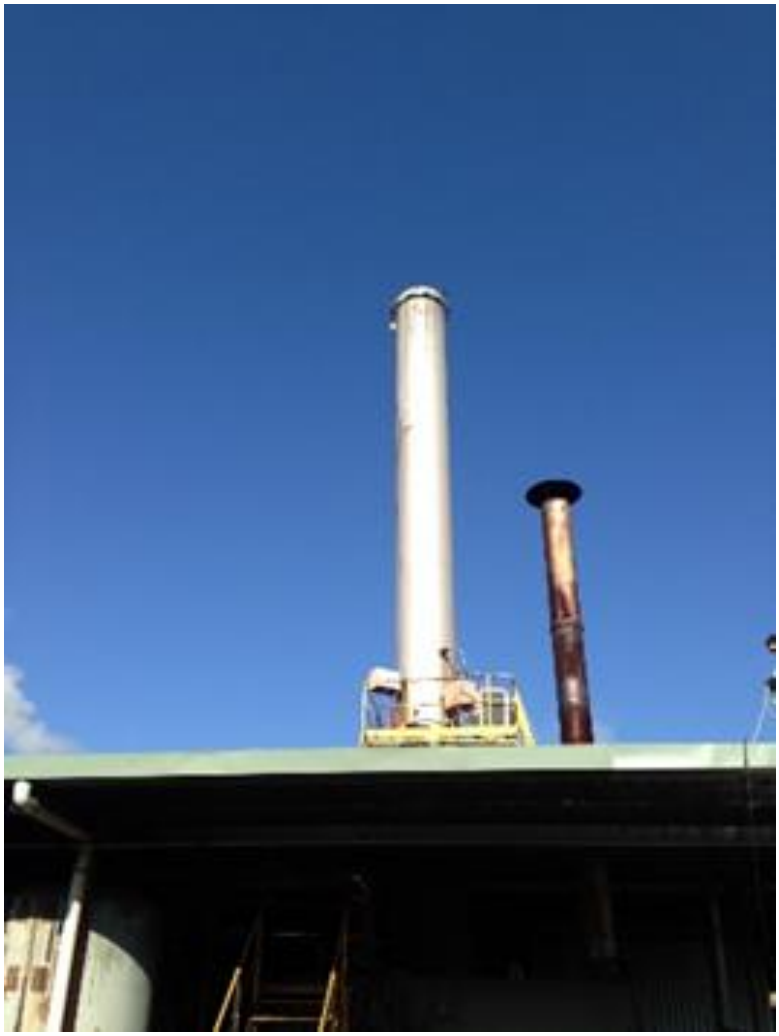
Ektimo



REPORT NUMBER R011150

Emission Testing Report
Astron Sustainability, Seven Hills

Document Information

Template Version; 230621

Client Name:	Astron Sustainability
Report Number:	R011150
Date of Issue:	8 October 2021
Attention:	Nidin Pillai
Address:	30-32 Powers Rd Seven Hills NSW 2147
Testing Laboratory:	Ektimo Pty Ltd, ABN 86 600 381 413

Report Authorisation

Steven Cooper
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. This does not include comments, conclusions or recommendations based upon the results. Refer to 'Test Methods' for full details of testing covered by NATA accreditation.

Table of Contents

1 EXECUTIVE SUMMARY

1.1 *Background*

Ektimo was engaged by Astron Sustainability to perform emission testing at their Seven Hills plant. Testing was carried out in accordance with Environmental Protection Licence 124.

1.2 *Project Objectives*

The objectives of the project were 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 Astron Sustainability's licence.

Monitoring was performed as follows:

Location	Test Date	Test Parameters*
EPA 1 – Afterburner Discharge Stack	8 July 2021	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.

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 210mm. Velocity measurements were taken with an anemometer 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 and all highlighted in red are outside 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 8-Jul-21	Detected values Corrected to 11% O_2	Detected values Corrected to 3% O_2	Detected values Corrected to 12% CO_2
1 - Afterburner Discharge Stack	Dioxins and furans	ng/m^3	0.1	0.001	0.013	-	-
	Hydrogen sulfide	mg/m^3	5	6.1	-	130	-
	Volatile organic compounds	mg/m^3	40	1.5	-	34	-
	Nitrogen oxides	mg/m^3	2000	11	-	230	-
	Mercury	mg/m^3	3	<0.0007	-	<0.02	-
	Chlorine	mg/m^3	200	<0.01	-	<0.2	-
	Cadmium	mg/m^3	3	<0.0007	-	<0.01	-
	Hydrochloric acid (HCl)	mg/m^3	400	0.22	-	4.8	-
	Total fluoride	mg/m^3	50	0.063	-	1.3	-
	Solid particles	mg/m^3	250	3.6	-	-	77
	Sulfuric acid mist and sulfur trioxide (as SO_3)	mg/m^3	100	0.056	-	1.1	-
	Type 1 substances	mg/m^3	10	≤0.025	-	≤0.55	-

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.

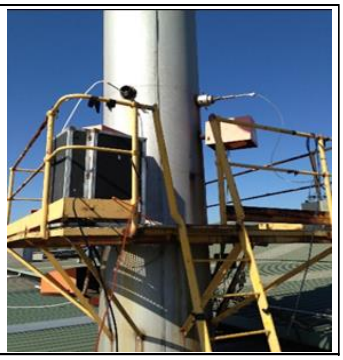
2 RESULTS

2.1 *EPA 1 – Afterburner Discharge Stack*

Date	8/07/2021	**Client**	Astron Sustainability
Report	R011150	**Stack ID**	EPA 1 - Afterburner Discharge Stack
Licence No.	146	**Location**	Seven Hills
Ektimo Staff	Zoe Parker & Scott Woods	**State**	NSW
Process Conditions	Please refer to client records.		210616

Sampling Plane Details	
Sampling plane dimensions	1035 mm
Sampling plane area	0.841 m²
Sampling port size, number	4" BSP (x2)
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 compliance to AS4323.1	Compliant 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



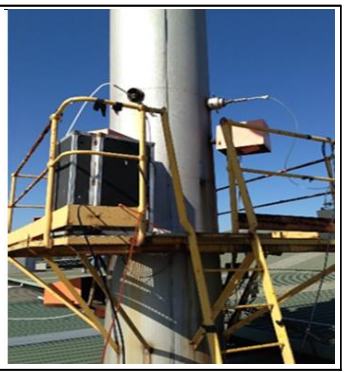
Stack Parameters		
Moisture content, %v/v	0.84	
Gas molecular weight, g/g mole	28.9 (wet)	29.0 (dry)
Gas density at STP, kg/m³	1.29 (wet)	1.29 (dry)
Gas density at discharge conditions, kg/m³	0.88	
% Oxygen correction & Factor	3 %	20.15
% Carbon dioxide correction & Factor	12 %	21.02
Gas Flow Parameters		
Flow measurement time(s) (hhmm)	0740 & 1000	
Temperature, °C	131	
Temperature, K	404	
Velocity at sampling plane, m/s	34	
Volumetric flow rate, actual, m³/s	29	
Volumetric flow rate (wet STP), m³/s	20	
Volumetric flow rate (dry STP), m³/s	19	
Mass flow rate (wet basis), kg/hour	91000	

Isokinetic Results	Results			
Sampling time	0830-0953			
	Concentration mg/m³	Corrected to 3% O2 mg/m³	Corrected to 12% O2 mg/m³	g/min
Solid Particles	3.6	-	77	4.3
Sulfur trioxide and/or Sulfuric acid (as SO_3)	0.056	1.1	-	0.066
Isokinetic Sampling Parameters				
Sampling time, min	80			
Isokinetic rate, %	100			
Velocity difference, %	8			

Date	8/07/2021	**Client**	Astron Sustainability
Report	R011150	**Stack ID**	EPA 1 - Afterburner Discharge Stack
Licence No.	146	**Location**	Seven Hills
Ektimo Staff	Zoe Parker & Scott Woods	**State**	NSW
Process Conditions	Please refer to client records.		210616

Sampling Plane Details

Sampling plane dimensions	1035 mm
Sampling plane area	0.841 m²
Sampling port size, number	4" BSP (x2)
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 compliance to AS4323.1	Compliant 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	0.73	
Gas molecular weight, g/g mole	28.9 (wet)	29.0 (dry)
Gas density at STP, kg/m³	1.29 (wet)	1.29 (dry)
Gas density at discharge conditions, kg/m³	0.87	
% Oxygen correction & Factor	3 %	21.52
Gas Flow Parameters		
Flow measurement time(s) (hhmm)	1135 & 1305	
Temperature, °C	134	
Temperature, K	407	
Velocity at sampling plane, m/s	33	
Volumetric flow rate, actual, m³/s	28	
Volumetric flow rate (wet STP), m³/s	19	
Volumetric flow rate (dry STP), m³/s	19	
Mass flow rate (wet basis), kg/hour	87000	

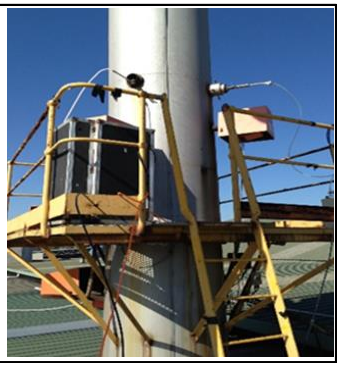
Hydrogen Sulfide	Results		
Sampling time	1152-1252		
	Concentration mg/m³	Corrected to 3% O2 mg/m³	Mass Rate g/min
Hydrogen Sulfide	6.1	130	6.9

Isokinetic Results	Results		
Sampling time	1135-1258		
	Concentration mg/m³	Corrected to 3% O2 mg/m³	Mass Rate g/min
Hydrochloric acid (HCl)	0.22	4.8	0.25
Chlorine	<0.01	<0.2	<0.01
Total fluoride (as HF)	0.063	1.3	0.07
Isokinetic Sampling Parameters			
Sampling time, min	80		
Isokinetic rate, %	98		
Velocity difference, %	2		

Date	8/07/2021	**Client**	Astron Sustainability
Report	R011150	**Stack ID**	EPA 1 - Afterburner Discharge Stack
Licence No.	146	**Location**	Seven Hills
Ektimo Staff	Zoe Parker & Scott Woods	**State**	NSW
Process Conditions	Please refer to client records.		210616

Sampling Plane Details

Sampling plane dimensions	1035 mm
Sampling plane area	0.841 m²
Sampling port size, number	4" BSP (x2)
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 compliance to AS4323.1	Compliant 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	0.85	
Gas molecular weight, g/g mole	28.9 (wet)	29.0 (dry)
Gas density at STP, kg/m³	1.29 (wet)	1.29 (dry)
Gas density at discharge conditions, kg/m³	0.85	
% Oxygen correction & Factor	3 %	22.45
Gas Flow Parameters		
Flow measurement time(s) (hhmm)	1000 & 1135	
Temperature, °C	142	
Temperature, K	415	
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	89000	

Isokinetic Results	Results		
Sampling time	1005-1128		
	Concentration mg/m³	Corrected to 3% O2 mg/m³	Mass Rate g/min
Antimony	<0.006	<0.1	<0.007
Arsenic	<0.003	<0.06	<0.003
Cadmium	<0.0007	<0.01	<0.0008
Lead	0.015	0.33	0.017
Mercury	<0.0007	<0.02	<0.0008
Total Type 1 Substances	≤0.025	≤0.55	≤0.028
Isokinetic Sampling Parameters			
Sampling time, min	80		
Isokinetic rate, %	100		
Velocity difference, %	-8		

Date	8/07/2021	**Client**	Astron Sustainability
Report	R011150	**Stack ID**	EPA 1 - Afterburner Discharge Stack
Licence No.	146	**Location**	Seven Hills
Ektimo Staff	Zoe Parker & Scott Woods	**State**	NSW
Process Conditions	Please refer to client records.		210616

Total VOCs (as n-Propane)	Results		
Sampling time	1012-1112		
	Concentration mg/m³	Corrected to 3% O2 mg/m³	Mass Rate g/min
Total	1.5	34	1.7

VOC (speciated)	Results		
Sampling time	1012-1112		
	Concentration mg/m³	Corrected to 3% O2 mg/m³	Mass Rate g/min
Detection limit[1]	<0.02	<0.4	<0.02
Isopropanol	1.8	40	2
Toluene	0.22	4.8	0.25
Ethylbenzene	0.036	0.8	0.041
m + p-Xylene	0.16	3.6	0.18
o-Xylene	0.045	1	0.051
Methylcyclohexane	0.036	0.8	0.041
Nonane	0.023	0.52	0.027

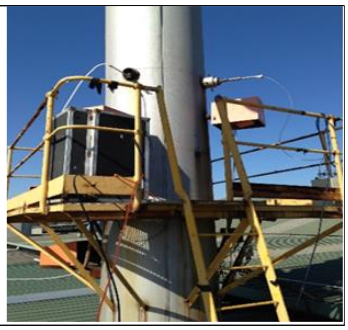
(1) Unless otherwise reported, the following target compounds were found to be below detection:
Dichloromethane, Ethanol, 1,1-Dichloroethene, trans-1,2-Dichloroethene, cis-1,2-Dichloroethene, Chloroform, 1,1,1-Trichloroethane, 1,2-Dichloroethane, Benzene, Carbon tetrachloride, Butanol, 1-Methoxy-2-propanol, Trichloroethylene, 1,1,2-Trichloroethane, Tetrachloroethene, Chlorobenzene, Styrene, 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, 2-Methylhexane, Isopropyl acetate, 2,3-Dimethylpentane, 3-Methylhexane, Heptane, Ethyl acrylate, Methyl methacrylate, Propyl acetate, Methyl Isobutyl Ketone, 2-Hexanone, Octane, Butyl acetate, 1-Methoxy-2-propyl acetate, Butyl acrylate, Cellosolve acetate, alpha-Pinene, beta-Pinene, Decane, 3-Carene, D-Limonene, Undecane, Dodecane, Tridecane, Tetradecane

Date	8/07/2021	**Client**	Astron Sustainability
Report	R011150	**Stack ID**	EPA 1 - Afterburner Discharge Stack
Licence No.	124	**Location**	Seven Hills
Ektimo Staff	Zoe Parker & Scott Woods	**State**	NSW
Process Conditions	Please refer to client records.		

210616

Sampling Plane Details	
Sampling plane dimensions	1035 mm
Sampling plane area	0.841 m²
Sampling port size, number	4" BSP (x2)
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 compliance to AS4323.1	Compliant 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	0.99	
Gas molecular weight, g/g mole	28.9 (wet)	29.0 (dry)
Gas density at STP, kg/m³	1.29 (wet)	1.29 (dry)
Gas density at discharge conditions, kg/m³	0.89	
% Oxygen correction & Factor	3 %	21.80
% Oxygen correction & Factor	11 %	12.06
Gas Flow Parameters		
Flow measurement time(s) (hhmm)	0740 & 1400	
Temperature, °C	125	
Temperature, K	398	
Velocity at sampling plane, m/s	33	
Volumetric flow rate, actual, m³/s	28	
Volumetric flow rate (wet STP), m³/s	19	
Volumetric flow rate (dry STP), m³/s	19	
Mass flow rate (wet basis), kg/hour	90000	
Velocity difference, %	2	

Gas Analyser Results	Average			Minimum			Maximum		
Sampling time	0803 - 1343			0803 - 1343			0803 - 1343		
	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)	11	230	12	7	150	8	15	330	17
Carbon monoxide	<2	<50	<3	<2	<50	<3	3.7	82	4.3
	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	3	65	4.3
	Concentration % v/v			Concentration % v/v			Concentration % v/v		
Carbon dioxide	0.5			<0.4			0.6		
Oxygen	20.1			19.9			20.4		

Date	8/07/2021	**Client**	Astron Sustainability
Report	R011150	**Stack ID**	EPA 1 - Afterburner Discharge Stack
Licence No.	124	**Location**	Seven Hills
Ektimo Staff	Zoe Parker & Scott Woods	**State**	NSW
Process Conditions	Please refer to client records.		

Dioxins & Furans (PCDDs & PCDFs)	Results		
Sampling time	0750 - 1355		
	Concentration ng/m³	Corrected to 11% O2 ng/m³	Mass Rate ng/min
2,3,7,8-TCDF	0.000082	0.00099	0.094
2,3,7,8-TCDD	<0.0003	<0.004	<0.4
1,2,3,7,8-PeCDF	0.000015	0.00018	0.017
2,3,4,7,8-PeCDF	0.00021	0.0025	0.24
1,2,3,7,8-PeCDD	<0.0002	<0.002	<0.2
1,2,3,4,7,8-HxCDF	0.000053	0.00064	0.061
1,2,3,6,7,8-HxCDF	0.000048	0.00058	0.056
2,3,4,6,7,8-HxCDF	0.000042	0.0005	0.048
1,2,3,7,8,9-HxCDF	<0.00001	<0.0001	<0.01
1,2,3,4,7,8-HxCDD	<0.00001	<0.0002	<0.02
1,2,3,6,7,8-HxCDD	0.000016	0.00019	0.018
1,2,3,7,8,9-HxCDD	0.000018	0.00022	0.021
1,2,3,4,6,7,8-HpCDF	0.000011	0.00013	0.013
1,2,3,4,7,8,9-HpCDF	<0.000001	<0.00001	<0.001
1,2,3,4,6,7,8-HpCDD	0.000011	0.00014	0.013
OCDF	0.00000009	0.0000011	0.0001
OCDD	0.0000021	0.000025	0.0024
Total TCDF isomers	0.03	0.36	34
Total TCDD isomers	0.0097	0.12	11
Total PeCDF isomers	0.01	0.12	12
Total PeCDD isomers	0.0047	0.056	5.4
Total HxCDF isomers	0.0038	0.046	4.4
Total HxCDD isomers	0.0038	0.046	4.4
Total HpCDF isomers	0.0012	0.015	1.4
Total HpCDD isomers	0.0025	0.03	2.9
Total PCDDs + PCDFs	0.073	0.88	84
WHO05-TEQ			
Lower Bound	0.00051	0.0062	0.58
Middle Bound	0.00077	0.0093	0.89
Upper Bound	0.001	0.013	1.2

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.

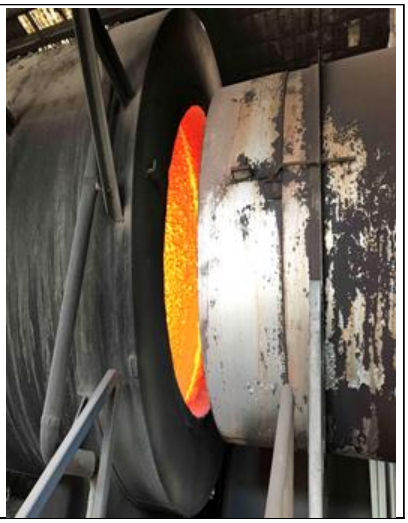
Isokinetic Sampling Parameters	Results
Dioxins & Furans	
Sampling time, min	360
Isokinetic rate, %	101
Velocity difference, %	2

2.2 *EPA 2 – Cooling Air Vent*

Date	8/07/2021	**Client**	Astron Sustainability
Report	R011150	**Stack ID**	EPA 2 - Cooling Air Vent
Licence No.	124	**Location**	Seven Hills
Ektimo Staff	Zoe Parker & Scott Woods	**State**	NSW
Process Conditions	Please refer to client records.		

210616

Sampling Plane Details		
Sampling plane dimensions	4555 x 210 mm	
Sampling plane area	0.957 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	3 3	
Sample plane compliance to AS4323.1	Non-compliant	



Comments
Slot width is 210mm this year
The number of points sampled is less than the requirement

The sampling plane is deemed to be non-compliant 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	1.6	
Gas molecular weight, g/g mole	28.8 (wet)	29.0 (dry)
Gas density at STP, kg/m³	1.29 (wet)	1.29 (dry)
Gas density at discharge conditions, kg/m³	1.15	
Gas Flow Parameters		
Flow measurement time(s) (hhmm)	1315	
Temperature, °C	35	
Temperature, K	308	
Velocity at sampling plane, m/s	15	
Volumetric flow rate, actual, m³/s	15	
Volumetric flow rate (wet STP), m³/s	13	
Volumetric flow rate (dry STP), m³/s	13	
Mass flow rate (wet basis), kg/hour	61000	

3 PLANT OPERATING CONDITIONS

Unless otherwise stated, the plant operating conditions were normal at the time of testing. See Astron Sustainability's records for complete process conditions.

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

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	Analysis
Sample plane criteria	NSW EPA TM-1	NA	NA	✓	NA
Flow rate, temperature and velocity	NSW EPA TM-2	NSW EPA TM-2	8%, 2%, 7%	NA	✓
Moisture content	NSW EPA TM-22	NSW EPA TM-22	8%	✓	✓
Molecular weight	NA	NSW EPA TM-23	not specified	NA	✓
Dry gas density	NA	NSW EPA TM-23	not specified	NA	✓
Carbon dioxide	NSW EPA TM-24	NSW EPA TM-24	13%	✓	✓
Carbon monoxide	NSW EPA TM-32	NSW EPA TM-32	12%	✓	✓
Nitrogen oxides	NSW EPA TM-11	NSW EPA TM-11	12%	✓	✓
Oxygen	NSW EPA TM-25	NSW EPA TM-25	13%	✓	✓
Hydrogen sulfide	NSW EPA TM-5	NSW EPA TM-5	not specified	✓	✓†
Speciated volatile organic compounds (VOC's)	NSW EPA TM-34[d]	Ektimo 344	19%	✓	✓†
Chlorine	NSW EPA TM-7	Ektimo 235	14%	✓	✓†
Dioxins and furans (PCDD's and PCDF's)	NSW EPA TM-18	NMI AUTL_02	16%	✓	✓¶
Fluorine	NSW EPA TM-9	ALS Method QWI-EN/EA144C & Ektimo 240	25%	✓	✓#,†
Hydrogen chloride	NSW EPA TM-8	Ektimo 235	14%	✓	✓†
Solid particles (total)	NSW EPA TM-15	NSW EPA TM-15	3%	✓	✓††
Sulfuric acid mist and/or sulfur trioxide	NSW EPA TM-3	Ektimo 235	16%	✓	✓†
Type 1 substances (Sb, As, Cd, Pb, Hg)	NSW EPA TM-12	Envirolab inhouse Metals-006, Metals-022, Metals-021	15%	✓	✓‡

210701

* 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:
19 July 2021 in report number LV-001734.
16 July 2021 in report number LV-001723.
16 July 2021 in report number R011150-ISE F.
23 July 2021 in report number LV-001748.
26 July 2021 in report number R011150 - H2S (Method 11).

†† 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 20 July 2021 in report 273924.

¶ Analysis performed by Australian Government National Measurement Institute, NATA accreditation number 198. Results were reported to Ektimo on 9 August 2021 in report DAU21_246.

Analysis (solid fluoride only) performed by Australian Laboratory Services Pty Ltd, NATA accreditation number 825. Results were reported to Ektimo on 27 July 2021 in report EN2106287.

d Excludes recovery study as specified in section 8.4.3 of USEPA Test Method 18.

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

6 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
APHA	American Public Health Association, Standard Methods for the Examination of Water and Waste Water
AS	Australian Standard
BSP	British standard pipe
CARB	Californian Air Resources Board
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
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 odorant(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}	Atmospheric suspended particulate matter having an equivalent aerodynamic diameter of less than approximately 10 microns (µm).
$PM_{2.5}$	Atmospheric suspended particulate matter having an equivalent aerodynamic diameter of less than approximately 2.5 microns (µm).
PSA	Particle size analysis
RATA	Relative accuracy test audit
Semi-quantified VOCs	Unknown VOCs (those not matching a standard compound), 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, unless otherwise specified.
TM	Test method
TOC	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.
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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