Ambient Air Monitoring Report

Chrin Brothers Sanitary Landfill
Williams Township, Northampton County, Pennsylvania

ERG Project No. 081022.002

DOES NOT INCLUDE APPENDIX C

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Prepared for:

ToxiLogics, Inc.
22 Bernard Dr.
Ewing, NJ 08628

Prepared by:

EarthRes Group, Inc.
P.O. Box 468
Pipersville, PA 18947
Phone: (215) 766-1211

ERG

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1.0 INTRODUCTION

1.1 Purpose and Scope

EarthRes Group, Inc. (ERG) is pleased to provide ToxiLogics, Inc. with this Ambient Air Monitoring Report for the Chrin Brothers Sanitary Landfill (Chrin or Site) located in Williams Township, Northampton County, Pennsylvania. The Site Location Map is included as Figure 1 in Appendix A.

The purpose of this project was to provide ambient air sample laboratory analytical data to ToxiLogics, Inc. in order to complete a Risk Assessment.

To complete this project, ERG completed the following scope of work:

- Select and locate seven (7) sampling locations based on wind directions and nearby facilities;
- Install a portable weather monitoring station for collection of meteorological data during the sampling period;
- Perform ambient air sampling at seven (7) sampling locations at and surrounding the Site;
- Prepare and ship samples to laboratory and coordinate with the laboratory for analytical services using modified EPA Method TO-15 to analyze for VOCs; and
- Prepare a report detailing the ambient air monitoring procedures and results, including a discussion of VOC concentrations and potential sources.

ERG has prepared this report has with the normal standard of care typically used by environmental professionals for projects of this type. The information contained herein is intended for the sole use of Chrin Brothers, Inc. (Chrin), its subsidiaries and authorized agents. Any other use of this report or data by any third party, or other unauthorized individuals for purposes other than its original purpose, shall be at their own risk. ERG and Chrin shall have no liability or obligation to any party resulting from that unauthorized use. Background information regarding ERG is presented in Appendix D.

1.2 Site Background

The Site is owned and operated by Chrin Brothers, Inc. and is located in Williams Township, Northampton County, Pennsylvania. The Site is bordered to the north by Industrial Drive and Interstate Route 78 (I-78); to the east by Morgan Hill Road, to the west by Morvale Road and to the south by a wooded area consisting of mature deciduous trees.

1.3 Description of Ambient Air Sampling Stations

ERG selected and located seven (7) ambient air sampling stations based on wind direction and nearby facilities. For the purposes of establishing the sampling stations, wind direction data from the Lehigh Valley International Airport (LVIA) was used by ERG. Based upon this data, the prevailing wind direction for the area is from the west. The data obtained from LVIA was confirmed using the on-site portable weather station. The locations of the air sampling stations are depicted on Figure 2 in Appendix A.

Station #1

Station #1 is located in a primarily upwind position from the Site on property owned by Chrin. The sampling station was established adjacent to a farm field on a tree at an elevation of approximately 220 feet Above Mean Sea Level (AMSL). A small stream and Morvale Road are located just north of the station while a vehicular scrap yard or storage area is located approximately 600 feet northeast from the station.

Station #2

Station #2 is located in a primarily upwind position from the Site on property owned by Chrin. The sampling station was established on a chain link fence located adjacent to a stormwater detention basin at an elevation of approximately 320 feet AMSL. The station is located approximately 240 feet northwest of Industrial Drive and approximately 400 feet southeast of I-78.

Station #3

Station #3 is located in a primarily downwind or crosswind position from the Site on property owned by Chrin. The sampling station was established on an unused piece of equipment located within an equipment storage area at an elevation of approximately 430 feet AMSL. The station is located approximately 150 feet south of Industrial Drive, approximately 400 feet south of I-78 and approximately 1,000 feet east from an existing gasoline station.

Station #4

Station #4 is located in a primarily upwind or crosswind position from the Site on property owned by Chrin. The sampling station was established on a tree located near a residential structure at an elevation of approximately 425 feet AMSL. The station is located approximately 450 feet northeast of Morvale Road.

Station #5

Station #5 is located in a primarily downwind position from the Site on property owned by Chrin. The sampling station was established on a tree located approximately 100 feet northeast of an existing communications tower at an elevation of approximately 750 feet AMSL. A support building related to the tower utilizes a propane-fueled emergency generator.

Station #6

Station #6 is located in a primarily downwind position from the Site on property owned by Chrin. The sampling station was established on a tree located approximately 150 feet southwest of Morgan Hill Road at an elevation of approximately 620 feet AMSL.

Station #7

Station #7 is located in a primarily downwind position from the Site on property not owned by Chrin. The sampling station was established approximately 5,000 feet east of the Site at an elevation of approximately 735 feet AMSL.

In summary, Stations #1 and #2 were located in primarily upwind positions and the samples obtained from these stations generally represented air quality entering the Site. Stations #5, #6 and #7 were located in primarily downwind positions and samples obtained from these stations generally represented air quality leaving the Site. Station #3 was located in a primarily downwind or crosswind position and samples obtained from this station could represent air quality leaving or entering the Site. Station #4 was located in a primarily upwind or crosswind position and samples from this station could represent air quality entering or leaving the Site.

1.4 Description of Weather Station

On December 18, 2008 the portable weather station manufactured by Met One Instruments, Inc. (Met One) was deployed at the Site by ERG personnel to measure and record wind speed and direction. The weather station was deployed in accordance with the procedures in the operations manual provided by Met One.

The weather station was located within the west-central portion of the Site on high ground within the landfill at an elevation of approximately 585 feet AMSL (see Figure 2 in Appendix B). Stored data from weather station was periodically downloaded by ERG personnel. Also, while downloading the data, the battery for the station was typically replaced with a fully charged battery. The weather station was inspected by ERG personnel periodically after precipitation events. On a few occasions, icing conditions caused the anemometer to freeze and ERG personnel removed the ice from the anemometer to restore normal operations.

2.0 SAMPLING AND ANALYTICAL METHODS

Ambient air sampling activities were initiated on January 9, 2009 for Stations #1 through #6. The following sampling schedule was used for the project: January 9 to 10, January 15 to 16, January 21 to 22, January 27 to 28, February 2 to 3, February 8 to 9 and, February 14 to 15. The 6-day sampling cycle was established following guidance provided by the Agency for Toxic Substances and Disease Registry (ATSDR Landfill Gas Primer).

ERG used 6-liter summa canisters with 24-hour flow controllers to collect the ambient air samples. The canisters were deployed on Day 1 of the sampling event and picked up 24 hours later on Day 2. The start date was for each sampling event was initiated six (6) days after the start of the prior sampling event in order to collect a sample representative for a different day of the week. Station #7 was established during completion of the third sampling event on January 21, 2009.

The summa canisters and flow controllers were provided by Air Toxics LTD (Air Toxics) located in Folsom, California. The summa canisters and flow controllers were checked and deployed by ERG personnel following guidance documents provided by Air Toxics. Upon conclusion of each sampling event, the canisters and controllers were returned to Air Toxics using chain-of-custody procedures. The samples were analyzed by Air Toxics for volatile organic compounds (VOCs) using EPA Method TO-15 modified. During completion of the sampling events, the controller flow rates were adjusted by Air Toxics from 3.8 mL/min to 3.0 mL/min to account for the low air temperatures experienced during sampling.

Wind rose diagrams for each ambient air monitoring event were produced using site-specific and local wind direction and wind speed data. Each wind rose diagram is a compilation of hourly average readings for wind direction and speed over which the summa canisters were actively collecting air samples. ERG used software available from Lakes Environmental titled WRPLOT View (v5.9) to create each wind rose diagram. The wind rose diagrams are a useful representation of large data quantities in a simple graphical plot. The graphical plot indicates the percentage of time that wind was blowing from each direction. Wind speeds (knots) are indicated by color. Calm winds are defined as following "wind is indeterminate with regard to speed or direction." The formula to convert knots to miles per hour (mph) is as follows: mph = knots x 1.1508. The wind roses for the sampling period are located in Appendix B.

3.0 FINDINGS

The summarized results of the ambient air samples are presented in the following paragraphs and attached tables. Tables 1 through 7 present the results for each sampling event. The complete laboratory analytical results are located in Appendix C. The ambient air samples were analyzed by Air Toxics for VOCs using EPA Method TO-15 modified. A total of sixty-two (62) compounds are analyzed and reported as part of this EPA Method.

For Sampling Event #1, completed on January 10, 2009, the results show VOCs were detected above Laboratory Reporting Limits (LRLs) at the following stations: Station #1 (2-butanone (MEK) and carbon disulfide), Station #2 (acetone, toluene and MEK), Station #3 (MEK and acetone) and Station #4 (MEK, carbon disulfide and toluene). No VOCs were detected above LRLs at Stations #5 and #6. The primary wind direction during the period was from the west with lesser components from west; northwest; southwest; and northeast. In summary, four of the sixty-two (62) total compounds analyzed for were detected at a combination of four stations. Fifty-eight (58) compounds were not detected during this sampling event at any station.

For Sampling Event #2, completed on January 16, 2009, the results show VOCs were detected above LRLs at Station #1 (toluene). No VOCs were detected above LRLs at Station #2, Station #3, Station #4, Station #5 and Station #6. The wind rose for the sampling period indicates the primary wind direction from the west, southwest with lesser components from the northwest; north, northwest; and west. In summary, one of the sixty-two (62) total compounds analyzed for were detected at one station. Sixty-one (61) compounds were not detected during this sampling event at any station.

For Sampling Event #3, completed on January 22, 2009, the results show VOCs were detected above LRLs at the following stations: Station #2 (carbon disulfide), Station #5 (ethanol, acetone, MEK, toluene, 2-propanol, tetrahydrofuran, ethyl benzene and m,p-xylene), Station #6 (acetone and MEK) and, Station #7 (ethanol and acetone). No VOCs were detected above LRLs at Station #1, Station #3 and Station #4. The wind rose for the sampling period indicates the primary wind direction from the southwest with a lesser component from the west. In summary, nine (9) of the sixty-two (62) total compounds analyzed for were detected at a combination of four stations. Fifty-three (53) compounds were not detected at any station during this sampling event.

For Sampling Event #4, completed on January 28, 2009, the results show VOCs were detected above LRLs at the following stations: Station #3 (ethanol, acetone, MEK) and Station #6 (toluene). No VOCs were detected above LRLs at Station #1, Station #2, Station #4, Station #5 and Station #7. The wind rose for the sampling period indicates the primary wind direction from the northeast with lesser components from the east, northeast; east; and southeast. In summary, four of the sixty-two (62) total compounds analyzed for were detected at a combination of two stations. Fifty-eight (58) compounds were not detected at any of the stations during this sampling event.

For Sampling Event #5, completed on February 3, 2009, the results show VOCs were detected above LRLs at the following stations: Station #1 (Freon 12) and Station #5 (acetone, MEK). No VOCs were detected above LRLs at Station #2, Station #3, Station #4, Station #6 and Station #7. The wind rose for the sampling period indicates the primary wind direction from the northeast with

lesser components from the north; and north, northwest. In summary, three of the sixty-two (62) total compounds analyzed for were detected at a combination of two stations. Fifty-nine (59) compounds were not detected at any of the stations during this sampling event.

For Sampling Event #6, completed on February 9, 2009, the results show no VOCs were detected above LRLs at Stations #1 through #7. The wind rose for the sampling period indicates the primary wind direction from the west, northwest with lesser components from the northwest; west; southwest, north, northwest; and north. In summary, none of the sixty-two (62) total compounds analyzed for were detected at any of the stations during this sampling event.

For Sampling Event #7, completed on February 15, 2009, the results show VOCs were detected above LRLs at the following stations: Station #1 (acetone), Station #2 (acetone), Station #4 (acetone and MEK) and Station #7 (acetone). No VOCs were detected above LRLs at Station #3, Station #5 and Station #6. The wind rose for the sampling period indicates the primary wind direction from the north, northwest with lesser components from the northwest; and north. In summary, two of the sixty-two (62) total compounds analyzed for were detected at a combination of four stations. Sixty (60) compounds were not detected at any of the stations during this sampling event.

4.0 POTENTIAL SOURCES OF VOLATILE ORGANIC COMPOUNDS

Potential sources of VOCs exist from both on-site and off-site source areas. The following sections present an overview of those potential source areas. Off-site potential source areas are shown on Figure 3 in Appendix A.

4.1 Potential On-Site Sources of VOCs

The Site consists of both active and closed landfill areas, including ancillary areas. Site ancillary facilities include aboveground leachate storage tanks, the landfill gas management system, fuel storage areas and equipment maintenance areas. In addition, the Site is frequented by numerous over the road and off road motor vehicles. All of the previously mentioned areas or operations are potential sources of VOCs.

Based upon data provided by ATSDR Landfill Gas Primer, landfill gas is composed of many components including: methane, carbon dioxide, nitrogen, oxygen, ammonia, sulfides, hydrogen, carbon monoxide and non-methane organic compounds (NMOCs). Typical NMOCS include: acrylonitrile, benzene, 1,1-dicholorethane, 1,2-cis dichlorothylene, dichloromethane, carbonyl sulfide, ethylbenzene, hexane, methyl ethyl ketone, tetracholoroethylene, toluene, trichloroethylene, vinyl chloride and xylene. VOCs are NMOCs minus methane.

In addition, the document titled "AP 42 Compilation of Air Pollutant Emission Factors" issued by the U.S. Environmental Protection Agency (EPA) identifies NMOCs as typically composing 0.05% of landfill gas by volume.

4.2 Potential Off-Site Sources of VOCs

To identify and locate potential off-site sources of VOCs within the vicinity of the Site, ERG completed a review of the Pennsylvania Department of Environmental Protection (PADEP) web-based application known as eMapPa (http://www.emappa.dep.state.pa.us/emappa/viewer.htm) and second, completed a driving inspection or "windshield survey" of the area to confirm the location of each potential source identified by eMapPa and identify any other potential sources omitted by eMapPa.

A total of thirty-eight (38) facilities were registered in the PA DEP system within approximately 0.25 to 1 mile from the Site. Of these facilities, ERG was able to refine the search results to those most likely to produce air emissions, which are shown on Figure 3 in Appendix A."
ERG excluded facilities registered to Chrin Brothers, Inc. in the search, as the goal was to identify sources other than the Site. ERG also excluded storage tank facilities or facilities listed to be inactive or closed. The following facilities were identified as potential air emissions sources within the search area:

Polytek Development Corporation
55 Hilton Street
Easton, PA 18042

Smooth-On, Inc.
2000 St. John Street
Easton, PA 18042

Air Products & Chemicals
400 Island Park Road
Easton, PA 18042

ERG conducted a search of the PA DEP eFACTS database system to further determine the potential of the above facilities to contribute air emissions.

Available information for the Polytek Development Corporation (Polytek) was obtained through the EPA Toxics Release Inventory (TRI) database. Polytek is a manufacturer of synthetic rubber products used in bathroom accessories and is required to report their air emissions of reportable substances to EPA annually. According to the current information available through the online database (2006), Polytek has reportable air emissions releases of 4,4'-methylene bis (2-chloroaniline), diisocyanates, and toluene diisocyanates (mixed isomers). According to information contained in the PA DEP eFACTS database, two (2) aboveground storage tanks are also registered to Polytek.

Smooth-On, Inc. is a manufacturer of chemical products. Smooth-On, Inc. is required to report their air emissions of reportable substances annually through EPA TRI system. According to the current information available through the TRI database (2006), Smooth-On, Inc. has reportable air emissions of 1,1-dichloro-1-fluoroethane, di(2-ethylhexyl)phthalate, dibutyl phthalate, diisocyanates, and toluene diisocyanate (mixed isomers). According to information contained in the PA DEP eFACTS database, six (6) aboveground storage tanks are also registered to Smooth-On, Inc.

Available information for Air Products & Chemicals (Air Products) was obtained through the EPA TRI database. Air Products is a manufacturer of inorganic chemicals and is required to report its air emissions of reportable substances to EPA annually. According to the current information available through the online database (2006), Air Products has reportable air emissions releases of 1,1,1-trichloroethane, acetone, methanol, n-methyl-2-pyrrolidone, tetrachloroethylene, toluene, trichloroethylene, and xylene (mixed isomers). No additional information was provided in the PA DEP eFACTS database.

During completion of the windshield survey by ERG, the following additional potential off-site sources of VOCs were identified: Interstate Route I-78, an active rail line located west of the Site, an active Exxon gasoline station located across Industrial Drive from the Site, an active welding shop located across Industrial Drive from the Site, a scrap yard near Station #1, an active autobody shop and Metropolitan Edison substation located near Station #2, an active dry cleaner, salvage yard and pedicure shop located east of the Site on Cedarville Road, an emergency generator related to the

communications tower near Station #5, an active construction area located east of Station #7, the Easton Area Joint Sewer Authority Sewage Treatment Plant located east of the Site and, an active Turkey Hill gasoline station located north of I-78 on Morgan Hill Road. Gasoline is a common VOC emission source and based upon review of Material Safety Data Sheets (MSDS) for unleaded gasoline containing ethanol, gasoline is a complex bend of many hydrocarbons including up to 10% by weight of ethanol (ethyl alcohol), 15% by weight of toluene, 15% by weight of xylenes, <4% by weight of ethyl benzene and <5% by weight of 1,2,4-trimethylbenzene.

5.0 DATA ANALYSIS

The following paragraphs present the laboratory analytical results for each station, wind rose data and a discussion of potential source areas for VOCs. Tables 1 through 7 present the results for each sampling event. The complete laboratory analytical results are located in Appendix C. The wind rose diagrams are located in Appendix B.

For Sampling Event #1, the results show VOCs were detected above LRLs at Station #1 (2-butanone (MEK) at 0.82 ppbv and carbon disulfide at 1.1 ppbv), #2 (acetone at 2.8 ppbv, toluene at 0.76 ppbv and MEK at 0.71 ppbv), Station #3 (MEK at 0.7 ppbv and acetone at 4 ppbv) and Station #4 (MEK at 0.81 ppbv, carbon disulfide at 1.2 ppbv and toluene at 0.71 ppbv). No VOCs were detected above LRLs at Stations #5 and #6.

The wind rose for the sampling period indicates a wind direction from the west for approximately 20% of the time at 13 to 20 mph; approximately 4% of the time from the west at 8 to 13 mph; approximately 8% of the time from the west, northwest at 20 to 24 mph; approximately 8% of the time from the west, northwest at 8 to 13 mph; approximately 12% of the time from southwest at 5 to 8 mph; approximately 4% of the time from west, southwest at 8 to 13 mph; approximately 4% of the time from the west, southwest at 13 to 20 mph; approximately 8% of the time from the southwest at 1 to 5 mph; approximately 8% of the time from the northeast at 5 to 8 mph; approximately 8% of the time from the east, northeast at 5 to 8 mph; approximately 4% of the time from the north, northeast at 1 to 5 mph; approximately 4% of the time from the east, northeast at 1 to 5 mph; and 8% calms.

For Sampling Event #2, the results show VOCs were detected above LRLs at Station #1 (toluene at1.0 ppbv). No VOCs were detected above LRLs at Stations #2, #3, #4, #5 and #6.

The wind rose for the sampling period indicates a wind direction from the west, southwest for approximately 24% of the time at 13 to 20 mph; approximately 12% of the time from the west, southwest at 8 to 13 mph; approximately 8% of the time from the west, southwest at 5 to 8 mph; approximately 8% of the time from the west at 8 to 13 mph; approximately 8% of the time from northwest at 13 to 20 mph; approximately 4% of the time from the northwest at 8 to 13 mph; approximately 4% of the time from the northwest at 5 to 8 mph; approximately 4% of the time form west, northwest at 13 to 20 mph; approximately 4% of the time from the north at 5 to 8 mph; approximately 8% of the time from the north, northwest at 13 to 20 mph; approximately 8% of the time from the north, northwest at 8 to 13 mph; approximately 4% from the time from the north, northwest at 5 to 8 mph; approximately 4% of the time from the southwest; and 0% calms.

For Sampling Event #3, the results show VOCs were detected above LRLs at Station #2 (carbon disulfide at 3.3 ppbv), Station #5 (ethanol at 5.7 ppbv, acetone at 4.6 ppbv, MEK at 2.6 ppbv, toluene at 2.0 ppbv, 2-propanol at 3.0 ppbv, tetrahydrofuran at 0.94 ppbv, ethyl benzene at 0.71 ppbv and m,p-xylene at 1.1 ppbv), Station #6 (acetone at 2.8 ppbv and MEK at 0.63 ppbv) and, Station #7 (ethanol at 3.3 ppbv and acetone at 2.4 ppbv). No VOCs were detected above LRLs at Stations #1, #3 and #4.

The wind rose for the sampling period indicates a wind direction from the southwest for approximately 24% of the time at 13 to 20 mph; approximately 22% of the time from the southwest west at 8 to 13 mph; approximately 30% of the time from the west, southwest at 13 to 20 mph; approximately 16% of the time from the west at 13 to 20 mph; approximately 8% of the time from the west, northwest at 13 to 20 mph; and 0% calms.

For Sampling Event #4, the results show VOCs were detected above LRLs at Station #3 (ethanol at 6.2 ppbv, acetone at 6.9 ppbv and MEK at 2.8 ppbv) and Station #6 (toluene at 0.72 ppbv). No VOCs were detected above LRLs at Stations #1, #2, #4, #5 and #7.

The wind rose for the sampling period indicates a wind direction from the northeast for approximately 12% of the time at 8 to 13 mph; approximately 18% of the time from the northeast at 5 to 8 mph; approximately 4% of the time from the northeast at 1 to 5 mph; approximately 8% of the time from east, northeast at 8 to 13 mph; approximately 9% of the time from east, northeast at 5 to 8 mph; approximately 9% of the time from east, northeast at 1 to 5 mph; approximately 9% of the time from the east at 1 to 5 mph; approximately 9% of the time from the east, southeast at 1 to 5 mph; approximately 4% of the time from the southeast at 1 to 5 mph; approximately 5% of the time from the southeast at 5 to 8 mph; approximately 4% of the time from the north at 1 to 5 mph; and approximately 9% calms.

For Sampling Event #5, completed on February 3, 2009, the results show VOCs were detected above LRLs at Station #1 (Freon 12 at 0.63 ppbv) and Station #5 (acetone at 3.1 ppb and MEK at 0.68 ppbv). No VOCs were detected above LRLs at Stations #2, #3, #4, #6 and #7. The wind rose for the sampling period indicates a wind direction from the north, northeast for approximately 40% of the time at 8 to 13 mph; approximately 4% of the time from the north, northeast at 5 to 8 mph; approximately 4% of the time from the northeast at 5 to 8 mph; approximately 16% of the time from the north at 13 to 20 mph, approximately 12% of the time from the north at 8 to 13 mph; approximately 12% of the time from the north, northwest at 13 to 20 mph; approximately 4% of the time from the north, northwest at 5 to 8 mph; approximately 4% of the time from the northwest at 8 to 13 mph; approximately 4% of the time from the west, northwest at 5 to 8 mph; and 0% calms.

For Sampling Event #6, the results show no VOCs were detected above LRLs at Station #1 through #7. The wind rose for the sampling period indicates a wind direction from the west, northwest for approximately 4% of the time at 13 to 20 mph; approximately 20% of the time from the west, northwest at 8 to 13 mph; approximately 4% of the time from west, northwest at 5 to 8 mph; approximately 12% of the time from the northwest at 20 to 24 mph; approximately 8% of the time from the northwest at 8 to 13 mph; approximately 4% of the time from the northwest at 8 to 13 mph; approximately 20% of the time from the west at 8 to 13 mph; approximately 8% of the time from the north, northwest at 13 to 20 mph; approximately 4% of the time from the north at 1 to 5 mph; approximately 4% of the time from the southwest at 5 to 8 mph; approximately 4% of the time from the southwest at 8 to 13 mph; approximately 4% of the time from the west, southwest at 1 to 5 mph; approximately 4% of the time from the west, southwest at 5 to 8 mph; and 0% calms.

For Sampling Event #7 the results show VOCs were detected above LRLs at Station #1 (acetone at 4.2 ppbv), Station #2 (acetone at 4.1 ppbv), Station #4 (acetone at 6.2 ppbv and MEK at 1.5 ppbv)

and Station #7 (acetone at 3.3 ppbv). No VOCs were detected above LRLs at Stations #3, #5 and #6.

The wind rose for the sampling period indicates a wind direction from the north, northwest for approximately 64% of the time at 5 mph to 8 mph; approximately 2% of the time from north, northwest at 1 to 5 mph; approximately 12% of the time from the north at 5 mph to 8 mph; approximately 18% of the time from the northwest at 5 mph to 8 mph; approximately 2% of the time from northwest at 1 to 5 mph; approximately 2% of the time from the west at 1 to 5 mph; and 0% calms.

6.0 SUMMARY AND CONCLUSIONS

The purpose of this project was to provide ambient air sample laboratory analytical data to ToxiLogics, Inc. in order to complete a Risk Assessment.

To complete the project, ERG selected and located seven (7) ambient air sampling stations based on wind direction and nearby facilities. Two of the stations were located in primarily upwind positions (Stations #1 and #2), one of the stations was located in a primarily downwind or crosswind position (Station #3), one of the stations was located in a primarily upwind or crosswind position (Station #4) and three of the stations were located in primarily downwind positions (Stations #5, #6 and #7).

To measure and record wind direction and speed, a portable weather station was deployed at the Site between December 18, 2008 and February 17, 2009. Stored data from weather station was periodically downloaded by ERG personnel.

Ambient air sampling activities were initiated on January 9, 2009 and were completed on February 15, 2009 at the seven (7) locations. Forty-seven (47) samples were obtained during the sampling period and analyzed by Air Toxics for VOCs using EPA Method TO-15 modified.

Review of the laboratory analytical results indicates low levels of VOCs were detected during the sampling events which are summarized in the following paragraph:

- For Sampling Event #1, completed on January 10, 2009, the results show VOCs were detected above LRLs at Station #1 (2-butanone (MEK) at 0.82 ppbv and carbon disulfide at 1.1 ppbv), Station #2 (acetone at 2.8 ppbv, toluene at 0.76 ppbv and MEK at 0.71 ppbv), Station #3 (MEK at 0.7 ppbv and acetone at 4 ppbv) and Station #4 (MEK at 0.81 ppbv, carbon disulfide at 1.2 ppbv and toluene at 0.71 ppbv). No VOCs were detected above LRLs at Stations #5 and #6. In summary, four of the sixty-two (62) total compounds analyzed for were detected at a combination of four stations. Fifty-eight (58) compounds were not detected during this sampling event at any station;

- For Sampling Event #2, completed on January 16, 2009, the results show VOCs were detected above LRLs at Station #1 (toluene at1.0 ppbv). No VOCs were detected above LRLs at Stations #2, #3, #4, #5 and #6. In summary, one of the sixty-two (62) total compounds analyzed for were detected at one station. Sixty-one (61) compounds were not detected during this sampling event at any station;

- For Sampling Event #3, completed on January 22, 2009, the results show VOCs were detected above LRLs at Station #2 (carbon disulfide at 3.3 ppbv), Station #5 (ethanol at 5.7 ppbv, acetone at 4.6 ppbv, MEK at 2.6 ppbv, toluene at 2.0 ppbv, 2-propanol at 3.0 ppbv, tetrahydrofuran at 0.94 ppbv, ethyl benzene at 0.71 ppbv and m,p-xylene at 1.1 ppbv), Station #6 (acetone at 2.8 ppbv and MEK at 0.63 ppbv) and, Station #7 (ethanol at 3.3 ppbv and acetone at 2.4 ppbv). No VOCs were detected above LRLs at Stations #1, #3 and #4. In summary, nine (9) of the sixty-two (62) total compounds analyzed for were detected at a

combination of four stations. Fifty-three (53) compounds were not detected at any station during this sampling event;

- For Sampling Event #4, completed on January 28, 2009, the results show VOCs were detected above LRLs at Station #3 (ethanol at 6.2 ppbv, acetone at 6.9 ppbv and MEK at 2.8 ppbv) and Station #6 (toluene at 0.72 ppbv). No VOCs were detected above LRLs at Stations #1, #2, #4, #5 and #7. In summary, four of the sixty-two (62) total compounds analyzed for were detected at a combination of two stations. Fifty-eight (58) compounds were not detected at any of the stations during this sampling event;

- For Sampling Event #5, completed on February 3, 2009, the results show VOCs were detected above LRLs at Station #1 (Freon 12 at 0.63 ppbv) and Station #5 (acetone at 3.1 ppb and MEK at 0.68 ppbv). No VOCs were detected above LRLs at Stations #2, #3, #4, #6 and #7. In summary, three of the sixty-two (62) total compounds analyzed for were detected at a combination of two stations. Fifty-nine (59) compounds were not detected at any of the stations during this sampling event;

- For Sampling Event #6, completed on February 9, 2009, the results show no VOCs were detected above LRLs at Stations #1 through #7. In summary, none of the sixty-two (62) total compounds analyzed for were detected at any of the stations during this sampling event; and

- For Sampling Event #7, completed on February 15, 2009, the results show VOCs were detected above LRLs at Station #1 (acetone at 4.2 ppbv), Station #2 (acetone at 4.1 ppbv), #4 (acetone at 6.2 ppbv and MEK at 1.5 ppbv) and Station #7 (acetone at 3.3 ppbv). No VOCs were detected above LRLs at Stations #3, #5 and #6. In summary, two of the sixty-two (62) total compounds analyzed for were detected at a combination of four stations. Sixty (60) compounds were not detected at any of the stations during this sampling event.

Based upon the information presented in the previous sections regarding the sampling locations, potential source areas, wind data and laboratory analytical results; ERG concludes the low levels of VOCs quantified at the Ambient Air Sampling Stations are attributable to both on-site and off-site sources. Potential on-site sources of VOCs would include: active and closed landfill areas, aboveground leachate storage tanks, the landfill gas management system, fuel storage areas and equipment maintenance area, and over the road and off road motor vehicles.

Potential off-site source areas located adjacent to the Site that may have impacted the sampling results would include: I-78; the Exxon gasoline station, welding shop and the auto body repair shop located on Industrial Drive; and the emergency generator located near Station #5. Also, regional sources of VOCs that may have impacted the sampling results would include: Air Products, Polytek and Smooth-On, Inc. Air Products is located southwest from the Site, in an upwind position from the Site. Polytek is located north of the Site while Smooth-On, Inc. is located northeast of the Site. Both Polytek and Smooth-On, Inc. are located in upwind positions from the Site.

Although the primary direction of wind during each sampling event can be determined by reviewing the wind rose, wind direction can vary by 45 and 180 degrees for some periods during each 24-hour

sampling event. The variable wind direction, locations of potential source areas, sporadic low levels of VOCs quantified and types of VOCs quantified (components of gasoline and common solvents) did not allow ERG to definitively identify source locations. Based upon the low levels of VOCs quantified in ambient air during completion of this project and the low levels of NMOCs that typically compose landfill gas by volume (0.05%), ERG does not recommend the collection of additional ambient air samples for VOC analysis.

Tables

Table 1
Summarized Air Sampling Analytical Results - January 10, 2009
Chrin Sanitary Landfill
Williams Township, Northampton County, PA

	Station 1-011009		Station 2-011009		Station 3-011009		Station 4-011009		Station 5-011009		Station 6-011009	
Parameter	(ppbv)	uG/m^3	(ppbv)	uG/m^3	(ppbv)	uG/m^3	(ppbv)	uG/m^3	(ppbv)	uG/m^3	(ppbv)	uG/m^3
Freon 12	U	U	U	U	U	U	U	U	U	U	U	U
Freon 114	U	U	U	U	U	U	U	U	U	U	U	U
Chloromethane	U	U	U	U	U	U	U	U	U	U	U	U
Vinyl Chloride	U	U	U	U	U	U	U	U	U	U	U	U
1,3-Butadiene	U	U	U	U	U	U	U	U	U	U	U	U
Bromomethane	U	U	U	U	U	U	U	U	U	U	U	U
Chloroethane	U	U	U	U	U	U	U	U	U	U	U	U
Freon 11	U	U	U	U	U	U	U	U	U	U	U	U
Ethanol	U	U	U	U	U	U	U	U	U	U	U	U
Freon 113	U	U	U	U	U	U	U	U	U	U	U	U
1,1-Dichloroethene	U	U	U	U	U	U	U	U	U	U	U	U
Acetone	U	U	2.8	6.7	4.0	9.6	U	U	U	U	U	U
2-Propanol	U	U	U	U	U	U	U	U	U	U	U	U
Carbon Disulfide	1.1	3.6	U	U	U	U	1.2	3.9	U	U	U	U
3-Chloropropene	U	U	U	U	U	U	U	U	U	U	U	U
Methylene Chloride	U	U	U	U	U	U	U	U	U	U	U	U
Methyl tert-butyl ether	U	U	U	U	U	U	U	U	U	U	U	U
trans-1,2-Dichloroethene	U	U	U	U	U	U	U	U	U	U	U	U
Hexane	U	U	U	U	U	U	U	U	U	U	U	U
1,1-Dichloroethane	U	U	U	U	U	U	U	U	U	U	U	U
2-Butanone (Methyl Ethyl Ketone)	0.82	2.4	0.71	2.1	0.70	2.0	0.81	2.4	U	U	U	U
cis-1,2-Dichloroethene	U	U	U	U	U	U	U	U	U	U	U	U
Tetrahydrofuran	U	U	U	U	U	U	U	U	U	U	U	U
Chloroform	U	U	U	U	U	U	U	U	U	U	U	U
1,1,1-Trichloroethane	U	U	U	U	U	U	U	U	U	U	U	U
Cyclohexane	U	U	U	U	U	U	U	U	U	U	U	U
Carbon Tetrachloride	U	U	U	U	U	U	U	U	U	U	U	U
2,2,4-Trimethylpentane	U	U	U	U	U	U	U	U	U	U	U	U
Benzene	U	U	U	U	U	U	U	U	U	U	U	U
1,2-Dichloroethane	U	U	U	U	U	U	U	U	U	U	U	U
Heptane	U	U	U	U	U	U	U	U	U	U	U	U
Trichloroethene	U	U	U	U	U	U	U	U	U	U	U	U
1,2-Dichloropropane	U	U	U	U	U	U	U	U	U	U	U	U
1,4-Dioxane	U	U	U	U	U	U	U	U	U	U	U	U
Bromodichloromethane	U	U	U	U	U	U	U	U	U	U	U	U
cis-1,3-Dichloropropene	U	U	U	U	U	U	U	U	U	U	U	U
4-Methyl-2-pentanone	U	U	U	U	U	U	U	U	U	U	U	U
Toluene	U	U	0.76	2.8	U	U	0.71	2.7	U	U	U	U
trans-1,3-Dichloropropene	U	U	U	U	U	U	U	U	U	U	U	U
1,1,2-Trichloroethane	U	U	U	U	U	U	U	U	U	U	U	U
Tetrachloroethene	U	U	U	U	U	U	U	U	U	U	U	U
2-Hexanone	U	U	U	U	U	U	U	U	U	U	U	U
Dibromochloromethane	U	U	U	U	U	U	U	U	U	U	U	U
1,2-Dibromoethane (EDB)	U	U	U	U	U	U	U	U	U	U	U	U
Chlorobenzene	U	U	U	U	U	U	U	U	U	U	U	U
Ethyl Benzene	U	U	U	U	U	U	U	U	U	U	U	U
m,p-Xylene	U	U	U	U	U	U	U	U	U	U	U	U
o-Xylene	U	U	U	U	U	U	U	U	U	U	U	U
Styrene	U	U	U	U	U	U	U	U	U	U	U	U
Bromoform	U	U	U	U	U	U	U	U	U	U	U	U
Cumene	U	U	U	U	U	U	U	U	U	U	U	U
1,1,2,2-Tetrachloroethane	U	U	U	U	U	U	U	U	U	U	U	U
Propylbenzene	U	U	U	U	U	U	U	U	U	U	U	U
4-Ethyltoluene	U	U	U	U	U	U	U	U	U	U	U	U
1,3,5-Trimethylbenzene	U	U	U	U	U	U	U	U	U	U	U	U
1,2,4-Trimethylbenzene	U	U	U	U	U	U	U	U	U	U	U	U
1,3-Dichlorobenzene	U	U	U	U	U	U	U	U	U	U	U	U
1,4-Dichlorobenzene	U	U	U	U	U	U	U	U	U	U	U	U
alpha-Chlorotoluene	U	U	U	U	U	U	U	U	U	U	U	U
1,2-Dichlorobenzene	U	U	U	U	U	U	U	U	U	U	U	U
1,2,4-Trichlorobenzene	U	U	U	U	U	U	U	U	U	U	U	U
Hexachlorobutadiene	U	U	U	U	U	U	U	U	U	U	U	U

Notes: All results shown in part per billion by volume (ppbv) and micrograms per cubic meter (uG/m^3)
The qualifier "B" indicates - Compound present in laboratory blank greater than reporting limit (background subtraction not performed).
The qualifier "J" indicates - Estimated value.
The qualifier "E" indicates - Exceeds instrument calibration range.
The qualifier "S" indicates - Saturated peak.
The qualifier "Q" indicates - Exceeds quality control limits.
The qualifier "U" indicates - Compound analyzed for but not detected above the reporting limit.
The qualifier "UJ" indicates- Non-detected compound associated with low bias in the CCV
The qualifier "N" indicates - The identification is based on presumptive evidence.

Table 2
Summarized Air Sampling Analytical Results - January 16, 2009
Chrin Sanitary Landfill
Williams Township, Northampton County, PA

	Station 1-011609		Station 2-011609		Station 3-011609		Station 4-011609		Station 5-011609		Station 6-011609	
Parameter	(ppbv)	uG/m^3	(ppbv)	uG/m^3	(ppbv)	uG/m^3	(ppbv)	uG/m^3	(ppbv)	uG/m^3	(ppbv)	uG/m^3
Freon 12	U	U	U	U	U	U	U	U	U	U	U	U
Freon 114	U	U	U	U	U	U	U	U	U	U	U	U
Chloromethane	U	U	U	U	U	U	U	U	U	U	U	U
Vinyl Chloride	U	U	U	U	U	U	U	U	U	U	U	U
1,3-Butadiene	U	U	U	U	U	U	U	U	U	U	U	U
Bromomethane	U	U	U	U	U	U	U	U	U	U	U	U
Chloroethane	U	U	U	U	U	U	U	U	U	U	U	U
Freon 11	U	U	U	U	U	U	U	U	U	U	U	U
Ethanol	U	U	U	U	U	U	U	U	U	U	U	U
Freon 113	U	U	U	U	U	U	U	U	U	U	U	U
1,1-Dichloroethene	U	U	U	U	U	U	U	U	U	U	U	U
Acetone	U	U	U	U	U	U	U	U	U	U	U	U
2-Propanol	U	U	U	U	U	U	U	U	U	U	U	U
Carbon Disulfide	U	U	U	U	U	U	U	U	U	U	U	U
3-Chloropropene	U	U	U	U	U	U	U	U	U	U	U	U
Methylene Chloride	U	U	U	U	U	U	U	U	U	U	U	U
Methyl tert-butyl ether	U	U	U	U	U	U	U	U	U	U	U	U
trans-1,2-Dichloroethene	U	U	U	U	U	U	U	U	U	U	U	U
Hexane	U	U	U	U	U	U	U	U	U	U	U	U
1,1-Dichloroethane	U	U	U	U	U	U	U	U	U	U	U	U
2-Butanone (Methyl Ethyl Ketone)	U	U	U	U	U	U	U	U	U	U	U	U
cis-1,2-Dichloroethene	U	U	U	U	U	U	U	U	U	U	U	U
Tetrahydrofuran	U	U	U	U	U	U	U	U	U	U	U	U
Chloroform	U	U	U	U	U	U	U	U	U	U	U	U
1,1,1-Trichloroethane	U	U	U	U	U	U	U	U	U	U	U	U
Cyclohexane	U	U	U	U	U	U	U	U	U	U	U	U
Carbon Tetrachloride	U	U	U	U	U	U	U	U	U	U	U	U
2,2,4-Trimethylpentane	U	U	U	U	U	U	U	U	U	U	U	U
Benzene	U	U	U	U	U	U	U	U	U	U	U	U
1,2-Dichloroethane	U	U	U	U	U	U	U	U	U	U	U	U
Heptane	U	U	U	U	U	U	U	U	U	U	U	U
Trichloroethene	U	U	U	U	U	U	U	U	U	U	U	U
1,2-Dichloropropane	U	U	U	U	U	U	U	U	U	U	U	U
1,4-Dioxane	U	U	U	U	U	U	U	U	U	U	U	U
Bromodichloromethane	U	U	U	U	U	U	U	U	U	U	U	U
cis-1,3-Dichloropropene	U	U	U	U	U	U	U	U	U	U	U	U
4-Methyl-2-pentanone	U	U	U	U	U	U	U	U	U	U	U	U
Toluene	1.0	3.8	U	U	U	U	U	U	U	U	U	U
trans-1,3-Dichloropropene	U	U	U	U	U	U	U	U	U	U	U	U
1,1,2-Trichloroethane	U	U	U	U	U	U	U	U	U	U	U	U
Tetrachloroethene	U	U	U	U	U	U	U	U	U	U	U	U
2-Hexanone	U	U	U	U	U	U	U	U	U	U	U	U
Dibromochloromethane	U	U	U	U	U	U	U	U	U	U	U	U
1,2-Dibromoethane (EDB)	U	U	U	U	U	U	U	U	U	U	U	U
Chlorobenzene	U	U	U	U	U	U	U	U	U	U	U	U
Ethyl Benzene	U	U	U	U	U	U	U	U	U	U	U	U
m,p-Xylene	U	U	U	U	U	U	U	U	U	U	U	U
o-Xylene	U	U	U	U	U	U	U	U	U	U	U	U
Styrene	U	U	U	U	U	U	U	U	U	U	U	U
Bromoform	U	U	U	U	U	U	U	U	U	U	U	U
Cumene	U	U	U	U	U	U	U	U	U	U	U	U
1,1,2,2-Tetrachloroethane	U	U	U	U	U	U	U	U	U	U	U	U
Propylbenzene	U	U	U	U	U	U	U	U	U	U	U	U
4-Ethyltoluene	U	U	U	U	U	U	U	U	U	U	U	U
1,3,5-Trimethylbenzene	U	U	U	U	U	U	U	U	U	U	U	U
1,2,4-Trimethylbenzene	U	U	U	U	U	U	U	U	U	U	U	U
1,3-Dichlorobenzene	U	U	U	U	U	U	U	U	U	U	U	U
1,4-Dichlorobenzene	U	U	U	U	U	U	U	U	U	U	U	U
alpha-Chlorotoluene	U	U	U	U	U	U	U	U	U	U	U	U
1,2-Dichlorobenzene	U	U	U	U	U	U	U	U	U	U	U	U
1,2,4-Trichlorobenzene	U	U	U	U	U	U	U	U	U	U	U	U
Hexachlorobutadiene	U	U	U	U	U	U	U	U	U	U	U	U

Notes: All results shown in part per billion by volume (ppbv) and micrograms per cubic meter (uG/m^3)
The qualifier "B" indicates - Compound present in laboratory blank greater than reporting limit (background subtraction not performed).
The qualifier "J" indicates - Estimated value.
The qualifier "E" indicates - Exceeds instrument calibration range.
The qualifier "S" indicates - Saturated peak.
The qualifier "Q" indicates - Exceeds quality control limits.
The qualifier "U" indicates - Compound analyzed for but not detected above the reporting limit.
The qualifier "UJ" indicates- Non-detected compound associated with low bias in the CCV
The qualifier "N" indicates - The identification is based on presumptive evidence.

Table 3
Summarized Air Sampling Analytical Results - January 22, 2009
Chrin Sanitary Landfill
Williams Township, Northampton County, PA

	Station 1-012209		Station 2-012209		Station 3-012209		Station 4-012209		Station 5-012209		Station 6-012209		Station 7-012209	
Parameter	(ppbv)	uG/m^3	(ppbv)	uG/m^3	(ppbv)	uG/m^3	(ppbv)	uG/m^3	(ppbv)	uG/m^3	(ppbv)	uG/m^3	(ppbv)	uG/m^3
Freon 12	U	U	U	U	U	U	U	U	U	U	U	U	U	U
Freon 114	U	U	U	U	U	U	U	U	U	U	U	U	U	U
Chloromethane	U	U	U	U	U	U	U	U	U	U	U	U	U	U
Vinyl Chloride	U	U	U	U	U	U	U	U	U	U	U	U	U	U
1,3-Butadiene	U	U	U	U	U	U	U	U	U	U	U	U	U	U
Bromomethane	U	U	U	U	U	U	U	U	U	U	U	U	U	U
Chloroethane	U	U	U	U	U	U	U	U	U	U	U	U	U	U
Freon 11	U	U	U	U	U	U	U	U	U	U	U	U	U	U
Ethanol	U	U	U	U	U	U	U	U	5.7	11.0	U	U	3.3	6.3
Freon 113	U	U	U	U	U	U	U	U	U	U	U	U	U	U
1,1-Dichloroethene	U	U	U	U	U	U	U	U	U	U	U	U	U	U
Acetone	U	U	U	U	U	U	U	U	4.6	11.0	2.8	6.6	2.4 J	5.8 J
2-Propanol	U	U	U	U	U	U	U	U	3.0	7.3	U	U	U	U
Carbon Disulfide	U	U	3.3	10.0	U	U	U	U	U	U	U	U	U	U
3-Chloropropene	U	U	U	U	U	U	U	U	U	U	U	U	U	U
Methylene Chloride	U	U	U	U	U	U	U	U	U	U	U	U	U	U
Methyl tert-butyl ether	U	U	U	U	U	U	U	U	U	U	U	U	U	U
trans-1,2-Dichloroethene	U	U	U	U	U	U	U	U	U	U	U	U	U	U
Hexane	U	U	U	U	U	U	U	U	U	U	U	U	U	U
1,1-Dichloroethane	U	U	U	U	U	U	U	U	U	U	U	U	U	U
2-Butanone (Methyl Ethyl Ketone)	U	U	U	U	U	U	U	U	2.6	7.6	0.63	1.9	U	U
cis-1,2-Dichloroethene	U	U	U	U	U	U	U	U	U	U	U	U	U	U
Tetrahydrofuran	U	U	U	U	U	U	U	U	0.94	2.8	U	U	U	U
Chloroform	U	U	U	U	U	U	U	U	U	U	U	U	U	U
1,1,1-Trichloroethane	U	U	U	U	U	U	U	U	U	U	U	U	U	U
Cyclohexane	U	U	U	U	U	U	U	U	U	U	U	U	U	U
Carbon Tetrachloride	U	U	U	U	U	U	U	U	U	U	U	U	U	U
2,2,4-Trimethylpentane	U	U	U	U	U	U	U	U	U	U	U	U	U	U
Benzene	U	U	U	U	U	U	U	U	U	U	U	U	U	U
1,2-Dichloroethane	U	U	U	U	U	U	U	U	U	U	U	U	U	U
Heptane	U	U	U	U	U	U	U	U	U	U	U	U	U	U
Trichloroethene	U	U	U	U	U	U	U	U	U	U	U	U	U	U
1,2-Dichloropropane	U	U	U	U	U	U	U	U	U	U	U	U	U	U
1,4-Dioxane	U	U	U	U	U	U	U	U	U	U	U	U	U	U
Bromodichloromethane	U	U	U	U	U	U	U	U	U	U	U	U	U	U
cis-1,3-Dichloropropene	U	U	U	U	U	U	U	U	U	U	U	U	U	U
4-Methyl-2-pentanone	U	U	U	U	U	U	U	U	U	U	U	U	U	U
Toluene	U	U	U	U	U	U	U	U	2.0	7.6	U	U	U	U
trans-1,3-Dichloropropene	U	U	U	U	U	U	U	U	U	U	U	U	U	U
1,1,2-Trichloroethane	U	U	U	U	U	U	U	U	U	U	U	U	U	U
Tetrachloroethene	U	U	U	U	U	U	U	U	U	U	U	U	U	U
2-Hexanone	U	U	U	U	U	U	U	U	U	U	U	U	U	U
Dibromochloromethane	U	U	U	U	U	U	U	U	U	U	U	U	U	U
1,2-Dibromoethane (EDB)	U	U	U	U	U	U	U	U	U	U	U	U	U	U
Chlorobenzene	U	U	U	U	U	U	U	U	U	U	U	U	U	U
Ethyl Benzene	U	U	U	U	U	U	U	U	0.71	3.1	U	U	U	U
m,p-Xylene	U	U	U	U	U	U	U	U	1.1	4.8	U	U	U	U
o-Xylene	U	U	U	U	U	U	U	U	U	U	U	U	U	U
Styrene	U	U	U	U	U	U	U	U	U	U	U	U	U	U
Bromoform	U	U	U	U	U	U	U	U	U	U	U	U	U	U
Cumene	U	U	U	U	U	U	U	U	U	U	U	U	U	U
1,1,2,2-Tetrachloroethane	U	U	U	U	U	U	U	U	U	U	U	U	U	U
Propylbenzene	U	U	U	U	U	U	U	U	U	U	U	U	U	U
4-Ethyltoluene	U	U	U	U	U	U	U	U	U	U	U	U	U	U
1,3,5-Trimethylbenzene	U	U	U	U	U	U	U	U	U	U	U	U	U	U
1,2,4-Trimethylbenzene	U	U	U	U	U	U	U	U	U	U	U	U	U	U
1,3-Dichlorobenzene	U	U	U	U	U	U	U	U	U	U	U	U	U	U
1,4-Dichlorobenzene	U	U	U	U	U	U	U	U	U	U	U	U	U	U
alpha-Chlorotoluene	U	U	U	U	U	U	U	U	U	U	U	U	U	U
1,2-Dichlorobenzene	U	U	U	U	U	U	U	U	U	U	U	U	U	U
1,2,4-Trichlorobenzene	U	U	U	U	U	U	U	U	U	U	U	U	U	U
Hexachlorobutadiene	U	U	U	U	U	U	U	U	U	U	U	U	U	U

Notes: All results shown in part per billion by volume (ppbv) and micrograms per cubic meter (uG/m^3)
The qualifier "B" indicates - Compound present in laboratory blank greater than reporting limit (background subtraction not performed).
The qualifier "J" indicates - Estimated value.
The qualifier "E" indicates - Exceeds instrument calibration range.
The qualifier "S" indicates - Saturated peak.
The qualifier "Q" indicates - Exceeds quality control limits.
The qualifier "U" indicates - Compound analyzed for but not detected above the reporting limit.
The qualifier "UJ" indicates- Non-detected compound associated with low bias in the CCV
The qualifier "N" indicates - The identification is based on presumptive evidence.

Table 4
Summarized Air Sampling Analytical Results - January 28, 2009
Chrin Sanitary Landfill
Williams Township, Northampton County, PA

	Station 1-012809		Station 2-012809		Station 3-012809		Station 4-012809		Station 5-012809		Station 6-012809		Station 7-012809	
Parameter	(ppbv)	uG/m^3	(ppbv)	uG/m^3	(ppbv)	uG/m^3	(ppbv)	uG/m^3	(ppbv)	uG/m^3	(ppbv)	uG/m^3	(ppbv)	uG/m^3
Freon 12	U	U	U	U	U	U	U	U	U	U	U	U	U	U
Freon 114	U	U	U	U	U	U	U	U	U	U	U	U	U	U
Chloromethane	U	U	U	U	U	U	U	U	U	U	U	U	U	U
Vinyl Chloride	U	U	U	U	U	U	U	U	U	U	U	U	U	U
1,3-Butadiene	U	U	U	U	U	U	U	U	U	U	U	U	U	U
Bromomethane	U	U	U	U	U	U	U	U	U	U	U	U	U	U
Chloroethane	U	U	U	U	U	U	U	U	U	U	U	U	U	U
Freon 11	U	U	U	U	U	U	U	U	U	U	U	U	U	U
Ethanol	U	U	U	U	6.2	12.0	U	U	U	U	U	U	U	U
Freon 113	U	U	U	U	U	U	U	U	U	U	U	U	U	U
1,1-Dichloroethene	U	U	U	U	U	U	U	U	U	U	U	U	U	U
Acetone	U	U	U	U	6.9	16.0	U	U	U	U	U	U	U	U
2-Propanol	U	U	U	U	U	U	U	U	U	U	U	U	U	U
Carbon Disulfide	U	U	U	U	U	U	U	U	U	U	U	U	U	U
3-Chloropropene	U	U	U	U	U	U	U	U	U	U	U	U	U	U
Methylene Chloride	U	U	U	U	U	U	U	U	U	U	U	U	U	U
Methyl tert-butyl ether	U	U	U	U	U	U	U	U	U	U	U	U	U	U
trans-1,2-Dichloroethene	U	U	U	U	U	U	U	U	U	U	U	U	U	U
Hexane	U	U	U	U	U	U	U	U	U	U	U	U	U	U
1,1-Dichloroethane	U	U	U	U	U	U	U	U	U	U	U	U	U	U
2-Butanone (Methyl Ethyl Ketone)	U	U	U	U	2.80	8.4	U	U	U	U	U	U	U	U
cis-1,2-Dichloroethene	U	U	U	U	U	U	U	U	U	U	U	U	U	U
Tetrahydrofuran	U	U	U	U	U	U	U	U	U	U	U	U	U	U
Chloroform	U	U	U	U	U	U	U	U	U	U	U	U	U	U
1,1,1-Trichloroethane	U	U	U	U	U	U	U	U	U	U	U	U	U	U
Cyclohexane	U	U	U	U	U	U	U	U	U	U	U	U	U	U
Carbon Tetrachloride	U	U	U	U	U	U	U	U	U	U	U	U	U	U
2,2,4-Trimethylpentane	U	U	U	U	U	U	U	U	U	U	U	U	U	U
Benzene	U	U	U	U	U	U	U	U	U	U	U	U	U	U
1,2-Dichloroethane	U	U	U	U	U	U	U	U	U	U	U	U	U	U
Heptane	U	U	U	U	U	U	U	U	U	U	U	U	U	U
Trichloroethene	U	U	U	U	U	U	U	U	U	U	U	U	U	U
1,2-Dichloropropane	U	U	U	U	U	U	U	U	U	U	U	U	U	U
1,4-Dioxane	U	U	U	U	U	U	U	U	U	U	U	U	U	U
Bromodichloromethane	U	U	U	U	U	U	U	U	U	U	U	U	U	U
cis-1,3-Dichloropropene	U	U	U	U	U	U	U	U	U	U	U	U	U	U
4-Methyl-2-pentanone	U	U	U	U	U	U	U	U	U	U	U	U	U	U
Toluene	U	U	U	U	U	U	U	U	U	U	0.72	2.7	U	U
trans-1,3-Dichloropropene	U	U	U	U	U	U	U	U	U	U	U	U	U	U
1,1,2-Trichloroethane	U	U	U	U	U	U	U	U	U	U	U	U	U	U
Tetrachloroethene	U	U	U	U	U	U	U	U	U	U	U	U	U	U
2-Hexanone	U	U	U	U	U	U	U	U	U	U	U	U	U	U
Dibromochloromethane	U	U	U	U	U	U	U	U	U	U	U	U	U	U
1,2-Dibromoethane (EDB)	U	U	U	U	U	U	U	U	U	U	U	U	U	U
Chlorobenzene	U	U	U	U	U	U	U	U	U	U	U	U	U	U
Ethyl Benzene	U	U	U	U	U	U	U	U	U	U	U	U	U	U
m,p-Xylene	U	U	U	U	U	U	U	U	U	U	U	U	U	U
o-Xylene	U	U	U	U	U	U	U	U	U	U	U	U	U	U
Styrene	U	U	U	U	U	U	U	U	U	U	U	U	U	U
Bromoform	U	U	U	U	U	U	U	U	U	U	U	U	U	U
Cumene	U	U	U	U	U	U	U	U	U	U	U	U	U	U
1,1,2,2-Tetrachloroethane	U	U	U	U	U	U	U	U	U	U	U	U	U	U
Propylbenzene	U	U	U	U	U	U	U	U	U	U	U	U	U	U
4-Ethyltoluene	U	U	U	U	U	U	U	U	U	U	U	U	U	U
1,3,5-Trimethylbenzene	U	U	U	U	U	U	U	U	U	U	U	U	U	U
1,2,4-Trimethylbenzene	U	U	U	U	U	U	U	U	U	U	U	U	U	U
1,3-Dichlorobenzene	U	U	U	U	U	U	U	U	U	U	U	U	U	U
1,4-Dichlorobenzene	U	U	U	U	U	U	U	U	U	U	U	U	U	U
alpha-Chlorotoluene	U	U	U	U	U	U	U	U	U	U	U	U	U	U
1,2-Dichlorobenzene	U	U	U	U	U	U	U	U	U	U	U	U	U	U
1,2,4-Trichlorobenzene	U	U	U	U	U	U	U	U	U	U	U	U	U	U
Hexachlorobutadiene	U	U	U	U	U	U	U	U	U	U	U	U	U	U

Notes: All results shown in part per billion by volume (ppbv) and micrograms per cubic meter (uG/m^3)

The qualifier "B" indicates - Compound present in laboratory blank greater than reporting limit (background subtraction not performed).

The qualifier "J" indicates - Estimated value.

The qualifier "E" indicates - Exceeds instrument calibration range.

The qualifier "S" indicates - Saturated peak.

The qualifier "Q" indicates - Exceeds quality control limits.

The qualifier "U" indicates - Compound analyzed for but not detected above the reporting limit.

The qualifier "UJ" indicates- Non-detected compound associated with low bias in the CCV

The qualifier "N" indicates - The identification is based on presumptive evidence.

Table 5
Summarized Air Sampling Analytical Results - February 3, 2009
Chrin Sanitary Landfill
Williams Township, Northampton County, PA

	Station 1-020309		Station 2-020309		Station 3-020309		Station 4-020309		Station 5-020309		Station 6-020309		Station 7-020309	
Parameter	(ppbv)	uG/m^3	(ppbv)	uG/m^3	(ppbv)	uG/m^3	(ppbv)	uG/m^3	(ppbv)	uG/m^3	(ppbv)	uG/m^3	(ppbv)	uG/m^3
Freon 12	0.63 J	3.1 J	U	U	U	U	U	U	U	U	U	U	U	U
Freon 114	U	U	U	U	U	U	U	U	U	U	U	U	U	U
Chloromethane	U	U	U	U	U	U	U	U	U	U	U	U	U	U
Vinyl Chloride	U	U	U	U	U	U	U	U	U	U	U	U	U	U
1,3-Butadiene	U	U	U	U	U	U	U	U	U	U	U	U	U	U
Bromomethane	U	U	U	U	U	U	U	U	U	U	U	U	U	U
Chloroethane	U	U	U	U	U	U	U	U	U	U	U	U	U	U
Freon 11	U	U	U	U	U	U	U	U	U	U	U	U	U	U
Ethanol	U	U	U	U	U	U	U	U	U	U	U	U	U	U
Freon 113	U	U	U	U	U	U	U	U	U	U	U	U	U	U
1,1-Dichloroethene	U	U	U	U	U	U	U	U	U	U	U	U	U	U
Acetone	U	U	U	U	U	U	U	U	3.1	7.4	U	U	U	U
2-Propanol	U	U	U	U	U	U	U	U	U	U	U	U	U	U
Carbon Disulfide	U	U	U	U	U	U	U	U	U	U	U	U	U	U
3-Chloropropene	U	U	U	U	U	U	U	U	U	U	U	U	U	U
Methylene Chloride	U	U	U	U	U	U	U	U	U	U	U	U	U	U
Methyl tert-butyl ether	U	U	U	U	U	U	U	U	U	U	U	U	U	U
trans-1,2-Dichloroethene	U	U	U	U	U	U	U	U	U	U	U	U	U	U
Hexane	U	U	U	U	U	U	U	U	U	U	U	U	U	U
1,1-Dichloroethane	U	U	U	U	U	U	U	U	U	U	U	U	U	U
2-Butanone (Methyl Ethyl Ketone)	U	U	U	U	U	U	U	U	0.68	2.0	U	U	U	U
cis-1,2-Dichloroethene	U	U	U	U	U	U	U	U	U	U	U	U	U	U
Tetrahydrofuran	U	U	U	U	U	U	U	U	U	U	U	U	U	U
Chloroform	U	U	U	U	U	U	U	U	U	U	U	U	U	U
1,1,1-Trichloroethane	U	U	U	U	U	U	U	U	U	U	U	U	U	U
Cyclohexane	U	U	U	U	U	U	U	U	U	U	U	U	U	U
Carbon Tetrachloride	U	U	U	U	U	U	U	U	U	U	U	U	U	U
2,2,4-Trimethylpentane	U	U	U	U	U	U	U	U	U	U	U	U	U	U
Benzene	U	U	U	U	U	U	U	U	U	U	U	U	U	U
1,2-Dichloroethane	U	U	U	U	U	U	U	U	U	U	U	U	U	U
Heptane	U	U	U	U	U	U	U	U	U	U	U	U	U	U
Trichloroethene	U	U	U	U	U	U	U	U	U	U	U	U	U	U
1,2-Dichloropropane	U	U	U	U	U	U	U	U	U	U	U	U	U	U
1,4-Dioxane	U	U	U	U	U	U	U	U	U	U	U	U	U	U
Bromodichloromethane	U	U	U	U	U	U	U	U	U	U	U	U	U	U
cis-1,3-Dichloropropene	U	U	U	U	U	U	U	U	U	U	U	U	U	U
4-Methyl-2-pentanone	U	U	U	U	U	U	U	U	U	U	U	U	U	U
Toluene	U	U	U	U	U	U	U	U	U	U	U	U	U	U
trans-1,3-Dichloropropene	U	U	U	U	U	U	U	U	U	U	U	U	U	U
1,1,2-Trichloroethane	U	U	U	U	U	U	U	U	U	U	U	U	U	U
Tetrachloroethene	U	U	U	U	U	U	U	U	U	U	U	U	U	U
2-Hexanone	U	U	U	U	U	U	U	U	U	U	U	U	U	U
Dibromochloromethane	U	U	U	U	U	U	U	U	U	U	U	U	U	U
1,2-Dibromoethane (EDB)	U	U	U	U	U	U	U	U	U	U	U	U	U	U
Chlorobenzene	U	U	U	U	U	U	U	U	U	U	U	U	U	U
Ethyl Benzene	U	U	U	U	U	U	U	U	U	U	U	U	U	U
m,p-Xylene	U	U	U	U	U	U	U	U	U	U	U	U	U	U
o-Xylene	U	U	U	U	U	U	U	U	U	U	U	U	U	U
Styrene	U	U	U	U	U	U	U	U	U	U	U	U	U	U
Bromoform	U	U	U	U	U	U	U	U	U	U	U	U	U	U
Cumene	U	U	U	U	U	U	U	U	U	U	U	U	U	U
1,1,2,2-Tetrachloroethane	U	U	U	U	U	U	U	U	U	U	U	U	U	U
Propylbenzene	U	U	U	U	U	U	U	U	U	U	U	U	U	U
4-Ethyltoluene	U	U	U	U	U	U	U	U	U	U	U	U	U	U
1,3,5-Trimethylbenzene	U	U	U	U	U	U	U	U	U	U	U	U	U	U
1,2,4-Trimethylbenzene	U	U	U	U	U	U	U	U	U	U	U	U	U	U
1,3-Dichlorobenzene	U	U	U	U	U	U	U	U	U	U	U	U	U	U
1,4-Dichlorobenzene	U	U	U	U	U	U	U	U	U	U	U	U	U	U
alpha-Chlorotoluene	U	U	U	U	U	U	U	U	U	U	U	U	U	U
1,2-Dichlorobenzene	U	U	U	U	U	U	U	U	U	U	U	U	U	U
1,2,4-Trichlorobenzene	U	U	U	U	U	U	U	U	U	U	U	U	U	U
Hexachlorobutadiene	U	U	U	U	U	U	U	U	U	U	U	U	U	U

Notes: All results shown in part per billion by volume (ppbv) and micrograms per cubic meter (uG/m^3)

The qualifier "B" indicates - Compound present in laboratory blank greater than reporting limit (background subtraction not performed).

The qualifier "J" indicates - Estimated value.

The qualifier "E" indicates - Exceeds instrument calibration range.

The qualifier "S" indicates - Saturated peak.

The qualifier "Q" indicates - Exceeds quality control limits.

The qualifier "U" indicates - Compound analyzed for but not detected above the reporting limit.

The qualifier "UJ" indicates- Non-detected compound associated with low bias in the CCV

The qualifier "N" indicates - The identification is based on presumptive evidence.

Table 6
Summarized Air Sampling Analytical Results - February 9, 2009
Chrin Sanitary Landfill
Williams Township, Northampton County, PA

	Station 1-020909		Station 2-020909		Station 3-020909		Station 4-020909		Station 5-020909		Station 6-020909		Station 7-020909	
Parameter	(ppbv)	uG/m^3	(ppbv)	uG/m^3	(ppbv)	uG/m^3	(ppbv)	uG/m^3	(ppbv)	uG/m^3	(ppbv)	uG/m^3	(ppbv)	uG/m^3
Freon 12	U	U	U	U	U	U	U	U	U	U	U	U	U	U
Freon 114	U	U	U	U	U	U	U	U	U	U	U	U	U	U
Chloromethane	U	U	U	U	U	U	U	U	U	U	U	U	U	U
Vinyl Chloride	U	U	U	U	U	U	U	U	U	U	U	U	U	U
1,3-Butadiene	U	U	U	U	U	U	U	U	U	U	U	U	U	U
Bromomethane	U	U	U	U	U	U	U	U	U	U	U	U	U	U
Chloroethane	U	U	U	U	U	U	U	U	U	U	U	U	U	U
Freon 11	U	U	U	U	U	U	U	U	U	U	U	U	U	U
Ethanol	U	U	U	U	U	U	U	U	U	U	U	U	U	U
Freon 113	U	U	U	U	U	U	U	U	U	U	U	U	U	U
1,1-Dichloroethene	U	U	U	U	U	U	U	U	U	U	U	U	U	U
Acetone	U	U	U	U	U	U	U	U	U	U	U	U	U	U
2-Propanol	U	U	U	U	U	U	U	U	U	U	U	U	U	U
Carbon Disulfide	U	U	U	U	U	U	U	U	U	U	U	U	U	U
3-Chloropropene	U	U	U	U	U	U	U	U	U	U	U	U	U	U
Methylene Chloride	U	U	U	U	U	U	U	U	U	U	U	U	U	U
Methyl tert-butyl ether	U	U	U	U	U	U	U	U	U	U	U	U	U	U
trans-1,2-Dichloroethene	U	U	U	U	U	U	U	U	U	U	U	U	U	U
Hexane	U	U	U	U	U	U	U	U	U	U	U	U	U	U
1,1-Dichloroethane	U	U	U	U	U	U	U	U	U	U	U	U	U	U
2-Butanone (Methyl Ethyl Ketone)	U	U	U	U	U	U	U	U	U	U	U	U	U	U
cis-1,2-Dichloroethene	U	U	U	U	U	U	U	U	U	U	U	U	U	U
Tetrahydrofuran	U	U	U	U	U	U	U	U	U	U	U	U	U	U
Chloroform	U	U	U	U	U	U	U	U	U	U	U	U	U	U
1,1,1-Trichloroethane	U	U	U	U	U	U	U	U	U	U	U	U	U	U
Cyclohexane	U	U	U	U	U	U	U	U	U	U	U	U	U	U
Carbon Tetrachloride	U	U	U	U	U	U	U	U	U	U	U	U	U	U
2,2,4-Trimethylpentane	U	U	U	U	U	U	U	U	U	U	U	U	U	U
Benzene	U	U	U	U	U	U	U	U	U	U	U	U	U	U
1,2-Dichloroethane	U	U	U	U	U	U	U	U	U	U	U	U	U	U
Heptane	U	U	U	U	U	U	U	U	U	U	U	U	U	U
Trichloroethene	U	U	U	U	U	U	U	U	U	U	U	U	U	U
1,2-Dichloropropane	U	U	U	U	U	U	U	U	U	U	U	U	U	U
1,4-Dioxane	U	U	U	U	U	U	U	U	U	U	U	U	U	U
Bromodichloromethane	U	U	U	U	U	U	U	U	U	U	U	U	U	U
cis-1,3-Dichloropropene	U	U	U	U	U	U	U	U	U	U	U	U	U	U
4-Methyl-2-pentanone	U	U	U	U	U	U	U	U	U	U	U	U	U	U
Toluene	U	U	U	U	U	U	U	U	U	U	U	U	U	U
trans-1,3-Dichloropropene	U	U	U	U	U	U	U	U	U	U	U	U	U	U
1,1,2-Trichloroethane	U	U	U	U	U	U	U	U	U	U	U	U	U	U
Tetrachloroethene	U	U	U	U	U	U	U	U	U	U	U	U	U	U
2-Hexanone	U	U	U	U	U	U	U	U	U	U	U	U	U	U
Dibromochloromethane	U	U	U	U	U	U	U	U	U	U	U	U	U	U
1,2-Dibromoethane (EDB)	U	U	U	U	U	U	U	U	U	U	U	U	U	U
Chlorobenzene	U	U	U	U	U	U	U	U	U	U	U	U	U	U
Ethyl Benzene	U	U	U	U	U	U	U	U	U	U	U	U	U	U
m,p-Xylene	U	U	U	U	U	U	U	U	U	U	U	U	U	U
o-Xylene	U	U	U	U	U	U	U	U	U	U	U	U	U	U
Styrene	U	U	U	U	U	U	U	U	U	U	U	U	U	U
Bromoform	U	U	U	U	U	U	U	U	U	U	U	U	U	U
Cumene	U	U	U	U	U	U	U	U	U	U	U	U	U	U
1,1,2,2-Tetrachloroethane	U	U	U	U	U	U	U	U	U	U	U	U	U	U
Propylbenzene	U	U	U	U	U	U	U	U	U	U	U	U	U	U
4-Ethyltoluene	U	U	U	U	U	U	U	U	U	U	U	U	U	U
1,3,5-Trimethylbenzene	U	U	U	U	U	U	U	U	U	U	U	U	U	U
1,2,4-Trimethylbenzene	U	U	U	U	U	U	U	U	U	U	U	U	U	U
1,3-Dichlorobenzene	U	U	U	U	U	U	U	U	U	U	U	U	U	U
1,4-Dichlorobenzene	U	U	U	U	U	U	U	U	U	U	U	U	U	U
alpha-Chlorotoluene	U	U	U	U	U	U	U	U	U	U	U	U	U	U
1,2-Dichlorobenzene	U	U	U	U	U	U	U	U	U	U	U	U	U	U
1,2,4-Trichlorobenzene	U	U	U	U	U	U	U	U	U	U	U	U	U	U
Hexachlorobutadiene	U	U	U	U	U	U	U	U	U	U	U	U	U	U

Notes: All results shown in part per billion by volume (ppbv) and micrograms per cubic meter (uG/m^3)
The qualifier "B" indicates - Compound present in laboratory blank greater than reporting limit (background subtraction not performed).
The qualifier "J" indicates - Estimated value.
The qualifier "E" indicates - Exceeds instrument calibration range.
The qualifier "S" indicates - Saturated peak.
The qualifier "Q" indicates - Exceeds quality control limits.
The qualifier "U" indicates - Compound analyzed for but not detected above the reporting limit.
The qualifier "UJ" indicates- Non-detected compound associated with low bias in the CCV
The qualifier "N" indicates - The identification is based on presumptive evidence.

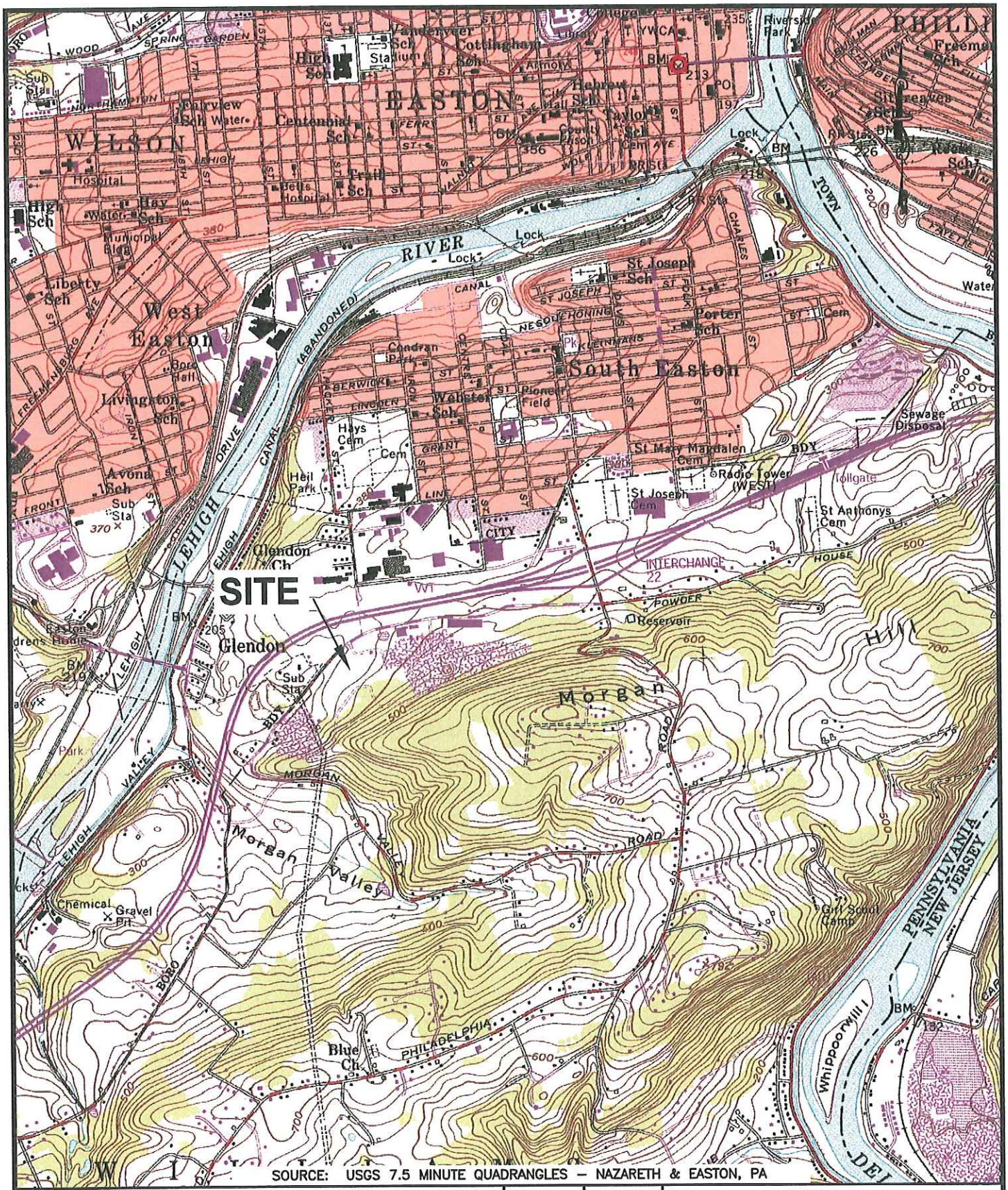
Table 7
Summarized Air Sampling Analytical Results - February 15, 2009
Chrin Sanitary Landfill
Williams Township, Northampton County, PA

	Station 1-021509		Station 2-021509		Station 3-021509		Station 4-021509		Station 5-021509		Station 6-021509		Station 7-021509	
Parameter	(ppbv)	uG/m^3	(ppbv)	uG/m^3	(ppbv)	uG/m^3	(ppbv)	uG/m^3	(ppbv)	uG/m^3	(ppbv)	uG/m^3	(ppbv)	uG/m^3
Freon 12	U	U	U	U	U	U	U	U	U	U	U	U	U	U
Freon 114	U	U	U	U	U	U	U	U	U	U	U	U	U	U
Chloromethane	U	U	U	U	U	U	U	U	U	U	U	U	U	U
Vinyl Chloride	U	U	U	U	U	U	U	U	U	U	U	U	U	U
1,3-Butadiene	U	U	U	U	U	U	U	U	U	U	U	U	U	U
Bromomethane	U	U	U	U	U	U	U	U	U	U	U	U	U	U
Chloroethane	U	U	U	U	U	U	U	U	U	U	U	U	U	U
Freon 11	U	U	U	U	U	U	U	U	U	U	U	U	U	U
Ethanol	U	U	U	U	U	U	U	U	U	U	U	U	U	U
Freon 113	U	U	U	U	U	U	U	U	U	U	U	U	U	U
1,1-Dichloroethene	U	U	U	U	U	U	U	U	U	U	U	U	U	U
Acetone	4.2	9.9	4.1	9.7	U	U	6.2	15.0	U	U	U	U	3.3	7.9
2-Propanol	U	U	U	U	U	U	U	U	U	U	U	U	U	U
Carbon Disulfide	U	U	U	U	U	U	U	U	U	U	U	U	U	U
3-Chloropropene	U	U	U	U	U	U	U	U	U	U	U	U	U	U
Methylene Chloride	U	U	U	U	U	U	U	U	U	U	U	U	U	U
Methyl tert-butyl ether	U	U	U	U	U	U	U	U	U	U	U	U	U	U
trans-1,2-Dichloroethene	U	U	U	U	U	U	U	U	U	U	U	U	U	U
Hexane	U	U	U	U	U	U	U	U	U	U	U	U	U	U
1,1-Dichloroethane	U	U	U	U	U	U	U	U	U	U	U	U	U	U
2-Butanone (Methyl Ethyl Ketone)	U	U	U	U	U	U	1.5	4.6	U	U	U	U	U	U
cis-1,2-Dichloroethene	U	U	U	U	U	U	U	U	U	U	U	U	U	U
Tetrahydrofuran	U	U	U	U	U	U	U	U	U	U	U	U	U	U
Chloroform	U	U	U	U	U	U	U	U	U	U	U	U	U	U
1,1,1-Trichloroethane	U	U	U	U	U	U	U	U	U	U	U	U	U	U
Cyclohexane	U	U	U	U	U	U	U	U	U	U	U	U	U	U
Carbon Tetrachloride	U	U	U	U	U	U	U	U	U	U	U	U	U	U
2,2,4-Trimethylpentane	U	U	U	U	U	U	U	U	U	U	U	U	U	U
Benzene	U	U	U	U	U	U	U	U	U	U	U	U	U	U
1,2-Dichloroethane	U	U	U	U	U	U	U	U	U	U	U	U	U	U
Heptane	U	U	U	U	U	U	U	U	U	U	U	U	U	U
Trichloroethene	U	U	U	U	U	U	U	U	U	U	U	U	U	U
1,2-Dichloropropane	U	U	U	U	U	U	U	U	U	U	U	U	U	U
1,4-Dioxane	U	U	U	U	U	U	U	U	U	U	U	U	U	U
Bromodichloromethane	U	U	U	U	U	U	U	U	U	U	U	U	U	U
cis-1,3-Dichloropropene	U	U	U	U	U	U	U	U	U	U	U	U	U	U
4-Methyl-2-pentanone	U	U	U	U	U	U	U	U	U	U	U	U	U	U
Toluene	U	U	U	U	U	U	U	U	U	U	U	U	U	U
trans-1,3-Dichloropropene	U	U	U	U	U	U	U	U	U	U	U	U	U	U
1,1,2-Trichloroethane	U	U	U	U	U	U	U	U	U	U	U	U	U	U
Tetrachloroethene	U	U	U	U	U	U	U	U	U	U	U	U	U	U
2-Hexanone	U	U	U	U	U	U	U	U	U	U	U	U	U	U
Dibromochloromethane	U	U	U	U	U	U	U	U	U	U	U	U	U	U
1,2-Dibromoethane (EDB)	U	U	U	U	U	U	U	U	U	U	U	U	U	U
Chlorobenzene	U	U	U	U	U	U	U	U	U	U	U	U	U	U
Ethyl Benzene	U	U	U	U	U	U	U	U	U	U	U	U	U	U
m,p-Xylene	U	U	U	U	U	U	U	U	U	U	U	U	U	U
o-Xylene	U	U	U	U	U	U	U	U	U	U	U	U	U	U
Styrene	U	U	U	U	U	U	U	U	U	U	U	U	U	U
Bromoform	U	U	U	U	U	U	U	U	U	U	U	U	U	U
Cumene	U	U	U	U	U	U	U	U	U	U	U	U	U	U
1,1,2,2-Tetrachloroethane	U	U	U	U	U	U	U	U	U	U	U	U	U	U
Propylbenzene	U	U	U	U	U	U	U	U	U	U	U	U	U	U
4-Ethyltoluene	U	U	U	U	U	U	U	U	U	U	U	U	U	U
1,3,5-Trimethylbenzene	U	U	U	U	U	U	U	U	U	U	U	U	U	U
1,2,4-Trimethylbenzene	U	U	U	U	U	U	U	U	U	U	U	U	U	U
1,3-Dichlorobenzene	U	U	U	U	U	U	U	U	U	U	U	U	U	U
1,4-Dichlorobenzene	U	U	U	U	U	U	U	U	U	U	U	U	U	U
alpha-Chlorotoluene	U	U	U	U	U	U	U	U	U	U	U	U	U	U
1,2-Dichlorobenzene	U	U	U	U	U	U	U	U	U	U	U	U	U	U
1,2,4-Trichlorobenzene	U	U	U	U	U	U	U	U	U	U	U	U	U	U
Hexachlorobutadiene	U	U	U	U	U	U	U	U	U	U	U	U	U	U

Notes: All results shown in part per billion by volume (ppbv) and micrograms per cubic meter (uG/m^3)
The qualifier "B" indicates - Compound present in laboratory blank greater than reporting limit (background subtraction not performed).
The qualifier "J" indicates - Estimated value.
The qualifier "E" indicates - Exceeds instrument calibration range.
The qualifier "S" indicates - Saturated peak.
The qualifier "Q" indicates - Exceeds quality control limits.
The qualifier "U" indicates - Compound analyzed for but not detected above the reporting limit.
The qualifier "UJ" indicates- Non-detected compound associated with low bias in the CCV
The qualifier "N" indicates - The identification is based on presumptive evidence.

Appendix A

Figures



SOURCE: USGS 7.5 MINUTE QUADRANGLES – NAZARETH & EASTON, PA

ENVIRONMENTAL ENGINEERING *and* SCIENCE

EARTHRES GROUP

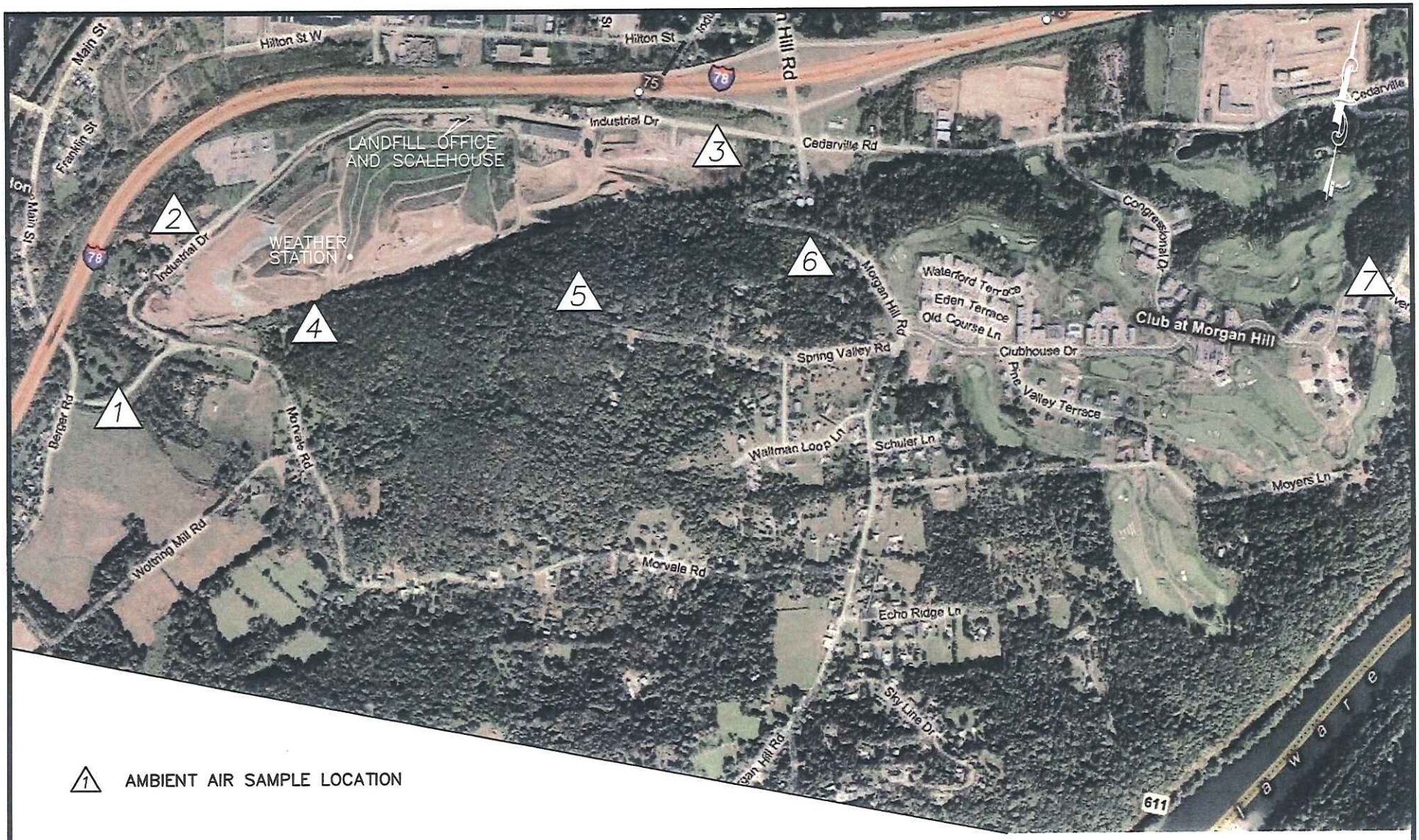
EarthRes Group, Inc.
P.O. Box 468
7137 Old Easton Road
Pipersville, PA 18947 USA
www.earthres.com
215-766-1211

DRAWN BY:	CHECKED BY:
AJG	SRC
DATE:	PROJECT NO:
03/19/09	081022.002

DRAWING SCALE: 1" = 2000'

FIGURE 1
SITE LOCATION MAP

CHRIN BROS. SANITARY LANDFILL
WILLIAMS TOWNSHIP
NORTHAMPTON COUNTY, PA



△1 AMBIENT AIR SAMPLE LOCATION

IMAGE PUBLISHED BY:
UNITED STATES GEOLOGIC SURVEY (USGS)

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EarthRes Group, Inc.
P.O. Box 468
7137 Old Easton Road
Pipersville, PA 18947 USA
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AJG	SRC
DATE:	PROJECT NO:
03/19/09	081022.002

DRAWING SCALE: 1" = 1200'

FIGURE 2
AMBIENT AIR SAMPLE LOCATION PLAN

CHRIN BROS. SANITARY LANDFILL
WILLIAMS TOWNSHIP
NORTHAMPTON COUNTY, PA

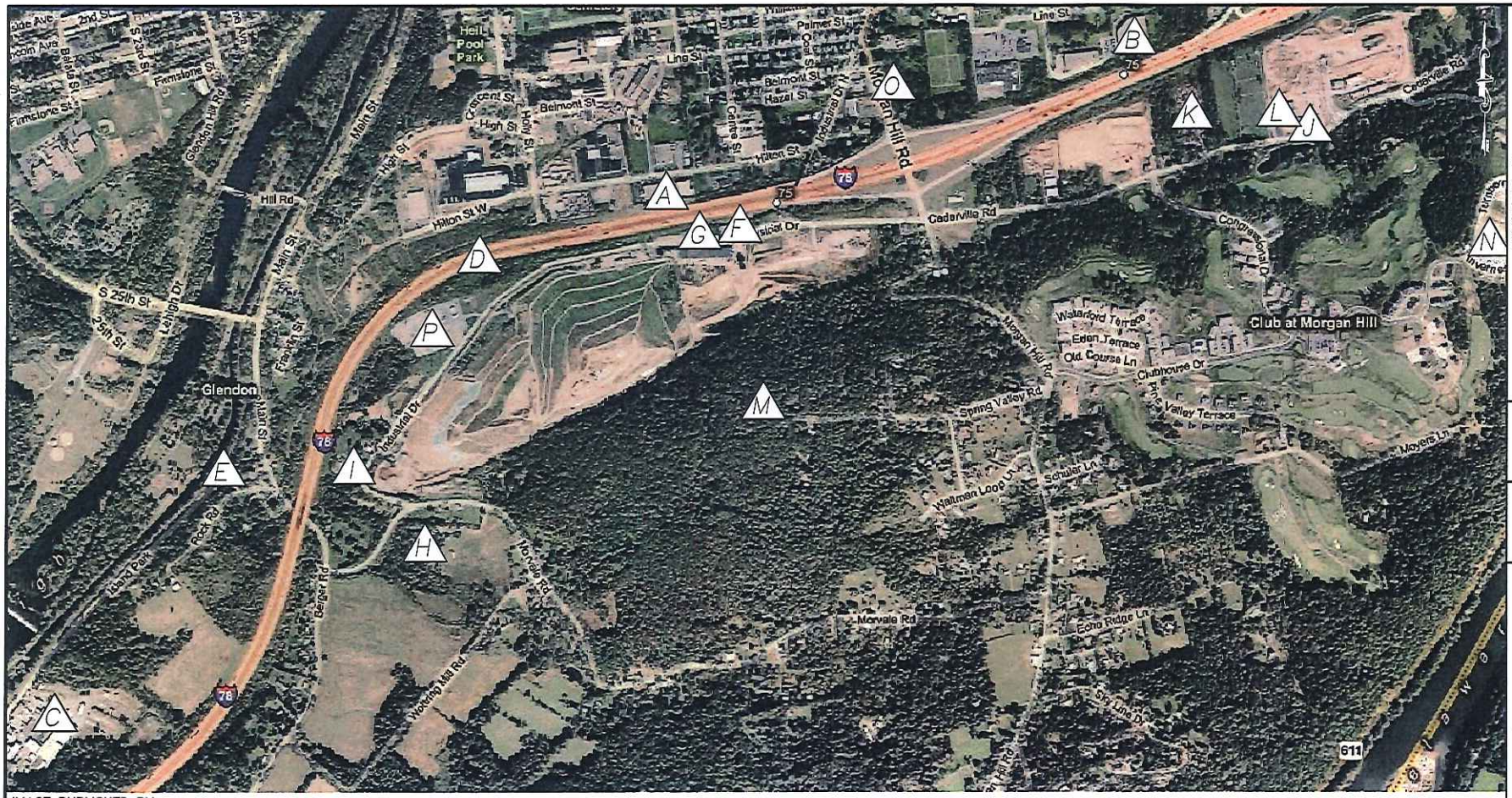


IMAGE PUBLISHED BY:
UNITED STATES GEOLOGIC SURVEY (USGS)

LEGEND

A	POLYTEK DEVELOPMENT CORPORATION
B	SMOOTH-ON, INC.
C	AIR PRODUCTS & CHEMICALS
D	I-78
E	ACTIVE RAIL LINE
F	EXXON GASOLINE STATION
G	WELDING SHOP
H	SCRAP YARD
I	AUTOBODY SHOP
J	DRY CLEANER
K	SALVAGE YARD
L	PEDICURE SHOP
M	CELL TOWER EMERGENCY GENERATOR
N	ACTIVE CONSTRUCTION
O	TURKEY HILL GASOLINE STATION
P	MET-ED SUBSTATION

NOTE: EASTON AREA JOINT SEWER AUTHORITY POTW IS LOCATED OFF THE MAP AREA TO THE EAST.

FIGURE 3
POTENTIAL OFF-SITE SOURCE AREAS FOR VOCs

CHRIN BROS. SANITARY LANDFILL
WILLIAMS TOWNSHIP
NORTHAMPTON COUNTY, PA

DRAWN BY: AJG
CHECKED BY: SRC
DATE: 03/19/09
PROJECT NO: 081022.002
DRAWING SCALE: 1" = 1000'

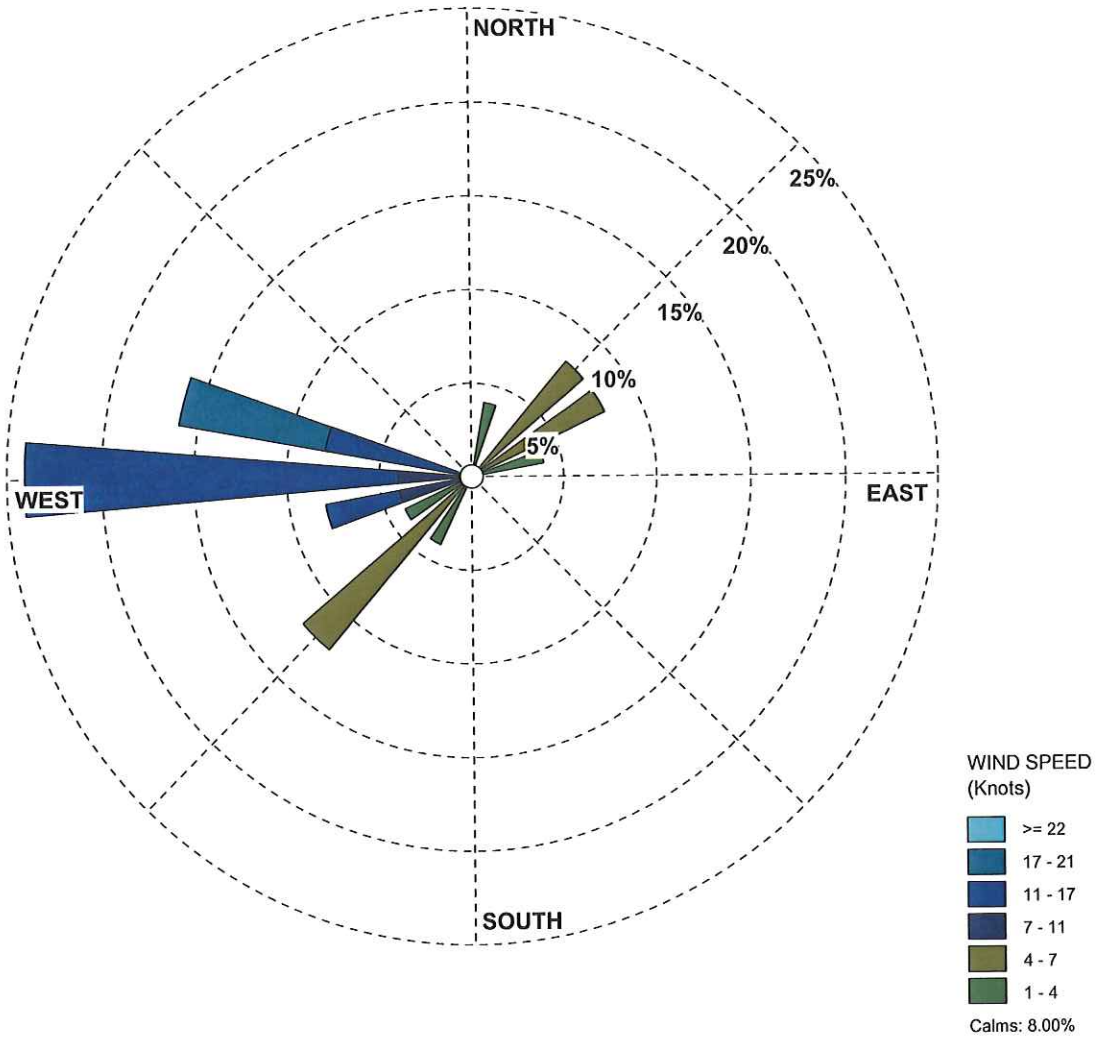
ENVIRONMENTAL ENGINEERING and SCIENCE
EarthRes Group, Inc.
P.O. Box 468
7137 Old Easton Road
Pipersville, PA 18947 USA
www.earthres.com
215-766-1211
ERG
EARTHRES GROUP

Appendix B

Wind Rose Diagrams

WIND ROSE PLOT:
01/09/2009 - 01/10/2009
0900 to 1100

DISPLAY:
Wind Speed
Direction (blowing from)

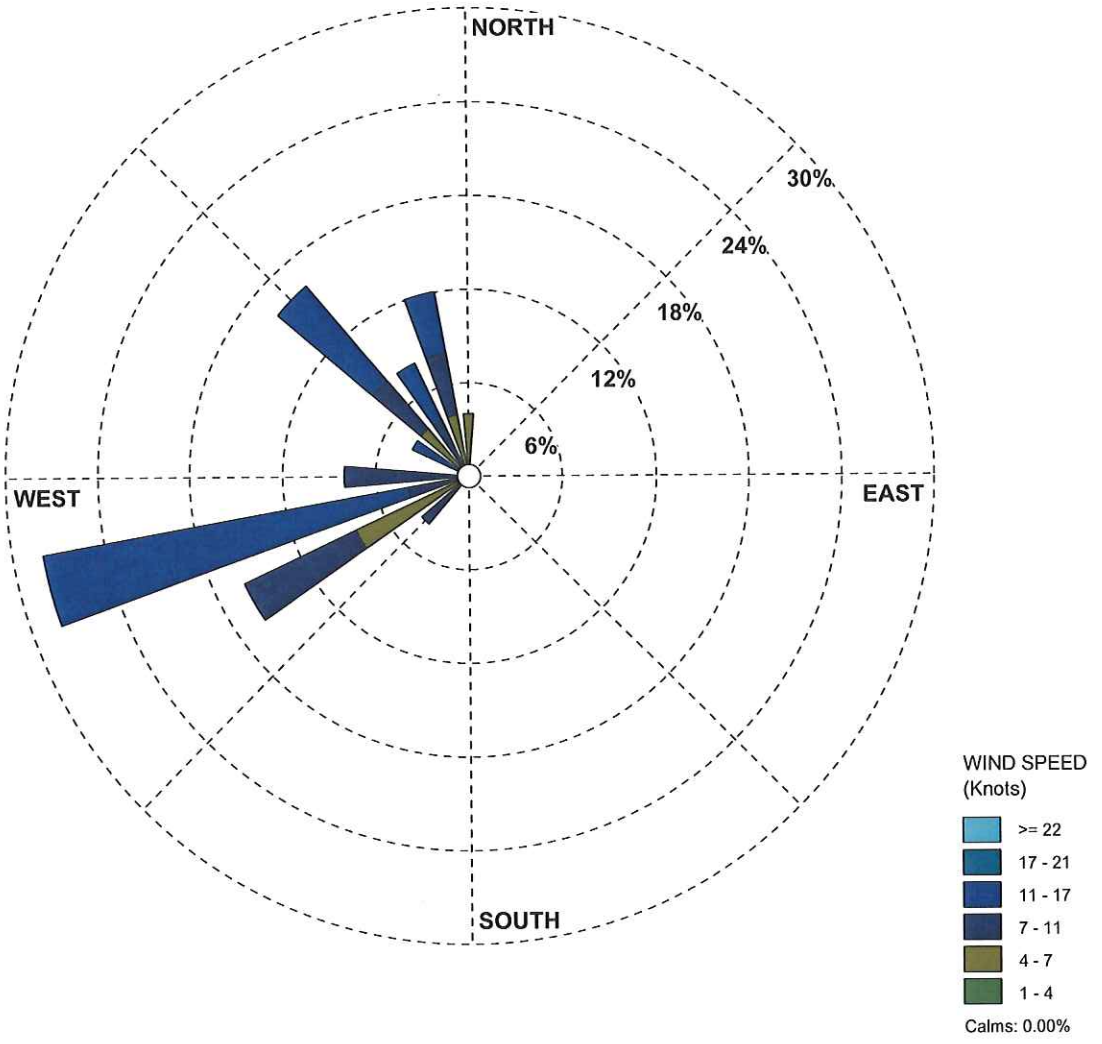


COMMENTS:	DATA PERIOD:	COMPANY NAME:	
Conversion Factor: Knots x 1.1508 = MPH	2009 Jan 9 - Jan 10 00:00 - 23:00	EarthRes Group, Inc.	
		MODELER: Andrew Gutshall	
	CALM WINDS: 8.00%	TOTAL COUNT: 25 hrs.	
	AVG. WIND SPEED: 8.22 Knots	DATE: 1/30/2009	PROJECT NO.: 081022.002

WRPLOT View - Lakes Environmental Software

WIND ROSE PLOT:
01/15/2009 - 01/16/2009
0800 to 1000

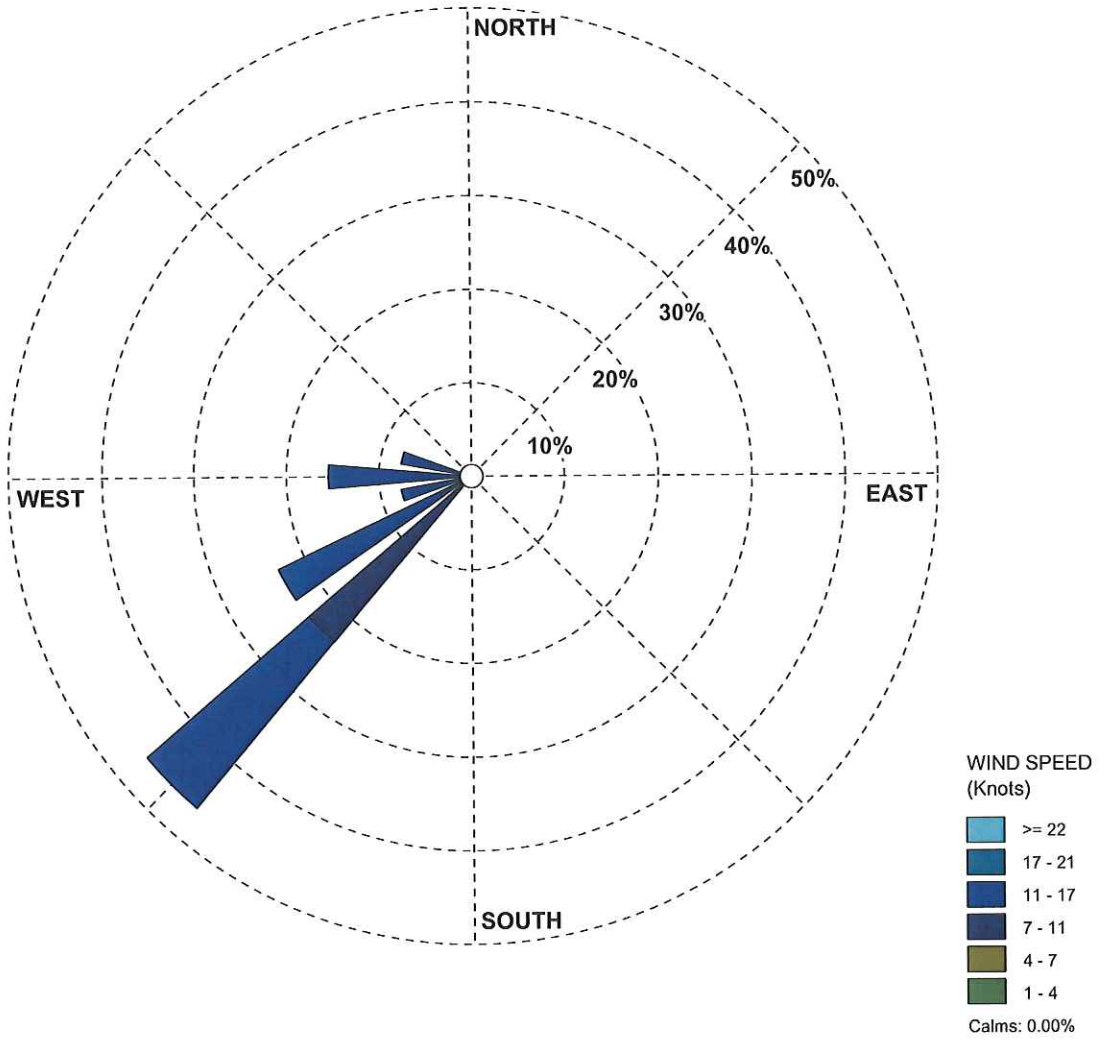
DISPLAY:
Wind Speed
Direction (blowing from)



COMMENTS: Conversion Factor: Knots x 1.1508 = MPH	DATA PERIOD: 2009 Jan 15 - Jan 16 00:00 - 23:00	COMPANY NAME: EarthRes Group, Inc.	
		MODELER: Andrew Gutshall	
	CALM WINDS: 0.00%	TOTAL COUNT: 25 hrs.	
	AVG. WIND SPEED: 10.37 Knots	DATE: 1/30/2009	PROJECT NO.: 081022.002

WIND ROSE PLOT:
01/21/2009 - 01/22/2009
0800 to 1100

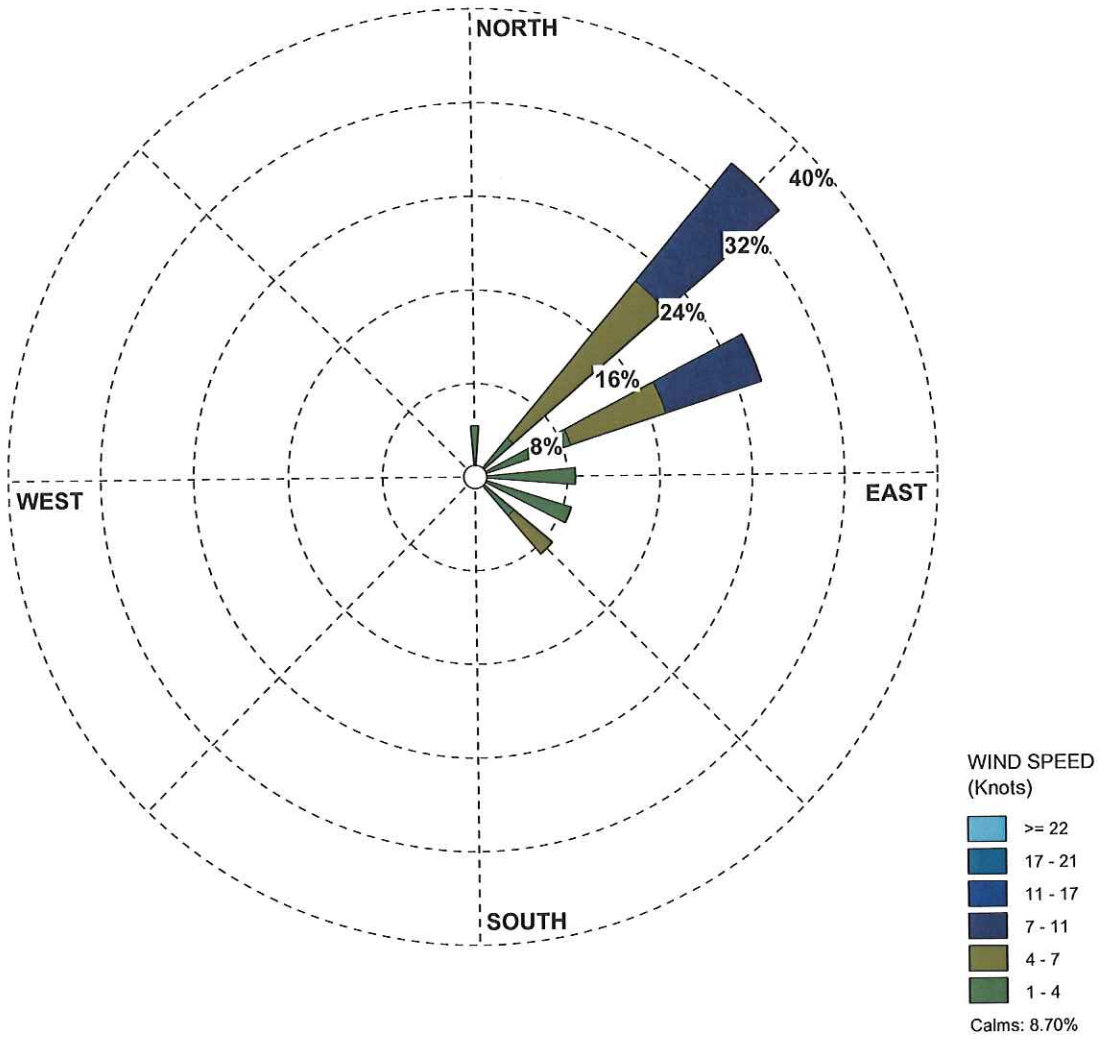
DISPLAY:
Wind Speed
Direction (blowing from)



COMMENTS: Conversion Factor: Knots x 1.1508 = MPH	DATA PERIOD: 2009 Jan 21 - Jan 22 00:00 - 23:00	COMPANY NAME: EarthRes Group, Inc.	
		MODELER: Andrew Gutshall	
	CALM WINDS: 0.00%	TOTAL COUNT: 26 hrs.	
	AVG. WIND SPEED: 11.87 Knots	DATE: 1/30/2009	PROJECT NO.: 081022.002

WIND ROSE PLOT:
01/27/2009 - 01/28/2009
1300 to 1500

DISPLAY:
Wind Speed
Direction (blowing from)

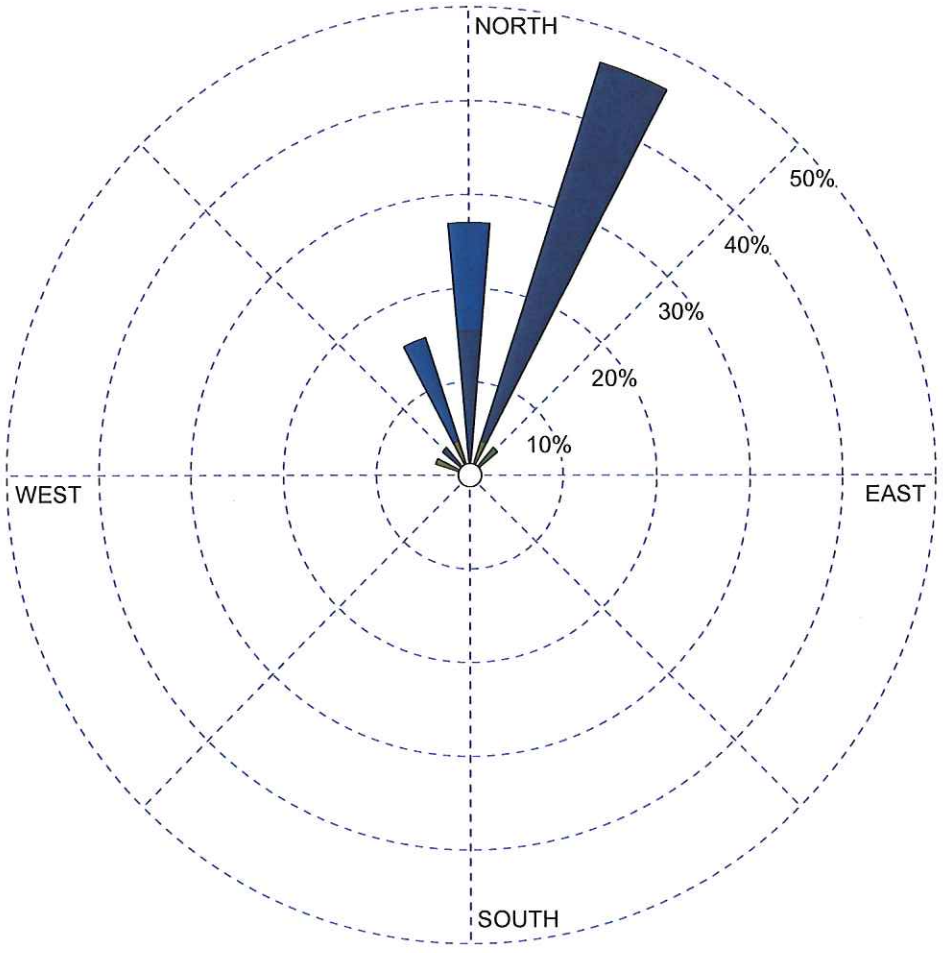


COMMENTS: Conversion Factor: Knots x 1.1508 = MPH Wind speed data unavailable for 0930-1245 on 01/28/09 due to weather station being frozen.	DATA PERIOD: 2009 Jan 27 - Jan 28 00:00 - 23:00	COMPANY NAME: EarthRes Group, Inc.	
		MODELER: Andrew Gutshall	
	CALM WINDS: 8.70%	TOTAL COUNT: 23 hrs.	
	AVG. WIND SPEED: 4.66 Knots	DATE: 2/3/2009	PROJECT NO.: 081022.002

WRPLOT View - Lakes Environmental Software

WIND ROSE PLOT:
02/02/2009 - 02/03/2009
1200 to 1500

DISPLAY:
Wind Speed
Direction (blowing from)



WIND SPEED
(Knots)

- >= 22
- 17 - 21
- 11 - 17
- 7 - 11
- 4 - 7
- 1 - 4

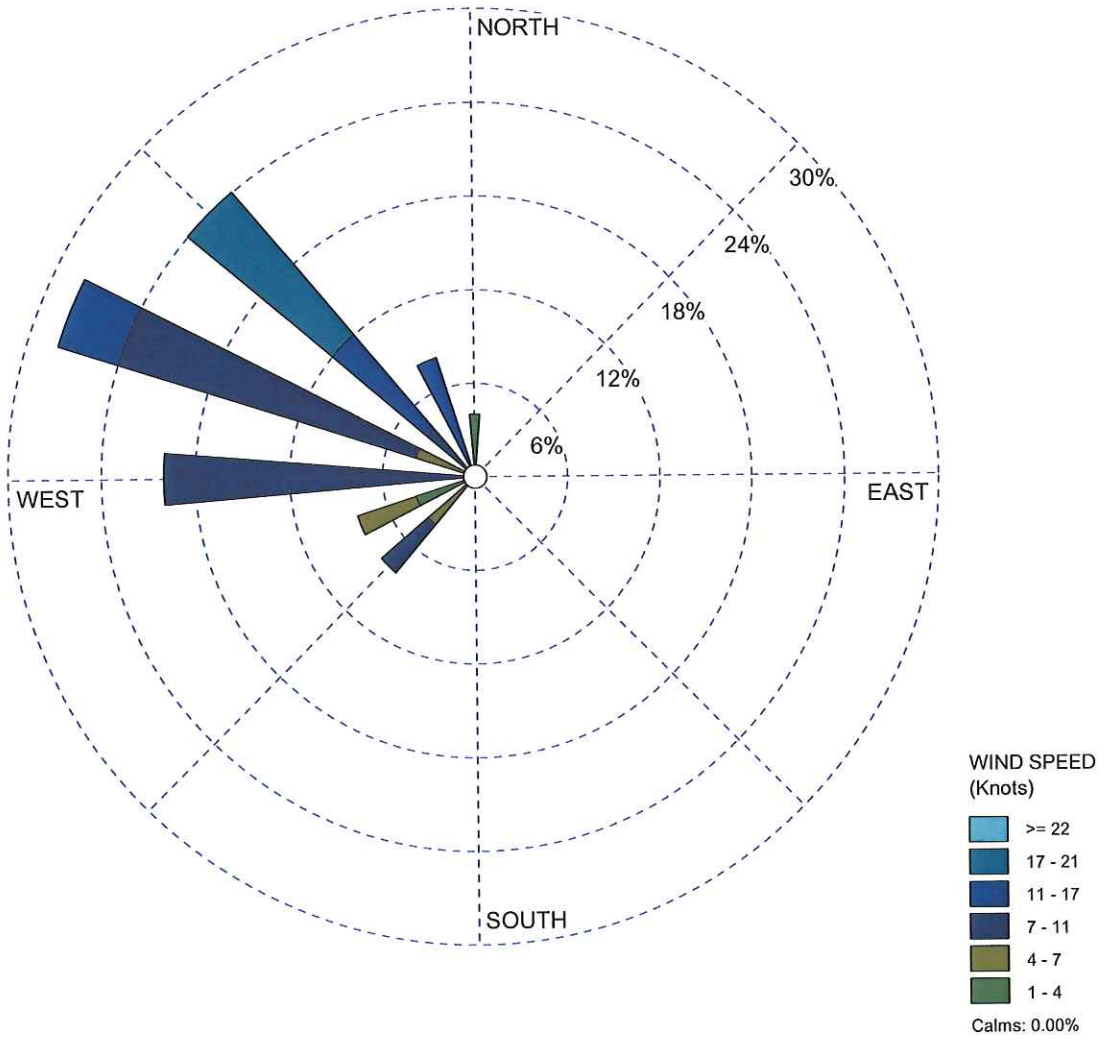
Calms: 0.00%

COMMENTS:	DATA PERIOD:	COMPANY NAME:	
Conversion Factor: Knots x 1.1508 = MPH	**2009** **Feb 2 - Feb 3** **00:00 - 23:00**	**EarthRes Group, Inc.**	
		MODELER: **Andrew Gutshall**	
	CALM WINDS: **0.00%**	TOTAL COUNT: **26 hrs.**	
	AVG. WIND SPEED: **9.29 Knots**	DATE: **2/18/2009**	PROJECT NO.: **081022.002**

WRPLOT View - Lakes Environmental Software

WIND ROSE PLOT:
02/08/2009 - 02/09/2009
1300 to 1500

DISPLAY:
Wind Speed
Direction (blowing from)

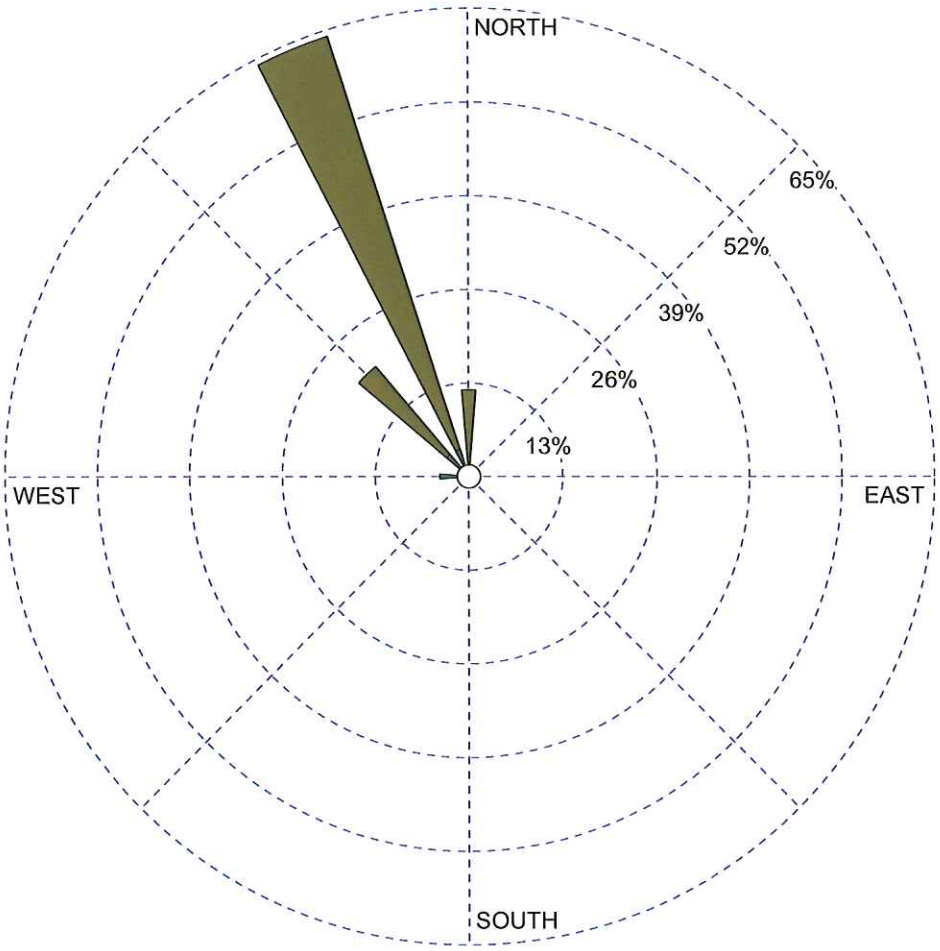


COMMENTS: Conversion Factor: Knots x 1.1508 = MPH	DATA PERIOD: 2009 Feb 8 - Feb 9 00:00 - 23:00	COMPANY NAME: EarthRes Group, Inc.	
		MODELER: Andrew Gutshall	
	CALM WINDS: 0.00%	TOTAL COUNT: 25 hrs.	
	AVG. WIND SPEED: 9.84 Knots	DATE: 2/18/2009	PROJECT NO.: 081022.002

WRPLOT View - Lakes Environmental Software

WIND ROSE PLOT:
02/14/2009 - 02/15/2009
1300 to 1500

DISPLAY:
Wind Speed
Direction (blowing from)



WIND SPEED
(Knots)
>= 22
17 - 21
11 - 17
7 - 11
4 - 7
1 - 4
Calms: 0.00%

COMMENTS:	DATA PERIOD:	COMPANY NAME:	
Conversion Factor: Knots x 1.1508 = MPH	2009 Feb 14 - Feb 15 00:00 - 23:00	EarthRes Group, Inc.	
		MODELER: Andrew Gutshall	
	CALM WINDS: 0.00%	TOTAL COUNT: 25 hrs.	
	AVG. WIND SPEED: 5.20 Knots	DATE: 2/18/2009	PROJECT NO.: 081022.002

WRPLOT View - Lakes Environmental Software

Appendix C

Laboratory Analytical Results

NOT INCLUDED

Appendix D

ERG – Company Information

EarthRes Group, Inc. (ERG) is a multidisciplinary environmental engineering and consulting firm providing high quality services to private and public clients.

We are a team of professional engineers, geologists and environmental scientists who take pride in developing successful, practical solutions to environmental issues for a broad range of clients. We cover all aspects of environmental regulation from air permitting to zoning issues. Our primary market sectors include:

- Industrial
- Mining
- Solid Waste
- Water Resources

ERG brings value to our clients through creative thinking and an understanding of what is important to their business. We provide superior and reasonably priced services while using innovative and conventional solutions to achieve results for our clients. We maintain honest, open communications and adhere to sound ethics and project management principles to achieve successful project completion and client satisfaction.

ERG offers a proven approach and decades of project experience. We offer:

- In-depth regulatory knowledge and experience working with state and federal agencies.
- Project management proven to be highly successful on numerous complex projects.
- Effective planning in a project-oriented environment with detailed cost proposals for every project.

Our priority is to understand the needs of our clients, the regulators, and third-party entities. ERG effectively communicates and coordinates with all involved parties, allowing clients to concentrate on their core business.

EARTHRES GROUP

Jan C. Hutwelker, P.E.

President, Principal Engineer

AREAS OF SPECIALIZATION

- Landfill Facility Design, Permitting & Evaluation
- Design & Evaluation of Landfill Gas Systems
- Design & Evaluation of Leachate Management Systems
- Mine Facility Design, Permitting & Evaluation
- Landfill Construction Management & CQA
- Computer Applications Controls

PROFESSIONAL PROJECT EXPERIENCE

Mr. Hutwelker is the President and founder of ERG. He has 27 years of diverse experience in the solid waste and mining industries. He specializes in the management of projects relating to the planning, design, permitting and operation of solid waste and mining facilities, as well as various civil and environmental projects. In addition to his design experience, Mr. Hutwelker has several years of experience in mine/plant production management and has been responsible for the implementation of much of his design work while managing those operations.

EDUCATION

B.S., Engineering of Mines, West Virginia University, 1981

REGISTRATIONS & AFFILIATIONS

Professional Engineer, Pennsylvania

Professional Engineer, New Jersey

New Jersey Certified Subsurface Evaluator

PADEP Act 101 Host Municipality Inspector, Pennsylvania (Former)

National Society of Professional Engineers

National Solid Wastes Management Association

Society of Mining Engineers of AIME

Air & Waste Management Association

Solid Waste Association of North America

CERTIFICATIONS & TRAINING

"Regulatory Training in Underground Storage Tanks", The New Jersey Agricultural Experiment Station Office of Continuing Professional Education of Rutgers University, New Jersey, 2009

11th Annual Solid Waste Fall Conference, Pennsylvania Keystone Chapter of Solid Waste Association of North America (SWANA), State College, PA September 2008

The Global Waste Management Symposium, Colorado, September 2008

Tennessee Certified - Mine Foreman, Preparation Plant

MSHA Certified - Methane Detection

8 Hour Annual Refresher Course on Hazardous Waste Operations and Emergency Response (HAZWOPER), SoBran, Inc., September 2007

"Underground Storage Tanks" Seminar, New Jersey Society of Professional Engineers, Trenton, NJ, 2006

"Current Issues in Storm Water Regulations in Pennsylvania," Lorman Education Services, Bethlehem, PA, 2005

"Regulatory Training in USTs" Course, Cook College at Rutgers University, New Brunswick, NJ, 2003

"Underground Storage Tanks" Seminar, New Jersey Society of Professional Engineers, Princeton, NJ, 2001

"Geosynthetics for Advanced Solutions" Seminar, GSE Lining Technology, Princeton, NJ, 2001

"Programmable Logic Controllers: Maintenance and Troubleshooting" Seminar, Impact Training Services, Allentown, PA, 1999

"The Stability Analysis of Slopes" Course, University of Kentucky, Lexington, KY, 1982

"Applied Hydrology and Sedimentology for Disturbed Areas" Course, University of Kentucky, Lexington, KY, 1982

KEY LANDFILL PROJECTS

Hazardous Waste Vault Liner Construction Certification/Quality Assurance, Confidential Client, Pennsylvania – Managed and performed CQA activities for the installation of double-lined containment for a hazardous-waste sludge-processing facility. Material installed included HDPE Geomembrane, Bentonite Geosynthetic Clay Liner, Geonet and Geotextiles.

Landfill Gas Management/Beneficial Use, CES Landfill/Keystone Potato Products, Hegins, PA – Directed cost analysis, design and permitting for the construction of a system to deliver landfill gas as boiler fuel for a proposed potato processing (dehydration) plant.

Municipal Waste Transfer Station Design, USA Waste, Beach Lake Transfer Station, Beach Lake, PA – Coordinated layout, design and construction specifications for construction of a 400-ton-per-day top-load transfer station.

LFG Pipeline Engineering Support, Confidential Client, PA – Provided engineering support services to develop costs for landfill gas (LFG) pipeline project: prepared preliminary conceptual design of piping and controls to convey gas from wellfield to compressor station, and developed estimate of construction costs; estimated condensate generation rates and evaluated the ability of the onsite treatment plant to treat the condensate.

Landfill Gas Pipeline, CES Landfill/Keystone Potato Products, Hegins, PA – Prepared PA DEP application for permit modification for the conveyance of landfill gas for off-site use. Permit modification included design drawings for the gas delivery system piping layout, and other relevant information on the proposed blowers, controls and condensate management system components.

Landfill Expansion Assistance, Commonwealth Environmental Systems Landfill, Hegins, PA – Application assistance related to landfill expansion project included design and sizing of gas-system components, preparation of PA DEP Air Quality Plan Approval Application, and preparation of Waste Management Program forms relating to air resources protection (Forms G-A and G-B) and gas management (Form K) for inclusion in Application for Permit Modification.

Gas System QA/QC Plan, Confidential Client, PA – Prepared document to include procedures currently used by ERG in landfill gas management system

construction, both in preparing specifications and when performing Quality Assurance/Quality Control activities. Document included procedures for the submittal reviewer, construction contractor and CQA personnel.

Gas System Optimization, Confidential Client, PA – Project included onsite monitoring, data analysis, system troubleshooting, and gas system engineering services to optimize gas quality at the control devices while maintaining stringent odor control at the site. Developed oxygen detection and tracking procedures to help the site quickly identify and locate oxygen intrusion in the gas system. Performed evaluation as basis for new gas system design to improve overall system efficiency.

Expert Testimony/Reporting, Confidential Client, Southeastern Pennsylvania – Prepared expert's report, reviewed deposition testimony and consulted in planning strategy supporting litigation regarding the permitting of a construction and demolition waste landfill in an abandoned quarry. Case was settled before going to trial.

Gas System Operations Support, Grand Central Sanitary Landfill, Pen Argyl, PA -Performed gas collection system monitoring, inspection and construction management for the maintenance and installation of HDPE piping, valves, horizontal and vertical wells, wellheads, and condensate traps/knockout tanks. Completed troubleshooting and analysis of LFG system to design modifications and enhance collection capacity as landfill construction progressed. Completed gas flow calculations for evaluating and designing piping systems using site gas flow data.

Landfill Gas Emissions Testing, Green Knight Economic Development Corporation, Pen Argyl, PA – Coordinated development of emissions testing protocol for 10 megawatt landfill gas turbine generating plant. Oversaw emissions testing of three turbines and reporting of test results to PA DEP.

Landfill Gas System Flare Design, Middle Mar Tee Landfill, Cape May County, NJ - Prepared a gas system design and construction package for the installation of solar flares on the passive gas venting system at the Middle Mar-Tee Landfill in Cape May County, New Jersey. Project tasks included initial GPS site survey for system design; preparation of a construction bid and contract documents package; and engineering support during the bidding phase of the project.

Gas Collection and Control System Design, Cumberland County Landfill, Shippensburg, PA – Prepared Gas Collection and Control System (GCCS) design plan to meet regulatory obligations of Title V Operating Permit and federal New Source Performance Standards (NSPS). Analyzed required capacity of Newton Expansion landfill gas system; prepared gas generation curves using LANDGEM. Calculated well spacing based on radius of influence calculations; designed piping system components; calculated overall flow and system losses.

Gas Flare System Design and CQA, Commonwealth Environmental Systems Landfill, Hegins, PA – Provided design and construction quality assurance (CQA) services for the specification, installation and startup of enclosed ground flare and related gas header piping. Prepared Construction Certification Report (Form 37) for submittal to PA DEP, detailing observed construction and testing procedures, and associated product data for the installed equipment.

Gas Management Design, Commonwealth Environmental Systems Landfill, Hegins, PA – Designed vertical gas-extraction wells for newly capped areas of landfill and prepared Project Manual including bid form, contract documents, technical specifications and construction drawings. Following design approval, prepared and presented detailed opinion of probable construction costs for project.

Landfill Gas-To-Energy Project, Plainfield Township, PA - Planning and permitting of a 10 mw turbine electric generating plant fueled by landfill gas. Work included layout of the building and preparation of air quality and solid waste permit applications. The plant is operated by a non-profit corporation with proceeds from the sale of electricity to go to surrounding communities. This project was awarded the "2000 Project of the Year" by the EPA's Landfill Methane Outreach Program.

WSI CCL Gas System Services, Cumberland County Landfill, Shippensburg, PA – Prepared piping design to extend proposed gas header around landfill perimeter; prepared addendum to enclosed flare construction project for final header design.

Gas System Evaluation, Cumberland County Landfill, Shippensburg, PA – Evaluated existing gas-collection system, prepared design and construction bid documents for recommended modifications, and performed construction

oversight services. Prepared bid documents and performed CQA for installation of proposed gas monitoring probes.

Gas System Design, Cumberland County Landfill, Shippensburg, PA – Analyzed required capacity for landfill's Newton Expansion gas collection and conveyance system to adequately size the piping for Pad N-1 and N-2 areas; sized piping and prepared construction specifications and drawings for system components ready for installation; and prepared request for determination for submittal to PA DEP Air Quality Program for approval to use landfill's existing candlestick flare as interim control device for expansion area. Provided construction oversight and quality assurance, and prepared and submitted Construction Certification Report (PA DEP Form 37).

Health Risk Assessment Development, Grand Central Sanitary Landfill, Pen Argyl, PA – Provided engineering and consulting services to assist in the development of a Health Risk Assessment for the landfill. Project included calculation of emission rates of various compounds from different landfill cover conditions.

Particulate Matter Monitoring, Grand Central Sanitary Landfill, Pen Argyl, PA – Provided engineering and consulting services related to the development of protocols for and performance of dustfall sampling and particulate matter monitoring around the landfill perimeter.

Landfill Gas Data Acquisition System, Grand Central Sanitary Landfill, Pen Argyl, PA – Directed development of design to integrate a radio telemetry data acquisition (DA) system into an existing landfill gas management system. The DA system relays critical operating information from 13 remote stations onsite including two enclosed ground flares, eight condensate pumping stations, and three repeater towers to a central location for system monitoring and data management for regulatory compliance. Upgraded control system with automated pressure controls to stabilize wellfield vacuum and provide consistent gas quality to off-site 10 megawatt generating facility.

Landfill Gas Management/Beneficial Use, CES Landfill/Keystone Potato Products, Hegins, PA – Directed cost analysis, design and permitting for the construction of a system to deliver landfill gas as boiler fuel for a proposed potato processing (dehydration) plant.

Landfill Expansion Design and Permitting, Pennsylvania – Managed design and permitting effort for a 10-million cubic yard municipal waste landfill

expansion. Work included preparation of local zoning application and testimony at multiple public hearings.

Landfill Design Modification and Permitting, Pennsylvania – Directed the design and permitting of a major design landfill modification to convert from gravity drain leachate extraction system to side-slope riser pump system. Project included regrading of proposed final slopes to gain approximately 10 percent additional capacity from facility.

Landfill Gas System and Flare Design, Pennsylvania – Managed design and installation of 4000 scfm landfill gas enclosed flare system.

Landfill Expansion Design and Permitting, Grand Central Sanitary Landfill, Pen Argyl, PA – Managed design and permitting efforts required for the construction of a six-cell, 27-acre municipal waste landfill expansion. Work included liner, leachate and landfill gas management system design, slope stability analysis, cell layout, grading and stormwater management design.

Residual Waste Landfill Feasibility Study, Confidential Client, Pennsylvania – Managed performance of a feasibility study for the siting of a captive residual waste landfill. Work included development of a preliminary geological study and preparation of conceptual designs and cost analyses.

Landfill Cell Construction Certification/Quality Assurance, Grand Central Sanitary Landfill Cells 1 through 7, Pen Argyl, PA – Managed CQA activities and certified the construction of 7 municipal waste landfill cells. Materials installed included; HDPE and PVC Geomembrane, Geosynthetic Clay Liner, Geotextiles and Geonet.

Hazardous Waste Vault Liner Construction Certification/Quality Assurance, Confidential Client, Pennsylvania – Managed and performed CQA activities for the installation of double-lined containment for a hazardous waste sludge processing facility. Material installed included HDPE Geomembrane, Bentonite Geosynthetic Clay Liner, Geonet and Geotextiles.

Landfill Closure Design and Permitting, Grand Central Sanitary Landfill, Pen Argyl, PA – Assisted with preparation of closure plan and permit application for the capping and closure of a 52 acre municipal waste landfill. Work included preparation of cap system design, gas collection system design, slope stability analysis, terrace layout, grading, drainage and stormwater management design.

Landfill Gas Extraction and Flare System Design, Grand Central Sanitary Landfill, Pen Argyl, PA – Gas well, piping and extraction system design for the management of gas from 70 acres of municipal waste landfill. Work included pipe sizing, layout and preparation of specifications for a centrifugal blower and enclosed flare system.

Landfill Gas Control System Design, Land Developer, New Jersey – Design of system to control and monitor methane at a retail shopping center to be constructed above a closed landfill.

Landfill Design and Permitting, Grand Central Sanitary Landfill, Pen Argyl, PA – Performed design work required for the permitting and construction of a nine-cell, 60-acre double-lined municipal waste landfill. Work included liner and leachate management system design, slope stability analysis, cell layout, grading and stormwater management design. The application was approved and the permit was issued in September 1990.

Landfill Design and Permitting, Confidential Client, Barbour County, WV – Performed design work required for the permitting of 625 acres of double-lined municipal waste landfill. Work included liner, leachate and landfill gas management system design, slope stability analysis, cell layout and grading.

Landfill Design and Permitting, John Fry II Sanitary Landfill, Pottsville, PA – Performed and managed work required for the siting and permitting of a proposed 30 acre lined landfill expansion. Work included research and documentation of multiple abandoned deep mine workings beneath the site and management of a subsidence investigation. Design work consisted of liner, leachate and gas collection system design, fill area grading, stability and settlement analyses and stormwater management system design.

Residual Waste Landfill Feasibility Study, Pharmaceutical Manufacturer, Eastern Pennsylvania – Performed feasibility study for the siting of a dedicated residual waste landfill. Work included preparation of conceptual designs and cost analyses for several siting options. One option included an analysis of costs involved in relocating waste from an unlined municipal waste landfill to construct a lined facility in the same location.

Landfill Construction and Operation Cost Analysis, Confidential Client, Barbour County, WV – Performed detailed cost analysis for a proposed

municipal waste landfill. Work included estimating and obtaining costs for materials, equipment, buildings, and operations to estimate start-up and yearly operating expenses.

Landfill Cap Construction Quality Assurance, Grand Central Sanitary Landfill, Pen Argyl, PA – Managed CQA activities for the installation of a cap system on 20 acres± of an active municipal waste landfill. Materials installed included; PVC and LLDPE Geomembrane, HDPE Geonet and Geotextiles.

Closure of Foundry Sand Fill Area, Grandview Speedway, Boyertown, PA – Responsible for monitoring final grading and the installation of a low-permeability soil cap for the closure of an area where waste foundry sand was placed as structural fill. Work included performing field topographic surveys, revising the design grades and stormwater management plan and certifying the construction to the State.

Landfill Cap Construction Quality Assurance, Aberdeen Proving Ground, Aberdeen, MD – Managed CQA activities for the installation of a cap geosynthetic cap system on a 25 acre ± municipal waste landfill. Materials installed included; PVC Geomembrane, HDPE Geonet and Geotextiles.

Landfill Expansion Planning, Confidential Client, Pennsylvania – Prepared conceptual design and cost analysis for presentation at zoning hearing for a proposed landfill expansion.

Composting Operation Cost Analysis, Confidential Client, Barbour County, WV – Performed detailed cost analysis for proposed yard waste composting operation. Work included pricing and analysis of costs for building, equipment and operations to predict return on investment.

PUBLICATIONS & PRESENTATIONS

Pullar, Thomas G., D.R. Horvath, J.C. Hutwelker, and R.J. Meyer, "Leachate Treatment: A Case Study of Grand Central Sanitary Landfill", The Global Waste Management Symposium, Copper Mountain, CO, 2008

Hutwelker, J.C., and J. Buczynski, "Effective Leachate Management" PWIA, SWANA and PA DEP Eighth Annual Fall Conference, State College, PA 2005

Hutwelker, J.C., and S.A. Dean, "21st Century Landfill Gas Management", Annual Fall Conference, State College, PA 2004

Hutwelker, J.C., and F.X. Taylor, "Oil-Resistant PVC Geomembrane Compatibility for Residual Waste", Proceedings, Geosynthetics 1993, Vancouver, BC, 1993

Hutwelker, J.C., F.X. Taylor, and T.G. Pullar, "The Evolution of Geosynthetics in a Landfill Lining System", Proceedings, Geosynthetics 1991, Atlanta, GA, 1991