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Report Number R002646

Emission Testing Report
Transpacific Cleanaway Landfills Ltd TULLAMARINE

Document Information

Client Name:	Transpacific Cleanaway Landfills Ltd (Tullamarine)
Report Number:	R002646
Date of Issue:	12 July 2016
Attention:	Kieren McDermott
Address:	Western Avenue TULLAMARINE VIC 3043
Testing Laboratory:	Ektimo (EML) ABN 98 006 878 342

Report Status

Format	Document Number	Report Date	Prepared By	Reviewed By (1)	Reviewed By (2)
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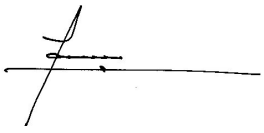

Zac Xavier
Director

NATA Accredited Laboratory
No. 2732

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1 EXECUTIVE SUMMARY

Ektimo was engaged by Transpacific Cleanaway Landfills Ltd (Tullamarine) to perform emissions testing on the Flare exhaust and to determine the Destruction and Removal Efficiency (DRE) of methane.

Monitoring was performed as follows:

Location	Test Date	Test Parameters*
Flare Inlet	12 April 2016	Methane
Flare Outlet		Methane and methane DRE [1]
Flare Outlet	7 June 2016	Methane and methane DRE [2]

* Flow rate, velocity, temperature and moisture were determined unless otherwise stated

1. Plant flow data was used to calculate inlet mass rate and methane DRE.

2. Plant flow and methane data was used to calculate mass rate and methane DRE.

The methodologies chosen by Ektimo are those recommended by the Victorian Environment Protection Authority (as specified in A Guide to Sampling and Analysis of Air Emissions and Air Quality, December 2002).

All results are reported on a dry basis at STP. Unless otherwise indicated, the methods cited in this report have been performed without deviation.

Plant operating conditions have been noted in the report.

2 RESULTS

2.1 Flare Stack Outlet (12/4/16)

Date	12-04-2016	**Client**	Transpacific Cleanaway		
Report	R002646	**Stack ID**	Flare Outlet		
Licence No.	-	**Location**	Tullamarine	**State**	VIC
Process Conditions	Please refer to client records.				

Sampling Plane Details		
Sampling plane dimensions	800 mm	
Sampling plane area	0.503 m²	
Exit plane dimensions	800	
Exit plane area	0.503 m²	
Sampling port size, number & depth	4" Flange (x2), 300 mm	
Access & height of ports	Fixed ladder	8 m
Duct orientation & shape	Vertical	Circular
Downstream disturbance	Exit	2 D
Upstream disturbance	Connection	6 D
No. traverses & points sampled	2	12
Compliance of sample plane to AS4323.1	Satisfactory	

Comments

Mass rate destruction efficiency for methane determined from measured (1) inlet and (2) outlet concentrations and measured (3) outlet flow and (4) inlet flow recorded from plant instrumentation. (1) (2) and (3) performed by Ektimo.

Molecular weight estimated from previous tests

Stack Parameters		
Moisture content, %v/v	11	
Gas molecular weight, g/g mole	28.5 (wet)	29.7 (dry)
Gas density at STP, kg/m³	1.27 (wet)	1.33 (dry)

Gas Flow Parameters	
Measurement time (hhmm)	0910
Temperature, °C	906
Velocity at sampling plane, m/s	6.2
Velocity at exit plane, m/s	6.2
Volumetric flow rate, discharge, m³/min	190
Volumetric flow rate (wet STP), m³/min	44
Volumetric flow rate (dry STP), m³/min	39
Mass flow rate (wet basis), kg/hour	3400

VOC's C_1-C_4	Average		Test 1		Test 2	
Sampling time			0900-0930		0930-1000	
	Concentration mg/m³	Mass Rate g/min	Concentration mg/m³	Mass Rate g/min	Concentration mg/m³	Mass Rate g/min
Methane	<1	<0.06	<1	<0.06	<1	<0.06

2.2 Flare Stack Inlet (12/4/16)

Date	12-04-2016	**Client**	Transpacific Cleanaway		
Report	R002646	**Stack ID**	Flare Inlet (Closest to flare)		
Licence No.	-	**Location**	Tullamarine	**State**	VIC
Ektimo Staff	ZXa				
Process Conditions	Please refer to client records.				

VOC's C_1-C_4		Test 1		Test 2	
		0955		0955	
		Concentration mg/m^3	Mass Rate g/min	Concentration mg/m^3	Mass Rate g/min
Methane		410000	1100	400000	1100

Destruction Efficiency %		>	99.995	>	99.995

Date	12-04-2016	**Client**	Transpacific Cleanaway		
Report	R002646	**Stack ID**	Flare Inlet (Furthest to flare)		
Licence No.	-	**Location**	Tullamarine	**State**	VIC
Ektimo Staff	ZXa				
Process Conditions	Please refer to client records.				

VOC's C_1-C_4		Test 1	
		0950	
		Concentration mg/m^3	Mass Rate g/min
Methane		410000	1100

Destruction Efficiency %		>	99.995

2.3 Flare Stack Outlet (7/6/16)

Date	7-06-2016	**Client**	Transpacific Cleanaway		
Report	R002646	**Stack ID**	Flare Outlet		
Licence No.	-	**Location**	Tullamarine	**State**	VIC
Process Conditions	Please refer to client records.				

Sampling Plane Details		
Sampling plane dimensions	800 mm	
Sampling plane area	0.503 m²	
Exit plane dimensions	800	
Exit plane area	0.503 m²	
Sampling port size, number & depth	4" Flange (x2), 300 mm	
Access & height of ports	Fixed ladder	8 m
Duct orientation & shape	Vertical	Circular
Downstream disturbance	Exit	2 D
Upstream disturbance	Connection	6 D
No. traverses & points sampled	2	12
Compliance of sample plane to AS4323.1	Satisfactory	

Comments

Mass rate destruction efficiency for methane determined from measured (1) outlet concentrations and measured (2) outlet flow and (3) inlet concentration and flow recorded from plant instrumentation. (1) and (2) performed by Ektimo.

Molecular weight estimated from previous tests

Stack Parameters		
Moisture content, %v/v	11	
Gas molecular weight, g/g mole	28.5 (wet)	29.7 (dry)
Gas density at STP, kg/m³	1.27 (wet)	1.33 (dry)

Gas Flow Parameters	
Measurement time (hhmm)	1020
Temperature, °C	860
Velocity at sampling plane, m/s	6.1
Velocity at exit plane, m/s	6.1
Volumetric flow rate, discharge, m³/min	190
Volumetric flow rate (wet STP), m³/min	45
Volumetric flow rate (dry STP), m³/min	40
Mass flow rate (wet basis), kg/hour	3400

VOC's C_1-C_4	Average		Test 1		Test 2	
Sampling time			0900-0930		0930-1000	
	Concentration mg/m³	Mass Rate g/min	Concentration mg/m³	Mass Rate g/min	Concentration mg/m³	Mass Rate g/min
Methane	<1	<0.06	<1	<0.06	<1	<0.06

2.4 Flare Stack Inlet (7/6/16)

Date	7-06-2016	**Client**	Transpacific Cleanaway		
Report	R002646	**Stack ID**	Flare Inlet (Closest to flare)		
Licence No.	-	**Location**	Tullamarine	**State**	VIC
Ektimo Staff	JSn/GSc				
Process Conditions	Please refer to client records.				

VOC's C_1-C_4		Test 1 0900-0930		Test 2 0930-1000	
		Concentration mg/m^3	Mass Rate g/min	Concentration mg/m^3	Mass Rate g/min
Methane		420000	1100	420000	1100

Destruction Efficiency %		>	99.995	>	99.995

3 PLANT OPERATING CONDITIONS

Unless otherwise stated, the plant operating conditions were normal at the time of testing. See Transpacific Cleanaway Landfills Ltd (Tullamarine)'s records for complete process conditions.

4 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	Method Detection Limit	Uncertainty*	NATA Accredited	
					Sampling	Analysis
Sample plane criteria	AS 4323.1	NA	-	-	✓	NA
Moisture	Ektimo (EML Air) 105	Ektimo (EML Air) 105	0.4%	6%	✓	✓
Temperature	Ektimo (EML Air) 100	NA	0°C	2%	✓	NA
Flow rate	Ektimo (EML Air) 100	NA	Location specific	8%	✓	NA
Velocity	Ektimo (EML Air) 100	NA	$2ms^{-1}$	7%	✓	NA
C_1-C_4 Hydrocarbons	Ektimo (EML Air) 340	Ektimo (EML Air) 340	Analyte specific	0.19	✓	✓

* Uncertainty values cited in this table are calculated at the 95% confidence level (coverage factor = 2).

5 QUALITY ASSURANCE/ QUALITY CONTROL INFORMATION

Ektimo (EML) and Ektimo (ETC) are 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 (EML) and Ektimo (ETC) are accredited by NATA (National Association of Testing Authorities) to ISO/IEC 17025. – General Requirements for the Competence of Testing and Calibration Laboratories. ISO/IEC 17025 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 Compliance Manager.

NATA is a member of APLAC (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.

6 DEFINITIONS

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

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, unless otherwise specified.
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.
VOC	Any chemical compound based on carbon with a vapour pressure of at least 0.010 kPa at 25°C or having a corresponding volatility under the particular conditions of use. These compounds may contain oxygen, nitrogen and other elements, but specifically excluded are carbon monoxide, carbon dioxide, carbonic acid, metallic carbides and carbonate salts.
TOC	The sum of all compounds of carbon which contain at least one carbon to carbon bond, plus methane and its derivatives.
OU	The number of odour units per unit of volume. The numerical value of the odour concentration is equal to the number of dilutions to arrive at the odour threshold (50% panel response).
$PM_{2.5}$	Atmospheric suspended particulate matter having an equivalent aerodynamic diameter of less than approximately 2.5 microns (µm).
PM_{10}	Atmospheric suspended particulate matter having an equivalent aerodynamic diameter of less than approximately 10 microns (µm).
BSP	British standard pipe
NT	Not tested or results not required
NA	Not applicable
D_{50}	'Cut size' of a cyclone defined as the particle diameter at which the cyclone achieves a 50% collection efficiency ie. half of the particles are retained by the cyclone and half are not and pass through it to the next stage. 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.
D	Duct diameter or equivalent duct diameter for rectangular ducts
<	Less than
>	Greater than
≥	Greater than or equal to
~	Approximately
CEM	Continuous Emission Monitoring
CEMS	Continuous Emission Monitoring System
DER	WA Department of Environment & Regulation
DECC	Department of Environment & Climate Change (NSW)
EPA	Environment Protection Authority
FTIR	Fourier Transform Infra Red
NATA	National Association of Testing Authorities
RATA	Relative Accuracy Test Audit
AS	Australian Standard
USEPA	United States Environmental Protection Agency
Vic EPA	Victorian Environment Protection Authority
ISC	Intersociety committee, Methods of Air Sampling and Analysis
ISO	International Organisation for Standardisation
APHA	American public health association, Standard Methods for the Examination of Water and Waste Water
CARB	Californian Air Resources Board
TM	Test Method
OM	Other approved method
CTM	Conditional test method
VDI	Verein Deutscher Ingenieure (Association of German Engineers)
NIOSH	National Institute of Occupational Safety and Health
XRD	X-ray Diffractometry