2024 Annual Ambient Monitoring Report for Petroleum Refining – Industry Standard

Technical Standards to Manage Air Pollution: Petroleum Refining - Industry Standard (PRIS), Ontario Regulation (O. Reg.) 419/05

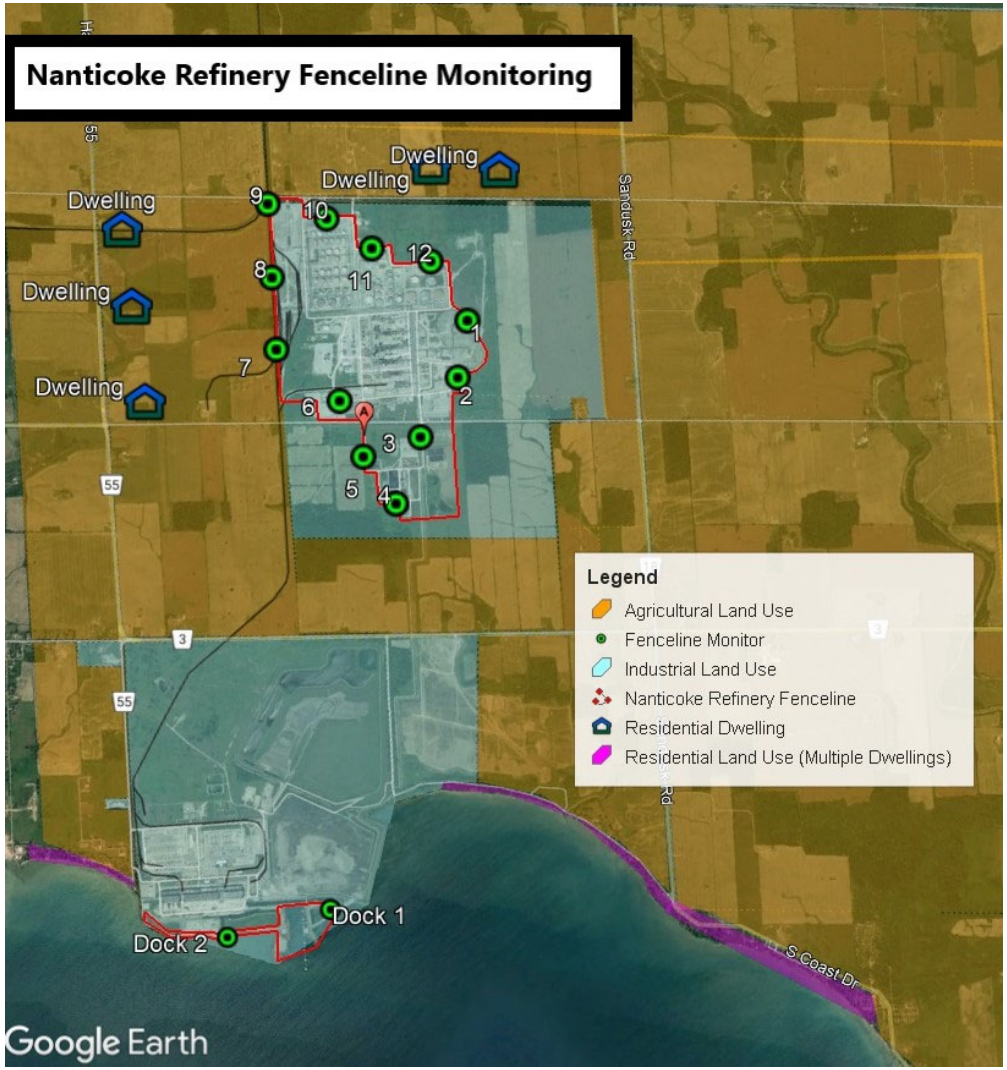
Part X – Complaints, Records and Reporting, Subsection 65(2)

Nanticoke Refinery, Imperial Oil

March 31, 2025

This report was prepared in accordance paragraph 6 of PRIS subsection 65(2).

i. The following map shows the location of each monitoring station required by subsection 60(1), the information required by clause 60(4)(d), and other topographical information including any nearby water bodies, roadways and adjacent land uses. Residential dwellings within a 1km radius of the Nanticoke Refinery's fenceline are shown on the map. There are no health care facilities, senior citizen's residences, childcare facilities or educational facilities within a 10km radius of the Nanticoke Refinery's fenceline.



ii. A) Please see Table A-1 for the information required by subsection 60(6).

Table A-1 2024 Benzene Sampling Information and Results for each Monitor

Station ID		1-FLARE	2-SPHERE	3-WWTP	4-WWTP	5-WWTP	6-FIREHALL	7-RAIL	8-RAIL	9-TERMINAL	10-TANKS	11-TANKS	12-TANKS	13-DOCK1	14-DOCK2
Location (Lat, Long)		(42.8360, -80.0406)	(42.8324, -80.0403)	(42.8283, -80.0423)	(42.8240, -80.0431)	(42.8264, -80.0466)	(42.8295, -80.0496)	(42.8318, -80.0558)	(42.8361, -80.0576)	(42.8406, -80.0594)	(42.8404, -80.0542)	(42.8392, -80.0499)	(42.8390, -80.0451)	(42.7988, -80.0408)	(42.7959, -80.0488)
Date of Deployment/ Date of Retrieval/ Results (ug/m^3)															
21-December-2023	4-January-2024	4.2	1.4	1.2	1.4	1.6	0.84	1.8	1.8	0.68	1.3	1.3	1.1	0.60	0.92
4-January-2024	18-January-2024	7.1	1.1	0.78	0.75	1.5	0.69	1.4	1.0	0.80	1.2	2.4	3.0	0.94	1.1
18-January-2024	1-February-2024	3.1	1.4	0.99	1.4	1.2	0.97	1.6	1.6	0.80	1.9	1.5	1.6	2.2	0.71
1-February-2024	15-February-2024	0.98	0.88	0.81	1.4	1.1	1.0	1.4	1.7	0.80	1.6	1.2	1.2	0.77	3.1
15-February-2024	29-February-2024	1.6	0.95	1.2	1.3	1.6	0.99	1.0	1.2	0.77	2.1	1.9	2.1	0.84	1.9
29-February-2024	14-March-2024	1.0	0.86	1.2	0.80	1.1	0.72	1.4	1.5	0.66	2.2	1.4	1.5	1.2	1.3
14-March-2024	28-March-2024	1.1	0.70	0.57	0.83	0.72	0.55	0.67	1.2	0.51	1.2	1.4	1.2	1.2	0.71
28-March-2024	11-April-2024	0.67	0.58	0.81	1.6	1.5	0.95	1.3	2.0	0.50	1.4	0.95	0.92	1.2	0.45
11-April-2024	25-April-2024	1.1	0.88	1.0	0.81	0.70	0.61	0.82	1.2	0.49	2.0	1.2	1.2	1.6	1.2
25-April-2024	9-May-2024	0.66	0.61	0.97	1.8	0.88	0.89	1.5	3.6	0.66	2.3	1.3	1.2	2.3	0.70
9-May-2024	23-May-2024	0.78	0.70	1.6	1.4	0.95	0.93	1.2	1.5	0.62	4.3	2.0	1.9	0.52	1.2
23-May-2024	6-June-2024	0.94	0.56	1.2	1.6	1.8	1.1	1.0	1.5	Note 1	3.4	1.9	1.4	0.86	0.57
6-June-2024	20-June-2024	0.97	0.77	1.3	1.1	0.92	0.85	0.97	1.3	0.99 Note 2	3.6	2.4	1.4	1.7	3.0
20-June-2024	4-July-2024	0.99	0.85	1.9	1.2	0.90	0.70	0.96	1.6	0.44	3.6	2.3	1.3	1.5	0.30
4-July-2024	18-July-2024	1.0	0.96	2.8	1.3	1.4	1.2	1.0	1.3	0.42	5.4	3.1	1.4	3.6	0.63
18-July-2024	1-August-2024	0.94	0.94	1.9	2.2	1.2	1.5	1.1	1.1	0.37	4.4	2.4	1.2	0.71	0.35
1-August-2024	15-August-2024	1.6	1.2	1.2	1.7	1.6	1.1	1.1	1.4	0.48	2.5	2.7	1.8	1.2	0.34
15-August-2024	29-August-2024	1.0	1.1	3.7	4.3	4.8	2.6	2.0	1.6	0.62	5.1	2.4	1.7	0.78	0.64
29-August-2024	12-September-2024	1.2	0.82	1.5	4.0	1.3	1.7	1.9	2.0	0.36	3.0	2.0	1.8	0.50	0.62
12-September-2024	26-September-2024	0.44	0.54	0.95	1.8	1.6	1.5	2.7	5.5	0.97	2.1	1.4	0.97	0.41	0.51
26-September-2024	10-October-2024	1.1	0.95	1.0	1.4	0.80	1.0	1.3	3.1	0.37	2.1	1.7	1.4	0.38	0.37
10-October-2024	24-October-2024	1.3	1.1	1.9	2.6	1.1	1.5	1.2	1.2	0.48	2.8	2.1	2.2	0.76	0.43
24-October-2024	7-November-2024	1.4	0.94	1.4	1.2	0.72	1.2	1.4	2.1	0.56	3.8	2.3	2.0	0.55	0.55
7-November-2024	21-November-2024	0.84	0.65	0.83	1.2	0.70	0.73	1.0	2.6	0.62	1.6	1.6	1.2	1.5	0.87
21-November-2024	5-December-2024	1.6	0.87	0.75	1.6	0.67	0.70	0.79	1.3	0.52	1.7	3.1	2.3	0.62	0.58
5-December-2024	19-December-2024	1.6	0.83	0.96	0.78	1.0	0.79	0.82	1.1	0.66	1.7	2.8	2.0	0.84	0.78

Note 1: Technician error in tube harvest. No sample taken. Note 2: Results reflect a 4-week sampling period (May 23 to June 20, 2024) due to technician error (see Note 1).

ii. B) Table B-1 provides the results of calculations required by section 62 to identify whether a statistically significant increase in the concentration of benzene occurred. As shown in Table B-1 there was no statistically significant increase in 2024 across stations 1-12. Monitoring of stations 13-DOCK1 and 14-DOCK2 started on November 24, 2022 therefore no statistical analysis could be completed for these stations for 2024 as they have not yet been monitored for three full calendar years.

Table B-1 Results of Section 62 Calculations

			1-FLARE	2-SPHERE	3-WWTP	4-WWTP	5-WWTP	6-FIREHALL	7-RAIL	8-RAIL	9-TERMINAL	10-TANKS	11-TANKS	12-TANKS
2018-2020	**61(2)3.**	**X**	0.28	0.06	0.46	0.32	0.09	0.14	0.46	0.43	-0.44	0.52	0.63	0.64
	61(2)4.	**S^2**	0.22	0.13	0.24	0.20	0.14	0.10	0.12	0.08	0.12	0.20	0.09	0.14
2024	**62(3)3.**	**X**	0.20	-0.15	0.19	0.36	0.14	-0.02	0.20	0.50	-0.54	0.87	0.62	0.41
	62(3)4.	**S^2**	0.33	0.07	0.18	0.20	0.18	0.12	0.10	0.16	0.08	0.20	0.10	0.08
	62(3)5.	**T**	-0.66	-3.15	-2.77	0.42	0.55	-1.95	-3.61	0.79	-1.43	3.40	-0.15	-3.14
	62(3)6.	**V**	36.32	59.43	48.99	43.15	38.87	39.20	46.10	33.51	47.72	43.02	39.63	54.54
	62(3)7.	**T**	3.55	3.46	3.46	3.46	3.55	3.55	3.46	3.55	3.46	3.46	3.55	3.46
	62(3)8.	**Statistically Significant Increase?**	No	No	No	No	No	No	No	No	No	No	No	No

ii. C) Table C-1 provides a summary of the annual average benzene concentration results from the time that the monitor was first required by subsection 60(1).

Table C-1 Annual Average Benzene Concentration Results at each Station

Year/Results (ug/m³)	1-FLARE	2-SPHERE	3-WWTP	4-WWTP	5-WWTP	6-FIREHALL	7-RAIL	8-RAIL	9-TERMINAL	10-TANKS	11-TANKS	12-TANKS	13-DOCK1 (Note 1)	14-DOCK2 (Note 1)
2018	1.4	1.1	2.0	1.9	1.3	1.3	2.0	1.7	0.8	1.6	2.0	2.0	-	-
2019	1.5	1.2	1.8	1.3	1.3	1.2	1.8	1.7	0.7	1.9	2.0	2.1	-	-
2020	1.5	1.1	1.6	1.4	1.0	1.1	1.3	1.5	0.6	2.1	1.9	1.9	-	-
2021	1.1	0.8	1.2	1.3	0.9	1.0	1.2	2.1	0.6	3.5	1.9	1.5	-	-
2022	1.2	1.0	1.7	1.9	1.4	1.2	1.4	2.4	0.6	3.4	2.0	2.0	1.5	1.0
2023	1.9	1.1	1.4	1.5	1.1	1.1	1.2	1.4	0.6	2.7	2.0	2.4	1.2	0.7
2024	1.5	0.9	1.3	1.6	1.3	1.1	1.3	1.8	0.6	2.6	2.0	1.6	1.1	0.9

Note 1: Annual averages for the two dock stations are only available starting from 2022 as they only began to be sampled on November 24, 2022 as per the amended PRIS Fence Line Benzene Monitoring Plan dated November 15, 2022.

iii. As shown in Table B-1, there was no statistically significant increase in the concentration of benzene across ambient monitoring stations 1-12 and therefore section 63 requirement does not apply for 2024. Statistical analysis could not be completed for ambient monitoring stations 13-DOCK1 and 14-DOCK2 in 2024 as they have not yet been monitored for three full calendar years.