Ektimo

VIP Drum Reconditioners, Seven Hills

Emission Testing Report

Report Number R012983

Document Information

Template Version 300522

Client Name:	VIP Drum Reconditioners
Report Number:	R012983
Date of Issue:	26 July 2022
Attention:	Grant McNally
Address:	30-32 Powers Rd Seven Hills NSW 2147
Testing Laboratory:	Ektimo Pty Ltd, ABN 86 600 381 413

Report Authorisation

Graham Edwards
Senior Air Monitoring Consultant

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 VIP Drum Reconditioners to perform emission testing at their Seven Hills plant. Testing was carried out in accordance with Environmental Protection Licence 124.

1.2 Project Objective

The objective of the project was to conduct a monitoring programme to quantify emissions from the afterburner discharge stack and characteristics of the ingress flow at the cooling air vent as required by VIP Drum Reconditioners' licence.

Monitoring was performed as follows:

Location	Test Date	Test Parameters*
EPA 1 – Afterburner Discharge Stack	7 June 2022	Solid particles Carbon dioxide, oxygen, carbon monoxide, nitrogen oxides Sulfuric acid mist & sulfur trioxide (as SO_3) Total fluoride, hydrochloric acid (HCl), chlorine Volatile organic compounds (VOCs) Metals (type 1 substances Sb, As, Cd, Pb, Hg) Dioxins and furans Dry gas density, molecular weight Hydrogen sulfide
EPA 2 – Cooling Air Vent		Dry gas density, molecular weight

* 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.

Hydrogen sulfide was sampled by two separate methods (USEPA Method 11 and Ektimo 255). Both test methods were performed simultaneously to reduce the potential of detection limit issues during reporting. Further information has been supplied in section 4 – *Deviations to test methods.*

The cooling air vent (EPA 2) consists of an open slot around the entire 4555mm circumference of the waste air duct stemming from the afterburner. The width of this slot is variable. Fresh ambient air is drawn through the slot under venturi. On the day of sampling the slot was open to a width of 220mm. Velocity measurements were taken with a pitot probe at three accessible locations around the circumference. All calculations assume that the cooling air vent flow into the afterburner waste air duct is consistent and uniform across the entire width and circumference of the slot.

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 124 (last amended on 7 July 2020).

EPA	Parameter	Units	Licence limit	Detected values at STP 7-Jun-22	Detected values Corrected to 11% O_2 7-Jun-22	Detected values Corrected to 3% O_2 7-Jun-22	Detected values Corrected to 12% CO_2 7-Jun-22
1 - Afterburner Discharge Stack	Dioxins and furans	ng/m^3	0.1	0.0022	0.023	-	-
	Hydrogen sulfide (USEPA Method 11)	mg/m^3	5	<0.3	-	<5	-
	Hydrogen sulfide (Method Ektimo 255)	mg/m^3	5	<0.006	-	<0.1	-
	Volatile organic compounds	mg/m^3	40	<0.2	-	<3	-
	Nitrogen oxides	mg/m^3	2000	9.3	-	180	-
	Mercury	mg/m^3	3	<0.0006	-	<0.01	-
	Chlorine	mg/m^3	200	<0.02	-	<0.4	-
	Cadmium	mg/m^3	3	<0.0007	-	<0.01	-
	Hydrochloric acid (HCl)	mg/m^3	400	0.24	-	4.7	-
	Total fluoride (as HF)	mg/m^3	50	<0.04	-	<0.7	-
	Solid particles	mg/m^3	250	5.4	-	-	52
	Sulfuric acid mist and sulfur trioxide (as SO_3)	mg/m^3	100	0.9	-	17	-
	Type 1 substances	mg/m^3	10	≤0.021	-	≤0.41	-

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 1 – Afterburner Discharge Stack

Date	7/06/2022	**Client**	VIP Drum Reconditioners
Report	R012983	**Stack ID**	EPA 1 - Afterburner Discharge Stack
Licence No.	124	**Location**	Seven Hills
Ektimo Staff	Graham Edwards, Ish Alam, Ahmad Ramiz	**State**	NSW
Process Conditions	Please refer to client records.		220530

Sampling Plane Details		
Sampling plane dimensions	1035 mm	
Sampling plane area	0.841 m²	
Sampling port size, number & depth	4" BSP (x2), 80 mm	
Access & height of ports	Step ladder 8 m	
Duct orientation & shape	Vertical Circular	
Downstream disturbance	Exit 7 D	
Upstream disturbance	Change in diameter 3 D	
No. traverses & points sampled	2 16	
Sample plane conformance to AS4323.1 (2021)	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	1.1	
Gas molecular weight, g/g mole	28.9 (wet)	29.0 (dry)
Gas density at STP, kg/m³	1.29 (wet)	1.30 (dry)
Gas density at discharge conditions, kg/m³	0.83	
% Oxygen correction & Factor	3 %	19.33
Gas Flow Parameters		
Flow measurement time(s) (hhmm)	0820 & 1130	
Temperature, °C	147	
Temperature, K	420	
Velocity at sampling plane, m/s	34	
Volumetric flow rate, actual, m³/s	29	
Volumetric flow rate (wet STP), m³/s	19	
Volumetric flow rate (dry STP), m³/s	19	
Mass flow rate (wet basis), kg/hour	87000	

Isokinetic Results	Results		
Sampling time	0925-1050		
	Concentration mg/m³	Corrected to 3% O2 mg/m³	Mass Rate g/min
Antimony	<0.006	<0.1	<0.007
Arsenic	<0.003	<0.05	<0.003
Cadmium	<0.0007	<0.01	<0.0008
Lead	0.011	0.21	0.012
Mercury	<0.0006	<0.01	<0.0007
Total Type 1 Substances	≤0.021	≤0.41	≤0.023
Isokinetic Sampling Parameters			
Sampling time, min		80	
Isokinetic rate, %		108	

Date	7/06/2022	**Client**	VIP Drum Reconditioners
Report	R012983	**Stack ID**	EPA 1 - Afterburner Discharge Stack
Licence No.	124	**Location**	Seven Hills
Ektimo Staff	Graham Edwards, Ish Alam, Ahmad Ramiz	**State**	NSW
Process Conditions	Please refer to client records.		220530

Sampling Plane Details	
Sampling plane dimensions	1035 mm
Sampling plane area	0.841 m²
Sampling port size, number & depth	4" BSP (x2), 80 mm
Access & height of ports	Step ladder 8 m
Duct orientation & shape	Vertical Circular
Downstream disturbance	Exit 7 D
Upstream disturbance	Change in diameter 3 D
No. traverses & points sampled	2 16
Sample plane conformance to AS4323.1 (2021)	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	1	
Gas molecular weight, g/g mole	28.9 (wet)	29.0 (dry)
Gas density at STP, kg/m³	1.29 (wet)	1.30 (dry)
Gas density at discharge conditions, kg/m³	0.83	
% Oxygen correction & Factor	3 %	19.15
Gas Flow Parameters		
Flow measurement time(s) (hhmm)	1130 & 1345	
Temperature, °C	147	
Temperature, K	420	
Velocity at sampling plane, m/s	34	
Volumetric flow rate, actual, m³/s	28	
Volumetric flow rate (wet STP), m³/s	18	
Volumetric flow rate (dry STP), m³/s	18	
Mass flow rate (wet basis), kg/hour	85000	

Gas Analyser Results	Average			Minimum			Maximum		
Sampling time	1211 - 1330			1211 - 1330			1211 - 1330		
	Concentration mg/m³	Corrected to 3% O2 mg/m³	Mass Rate g/min	Concentration mg/m³	Corrected to 3% O2 mg/m³	Mass Rate g/min	Concentration mg/m³	Corrected to 3% O2 mg/m³	Mass Rate g/min
Combustion Gases									
Nitrogen oxides (as NO_2)	9.3	180	10	8.2	160	8.9	13	240	14
Carbon monoxide	<3	<50	<3	<3	<50	<3	<3	<50	<3
	Concentration ppm	Corrected to 3% O2 ppm	Mass Rate g/min	Concentration ppm	Corrected to 3% O2 ppm	Mass Rate g/min	Concentration ppm	Corrected to 3% O2 ppm	Mass Rate g/min
Carbon monoxide	<2	<40	<3	<2	<40	<3	<2	<40	<3
	Concentration %v/v			Concentration %v/v			Concentration %v/v		
Carbon dioxide	0.8			0.7			0.9		
Oxygen	20			19.8			20.1		

Isokinetic Results	Results		
Sampling time	1205-1330		
	Concentration mg/m³	Corrected to 12% O2 mg/m³	Mass Rate g/min
Solid Particles	5.4	52	5.9
	Concentration	Corrected to 3% O2	Mass Rate
Sulfur trioxide and/or Sulfuric acid (as SO3)	0.9	17	0.98
Isokinetic Sampling Parameters			
Sampling time, min		80	
Isokinetic rate, %		101	
Gravimetric analysis date (total particulate)		06-10-2022	

Date	7/06/2022	**Client**	VIP Drum Reconditioners
Report	R012983	**Stack ID**	EPA 1 - Afterburner Discharge Stack
Licence No.	124	**Location**	Seven Hills
Ektimo Staff	Graham Edwards, Ish Alam, Ahmad Ramiz	**State**	NSW
Process Conditions	Please refer to client records.		220530

Total VOCs (as n-Propane)	Results		
	Concentration mg/m³	Corrected to 3% O2 mg/m³	Mass Rate g/min
Total	<0.2	<3	<0.2

VOC (speciated)	Results		
Sampling time	1230-1332		
	Concentration mg/m³	Corrected to 3% O2 mg/m³	Mass Rate g/min
Detection limit[1]	<0.2	<3	<0.2

(1) Unless otherwise reported, the following target compounds were found to be below detection:
Dichloromethane, Ethanol, Isopropanol, 1,1-Dichloroethene, trans-1,2-Dichloroethene, cis-1,2-Dichloroethene, Chloroform, 1,1,1-Trichloroethane, 1,2-Dichloroethane, Benzene, Carbon tetrachloride, Butanol, 1-Methoxy-2-propanol, Trichloroethylene, Toluene, 1,1,2-Trichloroethane, Tetrachloroethene, Chlorobenzene, Ethylbenzene, m + p-Xylene, Styrene, o-Xylene, 2-Butoxyethanol, 1,1,2,2-Tetrachloroethane, Isopropylbenzene, Propylbenzene, 1,3,5-Trimethylbenzene, tert-Butylbenzene, 1,2,4-Trimethylbenzene, 1,2,3-Trimethylbenzene, Acetone, Pentane, Acrylonitrile, Methyl ethyl ketone, n-Hexane, Ethyl acetate, Cyclohexane, Isopropyl acetate, 2-Methylhexane, 2,3-Dimethylpentane, 3-Methylhexane, Heptane, Ethyl acrylate, Methyl methacrylate, Propyl acetate, Methylcyclohexane, Methyl Isobutyl Ketone, 2-Hexanone, Octane, Butyl acetate, 1-Methoxy-2-propyl acetate, Butyl acrylate, Nonane, Cellosolve acetate, alpha-Pinene, beta-Pinene, Decane, 3-Carene, D-Limonene, Undecane, Dodecane, Tridecane, Tetradecane

Date	7/06/2022	**Client**	VIP Drum Reconditioners
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Licence No.	124	**Location**	Seven Hills
Ektimo Staff	Graham Edwards, Ish Alam, Ahmad Ramiz	**State**	NSW
Process Conditions	Please refer to client records.		*220530*

Sampling Plane Details		
Sampling plane dimensions	1035 mm	
Sampling plane area	0.841 m²	
Sampling port size, number & depth	4" BSP (x2), 80 mm	
Access & height of ports	Step ladder 8 m	
Duct orientation & shape	Vertical Circular	
Downstream disturbance	Exit 7 D	
Upstream disturbance	Change in diameter 3 D	
No. traverses & points sampled	2 16	
Sample plane conformance to AS4323.1 (2021)	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	1.2	
Gas molecular weight, g/g mole	28.9 (wet)	29.0 (dry)
Gas density at STP, kg/m³	1.29 (wet)	1.30 (dry)
Gas density at discharge conditions, kg/m³	0.83	
% Oxygen correction & Factor	3 %	19.15
Gas Flow Parameters		
Flow measurement time(s) (hhmm)	1130 & 1345	
Temperature, °C	147	
Temperature, K	420	
Velocity at sampling plane, m/s	34	
Volumetric flow rate, actual, m³/s	28	
Volumetric flow rate (wet STP), m³/s	18	
Volumetric flow rate (dry STP), m³/s	18	
Mass flow rate (wet basis), kg/hour	85000	

Isokinetic Results	Results		
Sampling time		1205-1330	
	Concentration mg/m³	Corrected to 3% O2 mg/m³	Mass Rate g/min
Chloride (as HCl)	0.24	4.7	0.27
Chlorine	<0.02	<0.4	<0.02
Total fluoride (as HF)	<0.04	<0.7	<0.04
Isokinetic Sampling Parameters			
Sampling time, min		80	
Isokinetic rate, %		103	

Date	7/06/2022	**Client**	VIP Drum Reconditioners
Report	R012983	**Stack ID**	EPA 1 - Afterburner Discharge Stack
Licence No.	124	**Location**	Seven Hills
Ektimo Staff	Graham Edwards, Ish Alam, Ahmad Ramiz	**State**	NSW
Process Conditions	Please refer to client records.		*220530*

Sampling Plane Details		
Sampling plane dimensions	1035 mm	
Sampling plane area	0.841 m²	
Sampling port size, number & depth	4" BSP (x2), 80 mm	
Access & height of ports	Step ladder 8 m	
Duct orientation & shape	Vertical Circular	
Downstream disturbance	Exit 7 D	
Upstream disturbance	Change in diameter 3 D	
No. traverses & points sampled	2 16	
Sample plane conformance to AS4323.1 (2021)	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	1	
Gas molecular weight, g/g mole	28.9 (wet)	29.0 (dry)
Gas density at STP, kg/m³	1.29 (wet)	1.30 (dry)
Gas density at discharge conditions, kg/m³	0.83	
% Oxygen correction & Factor	3 %	18.85
Gas Flow Parameters		
Flow measurement time(s) (hhmm)	0820 & 1130	
Temperature, °C	147	
Temperature, K	420	
Velocity at sampling plane, m/s	34	
Volumetric flow rate, actual, m³/s	29	
Volumetric flow rate (wet STP), m³/s	19	
Volumetric flow rate (dry STP), m³/s	19	
Mass flow rate (wet basis), kg/hour	87000	

Gas Analyser Results	Average	Minimum	Maximum
Sampling time	0850 - 1051	0850 - 1051	0850 - 1051
	Concentration %v/v	Concentration %v/v	Concentration %v/v
Carbon dioxide	0.7	0.6	0.9
Oxygen	20	19.8	20.1

Hydrogen Sulfide (Ektimo 255)	Results		
Sampling time		1110-1210	
	Concentration mg/m³	Corrected to 3% O2 mg/m³	Mass Rate g/min
Hydrogen Sulfide	<0.006	<0.1	<0.006

Hydrogen Sulfide (Method 11)	Results		
Sampling time		1110-1210	
	Concentration mg/m³	Corrected to 3% O2 mg/m³	Mass Rate g/min
Hydrogen Sulfide	<0.3	<5	<0.3
Isokinetic Sampling Parameters			
Sampling time, min		128	
Isokinetic rate, %		100	

Date	7/06/2022	**Client**	VIP Drum Reconditioners
Report	R012983	**Stack ID**	EPA 1 - Afterburner Discharge Stack
Licence No.	124	**Location**	Seven Hills
Ektimo Staff	Graham Edwards, Ish Alam, Ahmad Ramiz	**State**	NSW
Process Conditions	Please refer to client records.		*220530*

Dioxins & Furans (PCDDs & PCDFs)	Results		
Sampling time	0845 - 1055		
	Concentration ng/m³	Corrected to 11% O2 ng/m³	Mass Rate ng/min
2,3,7,8-TCDF	0.00032	0.0033	0.35
2,3,7,8-TCDD	<0.0006	<0.006	<0.6
1,2,3,7,8-PeCDF	<0.00004	<0.0004	<0.04
2,3,4,7,8-PeCDF	<0.0004	<0.004	<0.4
1,2,3,7,8-PeCDD	<0.0006	<0.006	<0.6
1,2,3,4,7,8-HxCDF	<0.00006	<0.0006	<0.06
1,2,3,6,7,8-HxCDF	<0.00006	<0.0006	<0.06
2,3,4,6,7,8-HxCDF	<0.00006	<0.0006	<0.06
1,2,3,7,8,9-HxCDF	<0.00004	<0.0004	<0.05
1,2,3,4,7,8-HxCDD	<0.00004	<0.0004	<0.04
1,2,3,6,7,8-HxCDD	<0.00004	<0.0004	<0.04
1,2,3,7,8,9-HxCDD	<0.00004	<0.0004	<0.04
1,2,3,4,6,7,8-HpCDF	0.000021	0.00022	0.023
1,2,3,4,7,8,9-HpCDF	<0.000006	<0.00006	<0.006
1,2,3,4,6,7,8-HpCDD	0.000023	0.00024	0.026
OCDF	0.00000091	0.0000095	0.001
OCDD	0.000006	0.000062	0.0066
Total TCDF isomers	0.076	0.79	84
Total TCDD isomers	0.0055	0.057	6.1
Total PeCDF isomers	0.022	0.23	24
Total PeCDD isomers	<0.004	<0.04	<4
Total HxCDF isomers	0.0046	0.047	5.1
Total HxCDD isomers	0.0022	0.023	2.5
Total HpCDF isomers	0.0021	0.022	2.3
Total HpCDD isomers	0.0053	0.055	5.8
Total PCDDs + PCDFs	0.14	1.5	160
WHO05-TEQ			
Lower Bound	0.00037	0.0038	0.41
Middle Bound	0.0013	0.014	1.5
Upper Bound	0.0022	0.023	2.5

Abbreviations and definitions

WHO05-TEQ	World Health Organisation toxic equivalents for dioxins and furans
Lower Bound	Defines values reported below detection as equal to zero.
Middle Bound	Defines values reported below detection are equal to half the detection limit.
Upper Bound	Defines values reported below detection are equal to the detection limit.

TEQs are calculated by multiplying the quantified result for each toxic compound by its corresponding toxic equivalency factor.

Isokinetic Sampling Parameters	Results
Dioxins & Furans	
Sampling time, min	128
Isokinetic rate, %	100

2.2 EPA 2 – Cooling Air Vent

Date	7/06/2022	**Client**	VIP Drum Reconditioners
Report	R012983	**Stack ID**	EPA 2 - Cooling Air Vent
Licence No.	124	**Location**	Seven Hills
Ektimo Staff	Graham Edwards, Ish Alam, Ahmad Ramiz	**State**	NSW
Process Conditions	Please refer to client records.		220530

Sampling Plane Details		
Sampling plane dimensions	4555 x 220 mm	
Sampling plane area	1 m²	
Sampling port size, number & depth	NA, 0 mm	
Access & height of ports	Stairs 3 m	
Duct orientation & shape	Horizontal Rectangular	
Downstream disturbance	Change in diameter 0 D	
Upstream disturbance	Change in diameter 0 D	
No. traverses & points sampled	4 4	
Sample plane conformance to AS4323.1 (2021)	Non-conforming	

Comments
Slot width is 220mm this year
The number of points sampled is less than the requirement
The discharge is assumed to be composed of dry air and moisture

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

Stack Parameters		
Moisture content, %v/v	<0.4	
Gas molecular weight, g/g mole	29.0 (wet)	29.0 (dry)
Gas density at STP, kg/m³	1.29 (wet)	1.29 (dry)
Gas density at discharge conditions, kg/m³	1.04	
Gas Flow Parameters		
Flow measurement time(s) (hhmm)	1256	
Temperature, °C	63	
Temperature, K	336	
Velocity at sampling plane, m/s	20	
Volumetric flow rate, actual, m³/s	20	
Volumetric flow rate (wet STP), m³/s	16	
Volumetric flow rate (dry STP), m³/s	16	
Mass flow rate (wet basis), kg/hour	74000	

3 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 and 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%	✓	✓
Hydrogen sulfide	Ektimo 255	Ektimo 255	not specified	✓	✓†
Hydrogen sulfide	NSW EPA TM-5 (USEPA Method 11)	NSW EPA TM-5	not specified	✓	✓†
Speciated volatile organic compounds (VOCs)	NSW EPA TM-34[d] (USEPA Method 18)	Ektimo 344	19%	✓	✓†
Solid particles (total)	NSW EPA TM-15 (AS 4323.2)	NSW EPA TM-15 (AS 4323.2)	3%	✓	✓††
Type 1 substances (As, Cd, Hg, Pb, Sb)	NSW EPA TM-12 (USEPA Method 29)	Envirolab in-house methods Metals-006, Metals-022 & Metals-021	15%	✓	✓‡
Dioxins and furans (PCDDs and PCDFs)	NSW EPA TM-18 (USEPA Method 23)	NMI in-house method AUTL_MET_02	16%	✓	✓¶
Fluorine & fluorine compounds	NSW EPA TM-9 (USEPA Method 13B)	ALS in-house method EA144C & Ektimo 240	25%	✓	✓#,†
Hydrogen chloride	NSW EPA TM-8 (USEPA Method 26A)	Ektimo 235	14%	✓	✓†
Chlorine	NSW EPA TM-7 (USEPA Method 26A)	Ektimo 235	14%	✓	✓†
Sulfuric acid mist and/or sulfur trioxide	NSW EPA TM-3 (USEPA Method 8)	Ektimo 235	16%	✓	✓†

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

† Analysis conducted at the Ektimo Mitcham, VIC laboratory, NATA accreditation number 14601. Results were reported on:
20 June 2022 in report LV-002975.
21 June 2022 in report LV-002993.
21 June 2022 in report LV-002999.
23 June 2022 in report R012983 – ISE F.

†† Gravimetric analysis conducted at the Ektimo Unanderra, NSW laboratory, NATA accreditation number 14601.

‡ Analysis performed by Envirolab, NATA accreditation number 2901. Results were reported to Ektimo on 16 June 2022 in report 297511.

¶ Analysis performed by Australian Government National Measurement Institute, NATA accreditation number 198. Results were reported to Ektimo on 4 July 2022 in report #DAU22_167.

Analysis (solid fluoride only) performed by Australian Laboratory Services Pty Ltd, NATA accreditation number 825. Results were reported to Ektimo on 22 June 2022 in report EN2205612.

d Excludes recovery study as specified in section 8.4.3 of USEPA Test Method 18. VOCs were less than the specified detection limit, therefore the USEPA Test Method 18 recovery study could not be executed.

4 Deviations to Test Methods

Hydrogen Sulfide

The hydrogen sulfide result (sampled on 7 June 2022) was performed via Ektimo Method 255 (based on Vic EPA Method B18; UV-Vis, colorimetric detection).

Ektimo Method 255 comprises sampling into an impinger solution containing an alkaline cadmium hydroxide suspension.

The hydrogen sulfide in the sample is precipitated as cadmium sulfide and the collected sulfide is determined spectrophotometrically at 670nm by measuring methylene blue. The methylene blue is produced by reaction of sulfide with an acid solution of N,N-dimethyl-p-phenylenediamine and ferric chloride.

Use of Ektimo Method 255 provides for a significantly lower detection limit than USEPA Method 11. A lower detection limit may be necessary at this location because the measured hydrogen sulfide concentration is subject to 3% oxygen correction. Please note, that hydrogen sulfide was also sampled via USEPA 11 (NSW TM-5).

5 Plant Operating Conditions

See VIP Drum Reconditioners records for complete process conditions.

The Open Head Incinerator Afterburner was indicating a combustion zone temperature of 960°C during the sampling period.

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
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
FTIR	Fourier transform infra-red
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
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
Velocity difference	The percentage difference between the average of initial flows and after flows.
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.
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.

8 Appendix 1: Site Photos

EPA 1 – Afterburner Discharge Stack

EPA 2 – Cooling Air Vent

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