

Ektimo

Santos Limited, Wilga Park

Emission Testing Report

Report R015604

ektimo.com.au



Accredited for compliance with ISO/IEC 17025 - Testing.
NATA is a signatory to the ILAC Mutual Recognition
Arrangement for the mutual recognition of the
equivalence of testing, calibration, and inspection reports.

Document Information

Client Name: Santos Limited
Report Number: R015604
Date of Issue: 22 November 2023
Attention: Abigail Kahi
Address: Level 22, 32 Turbot Street
BRISBANE QLD 4000
Testing Laboratory: Ektimo Pty Ltd, ABN 86 600 381 413

Report Authorisation

Graham Edwards
Senior Air Monitoring Consultant



NATA Accredited Laboratory
No. 14601

This document is confidential and is prepared for the exclusive use of Santos Ltd. and those granted permission by Santos Ltd.. The report shall not be reproduced except in full.

Please note that only numerical results pertaining to measurements conducted directly by Ektimo are covered by Ektimo terms of NATA accreditation as described in the Test Methods table. This does not include calculations that use data supplied by third-parties, comments, conclusions, or recommendations based upon the results. Refer to Test Methods section for full details of testing covered by NATA accreditation.

Table of Contents

- 1 Executive Summary4
 - 1.1 Background4
 - 1.2 Project Objective.....4
 - 1.3 Results Summary5

- 2 Results6
 - 2.1 GO1A6
 - 2.2 GO5B7
 - 2.3 GO6B8
 - 2.4 GO2A9
 - 2.5 GO3A10
 - 2.6 GO4A11
 - 2.7 GO4B12
 - 2.8 GO6A13
 - 2.9 GO7A14
 - 2.10 GO5A15

- 3 Sample Plane Compliance16
 - 3.1 GO1A16
 - 3.2 GO5B16
 - 3.3 GO6B16
 - 3.4 GO2A17
 - 3.5 GO3A17
 - 3.6 GO4A17
 - 3.7 GO4B18
 - 3.8 GO6A18
 - 3.9 GO7A18
 - 3.10 GO5A19

- 4 Plant Operating Conditions19
- 5 Test Methods20
- 6 Quality Assurance/Quality Control Information20
- 7 Compliance Summary.....21
- 8 Definitions22
- 9 Appendices23

Appendix A: Gas Calibration Certificates
Appendix B: Sampling Locations
Appendix C: Chain of Custody
Appendix D: Laboratory Results

1 Executive Summary

1.1 Background

Ektimo was engaged by Santos Limited to perform emission testing from gas fired engines situated at their Wilga Park plant.

1.2 Project Objective

The objective of the project was to conduct a monitoring programme to quantify emissions from multiple discharge points to determine compliance with Santos Limited's Development Approval DA07-0023.

Monitoring was performed as follows:

Location	Test Date	Test Parameters*
GO1A	24 October 2023	Solid particles Nitrogen oxides, nitric oxide, nitrogen dioxide Sulfur dioxide, sulfur trioxide Oxygen, carbon dioxide, carbon monoxide
GO5B		
GO6B		
GO2A	25 October 2023	
GO3A		
GO4A		
GO4B		
GO6A		
GO7A		
GO5A	26 October 2023	

* Flow rate, velocity, temperature, and moisture were also determined.

Emission testing was conducted on all engines at Wilga Park that were operational on the designated occasion for monitoring.

At time of sampling, unit GO3B was offline.

Santos Operators have advised GO3B was offline for 60K hour major overhaul.

The observations of the 2023 emissions testing are representative of the typical operating conditions of WPPS as not all engines operate all of the time.

All results are reported on a dry basis at STP.

Plant operating conditions have been noted in this report.

1.3 Results Summary

The following licence comparison table shows that all analytes are within the licence limit set by the Department of Planning DA 07_0023.

Location Description	Pollutant	Units	Department Planning limit	Detected values	Corrected to 3% O ₂
GO1A	Oxides of Nitrogen (as NO ₂)	mg/m ³ STP dry	450	210	420
GO2A	Oxides of Nitrogen (as NO ₂)	mg/m ³ STP dry	450	200	390
GO3A	Oxides of Nitrogen (as NO ₂)	mg/m ³ STP dry	450	230	370
GO4A	Oxides of Nitrogen (as NO ₂)	mg/m ³ STP dry	450	240	380
GO4B	Oxides of Nitrogen (as NO ₂)	mg/m ³ STP dry	450	190	380
GO5A	Oxides of Nitrogen (as NO ₂)	mg/m ³ STP dry	450	270	430
GO5B	Oxides of Nitrogen (as NO ₂)	mg/m ³ STP dry	450	220	440
GO6A	Oxides of Nitrogen (as NO ₂)	mg/m ³ STP dry	450	280	440
GO6B	Oxides of Nitrogen (as NO ₂)	mg/m ³ STP dry	450	220	440
GO7A	Oxides of Nitrogen (as NO ₂)	mg/m ³ STP dry	450	220	390

Please note that the measurement uncertainty associated with the test results was not considered when determining whether the results were compliant or non-compliant.

2 Results

2.1 GO1A

Date	24/10/2023	Client	Santos Limited
Report	R015604	Stack ID	GO1A
Licence No.	DA07_0023	Location	Wilga Park
Ektimo Staff	Aaron Davis / Scott Woods	State	NSW
Process Conditions	Engine operating at 3000kW		

23108

Stack Parameters		
Moisture content, %v/v	8.3	
Gas molecular weight, g/g mole	28.5 (wet)	29.4 (dry)
Gas density at STP, kg/m ³	1.27 (wet)	1.31 (dry)
Gas density at discharge conditions, kg/m ³	0.51	
% Oxygen correction & Factor	3 %	2.02
Gas Flow Parameters		
Flow measurement time(s) (hhmm)	1330 & 1440	
Temperature, °C	394	
Temperature, K	667	
Velocity at sampling plane, m/s	38	
Volumetric flow rate, actual, m ³ /s	11	
Volumetric flow rate (wet STP), m ³ /s	4.3	
Volumetric flow rate (dry STP), m ³ /s	3.9	
Mass flow rate (wet basis), kg/h	20000	

Gas Analyser Results	Sampling time	Average		
		1333 - 1432		
		Corrected to		
		Concentration	3% O ₂	Mass Rate
		mg/m ³	mg/m ³	g/min
Combustion Gases				
Nitric oxide (as NO ₂)		210		49
Nitrogen dioxide (as NO ₂)		2.7		0.64
Nitrogen oxides (as NO ₂)		210	420	49
Sulfur dioxide		<6		<1
Carbon monoxide		490		110
		Concentration		
		%v/v		
Carbon dioxide			5.1	
Oxygen			12.1	

Isokinetic Results	Sampling time	Results	
		1335-1436	
		Concentration	Mass Rate
		mg/m ³	g/min
Solid Particles		<2	<0.6
Sulfur trioxide and/or Sulfuric acid (as SO ₃)		0.062	0.015
Isokinetic Sampling Parameters			
Sampling time, min		60	
Isokinetic rate, %		103	
Gravimetric analysis date (total particulate)		30-10-2023	

2.2 G05B

Date	24/10/2023	Client	Santos Limited
Report	R015604	Stack ID	G05B
Licence No.	DA07_0023	Location	Wilga Park
Ektimo Staff	Aaron Davis / Scott Woods	State	NSW
Process Conditions	Engine operating at 3000kW		

23108

Stack Parameters		
Moisture content, %v/v	8.6	
Gas molecular weight, g/g mole	28.4 (wet)	29.4 (dry)
Gas density at STP, kg/m ³	1.27 (wet)	1.31 (dry)
Gas density at discharge conditions, kg/m ³	0.53	
% Oxygen correction & Factor	3 %	2.06
Gas Flow Parameters		
Flow measurement time(s) (hhmm)	1130 & 1240	
Temperature, °C	364	
Temperature, K	637	
Velocity at sampling plane, m/s	38	
Volumetric flow rate, actual, m ³ /s	11	
Volumetric flow rate (wet STP), m ³ /s	4.5	
Volumetric flow rate (dry STP), m ³ /s	4.1	
Mass flow rate (wet basis), kg/h	21000	

Gas Analyser Results		Average	
	Sampling time	1140 - 1239	
		Corrected to	
		Concentration	Mass Rate
		mg/m ³	g/min
		3% O ₂	
		mg/m ³	
Combustion Gases			
Nitric oxide (as NO ₂)		210	52
Nitrogen dioxide (as NO ₂)		6	1.5
Nitrogen oxides (as NO ₂)		220	53
Sulfur dioxide		<6	<1
Carbon monoxide		530	130
		Concentration	
		%v/v	
Carbon dioxide		5	
Oxygen		12.2	

Isokinetic Results		Results	
	Sampling time	1136-1237	
		Concentration	Mass Rate
		mg/m ³	g/min
Solid Particles		<2	<0.6
Sulfur trioxide and/or Sulfuric acid (as SO ₃)		0.088	0.022
Isokinetic Sampling Parameters			
Sampling time, min		60	
Isokinetic rate, %		101	
Gravimetric analysis date (total particulate)		30-10-2023	

2.3 GO6B

Date	24/10/2023	Client	Santos Limited
Report	R015604	Stack ID	GO6B
Licence No.	DA07_0023	Location	Wilga Park
Ektimo Staff	Aaron Davis / Scott Woods	State	NSW
Process Conditions	Engine operating at 3000kW		

23108

Stack Parameters			
Moisture content, %v/v	8.6		
Gas molecular weight, g/g mole	28.5 (wet)		29.4 (dry)
Gas density at STP, kg/m ³	1.27 (wet)		1.31 (dry)
Gas density at discharge conditions, kg/m ³	0.52		
% Oxygen correction & Factor	3 %		2.04
Gas Flow Parameters			
Flow measurement time(s) (hhmm)	1515 & 1625		
Temperature, °C	380		
Temperature, K	653		
Velocity at sampling plane, m/s	36		
Volumetric flow rate, actual, m ³ /s	10		
Volumetric flow rate (wet STP), m ³ /s	4.2		
Volumetric flow rate (dry STP), m ³ /s	3.8		
Mass flow rate (wet basis), kg/h	19000		

Gas Analyser Results	Sampling time	Average		
		1520 -1619		
Combustion Gases		Corrected to		
		Concentration mg/m ³	3% O ₂ mg/m ³	Mass Rate g/min
Nitric oxide (as NO ₂)		210		49
Nitrogen dioxide (as NO ₂)		2.9		0.67
Nitrogen oxides (as NO ₂)		220	440	50
Sulfur dioxide		<6		<1
Carbon monoxide		610		140
		Concentration %v/v		
Carbon dioxide			5.2	
Oxygen			12.1	

Isokinetic Results	Sampling time	Results	
		1520-1621	
Solid Particles		Concentration mg/m ³	Mass Rate g/min
Sulfur trioxide and/or Sulfuric acid (as SO ₃)		0.14	0.033
Isokinetic Sampling Parameters			
Sampling time, min		60	
Isokinetic rate, %		102	
Gravimetric analysis date (total particulate)		30-10-2023	

2.4 GO2A

Date	25/10/2023	Client	Santos Limited
Report	R015604	Stack ID	GO2A
Licence No.	DA07_0023	Location	Wilga Park
Ektimo Staff	Aaron Davis / Scott Woods	State	NSW
Process Conditions	Engine operating at 3000kW		

23108

Stack Parameters		
Moisture content, %v/v	8.4	
Gas molecular weight, g/g mole	28.5 (wet)	29.5 (dry)
Gas density at STP, kg/m ³	1.27 (wet)	1.32 (dry)
Gas density at discharge conditions, kg/m ³	0.53	
% Oxygen correction & Factor	3 %	1.90
Gas Flow Parameters		
Flow measurement time(s) (hhmm)	0945 & 1055	
Temperature, °C	363	
Temperature, K	636	
Velocity at sampling plane, m/s	36	
Volumetric flow rate, actual, m ³ /s	10	
Volumetric flow rate (wet STP), m ³ /s	4.2	
Volumetric flow rate (dry STP), m ³ /s	3.9	
Mass flow rate (wet basis), kg/h	19000	

Gas Analyser Results	Sampling time	Average		
		0951 -1050		
Combustion Gases		Concentration	3% O2	Mass Rate
		mg/m ³	mg/m ³	g/min
Nitric oxide (as NO ₂)		200		46
Nitrogen dioxide (as NO ₂)		2.4		0.54
Nitrogen oxides (as NO ₂)		200	390	47
Sulfur dioxide		<6		<1
Carbon monoxide		590		140
		Concentration		
		%v/v		
Carbon dioxide		5.6		
Oxygen		11.5		

Isokinetic Results	Sampling time	Results	
		0950-1051	
Solid Particles		Concentration	Mass Rate
		mg/m ³	g/min
Solid Particles		<3	<0.6
Sulfur trioxide and/or Sulfuric acid (as SO ₃)		0.032	0.0075
Isokinetic Sampling Parameters			
Sampling time, min		60	
Isokinetic rate, %		104	
Gravimetric analysis date (total particulate)		30-10-2023	

2.5 GO3A

Date	25/10/2023	Client	Santos Limited
Report	R015604	Stack ID	GO3A
Licence No.	DA07_0023	Location	Wilga Park
Ektimo Staff	Aaron Davis / Scott Woods	State	NSW
Process Conditions	Engine operating at 800kW		

23108

Stack Parameters		
Moisture content, %v/v	11	
Gas molecular weight, g/g mole	28.3 (wet)	29.6 (dry)
Gas density at STP, kg/m ³	1.26 (wet)	1.32 (dry)
Gas density at discharge conditions, kg/m ³	0.43	
% Oxygen correction & Factor	3 %	1.60
Gas Flow Parameters		
Flow measurement time(s) (hhmm)	1450 & 1605	
Temperature, °C	496	
Temperature, K	769	
Velocity at sampling plane, m/s	49	
Volumetric flow rate, actual, m ³ /s	3.9	
Volumetric flow rate (wet STP), m ³ /s	1.4	
Volumetric flow rate (dry STP), m ³ /s	1.2	
Mass flow rate (wet basis), kg/h	6100	

Gas Analyser Results		Average	
	Sampling time	1454 - 1553	
		Corrected to	
		Concentration	Mass Rate
		mg/m ³	g/min
Combustion Gases			
		3% O ₂	
		mg/m ³	
Nitric oxide (as NO ₂)		230	16
Nitrogen dioxide (as NO ₂)		6.2	0.45
Nitrogen oxides (as NO ₂)		230	17
Sulfur dioxide		<6	<0.4
Carbon monoxide		420	30
		Concentration	
		%v/v	
Carbon dioxide		6.6	
Oxygen		9.7	

Isokinetic Results		Results	
	Sampling time	1454-1600	
		Concentration	Mass Rate
		mg/m ³	g/min
Solid Particles		2.1	0.15
Sulfur trioxide and/or Sulfuric acid (as SO ₃)		0.037	0.0027
Isokinetic Sampling Parameters			
Sampling time, min		64	
Isokinetic rate, %		103	
Gravimetric analysis date (total particulate)		30-10-2023	

2.6 GO4A

Date	25/10/2023	Client	Santos Limited
Report	R015604	Stack ID	GO4A
Licence No.	DA07_0023	Location	Wilga Park
Ektimo Staff	Aaron Davis / Scott Woods	State	NSW
Process Conditions	Engine operating at 800kW		

23108

Stack Parameters		
Moisture content, %v/v	11	
Gas molecular weight, g/g mole	28.3 (wet)	29.6 (dry)
Gas density at STP, kg/m ³	1.26 (wet)	1.32 (dry)
Gas density at discharge conditions, kg/m ³	0.47	
% Oxygen correction & Factor	3 %	1.59
Gas Flow Parameters		
Flow measurement time(s) (hhmm)	1615 & 1730	
Temperature, °C	443	
Temperature, K	716	
Velocity at sampling plane, m/s	47	
Volumetric flow rate, actual, m ³ /s	3.8	
Volumetric flow rate (wet STP), m ³ /s	1.4	
Volumetric flow rate (dry STP), m ³ /s	1.2	
Mass flow rate (wet basis), kg/h	6300	

Gas Analyser Results		Average	
	Sampling time	1623 - 1722	
		Corrected to	
		Concentration	Mass Rate
		mg/m ³	g/min
		3% O ₂	
		mg/m ³	
Combustion Gases			
Nitric oxide (as NO ₂)		230	17
Nitrogen dioxide (as NO ₂)		5.5	0.41
Nitrogen oxides (as NO ₂)		240	18
Sulfur dioxide		<6	<0.4
Carbon monoxide		440	32
		Concentration	
		%v/v	
Carbon dioxide		6.6	
Oxygen		9.6	

Isokinetic Results		Results	
	Sampling time	1620-1726	
		Concentration	Mass Rate
		mg/m ³	g/min
Solid Particles		<2	<0.2
Sulfur trioxide and/or Sulfuric acid (as SO ₃)		0.14	0.01
Isokinetic Sampling Parameters			
Sampling time, min		64	
Isokinetic rate, %		102	
Gravimetric analysis date (total particulate)		30-10-2023	

2.7 GO4B

Date	25/10/2023	Client	Santos Limited
Report	R015604	Stack ID	GO4B
Licence No.	DA07_0023	Location	Wilga Park
Ektimo Staff	Aaron Davis / Scott Woods	State	NSW
Process Conditions	Engine operating at 3000kW		

23108

Stack Parameters		
Moisture content, %v/v	8.4	
Gas molecular weight, g/g mole	28.5 (wet)	29.4 (dry)
Gas density at STP, kg/m ³	1.27 (wet)	1.31 (dry)
Gas density at discharge conditions, kg/m ³	0.53	
% Oxygen correction & Factor	3 %	1.99
Gas Flow Parameters		
Flow measurement time(s) (hhmm)	0755 & 0905	
Temperature, °C	367	
Temperature, K	640	
Velocity at sampling plane, m/s	39	
Volumetric flow rate, actual, m ³ /s	11	
Volumetric flow rate (wet STP), m ³ /s	4.6	
Volumetric flow rate (dry STP), m ³ /s	4.2	
Mass flow rate (wet basis), kg/h	21000	

Gas Analyser Results		Average	
	Sampling time	0800 - 0859	
		Corrected to	
		Concentration	Mass Rate
		mg/m ³	g/min
		3% O ₂	
		mg/m ³	
Combustion Gases			
Nitric oxide (as NO ₂)		190	48
Nitrogen dioxide (as NO ₂)		<2	<0.5
Nitrogen oxides (as NO ₂)		190	48
Sulfur dioxide		<6	<2
Carbon monoxide		550	140
		Concentration	
		%v/v	
Carbon dioxide		5.2	
Oxygen		11.9	

Isokinetic Results		Results	
	Sampling time	0800-0901	
		Concentration	Mass Rate
		mg/m ³	g/min
Solid Particles		<2	<0.6
Sulfur trioxide and/or Sulfuric acid (as SO ₃)		<0.01	<0.003
Isokinetic Sampling Parameters			
Sampling time, min		60	
Isokinetic rate, %		103	
Gravimetric analysis date (total particulate)		30-10-2023	

2.8 GO6A

Date	25/10/2023	Client	Santos Limited
Report	R015604	Stack ID	GO6A
Licence No.	DA07_0023	Location	Wilga Park
Ektimo Staff	Aaron Davis / Scott Woods	State	NSW
Process Conditions	Engine operating at 850kW		

23108

Stack Parameters		
Moisture content, %v/v	11	
Gas molecular weight, g/g mole	28.3 (wet)	29.6 (dry)
Gas density at STP, kg/m ³	1.26 (wet)	1.32 (dry)
Gas density at discharge conditions, kg/m ³	0.44	
% Oxygen correction & Factor	3 %	1.60
Gas Flow Parameters		
Flow measurement time(s) (hhmm)	1325 & 1435	
Temperature, °C	490	
Temperature, K	763	
Velocity at sampling plane, m/s	50	
Volumetric flow rate, actual, m ³ /s	4	
Volumetric flow rate (wet STP), m ³ /s	1.4	
Volumetric flow rate (dry STP), m ³ /s	1.2	
Mass flow rate (wet basis), kg/h	6400	

Gas Analyser Results	Sampling time	Average		
		1326 - 1425		
Combustion Gases		Corrected to		
		Concentration mg/m ³	3% O ₂ mg/m ³	Mass Rate g/min
Nitric oxide (as NO ₂)		270		20
Nitrogen dioxide (as NO ₂)		6.6		0.49
Nitrogen oxides (as NO ₂)		280	440	21
Sulfur dioxide		<6		<0.4
Carbon monoxide		420		32
		Concentration %v/v		
Carbon dioxide			6.8	
Oxygen			9.7	

Isokinetic Results	Sampling time	Results	
		1328-1433	
Solid Particles		Concentration mg/m ³	Mass Rate g/min
Sulfur trioxide and/or Sulfuric acid (as SO ₃)		0.088	0.0066
Isokinetic Sampling Parameters			
Sampling time, min		64	
Isokinetic rate, %		109	
Gravimetric analysis date (total particulate)		30-10-2023	

2.9 G07A

Date	25/10/2023	Client	Santos Limited
Report	R015604	Stack ID	G07A
Licence No.	DA07_0023	Location	Wilga Park
Ektimo Staff	Aaron Davis / Scott Woods	State	NSW
Process Conditions	Engine operating at 950kW		

23108

Stack Parameters		
Moisture content, %v/v	10	
Gas molecular weight, g/g mole	28.3 (wet)	29.5 (dry)
Gas density at STP, kg/m ³	1.26 (wet)	1.32 (dry)
Gas density at discharge conditions, kg/m ³	0.48	
% Oxygen correction & Factor	3 %	1.74
Gas Flow Parameters		
Flow measurement time(s) (hhmm)	1150 & 1300	
Temperature, °C	421	
Temperature, K	694	
Velocity at sampling plane, m/s	40	
Volumetric flow rate, actual, m ³ /s	4.1	
Volumetric flow rate (wet STP), m ³ /s	1.6	
Volumetric flow rate (dry STP), m ³ /s	1.4	
Mass flow rate (wet basis), kg/h	7100	

Gas Analyser Results		Average	
	Sampling time	1155 -1254	
		Corrected to	
		Concentration	Mass Rate
		mg/m ³	g/min
		3% O ₂	
		mg/m ³	
Combustion Gases			
Nitric oxide (as NO ₂)		210	18
Nitrogen dioxide (as NO ₂)		9.4	0.78
Nitrogen oxides (as NO ₂)		220	19
Sulfur dioxide		<6	<0.5
Carbon monoxide		540	45
		Concentration	
		%v/v	
Carbon dioxide		6.2	
Oxygen		10.6	

Isokinetic Results		Results	
	Sampling time	1155-1256	
		Concentration	Mass Rate
		mg/m ³	g/min
Solid Particles		<3	<0.2
Sulfur trioxide and/or Sulfuric acid (as SO ₃)		0.16	0.013
Isokinetic Sampling Parameters			
Sampling time, min		60	
Isokinetic rate, %		104	
Gravimetric analysis date (total particulate)		30-10-2023	

2.10 G05A

Date	26/10/2023	Client	Santos Limited
Report	R015604	Stack ID	G05A
Licence No.	DA07_0023	Location	Wilga Park
Ektimo Staff	Aaron Davis / Scott Woods	State	NSW
Process Conditions	Engine operating at 850kW		

23108

Stack Parameters		
Moisture content, %v/v	11	
Gas molecular weight, g/g mole	28.3 (wet)	29.6 (dry)
Gas density at STP, kg/m ³	1.26 (wet)	1.32 (dry)
Gas density at discharge conditions, kg/m ³	0.45	
% Oxygen correction & Factor	3 %	1.56
Gas Flow Parameters		
Flow measurement time(s) (hhmm)	0755 & 0920	
Temperature, °C	481	
Temperature, K	754	
Velocity at sampling plane, m/s	49	
Volumetric flow rate, actual, m ³ /s	3.9	
Volumetric flow rate (wet STP), m ³ /s	1.4	
Volumetric flow rate (dry STP), m ³ /s	1.2	
Mass flow rate (wet basis), kg/h	6300	

Gas Analyser Results		Average		
Sampling time		0812 - 0911		
		Corrected to		
		Concentration	3% O ₂	Mass Rate
		mg/m ³	mg/m ³	g/min
Combustion Gases				
Nitric oxide (as NO ₂)		260		20
Nitrogen dioxide (as NO ₂)		9.2		0.68
Nitrogen oxides (as NO ₂)		270	430	20
Sulfur dioxide		<6		<0.4
Carbon monoxide		490		37
		Concentration		
		%v/v		
Carbon dioxide		6.8		
Oxygen		9.4		

Isokinetic Results		Results	
Sampling time		0810-0915	
		Concentration	Mass Rate
		mg/m ³	g/min
Solid Particles		<2	<0.2
Sulfur trioxide and/or Sulfuric acid (as SO ₃)		0.023	0.0017
Isokinetic Sampling Parameters			
Sampling time, min		64	
Isokinetic rate, %		104	
Gravimetric analysis date (total particulate)		30-10-2023	

3 Sample Plane Compliance

3.1 GO1A

Sampling Plane Details	
Source tested	Reciprocating engine - gas
Sampling plane dimensions	600 mm
Sampling plane area	0.283 m ²
Sampling port size, number	4" Flange (x2)
Duct orientation & shape	Vertical Circular
Downstream disturbance	Exit 8 D
Upstream disturbance	Change in diameter 3 D
No. traverses & points sampled	2 12
Sample plane conformance to AS 4323.1	Conforming but non-ideal

The sampling plane is deemed to be non-ideal due to the following reasons:
The sampling plane is too near to the upstream disturbance but is greater than or equal to 2D

3.2 GO5B

Sampling Plane Details	
Source tested	Reciprocating engine - gas
Sampling plane dimensions	600 mm
Sampling plane area	0.283 m ²
Sampling port size, number	4" Flange (x2)
Duct orientation & shape	Vertical Circular
Downstream disturbance	Exit 8 D
Upstream disturbance	Change in diameter 3 D
No. traverses & points sampled	2 12
Sample plane conformance to AS 4323.1	Conforming but non-ideal

The sampling plane is deemed to be non-ideal due to the following reasons:
The sampling plane is too near to the upstream disturbance but is greater than or equal to 2D

3.3 GO6B

Sampling Plane Details	
Source tested	Reciprocating engine - gas
Sampling plane dimensions	600 mm
Sampling plane area	0.283 m ²
Sampling port size, number	4" Flange (x2)
Duct orientation & shape	Vertical Circular
Downstream disturbance	Exit 8 D
Upstream disturbance	Change in diameter 3 D
No. traverses & points sampled	2 12
Sample plane conformance to AS 4323.1	Conforming but non-ideal

The sampling plane is deemed to be non-ideal due to the following reasons:
The sampling plane is too near to the upstream disturbance but is greater than or equal to 2D

3.4 GO2A

Sampling Plane Details	
Source tested	Reciprocating engine - gas
Sampling plane dimensions	600 mm
Sampling plane area	0.283 m ²
Sampling port size, number	4" Flange (x2)
Duct orientation & shape	Vertical Circular
Downstream disturbance	Exit 8 D
Upstream disturbance	Change in diameter 3 D
No. traverses & points sampled	2 12
Sample plane conformance to AS 4323.1	Conforming but non-ideal
The sampling plane is deemed to be non-ideal due to the following reasons:	
The sampling plane is too near to the upstream disturbance but is greater than or equal to 2D	

3.5 GO3A

Sampling Plane Details	
Source tested	Reciprocating engine - gas
Sampling plane dimensions	320 mm
Sampling plane area	0.0804 m ²
Sampling port size, number	Sampled at exit
Duct orientation & shape	Vertical Circular
Downstream disturbance	Exit 0 D
Upstream disturbance	Exit 0 D
No. traverses & points sampled	2 8
Sample plane conformance to AS 4323.1	Non-conforming
The sampling plane is deemed to be non-conforming due to the following reasons:	
The downstream disturbance is <1D from the sampling plane	
The upstream disturbance is <2D from the sampling plane	
The stack or duct does not have the required number of access holes (ports)	

3.6 GO4A

Sampling Plane Details	
Source tested	Reciprocating engine - gas
Sampling plane dimensions	320 mm
Sampling plane area	0.0804 m ²
Sampling port size, number	Sampled at exit
Duct orientation & shape	Vertical Circular
Downstream disturbance	Exit 0 D
Upstream disturbance	Exit 0 D
No. traverses & points sampled	2 8
Sample plane conformance to AS 4323.1	Non-conforming
The sampling plane is deemed to be non-conforming due to the following reasons:	
The downstream disturbance is <1D from the sampling plane	
The upstream disturbance is <2D from the sampling plane	
The stack or duct does not have the required number of access holes (ports)	

3.7 GO4B

Sampling Plane Details	
Source tested	Reciprocating engine - gas
Sampling plane dimensions	600 mm
Sampling plane area	0.283 m ²
Sampling port size, number	4" Flange (x2)
Duct orientation & shape	Vertical Circular
Downstream disturbance	Exit 8 D
Upstream disturbance	Change in diameter 3 D
No. traverses & points sampled	2 12
Sample plane conformance to AS 4323.1	Conforming but non-ideal
The sampling plane is deemed to be non-ideal due to the following reasons:	
The sampling plane is too near to the upstream disturbance but is greater than or equal to 2D	

3.8 GO6A

Sampling Plane Details	
Source tested	Reciprocating engine - gas
Sampling plane dimensions	320 mm
Sampling plane area	0.0804 m ²
Sampling port size, number	Sampled at exit
Duct orientation & shape	Vertical Circular
Downstream disturbance	Exit 0 D
Upstream disturbance	Exit 0 D
No. traverses & points sampled	2 8
Sample plane conformance to AS 4323.1	Non-conforming
The sampling plane is deemed to be non-conforming due to the following reasons:	
The downstream disturbance is <1D from the sampling plane	
The upstream disturbance is <2D from the sampling plane	
The stack or duct does not have the required number of access holes (ports)	

3.9 GO7A

Sampling Plane Details	
Source tested	Reciprocating engine - gas
Sampling plane dimensions	360 mm
Sampling plane area	0.102 m ²
Sampling port size, number	4" Flange (x2)
Duct orientation & shape	Vertical Circular
Downstream disturbance	Exit 2 D
Upstream disturbance	Junction 4 D
No. traverses & points sampled	2 12
Sample plane conformance to AS 4323.1	Conforming but non-ideal
The sampling plane is deemed to be non-ideal due to the following reasons:	
The sampling plane is too near to the downstream disturbance but is greater than or equal to 1D	
The sampling plane is too near to the upstream disturbance but is greater than or equal to 2D	

3.10 G05A

Sampling Plane Details	
Source tested	Reciprocating engine - gas
Sampling plane dimensions	320 mm
Sampling plane area	0.0804 m ²
Sampling port size, number	Sampled at exit
Duct orientation & shape	Vertical Circular
Downstream disturbance	Exit 0 D
Upstream disturbance	Exit 0 D
No. traverses & points sampled	2 8
Sample plane conformance to AS 4323.1	Non-conforming
The sampling plane is deemed to be non-conforming due to the following reasons:	
The downstream disturbance is <1D from the sampling plane	
The upstream disturbance is <2D from the sampling plane	
The stack or duct does not have the required number of access holes (ports)	

4 Plant Operating Conditions

The below plant operating conditions have been supplied by Santos Limited personnel.

Location	Test Date	Engine Operating Conditions
G01A	24 October 2023	3000 kW
G05B		3000 kW
G06B		3000 kW
G02A	25 October 2023	3000 kW
G03A		800 kW
G04A		800 kW
G04B		3000 kW
G06A		850kW
G07A		950 kW
G05A	26 October 2023	850kW

5 Test Methods

All sampling and analysis was performed by Ektimo unless otherwise specified. Specific details of the methods are available upon request.

Parameter	Sampling method	Analysis method	Uncertainty*	NATA accredited	
				Sampling	Analysis
Sampling points - Selection	NSW EPA TM-1 (AS 4323.1)	NA	NA	✓	NA
Flow rate, temperature & velocity	NSW EPA TM-2 (USEPA Method 2)	NSW EPA TM-2 (USEPA Method 2)	8%, 2%, 7%	NA	✓
Moisture content	NSW EPA TM-22 (USEPA Method 4)	NSW EPA TM-22 (USEPA Method 4)	8%	✓	✓
Molecular weight	NA	NSW EPA TM-23 (USEPA Method 3)	not specified	NA	✓
Dry gas density	NA	NSW EPA TM-23 (USEPA Method 3)	not specified	NA	✓
Carbon dioxide	NSW EPA TM-24 (USEPA Method 3A)	NSW EPA TM-24 (USEPA Method 3A)	13%	✓	✓
Carbon monoxide	NSW EPA TM-32 (USEPA Method 10)	NSW EPA TM-32 (USEPA Method 10)	12%	✓	✓
Nitrogen oxides	NSW EPA TM-11 (USEPA Method 7E)	NSW EPA TM-11 (USEPA Method 7E)	12%	✓	✓
Oxygen	NSW EPA TM-25 (USEPA Method 3A)	NSW EPA TM-25 (USEPA Method 3A)	13%	✓	✓
Sulfur dioxide	NSW EPA TM-4 (USEPA Method 6C)	NSW EPA TM-4 (USEPA Method 6C)	12%	✓	✓
Solid particles (total)	NSW EPA TM-15 (AS 4323.2)	NSW EPA TM-15 (AS 4323.2)	3%	✓	✓ ^{††}
Sulfuric acid mist and/or sulfur trioxide	NSW EPA TM-3 (USEPA Method 8)	Ektimo 235	16%	✓	✓ ^{†m}

180823

* Uncertainties cited in this table are estimated using typical values and are calculated at the 95% confidence level (coverage factor = 2).

† Analysis performed by Ektimo. Results were reported to Ektimo on 8 November 2023 in report LV-005079.

†† Gravimetric analysis conducted at the Ektimo NSW laboratory.

†m Includes analysis of SO₃/H₂SO₄ by Ektimo 235 which uses the same principle as USEPA SW-846 Method 9056A which is an approved alternative to the analytical procedure of USEPA Method 8.

6 Quality Assurance/Quality Control Information

Ektimo is accredited by the National Association of Testing Authorities (NATA) for the sampling and analysis of air pollutants from industrial sources. Unless otherwise stated test methods used are accredited with the National Association of Testing Authorities. For full details, search for Ektimo at NATA's website www.nata.com.au.

Ektimo is accredited by NATA to ISO/IEC 17025 - Testing. ISO/IEC 17025 - Testing requires that a laboratory have adequate equipment to perform the testing, as well as laboratory personnel with the competence to perform the testing. This quality assurance system is administered and maintained by the Quality Director.

NATA is a member of APAC (Asia Pacific Accreditation Co-operation) and of ILAC (International Laboratory Accreditation Co-operation). Through mutual recognition arrangements with these organisations, NATA accreditation is recognised worldwide.

Unless specifically noted, all samples were collected and handled in accordance with Ektimo's QA/QC standards.

7 Compliance Summary

Emission monitoring was performed on each release point for a minimum of 60 minutes.

The measured parameters were found to be below the emission limits specified in the Santos Development Approval DA07_0023.

Location	Compliant/non-compliant with approval conditions
GO1A	Compliant
GO5B	Compliant
GO6B	Compliant
GO2A	Compliant
GO3A	Compliant
GO4A	Compliant
GO4B	Compliant
GO6A	Compliant
GO7A	Compliant
GO5A	Compliant

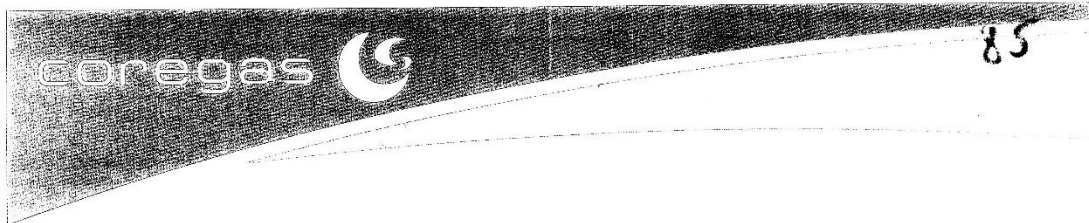
8 Definitions

The following symbols and abbreviations may be used in this test report:

% v/v	Volume to volume ratio, dry basis
~	Approximately
<	Less than
>	Greater than
≥	Greater than or equal to
APHA	American Public Health Association, Standard Methods for the Examination of Water and Waste Water
AS	Australian Standard
BaP-TEQ	Benzo(a)pyrene toxic equivalents
BSP	British standard pipe
CEM/CEMS	Continuous emission monitoring/Continuous emission monitoring system
CTM	Conditional test method
D	Duct diameter or equivalent duct diameter for rectangular ducts
D ₅₀	'Cut size' of a cyclone is defined as the particle diameter at which the cyclone achieves a 50% collection efficiency i.e. half of the particles are retained by the cyclone and half pass through it. The D ₅₀ method simplifies the capture efficiency distribution by assuming that a given cyclone stage captures all of the particles with a diameter equal to or greater than the D ₅₀ of that cyclone and less than the D ₅₀ of the preceding cyclone.
DECC	Department of Environment & Climate Change (NSW)
Disturbance	A flow obstruction or instability in the direction of the flow which may impede accurate flow determination. This includes centrifugal fans, axial fans, partially closed or closed dampers, louvres, bends, connections, junctions, direction changes or changes in pipe diameter.
DWER	Department of Water and Environmental Regulation (WA)
DEHP	Department of Environment and Heritage Protection (QLD)
EPA	Environment Protection Authority
FTIR	Fourier transform infra-red
ISC	Intersociety Committee, Methods of Air Sampling and Analysis
ISO	International Organisation for Standardisation
ITE	Individual threshold estimate
I-TEQ	International toxic equivalents
Lower bound	When an analyte is not present above the detection limit, the result is assumed to be equal to zero.
Medium bound	When an analyte is not present above the detection limit, the result is assumed to be equal to half of the detection limit.
NA	Not applicable
NATA	National Association of Testing Authorities
NIOSH	National Institute of Occupational Safety and Health
NT	Not tested or results not required
OM	Other approved method
OU	Odour unit. One OU is that concentration of odourant(s) at standard conditions that elicits a physiological response from a panel equivalent to that elicited by one Reference Odour Mass (ROM), evaporated in one cubic metre of neutral gas at standard conditions.
PM ₁₀	Particulate matter having an equivalent aerodynamic diameter less than or equal to 10 microns (µm).
PM _{2.5}	Particulate matter having an equivalent aerodynamic diameter less than or equal to 2.5 microns (µm).
PSA	Particle size analysis. PSA provides a distribution of geometric diameters, for a given sample, determined using laser diffraction.
RATA	Relative accuracy test audit
Semi-quantified VOCs	Unknown VOCs (those for which an analytical standard is not available), are identified by matching the mass spectrum of the chromatographic peak to the NIST Standard Reference Database (version 14.0), with a match quality exceeding 70%. An estimated concentration is determined by matching the area of the peak with the nearest suitable compound in the analytical calibration standard mixture.
STP	Standard temperature and pressure. Gas volumes and concentrations are expressed on a dry basis at 0 °C, at discharge oxygen concentration and an absolute pressure of 101.325 kPa.
TM	Test method
TOC	Total organic carbon. This is the sum of all compounds of carbon which contain at least one carbon-to-carbon bond, plus methane and its derivatives.
USEPA	United States Environmental Protection Agency
VDI	Verein Deutscher Ingenieure (Association of German Engineers)
Velocity difference	The percentage difference between the average of initial flows and after flows.
Vic EPA	Victorian Environment Protection Authority
VOC	Volatile organic compound. A carbon-based chemical compound with a vapour pressure of at least 0.010 kPa at 25°C or having a corresponding volatility under the given conditions of use. VOCs may contain oxygen, nitrogen and other elements. VOCs do not include carbon monoxide, carbon dioxide, carbonic acid, metallic carbides and carbonate salts.
WHO05-TEQ	World Health Organisation toxic equivalents
XRD	X-ray diffractometry
Upper bound	When an analyte is not present above the detection limit, the result is assumed to be equal to the detection limit.
95% confidence interval	Range of values that contains the true result with 95% certainty. This means there is a 5% risk that the true result is outside this range.

9 Appendices

Appendix A: Gas Calibration Certificates



**CERTIFIED REFERENCE MATERIAL
 CERTIFICATE OF ANALYSIS**

Coregas Pty Ltd

Page 1

Prod. Order No. LGP018699
 Prod. Order Batch No. LGP018699-4
 Cylinder Serial No. 660107
 Cylinder Capacity 11 L
 Customer No. : 10032487
 Customer : EKTIMO PTY LTD
 Order No. : SO02533105

Certificate No. QCSPC027296
 Date Certified 31/05/21
 Analyst Name Jason Yap
 Mixture Type Gas
 Cylinder Content 1.6 m3
 Valve Type BS14

Component	Required Concentration	Actual Concentration	Concentration Unit of Measure	Measurement Uncertainty	Method
Nitric Oxide	100	104.9	ppm mol	2% rel	8085 Chemi-Luminescence
Sulphur Dioxide	100	104.0	ppm mol	2% rel	7094 NDIR/ultratmat
Carbon Monoxide	100	100.1	ppm mol	2% rel	7050 NDIRS710
Carbon Dioxide	20	20.12	% mol	1% rel	7050 NDIRS710
Nitrogen		Balance			

All concentration are expressed on mole fraction basis.
 The certified values are traceable to Australian National Standards of mass and thus to the International System of Units (SI).
 The certified gas mixture is typically for calibration of instruments. Measurement Uncertainty is calculated using a coverage factor K=2, which gives 95% Confidence Interval.

Technical Note :

Filling Pressure	150	BAR
Min. Useable Pressure	5	BAR
Min. Storage Temperature	10	C
Period of Validity	3 Years	

Analyst

Jason Yap
 Chemist

NATA Signatory

Mark Qin
 Manager Spec. Gas Lab



ACCREDITED FOR
**TECHNICAL
 COMPETENCE**

Accredited Reference Material Producer
 Number: 12803
 Site Number: 15135

Accredited for compliance with ISO17034
 NATA is a signatory to the ILAC Mutual Recognition Arrangement for the mutual recognition of the equivalence of reference material certificates

<CMS-10-SOP-8115-F3 Approved by SG&QC Manager 13/10/2020>

Print Date : 31/05/21

---End of Document---





**CERTIFIED REFERENCE MATERIAL
 CERTIFICATE OF ANALYSIS**

Page 1

Coregas Pty Ltd
 Prod. Order No. LGP021909
 Prod. Order Batch No. LGP021909-2
 Cylinder Serial No. 660126
 Cylinder Capacity 11 L
 Customer No. : 10032487
 Customer : EKTIMO PTY LTD
 Order No. : SO03244856

Certificate No. QCSPC033641
 Date Certified 30/08/23
 Analyst Name Willis Vongpradith
 Mixture Type Gas
 Cylinder Content 1.5m3
 Valve Type 44

Component	Required Concentration	Actual Concentration	Concentration Unit of Measure	Measurement Uncertainty	Method
Nitrogen Dioxide					
Nitrogen	50	49.9	ppm mol	5% rel	8085 Chemi-luminescence
Comments :	1% Oxygen added for stability.				

All concentration are expressed on mole fraction basis.
 The certified values are traceable to Australian National Standards of mass and thus to the International System of Units (SI).
 The certified gas mixture is typically for calibration of instruments. Measurement Uncertainty is calculated using a coverage factor K=2, which gives 95% Confidence Interval.

Technical Note :

Filling Pressure	150	BAR
Min. Useable Pressure	5	BAR
Min. Storage Temperature	10	C
Period of Validity	2 Years	



WORLD RECOGNISED
ACCREDITATION
 Accredited Reference Material Producer
 Number: 12803
 Site Number: 15135

Analyst

Willis Vongpradith
 Lab Technician

NATA Signatory

Mark Qin
 Manager Spec. Gas Lab

Accredited for compliance with ISO17034
 NATA is a signatory to the ILAC Mutual Recognition Arrangement for the mutual recognition of the equivalence of testing, medical testing, calibration, inspection, proficiency testing scheme providers and reference materials producers reports and certificates

<CMS-10-SOP-8115-F3 Approved by SG&QC Manager 23/06/2022>

Print Date : 30/08/23

---End of Document---

Appendix B: Sampling Locations



Figure 1: GO 1A, 2A, 3B, 4B, 5B



Figure 2: GO 3A, 4A, 5A, 6A



Figure 3: GO 7A

Appendix C: Chain of Custody

Ektimo

Checked at Ektimo Dispatch by: _____
Sign/Date

Samples received in good order: 21/10/23
Sign/Date

Sample ID	Job No.	Analysis Required	Units Required	Analytical Lab	Purchase Order No.	Ektimo Contact	Notes	TAT Required (days)
N 20876	R015604	SO3 -	ug/litre	Ektimo		Aaron Davis	Blank Solution	
N 20877	R015604	SO3 -	ug/litre	Ektimo		Aaron Davis	Solution A	
N 20878	R015604	SO3 -	ug/litre	Ektimo		Aaron Davis	Solution A	
N 20879	R015604	SO3 -	ug/litre	Ektimo		Aaron Davis	Solution A	
N 20880	R015604	SO3 -	ug/litre	Ektimo		Aaron Davis	Solution A	
N 20881	R015604	SO3 -	ug/litre	Ektimo		Aaron Davis	Solution A	
N 20882	R015604	SO3 -	ug/litre	Ektimo		Aaron Davis	Solution A	
N 20883	R015604	SO3 -	ug/litre	Ektimo		Aaron Davis	Solution A	
N 20884	R015604	SO3 -	ug/litre	Ektimo		Aaron Davis	Solution A	
N 20885	R015604	SO3 -	ug/litre	Ektimo		Aaron Davis	Solution A	
N 20886	R015604	SO3 -	ug/litre	Ektimo		Aaron Davis	Solution A	

Logged + Scanned

Appendix D: Laboratory Results

CERTIFICATE OF ANALYSIS

Testing Laboratory: Ektimo
26 Redland Drive
Mitcham, VIC 3132

Report Number: LV-005079
Job Number: R015604
Date of Issue: 08/11/2023

Attention: Santos

Date samples received: 31/10/2023
Number of samples received: 11
Date samples analysed: 03/11/2023
No of samples analysed: 11

Test method(s) used: Ektimo 235

Comments

QC Acceptance Criteria:	Parameter	Criteria	Pass/Fail
	Standard Curve	$R^2 > 0.99$	Pass
	Range	All samples <110% of highest standard	Pass
	Repeat samples	Between 80% - 120%	Pass
	Method Blanks	All method blanks < PQL	Pass
	QC sample	2 standard deviations of theoretical	Pass
	Chemical Expiry	All chemicals within expiry date	Pass

This report supersedes any previous report(s) with this reference. Sample(s) have been analysed as received.

Ektimo is accredited by the National Association of Testing Authorities (NATA) for the sampling and analysis of air pollutants from industrial sources. Unless otherwise stated test methods used are accredited with the National Association of Testing Authorities. For full details, search for Ektimo at NATA's website www.nata.com.au.

Ektimo is accredited by NATA (National Association of Testing Authorities) to ISO/IEC 17025 - Testing. ISO/IEC 17025 - Testing requires that a laboratory have adequate equipment to perform the testing, as well as laboratory personnel with the competence to perform the testing. This quality assurance system is administered and maintained by the Quality Director.

NATA is a member of APAC (Asia Pacific Laboratory Accreditation Co-operation) and of ILAC (International Laboratory Accreditation Co-operation). Through the mutual recognition arrangements with both of these organisations, NATA accreditation is recognised world-wide.

A formal Quality Control program is in place at Ektimo to monitor analyses performed in the laboratory and sampling conducted in the field. The program is designed to check where appropriate; the sampling reproducibility, analytical method, accuracy, precision and the performance of the analyst. The Laboratory Manager is responsible for the administration and maintenance of this program.

REPORT AUTHORISATION

Version 230707



Cappi Tuffery
Laboratory Chemist



Daniel Balaam
Senior Laboratory Chemist



NATA Accredited Laboratory 14601

Accredited for compliance with ISO/IEC 17025. NATA is a signatory to the ILAC mutual recognition arrangement for the mutual recognition of the equivalence of testing, calibration and inspection reports

Ektimo PTY LTD • ABN 86 600 381 413

Melbourne, VIC (Head Office)
26 Redland Drive,
Mitcham, VIC 3132

Perth, WA (Postal Address)
52 Cooper Road,
Cockburn Central, WA 6164

Sydney, NSW
6/78 Reserve Road,
Artarmon, NSW 2064

Wollongong, NSW
1/251 Princes Highway,
Unanderra, NSW 2526

Brisbane, QLD
3/109 Riverside Place,
Morningside, QLD 4170

Report No. LV-005079

Job No. R015604

Client Name: Santos

Parameter	Analyte	Units	N 20876 Santos All Locations Blank Solution (SO3)	N 20877 Santos GO 5B Solution A	N 20878 Santos GO 1A Solution A	N 20879 Santos GO 6B Solution A	N 20880 Santos GO 4B Solution A	N 20881 Santos GO 2A Solution A	N 20882 Santos GO 7A Solution A	N 20883 Santos GO 6A Solution A
Sample Volume		mL	138	89	74	85	72	76	124	94
Sulfur trioxide (SO ₃)	SO ₄ ²⁻	mg/L	<0.2	1.01	0.83	1.61	<0.2	0.42	1.22	1.16
PQL	<	mg/L	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2

Parameter	Analyte	Units	N 20884 Santos GO 3A Solution A	N 20885 Santos GO 4A Solution A	N 20886 Santos GO 5A Solution A					
Sample Volume		mL	86	110	99					
Sulfur trioxide (SO ₃)	SO ₄ ²⁻	mg/L	0.49	1.43	0.28					
PQL	<	mg/L	0.2	0.2	0.2					

Ektimo

ektimo.com.au

1300 364 005

MELBOURNE (Head Office)

26 Redland Drive

Mitcham

VIC 3132

AUSTRALIA

SYDNEY

6/78 Reserve Road

Artarmon

NSW 2064

AUSTRALIA

WOLLONGONG

1/251 Princes Highway

Unanderra

NSW 2526

AUSTRALIA

PERTH

52 Cooper Road

Cockburn Central

WA 6164

AUSTRALIA

BRISBANE

3/109 Riverside Place

Morningside

QLD 4170

AUSTRALIA