Enhanced Ambient Air Monitoring
for
Clean Harbors Environmental Services Inc.
Lambton Facility

A Report to: Clean Harbors Environmental Services Inc.
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INTRODUCTION

Clean Harbors Environmental Services (Clean Harbors) received a Director's Order from the Ministry of the Environment (MOE) to conduct an enhanced air monitoring program. The monitoring requirement was in response to off-site odour complaints that were emanating from onsite sources. This requirement included a series of ½-hour upwind/downwind measurements for a selected group of speciated volatile organic compounds and was in addition to the existing air monitoring program. The target constituents were compounds that could potentially be contributed by facility operations.

This report contains a synopsis of the measurement methods used to conduct the monitoring requirements during the enhanced program as specified by MOE, and both summarized and individual measurement results that were obtained during the months of September and October.

1. METHODOLOGY

1.1 General Synopsis of Approach

The primary objective of this enhanced ambient air monitoring program was to measure specific airborne target volatile organic compounds at or near the facility perimeter by established procedures and to compare the results to Ontario Regulation 419 ½-hour air emission standards or guidelines.

One-half hour sampling was conducted upwind and downwind of the facility based on odour complaints. These off-site samples were either collected within 5 to 10 meters of the facility's perimeter fence line where feasible, or at the direction of the MOE in the off-site area of maximum perceived odour intensity. Samples were collected in 6-litre specially prepared canisters.

The results were provided to Clean Harbors as soon as possible after each sample day in a format (MS Excel) ready for reporting to the MOE.

1.2 Monitoring Locations

A map of the facility is shown in Figure 1. Upwind and downwind locations were chosen based on odour complaints with the samples being collected within 5 to 10 meters of the facility's perimeter fence line when possible, or at the direction of the MOE in the area of the maximum perceived odour intensity. Eleven ½-hour samples were taken on eleven separate days over the period of September 22nd to October 28th, 2011. The downwind locations were plotted on the map and labeled as samples 1 through 11, corresponding to the 11 sample days.

FIGURE 1
Downwind Sampling Locations

Downwind sample locations and days (1 to 11) plotted in yellow.

1.3 Sample Storage & Transportation

Before and after sample collection, the sample canisters were stored at the ORTECH laboratory in an appropriate, clean, temperature controlled environment. Exposed canisters were packed in protective cases and shipped via courier to the analytical laboratory within three days of exposure. Chain of custody records were maintained for all samples.

1.4 Sample Collection and Analysis

In order to maintain consistency with ongoing VOC monitoring at the facility, the same measurement method for VOCs was employed.

Thirty minute whole air upwind and downwind samples were collected into stainless steel electropolished 6 L evacuated canisters (e.g., Summa or Restek) at a constant flow rate following EPA method TO-15. The extensive list of target compounds is found in Table 1 below.

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-Dibromoethane	106-93-4
Benzene	71-43-2	1,2-Dichloroethane	107-06-2
1,1,1-Trichloroethane	71-55-6	MIBK	108-10-1
Vinyl Chloride	75-01-4	m/p-Xylene	108-38-3/106-42-3
Dichloromethane	75-09-2	1,3,5-Trimethylbenzene	108-67-8
1,1-Dichloroethane	75-34-3	Toluene	108-88-3
1,1-Dichloroethene	75-35-4	Chlorobenzene	108-90-7
Trichlorofluoromethane	75-69-4	Hexane	110-54-3
Dichlorodifluoromethane	75-71-8	Cyclohexane	110-82-7
1,1,2-Trichloro-1,2,2-Trifluoroethane	76-13-1	Hexane	110-54-3
1,2-Dichloropropane	78-87-5	Cyclohexane	110-82-7
MEK	78-93-3	1,2,4-Trichlorobenzene	120-82-1
Trichloroethene	79-01-6	Tetrachloroethene	127-18-4
Naphthalene	91-20-3	Ethyl Acetate	141-78-6
o-Xylene	95-47-6	Heptane	142-82-5
1,2-Dichlorobenzene	95-50-1	1,2-Dichloroethene (Cis)	156-59-2
1,2,4-Trimethylbenzene	95-63-6	1,2-Dichloroethene (Trans)	156-60-5

The canisters were cleaned, proofed and analyzed by a CALA accredited laboratory (ALS Laboratories). Proofing consisted of taking one canister and its associated sampling train from each batch of cleaned canisters and performing an

analysis to ensure that the cleaning process was adequate. The sampling trains and flow controllers were leak checked and the flow verified before use in the field. Each canister was inspected for damage upon receipt from the laboratory and after a period of acclimatization, the operator recorded the "as received" vacuum reading (should be ≥ -29 inches Hg). Prior to sampling the vacuum was checked again, and if significantly different (i.e., not within 3 inches Hg) the canister was not used and was returned to the laboratory. The stainless steel sampling train consisted of a ¼ inch sampling inlet, a 2 micron sintered steel particulate filter, a critical orifice (designed for 30 minute sampling), a flow controller and a vacuum gauge. Each sampling train had a unique identification number that was recorded. The critical orifice and flow controller accurately maintained a constant flow despite changes in vacuum over a range of -30 to -5 inches Hg in a 30 minute period. Prior to the scheduled sampling period the canisters were removed from their respective protective containers and positioned such that the sampling inlet was approximately 1.5 meters above ground. Initial and final canister vacuum readings were recorded for each sample along with ambient temperature and pressure. Final readings could not be less than -5" Hg, otherwise the sample would be invalidated.

1.5 Meteorological Measurements

Localized wind speed, direction and rainfall data were obtained from the nearby Sarnia-Lambton Environmental Association (SLEA) monitoring and meteorological station located on Moore Line, near Highway 40. These data were used to document the weather conditions during each sampling period and confirm the extent of upwind and downwind site positioning/source alignment.

1.6 Measurement Frequency and Scheduling

All samples were collected over a ½-hour period and at a frequency of twice per week, with initiation in response to odour complaints. Clean Harbors provided notification to the MOE one hour prior to commencement of sampling, either to the Sarnia District Office during regular business hours, or to the Spills Action Centre after regular business hours.

2. QUALITY ASSURANCE

To maintain an appropriate level of quality assurance with regard to the monitoring, various quality assurance practices were incorporated into the sampling and analysis methods, as routinely done, in effort to enhance the measurement validity. These included all pertinent items from the applicable methods as well as the MOE's Operations Manual for Air Quality Monitoring in

Ontario. MOE staff witnessed a number of the sampling events and at these times also directed the siting of the sampling locations. One audit was conducted by the MOE on October 6th.

2.1 Quality Assurance Program

The overall quality assurance program was managed by ORTECH. When available, 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. ORTECH personnel were not available for the October 14th sample, and instead, Clean Harbors personnel (manager) previously trained by ORTECH conducted the sampling. Table 2 lists the various QA/QC measures which were followed.

TABLE 2
QA/QC Measures

Activity	Measure
Sampling Apparatus	• Vacuum checks before and after each sample interval were recorded
Sample Collection	• Notification of MOE one hour prior to sample collection as a provision for MOE to conduct audits or witness the collection of samples • All samples were sited based on odour complaints • All samples were collected off-site within 5 to 10 meters of the facility's perimeter fence line, where feasible, or at locations recommended by the MOE • Collection at approximately 1.5 meters above ground • All upwind/downwind samples were collected simultaneously (within 5 to 10 minutes) for a period 30 minutes • Sample start and stop times were recorded
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. • Stored in climate controlled, organic solvent free environment • Shipped to lab via courier in protective cases within 3 days of exposure
Sample Analysis	• Use of CALA accredited laboratory (ALS Laboratories) • Documented methods and procedures • Detection limits were appropriate for comparison of results against applicable standards
Record Keeping	• All sampling 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, sample start and stop times, analysis requirement, initial and final vacuum, weather observations, and other information or observations (odours, nearby activities with potential impact, etc.) • Chain of Custody forms for sample tracking

3. RESULTS and DISCUSSION

3.1 General

The concurrent upwind and downwind thirty-minute measurements were conducted on the following eleven days in September and October, 2011:

September 22nd, 27th, 29th and,
October 6th, 7th, 11th, 14th, 17th, 21st, 26th and 28th.

Component levels were typically found to be either non-detectable, or very low in all of the upwind and downwind samples.

3.2 Meteorological Conditions

The meteorological conditions that occurred during the selected monitoring periods are summarized in Table 3 as five minute averages. Generally, wind directions measured during the sampling periods ranged from south-southeasterly to west-southwesterly and speeds ranged from 4 to 35 kph. Ambient temperatures ranged from 6.9 to 23.9ºC.

3.3 VOC Concentrations

Tabulated summaries of the downwind results compared to various criteria are presented in Table 4. All individual measured upwind and downwind values are provided in Table 5.

The maximum upwind and downwind measured concentrations of speciated VOCs during the monitoring survey were compared to the available standards, guidelines or assessment values. These maximum concentrations were calculated as percentages of the limits and are presented in Table 4. None of the thirty-eight compounds measured exceeded any of the Ontario standards or guidelines and twenty of the compounds were not detected at either the upwind or downwind sites during the survey. Eighteen compounds were higher downwind of the facility than upwind which indicates a facility contribution. The highest downwind percentages were recorded for benzene (21% of assessment value) and tetrachloroethylene (5% of standard). Note that benzene does not have a ½-hour Ontario standard or guideline so an assessment value was calculated from the ambient air quality criterion (AAQC) for comparative purposes. All other detected compounds reported percentages less than 1%.

4. CONCLUSIONS

Clean Harbors Environmental Services (Clean Harbors) was required by the Ontario MOE to conduct an enhanced air monitoring program. The monitoring requirement was in response to off-site odour complaints that are emanating from onsite sources. This requirement included a series of ½-hour upwind/downwind measurements for a selected group of speciated volatile organic compounds and was in addition to the existing air monitoring program. The target constituents were compounds that could potentially be contributed by facility operations.

None of the thirty-eight compounds measured exceeded any of the Ontario standards or guidelines and twenty of the compounds were not detected at either the upwind or downwind sites during the survey. Eighteen compounds had higher concentrations downwind of the facility than upwind, which indicated a facility contribution.

Rod Brooks
Sarnia Manager

Table 3
Summary of 30-Minute Meteorological Data for Individual Monitoring Days

	Date/Time (est)	WS10	WD10	RH	RAIN	TEMP	Bar
Sample Day	*dd/mm/yyyy hh:mm*	kph	degrees	%	mm	ºC	mbar
1	*22/09/2011 9:00*	6.0	181	90	0	15.9	1019
	9:05	6.0	189	89	0	16.0	1019
	9:10	5.7	200	88	0	16.1	1019
	9:15	6.2	207	88	0	16.2	1019
	9:20	6.7	221	88	0	16.3	1019
	9:25	10.1	235	88	0	16.3	1019
	9:30	11.3	235	87	0	16.3	1019
2	*27/09/2011 12:40*	18.8	166	61	0	19.8	1013
	12:45	18.2	152	59	0	20.2	1013
	12:50	22.5	155	61	0	19.7	1013
	12:55	14.9	166	61	0	20.1	1013
	13:00	19.2	167	60	0	20.3	1006
	13:05	16.6	183	60	0	20.3	1012
	13:10	15.6	187	58	0	20.6	1006
3	*29/09/2011 10:45*	10.7	254	86	0	15.1	1006
	10:50	8.5	257	85	0	15.1	1006
	10:55	12.8	235	84	0	15.5	1006
	11:00	11.3	226	84	0	15.4	1000
	11:05	9.5	254	83	0	15.5	1006
	11:10	10.8	231	84	0	15.4	1006
	11:15	9.4	236	83	0	15.5	1006
4	*06/10/2011 9:45*	7.1	162	82	0	16.9	1028
	9:50	5.5	155	80	0	17.4	1028
	9:55	5.0	160	80	0	17.4	1028
	10:00	7.5	169	79	0	17.4	1028
	10:05	4.5	169	79	0	17.9	1028
	10:10	4.6	171	77	0	18.1	1028
	10:15	3.9	144	75	0	18.5	1028
5	*07/10/2011 8:55*	3.9	169	95	0	15.4	1031
	9:00	4.8	178	94	0	15.6	1031
	9:05	5.2	161	93	0	15.9	1031
	9:10	5.3	161	92	0	16.2	1031
	9:15	5.7	165	91	0	16.5	1031
	9:20	4.9	163	89	0	16.9	1031
	9:25	6.7	157	88	0	17.4	1031
6	*11/10/2011 11:05*	15.6	162	58	0	22.4	1014
	11:10	11.1	166	58	0	23.1	1014
	11:15	13.0	177	58	0	23.1	1020
	11:20	11.0	179	57	0	23.4	1020
	11:25	11.9	167	55	0	23.8	1020
	11:30	13.2	156	52	0	23.9	1020
	11:35	14.7	170	53	0	23.9	1020

Table 3 (con't)
Summary of 30-Minute Meteorological Data for Individual Monitoring Days

	Date/Time (est)	WS10	WD10	RH	RAIN	TEMP	Bar
Sample Day	*dd/mm/yyyy hh:mm*	kph	degrees	%	mm	ºC	mbar
7	*14/10/2011 14:30*	27.5	258	75	0	13.8	997
	14:35	33.6	259	74	0	13.6	997
	14:40	34.0	247	73	0	13.5	997
	14:45	33.2	253	73	0	13.8	997
	14:50	28.6	249	74	0	13.7	997
	14:55	33.0	261	74	0	13.6	997
	15:00	34.2	258	74	0	13.4	991
8	*17/10/2011 12:30*	35.2	229	50	0	13.7	1005
	12:35	27.8	227	50	0	13.9	1005
	12:40	27.7	235	50	0	14.1	1005
	12:45	29.3	241	49	0	14.4	1005
	12:50	29.6	240	48	0	14.4	999
	12:55	28.6	243	49	0	14.4	1005
	13:00	29.5	240	48	0	14.7	1005
9	*21/10/2011 19:20*	11.8	266	75	0	7.7	1018
	19:25	11.0	270	75	0	7.7	1018
	19:30	12.5	282	74	0	7.8	1018
	19:35	9.2	284	75	0	7.7	1018
	19:40	7.6	291	77	0	7.5	1018
	19:45	7.0	286	78	0	7.5	1012
	19:50	6.4	268	78	0	7.5	1018
10	*26/10/2011 8:30*	15.5	340	99	0	10.2	1009
	8:35	11.9	338	98	0	10.3	1009
	8:40	13.0	333	98	0	10.3	1010
	8:45	15.2	332	97	0	10.4	1010
	8:50	11.7	331	97	0	10.5	1010
	8:55	11.1	337	97	0	10.6	1004
	9:00	9.8	328	96	0	10.7	1010
11	*28/10/2011 10:15*	7.5	167	80	0	6.9	1023
	10:20	6.5	158	80	0	7.3	1023
	10:25	7.0	187	80	0	7.4	1023
	10:30	6.6	183	79	0	7.5	1023
	10:35	5.2	179	79	0	7.6	1023
	10:40	9.0	174	77	0	7.9	1023
	10:45	7.8	200	75	0	7.8	1023

Table 4
Comparison of Upwind/Downwind Maximum Concentrations to ½-Hour Guidelines, Standards or Assessment Values

Compound	Downwind % of Std or Guideline	Upwind % of Std or Guideline	½ -Hour Standard or Guideline
Carbon Tetrachloride	ND(1)	ND(1)	7.2
Isopropyl alcohol	0.3	0.0	22000
Acetone	0.2	0.1	35640
Chloroform	ND	ND	3
Benzene	21.1	19.3	7(2)
1,1,1 -Trichloroethane	ND	ND	350000
Vinyl chloride	ND	ND	3
Methylene chloride	0.5	ND	660
1,1-Dichloroethane	ND	ND	495
1,1-Dichloroethene	ND	ND	30
Trichlorofluoromethane	0.0	0.0	18000
Dichlorodifluoromethane	0.0	0.0	1500000
Freon 113	ND	ND	2400000
1,2-Dichloropropane	ND	ND	2400
Methyl ethyl ketone	0.7	0.1	3000
Trichloroethylene	ND	ND	36
Naphthalene	ND	ND	36
o-Xylene	0.2	ND	2200
1,2-Dichlorobenzene	ND	ND	37000
1,2,4-Trimethylbenzene	0.2	0.2	660
Ethyl benzene	0.4	ND	1400
Styrene	0.9	ND	400
1,4-Dichlorobenzene	ND	ND	285
1,2-Dibromoethane	ND	ND	9
1,2-Dichloroethane	ND	ND	6
Methyl isobutyl ketone	0.4	ND	1200
m&p-Xylene	0.8	ND	2200
1,3,5-Trimethylbenzene	ND	ND	660
Toluene	1.2	0.1	2000
Chlorobenzene	ND	ND	4200
n-Hexane	0.0	0.0	22500
Cyclohexane	ND	ND	18300
1,2,4-Trichlorobenzene	ND	ND	100
Tetrachloroethylene	5.1	ND	1080
Ethyl acetate	0.1	ND	19000
n-Heptane	0.0	ND	33000
cis-1,2-Dichloroethene	ND	ND	315
trans-1,2-Dichloroethene	ND	ND	315

1. ND = not detected *2. Assessment value calculated from 24-hour AAQC, no ½-hour standard or guideline*

Table 5
Volatile Organic Compounds – Daily Results

	RESULTS OF ANALYSIS	Downwind	Upwind	Downwind	Upwind	Downwind	Upwind	Downwind	Upwind	Downwind	Upwind	
	Sample ID	DVOC-01	UVOC-01	DVOC-02	UVOC-02	DVOC-03	UVOC-03	DVOC-05	UVOC-05	DVOC-04	UVOC-04	
	Date Sampled	22-SEP-11	22-SEP-11	27-SEP-11	27-SEP-11	29-SEP-11	29-SEP-11	06-Oct-11	06-Oct-11	07-Oct-11	07-Oct-11	
	Time Sampled (est)	09:00-09:30	09:00-09:30	12:40-13:10	12:30-13:00	10:45-11:15	10:20-10:50	09:45-10:15	09:50-10:20	08:55-09:25	09:00-09:30	
	ALS Sample ID	L1062336-1	L1062336-2	L1064960-1	L1064960-2	L1065853-2	L1065853-1	L1068809-2	L1068809-1	L1070194-1	L1070194-2	1/2-hr Std
CAS No.:	Compound:	Conc. (µg/m³)	Conc. (µg/m³)	Conc. (µg/m³)	Conc. (µg/m³)	Conc. (µg/m³)	Conc. (µg/m³)	Conc. (µg/m³)	Conc. (µg/m³)	Conc. (µg/m³)	Conc. (µg/m³)	or guideline
56-23-5	Carbon Tetrachloride	<1.3	<1.3	<1.3	<1.3	<1.3	<1.3	<1.3	<1.3	<1.3	<1.3	7.2
67-63-0	Isopropyl alcohol	7.4	2.8	26.8	1.7	4.1	3.8	66.1	3.5	5.1	3.6	22000
67-64-1	Acetone	35.6	33.7	57.6	46.2	8.9	6.3	20.7	7.1	9.6	8.0	35640
67-66-3	Chloroform	<0.98	<0.98	<0.98	<0.98	<0.98	<0.98	1.17	<0.98	<0.98	<0.98	3
71-43-2	Benzene	0.71	<0.64	1.48	<0.64	<0.64	<0.64	<0.64	<0.64	<0.64	<0.64	7
71-55-6	1,1,1 -Trichloroethane	<1.1	<1.1	<1.1	<1.1	<1.1	<1.1	<1.1	<1.1	<1.1	<1.1	350000
75-01-4	Vinyl chloride	<0.51	<0.51	<0.51	<0.51	<0.51	<0.51	<0.51	<0.51	<0.51	<0.51	3
75-09-2	Methylene chloride	1.54	<0.69	1.68	<0.69	<0.69	<0.69	3.13	<0.69	2.16	<0.69	660
75-34-3	1,1-Dichloroethane	<0.81	<0.81	<0.81	<0.81	<0.81	<0.81	<0.81	<0.81	<0.81	<0.81	495
75-35-4	1,1-Dichloroethene	<0.79	<0.79	<0.79	<0.79	<0.79	<0.79	<0.79	<0.79	<0.79	<0.79	30
75-69-4	Trichlorofluoromethane	1.40	1.40	1.40	1.20	1.40	1.40	1.40	1.40	1.50	1.20	18000
75-71-8	Dichlorodifluoromethane	1.99	2.09	1.59	1.68	1.89	1.69	1.78	1.89	1.88	1.98	1500000
76-13-1	Freon 113	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	2400000
78-87-5	1,2-Dichloropropane	<0.92	<0.92	<0.92	<0.92	<0.92	<0.92	<0.92	<0.92	<0.92	<0.92	2400
78-93-3	Methyl ethyl ketone	12.6	2.31	9.07	3.95	2.19	0.59	22.4	<0.59	9.58	<0.59	3000
79-01-6	Trichloroethylene	<1.1	<1.1	<1.1	<1.1	<1.1	<1.1	<1.1	<1.1	<1.1	<1.1	36
91-20-3	Naphthalene	<2.6	<2.6	<2.6	<2.6	<2.6	<2.6	<2.6	<2.6	<2.6	<2.6	36
95-47-6	o-Xylene	4.98	<0.87	3.23	<0.87	<0.87	<0.87	3.83	<0.87	1.92	<0.87	2200
95-50-1	1,2-Dichlorobenzene	<1.2	<1.2	<1.2	<1.2	<1.2	<1.2	<1.2	<1.2	<1.2	<1.2	37000
95-63-6	1,2,4-Trimethylbenzene	1.48	<0.98	<0.98	<0.98	<0.98	<0.98	1.28	<0.98	<0.98	<0.98	660
100-41-4	Ethyl benzene	5.50	<0.87	3.93	<0.87	<0.87	<0.87	4.35	<0.87	2.52	<0.87	1400
100-42-5	Styrene	3.42	<0.85	1.54	<0.85	<0.85	<0.85	3.42	<0.85	<0.85	<0.85	400
106-46-7	1,4-Dichlorobenzene	<1.2	<1.2	<1.2	<1.2	<1.2	<1.2	<1.2	<1.2	<1.2	<1.2	285
106-93-4	1,2-Dibromoethane	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	9
107-06-2	1,2-Dichloroethane	<0.81	<0.81	<0.81	<0.81	<0.81	<0.81	<0.81	<0.81	<0.81	<0.81	6
108-10-1	Methyl isobutyl ketone	4.45	<0.82	1.24	<0.82	<0.82	<0.82	2.63	<0.82	1.07	<0.82	1200
108-38-3/106-42-3	m&p-Xylene	17.4	<1.7	8.90	<1.7	<1.7	<1.7	14.1	<1.7	6.9	<1.7	2200
108-67-8	1,3,5-Trimethylbenzene	<0.98	<0.98	<0.98	<0.98	<0.98	<0.98	<0.98	<0.98	<0.98	<0.98	660
108-88-3	Toluene	20.3	1.74	12.6	<0.75	2.88	1.51	20.7	<0.75	24.0	0.83	2000
108-90-7	Chlorobenzene	<0.92	<0.92	<0.92	<0.92	<0.92	<0.92	<0.92	<0.92	<0.92	<0.92	4200
110-54-3	n-Hexane	3.19	2.20	3.97	<0.70	1.63	<0.70	6.64	<0.70	1.84	1.13	22500
110-82-7	Cyclohexane	<0.69	<0.69	<0.69	<0.69	<0.69	<0.69	<0.69	<0.69	<0.69	<0.69	18300
120-82-1	1,2,4-Trichlorobenzene	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	100
127-18-4	Tetrachloroethylene	55.5	<1.4	17.7	<1.4	3.7	<1.4	36.3	<1.4	29.5	<1.4	1080
141-78-6	Ethyl acetate	1.88	<0.72	2.17	<0.72	<0.72	<0.72	14.7	<0.72	7.44	<0.72	19000
142-82-5	n-Heptane	1.07	<0.82	<0.82	<0.82	<0.82	<0.82	<0.82	<0.82	<0.82	<0.82	33000
156-59-2	cis-1,2-Dichloroethene	<0.79	<0.79	<0.79	<0.79	<0.79	<0.79	<0.79	<0.79	<0.79	<0.79	315
156-60-5	trans-1,2-Dichloroethene	<0.79	<0.79	<0.79	<0.79	<0.79	<0.79	<0.79	<0.79	<0.79	<0.79	315

< = less than detection limit

** = assessment value calculated from 24-hour AAQC*

Table 5 (con't)
Volatile Organic Compounds – Daily Results

	RESULTS OF ANALYSIS	Downwind	Upwind	Downwind	Upwind	Downwind	Upwind	Downwind	Upwind	Downwind	Upwind	Downwind	Upwind	
	Sample ID	DVOC-6	UVOC-6	DVOC-7	UVOC-7	DVOC-8	UVOC-8	DVOC-9	UVOC-9	DVOC-10	UVOC-10	DVOC-11	UVOC-11	
	Date Sampled	11-Oct-11	11-Oct-11	14-Oct-11	14-Oct-11	17-Oct-11	17-Oct-11	21-Oct-11	21-Oct-11	26-Oct-11	26-Oct-11	28-Oct-11	28-Oct-11	
	Time Sampled (est)	11:05 - 11:35	11:15 - 11:45	14:30 - 15:00	14:40 - 15:10	12:30 - 13:00	12:40 - 12:10	19:20 - 19:50	19:25 - 19:55	08:30 - 09:00	08:40 - 09:10	10:15-10:45	10:20-10:50	
	ALS Sample ID	L1070196-1	L1070196-2	L1073541-1	L1073541-2	L1073535-1	L1073535-2	L1076043-1	L1076043-2	L1077355-1	L1077355-2	L1079209-1	L1079209-2	1/2-hr Std
CAS No.:	**Compound:**	**Conc. (µg/m³)**	**Conc. (µg/m³)**	**Conc. (µg/m³)**	**Conc. (µg/m³)**	**Conc. (µg/m³)**	**Conc. (µg/m³)**	**Conc. (µg/m³)**	**Conc. (µg/m³)**	**Conc. (µg/m³)**	**Conc. (µg/m³)**	**Conc. (µg/m³)**	**Conc. (µg/m³)**	**or guideline**
56-23-5	Carbon Tetrachloride	<1.3	<1.3	<1.3	<1.3	<1.3	<1.3	<1.3	<1.3	<1.3	<1.3	<1.3	<1.3	7.2
67-63-0	Isopropyl alcohol	1.5	1.9	3.7	2.8	4.3	2.9	4.8	4.9	3.6	2.6	7.3	6.4	22000
67-64-1	Acetone	13.8	6.6	5.9	6.3	5.5	4.1	5.4	5.8	4.4	5.3	10.1	4.1	35640
67-66-3	Chloroform	<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
71-43-2	Benzene	<0.64	<0.64	<0.64	<0.64	<0.64	<0.64	0.83	1.35	<0.64	<0.64	<0.64	<0.64	7
71-55-6	1,1,1 -Trichloroethane	<1.1	<1.1	<1.1	<1.1	<1.1	<1.1	<1.1	<1.1	<1.1	<1.1	<1.1	<1.1	350000
75-01-4	Vinyl chloride	<0.51	<0.51	<0.51	<0.51	<0.51	<0.51	<0.51	<0.51	<0.51	<0.51	<0.51	<0.51	3
75-09-2	Methylene chloride	1.25	<0.69	<0.69	<0.69	<0.69	<0.69	<0.69	<0.69	<0.69	<0.69	<0.69	<0.69	660
75-34-3	1,1-Dichloroethane	<0.81	<0.81	<0.81	<0.81	<0.81	<0.81	<0.81	<0.81	<0.81	<0.81	<0.81	<0.81	495
75-35-4	1,1-Dichloroethene	<0.79	<0.79	<0.79	<0.79	<0.79	<0.79	<0.79	<0.79	<0.79	<0.79	<0.79	<0.79	30
75-69-4	Trichlorofluoromethane	1.20	1.20	1.40	1.40	1.40	1.20	1.30	1.20	1.20	1.40	1.40	1.40	18000
75-71-8	Dichlorodifluoromethane	1.88	1.89	1.89	1.98	1.69	1.69	2.08	2.09	2.09	2.19	1.79	1.69	1500000
76-13-1	Freon 113	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	2400000
78-87-5	1,2-Dichloropropane	<0.92	<0.92	<0.92	<0.92	<0.92	<0.92	<0.92	<0.92	<0.92	<0.92	<0.92	<0.92	2400
78-93-3	Methyl ethyl ketone	1.12	0.71	0.95	<0.59	1.90	<0.59	0.59	<0.59	1.24	<0.59	0.95	<0.59	3000
79-01-6	Trichloroethylene	<1.1	<1.1	<1.1	<1.1	<1.1	<1.1	<1.1	<1.1	<1.1	<1.1	<1.1	<1.1	36
91-20-3	Naphthalene	<2.6	<2.6	<2.6	<2.6	<2.6	<2.6	<2.6	<2.6	<2.6	<2.6	<2.6	<2.6	36
95-47-6	o-Xylene	<0.87	<0.87	<0.87	<0.87	1.31	<0.87	<0.87	<0.87	<0.87	<0.87	<0.87	<0.87	2200
95-50-1	1,2-Dichlorobenzene	<1.2	<1.2	<1.2	<1.2	<1.2	<1.2	<1.2	<1.2	<1.2	<1.2	<1.2	<1.2	37000
95-63-6	1,2,4-Trimethylbenzene	<0.98	<0.98	<0.98	<0.98	1.38	1.18	<0.98	<0.98	1.09	1.09	<0.98	<0.98	660
100-41-4	Ethyl benzene	<0.87	<0.87	<0.87	<0.87	1.13	<0.87	<0.87	<0.87	<0.87	<0.87	<0.87	<0.87	1400
100-42-5	Styrene	<0.85	<0.85	<0.85	<0.85	<0.85	<0.85	<0.85	<0.85	<0.85	<0.85	<0.85	<0.85	400
106-46-7	1,4-Dichlorobenzene	<1.2	<1.2	<1.2	<1.2	<1.2	<1.2	<1.2	<1.2	<1.2	<1.2	<1.2	<1.2	285
106-93-4	1,2-Dibromoethane	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	9
107-06-2	1,2-Dichloroethane	<0.81	<0.81	<0.81	<0.81	<0.81	<0.81	<0.81	<0.81	<0.81	<0.81	<0.81	<0.81	6
108-10-1	Methyl isobutyl ketone	<0.82	<0.82	<0.82	<0.82	<0.82	<0.82	<0.82	<0.82	<0.82	<0.82	<0.82	<0.82	1200
108-38-3/106-42-3	m&p-Xylene	<1.7	<1.7	<1.7	<1.7	3.8	<1.7	<1.7	<1.7	<1.7	<1.7	<1.7	<1.7	2200
108-67-8	1,3,5-Trimethylbenzene	<0.98	<0.98	<0.98	<0.98	<0.98	<0.98	<0.98	<0.98	<0.98	<0.98	<0.98	<0.98	660
108-88-3	Toluene	1.1	<0.75	1.4	<0.75	4.9	0.76	3.3	1.82	2.4	1.29	2.2	<0.75	2000
108-90-7	Chlorobenzene	<0.92	<0.92	<0.92	<0.92	<0.92	<0.92	<0.92	<0.92	<0.92	<0.92	<0.92	<0.92	4200
110-54-3	n-Hexane	0.78	<0.70	<0.70	<0.70	<0.70	<0.70	<0.70	<0.70	<0.70	<0.70	<0.70	<0.70	22500
110-82-7	Cyclohexane	<0.69	<0.69	<0.69	<0.69	<0.69	<0.69	<0.69	<0.69	<0.69	<0.69	<0.69	<0.69	18300
120-82-1	1,2,4-Trichlorobenzene	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	100
127-18-4	Tetrachloroethylene	7.1	<1.4	1.9	<1.4	3.5	<1.4	3	<1.4	3.8	<1.4	6	<1.4	1080
141-78-6	Ethyl acetate	<0.72	<0.72	0.8	<0.72	1.01	<0.72	<0.72	<0.72	<0.72	<0.72	<0.72	<0.72	19000
142-82-5	n-Heptane	<0.82	<0.82	<0.82	<0.82	<0.82	<0.82	<0.82	<0.82	<0.82	<0.82	<0.82	<0.82	33000
156-59-2	cis-1,2-Dichloroethene	<0.79	<0.79	<0.79	<0.79	<0.79	<0.79	<0.79	<0.79	<0.79	<0.79	<0.79	<0.79	315
156-60-5	trans-1,2-Dichloroethene	<0.79	<0.79	<0.79	<0.79	<0.79	<0.79	<0.79	<0.79	<0.79	<0.79	<0.79	<0.79	315

< = less than detection limit

** = assessment value calculated from 24-hour AAQC*