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Date: 20 March 2024
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Dear Dr Gwaze,

FEBRUARY 2024 MONTHLY PROGRESS REPORT ON THE POSTPONEMENT OF MINIMUM EMISSION STANDARD CONDITIONS FOR KUSILE POWER STATION: REF: LSA223027

ESKOM WAS ISSUED A MINIMUM EMISSION STANDARDS (MES) POSTPONEMENT IN RESPECT OF KUSILE'S SO₂ LEVELS BY THE DFFE ON 5 JUNE 2023. THE VARIED ATMOSPHERIC EMISSION LICENCE (AEL) WAS ISSUED BY THE NKANGALA DISTRICT MUNICIPALITY ON 13 JUNE 2023. BOTH THE MES APPROVAL AND THE AEL ALLOW ESKOM TO OPERATE THE TEMPORARY STACKS WITHOUT FGD. THE APPROVALS ARE ISSUED SUBJECT TO SEVERAL CONDITIONS, INCLUDING THAT ESKOM IMPLEMENT MEASURES TO MINIMISE THE IMPACT ON HUMAN HEALTH.

This letter provides an update on key issues, including specific reporting requirements identified by the authorities in the various approvals for the Kusile temporary stacks project. Monitoring and mitigation is being implemented as far as practical in line with the programme in the Kusile Power Station Temporary Stack Monitoring Framework approved by the authorities on 18 September 2023.

It had been agreed with the department that progress reports are to be submitted on or before the 20th of the month going forward.

As an initial point, I would like to confirm that no exceedances of the stack or ambient trigger level conditions were recorded during February 2024.

- 1. Progress of repairs of permanent stacks for the duration of the operation of the temporary stacks.**
 - I. The target date for the recovery of the West stack remains 31 December 2024.

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- II. Unit 1 and Unit 3 slurry cleaning completed.
- III. Unit 2 removal of accumulated slurry will follow the same process as Unit 1/3.
- IV. Subcontractor appointed - the current cleaning proposals utilize high pressure water for washing.
- V. Cleaning durations currently estimated at six weeks per flue and will be based on initial flue trial cleaning.
- VI. Alimak operation is not possible during windy conditions and wind direction can result in flue gas contamination at the top of the stack from units 1 or 3 preventing safe access to the stack. Total Delays from October 2023 to date is 40 days.
- VII. The Permanent Stack recovery progress report is attached (**Annexures A**).

2. Temporary Stack Emission Monitoring

Continuous Emission Monitoring (CEMS):

- I. Unit 1, 2 and 3 CEMS are installed and commissioned.
- II. The retrofitting of Unit 1 and 3 reports from Sep until Dec 2023 are in progress and will be resubmitted when finalized.
- III. Unit 2 PM spot checks was done on the 23 February 2024
- IV. Unit 2 correlation test is planned to be completed by 30 April 2024 due to load restriction caused by challenges on milling plant. The Unit went off on 17 March 2024 for boiler tube leak repair.
- V. Unit 2 emission reports will be retrofitted upon finalization of correlation test and implementation of correlation curves.

Stack Performance:

- I. The Kusile Monthly Emission report for February 2024, which includes emission data for Units 1,2, 3 and 4 is attached (**Annexure B**).
- II. **Based on the available data information, all Kusile units operated in compliance with the AEL emission limits for PM, NO_x or SO₂ during February 2024.**
- III. Fall out dust (fugitive dust) reports are submitted to the licensing authority on or before 30th of every month as per Atmospheric Emission License condition.

3. Health Screening for the increased SO₂ emission and associated health impacts

- I. communication system is developed to enable communication with the health ambassadors in the various receptor areas.
- II. An SMS system had been developed. The contact details of ambassadors have been loaded on the SMS system and they are grouped according to receptor areas.
- III. A toll-free line will be established for community members who would like to call in with concerns (for health related information)
- IV. Engagement with specific businesses in the area is taking and will continue and progress reported in the proceeding months.
- V. The surrounding business are planned to be visited for engagement and awareness once a date had been agreed on.

4. Occupational Health and Hygiene status

4.1. Continuous SO₂ Perimeter Monitoring:

- I. Weekly monitoring of the plant's perimeter for SO₂ surges was conducted throughout February 2024.

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- II. SO₂ levels along the perimeter remained below detection levels, meeting the statutory requirement of 0.5 ppm OEL-STEL/C.

4.2. Continuous Personal Exposure Sampling:

- I. An EOD Controller and three Senior Plant Operators underwent personal exposure sampling for SO₂ during February 2024.
- II. Their exposure levels were consistently below detection levels and compliant with the statutory requirement of 0.5 ppm OEL-STEL/C.

Table: Personal Exposure Sulphur Dioxide Concentration for February 2024

Month	Number of samples	Areas Sampled	Designation	Concentration (ppm)	Status	Comment(s)
February 2024	1	EOD	Controller	< 0,5	Complaint	Concentrations below OEL.
February 2024	1	FGD	Senior Plant Operator	< 0,5	Complaint	Concentrations below OEL.
February 2024	1	BOP	Senior Plant Operator	< 0,5	Complaint	Concentrations below OEL.
February 2024	1	Units	Senior Plant Operator	< 0,5	Complaint	Concentrations below OEL.

4.3. Conclusion:

Our continuous SO₂ perimeter monitoring, and personal exposure sampling generally indicated compliance with regulatory limits with no ongoing issues. We will continue to monitor and investigate any anomalies to ensure the safety and well-being of both our workers and the surrounding community.

5. Stakeholder Engagement Plan and Status

Stakeholders	Method of engagement	Involvement	Status
Employees	<ul style="list-style-type: none"> • Awareness sessions • Leadership briefings (GM's address) • Employee engagements 	<ul style="list-style-type: none"> • Once a month • Every Friday Monthly	Complete
Local Municipalities <ul style="list-style-type: none"> • Emalahleni • Victor Khanye • Bronkhorstspuit 	Face-to-face meeting	Once a quarter	March 2024
Media <ul style="list-style-type: none"> • Emalahleni FM • Witbank News 	<ul style="list-style-type: none"> • Advert • Print 	When required	Eskom media desk to publish

Media - an update article was published on the Eskom website under news, shared via Generations communication account for all and also published on ESI Africa

6. Ambient Air Quality Monitoring

- I. In order to better assess compliance with national ambient air quality standards, identify potential sources of pollution, protect public health and the environment and establish a baseline for future mitigation measures Eskom has installed additional

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ambient air quality monitoring stations at Balmoral and Wilge. The existing air quality monitoring stations (Kendal, Phola and Chicken Farm) will complement the additional monitoring sites to reduce uncertainties and improve the understanding of air quality issues in the area.

- II. The Balmoral and Wilge monitoring stations are equipped to monitor ambient concentrations of sulphur dioxide (SO₂) continuously. In addition, meteorological parameters of wind velocity, wind direction and ambient temperature, humidity, ambient pressure and rainfall, amongst others, are also recorded.
- III. The following parameters, nitrogen dioxide (NO₂), ozone (O₃) and fine particulate matter of particulate size <10µm and particulate size <2.5µm in diameter (PM₁₀ and PM_{2.5}) will be monitored from 01 April 2024.
- IV. The data for this reporting period (01 – 29 February 2024) were analysed for ambient SO₂ as monitored at Balmoral, Chicken Farm, Phola and Wilge air quality monitoring stations. The Particulate Matter and NO₂ data were further analysed for Chicken Farm and Phola.
- V. This report focuses on the results of the ambient air quality monitoring stations; results from stack monitoring, fugitive dust and animal health are addressed in our reports produced for the station.
- VI. There were no exceedances of the ambient SO₂ limits recorded for all the monitoring stations during the monitoring period under review. There were seven (7) exceedances of the PM_{2.5} daily limit of 40 µg/m³ recorded at the Chicken Farm monitoring station.
- VII. There were no events that triggered the notification of stakeholders in terms of the agreed AEGL recorded in February 2024.

Table 1 Highest SO₂ concentrations recorded (in ppb)

Monitoring Stations	10-min average	Date	Hourly average	Date	Daily average	Date
Balmoral	116.2	12/02/2024 19:10	90.4	13/02/2024 19:00	15.6	13/02/2024
Chicken Farm	152.7	02/02/2024 12:30	122.6	02/02/2024 11:00	26.6	02/02/2024
Phola	116.4	28/02/2024 10:20	80.0	28/02/2024 17:00	18.3	28/02/2024
Wilge	130.2	28/02/2024 11:50	112.8	28/02/2024 17:00	24.9	28/02/2024

- VIII. Good representative percentage data was recovered for all the parameters monitored during the monitoring period under review at the monitoring stations with the exceptions of few parameters at Phola, Chicken Farm and Balmoral respectively. The pollutant and meteorological data for Balmoral were low due to power interruptions in the area. The data for PM_{2.5} and PM₁₀ were not recorded at the Phola monitoring station due to faulty instruments. The data for PM₁₀ was not recorded at Chicken Farm monitoring station due to faulty instrument.
- IX. A further monitoring station will be commissioned in Ogies in April 2024 as per commitments.
- X. The raw monitoring data, downloaded at 1-minute averages, is available in real-time to the DFFE-managed South African Air Quality Information System (SAAQIS) since the 14th of December 2023 for all Eskom air quality monitoring sites.
- XI. The detailed February 2024 Kusile ambient monitoring report is attached (**Annexure C**).

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7. Poultry Health Monitoring

- I. A service provider had been appointed for Kendal Poultry monitoring per the condition of environmental authorisation (record of decision) and the MES approval. Execution of the monitoring is on hold due to the outbreak of Avian Influenza.
- II. Kendal Poultry provided updates indicating that the outbreak is improving. In February 2024, they indicated that tests are carried out with State Vet in effort to ensure lifting the quarantine and that Eskom would be updated as to when monitoring can commence.

8. Animal Health Monitoring

- I. Though engagements took longer than expected, agreement had been reached and monitoring should commence, and results reflected in the upcoming progress reporting updates.
- II. Eskom has reached an agreement with Topigs and GHB farms regarding animal/pig health monitoring on 13 March 2024. Monitoring has commenced and the results will be shared in the upcoming progress reporting updates.

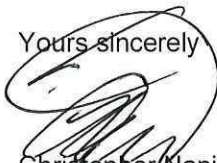
9. Emergency preparedness and response

- I. There has been no incidence of exceedance that required emergency response from Kusile Power Station, however the Emergency Response Team (ERT) remain on high alert.
- II. The ERT is in regular communication with Emalahleni Local Municipality Emergency Services as per the Mutual Aid Agreement.
- III. Emalahleni Local Municipality Emergency Services representatives in Disaster Management, Fire and Emergency Services, and Environment were added in Kusile Power Station Distribution List for regular updates.
- IV. All other Service Level Agreement (SLA's) with relevant stakeholder (Kendal Power Station) remain in force for duration of the temporal stack.

In conclusion, I believe the above illustrates that Eskom is committed to complying with the conditions of the approvals granted with respect to the Kusile temporary stacks. Eskom is implementing measures to ensure that it understands its impact and can limit its operations' environmental and health impact. Further, where full implementation of the conditions is not yet completed, Eskom is working with relevant stakeholders with focus to ensure the remaining issues are resolved as soon as possible.

I hope the above is in order. Please contact our team if you require any further information.

Yours sincerely



Christopher Nani
**ACTING GENERAL MANAGER
KUSILE POWER STATION**

DATE: 26/03/2024

**MONTHLY PROGRESS REPORTS ON THE POSTPONEMENT OF MINIMUM EMISSION
STANDARD CONDITIONS FOR KUSILE POWER STATION: REF: LSA223027**

List of annexures

Annexure A: Kusile West Chimney Recovery Project – February 2024

Annexure B: Kusile Monthly Emission Report – February 2024

Annexure C: Kusile Ambient Air Quality Report – February 2024

Dr P. Gwaze
 National Air Quality Officer
 Department of Forestry, Fisheries and Environment
 Private Bag X 447
 PRETORIA
 0001

Date: 20 March 2024

Enquiries: S. Mahlangu
 Tel: 013 699 7097

Monthly Progress Report for Kusile Power Station West Stack Recovery March 2024:

1.	Head Frame for Flue Cleaning	Status	Start Date	End Date
	Installation	100%	10 Jan 2024	9 March 2024
2.	Secure Lobster Bends			
	Secure Lobster bend K2-3	100%	12 Feb 2024	11 March 2024
	Cleaning Lobster bend 3	50%	11 March 2024	14 March 2024
	Cleaning Lobster bend 2	0%	13 March 2024	16 March 2024
3.	Vertical Flue Cleaning			
	Clean vertical flue unit 3	0%	14 March 2024	26 April 2024
	Clean vertical flue unit 2	0%	29 April 2024	27 May 2024
	Clean vertical flue unit 1	0%	28 May 2024	2 July 2024

NOTES:

West Stack:

- The target date for the recovery of the West stack remains the 31 December 2024.

Risks

- Alimak operation is not possible during windy conditions and wind direction can result in flue gas contamination at the top of the stack from units 1 or 3 preventing safe access to the stack.
- Total Delays from October 2023 to date is 40 days.

Correlation Tests

- Unit 2 spot checks was Done on the 23 February 2024.

Trust, you find the above in order.

Kind Regards,



Zandi Shange
 General Manager - Kusile Power Station Project



Ms Nompumelelo Simelane
Nkangala District Municipality
PO Box 437
Middleburg
1050

Date:

March 2024

Enquiries: Lesiba Kgobe
Tel: +27 13 699 7817

Ref: *Kusile Power Station AEL (17/4/AEL/MP311/12/01)*

Dear Ms. Simelane

KUSILE POWER STATION'S MONTHLY EMISSIONS REPORT FOR FEBRUARY 2024

This serves as the monthly report required in terms of Section 7.6 in Kusile Power Station's Atmospheric Emission License: 17/4/AEL/MP311/12/01. The emissions are for the month of February 2024.

Hoping the above will meet your satisfaction.

Yours sincerely

Christopher Nani
ACTING GENERAL MANAGER
DATE: *15/03/2024*

1. KUSILE POWER STATION MONTHLY EMISSIONS REPORT: Atmospheric Emission License
17/4/AEL/MP311/12/01



2 Raw Materials and Products

Raw Materials and Products	Raw Material Type	Units	Max Permitted Consumption Rate	Consumption Rate Feb-2024
	Coal	Tons	1 818 083	659 219
	Fuel Oil	Tons	5 533	1941.675
	Limestone	Tons	72 917	8292

Production Rates	Product / By-Product Name	Units	Max Production Capacity Permitted	Indicative Production Rate Feb-2024
	Energy	GWh	3 214.080	1 240.822
	Ash	Tons	663 583	199 149.984
	Gypsum	Tons	129 250	4 643.520
	RE PM	kg/MWh	<i>not specified</i>	0.077
	RE SOx	kg/MWh	<i>not specified</i>	5.605

3 Energy source characteristics

Fuel Characteristic	Units	Stipulated Range	Monthly Average Content
Coal CV	MJ/kg	<i>not specified</i>	19.940
Coal Sulphur	%	1.3	0.800
Ash in Coal	%	38	30.210
Fuel Oil Sulphur	%	3	2.580
Ash in FO	%	0.02	0.020

4 Emissions Limits (mg/Nm³)

Associated Unit/Stack	PM	SO ₂	NO _x
North	50	3500	750
South	50	1000	750

5 Abatement Technology (%)

Associated Unit/Stack	Technology Type	Efficiency Feb-2024	Utilisation Feb-2024	Technology Type	Utilisation Feb-2024	Efficiency Feb-2024
Unit 1	FFP	99.938	100	FGD	Off	Out of service
Unit 2	FFP	99.997	100	FGD	Off	Out of service
Unit 3	FFP	99.885	100	FGD	Off	Out of service
Unit 4	FFP	99.986	100	FGD	100	99.963%

Note: Both the FFP and FGD does not have bypass mode operation, hence plant 100% Utilised.

6. Monitoring reliability (%)

Associated Unit/Stack	PM	SO ₂	NO
Unit 1	28.3	100.0	100.0
Unit 2	100.0	100.0	100.0
Unit 3	100.0	100.0	100.0
Unit 4	100.0	98.0	59.4

7. Emissions Performance

Table 7.1: Monthly tonnages for the month of Feb - 2024

Associated Unit/Stack	PM	SO ₂	NO _x
Unit 1	32.3	2 650	849
Unit 2	1.7	1 515	403
Unit 3	57.7	2 734	565
Unit 4	4.0	56	370
SUM	95.7	6 955	2 187

KUSILE POWER STATION'S MONTHLY EMISSIONS REPORT FOR FEBRUARY 2024 -
17/4/AEL/MP311/12/01

Table 7.2: Operating days in compliance to PM AEL Limit - February 2024

Associated Unit/Stack	Normal	Grace	Section 30	Contravention	Total Exceedance	Average PM (mg/Nm ³)
Unit 1	24	0	0	0	0	19.0
Unit 2	28	0	0	0	0	1.6
Unit 3	29	0	0	0	0	32.8
Unit 4	16	0	0	0	0	4.2
SUM	97	0	0	0	0	

Table 7.3: Operating days in compliance to SO₂ AEL Limit - February 2024

Associated Unit/Stack	Normal	Grace	Section 30	Contravention	Total Exceedance	Average SO ₂ (mg/Nm ³)
Unit 1	25	0	0	0	0	1 395.5
Unit 2	29	0	0	0	0	1 364.2
Unit 3	29	0	0	0	0	1 524.5
Unit 4	17	0	0	0	0	56.7
SUM	100	0	0	0	0	

Table 7.4: Operating days in compliance to NO_x AEL Limit - February 2024

Associated Unit/Stack	Normal	Grace	Section 30	Contravention	Total Exceedance	Average NO _x (mg/Nm ³)
Unit 1	25	0	0	0	0	445.8
Unit 2	29	0	0	0	0	365.2
Unit 3	29	0	0	0	0	317.2
Unit 4	17	0	0	0	0	357.7
SUM	100	0	0	0	0	

Table 7.5: Legend Description

Condition	Colour	Description
Normal		Emissions below Emission Limit Value (ELV)
Grace		Emissions above the ELV during grace period
Section 30		Emissions above ELV during a NEMA S30 incident
Contravention		Emissions above ELV but outside grace or S30 incident conditions

Figure 1: Kusile Unit 1 PM Emissions - February 2024

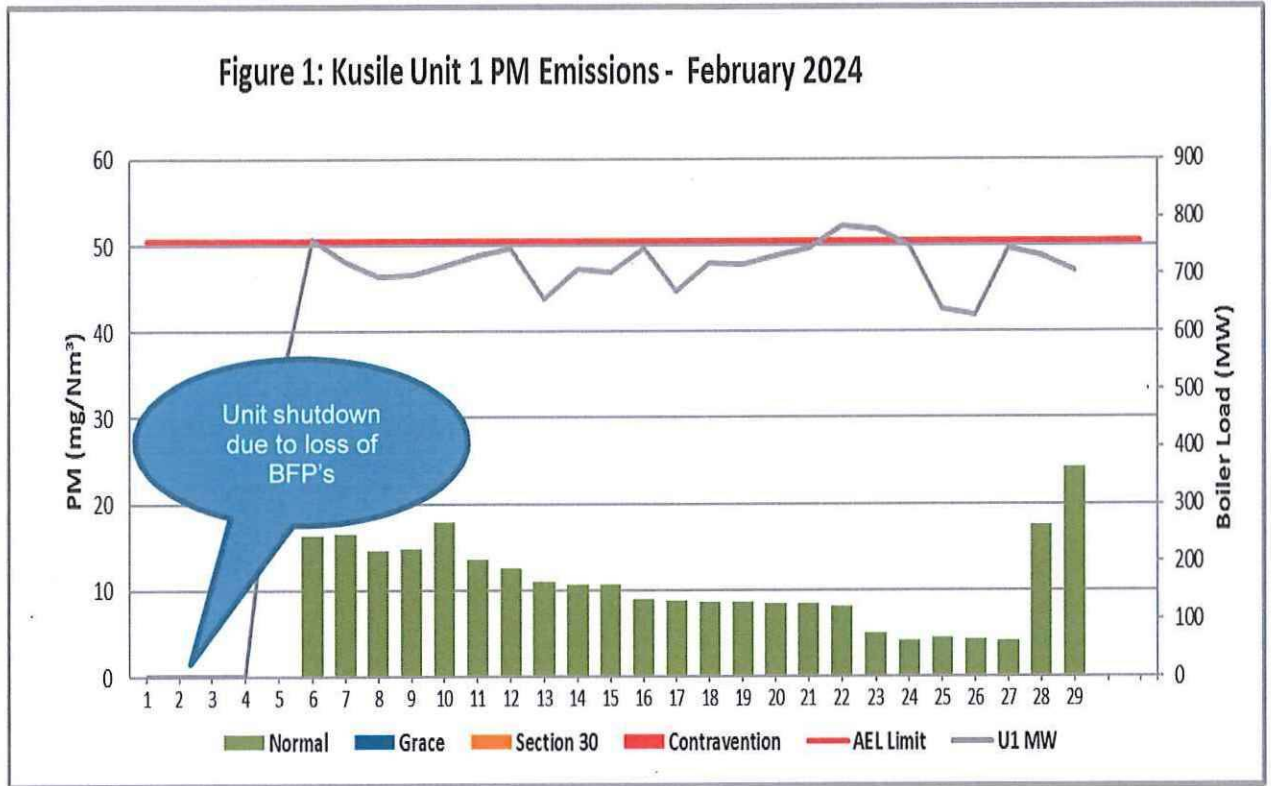


Figure 2: Kusile Unit 2 PM Emissions - February 2024

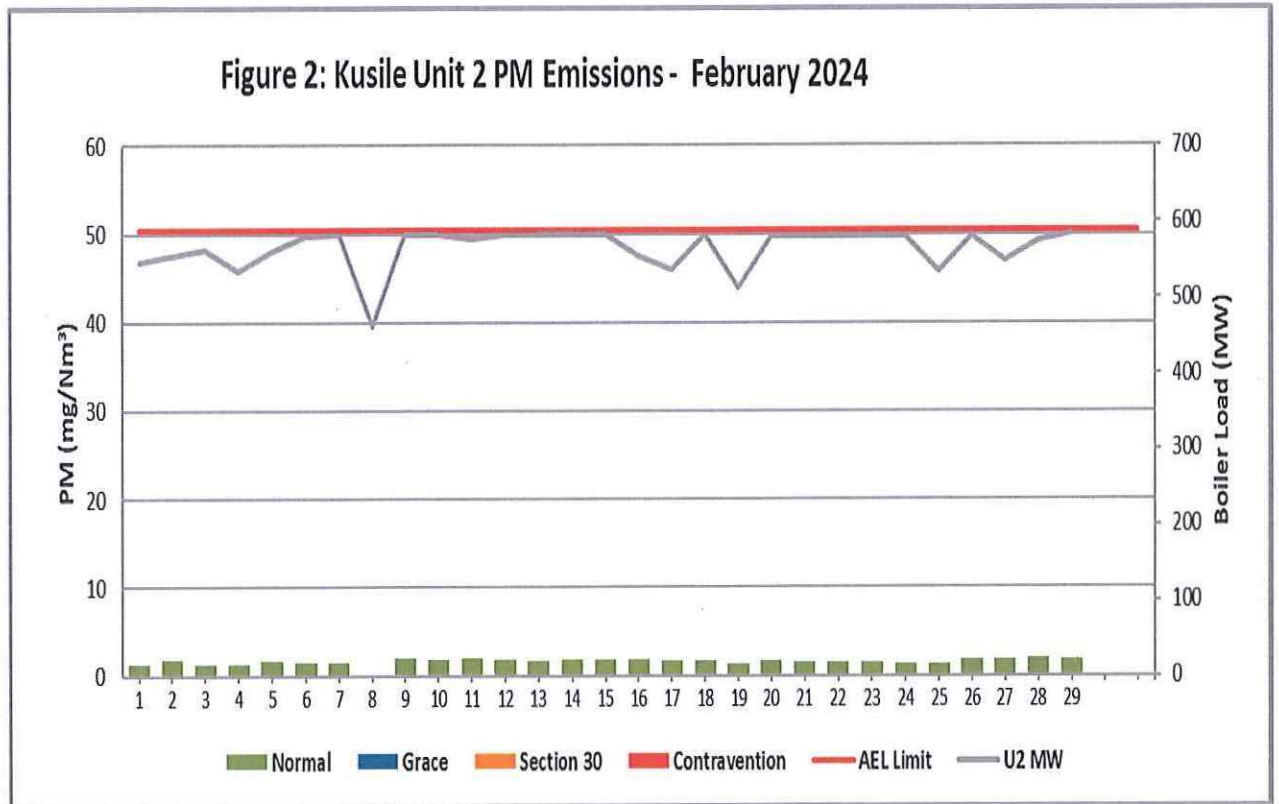


Figure 3: Kusile Unit 3 PM Emissions - February 2024

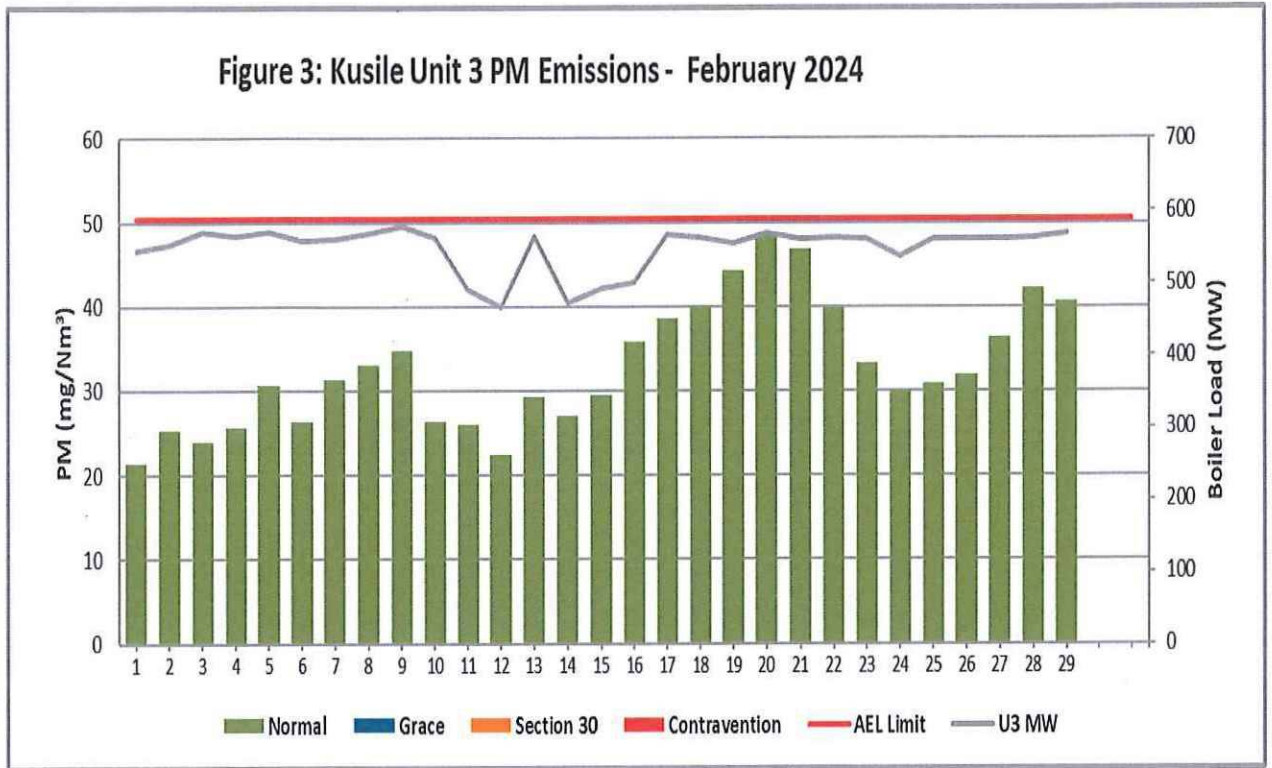


Figure 4: Kusile Unit 4 PM Emissions - February 2024

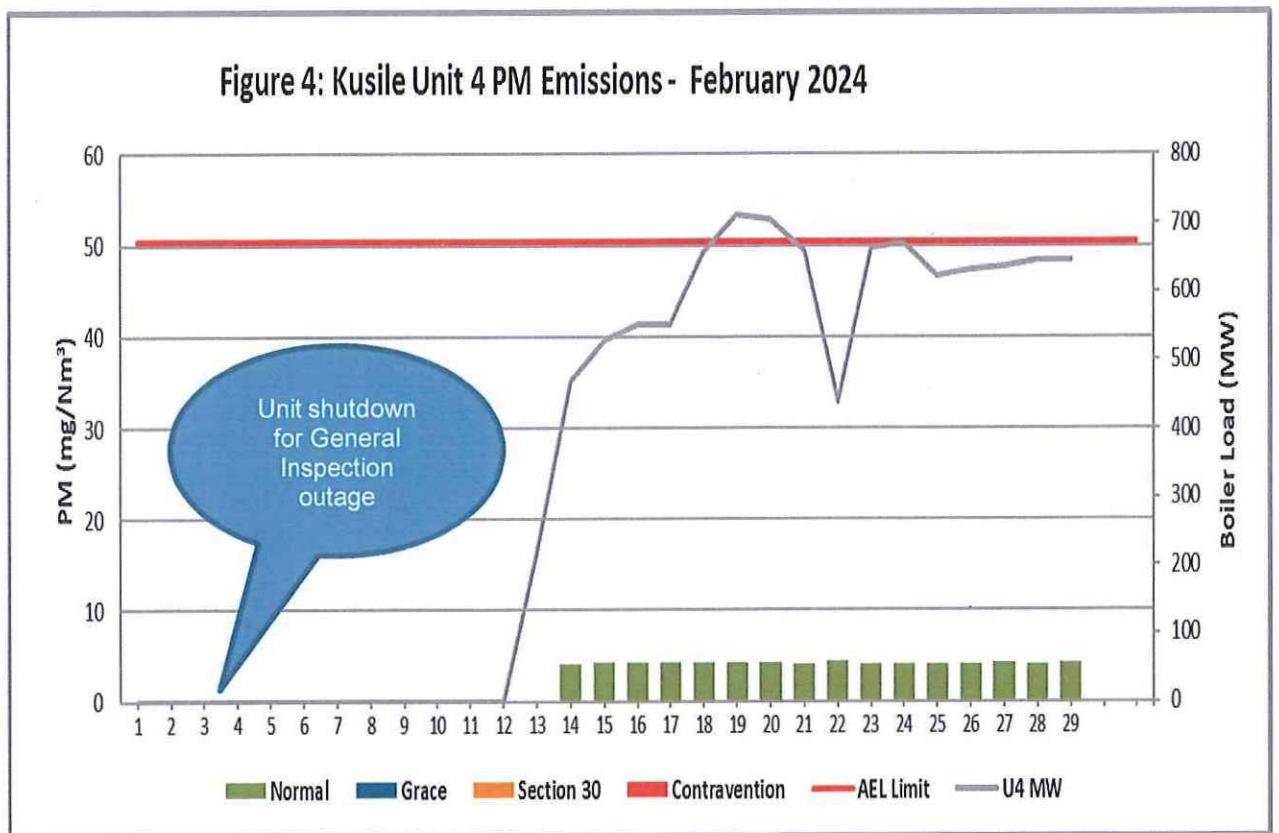


Figure 7: Kusile Unit 1 SO₂ Emissions - February 2024

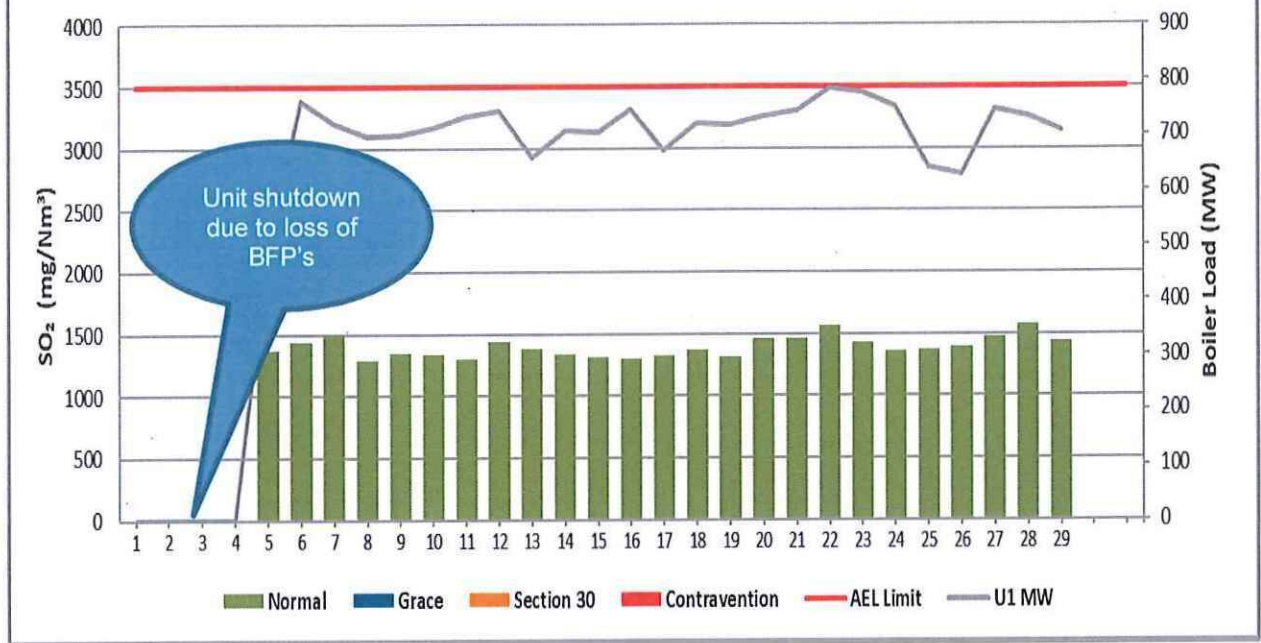


Figure 8: Kusile Unit 2 SO₂ Emissions - February 2024

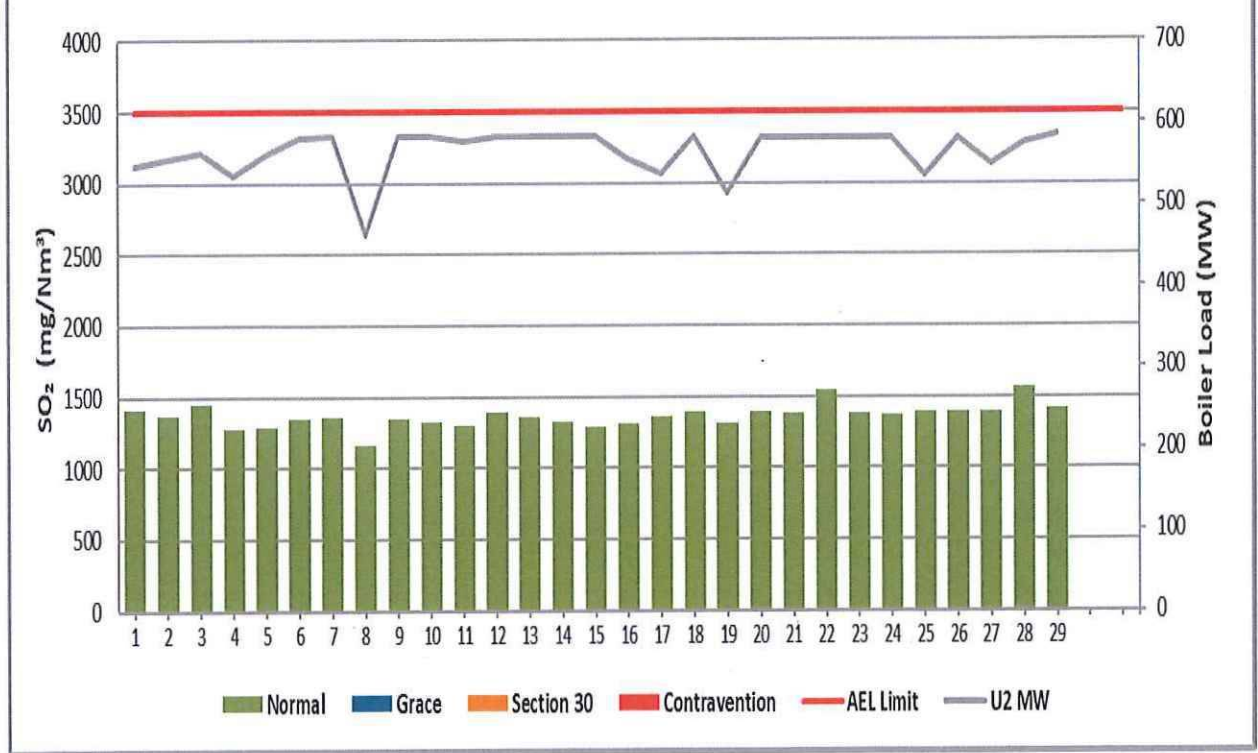


Figure 9: Kusile Unit 3 SO₂ Emissions - February 2024

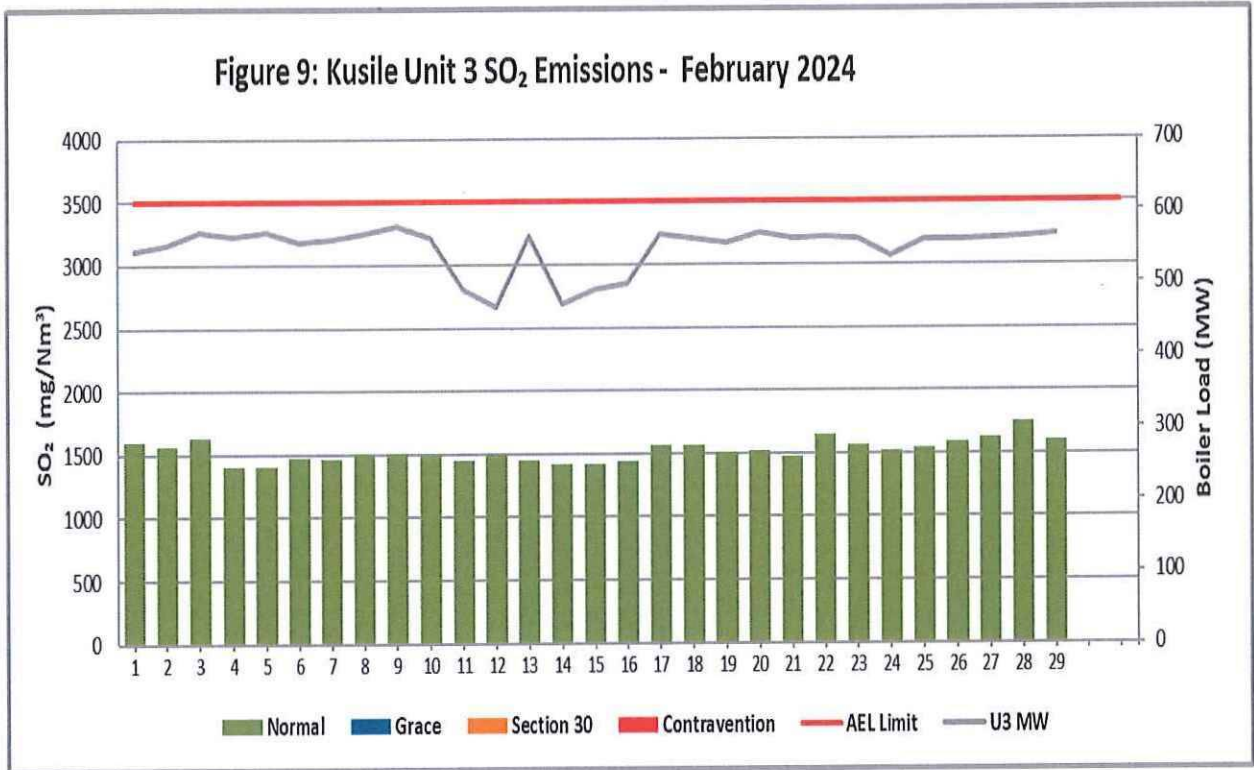


Figure 10: Kusile Unit 4 SO₂ Emissions - February 2024

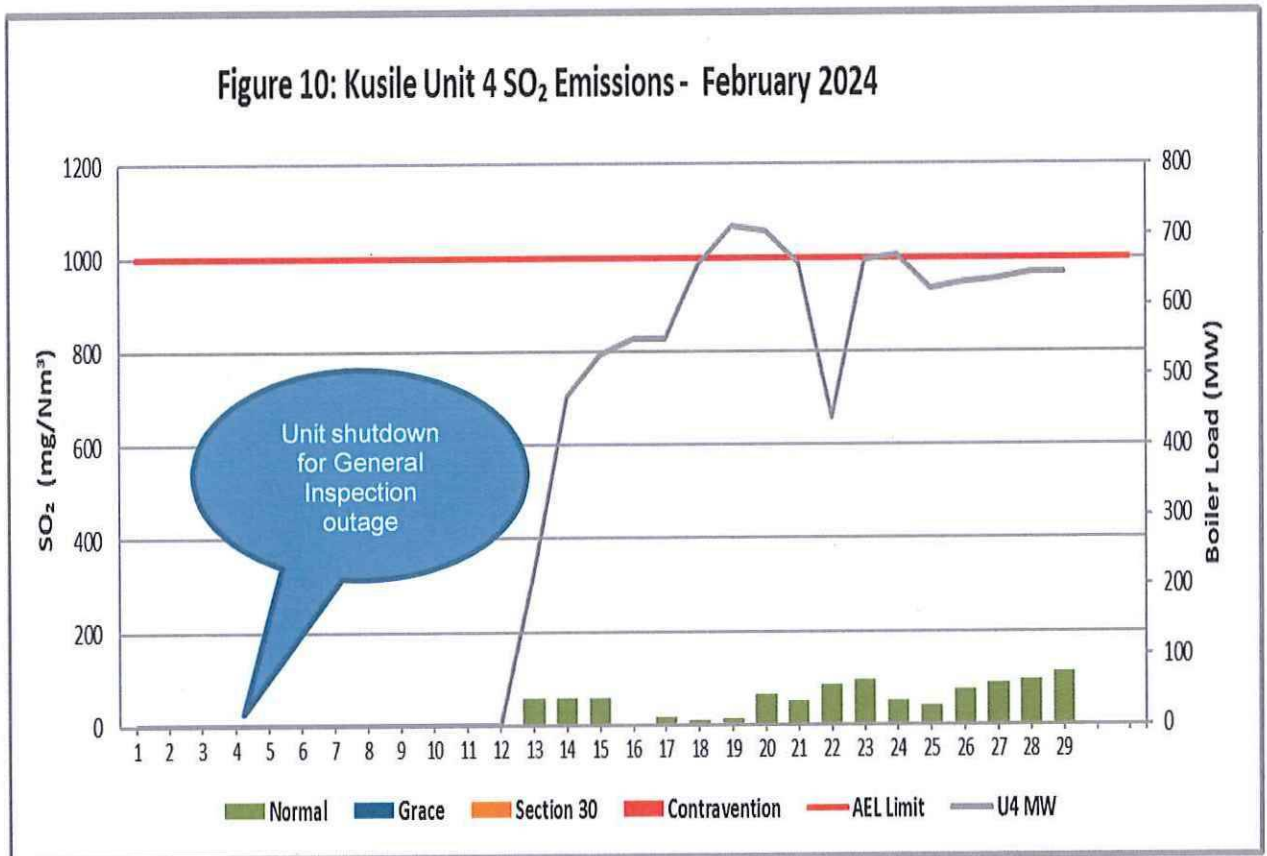


Figure 13: Kusile Unit 1 NOx Emissions - February 2024

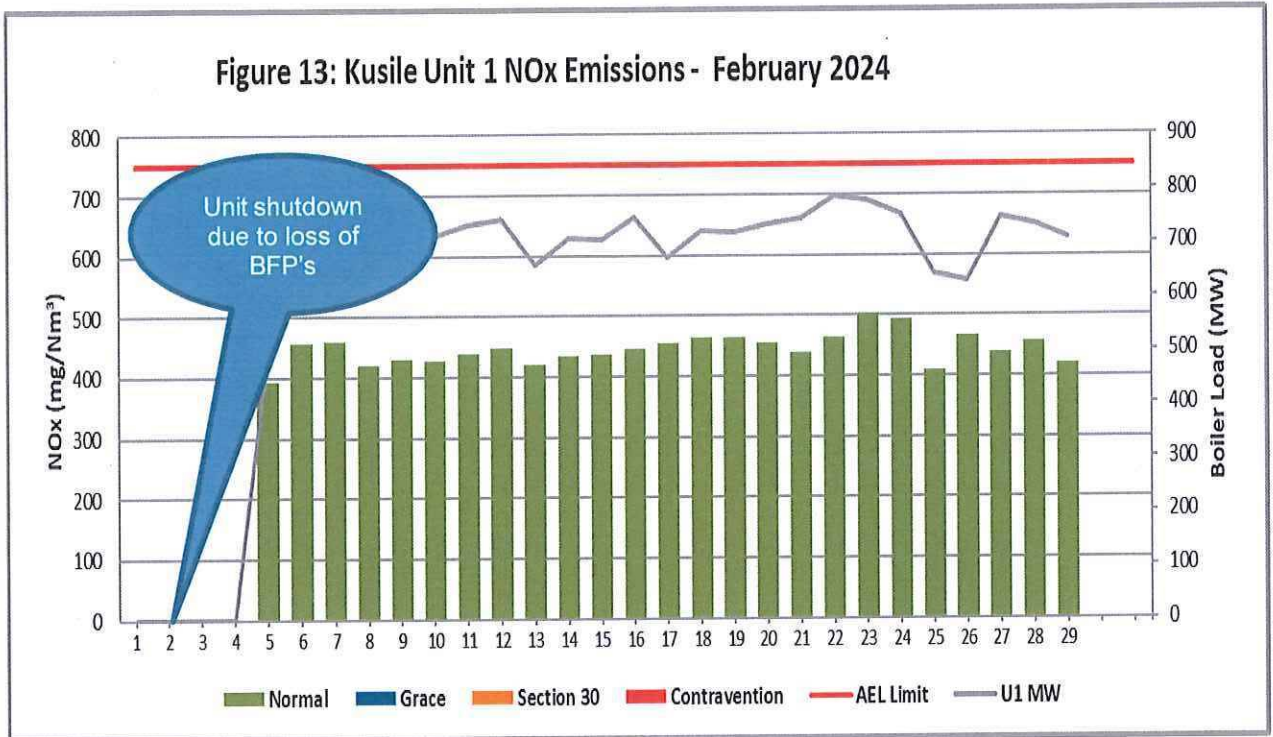


Figure 14: Kusile Unit 2 NOx Emissions - February 2024

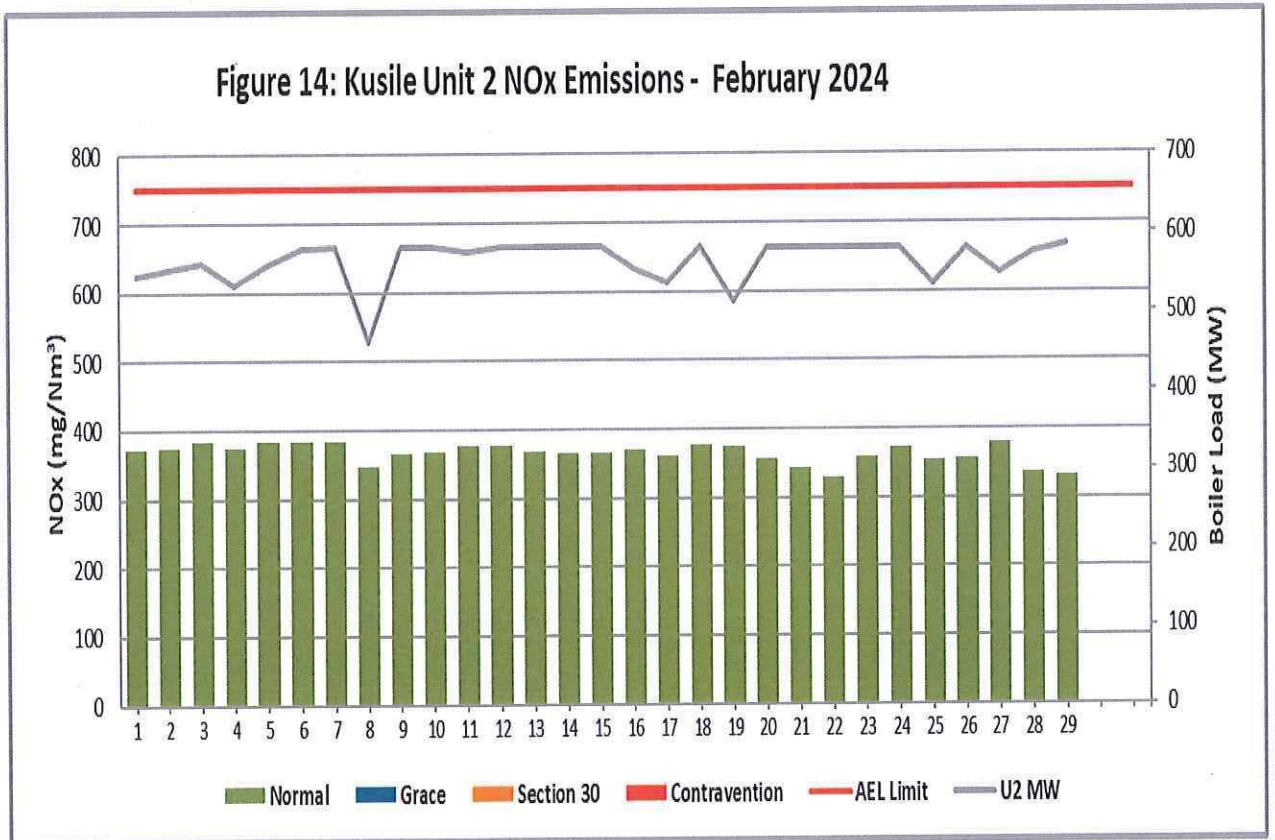


Figure 15: Kusile Unit 3 NOx Emissions - February 2024

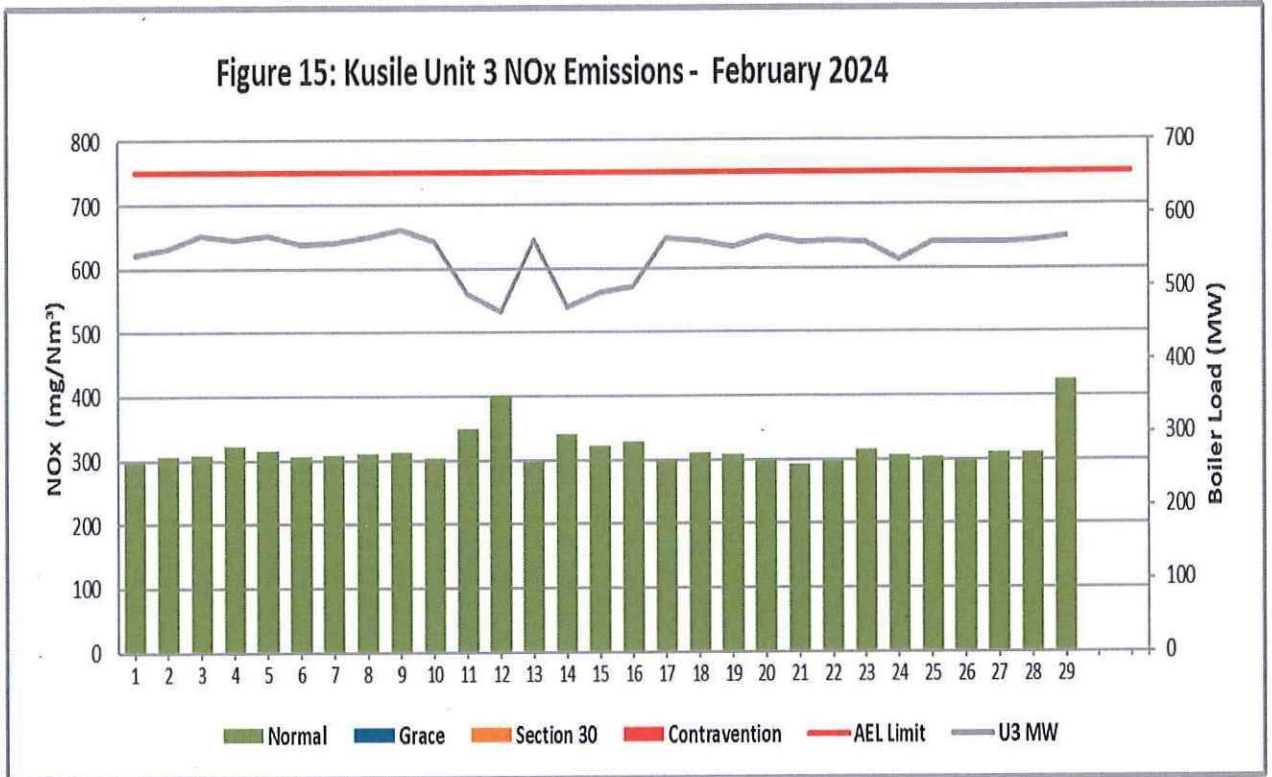
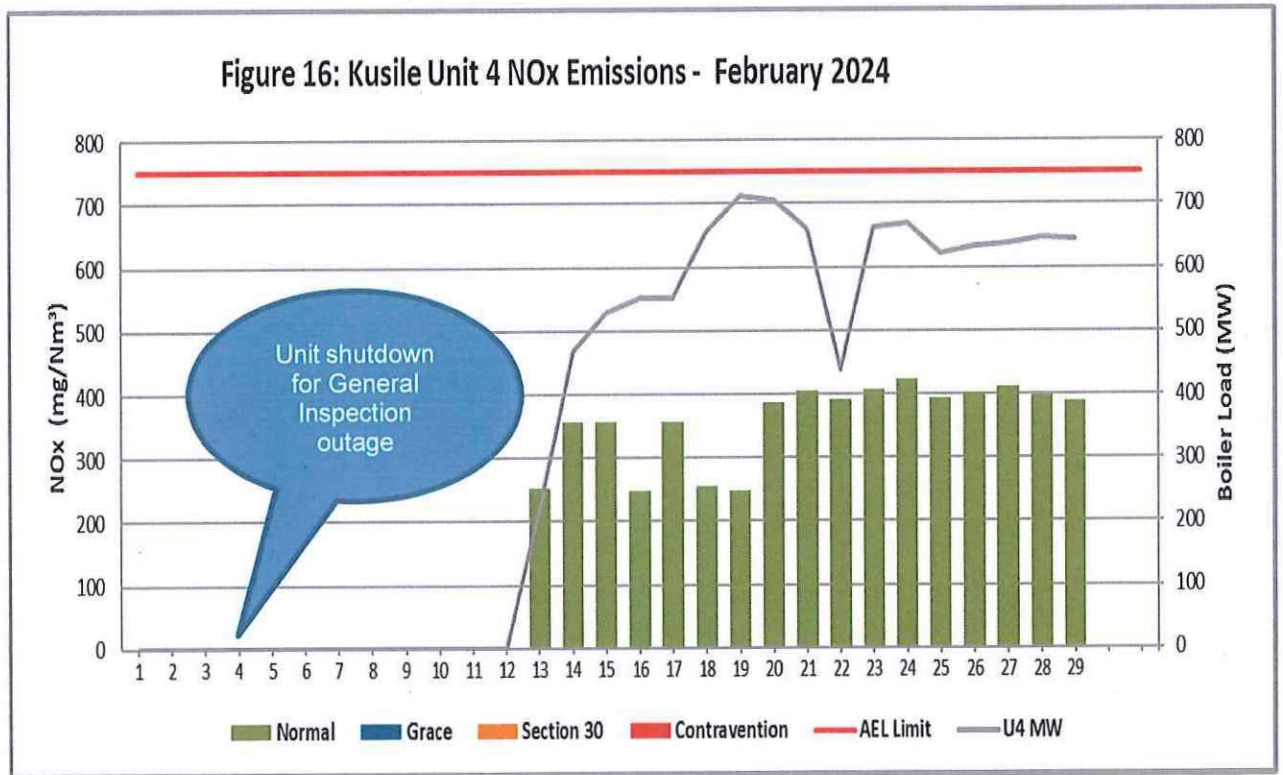


Figure 16: Kusile Unit 4 NOx Emissions - February 2024



KUSILE POWER STATION'S MONTHLY EMISSIONS REPORT FOR FEBRUARY 2024 -
17/4/AEL/MP311/12/01

8. Shut down and Light up information

Unit No. 1	Event 1		Event 2		Event 3	
Breaker Open (BO)	BO previously	BO previously	3:20 pm	2024/02/07	2:55 pm	2024/02/26
Draught Group (DG) Shut Down (SD)	n/a	n/a	3:20 pm	2024/02/07	3:10 pm	2024/02/26
BO to DG SD (duration)	n/a	DD:HH:MM	00:00:00	DD:HH:MM	26:15:10	DD:HH:MM
Fires in time	7:10 am	2024/02/05	9:15 pm	2024/02/07	3:35 pm	2024/02/26
Synch. to Grid (or BC)	1:45 pm	2024/02/05	11:45 pm	2024/02/07	8:10 pm	2024/02/26
Fires in to BC (duration)	00:06:35	DD:HH:MM	00:02:30	DD:HH:MM	00:04:35	DD:HH:MM
Emissions below limit from BC (end date)	not > limit	not > limit	not > limit	not > limit	not > limit	not > limit
Emissions below limit from BC (duration)	n/a	DD:HH:MM	n/a	DD:HH:MM	n/a	DD:HH:MM

Unit No. 2	Event 1		Event 2	
Breaker Open (BO)	1:25 am	2024/02/05	4:25 pm	2024/02/07
Draught Group (DG) Shut Down (SD)	DG did not trip or SD	DG did not trip or SD	4:40 pm	2024/02/07
BO to DG SD (duration)	n/a	DD:HH:MM	00:00:15	DD:HH:MM
Fires in time			11:35 am	2024/02/08
Synch. to Grid (or BC)			7:00 pm	2024/02/08
Fires in to BC (duration)		DD:HH:MM	00:07:25	DD:HH:MM
Emissions below limit from BC (end date)			not > limit	not > limit
Emissions below limit from BC (duration)		DD:HH:MM	n/a	DD:HH:MM

KUSILE POWER STATION'S MONTHLY EMISSIONS REPORT FOR FEBRUARY 2024 -
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Unit No. 3	Event 1	
Breaker Open (BO)	3:50 am	2024/02/12
Draught Group (DG) Shut Down (SD)	4:35 am	2024/02/12
BO to DG SD (duration)	00:00:45	DD:HH:MM
Fires in time	5:25 am	2024/02/12
Synch. to Grid (or BC)	2:40 pm	2024/02/12
Fires in to BC (duration)	00:09:15	DD:HH:MM
Emissions below limit from BC (end date)	not > limit	not > limit
Emissions below limit from BC (duration)	n/a	DD:HH:MM

Unit No. 4	Event 1		Event 2	
Breaker Open (BO)	BO previously	BO previously	11:30 am	2024/02/29
Draught Group (DG) Shut Down (SD)	n/a	n/a	7:40 pm	2024/02/29
BO to DG SD (duration)	n/a	DD:HH:MM	00:08:10	DD:HH:MM
Fires in time	3:00 am	2024/02/13		
Synch. to Grid (or BC)	11:25 pm	2024/02/13		
Fires in to BC (duration)	00:20:25	DD:HH:MM		DD:HH:MM
Emissions below limit from BC (end date)	not > limit	not > limit		
Emissions below limit from BC (duration)	n/a	DD:HH:MM		DD:HH:MM

9. Complaints

No complaints reported for the month of February 2024

Date and time complaint was received	Complaint received	Source code name	Root cause analysis	Calculation of impact/emissions associated with incidents and dispersion modelling of pollutants where applicable.	Measures implemented or to be implemented to prevent recurrence	Date by which measures will be implemented
N/A						

February 2024

1. INTRODUCTION

At the request of Environmental Management, Research, Testing and Development Department (RT&D) air quality team initiated an additional ambient air quality monitoring site at Balmoral and Wilge, in the vicinity of Kusile power station. The objective is to assess compliance with national ambient air quality standards, identify potential sources of pollution, protect public health and the environment and establish a baseline for future mitigation measures to enable Eskom to operate temporary stacks at the Kusile power stations at emission levels above the levels authorised in the station's Atmospheric Emission Licence (AEL). The existing air quality monitoring stations (Phola and Chicken Farm) will complement the additional monitoring stations to reduce uncertainties, as each monitoring station has an objective linked to a power station of interest. The Ogies monitoring station will be commissioned in April 2024.

Kendal air quality monitoring data does not form part of the analysis for this reporting since the Kendal monitoring site is solely used for research purposes to assess the worst-case scenario of emissions from the Kendal power station. The monitoring station is located about 2 km from the Kendal power station in the prevailing wind direction. Data recorded at the station reflects the impact of Kendal power station downwind of the station and other sources.

The Balmoral and Wilge monitoring stations are currently equipped to continuously monitor ambient concentrations of sulphur dioxide (SO₂). In addition, meteorological parameters of wind velocity, wind direction and ambient temperature, humidity, ambient pressure and rainfall, amongst others are also recorded.

The following parameters, nitrogen dioxide (NO₂), ozone (O₃) and fine particulate matter of particulate size <10µm and particulate size <2.5µm in diameter (PM₁₀ and PM_{2.5}) will be monitored from 01 April 2024.

The data for this reporting period (01 – 29 February 2024) were analysed for ambient SO₂ as monitored at Balmoral, Chicken Farm, Phola and Wilge air quality monitoring stations. The Particulate Matter and NO₂ data were further analysed for Chicken Farm and Phola.

This report focuses on the results of the ambient air quality monitoring stations; results from stack monitoring, fugitive dust and animal health are addressed in our reports produced for the station.

2. DATA ACQUISITION AND QUALITY CONTROL

Each monitoring station is visited every two weeks by trained technicians for routine service. Zero and span checks are carried out on each analyser during routine services and any discrepancies are logged and used during data verification at Eskom RT&D Sustainability Department.

Full dynamic calibration audits are carried out on the gas analysers (SO₂, NO₂ and O₃ analysers) quarterly and particulate matter analysers are calibrated every six months. All calibration results and certificates are filed in the laboratory for assessment purposes. Inter-laboratory calibrations are routinely carried out with other accredited laboratories, to enhance quality control.

Data at the monitoring stations are logged directly using dedicated CR-1000 Campbell Scientific data loggers. Permanent data records of all calculated 10-minutes mean values of all parameters monitored, together with minimum and maximum values, are stored on the

logging device. These are derived from 10-second scans and are also logged and saved in 1-minute intervals. The raw 1-minute average data is also transferred live to the South African Ambient Air Quality Information System (SAAQIS) server since the 14th of December 2023. Recorded data are downloaded remotely from the site through communicators that are connected to the Eskom network and transferred onto a central computer for verification and validation.

3. MONITORING STATION LOCATIONS

Figure 1 below indicates the locations of the air quality monitoring stations in relation to the Kusile power station. The new monitoring stations, Balmoral and Wilge, are denoted by green icons and the pre-existing monitoring stations, Chicken Farm and Phola, by yellow icons.

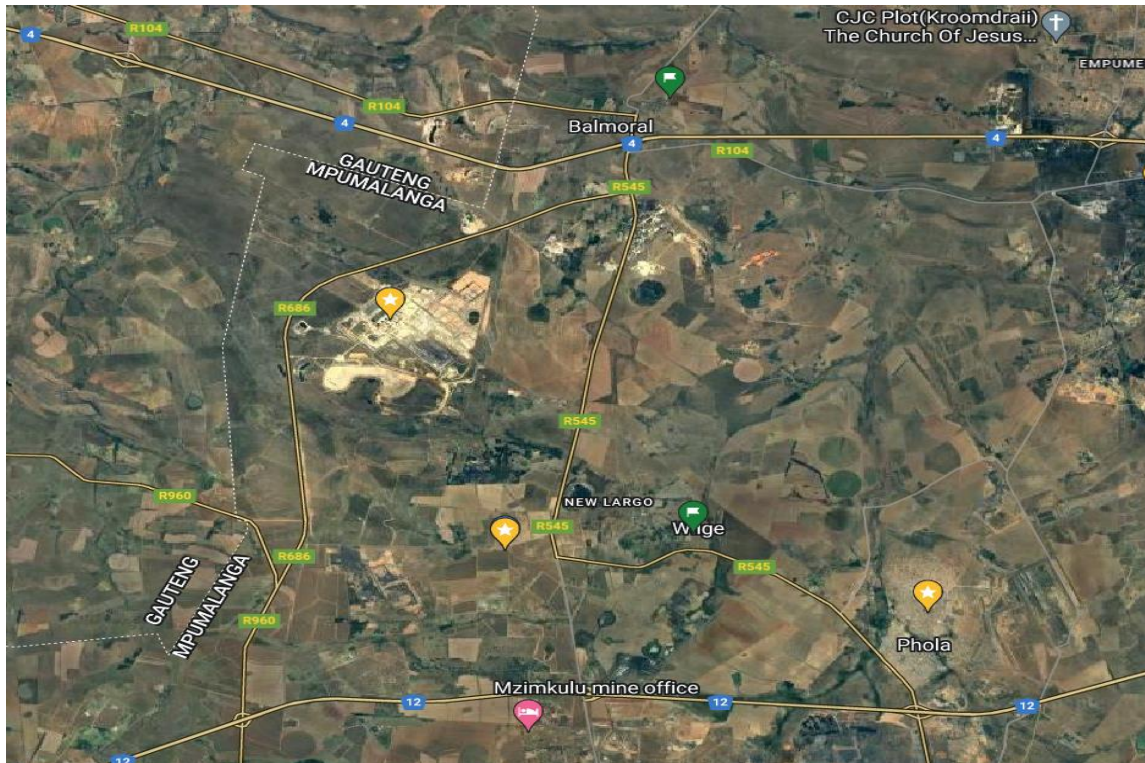


Figure 1: Air Quality Monitoring stations in relation to Kusile power station

4. MONITORING RESULTS AND DISCUSSIONS

The data is statistically analysed to assess the diurnal and monthly variations of the air pollutants, as well as to evaluate it against the current national ambient air quality standards for SO₂, NO₂, O₃, PM_{2.5} and PM₁₀.

4.1. DATA RECOVERY

The SANAS guideline figure of 90% data availability per parameter monitored is used as a standard for representative data capture. This describes the required completeness of data set for the reporting of averages and is based on standard arithmetic calculations. The completeness calculations for data sets exclude zero and span data and times where service and/or maintenance is being conducted on the instruments in question. Station availability is reported as a measure of the percentage of time that electrical power was available to the monitoring station.

Table 1: Percentage data recovery per parameter monitored in February 2024

Stations name	SO ₂	NO ₂	O ₃	PM _{2.5}	PM ₁₀	WSP	WDR	Station Availability
Balmoral	48.5					65.2	65.2	48.7
Chicken Farm	100	99.6	33.0	100	1.8	100	100	100
Phola	100	51.0	100	0	0	100	100	100
Wilge	86.6					100	100	86.8

Good representative percentage data was recovered for all the parameters monitored during the monitoring period under review at the monitoring stations with the exceptions of few parameters at Phola, Chicken Farm and Balmoral respectively. The pollutant and meteorological data for Balmoral were low due to power interruptions in the area. The data for PM_{2.5} and PM₁₀ were not recorded at the Phola monitoring station due to faulty instruments. The data for PM₁₀ was not recorded at Chicken Farm monitoring station due to faulty instrument.

4.2. METEOROLOGICAL OBSERVATIONS

The distributions of wind direction and wind speed for daytime and night-time hours for the reporting period are summarised on polar diagrams. The centre of the wind rose depicts the position of the air quality monitoring site. The positions of the spokes in the polar diagram represent directions from which the wind was blowing. The length of the segment indicates the percentage of the time the wind blew from that direction and the speed in the various categories are denoted by colours and width.

4.2.1. BALMORAL AIR QUALITY MONITORING STATION

The wind at Balmoral monitoring station was coming from the northerly to north-easterly directions during the day and from the south-easterly to south-south-easterly directions during the night time. The monitoring station is north-east of Kusile power station.

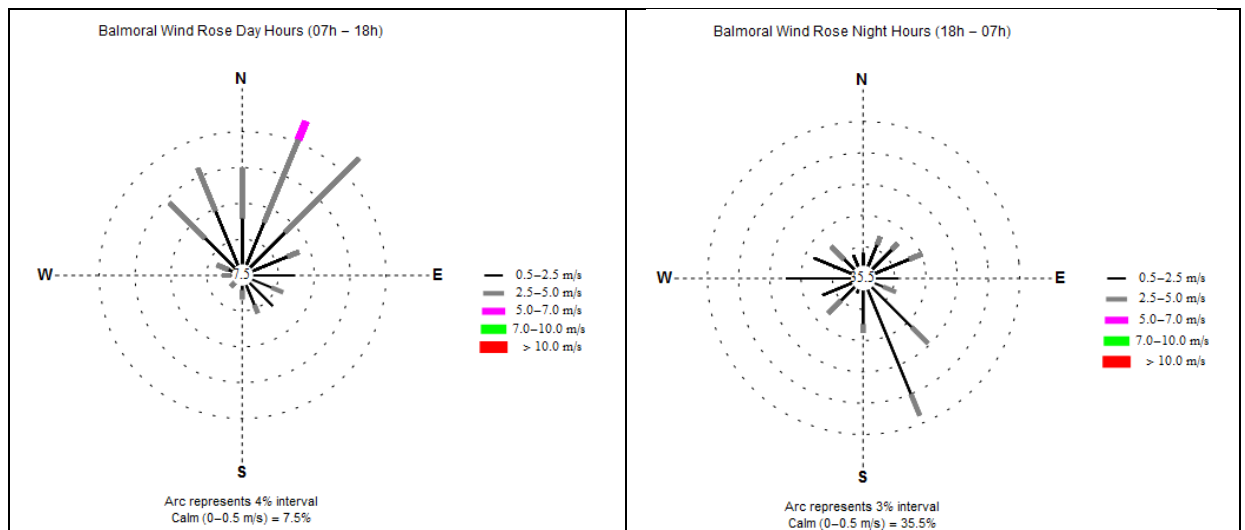


Figure 2: Wind profiles at Balmoral monitoring station

4.2.2. CHICKEN FARM AIR QUALITY MONITORING STATION

The dominant wind directions at Chicken Farm monitoring station during the day were north-west, north-north-west, north and east. During the night, the dominant wind directions were north-east, east and east-south-east. The monitoring station is south of Kusile power station.

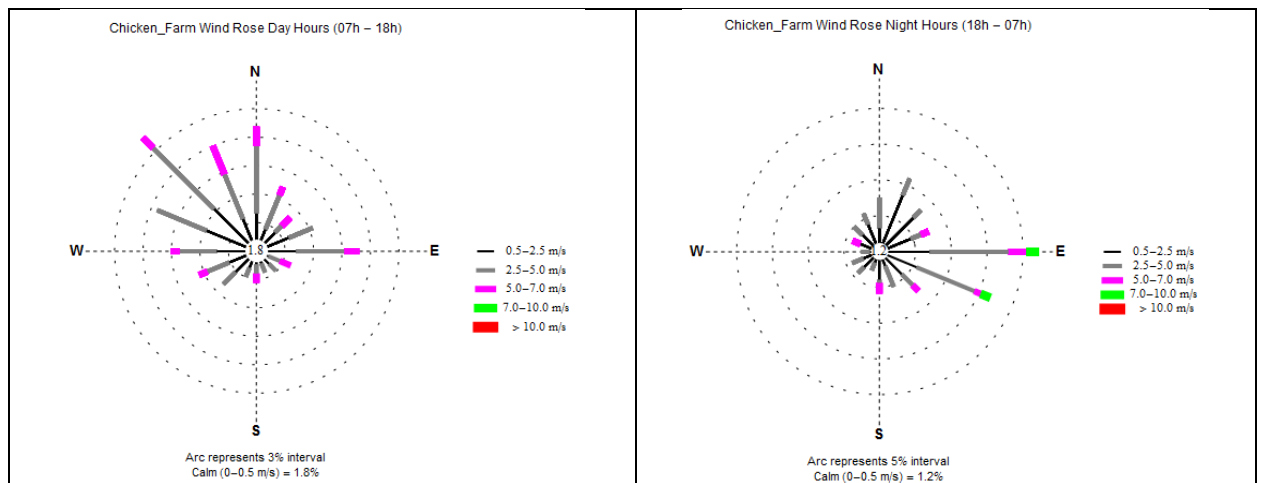


Figure 3: Wind profiles at Chicken Farm monitoring station

4.2.3. PHOLA AIR QUALITY MONITORING STATION

The dominant wind directions at Phola monitoring station during the day were west-north-west and north-west. During the night, the dominant wind directions were east-north-east, east and east-south-east. The monitoring station is south-east of Kusile power station.

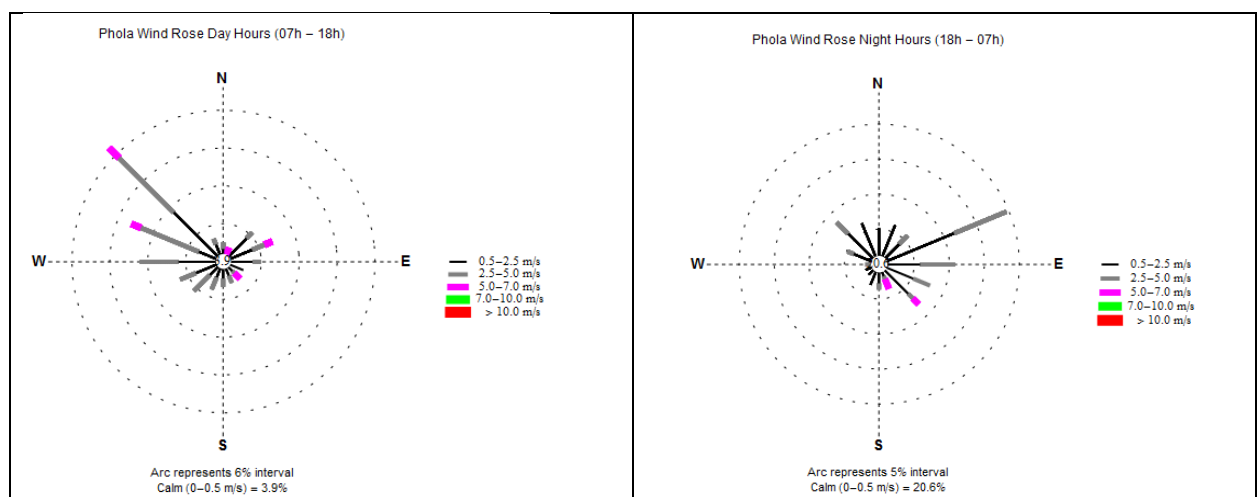


Figure 4: Wind profiles at Phola monitoring station.

4.2.4. WILGE AIR QUALITY MONITORING STATION

The wind at Wilge monitoring station was coming from the north, north-north-east, north-east to north-north-west directions during the day. The dominant wind sectors during the night are east-south-east and south-south-east. The monitoring station is south-east of Kusile power station.

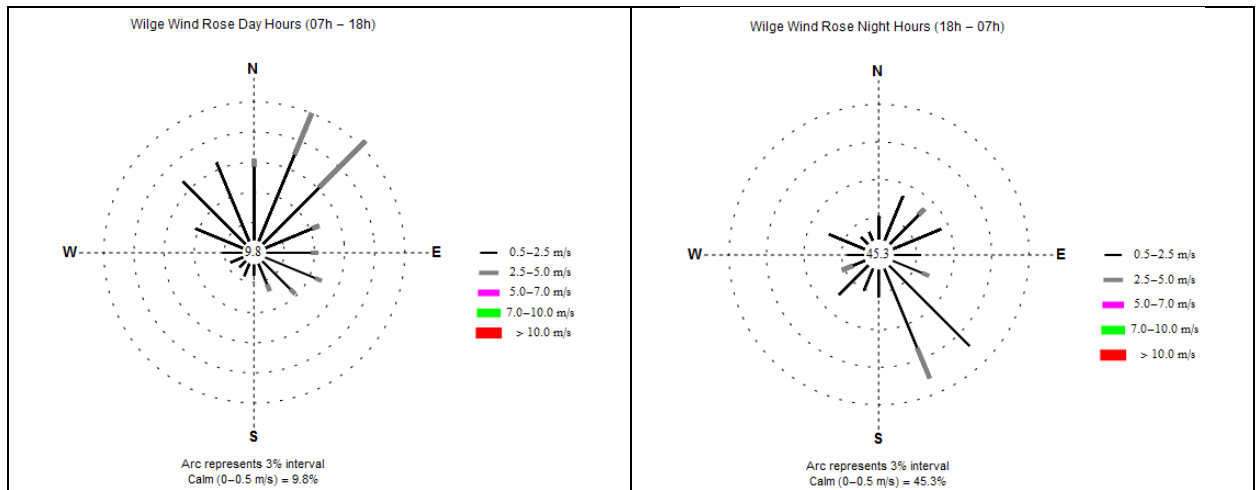


Figure 5: Wind profiles at Wilge monitoring station.

4.3. EXCEEDANCES OF THE NATIONAL AMBIENT AIR QUALITY LIMITS

Table 2: National Ambient Air Quality Standards

Pollutant	Unit	Period	Limit	Number of annual exceedances allowed	Source
Carbon Monoxide	Ppm	1hr	26.	88.	DFFE
Carbon Monoxide	Ppm	8hr	8.7	11.	DFFE
(PM ₁₀) by Beta gauge	µg/m ³	24hr	75.	4.	DFFE
(PM ₁₀) by Beta gauge	µg/m ³	1year	40.	0.	DFFE
(PM _{2.5}) by Beta gauge	µg/m ³	24hr	40	4	DFFE
(PM _{2.5}) by Beta gauge	µg/m ³	1year	20	0	DFFE
Nitrogen dioxide	Ppb	1year	21.	0.	DFFE
Nitrogen dioxide	Ppb	1hr	106.	88.	DFFE
Ozone	Ppb	8hr	61.	11.	DFFE
Sulphur dioxide	Ppb	1hr	134.	88.	DFFE
Sulphur dioxide	Ppb	10min	191.	526.	DFFE
Sulphur dioxide	Ppb	24hr	48.	4.	DFFE
Sulphur dioxide	Ppb	1year	19.	0.	DFFE

The National Department of Forestry, Fisheries and the Environment (DFFE) has set the South African Ambient Air Quality Standards for the criteria pollutants as illustrated in Table 2.

Table 3: Highest SO₂ concentration recorded (in ppb).

Monitoring Stations	10-min average	Date	Hourly average	Date	Daily average	Date
Balmoral	116.2	12/02/2024 19:10	90.4	13/02/2024 19:00	15.6	13/02/2024
Chicken Farm	152.7	02/02/2024 12:30	122.6	02/02/2024 11:00	26.6	02/02/2024
Phola	116.4	28/02/2024 10:20	80.0	28/02/2024 17:00	18.3	28/02/2024
Wilge	130.2	28/02/2024 11:50	112.8	28/02/2024 17:00	24.9	28/02/2024

There were no exceedances of the ambient SO₂ limits recorded for all the monitoring stations during the monitoring period under review. The highest SO₂ concentrations recorded at the monitoring stations are indicated in Table 3 and figures 6 to 9 below.

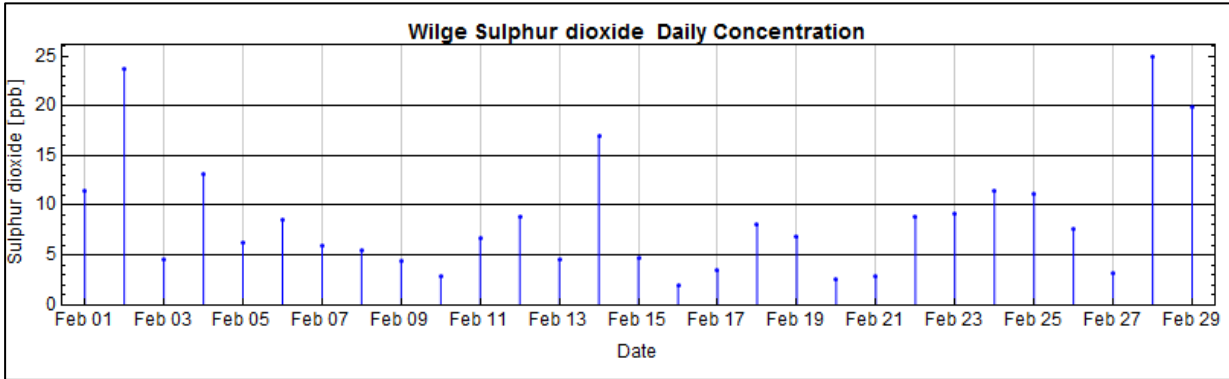


Figure 6: Time series graph for the SO₂ daily mean concentrations at Wilge AQM station

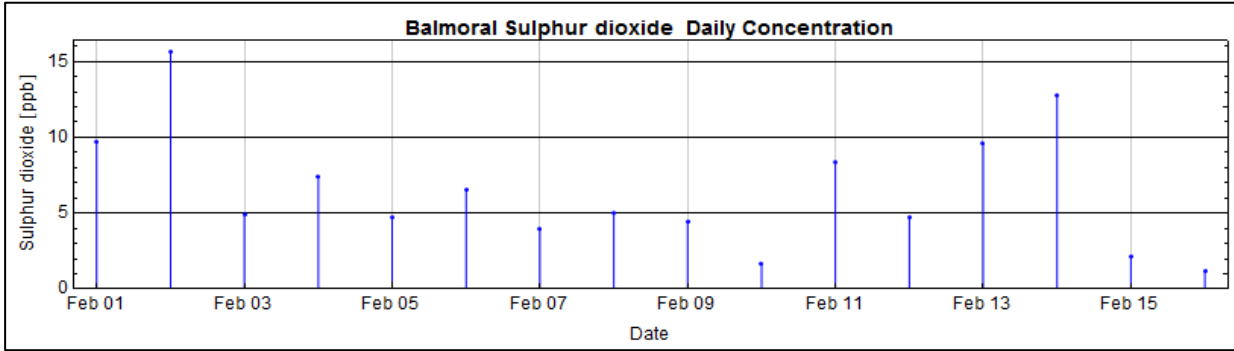


Figure 7: Time series graph for the SO₂ daily mean concentrations at Balmoral AQM station

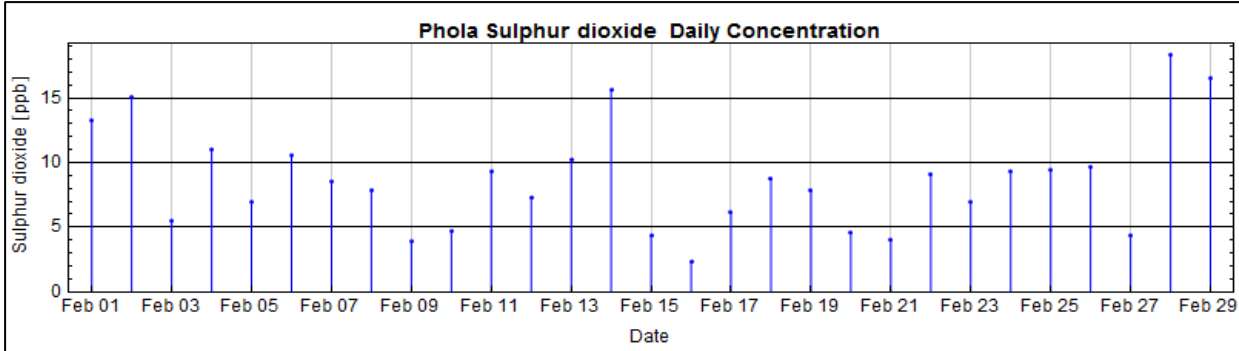


Figure 8: Time series graph for the SO₂ daily mean concentrations at Phola AQM station

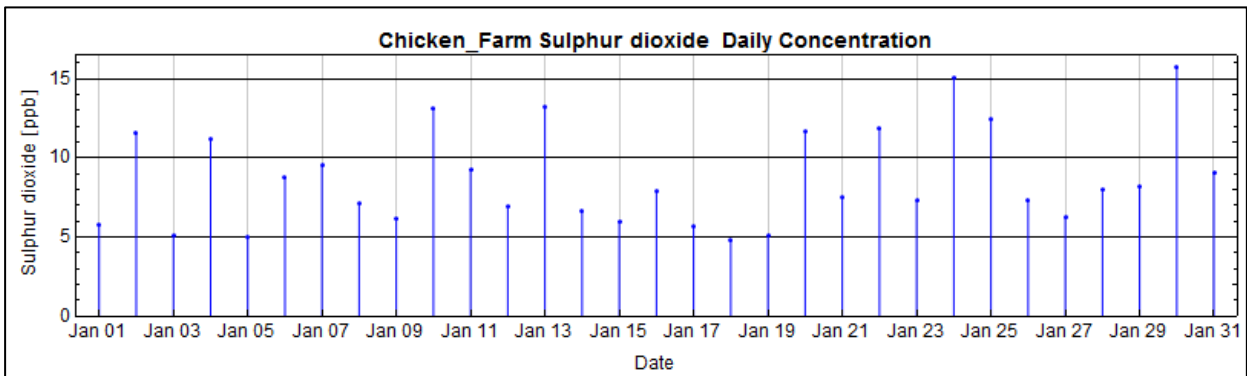


Figure 9: Time series graph for the SO₂ daily mean concentrations at Chicken Farm AQM station

There were no exceedances of the NO₂ hourly limit of 106 ppb recorded at the monitoring stations during the February 2024 monitoring period. There were seven (7) exceedances of the PM_{2.5} daily limit of 40 µg/m³ recorded at the Chicken Farm monitoring station. See Figure 10 below.

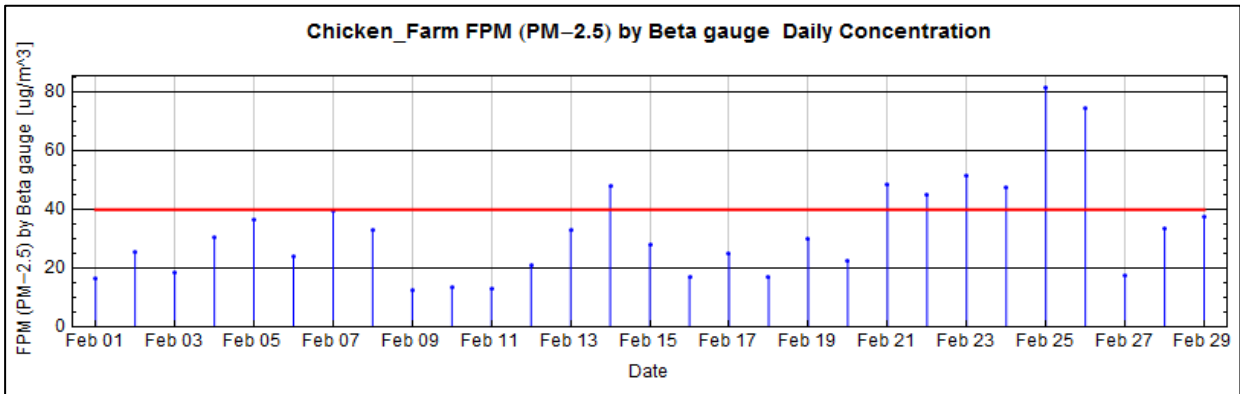


Figure 10: Time series graph for the PM_{2.5} daily mean concentrations at Chicken Farm AQM station

Table 4: Exceedances above national ambient air quality limits for Chicken Farm air quality monitoring station

PM _{2.5} Daily Exceedances (Chicken Farm)					
Pollutant	Limit	Year	Month	Day	Conc. (µg/m ³)
PM _{2.5}	40	2024	February	14	48.1
PM _{2.5}	40	2024	February	21	48.7
PM _{2.5}	40	2024	February	22	45.0
PM _{2.5}	40	2024	February	23	51.5
PM _{2.5}	40	2024	February	24	47.6
PM _{2.5}	40	2024	February	25	81.5
PM _{2.5}	40	2024	February	26	74.6

Table 5: Exceedances of the NAAQ Limits per pollutant- February 2024

Averaging Period	Balmoral	Chicken Farm	Phola	Wilge
SO ₂ 10-min	0	0	0	0
SO ₂ Hourly	0	0	0	0
SO ₂ Daily	0	0	0	0
NO ₂ Hourly		0	0	
O ₃ 8-hourly		55	26	
PM _{2.5} Daily		7	ND	
PM ₁₀ Daily		ND	ND	

A summary of all exceedances per pollutant for February 2024 is shown in Table 5.

SO₂ trigger levels or emergency response levels will be based on the United States Acute Exposure Guideline Levels for Hazardous Substances. (AEGL) as amended for South African circumstances. Levels confirmed with the authorities are as follows.

- a. AEGL 1 – the cautionary notification level (non-disabling level) - is based on the South African NAAQS limit – for SO₂ this will be 191 ppb over 10-minute for exposure more than 4 hours.
- b. AEGL 2 – the warning notification level (disabling level for those with asthma) – is aligned to the US AEGL approach – for SO₂ will be 744 ppb over a 10-minute for exposure up to 8 hours.
- c. AEGL – the lethality level – for SO₂, this will be 29 771 ppb over a 10-minute period.

There were no events that triggered the notification of stakeholders in terms of the agreed AEGL recorded in February 2024.

5. DFFE AND SAAQIS REPORTING

The raw monitoring data, downloaded at 1-minute averages is available in real-time to the DFFE-managed South African Air Quality Information System (SAAQIS) since the 14th of December 2023 for all Eskom air quality monitoring stations.

6. CONCLUSIONS

There were no exceedances of the ambient SO₂ limits recorded for all the monitoring stations during the monitoring period under review. There were seven (7) exceedances of the PM_{2.5} daily limit of 40 µg/m³ recorded at the Chicken Farm monitoring station.

There were no events that triggered the notification of stakeholders in terms of the agreed AEGL recorded in February 2024.