

**Countywide Recycling & Disposal Facility  
Ambient Air Monitoring  
Monthly Report #13  
June 20, 2008**

**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  
Lawhon & Associates, Inc.  
975 Eastwind Drive, Suite 190  
Westerville, OH 43081

**Countywide Recycling & Disposal Facility**  
**Ambient Air Monitoring**  
**Monthly Report #13**  
**June 20, 2008**  
**Monitoring Events #56 through 60**

## **1.0 INTRODUCTION**

Beginning on Monday May 21, 2007 ambient air sampling is being conducted every six days as mandated by Order 5.A. of the Ohio EPA Director's Findings and Orders dated March 28, 2007. This report covers the analytical results from the following Monitoring Events.

- Event #56: Monday April 21 to Tuesday April 22.
- Event #57: Sunday April 27 to Monday April 28.
- Event #58: Saturday May 3 to Sunday May 4.
- Event #59: Friday May 9 to Saturday May 10.
- Event #60: Thursday May 15 to Friday May 16.

Air samples were collected over a 24-hour period at four locations: Bolivar Elementary School (School); the cell tower on the Countywide facility (Cell Tower); near the top of the hill at the KOA campground to the northeast of the landfill (Campground); and east of the landfill near the floodgates located on Gracemont, off the Tri-County horse trail (Wetland). (Figure 1). The normal specified route for trucks entering the Countywide facility is Dueber Road and Gracemont Road through a wetland. Since there are no people working or residing in the wetland, it is being considered a temporary location until such time as the Agency specifies a fourth permanent monitoring location. The campground is frequently in the area of impact predicted by the air model.

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

All analyses were performed by Integrated Analytical Laboratory (IAL), Randolph, NJ. Certification numbers: ELAP-11402; NJDEP-14751; AIHA-100201.

As a conservative first evaluation, the concentrations of chemicals detected in the air samples were compared to the corresponding USEPA Region 9 Preliminary Remediation Goals (PRGs). The USEPA Region 9 PRG is the concentration of a chemical in the

ambient air that is estimated to be without significant risk to a person who would breathe that level of chemical continuously over many decades. The Region 9 PRGs are derived using conservative mathematical formulas and do not represent the level of a chemical in the air (or other environmental media) where health effects are likely to occur. Region 9 PRGs are generally accepted as conservative screening values, such that if the concentration of a chemical 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. The chemical that were 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 of 0.25 ug/m<sup>3</sup> is lower than the average background concentration of 1.96 ug/m<sup>3</sup> in ambient air in Ohio (Ohio EPA, *Portsmouth Ohio Air Quality Study 2003*). Consequently, finding certain chemicals in ambient air at levels above PRGs that are very close to analytical detection limits is not uncommon and may simply reflect fluctuations in background sources. It should be noted that not all of the compounds found in the air samples have corresponding PRGs.

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 #56, Monday/Tuesday April 21/22, 2008:

April 21: Average temperature in degrees F: 62, Max. 73, Min. 50.

Winds were 0 mph with max gusts of 23 mph out of the SE.

Average relative humidity 65% with 0.01 inches of precipitation recorded.

Complaints: Complaints occurred at 8:50 am from I-77 N between mile markers 96 and 97; and at 4:48 pm from Sherman Church Avenue between Haut Street and Hudson.

Extraction well drilling; RW-4 maintenance were potentially odor-causing activities noted on the Daily Odor Monitoring Summary.

April 22: Average temperature in degrees F: 62, Max. 75, Min. 52

Winds were 2 mph with max gusts of 18 mph out of the SE.

Average relative humidity 58% with no precipitation recorded.

Complaints: Complaints occurred at 4:19 pm from Sherman Church Avenue between Haut Street and Hudson; and at 6:27 pm from I-77 S between mile markers 96 and 95.

Extraction well drilling; RW-4 maintenance; and pipeline construction were potentially odor-causing activities noted on the Daily Odor Monitoring Summary.

### Event #57, Sunday/Monday April 27/28, 2008:

April 27: Average temperature in degrees F: 54, Max. 67, Min. 41.

Winds were 6 mph with max gusts at 18 mph out of the NNW.

Average relative humidity 71% with 0.01 inches of precipitation recorded.  
Complaints: There were no odor complaints during this time.  
April 28: Average temperature in degree F: 50, Max. 57, Min. 43.  
Winds were 6 mph with max gusts of 17 mph out of the N.  
Average relative humidity 72% with 0.32 inches of precipitation recorded.  
Complaints: There were no odor complaints during this time.

Event #58: Saturday/Sunday May 03/04, 2008:

May 03: Average temperature in degrees F: 63, Max. 70, Min. 55.  
Winds were 5 mph with max gusts at 24 mph out of the SSW.  
Average relative humidity 76% with 0.54 inches of precipitation recorded.  
Complaints: There were no odor complaints during this time.  
May 04: Average temperature in degrees F: 56, Max. 64, Min. 46.  
Winds were 9 mph with max gusts of 28 mph out of the NW.  
Average relative humidity 56% with no precipitation recorded.  
Complaints: There were no odor complaints during this time.

Event #59: Friday/Saturday May 09/10, 2008:

May 09: Average temperature in degrees F: 57, Max. 66, Min. 47  
Winds were 8 mph with max gusts at 21 mph out of the N.  
Average relative humidity was 73% with 0.03 inches of precipitation recorded.  
Complaints: There were no odor complaints during this time.  
May 10: Average temperature in degrees F: 54, Max. 66, Min. 42.  
Winds were 7 mph with max speed of 18 mph out of the N.  
Average relative humidity was 67% with 0.08 inches of precipitation recorded.  
Complaints: There were no odor complaints during this time.

Event #60, Thursday/Friday May 15/16, 2008:

May 15: Average temperature in degrees F: 58, Max. 66, Min. 51  
Winds were 2 mph with max speed of 18 mph out of the N.  
Average relative humidity 71% with 0.01 inches of precipitation recorded.  
Complaints: Complaints occurred at 7:10 am from the Bolivar Dam Road; and at 8:54 pm from Sherman Church Avenue in Bolivar. Pump maintenance; relief well maintenance were potentially odor-causing activities noted on the Daily Odor Monitoring Summary.  
May 16: Average temperature in degrees F: 54, Max. 64, Min. 46.  
Winds were 6 mph with max gusts of 22 mph out of the NNE.  
Average relative humidity was 68% with 0.19 inches of precipitation recorded.  
Complaints: There were no odor complaints during this time.

Note: There were very few odor complaints on the days that the monitoring took place.

### **3.0 ANALYTICAL RESULTS**

The laboratory analyzed the air samples for a large number of chemicals. Only those results that exceeded Region 9 PRGs will be discussed in the body of the report. Other compounds may have been detected in a sample, but were quantified at concentrations

below the respective PRG. All of the analytical results from the laboratory are provided in the Appendices.

### 3.1 Volatile Organic Compounds

Compounds detected by Method TO-15 modified are summarized in Tables 1 through 5. Method TO-15 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, this method also has the capability to tentatively identify and estimate the concentration of numerous compounds that are not on the “standard” list. These Tentatively Identified Compounds (TICs) include some compounds for which there are other specific analytical methods. Of particular relevance to interpreting the data from this monitoring effort is the fact that Method TO-15 identifies acetaldehyde, a carbonyl compound that is a specific target for Method TO-11A. All results for acetaldehyde will be discussed in Section 3.3. Data reports from the analytical laboratory are provided in the Appendices. Results that exceeded corresponding Region 9 PRGs and any other relevant findings are discussed below. Chemicals that were detected below PRGs will not be discussed unless those particular results help to explain other findings.

#### Event #56, April 21/22, 2008:

Analytical results for Method TO-15 for Event #56 are summarized in Table 1 and provided in Appendix A. Seven compounds were measured at levels above their respective PRG. The prevailing wind direction was from the southeast for 4/21 and 4/22.

**Event #56: VOCs Detected Above PRGs**  
**Concentrations in ug/m3**

Compound	PRG	School	Cell Tower	Campground	Wetland
		4/21 Up : 4/22 Up	4/21 Cross/Up : 4/22 Cross/Up	4/21 Down : 4/22 Down	4/21 Cross : 4/22 Cross
Benzene	<b>0.25</b>	<b>26</b>	<b>6.4</b>	<b>20</b>	<b>123</b>
1,3-Butadiene	<b>0.061</b>	<b>12</b>	<b>6.4</b>	<b>24</b>	<b>7.2</b>
Chloroethane	<b>2.3</b>	1.7	ND	<b>3.3</b>	1.8
Methylene Chloride	<b>4.1</b>	<b>8.9</b>	<b>227</b>	<b>9.3</b>	<b>4.2</b>
1,2,4-Trimethylbenzene	<b>6.2</b>	<b>21</b>	<b>8.2</b>	<b>16</b>	<b>18</b>
Vinyl Chloride	<b>0.11</b>	<b>1.4</b>	ND	ND	ND
Acetaldehyde (TIC)	<b>0.87</b>	<b>67</b>	<b>34</b>	<b>97</b>	<b>65</b>

#### Event #57, April 27/28, 2008:

Analytical results for Method TO-15 for Event #57 are summarized in Table 2 and provided in Appendix B. Six compounds were measured at levels above their respective PRG. When the monitoring began on 4/27 the prevailing wind direction was from the north-northwest. By 4/28 the wind direction was from the north.

**Event #57: VOCs Detected Above PRGs  
Concentrations in ug/m3**

<b>Compound</b>	<b>PRG</b>	<b>School</b> 4/27 Down/Cross : 4/28 Down	<b>Cell Tower</b> 4/27 Cross/Down : 4/28 Cross	<b>Campground</b> 4/27 Up/Cross : 4/28 Up	<b>Wetland</b> 4/27 Down/Cross : 4/28 Cross
Benzene	<b>0.25</b>	<b>9.6</b>	<b>16</b>	<b>15</b>	<b>39</b>
1,3-Butadiene	<b>0.061</b>	<b>5.6</b>	<b>57</b>	<b>17</b>	<b>4.6</b>
Methylene Chloride	<b>4.1</b>	<b>153</b>	3.9	3.4	37
1,2,4-Trimethylbenzene	<b>6.2</b>	<b>13</b>	<b>18</b>	<b>27</b>	<b>16</b>
Vinyl Chloride	<b>0.11</b>	ND	<b>3.7</b>	<b>3.1</b>	<b>1.4</b>
Acetaldehyde (TIC)	<b>0.87</b>	ND	ND	<b>79</b>	<b>25</b>

Event #58, May 03/04, 2008:

Analytical results for Method TO-15 for Event #58 are summarized in Table 3 and provided in Appendix C. Five compounds were measured at levels above their respective PRG. When the monitoring began on 5/03 the prevailing wind direction was from the south-southwest. By 5/04 the wind direction was from the northwest.

**Event #58: VOCs Detected Above PRGs  
Concentrations in ug/m3**

<b>Compound</b>	<b>PRG</b>	<b>School</b> 5/3 Cross : 5/4 Cross	<b>Cell Tower</b> 5/3 Up : 5/4 Up/Cross	<b>Campground</b> 5/3 Cross : 5/4 Cross	<b>Wetland</b> 5/3 Cross : 5/4 Down/Cross
Benzene	<b>0.25</b>	<b>17</b>	<b>44</b>	<b>2.6</b>	<b>1.9</b>
1,3-Butadiene	<b>0.061</b>	<b>11</b>	<b>4.0</b>	<b>4.7</b>	ND
Chloroethane	<b>2.3</b>	<b>4.0</b>	<b>4.5</b>	ND	ND
Vinyl Chloride	<b>0.11</b>	<b>1.9</b>	<b>1.9</b>	ND	ND
Acetaldehyde (TIC)	<b>0.87</b>	<b>72</b>	<b>70</b>	<b>20</b>	ND

Event #59, May 09/10, 2008:

Analytical results for Method TO-15 for Event #59 are summarized in Table 4 and provided in Appendix D. Six compounds were measured at levels above their respective PRG. . The prevailing wind direction was from the north for 5/09 and 5/10.

**Event #59: VOCs Detected Above PRGs**  
**Concentrations in ug/m3**

<b>Compound</b>	<b>PRG</b>	<b>School</b> 5/9 Down : 5/10 Down	<b>Cell Tower</b> 5/9 Cross : 5/10 Cross	<b>Campground</b> 5/9 Up : 5/10 Up	<b>Wetland</b> 5/9 Cross : 5/10 Cross
Benzene	<b>0.25</b>	<b>14</b>	<b>5</b>	<b>2.5</b>	<b>4.6</b>
1,3-Butadiene	<b>0.061</b>	<b>5.1</b>	<b>1.4</b>	<b>3.8</b>	ND
Chloroethane	<b>2.3</b>	<b>3.3</b>	ND	ND	1.7
Methylene Chloride	<b>4.1</b>	ND	ND	3.1	<b>5.3</b>
1,2,4-Trimethylbenzene	<b>6.2</b>	12	3.7	<b>12</b>	<b>11</b>
Acetaldehyde (TIC)	<b>0.87</b>	<b>67</b>	<b>29</b>	<b>18</b>	<b>22</b>

Event #60, May 15/16, 2008:

Analytical results for Method TO-15 for Event #60 are summarized in Table 5 and provided in Appendix E. Seven compounds were measured at levels above their respective PRG. When the monitoring began on 5/15 the prevailing wind direction was from the north. By 5/16 the wind direction was from the north-northeast.

**Event #60: VOCs Detected Above PRGs**  
**Concentrations in ug/m3**

<b>Compound</b>	<b>PRG</b>	<b>School</b> 5/15 Down : 5/16 Down	<b>Cell Tower</b> 5/15 Cross : 5/16 Down/Cross	<b>Campground</b> 5/15 Up : 5/16 Up/Cross	<b>Wetland</b> 5/15 Cross : 5/16 Cross
Benzene	<b>0.25</b>	<b>19</b>	<b>8.3</b>	<b>21</b>	ND
1,3-Butadiene	<b>0.061</b>	<b>8.0</b>	<b>15</b>	<b>7.2</b>	ND
Chloroethane	<b>2.3</b>	<b>3.5</b>	<b>5</b>	<b>2.7</b>	ND
Methylene Chloride	<b>4.1</b>	<b>4.3</b>	<b>9.8</b>	<b>191</b>	ND
1,2,4-Trimethylbenzene	<b>6.2</b>	<b>14</b>	<b>12</b>	5.8	ND
Vinyl Chloride	<b>0.11</b>	<b>3.6</b>	<b>4.3</b>	<b>3.1</b>	ND
Acetaldehyde (TIC)	<b>0.87</b>	ND	ND	ND	<b>5.6</b>

### 3.2 Sulfur Compounds

Event #56, April 21/22, 2008:

Carbon disulfide results for Method TO-15 for Event #56 are summarized below and provided in Appendix A.

**Event #56: Sulfur Compounds  
Concentrations in ug/m3**

<b>Compound</b>	<b>PRG</b>	<b>School</b> 4/21 Up : 4/22 Up	<b>Cell Tower</b> 4/21 Cross/Up : 4/22 Cross/Up	<b>Campground</b> 4/21 Down : 4/22 Down	<b>Wetland</b> 4/21 Cross : 4/22 Cross
Carbon disulfide	<b>730</b>	ND	14	2.6	9.0

Event #57, April 27/28, 2008:

Carbon disulfide results for Method TO-15 for Event #57 are summarized below and provided in Appendix B.

**Event #57: Sulfur Compounds  
Concentrations in ug/m3**

<b>Compound</b>	<b>PRG</b>	<b>School</b> 4/27 Down/Cross : 4/28 Down	<b>Cell Tower</b> 4/27 Cross/Down : 4/28 Cross	<b>Campground</b> 4/27 Up/Cross : 4/28 Up	<b>Wetland</b> 4/27 Down/Cross : 4/28 Cross
Carbon disulfide	<b>730</b>	ND	ND	8.0	7.4

Event #58, May 03/04, 2008:

Carbon disulfide results for Method TO-15 for Event #58 are summarized below and provided in Appendix C.

**Event #58: Sulfur Compounds  
Concentrations in ug/m3**

<b>Compound</b>	<b>PRG</b>	<b>School</b> 5/3 Cross : 5/4 Cross	<b>Cell Tower</b> 5/3 Up : 5/4 Up/Cross	<b>Campground</b> 5/3 Cross : 5/4 Cross	<b>Wetland</b> 5/3 Cross : 5/4 Down/Cross
Carbon disulfide	<b>730</b>	ND	4.6	ND	ND

Event #59, May 09/10, 2008:

Carbon disulfide results for Method TO-15 for Event #59 are summarized below and provided in Appendix D.

**Event #59: Sulfur Compounds  
Concentrations in ug/m3**

<b>Compound</b>	<b>PRG</b>	<b>School</b> 5/9 Down : 5/10 Down	<b>Cell Tower</b> 5/9 Cross : 5/10 Cross	<b>Campground</b> 5/9 Up : 5/10 Up	<b>Wetland</b> 5/9 Cross : 5/10 Cross
Carbon disulfide	<b>730</b>	ND	ND	ND	2.2

Event #60, May 15/16, 2008:

Carbon disulfide results for Method TO-15 for Event #60 are summarized below and provided in Appendix E.

**Event #60: Sulfur Compounds  
Concentrations in ug/m3**

<b>Compound</b>	<b>PRG</b>	<b>School</b> 5/15 Down : 5/16 Down	<b>Cell Tower</b> 5/15 Cross : 5/16 Down/Cross	<b>Campground</b> 5/15 Up : 5/16 Up/Cross	<b>Wetland</b> 5/15 Cross : 5/16 Cross
Carbon disulfide	<b>730</b>	ND	ND	2.5	ND

**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.

Event #56, March 21/22, 2008:

Analytical results for aldehydes are summarized on the following page. Formaldehyde was detected in two of the three samples from the School, Campground, and Wetland and three samples from the Cell Tower at a level above the Region 9 PRG. Acetaldehyde was estimated at levels above the PRG by Method TO-15 in the samples from the School, Cell Tower, Campground, and Wetland, but was not detected in any of the samples from any of the locations using Method TO-11A. Analytical results are in Appendix A.

**Event #56: Aldehydes  
Concentrations in ug/m3**

Aldehyde	PRG	School 4/21 Up : 4/22 Up			Cell Tower 4/21 Cross/Up : 4/22 Cross/Up			Campground 4/21 Down : 4/22 Down			Wetland 4/21 Cross : 4/22 Cross		
		1	2	3	1	2	3	1	2	3	1	2	3
Formaldehyde	<b>0.15</b>	<b>0.24</b>	ND	<b>0.22</b>	<b>0.30</b>	<b>0.25</b>	<b>0.37</b>	<b>0.31</b>	ND	<b>0.25</b>	ND	<b>0.23</b>	<b>0.28</b>
Acetaldehyde TO-11A	<b>0.87</b>	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Acetaldehyde TO-15 (TIC)	<b>0.87</b>	<b>67</b>			<b>34</b>			<b>97</b>			<b>65</b>		

Event #57, April 27/28, 2008:

Analytical results for aldehydes are summarized below. Formaldehyde was detected in three samples from the Cell Tower; two of the three samples from the Campground; and one of the three samples from the Wetland at a level above the Region 9 PRG.

Acetaldehyde was estimated at levels above the PRG by Method TO-15 in the samples from the Campground and Wetland, but was not detected in any of the samples from any of the locations using Method TO-11A. Analytical results are in Appendix B.

**Event #57: Aldehydes  
Concentrations in ug/m3**

Aldehyde	PRG	School 4/27 Down/Cross : 4/28 Down			Cell Tower 4/27 Cross/Down : 4/28 Cross			Campground 4/27 Up/Cross : 4/28 Up			Wetland 4/27 Down/Cross : 4/28 Cross		
		1	2	3	1	2	3	1	2	3	1	2	3
Formaldehyde	<b>0.15</b>	ND	ND	ND	<b>0.24</b>	<b>0.25</b>	<b>0.27</b>	<b>0.21</b>	<b>0.23</b>	ND	ND	ND	<b>0.26</b>
Acetaldehyde TO-11A	<b>0.87</b>	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Acetaldehyde TO-15 (TIC)	<b>0.87</b>	ND			ND			<b>79</b>			<b>25</b>		

Event #58, May 03/04, 2008:

Analytical results for aldehydes are summarized on the following page. Formaldehyde was detected in one of the three samples from the School; and two of the three samples from the Cell Tower, Campground, and Wetland at a level above the Region 9 PRG.

Acetaldehyde was estimated at levels above the PRG by Method TO-15 in the samples from the School, Cell Tower, and Campground but was detected in only one sample from the Cell Tower using Method TO-11A. Analytical results are in Appendix C.

**Event #58: Aldehydes  
Concentrations in ug/m3**

Aldehyde	PRG	School 5/3 Cross : 5/4 Cross			Cell Tower 5/3 Up : 5/4 Up/Cross			Campground 5/3 Cross : 5/4 Cross			Wetland 5/3 Cross : 5/4 Down/Cross		
		1	2	3	1	2	3	1	2	3	1	2	3
Formaldehyde	<b>0.15</b>	ND	ND	0.46	ND	<b>0.22</b>	<b>3.4</b>	<b>0.21</b>	ND	<b>0.31</b>	<b>0.21</b>	ND	0.58
Acetaldehyde TO-11A	<b>0.87</b>	ND	ND	ND	ND	ND	<b>1.0</b>	ND	ND	ND	ND	ND	ND
Acetaldehyde TO-15 (TIC)	<b>0.87</b>	<b>72</b>			<b>70</b>			<b>20</b>			ND		

Event #59, May 09/10, 2008:

Analytical results for aldehydes are summarized below. Formaldehyde was detected in two of the three samples from the Cell Tower at a level above the Region 9 PRG. Acetaldehyde was estimated at levels above the PRG by Method TO-15 in the samples from the School, Cell Tower, Campground, and Wetland, but was not detected in any of the samples from any of the locations using Method TO-11A. Analytical results are in Appendix D.

**Event #59: Aldehydes  
Concentrations in ug/m3**

Aldehyde	PRG	School 5/9 Down : 5/10 Down			Cell Tower 5/9 Cross : 5/10 Cross			Campground 5/9 Up : 5/10 Up			Wetland 5/9 Cross : 5/10 Cross		
		1	2	3	1	2	3	1	2	3	1	2	3
Formaldehyde	<b>0.15</b>	ND	ND	ND	<b>0.23</b>	ND	<b>0.24</b>	ND	ND	ND	ND	ND	ND
Acetaldehyde TO-11A	<b>0.87</b>	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Acetaldehyde TO-15 (TIC)	<b>0.87</b>	<b>67</b>			<b>29</b>			<b>18</b>			<b>22</b>		

Event #60, May 15/16, 2008:

Analytical results for aldehydes are summarized on the following page. Formaldehyde was detected in one of the three samples from the School, Cell Tower, and Wetland; and two of the three samples from the Campground at a level above the Region 9 PRG. Acetaldehyde was estimated at levels above the PRG by Method TO-15 in the sample from the Wetland, but was detected in only one sample from the Campground using Method TO-11A. The level detected at the Campground was at a level below the PRG. Analytical results are in Appendix E.

**Event #60: Aldehydes  
Concentrations in ug/m<sup>3</sup>**

Aldehyde	PRG	School 5/15 Down : 5/16 Down			Cell Tower 5/15 Cross : 5/16 Down/Cross			Campground 5/15 Up : 5/16 Up/Cross			Wetland 5/15 Cross : 5/16 Cross		
		1	2	3	1	2	3	1	2	3	1	2	3
Formaldehyde	<b>0.15</b>	ND	ND	<b>0.28</b>	ND	ND	<b>0.67</b>	ND	<b>0.23</b>	<b>0.26</b>	ND	ND	<b>0.54</b>
Acetaldehyde TO-11A	<b>0.87</b>	ND	ND	ND	ND	ND	ND	ND	ND	0.67	ND	ND	ND
Acetaldehyde TO-15 (TIC)	<b>0.87</b>	ND			ND			ND			<b>5.6</b>		

### 3.4 Hydrogen Chloride and Hydrogen Fluoride

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.

Analytical results for sampling events #56 through #60 are summarized on the following pages. All detected concentrations were very low, and were orders of magnitude below the PRG of 210 ug/m<sup>3</sup> for HCl.

Event #56, April 21/22, 2008:

Hydrogen fluoride was not detected in any of the samples from any of the four locations. Hydrogen chloride not was detected any of the samples from any of the four locations. Analytical results are in Appendix A.

Event #57, April 27/28, 2008:

Hydrogen fluoride was not detected in any of the samples from any of the four locations. Hydrogen chloride not was detected any of the samples from any of the four locations. Analytical results are in Appendix B.

Event #58, May 03/04, 2008:

Hydrogen fluoride was detected at a concentration of 2.4 ug/m<sup>3</sup> in the third sample from the Cell Tower. Hydrogen chloride not was detected any of the samples from any of the four locations. Analytical results are in Appendix C.

Event #59, May 09/10, 2008:

Hydrogen fluoride was not detected in any of the samples from any of the four locations. Hydrogen chloride not was detected any of the samples from any of the four locations. Analytical results are in Appendix D.

Event #60, May 15/16, 2008:

Hydrogen fluoride was detected at a concentration of 2.7 ug/m<sup>3</sup> in the second sample from the Wetland. Hydrogen chloride not was detected any of the samples from any of the four locations. Analytical results are in Appendix E.

## **4.0 SUMMARY**

### **4.1 Volatile Organic Compounds**

Occasional anomalous results for benzene, methylene chloride, and vinyl chloride continue to create challenges for interpreting the data. Chloroethane was sporadically found at low concentrations, but above the PRG in a number of samples from these monitoring event. Chloroethane was rarely detected prior to the middle of April, 2008. There were no clear differences in the concentrations of chloroethane found in upwind vs. downwind monitoring locations. As of this time, we do not know of any specific change in conditions that would explain the appearance of low levels of chloroethane during the April monitoring.

A number of the 1, 3-butadiene results also appear to be outside of the range of concentrations previously detected and expected from local automotive emissions. Levels of benzene, 1, 3-butadiene and vinyl chloride found in published studies were discussed in the previous monthly report.

It is unlikely that the VOCs detected at the community monitoring locations came from the landfill for the following reasons.

- 1) The air dispersion modeling that has been conducted at the request of OEPA indicates that the maximum concentration of a VOC at the eastern fence-line of the landfill (most highly impacted location) would not exceed 30 ug/m<sup>3</sup> under worst-case conditions. Concentrations would continue to decline rapidly with distance away from the source areas of the landfill, thus making it difficult to distinguish the landfill from other sources that might influence the off-site monitoring stations. For example, concentrations of VOCs at the wetland monitor, which is close to the eastern fence-line are not consistently higher than concentrations found at the Bolivar School which is the farthest away from the landfill.
- 2) As in the past, certain compounds were detected at levels above Region 9 PRGs at both upwind and downwind locations with respect to the landfill. This also supports the contention that the chemicals found during the ambient air monitoring are not coming exclusively from the landfill.
- 3) The VOCs found at the community monitoring locations are not consistent with the "signature" of reaction landfill gas. The majority of the VOCs detected in the landfill gas, including benzene, have a number of common sources such as motor vehicle

emissions. However, tetrahydrofuran and ethyl acetate have many fewer sources, but are abundant in the reaction landfill gas. These compounds have rarely (tetrahydrofuran) and never (ethyl acetate) been found during the ambient air monitoring. Furthermore, t-butyl alcohol has been frequently found during the ambient monitoring but has not been detected in the landfill gas.

#### **4.2 Aldehydes (Carbonyl Compounds)**

Formaldehyde was detected at less than 1.0 ug/m<sup>3</sup>, but still above the Region 9 PRG in a number of the samples. As stated in previous reports, the low concentrations of formaldehyde that have been detected during our monitoring are likely related to regional air quality conditions. Acetaldehyde was only detected in two sample tubes analyzed by Method TO-11A, and only one reading was above the Region 9 PRG. As mentioned previously, although acetaldehyde is routinely reported as a Method TO-15 TIC at higher concentrations than detected by Method TO-11A, the latter analytical method is specific for carbonyl compounds and thus the results are considered more reliable than the TO-15 TICs. Like formaldehyde, the low levels of acetaldehyde occasionally detected in the community air samples appears to be background and not attributable to the landfill.

#### **4.3 Hydrogen Fluoride and Hydrogen Chloride**

Hydrogen chloride was not detected in any of the sample tubes from the monitoring events covered by this report and hydrogen fluoride was detected at very low concentrations in only two of the sample tubes from these five monitoring events.

#### **4.4 Laboratory Issues**

We are examining the laboratory QC packages for any potential explanations for the apparently anomalous TO-15 findings. As indicated in discussions with Ohio EPA staff, we are in the process of transitioning the VOC analyses from IAL to Test America laboratories. In the next monthly report we expect to present the results of a limited number of co-located samples sent to both laboratories for comparison.

#### **4.5 Conclusion**

Monitoring results for mid-April through mid-May were similar to those presented in previous monthly reports. No significant new information was revealed that would cause us to change our opinion that the monitoring results represent regional air quality and are not exclusively attributable to emissions from Countywide landfill. It remains our opinion that there is not a risk to public health related to airborne emissions from Countywide landfill

**Countywide Recycling & Disposal Facility  
Ambient Air Monitoring  
Monthly Report #13**

June 20, 2008

**EPA Method TO-15 SUMMARY TABLES**

**Countywide Recycling & Disposal Facility**

**EPA Method TO-15 Modified: Volatile Organic Compounds**

**Table 1: Event #56 April 21/22, 2008**

Analyte	PRG	Monitoring Location			
		School	Cell Tower	Campground	Wetland
		4/21 Up : 4/22 Up	4/21 Cross/Up : 4/22 Cross/Up	4/21 Down : 4/22 Down	4/21 Cross : 4/22 Cross
All results in ug/m3					
<b>Method TO-15 Modified</b>					
Acetone	3300	426	ND	660	251
Benzene	<b>0.25</b>	<b>26</b>	<b>6.4</b>	<b>20</b>	<b>123</b>
1,3-Butadiene	<b>0.061</b>	<b>12</b>	<b>6.4</b>	<b>24</b>	<b>7.2</b>
tert-Butyl alcohol	NA	204	122	675	142
Carbon disulfide	730	ND	14	2.6	9.0
Chloroethane	<b>2.3</b>	1.7	ND	<b>3.3</b>	1.8
Chloromethane	95	7.3	3.2	8.7	6.1
Cyclohexane	6200	ND	3.8	2.5	2.4
Dichlorodifluoromethane	210	6.4	30	4.8	6.1
Ethylbenzene	1100	16	9.1	14	15
4-Ethyltoluene	NA	6.0	ND	4.8	5.5
Heptane	NA	54	17	97	50
Hexane	210	19	11	16	16
Methyl ethyl ketone	5100	111	38	243	100
Methyl isobutyl ketone	3100	20	5.8	29	20
Methylene chloride	<b>4.1</b>	<b>8.9</b>	<b>227</b>	<b>9.3</b>	<b>4.2</b>
Styrene	1100	ND	3.9	ND	ND
Toluene	400	61	45	63	58
Trichlorofluoromethane	730	2.8	8.0	ND	ND
1,2,4-Trimethylbenzene	<b>6.2</b>	<b>21</b>	<b>8.2</b>	<b>16</b>	<b>18</b>
1,3,5-Trimethylbenzene	6.2	5.9	ND	4.5	5.1
2,2,4-Trimethylpentane	NA	8.8	3.4	ND	5.6
Vinyl Chloride	<b>0.11</b>	<b>1.4</b>	ND	ND	ND
m/p-Xylene	110	57	27	52	53
o-Xylene	110	22	11	19	20
<b>Tentatively Identified Compounds</b>					
Acetaldehyde	<b>0.87</b>	<b>67</b>	<b>34</b>	<b>97</b>	<b>65</b>
Acetonitrile	62	27	12	ND	37
Butanal	NA	32	ND	71	47
Butane, 2-methyl-	NA	ND	94	ND	ND
Difluorochloromethane	NA	ND	39	ND	ND
Ethanol	NA	ND	19	ND	ND
Heptane, 3-methylene	NA	151	39	ND	169
1-Heptene	NA	72	22	140	44
Hexanal	NA	65	ND	45	49
1-Hexene	NA	45	ND	62	ND
2-Hexene, 3,5-dimethyl	NA	ND	ND	362	ND
Isobutane	NA	ND	20	ND	ND
Pentanal	NA	35	ND	49	35

Analyte	PRG	Monitoring Location			
		School	Cell Tower	Campground	Wetland
		4/21 Up : 4/22 Up	4/21 Cross/Up : 4/22 Cross/Up	4/21 Down : 4/22 Down	4/21 Cross : 4/22 Cross
All results in ug/m3					
Pentane	NA	ND	191	ND	ND
1-Pentene	NA	34	19	63	ND
2-Pentanone	NA	ND	ND	46	ND
1R- .alpha. -Pinene	NA	ND	ND	ND	100
Propene	NA	24	ND	40	26
1-Propene-2-methyl	NA	ND	ND	ND	95
ND = Not Detected					
NA = Not Available					
Shading indicates result exceeds PRG					

**Countywide Recycling & Disposal Facility**  
**EPA Method TO-15 Modified: Volatile Organic Compounds**  
**Table 2: Event #57 April 27/28, 2008**

Analyte	PRG	Monitoring Location			
		School	Cell Tower	Campground	Wetland
		4/27 Down/Cross : 4/28 Down	4/27 Cross/Down : 4/28 Cross	4/27 Up/Cross : 4/28 Up	4/27 Down/Cross : 4/28 Cross
All results in ug/m3					
<b>Method TO-15 Modified</b>					
Acetone	3300	ND	343	546	ND
Benzene	<b>0.25</b>	<b>9.6</b>	<b>16</b>	<b>15</b>	<b>39</b>
1,3-Butadiene	<b>0.061</b>	<b>5.6</b>	<b>57</b>	<b>17</b>	<b>4.6</b>
tert-Butyl alcohol	NA	32	351	365	118
Carbon disulfide	730	ND	ND	8.0	7.4
Chloroethane	2.3	ND	2.2	1.7	1.4
Chloromethane	95	4.0	5.7	5.1	5.4
Cyclohexane	6200	12	ND	ND	6.3
Dichlorodifluoromethane	210	22	6.9	5.5	48
Ethylbenzene	1100	9.6	13	16	12
4-Ethyltoluene	NA	6.0	5.4	8.1	5.2
Heptane	NA	23	64	65	28
Hexane	210	25	11	11	17
Methyl ethyl ketone	5100	48	136	188	80
Methyl isobutyl ketone	3100	5.2	28	30	13
Methylene chloride	<b>4.1</b>	<b>153</b>	3.9	3.4	37
Styrene	1100	6.1	ND	ND	4.9
Toluene	400	116	62	65	75
Trichlorofluoromethane	730	3.9	ND	ND	3.5
1,2,4-Trimethylbenzene	<b>6.2</b>	<b>13</b>	<b>18</b>	<b>27</b>	<b>16</b>
1,3,5-Trimethylbenzene	6.2	4.2	4.9	6.9	4.4
2,2,4-Trimethylpentane	NA	6.9	6.4	6.8	5.9
Vinyl Chloride	<b>0.11</b>	ND	<b>3.7</b>	<b>3.1</b>	<b>1.4</b>
m/p-Xylene	110	23	48	58	39
o-Xylene	110	8.6	17	21	14
<b>Tentatively Identified Compounds</b>					
Acetaldehyde	<b>0.87</b>	ND	ND	<b>79</b>	<b>25</b>
Acetonitrile	62	15	30	35	15
Butanal	NA	ND	44	50	ND
Butane, 2-methyl-	NA	124	ND	ND	106
Cyclopentane	NA	24	ND	ND	ND
Decane	NA	38	ND	ND	ND
Difluorochloromethane	NA	ND	ND	ND	81
Dodecane	NA	70	ND	ND	ND
Ethanol	NA	ND	ND	ND	19
Heptane, 3-methylene	NA	ND	ND	ND	73
2-Heptane, 3-methyl-	NA	ND	ND	325	ND
1-Heptene	NA	ND	72	88	ND
Hexanal	NA	ND	41	ND	ND

Hexane, 3-methyl-	NA	24	ND	ND	ND
Hexane, 2-methyl-4-methylene-	NA	ND	344	ND	ND
1-Hexene	NA	ND	38	41	ND
3-Hydroxymandelic acid, ethyl ester	NA	ND	ND	ND	106
Isobutane	NA	40	ND	ND	36
Pentanal	NA	ND	35	42	ND
Pentane	NA	68	ND	ND	74
2-Pentanone	NA	ND	34	39	ND
1-Pentene	NA	ND	57	52	ND
1R .alpha. -Piene	NA	ND	ND	ND	39
Propene	NA	11	60	46	ND
Undecane	NA	102	ND	ND	ND
ND = Not Detected					
NA = Not Available					
Shading indicates result exceeds PRG					

**Countywide Recycling & Disposal Facility**  
**EPA Method TO-15 Modified: Volatile Organic Compounds**

**Table 3: Event #58 May 03/04, 2008**

Analyte	PRG	Monitoring Location			
		School	Cell Tower	Campground	Wetland
		5/3 Cross : 5/4 Cross	5/3 Up : 5/4 Up/Cross	5/3 Cross : 5/4 Cross	5/3 Cross : 5/4 Down/Cross
All results in ug/m3					
<b>Method TO-15 Modified</b>					
Acetone	3300	398	241	60	71
Benzene	<b>0.25</b>	<b>17</b>	<b>44</b>	<b>2.6</b>	<b>1.9</b>
1,3-Butadiene	<b>0.061</b>	<b>11</b>	<b>4.0</b>	<b>4.7</b>	ND
tert-Butyl alcohol	NA	151	118	38	29
Carbon disulfide	730	ND	4.6	ND	ND
Chloroethane	<b>2.3</b>	<b>4.0</b>	<b>4.5</b>	ND	ND
Chloromethane	95	10	8.3	4.9	3.6
Dichlorodifluoromethane	210	7.1	7.0	9.1	8.1
Ethylbenzene	1100	11	11	ND	ND
4-Ethyltoluene	NA	4.9	5.1	ND	ND
Heptane	NA	37	29	7.5	8.1
Hexane	210	18	9.1	4.0	5.4
Methyl ethyl ketone	5100	90	90	14	16
Methyl isobutyl ketone	3100	15	16	ND	ND
Methylene chloride	4.1	2.5	2.1	ND	ND
Toluene	400	45	49	5.5	4.2
Trichlorofluoromethane	730	ND	3.2	4.1	3.9
1,2,4-Trimethylbenzene	<b>6.2</b>	16	16	ND	ND
1,3,5-Trimethylbenzene	6.2	4.5	4.5	ND	ND
2,2,4-Trimethylpentane	NA	5.5	4.1	ND	ND
Vinyl Chloride	<b>0.11</b>	<b>1.9</b>	<b>1.9</b>	ND	ND
m/p-Xylene	110	42	41	4.1	2.9
o-Xylene	110	15	15	ND	ND
<b>Tentatively Identified Compounds</b>					
Acetaldehyde	<b>0.87</b>	<b>72</b>	<b>70</b>	<b>20</b>	ND
Acetonitrile	62	29	37	ND	ND
Butanal	NA	25	35	ND	ND
Butane	NA	ND	ND	ND	6.6
Cyclotrisiloxane, hexamethyl-	NA	ND	ND	15	ND
Decanal	NA	ND	ND	11	15
Heptane, 3-methylene	NA	101	119	23	21
1-Heptene	NA	48	ND	6.0	ND
Hexanal	NA	45	28	ND	ND
1-Hexene	NA	41	ND	ND	ND
Isobutane	NA	ND	ND	ND	17
Nonanal	NA	ND	ND	ND	14
Pentanal	NA	ND	24	ND	ND
Pentane	NA	29	ND	8.2	8.2
1-Pentene	NA	49	23	14	8.9

1-Pentene, 2-methyl	NA	ND	ND	8.6	8.2
.alpha.-Pinene	NA	ND	52	ND	ND
Propene	NA	27	16	50	7.9
1-Propene, 2-methyl-	NA	ND	71	95	23
ND = Not Detected					
NA = Not Available					
Shading indicates result exceeds PRG					

**Countywide Recycling & Disposal Facility**

**EPA Method TO-15 Modified: Volatile Organic Compounds**

**Table 4: Event #59 May 09/10, 2008**

Analyte	PRG	Monitoring Location			
		School	Cell Tower	Campground	Wetland
		5/9 Down : 5/10 Down	5/9 Cross : 5/10 Cross	5/9 Up : 5/10 Up	5/9 Cross : 5/10 Cross
All results in ug/m3					
<b>Method TO-15 Modified</b>					
Acetone	3300	436	85	ND	ND
Benzene	<b>0.25</b>	<b>14</b>	<b>5</b>	<b>2.5</b>	<b>4.6</b>
1,3-Butadiene	<b>0.061</b>	<b>5.1</b>	<b>1.4</b>	<b>3.8</b>	ND
tert-Butyl alcohol	NA	98	31	30	18
Carbon disulfide	730	ND	ND	ND	2.2
Chloroethane	<b>2.3</b>	<b>3.3</b>	ND	ND	1.7
Chloromethane	95	8.1	2.6	4.5	1.5
Cyclohexane	6200	ND	ND	ND	3.6
Dichlorodifluoromethane	210	6.2	ND	6.3	ND
Ethylbenzene	1100	8.9	2.8	3.9	4.8
4-Ethyltoluene	NA	3.7	ND	2.9	3.1
Heptane	NA	38	12	8.0	5.7
Hexane	210	12	3.6	4.6	7.6
Methyl ethyl ketone	5100	103	31	17	16
Methyl isobutyl ketone	3100	12	3.4	ND	ND
Methylene chloride	<b>4.1</b>	ND	ND	3.1	<b>5.3</b>
Toluene	400	49	17	13	19
Trichlorofluoromethane	730	ND	ND	ND	3.0
1,2,4-Trimethylbenzene	<b>6.2</b>	12	3.7	<b>12</b>	<b>11</b>
1,3,5-Trimethylbenzene	6.2	3.5	ND	3.0	2.9
2,2,4-Trimethylpentane	NA	3.7	ND	ND	ND
m/p-Xylene	110	52	16	26	31
o-Xylene	110	12	3.7	7.1	7.6
<b>Tentatively Identified Compounds</b>					
Acetaldehyde	<b>0.87</b>	<b>67</b>	<b>29</b>	<b>18</b>	<b>22</b>
Acetonitrile	62	23	7.4	ND	ND
Butanal	NA	29	11	ND	ND
Butane, 2-methyl-	NA	ND	ND	27	27
Cyclopropane, ethyl-	NA	ND	ND	ND	7.7
Heptane, 3-methylene	NA	105	39	25	12
1-Heptene	NA	56	20	ND	ND
1-Hexene	NA	38	16	12	ND
Hexanal	NA	41	16	ND	ND
Isobutane	NA	ND	ND	11	ND
D-Limonene	NA	ND	ND	ND	14
Pentanal	NA	30	ND	ND	ND
Pentane	NA	ND	ND	9.7	14
1-Pentene	NA	27	12	18	ND
1R .alpha. -Piene	NA	ND	ND	ND	61

Propene	NA	ND	5.8	21	ND
1-Propene, 2-methyl-	NA	90	40	74	33
Tridecane	NA	ND	ND	29	25
Undecane, 2,6-dimethyl-	NA	ND	ND	ND	10
ND = Not Detected					
NA = Not Available					
Shading indicates result exceeds PRG					

**Countywide Recycling & Disposal Facility**  
**EPA Method TO-15 Modified: Volatile Organic Compounds**  
**Table 5: Event #60 May 15/16, 2008**

Analyte	PRG	Monitoring Location			
		School	Cell Tower	Campground	Wetland
		5/15 Down : 5/16 Down	5/15 Cross : 5/16 Down/Cross	5/15 Up : 5/16 Up/Cross	5/15 Cross : 5/16 Cross
All results in ug/m3					
<b>Method TO-15 Modified</b>					
Acetone	3300	287	388	360	17
Benzene	<b>0.25</b>	<b>19</b>	<b>8.3</b>	<b>21</b>	ND
1,3-Butadiene	<b>0.061</b>	<b>8.0</b>	<b>15</b>	<b>7.2</b>	ND
tert-Butyl alcohol	NA	116	81	59	2.1
Carbon disulfide	730	ND	ND	2.5	ND
Chloroethane	<b>2.3</b>	<b>3.5</b>	<b>5</b>	<b>2.7</b>	ND
Chloromethane	95	8.3	17	7.5	2.7
Dichlorodifluoromethane	210	6.3	14	3.8	6.3
Ethylbenzene	1100	13	8.6	4.3	ND
4-Ethyltoluene	NA	4.5	3.9	ND	ND
Heptane	NA	33	41	25	ND
Hexane	210	16	12	6.2	ND
Methyl ethyl ketone	5100	97	114	84	4.9
Methyl isobutyl ketone	3100	10	13	5.7	ND
Methylene chloride	<b>4.1</b>	<b>4.3</b>	<b>9.8</b>	<b>191</b>	ND
Toluene	400	51	47	21	2.6
Trichlorofluoromethane	730	ND	ND	4.6	ND
1,2,4-Trimethylbenzene	<b>6.2</b>	<b>14</b>	<b>12</b>	5.8	ND
1,3,5-Trimethylbenzene	6.2	3.7	3.1	ND	ND
2,2,4-Trimethylpentane	NA	3.3	3.2	ND	ND
Vinyl Chloride	<b>0.11</b>	<b>3.6</b>	<b>4.3</b>	<b>3.1</b>	ND
m/p-Xylene	110	76	49	26	ND
o-Xylene	110	17	11	6.1	ND
<b>Tentatively Identified Compounds</b>					
Acetaldehyde	<b>0.87</b>	ND	ND	ND	<b>5.6</b>
Acetonitrile	62	20	27	14	1.0
Butanal	NA	24	20	32	ND
Butane	NA	ND	ND	ND	3.0
2-Butanone, 3-methyl	NA	ND	23	ND	ND
Cyclotrisiloxane, hexamethyl-	NA	ND	ND	ND	7.4
Heptane, 3-methylene	NA	110	234	119	ND
1-Heptene	NA	44	56	34	ND
Hexanal	NA	49	ND	ND	ND
1-Hexene	NA	33	41	30	ND
Isobutane	NA	ND	ND	ND	2.1
Methyl vinyl ketone	NA	ND	20	17	ND
Nonanal	NA	ND	ND	ND	4.2
Pentane	NA	22	44	24	2.6
1-Pentene	NA	40	69	43	3.7

.alpha.-Pinene	NA	47	ND	ND	ND
1R- .alpha. -Pinene	NA	ND	ND	36	ND
Propene	NA	31	60	43	2.7
1-Propene, 2-methyl-	NA	ND	ND	ND	14
ND = Not Detected					
NA = Not Available					
Shading indicates result exceeds PRG					