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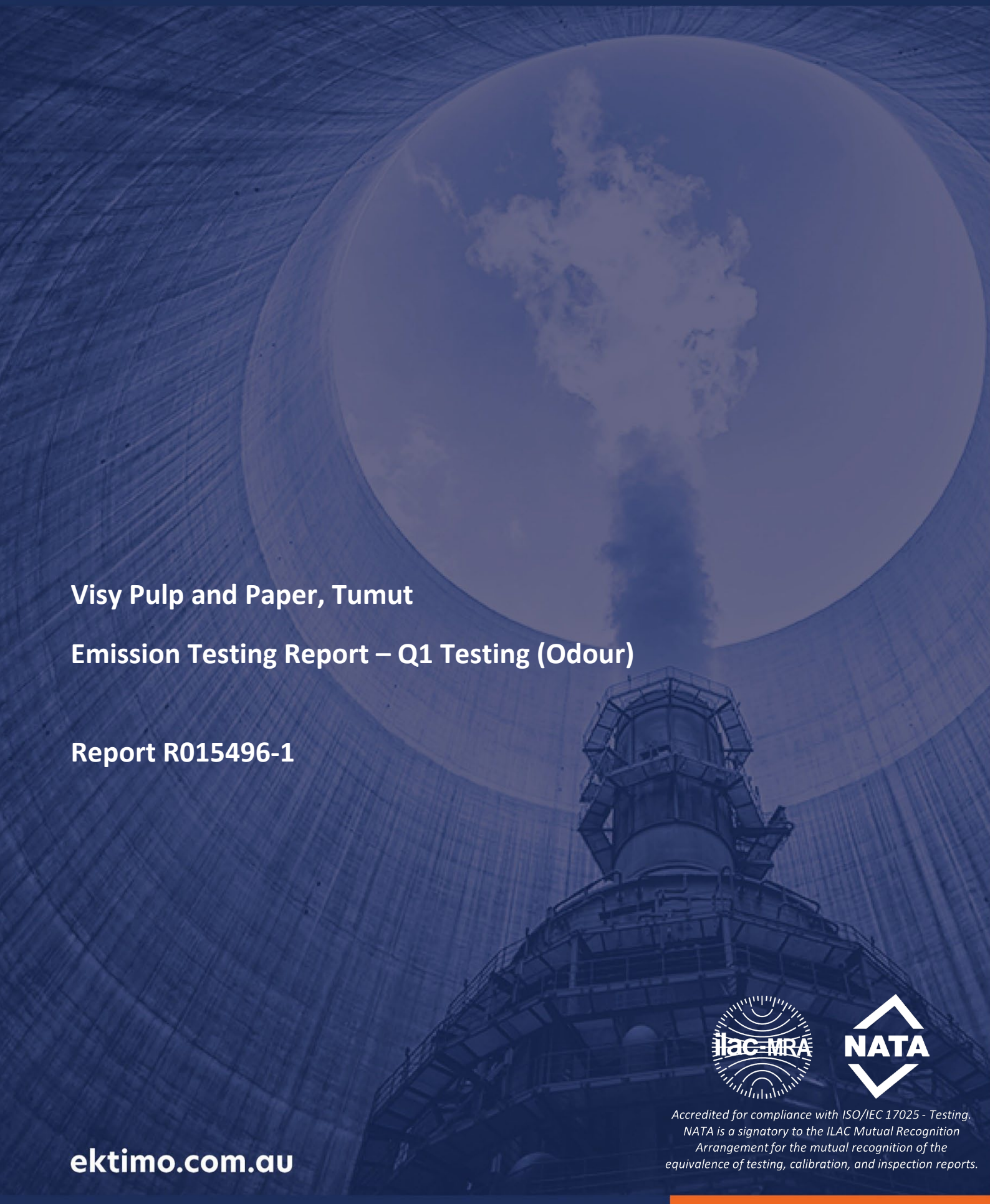

Visy Pulp and Paper, Tumut

Emission Testing Report – Q1 Testing (Odour)

Report R015496-1

Ektimo

Document Information

Client Name:	Visy Pulp and Paper
Report Number:	R015496-1
Date of Issue:	6 September 2023
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
Operations Manager

NATA Accredited Laboratory
No. 14601

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

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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	16 August 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)		

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

** Access to sampling locations was unavailable due to safety concerns.

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

Note that odour sampling and analysis is typically conducted on emissions from Cooling Tower 1 and 2 (Paper Machine Side). On this occasion monitoring could not be performed due to temporary restricted access to the sampling locations.

2 Results

2.1 EPA 1 – Main Stack 1

Date	16/08/2023	**Client**	Visy Pulp and Paper
Report	R015496	**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		*230814*

Stack Parameters		
Moisture content, %v/v	21	
Gas molecular weight, g/g mole	28.0 (wet)	30.8 (dry)
Gas density at STP, kg/m³	1.25 (wet)	1.37 (dry)
Gas density at discharge conditions, kg/m³	0.70	
Gas Flow Parameters		
Flow measurement time(s) (hhmm)	0930	
Temperature, °C	196	
Temperature, K	469	
Velocity at sampling plane, m/s	30	
Volumetric flow rate, actual, m³/s	160	
Volumetric flow rate (wet STP), m³/s	92	
Volumetric flow rate (dry STP), m³/s	72	
Mass flow rate (wet basis), kg/h	410000	

Odour	Average		Test 1		Test 2	
Sampling time			0935 - 0940		0942 - 0952	
	Concentration	Odourant Flow Rate	Concentration	Odourant Flow Rate	Concentration	Odourant Flow Rate
	ou	ou.m³/min	ou	ou.m³/min	ou	ou.m³/min
Results	1100	5900000	1100	6200000	1000	5700000
Lower uncertainty limit	860		830		760	
Upper uncertainty limit	1300		1500		1400	
Analysis date & time			17/08/23, 1000 - 1245		17/08/23, 1000 - 1245	
Holding time			25 hours		24 hours	
Dilution factor			1		1	
Bag material			Nalophan		Nalophan	
Butanol threshold (ppb)	58					
Laboratory temp (°C)	22					
Last calibration date	October 2022					

2.2 EPA 22 – Main Stack 2

Date	16/08/2023	**Client**	Visy Pulp and Paper
Report	R015496	**Stack ID**	EPA 22 - Main Stack 2
Licence No.	10232	**Location**	Tumut
Ektimo Staff	Aaron Davis / Ahmad Ramiz	**State**	NSW
Process Conditions	Please refer to client records		*230814*

Stack Parameters		
Moisture content, %v/v	19	
Gas molecular weight, g/g mole	28.2 (wet)	30.7 (dry)
Gas density at STP, kg/m³	1.26 (wet)	1.37 (dry)
Gas density at discharge conditions, kg/m³	0.73	
Gas Flow Parameters		
Flow measurement time(s) (hhmm)	0830	
Temperature, °C	179	
Temperature, K	452	
Velocity at sampling plane, m/s	22	
Volumetric flow rate, actual, m³/s	100	
Volumetric flow rate (wet STP), m³/s	59	
Volumetric flow rate (dry STP), m³/s	48	
Mass flow rate (wet basis), kg/h	270000	

Odour	Average		Test 1		Test 2	
Sampling time			0835 - 0845		0847 - 0857	
	Concentration ou	Odourant Flow Rate ou.m³/min	Concentration ou	Odourant Flow Rate ou.m³/min	Concentration ou	Odourant Flow Rate ou.m³/min
Results	590	2100000	660	2400000	510	1800000
Lower uncertainty limit	470		490		380	
Upper uncertainty limit	730		900		690	
Analysis date & time			17/08/23, 1000 - 1245		17/08/23, 1000 - 1245	
Holding time			26 hours		25 hours	
Dilution factor			1		1	
Bag material			Nalophan		Nalophan	
Butanol threshold (ppb)	58					
Laboratory temp (°C)	22					
Last calibration date	October 2022					

2.3 Cooling Pond 3A

Client	Visy Pulp and Paper	**Test Location**	Cooling Pond 3A	
Date	16/08/2023	**Plant/Site**	Tumut	
Report No.	R015496		Tumut, NSW	
Ektimo Staff	Aaron Davis / Ahmad Ramiz			***220907***
Test Location Details				
Location Description		Blackish, brown murky liquid, not filling		
Surface Description		Clear surface, aerating		
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		0855 - 0905	0905 - 0915	
Sample dilution		1	1	
Concentration, ou		44	<30	
Average concentration, ou		**≤39**		
95% Confidence Interval		31 - 49		
Flux Emission Rate, ou.m^3/m^2/min		**≤1.4**		
Total area source emission rate, ou.m^3/min		**≤2300**		
Flux Testing Parameters				
Equilibration time, hrs		0830 - 0854		
Sweep Rate @ STP, L/min		4.67		
Penetration Depth, mm		10		
Static Pressure, Pa		10		
Surface temperature, °C		10		
Chamber temperature, °C		13		
Ambient temperature, °C		10		

2.4 Cooling Pond 3B

Client	Visy Pulp and Paper	**Test Location**	Cooling Pond 3B	
Date	16/08/2023	**Plant/Site**	Tumut	
Report No.	R015496		Tumut, NSW	
Ektimo Staff	Aaron Davis / Ahmad Ramiz			***220907***
Test Location Details				
Location Description		Brown murky liquid, filling up		
Surface Description		Foamy, white		
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		0942 - 0952	0952 - 1002	
Sample dilution		1	1	
Concentration, ou		81	63	
Average concentration, ou		**72**		
95% Confidence Interval		58 - 90		
Flux Emission Rate, ou.m^3/m^2/min		**2.6**		
Total area source emission rate, ou.m^3/min		**4200**		
Flux Testing Parameters				
Equilibration time, hrs		0918 - 0942		
Sweep Rate @ STP, L/min		4.58		
Penetration Depth, mm		10		
Static Pressure, Pa		20		
Surface temperature, °C		14		
Chamber temperature, °C		17		
Ambient temperature, °C		13		

2.5 Vacuum Pump 3 – (790 Couch)

Date	16/08/2023	**Client**	Visy Pulp and Paper
Report	R015496	**Stack ID**	Vacuum Pump 3 (790 Couch)
Licence No.	10232	**Location**	Tumut
Ektimo Staff	Aaron Davis / Ahmad Ramiz	**State**	NSW
Process Conditions	Please refer to client records.		*230825*

Comments
The discharge is assumed to be composed of dry air and moisture

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/m³	1.23 (wet)	1.29 (dry)
Gas density at discharge conditions, kg/m³	1.00	
Gas Flow Parameters		
Flow measurement time(s) (hhmm)	1255	
Temperature, °C	50	
Temperature, K	323	
Velocity at sampling plane, m/s	7.5	
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/h	21000	

Odour	Average		Test 1		Test 2	
Sampling time			1300 - 1302		1305 - 1307	
	Concentration	Odourant Flow Rate	Concentration	Odourant Flow Rate	Concentration	Odourant Flow Rate
	ou	ou.m³/min	ou	ou.m³/min	ou	ou.m³/min
Results	9500	2800000	12000	3600000	6700	1900000
Lower uncertainty limit	7700		9100		4900	
Upper uncertainty limit	12000		17000		9100	
Analysis date & time			17/08/23, 1000 - 1245		17/08/23, 1000 - 1245	
Holding time			21 hours		21 hours	
Dilution factor			5		5	
Bag material			Nalophan		Nalophan	
Butanol threshold (ppb)	58					
Laboratory temp (°C)	22					
Last calibration date	October 2022					

2.6 Vacuum Pump 7 – (794 First Bottom)

Date	16/08/2023	**Client**	Visy Pulp and Paper
Report	R015496	**Stack ID**	Vacuum Pump 7 (794 First Bottom)
Licence No.	10232	**Location**	Tumut
Ektimo Staff	Aaron Davis / Ahmad Ramiz	**State**	NSW
Process Conditions	Please refer to client records.		*230825*

Comments
The discharge is assumed to be composed of dry air and moisture

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)	1220	
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/h	16000	

Odour	Average		Test 1		Test 2	
Sampling time			1225 - 1227		1230 - 1232	
	Concentration	Odourant Flow Rate	Concentration	Odourant Flow Rate	Concentration	Odourant Flow Rate
	ou	ou.m³/min	ou	ou.m³/min	ou	ou.m³/min
Results	32000	7000000	35000	7700000	29000	6400000
Lower uncertainty limit	26000		26000		21000	
Upper uncertainty limit	40000		47000		39000	
Analysis date & time			17/08/23, 1000 - 1245		17/08/23, 1000 - 1245	
Holding time			22 hours		22 hours	
Dilution factor			9		9	
Bag material			Nalophan		Nalophan	
Butanol threshold (ppb)	58					
Laboratory temp (°C)	22					
Last calibration date	October 2022					

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

Date	16/08/2023	**Client**	Visy Pulp and Paper
Report	R015496	**Stack ID**	Vacuum Pump 9
Licence No.	10232	**Location**	Tumut
Ektimo Staff	Aaron Davis / Ahmad Ramiz	**State**	NSW
Process Conditions	Please refer to client records.		*230825*

Comments
The discharge is assumed to be composed of dry air and moisture

Stack Parameters		
Moisture content, %v/v	26 (saturated)	
Gas molecular weight, g/g mole	26.1 (wet)	29.0 (dry)
Gas density at STP, kg/m³	1.17 (wet)	1.29 (dry)
Gas density at discharge conditions, kg/m³	0.90	
Gas Flow Parameters		
Flow measurement time(s) (hhmm)	1240	
Temperature, °C	65	
Temperature, K	338	
Velocity at sampling plane, m/s	8.8	
Volumetric flow rate, actual, m³/s	23	
Volumetric flow rate (wet STP), m³/s	18	
Volumetric flow rate (dry STP), m³/s	13	
Mass flow rate (wet basis), kg/h	75000	

Odour	Average		Test 1		Test 2	
Sampling time			1245 - 1247		1250 - 1252	
	Concentration	Odourant Flow Rate	Concentration	Odourant Flow Rate	Concentration	Odourant Flow Rate
	ou	ou.m³/min	ou	ou.m³/min	ou	ou.m³/min
Results	2900	3200000	3300	3600000	2600	2800000
Lower uncertainty limit	2400		2400		1900	
Upper uncertainty limit	3600		4500		3500	
Analysis date & time			17/08/23, 1000 - 1245		17/08/23, 1000 - 1245	
Holding time			22 hours		21 hours	
Dilution factor			5		5	
Bag material			Nalophan		Nalophan	
Butanol threshold (ppb)	58					
Laboratory temp (°C)	22					
Last calibration date	October 2022					

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

Date	16/08/2023	**Client**	Visy Pulp and Paper
Report	R015496	**Stack ID**	Vacuum Pump 10
Licence No.	10232	**Location**	Tumut
Ektimo Staff	Aaron Davis / Ahmad Ramiz	**State**	NSW
Process Conditions	Please refer to client records.		*230825*

Comments
The discharge is assumed to be composed of dry air and moisture

Stack Parameters		
Moisture content, %v/v	8 (saturated)	
Gas molecular weight, g/g mole	28.1 (wet)	29.0 (dry)
Gas density at STP, kg/m³	1.25 (wet)	1.29 (dry)
Gas density at discharge conditions, kg/m³	1.05	
Gas Flow Parameters		
Flow measurement time(s) (hhmm)	1310	
Temperature, °C	41	
Temperature, K	314	
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/h	110000	

Odour	Average		Test 1		Test 2	
Sampling time			1320 - 1322		1325 - 1327	
	Concentration	Odourant Flow Rate	Concentration	Odourant Flow Rate	Concentration	Odourant Flow Rate
	ou	ou.m³/min	ou	ou.m³/min	ou	ou.m³/min
Results	5200	7800000	4300	6400000	6100	9200000
Lower uncertainty limit	4200		3200		4500	
Upper uncertainty limit	6500		5900		8300	
Analysis date & time			17/08/23, 1000 - 1245		17/08/23, 1000 - 1245	
Holding time			21 hours		21 hours	
Dilution factor			5		5	
Bag material			Nalophan		Nalophan	
Butanol threshold (ppb)	58					
Laboratory temp (°C)	22					
Last calibration date	October 2022					

3 Sample Plane Compliance

3.1 EPA 1 – Main Stack 1

Sampling Plane Details	
Sampling plane dimensions	2660 mm
Sampling plane area	5.56 m²
Sampling port size, number	4" Flange (x4)
Duct orientation & shape	Vertical Circular
Downstream disturbance	Exit 5 D
Upstream disturbance	Junction 20 D
No. traverses & points sampled	2 12
Sample plane conformance to USEPA Method	Conforming

3.2 EPA 22 – Main Stack 2

Sampling Plane Details	
Source tested	Boiler
Pollution control equipment	Electrostatic precipitator - dry
Sampling plane dimensions	2450 mm
Sampling plane area	4.71 m²
Sampling port size, number	4" Flange (x4)
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 USEPA Method	Conforming

3.3 Vacuum Pump 3 – (790 Couch)

Sampling Plane Details	
Source tested	Vacuum pump outlet
Sampling plane dimensions	1006 mm
Sampling plane area	0.795 m²
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 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)

3.4 Vacuum Pump 7 – (794 First Bottom)

Sampling Plane Details	
Source tested	Vacuum pump outlet
Sampling plane dimensions	906 mm
Sampling plane area	0.645 m²
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 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)

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

Sampling Plane Details	
Source tested	Vacuum pump outlet
Sampling plane dimensions	1500 x 1750 mm
Sampling plane area	2.63 m²
Sampling port size, number	1/4 inch hole
Duct orientation & shape	Vertical 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 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

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

Sampling Plane Details	
Source tested	Vacuum pump outlet
Sampling plane dimensions	2450 x 3500 mm
Sampling plane area	8.58 m²
Sampling port size, number	Sampled at exit
Duct orientation & shape	Vertical Rectangular
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 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)

4 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.

5 Test Methods

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

Parameter	Sampling method	Analysis method	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	✓	✓¥

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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).

¥ Odour analysis conducted at the Ektimo NSW EPA laboratory by forced choice olfactometry. Results were reported to Ektimo on 17 August 2023 in report ON-00213.

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:

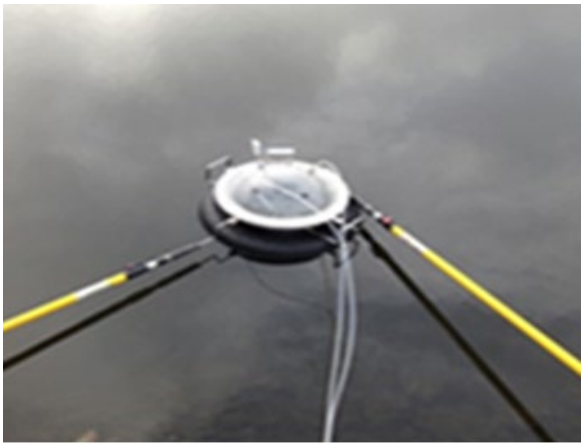
% v/v	Volume to volume ratio
~	Approximately
<	Less than
>	Greater than
≥	Greater than or equal to
APHA	American Public Health Association, Standard Methods for the Examination of Water and Waste Water
AS	Australian Standard
BaP-TEQ	Benzo(a)pyrene toxic equivalents
BSP	British standard pipe
CEM/CEMS	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
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.
PM_{10}	Particulate matter having an equivalent aerodynamic diameter less than or equal to 10 microns (µm).
$PM_{2.5}$	Particulate matter having an equivalent aerodynamic diameter less than or equal to 2.5 microns (µm).
PSA	Particle size analysis. PSA provides a distribution of geometric diameters, for a given sample, determined using laser diffraction.
RATA	Relative accuracy test audit
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
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.
WHO05-TEQ	World Health Organisation toxic equivalents
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 Appendices

Appendix A: Site Images

EPA 1 - Main Stack 1

EPA 22 – Main Stack 2



Cooling Pond 3A

Cooling Pond 3B

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)

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Ektimo

Visy Pulp and Paper, Tumut

Emission Testing Report – Quarter 3 Testing (Odour)

Report R016507-1

Ektimo

Document Information

Client Name:	Visy Pulp and Paper
Report Number:	R016507-1
Date of Issue:	25 March 2024
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
Operations Manager

NATA Accredited Laboratory
No. 14601

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

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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	22 February 2024	Odour (duplicate)
EPA 22 – Main Stack 2		
Cooling Pond 3A		Odour (single)
Cooling Pond 3B		
Cooling Tower 1 (#1 Paper Machine Side)		
Cooling Tower 2 (#2 Paper Machine Side)		
Vacuum Pump 3 – (790 Couch)		Odour (duplicate)
Vacuum Pump 7 – (794 First Bottom)		
Vacuum Pump 9 – (Paper Machine Hood Vent Exhaust)		
Vacuum Pump 10 – (Paper Machine Hood Vent Exhaust)		

* 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	22/02/2024	**Client**	Visy Pulp and Paper
Report	R016507-1	**Stack ID**	EPA 1 - Main Stack 1
Licence No.	10232	**Location**	Tumut
Ektimo Staff	Aaron Davis / Scott Woods	**State**	NSW
Process Conditions	Please refer to client records.		*240226*

Stack Parameters		
Moisture content, %v/v	21	
Gas molecular weight, g/g mole	28.0 (wet)	30.6 (dry)
Gas density at STP, kg/m³	1.25 (wet)	1.36 (dry)
Gas density at discharge conditions, kg/m³	0.69	
Gas Flow Parameters		
Flow measurement time(s) (hhmm)	0835	
Temperature, °C	194	
Temperature, K	467	
Velocity at sampling plane, m/s	28	
Volumetric flow rate, actual, m³/s	160	
Volumetric flow rate (wet STP), m³/s	86	
Volumetric flow rate (dry STP), m³/s	68	
Mass flow rate (wet basis), kg/h	390000	

Odour	Average		Test 1		Test 2	
Sampling time			0840 - 0850		0855 - 0900	
	Concentration ou	Odourant Flow Rate ou.m³/min	Concentration ou	Odourant Flow Rate ou.m³/min	Concentration ou	Odourant Flow Rate ou.m³/min
Results	1700	8600000	1600	8200000	1700	9000000
Lower uncertainty limit	1400		1200		1300	
Upper uncertainty limit	2000		2100		2300	
Analysis date & time			23/02/24, 1100-1345		23/02/24, 1100-1345	
Holding time			26 hours		26 hours	
Dilution factor			1		1	
Bag material			Nalophan		Nalophan	
Butanol threshold (ppb)	56					
Laboratory temp (°C)	21					
Last calibration date	October 2023					

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2.2 EPA 22 – Main Stack 2

Date	22/02/2024	**Client**	Visy Pulp and Paper
Report	R016507-1	**Stack ID**	EPA 22 - Main Stack 2
Licence No.	10232	**Location**	Tumut
Ektimo Staff	Aaron Davis / Scott Woods	**State**	NSW
Process Conditions	Please refer to client records.		*240226*

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	0.72	
Gas Flow Parameters		
Flow measurement time(s) (hhmm)	0930	
Temperature, °C	174	
Temperature, K	447	
Velocity at sampling plane, m/s	23	
Volumetric flow rate, actual, m³/s	110	
Volumetric flow rate (wet STP), m³/s	62	
Volumetric flow rate (dry STP), m³/s	49	
Mass flow rate (wet basis), kg/h	280000	

Odour	Average		Test 1		Test 2	
Sampling time			0935 - 0945		0950 - 0955	
	Concentration ou	Odourant Flow Rate ou.m³/min	Concentration ou	Odourant Flow Rate ou.m³/min	Concentration ou	Odourant Flow Rate ou.m³/min
Results	1200	4400000	1200	4600000	1100	4200000
Lower uncertainty limit	960		920		850	
Upper uncertainty limit	1400		1600		1500	
Analysis date & time			23/02/24, 1100-1345		23/02/24, 1100-1345	
Holding time			26 hours		25 hours	
Dilution factor			1		1	
Bag material			Nalophan		Nalophan	
Butanol threshold (ppb)	56					
Laboratory temp (°C)	21					
Last calibration date	October 2023					

2.3 Cooling Pond 3A

Client	Visy Pulp and Paper	**Test Location**	Cooling Pond 3A
Date	22/02/2024	**Plant/Site**	Tumut
Report No.	R016507-1		Tumut, NSW
Ektimo Staff	Aaron Davis / Scott Woods		***220907***

Test Location Details	
Location Description	Green, brown murky liquid, not filling
Surface Description	Clear surface, not aerating
Area Classification	Industrial
Source dimensions (L x W), m	50 x 32
Source area, m^2	1600
Sampling Method	AS4323.4 (Flux)
Odour	
Sampling time, hrs	0850 - 0900
Sample dilution	1
Concentration, ou	120
95% Confidence Interval	93 - 160
Flux Emission Rate, ou.m^3/m^2/min	**4.1**
Total area source emission rate, ou.m^3/min	**6500**
Flux Testing Parameters	
Equilibration time, hrs	0825 - 0849
Sweep Rate @ STP, L/min	4.19
Penetration Depth, mm	5
Static Pressure, Pa	10
Surface temperature, °C	21
Chamber temperature, °C	25
Ambient temperature, °C	22

2.4 Cooling Pond 3B

Client	Visy Pulp and Paper	**Test Location**	Cooling Pond 3B
Date	22/02/2024	**Plant/Site**	Tumut
Report No.	R016507-1		Tumut, NSW
Ektimo Staff	Aaron Davis / Scott Woods		***220907***

Test Location Details	
Location Description	Brown, green murky liquid, filling up
Surface Description	White foam and green sludge
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
Sampling time, hrs	0930 - 0940
Sample dilution	1
Concentration, ou	180
Average concentration, ou	**180**
95% Confidence Interval	130 - 230
Flux Emission Rate, ou.m^3/m^2/min	**5.9**
Total area source emission rate, ou.m^3/min	**9500**
Flux Testing Parameters	
Equilibration time, hrs	0905 - 0929
Sweep Rate @ STP, L/min	4.26
Penetration Depth, mm	5
Static Pressure, Pa	15
Surface temperature, °C	22
Chamber temperature, °C	26
Ambient temperature, °C	23

2.5 Cooling Tower 1 (#1 Paper Machine Side)

Date	22/02/2024	**Client**	Visy Pulp and Paper
Report	R016507-1	**Stack ID**	Cooling Tower 1 (#1 Paper Machine Side)
Licence No.	10232	**Location**	Tumut
Ektimo Staff	Aaron Davis / Scott Woods	**State**	NSW
Process Conditions	Please refer to client records.		

Comments
The discharge is assumed to be composed of dry air and moisture

Odour	Results
Sampling time	1020 - 1030
	Concentration ou
Results	160
Lower uncertainty limit	120
Upper uncertainty limit	220
Analysis date & time	23/02/24, 1100-1345
Holding time	25 hours
Dilution factor	1
Bag material	Nalophan
Butanol threshold (ppb)	55.7
Laboratory temp (℃)	21
Last calibration date	October 2023

2.6 Cooling Tower 2 (#2 Paper Machine Side)

Date	22/02/2024	**Client**	Visy Pulp and Paper
Report	R016507-1	**Stack ID**	Cooling Tower 2 (#2 Paper Machine Side)
Licence No.	10232	**Location**	Tumut
Ektimo Staff	Aaron Davis / Scott Woods	**State**	NSW
Process Conditions	Please refer to client records.		

Comments
The discharge is assumed to be composed of dry air and moisture

Odour	Results
Sampling time	1032 - 1042
	Concentration ou
Results	190
Lower uncertainty limit	140
Upper uncertainty limit	260
Analysis date & time	23/02/24, 1100-1345
Holding time	25 hours
Dilution factor	1
Bag material	Nalophan
Butanol threshold (ppb)	55.7
Laboratory temp (℃)	21
Last calibration date	October 2023

2.7 Vacuum Pump 3 – (790 Couch)

Date	22/02/2024	**Client**	Visy Pulp and Paper
Report	R016507-1	**Stack ID**	Vacuum Pump 3 (790 Couch)
Licence No.	10232	**Location**	Tumut
Ektimo Staff	Aaron Davis / Scott Woods	**State**	NSW
Process Conditions	Please refer to client records.		*240226*

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

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/m³	1.22 (wet)	1.29 (dry)
Gas density at discharge conditions, kg/m³	0.98	
Gas Flow Parameters		
Flow measurement time(s) (hhmm)	1245	
Temperature, °C	52	
Temperature, K	325	
Velocity at sampling plane, m/s	8.1	
Volumetric flow rate, actual, m³/s	6.4	
Volumetric flow rate (wet STP), m³/s	5.1	
Volumetric flow rate (dry STP), m³/s	4.4	
Mass flow rate (wet basis), kg/h	23000	

Odour	Average		Test 1		Test 2	
Sampling time			1250 - 1252		1253 - 1255	
	Concentration ou	Odourant Flow Rate ou.m³/min	Concentration ou	Odourant Flow Rate ou.m³/min	Concentration ou	Odourant Flow Rate ou.m³/min
Results	27000	8300000	22000	6900000	32000	9700000
Lower uncertainty limit	22000		17000		24000	
Upper uncertainty limit	33000		30000		42000	
Analysis date & time			23/02/24, 1100-1345		23/02/24, 1100-1345	
Holding time			22 hours		22 hours	
Dilution factor			5		5	
Bag material			Nalophan		Nalophan	
Butanol threshold (ppb)	56					
Laboratory temp (°C)	21					
Last calibration date	October 2023					

2.8 Vacuum Pump 7 – (794 First Bottom)

Date	22/02/2024	**Client**	Visy Pulp and Paper
Report	R016507-1	**Stack ID**	Vacuum Pump 7 (794 First Bottom)
Licence No.	10232	**Location**	Tumut
Ektimo Staff	Aaron Davis / Scott Woods	**State**	NSW
Process Conditions	Please refer to client records.		*240226*

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

Stack Parameters		
Moisture content, %v/v	12 (saturated)	
Gas molecular weight, g/g mole	27.7 (wet)	29.0 (dry)
Gas density at STP, kg/m³	1.24 (wet)	1.29 (dry)
Gas density at discharge conditions, kg/m³	1.00	
Gas Flow Parameters		
Flow measurement time(s) (hhmm)	1305	
Temperature, °C	48	
Temperature, K	321	
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/h	16000	

Odour	Average		Test 1		Test 2	
Sampling time			1308 - 1310		1312 - 1314	
	Concentration ou	Odourant Flow Rate ou.m³/min	Concentration ou	Odourant Flow Rate ou.m³/min	Concentration ou	Odourant Flow Rate ou.m³/min
Results	17000	3600000	16000	3500000	17000	3800000
Lower uncertainty limit	14000		12000		13000	
Upper uncertainty limit	20000		21000		23000	
Analysis date & time			23/02/24, 1100-1345		23/02/24, 1100-1345	
Holding time			22 hours		22 hours	
Dilution factor			5		5	
Bag material			Nalophan		Nalophan	
Butanol threshold (ppb)	56					
Laboratory temp (°C)	21					
Last calibration date	October 2023					

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

Date	22/02/2024	**Client**	Visy Pulp and Paper
Report	R016507-1	**Stack ID**	Vacuum Pump 9 (Paper Machine Hood Vent Exhaust)
Licence No.	10232	**Location**	Tumut
Ektimo Staff	Aaron Davis / Scott Woods	**State**	NSW
Process Conditions	Please refer to client records.		*240226*

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

Stack Parameters		
Moisture content, %v/v	27 (saturated)	
Gas molecular weight, g/g mole	26.0 (wet)	29.0 (dry)
Gas density at STP, kg/m³	1.16 (wet)	1.29 (dry)
Gas density at discharge conditions, kg/m³	0.89	
Gas Flow Parameters		
Flow measurement time(s) (hhmm)	1238	
Temperature, °C	66	
Temperature, K	339	
Velocity at sampling plane, m/s	10	
Volumetric flow rate, actual, m³/s	27	
Volumetric flow rate (wet STP), m³/s	20	
Volumetric flow rate (dry STP), m³/s	15	
Mass flow rate (wet basis), kg/h	85000	

Odour	Average		Test 1		Test 2	
Sampling time			1240 - 1242		1244 - 1246	
	Concentration ou	Odourant Flow Rate ou.m³/min	Concentration ou	Odourant Flow Rate ou.m³/min	Concentration ou	Odourant Flow Rate ou.m³/min
Results	2800	3500000	2000	2500000	3600	4400000
Lower uncertainty limit	2300		1500		2700	
Upper uncertainty limit	3400		2700		4800	
Analysis date & time			23/02/24, 1100-1345		23/02/24, 1100-1345	
Holding time			23 hours		23 hours	
Dilution factor			5		5	
Bag material			Nalophan		Nalophan	
Butanol threshold (ppb)	56					
Laboratory temp (°C)	21					
Last calibration date	October 2023					

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

Date	22/02/2024	**Client**	Visy Pulp and Paper
Report	R016507-1	**Stack ID**	Vacuum Pump 10 (Paper Machine Hood Vent Exhaust)
Licence No.	10232	**Location**	Tumut
Ektimo Staff	Aaron Davis / Scott Woods	**State**	NSW
Process Conditions	Please refer to client records.		240226

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

Stack Parameters		
Moisture content, %v/v	8.1 (saturated)	
Gas molecular weight, g/g mole	28.1 (wet)	29.0 (dry)
Gas density at STP, kg/m³	1.25 (wet)	1.29 (dry)
Gas density at discharge conditions, kg/m³	1.04	
Gas Flow Parameters		
Flow measurement time(s) (hhmm)	1325	
Temperature, °C	41	
Temperature, K	314	
Velocity at sampling plane, m/s	3.3	
Volumetric flow rate, actual, m³/s	28	
Volumetric flow rate (wet STP), m³/s	23	
Volumetric flow rate (dry STP), m³/s	22	
Mass flow rate (wet basis), kg/h	110000	

Odour	Average		Test 1		Test 2	
Sampling time			1328 - 1330		1332 - 1334	
	Concentration	Odourant Flow Rate	Concentration	Odourant Flow Rate	Concentration	Odourant Flow Rate
	ou	ou.m³/min	ou	ou.m³/min	ou	ou.m³/min
Results	9400	13000000	9400	13000000	9400	13000000
Lower uncertainty limit	7700		7100		7100	
Upper uncertainty limit	12000		13000		13000	
Analysis date & time			23/02/24, 1100-1345		23/02/24, 1100-1345	
Holding time			22 hours		22 hours	
Dilution factor			5		5	
Bag material			Nalophan		Nalophan	
Butanol threshold (ppb)	56					
Laboratory temp (°C)	21					
Last calibration date	October 2023					

3 Sample Plane Compliance

3.1 EPA 1 – Main Stack 1

Sampling Plane Details	
Sampling plane dimensions	2660 mm
Sampling plane area	5.56 m²
Sampling port size, number	4" Flange (x4)
Duct orientation & shape	Vertical Circular
Downstream disturbance	Exit 5 D
Upstream disturbance	Junction 20 D
No. traverses & points sampled	2 12
Sample plane conformance to USEPA Method 1	Conforming

3.2 EPA 22 – Main Stack 2

Sampling Plane Details	
Source tested	Boiler
Pollution control equipment	Electrostatic precipitator - dry
Sampling plane dimensions	2450 mm
Sampling plane area	4.71 m²
Sampling port size, number	4" Flange (x4)
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 USEPA Method 1	Conforming

3.3 Cooling Tower 1 (#1 Paper Machine Side)

Sampling Plane Details	
Sampling plane dimensions	Exit diameter could not be measured mm
Sampling port size, number	Sampled at exit
Duct orientation & shape	Vertical
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
Velocity and volumetric flowrate measurements could not be taken.
The number of traverses sampled is less than the requirement

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)

3.4 Cooling Tower 2 (#2 Paper Machine Side)

Sampling Plane Details	
Sampling plane dimensions	Exit diameter could not be measured mm
Sampling port size, number	Sampled at exit
Duct orientation & shape	Vertical
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
Velocity and volumetric flowrate measurements could not be taken.
The number of traverses sampled is less than the requirement

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)

3.5 Vacuum Pump 3 – (790 Couch)

Sampling Plane Details	
Source tested	Vacuum pump outlet
Sampling plane dimensions	1006 mm
Sampling plane area	0.795 m²
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 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)

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3.6 Vacuum Pump 7 – (794 First Bottom)

Sampling Plane Details	
Source tested	Vacuum pump outlet
Sampling plane dimensions	906 mm
Sampling plane area	0.645 m²
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 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)

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

Sampling Plane Details	
Source tested	Vacuum pump outlet
Sampling plane dimensions	1500 x 1750 mm
Sampling plane area	2.63 m²
Sampling port size, number	1/4 inch hole
Duct orientation & shape	Vertical 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 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

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

Sampling Plane Details	
Source tested	Vacuum pump outlet
Sampling plane dimensions	2450 x 3500 mm
Sampling plane area	8.58 m²
Sampling port size, number	Sampled at exit
Duct orientation & shape	Vertical Rectangular
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 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)

4 Plant Operating Conditions

See Visy Pulp and Paper records for complete process conditions.

Based on information received from Visy Pulp and Paper personnel, it is our understanding that samples were collected during typical plant operations.

5 Test Methods

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

Parameter	Sampling method	Analysis method	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	✓	✓¥

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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).
¥ Odour analysis conducted at the Ektimo NSW laboratory by forced choice olfactometry. Results were reported to Ektimo on 23 February 2024 in report ON-00238.

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.

Unless specifically noted, all samples were collected and handled in accordance with Ektimo's QA/QC standards.

7 Definitions

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

% v/v	Volume to volume ratio
~	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
BaP-TEQ	Benzo(a)pyrene toxic equivalents
BSP	British standard pipe
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
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.
PM_{10}	Particulate matter having an equivalent aerodynamic diameter less than or equal to 10 microns (µm).
$PM_{2.5}$	Particulate matter having an equivalent aerodynamic diameter less than or equal to 2.5 microns (µm).
PSA	Particle size analysis. PSA provides a distribution of geometric diameters, for a given sample, determined using laser diffraction.
RATA	Relative accuracy test audit
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
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.
WHO05-TEQ	World Health Organisation toxic equivalents
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.

Appendix A: Site Images

EPA 1 - Main Stack 1

EPA 22 – Main Stack 2

Cooling Pond 3A

Cooling Pond 3B

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)

Cooling Tower (#1 Paper Machine Side)

Cooling Tower (#2 Paper Machine Side)

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