

REPORT

Ambient Air Quality Monitoring (VOCs) Report - August 2021

Akzo Nobel Pty Ltd

Submitted to:

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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 August 2021.

2.0 SCOPE OF WORKS

2.1 Monitoring Schedule

The VOCs monitoring programme was conducted during August 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
19	Sunday 1 st August 2021	Monday 2 nd August 2021
20	Saturday 7 th August 2021	Sunday 8 th August 2021
21	Friday 13 th August 2021	Saturday 14 th August 2021
22	Thursday 19 th August 2021	Friday 20 th August 2021
23	Wednesday 25 th August 2021	Thursday 26 th August 2021

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/m³)
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 9.

Table 5: Round 19 – 02-08-2021

Sample No	Location	Sample period		Concentration ($\mu\text{g}/\text{m}^3$)		
		Start	End	Toluene	Ethylbenzene	Total Xylenes
21-1371	West	01-08-2021 10:32	02-08-2021 10:52	<10	<10	<20
21-1372	South West	01-08-2021 10:41	02-08-2021 11:46	<10	<10	<20
21-1373	South	01-08-2021 10:46	02-08-2021 11:06	<10	25	57
21-1374	South East	01-08-2021 10:57	02-08-2021 11:16	<10	<10	<20
21-1375	East	01-08-2021 11:02	02-08-2021 11:24	<10	<10	<20
21-1376	North East	01-08-2021 11:08	02-08-2021 11:29	<10	<10	<20
21-1377	North	01-08-2021 11:18	02-08-2021 11:39	<10	<10	<20
21-1378	North West	01-08-2021 11:25	02-08-2021 11:52	<10	<10	<20

Notes: Concentration expressed at 0°C and 101.325 kPa.
Analysis commenced on 01-10-2021, conducted by Golder Associates.

Table 6: Round 20 – 08-08-2021

Sample No	Location	Sample period		Concentration ($\mu\text{g}/\text{m}^3$)		
		Start	End	Toluene	Ethylbenzene	Total Xylenes
21-1427	West	07-08-2021 11:37	08-08-2021 12:17	<10	<10	<20
21-1428	South West	07-08-2021 13:10	08-08-2021 13:25	<10	<10	<20
21-1429	South	07-08-2021 11:50	08-08-2021 12:28	<10	<10	<20
21-1430	South East	07-08-2021 12:01	08-08-2021 12:37	<10	<10	<20
21-1431	East	07-08-2021 12:30	08-08-2021 12:46	<10	<10	57
21-1432	North East	07-08-2021 12:39	08-08-2021 12:51	<10	<10	<20

Sample No	Location	Sample period		Concentration ($\mu\text{g}/\text{m}^3$)		
		Start	End	Toluene	Ethylbenzene	Total Xylenes
21-1433	North	07-08-2021 12:48	08-08-2021 13:03	<10	<10	<20
21-1434	North West	07-08-2021 12:58	08-08-2021 13:14	<10	<10	<20

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

Analysis commenced on 01-10-2021, conducted by Golder Associates.

Table 7: Round 21 – 14-08-2021

Sample No	Location	Sample period		Concentration ($\mu\text{g}/\text{m}^3$)		
		Start	End	Toluene	Ethylbenzene	Total Xylenes
21-1470	North West	13-08-2021 15:01	14-08-2021 15:20	<10	<10	<20
21-1471	North	13-08-2021 15:13	14-08-2021 15:26	<10	<10	<20
21-1472	North East	13-08-2021 15:25	14-08-2021 15:34	<10	<10	<20
21-1473	East	13-08-2021 15:34	14-08-2021 15:39	<10	<10	<20
21-1474	South East	13-08-2021 15:43	14-08-2021 16:22	<10	<10	49
21-1475	South	13-08-2021 16:11	14-08-2021 15:47	<10	<10	27
21-1476	South West	13-08-2021 16:25	14-08-2021 15:54	<10	<10	23
21-1477	West	13-08-2021 16:23	14-08-2021 15:59	19	<10	<20

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

Analysis commenced on 01-10-2021, conducted by Golder Associates.

Table 8: Round 22 – 20-08-2021

Sample No	Location	Sample period		Concentration ($\mu\text{g}/\text{m}^3$)		
		Start	End	Toluene	Ethylbenzene	Total Xylenes
21-1492	West	19-08-2021 09:25	20-08-2021 09:57	<10	<10	<20

Sample No	Location	Sample period		Concentration ($\mu\text{g}/\text{m}^3$)		
		Start	End	Toluene	Ethylbenzene	Total Xylenes
21-1493	South West	19-08-2021 09:36	20-08-2021 10:06	<10	<10	<20
21-1494	South	19-08-2021 09:46	20-08-2021 10:15	<10	<10	26
21-1495	South East	19-08-2021 09:56	20-08-2021 10:23	<10	<10	<20
21-1496	East	19-08-2021 10:05	20-08-2021 10:31	<10	<10	<20
21-1497	North East	19-08-2021 10:18	20-08-2021 10:37	<10	33	76
21-1498	North	19-08-2021 10:26	20-08-2021 11:11	<10	<10	<20
21-1499	North West	19-08-2021 10:32	20-08-2021 10:48	<10	<10	<20

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

Analysis commenced on 01-10-2021, conducted by Golder Associates.

Table 9: Round 23 – 26-08-2021

Sample No	Location	Sample period		Concentration ($\mu\text{g}/\text{m}^3$)		
		Start	End	Toluene	Ethylbenzene	Total Xylenes
21-1529	North West	25-08-2021 09:58	26-08-2021 10:14	<10	<10	<20
21-1530	North	25-08-2021 10:10	26-08-2021 10:20	<10	<10	100
21-1531	North East	25-08-2021 10:20	26-08-2021 10:29	<10	<10	<20
21-1532	East	25-08-2021 10:29	26-08-2021 10:35	<10	<10	<20
21-1533	South East	25-08-2021 10:38	26-08-2021 10:41	<10	<10	<20
21-1534	South	25-08-2021 10:48	26-08-2021 10:47	<10	<10	<20

Sample No	Location	Sample period		Concentration ($\mu\text{g}/\text{m}^3$)		
		Start	End	Toluene	Ethylbenzene	Total Xylenes
21-1535	South West	25-08-2021 10:57	26-08-2021 10:55	<10	<10	<20
21-1536	West	25-08-2021 11:07	26-08-2021 10:59	<10	<10	<20

Notes: Concentration expressed at 0°C and 101.325 kPa.
Analysis commenced on 01-10-2021, conducted by Golder Associates.

6.2 Meteorological Conditions

The average meteorological conditions are summarised in Table 10. Wind rose plots for each sampling round are available Figure 2 to Figure 6

Table 10: Summary of Wind Conditions

Round No	Start Date	End Date	Predominant Wind Direction (°)	Average Wind Speed (m/s)
19	01-08-2021	02-08-2021	N-NE	1.7
20	07-08-2021	08-08-2021	W	1.4
21	13-08-2021	14-08-2021	W	1.4
22	19-08-2021	20-08-2021	N-NE	2.4
23	25-08-2021	26-08-2021	S	1.4

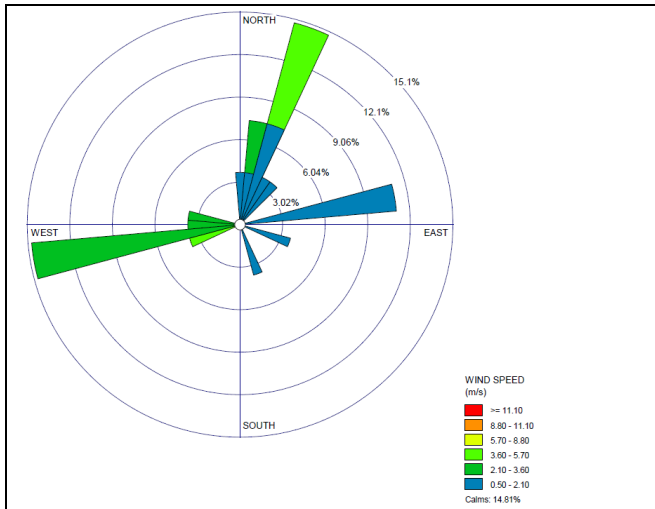


Figure 2: Round 20 - 02-05-2021

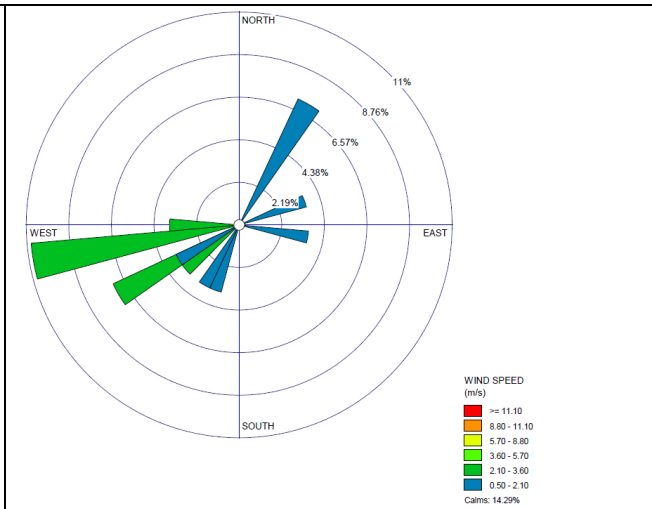


Figure 3: Round 20 - 02-08-2021

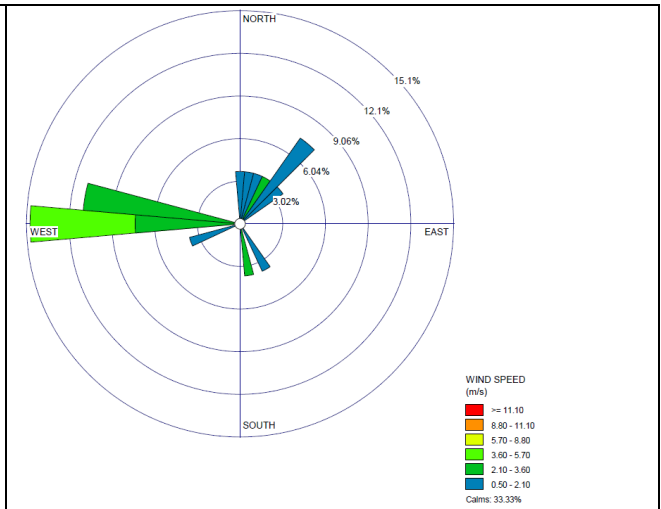


Figure 4: Round 21 - 14-08-2021

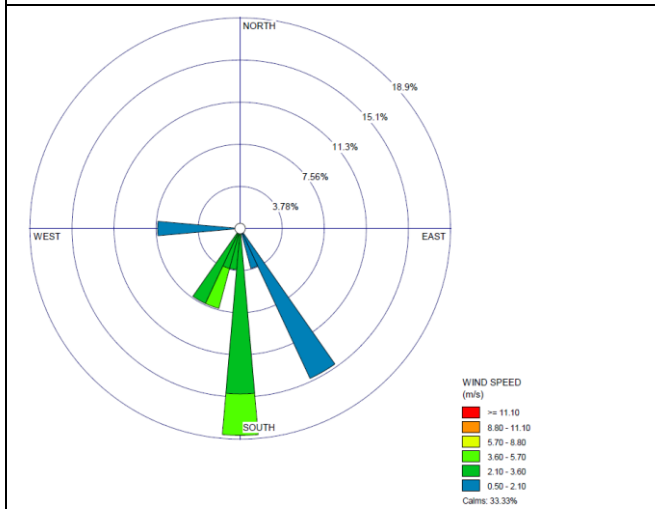


Figure 5: Round 23 - 26-08-202

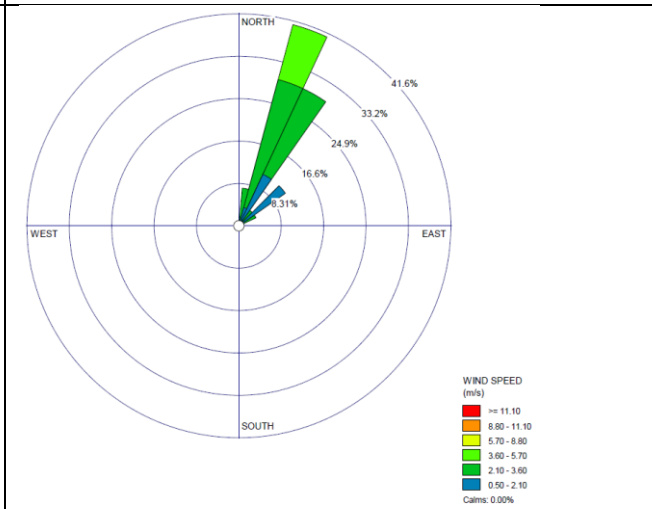


Figure 6: Round 22 - 20-08-2021

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 11.

Table 11: Summary

Location	Sample Date	Concentration ($\mu\text{g}/\text{m}^3$)			Predominant Wind Direction
		Toluene	Ethylbenzene	Total Xylenes	
South	02-08-21	<10	25	57	N-NE
East	08-08-21	<10	<10	57	W
South East	14-08-21	<10	<10	49	W
South	14-08-21	<10	<10	27	W
South West	14-08-21	<10	<10	23	W
West	14-08-21	19	<10	<20	W
North East	20-08-21	<10	<10	26	N-NE
South	20-08-21	<10	33	76	N-NE
North	26-08-21	<10	<10	100	S
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 August 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.

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APPENDIX A

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