Ektimo

Experts in air quality, odour and emission monitoring.



Emission Testing Report Q1 Testing - Odour

Report: R019318-1

Visy Pulp and Paper, Tumut

ilac-MRA NATA

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Document Information

Client Name:	Visy Pulp and Paper
Report Number:	R019318-1
Date of Issue:	25 September 2025
Attention:	Matthew O`Donovan
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Report Authorisation



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1 Executive Summary

1.1 Background

Ektimo was engaged by Visy Pulp and Paper to perform routine odour monitoring 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 quantify odour emissions from 10 discharge points.

Monitoring was performed as follows:

Location	Test Date	Test Parameters*
EPA 1 – Main Stack 1	4 September 2025	Odour (duplicate) Including characters and hedonic tone
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 at all locations except for Cooling Pond 3A, Cooling Pond 3B, Cooling Tower 1 - (#1 Paper Machine Side) and Cooling Tower 2 - (#2 Paper Machine Side).

All volume-based concentrations are reported on a wet basis at STP.

2 Results

2.1 EPA 1 – Main Stack 1

Date	4/09/2025	**Client**	Visy Pulp and Paper
Report	R019318-1	**Stack ID**	EPA 1 - Main Stack 1
Licence No.	10232	**Location**	Tumut
Ektimo Staff	Aaron Davis	**State**	NSW
Process Conditions	Normal operating conditions		250822

Stack Parameters		
Moisture content, %v/v	21	
Gas molecular weight, g/g mole	28.2 (wet)	30.9 (dry)
Gas density at STP, kg/m³	1.26 (wet)	1.38 (dry)
Gas density at discharge conditions, kg/m³	0.70	
Gas Flow Parameters		
Flow measurement time(s) (hhmm)	0830	
Temperature, °C	193	
Temperature, K	466	
Ambient pressure, kPa	97	
Stack pressure, kPa	97	
Velocity at sampling plane, m/s	29	
Volumetric flow rate, actual, m³/s	160	
Volumetric flow rate (wet STP), m³/s	90	
Volumetric flow rate (dry STP), m³/s	71	
Mass flow rate (wet basis), kg/h	410000	

Odour	Average		Test 1		Test 2	
Sampling time			0834 - 0844		0845 - 0855	
	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	1000	5600000	1100	5900000	990	5400000
Lower uncertainty limit	910		900		820	
Upper uncertainty limit	1200		1300		1200	
Hedonic tone			Mildly unpleasant		Mildly unpleasant	
Odour character			Gas, fermentation, fuel, paint thinner, sulfur, burning, chlorine		Burning, cooking fumes, sweet, chemicals, chlorine, fermentation, sulfur	
Analysis date & time			05/09/25, 0900 - 1240		05/09/25, 0900 - 1240	
Holding time			25 hours		24 hours	
Dilution factor			1		1	
Bag material			Nalophan		Nalophan	
Butanol threshold (ppb)	46					
Laboratory temp (°C)	21					
Last calibration date	October 2024					

2.2 EPA 22 – Main Stack 2

Date	4/09/2025	**Client**	Visy Pulp and Paper
Report	R019318-1	**Stack ID**	EPA 22 - Main Stack 2
Licence No.	10232	**Location**	Tumut
Ektimo Staff	Aaron Davis	**State**	NSW
Process Conditions	Normal operating conditions		250822

Stack Parameters		
Moisture content, %v/v	21	
Gas molecular weight, g/g mole	27.9 (wet)	30.6 (dry)
Gas density at STP, kg/m³	1.24 (wet)	1.36 (dry)
Gas density at discharge conditions, kg/m³	0.73	
Gas Flow Parameters		
Flow measurement time(s) (hhmm)	0920	
Temperature, °C	173	
Temperature, K	446	
Ambient pressure, kPa	97	
Stack pressure, kPa	97	
Velocity at sampling plane, m/s	23	
Volumetric flow rate, actual, m³/s	110	
Volumetric flow rate (wet STP), m³/s	63	
Volumetric flow rate (dry STP), m³/s	50	
Mass flow rate (wet basis), kg/h	280000	

Odour	Average		Test 1		Test 2	
Sampling time			0923 - 0933		0934 - 0944	
	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	520	1900000	540	2000000	490	1900000
Lower uncertainty limit	450		450		410	
Upper uncertainty limit	590		650		590	
Hedonic tone			Mildly unpleasant		Mildly unpleasant	
Odour character			Chemicals, solvent, stagnant water, sulfur, gas, fermentation, burning, chlorine		Chemicals, solvent, stagnant water, gas, fermentation, burning, sulfur, chlorine	
Analysis date & time			05/09/25, 0900 - 1240		05/09/25, 0900 - 1240	
Holding time			24 hours		24 hours	
Dilution factor			1		1	
Bag material			Nalophan		Nalophan	
Butanol threshold (ppb)	46					
Laboratory temp (°C)	21					
Last calibration date	October 2024					

2.3 Cooling Pond 3A

Date	4/09/2025	**Test Location**	Cooling Pond 3A
Report	R019318-1	**Plant/Site**	Tumut
Client	Visy Pulp and Paper Pty Ltd		Tumut, NSW
Ektimo Staff	Aaron Davis / Sahad Musthafa		190825

Test Location Details		
Location Description	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	0920 - 0930	0931 - 0941
Holding time, hrs	24	24
Sample dilution	1	1
Concentration, ou	130	95
Hedonic tone	Mildly unpleasant	Mildly unpleasant
Odour character	Leachate, garbage, chemicals, mud	Leachate, mud, garbage, chemicals, algae
Average concentration, ou	**110**	
95% Confidence Interval	100 - 130	
Flux Emission Rate, ou.m^3/m^2/min	**3.6**	
Total area source emission rate, ou.m^3/min	**5800**	
Flux Testing Parameters		
Equilibration time, h	0854 - 0918	
Sweep Rate @ STP, L/min	4.08	
Penetration Depth, mm	5	
Static Pressure, Pa	10	
Surface temperature, °C	11	
Chamber temperature, °C	16	
Ambient temperature, °C	12	
Odour Analysis Parameters		
Analysis date & time	05/09/25, 0900 - 1240	
Bag material	0	
Butanol threshold, ppb	46.4	
Laboratory temp, °C	20.8	
Olfactometer calibration date	8/10/2024	

2.4 Cooling Pond 3B

Date	4/09/2025	**Test Location**	Cooling Pond 3B
Report	R019318-1	**Plant/Site**	Tumut
Client	Visy Pulp and Paper Pty Ltd		Tumut, NSW
Ektimo Staff	Aaron Davis / Sahad Musthafa		190825

Test Location Details		
Location Description	Brown murky liquid, filling	
Surface Description	Foamy across ~70% of 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	0830 - 0840	0842 - 0852
Holding time, hrs	25	24
Sample dilution	1	1
Concentration, ou	830	700
Hedonic tone	Very unpleasant	Very unpleasant
Odour character	Sewage, manure, garbage, dirt	Sewage, manure, garbage, mud
Average concentration, ou	**760**	
95% Confidence Interval	670 - 870	
Flux Emission Rate, ou.m^3/m^2/min	**23**	
Total area source emission rate, ou.m^3/min	**37000**	
Flux Testing Parameters		
Equilibration time, h	0802 - 0826	
Sweep Rate @ STP, L/min	3.91	
Penetration Depth, mm	5	
Static Pressure, Pa	10	
Surface temperature, °C	10	
Chamber temperature, °C	10	
Ambient temperature, °C	15	
Odour Analysis Parameters		
Analysis date & time	05/09/25, 0900 - 1240	
Bag material	0	
Butanol threshold, ppb	46.4	
Laboratory temp, °C	20.8	
Olfactometer calibration date	8/10/2024	

2.5 Cooling Tower 1 - (#1 Paper Machine Side)

Date	4/09/2025	**Client**	Visy Pulp and Paper
Report	R019318-1	**Stack ID**	Cooling Tower 1 (#1 Paper Machine Side)
Licence No.	10232	**Location**	Tumut
Ektimo Staff	Aaron Davis / Sahad Musthafa	**State**	NSW
Process Conditions	Please refer to client records.		

Comments
Velocity, temperature and volumetric flowrate measurements could not be taken.
The discharge is assumed to be composed of dry air and moisture

Odour	Average	Test 1	Test 2
Sampling time		0951 - 1001	1002 - 1012
	Concentration ou	Concentration ou	Concentration ou
Results	66	63	69
Lower uncertainty limit	58	53	57
Upper uncertainty limit	75	76	82
Hedonic tone		Mildly unpleasant	Mildly unpleasant
Odour character		Organics, compost, mould, garbage, waste, fermentation	Smokey, organics, pine, compost, garbage, waste, fermentation, mould
Analysis date & time		05/09/25, 0900 - 1240	05/09/25, 0900 - 1240
Holding time		23 hours	23 hours
Dilution factor		1	1
Bag material		Nalophan	Nalophan
Butanol threshold (ppb)	46		
Laboratory temp (°C)	21		
Last calibration date	October 2024		

2.6 Cooling Tower 2 - (#2 Paper Machine Side)

Date	4/09/2025	**Client**	Visy Pulp and Paper
Report	R019318-1	**Stack ID**	Cooling Tower 2 (#2 Paper Machine Side)
Licence No.	10232	**Location**	Tumut
Ektimo Staff	Aaron Davis / Sahad Musthafa	**State**	NSW
Process Conditions	Please refer to client records.		

Comments
Velocity, temperature and volumetric flowrate measurements could not be taken
The discharge is assumed to be composed of dry air and moisture

Odour	Average	Test 1	Test 2
Sampling time		1014 - 1024	1026 - 1036
	Concentration ou	Concentration ou	Concentration ou
Results	110	110	100
Lower uncertainty limit	95	94	86
Upper uncertainty limit	120	140	120
Hedonic tone		Mildly unpleasant	Mildly unpleasant
Odour character		Garbage, fermentation, rubbish, sweet, fertiliser, mould, water	Garbage, fermentation, rubbish, sweet, mould, fertiliser, smokey
Analysis date & time		05/09/25, 0900 - 1240	05/09/25, 0900 - 1240
Holding time		23 hours	23 hours
Dilution factor		1	1
Bag material		Nalophan	Nalophan
Butanol threshold (ppb)	46		
Laboratory temp (°C)	21		
Last calibration date	October 2024		

2.7 Vacuum Pump 3 – (790 Couch)

Date	4/09/2025	**Client**	Visy Pulp and Paper
Report	R019318-1	**Stack ID**	Vacuum Pump 3 (790 Couch)
Licence No.	10232	**Location**	Tumut
Ektimo Staff	Aaron Davis / Sahad Musthafa	**State**	NSW
Process Conditions	Please refer to client records.		250903

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	15 (saturated)	
Gas molecular weight, g/g mole	27.3 (wet)	29.0 (dry)
Gas density at STP, kg/m³	1.22 (wet)	1.29 (dry)
Gas density at discharge conditions, kg/m³	0.97	
Gas Flow Parameters		
Flow measurement time(s) (hhmm)	1155	
Temperature, °C	54	
Temperature, K	327	
Ambient pressure, kPa	97	
Stack pressure, kPa	97	
Velocity at sampling plane, m/s	8.9	
Volumetric flow rate, actual, m³/s	7.1	
Volumetric flow rate (wet STP), m³/s	5.7	
Volumetric flow rate (dry STP), m³/s	4.8	
Mass flow rate (wet basis), kg/h	25000	

Odour	Average		Test 1		Test 2	
Sampling time			1200 - 1202		1204 - 1206	
	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	4400	1500000	4200	1400000	4600	1600000
Lower uncertainty limit	3900		3500		3800	
Upper uncertainty limit	5000		5100		5500	
Hedonic tone			Very unpleasant		Very unpleasant	
Odour character			Fermenting, sulfur, garbage, sewage, wet cardboard, gas		Fermenting, sulfur, garbage, sewage, wet cardboard	
Analysis date & time			05/09/25, 0900 - 1240		05/09/25, 0900 - 1240	
Holding time			21 hours		21 hours	
Dilution factor			6		6	
Bag material			Nalophan		Nalophan	
Butanol threshold (ppb)	46					
Laboratory temp (°C)	21					
Last calibration date	October 2024					

2.8 Vacuum Pump 7 – (794 First Bottom)

Date	4/09/2025	**Client**	Visy Pulp and Paper
Report	R019318-1	**Stack ID**	Vacuum Pump 7 (794 First Bottom)
Licence No.	10232	**Location**	Tumut
Ektimo Staff	Aaron Davis / Sahad Musthafa	**State**	NSW
Process Conditions	Please refer to client records.		250903

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	9.9 (saturated)	
Gas molecular weight, g/g mole	27.9 (wet)	29.0 (dry)
Gas density at STP, kg/m³	1.24 (wet)	1.29 (dry)
Gas density at discharge conditions, kg/m³	1.02	
Gas Flow Parameters		
Flow measurement time(s) (hhmm)	1210	
Temperature, °C	45	
Temperature, K	318	
Ambient pressure, kPa	97	
Stack pressure, kPa	97	
Velocity at sampling plane, m/s	7.2	
Volumetric flow rate, actual, m³/s	4.7	
Volumetric flow rate (wet STP), m³/s	3.8	
Volumetric flow rate (dry STP), m³/s	3.5	
Mass flow rate (wet basis), kg/h	17000	

Odour	Average		Test 1		Test 2	
Sampling time			1212 - 1214		1216 - 1218	
	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	3400	770000	3500	810000	3200	740000
Lower uncertainty limit	3000		2900		2700	
Upper uncertainty limit	3800		4200		3800	
Hedonic tone			Very unpleasant		Very unpleasant	
Odour character			Sweet, chemical, onion, gas, wet cardboard		Sweet, chemical, onion, gas, wet cardboard	
Analysis date & time			05/09/25, 0900 - 1240		05/09/25, 0900 - 1240	
Holding time			21 hours		21 hours	
Dilution factor			6		6	
Bag material			Nalophan		Nalophan	
Butanol threshold (ppb)	46					
Laboratory temp (°C)	21					
Last calibration date	October 2024					

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

Date	4/09/2025	**Client**	Visy Pulp and Paper
Report	R019318-1	**Stack ID**	Vacuum Pump 9 (Paper Machine Hood Vent Exhaust)
Licence No.	10232	**Location**	Tumut
Ektimo Staff	Aaron Davis / Sahad Musthafa	**State**	NSW
Process Conditions	Please refer to client records.		250903

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	35 (saturated)	
Gas molecular weight, g/g mole	25.1 (wet)	29.0 (dry)
Gas density at STP, kg/m³	1.12 (wet)	1.29 (dry)
Gas density at discharge conditions, kg/m³	0.85	
Gas Flow Parameters		
Flow measurement time(s) (hhmm)	1220	
Temperature, °C	72	
Temperature, K	345	
Ambient pressure, kPa	97	
Stack pressure, kPa	97	
Velocity at sampling plane, m/s	10	
Volumetric flow rate, actual, m³/s	27	
Volumetric flow rate (wet STP), m³/s	21	
Volumetric flow rate (dry STP), m³/s	13	
Mass flow rate (wet basis), kg/h	83000	

Odour	Average		Test 1		Test 2	
Sampling time			1223 - 1225		1226 - 1228	
	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	3300	4100000	3500	4300000	3200	3900000
Lower uncertainty limit	2900		2900		2700	
Upper uncertainty limit	3800		4200		3800	
Hedonic tone			Very unpleasant		Very unpleasant	
Odour character			Burning, onion, organic, rubbish, green waste		Chemical, onion, water, rubbish, wet cardboard	
Analysis date & time			05/09/25, 0900 - 1240		05/09/25, 0900 - 1240	
Holding time			21 hours		21 hours	
Dilution factor			6		6	
Bag material			Nalophan		Nalophan	
Butanol threshold (ppb)	46					
Laboratory temp (°C)	21					
Last calibration date	October 2024					

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

Date	4/09/2025	**Client**	Visy Pulp and Paper
Report	R019318-1	**Stack ID**	Vacuum Pump 10 (Paper Machine Hood Vent Exhaust)
Licence No.	10232	**Location**	Tumut
Ektimo Staff	Aaron Davis / Sahad Musthafa	**State**	NSW
Process Conditions	Please refer to client records.		250903

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	7.6 (saturated)	
Gas molecular weight, g/g mole	28.1 (wet)	29.0 (dry)
Gas density at STP, kg/m³	1.26 (wet)	1.29 (dry)
Gas density at discharge conditions, kg/m³	1.05	
Gas Flow Parameters		
Flow measurement time(s) (hhmm)	1245	
Temperature, °C	40	
Temperature, K	313	
Ambient pressure, kPa	97	
Stack pressure, kPa	97	
Velocity at sampling plane, m/s	3.3	
Volumetric flow rate, actual, m³/s	28	
Volumetric flow rate (wet STP), m³/s	24	
Volumetric flow rate (dry STP), m³/s	22	
Mass flow rate (wet basis), kg/h	110000	

Odour	Average		Test 1		Test 2	
Sampling time			1249 - 1251		1258 - 1300	
	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	6300	8900000	6600	9300000	6000	8400000
Lower uncertainty limit	5500		5500		5000	
Upper uncertainty limit	7100		7900		7200	
Hedonic tone			Very unpleasant		Very unpleasant	
Odour character			Stale food, gas, compost, garbage		Stale food, gas, compost, garbage	
Analysis date & time			05/09/25, 0900 - 1240		05/09/25, 0900 - 1240	
Holding time			20 hours		20 hours	
Dilution factor			6		6	
Bag material			Nalophan		Nalophan	
Butanol threshold (ppb)	46					
Laboratory temp (°C)	21					
Last calibration date	October 2024					

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

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

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)

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 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 were 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 (USEPA Method 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%	✓	✓
Molecular weight	NA	NSW EPA TM-23 (USEPA Method 3)	not specified	NA	✓
Dry gas density	NA	NSW EPA TM-23 (USEPA Method 3)	not specified	NA	✓
Odour	NSW EPA OM-7 (AS 4323.3)	NSW EPA OM-7 (AS 4323.3)	refer to results	✓	✓¥
Odour characterisation	NA	direct observation	NA	NA	×
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 5 September 2025 in report ON-00318.

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, dry basis (except moisture)
~	Approximately
<	Less than
>	Greater than
≥	Greater than or equal to
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 - (#1 Paper Machine Side)



Cooling Tower - (#2 Paper Machine Side)

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Ektimo

Experts in air quality, odour and emission monitoring.



Emission Testing Report Q3 Testing - Odour

Report: R020094-1

Visy Pulp and Paper, Tumut

ilac-MRA NATA

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.

Document Information

Client Name:	Visy Pulp and Paper
Report Number:	R020094-1
Date of Issue:	10 March 2026
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

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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 routine odour monitoring 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 quantify odour emissions from 10 discharge points.

Monitoring was performed as follows:

Location	Test Date	Test Parameters*
EPA 1 – Main Stack 1	25 February 2026	Odour (duplicate) Including characters and hedonic tone
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 at all locations except for Cooling Pond 3A, Cooling Pond 3B, Cooling Tower 1 - (#1 Paper Machine Side) and Cooling Tower 2 - (#2 Paper Machine Side).

All volume-based concentrations are reported on a wet basis at STP.

2 Results

2.1 EPA 1 – Main Stack 1

Date	25/02/2026	**Client**	Visy Pulp and Paper
Report	R020094-1	**Stack ID**	EPA 1 - Main Stack 1
Licence No.	10232	**Location**	Tumut
Ektimo Staff	Aaron Davis / Ahmad Ramiz	**State**	NSW
Process Conditions	Refer to client records		260216

Stack Parameters		
Moisture content, %v/v	21	
Gas molecular weight, g/g mole	28.1 (wet)	30.7 (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)	0815	
Temperature, °C	191	
Temperature, K	464	
Ambient pressure, kPa	97	
Stack pressure, kPa	97	
Velocity at sampling plane, m/s	30	
Volumetric flow rate, actual, m³/s	170	
Volumetric flow rate (wet STP), m³/s	94	
Volumetric flow rate (dry STP), m³/s	75	
Mass flow rate (wet basis), kg/h	430000	

Odour	Average		Test 1		Test 2	
Sampling time			0810 - 0820		0821 - 0831	
	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	2600	15000000	2900	16000000	2400	14000000
Lower uncertainty limit	2400		2600		2100	
Upper uncertainty limit	2900		3200		2700	
Hedonic tone			Mildly unpleasant		Mildly unpleasant	
Odour character			Earthy, sulfur, exhaust engine, gas		Earthy, sulfur, exhaust engine, gas	
Analysis date & time			26/02/26, 1030 - 1330		26/02/26, 1030 - 1330	
Holding time			26 hours		26 hours	
Dilution factor			1		1	
Bag material			Nalophan		Nalophan	
Butanol threshold (ppb)	51					
Laboratory temp (°C)	23					
Last calibration date	November 2025					

2.2 EPA 22 – Main Stack 2

Date	25/02/2026	**Client**	Visy Pulp and Paper
Report	R020094-1	**Stack ID**	EPA 22 - Main Stack 2
Licence No.	10232	**Location**	Tumut
Ektimo Staff	Aaron Davis / Ahmad Ramiz	**State**	NSW
Process Conditions	Refer to client records		260216

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)	0845	
Temperature, °C	180	
Temperature, K	454	
Ambient pressure, kPa	97	
Stack pressure, kPa	97	
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	47	
Mass flow rate (wet basis), kg/h	270000	

Odour	Average		Test 1		Test 2	
Sampling time			0845 - 0855		0856 - 0906	
	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	740	2600000	840	3000000	640	2300000
Lower uncertainty limit	680		740		570	
Upper uncertainty limit	800		940		720	
Hedonic tone			Neutral - mildly unpleasant		Neutral - mildly unpleasant	
Odour character			Gas, grains, sulfur, chemicals		Gas, grains, sulfur, chemicals	
Analysis date & time			26/02/26, 1030 - 1330		26/02/26, 1030 - 1330	
Holding time			25 hours		25 hours	
Dilution factor			1		1	
Bag material			Nalophan		Nalophan	
Butanol threshold (ppb)	51					
Laboratory temp (℃)	23					
Last calibration date	November 2025					

2.3 Cooling Pond 3A

Date	25/02/2026	**Test Location**	Cooling Pond 3A
Report	R020094-1	**Plant/Site**	Tumut
Client	Visy Pulp and Paper		Tumut, NSW
Ektimo Staff	Aaron Davis / Ahmad Ramiz		190825

Test Location Details			
Location Description		Green murky liquid, not filling or aerating	
Surface Description		Thick foam 90% coverage	
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, h	0910 - 0920		0921 - 0931
Holding time, h	25		25
Sample dilution	1		1
Concentration, ou	3800		3200
Hedonic tone	Very unpleasant		Very unpleasant
Odour character	Rotten eggs, sewer, earthy		Rotten eggs, sewer, earthy
Average concentration, ou		**3500**	
95% Confidence Interval		3200 - 3800	
Flux Emission Rate, ou.m^3/m^2/min		**100**	
Total area source emission rate, ou.m^3/min		**160000**	
Flux Testing Parameters			
Equilibration time, h		0845 - 0909	
Sweep Rate @ STP, L/min		3.77	
Penetration Depth, mm		5	
Static Pressure, Pa		10	
Surface temperature, °C		23	
Chamber temperature, °C		27	
Ambient temperature, °C		25	
Odour Analysis Parameters			
Analysis date & time		26/02/26, 1030 - 1330	
Bag material		Nalophan	
Butanol threshold, ppb		51.3	
Laboratory temp, °C		23.5	
Olfactometer calibration date		20/11/2025	

2.4 Cooling Pond 3B

Date	25/02/2026	**Test Location**	Cooling Pond 3B
Report	R020094-1	**Plant/Site**	Tumut
Client	Visy Pulp and Paper		Tumut, NSW
Ektimo Staff	Aaron Davis / Ahmad Ramiz		190825

Test Location Details			
Location Description		Green murky liquid, filling	
Surface Description		Foamy across 90% of 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, h	0815 - 0825		0830 - 0840
Holding time, h	26		26
Sample dilution	1		1
Concentration, ou	2900		2900
Hedonic tone	Mildly unpleasant - very unpleasant		Mildly unpleasant - very unpleasant
Odour character	Rotten eggs, earthy, sewer		Rotten eggs, earthy, sewer
Average concentration, ou		**2900**	
95% Confidence Interval		2600 - 3100	
Flux Emission Rate, ou.m^3/m^2/min		**87**	
Total area source emission rate, ou.m^3/min		**140000**	
Flux Testing Parameters			
Equilibration time, h		0750 - 0814	
Sweep Rate @ STP, L/min		3.91	
Penetration Depth, mm		5	
Static Pressure, Pa		10	
Surface temperature, °C		22	
Chamber temperature, °C		25	
Ambient temperature, °C		24	
Odour Analysis Parameters			
Analysis date & time		26/02/26, 1030 - 1330	
Bag material		Nalophan	
Butanol threshold, ppb		51.3	
Laboratory temp, °C		23.5	
Olfactometer calibration date		20/11/2025	

2.5 Cooling Tower 1 - (#1 Paper Machine Side)

Date	25/02/2026	**Client**	Visy Pulp and Paper
Report	R020094-1	**Stack ID**	Cooling Tower 1 (#1 Paper Machine Side)
Licence No.	10232	**Location**	Tumut
Ektimo Staff	Aaron Davis / Ahmad Ramiz	**State**	NSW
Process Conditions	Please refer to client records.		260224

Comments
Velocity, temperature and volumetric flowrate measurements could not be taken.
The discharge is assumed to be composed of dry air and moisture

Odour	Average	Test 1	Test 2
Sampling time		0925 - 0935	0936 - 0946
	Concentration ou	Concentration ou	Concentration ou
Results	300	300	300
Lower uncertainty limit	280	270	270
Upper uncertainty limit	330	340	340
Hedonic tone		Neutral	Neutral
Odour character		Wet cardboard, garbage, saline, cement powder, earthy	Wet cardboard, garbage, saline, cement powder, earthy, mulch
Analysis date & time		26/02/26, 1030 - 1330	26/02/26, 1030 - 1330
Holding time		25 hours	25 hours
Dilution factor		1	1
Bag material		Nalophan	Nalophan
Butanol threshold (ppb)	51		
Laboratory temp (℃)	23		
Last calibration date	November 2025		

2.6 Cooling Tower 2 - (#2 Paper Machine Side)

Date	25/02/2026	**Client**	Visy Pulp and Paper
Report	R020094-1	**Stack ID**	Cooling Tower 2 (#2 Paper Machine Side)
Licence No.	10232	**Location**	Tumut
Ektimo Staff	Aaron Davis / Ahmad Ramiz	**State**	NSW
Process Conditions	Please refer to client records.		260224

Comments
Velocity, temperature and volumetric flowrate measurements could not be taken.
The discharge is assumed to be composed of dry air and moisture

Odour	Average	Test 1	Test 2
Sampling time		0925 - 0935	0936 - 0946
	Concentration ou	Concentration ou	Concentration ou
Results	270	230	300
Lower uncertainty limit	250	200	270
Upper uncertainty limit	290	260	340
Hedonic tone		Neutral	Neutral
Odour character		Earthy, cement powder, mulch, leather, stagnant water, wet cardboard	Earthy, cement powder, mulch, leather, stagnant water, wet cardboard, garbage
Analysis date & time		26/02/26, 1030 - 1330	26/02/26, 1030 - 1330
Holding time		25 hours	25 hours
Dilution factor		1	1
Bag material		Nalophan	Nalophan
Butanol threshold (ppb)	51		
Laboratory temp (℃)	23		
Last calibration date	November 2025		

2.7 Vacuum Pump 3 – (790 Couch)

Date	25/02/2026	**Client**	Visy Pulp and Paper
Report	R020094-1	**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.		260224

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	19 (saturated)	
Gas molecular weight, g/g mole	26.9 (wet)	29.0 (dry)
Gas density at STP, kg/m³	1.20 (wet)	1.29 (dry)
Gas density at discharge conditions, kg/m³	0.95	
Gas Flow Parameters		
Flow measurement time(s) (hhmm)	1045	
Temperature, °C	58	
Temperature, K	331	
Ambient pressure, kPa	97	
Stack pressure, kPa	97	
Velocity at sampling plane, m/s	9.8	
Volumetric flow rate, actual, m³/s	7.8	
Volumetric flow rate (wet STP), m³/s	6.2	
Volumetric flow rate (dry STP), m³/s	5	
Mass flow rate (wet basis), kg/h	27000	

Odour	Average		Test 1		Test 2	
Sampling time			1050 - 1051		1053 - 1054	
	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	6100000	16000	5800000	17000	6400000
Lower uncertainty limit	15000		14000		15000	
Upper uncertainty limit	18000		18000		19000	
Hedonic tone			Mildly unpleasant - very unpleasant		Mildly unpleasant - very unpleasant	
Odour character			Wet cardboard, smokey, rubbish, combustion, gas		Wet cardboard, smokey, rubbish, combustion, gas	
Analysis date & time			26/02/26, 1030 - 1330		26/02/26, 1030 - 1330	
Holding time			23 hours		23 hours	
Dilution factor			6		6	
Bag material			Nalophan		Nalophan	
Butanol threshold (ppb)	51					
Laboratory temp (℃)	23					
Last calibration date	November 2025					

2.8 Vacuum Pump 7 – (794 First Bottom)

Date	25/02/2026	**Client**	Visy Pulp and Paper
Report	R020094-1	**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.		*260224*

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	1.01	
Gas Flow Parameters		
Flow measurement time(s) (hhmm)	1105	
Temperature, °C	48	
Temperature, K	321	
Ambient pressure, kPa	97	
Stack pressure, kPa	97	
Velocity at sampling plane, m/s	7.5	
Volumetric flow rate, actual, m³/s	4.8	
Volumetric flow rate (wet STP), m³/s	3.9	
Volumetric flow rate (dry STP), m³/s	3.5	
Mass flow rate (wet basis), kg/h	18000	

Odour	Average		Test 1		Test 2	
Sampling time			1107 - 1108		1110 - 1111	
	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	6800	1600000	6500	1500000	7100	1700000
Lower uncertainty limit	6300		5800		6300	
Upper uncertainty limit	7400		7300		8000	
Hedonic tone			Neutral - mildly unpleasant		Neutral - mildly unpleasant	
Odour character			Gas, grains, smokey, wet cardboard		Gas, grains, smokey, wet cardboard	
Analysis date & time			26/02/26, 1030 - 1330		26/02/26, 1030 - 1330	
Holding time			23 hours		23 hours	
Dilution factor			6		6	
Bag material			Nalophan		Nalophan	
Butanol threshold (ppb)	51					
Laboratory temp (℃)	23					
Last calibration date	November 2025					

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

Date	25/02/2026	**Client**	Visy Pulp and Paper
Report	R020094-1	**Stack ID**	Vacuum Pump 9 (Paper Machine Hood Vent Exhaust)
Licence No.	10232	**Location**	Tumut
Ektimo Staff	Aaron Davis / Ahmad Ramiz	**State**	NSW
Process Conditions	Please refer to client records.		*260224*

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	43 (saturated)	
Gas molecular weight, g/g mole	24.2 (wet)	29.0 (dry)
Gas density at STP, kg/m³	1.08 (wet)	1.29 (dry)
Gas density at discharge conditions, kg/m³	0.81	
Gas Flow Parameters		
Flow measurement time(s) (hhmm)	1120	
Temperature, °C	77	
Temperature, K	350	
Ambient pressure, kPa	97	
Stack pressure, kPa	97	
Velocity at sampling plane, m/s	11	
Volumetric flow rate, actual, m³/s	28	
Volumetric flow rate (wet STP), m³/s	21	
Volumetric flow rate (dry STP), m³/s	12	
Mass flow rate (wet basis), kg/h	81000	

Odour	Average		Test 1		Test 2	
Sampling time			1120 - 1121		1124 - 1125	
	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	4800	6000000	4500	5700000	5000	6200000
Lower uncertainty limit	4400		4000		4400	
Upper uncertainty limit	5200		5100		5600	
Hedonic tone			Neutral - mildly unpleasant		Neutral - mildly unpleasant	
Odour character			Wet cardboard, smokey, earthy, stagnant water		Wet cardboard, smokey, landfill, earthy	
Analysis date & time			26/02/26, 1030 - 1330		26/02/26, 1030 - 1330	
Holding time			23 hours		23 hours	
Dilution factor			6		6	
Bag material			Nalophan		Nalophan	
Butanol threshold (ppb)	51					
Laboratory temp (℃)	23					
Last calibration date	November 2025					

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

Date	25/02/2026	**Client**	Visy Pulp and Paper
Report	R020094-1	**Stack ID**	Vacuum Pump 10 (Paper Machine Hood Vent Exhaust)
Licence No.	10232	**Location**	Tumut
Ektimo Staff	Aaron Davis / Ahmad Ramiz	**State**	NSW
Process Conditions	Mist sprays were not operational		260224

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

Stack Parameters		
Moisture content, %v/v	12	
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	0.91	
Gas Flow Parameters		
Flow measurement time(s) (hhmm)	1030	
Temperature, °C	81	
Temperature, K	354	
Ambient pressure, kPa	97	
Stack pressure, kPa	97	
Velocity at sampling plane, m/s	3.5	
Volumetric flow rate, actual, m³/s	30	
Volumetric flow rate (wet STP), m³/s	22	
Volumetric flow rate (dry STP), m³/s	20	
Mass flow rate (wet basis), kg/h	99000	

Odour	Average		Test 1		Test 2	
Sampling time			1032 - 1033		1035 - 1037	
	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	4800	6400000	5000	6700000	4500	6100000
Lower uncertainty limit	4400		4500		4000	
Upper uncertainty limit	5200		5600		5100	
Hedonic tone			Neutral - mildly unpleasant		Neutral - mildly unpleasant	
Odour character			Rubbish, smokey, musty, wet cardboard		Rubbish, smokey, musty, wet cardboard	
Analysis date & time			26/02/26, 1030 - 1330		26/02/26, 1030 - 1330	
Holding time			24 hours		24 hours	
Dilution factor			6		6	
Bag material			Nalophan		Nalophan	
Butanol threshold (ppb)	51					
Laboratory temp (℃)	23					
Last calibration date	November 2025					

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
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

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)

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	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 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 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 were 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 (USEPA Method 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%	✓	✓
Molecular weight	NA	NSW EPA TM-23 (USEPA Method 3)	not specified	NA	✓
Dry gas density	NA	NSW EPA TM-23 (USEPA Method 3)	not specified	NA	✓
Odour	NSW EPA OM-7 (AS 4323.3)	NSW EPA OM-7 (AS 4323.3)	refer to results	✓	✓¥
Odour characterisation	NA	direct observation	NA	NA	×
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 26 February 2026 in report ON-00345.

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, dry basis (except moisture)
~	Approximately
<	Less than
>	Greater than
≥	Greater than or equal to
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)



Cooling Tower 1 - (#1 Paper Machine Side)



Cooling Tower - (#2 Paper Machine Side)

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