



REPORT

Ambient Air Quality Monitoring (VOCs) Report - March 2020

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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Table of Contents

1.0 INTRODUCTION1

2.0 SCOPE OF WORKS1

 2.1 Monitoring Schedule 1

 2.2 Sampling Locations 1

3.0 TEST METHODS2

4.0 UNCERTAINTY3

5.0 AMBIENT AIR QUALITY CRITERIA3

6.0 RESULTS4

 6.1 VOCs 4

 6.2 Meteorological Conditions 7

7.0 DISCUSSION1

8.0 IMPORTANT INFORMATION2

TABLES

Table 1: Installation and Collection dates 1

Table 3: BTEX Reporting Limits 2

Table 4: Analytical Uncertainty 3

Table 5: Ambient Air Quality Criteria for the AkzoNobel Air Quality Monitoring Program 3

Table 6: Round 1 – 06-02-2021 4

Table 7: Round 2 – 12-02-2021 4

Table 8: Round 3 – 19-02-2021 5

Table 9: Round 4 – 24-02-2021 5

Table 10: Round 5 – 02-03-2021 6

Table 11: Summary of Wind Conditions 1

Table 12: Summary 1

FIGURES

Figure 1: AkzoNobel fenceline (green) and air quality (VOCs) sampling locations (labelled pins) 2

Figure 2: Round 1 – 06-02-2021 7

Figure 3: Round 2 – 12-02-2021 7

Figure 4: Round 3 – 19-02-21 7

Figure 5: Round 4 – 24-02-20217
Figure 6: Round 5 – 02-03-20217

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. 19130795-008-TM-Rev0, issued on 22 January 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 results obtained from the monitoring programme.

2.0 SCOPE OF WORKS

2.1 Monitoring Schedule

The VOCs monitoring programme was conducted between the 6/02/2021 and 2/03/2021 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 with five monitoring rounds conducted. 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
1	Friday 5 th February 2021	Saturday 6 th February 2021
2	Thursday 11 th February 2021	Friday 12 th February 2021
3 *	Thursday 18 th February 2021	Friday 19 th February 2021
4	Tuesday 23 rd February 2021	Wednesday 23 rd February 2021
5	Monday 1 st March 2021	Tuesday 2 nd March 2021

*Sampling was delayed by one day due to the 5-day circuit breaker COVID19 lockdown in Victoria.

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* ($\mu\text{g}/\text{m}^3$)
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

The National Environment Protection (Air Toxics) Measure (NEPC 1994) includes 24-hr criteria for toluene and total xylenes. There are no available NEPM (Air Toxics) criteria for ethylbenzene.

For the purposes of this assessment toluene and total xylene observations will be compared directly to their corresponding NEPM (Air Toxics) criteria (Table 4).

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

VOC Compound	NEPM (Air Toxics)	
	Averaging Period	Criteria ($\mu\text{g}/\text{m}^3$)
Toluene	24-hr	3766
Xylenes	24-hr	1085

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. The limit of reporting for toluene in round 3 was increased to 100 µg/m³ due to the presence of toluene in the analytical blanks.

Table 5: Round 1 – 06-02-2021

Sample No	Location	Sample period		Concentration (µg/m ³)		
		Start	End	Toluene	Ethylbenzene	Total Xylenes
21-76	South	05-02-2021 14:05	06-02-2021 14:22	<10	15	99
21-75	South West	05-02-2021 14:15	06-02-2021 14:28	<10	<10	<10
21-74	West	05-02-2021 14:25	06-02-2021 14:36	<10	<10	<10
21-73	North West	05-02-2021 14:40	06-02-2021 14:44	<10	<10	<10
21-72	North	05-02-2021 14:55	06-02-2021 14:49	<10	<10	60
21-71	East	05-02-2021 15:05	06-02-2021 14:57	<10	<10	<10

Notes: South East and North East samplers were not deployed on the first round of sampling. Concentration expressed at 0°C and 101.325 kPa. Analysis commenced on 01-03-2021, conducted by Golder Associates.

Table 6: Round 2 – 12-02-2021

Sample No	Location	Sample period		Concentration (µg/m ³)		
		Start	End	Toluene	Ethylbenzene	Total Xylenes
21-163	South East	11-02-2021 10:46	12-02-2021 10:39	<10	<10	<10
21-161	South	11-02-2021 9:29	12-02-2021 9:50	<10	28	200
21-160	South West	11-02-2021 9:38	12-02-2021 10:04	<10	<10	<10
21-159	West	11-02-2021 9:45	12-02-2021 10:10	<10	<10	<10
21-158	North West	11-02-2021 9:55	12-02-2021 10:15	<10	<10	<10
21-157	North	11-02-2021 10:01	12-02-2021 10:20	<10	<10	<10
21-162	North East	11-02-2021 10:37	12-02-2021 10:27	<10	<10	19
21-156	East	11-02-2021 10:26	12-02-2021 10:31	<10	<10	<10

Notes: Concentration expressed at 0°C and 101.325 kPa. Analysis commenced on 01-03-2021, conducted by Golder Associates.

Table 7: Round 3 – 19-02-2021

Sample No	Location	Sample period		Concentration ($\mu\text{g}/\text{m}^3$)		
		Start	End	Toluene	Ethylbenzene	Total Xylenes
21-243	South East	18-02-21 16:00	19-02-21 16:08	<100	<10	<10
21-244	South	18-02-21 15:49	19-02-21 15:57	<100	<10	150
21-245	South West	18-02-21 15:40	19-02-21 15:52	<100	<10	<10
21-246	West	18-02-21 15:35	19-02-21 15:45	<100	<10	<10
21-247	North West	18-02-21 16:28	19-02-21 16:34	<100	<10	<10
21-248	North	18-02-21 16:20	19-02-21 16:28	<100	<10	<10
21-249	North East	18-02-21 16:12	19-02-21 16:20	<100	<10	<10
21-250	East	18-02-21 16:06	19-02-21 16:14	<100	<10	<10

Notes: Concentration expressed at 0°C and 101.325 kPa. Analysis commenced on 01-03-2021, conducted by Golder Associates.

Table 8: Round 4 – 24-02-2021

Sample No	Location	Sample period		Concentration ($\mu\text{g}/\text{m}^3$)		
		Start	End	Toluene	Ethylbenzene	Total Xylenes
21-252	South East	23-02-21 10:12	24-02-21 10:44	<10	<10	<10
21-253	South	23-02-21 10:05	24-02-21 10:37	<10	<10	<10
21-254	South West	23-02-21 9:59	24-02-21 10:32	<10	<10	<10
21-255	West	23-02-21 10:42	24-02-21 11:16	<10	<10	<10
21-256	North West	23-02-21 10:36	24-02-21 11:09	<10	<10	<10
21-257	North	23-02-21 10:30	24-02-21 11:03	<10	34	200
21-258	North East	23-02-21 10:24	24-02-21 10:54	<10	<10	<10
21-259	East	23-02-21 10:18	24-02-21 10:50	<10	<10	<10

Notes: Concentration expressed at 0°C and 101.325 kPa. Analysis commenced on 01-03-2021, conducted by Golder Associates.

Table 9: Round 5 – 02-03-2021

Sample No	Location	Sample period		Concentration ($\mu\text{g}/\text{m}^3$)		
		Start	End	Toluene	Ethylbenzene	Total Xylenes
21-261	South East	01-03-21 15:42	02-03-21 16:08	<10	<10	<10
21-262	South	01-03-21 15:49	02-03-21 16:22	<10	50	200
21-263	South West	01-03-21 15:53	02-03-21 16:27	<10	<10	<10
21-264	West	01-03-21 15:57	02-03-21 16:35	<10	<10	<10
21-265	North West	01-03-21 16:01	02-03-21 16:41	<10	<10	<10
21-266	North	01-03-21 16:05	02-03-21 16:50	<10	26	130
21-267	North East	01-03-21 16:13	02-03-21 16:57	<10	18	48
21-268	East	01-03-21 16:15	02-03-21 17:04	<10	<10	17

Notes: Concentration expressed at 0°C and 101.325 kPa. Analysis commenced on 01-03-2021, 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 in Figure 2 to Figure 6 below:

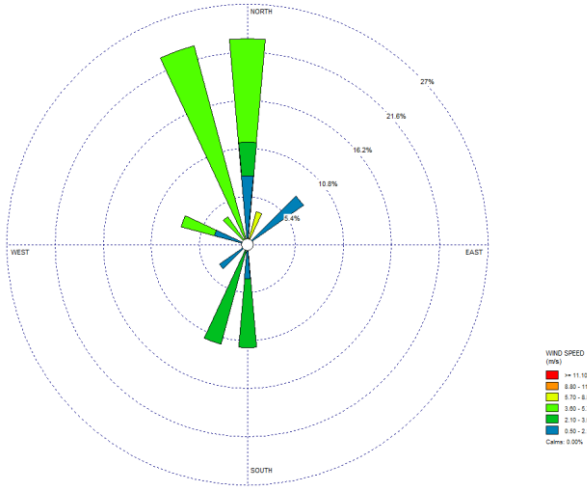


Figure 2: Round 1 – 06-02-2021

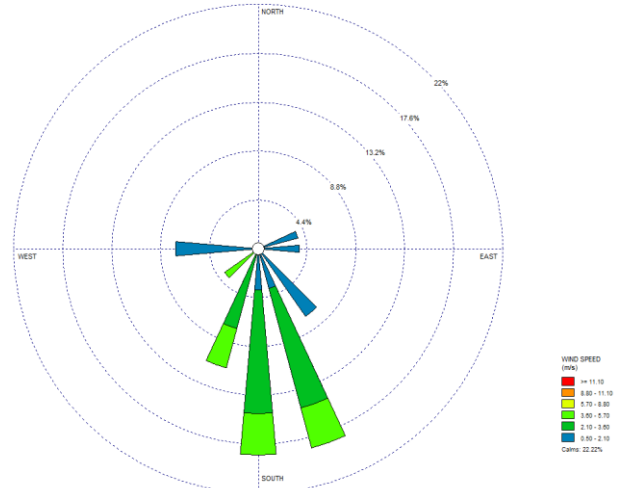


Figure 5: Round 4 – 24-02-2021

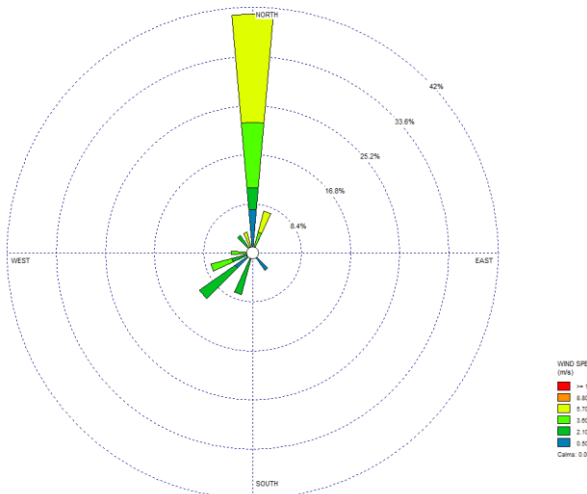


Figure 3: Round 2 – 12-02-2021

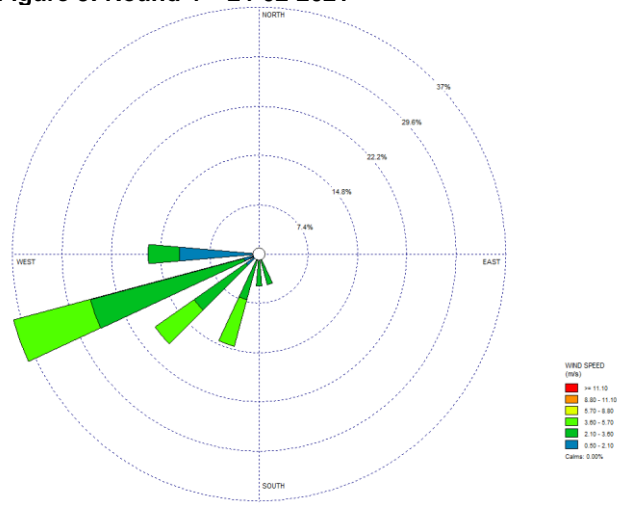


Figure 6: Round 5 – 02-03-2021

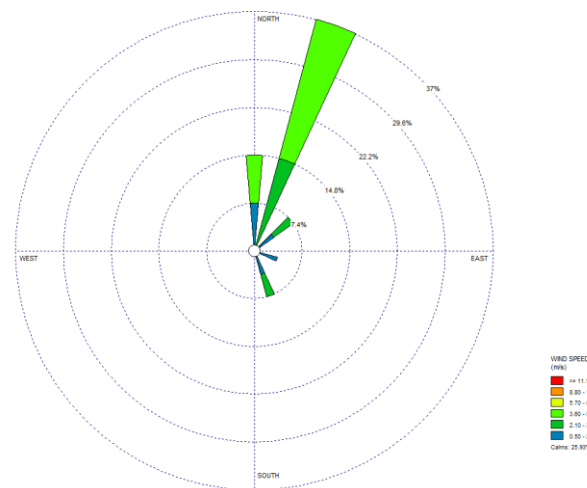


Figure 4: Round 3 – 19-02-21

Table 10: Summary of Wind Conditions

Round No	Start Date	End Date	Average Wind Direction (°)	Average Wind Speed (m/s)
Round 1	05-02-21	06-02-21	N-NNW	3.5
Round 2	11-02-21	12-02-21	N	3.6
Round 3	18-02-21	19-02-21	NNE	2.2
Round 4	23-02-21	24-02-21	S-SSE	1.8
Round 5	01-03-21	02-03-21	WSW	2.8

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	
N	6/02/2021	<10	<10	60	N-NNE
S	6/02/2021	<10	15	99	N-NNE
S	12/02/2021	<10	28	200	N
NE	12/02/2021	<10	<10	19	N
S	19/02/2021	<100	<10	150	NNE
N	24/02/2021	<10	34	200	S
S	2/03/2021	<10	50	200	WSW
N	2/03/2021	<10	26	130	WSW
NE	2/03/2021	<10	18	48	WSW
E	2/03/2021	<10	<10	17	WSW
Criteria		3766	NA	1085	

The VOC fence line monitoring conducted at AzkoNobel, Sunshine North, between the 6/02/2021 and 2/03/2021 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



Mark Tulau

FMD/MT/fmd

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APPENDIX A

Important Information

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