2022 Reporting Year Annual Ambient Monitoring Report for Petroleum Refining – Industry Standard

Technical Standards to Manage Air Pollution Petroleum Refining – Industry Standard

Shell Canada Limited
Corunna Facility

Prepared by:

Shell Canada Limited
150 St. Clair Parkway
Corunna, Ontario
N0N 1G0

March 31, 2023

AFN Senior Centre
1840 Virgil Ave.

AFN Community Centre
1900 Virgil Ave.

AFN Daycare Centre
1972 Virgil Ave.

Aamjiwnaang First Nations

Aamjiwnaang First Nations

AFN Healthcare Centre

Residential

330 Degrees (NNW)

0 Degrees (North)

30 Degrees (NNE)

60 Degrees (ENE)

Dwelling (STN-12)

Dwelling (STN-1)

Dwelling (STN-11)

STN-12

STN-11

STN-1

STN-2

STN-3

Lambton College Fire School

300 Degrees (WNW)

Residential

Industrial land Use

GATX Rail Facility

270 Degrees (West)

STN-10

90 Degrees (East)

STN-4

STN-5

120 Degrees (ESE)

150 Degrees (SSE)
Monitor relocated to 226 degrees at request of MOECC

Industrial Land Use

240 Degrees (WSW)

STN-9

STN-8

STN-7

STN-6

Dwelling (STN-9)

226 Degrees (SW)

210 Degrees (SSW)

180 Degrees (South)

Dockside Industrial Park

Industrial Land Use

Residential

Thompson Gardens (Senior Residence)

LEGEND

• Ambient Air Monitor

⊠ Sensitive Receptor

Last Revised March 2018: added land use designations; receptor locations; and updated drawing title names.

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LEHDER ENVIRONMENTAL SERVICES
704 MARA STREET, SUITE 210
POINT EDWARD, ON N7V 1X4
T 519-336-4101   F 519-336-4311
www.lehder.com

LEHDER PROJECT NUMBER:
165178

DATE:
January 2017

LEHDER DRAWING NUMBER:
B-164255B-2

Sarnia Manufacturing Centre
Shell Canada Products

Location of Property Line
Monitoring Stations

0   250m   500m   750m   1000m

SCALE: 1:15000 (1mm=15meter)

SCALE: 1:15000 (1mm=15meter)

Ontario Ministry of the Environment, Conservation and Parks (MECP)

Petroleum Industry Refining Standard (PRIS)

Shell Canada Products Sarnia Manufacturing Centre

Sarnia, Ontario Canada

2022 Property Line Benzene Monitoring Results

Location	UTM Coordinates	22-Dec-21 / 5-Jan-22	5-Jan-22 / 19-Jan-22	19-Jan-22 / 2-Feb-22	2-Feb-22 / 16-Feb-22	16-Feb-22 / 2-Mar-22	2-Mar-22 / 16-Mar-22	16-Mar-22 / 30-Mar-22	30-Mar-22 / 13-Apr-22	13-Apr-22 / 27-Apr-22	27-Apr-22 / 11-May-22	11-May-22 / 25-May-22	25-May-22 / 8-Jun-22	8-Jun-22 / 22-Jun-22
		ug/m3	ug/m3	ug/m3	ug/m3	ug/m3	ug/m3	ug/m3	ug/m3	ug/m3	ug/m3	ug/m3	ug/m3	ug/m3
Station #1	382166mE, 4752034mN	1.87	1.94	1.53	2.13	2.50	1.76	1.99	1.66	1.79	1.65	2.13	1.59	2.78
Station #2	382511mE, 4752034mN	1.74	1.50	1.13	1.41	1.69	1.32	1.30	1.21	1.33	1.68	1.78	1.01	1.63
Station #3	383172mE, 4752033mN	1.44	0.91	0.95	1.21	1.06	1.14	1.23	1.00	1.07	1.52	1.30	1.04	1.11
Station #4	383332mE, 4751409mN	1.33	1.03	0.96	1.10	1.12	1.07	1.03	0.93	1.13	1.37	1.22	0.84	1.06
Station #5	382517mE, 4751245mN	1.88	1.47	1.68	2.19	1.62	1.64	2.21	1.58	1.82	1.65	1.38	1.10	1.44
Station #6	382125mE, 4750795mN	2.00	1.80	1.89	1.84	1.68	1.82	1.89	1.91	1.66	1.25	1.43	0.86	1.28
Station #7	381748mE, 4750810mN	1.69	1.92	2.36	2.35	2.05	1.92	2.31	1.91	2.01	2.01	1.58	0.89	1.62
Station #8	381455mE, 4750820mN	9.01	5.44	3.27	5.66	7.50	4.40	4.21	2.27	3.44	8.48	9.09	5.32	8.78
Station #9	381051mE, 4750852mN	1.51	1.63	1.01	1.06	1.81	1.54	1.33	0.92	1.12	2.55	1.51	0.70	1.09
Station #10	381112mE, 4751494mN	2.20	1.56	2.10	0.93	1.43	1.81	1.39	2.41	1.83	2.61	1.65	0.84	1.90
Station #11	381438mE, 4751966mN	6.49	1.34	6.57	2.66	2.06	3.68	3.54	6.00	2.58	5.88	3.29	2.17	2.60
Station #12	381773mE, 4752076mN	4.46	4.56	6.76	9.73	7.72	6.26	4.17	4.93	3.76	1.93	3.03	3.33	3.61

Field QA/QC Data

Field Blank #1

	Col 1	Col 2	Col 3	Col 4	Col 5	Col 6	Col 7	Col 8	Col 9	Col 10	Col 11	Col 12	Col 13
Location	Station #2	Station #3	Station #4	Station #5	Station #6	Station #1	Station #2	Station #3	Station #4	Station #5	Station #6	Station #1	Station #2
Value (ug/m3)	<0.30	<0.31	<0.31	<0.312	<0.311	<0.310	<0.307	<0.306	<0.305	<0.304	<0.301	<0.301	<0.301

Field Duplicate

	Col 1	Col 2	Col 3	Col 4	Col 5	Col 6	Col 7	Col 8	Col 9	Col 10	Col 11	Col 12	Col 13
Location	Station #2	Station #3	Station #4	Station #5	Station #6	Station #1	Station #2	Station #3	Station #4	Station #5	Station #6	Station #1	Station #2
Value (ug/m3)	1.62	0.88	0.95	1.97	1.64	1.68	1.28	0.91	1.06	1.45	1.37	1.57	1.62
RPD (%)	6.90%	3.30%	1.04%	10.05%	2.38%	4.55%	1.54%	9.22%	6.19%	12.12%	4.20%	1.26%	0.61%

Field Blank #2

	Col 1	Col 2	Col 3	Col 4	Col 5	Col 6	Col 7	Col 8	Col 9	Col 10	Col 11	Col 12	Col 13
Location	Station #8	Station #9	Station #10	Station #11	Station #12	Station #7	Station #8	Station #9	Station #10	Station #11	Station #12	Station #7	Station #8
Value (ug/m3)	<0.30	<0.31	<0.31	<0.312	<0.310	<0.310	<0.307	<0.306	<0.305	<0.304	<0.301	<0.301	<0.301

Notes:
1) RPD is Relative Percent Difference (Difference / Mean expressed as a percent). Used as the default precision evaluation.

Ontario Ministry of the Environment, Conservation and Parks (MECP)

Petroleum Industry Refining Standard (PRIS)

Shell Canada Products Sarnia Manufacturing Centre

Sarnia, Ontario Canada

| Sample Deployment Date | | 22-Jun-22 | 6-Jul-22 | 20-Jul-22 | 3-Aug-22 | 17-Aug-22 | 31-Aug-22 | 14-Sep-22 | 28-Sep-22 | 12-Oct-22 | 26-Oct-22 | 9-Nov-22 | 23-Nov-22 | 7-Dec-22 |
| Sample Retrieval Date | | 6-Jul-22 | 20-Jul-22 | 3-Aug-22 | 17-Aug-22 | 31-Aug-22 | 14-Sep-22 | 28-Sep-22 | 12-Oct-22 | 26-Oct-22 | 9-Nov-22 | 23-Nov-22 | 7-Dec-22 | 21-Dec-22 |
UTM Coordinates	Location	ug/m3	ug/m3	ug/m3	ug/m3	ug/m3	ug/m3	ug/m3	ug/m3	ug/m3	ug/m3	ug/m3	ug/m3	ug/m3
382166mE, 4752034mN	Station #1	2.18	1.71	1.73	2.59	1.58	1.24	1.58	1.75	2.07	1.37	2.51	2.31	2.10
382511mE, 4752034mN	Station #2	1.00	1.52	1.15	2.12	0.97	1.04	1.27	1.18	1.46	0.97	2.72	1.72	1.27
383172mE, 4752033mN	Station #3	0.81	1.01	0.87	2.58	1.09	1.39	0.97	0.78	0.79	0.73	1.52	1.13	0.92
383332mE, 4751409mN	Station #4	0.62	0.86	1.03	3.08	1.40	1.77	1.02	1.02	0.78	0.89	1.31	1.15	0.74
382517mE, 4751245mN	Station #5	0.98	1.12	1.98	2.09	1.83	1.71	1.82	1.69	1.25	0.99	2.31	1.68	1.23
382125mE, 4750795mN	Station #6	1.34	1.26	1.14	2.34	1.72	1.61	1.60	1.47	1.06	1.20	1.58	1.29	1.43
381748mE, 4750810mN	Station #7	1.45	1.41	1.36	2.47	1.81	1.59	2.02	2.03	0.83	1.28	1.09	1.49	1.31
381455mE, 4750820mN	Station #8	7.95	19.80	2.84	13.80	14.00	12.10	6.12	13.40	0.81	4.21	2.18	3.04	4.09
381051mE, 4750852mN	Station #9	1.31	1.87	0.58	2.96	0.74	1.31	0.76	2.83	0.55	1.44	1.48	1.01	2.79
381112mE, 4751494mN	Station #10	1.55	2.44	1.97	2.58	1.64	2.23	1.30	2.63	1.90	3.47	3.04	2.10	3.56
381438mE, 4751966mN	Station #11	2.72	2.12	2.00	2.50	2.76	2.63	2.48	1.76	4.17	4.58	1.88	4.64	2.92
381773mE, 4752076mN	Station #12	4.26	2.75	4.04	3.40	2.56	2.32	2.73	2.79	4.16	3.16	4.62	9.86	3.52

Field QA/QC Data

Field Blank #1	Location	Station #3	Station #4	Station #5	Station #6	Station #1	Station #2	Station #3
	Value (ug/m3)	<0.301	<0.301	<0.301	<0.301	<0.308	<0.308	<0.309
Field Duplicate	Location	Station #3	Station #4	Station #5	Station #6	Station #1	Station #2	Station #3
	Value (ug/m3)	0.71	0.99	1.85	2.21	2.67	1.23	0.82
	RPD (%)	11.98%	14.78%	6.57%	5.56%	6.37%	2.50%	10.99%
Field Blank #2	Location	Station #9	Station #10	Station #11	Station #12	Station #7	Station #8	Station #9
	Value (ug/m3)	<0.301	<0.301	<0.301	<0.301	<0.308	0.377	<0.309

Section 65(2) 6. ii. B. & C. Statistical Analysis of Benzene Measurements

Monitoring Station	Analysis Year		Benzene Measurements Baseline						
	Mean, Y	Square of Standard Deviation, $S2^2$	n, number of two-week average concentrations Subsection 62(3)	Mean, X Subsection 61(2)	Square of Standard Deviation, $S1^2$ Subsection 61(2)	m, number of two-week average concentrations Subsection 61(2)	Test Statistic, T_Calc	Degrees of Freedom, v	Is the increase in the benzene concentration in analysis year statistically significant?
1	0.64	0.04	26	0.62	0.24	77	0.26	97.0	NO
2	0.32	0.06	26	0.26	0.07	76	1.02	45.4	NO
3	0.09	0.07	26	0.06	0.04	78	0.55	35.1	NO
4	0.09	0.09	26	0.03	0.06	78	0.85	35.6	NO
5	0.46	0.06	26	0.41	0.09	78	0.83	53.0	NO
6	0.42	0.05	26	0.38	0.09	78	0.62	56.0	NO
7	0.51	0.08	26	0.39	0.09	77	1.79	46.1	NO
8	1.72	0.51	26	1.74	0.46	78	-0.12	41.2	NO
9	0.26	0.22	26	0.23	0.19	78	0.30	40.8	NO
10	0.66	0.12	26	0.55	0.22	78	1.19	57.7	NO
11	1.11	0.18	26	0.87	0.53	77	1.99	74.9	NO
12	1.39	0.17	26	1.19	0.77	78	1.56	90.2	NO

Year	Annual Average Benzene Concentration ($\mu g/m^3$)											
	Station 1	Station 2	Station 3	Station 4	Station 5	Station 6	Station 7	Station 8	Station 9	Station 10	Station 11	Station 12
2018	3.06	2.12	1.50	1.33	1.92	2.06	2.31	9.77	2.24	2.59	5.08	9.62
2019	1.61	1.29	1.11	1.10	1.56	1.56	1.57	7.93	1.45	1.80	1.95	2.45
2020	1.79	1.39	1.11	1.06	1.58	1.49	1.55	7.66	1.21	1.51	2.71	4.09
2021	1.76	1.39	1.03	1.02	1.60	1.53	1.50	5.46	1.48	1.95	2.68	3.32
2022	1.92	1.43	1.14	1.15	1.63	1.55	1.72	6.97	1.44	2.04	3.31	4.40
2023												
2024												
2025												
2026												