Report No. 51010

a Kontrol Energy Company

Report:

Clean Harbors Environmental Services Inc.
Lambton Facility
Ambient Air Monitoring 2018

Date: December-18-2018



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1	December-18-2018	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 2018 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 2018 monitoring program, the following deviations from the monitoring plan were made:

- The 2018 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) or rescheduled sampling resulting from equipment issues in the field.

2.1 Sampling Frequency and Substance List

A list of the compounds, by type (VOC, particulates and metals, and carbonyls) included in the 2018 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 MECP, sampling dates were shifted to avoid sampling on days where no operation occurred at the Facility, such as weekends and statutory holidays, or as a result of rescheduling due to issues encountered in the field. A list of the actual sampling days included in the 2018 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 14, 2018.
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 14		X			Contracted lab provided incorrect flow controllers for VOC sampling – make-up day for this set's VOC on July 19th.
May 29	X	X			Not a NAPS day. (rescheduled from May 26th to avoid weekend)
June 7	X	X			
June 19	X	X			
June 28	X	X	X	X	Not a NAPS day. (rescheduled from July 1st to avoid weekend)
July 13		X			VOC canister timer failed – make-up day for this set's VOC on September 5
July 19	X				VOC only make-up day for May 14th.
July 25	X	X	X	X	
August 6	X	X			
August 21	X	X			Not a NAPS day. (Rescheduled from August 10th to avoid weekend)
August 30	X	X	X	X	
September 5	X				VOC only make-up day for July 13th.
September 11	X	X			
September 26	X	X			Not a NAPS Day. (rescheduled from September 23rd to avoid weekend) No record for south site VOCs – contracted lab indicated no record due to contamination.

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 2018 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 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 (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 14, 2018 (Eastern Standard Time) and ended on 2400 hours September 26, 2018. The sampling schedule generally followed the NAPS schedule, with adjustments as needed to avoid sampling on days where the facility was not operating or to make-up for missed sampling due to instrument issues encountered in the field. 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 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 2018 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 2018 monitoring program, there were five days where this wind direction occurred for a significant number of hours:

- May 14 16 hours
- July 13 22 hours
- July 19 16 hours
- August 6 12 hours
- September 5 19 hours

Daily mean temperatures ranged from 16 to 26°C and daily average wind speeds ranged from 5.6 to 13 kph. Rainfall was measured on two days – August 6 and August 21. 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 25 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 2-Propenenitrile (132% of the 0.6 $\mu g/m^3$ Sch. 3 standard) on June 19th at the South site. This value, which is less than 2 times the method detection limit, appears to be anomalous since the compound was not detected in any of the other samples collected during the 2018 program or in any of the years since the EPA TO-15 method was implemented in 2012.

The second highest percentage was reported for benzene (35% of the 24 hour 2.3 µg/m^3 AAQC) at the North site on June 28. Benzene has historically been the compound with the highest percentage of an AAQC, standard, or guideline for the monitoring program. A slightly less concentration was also observed on August 30 at the North monitor. However; on both of these days the wind was blowing either from a western or northerly direction where this monitor was not downwind of the Facility. Other concentrations at both monitors 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, except for May 29 which had elevated levels at both monitors. The highest TSP concentration sampled during the monitoring program was 151 µg/m^3 at the South site on May 29. This concentration exceeds the Sch. 3 standard of 120 µg/m^3 for particulate; however, the North monitor also recorded a relatively high value of 97 µg/m^3 meaning that the Facility's contribution would have been well below the 120 µg/m^3 sch.3 standard. It was noted that farm fields adjacent to both of the monitoring locations were being worked on the sampling day and particulate measurements were likely elevated due to these agricultural activities.

As tabulated in Table 11 and APPENDIX B, eight of the elemental constituents of TSP (thallium, tin, antimony, arsenic, beryllium and cadmium) 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 a single higher value of 48 µg/m^3 noted on July 25 at the North monitor. Winds were blowing from the north on this day and so the Facility was not upwind of the monitor. Propanal was detected on August 30th at both the North and South sites. The highest concentration was measured upwind of the Facility. Propanal does not have an AAQC, standard, or guideline.

4.5 Mercury Concentrations

Both particulate and vapour phase mercury components were measured as shown in Table 13, 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 three high-volume sample filters. 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 2018. 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 encountered issues in the field, VOCs were unable to be sampled on two (2) of the scheduled sample days. Combined, the total of fourteen (14) sample days resulted in twelve (12) sets of VOC and Particulate samples. This resulted in an additional two (2) VOC only make-up sampling days. 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 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 2-Propenenitrile (132% of the 0.6 µg/m^3 Sch. 3 standard) on June 19th at the South site. This value, which is less than 2 times the method detection limit, appears to be anomalous since the compound was not detected in any of the other samples collected during the 2018 program or in any year since the EPA TO-15 method was implemented in 2012.

The compound measured at the second highest percentage of a standard, guideline, or AAQC was benzene, which was found in concentrations up to 34.8 % of its 24 hour AAQC. Benzene has historically been the compound measured at the highest percentage during the monitoring program.

Measured concentrations of total particulate and speciated particulates were all less than their respective standard, guideline, or AAQC, with the exception of one (1) exceedance of 126% of the sch.3 standard for total particulate on May 29th at the South site. As noted previously it is expected that agricultural work conducted on the fields adjacent to both of the monitoring sites impacted these results, and relatively high concentrations measured that day at the North monitor mean that the Facility's contribution to this concentration was well below the standard. Total particulate was generally measured in concentrations less than 35% the 24-hour standard. Of the speciated components, iron was measured at the highest percentage of its limit, at 55%.

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 73% of the standard was found. However, the monitoring site was not downwind of the Facility on this day. Propanal was detected on one sample day at a maximum of 2.3 $\mu g/m^3$. Propanal does not have an AAQC, standard, or guideline.

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%) its schedule 3 standard in all samples.

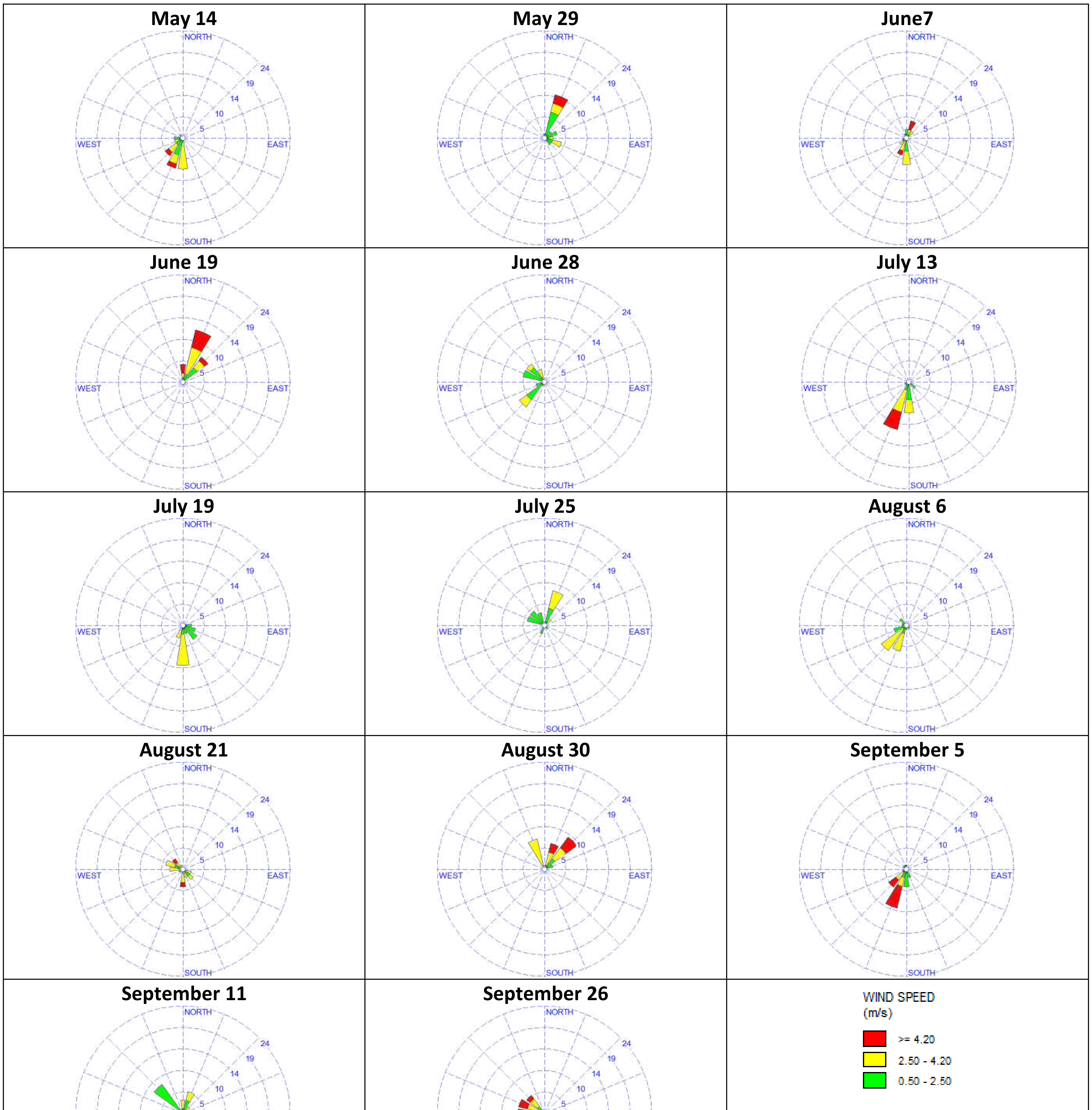
Table 8 - Summary of 24-Hour Meteorological Data for Individual Monitoring Days

Sample Date	Prevailing Wind Direction	Wind Speed (km/h)	Temperature (°C)	Rainfall (mm)	Captured Downwind SE-SW Quadrant (Hours)
May 14	SSW	10	16	0	16
May 29	ENE	7.8	23	0	2
June 07	SW	10	19	0	11
June 19	NNE	11	19	0	0
June 28	W	6.5	23	0	6
July 13	SSW	8.7	24	0	22
July 19	SEE	7.8	21	0	16
July 25	NNW	5.6	22	0	2
August 06	SW	7.8	25	0.9	12
August 21	SW	11.8	22	1.3	8
August 30	NNE	11	18	0	0
September 05	SSW	11	26	0	19
September 11	N	7.7	17	0	0
September 26	W	13	16	0	3

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).

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)



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.

Table 9 - Summary of Hourly Meteorological Data

YYYY-MM-DD hh:mm	WS kph	WD10 Degrees	RAIN mm	TEMP C	Bar mbar
2018-05-14 1:00	8.1	204	0	10.2	1015
2018-05-14 2:00	9.4	229	0	10.3	1014
2018-05-14 3:00	9.8	237	0	10.1	1015
2018-05-14 4:00	7.3	237	0	10.8	1014
2018-05-14 5:00	4.3	264	0	12.1	1015
2018-05-14 6:00	4.7	318	0	12	1014
2018-05-14 7:00	6.2	267	0	12.6	1015
2018-05-14 8:00	7.1	235	0	13.7	1016
2018-05-14 9:00	9.5	236	0	14.5	1016
2018-05-14 10:00	8.1	217	0	15.7	1016
2018-05-14 11:00	3.6	202	0	17.5	1015
2018-05-14 12:00	12.1	208	0	18.8	1015
2018-05-14 13:00	11.4	180	0	20	1015
2018-05-14 14:00	13	186	0	20.6	1012
2018-05-14 15:00	12.5	180	0	21.4	1011
2018-05-14 16:00	10.4	173	0	22.3	1011
2018-05-14 17:00	18.5	222	0	22.6	1011
2018-05-14 18:00	16.5	193	0	21.4	1011
2018-05-14 19:00	13.9	184	0	20.3	1012
2018-05-14 20:00	13.2	190	0	18.8	1011
2018-05-14 21:00	9.3	195	0	17.3	1011
2018-05-14 22:00	6.9	205	0	16.9	1011
2018-05-14 23:00	5.7	189	0	16.8	1010
2018-05-14 0:00	8.9	201	3	17.5	1009
2018-05-29 1:00	3	31	0	18.9	1015
2018-05-29 2:00	8.3	21	0	18.7	1015
2018-05-29 3:00	5.5	32	0	17.8	1014
2018-05-29 4:00	6.3	26	0	17.6	1016
2018-05-29 5:00	3.8	1	0	17.6	1015
2018-05-29 6:00	6.3	28	0	17.8	1015
2018-05-29 7:00	7.8	43	0	20	1016
2018-05-29 8:00	9.5	79	0	22.6	1016
2018-05-29 9:00	10.7	105	0	25.4	1017
2018-05-29 10:00	13.3	114	0	27.9	1015
2018-05-29 11:00	7.1	120	0	28.9	1015
2018-05-29 12:00	6.1	146	0	30.3	1017
2018-05-29 13:00	4.9	135	0	30.4	1015
2018-05-29 14:00	2.1	78	0	30.6	1015
2018-05-29 15:00	3.4	120	0	31.1	1015
2018-05-29 16:00	16.1	23	0	28.5	1014
2018-05-29 17:00	15.1	23	0	26.7	1015
2018-05-29 18:00	16	30	0	25.9	1014
2018-05-29 19:00	14.5	24	0	23.4	1014
2018-05-29 20:00	7.9	32	0	21.4	1014
2018-05-29 21:00	5.7	55	0	20.3	1014
2018-05-29 22:00	4	69	0	19.2	1013
2018-05-29 23:00	3.7	75	0	18.6	1014
2018-05-29 0:00	6.7	92	0	19.3	1014

Table 9 - Summary of Hourly Meteorological Data

YYYY-MM-DD hh:mm	WS kph	WD10 Degrees	RAIN mm	TEMP C	Bar mbar
2018-06-07 1:00	8.7	179	0	13.5	1016
2018-06-07 2:00	9	184	0	13.6	1014
2018-06-07 3:00	9.9	184	0	13.6	1014
2018-06-07 4:00	10	180	0	13.1	1015
2018-06-07 5:00	8.6	173	0	13.5	1015
2018-06-07 6:00	8.8	172	0	14.1	1015
2018-06-07 7:00	11.2	197	0	15.7	1015
2018-06-07 8:00	16	208	0	17.7	1016
2018-06-07 9:00	14.4	204	0	19.4	1017
2018-06-07 10:00	13.7	212	0	21.7	1016
2018-06-07 11:00	12.2	216	0	22.9	1016
2018-06-07 12:00	7.5	236	0	24.3	1016
2018-06-07 13:00	4	248	0	25.2	1016
2018-06-07 14:00	1.5	251	0	25.8	1016
2018-06-07 15:00	0.8	308	0	26.5	1014
2018-06-07 16:00	2.1	335	0	27	1016
2018-06-07 17:00	7.3	353	0	26.3	1016
2018-06-07 18:00	19.4	26	0	22	1016
2018-06-07 19:00	17.6	33	0	19.5	1016
2018-06-07 20:00	14.6	32	0	19	1018
2018-06-07 21:00	11	47	0	16.2	1019
2018-06-07 22:00	8.9	39	0	14	1020
2018-06-07 23:00	9.1	26	0	13.3	1020
2018-06-07 0:00	4.4	359	0	13.5	1020
2018-06-19 1:00	13	359	0	17.1	1014
2018-06-19 2:00	15.9	13	0	17.3	1015
2018-06-19 3:00	18.9	20	0	16.4	1015
2018-06-19 4:00	18.4	9	0	16.3	1016
2018-06-19 5:00	16.8	11	0	15.9	1014
2018-06-19 6:00	15	15	0	15.9	1017
2018-06-19 7:00	18.7	27	0	17.5	1017
2018-06-19 8:00	18.3	29	0	17.2	1017
2018-06-19 9:00	13.7	43	0	18.8	1017
2018-06-19 10:00	7.4	50	0	21.5	1017
2018-06-19 11:00	5	48	0	22.7	1017
2018-06-19 12:00	2.3	42	0	23.4	1016
2018-06-19 13:00	0.7	56	0	23.6	1016
2018-06-19 14:00	8.4	2	0	23.1	1017
2018-06-19 15:00	10.7	28	0	23	1017
2018-06-19 16:00	14.3	22	0	22.2	1016
2018-06-19 17:00	15.4	39	0	20.2	1014
2018-06-19 18:00	12.6	32	0	19.8	1014
2018-06-19 19:00	10.2	29	0	18.6	1015
2018-06-19 20:00	10.4	34	0	17.2	1015
2018-06-19 21:00	10.9	24	0	15.9	1015
2018-06-19 22:00	5.6	27	0	16	1015
2018-06-19 23:00	6.2	33	0	16.4	1014
2018-06-19 0:00	5.2	39	0	15.9	1014

Table 9 - Summary of Hourly Meteorological Data

YYYY-MM-DD hh:mm	WS kph	WD10 Degrees	RAIN mm	TEMP C	Bar mbar
2018-06-28 1:00	8.3	323	0	18.8	1009
2018-06-28 2:00	8.6	318	0	18.9	1009
2018-06-28 3:00	6.7	312	0	18.8	1009
2018-06-28 4:00	8.3	295	0	18.3	1010
2018-06-28 5:00	7.3	294	0	18.7	1010
2018-06-28 6:00	7.6	302	0	18.6	1010
2018-06-28 7:00	9.2	322	0	18.1	1010
2018-06-28 8:00	12.3	333	0	19.3	1012
2018-06-28 9:00	9.4	334	0	20.3	1013
2018-06-28 10:00	4.3	313	0	22.6	1012
2018-06-28 11:00	3.6	289	0	23.1	1013
2018-06-28 12:00	2.1	301	0	24.7	1013
2018-06-28 13:00	2.1	331	0	25.9	1013
2018-06-28 14:00	0.7	269	0	27.6	1013
2018-06-28 15:00	2	251	0	28	1013
2018-06-28 16:00	5.2	254	0	28.6	1012
2018-06-28 17:00	3.8	224	0	28.9	1012
2018-06-28 18:00	5.9	228	0	29.6	1012
2018-06-28 19:00	10.6	223	0	26.9	1013
2018-06-28 20:00	9.9	214	0	24.3	1014
2018-06-28 21:00	8.6	219	0	23.2	1013
2018-06-28 22:00	6.8	226	0	22.4	1014
2018-06-28 23:00	6.3	210	0	20.5	1014
2018-06-28 0:00	6.4	220	0	20.6	1014
2018-07-13 1:00	6.3	183	0	17.9	1022
2018-07-13 2:00	3.4	202	0	15.9	1022
2018-07-13 3:00	0.9	137	0	15.5	1022
2018-07-13 4:00	2.4	136	0	15.2	1022
2018-07-13 5:00	2.7	136	0	15.6	1021
2018-07-13 6:00	2.8	177	0	17.3	1022
2018-07-13 7:00	1	301	0	19	1022
2018-07-13 8:00	3.2	220	0	22.2	1022
2018-07-13 9:00	9.2	210	0	25.8	1021
2018-07-13 10:00	10.2	210	0	26.3	1019
2018-07-13 11:00	10.5	243	0	27.3	1022
2018-07-13 12:00	9.7	213	cal	28.6	1021
2018-07-13 13:00	10.8	211	0	30.1	1020
2018-07-13 14:00	12.5	194	0	30.4	1020
2018-07-13 15:00	15.4	212	0	30.3	1021
2018-07-13 16:00	17.4	208	0	31.6	1019
2018-07-13 17:00	18.3	209	0	31.2	1019
2018-07-13 18:00	16.9	208	0	30.1	1019
2018-07-13 19:00	14.3	190	0	28.7	1018
2018-07-13 20:00	10	181	0	26.9	1018
2018-07-13 21:00	9.1	190	0	24	1018
2018-07-13 22:00	7.5	194	0	22.9	1019
2018-07-13 23:00	7.2	187	0	21.2	1019
2018-07-13 0:00	5.9	187	0	20.7	1020

Table 9 - Summary of Hourly Meteorological Data

YYYY-MM-DD hh:mm	WS kph	WD10 Degrees	RAIN mm	TEMP C	Bar mbar
2018-07-19 1:00	4.4	96	0	13.2	1017
2018-07-19 2:00	2.1	106	0	12.5	1019
2018-07-19 3:00	2.8	141	0	12.2	1018
2018-07-19 4:00	1.9	185	0	12.7	1018
2018-07-19 5:00	1.7	147	0	12.1	1019
2018-07-19 6:00	2.5	86	0	12.7	1020
2018-07-19 7:00	3.3	125	0	17.2	1019
2018-07-19 8:00	6.9	167	0	21.8	1020
2018-07-19 9:00	14.3	175	0	24.6	1019
2018-07-19 10:00	13.9	190	0	25.5	1020
2018-07-19 11:00	11.3	195	0	25.8	1019
2018-07-19 12:00	10.4	192	0	25.9	1019
2018-07-19 13:00	10.6	178	0	27.1	1019
2018-07-19 14:00	14.1	193	0	27.2	1018
2018-07-19 15:00	13.8	180	0	27.5	1017
2018-07-19 16:00	12.9	171	0	28.2	1018
2018-07-19 17:00	12.5	176	0	28.5	1016
2018-07-19 18:00	12.1	175	0	27.6	1017
2018-07-19 19:00	8.7	170	0	26.5	1016
2018-07-19 20:00	5.8	157	0	23.9	1015
2018-07-19 21:00	5.1	130	0	20.7	1016
2018-07-19 22:00	5.1	130	0	19	1016
2018-07-19 23:00	4.9	115	0	16.8	1015
2018-07-19 0:00	6.4	118	0	16.8	1013
2018-07-25 1:00	3.1	290	0	20.1	1013
2018-07-25 2:00	3.2	299	0	20.2	1013
2018-07-25 3:00	4	317	0	19.9	1013
2018-07-25 4:00	3.6	333	0	19.8	1014
2018-07-25 5:00	5.2	331	0	19.7	1013
2018-07-25 6:00	5.2	16	0	19.9	1015
2018-07-25 7:00	8.2	27	0	19.8	1013
2018-07-25 8:00	9.4	21	0	20.7	1015
2018-07-25 9:00	5.8	32	0	22	1015
2018-07-25 10:00	5.3	326	0	24.2	1015
2018-07-25 11:00	3.4	334	0	25.1	1015
2018-07-25 12:00	2.3	304	0	25.9	1015
2018-07-25 13:00	2.8	314	0	27	1015
2018-07-25 14:00	3.6	298	0	27.7	1014
2018-07-25 15:00	3	296	0	27.7	1014
2018-07-25 16:00	12.3	18	0	26.8	1014
2018-07-25 17:00	11.7	34	0	25.9	1014
2018-07-25 18:00	13	28	0	25.3	1013
2018-07-25 19:00	11.6	29	0	23.1	1013
2018-07-25 20:00	7.8	28	0	21.4	1013
2018-07-25 21:00	3.6	47	0	20.3	1014
2018-07-25 22:00	2.6	127	0	19.4	1014
2018-07-25 23:00	2	195	0	18	1013
2018-07-25 0:00	2.5	202	0	17.7	1013

Table 9 - Summary of Hourly Meteorological Data					
YYYY-MM-DD hh:mm	WS kph	WD10 Degrees	RAIN mm	TEMP C	Bar mbar
2018-08-06 1:00	11.8	196	0	23.6	1018
2018-08-06 2:00	11.4	198	0	23.9	1017
2018-08-06 3:00	10.1	200	0	22.6	1017
2018-08-06 4:00	10.4	215	0	23.1	1017
2018-08-06 5:00	11.2	229	0	23.2	1017
2018-08-06 6:00	9	224	0	23.8	1017
2018-08-06 7:00	7.4	201	0	23.8	1018
2018-08-06 8:00	9.2	207	0	25.4	1017
2018-08-06 9:00	10.5	214	0	27.1	1019
2018-08-06 10:00	14.2	226	0	27.8	1018
2018-08-06 11:00	10.4	259	0	27.4	1019
2018-08-06 12:00	6	301	0	27.7	1019
2018-08-06 13:00	2.4	312	0	29.2	1017
2018-08-06 14:00	0.8	308	0	30	1015
2018-08-06 15:00	0.7	123	0	29.6	1017
2018-08-06 16:00	6.7	307	14.25	25.6	1016
2018-08-06 17:00	5.2	136	0	21.8	1016
2018-08-06 18:00	5.1	187	0.25	23.1	1015
2018-08-06 19:00	12.4	219	0.75	21.8	1016
2018-08-06 20:00	6.5	240	0	21.8	1016
2018-08-06 21:00	3.9	245	0	21.9	1016
2018-08-06 22:00	7.1	245	5.5	21.9	1015
2018-08-06 23:00	6.6	231	0.25	21.2	1016
2018-08-06 0:00	8.3	211	0	21	1015
2018-08-21 1:00	10.9	109	0	20.8	1012
2018-08-21 2:00	9.3	122	1.25	21.6	1011
2018-08-21 3:00	10.3	131	19.5	21	1010
2018-08-21 4:00	5.1	135	0.25	21.5	1009
2018-08-21 5:00	5	136	0	21.8	1010
2018-08-21 6:00	9.8	160	0.25	21.5	1009
2018-08-21 7:00	11.9	164	0	21.5	1009
2018-08-21 8:00	15.1	170	0	22.4	1008
2018-08-21 9:00	13.8	176	0.25	21.7	1009
2018-08-21 10:00	14.1	180	0	23.2	1007
2018-08-21 11:00	18.1	190	0	24.8	1007
2018-08-21 12:00	14.4	231	0	25.2	1006
2018-08-21 13:00	14.6	240	0	24.7	1006
2018-08-21 14:00	10.5	264	2.25	22.4	1006
2018-08-21 15:00	11.9	261	0	23.9	1005
2018-08-21 16:00	13.1	261	3.25	24.6	1006
2018-08-21 17:00	11.2	284	2.75	21.5	1006
2018-08-21 18:00	14.4	309	0.25	22.1	1007
2018-08-21 19:00	18	323	0	20.2	1006
2018-08-21 20:00	13.7	329	0	19.8	1009
2018-08-21 21:00	10.2	315	0	19.3	1009
2018-08-21 22:00	8.6	290	0	18.5	1010
2018-08-21 23:00	8.4	293	0	18.4	1011
2018-08-21 0:00	10.7	286	0	18.5	1010

Table 9 - Summary of Hourly Meteorological Data					
YYYY-MM-DD hh:mm	WS kph	WD10 Degrees	RAIN mm	TEMP C	Bar mbar
2018-08-30 1:00	11.3	24	0	18.9	1020
2018-08-30 2:00	13.4	340	0	18.4	1020
2018-08-30 3:00	14.2	343	0	17.2	1020
2018-08-30 4:00	12.6	338	0	16.8	1020
2018-08-30 5:00	10.4	333	0	16.6	1020
2018-08-30 6:00	9.6	339	0	16.2	1021
2018-08-30 7:00	8.4	328	0	16.1	1022
2018-08-30 8:00	9.2	329	0	17	1022
2018-08-30 9:00	8.8	27	0	18.5	1024
2018-08-30 10:00	10.2	37	0	19.5	1022
2018-08-30 11:00	13.4	25	0	19.4	1021
2018-08-30 12:00	16	30	0	18.8	1023
2018-08-30 13:00	16.8	36	0	20	1024
2018-08-30 14:00	15.6	31	0	19.6	1023
2018-08-30 15:00	16.6	34	0	20.1	1021
2018-08-30 16:00	15.7	40	0	19.6	1021
2018-08-30 17:00	13.3	30	0	19	1023
2018-08-30 18:00	12.6	36	0	18.2	1022
2018-08-30 19:00	11.4	45	0	17.4	1022
2018-08-30 20:00	6.6	44	0	15.4	1023
2018-08-30 21:00	6.5	40	0	15.3	1023
2018-08-30 22:00	5.8	55	0	16.2	1022
2018-08-30 23:00	6.2	57	0	15.7	1023
2018-08-30 0:00	2.9	63	0	15.7	1023
2018-09-05 1:00	4.1	170	0	22.1	1022
2018-09-05 2:00	5.7	173	0	21.4	1022
2018-09-05 3:00	1.8	149	0	21.8	1019
2018-09-05 4:00	2.7	156	0	21.9	1021
2018-09-05 5:00	7.9	172	0	21	1020
2018-09-05 6:00	5.7	176	0	21.1	1020
2018-09-05 7:00	5	194	0	22.5	1021
2018-09-05 8:00	8.5	203	0	25.6	1021
2018-09-05 9:00	11.4	208	0	27.6	1020
2018-09-05 10:00	11.7	212	0	29.9	1020
2018-09-05 11:00	16.7	228	0	30.1	1021
2018-09-05 12:00	17.5	218	0	30.6	1020
2018-09-05 13:00	20.5	208	0	31.8	1020
2018-09-05 14:00	25.5	203	0	31.6	1019
2018-09-05 15:00	25.6	202	0	31.8	1019
2018-09-05 16:00	23.2	205	0	31.6	1018
2018-09-05 17:00	16.7	213	0	30.9	1018
2018-09-05 18:00	10.3	214	0	30	1018
2018-09-05 19:00	12.6	215	0.75	26.7	1018
2018-09-05 20:00	5.2	218	0	22.6	1019
2018-09-05 21:00	6.7	251	0	22.5	1020
2018-09-05 22:00	7.2	331	5.25	22.2	1020
2018-09-05 23:00	5.3	315	5	21	1022
2018-09-05 0:00	6.7	351	0	20.9	1022

Table 9 - Summary of Hourly Meteorological Data

YYYY-MM-DD hh:mm	WS kph	WD10 Degrees	RAIN mm	TEMP C	Bar mbar
2018-09-11 1:00	7.2	317	0	14.2	1018
2018-09-11 2:00	5.5	305	0	14.7	1018
2018-09-11 3:00	6.8	304	0	14.9	1018
2018-09-11 4:00	6.9	317	0	14.4	1019
2018-09-11 5:00	7.2	324	0	14.5	1020
2018-09-11 6:00	7.3	323	0	14.8	1020
2018-09-11 7:00	6.4	312	0	13.8	1021
2018-09-11 8:00	6.6	323	0	14.7	1022
2018-09-11 9:00	9.6	338	0	16.5	1022
2018-09-11 10:00	7.7	357	0	17.3	1022
2018-09-11 11:00	11.9	9	0	18.6	1022
2018-09-11 12:00	11.1	1	0	19.3	1023
2018-09-11 13:00	12.2	12	0	19.7	1023
2018-09-11 14:00	10.5	28	0	21	1022
2018-09-11 15:00	10.9	47	0	20.3	1023
2018-09-11 16:00	7.5	32	0	21.1	1023
2018-09-11 17:00	8.3	32	0	21.2	1021
2018-09-11 18:00	6.4	29	0	19.6	1021
2018-09-11 19:00	6.8	60	0	17.4	1020
2018-09-11 20:00	7.2	55	0	15.2	1022
2018-09-11 21:00	5.9	117	0	14.1	1021
2018-09-11 22:00	5.6	109	0	13.1	1021
2018-09-11 23:00	5.7	119	0	13.5	1023
2018-09-11 0:00	3.7	129	0	12.8	1022
2018-09-26 1:00	25.1	221	0	20.6	1010
2018-09-26 2:00	19.5	229	0	20.4	1009
2018-09-26 3:00	19.3	229	0	20.7	1009
2018-09-26 4:00	15.2	250	0	19.5	1009
2018-09-26 5:00	11.2	261	0	19.3	1010
2018-09-26 6:00	8.7	264	0	19.2	1011
2018-09-26 7:00	13.3	280	0	18.9	1011
2018-09-26 8:00	10.5	296	0	17.5	1012
2018-09-26 9:00	17.9	318	0	15.4	1013
2018-09-26 10:00	14.6	320	0	16.1	1014
2018-09-26 11:00	14.5	313	0	16.7	1015
2018-09-26 12:00	14.5	300	0	17.1	1015
2018-09-26 13:00	14.7	286	0	18	1015
2018-09-26 14:00	18.8	282	0	18	1015
2018-09-26 15:00	17.7	282	0	17.5	1017
2018-09-26 16:00	15.8	281	0	17.5	1017
2018-09-26 17:00	14.2	280	0	17.7	1017
2018-09-26 18:00	13.3	277	0	16.5	1017
2018-09-26 19:00	7.2	287	0	15	1018
2018-09-26 20:00	6.4	309	0	12.6	1018
2018-09-26 21:00	6.1	305	0	11.7	1019
2018-09-26 22:00	5	257	0	10.1	1020
2018-09-26 23:00	3	214	0	8.2	1021
2018-09-26 0:00	4.5	198	0	6.9	1019

Table 10 - VOC Summary

Compound:	CAS No.	24-hr Std (sch 3) 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	nd	nd	nd	nd	nd	nd	nd	nd
Isopropyl Alcohol	67-63-0	7,300	1.3	nd	4.2	3.7	nd	9.0	0.1%	0.1%
Acetone	67-64-1	11,800	13	nd	20	14	7.1	21	0.2%	0.2%
Chloroform	67-66-3	1	nd	nd	nd	nd	nd	nd	nd	nd
Benzene	71-43-2	2.3*	nd	nd	nd	0.13	nd	0.80	nd	35%
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	0.23	nd	2.0	0.47	nd	4.0	0.9%	1.8%
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	0.19	nd	0.8	0.069	nd	0.83	0.0%	0.0%
Trichlorofluoromethane	75-69-4	6,000	0.10	nd	1.2	0.30	nd	1.2	0.0%	0.0%
Dichlorodifluoromethane	75-71-8	500,000	1.7	nd	2.1	1.9	1.7	2.1	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	1.8	nd	3.6	1.8	0.71	2.9	na	na
1,2-Dichloropropane	78-87-5	2,400	nd	nd	nd	nd	nd	nd	nd	nd
MEK	78-93-3	1,000	1.3	nd	2.2	1.9	0.87	3.7	0.2%	0.4%
Trichloroethene	79-01-6	12	0.13	nd	1.6	nd	nd	nd	13.3%	nd
Naphthalene	91-20-3	22.5	nd	nd	nd	nd	nd	nd	nd	nd
o-Xylene	95-47-6	730	0.22	nd	1.4	0.5	nd	2.2	0.2%	0.3%
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	0.2	nd	1.5	nd	0.7%
3-Methyl Pentane	96-14-0	na	nd	nd	nd	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	0.16	nd	1.1	0.4	nd	1.7	0.1%	0.2%
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	0.066	nd	0.79	nd	nd	nd	132%	nd
2-Methyl Pentane	107-83-5	na	nd	nd	nd	0.1	nd	0.76	na	na
MIBK	108-10-1	1,200	nd	nd	nd	nd	nd	nd	nd	nd
m/p-Xylene	108-38-3/106-42-3	730	0.67	nd	3.2	1.4	nd	5.8	0.4%	0.8%
1,3,5-Trimethylbenzene	108-67-8	165	nd	nd	nd	nd	nd	nd	nd	nd
Toluene	108-88-3	2,000	9.3	nd	27	8.4	2.0	16	1.3%	0.8%
Chlorobenzene	108-90-7	3,500	nd	nd	nd	nd	nd	nd	nd	nd
Hexane	110-54-3	7,500	0.34	nd	2.4	0.46	nd	1.6	0.0%	0.0%
Cyclohexane	110-82-7	6,100	0.071	nd	0.85	0.14	nd	0.92	0.0%	0.0%
Nonane	111-84-2	na	0.30	nd	2.0	0.40	nd	2.4	na	na
1,2,4-Trichlorobenzene	120-82-1	400	nd	nd	nd	nd	nd	nd	nd	nd
Tetrachloroethene	127-18-4	360	0.66	nd	4.7	1.9	nd	15	1.3%	4.1%
Ethyl Acetate	141-78-6	19,000	0.11	nd	1.3	0.12	nd	1.5	0.0%	0.0%
Heptane	142-82-5	11,000	0.15	nd	0.92	0.33	nd	1.5	0.0%	0.0%
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	nd	nd	nd	nd	nd	nd	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	38	17	151	34	17	97	126%	81%
Lead	7439-92-1	0.5	0.0021	nd	0.0078	0.0030	nd	0.012	1.6%	2.4%
Manganese	7439-96-5	2.5	0.0094	0.0022	0.047	0.0093	0.0019	0.032	1.9%	1.3%
Nickel	7440-02-0	2	0.0012	nd	0.0042	0.0016	nd	0.0052	0.2%	0.3%
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	na	na
Barium	7440-39-3	10*	0.0060	0.0020	0.014	0.006	0.0022	0.010	na	na
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*	0.00034	nd	0.0041	0.00046	nd	0.0030	na	na
Cobalt	7440-48-4	0.1*	0.000084	nd	0.0010	0.00011	nd	0.0013	na	na
Copper	7440-50-8	50	0.038	0.018	0.061	0.040	0.010	0.087	0.1%	0.2%
Vanadium	7440-62-2	2	0.00033	nd	0.0039	0.00049	nd	0.003	0.2%	0.2%
Zinc	7440-66-6	120	0.019	0.0061	0.040	0.029	0.008	0.070	0.0%	0.1%
Selenium	7782-49-2	10*	nd	nd	nd	0.00044	nd	0.0052	na	na
Iron	15438-31-0	4	0.37	0.068	2.2	0.32	0.070	1.2	55%	30%

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	0.76	0.56	1.0	16	0.35	48	1.6%	73%
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	0.50	nd	1.5	0.77	nd	2.3	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	--	--	0.000016	nd	0.000036	0.000030	nd	0.000058	na	na
Vapour Mercury	7439-97-6	--	nd	nd	nd	nd	nd	nd	na	na
Total Mercury	--	2	0.000016	nd	0.000036	0.000030	nd	0.000058	0.0%	0.0%

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

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

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	
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Report No.: 50881-1
10 pages

Revision History

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

NOTICE:

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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.	29-May-18 NVOC-2 North	29-May-18 SVOC-2 South	07-Jun-18 NVOC-3 North	07-Jun-18 SVOC-3 South	19-Jun-18 NVOC-4 North	19-Jun-18 SVOC-4 South	28-Jun-18 NVOC-5 North	28-Jun-18 SVOC-5 South	19-Jul-18 NVOC-6 North	19-Jul-18 SVOC-6 South	25-Jul-18 NVOC-7 North	25-Jul-18 SVOC-7 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	<2.5	<2.5	3.60	2.6	<2.5	9.0	4.2	3.3	<2.5	2.9	<2.5
Acetone	67-64-1	20.60	20.40	16.20	18.70	7.1	8.6	21.4	18.0	13.1	15.9	13.5	14.1
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	0.80	<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	<0.51	<0.51	<0.51	<0.51	<0.51	<0.51	<0.51	<0.51
Dichloromethane	75-09-2	<0.69	1.96	<0.69	<0.69	<0.69	0.83	0.93	<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	0.8	<0.71	<0.71	<0.77	<0.71
Trichlorofluoromethane	75-69-4	1.20	1.20	<1.1	<1.1	<1.1	<1.1	<1.1	<1.1	<1.1	<1.1	<1.1	<1.1
Dichlorodifluoromethane	75-71-8	2.01	2.09	1.74	1.74	1.88	2.10	1.84	1.9	1.90	1.83	1.87	1.75
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	2.01	3.55	1.11	1.26	0.71	0.92	2.91	3.0	1.27	3.07	1.8	1.59
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	1.26	2.18	1.81	1.13	0.98	1.90	3.73	1.5	0.95	0.97	1.82	1.43
Trichloroethene	79-01-6	<1.1	1.60	<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	1.48	<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	<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	1.31	<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	0.79	<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	0.76	<0.70
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	2.10	<1.7	<1.7	<1.7	<1.7	4.4	<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	15.70	14.70	6.96	9.59	3.49	26.60	10.20	9.6	7.99	7.47	13.40	3.71
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	0.74	<0.70	<0.70	<0.70	<0.70	1.47	<0.70	<0.70	<0.70	1.58	2.42
Cyclohexane	110-82-7	<0.69	<0.69	<0.69	<0.69	<0.69	<0.69	<0.69	<0.69	<0.69	<0.69	0.78	0.85
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	1.60	<1.4	<1.4	<1.4	4.7	3.1	<1.4	<1.4	<1.4	2.2	<1.4
Ethyl Acetate	141-78-6	<0.72	<0.72	<0.72	<0.72	<0.72	<0.72	<0.72	<0.72	<0.72	<0.72	<0.72	<0.72
Heptane	142-82-5	<0.82	<0.82	<0.82	<0.82	<0.82	<0.82	<0.82	<0.82	<0.82	<0.82	1.38	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
2-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.	06-Aug-18 NVOC-8 North	06-Aug-18 SVOC-8 South	21-Aug-18 NVOC-10 North	21-Aug-18 SVOC-10 South	30-Aug-18 NVOC-10 North	30-Aug-18 SVOC-10 South	05-Sep-18 NVOC-11 North	05-Sep-18 SVOC-11 South	11-Sep-18 NVOC-12 North	11-Sep-18 SVOC-12 South	26-Sep-18 NVOC-13 North	26-Sep-18 SVOC-13 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	na
Isopropyl Alcohol	67-63-0	3.5	4.1	3.5	3.9	7.9	<2.5	5.7	<2.5	2.8	<2.5	2.9	na
Acetone	67-64-1	19.5	18.3	21.1	16.2	8.5	6.3	15.7	14.5	7.5	6.3	8.2	na
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	na
Benzene	71-43-2	<0.64	<0.64	<0.64	<0.64	0.73	<0.64	<0.64	<0.64	<0.64	<0.64	<0.64	na
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	na
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	na
Dichloromethane	75-09-2	0.72	<0.69	<0.69	<0.69	<0.69	<0.69	3.97	<0.69	<0.69	<0.69	<0.69	na
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	na
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	na
Chlorodifluoromethane	75-45-6	0.83	<0.71	<0.71	0.74	<0.71	<0.71	<0.71	<0.71	<0.71	0.73	<0.71	na
Trichlorofluoromethane	75-69-4	<1.1	<1.1	1.2	<1.1	<1.1	<1.1	<1.1	<1.1	1.2	<1.1	<1.1	na
Dichlorodifluoromethane	75-71-8	1.98	1.82	1.98	1.92	1.74	1.81	1.74	1.77	1.83	1.87	2.06	na
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	na
2-Methyl Butane	78-78-4	1.61	1.87	2.28	1.96	1.69	0.83	2.51	2.67	1.42	1.28	2.26	na
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	na
MEK	78-93-3	3.18	1.71	1.56	1.80	1.14	0.62	3.30	1.15	0.87	0.92	1.71	na
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	na
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	na
o-Xylene	95-47-6	<0.87	<0.87	<0.87	<0.87	1.68	1.4	2.24	1.18	<0.87	<0.87	<0.87	na
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	na
1,2,4-Trimethylbenzene	95-63-6	<0.98	<0.98	<0.98	<0.98	1.15	<0.98	1.51	<0.98	<0.98	<0.98	<0.98	na
3-Methyl Pentane	96-14-0	<0.70	<0.70	<0.70	<0.70	<0.70	<0.70	<0.70	<0.70	<0.70	<0.70	<0.70	na
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	na
Ethyl Benzene	100-41-4	<0.87	<0.87	<0.87	<0.87	1.42	1.06	1.72	0.9	<0.87	<0.87	<0.87	na
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	na
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	na
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	na
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	na
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	na
2-Methyl Pentane	107-83-5	<0.70	<0.70	<0.70	<0.70	<0.70	<0.70	0.71	<0.70	<0.70	<0.70	<0.70	na
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	na
m/p-Xylene	108-38-3/106-42-3	2.0	<1.7	<1.7	<1.7	4.0	3.2	5.8	2.7	<1.7	<1.7	<1.7	na
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	na
Toluene	108-88-3	7.82	7.77	11.30	11.70	8.12	10.00	11.40	8.51	2.00	2.16	2.59	na
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	na
Hexane	110-54-3	0.81	<0.70	<0.70	<0.70	0.79	<0.70	0.89	0.9	<0.70	<0.70	<0.70	na
Cyclohexane	110-82-7	<0.69	<0.69	<0.69	<0.69	0.92	<0.69	<0.69	<0.69	<0.69	<0.69	<0.69	na
Nonane	111-84-2	<1.0	<1.0	<1.0	<1.0	2.4	2	2.4	1.6	<1.0	<1.0	<1.0	na
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	na
Tetrachloroethene	127-18-4	2.8	<1.4	<1.4	<1.4	<1.4	1.6	14.6	<1.4	<1.4	<1.4	<1.4	na
Ethyl Acetate	141-78-6	<0.72	<0.72	1.46	1.32	<0.72	<0.72	<0.72	<0.72	<0.72	<0.72	<0.72	na
Heptane	142-82-5	<0.82	<0.82	<0.82	<0.82	1.51	0.92	1.06	<0.82	<0.82	<0.82	<0.82	na
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	na
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	na
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	na
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	na
2-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	na

na=no analytical results due to lab contamination

Table B-2 – 24-hr Carbonyl Data

		Sample Date:	28-Jun-18		25-Jul-18		30-Aug-18	
		Location:	**North**	**South**	**North**	**South**	**North**	**South**
		Media ID:	NC-05	SC-05	NC-07	SC-07	NC-10	SC-10
		Duration (min):	1415	1439	1535	1436	1438	1446
		Volume (m^3)	1.316	1.353	1.343	1.350	1.298	1.345
Compound	CAS No.	24-Hour AAQC ($\mu g/m^3$)						
Formaldehyde	50-00-0	65	0.3	0.6	47.7	0.7	0.6	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	0.4	nd	nd	nd	nd	nd	nd
Glutaraldehyde	111-30-8	14*	nd	nd	nd	nd	nd	nd
Propionaldehyde (Propanal)	123-38-6	na	nd	nd	nd	nd	2.3	1.5
n-Butyraldehyde (n-Butanal)	123-72-3	na	nd	nd	nd	nd	nd	nd

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

Table B-3 - 24-hr Mercury Data

		Sample Date:	28-Jun-18		25-Jul-18		30-Aug-18	
		Location:	**North**	**South**	**North**	**South**	**North**	**South**
		Media ID:	NM-05	SM-05	NM-07	SM-07	NM-10	SM-10
		Duration (min):	1415	1439	1535	1436	1438	1446
		Particulate Volume (m^3)	1541	1657	1508	1561	1596	1689
		Vapour Volume (m^3)	0.102	0.099	0.099	0.102	0.100	0.107
Compound	CAS No.	24-Hour AAQC ($\mu g/m^3$)						
Particulate Mercury	-	-	0.00006	ND	ND	0.00001	0.00003	0.00004
Vapour Mercury	7439-97-6	-	ND	ND	ND	ND	ND	ND
Total Mercury	-	2 (2)	0.00006	ND	ND	0.00001	0.00003	0.00004

nd=below method detection limit

Table B-4 - 24-hr Particulate Data

		Sample Date:	14-May-18		29-May-18		7-Jun-18		19-Jun-18		28-Jun-18		13-Jul-18	
		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):	1427	1398	1440	1458	1415	1443	1445	1468	1415	1439	1433	1320
		Sample Volume (m^3):	2101	1881	2095	1974	1845	1986	1942	2039	1540	1657	1563	1501
Parameter	CAS No.	24-hr std sch 3 ($\mu g/m^3$)												
TSP	na	120	27	30	97	151	40	35	18	17	30	30	41	56
Lead	7439-92-1	0.5	0.01	0.01	0.00	0.00	0.01	0.00	nd	nd	0.00	0.00	0.01	0.00
Manganese	7439-96-5	2.5	0.01	0.01	0.03	0.05	0.01	0.01	0.00	0.00	0.01	0.00	0.02	0.02
Nickel	7440-02-0	2	0.00	0.00	0.00	0.00	0.00	0.00	nd	nd	0.00	0.00	0.01	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	0.01	0.01	0.00	0.00	0.01	0.01	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*	0.00	nd	0.00	0.00	nd	nd	nd	nd	nd	nd	nd	nd
Cobalt	7440-48-4	0.1*	nd	nd	nd	0.00	nd	nd	nd	nd	nd	nd	0.00	nd
Copper	7440-50-8	50	0.02	0.05	0.05	0.06	0.05	0.06	0.09	0.03	0.05	0.04	0.03	0.05
Vanadium	7440-62-2	2	nd	nd	0.00	0.00	nd	nd	nd	nd	nd	nd	nd	nd
Zinc	7440-66-6	120	0.07	0.04	0.04	0.03	0.03	0.02	0.01	0.01	0.04	0.03	0.04	0.02
Selenium	7782-49-2	10*	0.01	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Iron	15438-31-0	4	0.31	0.33	1.22	2.19	0.49	0.45	0.08	0.07	0.23	0.16	0.52	0.57

		Sample Date:	25-Jul-18		6-Aug-18		21-Aug-18		30-Aug-18		11-Sep-18		26-Sep-18	
		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):	1436	1535	1423	1431	1450	1463	1441	1438	1530	1471	1379	1444
		Sample Volume (m^3):	1508	1561	1539	1648	1598	1692	1596	1689	1692	1708	1539	1700
Parameter	CAS No.	24-hr std sch 3 ($\mu g/m^3$)												
TSP	na	120	27	27	34	29	26	23	23	23	17	17	29	18
Lead	7439-92-1	0.5	0.00	0.00	0.00	0.00	nd	nd	nd	nd	nd	nd	nd	nd
Manganese	7439-96-5	2.5	0.00	0.00	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00
Nickel	7440-02-0	2	nd	0.00	0.00	nd	nd	nd	nd	nd	nd	nd	0.00	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*	0.00	0.00	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
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	nd	nd	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	0.07	0.05	0.02	0.02	0.01	0.02	0.04	0.03	0.03	0.02	0.02	0.02
Vanadium	7440-62-2	2	nd	nd	nd	nd	0.00	nd	nd	nd	nd	nd	nd	nd
Zinc	7440-66-6	120	0.02	0.01	0.03	0.02	0.01	0.01	0.01	0.01	0.03	0.01	0.02	0.01
Selenium	7782-49-2	10*	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Iron	15438-31-0	4	0.14	0.14	0.28	0.19	0.14	0.08	0.12	0.11	0.07	0.08	0.19	0.08

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