CONSULTING ENGINEERS & SCIENTISTS

Celebrating EXCELLENCE SINCE 1972 — RWDI 35 years!

RWDI AIR Inc.
650 Woodlawn Road West, Guelph, Ontario, Canada N1K 1B8
Tel: (519) 823-1311 E-mail: info@rwdi.com
Fax: (519) 823-1316 Web: www.rwdi.com

Date:	March 6, 2008	RWDI Reference #: W07-5258B	Pages (Including Cover): 17

To:	Remi Godin	E-Mail:	rgodin@wm.com
CC:	Ross Wallace	E-Mail:	Rwallac3@wm.com
CC:	Kevin Bechard	E-Mail:	kbechard@wm.com
CC:	Michael Pullen	E-Mail:	mpullen@wm.com
From:	Colin Welburn	E-Mail:	colin.welburn@rwdi.com
RE:	**Ambient VOC Monitoring Results - October 2007 to Present**		

Remi,

Please find attached the results of the ambient VOC monitoring results from samples collected at Waste Management's Ottawa Landfill on October 26, 2007, November 19 2007 and follow-up sampling conducted on February 12, 2008. These samples were collected to conform to the requirements listed in the Minutes of Settlement, signed on September 27, 2007. One set of upwind/downwind samples was collected on each sample day. While the downwind benzene sample on November 19 showed benzene concentrations at 29 ug/m3, follow-up analysis and sampling indicates that the benzene did not originate from normal landfill operations. Furthermore, there is no reason to expect such high benzene concentrations to be replicated in future sampling events.

1 SAMPLING RESULTS

The sampling results are presented in Tables A1 to A5. Please refer to the report "Ambient Monitoring Report – Ottawa Landfill" dated October 10, 2007 for a description of the methodology followed when collecting these samples. The results show concentrations within acceptable levels of all VOCs with the exception of the downwind benzene sample collected on November 19. This sample indicated that benzene were present at a concentration of 29 ug/m^3. Such a benzene concentration would normally be considered an acceptable level to the MOE. However, under the criteria that Waste Managements has agreed to under the Section 6 of the Minutes of Settlement, the benzene concentration reported for the November 19th sample

triggered the "Benzene Exceedance Response Action Plan" (BERAP). The results of the BERAP are discussed in Section 2 of this memo.

The Table 1 shows the relative concentration of benzene compared to the BTEX family of compounds (benzene, toluene, ethyl-benzene and xylene) measured both at the source locations and the other VOC sampling days for 2007.

TABLE 1: Summary of BTEX composition in measured source samples and ambient samples

Sample	Benzene		Ethylbenzene		Toluene		Xylene		Total BTEX ug/m^3
	ug/m^3	% of BTEX	ug/m^3	% of BTEX	ug/m^3	% of BTEX	ug/m^3	% of BTEX	
Source Samples									
Raw landfill gas (2004)	3,670	2%	31,900	16%	65,400	33%	100,200	50%	201,170
Flux chamber – max (2004)	53	19%	68	24%	9	3%	148	53%	278
2007 Ambient Samples									
Downwind sample June 11	0.49	10%	0.29	6%	3	61%	1.11	23%	5
Downwind sample July 7	1.3	32%	0.19	5%	1.75	43%	0.83	20%	4
Downwind sample July 23	1.72	20%	1	7%	4	47%	2.29	26%	9
Downwind sample August 20	1.5	19%	0	3%	5	59%	2	19%	8
Downwind sample August 28	0.84	22%	0	2%	3	66%	0	9%	4
Downwind sample October 26	1.15	9%	1	6%	7	61%	3	24%	12
Downwind sample November 19	29.82	80%	0	1%	5	13%	2	6%	37

Based on this comparison, we strongly suspect that the benzene concentration in the November 19 sample is anomalous. Benzene concentrations for other samples were previously less than 2 ug/m3. Furthermore, one would expect the BTEX profile to be consistent with the other downwind samples if the benzene observed in the November 19 was due to landfill operations.

Even in source-specific measurements, relative benzene concentrations are less than 20% of the combined BTEX concentration.

In addition, a review of total VOC concentrations for the sampling conducted in 2007 was made. The November 19th downwind sample was the ranked as 11th highest concentration among the 14 samples in terms of total VOC concentration. This is highly unexpected. One would expect that a high benzene concentration would coincide with a high concentration of total VOC.

2 BENZENE EXCEEDANCE RESPONSE ACTION PLAN

The plan consists of the following actions:

a. Audit of sample proofing data from the laboratory
b. Monitoring the sample location with a handheld VOC instrument to determine if there was a localized area of high concentration.
c. Collect a follow-up upwind / downwind VOC sample pair at the landfill for a similar wind direction.
d. Consult with WM regarding any irregularities observed by WM on November 19 in the vicinity of the downwind sample location (i.e. paint cans, gas canisters, etc.).
e. Submit a memo report to WM and the MOE summarizing the monitoring event and results of follow-up analysis.

2.1 TUBE AUDIT

OSB Labs was contacted to determine if the sampling media may have been contaminated with residual benzene from previous sampling events. OSB provided RWDI with the a VOC scan of sampling tube #75 prior to the Tube being shipped to RWDI for sampling(Chromatograph ID 7Nov1607 shown in Figure 1). This was compared to the analysis of the Tube containing the Downwind sample taken on November 19 (Chromatograph ID 07112303.D in Figure2).

The benzene signal on 7Nov1607 was very small, almost insignificant. Therefore, we cannot conclude that the sample was contaminated prior to sampling at the landfill.

2.2 HANDHELD VOC SURVEY

An RWDI representative, Colin Welburn, visited the site and measured ambient VOC concentrations using a RAE Systems "ppbRAE" Parts per Billion VOC Monitor (Model PGM-7240). The PGM-7240 is an extremely sensitive Photo-ionization Detector (PID) for real-time monitoring of VOCs at ppb levels. This monitor had an equivalent benzene detection limit of 1.9 ppb (or 6.6ug/m3). While the PGM-7240 produces real-time concentrations, it is only capable of providing Total VOC concentrations.

VOC concentrations were measured on the landfill property and along the property boundary, with special emphasis on the area where the November 19 downwind sample was taken. The following information was observed:

TABLE 2: Comparison of weather conditions and benzene concentrations

	January 29, 2008	November 19, 2007
Weather Conditions		
Time	14:38	17:00
Temperature	-4.6°C	2.0 °C
Wind Direction and Speed	E at 14.5 km/hr	ESE at 20 km/hr
Terrain Condition	Approximately 30 cm of snow	Bare Ground
Measured concentrations ***Maximum real-time Total VOC concentration (expressed as benzene)***		
At property line and sample location	Less than 6.6 ug/m^3	
Along landfill face	Less than 6.6 ug/m^3	
At opening of fuel door while refuelling RWDI representative's car	3,170 ug/m^3	

It is observed that, while the wind conditions were similar between January 29 and November 19, the concentrations of total VOCs were below detection limits both at the November downwind sampling location and the face of the landfill. The VOC concentrations observed at the vehicle fuel door is presented for illustrative purposes and to demonstrate the in-field detection range of the monitor.

2.3 FOLLOW UP VOC SAMPLING

Follow up VOC sampling was conducted on Feb 12, 2008. Samples were collected at the same locations and in similar wind conditions as on Nov 19, 07. The following information was observed:

TABLE 3: Comparison of weather conditions and benzene concentrations

	February 12, 2008	November 19, 2007
Weather Conditions		
Time	14:00	17:00
Temperature	-13°C	2.0 °C
Wind Direction and Speed	ESE at ~19 km/hr	ESE at 20 km/hr
Terrain Condition	Approximately 40 cm of snow	Bare Ground
Measured Benzene Concentrations		
Upwind	0.31	0.37
Downwind	0.53	29.82
Net Landfill Contribution	0.22	29.45

The net benzene concentration measured on February 12 (0.22 ug/m3) was well below the level requiring further action (15ug/m3). The measured benzene concentration was in the same range as those of samples collected at other locations at the landfill. This indicates that the elevated benzene concentration measured on November 19 was not representative of the general air quality at and around the landfill site.

2.4 OPERATING LOGS

In the unlikely event that benzene concentrations reported on November 19 were representative of ambient air quality, a possible cause may have been the dumping of garbage outside of Waste Management premises by the public. The vicinity of the Waste Management Property is regularly maintained and inspected by Waste Management staff however Waste Management does not maintain logs of this day-to-day maintenance around the landfill property.

Figure 4 is a photograph that was taken on the morning of September 30th by RWDI staff during a morning odour survey. This photograph was taken at the same location as where the November 19 Downwind sample was collected. It can be observed in this photograph that unauthorized dumping has been known to occur in this area. When the site was revisited by RWDI staff in the afternoon, the containers seen in this figure had been removed, indicating the level of care that is given to maintaining clean premises.

Future ambient monitoring will be conducted with Waste Management Staff in attendance to ensure that the sampling location is representative of the facility and that the area is clear of non-Waste Management pollution sources.

3 CONCLUSIONS

Based on the results of the activities undertaken in this monitoring program the following conclusions can be drawn:

- The VOC concentrations are generally quite low with all measured levels below their respective air quality standards.
- Benzene levels were also quite low with the exception of a single downwind sample which exceeded the 15ug/m3 threshold requiring further action (i.e. Benzene Response Action)

Benzene Response Action Conclusions

- The results of the tube audit indicated that the sample tube was not contaminated with benzene prior to sampling on November 19.
- Handheld VOC monitoring with the ppbRae showed that ambient VOC concentrations both on the landfill face and downwind of the landfill along the property line were below detection limits of the monitor. While wind conditions were similar between the monitoring event and the November 19 sampling event, the difference of snow cover between the two events was a distinction that could not be changed.
- Results of the follow up sampling on February 12 show that benzene concentrations were well below the elevated concentrations measured on November 19. Although the exact cause of this high concentration has not been determined, the fact that the sample included elevated levels of benzene only indicates that the benzene did not originate from normal landfill operations. Furthermore, there is no reason to expect such high benzene concentrations to be replicated in future sampling events.
- Based on the above conclusions RWDI recommends that WM staff attend the sampling events and inspect the site.

Yours very truly,

RWDI AIR
Colin Welburn
Project Manager Specialist

Attachments:

- Figure 1: VOC Scan prior to shipment to RWDI for Sampling
- Figure 2: VOC Scan for Downwind Sample on 19 November
- Figure 3: Example of unauthorized waste dumped at the November 19th monitoring site
- Figure 4: Sampling Locations – Oct. 26, 2007;
- Figure 5: Sampling Locations – Nov. 19, 2007;
- Figure 6: Sampling Locations – Feb. 12, 2008;
- Table 1: Summary of BTEX composition in measured source samples and ambient samples
- Table 2: Comparison of weather conditions and benzene concentrations
- Table 3: Comparison of weather conditions and benzene concentrations
- Table A-1: Analytical Results for Ambient VOC Sampling at Ottawa Landfill – Oct. 26, 2007;
- Table A-2: Analytical Results for Ambient VOC Sampling at Ottawa Landfill – Nov. 19, 2007;
- Table A-3: Analytical Results for Ambient VOC Sampling at Ottawa Landfill – Feb. 12, 2008;
- Table A-4: Maximum Measured Downwind Concentrations and Net Landfill Contribution for VOC Contaminants

Figure 1 – VOC Scan prior to shipment to RWDI for Sampling

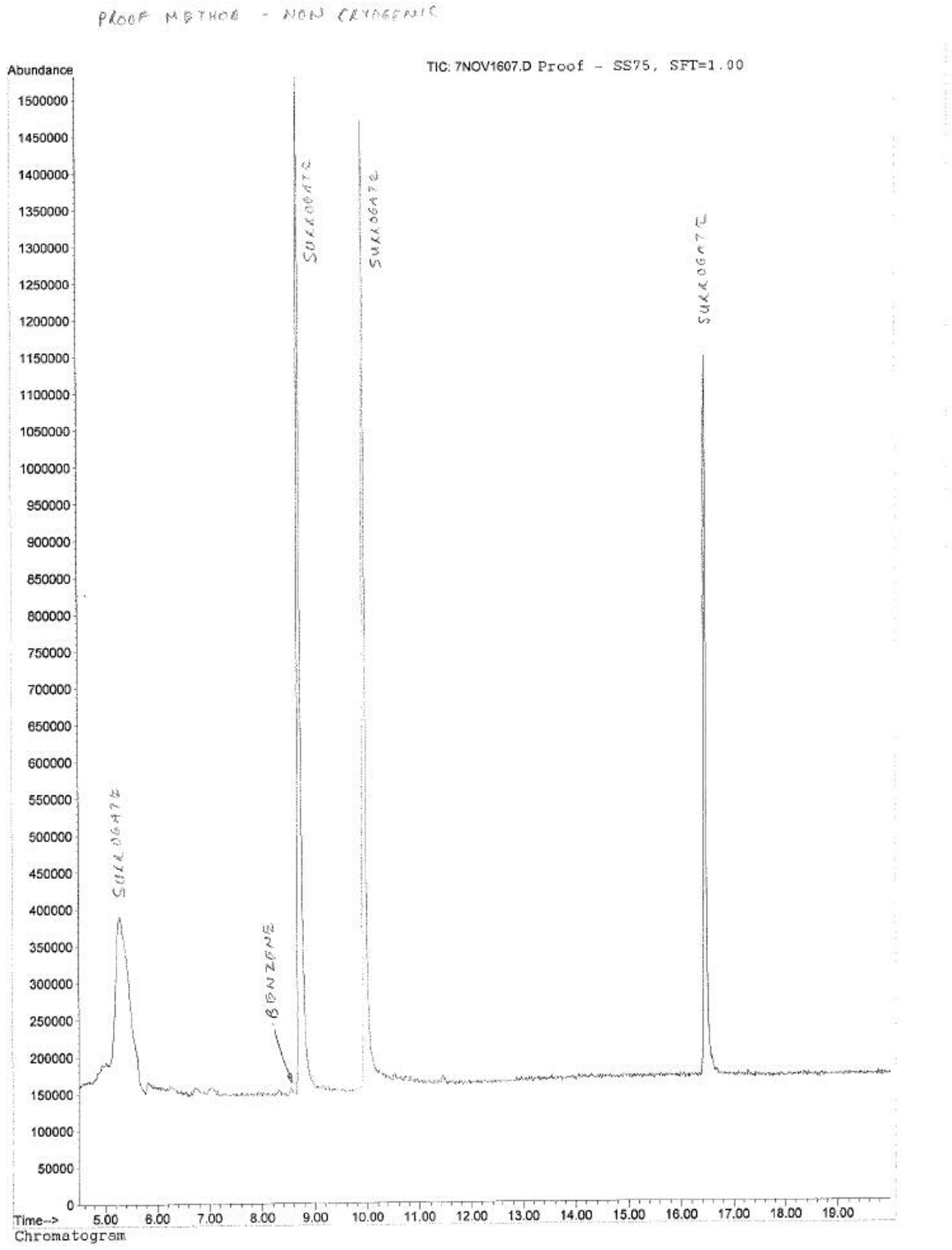


Figure 2 – VOC Scan for Downwind Sample on 19 November

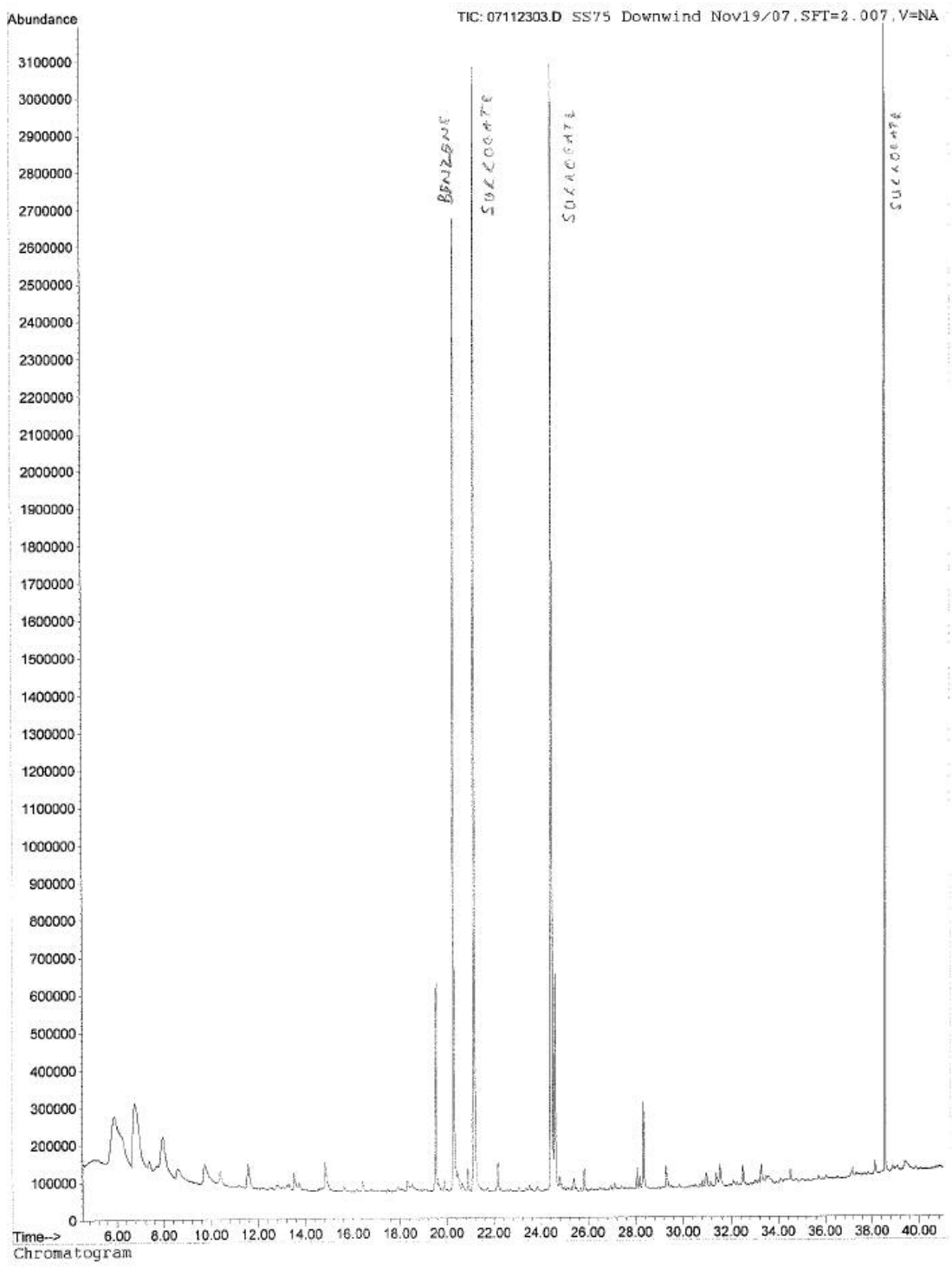
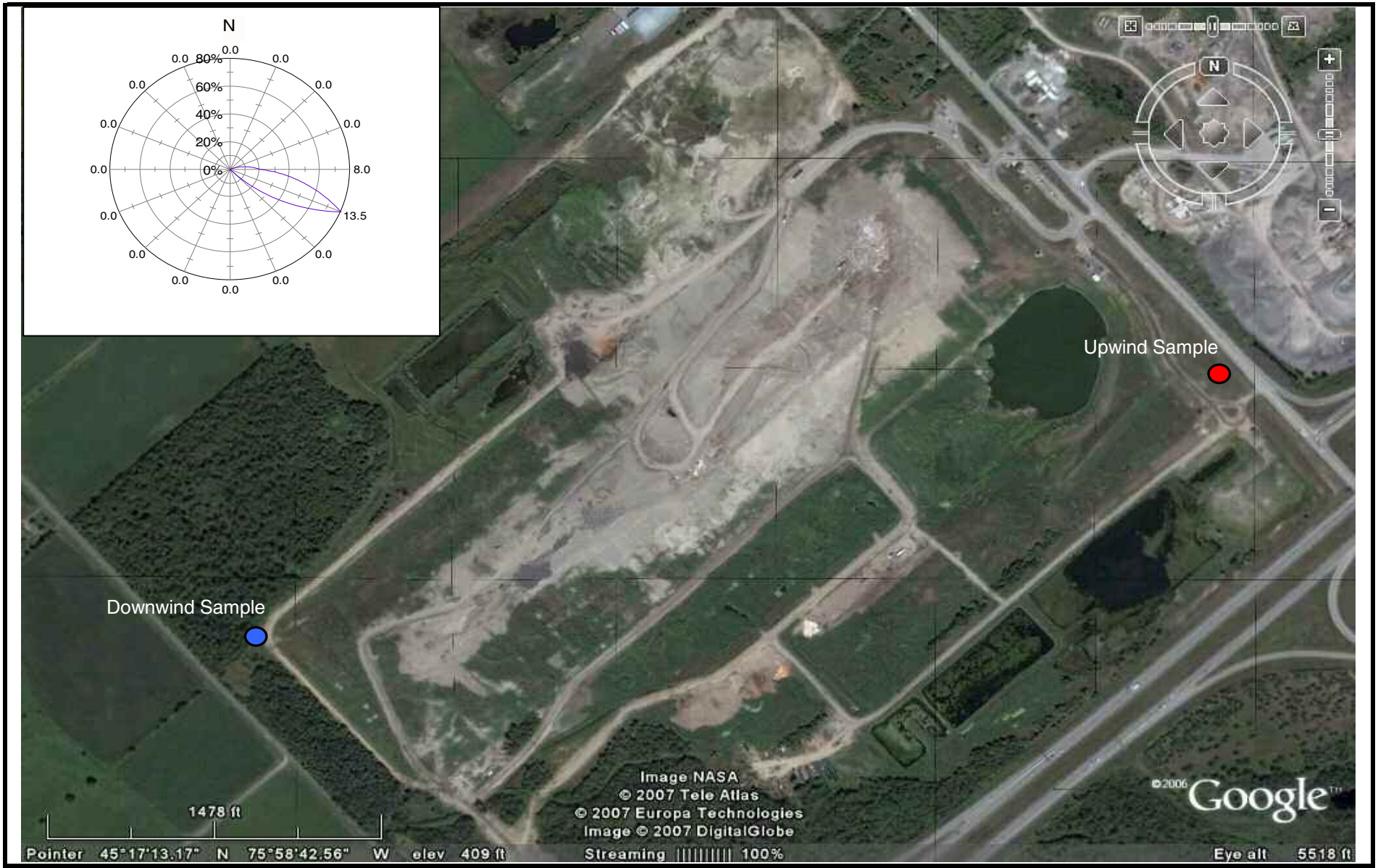


Figure 3: Example of unauthorized waste dumped outside WM property at the November 19th monitoring site (taken at 8:30 on 30th of September).



Ambient Monitoring Locations - October 26, 2007

Windrose from On-Site Meteorological Station Showing Winds Blowing From and Mean Wind Speeds in km/hr

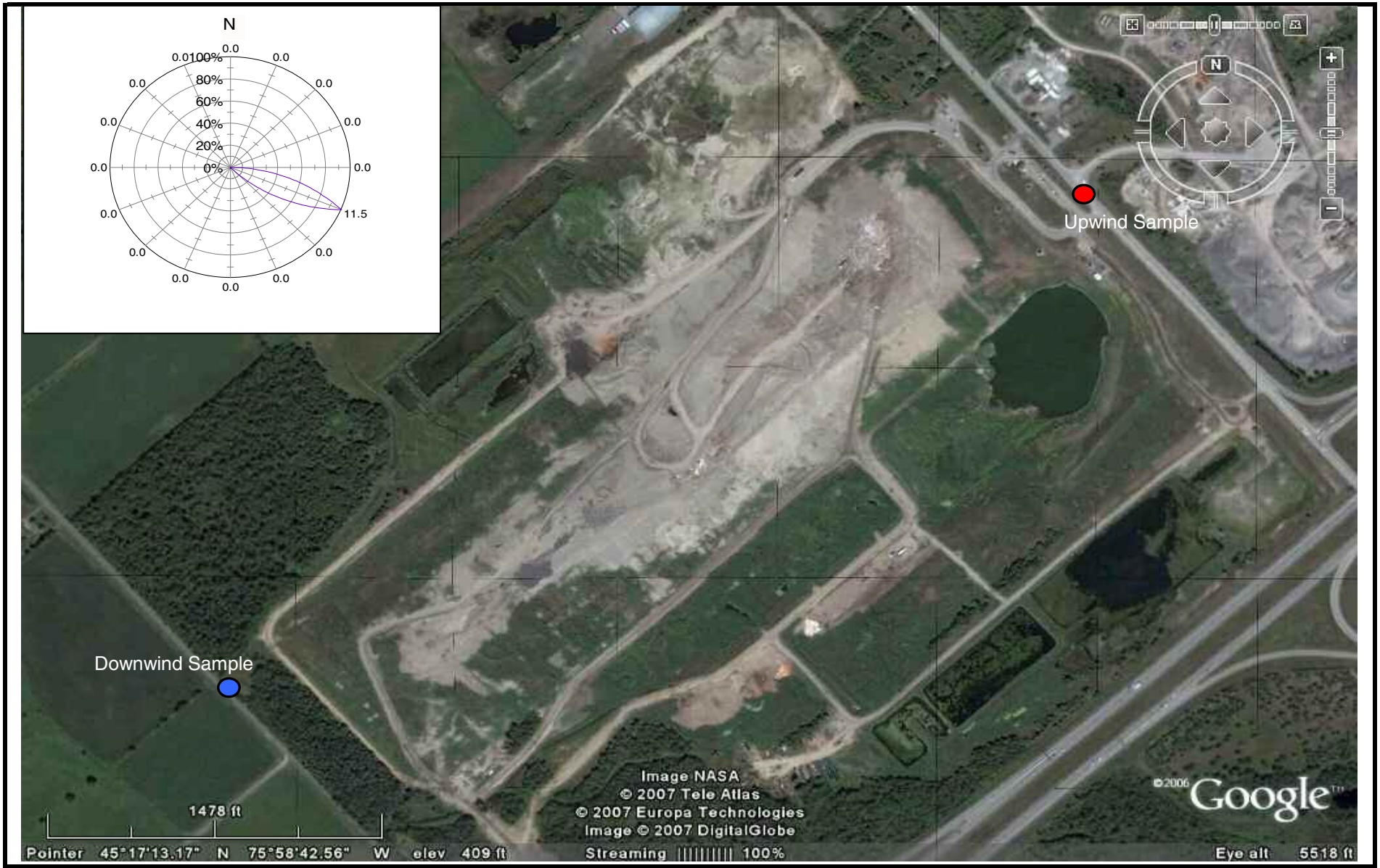
Ottawa Landfill--Ottawa, Ontario

Project #W07-5258B

Figure No.: 4

Date: January 16, 2008

RWDI



Ambient Monitoring Locations - November 19, 2007

Windrose from On-Site Meteorological Station Showing Winds Blowing From and Mean Wind Speeds in km/hr

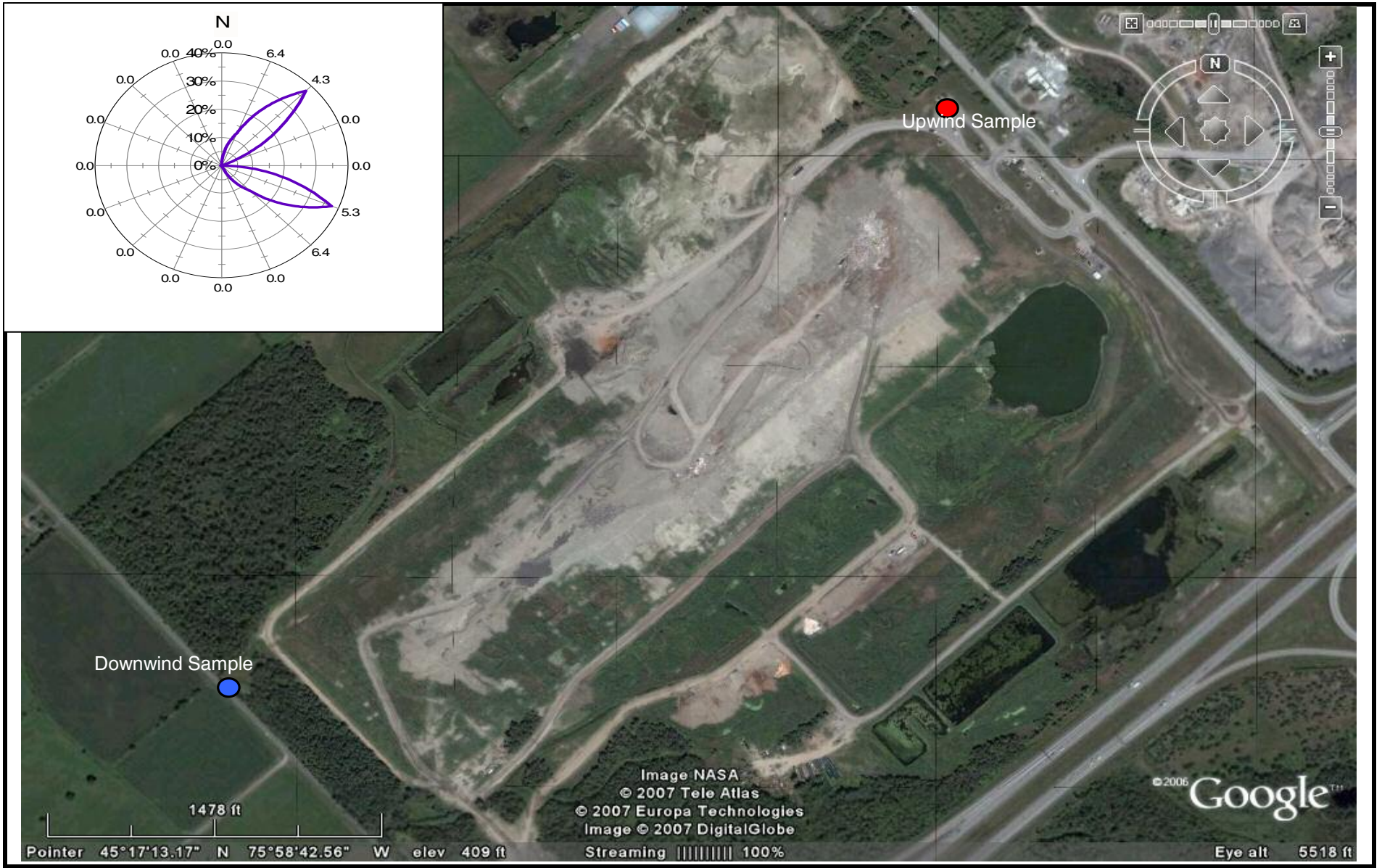
Ottawa Landfill--Ottawa, Ontario

Project #W07-5258B

Figure No.: 5

Date: January 16, 2008

RWDI



Ambient Monitoring Locations - February 12, 2008

Windrose from On-Site Meteorological Station Showing Winds Blowing From and Mean Wind Speeds in km/hr

Ottawa Landfill--Ottawa, Ontario

Project #W07-5258B

Figure No.: 6

Date: February 16, 2008

RWDI

Table A-1: Analytical Results for Ambient VOC Sampling at Ottawa Landfill - October 26, 2007

REPORT: 07054b (Method - SCAN ATD-GC-MSD Cryogenic Oven Control)

			Blank *Tube: SS83* *Date: October 26/07*	*071026DW* *Tube: SS63* *Date: October 26/07*			*071026UW* *Tube: SS66* *Date: October 26/07*			
	Laboratory Description		**07110902**	**07110903**	**07110903**		**07110904**	**07110904**		**Net Landfill Co**
CAS #	**COMPOUND**	**POI Ontario (ug/m³)**	**Measured Amount (ng)**	**Downwind Measured Amount (ng)**	**Downwind Measured Concentration (ug/m³)**	**Downwind Percentage of POI Limit (%)**	**Upwind Measured Amount (ng)**	**Upwind Measured Concentration (ug/m³)**	**Upwind Percentage of POI Limit (%)**	**Concentration (ug/m³)**
- -	**Sample Volume (m^3)**	- -	- -	- -	**0.0075**	- -	- -	**0.0090**	- -	- -
75-71-8	Dichlorodifluoromethane	1,500,000	3.7	13.4	1.78	<0.1%	10.6	1.17	<0.1%	0.61
75-45-6	Chlorodifluoromethane	1,050,000	ND	12.8	1.7	<0.1%	4.6	0.51	<0.1%	1.19
75-01-4	Vinyl Chloride [1]	3	0.241	0.872	0.12	4.0%	0.221	0.02	0.7%	0.10
78-78-4	2-Methyl Butane	-	22	65	8.63	-	34	3.76	-	4.87
75-69-4	Trichlorofluoromethane	18,000	1410	510	67.68	0.4%	1250	138.23	0.8%	background
109-66-0	Pentane	-	17.0	34	4.51	-	24	2.65	-	1.86
64-17-5	Ethanol	19,000	2000	3300	437.9	2%	550	60.82	0.3%	377.08
75-35-4	1,1-Dichloroethene	30	1.0	1.2	0.16	0.5%	1.2	0.13	0.4%	0.03
76-13-1	1,1,2-Trichloro-1,2,2-Trifluoroethane	2,400,000	2.2	3.8	0.5	<0.1%	3.1	0.34	<0.1%	0.16
108-20-3	Isopropyl Ether	220	ND	ND	ND	ND	ND	ND	ND	ND
67-64-1	Acetone	48,000	67	80	10.62	<0.1%	47	5.2	<0.1%	5.42
67-63-0	Isopropyl Alcohol	24,000	5.0	33	4.38	<0.1%	9.9	1.09	<0.1%	3.29
107-83-5	2-Methyl Pentane	-	3.2	19.8	2.63	-	5.6	0.62	-	2.01
75-09-2	Dichloromethane	5,300	25	95	12.61	0.2%	35	3.87	<0.1%	8.74
96-14-0	3-Methyl Pentane	-	0.8	2.3	0.31	-	1.4	0.15	-	0.16
107-13-1	2-Propenitrile	180	3.5	3.0	0.4	0.2%	2.2	0.24	0.1%	0.16
156-60-5	1,2-Dichloroethene (trans)	315	ND	ND	ND	ND	ND	ND	ND	ND
110-54-3	Hexane	25,000	2.8	7.2	0.96	<0.1%	4.1	0.45	<0.1%	0.51
75-34-3	1,1-Dichloroethane	600	ND	ND	ND	ND	ND	ND	ND	ND
123-72-8	n-Butanal	-	7.6	14.6	1.94	-	10.9	1.21	-	0.73
156-59-2	1,2-Dichloroethene (cis)	315	ND	ND	ND	ND	ND	ND	ND	ND
78-93-3	MEK	30,000	19.0	36	4.78	<0.1%	30	3.32	<0.1%	1.46
141-78-6	Ethyl Acetate	19,000	18.6	27	3.58	<0.1%	23	2.54	<0.1%	1.04
67-66-3	Chloroform	300	0.6	1.8	0.24	<0.1%	0.9	0.1	<0.1%	0.14
591-76-4	2-Methyl Hexane	-	7.3	39	5.18	-	8.6	0.95	-	4.23
110-82-7	Cyclohexane	183,000	56	460	61.04	<0.1%	75	8.29	<0.1%	52.75
71-55-6	1,1,1-Trichloroethane	350,000	0.4	4.4	0.58	<0.1%	2.3	0.25	<0.1%	0.33
56-23-5	Carbon Tetrachloride	7.2		29	3.85	53%	16.3	1.8	25%	2.05
589-34-4	3-Methyl Hexane	-	8.8	18.7	2.48	-	12.4	1.37	-	1.11
71-43-2	Benzene	-	7.0	8.7	1.15	-	9.7	1.07	-	0.08
107-06-2	1,2-Dichloroethane	6	ND	ND	ND	ND	ND	ND	ND	ND
142-82-5	Heptane	33,000	4.3	8.2	1.09	<0.1%	5.5	0.61	<0.1%	0.48
79-01-6	Trichloroethene	3,500	1.5	1.9	0.25	<0.1%	1.6	0.18	<0.1%	0.07
78-87-5	1,2-Dichloropropane	2,400	ND	ND	ND	ND	ND	ND	ND	ND
108-87-2	Methyl Cyclohexane	-	19.1	33	4.38	-	23	2.54	-	1.84
108-10-1	MIBK	1,200	3.2	5.1	0.68	<0.1%	4.0	0.44	<0.1%	0.24
108-88-3	Toluene	2,000	27	56	7.43	0.4%	37	4.09	0.2%	3.34
127-18-4	Tetrachloroethene	10,000	2.4	4.9	0.65	<0.1%	3.1	0.34	<0.1%	0.31
123-86-4	Butyl Acetate	735	2.5	6.6	0.88	0.1%	ND	ND	ND	0.88
106-93-4	1,2-Dibromoethane	9	ND	ND	ND	ND	ND	ND	ND	ND
108-90-7	Chlorobenzene	4,200	0.2	0.3	0.04	<0.1%	0.2	0.02	<0.1%	0.02
100-41-4	Ethyl Benzene	3,000	2.4	5.5	0.73	<0.1%	3.3	0.36	<0.1%	0.37
111-84-2	Nonane	-	1.5	2.5	0.33	-	4.6	0.51	-	background
08-38-3/106-42	m/p-Xylene	2,300	8.4	17.4	2.31	0.1%	11.8	1.3	<0.1%	1.01
95-47-6	o-Xylene	2,300	2.2	4.3	0.57	<0.1%	2.9	0.32	<0.1%	0.25
- -	Total Xylenes (sum of m/p/o-xylenes)	2,300	- -	- -	2.88	0.1%	- -	1.62	<0.1%	1.26
110-12-3	5-Methyl-2-Hexanone	460	ND	ND	ND	ND	ND	ND	ND	ND
100-42-5	Styrene	400	6.1	7.1	0.94	0.2%	5.5	0.61	0.2%	0
103-65-1	Propyl Benzene	-	1.8	2.8	0.37	-	2.4	0.27	-	0
20-14-4/622-96	m/p-Ethyl Toluene	-	2.2	3.2	0.42	-	2.4	0.27	-	0
124-18-5	Decane	-	6.3	9.4	1.25	-	7.2	0.8	-	0.45
108-67-8	1,3,5-Trimethylbenzene	-	1.6	2.2	0.29	-	1.6	0.18	-	0.11
611-14-3	o-Ethyl Toluene	-	0.6	0.9	0.12	-	0.7	0.08	-	0
95-63-6	1,2,4-Trimethylbenzene	500	5.8	7.5	1	0.2%	5.7	0.63	0.1%	0.37
535-77-3	m-Cymene	-	0.5	1.1	0.15	-	0.6	0.07	-	0
138-86-3	Limonene	-	1.7	5.9	0.78	-	4.1	0.45	-	0.33
99-87-6	p-Cymene	-	9.7	30	3.98	-	9.5	1.05	-	2.93
106-46-7	1,4-Dichlorobenzene	285	3.9	5.2	0.69	0.2%	4.7	0.52	0.2%	0.17
526-73-8	1,2,3-Trimethylbenzene	-	1.6	2.3	0.31	-	1.6	0.18	-	0.13
95-50-1	1,2-Dichlorobenzene	37,000	ND	ND	ND	ND	Trace	Trace	<0.1%	ND
120-82-1	1,2,4-Trichlorobenzene	100	Trace	Trace	Trace	<0.1%	0.1	0.01	<0.1%	background
91-20-3	Naphthalene	36	4.5	5.7	0.76	2%	4.5	0.5	1%	0.26
	TVOCs (Toluene)	-	2700	5300	703.29	-	2300	254.33	-	448.96
	TVOCs (Quantified)	-	3800	5000	663.48	-	2300	254.33	-	409.15
	Molhave-Clausen TVOCs (Toluene)	-	2700	5300	703.29	-	2300	254.33	-	448.96

Notes:

[1] Vinyl Chloride assessed using SIM analysis, which has a lower detection limit.

[2] Net Landfill Contribution = Downwind Measured Concentration - Upwind Measured Concentration. Where the net landfill contribution was a negative number, the impacts were deemed to be from background sources.

POI = Half Hour Point of Impingement (Ontario Ministry of Environment)

TRACE = Characteristic ions present but too low to be quantified

Table A-2: Analytical Results for Ambient VOC Sampling at Ottawa Landfill - November 19, 2007

REPORT: 07054c (Method - SCAN ATD-GC-MSD Cryogenic Oven Control)

			071119DW Tube: SS75 Date: November 19/07			*071119UW Tube: SS85 Date: November 19/07*			
	Laboratory Description			**0**			**0**		**Net Landfill Co**
CAS #	**COMPOUND**	**POI Ontario (ug/m³)**	**Downwind Measured Amount (ng)**	**Downwind Measured Concentration (ug/m³)**	**Downwind Percentage of POI Limit (%)**	**Upwind Measured Amount (ng)**	**Upwind Measured Concentration (ug/m³)**	**Upwind Percentage of POI Limit (%)**	**Concentration (ug/m³)**
- -	**Sample Volume (m³)**	**- -**	**- -**	**0.0067**	**- -**		**0.0067**	**- -**	- -
75-71-8	Dichlorodifluoromethane	1,500,000	18.0	2.68	<0.1%	9.3	1.39	<0.1%	1.29
75-45-6	Chlorodifluoromethane	1,050,000	3.7	0.55	<0.1%	ND	ND	ND	0.55
75-01-4	Vinyl Chloride [1]	3	0.332	0.05	1.7%	1.400	0.21	7.0%	background
78-78-4	2-Methyl Butane	-	9.4	1.4	-	8.8	1.31	-	0.09
75-69-4	Trichlorofluoromethane	18,000	2.9	0.43	<0.1%	0.5	0.07	<0.1%	0.36
109-66-0	Pentane	-	5.8	0.86	-	7.9	1.18	-	background
64-17-5	Ethanol	19,000	20	2.98	<0.1%	26	3.88	<0.1%	background
75-35-4	1,1-Dichloroethene	30	ND	ND	ND	Trace	Trace	<0.1%	ND
76-13-1	1,1,2-Trichloro-1,2,2-Trifluoroethane	2,400,000	2.4	0.36	<0.1%	1.0	0.15	<0.1%	0.21
108-20-3	Isopropyl Ether	220	ND	ND	ND	ND	ND	ND	ND
67-64-1	Acetone	48,000	5.6	0.83	<0.1%	5.6	0.83	<0.1%	0
67-63-0	Isopropyl Alcohol	24,000	1.6	0.24	<0.1%	0.9	0.13	<0.1%	0.11
107-83-5	2-Methyl Pentane	-	1.8	0.27	-	1.6	0.24	-	0.03
75-09-2	Dichloromethane	5,300	20	2.98	<0.1%	81	12.08	0.2%	background
96-14-0	3-Methyl Pentane	-	0.6	0.09	-	0.6	0.09	-	0
107-13-1	2-Propenitrile	180	ND	ND	ND	ND	ND	ND	ND
156-60-5	1,2-Dichloroethene (trans)	315	ND	ND	ND	ND	ND	ND	ND
110-54-3	Hexane	25,000	1.5	0.22	<0.1%	1.6	0.24	<0.1%	background
75-34-3	1,1-Dichloroethane	600	ND	ND	ND	ND	ND	ND	ND
123-72-8	n-Butanal	-	1.9	0.28	-	2.4	0.36	-	background
156-59-2	1,2-Dichloroethene (cis)	315	ND	ND	ND	0.8	0.12	<0.1%	ND
78-93-3	MEK	30,000	7.6	1.13	<0.1%	5.9	0.88	<0.1%	0.25
141-78-6	Ethyl Acetate	19,000	6.1	0.91	<0.1%	7.2	1.07	<0.1%	background
67-66-3	Chloroform	300	0.4	0.06	<0.1%	0.2	0.03	<0.1%	0.03
591-76-4	2-Methyl Hexane	-	4.3	0.64	-	5.3	0.79	-	background
110-82-7	Cyclohexane	183,000	25	3.73	<0.1%	8.2	1.22	<0.1%	2.51
71-55-6	1,1,1-Trichloroethane	350,000	1.6	0.24	<0.1%	ND	ND	ND	0.24
56-23-5	Carbon Tetrachloride	7.2	4.5	0.67	9%	ND	ND	ND	0.67
589-34-4	3-Methyl Hexane	-	5.8	0.86	-	8.0	1.19	-	background
71-43-2	Benzene	-	200	29.82	-	2.5	0.37	-	29.45
107-06-2	1,2-Dichloroethane	6	ND	ND	ND	ND	ND	ND	ND
142-82-5	Heptane	33,000	2.3	0.34	<0.1%	3.2	0.48	<0.1%	background
79-01-6	Trichloroethene	3,500	0.6	0.09	<0.1%	1.1	0.16	<0.1%	background
78-87-5	1,2-Dichloropropane	2,400	ND	ND	ND	ND	ND	ND	ND
108-87-2	Methyl Cyclohexane	-	10.6	1.58	-	15.1	2.25	-	background
108-10-1	MIBK	1,200	ND	ND	ND	ND	ND	ND	ND
108-88-3	Toluene	2,000	32	4.77	0.2%	20	2.98	0.1%	1.79
127-18-4	Tetrachloroethene	10,000	5.5	0.82	<0.1%	6.5	0.97	<0.1%	background
123-86-4	Butyl Acetate	735	ND	ND	ND	ND	ND	ND	ND
106-93-4	1,2-Dibromoethane	9	ND	ND	ND	ND	ND	ND	ND
108-90-7	Chlorobenzene	4,200	Trace	Trace	<0.1%	Trace	Trace	<0.1%	0
100-41-4	Ethyl Benzene	3,000	2.6	0.39	<0.1%	2.2	0.33	<0.1%	0.06
111-84-2	Nonane	-	1.2	0.18	-	0.6	0.09	-	0.09
8-38-3/106-42	m/p-Xylene	2,300	11.5	1.71	<0.1%	9.5	1.42	<0.1%	0.29
95-47-6	o-Xylene	2,300	3.0	0.45	<0.1%	2.1	0.31	<0.1%	0.14
- -	Total Xylenes (sum of m/p/o-xylenes	2,300	- -	2.16	<0.1%	- -	1.73	<0.1%	0.43
110-12-3	5-Methyl-2-Hexanone	460	ND	ND	ND	ND	ND	ND	ND
100-42-5	Styrene	400	2.9	0.43	0.1%	2.4	0.36	<0.1%	0
103-65-1	Propyl Benzene	-	1.2	0.18	-	1.2	0.18	-	0
0-14-4/622-96	m/p-Ethyl Toluene	-	1.4	0.21	-	1.5	0.22	-	background
124-18-5	Decane	-	5.0	0.75	-	2.0	0.3	-	0.45
108-67-8	1,3,5-Trimethylbenzene	-	1.2	0.18	-	1.1	0.16	-	0.02
611-14-3	o-Ethyl Toluene	-	0.4	0.06	-	0.4	0.06	-	0
95-63-6	1,2,4-Trimethylbenzene	500	3.3	0.49	<0.1%	2.1	0.31	<0.1%	0.18
535-77-3	m-Cymene	-	0.4	0.06	-	0.3	0.04	-	0
138-86-3	Limonene	-	0.7	0.1	-	0.3	0.04	-	0.06
99-87-6	p-Cymene	-	4.2	0.63	-	3.9	0.58	-	0.05
106-46-7	1,4-Dichlorobenzene	285	1.8	0.27	<0.1%	2.4	0.36	0.1%	background
526-73-8	1,2,3-Trimethylbenzene	-	1.1	0.16	-	0.8	0.12	-	0.04
95-50-1	1,2-Dichlorobenzene	37,000	Trace	Trace	<0.1%	Trace	Trace	<0.1%	0
120-82-1	1,2,4-Trichlorobenzene	100	ND	ND	ND	ND	ND	ND	ND
91-20-3	Naphthalene	36	9.5	1.42	4%	3.4	0.51	1%	0.91
	TVOCs (Toluene)	-	740	110.32	-	520	77.52	-	32.8
	TVOCs (Quantified)	-	450	67.08	-	270	40.25	-	26.83
	Molhave-Clausen TVOCs (Toluene)	-	740	110.32	-	520	77.52	-	32.8

Notes:

[1] Vinyl Chloride assessed using SIM analysis, which has a lower detection limit.

[2] Net Landfill Contribution = Downwind Measured Concentration

POI = Half Hour Point of Impingement (Ontario Ministry of Environment)

TRACE = Characteristic ions present but too low to be quantified

Table A-3: Analytical Results for Ambient VOC Sampling at Ottawa Landfill - February 12, 2008

REPORT: 07054c (Method - SCAN ATD-GC-MSD Cryogenic Oven Control)

			080212DW Tube: SS85 Date: February 12/08			*080212UW Tube: SS81 Date: February 12/08*			
	Laboratory Description			**0**			**0**		**Net Landfill Co**
CAS #	**COMPOUND**	**POI Ontario (ug/m³)**	**Downwind Measured Amount (ng)**	**Downwind Measured Concentration (ug/m³)**	**Downwind Percentage of POI Limit (%)**	**Upwind Measured Amount (ng)**	**Upwind Measured Concentration (ug/m³)**	**Upwind Percentage of POI Limit (%)**	**Concentration (ug/m³)**
- -	**Sample Volume (m³)**	- -	- -	**0.0078**	- -		**0.0090**	- -	- -
75-71-8	Dichlorodifluoromethane	1,500,000	24.0	3.07	<0.1%	24	2.66	<0.1%	0.41
75-45-6	Chlorodifluoromethane	1,050,000	ND	ND	ND	ND	ND	ND	ND
75-01-4	Vinyl Chloride [1]	3	0.9	0.11	3.7%	0.3	0.03	1.0%	0.08
78-78-4	2-Methyl Butane	-	4.8	0.61	-	4.3	0.48	-	0.13
75-69-4	Trichlorofluoromethane	18,000	1.1	0.14	<0.1%	0.9	0.1	<0.1%	0.04
109-66-0	Pentane	-	2.8	0.36	-	4.3	0.48	-	background
64-17-5	Ethanol	19,000	14.3	1.83	<0.1%	14.5	1.61	<0.1%	0.22
75-35-4	1,1-Dichloroethene	30	Trace	0	ND	0.1	0.01	<0.1%	ND
76-13-1	1,1,2-Trichloro-1,2,2-Trifluoroethane	2,400,000	2.3	0.29	<0.1%	2.3	0.25	<0.1%	0.04
108-20-3	Isopropyl Ether	220	ND	ND	ND	ND	ND	ND	ND
67-64-1	Acetone	48,000	112	14.3	<0.1%	10.3	1.14	<0.1%	13.16
67-63-0	Isopropyl Alcohol	24,000	4.3	0.55	<0.1%	2.2	0.24	<0.1%	0.31
107-83-5	2-Methyl Pentane	-	1.0	0.13	-	0.9	0.1	-	0.03
75-09-2	Dichloromethane	5,300	30	3.83	<0.1%	210	23.26	0.4%	background
96-14-0	3-Methyl Pentane	-	0.7	0.09	-	0.4	0.04	-	0.05
107-13-1	2-Propenitrile	180	ND	ND	ND	ND	ND	ND	ND
156-60-5	1,2-Dichloroethene (trans)	315	ND	ND	ND	ND	ND	ND	ND
110-54-3	Hexane	25,000	4.1	0.52	<0.1%	4.7	0.52	<0.1%	0
75-34-3	1,1-Dichloroethane	600	ND	ND	ND	ND	ND	ND	ND
123-72-8	n-Butanal	-	14.0	1.79	-	5.2	0.58	-	1.21
156-59-2	1,2-Dichloroethene (cis)	315	ND	ND	ND	ND	ND	ND	ND
78-93-3	MEK	30,000	14.9	1.9	<0.1%	4.3	0.48	<0.1%	1.42
141-78-6	Ethyl Acetate	19,000	3.6	0.46	<0.1%	4.0	0.44	<0.1%	0.02
67-66-3	Chloroform	300	0.4	0.05	<0.1%	0.2	0.02	<0.1%	0.03
591-76-4	2-Methyl Hexane	-	2.1	0.27	-	5.7	0.63	-	background
110-82-7	Cyclohexane	183,000	4.4	0.56	<0.1%	5.0	0.55	<0.1%	0.01
71-55-6	1,1,1-Trichloroethane	350,000	8.4	1.07	<0.1%	2.3	0.25	<0.1%	0.82
56-23-5	Carbon Tetrachloride	7.2	11.7	1.49	21%	ND	ND	ND	1.49
589-34-4	3-Methyl Hexane	-	2.4	0.31	-	6.4	0.71	-	background
71-43-2	Benzene	-	3.8	0.49	-	2.2	0.24	-	0.25
107-06-2	1,2-Dichloroethane	6	ND	ND	ND	ND	ND	ND	ND
142-82-5	Heptane	33,000	1.5	0.19	<0.1%	3.2	0.35	<0.1%	background
79-01-6	Trichloroethene	3,500	0.3	0.04	<0.1%	0.6	0.07	<0.1%	background
78-87-5	1,2-Dichloropropane	2,400	ND	ND	ND	ND	ND	ND	ND
108-87-2	Methyl Cyclohexane	-	5.7	0.73	-	13.0	1.44	-	background
108-10-1	MIBK	1,200	ND	ND	ND	ND	ND	ND	ND
108-88-3	Toluene	2,000	10.8	1.38	<0.1%	18.7	2.07	0.1%	background
127-18-4	Tetrachloroethene	10,000	2.2	0.28	<0.1%	2.8	0.31	<0.1%	background
123-86-4	Butyl Acetate	735	ND	ND	ND	ND	ND	ND	ND
106-93-4	1,2-Dibromoethane	9	ND	ND	ND	ND	ND	ND	ND
108-90-7	Chlorobenzene	4,200	0.2	0.03	<0.1%	Trace	0	ND	0.03
100-41-4	Ethyl Benzene	3,000	5.7	0.73	<0.1%	1.9	0.21	<0.1%	0.52
111-84-2	Nonane	-	3.3	0.42	-		ND	-	0.42
8-38-3/106-42	m/p-Xylene	2,300	26	3.32	0.1%	6.1	0.68	<0.1%	2.64
95-47-6	o-Xylene	2,300	3.4	0.43	<0.1%	2	0.22	<0.1%	0.21
- -	Total Xylenes (sum of m/p/o-xylenes)	2,300	29.4	3.75	0.2%	8.1	0.9	<0.1%	2.85
110-12-3	5-Methyl-2-Hexanone	460	ND	ND	ND	ND	ND	ND	ND
100-42-5	Styrene	400	2.6	0.33	<0.1%	2.7	0.3	<0.1%	0
103-65-1	Propyl Benzene	-	2.2	0.28	-	1.2	0.13	-	0
0-14-4/622-96	m/p-Ethyl Toluene	-	1.9	0.24	-	1.2	0.13	-	0
124-18-5	Decane	-	3.2	0.41	-	2.3	0.25	-	0.16
108-67-8	1,3,5-Trimethylbenzene	-	0.6	0.08	-	1.0	0.11	-	background
611-14-3	o-Ethyl Toluene	-	0.5	0.06	-	0.4	0.04	-	0
95-63-6	1,2,4-Trimethylbenzene	500	1.5	0.19	<0.1%	2.3	0.25	<0.1%	background
535-77-3	m-Cymene	-	0.5	0.06	-	0.3	0.03	-	0
138-86-3	Limonene	-	2.4	0.31	-	0.2	0.02	-	0.29
99-87-6	p-Cymene	-	6.0	0.77	-	3.5	0.39	-	0.38
106-46-7	1,4-Dichlorobenzene	285	2.0	0.26	<0.1%	1.3	0.14	<0.1%	0.12
526-73-8	1,2,3-Trimethylbenzene	-	0.6	0.08	-	0.7	0.08	-	0
95-50-1	1,2-Dichlorobenzene	37,000	Trace	0	ND	ND	ND	ND	ND
120-82-1	1,2,4-Trichlorobenzene	100	ND	ND	ND	ND	ND	ND	ND
91-20-3	Naphthalene	36	4.1	0.52	1%	2	0.22	1%	0.3
	TVOCs (Toluene)	-	1130	144.32	-	750	83.06	-	61.26
	TVOCs (Quantified)	-	350	44.7	-	390	43.19	-	1.51
	Molhave-Clausen TVOCs (Toluene)	-	1130	144.32	-	750	83.06	-	61.26

Notes:

[1] Vinyl Chloride assessed using SIM analysis, which has a lower detection limit.

[2] Net Landfill Contribution = Downwind Measured Concentration -

POI = Half Hour Point of Impingement (Ontario Ministry of Environment)

TRACE = Characteristic ions present but too low to be quantified

Table A-4: Maximum Measured Downwind Concentrations and Net Landfill Contribution for VOC Contaminants

CAS #	COMPOUND	POI Limit (ug/m^3)	Maximum Measured Downwind Concentration (ug/m^3)	Maximum Net Landfill Contribution (ug/m^3)
75-71-8	Dichlorodifluoromethane	1,500,000	2.83	1.89
75-45-6	Chlorodifluoromethane	1,050,000	10.87	7.72
75-01-4	Vinyl Chloride [1]	3	0.16	0.16
78-78-4	2-Methyl Butane	-	12.45	8.59
75-69-4	Trichlorofluoromethane	18,000	67.68	9.3
109-66-0	Pentane	-	6.06	5.49
64-17-5	Ethanol	19,000	437.9	377.08
75-35-4	1,1-Dichloroethene	30	0.16	0.03
76-13-1	1,1,2-Trichloro-1,2,2-Trifluoroethane	2,400,000	0.73	0.57
108-20-3	Isopropyl Ether	220	ND	ND
67-64-1	Acetone	48,000	29.11	28.16
67-63-0	Isopropyl Alcohol	24,000	4.38	3.29
107-83-5	2-Methyl Pentane	-	2.63	2.01
75-09-2	Dichloromethane	5,300	12.61	8.74
96-14-0	3-Methyl Pentane	-	0.31	0.16
107-13-1	2-Propenitrile	180	0.4	0.16
156-60-5	1,2-Dichloroethene (trans)	315	ND	ND
110-54-3	Hexane	25,000	0.96	0.51
75-34-3	1,1-Dichloroethane	600	ND	ND
123-72-8	n-Butanal	-	1.94	0.73
156-59-2	1,2-Dichloroethene (cis)	315	0.89	0.89
78-93-3	MEK	30,000	4.78	3.52
141-78-6	Ethyl Acetate	19,000	4.2	4.2
67-66-3	Chloroform	300	0.24	0.14
591-76-4	2-Methyl Hexane	-	5.18	4.23
110-82-7	Cyclohexane	183,000	92.99	85.98
71-55-6	1,1,1-Trichloroethane	350,000	0.73	0.33
56-23-5	Carbon Tetrachloride	7.2	3.85	3.18
589-34-4	3-Methyl Hexane	-	2.48	1.74
71-43-2	Benzene*	-	1.72	1.07
107-06-2	1,2-Dichloroethane	6	ND	ND
142-82-5	Heptane	33,000	1.7	1.11
79-01-6	Trichloroethene	3,500	2.62	1.33
78-87-5	1,2-Dichloropropane	2,400	ND	ND
108-87-2	Methyl Cyclohexane	-	4.89	4.54
108-10-1	MIBK	1,200	0.69	0.24
108-88-3	Toluene	2,000	7.43	3.55
127-18-4	Tetrachloroethene	10,000	0.97	0.68
123-86-4	Butyl Acetate	735	0.88	0.88
106-93-4	1,2-Dibromoethane	9	ND	ND
108-90-7	Chlorobenzene	4,200	0.04	0.02
100-41-4	Ethyl Benzene	3,000	0.73	0.37
111-84-2	Nonane	-	0.63	0.24
108-38-3/106-42-3	m/p-Xylene	2,300	2.31	1.01
95-47-6	o-Xylene	2,300	0.64	0.25
- -	Total Xylenes (sum of m/p/o-xylenes)	2,300	2.88	1.26
110-12-3	5-Methyl-2-Hexanone	460	ND	ND
100-42-5	Styrene	400	0.94	0.33
103-65-1	Propyl Benzene	-	0.8	0.1
620-14-4/622-96-8	m/p-Ethyl Toluene	-	0.78	0.23
124-18-5	Decane	-	2.73	0.64
108-67-8	1,3,5-Trimethylbenzene	-	0.44	0.23
611-14-3	o-Ethyl Toluene	-	0.24	0.04
95-63-6	1,2,4-Trimethylbenzene	500	1.57	0.37
535-77-3	m-Cymene	-	0.16	0.08
138-86-3	Limonene	-	0.78	0.44
99-87-6	p-Cymene	-	3.98	2.93
106-46-7	1,4-Dichlorobenzene	285	0.69	0.17
526-73-8	1,2,3-Trimethylbenzene	-	0.42	0.13
95-50-1	1,2-Dichlorobenzene	37,000	ND	ND
120-82-1	1,2,4-Trichlorobenzene	100	ND	ND
91-20-3	Naphthalene	36	1.42	0.91
	TVOCs (Toluene)	-	703.29	448.96
	TVOCs (Quantified)	-	663.48	409.15
	Molhave-Clausen TVOCs (Toluene)	-	703.29	448.96

*Note: This maximum concentration does not include the Nov 19, 07 downwind value since it has been shown to be anamolous.