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ORTECH
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Report:

Clean Harbors Environmental Services Inc.
Lambton Facility
Ambient Air Monitoring 2020

Date: February 01, 2021



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Version	Date	Summary Changes/Purpose of Revision
1	December-17-2020	Draft to client for review.
2	February 1, 2021	Added additional comments to section 4.

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Figures and Tables

1. INTRODUCTION

Clean Harbors Environmental Services Inc. (Clean Harbors) has been conducting an annual ambient air fenceline monitoring program spanning more than twenty (20) years at its Lambton Facility (the Facility) near Corunna, Ontario. The objective of the program is to ensure that potential contaminant releases from the Facility's ongoing operations are within accepted regulatory and guideline limits. The monitoring program includes a series of measurements for a number of speciated vapor and particulate constituents in accordance with the monitoring plan prepared by ORTECH in 2015 [1]. A copy of the 2015 monitoring plan is attached to this report in APPENDIX A for reference.

This report provides a brief overview of monitoring activities and presents the results of the 2020 monitoring program.

2. SUMMARY OF MONITORING PROGRAM

The monitoring plan contains detailed information on the sample collection methodology used for the program. During the 2020 monitoring program, the following deviations from the monitoring plan were made:

- The 2020 monitoring program included the full historical list of VOCs and Carbonyls rather than the plan's proposed list which would have removed of several VOCs and Carbonyls from the program; and,
- Rescheduled sampling of one set of particulate, carbonyl, and mercury due to equipment issues encountered in the field.
- The analytical laboratory was unable to report isopropyl alcohol in several VOC results due to suspected interference from isopropyl alcohol used as a disinfectant to address COVID-19 concerns. The lab advised that IPA should be removed from other reports as well. Refer to e-mail from the lab included in APPENDIX C. Accordingly, ORTECH has not included isopropyl alcohol in this report.

2.1 Sampling Frequency and Substance List

The list of the compounds, by type (VOC, particulates and metals, and carbonyls) included in the 2020 monitoring program are found in Table 1, Table 2, and Table 3 respectively. As noted above, these lists do not include the proposed removals put forward in the 2015 monitoring plan and did not include isopropyl alcohol.

In summary, a series of concurrent 24-hour (midnight to midnight – eastern standard time) samples were taken at two (2) monitoring locations based on the twelve-day National Air Pollutant Surveillance (NAPS) cycle. The number of samples collected varied by the type of compound as shown in Table 4. Figure 1 shows the location of the monitoring sites located to the north and south of the Facility.

Although the sampling was intended to occur on NAPS days as noted in Table 4, one set of particulate, carbonyl, and mercury samples needed to be rescheduled from August 31st to September 9th as a result

of equipment issues encountered in the field. A list of the actual sampling days included in the 2020 monitoring program as well as the groups sampled is provided in Table 5.

Table 1 - Volatile Organic Compounds (VOCs)

Compound	CAS No.	Compound	CAS No.
Carbon Tetrachloride	56-23-5	Ethyl Benzene	100-41-4
Isopropyl Alcohol	67-63-0	Styrene	100-42-5
Acetone	67-64-1	1,4-Dichlorobenzene	106-46-7
Chloroform	67-66-3	1,2-DibroMOECCthane	106-93-4
Benzene	71-43-2	1,2-Dichloroethane	107-06-2
1,1,1-Trichloroethane	71-55-6	2-Propenenitrile	107-13-1
Vinyl Chloride	75-01-4	2-Methyl Pentane	107-83-5
Dichloromethane	75-09-2	MIBK	108-10-1
1,1-Dichloroethane	75-34-3	m/p-Xylene	108-38-3/106-42-3
1,1-Dichloroethene	75-35-4	1,3,5-Trimethylbenzene	108-67-8
Chlorodifluoromethane	75-45-6	Toluene	108-88-3
Trichlorofluoromethane	75-69-4	Chlorobenzene	108-90-7
Dichlorodifluoromethane	75-71-8	Hexane	110-54-3
1,1,2-Trichloro-1,2,2-Trifluoroethane	76-13-1	Cyclohexane	110-82-7
2-Methyl Butane	78-78-4	Nonane	111-84-2
1,2-Dichloropropane	78-87-5	1,2,4-Trichlorobenzene	120-82-1
MEK	78-93-3	Tetrachloroethene	127-18-4
Trichloroethene	79-01-6	Ethyl Acetate	141-78-6
Naphthalene	91-20-3	Heptane	142-82-5
o-Xylene	95-47-6	1,2-Dichloroethene (Cis)	156-59-2
1,2-Dichlorobenzene	95-50-1	1,2-Dichloroethene (Trans)	156-60-5
1,2,4-Trimethylbenzene	95-63-6	1,2,3-Trimethylbenzene	526-73-8
3-Methyl Pentane	96-14-0	3-Methyl Hexane	589-34-4
p-Cymene	99-87-6	o-Ethyl Toluene	611-14-3

Table 2 - Total Suspended Particulate (TSP) and Metals

Parameter	CAS No.
Total Suspended Particulate (TSP)	Not available
Lead	7439-92-1
Manganese	7439-96-5
Nickel	7440-02-0
Thallium	7440-28-0
Tin	7440-31-5
Antimony	7440-36-0
Arsenic	7440-38-2
Barium	7440-39-3
Beryllium	7440-41-4
Cadmium	7440-43-9
Chromium	7440-47-3
Cobalt	7440-48-4
Copper	7440-50-8
Vanadium	7440-62-2
Zinc	7440-66-6
Selenium	7782-49-2
Iron	15438-31-0

Table 3 - Carbonyls

Parameter	CAS No.
Formaldehyde	50-00-0
Acetone	67-64-1
Acetaldehyde	75-07-0
Benzaldehyde	100-52-7
Acrolein	107-02-08
Glutaraldehyde	111-30-8
Propionaldehyde (Propanal)	123-38-6
n-Butyraldehyde (n-Butanal)	123-72-3

Table 4 – Planned Measurement Frequencies

Constituent	Frequency and Schedule
VOCs/TSP/Metals	13 sample days on the 12 day NAPS cycle beginning May 3, 2020.
Carbonyls and Mercury	Four sample days distributed over the period of May to September. Taken on a day when VOCs/TSP/Metal samples were collected

Table 5 – Actual Sampling Dates and Groups Sampled during Monitoring Program

Date	VOC	TSP & Metals	Carbonyls	Mercury	Comments
03-May	X	X			
15-May	X	X			
27-May	X	X			
08-Jun	X	X	X	X	
20-Jun	X	X			
02-Jul	X	X	X	X	
14-Jul	X	X			
26-Jul	X	X			
07-Aug	X	X	X	X	
19-Aug	X	X			
31-Aug	X				No hi-vol samples due to timer failure. Hi-vols made up on Sep 9th.
09-Sep		X	X	X	Make-up for missed vi-vols on Aug 31.
12-Sep	X	X			
24-Sep	X	X			

Figure 1 - Monitoring Locations

2.2 Sample Collection and Analysis Procedures

A summary of the sampling media, analytical method, and standard methods used during the monitoring program is presented in Table 6. The procedures used for sample collection and analysis are described in detail in the 2015 monitoring plan.

There were no deviations from the 2015 monitoring plan during the 2020 monitoring program with respect to sample collection procedures and analysis methods.

Table 6 - Sampling and Measurement Methods

Parameter	Sample Media	Analytical Method	Standard Method
VOC	6L evacuated canisters	GC/MSD	US EPA TO-15a
TSP	Glass-fibre filters	Gravimetric	US EPA IO2-1
Metals and Particulate Mercury	Glass-fibre filters	ICP MS	US EPA 6010B
		CVAA	US EPA 7471A
Carbonyls	Lp DNHP cartridge	HPLC	US EPA TO-11a and IP-6A
Mercury Vapour	Carulite tubes	Acid Extraction CVAA	US EPA 7470 and OSHA ID-140

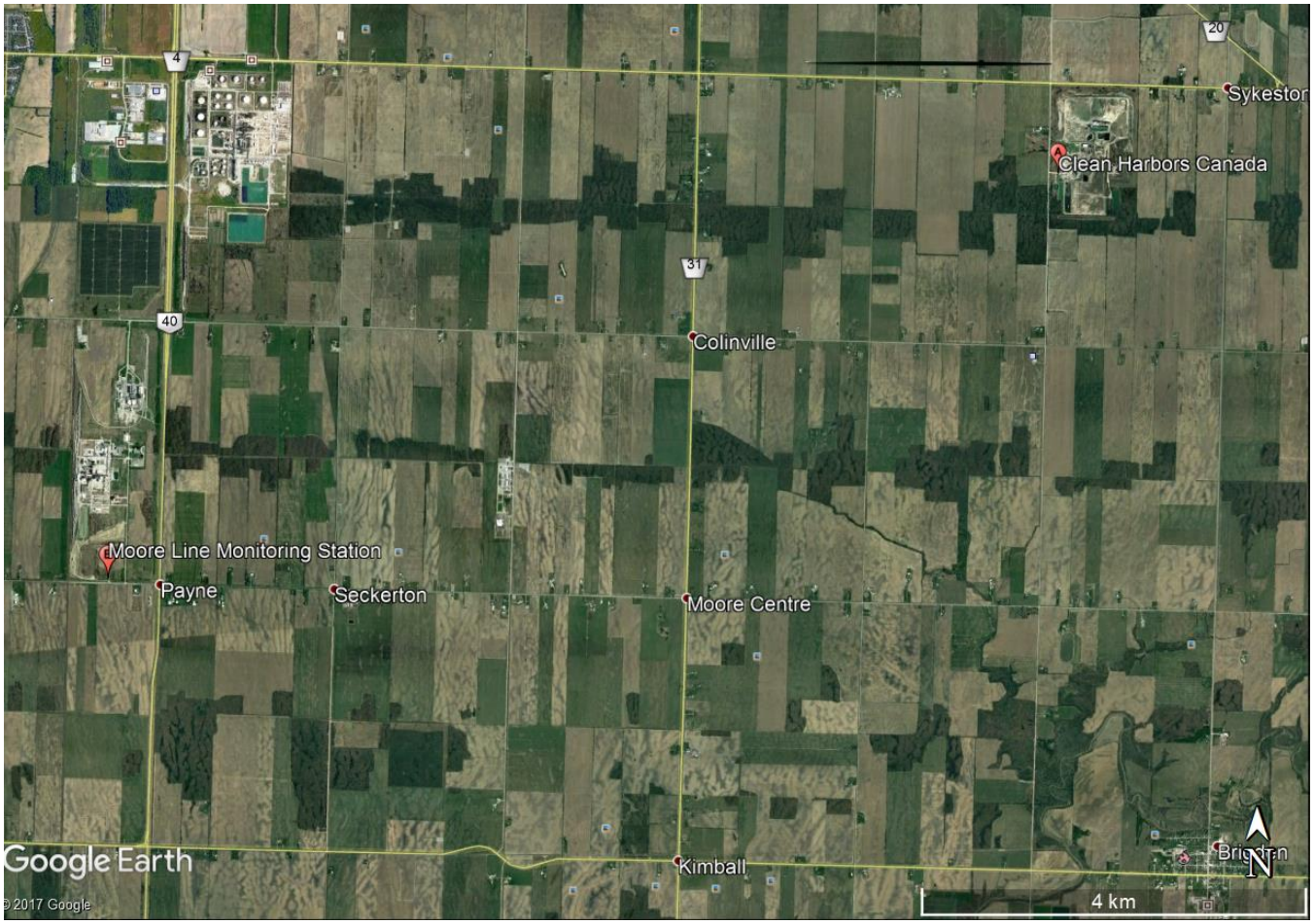
Results for TSP, metals and particulate mercury, carbonyl, and mercury basis are provided as total mass. These results are converted to concentrations using sample volumes calculated from field instrument records.

2.3 Meteorological Data

Localized wind speed, direction and rainfall data were obtained from the Sarnia-Lambton Environmental Association (SLEA) monitoring and meteorological station located near the corner of Moore Line and Highway 40. These data were used to document the weather conditions during each sampling period and confirm the extent of downwind site positioning/source alignment. For periods were information from Moore Line was not available, hourly data from Environment and Climate Change Canada's Sarnia Climate station near Chris Hadfield airport was substituted.

The location of the Moore Line monitoring station with respect to the Facility is shown in Figure 2.

Figure 2 - Location of Moore Line Monitoring Station



3. QUALITY ASSURANCE

ORTECH personnel are trained and proficient in the collection of air monitoring samples. Applicable Standard Operating Procedures and/or instrument manuals are followed. Table 7 lists the various QA/QC measures.

Table 7 - QA/QC Measures

Activity	Measure
Sampling Apparatus	• Calibration of equipment at appropriate intervals • Flow checks before and after each sample interval (±10% criterion)
Sample Collection	• All sample periods initiated at midnight (eastern standard time) • Collection at 1.5 to 2.0 meters above ground (2.5 meters for TSP/Metals) • All samples will be collected simultaneously • Field blank collection media (20% of samples) will be utilized that are handled and analyzed in the same manner as regular samples (without air flow) to assess any detectable contamination. Field blanks are not applicable for VOCs collected in canisters • Provision for MECP to conduct audits
Sample Control	• Precautionary measures were followed during the collection/storage/transfer of samples prior to analysis to maintain sample integrity, along with proper sample identification, and recording procedures • storage in climate controlled, organic solvent free environment • shipment to lab via courier in protective cases within 3 days of exposure with ice packs if applicable
Sample Analysis	• Use of CALA accredited laboratories (BV Labs and ALS Environmental) • Documented methods and procedures
Record Keeping	• All sampling media/canisters assigned unique identification numbers • Use of field Sampling Logs to record: sample canister I.D., sample train I.D., operator name and signature, sample location, date and time, sample start and stop times, analysis requirement, sample flows, weather observations, and other information or observations (odours, nearby activities with potential impact, etc.) • Chain of Custody forms for sample tracking

4. RESULTS AND DISCUSSION

The concurrent north and south twenty-four hour sampling commenced at 0000 hours on May 3, 2020 (Eastern Standard Time) and ended on 2400 hours September 24, 2020. The sampling schedule generally followed the NAPS schedule, with a single adjustment made due to equipment issues. A summary of the sample dates and which compound groups were included on each day is identified in Table 5.

Field Blanks were not subtracted from the results to be conservative. Generally, the field blanks were non-detects with the exception for the hi-vol blank filter (NBTSP-04) from the North site taken September 19th, which had concentrations of total particulate (19 µg/m^3) and barium (3.1E-3 µg/m^3) similar other samples taken in the period. The lab noted that this filter was not folded.

For computing mean, minimum, and maximum statistics the following considerations were made:

- A result of "non-detect" was considered to have a value of zero as was done in previous reporting years.

- Laboratory duplicates were considered as additional samples when calculating statistics (e.g. included in mean calculations). If a laboratory duplicate had the highest value for a component, that value was presented as the overall maximum for comparison against applicable AAQCs, standards, and limits in order to be conservative.

Tabulated summaries of the measured results are indicated in the report text with all individual measured values provided in the appendices.

The maximum observed concentrations for target compounds were compared with available 24-hour standards and guidelines on the MECP's Air Contaminants Benchmark List (ACB) [3]. If no standard or guideline was available, the 24-hour Ontario Ambient Air Criteria (AAQC) [4] for that contaminant was used to compare, if available. ACB standards, guideline, or MECP AAQC are collectively referred to in this report as Limits. A summary of the applicable 24-hour limits is presented in Table 8.

4.1 Meteorological Data

Meteorological data for the 2020 monitoring period was taken from SLEA's Moore Line monitoring station (refer to station location in Figure 2). The Moore Line station was out of service on August 19th, data for this date is taken from Environment and Climate Change Canada (ECCC)'s Sarnia Climate Station (ID: 6127519)[2].

The 24-hour average meteorological conditions that occurred during the selected monitoring days are summarized in Table 9 and Figure 3. Specific information for each hour of each monitoring day is provided in Table 10.

The desired wind direction is for the wind to be blowing from the southwest to southeast quadrant, which results in the monitoring instruments aligning upwind and downwind of operations. For the 2020 monitoring program, there were four days where this wind direction occurred for a significant (12 or more) number of hours:

- May 27 18 hours
- June 8 12 hours
- July 14 12 hours
- July 26 19 hours

Daily mean temperatures ranged from 15 to 26°C and daily average wind speeds ranged from 3.5 to 17 kph. Rainfall was measured on one sampling day. ECCC's Sarnia Climate Station does not measure rainfall, and weather notes were not available for August 19th; however, SLEA's Scott Road station also measures rainfall and no rain was recorded on August 19th. Wind roses for the specific monitoring days (i.e., 24-hour frequencies) are shown in Figure 3.

4.2 VOC Concentrations

The measured concentrations of speciated VOCs during the monitoring survey are summarized in Table 11. Individual concentrations for each sample are tabulated in APPENDIX B. The summarized data provide the arithmetic means, as well as ranges, for the twelve measurement sets, along with the applicable 24-hour Limit for each contaminant. It can be seen from the mean concentrations that 20 of the 48 target compounds reported were non-detectable in all measurements at both monitoring sites.

As also shown in Table 11, a comparison was made between the maximum measured concentrations at the North and South sites, with the applicable limits. 43 of 48 compounds had maximum measured levels that were less than 1% of the limits.

Benzene has historically been the compound with the highest percentage of an applicable limit for the monitoring program; however, for the 2020 reporting year carbon tetrachloride had the highest percentage. Carbon tetrachloride was only observed at a concertation above detectable limits once, on September 12th under predominantly ESE winds at both the south and north sites, and at a concentration of 1.6 µg/m^3 (67% of the 2.4 µg/m^3 limit) at both sites. The wind direction and similarity of the results at both monitors would seem to indicate an offsite source for this contaminant on that day.

Benzene was observed at the next highest percentage of an applicable limit with a maximum concentration of 0.86 µg/m^3 (37% of the 2.3 µg/m^3 limit) on July 14th at the North monitor under predominantly SSE winds. The concentration observed at the south monitor was 0.78 µg/m^3 on that sampling day. Benzene was detected in multiple analyses. There were two sampling days where benzene was only detected at the downwind monitor – July 26th with a concentration of 0.77 µg/m^3 at the North monitor, and September 24th, with a concentration of 0.85 µg/m^3 at the North monitor. Both occurrences were under predominantly SW winds.

Aside from benzene, the VOC measured at the highest percentage of a 24-hour limit was dichloromethane at a concentration of 20 µg/m^3 (9.1% of the 24-hour limit of 220 µg/m^3)

4.3 Particulate and Metal Component Concentrations

A summary of the measured Total Suspended Particulate (TSP) and associated elemental concentrations is shown in Table 12 with individual monitoring results in APPENDIX B. TSP concentrations reported at the North monitor were typically similar to those of the South monitor throughout the sampling program, except for May 27th, which saw elevated TSP concentrations at the South monitor under predominantly SSE winds. The highest TSP concentration sampled during the monitoring program was also at the South monitor on this day and was 110 µg/m^3 (92% of the 24-hour limit of 120 µg/m^3). The

concentration at the North monitor on this day was 40 µg/m^3. The wind direction on this day would seem to indicate that this hit was an offsite impact.

As tabulated in Table 12 and APPENDIX B, seven of the elemental constituents of TSP (thallium, tin, antimony, arsenic, cadmium, chromium, cobalt, vanadium, and selenium) were consistently non-detectable at both monitoring sites. Barium, Copper, Iron, Manganese, and Zinc were consistently detected in the samples. Nickel and Lead were sometimes present at detectable concentrations.

Iron was present at the highest percentage of an applicable limit at a maximum of 1.4 µg/m^3 (14% of the 24-hour limit of 10 µg/m^3). Note that the comparison for elemental iron in these data against the standard level of metallic iron was very conservative since only a fraction of the measured element (if any) could be expected to comprise metallic iron (i.e., particulate iron is likely to exist primarily as iron oxides, salts, silicates, etc.).

Of the remaining metals, Manganese, Nickel, and Lead were present in concentrations between 1% and 10% of any applicable limits. Other metals were present at a maximum of less than 1% of applicable limits, or did not have an applicable limit for comparison.

4.4 Carbonyl Concentrations

The measured speciated carbonyl concentrations are summarized in Table 13 with individual daily levels shown in APPENDIX B. Formaldehyde was the only carbonyl compound detected in any of the samples, and was detected in only one of the samples analyzed at the North monitor at a concentration of 64 µg/m^3 (99% of the 24-hour limit of 65 µg/m^3) on August 7th under predominantly NE winds. The wind direction as well as the south monitor not detecting any Formaldehyde on that day would seem to indicate an offsite source.

4.5 Mercury Concentrations

Both particulate and vapour phase mercury components were measured as shown in Table 14, with individual daily results in Appendix B.

Vapour phase mercury was not detected in any of the samples and only small quantities of particle phase mercury were measured in all of the four high-volume sample filters.

The total mercury value was calculated by adding the particulate mercury captured on the particulate filter and the acid extractable (Vapour phase) mercury captured in the carulite tube for each mercury sample day. Where a duplicate was taken for a mercury component, a total mercury value was calculated using both values.

The combined results at the maximum concentration represented only a small percentage (1.3%) of the total mercury 24-hour limit. Although total mercury levels have decreased over the past years, it must

be recognized that atmospheric mercury typically exists at very low concentrations and primarily in the vapour form. Therefore, the applied measurement technique for mercury vapour, while adequate for comparison of results to the accepted criterion, has insufficient sensitivity for quantification.

5. CONCLUSIONS

Clean Harbors is required to conduct certain fenceline ambient air measurements at its Corunna Facility on an annual basis as a condition of the operational Environmental Compliance Approval for the facility.

A total of thirteen pairs of simultaneous north/south fixed location speciated VOC measurements were conducted by sampling for 24-hour periods. Sampling was initiated at midnight (eastern standard time) following the twelve-day NAPS cycle adjusted to ensure no samples were taken on days where the Facility was not in operation. Sampling occurred from May through September 2020. Similarly, 24-hour samples were also collected for subsequent analysis of TSP and selected elemental constituents. Generally, particulates were collected on the same day as VOCs; however, due to equipment issues in the field, one set of particulate samples was collected on a different day. Combined, the total of fourteen (14) sample days resulted in thirteen (13) sets of VOC and Particulate samples. Four sample sets of speciated carbonyls and airborne mercury were collected; one in each of June, July, August, and September. The levels of all compounds measured were compared with any applicable 24-hour limits found in the MECP's ACB or Ontario's AAQCs.

Meteorological data indicated that five of the fourteen monitoring days had significant numbers (≥50%) of hours with winds blowing from the southwest to southeast quadrant where the north and south monitors would be aligned downwind and upwind respectively.

Most measured VOC concentrations were less than 1% of the schedule 3 standards, guidelines or AAQCs. The highest percentage was reported for carbon tetrachloride at 1.6 µg/m^3 (67%of the 2.3 µg/m^3 24-hour AAQC), on September 12th in equal concentration at both monitors under predominantly ESE winds.

Benzene, which has historically been the contaminant present at the highest percentage of an available limit, was observed at a maximum concentration of 0.86 µg/m^3 (37% of the 2.3 µg/m^3 limit) on July 14th at the North monitor under predominantly SSE winds.

All measured VOC concentrations were below applicable 24-hour AAQCs, standards, and guidelines.

Measured concentrations of total particulate and speciated particulates were all less than their respective standard, guideline, or AAQC. Of the speciated components, iron was measured at the highest percentage of its limit, at 14%.

Of the speciated carbonyl measurements, only formaldehyde was detected, and was detected in only one sample at the North monitor at a concentration of 64 µg/m^3 (99% of the 24-hour limit of 65 µg/m3) on August 7th under predominantly NE winds.

Particulate mercury was measured in small quantities, while vapour mercury was not detected in any of the samples. The highest total mercury concentration was measured at 1.3% of the applicable limit.

Table 8 - Summary of Available 24-hour Limits for Target Compounds

Compound	CAS NO.	Limit (ug/m3)	Limiting Effect	Reference	Notes
Carbon Tetrachloride	56-23-5	2.4	(health)	Standard	
Isopropyl Alcohol	67-63-0	7,300	(health)	Standard	
Acetone	67-64-1	11,880	(health)	Standard	
Chloroform	67-66-3	1	(health)	Standard	
Benzene	71-43-2	2.3	(health)	AAQC	
1,1,1-Trichloroethane	71-55-6	115,000	(health)	Standard	
Vinyl Chloride	75-01-4	1	(health)	Standard	
Dichloromethane	75-09-2	220	(health)	Standard	
1,1-Dichloroethane	75-34-3	165	(health)	Standard	
1,1-Dichloroethene	75-35-4	10	(health)	Standard	
Chlorodifluoromethane	75-45-6	350,000	(health)	Guideline	
Trichlorofluoromethane	75-69-4	6,000	(health)	Guideline	
Dichlorodifluoromethane	75-71-8	500,000	(health)	Guideline	
1,1,2-Trichloro-1,2,2-Trifluoroethane	76-13-1	800,000	(health)	Standard	
2-Methyl Butane	78-78-4	35500	(health)	SL-JSL	
1,2-Dichloropropane	78-87-5	2,400	Odour	Guideline	
MEK	78-93-3	1,000	(health)	Standard	
Trichloroethene	79-01-6	12	(health)	Standard	
Naphthalene	91-20-3	22.5	(health)	Guideline	
o-Xylene	95-47-6	730	(health)	Standard (xylenes)	
1,2-Dichlorobenzene	95-50-1	NA			
1,2,4-Trimethylbenzene	95-63-6	220	(health)	Standard	
3-Methyl Pentane	96-14-0	1750	Health	SL-JSL	
p-Cymene	99-87-6	50	Health	SL-JSL	
Ethyl Benzene	100-41-4	1,000	(health)	AAQC	
Styrene	100-42-5	400	(health)	Standard	
1,4-Dichlorobenzene	106-46-7	95	(health)	Standard	
1,2-Dibromoethane	106-93-4	3	(health)	Guideline	
1,2-Dichloroethane	107-06-2	2	(health)	Standard	
2-Propenenitrile	107-13-1	0.6	(health)	Standard	
2-Methyl Pentane	107-83-5	1750	Health	SL-JSL	
MIBK	108-10-1	1,200	(odour)	Guideline	
m/p-Xylene	108-38-3/106-42-3	730	(health)	Standard (xylenes)	
1,3,5-Trimethylbenzene	108-67-8	220	Health	Standard	
Toluene	108-88-3	2,000	Odour	Guideline	
Chlorobenzene	108-90-7	NA			
Hexane	110-54-3	7,500	(health)	Schd 3	
Cyclohexane	110-82-7	6,100	(health)	Schd 3	
Nonane	111-84-2	5250	Health	SL-JSL	
1,2,4-Trichlorobenzene	120-82-1	400	Health	Guideline	
Tetrachloroethene	127-18-4	360	Health	Standard	
Ethyl Acetate	141-78-6	NA			
Heptane	142-82-5	11,000	Health	Standard	
1,2-Dichloroethene (Cis)	156-59-2	105	Health	Guideline	
1,2-Dichloroethene (Trans)	156-60-5	105	Health	Guideline	
1,2,3-Trimethylbenzene	526-73-8	220	Health	Standard	
3-Methyl Hexane	589-34-4	1535	Health	SL-JSL	
2-Ethyl Toluene	611-14-3	0.5	Health	SL-JSL	
Total Suspended Particulate <44 microns	-	120	Visibility	Standard	
Lead	7439-92-1	0.5	Health	Standard	
Manganese	7439-96-5	0.4	Health	Standard	
Nickel	7440-02-0	0.2	Health	AAQC	As suspended particulate matter
Thallium	7440-28-0	0.5	Health	SL-JSL	
Tin	7440-31-5	10	Health	Standard	
Antimony	7440-36-0	25	Health	Standard	
Arsenic	7440-38-2	0.3	Health	Guideline	
Barium	7440-39-3	10	Health	Guideline	
Beryllium	7440-41-4	NA			
Cadmium	7440-43-9	0.025	Health	Standard	
Chromium	7440-47-3	0.5	Health	Standard	
Cobalt	7440-48-4	0.1	Health	Guideline	
Copper	7440-50-8	50	Health	Standard	
Vanadium	7440-62-2	2	Health	Standard	
Zinc	7440-66-6	120	Particulate	Standard	
Selenium	7782-49-2	10	Health	Guideline	
Iron	15438-31-0	10	Health	Standard	For metallic Iron
Formaldehyde	50-00-0	65	Health	Standard	
Acetone	67-64-1	11,880	Health	Standard	
Acetaldehyde	75-07-0	500	Health	Standard	
Benzaldehyde	100-52-7	2	Health	SL-JSL	
Acrolein	1070-20-8	NA			
Glutaraldehyde	111-30-8	14	Health	Guideline	
Propionaldehyde (Propanal)	123-38-6	NA			
n-Butyraldehyde (n-Butanal)	123-72-3	NA			
Particulate Mercury	-	Assessed as total mercury			
Vapour Mercury	7439-97-6				
Total Mercury	-	2	Health	Standard	

Note: Standard, Guideline, and SL-JSL refer to standards, guidelines, and screening limits presented in the ACB.

Table 9 - Summary of 24-Hour Meteorological Data for Individual Monitoring Days

Sample Date	Prevailing Wind Direction	Average Wind Speed (km/h)	Average Temperature (°C)	Total Rainfall (mm)	SE-SW Quadrant (Hours)
May 03	NW	17	15	0.00	0
May 15	SW	15	15	7.50	9
May 27	SSE	11	24	0.00	18
June 08	SSE	6.7	19	0.00	12
June 20	SSW	8.2	25	0.00	21
July 02	NNW	5.5	25	0.00	3
July 14	SSE	3.5	22	0.00	12
July 26	SW	14	26	0.00	19
August 07	NE	5.9	19	0.00	1
August 19	N	5.6	17	NA	2
August 31	SE	7.6	19	0.00	11
September 09	NNE	8.6	17	0.00	1
September 12	ESE	10	17	0.00	10
September 24	SW	9.3	18	0.00	11

Note: Ranges based on hourly averaged data of the nearby SLEA Moore Line (10 m) meteorological station over the 24-hour intervals which coincided with the individual sample periods (see also Figure 1).

Highlighted data comes from Environment Canada and Climate Change's Sarnia Climate Station [3].

Prevailing wind direction is the closest direction to the resultant wind vector for the day as computed by WRPLOT View software. *"The resultant vector is the dominant direction or mean direction of the vectors. This is calculated by computing the vector resultant or vector sum of the unit vectors that represent the various directions in the data. The magnitude of the resultant vector represents the mean resultant vector length." Wind speed is an arithmetic average.*

Figure 3 – Wind Roses for Sampling Periods (24-hrs, midnight to midnight)

May 03	May 15	May 27
June 08	June 20	July 02
July 14	July 26	August 07
August 19	August 31	September 09

Figure 3 (Cont.) - Wind Roses for Sampling Periods (24-hrs, midnight to midnight)

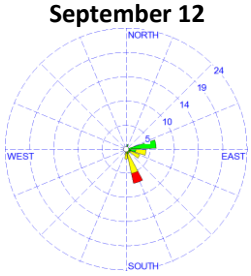
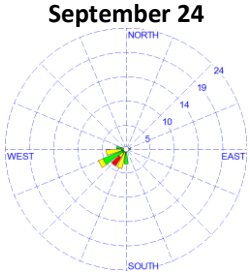
September 12	September 24	
		
WIND SPEED (m/s) >= 4.20 2.50 - 4.20 0.50 - 2.50 Note: Rings on wind rose diagrams mark 5, 10, 14, 19, and 24 hours. Bar length indicates the number of hours from that wind direction.	Highlighted windrose based on data from ECCC Sarnia Climate station [3].	

Table 10 - Summary of Hourly Meteorological Data

YYYY-MM-DD hh:mm (EST)	WS kph	WD10 Degrees	RAIN mm	TEMP C	Bar mbar
2020-05-03 1:00	3	316	0	13.8	1007
2020-05-03 2:00	8.6	230	0	11.9	1006
2020-05-03 3:00	11.7	236	0	13.5	1006
2020-05-03 4:00	12.5	240	0	13.5	1006
2020-05-03 5:00	10.8	244	0	11.5	1005
2020-05-03 6:00	9.5	259	0	12.4	1006
2020-05-03 7:00	10.4	291	0	14.5	1007
2020-05-03 8:00	17.3	328	0	15.8	1007
2020-05-03 9:00	20	11	0	15.8	1009
2020-05-03 10:00	11.7	356	0	16.9	1009
2020-05-03 11:00	7.2	6	0	18.3	1009
2020-05-03 12:00	5	24	0	18.7	1009
2020-05-03 13:00	4.9	316	0	19.8	1008
2020-05-03 14:00	13.8	265	0	21	1007
2020-05-03 15:00	18.7	279	0	22.4	1006
2020-05-03 16:00	20.3	281	0	22	1005
2020-05-03 17:00	19.3	288	0	21	1006
2020-05-03 18:00	20.7	291	0	21.1	1005
2020-05-03 19:00	21.5	317	0	19.3	1005
2020-05-03 20:00	37.6	13	0	9.7	1008
2020-05-03 21:00	33.2	14	0	8.1	1008
2020-05-03 22:00	32.2	13	0	6.9	1009
2020-05-03 23:00	31.1	13	0	7	1009
2020-05-03 0:00	30	14	0	6	1010
2020-05-15 1:00	17.1	196	0	14.4	1010
2020-05-15 2:00	20.4	192	0	14.9	1009
2020-05-15 3:00	12.5	206	0	15	1009
2020-05-15 4:00	14.3	203	0.5	14.8	1008
2020-05-15 5:00	10.3	188	2	14.8	1007
2020-05-15 6:00	11.1	191	3	14.7	1008
2020-05-15 7:00	14.2	185	1.5	14.7	1008
2020-05-15 8:00	21.2	176	0	15.8	1007
2020-05-15 9:00	23.5	193	0	18.7	1006
2020-05-15 10:00	27.8	231	0	19.3	1006
2020-05-15 11:00	27	247	0	19.4	1008
2020-05-15 12:00	20.8	259	0	19.8	1008
2020-05-15 13:00	15.8	278	0	20	1007
2020-05-15 14:00	12.7	287	0	18.7	1009
2020-05-15 15:00	11.7	280	0	18.6	1010
2020-05-15 16:00	22.7	15	0.5	13.9	1010
2020-05-15 17:00	19.7	22	0	14.6	1011
2020-05-15 18:00	7	51	0	14.7	1011
2020-05-15 19:00	4.2	20	0	15.7	1011
2020-05-15 20:00	4.6	59	0	14.8	1011
2020-05-15 21:00	14.9	36	0	13.7	1012
2020-05-15 22:00	14.2	35	0	9.9	1014
2020-05-15 23:00	10	30	0	9.5	1014
2020-05-15 0:00	4.8	355	0	9.4	1014

Table 10 - Summary of Hourly Meteorological Data

YYYY-MM-DD hh:mm (EST)	WS kph	WD10 Degrees	RAIN mm	TEMP C	Bar mbar
2020-05-27 1:00	2.7	109	0	20.2	1015
2020-05-27 2:00	3.1	104	0	19.3	1015
2020-05-27 3:00	4	146	0	19.4	1014
2020-05-27 4:00	3.9	133	0	18.2	1014
2020-05-27 5:00	3.4	129	0	17.6	1014
2020-05-27 6:00	4.3	115	0	17.8	1015
2020-05-27 7:00	8.7	161	0	21.6	1015
2020-05-27 8:00	11.4	173	0	23.2	1014
2020-05-27 9:00	16.1	188	0	25.6	1015
2020-05-27 10:00	18.2	189	0	26.9	1015
2020-05-27 11:00	14.9	193	0	26.5	1014
2020-05-27 12:00	14.8	185	0	27.5	1014
2020-05-27 13:00	17.6	176	0	28.3	1015
2020-05-27 14:00	21.8	169	0	29.1	1014
2020-05-27 15:00	26	170	0	28.6	1013
2020-05-27 16:00	21.8	174	0	25.9	1014
2020-05-27 17:00	17.9	176	0	26.3	1013
2020-05-27 18:00	19.4	167	0	27.3	1014
2020-05-27 19:00	10.6	155	0	26.5	1012
2020-05-27 20:00	9.7	155	0	24.8	1012
2020-05-27 21:00	7.2	157	0	23.3	1013
2020-05-27 22:00	4.5	153	0	22.4	1014
2020-05-27 23:00	3.7	141	0	22.3	1013
2020-05-27 0:00	3.7	124	0	20.5	1014
2020-06-08 1:00	1.4	55	0	9.8	1017
2020-06-08 2:00	4.5	31	0	9.7	1018
2020-06-08 3:00	6	29	0	10.2	1018
2020-06-08 4:00	3.2	12	0	9.8	1017
2020-06-08 5:00	4.4	25	0	9.5	1017
2020-06-08 6:00	5.9	43	0	10.5	1017
2020-06-08 7:00	5.5	20	0	13.2	1018
2020-06-08 8:00	7.5	102	0	15.7	1018
2020-06-08 9:00	6.7	135	0	18.1	1018
2020-06-08 10:00	5.5	132	0	20.4	1018
2020-06-08 11:00	4.4	125	0	22.3	1018
2020-06-08 12:00	2.3	145	0	23.6	1017
2020-06-08 13:00	2.6	137	0	24.5	1017
2020-06-08 14:00	5.3	168	0	25.6	1017
2020-06-08 15:00	7.2	195	0	26.8	1015
2020-06-08 16:00	13	220	0	27.3	1015
2020-06-08 17:00	11.7	227	0	25.8	1013
2020-06-08 18:00	7.1	210	0	26.9	1014
2020-06-08 19:00	10.9	228	0	26	1013
2020-06-08 20:00	10.9	219	0	24.1	1013
2020-06-08 21:00	8	178	0	20.3	1013
2020-06-08 22:00	10.4	171	0	18.6	1013
2020-06-08 23:00	10	179	0	17.4	1013
2020-06-08 0:00	5.6	190	0	15.2	1012

Table 10 - Summary of Hourly Meteorological Data

YYYY-MM-DD hh:mm (EST)	WS kph	WD10 Degrees	RAIN mm	TEMP C	Bar mbar
2020-06-20 1:00	2.3	214	0	19.1	1015
2020-06-20 2:00	3.1	202	0	18.4	1014
2020-06-20 3:00	2.8	254	0	18	1015
2020-06-20 4:00	2.6	198	0	18.1	1014
2020-06-20 5:00	2.8	121	0	17.4	1014
2020-06-20 6:00	2.5	128	0	17.7	1015
2020-06-20 7:00	2.7	210	0	21.4	1016
2020-06-20 8:00	6.5	212	0	24.3	1015
2020-06-20 9:00	9.1	222	0	26	1016
2020-06-20 10:00	9.6	218	0	28.8	1015
2020-06-20 11:00	8.7	220	0	29.7	1015
2020-06-20 12:00	9.6	219	0	30.4	1015
2020-06-20 13:00	6.8	199	0	30.7	1014
2020-06-20 14:00	11.3	224	0	31.3	1013
2020-06-20 15:00	10.3	223	0	31.9	1013
2020-06-20 16:00	7.8	218	0	32	1013
2020-06-20 17:00	10.7	208	0	31.5	1011
2020-06-20 18:00	15.3	215	0	31.6	1012
2020-06-20 19:00	15.1	201	0	29.8	1012
2020-06-20 20:00	14.4	175	0	27.6	1012
2020-06-20 21:00	9	166	0	24.8	1011
2020-06-20 22:00	12.5	175	0	23.7	1012
2020-06-20 23:00	12.3	171	0	22.8	1011
2020-06-20 0:00	9.5	169	0	22.2	1012
2020-07-02 1:00	5	285	0	18.9	1014
2020-07-02 2:00	6.1	315	0	18.1	1011
2020-07-02 3:00	5.8	311	0	18.4	1014
2020-07-02 4:00	5.9	327	0	18.2	1014
2020-07-02 5:00	5.4	333	0	18.5	1014
2020-07-02 6:00	6.1	321	0	18.1	1014
2020-07-02 7:00	7.8	25	0	20.6	1015
2020-07-02 8:00	4.7	358	0	23.8	1015
2020-07-02 9:00	5.5	355	0	25.7	1014
2020-07-02 10:00	7.1	17	0	19.2	1014
2020-07-02 11:00	5.5	13	0	28	1016
2020-07-02 12:00	2.7	325	0	30	1015
2020-07-02 13:00	1.5	313	0	30.5	1015
2020-07-02 14:00	4.9	43	0	30.3	1012
2020-07-02 15:00	5.9	47	0	30.4	1014
2020-07-02 16:00	7.4	48	0	31.1	1014
2020-07-02 17:00	9.4	36	0	31.2	1012
2020-07-02 18:00	7.3	49	0	30.2	1013
2020-07-02 19:00	2.6	65	0	30.7	1013
2020-07-02 20:00	1.8	210	0	28.9	1012
2020-07-02 21:00	4.1	218	0	24.7	1013
2020-07-02 22:00	5.2	209	0	22.2	1012
2020-07-02 23:00	7.3	240	0	21.6	1013
2020-07-02 0:00	7.9	246	0	21.6	1013

Table 10 - Summary of Hourly Meteorological Data

YYYY-MM-DD hh:mm (EST)	WS kph	WD10 Degrees	RAIN mm	TEMP C	Bar mbar
2020-07-14 1:00	1.1	149	0	15.1	1015
2020-07-14 2:00	1.5	182	0	14.5	1014
2020-07-14 3:00	1.8	237	0	14.6	1014
2020-07-14 4:00	1.3	207	0	14.1	1016
2020-07-14 5:00	0.5	236	0	13.5	1015
2020-07-14 6:00	1.6	240	0	14.5	1016
2020-07-14 7:00	1	193	0	18.8	1016
2020-07-14 8:00	3.6	196	0	21.6	1017
2020-07-14 9:00	2.5	146	0	22.7	1017
2020-07-14 10:00	1.3	212	0	24.5	1017
2020-07-14 11:00	2.8	65	0	25.1	1016
2020-07-14 12:00	1	166	0	25.7	1017
2020-07-14 13:00	6.2	297	0	26.2	1016
2020-07-14 14:00	3.7	246	0	27.2	1016
2020-07-14 15:00	2.4	196	0	28.1	1016
2020-07-14 16:00	3.7	108	0	26.7	1015
2020-07-14 17:00	5.9	67	0	27.1	1017
2020-07-14 18:00	9.3	53	0	26.8	1016
2020-07-14 19:00	5.5	81	0	25.9	1016
2020-07-14 20:00	4.2	103	0	23.7	1016
2020-07-14 21:00	2.3	126	0	21.8	1017
2020-07-14 22:00	7.5	159	0	20	1017
2020-07-14 23:00	5.5	169	0	19.8	1016
2020-07-14 0:00	6.9	167	0	18.9	1017
2020-07-26 1:00	5	192	0	18.4	1017
2020-07-26 2:00	5.5	194	0	18.1	1017
2020-07-26 3:00	6.2	202	0	17.7	1016
2020-07-26 4:00	6.9	198	0	18.2	1016
2020-07-26 5:00	6.3	203	0	18.2	1016
2020-07-26 6:00	5.7	218	0	18.6	1017
2020-07-26 7:00	9.6	223	0	20.8	1017
2020-07-26 8:00	13.1	233	0	24	1017
2020-07-26 9:00	14.3	242	0	26.7	1015
2020-07-26 10:00	16.5	249	0	29	1016
2020-07-26 11:00	19.7	258	0	29.2	1015
2020-07-26 12:00	17.4	253	0	30.7	1015
2020-07-26 13:00	15.8	215	0	31.6	1015
2020-07-26 14:00	18.5	212	0	33.2	1014
2020-07-26 15:00	18.5	210	0	32.4	1014
2020-07-26 16:00	18.6	205	0	32.9	1013
2020-07-26 17:00	20.4	205	0	33	1012
2020-07-26 18:00	23.6	206	0	32.1	1011
2020-07-26 19:00	24.3	205	0	30.2	1011
2020-07-26 20:00	20.2	205	0	28.4	1010
2020-07-26 21:00	19	207	0	27.2	1011
2020-07-26 22:00	15.1	205	0	26.9	1011
2020-07-26 23:00	12	199	0	25.2	1009
2020-07-26 0:00	10.8	190	0	23.6	1009

Table 10 - Summary of Hourly Meteorological Data

YYYY-MM-DD hh:mm (EST)	WS kph	WD10 Degrees	RAIN mm	TEMP C	Bar mbar
2020-08-07 1:00	0.7	103	0	14.5	1018
2020-08-07 2:00	0.6	102	0	14.4	1019
2020-08-07 3:00	1.1	103	0	13.5	1018
2020-08-07 4:00	0.9	119	0	12.7	1019
2020-08-07 5:00	3.3	312	0	12.9	1019
2020-08-07 6:00	2.3	306	0	12.5	1020
2020-08-07 7:00	1.8	309	0	14.7	1020
2020-08-07 8:00	4.1	358	0	19.3	1020
2020-08-07 9:00	8	27	0	21.1	1020
2020-08-07 10:00	11.9	33	0	23.5	1020
2020-08-07 11:00	11.9	39	0	24.6	1020
2020-08-07 12:00	9.3	36	0	24.8	1019
2020-08-07 13:00	9.7	32	0	24.8	1020
2020-08-07 14:00	12	41	0	24.6	1019
2020-08-07 15:00	12	47	0	25	1020
2020-08-07 16:00	9.8	54	0	25.4	1019
2020-08-07 17:00	9.8	42	0	24.9	1020
2020-08-07 18:00	9.7	58	0	24.8	1019
2020-08-07 19:00	8	56	0	24	1018
2020-08-07 20:00	2.3	62	0	21	1020
2020-08-07 21:00	3.6	109	0	17.8	1020
2020-08-07 22:00	4.9	84	0	16.5	1020
2020-08-07 23:00	1	128	0	15.4	1019
2020-08-07 0:00	3.6	214	0	14.7	1019
2020-08-19 1:00	4	308	NA	17.2	1018.1
2020-08-19 2:00	3.4	305	NA	14	1018.1
2020-08-19 3:00	0.7	309	NA	13.2	1018.3
2020-08-19 4:00	0.7	281	NA	13.4	1018.2
2020-08-19 5:00	3.4	317	NA	12.6	1018.2
2020-08-19 6:00	3.6	321	NA	14	1018.7
2020-08-19 7:00	5.5	310	NA	15.5	1019.2
2020-08-19 8:00	6	318	NA	18	1019.6
2020-08-19 9:00	6.6	322	NA	19.6	1019.8
2020-08-19 10:00	7.1	335	NA	19.7	1020.1
2020-08-19 11:00	7.6	356	NA	20.1	1020.4
2020-08-19 12:00	10.2	1	NA	20.8	1020.5
2020-08-19 13:00	7.4	16	NA	21	1020.3
2020-08-19 14:00	7.9	30	NA	20.9	1020
2020-08-19 15:00	7.6	40	NA	20.6	1019.8
2020-08-19 16:00	8.4	45	NA	20.9	1019
2020-08-19 17:00	8.1	53	NA	20.7	1019.5
2020-08-19 18:00	9	57	NA	20.2	1019.2
2020-08-19 19:00	8.8	62	NA	18.1	1019.1
2020-08-19 20:00	5	71	NA	17.1	1019.4
2020-08-19 21:00	5	86	NA	15	1019.4
2020-08-19 22:00	2.1	100	NA	14.1	1019.4
2020-08-19 23:00	3	180	NA	13.9	1019.3
2020-08-19 0:00	4.3	177	NA	13.5	1019.5

Table 10 - Summary of Hourly Meteorological Data

YYYY-MM-DD hh:mm (EST)	WS kph	WD10 Degrees	RAIN mm	TEMP C	Bar mbar
2020-08-31 1:00	3.6	112	0	12.3	1014
2020-08-31 2:00	6.2	77	0	12.5	1014
2020-08-31 3:00	5.3	84	0	12.2	1013
2020-08-31 4:00	3.7	118	0	12.3	1014
2020-08-31 5:00	6.4	83	0	12.4	1014
2020-08-31 6:00	6.2	90	0	12.3	1014
2020-08-31 7:00	4.9	88	0	12.9	1014
2020-08-31 8:00	7.8	104	0	16.2	1014
2020-08-31 9:00	9.9	113	0	19.4	1013
2020-08-31 10:00	9.6	148	0	22.7	1013
2020-08-31 11:00	11.1	162	0	23.5	1013
2020-08-31 12:00	11.1	157	0	24.8	1012
2020-08-31 13:00	10.1	157	0	25.1	1011
2020-08-31 14:00	11.4	167	0	25.7	1011
2020-08-31 15:00	10.2	168	0	25.7	1010
2020-08-31 16:00	15	186	0	26.1	1011
2020-08-31 17:00	13.4	171	0	25.8	1010
2020-08-31 18:00	11.8	180	0	24.9	1010
2020-08-31 19:00	10.2	163	0	21.8	1010
2020-08-31 20:00	3.5	154	0	18.7	1010
2020-08-31 21:00	2.5	131	0	16.8	1011
2020-08-31 22:00	2.3	55	0	16.6	1012
2020-08-31 23:00	2.9	57	0	16.1	1012
2020-08-31 0:00	2.1	59	0	15.6	1012
2020-09-09 1:00	9.3	53	0	16.2	1021
2020-09-09 2:00	7.4	75	0	15.9	1021
2020-09-09 3:00	6.3	68	0	15.5	1021
2020-09-09 4:00	9.2	32	0	15.3	1021
2020-09-09 5:00	8.4	40	0	15.4	1022
2020-09-09 6:00	9.3	39	0	16	1022
2020-09-09 7:00	8	64	0	15.8	1023
2020-09-09 8:00	6.2	75	0	15.8	1023
2020-09-09 9:00	6	47	0	16.5	1024
2020-09-09 10:00	12.2	33	0	17.3	1024
2020-09-09 11:00	9.7	38	0	18.1	1024
2020-09-09 12:00	11.1	24	0	18.1	1024
2020-09-09 13:00	11	4	0	18	1023
2020-09-09 14:00	10.4	3	0	18.5	1022
2020-09-09 15:00	10.7	19	0	18.4	1024
2020-09-09 16:00	13.2	25	0	18.5	1023
2020-09-09 17:00	14.4	15	0	18	1021
2020-09-09 18:00	12.4	5	0	18.1	1021
2020-09-09 19:00	11.8	344	0	17.5	1022
2020-09-09 20:00	9.7	339	0	17.4	1023
2020-09-09 21:00	4	329	0	17	1023
2020-09-09 22:00	1.2	303	0	16.8	1023
2020-09-09 23:00	2.6	225	0	16.7	1022
2020-09-09 0:00	2.3	244	0	16.9	1023

Table 10 - Summary of Hourly Meteorological Data					
YYYY-MM-DD hh:mm (EST)	WS kph	WD10 Degrees	RAIN mm	TEMP C	Bar mbar
2020-09-12 1:00	7.3	76	0	10.5	1023
2020-09-12 2:00	8.4	86	0	10.5	1021
2020-09-12 3:00	8.2	80	0	8.8	1022
2020-09-12 4:00	7.3	84	0	8.8	1020
2020-09-12 5:00	8.2	84	0	9.4	1020
2020-09-12 6:00	7.7	81	0	9.3	1020
2020-09-12 7:00	10.9	90	0	10.4	1020
2020-09-12 8:00	9.7	97	0	11.7	1020
2020-09-12 9:00	13.9	116	0	14.3	1019
2020-09-12 10:00	9.4	129	0	16.5	1019
2020-09-12 11:00	10.4	136	0	19.4	1018
2020-09-12 12:00	11.9	160	0	22.3	1017
2020-09-12 13:00	12.5	167	0	23.6	1016
2020-09-12 14:00	14.4	173	0	23.8	1016
2020-09-12 15:00	13.7	173	0	24.9	1015
2020-09-12 16:00	13.6	166	0	25.6	1013
2020-09-12 17:00	15.8	157	0	23.8	1014
2020-09-12 18:00	16.9	160	0	22.2	1012
2020-09-12 19:00	10.1	168	0	20.3	1013
2020-09-12 20:00	8.9	158	0	19.7	1012
2020-09-12 21:00	2.6	103	0	18.5	1012
2020-09-12 22:00	4.3	29	0	17.9	1012
2020-09-12 23:00	4.2	93	0	18.1	1012
2020-09-12 0:00	4.3	121	0	17.9	1011
2020-09-24 1:00	7.6	273	0	16.8	1012
2020-09-24 2:00	7.3	246	0	15.5	1013
2020-09-24 3:00	4	268	0	15.1	1013
2020-09-24 4:00	6.5	283	0	15.3	1013
2020-09-24 5:00	7.3	247	0	14.8	1012
2020-09-24 6:00	8	230	0	14.3	1013
2020-09-24 7:00	7	223	0	13.3	1012
2020-09-24 8:00	6.5	231	0	15.4	1013
2020-09-24 9:00	8.9	247	0	18.5	1014
2020-09-24 10:00	10.9	251	0	20.5	1012
2020-09-24 11:00	11.2	250	0	21.5	1014
2020-09-24 12:00	9.9	258	0	22.7	1014
2020-09-24 13:00	13.5	235	0	23.7	1013
2020-09-24 14:00	14.2	225	0	25	1012
2020-09-24 15:00	16.2	217	0	24.8	1013
2020-09-24 16:00	15.6	219	0	24.4	1013
2020-09-24 17:00	13.4	203	0	24.2	1012
2020-09-24 18:00	12.2	203	0	22.6	1012
2020-09-24 19:00	11.1	200	0	18.8	1012
2020-09-24 20:00	10.6	197	0	16.6	1014
2020-09-24 21:00	8.9	189	0	15.2	1012
2020-09-24 22:00	4.3	174	0	14.6	1013
2020-09-24 23:00	3.6	176	0	13.1	1013
2020-09-24 0:00	3.4	86	0	12.5	1014

Note:
Highlighted data from ECCC Sarnia Climate station [3].

Table 11 - VOC Summary

Compound	CAS No.	24-hr Limit µg/m³	South			North			South Sample Max as % of 24-hr Std (sch 3)	North Sample Max as % of 24-hr Std (sch 3)
			Mean	Minimum	Maximum	Mean	Minimum	Maximum		
Carbon Tetrachloride	56-23-5	2.4	0.062	ND	1.6	0.062	ND	1.6	67%	67%
Isopropyl Alcohol	67-63-0	7,300	NR	NR	NR	NR	NR	NR	NR	NR
Acetone	67-64-1	11,880	6.1	ND	25	6.4	ND	25	<1%	<1%
Chloroform	67-66-3	1	ND	ND	ND	ND	ND	ND	ND	ND
Benzene	71-43-2	2.3	0.12	ND	0.84	0.19	ND	0.86	37%	37%
1,1,1-Trichloroethane	71-55-6	115,000	ND	ND	ND	ND	ND	ND	ND	ND
Vinyl Chloride	75-01-4	1	ND	ND	ND	ND	ND	ND	ND	ND
Dichloromethane	75-09-2	220	0.26	ND	1.7	1.1	ND	20	<1%	9.1%
1,1-Dichloroethane	75-34-3	165	ND	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethene	75-35-4	10	ND	ND	ND	ND	ND	ND	ND	ND
Chlorodifluoromethane	75-45-6	350,000	0.52	ND	1.5	0.52	ND	1.6	<1%	<1%
Trichlorofluoromethane	75-69-4	6,000	0.72	ND	2.0	0.74	ND	2.2	<1%	<1%
Dichlorodifluoromethane	75-71-8	500,000	1.2	ND	3.2	1.2	ND	3.4	<1%	<1%
1,1,2-Trichloro-1,2,2-Trifluoroethane	76-13-1	800,000	0.058	ND	1.5	0.062	ND	1.6	<1%	<1%
2-Methyl Butane	78-78-4	35,500	1.34	ND	4.5	1.2	ND	5.7	<1%	<1%
1,2-Dichloropropane	78-87-5	2,400	ND	ND	ND	ND	ND	ND	ND	ND
MEK	78-93-3	1,000	0.66	ND	2.0	1.1	ND	6.0	<1%	<1%
Trichloroethene	79-01-6	12	ND	ND	ND	ND	ND	ND	ND	ND
Naphthalene	91-20-3	22.5	ND	ND	ND	ND	ND	ND	ND	ND
o-Xylene	95-47-6	730	ND	ND	ND	0.39	ND	3.7	ND	<1%
1,2-Dichlorobenzene	95-50-1	NA	ND	ND	ND	ND	ND	ND	NA	NA
1,2,4-Trimethylbenzene	95-63-6	220	0.33	ND	1.8	0.36	ND	1.5	<1%	<1%
3-Methyl Pentane	96-14-0	1,750	0.13	ND	0.97	0.16	ND	1.4	<1%	<1%
p-Cymene	99-87-6	50	ND	ND	ND	ND	ND	ND	ND	ND
Ethyl Benzene	100-41-4	1,000	ND	ND	ND	0.33	ND	3.6	ND	<1%
Styrene	100-42-5	400	ND	ND	ND	0.073	ND	1.0	ND	<1%
1,4-Dichlorobenzene	106-46-7	95	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dibromoethane	106-93-4	3	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichloroethane	107-06-2	2	ND	ND	ND	ND	ND	ND	ND	ND
2-Propenenitrile	107-13-1	0.60	ND	ND	ND	ND	ND	ND	ND	ND
2-Methyl Pentane	107-83-5	1,750	0.25	ND	1.3	0.26	ND	1.4	<1%	<1%
MIBK	108-10-1	1,200	ND	ND	ND	0.13	ND	1.3	ND	<1%
m/p-Xylene	108-38-3/106-42-3	730	0.18	ND	2.4	1.5	ND	12	<1%	1.7%
1,3,5-Trimethylbenzene	108-67-8	220	ND	ND	ND	ND	ND	ND	ND	ND
Toluene	108-88-3	2,000	1.4	ND	7.6	2.7	ND	19	<1%	<1%
Chlorobenzene	108-90-7	NA	ND	ND	ND	ND	ND	ND	NA	NA
Hexane	110-54-3	7,500	0.28	ND	2.2	0.35	ND	3.7	<1%	<1%
Cyclohexane	110-82-7	6,100	0.069	ND	0.94	0.15	ND	1.9	<1%	<1%
Nonane	111-84-2	5,250	0.050	ND	1.3	0.054	ND	1.4	<1%	<1%
1,2,4-Trichlorobenzene	120-82-1	400	ND	ND	ND	0.096	ND	2.5	ND	<1%
Tetrachloroethene	127-18-4	360	0.23	ND	4.1	0.30	ND	4.6	1.1%	1.3%
Ethyl Acetate	141-78-6	NA	0.062	ND	0.84	0.18	ND	2.1	NA	NA
Heptane	142-82-5	11,000	0.068	ND	0.93	0.16	ND	1.4	<1%	<1%
1,2-Dichloroethene (Cis)	156-59-2	105	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichloroethene (Trans)	156-60-5	105	ND	ND	ND	ND	ND	ND	ND	ND
1,2,3-Trimethylbenzene	526-73-8	220	ND	ND	ND	ND	ND	ND	ND	ND
3-Methyl Hexane	589-34-4	1,535	0.034	ND	0.89	0.080	ND	1.2	<1%	<1%
2-Ethyl Toluene	611-14-3	0.50	ND	ND	ND	ND	ND	ND	ND	ND

nd = below method detection limit
na = no applicable limit

Table 12 - TSP & Metals Summary

Parameter	CAS No.	24-hr Limit (µg/m³)	South Site			North Site			Sample Max as % of 24-hr Std	
			mean	min	max	mean	min	max	South Site	North Site
Total Suspended Particulate	NA-TSP	120	32	6.1	110	29	5.1	93	92%	77%
Lead	7439-92-1	0.50	0.0012	ND	0.0042	0.0022	ND	0.0084	<1%	1.7%
Manganese	7439-96-5	0.40	0.011	0.0019	0.041	0.010	0.0019	0.037	10%	9.3%
Nickel	7440-02-0	0.2	0.00047	ND	0.0040	0.00083	ND	0.0035	2.0%	1.8%
Thallium	7440-28-0	0.50	ND	ND	ND	ND	ND	ND	ND	ND
Tin	7440-31-5	10	ND	ND	ND	ND	ND	ND	ND	ND
Antimony	7440-36-0	25	ND	ND	ND	ND	ND	ND	ND	ND
Arsenic	7440-38-2	0.30	ND	ND	ND	ND	ND	ND	ND	ND
Barium	7440-39-3	10	0.0052	0.0019	0.013	0.0049	0.0019	0.014	<1%	<1%
Beryllium	7440-41-4	NA	ND	ND	ND	ND	ND	ND	NA	NA
Cadmium	7440-43-9	0.025	ND	ND	ND	ND	ND	ND	ND	ND
Chromium	7440-47-3	0.5	ND	ND	ND	ND	ND	ND	ND	ND
Cobalt	7440-48-4	0.10	ND	ND	ND	ND	ND	ND	ND	ND
Copper	7440-50-8	50	0.040	0.012	0.092	0.016	ND	0.039	<1%	<1%
Vanadium	7440-62-2	2.0	ND	ND	ND	ND	ND	ND	ND	ND
Zinc	7440-66-6	120	0.017	0.0082	0.034	0.019	0.011	0.036	<1%	<1%
Selenium	7782-49-2	10	ND	ND	ND	ND	ND	ND	ND	ND
Iron	15438-31-0	10	0.34	0.083	1.4	0.36	0.074	1.4	14%	14%

nd = below method detection limit
na = no applicable limit

Table 13 - Carbonyls Summary

Compound	CAS No.	24-hr Limit (µg/m³)	South Site			North Site			Sample Max as % of 24-hr Std	
			mean	min	max	mean	min	max	South Site	North Site
Formaldehyde	65	65	ND	ND	ND	16	ND	64	ND	98%
Acetone	11,880	11,880	ND	ND	ND	ND	ND	ND	ND	ND
Acetaldehyde	500	500	ND	ND	ND	ND	ND	ND	ND	ND
Benzaldehyde	2.00	2.00	ND	ND	ND	ND	ND	ND	ND	ND
Acrolein	NA	NA	ND	ND	ND	ND	ND	ND	NA	NA
Glutaraldehyde	14	14	ND	ND	ND	ND	ND	ND	ND	ND
Propionaldehyde (Propanal)	NA	NA	ND	ND	ND	ND	ND	ND	NA	NA
n-Butyraldehyde (n-Butanal)	NA	NA	ND	ND	ND	ND	ND	ND	NA	NA

nd = below method detection limit
na = no applicable limit

Table 14 - Mercury Summary

Compound	CAS No.	24-hr Std Sch 3 (µg/m³)	South Site			North Site			Sample Max as % of 24-hr Std	
			mean	min	max	mean	min	max	South Site	North Site
Particulate Mercury	--	NA	1.8E-05	ND	3.2E-05	2.6E-05	ND	1.1E-04	NA	NA
Vapour Mercury	7439-97-6	NA	ND	ND	ND	5.2E-03	ND	2.6E-02	NA	NA
Total Mercury	--	2	1.8E-05	ND	3.2E-05	5.2E-03	ND	2.6E-02	<1%	1.3%

nd = below method detection limit
na = no applicable limit

6. REFERENCES

[1] "Report: Clean Harbors Environmental Services Inc., Lambton Facility, Ambient Air Monitoring Plan" (ORTECH # R50881-01), ORTECH Consulting Inc., December 2015.

[2] "Historical Data", Environment and Climate Change Canada. [online]: https://climate.weather.gc.ca/historical_data/search_historic_data_e.html. Accessed September 2020.

[3] "Air Contaminants Benchmarks List: standards, guidelines and screening levels for assessing point of impingement concentrations of air contaminants," Ontario Ministry of Environment, Conservation, and Parks, Version 2.0, April 2018. [online]: https://www.ontario.ca/page/air-contaminants-benchmarks-list-standards-guidelines-and-screening-levels-assessing-point. Accessed December 2020.

[4] "Ontario's Ambient Air Quality Criteria," Ontario Ministry of Environment, Conservation, and Parks, Updated November 27, 2020. [online]: https://www.ontario.ca/page/ontarios-ambient-air-quality-criteria. Accessed December 2020.

APPENDIX A – Copy of Monitoring Plan

Report No. 50881–1

ORTECH

Report:

Clean Harbors Environmental Services Inc.
Lambton Facility
Ambient Air Monitoring Plan

Date: December 11, 2015



Report:

Clean Harbors Environmental Services Inc.
Lambton Facility
Ambient Air Monitoring Plan

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Report No.: 50881-1
10 pages

Revision History

Version	Date	Summary Changes/Purpose of Revision
1	December 11, 2015	original

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INTRODUCTION

Clean Harbors has conducted various ambient air monitoring programs at their Telfer Road facility since the 1990's. The current Air Monitoring Plan was approved by the Ontario Ministry of Environment and Climate Change (MOECC) and initiated in June 2011 (ORTECH – P5061-2, June 21, 2011). This Plan was reviewed by the MOECC in August 2015, resulting in a number of suggested changes to the program. As solicited by Clean Harbors, this plan outlines the general methods to conduct the monitoring requirements and recommendations from Clean Harbors and the MOECC.

The monitoring plan includes the following proposed changes:

- Relocation of the north monitoring site;
- Update of the target VOC list; and
- Update of the aldehyde and ketone (Carbonyls) target list.

The primary emphasis of this monitoring program is directed toward potential fugitive emission releases from the landfill and other low-level facility sources. The target substances were selected to characterize the property line concentrations related to these emissions and include:

- An extensive group of speciated volatile organic compounds (VOCs);
- Total suspended particulate matter (TSP) and metals;
- Vapour and particulate mercury (Mercury); and
- Specific aldehyde and ketone constituents (Carbonyls).

1. Proposed Approach

1.1 General Synopsis of Approach

The primary objective of the ambient air monitoring program is to measure specific airborne target compounds at or near the facility perimeter by established procedures to verify that concentrations are within accepted regulatory limits.

Concurrent 24-hour sampling will be conducted at two fixed locations. The north site will be located at the north perimeter on top of the berm with the south site at some distance from the southerly fence line.

The measured data will be provided to Clean Harbors as soon as possible after each sample day and a study report will be prepared annually upon completion of all measurement sets.

1.2 Monitoring Locations

The north and south fixed monitoring locations are shown on the map in Figure 1. The current north site is within the perimeter fencing of the north property line (Petrolia Line) at the base of

the sloped berm which is adjacent to the exposed waste landfill area. It was recommended by the MOECC that this site be moved to the top of the berm approximately 150 metres east of the present location (see Figure 1). This new location will mitigate all possible obstructions between the monitoring site and the facility, with the emphasis directed toward measuring maximum potential constituent levels from the active landfill operations under southerly wind regimes. The south site will remain at its present location and is south of the facility on a property at the corner of Telfer Road and Rokeby Line. The locale is upwind of all facility operations under southerly quadrant wind conditions and is sited to minimize possible particulate contributions from the adjacent gravel road (Telfer Road). The monitoring position of both the north and south locations will be fixed throughout the survey period.

Figure 1
North and South Sampling Locations

1.3 Sample Storage & Transportation

Before and after sample collection, the sample media and canisters will be stored at the ORTECH laboratory in an appropriate, clean, temperature controlled environment. Exposed sample media and canisters will be packed in protective cases (with ice packs if required) and shipped via courier to the analytical laboratory within three days of exposure. Chain of custody records will be maintained for all samples.

1.4 Sample Collection and Analysis

In order to maintain consistency with previous monitoring at the facility, essentially the same measurement methods will be used for concurrent monitoring as shown below in Table 1.

Table 1
Measurement Methods

Parameter	Sample Media	Analytical Method	Standard Method
VOC	6L evacuated canisters	GC/MSD	US EPA TO-15a
TSP	Glass-fibre filters	Gravimetric	US EPA IO2-1
Metals and Particulate Mercury	Glass-fibre filters	ICP MS	US EPA 6010B
		CVAA	US EPA 7471A
Carbonyls	Lp DNHP cartridge	HPLC	US EPA TO-11a and IP-6A
Mercury Vapour	Carulite tubes	Acid Extraction CVAA	US EPA 7470 and OSHA ID-140

VOC **-** Twenty-four hour whole air upwind and downwind samples will be collected into stainless steel electropolished 6 L evacuated canisters at a constant flow rate following EPA method TO-15. The canisters and flow controllers will be provided, cleaned, proofed and analyzed by a CALA accredited laboratory.

Proofing consists of taking one canister and its associated sampling train and flow controller from each batch of cleaned canisters and performing an analysis to ensure that the cleaning process was adequate. The sampling trains and flow controllers will be leak checked and the flow verified before shipping from the laboratory. Each canister will be inspected for damage upon receipt from the laboratory and after a period of acclimatization, the operator will record the “as received” vacuum reading (should be ≥ -29 inches Hg). Prior to sampling, the vacuum will be checked again, and if significantly different (i.e., not within 3 inches Hg) the canister will not be used and will be returned to the laboratory. The precleaned stainless steel sampling train consists of a ¼ inch sampling inlet, a 2 micron sintered steel particulate filter, a critical orifice (designed for 24-hour sampling), a flow controller and a vacuum gauge. Each sampling

train has a unique identification number that will be recorded. The critical orifice and flow controller will accurately maintain a constant flow despite changes in vacuum over a range of -30 to -5 inches Hg in a 24-hour period. Prior to the scheduled sampling period the canisters will be removed from their respective protective containers and positioned such that the sampling inlet is approximately 1.5 meters above ground. Initial and final canister vacuum readings will be recorded for each sample along with ambient temperature and pressure. Final readings should be between -5 and -8 inches Hg to ensure a valid sample.

The extensive list of target compounds is found in Table 2. As some of the compounds are not found on the typical laboratory T0-15 list offered by commercial laboratories, the lab must procure custom certified calibration gas standards and develop methods for these additional compounds. Clean Harbors conducted a comprehensive review of their latest Emission Summary and Dispersion Modelling (ESDM) report with respect to the compound list and it is recommended that the thirteen highlighted compounds be removed from the target list, with the following rational. For seven of the compounds, the total point of impingement (POI) concentrations (modelled and fugitive) were less than 1% of their respective POI standards: Chlorodifluoromethane, 2-Methyl Butane, 3-Methyl Pentane, p-Cymene, 2-Methyl Pentane, Nonane and 3-Methyl Hexane. The following six compounds were not found on the latest ESDM compound list: 1,1,2-Trichloro-1,2,2-Trifluoroethane, 1,2,Dichlorobenzene, Chlorobenzene, Ethyl Acetate, 1,2,3,-Trimethylbenzene and o-Ethyl Toluene. The remainder of the compounds is covered by the standard EPA TO-15 list with the addition of naphthalene and 2-Propenenitrile.

Table 2
VOC Compound List

Compound	CAS No.	Compound	CAS No.
Carbon Tetrachloride	56-23-5	Ethyl Benzene	100-41-4
Isopropyl Alcohol	67-63-0	Styrene	100-42-5
Acetone	67-64-1	1,4-Dichlorobenzene	106-46-7
Chloroform	67-66-3	1,2-Dibromoethane	106-93-4
Benzene	71-43-2	1,2-Dichloroethane	107-06-2
1,1,1-Trichloroethane	71-55-6	2-Propenenitrile	107-13-1
Vinyl Chloride	75-01-4	2-Methyl Pentane	107-83-5
Dichloromethane	75-09-2	MIBK	108-10-1
1,1-Dichloroethane	75-34-3	m/p-Xylene	108-38-3/106-42-3
1,1-Dichloroethene	75-35-4	1,3,5-Trimethylbenzene	108-67-8
Chlorodifluoromethane	75-45-6	Toluene	108-88-3
Trichlorofluoromethane	75-69-4	Chlorobenzene	108-90-7
Dichlorodifluoromethane	75-71-8	Hexane	110-54-3
1,1,2-Trichloro-1,2,2-Trifluoroethane	76-13-1	Cyclohexane	110-82-7
2-Methyl Butane	78-78-4	Nonane	111-84-2
1,2-Dichloropropane	78-87-5	1,2,4-Trichlorobenzene	120-82-1
MEK	78-93-3	Tetrachloroethene	127-18-4
Trichloroethene	79-01-6	Ethyl Acetate	141-78-6
Naphthalene	91-20-3	Heptane	142-82-5
o-Xylene	95-47-6	1,2-Dichloroethene (Cis)	156-59-2
1,2-Dichlorobenzene	95-50-1	1,2-Dichloroethene (Trans)	156-60-5
1,2,4-Trimethylbenzene	95-63-6	1,2,3-Trimethylbenzene	526-73-8
3-Methyl Pentane	96-14-0	3-Methyl Hexane	589-34-4
p-Cymene	99-87-6	o-Ethyl Toluene	611-14-3

TSP/Metals **-** Total suspended particulate matter will be measured for 24-hour periods by sampling on preweighed glass fibre filters using conventional high-volume sampling units and operated according to standard techniques. These samplers will be calibrated on a quarterly basis utilizing calibration equipment that is certified against a reference or transfer standard traceable to a recognized national primary standard. At each sample interval, performance checks will be conducted to ensure that the flows are within ±10% of the required flow (40 CFM). TSP will be determined gravimetrically and subsequent filter particulate analysis by a CALA accredited laboratory will be done using inductively coupled plasma emission spectroscopy with mass spectrometric detection (ICP-MS) for 17 trace elements (Table 3). A portion of the filter after extraction will also be analyzed by cold vapour atomic absorption spectroscopy (CVAA) for particulate mercury, as understood to be required by MOECC, in general accordance with published standard methods. The target list of TSP and metals will remain unchanged from the June 21, 2011 Monitoring Plan.

Table 3
TSP and Metals

Parameter	CAS No.
Total Suspended Particulate (TSP)	Not available
Antimony	7440-36-0
Arsenic	7440-38-2
Barium	7440-39-3
Beryllium	7440-41-4
Cadmium	7440-43-9
Chromium	7440-47-3
Cobalt	7440-48-4
Copper	7440-50-8
Iron	15438-31-0
Lead	7439-92-1
Manganese	7439-96-5
Nickel	7440-02-0
Selenium	7782-49-2
Thallium	7440-28-0
Tin	7440-31-5
Vanadium	7440-62-2
Zinc	7440-66-6

Carbonyls – Speciated aldehyde and ketone compounds (Table 4) will be measured, as in past years, by sampling for 24-hours on SepPak (Lp DNHP) cartridges with subsequent analysis by high performance liquid chromatography (HPLC) with ultraviolet (UV) detection following US EPA Compendium Method T0-11a and US EPA Analytical Method IP-6A. The sampling units, consisting of diaphragm pumps, flow controllers and timers within protective enclosures, will be operated at an approximately 1 L/min flowrate to achieve approximately 1.5 m^3 total air volume through the DNHP-coated adsorbents (i.e., low pressure drop 2,4-Dinitrophenylhydrazine cartridges). The flows will be checked before and after each sample interval using NIST-traceable flow standards (i.e. BIOS Dry Cal). Analyses will be conducted by a CALA accredited laboratory and results will be compared with the associated 24-hour Standards and AAQC for the applicable species.

The list of carbonyl compounds was compared by Clean Harbors to their latest ESDM and it is recommended that the seven highlighted parameters be deleted from the target list leaving Formaldehyde as the single compound on the list. Five of these compounds (Acetaldehyde, Acrolein, Glutaraldehyde, Propionaldehyde and n-Butyraldehyde) are not emitted by Clean Harbors according to their ESDM report and Acetone is already included in the VOC target list. Benzaldehyde's total POI concentration (modelled and fugitive) was less than 1% of its respective POI standard.

TABLE 4
Carbonyls

Parameter	CAS No.
Formaldehyde	50-00-0
Acetone	67-64-1
Acetaldehyde	75-07-0
Benzaldehyde	100-52-7
Acrolein	107-02-08
Glutaraldehyde	111-30-8
Propionaldehyde (Propanal)	123-38-6
n-Butyraldehyde (n-Butanal)	123-72-3

Mercury **-** Mercury vapour will be collected, as in past years, for 24-hour periods onto adsorbent sample tubes based generally on OSHA Method ID-140 and analyzed following US EPA Method 7470. The carulite adsorbent tubes (6 mm diameter and 80 mm length), containing Hydrar (i.e., similar to hopcalite material composition), will use the same sampling apparatus as the carbonyls and will be similarly checked for proper flows before and after each sample period. The flow rates will be maintained at approximately 70 mL/min to collect total sample volumes of about 0.1 m^3. The samples will be analyzed by a CALA accredited laboratory utilizing cold vapour atomic absorption (CVAA) spectroscopy with ultraviolet (UV) detection. The particulate mercury result, determined by extraction, will be combined with the vapour phase mercury level for comparison with the applicable standards and AAQC.

1.5 Meteorological Measurements

Localized wind speed, direction and rainfall data will be obtained from the nearby Sarnia-Lambton Environmental Association (SLEA) monitoring and meteorological station (Moore Line). These data will be used to document the weather conditions during each sampling period and confirm the extent of downwind site positioning/source alignment.

1.6 Measurement Frequency and Scheduling

All samples will be collected over a twenty-four hour period from midnight to midnight (eastern standard time) initiated on the twelve day NAPS cycle. Measurement frequency and scheduling are shown in Table 5.

Table 5
Measurement Frequencies

Constituent	Frequency and Schedule
VOCs/TSP/Metals	12 sample days on the 12 day NAPS cycle beginning May 12, 2016
Formaldehyde and Mercury	One sample day per month for June, July and August taken on a day when VOCs/TSP/Metal samples are collected

2. Quality Assurance

To maintain an appropriate level of quality assurance with regard to the monitoring, various quality assurance practices will be incorporated into the sampling and analysis methods, as routinely done, in an effort to enhance the measurement validity. These will include all pertinent items from the applicable methods as well as the MOECC's Operations Manual for Air Quality Monitoring in Ontario (March 2008).

2.1 Quality Assurance Program

ORTECH personnel, trained and proficient in these methods, will be responsible for the collection of samples and will follow applicable Standard Operating Procedures and/or instrument manuals. Table 6 lists the various QA/QC measures.

Table 6
QA/QC Measures

Activity	Measure
Sampling Apparatus	• Calibration of equipment at appropriate intervals • Flow checks before and after each sample interval (±10% criterion)
Sample Collection	• All sample periods will start at midnight • Collection at 1.5 to 2.0 meters above ground (2.5 meters for TSP/Metals) • All samples will be collected simultaneously • Field blank collection media (20% of samples) will be utilized that are handled and analyzed in the same manner as regular samples (without air flow) to assess any detectable contamination. Field blanks are not applicable for VOCs collected in canisters • Provision for MOE to conduct audits
Sample Control	• Precautionary measures will be followed during the collection/storage/transfer of samples prior to analysis to maintain sample integrity, along with proper sample identification, and recording procedures • Storage in climate controlled, organic solvent free environment • Shipment to lab via courier in protective cases within 3 days of exposure
Sample Analysis	• Use of CALA accredited laboratories • Documented methods and procedures
Record Keeping	• All sampling media/canisters will have unique identification numbers • Use of field Sampling Logs to record: sample canister I.D., sample train I.D., operator's name and signature, sample location, date and time, sample start and stop times, analysis requirement, sample flows, weather observations, and other information or observations (odours, nearby activities with potential impact, etc.) • Chain of Custody forms for sample tracking (sample placement, collection times, sample identification numbers)

3. Reporting

Analytical results will be reported as soon as possible to Clean Harbors and will include all applicable QA/QC and meteorological information. These data will be summarized in tables and compared to applicable air quality standards and AAQC.

An annual summary report will be prepared after the final set of monitoring data is received from the contract laboratory. Unless otherwise required, the report will include a description of the measurement procedures along with specific data and summarized tabulations such as:

- A summary of the various measurement results collected each sampling location;
- Summaries of the meteorological data, including wind speed and direction, acquired for each sample interval;
- Comparison of the various constituents to applicable twenty-four hour air quality standards or AAQC; and
- Electronic copy of time stamped (Eastern Standard) constituent measurements and meteorological data.

All data (uncensored, but flagged as appropriate) will be made available in electronic format and will include any recorded local meteorological data.

4. Annual Program Review

The MOECC and Clean Harbors will review the results of the sampling program each year and, based upon this review of the data, the program will be re-evaluated for the following year. This review will include the measurement frequency and scheduling as well as the target compound list and sampling locations. This program may change in the future as the understanding of the monitoring data and the proposed landfill expansion evolves. Any proposed modifications to the air monitoring program will be submitted to the Regional Director of the MOECC for approval prior to implementation.

Rod Brooks
Sarnia Manager

APPENDIX B – Data for 24-hour Samples

Table B-1 - 24-hr VOC Data

	Sample ID	NVOC-01	SVOC-01	NVOC-02	SVOC-02	NVOC-03	SVOC-03	NVOC-04	SVOC-04	NVOC-05	SVOC-05	NVOC-06	SVOC-06
	Location	NORTH	SOUTH	NORTH	SOUTH	NORTH	SOUTH	NORTH	SOUTH	NORTH	SOUTH	NORTH	SOUTH
	Date Sampled	May 3, 2020	May 3, 2020	May 15, 2020	May 15, 2020	May 27, 2020	May 27, 2020	June 8, 2020	June 8, 2020	June 20, 2020	June 20, 2020	July 2, 2020	July 2, 2020
Substance Name	**CAS#**												
Carbon Tetrachloride	56-23-5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Isopropyl Alcohol	67-63-0	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Acetone	67-64-1	7.0	8.9	7.9	7.5	10	12	10	7.5	21	18	15	18
Chloroform	67-66-3	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Benzene	71-43-2	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.81	0.84
1,1,1-Trichloroethane	71-55-6	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Vinyl Chloride	75-01-4	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Dichloromethane	75-09-2	ND	ND	0.86	0.83	ND	ND	ND	1.7	1.1	ND	ND	0.73
1,1-Dichloroethane	75-34-3	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethene	75-35-4	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chlorodifluoromethane	75-45-6	0.83	0.79	0.81	0.81	1.0	0.97	0.86	0.86	1.1	1.1	1.1	1.1
Trichlorofluoromethane	75-69-4	1.2	1.2	1.2	1.2	1.2	1.3	1.3	1.3	1.6	1.6	1.7	1.6
Dichlorodifluoromethane	75-71-8	2.1	2.2	2.1	2.1	2.2	2.2	2.5	2.6	2.7	2.6	2.6	2.6
1,1,2-Trichloro-1,2,2-Trifluoroethane	76-13-1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2-Methyl Butane	78-78-4	0.86	0.87	1.1	1.0	1.4	2.3	1.0	2.7	2.4	3.9	5.7	4.5
1,2-Dichloropropane	78-87-5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
MEK	78-93-3	0.68	0.62	1.4	1.4	2.0	1.5	1.1	0.91	2.9	2.0	2.2	1.8
Trichloroethene	79-01-6	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Naphthalene	91-20-3	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
o-Xylene	95-47-6	ND	ND	ND	ND	ND	ND	ND	ND	0.89	ND	ND	ND
1,2-Dichlorobenzene	95-50-1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2,4-Trimethylbenzene	95-63-6	1.0	1.8	ND	ND	ND	1.7	ND	ND	1.1	1.2	1.1	0.99
3-Methyl Pentane	96-14-0	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.72	0.75	0.74
p-Cymene	99-87-6	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Ethyl Benzene	100-41-4	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Styrene	100-42-5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,4-Dichlorobenzene	106-46-7	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dibromoethane	106-93-4	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichloroethane	107-06-2	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2-Propenenitrile	107-13-1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2-Methyl Pentane	107-83-5	ND	ND	ND	ND	ND	ND	ND	ND	ND	1.2	1.2	1.2
MIBK	108-10-1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
m/p-Xylene	108-38-3/106-42-3	ND	ND	ND	ND	ND	ND	ND	ND	2.3	ND	1.9	ND
1,3,5-Trimethylbenzene	108-67-8	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Toluene	108-88-3	1.0	1.4	1.9	1.1	1.3	2.0	0.82	1.6	4.1	2.6	5.8	7.6
Chlorobenzene	108-90-7	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Hexane	110-54-3	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.95	0.96	0.93
Cyclohexane	110-82-7	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.85
Nonane	111-84-2	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2,4-Trichlorobenzene	120-82-1	ND	ND	2.5	ND	ND	ND	ND	ND	ND	ND	ND	ND
Tetrachloroethene	127-18-4	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Ethyl Acetate	141-78-6	ND	ND	ND	0.84	ND	ND	ND	ND	0.91	ND	ND	ND
Heptane	142-82-5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichloroethene (Cis)	156-59-2	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichloroethene (Trans)	156-60-5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2,3-Trimethylbenzene	526-73-8	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
3-Methyl Hexane	589-34-4	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2-Ethyl Toluene	611-14-3	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

	Sample ID	NVOC-07	SVOC-07	NVOC-08	SVOC-08	NVOC-09	SVOC-09	NVOC-10	SVOC-10	NVOC-11	SVOC-11	NVOC-12	SVOC-12
	Location	NORTH	SOUTH	NORTH	SOUTH	NORTH	SOUTH	NORTH	SOUTH	NORTH	SOUTH	NORTH	SOUTH
	Date Sampled	July 14, 2020	July 14, 2020	July 26, 2020	July 26, 2020	August 7, 2020	August 7, 2020	August 19, 2020	August 19, 2020	August 31, 2020	August 31, 2020	September 12, 2020	September 12, 2020
Substance Name	**CAS#**												
Carbon Tetrachloride	56-23-5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	1.6	1.6
Isopropyl Alcohol	67-63-0	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Acetone	67-64-1	14	16	25	25	9.3	11	8.4	5.2	10	6.2	12	11
Chloroform	67-66-3	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Benzene	71-43-2	0.86	0.78	0.77	ND	ND	ND	0.85	0.80	ND	ND	0.84	0.72
1,1,1-Trichloroethane	71-55-6	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Vinyl Chloride	75-01-4	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Dichloromethane	75-09-2	20	1.3	1.8	ND	ND	1.4	1.3	ND	ND	ND	0.97	0.77
1,1-Dichloroethane	75-34-3	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethene	75-35-4	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chlorodifluoromethane	75-45-6	1.1	1.1	1.2	1.2	0.91	1.0	1.2	1.2	0.83	0.93	1.6	1.5
Trichlorofluoromethane	75-69-4	1.6	1.7	1.6	1.6	1.2	1.2	1.8	1.7	1.4	1.1	2.2	2.0
Dichlorodifluoromethane	75-71-8	2.4	2.7	2.7	2.6	2.1	2.1	2.8	2.6	1.9	1.9	3.4	3.2
1,1,2-Trichloro-1,2,2-Trifluoroethane	76-13-1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	1.6	1.5
2-Methyl Butane	78-78-4	2.1	3.8	2.5	3.2	0.78	1.3	4.2	3.2	1.7	2.3	3.8	1.5
1,2-Dichloropropane	78-87-5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
MEK	78-93-3	3.0	1.6	3.4	1.8	0.85	1.3	2.1	1.1	0.78	0.72	1.5	1.4
Trichloroethene	79-01-6	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Naphthalene	91-20-3	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
o-Xylene	95-47-6	1.9	ND	1.6	ND	ND	ND	1.2	ND	ND	ND	0.97	ND
1,2-Dichlorobenzene	95-50-1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2,4-Trimethylbenzene	95-63-6	1.1	1.7	1.5	1.1	ND	ND	1.5	ND	ND	ND	1.1	ND
3-Methyl Pentane	96-14-0	1.4	0.97	ND	ND	ND	ND	0.89	0.97	ND	ND	1.0	ND
p-Cymene	99-87-6	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Ethyl Benzene	100-41-4	1.8	ND	1.2	ND	ND	ND	1.0	ND	ND	ND	0.92	ND
Styrene	100-42-5	0.95	ND	0.94	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,4-Dichlorobenzene	106-46-7	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dibromoethane	106-93-4	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichloroethane	107-06-2	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2-Propenenitrile	107-13-1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2-Methyl Pentane	107-83-5	1.4	1.3	0.84	0.90	ND	ND	1.3	1.1	ND	ND	1.4	0.71
MIBK	108-10-1	1.1	ND	0.88	ND	ND	ND	ND	ND	ND	ND	ND	ND
m/p-Xylene	108-38-3/106-42-3	11	2.2	3.8	ND	ND	2.4	3.0	ND	ND	ND	2.1	ND
1,3,5-Trimethylbenzene	108-67-8	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Toluene	108-88-3	18	5.5	7.4	3.0	1.5	4.1	6.0	3.4	1.5	2.1	2.2	1.4
Chlorobenzene	108-90-7	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Hexane	110-54-3	3.7	1.4	1.0	0.91	ND	ND	1.4	2.2	ND	ND	1.1	0.77
Cyclohexane	110-82-7	1.9	ND	ND	ND	ND	ND	1.3	0.94	ND	ND	ND	ND
Nonane	111-84-2	ND	1.3	1.4	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2,4-Trichlorobenzene	120-82-1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Tetrachloroethene	127-18-4	ND	ND	ND	ND	ND	4.1	4.6	1.8	ND	ND	ND	ND
Ethyl Acetate	141-78-6	0.90	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.77	0.76
Heptane	142-82-5	1.4	0.93	1.0	ND	ND	ND	0.86	ND	ND	ND	0.91	0.84
1,2-Dichloroethene (Cis)	156-59-2	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichloroethene (Trans)	156-60-5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2,3-Trimethylbenzene	526-73-8	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
3-Methyl Hexane	589-34-4	1.2	0.89	ND	ND	ND	ND	ND	ND	ND	ND	0.86	ND
2-Ethyl Toluene	611-14-3	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

	Sample ID	NVOC-13	SVOC-13
	Location	NORTH	SOUTH
	Date Sampled	September 24, 2020	September 24, 2020
Substance Name	**CAS#**		
Carbon Tetrachloride	56-23-5	ND	ND
Isopropyl Alcohol	67-63-0	NR	NR
Acetone	67-64-1	17	13
Chloroform	67-66-3	ND	ND
Benzene	71-43-2	0.85	ND
1,1,1-Trichloroethane	71-55-6	ND	ND
Vinyl Chloride	75-01-4	ND	ND
Dichloromethane	75-09-2	1.9	ND
1,1-Dichloroethane	75-34-3	ND	ND
1,1-Dichloroethene	75-35-4	ND	ND
Chlorodifluoromethane	75-45-6	1.0	0.93
Trichlorofluoromethane	75-69-4	1.3	1.3
Dichlorodifluoromethane	75-71-8	1.9	2.3
1,1,2-Trichloro-1,2,2-Trifluoroethane	76-13-1	ND	ND
2-Methyl Butane	78-78-4	3.2	4.3
1,2-Dichloropropane	78-87-5	ND	ND
MEK	78-93-3	6.0	1.1
Trichloroethene	79-01-6	ND	ND
Naphthalene	91-20-3	ND	ND
o-Xylene	95-47-6	3.7	ND
1,2-Dichlorobenzene	95-50-1	ND	ND
1,2,4-Trimethylbenzene	95-63-6	1.0	ND
3-Methyl Pentane	96-14-0	ND	ND
p-Cymene	99-87-6	ND	ND
Ethyl Benzene	100-41-4	3.6	ND
Styrene	100-42-5	ND	ND
1,4-Dichlorobenzene	106-46-7	ND	ND
1,2-Dibromoethane	106-93-4	ND	ND
1,2-Dichloroethane	107-06-2	ND	ND
2-Propenenitrile	107-13-1	ND	ND
2-Methyl Pentane	107-83-5	0.74	ND
MIBK	108-10-1	1.3	ND
m/p-Xylene	108-38-3/106-42-3	12	ND
1,3,5-Trimethylbenzene	108-67-8	ND	ND
Toluene	108-88-3	19	1.7
Chlorobenzene	108-90-7	ND	ND
Hexane	110-54-3	0.84	ND
Cyclohexane	110-82-7	0.75	ND
Nonane	111-84-2	ND	ND
1,2,4-Trichlorobenzene	120-82-1	ND	ND
Tetrachloroethene	127-18-4	3.2	ND
Ethyl Acetate	141-78-6	2.1	ND
Heptane	142-82-5	ND	ND
1,2-Dichloroethene (Cis)	156-59-2	ND	ND
1,2-Dichloroethene (Trans)	156-60-5	ND	ND
1,2,3-Trimethylbenzene	526-73-8	ND	ND
3-Methyl Hexane	589-34-4	ND	ND
2-Ethyl Toluene	611-14-3	ND	ND

ND = “non-detect” - below lab detection limits

NR = “not-reported” – see e-mail in APPENDIX C.

Table B-2 – 24-hr Carbonyl Data

		Sample ID	NC-01	SC-01	NC-02	SC-02	NC-03	SC-03	NC-04	SC-04
		Location	NORTH	SOUTH	NORTH	SOUTH	NORTH	SOUTH	NORTH	SOUTH
		Type	SAMPLE	SAMPLE	SAMPLE	SAMPLE	SAMPLE	SAMPLE	SAMPLE	SAMPLE
		Date Sampled	June 8, 2020	June 8, 2020	July 2, 2020	July 2, 2020	August 7, 2020	August 7, 2020	September 9, 2020	September 9, 2020
		Duration (min):	1395	1397	1409	1439	1437	1389	1430	1475
		Volume (m3)	1.39	0.76	1.42	1.55	1.39	1.38	1.41	1.49
Sort ID	**Compound**	**CAS No.**								
1	Formaldehyde	50-00-0	ND	ND	ND	ND	64	ND	ND	ND
2	Acetone	67-64-1	ND	ND	ND	ND	ND	ND	ND	ND
3	Acetaldehyde	75-07-0	ND	ND	ND	ND	ND	ND	ND	ND
4	Benzaldehyde	100-52-7	ND	ND	ND	ND	ND	ND	ND	ND
5	Acrolein	1070-20-8	ND	ND	ND	ND	ND	ND	ND	ND
6	Glutaraldehyde	111-30-8	ND	ND	ND	ND	ND	ND	ND	ND
7	Propionaldehyde (Propanal)	123-38-6	ND	ND	ND	ND	ND	ND	ND	ND
8	n-Butyraldehyde (n-Butanal)	123-72-3	ND	ND	ND	ND	ND	ND	ND	ND

ND=below method detection limit

Table B-3 - 24-hr Mercury Data

		Sample ID	NM-01	NTSP-04	SM-01	STSP-04	NM-02	NTSP-06	SM-02	STSP-06
		Location	NORTH	NORTH	SOUTH	SOUTH	NORTH	NORTH	SOUTH	SOUTH
		Type	SAMPLE	SAMPLE	SAMPLE	SAMPLE	SAMPLE	SAMPLE	SAMPLE	SAMPLE
		Date Sampled	June 8, 2020	June 8, 2020	June 8, 2020	June 8, 2020	July 2, 2020	July 2, 2020	July 2, 2020	July 2, 2020
		Duration (min):	1395	1395	1397	1397	1409	1409	1439	1439
		Volume (m3)	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10
Sort ID	**Compound**	**CAS No.**								
1	Particulate Mercury	NA-HG-TSP	-	1.1E-04	-	3.2E-05	-	ND	-	2.0E-05
2	Vapour Mercury	7439-97-6	ND	-	ND	-	ND	-	ND	-
3	Total Mercury	NA-THG	1.1E-04	1.1E-04	3.2E-05	3.2E-05	ND	ND	2.0E-05	2.0E-05

		Sample ID	NM-03	NTSP-09	SM-03	STSP-09	STSP-09DUP	NM-04	NTSP- 11B	NTSP- 11BDUP	SM-04	STSP-11B
		Location	NORTH	NORTH	SOUTH	SOUTH	SOUTH	NORTH	NORTH	NORTH	SOUTH	SOUTH
		Type	SAMPLE	SAMPLE	SAMPLE	SAMPLE	DUP	SAMPLE	SAMPLE	DUP	SAMPLE	SAMPLE
		Date Sampled	August 7, 2020	August 7, 2020	August 7, 2020	August 7, 2020	August 7, 2020	September 9, 2020	September 9, 2020	September 9, 2020	September 9, 2020	September 9, 2020
		Duration (min):	1437	1437	1389	1389	1389	1430	1430	1430	1475	1475
		Volume (m3)	0.12	0.12	0.12	0.12	0.12	0.10	0.10	0.10	0.13	0.13
Sort ID	**Compound**	**CAS No.**										
1	Particulate Mercury	NA-HG-TSP	-	1.9E-05	-	2.0E-05	2.0E-05	-	ND	ND	-	ND
2	Vapour Mercury	7439-97-6	2.6E-02	-	ND	-	-	ND	-	-	ND	-
3	Total Mercury	NA-THG	2.6E-02	2.6E-02	2.0E-05	2.0E-05	2.0E-05	ND	ND	ND	ND	ND

ND=below method detection limit
DUP = laboratory duplicate
Note: Total mercury is the sum of particulate and vapor mercury. To be conservative, the total mercury for each component measurement was calculated using the higher of the other component if duplicates were present (e.g. for a parcticulate measurement, the highest of the vapour sample or vapor dupcliate from that same day was added to calculate total mercury).

Table B-4 - 24-hr Particulate Data

	Sample ID	NTSP-01	STSP-01	STSP-01DUP	NTSP-02	NTSP-02DUP	STSP-02	NTSP-03	NTSP-03DUP	STSP-03	NTSP-04	STSP-04	NTSP-05	STSP-05	NTSP-06	STSP-06	NTSP-07	STSP-07
	Location	NORTH	SOUTH	SOUTH	NORTH	NORTH	SOUTH	NORTH	NORTH	SOUTH	NORTH	SOUTH	NORTH	SOUTH	NORTH	SOUTH	NORTH	SOUTH
	Type	SAMPLE	SAMPLE	DUP	SAMPLE	DUP	SAMPLE	SAMPLE	DUP	SAMPLE	SAMPLE	SAMPLE	SAMPLE	SAMPLE	SAMPLE	SAMPLE	SAMPLE	SAMPLE
	Date Sampled	May 3, 2020	May 3, 2020	May 3, 2020	May 15, 2020	May 15, 2020	May 15, 2020	May 27, 2020	May 27, 2020	May 27, 2020	June 8, 2020	June 8, 2020	June 20, 2020	June 20, 2020	July 2, 2020	July 2, 2020	July 14, 2020	July 14, 2020
	Duration (min):	1408	1438	1438	1321	1321	1431	1420	1420	1436	1395	1397	1353	1406	1409	1439	1383	1425
	Volume (m3)	1532	1557	1557	1443	1443	1561	1568	1568	1552	1513	1539	1526	1495	1526	1533	1532	1546
Compound	**CAS No.**																	
Total Suspended Particulate (TSP)	NA-TSP	19	22	-	5.1	-	6.1	40	-	110	31	30	33	33	24	25	44	29
Antimony	7440-36-0	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Arsenic	7440-38-2	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Barium	7440-39-3	3.5E-03	3.2E-03	2.8E-03	1.9E-03	2.1E-03	1.9E-03	6.0E-03	5.5E-03	1.3E-02	2.1E-03	2.7E-03	6.3E-03	4.8E-03	8.5E-03	7.9E-03	4.9E-03	3.8E-03
Beryllium	7440-41-4	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Cadmium	7440-43-9	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chromium	7440-47-3	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Cobalt	7440-48-4	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Copper	7440-50-8	5.5E-03	1.3E-02	1.2E-02	8.3E-03	ND	1.4E-02	1.2E-02	1.2E-02	3.6E-02	1.2E-02	1.8E-02	2.3E-02	3.8E-02	2.4E-02	3.5E-02	2.6E-02	6.3E-02
Iron	15438-31-0	2.5E-01	3.0E-01	2.7E-01	8.3E-02	9.4E-02	8.3E-02	6.8E-01	6.2E-01	1.4E+00	2.8E-01	2.6E-01	4.9E-01	3.8E-01	2.5E-01	2.5E-01	4.4E-01	2.4E-01
Lead	7439-92-1	ND	ND	ND	ND	ND	ND	3.4E-03	2.8E-03	3.7E-03	ND	ND	5.2E-03	ND	ND	ND	2.9E-03	ND
Manganese	7439-96-5	8.6E-03	1.1E-02	1.0E-02	1.9E-03	2.3E-03	1.9E-03	1.7E-02	1.5E-02	4.1E-02	8.3E-03	6.7E-03	1.4E-02	1.0E-02	7.1E-03	7.0E-03	1.5E-02	7.3E-03
Nickel	7440-02-0	ND	4.0E-03	ND	2.9E-03	ND	ND	2.8E-03	ND	2.6E-03	ND	ND	ND	ND	ND	ND	ND	ND
Selenium	7782-49-2	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Thallium	7440-28-0	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Tin	7440-31-5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Vanadium	7440-62-2	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Zinc	7440-66-6	1.1E-02	1.3E-02	1.2E-02	1.3E-02	1.6E-02	8.5E-03	1.7E-02	1.6E-02	2.4E-02	2.1E-02	8.2E-03	2.4E-02	1.3E-02	1.3E-02	1.2E-02	1.6E-02	1.2E-02

	Sample ID	NTSP-08	STSP-08	NTSP-09	STSP-09	NTSP-10	STSP-10	NTSP- 11B	STSP-11B	NTSP-12	STSP-12	NTSP- 13	STSP- 13
	Location	NORTH	SOUTH	NORTH	SOUTH	NORTH	SOUTH	NORTH	SOUTH	NORTH	SOUTH	NORTH	SOUTH
	Type	SAMPLE	SAMPLE	SAMPLE	SAMPLE	SAMPLE	SAMPLE	SAMPLE	SAMPLE	SAMPLE	SAMPLE	SAMPLE	SAMPLE
	Date Sampled	July 26, 2020	July 26, 2020	August 7, 2020	August 7, 2020	August 19, 2020	August 19, 2020	September 9, 2020	September 9, 2020	September 12, 2020	September 12, 2020	September 24, 2020	September 24, 2020
	Duration (min):	1446	1456	1437	1389	1424	1424	1430	1475	1456	1425	1409	1429
	Volume (m3)	1594	1818	1597	1503	1344	1538	1351	1625	1607	1592	1586	1538
Compound	**CAS No.**												
Total Suspended Particulate (TSP)	NA-TSP	24	22	19	20	7.7	14	10	13	22	14	93	78
Antimony	7440-36-0	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Arsenic	7440-38-2	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Barium	7440-39-3	6.7E-03	5.4E-03	3.1E-03	2.5E-03	2.1E-03	2.6E-03	2.0E-03	5.5E-03	4.0E-03	4.2E-03	1.4E-02	1.3E-02
Beryllium	7440-41-4	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Cadmium	7440-43-9	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chromium	7440-47-3	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Cobalt	7440-48-4	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Copper	7440-50-8	2.8E-02	1.5E-02	2.1E-02	5.6E-02	7.7E-03	6.4E-02	6.4E-03	6.6E-02	8.4E-03	9.2E-02	3.9E-02	4.3E-02
Iron	15438-31-0	3.3E-01	2.3E-01	2.1E-01	2.2E-01	9.7E-02	1.5E-01	7.4E-02	1.4E-01	1.2E-01	1.5E-01	1.4E+00	7.5E-01
Lead	7439-92-1	6.9E-03	2.3E-03	ND	4.2E-03	ND	ND	ND	ND	3.5E-03	3.4E-03	8.4E-03	3.8E-03
Manganese	7439-96-5	1.3E-02	7.6E-03	6.3E-03	7.2E-03	4.2E-03	4.5E-03	2.4E-03	4.9E-03	4.0E-03	5.0E-03	3.7E-02	2.3E-02
Nickel	7440-02-0	3.1E-03	ND	ND	ND	ND	ND	ND	ND	ND	ND	3.5E-03	ND
Selenium	7782-49-2	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Thallium	7440-28-0	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Tin	7440-31-5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Vanadium	7440-62-2	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Zinc	7440-66-6	3.3E-02	1.6E-02	1.3E-02	3.4E-02	1.6E-02	1.9E-02	2.9E-02	1.5E-02	1.4E-02	1.8E-02	3.6E-02	2.8E-02

ND = below method detection limit
DUP = laboratory duplicate

APPENDIX C– Copy -of E-mail from ALS regarding Isopropyl Alcohol

ORTECH Consulting Inc.

From: Gayle Braun <Gayle.Braun@ALSGlobal.com>
Sent: December-07-20 12:53 PM
To: ORTECH Consulting Inc.
Subject: RE: [EXTERNAL] - RE: L2498821 COA [Job #] 51110

Yes, at least until lab cleaning procedures change

Gayle Braun
Senior Account Manager, Environmental

T +1 519 652 6044
C +1 519 421 6566

-----Original Message-----
From: ORTECH Consulting Inc. [mailto:ortech@ortechsarnia.ca]
Sent: Monday, December 7, 2020 12:50 PM
To: Gayle Braun <Gayle.Braun@ALSGlobal.com>
Subject: RE: [EXTERNAL] - RE: L2498821 COA [Job #] 51110

Thanks Gayle - should this be omitted from the rest of the reports then? I can cross out on my end.

Terry

-----Original Message-----
From: Gayle Braun <Gayle.Braun@ALSGlobal.com>
Sent: December-07-20 12:10 PM
To: ORTECH Consulting Inc. <ortech@ortechsarnia.ca>
Subject: RE: [EXTERNAL] - RE: L2498821 COA [Job #] 51110

Hi Terry, we are using IPA to clean in the lab (during Covid) so we are not currently reporting it.
You'd end up with false positives

Gayle Braun
Senior Account Manager, Environmental

T +1 519 652 6044
C +1 519 421 6566

-----Original Message-----
From: ORTECH Consulting Inc. [mailto:ortech@ortechsarnia.ca]
Sent: Monday, December 7, 2020 12:01 PM
To: Gayle Braun <Gayle.Braun@ALSGlobal.com>
Cc: Jeff Getty <jgetty@ortech.ca>
Subject: [EXTERNAL] - RE: L2498821 COA [Job #] 51110

CAUTION: This email originated from outside of ALS. Do not click links or open attachments unless you recognize the sender and are sure content is relevant to you.

Thanks Gayle,

Report looks good but I am still missing isopropyl alcohol from the following analyses:

L2451174
L2470343
L2475099
L2481580
L2488143
L2492195
L2503476
L2510238

Could you please send revised reports over?

Thanks,

Terry

-----Original Message-----
From: gayle.braun@alsglobal.com <gayle.braun@alsglobal.com>
Sent: December-03-20 11:19 AM
To: ORTECH Consulting Inc. <ortech@ortechsarnia.ca>
Subject: L2498821 COA [Job #] 51110

Hello,
Revised analyte list

Please find enclosed your certificate of analysis. For any questions regarding the report, please contact your account manager.

Notes / Abbreviations:
COC = Chain of Custody

SRC = Sample Receipt Confirmation
COA = Certificate of Analysis

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