Ektimo

Visy Pulp and Paper, Tumut

Emission Testing Report - Q1 Testing

Report Number R013282-1

Document Information

Template Version 190722

Client Name:	Visy Pulp and Paper
Report Number:	R013282-1
Date of Issue:	29 July 2022
Attention:	Matthew O`Donovan
Address:	1302 Snowy Mountains Highway Tumut NSW 2720
Testing Laboratory:	Ektimo Pty Ltd, ABN 86 600 381 413

Report Authorisation

Aaron Davis
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.

Table of Contents

1 Executive Summary

1.1 Background

Ektimo was engaged by Visy Pulp and Paper to perform an odour monitoring survey at their Tumut facility. The program incorporated both point source and area source (flux hood) monitoring.

1.2 Project Objective

The objective of the project was to conduct a monitoring program to quantify emissions from multiple discharge points.

Monitoring was performed as follows:

Location	Test Date	Test Parameters*
EPA 1 – Main Stack 1 EPA 22 – Main Stack 2 Cooling Pond 3A Cooling Pond 3B Cooling Tower 1 (#1 Paper Machine Side) Cooling Tower 2 (#2 Paper Machine Side) Vacuum Pump 3 – (790 Couch) Vacuum Pump 7 – (794 First Bottom) Vacuum Pump 9 – (Paper Machine Hood Vent Exhaust) Vacuum Pump 10 – (Paper Machine Hood Vent Exhaust)	19 July 2022	Odour (duplicate)

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

All results are reported on a dry basis at STP (except odour wet – STP).

2 Results

2.1 EPA 1 – Main Stack 1

Date	19/07/2022	**Client**	Visy Pulp and Paper
Report	R013282-1	**Stack ID**	EPA 1 - Main Stack 1
Licence No.	10252	**Location**	Tumut
Ektimo Staff	Aaron Davis / Scott Woods	**State**	NSW
Process Conditions	Please refer to client records		*220701*

Sampling Plane Details	
Sampling plane dimensions	2660 mm
Sampling plane area	5.56 m²
Sampling port size, number	4" Flange (x2)
Access & height of ports	Lift & fixed ladder 90 m
Duct orientation & shape	Vertical Circular
Downstream disturbance	Exit 5 D
Upstream disturbance	Junction 20 D
No. traverses & points sampled	2 24
Sample plane conformance to AS 4323.1	Ideal sampling plane

Stack Parameters		
Moisture content, %v/v	23	
Gas molecular weight, g/g mole	27.8 (wet)	30.6 (dry)
Gas density at STP, kg/m³	1.24 (wet)	1.37 (dry)
Gas density at discharge conditions, kg/m³	0.70	
Gas Flow Parameters		
Flow measurement time(s) (hhmm)	1045 & 1115	
Temperature, °C	188	
Temperature, K	462	
Velocity at sampling plane, m/s	31	
Volumetric flow rate, actual, m³/s	170	
Volumetric flow rate (wet STP), m³/s	97	
Volumetric flow rate (dry STP), m³/s	75	
Mass flow rate (wet basis), kg/hour	430000	

Odour	Average		Test 1		Test 2	
Sampling time			1050 - 1100		1100 - 1110	
	Concentration ou	Odourant Flow Rate oum³/min	Concentration ou	Odourant Flow Rate oum³/min	Concentration ou	Odourant Flow Rate oum³/min
Results	990	5800000	1000	6000000	950	5600000
Lower uncertainty limit	780		730		670	
Upper uncertainty limit	1300		1500		1400	
Analysis date & time			20/07/22, 0950-1012		20/07/22, 0950-1012	
Holding time			23 hours		23 hours	
Dilution factor			1		1	
Bag material			Nalophan		Nalophan	
Butanol threshold (ppb)	52					
Laboratory temp (°C)	22					
Last calibration date	October 2021					

2.2 EPA 22 – Main Stack 2

Date	19/07/2022	**Client**	Visy Pulp and Paper
Report	R013282-1	**Stack ID**	EPA 22 - Main Stack 2
Licence No.	10252	**Location**	Tumut
Ektimo Staff	Aaron Davis / Scott Woods	**State**	NSW
Process Conditions	Please refer to client records		*220701*

Sampling Plane Details	
Sampling plane dimensions	2450 mm
Sampling plane area	4.71 m²
Sampling port size, number	4" Flange (x2)
Access & height of ports	Stairs 30 m
Duct orientation & shape	Vertical Circular
Downstream disturbance	Exit 10 D
Upstream disturbance	Junction 5 D
No. traverses & points sampled	2 20
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	20	
Gas molecular weight, g/g mole	27.8 (wet)	30.2 (dry)
Gas density at STP, kg/m³	1.24 (wet)	1.35 (dry)
Gas density at discharge conditions, kg/m³	0.72	
Gas Flow Parameters		
Flow measurement time(s) (hhmm)	1000 & 1030	
Temperature, °C	175	
Temperature, K	448	
Velocity at sampling plane, m/s	22	
Volumetric flow rate, actual, m³/s	100	
Volumetric flow rate (wet STP), m³/s	60	
Volumetric flow rate (dry STP), m³/s	48	
Mass flow rate (wet basis), kg/hour	270000	

Odour	Average		Test 1		Test 2	
Sampling time			1005 - 1010		1010 - 1020	
	Concentration ou	Odourant Flow Rate oum³/min	Concentration ou	Odourant Flow Rate oum³/min	Concentration ou	Odourant Flow Rate oum³/min
Results	920	3300000	880	3200000	950	3400000
Lower uncertainty limit	720		620		670	
Upper uncertainty limit	1200		1200		1400	
Analysis date & time			20/07/22, 1040-1255		20/07/22, 1040-1255	
Holding time			24 hours		24 hours	
Dilution factor			1		1	
Bag material			Nalophan		Nalophan	
Butanol threshold (ppb)	44					
Laboratory temp (°C)	24					
Last calibration date	October 2021					

2.3 Cooling Pond 3A

Client	Visy Pulp and Paper	**Test Location**	Cooling Pond 3A
Date	19/07/2022	**Plant/Site**	Tumut
Report No.	R013282-1		Tumut, NSW
Ektimo Staff	Scott Woods / Aaron Davis		***211014***

Test Location Details		
Location Description	Brown liquid, aerating, filling up	
Surface Description	Steamy and foamy	
Area Classification	Industrial	
Source dimensions (L x W), m	50 x 32	
Source area, m^2	1600	
Sampling Method	AS4323.4 (Flux)	
Sampling Results	Test 1	Test 2
Sampling time, hrs	0915 - 0925	0925 - 0935
Sample dilution	1	1
Odour concentration, ou	810	880
Average Odour Concentration, ou	**840**	
95% Confidence Interval	660 - 1100	
Odour Flux Rate, ou/m^2/min	**24**	
Odourant flow rate, oum³/min	**38000**	
Flux Testing Parameters		
Equilibration time, hrs	0850 - 0914	
Sweep Rate @ STP, L/min	3.58	
Penetration Depth, mm	10	
Static Pressure, Pa	10	
Surface temperature, °C	8	
Chamber temperature, °C	12	
Ambient temperature, °C	9	

2.4 Cooling Pond 3B

Client	Visy Pulp and Paper	**Test Location**	Cooling Pond 3B
Date	19/07/2022	**Plant/Site**	Tumut
Report No.	R013282-1		Tumut, NSW
Ektimo Staff	Scott Woods / Aaron Davis		*211014*

Test Location Details		
Location Description	Brown liquid, aerating, not filling up	
Surface Description	Generally clear, slightly cloudy	
Area Classification	Industrial	
Source dimensions (L x W), m	50 x 32	
Source area, m^2	1600	
Sampling Method	AS4323.4 (Flux)	
Sampling Results	Test 1	Test 2
Sampling time, hrs	0955 - 1005	1005 - 1015
Sample dilution	1	1
Odour concentration, ou	240	260
Average Odour Concentration, ou	**250**	
95% Confidence Interval	190 - 320	
Odour Flux Rate, ou/m^2/min	**6.9**	
Odourant flow rate, oum³/min	**11000**	
Flux Testing Parameters		
Equilibration time, hrs	0930 - 0954	
Sweep Rate @ STP, L/min	3.53	
Penetration Depth, mm	10	
Static Pressure, Pa	10	
Surface temperature, °C	9	
Chamber temperature, °C	14	
Ambient temperature, °C	10	

2.5 Cooling Tower 1 (#1 Paper Machine Side)

Date	19/07/2022	**Client**	Visy Pulp and Paper
Report	R013282-1	**Stack ID**	Cooling Tower 1 (#1 Paper Machine Side)
Licence No.	10252	**Location**	Tumut
Ektimo Staff	Aaron Davis / Scott Woods	**State**	NSW
Process Conditions	Please refer to client records		220701

Sampling Plane Details	
Sampling plane dimensions	Exit diameter could not be measured mm
Sampling plane area	NA
Sampling port size, number	Sampled at exit
Access & height of ports	Stairs 40 m
Duct orientation & shape	Vertical
Downstream disturbance	Exit 0 D
Upstream disturbance	Change in diameter 0 D
No. traverses & points sampled	1 1
Sample plane conformance to AS 4323.1	Non-conforming

Comments

Velocity and volumetric flowrate measurements could not be taken
The number of traverses 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
The stack or duct does not have the required number of access holes (ports)

Odour	Average	Test 1	Test 2
Sampling time		1125 - 1130	1130 - 1135
	Concentration ou	Concentration ou	Concentration ou
Results	710	680	740
Lower uncertainty limit	560	480	520
Upper uncertainty limit	910	960	1100
Analysis date & time		20/07/22, 1040-1255	20/07/22, 1040-1255
Holding time		23 hours	23 hours
Dilution factor		1	1
Bag material		Nalophan	Nalophan
Butanol threshold (ppb)	44		
Laboratory temp (°C)	24		
Last calibration date	October 2021		

2.6 Cooling Tower 2 (#2 Paper Machine Side)

Date	19/07/2022	**Client**	Visy Pulp and Paper
Report	R013282-1	**Stack ID**	Cooling Tower 2 (#2 Paper Machine Side)
Licence No.	10252	**Location**	Tumut
Ektimo Staff	Aaron Davis / Scott Woods	**State**	NSW
Process Conditions	Please refer to client records		220701

Sampling Plane Details	
Sampling plane dimensions	Exit diameter could not be measured mm
Sampling plane area	NA
Sampling port size, number	Sampled at exit
Access & height of ports	Stairs 40 m
Duct orientation & shape	Vertical
Downstream disturbance	Exit 0 D
Upstream disturbance	Change in diameter 0 D
No. traverses & points sampled	1 1
Sample plane conformance to AS 4323.1	Non-conforming

Comments

Velocity and volumetric flowrate measurements could not be taken
The number of traverses 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
The stack or duct does not have the required number of access holes (ports)

Odour	Average	Test 1	Test 2
Sampling time		1140 - 1145	1145 - 1150
	Concentration ou	Concentration ou	Concentration ou
Results	650	680	620
Lower uncertainty limit	510	480	440
Upper uncertainty limit	830	960	880
Analysis date & time		20/07/22, 1040-1255	20/07/22, 1040-1255
Holding time		23 hours	22 hours
Dilution factor		1	1
Bag material		Nalophan	Nalophan
Butanol threshold (ppb)	44		
Laboratory temp (°C)	24		
Last calibration date	October 2021		

2.7 Vacuum Pump 3 – (790 Couch)

Date	19/07/2022	**Client**	Visy Pulp and Paper
Report	R013282-1	**Stack ID**	Vacuum Pump 3 (790 Couch)
Licence No.	10252	**Location**	Tumut
Ektimo Staff	Aaron Davis / Scott Woods	**State**	NSW
Process Conditions	Please refer to client records		220701

Sampling Plane Details	
Sampling plane dimensions	1006 mm
Sampling plane area	0.795 m²
Sampling port size, number	Sampled at exit
Access & height of ports	Stairs 20 m
Duct orientation & shape	Vertical Circular
Downstream disturbance	Exit 0 D
Upstream disturbance	Exit 0 D
No. traverses & points sampled	1 1
Sample plane conformance to AS 4323.1	Non-conforming

Comments
The number of traverses sampled is less than the requirement
The number of points sampled is less than the requirement
The discharge is assumed to be composed of dry air and moisture
The gas temperature of the sampling plane is below the dew point

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)

Stack Parameters		
Moisture content, %v/v	13 (saturated)	
Gas molecular weight, g/g mole	27.5 (wet)	29.0 (dry)
Gas density at STP, kg/m³	1.23 (wet)	1.29 (dry)
Gas density at discharge conditions, kg/m³	0.99	
Gas Flow Parameters		
Flow measurement time(s) (hhmm)	1255	
Temperature, °C	51	
Temperature, K	324	
Velocity at sampling plane, m/s	7.6	
Volumetric flow rate, actual, m³/s	6	
Volumetric flow rate (wet STP), m³/s	4.8	
Volumetric flow rate (dry STP), m³/s	4.2	
Mass flow rate (wet basis), kg/hour	21000	

Odour	Average		Test 1		Test 2	
Sampling time			1300 - 1305		1305 - 1310	
	Concentration ou	Odourant Flow Rate oum³/min	Concentration ou	Odourant Flow Rate oum³/min	Concentration ou	Odourant Flow Rate oum³/min
Results	24000	7000000	26000	7700000	22000	6400000
Lower uncertainty limit	19000		19000		16000	
Upper uncertainty limit	31000		38000		31000	
Analysis date & time			20/07/22, 1040-1255		20/07/22, 1040-1255	
Holding time			21 hours		21 hours	
Dilution factor			5		5	
Bag material			Nalophan		Nalophan	
Butanol threshold (ppb)	44					
Laboratory temp (°C)	24					
Last calibration date	October 2021					

2.8 Vacuum Pump 7 – (794 First Bottom)

Date	19/07/2022	**Client**	Visy Pulp and Paper
Report	R013282-1	**Stack ID**	Vacuum Pump 7 (794 First Bottom)
Licence No.	10252	**Location**	Tumut
Ektimo Staff	Aaron Davis / Scott Woods	**State**	NSW
Process Conditions	Please refer to client records		220701

Sampling Plane Details	
Sampling plane dimensions	906 mm
Sampling plane area	0.645 m²
Sampling port size, number	Sampled at exit
Access & height of ports	Stairs 20 m
Duct orientation & shape	Vertical Circular
Downstream disturbance	Exit 0 D
Upstream disturbance	Exit 0 D
No. traverses & points sampled	1 1
Sample plane conformance to AS 4323.1	Non-conforming

Comments
The number of traverses sampled is less than the requirement
The number of points sampled is less than the requirement
The discharge is assumed to be composed of dry air and moisture
The gas temperature of the sampling plane is below the dew point

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)

Stack Parameters		
Moisture content, %v/v	12 (saturated)	
Gas molecular weight, g/g mole	27.6 (wet)	29.0 (dry)
Gas density at STP, kg/m³	1.23 (wet)	1.29 (dry)
Gas density at discharge conditions, kg/m³	1.00	
Gas Flow Parameters		
Flow measurement time(s) (hhmm)	1310	
Temperature, °C	49	
Temperature, K	322	
Velocity at sampling plane, m/s	7	
Volumetric flow rate, actual, m³/s	4.5	
Volumetric flow rate (wet STP), m³/s	3.7	
Volumetric flow rate (dry STP), m³/s	3.2	
Mass flow rate (wet basis), kg/hour	16000	

Odour	Average		Test 1		Test 2	
Sampling time			1315 - 1320		1320 - 1325	
	Concentration ou	Odourant Flow Rate oum³/min	Concentration ou	Odourant Flow Rate oum³/min	Concentration ou	Odourant Flow Rate oum³/min
Results	19000	4200000	20000	4400000	18000	4000000
Lower uncertainty limit	15000		14000		13000	
Upper uncertainty limit	25000		28000		26000	
Analysis date & time			20/07/22, 1040-1255		20/07/22, 1040-1255	
Holding time			21 hours		21 hours	
Dilution factor			5		5	
Bag material			Nalophan		Nalophan	
Butanol threshold (ppb)	44					
Laboratory temp (°C)	24					
Last calibration date	October 2021					

2.9 Vacuum Pump 9 – (Paper Machine Hood Vent Exhaust)

Date	19/07/2022	**Client**	Visy Pulp and Paper
Report	R013282-1	**Stack ID**	Vacuum Pump 9
Licence No.	10252	**Location**	Tumut
Ektimo Staff	Aaron Davis / Scott Woods	**State**	NSW
Process Conditions	Please refer to client records		220701

Sampling Plane Details	
Sampling plane dimensions	1500 x 1750 mm
Sampling plane area	2.63 m²
Sampling port size, number	Sampled at exit
Access & height of ports	Stairs 40 m
Duct orientation & shape	Horizontal Rectangular
Downstream disturbance	Exit 2 D
Upstream disturbance	Junction 0.1 D
No. traverses & points sampled	1 4
Sample plane conformance to AS 4323.1	Non-conforming

Comments
The number of traverses sampled is less than the requirement
The number of points sampled is less than the requirement
The discharge is assumed to be composed of dry air and moisture
The gas temperature of the sampling plane is below the dew point

The sampling plane is deemed to be non-conforming due to the following reasons:
The upstream disturbance is <2D from the sampling plane
The stack or duct does not have the required number of access holes (ports)
The sampling plane is too near to the downstream disturbance but is greater than or equal to 1D

Stack Parameters		
Moisture content, %v/v	24 (saturated)	
Gas molecular weight, g/g mole	26.3 (wet)	29.0 (dry)
Gas density at STP, kg/m³	1.18 (wet)	1.29 (dry)
Gas density at discharge conditions, kg/m³	0.91	
Gas Flow Parameters		
Flow measurement time(s) (hhmm)	1330	
Temperature, °C	63	
Temperature, K	336	
Velocity at sampling plane, m/s	8.2	
Volumetric flow rate, actual, m³/s	22	
Volumetric flow rate (wet STP), m³/s	17	
Volumetric flow rate (dry STP), m³/s	13	
Mass flow rate (wet basis), kg/hour	71000	

Odour	Average		Test 1		Test 2	
Sampling time			1335 - 1340		1340 - 1345	
	Concentration ou	Odourant Flow Rate oum³/min	Concentration ou	Odourant Flow Rate oum³/min	Concentration ou	Odourant Flow Rate oum³/min
Results	5000	5000000	4800	4800000	5200	5200000
Lower uncertainty limit	3900		3400		3600	
Upper uncertainty limit	6400		6800		7300	
Analysis date & time			20/07/22, 1040-1255		20/07/22, 1040-1255	
Holding time			21 hours		21 hours	
Dilution factor			5		5	
Bag material			Nalophan		Nalophan	
Butanol threshold (ppb)	44					
Laboratory temp (°C)	24					
Last calibration date	October 2021					

2.10 Vacuum Pump 10 – (Paper Machine Hood Vent Exhaust)

Date	19/07/2022	**Client**	Visy Pulp and Paper
Report	R013282-1	**Stack ID**	Vacuum Pump 10
Licence No.	10252	**Location**	Tumut
Ektimo Staff	Aaron Davis / Scott Woods	**State**	NSW
Process Conditions	Please refer to client records		220701

Sampling Plane Details	
Sampling plane dimensions	2450 x 3500 mm
Sampling plane area	8.58 m²
Sampling port size, number	Sampled at exit
Access & height of ports	Stairs 40 m
Duct orientation & shape	Vertical Rectangular
Downstream disturbance	Bend 2 D
Upstream disturbance	Bend 0.2 D
No. traverses & points sampled	5 25
Sample plane conformance to AS 4323.1	Non-conforming

Comments
The discharge is assumed to be composed of dry air and moisture
The gas temperature of the sampling plane is below the dew point

The sampling plane is deemed to be non-conforming due to the following reasons:
The upstream disturbance is <2D from the sampling plane
The sampling plane is too near to the downstream disturbance but is greater than or equal to 1D

Stack Parameters		
Moisture content, %v/v	8.5 (saturated)	
Gas molecular weight, g/g mole	28.0 (wet)	29.0 (dry)
Gas density at STP, kg/m³	1.25 (wet)	1.29 (dry)
Gas density at discharge conditions, kg/m³	1.03	
Gas Flow Parameters		
Flow measurement time(s) (hhmm)	1205	
Temperature, °C	42	
Temperature, K	315	
Velocity at sampling plane, m/s	3.5	
Volumetric flow rate, actual, m³/s	30	
Volumetric flow rate (wet STP), m³/s	25	
Volumetric flow rate (dry STP), m³/s	23	
Mass flow rate (wet basis), kg/hour	110000	

Odour	Average		Test 1		Test 2	
Sampling time			1210 - 1215		1215 - 1220	
	Concentration ou	Odourant Flow Rate oum³/min	Concentration ou	Odourant Flow Rate oum³/min	Concentration ou	Odourant Flow Rate oum³/min
Results	3000	4400000	2900	4300000	3100	4600000
Lower uncertainty limit	2300		2000		2200	
Upper uncertainty limit	3800		4000		4400	
Analysis date & time			20/07/22, 1040-1255		20/07/22, 1040-1255	
Holding time			22 hours		22 hours	
Dilution factor			5		5	
Bag material			Nalophan		Nalophan	
Butanol threshold (ppb)	44					
Laboratory temp (°C)	24					
Last calibration date	October 2021					

3 Plant Operating Conditions

See Visy Pulp and Paper records for complete process conditions.

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 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 Alt-Method 008)	NSW EPA TM-22 (USEPA Alt-Method 008)	19%	✓	✓
Odour	NSW EPA OM-7 (AS 4323.3)	NSW EPA OM-7 (AS 4323.3)	refer to results	✓	✓¥
Odour from diffuse sources	NSW EPA OM-8 (AS 4323.4)	NSW EPA OM-8 (AS 4323.4)	refer to results	✓	✓¥

220727

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

¥ Odour analysis conducted at the NSW laboratory by forced choice olfactometry, NATA accreditation number 14601. Results were reported on.
14 July 2022 in report ON-00149.
20 July 2022 in report ON-00151.

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 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

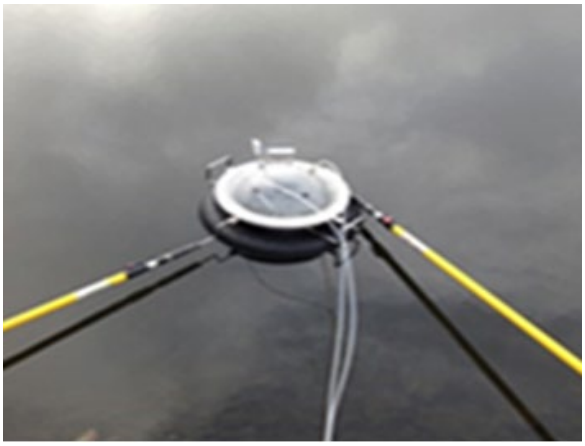
The following symbols and abbreviations may be used in this test report:

% v/v	Volume to volume ratio, dry or wet basis
~	Approximately
<	Less than
>	Greater than
≥	Greater than or equal to
AS	Australian Standard
BSP	British standard pipe
CARB	Californian Air Resources Board
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
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.
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
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
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.

7 Appendix 1: Site Photos

EPA 1 - Main Stack 1

EPA 22 – Main Stack 2



Cooling Pond 3A

Cooling Pond 3B

Cooling Tower (#1 Paper Machine Side)

Cooling Tower (#2 Paper Machine Side)

Vacuum Pump 3 – (790 Couch)

Vacuum Pump 7 – (794 First Bottom)

Vacuum Pump 9 (Paper Machine Hood Vent Exhaust)

Vacuum Pump 10 (Paper Machine Hood Vent Exhaust)

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

Ektimo

Visy Pulp and Paper, Tumut

Emission Testing Report – Q3 Testing (Odour)

Report Number R014339-1r

Document Information

Template Version 130223

Client Name:	Visy Pulp and Paper
Report Number:	R014339-1r
Date of Issue:	21 April 2023
Attention:	Matthew O`Donovan
Address:	1302 Snowy Mountains Highway Tumut NSW 2720
Testing Laboratory:	Ektimo Pty Ltd, ABN 86 600 381 413

Amendment Record

Original Document Number	Initiator	Original Report Date	Section (s)	Reason for revision
R014339-1	Ektimo	30 March 2023	2. Results (page 5) 7 Appendix 1: Site photos (page 17)	Additional sampling location added.

Report Authorisation

Aaron Davis
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.

Table of Contents

1 Executive Summary

1.1 Background

Ektimo was engaged by Visy Pulp and Paper to perform an odour monitoring survey at their Tumut facility. The program incorporated both point source and area source (flux hood) monitoring.

1.2 Project Objective & Overview

The objective of the project was to conduct a monitoring program to quantify emissions from multiple discharge points.

Monitoring was performed as follows:

Location	Test Date	Test Parameters*
EPA 1 – Main Stack 1	30 March 2023	Odour (duplicate)
EPA 22 – Main Stack 2 Cooling Pond 3A Cooling Pond 3B Cooling Tower 1 (#1 Paper Machine Side) Cooling Tower 2 (#2 Paper Machine Side) Vacuum Pump 3 – (790 Couch) Vacuum Pump 7 – (794 First Bottom) Vacuum Pump 9 – (Paper Machine Hood Vent Exhaust) Vacuum Pump 10 – (Paper Machine Hood Vent Exhaust)	23 February 2023	

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

All results are reported on a dry basis at STP (except odour wet – STP).

2 Results

2.1 EPA 1 – Main Stack 1

Date	30/03/2023	**Client**	Visy Pulp and Paper
Report	R014339	**Stack ID**	EPA 1 - Main Stack 1
Licence No.	10232	**Location**	Tumut
Ektimo Staff	Aaron Davis/Ahmad Ramiz	**State**	NSW
Process Conditions	Please refer to client records.		230328

Sampling Plane Details	
Sampling plane dimensions	2660 mm
Sampling plane area	5.56 m²
Sampling port size, number	4" Flange (x2)
Duct orientation & shape	Vertical Circular
Downstream disturbance	Exit 5 D
Upstream disturbance	Junction 20 D
No. traverses & points sampled	2 24
Sample plane conformance to AS 4323.1	Ideal sampling plane

Stack Parameters		
Moisture content, %v/v	22	
Gas molecular weight, g/g mole	27.8 (wet)	30.7 (dry)
Gas density at STP, kg/m³	1.24 (wet)	1.37 (dry)
Gas density at discharge conditions, kg/m³	0.69	
% Oxygen correction & Factor	8 %	0.82
Gas Flow Parameters		
Flow measurement time(s) (hhmm)	1025 & 1235	
Temperature, °C	189	
Temperature, K	462	
Velocity at sampling plane, m/s	27	
Volumetric flow rate, actual, m³/s	150	
Volumetric flow rate (wet STP), m³/s	84	
Volumetric flow rate (dry STP), m³/s	65	
Mass flow rate (wet basis), kg/hour	380000	

Odour	Average		Test 1		Test 2	
Sampling time			1110 - 1120		1135 - 1145	
	Concentration ou	Odourant Flow Rate oum³/min	Concentration ou	Odourant Flow Rate oum³/min	Concentration ou	Odourant Flow Rate oum³/min
Results	790	4000000	790	4000000	790	4000000
Lower uncertainty limit	640		580		580	
Upper uncertainty limit	980		1100		1100	
Analysis date & time			31/03/23, 1000 - 1145		31/03/23, 1000 - 1145	
Holding time			23 hours		23 hours	
Dilution factor			1		1	
Bag material			Nalophan		Nalophan	
Butanol threshold (ppb)	53					
Laboratory temp (°C)	22					
Last calibration date	October 2022					

2.2 EPA 22 – Main Stack 2

Date	23/02/2023	**Client**	Visy Pulp and Paper
Report	R014339-1	**Stack ID**	EPA 22 - Main Stack 2
Licence No.	10232	**Location**	Tumut
Ektimo Staff	Zoe Parker / Aaron Davis	**State**	NSW
Process Conditions	Please refer to client records		*230220*

Sampling Plane Details	
Sampling plane dimensions	2450 mm
Sampling plane area	4.71 m²
Sampling port size, number	4" Flange (x2)
Duct orientation & shape	Vertical Circular
Downstream disturbance	Exit 10 D
Upstream disturbance	Junction 5 D
No. traverses & points sampled	2 20
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	21	
Gas molecular weight, g/g mole	28.0 (wet)	30.7 (dry)
Gas density at STP, kg/m³	1.25 (wet)	1.37 (dry)
Gas density at discharge conditions, kg/m³	0.74	
Gas Flow Parameters		
Flow measurement time(s) (hhmm)	1005 & 1035	
Temperature, °C	172	
Temperature, K	446	
Velocity at sampling plane, m/s	21	
Volumetric flow rate, actual, m³/s	97	
Volumetric flow rate (wet STP), m³/s	58	
Volumetric flow rate (dry STP), m³/s	45	
Mass flow rate (wet basis), kg/hour	260000	

Odour	Average		Test 1		Test 2	
Sampling time			1010 - 1020		1021 - 1031	
	Concentration ou	Odourant Flow Rate oum³/min	Concentration ou	Odourant Flow Rate oum³/min	Concentration ou	Odourant Flow Rate oum³/min
Results	1400	4900000	1200	4200000	1600	5500000
Lower uncertainty limit	1100		910		1200	
Upper uncertainty limit	1700		1700		2200	
Analysis date & time			24/02/23, 1000-1230		24/02/23, 1000-1230	
Holding time			24 hours		24 hours	
Dilution factor			1		1	
Bag material			Nalophan		Nalophan	
Butanol threshold (ppb)	58					
Laboratory temp (°C)	23					
Last calibration date	October 2022					

2.3 Cooling Pond 3A

Client	Visy Pulp and Paper	**Test Location**	Cooling Pond 3A
Date	23/02/2023	**Plant/Site**	Tumut
Report No.	R014339-1		Tumut, NSW
Ektimo Staff	Zoe Parker / Aaron Davis		***220907***

Test Location Details			
Location Description	Green/brown murky liquid, filling up		
Surface Description	Cloudy surface		
Area Classification	Industrial		
Source dimensions (L x W), m	50 x 32		
Source area, m^2	1600		
Sampling Method	AS4323.4 (Flux)		
Odour	Test 1		Test 2
Sampling time, hrs	0845 - 0855		0856 - 0906
Sample dilution	1		1
Concentration, ou	360		260
Average concentration, ou	**310**		
95% Confidence Interval	250 - 380		
Flux Emission Rate, ou.m^3/m^2/min	**11**		
Total area source emission rate, ou.m^3/min	**17000**		
Flux Testing Parameters			
Equilibration time, hrs	0820 - 0844		
Sweep Rate @ STP, L/min	4.36		
Penetration Depth, mm	10		
Static Pressure, Pa	20		
Surface temperature, °C	18		
Chamber temperature, °C	23		
Ambient temperature, °C	19		

2.4 Cooling Pond 3B

Client	Visy Pulp and Paper	**Test Location**	Cooling Pond 3B
Date	23/02/2023	**Plant/Site**	Tumut
Report No.	R014339-1		Tumut, NSW
Ektimo Staff	Zoe Parker / Aaron Davis		***220907***

Test Location Details			
Location Description	Green murky liquid, not filling up		
Surface Description	Cloudy surface		
Area Classification	Industrial		
Source dimensions (L x W), m	50 x 32		
Source area, m^2	1600		
Sampling Method	AS4323.4 (Flux)		
Odour	Test 1		Test 2
Sampling time, hrs	0935 - 0945		0946 - 0956
Sample dilution	1		1
Concentration, ou	240		260
Average concentration, ou	**250**		
95% Confidence Interval	200 - 300		
Flux Emission Rate, ou.m^3/m^2/min	**8.6**		
Total area source emission rate, ou.m^3/min	**14000**		
Flux Testing Parameters			
Equilibration time, hrs	0910 - 0935		
Sweep Rate @ STP, L/min	4.42		
Penetration Depth, mm	10		
Static Pressure, Pa	10		
Surface temperature, °C	20		
Chamber temperature, °C	25		
Ambient temperature, °C	21		

2.5 Cooling Tower 1 (#1 Paper Machine Side)

Date	23/02/2023	**Client**	Visy Pulp and Paper
Report	R014339-1	**Stack ID**	Cooling Tower 1 (#1 Paper Machine Side)
Licence No.	10252	**Location**	Tumut
Ektimo Staff	Zoe Parker / Aaron Davis	**State**	NSW
Process Conditions	Please refer to client records.		230316

Sampling Plane Details	
Sampling plane dimensions	Exit diameter could not be measured mm
Sampling plane area	NA
Sampling port size, number	Sampled at exit
Duct orientation & shape	Vertical
Downstream disturbance	Exit 0 D
Upstream disturbance	Change in diameter 0 D
No. traverses & points sampled	1 1
Sample plane conformance to AS 4323.1	Non-conforming

Comments
Velocity and volumetric flowrate measurements could not be taken
The number of traverses 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
The stack or duct does not have the required number of access holes (ports)

Odour	Average	Test 1	Test 2
Sampling time		1003 - 1014	1015 - 1024
	Concentration ou	Concentration ou	Concentration ou
Results	790	790	790
Lower uncertainty limit	640	580	580
Upper uncertainty limit	980	1100	1100
Analysis date & time		24/02/23, 1000-1230	24/02/23, 1000-1230
Holding time		24 hours	24 hours
Dilution factor		1	1
Bag material		Nalophan	Nalophan
Butanol threshold (ppb)	58		
Laboratory temp (°C)	23		
Last calibration date	October 2022		

2.6 Cooling Tower 2 (#2 Paper Machine Side)

Date	23/02/2023	**Client**	Visy Pulp and Paper
Report	R014339-1	**Stack ID**	Cooling Tower 2 (#2 Paper Machine Side)
Licence No.	10252	**Location**	Tumut
Ektimo Staff	Zoe Parker / Aaron Davis	**State**	NSW
Process Conditions	Please refer to client records.		230316

Sampling Plane Details	
Sampling plane dimensions	Exit diameter could not be measured mm
Sampling plane area	NA
Sampling port size, number	Sampled at exit
Duct orientation & shape	Vertical
Downstream disturbance	Exit 0 D
Upstream disturbance	Change in diameter 0 D
No. traverses & points sampled	1 1
Sample plane conformance to AS 4323.1	Non-conforming

Comments
Velocity and volumetric flowrate measurements could not be taken
The number of traverses 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
The stack or duct does not have the required number of access holes (ports)

Odour	Average	Test 1	Test 2
Sampling time		1026 - 1035	1036 - 1045
	Concentration ou	Concentration ou	Concentration ou
Results	1000	1000	1000
Lower uncertainty limit	830	760	760
Upper uncertainty limit	1300	1400	1400
Analysis date & time		24/02/23, 1000-1230	24/02/23, 1000-1230
Holding time		24 hours	24 hours
Dilution factor		1	1
Bag material		Nalophan	Nalophan
Butanol threshold (ppb)	58		
Laboratory temp (°C)	23		
Last calibration date	October 2022		

2.7 Vacuum Pump 3 – (790 Couch)

Date	23/02/2023	**Client**	Visy Pulp and Paper
Report	R014339-1	**Stack ID**	Vacuum Pump 3 (790 Couch)
Licence No.	10252	**Location**	Tumut
Ektimo Staff	Zoe Parker / Aaron Davis	**State**	NSW
Process Conditions	Please refer to client records.		*230316*

Sampling Plane Details	
Sampling plane dimensions	1006 mm
Sampling plane area	0.795 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	1 1
Sample plane conformance to AS 4323.1	Non-conforming

Comments

The number of traverses sampled is less than the requirement
The number of points sampled is less than the requirement
The discharge is assumed to be composed of dry air and moisture
The gas temperature of the sampling plane is below the dew point

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)

Stack Parameters		
Moisture content, %v/v	14 (saturated)	
Gas molecular weight, g/g mole	27.4 (wet)	29.0 (dry)
Gas density at STP, kg/m^3	1.22 (wet)	1.29 (dry)
Gas density at discharge conditions, kg/m^3	0.99	
Gas Flow Parameters		
Flow measurement time(s) (hhmm)	1155 & 1205	
Temperature, °C	52	
Temperature, K	325	
Velocity at sampling plane, m/s	7.7	
Volumetric flow rate, actual, m^3/s	6.1	
Volumetric flow rate (wet STP), m^3/s	5	
Volumetric flow rate (dry STP), m^3/s	4.3	
Mass flow rate (wet basis), kg/hour	22000	

Odour	Average		Test 1		Test 2	
Sampling time			1156 - 1158		1200 - 1202	
	Concentration ou	Odourant Flow Rate oum^3/min	Concentration ou	Odourant Flow Rate oum^3/min	Concentration ou	Odourant Flow Rate oum^3/min
Results	4800	1400000	5600	1700000	3900	1200000
Lower uncertainty limit	3900		4200		2900	
Upper uncertainty limit	5900		7600		5300	
Analysis date & time			24/02/23, 1000-1230		24/02/23, 1000-1230	
Holding time			22 hours		22 hours	
Dilution factor			5		5	
Bag material			Nalophan		Nalophan	
Butanol threshold (ppb)	58					
Laboratory temp (°C)	23					
Last calibration date	October 2022					

2.8 Vacuum Pump 7 – (794 First Bottom)

Date	23/02/2023	**Client**	Visy Pulp and Paper
Report	R014339-1	**Stack ID**	Vacuum Pump 7 (794 First Bottom)
Licence No.	10252	**Location**	Tumut
Ektimo Staff	Zoe Parker / Aaron Davis	**State**	NSW
Process Conditions	Please refer to client records.		230316

Sampling Plane Details	
Sampling plane dimensions	906 mm
Sampling plane area	0.645 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	1 1
Sample plane conformance to AS 4323.1	Non-conforming

Comments

The number of traverses sampled is less than the requirement
The number of points sampled is less than the requirement
The discharge is assumed to be composed of dry air and moisture
The gas temperature of the sampling plane is below the dew point

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)

Stack Parameters		
Moisture content, %v/v	13 (saturated)	
Gas molecular weight, g/g mole	27.6 (wet)	29.0 (dry)
Gas density at STP, kg/m^3	1.23 (wet)	1.29 (dry)
Gas density at discharge conditions, kg/m^3	1.00	
Gas Flow Parameters		
Flow measurement time(s) (hhmm)	1205 & 1215	
Temperature, °C	50	
Temperature, K	323	
Velocity at sampling plane, m/s	6.9	
Volumetric flow rate, actual, m^3/s	4.5	
Volumetric flow rate (wet STP), m^3/s	3.6	
Volumetric flow rate (dry STP), m^3/s	3.2	
Mass flow rate (wet basis), kg/hour	16000	

Odour	Average		Test 1		Test 2	
Sampling time			1206 - 1208		1209 - 1211	
	Concentration ou	Odourant Flow Rate oum^3/min	Concentration ou	Odourant Flow Rate oum^3/min	Concentration ou	Odourant Flow Rate oum^3/min
Results	4600	1000000	5600	1200000	3600	790000
Lower uncertainty limit	3700		4200		2700	
Upper uncertainty limit	5700		7600		4900	
Analysis date & time			24/02/23, 1000-1230		24/02/23, 1000-1230	
Holding time			22 hours		22 hours	
Dilution factor			5		5	
Bag material			Nalophan		Nalophan	
Butanol threshold (ppb)	58					
Laboratory temp (°C)	23					
Last calibration date	October 2022					

2.9 *Vacuum Pump 9 – (Paper Machine Hood Vent Exhaust)*

Date	23/02/2023	**Client**	Visy Pulp and Paper
Report	R014339-1	**Stack ID**	Vacuum Pump 9
Licence No.	10252	**Location**	Tumut
Ektimo Staff	Zoe Parker / Aaron Davis	**State**	NSW
Process Conditions	Please refer to client records.		*230316*

Sampling Plane Details	
Sampling plane dimensions	1500 x 1750 mm
Sampling plane area	2.63 m^2
Sampling port size, number	Sampled at exit
Duct orientation & shape	Horizontal Rectangular
Downstream disturbance	Exit 2 D
Upstream disturbance	Junction 0.1 D
No. traverses & points sampled	1 1
Sample plane conformance to AS 4323.1	Non-conforming

Comments

The number of traverses sampled is less than the requirement
The number of points sampled is less than the requirement
The discharge is assumed to be composed of dry air and moisture
The gas temperature of the sampling plane is below the dew point

The sampling plane is deemed to be non-conforming due to the following reasons:
The upstream disturbance is <2D from the sampling plane
The stack or duct does not have the required number of access holes (ports)
The sampling plane is too near to the downstream disturbance but is greater than or equal to 1D

Stack Parameters		
Moisture content, %v/v	23 (saturated)	
Gas molecular weight, g/g mole	26.4 (wet)	29.0 (dry)
Gas density at STP, kg/m^3	1.18 (wet)	1.29 (dry)
Gas density at discharge conditions, kg/m^3	0.92	
Gas Flow Parameters		
Flow measurement time(s) (hhmm)	1155 & 1210	
Temperature, °C	63	
Temperature, K	336	
Velocity at sampling plane, m/s	8.3	
Volumetric flow rate, actual, m^3/s	22	
Volumetric flow rate (wet STP), m^3/s	17	
Volumetric flow rate (dry STP), m^3/s	13	
Mass flow rate (wet basis), kg/hour	72000	

Odour	Average		Test 1		Test 2	
Sampling time			1200 - 1202		1204 - 1206	
	Concentration ou	Odourant Flow Rate oum^3/min	Concentration ou	Odourant Flow Rate oum^3/min	Concentration ou	Odourant Flow Rate oum^3/min
Results	2700	2800000	2100	2200000	3300	3400000
Lower uncertainty limit	2200		1600		2500	
Upper uncertainty limit	3400		2900		4500	
Analysis date & time			24/02/23, 1000-1230		24/02/23, 1000-1230	
Holding time			22 hours		22 hours	
Dilution factor			5		5	
Bag material			Nalophan		Nalophan	
Butanol threshold (ppb)	58					
Laboratory temp (°C)	23					
Last calibration date	October 2022					

2.10 Vacuum Pump 10 – (Paper Machine Hood Vent Exhaust)

Date	23/02/2023	**Client**	Visy Pulp and Paper
Report	R014339-1	**Stack ID**	Vacuum Pump 10
Licence No.	10252	**Location**	Tumut
Ektimo Staff	Zoe Parker / Aaron Davis	**State**	NSW
Process Conditions	Please refer to client records.		*230316*

Sampling Plane Details	
Sampling plane dimensions	2450 x 3500 mm
Sampling plane area	8.58 m^2
Sampling port size, number	Sampled at exit
Duct orientation & shape	Vertical Rectangular
Downstream disturbance	Bend 2 D
Upstream disturbance	Bend 0.2 D
No. traverses & points sampled	5 25
Sample plane conformance to AS 4323.1	Non-conforming

Comments
The discharge is assumed to be composed of dry air and moisture
The gas temperature of the sampling plane is below the dew point

The sampling plane is deemed to be non-conforming due to the following reasons:
The upstream disturbance is <2D from the sampling plane
The sampling plane is too near to the downstream disturbance but is greater than or equal to 1D

Stack Parameters		
Moisture content, %v/v	8.7 (saturated)	
Gas molecular weight, g/g mole	28.0 (wet)	29.0 (dry)
Gas density at STP, kg/m^3	1.25 (wet)	1.29 (dry)
Gas density at discharge conditions, kg/m^3	1.04	
Gas Flow Parameters		
Flow measurement time(s) (hhmm)	1240 & 1250	
Temperature, °C	43	
Temperature, K	316	
Velocity at sampling plane, m/s	3.6	
Volumetric flow rate, actual, m^3/s	31	
Volumetric flow rate (wet STP), m^3/s	25	
Volumetric flow rate (dry STP), m^3/s	23	
Mass flow rate (wet basis), kg/hour	110000	

Odour	Average		Test 1		Test 2	
Sampling time			1242 - 1244		1245 - 1247	
	Concentration ou	Odourant Flow Rate oum^3/min	Concentration ou	Odourant Flow Rate oum^3/min	Concentration ou	Odourant Flow Rate oum^3/min
Results	4200	6400000	2800	4300000	5600	8600000
Lower uncertainty limit	3400		2100		4200	
Upper uncertainty limit	5200		3800		7600	
Analysis date & time			24/02/23, 1000-1230		24/02/23, 1000-1230	
Holding time			22 hours		22 hours	
Dilution factor			5		5	
Bag material			Nalophan		Nalophan	
Butanol threshold (ppb)	58					
Laboratory temp (°C)	23					
Last calibration date	October 2022					

3 Plant Operating Conditions

See Visy Pulp and Paper records for complete process conditions.

From information received from the site operator, unless otherwise noted it is our understanding that samples were collected during normal plant operations. Unless otherwise noted all samples were collected in compliance with Ektimo's QA/QC standards.

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%	✓	✓
Odour	NSW EPA OM-7 (AS 4323.3)	NSW EPA OM-7 (AS 4323.3)	refer to results	✓	✓¥
Odour from diffuse sources	NSW EPA OM-8 (AS 4323.4)	NSW EPA OM-8 (AS 4323.4)	refer to results	✓	✓¥

230320

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

¥ Odour analysis conducted at the Ektimo NSW EPA laboratory by forced choice olfactometry. Results were reported to Ektimo on:

- 24 February 2023 in report ON-00184.
- 31 March 2023 in report ON-00195.

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 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

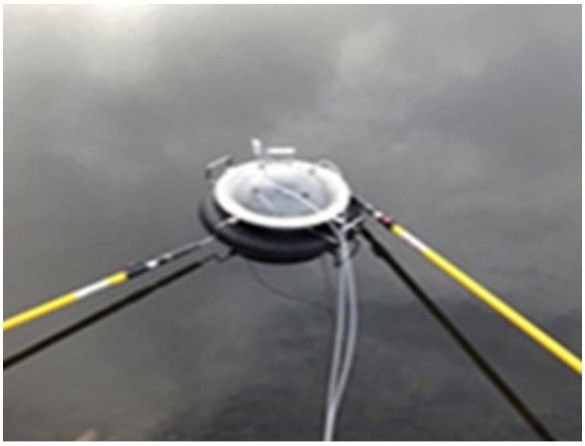
The following symbols and abbreviations may be used in this test report:

% v/v	Volume to volume ratio, dry or wet basis
~	Approximately
<	Less than
>	Greater than
≥	Greater than or equal to
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
FTIR	Fourier transform infra-red
ISO	International Organisation for Standardisation
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 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.
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
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.

7 Appendix 1: Site Photos

EPA 1 - Main Stack 1

EPA 22 – Main Stack 2



Cooling Pond 3A

Cooling Pond 3B

Cooling Tower (#1 Paper Machine Side)

Cooling Tower (#2 Paper Machine Side)

Vacuum Pump 3 – (790 Couch)

Vacuum Pump 7 – (794 First Bottom)

Vacuum Pump 9 (Paper Machine Hood Vent Exhaust)

Vacuum Pump 10 (Paper Machine Hood Vent Exhaust)

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