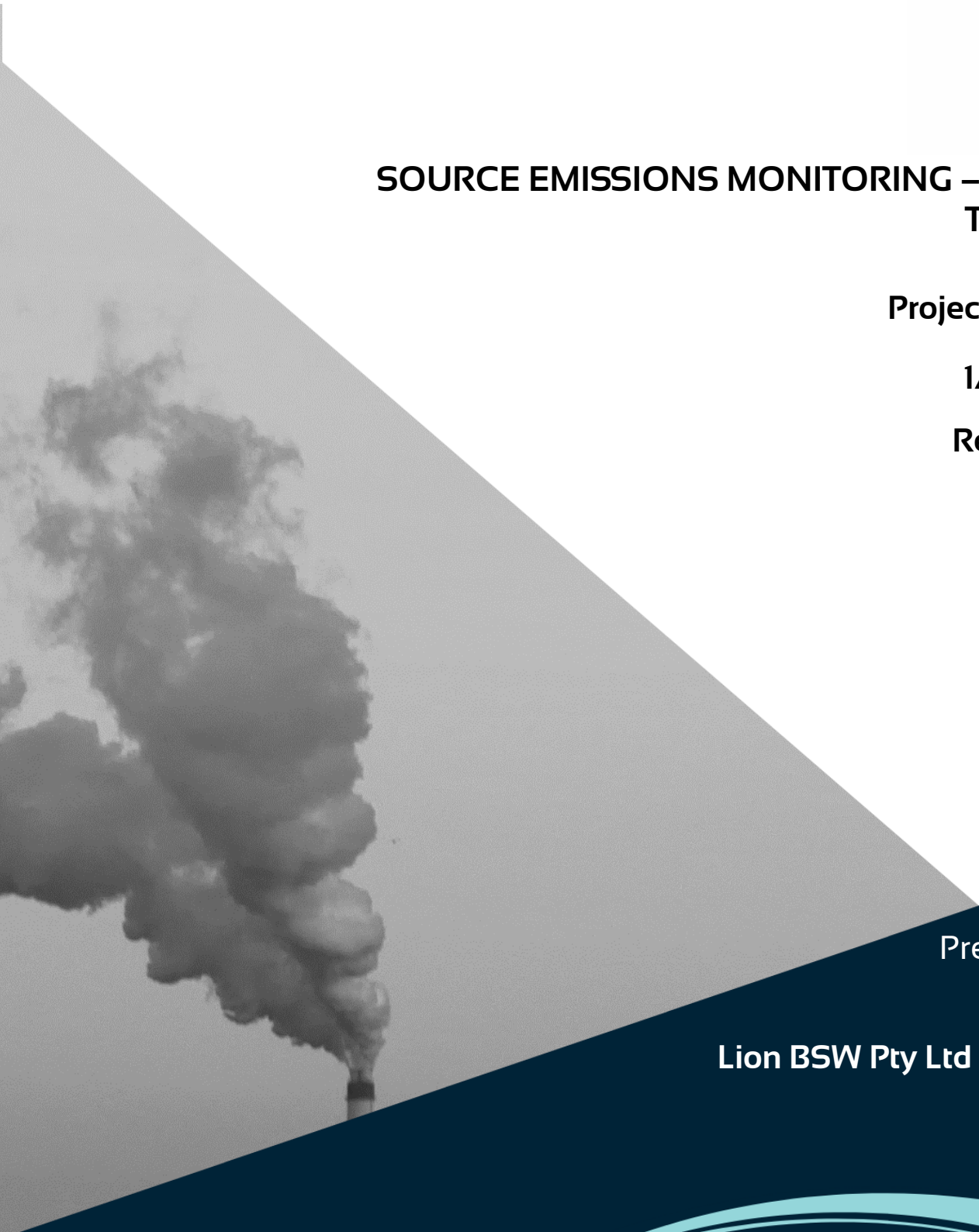

SOURCE EMISSIONS MONITORING – LION CO TOOHEYS

Project ID: 16773

1/05/2025

Release: R0

Prepared For:

Lion BSW Pty Ltd – Tooheys Lidcombe

Assured Environmental

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Project Title: LION CO TOOHEYS

Project Reference ID: 16773

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Table 1: History of Revisions

Revision	Date	Issued to	Changes
R0	1/05/2025	Jason Lee	Initial Release

ACCREDITED FOR COMPLIANCE TO ISO/IEC 17025

The results of the tests, calibrations and/or measurements included in this document are traceable to Australian/national standards.

Accreditation number: 19703

EXECUTIVE SUMMARY

Assured Environmental (AE) conducted emissions monitoring at the LION Co–Tooheys facility located in Lidcombe, NSW. Monitoring at the stack release point (EPA ID: 7) was undertaken to determine the concentration and mass emission rates of the parameters listed in Table 2 below. All testing was conducted on 9 April 2025, in accordance with the New South Wales Environmental Protection Licence (Licence Number 1167), during normal operating conditions.

Table 2 provides a summary of the results of monitoring along with a comparison of measured emission with the limits provided in the environmental authority.

Table 2: Summary of Emissions

Release Point Parameter	Unit of Measure	Stack result	License Limit
Sample location	-	Co-generation Engine Stack	
Date of testing	dd-mm-yyyy	09/04/2025	
Average stack temperature	°C	211	
Average oxygen content	%-vol	10.7	
Oxides of nitrogen (NO_2)	mg/Nm^3	151	
NOx Concentration at 5 % O_2	mg/Nm^3	235	250
Emission rate	g/sec	18.8	
Carbon monoxide	mg/Nm^3	507	
CO Concentration at 5 % O_2	mg/Nm^3	789	
Emission rate	g/sec	62.9	
TVOC (as propane)	mg/Nm^3	0.16	
TVOC Concentration at 5 % O_2	mg/Nm^3	0.25	40
Emission rate	g/sec	0.02	

Note: The decision rule relies solely on the test values without considering the uncertainty limits in Table 9. Based on this rule, pollutant emissions from the Co-generation Engine stack comply with EPA concentration limits

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1 MONITORING PLAN

Assured Environmental (AE) was appointed by LION Co–Toohey's to conduct source emissions sampling and analysis at their facility in Lidcombe, NSW. Sampling was carried out by AE during day shift operations on 9 April 2025. The plant was operating at typical capacity at the time of sampling.

AE was responsible for the collection and analysis of samples, unless otherwise specified. Samples were recovered and stored appropriately before being returned to the laboratory, where they were prepared and analysed according to the methodologies outlined in this report.

This testing program was conducted to satisfy the conditions specified in the Environmental Authority issued to the facility by the NSW Environment Protection Authority (Licence No: 1167). Table 3 provides a summary of the monitoring activities undertaken during the sampling program, while Table 4 summarises the plant operating conditions during sampling.

Table 3: Summary of Sampling Undertaken

Analyte	Test Method	Source	Licence Limit
Dry gas density	TM-23	Co-generation Engine Stack	
Moisture	TM-22	Co-generation Engine Stack	
Molecular weight of stack gases	TM-23	Co-generation Engine Stack	
Nitrogen Oxides	TM-11	Co-generation Engine Stack	250 mg/Nm^3 @ 5%O_2
Temperature	TM-2	Co-generation Engine Stack	
Velocity	TM-2	Co-generation Engine Stack	
Volatile organic Compounds as n-propane equivalent	TM-34	Co-generation Engine Stack	40 mg/Nm^3 @ 5%O_2
Volumetric flowrate	TM-2	Co-generation Engine Stack	

Table 4: Operating data

Source	Process	Production rate	Control equipment
Co-generation Engine Stack	Generation of electrical Power from gas	See below production details- Appendix A	Continuous Emission Monitoring System (CEMS)

2 MONITORING METHODOLOGY

2.1 Overview

AE personnel made contact with the nominated site representative and confirmed that the plant was operating normally. At this time, all site access permits were arranged and the previously prepared draft sampling plan for the day was agreed with the client.

The following sections provide a summary of the specific locations utilised and methodologies used for the monitoring.

2.2 Sample Locations

Table 5 provides a description of each of the sampling points utilised for the sampling program. For each sampling point, an assessment of compliance against the requirements of AS4323.1:2021 was undertaken. Based on this analysis, and in accordance with the requirements of the standard, sampling locations are identified as either ideal, non-ideal or non-conforming. Where a sampling plane is identified as non-ideal or non-conforming, no alternative ideal sampling planes representative of the source were available at the facility.

Table 5: Assessment of Compliance with AS4323.1

AS4323.1	Sample location	Lidcombe
	Description	Cogen
	Stack coordinates	UTM 56s:
	Easting	319069.25 m E
	Southing	6252742.34 m S
	Stack Exit point from ground (m)	15
	Stack Shape	CIRCULAR
	Ideal Sampling Plane Assessment	
	Stack Diameter (m)	0.48
	Stack Cross Section Area (m^2)	0.18
	Distance to upstream disturbance (m) (from disturbance)	1.40
	Upstream Diameters (D)	2.92
	Distance to downstream disturbance (m) (from disturbance)	1.90
	Downstream diameters (D)	3.96
4.2.2 Table 1	Meets Requirements AS4323.1 Table 1	No
	Non-deal Sampling Plane Assessment	0
	Assessment required?	No
	Total traverse point factors	11
	Non-conforming Sampling Plane Assessment	
4.2.2(a)	Gas flow in same direction	Yes
4.2.2(b)	Gas flow steady & evenly distributed (cyclonic or swirl <15°)	Yes
4.2.2(c)	Temperature difference between points <10%, and each point <10% of average	Yes
4.2.2(d)	Ratio of highest to lowest differential pressure & ratio highest to lowest velocity	12
		11

4.2.2(e)	Minimum differential pressure	21.09
	Gas temperature above dewpoint	Yes
	Sampling Plane Type	0
4.2.2, 4.2.3, 4.2.4	Sampling plane type	Non-ideal
	Alternative sampling plane available?	No
	Number of Sample Points Adopted	0
	Port size (mm)	110
	Port thread type	Flange
	Number of traverses	2
	Number of points per traverse	6
	Total number of traverse points	12
	Flow & temperature compliance check	Yes
	Total sample time (min)	60

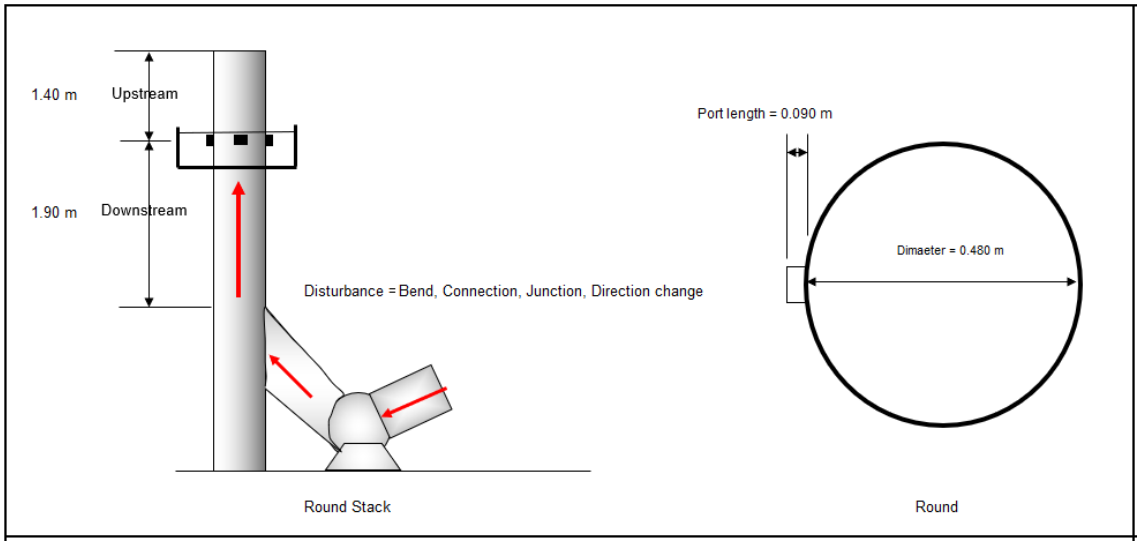


Figure 1: Schematic of sampling location

Figure 2: Sampling location

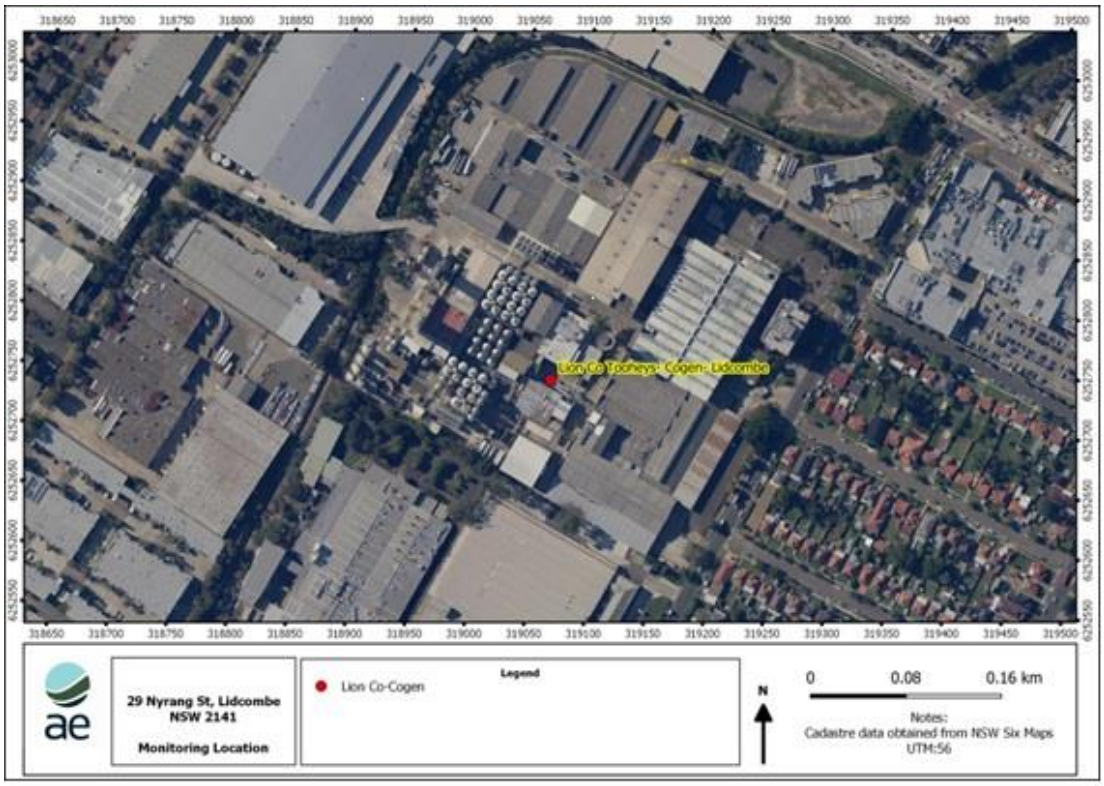


Figure 3: Site location

2.3 Sampling Methodology

All sampling and analysis were carried out in accordance with the methods listed in Table 6. Any deviations to these approved methods have been documented where applicable. These notes also contain any known upset operational conditions of the plant during testing.

Table 6: Test Methods

Parameter	NSW Test Method	Reference Sample method	NATA accreditation	Sampling Notes	Analysis By
Sample Plane Criteria	TM-1	AS4323.1	yes	a	1
Gas Velocity & Temperature	TM-2	USEPA Method 2	yes	nil	1
Stack Gas Density	TM-23	USEPA Method 3	yes	nil	1
Oxygen & Carbon Dioxide	TM-25	USEPA Method 3A	yes	nil	1
Stack Gas Water Vapour	TM-22	USEPA Method 4	yes	nil	1
Sulfur Dioxide	TM-4	USEPA Method 6/6C	yes	nil	1
Oxides of Nitrogen – as NO_2	TM-11	USEPA Method 7E	yes	nil	1
Total VOC	TM-34	USEPA Method 18	yes	b	2

Table 7: Sampling Notes

Note	Comment
a	Sample location is compliant as per AS4323.1. The temperature and velocity survey showed that the sample position complied to items (a) to (f) as per AS4323.1.
b	Analyser calibration performed in the AE laboratory prior to conducting field work and post field work.
c	Total VOCs was be analysed from a Carbon tube.

Table 8: Analysis By

Note	Company	Work performed	NATA ID	Report Number
1	AE	Sampling & analysis	19703	16773
2	Envirolab Services	Laboratory analysis	2901	377929

2.4 Measurement Uncertainty

There is an inherent uncertainty associated with any scientific measurement, including stack emissions monitoring. The measurement uncertainty can be controlled with strict adherence to the reference methodology along with utilising appropriate calibration standards with corresponding acceptable uncertainty reports.

Many source sampling methods do not outline exact procedures for establishing direct measurement uncertainty. In the absence of a defined procedure, the uncertainty budgets presented are based on estimations using ISO-GUM method.

Each individual source and test may have a unique associated uncertainty assigned, due to factors such as the stack sample location in relation to the positioning requirements of AS4323.1, stack temperature, water vapour content and sample analysis.

The table below outlines the estimated uncertainties associate with reports presented within this report.

Table 9: Sample Uncertainty

Parameter	Reference method	Measurement Uncertainty	Coverage factor	Confidence coefficient
Gas velocity	USEPA Method 2	3	2	95
Gas temperature (°K)	USEPA Method 2	3	2	95
Gas water vapour content	USEPA Method 4	4	2	95
Oxygen	USEPA Method 3A	7	2	95
Combustion gases	USEPA Method 6C,7E & 10	7	2	95
Volatile Organic Compounds	USEPA Method 18	39	2	95

the % uncertainties are for results ≥10 the reporting limit given in the laboratory analysis; note, as you approach the reporting limit, statistically ("Horwitz trumpet") the estimated MU will increase.*

2.5 Calibration Records

The sampling equipment was transported to site using AE's mobile lab and freight contractors. Prior to commencement of sampling, the mobile laboratory was set up at the base of the stack and used as a temporary site office and laboratory whilst on site. Sampling consoles, analysers, calibration gases and sample recovery equipment were set up with umbilicals connecting these sampling consoles to the probes and impingers in accordance with the methods.

All equipment used in the sampling program was calibrated in accordance with AE's NATA accredited procedures. Table 10 presents a summary of the calibration status of each of the key equipment used in the sampling program.

Table 10: Calibration Records

Equipment	Equipment ID	Calibration Due Date	Calibration information
Pitot	PN57	12/12/2025	
Gas Analyser	SN1056	Daily onsite	On-site calibration, pre- and post-sampling
Thermocouple	TN110	27/07/2025	
SKC Pump	SN1073	15/05/2025	

3 MONITORING RESULTS

3.1 Results – Co-Generation Engine Stack

Table 11: Results table

Release Point Parameter	Unit of Measure	Stack result
Site	-	Toohey's Brewery
Sample location	-	29 Nyrang St, Lidcombe NSW 2141
Run ID	-	2
Test parameter	-	VOCs
Date of testing	dd-mm-yyyy	9/04/2025
Start time	hh:mm	11:00
Finish Time	hh:mm	12:00
Average stack temperature	K	484
Average stack temperature	°C	211
Atmospheric Pressure	kPa	102
Absolute stack pressure	mbar	1100
Average stack gas water vapour content	%-vol	11.1
Average carbon dioxide content	%-vol	5.6
Average oxygen content	%-vol	10.7
Dry gas density	kg/Nm^3	2
Dry gas molecular weight	g/gmole	44
Sample volume (dry gas meter)	Nm^3	0.05
Exhaust Velocity	m/sec	17.4
Actual stack volume flow	m^3/min	230
Dry standard stack flow rate	Nm^3/min	124
Actual stack volume flow	m^3/sec	4
Dry standard stack flow rate	Nm^3/sec	2
Oxides of nitrogen (NO_2)	mg/Nm^3	151.00
NOx Concentration at 5 % O2	mg/Nm^3	235.38
Emission rate	g/min	18.72
Carbon monoxide	mg/Nm^3	507.00
CO Concentration at 5 % O2	mg/Nm^3	790.32
Emission rate	g/min	62.87
TVOC (as propane)	mg/Nm^3	0.16
TVOC Concentration at 5 % O2	mg/Nm^3	0.25
Emission rate	g/min	0.02

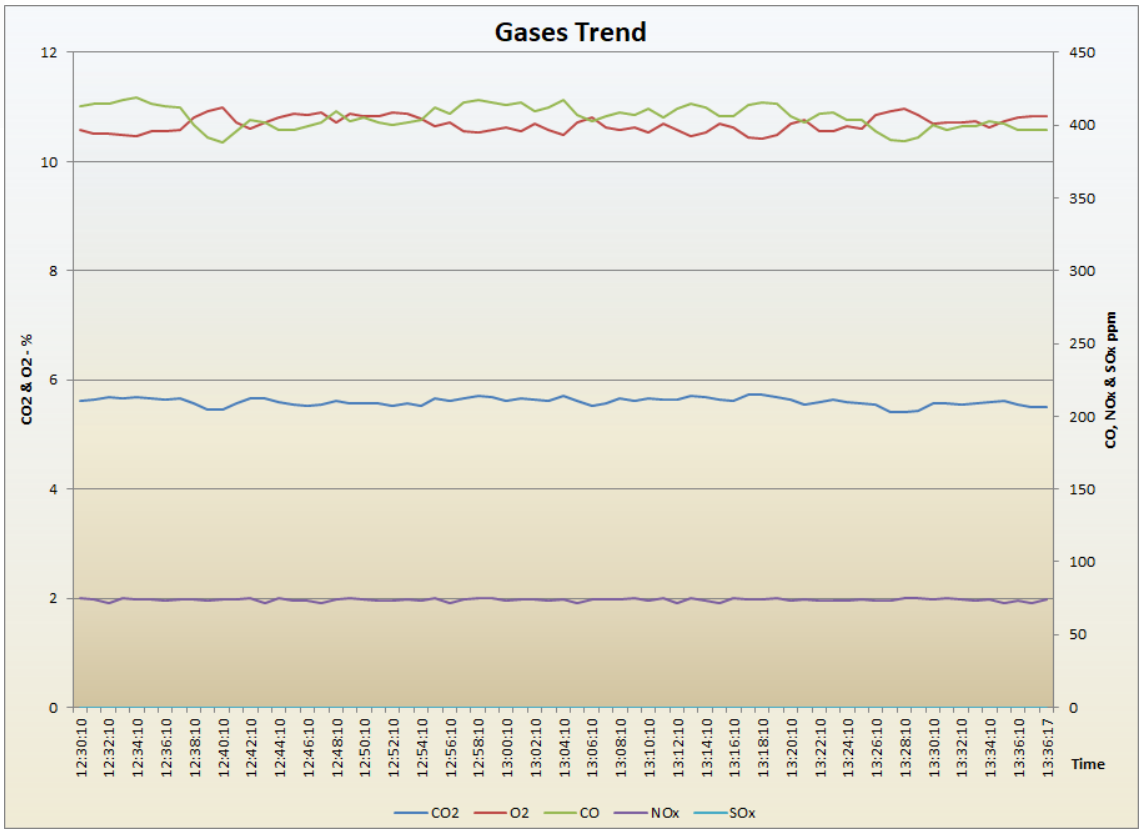


Figure 4: Gas Trend During Sampling

4 QUALITY ASSURANCE & QUALITY CONTROL (QA/QC)

Assured Environmental operates within a quality system based upon the requirements of ISO17025. Our quality system defines specific procedures and methodologies to ensure any project undertaken by Assured Environmental is conducted with the highest level of quality given the specific confines of each project. The overall objective of our QA/QC procedures is to representatively sample and accurately analyse components in the gas streams and therefore report valid measurements of emission concentrations.

To ensure representativeness of field work, our quality procedures target:

1. Correct sampling locations
2. Sample time
3. Frequency of samples and
4. Method selection & adherence

To ensure representativeness of lab work, our quality procedures target:

1. Sample preservation
2. Chain of custody (COC)
3. Sample preparation and
4. Analytical techniques

Assured Environmental maintains strict quality assurance throughout all its sampling programs, covering on-site 'field work' and the analytical phase of our projects. Our QA program covers the calibration of all sampling and analytical apparatus where applicable and the use of spikes, replicate sample and reference standards. The test methodologies used for this project are outlined in the methods section of this document. Field test data has been recorded and calculated using direct entry into Microsoft Excel spreadsheets following the procedures of the appropriate test methods. Determination of emission concentrations has been performed using the same Microsoft Excel spreadsheets which are partially supplied as an attachment to this report. More detailed information can be supplied upon request.

QA/QC checks for this project will use validation techniques and criteria appropriate to the type of data and the purpose of the measurement to approve the test report. Records of all data will be maintained. Complete chain of custody (COC) procedures has been followed to document the entire custodial history of each sample. The COC forms also served as a laboratory sheet detailing sample ID and analysis requirements.

5 GLOSSARY OF TERMS

The following terms and abbreviations may be used in this report:

Table 12: Definitions

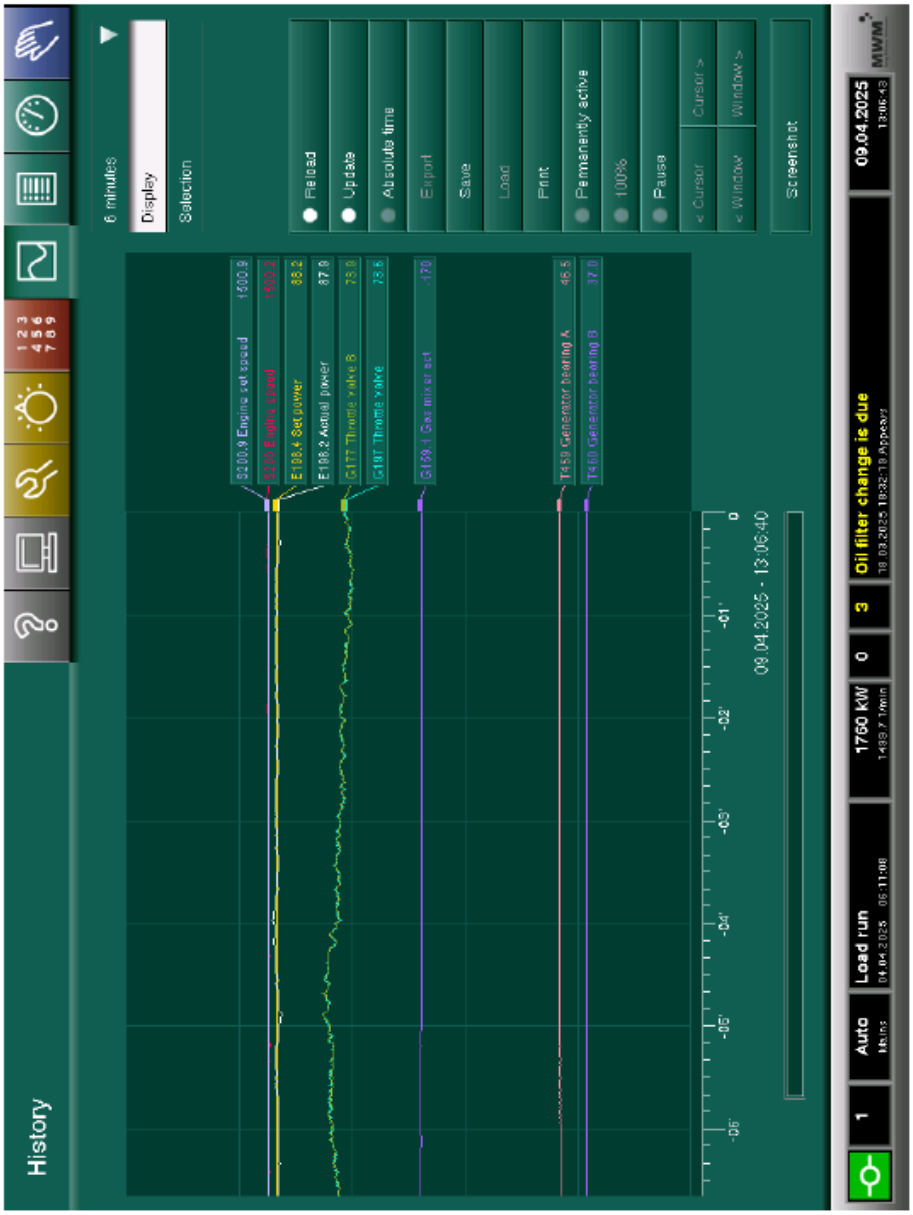
Symbol	Definition
s	The analytes tested for was not detected; the value stated is the reportable limit of detection
Am^3	Actual gas volume in cubic metres at measured conditions
AS	Australian Standard
BH	Back half of sample train (filter holder and impingers) (referred to during sample recovery)
°C	Degrees Celsius
CARB	California Air Resources Board methods
dscm	Dry standard cubic meters
FH	Front half of sample train (probe and filter holder) (referred to during sample recovery)
f/ml	Fibres per millilitre
g	Grams
kg	Kilograms
m	Metres
m^3	Gas volume in cubic metres
mbar	Millibars
mg	Milligrams (10-3 grams)
min	Minute
ml	Millilitres
mmH2O	Millimetres of water
Mole	SI unit that measures the amount of substance
N/A	Not applicable
ng	Nanograms (10-9 grams)
NATO	North Atlantic Treaty Organisation
NIOSH	National institute for occupational safety and health (USA)
Nm^3	Gas volume in dry cubic metres at standard temperature and pressure (0°C and 101.3 kPa)
NMI	National Measurement Institute
NM VOC	Non-methane volatile organic compound
NR	Not required on this occasion
OSHA	Occupational Safety and Health Act
OU	Odour unit ($ou.m^3$)
PCDD	Polychlorinated dibenzo-p-dioxin
PCDF	Polychlorinated dibenzofuran
PM	Particulate matter
ppb	Parts per billion
ppm	Parts per million
sec	Second
Sm^3	Standard gas volume in dry cubic metres at standard temperature and pressure (0°C and 101.3 kPa) and corrected to a standardised value (e.g. 15% O2)

STP	Standard temperature and pressure (0°C and 101.3 kPa)
TO	USEPA air toxics method
TWA	Time-weighted average
USEPA	United States Environmental Protection Authority

APPENDIX A: PLANT PROCESS DATA

This is the Process data.

Name:	PLC date: 09.04.2025	Number of faults: 0 Number of alarms: 3
Comment: Toohey's	PLC release: 2.50.21-m03	State: Load run Operation mode: Mains
Number: 9296876	PLC operating system: 2.53.03	Actual power: 1760 kW Actual speed: 1499.7 1/min
Engine type: TCG2020V20	Visualisation: 3.4.2	Operation hours: 36991 Starts: 2364
Serial number CPU-P: 233500100-01891	Serial number BRT: 26030040114483	Serial number DZR: 832800092



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