Ektimo

CPE Central Park Pty Ltd, Chippendale

Emission Testing Report

Report Number R014018

Document Information

Template Version 190722

Client Name:	CPE Central Park Pty Ltd
Report Number:	R014018
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Attention:	JP Ricafuente
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Testing Laboratory:	Ektimo Pty Ltd, ABN 86 600 381 413

Report Authorisation

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NATA Accredited Laboratory
No. 14601

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.

Please note that only numerical results pertaining to measurements conducted directly by Ektimo are covered by Ektimo's 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' for full details of testing covered by NATA accreditation.

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1 Executive Summary

1.1 Background

Ektimo was engaged by Clean Peak Energy (CPE) Central Park Pty Ltd to perform emission testing at their Chippendale plant. Testing was carried out in accordance with Environmental Licence 20768.

1.2 Project Objective & Overview

The objective of the project was to conduct a monitoring programme to quantify emissions from two (2) discharge points to determine compliance with CPE's Environment Protection Licence.

Monitoring was performed as follows:

Location	Test Date	Test Parameters*
EPA ID No. 1 - Engine 1	December 12, 2022	Nitrogen Oxides (as NO_2), Ammonia
EPA ID No. 2 - Engine 2		

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

All results are reported on a dry basis at STP.

Plant operating conditions have been noted in the report.

1.3 Licence Comparison

The following licence comparison table shows that all analytes highlighted in green are within the licence limit set by the NSW EPA as per licence 20768 (last amended on 18 April 2016).

EPA No.	Location Description	Pollutant	Units	Licence Limit	Detected Values
1	Engine 1	Nitrogen Oxides	mg/m^3	57	27
		Ammonia	mg/m^3	4	0.49
2	Engine 2	Nitrogen Oxides	mg/m^3	57	19
		Ammonia	mg/m^3	4	0.11

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

Refer to the Test Methods table for the measurement uncertainties.

2 Results

2.1 EPA ID No. 1 - Engine 1

Date	12/12/2022	**Client**	CPE Central Park Pty Ltd
Report	R014018	**Stack ID**	EPA ID No. 1 - Engine 1
Licence No.	20768	**Location**	Chippendale
Ektimo Staff	Ish Alam, Graham Edwards	**State**	NSW
Process Conditions	Engine Load: 1046kW (93.4%), SCR Temp: 396°C		*221129*

Sampling Plane Details	
Sampling plane dimensions	430 mm
Sampling plane area	0.145 m²
Sampling port size, number & depth	1" BSP (x2), 55 mm
Duct orientation & shape	Vertical Circular
Downstream disturbance	Bend 7 D
Upstream disturbance	Bend 6 D
No. traverses & points sampled	2 8
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

Stack Parameters		
Moisture content, %v/v	7.4	
Gas molecular weight, g/g mole	28.7 (wet)	29.6 (dry)
Gas density at STP, kg/m³	1.28 (wet)	1.32 (dry)
Gas density at discharge conditions, kg/m³	0.90	
Gas Flow Parameters		
Flow measurement time(s) (hhmm)	1021 & 1130	
Temperature, °C	116	
Temperature, K	389	
Velocity at sampling plane, m/s	14	
Volumetric flow rate, actual, m³/s	2	
Volumetric flow rate (wet STP), m³/s	1.4	
Volumetric flow rate (dry STP), m³/s	1.3	
Mass flow rate (wet basis), kg/hour	6600	

Gas Analyser Results	Average		Minimum		Maximum	
Sampling time	1023 - 1123		1023 - 1123		1023 - 1123	
Combustion Gases	Concentration mg/m³	Mass Rate g/min	Concentration mg/m³	Mass Rate g/min	Concentration mg/m³	Mass Rate g/min
Nitrogen oxides (as NO_2)	27	2.2	16	1.3	41	3.2
	Concentration % v/v		Concentration % v/v		Concentration % v/v	
Carbon dioxide	6.4		6.4		6.5	
Oxygen	10.1		10.1		10.2	

Ammonia	Results	
Sampling time	1033-1140	
	Concentration mg/m³	Mass Rate g/min
Ammonia	0.49	0.039

2.2 EPA ID No. 2 - Engine 2

Date	12/12/2022	**Client**	CPE Central Park Pty Ltd
Report	R014018	**Stack ID**	EPA ID No. 2 - Engine 2
Licence No.	20768	**Location**	Chippendale
Ektimo Staff	Ish Alam, Graham Edwards	**State**	NSW
Process Conditions	Engine Load: 960kW (86%), SCR Temp: 419°C		221129

Sampling Plane Details	
Sampling plane dimensions	430 mm
Sampling plane area	0.145 m²
Sampling port size, number & depth	1" BSP (x2), 55 mm
Duct orientation & shape	Vertical Circular
Downstream disturbance	Bend 7 D
Upstream disturbance	Bend 6 D
No. traverses & points sampled	2 8
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

Stack Parameters		
Moisture content, %v/v	12	
Gas molecular weight, g/g mole	28.2 (wet)	29.6 (dry)
Gas density at STP, kg/m³	1.26 (wet)	1.32 (dry)
Gas density at discharge conditions, kg/m³	0.88	
Gas Flow Parameters		
Flow measurement time(s) (hhmm)	1158 & 1305	
Temperature, °C	115	
Temperature, K	389	
Velocity at sampling plane, m/s	12	
Volumetric flow rate, actual, m³/s	1.8	
Volumetric flow rate (wet STP), m³/s	1.3	
Volumetric flow rate (dry STP), m³/s	1.1	
Mass flow rate (wet basis), kg/hour	5700	

Gas Analyser Results	Average		Minimum		Maximum	
Sampling time	1200 - 1300		1200 - 1300		1200 - 1300	
	Concentration mg/m³	Mass Rate g/min	Concentration mg/m³	Mass Rate g/min	Concentration mg/m³	Mass Rate g/min
Combustion Gases						
Nitrogen oxides (as NO_2)	19	1.3	15	1	22	1.5
	Concentration % v/v		Concentration % v/v		Concentration % v/v	
Carbon dioxide	6.8		6.7		6.8	
Oxygen	9.5		9.5		9.8	

Ammonia	Results	
Sampling time	1158-1303	
	Concentration mg/m³	Mass Rate g/min
Ammonia	0.11	0.0073

3 Plant Operating Conditions

The below plant operating conditions have been supplied by CPE Central Park's personnel

Location	Engine Load	SCR Temperature
EPA ID No. 1 - Engine 1	1046 kW (93.44%)	396°C
EPA ID No. 2 - Engine 2	960 kW (86%)	419°C

4 Test Methods

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

Parameter	Sampling method	Analysis method	Uncertainty*	NATA accredited Sampling	NATA accredited 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 Alt-Method 008)	NSW EPA TM-22 (USEPA Alt-Method 008)	19%	✓	✓
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%	✓	✓
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%	✓	✓
Ammonia	Ektimo 260	Envirolab in-house methods Inorg-093 & Inorg-057	18%	✓	✓‡

221102

* Uncertainties cited in this table are estimated using typical values and are calculated at the 95% confidence level (coverage factor = 2).
†† Gravimetric analysis conducted at the Ektimo, NSW laboratory, NATA accreditation number 14601.
‡ Analysis performed by Envirolab, NATA accreditation number 2901. Result was reported to Ektimo on 20 December 2022 in report 312953-[R00].

5 Deviations to Test Methods

Ektimo notes that Environmental Licence 20768 references the sampling and analysis of ammonia via Special Method 1 i.e. Sampling Method SCAQMD Method 207.1 or USEPA CTM-027. USEPA CTM-027 is an isokinetic method which was not possible to perform at testing locations EPA ID No. 1 or EPA ID No. 2, due to port size restrictions, out-of-stack obstructions, and positive pressure within the sampling planes at both test locations. Alternatively, Ektimo utilised NATA accredited in-house method, Ektimo 260. Ektimo 260 is a mini-impinger method, which utilises 0.1N sulfuric acid as a sampling solution and is analysed via an in-house colorimetric

method (phenolate method i.e. Envirolab inorg-093 and Envirolab inorg-057) which has a sampling range of 0.003 mg/m^3 to 25 mg/m^3. Sampling Method SCAQMD Method 207.1 utilises 0.1N sulfuric acid as a sampling solution and is analysed via ion selective electrode (ISE). Ektimo considers utilising Ektimo 260 instead of Sampling Method SCAQMD Method 207.1 to be a minor deviation.

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.

7 Definitions

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

% v/v	Volume to volume ratio, dry or wet basis
~	Approximately
<	Less than
>	Greater than
≥	Greater than or equal to
AS	Australian Standard
CTM	Conditional test method
D	Duct diameter or equivalent duct diameter for rectangular ducts
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.
EPA	Environment Protection Authority
ISC	Intersociety Committee, Methods of Air Sampling and Analysis
ISO	International Organisation for Standardisation
ITE	Individual threshold estimate
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
OM	Other approved method
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
USEPA	United States Environmental Protection Agency
Velocity difference	The percentage difference between the average of initial flows and after flows.
Vic EPA	Victorian Environment Protection Authority
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.

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