APPENDIX I

Air Quality Monitoring Report

Clean Harbors Canada, Inc.

2017 Annual Landfill Report

Report No. | 50960

ORTECH
a Kontrol Energy Company

Report:

Clean Harbors Environmental Services Inc.
Lambton Facility
Ambient Air Monitoring 2017

Date: November-23-2017



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Submitted to: Erica Carabott
Senior Compliance Manager
Clean Harbors Environmental Services Inc.
4090 Tefler Rd., Corunna, Ontario N0N 1G0
Tel: (519) 864-3890
Email: carabott.erica@cleanharbors.com

Prepared by: Terry Lam, P. Eng.
Project Manager
ORTECH Consulting Inc.
1133C Vanier Rd., Sarnia, ON N7S 3Y6
Tel: (519) 336-3327
Email: ortech@ortechsarnia.ca

Reviewed by: Rod Brooks
Sarnia Manager
Tel: (519) 336-3327
Email: rbrooks@ortech.ca

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Version	Date	Summary Changes/Purpose of Revision
1	November-23-2017	original

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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 near Corunna (the Facility). The objective of the program is to ensure that potential contaminant releases from the facility's ongoing operations are within accepted regulatory limits. The monitoring program includes a series of measurements for a number of speciated vapor and particulate constituents in accordance with a 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 2017 monitoring program.

2. SUMMARY OF MONITORING PROGRAM

A copy of the monitoring plan is provided in APPENDIX A. The monitoring plan contains detailed information on the methodology used for the program. During the 2017 monitoring program, the following deviations from the monitoring plan were made:

- The 2017 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,
- Delayed sampling from scheduled days to avoid sampling on days when the Facility was not in operation (such as on weekends or statutory holidays).

2.1 Sampling Frequency and Substance List

A list of the compounds, by type (VOC, particulates and metals, and carbonyls) included in the 2017 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.

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, which are located to the north and south of the Facility, the historically predominant wind directions at the Facility location.

Although the sampling was intended to occur on NAPS days as noted in Table 4, at the request of the MOECC, sampling dates were shifted to avoid sampling on days where no operation occurred at the Facility, such as weekends and statutory holidays. A list of the actual sampling days included in the 2017 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	12 sample days on the 12 day NAPS cycle beginning May 12, 2016.
Carbonyls and Mercury	Three sample days distributed over the period of May to August. 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
May 10, 2017	X	X			Not a NAPS Day
May 19, 2017	X	X			
May 31, 2017	X	X			
Jun 12, 2017	X	X			
Jun 27, 2017	X	X	X	X	Not a NAPS Day
Jul 06, 2017	X	X			
Jul 18, 2017	X	X	X	X	
Aug 02, 2017	X	X	X	X	Not a NAPS Day
Aug 15, 2017	X	X			
Aug 23, 2017	X	X			
Sep 07, 2017	X	X			Not a NAPS Day
Sep 22, 2017	X	X			Not a NAPS Day

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 2017 monitoring program with respect to sample collection and analysis procedures and methods.

Table 6 - Sampling and Measurement Methods

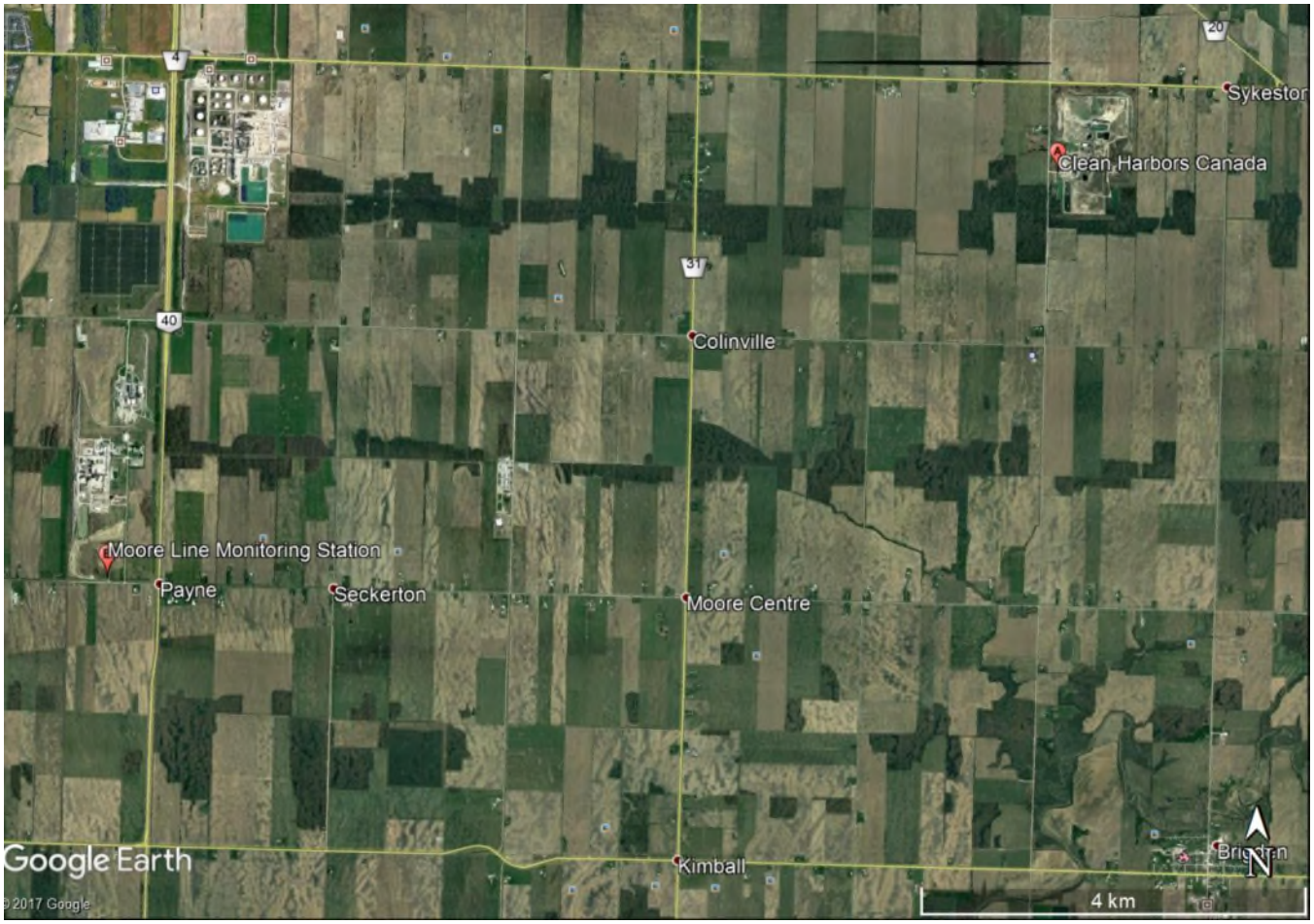
Parameter	Sample Media	Analytical Method	Standard Method
VOC	6L evacuated canisters	GC/MSD	US EPA TO-15a
TSP	Glass-fibre filters	Gravimetric	US EPA IO2-1
Metals and Particulate Mercury	Glass-fibre filters	ICP MS	US EPA 6010B
		CVAA	US EPA 7471A
Carbonyls	Lp DNHP cartridge	HPLC	US EPA TO-11a and IP-6A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

2.3 Meteorological Data

Localized wind speed, direction and rainfall data was obtained from the nearby 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.

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 trained and proficient in these methods were responsible for the collection of samples and followed the applicable Standard Operating Procedures and/or instrument manuals. 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 MOECC 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 paks if applicable
Sample Analysis	• Use of CALA accredited laboratories (Maxxam Analytics 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 measurements commenced at 0000 hours on May 10, 2017 (Eastern Standard Time) and ended on 2400 hours September 22, 2017. The sampling schedule generally followed the NAPS schedule, with adjustments as needed to avoid sampling on days where the facility was not operating. A summary of the sample dates and which compound groups were included on each day can be found in Table 5 earlier in this document.

Component levels were typically found to be either non-detectable, or very low in the field blank samples of the various applicable collection media. Accordingly, any detectable substances in the media blanks were not subtracted from the sample results; whereby, the sample results could then be considered to be more conservative. In addition, any non-detectable or trace substances in the sample collection media were assigned a zero value, as done previously. In cases of laboratory duplicate sample analyses, the highest (most conservative) results were also used. Tabulated summaries of the measured results are indicated in the report text with all individual measured values provided in the appendices.

4.1 Meteorological Data

Meteorological data for the 2017 monitoring period was taken from SLEA's Moore Line monitoring station (refer to station location in Figure 2).

The 24-hour average meteorological conditions that occurred during the selected monitoring days are summarized in Table 8 and Figure 3. Specific information for each hour of each monitoring day is provided in Table 9.

The desired wind direction is from the southeast to southwest quadrant which results in the monitoring instruments aligning upwind and downwind of operations. For the 2017 monitoring program, there were four days where this wind direction occurred for a significant number of hours:

- July 6 – 15 hours
- July 18 – 18 hours
- August 2 – 17 hours
- September 22 – 14 hours

Daily mean temperatures ranged from 7.6 to 27 C and daily average wind speeds ranged from 4.9 to 26 kph. Rainfall was measured on three days – July 6, August 2, and August 15. Sampling locales and 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 10, along with a comparison of the maximum 24-hour levels with available schedule 3 standards. 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 schedule 3 24-hour standards. It can be seen from the mean concentrations that 24 of the 48 target compounds reported were non-detectable in all measurements at both monitoring sites.

As also shown in Table 10, a comparison was made between the maximum measured concentrations at the north and south sites, with the schedule 3 standards (or guideline or AAQC as applicable). In practically all cases, the maximum measured levels were less than 1% of the standards and most of the compound maximum concentrations were a very small fraction of these regulatory limits.

The highest percentage was reported for benzene (88.7% of the 24 hour 2.3 µg/m^3 AAQC) at the north site on September 7. A slightly less concentration was also observed on August 23 at the north monitor. However; on both of these days the wind was blowing from a western direction where this monitor was not downwind of the Facility. The only other detected benzene concentration was at 33% of the standard at the south monitor on August 2. On this day the wind was blowing from the south west with

the south monitor upwind of the facility. Concentrations at the north, downwind monitor were below detection limits.

4.3 Particulate and Metal Component Concentrations

A summary of the measured TSP and associated elemental concentrations is shown in Table 11 with individual monitoring results in APPENDIX B. TSP concentrations reported at the north site were typically similar or higher than those of the south location throughout the sampling program. The highest TSP concentration sampled during monitoring program was 70 µg/m^3 at the north site on June 27. This maximum value is well below the Sch. 3 standard of 120 µg/m^3 for particulate.

For days where the desired upwind/downwind monitor alignment was achieved, particulate emissions were measured in similar quantities at both monitors.

As tabulated in Table 11 and APPENDIX B, nine of the elemental constituents of TSP (thallium, tin, antimony, arsenic, beryllium, cadmium, cobalt, vanadium and selenium) were consistently non-detectable at both monitoring sites. 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.). However, measured levels of all of the elemental metals were below any respective standards.

4.4 Carbonyl Concentrations

The measured speciated carbonyl concentrations are summarized in Table 12 with individual daily levels shown in APPENDIX B. Of the eight species, formaldehyde was the only compound detected in all of the samples. Concentrations of formaldehyde were typically 1 µg/m^3 or less with higher values noted at the south site for two out of three of the sampling days. However, a comparatively higher value of 44.2 µg/m^3, 68% of the Sch. 3 standard, was sampled at the north site on July 18. The wind was blowing from the south-southwest direction on this day with the north site downwind of the Facility.

4.5 Mercury Concentrations

Both particulate and vapour phase mercury components were measured as shown in Table 13, with individual daily results in Appendix 1. 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 three high-volume sample filters (see also Table 11). The combined results at the maximum concentration represented only a small fraction of the total mercury 24-hour standard. 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 twelve pairs of simultaneous north/south fixed location speciated VOC measurements were conducted by sampling for 24-hour periods, 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 during May through September 2017. Similarly, 24-hour samples were also collected for subsequent analysis of TSP and selected elemental constituents along with the acquisition of local meteorological data for these time-frames. Three sample sets of speciated carbonyls and airborne mercury were collected; one in each of June, July and August concurrent with the VOC and TSP measurements. The levels of all constituents measured were compared with any applicable O.Reg. 419 Schedule 3 standards, or where no standard exists, the relevant guideline or AAQC.

Meteorological data indicated that four of the twelve monitoring days had significant numbers 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 compound measured at the highest percentage of a standard, guideline, or AAQC was benzene, which was found in concentrations up to 88.7 % of its 24 hour AAQC. No VOC species were measured in concentrations greater than their respective standard, guideline, or AAQC.

Measured concentrations of total particulate and speciated particulates were all less than their respective standard, guideline, or AAQC. Total particulate was measured in concentrations of up to 58% of the 24 hour standard. Of the speciated components, iron had was measured at the highest percentage of its limit, at 24%.

Of the speciated carbonyl measurements, only formaldehyde was detected on all occasions at both sites, although formaldehyde concentrations were generally low in comparison to the standard, there was one measurement where a concentration of 67.9% of the standard was found.

Particulate mercury was measured in small quantities, while vapour mercury was not detected in any of the samples. Total mercury was measured in concentrations of well below (<0.1%) of its schedule 3 standard in all samples.

Table 8 - Summary of 24-Hour Meteorological Data for Individual Monitoring Days

Sample Date	Prevailing Wind Direction	Wind Speed (km/h)	Temperature (°C)	Rainfall (mm)	Captured Downwind SE-SW Quadrant (Hours)
May 10, 2017	ESE	6.5	11	0.0	4
May 19, 2017	N	26	7.6	0.0	0
May 31, 2017	WSW	13	16	0.0	9
Jun 12, 2017	WSW	18	27	0.0	5
Jun 27, 2017	WNW	9.8	16	0.0	5
Jul 06, 2017	SW	8.3	23	3.25	15
Jul 18, 2017	SSW	7.1	22	0.0	18
Aug 02, 2017	SW	7.6	22	0.75	17
Aug 15, 2017	NE	7.5	20	0.50	2
Aug 23, 2017	WNW	8.2	17	0.0	0
Sep 07, 2017	W	12	13	0.0	0
Sep 22, 2017	SSE	4.9	23	0.0	14

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 Table 9).

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."*

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

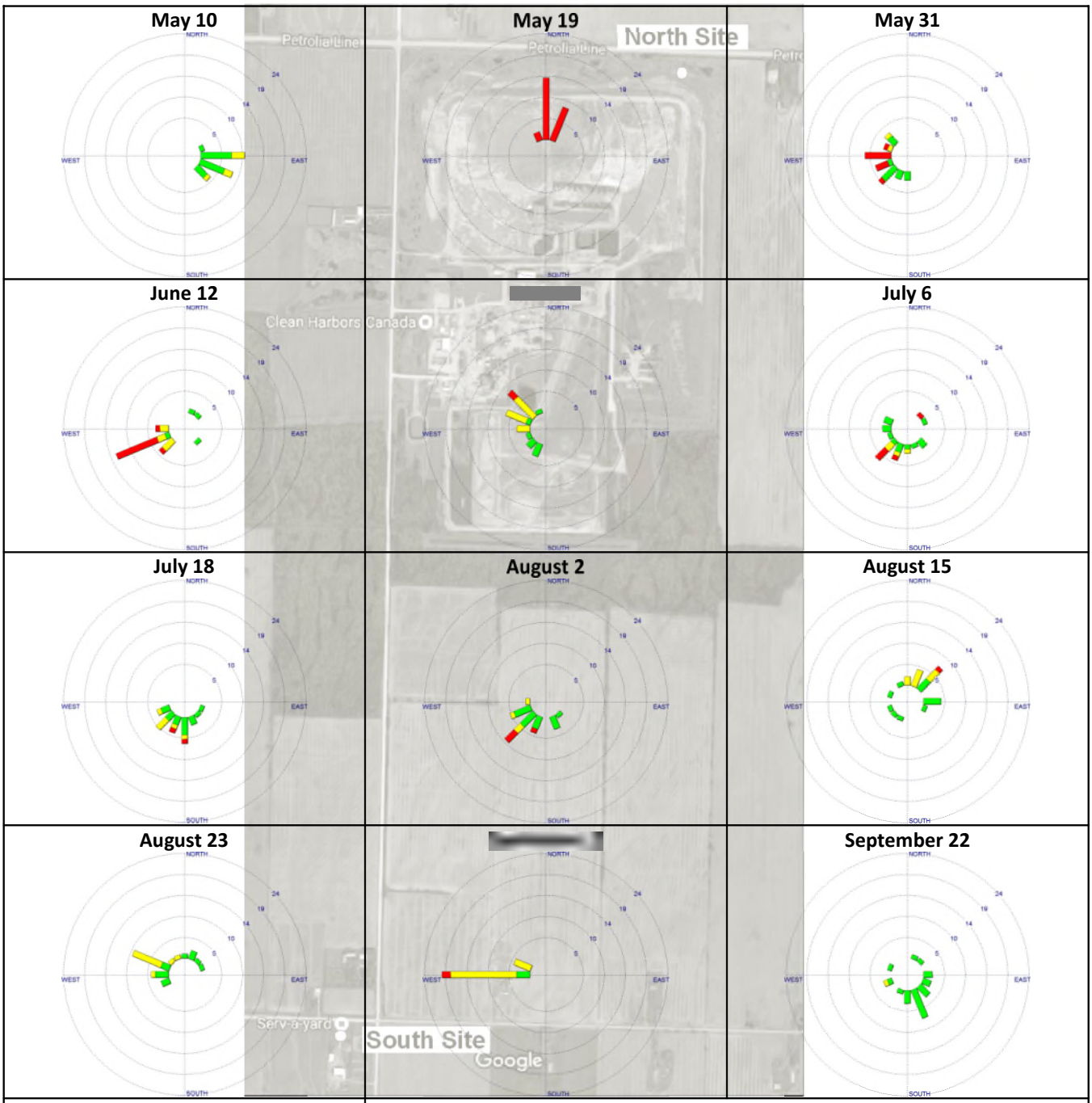


Table 9 - Summary of Hourly Meteorological Data

YYYY-MM-DD hh:mm	WS kph	WD10 Degrees	RAIN mm	TEMP C	Bar mbar
2017-05-10 0:00	3.1	90	0	8.9	1016
2017-05-10 1:00	0.7	190	0	8.2	1015
2017-05-10 2:00	2	62	0	6	1016
2017-05-10 3:00	3.1	81	0	4.9	1017
2017-05-10 4:00	4.5	112	0	5.1	1017
2017-05-10 5:00	2.8	99	0	5.2	1017
2017-05-10 6:00	5.1	91	0	6.9	1018
2017-05-10 7:00	11	121	0	7.9	1018
2017-05-10 8:00	9.6	129	0	9.5	1018
2017-05-10 9:00	5.2	115	0	10.6	1019
2017-05-10 10:00	7.6	111	0	11.2	1019
2017-05-10 11:00	6.3	120	0	13.9	1018
2017-05-10 12:00	5.7	110	0	15.1	1017
2017-05-10 13:00	7.3	94	0	15.9	1017
2017-05-10 14:00	8.3	90	0	15.5	1018
2017-05-10 15:00	10.2	89	0	16.4	1017
2017-05-10 16:00	10.8	92	0	16.7	1016
2017-05-10 17:00	9.9	103	0	15.8	1016
2017-05-10 18:00	7.9	89	0	14.1	1016
2017-05-10 19:00	5	130	0	12.3	1016
2017-05-10 20:00	7.9	145	0	11.2	1016
2017-05-10 21:00	7.1	125	0	10.4	1017
2017-05-10 22:00	6.5	106	0	9.6	1015
2017-05-10 23:00	8.2	92	0	9.4	1016
2017-05-19 0:00	19.2	336	0	13.9	1015
2017-05-19 1:00	24	347	0	11.4	1015
2017-05-19 2:00	23.3	345	0	9.5	1015
2017-05-19 3:00	25.8	355	0	8.2	1017
2017-05-19 4:00	26.4	6	0	7.1	1018
2017-05-19 5:00	25.7	8	0	6.9	1018
2017-05-19 6:00	24.6	5	0	7.1	1020
2017-05-19 7:00	24.9	11	0	6.3	1021
2017-05-19 8:00	26.3	6	0	6.4	1021
2017-05-19 9:00	28	11	0	5.7	1021
2017-05-19 10:00	27.2	7	0	7	1022
2017-05-19 11:00	30.3	7	0	7	1021
2017-05-19 12:00	25.8	4	0	7.8	1022
2017-05-19 13:00	30.6	13	0	8.2	1023
2017-05-19 14:00	31	9	0	7.9	1021
2017-05-19 15:00	25.8	6	0	6.7	1022
2017-05-19 16:00	27	12	0	6.3	1020
2017-05-19 17:00	28.4	7	0	6.2	1022
2017-05-19 18:00	34.4	9	0	6.3	1021
2017-05-19 19:00	27.8	12	0	6.8	1023
2017-05-19 20:00	23.8	16	0	6.3	1021
2017-05-19 21:00	22.6	12	0	7.1	1023
2017-05-19 22:00	20.5	12	0	7.8	1023
2017-05-19 23:00	20.4	18	0	8.8	1021

Table 9 - Summary of Hourly Meteorological Data

YYYY-MM-DD hh:mm	WS kph	WD10 Degrees	RAIN mm	TEMP C	Bar mbar
2017-05-31 0:00	7.2	185	0	11.3	1012
2017-05-31 1:00	4.4	228	0	11.7	1013
2017-05-31 2:00	6.7	224	0	11.7	1014
2017-05-31 3:00	8.7	207	0	11.6	1013
2017-05-31 4:00	6.8	228	0	11	1012
2017-05-31 5:00	6.6	222	0	11.6	1013
2017-05-31 6:00	8.7	243	0	13.9	1013
2017-05-31 7:00	15.4	233	0	15.8	1013
2017-05-31 8:00	16.3	245	0	17.2	1012
2017-05-31 9:00	17.7	256	0	18.5	1013
2017-05-31 10:00	18.9	254	0	19.2	1012
2017-05-31 11:00	21	268	0	19.4	1012
2017-05-31 12:00	23	260	0	19.9	1012
2017-05-31 13:00	23.5	262	0	21	1012
2017-05-31 14:00	22	266	0	20.8	1012
2017-05-31 15:00	23.3	262	0	21.6	1012
2017-05-31 16:00	18.4	281	0	21.2	1012
2017-05-31 17:00	15.8	289	0	20.5	1012
2017-05-31 18:00	12.9	302	0	18.3	1013
2017-05-31 19:00	11.7	310	0	17.1	1014
2017-05-31 20:00	8.1	323	0	15.8	1015
2017-05-31 21:00	4.7	320	0	16	1015
2017-05-31 22:00	2.8	180	0	13.1	1015
2017-05-31 23:00	4.6	174	0	11.1	1015
2017-06-12 0:00	10.5	251	0	21.4	1015
2017-06-12 1:00	10.6	236	0	20.6	1016
2017-06-12 2:00	13.2	222	0	20.1	1016
2017-06-12 3:00	12.1	236	0	20.3	1016
2017-06-12 4:00	11.9	242	0	20.3	1016
2017-06-12 5:00	13.6	241	0	21	1015
2017-06-12 6:00	16.9	230	0	22.4	1015
2017-06-12 7:00	20.1	239	0	24.6	1017
2017-06-12 8:00	23.8	247	0	26.6	1016
2017-06-12 9:00	24.6	243	0	27.4	1013
2017-06-12 10:00	27.5	244	0	27.9	1015
2017-06-12 11:00	28.9	240	0	30.7	1014
2017-06-12 12:00	35.5	237	0	32.1	1014
2017-06-12 13:00	32.3	239	0	32	1013
2017-06-12 14:00	29.8	244	0	33.1	1013
2017-06-12 15:00	26.2	244	0	33.6	1013
2017-06-12 16:00	23.2	238	0	33.6	1014
2017-06-12 17:00	17.8	267	0	31.8	1010
2017-06-12 18:00	13.3	272	0	30.5	1013
2017-06-12 19:00	9.7	268	0	28.9	1013
2017-06-12 20:00	7.6	247	0	27.5	1013
2017-06-12 21:00	4.4	13	0	26.2	1012
2017-06-12 22:00	7.5	39	0	23.7	1014
2017-06-12 23:00	2.4	136	0	22.5	1015

Table 9 - Summary of Hourly Meteorological Data

YYYY-MM-DD hh:mm	WS kph	WD10 Degrees	RAIN mm	TEMP C	Bar mbar
2017-06-27 0:00	11.8	281	0	12.4	1015
2017-06-27 1:00	9.6	274	0	10.7	1015
2017-06-27 2:00	9.9	278	0	10.3	1014
2017-06-27 3:00	11.3	290	0	10.5	1015
2017-06-27 4:00	9.4	289	0	10.4	1015
2017-06-27 5:00	9.4	292	0	10.3	1016
2017-06-27 6:00	9	307	0	11.9	1016
2017-06-27 7:00	10	309	0	13.1	1017
2017-06-27 8:00	11.9	309	0	15.2	1017
2017-06-27 9:00	14.4	308	0	16.5	1018
2017-06-27 10:00	15.7	318	0	17.7	1017
2017-06-27 11:00	15.3	317	0	19	1018
2017-06-27 12:00	11.8	307	0	19.8	1018
2017-06-27 13:00	13.1	295	0	19.2	1017
2017-06-27 14:00	14.9	287	0	20.2	1018
2017-06-27 15:00	12.8	281	0	21.1	1016
2017-06-27 16:00	11.3	323	0	20	1017
2017-06-27 17:00	8.6	331	0	18.3	1017
2017-06-27 18:00	6.7	289	0	19.2	1016
2017-06-27 19:00	3.9	244	0	18.1	1016
2017-06-27 20:00	4.9	200	0	17.3	1016
2017-06-27 21:00	3.4	197	0	14.1	1017
2017-06-27 22:00	3.3	206	0	13.4	1017
2017-06-27 23:00	3.3	227	0	12.9	1018
2017-07-06 0:00	2.4	215	0	16.8	1018
2017-07-06 1:00	2.1	137	0	16	1018
2017-07-06 2:00	4.1	129	0	15.7	1018
2017-07-06 3:00	2.8	150	0	14.6	1017
2017-07-06 4:00	1.4	208	0	14.1	1017
2017-07-06 5:00	3.1	189	0	14.7	1017
2017-07-06 6:00	1.8	207	0	20	1017
2017-07-06 7:00	3.8	285	0	20.7	1018
2017-07-06 8:00	6.2	257	0	23.9	1017
2017-07-06 9:00	7	269	0	25.9	1017
2017-07-06 10:00	5.1	285	0	25.9	1017
2017-07-06 11:00	4.1	263	0	27.7	1016
2017-07-06 12:00	7.2	235	0	27.9	1015
2017-07-06 13:00	11.7	228	0	30	1016
2017-07-06 14:00	12.9	217	0	30.6	1014
2017-07-06 15:00	19.6	222	0	29.6	1013
2017-07-06 16:00	20	225	0	29.2	1013
2017-07-06 17:00	17.5	220	0	28.7	1013
2017-07-06 18:00	15.6	212	0	27.7	1013
2017-07-06 19:00	12.1	208	0	25.4	1012
2017-07-06 20:00	8.6	198	0	22.6	1011
2017-07-06 21:00	9.8	191	0	21.6	1012
2017-07-06 22:00	1.6	182	0	21.3	1012
2017-07-06 23:00	18.1	52	3.25	20.3	1011

Table 9 - Summary of Hourly Meteorological Data

YYYY-MM-DD hh:mm	WS kph	WD10 Degrees	RAIN mm	TEMP C	Bar mbar
2017-07-18 0:00	4.8	76	0	15.2	1019
2017-07-18 1:00	2.4	143	0	14.9	1017
2017-07-18 2:00	1.9	206	0	14.2	1019
2017-07-18 3:00	3.8	200	0	13.4	1019
2017-07-18 4:00	1.7	226	0	13.5	1018
2017-07-18 5:00	1.6	136	0	14	1019
2017-07-18 6:00	1.9	109	0	16.3	1019
2017-07-18 7:00	2.6	160	0	20.4	1020
2017-07-18 8:00	7.5	215	0	23.5	1020
2017-07-18 9:00	9.5	215	0	26	1019
2017-07-18 10:00	7.7	236	0	26.5	1020
2017-07-18 11:00	6.6	242	0	27	1019
2017-07-18 12:00	5.6	243	0	27.2	1019
2017-07-18 13:00	9.6	238	0	28.1	1019
2017-07-18 14:00	10.5	235	0	28.7	1018
2017-07-18 15:00	13.4	218	0	29	1019
2017-07-18 16:00	15.6	203	0	28.1	1017
2017-07-18 17:00	15.6	190	0	27.6	1018
2017-07-18 18:00	12.6	197	0	26.6	1017
2017-07-18 19:00	7.3	184	0	24.7	1018
2017-07-18 20:00	9	170	0	21.6	1017
2017-07-18 21:00	6.5	167	0	20	1017
2017-07-18 22:00	6.2	178	0	19.1	1018
2017-07-18 23:00	5.6	182	0	18.7	1018
2017-08-02 0:00	5.4	210	0	19.5	1016
2017-08-02 1:00	2.2	226	0	18.3	1016
2017-08-02 2:00	3.3	152	0	17.2	1016
2017-08-02 3:00	3.3	156	0	16.5	1017
2017-08-02 4:00	5.8	212	0	17.1	1017
2017-08-02 5:00	6.7	244	0	17.6	1017
2017-08-02 6:00	5.4	218	0	20.5	1018
2017-08-02 7:00	7.9	245	0	23.1	1018
2017-08-02 8:00	8.2	231	0	25.1	1017
2017-08-02 9:00	9.4	223	0	27.4	1018
2017-08-02 10:00	11.6	225	0	28.6	1016
2017-08-02 11:00	15.6	228	0	28.6	1017
2017-08-02 12:00	15.2	221	0	29.5	1017
2017-08-02 13:00	16.2	204	0	30.1	1017
2017-08-02 14:00	15.6	236	0	27.3	1016
2017-08-02 15:00	10.6	263	0.75	21.6	1016
2017-08-02 16:00	8.8	227	0	20.8	1016
2017-08-02 17:00	9.1	237	0	21	1016
2017-08-02 18:00	4.9	196	0	21.8	1015
2017-08-02 19:00	3.2	240	0	20.8	1015
2017-08-02 20:00	2	258	0	19.3	1017
2017-08-02 21:00	3.2	138	0	19.2	1017
2017-08-02 22:00	3.9	197	0	18.5	1017
2017-08-02 23:00	3.9	163	0	17.5	1017

Table 9 - Summary of Hourly Meteorological Data					
YYYY-MM-DD hh:mm	WS kph	WD10 Degrees	RAIN mm	TEMP C	Bar mbar
2017-08-15 0:00	3	325	0	18.3	1011
2017-08-15 1:00	3.9	91	0	16.8	1010
2017-08-15 2:00	4.7	95	0	16	1011
2017-08-15 3:00	4.5	101	0	15.5	1011
2017-08-15 4:00	2.7	121	0	15.5	1011
2017-08-15 5:00	1.7	100	0	15.5	1011
2017-08-15 6:00	3.8	290	0.25	17.1	1011
2017-08-15 7:00	5	255	0.25	18	1010
2017-08-15 8:00	3.1	235	0	18.9	1012
2017-08-15 9:00	6	337	0	21.4	1012
2017-08-15 10:00	9	352	0	24.1	1010
2017-08-15 11:00	10.4	358	0	23.7	1013
2017-08-15 12:00	11.6	26	0	23.7	1013
2017-08-15 13:00	10.4	18	0	23.8	1013
2017-08-15 14:00	12.7	15	0	25.6	1013
2017-08-15 15:00	16.3	46	0	23.9	1014
2017-08-15 16:00	14.5	47	0	23.8	1013
2017-08-15 17:00	12.3	47	0	23.7	1014
2017-08-15 18:00	11.9	45	0	22.6	1012
2017-08-15 19:00	7.5	38	0	19.4	1014
2017-08-15 20:00	9.5	28	0	18.4	1016
2017-08-15 21:00	8	42	0	17.4	1015
2017-08-15 22:00	4.4	44	0	16.8	1015
2017-08-15 23:00	1.9	96	0	15.2	1015
2017-08-23 0:00	8.6	282	0	14.6	1012
2017-08-23 1:00	9	284	0	14.7	1012
2017-08-23 2:00	5.9	284	0	14	1012
2017-08-23 3:00	5.8	271	0	13.2	1013
2017-08-23 4:00	4.8	257	0	12.5	1013
2017-08-23 5:00	5.3	257	0	12.2	1013
2017-08-23 6:00	7.9	274	0	13.9	1014
2017-08-23 7:00	12.3	276	0	16	1013
2017-08-23 8:00	11.8	296	0	17.6	1013
2017-08-23 9:00	11.7	306	0	19.1	1013
2017-08-23 10:00	11.8	299	0	20.6	1014
2017-08-23 11:00	13.1	299	0	20.8	1013
2017-08-23 12:00	13.5	301	0	21.4	1014
2017-08-23 13:00	13.6	290	0	22.4	1014
2017-08-23 14:00	15.1	329	0	21.2	1014
2017-08-23 15:00	9.7	301	0	21.7	1013
2017-08-23 16:00	8.5	299	0	21.2	1013
2017-08-23 17:00	7.3	59	0	19.4	1014
2017-08-23 18:00	4.2	274	0	18.2	1014
2017-08-23 19:00	1	76	0	16.7	1014
2017-08-23 20:00	1.3	221	0	14.4	1014
2017-08-23 21:00	2.1	14	0	13.7	1015
2017-08-23 22:00	6.2	5	0	14.3	1014
2017-08-23 23:00	6.4	29	0	14.6	1016

Table 9 - Summary of Hourly Meteorological Data					
YYYY-MM-DD hh:mm	WS kph	WD10 Degrees	RAIN mm	TEMP C	Bar mbar
2017-09-07 0:00	2.8	251	0	10	1012
2017-09-07 1:00	9	277	0	10.8	1013
2017-09-07 2:00	8.8	279	0	9.9	1013
2017-09-07 3:00	9.7	277	0	9.8	1012
2017-09-07 4:00	9	278	0	9.4	1012
2017-09-07 5:00	11.6	278	0	8.8	1012
2017-09-07 6:00	11.7	279	0	9.3	1013
2017-09-07 7:00	11.4	276	0	10.4	1013
2017-09-07 8:00	10.1	271	0	11.8	1013
2017-09-07 9:00	11.2	282	0	13.8	1013
2017-09-07 10:00	14.9	286	0	15.5	1014
2017-09-07 11:00	14.9	296	0	16.7	1013
2017-09-07 12:00	14.8	288	0	17.4	1013
2017-09-07 13:00	14.2	280	0	17.1	1014
2017-09-07 14:00	13.9	270	0	19.1	1014
2017-09-07 15:00	15.8	273	0	18.8	1013
2017-09-07 16:00	12.5	281	0	17.9	1012
2017-09-07 17:00	14	280	0	15.9	1014
2017-09-07 18:00	16.5	272	0	13.8	1015
2017-09-07 19:00	12.5	272	0	12.9	1015
2017-09-07 20:00	11.3	272	0	12.4	1016
2017-09-07 21:00	11.4	270	0	11.5	1016
2017-09-07 22:00	9.7	273	0	11.4	1016
2017-09-07 23:00	7.8	273	0	11.6	1017
2017-09-22 0:00	3	233	0	18.2	1020
2017-09-22 1:00	2	292	0	17.9	1020
2017-09-22 2:00	4.3	100	0	17.4	1020
2017-09-22 3:00	1.5	86	0	17.9	1019
2017-09-22 4:00	2.5	51	0	16.5	1021
2017-09-22 5:00	4.9	82	0	17.1	1021
2017-09-22 6:00	4.5	102	0	17.8	1021
2017-09-22 7:00	4.2	124	0	19	1020
2017-09-22 8:00	4.1	147	0	22.5	1021
2017-09-22 9:00	4.2	140	0	25.5	1020
2017-09-22 10:00	3.6	176	0	28.5	1019
2017-09-22 11:00	6.6	146	0	28.7	1019
2017-09-22 12:00	3.6	148	0	29.7	1020
2017-09-22 13:00	5.3	119	0	30.2	1018
2017-09-22 14:00	3.8	148	0	31.4	1018
2017-09-22 15:00	5.7	178	0	31.6	1019
2017-09-22 16:00	10.7	244	0	30.7	1019
2017-09-22 17:00	8.6	249	0	29	1019
2017-09-22 18:00	6.8	189	0	25.8	1019
2017-09-22 19:00	7.8	162	0	22	1019
2017-09-22 20:00	7	159	0	21	1019
2017-09-22 21:00	5.7	161	0	19.8	1019
2017-09-22 22:00	3.1	164	0	19.3	1019
2017-09-22 23:00	3.2	195	0	17.9	1020

Table 10 - VOC Summary

Compound:	CAS No.	24-hr Std (sch 3) µg/m³	South			North			South Site 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	nd	nd	nd	nd	nd	nd	nd	nd
Isopropyl Alcohol	67-63-0	7,300	38.72	nd	440.00	4.14	nd	23.00	6.0	0.3
Acetone	67-64-1	11,800	16.49	4.30	34.60	16.36	5.10	33.70	0.3	0.3
Chloroform	67-66-3	1	nd	nd	nd	nd	nd	nd	nd	nd
Benzene	71-43-2	2.3*	0.06	nd	0.68	0.34	nd	2.04	29.6	88.7
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	0.12	nd	1.43	0.35	nd	2.69	0.7	1.2
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	nd	nd	nd	nd	nd	nd	nd	nd
Trichlorofluoromethane	75-69-4	6,000	0.83	nd	1.30	0.82	nd	1.30	0.0	0.0
Dichlorodifluoromethane	75-71-8	500,000	2.10	1.84	2.51	2.06	1.77	2.32	0.0	0.0
1,1,2-Trichloro-1,2,2-Trifluoroethane	76-13-1	800,000	nd	nd	nd	nd	nd	nd	nd	nd
2-Methyl Butane	78-78-4	na	2.98	0.71	8.52	1.70	nd	3.15	na	na
1,2-Dichloropropane	78-87-5	2,400	nd	nd	nd	nd	nd	nd	nd	nd
MEK	78-93-3	1,000	0.83	nd	1.62	1.50	nd	4.56	0.2	0.5
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	0.09	nd	1.03	nd	0.1
1,2-Dichlorobenzene	95-50-1	na	nd	nd	nd	nd	nd	nd	na	na
1,2,4-Trimethylbenzene	95-63-6	220	nd	nd	nd	nd	nd	nd	nd	nd
3-Methyl Pentane	96-14-0	na	0.09	nd	1.02	nd	nd	nd	na	na
p-Cymene	99-87-6	na	nd	nd	nd	nd	nd	nd	na	na
Ethyl Benzene	100-41-4	1,000	nd	nd	nd	0.08	nd	0.95	nd	0.1
Styrene	100-42-5	400	nd	nd	nd	nd	nd	nd	nd	nd
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	0.6	nd	nd	nd	nd	nd	nd	nd	nd
2-Methyl Pentane	107-83-5	na	0.29	nd	1.70	nd	nd	nd	na	na
MIBK	108-10-1	1,200	nd	nd	nd	0.10	nd	1.22	nd	0.1
m/p-Xylene	108-38-3/106-42-3	730	nd	nd	nd	0.61	nd	3.00	nd	0.4
1,3,5-Trimethylbenzene	108-67-8	165	nd	nd	nd	nd	nd	nd	nd	nd
Toluene	108-88-3	2,000	1.62	nd	2.71	2.40	nd	6.35	0.1	0.3
Chlorobenzene	108-90-7	3,500	nd	nd	nd	nd	nd	nd	nd	nd
Hexane	110-54-3	7,500	0.21	nd	1.65	0.07	nd	0.87	0.0	0.0
Cyclohexane	110-82-7	6,100	nd	nd	nd	nd	nd	nd	nd	nd
Nonane	111-84-2	na	nd	nd	nd	nd	nd	nd	na	na
1,2,4-Trichlorobenzene	120-82-1	400	nd	nd	nd	nd	nd	nd	nd	nd
Tetrachloroethene	127-18-4	360	0.10	nd	1.14	0.17	nd	1.99	0.3	0.6
Ethyl Acetate	141-78-6	19,000	0.17	nd	1.19	0.23	nd	1.05	0.0	0.0
Heptane	142-82-5	11,000	0.32	nd	3.83	nd	nd	nd	0.0	nd
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	165	nd	nd	nd	nd	nd	nd	nd	nd
3-Methyl Hexane	589-34-4	na	0.79	nd	9.51	0.08	nd	0.95	na	na
o-Ethyl Toluene	611-14-3	na	nd	nd	nd	nd	nd	nd	na	na

nd = below method detection limit

* = ambient air quality criteria

na = no applicable Sch. 3 standard or guideline

Table 11 - TSP & Metals Summary

Parameter	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
Total Suspended Particulate	na	120	32	12	57	35	17	70	48	58
Lead	7439-92-1	0.5	0.00	0.00	0.00	0.01	0.00	0.02	0.7	3.9
Manganese	7439-96-5	2.5	0.01	0.00	0.02	0.01	0.00	0.03	0.6	1.3
Nickel	7440-02-0	2	0.00	0.00	0.00	0.00	0.00	0.00	0.1	0.2
Thallium	7440-28-0	na	nd	nd	nd	nd	nd	nd	na	na
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	0.3*	nd	nd	nd	nd	nd	nd	nd	nd
Barium	7440-39-3	10*	0.01	0.00	0.01	0.01	0.00	0.01	0.1	0.1
Beryllium	7440-41-4	0.01	nd	nd	nd	nd	nd	nd	nd	nd
Cadmium	7440-43-9	0.03	nd	nd	nd	nd	nd	nd	nd	nd
Chromium	7440-47-3	1.5*	0.00	0.00	0.01	0.01	0.00	0.04	0.3	2.4
Cobalt	7440-48-4	0.1*	nd	nd	nd	nd	nd	nd	nd	nd
Copper	7440-50-8	50	0.05	0.02	0.10	0.02	0.01	0.03	0.2	0.1
Vanadium	7440-62-2	2	nd	nd	nd	nd	nd	nd	nd	nd
Zinc	7440-66-6	120	0.01	0.01	0.03	0.03	0.01	0.14	0.0	0.1
Selenium	7782-49-2	10*	nd	nd	nd	nd	nd	nd	nd	nd
Iron	15438-31-0	4	0.25	0.03	0.60	0.31	0.09	0.95	15	24

nd = below method detection limit

* = ambient air quality criteria

na = no applicable Sch. 3 standard or guideline

Table 12 - Carbonyls 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
Formaldehyde	50-00-0	65	0.8	0.6	1.0	15.1	0.5	44.2	1.5	67.9
Acetone	67-64-1	11,880	nd	nd	nd	nd	nd	nd	nd	nd
Acetaldehyde	75-07-0	500	nd	nd	nd	nd	nd	nd	nd	nd
Benzaldehyde	100-52-7	na	nd	nd	nd	nd	nd	nd	na	na
Acrolein	107-02-08	0.08	nd	nd	nd	nd	nd	nd	nd	nd
Glutaraldehyde	111-30-8	14*	nd	nd	nd	nd	nd	nd	nd	nd
Propionaldehyde (Propanal)	123-38-6	na	0.9	0.0	1.4	1.1	0.0	2.1	na	na
n-Butyraldehyde (n-Butanal)	123-72-3	na	nd	nd	nd	nd	nd	nd	na	na

nd = below method detection limit
* = ambient air quality criteria
na = no applicable Sch. 3 standard or guideline

Table 13 - Mercury Summary

Parameter	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	--	--	0.00001	0.00000	0.00002	0.00023	0.00001	0.00064	--	--
Vapour Mercury	7439-97-6	--	nd	nd	nd	nd	nd	nd	--	--
Total Mercury	--	2	0.00001	0.00000	0.00002	0.00023	0.00001	0.00064	0.010	0.004

nd = below method detection limit
* = ambient air quality criteria
na = no applicable Sch. 3 standard or guideline

6. REFERENCES

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

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



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Submitted to: Michael Parker
Director of Environmental Compliance
Clean Harbors Environmental Services Inc.
4090 Telfer Rd., Corunna, Ontario N0N 1G0
Tel: (519) 864-3836
E-mail: michael.parker@cleanharbors.com

Prepared by: Rod Brooks, Sarnia Manager
ORTECH Consulting Inc.
1133C Vanier Rd., Sarnia, Ontario N7S 3Y6
Tel: (519) 336-3327
Email: rbrooks@ortech.ca

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Version	Date	Summary Changes/Purpose of Revision
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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

Compound	CAS NO.	10-May-17 NVOC-1 North	10-May-17 SVOC-1 South	19-May-17 NVOC-2 North	19-May-17 SVOC-2 South	31-May-17 NVOC-3 North	31-May-17 SVOC-3 South	12-Jun-17 NVOC-4 North	12-Jun-17 SVOC-4 South	27-Jun-17 NVOC-5 North	27-Jun-17 SVOC-5 South	06-Jul-17 NVOC-6 North	06-Jul-17 SVOC-6 South
Carbon Tetrachloride	56-23-5	<1.3	<1.3	<1.3	<1.3	<1.3	<1.3	<1.3	<1.3	<1.3	<1.3	<1.3	<1.3
Isopropyl Alcohol	67-63-0	3.10	440.00	<2.5	<2.5	<2.5	<2.5	19.00	3.90	<2.5	<2.5	<2.5	<2.5
Acetone	67-64-1	13.80	34.60	11.60	9.30	13.40	16.30	33.70	22.10	8.60	9.60	25.80	22.80
Chloroform	67-66-3	<0.98	<0.98	<0.98	<0.98	<0.98	<0.98	<0.98	<0.98	<0.98	<0.98	<0.98	<0.98
Benzene	71-43-2	<0.64	<0.64	<0.64	<0.64	<0.64	<0.64	<0.64	<0.64	<0.64	<0.64	<0.64	<0.64
1,1,1-Trichloroethane	71-55-6	<1.1	<1.1	<1.1	<1.1	<1.1	<1.1	<1.1	<1.1	<1.1	<1.1	<1.1	<1.1
Vinyl Chloride	75-01-4	<0.51	<0.51	<0.51	<0.51	<0.87	<0.87	<0.51	<0.51	<0.51	<0.51	<0.51	<0.51
Dichloromethane	75-09-2	<0.69	<0.69	<0.69	1.43	<0.69	<0.69	2.69	<0.69	<0.69	<0.69	0.72	<0.69
1,1-Dichloroethane	75-34-3	<0.81	<0.81	<0.81	<0.81	<0.81	<0.81	<0.81	<0.81	<0.81	<0.81	<0.81	<0.81
1,1-Dichloroethene	75-35-4	<0.79	<0.79	<0.79	<0.79	<0.79	<0.79	<0.79	<0.79	<0.79	<0.79	<0.79	<0.79
Chlorodifluoromethane	75-45-6	<0.71	<0.71	<0.71	<0.71	<0.71	<0.71	<0.71	<0.71	<0.71	<0.71	<0.71	<0.71
Trichlorofluoromethane	75-69-4	1.20	1.20	1.20	1.20	<0.98	<0.98	1.20	1.20	<1.1	<1.1	<1.1	<1.1
Dichlorodifluoromethane	75-71-8	2.27	2.26	2.16	2.16	1.85	1.97	2.16	1.97	2.07	1.93	1.77	1.84
1,1,2-Trichloro-1,2,2-Trifluoroethane	76-13-1	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5
2-Methyl Butane	78-78-4	0.98	1.47	<0.59	1.09	1.08	0.71	2.06	1.89	1.45	1.22	2.53	2.87
1,2-Dichloropropane	78-87-5	<0.92	<0.92	<0.92	<0.92	<0.92	<0.92	<0.92	<0.92	<0.92	<0.92	<0.92	<0.92
MEK	78-93-3	0.66	0.61	0.67	0.86	<0.82	<0.82	4.56	1.53	<0.59	<0.59	3.05	0.97
Trichloroethene	79-01-6	<1.1	<1.1	<1.1	<1.1	<1.1	<1.1	<1.1	<1.1	<1.1	<1.1	<1.1	<1.1
Naphthalene	91-20-3	<2.6	<2.6	<2.6	<2.6	<1.0	<1.0	<2.6	<2.6	<2.6	<2.6	<2.6	<2.6
o-Xylene	95-47-6	<0.87	<0.87	<0.87	<0.87	<1.7	<1.7	1.03	<0.87	<0.87	<0.87	<0.87	<0.87
1,2-Dichlorobenzene	95-50-1	<1.2	<1.2	<1.2	<1.2	<1.2	<1.2	<1.2	<1.2	<1.2	<1.2	<1.2	<1.2
1,2,4-Trimethylbenzene	95-63-6	<0.98	<0.98	<0.98	<0.98	<0.98	<0.98	<0.98	<0.98	<0.98	<0.98	<0.98	<0.98
3-Methyl Pentane	96-14-0	<0.70	<0.70	<0.70	<0.70	<2.6	<2.6	<0.70	<0.70	<0.70	<0.70	<0.70	<0.70
p-Cymene	99-87-6	<1.1	<1.1	<1.1	<1.1	<1.1	<1.1	<1.1	<1.1	<1.1	<1.1	<1.1	<1.1
Ethyl Benzene	100-41-4	<0.87	<0.87	<0.87	<0.87	<0.87	<0.87	0.95	<0.87	<0.87	<0.87	<0.87	<0.87
Styrene	100-42-5	<0.85	<0.85	<0.85	<0.85	<1.4	<1.4	<0.85	<0.85	<0.85	<0.85	<0.85	<0.85
1,4-Dichlorobenzene	106-46-7	<1.2	<1.2	<1.2	<1.2	<1.2	<1.2	<1.2	<1.2	<1.2	<1.2	<1.2	<1.2
1,2-Dibromoethane	106-93-4	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5
1,2-Dichloroethane	107-06-2	<0.81	<0.81	<0.81	<0.81	<0.81	<0.81	<0.81	<0.81	<0.81	<0.81	<0.81	<0.81
2-Propenenitrile	107-13-1	<0.43	<0.43	<0.43	<0.43	<0.43	<0.43	<0.43	<0.43	<0.43	<0.43	<0.43	<0.43
2-Methyl Pentane	107-83-5	<0.70	<0.70	<0.70	<0.70	<0.70	<0.70	<0.70	<0.70	<0.70	<0.70	<0.70	<0.70
MIBK	108-10-1	<0.82	<0.82	<0.82	<0.82	<0.70	<0.70	1.22	<0.82	<0.82	<0.82	<0.82	<0.82
m/p-Xylene	108-38-3/ 106-42-3	<1.7	<1.7	<1.7	<1.7	<1.7	<1.7	3.00	<1.7	<1.7	<1.7	2.30	<1.7
1,3,5-Trimethylbenzene	108-67-8	<0.98	<0.98	<0.98	<0.98	<0.51	<0.51	<0.98	<0.98	<0.98	<0.98	<0.98	<0.98
Toluene	108-88-3	0.78	1.29	0.88	1.57	<1.5	<1.5	6.35	1.50	1.42	1.04	4.38	1.62
Chlorobenzene	108-90-7	<0.92	<0.92	<0.92	<0.92	<0.92	<0.92	<0.92	<0.92	<0.92	<0.92	<0.92	<0.92
Hexane	110-54-3	<0.70	<0.70	<0.70	<0.70	<0.70	<0.70	<0.70	<0.70	0.87	<0.70	<0.70	<0.70
Cyclohexane	110-82-7	<0.69	<0.69	<0.69	<0.69	<0.69	<0.69	<0.69	<0.69	<0.69	<0.69	<0.69	<0.69
Nonane	111-84-2	<1.0	<1.0	<1.0	<1.0	<0.85	<0.85	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
1,2,4-Trichlorobenzene	120-82-1	<1.5	<1.5	<1.5	<1.5	<1.1	<1.1	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5
Tetrachloroethene	127-18-4	<1.4	<1.4	<1.4	<1.4	1.99	1.14	<1.4	<1.4	<1.4	<1.4	<1.4	<1.4
Ethyl Acetate	141-78-6	<0.72	<0.72	<0.72	<0.72	<0.72	0.80	0.86	<0.72	<0.72	<0.72	<0.72	<0.72
Heptane	142-82-5	<0.82	<0.82	<0.82	3.83	<0.82	<0.82	<0.82	<0.82	<0.82	<0.82	<0.82	<0.82
1,2-Dichloroethene (Cis)	156-59-2	<0.79	<0.79	<0.79	<0.79	<0.79	<0.79	<0.79	<0.79	<0.79	<0.79	<0.79	<0.79
1,2-Dichloroethene (Trans)	156-60-5	<0.79	<0.79	<0.79	<0.79	<0.79	<0.79	<0.79	<0.79	<0.79	<0.79	<0.79	<0.79
1,2,3-Trimethylbenzene	526-73-8	<0.98	<0.98	<0.98	<0.98	<0.98	<0.98	<0.98	<0.98	<0.98	<0.98	<0.98	<0.98
3-Methyl Hexane	589-34-4	<0.82	<0.82	0.95	9.51	<0.82	<0.82	<0.82	<0.82	<0.82	<0.82	<0.82	<0.82
o-Ethyl Toluene	611-14-3	<0.98	<0.98	<0.98	<0.98	<0.98	<0.98	<0.98	<0.98	<0.98	<0.98	<0.98	<0.98

Compound	CAS NO.	18-Jul-17 NVOC-7 North	18-Jul-17 SVOC-7 South	02-Aug-17 NVOC-8 North	02-Aug-17 SVOC-8 South	15-Aug-17 NVOC-09 North	15-Aug-17 SVOC-09 South	23-Aug-17 NVOC-10 North	23-Aug-17 SVOC-10 South	07-Sep-17 NVOC-11 North	07-Sep-17 SVOC-11 South	22-Sep-17 NVOC-12 North	22-Sep-17 SVOC-12 South
Carbon Tetrachloride	56-23-5	<1.3	<1.3	<1.3	<1.3	<1.3	<1.3	<1.3	<1.3	<1.3	<1.3	<1.3	<1.3
Isopropyl Alcohol	67-63-0	<2.5	3.70	<2.5	<2.5	<2.5	<2.5	23.00	17.00	<2.5	<2.5	4.60	<2.5
Acetone	67-64-1	16.60	10.50	25.10	21.30	14.60	17.90	6.70	9.20	5.10	4.30	21.30	20.00
Chloroform	67-66-3	<0.98	<0.98	<0.98	<0.98	<0.98	<0.98	<0.98	<0.98	<0.98	<0.98	<0.98	<0.98
Benzene	71-43-2	<0.64	<0.64	<0.64	0.68	<0.64	<0.64	2.00	<0.64	2.04	<0.64	<0.64	<0.64
1,1,1-Trichloroethane	71-55-6	<1.1	<1.1	<1.1	<1.1	<1.1	<1.1	<1.1	<1.1	<1.1	<1.1	<1.1	<1.1
Vinyl Chloride	75-01-4	<0.51	<0.51	<0.51	<0.51	<0.51	<0.51	<0.51	<0.51	<0.51	<0.51	<0.51	<0.51
Dichloromethane	75-09-2	<0.69	<0.69	0.79	<0.69	<0.69	<0.69	<0.69	<0.69	<0.69	<0.69	<0.69	<0.69
1,1-Dichloroethane	75-34-3	<0.81	<0.81	<0.81	<0.81	<0.81	<0.81	<0.81	<0.81	<0.81	<0.81	<0.81	<0.81
1,1-Dichloroethene	75-35-4	<0.79	<0.79	<0.79	<0.79	<0.79	<0.79	<0.79	<0.79	<0.79	<0.79	<0.79	<0.79
Chlorodifluoromethane	75-45-6	<0.71	<0.71	<0.71	<0.71	<0.71	<0.71	<0.71	<0.71	<0.71	<0.71	<0.71	<0.71
Trichlorofluoromethane	75-69-4	<1.1	<1.1	1.20	1.20	1.30	1.30	1.30	1.30	1.20	1.30	1.20	1.20
Dichlorodifluoromethane	75-71-8	1.92	1.88	1.96	1.98	2.19	2.15	1.96	2.51	2.32	2.40	2.13	2.17
1,1,2-Trichloro-1,2,2-Trifluoroethane	76-13-1	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5
2-Methyl Butane	78-78-4	1.39	1.93	2.27	8.52	2.80	2.97	1.32	5.57	1.39	2.43	3.15	5.04
1,2-Dichloropropane	78-87-5	<0.92	<0.92	<0.92	<0.92	<0.92	<0.92	<0.92	<0.92	<0.92	<0.92	<0.92	<0.92
MEK	78-93-3	2.37	1.15	3.23	1.62	1.21	1.27	0.68	0.73	<0.59	<0.59	1.51	1.27
Trichloroethene	79-01-6	<1.1	<1.1	<1.1	<1.1	<1.1	<1.1	<1.1	<1.1	<1.1	<1.1	<1.1	<1.1
Naphthalene	91-20-3	<2.6	<2.6	<2.6	<2.6	<2.6	<2.6	<2.6	<2.6	<2.6	<2.6	<2.6	<2.6
o-Xylene	95-47-6	<0.87	<0.87	<0.87	<0.87	<0.87	<0.87	<0.87	<0.87	<0.87	<0.87	<0.87	<0.87
1,2-Dichlorobenzene	95-50-1	<1.2	<1.2	<1.2	<1.2	<1.2	<1.2	<1.2	<1.2	<1.2	<1.2	<1.2	<1.2
1,2,4-Trimethylbenzene	95-63-6	<0.98	<0.98	<0.98	<0.98	<0.98	<0.98	<0.98	<0.98	<0.98	<0.98	<0.98	<0.98
3-Methyl Pentane	96-14-0	<0.70	<0.70	<0.70	1.02	<0.70	<0.70	<0.70	<0.70	<0.70	<0.70	<0.70	<0.70
p-Cymene	99-87-6	<1.1	<1.1	<1.1	<1.1	<1.1	<1.1	<1.1	<1.1	<1.1	<1.1	<1.1	<1.1
Ethyl Benzene	100-41-4	<0.87	<0.87	<0.87	<0.87	<0.87	<0.87	<0.87	<0.87	<0.87	<0.87	<0.87	<0.87
Styrene	100-42-5	<0.85	<0.85	<0.85	<0.85	<0.85	<0.85	<0.85	<0.85	<0.85	<0.85	<0.85	<0.85
1,4-Dichlorobenzene	106-46-7	<1.2	<1.2	<1.2	<1.2	<1.2	<1.2	<1.2	<1.2	<1.2	<1.2	<1.2	<1.2
1,2-Dibromoethane	106-93-4	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5
1,2-Dichloroethane	107-06-2	<0.81	<0.81	<0.81	<0.81	<0.81	<0.81	<0.81	<0.81	<0.81	<0.81	<0.81	<0.81
2-Propenenitrile	107-13-1	<0.43	<0.43	<0.43	<0.43	<0.43	<0.43	<0.43	<0.43	<0.43	<0.43	<0.43	<0.43
2-Methyl Pentane	107-83-5	<0.70	<0.70	<0.70	1.70	<0.70	<0.70	<0.70	0.92	<0.70	<0.70	<0.70	0.85
MIBK	108-10-1	<0.82	<0.82	<0.82	<0.82	<0.82	<0.82	<0.82	<0.82	<0.82	<0.82	<0.82	<0.82
m/p-Xylene	108-38-3/ 106-42-3	<1.7	<1.7	2.00	<1.7	<1.7	<1.7	<1.7	<1.7	<1.7	<1.7	<1.7	<1.7
1,3,5-Trimethylbenzene	108-67-8	<0.98	<0.98	<0.98	<0.98	<0.98	<0.98	<0.98	<0.98	<0.98	<0.98	<0.98	<0.98
Toluene	108-88-3	2.59	1.51	3.62	2.71	2.20	1.92	2.44	2.34	2.49	1.84	1.64	2.06
Chlorobenzene	108-90-7	<0.92	<0.92	<0.92	<0.92	<0.92	<0.92	<0.92	<0.92	<0.92	<0.92	<0.92	<0.92
Hexane	110-54-3	<0.70	<0.70	<0.70	1.65	<0.70	<0.70	<0.70	<0.70	<0.70	<0.70	<0.70	0.82
Cyclohexane	110-82-7	<0.69	<0.69	<0.69	<0.69	<0.69	<0.69	<0.69	<0.69	<0.69	<0.69	<0.69	<0.69
Nonane	111-84-2	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
1,2,4-Trichlorobenzene	120-82-1	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5
Tetrachloroethene	127-18-4	<1.4	<1.4	<1.4	<1.4	<1.4	<1.4	<1.4	<1.4	<1.4	<1.4	<1.4	<1.4
Ethyl Acetate	141-78-6	0.90	<0.72	<0.72	<0.72	<0.72	<0.72	<0.72	<0.72	<0.72	<0.72	1.05	1.19
Heptane	142-82-5	<0.82	<0.82	<0.82	<0.82	<0.82	<0.82	<0.82	<0.82	<0.82	<0.82	<0.82	<0.82
1,2-Dichloroethene (Cis)	156-59-2	<0.79	<0.79	<0.79	<0.79	<0.79	<0.79	<0.79	<0.79	<0.79	<0.79	<0.79	<0.79
1,2-Dichloroethene (Trans)	156-60-5	<0.79	<0.79	<0.79	<0.79	<0.79	<0.79	<0.79	<0.79	<0.79	<0.79	<0.79	<0.79
1,2,3-Trimethylbenzene	526-73-8	<0.98	<0.98	<0.98	<0.98	<0.98	<0.98	<0.98	<0.98	<0.98	<0.98	<0.98	<0.98
3-Methyl Hexane	589-34-4	<0.82	<0.82	<0.82	<0.82	<0.82	<0.82	<0.82	<0.82	<0.82	<0.82	<0.82	<0.82
o-Ethyl Toluene	611-14-3	<0.98	<0.98	<0.98	<0.98	<0.98	<0.98	<0.98	<0.98	<0.98	<0.98	<0.98	<0.98

Table B-2 – 24-hr Carbonyl Data

		Sample Date:	27-Jun-17		18-Jul-18		02-Aug-17	
		Location:	North	South	North	South	North	South
		Duration (min):	1404	1430	1397	1418	1425	1425
		Volume (m^3)	1.50	1.47	1.45	1.42	1.46	1.44
Compound	**CAS No.**	24-hr std sch 3 (µg/m3)						
Formaldehyde	50-00-0	65	0.5	0.7	44.2	0.6	0.5	1.0
Acetone	67-64-1	11880	nd	nd	nd	nd	nd	nd
Acetaldehyde	75-07-0	500	nd	nd	nd	nd	nd	nd
Benzaldehyde	100-52-7	na	nd	nd	nd	nd	nd	nd
Acrolein	107-02-08	0.08	nd	nd	nd	nd	nd	nd
Glutaraldehyde	111-30-8	14*	nd	nd	nd	nd	nd	nd
Propionaldehyde (Propanal)	123-38-6	na	1.3	1.4	nd	nd	2.1	1.4
n-Butyraldehyde (n-Butanal)	123-72-3	na	nd	nd	nd	nd	nd	nd

Table B-3 - 24-hr Mercury Data

		Sample Date:	27-Jun-17		18-Jul-17		02-Aug-17	
		Location:	North	South	North	South	North	South
		Duration (min):	1404	1430	1397	1418	1425	1425
		Particulate Volume (m^3)	2148	1974	2046	1859	2114	1861
		Vapour Volume (m^3)	0.913	0.913	0.999	1.035	1.019	1.033
Compound	CAS No.	24-hr Std Sch 3 ($\mu g/m^3$)						
Particulate Mercury	-	-	0.00001	0.00002	0.00064	0.00001	0.00005	nd
Vapour Mercury	7439-97-6	-	nd	nd	nd	nd	nd	nd
Total Mercury	-	2	0.00001	0.00002	0.00064	0.00001	0.00005	nd

Note: nd = below method detection limit

Table B-4 - 24-hr Particulate Data

		Sample Date:	10-May-17		19-May-17		31-May-17		12-Jun-17		27-Jun-17		6-Jul-17	
		Location:	North	South	North	South	North	South	North	South	North	South	North	South
		Media ID:	NTSP-1	STSP-1	NTSP-2	STSP-2	NTSP-3	STSP-3	NTSP-4	STSP-4	NTSP-5	STSP-5	NTSP-6	STSP-6
		Duration (min):	1441	1447	1417	1426	1435	1404	1384	1411	1404	1430	1389	1408
		Sample Volume (m^3):	2225	2028	2145	1959	2208	1937	2061	1905	2148	1974	2041	1846
Parameter	CAS No.	24-hr std sch 3 ($\mu g/m^3$)												
TSP	na	120	28	39	55	31	35	34	70	57	17	15	40	38
Lead	7439-92-1	0.5	0.00	0.00	0.00	nd	0.01	0.00	0.02	0.00	nd	nd	0.01	0.00
Manganese	7439-96-5	2.5	0.01	0.01	0.01	0.01	0.02	0.01	0.03	0.02	0.00	0.00	0.02	0.01
Nickel	7440-02-0	2	nd	nd	nd	nd	nd	nd	0.00	nd	nd	nd	0.00	0.00
Thallium	7440-28-0	na	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Tin	7440-31-5	10	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Antimony	7440-36-0	25	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Arsenic	7440-38-2	0.3*	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Barium	7440-39-3	10*	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.00	0.00	0.01	0.01
Beryllium	7440-41-4	0.01	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Cadmium	7440-43-9	0.025	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Chromium	7440-47-3	1.5*	nd	nd	nd	nd	0.00	0.00	0.04	0.01	0.00	nd	0.01	nd
Cobalt	7440-48-4	0.1*	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Copper	7440-50-8	50	0.01	0.06	0.02	0.03	0.02	0.04	0.02	0.02	0.02	0.03	0.03	0.06
Vanadium	7440-62-2	2	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Zinc	7440-66-6	120	0.02	0.01	0.03	0.01	0.04	0.02	0.14	0.03	0.01	0.01	0.05	0.02
Selenium	7782-49-2	10*	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Iron	15438-31-0	4	0.26	0.27	0.35	0.33	0.44	0.38	0.95	0.60	0.14	0.09	0.50	0.32

		Sample Date:	18-Jul-17		2-Aug-17		15-Aug-17		23-Aug-17		7-Sep-17		22-Sep-17	
		Location:	North	South	North	South	North	South	North	South	North	South	North	South
		Media ID:	NTSP-7	STSP-7	NTSP-8	STSP-8	NTSP-9	STSP-9	NTSP-10	STSP-10	NTSP-11	STSP-11	NTSP-12	STSP-12
		Duration (min):	1397	1418	1425	1425	1431	1379	1421	1445	1414	1441	1411	1380
		Sample Volume (m^3):	2047	1859	2115	1861	2047	1809	2117	1995	2132	2012	1922	1768
Parameter	CAS No.	24-hr std sch 3 ($\mu g/m^3$)												
TSP	na	120	39	38	37	30	23	28	21	21	21	12	31	35
Lead	7439-92-1	0.5	0.00	0.00	0.01	0.00	0.00	0.00	nd	nd	0.00	nd	0.00	0.00
Manganese	7439-96-5	2.5	0.01	0.01	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01
Nickel	7440-02-0	2	nd	nd	0.00	nd	nd	nd	nd	nd	nd	nd	nd	nd
Thallium	7440-28-0	na	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Tin	7440-31-5	10	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Antimony	7440-36-0	25	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Arsenic	7440-38-2	0.3*	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Barium	7440-39-3	10*	0.01	0.01	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01
Beryllium	7440-41-4	0.01	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Cadmium	7440-43-9	0.025	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Chromium	7440-47-3	1.5*	nd	0.00	nd	0.00	nd	0.00	nd	nd	nd	nd	nd	nd
Cobalt	7440-48-4	0.1*	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Copper	7440-50-8	50	0.02	0.09	0.01	0.03	0.02	0.06	0.02	0.06	0.02	0.04	0.03	0.10
Vanadium	7440-62-2	2	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Zinc	7440-66-6	120	0.02	0.02	0.04	0.02	0.01	0.01	0.01	0.01	0.01	0.01	0.02	0.02
Selenium	7782-49-2	10*	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Iron	15438-31-0	4	0.30	0.28	0.23	0.21	0.12	0.11	0.09	0.08	0.10	0.03	0.25	0.28

Notes: nd = below method detection limit
na = no applicable Sch 3 standard of guideline
** = guideline*