

**Countywide Recycling & Disposal Facility
Ambient Air Monitoring
Monthly Report #26
July 20, 2009**

**To Fulfill the Requirements Set Forth in Order 5.A. of the Ohio EPA
Director's Findings and Orders Dated March 28, 2007**

**Republic Services of Ohio II, LLC
Countywide Recycling & Disposal Facility
3619 Gracemont Street SW
East Sparta, Ohio 44262**

Prepared by:



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**Countywide Recycling & Disposal Facility
Ambient Air Monitoring
Monthly Report #26**

Monitoring Events #122 through #126

July 20, 2009

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1.0 INTRODUCTION

1.1 Current Activities

As described in Section 1.2 below, beginning on Monday May 21, 2007, Lawhon & Associates, Inc. (L&A) has conducted ambient air sampling every six days as mandated by Order 5.A. of the Ohio EPA Director's Findings and Orders dated March 28, 2007. This report summarizes the analytical results from the following Community Monitoring Events.

- Event #122: Friday May 22 to Saturday May 23
- Event #123: Thursday May 28 to Friday May 29
- Event #124: Wednesday June 3 to Thursday June 4
- Event #125: Tuesday June 9 to Wednesday June 10
- Event #126: Monday June 15 to Tuesday June 16

Previous Monthly Reports describe modifications that have been made to the sampling apparatus and sampling protocol to minimize/eliminate sources of variability. No modifications have been made to the system during the time period reflected in this Monthly Report.

Previously, we eliminated tubing in the collection of SUMMA® samples for Volatile Organic Compounds. Given the possibility that the Teflon® tubing may be a source of fluoride ion, all manifold tubing for collection of the acid and aldehyde samples was replaced with Tygon®.

1.2 Background

As specified by the Ohio EPA in Bryan Zima's March 28, 2007, letter to Jason Perdion of Baker & Hostetler, air samples were analyzed for the following groups of compounds:

- Volatile Organic Compounds (VOCs): EPA Method TO-15 modified with Tentatively Identified Compounds (TICs)
- Sulfur Compounds: EPA Method TO-15 modified
- Aldehydes and Ketones: EPA Method TO-11A
- Hydrogen Fluoride and Hydrogen Chloride: NIOSH Method 7903

VOCs were analyzed by TestAmerica Inc., 5815 Middlebrook Pike, Knoxville, TN 37921. The analyses for aldehydes (EPA Method TO-11A) and hydrogen fluoride / hydrogen chloride (NIOSH Method 7903) were performed by TestAmerica Inc. Phoenix, 4625 E. Cotton Center Blvd, Suite 189, Phoenix, AZ 85040. Prior to April 2009,

analyses for aldehydes and hydrogen fluoride/hydrogen chloride were performed by Integrated Analytical Laboratory (IAL), Randolph, NJ.

In order to identify conditions that may be of concern, results from the community monitoring are compared to conservative risk-based concentrations for compounds in air in non-occupational settings. The most conservative (lowest value) used for comparison is the USEPA Region 9 Preliminary Remediation Goals (PRGs). Where available, we use the Agency for Toxic Substances and Disease Registry (ATSDR) Minimal Risk Levels (MRLs). The differences between these screening levels are briefly discussed below.

The USEPA Region 9 PRG is the concentration of a compound in the ambient air that is estimated to be without significant risk to a person who would breathe that level of compound continuously over many decades. The Region 9 PRGs are derived using conservative mathematical formulas and do not represent the level of a compound in the air (or other environmental media) where health effects are likely to occur. Region 9 PRGs are generally accepted as extremely conservative screening values, such that if the concentration of a compound in the air is less than the corresponding PRG, most public health officials and regulators are confident that there is no risk to human health. On the other hand, an analytical result that exceeds the corresponding PRG does not mean that there is an unacceptable risk to public health.

Many of the compounds that are detected in these Monitoring Events are commonly found at low levels in ambient air. For some compounds such as benzene, the mathematically-derived Region 9 PRG (0.25 ug/m³) is lower than the average background concentration of 1.96 ug/m³ in ambient air in Ohio (Ohio EPA, *Portsmouth Ohio Air Quality Study 2003*). Consequently, finding certain compounds in ambient air at levels above PRGs is not uncommon and may simply reflect fluctuations in background sources. Additionally, not all of the compounds found in the air samples have corresponding PRGs.

Analytical results are also compared to the ATSDR Acute and Chronic Minimal Risk Levels (MRLs), where available. An MRL is an estimate of the daily human exposure to a hazardous substance that is likely to be without appreciable risk of adverse health effects over a specified duration of exposure. PRGs and MRLs are useful screening levels that assist risk assessors in identifying those compounds that may pose a health concern. Neither PRGs nor MRLs represent levels of exposure that have been documented to cause actual health effects.

Most of the compounds that were either not detected or detected at levels below PRGs or MRLs will not be discussed unless those particular results help to explain other findings.

Ambient environmental/climate conditions are discussed in Section 2.0. Results of the monitoring are discussed in Section 3.0 and summarized in Section 4.0 of this report. Analytical results from the laboratory are provided in the Appendices.

2.0 AMBIENT CONDITIONS

The descriptions of ambient conditions are taken from the Daily Odor Monitoring Summary compiled by Countywide's consultant, Diversified Engineering.

Event #122: Friday May 22 to Saturday May 23

May 22: Average temperature in degrees F: 70, Max. 87, Min. 53.

Winds were calm with a max speed of 8 mph out of the NNE.

Average relative humidity 57% with no precipitation recorded.

Complaints: There were no odor complaints during this time.

May 23: Average temperature in degrees F: 72, Max. 88, Min. 61

Winds were calm with a max speed of 5 mph out of the SSE.

Average relative humidity 56% with no precipitation recorded.

Complaints: There were no odor complaints during this time.

Event #123: Thursday May 28 to Friday May 29

May 28: Average temperature in degrees F: 73, Max. 81, Min. 66.

Winds were 3 mph with max gusts of 17 mph out of the SW.

Average relative humidity 78% with 0.02 inches of precipitation recorded.

Complaints: A complaint occurred at 8:53am from 3232 Downing Street SW in East Sparta. Grading in "Bowl" area and gas well drilling were potentially odor-causing activities noted on the Daily Odor Monitoring Summary.

May 29: Average temperature in degrees F: 66, Max. 75, Min. 57.

Winds were 3 mph with max gusts of 28 mph out of the NW.

Average relative humidity 74% with 0.16 inches of precipitation recorded.

Complaints: There were no odor complaints during this time.

Event #124: Wednesday June 3 to Thursday June 4

June 3: Average temperature in degrees F: 60, Max. 66, Min. 53.

Winds were 3 mph with a max speed of 8 mph out of the NE.

Average relative humidity 80% with 0.29 inches of precipitation recorded.

Complaints: There were no odor complaints during this time.

June 4: Average temperature in degrees F: 59, Max. 72, Min. 48

Winds were 3 mph with a max speed of 9 mph out of the SE.

Average relative humidity 65% with no precipitation recorded.

Complaints: A complaint occurred at 8:50am from 9863 Sherman Church Avenue in Bolivar. Removal of road material for temporary cap was a potentially odor-causing activity noted on the Daily Odor Monitoring Summary.

Event #125: Tuesday June 9 to Wednesday June 10

June 9: Average temperature in degrees F: 75, Max. 84, Min. 66.

Winds were 3 mph with a max speed of 9 mph out of the NW.

Average relative humidity 66% with no precipitation recorded.

Complaints: There were no odor complaints during this time.

June 10: Average temperature in degrees F: 68, Max. 78, Min. 60.
Winds were calm with a max speed of 5 mph out of the SSE.
Average relative humidity 76% with no precipitation recorded.
Complaints: There were no odor complaints during this time.

Event #126: Monday June 15 to Tuesday June 16

June 15: Average temperature in degrees F: 68, Max. 82, Min. 53.
Winds were 1 mph with a max speed of 7 mph out of the NE.
Average relative humidity 64% with 0.01 inches of precipitation recorded.
Complaints: There were no odor complaints during this time.

June 16: Average temperature in degrees F: 68, Max. 84, Min. 53.
Winds were 3 mph with max gusts of 17 mph out of the E.
Average relative humidity 62% with 0.24 inches of precipitation recorded.
Complaints: There were no odor complaints during this time.

Odor complaints were noted for Events #123 and #124. Both complaints occurred in the morning at locations nominally downwind of the landfill at least part of Event time. Rain occurred during both of these events.

3.0 ANALYTICAL RESULTS

The laboratory analyzed the air samples for a large number of compounds. Only those results that exceeded Region 9 PRGs and/or ATSDR MRLs will be discussed in the body of this report (see Section 1.0). Other compounds may have been detected in a sample, but were quantified at concentrations below the respective PRG. Analytical results from the laboratory are provided in the Appendices.

The prevailing wind direction for each monitoring station relative to the landfill is designated as:

- C: Crosswind
- D: Downwind
- U: Upwind
- V: Variable

Wind direction is indicated for the first and second days of the regularly scheduled monitoring event separated by a right slash (“/”).

3.1 Volatile Organic Compounds

Compounds detected by Method TO-15 modified (TO-15M) are summarized in Tables 1 through 5. TO-15M analyzes air samples collected in a SUMMA® canister for the presence of an extensive list of volatile organic compounds. In addition to a “standard analyte” list, the laboratory provides a list of tentatively identified compounds and estimates the concentration of compounds that are not on the “standard” list. These Tentatively Identified Compounds (TICs) include some compounds for which there are other specific analytical methods, such as acetaldehyde which is a target analyte for EPA Method TO-11A (TO-11A). All of the TO-15M analyses presented in this monthly

report were performed by TestAmerica Inc., Knoxville, TN. Laboratory data reports are provided in the Appendices. The QA/QC packages from Test America are not included in the Appendices because of their large size but can be made available upon request.

Only VOCs that were detected at concentrations exceeding the respective Region 9 PRG (most conservative screening level) in one or more samples during a monitoring event are presented in the summary tables that follow. The results from the analytical laboratory can be found in the Appendix noted.

Event #122: Friday May 22 to Saturday May 23

Analytical results are summarized in Table 1 and provided in Appendix A.

**Table 1. Event #122: VOCs Detected Above PRGs
Concentrations in ug/m³**

Compound	Acute MRL	Chronic MRL	PRG	School	Cell-Tower	Camp-ground	Wetland	
							Co-Located	
Prevailing Wind Direction				D/C	D/C	U/D	C/U	
Benzene	29	10	0.25	1.3	0.96	1.1	0.87	1.2
Carbon tetrachloride	188	188	0.13	0.53J	0.51J	0.45J	0.51J	0.62J

Bold indicates result exceeded Region 9 PRG
 Shading indicates result exceeded concentration for ATSDR Minimal Risk Level (MRL)
 Laboratory Data Qualifiers
 J = Estimated concentration below laboratory reporting limit

Event #123: Thursday May 28 to Friday May 29

Analytical results are summarized in Table 2 and provided in Appendix B.

**Table 2. Event #123: VOCs Detected Above PRGs
Concentrations in ug/m³**

Compound	Acute MRL	Chronic MRL	PRG	School	Cell Tower		Camp-ground	Wetland
					Co-located			
Prevailing wind direction				U/C	U/C		D/C	D/C
Benzene	29	10	0.25	0.57J	0.41J	0.45J	0.48J	0.45J
Carbon tetrachloride	188	188	0.13	0.61J	0.54J	0.51J	0.52J	0.52J

Bold indicates result exceeded Region 9 PRG
 Shading indicates result exceeded concentration for ATSDR Minimal Risk Level (MRL)
 Laboratory Data Qualifiers:
 J = Estimated concentration below laboratory reporting limit

Event #124: Wednesday June 3 to Thursday June 4

Analytical results are summarized in Table 3 and provided in Appendix C.

**Table 3. Event #124: VOCs Detected Above PRGs
Concentrations in ug/m³**

Compound	Acute MRL	Chronic MRL	PRG	School		Cell Tower	Camp-ground	Wetland
				Co-located				
Prevailing wind direction				D/C		D/C	U/C	C/U
Benzene	29	10	0.25	0.70	0.83	0.70	0.65	0.66
Carbon tetrachloride	188	188	0.13	0.56J	0.58J	0.5J	0.56J	0.50J

Bold indicates result exceeded Region 9 PRG
 Shading indicates result exceeded concentration for ATSDR Minimal Risk Level (MRL)
 Laboratory Data Qualifiers:
 J = Estimated concentration below laboratory reporting limit

Event #125: Tuesday June 9 to Wednesday June 10

Analytical results are summarized in Table 4 and provided in Appendix D.

**Table 4. Event #125: VOCs Detected Above PRGs
Concentrations in ug/m³**

Compound	Acute MRL	Chronic MRL	PRG	School	Cell Tower	Campground		Wetland
						Co-located		
Prevailing wind direction				C/C	C/C	C/D		C/U
Benzene	29	10	0.25	1.2	0.92	1.1	0.88	1.3
Carbon tetrachloride	188	188	0.13	0.53J	0.60J	0.54J	0.53J	0.59J

Bold indicates result exceeded Region 9 PRG
Shading indicates result exceeded concentration for ATSDR Minimal Risk Level (MRL)
Laboratory Data Qualifiers:
J = Estimated concentration below laboratory reporting limit

Event #126: Monday June 15 to Tuesday June 16

Analytical results are summarized in Table 5 and provided in Appendix E.

**Table 5. Event #126: VOCs Detected Above PRGs
Concentrations in ug/m³**

Compound	Acute MRL	Chronic MRL	PRG	School	Cell Tower	Camp-ground	Wetland	
							Co-located	
Prevailing wind direction				D/C	D/C	U/C	C/U	
Benzene	29	10	0.25	0.62	0.46J	0.61J	0.49J	0.51J
Carbon tetrachloride	188	188	0.13	0.55J	0.52J	0.55J	0.52J	0.55J

Bold indicates result exceeded Region 9 PRG
Shading indicates result exceeded concentration for ATSDR Minimal Risk Level (MRL)
Laboratory Data Qualifiers:
J = Estimated concentration below laboratory reporting limit

3.2 Sulfur Compounds

Carbon disulfide was the only sulfur compound detected during the five sampling events reviewed in this report. When detected, the concentrations of carbon disulfide were extremely low and well below the Region 9 PRG. All detections are included on the TO-15M Summary Tables.

3.3 Aldehydes and Ketones

In order to obtain a continuous 24 hours of data, three separate gel collection tubes were sequentially exposed to ambient air for a period of approximately 8-hours each. Consequently there are three separate sample results for each location for each monitoring event. Analyses for aldehydes and ketones by method TO-11A were conducted by TestAmerica Inc., Phoenix Arizona.

Although Method TO-11A analyzes for a number of carbonyl compounds, formaldehyde and acetaldehyde are most frequently detected and are the aldehyde compounds of greatest potential concern from a public health standpoint. In addition to formaldehyde and acetaldehyde, the following carbonyl compounds were occasionally detected in the samples summarized in this Monthly Report #26: acetone, benzaldehyde, propionaldehyde and butyraldehyde. The results for these compounds are included on the laboratory reporting sheets found in the Appendices. Only results for formaldehyde and acetaldehyde are summarized in the tables below.

Event #122: Friday May 22 to Saturday May 23

The laboratory report is in Appendix A.

**Table 6. Event #122: Aldehydes
Concentrations in ug/m³**

Aldehyde	Acute MRL ¹	Chronic MRL ¹	PRG	School			Cell Tower			Campground			Wetland		
				D/C			D/C			U/D			C/U		
Prevailing wind direction				1	2	3	1	2	3	1	2	3	1	2	3
Formaldehyde	50	10	0.15	25.1	5.1	12.4	15.1	5.2*	2.1*	28.4	9.8	29.4	16.8	4.1*	11.7
Acetaldehyde	NA	NA	0.87	97.1	11.7	30.6	46.7	10.6	1.1*	42.5	14.2	44.9	57.2	10.4	35.1

*Indicates possible break-through from front to back of sorbent tube.
 1. ATSDR Minimal Risk Levels (MRL) (ATSDR Toxicological Profile for Formaldehyde, July 1999) - Acute MRL 0.04 ppm = 50 ug/m³ (appropriate to compare exposures of up to 14 days); Chronic MRL 0.008 ppm=10 ug/m³
 Bold indicates concentration exceeded Region 9 PRG
 Shading indicates concentration exceeded the conc. for the Chronic MRL; however, Chronic MRLs apply to long-term exposures.
 NA= Not available
 Note: As indicated previously, all tubing in the sampling apparatus manifolds is now Tygon®.

Event #123: Thursday May 28 to Friday May 29

The laboratory report is in Appendix B.

**Table 7. Event #123: Aldehydes
Concentrations in ug/m³**

Aldehyde	Acute MRL ¹	Chronic MRL ¹	PRG	School			Cell Tower			Campground			Wetland		
				U/C			U/C			D/C			D/C		
Prevailing wind direction				1	2	3	1	2	3	1	2	3	1	2	3
Formaldehyde	50	10	0.15	10.7	3.7	3.7*	7.4	4.4	3.7	13.7	10.9	10.0	8.8	3.6	4.9
Acetaldehyde	NA	NA	0.87	28.0	6.9*	9.6*	15.0*	6.9	9.6	19.4	11.4	13.5	25.1*	7.0	14.2

*Indicates possible break-through from front to back of sorbent tube.
 1. ATSDR Minimal Risk Levels (MRL) (ATSDR Toxicological Profile for Formaldehyde, July 1999) - Acute MRL 0.04 ppm = 50 ug/m³ (appropriate to compare exposures of up to 14 days); Chronic MRL 0.008 ppm=10 ug/m³
 Bold indicates concentration exceeded Region 9 PRG
 Shading indicates concentration exceeded the conc. for the Chronic MRL; however, Chronic MRLs apply to long-term exposures.
 NA= Not available
 Note: As indicated previously, all tubing in the sampling apparatus manifolds is now Tygon®.

Event #124: Wednesday June 3 to Thursday June 4

The laboratory report is in Appendix C.

**Table 8. Event #124: Aldehydes
Concentrations in ug/m³**

Aldehyde	Acute MRL ¹	Chronic MRL ¹	PRG	School			Cell Tower			Campground			Wetland		
				D/C			D/C			U/C			C/U		
Prevailing wind direction				1	2	3	1	2	3	1	2	3	1	2	3
Formaldehyde	50	10	0.15	6.9	2.8*	6.9	4.6	3.3*	5.7	8.0	6.8	16.1	4.8	2.4*	7.9
Acetaldehyde	NA	NA	0.87	27.3	6.7	20.7	11.5	6.5	18.2	13.6	8.8	27.7	16.9	5.7	8.8

*Indicates possible break-through from front to back of sorbent tube.
 1. ATSDR Minimal Risk Levels (MRL) (ATSDR Toxicological Profile for Formaldehyde, July 1999) - Acute MRL 0.04 ppm = 50 ug/m³ (appropriate to compare exposures of up to 14 days); Chronic MRL 0.008 ppm=10 ug/m³
 Bold indicates concentration exceeded Region 9 PRG
 Shading indicates concentration exceeded the conc. for the Chronic MRL; however, Chronic MRLs apply to long-term exposures.
 NA= Not available
 Note: As indicated previously, all tubing in the sampling apparatus manifolds is now Tygon®.

Event #125: Tuesday June 9 to Wednesday June 10

The laboratory report is in Appendix D.

Table 9. Event #125: Aldehydes Concentrations in ug/m³

Aldehyde	Acute MRL ¹	Chronic MRL ¹	PRG	School			Cell Tower			Campground			Wetland		
				C/C			C/C			C/D			C/U		
Prevailing wind direction				1	2	3	1	2	3	1	2	3	1	2	3
Formaldehyde	50	10	0.15	19.8	4.4	6.9	13.8	6.4	7.7	3.6*	2.0*	1.3*	13.5	3.1	7.4
Acetaldehyde	NA	NA	0.87	41.7	6.6	12.6	24.4	9.3	13.7	1.2*	1.3*	0.9*	27.9	5.9	15.2

*Indicates possible break-through from front to back of sorbent tube.
1. ATSDR Minimal Risk Levels (MRL) (ATSDR Toxicological Profile for Formaldehyde, July 1999) - Acute MRL 0.04 ppm = 50 ug/m³ (appropriate to compare exposures of up to 14 days); Chronic MRL 0.008 ppm=10 ug/m³
Bold indicates concentration exceeded Region 9 PRG
Shading indicates concentration exceeded the conc. for the Chronic MRL; however, Chronic MRLs apply to long-term exposures.
NA= Not available
Note: As indicated previously, all tubing in the sampling apparatus manifolds is now Tygon®.

Event #126: Monday June 15 to Tuesday June 16

Analytical results are provided in Appendix E.

Table 10. Event #126: Aldehydes Concentrations in ug/m³

Aldehyde	Acute MRL ¹	Chronic MRL ¹	PRG	School			Cell Tower			Campground			Wetland		
				D/C			D/C			U/C			C/U		
Prevailing wind direction				1	2	3	1	2	3	1	2	3	1	2	3
Formaldehyde	50	10	0.15	21.9	4.8	11.4	14.9	6.4	12.0	29.5	9.1	25.7	16.6	3.9*	14.0
Acetaldehyde	NA	NA	0.87	36.9	6.5	23.2	29.7	9.1	26.6	37.2	11.1	38.6	28.8	5.8	30.9

*Indicates possible break-through from front to back of sorbent tube.
1. ATSDR Minimal Risk Levels (MRL) (ATSDR Toxicological Profile for Formaldehyde, July 1999) - Acute MRL 0.04 ppm = 50 ug/m³ (appropriate to compare exposures of up to 14 days); Chronic MRL 0.008 ppm=10 ug/m³
Bold indicates concentration exceeded Region 9 PRG
Shading indicates concentration exceeded the conc. for the Chronic MRL; however, Chronic MRLs apply to long-term exposures.
NA= Not available
Note: As indicated previously, all tubing in the sampling apparatus manifolds is now Tygon®.

3.4 Hydrogen Chloride (HCl) and Hydrogen Fluoride (HF)

As with the aldehyde and ketone samples, three separate gel collection tubes were sequentially exposed to ambient air for a period of approximately 8-hours each. Consequently there are three separate sample results for each location for each monitoring event. The concentrations of HF and HCl in the air are quantified based on the mass of fluoride and chloride ion captured on the gel inside the tubes and the volume of air that was passed through the tube.

The majority of samples collected from late-May through mid-June had no detectable amounts of either HF or HCl. HCl was only detected above its PRG on three occasions: Events #122, #125, and #126; and these detections were noted in only one of three 8-hour sorbent tubes. The highly conservative Region 9 PRG screening value for HCl (21 ug/m³) is for essentially constant exposure over many years. The HCL detections above the PRG may be attributable, in part, to moisture in the sorbent tube (as noted by the analytical laboratory).

None of the sorbent tubes had detectable amounts of HF; thus, none of the samples had concentrations above the HF MRL. There is no PRG for HF.

The results for HF and HCl are summarized in the tables below.

**Table 11. Event #122: Friday May 22 to Saturday May 23:
Concentrations in ug/m³**

Compound	ATSDR MRL ¹	PRG	School			Cell Tower			Campground			Wetland		
			1	2	3	1	2	3	1	2	3	1	2	3
Prevailing wind direction			D/C			D/C			U/D			C/U		
HF	17	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
HCl	NA	21	ND	11.6	12.4	13.1*	ND	13.7	ND	ND	ND	17.3*	ND	41.8*

1. ATSDR MRL – hydrogen fluoride = 2ppm = 17 ug/m³ (Acute inhalation exposure)
 Bold indicates concentration exceeded Region 9 PRG
 Shading indicates concentration exceeded Chronic MRL
 *Indicates possible break-through from front to back of sorbent tube.
 Note: As indicated previously, all tubing in the sampling apparatus manifolds is now Tygon®.

**Table 12. Event #123: Thursday May 28 to Friday May 29:
Concentrations in ug/m³**

Compound	ATSDR MRL ¹	PRG	School			Cell Tower			Campground			Wetland		
			1	2	3	1	2	3	1	2	3	1	2	3
Prevailing wind direction			U/C			U/C			D/C			D/C		
HF	17	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
HCl	NA	21	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	16.8

1. ATSDR MRL – hydrogen fluoride = 2ppm = 17 ug/m³ (Acute inhalation exposure)
 Bold indicates concentration exceeded Region 9 PRG
 Shading indicates concentration exceeded Chronic MRL
 Note: As indicated previously, all tubing in the sampling apparatus manifolds is now Tygon®.

**Table 13. Event #124: Wednesday June 3 to Thursday June 4:
Concentrations in ug/m³**

Compound	ATSDR MRL ¹	PRG	School			Cell Tower			Campground			Wetland		
			1	2	3	1	2	3	1	2	3	1	2	3
Prevailing wind direction			D/C			D/C			U/C			C/U		
HF	17	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
HCl	NA	21	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

1. ATSDR MRL – hydrogen fluoride = 2ppm = 17 ug/m³ (Acute inhalation exposure)
 Bold indicates concentration exceeded Region 9 PRG
 Shading indicates concentration exceeded Chronic MRL
 Note: As indicated previously, all tubing in the sampling apparatus manifolds is now Tygon®.

**Table 14. Event #125: Tuesday June 9 to Wednesday June 10:
Concentrations in ug/m³**

Compound	ATSDR MRL ¹	PRG	School			Cell Tower			Campground			Wetland		
			1	2	3	1	2	3	1	2	3	1	2	3
Prevailing wind direction			C/C			C/C			C/D			C/U		
HF	17	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
HCl	NA	21	ND	ND	ND	ND	ND	ND	ND	37.7	ND	ND	ND	ND

1. ATSDR MRL – hydrogen fluoride = 2ppm = 17 ug/m³ (Acute inhalation exposure)
 Bold indicates concentration exceeded Region 9 PRG
 Shading indicates concentration exceeded Chronic MRL
 Note: As indicated previously, all tubing in the sampling apparatus manifolds is now Tygon®.

**Table 15. Event #126: Monday June 15 to Tuesday June 16:
Concentrations in ug/m³**

Compound	ATSDR MRL ¹	PRG	School			Cell Tower			Campground			Wetland		
			1	2	3	1	2	3	1	2	3	1	2	3
Prevailing wind direction			D/C			D/C			U/C			C/U		
HF	17	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
HCl	NA	21	67.1*	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

1. ATSDR MRL – hydrogen fluoride = 2ppm = 17 ug/m³ (Acute inhalation exposure)
 Bold indicates concentration exceeded Region 9 PRG
 *Indicates possible break-through from front to back of sorbent tube.
 Note: As indicated previously, all tubing in the sampling apparatus manifolds is now Tygon®.

The laboratory analytical results for HF and HCl are included in Appendices A through E of this report.

4.0 SUMMARY

4.1 Volatile Organic Compounds

During the regularly scheduled every-six-day community monitoring events covered by this report (Event #122 to #126), benzene and carbon tetrachloride were the only VOCs that exceeded their respective Region 9 PRGs. No other VOCs were reported to be present at concentrations above their respective Region 9 PRGs. Neither of these constituents exceeded their respective acute or chronic MRLs.

All of the reported benzene concentrations were within the range of background levels reported in the literature and by other investigators. The concentration of benzene detected from all samples conducted from late-May to mid-June ranged from 0.41 ug/m³ to 1.3 ug/m³ (average 0.78 ug/m³); these concentrations are well below the average background concentration (1.96 ug/m³) in ambient air in Ohio (Ohio EPA, *Portsmouth Ohio Air Quality Study 2003*). As mentioned in previous Monthly Reports, there are numerous local and area sources of benzene and related compounds, including lawn mowing, emissions from the heavy equipment working on the nearby expansion area of the landfill, motor vehicle traffic along I-77, other motor vehicle traffic at locations near the monitoring equipment, the Marathon refinery on the south side of Canton, and the landfill. The sources of carbon tetrachloride are not known, but the consistently low concentrations of this environmentally persistent compound across all monitoring locations (irrespective of wind direction) indicate that, like benzene, it is present in background air and not related to the landfill.

Note: The two compounds, benzene and carbon tetrachloride, that were measured at concentrations (or estimated concentrations as designated by a “J” qualifier) above their Region 9 PRGs (0.25 ug/m³ and 0.13 ug/m³, respectively) have PRGs that are below the reporting limit (0.64 ug/m³ and 1.3 ug/m³, respectively) for the analytical laboratory. Consequently, any quantifiable detection of these compounds will exceed the highly conservative Region 9 PRG. Therefore, the ATSDR MRLs provide a more realistic basis of comparison, since all of the MRLs are above the range of laboratory reporting limits.

4.2 Aldehydes (Carbonyl Compounds)

Formaldehyde and acetaldehyde were detected at all community sampling locations. The Region 9 PRGs for formaldehyde and acetaldehyde (0.15 ug/m³ and 0.87 ug/m³, respectively) are very close to the laboratory reporting limits for these compounds. Consequently, almost any measurable levels of formaldehyde and acetaldehyde will exceed the respective Region 9 PRG. Therefore, the ATSDR Acute (50 ug/m³) and Chronic (10 ug/m³) MRLs are more relevant guidelines for interpreting the analytical results.

The ATSDR Acute MRL value for formaldehyde (50ug/m³), which is a guideline for exposures lasting 1 to 14 days, was not exceeded in any sample covered in this report. The ATSDR Chronic MRL value (10ug/m³) for formaldehyde was exceeded in one or more samples during each sampling events covered in this report. However, the ATSDR chronic MRL is intended as a guideline for the assessment of long term exposure (greater than 365 days). A review of the historical data collected at the Countywide Recycling & Disposal Facility (July 26th, 2007 to June 16th, 2009) yields an average formaldehyde concentration of 5.71 ug/m³, which is well below both the ATSDR acute and chronic MRL values. ATSDR MRL standards for acetaldehyde are not available.

There are no apparent correlations between the sampling location's orientation to the landfill and prevailing wind (upwind, downwind, or crosswind) and the concentration of either formaldehyde or acetaldehyde. This suggests that the slightly elevated concentrations of these compounds may be derived from other common sources, such as vehicle exhaust.

As noted in previous reports, the first and third sorbent tubes tend to capture the highest concentrations of aldehydes. The first sorbent tube is programmed to turn on at 3:00 PM and run until 11:00 PM; the second tube samples air from 11:00 PM to 7:00 AM; and the third tube samples air from 7:00 AM to 3:00 PM. Thus, it is very likely that the first and third tubes are drawing air samples during the evening and morning rush hours, respectively. Again, this suggests that the density of motor vehicle traffic may help explain the often-observed increased levels of aldehydes in sorbent tubes #1 and #3.

4.3 Hydrogen Fluoride and Hydrogen Chloride

Hydrogen fluoride was not detected during community monitoring during this period. Hydrogen chloride was detected and exceeded the conservative Region 9 PRG (21.0 ug/m³), for a few of the sorbent tubes in monitoring event #122 (41.8 ug/m³—wetland; average concentration 19.7 ug/m³), event #125 (37.7 ug/m³—campground; average 11.3 ug/m³) and event #126 (67.1 ug/m³—school; average 22.4 ug/m³). Only one of these events had an average concentration above the PRG. Thus, the average HCl concentration over the entire monitoring period was less than the PRG.

It should be recognized that NIOSH Method 7903 for inorganic acids was designed for industrial-not ambient environmental applications and is subject to interferences, particularly moisture. HF and HCl were either not present or were only detected at very low levels in the majority of samples that have been collected since the initiation of this

monitoring program in May 2007. Even those results that appear to be outside of the “typical range” for this program are extremely low concentrations that do not present a risk to public health.

4.4 Laboratory Issues

No major laboratory issues have been identified as of the date of this report that would alter the conclusions based upon the monitoring results presented here. Results from the co-located (duplicate) TO-15 samples were similar for all locations and events.

4.6 Conclusions

No potentially significant concentration of any VOC, including benzene, has been reported in the months since alterations were made to the sampling apparatus. This is still the case for the monitoring events presented in this Monthly Report #26.

Our specific conclusions are summarized below:

- The levels of benzene recorded at the community monitoring locations during late-May through mid-June were very low and well within Ohio background as reported by Ohio EPA (Portsmouth Ohio Air Quality Study, 2003).
- Because there are numerous local and regional sources of VOCs, it is expected that many of these compounds will continue to be detected at low levels as the community monitoring program moves forward.
- Concentrations of formaldehyde and acetaldehyde from late-May through mid-June were comparable to the values observed in previous months. The ATSDR Acute MRL value for formaldehyde (50ug/m³) was not exceeded in any sample covered in this report. The 24-hour average concentrations of formaldehyde occasionally exceeded the ASTDR chronic MRL *value*; however, the historical average level of formaldehyde recorded from all locations from July 2008 through June 2009 (5.71 ug/m³) is well below the chronic ATSDR MRL value.
- *The results for HCl and HF sampling continue to show no indication of any threat from these constituents; thus, sampling for hydrogen fluoride and hydrogen chloride should be eliminated.*
- There are no clear trends with regard to the specific compounds or the concentrations of those compounds detected with respect to whether the monitoring location was upwind or downwind of the landfill during the monitoring event.
- The results presented in this Monthly Report #26 continue to support our conclusions that the occurrence of low levels of VOCs, aldehydes, and inorganic acids in the air of the community surrounding Countywide reflect local and regional sources; and that the levels of these compounds in the ambient air do not represent either an immediate or long-term threat to public health.

**Countywide Recycling & Disposal Facility
Ambient Air Monitoring
Monthly Report #26**

Monitoring Events #122 through #126

July 20, 2009

EPA Method TO-15 SUMMARY TABLES

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- Table 1. Event #122: Friday, May 22 to Saturday, May 23**
- Table 2. Event #123: Thursday, May 28 to Friday, May 29**
- Table 3. Event #124: Wednesday, June 3 to Thursday, June 4**
- Table 4. Event #125: Tuesday, June 9 to Wednesday, June 10**
- Table 5. Event #126: Monday, June 15 to Tuesday, June 16**

Countywide Recycling & Disposal Facility								
EPA Method TO-15 Modified: Volatile Organic Compounds								
Table 2: Event #123: May 28/29, 2009								
Analyte	Monitoring Location							
	School	Cell Tower	Campground	Wetland				
	Co-Located							
Prevailing Wind Direction								
All results in ug/m3								
Method TO-15 Modified	Acute MRL	Chronic MRL	PRG					
Acetone	61762	30881	3300	62	11J	13	44	42
Benzene	29	10	0.25	0.57J	0.41J	0.45J	0.48J	0.45J
Bromomethane	194	19	5.2	ND	ND	ND	ND	ND
1,3-Butadiene	NA	NA	0.061	ND	ND	ND	ND	ND
tert-Butyl alcohol	NA	NA	NA	0.48J	0.23J	0.16J	0.69J	0.52J
Carbon disulfide	NA	934	730	0.20J	ND	ND	ND	0.12J
Carbon tetrachloride	188	188	0.13	0.61J	0.54J	0.51J	0.52J	0.52J
Chlorobenzene	NA	NA	62	ND	ND	ND	ND	ND
Chloroethane	39583	NA	2.3	0.11J	ND	ND	ND	0.13J
Chloroform	488	98	0.083	ND	ND	ND	ND	ND
Chloromethane	1033	103	95	2.0	1.3	1.2	1.3	1.4
Cyclohexane	NA	NA	6200	ND	ND	ND	ND	ND
Dichlorodifluoromethane	NA	NA	210	2.7	2.4	2.4	2.4	4.5
cis-1,2-Dichloroethene	NA	NA	37	ND	ND	ND	ND	ND
Ethylbenzene	43419	1303	1100	ND	ND	ND	ND	0.31J
4-Ethyltoluene	NA	NA	NA	ND	ND	ND	ND	ND
Heptane	NA	NA	NA	1.6J	0.37J	0.40J	0.90J	1.3J
Hexane	NA	2115	210	0.85J	2.9	0.54J	1.3J	0.73J
Methyl ethyl ketone	NA	NA	5100	8.3	1.5J	1.9J	6.2	7.9
Methyl isobutyl ketone	NA	NA	3100	0.70J	ND	ND	0.34J	0.55J
Methylene chloride	2084	1042	4.1	1.7JB	1.3JB	2.0B	2.1B	1.8B
Styrene	8520	852	1100	ND	ND	ND	ND	ND
Tetrachloroethene	1378	276	0.32	ND	ND	ND	ND	ND
Tetrahydrofuran	NA	NA	0.99	0.33J	ND	ND	ND	0.19J
Toluene	3768	301	400	1.7	1.2	1.7	1.2	2.0
1,1,1-Trichloroethane	10800	NA	2300	ND	ND	ND	ND	ND
1,1,2-Trichloro-1,2,2-trifluoroethane	NA	NA	NA	0.64J	0.59J	0.59J	0.62J	0.64J
Trichlorofluoromethane	NA	NA	730	1.5	1.4	1.3	1.5	1.6
1,2,4-Trimethylbenzene	NA	NA	6.2	0.83J	0.57J	0.31J	ND	0.43J
1,3,5-Trimethylbenzene	NA	NA	6.2	ND	ND	ND	ND	ND
2,2,4-Trimethylpentane	NA	NA	NA	ND	ND	ND	ND	ND
Vinyl Chloride	1278	77	0.11	ND	ND	ND	ND	ND
m/p-Xylene	8687	8687	110	0.85J	ND	ND	ND	0.93
o-Xylene	8687	8687	110	0.33J	ND	ND	ND	0.29J
*Prevailing Wind Direction with respect to the landfill								
U: Upwind								
D: Downwind								
C: Crosswind								
V: Variable								
NS = No Sample								
ND = Not Detected								
NA = Not Available								
Y = TIC present								
Bold indicates result exceeds Region 9 PRG								
Shading indicates result exceeds ATSDR MRL								
Laboratory Data Qualifiers:								
B = Compound present in blank								
J = Estimated concentration below laboratory reporting limit								
D = Dilution								
E = Exceeds calibration range of instrument								
TICs: Compound has been tentatively identified but the estimated concentration is highly uncertain.								

Countywide Recycling & Disposal Facility								
EPA Method TO-15 Modified: Volatile Organic Compounds								
Table 3: Event #124: June 3/4, 2009								
Analyte	Monitoring Location							
	School				Cell Tower	Campground	Wetland	
	Co-Located							
Prevailing Wind Direction								
All results in ug/m3								
Method TO-15 Modified	Acute MRL	Chronic MRL	PRG					
Acetone	61762	30881	3300	24	12J	26	27	29
Benzene	29	10	0.25	0.70	0.83	0.70	0.65	0.66
Bromomethane	194	19	5.2	ND	ND	0.14J	ND	ND
1,3-Butadiene	NA	NA	0.061	ND	ND	ND	ND	ND
tert-Butyl alcohol	NA	NA	NA	0.57J	0.34J	0.28J	0.31J	0.38J
Carbon disulfide	NA	934	730	0.14J	0.10J	ND	ND	0.098J
Carbon tetrachloride	188	188	0.13	0.56J	0.58J	0.51J	0.56J	0.50J
Chlorobenzene	NA	NA	62	ND	ND	ND	ND	ND
Chloroethane	39583	NA	2.3	ND	ND	0.17J	0.10J	0.12J
Chloroform	488	98	0.083	ND	ND	ND	ND	ND
Chloromethane	1033	103	95	0.97J	1.2	1.2	1.2	1.1
Cyclohexane	NA	NA	6200	0.20J	0.19J	0.14J	0.15J	0.22J
1,4- Dichlorobenzene	12020	60	0.31	ND	ND	ND	ND	ND
Dichlorodifluoromethane	NA	NA	210	2.2	2.5	2.3	2.3	2.3
cis-1,2-Dichloroethene	NA	NA	37	ND	ND	ND	ND	ND
Ethylbenzene	43419	1303	1100	0.41J	0.34J	ND	ND	0.31J
4-Ethyltoluene	NA	NA	NA	ND	ND	ND	ND	ND
Heptane	NA	NA	NA	0.84J	0.93J	0.81J	1.1J	0.82J
Hexane	NA	2115	210	0.77J	1.1J	0.69J	0.66J	0.89J
Methyl ethyl ketone	NA	NA	5100	4.1	1.8J	3.1	4.2	4.1
Methyl isobutyl ketone	NA	NA	3100	0.28J	ND	0.30J	0.26J	0.25J
Methylene chloride	2084	1042	4.1	0.78JB	0.73JB	1.1JB	0.52JB	1.0JB
Styrene	8520	852	1100	ND	ND	ND	ND	ND
Tetrahydrofuran	NA	NA	0.99	0.21J	ND	0.23J	ND	ND
Toluene	3768	301	400	2.3	2.1	1.8	1.6	2.6
1,1,1-Trichloroethane	10800	NA	2300	ND	ND	ND	ND	ND
1,1,2-Trichloro-1,2,2-trifluoroethane	NA	NA	NA	0.49J	0.53J	0.50J	0.53J	0.51J
Trichlorofluoromethane	NA	NA	730	1.3	1.3	1.4	1.3	1.4
1,2,4-Trimethylbenzene	NA	NA	6.2	0.65J	0.49J	0.39J	0.33J	0.40J
1,3,5-Trimethylbenzene	NA	NA	6.2	ND	ND	ND	ND	ND
2,2,4-Trimethylpentane	NA	NA	NA	0.20J	0.22J	ND	ND	0.18J
Vinyl Chloride	1278	77	0.11	ND	ND	ND	ND	ND
m/p-Xylene	8687	8687	110	1.1	0.95	0.72J	0.75J	0.82J
o-Xylene	8687	8687	110	0.38J	0.34J	0.27J	0.27J	0.33J
*Prevailing Wind Direction with respect to the landfill								
U: Upwind								
D: Downwind								
C: Crosswind								
V: Variable								
NS = No Sample								
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