

Gourikwa Power Station

Annual Report 2024



COMPILED BY: Maureen Dlulisa

DATE: June 2024

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1. ENTERPRISE DETAILS

1.1 ENTERPRISE DETAILS

Enterprise Name	Eskom Holdings SOC Limited
Trading As	Gourikwa Power Station
Enterprise Registration Number	2002/015527/30
Registered Address	Rosenpark, 15 Pasista Street, Bellville
Postal Address	P O Box 10438, Dana Bay, 6510
General Telephone Number	044 606 3400
Industry Sector	Electricity Generation
Name of the Responsible Officer	Pamela Mrubata (Plant Manager)
Name of Emission Control Officer	Maureen Dlulisa
Telephone Number	021 573 6000
Cellular Phone Number	083 404 9740
Fax Number	086 538 6505
Email Address	Dlulism@eskom.co.za
After Hours Contact Details	083 404 9740
Land Use Zoning as per Town Planning Scheme	INDUSTRIAL Zone 1

1.2 FACILITY BACKGROUND LOCATION AND EXTENT OF THE PLANT

Physical Address of Premises	PetroSA Landfill Site Mossel Bay, 6500
Description of Site	Gourikwa power plant is located approximately 13km west of Mossel Bay, and approximately 1km west of the PetroSA facility, north of the N2.
Co-ordinates of Centre of Operations	Latitude: 34.164722° Longitude: 21.961667°
Property Registration Number (Surveyor - General Code)	W043C051000000000399000000
Extent (km ²)	81.8908 hectares
Elevation Above Mean Sea Level (m)	190 m
Province	Western Cape
District Municipality	Garden Route District Municipality
Local Municipality	Mossel Bay Local Municipality
Designated Priority Area	N/a

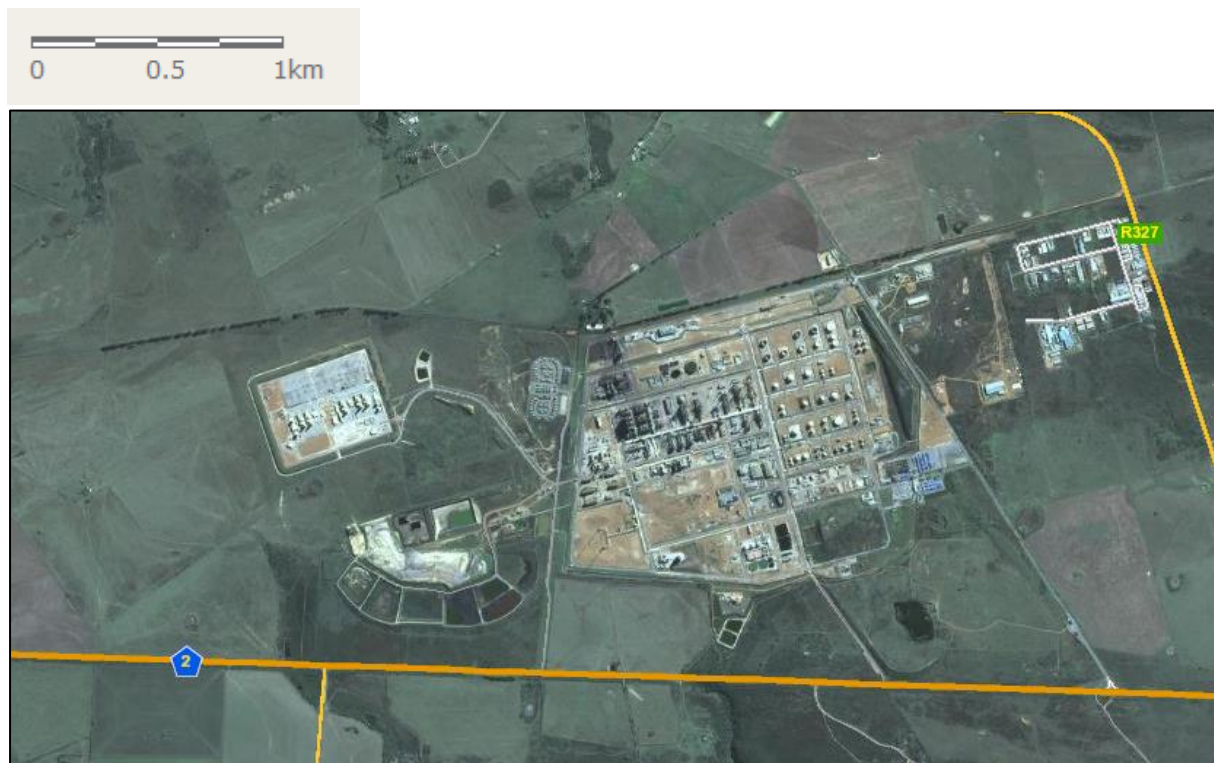


Figure 1: Gourikwa in relation to its surroundings

All areas within a 5 km radius;

- North:
 - Agricultural
- East:
 - Petro SA Industrial: 1 km
 - Mossel Bay Residential 9.9 km
- South East:
 - Dana Bay Residential 6.8 km
- South:
 - Waste Disposal Site 0.5 km
 - Transportation: N3 1.2 km
 - Agricultural > 5km
- West:
 - Agricultural

1.3 ATMOSPHERIC EMISSION LICENSE AND OTHER AUTHORISATIONS

Name of Licensing Authority	Garden Route District Municipality
Atmospheric Emission License Number	WCED013
Date that AEL was Issued	17 May 2023
Type of AEL	Full
Review Date	Annually on a date determined by Licensing Authority
Renewal Application Date	30 April 2028

2. NATURE OF THE PROCESS

2.1 LISTED ACTIVITY

Listed Activity No.	Category of Listed Activity	Sub-category of Listed Activity	Listed Activity Name	Description of Listed Activity
1	Category 1	Subcategory 1.2	Liquid fuel combustion installations	Liquid fuels combustion installations used primarily for steam raising or electricity generation.
2	Category 2	Subcategory 2.4:	Storage and Handling of Petroleum Products.	Petroleum product storage tanks and product transfer facilities, except those used for liquefied petroleum gas.

2.3 UNIT PROCESSES

Unit Process	Function of Unit Process	Batch or Continuous Process
Unit 11	Power Generation 150MW	Intermittent
Unit 12	Power Generation 150MW	Intermittent
Unit 13	Power Generation 150MW	Intermittent
Unit 21	Power Generation 150MW	Intermittent
Unit 22	Power Generation 150MW	Intermittent
Fuel storage	Fuel storage	Continuous

3. TECHNICAL INFORMATION

3.1 RAW MATERIALS USED

Regulated Raw Materials		
Raw Material Type	Maximum Permitted Consumption Rate (Quantity)	Units (quantity/period)
Diesel	40 000	Litre/hour/unit
Non-regulated Raw Materials		
Raw Material Type	Maximum Permitted Consumption Rate (Quantity)	Units (quantity/period)
Environmentally friendly solvent	100L mixed with 400L water per unit	L/Month/unit

* Regulated raw materials refers to those materials when increased or decreased may result in the change of air emissions output.

* Non-regulated raw materials refer to those materials when increased or decreased may not result in any change of air emissions output.

Materials for Energy Source	Actual Consumption Rate (Quantity)	Units (quantity / period)	Max Sulphur Content of Fuel (%)	Max Ash Content of Fuel (%)
Diesel	40 000	Litres/hour/unit	0.05	Trace amounts

3.2 APPLIANCES AND ABATEMENT EQUIPMENT CONTROL TECHNOLOGY

Appliances				Air Pollution Control Technology							
Associate d Source Code/ Stack I.D.	Appliance / Process Equipment Number	Appliance type/ Descriptio n	Appliance Serial Number	Appliance Manufactu re Date	Product Name and Model	Technolog y Type	Commissi on Date	Date of Significant Modificati on /Upgrade	Design Capacity	Permitted Minimum Control Efficiency (%)	Permitted Minimum Utilization (%)
Unit 11	11MBM12	Low NO _x burners	N/A	Unknown	CEMS Analyzer	(Siemens)	2007	n/a	N/A	NO _x emissions < 250 mgNm ³¹	100%
Unit 12	12MBM12	Low NO _x burners	N/A	Unknown	CEMS Analyzer	(Siemens)	2007	n/a	N/A		100%
Unit 13	13MBM12	Low NO _x burners	N/A	Unknown	CEMS Analyzer	(Siemens)	2007	n/a	N/A		100%
Unit 21	21MBM12	Low NO _x burners	N/A	Unknown	CEMS Analyzer	(Siemens)	2008	n/a	N/A		100%
Unit 22	22MBM12	Low NO _x burners	N/A	Unknown	CEMS Analyzer	(Siemens)	2008	n/a	N/A		100%

¹ As per license

4. ATMOSPHERIC EMISSIONS:

4.1 POINT SOURCE PARAMETERS

Point Source code/ stack I.D.	Source name	Latitude (decimal degrees)	Longitude (decimal degrees)	Height of Release Above Ground (m)	Height Above Nearby Building (m)	Diameter at Stack Tip / Vent Exit (m)	Actual Gas Exit Temperature (°C)	Actual Gas Volumetric Flow (m³/hr)	Actual Gas Exit Velocity (m/s)
1	Stack 11	34.166641	21.961986	30	18	6	560	1200	40
2	Stack 12	34.166399	21.962847	30	18	6	560	1200	40
3	Stack 13	34.166283	21.963260	30	18	6	560	1200	40
4	Stack 21	34.167331	21.959516	30	18	6	560	1200	40
5	Stack 22	34.167211	21.959926	30	18	6	560	1200	40

4.2 FUGITIVE EMISSIONS (AREA AND OR LINE SOURCES)

The fuel storage tanks vent to the atmosphere. No fugitive monitoring is conducted on site. The Environmental Management Plan is however in place, which guides the processes and procedures to be taken in the event of a leak. Any leaks are logged, managed and reported.

4.3 EMERGENCY INCIDENTS

No incidents occurred during the period under review.

4.4 EMISSIONS

Table 1: General overview of emissions Gourikwa Power Station - 2021/2022 to 2023/2024

Year	NO _x Total (Tons/annum	PM Total (Tons/annum	SO ₂ Total (Tons/annum	CO ₂ Total (Tons/annum
2023/2024	2072.258	0	9.309	1671361.70
2022/2023	1603.148	0.008	7.418	1370668.55
2021/2022	746.932	0.017	911.097	714559.50

Table 2: Annual Figures of emissions, energy sent out and fuel usage at Gourikwa Power Station 2021/2022 – 2023/2024

Year	Energy Sent Out (GWh)	Diesel used (tons)
2023/2024	2038.316	514 198.89
2022/2023	1681.217	425 567.226
2021/2022	870.396	227 774.452

Table 3: Pollutant Emission Trends for 2023/2024 financial year

Financial Year 2023/2024						
Month	NO _x (tons) Calculated Values	SO ₂ (tons) Calculated Values	CO ₂ (tons) Calculated Values	PM (tons) Measured Values	Diesel consumed (tons)	GWh Sent Out
Apr 2023	182135.0	688.0	150 339. 239	0	46 776.12	184.931
May 2023	288944.0	1306.0	229 025 991	0	71 258.50	281.981
June 2023	166304.0	655.0	126 206 605	0	39 267.56	155.567
July 2023	203770.0	768.0	157 306 060	0	48 943.76	196.903
Aug 2023	139675.0	530.0	102 893 051	0	32 013.85	127.308
Sept 2023	153464.0	541.0	116 799 018	0	36 340.51	145.316
Oct 2023	144399.0	599.0	112 648 427	0	35 049.11	140.566
Nov 2023	300073.0	1607.0	250 646 433	0	77 985.42	308.504
Dec 2023	78291.0	460.0	64 941 167	0	20 205.61	80.023
Jan 2024	97482.0	441.0	81 356 285	0	25 312.96	99.168
Feb 2024	161926.0	736.0	132 465 899	0	41 215.06	160.918
Mar 2024	155795.0	978.0	128 015 624	0	39 830.42	157.131
Totals	2072258.00	9309.0	1 652 643. 799	0	514 198.89	2038.316

The station reports on calculated CO₂ values for consistency otherwise SO₂, PM and NO_x are measured as reported in monthly emission reports.

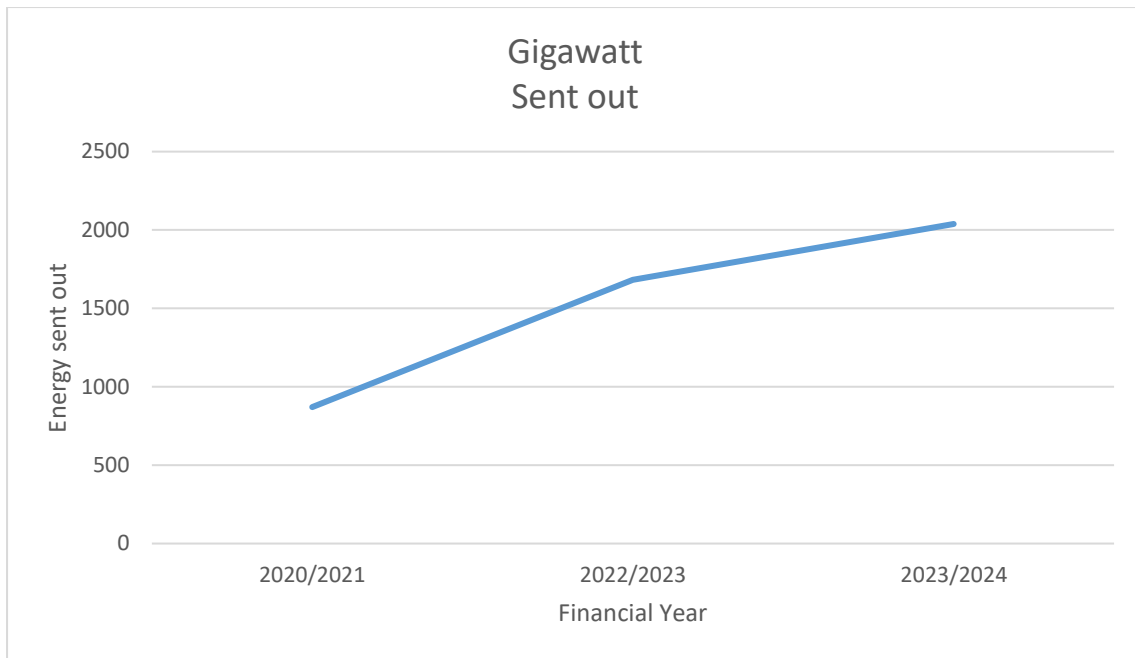


Figure 1: Annual GWh sent out between 2021 and 2024 for Gourikwa Power Station

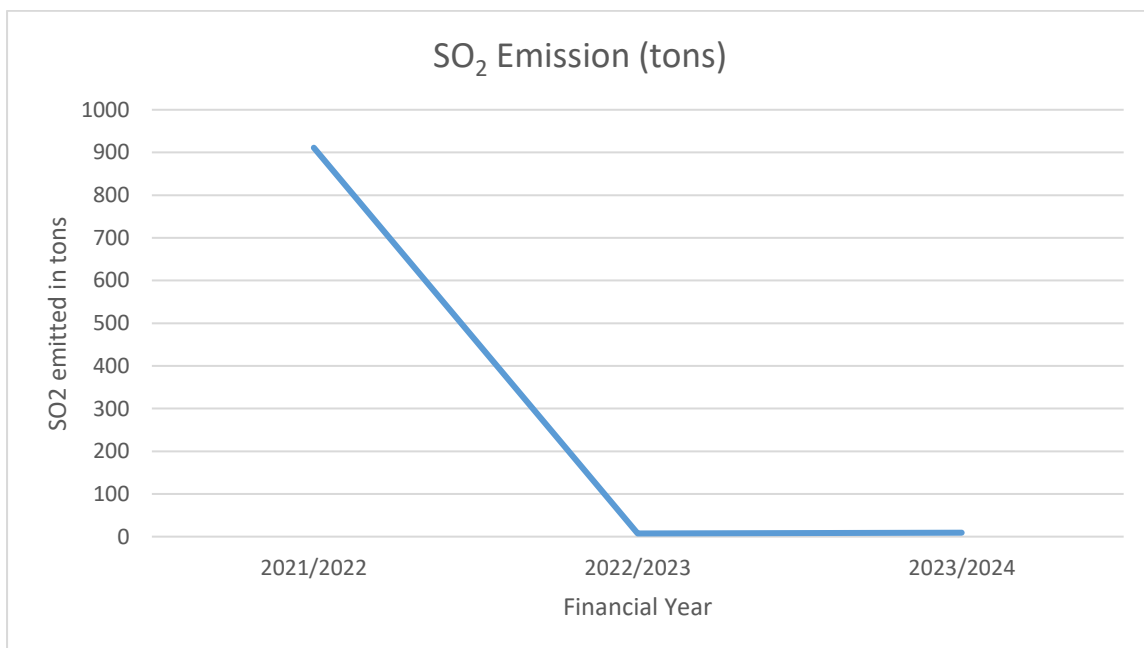


Figure 2: Annual SO₂ Emissions in tons between 2021 and 2024 for Gourikwa Power Station

*Reduction in SO₂ emissions is due to the lower Sulphur content in the Diesel currently used by the Power Station

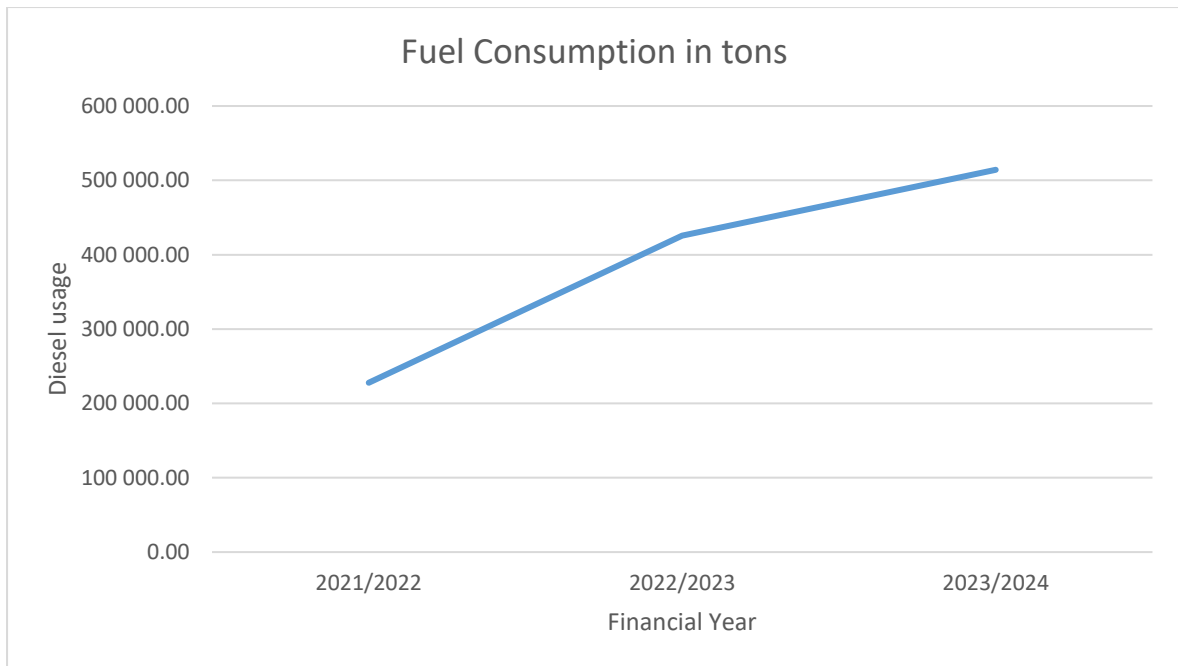


Figure 3: Annual fuel usage in tons between 2021 and 2024 for Gourikwa Power Station

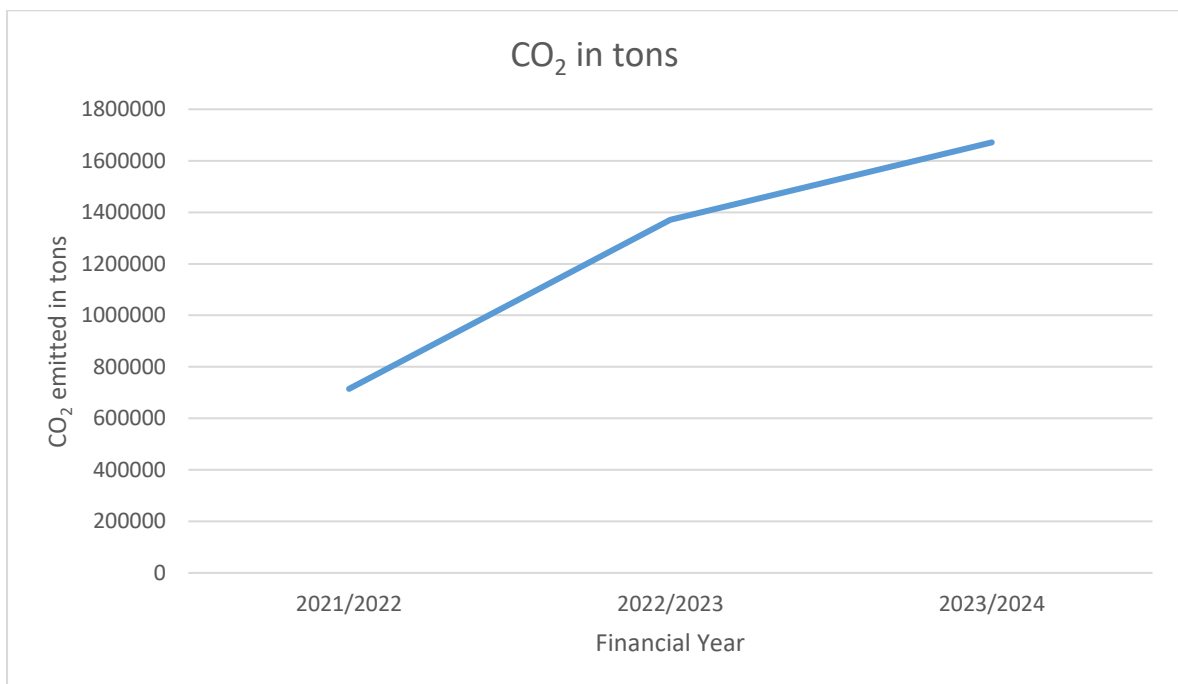


Figure 4: Monthly CO₂ Emissions in tons between 2021 and 2024 for Gourikwa Power Station

5. IMPACT OF ENTERPRISE ON THE RECEIVING ENVIRONMENT

5.1 ANALYSIS OF EMISSIONS' IMPACT ON HUMAN HEALTH

The Ambient Monitoring Station is located at the Garden Route District Municipal offices. Monthly reports are received, and analysis of emissions is done.

5.2 ANALYSIS OF EMISSIONS' IMPACT ON THE ENVIRONMENT

No analysis conducted during 2023/24 financial year period.

6. COMPLAINTS

No complaints were received in the past financial year. No complaints have been received for the last five years.

7. CURRENT OR PLANNED AIR QUALITY MANAGEMENT INTERVENTIONS

No planned air quality management interventions for the foreseeable future.

8. COMPLIANCE AND ENFORCEMENT HISTORY

Eskom Gourikwa Power Station is within AEL limits for Sulphur Dioxide, Oxides of Nitrogen Particulate Matter. The station still calculates Carbon Dioxide emissions.

No air quality related enforcement actions have been taken against Gourikwa Power Station.

8.1 CONTINUOUS EMISSION MONITORING SYSTEM

All 5 units are internally calibrated, annually, by station technicians and every second year calibrated by an external service provider. The last external calibration was done in May 2022. (Calibration certificates are attached to this report as well as the annual emission testing).

8.2 COMPLIANCE AUDIT REPORT(S):

No compliance audit was undertaken in period under review.

8.3 ABATEMENT EQUIPMENT CONTROL TECHNOLOGY AVAILABILITY (%)

The abatement technology (low NOx burners) was available 100% of the time while the units were in generating mode.

On average, 98% of the hourly values from the CEMS were valid in the past financial year.

Monitoring data availability

Table 4: General oversight of monitoring data availability

	Unit 11	Unit 12	Unit 13	Unit 21	Unit 22
PM	8759	8759	8760	8759	8759
SO ₂	8759	8759	8760	8759	8759
NOx	8759	8759	8760	8759	8759
CO	8759	8759	8760	8759	8759

CEMS at Gourikwa Power Station, for the period 2023/2024 in terms of the number of full hours that valid results were obtained for the CEMS is approximately 99% of the time.

8.4 LEAK DETECTION AND REPAIR PROGRAMME

The station has not had any major fuel leaks that required reporting in terms of the Leak Detection and Repair Programme or legislation. Plant walk downs are performed at the start of every shift as per procedure (Weekly Inspection and Routine Operation of Power Station, Doc No.: OP-UCA-001r).

8.5 BTEX MONITORING

The station is required, in terms of the Atmospheric Emission Licence condition 7.6.2, to conduct a 2-week sampling regime in April and October and to submit the report to the authorities. In the period under review in October 2023, report was sent to the authorities and will again be attached to this annual report.

8.6 NAEIS REPORTING

Eskom has reported Gourikwa Power Station's emissions as per the NAEIS system requirement and is currently being reviewed/audited.

Hoping the above will meet your satisfaction. For any queries please do not hesitate to contact Maureen Dlulisa (021 573 6162).

Yours sincerely



Pamela Mrubata
GOURIKWA POWER STATION

10. FORMAL DECLARATIONS

10.1 ANNEXURE A: DECLARATION OF ACCURACY OF INFORMATION

Please sign a written declaration indicating that the contents of annual report is true reflection of information provided.

STACK EMISSIONS MONITORING REPORT 2022



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Jacques Le Roux

Technical Director – Head Office

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CLIENT DETAILS

Company Name:	Eskom Gourikwa Power Station
Contact Person:	Antony Domburg
Contact Telephone:	072 209 6113
Company Address:	Petro SA Landfill Site, Mossel Bay 6500
Permit/ AEL Reference:	WCED013
Release Point/ Stack ID:	Unit 11/GT11
Sampling Date:	13 May 2022
Reporting Period:	2022



Project Number:	TEC-ESK-222590
Report Number:	ESKG-02-106-001-01
Report Submission Date:	28 July 2022



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REVISION AND APPROVAL PAGE

Revision Number	01		
Rayten Report Number	ESKG-02-106-001-01		
Rayten Project Number	TEC-ESK-222590		
	Name	Signature	Date
Author	Clive Wray Engineering Manager (Pr. Eng.) (Technical Signatory)		28 July 2022
Document Reviewer	Jacques Le Roux Technical Director (Technical Signatory)		28 July 2022
Document Authorisation	Clive Wray Engineering Manager (Pr. Eng.) (Technical Signatory)		28 July 2022

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Emissions Measurements Report

Name of Enterprise: Rayten Engineering Solutions (Pty) Ltd

Declaration of accuracy of information provided:

I, Claire Wray, declare that the information provided in this report is in all respects factually true and correct.

Signed at, _____ Randburg _____ on this __28__ day of _July_ 2022_



Claire Wray

Director

EXECUTIVE SUMMARY

Monitoring Objectives

Rayten Engineering Solutions (Rayten) conducted a stack emission survey at Eskom Gourikwa situated in Mosselbay, Western Cape. The objective of the measurement program was to quantify the following parameters and emissions from a single point source.

Stack ID

Unit 11/GT11

Stack Parameters

- Gas velocity
- Gas volumetric flow rate
- Gas temperature
- Gas static and absolute pressure
- Moisture Content

Isokinetic Emissions

- Particulate Matter (PM)

Anisokinetic Emissions (Instrumental Monitoring)

- Combustion Gas Components (O₂, NO, NO₂, NO_x, CO, CO₂ & SO₂)

Emissions Summary

Category for Limits:	1.2: Liquid Fuel Combustion Installations
Sampling Date:	13/05/2022
Sampling Times:	18:00 – 21:47
Amount of Test Runs:	3
Sampling Duration:	60 minutes per test run

Parameter	Reporting Units	Results	Limits	Compliant (Y/N)
Avg. Particulate Matter (PM)	mg/Nm ³	1.96	50	Y
Avg. Sulphur Dioxide (SO ₂)	mg/Nm ³	114.4	500	Y
Avg. Oxides of Nitrogen (NO _x)	mg/Nm ³	103.8	250	Y
Avg. Oxygen (in stack)	%v/v	14.6	N/A	N/A
Referenced Oxygen	%	15	N/A	N/A

N/A = Not Applicable

LIST OF ABBREVIATIONS

Abbreviation	Meaning
AEL	Atmospheric Emission Licence
US EPA	United States Environmental Protection Agency
NPT	Normalised Pressure and Temperature
°C	Degree Celsius
mm	Millimetres
m	Meters
m ³	Cubic Meters
Nm ⁻³	Normalised Cubic Meter
mg	Milligrams
ml	Millilitres
m ³ /hr	Cubic Meter per Hour
kg/s	Kilogram per Second
kg/hr	Kilogram per Hour
m/s	Metres per Second
mg.Nm ⁻³	Milligrams per normalised Cubic Meter
ppm	Parts per million
ATM	Atmosphere
dscm	Dry Standard Cubic Meter
scmm	Standard Cubic Meter per Minute
acmm	Actual Cubic Meter per Minute
acms	Actual Cubic Meter per Second
g/dscm	Grams per Dry Standard Cubic Meter
BDL	Below Detection Limit
O ₂	Oxygen
PM	Particulate Matter
NO ₂	Nitrogen Dioxide
NO _x	Nitrogen Oxides
CO	Carbon Monoxide
CO ₂	Carbon Dioxide
SO ₂	Sulphur Dioxide
H ₂ O	Water

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LIST OF APPENDICES

Appendix A – SANAS Accreditation Certificate

1. INTRODUCTION

Rayten Engineering Solutions (Rayten) conducted a stack emission survey at Eskom Gourikwa situated in Mosselbay, Western cape. The objective of the measurement program was to quantify the following parameters and emissions from a single point source:

- Particulate Matter (PM)
- Sulphur Dioxide (SO₂)
- Oxides of Nitrogen expressed as NO₂ (NO_x)

Stack and Associated Listed Activity

Stack ID	Category	Subcategory	Description
011	1	2	Unit 11/GT11

Atmospheric Emissions Licence (AEL) Number (if applicable)

Name of Plant/ Facility:	Eskom Gourikwa
AEL Licence Number:	WCED013
AEL Expiry Date:	April 2023
Reporting Period:	2022

Process Details

Site Location:	Eskom Mosselbay Power Station
Description of Process:	Electricity Generation
Continuous or Batch:	Continuous
Product Details:	-
Normal Operation or Erratic:	Normal
Fuel Used (if applicable):	Diesel

Accreditation Status of Laboratory (Rayten Engineering Solutions)

Name of Service Provider:	Rayten Engineering Solutions (Internal Lab)
Accreditation Status:	Accredited
Last Audit Date:	September 2021
Audit Status:	Passed
Address:	43 Kayburne Ave, Randpark Ridge, Gauteng
Telephone:	011-792-0880

2. METHOD OF MEASUREMENTS

All samples and analyses were carried out according to internationally accepted reference methods, which comply with the National Environmental Management: Air Quality Act of 2004 (Act 39 of 2004), prescribed in Schedule A: Methods for sampling and analysis in terms of Notice GN1207 dated 31 October 2018. Sampling techniques were applied to measure the following:

Methods of Measurement and Analyses

Parameter/ Pollutant	Standard Reference Method or Alternative Method	Analysis Technique	Laboratory	Laboratory Accredited	Calculated Measure of Uncertainty +/-.
Sample and Velocity Traverses	US EPA Method 1	N/A	Rayten (Site)	Yes	N/A
Stack Gas Velocity & Volumetric Flow Rate	US EPA Method 2	Dry Gas Meter and Type S Pitot tube	Rayten (Site)	Yes	4.05 m/s
The gas temperatures	Connected to a digital thermometer (K-type)	Connected to a digital thermometer (K- type)	Rayten (Site)	Yes	N/A
Oxygen and Carbon Dioxide Concentration	US EPA Method 3A	Instrumental (RAY-T3-IMR- 001)	Rayten (Site)	Yes	Oxygen = 0.41% of indicated value.
Determination of Moisture Content in Stack Gases.	US EPA Method 4	Gravimetric	Rayten (Site)	Yes	1.81 mg
Particulate Matter	US EPA Method 5	Gravimetric	Rayten (Randburg)	Yes	2.48 mg
Sulphur Dioxide	US EPA Method 6C	Instrumental (RAY-T3-IMR- 001)	Rayten (Site)	Yes	1.95 ppm
Oxides of Nitrogen	US EPA Method 7E	Instrumental (RAY-T3-IMR- 001)	Rayten (Site)	Yes	8.18 ppm

Calibrated Equipment Checklist.

Equipment	ID
APEX Kit Number	T3
Dry Gas Meter	1903078
Gas Analyzer	RAY-T3-IMR-001
Nozzle set	RAY-T3-SN-001
Pitot Tube	RAY-T3-PT-001
Site Balance	RAY-T3-SC-001
Barometer	RAY-T3-BAR-001
Manometer	RAY-T3-MM-001

3. RESULTS

Table A: Stack Parameters:

Plant	ESKOM GOURIKWA	Address	GOURIKWA	Job #	UNIT 11 OR GT 11
LEAD TECHNICIAN:	J Mashala				
SUPPORTING TECHNICIAN:	G Mokgosi				
ISOKINETIC MACHINE USED:	APEX 2 (DURBAN MACHINE)			1 903 078	
GAS ANALYSER USED:	RAY-T3B-IMRA-001			D2802A08	
PITOT TUBE USED:	RAY-T3-PT-001			0,8199	
					
STACK PARAMETERS					
Run Number		1	2	3	Average
Date	Test Date	13/05/2022	13/05/2022	13/05/2022	
Start	Run Start Time	18:00	19:24	20:47	
	Run Finish Time	19:00	20:24	21:47	
	Net Traversing Points	24	24	24	
Θ	Net Run Time, minutes	60	60	60	60
D _N	Nozzle Diameter, mm	6,1	6,1	6,1	6,1
C _p	Pitot Tube Coefficient	0,8199	0,8199	0,8199	0,82
Y	Dry Gas Meter Calibration Factor	0,964	0,964	0,964	0,964
P _{Br}	Barometric Pressure, mm of Mercury	773,46	773,46	773,46	773,46
P _{Br}	Barometric Pressure, HPa	1031,20	1031,20	1031,20	1031,20
ΔH	Average orifice meter Differential, mm H ₂ O	70,00	76,00	74,00	73,33
V _m	Dry Gas Meter Volume Sampled, m ³	1,663	1,720	1,683	1,689
t _m	Average Dry Gas Meter Temperature, °C	12,6	7,6	5,5	8,6
V _{mstd}	Dry Gas Meter Volume Sampled, Nm ³ (Dry at 273K, 101.3kPa)	1,56	1,64	1,63	1,61
V _{lc}	Total Moisture Liquid collected, ml	3,7	4,8	4,5	4,3
V _{wstd}	Volume of Water Vapor, Nm ³ (Dry at 273K, 101.3kPa)	0,005	0,006	0,006	0,005
% H ₂ O	Moisture Content of Stack Gas, %	0,29	0,36	0,34	0,33
%CO ₂	Carbon Dioxide, %	3,70	3,70	3,70	3,70
%O ₂	Oxygen, %	14,6	14,6	14,6	14,6
% CO+ N ₂	Carbon Monoxide & Nitrogen, %	82	82	82	82
P _g	Flue Gas Static Pressure, mm of H ₂ O	-44,00	-44,00	-44,00	-44,00
P _s	Absolute Flue Gas Pressure, mm of Mercury	770,23	770,23	770,23	770,23
t _s	Average Stack Gas Temperature, °C	520,0	519,0	518,0	519,0
ΔP _{avg}	Average Velocity Head, mm of H ₂ O	34,0	34,0	34,0	34,0
v _s	Average Stack Gas Velocity, m/s	22,8	22,7	22,8	22,8
D _s	Stack Diameter (m)	6,2	6,2	6,2	6,2
A _s	Stack Crosssectional Area, m ²	30,19	30,19	30,19	30,19
Q _d	Dry Volumetric Flow Rate, Nm ³ /min (Dry at 273K, 101.3kPa)	27 345	27 409	27 254	27 336
Q _{aw}	Actual Wet Volumetric Flue Gas Flow Rate, m ³ /min	41 255	41 131	41 372	41 252
%d	Percent Isokinetic of Sampling Rate, %	98,4	103,9	103,0	101,8

Table B: Pollutant Concentrations:

Plant	ESKOM GOURIKWA	Address	GOURIKWA	Job #	UNIT 11 OR GT 11
-------	----------------	---------	----------	-------	------------------

EMISSION RESULTS

Rayten

ENGINEERING SOLUTIONS

Environmental and Engineering Consultants

Particulate Matter					
W _{total}	Particulate Method 5 Filter + Probe Catch Weight, mg	3,2	2,8	4,2	3,4
C _{mg/dscm}	Particulate Concentration (Dry mg/Nm³ at 273K, 101.3kPa)	2,02	1,71	2,55	2,09
C _{mg/dscm}	Particulate Concentration (Dry mg/Nm³ at 273K, 101.3kPa) @15% O ₂	1,89	1,60	2,39	1,96
E (kg/hr)	Particulate Emission Rate, kg/hr	3,31	2,81	4,17	3,43
Combustion Gas Concentrations					
SO ₂ ppm		42,00	43,00	43,00	42,67
SO ₂ mg/Nm³	mg/Nm³ at 273K, 101.3kPa	120,12	122,98	122,98	122,03
SO ₂ mg/Nm³	mg/Nm³ at 273K, 101.3kPa @15% O ₂	112,6	115,3	115,3	114,4
E (kg/hr)	SO ₂ Emission Rate, kg/hr	197,08	202,24	201,10	200,14
NO _x ppm		53,00	54,00	55,00	54,00
NO _x mg/Nm³	(NO _x expressed as NO ₂) mg/Nm³ at 273K, 101.3kPa	108,65	110,70	112,75	110,70
NO _x mg/Nm³	(NO _x expressed as NO ₂) mg/Nm³ at 273K, 101.3kPa @15% O ₂	101,9	103,8	105,7	103,8
E (kg/hr)	NO _x Emission Rate, kg/hr	178,26	182,05	184,37	181,56
CO ppm		32,00	29,00	27,00	29,33
CO mg/Nm³	mg/Nm³ at 273K, 101.3kPa	39,4	35,7	33,2	36,1
E (kg/hr)	CO Emission Rate, kg/hr	64,58	58,66	54,31	59,18

Table C: NAEIS Emissions Reporting Requirements:

Description:	Average:	Units:
Inside Stack Diameter =	6,20	m
Stack Exit Temperature =	519	°C
Actual Exit Flow Rate =	41252	m ³ /min
Actual Exit Flow Rate =	688	m ³ /s
PM emission rate =	3,43	kg/hr
PM emission rate =	30031	kg/year
SO ₂ emission rate =	200	kg/hr
SO ₂ emission rate =	1753244	kg/year
NO _x emission rate =	182	kg/hr
NO _x emission rate =	1590477	kg/year
CO emission rate =	59	kg/hr
CO emission rate =	518430	kg/year
Above emission rates assume plant operates 24 hours for 365 days.		

4. DISCUSSION

Sample ports were available on the stack which were utilised for volumetric flow rate and isokinetic measurements.

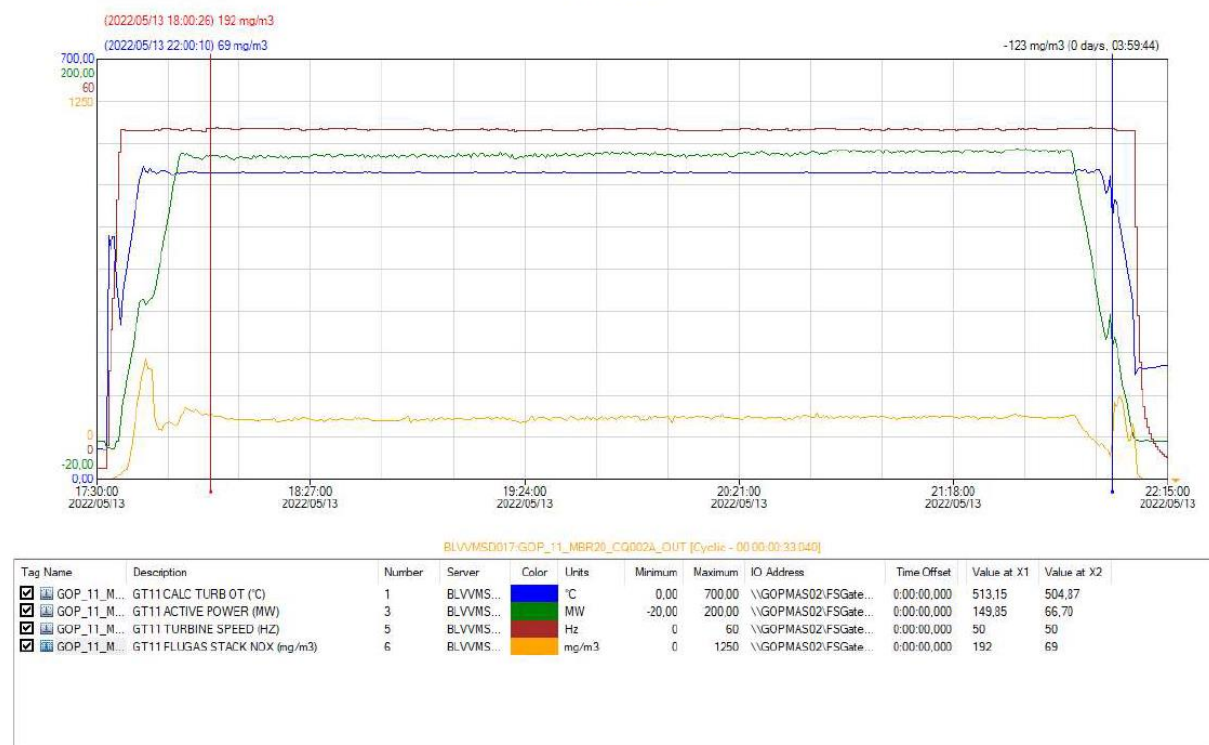
Duct/ Stack Characteristics

Stack Shape	Circular	
Diameter / Depth:	6.2	m
Width (if square):	-	m
Area of Stack:	30.19	m ²
Stack Orientation:	Vertical	
Number of ports:	3	

Site Notes/ Conditions

1	No concerns noted on site.
2	Eskom CEMs unit readings are graphed below for information.
3	-
4	-
5	-

GOP_11



Rayten monitored the stack accordingly and the results are a respectable indication of the stack emission rates. It is Rayten's opinion that the component emissions reported are representative of the true emissions from the point source, at the time the samples were taken.

5. QUALITY CONTROL AND QUALITY ASSURANCE

Rayten Engineering Solutions follows a strict Quality Management System which has been set up to comply with international standards. Rayten Engineering Solutions (Pty) Ltd is a SANAS accredited laboratory (T0894) in accordance with ISO/IEC 17025:2017 international standards. Rayten Engineering's scope of accreditation is attached. Calibration certificates can be made available on request.

6. CONCLUSIONS

It is Rayten's opinion that the component emissions reported are representative of the true emissions from the point source, at the time the samples were taken.

The results may become non-representative of the true emissions if deviations from process operating conditions, raw material feed rate and/or composition changes as well as upset conditions occur other than what was present at the time of taking the various samples.

Does the Unit11/GT11 comply with the minimum emissions standards as stipulated within the section 21 listed activities?

☒ YES

☐ NO

☐ N/A

APPENDIX A

SANAS ACCREDITATION CERTIFICATE



CERTIFICATE OF ACCREDITATION

In terms of section 22(2) (b) of the Accreditation for Conformity Assessment, Calibration and Good Laboratory Practice Act, 2006 (Act 19 of 2006), read with sections 23(1), (2) and (3) of the said Act, I hereby certify that:-

RAYTEN ENGINEERING SOLUTIONS (PTY) LTD

Co. Reg. No.: 2019/310726/07

Facility Accreditation Number: **T0894**

is a South African National Accreditation System accredited facility
provided that all conditions and requirements are complied with

This certificate is valid as per the scope as stated in the accompanying schedule of accreditation,
Annexure "A", bearing the above accreditation number for

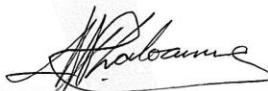
ENVIRONMENTAL ANALYSIS

The facility is accredited in accordance with the recognised International Standard

ISO/IEC 17025:2017

The accreditation demonstrates technical competency for a defined scope and the operation of a
quality management system

While this certificate remains valid, the Accredited Facility named above is authorised to
use the relevant accreditation symbol to issue facility reports and/or certificates



Mr M Phaloane
Acting Chief Executive Officer

Effective Date: 13 February 2020
Certificate Expires: 12 February 2025



STACK EMISSIONS MONITORING REPORT 2022



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Your contact at RAYTEN ENGINEERING SOLUTIONS (Pty) Ltd

Jacques Le Roux

Technical Director – Head Office

Tel: 011 792 0880 / Mobile: 068 072 2234

CLIENT DETAILS

Company Name:	Eskom Gourikwa Power Station
Contact Person:	Antony Domburg
Contact Telephone:	072 209 6113
Company Address:	Petro SA Landfill Site, Mossel Bay 6500
Permit/ AEL Reference:	WCED013
Release Point/ Stack ID:	Unit 12/GT12
Sampling Date:	12 May 2022
Reporting Period:	2022



Project Number:	TEC-ESK-222590
Report Number:	ESKG-02-106-002-01
Report Submission Date:	28 July 2022



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REVISION AND APPROVAL PAGE

Revision Number	01		
Rayten Report Number	ESKG-02-106-002-01		
Rayten Project Number	TEC-ESK-222590		
	Name	Signature	Date
Author	Clive Wray Engineering Manager (Pr. Eng.) (Technical Signatory)		28 July 2022
Document Reviewer	Jacques Le Roux Technical Director (Technical Signatory)		28 July 2022
Document Authorisation	Clive Wray Engineering Manager (Pr. Eng.) (Technical Signatory)		28 July 2022

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Emissions Measurements Report

Name of Enterprise: Rayten Engineering Solutions (Pty) Ltd

Declaration of accuracy of information provided:

I, Claire Wray, declare that the information provided in this report is in all respects factually true and correct.

Signed at, _____ Randburg _____ on this __28__ day of _July_ 2022_



Claire Wray

Director

EXECUTIVE SUMMARY

Monitoring Objectives

Rayten Engineering Solutions (Rayten) conducted a stack emission survey at Eskom Gourikwa situated in Mosselbay, Western Cape. The objective of the measurement program was to quantify the following parameters and emissions from a single point source.

Stack ID

Unit 12/GT12

Stack Parameters

- Gas velocity
- Gas volumetric flow rate
- Gas temperature
- Gas static and absolute pressure
- Moisture Content

Isokinetic Emissions

- Particulate Matter (PM)

Anisokinetic Emissions (Instrumental Monitoring)

- Combustion Gas Components (O₂, NO, NO₂, NO_x, CO, CO₂ & SO₂)

Emissions Summary

Category for Limits:	1.2: Liquid Fuel Combustion Installations
Sampling Date:	12/05/2022
Sampling Times:	18:00 – 21:45
Amount of Test Runs:	3
Sampling Duration:	60 minutes per test run

Parameter	Reporting Units	Results	Limits	Compliant (Y/N)
Avg. Particulate Matter (PM)	mg/Nm ³	1.42	50	Y
Avg. Sulphur Dioxide (SO ₂)	mg/Nm ³	106.3	500	Y
Avg. Oxides of Nitrogen (NO _x)	mg/Nm ³	109.3	250	Y
Avg. Oxygen (in stack)	%v/v	14.7	N/A	N/A
Referenced Oxygen	%	15	N/A	N/A

N/A = Not Applicable

LIST OF ABBREVIATIONS

Abbreviation	Meaning
AEL	Atmospheric Emission Licence
US EPA	United States Environmental Protection Agency
NPT	Normalised Pressure and Temperature
°C	Degree Celsius
mm	Millimetres
m	Meters
m ³	Cubic Meters
Nm ⁻³	Normalised Cubic Meter
mg	Milligrams
ml	Millilitres
m ³ /hr	Cubic Meter per Hour
kg/s	Kilogram per Second
kg/hr	Kilogram per Hour
m/s	Metres per Second
mg.Nm ⁻³	Milligrams per normalised Cubic Meter
ppm	Parts per million
ATM	Atmosphere
dscm	Dry Standard Cubic Meter
scmm	Standard Cubic Meter per Minute
acmm	Actual Cubic Meter per Minute
acms	Actual Cubic Meter per Second
g/dscm	Grams per Dry Standard Cubic Meter
BDL	Below Detection Limit
O ₂	Oxygen
PM	Particulate Matter
NO ₂	Nitrogen Dioxide
NO _x	Nitrogen Oxides
CO	Carbon Monoxide
CO ₂	Carbon Dioxide
SO ₂	Sulphur Dioxide
H ₂ O	Water

CONTENTS

REVISION AND APPROVAL PAGE	0
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2. METHOD OF MEASUREMENTS.....	7
3. RESULTS.....	9
4. DISCUSSION	11
5. QUALITY CONTROL AND QUALITY ASSURANCE	12
6. CONCLUSIONS	12

LIST OF APPENDICES

Appendix A – SANAS Accreditation Certificate

1. INTRODUCTION

Rayten Engineering Solutions (Rayten) conducted a stack emission survey at Eskom Gourikwa situated in Mosselbay, Western cape. The objective of the measurement program was to quantify the following parameters and emissions from a single point source:

- Particulate Matter (PM)
- Sulphur Dioxide (SO₂)
- Oxides of Nitrogen expressed as NO₂ (NO_x)

Stack and Associated Listed Activity

Stack ID	Category	Subcategory	Description
012	1	2	Unit 12/GT12

Atmospheric Emissions Licence (AEL) Number (if applicable)

Name of Plant/ Facility:	Eskom Gourikwa
AEL Licence Number:	WCED013
AEL Expiry Date:	April 2023
Reporting Period:	2022

Process Details

Site Location:	Eskom Mosselbay Power Station
Description of Process:	Electricity Generation
Continuous or Batch:	Continuous
Product Details:	-
Normal Operation or Erratic:	Normal
Fuel Used (if applicable):	Diesel

Accreditation Status of Laboratory (Rayten Engineering Solutions)

Name of Service Provider:	Rayten Engineering Solutions (Internal Lab)
Accreditation Status:	Accredited
Last Audit Date:	September 2021
Audit Status:	Passed
Address:	43 Kayburne Ave, Randpark Ridge, Gauteng
Telephone:	011-792-0880

2. METHOD OF MEASUREMENTS

All samples and analyses were carried out according to internationally accepted reference methods, which comply with the National Environmental Management: Air Quality Act of 2004 (Act 39 of 2004), prescribed in Schedule A: Methods for sampling and analysis in terms of Notice GN1207 dated 31 October 2018. Sampling techniques were applied to measure the following:

Methods of Measurement and Analyses

Parameter/ Pollutant	Standard Reference Method or Alternative Method	Analysis Technique	Laboratory	Laboratory Accredited	Calculated Measure of Uncertainty +/-.
Sample and Velocity Traverses	US EPA Method 1	N/A	Rayten (Site)	Yes	N/A
Stack Gas Velocity & Volumetric Flow Rate	US EPA Method 2	Dry Gas Meter and Type S Pitot tube	Rayten (Site)	Yes	4.05 m/s
The gas temperatures	Connected to a digital thermometer (K-type)	Connected to a digital thermometer (K- type)	Rayten (Site)	Yes	N/A
Oxygen and Carbon Dioxide Concentration	US EPA Method 3A	Instrumental (RAY-T3-IMR- 001)	Rayten (Site)	Yes	Oxygen = 0.41% of indicated value.
Determination of Moisture Content in Stack Gases.	US EPA Method 4	Gravimetric	Rayten (Site)	Yes	1.81 mg
Particulate Matter	US EPA Method 5	Gravimetric	Rayten (Randburg)	Yes	2.48 mg
Sulphur Dioxide	US EPA Method 6C	Instrumental (RAY-T3-IMR- 001)	Rayten (Site)	Yes	1.95 ppm
Oxides of Nitrogen	US EPA Method 7E	Instrumental (RAY-T3-IMR- 001)	Rayten (Site)	Yes	8.18 ppm

Calibrated Equipment Checklist.

Equipment	ID
APEX Kit Number	T3
Dry Gas Meter	1903078
Gas Analyzer	RAY-T3-IMR-001
Nozzle set	RAY-T3-SN-001
Pitot Tube	RAY-T3-PT-001
Site Balance	RAY-T3-SC-001
Barometer	RAY-T3-BAR-001
Manometer	RAY-T3-MM-001

3. RESULTS

Table A: Stack Parameters:

Plant	ESKOM GOURIKWA	Address	GOURIKWA	Job #	UNIT 12 OR GT 12
LEAD TECHNICIAN:	J Mashala				
SUPPORTING TECHNICIAN:	G Mokgosi				
ISOKINETIC MACHINE USED:	APEX 2 (DURBAN MACHINE)	1 903 078			
GAS ANALYSER USED:	RAY-T3B-IMRA-001	D2802A08			
PITOT TUBE USED:	RAY-T3-PT-001	0,8199			
					
STACK PARAMETERS					
Run Number		1	2	3	Average
Date	Test Date	12/05/2022	12/05/2022	12/05/2022	
Start	Run Start Time	18:00	19:23	20:45	
	Run Finish Time	19:00	20:23	21:45	
	Net Traversing Points	24	24	24	
Θ	Net Run Time, minutes	60	60	60	60
D _N	Nozzle Diameter, mm	6,1	6,1	6,1	6,1
C _p	Pitot Tube Coefficient	0,8199	0,8199	0,8199	0,82
Y	Dry Gas Meter Calibration Factor	0,964	0,964	0,964	0,964
P _{Br}	Barometric Pressure, mm of Mercury	771,96	771,96	771,96	771,96
P _{Br}	Barometric Pressure, HPa	1029,20	1029,20	1029,20	1029,20
ΔH	Average orifice meter Differential, mm H ₂ O	60,00	92,00	90,00	80,67
V _m	Dry Gas Meter Volume Sampled, m ³	1,534	1,838	1,869	1,747
t _m	Average Dry Gas Meter Temperature, °C	14,8	9,4	6,0	10,1
V _{mstd}	Dry Gas Meter Volume Sampled, Nm ³ (Dry at 273K, 101.3kPa)	1,43	1,75	1,80	1,66
V _{lc}	Total Moisture Liquid collected, ml	3,2	2,5	3,7	3,1
V _{wstd}	Volume of Water Vapor, Nm ³ (Dry at 273K, 101.3kPa)	0,004	0,003	0,005	0,004
% H ₂ O	Moisture Content of Stack Gas, %	0,28	0,18	0,25	0,24
%CO ₂	Carbon Dioxide, %	3,50	3,70	3,60	3,60
%O ₂	Oxygen, %	14,8	14,7	14,6	14,7
% CO+ N ₂	Carbon Monoxide & Nitrogen, %	81,7	81,6	81,8	81,7
P _g	Flue Gas Static Pressure, mm of H ₂ O	-9,00	-9,00	-9,00	-9,00
P _s	Absolute Flue Gas Pressure, mm of Mercury	771,30	771,30	771,30	771,30
t _s	Average Stack Gas Temperature, °C	515,0	514,0	515,5	515
ΔP _{avg}	Average Velocity Head, mm of H ₂ O	28,0	40,0	40,0	36,0
v _s	Average Stack Gas Velocity, m/s	20,5	24,2	24,5	23,1
D _s	Stack Diameter (m)	6,200	6,200	6,200	6,200
A _s	Stack Crosssectional Area, m ²	30,19	30,19	30,19	30,19
Q _d	Dry Volumetric Flow Rate, Nm ³ /min (Dry at 273K, 101.3kPa)	25 071	30 295	29 977	28 448
Q _{aw}	Actual Wet Volumetric Flue Gas Flow Rate, m ³ /min	37 090	43 893	44 324	41 769
%d	Percent Isokinetic of Sampling Rate, %	98,0	99,8	103,8	100,5

Table B: Pollutant Concentrations:

Plant	ESKOM GOURIKWA	Address	GOURIKWA	Job #	UNIT 12 OR GT 12
EMISSION RESULTS 					
Particulate Matter					
W_{total}	Particulate Method 5 Filter + Probe Catch Weight, mg	2,2	4,3	0,8	2,4
C_{mg/dscm}	Particulate Concentration (Dry mg/Nm ³ at 273K, 101.3kPa)	1,53	2,45	0,46	1,48
C_{mg/dscm}	Particulate Concentration (Dry mg/Nm ³ at 273K, 101.3kPa) @15% O ₂	1,48	2,34	0,43	1,42
E (kg/hr)	Particulate Emission Rate, kg/hr	2,30	4,46	0,83	2,53
Combustion Gas Concentrations					
SO₂ ppm		40,00	41,00	36,00	39,00
SO₂ mg/Nm³	mg/Nm ³ at 273K, 101.3kPa	114,40	117,26	102,96	111,54
SO₂ mg/Nm³	mg/Nm ³ at 273K, 101.3kPa @15% O ₂	110,7	111,7	96,5	106,3
E (kg/hr)	SO ₂ Emission Rate, kg/hr	172,09	213,14	185,19	190,14
NO_x ppm		55,00	56,00	57,00	56,00
NO_x mg/Nm³	(NO _x expressed as NO ₂) mg/Nm ³ at 273K, 101.3kPa	112,75	114,80	116,85	114,80
NO_x mg/Nm³	(NO _x expressed as NO ₂) mg/Nm ³ at 273K, 101.3kPa @15% O ₂	109,1	109,3	109,5	109,3
E (kg/hr)	NO _x Emission Rate, kg/hr	169,61	208,67	210,17	196,15
CO ppm		21,00	20,00	18,00	19,67
CO mg/Nm³	mg/Nm ³ at 273K, 101.3kPa	25,8	24,6	22,1	24,2
E (kg/hr)	CO Emission Rate, kg/hr	38,86	44,72	39,82	41,13

Table C: NAEIS Emissions Reporting Requirements:

Description:	Average:	Units:
Inside Stack Diameter =	6,20	m
Stack Exit Temperature =	515	°C
Actual Exit Flow Rate =	41769	m ³ /min
Actual Exit Flow Rate =	696	m ³ /s
PM emission rate =	2,53	kg/hr
PM emission rate =	22142,6	kg/year
SO ₂ emission rate =	190	kg/hr
SO ₂ emission rate =	1665628	kg/year
NO _x emission rate =	196	kg/hr
NO _x emission rate =	1718274	kg/year
CO emission rate =	41	kg/hr
CO emission rate =	360307	kg/year
Above emission rates assume plant operates 24 hours for 365 days.		

4. DISCUSSION

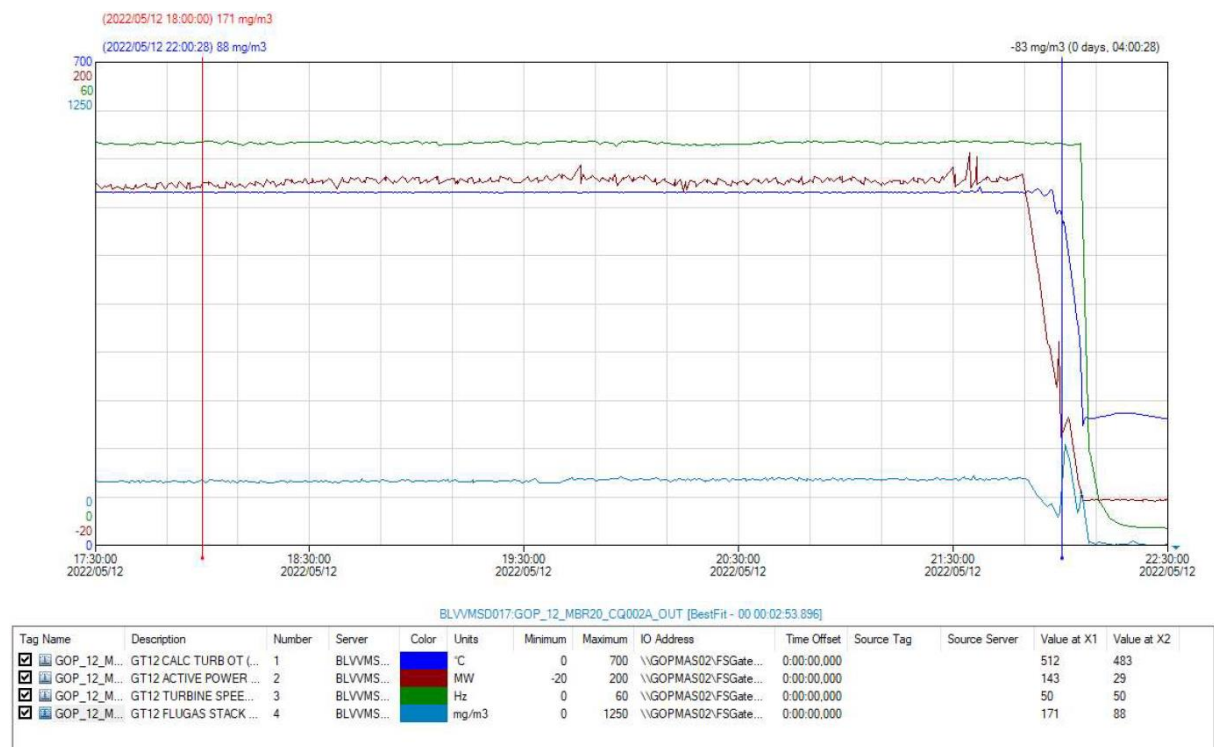
Sample ports were available on the stack which were utilised for volumetric flow rate and isokinetic measurements.

Duct/ Stack Characteristics

Stack Shape	Circular	
Diameter / Depth:	6.2	m
Width (if square):	-	m
Area of Stack:	30.19	m ²
Stack Orientation:	Vertical	
Number of ports:	3	

Site Notes/ Conditions

1	No concerns noted on Site.
2	Eskom CEMs unit readings are graphed below for information.
3	-
4	-
5	-



Rayten monitored the stack accordingly and the results are a respectable indication of the stack emission rates. It is Rayten's opinion that the component emissions reported are representative of the true emissions from the point source, at the time the samples were taken.

5. QUALITY CONTROL AND QUALITY ASSURANCE

Rayten Engineering Solutions follows a strict Quality Management System which has been set up to comply with international standards. Rayten Engineering Solutions (Pty) Ltd is a SANAS accredited laboratory (T0894) in accordance with ISO/IEC 17025:2017 international standards. Rayten Engineering's scope of accreditation is attached. Calibration certificates can be made available on request.

6. CONCLUSIONS

It is Rayten's opinion that the component emissions reported are representative of the true emissions from the point source, at the time the samples were taken.

The results may become non-representative of the true emissions if deviations from process operating conditions, raw material feed rate and/or composition changes as well as upset conditions occur other than what was present at the time of taking the various samples.

Does the Unit12/GT12 comply with the minimum emissions standards as stipulated within the section 21 listed activities?

☒ YES

☐ NO

☐ N/A

APPENDIX A

SANAS ACCREDITATION CERTIFICATE



CERTIFICATE OF ACCREDITATION

In terms of section 22(2) (b) of the Accreditation for Conformity Assessment, Calibration and Good Laboratory Practice Act, 2006 (Act 19 of 2006), read with sections 23(1), (2) and (3) of the said Act, I hereby certify that:-

RAYTEN ENGINEERING SOLUTIONS (PTY) LTD

Co. Reg. No.: 2019/310726/07

Facility Accreditation Number: **T0894**

is a South African National Accreditation System accredited facility
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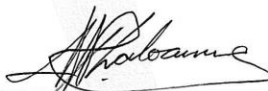
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Mr M Phaloane
Acting Chief Executive Officer

Effective Date: 13 February 2020
Certificate Expires: 12 February 2025



STACK EMISSIONS MONITORING REPORT 2022



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Your contact at RAYTEN ENGINEERING SOLUTIONS (Pty) Ltd

Jacques Le Roux

Technical Director – Head Office

Tel: 011 792 0880 / Mobile: 068 072 2234

CLIENT DETAILS

Company Name:	Eskom Gourikwa Power Station
Contact Person:	Antony Domburg
Contact Telephone:	072 209 6113
Company Address:	Petro SA Landfill Site, Mossel Bay 6500
Permit/ AEL Reference:	WCED013
Release Point/ Stack ID:	Unit 13/GT13
Sampling Date:	11 May 2022
Reporting Period:	2022



Project Number:	TEC-ESK-222590
Report Number:	ESKG-02-106-003-01
Report Submission Date:	28 July 2022



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REVISION AND APPROVAL PAGE

Revision Number	01		
Rayten Report Number	ESKG-02-106-003-01		
Rayten Project Number	TEC-ESK-222590		
	Name	Signature	Date
Author	Clive Wray Engineering Manager (Pr. Eng.) (Technical Signatory)		28 July 2022
Document Reviewer	Jacques Le Roux Technical Director (Technical Signatory)		28 July 2022
Document Authorisation	Clive Wray Engineering Manager (Pr. Eng.) (Technical Signatory)		28 July 2022

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Emissions Measurements Report

Name of Enterprise: Rayten Engineering Solutions (Pty) Ltd

Declaration of accuracy of information provided:

I, Claire Wray, declare that the information provided in this report is in all respects factually true and correct.

Signed at, _____ Randburg _____ on this __28__ day of _July_ 2022_



Claire Wray

Director

EXECUTIVE SUMMARY

Monitoring Objectives

Rayten Engineering Solutions (Rayten) conducted a stack emission survey at Eskom Gourikwa situated in Mosselbay, Western Cape. The objective of the measurement program was to quantify the following parameters and emissions from a single point source.

Stack ID

Unit 13/GT13

Stack Parameters

- Gas velocity
- Gas volumetric flow rate
- Gas temperature
- Gas static and absolute pressure
- Moisture Content

Isokinetic Emissions

- Particulate Matter (PM)

Anisokinetic Emissions (Instrumental Monitoring)

- Combustion Gas Components (O₂, NO, NO₂, NO_x, CO, CO₂ & SO₂)

Emissions Summary

Category for Limits:	1.2: Liquid Fuel Combustion Installations
Sampling Date:	11/05/2022
Sampling Times:	17:00 – 21:00
Amount of Test Runs:	3
Sampling Duration:	60 minutes per test run

Parameter	Reporting Units	Results	Limits	Compliant (Y/N)
Avg. Particulate Matter (PM)	mg/Nm ³	1.43	50	Y
Avg. Sulphur Dioxide (SO ₂)	mg/Nm ³	80.4	500	Y
Avg. Oxides of Nitrogen (NO _x)	mg/Nm ³	81.61	250	Y
Avg. Oxygen (in stack)	%v/v	14.2	N/A	N/A
Referenced Oxygen	%	15	N/A	N/A

N/A = Not Applicable

LIST OF ABBREVIATIONS

Abbreviation	Meaning
AEL	Atmospheric Emission Licence
US EPA	United States Environmental Protection Agency
NPT	Normalised Pressure and Temperature
°C	Degree Celsius
mm	Millimetres
m	Meters
m ³	Cubic Meters
Nm ⁻³	Normalised Cubic Meter
mg	Milligrams
ml	Millilitres
m ³ /hr	Cubic Meter per Hour
kg/s	Kilogram per Second
kg/hr	Kilogram per Hour
m/s	Metres per Second
mg.Nm ⁻³	Milligrams per normalised Cubic Meter
ppm	Parts per million
ATM	Atmosphere
dscm	Dry Standard Cubic Meter
scmm	Standard Cubic Meter per Minute
acmm	Actual Cubic Meter per Minute
acms	Actual Cubic Meter per Second
g/dscm	Grams per Dry Standard Cubic Meter
BDL	Below Detection Limit
O ₂	Oxygen
PM	Particulate Matter
NO ₂	Nitrogen Dioxide
NO _x	Nitrogen Oxides
CO	Carbon Monoxide
CO ₂	Carbon Dioxide
SO ₂	Sulphur Dioxide
H ₂ O	Water

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LIST OF APPENDICES

Appendix A – SANAS Accreditation Certificate

1. INTRODUCTION

Rayten Engineering Solutions (Rayten) conducted a stack emission survey at Eskom Gourikwa situated in Mosselbay, Western cape. The objective of the measurement program was to quantify the following parameters and emissions from a single point source:

- Particulate Matter (PM)
- Sulphur Dioxide (SO₂)
- Oxides of Nitrogen expressed as NO₂ (NO_x)

Stack and Associated Listed Activity

Stack ID	Category	Subcategory	Description
013	1	2	Unit 13/GT13

Atmospheric Emissions Licence (AEL) Number (if applicable)

Name of Plant/ Facility:	Eskom Gourikwa
AEL Licence Number:	WCED013
AEL Expiry Date:	April 2023
Reporting Period:	2022

Process Details

Site Location:	Eskom Mosselbay Power Station
Description of Process:	Electricity Generation
Continuous or Batch:	Continuous
Product Details:	-
Normal Operation or Erratic:	Normal
Fuel Used (if applicable):	Diesel

Accreditation Status of Laboratory (Rayten Engineering Solutions)

Name of Service Provider:	Rayten Engineering Solutions (Internal Lab)
Accreditation Status:	Accredited
Last Audit Date:	September 2021
Audit Status:	Passed
Address:	43 Kayburne Ave, Randpark Ridge, Gauteng
Telephone:	011-792-0880

2. METHOD OF MEASUREMENTS

All samples and analyses were carried out according to internationally accepted reference methods, which comply with the National Environmental Management: Air Quality Act of 2004 (Act 39 of 2004), prescribed in Schedule A: Methods for sampling and analysis in terms of Notice GN1207 dated 31 October 2018. Sampling techniques were applied to measure the following:

Methods of Measurement and Analyses

Parameter/ Pollutant	Standard Reference Method or Alternative Method	Analysis Technique	Laboratory	Laboratory Accredited	Calculated Measure of Uncertainty +/-.
Sample and Velocity Traverses	US EPA Method 1	N/A	Rayten (Site)	Yes	N/A
Stack Gas Velocity & Volumetric Flow Rate	US EPA Method 2	Dry Gas Meter and Type S Pitot tube	Rayten (Site)	Yes	4.05 m/s
The gas temperatures	Connected to a digital thermometer (K-type)	Connected to a digital thermometer (K- type)	Rayten (Site)	Yes	N/A
Oxygen and Carbon Dioxide Concentration	US EPA Method 3A	Instrumental (RAY-T3-IMR- 001)	Rayten (Site)	Yes	Oxygen = 0.41% of indicated value.
Determination of Moisture Content in Stack Gases.	US EPA Method 4	Gravimetric	Rayten (Site)	Yes	1.81 mg
Particulate Matter	US EPA Method 5	Gravimetric	Rayten (Randburg)	Yes	2.48 mg
Sulphur Dioxide	US EPA Method 6C	Instrumental (RAY-T3-IMR- 001)	Rayten (Site)	Yes	1.95 ppm
Oxides of Nitrogen	US EPA Method 7E	Instrumental (RAY-T3-IMR- 001)	Rayten (Site)	Yes	8.18 ppm

Calibrated Equipment Checklist.

Equipment	ID
APEX Kit Number	T3
Dry Gas Meter	1903078
Gas Analyzer	RAY-T3-IMR-001
Nozzle set	RAY-T3-SN-001
Pitot Tube	RAY-T3-PT-001
Site Balance	RAY-T3-SC-001
Barometer	RAY-T3-BAR-001
Manometer	RAY-T3-MM-001

3. RESULTS

Table A: Stack Parameters:

Plant	ESKOM GOURIKWA	Address	GOURIKWA	Job #	UNIT 13 OR GT 13
LEAD TECHNICIAN:	J Mashala				
SUPPORTING TECHNICIAN:	G Mokgosi				
ISOKINETIC MACHINE USED:	APEX 2 (DURBAN MACHINE)			1 903 078	
GAS ANALYSER USED:	RAY-T3B-IMRA-001			D2802A08	
PITOT TUBE USED:	RAY-T3-PT-001			0,8199	
					
STACK PARAMETERS					
Run Number		1	2	3	Average
Date	Test Date	11/05/2022	11/05/2022	11/05/2022	
Start	Run Start Time	17:00	18:32	20:00	
	Run Finish Time	18:00	19:32	21:00	
	Net Traversing Points	24	24	24	
Θ	Net Run Time, minutes	60	60	60	60
D _N	Nozzle Diameter, mm	6,1	6,1	6,1	6,1
C _p	Pitot Tube Coefficient	0,8199	0,8199	0,8199	0,82
Y	Dry Gas Meter Calibration Factor	0,964	0,964	0,964	0,964
P _{Br}	Barometric Pressure, mm of Mercury	778,71	778,71	778,71	778,71
P _{Br}	Barometric Pressure, HPa	1038,20	1038,20	1038,20	1038,20
ΔH	Average orifice meter Differential, mm H ₂ O	68,00	74,00	72,00	71,33
V _m	Dry Gas Meter Volume Sampled, m ³	1,618	1,644	1,649	1,637
t _m	Average Dry Gas Meter Temperature, °C	15,3	11,0	6,8	11,0
V _{mstd}	Dry Gas Meter Volume Sampled, Nm ³ (Dry at 273K, 101.3kPa)	1,51	1,56	1,59	1,56
V _{lc}	Total Moisture Liquid collected, ml	3,3	6	3,9	4,4
V _{wstd}	Volume of Water Vapor, Nm ³ (Dry at 273K, 101.3kPa)	0,004	0,007	0,005	0,005
% H ₂ O	Moisture Content of Stack Gas, %	0,27	0,48	0,30	0,35
%CO ₂	Carbon Dioxide, %	3,80	3,80	3,80	3,80
%O ₂	Oxygen, %	14,2	14,2	14,1	14,2
% CO+ N ₂	Carbon Monoxide & Nitrogen, %	82	82	82,1	82,0
P _g	Flue Gas Static Pressure, mm of H ₂ O	-3,00	-3,00	-3,00	-3,00
P _s	Absolute Flue Gas Pressure, mm of Mercury	778,49	778,49	778,49	778,49
t _s	Average Stack Gas Temperature, °C	512	512	512	512
ΔP _{avg}	Average Velocity Head, mm of H ₂ O	32,0	32,0	32,0	32,0
v _s	Average Stack Gas Velocity, m/s	21,7	21,7	21,7	21,7
D _s	Stack Diameter (m)	6,2	6,2	6,2	6,2
A _s	Stack Crosssectional Area, m ²	30,19	30,19	30,19	30,19
Q _d	Dry Volumetric Flow Rate, Nm ³ /min (Dry at 273K, 101.3kPa)	26 959	26 949	26 980	26 963
Q _{aw}	Actual Wet Volumetric Flue Gas Flow Rate, m ³ /min	39 390	39 324	39 346	39 353
%d	Percent Isokinetic of Sampling Rate, %	96,7	100,4	102,1	99,7

Table B: Pollutant Concentrations:

Plant	ESKOM GOURIKWA	Address	GOURIKWA	Job #	UNIT 13 OR GT 13
EMISSION RESULTS  Environmental and Engineering Consultants					
Particulate Matter					
W_{total}	Particulate Method 5 Filter + Probe Catch Weight, mg	3,0	2,9	1,7	2,5
C_{mg/dscm}	Particulate Concentration (Dry mg/Nm ³ at 273K, 101.3kPa)	1,95	1,83	1,09	1,62
C_{mg/dscm}	Particulate Concentration (Dry mg/Nm ³ at 273K, 101.3kPa) @15% O ₂	1,72	1,61	0,95	1,43
E (kg/hr)	Particulate Emission Rate, kg/hr	3,15	2,95	1,77	2,62
Combustion Gas Concentrations					
SO₂ ppm		35,00	31,00	30,00	32,00
SO₂ mg/Nm³	mg/Nm ³ at 273K, 101.3kPa	100,10	88,66	85,80	91,52
SO₂ mg/Nm³	mg/Nm ³ at 273K, 101.3kPa @15% O ₂	88,32	78,23	74,61	80,39
E (kg/hr)	SO ₂ Emission Rate, kg/hr	161,91	143,36	138,89	148,05
NO_x ppm		46,00	45,00	45,00	45,33
NO_x mg/Nm³	(NO _x expressed as NO ₂) mg/Nm ³ at 273K, 101.3kPa	94,30	92,25	92,25	92,93
NO_x mg/Nm³	(NO _x expressed as NO ₂) mg/Nm ³ at 273K, 101.3kPa @15% O ₂	83,21	81,40	80,22	81,61
E (kg/hr)	NO _x Emission Rate, kg/hr	152,53	149,16	149,33	150,34
CO ppm		20,00	17,00	15,00	17,33
CO mg/Nm³	mg/Nm ³ at 273K, 101.3kPa	24,60	20,91	18,45	21,32
E (kg/hr)	CO Emission Rate, kg/hr	39,79	33,81	29,87	34,49

Table C: NAEIS Emissions Reporting Requirements:

Description:	Average:	Units:
Inside Stack Diameter =	6,20	m
Stack Exit Temperature =	512	°C
Actual Exit Flow Rate =	39353,1	m ³ /min
Actual Exit Flow Rate =	655,9	m ³ /s
PM emission rate =	2,62	kg/hr
PM emission rate =	22978,4	kg/year
SO ₂ emission rate =	148	kg/hr
SO ₂ emission rate =	1296961	kg/year
NO _x emission rate =	150	kg/hr
NO _x emission rate =	1317005	kg/year
CO emission rate =	34	kg/hr
CO emission rate =	302127	kg/year
Above emission rates assume plant operates 24 hours for 365 days.		

4. DISCUSSION

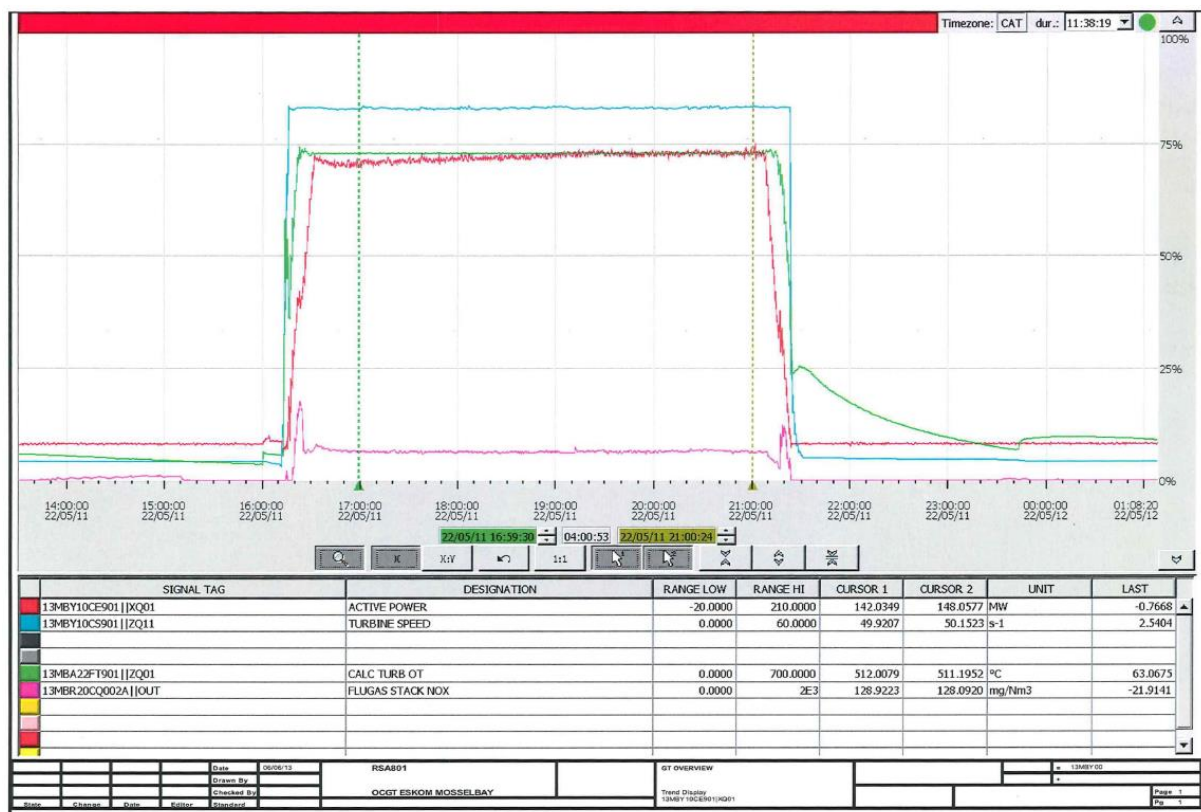
Sample ports were available on the stack which were utilised for volumetric flow rate and isokinetic measurements.

Duct/ Stack Characteristics

Stack Shape	Circular	
Diameter / Depth:	6.2	m
Width (if square):	-	m
Area of Stack:	30.19	m ²
Stack Orientation:	Vertical	
Number of ports:	3	

Site Notes/ Conditions

1	No concerns noted on Site.
2	Eskom CEMs unit readings are graphed below for information.
3	-
4	-
5	-



Rayten monitored the stack accordingly and the results are a respectable indication of the stack emission rates. It is Rayten's opinion that the component emissions reported are representative of the true emissions from the point source, at the time the samples were taken.

5. QUALITY CONTROL AND QUALITY ASSURANCE

Rayten Engineering Solutions follows a strict Quality Management System which has been set up to comply with international standards. Rayten Engineering Solutions (Pty) Ltd is a SANAS accredited laboratory (T0894) in accordance with ISO/IEC 17025:2017 international standards. Rayten Engineering's scope of accreditation is attached. Calibration certificates can be made available on request.

6. CONCLUSIONS

It is Rayten's opinion that the component emissions reported are representative of the true emissions from the point source, at the time the samples were taken.

The results may become non-representative of the true emissions if deviations from process operating conditions, raw material feed rate and/or composition changes as well as upset conditions occur other than what was present at the time of taking the various samples.

Does the Unit13/GT13 comply with the minimum emissions standards as stipulated within the section 21 listed activities?

☒ YES

☐ NO

☐ N/A

APPENDIX A

SANAS ACCREDITATION CERTIFICATE



CERTIFICATE OF ACCREDITATION

In terms of section 22(2) (b) of the Accreditation for Conformity Assessment, Calibration and Good Laboratory Practice Act, 2006 (Act 19 of 2006), read with sections 23(1), (2) and (3) of the said Act, I hereby certify that:-

RAYTEN ENGINEERING SOLUTIONS (PTY) LTD

Co. Reg. No.: 2019/310726/07

Facility Accreditation Number: **T0894**

is a South African National Accreditation System accredited facility
provided that all conditions and requirements are complied with

This certificate is valid as per the scope as stated in the accompanying schedule of accreditation,
Annexure "A", bearing the above accreditation number for

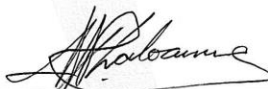
ENVIRONMENTAL ANALYSIS

The facility is accredited in accordance with the recognised International Standard

ISO/IEC 17025:2017

The accreditation demonstrates technical competency for a defined scope and the operation of a
quality management system

While this certificate remains valid, the Accredited Facility named above is authorised to
use the relevant accreditation symbol to issue facility reports and/or certificates



Mr M Phaloane
Acting Chief Executive Officer

Effective Date: 13 February 2020
Certificate Expires: 12 February 2025



STACK EMISSIONS MONITORING REPORT 2022



Environmental and Engineering Consultants

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Randpark Ridge
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Tel: +27 (0)11 792-0880

Your contact at RAYTEN ENGINEERING SOLUTIONS (Pty) Ltd

Jacques Le Roux

Technical Director – Head Office

Tel: 011 792 0880 / Mobile: 068 072 2234

CLIENT DETAILS

Company Name:	Eskom Gourikwa Power Station
Contact Person:	Antony Domburg
Contact Telephone:	072 209 6113
Company Address:	Petro SA Landfill Site, Mossel Bay 6500
Permit/ AEL Reference:	WCED013
Release Point/ Stack ID:	Unit 21/GT21
Sampling Date:	10 May 2022
Reporting Period:	2022



Project Number:	TEC-ESK-222590
Report Number:	ESKG-02-106-004-01
Report Submission Date:	28 July 2022



T0894



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REVISION AND APPROVAL PAGE

Revision Number	01		
Rayten Report Number	ESKG-02-106-004-01		
Rayten Project Number	TEC-ESK-222590		
	Name	Signature	Date
Author	Clive Wray Engineering Manager (Pr. Eng.) (Technical Signatory)		28 July 2022
Document Reviewer	Jacques Le Roux Technical Director (Technical Signatory)		28 July 2022
Document Authorisation	Clive Wray Engineering Manager (Pr. Eng.) (Technical Signatory)		28 July 2022

DISCLAIMER

Note that although every effort has been made by Rayten Engineering Solutions to obtain the correct information and to carry out an appropriate, independent, impartial, and competent study; Rayten Engineering Solutions cannot be held liable for any incident which directly or indirectly relates to the work in this document and which may have an effect on the client or on any other third party.

CONFIDENTIALITY

The content of this report will be kept confidential. Copies of the report will not be distributed to other parties except with the expressed permission of the client. The exception to this confidentiality being the requirement from the relevant authority or department. Copyright is vested in Rayten Engineering Solutions in terms of the Copyright Act (Act 98 of 1978) and no use or reproduction or duplication thereof may occur without the written consent of the author.

Emissions Measurements Report

Name of Enterprise: Rayten Engineering Solutions (Pty) Ltd

Declaration of accuracy of information provided:

I, Claire Wray, declare that the information provided in this report is in all respects factually true and correct.

Signed at, _____ Randburg _____ on this __28__ day of _July_ 2022_



Claire Wray

Director

EXECUTIVE SUMMARY

Monitoring Objectives

Rayten Engineering Solutions (Rayten) conducted a stack emission survey at Eskom Gourikwa situated in Mosselbay, Western Cape. The objective of the measurement program was to quantify the following parameters and emissions from a single point source.

Stack ID

Unit 21/GT21

Stack Parameters

- Gas velocity
- Gas volumetric flow rate
- Gas temperature
- Gas static and absolute pressure
- Moisture Content

Isokinetic Emissions

- Particulate Matter (PM)

Anisokinetic Emissions (Instrumental Monitoring)

- Combustion Gas Components (O₂, NO, NO₂, NO_x, CO, CO₂ & SO₂)

Emissions Summary

Category for Limits:	1.2: Liquid Fuel Combustion Installations
Sampling Date:	10/05/2022
Sampling Times:	09:08 – 13:15
Amount of Test Runs:	3
Sampling Duration:	60 minutes per test run

Parameter	Reporting Units	Results	Limits	Compliant (Y/N)
Avg. Particulate Matter (PM)	mg/Nm ³	4.40	50	Y
Avg. Sulphur Dioxide (SO ₂)	mg/Nm ³	110.8	500	Y
Avg. Oxides of Nitrogen (NO _x)	mg/Nm ³	141.7	250	Y
Avg. Oxygen (in stack)	%v/v	16.4	N/A	N/A
Referenced Oxygen	%	15	N/A	N/A

N/A = Not Applicable

LIST OF ABBREVIATIONS

Abbreviation	Meaning
AEL	Atmospheric Emission Licence
US EPA	United States Environmental Protection Agency
NPT	Normalised Pressure and Temperature
°C	Degree Celsius
mm	Millimetres
m	Meters
m ³	Cubic Meters
Nm ⁻³	Normalised Cubic Meter
mg	Milligrams
ml	Millilitres
m ³ /hr	Cubic Meter per Hour
kg/s	Kilogram per Second
kg/hr	Kilogram per Hour
m/s	Metres per Second
mg.Nm ⁻³	Milligrams per normalised Cubic Meter
ppm	Parts per million
ATM	Atmosphere
dscm	Dry Standard Cubic Meter
scmm	Standard Cubic Meter per Minute
acmm	Actual Cubic Meter per Minute
acms	Actual Cubic Meter per Second
g/dscm	Grams per Dry Standard Cubic Meter
BDL	Below Detection Limit
O ₂	Oxygen
PM	Particulate Matter
NO ₂	Nitrogen Dioxide
NO _x	Nitrogen Oxides
CO	Carbon Monoxide
CO ₂	Carbon Dioxide
SO ₂	Sulphur Dioxide
H ₂ O	Water

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LIST OF APPENDICES

Appendix A – SANAS Accreditation Certificate

1. INTRODUCTION

Rayten Engineering Solutions (Rayten) conducted a stack emission survey at Eskom Gourikwa situated in Mosselbay, Western cape. The objective of the measurement program was to quantify the following parameters and emissions from a single point source:

- Particulate Matter (PM)
- Sulphur Dioxide (SO₂)
- Oxides of Nitrogen expressed as NO₂ (NO_x)

Stack and Associated Listed Activity

Stack ID	Category	Subcategory	Description
021	1	2	Unit 21/GT21

Atmospheric Emissions Licence (AEL) Number (if applicable)

Name of Plant/ Facility:	Eskom Gourikwa
AEL Licence Number:	WCED013
AEL Expiry Date:	April 2023
Reporting Period:	2022

Process Details

Site Location:	Eskom Mosselbay Power Station
Description of Process:	Electricity Generation
Continuous or Batch:	Continuous
Product Details:	-
Normal Operation or Erratic:	Normal
Fuel Used (if applicable):	Diesel

Accreditation Status of Laboratory (Rayten Engineering Solutions)

Name of Service Provider:	Rayten Engineering Solutions (Internal Lab)
Accreditation Status:	Accredited
Last Audit Date:	September 2021
Audit Status:	Passed
Address:	43 Kayburne Ave, Randpark Ridge, Gauteng
Telephone:	011-792-0880

2. METHOD OF MEASUREMENTS

All samples and analyses were carried out according to internationally accepted reference methods, which comply with the National Environmental Management: Air Quality Act of 2004 (Act 39 of 2004), prescribed in Schedule A: Methods for sampling and analysis in terms of Notice GN1207 dated 31 October 2018. Sampling techniques were applied to measure the following:

Methods of Measurement and Analyses

Parameter/ Pollutant	Standard Reference Method or Alternative Method	Analysis Technique	Laboratory	Laboratory Accredited	Calculated Measure of Uncertainty +/-.
Sample and Velocity Traverses	US EPA Method 1	N/A	Rayten (Site)	Yes	N/A
Stack Gas Velocity & Volumetric Flow Rate	US EPA Method 2	Dry Gas Meter and Type S Pitot tube	Rayten (Site)	Yes	4.05 m/s
The gas temperatures	Connected to a digital thermometer (K-type)	Connected to a digital thermometer (K- type)	Rayten (Site)	Yes	N/A
Oxygen and Carbon Dioxide Concentration	US EPA Method 3A	Instrumental (RAY-T3-IMR- 001)	Rayten (Site)	Yes	Oxygen = 0.41% of indicated value.
Determination of Moisture Content in Stack Gases.	US EPA Method 4	Gravimetric	Rayten (Site)	Yes	1.81 mg
Particulate Matter	US EPA Method 5	Gravimetric	Rayten (Randburg)	Yes	2.48 mg
Sulphur Dioxide	US EPA Method 6C	Instrumental (RAY-T3-IMR- 001)	Rayten (Site)	Yes	1.95 ppm
Oxides of Nitrogen	US EPA Method 7E	Instrumental (RAY-T3-IMR- 001)	Rayten (Site)	Yes	8.18 ppm

Calibrated Equipment Checklist.

Equipment	ID
APEX Kit Number	T3
Dry Gas Meter	1903078
Gas Analyzer	RAY-T3-IMR-001
Nozzle set	RAY-T3-SN-001
Pitot Tube	RAY-T3-PT-001
Site Balance	RAY-T3-SC-001
Barometer	RAY-T3-BAR-001
Manometer	RAY-T3-MM-001

3. RESULTS

Table A: Stack Parameters:

Plant	ESKOM GOURIKWA	Address	GOURIKWA	Job #	UNIT 21 OR GT 21
LEAD TECHNICIAN:	J Mashala				
SUPPORTING TECHNICIAN:	G Mokgosi				
ISOKINETIC MACHINE USED:	APEX 2 (DURBAN MACHINE)			1 903 078	
GAS ANALYSER USED:	RAY-T3B-IMRA-001			D2802A08	
PITOT TUBE USED:	RAY-T3-PT-001			0,8199	
					
STACK PARAMETERS					
Run Number		1	2	3	Average
Date	Test Date	10/05/2022	10/05/2022	10/05/2022	
Start	Run Start Time	09:08	10:50	12:15	
	Run Finish Time	10:08	11:50	13:15	
	Net Traversing Points	24	24	24	
Θ	Net Run Time, minutes	60	60	60	60
D _N	Nozzle Diameter, mm	6,1	6,1	6,1	6,1
C _p	Pitot Tube Coefficient	0,8199	0,8199	0,8199	0,82
Y	Dry Gas Meter Calibration Factor	0,964	0,964	0,964	0,964
P _{Br}	Barometric Pressure, mm of Mercury	771,21	771,21	771,21	771,21
P _{Br}	Barometric Pressure, HPa	1028,20	1028,20	1028,20	1028,20
ΔH	Average orifice meter Differential, mm H ₂ O	64,00	72,00	72,00	69,33
V _m	Dry Gas Meter Volume Sampled, m ³	1,545	1,692	1,709	1,649
t _m	Average Dry Gas Meter Temperature, °C	19,4	23,8	25,8	23,0
V _{mstd}	Dry Gas Meter Volume Sampled, Nm ³ (Dry at 273K, 101.3kPa)	1,43	1,54	1,54	1,51
V _{lc}	Total Moisture Liquid collected, ml	5,5	4,5	3,3	4,4
V _{wstd}	Volume of Water Vapor, Nm ³ (Dry at 273K, 101.3kPa)	0,007	0,006	0,004	0,006
% H ₂ O	Moisture Content of Stack Gas, %	0,47	0,36	0,27	0,37
%CO ₂	Carbon Dioxide, %	2,80	2,60	2,70	2,70
%O ₂	Oxygen, %	16,4	16,4	16,4	16,4
% CO+ N ₂	Carbon Monoxide & Nitrogen, %	80,8	81	80,9	80,9
P _g	Flue Gas Static Pressure, mm of H ₂ O	-4,00	-4,00	-4,00	-4,00
P _s	Absolute Flue Gas Pressure, mm of Mercury	770,92	770,92	770,92	770,92
t _s	Average Stack Gas Temperature, °C	516	516	516	516
ΔP _{avg}	Average Velocity Head, mm of H ₂ O	30,0	30,0	30,0	30,0
v _s	Average Stack Gas Velocity, m/s	21,2	21,1	21,0	21,1
D _s	Stack Diameter (m)	6,2	6,2	6,2	6,2
A _s	Stack Crosssectional Area, m ²	30,19	30,19	30,19	30,19
Q _d	Dry Volumetric Flow Rate, Nm ³ /min (Dry at 273K, 101.3kPa)	25 967	26 066	26 229	26 087
Q _{aw}	Actual Wet Volumetric Flue Gas Flow Rate, m ³ /min	38 384	38 282	38 081	38 249
%d	Percent Isokinetic of Sampling Rate, %	94,9	101,3	101,0	99,1

Table B: Pollutant Concentrations:

Plant	ESKOM GOURIKWA	Address	GOURIKWA	Job #	UNIT 21 OR GT 21
EMISSION RESULTS 					
Particulate Matter					
W_{total}	Particulate Method 5 Filter + Probe Catch Weight, mg	6,0	5,3	3,8	5,1
C_{mg/dscm}	Particulate Concentration (Dry mg/Nm ³ at 273K, 101.3kPa)	4,20	3,45	2,48	3,38
C_{mg/dscm}	Particulate Concentration (Dry mg/Nm ³ at 273K, 101.3kPa) @15% O ₂	5,48	4,50	3,23	4,40
E (kg/hr)	Particulate Emission Rate, kg/hr	6,5501	5,3930	3,8970	5,28
Combustion Gas Concentrations					
SO₂ ppm		28,11	30,00	31,00	29,70
SO₂ mg/Nm³	mg/Nm ³ at 273K, 101.3kPa	80,39	85,80	88,66	84,95
SO₂ mg/Nm³	mg/Nm ³ at 273K, 101.3kPa @15% O ₂	104,86	111,91	115,64	110,81
E (kg/hr)	SO ₂ Emission Rate, kg/hr	125,2557	134,1870	139,5260	132,99
NO_x ppm		53,00	52,00	54,00	53,00
NO_x mg/Nm³	(NO _x expressed as NO ₂) mg/Nm ³ at 273K, 101.3kPa	108,65	106,60	110,70	108,65
NO_x mg/Nm³	(NO _x expressed as NO ₂) mg/Nm ³ at 273K, 101.3kPa @15% O ₂	141,72	139,04	144,39	141,72
E (kg/hr)	NO _x Emission Rate, kg/hr	169,2779	166,7172	174,2108	170,07
CO ppm		21,70	18,50	16,00	18,73
CO mg/Nm³	mg/Nm ³ at 273K, 101.3kPa	26,69	22,76	19,68	23,04
E (kg/hr)	CO Emission Rate, kg/hr	41,5849	35,5877	30,9708	36,05

Table C: NAEIS Emissions Reporting Requirements:

Description:	Average:	Units:
Inside Stack Diameter =	6,20	m
Stack Exit Temperature =	516	°C
Actual Exit Flow Rate =	38249,5	m ³ /min
Actual Exit Flow Rate =	637,5	m ³ /s
PM emission rate =	5,3	kg/hr
PM emission rate =	46253,3	kg/year
SO ₂ emission rate =	133	kg/hr
SO ₂ emission rate =	1164989	kg/year
NO _x emission rate =	170	kg/hr
NO _x emission rate =	1489801	kg/year
CO emission rate =	36	kg/hr
CO emission rate =	315779	kg/year
Above emission rates assume plant operates 24 hours for 365 days.		

4. DISCUSSION

Sample ports were available on the stack which were utilised for volumetric flow rate and isokinetic measurements.

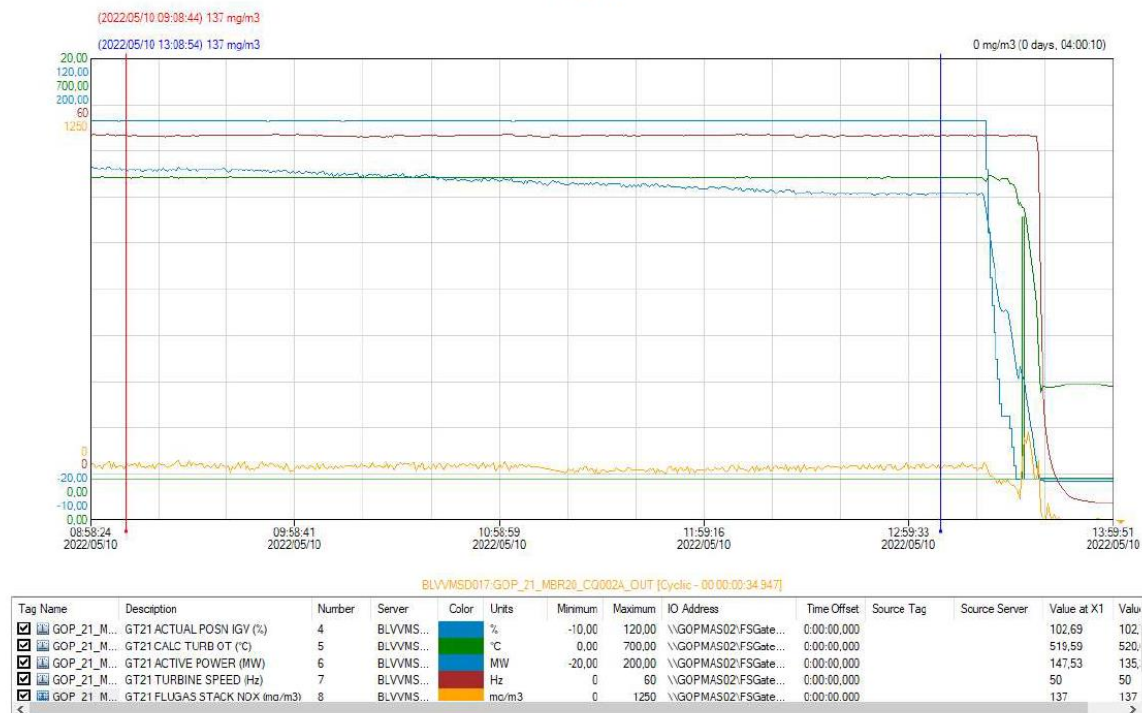
Duct/ Stack Characteristics

Stack Shape	Circular	
Diameter / Depth:	6.2	m
Width (if square):	-	m
Area of Stack:	30.19	m ²
Stack Orientation:	Vertical	
Number of ports:	3	

Site Notes/ Conditions

1	No concerns noted on Site.
2	Eskom CEMs unit readings are graphed below for information.
3	-
4	-
5	-

GOP_21



Rayten monitored the stack accordingly and the results are a respectable indication of the stack emission rates. It is Rayten's opinion that the component emissions reported are representative of the true emissions from the point source, at the time the samples were taken.

5. QUALITY CONTROL AND QUALITY ASSURANCE

Rayten Engineering Solutions follows a strict Quality Management System which has been set up to comply with international standards. Rayten Engineering Solutions (Pty) Ltd is a SANAS accredited laboratory (T0894) in accordance with ISO/IEC 17025:2017 international standards. Rayten Engineering's scope of accreditation is attached. Calibration certificates can be made available on request.

6. CONCLUSIONS

It is Rayten's opinion that the component emissions reported are representative of the true emissions from the point source, at the time the samples were taken.

The results may become non-representative of the true emissions if deviations from process operating conditions, raw material feed rate and/or composition changes as well as upset conditions occur other than what was present at the time of taking the various samples.

Does the Unit21/GT21 comply with the minimum emissions standards as stipulated within the section 21 listed activities?

☒ YES

☐ NO

☐ N/A

APPENDIX A

SANAS ACCREDITATION CERTIFICATE



CERTIFICATE OF ACCREDITATION

In terms of section 22(2) (b) of the Accreditation for Conformity Assessment, Calibration and Good Laboratory Practice Act, 2006 (Act 19 of 2006), read with sections 23(1), (2) and (3) of the said Act, I hereby certify that:-

RAYTEN ENGINEERING SOLUTIONS (PTY) LTD

Co. Reg. No.: 2019/310726/07

Facility Accreditation Number: **T0894**

is a South African National Accreditation System accredited facility
provided that all conditions and requirements are complied with

This certificate is valid as per the scope as stated in the accompanying schedule of accreditation,
Annexure "A", bearing the above accreditation number for

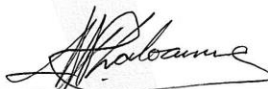
ENVIRONMENTAL ANALYSIS

The facility is accredited in accordance with the recognised International Standard

ISO/IEC 17025:2017

The accreditation demonstrates technical competency for a defined scope and the operation of a
quality management system

While this certificate remains valid, the Accredited Facility named above is authorised to
use the relevant accreditation symbol to issue facility reports and/or certificates



Mr M Phaloane
Acting Chief Executive Officer

Effective Date: 13 February 2020
Certificate Expires: 12 February 2025



STACK EMISSIONS MONITORING REPORT 2022



Environmental and Engineering Consultants

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Your contact at RAYTEN ENGINEERING SOLUTIONS (Pty) Ltd

Jacques Le Roux

Technical Director – Head Office

Tel: 011 792 0880 / Mobile: 068 072 2234

CLIENT DETAILS

Company Name:	Eskom Gourikwa Power Station
Contact Person:	Antony Domburg
Contact Telephone:	072 209 6113
Company Address:	Petro SA Landfill Site, Mossel Bay 6500
Permit/ AEL Reference:	WCED013
Release Point/ Stack ID:	Unit 22/GT22
Sampling Date:	10 May 2022
Reporting Period:	2022



Project Number:	TEC-ESK-222590
Report Number:	ESKG-02-106-005-01
Report Submission Date:	28 July 2022



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REVISION AND APPROVAL PAGE

Revision Number	01		
Rayten Report Number	ESKG-02-106-005-01		
Rayten Project Number	TEC-ESK-222590		
	Name	Signature	Date
Author	Clive Wray Engineering Manager (Pr. Eng.) (Technical Signatory)		28 July 2022
Document Reviewer	Jacques Le Roux Technical Director (Technical Signatory)		28 July 2022
Document Authorisation	Clive Wray Engineering Manager (Pr. Eng.) (Technical Signatory)		28 July 2022

DISCLAIMER

Note that although every effort has been made by Rayten Engineering Solutions to obtain the correct information and to carry out an appropriate, independent, impartial, and competent study; Rayten Engineering Solutions cannot be held liable for any incident which directly or indirectly relates to the work in this document and which may have an effect on the client or on any other third party.

CONFIDENTIALITY

The content of this report will be kept confidential. Copies of the report will not be distributed to other parties except with the expressed permission of the client. The exception to this confidentiality being the requirement from the relevant authority or department. Copyright is vested in Rayten Engineering Solutions in terms of the Copyright Act (Act 98 of 1978) and no use or reproduction or duplication thereof may occur without the written consent of the author.

Emissions Measurements Report

Name of Enterprise: Rayten Engineering Solutions (Pty) Ltd

Declaration of accuracy of information provided:

I, Claire Wray, declare that the information provided in this report is in all respects factually true and correct.

Signed at, _____ Randburg _____ on this __28__ day of _July_ 2022_



Claire Wray

Director

EXECUTIVE SUMMARY

Monitoring Objectives

Rayten Engineering Solutions (Rayten) conducted a stack emission survey at Eskom Gourikwa situated in Mosselbay, Western Cape. The objective of the measurement program was to quantify the following parameters and emissions from a single point source.

Stack ID

Unit 22/GT22

Stack Parameters

- Gas velocity
- Gas volumetric flow rate
- Gas temperature
- Gas static and absolute pressure
- Moisture Content

Isokinetic Emissions

- Particulate Matter (PM)

Anisokinetic Emissions (Instrumental Monitoring)

- Combustion Gas Components (O₂, NO, NO₂, NO_x, CO, CO₂ & SO₂)

Emissions Summary

Category for Limits:	1.2: Liquid Fuel Combustion Installations
Sampling Date:	10/05/2022
Sampling Times:	17:00 – 20:40
Amount of Test Runs:	3
Sampling Duration:	60 minutes per test run

Parameter	Reporting Units	Results	Limits	Compliant (Y/N)
Avg. Particulate Matter (PM)	mg/Nm ³	3.09	50	Y
Avg. Sulphur Dioxide (SO ₂)	mg/Nm ³	84.8	500	Y
Avg. Oxides of Nitrogen (NO _x)	mg/Nm ³	96.7	250	Y
Avg. Oxygen (in stack)	%v/v	14.1	N/A	N/A
Referenced Oxygen	%	15	N/A	N/A

N/A = Not Applicable

LIST OF ABBREVIATIONS

Abbreviation	Meaning
AEL	Atmospheric Emission Licence
US EPA	United States Environmental Protection Agency
NPT	Normalised Pressure and Temperature
°C	Degree Celsius
mm	Millimetres
m	Meters
m ³	Cubic Meters
Nm ⁻³	Normalised Cubic Meter
mg	Milligrams
ml	Millilitres
m ³ /hr	Cubic Meter per Hour
kg/s	Kilogram per Second
kg/hr	Kilogram per Hour
m/s	Metres per Second
mg.Nm ⁻³	Milligrams per normalised Cubic Meter
ppm	Parts per million
ATM	Atmosphere
dscm	Dry Standard Cubic Meter
scmm	Standard Cubic Meter per Minute
acmm	Actual Cubic Meter per Minute
acms	Actual Cubic Meter per Second
g/dscm	Grams per Dry Standard Cubic Meter
BDL	Below Detection Limit
O ₂	Oxygen
PM	Particulate Matter
NO ₂	Nitrogen Dioxide
NO _x	Nitrogen Oxides
CO	Carbon Monoxide
CO ₂	Carbon Dioxide
SO ₂	Sulphur Dioxide
H ₂ O	Water

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2. METHOD OF MEASUREMENTS.....	7
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5. QUALITY CONTROL AND QUALITY ASSURANCE	12
6. CONCLUSIONS	12

LIST OF APPENDICES

Appendix A – SANAS Accreditation Certificate

1. INTRODUCTION

Rayten Engineering Solutions (Rayten) conducted a stack emission survey at Eskom Gourikwa situated in Mosselbay, Western cape. The objective of the measurement program was to quantify the following parameters and emissions from a single point source:

- Particulate Matter (PM)
- Sulphur Dioxide (SO₂)
- Oxides of Nitrogen expressed as NO₂ (NO_x)

Stack and Associated Listed Activity

Stack ID	Category	Subcategory	Description
022	1	2	Unit 22/GT22

Atmospheric Emissions Licence (AEL) Number (if applicable)

Name of Plant/ Facility:	Eskom Gourikwa
AEL Licence Number:	WCED013
AEL Expiry Date:	April 2023
Reporting Period:	2022

Process Details

Site Location:	Eskom Mosselbay Power Station
Description of Process:	Electricity Generation
Continuous or Batch:	Continuous
Product Details:	-
Normal Operation or Erratic:	Normal
Fuel Used (if applicable):	Diesel

Accreditation Status of Laboratory (Rayten Engineering Solutions)

Name of Service Provider:	Rayten Engineering Solutions (Internal Lab)
Accreditation Status:	Accredited
Last Audit Date:	September 2021
Audit Status:	Passed
Address:	43 Kayburne Ave, Randpark Ridge, Gauteng
Telephone:	011-792-0880

2. METHOD OF MEASUREMENTS

All samples and analyses were carried out according to internationally accepted reference methods, which comply with the National Environmental Management: Air Quality Act of 2004 (Act 39 of 2004), prescribed in Schedule A: Methods for sampling and analysis in terms of Notice GN1207 dated 31 October 2018. Sampling techniques were applied to measure the following:

Methods of Measurement and Analyses

Parameter/ Pollutant	Standard Reference Method or Alternative Method	Analysis Technique	Laboratory	Laboratory Accredited	Calculated Measure of Uncertainty +/-.
Sample and Velocity Traverses	US EPA Method 1	N/A	Rayten (Site)	Yes	N/A
Stack Gas Velocity & Volumetric Flow Rate	US EPA Method 2	Dry Gas Meter and Type S Pitot tube	Rayten (Site)	Yes	4.05 m/s
The gas temperatures	Connected to a digital thermometer (K-type)	Connected to a digital thermometer (K- type)	Rayten (Site)	Yes	N/A
Oxygen and Carbon Dioxide Concentration	US EPA Method 3A	Instrumental (RAY-T3-IMR- 001)	Rayten (Site)	Yes	Oxygen = 0.41% of indicated value.
Determination of Moisture Content in Stack Gases.	US EPA Method 4	Gravimetric	Rayten (Site)	Yes	1.81 mg
Particulate Matter	US EPA Method 5	Gravimetric	Rayten (Randburg)	Yes	2.48 mg
Sulphur Dioxide	US EPA Method 6C	Instrumental (RAY-T3-IMR- 001)	Rayten (Site)	Yes	1.95 ppm
Oxides of Nitrogen	US EPA Method 7E	Instrumental (RAY-T3-IMR- 001)	Rayten (Site)	Yes	8.18 ppm

Calibrated Equipment Checklist.

Equipment	ID
APEX Kit Number	T3
Dry Gas Meter	1903078
Gas Analyzer	RAY-T3-IMR-001
Nozzle set	RAY-T3-SN-001
Pitot Tube	RAY-T3-PT-001
Site Balance	RAY-T3-SC-001
Barometer	RAY-T3-BAR-001
Manometer	RAY-T3-MM-001

3. RESULTS

Table A: Stack Parameters:

Plant	ESKOM GOURIKWA	Address	GOURIKWA	Job #	UNIT 22 OR GT 22
LEAD TECHNICIAN:	J Mashala				
SUPPORTING TECHNICIAN:	G Mokgosi				
ISOKINETIC MACHINE USED:	APEX 2 (DURBAN MACHINE)			1 903 078	
GAS ANALYSER USED:	RAY-T3B-IMRA-001			D2802A08	
PITOT TUBE USED:	RAY-T3-PT-001			0,8199	
					
STACK PARAMETERS					
Run Number		1	2	3	Average
Date	Test Date	10/05/2022	10/05/2022	10/05/2022	
Start	Run Start Time	17:00	18:20	19:40	
	Run Finish Time	18:00	19:20	20:40	
	Net Traversing Points	24	24	24	
⊖	Net Run Time, minutes	60	60	60	60
D _N	Nozzle Diameter, mm	6,1	6,1	6,1	6,1
C _p	Pitot Tube Coefficient	0,8199	0,8199	0,8199	0,82
Y	Dry Gas Meter Calibration Factor	0,964	0,964	0,964	0,964
P _{Br}	Barometric Pressure, mm of Mercury	771,21	771,21	771,21	771,21
P _{Br}	Barometric Pressure, HPa	1028,20	1028,20	1028,20	1028,20
ΔH	Average orifice meter Differential, mm H ₂ O	66,00	68,00	68,00	67,33
V _m	Dry Gas Meter Volume Sampled, m ³	1,590	1,609	1,640	1,613
t _m	Average Dry Gas Meter Temperature, °C	16,8	10,3	8,1	11,7
V _{mstd}	Dry Gas Meter Volume Sampled, Nm ³ (Dry at 273K, 101.3kPa)	1,46	1,52	1,56	1,51
V _{lc}	Total Moisture Liquid collected, ml	4,6	3,2	4,1	4,0
V _{wstd}	Volume of Water Vapor, Nm ³ (Dry at 273K, 101.3kPa)	0,006	0,004	0,005	0,005
% H ₂ O	Moisture Content of Stack Gas, %	0,39	0,26	0,32	0,32
%CO ₂	Carbon Dioxide, %	3,80	3,80	4,00	3,87
%O ₂	Oxygen, %	14,2	14,3	13,9	14,1
% CO+ N ₂	Carbon Monoxide & Nitrogen, %	82	81,9	82,1	82,0
P _g	Flue Gas Static Pressure, mm of H ₂ O	-4,00	-4,00	-4,00	-4,00
P _s	Absolute Flue Gas Pressure, mm of Mercury	770,92	770,92	770,92	770,92
t _s	Average Stack Gas Temperature, °C	516,0	516,0	515,0	515,7
ΔP _{avg}	Average Velocity Head, mm of H ₂ O	30,0	30,0	30,0	30,0
v _s	Average Stack Gas Velocity, m/s	21,1	21,1	21,1	21,1
D _s	Stack Diameter (m)	6,2	6,2	6,2	6,2
A _s	Stack Crosssectional Area, m ²	30,19	30,19	30,19	30,19
Q _d	Dry Volumetric Flow Rate, Nm ³ /min (Dry at 273K, 101.3kPa)	26 049	26 018	26 032	26 033
Q _{aw}	Actual Wet Volumetric Flue Gas Flow Rate, m ³ /min	38 190	38 284	38 239	38 237
%d	Percent Isokinetic of Sampling Rate, %	96,8	101,1	103,8	100,6

Table B: Pollutant Concentrations:

Plant	ESKOM GOURIKWA	Address	GOURIKWA	Job #	UNIT 22 OR GT 22
EMISSION RESULTS 					
Particulate Matter					
W_{total}	Particulate Method 5 Filter + Probe Catch Weight, mg	5,9	5,7	4,4	5,3
C_{mg/dscm}	Particulate Concentration (Dry mg/Nm ³ at 273K, 101.3kPa)	4,04	3,74	2,80	3,53
C_{mg/dscm}	Particulate Concentration (Dry mg/Nm ³ at 273K, 101.3kPa) @15% O ₂	3,57	3,35	2,36	3,09
E (kg/hr)	Particulate Emission Rate, kg/hr	6,32	5,83	4,37	5,51
Combustion Gas Concentrations					
SO₂ ppm		28,00	31,00	30,00	29,67
SO₂ mg/Nm³	mg/Nm ³ at 273K, 101.3kPa	80,08	88,66	85,80	84,85
SO₂ mg/Nm³	mg/Nm ³ at 273K, 101.3kPa @15% O ₂	80,08	88,66	85,80	84,85
E (kg/hr)	SO ₂ Emission Rate, kg/hr	125,16	138,41	134,01	132,53
NO_x ppm		53,00	53,00	56,00	54,00
NO_x mg/Nm³	(NO _x expressed as NO ₂) mg/Nm ³ at 273K, 101.3kPa	108,65	108,65	114,80	110,70
NO_x mg/Nm³	(NO _x expressed as NO ₂) mg/Nm ³ at 273K, 101.3kPa @15% O ₂	95,87	97,30	97,01	96,73
E (kg/hr)	NO _x Emission Rate, kg/hr	169,81	169,61	179,31	172,91
CO ppm		23,00	22,00	20,00	21,67
CO mg/Nm³	mg/Nm ³ at 273K, 101.3kPa	28,29	27,06	24,60	26,65
E (kg/hr)	CO Emission Rate, kg/hr	44,22	42,24	38,42	41,63

Table C: NAEIS Emissions Reporting Requirements:

Description:	Average:	Units:
Inside Stack Diameter =	6,20	m
Stack Exit Temperature =	516	°C
Actual Exit Flow Rate =	38237,5	m ³ /min
Actual Exit Flow Rate =	637,3	m ³ /s
PM emission rate =	5,5	kg/hr
PM emission rate =	48230,6	kg/year
SO ₂ emission rate =	133	kg/hr
SO ₂ emission rate =	1160935	kg/year
NO _x emission rate =	173	kg/hr
NO _x emission rate =	1514709	kg/year
CO emission rate =	42	kg/hr
CO emission rate =	364656	kg/year
Above emission rates assume plant operates 24 hours for 365 days.		

4. DISCUSSION

Sample ports were available on the stack which were utilised for volumetric flow rate and isokinetic measurements.

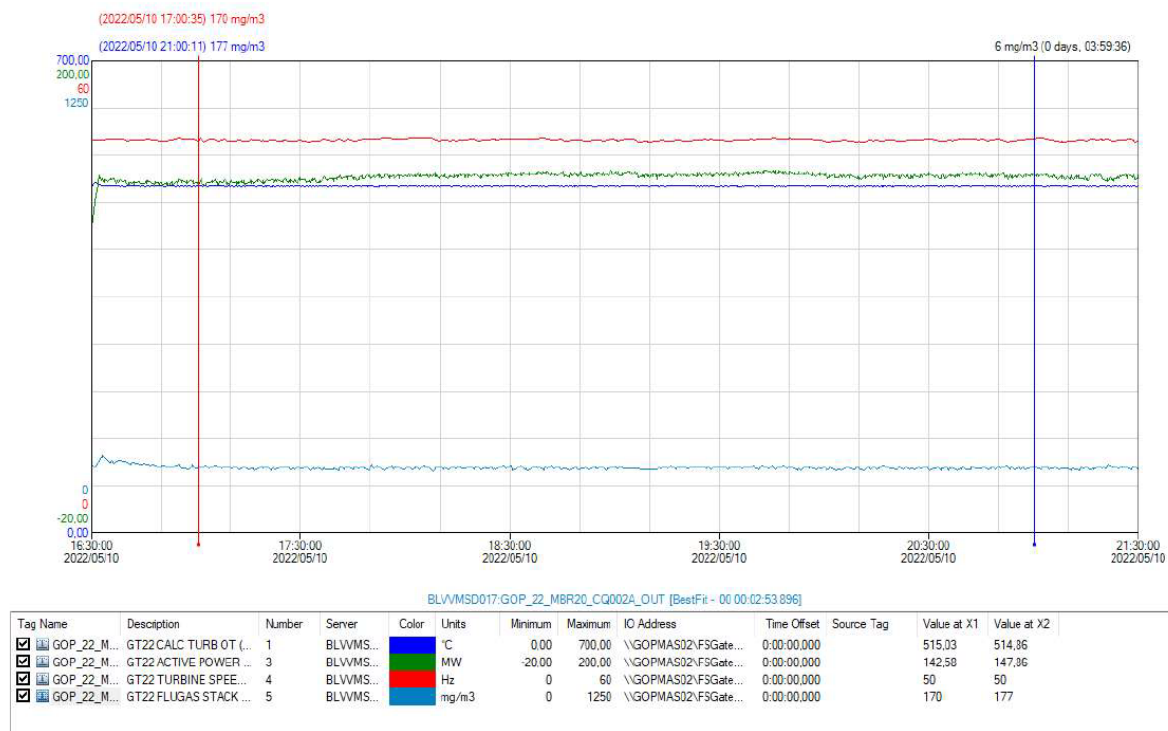
Duct/ Stack Characteristics

Stack Shape	Circular	
Diameter / Depth:	6.2	m
Width (if square):	-	m
Area of Stack:	30.19	m ²
Stack Orientation:	Vertical	
Number of ports:	3	

Site Notes/ Conditions

1	No concerns noted on Site.
2	Eskom CEMs unit readings are graphed below for information.
3	-
4	-
5	-

GOP_22



Rayten monitored the stack accordingly and the results are a respectable indication of the stack emission rates. It is Rayten's opinion that the component emissions reported are representative of the true emissions from the point source, at the time the samples were taken.

5. QUALITY CONTROL AND QUALITY ASSURANCE

Rayten Engineering Solutions follows a strict Quality Management System which has been set up to comply with international standards. Rayten Engineering Solutions (Pty) Ltd is a SANAS accredited laboratory (T0894) in accordance with ISO/IEC 17025:2017 international standards. Rayten Engineering's scope of accreditation is attached. Calibration certificates can be made available on request.

6. CONCLUSIONS

It is Rayten's opinion that the component emissions reported are representative of the true emissions from the point source, at the time the samples were taken.

The results may become non-representative of the true emissions if deviations from process operating conditions, raw material feed rate and/or composition changes as well as upset conditions occur other than what was present at the time of taking the various samples.

Does the Unit22/GT22 comply with the minimum emissions standards as stipulated within the section 21 listed activities?

☒ YES

☐ NO

☐ N/A

APPENDIX A

SANAS ACCREDITATION CERTIFICATE



CERTIFICATE OF ACCREDITATION

In terms of section 22(2) (b) of the Accreditation for Conformity Assessment, Calibration and Good Laboratory Practice Act, 2006 (Act 19 of 2006), read with sections 23(1), (2) and (3) of the said Act, I hereby certify that:-

RAYTEN ENGINEERING SOLUTIONS (PTY) LTD

Co. Reg. No.: 2019/310726/07

Facility Accreditation Number: **T0894**

is a South African National Accreditation System accredited facility
provided that all conditions and requirements are complied with

This certificate is valid as per the scope as stated in the accompanying schedule of accreditation,
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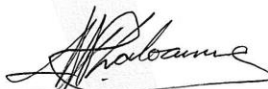
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ISO/IEC 17025:2017

The accreditation demonstrates technical competency for a defined scope and the operation of a
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use the relevant accreditation symbol to issue facility reports and/or certificates



Mr M Phaloane
Acting Chief Executive Officer

Effective Date: 13 February 2020
Certificate Expires: 12 February 2025



CLIENT DETAILS

Contact Kirsten Burgess
Client ARGOS SCIENTIFIC AFRICA (PTY) LTD
Address Unit 16, 360 Business Park
8 Section street
Paarden Eiland
Telephone
Facsimile
Email kburgess@argos-sci.com
Order Number To Follow
Samples 4
Sample matrix AIR

LABORATORY DETAILS

Laboratory X-Lab Earth Science
Address 2 Samantha Street, Strydompark, Randburg,
2169
Telephone +27 (0)11 590 3000
Laboratory Manager Mrs Tasneem Tagari
Lab Reference JBX23-14797
Report Number 0000057925
Date Received 19/04/2023 11:02
Date Started 25/04/2023 9:04
Date Reported 25/04/2023 13:06

The document is issued in accordance with SANAS's accreditation requirements.
Accredited for compliance with ISO/IEC 17025. SANAS accredited laboratory T0775.



Samples received at ambient temperature in good condition.

SIGNATORIES



Tasneem Tagari

General Manager/Technical Signatory

TEST REPORT

Sample Number
Sample Name

JBX23-14797.001 365519 (South)	JBX23-14797.002 365516 (West)	JBX23-14797.003 365512 (North)	JBX23-14797.004 365504 (East)
-----------------------------------	----------------------------------	-----------------------------------	----------------------------------

Parameter

Units

LOR

BTEX in Air Method: ME-AN-061

Benzene	ng/tube	10	<10	<10	<10	11
Toluene	ng/tube	10	18	<10	<10	47
Ethylbenzene	ng/tube	10	<10	<10	<10	<10
m/p-xylene	ng/tube	10	<10	<10	<10	<10
o-xylene	ng/tube	10	<10	<10	<10	<10

Volatile Organic Compounds (VOC) in Air Method: ME-AN-061

Styrene *	ng/tube	10	<10	<10	<10	<10
-----------	---------	----	-----	-----	-----	-----

METHOD SUMMARY

METHOD

METHOD SUMMARY

ME-AN-061

This method is used to determine Benzene, Toluene, Ethylbenzene & Xylene's in air samples which have been actively or passively sampled onto an adsorbent thermal desorption tube. The sample tubes are loaded onto the thermal desorption unit autosampler and the compounds are desorbed at 300°C for 7 minutes with a flow of Helium onto a cryo-focusing Tenax® trap. The trap is then quickly desorbed onto the analytical capillary column in the gas chromatograph which separates the compounds. Each compound is then identified and quantified by the mass spectrometer which is operated in full scan mode over a 50 – 300amu range. Identification of analytes is accomplished by comparing their mass spectra with the mass spectra of authentic standards and elution times. Quantitation is accomplished by comparing the response of a major (quantitation) ion relative to an internal standard using an appropriate calibration curve.

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FOOTNOTES

IS	Insufficient sample for analysis.	-	The sample was not analysed for this analyte
LNR	Sample listed, but not received.	*	Results marked "Not SANAS Accredited" in this report are not
^	Performed by outside laboratory.		included in the SANAS Schedule of Accreditation for this laboratory
LOR	Limit of Reporting		/ certification body / inspection body".

Samples analysed as received.
Solid samples expressed on a dry weight basis.

Unless otherwise indicated, samples were received in containers fit for purpose.

This document is issued by the Company under its General Conditions of Service.

Attention is drawn to the limitation of liability, indemnification and jurisdiction issues defined therein.

WARNING: The sample(s) to which the findings recorded herein (the "Findings") relate was(were) draw and / or provided by the Client or by a third party acting at the Client's direction. The Findings constitute no warranty of the sample's representativity of all goods and strictly relate to the sample(s). The Company accepts no liability with regard to the origin or source from which the sample(s) is/are said to be extracted.

Any unauthorized alteration, forgery or falsification of the content or appearance of this document is unlawful and offenders may be prosecuted to the fullest extent of the law.

X-Lab Earth Science is accredited by SANAS and conforms to the requirements of ISO/IEC 17025 for specific test or calibrations as indicated on the scope of accreditation to be found at <http://sanas.co.za>.

The document is issued in accordance with SANAS's accreditation requirements and shall not be reproduced, except in full, without written approval of the laboratory

CLIENT DETAILS

Contact Kirsten Burgess
Client ARGOS SCIENTIFIC AFRICA (PTY) LTD
Address Unit 16, 360 Business Park
8 Section street
Paarden Eiland
Telephone
Facsimile
Email kburgess@argos-sci.com
Order Number ESKOM DANA BAY BTEX SAMPLING
Samples 4
Sample matrix AIR

LABORATORY DETAILS

Laboratory X-Lab Earth Science
Address 2 Samantha Street, Strydompark, Randburg,
2169
Telephone +27 (0)11 590 3000
Laboratory Manager Mrs Tasneem Tagari
Lab Reference JBX23-16472
Report Number 0000066798
Date Received 13/10/2023 07:46
Date Started 20/10/2023 11:25
Date Reported 21/10/2023 10:41

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Accredited for compliance with ISO/IEC 17025. SANAS accredited laboratory T0775.



Samples received at ambient temperature in good condition.

SIGNATORIES



Tasneem Tagari

General Manager/Technical Signatory

TEST REPORT

Sample Number
Sample Name

JBX23-16472.001 364762 (SOUTH)	JBX23-16472.002 365508 (WEST)	JBX23-16472.003 365501 (NORTH)	JBX23-16472.004 365514 (EAST)
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Parameter

Units

LOR

BTEX in Air Method: ME-AN-061

Benzene	ng/tube	10	11	<10	<10	<10
Toluene	ng/tube	10	12	<10	14	<10
Ethylbenzene	ng/tube	10	<10	<10	<10	<10
m/p-xylene	ng/tube	10	<10	<10	<10	<10
o-xylene	ng/tube	10	<10	<10	<10	<10

Volatile Organic Compounds (VOC) in Air Method: ME-AN-061

Styrene *	ng/tube	10	<10	<10	<10	<10
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