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***Date: 2023/09/30***

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**Ref: H16/1/13-AEL/M1M/R1_Bi-Annual 2023**

**Dear Mr Koenaite**

**MEDUPI POWER STATION BI-ANNUAL EMISSIONS REPORT**

This report serves to fulfil the requirements of Section 7.7.2 of the Medupi Power Station Provisional Atmospheric Emission License (AEL) number H16/1/13-AEL/M1M/R1. This report reflects verified emissions data for the period of April 2023 to September 2023. The daily emissions figures for the reporting period were submitted monthly to the licensing authority.

The content of this report is aligned to the requirements of the Medupi Power Station provisional Atmospheric Emissions Licence and covers the following aspects:

- Compliance with regards to each AEL condition
- Interpretation of all available data, tests, and monitoring results regarding operation and all impacts on the environment
- Recommendations regarding non-compliance or potential non-compliance
- Target dates for the implementation of recommendations by the License Holder to achieve compliance
- Impact of implemented corrective action taken for identified non-compliance

## 1. Bi-annual Reporting Requirements as per condition 7.7.2 of the AEL

- **Compliance with regards to each AEL condition, Recommendations regarding non-compliance or potential non-compliance and Target dates.**

  Non-compliances to conditions of the licence are reported to the licensing authority as soon as they are identified by the Medupi Power Station. The Station uses Continuous Emissions Monitoring System (CEMS) for emissions monitoring. Online monitoring is conducted on Unit 1, 2, 3, 5 and 6 for both Particulate Matter (PM) and Gaseous ($NO_2$ and $SO_2$) emissions. The accuracy of the monitors is confirmed by the parallel tests and correlation tests conducted annually. Note the AEL requirement is to conduct the tests once every two years. Although emissions limits were exceeded in certain instances as reflected in the monthly emissions reports, three (3) of the exceedances were due to bag failures. There were no Section 30 reported for this reporting period. The AEL Compliance status is indicated on table 1 below.

**Table 1: AEL Compliance Status and Action Plan**

| Condition No. | Condition | Non-Compliance /Finding | Recommendation | Target Date |
|---|---|---|---|---|
| 4.3 | AEL condition 4.3 | AEL condition 4.3 deals with sampling and/or analysis requirements. “The license holder is responsible for quality assurance of methods and performance. Where the license holder uses external laboratories for sampling or analysis, accredited laboratories shall be used”. The last tests were conducted by Inthuu Laboratories (Inthuu) and were performed as per the methods stipulated under annexure A of GN893. At the time of the last correlation tests for Unit 5 and | The station must conduct parallel and correlation tests using the new service provider which is SANAS accreditation | 31 December 2024 |

| | | | | |
|---|---|---|---|---|
| | | 6, and the parallel tests for all units except for unit 5, Inthuu was not accredited. This is a finding against the against the station's AEL. It is noted that the station has shown progress in rectifying the finding. Inthuu has since received SANAS accreditation and at the time of finalising this report the station indicated that the process of undertaking new tests with a different, accredited Service Provider (Levego) was underway. | | |
| 7.1.5 | AEL condition 7.1.5 requires the station to "continuously operate, and maintain a Flue Gas Desulphurisation (FGD) plant for control of SO2 on all six units. The FGD plant shall be retrofitted in each unit within 6 years after the first commissioning of each unit and during General Overhaul outages" | AEL condition 7.1.5 deals with appliances and control measures. The station is required to "continuously operate and maintain a Flue Gas Desulphurisation (FGD) plant for control of SO2 on all six units. The FGD plant shall be retrofitted in each unit within 6 years after the first commissioning of each unit and during General Overhaul outages". The station is operating without an FGD plant, more than 6 years after the commissioning of the units. It is noted that the station MES allows exiting plant limits for SO2 until 2025 and the licence allows SO2 at 3500mg/Nm³ monthly average until 2025, however, condition 7.1.5 is written as indicated. | The station should continue to drive FGD implementation and request amendment of the condition. | 30 September 2029 |
| 7.3.2 | AEL condition 7.3.2 | AEL condition 7.3.2. requires the station to "operate, calibrate and continuously maintain the CEMS, dependent of the units' operation. The CEMS must be maintained to yield a minimum of 90% valid hourly average values during the reporting period". The validity of the data is verified using the data integrity reviews. The review OGE/CM/APC/FEB23/11, dated 27 February 2023, indicated that the emissions monitoring and reporting at Medupi PS was not satisfactory. It is noted that the latest review report OGE/CM/APC/AUG23/3, dated 6 September 2023, has since shown an improvement from the | Develop and action for the CO2 review and close the actions to improve reliability | 31 December 2024 |

| | | | | |
|---|---|---|---|---|
| | | station, but it has highlighted findings around the PM calibration records, the poor performance of Unit 3 Gas monitor, the poor performance of the velocity flow meters and the installation of stack moisture instruments. | | |
| 7.3.7 | AEL condition 7.3.7 | AEL condition 7.3.7 requires the station to "install, maintain and operate ambient air quality [Sulphur Dioxide (SO2); Nitrogen Dioxide (NO2), Carbon Monoxide (CO); Particulate Matter (PM10 and PM2.5); Ozone (O3); and Mercury (Hg)] monitoring and associated meteorological stations at relevant areas upwind and downwind of the facility". Although there are two ambient air quality stations linked to the Medupi Power station, the Marapong station is not operational due to vandalism. At the time of finalising this report, the Marapong station was in the process of being relocated to Ditheku primary school (project number SEL652111325). | The station should continue to drive the re-installation and operation of the Marapong station. | 31 March 2024 |
| 7.8 | AEL condition 7.8 | AEL condition 7.8 deals with license notification requirements. The station is required to notify the Licensing Authority, by letter or by electronic mail, of the date upon which isokinetic stack sampling, spot measurement or correlation tests will commence, within fourteen (14) days prior to such date. Authorities were notified, by email on the 14th of August 2023, that correlation tests would be conducted on Unit 6 from the 16th to the 20th of August 2023. This notification was done only two days prior to the commencement of the tests. | The station should ensure the authorities are notified 14 days in advance when tests are | 31 December 2023 |

## 2. Interpretation of all available data, test, and monitoring results regarding operation of the plant and all impacts on the environment

### PM Exceedances

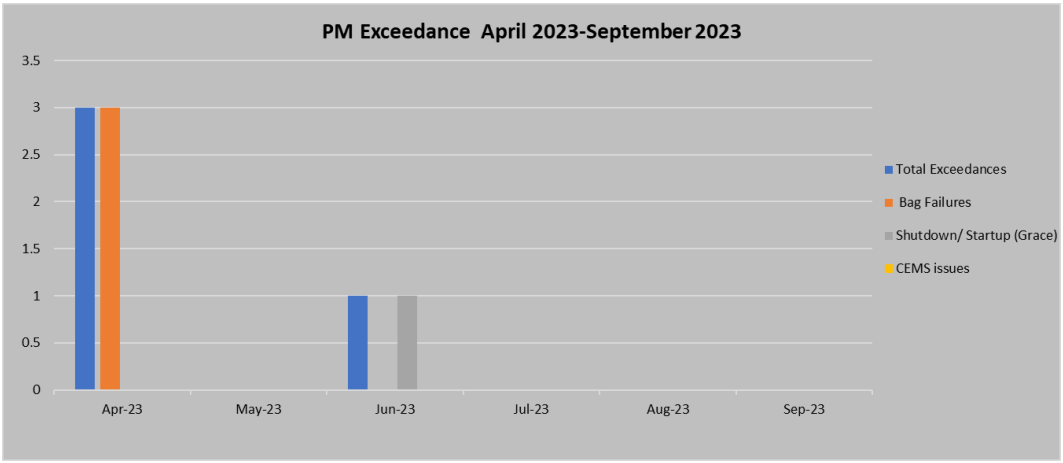


**Figure 1: Number exceedances for unit 1, 2, 3, 4, 5 and 6**

Medupi Power Station makes use of the Pulse Jet Fabric Filter Plant (PJFF) to reduce PM from the stacks. A daily average PM limit of 50 mg/Nm3 was granted and is in effect from July 2019 as reflected on the Medupi Power Station AEL. PM exceedances are presented on figure 1 above. Based on the presented data, bag failures related exceedances were dominant during the months of April 2023 – September 2023. A unit start-up exceedance was only recorded once in June 2023.

### $SO_2$ and $NO_2$ Exceedances

There were no $SO_2$ and $NO_2$ exceedances recorded for this reporting period.

## Unit 1-6 Emission Tonnages

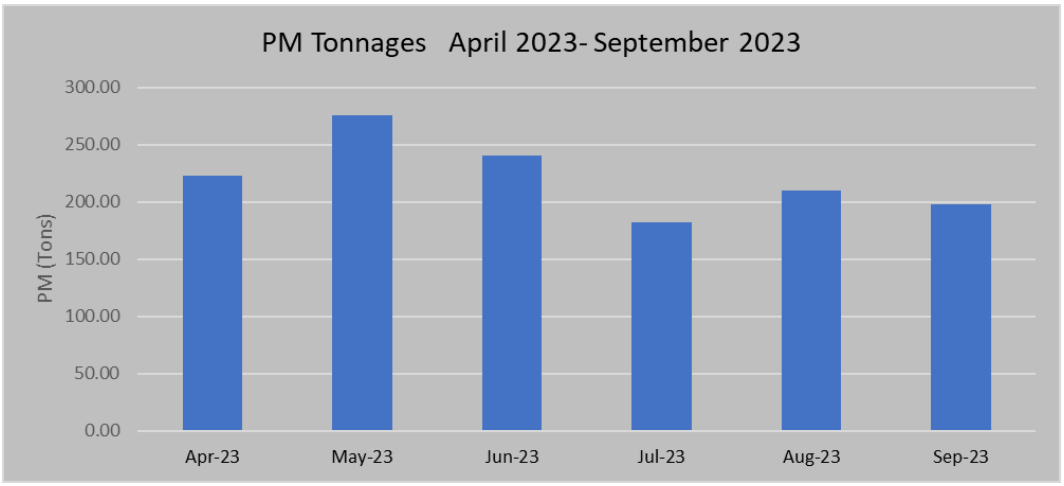


**Figure 2: Six monthly PM Tonnages**

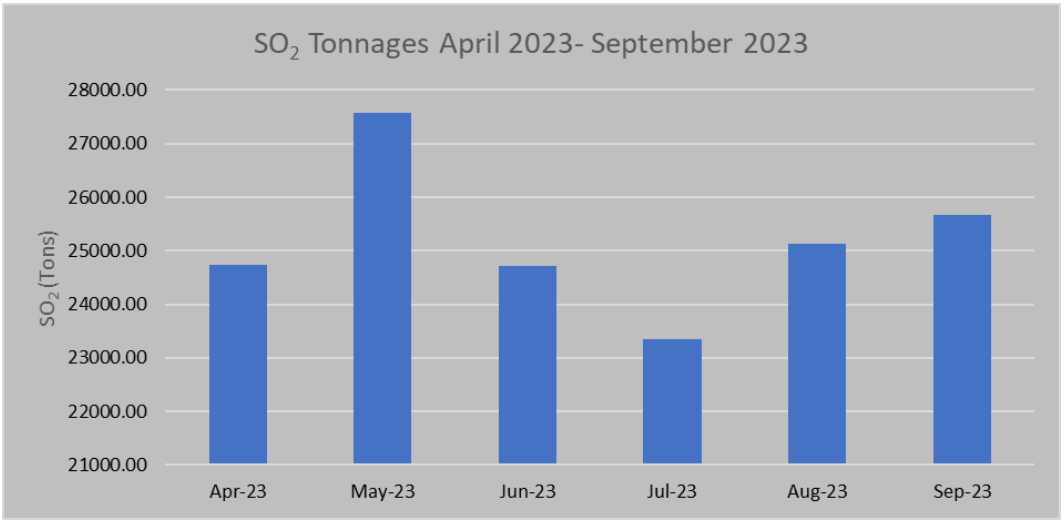


**Figure 3: Six monthly $SO_2$ tonnages**

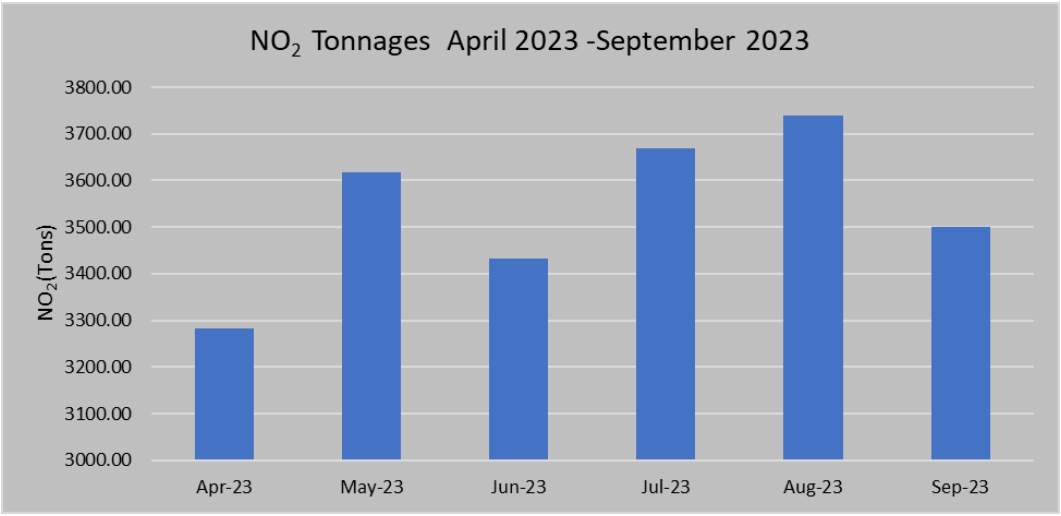


**Figure 4: Six monthly NO2 tonnages**

**Table 2: Emissions spot/verification/correlation/parallel test results**

| Unit | Type of test | Date |
|---|---|---|
| 1 | Gaseous Parallel Measurements | 27 February 2023 |
| | Particulate Matter Monitor Correlation Measurements | 29 May 2023 |
| 2 | Gaseous Parallel Measurements | 19 December 2022 |
| | Particulate Matter Monitor Correlation Measurements | 18 May 2023 |
| 3 | Gaseous Parallel Measurements | 04 November 2022 |
| | Particulate Matter Monitor Correlation Measurements | 18 May 2023 |
| 4 | Gaseous Parallel Measurements | - |
| | Particulate Matter Monitor Correlation Measurements | - |
| 5 | Gaseous Parallel Measurements | 31 May 2022<br>25 April 2023 |
| | Particulate Matter Monitor Correlation Measurements | 26 September 2022 |
| 6 | Gaseous Parallel Measurements | 12 December 2022 |
| | Particulate Matter Monitor Correlation Measurements | 16 September 2022 |

All the correlation and parallel test reports are still valid. No parallel and correlation tests for Unit 4 which is off due the Generator incident.

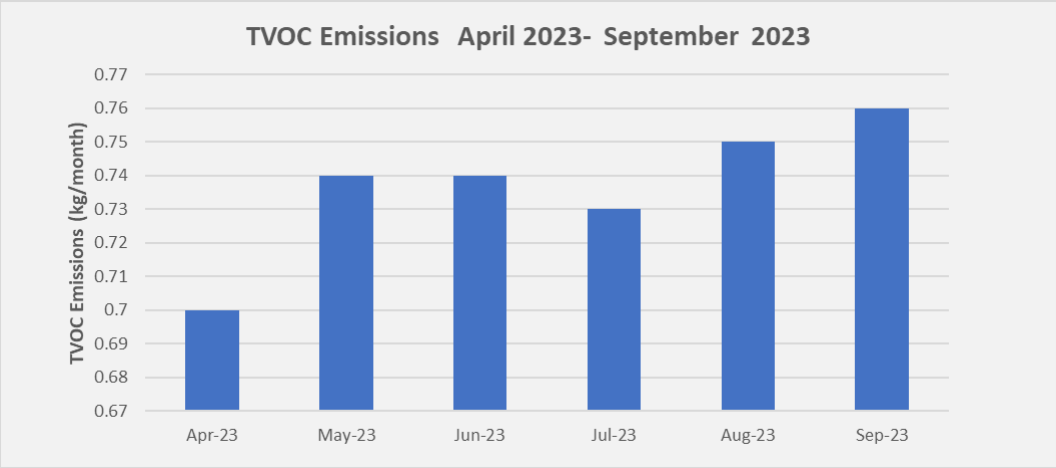


**Figure 5: Six monthly fuel oil TVOC emissions performance**

**Fuel Oil Consumption**

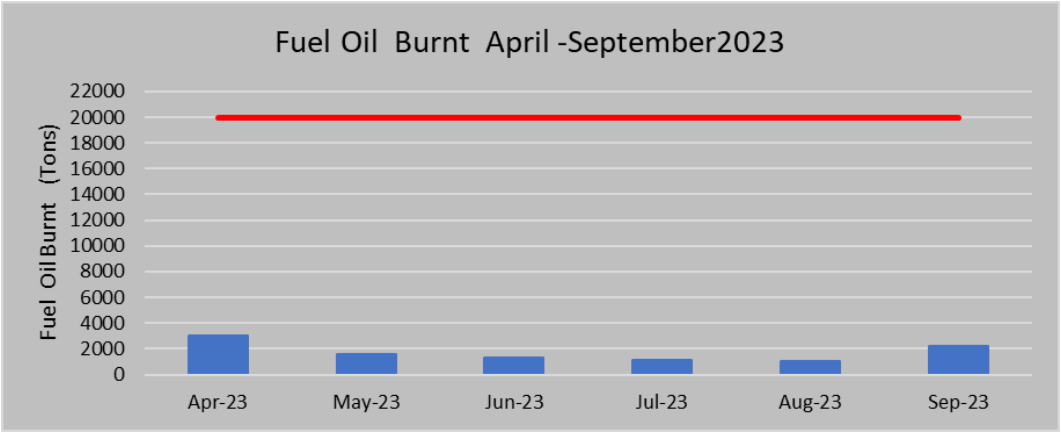


**Figure 6: Six monthly fuel oil consumption**

Medupi Power Station uses fuel oil during Unit light up, the maximum allowable tons of fuel oil to be used by Medupi Power Station is 20 000 tons/month. The Power Station monitors the monthly usage and report to Waterberg District Municipality (WDM), figure 6 indicates that the Power Station complies with the requirements of the provisional AEL limit of 20 000 tons per month.

### Coal Burnt Rate

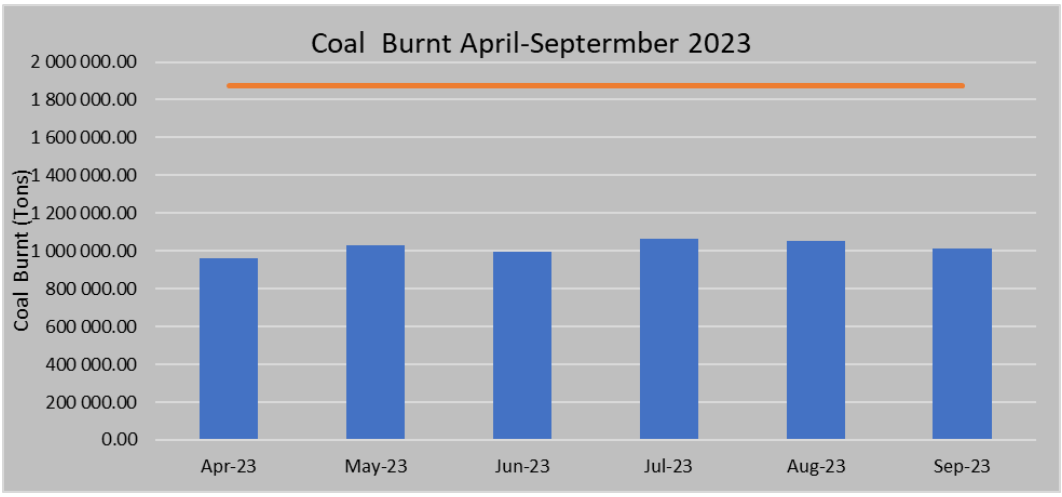


**Figure 7: Six monthly coal burnt rate**

Medupi Power Station AEL No. H16/1/13-AEL/M1/R1 prescribes limits for raw materials consumption for coal. Medupi Power Station coal consumption rate was well within the limit 1 875 000 tons/month as prescribed by the provisional AEL for the past six months.

### Production rates

The maximum licensed production capacity is limited to 4 800 MW. The power station remained within prescribed limit for the period between April 2023 and September 2023. For most of the months, the Units were operated with load losses to reduce particulate emissions.

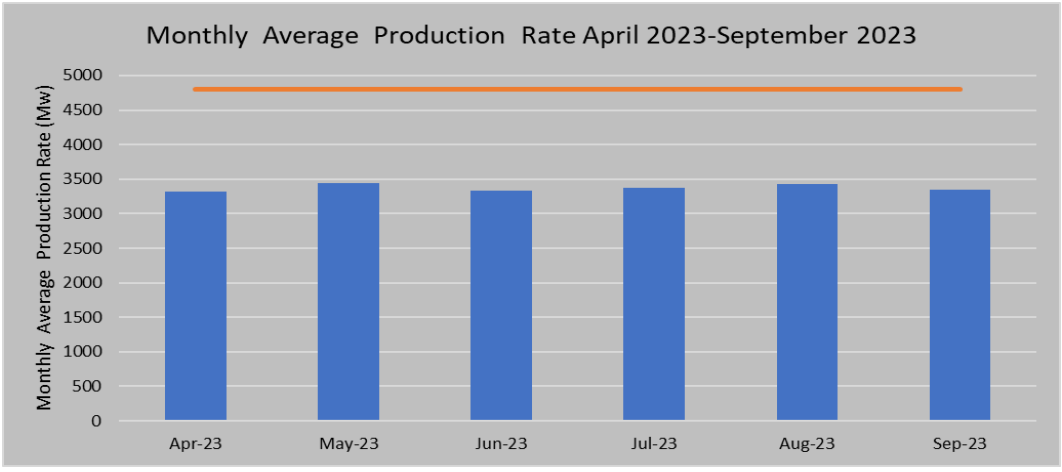


**Figure 8: Six monthly production rate**

## Ambient Air Quality Results for January 2023 – September 2023

Eskom commissioned an ambient air quality monitoring site at Kroomdraai farm to assess background conditions of ambient air quality prior to the commissioning of Medupi Power Station and the impacts on the environment thereof. The Medupi site is equipped for continuous monitoring of ambient concentrations of sulphur dioxide ($SO_2$), nitrogen dioxide ($NO_2$), ozone ($O_3$), fine particulate matter of sizes <10µm and <2.5 in diameter ($PM_{10}$ and $PM_{2.5}$). Ambient air quality monitoring is presented for 2023 monitoring period. See table 2 below. The number of exceedances for the $O_3$, $PM_{10}$, and $PM_{2.5}$ daily limit exceeded the annual allowable limit. The rest of the ambient pollutants are still within the allowable limits.

**Table 3: Number of exceedances of the National Ambient Air Quality Limits for reporting period**

| | $SO_2$ hourly | $SO_2$ daily | $SO_2$ 10-minute | $NO_2$ hourly | $PM_{10}$ daily | $PM_{2.5}$ daily | $O_3$ 8-hourly |
|---|---|---|---|---|---|---|---|
| January | 0 | 0 | 0 | 0 | 4 | ND | 0 |
| February | 0 | 0 | 0 | 0 | 1 | ND | 2 |
| March | 0 | 0 | 0 | 0 | 4 | 7 | 0 |
| April | 3 | 0 | 8 | 0 | 0 | 1 | 0 |
| May | 5 | 1 | 14 | 0 | 0 | 0 | 0 |
| June | 2 | 0 | 11 | 0 | 0 | 2 | 0 |
| July | 1 | 0 | 2 | 0 | 2 | 2 | 0 |
| August | 3 | 0 | 4 | 0 | 3 | ND | 17 |
| September | 2 | 0 | 4 | 0 | 4 | ND | 69 |
| **Total** | **16** | **1** | **43** | **0** | **18** | **12** | **88** |
| Allowed number of exceedances | 88 | 4 | 526 | 0 | 4 | 4 | 11 |

## Fugitive Dust Fall Results

Medupi Power Station dust monitoring network consists of 20 buckets which are collected and analysed within 30 +- 3 days. The results for the reporting period of April 2023 to September 2023 is depicted in figure 9 below. It is evident that the dust management practice within the Power Station is a challenge, however from the months on April 2023 to June 2023 the station did not record any fugitive dust fall exceedances.

**Table 4: Five monthly Fugitive Dust Buckets Exceedances**

| Monitoring Point | Number of Exceedances | Months and Dust fallout (mg/m$^2$/days) |
|---|---|---|
| D05a | 2 | 1544 mg/m$^2$/d in August 2023, 1525 mg/m$^2$/d September 2023. |
| D15a | 3 | 1712 mg/m$^2$/d for July 2023, 1873 mg/m$^2$/d for August 2023 and 1895 mg/m$^2$/d for September 2023 |

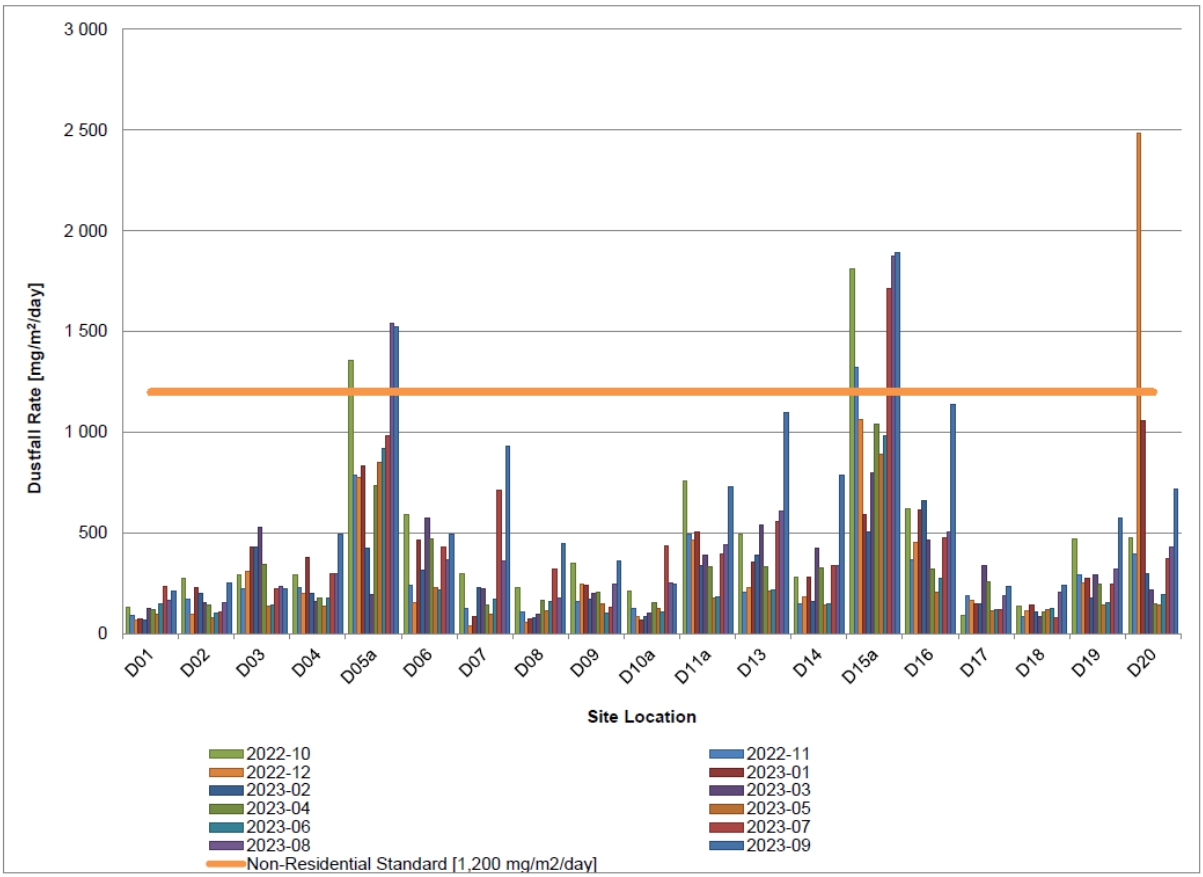


**Figure 9: Five monthly Fugitive Dust-Fall monitoring**

**Conclusion**

Medupi Power Station complies with most of the requirement of the AEL issued in terms of Section 40(1) (a) of the National Environmental Management: Air Quality Act, 2004, listed activity No. 1.1, 2.4 and 5.1.

The stack emissions performance has improved, only four (4) exceedances were recorded from April 2023 to September 2023. Fugitive dust management plan for the station was revised to include additional measures for managing fugitive dust from the ash dump. The station is currently applying a dust suppressant (chemical suppression) and shall continue to monitor the dust to assess the effectiveness of the chemical.

**Compiled by:**

Lutendo Murovhi
MEDUPI POWER STATION: ENVIRONMENTAL MANAGEMENT OFFICER

**Reviewed by:**

Thabo Khoza
MEDUPI POWER STATION: ENVIRONMENTAL MANAGEMENT SENIOR ADVISOR

**Supported by:**

Mokgadi Dikgale
MEDUPI POWER STATION: ENVIRONMENTAL MANEGEMENT MANAGER

**Approved by:**

pp J.T. Austin
Zweli Witbooi
MEDUPI POWER STATION: GENERAL MANAGER

| Eskom | DELEGATION OF AUTHORITY LETTER | Document Identifier | 240-139241745 | Rev | 2 |
|---|---|---|---|---|---|
| | | Effective Date | 23 November 2020 | | |
| | | Review Date | November 2023 | | |

**Johann Austin**
Senior Technical Plant Manager
Generation Division
Unique no: **0872823**

Date: 31 October 2023

For enquiries: Bheki Nxumalo
011 800 6722

Dear Johann,

**TEMPORARY DELEGATION OF AUTHORITY**

In terms of the powers, duties and authorities delegated and attached to my position, I **Bheki Nxumalo** in my capacity as **Group Executive: Generation** of Eskom Holdings SOC Ltd **Generation Division,** hereby delegate you as the **Acting General Manager: Medupi Power Station ,**all powers, duties and authorities attached to the position of **General Manager: Medupi Power Station.**

This appointment is in accordance with the Eskom Delegation of Authority Policy (Eskom DOA) (240-62072907).

This delegation is effective from **31 October 2023** until **05 November 2023**

I also confirm that you can exercise all the powers delegated to the **General Manager: Medupi Power Station** as set out in the DOA and/or **Generation Division** DOA on the following cost centres:

| COST CENTRE NAME/PROJECT | COST CENTRE NUMBER |
|---|---|
| General Manager: Medupi Power Station | 316000 |

The Delegation shall be exercised subject to the following conditions and limitations:

- lawfully;
- within the scope and powers of the delegated powers and authorities;
- subject to and in compliance with any limitations, conditions, policies and/or directives that may be developed and implemented by the Board, or by Exco at the behest of the Board; and
- in accordance with the provisions of the Public Finance Management Act No 1 of 1999, as amended.

As you conduct your duties as an Eskom employee, you are required to act in good faith and for a proper purpose, in the best interests of Eskom, and exercise the necessary skill, care, and diligence.

I wish you all the best for the challenges that lie ahead and look forward to your valuable contribution.

Approved /~~Not Approved~~

**Bheki Nxumalo**
**GROUP EXECUTIVE**
**: GENERATION**

Date: 31-10-2023

Accepted by:

.....

**Johann Austin**
**Snr Technical Plant Manager**
**GENERATION DIVISION**

Date: 2023-10-31