Eskom

Dr Patience Gwaze
National Air Quality Officer
Department of Forestry, Fisheries and the Environment
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Date: 27 May 2024
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Dear Dr Gwaze,

APRIL 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 SO_2 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.

As an initial point, I would like to confirm that no exceedances of the stack or ambient trigger level conditions were recorded during April 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.
   II. Stabilization anchor cables installed.

Risks:

I. 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.
II. Possible delays during the cleaning process due to a different type of buildup material to what was envisaged based when samples were taken.
III. Possible damage to the liner during the cleaning process.

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. Unit 1, 3 and 4 are operated with valid correlation and parallel curves.
III. Unit 2 correlation scheduled to be completed by the 9th May 2024 with reported expected to be finalized by 31 May 2024.
IV. Unit 2 is operated with unity curves; the emissions will be retrofitted upon completion of the test and implementation of the curves.

Stack Performance:

I. The Kusile Monthly Emission report for April 2024, which includes emission data for Units 1,2, 3 and 4 is attached **(Annexure B**).
II. **Based on the available data information, Kusile Unit 1 and 2 operated in compliance with the AEL emission limits for PM, NOx or SO_2** during April 2024.
III. Kusile Unit 3 operated in compliance with the AEL emission limits for NOx or SO2, **however recorded PM exceedance on the 25th and 30th April 2024 due to PJFFP bag failures**.

3. Health Screening for the increased SO_2 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. IT department has finalised the toll-free line for the communities around us regarding the SO2 emission.
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 SO_2 Perimeter Monitoring:

I. Weekly monitoring of the plant's perimeter for SO_2 surges were conducted throughout April 2024.
II. SO_2 levels along the perimeter remained below detection levels, meeting the statutory requirement of 0.5 ppm OEL-STEL/C.
III. However, on April 10th, complaints were received from the Security Department regarding a strong SO_2 smell in the area.

IV. The site emergency preparedness plan was activated, and the onsite Environmental department confirmed that stack SO_2 levels were within licensed limits via Continuous Emissions Monitoring System (CEMS) checks.

V. Upon assessment and evaluation of the area, the occupational hygiene team recorded SO_2 levels ranging between 0.0 – 0.5 ppm at various sampling points around the North Gate. Subsequent measurements were taken approximately 4 hours later during the same day and measurements showed levels returning to normal at 0 ppm.

VI. Despite efforts, the specific source of the elevated SO_2 could not be definitively established. It was hypothesized that emissions from a temporary stack may have contributed, influenced by prevailing wind conditions on the day of the survey.

4.2. Continuous Personal Exposure Sampling:

I. An FGD Controller and a Senior Plant Operator underwent personal exposure sampling for SO_2 during April 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 April 2024

Month	Number of samples	Areas Sampled	Designation	Concentration (ppm)	Status	Comment(s)
April 2024	2	FGD	Controller	< 0,5	Complaint	Concentrations below OEL.
April 2024	2	FGD	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	• Awareness sessions Leadership briefings (GM's address) Employee engagements	• Once a month • Every Friday Monthly	Complete
Local Municipalities • Emalahleni • Victor Khanye • Bronkhorstspruit	Face-to-face meeting	Once a quarter	July 2024
Media • Emalahleni FM • Witbank News	• Advert • Print	When required	Eskom media desk to publish

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 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 (SO_2) 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 (NO_2), ozone (O_3) and fine particulate matter of particulate size <10µm and particulate size <2.5µm in diameter (PM_{10} and $PM_{2.5}$) will be monitored from 01 April 2024.

IV. The data for this reporting period (01 – 30 April 2024) were analysed for ambient SO_2 as monitored at Balmoral, Chicken Farm, Phola and Wilge air quality monitoring stations. The Particulate Matter and NO_2 data were further analysed for Chicken Farm and Phola.

V. Full dynamic calibration audits are carried out on the gas analysers (SO_2, NO_2 and O_3 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.

VI. There were no exceedances of the NO2 hourly limit of 106 ppb recorded at the monitoring stations during the April 2024 monitoring period.

VII. There was one (1) exceedance of the SO2 hourly limit of 134 ppb and one (1) exceedance of SO2 10-minutes limit of 191 ppb recorded during the monitoring period at Wilge air quality monitoring site.

VIII. There were eight (8) exceedances of the PM2.5 daily limit of 40 µg/m3 at the Chicken Farm monitoring station and three (3) exceedances of PM10 daily limit of 75 µg/m3 recorded at Phola air quality monitoring station.

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

Table 1 Highest SO_2 concentrations recorded (in ppb)

Monitoring Stations	10-min average	Date	Hourly average	Date	Daily average	Date
Balmoral	149	23/04/2024 10:20	101.5	23/04/2024 11h00	18.9	28/04/2024
Chicken Farm	166.2	19/04/2024 14:20	122.6	19/04/2024 03:00	40.9	19/04/2024
Phola	120.0	10/04/2024 10:30	69.8	20/04/2024 12:00	29	19/04/2024
Wilge	205.2	10/04/2024 10:50	141.2	10/04/2024 11:00	25.3	19/04/2024

X. Good representative percentage data was recovered for all the parameters monitored during the monitoring period under review at the monitoring stations. The data for PM2.5 was 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. The data for SO2 was low recorded at the Balmoral monitoring station due to faulty instrument and power interruptions at site.

XI. A further monitoring station will be commissioned in Ogies in May 2024 as per commitments.

XII. 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.

XIII. The detailed February 2024 Kusile ambient monitoring report is attached (**Annexure C).**

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. Eskom Kusile representatives scheduled meeting with Kendal Poultry Farms for the 04 June 2024 to discuss status of lockdown and way-forward.

8. **Animal Health Monitoring**

I. Eskom has reached an agreement with Topigs and GHB farms regarding animal/pig health monitoring on 13 March 2024, monitoring commenced.

II. Reports for the month of March and April 2024 had been issued **(Annexure D).**

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: 30/05/2024

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 – April 2024
Annexure C: Kusile Monthly Emission Report – April 2024
Annexure C: Kusile Ambient Air Quality Report – April 2024
Annexure D: Animal Health Monitoring– April 2024

Eskom

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

Date: 13 May 2024

Enquiries: S Mahlangu
Tel: 013 699 7097

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

		Status	Start Date	End Date
	Secure Lobster Bend K1			
	Secure the Lobster 1 to 90ML X 6 brackets, 6 chain blocks 6 lifting lugs and slings.	100%	3 April 2024	20 April 2024
	Cleaning Lobster K1			
	Scaffolding required for cleaning lobster	100%	8 May 2024	11 May 2024
	Cleaning Damaged lobster	0 %	20 May 2024	24 May 2024
	Vertical Flue Cleaning unit 3			
	Clean vertical flue unit 3	35%	19 April 2024	12 July 2024
	Clean vertical flue unit 2	0%	22 July 2024	2 Sept 2024
	Clean vertical flue unit 1	0%	7 June 2024	19 July 2024
	Clean vertical flue unit 3: 2nd Pass if required	0%	18 June 2024	12 July 2024
	Fabricate new Lobster for K1	0%	7 June 2024	22 July2024

NOTES:

Unit 2 Temporary Stack:

- Correlation Test Completed 9 May 2024
- Stabilization anchor cables installed.

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.
- Possible delays during the cleaning process due to a different type of buildup material to what was envisaged based when samples were taken.
- Possible damage to the liner during the cleaning process.

Trust, you find the above in order.

Kind Regards,

……..

Zandi Shange
General Manager - Kusile Power Station Project

Generation Division - Group Capital
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Eskom

Ms Nompumelelo Simelane
Nkangala District Municipality
PO Box 437
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Date:

May 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 APRIL 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 April 2024.

Hoping the above will meet your satisfaction.

Yours sincerely

Christopher Nani
ACTING GENERAL MANAGER
DATE: 30/05/2024

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Management Department (Kusile Power Station)
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Compiled by	Name: Nhlonipho Surname: Nkosi Environmental Officer	Signature	Date 27/05/2024
Verified by	Name: Cylia Surname: Malebana Senior Environmental Advisor	Signature:	Date: 27/05/2024
Checked by	Name: Nontobeko Surname: Moyo PJFFP System Engineer	Signature:	Date: 27/05/2024
Supported by	Name: Masungi Surname: Sibuyi Process Engineer	Signature:	Date: 27/05/2024
Verified by	Name: Siyakudumisa Surname: Mtsweni Boiler Engineering Manager	Signature:	Date: 27.05.2024
Validated by	Name: Lesiba Surname: Kgobe Environmental Management Manager	Signature:	Date: 27/05/2024

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 Apr-2024**
	Coal	Tons	*1 818 083*	*774 902*
	Fuel Oil	Tons	*5 533*	*1613.517*
	Limestone	Tons	*72 917*	*7889*
Production Rates	**Product / By-Product Name**	**Units**	**Max Production Capacity Permitted**	**Indicative Production Rate Apr-2024**
	Energy	GWh	*3 214.080*	*1 447.198*
	Ash	Tons	*663 583*	*251 998.277*
	Gypsum	Tons	*129 250*	*4 417.840*
	RE PM	kg/MWh	*not specified*	*0.066*
	RE SOx	kg/MWh	*not specified*	*4.812*

3. Energy source characteristics

Fuel Characteristic	Units	Stipulated Range	Monthly Average Content
Coal Sulphur	%	*1.3*	*0.920*
Ash in Coal	%	*38*	*32.520*
Fuel Oil Sulphur	%	*3.5*	*2.520*

4. Emissions Limits (mg/Nm³)

Associated Unit/Stack	PM	SO_2	NOx
North	*50*	*3500*	*750*
South	*50*	*1000*	*750*

5. Abatement Technology (%)

Associated Unit/Stack	Technology Type	Efficiency Apr-2024	Utilisation Apr - 2024	Technology Type	Efficiency Apr-2024	Utilisation Apr- 2024
Unit 1	*FFP*	*99.953%*	*100%*	*FGD*	*Out of service*	*Out of service*
Unit 2	*FFP*	*99.972%*	*100%*	*FGD*	*Out of service*	*Out of service*
Unit 3	*FFP*	*99.901%*	*100%*	*FGD*	*Out of service*	*Out of service*
Unit 4	*FFP*	*99.998%*	*100%*	*FGD*	*99.968%*	*100%*

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	*100.0*	*100.0*	*100.0*
Unit 2	*100.0*	*100.0*	*99.9*
Unit 3	*100.0*	*100.0*	*100.0*
Unit 4	*86.7*	*99.4*	*99.9*

7. Emissions Performance

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

Associated Unit/Stack	PM	SO_2	NO_x
Unit 1	29.3	3 030	872
Unit 2	13.7	1 375	343
Unit 3	50.8	2 442	609
Unit 4	1.1	116	692
SUM	94.9	6 963	2 517

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

Associated Unit/Stack	Normal	Grace	Section 30	Contravention	Total Exceedance	Average PM (mg/Nm³)
Unit 1	30	0	0	0	0	14.7
Unit 2	25	0	0	0	0	14.3
Unit 3	25	2	0	0	2	32.1
Unit 4	30	0	0	0	0	0.5
SUM	**110**	**2**	**0**	**0**	**2**	

Table 7.3: Operating days in compliance to SO_2 AEL Limit – April 2024

Associated Unit/Stack	Normal	Grace	Section 30	Contravention	Total Exceedance	Average SO_2 (mg/Nm³)
Unit 1	30	0	0	0	0	1 498.5
Unit 2	27	0	0	0	0	1 376.9
Unit 3	28	0	0	0	0	1 478.6
Unit 4	30	0	0	0	0	58.2
SUM	**115**	**0**	**0**	**0**	**0**	

Table 7.4: Operating days in compliance to NOx AEL Limit - April 2024

Associated Unit/Stack	Normal	Grace	Section 30	Contravention	Total Exceedance	Average NOx (mg/Nm³)
Unit 1	30	0	0	0	0	431.7
Unit 2	27	0	0	0	0	343.7
Unit 3	28	0	0	0	0	369.1
Unit 4	30	0	0	0	0	346.0
SUM	**115**	**0**	**0**	**0**	**0**	

Note: NOx emissions is measured as NO in PPM. Final NOx value is expressed as total NO_2

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 - April 2024

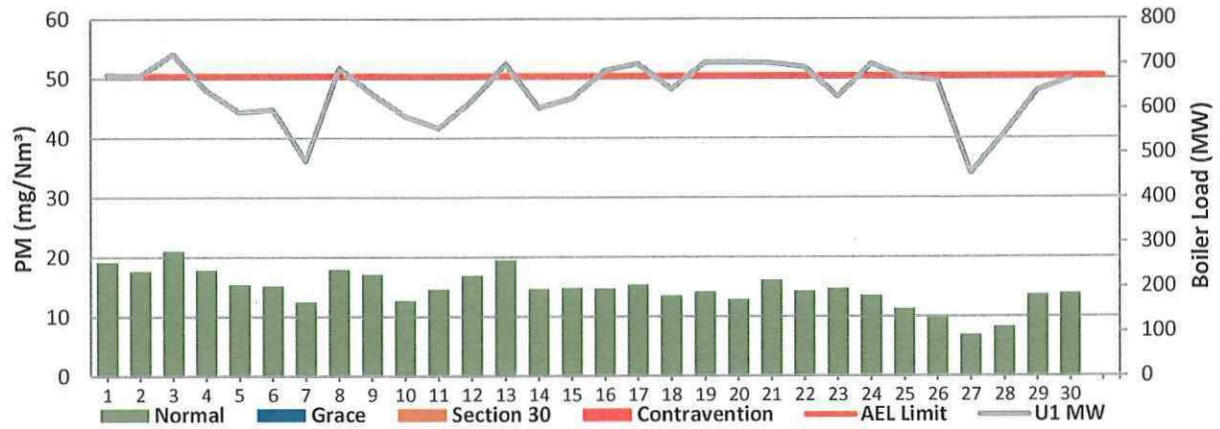


Figure 2: Kusile Unit 2 PM Emissions - April 2024

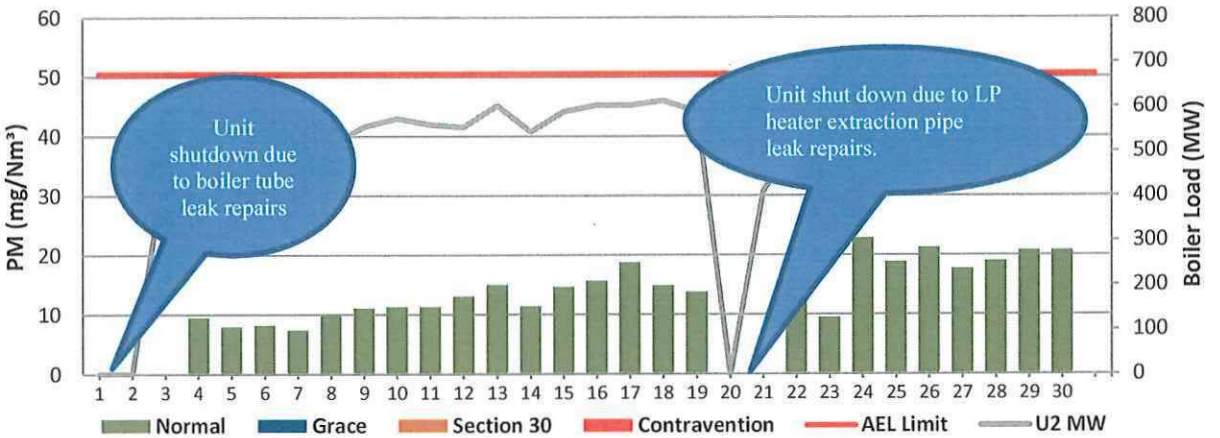
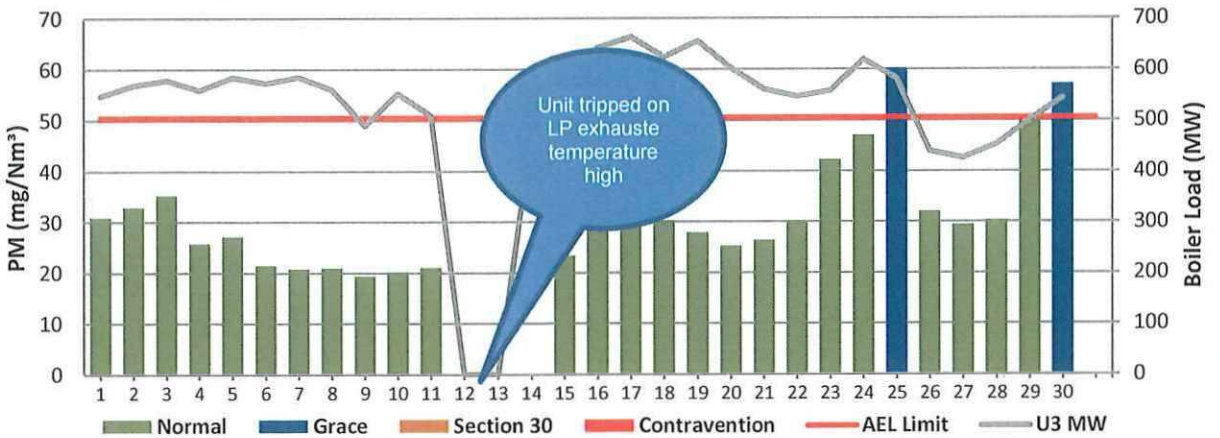


Figure 3: Kusile Unit 3 PM Emissions - April 2024



Exceedance on the 25th and 30th due to PJFFP bag failures.

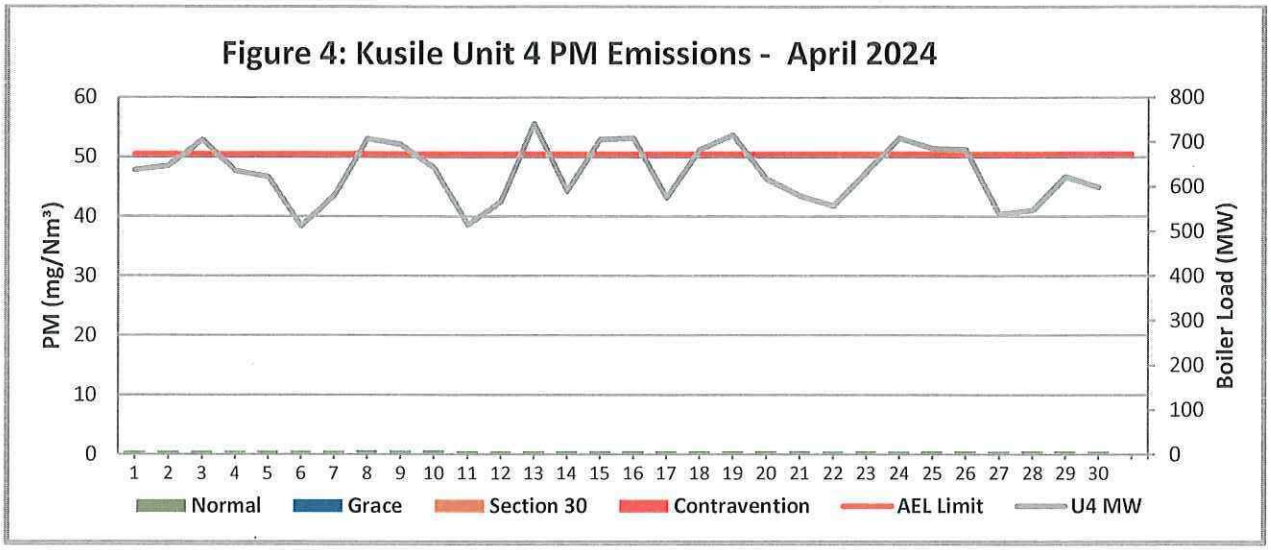


Figure 4: Kusile Unit 4 PM Emissions - April 2024
PM (mg/Nm³)
Boiler Load (MW)
Normal
Grace
Section 30
Contravention
AEL Limit
U4 MW

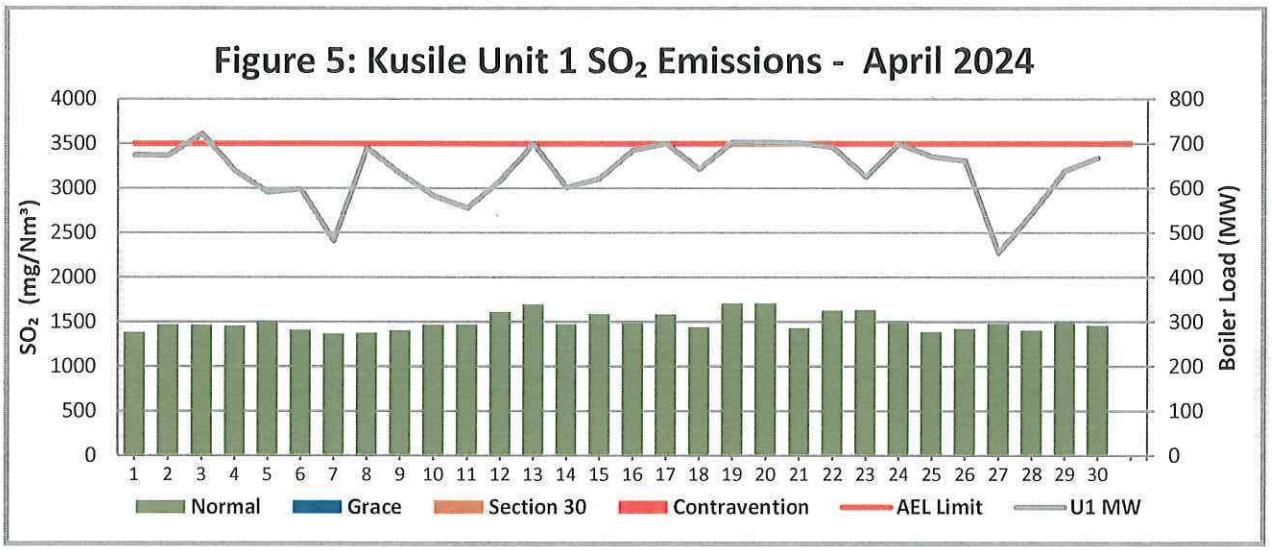


Figure 5: Kusile Unit 1 SO₂ Emissions - April 2024
SO₂ (mg/Nm³)
Boiler Load (MW)
Normal
Grace
Section 30
Contravention
AEL Limit
U1 MW

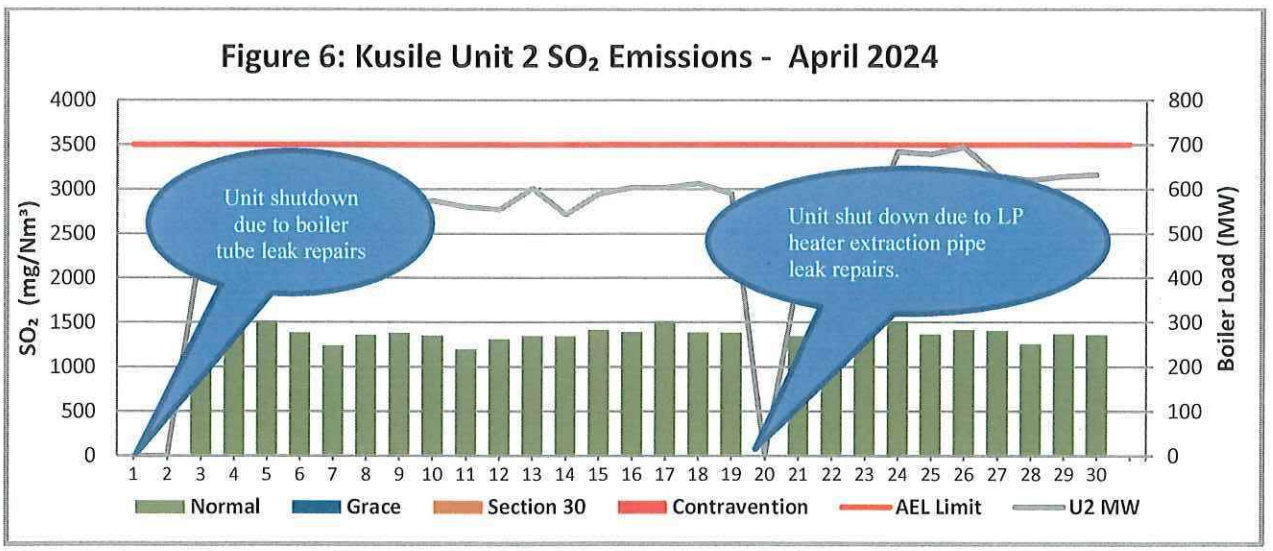


Figure 6: Kusile Unit 2 SO₂ Emissions - April 2024
Unit shutdown due to boiler tube leak repairs
Unit shut down due to LP heater extraction pipe leak repairs.
SO₂ (mg/Nm³)
Boiler Load (MW)
Normal
Grace
Section 30
Contravention
AEL Limit
U2 MW

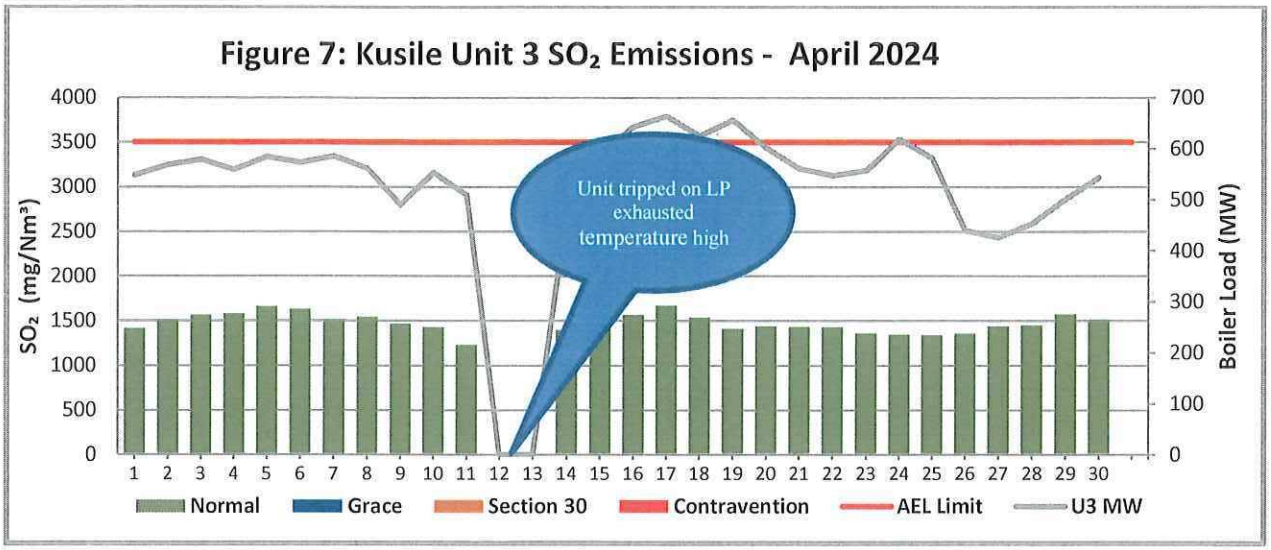


Figure 7: Kusile Unit 3 SO₂ Emissions - April 2024
SO₂ (mg/Nm³)
Boiler Load (MW)
Unit tripped on LP exhausted temperature high
Normal
Grace
Section 30
Contravention
AEL Limit
U3 MW

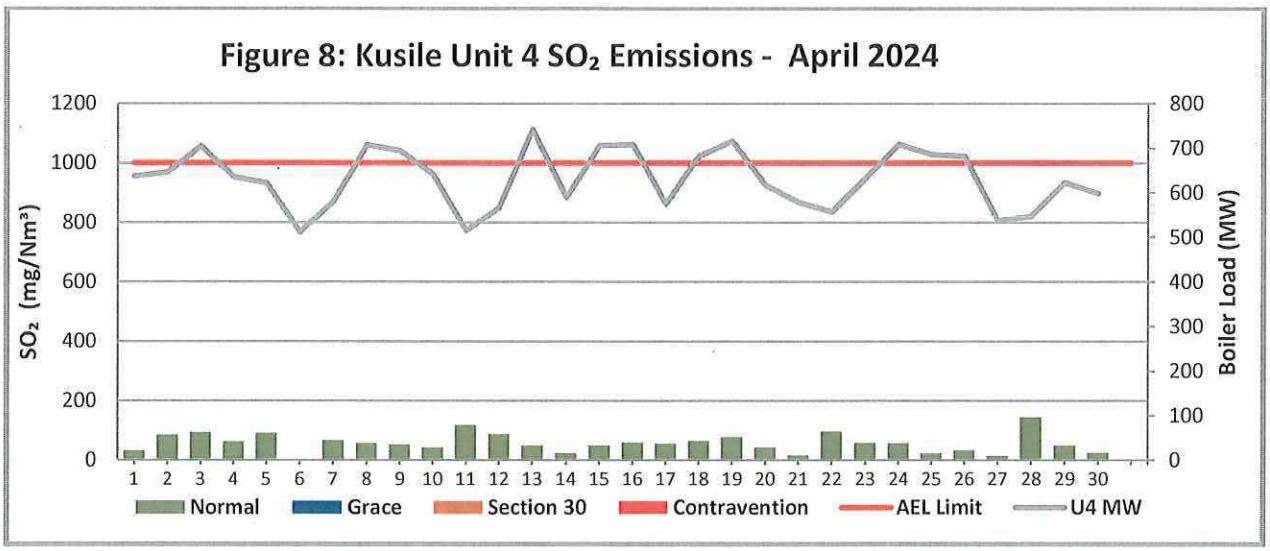


Figure 8: Kusile Unit 4 SO₂ Emissions - April 2024
SO₂ (mg/Nm³)
Boiler Load (MW)
Normal
Grace
Section 30
Contravention
AEL Limit
U4 MW

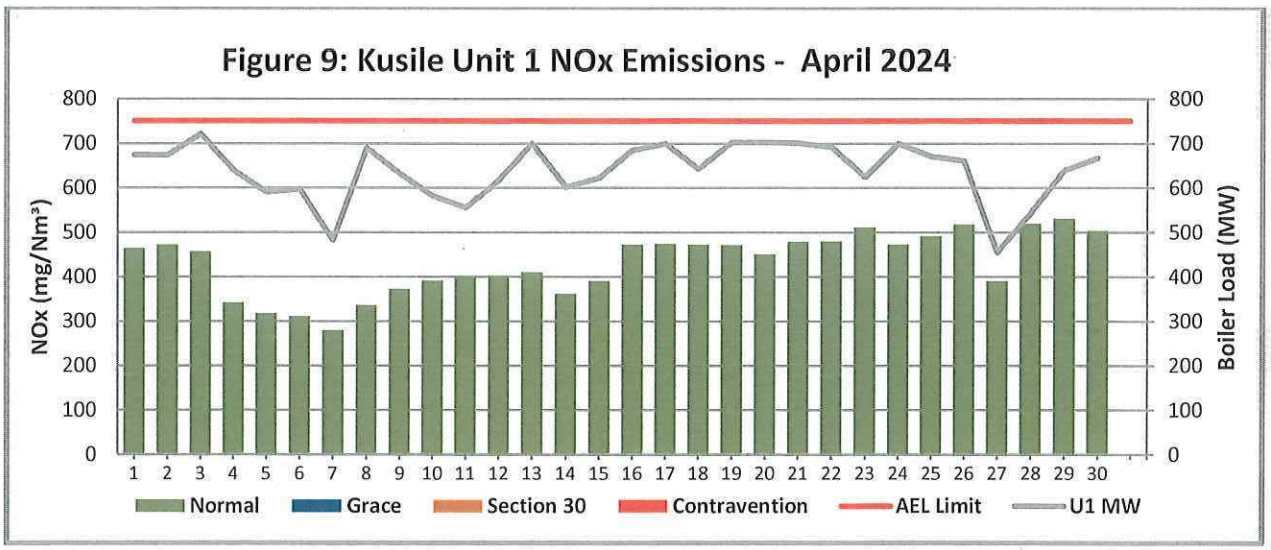


Figure 9: Kusile Unit 1 NOx Emissions - April 2024
NOx (mg/Nm³)
Boiler Load (MW)
Normal
Grace
Section 30
Contravention
AEL Limit
U1 MW

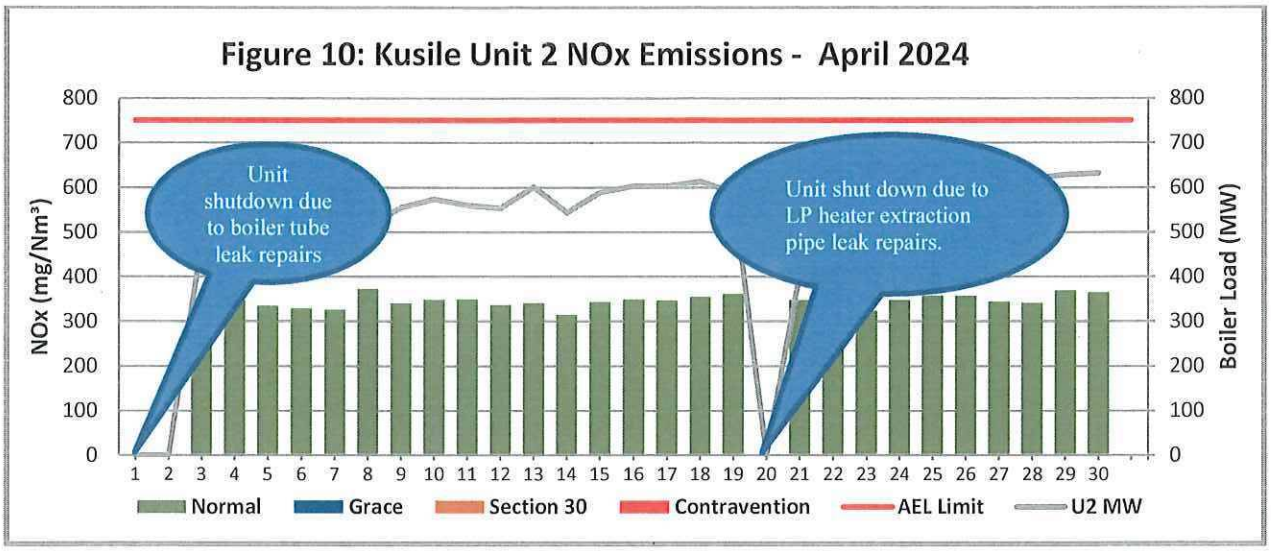


Figure 10: Kusile Unit 2 NOx Emissions - April 2024
NOx (mg/Nm³)
Boiler Load (MW)
Unit shutdown due to boiler tube leak repairs
Unit shut down due to LP heater extraction pipe leak repairs.
Normal
Grace
Section 30
Contravention
AEL Limit
U2 MW

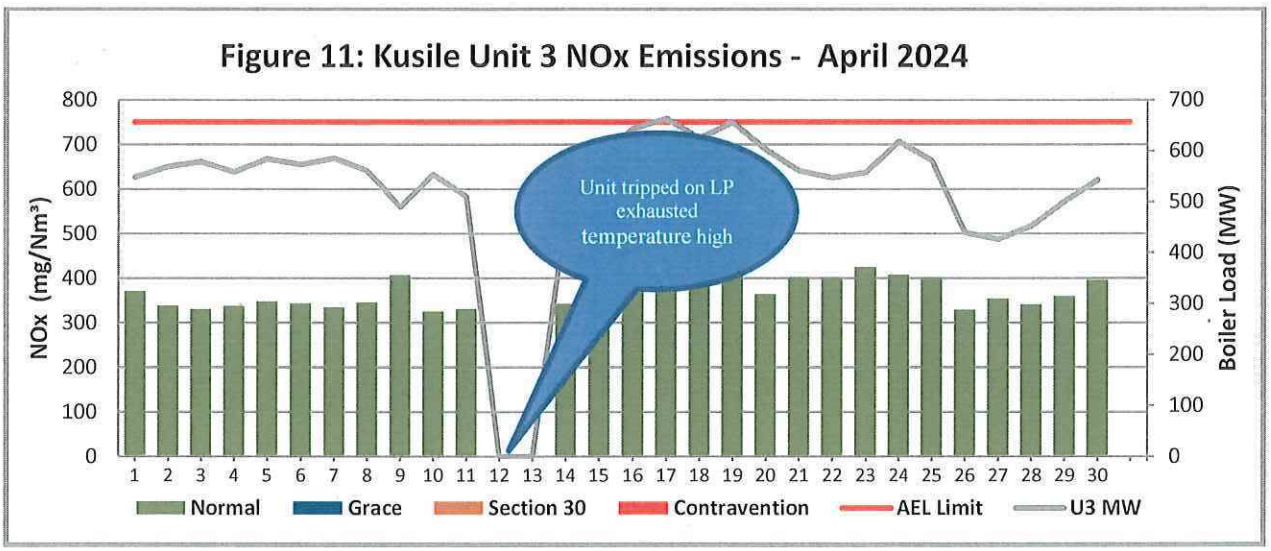


Figure 11: Kusile Unit 3 NOx Emissions - April 2024
NOx (mg/Nm³)
Boiler Load (MW)
Unit tripped on LP exhausted temperature high
Normal
Grace
Section 30
Contravention
AEL Limit
U3 MW

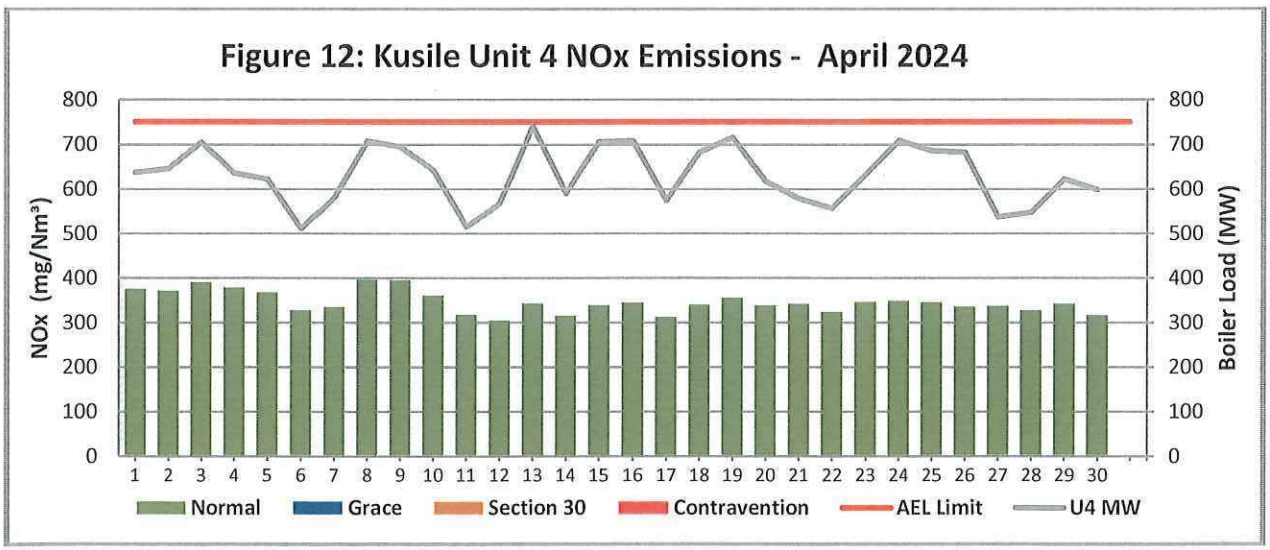


Figure 12: Kusile Unit 4 NOx Emissions - April 2024
NOx (mg/Nm³)
Boiler Load (MW)
Normal
Grace
Section 30
Contravention
AEL Limit
U4 MW

8. Correlation and Parallel test

Unit 1, 3 and 4 are operated with valid correlation and parallel curves. Unit 2 is operated with unity curves; the emissions will be retrofitted upon completion of the test and implementation of the curves. The emission reports for Unit 2 will be resubmitted.

9. Shut down and Light up information

Unit No. 1	*Event 1*		*Event 2*	
Breaker Open (BO)	BO previously	BO previously	4:45 am	2024/04/28
Draught Group (DG) Shut Down (SD)	n/a	n/a	DG did not trip or SD	DG did not trip or SD
BO to DG SD (duration)	n/a	DD:HH:MM	n/a	DD:HH:MM
Fires in time				
Synch. to Grid (or BC)				
Fires in to BC (duration)		DD:HH:MM		DD:HH:MM
Emissions below limit from BC (end date)				
Emissions below limit from BC (duration)		DD:HH:MM		DD:HH:MM

Unit No. 2	*Event 1*		*Event 2*	
Breaker Open (BO)	BO previously	BO previously	11:15 am	2024/04/19
Draught Group (DG) Shut Down (SD)	n/a	n/a	DG did not trip or SD	DG did not trip or SD
BO to DG SD (duration)	n/a	DD:HH:MM	n/a	DD:HH:MM
Fires in time	7:40 am	2024/04/02	12:05 pm	2024/04/21
Synch. to Grid (or BC)	9:35 am	2024/04/03	3:15 pm	2024/04/21
Fires in to BC (duration)	01:01:55	DD:HH:MM	00:03:10	DD:HH:MM
Emissions below limit from BC (end date)	not > limit	not > limit	not > limit	not > limit
Emissions below limit from BC (duration)	n/a	DD:HH:MM	n/a	DD:HH:MM

Unit No. 3	*Event 1*		*Event 2*	
Breaker Open (BO)	3:55 am	2024/04/09	10:00 pm	2024/04/11
Draught Group (DG) Shut Down (SD)	DG did not trip or SD	DG did not trip or SD	12:20 pm	2024/04/12
BO to DG SD (duration)	n/a	DD:HH:MM	00:14:20	DD:HH:MM
Fires in time	5:25 am	2024/04/09	4:45 pm	2024/04/13
Synch. to Grid (or BC)	3:30 pm	2024/04/09	10:25 am	2024/04/14
Fires in to BC (duration)	00:10:05	DD:HH:MM	00:17:40	DD:HH:MM
Emissions below limit from BC (end date)	not > limit	not > limit	not > limit	not > limit
Emissions below limit from BC (duration)	n/a	DD:HH:MM	n/a	DD:HH:MM

10. Complaints

No complaints reported for the month of April 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**
No complaints reported for the month of April 2024						

Kusile Ambient Air Quality Monitoring

APRIL 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 (SO_2). 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 (NO_2), ozone (O_3) and fine particulate matter of particulate size <10µm and particulate size <2.5µm in diameter (PM_{10} and $PM_{2.5}$) will be monitored from 01 April 2024.

The data for this reporting period (01 – 30 April 2024) were analysed for ambient SO_2 as monitored at Balmoral, Chicken Farm, Phola and Wilge air quality monitoring stations. The Particulate Matter and NO_2 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 other reports..

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 (SO_2, NO_2 and O_3 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.

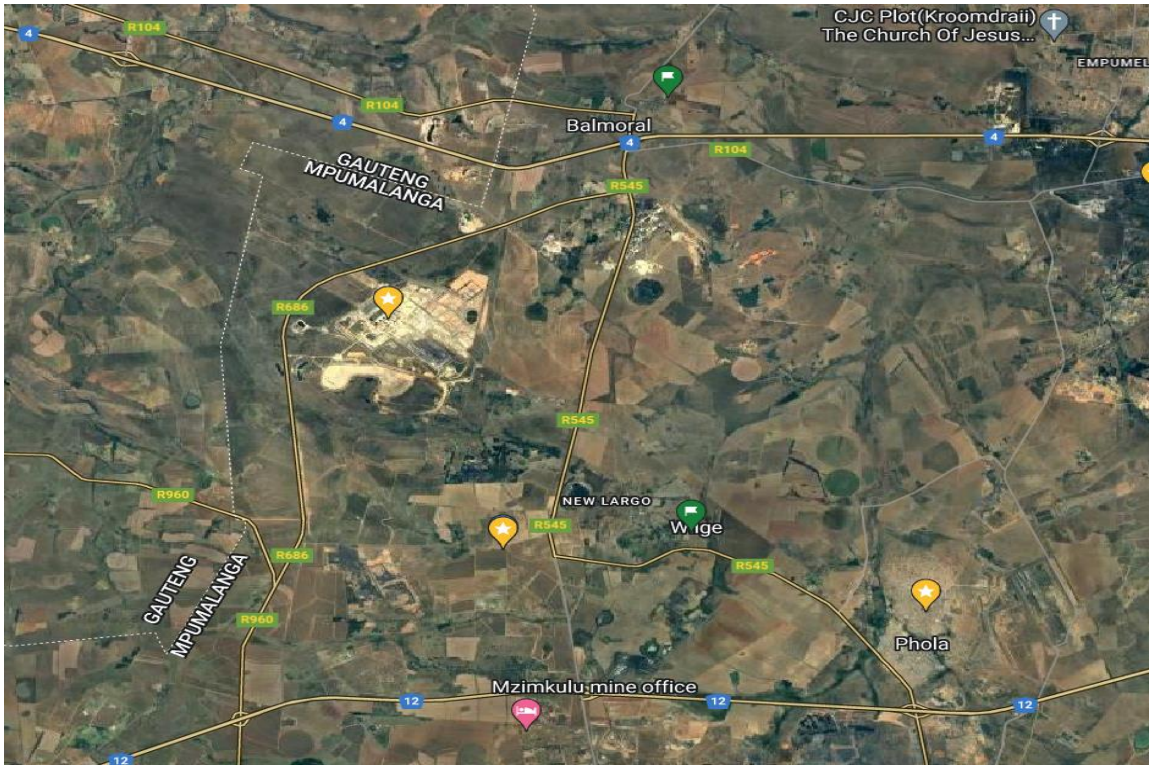


Figure 1: Air Quality Monitoring stations in relation to Kusile power station

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 SO_2, NO_2, O_3, $PM_{2.5}$ and PM_{10}.

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 March 2024

Stations name	SO_2	NO_2	O_3	$PM_{2.5}$	PM_{10}	WSP	WDR	Station Availability
Balmoral (BL)	39.9					99.7	99.7	99.2
Chicken Farm (CF)	87.9	33.1	88.5	88.8	0	100	100	88.8
Phola (PO)	96.8	96.5	97.1	0	63.7	99.9	99.9	97.2
Wilge (WL)	99.9					100	100	100

Good representative percentage data was recovered for all the parameters monitored during the monitoring period under review at the monitoring stations. The data for $PM_{2.5}$ was not recorded at the Phola monitoring station due to faulty instruments. The data for PM_{10} was not recorded at Chicken Farm monitoring station due to faulty instrument. The data for SO_2 was low recorded at the Balmoral monitoring station due to faulty instrument and power interruptions at site.

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 north-north-easterly to north-east directions during the day and from the south-south-easterly to westerly directions during the night time. The monitoring station is north-east of Kusile power station.

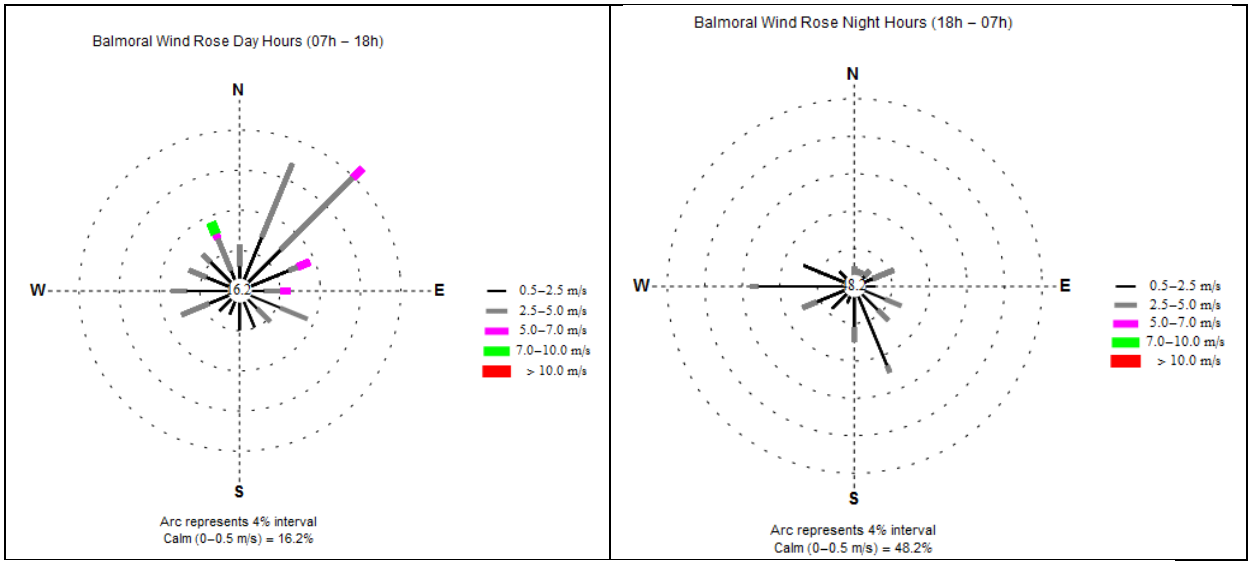


Figure 2: Wind profiles at Balmoral monitoring station

4.2.2. CHICKEN FARM AIR QUALITY MONITORING STATION

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

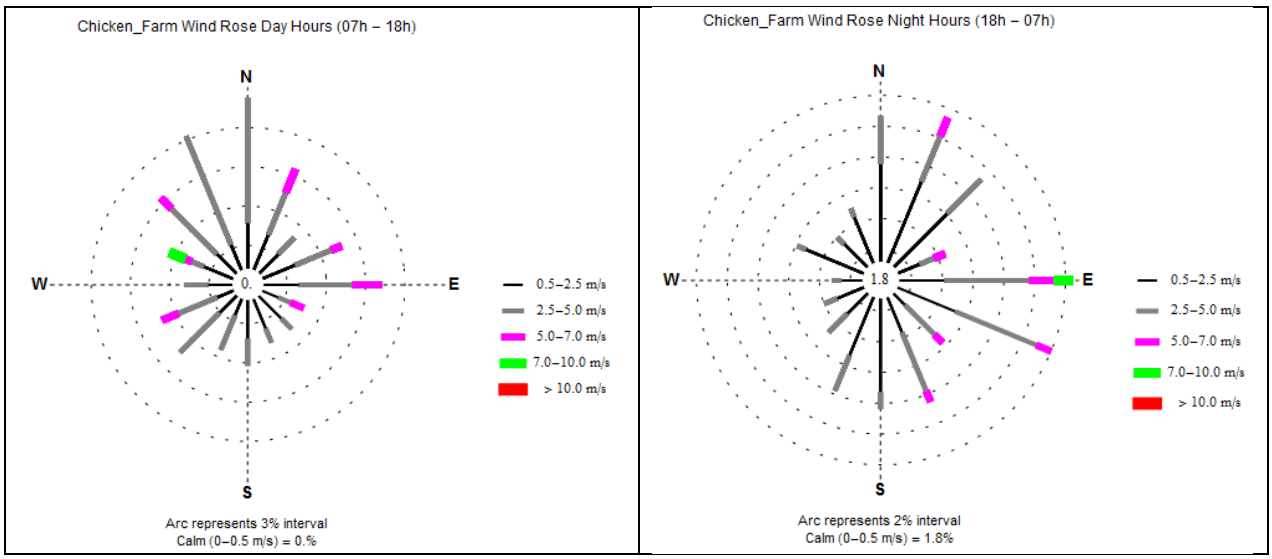


Figure 3: Wind profiles at Chicken Farm monitoring station

4.2.3. PHOLA AIR QUALITY MONITORING STATION

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

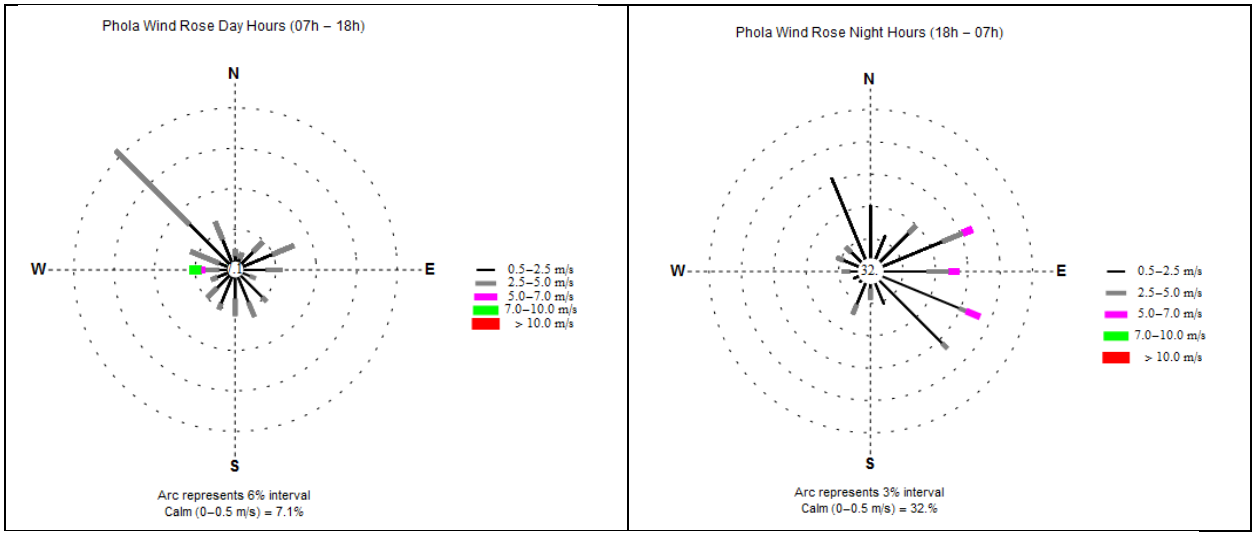


Figure 4: Wind profiles at Phola monitoring station.

4.2.4. WILGE AIR QUALITY MONITORING STATION

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

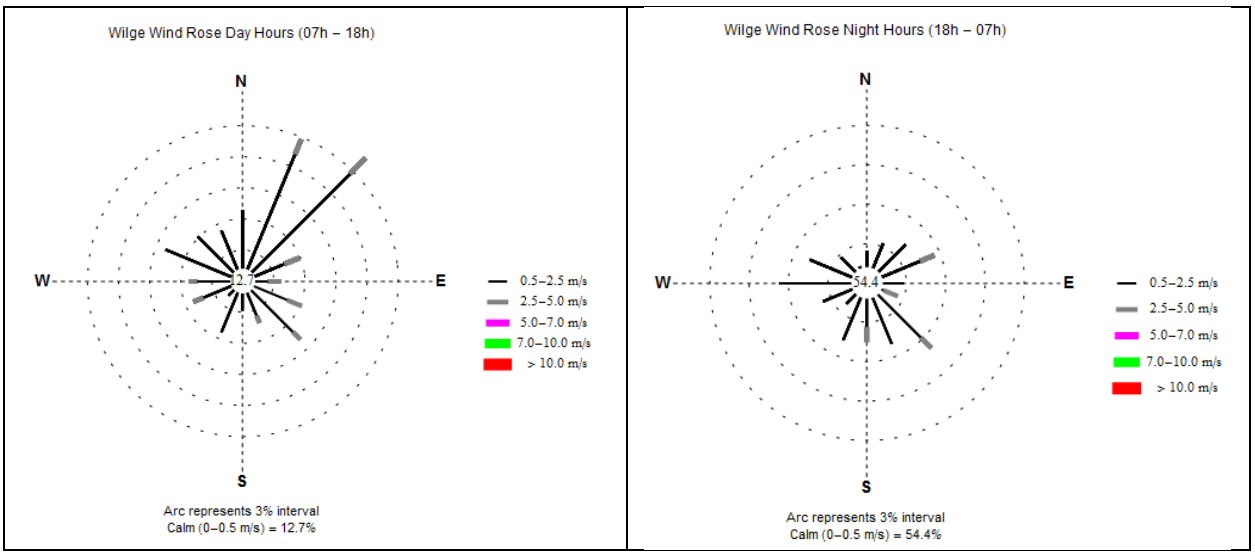


Figure 5: Wind profiles at Wilge monitoring station.

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 SO_2 concentration recorded (in ppb).

Monitoring Stations	10-min average	Date	Hourly average	Date	Daily average	Date
Balmoral	149	23/04/2024 10:20	101.5	23/04/2024 11h00	18.9	28/04/2024
Chicken Farm	166.2	19/04/2024 14:20	122.6	19/04/2024 03:00	40.9	19/04/2024
Phola	120.0	10/04/2024 10:30	69.8	20/04/2024 12:00	29	19/04/2024
Wilge	205.2	10/04/2024 10:50	141.2	10/04/2024 11:00	25.3	19/04/2024

There was one (1) exceedance of the SO_2 hourly limit of 134 ppb and one (1) exceedance of SO_2 10-minutes limit of 191 ppb recorded during the monitoring period at Wilge air quality monitoring site. The highest SO_2 concentrations recorded at the monitoring stations are indicated in Table 3 and figures 6 to 9 below.

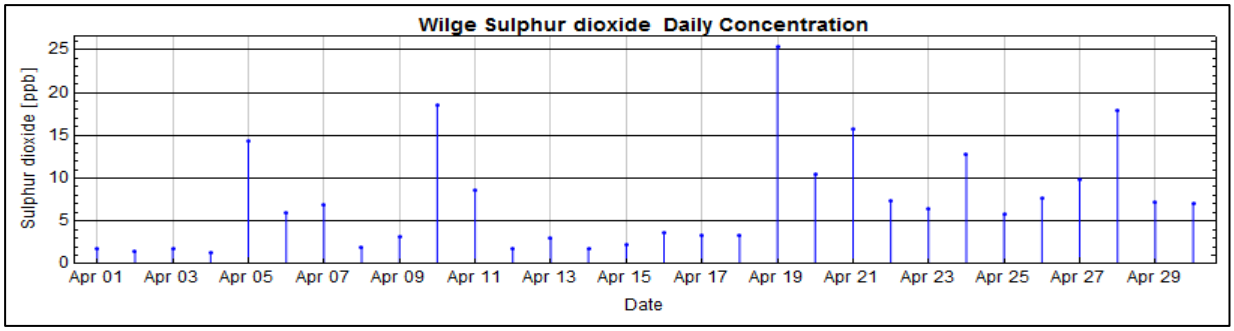


Figure 6: Time series graph for the SO_2 daily mean concentrations at Wilge AQM station

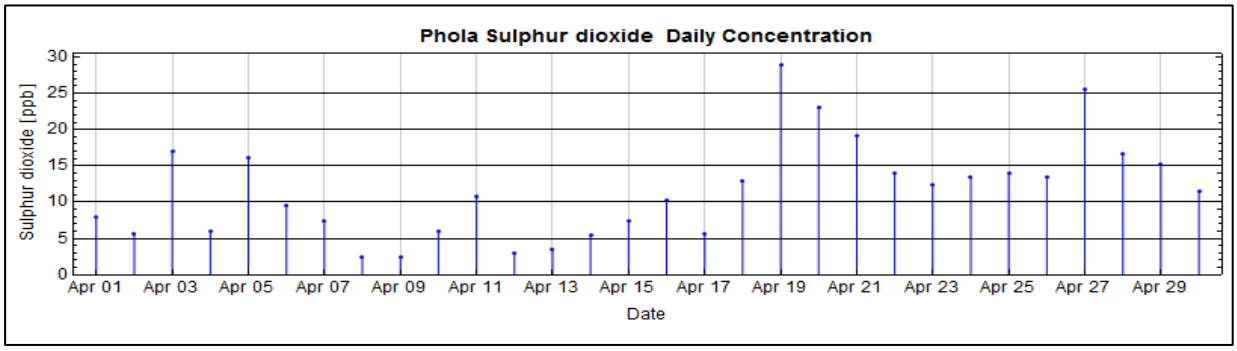


Figure 7: Time series graph for the SO_2 daily mean concentrations at Phola AQM station

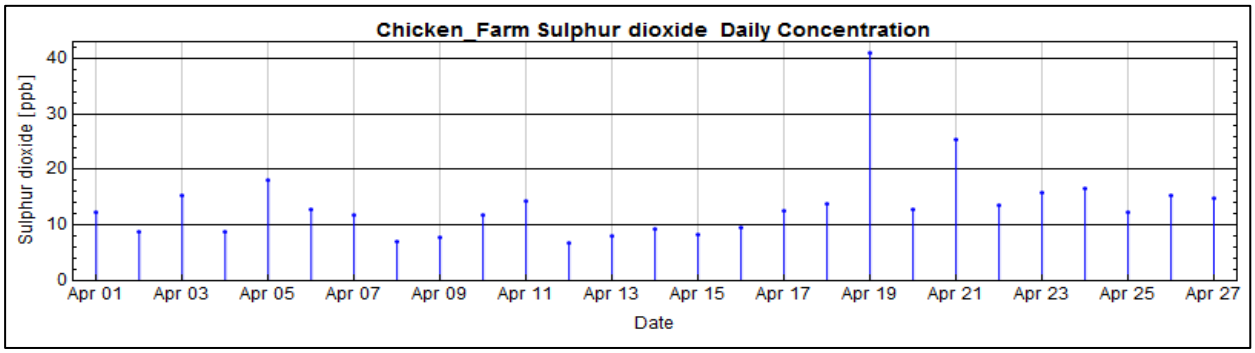


Figure 8: Time series graph for the SO_2 daily mean concentrations at Chicken Farm AQM station

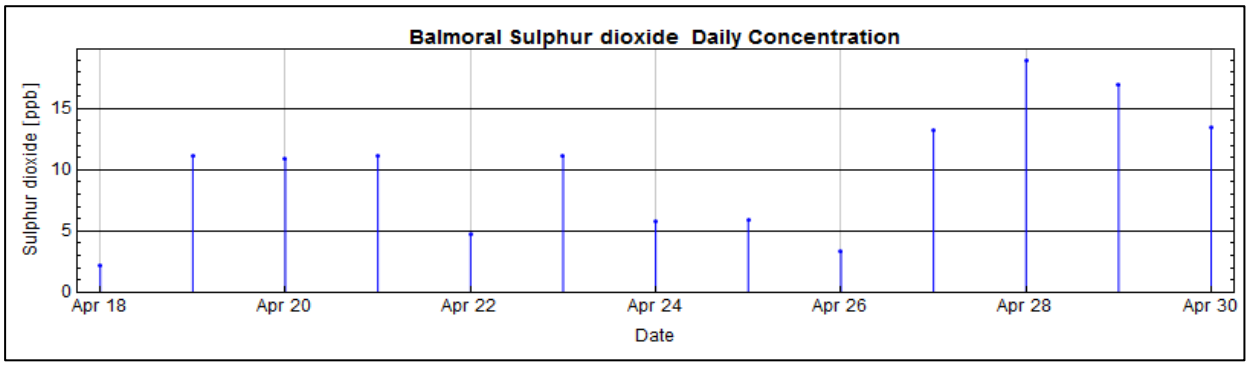


Figure 9: Time series graph for the SO_2 daily mean concentrations at Balmoral AQM station

There were no exceedances of the NO_2 hourly limit of 106 ppb recorded at the monitoring stations during the April 2024 monitoring period. There were eight (8) exceedances of the $PM_{2.5}$ daily limit of 40 µg/m^3 at the Chicken Farm monitoring station and three (3) exceedances of PM_{10} daily limit of 75 µg/m^3 recorded at Phola air quality monitoring station. See Figure 10 to 11 below.

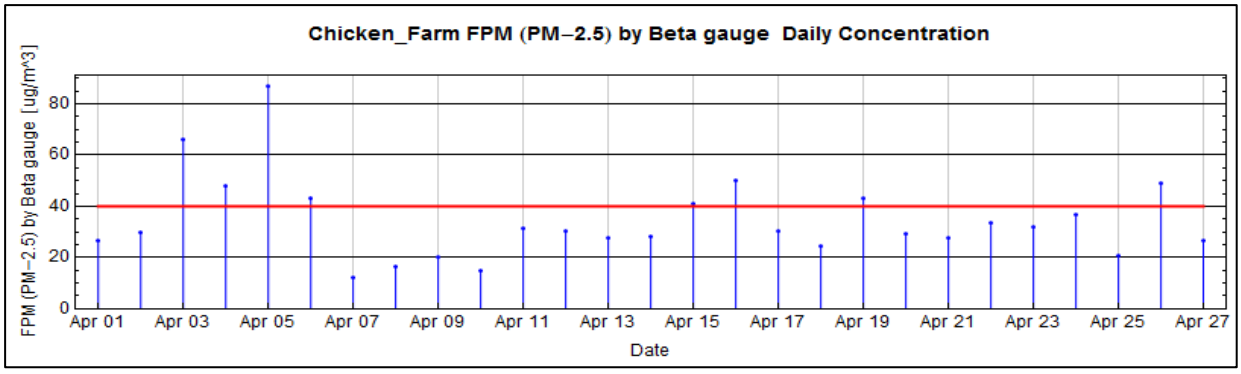


Figure 10: Time series graph for the $PM_{2.5}$ daily mean concentrations at Chicken Farm AQM station

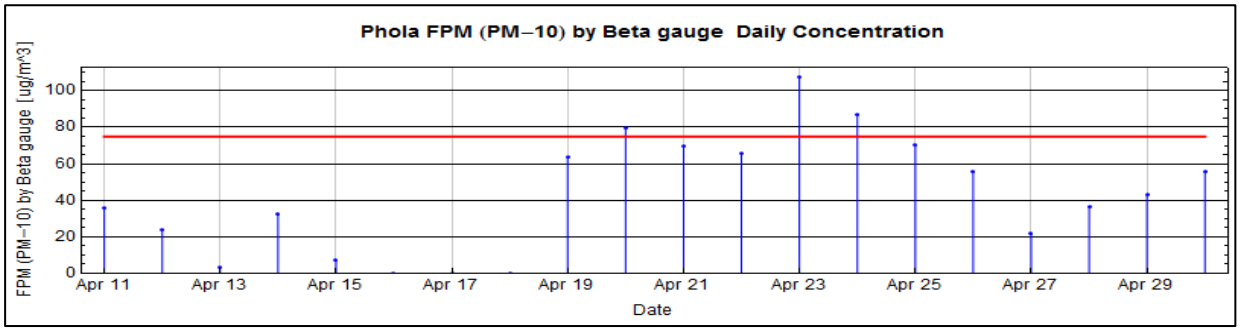


Figure 11: Time series graph for the PM_{10} daily mean concentrations at Phola AQM station

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

PM_{10} Daily Exceedances (Phola)					
Pollutant	**Limit**	**Year**	**Month**	**Day**	**Conc. (µg/m^3)**
$PM_{10.}$	75	2024	April	20	79.5
$PM_{10.}$	75	2024	April	23	107.4
$PM_{10.}$	75	2024	April	24	87.1
$PM_{2.5}$ Daily Exceedances (Chicken Farm)					
Pollutant	**Limit**	**Year**	**Month**	**Day**	**Conc. (µg/m^3)**
$PM_{2.5}$	40	2024	April	03	66.3
$PM_{2.5}$	40	2024	April	04	48.1
$PM_{2.5}$	40	2024	April	05	86.8
$PM_{2.5}$	40	2024	April	06	43.4
$PM_{2.5}$	40	2024	April	15	40.9
$PM_{2.5}$	40	2024	April	16	50.0
$PM_{2.5}$	40	2024	April	19	43.0
$PM_{2.5}$	40	2024	April	26	49.1

SO_2 Hourly Exceedances (Wilge)								
Pollutant	**Limit**	**Year**	**Month**	**Day**	**WSP**	**WDR**	**Time**	**Conc.**
SO_2	134	2024	April	10	1.83	WSW	11h00	141.2

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

Averaging Period	Balmoral	Chicken Farm	Phola	Wilge
SO_2 10-min	0	0	0	1
SO_2 Hourly	0	0	0	1
SO_2 Daily	0	0	0	0
NO_2 Hourly		0	0	
O_3 8-hourly		13	0	
$PM_{2.5}$ Daily		8	0	
PM_{10} Daily		0	3	

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

SO_2 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 SO_2 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 SO_2 will be 744 ppb over a 10-minute for exposure up to 8 hours.

c. AEGL – the lethality level – for SO_2, 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 April 2024.

Table 6: Number of exceedances recorded from November 2023 to April 2024

SITES	CF	PO	BL	WL	Allowed No. of Exceedances (November 2023 to April 2024)
PM_{10} (Daily)	0	3	ND	ND	**4**
$PM_{2.5}$ (Daily)	31	1	ND	ND	**4**
NO_2 (hourly)	0	0	ND	ND	**88**
SO_2 (Hourly	0	0	0	1	**88**
SO_2 (Daily)	0	0	0	0	**4**
O_3 (8h moving)	355	67	ND	ND	**11**
SO_2 (10 minute)	0	0	0	2	**526**

Chicken Farm air quality monitoring is in non-compliance with national ambient air quality limits of $PM_{2.5}$ daily limit of 40 µg/m³ and Ozone 8 hourly limit of 61 ppb. The sources that have an impact on Chicken farm are Eva high Steel and Vanadium in the north-east, Phola Township in the east-south-east, Klipspruit Colliery in the south-east and Kusile Power station in the north to north-west sectors. The monitoring of particulate matter ($PM_{2.5}$) at Chicken Farm was started with the temporary stack project in November 2023. The national ambient quality limit of PM_{10} daily limit of 75 µg/m³ was never exceeded at Chicken Farm air quality monitoring since from November 2023 to April 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 NO_2 hourly limit of 106 ppb recorded at the monitoring stations during the April 2024 monitoring period.

There was one (1) exceedance of the SO_2 hourly limit of 134 ppb and one (1) exceedance of SO_2 10-minutes limit of 191 ppb recorded during the monitoring period at Wilge air quality monitoring site.

There were eight (8) exceedances of the $PM_{2.5}$ daily limit of 40 µg/m^3 at the Chicken Farm monitoring station and three (3) exceedances of PM_{10} daily limit of 75 µg/m^3 recorded at Phola air quality monitoring station.

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

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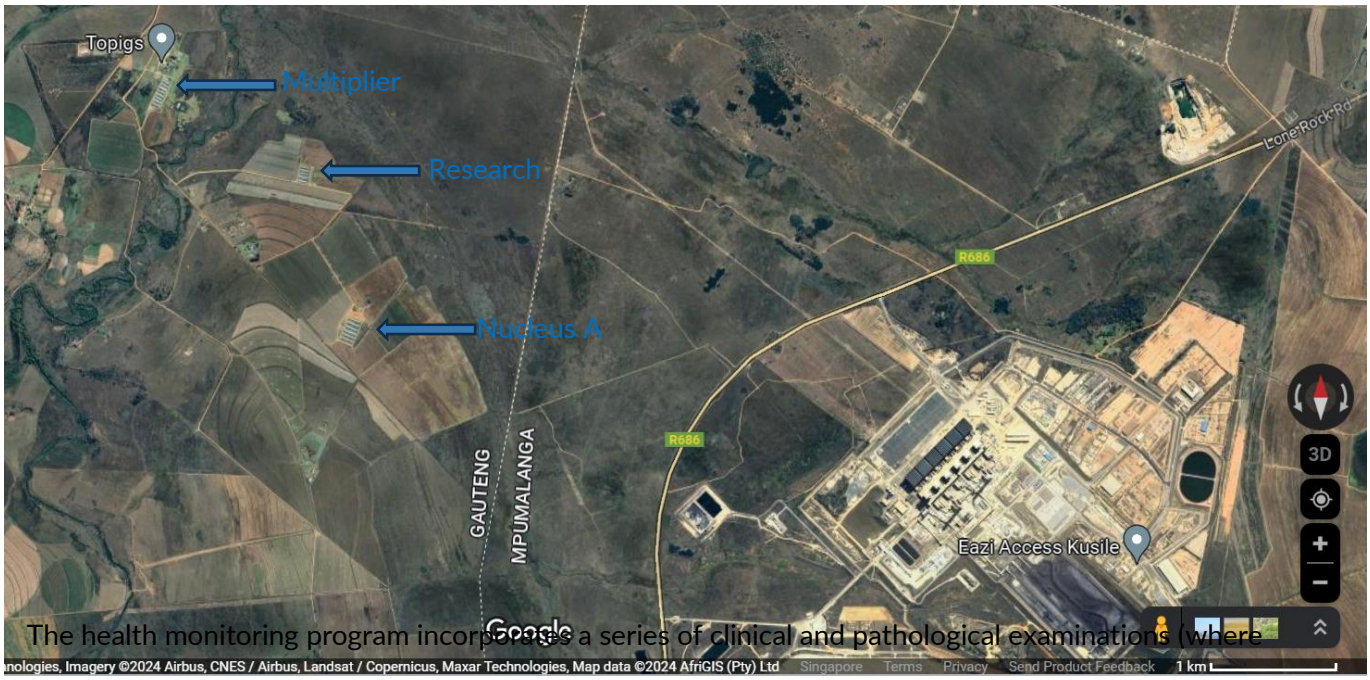
Animal Health Monitoring Summary Report April 2024

A comprehensive animal health monitoring program was designed to encompass five piggeries, including a control piggery, Rietfontein, situated in Mpumalanga Province near Villers, away from any power station. The study aims to compare the health status of pigs at Rietfontein with those at four other piggeries—Nucleus A, Multiplier, Research, and GHB Spitskop—located near the Khusile Power Plant (see location of piggeries on maps below). The primary objective is to assess any differences in health status, focusing on clinical disease, infection, and inflammation, potentially influenced by the proximity to the power plant.



The health monitoring program incorporates a series of clinical and pathological examinations (where

The health monitoring program incorporates a series of clinical and pathological examinations (where applicable), as well as laboratory analyses. Clinical examinations are conducted on 30 pigs from each piggery, including sows, suckling piglets, and replacement gilts. Parameters such as habitus, respiratory rate, nasal discharge, heart rate, rectal temperature, and depth of breathing are assessed, and coughing severity is recorded in gilt houses. The objective is to determine if the animals are clinically sound.

Laboratory analyses involve the following tests:

- Haemoglobin determinations from suckling piglets using a HemoCue Hb 201+ autoanalyzer. Haemoglobin is the protein in red blood cells responsible for transporting oxygen throughout the body. In piglets, haemoglobin levels can be influenced by various factors, including nutrition, iron levels, disease, and environmental conditions. Poor air quality can potentially affect haemoglobin synthesis.
- Full blood counts (FBC) on sows and gilts. FBC is a comprehensive blood test that measures various components of the blood, including red blood cells, white blood cells, and platelets. By examining the levels and types of white blood cells (such as neutrophils, lymphocytes, eosinophils, basophils, and monocytes), FBC can help detect signs of infection and inflammation.
- Acute phase biomarker (Amyloid A) levels from sows and replacement gilts. Amyloid A is an acute-phase protein whose levels in the blood increase in response to inflammation making it an indicator of the body's reaction to various stressors, including infections and environmental stress.
- Nasal swabs collected from replacement gilts to test for Glaesserella parasuis (Glässer's disease). Glaesserella parasuis is a commensal organism in the upper respiratory tract of pigs, under stressful conditions, such as poor air quality, it can potentially proliferate and cause disease.

Elevated rates of positive tests, even in the absence of clinical signs, can indicate a compromised respiratory environment.

Findings:

Rietfontein (Control Piggery):
Clinical examinations found all animals clinically normal. Haemoglobin levels were normal in 80% of piglets, with 20% showing low levels but not anaemic. Amyloid A levels were below the reference range, indicating no significant inflammation. Full blood counts revealed one gilt with lowered lymphocyte and neutrophil counts, suggesting a possible subclinical infection or lowered immune system. Nasal swabs detected one positive and one weak positive result for Glaesserella parasuis, though no clinical signs of Glässer's disease were observed.

Nucleus A:
Clinical examinations identified one gilt with an elevated rectal temperature, with other animals normal. Haemoglobin levels were normal in 37% of piglets, with 20% showing low levels and 43% anaemic. Amyloid A levels were normal. Full blood counts indicated increased neutrophil counts in two gilts and lowered lymphocyte counts in another two. Nasal swabs detected two positive results for Glaesserella parasuis, no clinical signs of Glässer's disease were observed.

Multiplier:
All animals were clinically normal. Haemoglobin levels were normal in 86.7% of piglets, with 13.3% showing low levels. Amyloid A levels were normal. Full blood counts revealed some animals with lowered lymphocyte and neutrophil counts, suggesting potential subclinical infections or immune system issues. One nasal swab tested positive for Glaesserella parasuis, no clinical signs of Glässer's disease were observed.

Research:
Clinical examinations found all animals normal. Haemoglobin levels were normal in 70% of piglets, with 26.7% showing low levels and 3.3% anaemic. Amyloid A levels were normal. Full blood counts indicated one sow with a lowered lymphocyte count and one gilt with a lowered neutrophil count. One nasal swab tested positive for Glaesserella parasuis, no clinical signs of Glässer's disease were observed.

GHB Spitskop:
All animals were clinically normal. Haemoglobin levels were normal in 20% of piglets, with 66.7% showing low levels and 13.3% anaemic. Amyloid A levels were normal. Full blood counts revealed one sow with a

moderately high neutrophil count and another with elevated neutrophil and lowered lymphocyte counts, suggesting potential subclinical infection. Two nasal swabs tested positive for Glaesserella parasuis, no clinical signs of Glässer's disease were observed.

Discussion:

In the initial results of the animal health monitoring program, the control piggery, Rietfontein, showed better overall health metrics compared to the piggeries near the Khusile Power Station. Lower haemoglobin levels and more frequent subclinical infections were observed in the piggeries near the power station. However, since only the initial dataset is available, these results should be interpreted with caution. Continuous monitoring and further investigation are recommended to understand the long-term effects and potential health risks associated with air quality around the piggeries included in the health monitoring program.

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BVSc
D18/11784

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Veterinary Consultancy

Topigs SA Rietfontein Health Monitoring Report 2024-04-30

Assessment and Sampling date: 2024-04-18

Clinical Assessment:

Clinical examination of 30 pigs (10 sows, 10 suckling piglets, 10 replacement gilts)

Clinical assessments will be scored as follows:

- Habitus:
  - 0 – normal
  - 1 – listless
- Respiratory rate:
  - 0 – normal
  - 1 – slightly elevated
  - 2 – moderately elevated
  - 3 – clearly elevated, distinct abdominal breathing
- Nasal Discharge:
  - 0 – absent
  - 1 – present
- Coughing:
  - 0 – normal
  - 1 – mild
  - 2 – moderate
  - 3 – severe
- Sneezing:
  - 0 – absent
  - 1 – present
- Rectal temperature:
  - 0 – normal
  - 1 – elevated (above 40°C)

Number	Piglet/Gilt/Sow	Habitus	Respiratory rate	Nasal Discharge	Coughing	Sneezing	Rectal temp	Comment
1	Piglet	0	0	0	0	0	0	Clinically Normal
2	Piglet	0	0	0	0	0	0	Clinically Normal
3	Piglet	0	0	0	0	0	0	Clinically Normal
4	Piglet	0	0	0	0	0	0	Clinically Normal
5	Piglet	0	0	0	0	0	0	Clinically Normal
6	Piglet	0	0	0	0	0	0	Clinically Normal
7	Piglet	0	0	0	0	0	0	Clinically Normal
8	Piglet	0	0	0	0	0	0	Clinically Normal
9	Piglet	0	0	0	0	0	0	Clinically Normal

10	Piglet	0	0	0	0	0	0	Clinically Normal
11	Gilt	0	0	0	0	0	0	Clinically Normal
12	Gilt	0	0	0	0	0	0	Clinically Normal
13	Gilt	0	0	0	0	0	0	Clinically Normal
14	Gilt	0	0	0	0	0	0	Clinically Normal
15	Gilt	0	0	0	0	0	0	Clinically Normal
16	Gilt	0	0	0	0	0	0	Clinically Normal
17	Gilt	0	0	0	0	0	0	Clinically Normal
18	Gilt	0	0	0	0	0	0	Clinically Normal
19	Gilt	0	0	0	0	0	0	Clinically Normal
20	Gilt	0	0	0	0	0	0	Clinically Normal
21	Sow	0	0	0	0	0	0	Clinically Normal
22	Sow	0	0	0	0	0	0	Clinically Normal
23	Sow	0	0	0	0	0	0	Clinically Normal
24	Sow	0	0	0	0	0	0	Clinically Normal
25	Sow	0	0	0	0	0	0	Clinically Normal
26	Sow	0	0	0	0	0	0	Clinically Normal
27	Sow	0	0	0	0	0	0	Clinically Normal
28	Sow	0	0	0	0	0	0	Clinically Normal
29	Sow	0	0	0	0	0	0	Clinically Normal
30	Sow	0	0	0	0	0	0	Clinically Normal

Remarks:

All animals that were examined during the clinical assessment were found clinically normal and within the expected clinical parameters of a healthy pig.

Laboratory analysis:

Haemoglobin*:

Animal Number	Hg level	Interpretation
1	107	Low
2	107	Low
3	119	Normal
4	120	Normal
5	121	Normal
6	121	Normal
7	122	Normal
8	122	Normal
9	141	Normal
10	159	Normal

% Anaemic	0%
% Low	20%
% Normal	80%

Remarks

Haemoglobin samples collected from suckling piglets on caudal auricular vein prior to weaning showed that 80% of the piglets had normal levels and 20% of the piglets had low levels but not anaemic.

*Due to malfunction of the Haemoglobin device only 10 piglets were tested.

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Amyloid A:

Number	Gilt/Sow	Result	Interpretation
1	Gilt	<3	Normal
2	Gilt	12,10	Normal
3	Gilt	5,80	Normal
4	Gilt	7,10	Normal
5	Gilt	<3	Normal
6	Gilt	<3	Normal
7	Gilt	<3	Normal
8	Gilt	10,90	Normal
9	Gilt	<3	Normal
10	Gilt	<3	Normal
11	Sow	5,50	Normal
12	Sow	<3	Normal
13	Sow	<3	Normal
14	Sow	<3	Normal
15	Sow	3,60	Normal
16	Sow	6,00	Normal
17	Sow	13,80	Normal
18	Sow	14,00	Normal
19	Sow	4,00	Normal
20	Sow	20,80	Normal

Remarks:

All Amyloid A test results are below the cutoff reference range (<42,7 mg/L) for pigs. No significant increase in Amyloid A levels is seen and results are therefore interpreted as normal. Amyloid A is an acute phase protein which is used as one of the health markers to assist with detecting inflammation or infection in animals. The marker can help determine disease severity if present.

Full blood counts:

Number	Gilt/Sow	Hb	Result	Interpretation
1	Gilt	Normal	Haematology results within normal parameters	Haematology normal
2	Gilt	Normal	Haematology results within normal parameters	Haematology normal
3	Gilt	Normal	Haematology results within normal parameters	Haematology normal
4	Gilt	Normal	Haematology results within normal parameters	Haematology normal
5	Gilt	Normal	Haematology results within normal parameters	Haematology normal
6	Gilt	Normal	Haematology results within normal parameters	Haematology normal
7	Gilt	Normal	Haematology results within normal parameters	Haematology normal
8	Gilt	Normal	Haematology results within normal parameters	Haematology normal
9	Gilt	Normal	Mild Neutropenia and Lymphocytopenia	Low neutrophil and lymphocyte count
10	Gilt	Normal	Haematology results within normal parameters	Haematology normal
11	Sow	Normal	Haematology results within normal parameters	Haematology normal

12	Sow	Normal	Haematology results within normal parameters	Haematology normal
13	Sow	Normal	Haematology results within normal parameters	Haematology normal
14	Sow	Normal	Haematology results within normal parameters	Haematology normal
15	Sow	Normal	Haematology results within normal parameters	Haematology normal
16	Sow	Normal	Haematology results within normal parameters	Haematology normal
17	Sow	Normal	Haematology results within normal parameters	Haematology normal
18	Sow	Normal	Haematology results within normal parameters	Haematology normal
19	Sow	Normal	Haematology results within normal parameters	Haematology normal
20	Sow	Normal	Haematology results within normal parameters	Haematology normal

Remarks

One of the main focus areas of full blood counts is examining the white blood cell counts. White blood cells are composed of neutrophils, lymphocytes, eosinophils, basophils and monocytes. White blood cell counts can be used to indicate infectious or inflammatory disorders among other conditions.

There was one gilt with a lowered lymphocyte and neutrophil count, this animal tested normal on clinical examination and no other change in white blood cell count is seen. Lowered neutrophil and lymphocyte counts could suggest underlying infection (subclinical) or a lowered immune system and should be interpreted with caution for now and suggest continuing monitoring this going forward.

Nasal Swabs (Glässer's disease)

Number	Animal	Test	Pathogen tested for	Result
1	Gilt	PCR	Glaesserella parasuis	Negative
2	Gilt	PCR	Glaesserella parasuis	Negative
3	Gilt	PCR	Glaesserella parasuis	Negative
4	Gilt	PCR	Glaesserella parasuis	Negative
5	Gilt	PCR	Glaesserella parasuis	Negative
6	Gilt	PCR	Glaesserella parasuis	Weak Positive
7	Gilt	PCR	Glaesserella parasuis	Positive
8	Gilt	PCR	Glaesserella parasuis	Negative
9	Gilt	PCR	Glaesserella parasuis	Negative
10	Gilt	PCR	Glaesserella parasuis	Negative

Remarks:

One positive and one weak positive result detected on PCR. Glaesserella parasuis is a commensal bacterium in the respiratory tract of the pig and in the absence of clinical disease does not necessarily suggest it to be a problem. (no clinical signs of Glässer's disease were observed during clinical examination of the gilts tested in the table above) Keep in mind that if the incidence of Glässer's increases on the test results even in the absence of clinical signs it should still warrant further investigation or may suggest a favourable lung environment for the bacterium.

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Conclusion

Test results and clinical assessment show minimal to no signs of infection, inflammation or other relevant conditions in the animals tested above.

Dr A.H Westerink

D18/11784

cs vet
Veterinary Consultancy

Topigs SA Dalplaas Health Monitoring Report 2024-04-30

Assessment and Sampling date: 2024-04-22

Nucleus A

Clinical Assessment:

Clinical examination of 30 pigs (10 sows, 10 suckling piglets, 10 replacement gilts)

Clinical assessments will be scored as follows:

- Habitus:
  - 0 – normal
  - 1 – listless
- Respiratory rate:
  - 0 – normal
  - 1 – slightly elevated
  - 2 – moderately elevated
  - 3 – clearly elevated, distinct abdominal breathing
- Nasal Discharge:
  - 0 – absent
  - 1 – present
- Coughing:
  - 0 – normal
  - 1 – mild
  - 2 – moderate
  - 3 – severe
- Sneezing:
  - 0 – absent
  - 1 – present
- Rectal temperature:
  - 0 – normal
  - 1 – elevated (above 40°C)

Number	Piglet/Gilt/Sow	Habitus	Respiratory rate	Nasal Discharge	Coughing	Sneezing	Rectal temp	Comment
1	Piglet	0	0	0	0	0	0	Clinically Normal
2	Piglet	0	0	0	0	0	0	Clinically Normal
3	Piglet	0	0	0	0	0	0	Clinically Normal
4	Piglet	0	0	0	0	0	0	Clinically Normal
5	Piglet	0	0	0	0	0	0	Clinically Normal
6	Piglet	0	0	0	0	0	0	Clinically Normal
7	Piglet	0	0	0	0	0	0	Clinically Normal
8	Piglet	0	0	0	0	0	0	Clinically Normal

9	Piglet	0	0	0	0	0	0	Clinically Normal
10	Piglet	0	0	0	0	0	0	Clinically Normal
11	Gilt	0	0	0	0	0	0	Clinically Normal
12	Gilt	0	0	0	0	0	0	Clinically Normal
13	Gilt	0	0	0	0	0	0	Clinically Normal
14	Gilt	0	0	0	0	0	0	Clinically Normal
15	Gilt	0	0	0	0	0	0	Clinically Normal
16	Gilt	0	0	0	0	0	0	Clinically Normal
17	Gilt	0	0	0	0	0	0	Clinically Normal
18	Gilt	0	0	0	0	0	1	Elevated rectal temperature of 40,5°C. Clinically the gilt was examined and found to be otherwise normal
19	Gilt	0	0	0	0	0	0	Clinically Normal
20	Gilt	0	0	0	0	0	0	Clinically Normal
21	Sow	0	0	0	0	0	0	Clinically Normal
22	Sow	0	0	0	0	0	0	Clinically Normal
23	Sow	0	0	0	0	0	0	Clinically Normal
24	Sow	0	0	0	0	0	0	Clinically Normal
25	Sow	0	0	0	0	0	0	Clinically Normal
26	Sow	0	0	0	0	0	0	Clinically Normal
27	Sow	0	0	0	0	0	0	Clinically Normal
28	Sow	0	0	0	0	0	0	Clinically Normal
29	Sow	0	0	0	0	0	0	Clinically Normal
30	Sow	0	0	0	0	0	0	Clinically Normal

Remarks:

On clinical examination one gilt had an elevated rectal temperature, the gilt tested normal on all the other clinical parameters. All the other animals that were examined during the clinical assessment were found to be clinically normal and within the expected clinical parameters of a healthy pig.

Laboratory analysis:

Haemoglobin (Hb):

% Anaemic	43%
% Low	20%
% Normal	37%

Number	Hb result	Interpretation
1	63	Anaemic
2	65	Anaemic
3	68	Anaemic
4	68	Anaemic
5	72	Anaemic
6	73	Anaemic
7	73	Anaemic
8	73	Anaemic

9	76	Anaemic
10	77	Anaemic
11	77	Anaemic
12	77	Anaemic
13	79	Anaemic
14	80	Low
15	80	Low
16	82	Low
17	86	Low
18	88	Low
19	89	Low
20	90	Normal
21	92	Normal
22	94	Normal
23	97	Normal
24	98	Normal
25	99	Normal
26	99	Normal
27	107	Normal
28	107	Normal
29	108	Normal
30	128	Normal

Remarks

Haemoglobin samples collected from suckling piglets on the caudal auricular vein prior to weaning showed that only 37% of the piglets had normal Hb levels, 20% of the piglets had low levels and 43% had levels indicating anaemia. Nucleus A had much lower Hb levels compared to all other units on Dalplaas. The Hb levels are lower than expected and should be monitored.

Amyloid A:

Number	Sow/Gilt	Result (mg/L)	Interpretation
1	Gilt	10,00	Normal
2	Gilt	<3	Normal
3	Gilt	3,70	Normal
4	Gilt	9,50	Normal
5	Gilt	<3	Normal
6	Gilt	<3	Normal
7	Gilt	<3	Normal
8	Gilt	8,60	Normal
9	Gilt	<3	Normal
10	Gilt	<3	Normal
11	Sow	<3	Normal
12	Sow	<3	Normal
13	Sow	<3	Normal
14	Sow	<3	Normal

15	Sow	<3	Normal
16	Sow	<3	Normal
17	Sow	<3	Normal
18	Sow	<3	Normal
19	Sow	<3	Normal
20	Sow	<3	Normal

Remarks:

All Amyloid A test results are below the cutoff reference range (<42,7mg/L) for pigs. No significant increase in Amyloid A levels is seen and results are therefore interpreted as normal. Amyloid A is an acute phase protein which is used as one of the health markers to assist with detecting inflammation or infection in animals. The marker can help determine disease severity if present.

Full blood counts:

Number	Gilt/Sow	Hb	Result	Interpretation
1	Gilt	Normal	Neutrophilia	Increased neutrophil count suggests form of infection, this is likely subclinical as the animal tested within normal limits on clinical exam
2	Gilt	Normal	Haematology results within normal parameters	Haematology normal
3	Gilt	Normal	Haematology results within normal parameters	Haematology normal
4	Gilt	Normal	Mild Neutrophilia	Slightly increased neutrophil count may suggest subclinical infection
5	Gilt	Normal	Haematology results within normal parameters	Haematology normal
6	Gilt	Normal	Haematology results within normal parameters	Haematology normal
7	Gilt	Normal	Haematology results within normal parameters	Haematology normal
8	Gilt	Low	Mild Lymphocytopenia	Lymphocyte count is slightly lowered. Haemoglobin is low.
9	Gilt	Normal	Haematology results within normal parameters	Haematology normal
10	Gilt	Normal	Haematology results within normal parameters	Haematology normal
11	Sow	Normal	Haematology results within normal parameters	Haematology normal
12	Sow	Normal	Haematology results within normal parameters	Haematology normal
13	Sow	Normal	Mild Lymphocytopenia	Mildly decreased Lymphocyte count
14	Sow	Normal	Haematology results within normal parameters	Haematology normal
15	Sow	Normal	Haematology results within normal parameters	Haematology normal
16	Sow	Normal	Haematology results within normal parameters	Haematology normal
17	Sow	Normal	Haematology results within normal parameter	Haematology normal
18	Sow	Normal	Haematology results within normal parameters	Haematology normal
19	Sow	Normal	Haematology results within normal parameters	Haematology normal
20	Sow	Normal	Haematology results within normal parameters	Haematology normal

Remarks

One of the main focus areas of full blood counts is examining the white blood cell counts. White blood cells are composed of neutrophils, lymphocytes, eosinophils, basophils and monocytes. White blood cell counts can be used to indicate infectious or inflammatory disorders among other conditions.

Two gilts showed increased neutrophil counts, this could possibly indicate a subclinical infection or recovery from an infection. Both animals tested within normal limits during the clinical examination, however gilt No. 4 tested positive for Glässer's disease on the PCR test which could explain the increased neutrophil count (see table below)

There were also two animals with slightly lowered Lymphocyte counts. In the absence of clinical symptoms and otherwise normal white blood cell counts it makes interpretation of a mild Lymphocytopenia difficult. One animal has a low haemoglobin count which suggests anaemia.

Nasal Swabs (Glässer's disease)

Number	Animal	Test	Pathogen tested for	Result
1	Gilt	PCR	Glaesserella parasuis	Negative
2	Gilt	PCR	Glaesserella parasuis	Negative
3	Gilt	PCR	Glaesserella parasuis	Negative
4	Gilt	PCR	Glaesserella parasuis	Positive
5	Gilt	PCR	Glaesserella parasuis	Negative
6	Gilt	PCR	Glaesserella parasuis	Negative
7	Gilt	PCR	Glaesserella parasuis	Negative
8	Gilt	PCR	Glaesserella parasuis	Negative
9	Gilt	PCR	Glaesserella parasuis	Positive
10	Gilt	PCR	Glaesserella parasuis	Negative

Remarks:

Two positive results detected on PCR. Glaesserella parasuis is a commensal bacterium in the respiratory tract of the pig and in the absence of clinical disease does not necessarily suggest it to be a problem. (no clinical signs of Glässer's disease were observed during clinical examination of the gilts tested in the table above, gilt No 4 did however have an elevated neutrophil count) Keep in mind that if the incidence of Glässer's increases on the test results even in the absence of clinical signs it should still warrant further investigation or may suggest a favourable lung environment for the bacterium.

Conclusion

Haemoglobin levels in suckling piglets prior to weaning are low and will be monitored going forward. There are some signs indicating infection (possibly subclinical) in a few animals when looking at the white blood cell counts and one of these animal's neutrophil count corresponds to a positive Glässer's disease result.

Multiplier

Clinical Assessment:

Number	Piglet/Gilt/Sow	Habitus	Respiratory rate	Nasal Discharge	Coughing	Sneezing	Rectal temp	Comment
1	Piglet	0	0	0	0	0	0	Clinically Normal
2	Piglet	0	0	0	0	0	0	Clinically Normal
3	Piglet	0	0	0	0	0	0	Clinically Normal
4	Piglet	0	0	0	0	0	0	Clinically Normal
5	Piglet	0	0	0	0	0	0	Clinically Normal

6	Piglet	0	0	0	0	0	0	Clinically Normal
7	Piglet	0	0	0	0	0	0	Clinically Normal
8	Piglet	0	0	0	0	0	0	Clinically Normal
9	Piglet	0	0	0	0	0	0	Clinically Normal
10	Piglet	0	0	0	0	0	0	Clinically Normal
11	Gilt	0	0	0	0	0	0	Clinically Normal
12	Gilt	0	0	0	0	0	0	Clinically Normal
13	Gilt	0	0	0	0	0	0	Clinically Normal
14	Gilt	0	0	0	0	0	0	Clinically Normal
15	Gilt	0	0	0	0	0	0	Clinically Normal
16	Gilt	0	0	0	0	0	0	Clinically Normal
17	Gilt	0	0	0	0	0	0	Clinically Normal
18	Gilt	0	0	0	0	0	0	Clinically Normal
19	Gilt	0	0	0	0	0	0	Clinically Normal
20	Gilt	0	0	0	0	0	0	Clinically Normal
21	Sow	0	0	0	0	0	0	Clinically Normal
22	Sow	0	0	0	0	0	0	Clinically Normal
23	Sow	0	0	0	0	0	0	Clinically Normal
24	Sow	0	0	0	0	0	0	Clinically Normal
25	Sow	0	0	0	0	0	0	Clinically Normal
26	Sow	0	0	0	0	0	0	Clinically Normal
27	Sow	0	0	0	0	0	0	Clinically Normal
28	Sow	0	0	0	0	0	0	Clinically Normal
29	Sow	0	0	0	0	0	0	Clinically Normal
30	Sow	0	0	0	0	0	0	Clinically Normal

Remarks:

All animals that were examined during the clinical assessment were found clinically normal and within the expected clinical parameters of a healthy pig.

Laboratory analysis:

Haemoglobin (Hb):

% Anaemic	0%
% Low	13,3%
% Normal	86,7%

Number	Hb result	Interpretation
1	103	Low
2	103	Low
3	105	Low
4	107	Low
5	110	Normal
6	110	Normal

7	112	Normal
8	112	Normal
9	113	Normal
10	113	Normal
11	114	Normal
12	114	Normal
13	116	Normal
14	118	Normal
15	119	Normal
16	119	Normal
17	121	Normal
18	121	Normal
19	121	Normal
20	122	Normal
21	123	Normal
22	124	Normal
23	125	Normal
24	126	Normal
25	129	Normal
26	129	Normal
27	132	Normal
28	134	Normal
29	134	Normal
30	143	Normal

Remarks

Haemoglobin samples collected from suckling piglets on the caudal auricular vein prior to weaning showed that 86,7% of the piglets had normal Hb levels, 13,3% of the piglets had low levels. Overall, this is an acceptable result, the aim is to get as close as possible to 100% normal levels.

Amyloid A:

Number	Sow/Gilt	Result (mg/L)	Interpretation
1	Gilt	<3	Normal
2	Gilt	<3	Normal
3	Gilt	<3	Normal
4	Gilt	<3	Normal
5	Gilt	<3	Normal
6	Gilt	<3	Normal
7	Gilt	<3	Normal
8	Gilt	<3	Normal
9	Gilt	<3	Normal
10	Gilt	<3	Normal
11	Sow	<3	Normal
12	Sow	<3	Normal

13	Sow	<3	Normal
14	Sow	<3	Normal
15	Sow	<3	Normal
16	Sow	<3	Normal
17	Sow	<3	Normal
18	Sow	<3	Normal
19	Sow	<3	Normal
20	Sow	9,30	Normal

Remarks:

All Amyloid A test results are below the cutoff reference range (<42,7mg/L) for pigs. No significant increase in Amyloid A levels is seen and results are therefore interpreted as normal. Amyloid A is an acute phase protein which is used as one of the health markers to assist with detecting inflammation or infection in animals. The marker can help determine disease severity if present.

Full blood counts:

Number	Gilt/Sow	Hb	Result	Interpretation
1	Gilt	Normal	Haematology results within normal parameters	Haematology normal
2	Gilt	Normal	Haematology results within normal parameters	Haematology normal
3	Gilt	Normal	Haematology results within normal parameters	Haematology normal
4	Gilt	Normal	Haematology results within normal parameters	Haematology normal
5	Gilt	Normal	Haematology results within normal parameters	Haematology normal
6	Gilt	Normal	Mild neutropenia	Neutrophil count is slightly lowered
7	Gilt	Normal	Haematology results within normal parameters	Haematology normal
8	Gilt	Normal	Haematology results within normal parameters	Haematology normal
9	Gilt	Normal	Haematology results within normal parameters	Haematology normal
10	Gilt	Normal	Haematology results within normal parameters	Haematology normal
11	Sow	Normal	Haematology results within normal parameters	Haematology normal
12	Sow	Normal	Mild Lymphocytopenia	Lymphocyte count is slightly lowered
13	Sow	Normal	Haematology results within normal parameters	Haematology normal
14	Sow	Normal	Haematology results within normal parameters	Haematology normal
15	Sow	Normal	Mild Lymphocytopenia	Lymphocyte count is slightly lowered
16	Sow	Normal	Mild Lymphocytopenia	Lymphocyte count is slightly lowered
17	Sow	Normal	Haematology results within normal parameters	Haematology normal
18	Sow	Normal	Haematology results within normal parameters	Haematology normal
19	Sow	Normal	Haematology results within normal parameters	Haematology normal
20	Sow	Normal	Haematology results within normal parameters	Haematology normal

Remarks

One of the main focus areas of full blood counts is examining the white blood cell counts. White blood cells are composed of neutrophils, lymphocytes, eosinophils, basophils and monocytes. White blood cell counts can be used to indicate infectious or inflammatory disorders among other conditions.

There were a few animals with slightly lowered Lymphocyte counts and one with a slightly lowered neutrophil count, all animals tested normal on clinical examination and no other change in white blood cell count is seen. Lowered neutrophil and lymphocyte counts could suggest underlying infection (subclinical) or lowered immune systems and should be interpreted with caution for now and suggest continuing monitoring this going forward.

Nasal Swabs (Glässer's disease)

Number	Test	Pathogen tested for	Result
1	PCR	Glaesserella parasuis	Negative
2	PCR	Glaesserella parasuis	Negative
3	PCR	Glaesserella parasuis	Negative
4	PCR	Glaesserella parasuis	Negative
5	PCR	Glaesserella parasuis	Negative
6	PCR	Glaesserella parasuis	Negative
7	PCR	Glaesserella parasuis	Negative
8	PCR	Glaesserella parasuis	Negative
9	PCR	Glaesserella parasuis	Negative
10	PCR	Glaesserella parasuis	Positive

Remarks:

One positive result detected on PCR. Glaesserella parasuis is a commensal bacterium in the respiratory tract of the pig and in the absence of clinical disease does not necessarily suggest it to be a problem. (no clinical signs of Glässer's disease were observed during clinical examination of the gilts tested in the table above) Keep in mind that if the incidence of Glässer's increases on the test results even in the absence of clinical signs it should still warrant further investigation or may suggest a favourable lung environment for the bacterium.

Conclusion

There does not appear to be any significant signs of active infection or inflammation. Lowered Lymphocyte and neutrophil counts will be monitored going forward, if these results are continuously seen in future tests, then further investigation is warranted.

Research

Clinical Assessment:

Number	Piglet/Gilt/Sow	Habitus	Respiratory rate	Nasal Discharge	Coughing	Sneezing	Rectal temp	Comment
1	Piglet	0	0	0	0	0	0	Clinically Normal
2	Piglet	0	0	0	0	0	0	Clinically Normal
3	Piglet	0	0	0	0	0	0	Clinically Normal
4	Piglet	0	0	0	0	0	0	Clinically Normal
5	Piglet	0	0	0	0	0	0	Clinically Normal
6	Piglet	0	0	0	0	0	0	Clinically Normal
7	Piglet	0	0	0	0	0	0	Clinically Normal

8	Piglet	0	0	0	0	0	0	Clinically Normal
9	Piglet	0	0	0	0	0	0	Clinically Normal
10	Piglet	0	0	0	0	0	0	Clinically Normal
11	Gilt	0	0	0	0	0	0	Clinically Normal
12	Gilt	0	0	0	0	0	0	Clinically Normal
13	Gilt	0	0	0	0	0	0	Clinically Normal
14	Gilt	0	0	0	0	0	0	Clinically Normal
15	Gilt	0	0	0	0	0	0	Clinically Normal
16	Gilt	0	0	0	0	0	0	Clinically Normal
17	Gilt	0	0	0	0	0	0	Clinically Normal
18	Gilt	0	0	0	0	0	0	Clinically Normal
19	Gilt	0	0	0	0	0	0	Clinically Normal
20	Gilt	0	0	0	0	0	0	Clinically Normal
21	Sow	0	0	0	0	0	0	Clinically Normal
22	Sow	0	0	0	0	0	0	Clinically Normal
23	Sow	0	0	0	0	0	0	Clinically Normal
24	Sow	0	0	0	0	0	0	Clinically Normal
25	Sow	0	0	0	0	0	0	Clinically Normal
26	Sow	0	0	0	0	0	0	Clinically Normal
27	Sow	0	0	0	0	0	0	Clinically Normal
28	Sow	0	0	0	0	0	0	Clinically Normal
29	Sow	0	0	0	0	0	0	Clinically Normal
30	Sow	0	0	0	0	0	0	Clinically Normal

Remarks:

All animals that were examined during the clinical assessment were found clinically normal and within the expected clinical parameters of a healthy pig.

Laboratory analysis:

Haemoglobin (Hb):

% Anaemic	3,3%
% Low	26,7%
% Normal	70%

Number	Hb result	Interpretation
1	87	Anaemic
2	93	Low
3	93	Low
4	98	Low
5	98	Low
6	105	Low
7	105	Low
8	106	Low

9	108	Low
10	110	Normal
11	112	Normal
12	113	Normal
13	113	Normal
14	115	Normal
15	118	Normal
16	118	Normal
17	118	Normal
18	119	Normal
19	120	Normal
20	120	Normal
21	121	Normal
22	121	Normal
23	123	Normal
24	123	Normal
25	123	Normal
26	125	Normal
27	125	Normal
28	128	Normal
29	133	Normal
30	135	Normal

Remarks

Haemoglobin samples collected from suckling piglets on the caudal auricular vein prior to weaning showed that 70% of the piglets had normal Hb levels, 26,7% of the piglets had low levels and 3,3% were anaemic. Few anaemic levels were detected but would expect to see more normal Hb levels.

Amyloid A:

Number	Sow/Gilt	Result (mg/L)	Interpretation
1	Gilt	<3	Normal
2	Gilt	<3	Normal
3	Gilt	<3	Normal
4	Gilt	<3	Normal
5	Gilt	<3	Normal
6	Gilt	5,40	Normal
7	Gilt	<3	Normal
8	Gilt	<3	Normal
9	Gilt	<3	Normal
10	Gilt	<3	Normal
11	Sow	<3	Normal
12	Sow	<3	Normal
13	Sow	3,20	Normal
14	Sow	<3	Normal
15	Sow	<3	Normal

16	Sow	<3	Normal
17	Sow	<3	Normal
18	Sow	<3	Normal
19	Sow	<3	Normal
20	Sow	9,30	Normal

Remarks:

All Amyloid A test results are below the cutoff reference range (<42,7mg/L) for pigs. No significant increase in Amyloid A levels is seen and results are therefore interpreted as normal. Amyloid A is an acute phase protein which is used as one of the health markers to assist with detecting inflammation or infection in animals. The marker can help determine disease severity if present.

Full blood counts:

Number	Gilt/Sow	Hb	Result	Interpretation
1	Gilt	Normal	Haematology results within normal parameters	Haematology normal
2	Gilt	Normal	Haematology results within normal parameters	Haematology normal
3	Gilt	Normal	Haematology results within normal parameters	Haematology normal
4	Gilt	Normal	Haematology results within normal parameters	Haematology normal
5	Gilt	Normal	Neutropenia	Low Neutrophil count
6	Gilt	Normal	Haematology results within normal parameters	Haematology normal
7	Gilt	Normal	Haematology results within normal parameters	Haematology normal
8	Gilt	Normal	Haematology results within normal parameters	Haematology normal
9	Gilt	Normal	Haematology results within normal parameters	Haematology normal
10	Gilt	Normal	Haematology results within normal parameters	Haematology normal
11	Sow	Normal	Lymphocytopenia	Low Lymphocyte count
12	Sow	Normal	Haematology results within normal parameters	Haematology normal
13	Sow	Normal	Haematology results within normal parameters	Haematology normal
14	Sow	Normal	Haematology results within normal parameters	Haematology normal
15	Sow	Normal	Haematology results within normal parameters	Haematology normal
16	Sow	Normal	Haematology results within normal parameters	Haematology normal
17	Sow	Normal	Haematology results within normal parameters	Haematology normal
18	Sow	Normal	Haematology results within normal parameters	Haematology normal
19	Sow	Normal	Haematology results within normal parameters	Haematology normal
20	Sow	Normal	Haematology results within normal parameters	Haematology normal

Remarks

One of the main focus areas of full blood counts is examining the white blood cell counts. White blood cells are composed of neutrophils, lymphocytes, eosinophils, basophils and monocytes. White blood cell counts can be used to indicate infectious or inflammatory disorders among other conditions.

There was one sow with a lowered lymphocyte count and one gilt with a lowered neutrophil count, all animals tested normal on clinical examination and no other change in white blood cell count is seen. Very low neutrophil and lymphocyte counts could suggest underlying infection (subclinical) or lowered immune systems and should be interpreted with caution for now and suggest continuing monitoring this going forward.

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Nasal Swabs (Glässer's disease)

Number	Test	Pathogen tested for	Result
1	PCR	Glaesserella parasuis	Negative
2	PCR	Glaesserella parasuis	Positive
3	PCR	Glaesserella parasuis	Negative
4	PCR	Glaesserella parasuis	Negative
5	PCR	Glaesserella parasuis	Negative
6	PCR	Glaesserella parasuis	Negative
7	PCR	Glaesserella parasuis	Negative
8	PCR	Glaesserella parasuis	Negative
9	PCR	Glaesserella parasuis	Negative
10	PCR	Glaesserella parasuis	Negative

Remarks:

One positive result detected on PCR. Glaesserella parasuis is a commensal bacterium in the respiratory tract of the pig and in the absence of clinical disease does not necessarily suggest it to be a problem. (no clinical signs of Glässer's disease were observed during clinical examination of the gilts tested in the table above) Keep in mind that if the incidence of Glässer's increases on the test results even in the absence of clinical signs it should still warrant further investigation or may suggest a favourable lung environment for the bacterium.

Conclusion

There does not appear to be any significant signs of active infection or inflammation. Low Lymphocyte and neutrophil counts will be monitored going forward, if these results are continuously seen in future tests, then further investigation is warranted.

Dr A.H. Westerink

D18/11784

cs vet
Veterinary Consultancy

GHB Spitskop Health Monitoring Report 2024-04-30

Assessment and Sampling date: 2024-04-23

Clinical Assessment:

Clinical examination of 30 pigs (10 sows, 10 suckling piglets, 10 replacement gilts)

Clinical assessments will be scored as follows:

- Habitus:
  - 0 – normal
  - 1 – listless
- Respiratory rate:
  - 0 – normal
  - 1 – slightly elevated
  - 2 – moderately elevated
  - 3 – clearly elevated, distinct abdominal breathing
- Nasal Discharge:
  - 0 – absent
  - 1 – present
- Coughing:
  - 0 – normal
  - 1 – mild
  - 2 – moderate
  - 3 – severe
- Sneezing:
  - 0 – absent
  - 1 – present
- Rectal temperature:
  - 0 – normal
  - 1 – elevated (above 40°C)

Number	Piglet/Gilt/Sow	Habitus	Respiratory rate	Nasal Discharge	Coughing	Sneezing	Rectal temp	Comment
1	Piglet	0	0	0	0	0	0	Clinically Normal
2	Piglet	0	0	0	0	0	0	Clinically Normal
3	Piglet	0	0	0	0	0	0	Clinically Normal
4	Piglet	0	0	0	0	0	0	Clinically Normal
5	Piglet	0	0	0	0	0	0	Clinically Normal
6	Piglet	0	0	0	0	0	0	Clinically Normal
7	Piglet	0	0	0	0	0	0	Clinically Normal
8	Piglet	0	0	0	0	0	0	Clinically Normal

9	Piglet	0	0	0	0	0	0	Clinically Normal
10	Piglet	0	0	0	0	0	0	Clinically Normal
11	Gilt	0	0	0	0	0	0	Clinically Normal
12	Gilt	0	0	0	0	0	0	Clinically Normal
13	Gilt	0	0	0	0	0	0	Clinically Normal
14	Gilt	0	0	0	0	0	0	Clinically Normal
15	Gilt	0	0	0	0	0	0	Clinically Normal
16	Gilt	0	0	0	0	0	0	Clinically Normal
17	Gilt	0	0	0	0	0	0	Clinically Normal
18	Gilt	0	0	0	0	0	0	Clinically Normal
19	Gilt	0	0	0	0	0	0	Clinically Normal
20	Gilt	0	0	0	0	0	0	Clinically Normal
21	Sow	0	0	0	0	0	0	Clinically Normal
22	Sow	0	0	0	0	0	0	Clinically Normal
23	Sow	0	0	0	0	0	0	Clinically Normal
24	Sow	0	0	0	0	0	0	Clinically Normal
25	Sow	0	0	0	0	0	0	Clinically Normal
26	Sow	0	0	0	0	0	0	Clinically Normal
27	Sow	0	0	0	0	0	0	Clinically Normal
28	Sow	0	0	0	0	0	0	Clinically Normal
29	Sow	0	0	0	0	0	0	Clinically Normal
30	Sow	0	0	0	0	0	0	Clinically Normal

Remarks:

All animals that were examined during the clinical assessment were all found clinically normal and within the expected clinical parameters of a healthy pig.

Laboratory analysis:

Haemoglobin:

% Anaemic	13,3%
% Low	66,7%
% Normal	20%

Number	Hb result	Interpretation
1	75	Anaemic
2	76	Anaemic
3	86	Anaemic
4	87	Anaemic
5	95	Low
6	95	Low
7	99	Low
8	99	Low
9	99	Low

10	100	Low
11	102	Low
12	102	Low
13	102	Low
14	102	Low
15	103	Low
16	103	Low
17	103	Low
18	104	Low
19	105	Low
20	105	Low
21	106	Low
22	106	Low
23	107	Low
24	109	Low
25	110	Normal
26	110	Normal
27	111	Normal
28	112	Normal
29	114	Normal
30	114	Normal

Remarks

Haemoglobin samples collected from suckling piglets on the caudal auricular vein prior to weaning showed that only 20% of the piglets had normal Hb levels, 66,7% of the piglets had low levels and 13,3% had levels indicating anaemia. The Hb levels are lower than expected and should be monitored.

Amyloid A:

Number	Sow/Gilt	Result (mg/L)	Interpretation
1	Gilt	<3	Normal
2	Gilt	<3	Normal
3	Gilt	<3	Normal
4	Gilt	<3	Normal
5	Gilt	<3	Normal
6	Gilt	<3	Normal
7	Gilt	<3	Normal
8	Gilt	<3	Normal
9	Gilt	<3	Normal
10	Gilt	<3	Normal
11	Sow	<3	Normal
12	Sow	<3	Normal
13	Sow	<3	Normal
14	Sow	<3	Normal
15	Sow	<3	Normal
16	Sow	<3	Normal

17	Sow	<3	Normal
18	Sow	7,40	Normal
19	Sow	<3	Normal
20	Sow	<3	Normal

Remarks:

All Amyloid A test results are below the cutoff reference range(<42,7mg/L) for pigs. No significant increase in Amyloid A levels is seen and results are therefore interpreted as normal. Amyloid A is an acute phase protein which is used as one of the health markers to assist with detecting inflammation or infection in animals. The marker can help determine disease severity if present.

Full blood counts:

Number	Gilt/Sow	Hb	Result	Interpretation
1	Gilt	Normal	Haematology results within normal parameters	Haematology normal
2	Gilt	Normal	Haematology results within normal parameters	Haematology normal
3	Gilt	Normal	Haematology results within normal parameters	Haematology normal
4	Gilt	Normal	Haematology results within normal parameters	Haematology normal
5	Gilt	Normal	Haematology results within normal parameters	Haematology normal
6	Gilt	Normal	Haematology results within normal parameters	Haematology normal
7	Gilt	Normal	Haematology results within normal parameters	Haematology normal
8	Gilt	Normal	Haematology results within normal parameters	Haematology normal
9	Gilt	Normal	Mild Lymphocytopenia	Lymphocyte count is slightly low
10	Gilt	Normal	Haematology results within normal parameters	Haematology normal
11	Sow	Normal	Haematology results within normal parameters	Haematology normal
12	Sow	Normal	Neutrophilia and mild Lymphocytopenia	Increased Neutrophil count and slightly lowered Lymphocyte count
13	Sow	Normal	Moderate neutrophilia	Moderately high neutrophil count
14	Sow	Normal	Haematology results within normal parameters	Haematology normal
15	Sow	Normal	Haematology results within normal parameters	Haematology normal
16	Sow	Normal	Haematology results within normal parameters	Haematology normal
17	Sow	Normal	Haematology results within normal parameters	Haematology normal
18	Sow	Normal	Haematology results within normal parameters	Haematology normal
19	Sow	Normal	Haematology results within normal parameters	Haematology normal
20	Sow	Normal	Haematology results within normal parameters	Haematology normal

Remarks

One of the main focus areas of full blood counts is examining the white blood cell counts. White blood cells are composed of neutrophils, lymphocytes, eosinophils, basophils and monocytes. White blood cell counts can be used to indicate infectious or inflammatory disorders among other conditions.

One sow had a moderately high neutrophil count, this animal tested normal on clinical examination which likely suggests a subclinical infection. There was another sow with an elevated neutrophil count and a lowered lymphocyte count, this animal also tested normal on clinical examination. An elevated neutrophil count and lowered lymphocyte count could suggest underlying infection (subclinical) or recovery from an

active infection. One gilt had a lowered lymphocyte count which may indicate subclinical infection or a lowered immune system and should be interpreted with caution.

Nasal Swabs (Glässer's disease)

Number	Test	Pathogen tested for	Result
1	PCR	Glaesserella parasuis	Positive
2	PCR	Glaesserella parasuis	Negative
3	PCR	Glaesserella parasuis	Negative
4	PCR	Glaesserella parasuis	Negative
5	PCR	Glaesserella parasuis	Negative
6	PCR	Glaesserella parasuis	Negative
7	PCR	Glaesserella parasuis	Negative
8	PCR	Glaesserella parasuis	Negative
9	PCR	Glaesserella parasuis	Negative
10	PCR	Glaesserella parasuis	Positive

Remarks:

Two positive results detected on PCR. Glaesserella parasuis is a commensal bacterium in the respiratory tract of the pig and in the absence of clinical disease does not necessarily suggest it to be a problem. (no clinical signs of Glässer's disease were observed during clinical examination of the gilts tested in the table above) Keep in mind that if the incidence of Glässer's increases on the test results even in the absence of clinical signs it should still warrant further investigation or may suggest a favourable lung environment for the bacterium.

Conclusion

There are some signs of infection and inflammation seen with white blood cell counts, this likely suggests a low incidence of subclinical infection. Changes in white blood cell counts will be monitored going forward. Haemoglobin levels in piglets are lower than expected and will be monitored.

Dr A.H. Westerink

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