



REPORT

Ambient Air Quality Monitoring (VOCs) Report - October 2021

Akzo Nobel Pty Ltd

Submitted to:

Akzo Nobel Pty Ltd

51 McIntyre Rd
Sunshine North
3020 VIC

Submitted by:

Golder Associates Pty Ltd

Building 7, Botanicca Corporate Park, 570 – 588 Swan Street, Richmond, Victoria 3121,
Australia

+61 3 8862 3500

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APPENDICES

APPENDIX A
Important Information

1.0 INTRODUCTION

Golder Associates Pty Ltd (Golder) was commissioned by AkzoNobel Pty Ltd (AkzoNobel) to conduct an ambient air quality monitoring programme at the AkzoNobel site located at 51 McIntyre Road, Sunshine North (the site). The aim of the monitoring program was to assess Volatile Organic Compounds (VOCs) at the site boundary in accordance with the scope outlined in Golder Proposal No. 19130795-014-TM-Rev0, issued on 14/04/2021.

The assessment has been conducted in response to an Amended Clean Up Notice issued to AkzoNobel by the Environment Protection Authority (EPA VIC) issued on 24/12/2020 (CUN No. 90011933).

The following report describes the scope of works, test methods used, and the VOC monitoring results for October 2021.

2.0 SCOPE OF WORKS

2.1 Monitoring Schedule

The VOCs monitoring programme was conducted during September 2021 around the boundary of the AkzoNobel site in Sunshine North. The VOC monitoring consisted of samples being deployed on a 1-in-6-day sampling schedule for a period of 24 hours. The installation and collection dates for the samplers are presented in Table 1.

Table 1: Installation and Collection dates

Round No.	Installation Date	Collection Date
29	Thursday 30 th September 2021	Friday 1 st October 2021
30	Wednesday 6 th October 2021	Thursday 7 th October 2021
31	Tuesday 12 th October 2021	Wednesday 13 th October 2021
32	Monday 18 th October 2021	Tuesday 19 th October 2021
33*	Monday 25 th October 2021	Tuesday 26 th October 2021
34	Saturday 30 th October 2021	Sunday 31 st October 2021

Note: * Round 33 which was scheduled for Sunday 24th to Monday 25th October 2021 was delayed one day due to restricted site access on Sunday 24th October as a result of a COVID exposure on site.

2.2 Sampling Locations

Eight sampling locations were selected around the site boundary to represent and characterise the off-site emissions. (Figure 1).



Figure 1: AkzoNobel fence line (green) and air quality (VOCs) sampling locations (labelled pins)

3.0 TEST METHODS

Benzene, Toluene, Ethyl benzene, Xylene isomers (BTEX) monitoring was carried out in accordance with Golder Associates Test Method No. P13, “Passive Gas Sampling: In Ambient Air by Radiello Passive Samplers”.

Diffusive samplers consist of a diffusive barrier through which gases of interest are allowed to pass, to a separate sorbent section. Gases of interest diffuse across the barrier driven by a concentration gradient and are collected in the sorbent material. The sorbent section is then desorbed in a suitable solvent and analysed by gas chromatography with flame ionisation detection (GC-FID).

Table 2: BTEX Reporting Limits

Compound	Limit of Detection* (µg/m ³)
Benzene	20
Toluene	10
Ethylbenzene	10
m,p-Xylene	10
o-Xylene	10

* Based on a 24 hour sampling period

4.0 UNCERTAINTY

Experiments conducted in a standard atmosphere chamber suggest that the calculated sampling rates for Radiello adsorbing cartridges seldom deviate by more than $\pm 10\%$ from the experimentally measured values.

The estimated measurement uncertainty for analysis of BTEX on Radiello adsorbing cartridges is $\pm 10\%$. The specific measurement uncertainty for each compound is detailed in Table 3.

Table 3: Analytical Uncertainty

VOC Compound	Measurement Uncertainty
Ethylbenzene	2.5%
Toluene	1.5%
Xylene (m-, o- and p-)	2.5% (each)

5.0 AMBIENT AIR QUALITY CRITERIA

As part of the implementation of the Environment Protection Act 2017 which came into effect on 1 July 2021, the Environment Protection Authority, Victoria (EPA Vic), published the draft Guideline for assessing and minimising air pollution in Victoria, Publication 1961, May 2021 (draft guideline). The National Environmental Protection (Air Toxics) Measure, (NEPM (Air Toxics)), describes air quality objectives and sampling methodologies at sites where significantly elevated concentrations of one or more air toxics are expected to occur.

For the purposes of this assessment, the contaminants of interest (toluene, ethylbenzene and total xylene) observations will be compared directly to their corresponding NEPM (Air Toxics) criteria and Victoria Environment Protection Authority's Draft Air Quality Assessment Criteria (AQAC) (Table 4).

Table 4: Ambient Air Quality Criteria for the AkzoNobel Air Quality Monitoring Program

VOC Compound	Averaging Period	NEPM (Air Toxics)	Draft Air Quality Assessment Criteria (AQAC)
		Concentration ($\mu\text{g}/\text{m}^3$)	
Toluene	24-hr	3766	
Ethylbenzene	24-hr		21712
Xylenes	24-hr	1085	8685

Notes: $\mu\text{g}/\text{m}^3$ = micrograms per cubic metre of air at 25 °C and 101.3 kPa

6.0 RESULTS

6.1 VOCs

The results of the VOC monitoring for toluene, ethylbenzene and total xylene isomers for each round of the monitoring programme are presented in Table 5 to Table 10.

Table 5: Round 29 – 01-10-2021

Sample No	Location	Sample period		Concentration ($\mu\text{g}/\text{m}^3$)		
		Start	End	Toluene	Ethylbenzene	Total Xylenes
21-1841	North West	30-09-2021 13:04	01-10-2021 13:52	<10	<10	<20
21-1842	North	30-09-2021 13:15	01-10-2021 14:01	<10	<10	<20
21-1843	North East	30-09-2021 13:20	01-10-2021 14:10	<10	<10	<20
21-1844	East	30-09-2021 13:41	01-10-2021 14:15	<10	<10	<20
21-1845	South East	30-09-2021 13:51	01-10-2021 14:21	<10	<10	<20
21-1846	South	30-09-2021 14:02	01-10-2021 14:28	<10	51	120
21-1847	South West	30-09-2021 14:13	01-10-2021 14:35	30	<10	65
21-1848	West	30-09-2021 14:22	01-10-2021 14:40	<10	<10	<20

Notes: Concentration expressed at 0°C and 101.325 kPa.
Analysis commenced on 18-11-2021, conducted by Golder Associates.

Table 6: Round 30 – 07-10-2021

Sample No	Location	Sample period		Concentration ($\mu\text{g}/\text{m}^3$)		
		Start	End	Toluene	Ethylbenzene	Total Xylenes
21-1885	North West	06-10-2021 09:44	07-10-2021 10:42	<10	<10	<20
21-1886	North	06-10-2021 09:53	07-10-2021 10:48	40	<10	<20
21-1887	North East	06-10-2021 10:02	07-10-2021 10:58	55	<10	<20
21-1888	East	06-10-2021 10:10	07-10-2021 11:04	<10	27	76
21-1889	South East	06-10-2021 10:17	07-10-2021 11:08	<10	<10	<20
21-1890	South	06-10-2021 10:26	07-10-2021 11:15	<10	<10	<20
21-1891	South West	06-10-2021 10:35	07-10-2021 11:24	<10	<10	54
21-1892	West	06-10-2021 10:41	07-10-2021 11:30	<10	<10	<20

Notes: Concentration expressed at 0°C and 101.325 kPa.
Analysis commenced on 18-11-2021, conducted by Golder Associates.

Table 7: Round 31 – 13-10-2021

Sample No	Location	Sample period		Concentration ($\mu\text{g}/\text{m}^3$)		
		Start	End	Toluene	Ethylbenzene	Total Xylenes
21-1912	North West	12-10-2021 09:52	13-10-2021 12:22	<10	<10	<10
21-1913	North	12-10-2021 10:01	13-10-2021 12:12	<10	<10	<10
21-1914	North East	12-10-2021 10:11	13-10-2021 12:04	<10	<10	<10
21-1915	East	12-10-2021 10:20	13-10-2021 11:57	<10	<10	<20
21-1916	South East	12-10-2021 10:26	13-10-2021 11:49	<10	<10	<20
21-1917	South	12-10-2021 10:35	13-10-2021 12:41	<10	<10	110
21-1918	South West	12-10-2021 10:44	13-10-2021 12:35	<10	<10	33
21-1919	West	12-10-2021 10:49	13-10-2021 12:28	<10	<10	<20

Notes: Concentration expressed at 0°C and 101.325 kPa.

Analysis commenced on 18-11-2021, conducted by Golder Associates.

Table 8: Round 32 – 19-10-2021

Sample No	Location	Sample period		Concentration ($\mu\text{g}/\text{m}^3$)		
		Start	End	Toluene	Ethylbenzene	Total Xylenes
21-1939	North West	18-10-2021 11:37	19-10-2021 12:14	<10	<10	<20
21-1940	North	18-10-2021 11:44	19-10-2021 12:20	<10	65	130
21-1941	North East	18-10-2021 11:53	19-10-2021 12:29	<10	<10	100
21-1942	East	18-10-2021 12:01	19-10-2021 12:38	<10	21	54
21-1943	South East	18-10-2021 12:09	19-10-2021 12:42	<10	<10	<20
21-1944	South	18-10-2021 12:20	19-10-2021 12:50	<10	<10	<20
21-1945	South West	18-10-2021 12:28	19-10-2021 12:59	<10	<10	<20
21-1946	West	18-10-2021 12:35	19-10-2021 13:06	<10	48	36

Notes: Concentration expressed at 0°C and 101.325 kPa.

Analysis commenced on 18-11-2021, conducted by Golder Associates.

Table 9: Round 33 – 26-10-2021

Sample No	Location	Sample period		Concentration ($\mu\text{g}/\text{m}^3$)		
		Start	End	Toluene	Ethylbenzene	Total Xylenes
21-1998	North West	25-10-2021 13:31	26-10-2021 13:32	<10	<10	<20
21-1999	North	25-10-2021 13:41	26-10-2021 13:40	<10	59	100
21-2000	North East	25-10-2021 13:50	26-10-2021 13:50	<10	<10	<20
21-2001	East	25-10-2021 13:59	26-10-2021 13:28	71	<10	<20
21-2002	South East	25-10-2021 14:05	26-10-2021 14:03	<10	<10	<20
21-2003	South	25-10-2021 14:11	26-10-2021 14:12	<10	<10	<20
21-2004	South West	25-10-2021 14:23	26-10-2021 14:19	<10	<10	<20
21-2005	West	25-10-2021 14:29	26-10-2021 14:25	<10	<10	<20

Notes: Concentration expressed at 0°C and 101.325 kPa.

Analysis commenced on 18-11-2021, conducted by Golder Associates.

Table 10: Round 34 – 31-10-2021

Sample No	Location	Sample period		Concentration ($\mu\text{g}/\text{m}^3$)		
		Start	End	Toluene	Ethylbenzene	Total Xylenes
21-2031	North West	30-10-2021 11:54	31-10-2021 12:52	<10	<10	<20
21-2032	North	30-10-2021 12:06	31-10-2021 12:58	<10	<10	<20
21-2033	North East	30-10-2021 12:16	31-10-2021 13:08	<10	<10	<20
21-2034	East	30-10-2021 12:26	31-10-2021 13:16	<10	<10	<20
21-2035	South East	30-10-2021 12:32	31-10-2021 13:25	<10	<10	42
21-2036	South	30-10-2021 12:50	31-10-2021 13:34	<10	<10	<20
21-2037	South West	30-10-2021 13:00	31-10-2021 13:42	<10	<10	<20
21-2038	West	30-10-2021 13:08	31-10-2021 13:50	<10	<10	<20

Notes: Concentration expressed at 0°C and 101.325 kPa.

Analysis commenced on 18-11-2021, conducted by Golder Associates.

6.2 Meteorological Conditions

The average meteorological conditions are summarised in Table 11. Wind rose plots for each sampling round are available in Figure 2 to Figure 7.

Table 11: Summary of Wind Conditions

Round No	Start Date	End Date	Predominant Wind Direction (°)	Average Wind Speed (m/s)
29	30-09-2021	01-10-2021	NE	1.0
30	06-10-2021	07-10-2021	W	2.6
31	12-10-2021	13-10-2021	NE	1.3
32	18-10-2021	19-10-2021	S-SW	1.8
33	25-10-2021	26-10-2021	S	1.3
34	30-10-2021	31-10-2021	W	1.3

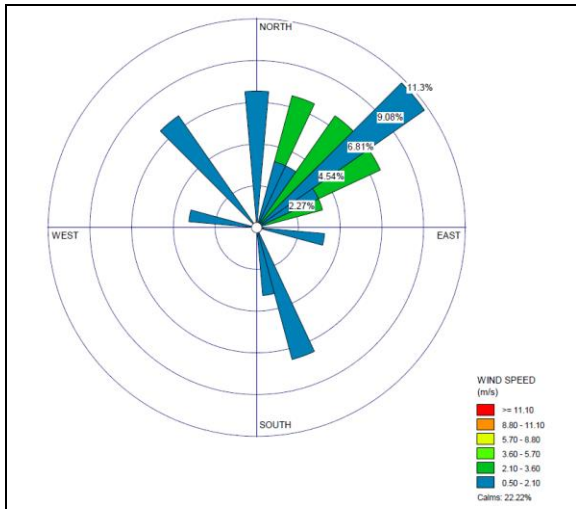


Figure 2: Round 29 – 01-10-2021

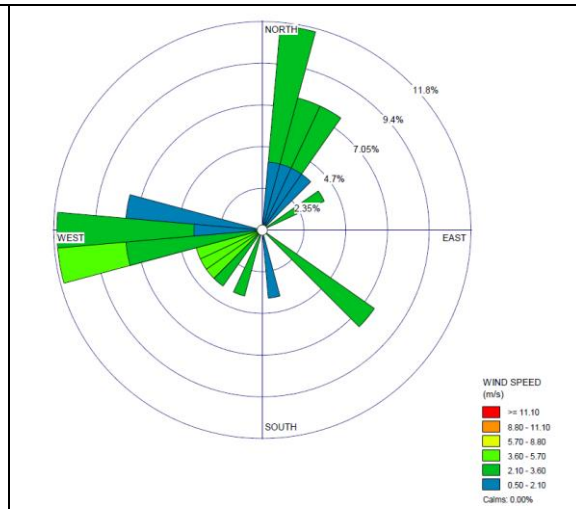


Figure 3: Round 30 – 07-10-2021

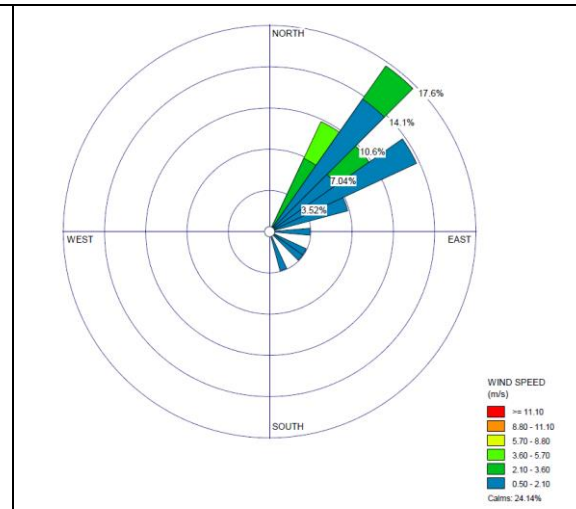


Figure 4: Round 31 – 13-10-2021

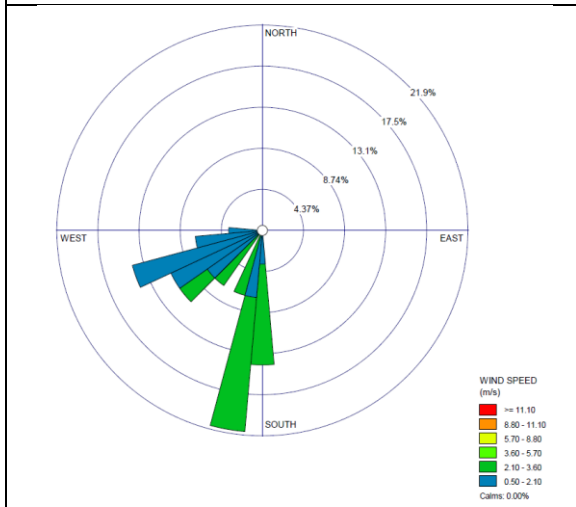


Figure 5: Round 32 – 19-10-2021

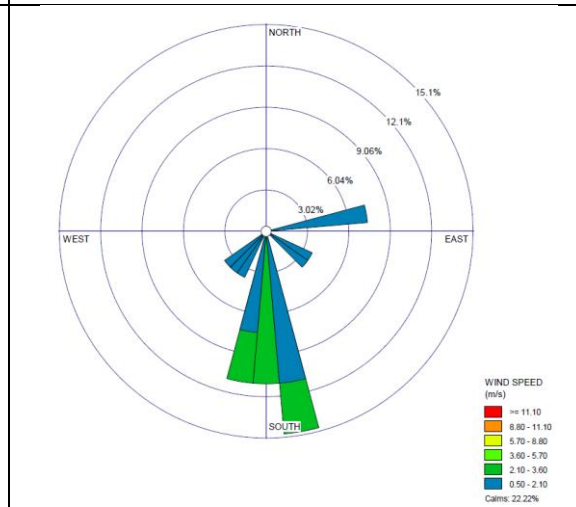


Figure 6: Round 33 – 26-10-2021

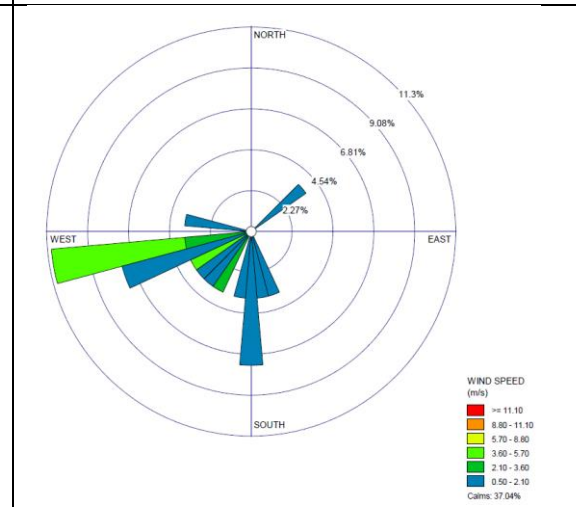


Figure 7: Round 34 – 31-10-2021

7.0 DISCUSSION

A summary of compounds detected above the method limit of detection, compared with the predominant wind direction and ambient air quality criteria is presented in Table 12.

Table 12: Summary

Location	Sample Date	Concentration ($\mu\text{g}/\text{m}^3$)			Predominant Wind Direction
		Toluene	Ethylbenzene	Total Xylenes	
South	01-10-21	<10	51	120	NE
South West	01-10-21	30	<10	65	NE
North	07-10-21	40	<10	<20	W
North East	07-10-21	55	<10	<20	W
East	07-10-21	<10	27	76	W
South West	07-10-21	<10	<10	54	W
East	13-10-21	<10	<10	<20	NE
South	13-10-21	<10	<10	110	NE
South West	13-10-21	<10	<10	33	NE
North	19-10-21	<10	65	130	S-SW
North East	19-10-21	<10	<10	100	S-SW
East	19-10-21	<10	21	54	S-SW
West	19-10-21	<10	48	36	S-SW
North	26-10-21	<10	59	100	S
East	26-10-21	71	<10	<20	S
South East	31-10-21	<10	<10	42	W
Criteria (NEPM Air Toxics)		3766	NA	1085	
Criteria (Draft AQAC)		NA	21712	8685	

NA – Not applicable

The VOC fence line monitoring conducted at AzkoNobel, Sunshine North during October 2021 reported all results below the ambient air quality monitoring criteria for all reported compounds.

8.0 IMPORTANT INFORMATION

Your attention is drawn to the document titled - "Important Information Relating to this Report", which is included in Appendix A of this report. The statements presented in that document are intended to inform a reader of the report about its proper use. There are important limitations as to who can use the report and how it can be used. It is important that a reader of the report understands and has realistic expectations about those matters. The Important Information document does not alter the obligations Golder Associates has under the contract between it and its client.

Signature Page

Golder Associates Pty Ltd



Florence Damour
Environmental Scientist
FMD/MT/fmd



Mark Tulau
Air Quality Specialist

A.B.N. 64 006 107 857

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APPENDIX A

Important Information

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