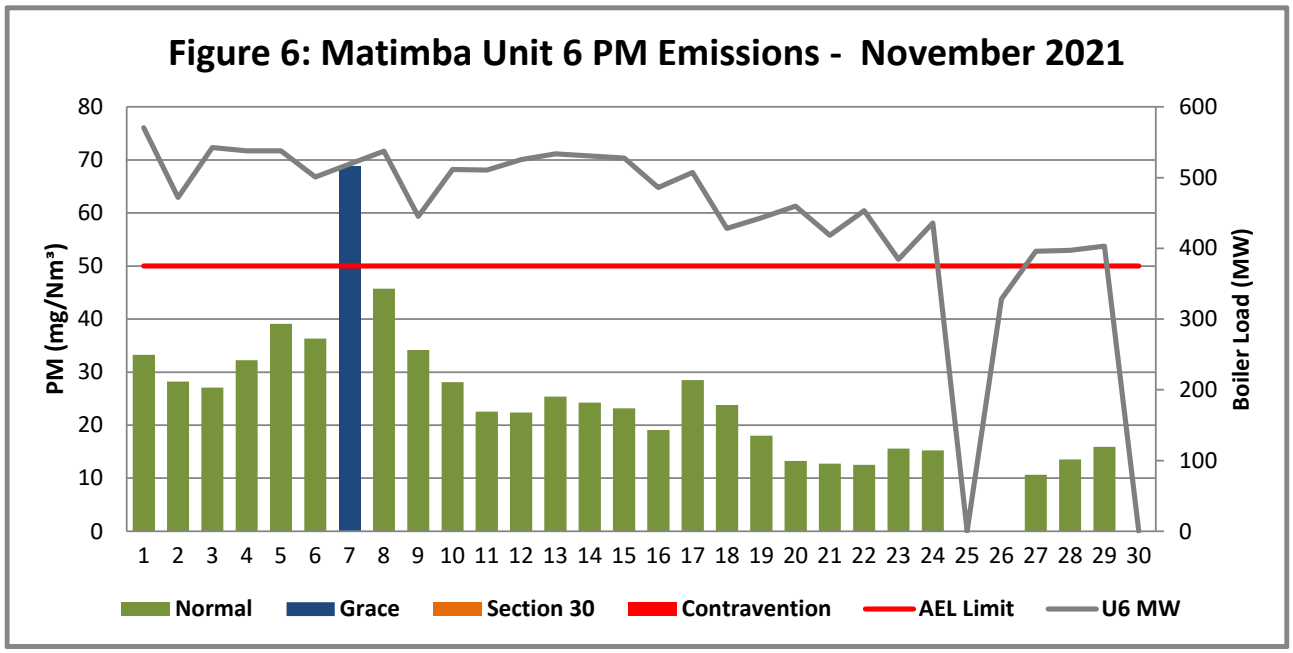


**Figure 6: Particulate matter daily average emissions against emission limit for unit 6 for the month of November 2021**

**Interpretation:**

Unit 6 exceeded the daily limit of 50mg/Nm$^3$ on 7 November 2021. The exceedance was due to damaged precipitator fields. The damages occurred due to increased ash build-up after unexpected breakdowns on the dust handling and ash conveyancing plants. The exceedance remained within the 48 hour grace period.

### 2.4.2 Gaseous Emissions

**Unit 1 $SO_2$ Emissions**

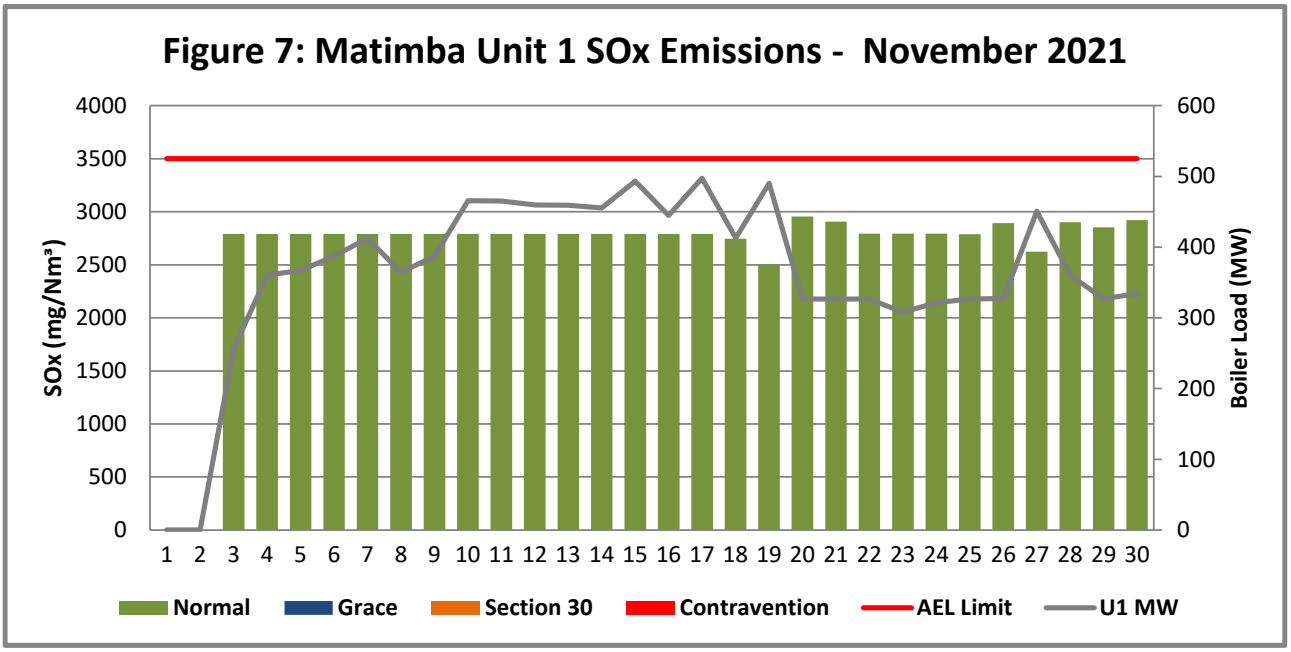


**Figure 7: SO2 daily average emissions against emission limit for unit 1 for the month of November 2021**

**Interpretation:**

Unit 1 was returned from outage on 3 November 2021. After the unit was lit up it was determined that the gaseous monitor power supply was defective as well as a communication module which sends the SOx emission data to the servers from where it is extracted. The power supply was repaired on 17 November 2021 and the communication module was repaired on 09 December 2021. Averaged emission data from the Unit 1 QAL 2 report was used for reporting purposes.

**Unit 2 $SO_2$ Emissions**

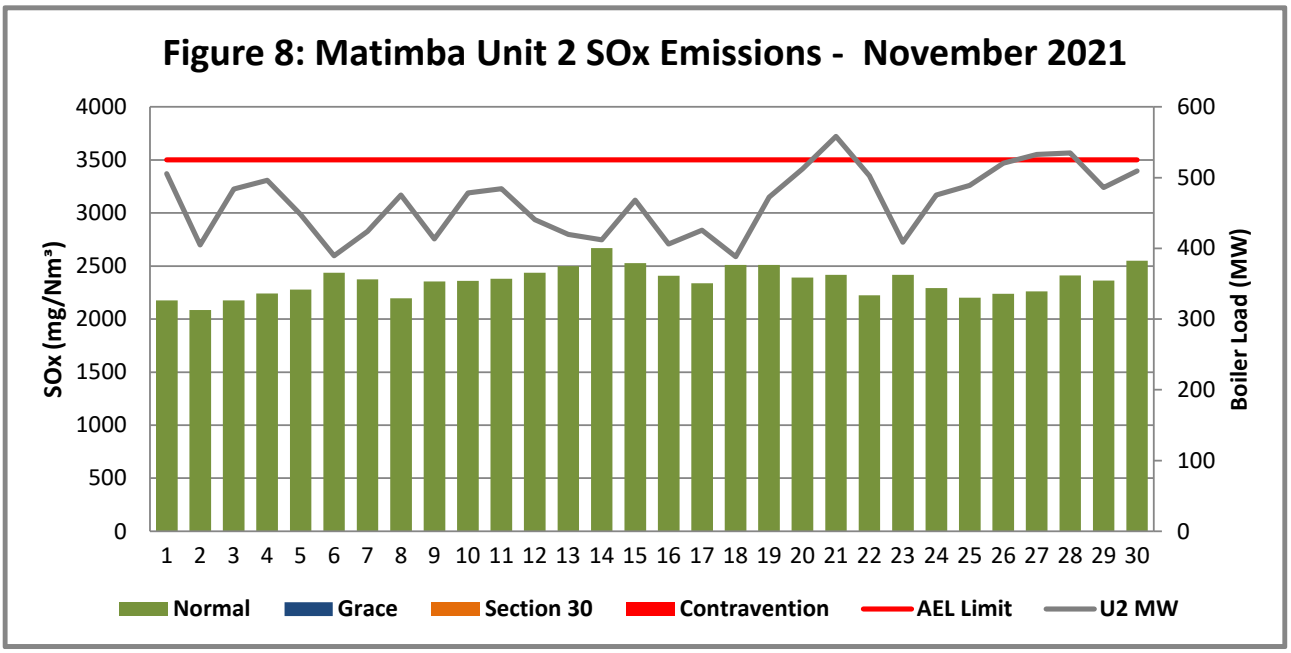


**Figure 8: SO2 daily average emissions against emission limit for unit 2 for the month of November 2021**

**Interpretation:**

All daily averages below $SO_2$ emission monthly limit of 3500 mg/$Nm^3$.

**Unit 3 $SO_2$ Emissions**

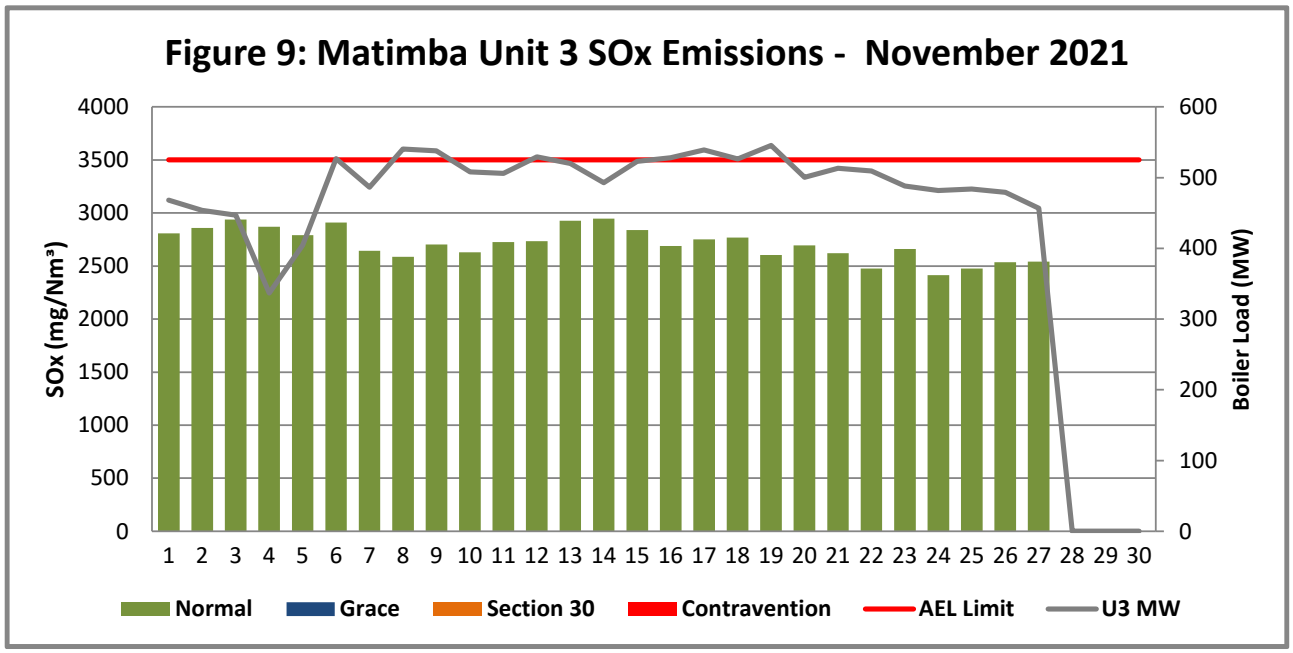


**Figure 9: SO2 daily average emissions against emission limit for unit 3 for the month of November 2021**

**Interpretation:**

All daily averages below $SO_2$ emission monthly limit of 3500 mg/$Nm^3$.

**Unit 4 $SO_2$ Emissions**

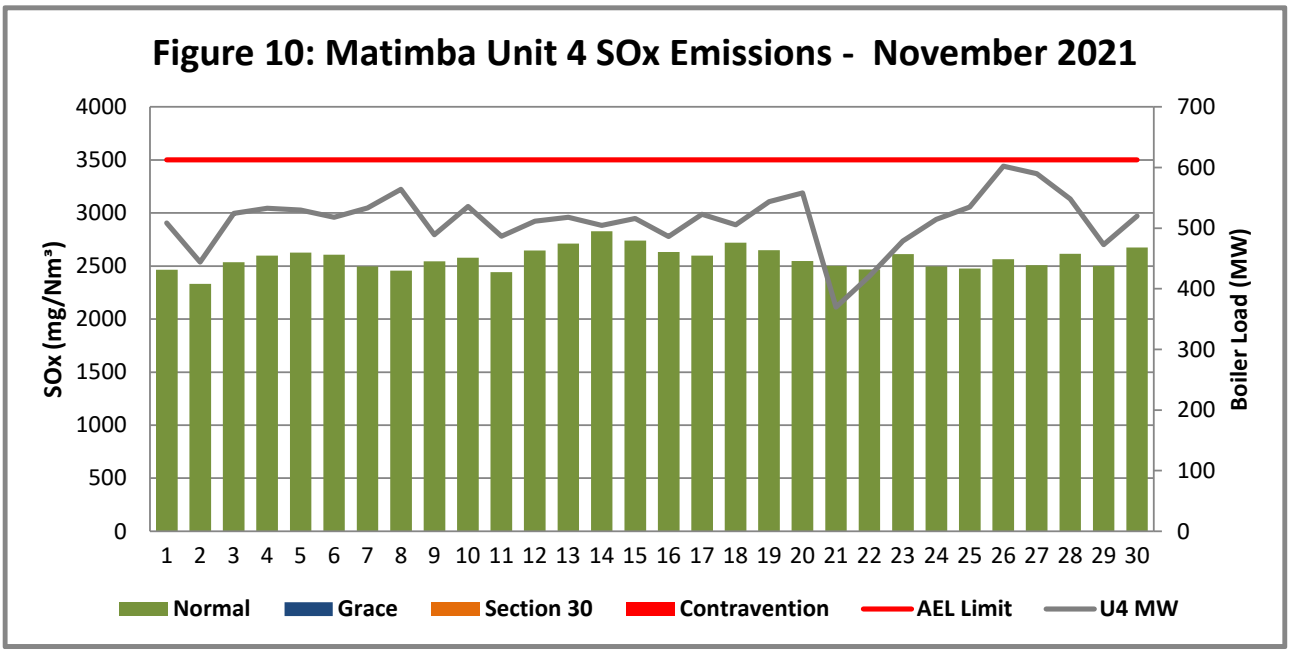


**Figure 10: SO2 daily average emissions against emission limit for unit 4 for the month of November 2021**

**Interpretation:**

All daily averages below $SO_2$ emission monthly limit of 3500 mg/$Nm^3$.

**Unit 5 $SO_2$ Emissions**

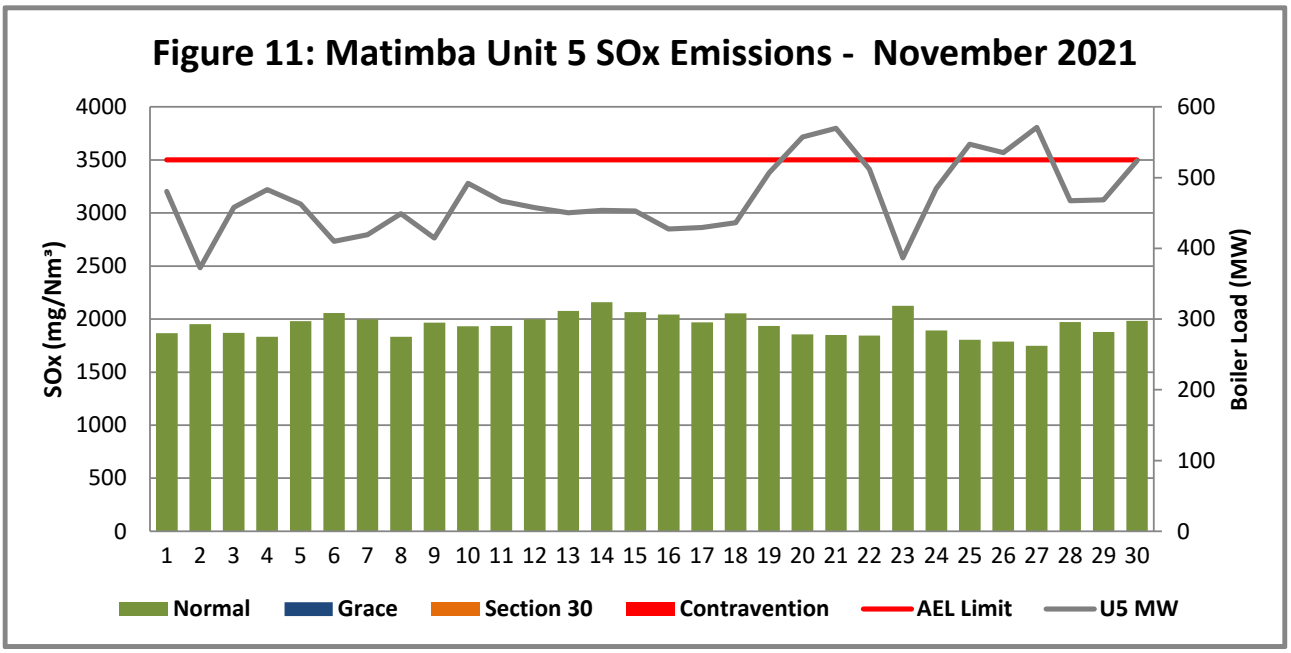


**Figure 11: SO2 daily average emissions against emission limit for unit 5 for the month of November 2021**

**Interpretation:**

All daily averages below $SO_2$ emission monthly limit of 3500 mg/$Nm^3$.

**Unit 6 $SO_2$ Emissions**

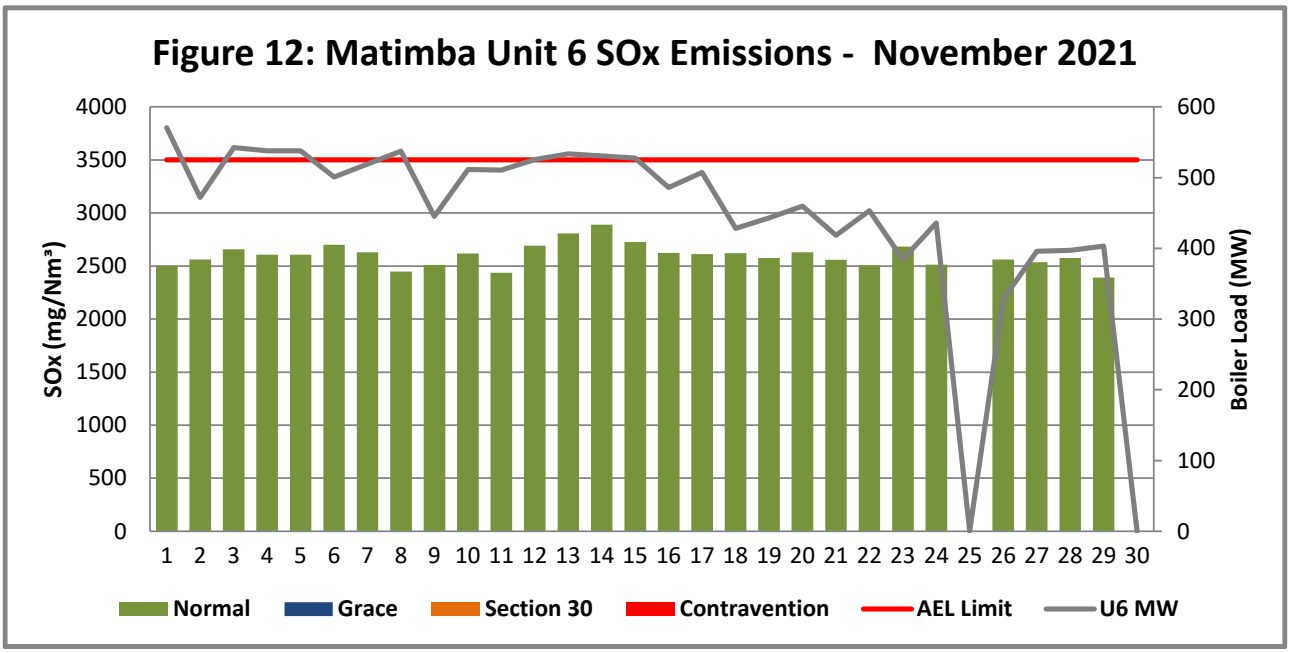


**Figure 12: SO2 daily average emissions against emission limit for unit 6 for the month of November 2021**

**Interpretation:**

All daily averages remained below $SO_2$ emission monthly limit of 3500 mg/$Nm^3$.

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**Unit 1 $NO_x$ Emissions**

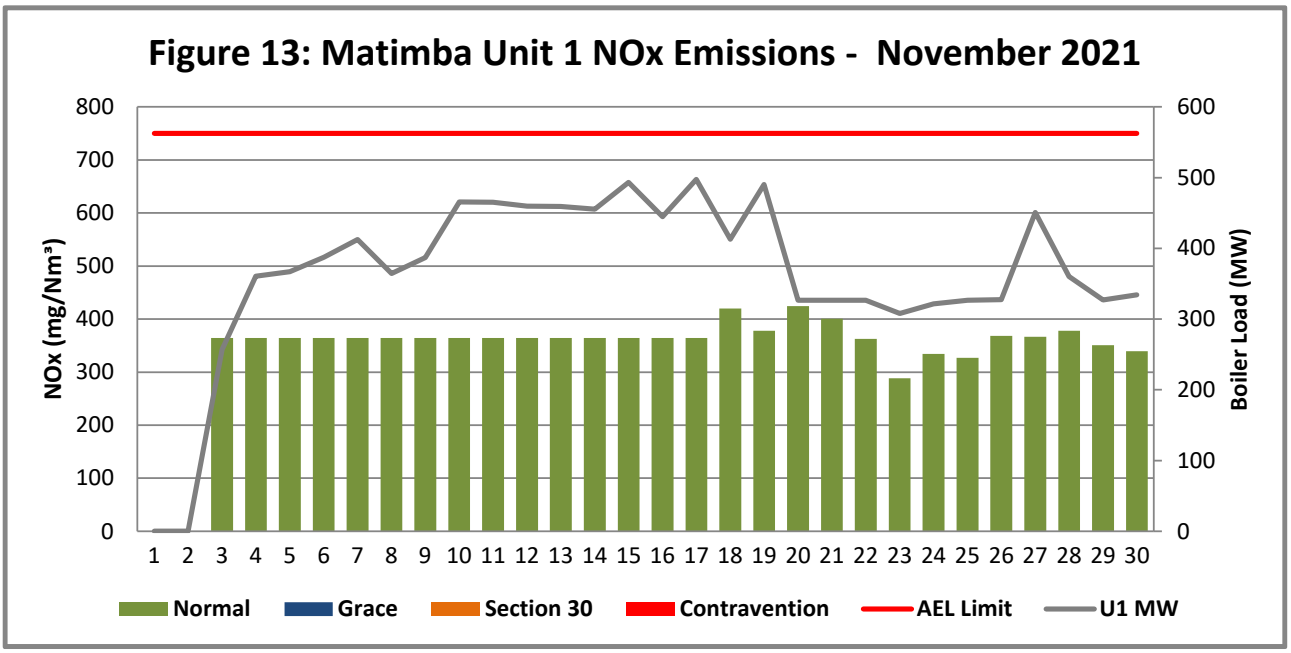


**Figure 13: Figure 14: NOx daily average emissions against emission limit for unit 1 for the month of November 2021**

**Interpretation:**

Unit 1 was returned from outage on 3 November 2021. After the unit was lit up it was determined that the gaseous monitor power supply was defective. The power supply was repaired on 17 November 2021. Averaged emission data was used for NOx emission data for 3 to 17 November 2021.

**Unit 2 $NO_x$ Emissions**

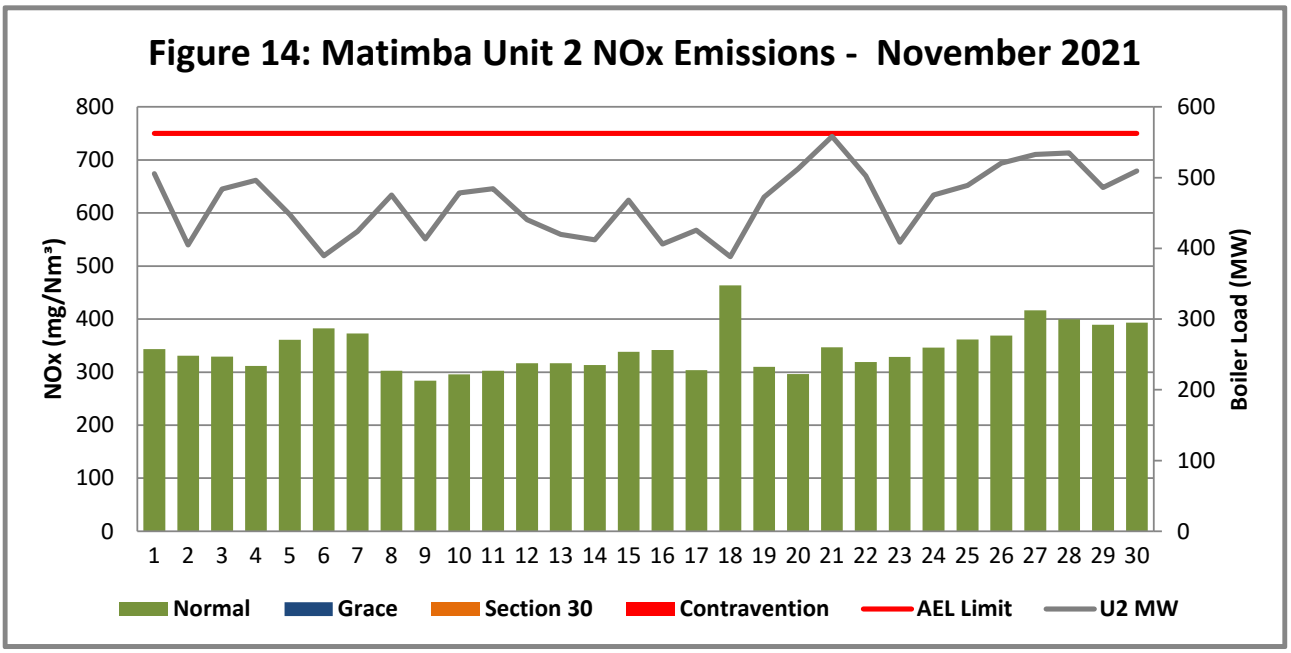


**Figure 15: NOx daily average emissions against emission limit for unit 2 for the month of November 2021**

**Interpretation:**

All daily averages below NOx emission limit of 750 mg/Nm$^3$.

**Unit 3 $NO_x$ Emissions**

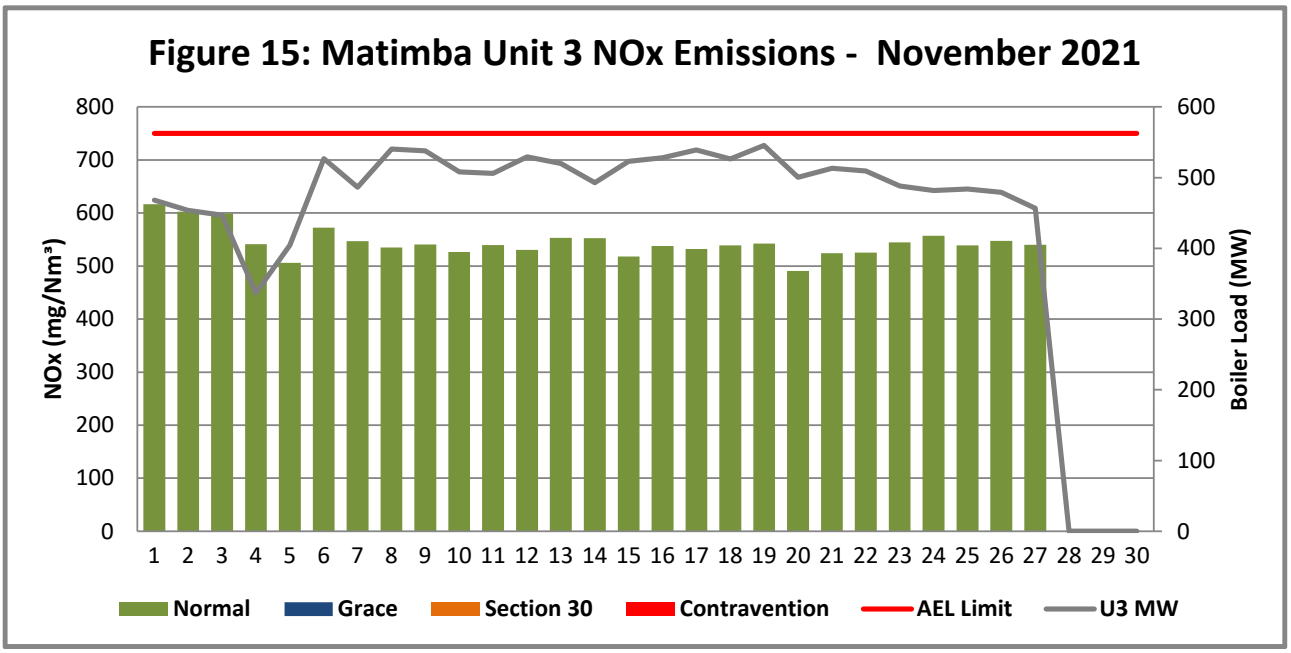


**Figure 16: NOx daily average emissions against emission limit for unit 3 for the month of November 2021**

**Interpretation:**

All daily averages below NOx emission limit of 750 mg/Nm$^3$.

**Unit 4 $NO_x$ Emissions**

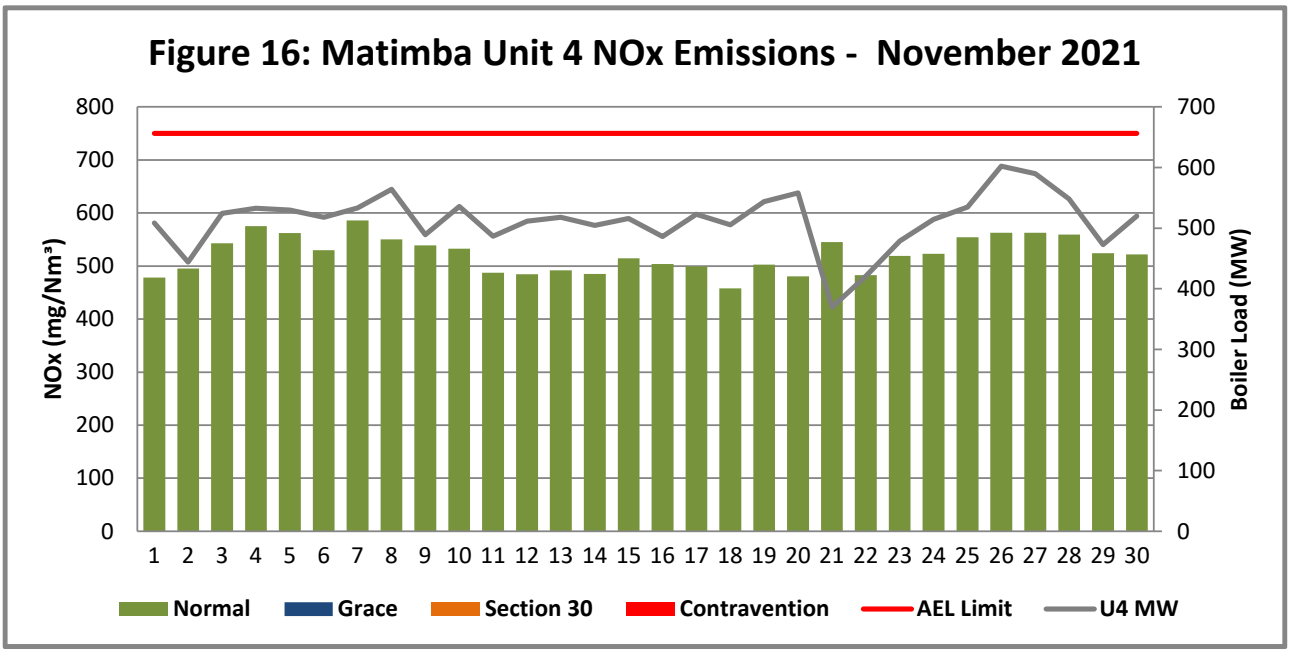


**Figure 17: NOx daily average emissions against emission limit for unit 4 for the month of November 2021**

**Interpretation:**

All daily averages below NOx emission limit of 750 mg/Nm$^3$.

**Unit 5 $NO_x$ Emissions**

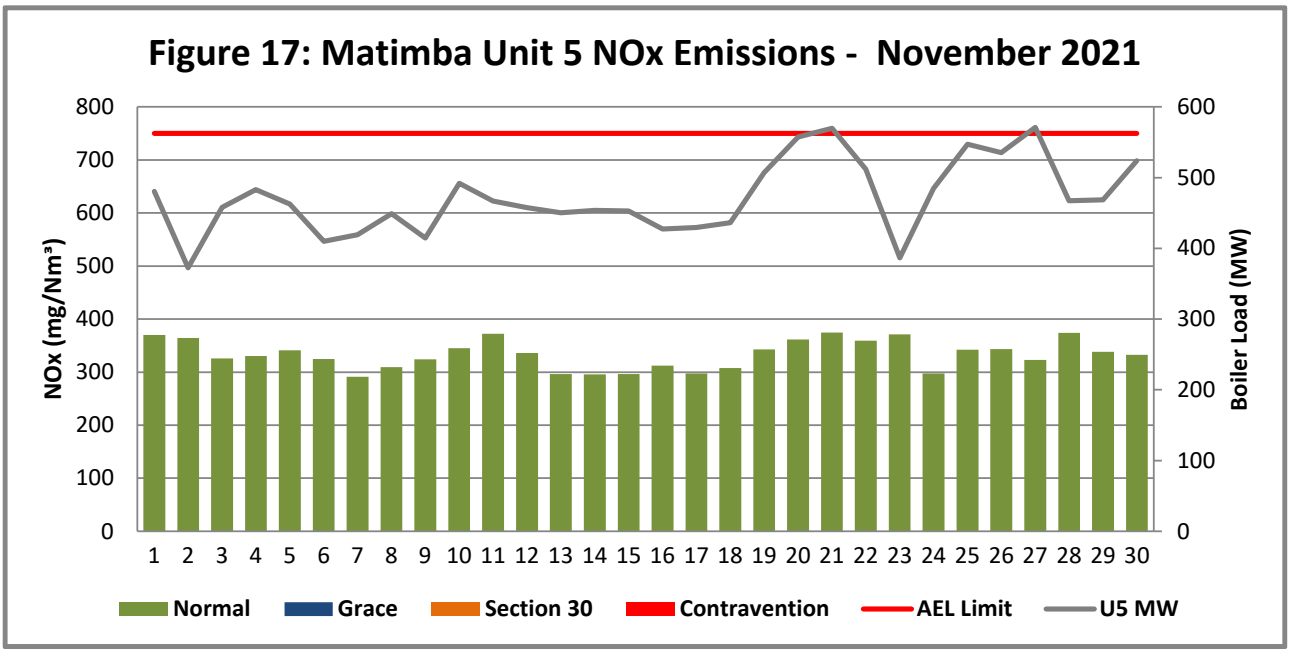


**Figure 18: NOx daily average emissions against emission limit for unit 5 for the month of November 2021**

**Interpretation:**

All daily averages below NOx emission limit of 750 mg/Nm$^3$.

**Unit 6 $NO_x$ Emissions**

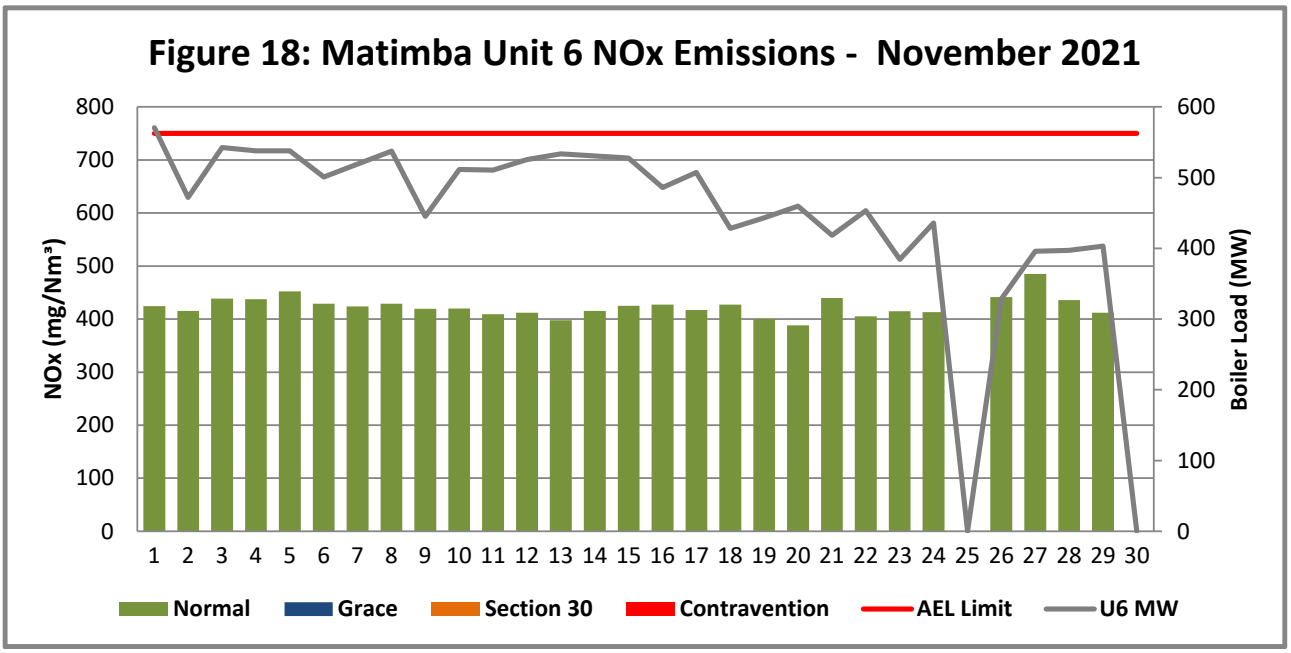


**Figure 19: NOx daily average emissions against emission limit for unit 6 for the month of November 2021**

**Interpretation:**

All daily averages below NOx emission limit of 750 mg/Nm$^3$.

### 2.4.3 Total Volatile Organic Compounds

**Table 4:** Total volatile compound estimates

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**CALCULATION OF EMISSIONS OF TOTAL VOLATILE COMPOUNDS FROM FUEL OIL STORAGE TANKS***

| | |
|---|---|
| **Date:** | Tuesday, 21 December 2021 |
| **Station:** | Matimba Power Station |
| **Province:** | Limpopo Province |
| **Tank no.** | 1-4 |
| **Description:** | Outdoor fuel oil storage tank |
| **Tank Type:** | Vertical fixed roof (vented to atmosphere) |
| **Material stored:** | Fuel Oil 150 |

**MONTHLY INPUT DATA FOR THE STATION**

**Please only insert relevant monthly data inputs into the *blue cells* below**
**Choose from a dropdown menu in the *green cells***
**The total VOC emissions for the month are in the *red cells***

IMPORTANT: Do not change ***any*** other cells without consulting the AQ CoE

| | |
|---|---|
| **MONTH:** | **November** |

| **GENERAL INFORMATION:** | **Data** | **Unit** |
|---|---|---|
| **Total number of fuel oil tanks:** | 4 | NA |
| **Height of tank:** | 13,34 | m |
| **Diameter of tank:** | 9,53 | m |
| **Net fuel oil throughput for the month:** | ***3473,179*** | |
| **Molecular weight of the fuel oil:** | 166,00 | Lb/lb-mole |

| **METEROLOGICAL DATA FOR THE MONTH** | **Data** | **Unit** |
|---|---|---|
| **Daily average ambient temperature** | 26,22 | °C |
| **Daily maximum ambient temperature** | 32,63 | °C |
| **Daily minimum ambient temperature** | 20,19 | °C |
| **Daily ambient temperature range** | 12,44 | °C |
| **Daily total insolation factor** | 6,14 | kWh/m²/day |
| **Tank paint colour** | ***Grey/medium*** | NA |
| **Tank paint solar absorbtance** | 0,68 | NA |

| **FINAL OUTPUT:** | **Result** | **Unit** |
|---|---|---|
| **Breathing losses:** | 0,59 | kg/month |
| **Working losses:** | 0,10 | kg/month |
| ***TOTAL LOSSES (Total TVOC Emissions for the month):*** | **0,69** | **kg/month** |

*Calculations performed on this spreadsheet are taken from the USEPA AP-42- Section 7.1 Organic Liquid Storage Tanks - January 1996. This spreadsheet is derived from materials provided by Jimmy Peress, PE, Tritech Consulting Engineers, 85-93 Chevy Chase Street, Jamaica, NY 11432 USA, Tel - 718-454-3920, Fax - 718-454-6330, e-mail - PeressJ@nyc.rr.com.

### 2.4.4 Greenhouse gas ($CO_2$) emissions

$CO_2$ emissions are reported in terms of the Greenhouse gas reporting regulations (GN 43712, GNR. 994/2020) and are not included in the monthly AEL compliance report.

## 2.5 Daily power generated

**Table 5:** Daily power generated per unit in MWh for the month of November 2021

| Date | Unit 1 | Unit 2 | Unit 3 | Unit 4 | Unit 5 | Unit 6 |
|---|---|---|---|---|---|---|
| 2021/11/01 | 0 | 11979 | 11169 | 12186 | 11466 | 13572 |
| 2021/11/02 | 1,733 | 9590 | 10833 | 10631 | 8897 | 11262 |
| 2021/11/03 | 3705 | 11413 | 10666 | 12485 | 10865 | 12856 |
| 2021/11/04 | 8600 | 11731 | 2741 | 12730 | 11477 | 12779 |
| 2021/11/05 | 7876 | 9333 | 9539 | 12668 | 11035 | 12798 |
| 2021/11/06 | 9274 | 9218 | 12608 | 12389 | 9767 | 10470 |
| 2021/11/07 | 7471 | 10012 | 11599 | 12731 | 9977 | 12234 |
| 2021/11/08 | 5455 | 11244 | 12899 | 13500 | 10701 | 12818 |
| 2021/11/09 | 8254 | 9754 | 12856 | 11707 | 9871 | 10573 |
| 2021/11/10 | 11172 | 9026 | 12141 | 12822 | 11709 | 12143 |
| 2021/11/11 | 11155 | 11456 | 12035 | 11632 | 11121 | 12123 |
| 2021/11/12 | 11023 | 10416 | 12660 | 12238 | 10894 | 12495 |
| 2021/11/13 | 11021 | 9916 | 12415 | 12353 | 10707 | 12651 |
| 2021/11/14 | 10893 | 9722 | 11767 | 12060 | 10813 | 12626 |
| 2021/11/15 | 11869 | 11064 | 12479 | 12321 | 10791 | 12571 |
| 2021/11/16 | 10660 | 9592 | 12568 | 11651 | 8891 | 11526 |
| 2021/11/17 | 7708 | 4580 | 9042 | 11725 | 9617 | 11353 |
| 2021/11/18 | 7478 | 3973 | 12568 | 12131 | 10381 | 10223 |
| 2021/11/19 | 10550 | 11191 | 13010 | 12376 | 12030 | 10485 |
| 2021/11/20 | 7831 | 12109 | 11980 | 11515 | 13259 | 10924 |
| 2021/11/21 | 7835 | 13206 | 12228 | 1384 | 13539 | 9937 |
| 2021/11/22 | 7827 | 11892 | 12170 | 2051 | 12206 | 10768 |
| 2021/11/23 | 5054 | 9694 | 11659 | 11448 | 9268 | 9155 |
| 2021/11/24 | 7679 | 11211 | 11496 | 12243 | 11415 | 9568 |
| 2021/11/25 | 7832 | 11547 | 11554 | 12783 | 13085 | 0 |
| 2021/11/26 | 7843 | 12297 | 11437 | 14411 | 12716 | 2256 |
| 2021/11/27 | 10708 | 12593 | 10721 | 14068 | 13544 | 9382 |
| 2021/11/28 | 8729 | 12644 | 0 | 13102 | 4272 | 9428 |
| 2021/11/29 | 7841 | 11511 | 0 | 11328 | 11184 | 5280 |
| 2021/11/30 | 8009 | 12038 | 0 | 12429 | 12443 | 0 |

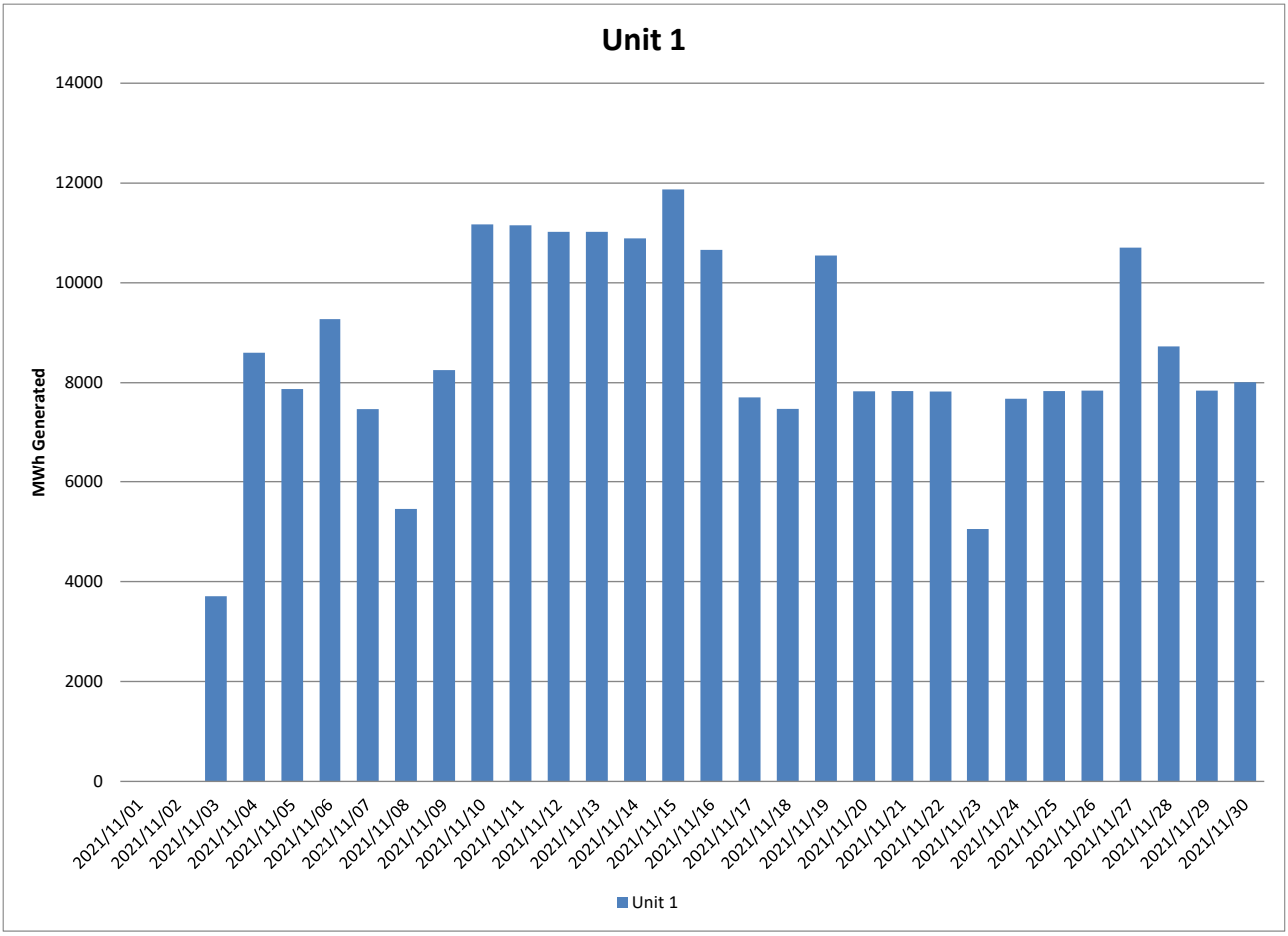


**Figure 20: Unit 1 daily generated power in MWh for the month of November 2021**

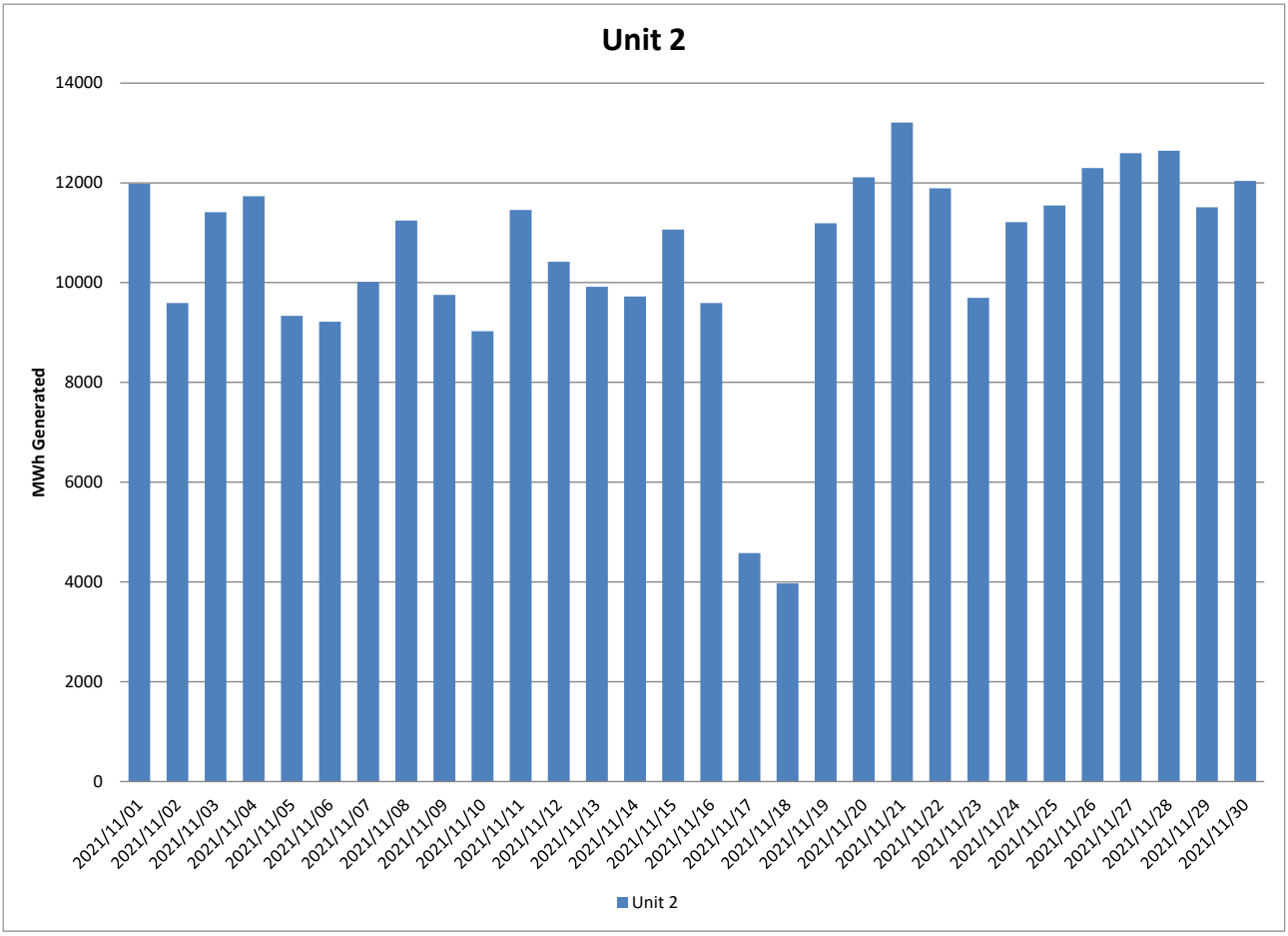


**Figure 21: Unit 2 daily generated power in MWh for the month of November 2021**

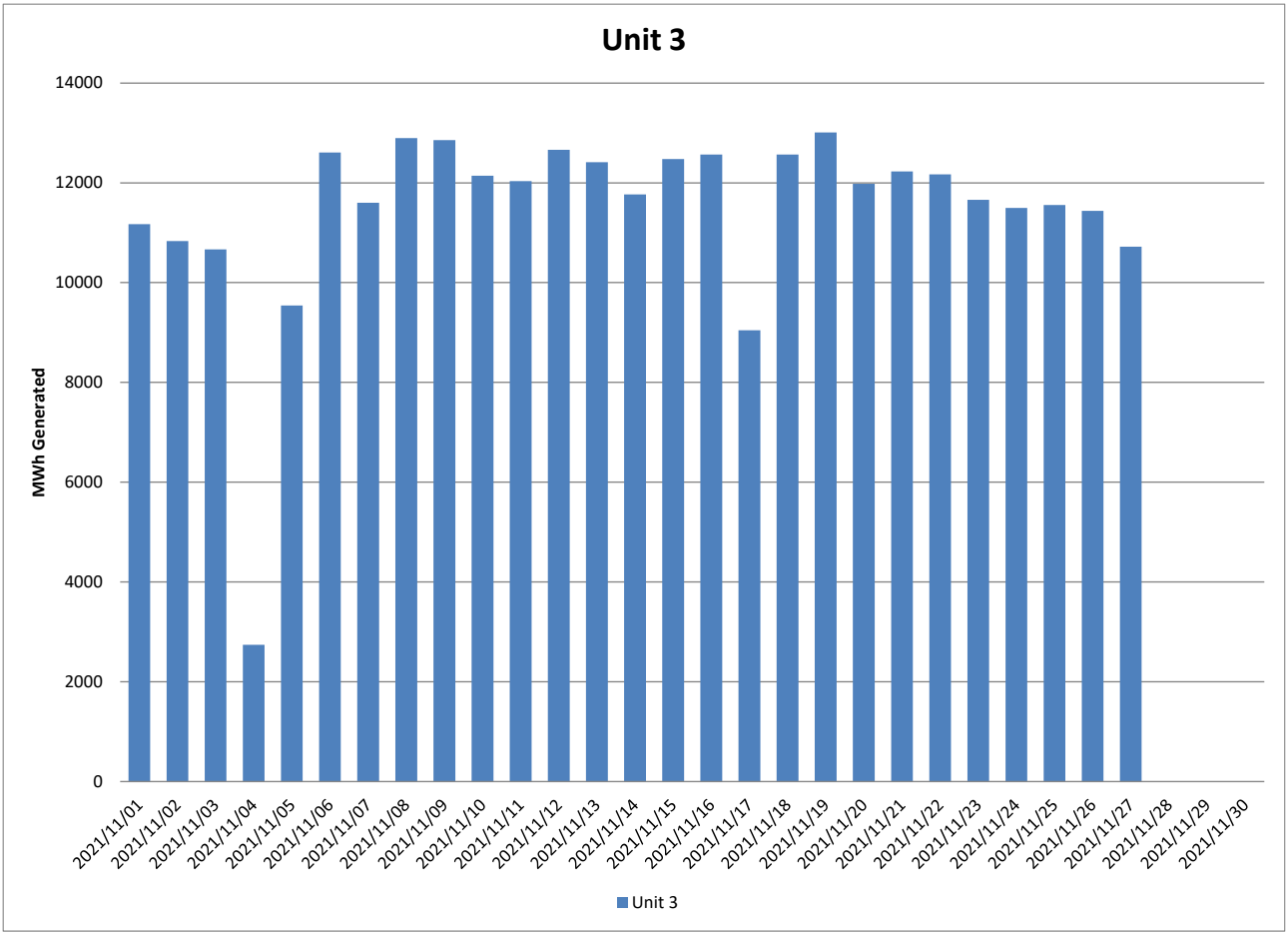


**Figure 22: Unit 3 daily generated power in MWh for the month of November 2021**

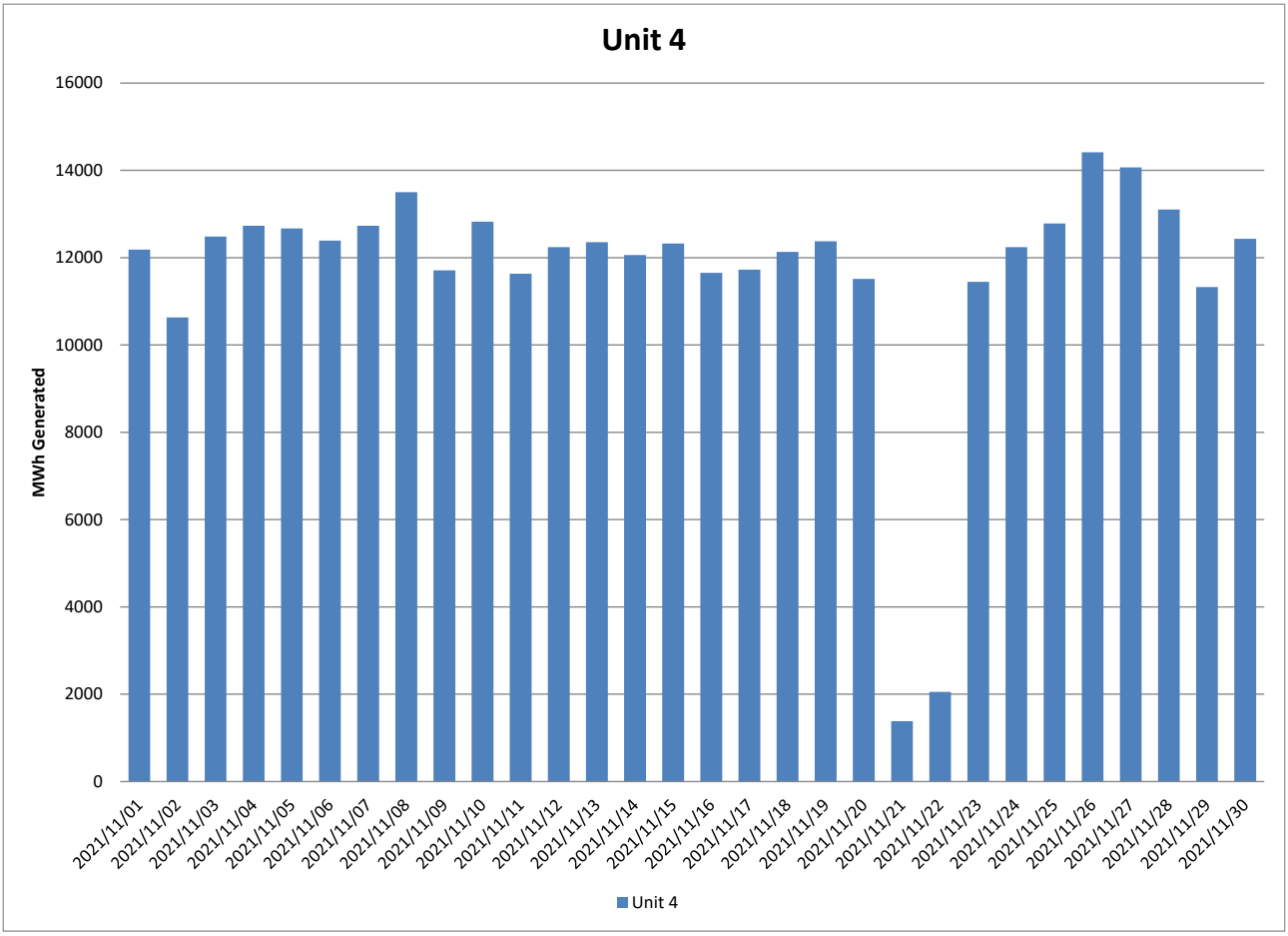


**Figure 23: Unit 4 daily generated power in MWh for the month of November 2021**

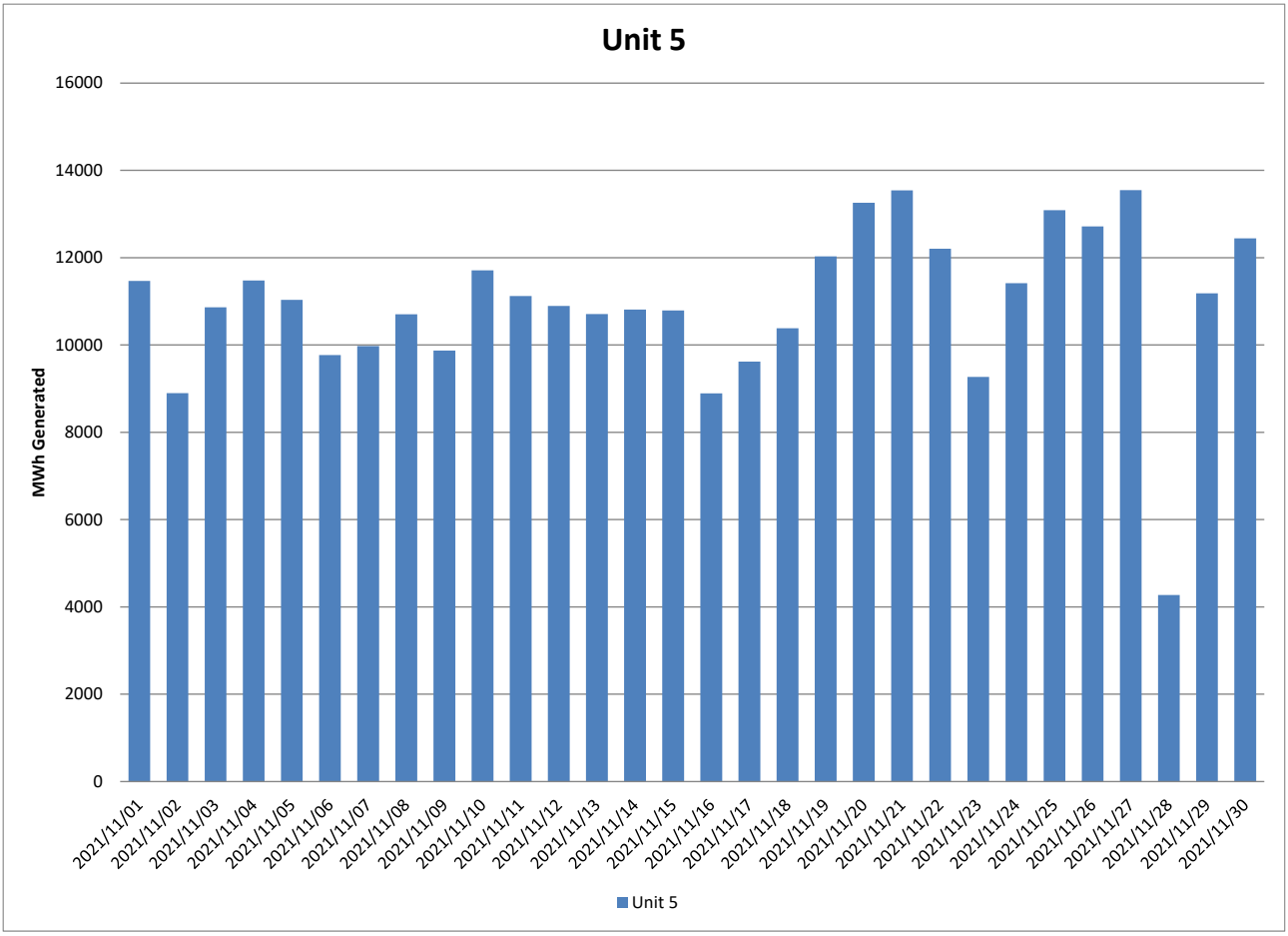


**Figure 24: Unit 5 daily generated power in MWh for the month of November 2021**

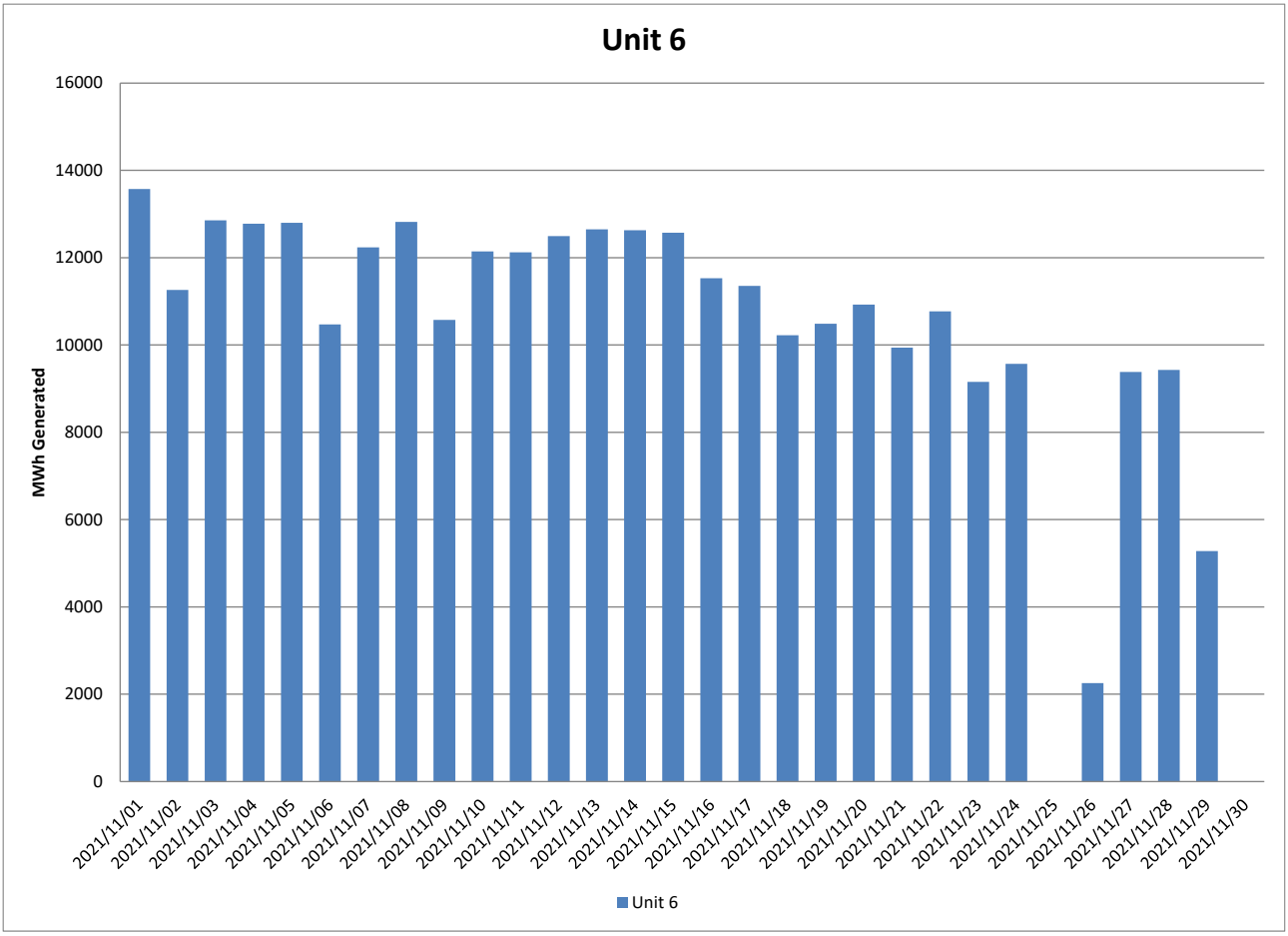


**Figure 25: Unit 6 daily generated power in MWh for the month of November 2021**

## 2.6 Pollutant Tonnages

The emitted pollutant tonnages for November 2021 are provided in table 6. Averaged Quality Assurance level 2 (QAL 2) values were used for $CO_2$ data for Unit 2, Unit 3, Unit 4, Unit 5, and Unit 6 due to the monitor providing unreliable values. Matimba is currently in the process of implementing recommended changes on this monitor in order to improve the reliability of the data. The expected completion date for these changes is 30 January 2021. Averaged QAL 2 values were also used for Unit 1 for the following dates and pollutants: 1-30 November 2021 for $SO_x$ emissions due to a defective power supply and a defective communication module, 1-17 November 2021 for $NO_x$ and $CO_2$ data due to a defective power supply. The Power supply was repaired on 17 November 2021 and the defective communication module was repaired 09 December 2021.

**Table 6:** Pollutant tonnages for the month of November 2021

| Associated Unit/Stack | PM (tons) | $SO_2$ (tons) | $NO_x$ (tons) |
|---|---|---|---|
| Unit 1 | 56,6 | 3 367,6 | 440,7 |
| Unit 2 | 51,7 | 5 694,7 | 828,3 |
| Unit 3 | 90,2 | 4 503,8 | 906,3 |
| Unit 4 | 58,5 | 5 148,0 | 1 044,9 |
| Unit 5 | 36,0 | 3 377,3 | 582,1 |
| Unit 6 | 37,2 | 4 166,9 | 676,8 |
| **SUM** | 330,2 | 26 258,2 | 4 479,1 |

## 2.7 Reference values

**Table 7:** Reference values for data provided, November 2021

| Compound / Parameter | Units of Measure | Unit 1 | Unit 2 | Unit 3 | Unit 4 | Unit 5 | Unit 6 |
|---|---|---|---|---|---|---|---|
| Oxygen | % | 8,50 | 8,14 | 9,07 | 6,45 | 8,12 | 7,62 |
| Moisture | % | 4,42 | 3,18 | 4,94 | 3,17 | 4,69 | 3,16 |
| Velocity | m/s | 17,5 | 24,9 | 27,3 | 24,5 | 22,9 | 24,9 |
| Temperature | $^{o}C$ | 121,7 | 122,9 | 130,5 | 134,8 | 121,1 | 172,8 |
| Pressure | mBar | 933,4 | 1 185,0 | 911,6 | 918,2 | 929,6 | 919,2 |

## 2.8 Continuous Emission Monitors

### 2.8.1 Reliability

$CO_2$ monitor reliability for units 1, 2, 3, 4, 5 and 6 performed below the required 80% reliability as per the AEL. The monitors for unit 2, 3, 4, 5 and 6 were 100% available for November 2021 however the data received were removed and replaced with calculated values and averaged values due to values received from the monitors not being reliable. The monitor for unit 1 was not available from 1 to 17 November 2021 due to a defective power supply which was repaired on 17 November 2021. Unit 1 $SO_x$ monitor also performed below the required 80% availability due to a defective communication module which was repaired on 09 December 2021.

Averaged Quality Assurance level 2 (QAL 2) values were used for Unit 1 $SO_x$ data, Unit 2 $CO_2$ data and Unit 3 $CO_2$ data. $CO_2$ data for Unit 4, Unit 5 and Unit 6 was calculated by balance with oxygen readings.

**Table 8:** Average percentage (%) availability of monitors for the month of November 2021.

| Associated Unit/Stack | PM | $SO_2$ | NO | $CO_2$ |
|---|---|---|---|---|
| Unit 1 | 93,8 | 0,0 | 44,0 | 44,0 |
| Unit 2 | 100,0 | 100,0 | 88,9 | 0,0 |
| Unit 3 | 100,0 | 99,9 | 99,9 | 0,0 |
| Unit 4 | 100,0 | 100,0 | 100,0 | 0,0 |
| Unit 5 | 100,0 | 100,0 | 100,0 | 0,0 |
| Unit 6 | 100,0 | 100,0 | 100,0 | 0,0 |

### 2.8.2 Changes, downtime and repairs

**Unit 1**

- No adjustments done on the CEMs. Calibration of gaseous analysers is done every second week.
- No downtime or repairs done on the particulate monitors

**Unit 2**

- No adjustments done on the CEMs. Calibration of gaseous analysers is done every second week.
- No downtime or repairs done on the particulate monitors

**Unit 3**

- No adjustments done on the CEMs. Calibration of gaseous analysers is done every second week.
- No downtime or repairs done on the particulate monitors

**Unit 4**

- Unit 4 gaseous emission monitor was repaired on 21 November 2021.
- No downtime or repairs done on the particulate monitors

**Unit 5**

- Unit 5 gaseous emission monitor was repaired on 21 November 2021.
- No downtime or repairs done on the particulate monitors

**Unit 6**

- Unit 6 gaseous emission monitor was repaired on 21 November 2021.
- No downtime or repairs done on the particulate monitors

### 2.8.3 Sampling dates and times

Continuous

## 2.9 Units Start-up information

**Table 9:** Start-up information

| | | |
|---|---|---|
| **Unit** | 1 | |
| **Fires in** | 2021-11-02 | 21h38 |
| **Synchronization with Grid** | 2021-11-03 | 09h30 |
| **Emissions below limit** | 2021-11-03 | 18h51 |
| **Fires in to synchronization** | 11,87 | HOURS |
| **Synchronization to < Emission limit** | 9,35 | HOURS |

| | | |
|---|---|---|
| **Unit** | 1 | |
| **Fires in** | 2021-11-05 | 10h54 |
| **Synchronization with Grid** | 2021-11-05 | 13h30 |
| **Emissions below limit** | 2021-11-05 | 15h51 |
| **Fires in to synchronization** | 2,6 | HOURS |
| **Synchronization to < Emission limit** | 2,35 | HOURS |

| | | |
|---|---|---|
| **Unit** | 1 | |
| **Fires in** | 2021-11-07 | 20h18 |
| **Synchronization with Grid** | 2021-11-08 | 06h01 |
| **Emissions below limit** | 2021-11-08 | 10h42 |
| **Fires in to synchronization** | 9,71 | HOURS |
| **Synchronization to < Emission limit** | 4,68 | HOURS |

| | | |
|---|---|---|
| **Unit** | 1 | |
| **Fires in** | 2021-11-08 | 21h31 |
| **Synchronization with Grid** | 2021-11-09 | 02h33 |
| **Emissions below limit** | 2021-11-10 | 11h34 |
| **Fires in to synchronization** | 5,03 | HOURS |
| **Synchronization to < Emission limit** | 33,02 | HOURS |

| | | |
|---|---|---|
| **Unit** | 1 | |
| **Fires in** | 2021-11-17 | 11h39 |
| **Synchronization with Grid** | 2021-11-17 | 18h46 |
| **Emissions below limit** | 2021-11-17 | 22h17 |
| **Fires in to synchronization** | 7,12 | HOURS |
| **Synchronization to < Emission limit** | 3,52 | HOURS |

| | | |
|---|---|---|
| **Unit** | 1 | |
| **Fires in** | 2021-11-18 | 19h36 |
| **Synchronization with Grid** | 2021-11-19 | 01h52 |
| **Emissions below limit** | 2021-11-19 | 05h08 |
| **Fires in to synchronization** | 6,27 | HOURS |
| **Synchronization to < Emission limit** | 3,27 | HOURS |

| | | |
|---|---|---|
| **Unit** | 1 | |
| **Fires in** | 2021-11-19 | 01h54 |
| **Synchronization with Grid** | 2021-11-19 | 02h35 |
| **Emissions below limit** | 2021-11-19 | 05h08 |
| **Fires in to synchronization** | 0,68 | HOURS |
| **Synchronization to < Emission limit** | 2,55 | HOURS |

| | | |
|---|---|---|
| **Unit** | 1 | |
| **Fires in** | 2021-11-23 | 20h03 |
| **Synchronization with Grid** | 2021-11-23 | 23h22 |
| **Emissions below limit** | 2021-11-24 | 06h00 |
| **Fires in to synchronization** | 3,32 | HOURS |
| **Synchronization to < Emission limit** | 6,63 | HOURS |

| | | |
|---|---|---|
| **Unit** | 2 | |
| **Fires in** | 2021-11-05 | 17h16 |
| **Synchronization with Grid** | 2021-11-05 | 20h09 |
| **Emissions below limit** | 2021-11-05 | 20h09 |
| **Fires in to synchronization** | 2,88 | HOURS |
| **Synchronization to < Emission limit** | 0 | HOURS |

| | | |
|---|---|---|
| **Unit** | 2 | |
| **Fires in** | 2021-11-10 | 15h10 |
| **Synchronization with Grid** | 2021-11-10 | 17h30 |
| **Emissions below limit** | 2021-11-10 | 19h08 |
| **Fires in to synchronization** | 2,33 | HOURS |
| **Synchronization to < Emission limit** | 1,63 | HOURS |

| | | |
|---|---|---|
| **Unit** | 2 | |
| **Fires in** | 2021-11-18 | 07h23 |
| **Synchronization with Grid** | 2021-11-18 | 09h35 |
| **Emissions below limit** | 2021-11-18 | 10h00 |
| **Fires in to synchronization** | 2,2 | HOURS |
| **Synchronization to < Emission limit** | 0,42 | HOURS |

| | | |
|---|---|---|
| **Unit** | 2 | |
| **Fires in** | 2021-11-18 | 15h15 |
| **Synchronization with Grid** | 2021-11-18 | 18h46 |
| **Emissions below limit** | 2021-11-18 | 20h08 |
| **Fires in to synchronization** | 3,52 | HOURS |
| **Synchronization to < Emission limit** | 1,37 | HOURS |

| **Unit** | 3 | |
|---|---|---|
| **Fires in** | 2021-11-04 | 16h05 |
| **Synchronization with Grid** | 2021-11-04 | 19h56 |
| **Emissions below limit** | 2021-11-04 | 23h08 |
| **Fires in to synchronization** | 3,85 | HOURS |
| **Synchronization to < Emission limit** | 3,2 | HOURS |

| **Unit** | 3 | |
|---|---|---|
| **Fires in** | 2021-11-17 | 15h00 |
| **Synchronization with Grid** | 2021-11-17 | 18h17 |
| **Emissions below limit** | 2021-11-17 | 22h17 |
| **Fires in to synchronization** | 3,28 | HOURS |
| **Synchronization to < Emission limit** | 4 | HOURS |

| **Unit** | 4 | |
|---|---|---|
| **Fires in** | 2021-11-20 | 00h39 |
| **Synchronization with Grid** | 2021-11-20 | 03h20 |
| **Emissions below limit** | 2021-11-20 | 09h25 |
| **Fires in to synchronization** | 2,68 | HOURS |
| **Synchronization to < Emission limit** | 6,08 | HOURS |

| **Unit** | 4 | |
|---|---|---|
| **Fires in** | 2021-11-22 | 12h29 |
| **Synchronization with Grid** | 2021-11-22 | 19h05 |
| **Emissions below limit** | 2021-11-23 | 08h08 |
| **Fires in to synchronization** | 6,6 | HOURS |
| **Synchronization to < Emission limit** | 13,05 | HOURS |

| **Unit** | 5 | |
|---|---|---|
| **Fires in** | 2021-11-16 | 12h55 |
| **Synchronization with Grid** | 2021-11-16 | 15h54 |
| **Emissions below limit** | 2021-11-16 | 15h54 |
| **Fires in to synchronization** | 2,98 | HOURS |
| **Synchronization to < Emission limit** | 0 | HOURS |

| **Unit** | 5 | |
|---|---|---|
| **Fires in** | 2021-11-28 | 13h07 |
| **Synchronization with Grid** | 2021-11-28 | 16h59 |
| **Emissions below limit** | 2021-11-28 | 19h17 |
| **Fires in to synchronization** | 3,87 | HOURS |
| **Synchronization to < Emission limit** | 2,3 | HOURS |

| | | |
|---|---|---|
| **Unit** | 6 | |
| **Fires in** | 2021-11-06 | 20h28 |
| **Synchronization with Grid** | 2021-11-06 | 23h38 |
| **Emissions below limit** | 2021-11-06 | 23h38 |
| **Fires in to synchronization** | 3,17 | HOURS |
| **Synchronization to < Emission limit** | 0 | HOURS |

| | | |
|---|---|---|
| **Unit** | 6 | |
| **Fires in** | 2021-11-26 | 08h50 |
| **Synchronization with Grid** | 2021-11-26 | 16h58 |
| **Emissions below limit** | 2021-11-26 | 16h58 |
| **Fires in to synchronization** | 8,13 | HOURS |
| **Synchronization to < Emission limit** | 0 | HOURS |

## 2.10 Emergency generation

**Table 10:** Emergency generation

| | Unit 1 | Unit 2 | Unit 3 | Unit 4 | Unit 5 | Unit 6 |
|---|---|---|---|---|---|---|
| **Emergency Generation hours declared by national Control** | 447 | 514 | 453 | 505 | 531 | 468 |
| **Emergency Hours declared including hours after stand down** | 457 | 524 | 463 | 515 | 541 | 478 |
| **Days over the Limit during Emergency Generation** | 10 | 5 | 16 | 2 | 0 | 1 |

Unit 1 exceeded the 50mg/Nm$^3$ limit during emergency generation 10 times in November 2021. Unit 2 exceeded the 50mg/Nm$^3$ limit during emergency generation 5 times in November 2021. Unit 3 exceeded the 50mg/Nm$^3$ limit during emergency generation 16 times in November 2021. Unit 4 exceeded the 50mg/Nm$^3$ limit during emergency generation 2 times in November 2021. Unit 6 exceeded the 50mg/Nm$^3$ limit during emergency generation 1 time in November 2021. Full details for exceedances are provided in section 2.4.1.

## 2.11 Complaints register

**Table 11:** Complaints

| Source Code/ Name | Root Cause Analysis | Calculation of Impacts/ emissions associated with the incident | Dispersion modelling of pollutants where applicable | Measures implemented to prevent reoccurrence | Date by which measure will be implemented |
|---|---|---|---|---|---|
| None | | | | | |

## 2.12 Air quality improvements and social responsibility conducted

### 2.12.1 Air quality improvements

None

### 2.12.2 Social responsibility conducted

None

## 2.13 Ambient air quality monitoring

There were no exceedances recorded in the reporting period.

Ambient PM2.5, PM10 and NO2 concentrations at Marapong monitoring site show influence of emissions from low level sources in the area while ambient SO2 show influence of emissions from tall stack emitters and other industrial activities.

The average data recovery for the period was 67,8% and the station availability was 62,5%.

Detailed results can be found in Attachment 1, “Marapong Monthly Report_October 2021”.

## 2.14 Electrostatic precipitator and Sulphur plant status

**Unit 1**

- 2 fields out of service, will be inspected next opportunity.
- No abnormalities on the SO3 plant. Preventative maintenance done during the month.

**Unit 2**

- All precipitator fields in service.
- No abnormalities on the SO3 plant. Preventative maintenance done during the month.

**Unit 3**

- All precipitator fields in service.
- No abnormalities on the SO3 plant. Preventative maintenance done during the month.

**Unit 4**

- 1 field out of service, will be inspected next opportunity.
- No abnormalities on the SO3 plant. Preventative maintenance done during the month.

**Unit 5**

- All precipitator fields in service.
- No abnormalities on the SO3 plant. Preventative maintenance done during the month.

**Unit 6**

- All precipitator fields in service.
- No abnormalities on the SO3 plant. Preventative maintenance done during the month.

**SO3 common plant**

- No abnormalities on the sulphur storage plant.

## 2.15 General

Name and reference number of the monitoring method used:

1. Particulate and gas monitoring according to standards
    a. BS EN 14181:2004 - Quality Assurance of Automated Measuring Systems
    b. ESKOM internal standard 240-56242363 Emissions Monitoring and Reporting Standard

Sampling locations:

1. Stack one
    a. Particulates:
        i. S23º 40' 2.8" E027º 36' 34.8" 175m from ground level and 75m from the top.
    b. Gas:
        i. S23º 40' 2.8" E027º 36' 34.8" 100m from ground level and 150m from the top.
    c. Stack height
        i. 250 meter consist of 3 flues
2. Stack two
    a. Particulates:
        i. S23º 40' 14.8" E027º 36' 47.5" 175m from ground level and 75m from the top.
    b. Gas:
        i. S23º 40' 14.8" E027º 36' 47.5" 100m from ground level and 150m from the top.
    c. Stack height
        i. 250 meter consist of 3 flues

# 3. Attachments

None

# 4. Report Conclusion

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

Hoping the above will meet your satisfaction.

I hereby declare that the information in this report is correct.

Yours sincerely

GENERAL MANAGER: MATIMBA POWER STATION