



**Revitalizing Auto Communities
Environmental Response Trust**

February 27, 2014

U.S. EPA Region 5
Remediation and Reuse Branch
Land and Chemicals Division, LU-9J
77 West Jackson Blvd.
Chicago, IL 60604-3590
Attn: Mirtha Cápiro

RE: Site-Wide Groundwater Monitoring Report for 2013
RACER Trust Moraine Facilities
Moraine, Ohio

Dear Ms. Cápiro:

The Revitalizing Auto Communities Environmental Response Trust (RACER Trust) is providing this Site-Wide Groundwater Monitoring Report for 2013 for the RACER Trust Moraine Facilities in Moraine, Ohio. This report presents the groundwater monitoring activities conducted to assess the performance of the current corrective measures completed in 2013 at the following facilities located in Moraine, Ohio: former Delphi Harrison Thermal Systems, Moraine Plant, former General Motors Powertrain Group, Moraine Engine Plant and former General Motors Truck Group, Moraine Assembly Plant.

If you have any questions, please contact me at (937) 751-8635.

Sincerely,

Pamela L. Barnett, PG
Assembly Region Cleanup Manager (DE, LA, MA, OH, PA, VA)
RACER Trust

cc: B. Gitzinger, Ohio EPA

Site-Wide Groundwater Monitoring Report for 2013

Revitalizing Auto Communities Environmental Response Trust (RACER Trust)

Former Delphi Harrison Thermal Systems, Moraine Plant
Former General Motors Powertrain Group, Moraine Engine Plant
Former General Motors Truck Group, Moraine Assembly Plant

Moraine, Ohio

February 27, 2014

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1. Introduction

This Site-Wide Groundwater Monitoring Report presents the groundwater monitoring activities completed in 2013 at the following Revitalizing Auto Communities Environmental Response Trust (RACER Trust) (formerly General Motors Corporation [GM Corporation]) facilities located in Moraine, Ohio (Figure 1): former Delphi Harrison Thermal Systems Moraine Plant (former Delphi Thermal Moraine), former General Motors Powertrain Group, Moraine Engine Plant (former Moraine Engine), and former General Motors Truck Group, Moraine Assembly Plant (former Moraine Assembly). A multi-phased Resource Conservation and Recovery Act (RCRA) Facility Investigation (RFI) was completed for these facilities and approved by the United States Environmental Protection Agency (U.S. EPA) in 2000 (ARCADIS Geraghty & Miller, Inc. 2000a and b, ENVIRON 2000a and b). The 2000 RFI identified that the primary source area of volatile organic compounds (VOCs) in shallow groundwater at the three facilities is located at the Area of Interest (AOI) 7 - Former Oil House Area, in the northern portion of the former Moraine Engine facility (Figure 2).

The focus of the Interim Measures/Corrective Measures (IM/CM) Report (ARCADIS Geraghty & Miller, Inc. 2001) was a site-wide remedy that addressed the source of the VOCs in groundwater and the downgradient plume based on the conceptual site model at that time. Subsequent to submittal of the IM/CM Report, implementation of the interim measures proposed in the IM/CM Report was conducted on an ongoing basis by former GM Corporation and has been continued by RACER Trust awaiting the issuance of the Statement of Basis and implementation of the final remedy for the site. The interim measures proposed in the IM/CM Report incorporated the Former Oil House Area interim measures (in-situ remediation of groundwater in the Oil House Area and downgradient of the Oil House Area, Figure 2); the capture zone interim measures (pump and treat system for the upper aquifer and pumping for the lower aquifer, Figure 2); institutional actions (the Site will remain industrial and groundwater use will be restricted); and a site-wide groundwater monitoring program.

The conceptual site model previously developed for the Site was revised using the additional data collected during the supplemental investigations since submittal of the IM/CM Report. The revised conceptual site model was presented in the draft Corrective Measures Proposal (CMP) (ARCADIS, Inc. 2008a) and was used to support the updated risk analysis and corrective measures evaluation. Following completion of the Landfill L1 investigation in 2011 and 2012 and the pre-design investigation in 2012, the conceptual site model, risk analysis, and corrective measures evaluation was updated for the CMP completed in 2012 (ARCADIS, Inc. 2012a). The 2012 CMP also

contained an evaluation of source areas not investigated during the previous phases of the RFI (e.g., Process Sump Area).

This report addresses several components of the proposed final remedy, including the site-wide groundwater monitoring program and the performance of the ongoing interim measures (Table 1). All groundwater monitoring for the facilities was conducted in accordance with the approved Site-Wide Groundwater Monitoring Plan (ARCADIS G&M, Inc. 2002) and as modified in the Site-Wide Groundwater Monitoring Report for 2009 (ARCADIS, Inc. 2010a).

1.1 Site Description

The RACER Trust Moraine Site has been used for industrial purposes since the property was acquired in the mid-1920s by former GM Corporation. The former Moraine Engine and Moraine Assembly facilities occupy approximately 239 acres, while the adjacent former Delphi Thermal Moraine facility occupies approximately 124 acres. The facilities are located in the City of Moraine in Montgomery County in southwestern Ohio. A small portion of the Moraine Assembly facility is located in the City of Kettering. Figure 1 presents the location of each facility, property boundaries, and site features.

Frigidaire (a former division of GM Corporation) produced appliances from the late 1920s until 1979. Former GM Corporation announced the shutdown of all Frigidaire operations in January 1979. During 1980 and 1981, the majority of the former Frigidaire Plant 2 was converted to the former Moraine Engine facility, and the former Frigidaire Plant 3 and the northeast corner of former Frigidaire Plant 2 were converted to the Moraine Assembly facility. Since 1981, former Moraine Engine operations have included the machining, painting (this operation was discontinued in September 1995), and assembly of diesel truck engines. Operations at the former Moraine Engine facility ceased in the fall of 2000. The plant building has undergone decommissioning and demolition, and the majority of this site has been covered with a parking surface. Former GM Corporation operated a regional haulaway at the location of the former Moraine Engine plant, which was referred to as the Vehicle Distribution Center. Operations at the regional haulaway ceased in December 2008.

Since 1981, Moraine Assembly operations included the manufacture, assembly, and painting of small trucks and later sport utility vehicles. Operations at the former Moraine Assembly ceased in December 2008.

Former Delphi Thermal Moraine's major operations, which began in 1941, included the machining and assembly of automotive air conditioning compressors, accumulator dehydrators, and miscellaneous air conditioning valves. Operations at the former Delphi Thermal Moraine Building 14 ceased in September 2003 and the building was decommissioned. Demolition of Building 14 was completed in 2005.

On June 1, 2009, former GM Corporation and certain subsidiaries filed voluntary petitions for relief under Chapter 11 of the Bankruptcy Code. An order was entered approving the sale of substantially all of former GM Corporation's assets to a new and independent company (now known as General Motors Company, LLC) under Section 363 of the Bankruptcy Code on June 5, 2009. The sale closed on July 10, 2009. At that time, former GM Corporation changed its name to Motors Liquidation Company. RACER Trust was established on March 31, 2011 by a federal bankruptcy court to own, manage, remediate and revitalize the properties from the 2009 former GM Corporation bankruptcy.

On June 30, 2011, RACER Trust sold former Delphi Thermal Moraine, former Moraine Engine Plant, and former Moraine Assembly Plant to Industrial Realty Group (IRG) Moraine, LLC. As part of the property transfer, RACER Trust retained environmental liability for these properties. Current site operations include multi-tenant use for industrial purposes.

The closed South Settling Lagoon was not included in this property transaction. The closed South Settling Lagoon was retained by RACER Properties LLC.

On September 29, 2011, the Administrative Order on Consent (AOC) for the Moraine Site was fully executed proceeding under Section 3008(h) of the Resource Conservation and Recovery Act, as amended, 42 U.S. C. Section 6928(h), U.S. EPA Docket No: RCRA-05-2011-0016. The performance-based AOC covers corrective action for past releases of hazardous contaminants at or from the Site.

1.2 Groundwater Monitoring Program Objectives

The objectives of groundwater monitoring at the former Moraine Facilities are as follows:

1. Monitor groundwater quality upgradient and downgradient of the closed North and South Settling Lagoons;

2. Monitor groundwater quality upgradient and downgradient of Landfills L1, L2, and L3;
3. Monitor the effectiveness of and the need for current groundwater capture systems in the upper and lower aquifers at the southern, downgradient property boundary;
4. Monitor the effectiveness of corrective measures activities in In-Situ Reactive Zones RZ-1, RZ-3, and RZ-4, to address VOCs related to the Former Oil House Area; and
5. Monitor an appropriate list of wells once corrective measures objectives have been met, as discussed in the 2012 CMP (ARCADIS, Inc. 2012a), to verify that these objectives continue to be met without the active measures.

1.3 Baseline Groundwater Monitoring Program Sampling Event

To provide a basis for evaluating the performance of the interim measures, a comprehensive site-wide groundwater sampling event for VOCs was completed in September 1999 to establish a baseline data set. The next site-wide groundwater sampling event was completed between September and October 2000. During the 2000 sampling event, at the request of U.S. EPA, groundwater samples were analyzed for Appendix IX VOCs by Method 8260 and cis-1,2-dichloroethene (cis-1,2-DCE), semi-volatile organic compounds (SVOCs) and metals to verify that current groundwater conditions were consistent with previous Site conditions. The results of this one-time sampling event confirmed that VOCs were the only constituents of potential concern in groundwater at the Site. SVOCs were not detected and metals were not detected above levels of concern during the 2000 sampling event. The analytical results from the 1999 baseline event and the 2000 site-wide event are presented in the Interim Measures/Corrective Measures Report (ARCADIS Geraghty & Miller, Inc. 2001).

1.4 Interim Measures Description

1.4.1 In-Situ Reactive Zones

The reductive dechlorination of chlorinated VOCs can be enhanced by the introduction of a carbon source that stimulates activity of indigenous microorganisms. The high carbon loading triggers a succession of microbial species. Initially, aerobic electron acceptors such as oxygen and nitrate are consumed. Then, the microbial succession

leads to a consortium of species that survive by sulfate reduction, methanogenesis and other similar metabolic pathways, supporting the highly reducing conditions necessary for the dechlorination of tetrachloroethene (PCE), trichloroethene (TCE), cis-1,2-DCE, and vinyl chloride. This enhanced reductive dechlorination process (ERD) has been developed at the Site through the use of RZs for introduction of a degradable carbon source necessary to develop the desired reducing conditions.

Enhanced reductive dechlorination was implemented in 1999 as a component of the Former Oil House Area interim measures at three zones: 1) at the southern boundary of the Former Oil House Area (RZ-1); 2) at an intermediate downgradient location south of the Former Oil House Area in the ME well series area (RZ-2 which was operated from 1999 to 2002); and 3) at a downgradient location south of former Delphi Thermal Moraine (RZ-3 West) and the former Moraine Engine plant (RZ-3 East). Using the data obtained from the Supplemental Groundwater Investigation conducted in 2006, RZ-4 was designed and installed to address VOC impacts identified west of RZ-3 West (GM-16). The RZ locations are shown on Figure 2. The actual layouts of each RZ are shown on Figures 3 and 4, and discussed below:

- At RZ-1, molasses solution was introduced into the upper aquifer, above the upper clay till. The carbon injection wells are screened across the lower 10 ft of this portion of the upper aquifer, which is 4 ft to 12 ft thick. RZ-1 consists of 21 introduction wells, of which 12 wells (RZ-1J through RZ-1U) were added in 2002, to expand RZ-1.
- Former RZ-2 consisted of four monitoring wells (ME-1 [abandoned], ME-2, ME-4, ME-5 [abandoned]), located along the western edge of the former Moraine Engine Plant 3 building. The RZ-2 wells were screened within the upper 3 ft of the upper aquifer. RZ-2 was operated from 1999 to 2002.
- RZ-3 consists of 46 introduction wells, 30 wells in RZ-3 West (RZ-3A through RZ-3DD) and 16 wells in RZ-3 East (RZ-3FF through RZ-3KK, and RZ-3MM through RZ-3VV). At RZ-3, the introduction wells were screened from the approximate upper aquifer water table to a depth of 46 ft to 68 ft bls, allowing carbon introduction through the lower 20 ft to 30 ft of the upper aquifer. Introduction wells RZ-3RR through RZ-3VV were installed in April 2005 in order to establish a reactive zone further down-gradient and closer to the property boundary. The additional introduction wells were screened from 34 ft to 54 ft bls. Introduction wells RZ-3MM through RZ-3QQ have not been operated since the installation of

RZ-3RR through RZ-3VV in 2005, therefore, of the 16 existing introduction wells in RZ-3 East, only 11 are active.

- RZ-4 consists of 15 introduction wells, 7 wells in RZ-4 West (RZ-4I through RZ-4O) and 8 wells in RZ-4 East (RZ-4A through RZ-4H). These introduction wells were installed in July 2006. The RZ-4 West introduction wells are located in the southeast corner of the closed South Settling Lagoon and the RZ-4 East introduction wells are located north of Landfill L1 and west of the Waste Pile/Staging Area. At RZ-4, the introduction wells were screened from the approximate upper aquifer water table to a depth of 57 ft to 62 ft bls, allowing carbon introduction through the lower 30 feet of the upper aquifer. Only RZ-4 East remains active.

To establish conditions conducive to ERD within reactive zones RZ-1, RZ-2, and RZ-3, a readily degradable carbon source (a dilute solution of molasses and potable water) was periodically delivered into the reactive zone introduction wells during a 6-month period from December 1999 to May 2000. The molasses solution consisted of either a 10-to-1 or 20-to-1 ratio of potable water to feed-grade molasses that was pumped into each RZ well. The initial event, conducted in December 1999, consisted of two consecutive rounds of carbon source introductions in each RZ well. After the initial introduction event, the carbon source solution introductions were scheduled twice per month through May 2000. Due to the success during the first six months of implementing this technology, carbon source introduction activities continued in October, November, and December 2000, and subsequently from June 2001 through December 2013.

Introductions in RZ-1 were modified in the fall of 2003 after review of the previous site-wide groundwater analytical results. Due to the success of RZ-1, reduced carbon loading was implemented at a frequency of one introduction event every other month, and monitoring well GM-28 was periodically sampled to ensure that the necessary reducing conditions were being sustained to promote the dechlorination process. In May 2005, the introduction routine was changed to two injections every quarter to maintain reducing conditions and provide sufficient carbon to allow for complete degradation of the VOCs.

Monthly injections were completed in 2013 in Reactive Zones RZ-1, RZ-2 and RZ-4 East through August, with exception of January, due to weather conditions. The frequency of substrate injections at Reactive Zones RZ-1, RZ-3 and RZ-4 East was modified starting in September 2013. This amended schedule includes quarterly

injections based on the updated conceptual site model, specifically transport velocities in the upper aquifer. The groundwater mass transport velocity was evaluated and refined as part of the 2012 CMP (ARCADIS, Inc. 2012a) using data generated through operation of the injection program and the Pre-Design Investigation. The results of the evaluation indicated that the estimated mass transport velocity is approximately 0.25 feet per day (ft/day), which is slower than estimates generated prior to initiation of the injections in 1999 (e.g., greater than 1 ft/day). Calculations were subsequently completed to evaluate the current injection frequency relative to the revised (lower) mass transport velocity. Specifically, the estimated time for the molasses solution to “wash out” of the injection area through groundwater transport was estimated assuming a mass transport velocity of 0.25 ft/day. The results of these calculations indicated that molasses will wash out of the injection area every three to four months. The calculations are generally consistent with previous estimates which indicated injections were required on a monthly basis with an assumed mass transport velocity three to four times greater than current estimates.

During the initial period of the amended injection schedule (quarterly), an evaluation will be completed to confirm the interim measure remains effective. This evaluation will consist of baseline sampling and a four month discontinuation of reagent injections to provide data for the establishment of organic carbon degradation trends and to demonstrate that a reduced injection frequency is appropriate. The evaluation will be completed in 2014. Details regarding the frequency and strength of carbon source introductions for 2013 are provided in Table 2.

1.4.2 Capture Zones

The capture zone interim measure for the upper aquifer consisted of groundwater extraction at the property boundary using well TW-2, treatment through an air stripper tower, and discharge through a NPDES permitted outfall to the South Storm Water Retention Basin ultimately discharging to the Great Miami River. Groundwater recovery from TW-2 began on January 31, 1996. On July 20, 2012 RACER Trust sent U.S. EPA a letter indicating that operation of TW-2 would be discontinued. RACER Trust indicated operation of TW-2 was no longer necessary based on the performance of the upgradient IRZ barrier and that capture of the upper aquifer will be maintained by continued operation of lower aquifer well, DN-13. The TW-2 Groundwater Recovery and Treatment System was shutdown on July 31, 2012.

During the 17.5 years of operation (January 31, 1996 through July 31, 2012), the system recovered and treated a total of 1,021,938,747 gallons at an average flow rate of 96 gpm. The location of recovery well TW-2 is shown on Figure 2.

Well DN-13 is a lower aquifer extraction well that is owned and operated by Montgomery County and has been used in a Pump-to-Waste Program since March 1990 in cooperation with former GM Corporation/MLC until March 31, 2011 and continued with RACER Trust. The capture zone interim measure for the lower aquifer consists of continued pumping of DN-13 in 2013 at an approximate range of 525 to 751 gpm. Well DN-13 was operational throughout 2013 except for the periodic shutdowns for operation and maintenance activities that are documented in the 2013 Quarterly Technical Progress Reports. Capture analysis is discussed in Section 3.2. The location of well DN-13 is shown on Figure 2.

2. Groundwater Monitoring Summary

In accordance with the Site-Wide Groundwater Monitoring Plan (ARCADIS G&M, Inc. 2002), annual groundwater sampling was completed in 2001 through 2013. The latest annual groundwater monitoring was completed in September 2013. The 1999 baseline through 2012 groundwater quality data for the site-specific VOC parameter list are reproduced in tables in Appendix A and for 2013 in Table 3 of this report to support the evaluation of the groundwater quality of source areas, the effectiveness of the on-going interim measures (RZ and capture zones), monitoring the closed settling lagoons and monitoring plume migration.

A summary of the activities and methodologies that were completed in 2013 are presented in Section 2.1 and the groundwater monitoring results are presented in Section 2.2.

2.1 Groundwater Monitoring Activities/Methodologies

In order to meet the objectives of the groundwater monitoring program, the scope of work presented in Section 3.0 of the Site-Wide Groundwater Monitoring Plan (ARCADIS G&M, Inc. 2002) and Section 5.0 of the Site-Wide Groundwater Monitoring Report for 2012 (ARCADIS, Inc. 2013a) was implemented during 2013. The following sections summarize the collection of the annual groundwater elevation measurements, the monthly groundwater monitoring, and the annual site-wide groundwater monitoring.

2.1.1 Groundwater Elevation Monitoring

Groundwater levels were measured on September 23 and 24, 2013. The measured wells included all on-site and off-site monitoring wells at the three facilities as shown on Figure 5 (upper aquifer wells) and Figure 6 (lower aquifer wells). Groundwater levels were also measured in former Moraine Assembly production wells (where accessible), former Moraine Assembly fire wells, one lower aquifer well (MT596M) located east of the former Moraine Assembly and Engine plants and four City of Moraine upper aquifer wells located west of the Great Miami River. Groundwater levels were measured in accordance with procedures defined in the Site-Wide Groundwater Monitoring Plan (ARCADIS G&M, Inc. 2002) Standard Operating Procedure (SOP) #4 and recorded electronically in the field.

2.1.2 Monthly Groundwater Recovery System Monitoring

The National Pollution Discharge Elimination System (NPDES) permit was revised in 2012 to include lower aquifer well DN-13 as a separate final outfall to the Great Miami River and remove the north and south retention basins (TW-2 is an intermediate monitoring station prior to discharge to south storm water retention basin), as they were included with the property sold to IRG Moraine LLC in 2011. The Ohio EPA approved renewal of NPDES Permit 1IC00008*KD for the internal outfall related to TW-2 and for the DN-13 outfall on September 11, 2012. The permit requires monthly monitoring and reporting. As proposed in a letter from RACER Trust to U.S. EPA submitted July 20, 2012 (ARCADIS, Inc. 2012b), the TW-2 groundwater recovery and treatment system was shutdown on July 31, 2012, following the shut down procedures in the 1996 Operations, Maintenance, and Monitoring Manual Groundwater Recovery and Treatment. The impact of the system shutdown was measured by the results of monthly sampling of GM-6 and GM-17 for a total of six months (August 2012 through January 2013). As discussed in the April 24, 2013 letter to the U.S. EPA (ARCADIS, Inc. 2013b), shutdown of the groundwater recovery and treatment system continued through 2013 due to the results of this monthly sampling. Continued shutdown of the system is recommended based on the results of the 2013 site-wide sampling event. A discussion of the monitoring well data from GM-6 and GM-17 is provided in Section 2.2.3.1.3.

Table 4 summarizes the VOC results for the monthly DN-13 effluent sampling during 2013. All analyses were conducted in accordance with methods specified in the Final Interim Measures Design Plans (Geraghty & Miller, Inc. 1995).

2.1.3 Site-Wide Groundwater Monitoring

In accordance with the Site-Wide Groundwater Monitoring Plan (ARCADIS G&M, Inc. 2002) with modifications from the Site-Wide Groundwater Monitoring Report for 2008 (ARCADIS, Inc. 2009), monitoring wells sampled on an annual basis and 5-year basis for the site-wide monitoring event in 2013. At the request of the U.S. EPA, wells HR-7 and GM-9, were added to the annual program starting in 2010 (BOW Environmental Solutions, Inc. 2010).

In 2013, the following changes were made, as recommended in the Site-Wide Groundwater Monitoring Report for 2012 (ARCADIS, U.S., Inc. 2013a):

- Wells HR-1, GM-63, GM-83S, and HR-16 were included due to increased concentrations at HR-17 and W-4-S that were not attributed to the closed South Settling Lagoon,
- Upper aquifer monitoring wells HR-8 and HR-9 were removed due to accessibility. These wells were replaced with upper aquifer well W-1-N,
- Lower aquifer monitoring well HR-10 was removed due to accessibility. This well was replaced with lower aquifer well RMW-88,
- Lower aquifer monitoring wells GM-40 and GM-42 were removed and replaced with RMW-86 and RMW-87 due to the well depths of GM-40 and GM-42. RMW-86 and RMW-87 are shallower and better positioned to monitor lower aquifer plume migration, and
- Lower aquifer monitoring well RMW-85 was included due to its proximity to the lower aquifer source area.

Monitoring wells sampled on a five year basis were sampled in 2013 and included the following:

Upper Aquifer Monitoring Wells

- Upgradient Contributions: HR-11
- Source Areas: GM-27
- Downgradient Reactive Zone Performance Wells: GM-30, HR-3
- Downgradient On-Site: HR-1, GM-31, GM-33, ME-3, ME-6, HR-5, GM-22
- Off-Site Downgradient of the Site: GM-10, GM-17, GM-18, GM-51, GM-63, GM-64, WSU-24

Lower Aquifer Monitoring Wells

- On-Site Groundwater Quality: GM-39, GM-41, GM-58, GM-61, GM-82

- Downgradient Groundwater Quality: GM-9, GM-1, GM-3

For a summary of the site-wide monitoring well sampling program, see Table 21 of the Site-Wide Groundwater Monitoring Report for 2009 (ARCADIS, Inc. 2010a). A summary of the 2013 annual sampling event, including the number of monitoring wells and analytical parameters are presented on Table 1.

Monitoring well GM-62 was abandoned and GM-57 was damaged from activities associated with the Interstate 75 interchange construction in 2011. Monitoring wells GM-57 and GM-62 were repaired/replaced by ODOT on November 21 and 22, 2013. Well construction data for the wells used in the site-wide program are presented in Table 5. Survey data for these wells was not available at the time of this report.

Groundwater samples were collected from specified wells using low-flow methodology following procedures outlined in SOP #21 (ARCADIS G&M, Inc., 2002). Well GM-28 could not be sampled due to an obstruction in the well. Field parameters including pH, specific conductance, temperature, oxidation/reduction potential, and dissolved oxygen were measured during purging of each well using a multi-parameter groundwater quality flow-through cell. One groundwater sample from well DN-13 was collected through the sampling valve according to SOP #28 (ARCADIS G&M, Inc., 2002).

All groundwater samples were collected and managed under standard chain-of-custody procedures, and validated in accordance with the approved Supplemental RFI Work Plan and the RFI Quality Assurance Project Plan (Geraghty & Miller, Inc., 1997a) and as presented in the Amended Quality Assurance Project Plan (ARCADIS, Inc. 2011a). Field parameter data for the site-wide groundwater monitoring event are presented in Appendix B. Analytical results are presented and discussed in Section 2.2.3.

2.1.4 Laboratory Analytical Methods

Groundwater samples were analyzed for the site-specific VOC parameter list using SW 846 Method 8260. This parameter list was developed after evaluating data from the September 1999 baseline groundwater sampling event and the one-time sampling event conducted in September/October 2000 (which included analysis of Appendix IX VOCs and cis-1,2-DCE, SVOCs, and metals), conducted as part of the Former Oil House Area interim measures. The site-specific VOC parameter list is: benzene, 1,1-dichloroethane (1,1-DCA), 1,1-dichloroethene (1,1-DCE), cis-1,2-DCE, trans-1,2-dichloroethene (trans-1,2-DCE), ethylbenzene, tetrachloroethene (PCE), toluene,

1,1,1-trichloroethane (1,1,1-TCA), trichloroethene (TCE), vinyl chloride, and xylenes. Select groundwater samples from upper aquifer monitoring wells collected during the site-wide groundwater monitoring event were also analyzed for the following biogeochemical indicator parameters: manganese (total and dissolved), iron (total and dissolved), sulfate, sulfide, total organic carbon (TOC), chloride, dissolved gases (ethane and ethene), and methane. Table 1 lists specific field, laboratory, biogeochemical indicator parameters, and field and laboratory analytical methods. All groundwater samples were submitted to TestAmerica Laboratories, Inc. in North Canton, Ohio or Microseeps Inc. in Pittsburgh, Pennsylvania. Only ethene, ethane, and methane samples were submitted to and analyzed by Microseeps. A complete set of groundwater results from 2013, including quality assurance/quality control (QA/QC) samples, are presented in Appendix C.

2.2 Groundwater Monitoring Program Results

2.2.1 Groundwater Elevation Monitoring

As part of the site-wide assessment of current groundwater conditions, groundwater levels were measured to determine groundwater flow directions in the upper and lower aquifers and to determine vertical gradients between the two aquifers. One groundwater elevation monitoring event was completed on September 23 to 24, 2013 as part of the site-wide groundwater monitoring. The groundwater level measurement data are presented on Table 6.

2.2.1.1 Upper Aquifer

Depth-to-water data from upper aquifer wells were collected on September 23 to 24, 2013. Groundwater elevations ranged from 701.14 feet above mean seal level (ft. AMSL) (MW-4 - southwest of the Site and west of the Great Miami River) to 710.36 ft. AMSL (GM-24 - northeast end of Site). A contour map of the potentiometric surface was manually drawn for the upper aquifer (Figure 7). Groundwater flow for the upper aquifer is generally from northeast to southwest. A comparison of the September 2013 general groundwater flow conditions to the historical groundwater flow conditions documented in the annual groundwater monitoring reports for the upper aquifer post-2001, indicates a similar flow direction across the Site.

Table 7 presents the 2013 monthly precipitation totals, recorded by the National Weather Service, and the deviation from calculated average amounts. The 2013 annual total precipitation recorded at the Dayton, Ohio monitoring station was 36.53

inches, which was 1.87 inches below average. Precipitation for the months of February through September and November was below normal, while precipitation for all other months was above normal.

Horizontal hydraulic gradients in the upper aquifer near the former Oil House Area above the upper clay till in 2013 range in magnitude from 3.4×10^{-4} feet per foot (ft./ft.) to 1.4×10^{-3} ft./ft. (Table 8). The values calculated in this area may be influenced by the IRZs currently being operating at the former Oil House Area (RZ-1). Horizontal hydraulic gradient values that may be more representative in the upper aquifer either below the upper clay till or in absence of the upper clay till typically range from 2.6×10^{-4} ft./ft. to 6.2×10^{-4} ft./ft. (Table 8). Considering the more representative values, the average hydraulic gradient is 4.6×10^{-4} ft./ft. for the upper aquifer.

2.2.1.2 Lower Aquifer

Depth-to-water data from lower aquifer wells were collected on September 23 and 24, 2013. Groundwater elevations ranged from 705.12 ft. AMSL (GM-65D - southwest of the Site) to 710.86 ft. AMSL (MT596M - northeast of Site). A contour map of the potentiometric surface was manually drawn for the lower aquifer (Figure 8). Groundwater flow for the lower aquifer is generally from northeast to southwest towards IM pumping well DN-13. An estimated cone of depression surrounds pumping well DN-13 as indicated by surrounding monitoring wells with inflected contours (Figure 8). Capture at DN-13 is discussed further in Section 3.2. A comparison of the September 2013 general groundwater flow conditions to the historical groundwater flow conditions documented in the annual groundwater monitoring reports for the lower aquifer post-2001, indicates a similar flow direction across the Site.

Horizontal hydraulic gradients in the lower aquifer in 2013 range in magnitude from 4.7×10^{-4} ft./ft. to 6.5×10^{-4} ft./ft. Overall, an average hydraulic gradient of 5.3×10^{-4} ft./ft. was determined for the lower aquifer; however, further downgradient the hydraulic gradient increases with proximity to pumping well DN-13 (Section 3.2).

2.2.2 Vertical Gradients

Vertical hydraulic gradients between the upper aquifer above the upper clay till, upper aquifer and the lower aquifer were calculated for the groundwater-elevation data collected on September 23 and 24, 2013. Fifteen pairs of upper and lower aquifer wells were used to calculate the vertical hydraulic gradients upgradient, on-site, and

off-site and downgradient (Table 9). Vertical gradients were calculated using the following equation:

$$I_v = \frac{h_{upper} - h_{lower}}{D_v}$$

Where

I_v = vertical gradient (ft./ft.)

h_{upper} = groundwater elevation in upper aquifer monitoring well (ft. AMSL)

h_{lower} = groundwater elevation in lower aquifer monitoring well (ft. AMSL)

D_v = distance between midpoint of lower screen and midpoint of saturated section of upper screen (ft.)

Vertical gradients ranged between 1.7×10^{-2} ft./ft. downward to 4.2×10^{-3} ft./ft. upward. Based on the spatial distribution of the monitoring well pairs, it appears the overall vertical gradient for the upper aquifer upgradient, on-site, and downgradient is downward. However, there were three on-site well pairs (HR-3/HR-13, GM-68S/GM-68D, and GM-75S/GM-75D) with an upward gradient. There was no upper aquifer vertical gradient calculated at well pair GM-23/GM-27 because product was present in GM-23.

2.2.3 Groundwater Monitoring Analytical Results

As described in Section 2.1.4, groundwater was evaluated on a site-wide basis for the presence of the site-specific list of VOCs. Table 3 presents the results for the site-wide groundwater sampling event completed in 2013 for the upper and lower aquifers. Analytical data for 1999 through 2013 groundwater sampling events are presented on Figures 9 and 10 for the upper and lower aquifer wells, respectively. The upper aquifer groundwater results are presented in Section 2.2.3.1 and evaluated based on groundwater quality at the upgradient plume contributions, source areas (Former Oil House Area and Process Sump Area), in relation to current interim measures (RZs), upgradient/downgradient of closed settling lagoons, and plume migration. The lower aquifer groundwater results are presented in Section 2.2.3.2.

2.2.3.1 Upper Aquifer Groundwater Quality

2.2.3.1.1 Upgradient Contributions

Upgradient monitoring wells HR-11 and W-1-N were sampled in 2013. Concentrations in HR-11 were below detection levels for all constituents in 2013, except for low detections of 1,1-DCA, cis-1,2-DCE, and trans-1,2-DCE at 4.4 ug/L, 1.6 ug/L, and 0.24 J ug/L, respectively. Concentrations in W-1-N were below detection levels for all constituents in 2013, except for low detections of 1,1-DCA and cis-1,2-DCE at 1.6 ug/L and 0.27 J ug/L, respectively. The detected chlorinated VOCs are consistent with historical values for upgradient groundwater quality as indicated in the Description of Current Conditions (DOCC) (Geraghty & Miller, Inc. 1991 and 1997b) and RFI Reports (ARCADIS Geraghty & Miller, Inc. 2000a and 2000b) for the former Moraine Facilities (including the 1999 baseline sampling results) and are similar to detected compounds downgradient at the site. This confirms that upgradient sources of chlorinated VOCs not related to former GM Corporation operations continue to exist in the local area and are contributing to groundwater quality on-site.

2.2.3.1.2 Source Areas

To evaluate the source areas of VOCs at the Site, five upper aquifer monitoring wells (GM-23, GM-27, GM-59, GM-60, and GM-75S) were sampled in 2013. Monitoring well GM-23 is located in the Former Oil House Area and is screened above the upper clay till. Monitoring well GM-27 is paired with GM-23 and screened below the upper clay till. Monitoring wells GM-59 and GM-60 are located in the former Vehicle Distribution Center/former Moraine Engine building footprint. Monitoring well GM-59 is screened above the upper clay till and GM-60 is screened above the regional clay till. Monitoring well GM-75S is located in the southwest corner of the former Moraine Assembly building in the Process Sump Area and is screened at the regional clay till.

Monitoring well GM-23 is within the zone of influence of current interim measure (RZ-1) and the groundwater concentration trends are presented in Figure 11. The wells (GM-59, GM-60, and GM-75S) downgradient of the Process Sump Area are currently not addressed by ongoing interim measures; however, this area was evaluated in the CMP (ARCADIS, Inc. 2012a).

- A comparison between historical VOC concentrations detected at GM-23 to 2013 VOC concentrations is discussed in Section 2.2.3.1.3.
- Concentrations of VOCs at GM-27 have been generally decreasing since the well was installed in 1999. As part of the five year sampling program GM-27 was

sampled in 2013, concentrations of TCE and cis-1,2-DCE were detected at elevated concentrations of 42 ug/L and 12 ug/L, respectively.

- In 2013, concentrations of PCE, TCE, and cis-1,2-DCE were detected at elevated concentrations in wells GM-59, GM-60 and GM-75S.
 - PCE concentrations in GM-59 have increased to 1,000 ug/L in 2013, increasing from 800 ug/L in 2012. TCE concentrations in GM-59 were 750 ug/L in 2008, decreased to 69 ug/L in 2010 and increased to 510 ug/L and 710 ug/L in 2011 and 2012, respectively. The TCE concentration increased to 1,100 ug/L in 2013. Concentrations of cis-1,2-DCE has remained consistently low in GM-59 since a detection of 41 ug/L in 2008. The cis-1,2-DCE concentration in GM-59 was 11 ug/L in 2013.
 - Concentrations of PCE in GM-60 remained consistent from 2012 to 2013 (610 ug/L and 670 ug/L, respectively). Concentrations of TCE in GM-60 increased slightly from 980 ug/L in 2012 to 1,100 ug/L in 2013. Concentrations of cis-1,2-DCE decreased slightly from 480 ug/L in 2012 to 400 ug/L in 2013.
 - Concentrations of PCE at GM-75S remained consistent from 2012 to 2013 (420 ug/L and 480 ug/L, respectively). The concentration of TCE increased slightly from 250 ug/L in 2012 to 350 ug/L in 2013. Concentrations of cis-1,2-DCE remained consistent from 2009 to 2013. The cis-1,2-DCE concentration in GM-75S was 4.5 ug/L in 2013.

2.2.3.1.3 Interim Measures Performance Results

As described in Section 1.4, the RZ network consists of RZ-1, RZ-3 (East and West), and RZ-4 East. In 2013, carbon solution was introduced into the groundwater through introduction wells shown on Figures 3 and 4. Operation of the RZs was monitored through the collection of field parameter measurements, and laboratory analyses of biogeochemical indicator parameters and site-specific VOCs, according to the Site-Wide Groundwater Monitoring Plan (ARCADIS G&M, Inc. 2002) and revisions in the draft Site-Wide Groundwater Monitoring Report for 2009 (ARCADIS, Inc. 2010b). Concentrations of site-specific VOCs as related to the performance of the RZs are presented in this section. Groundwater concentration trends for the RZ performance monitoring wells are presented in Figure 11 (RZ-1), Figure 12 (RZ-3 East), Figure 13 (RZ-3 West), and Figure 14 (RZ-4 East).

RZ-1

RZ-1 was installed as an interim measure to remediate the area downgradient of the primary source area at the Site (Former Oil House Area). Five upper aquifer wells (GM-23, GM-29, GM-30, HR-3 and GM-28) are used to monitor the groundwater quality to evaluate the effectiveness of the RZ (Figure 11).

- PCE concentrations at GM-23 have decreased from 15,000 ug/L in 2001 to 33 ug/L in 2012. The PCE concentration was 37 ug/L in 2013. TCE concentrations have decreased from 2,200 ug/L in 2001 to 28 ug/L in 2013. Concentrations of cis-1,2-DCE have decreased from 19,000 ug/L in 2005 to 470 ug/L in 2013. Vinyl chloride concentrations have increased historically to a concentration of 4,100 ug/L in 2006 and subsequently have decreased to a current concentration of 210 ug/L in 2013. Concentrations of trans-1,2-DCE have been below detection limits since introductions began in 2000; however, concentrations peaked in 2006 at 270 ug/L and have subsequently decreased to 15 ug/L in 2013.
- Monitoring well GM-29 is within the zone of influence of carbon introductions conducted in the Former Oil House Area after RZ-1 was expanded in 2002. Concentrations of PCE and TCE have remained consistent since 2000 with current concentrations of 15 ug/L and 280 ug/L in 2013, respectively. Concentrations of cis-1,2-DCE had a peak concentration of 2,871 ug/L in 2000, and has subsequently decreased in concentrations to 470 ug/L in 2011, with a slight increases to 520 ug/L and 530 ug/L in 2012 and 2013, respectively. Concentrations for vinyl chloride have fluctuated since introductions began in 2000, but have decreased since 2005, with a concentration of 60 ug/L in 2013.
- As part of the five year sampling program GM-30 was sampled in 2013. Concentrations of VOCs at GM-30 have been generally decreasing since the well was installed in 1999. Concentrations of 1,1-DCA (5.3 ug/L), benzene (4.0 ug/L), ethylbenzene (20 ug/L), PCE (0.23 J ug/L), toluene (1.1 ug/L), trans-1,2-DCE (0.63 J ug/L), TCE (0.28 J ug/L), vinyl chloride (0.34 J ug/L) and xylenes (7.2 ug/L) were detected.
- As part of the five year sampling program HR-3 was sampled in 2013, concentrations of 1,1,1-TCA, 1,1-DCA, 1,1-DCE, cis-1,2-DCE, trans-1,2-DCE, TCE, and vinyl chloride were detected in HR-3 in 2013. Concentrations of 1,1,1-TCA, cis-1,2-DCE, and TCE peaked in 2013 to 6.9 ug/L, 59 ug/L, and 190 ug/L, respectively. The other constituents were detected at relatively low levels.

- Monitoring well GM-28 is used for evaluating groundwater conditions downgradient of RZ-1. Well GM-28 was not sampled in 2013 due to an obstruction in the well. Concentrations of PCE, TCE, and cis-1,2-DCE have remained consistently low since peak concentrations in 1999. Vinyl chloride concentrations at GM-28 have been below detection limits except for concentrations of 12.4 ug/L and 6.5 ug/L in 2000 and 2008, respectively. Since 2008, concentrations have decreased from 6.5 ug/L to 0.57J ug/L in 2011. Based on the remedy outlined in the 2012 CMP, the necessity to replace/repair monitoring well GM-28 will be evaluated.

RZ-3 East

RZ-3 East is located south of former Moraine Engine Plant, which is downgradient and cross-gradient to the east (Figure 7) of the Former Oil House Area. One upper aquifer well (GM-21) is used to monitor the groundwater quality to evaluate the effectiveness of the RZ (Figure 12).

- Monitoring well GM-21 is used to monitor groundwater conditions downgradient of RZ-3 East. PCE concentrations in this well have consistently been below detection limits, except for 2008 when PCE was detected at a concentration of 0.56 J ug/L. Concentrations of TCE in well GM-21 peaked in 2002 at 230 ug/L and have decreased to 12 ug/L in 2013. Concentrations of cis-1,2-DCE has fluctuated since a peak concentration of 100 ug/L in 2003, with a concentration of 5.1 ug/L in 2013.

RZ-3 West

RZ-3 is located south of former Delphi Thermal Moraine. Two upper aquifer wells (GM-6 and GM-8) are used to monitor the groundwater quality to evaluate the effectiveness of the RZ (Figure 13). Note that data from monitoring wells GM-6 and GM-8 are also utilized to support the shutdown of TW-2 as discussed in Section 2.1.2. Monitoring well "East" was previously monitored as part of RZ-3 West, but is no longer part of the site wide program. Historical data for monitoring well East can be found in Appendix A.

- Monitoring well GM-6 is used for evaluating groundwater conditions downgradient of RZ-3 West. Concentrations of PCE have decreased in GM-6 from 81.4 ug/L in 1999 to below detection limits in 2013. Concentrations of TCE have decreased from 78.2 ug/L in 1999 to 0.26 J ug/L in 2013. Concentrations of cis-1,2-DCE and

vinyl chloride have fluctuated since 1999, with peak values of 52.9 ug/L in 1999 and 12 ug/L in 2002, respectively. Current concentrations of cis-1,2-DCE and vinyl chloride were 1.9 ug/L and 0.79 J ug/L, respectively.

- Monitoring well GM-8 also serves as a downgradient well for RZ-3 West. Concentrations of PCE, TCE, and cis-1,2-DCE have remained consistently low or below their respective detection limits since 2000. Concentrations of vinyl chloride have fluctuated and remain at a low concentration or below detection limit since 2007 with a current concentration below the detection limit in 2013.

RZ-4 East

RZ-4 East was designed to address VOC impacts identified west of RZ-3 West (Figure 13).

- Monitoring well GM-19S is used to evaluate groundwater conditions downgradient of RZ-4 East. Concentrations of PCE and TCE have been at low concentrations or below detection limits since 2007. Concentrations of cis-1,2-DCE have been at low concentrations or below detection limits since 2007, with an increase to 26 ug/L in 2013. Concentrations of vinyl chloride reached a peak concentration of 17 ug/L in 2013.

2.2.3.1.4 Closed Settling Lagoon Monitoring Results

Groundwater quality is monitored upgradient and downgradient of the closed North and South Settling Lagoons as described in Section 2.1. Upgradient monitoring wells used for the North Settling Lagoon is HR-4 and for South Settling Lagoon is HR-17 (Figure 2). Wells downgradient of the closed North (W-2-N, W-3-N, W-4-N) and South (W-2-S, W-3-S, W-4-S) Settling Lagoons (closed through in-situ solidification and installation of a cover system in 2001, after the 1999 baseline sampling event) were sampled for both the site-wide groundwater monitoring and post-closure monitoring programs.

Closed North Settling Lagoon

- Concentrations of PCE, TCE and daughter products at HR-4 have been low or below detection limits since 1999.
- Concentrations of PCE, TCE, and daughter products at W-2-N have been low or below detection limits since 1999.

- Concentrations of PCE and TCE at W-3-N have been generally decreasing since peak values in 2001 at 9.0 ug/L and 2.1 ug/L, respectively. Current concentrations of PCE and TCE are low or below detection limits in 2013. Concentrations of cis-1,2-DCE had a peak concentration of 291 ug/L in 1999 and has been generally decreasing to a current concentration of 34 ug/L in 2013. Vinyl chloride had a peak concentration of 24.0 ug/L in 2000 and has a current concentration of 1.6 ug/L in 2013.
- Concentrations of PCE and vinyl chloride at W-4-N have been low or below detection limits since 1999. Concentrations of TCE had a peak concentration of 15 ug/L in 2009 and decreased to 7.4 ug/L in 2013. Concentrations of cis-1,2-DCE decreased slightly from 14 ug/L in 2012 to 11 ug/L in 2013.

Closed South Settling Lagoon

- Concentrations of PCE and TCE at HR-17 increased to 150 ug/L and 100 ug/L, respectively, in 2013. Concentrations of cis-1,2-DCE peaked at 7.1 ug/L in 2004 and have been generally decreasing to a current concentration of 1.4 ug/L in 2013. Vinyl chloride has been below the detection limit since 1999.
- Concentrations of PCE, cis-1,2-DCE, and vinyl chloride in W-2-S have been low or below detection limits since 1999. Concentrations of TCE peaked to 7.1 ug/L in 2011 and have remained relatively consistent in 2012 and 2013 at 6.1 ug/L and 6.4 ug/L, respectively.
- Concentrations of PCE, cis-1,2-DCE, and vinyl chloride in W-3-S have been low or below detection limits since 1999. PCE concentrations increased from 4.4 ug/L in 2012 to 25 ug/L in 2013. Cis-1,2-DCE was detected in 2013 at concentrations of 1.4 ug/L. Concentrations of TCE increased from 5.7 ug/L in 2012 to 21 ug/L in 2013.
- Concentrations of TCE in W-4-S have increased since 1999 from 14.7 ug/L, to current concentration of 50 ug/L in 2013. Concentrations of cis-1,2-DCE have remained relatively consistent since 1999 with concentrations of 6.3 ug/L in 2013. Concentrations of PCE have increased since 1999 from 30.5 ug/L to 60 ug/L in 2013. Concentrations of vinyl chloride have been below the detection limit since 1999.

2.2.3.1.5 Plume Migration

The upper aquifer plume migration from the source area (Former Oil House Area) is monitored downgradient on Site, at the property boundary, and downgradient off Site. Additional monitoring wells (GM-47, GM-50, and GM-63) were sampled in the Riverview Plat neighborhood.

Downgradient On-Site

Monitoring wells GM-43, GM-31, GM-33, GM-35, ME-3, ME-6, and GM-22 were sampled to monitor the plume between the source area and property boundary (Figure 2).

- PCE concentrations in GM-43 have been generally consistent since 2004, with a current concentration of 22 ug/L in 2013. TCE concentrations had been increasing since 2004, to a peak of 230 ug/L in 2012, but decreased to 170 ug/L in 2013. Concentrations of cis-1,2-DCE have decreased from a peak concentration of 220 ug/L in 2010 to 32 ug/L in 2013. Vinyl chloride has been low or below detection limit since 2004.
- As part of the five year sampling program GM-31 was sampled in 2013. TCE concentrations in GM-31 have been generally increasing since 2001, with a concentration of 120 ug/L in 2013. Concentrations of cis-1,2-DCE have been generally decreasing since a peak of 200 ug/L in 2002. Cis-1,2-DCE was detected at a concentration of 21 ug/L in 2013.
- As part of the five year sampling program GM-33 was sampled in 2013. Concentrations of PCE in GM-33 have been generally decreasing since a peak of 50 ug/L in 2005 to a concentration of 28 ug/L in 2013. Concentrations of TCE have been generally decreasing since a peak of 75 ug/L when the well was installed in 2003 to a concentration of 14 ug/L in 2013.
- PCE concentrations in GM-35 have decreased from 37 ug/L in 2010 to below the detection limit in 2013. TCE concentrations have been generally decreasing since a peak of 270 ug/L in 2003 to 18 J ug/L in 2013. Cis-1,2-DCE concentrations have been generally decreasing since a peak of 300 ug/L in 2003 to 69 ug/L in 2013. Vinyl chloride concentrations had been generally decreasing since a peak of 59 ug/L in 2003 to 11 J ug/L in 2013.

- As part of the five year sampling program ME-3 was sampled in 2013. Concentrations of PCE and TCE in ME-3 are significantly lower than baseline conditions in 1999 (60.4 ug/L and 47.5 ug/L). Concentrations of PCE have been generally increasing since from below detection levels in 2005 to a concentration of 7.1 ug/L in 2013. Since 2002, concentrations of TCE have been generally increasing from below detection levels to a concentration on 4.6 ug/L in 2013.
- As part of the five year sampling program ME-6 was sampled in 2013. Concentrations of cis-1,2-DCE, PCE, and TCE have been generally decreasing in ME-6 since baseline conditions in 1999. Concentrations of cis-1,2-DCE, PCE, and TCE were 1.5 ug/L, 5.1 ug/L, and 2.8 ug/L, respectively in 2013.
- As part of the five year sampling program GM-22 was sampled in 2013. Concentrations of PCE in GM-22 have been generally consistent since baseline conditions in 1999, with a concentration of 4.3 ug/L in 2013. Concentrations of TCE have been generally decreasing from a peak of 10 ug/L in 2004 to a concentration of 3.9 ug/L in 2013.

Monitoring wells HR-1, HR-2, HR-5, and, HR-7 are west (side-gradient) of the Former Oil House Area and south of Landfills L2 and L3. In addition, HR-7 is downgradient of the closed North Settling Lagoon. Monitoring well HR-2 is part of the annual program to monitor groundwater concentrations south of Landfill L2 and L3. Monitoring well HR-7 on the western most property boundary of the former Building 14 was added to the site-wide annual program at request of the U.S. EPA (BOW Environmental Solutions, Inc. 2010).

- As part of the five year sampling program HR-1 was sampled in 2013. Concentrations of cis-1,2-DCE in HR-1 have been generally decreasing since a peak of 24 ug/L in 2004 to a concentration of 3.1 ug/L in 2013. Concentrations of PCE have been generally consistent with baseline conditions in 1999, with a concentration of 30 ug/L in 2013. Concentrations of TCE have been generally increasing since a low of 31 ug/L in 2004, to a concentration of 100 ug/L in 2013.
- Concentrations of PCE, TCE, vinyl chloride at HR-2 have been low or below the detection limits since 1999. Concentrations of cis-1,2-DCE have decreased since 1999 from 9.6 ug/L to 1.6 ug/L in 2013.
- As part of the five year sampling program HR-5 was sampled in 2013. Concentrations of cis-1,2-DCE and TCE have been generally consistent with

baseline conditions in 1999, with concentrations of 7.0 ug/L and 14 ug/L in 2013, respectively.

- Concentrations of PCE, cis-1,2-DCE, and vinyl chloride at HR-7 have been low or below the detection limits since 1999. Concentrations of TCE have slightly decreased from 9.8 ug/L in 1999 to 6.2 ug/L in 2013.

Property Boundary

Monitoring wells GM-2, GM-6, and GM-8, along with inactive extraction well TW-2 are located at the southwestern most property boundary (Landfill L1), downgradient of the Former Oil House Area, and RZ-3 West. These wells are used to monitor the groundwater quality at the property boundary. GM-6 and GM-8 are used to monitor the performance of RZ-3 West and are discussed in Section 2.2.3.1.3.

- Concentrations of PCE in GM-2 have been decreasing since a peak of 8.7 ug/L in 2002, with a slight increase to 0.31 J ug/L in 2013. Concentrations of TCE have generally decreased from 82.8 ug/L in 2000 to 0.70 J ug/L in 2013. Concentrations of cis-1,2-DCE reached a peak concentration of 39.2 ug/L in 2000, decreased to 3.8 ug/L in 2010, and increased to 13 ug/L in 2013. Concentrations of vinyl chloride have been low or below detection limits since 1999, with a concentration of 1.3 ug/L in 2013.
- The concentrations of PCE, TCE, cis-1,2-DCE and vinyl chloride at TW-2 were below their respective detection limits in 2013.

Downgradient Off-Site

Monitoring wells GM-10, GM-16, GM-17, GM-18, GM-47, GM-50, GM-51, GM-63, and GM-64 are located west of Landfill L1 and south of the closed South Settling Lagoon. GM-47 and GM-50 are paired upper aquifer wells. GW-47 is screened just above the regional clay till and GM-50 is screened near the water table. These wells are used to monitor plume migration south of RZ-4 East and RZ-3 West, within the Riverview Plat neighborhood (northwest of intersection of Main Street and Dryden Road - Figure 2).

- As part of the five year sampling program GM-10 was sampled in 2013. Concentrations of TCE in GM-10 have been decreasing since a peak concentration of 27 ug/L in 2001 to a concentration of 3.1 ug/L in 2013.

Concentrations of PCE have been low since baseline conditions in 1999, with a concentration of 1.1 ug/L in 2013.

- Concentrations of PCE and TCE in GM-16 have decreased from concentrations of 110 ug/L and 75 ug/L, respectively, in 2010 to concentrations of 51 ug/L and 17 ug/L, respectively, in 2013. Cis-1,2-DCE concentrations have fluctuated, with a peak concentration of 43 ug/L in 2007, and a concentration of 12 ug/L in 2013. Concentrations of vinyl chloride have been low or below the detection limit since 1999.
- As part of the five year sampling program GM-17 was sampled in 2013. Concentrations of PCE and TCE in GM-17 have been generally decreasing since peak concentrations of 48 ug/L and 79 ug/L in 2001, respectively. Concentrations of PCE and TCE were 2.8 ug/L and 4.7 ug/L in 2013, respectively. Concentrations of cis-1,2-DCE have been generally decreasing since a peak of 41.6 ug/L in 2000, with a concentration of 2.6 ug/L in 2013.
- As part of the five year sampling program GM-18 was sampled in 2013. Concentrations of cis-1,2-DCE and TCE in GM-18 have been generally decreasing since the wells were installed in 1999, with concentrations of 3.7 ug/L and 10 ug/L in 2013, respectively. Concentrations of PCE have been generally decreasing since a peak of 28 ug/L in 2002 to a concentration of 17 ug/L in 2013.
- Concentrations of PCE and TCE in GM-47 have decreased since 2006, from 78 ug/L and 50 ug/L, respectively, to 47 ug/L and 14 ug/L, respectively, in 2013. Concentrations of cis-1,2-DCE have fluctuated, with a peak concentration of 170 ug/L in 2007 and has decreased to 26 ug/L in 2013. Concentrations of vinyl chloride have been low or below the detection limit since installation in 2006.
- PCE concentrations in GM-50 have fluctuated since 2006, with a peak concentration of 180 ug/L in 2006, and a current concentration of 73 ug/L in 2013. Concentrations of TCE have fluctuated since 2006, with a concentration of 40 ug/L in 2013. Cis-1,2-DCE concentrations have fluctuated since 2006, with a peak concentration of 130 ug/L in 2007 and have decreased to 5.7 ug/L in 2013. Concentrations of vinyl chloride have been low or below the detection limit since the well was installed in 2006.
- As part of the five year sampling program GM-51 was sampled in 2013. Concentrations of cis-1,2-DCE, PCE, and TCE have been generally decreasing

since the well was installed in 2006 to peak concentrations of 2.8 ug/L, 46 ug/L, and 64 ug/L in 2013, respectively.

- As part of the five year sampling program GM-63 was sampled in 2013. Concentrations of cis-1,2-DCE have been decreasing since a peak concentration of 5.6 ug/L when the well was installed in 2006 to a concentration of 1.9 ug/L in 2013. Concentrations of PCE have been generally decreasing since a peak concentration of 160 ug/L when the well was installed in 2006 to a concentration of 81 ug/L in 2013. Concentrations of TCE have been decreasing since a peak concentration of 140 ug/L in 2010 to a concentration of 48 ug/L in 2013.
- As part of the five year sampling program GM-64 was sampled in 2013. Concentrations of cis-1,2-DCE, PCE, TCE, and vinyl chloride have been consistent since the wells were installed in 2006, with concentrations of 44 ug/L, 41 ug/L, 31 ug/L, and 5.8 ug/L in 2013, respectively.

Additional off-site wells further delineate downgradient concentrations east and west of the Great Miami River (GM-52, GM-55, GM-65S, GM-78, GM-79, GM-80, and GM-83S). Concentrations of PCE have been detected in each of these monitor wells and range from 0.31 ug/L (GM-79) to 53 ug/L (GM-52) in 2013. Concentrations of TCE have been detected in monitor wells GM-52, GM-65S, GM-79, and GM-80 and range from below detection limits (GM-55, GM-78, and GM-83S) to 18 ug/L (GM-52) in 2013.

At the off-site downgradient well GM-26, no VOCs were detected in the 1999 baseline event, while PCE was detected at 1.6 ug/L in 2013.

2.2.3.2 Lower Aquifer Groundwater Quality

This section includes a discussion of the groundwater quality in lower aquifer monitoring wells shown on Figure 6 that are part of the site-wide program. Monitoring well GM-9 located off-site downgradient was added to the site-wide annual program at request of the U.S. EPA (BOW Environmental Solutions, Inc. 2010).

In 2013, the upgradient lower aquifer monitoring well HR-12 and RMW-88 exhibited the presence of site-specific VOCs. The detected VOCs in 2013 included 1,1-DCA, cis-1,2-DCE, trans-1,2-DCE, and vinyl chloride, suggesting that upgradient releases of chlorinated VOCs have occurred and have been migrating long enough to allow for degradation of the chlorinated VOCs 1,1,1-TCA, PCE, and/or TCE to occur. The detected VOCs in HR-12 are consistent with historical values for upgradient

groundwater quality as indicated in the DOCC (Geraghty & Miller, Inc. 1991 and 1997b) and RFI Reports (ARCADIS Geraghty & Miller, Inc. 2000a and 2000b) for the former Moraine Facilities. This confirms that upgradient sources of VOCs, not related to former GM Corporation operations, continue to exist in the lower aquifer in the local area. Additionally, the types of VOCs detected upgradient are similar to those detected further downgradient beneath the Site, indicating that total VOC concentrations detected beneath the Site include both upgradient (off-site) and on-site contributions.

On-site lower-aquifer monitoring wells located near the source material (Former Oil House Area and Process Sump Area) that were part of the site-wide monitoring program in 2013 included GM-39, GM-54, GM-61, GM-68D, GM-75D, GM-82, and RMW-85. Detected VOCs in 2013 included PCE that ranged from 0.68 J ug/L in GM-39 to 180 ug/L in GM-75D. Concentrations of TCE ranged from 0.63 J ug/L in GM-39 to 180 ug/L in GM-75D. Concentrations of cis-1,2-DCE ranged from below detection limits to 60 ug/L in RMW-85.

Other on-site lower aquifer monitoring wells HR-15 (located south of the closed North Settling Lagoon), GM-41 and GM-58 (located in the parking lot south of the Former Assembly Plant), RMW-86 (located just east of RZ-4 East), RMW-87 (located just west of former Delphi Thermal Building 14) and GM-19D (located just south of RZ-4 East) were sampled in 2013. Concentrations of PCE, TCE and cis-1,2-DCE at HR-15, GM-58, RMW-87 and GM-19D were at low concentrations or below the detection limits in 2013. The concentration of TCE at GM-41 was 79 ug/L in 2013. Concentrations of PCE and TCE at RMW-86 were detected at 41 ug/L and 190 ug/L, respectively. Detected concentrations of cis-1,2-DCE at RMW-86 was at 110 ug/L. Vinyl chloride detections were relatively low at these wells with the highest concentration at GM-19D, (7.8 ug/L).

Off-site and side-gradient wells that were sampled in 2013 included GM-83D to the west and GM-84 and GM-77D to the east. The 2013 VOC concentrations were consistent with previous years. The only VOC detected in GM-83D was vinyl chloride (1.9 ug/L). The only VOC detected in GM-84 was TCE (3.6 ug/L). The only VOC detected in GM-77D was PCE (12 ug/L).

The off-site groundwater quality downgradient was evaluated with lower aquifer wells GM-11, GM-15, and GM-20D. The concentrations of TCE were equal to or exceeded the MCL (5 ug/L) in wells GM-11 and GM-20D in 2013.

Off-site wells further downgradient that were sampled in 2013 included GM-1, GM-3, GM-9 and DN-13. Monitoring well GM-1 and GM-3 had TCE concentrations of 21 ug/L and 15 ug/L in 2013. Monitoring well GM-9 had concentrations of TCE and cis-1,2-DCE of 19 ug/L and 0.44 J ug/L in 2013, respectively. Detected concentrations of PCE, TCE, cis-1,2-DCE, and vinyl chloride at DN-13 in 2013 were 0.58 J ug/L, 8.4 ug/L, 6.9 ug/L, and 1.1 ug/L, respectively. The groundwater in the vicinity of these wells is captured in the lower aquifer capture zone well DN-13 (Section 3.2).

3. Corrective Measure Performance

3.1 RZ Performance Results

A detailed assessment of the effectiveness of the RZs and the results of this monitoring are presented in Appendix D and summarized below.

- Aquifer conditions were reducing within and downgradient of the reactive zones due to the introduction of carbohydrate, as evidenced by the field parameters and biogeochemical data;
- The target compounds (PCE and TCE) were reduced to daughter products (cis-1,2-DCE and vinyl chloride) and ultimately to end products (ethene and ethane) based on the VOC and light hydrocarbon data (ethene and ethane); and
- Enhanced reductive dechlorination continued to achieve the desired reduction of VOC concentrations in groundwater.

3.2 Capture Zone Performance Results

Pumping well DN-13 is utilized to capture site-specific VOCs in lower aquifer groundwater. To determine the effectiveness of DN-13 capture, lines of evidence were evaluated following the general procedures outlined in the U.S. EPA guidance, A Systematic Approach for Evaluation of Capture Zones at Pump and Treat Systems (U.S. EPA 2008).

1. Review site data, site conceptual model, and remedial objectives.
2. Define site-specific target capture zone(s).
3. Interpret groundwater levels.
4. Complete calculations for basis of hydraulic capture.
5. Evaluate groundwater concentration trends.
6. Interpret site capture.

3.2.1 Review of Site Data, Site Conceptual Model, and Remedial Objectives

The initial steps for capture zone analysis included review of the conceptual site model, including hydrogeologic structure, hydraulic conductivity, Site groundwater elevations (Table 6), Site groundwater horizontal (Tables 8 and 10) and vertical gradients (Table 9), and DN-13 pumping rates.

A depiction of the lower aquifer, the location of the predominantly continuous regional clay till unit, and the screened interval of monitoring wells and DN-13 is presented in the 2012 CMP (ARCADIS, Inc. 2012a). The lower aquifer hydraulic conductivity ranges from 260 to 440 ft./day (Geraghty & Miller, Inc. 1990). Site groundwater elevations for the lower aquifer are depicted on Figure 8 and show groundwater flow trending northeast to southwest across the site. From January through December 2013, DN-13 pumping rates ranged from 0.76 to 1.08 MGD.

3.2.2 Define Site-Specific Target Capture Zone

The target capture zone for DN-13 is the plume extent within the lower aquifer (ARCADIS, Inc. 2012a). The pumping program is utilized to control the migration of the plume and capture the plume downgradient of the source areas. The hydraulic capture is focused entirely on the lower aquifer. The lower aquifer plume extent in 2012 is depicted on Appendix J - Figure J-8 and three-dimensional views provided in Appendix J of the 2012 CMP (ARCADIS, Inc. 2012a). The maximum plume width (perpendicular to groundwater flow) for the lower aquifer total CVOC plume was estimated to be 2,300 ft. To account for some uncertainty in this delineation an additional 250 ft. was added (i.e., 125 ft. on either side) which results in an approximate plume width of 2,550 ft.

3.2.3 Interpret Groundwater Levels

Groundwater elevation data are lines of evidence used to demonstrate hydraulic capture and are measured on an annual basis at the Site (Table 6). In general, the lower aquifer groundwater flow in 2013 is primarily from the northeast to the southwest directly in line with DN-13 (Figure 8). Groundwater elevation data of surrounding monitoring wells indicate a cone of depression is evident in the vicinity of pumping well DN-13 with groundwater flow towards the pumping well (Figure 8).

3.2.4 Complete Calculations for Basis of Hydraulic Capture

To verify the interpretation of field data, such as a groundwater level potentiometric map, additional flow calculations were completed to evaluate the extent of capture.

As outlined in the guidance, A Systematic Approach for Evaluation of Capture Zones at Pump and Treat Systems (U.S. EPA 2008), the simplest and most commonly applied horizontal capture zone calculation is the estimated flow rate calculation. Through application of Darcy's law, this calculation provides an estimated pumping rate required to capture the groundwater flux through the extent of the plume. This estimated groundwater flux/required pumping rate can then be compared to the actual pumping rates measured in the field to assess whether or not the system is pumping at a rate sufficient to capture the plume.

Simplifying assumptions for this calculation include the following:

- Homogeneous, isotropic aquifer of infinite extent.
- Confined aquifer, uniform aquifer thickness.
- Fully penetrating recovery well(s).
- Uniform regional horizontal hydraulic gradient.
- Steady-state flow.
- Negligible vertical gradient.
- Net recharge is accounted for in the regional hydraulic gradient.
- No other sources of water to the recovery well (e.g., flux from rivers or from other aquifers), except as represented by the "factor" in the estimated flow rate calculation.

The recovery rate or groundwater flux was calculated using the following equation:

$$Q = K \cdot i \cdot (b \cdot w) \cdot \text{factor}$$

where:

Q is the volumetric recovery rate or groundwater flux (ft³/day)

K is the hydraulic conductivity (ft/day)

i is the regional hydraulic gradient (ft./ft.)

b is the saturated thickness (ft.)

w is the plume width (ft.)

factor is intended to account for other contributions to the pumping well such as flux from a river or induced vertical flow from other stratigraphic unit; the assumed value is 1.5 to 2.0 (U.S. EPA 2008)

As noted in the U.S. EPA guidance document, this calculation requires an estimate of the regional hydraulic gradient, without the influence of pumping. Because regional hydraulic gradients often change with time, U.S. EPA (2008) suggests that, in some cases, groundwater level data obtained cross-gradient or even up-gradient, collected during the remedy implementation, may be more appropriate than pre-remedy groundwater level data for calculating regional hydraulic gradient. The average hydraulic gradient for the lower aquifer in 2013 is 5.3×10^{-4} ft./ft. (Table 8).

The hydraulic conductivity, K, for the lower aquifer ranges from 260 to 440 ft./day.

As presented earlier, the plume is conservatively estimated to be approximately 2,550 ft. wide. The estimated saturated thickness of the lower aquifer is 85 ft.

Using the parameter values listed above, the groundwater flux/required pumping rate was calculated for the Site and shown in the table below.

Condition	Hydraulic Conductivity (ft./day)	Hydraulic Gradient (ft./ft.)	Saturated Thickness (ft.)	Lower Aquifer Plume Width (ft.)	Factor	Groundwater Flux/Pumping Rate (MGD)
2013 Minimum	260	5.3×10^{-4}	85	2,550	2	0.45
2013 Maximum (Conservative)	440	5.3×10^{-4}	85	2,550	2	0.76

Note that a maximum factor of 2 was applied in all cases to provide a conservative range in groundwater fluxes. For the given range in hydraulic conductivity values, the minimum and maximum estimated groundwater fluxes through the target capture zone are approximately 0.45 and 0.76 MGD, respectively. Compared to the current recovery rate range at DN-13 in 2013 of 0.76 to 1.1 MGD, the estimated DN-13 groundwater flux/required pumping rate under both hydraulic conductivity conditions is equal to the low in the current range and less than the high in the current range of operating pumping rates at DN-13. The average pumping rate for DN-13 in 2013 was 0.95 MGD.

Therefore, even after incorporating an overly conservative set of parameters and a maximum factor of safety, the results of this calculation suggests that the current operating rate of the DN-13 is sufficient to capture the plume.

As with the calculations used to measure the capture zone dimensions presented in the following section, it is important to note that this analysis cannot account for aquifer heterogeneities (e.g., changes in transmissivity) nor does it account for system complexities (e.g., boundary effects, recharge, and off-site pumping), so these results represent a very simplified and idealized version of the actual flux through the aquifer.

3.2.5 Vertical Gradients

Vertical gradients were calculated from available upper and lower aquifer well pairs within the vicinity of DN-13 including GM-10/GM-9, GM-16/GM-15, GM-18/GM-13, and GM-17/GM-11. The calculated gradients presented in Table 9 indicated that a negative (downward) gradient is present.

3.2.6 Horizontal Hydraulic Gradients

In addition to capture interpretation via potentiometric surface maps, observed water level data were also used to approximate the extent of hydraulic capture by calculating the magnitude and direction of hydraulic gradients between sets of adjacent monitoring wells located in the vicinity of the extraction wells. This triangular irregular network analysis provides a means of evaluating observed water level data.

Generally, monitoring well pairs are used as gradient control points for capture evaluation (i.e., used to demonstrate inward gradients to the pumping well). However, the current distribution of monitoring wells in the vicinity of DN-13 prohibits the designation of practical well pairs in close proximity to DN-13 to provide an accurate measure of the cone of depression. Instead, hydraulic gradients were calculated to evaluate the flow direction (gradient angle and magnitude) using water level data from sets of three adjacent monitoring wells (Devlin 2003). This method of analysis is consistent with and presented in U.S. EPA's A Systematic Approach for Evaluation of Capture Zones at Pump and Treat Systems (U.S. EPA 2008).

The hydraulic gradients were evaluated using 2013 groundwater elevation data to assess the hydraulic influence of DN-13. Results of the evaluation are presented, including the hydraulic gradient and flow direction, in Table 10. Seven sets of three groundwater elevations of adjacent monitoring wells in the vicinity of DN-13 were evaluated. The groundwater flow directions (hydraulic gradients) in the lower aquifer displayed on Figure 15 demonstrate DN-13 capture. As depicted on Figure 15, the primary direction of groundwater flow is directed towards DN-13.

3.2.7 Concentration Trends

Plume migration follows groundwater flow towards pumping well DN-13 (Figure 8 and Appendix J of 2012 CMP [ARCADIS, Inc 2012a]). Concentrations of site-specific VOCs above MCLs do not extend downgradient of DN-13 except for cross gradient monitoring well GM-9 (TCE detected at 19 ug/L in 2013; Figure 10). The concentrations at GM-9 have been steady since 1999 and indicate that the well is being captured. Concentrations of site-specific VOCs detected at DN-13 have been steady since 2001 (Figure 10) indicating DN-13 is capturing the plume. Section 2.2.3.2. presents the details on the distribution of site-specific VOCs in groundwater in the lower aquifer.

3.2.8 Interpret Capture

The lines of evidence evaluated indicate sufficient capture within the lower aquifer exists to mitigate and control the migration of contaminants off-site. The lines of evidence and a summary follows:

1. Interpret Groundwater Levels - the lower aquifer groundwater elevation data indicated that groundwater flows from the northeast to the southwest towards pumping well DN-13.
2. Groundwater Flux Calculation - the groundwater flux calculation based on conservative data inputs indicated that the DN-13 pumping rate is sufficient to capture the width of the plume.
3. Vertical Gradients - the vertical gradients calculated indicated an overall negative (downward) gradient from the upper to lower aquifer.
4. Horizontal Hydraulic Gradients - the horizontal gradient evaluation indicated that there is capture in the vicinity of pumping well DN-13.
5. Evaluate Groundwater Concentration Trends - this evaluation indicated that VOC concentrations at DN-13 have remained steady. In addition, concentrations of VOCs in off-site lower aquifer groundwater monitoring wells downgradient of DN-13 indicate there is no migration of VOCs beyond pumping well DN-13.

All lines of evidence suggest that sufficient hydraulic capture within the lower aquifer at the Site has been achieved.

4. Corrective Action Completion Strategy

4.1 Effectiveness of Interim Measure Activities

4.1.1 Background and Objectives

Updated Corrective Measures Objectives (CMOs) based on the RFI, Supplemental RFI, and supplemental investigation results, including the BRA conclusions; Supplemental BRA conclusions; CMP supplemental risk assessment; requirements of the AOC; and U.S. EPA guidance (U.S. EPA 1994) have been provided in the 2012 CMP (ARCADIS, Inc. 2012a). The CMOs established in the CMP to address site-specific VOCs in groundwater include:

The CMOs for the protection of human health for the upper aquifer are as follows:

1. Address VOC mass from historic releases from the primary source area (former Oil House Area), including the VOC mass delineated near the Process Sump Area.
2. Limit future migration of VOCs from the primary source area to downgradient portions of the upper aquifer and into the lower aquifer.
3. Prevent the migration of VOCs at concentrations exceeding the MCLs beyond the existing plume boundary.
4. Continue implementing the final corrective measures until the CMOs are achieved on-site and MCLs can be met and maintained at the property line point of compliance without active remedial measures.

The CMOs for the protection of human health for the lower aquifer are as follows:

1. To maintain the lower aquifer as usable groundwater for potential off-site, downgradient drinking water uses.
2. Prevent the migration of VOCs at concentrations exceeding MCLs beyond the existing plume boundary.
3. To meet and maintain MCLs at the downgradient property line point of compliance without active remedial measures.

Implementation of the final remedy as outlined in the 2012 CMP is pending U.S. EPA approval.

4.1.2 Results

An evaluation of the data collected in 2013 is presented in Section 2.2.3. Current site-specific VOC groundwater distribution within the upper aquifer above MCLs is migrating downgradient beyond the property boundary and off-site. For the lower aquifer, well DN-13 through several lines of evidence indicates sufficient capture within the lower aquifer exists to mitigate and control the migration of site-specific constituents off-site (refer to Section 3.2).

4.2 Monitoring of Closed Lagoons

4.2.1 Background and Objectives

One additional component of the site-wide groundwater monitoring program is monitoring of other specific units (i.e., the closed lagoons). The Site-Wide Groundwater Monitoring Plan was developed to meet the objectives of the Ohio EPA post-closure monitoring for the closed North and South Settling Lagoons.

4.2.2 Methodology

As indicated above, this site-wide monitoring program was developed to meet the objectives of RCRA corrective action and the post-closure groundwater monitoring requirements for the closed lagoons. The site-wide program monitors potentially significant contributions of hazardous waste constituents to existing groundwater quality from the closed lagoons. To determine if the closed lagoons may be significant contributors of hazardous waste constituents to existing groundwater concentrations, monitoring data collected from the designated post-closure monitoring wells located downgradient of each of the closed lagoons are evaluated for temporal trends. The approach proposed in the Site-Wide Groundwater Monitoring Plan for this assessment includes, as an initial approach, the application of straight line regression to determine if the data suggests a strong positive correlation.

The monitoring wells identified in the Site-Wide Groundwater Monitoring Plan for monitoring each of the closed lagoons are:

- Closed North Settling Lagoon: HR-4 (upgradient), W-2-N, W-3-N, W-4-N.

- Closed South Settling Lagoon: HR-17 (upgradient), W-2-S, W-3-S, W-4-S.
- Monitoring wells recommended for sampling in the 2012 annual report in order to better characterize the increased concentrations at HR-17 and W-4-S that were not attributed to the closed South Settling Lagoon: GM-63, GM-83S, HR-1, HR-16.

4.2.3 Results

As proposed in the Site-Wide Groundwater Monitoring Plan (ARCADIS G&M, Inc. 2002), post-closure monitoring data collected from those wells assigned to the closed North and South Settling Lagoons were reviewed for temporal trends. Data considered in the evaluation included results through the September 2013 monitoring event and data ranging back to the initial post-closure monitoring event conducted in November 2001. Currently, the data set collected since the lagoons were closed includes thirteen¹ data points for any monitoring well/constituent pair. The data plots for key constituents are provided on Figure E-1 for the closed North Settling Lagoon (NSL) and Figure E-2 for the closed South Settling Lagoon (SSL) in Appendix E.

As presented on Figure E-1, the linear regression analysis for the monitoring wells used to assess conditions at the NSL suggest increasing concentrations of trans-1,2-DCE in downgradient well W-2-N, and 1,1-DCA and cis-1,2-DCE in downgradient well W-4-N. In each of these cases, the slope is positive and the linear regression had a correlation coefficient (R^2) greater than 0.5. There were increasing concentrations of 1,1-DCA and trans-1,2-DCE in upgradient well HR-4. As provided for in the Site Wide Groundwater Monitoring Plan (ARCADIS Inc. 2002), further assessment of these trends was performed using the Mann-Kendall trend test. The results of the trend tests are provided on Table E-1. The results of this test indicate a statistically significant increasing trend for 1,1-DCA concentration in upgradient well HR-4. The increasing trends for 1,1-DCA, trans-1,2-DCE and cis-1,2-DCE in downgradient well W-4-N were also found to be statistically significant (see Table E-1). The results indicate that the trend for trans-1,2-DCE concentrations in W-2-N indicated by the linear regression is not statistically significant. Therefore, these data and concentration trend do not indicate any significant increases in groundwater concentrations of trans-1,2-DCE in W-2-N that would be attributable to the NSL.

¹ With the exception of W-4-S which contains seventeen data points for each constituent.

In summary, the NSL data indicate a statistically significant increasing trend in cis-1,2-DCE, trans-1,2-DCE, and 1,1-DCA in downgradient monitoring well W-4-N. However, there is statistical evidence that the concentrations of 1,1-DCA in W-4-N are correlated with the concentrations in HR-4. Pearson correlation coefficients were used to test the hypothesis that there is no correlation between the 1,1-DCA concentrations in these two wells. The hypothesis was rejected. A similar test was contemplated for cis-1,2-DCE, but the test could not be carried out due to the high frequency of non-detections. Three observations suggest a source other than the NSL for 1,1-DCA, trans-1,2-DCE and cis-1,2-DCE in monitoring well W-4-N:

- The statistical correlation of concentrations of 1,1-DCA between monitoring well W-4-N and the background well HR-4,
- The absence of detections of 1,1-DCA, cis-1,2-DCE or trans-1,2-DCE above MCLs, and
- The fact that these three constituents are daughter products of other constituents that have been detected upgradient of the NSL.

As presented on Figure E-2, the linear regression analysis for the monitoring wells used to assess conditions at the SSL suggest increasing concentrations of 1,1-DCA, cis-1,2-DCE, trans-1,2-DCE, PCE and TCE in downgradient monitoring well W-4-S. Additionally, increasing concentrations of cis-1,2-DCE in W-3-S were noted by an R^2 greater than a 0.5 criterion. Increasing concentrations of TCE and PCE in upgradient monitoring well HR-17 were also observed. As provided for in the Site-Wide Groundwater Monitoring Plan (ARCADIS G&M, Inc. 2002), further assessment of these trends was performed using the Mann-Kendall trend test. The results of the trend tests are provided on Table E-1. The results confirmed that all eight of the correlated increases identified in the linear regressions are statistically significant (see Table E-1). Additionally, the Mann-Kendall test identified increasing TCE trends in W-2-S and W-3-S, and an increasing PCE trend in W-3-S. The R^2 was just below the 0.5 criterion of TCE in W-2-S and close to 0.3 for TCE and PCE in W-3-S; therefore, the results do not indicate any significant increases in groundwater concentrations of TCE and PCE that would be attributable to the SSL.

The detected concentrations for TCE and PCE in the upgradient monitoring well HR-17 in the 2013 sampling event were 100 ug/L and 150 ug/L, respectively. The trends of

TCE and PCE concentrations in that well are strongly positive and statistically significant. The observed concentration increases identified in downgradient monitoring well W-4-S for TCE and PCE appear to correlate with the concentrations and increasing trends also observed in upgradient well HR-17. The correlations between concentrations in HR-17 and W-4-S for TCE and PCE were tested statistically using Pearson correlation coefficients and were found to be statistically correlated at the 5% significance level. This correlation suggests a source other than the SSL for the TCE and PCE increases. Although the concentrations for cis-1,2-DCE, trans-1,2-DCE and 1,1-DCA in wells W-4-S and HR-17 are not statistically correlated, the concentrations are still below MCLs. Further, the presence of 1,1-DCA, cis-1,2-DCE and trans-1,2-DCE is expected from the natural attenuation processes observed at the Site.

Data collected from HR-1, approximately 1,000 feet upgradient of HR-17 and the SSL corroborate the statistical analysis. TCE was detected at 100 ug/L and PCE was detected at 30 ug/L; cis-1,2-DCE, trans-1,2-DCE and 1,1-DCA were detected at concentrations below MCLs, similar to the results in HR-17. GM-63, located near W-4-S but side-gradient of the SSL had results comparable to W-4-S. TCE was detected at 48 ug/L in GM-63 and at 50 ug/L in W-4-S; PCE was detected at 81 ug/L in GM-63 and 60 ug/L in W-4-S; 1,1,1-TCA, cis-1,2-DCE, trans-1,2-DCE, and 1,1-DCA were detected in both monitoring wells at levels below their respective MCLs. Combining the statistical analysis with the data from HR-1 and GM-63 it can be seen that concentrations downgradient of the SSL are due to upgradient groundwater impacts rather than being attributable to the SSL.

The plume from the upgradient source is delineated on the west side by GM-83S and HR-16. The concentrations of the main constituents of concern in these wells were 1.3 ug/L or less.

In conclusion, the monitoring of the closed North and South Settling Lagoons showed that the closed lagoons were not contributing hazardous waste constituents to existing groundwater concentrations in the area.

5. Conclusions and Recommendations

This site-wide report presents the groundwater monitoring activities completed in 2013 at the RACER Trust Moraine Facilities located in Moraine, Ohio. This sampling was conducted to meet the five objectives presented in Section 1.2. Compliance with these objectives is presented for the closed lagoons, interim measures, and on-going site-wide groundwater monitoring in the following sections.

5.1 Post-Closure Monitoring

As proposed in the Site-Wide Groundwater Monitoring Plan (ARCADIS G&M, Inc. 2002), post-closure monitoring data collected at the closed North and South Settling Lagoons were evaluated to determine if these closed units may be contributing site-specific VOCs to groundwater.

This evaluation determined that post-closure monitoring data indicated that these units are not affecting groundwater quality. Based on the results from the 2013 monitoring, no changes in the monitoring program for the closed lagoons are proposed.

5.2 Interim Measures Performance

The approach for RACER Trust in achieving its corrective action goals for the former Moraine Facilities is based on a combination of interim measures (in-situ treatment and hydraulic control) designed to reduce existing plume concentrations thereby achieving plume reduction and migration control.

5.2.1 In-Situ Treatment

Groundwater quality monitoring at and downgradient of the reductive dechlorination treatment zones indicates that this in-situ treatment program has been effective at reducing VOC concentrations in groundwater. As observed during the 2013 monitoring, the upper aquifer conditions in the areas downgradient of the in-situ reactive zones have been converted to more reducing conditions through the introduction of a carbon source, as evidenced by the changes in field and bioattenuation indicator parameters. Further, the VOC results indicate that the target compounds (PCE and TCE) have been effectively reduced to daughter products (cis-1,2-DCE and vinyl chloride) and ultimately to ethene and ethane.

In general, the process of enhanced reductive dechlorination has been successful in achieving a reduction of VOC concentrations downgradient of source areas. The

frequency of substrate injections will be reduced to quarterly events in 2014 based on the updated transport velocities in the updated conceptual site model. An evaluation will be completed in 2014 to confirm the interim measure remains effective with this amended schedule.

5.2.2 Hydraulic Capture

Groundwater elevation monitoring, horizontal and vertical gradients, groundwater flux calculations and lower aquifer VOC concentrations indicates that the capture zone interim measure DN-13 continues to be effective at maintaining capture in the lower aquifer.

Based on the effective performance of the pumping program during 2013, the current pumping program at DN-13 will continue to be implemented and evaluated in 2014 as in 2013. The TW-2 system was shutdown on July 31, 2012 as discussed in the April 24, 2013 summary letter to the U.S. EPA. VOC concentrations for all constituents were below MCLs at GM-6, GM-17, and TW-2 in 2013. Based on this data, the TW-2 Groundwater Recovery and Treatment System will be recommended for permanent shutdown and no further evaluation will be proposed. Operation of TW-2 is not included in the final remedy proposed in the 2012 CMP.

The ongoing groundwater monitoring program includes the assessment of changes in site-specific VOCs in both the upper and lower aquifers at locations upgradient of the former Moraine Facilities, as well as on-site and downgradient of the former facilities. Data collected from upper and lower aquifer wells located upgradient of the former facilities confirms that upgradient sources of VOCs, not related to former GM Corporation operations, persist in the local area. Notwithstanding these upgradient contributions of VOCs to on-site groundwater, the monitoring data indicate a site-wide decrease in VOC concentrations since the baseline sampling event conducted in 1999, other than areas evaluated in the 2012 CMP (Process Sump Area). In addition, VOC concentrations remain above MCLs for off-site wells in the upper and lower aquifers. However, lower aquifer groundwater downgradient beyond the property boundary is captured by the lower aquifer capture zone well DN-13.

The overall decreasing concentrations in the wells downgradient of the Site since the interim measures were first implemented are likely attributable to the combined effects of interim measures pumping at TW-2 which began in January 1996 (inactive as of July 2012), pumping at DN-13, and on-going enhanced reductive dechlorination of the VOCs. However, concentrations in upper aquifer monitoring wells immediately downgradient of the Site, as well as concentrations in lower aquifer wells remain above

MCLs. Therefore, active measures to include a final proposed site-wide remedy are still required to achieve the corrective measures objectives.

Based on the evaluation of the site-wide groundwater quality, both the amended in-situ treatment and hydraulic capture (lower aquifer) will be continued until modifications are implemented for the final site-wide remedy proposed in the 2012 CMP.

5.3 Reassessment of Site-Wide Groundwater Monitoring Program

In accordance with the Site-Wide Groundwater Monitoring Plan (ARCADIS G&M, Inc. 2002) with modifications from the Site-Wide Groundwater Monitoring Report for 2008 (ARCADIS, Inc. 2009), groundwater monitoring was completed in 2013 to evaluate groundwater quality upgradient and downgradient of the closed lagoons and landfills, performance of the in-situ reactive zones, and performance of the capture zones. Based on the data collected during the 2013 monitoring period, it appears that the monitoring program has provided sufficient data for a comprehensive evaluation of the current corrective action objectives. To reassess the monitoring program in support of the proposed final corrective measures, the following is recommended:

- In 2013, the changes detailed in Section 2.1.3 were made, as recommended in the Site-Wide Groundwater Monitoring Report for 2012 (ARCADIS, U.S., Inc. 2013a). A similar approach will be completed for the 2014 Site-Wide Groundwater Monitoring Program, as shown in Table 11, with the exception noted below.
 - Monitoring well GM-83S will not be sampled in 2014 as part of the Site-Wide Groundwater Monitoring Program. Note that this well was sampled to assist in evaluation of groundwater data trends present in closed South Settling Lagoon monitoring well W-4-S. Based on data collected in 2012 and 2013 from GM-83S, concentrations of VOCs remain very low and this additional data has assisted with the demonstration presented in Section 4.2. Monitoring wells HR-1, HR-16 and GM-63 will continue to be sampled in 2014 to support the evaluation of VOC concentrations in proximity to the closed South Settling Lagoon.
 - Monitoring wells GM-30, GM-31, GM-51, and HR-3 are currently sampled every five years and had observed increases in VOC concentrations in 2013. In order to monitor these increasing trends more closely these wells will be included in the list of wells to be sampled in 2014.



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- Future revisions to the site-wide groundwater monitoring program will be presented in support of the final site-wide corrective measures when the Statement of Basis is finalized.

6. References

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Table 1. Site-Wide Groundwater Monitoring and Remedial System Monitoring Events in 2013, RACER Trust, Moraine, Ohio.

2013 Site-Wide Annual Groundwater Sampling

Site-specific list of VOCs⁽¹⁾ and field parameters⁽²⁾ were analyzed during 2013 from the following upper aquifer monitoring wells. The wells underlined are included in the 5 year groundwater sampling plan. Biogeochemical parameters⁽³⁾ were analyzed at select wells identified below (GM-32 sampled only for field parameters and total organic carbon):

W-1-N	HR-16	<u>GM-17</u>	<u>GM-31</u>	<u>GM-63</u>
W-2-N	HR-17	<u>GM-18</u>	<u>GM-33</u>	<u>GM-64</u>
W-3-N	W-2-S	GM-19S ⁽³⁾	GM-35	GM-65S
W-4-N	W-3-S	GM-21 ⁽³⁾	GM-43	GM-75S ⁽³⁾
<u>HR-1</u>	W-4-S	<u>GM-22</u>	GM-47	GM-78
HR-2	TW-2	GM-23 ⁽³⁾	GM-50	GM-79
<u>HR-3</u>	GM-2	GM-26	<u>GM-51</u>	GM-80
HR-4	GM-6	<u>GM-27</u>	GM-52	GM-83S
<u>HR-5</u>	GM-8 ⁽³⁾	GM-28 ⁽⁴⁾	GM-55	<u>ME-3</u>
HR-7	<u>GM-10</u>	GM-29 ⁽³⁾	GM-59 ⁽³⁾	<u>ME-6</u>
<u>HR-11</u>	GM-16	<u>GM-30</u>	GM-60 ⁽³⁾	<u>WSU-24</u>

Site-specific list of VOCs⁽¹⁾ were analyzed during 2013 from the following list of lower aquifer monitoring wells:

HR-12	GM-11	GM-54	<u>GM-82</u>	RMW-88
HR-15	GM-15	<u>GM-58</u>	GM-83D	
DN-13 ⁵	GM-19D	<u>GM-61</u>	GM-84	
<u>GM-1</u>	GM-20D	GM-68D	RMW-85	
<u>GM-3</u>	<u>GM-39</u>	GM-75D	RMW-86	
GM-9	<u>GM-41</u>	GM-77D	RMW-87	

Analytical Methods

The following table presents the analytical methods used to analyze each parameter sampled during site-wide annual groundwater monitoring.

<u>Parameter</u>	<u>Analytical Method</u>
Site-specific list of VOCs	EPA Method 8260B/EPA Method 624
Manganese, total and dissolved	EPA Method 6010B
Iron, total and dissolved	EPA Method 6010B
Sulfate	SM 375.4
Sulfide	SM 376.1
Total Organic Carbon	SM 415.1
Chlorides	SM 325.2
Ethane, Ethene, Methane	Method AM18G

1 - Site-specific list of VOCs includes: benzene, 1,1-dichloroethane, 1,1-dichloroethene, cis-1,2-dichloroethene, trans-1,2-dichloroethene, ethylbenzene, tetrachloroethene, toluene, 1,1,1-trichloroethane, trichloroethene, vinyl chloride, and xylenes.

2 - Field parameters include: pH, specific conductivity, dissolved oxygen, oxidation reduction potential, and temperature.

3 - Biogeochemical parameters include: manganese (total and dissolved), iron (total and dissolved), sulfate, sulfide, total organic carbon, chlorides, ethane, ethene, and methane.

4 - Well not sampled due to obstruction in well.

5 - DN-13 was sampled on a monthly basis per the NPDES permit.



Table 2. Carbon Source Solution Introduction Volumes for 2013, RACER Trust, Moraine, Ohio.

Location	Injection Well	January		February		March		April		May		June	
		No Injections ⁽¹⁾		Injection Event #149 ⁽²⁾		Injection Event #150 ⁽³⁾		Injection Event #151 ⁽⁴⁾		Injection Event #152 ⁽⁵⁾		Injection Event #153 ⁽⁶⁾	
		Volume (gal)	Flow Rate (gpm)	Volume (gal)	Flow Rate (gpm)	Volume (gal)	Flow Rate (gpm)	Volume (gal)	Flow Rate (gpm)	Volume (gal)	Flow Rate (gpm)	Volume (gal)	Flow Rate (gpm)
Reactive Zone 1	RZ-1C	---	NA	800	25.80	800	13.90	800	15.10	800	14.30	800	38.10
	RZ-1D	---	NA	800	32.00	800	33.30	800	32.00	800	29.60	800	33.30
	RZ-1E	---	NA	800	30.80	800	30.80	800	32.00	800	29.60	800	30.80
	RZ-1F	---	NA	800	34.80	800	33.30	800	34.80	800	27.60	800	32.00
	RZ-1G	---	NA	800	33.30	800	34.80	800	36.40	800	32.00	800	34.80
	RZ-1H	---	NA	800	24.20	800	24.20	800	24.20	800	24.20	800	23.50
	RZ-1I	---	NA	800	36.40	800	33.30	800	34.80	800	33.30	800	34.80
	RZ-1J	---	NA	800	36.40	800	36.40	800	36.40	800	32.00	800	38.10
	RZ-1K	---	NA	800	34.80	800	36.40	800	38.10	800	34.80	800	34.80
	RZ-1L	---	NA	800	38.10	800	36.40	800	36.40	800	34.80	800	36.40
	RZ-1M	---	NA	800	30.80	800	19.00	800	10.70	800	7.00	800	27.60
	RZ-1N	---	NA	800	29.60	800	27.60	800	28.60	800	27.60	800	25.80
	RZ-1O	---	NA	800	38.10	800	12.50	800	11.10	800	17.00	800	32.00
	RZ-1P	---	NA	800	34.80	800	34.80	800	30.80	800	33.30	800	32.00
	RZ-1Q	---	NA	800	8.90	800	5.60	800	4.80	800	4.00	800	29.60
	RZ-1R	---	NA	800	34.80	800	38.10	800	34.80	800	33.30	800	36.40
	RZ-1S	---	NA	800	33.30	800	32.00	800	29.60	800	30.80	800	32.00
	RZ-1T	---	NA	800	36.40	800	36.40	800	33.30	800	33.30	800	36.40
	RZ-1U	---	NA	800	38.10	800	30.80	800	32.00	800	11.10	800	40.00
Reactive Zone 3	RZ-3A	---	NA	1600	39.20	1600	30.80	1600	40.00	1600	26.30	1600	34.10
	RZ-3B	---	NA	1600	38.10	1600	30.80	1600	36.00	1600	29.80	1600	31.40
	RZ-3C	---	NA	1600	32.00	1600	34.10	1600	34.80	1600	32.00	1600	34.10
	RZ-3D	---	NA	1600	28.10	1600	26.00	1600	29.70	1600	23.90	1600	28.20
	RZ-3E	---	NA	1600	28.60	1600	20.00	1600	34.80	1600	24.80	800	28.60
	RZ-3F	---	NA	1600	30.80	1600	31.50	1600	30.80	1600	28.10	1600	27.70
	RZ-3G	---	NA	1600	29.90	1600	24.30	1600	32.70	1600	27.60	1600	25.40
	RZ-3H	---	NA	1600	36.40	1600	30.20	1600	34.80	1600	30.70	1600	27.70
	RZ-3I	---	NA	1600	28.60	1600	25.90	1600	37.20	1600	26.20	1600	31.40
	RZ-3J	---	NA	1600	38.10	1600	32.00	1600	41.10	1600	32.70	1600	33.30
	RZ-3K	---	NA	1600	40.00	1600	27.60	1600	37.30	1600	32.70	1600	27.10
	RZ-3L	---	NA	1600	39.00	1600	32.00	1600	39.30	1600	29.60	1600	34.80
	RZ-3M	---	NA	1600	40.00	1600	35.60	1600	38.10	1600	33.30	1600	35.60
	RZ-3N	---	NA	1600	38.20	1600	32.00	1600	29.10	1600	30.80	1600	34.80
	RZ-3O	---	NA	1600	35.60	1600	33.30	1600	33.30	1600	34.10	1600	34.10
	RZ-3P	---	NA	1600	23.90	1600	29.10	1600	25.00	1600	32.00	1600	28.60
	RZ-3Q	---	NA	1600	25.50	1600	36.40	1600	30.20	1600	36.40	1600	33.60
	RZ-3R	---	NA	1600	34.10	1600	37.20	1600	29.10	1600	34.10	1600	37.20
	RZ-3S	---	NA	1600	29.70	1600	28.60	1600	28.60	1600	33.30	1600	31.00
	RZ-3T	---	NA	1600	33.30	1600	30.20	1600	31.40	1600	30.80	1600	29.60
	RZ-3U	---	NA	1600	34.10	1600	37.20	1600	36.40	1600	34.10	1600	29.10
	RZ-3V	---	NA	1600	39.00	1600	30.20	1600	35.70	1600	32.70	1600	28.60
	RZ-3W	---	NA	1600	37.40	1600	35.60	1600	37.30	1600	34.80	1600	33.30
	RZ-3X	---	NA	1600	30.20	1600	22.50	1600	35.70	1600	32.00	1600	30.80
	RZ-3Y	---	NA	1600	37.20	1600	35.60	1600	39.10	1600	35.60	1600	34.10
	RZ-3Z	---	NA	1600	33.30	1600	32.00	1600	37.30	1600	32.70	1600	34.10
	RZ-3AA	---	NA	1600	32.80	1600	34.10	1600	36.40	1600	32.00	1600	32.00
	RZ-3BB	---	NA	1600	35.70	1600	26.20	1600	38.10	1600	32.00	1600	29.70



Table 2. Carbon Source Solution Introduction Volumes for 2013, RACER Trust, Moraine, Ohio.

Location	Injection Well	January		February		March		April		May		June	
		No Injections ⁽¹⁾		Injection Event #149 ⁽²⁾		Injection Event #150 ⁽³⁾		Injection Event #151 ⁽⁴⁾		Injection Event #152 ⁽⁵⁾		Injection Event #153 ⁽⁶⁾	
		Volume (gal)	Flow Rate (gpm)	Volume (gal)	Flow Rate (gpm)	Volume (gal)	Flow Rate (gpm)	Volume (gal)	Flow Rate (gpm)	Volume (gal)	Flow Rate (gpm)	Volume (gal)	Flow Rate (gpm)
Reactive Zone 3	RZ-3CC	---	NA	1600	38.10	1600	35.70	1600	36.40	1600	34.10	1600	36.40
	RZ-3DD	---	NA	1600	40.00	1600	30.80	1600	39.30	1600	34.20	1600	35.70
	RZ-3GG	---	NA	1600	36.50	1600	36.40	1600	28.40	1600	32.70	1600	28.10
	RZ-3HH	---	NA	1600	35.60	1600	34.50	1600	35.60	1600	30.30	1600	24.90
	RZ-3II	---	NA	1600	34.90	1600	32.70	1600	38.20	1600	32.70	1600	32.00
	RZ-3JJ	---	NA	1600	6.00	900	3.20	800	6.00	800	8.90	1600	NA
	RZ-3KK	---	NA	1600	20.80	1500	34.50	1600	32.70	1500	32.70	1500	33.50
	RZ-3RR	---	NA	1600	23.70	1600	26.80	1600	29.40	1600	26.30	1600	25.40
	RZ-3SS	---	NA	1600	21.00	1600	19.80	1600	19.50	1600	20.90	1600	20.60
	RZ-3TT	---	NA	1600	22.60	1600	20.50	1600	20.90	1600	19.00	1600	24.50
	RZ-3UU	---	NA	1600	23.10	1600	20.10	1600	18.40	1600	19.30	1600	19.00
	RZ-3VV	---	NA	1600	20.60	1600	22.60	1600	20.30	1600	21.90	1600	19.90
Reactive Zone 4	RZ-4A	---	NA	3000	28.00	3000	23.40	3000	29.70	3000	28.60	3000	28.30
	RZ-4B	---	NA	3000	30.50	3000	30.30	3000	35.50	3000	30.10	3000	31.80
	RZ-4C	---	NA	3000	27.20	3000	27.10	3000	28.50	3000	30.60	3000	29.00
	RZ-4D	---	NA	3000	33.20	3000	24.30	3000	31.50	3000	31.90	3000	32.90
	RZ-4E	---	NA	3000	28.90	3000	31.00	3000	31.00	3000	32.60	3000	30.80
	RZ-4F	---	NA	3000	25.90	3000	23.30	3000	26.20	3000	28.20	3000	29.60
	RZ-4G	---	NA	3000	31.80	3000	30.50	3000	30.50	3000	30.00	3000	34.50
	RZ-4H	---	NA	3000	33.50	3000	35.60	3000	29.90	3000	27.70	3000	34.80
Site-Wide Total		NA	NA	103,200	NA	102,400	NA	102,400	NA	102,300	NA	102,300	NA



Table 2. Carbon Source Solution Introduction Volumes for 2013, RACER Trust, Moraine, Ohio.

Location	Injection Well	July		August		September		October		November		December	
		Injection Event #154 ⁽⁷⁾		No Injections ⁽⁸⁾		No Injections ⁽⁹⁾		No Injections ⁽¹⁰⁾		No Injections ⁽¹¹⁾		Injection Event #155 ⁽¹²⁾	
		Volume (gal)	Flow Rate (gpm)	Volume (gal)	Flow Rate (gpm)	Volume (gal)	Flow Rate (gpm)	Volume (gal)	Flow Rate (gpm)	Volume (gal)	Flow Rate (gpm)	Volume (gal)	Flow Rate (gpm)
Reactive Zone 1	RZ-1C	800	36.40	---	NA	---	NA	---	NA	---	NA	800	34.80
	RZ-1D	800	33.30	---	NA	---	NA	---	NA	---	NA	800	29.60
	RZ-1E	800	28.60	---	NA	---	NA	---	NA	---	NA	800	32.00
	RZ-1F	800	34.80	---	NA	---	NA	---	NA	---	NA	800	33.30
	RZ-1G	800	33.30	---	NA	---	NA	---	NA	---	NA	800	33.30
	RZ-1H	800	22.90	---	NA	---	NA	---	NA	---	NA	800	22.90
	RZ-1I	800	38.10	---	NA	---	NA	---	NA	---	NA	800	33.30
	RZ-1J	800	32.00	---	NA	---	NA	---	NA	---	NA	800	30.80
	RZ-1K	800	32.00	---	NA	---	NA	---	NA	---	NA	800	36.40
	RZ-1L	800	32.00	---	NA	---	NA	---	NA	---	NA	800	33.30
	RZ-1M	800	28.60	---	NA	---	NA	---	NA	---	NA	800	29.60
	RZ-1N	800	30.80	---	NA	---	NA	---	NA	---	NA	800	29.60
	RZ-1O	800	32.00	---	NA	---	NA	---	NA	---	NA	800	34.80
	RZ-1P	800	34.80	---	NA	---	NA	---	NA	---	NA	800	36.40
	RZ-1Q	800	34.80	---	NA	---	NA	---	NA	---	NA	800	40.00
	RZ-1R	800	32.00	---	NA	---	NA	---	NA	---	NA	800	38.10
	RZ-1S	800	28.60	---	NA	---	NA	---	NA	---	NA	800	40.00
	RZ-1T	800	36.40	---	NA	---	NA	---	NA	---	NA	800	40.00
	RZ-1U	800	36.40	---	NA	---	NA	---	NA	---	NA	800	40.00
Reactive Zone 3	RZ-3A	1600	32.00	---	NA	---	NA	---	NA	---	NA	1600	27.10
	RZ-3B	1600	33.30	---	NA	---	NA	---	NA	---	NA	1600	32.80
	RZ-3C	1600	30.80	---	NA	---	NA	---	NA	---	NA	1600	31.00
	RZ-3D	1600	20.70	---	NA	---	NA	---	NA	---	NA	1600	22.90
	RZ-3E	1600	31.40	---	NA	---	NA	---	NA	---	NA	1600	30.30
	RZ-3F	1600	25.80	---	NA	---	NA	---	NA	---	NA	1600	25.40
	RZ-3G	1600	26.70	---	NA	---	NA	---	NA	---	NA	1600	26.70
	RZ-3H	1600	26.70	---	NA	---	NA	---	NA	---	NA	1600	31.50
	RZ-3I	1600	30.30	---	NA	---	NA	---	NA	---	NA	1600	25.90
	RZ-3J	1600	31.00	---	NA	---	NA	---	NA	---	NA	1600	30.30
	RZ-3K	1600	32.00	---	NA	---	NA	---	NA	---	NA	1600	27.70
	RZ-3L	1600	30.80	---	NA	---	NA	---	NA	---	NA	1600	33.60
	RZ-3M	1600	36.40	---	NA	---	NA	---	NA	---	NA	1600	29.30
	RZ-3N	1600	35.60	---	NA	---	NA	---	NA	---	NA	1600	30.20
	RZ-3O	1600	33.30	---	NA	---	NA	---	NA	---	NA	1600	35.60
	RZ-3P	1600	27.60	---	NA	---	NA	---	NA	---	NA	1600	29.60
	RZ-3Q	1600	32.80	---	NA	---	NA	---	NA	---	NA	1600	34.10
	RZ-3R	1600	36.40	---	NA	---	NA	---	NA	---	NA	1600	35.60
	RZ-3S	1600	33.30	---	NA	---	NA	---	NA	---	NA	1600	26.30
	RZ-3T	1600	32.20	---	NA	---	NA	---	NA	---	NA	1600	28.30
	RZ-3U	1600	34.80	---	NA	---	NA	---	NA	---	NA	1600	31.50
	RZ-3V	1600	31.40	---	NA	---	NA	---	NA	---	NA	1600	28.80
	RZ-3W	1600	36.40	---	NA	---	NA	---	NA	---	NA	1600	29.30
	RZ-3X	1600	34.80	---	NA	---	NA	---	NA	---	NA	1600	32.00
	RZ-3Y	1600	35.60	---	NA	---	NA	---	NA	---	NA	1600	32.00
	RZ-3Z	1600	31.20	---	NA	---	NA	---	NA	---	NA	1600	29.10
	RZ-3AA	1600	32.70	---	NA	---	NA	---	NA	---	NA	1600	35.60
	RZ-3BB	1600	32.70	---	NA	---	NA	---	NA	---	NA	1600	28.70



Table 2. Carbon Source Solution Introduction Volumes for 2013, RACER Trust, Moraine, Ohio.

Location	Injection Well	July		August		September		October		November		December	
		Injection Event #154 ⁽⁷⁾		No Injections ⁽⁸⁾		No Injections ⁽⁹⁾		No Injections ⁽¹⁰⁾		No Injections ⁽¹¹⁾		Injection Event #155 ⁽¹²⁾	
		Volume (gal)	Flow Rate (gpm)	Volume (gal)	Flow Rate (gpm)	Volume (gal)	Flow Rate (gpm)	Volume (gal)	Flow Rate (gpm)	Volume (gal)	Flow Rate (gpm)	Volume (gal)	Flow Rate (gpm)
Reactive Zone 3	RZ-3CC	1600	33.30	---	NA	---	NA	---	NA	---	NA	1600	32.70
	RZ-3DD	1600	33.30	---	NA	---	NA	---	NA	---	NA	1600	30.80
	RZ-3GG	1600	33.30	---	NA	---	NA	---	NA	---	NA	1600	30.80
	RZ-3HH	1600	36.40	---	NA	---	NA	---	NA	---	NA	1600	30.30
	RZ-3II	1600	34.80	---	NA	---	NA	---	NA	---	NA	1600	32.00
	RZ-3JJ	800	NA	---	NA	---	NA	---	NA	---	NA	800	N/A
	RZ-3KK	1600	32.00	---	NA	---	NA	---	NA	---	NA	1600	23.60
	RZ-3RR	1600	27.60	---	NA	---	NA	---	NA	---	NA	1600	24.90
	RZ-3SS	1600	21.40	---	NA	---	NA	---	NA	---	NA	1600	24.20
	RZ-3TT	1600	22.00	---	NA	---	NA	---	NA	---	NA	1600	20.30
	RZ-3UU	1600	19.60	---	NA	---	NA	---	NA	---	NA	1600	26.70
	RZ-3VV	1600	20.00	---	NA	---	NA	---	NA	---	NA	1600	22.90
Reactive Zone 4	RZ-4A	3000	29.80	---	NA	---	NA	---	NA	---	NA	3000	23.30
	RZ-4B	3000	29.60	---	NA	---	NA	---	NA	---	NA	3000	29.20
	RZ-4C	3000	32.50	---	NA	---	NA	---	NA	---	NA	3000	29.60
	RZ-4D	3000	34.90	---	NA	---	NA	---	NA	---	NA	3000	31.80
	RZ-4E	3000	34.60	---	NA	---	NA	---	NA	---	NA	3000	24.90
	RZ-4F	3000	29.50	---	NA	---	NA	---	NA	---	NA	3000	23.30
	RZ-4G	3000	35.00	---	NA	---	NA	---	NA	---	NA	3000	35.10
	RZ-4H	3000	35.90	---	NA	---	NA	---	NA	---	NA	3000	32.60
Site-Wide Total		102,400	NA	NA	NA	NA	NA	NA	NA	NA	NA	102,400	NA



Table 2. Carbon Source Solution Introduction Volumes for 2013, RACER Trust, Moraine, Ohio.

Notes:

Carbon source introduced into each well is a 50:1 solution (potable water to molasses).

gpm - gallons per minute.

gal - gallons.

NA - Not Applicable.

--- Introduction well was not selected for introduction during this event.

(1) No injection event scheduled.

(2) Injection Event #149 was completed on February 4th through February 8th, February 11th through February 15th, February 18th through February 21st, and February 25th through February 27th, 2013.

(3) Injection Event #150 was completed March 4th through March 8th, March 11th through March 15th, March 18th through 21st, and March 26th through March 28th, 2013.

(4) Injection Event #151 was completed on April 1st through April 4th, April 8th through April 9th, April 17th through April 18th, April 22nd through April 26th, and April 29th, 2013.

(5) Injection Event #152 was completed on May 1st through May 3rd, May 6th, May 8th through May 10th, May 13th through May 14th, May 16th, May 20th, May 22nd through May 23rd, and May 28th through May 30th, 2013.

(6) Injection Event #153 was completed on June 5th through June 6th, June 17th through June 21st, June 24th through June 28th, and July 1st through July 5th, 2013.

(7) Injection Event #154 was completed on July 7th through the 9th, July 11th, July 16th through the 18th, July 22nd, July 24th through the 26th, July 29th through August 1st, August 5th through the 8th, August 12th through the 13th, and August 15th through the 16th, 2013.

(8) No injection event scheduled.

(9) No injection event scheduled.

(10) No injection event scheduled.

(11) No injection event scheduled.

(12) Injection Event #155 was completed on November 21st through 22nd, November 25th through 27th, December 4th, December 6th, December 9th through 10th, December 13th, December 17th through 20th, January 2nd, January 8th, January 10th, and January 13th through 14th, 2014.



Table 3. Summary of Groundwater VOC Analytical Results from Upper/Lower Aquifer Monitoring Wells in 2013, RACER Trust, Moraine, Ohio.

	Units	Upgradient Contributions		Source Areas		GM-59 9/27/2013 Upper Aquifer	GM-60 9/27/2013 Upper Aquifer	GM-75S 9/27/2013 Upper Aquifer
		HR-11 9/26/2013	W-1-N 9/27/2013	GM-23 9/27/2013	GM-27 9/27/2013			
		Upper Aquifer	Upper Aquifer	Upper Aquifer	Upper Aquifer			
<u>Volatile Organic Compounds</u>								
1,1,1-Trichloroethane	µg/L	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	1.0	1.4	1.8
1,1-Dichloroethane	µg/L	4.4	1.6	2.6	2.3	< 1.0 U	1.3	0.53 J
1,1-Dichloroethene	µg/L	< 1.0 U	< 1.0 U	1.7	< 1.0 U	< 1.0 U	1.5	< 1.0 U
Benzene	µg/L	< 1.0 U	< 1.0 U	0.28 J	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
cis-1,2-Dichloroethene	µg/L	1.6	0.27 J	470	12	11	400	4.5
Ethylbenzene	µg/L	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
Tetrachloroethene	µg/L	< 1.0 U	< 1.0 U	37	1.8	1000	670	480
Toluene	µg/L	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 UB	< 1.0 U	< 1.0 U	< 1.0 U
trans-1,2-Dichloroethene	µg/L	0.24 J	< 1.0 U	15	0.51 J	0.56 J	4.2	0.29 J
Trichloroethene	µg/L	< 1.0 U	< 1.0 U	28	42	1100	1100	350
Vinyl chloride	µg/L	< 1.0 U	< 1.0 U	210	0.18 J	< 1.0 U	2.1	< 1.0 U
Xylene (total)	µg/L	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U
Total VOCs	µg/L	6.2	1.9	764.6	58.8	2112.6	2180.5	837.1

µg/L - Micrograms per Liter.

All QA/QC results for 2013 data are shown in Appendix C.

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J - Value is estimated.

U - Constituent not detected above laboratory reporting limit shown.

B - Constituent found in sample was detected in associated blank. Presence is suspect.

GM-28 was unable to be sampled due to an obstruction in the well casing.



Table 3. Summary of Groundwater VOC Analytical Results from Upper/Lower Aquifer Monitoring Wells in 2013, RACER Trust, Moraine, Ohio.

	Units	Downgradient Reactive Zone Performance Wells						
		GM-29	GM-30	HR-3	GM-21	GM-6	GM-8	GM-19S
		9/27/2013	9/27/2013	9/27/2013	9/26/2013	9/25/2013	9/26/2013	9/26/2013
		Upper Aquifer	Upper Aquifer	Upper Aquifer	Upper Aquifer	Upper Aquifer	Upper Aquifer	Upper Aquifer
<u>Volatile Organic Compounds</u>								
1,1,1-Trichloroethane	µg/L	15	< 1.0 U	6.9	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
1,1-Dichloroethane	µg/L	12	5.3	12	9.5	0.66 J	0.88 J	8.3
1,1-Dichloroethene	µg/L	1.7	< 1.0 U	0.51 J	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
Benzene	µg/L	0.20 J	4.0	< 1.0 U	< 1.0 U	< 1.0 U	1.9	< 1.0 U
cis-1,2-Dichloroethene	µg/L	530	< 1.0 U	59	5.1	1.9	0.27 J	26
Ethylbenzene	µg/L	< 1.0 U	20	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
Tetrachloroethene	µg/L	15	0.23 J	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
Toluene	µg/L	< 1.0 U	1.1	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
trans-1,2-Dichloroethene	µg/L	20	0.63 J	2.2	1.1	< 1.0 U	< 1.0 U	1.1
Trichloroethene	µg/L	280	0.28 J	190	12	0.26 J	0.21 J	0.46 J
Vinyl chloride	µg/L	60	0.34 J	0.93 J	3.8	0.79 J	< 1.0 U	17
Xylene (total)	µg/L	< 2.0 U	7.2	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U
Total VOCs	µg/L	933.9	39.1	271.5	31.5	3.6	3.3	52.9

µg/L - Micrograms per Liter.

All QA/QC results for 2013 data are shown in Appendix C.

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B - Constituent found in sample was detected in associated blank. Presence is suspect.

GM-28 was unable to be sampled due to an obstruction in the well casing.



Table 3. Summary of Groundwater VOC Analytical Results from Upper/Lower Aquifer Monitoring Wells in 2013, RACER Trust, Moraine, Ohio.

	Units	Closed North Settling Lagoon Monitoring Results				Closed South Settling Lagoon Monitoring Results				
		HR-4	W-2-N	W-3-N	W-4-N	HR-16	HR-17	W-2-S	W-3-S	W-4-S
		9/27/2013	9/26/2013	9/26/2013	9/27/2013	9/25/2013	9/25/2013	9/25/2013	9/25/2013	9/25/2013
		Upper Aquifer	Upper Aquifer	Upper Aquifer	Upper Aquifer	Upper Aquifer	Upper Aquifer	Upper Aquifer	Upper Aquifer	Upper Aquifer
<u>Volatile Organic Compounds</u>										
1,1,1-Trichloroethane	µg/L	0.29 J	< 1.0 U	< 1.0 U	< 1.0 U	0.61 J	1.3	1.8	0.49 J	1.6
1,1-Dichloroethane	µg/L	3.0	< 1.0 U	< 1.0 U	7.1	< 1.0 U	0.93 J	0.86 J	1.2	1.9
1,1-Dichloroethene	µg/L	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
Benzene	µg/L	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
cis-1,2-Dichloroethene	µg/L	< 1.0 U	0.89 J	34	11	< 1.0 U	1.4	1.1	1.4	6.3
Ethylbenzene	µg/L	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
Tetrachloroethene	µg/L	0.21 J	< 1.0 U	0.96 J	0.63 J	0.14 J	150	0.31 J	25	60
Toluene	µg/L	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
trans-1,2-Dichloroethene	µg/L	< 1.0 U	< 1.0 U	0.64 J	0.76 J	< 1.0 U	0.92 J	< 1.0 U	0.59 J	1.2
Trichloroethene	µg/L	0.27 J	< 1.0 U	< 1.0 U	7.4	1.3	100	6.4	21	50
Vinyl chloride	µg/L	< 1.0 U	< 1.0 U	1.6	0.18 J	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
Xylene (total)	µg/L	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U
Total VOCs	µg/L	3.8	0.89	37.2	27.1	2.1	254.6	10.5	49.7	121.0

µg/L - Micrograms per Liter.

All QA/QC results for 2013 data are shown in Appendix C.

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GM-28 was unable to be sampled due to an obstruction in the well casing.



Table 3. Summary of Groundwater VOC Analytical Results from Upper/Lower Aquifer Monitoring Wells in 2013, RACER Trust, Moraine, Ohio.

	Units	Downgradient On-Site										
		HR-1	GM-43	GM-31	GM-33	GM-35	ME-3	ME-6	HR-2	HR-5	HR-7	GM-22
		9/26/2013	9/26/2013	9/27/2013	9/26/2013	9/26/2013	9/27/2013	9/27/2013	9/27/2013	9/26/2013	9/26/2013	9/26/2013
		Upper Aquifer	Upper Aquifer	Upper Aquifer	Upper Aquifer	Upper Aquifer	Upper Aquifer	Upper Aquifer	Upper Aquifer	Upper Aquifer	Upper Aquifer	Upper Aquifer
Volatile Organic Compounds												
1,1,1-Trichloroethane	µg/L	0.99 J	1.0	9.8	3.4	< 50 U	1.0	5.9	< 1.0 U	< 1.0 U	< 1.0 U	0.65 J
1,1-Dichloroethane	µg/L	1.2	2.0	2.3	1.1	30 J	0.41 J	20	7.5	0.70 J	0.35 J	< 1.0 U
1,1-Dichloroethene	µg/L	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 50 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
Benzene	µg/L	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 50 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
cis-1,2-Dichloroethene	µg/L	3.1	32	21	1.3	69	0.35 J	1.5	1.6	7.0	1.9	< 1.0 U
Ethylbenzene	µg/L	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 50 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
Tetrachloroethene	µg/L	30	22	0.43 J	28	< 50 U	7.1	5.1	< 1.0 U	0.57 J	< 1.0 U	4.3
Toluene	µg/L	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 50 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
trans-1,2-Dichloroethene	µg/L	0.90 J	3.7	1.2	< 1.0 U	18 J	< 1.0 U	< 1.0 U	0.28 J	0.63 J	< 1.0 U	< 1.0 U
Trichloroethene	µg/L	100	170	120	14	18 J	4.6	2.8	0.40 J	14	6.2	3.9
Vinyl chloride	µg/L	< 1.0 U	0.21 J	< 1.0 U	< 1.0 U	11 J	< 1.0 U	0.28 J	< 1.0 U	0.36 J	< 1.0 U	< 1.0 U
Xylene (total)	µg/L	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U	< 100 U	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U
Total VOCs	µg/L	136.2	230.9	154.7	47.8	146.0	13.5	35.6	9.8	23.3	8.5	8.9

µg/L - Micrograms per Liter.

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GM-28 was unable to be sampled due to an obstruction in the well casing.



Table 3. Summary of Groundwater VOC Analytical Results from Upper/Lower Aquifer Monitoring Wells in 2013, RACER Trust, Moraine, Ohio.

	Units	Property Boundary		Off-Site Downgradient of the Site							
		GM-2	TW-2	GM-10	GM-16	GM-17	GM-18	GM-47	GM-50	GM-51	GM-52
		9/25/2013	9/25/2013	9/25/2013	9/25/2013	9/27/2013	9/25/2013	9/25/2013	9/25/2013	9/25/2013	9/25/2013
		Upper Aquifer	Upper Aquifer	Upper Aquifer	Upper Aquifer	Upper Aquifer	Upper Aquifer	Upper Aquifer	Upper Aquifer	Upper Aquifer	Upper Aquifer
<u>Volatile Organic Compounds</u>											
1,1,1-Trichloroethane	µg/L	< 1.0 U	< 1.0 U	0.20 J	0.36 J	< 1.0 U	0.22 J	0.65 J	2.5	1.9	0.47 J
1,1-Dichloroethane	µg/L	1.0	< 1.0 U	< 1.0 U	4.4	0.36 J	0.68 J	3.7	3.5	1.8	1.2
1,1-Dichloroethene	µg/L	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
Benzene	µg/L	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
cis-1,2-Dichloroethene	µg/L	13	< 1.0 U	< 1.0 U	12	2.6	3.7	26	5.7	2.8	3.1
Ethylbenzene	µg/L	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
Tetrachloroethene	µg/L	0.31 J	< 1.0 U	1.1	51	2.8	17	47	73	46	53
Toluene	µg/L	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
trans-1,2-Dichloroethene	µg/L	0.26 J	< 1.0 U	< 1.0 U	0.40 J	< 1.0 U	< 1.0 U	2.4	0.29 J	0.30 J	< 1.0 U
Trichloroethene	µg/L	0.70 J	< 1.0 U	3.1	17	4.7	10	14	40	64	18
Vinyl chloride	µg/L	1.3	< 1.0 U	< 1.0 U	0.55 J	< 1.0 U	< 1.0 U	0.42 J	0.30 J	< 1.0 U	< 1.0 U
Xylene (total)	µg/L	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U
Total VOCs	µg/L	16.6	0.0	4.4	85.7	10.5	31.6	94.2	125.3	116.8	75.8

µg/L - Micrograms per Liter.

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GM-28 was unable to be sampled due to an obstruction in the well casing.



Table 3. Summary of Groundwater VOC Analytical Results from Upper/Lower Aquifer Monitoring Wells in 2013, RACER Trust, Moraine, Ohio.

	Units	Off-Site Downgradient of the Site									
		GM-63 9/25/2013	GM-64 9/26/2013	GM-55 9/25/2013	GM-65S 9/25/2013	WSU-24 9/25/2013	GM-78 9/25/2013	GM-79 9/25/2013	GM-80 9/25/2013	GM-83S 9/26/2013	GM-26 9/25/2013
		Upper Aquifer	Upper Aquifer	Upper Aquifer	Upper Aquifer	Upper Aquifer	Upper Aquifer	Upper Aquifer	Upper Aquifer	Upper Aquifer	Upper Aquifer
Volatile Organic Compounds											
1,1,1-Trichloroethane	µg/L	4.4	0.71 J	< 1.0 U	< 1.0 U	0.23 J	< 1.0 U	0.88 J	< 1.0 U	< 1.0 U	< 1.0 U
1,1-Dichloroethane	µg/L	1.6	4.2	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	1.1	< 1.0 U	< 1.0 U	< 1.0 U
1,1-Dichloroethene	µg/L	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
Benzene	µg/L	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
cis-1,2-Dichloroethene	µg/L	1.9	44	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	1.4	< 1.0 U	1.1	< 1.0 U
Ethylbenzene	µg/L	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
Tetrachloroethene	µg/L	81	41	4.6	5.6	13	11	0.31 J	6.7	< 1.0 U	1.6
Toluene	µg/L	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
trans-1,2-Dichloroethene	µg/L	0.33 J	2.8	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	0.42 J	< 1.0 U	< 1.0 U	< 1.0 U
Trichloroethene	µg/L	48	31	< 1.0 U	0.82 J	2.5	< 1.0 U	3.9	4.6	< 1.0 U	< 1.0 U
Vinyl chloride	µg/L	< 1.0 U	5.8	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
Xylene (total)	µg/L	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U
Total VOCs	µg/L	137.2	129.5	4.6	6.4	15.7	11.0	8.0	11.3	1.1	1.6

µg/L - Micrograms per Liter.

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GM-28 was unable to be sampled due to an obstruction in the well casing.



Table 3. Summary of Groundwater VOC Analytical Results from Upper/Lower Aquifer Monitoring Wells in 2013, RACER Trust, Moraine, Ohio.

	Units	Upgradient Contributions		On-Site Groundwater Quality						
		RMW-88	HR-12	GM-39	GM-54	GM-61	GM-68D	GM-75D	GM-82	RMW-85
		9/27/2013	9/26/2013	9/27/2013	9/26/2013	9/26/2013	9/26/2013	9/27/2013	9/26/2013	9/27/2013
		Lower Aquifer	Lower Aquifer	Lower Aquifer	Lower Aquifer	Lower Aquifer	Lower Aquifer	Lower Aquifer	Lower Aquifer	Lower Aquifer
<u>Volatile Organic Compounds</u>										
1,1,1-Trichloroethane	µg/L	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	0.47 J	< 1.0 U	0.49 J	0.19 J
1,1-Dichloroethane	µg/L	35	1.8	< 1.0 U	0.31 J	1.3	< 1.0 U	0.40 J	1.4	0.84 J
1,1-Dichloroethene	µg/L	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	0.28 J	0.60 J	0.26 J
Benzene	µg/L	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
cis-1,2-Dichloroethene	µg/L	75	0.24 J	< 1.0 U	< 1.0 U	17	0.77 J	25	41	60
Ethylbenzene	µg/L	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
Tetrachloroethene	µg/L	< 1.0 U	< 1.0 U	0.68 J	69	7.2	45	180	20	61
Toluene	µg/L	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
trans-1,2-Dichloroethene	µg/L	4.5	< 1.0 U	< 1.0 U	< 1.0 U	1.1	< 1.0 U	0.58 J	1.3	0.48 J
Trichloroethene	µg/L	< 1.0 U	< 1.0 U	0.63 J	2.7	5.2	5.6	180	56	95
Vinyl chloride	µg/L	2.0	< 1.0 U	1.5	< 1.0 U	1.2	< 1.0 U	3.2	7.4	0.31 J
Xylene (total)	µg/L	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U
Total VOCs	µg/L	116.5	2.0	2.8	72.0	33.0	51.8	389.5	128.2	218.1

µg/L - Micrograms per Liter.

All QA/QC results for 2013 data are shown in Appendix C.

< - Constituent not detected above laboratory reporting limit shown.

J - Value is estimated.

U - Constituent not detected above laboratory reporting limit shown.

B - Constituent found in sample was detected in associated blank. Presence is suspect.

GM-28 was unable to be sampled due to an obstruction in the well casing.



Table 3. Summary of Groundwater VOC Analytical Results from Upper/Lower Aquifer Monitoring Wells in 2013, RACER Trust, Moraine, Ohio.

	Units	Lower Aquifer Groundwater Quality							
		HR-15	GM-19D	GM-41	GM-58	RMW-86	RMW-87	GM-15	GM-20D
		9/26/2013	9/26/2013	9/27/2013	9/27/2013	9/26/2013	9/26/2013	9/25/2013	9/25/2013
		Lower Aquifer	Lower Aquifer	Lower Aquifer	Lower Aquifer	Lower Aquifer	Lower Aquifer	Lower Aquifer	Lower Aquifer
<u>Volatile Organic Compounds</u>									
1,1,1-Trichloroethane	µg/L	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	15	< 1.0 U	< 1.0 U	0.32 J
1,1-Dichloroethane	µg/L	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	16	18	1.3	< 1.0 U
1,1-Dichloroethene	µg/L	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	2.3	< 1.0 U	< 1.0 U	< 1.0 U
Benzene	µg/L	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
cis-1,2-Dichloroethene	µg/L	3.5	2.7	12	< 1.0 U	110	43	1.8	< 1.0 U
Ethylbenzene	µg/L	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
Tetrachloroethene	µg/L	< 1.0 U	< 1.0 U	< 1.0 U	34	41	< 1.0 U	< 1.0 U	1.3
Toluene	µg/L	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
trans-1,2-Dichloroethene	µg/L	< 1.0 U	< 1.0 U	0.89 J	< 1.0 U	2.9	2.2	< 1.0 U	< 1.0 U
Trichloroethene	µg/L	0.75 J	1.0	79	0.41 J	190	9.8	4.5	5.3
Vinyl chloride	µg/L	1.4	7.8	1.9	< 1.0 U	1.3	1.3	0.19 J	< 1.0 U
Xylene (total)	µg/L	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U
Total VOCs	µg/L	5.7	11.5	93.8	34.4	378.5	74.3	7.8	6.9

µg/L - Micrograms per Liter.

All QA/QC results for 2013 data are shown in Appendix C.

< - Constituent not detected above laboratory reporting limit shown.

J - Value is estimated.

U - Constituent not detected above laboratory reporting limit shown.

B - Constituent found in sample was detected in associated blank. Presence is suspect.

GM-28 was unable to be sampled due to an obstruction in the well casing.



Table 3. Summary of Groundwater VOC Analytical Results from Upper/Lower Aquifer Monitoring Wells in 2013, RACER Trust, Moraine, Ohio.

	Units	Downgradient Groundwater Quality							
		GM-9	DN-13	GM-83D	GM-84	GM-1	GM-3	GM-77D	GM-11
		9/25/2013	9/27/2013	9/26/2013	9/26/2013	9/25/2013	9/25/2013	9/26/2013	9/25/2013
		Lower Aquifer	Lower Aquifer	Lower Aquifer	Lower Aquifer	Lower Aquifer	Lower Aquifer	Lower Aquifer	Lower Aquifer
<u>Volatile Organic Compounds</u>									
1,1,1-Trichloroethane	µg/L	1.4	0.93 J	< 1.0 U	< 1.0 U	0.41 J	0.54 J	< 1.0 U	0.32 J
1,1-Dichloroethane	µg/L	< 1.0 U	1.9	< 1.0 U	< 1.0 U	< 1.0 U	0.86 J	< 1.0 U	< 1.0 U
1,1-Dichloroethene	µg/L	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
Benzene	µg/L	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
cis-1,2-Dichloroethene	µg/L	0.44 J	6.9	< 1.0 U	< 1.0 U	< 1.0 U	1.7	< 1.0 U	0.40 J
Ethylbenzene	µg/L	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
Tetrachloroethene	µg/L	< 1.0 U	0.58 J	< 1.0 U	< 1.0 U	0.83 J	2.3	12	1.3
Toluene	µg/L	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
trans-1,2-Dichloroethene	µg/L	< 1.0 U	0.55 J	< 1.0 U	< 1.0 U	< 1.0 U	0.29 J	< 1.0 U	< 1.0 U
Trichloroethene	µg/L	19	8.4	< 1.0 U	3.6	21	15	< 1.0 U	23
Vinyl chloride	µg/L	< 1.0 U	1.1	1.9	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
Xylene (total)	µg/L	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U
Total VOCs	µg/L	20.8	20.4	1.9	3.6	22.2	20.7	12.0	25.0

µg/L - Micrograms per Liter.

All QA/QC results for 2013 data are shown in Appendix C.

< - Constituent not detected above laboratory reporting limit shown.

J - Value is estimated.

U - Constituent not detected above laboratory reporting limit shown.

B - Constituent found in sample was detected in associated blank. Presence is suspect.

GM-28 was unable to be sampled due to an obstruction in the well casing.



Table 4. DN-13 Monthly Monitoring for 2013, RACER Trust, Moraine, Ohio.

Volatile Organic Compound¹	Units	1/14/2013	2/4/2013	3/4/2013	4/1/2013	5/1/2013	6/6/2013	7/1/2013	8/1/2013	9/5/2013	10/3/2013	11/5/2013	12/4/2013
1,1,1-Trichloroethane	µg/L	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U
1,1-Dichloroethane	µg/L	1.7 J	1.8 J	< 5.0 U	1.2 J	1.8 J	< 5.0 U	1.7 J	1.3 J	1.4 J	1.9 J	1.5 J	1.3 J
Benzene	µg/L	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U
Chloroethane	µg/L	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U
cis-1,2-Dichloroethene	µg/L	6.9	6.6	5.5	5.9	6.9	6.6	6.8	5.4	5.9	6.1	6.3	5.9
Ethylbenzene	µg/L	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U
Tetrachloroethene	µg/L	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U
Toluene	µg/L	< 5.0 U	0.66 J	< 5.0 U	< 5.0 U	0.94 J	0.78 JB	< 5.0 U	< 5.0 U	1.1 J	< 5.0 U	< 5.0 U	< 5.0 U
Trichloroethene	µg/L	7.4	7.9	7.5	7.6	7.2	6.4	6.2	7.1	5.8	7.0	9.4	6.2
Vinyl chloride	µg/L	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U
Xylene (total)	µg/L	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U
Total VOCs	µg/L	16.0	16.96	13.0	14.7	16.84	13.78	14.7	13.8	14.2	15.0	17.2	13.4

1 - Analytical method for volatile organic compounds (VOC) analysis is Method 624.

All concentrations in micrograms per liter (µg/L) as reported by the laboratory.

< - Constituent not detected above laboratory reporting limit shown.

U - Constituent not detected above laboratory reporting limit shown.

J - Estimated result less than reporting limit.

B - Compound was found in the trip blank and sample.



Table 5. Monitoring Well Construction Details, RACER Trust, Moraine, Ohio.

Well	Surface Elevation	TOC Elevation	Well Diameter	Screened Interval				Borehole Depth	State Plane Coordinates		Geologic
	ft msl	ft msl	inches	ft bls	ft bls	ft msl	ft msl	ft bls	Northing, y	Easting, x	Modifiers
Upper Aquifer Wells											
W-1-N	737.61	739.02	4	35	70	703	668	70	625116.2043	1483946.9943	UA:TT
W-2-N	729.68	731.68	4	35	60	695	670	60	623865.9104	1483351.6742	UA
W-3-N	731.98	733.66	4	32	57	700	675	57	623695.8796	1483607.3111	UA
W-4-N	729.88	731.63	4	40	65	690	665	65	623651.9134	1483795.0108	UA:TT
HR-1	730.10	732.71	2	47	57	683	673	57	621967.7490	1483378.1275	UA:TT
HR-2	732.62	734.75	2	47	57	686	676	58	623649.3090	1484030.9226	UA:TT
HR-3	734.31	736.75	2	50	60	684	674	61	623612.1403	1484238.0984	UA:TT
HR-4	740.61	742.60	2	55	65	686	676	67	624582.0074	1484003.5860	UA:TT
HR-5	730.95	734.27	2	44	54	687	677	59	623354.8172	1483478.6541	UA:TT
HR-6	730.18	732.66	2	43	53	687	677	59	622588.6622	1483298.8965	UA:TT
HR-7	731.00	731.73	2	47	57	684	674	58	623373.8266	1483168.5266	UA:TT
HR-11	740.90	743.33	2	60	70	681	671	75	625682.4858	1485262.9762	UA
HR-16	724.60	727.01	4	42	62	683	663	70	621167.6648	1482171.8435	UA:TT
HR-17	725.40	726.43	4	27	47	698	678	56	621128.4488	1482780.5158	UA:TT
W-1-S	728.23	729.29	4	25	60	703	668	60	621396.0291	1482990.4046	UA:TT
W-2-S	725.01	726.64	4	30	65	695	660	65	620618.7813	1482078.7622	UA:TT
W-3-S ⁽¹⁾	727.17	729.17	4	36	76	691	651	76	620466.6686	1482207.4451	UA
W-4-S	726.66	727.92	4	30	70	697	657	70	620394.9579	1482564.2035	UA
GM-2 ⁽²⁾	NM	735.81	2	45	55	688	678	55	619586.2208	1483427.9998	UA
4S ⁽²⁾	NM	731.36	4	30	65	699	664	65	619578.3226	1483129.6378	UA
GM-6 ⁽²⁾	NM	730.27	2	35	45	696	686	45	619627.6172	1482930.9571	UA:TT
GM-8	735.17	735.17	2	40	50	695	685	50	619866.4552	1482965.5535	UA:TT
GM-10 ⁽²⁾	NM	723.90	2	40	50	681	671	50	618762.6410	1482667.7306	UA:TT
GM-16 ⁽²⁾	NM	725.30	2	48	58	678	668	58	619420.5576	1482149.1466	UA
GM-17 ⁽²⁾	NM	723.84	2	40	50	684	674	50	619311.8761	1482697.0210	UA:TT
GM-18 ⁽²⁾	NM	723.80	2	45	55	679	669	55	619229.5883	1482505.4542	UA
GM-19S ⁽²⁾	NM	730.92	2	47	57	691	681	57	620339.5683	1483017.2551	UA:TT
GM-21	725.36	725.00	2	45	55	680	670	55	619920.5937	1483764.5951	UA:TT
GM-22	731.84	731.63	2	44	54	688	678	54	620840.4209	1484226.5683	UA:TT
GM-23 ⁽²⁾	NM	731.07	2	24	34	674	664	34	623699.2336	1484619.9213	UA:TUT
GM-24	747.61	747.29	2	58	68	690	680	70	625945.0802	1486991.6971	UA
GM-25	747.05	746.17	2	48	58	699	689	58	622786.2705	1486599.6865	UA:TT



Table 5. Monitoring Well Construction Details, RACER Trust, Moraine, Ohio.

Well	Surface Elevation	TOC Elevation	Well Diameter	Screened Interval				Borehole Depth	State Plane Coordinates		Geologic
	ft msl	ft msl	inches	ft bls	ft bls	ft msl	ft msl	ft bls	Northing, y	Easting, x	Modifiers
Upper Aquifer Wells											
GM-26	722.29	722.29	2	50	60	672	662	60	617729.9788	1482129.0695	UA
GM-27	731.03	730.57	2	40	50	691	681	58	623696.6136	1484630.7659	UA:TT
GM-28 ⁽²⁾⁽³⁾	NM	736.46	2	22	32	715	705	32	623392.3799	1484436.8617	UA:TUT
GM-29	731.31	731.37	2	28	38	703	693	38	623534.4471	1484535.0727	UA:TUT
GM-30 ⁽²⁾⁽⁴⁾	NM	734.79	2	28	38	707	697	38	623876.3465	1484609.5933	UA:TUT
GM-31 ⁽⁴⁾	732.05	732.13	2	51	61	681	671	62	621336.9337	1483965.1322	UA:TT
GM-32	732.47	732.08	2	51	61	681	671	61	620114.2493	1483379.9656	UA:TT
GM-33	730.30	729.77	2	48	58	682	672	58	620761.9955	1483714.2282	UA:TT
GM-34	731.06	730.56	2	26	36	705	695	36	620753.8480	1483727.5719	UA:WT
GM-35	731.56	731.27	2	57	67	675	665	70	620389.3810	1483279.5201	UA:TT
GM-36	731.44	731.11	2	25	35	706	696	35	620383.2312	1483300.8386	UA:WT
GM-37	730.36	730.05	2	46	56	684	674	56	620407.3595	1483456.0282	UA:TT
GM-38	730.31	729.88	2	24	34	706	696	34	620403.1387	1483471.6479	UA:WT
GM-43	729.41	729.00	2	40	50	689	679	54	622192.2046	1483441.3723	UA:TT
GM-44	729.30	728.77	2	51	61	678	668	62	621686.3425	1483331.5124	UA:TT
GM-45	730.03	729.75	2	50	60	680	670	60	621409.1769	1483266.9285	UA:TT
GM-46	728.13	727.79	2	19.8	29.8	708	698	29.8	623393.7601	1484777.0271	UA:TUT
GM-47	727.03	726.75	2	49.4	59.4	678	668	59.4	620060.6143	1482479.3608	UA:TT
GM-48	728.98	728.67	2	63.2	73.2	666	656	73.2	619488.4287	1481740.8154	UA:TT
GM-49	728.28	727.88	2	66.9	76.9	661	651	76.9	618643.7266	1481742.8231	UA:TT
GM-50	727.03	726.56	2	29.7	39.7	697	687	39.7	620065.0482	1482445.8840	UA:WT
GM-51	728.82	728.30	2	34.3	44.3	695	685	44.3	619465.2399	1481753.1472	UA:WT
GM-52	728.16	727.62	2	34	44	694	684	44	618604.5296	1481740.7235	UA:WT
GM-53	730.53	730.35	2	23	33	708	698	33	621184.8324	1484855.6876	UA:TT
GM-55	719.90	719.86	2	25	35	695	685	35	618008.2839	1482441.5719	UA:WT
GM-57 ⁽⁵⁾	719.41	721.74	2	25	35	694	684	35	617724.0851	1482132.1351	UA:WT
GM-59	732.46	732.25	2	25	35	707	697	35	622761.5281	1484712.7729	UA:WT
GM-60	732.46	732.24	2	42	52	690	680	52	622761.3002	1484712.7809	UA:TT
GM-62 ⁽⁶⁾	722.17	722.11	2	50	60	672	662	60	618397.3774	1482818.1330	UA
GM-62R	NM	NM	2	50	60	NA	NA	60	NM	NM	UA
GM-63	726.21	725.79	2	30	40	696	686	40	620283.7218	1482686.3290	UA:WT
GM-64	726.38	725.95	2	50	60	676	666	60	620284.6106	1482681.2885	UA:TT
GM-65S	723.94	723.58	2	42	52	682	672	52	617392.2259	1481382.4271	UA
GM-66	733.50	733.22	2	45	55	688	678	57	622780.3860	1484091.5572	UA:TT
GM-67S	732.54	732.06	2	44	54	689	679	54	623050.0533	1484547.2174	UA:TT
GM-68S	732.48	732.18	2	39.5	49.5	693	683	49.5	622326.2125	1484652.8528	UA:TT
GM-71	737.19	736.82	2	21	31	716	706	37	622633.7567	1485222.9070	UA:TUT



Table 5. Monitoring Well Construction Details, RACER Trust, Moraine, Ohio.

Well	Surface Elevation	TOC Elevation	Well Diameter	Screened Interval				Borehole Depth	State Plane Coordinates		Geologic
	ft msl	ft msl	inches	ft bls	ft bls	ft msl	ft msl	ft bls	Northing, y	Easting, x	Modifiers
Upper Aquifer Wells											
GM-72	737.05	736.78	2	52	62	685	675	67	622633.7567	1485233.9320	UA:TT
GM-74S	732.52	732.17	2	40	50	693	683	50	622444.5430	1484733.8601	UA:TT
GM-75S	738.26	737.69	2	42	52	696	686	52	622790.6745	1485039.3503	UA:TT
GM-76S	739.49	739.00	2	27	37	712	702	37	623538.7809	1485313.4176	UA:TT
GM-77S	741.49	741.14	2	33	43	708	698	43	621576.9342	1485892.0315	UA:TT
GM-78	721.58	721.18	2	40	50	682	672	70	618257.5787	1483035.5947	UA
GM-79	718.54	717.91	2	45	55	674	664	60	618970.9862	1481045.8893	UA:TT
GM-80	716.23	715.82	2	15	25	701	691	25	617951.2997	1480939.3277	UA:WT
GM-81	715.80	715.31	2	50	60	666	656	90	617934.8895	1480934.7439	UA
GM-83S	726.44	725.84	2	44	54	682	672	54	622568.7465	1482112.9569	UA:TT
EAST	NM	730.98	2	NA	NA	NA	NA	71	620545.6947	1483674.2190	UA:TT
WEST	NM	731.08	2	NA	NA	NA	NA	52	620509.6228	1483299.0985	UA:TT
WSU-17	726.93	726.18	2	11.69	66.9	715.2	659.3	67	619558.2279	1482898.5384	UA:TT
WSU-18	734.18	733.52	2	29.2	69.2	705.0	664.3	69	619554.9290	1483096.6469	UA:TT
WSU-19	727.28	726.62	2	33.4	63.4	693.9	663.2	63	619736.8872	1482880.3995	UA:TT
WSU-22	726.21	726.49	2	NA	NA	NA	NA	52	620311.4363	1482687.2293	UA:TT
WSU-23	724.65	724.90	2	NA	NA	NA	NA	58	620381.0854	1481978.6336	UA:TT
WSU-24	725.10	724.82	2	NA	NA	NA	NA	66	619124.1425	1483169.1107	UA:TT
TW-2 ⁽²⁾	NM	733.38	10	35	45	696	686	45	619568.4036	1482942.6663	UA:TT
ME-2 ⁽⁴⁾	732.38	732.08	2	27	37	705	695	37	621327.2669	1484014.6258	UA:WT
ME-3 ⁽⁴⁾	732.23	731.73	2	29	39	703	693	39	621288.3532	1483969.5620	UA:WT
ME-4 ⁽⁴⁾	732.05	732.24	2	26	36	706	696	36	621321.4422	1483952.3693	UA:WT
ME-6 ⁽⁴⁾	733.09	732.68	2	29	39	704	694	39	621706.9517	1484057.0461	UA:WT
MW-1 ⁽⁷⁾	713.60	715.53	2	61.2	71.2	652	642	71.7	621420.6144	1480209.1127	UA:TT
MW-4 ⁽⁷⁾	707.45	707.19	2	19.6	39.6	688	668	40	619035.3250	1478050.0733	UA
MW-5 ⁽⁷⁾	709.59	709.34	2	22.5	42.5	687	667	43	618787.9839	1478971.6197	UA
MW-9 ⁽⁷⁾	713.16	712.85	2	63	73	650	640	73.5	617169.4849	1478747.1452	UA
GM-1	NM	735.74	2	90	100	NA	NA	100	619570.7118	1483421.8130	LA
GM-3	NM	730.44	2	90	100	NA	NA	100	619621.9727	1482926.3542	LA
GM-4	NM	731.46	2	140	150	NA	NA	150	619602.7099	1482922.7333	LA
GM-5	NM	731.29	2	90	100	NA	NA	100	619588.6213	1483126.6107	LA
GM-7R	NM	735.61	2	80	90	NA	NA	91	619863.8298	1482962.1340	LA
GM-9	NM	724.07	2	90	100	NA	NA	100	618771.8670	1482674.1902	LA
GM-11	NM	723.71	2	90	100	NA	NA	100	619318.6270	1482694.0524	LA



Table 5. Monitoring Well Construction Details, RACER Trust, Moraine, Ohio.

Well	Surface Elevation	TOC Elevation	Well Diameter	Screened Interval				Borehole Depth	State Plane Coordinates		Geologic
	ft msl	ft msl	inches	ft bls	ft bls	ft msl	ft msl	ft bls	Northing, y	Easting, x	Modifiers
Lower Aquifer Wells											
GM-13	NM	723.82	2	90	100	NA	NA	100	619239.1943	1482501.6168	LA
GM-14	NM	723.50	2	140	150	NA	NA	150	619244.0886	1482515.5184	LA
GM-15	NM	725.23	2	90	100	NA	NA	100	619427.7004	1482156.5128	LA
GM-19D	NM	730.73	4	145	150	NA	NA	150	620339.8625	1483063.5273	LA
GM-20D	NM	727.26	4	87	92	NA	NA	92	619177.7271	1483236.8889	LA
GM-39	731.15	730.95	2	106	116	625	615	116	623705.5364	1484609.0626	LA
GM-40	727.28	727.04	2	140	150	587	577	150	621693.8055	1483084.8121	LA
GM-41	731.22	733.65	2	104	114	627	617	114	621635.7801	1484818.4021	LA
GM-42	729.48	729.16	2	140	150	589	579	150	620810.1968	1483562.5296	LA
GM-54	730.51	730.29	2	70	80	661	651	80	621182.1891	1484848.6752	LA
GM-56	719.75	719.52	2	75	85	645	635	85	618006.1752	1482448.5647	LA:NTP
GM-58	735.59	735.46	2	72	82	664	654	82	621541.9882	1485308.7468	LA:BT
GM-61	732.48	732.23	2	70	80	662	652	80	622762.6947	1484707.4691	LA:BT
GM-65D	723.83	723.54	2	85	95	639	629	108	617389.5183	1481380.4746	LA:NTP
GM-67D	732.64	732.19	2	70	80	663	653	121	623053.5624	1484533.4779	LA:BT
GM-68D	732.46	732.27	2	64	74	668	658	150	622327.5383	1484645.8862	LA:BT
GM-69	732.42	732.08	2	90	100	642	632	140	621314.8199	1484401.6371	LA
GM-70	737.47	737.19	2	72	82	665	655	120	621944.0370	1485505.8829	LA
GM-73	737.34	736.97	2	85	95	652	642	120	622635.9765	1485216.5022	LA
GM-74D	732.49	732.04	2	69	79	663	653	120	622450.0123	1484735.6502	LA:BT
GM-75D	738.13	737.68	2	85	95	653	643	120	622793.2406	1485027.5873	LA
GM-76D	739.48	738.94	2	70	80	669	659	120	623535.2043	1485312.4245	LA:BT
GM-77D	741.52	740.93	2	75	85	667	657	100	621574.4283	1485889.3662	LA:BT
GM-82	732.55	732.14	2	85	95	648	638	119.5	621972.7146	1484304.7894	LA
GM-83D	726.41	725.77	2	110	120	616	606	120	622568.1953	1482120.4685	LA
GM-84	740.44	739.92	2	96.5	106.5	644	634	120	620619.4561	1485522.1487	LA:BT
RMW-85 ⁽⁸⁾	736.28	736.65	2	85	95	651	641	105	622914.0083	1484978.1674	LA
RMW-86 ⁽⁸⁾	728.85	729.22	2	70	80	659	649	105	620409.7071	1483253.2715	LA:BT
RMW-87 ⁽⁸⁾	727.69	728.01	2	67	77	661	651	100	621671.6198	1483277.4116	LA:BT
RMW-88 ⁽⁸⁾	738.57	739.11	2	90	100	649	639	100	625051.9881	1484580.6683	LA



Table 5. Monitoring Well Construction Details, RACER Trust, Moraine, Ohio.

Well	Surface Elevation	TOC Elevation	Well Diameter	Screened Interval				Borehole Depth	State Plane Coordinates		Geologic
	ft msl	ft msl	inches	ft bls	ft bls	ft msl	ft msl	ft bls	Northing, y	Easting, x	Modifiers
Lower Aquifer Wells											
HR-12	741.00	742.64	4	120	130	621	611	130	625702.3993	1485250.0490	LA
HR-13	733.20	735.03	4	75	85	658	648	85	623616.8315	1484215.3411	LA:BT
HR-14	729.90	731.63	4	78	88	652	642	88	623675.4267	1483782.2839	LA
HR-15	732.10	733.74	4	88	98	644	634	98	623712.7941	1483595.9072	LA
M73C	NM	716.55	NA	NA	NA	NA	NA	NA	618973.2537	1482114.3309	LA
MT69 ⁽⁹⁾	719.84	722.71	8	NA	NA	NA	NA	158	617749.1907	1482121.3945	LA
MT576M	750.00	751.46	5	NA	NA	NA	NA	114	622940.2909	1487799.4686	LA
MT596M*	759.18	757.73	5	NA	NA	NA	NA	89	624057.1091	1488849.1418	LA
DN-13	724.09	727.54	20	110	170	614	554	170	619196.1959	1482267.5426	LA
11B	744.50	742.56	NA	NA	NA	NA	NA	158	622501.4801	1485799.6814	LA
12A	740.86	742.39	18	104	144	637	597	154	622804.0361	1485951.2100	LA
A	NM	739.00	20	155	205	NA	NA	205	624325.4108	1484805.7949	LA
31	NM	734.05	20	90	122	NA	NA	122	623727.4107	1485049.2752	LA
34	NM	733.46	20	107	140	NA	NA	140	622178.4664	1485017.7925	LA
39	NM	732.07	20	117	142	NA	NA	145	623442.4628	1484987.5777	LA
44	733.91	734.62	24	128	166	606	568	NA	624519.7322	1483988.8824	LA
FW-1A	NM	739.89	24	105	166	NA	NA	169	625357.5160	1486090.3366	LA
FW-2	NM	737.48	20	NA	150	NA	NA	160	622516.4369	1485616.6642	LA
FW-3	NM	739.26	20	NA	141	NA	NA	200	622675.0394	1484968.9430	LA
FW-4	NM	731.62	14	NA	136	NA	NA	160	620605.0473	1484338.1137	LA

TOC - Top of Casing.

ft msl - Feet Above Mean Sea Level.

ft bls - Feet Below Land Surface.

(1) - Ground surface elevation estimated based on a 2-foot height of outer casing stick-up.

(2) - Elevations estimated.

(3) - Well flush mount damaged and obstructed at depth.

(4) - Depth of screened interval and total well depth have been modified from the well log due to site construction.

(5) - Well above grade construction damaged in 2011.

(6) - Well Abandoned in 2011 and replaced with GM-62R in 2013.

(7) - City of Moraine Monitoring Wells.

(8) - TOC Elevation is calculated based on adjacent well elevations and field measurements on November 26, 2012.

(9) - Well unusable - collapsed screen.

* Measuring point is top of cement housing.

Site coordinates based on site-specific benchmarks.

State plane coordinates in NAD 83 Ohio South.

UA - Upper Aquifer.

LA - Lower Aquifer.

TT - Top of Till (regional clay till).

TUT - Top of Upper Till (upper clay till).

BT - Below Till (regional clay till).

NTP - No Till Present.

NA - Not Available.

NM - Not Measured.

WT - Water Table (screened across the watertable interface).



Table 6. Groundwater Level Measurements Collected During 2013, RACER Trust, Moraine, Ohio.

Well	Measuring Point Elevation	Depth-to-Water (feet)	Total Depth (feet)	Groundwater Elevation (AMSL)
Upper Aquifer Wells				
W-1-N	739.02	29.91	73.60	709.11
W-2-N	731.68	22.98	60.30	708.70
W-3-N	733.66	24.98	51.60	708.68
W-4-N	731.63	22.87	67.50	708.76
HR-1	732.71	24.88	59.70	707.83
HR-2	734.75	25.92	59.00	708.83
HR-3	736.75	27.91	62.90	708.84
HR-4	742.60	33.44	67.20	709.16
HR-5	734.27	25.69	58.10	708.58
HR-6	732.66	24.69	55.80	707.97
HR-7	731.73	23.37	57.50	708.36
HR-11	743.33	33.54	69.08	709.79
HR-16	727.01	19.91	67.10	707.10
HR-17	726.43	19.02	50.00	707.41
W-1-S	729.29	21.64	60.00	707.65
W-2-S	726.64	20.04	69.10	706.60
W-3-S	729.17	22.48	74.70	706.69
W-4-S	727.92	20.93	51.90	706.99
GM-2	735.81	28.69	56.50	707.12
4S	731.36	24.53	66.25	706.83
GM-6	730.27	23.67	46.40	706.60
GM-8	735.17	28.58	51.55	706.59
GM-10	723.90	17.57	49.50	706.33
GM-16	725.30	19.05	57.50	706.25
GM-17	723.84	17.38	49.45	706.46
GM-18	723.80	17.47	54.30	706.33
GM-19S	730.92	23.68	56.23	707.24
GM-21	725.00	17.75	54.90	707.25
GM-22	731.63	23.53	56.80	708.10
GM-23	731.07	22.10	31.90	708.97
GM-24	747.29	36.93	67.70	710.36
GM-25	746.17	36.98	56.00	709.19
GM-26	722.29	16.33	58.30	705.96
GM-27	730.57	21.54	46.90	709.03
GM-28	736.46	27.67	36.50	708.79
GM-29	731.37	22.34	33.10	709.03
GM-30	734.79	25.64	36.30	709.15
GM-31	732.13	24.37	63.10	707.76
GM-32	732.08	24.90	56.75	707.18
GM-33	729.77	22.16	54.80	707.61
GM-34	730.56	22.93	35.40	707.63
GM-35	731.27	24.12	66.40	707.15
GM-36	731.11	23.85	34.60	707.26



Table 6. Groundwater Level Measurements Collected During 2013, RACER Trust, Moraine, Ohio.

Well	Measuring Point Elevation	Depth-to-Water (feet)	Total Depth (feet)	Groundwater Elevation (AMSL)
Upper Aquifer Wells				
GM-37	730.05	22.50	34.50	707.55
GM-38	729.88	22.68	57.70	707.20
GM-43	729.00	21.09	49.80	707.91
GM-44	728.77	21.14	61.30	707.63
GM-45	729.75	21.51	60.30	708.24
GM-46 ¹	727.79	NM	NM	NA
GM-47	726.75	20.27	59.35	706.48
GM-48	728.67	22.47	44.70	706.20
GM-49	727.88	22.31	75.30	705.57
GM-50	726.56	20.12	39.55	706.44
GM-51	728.30	22.72	73.30	705.58
GM-52	727.62	22.04	43.90	705.58
GM-53	730.35	22.18	32.50	708.17
GM-55	719.86	13.83	35.30	706.03
GM-57 ²	NM	16.43	36.80	NA
GM-59	732.25	23.61	34.41	708.64
GM-60	732.24	23.60	50.43	708.64
GM-62 ³	NM	NM	NM	NA
GM-63	725.79	19.06	39.20	706.73
GM-64	725.95	19.25	58.30	706.70
GM-65S	723.58	18.42	52.00	705.16
GM-66	733.22	24.83	54.20	708.39
GM-67S	732.06	23.38	53.63	708.68
GM-68S	732.18	23.65	49.19	708.53
GM-71	736.82	28.04	61.50	708.78
GM-72	736.78	28.04	32.12	708.74
GM-74S	732.17	23.53	48.87	708.64
GM-75S	737.69	29.00	51.90	708.69
GM-76S	739.00	29.78	36.70	709.22
GM-77S	741.14	32.43	42.20	708.71
GM-78	721.18	14.63	49.80	706.55
GM-79	717.91	12.59	54.60	705.32
GM-80	715.82	10.86	24.60	704.96
GM-81	715.31	10.28	59.90	705.03
GM-83S	725.84	17.75	53.30	708.09
EAST	730.98	23.38	72.00	707.60
WEST	731.08	23.64	52.40	707.44
WSU-17	726.18	19.53	65.35	706.65
WSU-18	733.52	26.75	60.80	706.77
WSU-19	726.62	21.51	63.85	705.11
WSU-23 ¹	724.90	NM	NM	NA
WSU-24	724.82	17.96	65.30	706.86
TW-2	733.38	21.18	55.90	712.20
ME-2	732.08	NM	NM	NA
ME-3	731.73	23.95	36.60	707.78
ME-4	732.24	24.52	27.70	707.72
ME-6	732.68	25.00	35.50	707.68



Table 6. Groundwater Level Measurements Collected During 2013, RACER Trust, Moraine, Ohio.

Well	Measuring Point Elevation	Depth-to-Water (feet)	Total Depth (feet)	Groundwater Elevation (AMSL)
Lower Aquifer Wells				
GM-1	735.74	28.88	102.05	706.86
GM-3	730.44	24.01	100.15	706.43
GM-4	731.46	24.99	137.50	706.47
GM-5	731.29	24.71	101.10	706.58
GM-7R	735.61	28.76	91.80	706.85
GM-9	724.07	17.95	99.50	706.12
GM-11	723.71	17.60	99.00	706.11
GM-13	723.82	18.06	99.00	705.76
GM-14	723.50	17.74	148.70	705.76
GM-15	725.23	19.68	99.90	705.55
GM-19D	730.73	23.48	148.00	707.25
GM-20D	727.26	20.18	100.80	707.08
GM-39	730.95	21.87	116.70	709.08
GM-40	727.04	19.78	149.50	707.26
GM-41	733.65	25.39	116.15	708.26
GM-42	729.16	22.09	150.20	707.07
GM-54	730.29	22.01	79.08	708.28
GM-56	719.52	13.55	88.10	705.97
GM-58	735.46	26.89	81.60	708.57
GM-61	732.23	23.54	78.28	708.69
GM-65D	723.54	18.42	95.30	705.12
GM-67D	732.19	23.46	79.30	708.73
GM-68D	732.27	23.74	74.40	708.53
GM-69	732.08	24.20	100.80	707.88
GM-70	737.19	28.42	81.65	708.77
GM-73	736.97	28.08	95.55	708.89
GM-74D	732.04	23.46	78.90	708.58
GM-75D	737.68	28.81	94.80	708.87
GM-76D	738.94	29.76	80.30	709.18
GM-77D	740.93	32.10	86.20	708.83
GM-82	732.14	24.05	96.20	708.09
GM-83D	725.77	18.47	121.90	707.30
GM-84	739.92	31.75	106.85	708.17
RMW-85 ⁴	736.65	27.74	95.40	708.91
RMW-86 ⁴	729.22	22.26	80.20	706.96
RMW-87 ⁴	728.01	20.52	77.30	707.49
RMW-88 ⁴	739.11	29.65	102.70	709.46
HR-12	742.64	32.84	130.15	709.80
HR-13	735.03	26.12	87.90	708.91
HR-14	731.63	22.94	90.50	708.69
HR-15	733.74	25.19	102.30	708.55
M73C	716.55	10.94	191.00	705.61
MT576M ¹	751.46	NM	NM	NA
MT596M	757.73	46.87	71.45	710.86

Table 6. Groundwater Level Measurements Collected During 2013, RACER Trust, Moraine, Ohio.

Well	Measuring Point Elevation	Depth-to-Water (feet)	Total Depth (feet)	Groundwater Elevation (AMSL)
Production and Fire Wells				
DN-13 (County Well) [ON]	727.78	NM	NM	NA
11B	742.56	33.74	NM	708.82
12A	742.39	33.36	NM	709.03
31 ¹	734.05	NM	NM	NA
34	733.46	24.85	136	708.61
39	732.07	22.93	NM	709.14
A	739.00	28.23	172	710.77
FW-1A	739.89	31.00	NM	708.89
FW-2	737.48	28.50	NM	708.98
FW-3	739.26	30.37	NM	708.89
FW-4	731.62	24.11	NM	707.51
Stream Gauge*				
SG1 ¹	747.64	NM	NA	NM
SG2	709.95	3.40	NA	706.55
SG3	718.45	7.10	NA	711.35
SG4	714.78	6.33	NA	708.45
SG5 ¹	711.10	NM	NA	NM
SG6	723.21	15.72	NA	707.49
SG7	731.55	15.57	NA	715.98
IRZ Wells				
RZ-3MM	726.92	19.72	48.60	707.20
RZ-4A	725.71	18.42	55.20	707.29
RZ-4D	727.07	19.90	54.20	707.17
RZ-4L	727.54	20.71	59.40	706.83
Moraine City				
MW-1	715.53	10.13	72.6	705.40
MW-4	707.19	6.05	37.10	701.14
MW-5	709.34	6.48	14.20	702.86
MW-9	712.85	10.66	72.00	702.19

Measuring point is to top of the well casing or surveyed measuring point.

Groundwater elevations are reported in feet above mean sea level (AMSL).

Groundwater levels were measured on September 23 to 24, 2013 using an electronic water level indicator (more than one meter was used and groundwater elevations reflect a calibration factor).

Groundwater level measurements are reported in feet below the measuring point.

1 - Well could not be located.

2 - Well damaged.

3 - Well was abandoned (GM-62) or damaged (GM-57) by ODOT during reconstruction of I 75 interchange.

4 - TOC Elevation is calculated based on adjacent well elevations and field measurements on November 26, 2012.

NM - Not Measured.

NA - Not Applicable.

*Surface water measurement.



Table 7. Summary of Precipitation Measurements Recorded by the National Weather Service, During 2013 - Dayton, Ohio.

Date	Actual Precipitation	Average Precipitation	Departure from Average
January	3.10	2.59	0.51 Above
February	1.29	2.14	0.85 Below
March	3.16	3.23	0.07 Below
April	3.76	3.88	0.12 Below
May	2.99	4.23	1.24 Below
June	3.12	4.01	0.89 Below
July	3.58	3.72	0.14 Below
August	1.38	3.02	1.64 Below
September	2.23	2.97	0.74 Below
October	5.74	2.62	3.12 Above
November	1.60	3.05	1.45 Below
December	4.58	2.94	1.64 Above
2013 Total	36.53	38.4	1.87 Below

All precipitation measurements are reported in inches.

Average precipitation Information obtained from the NOAA Website (<http://www7.ncdc.noaa.gov/IPSLcd/lcd.html>)

Table 8. Horizontal Gradients for Upper/Lower Aquifer Well Pairs in 2013, RACER Trust Moraine, Ohio.

Average Hydraulic Gradients for Upper Well Pairs	Horizontal Gradients - September 23 and 24, 2013
W-2-N/W-1-S	4.2E-04
W-3-N/HR-1	4.9E-04
HR-5/HR-1	5.5E-04
HR-6/W-1-S	2.6E-04
HR-4/HR-1	5.5E-04
HR-7/W-1-S	3.6E-04
W-3-N/HR-6	6.2E-04
HR-5/W-1-S	4.7E-04
HR-6/W-4-S	4.2E-04
HR-1/GM-16	5.6E-04
GM-75S/GM-68S	2.7E-04
GM-53/4S	5.6E-04
Average Hydraulic Gradient	4.6E-04
Average Hydraulic Gradients for Upper Well Pairs (former Oil House Area)	
GM-30/GM-28	6.9E-04
GM-23/GM-28	NU
GM-29/GM-28	1.4E-03
GM-30/GM-29	3.4E-04
GM-23/GM-29	NU
GM-30/GM-23	NU
Average Hydraulic Gradient	8.0E-04
Average Hydraulic Gradient for all Upper Well Pairs	
	6.3E-04
GM-58/GM-20D	4.7E-04
GM-39/GM-1	5.2E-04
HR-15/GM-3	5.1E-04
HR-14/GM-5	5.1E-04
GM-67D/RMW-87	6.5E-04
Average Hydraulic Gradient for Lower Wells	5.3E-04

NU - Not used for report. GM-23 water level not compensated for product of unknown density.

Note: All gradients in feet per feet.

Table 9. Vertical Gradients for Upper/Lower Aquifer Well Pairs in 2013, RACER Trust Moraine, Ohio.

Upper/Lower Aquifer Wells	Vertical Gradients - September 23 and 24, 2013	
	Direction	Gradient (ft/ft)
<u>Upgradient</u>		
HR-11/HR-12	D	1.7E-04
<u>On-Site</u>		
W-3-N/HR-15	D	-2.7E-03
W-4-N/HR-14	D	-2.3E-03
HR-3/HR-13	U	2.8E-03
GM-2/GM-1	D	-5.8E-03
GM-6/GM-3	D	-3.1E-03
4S/GM-5	D	-5.3E-03
GM-68S/GM-68D	U	1.2E-04
GM-75S/GM-75D	U	4.2E-03
<u>Former Oil House Area</u>		
GM-23/GM-27 ⁽¹⁾	NA	NU
GM-23/GM-39	NA	NU
<u>Off-Site/Downgradient</u>		
GM-10/GM-9	D	-4.2E-03
GM-16/GM-15	D	-1.7E-02
GM-18/GM-13	D	-1.3E-02
GM-17/GM-11	D	-7.0E-03
GM-55/GM-56	D	-1.3E-03
GM-65S/GM-65D	D	-9.3E-04

(1) - Vertical gradient from upper aquifer above the upper clay till (GM-23) to the upper aquifer below the upper clay till.

NU - Not used for report. GM-23 water level not compensated for product of unknown density.

D - Downward gradient (-).

U - Upward gradient (+).

NA - Not applicable.

Note: All gradients in feet per feet.

Table 10. Lower Aquifer Triangular Irregular Network Horizontal Hydraulic Gradients in 2013, RACER Trust, Moraine, Ohio.

TIN Cell	Monitoring Well Groundwater Elevations (ft. AMSL)			Hydraulic Gradient	Flow Direction Azimuth (degrees)
TIN A	GM-19D	GM-4	GM-1	1.2E-03	227
	707.25	706.47	706.86		
TIN B	GM-1	GM-4	GM-20D	1.2E-03	321
	706.86	706.47	707.08		
TIN C	GM-4	GM-20D	GM-14	1.8E-03	273
	706.47	707.08	705.76		
TIN D	GM-14	GM-20D	GM-9	1.8E-03	275
	705.76	707.08	706.12		
TIN E	GM-9	GM-14	M73C	8.9E-04	306
	706.12	705.76	705.61		
TIN F	GM-4	GM-14	GM-15	1.3E-03	219
	706.47	705.76	705.55		
TIN G	GM-19D	GM-15	GM-4	1.3E-03	221
	707.25	705.55	706.47		

TIN - Triangular irregular network.

ft. - Feet.

AMSL- Above mean sea level.



Table 11. Site-Wide Groundwater Monitoring Program for 2014, RACER Trust, Moraine, Ohio.

Upper aquifer monitoring wells to be sampled in 2014:

W-1-N	HR-4	TW-2	GM-23	GM-35	GM-59	GM-80
W-2-N	HR-7	GM-2	GM-26	GM-43	GM-60	
W-3-N	HR-16	GM-16	GM-28**	GM-47	GM-63	
W-4-N	HR-17	GM-6	GM-29	GM-50	GM-65S	
HR-1	W-2-S	GM-8	GM-30	GM-51	GM-75S	
HR-2	W-3-S	GM-19S	GM-31	GM-52	GM-78	
HR-3	W-4-S	GM-21	GM-32*	GM-55	GM-79	

Lower aquifer monitoring wells to be sampled in 2014:

HR-12	GM-9	GM-19D	GM-68D	GM-83D	RMW-86
HR-15	GM-11	GM-20D	GM-75D	GM-84	RMW-87
DN-13	GM-15	GM-54	GM-77D	RMW-85	RMW-88

Notes:

* Upper aquifer monitoring well GM-32 will be sampled for total organic carbon only.

**Upper aquifer monitoring well GM-28 will not be included in the 2014 Site-Wide Groundwater Monitoring Program due to an existing obstruction in the well that has prohibited the collection of a sample from that well since 2011.

Rationale for the selection of the upper and lower aquifer monitoring wells is included in Table 21 of the "Site-Wide Groundwater Monitoring Report for 2008, General Motors Corporation, Moraine, Ohio" (ARCADIS, Inc. 2009). Removal and addition of monitor wells to the program are discussed below.

Upper aquifer monitoring wells HR-1, HR-16, and GM-63 are included due to increased concentrations at HR-17 and W-4-S that were not attributed to the closed South Settling Lagoon.

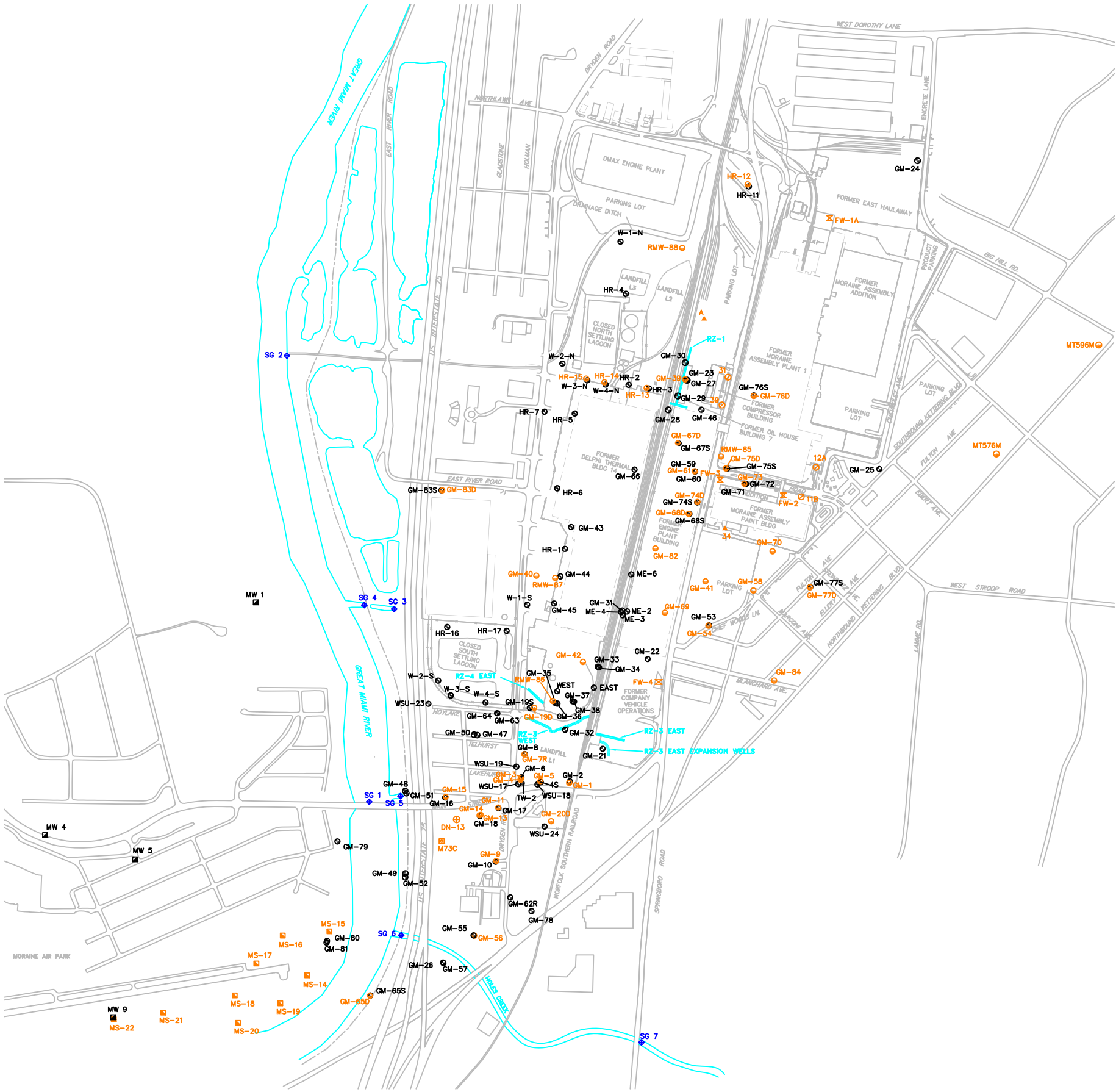
Upper aquifer monitoring wells HR-3, GM-30, GM-31, and GM-51 are included due to the observed increase in volatile organic compound concentrations observed during the 2013 Annual Site-Wide Groundwater Monitoring Program.

Upper aquifer monitoring wells HR-8 and HR-9 were removed due to accessibility. These wells were replaced with upper aquifer monitoring well W-1-N.

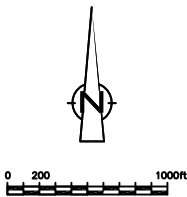
Lower aquifer monitoring well HR-10 was removed due to accessibility. This well was replaced with lower aquifer monitoring well RMW-88.

Lower aquifer monitoring wells GM-40 and GM-42 were removed and replaced with RMW-86 and RMW-87 due to the well depths of GM-40 and GM-42. RMW-86 and RMW-87 are shallower and better positioned to monitor lower aquifer plume migration.

Lower aquifer monitoring well RMW-85 is included due to its proximity to the lower aquifer source area.



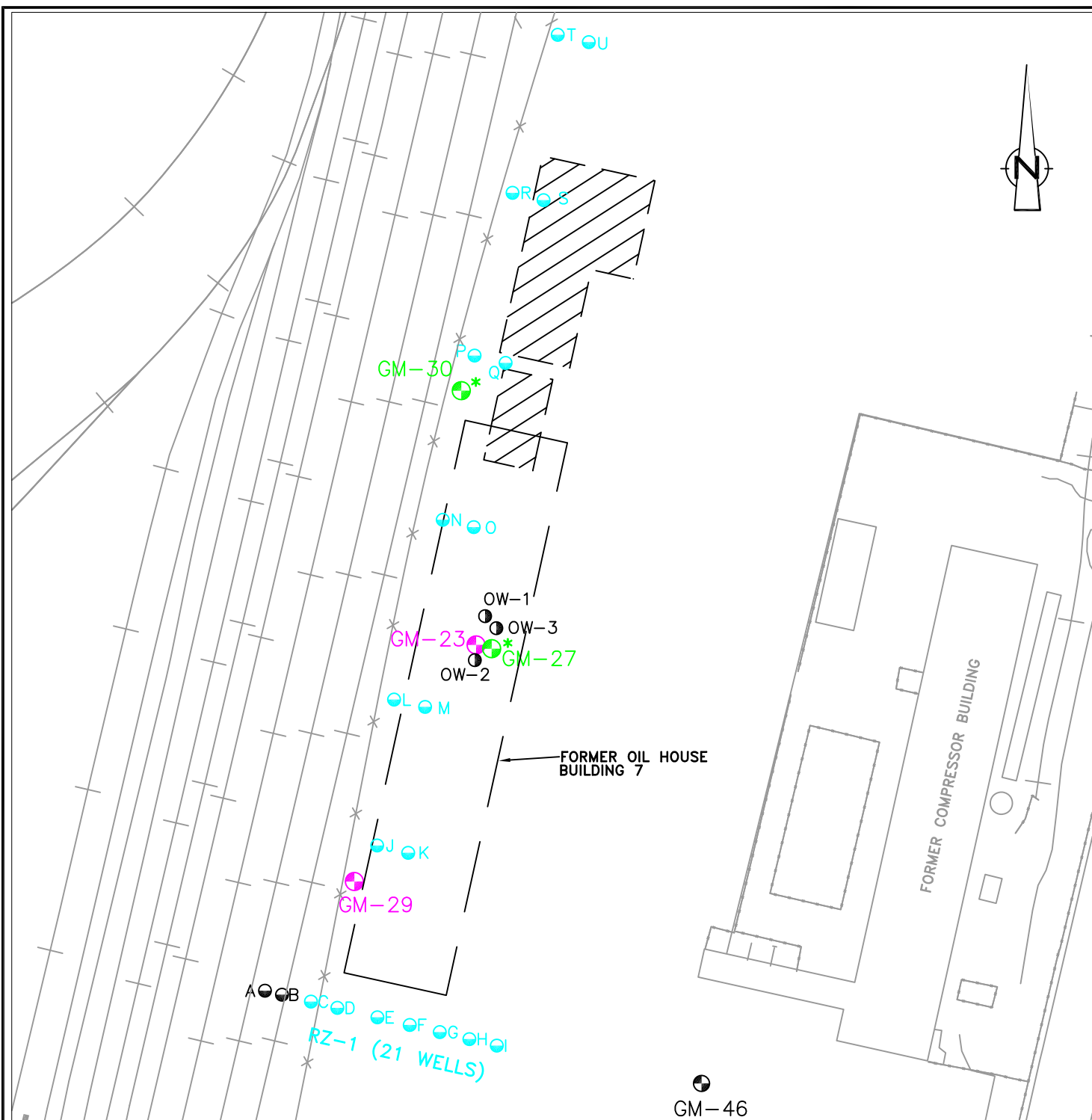
- LEGEND**
- MONITORING WELL (UPPER AQUIFER)
 - INACTIVE RECOVERY WELL (TW-2)
 - MONITORING WELL (LOWER AQUIFER)
 - PIEZOMETER
 - CARBON SOURCE INTRODUCTION WELLS, REACTIVE ZONES (RZ-1, RZ-3, AND RZ-4)
 - ⊗ FIRE WELL
 - ▲ PRODUCTION WELL CONVERTED TO MONITORING WELL (34, A)
 - INACTIVE PRODUCTION WELL (31, 39, 11B, 12A)
 - ⊕ MONTGOMERY COUNTY WELL (USED BY RACER TRUST AS A LOWER AQUIFER RECOVERY WELL)
 - MONTGOMERY COUNTY WELL (INACTIVE MIAMI SHORES WELL FIELD - DAYTON PRIMARY PUBLIC SUPPLY BACKUP)
 - ◆ STREAM GAUGE
 - RIVER LEVEE
 - CITY OF MORaine MONITORING WELL
 - FORMER BUILDING FOOTPRINT
 - SURFACE WATER FEATURE
- NOTES:**
1. ORANGE INDICATES LOWER AQUIFER WELLS.
 2. BLACK INDICATES UPPER AQUIFER WELLS.



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SITE-WIDE CORRECTIVE MEASURES





LEGEND

- ② MONITORING WELL USED FOR SITE-WIDE ON AN ANNUAL BASIS (UPPER AQUIFER)
- ②* MONITORING WELL USED FOR SITE-WIDE MONITORING ON A FIVE-YEAR BASIS (UPPER AQUIFER)
- ② CARBON SOURCE INTRODUCTION WELL
- ② INACTIVE CARBON SOURCE INTRODUCTION WELL
- ② OXIDATION WELLS (INACTIVE)
- ② MONITORING WELL (UPPER AQUIFER)
- ② APPROXIMATE LOCATION OF FORMER MORaine ENGINE TANK FARM
- ② MONITORING WELL UTILIZED FOR PERFORMANCE MONITORING

0 150 FT



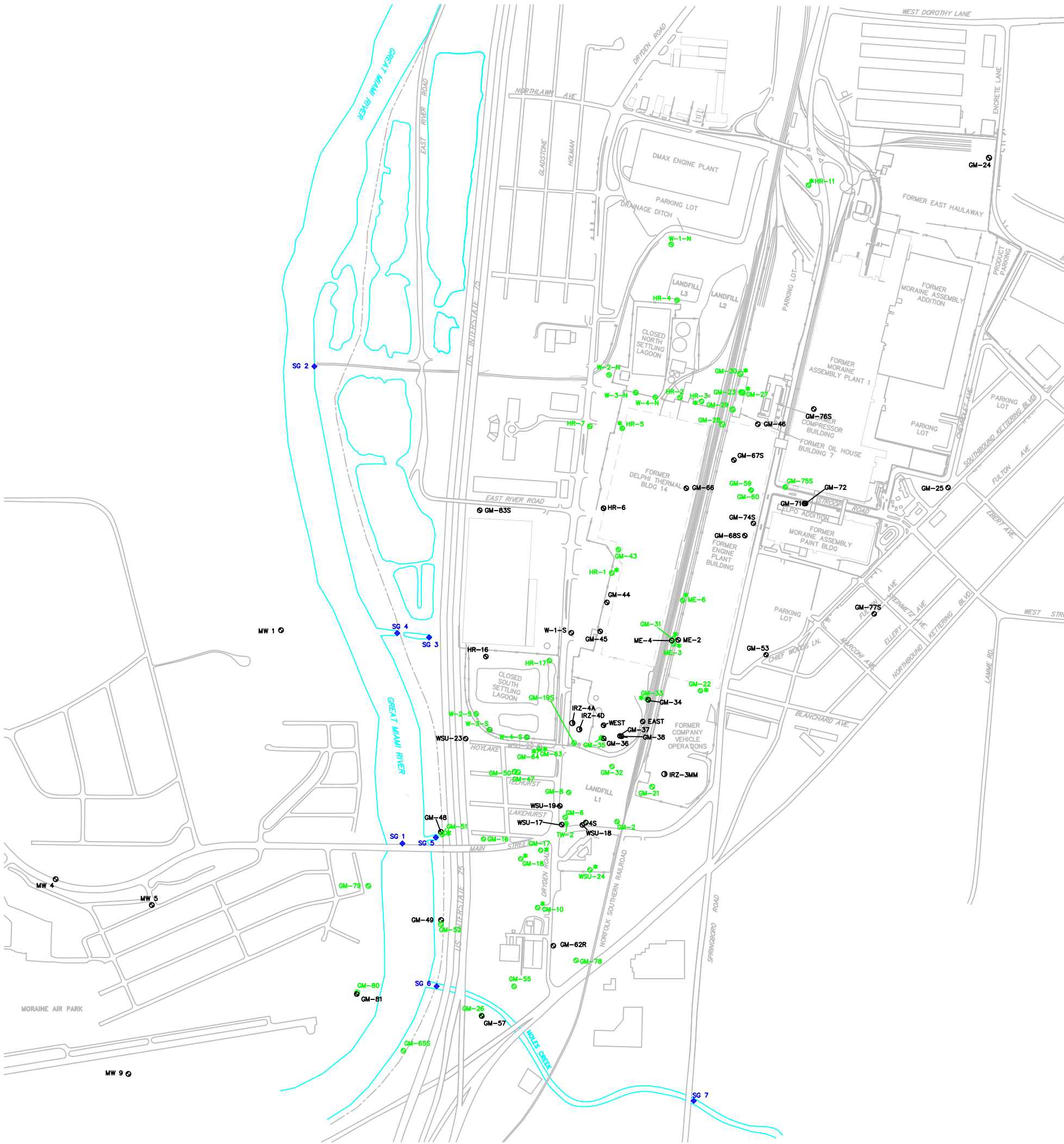
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REACTIVE ZONE #1



FIGURE

3



0 200 1000ft

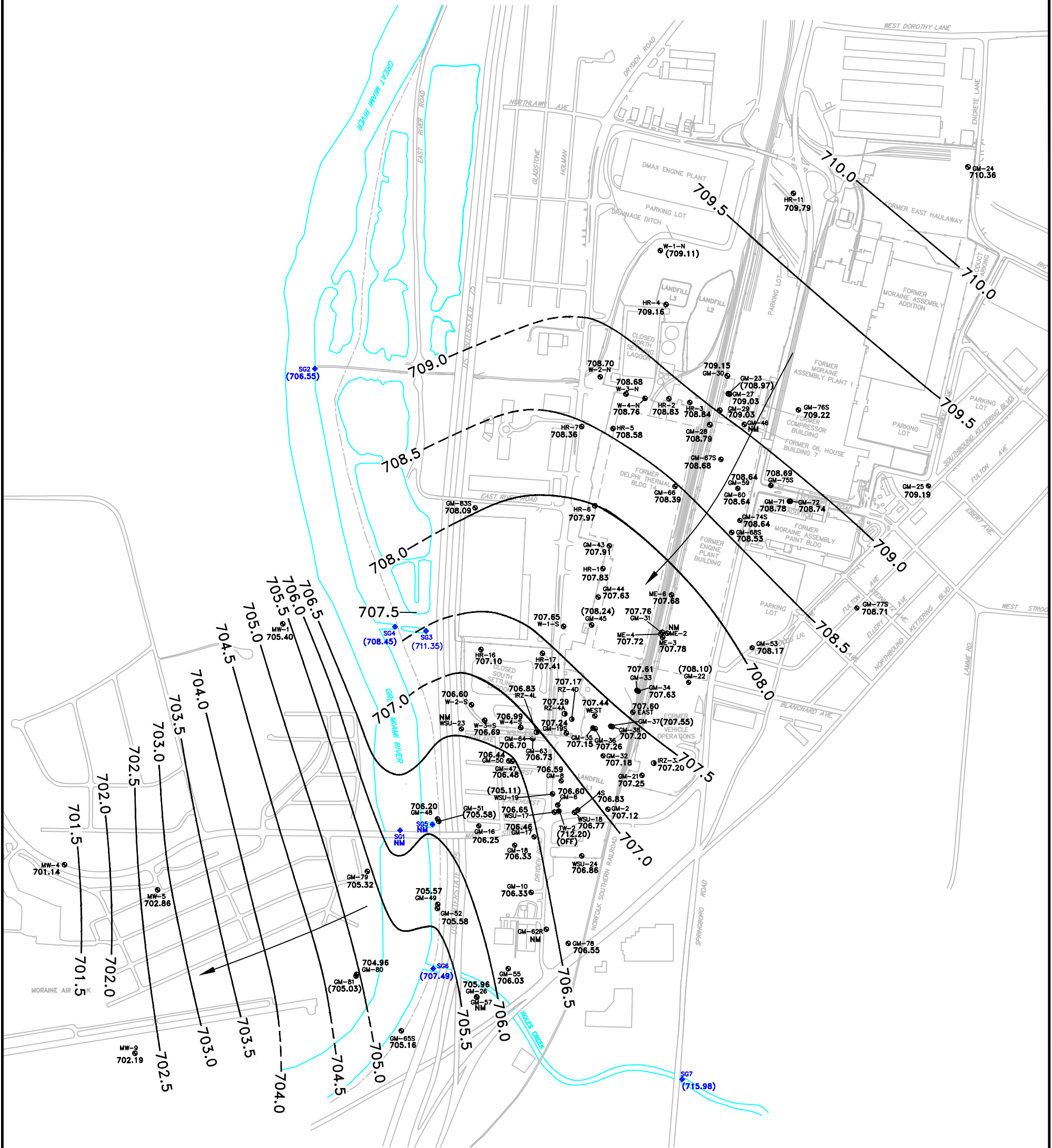
LEGEND

- MONITORING WELL (UPPER AQUIFER)
- INACTIVE RECOVERY WELL (USED FOR SITE-WIDE MONITORING)
- STREAM GAUGE
- CARBON INTRODUCTION WELL
- MONITORING WELL USED FOR SITE-WIDE MONITORING ON AN ANNUAL BASIS (UPPER AQUIFER)
- MONITORING WELL USED FOR SITE-WIDE MONITORING ON A FIVE-YEAR BASIS (UPPER AQUIFER)
- FORMER BUILDING FOOTPRINT
- RIVER LEVEE
- SURFACE WATER FEATURE

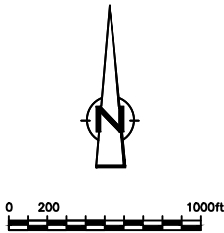
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UPPER AQUIFER MONITORING WELLS
FOR SITE-WIDE GROUNDWATER
MONITORING

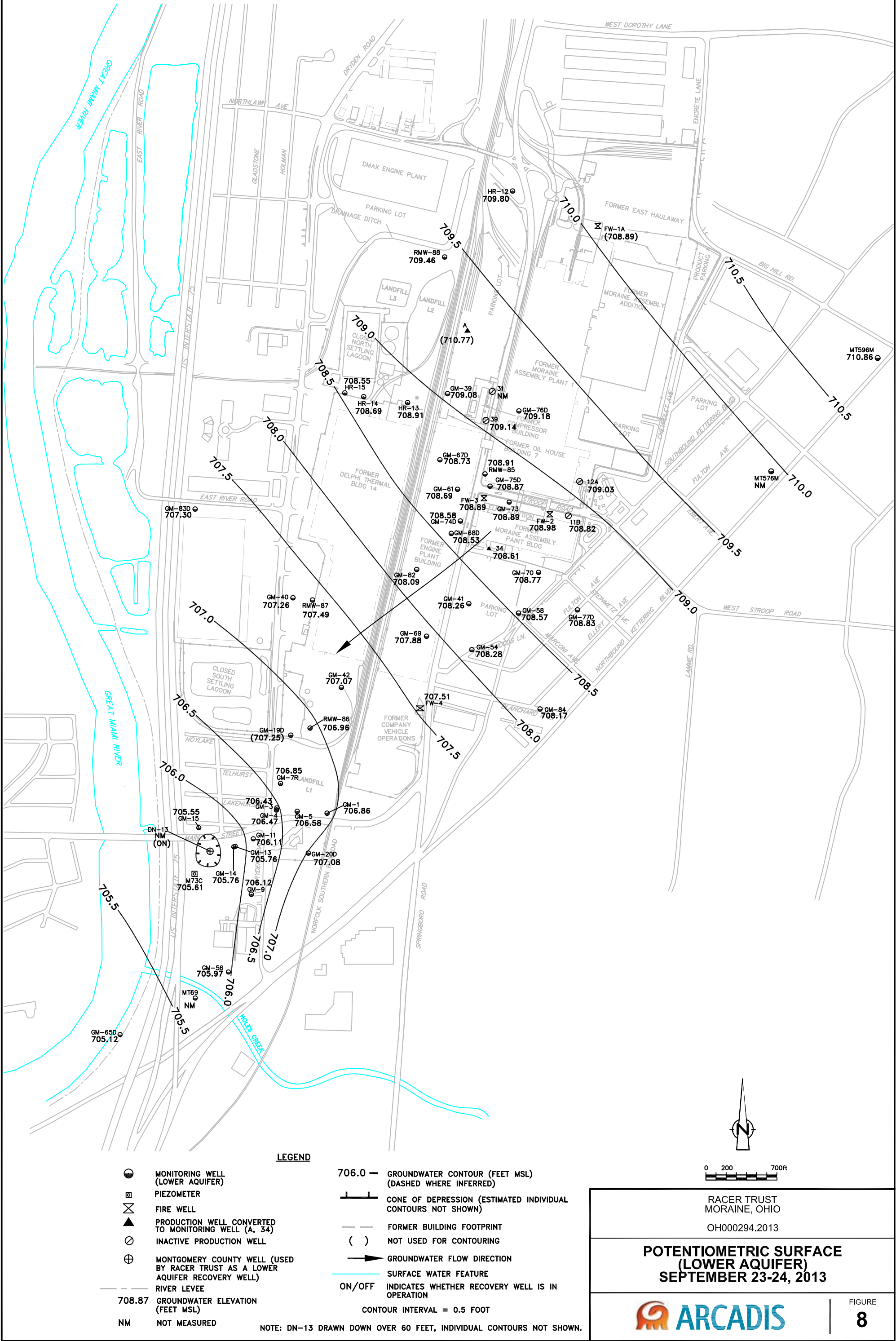




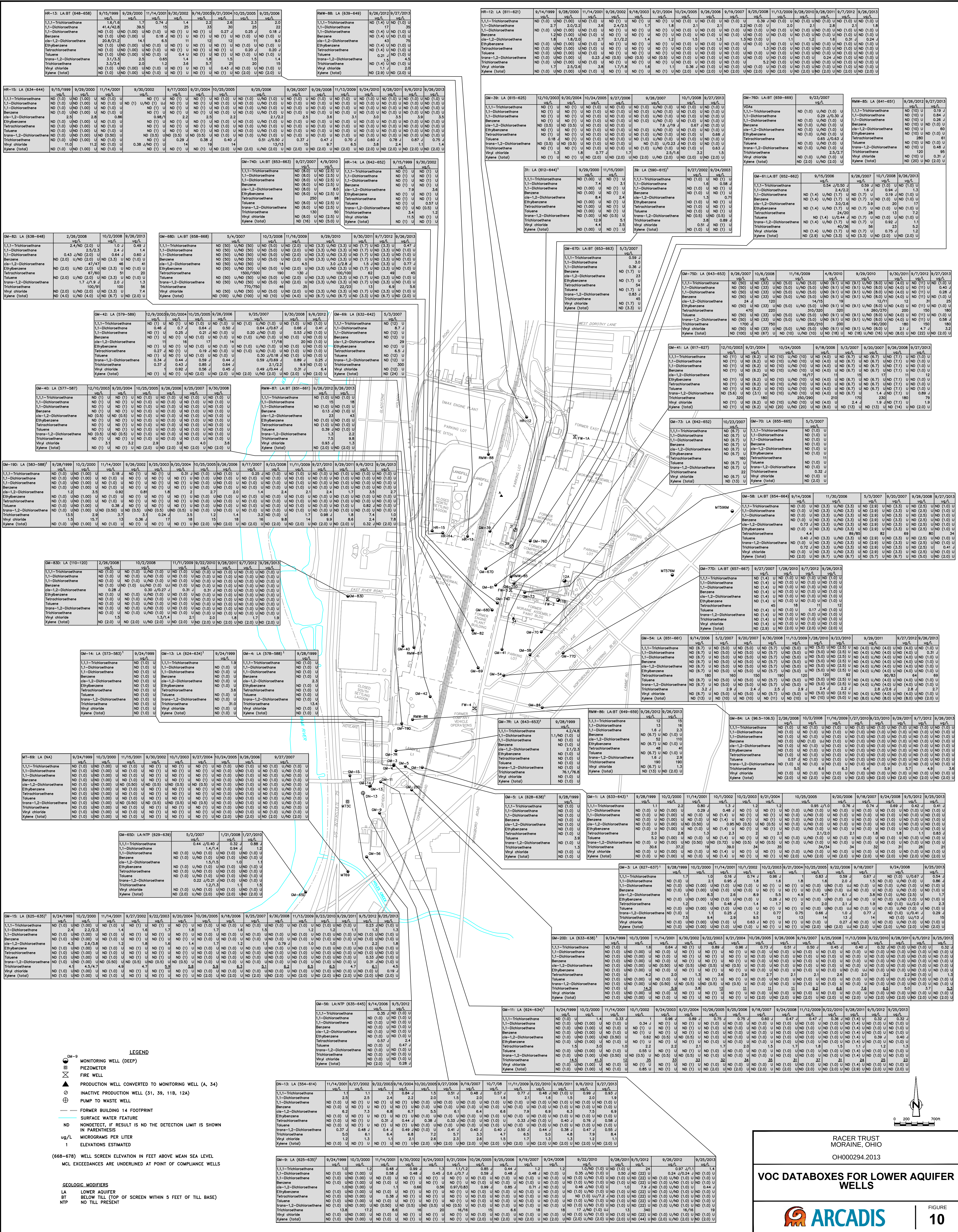
- LEGEND**
- MONITORING WELL (UPPER AQUIFER)
 - INACTIVE RECOVERY WELL (TW-2)
 - ◆ 707.94 STREAM GAUGE AND STREAM GAUGE MEASUREMENT; NOT USED FOR CONTOURING
 - CARBON INTRODUCTION WELL
 - RIVER LEVEE
 - 701.36 GROUNDWATER ELEVATION (FEET MSL)
 - 706.0 — GROUNDWATER CONTOUR (FEET MSL) (DASHED WHERE INFERRED)
 - () NOT USED FOR CONTOURING
 - NM NOT MEASURED
 - FLOW DIRECTION
 - ON/OFF INDICATES WHETHER RECOVERY WELL IS IN OPERATION
 - FORMER BUILDING FOOTPRINT
 - SURFACE WATER FEATURE
 - CONTOUR INTERVAL = 0.5 FOOT

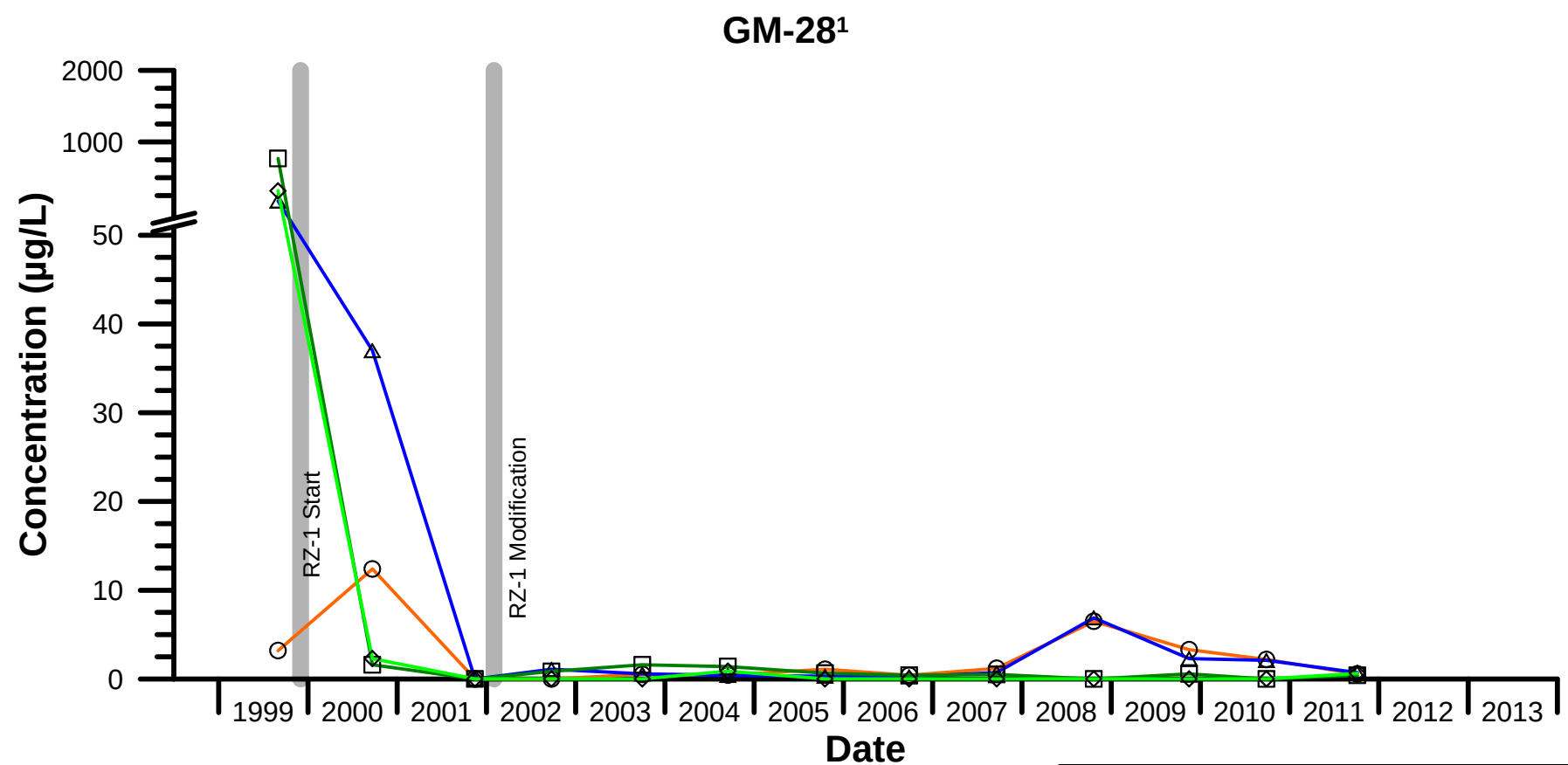
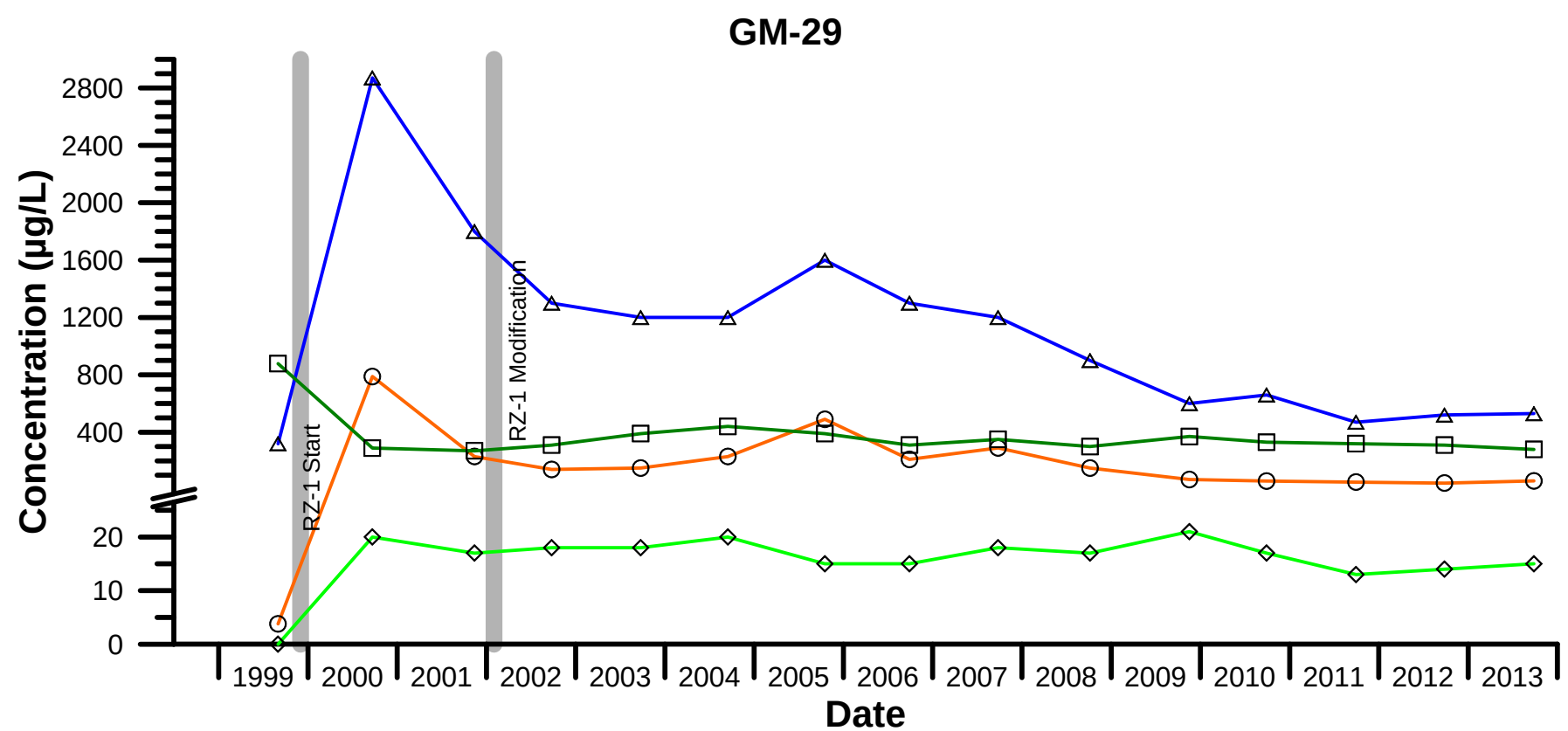
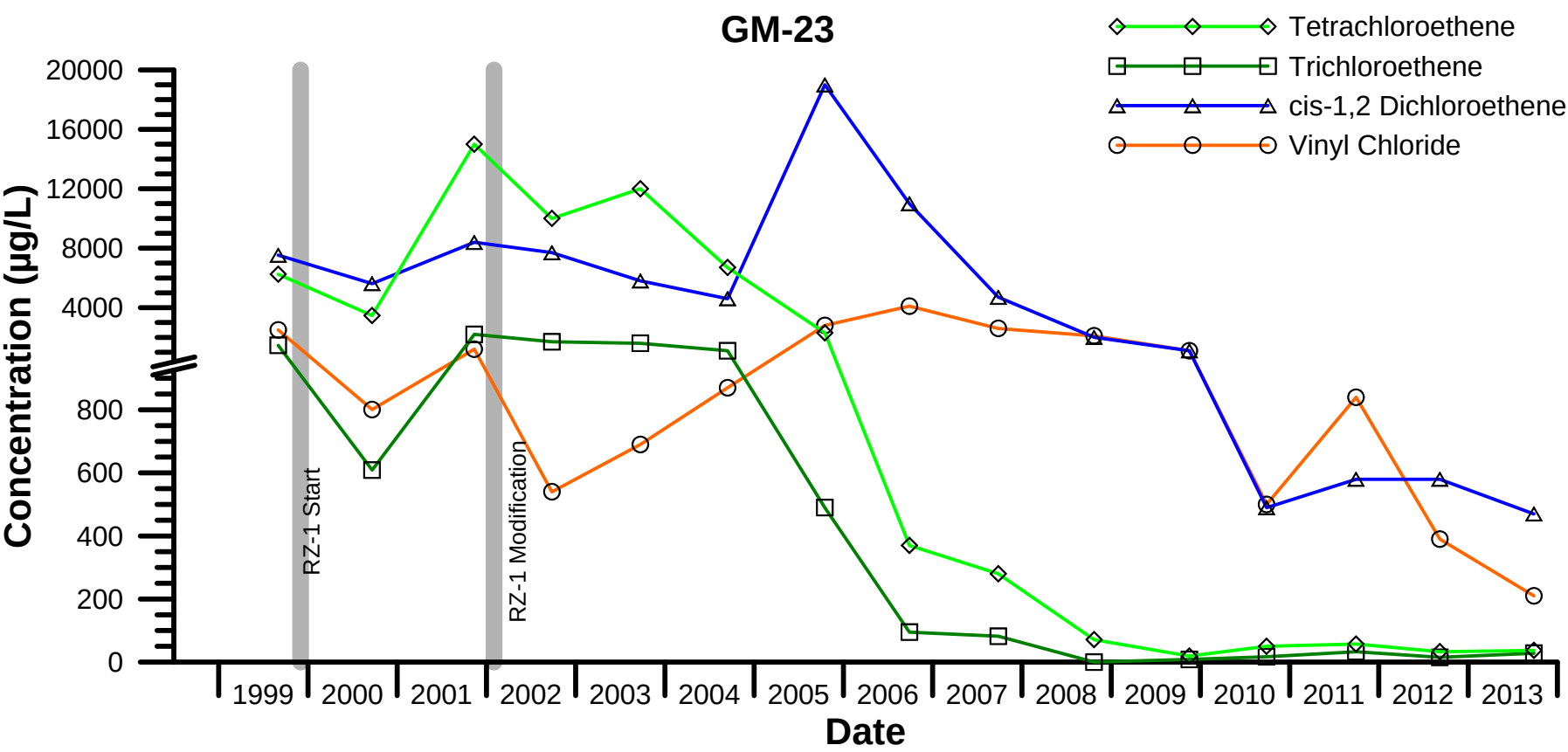


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POTENTIOMETRIC SURFACE (UPPER AQUIFER) SEPTEMBER 23-24, 2013	
	FIGURE 7



[illegible]



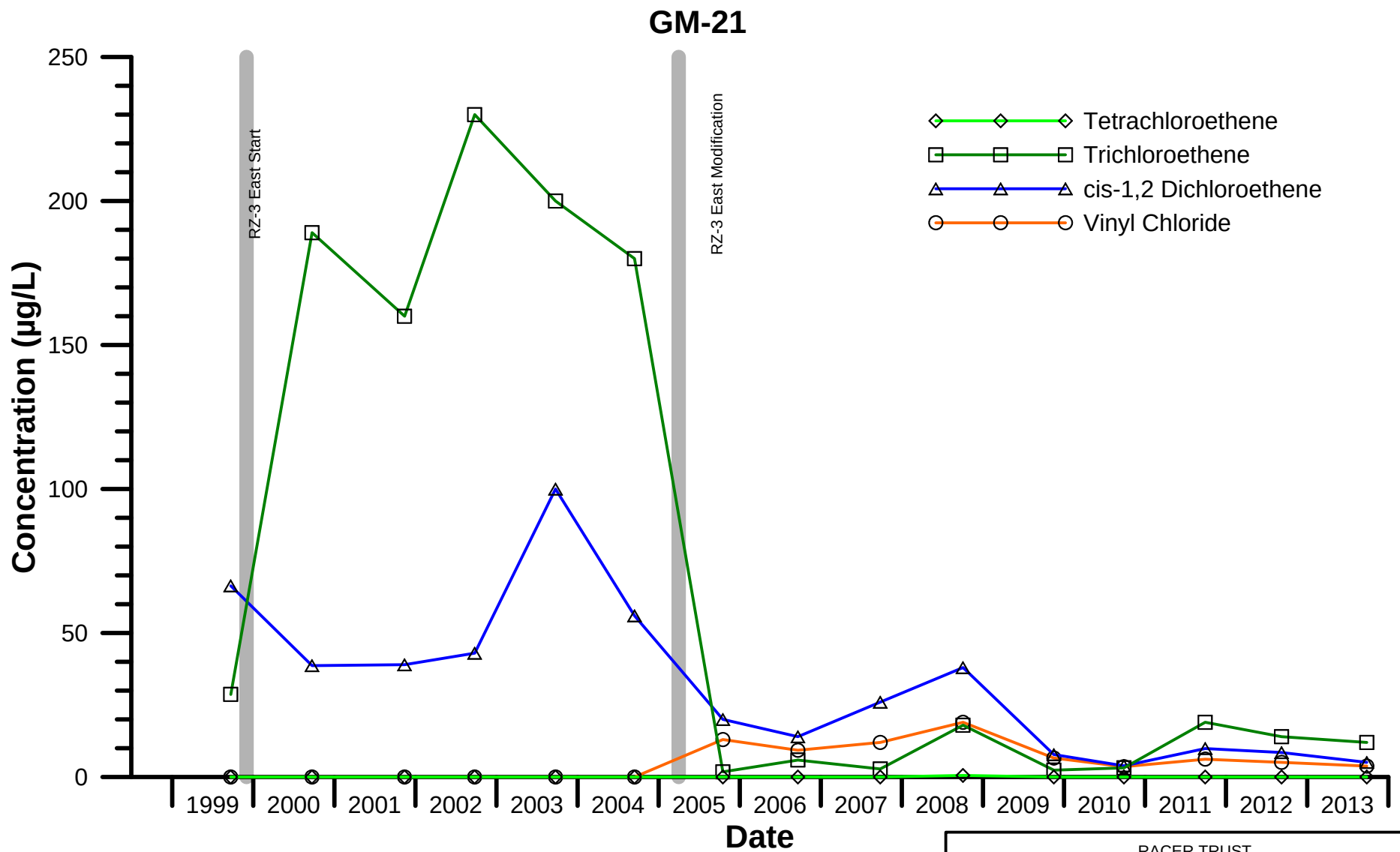


1. Performance monitoring well GM-28 was not sampled in 2012 and 2013 due to an obstruction in the well.

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**RZ-1 AREA GROUNDWATER
CONCENTRATION GRAPHS**





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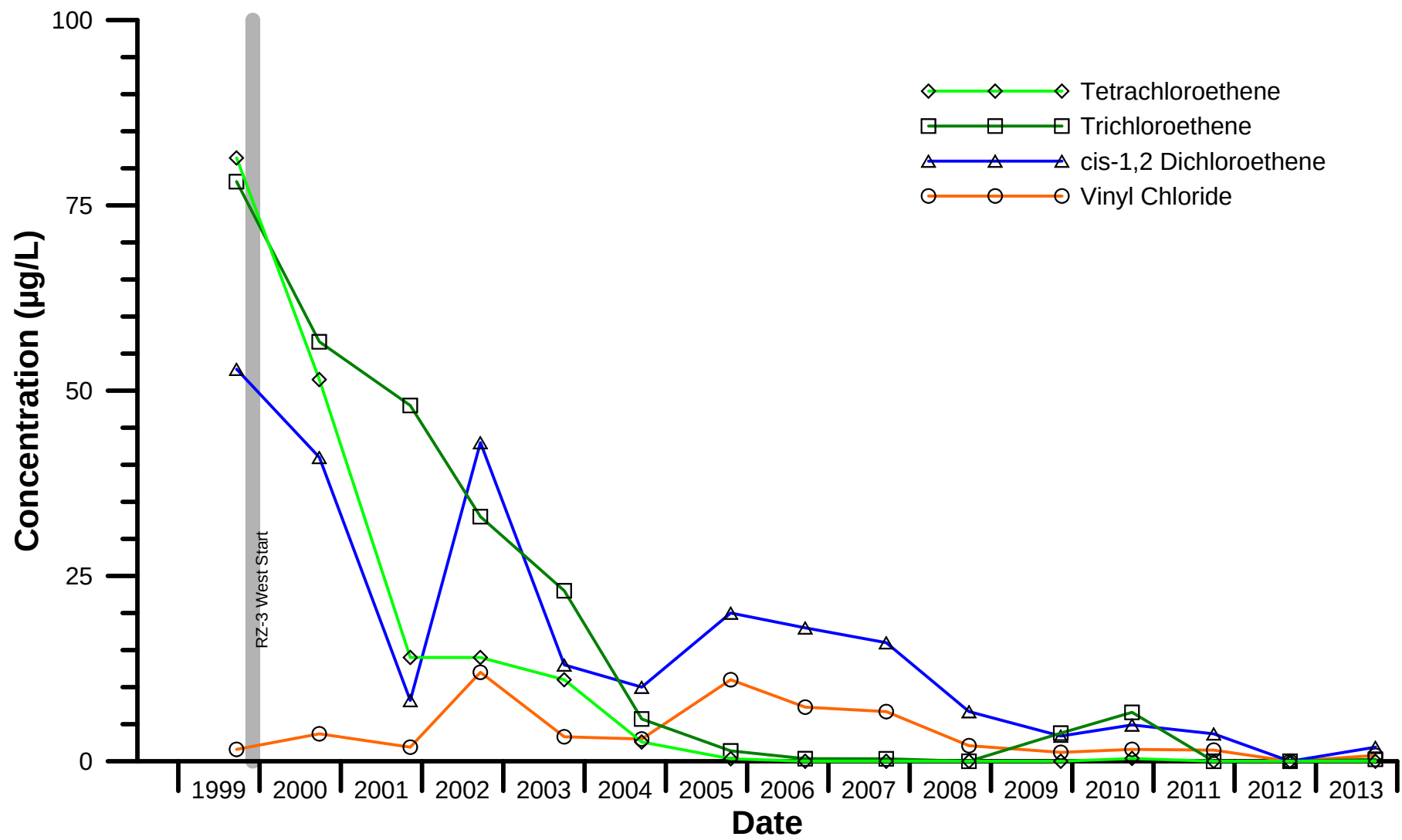
RZ-3 EAST AREA GROUNDWATER CONCENTRATION GRAPH



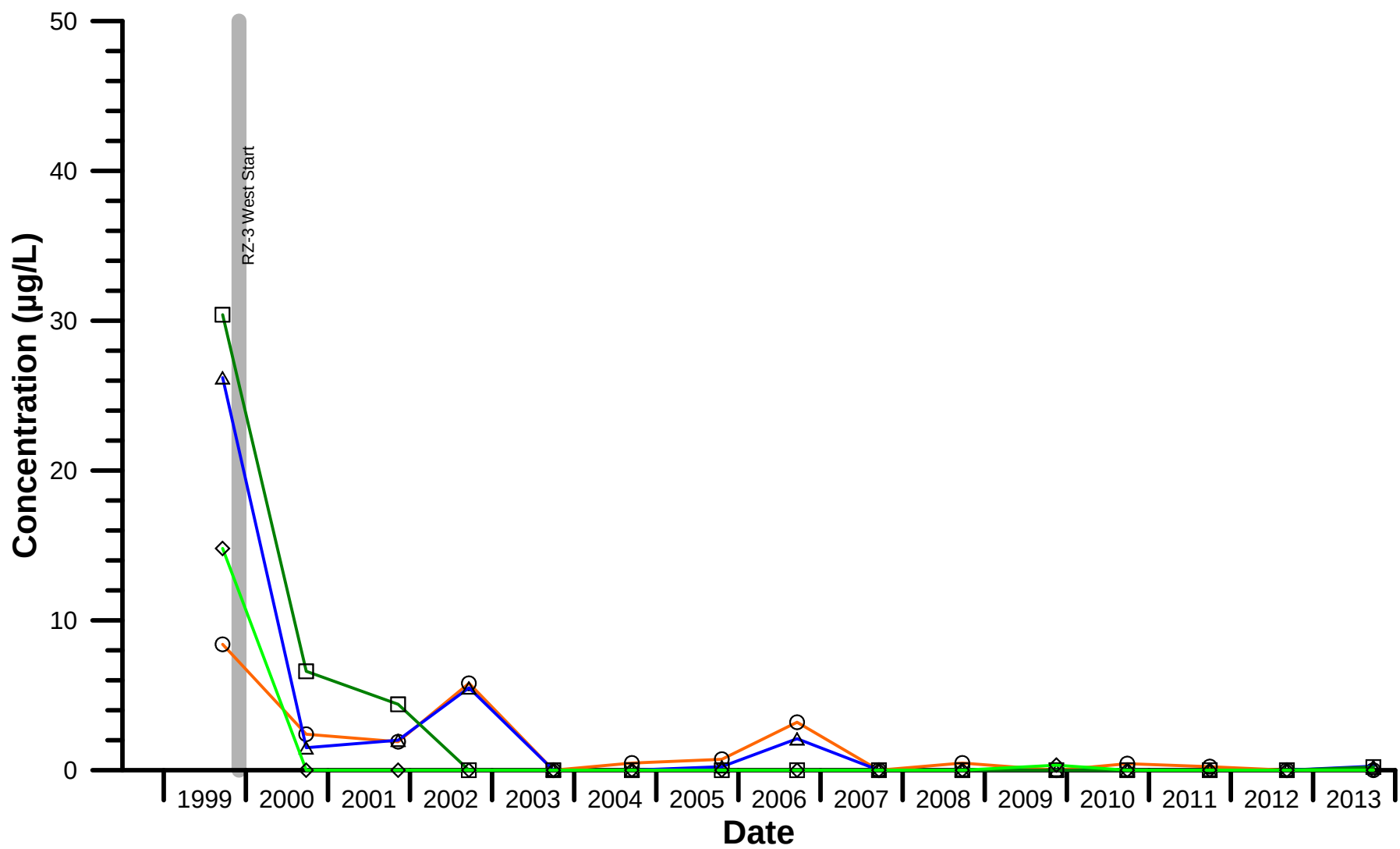
FIGURE

12

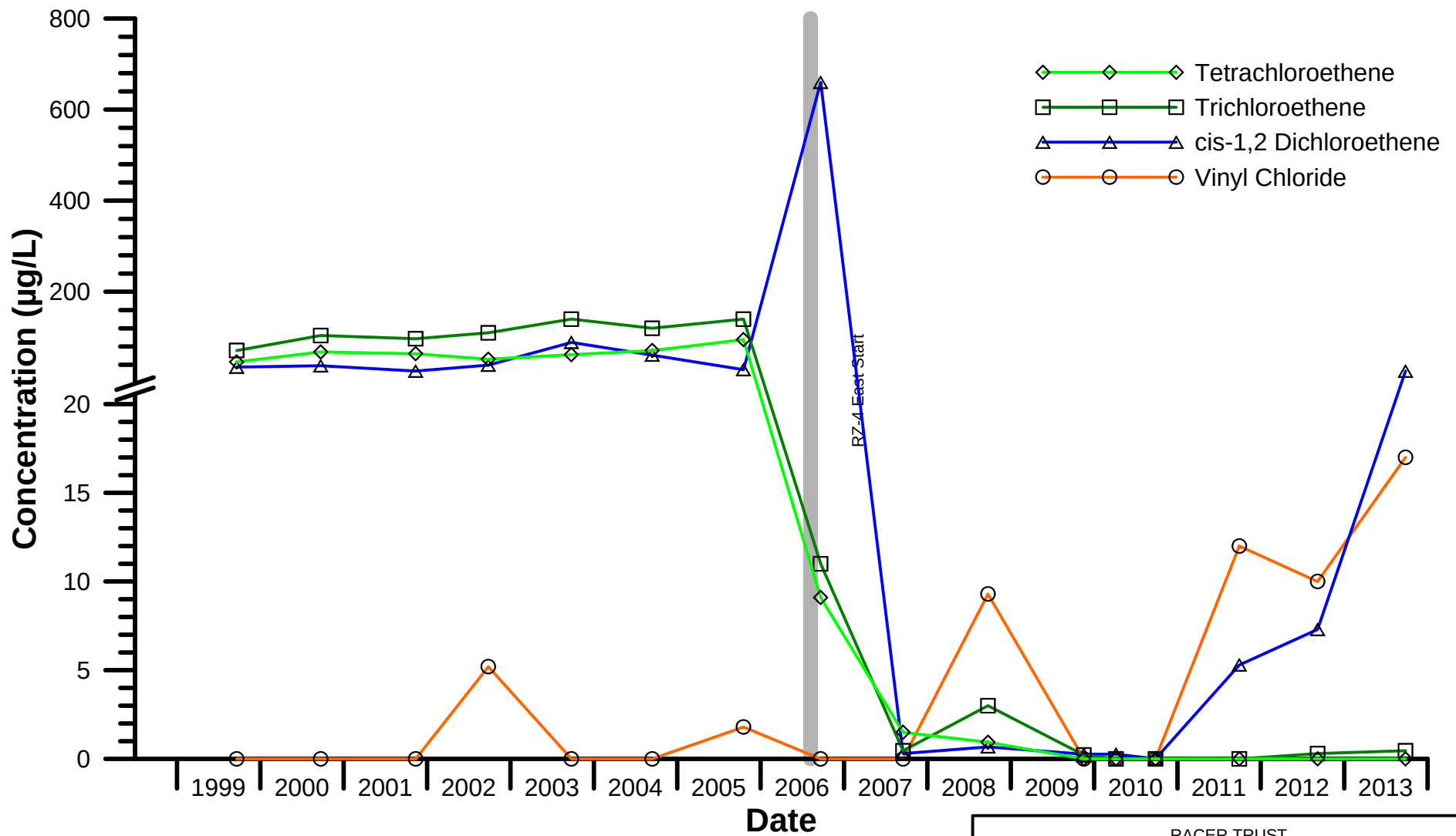
GM-6



GM-8



GM-19S

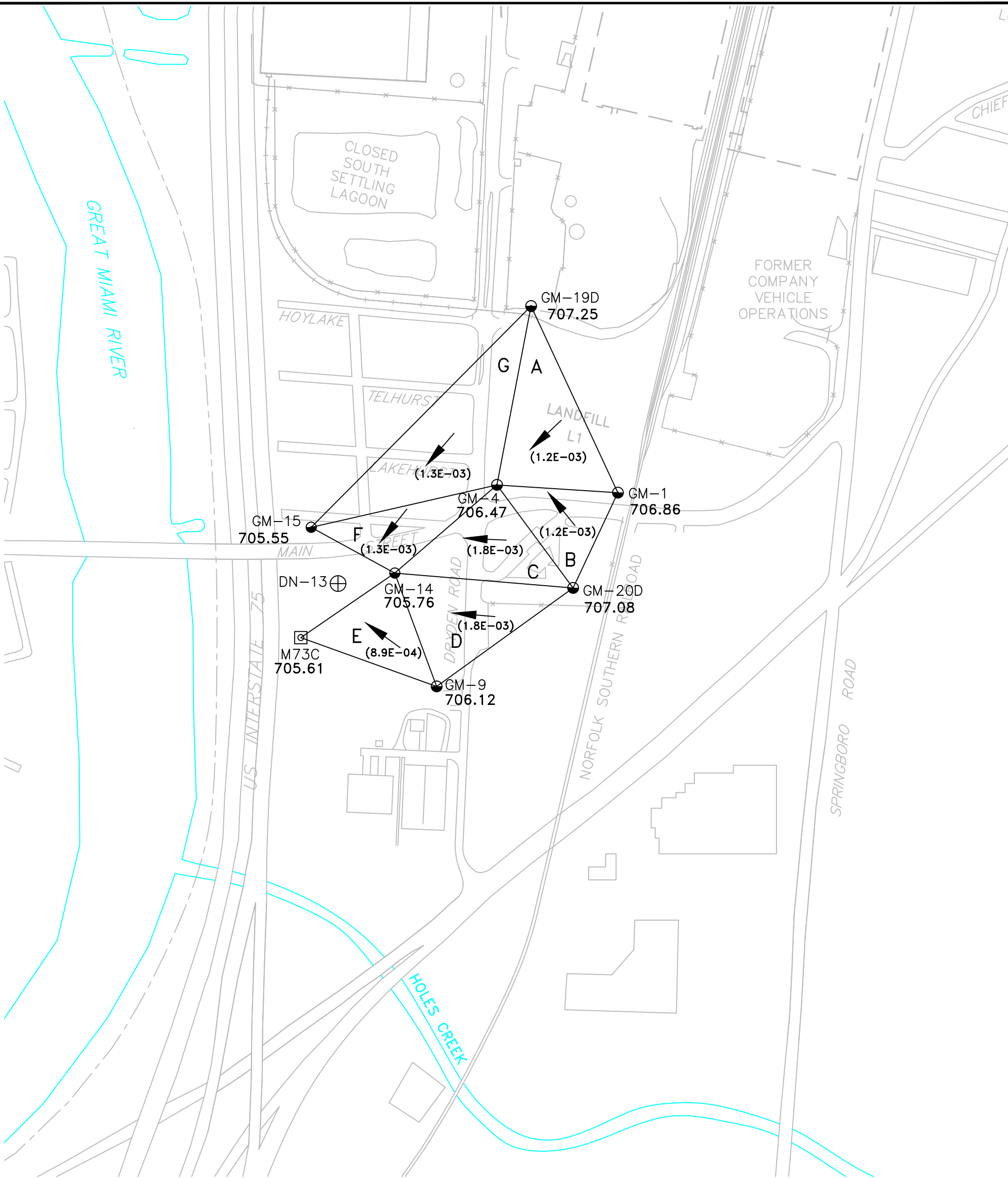


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RZ-4 EAST AREA GROUNDWATER CONCENTRATION GRAPH

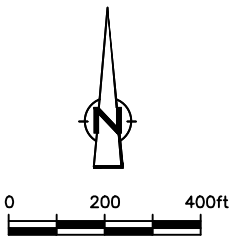


FIGURE
14



LEGEND

- GM-9 MONITORING WELL (LOWER AQUIFER)
- PIEZOMETER (LOWER AQUIFER)
- ⊕ MONTGOMERY COUNTY WELL (LOWER AQUIFER CAPTURE WELL - NPDES OUTFALL DISCHARGE)
- RIVER LEVEE
- A TRIANGULAR IRREGULAR NETWORK (TIN) CELL ID
- ➔ GRADIENT DIRECTION AND MAGNITUDE (FOOT/FOOT)
(1.5E-0.3)



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LOWER AQUIFER
HORIZONTAL GRADIENTS
SEPTEMBER 2013

ARCADIS

FIGURE
15



Appendix A

Site-Wide Groundwater VOC
Analytical Results from 1999 to 2012



Table A-1. Annual Groundwater Analytical Results for the Upper Aquifer Wells from 1999-2012, RACER Trust, Moraine, Ohio.

Well	Date	VOCs (ug/L)											
		1,1,1-TCA	1,1-DCA	1,1-DCE	Benzene	cis-1,2-DCE	Ethyl-benzene	PCE	Toluene	trans-1,2-DCE	TCE	Vinyl Chloride	Xylenes (total)
Upgradient of the Site													
HR-11	9/14/1999	<1.0	13.5	<1.0	<1.0	3.3	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	9/18/2000	<1.0	32.9	<1.0	<1.0	18.5	<1.0	<1.0	<1.0	2.6	<1.0	<1.0	<1.0
	11/6/2001	0.30J	33	<1.0	<1.0	18	<1.0	<1.0	<1.0	2.3	<1.0	<1.0	<1.0
	9/26/2002	<1	18	<1	<1	6.1	<1	<1	<1	0.72	<1	<1	<1
	9/18/2003	<1 U	10	<1 U	<1 U	1.7	<1 U	<1 U	<1 U	<0.5 U	<1 U	<1 U	<1 U
	9/15/2004	<1 U	7.3	<1 U	<1 U	0.45 J	<1 U	2.2	<1 U	<0.5 U	<1 U	<1 U	<1 U
	10/17/2005	<1.0 U	6.5	<1.0 U	<1.0 U	0.72 J	<1.0 U	6.0	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<2.0 U
	9/25/2006	<1 U	6.7	<1 U	<1 U	0.31 J	<1 U	<1 U	<1 U	<1 U	<1 U	<1 U	<2 U
	9/19/2007	<1 U	7.1	<1 U	<1 U	<1 U	<1 U	<1 U	<1 U	<1 U	<1 U	<1 U	<2 U
	9/25/2008	<1 U	5.2	<1 U	<1 U	<1 U	<1 U	<1 U	<1 U	<1 U	<1 U	<1 U	<2 U
GM-24	9/23/1999	2.7	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
On-Site													
W-1-N	9/17/1999	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	9/19/2002	<1.0	0.36J	<1.0	<1.0	<0.50	<1.0	<1.0	<1.0	<0.50	<1.0	<1.0	<1.0
HR-4	9/14/1999	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	1.2	<1.0	<1.0	1.4	<1.0	<1.0
	9/20/2000	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	11/6/2001	0.17J	<1.0	<1.0	<1.0	0.28J	<1.0	0.88J	<1.0	<0.50	1.0	<1.0	<1.0
	9/27/2002	<1	<1	<1	<1	<0.5	<1	0.59J	<1	<0.5	0.71J	<1	<1
	9/18/2003	<1 U	<1 U	<1 U	<1 U	<0.5 U	<1 U	0.55 J	<1 U	<0.5 U	0.71 J	<1 U	<1 U
	9/16/2004	<1 U	0.77 J	<1 U	<1 U	<0.5 U	<1 U	1.3	<1 U	<0.5 U	0.5 J	<1 U	<1 U
	10/20/2005	<1.0 U	1.5	<1.0 U	<1.0 U	<1.0 U	<1.0 U	0.39 J	<1.0 U	<1.0 U	0.32 J	<1.0 U	<2.0 U
	9/25/2006	<1 U	1.6	<1 U	<1 U	0.26 J	<1 U	0.41 J	<1 U	<1 U	0.34 J	<1 U	<2 U
	9/26/2007	<1 U	3.6	<1 U	<1 U	<1 U	<1 U	0.33 J	<1 U	<1 U	0.31 J	<1 U	<2 U
	9/30/2008	<1 U	4.1	<1 U	<1 U	0.23 J	<1 U	0.44 J	<1 U	<1 U	0.31 J	<1 U	<2 U
	11/13/2009	<1.0 U	5.5	<1.0 U	<1.0 U	<1.0 U	<1.0 U	0.37 J	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<2.0 U
	9/28/2010	<1.0 U	3.9	<1.0 U	<1.0 U	<1.0 U	<1.0 U	0.34 J	<1.0 U	<1.0 U	0.28 J	<1.0 U	<2.0 U
	9/28/2011	<1.0 U	4.5	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	0.27 J	<1.0 U	<2.0 U
	9/7/2012	0.23 J	5	<1.0 U	<1.0 U	0.35 J	<1.0 U	<1.0 U	<1.0 U	<1.0 U	0.32 J	<1.0 U	<2.0 U
W-2-N	9/14/1999	<1.0	<1.0	<1.0	<1.0	1.6	<1.0	<1.0	<1.0	<1.0	1.7	<1.0	<1.0
	9/19/2000	<1.0	<1.0	<1.0	<1.0	1.2	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	11/6/2001	0.48J	0.33J	<1.0	<1.0	1.1	<1.0	<1.0	<1.0	<0.50	1.3	<1.0	<1.0
	9/19/2002	<1.0	0.31J	<1.0	<1.0	1.6	<1.0	<1.0	<1.0	<0.50	1.4	<1.0	<1.0
	9/18/2003	<1 U	<1 U	<1 U	<1 U	1.3	<1 U	<1 U	<1 U	<0.5 U	<1 U	<1 U	<1 U
	9/16/2004	0.3 J	0.36 J	<1 U	<1 U	1.8	<1 U	0.31 J	<1 U	0.2 J	1.4	<1 U	<1 U
	10/20/2005	<1.0 U	0.28 J	<1.0 U	<1.0 U	1.3	<1.0 U	<1.0 U	<1.0 U	<1.0 U	0.91 J	<1.0 U	<2.0 U
	9/22/2006	0.25 J	0.29 J	<1 UJ	<1 UJ	1.4 J	<1 UJ	<1 UJ	<1 UJ	0.18 J	1 J	<1 UJ	<2 UJ
	9/25/2007	<1 U	0.22 J	<1 U	<1 U	1.6	<1 U	<1 U	0.28J	<1 U	0.88J	<1 U	<2 U
	9/29/2008	<1 U	<1 U	<1 U	<1 U	1.7	<1 U	<1 U	<1 U	<1 U	0.47 J	<1 U	<2 U
	11/13/2009	<1.0 U	<1.0 U	<1.0 U	<1.0 U	1.5	<1.0 U	<1.0 U	<1.0 U	<1.0 U	0.37 J	<1.0 U	<2.0 U
	9/24/2010	<1.0 U	<1.0 U	<1.0 U	<1.0 U	1.4	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<2.0 U
	9/28/2011	<1.0 U	<1.0 U	<1.0 U	<1.0 U	1.4	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<2.0 U
	9/6/2012	<1.0 U	<1.0 U	<1.0 U	<1.0 U	1.3	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<2.0 U
W-3-N	9/17/1999	<1.0	<1.0	<1.0	<1.0	291	<1.0	2.5	<1.0	2.6	<1.0	12.8	<1.0
	9/19/2000	<1.0	<1.0	<1.0	<1.0	282	<1.0	<1.0	<1.0	3.9	<1.0	24.0	<1.0
	11/7/2001	<5.6	<5.6	<5.6	<5.6	160	<5.6	9.0	<5.6	2.2J	2.1J	7.6	<5.6
	9/23/2002	<6.7	<6.7	<6.7	<6.7	150	<6.7	<6.7	<6.7	<3.3	<6.7	6.5J	<6.7
	9/17/2003	<4 U	<4 U	<4 U	<4 U	100	<4 U	5.1	<4 U	1.6J	1.7 J	6.6	<4 U
	9/16/2004	<4 U	<4 U	<4 U	<4 U	120	<4 U	0.94 J	<4 U	1.6 J	<4 U	6.1	<4 U
	10/20/2005	<4.0 U	<4.0 U	<4.0 U	<4.0 U	84	<4.0 U	1.4 J	<4.0 U	1.0J	<4.0 U	8.0	<8.0 U
	9/25/2006	<5 U	<5 U	<5 U	<5 U	140	<5 U	<5 U	<5 U	1.9J	<5 U	9.6	<10 U
	9/26/2007	<4 U	<4 U	<4 U	<4 U	110	<4 U	<4 U	<4 U	1.4J	<4 U	5.6	<8 U
	9/29/2008	<3.3 U	<3.3 U	<3.3 U	<3.3 U	98	<3.3 U	<3.3 U	<3.3 U	1.4 J	<3.3 U	3.8	<6.7 U
	11/13/2009	<2.0 U	<2.0 U	<2.0 U	<2.0 U	72	<2.0 U	<2.0 U	<2.0 U	0.99 J	<2.0 U	3.2	<4.0 U
	9/24/2010	<2.0 U	<2.0 U	<2.0 U	<2.0 U	56	<2.0 U	<2.0 U	<2.0 U	0.79 J	<2.0 U	2.4	<4.0 U
	9/28/2011	<2.5 U	<2.5 U	<2.5 U	<2.5 U	53	<2.5 U	0.94 J	<2.5 U	0.80 J	<2.5 U	2.7	<5.0 U
	9/6/2012	<2.0 U	<2.0 U	<2.0 U	<2.0 U	41	<2.0 U	0.60 J	<2.0 U	0.79 J	<2.0 U	1.4 J	<4.0 U



Table A-1. Annual Groundwater Analytical Results for the Upper Aquifer Wells from 1999-2012, RACER Trust, Moraine, Ohio.

Well	Date	VOCs (ug/L)										Vinyl Chloride	Xylenes (total)
		1,1,1-TCA	1,1-DCA	1,1-DCE	Benzene	cis-1,2-DCE	Ethylbenzene	PCE	Toluene	trans-1,2-DCE	TCE		
W-4-N	9/17/1999	<1.0	1.3	<1.0	<1.0	2.2	<1.0	2.1	<1.0	<1.0	9.8	<1.0	<1.0
	9/19/2000	<1.0	<1.0	<1.0	<1.0	2.0	<1.0	<1.0	<1.0	<1.0	7.3	<1.0	<1.0
	11/7/2001	0.33J	0.89J	<1.0	<1.0	1.6	<1.0	0.92J	<1.0	<0.50	7.1	<1.0	<1.0
	9/24/2002	0.44J	1.7	<1	<1	5.2	<1	0.94J	<1	0.33J	8.5	0.77J	<1
	9/17/2003	0.26 J	0.94 J	<1 U	<1 U	1.7	<1 U	1.1	<1 U	<0.5 U	8.1	0.48 J	<1 U
	9/16/2004	0.4 J	1.7	<1 U	<1 U	5.8	<1 U	1.7	<1 U	0.38 J	12	0.49 J	<1 U
	10/20/2005	<1.0 U	1.2	<1.0 U	<1.0 U	2.0	<1.0 U	1.0	<1.0 U	<1.0 U	7.2	0.54 J	<2.0 U
	9/25/2006	<1 U	1.3	<1 U	<1 U	2.4	<1 U	0.96 J	<1 U	0.19 J	7.6	0.56 J	<2 U
	9/26/2007	0.34J	1.6	<1 U	<1 U	2.6	<1 U	0.88 J	<1 U	0.24 J	10	0.96 J	<2 U
	9/29/2008	0.39 J	1.9	<1 U	<1 U	11	<1 U	0.38 J	<1 U	0.92 J	8.4	0.34 J	<2 U
	11/13/2009	0.47 J	1.6	<1.0 U	<1.0 U	5.7	<1.0 U	0.68 J	<1.0 U	0.39 J	15	0.25 J	<2.0 U
	9/24/2010	0.41 J	2.1	<1.0 U	<1.0 U	7.9	<1.0 U	0.67 J	<1.0 U	0.51 J	13	<1.0 U	<2.0 U
	9/28/2011	<1.0 U	2.4	<1.0 U	<1.0 U	9.7	<1.0 U	1.1	<1.0 U	0.59 J	9.9	<1.0 U	<2.0 U
	9/7/2012	<1.0 U	5.6	<1.0 U	<1.0 U	14	<1.0 U	0.52 J	<1.0 U	1.2	6.3	<1.0 U	<2.0 U
HR-2	9/16/1999	<1.0	3.9	<1.0	<1.0	9.6	<1.0	<1.0	<1.0	1.5	<1.0	<1.0	<1.0
	9/19/2000	<1.0	4.6	<1.0	<1.0	8.6	<1.0	<1.0	<1.0	1.1	<1.0	<1.0	<1.0
	11/7/2001	<1.0	4.2	<1.0	<1.0	8.3	<1.0	<1.0	<1.0	1.1	0.56J	<1.0	<1.0
	9/24/2002	<1	4.9	<1	<1	8.8	<1	<1	<1	1.2	0.46J	<1	<1
	9/16/2003	<1 U	4.5	<1 U	<1 U	7.2	<1 U	<1 U	<1 U	0.96	0.4 J	<1 U	<1 U
	9/16/2004	<1 U	5.6	<1 U	<1 U	7.8	<1 U	0.37 J	<1 U	1.1	0.53 J	0.23 J	<1 U
	10/20/2005	<1.0 U	4.4	<1.0 U	<1.0 U	5.0	<1.0 U	<1.0 U	<1.0 U	0.78 J	0.35 J	0.29 J	<2.0 U
	9/25/2006	<1 U	5.2	<1 U	<1 U	5.6	<1 U	<1 U	<1 U	0.79 J	0.48 J	<1 U	<2 U
	9/26/2007	<1 U	5.3	<1 U	<1 U	5.0	<1 U	<1 U	<1 U	0.76J	0.45J	<1 U	<2 U
	10/1/2008	<1 U	4.6	<1 U	<1 U	3.4	<1 U	<1 U	<1 U	0.47 J	0.36 J	<1 U	<2 U
	11/13/2009	<1.0 U	5.6	<1.0 U	<1.0 U	3.7	<1.0 U	<1.0 U	<1.0 U	0.58 J	0.45 J	<1.0 U	<2.0 U
	9/28/2010	<1.0 U	5.6	<1.0 U	<1.0 U	2.8	<1.0 U	<1.0 U	<1.0 U	0.41 J	0.39 J	<1.0 U	<1.0 U
	9/28/2011	<1.0 U	6.4	<1.0 U	<1.0 U	2.1	<1.0 U	<1.0 U	<1.0 U	0.32 J	0.43 J	<1.0 U	<2.0 U
	9/7/2012	<1.0 U	7.7	<1.0 U	<1.0 U	1.8	<1.0 U	<1.0 U	<1.0 U	0.28 J	0.41 J	<1.0 U	<2.0 U
HR-3	9/16/1999	<1.0	6.2	<1.0	<1.0	6.1	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	9/19/2000	<1.0	5.1	<1.0	<1.0	4.6	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	11/7/2001	<1.0	6.9	<1.0	<1.0	5.1	<1.0	<1.0	<1.0	0.60	0.66J	<1.0	<1.0
	9/24/2002	<1	15	<1	<1	9.9	<1	<1	<1	1	1.4	<1	<1
	9/16/2003	<1 U	13	<1 U	<1 U	9.9	<1 U	<1 U	<1 U	1.1	1.6	<1 U	<1 U
	9/16/2004	0.27 J	23	<1 U	<1 U	18	<1 U	0.32 J	<1 U	1.8	8.1	<1 U	<1 U
	10/20/2005	0.34 J	18	<1.0 U	<1.0 U	11	<1.0 U	<1.0 U	<1.0 U	1.5	10	<1.0 U	<2.0 U
	9/25/2006	<1 U	10	<1 U	<1 U	8.2	<1 U	<1 U	<1 U	0.99 J	7.2	<1 U	<2 U
GM-30	10/2/2008	0.84 J	16	0.27 J	<1 UJ	17	<1 U	<1 U	<1 U	1.6	32	2.2	<2 U
	9/2/1999	<10	53.8J	<10	<10	7.5J	7030J	9.5J	6950J	<10	<10	<10	23300J
	9/20/2000	<1.0	50.6	<1.0	2.7	<1.0	2290	<1.0	98.9	<1.0	<1.0	<1.0	6770
	11/13/2001	<25	31	<25	<25	<12	840	<25	5.0J	<12	12J	<25	2000
	9/27/2002	<33	34	<33	<33	<17	350	<33	<33	<17	<33	<33	1400
	9/23/2003	<120 U	<120 U	<120 U	<120 U	<62 U	1000	<120 U	240	<62 U	<120 U	<120 U	7000
	9/14/2004	<40 U	33 J	<40 U	<40 U	<20 U	530	<40 U	<40 U	<20 U	<40 U	<40 U	3000
	10/17/2005	<50 U	23 J	<50 U	<50 U	<50 U	620	<50 U	<50 U	<50 U	<50 U	<50 U	3800
GM-23	9/20/2006	<33 U	25 J	<33 U	<33 U	<33 U	570	<33 U	5.8 J	<33 U	<33 U	<33 U	2500
	9/26/2007	<18 U	16 J	<18 U	<18 U	<18 U	380	<18 U	<18 U	<18 U	<18 U	<18 U	1300
	10/6/2008	<10 U	11	<10 U	<10 U	<10 U	300	<10 U	<10 U	<10 U	<10 U	<10 U	670
	9/2/1999	7.2	32.5	17.2	1.9	7530	<1.0	6250	<1.0	54.5	1460	2500	7.0
	9/20/2000	2.0	16.3	5.1	<1.0	5620	<1.0	3470	<1.0	33.2	609	801	<1.0
	11/12/2001	<420	<420	<420	<420	8400	<420	15000	<420	<210	2200	1200	<420
GM-30	9/26/2002	<400	<400	<400	<400	7700	<400	10000	<400	<200	1700	540	<400
	9/23/2003	<500 U	<500 U	<500 U	<500 U	5800	<500 U	12000	<500 U	<250 U	1600	690	<500 U
	9/14/2004	<500 U	<500 U	<500 U	<500 U	4600	<500 U	6700	<500 U	<250 U	1100	870	<500 U
	10/17/2005	<560 U	<560 U	<560 U	<560 U	19000	<560 U	2300	<560 U	<560 U	490 J	2800	<1100 U
	9/28/2006	<330 U	<330 U	<330 U	<330 U	11000	<330 U	370	<330 U	270 J	95 J	4100	<670 U
	9/27/2007	<200 U	<200 U	<200 U	<200 U	4700	<200 U	280	<200 U	130 J	82 J	2600	<400 U
	10/23/2008	<62 U	<62 U	<62 U	<62 U	2000	<62 U	71	<62 U	58 J	<62 U	2100	<120 U
	11/17/2009	<20 U	5.0 J	<20 U	<20 U	1100	<20 U	19 J	<20 U	31	8.3 J	1100	<40 U
	9/29/2010	<22 U	<22 U	<22 U	<22 U	490	<22 U	50	<22 U	16 J	17 J	500	<44 U
	9/30/2011	<20 U	<20 U	<20 U	<20 U	580	<20 U	57	<20 U	21	33	840	<40 U
	9/7/2012	<25 U	<25 U	<25 U	<25 U	580	<25 U	33	<25 U	21 J	15 J	390	<50 U

Table A-1. Annual Groundwater Analytical Results for the Upper Aquifer Wells from 1999-2012, RACER Trust, Moraine, Ohio.

Well	Date	VOCs (ug/L)										Vinyl Chloride	Xylenes (total)
		1,1,1-TCA	1,1-DCA	1,1-DCE	Benzene	cis-1,2-DCE	Ethylbenzene	PCE	Toluene	trans-1,2-DCE	TCE		
GM-27	9/1/1999	<1.0	2.4	<1.0	<1.0	20.6	<1.0	1.7	<1.0	<1.0	121	<1.0	<1.0
	9/20/2000	<1.0	2.2	<1.0	<1.0	13.9	<1.0	1.2	<1.0	<1.0	112	<1.0	<1.0
	11/13/2001	< 3.3	1.8J	< 3.3	< 3.3	13	< 3.3	6.8	< 3.3	< 1.7	110	< 3.3	< 3.3
	9/26/2002	< 3.3	1.7J	< 3.3	< 3.3	14	< 3.3	< 3.3	< 3.3	< 1.7	100	< 3.3	< 3.3
	9/23/2003	< 5 U	1.9 J	< 5 U	< 5 U	12	< 5 U	2.1 J	< 5 U	< 2.5 U	100	< 5 U	< 5 U
	9/15/2004	< 3.3 U	2 J	< 3.3 U	< 3.3 U	13	< 3.3 U	1.8 J	< 3.3 U	< 1.7 U	81	< 3.3 U	< 3.3 U
	10/17/2005	< 2.5 U	2.2 J	< 2.5 U	< 2.5 U	14	< 2.5 U	0.94 J	< 2.5 U	0.49 J	76	0.82 J	< 5.0 U
	9/28/2006	< 2.5 U	2.6	< 2.5 U	< 2.5 U	14	< 2.5 U	1 J	< 2.5 U	1 J	80	< 2.5 U	< 5 U
	9/27/2007	< 2 U	2.3	< 2 U	< 2 U	12	< 2 U	0.9 J	< 2 U	0.41 J	70	< 2 U	< 4 U
	10/23/2008	< 1.4 U	2	< 1.4 U	< 1.4 U	11	< 1.4 U	0.9 J	< 1.4 U	0.51 J	57	0.44 J	< 2.9 U
GM-29	9/1/1999	37.8	4.3	1.3	<1.0	320	<1.0	<20	<1.0	11.1	878	3.8	<1.0
	9/21/2000	24.5	16.6	3.1	<1.0	2871	<1.0	20.0	2.2	14.4	289	788	<1.0
	11/13/2001	< 50	< 50	< 50	< 50	1800	21J	17J	< 50	26	270	230	52
	9/25/2002	16J	< 40	< 40	< 40	1300	< 40	18J	< 40	21	310	140	< 40
	9/24/2003	18 J	< 33 U	< 33 U	< 33 U	1200	< 33 U	18 J	< 33 U	20	390	150	< 33 U
	9/15/2004	21 J	< 50 U	< 50 U	< 50 U	1200	< 50 U	20 J	< 50 U	21 J	440	230	< 50 U
	10/17/2005	19 J	18 J	< 50 U	< 50 U	1600	< 50 U	15 J	< 50 U	27 J	390	490	< 100 U
	9/28/2006	17 J	15 J	< 33 U	< 33 U	1300	< 33 U	15 J	< 33 U	20 J	310	210	< 67 U
	9/26/2007	15 J	15 J	< 50 U	< 50 U	1200	< 50 U	18 J	< 50 U	19 J	350	290	< 100 U
	10/6/2008	12 J	11 J	< 33 U	< 33 U	900	< 33 U	17 J	< 33 U	16 J	300	150	< 67 U
	11/17/2009	18	12	< 10 U	< 10 U	600	< 10 U	21 J	< 10 U	20	370	70	< 20 U
	9/29/2010	11 J	11 J	< 20 U	< 20 U	660	< 20 U	17 J	< 20 U	19 J	330	59	< 40 U
	9/30/2011	11 J	8.5 J	< 13 U	< 13 U	470	< 13 U	13	< 13 U	17	320	52	< 25 U
	9/26/2012	10 J	8.2 J	< 20 U	< 20 U	520	< 20 U	14 J	< 20 U	15 J	310	45	< 40 U
GM-28	9/1/1999	17.7	3.3	<1.0	<1.0	175	<1.0	316	<1.0	9.2	768	3.2	<1.0
	9/21/2000	5.0	9.9	<1.0	<1.0	37.0	<1.0	2.3	<1.0	22.3	1.6	12.4	<1.0
	11/15/2001	< 10	< 10	< 10	< 10	< 5.0	< 10	< 10	< 10	11	< 10	< 10	< 10
	9/24/2002	< 1	2.7	< 1	< 1	1.1	< 1	< 1	< 1.3 U	11	0.86J	< 1	< 1.2 U
	10/1/2003	< 1 U	3.3	< 1 U	< 1 U	0.58	< 1 U	< 1 U	< 1 U	4	1.6	0.53 J	< 1 U
	9/15/2004	< 1 U	3.3	< 1 U	< 1 U	0.41 J	< 1 U	0.88 J	< 1 U	1.2	1.4	0.44 J	< 1 U
	10/18/2005	< 1.0 U	4.0	< 1.0 U	< 1.0 U	0.32 J	< 1.0 U	< 1.0 U	< 1.0 U	0.63 J	0.66 J	1.1	< 2.0 U
	9/27/2006	< 1 U	4.2	< 1 U	< 1 U	0.26 J	< 1 U	< 1 U	< 1 U	0.66 J	0.43 J	0.42 J	< 2 U
	9/20/2007	< 1 U	4.6	< 1 U	< 1 U	0.72 J	< 1 U	< 1 U	< 1 U	0.58 J	0.51 J	1.2	< 2 U
	10/22/2008	< 5 U	2.2 J	< 5 U	< 5 U	6.9	< 5 U	< 5 U	< 5 U	1.3 J	< 5 U	6.5	< 10 U
	11/16/2009	< 1.0 U	3.6	< 1.0 U	< 1.0 U	2.3	< 1.0 U	< 1.0 U	< 1.0 U	1.7	0.58 J	3.3	< 2.0 U
	9/28/2010	< 1.0 U	4.6	< 1.0 U	< 1.0 U	2.1	< 1.0 U	< 1.0 U	< 1.0 U	1.5	< 1.0 U	2.2	< 2.0 U
	10/5/2011	< 1.0 U	2.1	< 1.0 U	< 1.0 U	0.72 J	< 1.0 U	0.63 J	< 1.0 U	0.69 J	0.41 J	0.57 J	< 2.0 U
	9/22/1999	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	10/21/2010	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
GM-25	9/17/1999	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	9.8	<1.0	<1.0
	9/19/2002	< 1.0	< 1.0	< 1.0	< 1.0	0.65	< 1.0	< 1.0	< 1.0	< 0.50	9.4	< 1.0	< 1.0
	9/19/2002	< 1.0	< 1.0	< 1.0	< 1.0	0.65	< 1.0	< 1.0	< 1.0	< 0.50	9.4	< 1.0	< 1.0
	2/26/2008	< 1 U	0.26 J	< 1 U	< 1 U	0.94 J	< 1 U	< 1 U	< 1 U	< 1 U	7.3	< 1 U	< 2 U
	9/23/2010	< 1.0 U	0.26 J	< 1.0 U	< 1.0 U	1.4	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	7.5	< 1.0 U	< 2.0 U
	9/28/2011	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	1.7	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	7.3	< 1.0 U	< 2.0 U
	9/6/2012	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	1.6	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	7	< 1.0 U	< 2.0 U
HR-5	9/16/1999	<1.0	<1.0	<1.0	<1.0	10.5	<1.0	<1.0	<1.0	1.1	12.0	<1.0	<1.0
	9/19/2000	<1.0	<1.0	<1.0	<1.0	5.6	<1.0	<1.0	3.0	<1.0	8.1	<1.0	2.0
	11/7/2001	0.17J	0.55J	<1.0	<1.0	7.8	<1.0	<1.0	<1.0	0.74	11	<1.0	<1.0
	9/23/2002	< 1	0.55J	< 1	< 1	7.5	< 1	< 1	< 1	0.58	13	< 1	< 1
	9/18/2003	< 1 U	0.42 J	< 1 U	< 1 U	5	< 1 U	< 1 U	< 1 U	0.46 J	11	< 1 U	< 1 U
	9/13/2004	< 1 U	0.43 J	< 1 U	< 1 U	4.8	< 1 U	< 1 U	< 1 U	0.44 J	11	< 1 U	< 1 U
	10/18/2005	< 1.0 U	0.54 J	< 1.0 U	< 1.0 U	4.6	< 1.0 U	< 1.0 U	< 1.0 U	0.52 J	13	1.1	< 2.0 U
	9/22/2006	< 1 UJ	0.41 J	< 1 UJ	< 1 UJ	5.2 J	< 1 UJ	0.27 J	< 1 UJ	0.46 J	13 J	0.22 J	< 2 UJ
	9/24/2007	< 1 U	0.51J	< 1 U	< 1 U	5.4	< 1 U	< 1 U	< 1 U	0.41J	13	< 1 U	< 2 U
	9/29/2008	< 1 U	0.48 J	< 1 U	< 1 U	5.4	< 1 U	< 1 U	< 1 U	0.59 J	13	< 1 U	< 2 U
HR-6	9/16/1999	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	2.0	<1.0	<1.0
	9/23/2002	< 1	< 1	< 1	< 1	< 0.5	< 1	< 1	< 1	< 0.5	1.5	< 1	< 1

Table A-1. Annual Groundwater Analytical Results for the Upper Aquifer Wells from 1999-2012, RACER Trust, Moraine, Ohio.

Well	Date	VOCs (ug/L)											
		1,1,1-TCA	1,1-DCA	1,1-DCE	Benzene	cis-1,2-DCE	Ethylbenzene	PCE	Toluene	trans-1,2-DCE	TCE	Vinyl Chloride	Xylenes (total)
HR-1	9/16/1999	1.6	2.4	<1.0	<1.0	5.8	<1.0	44.3	<1.0	3.9	56.0	<1.0	<1.0
	9/25/2000	1.3	2.4	<1.0	<1.0	8.5	<1.0	32.6	<1.0	3.2	56.4	<1.0	<1.0
	11/8/2001	2.2J	2.8J	< 3.3	< 3.3	9.9	< 3.3	36	< 3.3	2.8	86B	< 3.3	< 3.3
	9/23/2002	< 2	2.8	< 2	< 2	4.5	< 2	33	< 2	3.2	33	< 2	< 2
	9/18/2003	1 J	2.6	< 2 U	< 2 U	2.3	< 2 U	27	< 2 U	3.2	56	< 2 U	< 2 U
	9/13/2004	0.56 J	2.5	< 1 U	< 1 UJ	24	< 1 U	23	< 1 U	2.3	30	0.55 J	< 1 U
	10/18/2005	1.2	2.7	< 1.0 U	< 1.0 U	19	< 1.0 U	28	< 1.0 U	2.3	43	1.1	< 2.0 U
	9/25/2006	0.57 J	1.7	< 1.7 U	< 1.7 U	14	< 1.7 U	< 1.7 U	< 1.7 U	1.4 J	50	< 1.7 U	< 3.3 U
	9/24/2007	0.45J	2.2	0.21J	< 1 U	9.5	< 1 U	20	< 1 U	1.9	40	< 1 U	< 2 U
	9/29/2008	0.77 J	1.8 J	< 2.5 U	< 2.5 U	5	< 2.5 U	27	< 2.5 U	2 J	70	< 2.5 U	< 5 U
W-1-S	9/22/1999	<1.0	<1.0	<1.0	<1.0	8.0	<1.0	30.9	<1.0	1.1	11.6	<1.0	<1.0
	9/19/2002	< 2.0	0.97J	< 2.0	< 2.0	6.0	< 2.0	62	< 2.0	1.3	16	< 2.0	< 2.0
ME-6	8/31/1999	2.9	<1.0	<1.0	<1.0	255	<1.0	213	<1.0	<1.0	474	<1.0	<1.0
	9/21/2000	<1.0	<1.0	<1.0	<1.0	98.8	<1.0	6.7	1.9	2.5	19.0	6.1	<1.0
	11/15/2001	2.2	2.7	< 2.0	< 2.0	65	< 2.0	8.2	0.42J	1.8	23	13	< 2.0
	9/25/2002	< 10	< 10	< 10	< 10	5.2	< 10	< 10	6.6J	< 5	< 10	< 10	< 10
	10/1/2003	13	7.2	< 2 U	0.46 J	20	< 2 U	12	< 2 U	< 1 U	31	2.9	< 2 U
	9/15/2004	4.1	6.3	0.26 J	< 1 U	14	< 1 U	5.3	< 1 U	0.56	9.2	2.4	< 1 U
	10/18/2005	2.2	7.0	< 1.0 U	< 1.0 U	13	< 1.0 U	9.8	< 1.0 U	0.93 J	25	5.6	< 2.0 U
	9/27/2006	1.4	6.3	< 1.4 U	< 1.4 U	27	< 1.4 U	13	< 1.4 U	1.3 J	32	11	< 2.9 U
	9/20/2007	0.61 J	6.4	< 1 U	< 1 U	9.2	< 1 U	4.5	< 1 U	0.51 J	12	4.5	< 2 U
	10/22/2008	2.7	11	< 1 U	< 1 U	5.2	< 1 U	7.7	< 1 U	0.25 J	9	1.7	< 2 U
ME-1	8/31/1999	13.5	2.4	<1.0	<1.0	38.2	<1.0	83.6	<1.0	1.5	292	36	<1.0
GM-31	9/1/1999	<1.0	1.3	<1.0	<1.0	7.8	<1.0	1.3	<1.0	<1.0	27.2	<1.0	<1.0
	9/21/2000	<1.0	1.1	<1.0	<1.0	40.2	<1.0	<1.0	<1.0	<1.0	8.5	<1.0	<1.0
	11/15/2001	< 4.0	3.1J	< 4.0	< 4.0	120	< 4.0	< 4.0	< 4.0	1.8J	11	7.4	< 4.0
	9/24/2002	< 6	5.9J	< 6	< 6	200	< 6	< 6	< 6	3.5	10	19	< 6
	10/1/2003	< 5 U	6	< 5 U	< 5 U	170	< 5 U	< 5 U	< 5 U	3.5	28	10	< 5 U
	9/15/2004	1.4 J	4 J	< 5 U	< 5 U	120	< 5 U	2.5 J	< 5 U	2.7	29	2.4 J	< 5 U
	10/18/2005	3.4	6.2	0.42 J	< 2.0 U	120	< 2.0 U	< 2.0 U	< 2.0 U	3.7	67	3.1	< 4.0 U
	9/27/2006	2.3 J	5.1	< 4 U	< 4 U	110	< 4 U	< 4 U	< 4 U	2.9 J	65	1.2 J	< 8 U
	9/20/2007	3.7	4.8	< 3.3 U	< 3.3 U	100	< 3.3 U	< 3.3 U	< 3.3 U	2.8 J	90	1.1 J	6.7 U
	10/23/2008	2.9	3.2	< 2.5 U	< 2.5 U	76	< 2.5 U	< 2.5 U	< 2.5 U	3	78	0.9 J	< 5 U
ME-3	8/31/1999	42.5	6.1	<1.0	<1.0	5.7	<1.0	57.9	<1.0	<1.0	47.5	<1.0	<1.0
	9/21/2000	6.4	3.4	<1.0	<1.0	2.9	<1.0	<1.0	1.4	2.9	<1.0	2.1	<1.0
	11/15/2001	1.6	5.9	<1.0	<1.0	16	<1.0	1.3	0.34J	2.7	3.8	7.3	<1.0
	9/24/2002	< 2.5	< 2.5	< 2.5	< 2.5	< 1.2	< 2.5	< 2.5	< 2.5	< 1.2	< 2.5	< 2.5	< 2.5
	10/1/2003	0.31 J	24	< 1 U	0.6 J	0.96	< 1 U	< 1 U	< 1 U	< 0.5 U	1.5	< 1 U	< 1 U
	9/15/2004	0.53 J	18	< 1 U	< 1 U	2.2	< 1 U	0.21 J	< 1 U	< 0.5 U	1.5	1.1	< 1 U
	10/18/2005	1.6	15	< 1.0 U	< 1.0 U	1.1	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	1.9	1.6	< 2.0 U
	9/27/2006	1.1	8.5	< 1 U	< 1 U	3.5	< 1 U	1.9	< 1 U	0.34 J	2.4	2.2	< 2 U
9/20/2007	2	3.8	< 1 U	< 1 U	1.2	< 1 U	5.2	< 1 U	< 1 U	3.6	0.82 J	< 2 U	
10/22/2008	2.1	1.8	< 1 U	< 1 U	1.4	< 1 U	8.1	< 1 U	< 1 U	4.9	0.7 J	< 2 U	
GM-43	8/19/2004	< 9.1 U	6.9 J	< 9.1 U	< 9.1 U	210	< 9.1 U	16	< 9.1 U	8.7	100	2.8 J	< 9.1 U
	9/22/2006	< 5 UJ	3.7 J	< 5 UJ	< 5 UJ	120 J	< 5 UJ	21 J	< 5 UJ	5.7 J	98 J	< 5 UJ	< 10 UJ
	11/17/2009	2.5	5.7	0.74 J	< 2.5 U	150	< 2.5 U	28 J	< 2.5 U	6.2	180	1.0 J	< 5.0 U
	9/24/2010	< 8.0 U	6.8 J	< 8.0 U	< 8.0 U	220	< 8.0 U	26	< 8.0 U	8.1	170	< 8.0 U	< 16 U
	9/30/2011	< 4.0 U	4.2	1.0 J	< 4.0 U	130	< 4.0 U	22	< 4.0 U	5.3	180	1.0 J	< 8.0 U
	9/6/2012	< 10 U	< 10 U	< 10 U	< 10 U	79	< 10 U	28	< 10 U	4.1 J	230	< 10 U	< 20 U
GM-44	8/19/2004	4 J	3.3 J	< 6 U	< 6 U	130	< 6 U	57	< 6 U	4.4	140	< 6 U	< 6 U
	4/9/2010	1.8 J	2.5 J	0.70 J	< 3.3 U	48	< 3.3 U	70	< 3.3 U	4.4	110	< 3.3 U	< 6.7 U
GM-45	9/22/2006	3.5 J	3.1 J	< 8 UJ	< 8 UJ	54 J	< 8 UJ	230 J	< 8 UJ	2.7 J	230 J	< 8 UJ	< 16 UJ
	4/9/2010	2.7 J	2.5 J	< 5.7 U	< 5.7 U	36	< 5.7 U	200	< 5.7 U	3.3 J	180	< 5.7 U	< 11 U
HR-16	9/23/1999	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	2.7	<1.0	<1.0
	9/18/2002	< 1.0	< 1.0	< 1.0	< 1.0	0.46J	< 1.0	< 1.0	< 1.0	< 0.50	1.5	< 1.0	< 1.0
	1/21/2008	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	1.3	< 1 U	< 2 U
	9/6/2012	0.62 J	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	1.4	< 1.0 U	< 2.0 U

Table A-1. Annual Groundwater Analytical Results for the Upper Aquifer Wells from 1999-2012, RACER Trust, Moraine, Ohio.

Well	Date	VOCs (ug/L)											
		1,1,1-TCA	1,1-DCA	1,1-DCE	Benzene	cis-1,2-DCE	Ethylbenzene	PCE	Toluene	trans-1,2-DCE	TCE	Vinyl Chloride	Xylenes (total)
HR-17	9/23/1999	<1.0	<1.0	<1.0	<1.0	6.2	<1.0	15.5	<1.0	<1.0	7.4	<1.0	<1.0
	9/28/2000	1.9	<1.0	<1.0	<1.0	<1.0	<1.0	3.7	<1.0	<1.0	4.4	<1.0	<1.0
	11/8/2001	1.4	<1.0	<1.0	<1.0	<0.50	<1.0	3.3	<1.0	<0.50	4.2B	<1.0	<1.0
	9/18/2002	0.39J	1.5	<1.0	<1.0	5.1	<1.0	22	<1.0	1.4	12	<1.0	<1.0
	9/25/2003	<2 U	0.75 J	<2 U	<2 U	2.2	<2 U	64	<2 U	0.7 J	10	<2 U	<2 U
	9/17/2004	<5 U	2 J	<5 U	<5 U	7.1	<5 U	82	<5 U	1.6 J	18	<5 U	<5 U
	10/19/2005	<1.8 U	0.70 J	<1.8 U	<1.8 U	3.1	<1.8 U	45	<1.8 U	0.57 J	8.3	<1.8 U	<3.7 U
	9/18/2006	<1 U	0.6 J	<1 U	<1 U	4.6	<1 U	34	<1 U	0.46 J	5.6	<1 U	<2 U
	9/25/2007	<2.5 U	1.2 J	<2.5 U	<2.5 U	1.9 J	<2.5 U	51	<2.5 U	0.69 J	16	<2.5 U	<5 U
	9/26/2008	<4 U	1.1 J	<4 U	<4 U	2.7 J	<4 U	120	<4 U	1 J	31	<4 U	<8 U
	11/12/2009	<2.5 U	1.7 J	<2.5 U	<2.5 U	1.9 J	<2.5 U	85	<2.5 U	1.3 J	21	<2.5 U	<5.0 U
	9/23/2010	<1.7 U	1.9	<1.7 U	<1.7 U	2.2	<1.7 U	60	<1.7 U	1.2 J	18	<1.7 U	<3.3 U
	9/29/2011	<5.7 U	<5.7 U	<5.7 U	<5.7 U	<5.7 U	<5.7 U	110	<5.7 U	<5.7 U	57	<5.7 U	<11 U
	9/6/2012	<9.1 U	<9.1 U	<9.1 U	<9.1 U	2.4 J	<9.1 U	140	<9.1 U	<9.1 U	75	<9.1 U	<18 U
W-2-S	9/23/1999	1.9J	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	6.1	<1.0	<1.0
	9/27/2000	1.6	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	5.0	<1.0	<1.0
	11/8/2001	1.7	0.58J	<1.0	<1.0	0.49J	<1.0	<1.0	<1.0	<0.50	5.2B	<1.0	<1.0
	9/18/2002	1.5	0.98J	<1.0	<1.0	0.90	<1.0	<1.0	<1.0	<0.50	4.9	<1.0	<1.0
	9/26/2003	1.4	0.99 J	<1 U	<1 U	0.74	<1 U	<1 U	0.25 J	<0.5 U	5.5	<1 U	<1 U
	9/17/2004	1.5	1.3	<1 U	<1 U	1.1	<1 U	0.55 J	<1 U	<0.5 U	6.0	<1 U	<1 U
	10/19/2005	1.6	1.2	<1.0 U	<1.0 U	0.78 J	<1.0 U	0.36 J	<1.0 U	<1.0 U	5.4	<1.0 U	<2.0 U
	9/18/2006	1.8	1.2	<1 U	<1 U	1.2	<1 U	<1 U	<1 U	<1 U	5.1	<1 U	<2 U
	9/24/2007	1.4	1.1	<1 U	<1 U	0.89 J	<1 U	<1 U	<1 U	<1 U	5.3	<1 U	<2 U
	9/25/2008	1.4	0.92 J	<1 U	<1 U	0.78 J	<1 U	<1 U	<1 U	<1 U	5.2	<1 U	<2 U
	11/12/2009	1.7	1.2	<1.0 U	0.43 J	0.9 J	<1.0 UJ	0.35 J	<1.0 U	<1.0 U	6.6	<1.0 U	<2.0 U
	9/24/2010	1.4	1.1	<1.0 U	<1.0 U	0.82 J	<1.0 U	0.33 J	<1.0 U	<1.0 U	5.9	<1.0 U	<2.0 U
	9/29/2011	1.6	1.2	<1.0 U	<1.0 U	<1.0 U	<1.0 U	0.44 J	<1.0 U	<1.0 U	7.1	<1.0 U	<2.0 U
	9/6/2012	1.6	1.1	<1.0 U	<1.0 U	1.1	<1.0 U	0.35 J	<1.0 U	<1.0 U	6.1	<1.0 U	<2.0 U
W-3-S	9/23/1999	3.9	<1.0	<1.0	<1.0	<1.0	<1.0	1.1	<1.0	<1.0	2.6	<1.0	<1.0
	9/28/2000	2.8	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	2.5	<1.0	<1.0
	11/8/2001	1.6	<1.0	<1.0	<1.0	<0.50	<1.0	0.44J	<1.0	<0.50	1.5B	<1.0	<1.0
	9/18/2002	2.1	<1.0	<1.0	<1.0	<0.50	<1.0	0.61J	<1.0	<0.50	2.4	<1.0	<1.0
	9/26/2003	1.8	<1 U	<1 U	<1 U	0.34 J	<1 U	0.81 J	<1 U	<0.5 U	2.0	<1 U	<1 U
	9/17/2004	2.4	0.21 J	<1 U	<1 U	<0.5 U	<1 U	1.2	<1 U	<0.5 U	2.9	<1 U	<1 U
	10/19/2005	2.5	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	1.0	<1.0 U	<1.0 U	2.9	<1.0 U	<2.0 U
	9/18/2006	2.5	<1 U	<1 U	<1 U	<1 U	<1 U	0.6 J	<1 U	<1 U	3.4	<1 U	<2 U
	9/24/2007	1.4	<1 U	<1 U	<1 U	<1 U	<1 U	0.72 J	<1 U	<1 U	2.0	<1 U	<2 U
	9/26/2008	1.2	0.21 J	<1 U	<1 U	0.52 J	<1 U	1.3	<1 U	<1 U	2.1	<1 U	<2 U
	11/12/2009	1.2	<1.0 U	<1.0 U	<1.0 U	0.33 J	<1.0 UJ	0.87 J	<1.0 U	<1.0 U	2.5	<1.0 U	<2.0 U
	9/23/2010	0.87 J	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	0.95 J	<1.0 U	<1.0 U	2.3	<1.0 U	<2.0 U
	9/29/2011	0.51 J	0.38 J	<1.0 U	<1.0 U	0.72 J	<1.0 U	2.8	<1.0 U	0.19 J	2.6	<1.0 U	<2.0 U
	9/6/2012	0.60 J	0.89 J	<1.0 U	<1.0 U	1	<1.0 U	4.4	<1.0 U	0.49 J	5.7	<1.0 U	<2.0 U
W-4-S	9/23/1999	3.3	1.2	<1.0	<1.0	4.4	<1.0	30.5J	<1.0	<1.0	14.7J	<1.0	<1.0
	9/28/2000	3.0	1.0	<1.0	<1.0	4.0	<1.0	15.4	<1.0	<1.0	11.3	<1.0	<1.0
	11/8/2001	2.9	1.1	<1.0	<1.0	3.3	<1.0	13	<1.0	0.43J	8.9B	<1.0	<1.0
	9/18/2002	2.3	0.87J	<1.0	<1.0	3.6	<1.0	17	<1.0	0.60	9.8	<1.0	<1.0
	9/26/2003	2	0.92 J	<1 U	<1 U	3.6	<1 U	24	0.25 J	0.78	13	<1 U	<1 U
	9/17/2004	2.3	1.2	<1 U	<1 U	4.4	<1 U	18	<1 U	0.97	13	<1 U	<1 U
	10/19/2005	2.4	1.4	<1.0 U	<1.0 U	4.3	<1.0 U	20	<1.0 U	1.1	13	<1.0 U	<2.0 U
	9/19/2006	1.7	1.3	<1 U	<1 U	4.3	<1 U	18	<1 U	1	12	<1 U	<2 U
	9/24/2007	1.5	1.8	<1 U	<1 U	5.9	<1 U	26	<1 U	1.3	16	<1 U	<2 U
	9/26/2008	0.95 J	1.3	0.21 J	<1 U	6	<1 U	32	<1 U	1.2	16	<1 U	<2 U
	11/12/2009	1.3	1.6	<1.0 U	<1.0 U	9.1	<1.0 U	39	<1.0 U	1.5	23	<1.0 U	<2.0 U
	9/23/2010	1.1	1.6	<1.0 U	<1.0 U	9.1	<1.0 U	31	<1.0 U	1.5	20	<1.0 U	<2.0 U
	9/29/2011	1.1	1.5	<1.0 U	<1.0 U	8.9	<1.0 U	31	<1.0 U	1.4	21	<1.0 U	<2.0 U
	9/6/2012	1.0 J	1.6 J	<1.7 U	<1.7 U	9.4	<1.7 U	26	<1.7 U	1.4 J	21	<1.7 U	<3.3 U



Table A-1. Annual Groundwater Analytical Results for the Upper Aquifer Wells from 1999-2012, RACER Trust, Moraine, Ohio.

Well	Date	VOCs (ug/L)											
		1,1,1-TCA	1,1-DCA	1,1-DCE	Benzene	cis-1,2-DCE	Ethylbenzene	PCE	Toluene	trans-1,2-DCE	TCE	Vinyl Chloride	Xylenes (total)
GM-19S	9/20/1999	16.0	7.7	1.0	<1.0	34.6	<1.0	46.0	<1.0	2.3	71.1	<1.0	<1.0
	9/22/2000	14.5	4.4	<1.0	<1.0	37.6	<1.0	68.0	<1.0	2.6	104	<1.0	<1.0
	11/12/2001	7.6	2.9J	< 3.3	< 3.3	26	< 3.3	64	< 3.3	2.0	97	< 3.3	< 3.3
	9/26/2002	6.3	6.3	< 4	< 4	39	< 4	52	< 4	2.7	110	5.2	< 4
	9/25/2003	13	8.3	1.6 J	< 5 U	89	< 5 U	62	< 5 U	2.9	140	< 5 U	< 5 U
	9/13/2004	14	8.1	1.9 J	< 4 U	61	< 4 U	71	< 4 U	2.4	120	< 4 U	< 4 U
	10/18/2005	13	9.0	1.2 J	< 1.7 U	29	< 1.7 U	95	< 1.7 U	1.0 J	140	1.8	< 3.3 U
	9/21/2006	9.7 J	7 J	< 22 U	< 22 U	660	< 22 U	9.1 J	< 22 U	10 J	11 J	< 22 U	< 44 U
	9/17/2007	0.59 J	10	< 1 U	< 1 U	0.3 J	< 1 U	1.5	< 1 U	0.29 J	0.46 J	< 1 U	< 2 U
	9/23/2008	< 1 U	13	< 1 U	< 1 U	0.68 J	< 1 U	0.94 J	< 1 U	0.52 J	3	9.3	< 2 U
	11/17/2009	< 1.0 U	12	< 1.0 U	< 1.0 U	0.27 J	< 1.0 U	< 1.0 U	< 1.0 U	0.37 J	0.22 J	< 1.0 U	< 2.0 U
	4/7/2010	< 1.0 U	9.6	< 1.0 U	< 1.0 U	0.27 J	< 1.0 U	< 1.0 U	< 1.0 U	0.45 J	< 1.0 U	< 1.0 U	< 2.0 U
	9/27/2010	< 1.0 U	9.5	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	0.46 J	< 1.0 U	< 1.0 U	< 2.0 U
	9/29/2011	< 1.0 U	10	< 1.0 U	< 1.0 U	5.3	< 1.0 U	< 1.0 U	< 1.0 U	1.1	< 1.0 U	12	< 2.0 U
	9/6/2012	< 1.0 U	8.4	< 1.0 U	< 1.0 U	7.3	< 1.0 U	< 1.0 U	< 1.0 U	0.84 J	0.30 J	10	< 2.0 U
EAST	9/21/1999	21.0	5.4	<1.0	<1.0	9.1	<1.0	61.0	<1.0	<1.0	56.1	<1.0	<1.0
	9/22/2000	22.2	7.7	1.2	<1.0	77.3	<1.0	55.8	<1.0	1.8	97.2	3.0	<1.0
	11/12/2001	13	6.2	0.90J	< 3.3	51	< 3.3	56	< 3.3	2.7	92	1.5J	< 3.3
	9/23/2002	10	3.9	0.73J	< 2	8.8	< 2	49	< 2	< 1	46	< 2	< 2
	9/25/2003	7.1	2.3	< 2 U	< 2 U	4.3	< 2 U	47	< 2 U	< 1 U	35	< 2 U	< 2 U
	9/13/2004	5.7	0.72 J	0.34 J	< 1 U	1.6	< 1 U	40	< 1 U	< 0.5 U	23	< 1 U	< 1 U
	10/18/2005	5.9	3.0	< 1.0 U	< 1.0 U	3.1	< 1.0 U	47	< 1.0 U	< 1.0 U	23	1.2	< 2.0 U
	9/21/2006	10	3.2	0.59 J	< 1.4 U	4.1	< 1.4 U	41	< 1.4 U	< 1.4 U	29	< 1.4 U	< 2.9 U
9/21/1999	24.8	25.6	<1.0	<1.0	125	<1.0	41.3	<1.0	<1.0	37.3	<1.0	<1.0	
GM-33	9/25/2003	21	8.4	1 J	< 2.5 U	19	< 2.5 U	37	< 2.5 U	0.72 J	75	< 2.5 U	< 2.5 U
	9/13/2004	17	5.4	1.1 J	< 2 U	9.5	< 2 U	37	< 2 U	0.45 J	55	< 2 U	< 2 U
	10/18/2005	18	6.4	0.69 J	< 1.0 U	7.4	< 1.0 U	50	< 1.0 U	0.36 J	71	1.0	< 2.0 U
	9/21/2006	18	4.5	1.1 J	< 1.7 U	6.9	< 1.7 U	37	< 1.7 U	0.44 J	64	< 1.7 U	< 3.3 U
	9/24/2007	15	4.9	0.68 J	< 1.7 U	5.5	< 1.7 U	32	< 1.7 U	0.34 J	49	< 1.7 U	< 3.3 U
	10/23/2008	8.4	2.9	0.58 J	< 1.4 U	4.1	< 1.4 U	38	< 1.4 U	< 1.4 U	36	< 1.4 U	< 2.9 U
	9/25/2003	17	46	4 J	< 8 U	300	< 8 U	21	< 8 U	12	270	59	< 8 U
GM-35	9/13/2004	17	36	4.1 J	< 11 U	270	< 11 U	21	< 11 U	9.1	230	50	< 11 U
	10/18/2005	12	36	1.8 J	< 5.0 U	190	< 5.0 U	29	< 5.0 U	9.3	240	23	< 10 U
	9/22/2006	5.5 J	26 J	< 5 UJ	< 5 UJ	160 J	< 5 UJ	14 J	< 5 UJ	11 J	130 J	13 J	< 10 UJ
	9/24/2007	5.8 J	26	< 10 U	< 10 U	140	< 10 U	22	< 10 U	8 J	110	12	< 20 U
	9/29/2008	4.6 J	20	< 10 U	< 10 U	92	< 10 U	20	< 10 U	9.4 J	88	7.9 J	< 20 U
	11/13/2009	4.7	17	1.0 J	< 3.3 U	74	< 3.3 U	33	< 3.3 U	8.2	120	4.6	< 6.7 U
	9/27/2010	4.8	19	0.97 J	< 4.0 U	73	< 4.0 U	37	< 4.0 U	8.9	120	4.3	< 8.0 U
	9/30/2011	2.6 J	20	0.64 J	< 3.3 U	66	< 3.3 U	17	< 3.3 U	11	59	7.7	< 6.7 U
	9/6/2012	< 20 U	27	< 20 U	< 20 U	84	< 20 U	< 20 U	< 20 U	17 J	9.9 J	14 J	< 40 U
	9/22/1999	<1.0	3.3	<1.0	<1.0	2.6	<1.0	1.2	1.0	4.2	3.2	3.0	<1.0
9/25/2000	<1.0	35.9	<1.0	<1.0	<1.0	<1.0	<1.0	10.4	20.3	<1.0	<1.0	<1.0	
11/12/2001	< 5.0	6.2	< 5.0	4.3J	< 2.5	0.79J	< 5.0	12	2.9	< 5.0	1.1J	3.0J	
9/20/2002	< 10	9.7J	< 10	< 10	< 5	< 10	< 10	< 10	< 5	< 10	< 10	< 10	
10/1/2003	< 2 U	5.5	< 2 U	1.5 J	< 1 U	< 2 U	< 2 U	< 2 U	1	< 2 U	< 2 U	< 2 U	
9/14/2004	< 10 U	3 J	< 10 U	< 10 U	< 5 U	< 10 U	< 10 U	< 10 U	< 5 U	< 10 U	< 10 U	< 10 U	
10/19/2005	< 10 U	4.9 J	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 20 U	
9/19/2006	< 10 U	3.7 J	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 20 U	
9/18/2007	< 5 U	4.3 J	< 5 U	1.6 J	< 5 U	< 5 U	< 5 U	< 5 U	1 J	< 5 U	< 5 U	3.4 J	
9/23/2008	< 10 U	4 J	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 20 U	
GM-22	9/1/1999	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	3.6	<1.0	<1.0	4.0	<1.0	<1.0
	9/21/2000	<1.0	2.4	<1.0	<1.0	1.9	<1.0	1.6	<1.0	<1.0	<1.0	<1.0	<1.0
	11/13/2001	4.4	6.8	0.58J	< 1.0	8.5	< 1.0	4.9	< 1.0	0.17J	7.5	0.60J	< 1.0
	9/25/2002	0.93J	< 2	< 2	< 2	< 1	< 2	2.3	< 2	< 1	7.6	< 2	< 2
	9/24/2003	1.2	1	< 1 U	< 1 U	0.45 J	< 1 U	2.9	< 1 U	< 0.5 U	7.6	< 1 U	< 1 U
	9/14/2004	1.7	2.1	< 1 U	< 1 U	0.9	< 1 U	2.9	< 1 U	< 0.5 U	10	< 1 U	< 1 U
	10/17/2005	0.96 J	1.0	< 1.0 U	< 1.0 U	0.36 J	< 1.0 U	3.6	< 1.0 U	< 1.0 U	4.7	< 1.0 U	< 2.0 U
	9/20/2006	0.47 J	1.1	< 1 U	< 1 U	0.28 J	< 1 U	3.2	< 1 U	< 1 U	3	< 1 U	< 2 U
	9/26/2007	0.66 J	0.72 J	< 1 U	< 1 U	0.24 J	< 1 U	3.3	< 1 U	< 1 U	3.3	< 1 U	< 2 U
	10/3/2008	0.73 J	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	5.7	< 1 U	< 1 U	5.7	< 1 U	< 2 U



Table A-1. Annual Groundwater Analytical Results for the Upper Aquifer Wells from 1999-2012, RACER Trust, Moraine, Ohio.

Well	Date	VOCs (ug/L)											
		1,1,1-TCA	1,1-DCA	1,1-DCE	Benzene	cis-1,2-DCE	Ethylbenzene	PCE	Toluene	trans-1,2-DCE	TCE	Vinyl Chloride	Xylenes (total)
GM-21	9/22/1999	53.1	9.0	3.9	<1.0	66.4	<1.0	<1.0	<1.0	7.8	28.7	<1.0	<1.0
	9/22/2000	15.7	5.6	1.6	<1.0	38.7	<1.0	<1.0	<1.0	12.9	189	<1.0	<1.0
	11/13/2001	6.9	3.8J	<5.0	<5.0	39	<5.0	<5.0	<5.0	15	160	<5.0	<5.0
	9/25/2002	31	5J	2.6J	<6.7	43	<6.7	<6.7	<6.7	5.1	230	<6.7	<6.7
	9/24/2003	31	6.9 J	2 J	<8 U	100	<8 U	<8 U	<8 U	2.9 J	200	<8 U	<8 U
	9/14/2004	26	4.2 J	3.1 J	<9.1 U	56	<9.1 U	<9.1 U	<9.1 U	7.9	180	<9.1 U	<9.1 U
	10/17/2005	4.3	3.4	<1.0 U	<1.0 U	20	<1.0 U	<1.0 U	<1.0 U	22	1.8	13	<2.0 U
	9/20/2006	12	8.6	0.19 J	<1 U	14	<1 U	<1 U	<1 U	4.3	5.9	9.3	<2 U
	9/26/2007	8.5	18	<1.4 U	<1.4 U	26	<1.4 U	<1.4 U	<1.4 U	2.5	2.8	12	<2.9 U
	10/3/2008	8.7	15	0.33 J	<1.4 U	38	<1.4 U	0.56 J	<1.4 U	4.7	18	19	<2.9 U
	11/16/2009	2.4	22	<1.0 U	<1.0 U	7.8	<1.0 U	<1.0 U	<1.0 U	4.4	2.4	6.6	<2.0 U
	9/28/2010	0.75 J	20	<1.0 U	<1.0 U	3.9	<1.0 U	<1.0 U	<1.0 U	3	3.2	3.6	<2.0 U
	9/29/2011	1.0	16	<1.0 U	<1.0 U	9.9	<1.0 U	<1.0 U	<1.0 U	1.9	19	6.2	<2.0 U
	9/7/2012	<2.0 U	18	<2.0 U	<2.0 U	8.5	<2.0 U	<2.0 U	<2.0 U	1.7 J	14	5.1	<4.0 U
GM-8	9/20/1999	1.9	30.2	<1.0	3.4	26.2	20.7	14.8	<1.0	12.0	30.4	8.4	2.3
	9/26/2000	<1.0	36.5	<1.0	1.1	1.5	12.5	<1.0	<1.0	5.4	6.6	2.4	1.9
	11/9/2001	0.40J	40	<1.0	0.78J	2.0	0.40J	<1.0	<1.0	3.6	4.4	1.9	0.39J
	9/20/2002	<2	63	<2	5.5	5.5	7.5	<2	1.8J	9	<2	5.8	1.5J
	10/1/2003	<2 U	48	<2 U	5.4	<1 U	11	<2 U	<2 U	4.4	<2 U	<2 U	<2 U
	9/14/2004	<1 U	15	<1 U	4.2	<0.5 U	19	<1 U	<1 U	1.1	<1 U	0.48 J	1.1
	10/19/2005	<1.0 U	16	<1.0 U	3.5	0.24 J	29	<1.0 U	0.39 J	0.99 J	<1.0 U	0.73 J	<2.0 U
	9/19/2006	<5 U	18	<5 U	2.1 J	2.1 J	<5 U	<5 U	<5 U	1 J	<5 U	3.2 J	<10 U
	9/18/2007	<2 U	9.1	<2 U	2.4	<2 U	1.7 J	<2 U	<2 U	0.9 J	<2 U	<2 U	0.9 J
	9/23/2008	<1 U	1.7	<1 U	6.8	<1 U	8.6	<1 U	<1 U	0.27 J	<1 U	0.48 J	3.9
	11/16/2009	<1.0 U	2.9	<1.0 U	3.9	<1.0 U	5.5	0.34 J	0.13 J	0.22 J	<1.0 U	<1.0 U	1.3 J
	9/27/2010	<1.0 U	3	<1 U	4.7	<1.0 U	0.33 J	<1.0 U	0.18 J	0.29 J	<1.0 U	0.44 J	<2.0 U
	9/29/2011	<1.0 U	1.9	<1.0 U	3.5	<1.0 U	5.4	<1.0 U	<1.0 U	0.20 J	<1.0 U	0.24 J	0.99 J
	9/6/2012	<1.0 U	0.66 J	<1.0 U	3.5	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<2.0 U
GM-6	9/20/1999	24.6	33.2	1.2	<1.0	52.9	<1.0	81.4	<1.0	2.0	78.2	1.6	<1.0
	9/26/2000	12.1	13.0	<1.0	<1.0	41.0	<1.0	51.5	<1.0	2.2	56.6	3.7	<1.0
	11/9/2001	3.9	14	<2.0	<2.0	8.2	<2.0	14	<2.0	1.8	48	1.9J	<2.0
	9/20/2002	1.4J	60	<2	2.2	43	<2	14	<2	8.6	33	12	<2
	10/2/2003	0.19 J	20	<1 U	1	13	0.22 J	11	<1 U	2.5	23	3.3	<1 U
	9/14/2004	<1 U	18	<1 U	1.7	10	<1 U	2.6	<1 U	1.9	5.7	3	<1 U
	10/19/2005	<1.0 U	21	<1.0 U	0.49 J	20	<1.0 U	0.34 J	<1.0 U	2.1	1.4	11	<2.0 U
	9/19/2006	<1 U	16	<1 U	<1 U	18	<1 U	<1 U	<1 U	1.6	0.35 J	7.3	<2 U
	9/18/2007	<1 U	26	<1 U	0.42 J	16	<1 U	<1 U	<1 U	2.6	0.34 J	6.7	<2 U
	9/24/2008	<1 U	<8.4 U	<1 U	1.2	6.7	<1 U	<1 U	<1 U	1.3	<1 U	2.1	<2 U
	11/11/2009	<1.0 U	6.9	<1.0 U	1.3	3.4	<1.0 U	<1.0 U	<1.0 U	0.68 J	3.8	1.2	<2.0 U
	9/27/2010	<1.0 U	6.2	<1 U	1.1	4.9	<1.0 U	0.38 J	<1.0 U	0.89 J	6.6	1.6	<2.0 U
	9/29/2011	<1.0 U	4.5	<1.0 U	1.0	3.7	<1.0 U	<1.0 U	<1.0 U	0.84 J	<1.0 U	1.5	<2.0 U
	9/6/2012	<1.0 U	<1.0 U	<1.0 U	2.5	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<2.0 U
GM-53	9/14/2006	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<2.0 U
GM-59	9/15/2006	<14 U	<14 U	<14 U	<14 U	4 J	<14 U	310	<14 U	<14 U	94	<14 U	<29 U
	10/3/2008	<33 U	<33 U	<33 U	<33 U	41	<33 U	750	<33 U	<33 U	750	<33 U	<67 U
	11/17/2009	<6.7 U	<6.7 U	<6.7 U	<6.7 U	3.3 J	<6.7 U	500 J	<6.7 U	<6.7 U	170	<6.7 U	<13 U
	4/8/2010	<8.0 U	<8.0 U	<8.0 U	<8.0 U	2.9 J	<8.0 U	280	<8.0 U	<8.0 U	69	<8.0 U	<16 U
	9/29/2010	<15 U	<15 U	<15 U	<15 U	5.7 J	<15 U	520	<15 U	<15 U	350	<15 U	<31 U
	9/30/2011	<13 U	<13 U	<13 U	<13 U	6.4 J	<13 U	520	<13 U	<13 U	510	<13 U	<25 U
	9/7/2012	<50 U	<50 U	<50 U	<50 U	16 J	<50 U	800	<50 U	<50 U	710	<50 U	<100 U
GM-60	9/15/2006	<25 U	<25 U	<25 U	<25 U	220	<25 U	510	<25 U	<25 U	570	<25 U	<50 U
	10/3/2008	<25 U	<25 U	<25 U	<25 U	360	<25 U	900	<25 U	<25 U	920	<25 U	<50 U
	11/17/2009	<20 U	<20 U	<20 U	<20 U	160	<20 U	1100 J	<20 U	<20 U	1400	<20 U	<40 U
	4/8/2010	<22 U	<22 U	<22 U	<22 U	17 J	<22 U	820	<22 U	<22 U	740	<22 U	<44 U
	9/29/2010	<40 U	<40 U	<40 U	<40 U	940	<40 U	970	<40 U	10 J	1300	18 J	<80 U
	9/30/2011	<20 U	<20 U	<20 U	<20 U	370	<20 U	620	<20 U	3.8 J	810	11 J	<40 U
9/7/2012	<59 U	<59 U	<59 U	<59 U	480	<59 U	610	<59 U	<59 U	980	<59 U	<120 U	
GM-66	5/2/2007	<2.9 U	8.3	<2.9 U	<2.9 U	84	<2.9 U	<2.9 U	<2.9 U	3.3	31	4.1	<5.7 U
GM-67S	5/3/2007	<5.7 U	2.8 J	<5.7 U	<5.7 U	5.2 J	<5.7 U	1.1 J	<5.7 U	<5.7 U	140	<5.7 U	<11 U
GM-68S	5/4/2007	0.62 J	<2.5 U	<2.5 U	<2.5 U	<2.5 U	<2.5 U	28	<2.5 U	<2.5 U	78	<2.5 U	<5 U
GM-71	5/3/2007	<2 U	<2 U	<2 U	<2 U	<2 U	<2 U	62	<2 U	<2 U	11	<2 U	<4 U
GM-72	5/3/2007	<1.7 U	<1.7 U	<1.7 U	<1.7 U	<1.7 U	<1.7 U	53	<1.7 U	<1.7 U	0.66 J	<1.7 U	<3.3 U
GM-74S	9/27/2007	<4 U	<4 U	<4 U	<4 U	<4 U	<4 U	140	<4 U	<4 U	83	<4 U	<8 U
	4/9/2010	<5.7 U	<5.7 U	<5.7 U	<5.7 U	<5.7 U	<5.7 U	200	<5.7 U	<5.7 U	44	<5.7 U	<11 U



Table A-1. Annual Groundwater Analytical Results for the Upper Aquifer Wells from 1999-2012, RACER Trust, Moraine, Ohio.

Well	Date	VOCs (ug/L)											
		1,1,1-TCA	1,1-DCA	1,1-DCE	Benzene	cis-1,2-DCE	Ethyl-benzene	PCE	Toluene	trans-1,2-DCE	TCE	Vinyl Chloride	Xylenes (total)
GM-75S	9/26/2007	< 14 U	< 14 U	< 14 U	< 14 U	< 14 U	< 14 U	490	< 14 U	< 14 U	210	< 14 U	< 29 U
	10/6/2008	< 20 U	< 20 U	< 20 U	< 20 U	< 20 U	< 20 U	690	< 20 U	< 20 U	250	< 20 U	< 40 U
	11/16/2009	< 10 U	< 10 U	< 10 U	< 10 U	4.9 J	< 10 U	640	< 10 U	< 10 U	260	< 10 U	< 20 U
	9/29/2010	< 29 U	< 29 U	< 29 U	< 29 U	14 J	< 29 U	650	< 29 U	< 29 U	890	< 29 U	< 57 U
	9/30/2011	< 17 U	< 17 U	< 17 U	< 17 U	4.4 J	< 17 U	430	< 17 U	< 17 U	720	< 17 U	< 33 U
	9/7/2012	< 29 U	< 29 U	< 29 U	< 29 U	< 29 U	< 29 U	420	< 29 U	< 29 U	250	< 29 U	< 57 U
GM-76S	9/23/2007	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	1.2	< 1 U	< 1 U	1.6	< 1 U	< 2 U
GM-83S	2/26/2008	< 1 U	< 1 U	< 1 U	< 1 U	2.9	< 1 U	< 1 U	0.18 J	0.3 J	< 1 U	< 1 U	< 2 U
	9/7/2012	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	1.1	< 1.0 U	< 1.0 U	0.45 J	< 1.0 U	0.19 J	< 1.0 U	< 2.0 U
Downgradient of the Site													
TW-2	9/26/2000	4.5	27.8	< 1.0	< 1.0	22.5	10.4	5.0	< 1.0	2.9	43.1	5.9	3.2
	11/9/2001	3.9	20	< 2.0	< 2.0	8.8	0.38J	8.5	< 2.0	2.4	48	2.7	< 2.0
	9/20/2002	2.2	9	< 2	< 2	26	< 2	5.9	< 2	1.4	70	2.5	< 2
	10/2/2003	0.66 J	5.7	< 1 U	1.5	8.3	0.86 J	4.7	< 1 U	0.59	24	1.4	< 1 U
	9/14/2004	< 1 U	22	< 1 U	2.9	5.5	< 1 U	< 1 U	< 1 U	2	1.5	2.5	< 1 U
	10/20/2005	< 1.0 U	12	< 1.0 U	2.5	5.3	12	< 1.0 U	3.4	1.4	< 1.0 U	4.4	5.0
	9/19/2006	0.55 J	3.4	< 1 U	< 1 U	11	< 1 U	7	< 1 U	0.38 J	32	0.27 J	< 2 U
	9/18/2007	< 1 U	1.7	< 1 U	0.81 J	7.9	< 1 U	1.9	< 1 U	0.25 J	24	0.97 J	< 2 U
	9/24/2008	< 1 U	< 1.9 U	< 1 U	1.4	< 5.2 U	0.76 J	1.4	< 1 U	0.36 J	7.5	1	< 2 U
	11/11/2009	< 2.5 U	1.1 J	< 2.5 U	< 2.5 U	1.6 J	< 2.5 U	< 2.5 U	< 2.5 U	< 2.5 U	1.1 J	< 2.5 U	< 5.0 U
	9/28/2010	< 1.0 U	2	< 1.0 U	1.2	2.1	< 1.0 U	0.52 J	< 1.0 U	0.30 J	1.6	0.71 J	< 2.0 U
	9/28/2011	< 1.0 U	1.8	< 1.0 U	1.2	5.7	0.45 J	1.2	< 1.0 U	0.25 J	5.9	1.1	< 2.0 U
	9/6/2012	< 1.0 U	1.3	< 1.0 U	0.51 J	3.6	< 1.0 U	< 1.0 U	0.18 J	0.23 J	0.26 J	0.56 J	< 2.0 U
4S	9/20/1999	< 1.0	1.6	< 1.0	1.6	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
	10/2/2003	< 2 U	7	< 2 U	1.6 J	< 1 U	1.7 J	< 2 U	< 2 U	1.7	< 2 U	< 2 U	< 2 U
	9/14/2004	< 5 U	7.5	< 5 U	4.5 J	< 2.5 U	4.7 J	< 5 U	1.1 J	< 2.5 U	< 5 U	< 5 U	2.4 J
	10/19/2005	< 4.0 U	2.3 J	< 4.0 U	1.6 J	< 4.0 U	1.6 J	< 4.0 U	< 4.0 U	0.95 J	< 4.0 U	< 4.0 U	< 8.0 U
	9/20/2006	< 1 U	5.6	< 1 U	0.7 J	0.25 J	0.52 J	< 1 U	< 1 U	0.75 J	< 1 U	< 1 U	< 2 U
GM-2	9/20/1999	5.5	1.4	< 1.0	< 1.0	8.4	< 1.0	6.0	< 1.0	< 1.0	61.6	< 1.0	< 1.0
	9/25/2000	5.7	3.7	< 1.0	< 1.0	39.2	< 1.0	7.7	< 1.0	1.3	82.8	1.7	< 1.0
	11/9/2001	6.1	6.1	< 3.3	< 3.3	26	< 3.3	8.4	< 3.3	1.1J	65	< 3.3	< 3.3
	9/20/2002	0.75J	3.4	< 1	< 1	7.6	< 1	8.7	< 1	0.37J	26	< 1	< 1
	10/2/2003	0.21 J	1.7	< 1 U	< 1 U	4.7	0.21 J	5.7	< 1 U	< 0.5 U	13	0.46 J	< 1 U
	9/14/2004	< 1 U	1.6	< 1 U	< 1 U	5.6	< 1 U	4	< 1 U	0.23 J	6.2	< 1 U	< 1 U
	10/19/2005	< 1.0 U	2.0	< 1.0 U	< 1.0 U	6.8	< 1.0 U	3.6	< 1.0 U	0.26 J	4.6	0.24 J	< 2.0 U
	9/20/2006	< 1 U	2.1	< 1 U	< 1 U	7.7	< 1 U	2.6	< 1 U	0.34 J	5.1	0.61 J	< 2 U
	9/18/2007	< 1 U	1.4	< 1 U	< 1 U	4.9	< 1 U	1.6	< 1 U	0.28 J	2.3	1.1	< 2 U
	9/24/2008	< 1 U	< 1.1 U	< 1 U	< 1 U	6.7	< 1 U	1.3	< 1 U	0.19 J	2.4	< 1 U	< 2 U
	11/11/2009	< 1.0 U	1	< 1.0 U	< 1.0 U	3.2	< 1.0 U	0.90 J	< 1.0 U	< 1.0 U	1.4	2.3	< 2.0 U
	9/27/2010	< 1.0 U	1.2	< 1 U	< 1.0 U	3.8	< 1.0 U	0.44 J	< 1.0 U	< 1.0 U	0.95 J	2.5	< 2.0 U
	9/29/2011	< 1.0 U	0.92 J	< 1.0 U	< 1.0 U	9	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	0.75 J	0.69 J	< 2.0 U
	9/6/2012	< 1.0 U	0.71 J	< 1.0 U	< 1.0 U	15.0	< 1.0 U	< 1.0 U	0.46 J	< 1.0 U	0.96 J	1.2	< 2.0 U
GM-16	9/21/1999	2.2	< 1.0	< 1.0	< 1.0	1.7	< 1.0	44.1	< 1.0	< 1.0	8.5	< 1.0	< 1.0
	9/26/2000	2.5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	16.2	< 1.0	< 1.0	3.5	< 1.0	< 1.0
	11/8/2001	2.2	0.31J	< 1.0	< 1.0	0.39J	< 1.0	17	< 1.0	< 0.50	3.6	< 1.0	< 1.0
	9/24/2002	1.4J	4.1	< 2	< 2	6.2	< 2	63	< 2	1.6	28	< 2	< 2
	9/22/2003	1.9 J	2.8 J	< 4 U	< 4 U	5.8	< 4 U	110	< 4 U	1.1 J	57	< 4 U	< 4 U
	9/16/2004	3.1 J	4.3	< 3.3 U	< 3.3 U	7.4	< 3.3 U	130	< 3.3 U	1 J	90	< 3.3 U	< 3.3 U
	10/19/2005	1.7 J	1.1 J	< 3.3 U	< 3.3 U	2.8 J	< 3.3 U	100	< 3.3 U	0.90 J	55	< 3.3 U	< 6.7 U
	9/18/2006	2.1	1.1 J	< 1.4 U	< 1.4 U	3.8	< 1.4 U	98	< 1.4 U	1 J	51	< 1.4 U	< 2.9 U
	9/25/2007	1.4 J	1.5 J	< 4 U	< 4 UJ	43	< 4 U	94	< 4 U	1.3 J	52	< 4 U	< 8 U
	9/30/2008	1.8 J	3.8	< 3.3 U	< 3.3 U	20	< 3.3 U	100	< 3.3 U	1.1 J	48	< 3.3 U	< 6.7 U
	11/16/2009	1.4 J	1.6 J	< 3.3 U	< 3.3 U	12	< 3.3 U	110	< 3.3 U	1.5 J	74	< 3.3 U	< 6.7 U
	9/23/2010	1.1 J	1.3 J	< 4.0 U	< 4.0 U	2.2 J	< 4.0 U	110	< 4.0 U	1.2 J	75	< 4.0 U	< 8.0 U
	9/29/2011	< 3.3 U	5.5	< 3.3 U	< 3.3 U	23	< 3.3 U	64	< 3.3 U	0.77 J	45	1.2 J	< 6.7 U
	9/5/2012	0.94 J	3.8 J	< 4.0 U	< 4.0 U	12	< 4.0 U	66	< 4.0 U	< 4.0 U	41	< 4.0 U	< 8.0 U



Table A-1. Annual Groundwater Analytical Results for the Upper Aquifer Wells from 1999-2012, RACER Trust, Moraine, Ohio.

Well	Date	VOCs (ug/L)										Vinyl Chloride	Xylenes (total)
		1,1,1-TCA	1,1-DCA	1,1-DCE	Benzene	cis-1,2-DCE	Ethylbenzene	PCE	Toluene	trans-1,2-DCE	TCE		
GM-17	9/21/1999	6.4	26.4	<1.0	<1.0	30.0	<1.0	<1.0	<1.0	2.6	28.7	1.4	<1.0
	9/27/2000	6.7	23.9	<1.0	<1.0	41.6	<1.0	24.6	<1.0	2.5	48.4	<1.0	<1.0
	11/8/2001	6.8	7.3	<3.3	<3.3	16	<3.3	48	<3.3	1.8	79	<3.3	<3.3
	9/19/2002	2.3	6.0	<1.2	<1.2	13	<1.2	22	<1.2	0.67	39	0.79J	<1.2
	9/24/2003	1.3	1.2	<1 U	<1 U	2.9	<1 U	12	<1 U	<0.5 U	24	<1 U	<1 U
	9/15/2004	1.1	4	<1 U	<1 U	11	<1 U	3.6	<1 U	0.64	22	0.49 J	<1 U
	10/20/2005	1.4	5.5	<1.0 U	<1.0 U	9.0	<1.0 U	8.1	<1.0 U	0.57 J	29	2.0	<2.0 U
	9/27/2006	0.46 J	3.2	<1 U	<1 U	9.5	<1 U	11	<1 U	0.49 J	24	0.54 J	<2 U
	9/18/2007	0.31 J	1.5	<1 U	<1 U	4	<1 U	7.3	<1 U	0.22 J	15	<1 U	<2 U
	9/24/2008	0.29 J	<1 U	<1 U	<1 U	<1.9 U	<1 U	4.8	<1 U	<1 U	10	<1 U	<2 U
GM-18	9/22/1999	42.6	22.6	1.3	<1.0	35.3	<1.0	4.9	<1.0	2.2	131	<1.0	<1.0
	9/27/2000	31.8	10.4	<1.0	<1.0	23.9	<1.0	7.8	<1.0	1.8	115	<1.0	<1.0
	11/8/2001	23	3.3	1.3J	<3.3	14	<3.3	12	<3.3	1.6J	93	<3.3	<3.3
	9/19/2002	18	6.0	<3.3	<3.3	15	<3.3	28	<3.3	1.6J	98	<3.3	<3.3
	9/22/2003	10	3.7	<2 U	<2 U	8.8	<2 U	24	<2 U	<1 U	77	0.75 J	<2 U
	9/15/2004	5.2	2.2	0.46 J	<2 U	5.9	<2 U	20	<2 U	<1 U	53	<2 U	<2 U
	10/20/2005	7.0	15	0.30 J	<1.0 U	14	<1.0 U	21	<1.0 U	1.2	70 J	3.0	<2.0 U
	9/27/2006	6.2	17	<2.9 U	<2.9 U	21	<2.9 U	15	<2.9 U	2 J	72	2.5 J	<5.7 U
	9/19/2007	5.4	13	<2.5 U	<2.5 U	19	<2.5 U	14	<2.5 U	1.2 J	64	1.1 J	<5 U
	9/24/2008	2.3	<6.1 U	<1.4 U	<1.4 U	13	<1.4 U	16	<1.4 U	0.79 J	38	<1.4 U	<2.9 U
WSU-22	3/1/2006	3.1	1.7	<1.7 U	<1.7 U	4.3	<1.7 U	110	<1.7 U	1.2 J	88	<1.7 U	<3.3 U
WSU-23	3/1/2006	2.5	0.97 J	<1 U	<1 U	0.44 J	<1 U	<1 U	<1 U	<1 U	7.1	<1 U	<2 U
	11/30/2006	2.1	0.73 J	0.2 J	<1 U	0.46 J	<1 U	<1 U	<1 U	<1 U	6.1	<1 U	<2 U
WSU-24	9/23/1999	2.4	<1.0	<1.0	<1.0	<1.0	<1.0	1.9	<1.0	<1.0	17.0	<1.0	<1.0
	9/26/2000	2.1	<1.0	<1.0	<1.0	2.7	<1.0	1.2	<1.0	<1.0	16.8	<1.0	<1.0
	11/9/2001	2.4	0.81J	<1.0	<1.0	4.0	<1.0	1.6	<1.0	<0.50	18	<1.0	<1.0
	9/24/2002	1.4	<1	<1	<1	<0.5	<1	1.2	<1	<0.5	13	<1	<1
	9/22/2003	0.67 J	<1 U	<1 U	<1 U	<0.5 U	<1 U	1	<1 U	<0.5 U	7.9	<1 U	<1 U
	9/16/2004	0.58 J	<1 U	<1 U	<1 U	<0.5 U	<1 U	1.3	<1 U	<0.5 U	8	<1 U	<1 U
	10/20/2005	1.5	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	1.2	<1.0 U	<1.0 U	11	<1.0 U	<2.0 U
	9/26/2006	0.65 J	<1 U	<1 U	<1 U	<1 U	<1 U	0.81 J	<1 U	<1 U	10	<1 U	<2 U
	9/19/2007	0.66 J	<1 U	<1 U	<1 U	<1 U	<1 U	0.89 J	<1 U	<1 U	7.9	<1 U	<2 U
	9/25/2008	0.62 J	0.85 J	<1 U	<1 U	2.4 J	<1 U	1.7	<1 U	0.35 J	12 J	<1 U	<2 U
GM-10	9/21/1999	1.7	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	14.8	<1.0	<1.0
	9/27/2000	2.5	1.4	<1.0	<1.0	5.7	<1.0	1.4	<1.0	<1.0	23.2	<1.0	<1.0
	11/8/2001	2.7	3.4	<1.0	<1.0	16	<1.0	1.9	<1.0	0.93	27	1.2	<1.0
	9/18/2002	1.8	0.61J	<1.0	<1.0	2.3	<1.0	1.1	<1.0	<0.50	19	<1.0	<1.0
	9/24/2003	0.96 J	<1 U	<1 U	<1 U	<0.5 U	<1 U	2.2	<1 U	<0.5 U	33	<1 U	<1 U
	9/14/2004	1.2	<1 U	<1 U	<1 U	0.38 J	<1 U	1.5	<1 U	<0.5 U	15	<1 U	<1 U
	10/20/2005	1.6	<1.0 U	<1.0 U	<1.0 U	0.31 J	<1.0 U	1.2	<1.0 U	<1.0 U	12	<1.0 U	<2.0 U
	9/27/2006	0.9 J	0.29 J	<1 U	<1 U	0.77 J	<1 U	0.98 J	<1 U	<1 U	11	<1 U	<2 U
	9/19/2007	0.75 J	<1 U	<1 U	<1 U	0.35 J	<1 U	0.93 J	<1 U	<1 U	8.8	<1 U	<2 U
	9/24/2008	0.53 J	<1 U	<1 U	<1 U	<1 U	<1 U	0.85 J	<1 U	<1 U	5.9	<1 U	<2 U
GM-25	9/22/1999	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U
	10/21/2010	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<2.0 U
GM-26	9/22/1999	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	9/27/2000	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	11/12/2001	0.19J	<1.0	<1.0	<1.0	<0.50	<1.0	1.1	<1.0	<0.50	<1.0	<1.0	<1.0
	9/25/2002	<1	<1	<1	<1	<0.5	<1	0.92J	<1	<0.5	<1	<1	<1
	10/1/2003	<1 U	<1 U	<1 U	<1 U	<0.5 U	<1 U	0.85 J	<1 U	<0.5 U	<1 U	<1 U	<1 U
	9/16/2004	<1 U	<1 U	<1 U	<1 U	<0.5 U	<1 U	1.3	<1 U	<0.5 U	<1 U	<1 U	<1 U
	10/20/2005	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	1.0	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<2.0 U
	9/21/2006	<1 U	<1 U	<1 U	<1 U	<1 U	<1 U	0.91 J	<1 U	<1 U	<1 U	<1 U	<2 U
	9/27/2007	<1 U	<1 U	<1 U	<1 U	<1 U	<1 U	1.2	<1 U	<1 U	<1 U	<1 U	<2 U
	1/21/2008	<1 U	<1 U	<1 U	<1 UJ	<1 U	<1 U	1.2	<1 U	<1 U	<1 U	<1 U	<2 U
	10/1/2008	<1 U	<1 U	<1 U	<1 U	<1 U	<1 U	1.4	<1 U	<1 U	<1 U	<1 U	<2 U
	11/12/2009	<1.0 U	<1.0 U	<1.0 U	0.51 J	<1.0 U	<1.0 U	1.6	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<2.0 U
	9/22/2010	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	1.6	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<2.0 U
	9/28/2011	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	1.6	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<2.0 U
	9/5/2012	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	1.6	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<2.0 U
GM-46	3/2/2006	<1 U	2.7	<1 U	<1 U	6.8	<1 U	<1 U	<1 U	0.35 J	22	1.9	<2 U
	11/30/2006	<1 U	0.43 J	<1 U	<1 U	5.2	<1 U	0.67 J	<1 U	<1 U	1.5	1.5	<2 U



Table A-1. Annual Groundwater Analytical Results for the Upper Aquifer Wells from 1999-2012, RACER Trust, Moraine, Ohio.

Well	Date	VOCs (ug/L)											
		1,1,1-TCA	1,1-DCA	1,1-DCE	Benzene	cis-1,2-DCE	Ethylbenzene	PCE	Toluene	trans-1,2-DCE	TCE	Vinyl Chloride	Xylenes (total)
GM-47	3/1/2006	2.2	1.8	<1.0 U	<1.0 U	7.2	<1.0 U	78	0.28 J	1.5	50	<1.0 U	<2.0 U
	9/19/2006	2.2	1.7 J	<2.0 U	<2.0 U	9.5	<2.0 U	64	<2.0 U	1.4 J	44	<2.0 U	<4.0 U
	11/30/2006	1.9 J	1.7 J	<2.0 U	<2.0 U	8.9	<2.0 U	69	<2.0 U	1.4 J	51	<2.0 U	<4.0 U
	9/25/2007	2.2 J	2.4 J	<7.1 U	<7.1 U	170	<7.1 U	71	<7.1 U	4.6 J	53	<7.1 U	<14 U
	10/1/2008	1.4 J	2 J	<5 U	<5 U	160	<5 U	86	<5 U	3.9 J	36	1.9 J	<10 U
	11/13/2009	1.0 J	2.4 J	<2.5 U	<2.5 U	61	<2.5 U	61	<2.5 U	2.8	29	0.66 J	<5.0 U
	1/28/2010	0.85 J	2.3 J	<2.5 U	<2.5 U	51	<2.5 U	60	<2.5 U	2.5	24	<2.5 U	<5.0 U
	9/23/2010	0.77 J	2.7	<1.7 U	<1.7 U	42	<1.7 U	60	<1.7 U	2.4	22	0.39 J	<3.3 U
	9/29/2011	<2.5 U	2.9	<2.5 U	<2.5 U	34	<2.5 U	52	<2.5 U	2.3 J	18	<2.5 U	<5.0 U
9/6/2012	<2.5 U	3	<2.5 U	<2.5 U	23	<2.5 U	42	<2.5 U	2.0 J	13	<2.5 U	<5.0 U	
GM-48	3/1/2006	0.62 J	0.71 J	<1 U	<1 U	0.7 J	<1 U	<1 U	0.25 J	<1 U	2.1	<1 U	<2 U
	11/30/2006	0.97 J	0.72 J	<1 U	<1 U	0.83 J	<1 U	0.26 J	<1 U	0.19 J	2.4	<1 U	<2 U
GM-49	3/1/2006	2.4	3.4	<1 U	<1 U	4.7	<1 U	2.5	0.25 J	0.66 J	8.4	<1 U	<2 U
	11/30/2006	1.8	2.6	<1 U	<1 U	3.8	<1 U	3.1	<1 U	0.53 J	11	<1 U	<2 U
GM-50	4/28/2006	2.4 J	1.9 J	<5.0 U	<5.0 U	5.2	<5.0 U	180	<5.0 U	1.6 J	120	<5.0 U	<10 U
	9/19/2006	1.4 J	1.5 J	<5.6 U	<5.6 U	13	<5.6 U	150	<5.6 U	1.7 J	84	<5.6 U	<11 U
	11/30/2006	1.6 J	1.5 J	<5.0 U	<5.0 U	34	<5.0 U	140	<5.0 U	1.5 J	86	<5.0 U	<10 U
	9/25/2007	1.4 J	1.9 J	<5.9 U	<5.9 U	130	<5.9 U	100	<5.9 U	2.5 J	44	<5.9 U	<12 U
	10/1/2008	1.6 J	1.7 J	<2.5 U	<2.5 U	13	<2.5 U	82	<2.5 U	0.68 J	54	<2.5 U	<5 U
	11/13/2009	1.8 J	1.3 J	<5.0 U	<5.0 U	11	<5.0 U	110	<5.0 U	<5.0 U	120	<5.0 U	<10 U
	1/28/2010	1.5 J	1.2 J	<5.0 U	<5.0 U	8.1	<5.0 U	130	<5.0 U	<5.0 U	120	<5.0 U	<10 U
	9/23/2010	1.6 J	<5.0 U	<5.0 U	<5.0 U	4.0 J	<5.0 U	130	<5.0 U	0.95 J	140	<5.0 U	<10 U
	9/30/2011	1.7 J	2.3	<2.0 U	<2.0 U	7.1	<2.0 U	95	<2.0 U	0.62 J	86	<2.0 U	<4.0 U
	9/6/2012	2.7 J	<5.0 U	<5.0 U	<5.0 U	3.4 J	<5.0 U	84	<5.0 U	<5.0 U	63	<5.0 U	<10 U
GM-51	4/28/2006	0.9 J	<1 U	<1 U	<1 U	0.32 J	<1 U	6.7	<1 U	<1 U	4.9	<1 U	<2 U
	11/30/2006	0.76 J	<1 U	<1 U	<1 U	0.26 J	<1 U	6.6	<1 U	<1 U	5	<1 U	<2 U
	9/27/2007	0.61 J	0.23 J	<1 U	<1 U	1	<1 U	7.2	0.29 J	<1 U	3.9	<1 U	<2 U
	9/30/2008	0.6 J	0.78 J	<1 U	<1 U	2	<1 U	9.3	<1 U	0.7 J	7.7	<1 U	<2 U
GM-52	4/28/2006	2	0.94 J	<2 U	<2 U	1.9 J	<2 U	75	<2 U	0.67 J	61	<2 U	<4 U
	11/30/2006	1.3 J	0.93 J	<2 U	<2 U	2.7	<2 U	67	<2 U	0.76 J	47	<2 U	<4 U
	9/26/2007	1.3 J	1.5 J	<2.5 U	<2.5 U	18	<2.5 U	88	<2.5 U	1 J	47	<2.5 U	<5 U
	9/30/2008	1.9 J	3	<2.5 U	<2.5 U	14	<2.5 U	88	<2.5 U	<2.5 U	43	<2.5 U	<5 U
	11/12/2009	1.1 J	1.1 J	<2.5 U	<2.5 U	1.5 J	<2.5 U	94	<2.5 U	0.83 J	43	<2.5 U	<5.0 U
	1/27/2010	1.0 J	1.0 J	<4.0 U	<4.0 U	1.6 J	<4.0 U	94	<4.0 U	0.99 J	42	<4.0 U	<8.0 U
	9/22/2010	0.92 J	0.94 J	<3.3 U	<3.3 U	1.8 J	<3.3 U	90	<3.3 U	0.74 J	50	<3.3 U	<6.7 U
	9/29/2011	<4.0 U	1.9 J	<4.0 U	<4.0 U	4.2	<4.0 U	73	<4.0 U	<4.0 U	38	<4.0 U	<8.0 U
	9/5/2012	<4.0 U	4.1	<4.0 U	<4.0 U	7.9	<4.0 U	66	<4.0 U	<4.0 U	29	<4.0 U	<8.0 U
GM-55	9/14/2006	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	7.4	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<2 U
	11/12/2009	<1.0 U	<1.0 U	<1.0 U	0.46 J	<1.0 U	<1.0 U	7.7	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<2.0 U
	9/22/2010	<1.0 U	<1.0 U	<1.0 U	0.23 J	<1.0 U	<1.0 U	7.2	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<2.0 U
	9/28/2011	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	6.1	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<2.0 U
	9/5/2012	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	4.6	0.26 J	<1.0 U	<1.0 U	<1.0 U	<2.0 U
GM-57	9/14/2006	<1 U	<1 U	<1 U	<1 U	<1 U	0.21 J	1.9	0.48 J	<1 U	<1 U	<1 U	<2 U
	1/21/2008	<1 U	<1 U	<1 U	<1 U	<1 U	<1 U	1.9	<1 U	<1 U	<1 U	<1 U	<2 U
GM-62 ⁽¹⁾	9/14/2006	<1 U	<1 U	<1 U	<1 U	<1 U	<1 U	15	0.24 J	<1 U	<1 U	<1 U	<2 U
	4/8/2010	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	20	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<2.0 U
GM-63	9/14/2006	2.3 J	1.9 J	<5 U	<5 U	5.6	<5 U	160	<5 U	1.4 J	120	<5 U	<10 U
	12/1/2006	2.3 J	1.9 J	<4 U	<4 U	8.8	<4 U	140	<4 U	1.3 J	100	<4 U	<8 U
	9/25/2007	2.7 J	1.8 J	<6.7 U	<6.7 U	5 J	<6.7 U	130	<6.7 U	<6.7 U	120	<6.7 U	<13 U
	10/1/2008	4 J	2.2 J	<5 U	<5 U	4.9 J	<5 U	140	<5 U	<5 U	92	<5 U	<10 U
	1/28/2010	2.0 J	<5.7 U	<5.7 U	<5.7 U	3.2 J	<5.7 U	150	<5.7 U	<5.7 U	140	<5.7 U	<11 U
	9/6/2012	3.2 J	1.6 J	<5.7 U	<5.7 U	2.2 J	<5.7 U	89	<5.7 U	<5.7 U	58	<5.7 U	<11 U
GM-64	9/14/2006	1.8 J	1.8 J	<2.5 U	<2.5 U	16	<2.5 U	77	<2.5 U	1.6 J	34	<2.5 U	<5 U
	12/1/2006	2.1 J	2.1 J	<2.5 U	<2.5 U	42	<2.5 U	85	<2.5 U	2 J	35	<2.5 U	<5 U
	9/25/2007	<3.3 U	2.7 J	<3.3 U	<3.3 U	74	<3.3 U	11	<3.3 U	6.6	4.5	18	<6.7 U
	10/1/2008	0.55 J	2.7	<1 U	<1 U	15	<1 U	31	<1 U	2.3	14	2.3	<2 U
GM-65S	5/2/2007	0.62 J	0.78 J	<1 U	<1 U	1.7	<1 U	11	<1 U	<1 U	8	<1 U	<2 U
	1/21/2008	0.58 J	0.54 J	<1 U	<1 U	1.5	<1 U	13	<1 U	<1 U	7.9	<1 U	<2 U
	10/6/2008	<1 U	<1 U	<1 U	<1 U	<1 U	<1 U	8.7	<1 U	<1 U	3.8	<1 U	<2 U
	11/12/2009	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	11	<1.0 U	<1.0 U	2.5	<1.0 U	<2.0 U
	1/27/2010	<1.0 U	<1.0 U	<1.0 U	<1.0 U	0.22 J	<1.0 U	13	<1.0 U	<1.0 U	2.8	<1.0 U	<2.0 U
	9/22/2010	<1.0 U	0.34 J	<1.0 U	<1.0 U	0.63 J	<1.0 U	9.9	<1.0 U	<1.0 U	2.3	<1.0 U	<2.0 U
	9/28/2011	<1.0 U	0.16 J	<1.0 U	<1.0 U	<1.0 U	<1.0 U	7.8	<1.0 U	<1.0 U	2.3	<1.0 U	<2.0 U
	9/5/2012	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	6.5	<1.0 U	<1.0 U	2	<1.0 U	<2.0 U



Table A-1. Annual Groundwater Analytical Results for the Upper Aquifer Wells from 1999-2012, RACER Trust, Moraine, Ohio.

Well	Date	VOCs (ug/L)												Vinyl Chloride	Xylenes (total)
		1,1,1-TCA	1,1-DCA	1,1-DCE	Benzene	cis-1,2-DCE	Ethyl-benzene	PCE	Toluene	trans-1,2-DCE	TCE				
GM-77S	9/27/2007	<1 U	<1 U	<1 U	<1 U	<1 U	<1 U	<1 U	<1 U	<1 U	<1 U	<1 U	<1 U	<2 U	
	10/21/2010	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<2.0 U	
GM-78	10/23/2007	<1 U	<1 U	<1 U	<1 U	<1 U	<1 U	8.9	0.23 J	<1 U	<1 U	<1 U	<1 U	<2 U	
	1/21/2008	<1 U	<1 U	<1 U	<1 U	<1 U	<1 U	11	<1 U	<1 U	<1 U	<1 U	<1 U	<2 U	
	10/2/2008	<1 U	<1 U	<1 U	<1 UJ	<1 U	<1 U	11	<1 U	<1 U	<1 U	<1 U	<1 U	<2 U	
	11/12/2009	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 UJ	12	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<2.0 U	
	9/28/2010	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	11	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<2.0 U	
	9/29/2011	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	4.3	0.18 J	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<2.0 U	
	9/5/2012	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	9.5	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<2.0 U	
GM-79	10/23/2007	0.66 J	0.24 J	<1 U	<1 U	<1 U	<1 U	<1 U	<1 U	<1 U	1.6	<1 U	<1 U	<2 U	
	10/2/2008	0.65 J	<1 U	<1 U	<1 UJ	<1 U	<1 U	<1 U	<1 U	<1 U	1.8	<1 U	<1 U	<2 U	
	11/12/2009	0.72 J	0.31 J	<1.0 U	0.48 J	0.28 J	<1.0 UJ	<1.0 U	<1.0 U	<1.0 U	2.1	<1.0 U	<1.0 U	<2.0 U	
	9/22/2010	0.51 J	0.23 J	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	1.6	<1.0 U	<1.0 U	<2.0 U	
	9/28/2011	<1.0 U	0.22 J	<1.0 U	<1.0 U	0.19 J	<1.0 U	0.34 J	<1.0 U	<1.0 U	1.3	<1.0 U	<1.0 U	<2.0 U	
	9/5/2012	0.72 J	0.94 J	<1.0 U	<1.0 U	1.9	<1.0 U	<1.0 U	<1.0 U	0.29 J	2.2	<1.0 U	<1.0 U	<2.0 U	
GM-80	10/23/2007	<1 U	0.38 J	<1 U	<1 U	1.5	<1 U	0.68 J	<1 U	0.21 J	4	<1 U	<1 U	<2 U	
	9/22/2008	<1 U	0.39 J	<1 U	<1 U	3.6	<1 U	0.93 J	<1 U	0.19 J	5.4	<1 U	<1 U	<2 U	
	11/12/2009	0.24 J	0.55 J	<1.0 U	<1.0 U	3.2	<1.0 U	1.6	<1.0 U	0.25 J	9.8	<1.0 U	<1.0 U	<2.0 U	
	4/9/2010	<1.0 U	<1.0 U	<1.0 U	<1.0 U	0.85 J	<1.0 U	1.9	<1.0 U	<1.0 U	6.6	<1.0 U	<1.0 U	<2.0 U	
	9/21/2010	<1.0 U	0.30 J	<1.0 U	<1.0 U	1.3	<1.0 U	2.6	<1.0 U	<1.0 U	6	<1.0 U	<1.0 U	<2.0 U	
	9/28/2011	<1.0 U	0.47 J	<1.0 U	<1.0 U	2.7	<1.0 U	4.1	<1.0 U	0.24 J	5.9	<1.0 U	<1.0 U	<2.0 U	
	9/5/2012	0.43 J	1.7	<1.0 U	<1.0 U	8.3	<1.0 U	5.2	<1.0 U	0.30 J	13	<1.0 U	<1.0 U	<2.0 U	
GM-81	10/23/2007	0.22 J	0.93 J	<1 U	<1 U	0.98 J	<1 U	<1 U	<1 U	<1 U	0.61 J	<1 U	<1 U	<2 U	
	4/9/2010	0.23 J	0.92 J	<1.0 U	<1.0 U	1.5	<1.0 U	<1.0 U	<1.0 U	<1.0 U	1.2	<1.0 U	<1.0 U	<2.0 U	

(1) - Well abandoned.

All concentrations presented in micrograms per liter.

VOCs - Volatile Organic Compounds.

1,1,1-TCA - 1,1,1-Trichloroethane.

1,1-DCA - 1,1-Dichloroethane.

1,1-DCE - 1,1-Dichloroethene.

cis-1,2-DCE - cis-1,1-Dichloroethene.

PCE - Tetrachloroethene.

trans-1,2-DCE - trans-1,2-Dichloroethene.

TCE - Trichloroethene.

< - Constituent not detected above laboratory reporting limit shown.

J - Value is estimated.

U - Constituent not detected above laboratory reporting limit shown.



Table A-2. Annual Groundwater Analytical Results for the Lower Aquifer Wells from 1999-2012, RACER Trust, Moraine, Ohio.

Well	Date	VOCs (ug/L)											
		1,1,1-TCA	1,1-DCA	1,1-DCE	Benzene	cis-1,2-DCE	Ethyl-benzene	PCE	Toluene	trans-1,2-DCE	TCE	Vinyl Chloride	Xylenes
Upgradient of the Site													
RMW-88	9/26/2012	< 1.4 U	17	< 1.4 U	< 1.4 U	43	< 1.4 U	< 1.4 U	0.21 J	1.5	< 1.4 U	1.1 J	< 2.9 U
HR-12	9/14/1999	<1.0UJ	2.7	<1.0	1.2	1.8	<1.0	<1.0	<1.0	<1.0	<1.0	1.7	<1.0
	9/28/2000	<1.0	2.2	<1.0	<1.0	2.0	<1.0	<1.0	<1.0	<1.0	<1.0	2.5	<1.0
	11/14/2001	< 1.0	3.6	< 1.0	< 1.0	2.7	< 1.0	< 1.0	< 1.0	0.23	< 1.0	3.8	< 1.0
	9/26/2002	< 1	2.4	< 1	< 1	2.1	< 1	< 1	< 1	< 0.5	< 1	1.7	< 1
	9/18/2003	< 1 U	1.7	< 1 U	< 1 U	1.4	< 1 U	< 1 U	< 1 U	< 0.5 U	< 1 U	1.6	< 1 U
	9/21/2004	< 1 U	1.8	< 1 U	< 1 U	1.2	< 1 U	< 1 U	< 1 U	< 0.5 U	< 1 U	1.1	< 1 U
	10/24/2005	< 1.0 U	2.1	< 1.0 U	< 1.0 U	1.5	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	0.36 J	< 2.0 U
	9/26/2006	< 1 U	2.1	< 1 U	< 1 U	1.3	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 2 U
	9/19/2007	< 1 U	2.2	< 1 U	< 1 U	1.3	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 2 U
	9/25/2008	0.39 J	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	1.3	< 1 U	< 1 U	5.1	< 1 U	< 2 U
	11/13/2009	< 1.0 U	2	< 1.0 U	< 1.0 U	1.1	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 2.0 U
	9/28/2010	< 1.0 U	2.1	< 1.0 U	< 1.0 U	1.2	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 2.0 U
	9/28/2011	< 1.0 U	2.8	< 1.0 U	< 1.0 U	1.6	< 1.0 U	< 1.0 U	< 1.0 U	0.24 J	< 1.0 U	< 1.0 U	< 2.0 U
	9/7/2012	< 1.0 U	2.1	< 1.0 U	< 1.0 U	0.31 J	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 2.0 U
On-Site													
HR-14	9/15/1999	<1.0	<1.0	<1.0	<1.0	7.9	<1.0	<1.0	<1.0	<1.0	3.4	11.5	<1.0
	9/30/2002	< 1	< 1	< 1	< 1	3.6	< 1	< 1	< 1	< 0.5	1.2	< 1	< 1
HR-15	9/15/1999	<1.0	<1.0	<1.0	<1.0	2.5	<1.0	<1.0	<1.0	<1.0	<1.0	11.0	<1.0
	9/29/2000	<1.0	<1.0	<1.0	<1.0	2.8	<1.0	<1.0	<1.0	<1.0	<1.0	11.2	<1.0
	11/14/2001	< 1.0	< 1.0	< 1.0	< 1.0	0.86	< 1.0	< 1.0	< 1.0	< 0.50	< 1.0	< 1.0	< 1.0
	9/30/2002	< 1	< 1UJ	< 1	< 1	1	< 1	< 1	< 1	< 0.5	< 1	< 1	< 1
	9/17/2003	< 1 U	< 1 U	< 1 U	< 1 U	2.2	< 1 U	< 1 U	< 1 U	< 0.5 U	0.29 J	14	< 1 U
	9/21/2004	< 1 U	< 1 U	< 1 U	< 1 U	2.5	< 1 U	< 1 U	< 1 U	< 0.5 U	0.38 J	19	< 1 U
	10/25/2005	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	2.2	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	0.40 J	14	< 2.0 U
	9/25/2006	< 1 U	< 1 U	< 1 U	< 1 U	2.2	< 1 U	< 1 U	< 1 U	< 1 U	0.5 J	13	< 2 U
	9/26/2007	< 1 U	< 1 U	< 1 U	< 1 U	2.5	< 1 U	< 1 U	< 1 U	< 1 U	0.37 J	15	< 2 U
	9/29/2008	< 1 U	< 1 U	< 1 U	< 1 U	3.6	< 1 U	< 1 U	< 1 U	< 1 U	0.47 J	9.7	< 2 U
	11/13/2009	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	3.1	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	0.7 J	6.5	< 2.0 U
	9/24/2010	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	3	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	0.60 J	3.8	< 2.0 U
	9/28/2011	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	3.5	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	0.78 J	2.4	< 2.0 U
	9/6/2012	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	3.9	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	0.87 J	1.1	< 2.0 U



Table A-2. Annual Groundwater Analytical Results for the Lower Aquifer Wells from 1999-2012, RACER Trust, Moraine, Ohio.

Well	Date	VOCs (ug/L)											
		1,1,1-TCA	1,1-DCA	1,1-DCE	Benzene	cis-1,2-DCE	Ethyl-benzene	PCE	Toluene	trans-1,2-DCE	TCE	Vinyl Chloride	Xylenes
HR-13	9/15/1999	1.6	41.4	<1.0	<1.0	20.8	<1.0	<1.0	<1.0	3.1	3.4	<1.0	<1.0
	9/29/2000	1.7	39.5	<1.0	<1.0	14.1	<1.0	<1.0	<1.0	2.5	2.0	<1.0	<1.0
	11/14/2001	0.74J	15	<1.0	0.18J	6.5	<1.0	<1.0	<1.0	0.65	1.2	<1.0	<1.0
	9/30/2002	1.4	25	<1	<1	11	<1	<1	<1	1.4	3.6	<1	<1
	9/16/2003	2.2	33	<1 U	<1 U	12	<1 U	<1 U	<1 U	1.8	5.7	<1 U	<1 U
	9/21/2004	2.6	30	0.27 J	<1 U	12	<1 U	<1 U	<1 U	1.5	21	0.43 J	<1 U
	10/25/2005	2.3	25	0.25 J	<1.0 U	11	<1.0 U	0.20 J	<1.0 U	1.5	20	<1.0 U	<2.0 U
	9/25/2006	2	22	0.18 J	<1 U	9	<1 U	0.2 J	<1 U	1.4	15	<1 U	<2 U
31	9/25/2007	<1 U	1.5	<1 U	<1 U	1.1	<1 U	<1 U	<1 U	<1 U	5.1	<1 U	<2 U
	9/29/2000	<1.0	7.4	<1.0	<1.0	8.4	<1.0	<1.0	<1.0	<1.0	12.9	4.4	<1.0
39	11/15/2001	<1.0	3.1	<1.0	<1.0	2.4	<1.0	<1.0	<1.0	<0.50	5.1	2.5	<1.0
	9/27/2002	<1	1.6	<1	<1	1.3	<1	<1	<1	<0.5	3.8	0.51J	<1
GM-39	9/24/2003	<1 U	0.58 J	<1 U	<1 U	0.71	<1 U	<1 U	<1 U	<0.5 U	0.89 J	<1 U	<1 U
	12/10/2003	<1 U	<1 U	<1 U	<1 U	<0.5 U	<1 U	<1 U	0.18 J	<0.5 U	<1 U	1.3	<1 U
	9/20/2004	<1 U	<1 U	<1 U	<1 U	<0.5 U	<1 U	<1 U	<1 U	<0.5 U	<1 U	1.8	<1 U
	10/24/2005	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	0.77 J	<2.0 U
	9/27/2006	<1 U	<1 U	<1 U	<1 U	<1 U	<1 U	<1 U	<1 U	<1 U	<1 U	1.7	<2 U
	9/26/2007	<1 U	<1 U	<1 U	<1 U	19 J	<1 U	<1 U	<1 U	0.23 J	<1 U	1.6	<2 U
	10/1/2008	<1 U	<1 U	<1 U	<1 U	0.67 J	<1 U	<1 U	<1 U	<1 U	<1 U	3.2	<2 U
	12/10/2003	<1 U	<1 U	<1 U	<1 U	<0.5 U	<1 U	<1 U	<1 U	<0.5 U	<1 U	3.1	<1 U
GM-40	9/20/2004	<1 U	<1 U	<1 U	<1 U	<0.5 U	<1 U	<1 U	<1 U	<0.5 U	<1 U	3.2	<1 U
	10/25/2005	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	2.9	<2.0 U
	9/26/2006	<1 U	<1 U	<1 U	<1 U	<1 U	<1 U	<1 U	<1 U	<1 U	<1 U	3.9	<2 U
	9/25/2007	<1 U	<1 U	<1 U	<1 U	<1 U	<1 U	<1 U	<1 U	<1 U	<1 U	4	<2 U
	9/30/2008	<1 U	<1 U	<1 U	<1 U	<1 U	<1 U	<1 U	<1 U	<1 U	<1 U	3.6	<2 U
	9/15/2006	0.5 J	2.2	<1.7 U	<1.7 U	2.6	<1.7 U	20	0.44 J	<1.7 U	36	<1.7 U	<3.3 U
GM-61	9/26/2007	0.59 J	1.6 J	<1.7 U	<1.7 U	3.9	<1.7 U	28	<1.7 U	<1.7 U	56	<1.7 U	<3.3 U
	10/1/2008	<1 U	0.94 J	0.19 J	<1 U	20	<1 U	13	<1 U	0.92 J	23	0.75 J	<2 U
GM-41	12/10/2003	<11 U	<11 U	<11 U	<1 U	10	<11 U	<11 U	<11 U	<5.6 U	320	<11 U	<11 U
	9/21/2004	<6.2 U	<6.2 U	<6.2 U	<6.2 U	24	<6.2 U	<6.2 U	<6.2 U	<3.1 U	180	<6.2 U	<6.2 U
	10/24/2005	<10 U	<10 U	<10 U	<10 U	16	<10 U	<10 U	<10 U	<10 U	250	<10 U	<20 U
	9/18/2006	<4 U	<4 U	<4 U	<4 U	11	<4 U	<4 U	<4 U	<4 U	210	<4 U	<8 U
	5/3/2007	<6.7 U	<6.7 U	<6.7 U	<6.7 U	15	<6.7 U	<6.7 U	<6.7 U	<6.7 U	170	2.4 J	<13 U
	9/20/2007	<6.7 U	<6.7 U	<6.7 U	<6.7 U	17	<6.7 U	<6.7 U	<6.7 U	1.4 J	230	1.9 J	<13 U
	9/26/2008	<7.1 U	<7.1 U	<7.1 U	<7.1 U	11	<7.1 U	<7.1 U	<7.1 U	<7.1 U	180	<7.1 U	<14 U
	9/14/2006	<1 U	<1 U	<1 U	<1 U	0.73 J	<1 U	4.4	0.4 J	<1 U	0.72 J	<1 U	<2 U
GM-58	11/30/2006	<3.3 U	<3.3 U	<3.3 U	<3.3 U	<3.3 U	<3.3 U	85	<3.3 U	<3.3 U	<3.3 U	<3.3 U	<6.7 U
	5/3/2007	<2.9 U	<2.9 U	<2.9 U	<2.9 U	<2.9 U	<2.9 U	82	<2.9 U	<2.9 U	<2.9 U	<2.9 U	<5.7 U
	9/20/2007	<3.3 U	<3.3 U	<3.3 U	<3.3 U	<3.3 U	<3.3 U	69	<3.3 U	<3.3 U	<3.3 U	<3.3 U	<6.7 U
	9/26/2008	<2.5 U	<2.5 U	<2.5 U	<2.5 U	<2.5 U	<2.5 U	80	<2.5 U	<2.5 U	<2.5 U	<2.5 U	<5 U
	9/26/2012	12	13	1.6 J	<6.7 U	52	<6.7 U	48	<6.7 U	1.6 J	190	<6.7 U	<13 U
RMW-86	9/26/2012	<1.0 U	15	<1.0 U	0.13 J	23	<1.0 U	<1.0 U	0.39 J	1.3	7.5	0.93 J	<2.0 U

Table A-2. Annual Groundwater Analytical Results for the Lower Aquifer Wells from 1999-2012, RACER Trust, Moraine, Ohio.

Well	Date	VOCs (ug/L)											
		1,1,1-TCA	1,1-DCA	1,1-DCE	Benzene	cis-1,2-DCE	Ethyl-benzene	PCE	Toluene	trans-1,2-DCE	TCE	Vinyl Chloride	Xylenes
GM-54	9/14/2006	< 6.7 U	< 6.7 U	< 6.7 U	< 6.7 U	< 6.7 U	< 6.7 U	180	< 6.7 U	< 6.7 U	3.2 J	< 6.7 U	< 13 U
	5/2/2007	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	160	< 5 U	< 5 U	2.9 J	< 5 U	< 10 U
	9/20/2007	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	150	< 5 U	< 5 U	2.4 J	< 5 U	< 10 U
	9/30/2008	< 5.7 U	< 5.7 U	< 5.7 U	< 5.7 U	< 5.7 U	< 5.7 U	190	< 5.7 U	< 5.7 U	2.5 J	< 5.7 U	< 11 U
	11/13/2009	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	120	< 5.0 U	< 5.0 U	2.9 J	< 5.0 U	< 10 U
	1/28/2010	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	120	< 5.0 U	< 5.0 U	2.4 J	< 5.0 U	< 10 U
	9/23/2010	< 2.5 U	< 2.5 U	< 2.5 U	< 2.5 U	< 2.5 U	< 2.5 U	92	< 2.5 U	< 2.5 U	2.2 J	< 2.5 U	< 5.0 U
	9/29/2011	< 4.0 U	< 4.0 U	< 4.0 U	< 4.0 U	< 4.0 U	< 4.0 U	83	< 4.0 U	< 4.0 U	2.6 J	< 4.0 U	< 8.0 U
GM-42	9/7/2012	< 4.0 U	< 4.0 U	< 4.0 U	< 4.0 U	< 4.0 U	< 4.0 U	64	< 4.0 U	< 4.0 U	2.8 J	< 4.0 U	< 8.0 U
	12/9/2003	< 1 U	0.46 J	< 1 U	< 1 U	11	< 1 U	0.27 J	< 1 U	0.34 J	0.37 J	1	< 1 U
	9/20/2004	< 1 U	0.7 J	0.25 J	< 1 U	16	< 1 U	< 1 U	< 1 U	0.44 J	0.43 J	0.92 J	< 1 U
	10/25/2005	< 1.0 U	0.64 J	0.21 J	< 1.0 U	17	< 1.0 U	0.19 J	< 1.0 U	0.59 J	0.85 J	0.56 J	< 2.0 U
	9/26/2006	< 1 U	0.5 J	< 1 U	< 1 U	14	< 1 U	< 1 U	< 1 U	0.44 J	0.64 J	0.45 J	< 2 U
	9/25/2007	< 1 U	0.67 J	< 1 U	< 1 U	18	< 1 U	< 1 U	0.18 J	0.69 J	2.2	0.44 J	< 2 U
	9/30/2008	< 1 U	0.66 J	0.53 J	< 1 U	20	< 1 U	< 1 U	< 1 U	0.89 J	9.9	0.31 J	< 2 U
	9/6/2012	< 1.0 U	0.41 J	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	0.25 J	< 1.0 U	6.4	< 2.0 U
GM-19D	9/28/1999	<1.0	<1.0	<1.0	<1.0	1.2	<1.0	<1.0	<1.0	<1.0	13.5	1.5	<1.0
	10/2/2000	<1.0	<1.0	<1.0	<1.0	3.5	<1.0	<1.0	<1.0	<1.0	2.9	15.7	<1.0
	11/14/2001	0.18J	< 1.0	< 1.0	< 1.0	0.92	< 1.0	< 1.0	0.38J	< 0.50	3.7	13	< 1.0
	9/26/2002	< 1	< 1	< 1	< 1	0.81	< 1	< 1	< 1	< 0.5	3.1	0.36J	< 1
	9/25/2003	< 1 U	< 1 U	< 1 U	< 1 U	1.8	< 1 U	< 1 U	< 1 U	< 0.5 U	0.24 J	17	< 1 U
	9/20/2004	0.31 J	< 1 U	< 1 U	< 1 U	2	< 1 U	< 1 U	< 1 U	< 0.5 U	3.5	18	< 1 U
	10/25/2005	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	2.7	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	1.2	15	< 2.0 U
	9/26/2006	< 1 U	< 1 U	< 1 U	< 1 U	2	< 1 U	< 1 U	< 1 U	< 1 U	1.4	18	< 2 U
	9/17/2007	0.25 J	< 1 U	< 1 U	< 1 U	1.4	< 1 U	< 1 U	< 1 U	< 1 U	3.2	16	< 2 U
	9/23/2008	< 1 U	< 1 U	< 1 U	< 1 U	2.4	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	9.8	< 2 U
	11/11/2009	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	2.1	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	1.7	14	< 2.0 U
	9/27/2010	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	2.4	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	0.98 J	9.9	< 2.0 U
	9/29/2011	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	1.7	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	1.8	8.6	< 2.0 U
GM-7R	9/6/2012	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	3.5	< 1.0 U	< 1.0 U	0.82 J	< 1.0 U	7.4	2.4	0.32 J
	9/28/1999	4.2	<1.0	<1.0	<1.0	2.1	<1.0	<1.0	<1.0	<1.0	76.1	<1.0	<1.0
GM-67D	5/3/2007	0.59 J	3	0.36 J	< 1.7 U	23	< 1.7 U	54	< 1.7 U	0.83 J	45	< 1.7 U	< 3.3 U
GM-68D	5/4/2007	< 50 U	< 50 U	< 50 U	< 50 U	< 50 U	< 50 U	1500	< 50 U	< 50 U	750	< 50 U	< 100 U
	10/3/2008	< 5 U	< 5 U	< 5 U	< 5 U	14	< 5 U	190	< 5 U	< 5 U	46	< 5 U	< 10 U
	11/16/2009	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U	4.5	< 2.0 U	130 J	< 2.0 U	< 2.0 U	35	< 2.0 U	< 4.0 U
	9/29/2010	< 3.3 U	< 3.3 U	< 3.3 U	< 3.3 U	3.0 J	< 3.3 U	100	< 3.3 U	< 3.3 U	22	< 3.3 U	< 6.7 U
	9/30/2011	< 1.7 U	< 1.7 U	< 1.7 U	< 1.7 U	1.5 J	< 1.7 U	62	< 1.7 U	< 1.7 U	13	< 1.7 U	< 3.3 U
	9/7/2012	< 3.3 U	< 3.3 U	< 3.3 U	< 3.3 U	< 3.3 U	< 3.3 U	49	< 3.3 U	< 3.3 U	6.9	< 3.3 U	< 6.7 U
GM-69	5/3/2007	< 12 U	8.7 J	< 12 U	< 12 U	29	< 12 U	6.5 J	< 12 U	< 12 U	300	< 12 U	< 24 U
GM-70	5/3/2007	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	11	< 1 U	< 1 U	0.32 J	< 1 U	< 2 U
GM-73	10/23/2007	< 6.7 U	< 6.7 U	< 6.7 U	< 6.7 U	< 6.7 U	< 6.7 U	160	< 6.7 U	< 6.7 U	22	< 6.7 U	< 13 U
GM-74D	9/27/2007	< 8 U	< 8 U	< 8 U	< 8 U	< 8 U	< 8 U	250	< 8 U	< 8 U	130	< 8 U	< 16 U
	4/9/2010	< 2.5 U	< 2.5 U	< 2.5 U	< 2.5 U	8.0	< 2.5 U	98	< 2.5 U	< 2.5 U	50	< 2.5 U	< 5.0 U



Table A-2. Annual Groundwater Analytical Results for the Lower Aquifer Wells from 1999-2012, RACER Trust, Moraine, Ohio.

Well	Date	VOCs (ug/L)											
		1,1,1-TCA	1,1-DCA	1,1-DCE	Benzene	cis-1,2-DCE	Ethyl-benzene	PCE	Toluene	trans-1,2-DCE	TCE	Vinyl Chloride	Xylenes
GM-75D	9/26/2007	< 50 U	< 50 U	< 50 U	< 50 U	24 J	< 50 U	470	< 50 U	< 50 U	1700 J	< 50 U	< 100 U
	10/6/2008	< 33 U	< 33 U	< 33 U	< 33 U	120	< 33 U	220	< 33 U	< 33 U	750	< 33 U	< 67 U
	11/16/2009	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	15	< 5.0 U	320	< 5.0 U	< 5.0 U	210	< 5.0 U	< 10 U
	4/8/2010	< 9.1 U	< 9.1 U	< 9.1 U	< 9.1 U	19	< 9.1 U	320	< 9.1 U	< 9.1 U	200	< 9.1 U	< 18 U
	9/29/2010	< 9.1 U	< 9.1 U	< 9.1 U	< 9.1 U	12	< 9.1 U	260	< 9.1 U	< 9.1 U	190	< 9.1 U	< 18 U
	9/30/2011	< 4.0 U	< 4.0 U	< 4.0 U	< 4.0 U	12	< 4.0 U	200	< 4.0 U	< 4.0 U	180	2.1 J	< 8.0 U
	9/7/2012	< 11 U	< 11 U	< 11 U	< 11 U	31	< 11 U	150	< 11 U	< 11 U	150	4.7 J	< 22 U
GM-76D	9/23/2007	< 1 U	0.3 J	< 1 U	< 1 U	< 1 U	< 1 U	0.63 J	< 1 U	< 1 U	2.7	< 1 U	< 2 U
GM-82	2/26/2008	< 2 U	2.3	< 2 U	< 2 U	47	< 2 U	60	< 2 U	1.9 J	91	< 2 U	< 4 U
	10/2/2008	1 J	2.4 J	0.64 J	< 3.3 U	46	< 3.3 U	51	< 3.3 U	2 J	100	< 3.3 U	< 6.7 U
RMW-85	9/26/2012	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	280	< 10 U	< 10 U	120	< 10 U	< 20 U
GM-83D	2/26/2008	< 1 U	< 1 U	< 1 U	< 1 U	0.28 J	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	1.5	< 2 U
	10/2/2008	< 1 U	< 1 U	< 1 U	< 1 U	0.3 J	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	1.3	< 2 U
	11/11/2009	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	0.31 J	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	2.1	< 2.0 U
	9/22/2010	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	0.31 J	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	2	< 2.0 U
	9/28/2011	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	1.8	< 2.0 U
	9/7/2012	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	1.7	< 2.0 U
GM-84	2/26/2008	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	0.57 J	< 1 U	5.5	< 1 U	< 2 U
	10/2/2008	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	6.6	< 1 U	< 2 U
	11/16/2009	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	6.3	< 1.0 U	< 2.0 U
	1/27/2010	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	6.4	< 1.0 U	< 2.0 U
	9/23/2010	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	5.9	< 1.0 U	< 2.0 U
	9/29/2011	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	5.7	< 1.0 U	< 2.0 U
	9/7/2012	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	4.9	< 1.0 U	< 2.0 U
Downgradient of the Site													
GM-3	9/28/1999	1.7	<1.0	<1.0	<1.0	1.1	<1.0	1.2	<1.0	<1.0	7.5	<1.0	<1.0
	10/2/2000	1.0	2.1	<1.0	<1.0	8.3	<1.0	1.5	<1.0	1.1	9.4	<1.0	<1.0
	11/14/2001	0.16J	0.95J	< 1.0	< 1.0	2.6	< 1.0	0.48J	< 1.0	0.25J	2.9	< 1.0	< 1.0
	10/1/2002	0.74J	1.8	< 1	< 1	8.9	< 1	1.4	< 1	1.2	9.5	0.63J	< 1
	10/2/2003	0.96 J	1.6	< 1 U	< 1 U	5.5	0.26 J	1.7	< 1 U	0.77	12	< 1 U	< 1 U
	9/21/2004	1	1.8	< 1 U	< 1 U	4.9	< 1 U	2	< 1 U	0.75	13	< 1 U	< 1 U
	10/25/2005	0.83 J	1.6	< 1.0 U	< 1.0 U	4.7	< 1.0 U	2.0	< 1.0 U	0.66 J	14	< 1.0 U	< 2.0 U
	9/22/2006	0.59 J	2 J	< 1 UJ	< 1 UJ	6.1 J	< 1 UJ	2.1 J	< 1 UJ	1 J	13 J	0.27 J	< 2 UJ
	9/18/2007	0.67 J	1.5	< 1 U	< 1 U	3.8	< 1 U	1.9	< 1 U	0.77 J	14	< 1 U	< 2 U
	9/24/2008	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 UJ	< 1 U	< 1 U	< 1 UJ	< 1 U	< 2 U
GM-4	9/28/1999	<1.0	<1.0	<1.0	<1.0	2.3	<1.0	<1.0	<1.0	<1.0	13.4	<1.0	<1.0
GM-5	9/28/1999	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	3.9	<1.0	1.3	<1.0	<1.0

Table A-2. Annual Groundwater Analytical Results for the Lower Aquifer Wells from 1999-2012, RACER Trust, Moraine, Ohio.

Well	Date	VOCs (ug/L)											
		1,1,1-TCA	1,1-DCA	1,1-DCE	Benzene	cis-1,2-DCE	Ethyl-benzene	PCE	Toluene	trans-1,2-DCE	TCE	Vinyl Chloride	Xylenes
GM-1	9/28/1999	1.1	<1.0	<1.0	<1.0	<1.0	<1.0	2.0	5.2	<1.0	30.6	<1.0	<1.0
	10/2/2000	2.2	<1.0	<1.0	<1.0	<1.0	<1.0	2.8	<1.0	<1.0	37.2	<1.0	<1.0
	11/14/2001	0.80J	0.29J	<1.0	<1.0	<0.50	<1.0	1.3	<1.0	<0.50	19	<1.0	<1.0
	10/1/2002	1.3 J	0.48 J	<1.4 U	<1.4 U	0.95	<1.4 U	2.3	<1.4 U	<0.72 U	39	<1.4 U	<1.4 U
	10/2/2003	1.2	<1 U	<1 U	<1 U	<0.5 U	<1 U	2	<1 U	<0.5 U	34	<1 U	<1 U
	9/21/2004	1.2	<1 U	<1 U	<1 U	<0.5 U	<1 U	2.1	<1 U	<0.5 U	35	<1 U	<1 U
	10/25/2005	0.95 J	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	2.1	<1.0 U	<1.0 U	34	<1.0 U	<2.0 U
	9/20/2006	0.76 J	<1 U	<1 U	<1 U	<1 U	<1 U	2.1	<1 U	<1 U	34	<1 U	<2 U
	9/18/2007	0.74 J	<1 U	<1 U	<1 U	<1 U	<1 U	1.8	<1 U	<1 U	32	<1 U	<2 U
	9/24/2008	0.69 J	<1 U	<1 U	<1 U	<1 U	<1 U	1.8	<1 U	<1 U	31	<1 U	<2 U
GM-15	9/5/2012	0.42 J	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	1.1	<1.0 U	<1.0 U	26	<1.0 U	<2.0 U
	9/24/1999	<1.0	2.4	<1.0	<1.0	4.3	<1.0	<1.0	<1.0	<1.0	4.1	<1.0	<1.0
	10/2/2000	<1.0	2.3	<1.0	<1.0	2.6	<1.0	<1.0	<1.0	<1.0	4.7	<1.0	<1.0
	11/14/2001	<1.0	1.4	<1.0	<1.0	1.2	<1.0	<1.0	<1.0	<0.50	4.9	<1.0	<1.0
	9/27/2002	<1	1.6	<1	<1	1.8	<1	<1	<1	<0.5	4.7	<1	<1
	9/22/2003	<1 U	1.7	<1 U	<1 U	1.6	<1 U	<1 U	<1 U	<0.5 U	5.9	<1 U	<1 U
	9/20/2004	<1 U	1.8	<1 U	<1 U	1.4	<1 U	<1 U	<1 U	<0.5 U	5.8	<1 U	<1 U
	10/26/2005	<1.0 U	1.7	<1.0 U	<1.0 U	1.7	<1.0 U	<1.0 U	<1.0 U	<1.0 U	5.9	<1.0 U	<2.0 U
	9/18/2006	<1 U	1.6	<1 U	<1 U	1.2	<1 U	<1 U	<1 U	<1 U	6.3	<1 U	<2 U
	9/25/2007	<1 U	1.5	<1 U	<1 U	1.1	<1 U	<1 U	<1 U	<1 U	5.1	<1 U	<2 U
GM-14	9/30/2008	<1 U	1.1	<1 U	<1 U	0.79 J	<1 U	<1 U	<1 U	<1 U	6.2	<1 U	<2 U
	11/13/2009	<1.0 U	1.2	<1.0 U	<1.0 U	1	<1.0 U	<1.0 U	<1.0 U	<1.0 U	6.5	<1.0 U	<2.0 U
	9/23/2010	<1.0 U	1.2	<1.0 U	<1.0 U	1	<1.0 U	<1.0 U	<1.0 U	<1.0 U	6.5	<1.0 U	<2.0 U
	9/29/2011	<1.0 U	1.1	<1.0 U	<1.0 U	1.1	<1.0 U	<1.0 U	<1.0 U	<1.0 U	4.7	<1.0 U	<2.0 U
	9/5/2012	0.23 J	1.3	<1.0 U	<1.0 U	2.2	<1.0 U	<1.0 U	0.33 J	0.31 J	6.1	<1.0 U	<2.0 U
GM-13	9/24/1999	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
GM-11	9/24/1999	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	1.5	<1.0	<1.0	14.5	<1.0	<1.0
GM-11	10/2/2000	1.4	<1.0	<1.0	<1.0	<1.0	<1.0	3.0	<1.0	<1.0	41.3	<1.0	<1.0
	11/14/2001	0.33J	<1.0	<1.0	<1.0	<0.50	<1.0	1.0	<1.0	<0.50	12	<1.0	<1.0
	10/1/2002	1	0.34J	<1	<1	0.62	<1	2.2	<1	<0.5	35	<1	<1
	9/24/2003	0.96 J	<1 U	<1 U	<1 U	<0.5 U	<1 U	2.2	<1 U	<0.5 U	33	<1 U	<1 U
	9/21/2004	0.89 J	<1 U	<1 U	<1 U	<0.5 U	<1 U	2.1	<1 U	<0.5 U	33	<1 U	<1 U
	10/26/2005	0.75 J	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	1.7	<1.0 U	<1.0 U	32	<1.0 U	<2.0 U
	9/25/2006	0.75 J	<1 U	<1 U	<1 U	<1 U	<1 U	2	<1 U	<1 U	34	<1 U	<2 U
	9/18/2007	0.6 J	<1 U	<1 U	<1 U	<1 U	<1 U	1.5	<1 U	<1 U	35	<1 U	<2 U
	9/24/2008	0.47 J	<1 U	<1 U	<1 U	<1 U	<1 U	1.7	<1 U	<1 U	31	<1 U	<2 U
	11/12/2009	0.47 J	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	1.8	<1.0 U	<1.0 U	37	<1.0 U	<2.0 U
GM-11	9/22/2010	0.36 J	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	1.5	<1.0 U	<1.0 U	31	<1.0 U	<2.0 U
	9/28/2011	<1.4 U	<1.4 U	<1.4 U	<1.4 U	<1.4 U	<1.4 U	1.1 J	<1.4 U	<1.4 U	24	<1.4 U	<2.9 U
	9/5/2012	0.32 J	<1.0 U	<1.0 U	<1.0 U	0.39 J	<1.0 U	1.2	<1.0 U	<1.0 U	25	<1.0 U	<2.0 U

Table A-2. Annual Groundwater Analytical Results for the Lower Aquifer Wells from 1999-2012, RACER Trust, Moraine, Ohio.

Well	Date	VOCs (ug/L)											
		1,1,1-TCA	1,1-DCA	1,1-DCE	Benzene	cis-1,2-DCE	Ethyl-benzene	PCE	Toluene	trans-1,2-DCE	TCE	Vinyl Chloride	Xylenes
GM-20D	9/24/1999	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	10/3/2000	1.6	<1.0	<1.0	<1.0	<1.0	<1.0	4.2	<1.0	<1.0	14.3	<1.0	<1.0
	11/14/2001	0.64J	<1.0	<1.0	<1.0	<0.50	<1.0	2.0	<1.0	<0.50	5.9	<1.0	<1.0
	9/30/2002	<1	<1	<1	<1	<0.5	<1	1.3	<1	<0.5	3.8	<1	<1
	9/22/2003	0.89 J	<1 U	<1 U	<1 U	<0.5 U	<1 U	3.6	<1 U	<0.5 U	12	<1 U	<1 U
	9/21/2004	0.96 J	<1 U	<1 U	<1 U	<0.5 U	<1 U	2.9	<1 U	<0.5 U	11	<1 U	<1 U
	10/26/2005	0.73 J	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	2.7	<1.0 U	<1.0 U	11	<1.0 U	<2.0 U
	9/26/2006	0.51 J	<1 U	<1 U	<1 U	<1 U	<1 U	2.1	<1 U	<1 U	11	<1 U	<2 U
	9/19/2007	0.5 J	<1 U	<1 U	<1 U	<1 U	<1 U	2.1	<1 U	<1 U	9.2	<1 U	<2 U
	9/25/2008	0.45 J	<1 U	<1 U	<1 U	<1 U	<1 U	2.6	<1 U	<1 U	6.6	<1 U	<2 U
	11/13/2009	0.4 J	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	2	<1.0 U	<1.0 U	7.6	<1.0 U	<2.0 U
	9/22/2010	0.32 J	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	2.2	<1.0 U	<1.0 U	6.5	<1.0 U	<2.0 U
	9/28/2011	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	2.2	<1.0 U	<1.0 U	5.0	<1.0 U	<2.0 U
GM-56	9/5/2012	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	3.7	<1.0 U	<2.0 U
	9/14/2006	0.35 J	<1 U	<1 U	<1 U	<1 U	<1 U	0.57 J	<1 U	<1 U	<1 U	<1 U	<2 U
GM-65D	9/5/2012	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	2.4	0.47 J	<1.0 U	<1.0 U	<1.0 U	0.28 J
	5/2/2007	0.4 J	1.4	<1 U	<1 U	1.5	<1 U	<1 U	<1 U	0.21 J	1.3	<1 U	<2 U
	1/21/2008	0.32 J	0.94 J	<1 U	<1 U	1	<1 U	<1 U	<1 U	<1 U	1.1	<1 U	<2 U
DN-13	1/27/2010	0.88 J	1.2	<1.0 U	<1.0 U	1.1	<1.0 U	<1.0 U	<1.0 U	<1.0 U	1.5	<1.0 U	<2.0 U
	11/14/2001	1.1	2.5	<1.0	<1.0	6.2	<1.0	<1.0	<1.0	0.37J	5.0	1.2	<1.0
	9/27/2002	1.1	2.5	<1	<1	7.3	<1	<1	<1	0.48J	6.1	1.3	<1
	9/22/2003	1.1	2.4	<1 U	<1 U	6.8	<1 U	0.31 J	<1 U	0.4 J	6.4	1.1	<1 U
	9/16/2004	0.84 J	2.2	<1 U	<1 U	6.7	<1 U	0.44 J	<1 U	0.49 J	6.8	2.1	<1 U
	10/20/2005	1.5	2.0	<1.0 U	<1.0 U	5.5	<1.0 U	0.38 J	<1.0 U	<1.0 U	7.2	2.6	<2.0 U
	9/27/2006	0.51 J	1.5	<1 U	<1 U	6.1	<1 U	0.33 J	<1 U	0.41 J	5.7	2.3	<2 U
	9/19/2007	0.48 J	2	<1 U	<1 U	6.4	<1 U	<1 U	<1 U	0.4 J	3.3	2.6	<2 U
	9/24/2008	0.63 J	<1.7 U	<1 U	<1 U	6.2	<1 U	<1 U	<1 U	0.44 J	4.5	1.4	<2 U
	11/11/2009	0.77 J	2.1	<1.0 U	<1.0 U	7.9	<1.0 U	0.33 J	<1.0 U	0.50 J	6.5	1.7	<2.0 U
	9/22/2010	0.48 J	1.6	<1.0 U	<1.0 U	6.9	<1.0 U	<1.0 U	<1.0 U	0.44 J	5	1.3	<2.0 U
	9/28/2011	<1.0 U	1.5	<1.0 U	<1.0 U	6.3	<1.0 U	0.40 J	<1.0 U	0.38 J	4.8	1.3	<2.0 U
	9/6/2012	0.99 J	2	<1.0 U	<1.0 U	7.5	<1.0 U	0.76 J	<1.0 U	0.47 J	7.9	1.2	<2.0 U
GM-9	9/24/1999	1.0	<1.0	<1.0	<1.0	1.0	<1.0	<1.0	<1.0	<1.0	13.8	<1.0	<1.0
	10/3/2000	1.2	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	17.2	<1.0	<1.0
	11/14/2001	0.48J	0.58J	<1.0	<1.0	1.1	<1.0	0.38J	<1.0	<0.50	8.6	<1.0	<1.0
	9/30/2002	0.99J	0.48J	<1	<1	0.66	<1	<1	<1	<0.5	16	<1	<1
	9/24/2003	1.3	0.45 J	<1 U	<1 U	0.56	<1 U	<1 U	<1 U	<0.5 U	20	<1 U	<1 U
	9/21/2004	1.1	0.6 J	<1 U	<1 U	0.97	<1 U	<1 U	<1 U	<0.5 U	16	<1 U	<1 U
	10/26/2005	0.85 J	0.59 J	<1.0 U	<1.0 U	0.99 J	<1.0 U	<1.0 U	<1.0 U	<1.0 U	15	<1.0 U	<2.0 U
	9/25/2006	0.44 J	0.48 J	<1 U	<1 U	0.85 J	<1 U	<1 U	<1 U	<1 U	6.6	<1 U	<2 U
	9/19/2007	1.2	0.48 J	<1 U	<1 U	0.71 J	<1 U	<1 U	<1 U	<1 U	18	<1 U	<2 U
	9/24/2008	1.2	<1 U	<1 U	<1 U	<1 U	<1 U	<1 U	<1 U	<1 U	18	<1 U	<2 U
	9/22/2010	1	0.35 J	<1.0 U	<1.0 U	0.46 J	<1.0 U	<1.0 U	<1.0 U	<1.0 U	17 J	<1.0 U	<2.0 U
	9/28/2011	<1.0 U	0.50 J	<1.0 U	<1.0 U	1	<1.0 U	<1.0 U	<1.0 U	<1.0 U	13	<1.0 U	<2.0 U
	9/5/2012	24	<22 U	<22 U	<22 U	7.9 J	<22 U	<22 U	<22 U	<22 U	340	<22 U	<44 U



Table A-2. Annual Groundwater Analytical Results for the Lower Aquifer Wells from 1999-2012, RACER Trust, Moraine, Ohio.

Well	Date	VOCs (ug/L)											
		1,1,1-TCA	1,1-DCA	1,1-DCE	Benzene	cis-1,2-DCE	Ethyl-benzene	PCE	Toluene	trans-1,2-DCE	TCE	Vinyl Chloride	Xylenes
	9/26/2012	1.1	0.24 J	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	16.0	< 1.0 U	< 2.0 U
MT-69 ⁽¹⁾	9/24/1999	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
	10/3/2000	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
	11/15/2001	< 1.0	< 1.0	< 1.0	< 1.0	< 0.50	< 1.0	< 1.0	< 1.0	< 0.50	< 1.0	< 1.0	< 1.0
	9/30/2002	< 1	< 1	< 1	< 1	< 0.5	< 1	< 1	< 1	< 0.5	< 1	< 1	< 1
	10/1/2003	< 1 U	< 1 U	< 1 U	< 1 U	< 0.5 U	< 1 U	< 1 U	< 1 U	< 0.5 U	< 1 U	< 1 U	< 1 U
	9/27/2004	< 1 U	< 1 U	< 1 U	< 1 U	< 0.5 U	< 1 U	< 1 U	< 1 U	< 0.5 U	< 1 U	< 1 U	< 1 U
	10/24/2005	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 2.0 U
	9/26/2006	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 2 U
	9/27/2007	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 2 U
GM-77D	9/27/2007	< 1.4 U	< 1.4 U	< 1.4 U	< 1.4 U	< 1.4 U	< 1.4 U	45	< 1.4 U	< 1.4 U	< 1.4 U	< 1.4 U	< 2.9 U
	1/28/2010	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	18	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 2.0 U
	9/7/2012	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	11	0.17 J	< 1.0 U	< 1.0 U	< 1.0 U	< 2.0 U

(1) - Well unusable - collapsed screen.

All concentrations presented in micrograms per liter.

VOCs - Volatile Organic Compounds.

1,1,1-TCA - 1,1,1-Trichloroethane.

1,1-DCA - 1,1-Dichloroethane.

1,1-DCE - 1,1-Dichloroethene.

cis-1,2-DCE - cis-1,1-Dichloroethene.

< - Constituent not detected above laboratory reporting limit shown.

J - Value is estimated.

U - Constituent not detected above laboratory limit shown.

PCE - Tetrachloroethene.

trans-1,2-DCE - trans-1,2-Dichloroethene.

TCE - Trichloroethene.



Appendix B

Groundwater Sampling Data for 2013

Table B-1. Annual Groundwater Sampling Event Field Parameter Data Sheet for 2013, RACER Trust, Moraine, Ohio.

Well ID	Sample ID	pH (s.u.)	Temp (°C)	ORP (mV)	Conductivity (mS/cm)	DO (mg/L)	Purge Rate (L/min)	Time Start Purge	Time End Purge	Volume Purged (L)	Sample Date	Time Sampled	Sample Serve
Upper Aquifer Wells													
GM-2	GM-2/092513/	7.77	21.0	83.8	0.786	0.61	0.225	17:53	18:16	4.0	9/25/2013	18:16	Houle
GM-6	GM-6/092513/	7.36	17.9	-51.2	1.374	0.68	0.200	17:52	18:18	2.0	9/25/2013	18:18	Smith
GM-8	GM-8/092613/	7.92	15.7	-42.8	1.488	0.63	0.200	8:24	9:05	2.5	9/26/2013	9:05	Smith
GM-10	GM-10/092513/	6.39	17.6	72.0	0.968	4.40	0.200	12:48	13:11	1.5	9/25/2013	13:11	Smith
GM-16	GM-16/092513/	7.06	19.3	65.0	1.150	0.70	0.200	13:37	14:09	4.0	9/25/2013	14:09	Peck
GM-17	GM-17/092713/	6.99	17.62	-6.8	1.211	0.41	0.200	8:26	8:59	3.5	9/27/2013	8:59	Smith
GM-18	GM-18/092513/	6.34	18.0	59.2	1.242	0.96	0.200	14:31	14:51	1.5	9/25/2013	14:51	Smith
GM-19S	GM-19S/092613/	8.43	19.8	-64.1	1.539	0.54	0.200	12:50	13:22	2.0	9/26/2013	13:22	Smith
GM-21	GM-21/092613/	6.38	23.7	22.6	1.373	0.47	0.150	13:13	13:36	3.5	9/26/2013	13:36	Houle
GM-22	GM-22/092613/	7.39	26.9	182.1	0.820	3.68	0.150	14:40	14:56	3.0	9/26/2013	14:56	Houle
GM-23	GM-23/092713/	6.76	24.7	-49.0	1.228	0.40	0.200	16:29	16:55	3.0	9/27/2013	16:55	Peck
GM-26	GM-26/092513/	6.54	17.6	100.8	1.060	4.60	0.150	8:57	19:47	2.0	9/25/2013	19:47	Smith
GM-27	GM-27/092713/	6.91	22.6	14.0	1.545	0.73	0.200	12:00	12:37	3.2	9/27/2013	12:37	Peck
GM-28 ⁽¹⁾	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
GM-29	GM-29/092713/	6.87	24.0	-108.0	1.302	0.21	0.200	15:25	15:53	3.1	9/27/2013	15:53	Peck
GM-30	GM-30/092713/	6.45	24.8	-61.0	2.736	0.22	0.200	14:21	14:50	3.1	9/27/2013	14:50	Peck
GM-31	GM-31/092713/	7.75	24.7	157.3	1.383	1.14	0.100	11:26	12:05	4.5	9/27/2013	12:05	Houle/Schindler
GM-32	GM-32/092613/	8.05	18.36	-17.0	1.388	0.42	0.200	10:24	10:57	2.0	9/26/2013	10:57	Smith
GM-33	GM-33/092613/	7.40	19.93	44.5	1.538	0.34	0.200	16:35	17:06	2.5	9/26/2013	17:06	Smith
GM-35	GM-35/092613/	8.40	22.76	-16.9	8.944	0.11	0.200	14:20	14:40	2.0	9/26/2013	14:40	Smith
GM-43	GM-43/092613/	6.95	21.6	35.0	1.282	0.59	0.200	11:06	11:38	3.5	9/26/2013	11:38	Peck
GM-47	GM-47/092513/	6.97	21.8	49.0	1.429	0.51	0.200	16:00	16:31	3.5	9/25/2013	16:31	Peck
GM-50	GM-50/092513/	7.03	21.5	52.0	1.204	0.54	0.200	15:25	15:51	3.5	9/25/2013	15:51	Peck
GM-51	GM-51/092513/	7.59	21.9	208.7	0.813	0.58	0.250	11:37	11:54	4.0	9/25/2013	11:54	Houle
GM-52	GM-52/092513/	7.84	19.6	215.4	0.708	0.72	0.250	10:24	10:49	4.5	9/25/2013	10:49	Houle
GM-55	GM-55/092513/	6.54	17.8	84.8	0.961	4.49	0.200	10:14	10:58	3.0	9/25/2013	10:58	Smith
GM-59	GM-59/092713/	6.83	23.2	213.7	0.906	3.32	0.200	15:54	16:18	4.5	9/27/2013	16:18	Houle
GM-60	GM-60/092713/	6.90	25.0	188.4	0.600	0.71	0.200	14:02	15:00	5.5	9/27/2013	15:00	Houle
GM-63	GM-63/092513/	7.10	19.9	57.0	1.220	0.74	0.200	17:23	17:56	4.0	9/25/2013	17:56	Peck
GM-64	GM-64/092613/	6.98	20.3	-7.0	1.485	0.58	0.200	9:59	10:33	4.5	9/26/2013	10:33	Peck
GM-65S	GM-65S/092513/	7.86	16.2	262.1	0.699	7.00	0.200	9:09	9:25	4.0	9/25/2013	9:25	Houle
GM-75S	GM-75S/092713/	7.09	19.3	49.0	1.160	0.73	0.200	10:09	10:40	3.8	9/27/2013	10:40	Peck
GM-78	GM-78/092513/	6.35	16.0	87.2	1.110	5.54	0.200	11:15	11:43	2.0	9/25/2013	11:43	Smith
GM-79	GM-79/092513/	7.07	18.5	72.0	1.344	1.34	0.100	9:08	9:49	5.0	9/25/2013	9:49	Peck
GM-80	GM-80/092513/	7.85	19.1	74.0	0.447	7.67	0.100	10:25	11:00	5.0	9/25/2013	11:00	Peck
GM-83S	GM-83S/092613/	7.16	17.8	44.0	1.049	0.86	0.200	8:55	9:32	6.0	9/26/2013	9:32	Peck
HR-2	HR-2/092713/	6.86	19.47	16.4	1.554	0.51	0.200	14:15	14:45	3.8	9/27/2013	14:45	Smith
HR-3	HR-3/092713/	6.43	17.41	67.9	1.780	0.29	0.200	15:10	15:34	3.0	9/27/2013	15:34	Smith
HR-4	HR-4/092713/	7.12	17.61	-15.1	1.203	3.08	0.200	12:00	12:28	3.8	9/27/2013	12:28	Smith
HR-5	HR-5/092613/	6.98	22.5	-5.0	1.106	2.67	0.200	14:52	15:28	4.0	9/26/2013	15:28	Peck
HR-7	HR-7/092613/	7.01	21.2	51.0	1.256	0.59	0.200	15:59	16:27	4.0	9/26/2013	16:27	Peck
HR-11	HR-11/092613/	6.91	16.2	206.2	0.838	0.90	0.250	8:07	8:30	5.0	9/26/2013	8:30	Houle
HR-16	HR-16/092513/	7.71	19.9	231.9	0.663	2.62	0.250	13:48	14:03	3.5	9/25/2013	14:03	Houle
HR-17	HR-17/092513/	7.51	19.4	231.7	0.760	0.87	0.250	12:50	13:12	4.0	9/25/2013	13:12	Houle
ME-3	ME-3/092713/	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
ME-6	ME-6/092713/	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
TW-2	TW-2/092513/	7.79	18.4	-91.9	1.359	0.76	0.200	15:45	16:26	2.0	9/25/2013	16:26	Smith
W-1-N	W-1-N/092713/	6.97	18.68	-5.7	1.382	0.81	0.200	11:10	11:42	4.0	9/27/2013	11:42	Smith
W-2-N	W-2-N/092613/	7.68	20.48	16.8	1.258	0.41	0.200	17:40	18:01	1.5	9/26/2013	18:01	Smith
W-2-S	W-2-S/092513/	7.85	2.05	235.1	0.668	4.79	0.250	14:24	14:45	3.5	9/25/2013	14:45	Houle
W-3-N	W-3-N/092613/	6.98	21.0	-83.0	1.124	2.74	0.200	18:00	18:22	4.0	9/26/2013	18:22	Peck
W-3-S	W-3-S/092513/	7.65	20.1	235.8	0.665	2.92	0.300	15:20	15:35	3.0	9/25/2013	15:35	Houle
W-4-N	W-4-N/092713/	6.87	18.5	-13.1	1.337	0.33	0.200	13:16	13:43	3.5	9/27/2013	13:43	Smith
W-4-S	W-4-S/092513/	7.70	21.5	228.1	0.889	0.84	0.300	16:10	16:25	4.5	9/25/2013	16:25	Houle
WSU-24	WSU-24/092513/	7.09	18.9	87.0	1.012	5.72	0.200	12:31	13:12	2.8	9/25/2013	13:12	Peck

Table B-1. Annual Groundwater Sampling Event Field Parameter Data Sheet for 2013, RACER Trust, Moraine, Ohio.

Well ID	Sample ID	pH (s.u.)	Temp (°C)	ORP (mV)	Conductivity (mS/cm)	DO (mg/L)	Purge Rate (L/min)	Time Start Purge	Time End Purge	Volume Purged (L)	Sample Date	Time Sampled	Sample Serve
Lower Aquifer Wells													
DN-13	DN-13/092713/	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
GM-1	GM-1/092513/	7.61	22.0	287.1	0.728	2.28	0.250	17:15	17:34	3.5	9/25/2013	17:34	Houle
GM-3	GM-3/092513/	6.36	17.9	40.3	1.176	0.85	0.200	16:54	17:34	2.0	9/25/2013	17:34	Smith
GM-9	GM-9/092513/	6.41	17.5	76.9	0.993	0.80	0.200	11:57	12:29	2.0	9/25/2013	12:29	Smith
GM-11	GM-11/092513/	6.41	18.3	50.1	1.088	1.56	0.200	13:35	14:06	2.0	9/25/2013	14:06	Smith
GM-15	GM-15/092513/	6.98	19.6	-9.0	1.356	1.06	0.200	14:20	14:58	3.5	9/25/2013	14:58	Peck
GM-19D	GM-19D/092613/	7.70	19.93	1.1	1.423	0.68	0.200	11:19	11:59	8.0	9/26/2013	11:59	Smith
GM-20D	GM-20D/092513/	7.14	18.6	73.0	0.995	1.29	0.200	11:48	12:09	3.0	9/25/2013	12:09	Peck
GM-39	GM-39/092713/	6.94	22.71	-76.0	1.256	0.46	0.200	13:13	13:56	4.5	9/27/2013	13:56	Peck
GM-41	GM-41/092713/	7.26	18.0	0.1	0.651	0.95	0.125	9:30	10:11	4.0	9/27/2013	10:11	Houle
GM-54	GM-54/092613/	7.77	24.8	92.0	0.533	0.87	0.150	11:52	12:27	4.0	9/26/2013	12:27	Houle
GM-58	GM-58/092713/	7.16	18.2	320.4	0.864	0.85	0.150	8:32	9:05	3.5	9/27/2013	9:05	Houle
GM-61	GM-61/092613/	7.28	24.4	-10.1	0.308	0.84	0.150	17:00	17:23	3.0	9/26/2013	17:23	Houle
GM-68D	GM-68D/092613/	6.82	23.8	150.5	0.722	0.82	0.150	18:04	18:54	8.0	9/26/2013	18:54	Houle
GM-75D	GM-75D/092713/	6.79	18.3	-9.0	1.296	0.38	0.200	9:18	9:49	4.0	9/27/2013	9:49	Peck
GM-77D	GM-77D/092613/	7.50	19.4	210.0	0.581	1.28	0.150	9:52	10:20	4.5	9/26/2013	10:20	Houle
GM-82	GM-82/092613/	7.44	27.6	71.8	0.550	1.35	0.150	15:35	16:09	4.0	9/26/2013	16:09	Houle
GM-83D	GM-83D/092613/	7.11	15.8	-66.0	1.068	0.60	0.200	8:00	8:33	3.0	9/26/2013	8:33	Peck
GM-84	GM-84/092613/	8.19	18.5	-58.6	0.488	6.31	0.150	10:52	11:14	3.0	9/26/113	11:14	Houle
HR-1	HR-1/092613/	6.94	23.3	62.0	1.154	0.83	0.200	12:36	13:08	3.0	9/26/2013	13:08	Peck
HR-12	HR-12/092613/	7.71	18.0	30.2	0.669	1.49	0.250	8:55	9:14	4.5	9/26/2013	9:14	Houle
HR-15	HR-15/092613/	6.89	21.0	-57.0	1.182	0.55	0.200	17:00	17:30	3.8	9/26/2013	17:30	Peck
RMW-85	RMW-85/092713/	6.78	15.7	-37.0	1.344	0.29	0.200	8:24	8:55	3.2	9/27/2013	8:55	Peck
RMW-86	RMW-86/092613	7.72	19.62	22.4	1.466	0.49	0.300	15:04	15:48	5.0	9/26/2013	15:48	Smith
RMW-87	RMW-87/092613/	6.80	23.4	-7.0	1.601	0.21	0.200	13:39	14:21	5.0	9/26/2013	14:21	Peck
RMW-88	RMW-88/092713/	6.82	15.55	2.8	1.168	0.27	0.300	9:23	10:36	13.0	9/27/2013	10:36	Smith

Notes:

s.u. - Standard Units.

Temp - Temperature.

°C - Degrees Celsius.

ORP - Oxidation Reduction Potential.

mV - Millivolts.

mS/cm - Millisiemens per Centimeter.

DO - Dissolved Oxygen.

mg/L - Milligrams per Liter.

L/min - Liters per Minute.

L - Liters.

NM - Not Measured.

NS - Not Sampled.

⁽¹⁾ - Monitoring well GM-28 could not be sampled due to an obstruction in the well.



Appendix C

Groundwater Analytical Database for
2013



Table C-1. Summary of Groundwater VOC Analytical Results from Upper/Lower Aquifer Monitoring Wells in 2013, RACER Trust, Moraine, Ohio.

		Upgradient Contributions		Source Areas					
		HR-11 9/26/2013	W-1-N 9/27/2013	GM-23 9/27/2013	GM-27 9/27/2013	GM-59 9/27/2013	GM-60 9/27/2013	GM-75S 9/27/2013	Duplicate 9/27/2013
	Units	Upper Aquifer	Upper Aquifer	Upper Aquifer	Upper Aquifer	Upper Aquifer	Upper Aquifer	Upper Aquifer	QAQC
Volatile Organic Compounds									
1,1,1-Trichloroethane	µg/L	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	1.0	1.4	1.8	1.7
1,1-Dichloroethane	µg/L	4.4	1.6	2.6	2.3	< 1.0 U	1.3	0.53 J	0.53 J
1,1-Dichloroethene	µg/L	< 1.0 U	< 1.0 U	1.7	< 1.0 U	< 1.0 U	1.5	< 1.0 U	< 1.0 U
Benzene	µg/L	< 1.0 U	< 1.0 U	0.28 J	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
cis-1,2-Dichloroethene	µg/L	1.6	0.27 J	470	12	11	400	4.5	4.4
Ethylbenzene	µg/L	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
Tetrachloroethene	µg/L	< 1.0 U	< 1.0 U	37	1.8	1000	670	480	440
Toluene	µg/L	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 UB	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
trans-1,2-Dichloroethene	µg/L	0.24 J	< 1.0 U	15	0.51 J	0.56 J	4.2	0.29 J	0.32 J
Trichloroethene	µg/L	< 1.0 U	< 1.0 U	28	42	1100	1100	350	350
Vinyl chloride	µg/L	< 1.0 U	< 1.0 U	210	0.18 J	< 1.0 U	2.1	< 1.0 U	< 1.0 U
Xylene (total)	µg/L	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U
Total VOCs	µg/L	6.2	1.9	764.6	58.8	2112.6	2180.5	837.1	797.0

µg/L - Micrograms per Liter.

< - Constituent not detected above laboratory reporting limit shown.

J - Value is estimated.

U - Constituent not detected above laboratory reporting limit shown.

B - Constituent found in sample was detected in associated blank. Presence is suspect.

GM-28 was unable to be sampled due to an obstruction in the well casing.



Table C-1. Summary of Groundwater VOC Analytical Results from Upper/Lower Aquifer Monitoring Wells in 2013, RACER Trust, Moraine, Ohio.

		Downgradient Reactive Zone Performance Wells									
		GM-29 9/27/2013	GM-30 9/27/2013	HR-3 9/27/2013	GM-21 9/26/2013	GM-6 9/25/2013	GM-8 9/26/2013	Duplicate 9/26/2013	GM-19S 9/26/2013	Duplicate 9/26/2013	
	Units	Upper Aquifer	Upper Aquifer	Upper Aquifer	Upper Aquifer	Upper Aquifer	Upper Aquifer	QAQC	Upper Aquifer	QAQC	
<u>Volatile Organic Compounds</u>											
1,1,1-Trichloroethane	µg/L	15	< 1.0 U	6.9	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	
1,1-Dichloroethane	µg/L	12	5.3	12	9.5	0.66 J	0.88 J	0.85 J	8.3	6	
1,1-Dichloroethene	µg/L	1.7	< 1.0 U	0.51 J	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	
Benzene	µg/L	0.20 J	4.0	< 1.0 U	< 1.0 U	< 1.0 U	1.9	1.9	< 1.0 U	< 1.0 U	
cis-1,2-Dichloroethene	µg/L	530	< 1.0 U	59	5.1	1.9	0.27 J	0.21 J	26	18	
Ethylbenzene	µg/L	< 1.0 U	20	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	
Tetrachloroethene	µg/L	15	0.23 J	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	
Toluene	µg/L	< 1.0 U	1.1	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	
trans-1,2-Dichloroethene	µg/L	20	0.63 J	2.2	1.1	< 1.0 U	< 1.0 U	< 1.0 U	1.1	0.87 J	
Trichloroethene	µg/L	280	0.28 J	190	12	0.26 J	0.21 J	< 1.0 U	0.46 J	0.39 J	
Vinyl chloride	µg/L	60	0.34 J	0.93 J	3.8	0.79 J	< 1.0 U	< 1.0 U	17	14	
Xylene (total)	µg/L	< 2.0 U	7.2	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U	
Total VOCs	µg/L	933.9	39.1	271.5	31.5	3.6	3.3	3.0	52.9	39.3	

µg/L - Micrograms per Liter.

< - Constituent not detected above laboratory reporting limit shown.

J - Value is estimated.

U - Constituent not detected above laboratory reporting limit shown.

B - Constituent found in sample was detected in associated blank. Presence is suspect.

GM-28 was unable to be sampled due to an obstruction in the well casing.



Table C-1. Summary of Groundwater VOC Analytical Results from Upper/Lower Aquifer Monitoring Wells in 2013, RACER Trust, Moraine, Ohio.

		Closed North Settling Lagoon Monitoring Results				Closed South Settling Lagoon Monitoring Results				
		HR-4	W-2-N	W-3-N	W-4-N	HR-16	HR-17	W-2-S	W-3-S	W-4-S
		9/27/2013	9/26/2013	9/26/2013	9/27/2013	9/25/2013	9/25/2013	9/25/2013	9/25/2013	9/25/2013
	Units	Upper Aquifer	Upper Aquifer	Upper Aquifer	Upper Aquifer	Upper Aquifer	Upper Aquifer	Upper Aquifer	Upper Aquifer	Upper Aquifer
<u>Volatile Organic Compounds</u>										
1,1,1-Trichloroethane	µg/L	0.29 J	< 1.0 U	< 1.0 U	< 1.0 U	0.61 J	1.3	1.8	0.49 J	1.6
1,1-Dichloroethane	µg/L	3.0	< 1.0 U	< 1.0 U	7.1	< 1.0 U	0.93 J	0.86 J	1.2	1.9
1,1-Dichloroethene	µg/L	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
Benzene	µg/L	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
cis-1,2-Dichloroethene	µg/L	< 1.0 U	0.89 J	34	11	< 1.0 U	1.4	1.1	1.4	6.3
Ethylbenzene	µg/L	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
Tetrachloroethene	µg/L	0.21 J	< 1.0 U	0.96 J	0.63 J	0.14 J	150	0.31 J	25	60
Toluene	µg/L	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
trans-1,2-Dichloroethene	µg/L	< 1.0 U	< 1.0 U	0.64 J	0.76 J	< 1.0 U	0.92 J	< 1.0 U	0.59 J	1.2
Trichloroethene	µg/L	0.27 J	< 1.0 U	< 1.0 U	7.4	1.3	100	6.4	21	50
Vinyl chloride	µg/L	< 1.0 U	< 1.0 U	1.6	0.18 J	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
Xylene (total)	µg/L	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U
Total VOCs	µg/L	3.8	0.89	37.2	27.1	2.1	254.6	10.5	49.7	121.0

µg/L - Micrograms per Liter.

< - Constituent not detected above laboratory reporting limit shown.

J - Value is estimated.

U - Constituent not detected above laboratory reporting limit shown.

B - Constituent found in sample was detected in associated blank. Presence is suspect.

GM-28 was unable to be sampled due to an obstruction in the well casing.



Table C-1. Summary of Groundwater VOC Analytical Results from Upper/Lower Aquifer Monitoring Wells in 2013, RACER Trust, Moraine, Ohio.

	Units	Downgradient On-Site										
		HR-1	GM-43	GM-31	GM-33	GM-35	ME-3	ME-6	HR-2	HR-5	HR-7	GM-22
		9/26/2013	9/26/2013	9/27/2013	9/26/2013	9/26/2013	9/27/2013	9/27/2013	9/27/2013	9/26/2013	9/26/2013	9/26/2013
		Upper Aquifer	Upper Aquifer	Upper Aquifer	Upper Aquifer	Upper Aquifer	Upper Aquifer	Upper Aquifer	Upper Aquifer	Upper Aquifer	Upper Aquifer	Upper Aquifer
Volatile Organic Compounds												
1,1,1-Trichloroethane	µg/L	0.99 J	1.0	9.8	3.4	< 50 U	1.0	5.9	< 1.0 U	< 1.0 U	< 1.0 U	0.65 J
1,1-Dichloroethane	µg/L	1.2	2.0	2.3	1.1	30 J	0.41 J	20	7.5	0.70 J	0.35 J	< 1.0 U
1,1-Dichloroethene	µg/L	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 50 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
Benzene	µg/L	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 50 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
cis-1,2-Dichloroethene	µg/L	3.1	32	21	1.3	69	0.35 J	1.5	1.6	7.0	1.9	< 1.0 U
Ethylbenzene	µg/L	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 50 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
Tetrachloroethene	µg/L	30	22	0.43 J	28	< 50 U	7.1	5.1	< 1.0 U	0.57 J	< 1.0 U	4.3
Toluene	µg/L	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 50 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
trans-1,2-Dichloroethene	µg/L	0.90 J	3.7	1.2	< 1.0 U	18 J	< 1.0 U	< 1.0 U	0.28 J	0.63 J	< 1.0 U	< 1.0 U
Trichloroethene	µg/L	100	170	120	14	18 J	4.6	2.8	0.40 J	14	6.2	3.9
Vinyl chloride	µg/L	< 1.0 U	0.21 J	< 1.0 U	< 1.0 U	11 J	< 1.0 U	0.28 J	< 1.0 U	0.36 J	< 1.0 U	< 1.0 U
Xylene (total)	µg/L	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U	< 100 U	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U
Total VOCs	µg/L	136.2	230.9	154.7	47.8	146.0	13.5	35.6	9.8	23.3	8.5	8.9

µg/L - Micrograms per Liter.

< - Constituent not detected above laboratory reporting limit shown.

J - Value is estimated.

U - Constituent not detected above laboratory reporting limit shown.

B - Constituent found in sample was detected in associated blank. Presence is suspect.

GM-28 was unable to be sampled due to an obstruction in the well casing.



Table C-1. Summary of Groundwater VOC Analytical Results from Upper/Lower Aquifer Monitoring Wells in 2013, RACER Trust, Moraine, Ohio.

	Units	Property Boundary		Off-Site Downgradient of the Site							
		GM-2	TW-2	GM-10	GM-16	GM-17	GM-18	GM-47	GM-50	GM-51	GM-52
		9/25/2013	9/25/2013	9/25/2013	9/25/2013	9/27/2013	9/25/2013	9/25/2013	9/25/2013	9/25/2013	9/25/2013
		Upper Aquifer	Upper Aquifer	Upper Aquifer	Upper Aquifer	Upper Aquifer	Upper Aquifer	Upper Aquifer	Upper Aquifer	Upper Aquifer	Upper Aquifer
Volatile Organic Compounds											
1,1,1-Trichloroethane	µg/L	< 1.0 U	< 1.0 U	0.20 J	0.36 J	< 1.0 U	0.22 J	0.65 J	2.5	1.9	0.47 J
1,1-Dichloroethane	µg/L	1.0	< 1.0 U	< 1.0 U	4.4	0.36 J	0.68 J	3.7	3.5	1.8	1.2
1,1-Dichloroethene	µg/L	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
Benzene	µg/L	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
cis-1,2-Dichloroethene	µg/L	13	< 1.0 U	< 1.0 U	12	2.6	3.7	26	5.7	2.8	3.1
Ethylbenzene	µg/L	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
Tetrachloroethene	µg/L	0.31 J	< 1.0 U	1.1	51	2.8	17	47	73	46	53
Toluene	µg/L	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
trans-1,2-Dichloroethene	µg/L	0.26 J	< 1.0 U	< 1.0 U	0.40 J	< 1.0 U	< 1.0 U	2.4	0.29 J	0.30 J	< 1.0 U
Trichloroethene	µg/L	0.70 J	< 1.0 U	3.1	17	4.7	10	14	40	64	18
Vinyl chloride	µg/L	1.3	< 1.0 U	< 1.0 U	0.55 J	< 1.0 U	< 1.0 U	0.42 J	0.30 J	< 1.0 U	< 1.0 U
Xylene (total)	µg/L	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U
Total VOCs	µg/L	16.6	0.0	4.4	85.7	10.5	31.6	94.2	125.3	116.8	75.8

µg/L - Micrograms per Liter.

< - Constituent not detected above laboratory reporting limit shown.

J - Value is estimated.

U - Constituent not detected above laboratory reporting limit shown.

B - Constituent found in sample was detected in associated blank. Presence is suspect.

GM-28 was unable to be sampled due to an obstruction in the well casing.



Table C-1. Summary of Groundwater VOC Analytical Results from Upper/Lower Aquifer Monitoring Wells in 2013, RACER Trust, Moraine, Ohio.

		Off-Site Downgradient of the Site									
		GM-63 9/25/2013	GM-64 9/26/2013	GM-55 9/25/2013	GM-65S 9/25/2013	WSU-24 9/25/2013	GM-78 9/25/2013	GM-79 9/25/2013	GM-80 9/25/2013	GM-83S 9/26/2013	GM-26 9/25/2013
	Units	Upper Aquifer	Upper Aquifer	Upper Aquifer	Upper Aquifer	Upper Aquifer	Upper Aquifer	Upper Aquifer	Upper Aquifer	Upper Aquifer	Upper Aquifer
Volatile Organic Compounds											
1,1,1-Trichloroethane	µg/L	4.4	0.71 J	< 1.0 U	< 1.0 U	0.23 J	< 1.0 U	0.88 J	< 1.0 U	< 1.0 U	< 1.0 U
1,1-Dichloroethane	µg/L	1.6	4.2	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	1.1	< 1.0 U	< 1.0 U	< 1.0 U
1,1-Dichloroethene	µg/L	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
Benzene	µg/L	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
cis-1,2-Dichloroethene	µg/L	1.9	44	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	1.4	< 1.0 U	1.1	< 1.0 U
Ethylbenzene	µg/L	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
Tetrachloroethene	µg/L	81	41	4.6	5.6	13	11	0.31 J	6.7	< 1.0 U	1.6
Toluene	µg/L	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
trans-1,2-Dichloroethene	µg/L	0.33 J	2.8	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	0.42 J	< 1.0 U	< 1.0 U	< 1.0 U
Trichloroethene	µg/L	48	31	< 1.0 U	0.82 J	2.5	< 1.0 U	3.9	4.6	< 1.0 U	< 1.0 U
Vinyl chloride	µg/L	< 1.0 U	5.8	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
Xylene (total)	µg/L	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U
Total VOCs	µg/L	137.2	129.5	4.6	6.4	15.7	11.0	8.0	11.3	1.1	1.6

µg/L - Micrograms per Liter.

< - Constituent not detected above laboratory reporting limit shown.

J - Value is estimated.

U - Constituent not detected above laboratory reporting limit shown.

B - Constituent found in sample was detected in associated blank. Presence is suspect.

GM-28 was unable to be sampled due to an obstruction in the well casing.



Table C-1. Summary of Groundwater VOC Analytical Results from Upper/Lower Aquifer Monitoring Wells in 2013, RACER Trust, Moraine, Ohio.

		Upgradient Contributions		On-Site Groundwater Quality							
		RMW-88 9/27/2013	HR-12 9/26/2013	GM-39 9/27/2013	GM-54 9/26/2013	Duplicate 9/26/2013	GM-61 9/26/2013	GM-68D 9/26/2013	GM-75D 9/27/2013	GM-82 9/26/2013	RMW-85 9/27/2013
	Units	Lower Aquifer	Lower Aquifer	Lower Aquifer	Lower Aquifer	QAQC	Lower Aquifer	Lower Aquifer	Lower Aquifer	Lower Aquifer	Lower Aquifer
<u>Volatile Organic Compounds</u>											
1,1,1-Trichloroethane	µg/L	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	0.47 J	< 1.0 U	0.49 J	0.19 J
1,1-Dichloroethane	µg/L	35	1.8	< 1.0 U	0.31 J	0.32 J	1.3	< 1.0 U	0.40 J	1.4	0.84 J
1,1-Dichloroethene	µg/L	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	0.28 J	0.60 J	0.26 J
Benzene	µg/L	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
cis-1,2-Dichloroethene	µg/L	75	0.24 J	< 1.0 U	< 1.0 U	< 1.0 U	17	0.77 J	25	41	60
Ethylbenzene	µg/L	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
Tetrachloroethene	µg/L	< 1.0 U	< 1.0 U	0.68 J	69	69	7.2	45	180	20	61
Toluene	µg/L	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
trans-1,2-Dichloroethene	µg/L	4.5	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	1.1	< 1.0 U	0.58 J	1.3	0.48 J
Trichloroethene	µg/L	< 1.0 U	< 1.0 U	0.63 J	2.7	2.8	5.2	5.6	180	56	95
Vinyl chloride	µg/L	2.0	< 1.0 U	1.5	< 1.0 U	< 1.0 U	1.2	< 1.0 U	3.2	7.4	0.31 J
Xylene (total)	µg/L	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U
Total VOCs	µg/L	116.5	2.0	2.8	72.0	72.1	33.0	51.8	389.5	128.2	218.1

µg/L - Micrograms per Liter.

< - Constituent not detected above laboratory reporting limit shown.

J - Value is estimated.

U - Constituent not detected above laboratory reporting limit shown.

B - Constituent found in sample was detected in associated blank. Presence is suspect.

GM-28 was unable to be sampled due to an obstruction in the well casing.



Table C-1. Summary of Groundwater VOC Analytical Results from Upper/Lower Aquifer Monitoring Wells in 2013, RACER Trust, Moraine, Ohio.

	Units	Lower Aquifer Groundwater Quality							
		HR-15	GM-19D	GM-41	GM-58	RMW-86	RMW-87	GM-15	GM-20D
		9/26/2013	9/26/2013	9/27/2013	9/27/2013	9/26/2013	9/26/2013	9/25/2013	9/25/2013
		Lower Aquifer	Lower Aquifer	Lower Aquifer	Lower Aquifer	Lower Aquifer	Lower Aquifer	Lower Aquifer	Lower Aquifer
<u>Volatile Organic Compounds</u>									
1,1,1-Trichloroethane	µg/L	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	15	< 1.0 U	< 1.0 U	0.32 J
1,1-Dichloroethane	µg/L	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	16	18	1.3	< 1.0 U
1,1-Dichloroethene	µg/L	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	2.3	< 1.0 U	< 1.0 U	< 1.0 U
Benzene	µg/L	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
cis-1,2-Dichloroethene	µg/L	3.5	2.7	12	< 1.0 U	110	43	1.8	< 1.0 U
Ethylbenzene	µg/L	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
Tetrachloroethene	µg/L	< 1.0 U	< 1.0 U	< 1.0 U	34	41	< 1.0 U	< 1.0 U	1.3
Toluene	µg/L	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
trans-1,2-Dichloroethene	µg/L	< 1.0 U	< 1.0 U	0.89 J	< 1.0 U	2.9	2.2	< 1.0 U	< 1.0 U
Trichloroethene	µg/L	0.75 J	1.0	79	0.41 J	190	9.8	4.5	5.3
Vinyl chloride	µg/L	1.4	7.8	1.9	< 1.0 U	1.3	1.3	0.19 J	< 1.0 U
Xylene (total)	µg/L	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U
Total VOCs	µg/L	5.7	11.5	93.8	34.4	378.5	74.3	7.8	6.9

µg/L - Micrograms per Liter.

< - Constituent not detected above laboratory reporting limit shown.

J - Value is estimated.

U - Constituent not detected above laboratory reporting limit shown.

B - Constituent found in sample was detected in associated blank. Presence is suspect.

GM-28 was unable to be sampled due to an obstruction in the well casing.



Table C-1. Summary of Groundwater VOC Analytical Results from Upper/Lower Aquifer Monitoring Wells in 2013, RACER Trust, Moraine, Ohio.

	Units	Downgradient Groundwater Quality							
		GM-9	DN-13	GM-83D	GM-84	GM-1	GM-3	GM-77D	GM-11
		9/25/2013	9/27/2013	9/26/2013	9/26/2013	9/25/2013	9/25/2013	9/26/2013	9/25/2013
		Lower Aquifer	Lower Aquifer	Lower Aquifer	Lower Aquifer	Lower Aquifer	Lower Aquifer	Lower Aquifer	Lower Aquifer
Volatile Organic Compounds									
1,1,1-Trichloroethane	µg/L	1.4	0.93 J	< 1.0 U	< 1.0 U	0.41 J	0.54 J	< 1.0 U	0.32 J
1,1-Dichloroethane	µg/L	< 1.0 U	1.9	< 1.0 U	< 1.0 U	< 1.0 U	0.86 J	< 1.0 U	< 1.0 U
1,1-Dichloroethene	µg/L	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
Benzene	µg/L	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
cis-1,2-Dichloroethene	µg/L	0.44 J	6.9	< 1.0 U	< 1.0 U	< 1.0 U	1.7	< 1.0 U	0.40 J
Ethylbenzene	µg/L	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
Tetrachloroethene	µg/L	< 1.0 U	0.58 J	< 1.0 U	< 1.0 U	0.83 J	2.3	12	1.3
Toluene	µg/L	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
trans-1,2-Dichloroethene	µg/L	< 1.0 U	0.55 J	< 1.0 U	< 1.0 U	< 1.0 U	0.29 J	< 1.0 U	< 1.0 U
Trichloroethene	µg/L	19	8.4	< 1.0 U	3.6	21	15	< 1.0 U	23
Vinyl chloride	µg/L	< 1.0 U	1.1	1.9	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
Xylene (total)	µg/L	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U
Total VOCs	µg/L	20.8	20.4	1.9	3.6	22.2	20.7	12.0	25.0

µg/L - Micrograms per Liter.

< - Constituent not detected above laboratory reporting limit shown.

J - Value is estimated.

U - Constituent not detected above laboratory reporting limit shown.

B - Constituent found in sample was detected in associated blank. Presence is suspect.

GM-28 was unable to be sampled due to an obstruction in the well casing.



Table C-1. Summary of Groundwater VOC Analytical Results from Upper/Lower Aquifer Monitoring Wells in 2013, RACER Trust, Moraine, Ohio.

		QA/QC Equipment Blank 9/25/2013 QA/QC	QA/QC Equipment Blank 9/26/2013 QA/QC	QA/QC Equipment Blank 9/26/2013 QA/QC	QA/QC Equipment Blank 9/27/2013 QA/QC	QA/QC Trip Blank 9/25/2013 QA/QC	QA/QC Trip Blank 9/25/2013 QA/QC	QA/QC Trip Blank 9/25/2013 QA/QC
	Units							
<u>Volatile Organic Compounds</u>								
1,1,1-Trichloroethane	µg/L	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
1,1-Dichloroethane	µg/L	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
1,1-Dichloroethene	µg/L	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
Benzene	µg/L	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
cis-1,2-Dichloroethene	µg/L	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
Ethylbenzene	µg/L	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
Tetrachloroethene	µg/L	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
Toluene	µg/L	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
trans-1,2-Dichloroethene	µg/L	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
Trichloroethene	µg/L	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
Vinyl chloride	µg/L	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
Xylene (total)	µg/L	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U
Total VOCs	µg/L	0.0	0.0	0.0	0.0	0.0	0.0	0.0

µg/L - Micrograms per Liter.

< - Constituent not detected above laboratory reporting limit shown.

J - Value is estimated.

U - Constituent not detected above laboratory reporting limit shown.

B - Constituent found in sample was detected in associated blank. Presence is suspect.

GM-28 was unable to be sampled due to an obstruction in the well casing.



Appendix D

In-Situ Reactive Zones Performance
Results for 2013

In-Situ Reactive Zones Performance Results

As described in Section 1.4 of the Site-Wide Groundwater Monitoring Report for 2013 (Monitoring Report), the carbon solution delivery network consisted of three reactive zones, RZ-1, RZ-3 (East and West) and RZ-4 (East). During 2013, a carbon solution was introduced into the groundwater through introduction wells at RZ-1, RZ-3 (East and West), and RZ-4 (East) shown on Figures 3 and 4 of the Monitoring Report, respectively. RZ-1 was originally installed in 1999 as a nine well barrier downgradient of the Former Oil House Area source area, and then based on the performance of the enhanced reductive dechlorination (ERD) technology, RZ-1 was expanded into portions of the Former Oil House Area source area by the addition of 12 introduction wells in 2002. RZ-3 was originally installed in 1999 and has been operated as a cut-off barrier (30 wells in RZ-3 East and 11 wells in RZ-3 West) to mitigate further downgradient VOC migration. In 2005, RZ-3 East was modified by the addition of 5 introduction wells (RZ-3RR through RZ-3VV) and cessation of introduction in 5 existing wells (RZ-3MM through RZ-3QQ) to improve performance at the far eastern edge of the plume. Using data obtained from the Supplemental Groundwater Investigation conducted in 2006, RZ-4 was designed and installed to address VOC concentrations present on the western side of the plume. RZ-4 consists of 15 introduction wells, 7 wells in RZ-4 West and 8 wells in RZ-4 East. The RZ-4 West wells are located in the southeast corner of the closed South Settling Lagoon and the RZ-4 East wells are located north of Landfill L1 and west of the Waste Pile/Staging Area. Introductions to RZ-4 began in August 2006. Operation at RZ-4 West was discontinued September 2007. The following sections discuss the monitoring completed to assess the effectiveness of the in-situ reactive zones and the results of this monitoring.

Reactive Zone Monitoring

Operation of the reactive zones was monitored through the collection of field parameter measurements and laboratory analyses of biogeochemical indicator parameters and volatile organic compounds (VOCs), according to the Site-Wide Groundwater Monitoring Plan (ARCADIS G&M, Inc. 2002) and as modified in subsequent annual Monitoring Reports. Field parameter measurements included: pH, specific conductivity, dissolved oxygen (DO), oxidation-reduction potential (ORP), and temperature. Biogeochemical parameters, collected at select monitoring wells, included manganese (total and dissolved), iron (total and dissolved), sulfate, sulfide, total organic carbon (TOC), chlorides, light hydrocarbons (ethane and ethene), and methane. The monitored VOCs included: benzene, toluene, ethylbenzene, xylenes, tetrachloroethene (PCE), trichloroethene (TCE), cis-1,2-dichloroethene (cis-1,2-DCE), vinyl chloride, 1,1,1-trichloroethane (1,1,1-TCA), 1,1-dichloroethane (1,1-

DCA), 1,1-dichloroethene (1,1-DCE), and trans-1,2-dichloroethene (trans-1,2-DCE). The VOC data collected are presented in Tables D-1 through D-4 of this appendix. The bioattenuation parameter data is presented on Tables D-5 through D-8. An evaluation of pertinent monitoring data is presented in the following sections.

The operational monitoring data collected, as indicated above, can be broadly categorized as: (i) “primary” operational monitoring data, which tracks the actual operation of the remediation system and determines whether the operation is proceeding as planned, and (ii) “secondary” operational monitoring data, which assists in the occasional troubleshooting of the system. The secondary data becomes important in the event that degradation of the VOCs is not proceeding as expected, and the cause cannot be determined from the primary operational monitoring data. The primary operational monitoring data includes pH, TOC, VOCs, ethene, ethane, and methane. Secondary operational monitoring data includes dissolved manganese, dissolved iron, sulfate, and ORP. The primary operational data for select monitoring wells is discussed below and presented graphically on Figures D-1 through D-3.

Locations of the performance monitoring wells relative to each reactive zone are shown on Figures 3 and 4 of the Monitoring Report. The following wells are used for performance monitoring of the RZs.

- At RZ-1, monitoring wells GM-28, GM-29, and GM-23 are used for performance monitoring. GM-23 and GM-29 are located within the area of RZ-1 expansion wells. GM-28 is located downgradient of the original RZ-1 transect but was not sampled in 2013 due to an obstruction in the well. At RZ-1, carbon is introduced into injection wells RZ-1C through RZ-1U.
- At RZ-3 West, monitoring well GM-32, which is within the introduction zone due to its location being constrained by the proximity of Landfill L1, is designated as the downgradient monitoring well. Monitoring well GM-32 is only analyzed for TOC, as this well is located in the early stages of the reactive zone due to its proximity to the introduction wells. Monitoring wells GM-6 and GM-8 are located further downgradient and are also utilized to monitor the performance of RZ-3 West. At RZ-3 West, carbon solution is introduced in thirty wells, RZ-3A through RZ-3DD.
- For RZ-3 East, monitoring well GM-21 is designated as the downgradient monitor well. At RZ-3 East, carbon solution is introduced in the original wells, RZ-3GG through RZ-3KK, and five additional wells, RZ-3RR through RZ-3VV.

- For RZ-4 East, monitoring well GM-19S is used at the downgradient monitoring well. At RZ-4 East, carbon is introduced into RZ-4A through RZ-4H.

During 2013, a target volume of 800 gallons of 2 percent molasses solution was injected per introduction well at RZ-1 on a monthly basis from February through July. The introduction wells at RZ-3 West (RZ-3A through RZ-3DD) received a target volume of approximately 1,600 gallons of 2 percent molasses solution per well on a monthly basis from February through July. RZ-3 East introduction wells RZ-3GG through RZ-3KK received a target volume of approximately 1,600 gallons of 2 percent molasses solution per well on a monthly basis from February through July. The RZ-3 East replacement wells (RZ-3RR through RZ-3VV) received a target volume of approximately 1,600 gallons of 2 percent molasses solution per well on the same schedule as RZ-3GG through RZ-3KK in 2012. A target volume of 3,000 gallons of 2 percent molasses solution per introduction well was injected into the RZ-4 East wells RZ-4A through RZ-4H on a monthly basis from February through July. Table 2 in the Monitoring Report presents the carbon solution introduction volumes for different introduction wells in 2013.

RACER Trust submitted a letter to the U.S. EPA "In-Situ Reactive Zone Interim Measure Injection Frequency Evaluation" dated January 13, 2014, providing notification of adjusted frequency of substrate injections starting in August 2013. A proposed amended schedule including quarterly injections was based on the updated conceptual site model, specifically transport velocities in the upper aquifer presented in the 2012 Corrective Measures Proposal. During this initial period of the amended injection schedule, an evaluation is being completed to confirm that a reduced injection frequency is appropriate based upon the lower calculated transport velocity determined as part of the revised conceptual site model. This evaluation consists of a baseline sampling event completed on December 11, 2013 and a four month discontinuation of reagent injections to provide the necessary data for the establishment of organic carbon degradation trends, and ultimately the determination of the appropriate injection frequency based on these trends. The next injection will be completed beginning in March 2014. The monitoring program includes the collection of groundwater samples for the analysis of TOC from injection wells RZ-1E, RZ-3D, RZ-3S, RZ-3TT, and RZ-4E. Grab groundwater samples for TOC will be collected on a monthly basis hereafter from the same five RZ wells for two months (beginning in January and February). In addition, groundwater samples will be collected for the analysis of TOC, methane, ethene, ethane, and VOCs from monitoring wells GM-19S, GM-21 and GM-32 during the next routine (Fall 2014) monitoring event. Results of this monitoring program will be provided in the 2014 Annual Groundwater Monitoring Report.

Analysis of Primary Operational Monitoring Data

The primary operational data is comprised of a limited number of variables that are monitored at a frequency necessary to supply the information required for the operation of the remediation system. The entire data set is presented in Tables D-1 through D-8. Figures D-1 through D-3 present the primary operational data (pH, TOC, methane, VOCs, ethane, and ethene) graphically for monitoring wells used for monitoring the effectiveness of each of the IRZs (GM-23, GM-29, GM-28, GM-8, GM-21, and GM-19S). The graphs are organized to allow a simple comparison of the trends in each monitoring well for pH, TOC, methane, VOCs, ethene, ethane, and total parent-daughter compound molarity. A discussion of the primary operational data is provided below.

pH

The preferred pH range for reductive dechlorination is between 6 and 8, and the acceptable pH range extends from 5 to 9. All pH measurements collected in 2013 from performance monitoring wells were within the acceptable pH range.

Total Organic Carbon/Methane

TOC values in the RZ-1 performance monitoring wells indicate concentrations were at background or slightly above background levels and indicate the carbon is being consumed rapidly by an active soil microbial community. Methane concentrations in GM-23 and GM-29 remain above the background levels observed in these monitoring wells in the 1999 sampling before the start of carbon introductions indicating conditions conducive for reductive dechlorination (methanogenic) are being maintained.

TOC concentrations at RZ-3 performance monitoring wells indicate concentrations at background or slightly above background levels and indicate the carbon is being consumed rapidly by an active soil microbial community. Methane remained above baseline conditions at monitoring well GM-8 indicating conditions conducive for reductive dechlorination is being maintained.

TOC concentrations at RZ-3 East monitoring well GM-21 indicate TOC above baseline conditions.

Analytical results from GM-19S, the downgradient monitoring well for RZ-4 East, exhibit a common ERD signature. An initial spike in TOC (September 2006 sampling event) above background concentrations followed by a spike in total parent-daughter

ethene molarity (indicating that target compounds may have been de-sorbed from the aquifer soil-matrix), and increasing methane concentrations indicating that the carbon substrate loading is adequate to support methanogenesis and reductive dechlorination. These data will continue to be monitored in 2014 to determine if additional troubleshooting is warranted for the RZ-4 East injection program.

VOC Analytical Results

The groundwater analytical data for the site-specific list of VOCs are presented in Table D-1 for RZ-1, Table D-2 for RZ-3 West, Table D-3 for RZ-3 East, and Table D-4 for RZ-4 East. Additionally, the degradation of PCE and TCE (parent compounds) to cis-1,2-DCE, vinyl chloride (daughter products), and ethene and ethane (end products) are provided with the pH, TOC, and methane data for performance monitoring wells in RZ-1 (GM-23, GM-29, and GM-28 Figure D-1), RZ-3 West (GM-8 Figure D-2), RZ-3 East (GM-21 Figure D-2), and RZ-4 East (GM-19S Figure D-3).

The following bullets summarize the observations and trends evident among the reactive zones at the Moraine Facilities which indicate that enhanced reduction of the targeted chlorinated VOCs is progressing as a result of the carbon introduction process:

- Degradation of the chlorinated VOCs was sustained throughout 2013 within the RZ-1 treatment area. The total chlorinated VOC concentrations in GM-29 were stable in 2013 as compared to 2012 (933.9 ug/L in 2013 and 922.2 ug/L in 2012). Total chlorinated VOC concentrations in GM-23 decreased from 7,792 ug/L in 2007, to 4,229 ug/L in 2008, to 2,263 ug/L in 2009, and to 1,073 ug/L in 2010; however, in 2011, total chlorinated VOC concentrations in GM-23 were 1,531 ug/L. In 2012, total chlorinated VOC concentrations at GM-23 decreased to 1,039 ug/L and decreased further to 764.6 ug/L in 2013.
- Concentrations of total chlorinated VOCs at RZ-3 West monitoring well GM-8 remained stable in 2013 (3.3 ug/L) compared to 2012 (4.2 ug/L).
- Concentrations of total chlorinated VOCs at RZ-3 East monitoring well GM-21 have remained significantly lower compared to baseline conditions since the installation of introduction wells RZ-3RR through RZ-3VV. Total chlorinated VOC concentrations remained stable in 2013 (31.5 ug/L) when compared to 2012 (47.3 ug/L).
- Data from monitoring well GM-19S, downgradient of RZ-4 East has exhibited a decreasing trend in total chlorinated VOC concentrations falling from 706.8 ug/L in

September 2006 to 9.96 ug/L in September 2010, with a slight increase to 28.4 ug/L and 26.8 ug/L in 2011 and 2012, respectively. Total chlorinated VOC concentrations increased in 2013 to 52.9 u/L, due predominately to increase in daughter products, cis-1,2-DCE (26 ug/L) and vinyl chloride (17 ug/L).

Conclusions

The following observations and conclusions can be made:

- Aquifer conditions were reducing within and downgradient of the reactive zones due to the introduction of carbohydrate, as evidenced by the field parameters and biogeochemical data;
- The target compounds (PCE and TCE) were reduced to daughter products (cis-1,2-DCE and vinyl chloride) and ultimately to end products (ethene and ethane) based on the VOC and light hydrocarbon data; and
- Enhanced reductive dechlorination continued to achieve the desired reduction of VOC concentrations in groundwater.
- Based upon the revised site conceptual model and associated lower mass transport velocity, a reduction in the injection frequency is likely warranted. TOC analytical data will be used to develop concentration versus time relationships. TOC generally decreases on a first-order relationship. As such, first order decay rate constants will be calculated and used to estimate/extrapolate when it is expected that concentrations will reach 20 mg/L at each injection location and on a site-wide/average basis. Ultimately, these calculations will be used to determine the appropriate revised injection frequency. An evaluation of this data will be provided in the Annual Groundwater Monitoring Report for 2014.



Table D-1. Summary of Annual Groundwater Analytical Results from Reactive Zone 1 Wells, RACER Trust, Moraine, Ohio

ZZ-1		GM-29																						
Constituents	Units	9/1/99	2/22/00	5/26/00	9/21/00	3/20/01	6/26/01	11/13/01	12/12/01	6/13/02	9/25/02	5/22/03	9/24/03	9/15/04	10/17/05	9/28/06	9/26/07	10/6/08	11/17/09	9/29/10	9/30/11	9/26/12	9/27/13	
Volatile Organic Compounds																								
1,1,1-Trichloroethane	µg/L	37.8	36.0	32.5	24.5	27.0	23.8J	<50	19J	17	16J	< 50	18J	21 J	19 J	17 J	15 J	12 J	18	11 J	11 J	10 J	15	
1,1-Dichloroethane	µg/L	4.3	4.1	6.3	16.6	10.8	6.3J	<50	<50	<50	<40	< 50	<33	< 50 U	18 J	15 J	15 J	11 J	12	11 J	8.5 J	8.2 J	12	
1,1-Dichloroethene	µg/L	1.3	1.1	1.6	3.1	3.5	3.0J	<50	<50	<50	<40	< 50	<33	< 50 U	< 50 U	< 33 U	< 50 U	< 33 U	< 10 U	< 20 U	< 13 U	< 20 U	1.7	
Benzene	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0UJ	<50	<50	<50	<40	< 50	<33	< 50 U	< 50 U	< 33 U	< 50 U	< 33 U	< 10 U	< 20 U	< 13 U	< 20 U	0.20 J	
cis-1,2-Dichloroethene	µg/L	320	223	1,190J	2,871	2,170	2,050J	1,800	1,800	1,600	1,300	950	1,200	1,200	1,600	1,300	1,200	900	600	660	470	520	530	
Ethylbenzene	µg/L	<1.0	1.4	<1.0	<1.0	<1.0	<1.0UJ	21J	<50	<50	<40	< 50	<33	< 50 U	< 50 U	< 33 U	< 50 U	< 33 U	< 10 U	< 20 U	< 13 U	< 20 U	< 1.0 U	
Tetrachloroethene	µg/L	<20	38.7	24.6	20.0	24.4	24.8J	17J	22J	22	18J	47J	18J	20 J	15 J	15 J	18 J	17 J	21 J	17 J	13	14 J	15	
Toluene	µg/L	<1.0	<1.0	<1.0	2.2	<1.0	<1.0UJ	<50	<50	<50	<40	< 50	<33	< 50 U	< 50 U	< 33 U	< 50 U	< 33 U	< 10 U	< 20 U	< 13 U	< 20 U	< 1.0 U	
trans-1,2-Dichloroethene	µg/L	11.1	9.1	8.9	14.4	20.4	25.6J	26	24J	21	21	< 25	20	21 J	27 J	20 J	19 J	16 J	20	19 J	17	15 J	20	
Trichloroethene	µg/L	878	758	649J	289	354	437J	270	320	380	310	280	390	440	390	310	350	300	370	330	320	310	280	
Vinyl chloride	µg/L	3.8	1.0	1.7	788	362	276J	230	280	140	140	99	150	230	490	210	290	150	70	59	52	45	60	
Xylenes	µg/L	<1.0	6.0	<1.0	<1.0	<1.0	<1.0UJ	52	<50	<50	<40	< 50	<33	< 50 U	< 100 U	< 67 U	< 100 U	< 67 U	< 20 U	< 40 U	< 25 U	< 40 U	< 2.0 U	
Total VOCs	µg/L	1,256.3	1,078.4	1,914.6	4,028.8	2,972.1	2,846.5	2,416	2,465	2,180	1,805	1,376	1,796	1,932	2,559	1,887	1,907	1,406	1,111	1,107	891.5	922.2	933.9	

µg/L - Micrograms per Liter.
J - Value is estimated.
UJ - Constituent not detected above laboratory reporting limit; reporting limit estimated.
< - Constituent not detected above laboratory reporting limit shown.
U - Constituent not detected above laboratory reporting limit shown.
Samples collected in September and October 1999 represent baseline conditions.
Carbon source introductions began in December 1999.
(1) Well GM-28 not sampled in 2012 and 2013 due to obstruction in well.



Table D-1. Summary of Annual Groundwater Analytical Results from Reactive Zone 1 Wells, RACER Trust, Moraine, Ohio

RZ-1		GM-23																						
Constituents	Units	9/2/99	2/21/00	5/31/00	9/20/00	3/20/01	6/26/01	11/12/01	12/12/01	6/13/02	9/26/02	5/22/03	9/23/03	9/14/04	10/17/05	9/28/06	9/27/07	10/23/08	11/17/09	9/29/10	9/30/11	9/7/12	9/27/13	
Volatile Organic Compounds																								
1,1,1-Trichloroethane	µg/L	7.2	< 50	< 20	2.0	3.1	1.5	< 420	< 500	< 330	< 400	< 620 U	< 500 U	< 500 U	< 560 U	< 330 U	< 200 U	< 62 U	< 20 U	< 22 U	< 20 U	< 25 U	< 1.0 U	
1,1-Dichloroethane	µg/L	32.5	< 50	12.8 J	16.3	17.9	3.7	< 420	< 500	< 330	< 400	< 620 U	< 500 U	< 500 U	< 560 U	< 330 U	< 200 U	< 62 U	5.0 J	< 22 U	< 20 U	< 25 U	2.6	
1,1-Dichloroethene	µg/L	17.2	<50	6.6 J	5.1	15.9	16.3	< 420	< 500	< 330	< 400	< 620 U	< 500 U	< 500 U	< 560 U	< 330 U	< 200 U	< 62 U	< 20 U	< 22 U	< 20 U	< 25 U	1.7	
Benzene	µg/L	1.9	< 50	< 20	< 1.0	1.4	< 1.0	< 420	< 500	< 330	< 400	< 620 U	< 500 U	< 500 U	< 560 U	< 330 U	< 200 U	< 62 U	< 20 U	< 22 U	< 20 U	< 25 U	0.28 J	
cis-1,2-Dichloroethene	µg/L	7,530	10,400 D	4,080 J	5,620	9,640	11,000	8,400	7,200	9,900	7,700	6,800	5,800	4,600	19,000	11,000	4,700	2,000	1,100	490	580	580	470	
Ethylbenzene	µg/L	< 1.0	<50	< 20	< 1.0	<1.0	< 1.0	< 420	< 500	< 330	< 400	< 620 U	< 500 U	< 500 U	< 560 U	< 330 U	< 200 U	< 62 U	< 20 U	< 22 U	< 20 U	< 25 U	< 1.0 U	
Tetrachloroethene	µg/L	6,250	7,280 J	6,200 J	3,470	2,910	8,600	15,000	14,000	8,400	10,000	12,000	12,000	6,700	2,300	370	280	71	19 J	50	57	33	37	
Toluene	µg/L	<1.0	< 50	< 20	< 1.0	< 1.0	2.3	< 420	< 500	< 330	< 400	< 620 U	< 500 U	< 500 U	< 560 U	< 330 U	< 200 U	< 62 U	< 20 U	< 22 U	< 20 U	< 25 U	< 1.0 U	
trans-1,2-Dichloroethene	µg/L	54.5	118 J	39.8 J	33.2	85.5	60.8	<210	< 250	<170	< 200	< 310 U	< 250 U	< 250 U	< 560 U	270 J	130 J	58 J	31	16 J	21	21 J	15	
Trichloroethene	µg/L	1,460	1,350 D	1,480 J	609	745	1,780 J	2,200	2,100	1,900	1,700	1,500	1,600	1,100	490 J	95 J	82 J	< 62 U	8.3 J	17 J	33	15 J	28	
Vinyl chloride	µg/L	2,500	2,420 J	140 J	801	765	68	1200	< 500	810	540	1700	690	870	2,800	4,100	2,600	2,100	1,100	500	840	390	210	
Xylenes	µg/L	< 1.0	< 50	< 20	< 1.0	< 1.0	1.4	< 420	< 500	< 330	< 400	< 620 U	< 500 U	< 500 U	< 1100 U	< 670 U	< 400 U	< 120 U	< 40 U	< 44 U	< 40 U	< 50 U	< 2.0 U	
Total VOCs	µg/L	17,853.3	21,568	11,959.2	10,556.6	14,183.8	21,533.8	26,800	23,300	21,010	19,940	22,000	20,090	13,270	24,590	15,835	7,792	4,229	2,263	1,073	1,531	1,039	764.58	

µg/L - Micrograms per Liter.
J - Value is estimated.
UJ - Constituent not detected above laboratory reporting limit; reporting limit estimated.
< - Constituent not detected above laboratory reporting limit shown.
U - Constituent not detected above laboratory reporting limit shown.
Samples collected in September and October 1999 represent baseline conditions.
Carbon source introductions began in December 1999.
(1) Well GM-28 not sampled in 2012 and 2013 due to obstruction in well.



Table D-1. Summary of Annual Groundwater Analytical Results from Reactive Zone 1 Wells, RACER Trust, Moraine, Ohio

RZ-1		GM-28 ⁽¹⁾																			
Constituents	9/1/99	2/23/00	5/26/00	9/21/00	3/20/01	6/26/01	11/15/01	12/12/01	7/21/02	9/24/02	5/23/03	10/1/03	4/30/04	9/15/04	10/18/05	9/27/06	9/20/07	10/22/08	11/16/09	9/28/10	10/5/11
<u>Volatile Organic Compounds</u>																					
1,1,1-Trichloroethane	17.7	23.2	18.1	5.0	<1.0	<1.0	<10	<5.0UJ	<4.0	<1	< 1	<1.0	< 1	< 1 U	< 1.0 U	< 1 U	< 1 U	< 5 U	< 1.0 U	< 1.0 U	< 1.0 U
1,1-Dichloroethane	3.3	4.2	11.8	9.9	<1.0	<1.0	<10	<5.0UJ	<4.0	2.7	4.2	3.3	3.5	3.3	4.0	4.2	4.6	2.2 J	3.6	4.6	2.1
1,1-Dichloroethene	<1.0	<1.0	3.8	<1.0	<1.0	<1.0	<10	<5.0UJ	<4.0	<1	< 1	<1.0	< 1	< 1 U	< 1.0 U	< 1 U	< 1 U	< 5 U	< 1.0 U	< 1.0 U	< 1.0 U
Benzene	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<10	<5.0UJ	<4.0	<1	< 1	<1.0	< 1	< 1 U	< 1.0 U	< 1 U	< 1 U	< 5 U	< 1.0 U	< 1.0 U	< 1.0 U
cis-1,2-Dichloroethene	175	503	2,700	37.0	7.7	352	<5.0	2.2UJ	<2.0	1.1	0.66	0.58	0.45 J	0.41 J	0.32 J	0.26 J	0.72 J	6.9	2.3	2.1	0.72 J
Ethylbenzene	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<10	<5.0UJ	<4.0	<1	< 1	0.28J	< 1	< 1 U	< 1.0 U	< 1 U	< 1 U	< 5 U	< 1.0 U	< 1.0 U	< 1.0 U
Tetrachloroethene	316	88.4	30.2	2.3	2.8	<1.0	<10	<5.0UJ	<4.0	<1	0.95J	<1.0	< 1	0.88 J	< 1.0 U	< 1 U	< 1 U	< 5 U	< 1.0 U	< 1.0 U	0.63 J
Toluene	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<10	< 1.8UJ	<4.0	<1.3	1	1.0	< 1	< 1 U	< 1.0 U	< 1 U	< 1 U	< 5 U	< 1.0 U	< 1.0 U	< 1.0 U
trans-1,2-Dichloroethene	9.2	9.7	36.5	22.3	17.6	<1.0	11	11J	8.6	11	9.2	4.0	2.2	1.2	0.63 J	0.66 J	0.58 J	1.3 J	1.7	1.5	0.69 J
Trichloroethene	768	833	14.8	1.6	1.8	<1.0	<10	<5.0UJ	<4.0	0.86J	3.1	1.6	1.6	1.4	0.66 J	0.43 J	0.51 J	< 5 U	0.58 J	< 1.0 U	0.41 J
Vinyl chloride	3.2	<1.0	1.9	12.4	2.6	<1.0	<10	<5.0UJ	<4.0	<1	< 1	0.53J	< 1	0.44 J	1.1	0.42 J	1.2	6.5	3.3	2.2	0.57 J
Xylenes	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<10	<5.0UJ	<4.0	<1.2	0.87J	1.6	< 1	< 1 U	< 2.0 U	< 2 U	< 2 U	< 10 U	< 2.0 U	< 2.0 U	< 2.0 U
Total VOCs	1,292.4	1,461.5	2,817.1	90.5	32.5	352	11	11	8.6	15.66	19.98	12.89	7.75	7.63	6.71	5.97	7.61	16.9	11.48	10.4	5.12

µg/L - Micrograms per Liter.
J - Value is estimated.
UJ - Constituent not detected above laboratory reporting limit; reporting limit estimated.
< - Constituent not detected above laboratory reporting limit shown.
U - Constituent not detected above laboratory reporting limit shown.
Samples collected in September and October 1999 represent baseline conditions.
Carbon source introductions began in December 1999.
(1) Well GM-28 not sampled in 2012 and 2013 due to obstruction in well.



Table D-2. Summary of Annual Groundwater Analytical Results from Reactive Zone 3 West Wells, RACER Trust, Moraine, Ohio.

RZ-3 West		GM-8																GM-6															
Constituents	Units	3/6/98	9/20/99	9/26/00	11/9/01	9/20/02	10/1/03	9/14/04	10/19/05	9/19/06	9/18/07	9/23/08	11/16/09	9/27/10	9/29/11	9/6/12	9/26/13	3/6/98	9/20/99	9/26/00	11/9/01	9/20/02	10/2/03	9/14/04	10/19/05	9/19/06	9/18/07	9/24/08	11/11/09	9/27/10	9/29/11	9/6/12	9/25/13
Volatile Organic Compounds																																	
1,1,1-Trichloroethane	µg/L	6.7	1.9	<1.0	0.40J	<2.0	<2.0	< 1 U	< 1.0 U	< 5 U	< 2 U	< 1 U	<1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	36.2	24.6	12.1	3.9	1.4J	0.19J	< 1 U	< 1.0 U	< 1 U	< 1 U	< 1 U	<1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	
1,1-Dichloroethane	µg/L	49.3	30.2	36.5	40	63	48	15	16	18	9.1	1.7	2.9	3	1.9	0.66 J	0.88 J	35.3	33.2	13.0	14	60	20	18	21	16	26	< 8.4 U	6.9	6.2	4.5	< 1.0 U	0.66 J
1,1-Dichloroethene	µg/L	1.0	<1.0	<1.0	< 1.0	<2.0	<2.0	< 1 U	< 1.0 U	< 5 U	< 2 U	< 1 U	<1.0 U	< 1 U	< 1.0 U	< 1.0 U	< 1.0 U	<1.0	1.2	<1.0	< 2.0	<2.0	<1.0	< 1 U	< 1.0 U	< 1 U	< 1 U	<1.0 U	< 1 U	< 1.0 U	< 1.0 U	< 1.0 U	
Benzene	µg/L	2.3	3.4	1.1	0.78J	5.5	5.4	4.2	3.5	2.1 J	2.4	6.8	3.9	4.7	3.5	3.5	1.9	<1.0	<1.0	<1.0	< 2.0	2.2	1.0	1.7	0.49 J	< 1 U	0.42 J	1.2	1.3	1.1	1.0	2.5	< 1.0 U
cis-1,2-Dichloroethene	µg/L	56.1	26.2	1.5	2.0	5.5	<1.0	< 0.5	0.24 J	2.1 J	< 2 U	< 1 U	<1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	0.27 J	82.4	52.9	41.0	8.2	43	13	10	20	18	16	6.7	3.4	4.9	3.7	< 1.0 U	1.9
Ethylbenzene	µg/L	28.9	20.7	12.5	0.40J	7.5	11	19	29	< 5 U	1.7 J	8.6	5.5	0.33 J	5.4	< 1.0 U	< 1.0 U	<1.0	<10.0	<1.0	< 2.0	<2.0	0.22J	< 1 U	< 1.0 U	< 1 U	< 1 U	< 1 U	<1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	
Tetrachloroethene	µg/L	20.0	14.8	<1.0	< 1.0	<2.0	<2.0	< 1 U	< 1.0 U	< 5 U	< 2 U	< 1 U	0.34 J	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	94.0	81.4	51.5	14	14	11	2.6	0.34 J	< 1 U	< 1 U	< 1 U	<1.0 U	0.38 J	< 1.0 U	< 1.0 U	
Toluene	µg/L	<1.0	<1.0	<1.0	< 1.0	1.8J	1.2J	< 1 U	0.39 J	< 5 U	< 2 U	< 1 U	0.13 J	0.18 J	< 1.0 U	< 1.0 U	< 1.0 U	<1.0	<1.0	<1.0	< 2.0	<2.0	0.83J	< 1 U	< 1.0 U	< 1 U	< 1 U	< 1 U	<1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	
trans-1,2-Dichloroethene	µg/L	10.1	12.0	5.4	3.6	9	4.4	1.1	0.99 J	1 J	0.9 J	0.27 J	0.22 J	0.29 J	0.20 J	< 1.0 U	< 1.0 U	2.4	2.0	2.2	1.8	8.6	2.5	1.9	2.1	1.6	2.6	1.3	0.68 J	0.89 J	0.84 J	< 1.0 U	< 1.0 U
Trichloroethene	µg/L	95.2	30.4	6.6	4.4	<2.0	<2.0	< 1 U	< 1.0 U	< 5 U	< 2 U	< 1 U	<1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	0.21 J	119	78.2	56.6	48	33	23	5.7	1.4	0.35 J	0.34 J	< 1 U	3.8	6.6	< 1.0 U	< 1.0 U	0.26 J
Vinyl chloride	µg/L	10.1	8.4	2.4	1.9	5.8	<2.0	0.48 J	0.73 J	3.2 J	< 2 U	0.48 J	<1.0 U	0.44 J	0.24 J	< 1.0 U	< 1.0 U	2.3	1.6	3.7	1.9J	12	3.3	3	11	7.3	6.7	2.1	1.2	1.6	1.5	< 1.0 U	0.79 J
Xylenes	µg/L	10.3	2.3	1.9	0.39J	1.5J	2.0	1.1	< 2.0 U	< 10 U	0.9 J	3.9	1.3 J	< 2.0 U	0.99 J	< 2.0 U	< 2.0 U	<1.0	<10	<1.0	< 2.0	<2.0	1.0	< 1 U	< 2.0 U	< 2 U	< 2 U	< 2 U	<2.0 U	< 2.0 U	< 2.0 U	< 2.0 U	
Total VOCs	µg/L	290	150.3	67.9	53.87	99.6	72	40.88	50.85	26.4	15	21.75	14.29	8.94	12.2	4.2	3.3	371.6	275.1	180.1	91.8	174.2	76.04	42.9	56.33	43.25	52.06	11.3	17.28	21.67	11.5	2.5	3.6

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UJ - Constituent not detected above laboratory reporting limit; reporting limit estimated.
< - Constituent not detected above laboratory reporting limit shown.
U - Constituent not detected above laboratory reporting limit shown.
Samples collected in September and October 1999 represent baseline conditions.
Carbon source introductions began in December 1999.



Table D-3. Summary of Annual Groundwater Analytical Results from Reactive Zone 3 East Wells, RACER Trust, Moraine, Ohio.

RZ-3 East Constituents	Units	9/22/99	2/23/00	5/26/00	9/22/00	3/19/01	6/25/01	11/13/01	12/11/01	6/12/02	9/25/02	5/22/03	GM-21 9/24/03	9/14/04	10/17/05	9/20/06	12/1/06	9/26/07	10/3/08	11/16/09	9/28/10	9/29/11	9/7/12	9/26/13
<u>Volatile Organic Compounds</u>																								
1,1,1-Trichloroethane	µg/L	53.1	15.4	27.9	15.7	7.0	7.7	6.9	1.2	23	31	18	31	26	4.3	12	4.7	8.5	8.7	2.4	0.75 J	1.0	< 2.0 U	< 1.0 U
1,1-Dichloroethane	µg/L	9.0	5.8	6.8	5.6	5.1	4.1	3.8J	0.71J	5.4	5J	4.1J	6.9J	4.2 J	3.4	8.6	6.4	18	15	22	20	16	18	9.5
1,1-Dichloroethene	µg/L	3.9	1.6	2.4	1.6	1.2	<1.0	<5.0	<1.0	3.6	2.6J	< 6.7	2.0J	3.1 J	< 1.0 U	0.19 J	0.2 J	< 1.4 U	0.33 J	< 1.0 U	< 1.0 U	< 1.0 U	< 2.0 U	< 1.0 U
Benzene	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<5.0	<1.0	<6.0	<6.7	< 6.7	<8.0	< 9.1 U	< 1.0 U	< 1 U	< 1 U	< 1.4 U	< 1.4 U	< 1.0 U	< 1.0 U	< 1.0 U	< 2.0 U	< 1.0 U
cis-1,2-Dichloroethene	µg/L	66.4	35.9	47.8	38.7	39.5	37.8	39	6.5	48	43	130	100	56	20	14	8.2	26	38	7.8	3.9	9.9	8.5	5.1
Ethylbenzene	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<5.0	<1.0	<6.0	<6.7	< 6.7	<8.0	< 9.1 U	< 1.0 U	< 1 U	< 1 U	< 1.4 U	< 1.4 U	< 1.0 U	< 1.0 U	< 1.0 U	< 2.0 U	< 1.0 U
Tetrachloroethene	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<5.0	<1.0	<6.0	<6.7	< 6.7	<8.0	< 9.1 U	< 1.0 U	< 1 U	< 1 U	< 1.4 U	0.56 J	< 1.0 U	< 1.0 U	< 1.0 U	< 2.0 U	< 1.0 U
Toluene	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<5.0	<1.0	<6.0	<6.7	< 6.7	<8.0	< 9.1 U	< 1.0 U	< 1 U	< 1 U	< 1.4 U	< 1.4 U	< 1.0 U	< 1.0 U	< 1.0 U	< 2.0 U	< 1.0 U
trans-1,2-Dichloroethene	µg/L	7.8	9.3	7.4	12.9	16.4	15.7	15	2.8	8.3	5.1	2.2J	2.9J	7.9	22	4.3	4.8	2.5	4.7	4.4	3	1.9	1.7 J	1.1
Trichloroethene	µg/L	28.7	283	311	189	169	158	160	28	210	230	79	200	180	1.8	5.9	0.8 J	2.8	18	2.4	3.2	19	14	12
Vinyl chloride	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<5.0	<1.0	<6.0	<6.7	< 6.7	<8.0	< 9.1 U	13	9.3	4.7	12	19	6.6	3.6	6.2	5.1	3.8
Xylenes	µg/L	<1.0	2.3	<1.0	<1.0	<1.0	<1.0	<5.0	<1.0	<6.0	<6.7	< 6.7	<8.0	< 9.1 U	< 2.0 U	< 2 U	< 2 U	< 2.9 U	< 2.9 U	< 2.0 U	< 2.0 U	< 2.0 U	< 4.0 U	< 2.0 U
Total VOCs	µg/L	168.9	353.3	403.3	263.5	238.2	223.3	224.7	39.21	298.3	316.7	233.3	342.8	277.2	64.5	54.29	29.8	69.8	104.29	45.6	34.45	54	47.3	31.5

µg/L - Micrograms per Liter.
J - Value is estimated.
UJ - Constituent not detected above laboratory reporting limit; reporting limit estimated.
< - Constituent not detected above laboratory reporting limit shown.
U - Constituent not detected above laboratory reporting limit shown.
Samples collected in September and October 1999 represent baseline conditions.
Carbon source introductions began in December 1999.



Table D-4. Summary of Annual Groundwater Analytical Results from Reactive Zone 4 East Wells, RACER Trust, Moraine, Ohio.

RZ-4 East Constituents	Units	GM-19S																					
<u>Volatile Organic Compounds</u>		9/20/99	5/24/00	9/22/00	3/19/01	6/25/01	11/12/01	6/12/02	9/26/02	5/21/03	9/25/03	9/13/04	10/18/05	9/21/06	9/17/07	9/23/08	11/17/09	4/7/10	9/27/10	9/29/11	9/6/12	9/26/13	
1,1,1-Trichloroethane	µg/L	16.0	17.9	14.5	11.9	9.6	7.6	7.2	6.3	12	13	14	13	9.7 J	0.59 J	< 1 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	
1,1-Dichloroethane	µg/L	7.7	7.0	4.4	4.1	2.9	2.9J	3.7	6.3	8.4	8.3	8.1	9.0	7 J	10	13	12	9.6	9.5	10	8.4	8.3	
1,1-Dichloroethene	µg/L	1.0	1.1	<1.0	<1.0	<1.0	<3.3	0.98	<4	< 4	1.6J	1.9 J	1.2 J	< 22 U	< 1 U	< 1 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	
Benzene	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0	<3.3	0.62	<4	< 4	<5.0	< 4 U	< 1.7 U	< 22 U	< 1 U	< 1 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	
cis-1,2-Dichloroethene	µg/L	34.6	42.9	37.6	38.2	31.5	26	28	39	81	89	61	29	660	0.3 J	0.68 J	0.27 J	0.27 J	< 1.0 U	5.3	7.3	26	
Ethylbenzene	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0	<3.3	<3.3	<4	< 4	<5.0	< 4 U	< 1.7 U	< 22 U	< 1 U	< 1 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	
Tetrachloroethene	µg/L	46.0	57.1	68.0	67.6	71.7	64	60	52	62	62	71	95	9.1 J	1.5	0.94 J	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	
Toluene	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0	<3.3	<3.3	<4	< 4	<5.0	< 4 U	< 1.7 U	< 22 U	< 1 U	< 1 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	
trans-1,2-Dichloroethene	µg/L	2.3	2.7	2.6	3.0	2.4	2.0	2.3	2.7	2.5	2.9	2.4	1.0 J	10 J	0.29 J	0.52 J	0.37 J	0.45 J	0.46 J	1.1	0.84 J	1.1	
Trichloroethene	µg/L	71.1	104	104	107	121	97	110	110	120	140	120	140	11 J	0.46 J	3.0	0.22 J	< 1.0 U	< 1.0 U	< 1.0 U	0.30 J	0.46 J	
Vinyl chloride	µg/L	<1.0	1.4	<1.0	<1.0	<1.0	<3.3	0.70	5.2	< 4	<5.0	< 4 U	1.8	< 22 U	< 1 U	9.3	< 1.0 U	< 1.0 U	< 1.0 U	12	10	17	
Xylenes	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0	<3.3	<3.3	<4	< 4	<5.0	< 4 U	< 3.3 U	< 44 U	< 2 U	< 2 U	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U	
Total VOCs	µg/L	178.7	234.1	231.1	231.8	239.1	199.5	213.5	221.5	285.9	316.8	278.4	290	706.8	13.14	27.44	12.86	10.32	9.96	28.4	26.8	52.9	

µg/L - Micrograms per Liter.
J - Value is estimated.
UJ - Constituent not detected above laboratory reporting limit; reporting limit estimated.
< - Constituent not detected above laboratory reporting limit shown.
U - Constituent not detected above laboratory reporting limit shown.
Samples collected in September and October 1999 represent baseline conditions.
Carbon source introductions began in December 1999.



Table D-5. Bioattenuation Parameter Results for Groundwater Samples Collected in Reactive Zone 1, RACER Trust, Moraine, Ohio.

RZ-1		GM-29																					
Constituents	Units	9/1/99	2/22/00	5/26/00	9/21/00	3/20/01	6/26/01	11/13/01	12/12/01	6/13/02	9/25/02	5/22/03	9/24/03	9/15/04	10/17/05	9/28/06	9/26/07	10/6/08	11/17/09	9/29/10	9/30/11	9/26/12	9/27/13
Inorganics & TOC																							
Nitrate	mg/L	0	0	0	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Nitrite	mg/L	0	0	0	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Nitrogen, Ammonia	mg/L	<0.30	<0.30	<0.30	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Manganese (Total)	mg/L	0.552	0.136	0.35	0.248	0.203	0.136	0.17B	0.17	1.5B	0.18B	0.67J	0.20J	0.17	0.18	1.3	0.3 J	< 0.19 U	0.296	0.451	0.18	0.170	0.190
Manganese (Dissolved)	mg/L	0.13	0.101	0.177	0.125	0.116	0.128	0.17B	0.15	0.13B	0.16B	0.15J	0.21J	0.15	0.14	0.12	0.16 J	< 0.16 U	0.118	0.113	0.11	0.110	0.110
Iron (Total)	mg/L	18	1.43	10.1	8.48	5.84	2.52	3.4	3.8	47.8B	3.8	28.6	4.9	3.2	4.6	< 0.1 U	8.9	< 5.4 U	13.8	19.6	6.3	5	6.5
Iron (Dissolved)	mg/L	0.24	0.13	2.78	3.09	<0.10	2.03	3.3	2.9	2.2B	2.8	2.4	3.6	2.7	3.7	2.9	3.4	< 3.9 U	3.3	2.97	2.4	2.3	2.4
Iron (Ferrous)	mg/L	0.02	0	2.2	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Sulfate	mg/L	90	126	31	29	31	37	65	48	63	76	91J	52	14 J	51	70	65	< 5 UJ	68	72	64	58	55
Sulfide	mg/L	<4	<1	<1	<1	<1	<1	1.3	<1	<1	<1	0.54B	1.6	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	0.56 J	< 1.0 U	< 1.0 U	0.80 J	< 1.0 U
Total Organic Carbon	mg/L	18	11	22	<1	7.57	7.3	10	10	8	8	7	9	9	11	13	15 J	16	9	8	8.5	9.4	12
Chloride	mg/L	254	426	508	373	337	262	600B	460	490	490	490	560J	540	370	380	360 J	< 1 U	210	160	130	130 B	140
Permanent Gases																							
Carbon Dioxide	mg/L	46.52	49.87	44.05	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Oxygen	mg/L	1.02	0.66	1.41	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Nitrogen	mg/L	20.29	18.7	15.61	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Methane	mg/L	0.01152	0.007699	0.00017	1.62	1.30	1.5	0.610	1.2	0.56	1.1	0.6	1.5	3.8	13	10	NA	16	8.1	5.7	3.1	3.7	4.5
Carbon Monoxide	mg/L	<0.40	<0.40	<0.40	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Light Hydrocarbon Scan																							
Ethane	ng/L	5,641	1,861	751	639	460	17,000	20,000	28,000	14,000	16,000	7,400	9,900	13,000	170,000	350,000	NA	370,000	360,000	340,000	180,000	160,000	150,000
Ethene	ng/L	9,769	1,275	12,098	441,796	160,000	130,000	230,000	180,000	48,000	140,000	150,000	200,000	1,700,000	1,600,000 J	750,000	NA	420,000	140,000	59,000	20,000	18,000	17,000
Field Parameters																							
pH	S.U.	6.99	7.02	6.86	7.24	7.31	7.20	7.47	7.57	7.14	7.22	6.32	6.88	6.85	6.80	6.94	6.63	7.1	6.91	7.09	6.59	6.69	6.87
Specific Conductivity	umhos/cm	1,502	3,044	2,388	1,942	1,733	1,291	2,703	2,860	1,977	2,354	2,303	2,278	2,580	2,200	2,170	2,350	1,870	1,264	1,427	1,651	960	1,302
Dissolved Oxygen	mg/L	0.35	0.51	0.45	3.44	8.20	0.40	0.22	0.01	3.57	1.40	1.38	0.13	0.04	0.00	0.29	0.4	0.11	0.16	2.00	0.15	0.70	0.21
Redox Potential	mV	-526.6	19.6	-105.4	-35.0	-158.2	-166.4	-129.7	-168	-122.9	-91.3	-157.8	-118.6	-134	-153	-168	-139	-54	-140.1	-163	-14.2	-60	-108
Temperature	°C	17.8	16.9	17.97	17.64	20.04	20.47	16.42	17.13	19.33	17.63	18.23	16.81	16.4	16.8	16.69	18	16.78	16.50	18.00	21.1	21.0	24.0

mg/L - Milligrams per Liter.
ng/L - Nanograms per Liter.
S.U. - Standard Units.
umhos/cm - Micromohs per Centimeter.
mV - Millivolts.
°C - Degrees Celsius.
J - Value is estimated.
B - Blank Contamination.
NA - Not Analyzed.
U - Constituent not detected above laboratory reporting limit shown.
Samples collected in September 1999 represent baseline conditions.
Carbon source introductions began in December 1999.
(1) Well GM-28 not sampled in 2012 and 2013 due to obstruction in well.



Table D-5. Bioattenuation Parameter Results for Groundwater Samples Collected in Reactive Zone 1, RACER Trust, Moraine, Ohio.

RZ-1		GM-23																	
Constituents	Units	9/2/99	2/21/00	5/31/00	3/20/01	6/13/02	9/26/02	5/22/03	9/23/03	9/14/04	10/17/05	9/28/06	9/27/07	10/23/08	11/17/09	9/29/10	9/30/11	9/7/12	9/27/13
Inorganics & TOC																			
Nitrate	mg/L	0.08	0	0	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Nitrite	mg/L	3.83	0	0	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Nitrogen, Ammonia	mg/L	<0.30	0.94	2.84	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Manganese (Total)	mg/L	4.71	0.887	0.121	0.469	1.5 J	1.0 J	1.5 J	1.6 J	1.3 J	0.79	1.5	1.4 J	0.89	0.539	0.508	0.57	0.410 B	0.450
Manganese (Dissolved)	mg/L	0.346	0.841	0.101	0.311	1.3 J	0.68 J	1.5 J	1.7 J	1.2 J	0.81	1.5	1.3 J	0.90	0.516	0.492	0.5	0.380 B	0.440
Iron (Total)	mg/L	13.6	0.53	0.18	0.48	0.16 J	0.63	0.50	0.14	0.11	30.7	13.6	10.8	10.1	5.51	5.72	7.5	4.8	3.6
Iron (Dissolved)	mg/L	<0.10	<0.10	<0.10	< 1.0	<0.10	<0.10	<0.10	<0.10	<0.10	34.2	13.2	10	10	5.21	5.33	6	4.7	3.7
Iron (Ferrous)	mg/L	4	0	0	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Sulfate	mg/L	72	650	8040	1440	920	810	310 J	650	430 J	120	850	590	490	130	160	200	74	120
Sulfide	mg/L	<4	<1	<1	<1	<1	<1	<1 U	0.67 B	<1	<1	<1 U	< 1 U	< 1 U	0.73 J	< 1.0	< 1.0 U	<1.0 U	<1.0 U
Total Organic Carbon	mg/L	19	25	19	10.8	15 J	15	15	13	10 J	360	11	9	9	7	9	6.6	7.2	6.4
Chloride	mg/L	118	143	85	232	180	190	220	140 J	220	260	220	210	220	100	43	65	97 B	39
Permanent Gases																			
Carbon Dioxide	mg/L	88.47	264.8	323.79	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Oxygen	mg/L	0.96	1.56	17.78	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Nitrogen	mg/L	20.22	13.75	3.13	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Methane	mg/L	0.1248	0.72	0.02083	0.780	1.6	2.1	2.7	1.8	1.5	1.3	0.91	0.64	1.9	1.7	2.5	2	2.6	0.840
Carbon Monoxide	mg/L	<0.40	<0.40	<0.40	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Light Hydrocarbon Scan																			
Ethane	ng/L	6,878	14,644	1,037	11,000	25,000	32,000	44,000	23,000	17,000	16,000	12,000	7,100	21,000	31,000	36,000	25,000	71,000	16,000
Ethene	ng/L	580,916	439,458	569	260,000	230,000	230,000	1,200,000	270,000	260,000	500,000	900,000	370,000 J	960,000	2,100,000	1,700,000	230,000	74,000	16,000
Field Parameters																			
pH	S.U.	6.80	6.62	6.31	6.64	6.81	6.76	5.59	6.73	7.04	5.66	6.69	6.34	7.74	6.80	6.89	6.52	9.13	6.76
Specific Conductivity	umhos/cm	1,160	2,856	6,720	3,448	2,290	2,390	1,683	2,258	2,130	2,570	2,740	2,470	1,465	1,184	1,395	1,812	1,310	1,228
Dissolved Oxygen	mg/L	0.65	0.78	10.48	8.38	4.23	0.42	1.76	0.85	0.00	0.00	0.40	0.44	0.11	0.16	0.23	0.54	2.83	0.40
Redox Potential	mV	122.2	158.7	194.2	160.4	346.5	215.6	247.9	198.8	57	-108	-108	-91	189	-90.1	-104.2	-52	-161	-49
Temperature	°C	17.89	17.6	26.45	19.08	16.40	19.06	17.91	17.38	16.30	16.50	16.78	17.50	17.12	17.15	18.89	17.40	22.5	24.7

mg/L - Milligrams per Liter.
ng/L - Nanograms per Liter.
S.U. - Standard Units.
umhos/cm - Micromohs per Centimeter.
mV - Millivolts.
°C - Degrees Celsius.
J - Value is estimated.
B - Blank Contamination.
NA - Not Analyzed.
U - Constituent not detected above laboratory reporting limit shown.
Samples collected in September 1999 represent baseline conditions.
Carbon source introductions began in December 1999.
(1) Well GM-28 not sampled in 2012 and 2013 due to obstruction in well.



Table D-5. Bioattenuation Parameter Results for Groundwater Samples Collected in Reactive Zone 1, RACER Trust, Moraine, Ohio.

RZ-1		GM-28 ⁽¹⁾																				
Constituents	Units	9/1/99	2/23/00	5/26/00	9/21/00	3/20/01	6/26/01	11/15/01	12/12/01	7/21/02	9/24/02	5/23/03	10/1/03	4/30/04	9/15/04	10/18/05	9/27/06	9/20/07	10/22/08	11/16/09	9/28/10	10/5/11
Inorganics & TOC																						
Nitrate	mg/L	0.08	0	0	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Nitrite	mg/L	0.06	0	0	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Nitrogen, Ammonia	mg/L	<0.30	<0.30	0.68	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Manganese (Total)	mg/L	3.2	1.15	6.26	4.1	0.594	2.24	0.58	0.47	1.1	0.48B	0.69J	0.42J	0.34	0.37	0.45	0.46	0.44 J	1.4	0.468	0.468	0.72
Manganese (Dissolved)	mg/L	0.068	0.449	6.71	3.94	0.477	1.76	0.61	0.49	1.1	0.41B	0.29J	0.40J	0.32	0.36	0.45	0.43	0.43 J	1.5	0.444	0.466	0.49
Iron (Total)	mg/L	106	25.3	22.7	58.9	29.6	59	23.6	23.5	36.2	28.7	47.9	23.4J	17.6	15.7	16.1	14.5	11.7	23.4	11.3	11.6	22
Iron (Dissolved)	mg/L	<0.10	0.59	23.3	48.3	2.65	49.8	23.3	23.7	34.7	23.4	16.7	22.4J	16.4	15.1	15.2	13.1	10.7	23.7	10.2	10.6	5.5
Iron (Ferrous)	mg/L	0	0.03	2.6	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Sulfate	mg/L	89	43	<5	<5	9	106	<5	<5	<5	18	65J	31J	89	93 J	91	75	77	33	55	45	41
Sulfide	mg/L	<4	<1	<1	<1	<1	<1	1.5	<1.0	2.0	4.3	2.5	<1.0	< 1 U	< 1 U	< 1.0 U	< 1 U	< 1 U	< 1 U	< 1.0	< 1.0 U	
Total Organic Carbon	mg/L	15	24	742	571	90.0	360	74	68B	140	23	15	17	15 J	8	10	7	8 J	310	6	7	9.1
Chloride	mg/L	208	664	805	782	1030	508	730B	560	370	450	350	270J	320	340	320	320	300 J	260	220	170	130
Permanent Gases																						
Carbon Dioxide	mg/L	41.52	63.57	16.51	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Oxygen	mg/L	2.32	0.59	0.64	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Nitrogen	mg/L	19.42	16.39	19.82	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Methane	mg/L	0.002487	0.001832	0.21	1.70	13.0	13.0	13	20	19	14	8.9	11	7.9	6.6	2.8	2.5	2.3	2.9	4.2	2.3	0.76
Carbon Monoxide	mg/L	<0.40	<0.40	<0.40	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Light Hydrocarbon Scan																						
Ethane	ng/L	750	493	865	1,198	42,000	39,000	91,000	98,000	420,000	300,000	310,000	230,000	160,000	150,000	81,000	73,000	72,000	52,000	73,000	53,000	14,000
Ethene	ng/L	48	98	646	1,794,606	57,000	5,000	1,100	1,400	8,800	12,000	74,000	430	160	54	< 210 U	< 25 U	62	9,300	< 200 U	150	86
Field Parameters																						
pH	S.U.	7.02	6.92	7.01	7.18	7.1	6.64	6.50	7.45	6.84	7.24	6.86	6.80	NA	6.85	5.47	7.08	6.72	6.49	7.04	7.16	NA
Specific Conductivity	umhos/cm	1,359	3,124	4,402	4,538	3,724	3,216	3,136	3,700	2,187	2,195	2,132	1,501	NA	2,030	2,230	1,880	2	1,428	1,821	1,615	NA
Dissolved Oxygen	mg/L	0.95	1.45	2.52	6.78	4.36	0.41	0.83	0.20	0.68	0.35	1.41	0.34	NA	0	0	0.29	0.64	0.13	0.20	2.70	NA
Redox Potential	mV	90.5	56.0	-93.7	-200.1	-70.6	-177.8	-148.2	-203	-153.3	-135.3	-93.1	-146.9	NA	-165	-166	-183	-152	27	-166.2	-153.5	NA
Temperature	°C	16.4	18.48	19.24	20.21	18.93	19.04	19.24	18.92	20.44	18.68	16.88	17.97	NA	16.2	15.9	16.33	17.1	16.38	16.65	16.56	NA

mg/L - Milligrams per Liter.
ng/L - Nanograms per Liter.
S.U. - Standard Units.
umhos/cm - Micromohs per Centimeter.
mV - Millivolts.
°C - Degrees Celsius.
J - Value is estimated.
B - Blank Contamination.
NA - Not Analyzed.
U - Constituent not detected above laboratory reporting limit shown.
Samples collected in September 1999 represent baseline conditions.
Carbon source introductions began in December 1999.
(1) Well GM-28 not sampled in 2012 and 2013 due to obstruction in well.



Table D-6. Bioattenuation Parameter Results for Groundwater Samples Collected in Reactive Zone 3 West, RACER Trust, Moraine, Ohio.

RZ-3 West		GM-32																				
Constituents	Units	9/22/99	2/28/00	5/30/00	9/25/00	3/19/01	11/12/01	12/11/01	6/12/02	9/20/02	5/23/03	10/1/03	9/14/04	10/19/05	9/19/06	9/18/07	9/23/08	11/16/09	9/27/10	9/29/11	9/6/12	9/26/13
<u>Inorganics & TOC</u>																						
Nitrate	mg/L	0	0	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Nitrite	mg/L	0	0	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Nitrogen, Ammonia	mg/L	2.29	2.00	19.3	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Manganese (Total)	mg/L	0.147	0.516	0.051	0.30	0.17	0.16B	0.087B	0.043B	0.053B	0.1J	0.13J	0.13 J	0.076	0.088	0.077 J	0.051	NA	NA	NA	NA	NA
Manganese (Dissolved)	mg/L	0.052	0.061	0.048	0.31	<0.050	0.020B	0.024B	0.042B	0.028B	0.077J	0.11J	0.13 J	0.067	0.078	0.072 J	0.056	NA	NA	NA	NA	NA
Iron (Total)	mg/L	8.14	42.4	18.4	81.0	13	16.5	10.5	7.5	8.4B	21.3	31.4J	33.9	22.0	24.7	20	14	NA	NA	NA	NA	NA
Iron (Dissolved)	mg/L	3.53	0.59	17.1	81.6	3.17	5.2	6.5	8.1	6.8B	18.7	30.5J	34.5	19.8	24.5	19.5	13.6	NA	NA	NA	NA	NA
Iron (Ferrous)	mg/L	1.8	2.2	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Sulfate	mg/L	30	<5	<10	<10	<20	5	4J	1J	<5	<5	<5	< 5 U	< 5 U	< 5 U	< 5 U	24	NA	NA	NA	NA	NA
Sulfide	mg/L	<1	<10	<1	<1	1.6	<1	<1.0	0.50J	1.3	0.86B	7.3	16	4.1	1	14	7.7	NA	NA	NA	NA	NA
Total Organic Carbon	mg/L	68	1200	2020	2720	1120	320B	250	240	160	150	170	240 J	300	260	290 J	95	170	260	71	62	40
Chloride	mg/L	317	638	740	740	798	700B	630	470	510	390	510J	530	550	560	560 J	400	NA	NA	NA	NA	NA
<u>Permanent Gases</u>																						
Carbon Dioxide	mg/L	39.79	8.94	24.32	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Oxygen	mg/L	1.67	0.85	<0.15	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Nitrogen	mg/L	14.93	15.23	2.40	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Methane	mg/L	2.73	7.06	14.91	16.84	29	29	38	24	32	24	19	25	30 J	26	26	25	NA	NA	NA	NA	NA
Carbon Monoxide	mg/L	<0.40	<0.40	<0.40	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
<u>Light Hydrocarbon Scan</u>																						
Ethane	ng/L	1,649	9,965	1,029	189	7,900	42,000	72,000	84,000	94,000	74,000	46,000	57,000	85,000 J	76,000	73,000	58,000	NA	NA	NA	NA	NA
Ethene	ng/L	86,509	163,855	472,312	510,593	150,000	130,000	90,000	93,000	49,000	9,900	3,400	2,000	1,900 J	2,400	1,200	940	NA	NA	NA	NA	NA
<u>Field Parameters</u>																						
pH	S.U.	7.54	8.59	7.64	7.73	8.36	8.42	8.13	8.55	8.13	6.41	6.81	6.86	6.30	6.84	7.00	7.13	7.02	7.68	7.20	7.15	8.05
Specific Conductivity	umhos/cm	2,750	9,030	9,195	9,225	7,483	6,874	6,200	5,432	4,289	3,908	3,192	4,210	4,810	4,510	4,240	3,220	3,540	5,328	3,280	1,998	1,388
Dissolved Oxygen	mg/L	0.09	0.23	10.82	2.55	0.36	0.07	0.03	1.14	0.22	1.93	0.31	0	0	0.21	0.45	1.79	0.89	2.4	1.97	0.94	0.42
Redox Potential	mV	-226.4	-279.1	-213.6	-353.8	-152.5	-222.8	-279	-220.5	-227.1	-204.6	-154.4	-160	-191	-193	-161	-200	-108	-236.9	-244	-73	-17
Temperature	°C	19.27	19.72	23.48	19.27	19.3	18.84	18.62	20.83	19.81	19.31	18.47	17.20	17.00	17.70	16.70	18.71	16.30	16.79	18.77	21.5	18.36

mg/L - Milligrams per Liter.
ng/L - Nanograms per Liter.
S.U. - Standard Units.
umhos/cm - Micromohs per Centimeter.
mV - Millivolts.
°C - Degrees Celsius.
J - Value is estimated.
B - Blank Contamination.
NA - Not Analyzed.
U - Constituent not detected above laboratory reporting limit shown.
Samples collected in September 1999 represent baseline conditions.
Carbon source introductions began in December 1999.



Table D-6. Bioattenuation Parameter Results for Groundwater Samples Collected in Reactive Zone 3 West, RACER Trust, Moraine, Ohio.

RZ-3 West		GM-8														GM-6									
Constituents	Units	3/6/98	9/20/99	9/20/02	12/9/03	9/14/04	10/19/05	9/19/06	9/18/07	9/23/08	11/16/09	9/27/10	9/30/11	9/6/12	9/26/13	3/6/98	9/20/99	9/20/02	12/9/03	9/14/04	10/19/05	9/19/06	9/18/07	9/24/08	9/27/10
<u>Inorganics & TOC</u>																									
Nitrate	mg/L	<4.4	0	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<4.4	0	NA	NA	NA	NA	NA	NA	NA	NA
Nitrite	mg/L	<0.033	0	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.033	0	NA	NA	NA	NA	NA	NA	NA	NA
Nitrogen, Ammonia	mg/L	1.69	1.95	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.300	<0.30	NA	NA	NA	NA	NA	NA	NA	NA
Manganese (Total)	mg/L	0.204	0.125	0.085B	0.21	0.13	0.17	0.16	0.12 J	0.027	0.0617	0.14	0.035	0.025	0.037	1.07	1.11	0.27B	0.57	0.43	0.50	0.54	0.4 J	0.14	NA
Manganese (Dissolved)	mg/L	0.229	0.125	0.084B	0.21	0.14	0.15	0.15	0.11 J	0.026	0.0643	0.0604	0.031	0.025	0.036	1	0.958	0.24B	0.53	0.47	0.49	0.54	0.39 J	0.13	NA
Iron (Total)	mg/L	1.01	0.27	0.55B	1.9	1.8	3.2	3.4	3.3	0.69	2.2	4.27	1.2	0.830	1.700	1.32	0.27	0.40B	5.7	3.2	5.4	5.7	6.7	2.9	NA
Iron (Dissolved)	mg/L	1.22	0.26	0.52B	1.9	1.8	2.8	3.1	3	0.64	2.13	2.05	0.98	0.780	1.200	<0.1	<0.10	0.30B	1.9	3.1	4.8	5.6	6.3	2.6	NA
Iron (Ferrous)	mg/L	<0.2	0	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.2	NA	NA	NA	NA	NA	NA	NA	NA	NA
Sulfate	mg/L	59	54	59	<5	13 J	27	24	49	32	23	22	24	27	22	93	83	43	27	26 J	52	55	66	26	NA
Sulfide	mg/L	<1	<1	<1.0	<1.0	2	< 1.0 U	1.8	0.86 J	0.54 J	1.2 J	1.4	< 1.0 U	<1.0 U	<1.0 U	<1	<1	<1.0	<1.0	3.4	< 1.0 U	< 1 U	< 1 U	6.5	NA
Total Organic Carbon	mg/L	7	8	16	20	19 J	19	16	16 J	12	15	19	17	8.2	9.8	3	4	17	12	16 J	6	7	8 J	14 J	NA
Chloride	mg/L	248	216	180	180J	190	260	320	360 J	250	230	230	270	190 B	150	227	247	170	190J	230	290	340	400 J	250	NA
<u>Permanent Gases</u>																									
Carbon Dioxide	mg/L	15.8	9.91	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	47.4	48.44	NA	NA	NA	NA	NA	NA	NA	NA
Oxygen	mg/L	1.1	0.92	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	1.57	2.23	NA	NA	NA	NA	NA	NA	NA	NA
Nitrogen	mg/L	19.7	25.42	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	20.5	21.77	NA	NA	NA	NA	NA	NA	NA	NA
Methane	mg/L	1.48	2.47	8.5	14	9	8.1 J	7.2	9.1	4.4	7.8	6.7	4.7	2.5	1.8	0.008337	0.006916	7.8	7.8	7.2	4.4 J	3.5	5.3	5.2	NA
Carbon Monoxide	mg/L	<0.4	<0.40	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.4	<0.40	NA	NA	NA	NA	NA	NA	NA	NA
<u>Light Hydrocarbon Scan</u>																									
Ethane	ng/L	370	1,134	13,000	12,000	18,000	17,000 J	7,200	10,000	22,000	11,000	19,000	26,000	10,000	12,000	47	67	10,000	2,400	5,000	870 J	520	660	13,000	NA
Ethene	ng/L	12,233	39,617	3,700	440	56	< 76 U J	1,200	32	140	< 220 U	33	120	140	930	91	97	4,900	750	2,000	3,600 J	1,700	1,800	680	NA
<u>Field Parameters</u>																									
pH	S.U.	7.7	7.98	8.18	7.2	7.76	6.45	7.31	7.21	8.1	7.86	7.89	7.81	10.32	7.92	7	7.05	7.46	7.76	7.16	6.06	6.8	6.84	7.17	7.27
Specific Conductivity	umhos/cm	1,539	1,584	1,734	1,870	1,900	2,080	2,120	2,300	2,060	1,920	2,083	2,560	1,690	1,488	1,422	1,493	1,658	2,080	1,830	1,880	1,920	2,130	2,160	1,900
Dissolved Oxygen	mg/L	0.16	0.28	0.37	0.04	0	0	0.53	0.70	0	0	3.00	0.60	7.38	0.63	0.88	0.48	0.34	0.03	0	0	0.24	0.51	1.43	3.30
Redox Potential	mV	-145	-49.8	-150.6	-137	-186	-162	-160	-125	-262	-24	-167.7	-115	-209	-42.8	57.6	26.5	-27.7	-223	-111	-107	-111	-86	-159	-136.4
Temperature	°C	17.53	19.09	19.2	18.17	16.60	16.30	18.10	17.00	17.60	16.00	16.51	21.1	20.3	15.7	18.49	21.07	19.07	17.71	16.8	16.8	17.3	17.5	16.51	16.10

mg/L - Milligrams per Liter.
ng/L - Nanograms per Liter.
S.U. - Standard Units.
umhos/cm - Micromohs per Centimeter.
mV - Millivolts.
°C - Degrees Celsius.
J - Value is estimated.
B - Blank Contamination.
NA - Not Analyzed.
U - Constituent not detected above laboratory reporting limit shown.
Samples collected in September 1999 represent baseline conditions.
Carbon source introductions began in December 1999.



Table D-7. Bioattenuation Parameter Results for Groundwater Samples Collected in Reactive Zone 3 East, RACER Trust, Moraine, Ohio.

RZ-3 East		GM-21												
Constituents	Units	9/22/99	2/23/00	5/26/00	9/22/00	3/19/01	11/13/01	12/11/01	10/3/08	11/16/09	9/28/10	9/29/11	9/7/12	9/26/13
<u>Inorganics & TOC</u>														
Nitrate	mg/L	0	0	0	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Nitrite	mg/L	0	0	0	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Nitrogen, Ammonia	mg/L	<0.30	<0.3	<0.30	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Manganese (Total)	mg/L	0.321	0.233	0.215	0.336	0.298	0.30B	0.30B	0.78	0.882	0.758	0.93	1.100 B	1.1
Manganese (Dissolved)	mg/L	0.273	0.225	0.212	0.312	0.291	0.32B	0.29B	0.77	0.893	0.768	0.91	1.100 B	1.0
Iron (Total)	mg/L	2.58	0.30	0.83	0.63	0.11	<0.10	0.16	17.9	19.6	26.1	32	31	32
Iron (Dissolved)	mg/L	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	0.11	16.7	20.2	25.6	31	33	32
Iron (Ferrous)	mg/L	0.4	0	0	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Sulfate	mg/L	103	102	80	102	118	120	100	38	19	13	23	56	21
Sulfide	mg/L	<1	<1	<1	<1	<1	<1	1.9	1.5	4.0 J	< 1.0	< 1.0 U	14	1.0
Total Organic Carbon	mg/L	1	3	2	<1	<1	2B	1	18	45	91	100	86	120
Chloride	mg/L	136	145	126	129	165	140	150	240	220	230	300	240 B	290
<u>Permanent Gases</u>														
Carbon Dioxide	mg/L	37.04	37.40	18.70	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Oxygen	mg/L	1.41	0.99	1.89	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Nitrogen	mg/L	23.40	21.67	23.64	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Methane	mg/L	0.03744	0.01769	0.01370	0.04218	0.048	0.049	0.035	28	28	23	15	12	NA
Carbon Monoxide	mg/L	<0.40	<0.40	<0.40	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
<u>Light Hydrocarbon Scan</u>														
Ethane	ng/L	72	67	84	72	82	76	120	77,000	71,000	50,000	21,000	7,500	NA
Ethene	ng/L	169	38	70	69	46	46	100	13,000	6,700	3,600	3,100	5,800	NA
<u>Field Parameters</u>														
pH	S.U.	6.99	7.22	7.06	7.21	7.85	7.50	7.45	6.05	6.40	6.46	6.50	6.36	6.38
Specific Conductivity	umhos/cm	1,188	1,299	1,048	1,096	1,067	1,190	1,360	1,405	2,088	2,424	2,974	2,511	1,373
Dissolved Oxygen	mg/L	0.66	0.60	0.40	0.99	0.57	0.04	0.04	0.12	0.24	3.60	0.30	0.12	0.47
Redox Potential	mV	-26.9	113.3	167.1	153.9	218.5	168.8	-25	68	-92.1	-95.1	-13.7	-12	22.6
Temperature	°C	20.43	18.43	17.92	19.03	17.59	16.73	15.82	16.5	16.32	16.65	23.0	22.9	23.7

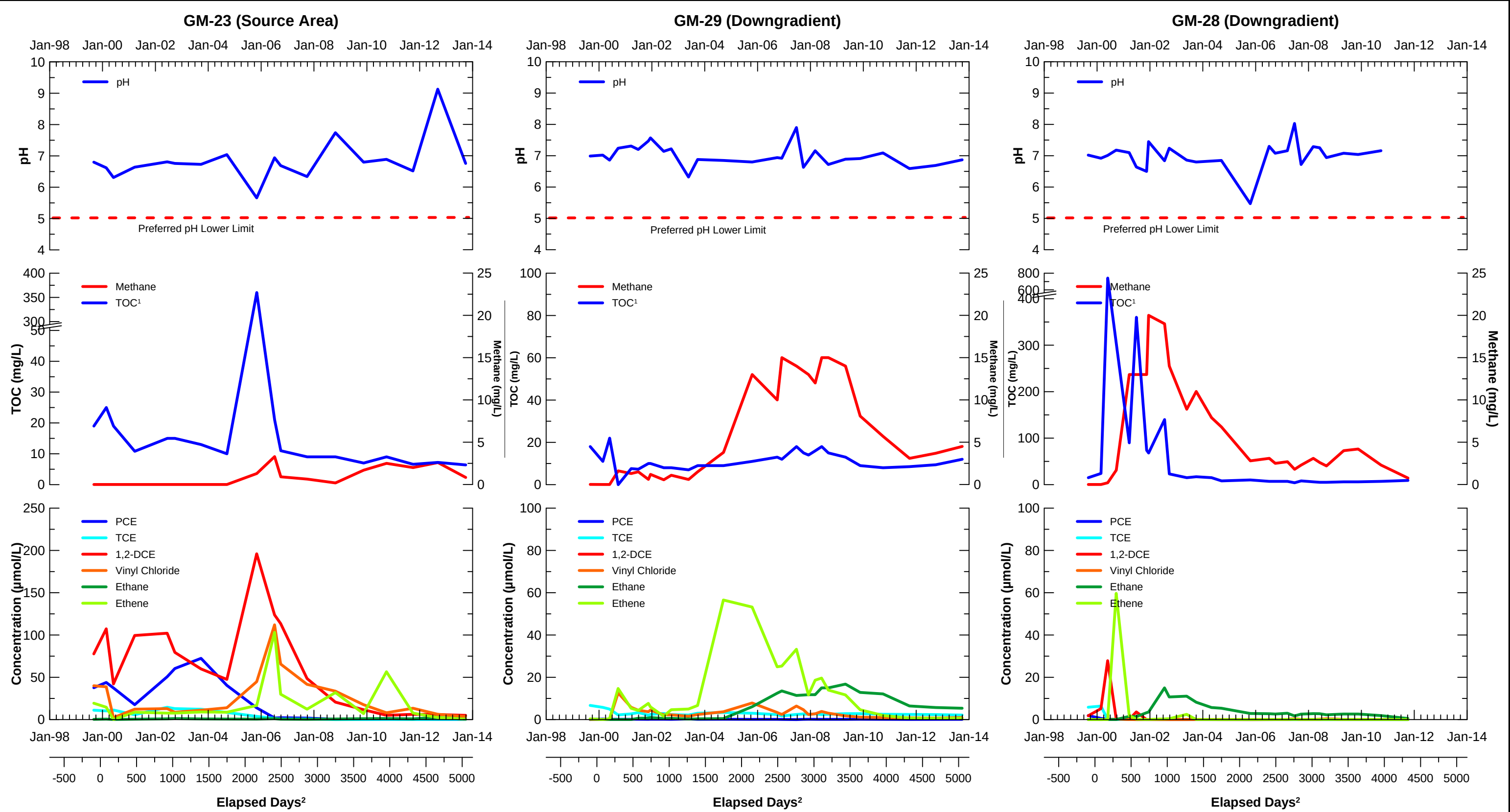
mg/L - Milligrams per Liter.
ng/L - Nanograms per Liter.
S.U. - Standard Units.
umhos/cm - Micromohs per Centimeter.
mV - Millivolts.
°C - Degrees Celsius.
J - Value is estimated.
B - Blank Contamination.
NA - Not Analyzed.
U - Constituent not detected above laboratory reporting limit shown.
Samples collected in September 1999 represent baseline conditions.
Carbon source introductions began in December 1999.



Table D-8. Bioattenuation Parameter Results for Groundwater Samples Collected in Reactive Zone 4 East, RACER Trust, Moraine, Ohio.

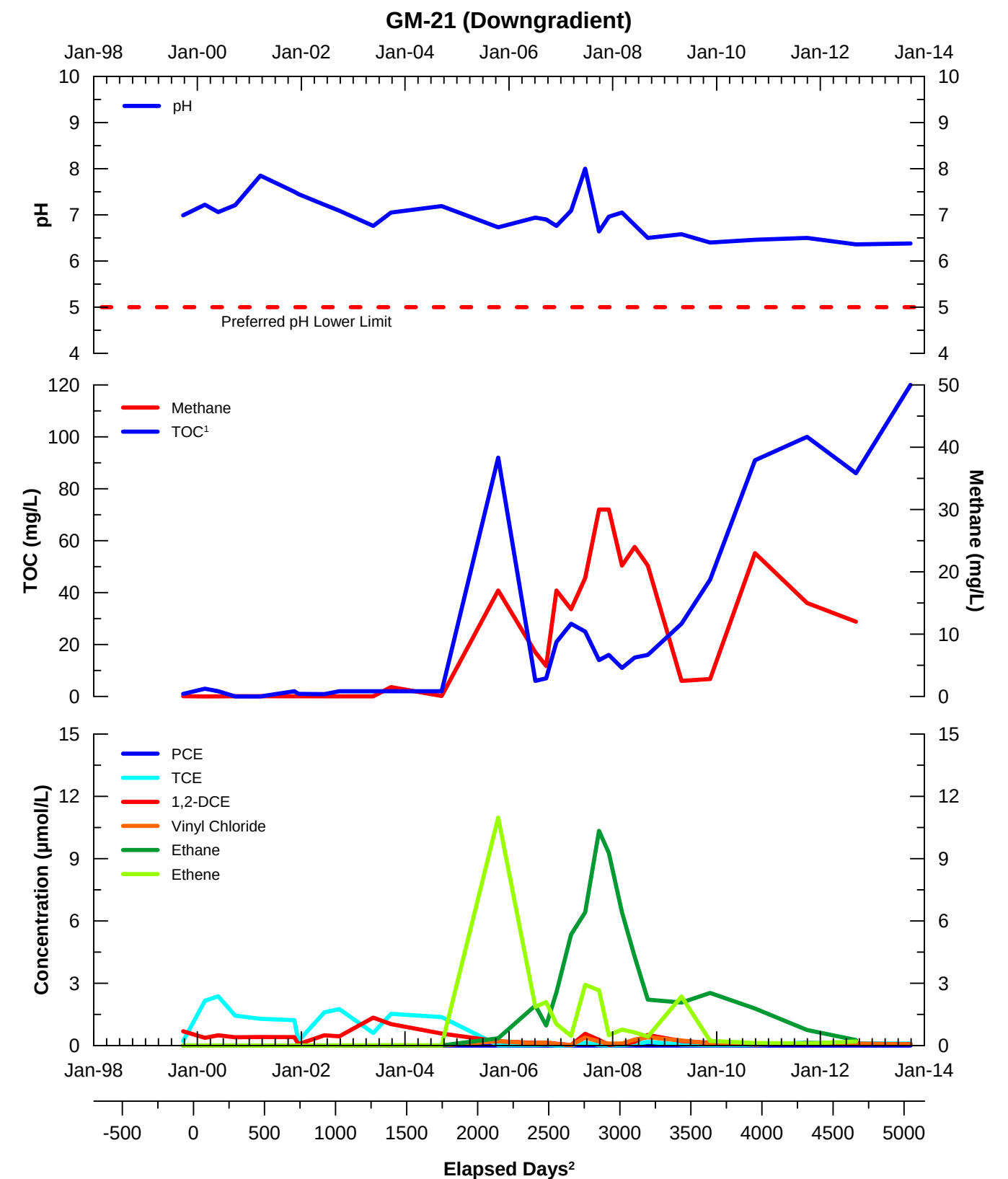
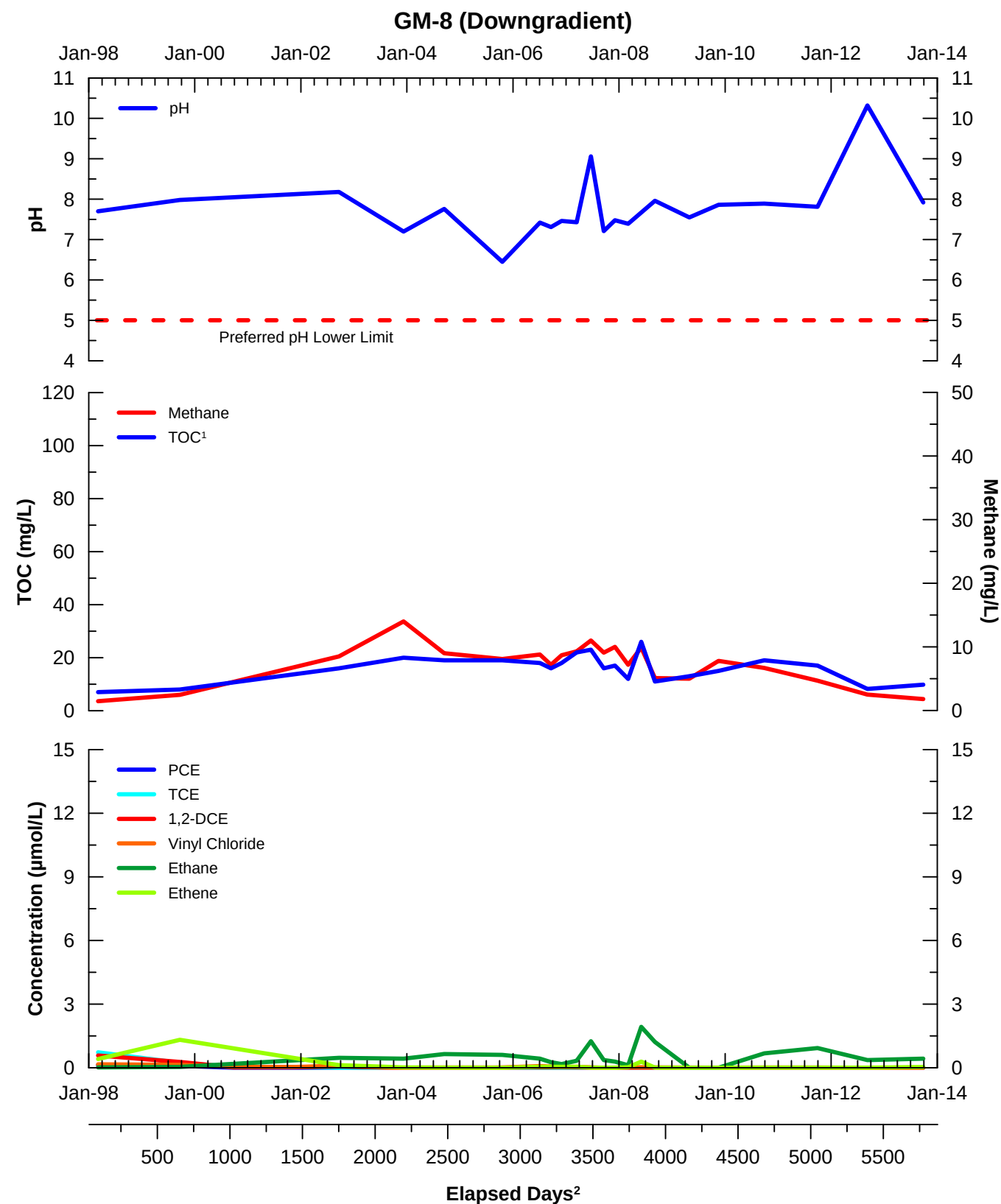
RZ-4 East		GM-19S																					
Constituents	Units	9/20/99	2/23/00	5/24/00	9/22/00	3/19/01	11/20/01	12/11/01	6/12/02	9/26/02	5/21/03	9/25/03	9/13/04	10/18/05	9/21/06	9/17/07	9/23/08	11/17/09	4/7/10	9/27/10	9/29/11	9/6/12	9/26/13
<u>Inorganics & TOC</u>																							
Nitrate	mg/L	11	0	0	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Nitrite	mg/L	0	0	0	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Nitrogen, Ammonia	mg/L	<0.30	<0.30	<0.30	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Manganese (Total)	mg/L	0.726	1.09	0.247	0.238	0.191	0.2	0.21B	0.25B	0.39B	0.3J	0.23J	0.25	0.24	0.99	0.28 J	0.16	0.0911	NA	0.169	0.17	0.130	0.110
Manganese (Dissolved)	mg/L	0.185	0.205	0.200	0.187	0.155	0.19	0.18B	0.18B	0.19B	0.2J	0.21J	0.16	0.2	0.94	0.15 J	0.16	0.0900	NA	0.170	0.14	0.130	0.110
Iron (Total)	mg/L	16.9	39.4	1.19	0.40	0.9	0.091	0.18	0.26	0.44	0.17	0.96	3	0.38	1.6	12.7	7.4	15.2	NA	18.9	11	6.7	5.5
Iron (Dissolved)	mg/L	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.1	<0.10	< 0.1 U	< 0.10 U	1.4	9.4	7.3	15.1	NA	18.3	9	6.4	5.4
Iron (Ferrous)	mg/L	0	0	0	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Sulfate	mg/L	127	131	131	118	113	100	90	110	110	150J	150	110 J	83	95	63	68	25	NA	21	58	84	76
Sulfide	mg/L	<1	<1	<1	<1	<1	<1	0.96J	<1.0	<1.0	<1	1.3	1.6	< 1.0 U	< 1 U	< 1 U	< 1 U	1.0 J	NA	0.80 J	< 1.0 U	0.75 J	< 1.0 U
Total Organic Carbon	mg/L	2	7	5	<1	<1	2B	1	1	3	2	2	1	3	22	6 J	3	10	NA	14	4.6	2.6	3.2
Chloride	mg/L	247	197	168	165	158	130B	150	140	210	270	300J	310	320	350	400 J	390	460	NA	390	340	290 B	230
<u>Permanent Gases</u>																							
Carbon Dioxide	mg/L	41.85	57.12	50.12	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Oxygen	mg/L	4.43	1.01	1.24	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Nitrogen	mg/L	20.87	17.07	17.13	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Methane	mg/L	0.009863	0.002712	0.003325	0.003706	0.039	0.005	0.0088	0.002	0.46	0.0021	0.0022	0.0014	< 0.0065 U	0.025	7.5	0.79	25	NA	19	1.3	0.009	0.220
Carbon Monoxide	mg/L	<0.40	<0.40	<0.40	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
<u>Light Hydrocarbon Scan</u>																							
Ethane	ng/L	71	104	139	184	210	300	350	410	730	170	80	48	< 250 U	730	7,800	550	11,000	NA	9,300	870	53	0.000085
Ethene	ng/L	55	45	43	36	61	34	27	130	770	78	45	51	< 220 U	550	22,000	30,000	< 120 U	NA	72	1,800	760	0.00059
<u>Field Parameters</u>																							
pH	S.U.	7.05	7.05	7.00	7.19	7.14	7.28	7.31	7.09	7.02	6.71	6.93	7.13	5.97	6.84	7.03	7.1	6.93	6.78	7.47	6.33	7.11	8.43
Specific Conductivity	umhos/cm	1,500	1,784	1,548	1,235	1,097	1,190	1,350	1,052	1,474	1,706	1,726	1,970	1,940	2,150	2,010	2,290	1,951	2,370	1,986	2,150	1,377	1,539
Dissolved Oxygen	mg/L	0.92	0.30	1.94	1.36	0.96	1.75	0.06	0.9	0.47	2.01	1.87	0	0	0.3	0.43	1.87	0.33	0.80	0.67	2.08	0.54	0.54
Redox Potential	mV	31.3	149.6	200.1	187.7	320.8	195.6	13	446.3	259.6	178.3	135	160	122	-82	-145	-153	-137.9	-157	-112.5	-150	-26	-64.1
Temperature	°C	20.85	18.69	20.80	20.09	20.14	19.24	19.1	20.39	20.36	20.22	19.57	18.6	17.6	17.9	17.5	16.9	16.68	17.73	16.43	17.82	23.9	19.8

mg/L - Milligrams per Liter.
ng/L - Nanograms per Liter.
S.U. - Standard Units.
umhos/cm - Micromohs per Centimeter.
mV - Millivolts.
°C - Degrees Celsius.
J - Value is estimated.
B - Blank Contamination.
NA - Not Analyzed.
U - Constituent not detected above laboratory reporting limit shown.
Samples collected in September 1999 represent baseline conditions.
Carbon source introductions began in December 1999.



1 - TOC breakthrough is 20 mg/L.
2 - Days since RZ-1 ERD implementation.
ERD - Enhanced reductive dechlorination.
pH - Negative logarithm of the hydrogen-ion concentration.
mg/L - Milligram per liter.
Note: GM-28 has not been sampled since 2011.

µmol/L - micromoles per liter.
TOC - Total organic carbon.
PCE - Tetrachloroethene.
TCE - Trichloroethene.
1,2-DCE - cis and trans-1,2-Dichloroethene.



1 - TOC breakthrough is 20 mg/L.
 2 - Days since RZ-3 ERD implementation.
 ERD - Enhanced reductive dechlorination.
 pH - Negative logarithm of the hydrogen-ion concentration.
 mg/L - Milligram per liter.
 Note: Ethene, ethane, and methane parameters were not collected during the 2013 annual groundwater sampling event at GM-21.

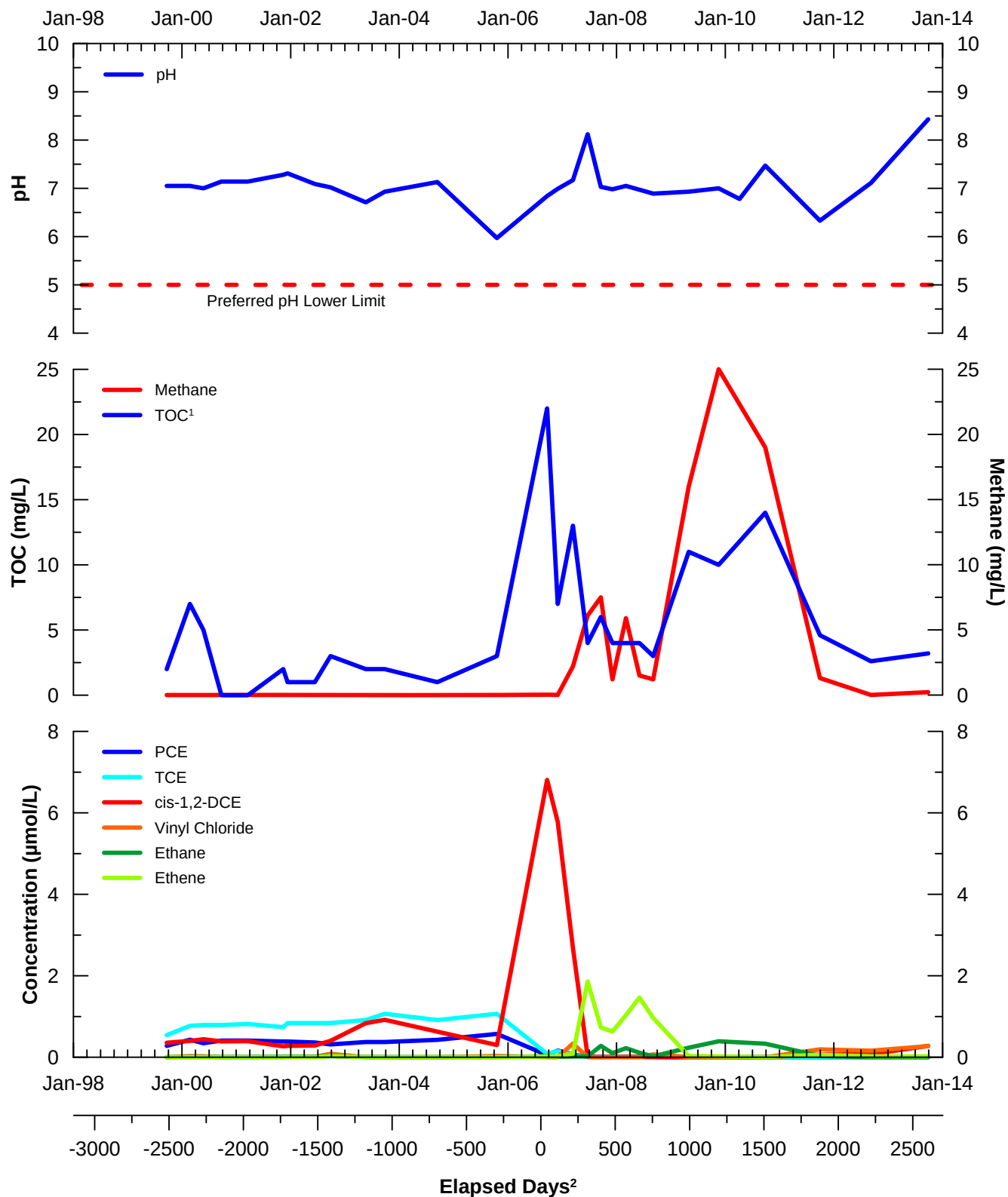
μmol/L - micromoles per liter.
 TOC - Total organic carbon.
 PCE - Tetrachloroethene.
 TCE - Trichloroethene.
 1,2-DCE - cis and trans-1,2-Dichloroethene.

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**RZ-3 WEST/EAST ERD ANALYSIS
 GM-8 (WEST), GM-21(EAST)**



FIGURE
D-2



1 - TOC breakthrough is 20 mg/L.
 2 - Days since RZ-4 ERD implementation.
 ERD - Enhanced reductive dechlorination.
 pH - Negative logarithm of the hydrogen-ion concentration.
 mg/L - Milligram per liter.
 $\mu\text{mol/L}$ - micromoles per liter.
 TOC - Total organic carbon.
 PCE - Tetrachloroethene.
 TCE - Trichloroethene.
 cis-1,2-DCE - cis-1,2-Dichloroethene.

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RZ-4 ERD ANALYSIS (GM-19S - DOWNGRADIENT)



FIGURE
D-3



Appendix E

Supporting Documentation for
Corrective Action Completion
Evaluation for 2013

Table E-1. Mann Kendall Trend Test Results North and South Settling Lagoon Groundwater Monitoring, RACER Trust, Moraine Ohio

Settling Lagoon	Upgradient/Downgradient	Well	Chemical	n	Number of Detections	Detection Frequency	S	p-value*	Trend Test Conclusion (at 0.05 level of significance)
North	Upgradient	HR-04	1,1,1-Trichloroethane	13	3	23%	-7	> 0.05	No Trend
North	Downgradient	W-2-N	1,1,1-Trichloroethane	13	3	23%	17	> 0.05	No Trend
North	Downgradient	W-3-N	1,1,1-Trichloroethane	13	0	0%	-57	> 0.05	No Trend
North	Downgradient	W-4-N	1,1,1-Trichloroethane	13	8	62%	34	> 0.05	No Trend
North	Upgradient	HR-04	1,1-Dichloroethane	13	10	77%	55	> 0.05	Increasing Trend
North	Downgradient	W-2-N	1,1-Dichloroethane	13	6	46%	23	> 0.05	No Trend
North	Downgradient	W-3-N	1,1-Dichloroethane	13	0	0%	-57	> 0.05	No Trend
North	Downgradient	W-4-N	1,1-Dichloroethane	13	13	100%	56	> 0.05	Increasing Trend
North	Upgradient	HR-04	1,1-Dichloroethene	13	0	0%	0	> 0.05	No Trend
North	Downgradient	W-2-N	1,1-Dichloroethene	13	0	0%	0	> 0.05	No Trend
North	Downgradient	W-3-N	1,1-Dichloroethene	13	0	0%	-57	> 0.05	No Trend
North	Downgradient	W-4-N	1,1-Dichloroethene	13	0	0%	0	> 0.05	No Trend
North	Upgradient	HR-04	Benzene	13	0	0%	0	> 0.05	No Trend
North	Downgradient	W-2-N	Benzene	13	0	0%	0	> 0.05	No Trend
North	Downgradient	W-3-N	Benzene	13	0	0%	-57	> 0.05	No Trend
North	Downgradient	W-4-N	Benzene	13	0	0%	0	> 0.05	No Trend
North	Upgradient	HR-04	cis-1,2-Dichloroethene	13	4	31%	26	> 0.05	No Trend
North	Downgradient	W-2-N	cis-1,2-Dichloroethene	13	13	100%	-11	> 0.05	No Trend
North	Downgradient	W-3-N	cis-1,2-Dichloroethene	13	13	100%	-62	> 0.05	Decreasing Trend
North	Downgradient	W-4-N	cis-1,2-Dichloroethene	13	13	100%	53	> 0.05	Increasing Trend
North	Upgradient	HR-04	Ethylbenzene	13	0	0%	0	> 0.05	No Trend
North	Downgradient	W-2-N	Ethylbenzene	13	0	0%	0	> 0.05	No Trend
North	Downgradient	W-3-N	Ethylbenzene	13	0	0%	-57	> 0.05	No Trend
North	Downgradient	W-4-N	Ethylbenzene	13	0	0%	0	> 0.05	No Trend
North	Upgradient	HR-04	Tetrachloroethene	13	11	85%	-35	> 0.05	Decreasing Trend
North	Downgradient	W-2-N	Tetrachloroethene	13	1	8%	6	> 0.05	No Trend
North	Downgradient	W-3-N	Tetrachloroethene	13	7	54%	-50	> 0.05	Decreasing Trend
North	Downgradient	W-4-N	Tetrachloroethene	13	13	100%	-31	> 0.05	No Trend
North	Upgradient	HR-04	Toluene	13	0	0%	0	> 0.05	No Trend
North	Downgradient	W-2-N	Toluene	13	1	8%	0	> 0.05	No Trend
North	Downgradient	W-3-N	Toluene	13	0	0%	-57	> 0.05	No Trend
North	Downgradient	W-4-N	Toluene	13	0	0%	0	> 0.05	No Trend

Footnotes on Page 4

Table E-1. Mann Kendall Trend Test Results North and South Settling Lagoon Groundwater Monitoring, RACER Trust, Moraine Ohio

Settling Lagoon	Upgradient/ Downgradient	Well	Chemical	n	Number of Detections	Detection Frequency	S	p-value*	Trend Test Conclusion (at 0.05 level of significance)
North	Upgradient	HR-04	trans-1,2-Dichloroethene	13	0	0%	36	> 0.05	No Trend
North	Downgradient	W-2-N	trans-1,2-Dichloroethene	13	2	15%	31	> 0.05	No Trend
North	Downgradient	W-3-N	trans-1,2-Dichloroethene	13	12	92%	-60	> 0.05	Decreasing Trend
North	Downgradient	W-4-N	trans-1,2-Dichloroethene	13	10	77%	43	> 0.05	Increasing Trend
North	Upgradient	HR-04	Trichloroethene	13	12	92%	-55	> 0.05	Decreasing Trend
North	Downgradient	W-2-N	Trichloroethene	13	8	62%	-37	> 0.05	Decreasing Trend
North	Downgradient	W-3-N	Trichloroethene	13	2	15%	-52	> 0.05	Decreasing Trend
North	Downgradient	W-4-N	Trichloroethene	13	13	100%	6	> 0.05	No Trend
North	Upgradient	HR-04	Vinyl Chloride	13	0	0%	0	> 0.05	No Trend
North	Downgradient	W-2-N	Vinyl Chloride	13	0	0%	0	> 0.05	No Trend
North	Downgradient	W-3-N	Vinyl Chloride	13	13	100%	-54	> 0.05	Decreasing Trend
North	Downgradient	W-4-N	Vinyl Chloride	13	9	69%	-18	> 0.05	No Trend
North	Upgradient	HR-04	Xylene (total)	13	0	0%	36	> 0.05	No Trend
North	Downgradient	W-2-N	Xylene (total)	13	0	0%	36	> 0.05	No Trend
North	Downgradient	W-3-N	Xylene (total)	13	0	0%	-24	> 0.05	No Trend
North	Downgradient	W-4-N	Xylene (total)	13	0	0%	36	> 0.05	No Trend

Footnotes on Page 4

Table E-1. Mann Kendall Trend Test Results North and South Settling Lagoon Groundwater Monitoring, RACER Trust, Moraine Ohio

Settling Lagoon	Upgradient/ Downgradient	Well	Chemical	n	Number of Detections	Detection Frequency	S	p-value*	Trend Test Conclusion (at 0.05 level of significance)
South	Upgradient	HR-17	1,1,1-Trichloroethane	13	3	23%	23	> 0.05	No Trend
South	Downgradient	W-2-S	1,1,1-Trichloroethane	13	13	100%	10	> 0.05	No Trend
South	Downgradient	W-3-S	1,1,1-Trichloroethane	13	13	100%	-48	> 0.05	Decreasing Trend
South	Downgradient	W-4-S	1,1,1-Trichloroethane	17	17	100%	-93	> 0.05	Decreasing Trend
South	Upgradient	HR-17	1,1-Dichloroethane	13	10	77%	32	> 0.05	No Trend
South	Downgradient	W-2-S	1,1-Dichloroethane	13	13	100%	3	> 0.05	No Trend
South	Downgradient	W-3-S	1,1-Dichloroethane	13	5	38%	15	> 0.05	No Trend
South	Downgradient	W-4-S	1,1-Dichloroethane	17	17	100%	77	> 0.05	Increasing Trend
South	Upgradient	HR-17	1,1-Dichloroethene	13	0	0%	23	> 0.05	No Trend
South	Downgradient	W-2-S	1,1-Dichloroethene	13	0	0%	0	> 0.05	No Trend
South	Downgradient	W-3-S	1,1-Dichloroethene	13	0	0%	8	> 0.05	No Trend
South	Downgradient	W-4-S	1,1-Dichloroethene	17	1	6%	7	> 0.05	No Trend
South	Upgradient	HR-17	Benzene	13	0	0%	23	> 0.05	No Trend
South	Downgradient	W-2-S	Benzene	13	1	8%	-4	> 0.05	No Trend
South	Downgradient	W-3-S	Benzene	13	0	0%	8	> 0.05	No Trend
South	Downgradient	W-4-S	Benzene	17	0	0%	14	> 0.05	No Trend
South	Upgradient	HR-17	cis-1,2-Dichloroethene	13	11	85%	-16	> 0.05	No Trend
South	Downgradient	W-2-S	cis-1,2-Dichloroethene	13	12	92%	17	> 0.05	No Trend
South	Downgradient	W-3-S	cis-1,2-Dichloroethene	13	6	46%	55	> 0.05	Increasing Trend
South	Downgradient	W-4-S	cis-1,2-Dichloroethene	17	17	100%	105	> 0.05	Increasing Trend
South	Upgradient	HR-17	Ethylbenzene	13	0	0%	23	> 0.05	No Trend
South	Downgradient	W-2-S	Ethylbenzene	13	0	0%	0	> 0.05	No Trend
South	Downgradient	W-3-S	Ethylbenzene	13	0	0%	0	> 0.05	No Trend
South	Downgradient	W-4-S	Ethylbenzene	17	0	0%	27	> 0.05	No Trend
South	Upgradient	HR-17	Tetrachloroethene	13	13	100%	52	> 0.05	Increasing Trend
South	Downgradient	W-2-S	Tetrachloroethene	13	7	54%	-42	> 0.05	Decreasing Trend
South	Downgradient	W-3-S	Tetrachloroethene	13	13	100%	50	> 0.05	Increasing Trend
South	Downgradient	W-4-S	Tetrachloroethene	17	17	100%	93	> 0.05	Increasing Trend
South	Upgradient	HR-17	Toluene	13	0	0%	23	> 0.05	No Trend
South	Downgradient	W-2-S	Toluene	13	1	8%	8	> 0.05	No Trend
South	Downgradient	W-3-S	Toluene	13	0	0%	0	> 0.05	No Trend
South	Downgradient	W-4-S	Toluene	17	1	6%	37	> 0.05	No Trend

Footnotes on Page 4

Table E-1. Mann Kendall Trend Test Results North and South Settling Lagoon Groundwater Monitoring, RACER Trust, Moraine Ohio

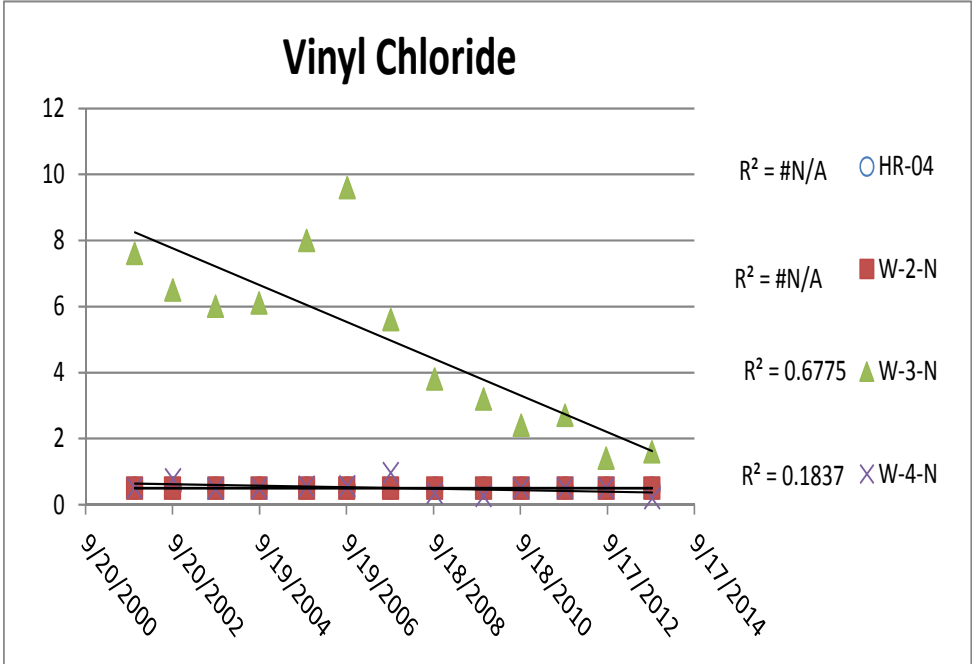
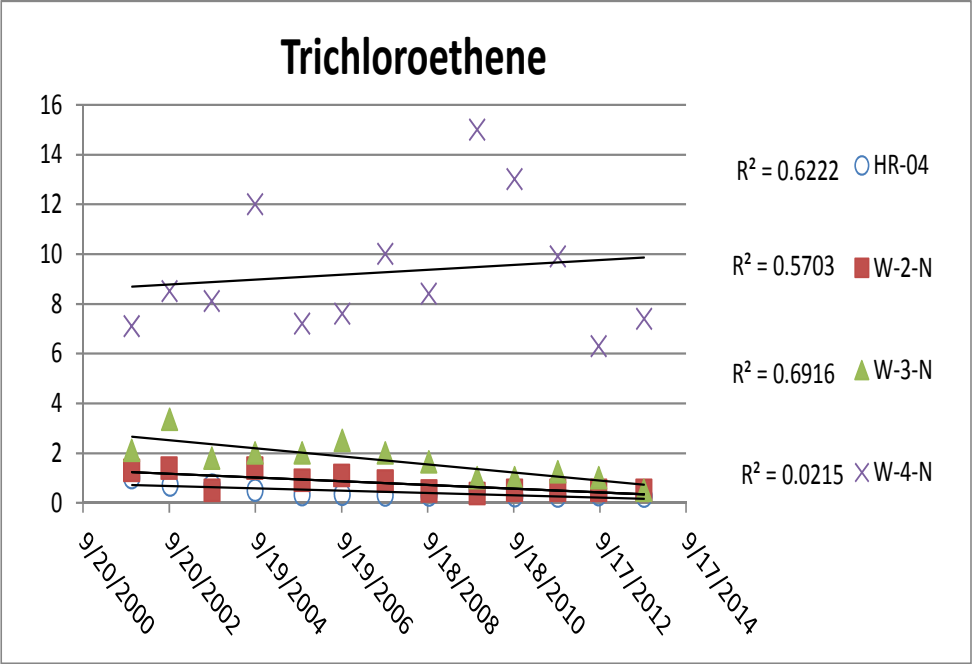
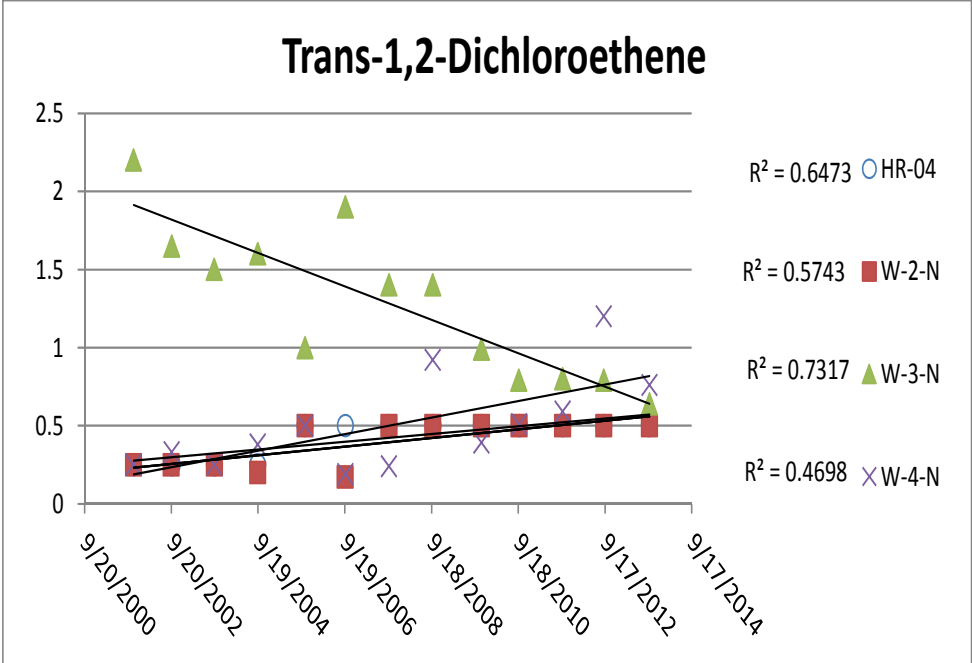
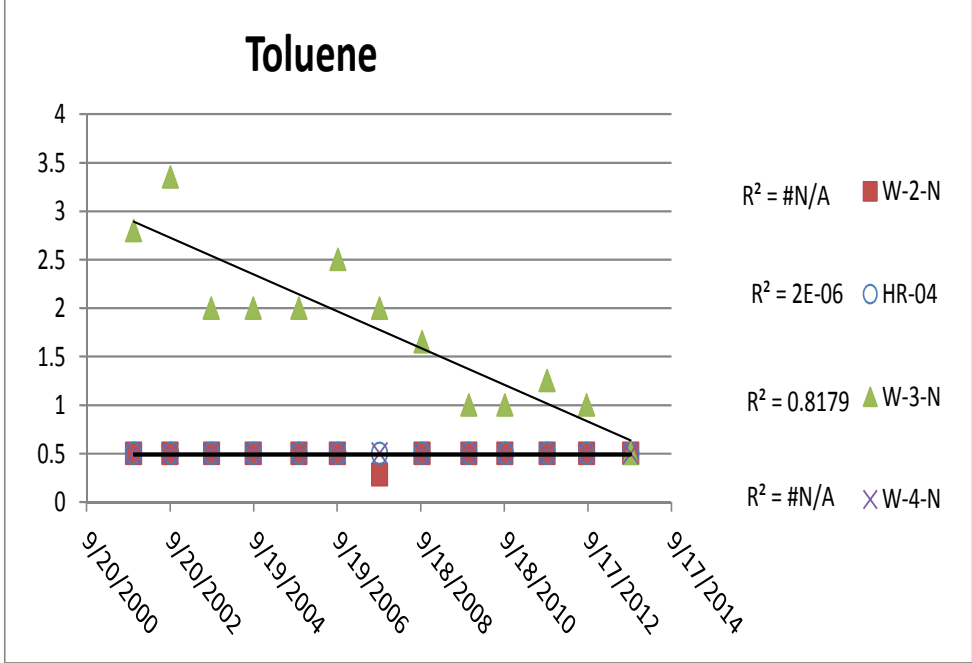
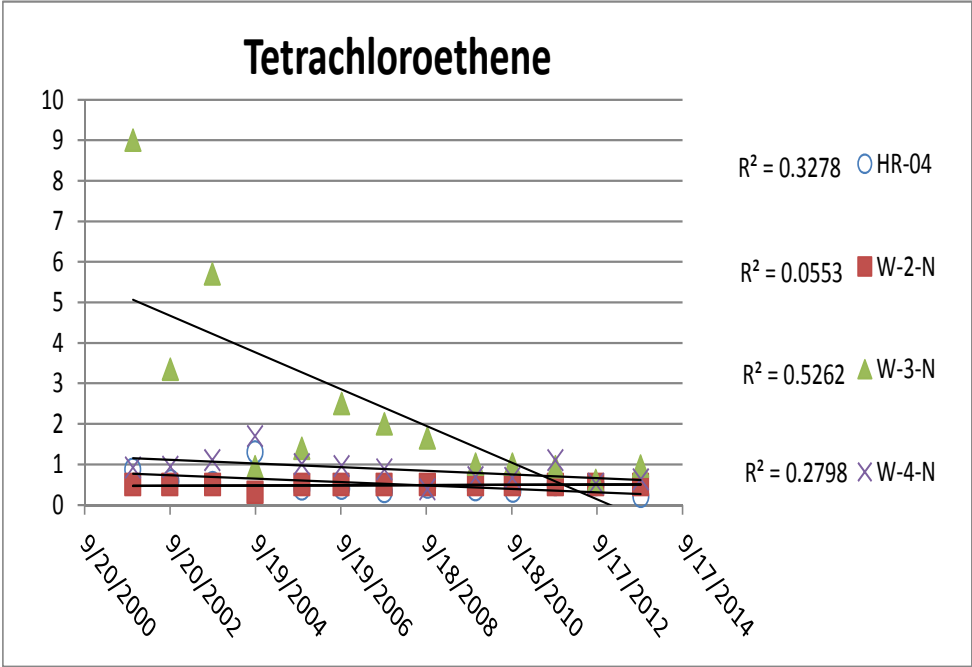
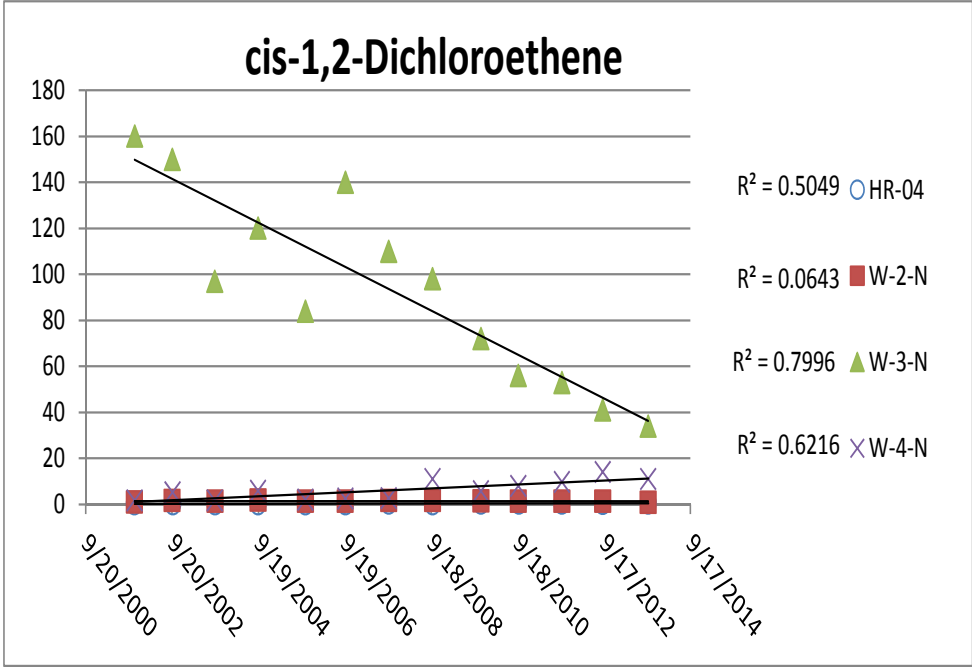
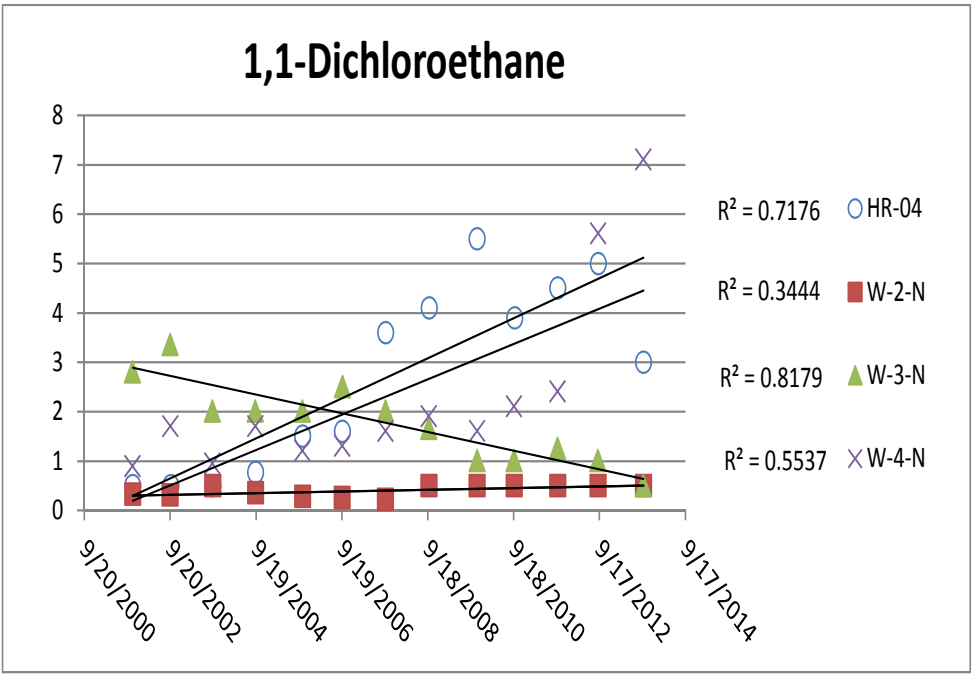
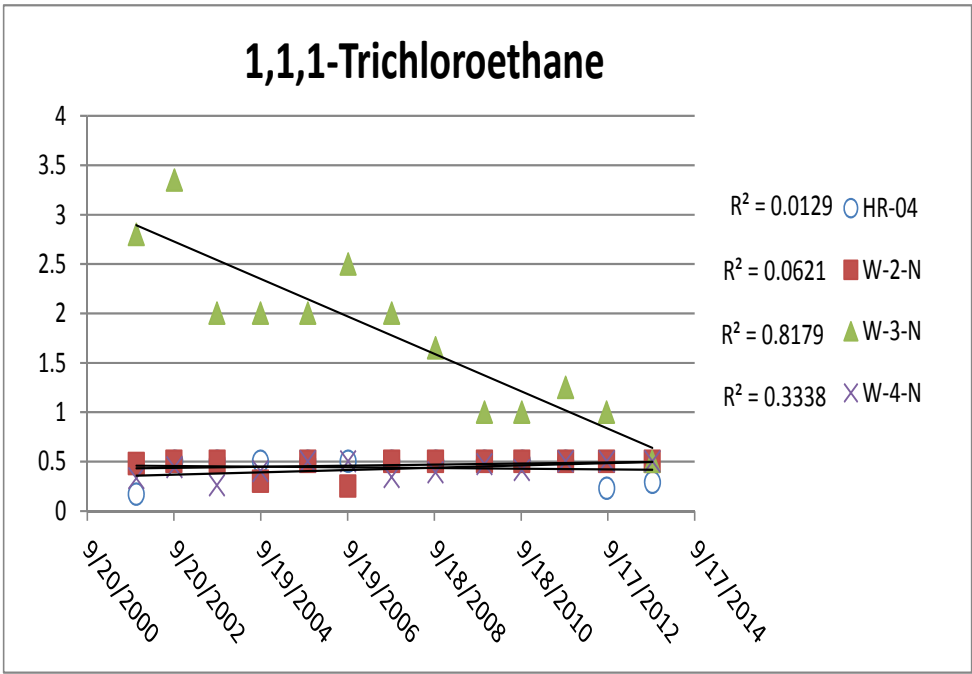
Settling Lagoon	Upgradient/Downgradient	Well	Chemical	n	Number of Detections	Detection Frequency	S	p-value*	Trend Test Conclusion (at 0.05 level of significance)
South	Upgradient	HR-17	trans-1,2-Dichloroethene	13	10	77%	28	> 0.05	No Trend
South	Downgradient	W-2-S	trans-1,2-Dichloroethene	13	0	0%	36	> 0.05	No Trend
South	Downgradient	W-3-S	trans-1,2-Dichloroethene	13	3	23%	25	> 0.05	No Trend
South	Downgradient	W-4-S	trans-1,2-Dichloroethene	17	17	100%	85	> 0.05	Increasing Trend
South	Upgradient	HR-17	Trichloroethene	13	13	100%	53	> 0.05	Increasing Trend
South	Downgradient	W-2-S	Trichloroethene	13	13	100%	37	> 0.05	Increasing Trend
South	Downgradient	W-3-S	Trichloroethene	13	13	100%	36	> 0.05	Increasing Trend
South	Downgradient	W-4-S	Trichloroethene	17	17	100%	98	> 0.05	Increasing Trend
South	Upgradient	HR-17	Vinyl Chloride	13	0	0%	23	> 0.05	No Trend
South	Downgradient	W-2-S	Vinyl Chloride	13	0	0%	0	> 0.05	No Trend
South	Downgradient	W-3-S	Vinyl Chloride	13	0	0%	0	> 0.05	No Trend
South	Downgradient	W-4-S	Vinyl Chloride	17	0	0%	14	> 0.05	No Trend
South	Upgradient	HR-17	Xylene (total)	13	0	0%	37	> 0.05	No Trend
South	Downgradient	W-2-S	Xylene (total)	13	0	0%	36	> 0.05	No Trend
South	Downgradient	W-3-S	Xylene (total)	13	0	0%	36	> 0.05	No Trend
South	Downgradient	W-4-S	Xylene (total)	17	0	0%	62	> 0.05	No Trend

* Indicated p-value represents the significance of both the upper and lower tails combined.

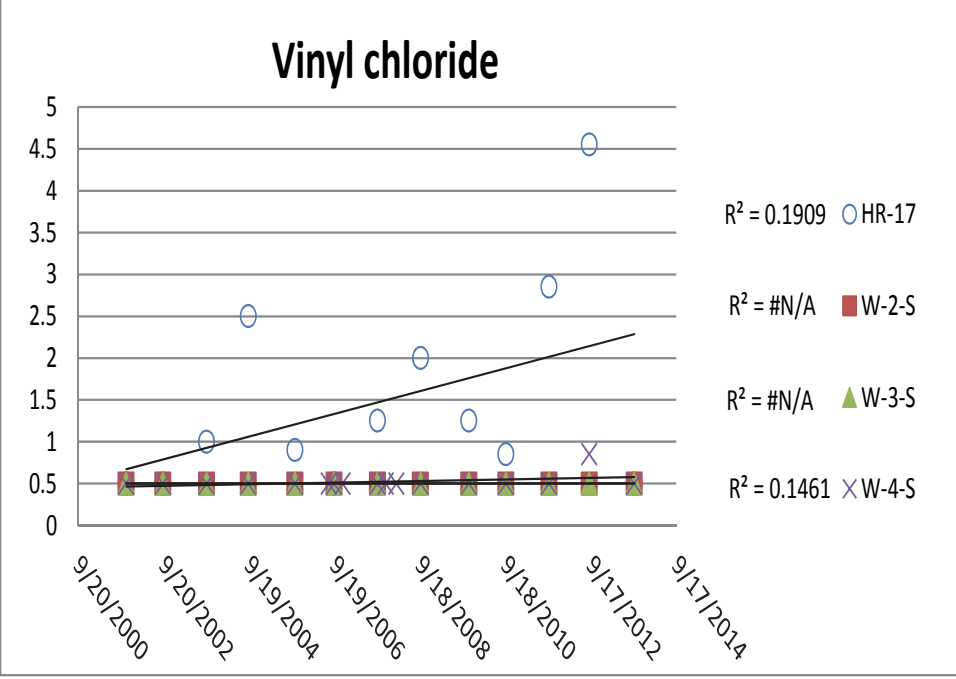
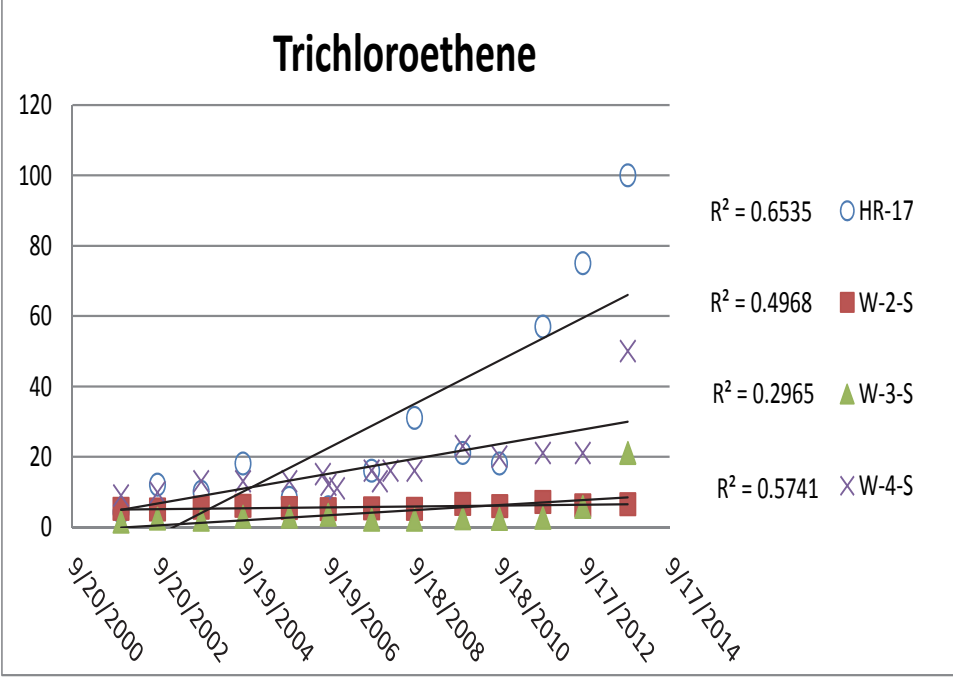
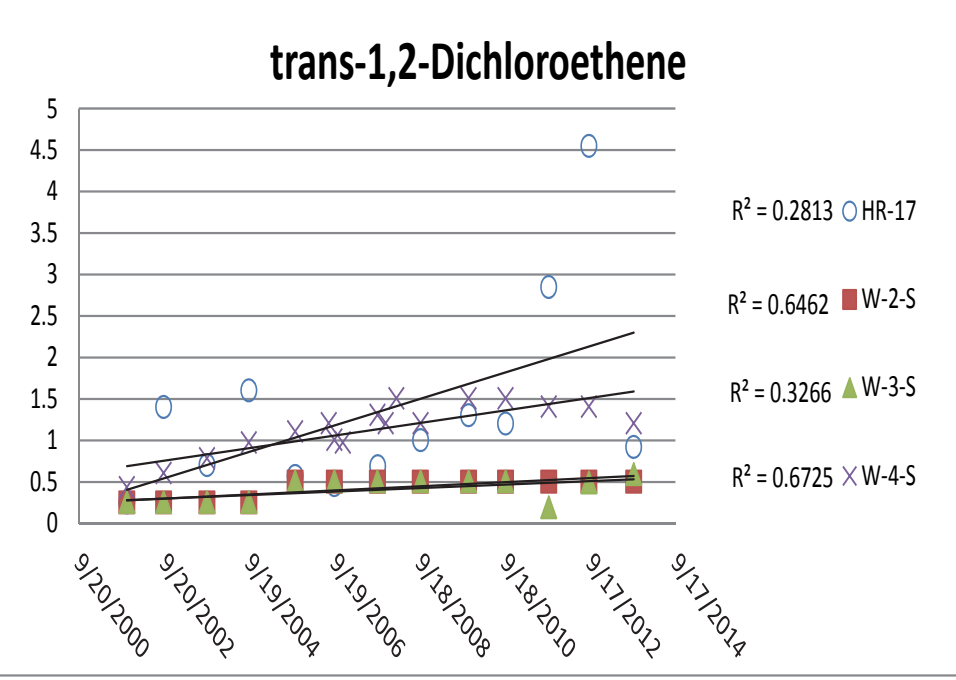
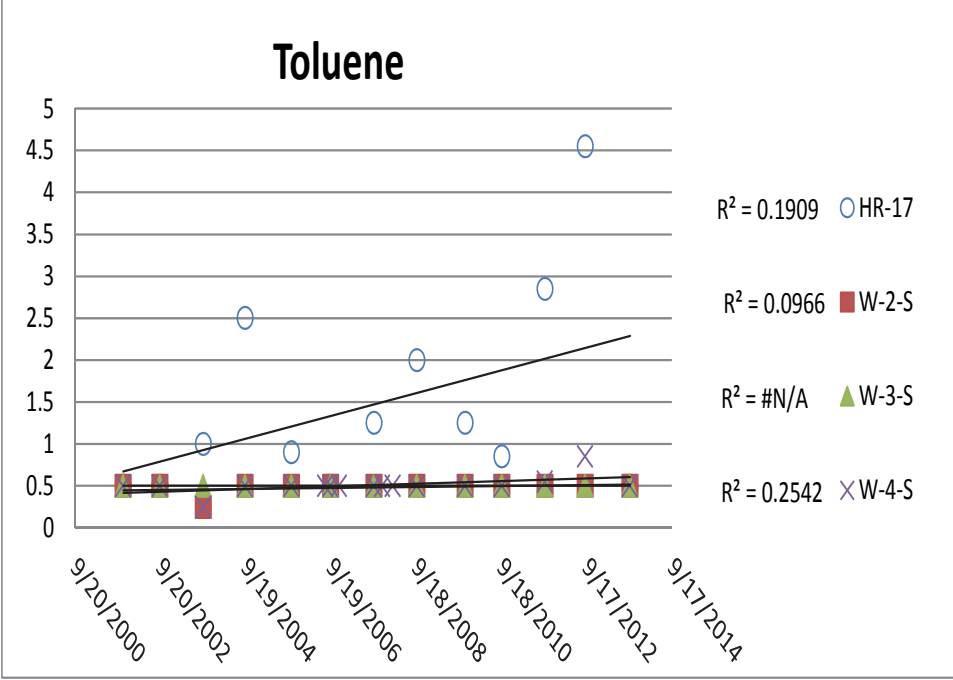
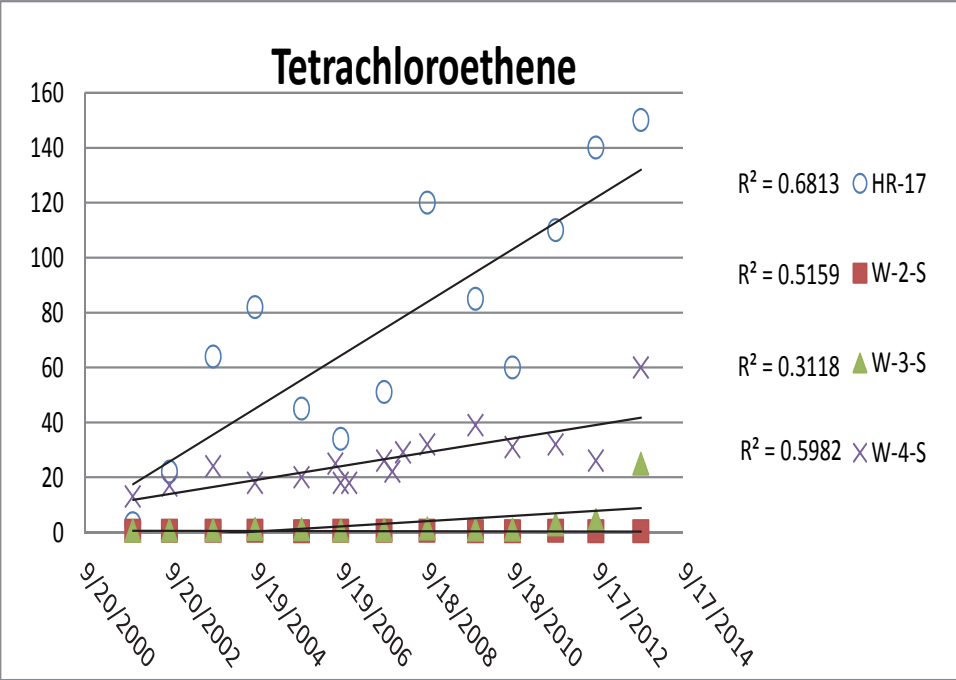
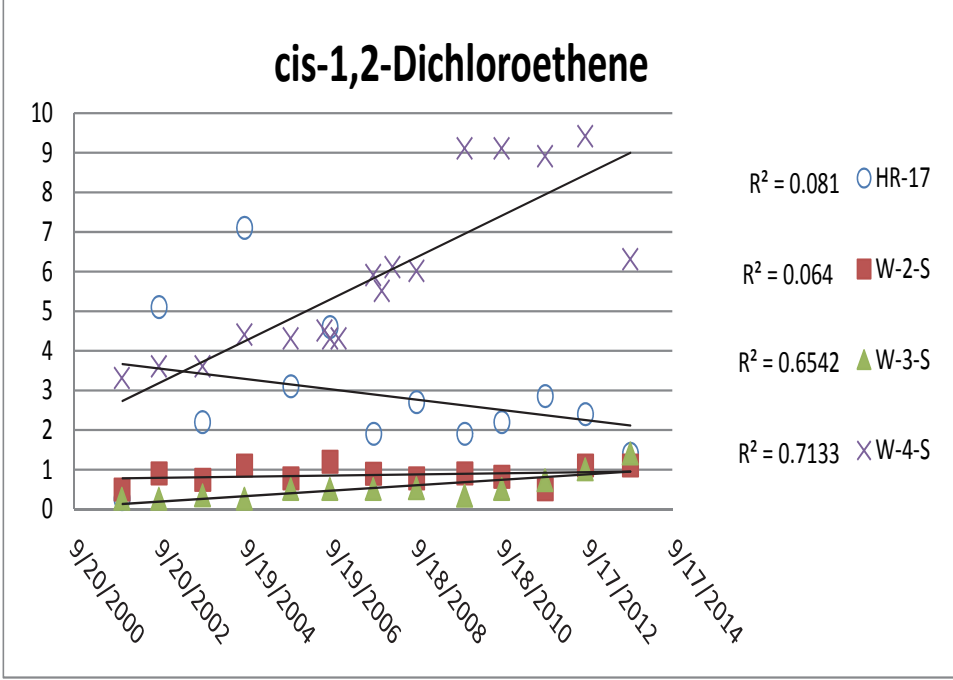
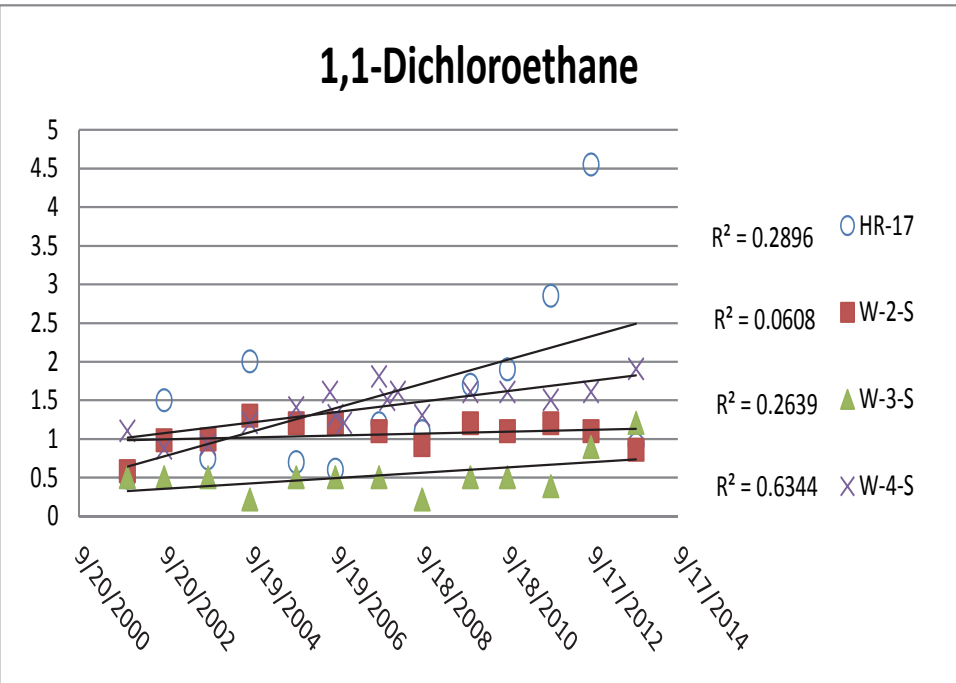
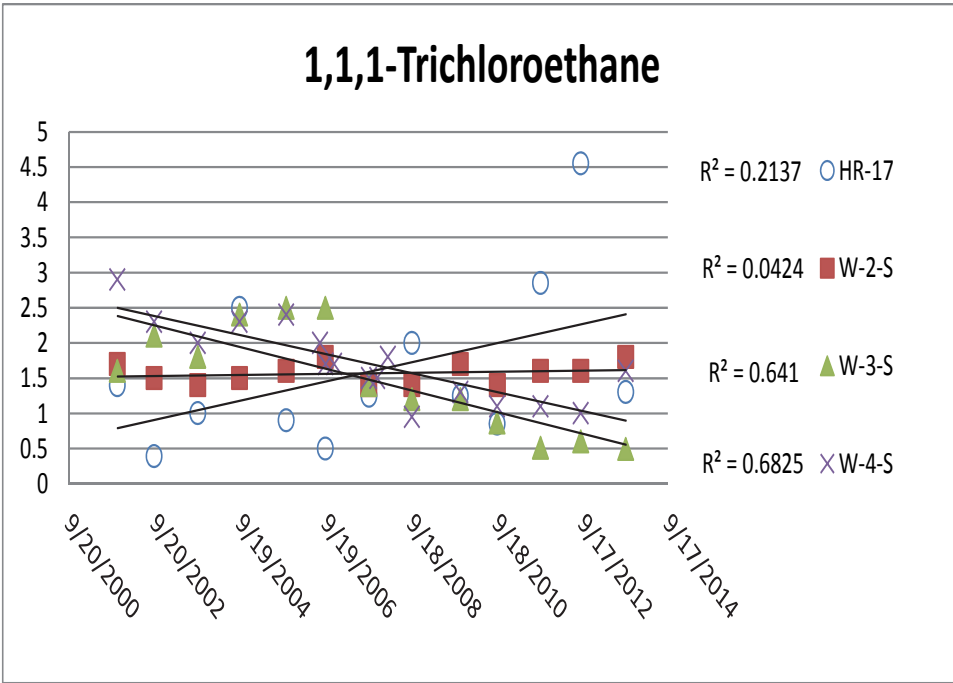
Bold - Increasing trends that are statistically significant in downgradient monitoring wells are shown in bold font.

Shaded - An increasing trend is shaded if the detection frequency is 40% or greater, or if the three most recent sampling results were over the analytical detection limit.

Trends identified by the model were not reported if the detection frequency was less than 10%.



Note: $R^2 = \text{\#N/A}$ refers to a slope of zero



Note: R² = #N/A refers to a slope of zero

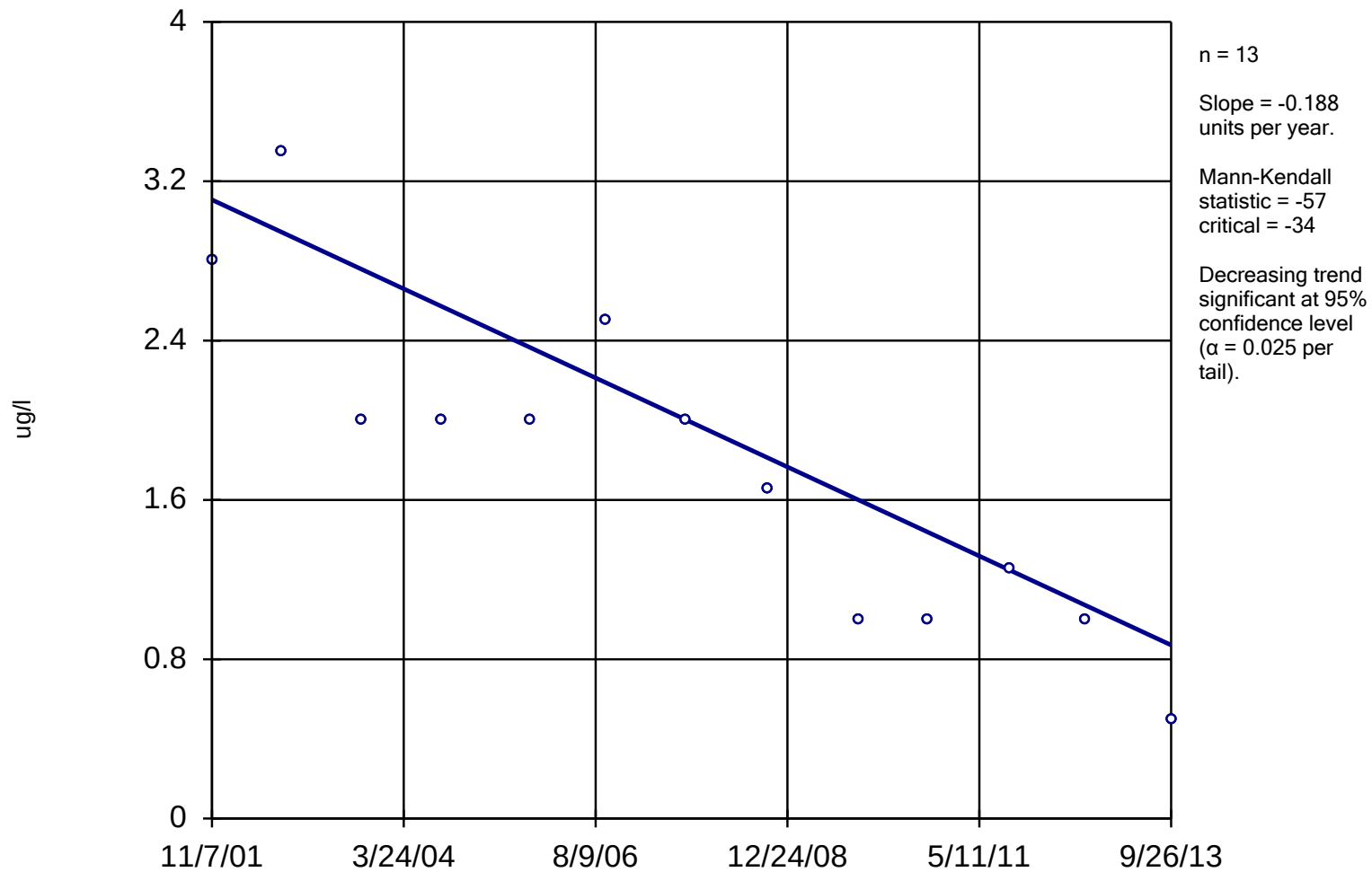
Trend Test

Facility: RACER Trust Client: ARCADIS G&M, Inc. Data File: 2013Linear Regression North Printed 1/27/2014, 11:19 AM

Constituent	Well	Slope	Calc.	Critical	Sig.	N	Alpha
1,1,1-Trichloroethane (ug/l)	HR-04 (bg)	0	-7	-34	No	13	0.05
1,1,1-Trichloroethane (ug/l)	W-2-N	0	17	34	No	13	0.05
1,1,1-Trichloroethane (ug/l)	W-3-N	-0.188	-57	-34	Yes	13	0.05
1,1,1-Trichloroethane (ug/l)	W-4-N	0.0118	34	34	No	13	0.05
1,1-Dichloroethane (ug/l)	HR-04 (bg)	0.4481	55	34	Yes	13	0.05
1,1-Dichloroethane (ug/l)	W-2-N	0.01238	23	34	No	13	0.05
1,1-Dichloroethane (ug/l)	W-3-N	-0.188	-57	-34	Yes	13	0.05
1,1-Dichloroethane (ug/l)	W-4-N	0.1865	56	34	Yes	13	0.05
1,1-Dichloroethene (ug/l)	HR-04 (bg)	0	0	34	No	13	0.05
1,1-Dichloroethene (ug/l)	W-2-N	0	0	34	No	13	0.05
1,1-Dichloroethene (ug/l)	W-3-N	-0.188	-57	-34	Yes	13	0.05
1,1-Dichloroethene (ug/l)	W-4-N	0	0	34	No	13	0.05
Benzene (ug/l)	HR-04 (bg)	0	0	34	No	13	0.05
Benzene (ug/l)	W-2-N	0	0	34	No	13	0.05
Benzene (ug/l)	W-3-N	-0.188	-57	-34	Yes	13	0.05
Benzene (ug/l)	W-4-N	0	0	34	No	13	0.05
cis-1,2-Dichloroethene (ug/l)	HR-04 (bg)	0.008251	26	34	No	13	0.05
cis-1,2-Dichloroethene (ug/l)	W-2-N	-0.01721	-11	-34	No	13	0.05
cis-1,2-Dichloroethene (ug/l)	W-3-N	-10.56	-62	-34	Yes	13	0.05
cis-1,2-Dichloroethene (ug/l)	W-4-N	0.883	53	34	Yes	13	0.05
Ethylbenzene (ug/l)	HR-04 (bg)	0	0	34	No	13	0.05
Ethylbenzene (ug/l)	W-2-N	0	0	34	No	13	0.05
Ethylbenzene (ug/l)	W-3-N	-0.188	-57	-34	Yes	13	0.05
Ethylbenzene (ug/l)	W-4-N	0	0	34	No	13	0.05
Tetrachloroethene (ug/l)	HR-04 (bg)	-0.03112	-35	-34	Yes	13	0.05
Tetrachloroethene (ug/l)	W-2-N	0	6	34	No	13	0.05
Tetrachloroethene (ug/l)	W-3-N	-0.2825	-50	-34	Yes	13	0.05
Tetrachloroethene (ug/l)	W-4-N	-0.04461	-31	-34	No	13	0.05
Toluene (ug/l)	HR-04 (bg)	0	0	34	No	13	0.05
Toluene (ug/l)	W-2-N	0	0	34	No	13	0.05
Toluene (ug/l)	W-3-N	-0.188	-57	-34	Yes	13	0.05
Toluene (ug/l)	W-4-N	0	0	34	No	13	0.05
trans-1,2-Dichloroethene (ug/l)	HR-04 (bg)	0	36	34	Yes	13	0.05
trans-1,2-Dichloroethene (ug/l)	W-2-N	0.01051	31	34	No	13	0.05
trans-1,2-Dichloroethene (ug/l)	W-3-N	-0.1039	-60	-34	Yes	13	0.05
trans-1,2-Dichloroethene (ug/l)	W-4-N	0.05034	43	34	Yes	13	0.05
Trichloroethene (ug/l)	HR-04 (bg)	-0.03782	-55	-34	Yes	13	0.05
Trichloroethene (ug/l)	W-2-N	-0.07877	-37	-34	Yes	13	0.05
Trichloroethene (ug/l)	W-3-N	-0.1533	-52	-34	Yes	13	0.05
Trichloroethene (ug/l)	W-4-N	0.04242	6	34	No	13	0.05
Vinyl chloride (ug/l)	HR-04 (bg)	0	0	34	No	13	0.05
Vinyl chloride (ug/l)	W-2-N	0	0	34	No	13	0.05
Vinyl chloride (ug/l)	W-3-N	-0.5124	-54	-34	Yes	13	0.05
Vinyl chloride (ug/l)	W-4-N	-0.01136	-18	-34	No	13	0.05
Xylene (total)	HR-04 (bg)	0	36	34	Yes	13	0.05
Xylene (total)	W-2-N	0	36	34	Yes	13	0.05
Xylene (total)	W-3-N	-0.1052	-24	-34	No	13	0.05
Xylene (total)	W-4-N	0	36	34	Yes	13	0.05

Sen's Slope Estimator

W-3-N

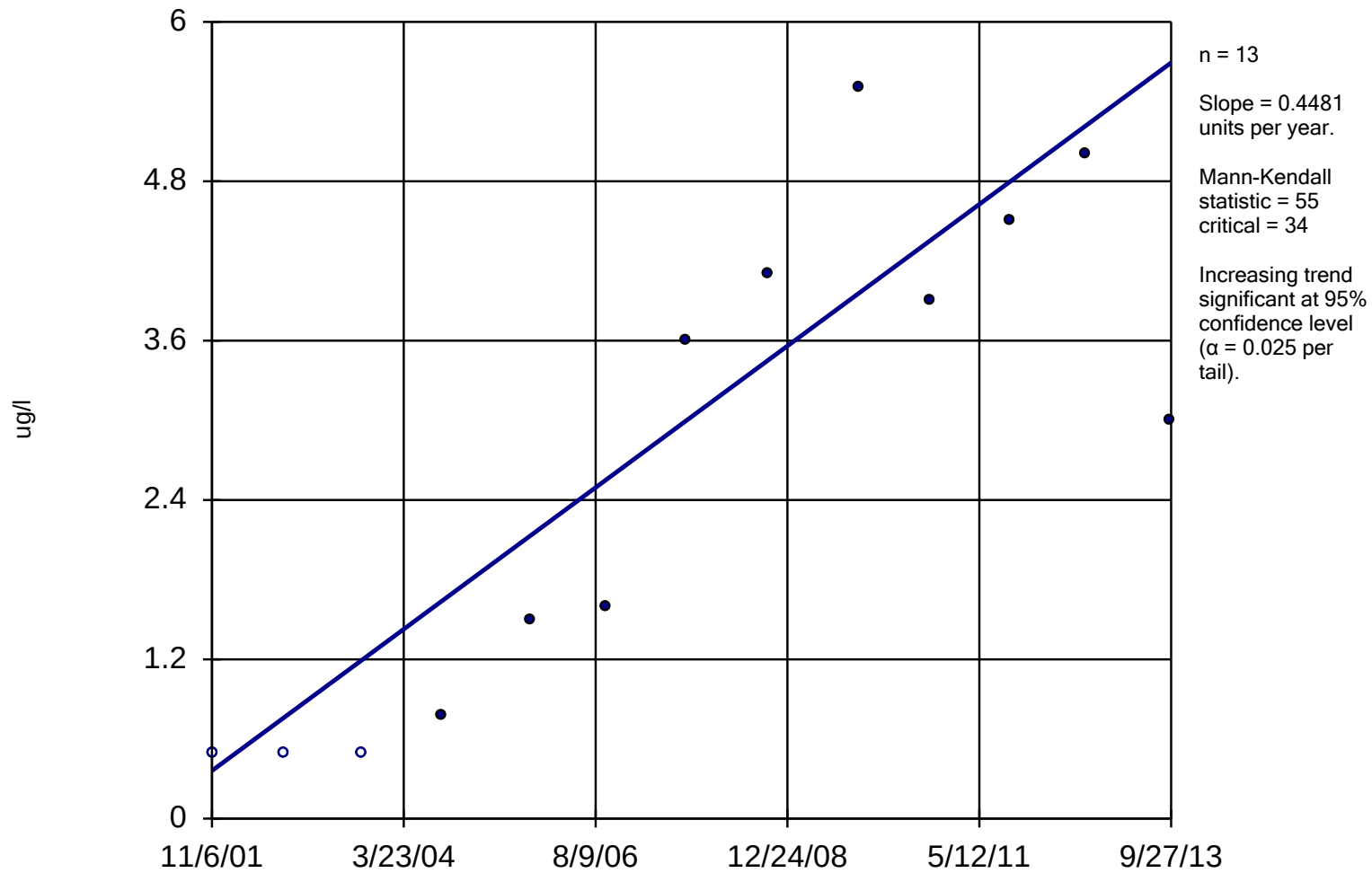


Constituent: 1,1,1-Trichloroethane Analysis Run 1/27/2014 11:17 AM

Facility: RACER Trust Client: ARCADIS G&M, Inc. Data File: 2013Linear Regression North

Sen's Slope Estimator

HR-04 (bg)

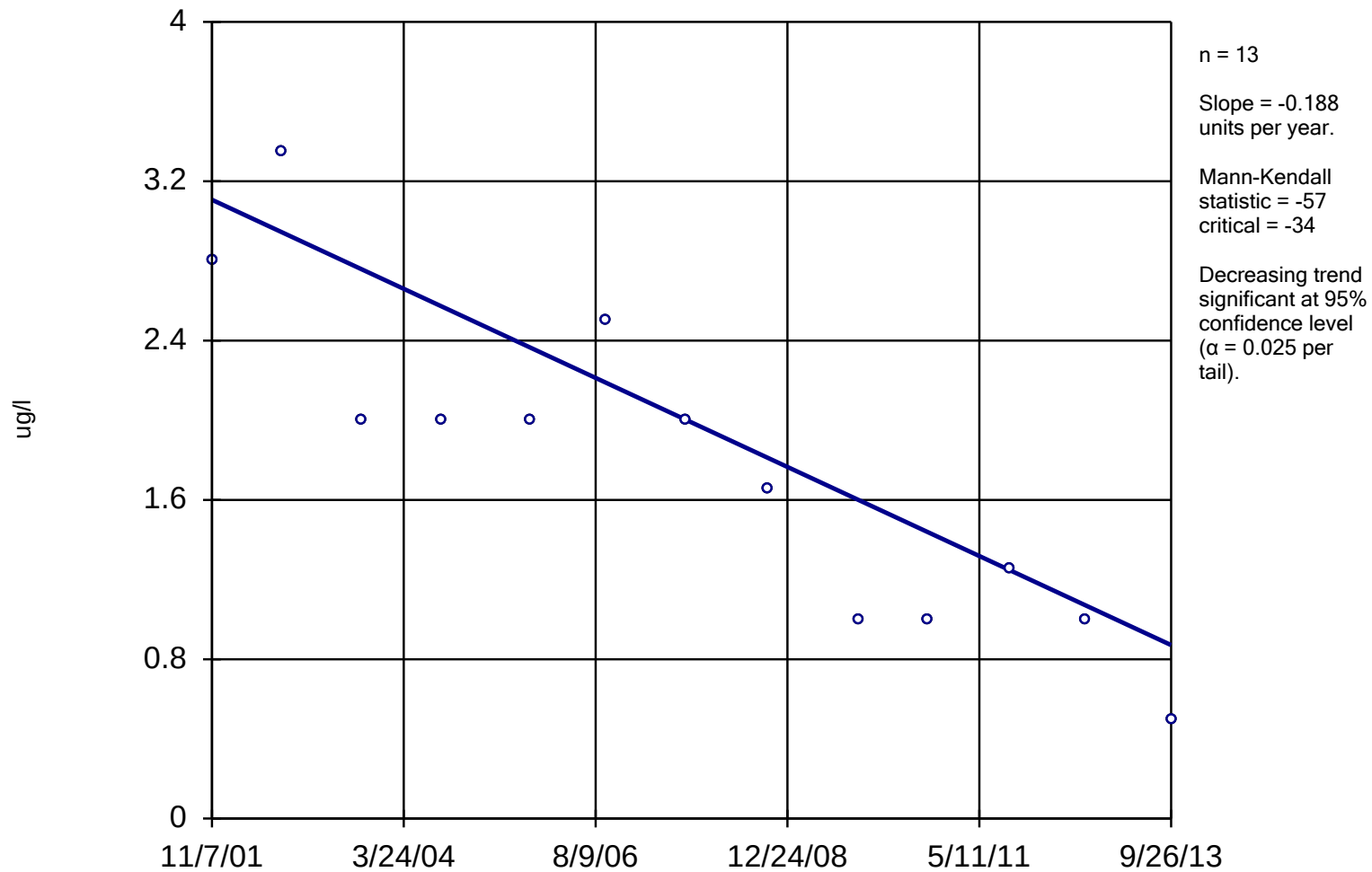


Constituent: 1,1-Dichloroethane Analysis Run 1/27/2014 11:17 AM

Facility: RACER Trust Client: ARCADIS G&M, Inc. Data File: 2013Linear Regression North

Sen's Slope Estimator

W-3-N

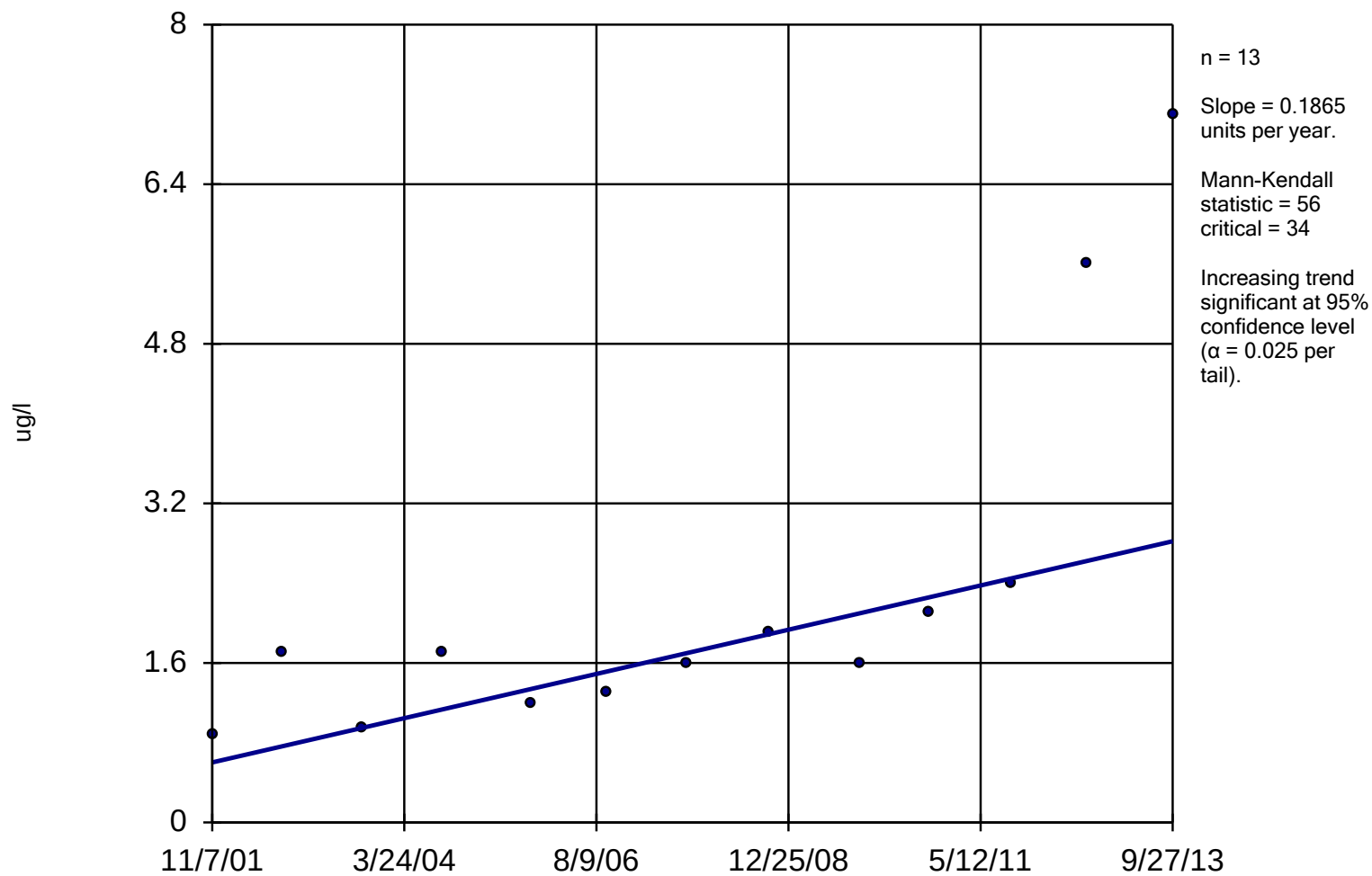


Constituent: 1,1-Dichloroethane Analysis Run 1/27/2014 11:17 AM

Facility: RACER Trust Client: ARCADIS G&M, Inc. Data File: 2013Linear Regression North

Sen's Slope Estimator

W-4-N

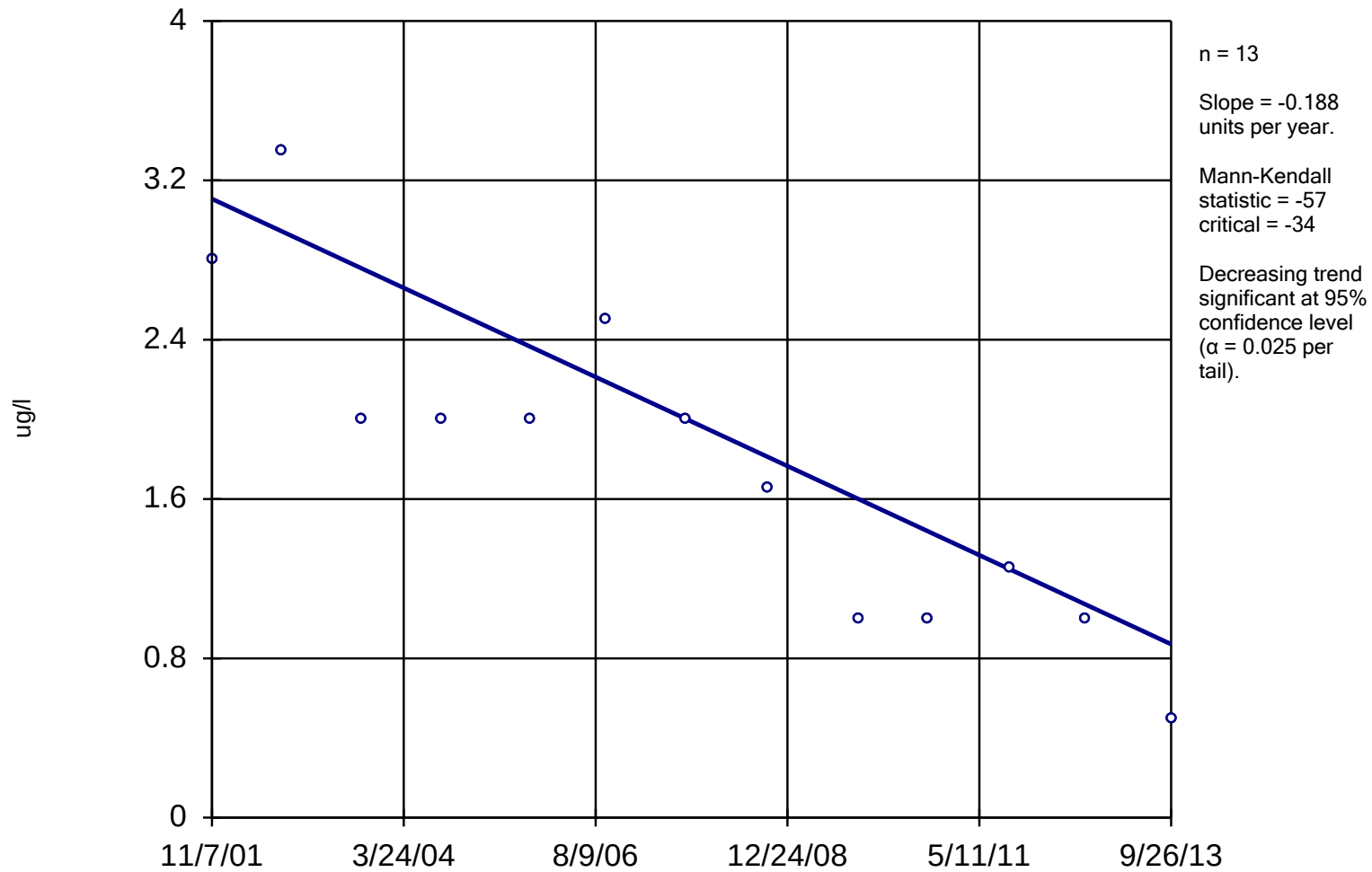


Constituent: 1,1-Dichloroethane Analysis Run 1/27/2014 11:17 AM

Facility: RACER Trust Client: ARCADIS G&M, Inc. Data File: 2013Linear Regression North

Sen's Slope Estimator

W-3-N

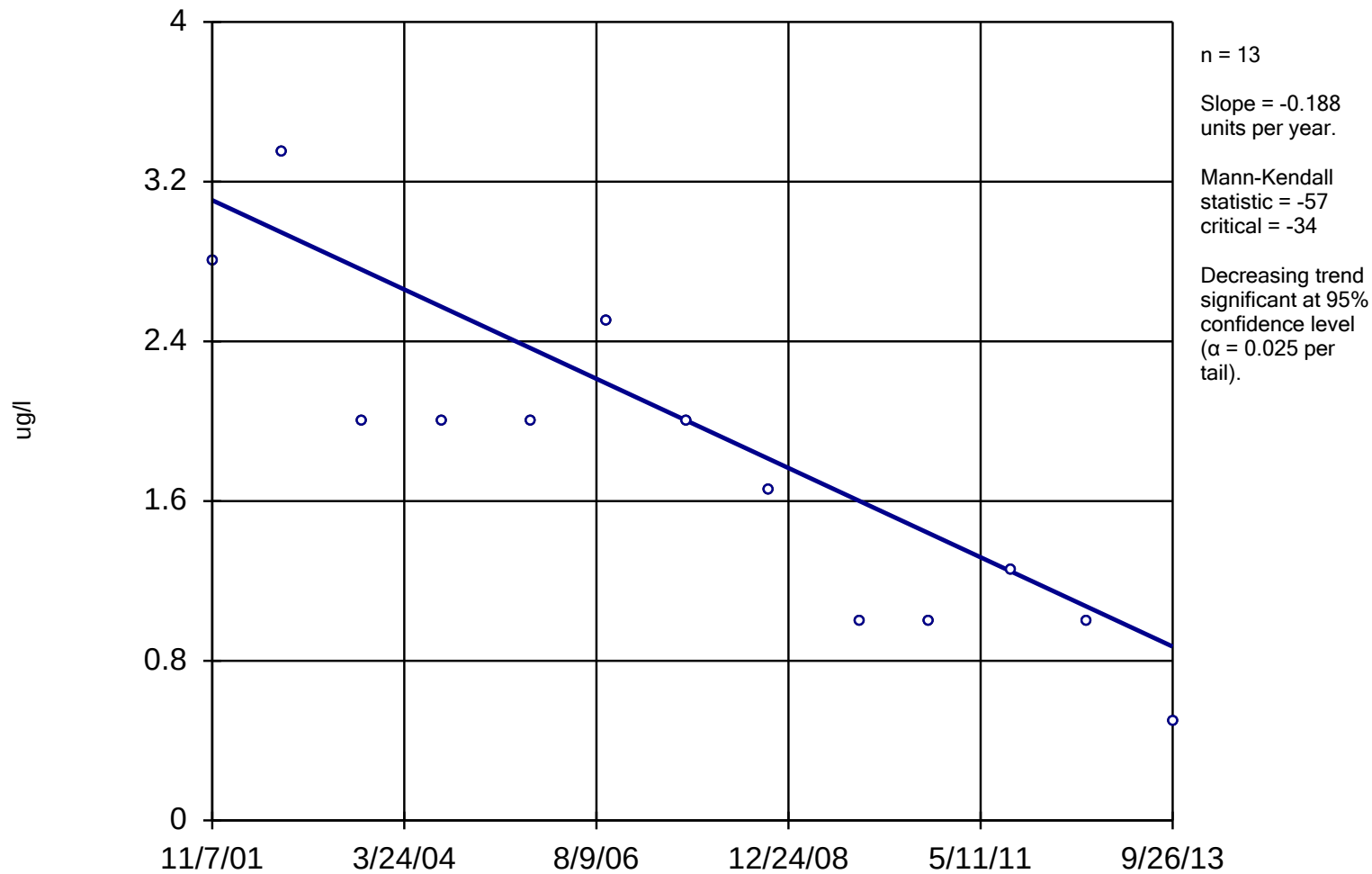


Constituent: 1,1-Dichloroethene Analysis Run 1/27/2014 11:17 AM

Facility: RACER Trust Client: ARCADIS G&M, Inc. Data File: 2013Linear Regression North

Sen's Slope Estimator

W-3-N

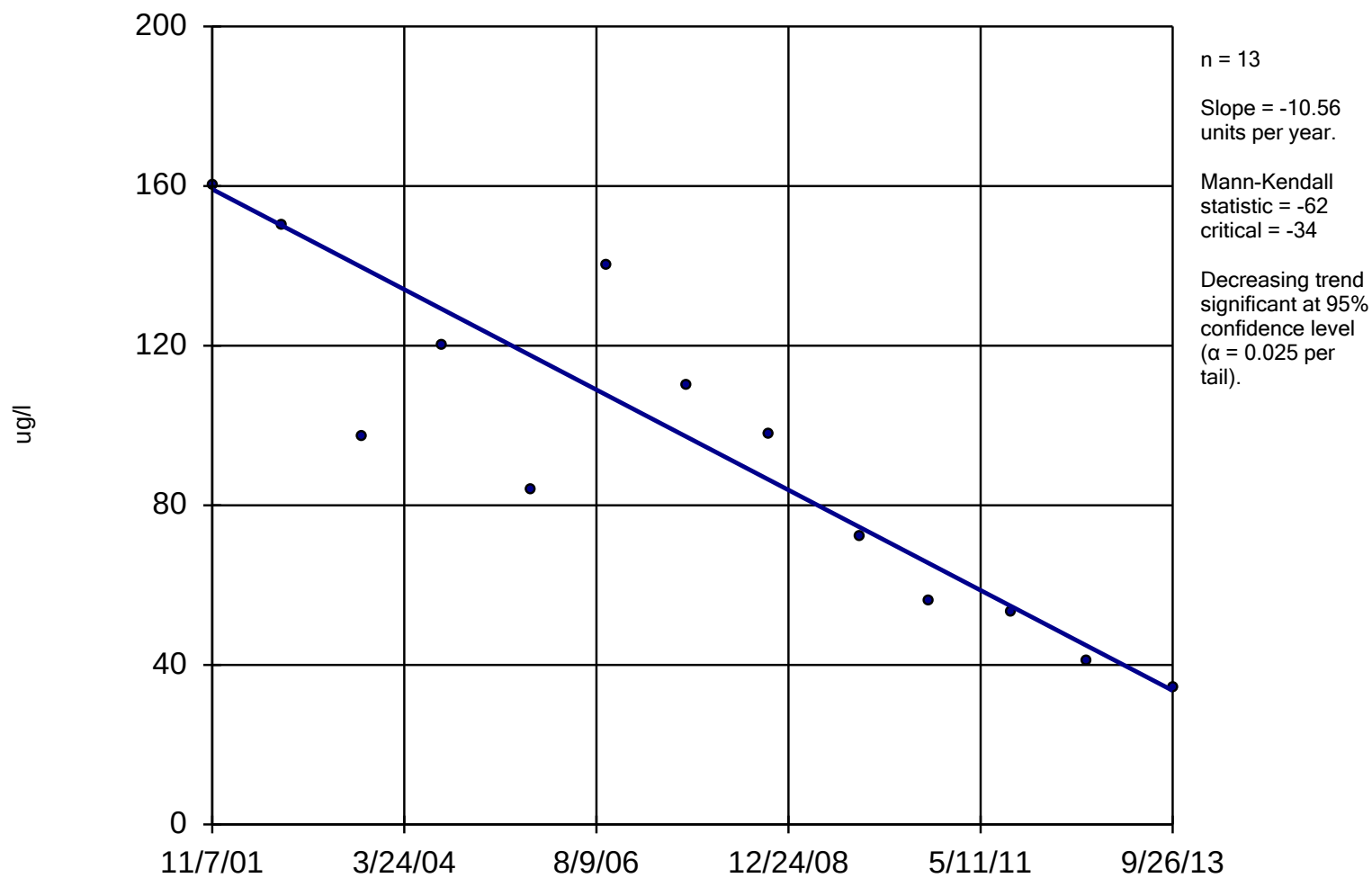


Constituent: Benzene Analysis Run 1/27/2014 11:17 AM

Facility: RACER Trust Client: ARCADIS G&M, Inc. Data File: 2013Linear Regression North

Sen's Slope Estimator

W-3-N

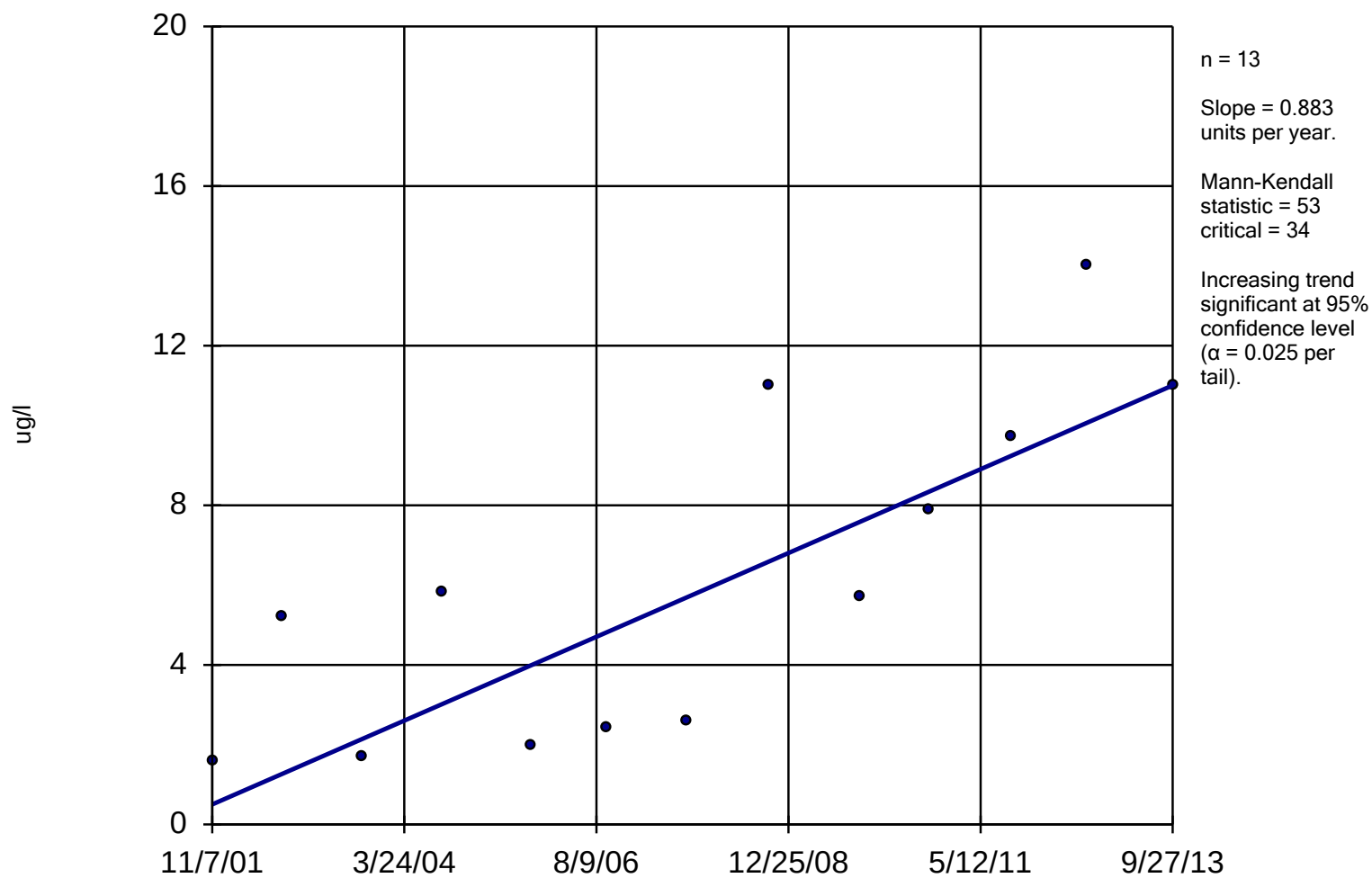


Constituent: cis-1,2-Dichloroethene Analysis Run 1/27/2014 11:17 AM

Facility: RACER Trust Client: ARCADIS G&M, Inc. Data File: 2013Linear Regression North

Sen's Slope Estimator

W-4-N

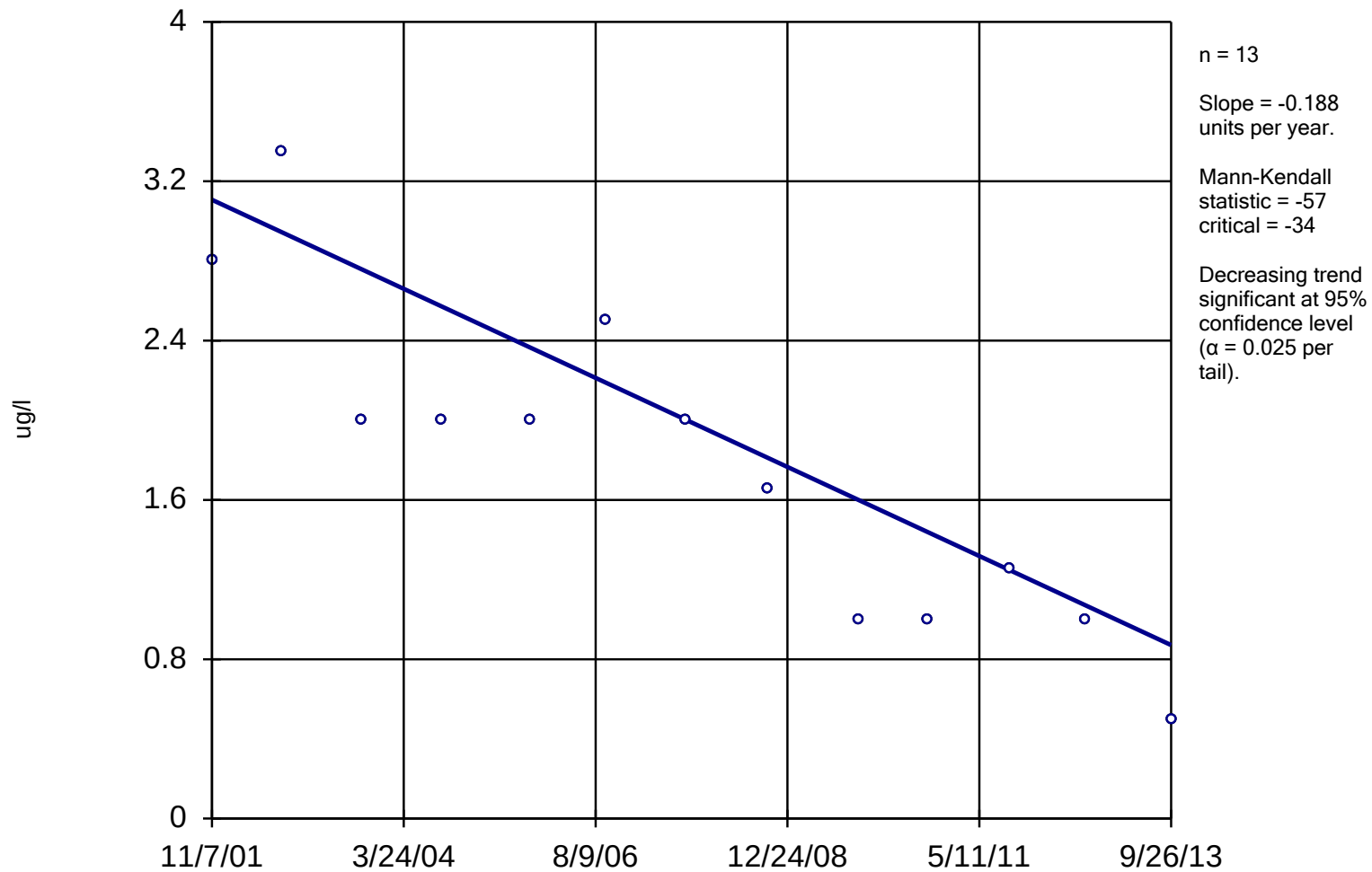


Constituent: cis-1,2-Dichloroethene Analysis Run 1/27/2014 11:17 AM

Facility: RACER Trust Client: ARCADIS G&M, Inc. Data File: 2013Linear Regression North

Sen's Slope Estimator

W-3-N

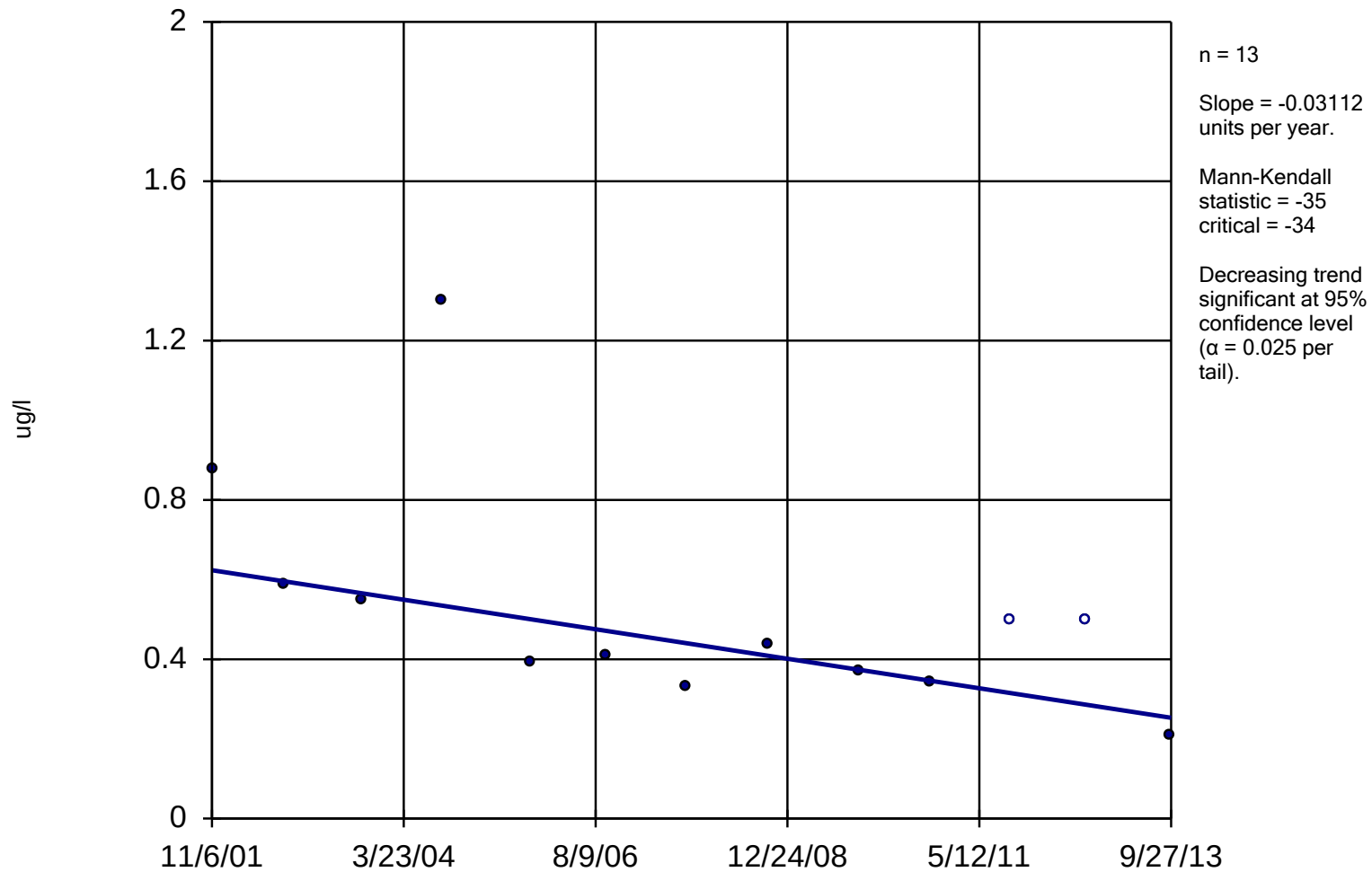


Constituent: Ethylbenzene Analysis Run 1/27/2014 11:17 AM

Facility: RACER Trust Client: ARCADIS G&M, Inc. Data File: 2013Linear Regression North

Sen's Slope Estimator

HR-04 (bg)

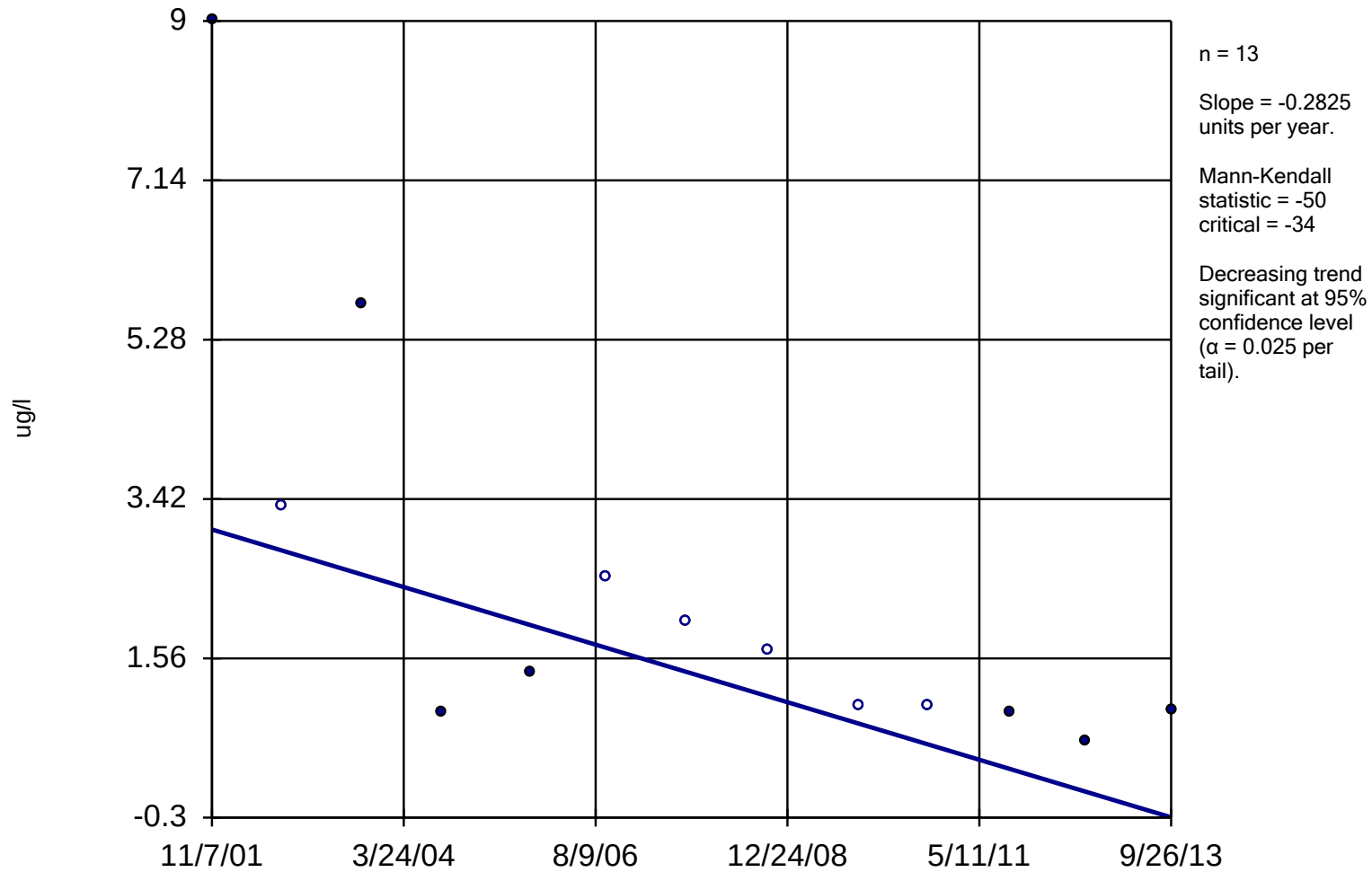


Constituent: Tetrachloroethene Analysis Run 1/27/2014 11:17 AM

Facility: RACER Trust Client: ARCADIS G&M, Inc. Data File: 2013Linear Regression North

Sen's Slope Estimator

W-3-N

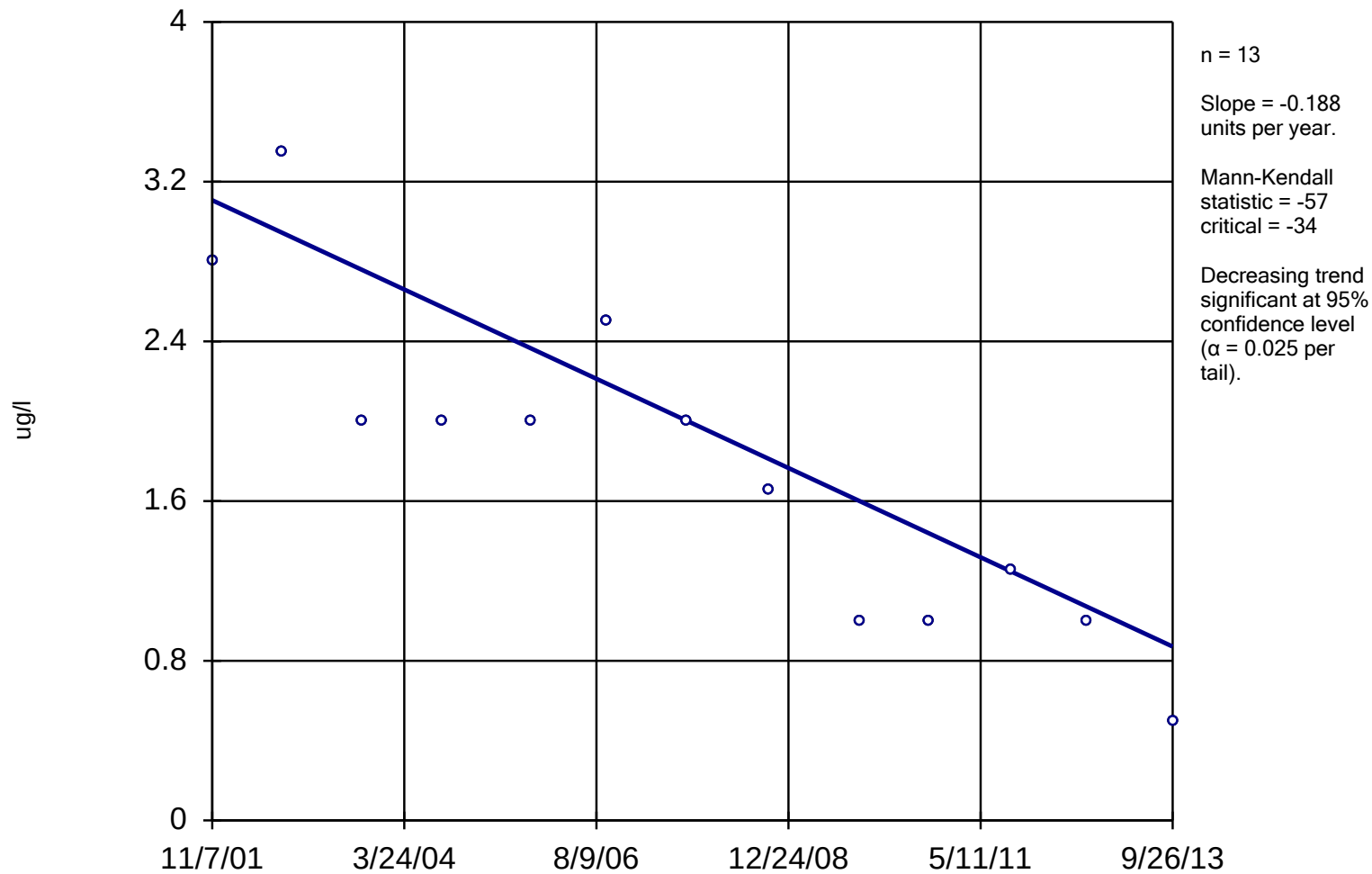


Constituent: Tetrachloroethene Analysis Run 1/27/2014 11:17 AM

Facility: RACER Trust Client: ARCADIS G&M, Inc. Data File: 2013Linear Regression North

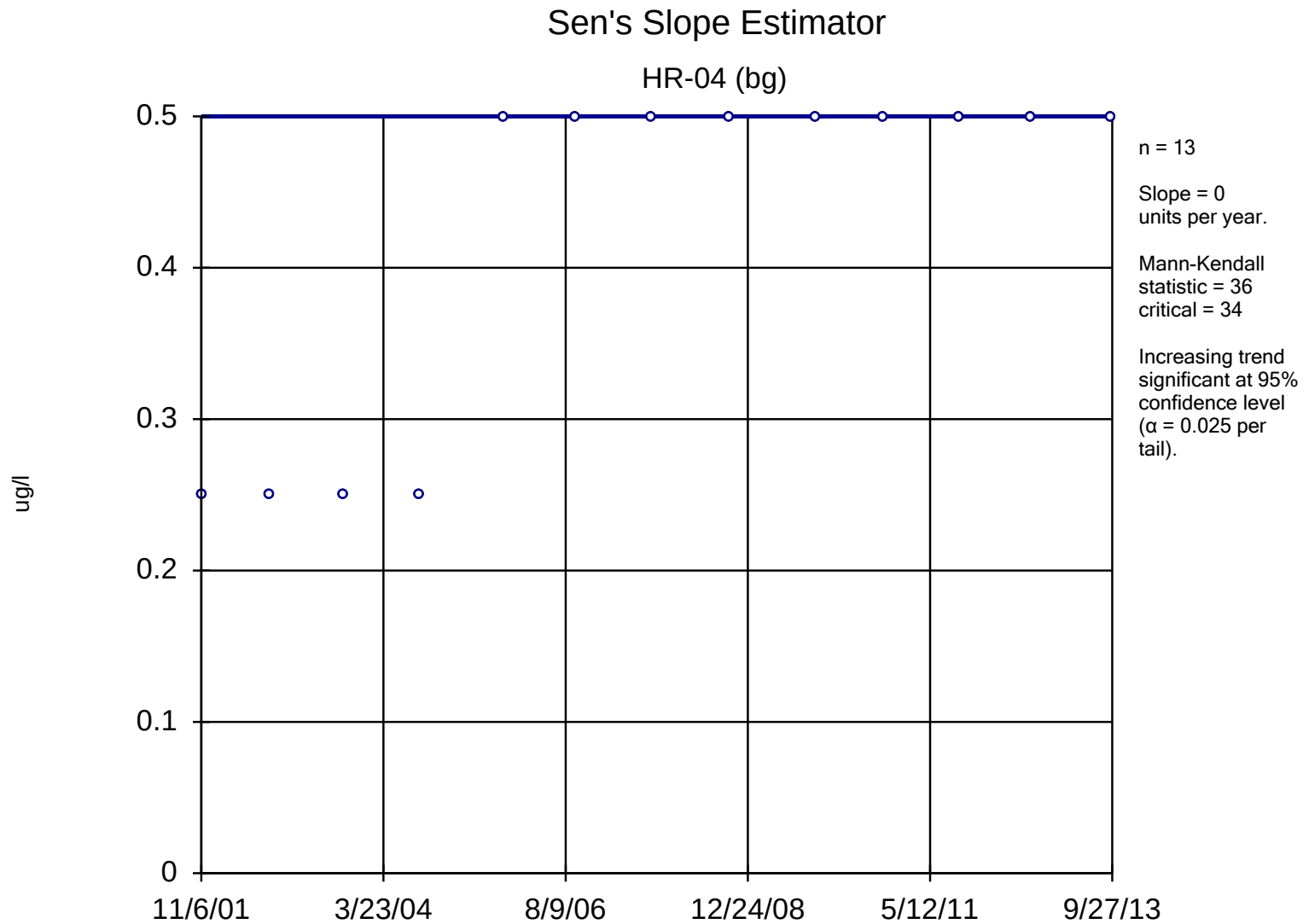
Sen's Slope Estimator

W-3-N



Constituent: Toluene Analysis Run 1/27/2014 11:17 AM

Facility: RACER Trust Client: ARCADIS G&M, Inc. Data File: 2013Linear Regression North

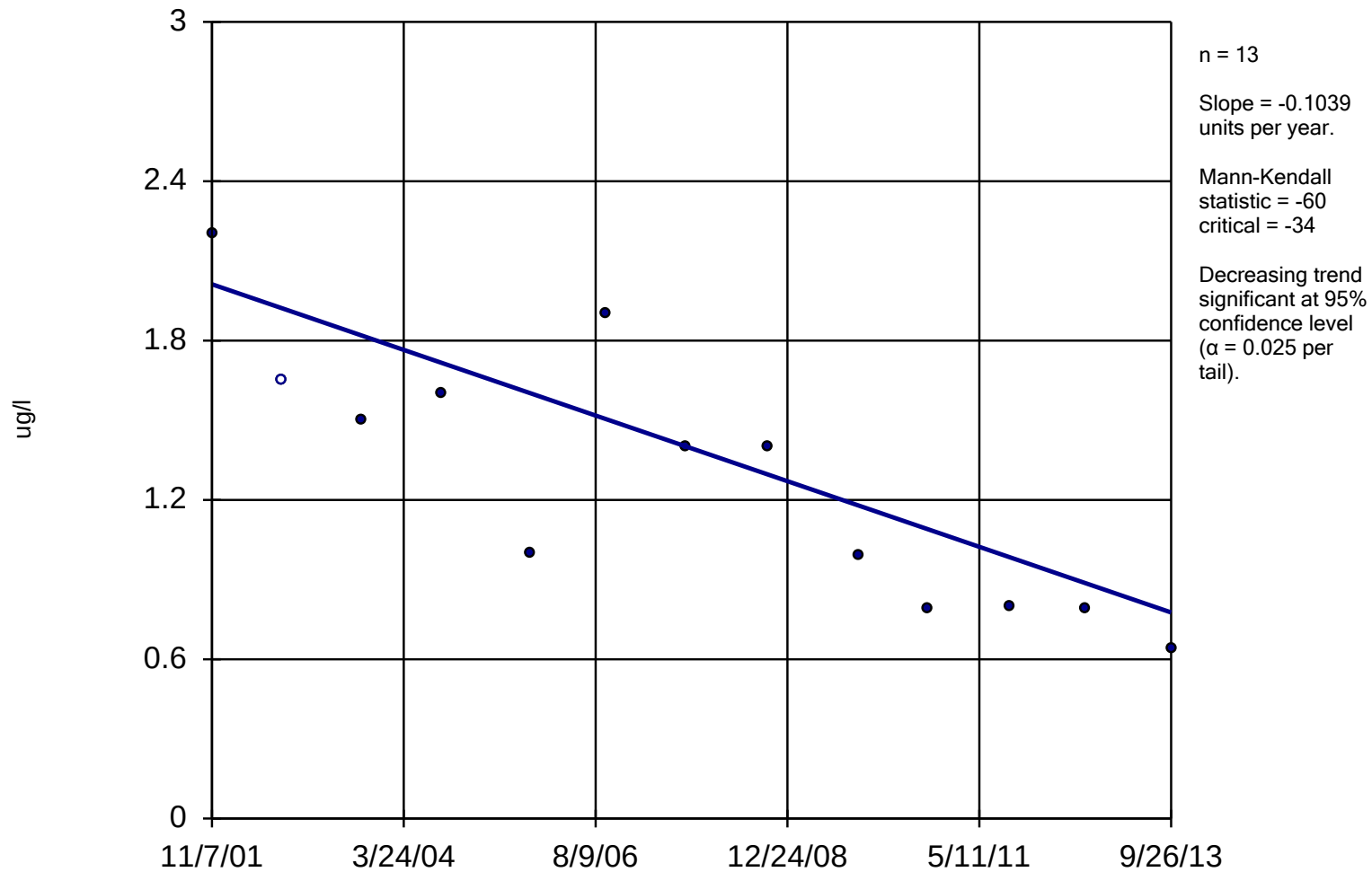


Constituent: trans-1,2-Dichloroethene Analysis Run 1/27/2014 11:17 AM

Facility: RACER Trust Client: ARCADIS G&M, Inc. Data File: 2013Linear Regression North

Sen's Slope Estimator

W-3-N

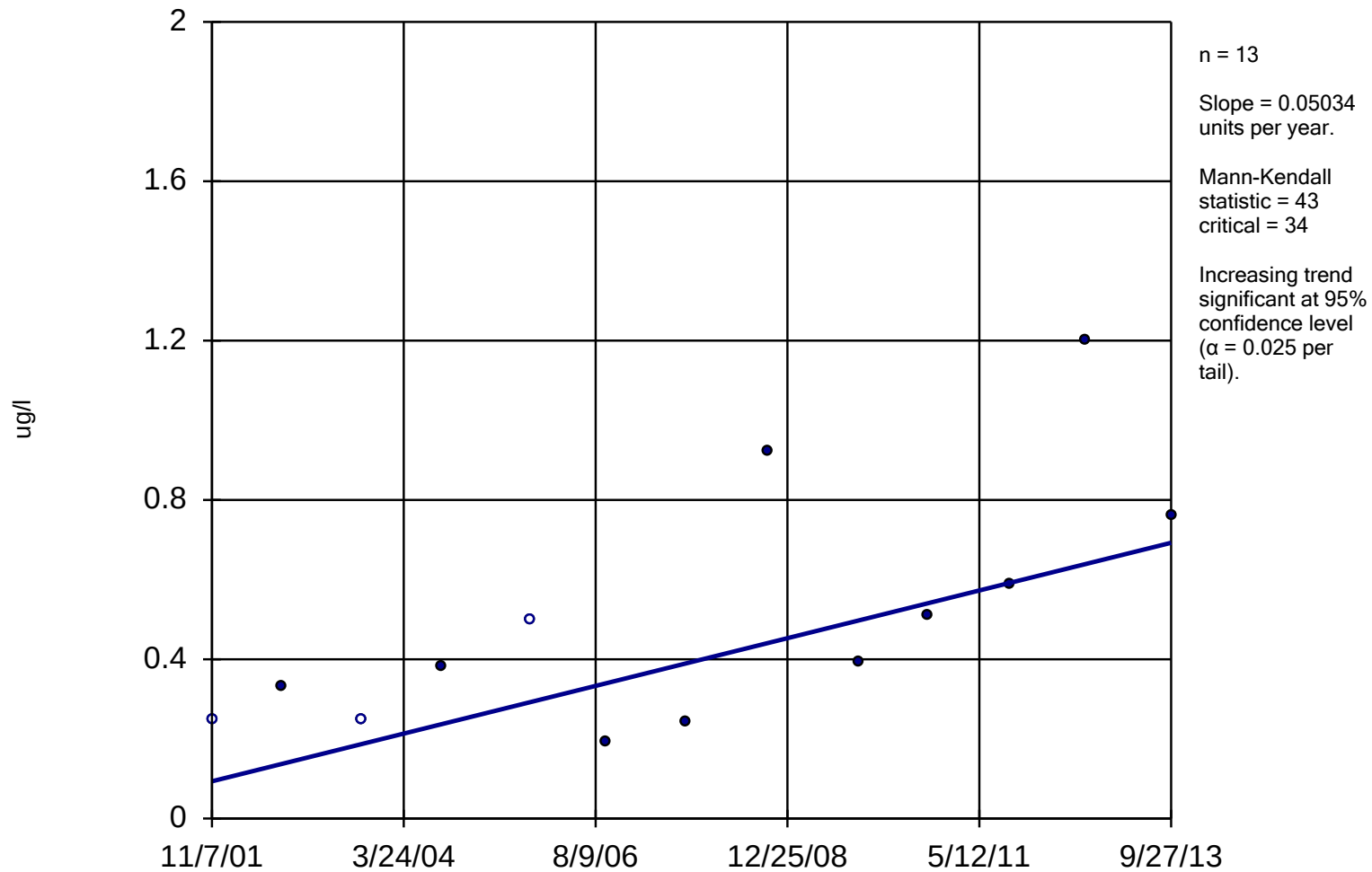


Constituent: trans-1,2-Dichloroethene Analysis Run 1/27/2014 11:17 AM

Facility: RACER Trust Client: ARCADIS G&M, Inc. Data File: 2013Linear Regression North

Sen's Slope Estimator

W-4-N

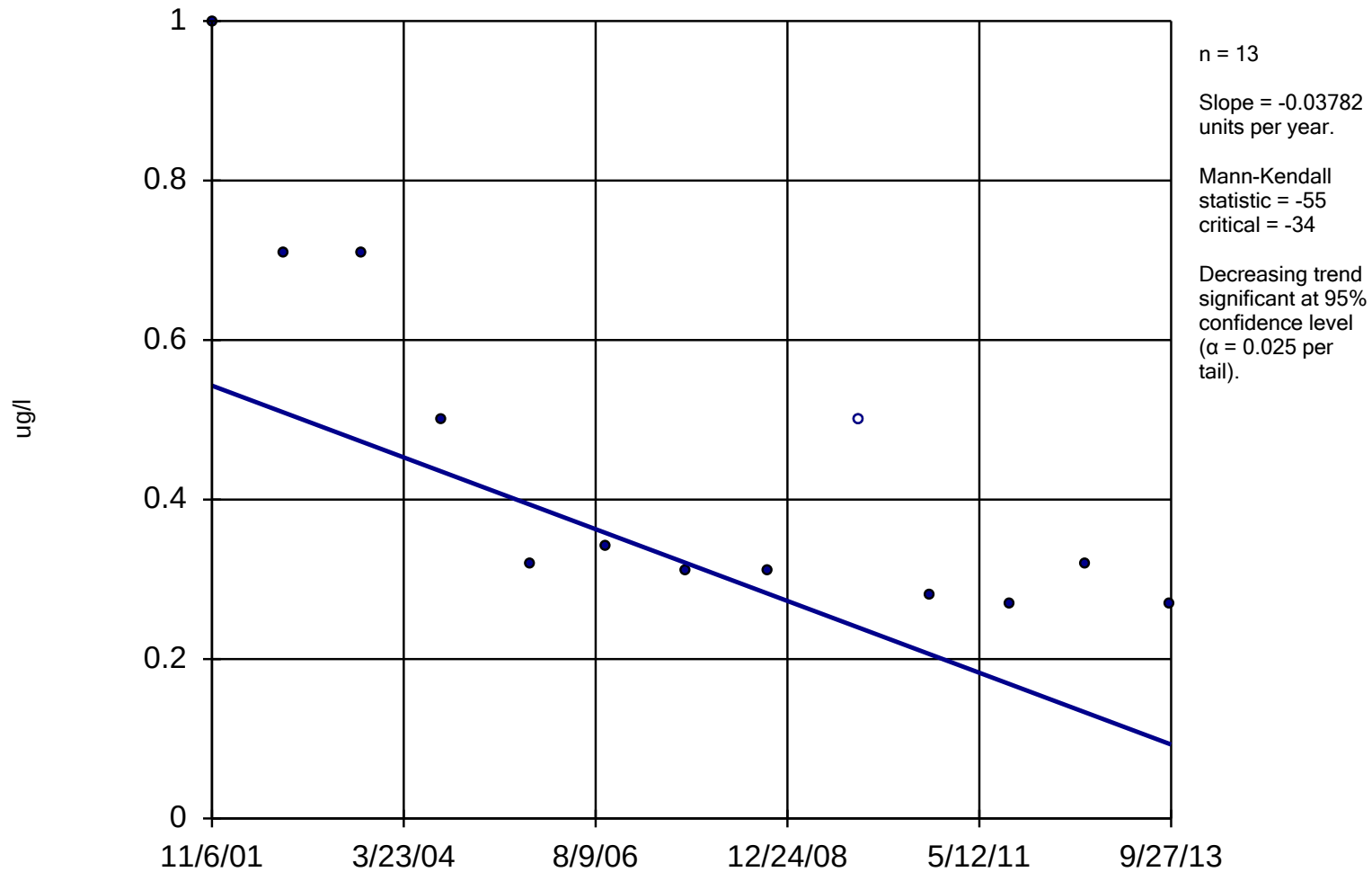


Constituent: trans-1,2-Dichloroethene Analysis Run 1/27/2014 11:17 AM

Facility: RACER Trust Client: ARCADIS G&M, Inc. Data File: 2013Linear Regression North

Sen's Slope Estimator

HR-04 (bg)

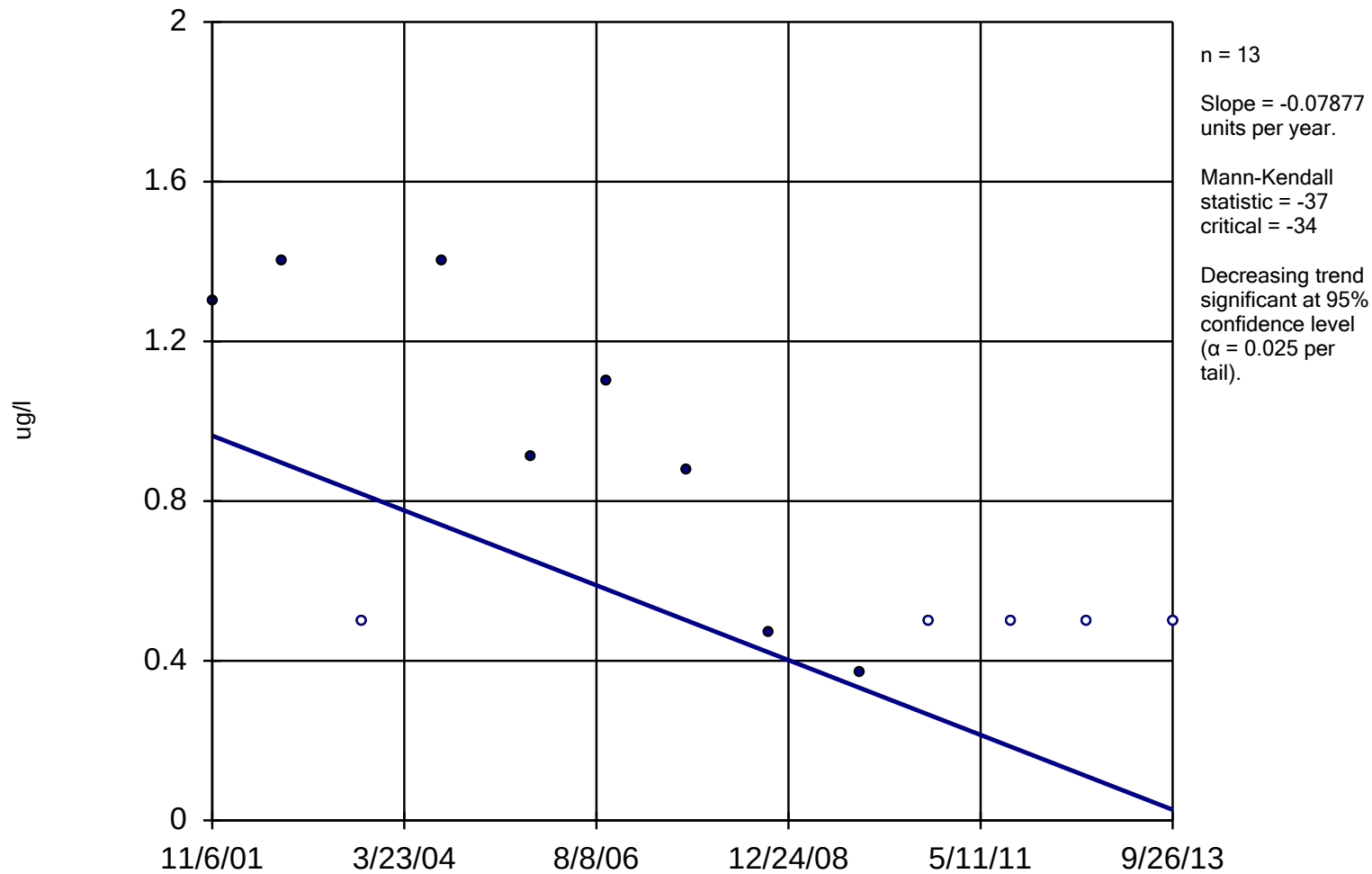


Constituent: Trichloroethene Analysis Run 1/27/2014 11:17 AM

Facility: RACER Trust Client: ARCADIS G&M, Inc. Data File: 2013Linear Regression North

Sen's Slope Estimator

W-2-N

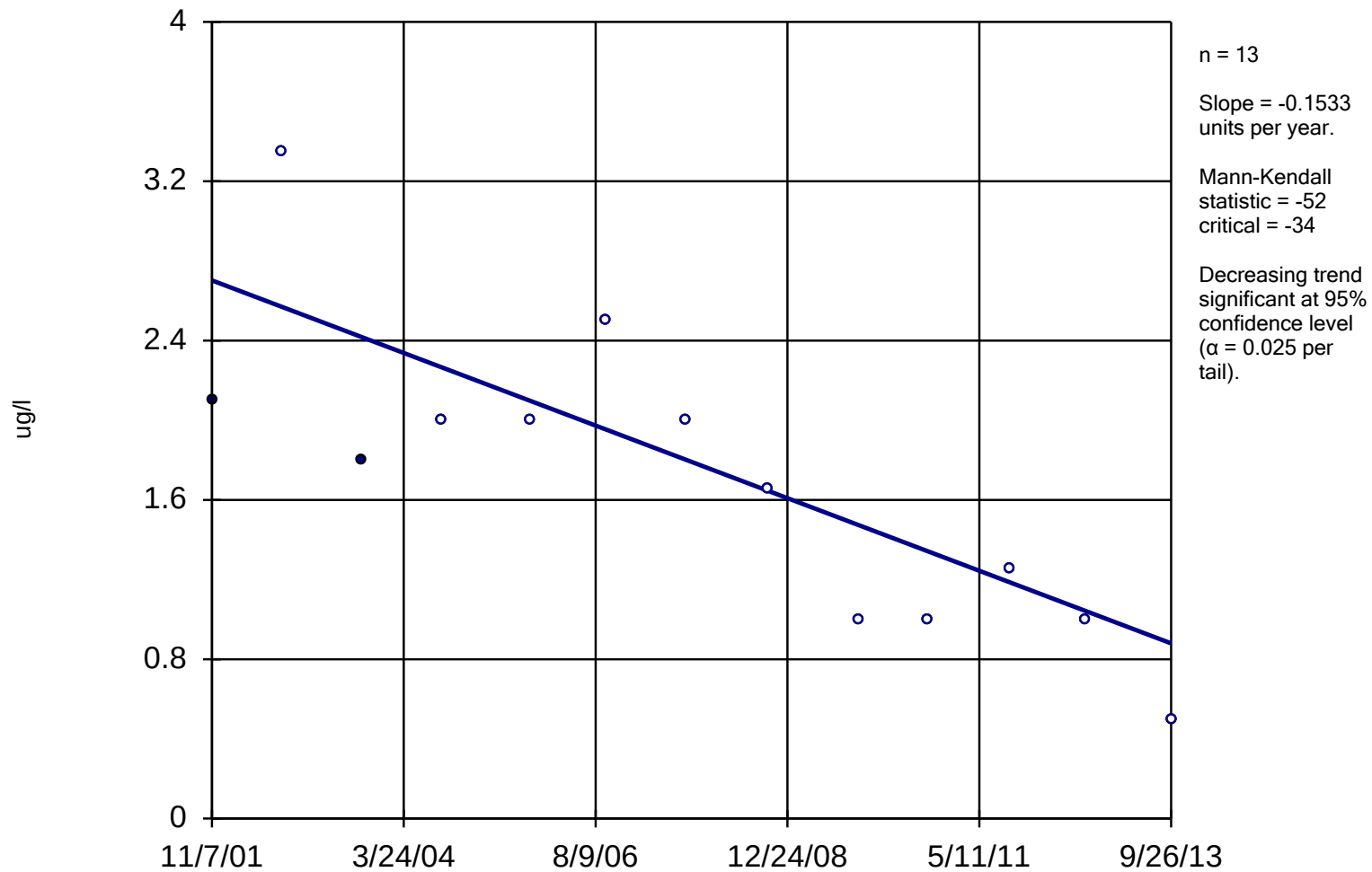


Constituent: Trichloroethene Analysis Run 1/27/2014 11:17 AM

Facility: RACER Trust Client: ARCADIS G&M, Inc. Data File: 2013Linear Regression North

Sen's Slope Estimator

W-3-N

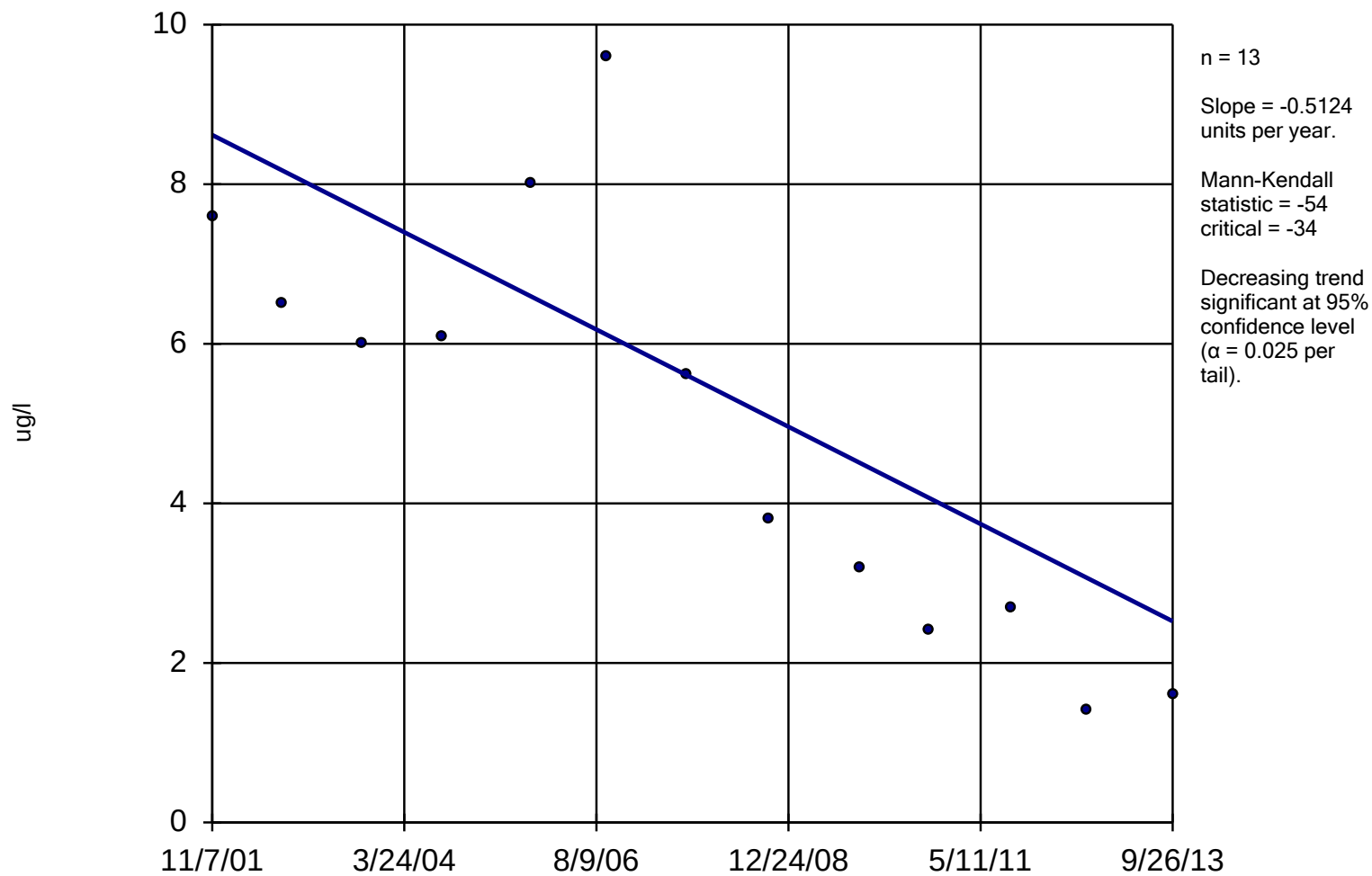


Constituent: Trichloroethene Analysis Run 1/27/2014 11:17 AM

Facility: RACER Trust Client: ARCADIS G&M, Inc. Data File: 2013Linear Regression North

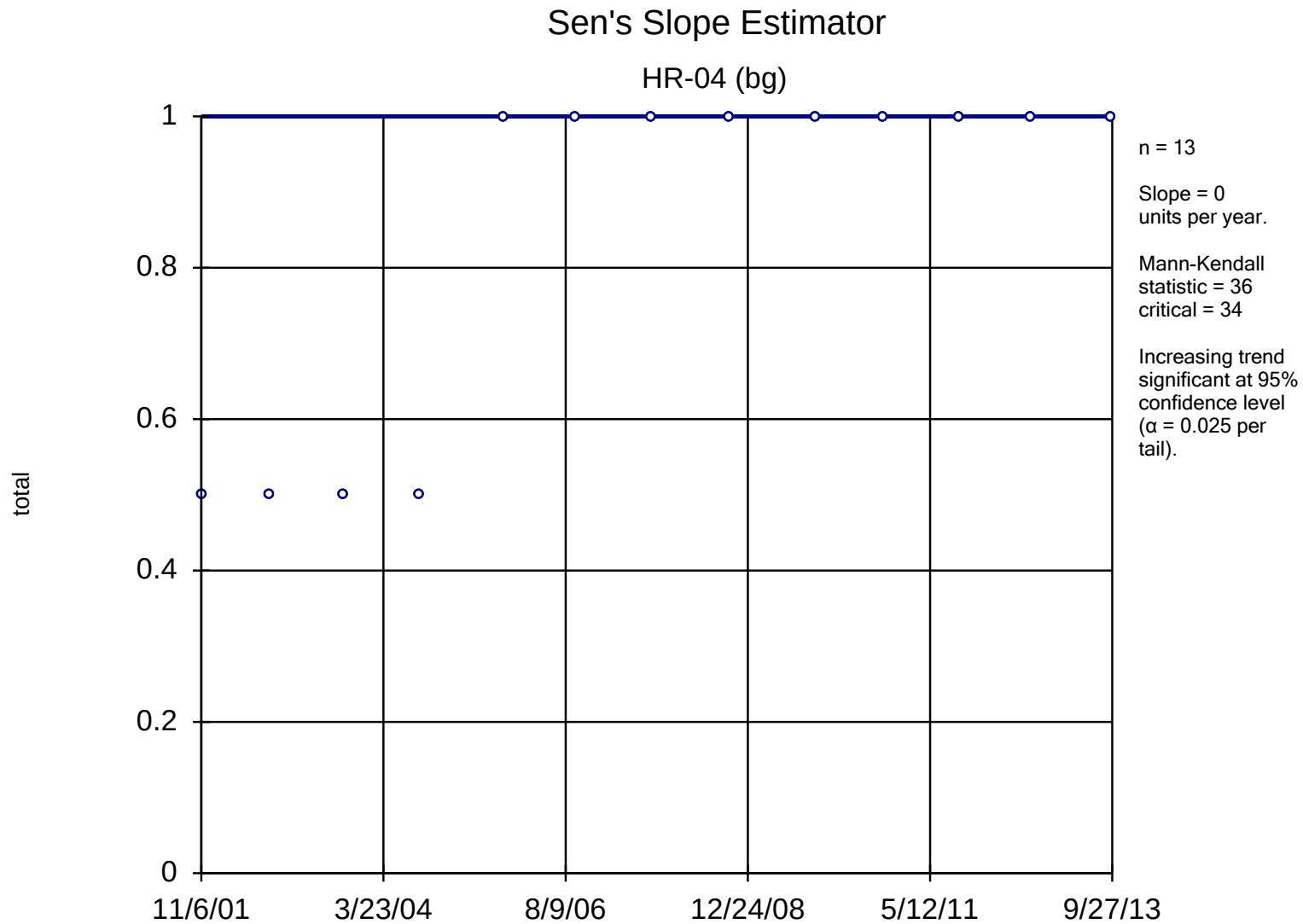
Sen's Slope Estimator

W-3-N



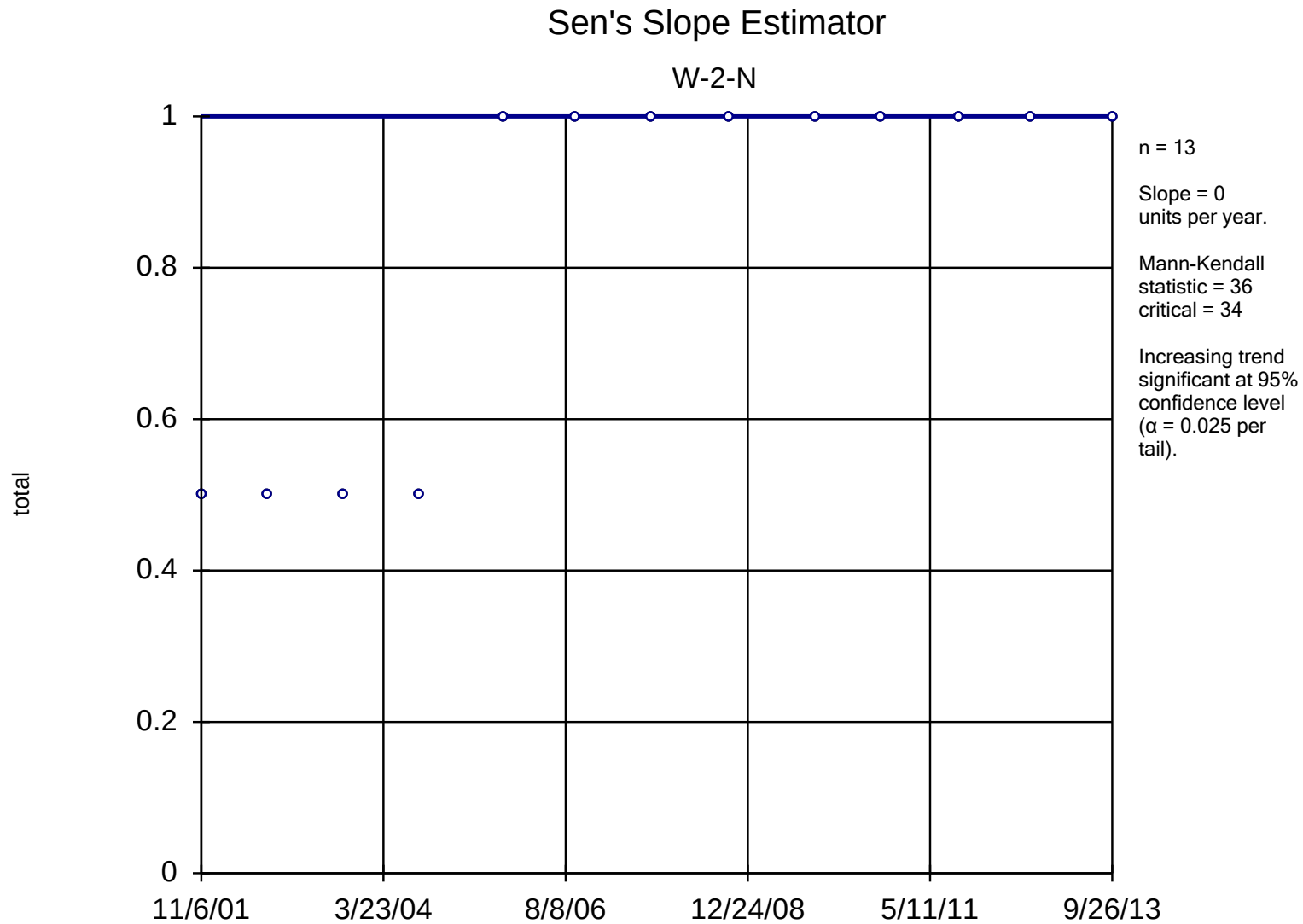
Constituent: Vinyl chloride Analysis Run 1/27/2014 11:17 AM

Facility: RACER Trust Client: ARCADIS G&M, Inc. Data File: 2013Linear Regression North



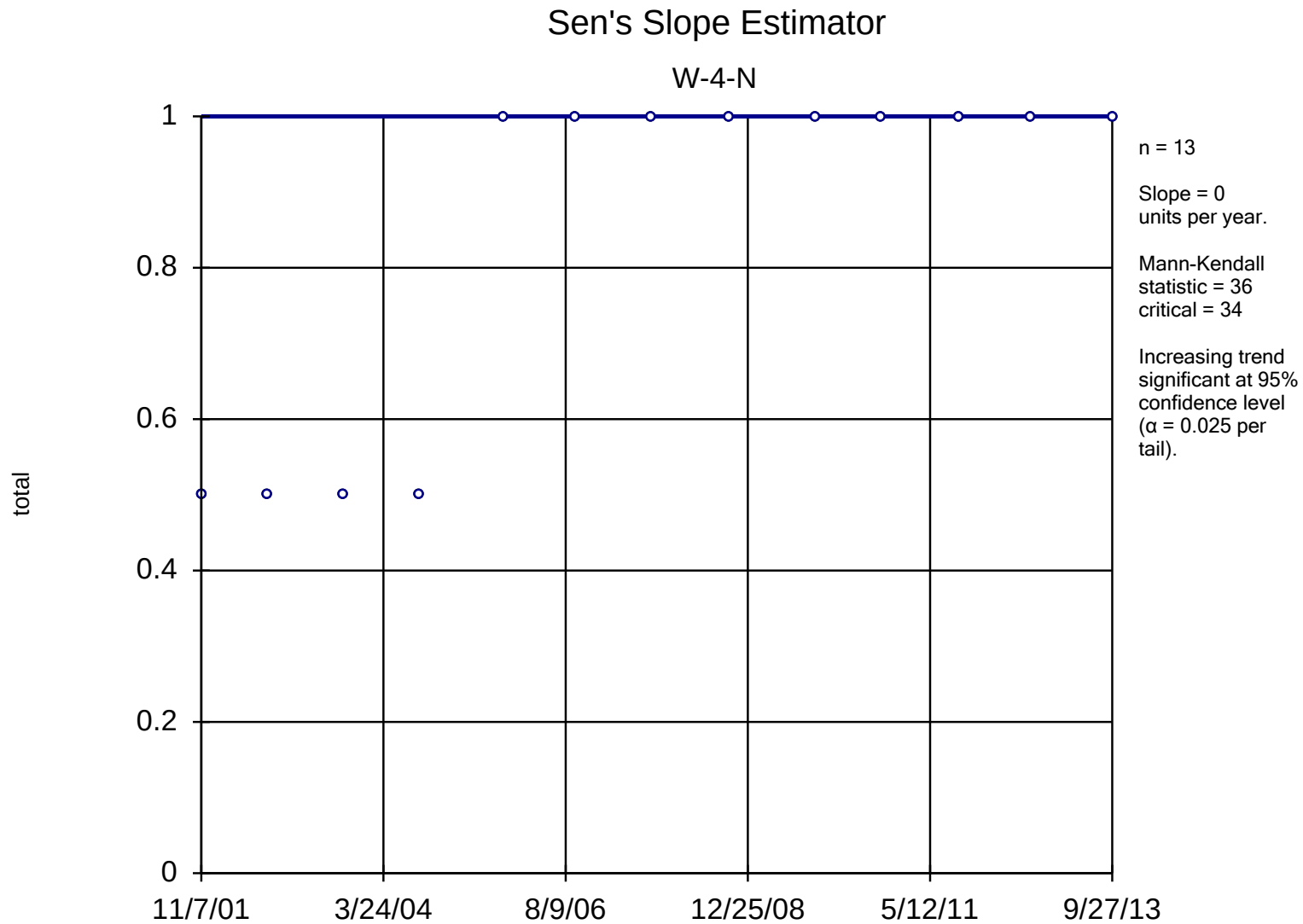
Constituent: Xylene Analysis Run 1/27/2014 11:17 AM

Facility: RACER Trust Client: ARCADIS G&M, Inc. Data File: 2013Linear Regression North



Constituent: Xylene Analysis Run 1/27/2014 11:17 AM

Facility: RACER Trust Client: ARCADIS G&M, Inc. Data File: 2013Linear Regression North



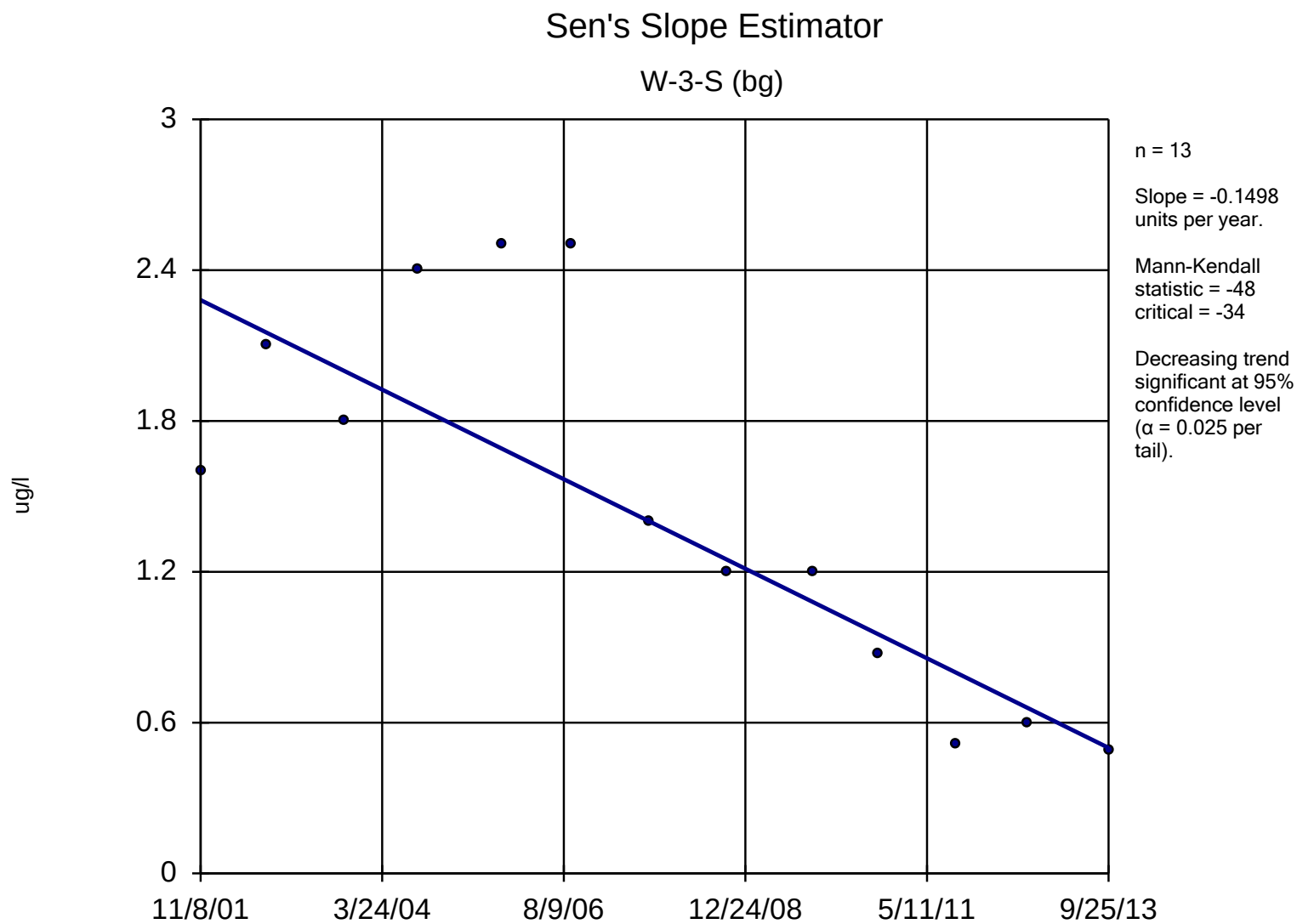
Constituent: Xylene Analysis Run 1/27/2014 11:17 AM

Facility: RACER Trust Client: ARCADIS G&M, Inc. Data File: 2013Linear Regression North

Trend Test

Facility: RACER Trust Client: ARCADIS G&M, Inc. Data File: 2013Linear Regression South Printed 1/28/2014, 3:08 PM

Constituent	Well	Slope	Calc.	Critical	Sig.	N	Alpha
1,1,1-Trichloroethane (ug/l)	HR-17 (bg)	0.08657	23	34	No	13	0.05
1,1,1-Trichloroethane (ug/l)	W-2-S (bg)	0	10	34	No	13	0.05
1,1,1-Trichloroethane (ug/l)	W-3-S (bg)	-0.1498	-48	-34	Yes	13	0.05
1,1,1-Trichloroethane (ug/l)	W-4-S (bg)	-0.1435	-93	-49	Yes	17	0.05
1,1-Dichloroethane (ug/l)	HR-17 (bg)	0.1496	32	34	No	13	0.05
1,1-Dichloroethane (ug/l)	W-2-S (bg)	0	3	34	No	13	0.05
1,1-Dichloroethane (ug/l)	W-3-S (bg)	0	15	34	No	13	0.05
1,1-Dichloroethane (ug/l)	W-4-S (bg)	0.06689	77	49	Yes	17	0.05
1,1-Dichloroethene (ug/l)	HR-17 (bg)	0.09744	23	34	No	13	0.05
1,1-Dichloroethene (ug/l)	W-2-S (bg)	0	0	34	No	13	0.05
1,1-Dichloroethene (ug/l)	W-3-S (bg)	0	8	34	No	13	0.05
1,1-Dichloroethene (ug/l)	W-4-S (bg)	0	7	49	No	17	0.05
Benzene (ug/l)	HR-17 (bg)	0.09744	23	34	No	13	0.05
Benzene (ug/l)	W-2-S (bg)	0	-4	-34	No	13	0.05
Benzene (ug/l)	W-3-S (bg)	0	8	34	No	13	0.05
Benzene (ug/l)	W-4-S (bg)	0	14	49	No	17	0.05
cis-1,2-Dichloroethene (ug/l)	HR-17 (bg)	-0.1133	-16	-34	No	13	0.05
cis-1,2-Dichloroethene (ug/l)	W-2-S (bg)	0.01875	17	34	No	13	0.05
cis-1,2-Dichloroethene (ug/l)	W-3-S (bg)	0.05285	55	34	Yes	13	0.05
cis-1,2-Dichloroethene (ug/l)	W-4-S (bg)	0.5629	105	49	Yes	17	0.05
Ethylbenzene (ug/l)	HR-17 (bg)	0.09744	23	34	No	13	0.05
Ethylbenzene (ug/l)	W-2-S (bg)	0	0	34	No	13	0.05
Ethylbenzene (ug/l)	W-3-S (bg)	0	0	34	No	13	0.05
Ethylbenzene (ug/l)	W-4-S (bg)	0	27	49	No	17	0.05
Tetrachloroethene (ug/l)	HR-17 (bg)	10.01	52	34	Yes	13	0.05
Tetrachloroethene (ug/l)	W-2-S (bg)	-0.01499	-42	-34	Yes	13	0.05
Tetrachloroethene (ug/l)	W-3-S (bg)	0.1971	50	34	Yes	13	0.05
Tetrachloroethene (ug/l)	W-4-S (bg)	2.112	93	49	Yes	17	0.05
Toluene (ug/l)	HR-17 (bg)	0.09744	23	34	No	13	0.05
Toluene (ug/l)	W-2-S (bg)	0	8	34	No	13	0.05
Toluene (ug/l)	W-3-S (bg)	0	0	34	No	13	0.05
Toluene (ug/l)	W-4-S (bg)	0	37	49	No	17	0.05
trans-1,2-Dichloroethene (ug/l)	HR-17 (bg)	0.1037	28	34	No	13	0.05
trans-1,2-Dichloroethene (ug/l)	W-2-S (bg)	0	36	34	Yes	13	0.05
trans-1,2-Dichloroethene (ug/l)	W-3-S (bg)	0.0139	25	34	No	13	0.05
trans-1,2-Dichloroethene (ug/l)	W-4-S (bg)	0.08776	85	49	Yes	17	0.05
Trichloroethene (ug/l)	HR-17 (bg)	4.932	53	34	Yes	13	0.05
Trichloroethene (ug/l)	W-2-S (bg)	0.1183	37	34	Yes	13	0.05
Trichloroethene (ug/l)	W-3-S (bg)	0.1641	36	34	Yes	13	0.05
Trichloroethene (ug/l)	W-4-S (bg)	1.229	98	49	Yes	17	0.05
Vinyl chloride (ug/l)	HR-17 (bg)	0.09744	23	34	No	13	0.05
Vinyl chloride (ug/l)	W-2-S (bg)	0	0	34	No	13	0.05
Vinyl chloride (ug/l)	W-3-S (bg)	0	0	34	No	13	0.05
Vinyl chloride (ug/l)	W-4-S (bg)	0	14	49	No	17	0.05
Xylene (total)	HR-17 (bg)	0.341	37	34	Yes	13	0.05
Xylene (total)	W-2-S (bg)	0	36	34	Yes	13	0.05
Xylene (total)	W-3-S (bg)	0	36	34	Yes	13	0.05
Xylene (total)	W-4-S (bg)	0	62	49	Yes	17	0.05



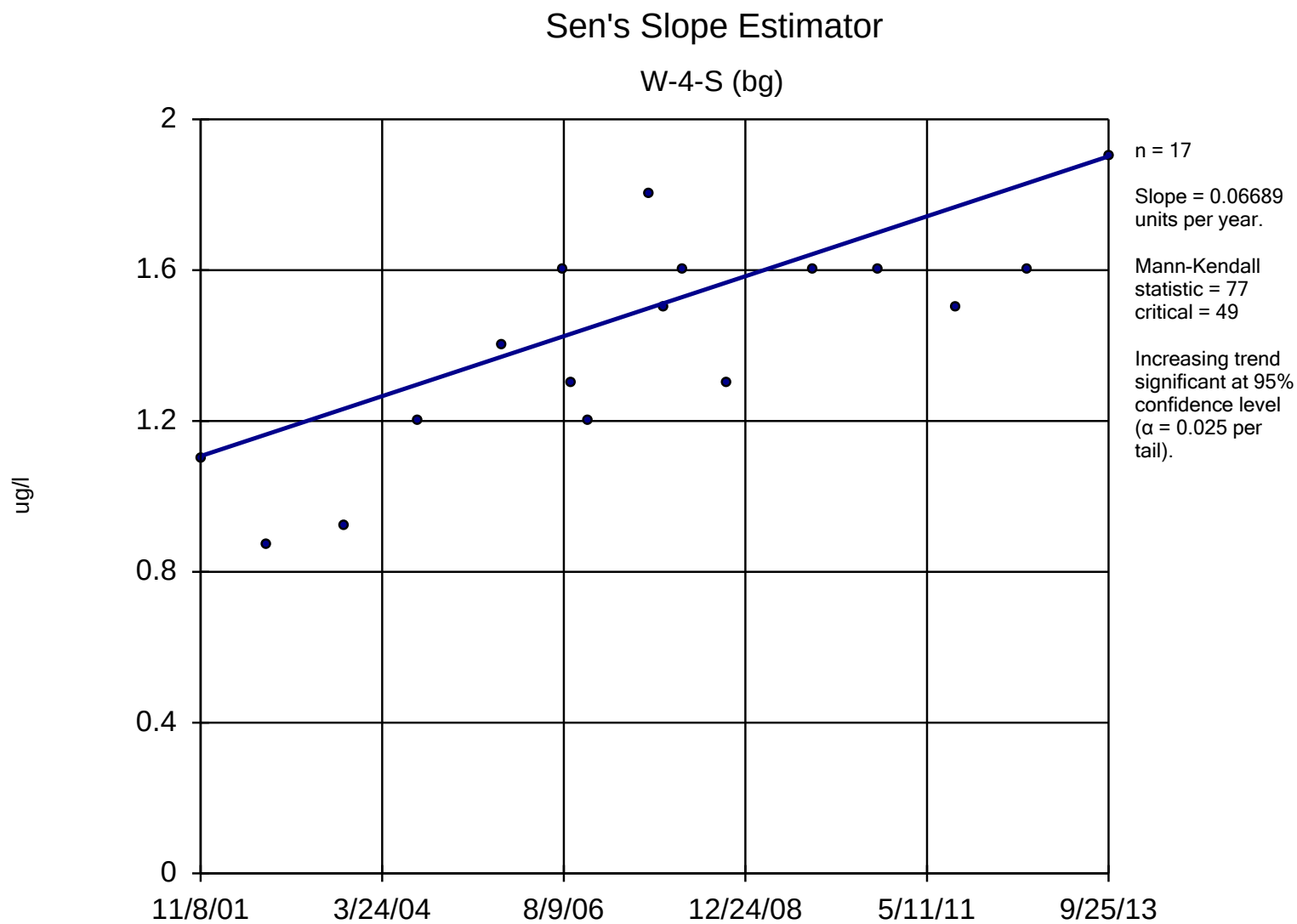
Constituent: 1,1,1-Trichloroethane Analysis Run 1/28/2014 3:06 PM

Facility: RACER Trust Client: ARCADIS G&M, Inc. Data File: 2013Linear Regression South



Constituent: 1,1,1-Trichloroethane Analysis Run 1/28/2014 3:06 PM

Facility: RACER Trust Client: ARCADIS G&M, Inc. Data File: 2013Linear Regression South

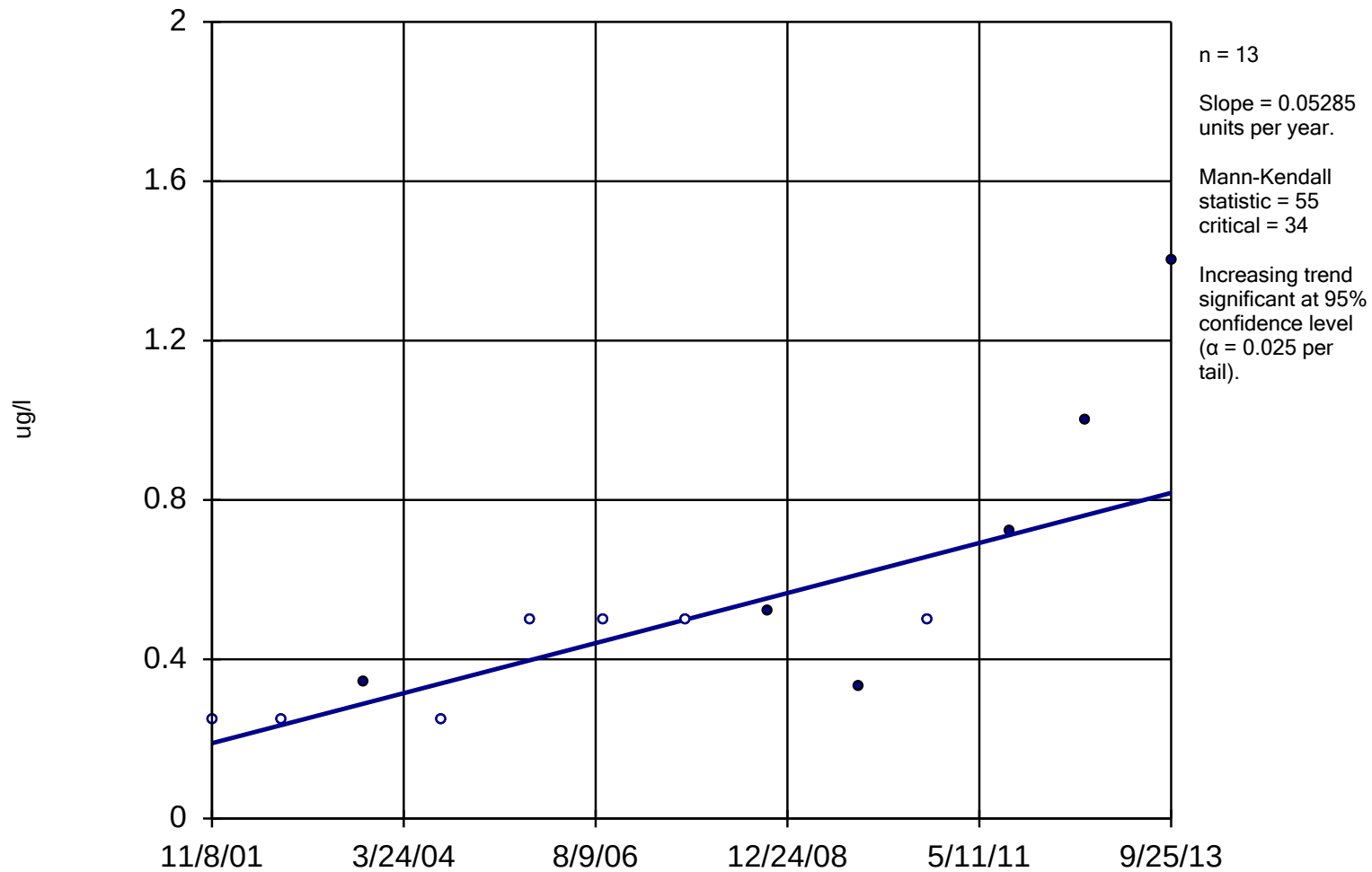


Constituent: 1,1-Dichloroethane Analysis Run 1/28/2014 3:06 PM

Facility: RACER Trust Client: ARCADIS G&M, Inc. Data File: 2013Linear Regression South

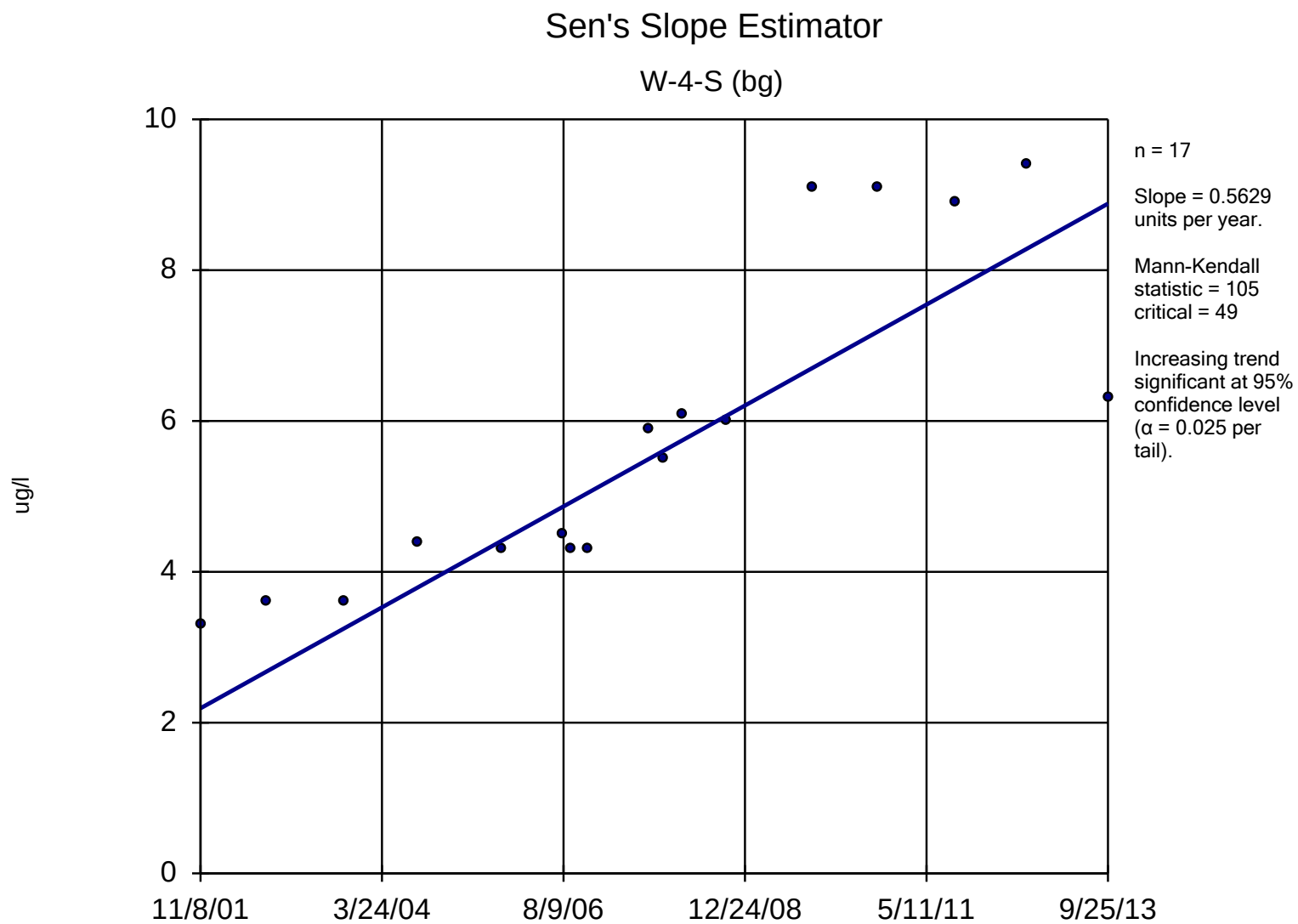
Sen's Slope Estimator

W-3-S (bg)



Constituent: cis-1,2-Dichloroethene Analysis Run 1/28/2014 3:06 PM

Facility: RACER Trust Client: ARCADIS G&M, Inc. Data File: 2013Linear Regression South

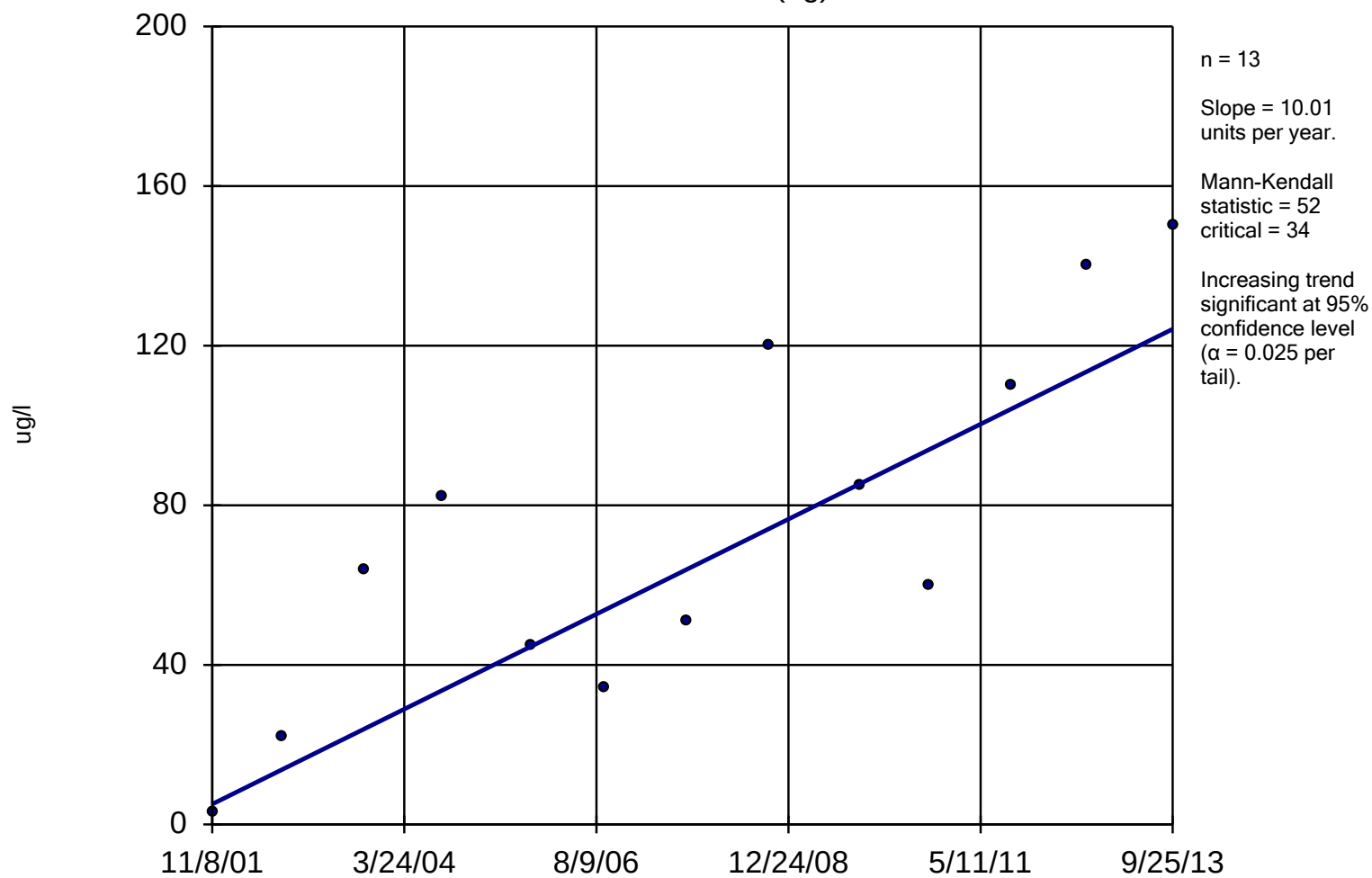


Constituent: cis-1,2-Dichloroethene Analysis Run 1/28/2014 3:06 PM

Facility: RACER Trust Client: ARCADIS G&M, Inc. Data File: 2013Linear Regression South

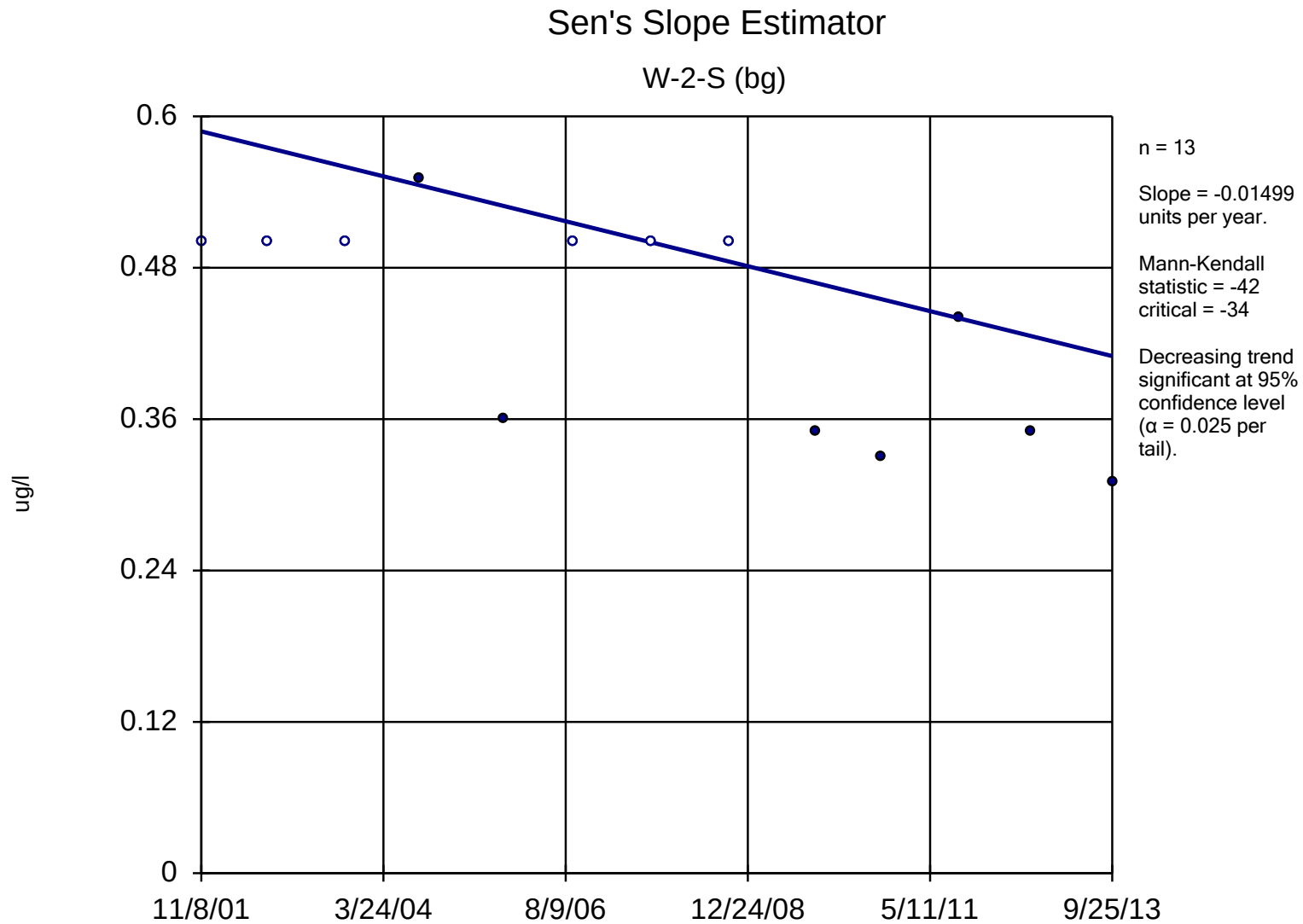
Sen's Slope Estimator

HR-17 (bg)



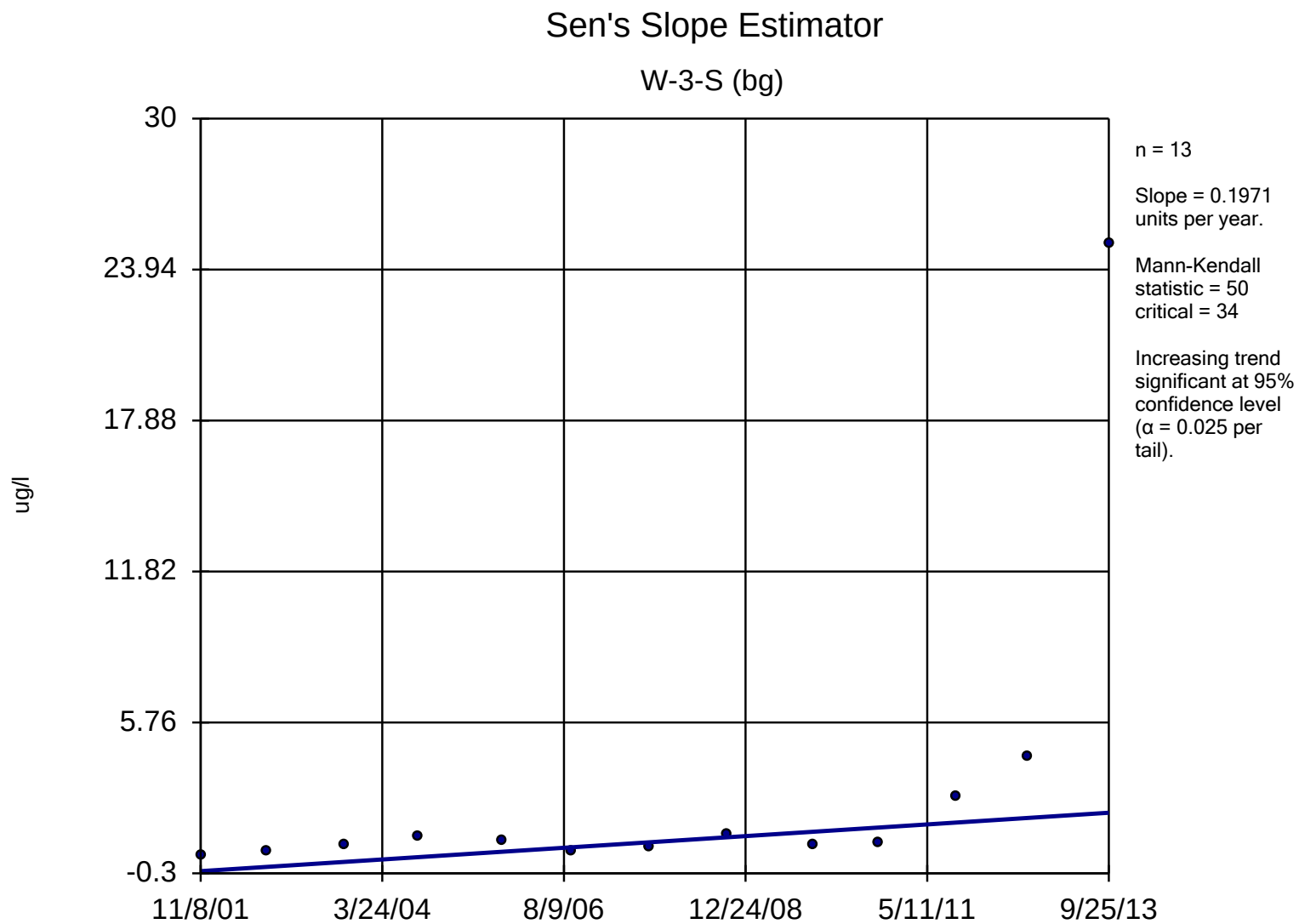
Constituent: Tetrachloroethene Analysis Run 1/28/2014 3:06 PM

Facility: RACER Trust Client: ARCADIS G&M, Inc. Data File: 2013Linear Regression South



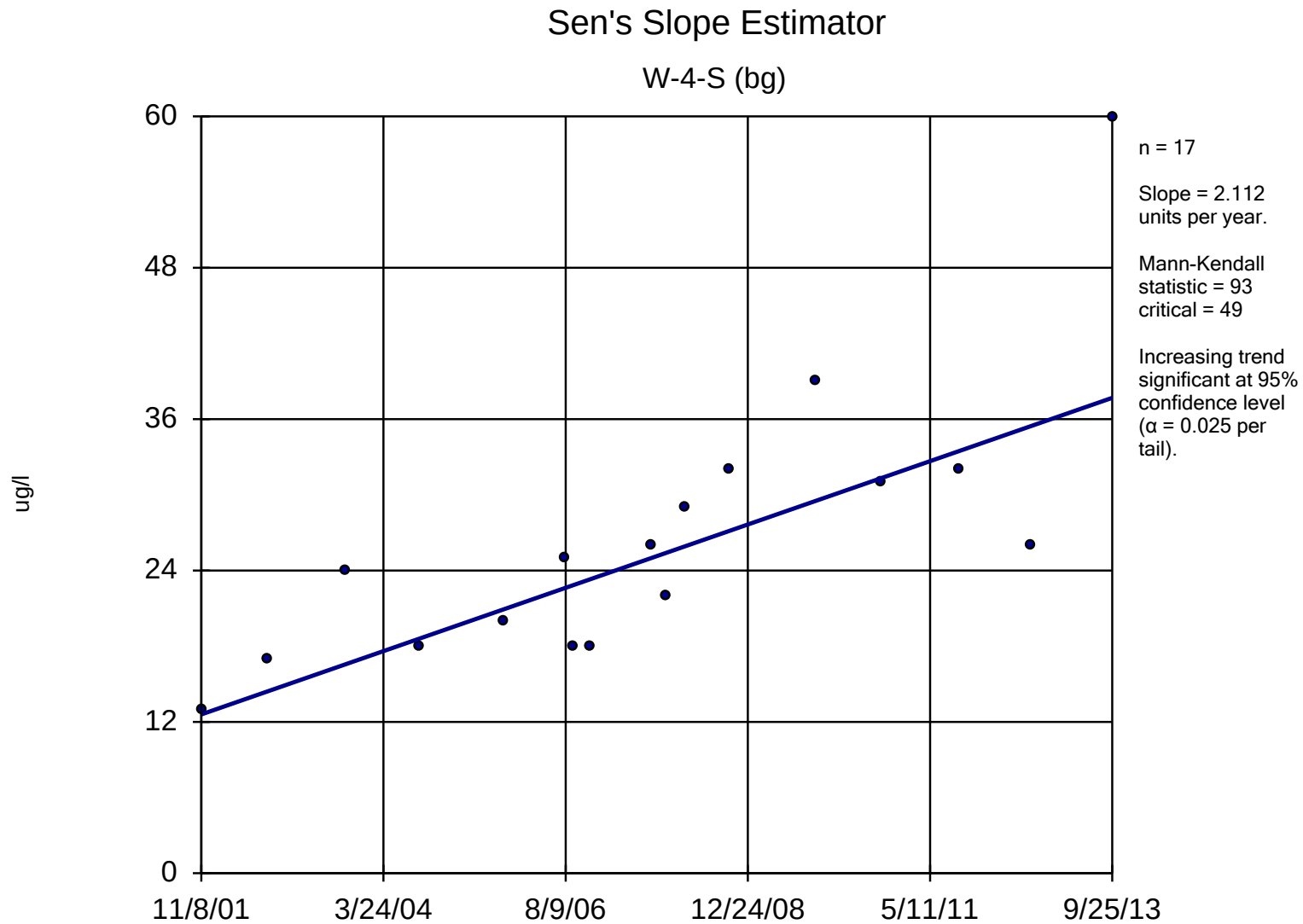
Constituent: Tetrachloroethene Analysis Run 1/28/2014 3:06 PM

Facility: RACER Trust Client: ARCADIS G&M, Inc. Data File: 2013Linear Regression South



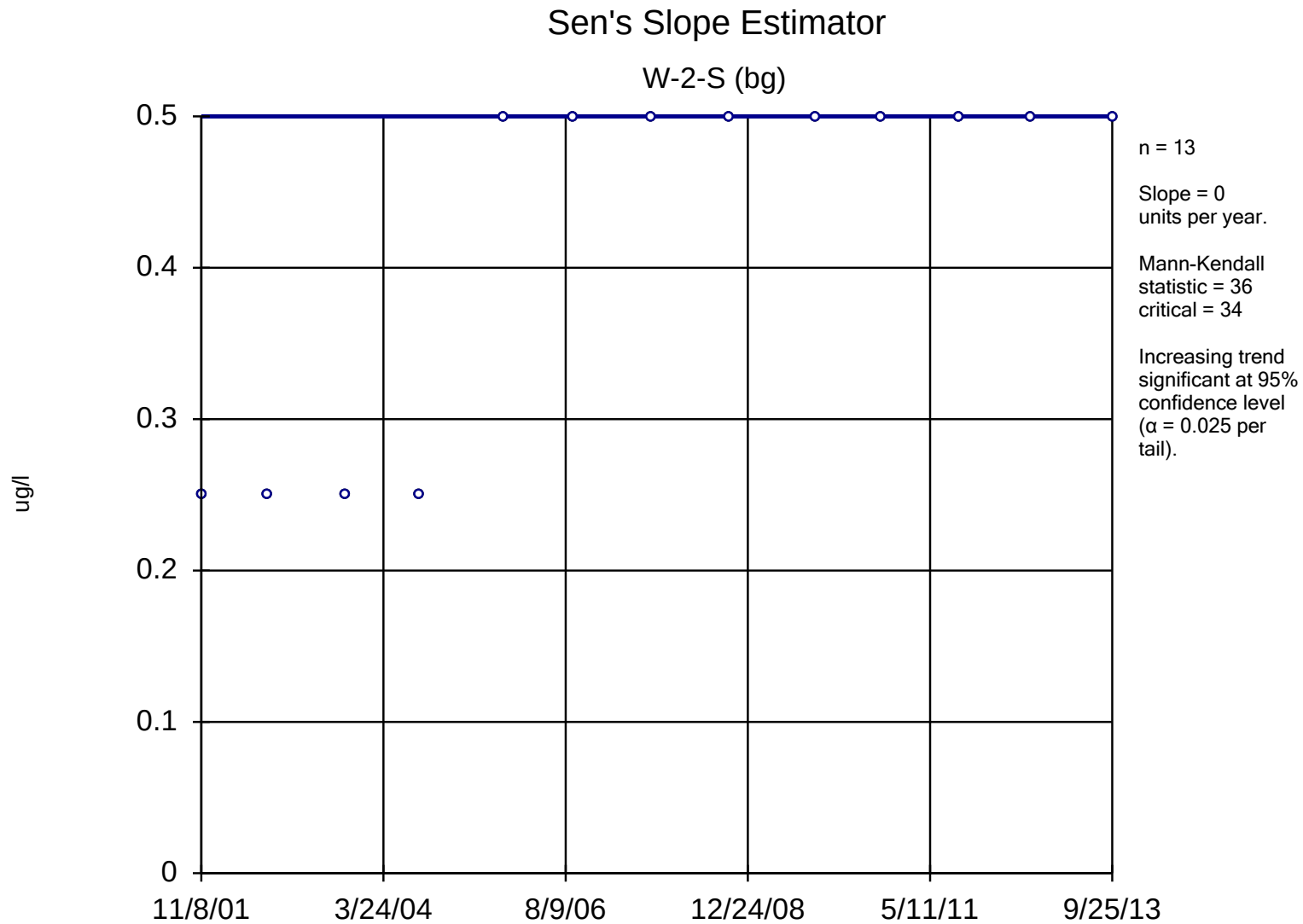
Constituent: Tetrachloroethene Analysis Run 1/28/2014 3:06 PM

Facility: RACER Trust Client: ARCADIS G&M, Inc. Data File: 2013Linear Regression South



Constituent: Tetrachloroethene Analysis Run 1/28/2014 3:06 PM

Facility: RACER Trust Client: ARCADIS G&M, Inc. Data File: 2013Linear Regression South



Constituent: trans-1,2-Dichloroethene Analysis Run 1/28/2014 3:06 PM
Facility: RACER Trust Client: ARCADIS G&M, Inc. Data File: 2013Linear Regression South

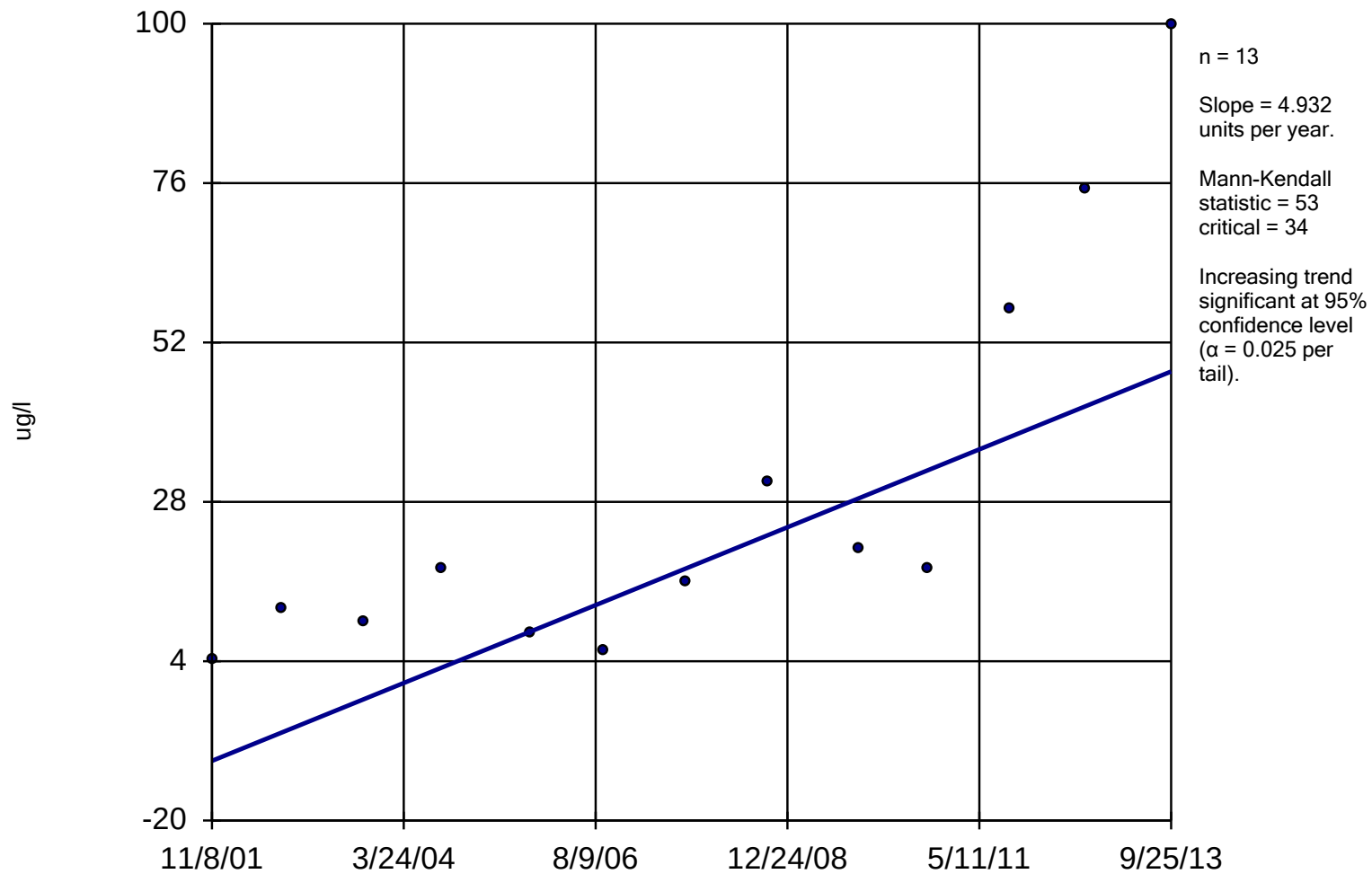


Constituent: trans-1,2-Dichloroethene Analysis Run 1/28/2014 3:06 PM

Facility: RACER Trust Client: ARCADIS G&M, Inc. Data File: 2013Linear Regression South

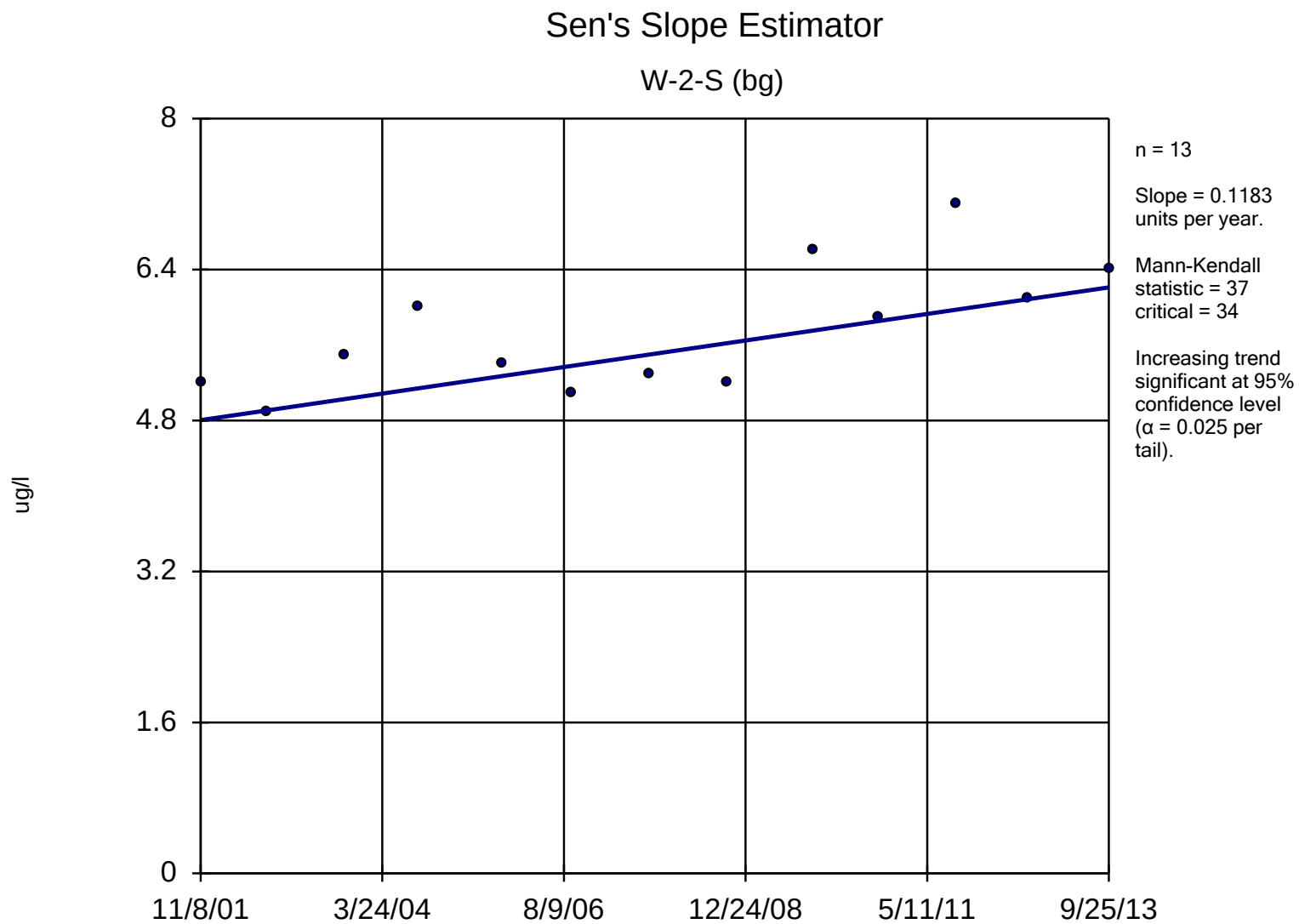
Sen's Slope Estimator

HR-17 (bg)



Constituent: Trichloroethene Analysis Run 1/28/2014 3:06 PM

Facility: RACER Trust Client: ARCADIS G&M, Inc. Data File: 2013Linear Regression South

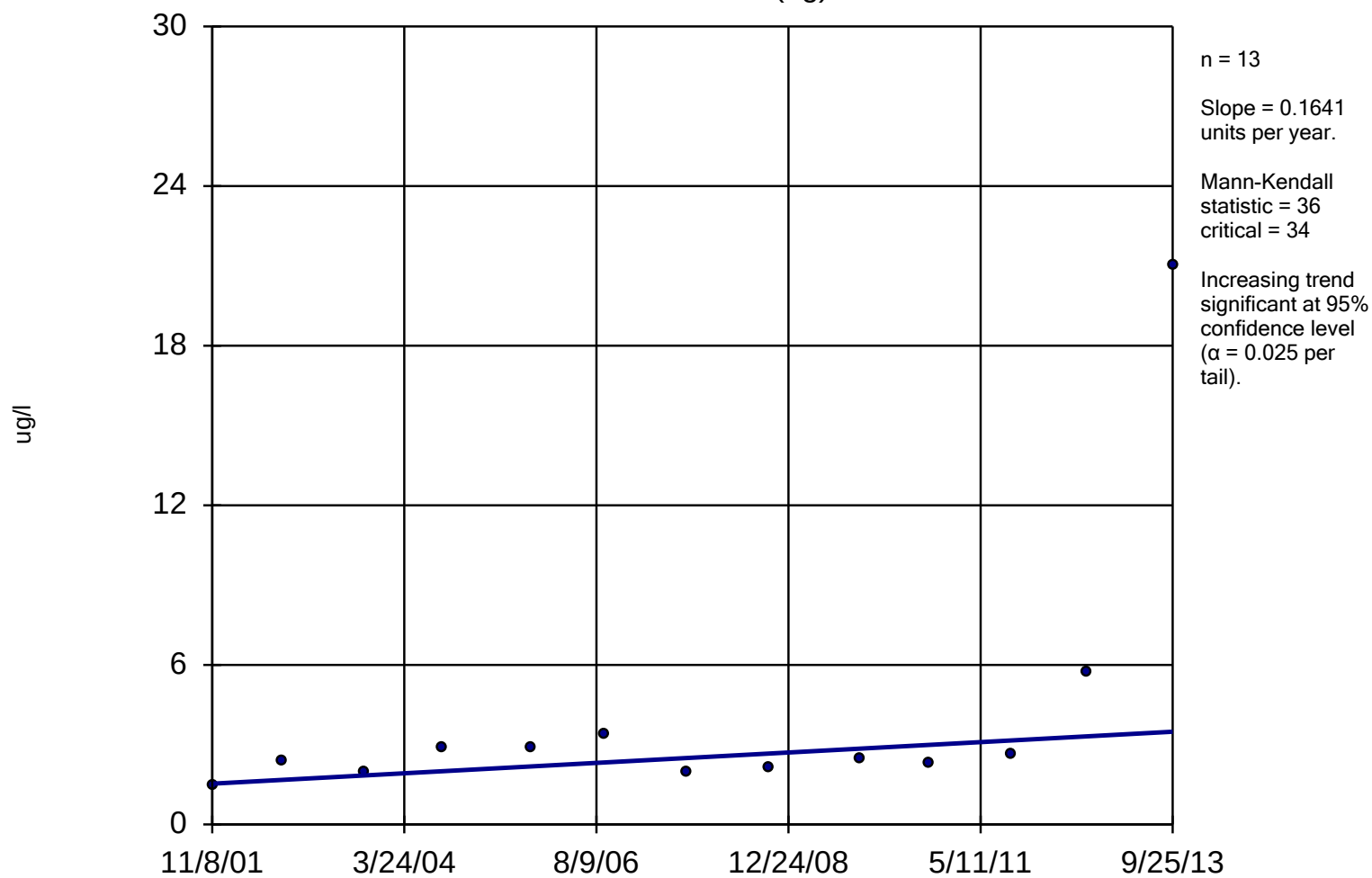


Constituent: Trichloroethene Analysis Run 1/28/2014 3:06 PM

Facility: RACER Trust Client: ARCADIS G&M, Inc. Data File: 2013Linear Regression South

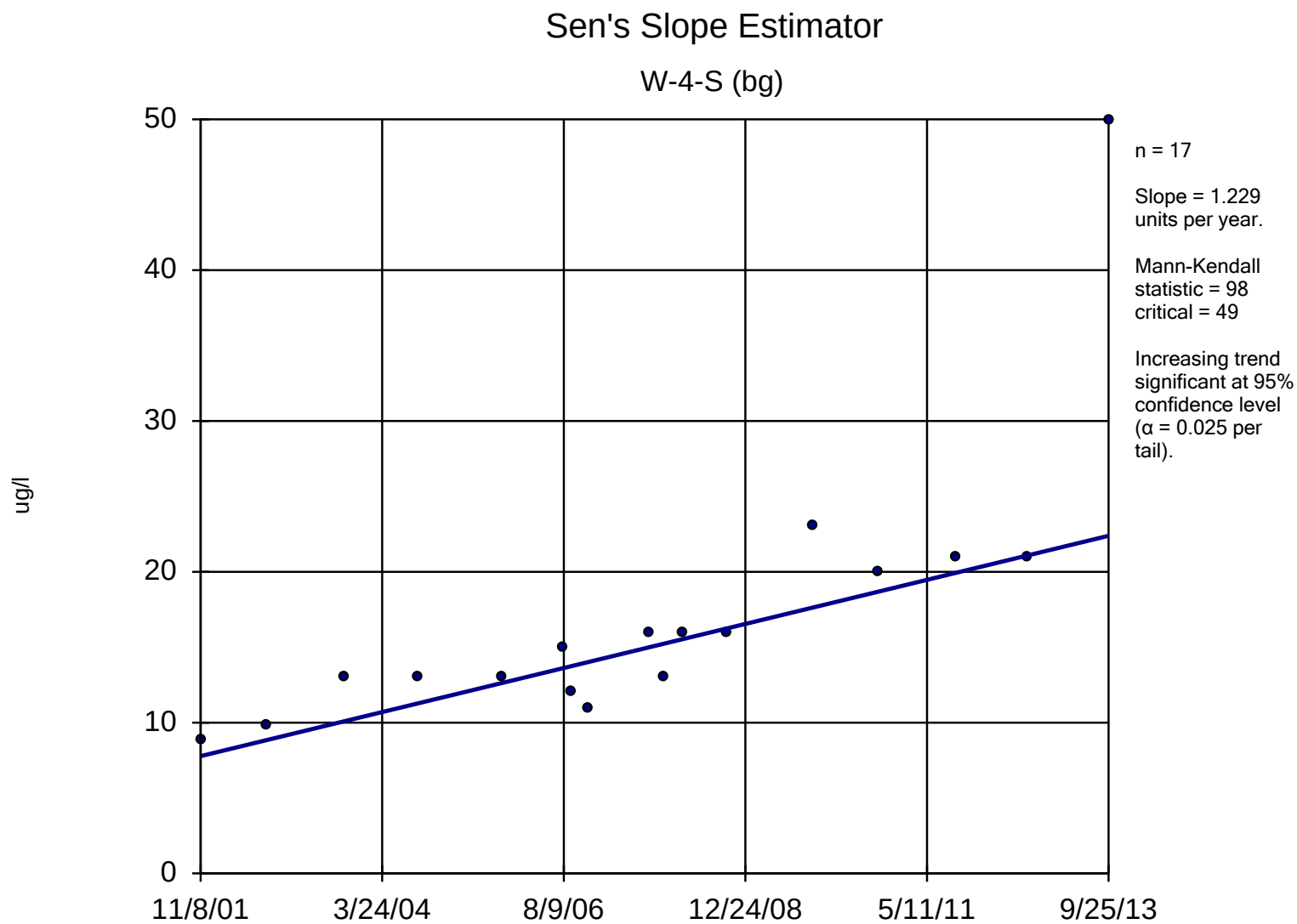
Sen's Slope Estimator

W-3-S (bg)



Constituent: Trichloroethene Analysis Run 1/28/2014 3:06 PM

Facility: RACER Trust Client: ARCADIS G&M, Inc. Data File: 2013Linear Regression South

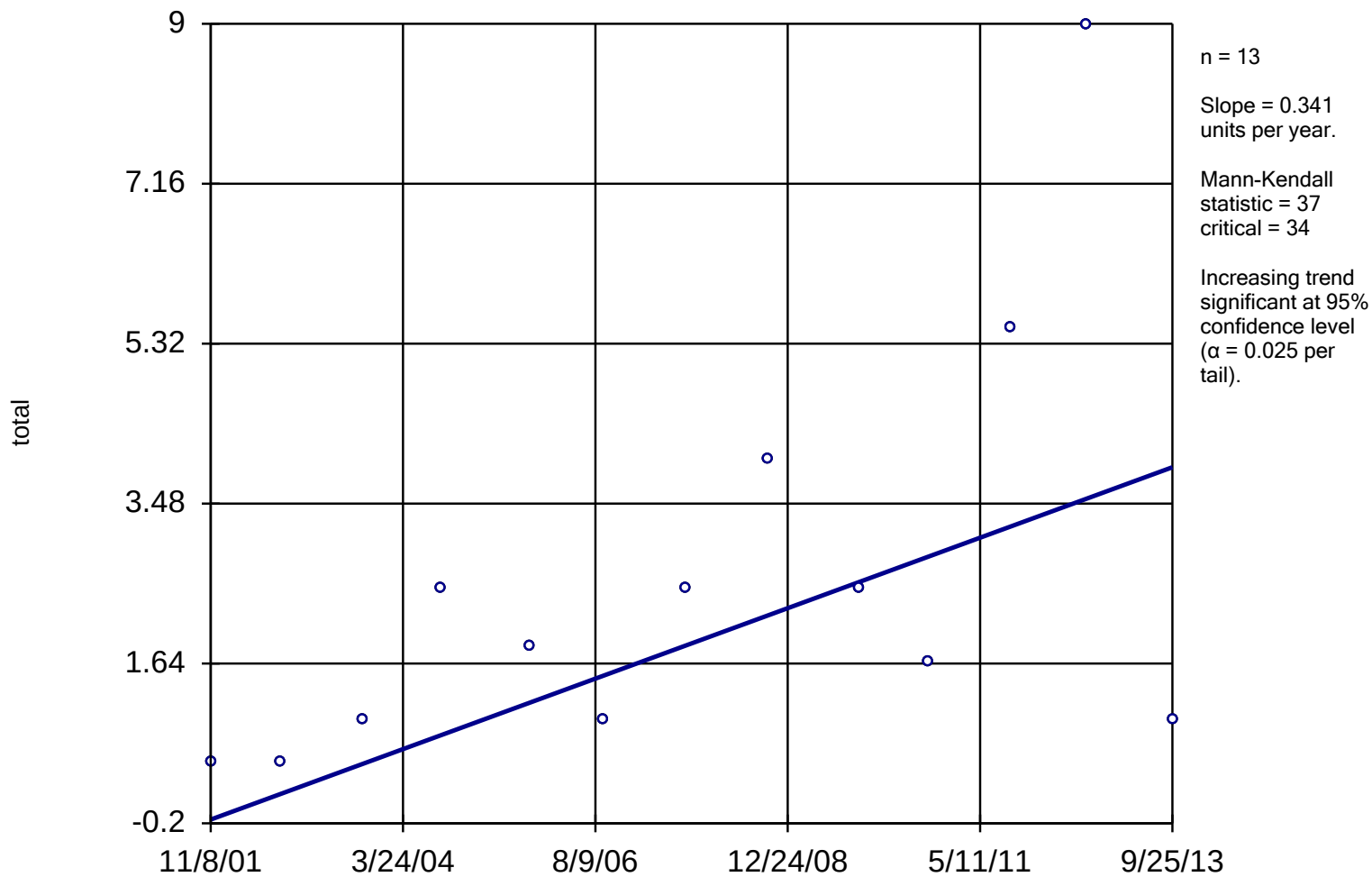


Constituent: Trichloroethene Analysis Run 1/28/2014 3:06 PM

Facility: RACER Trust Client: ARCADIS G&M, Inc. Data File: 2013Linear Regression South

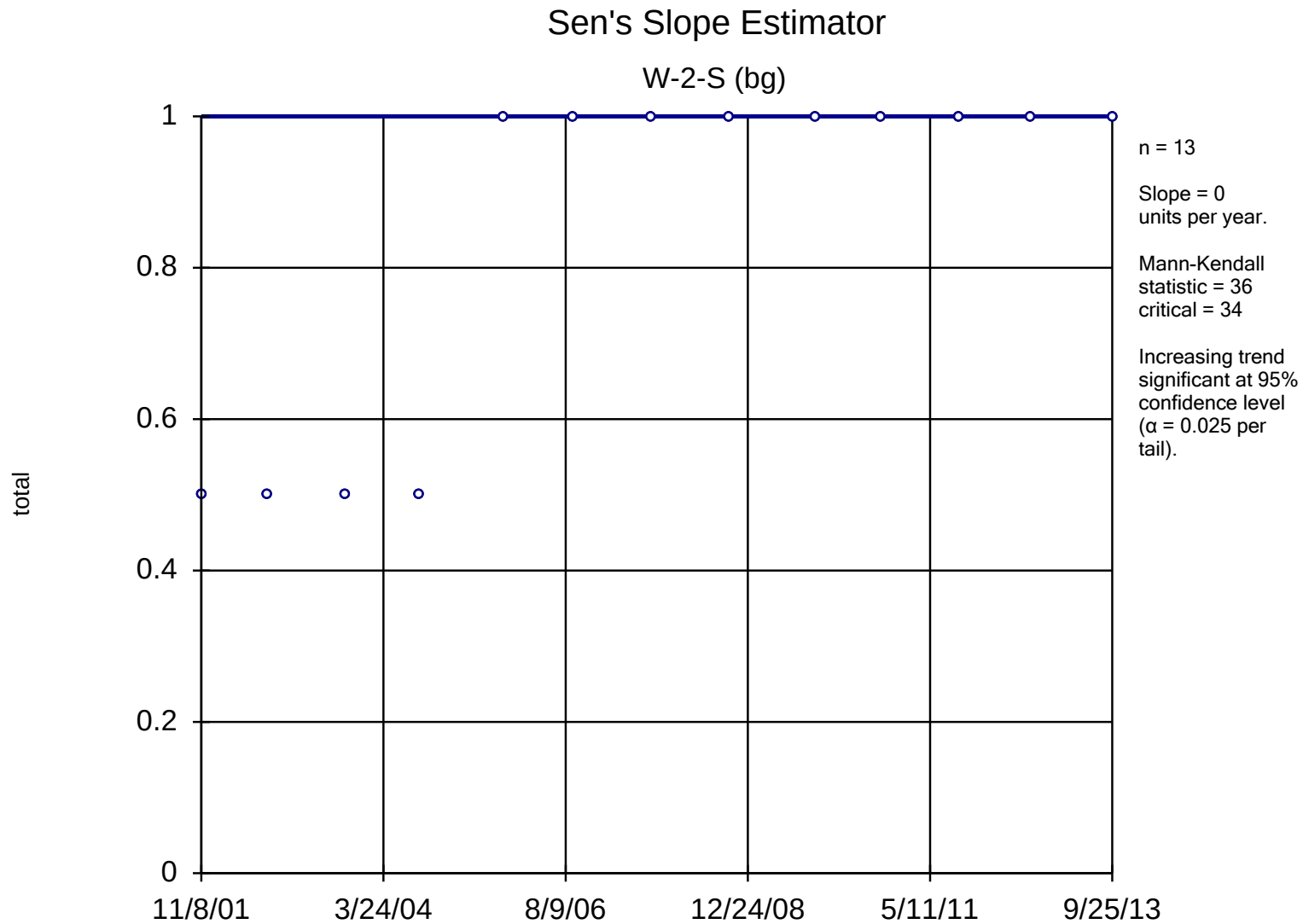
Sen's Slope Estimator

HR-17 (bg)



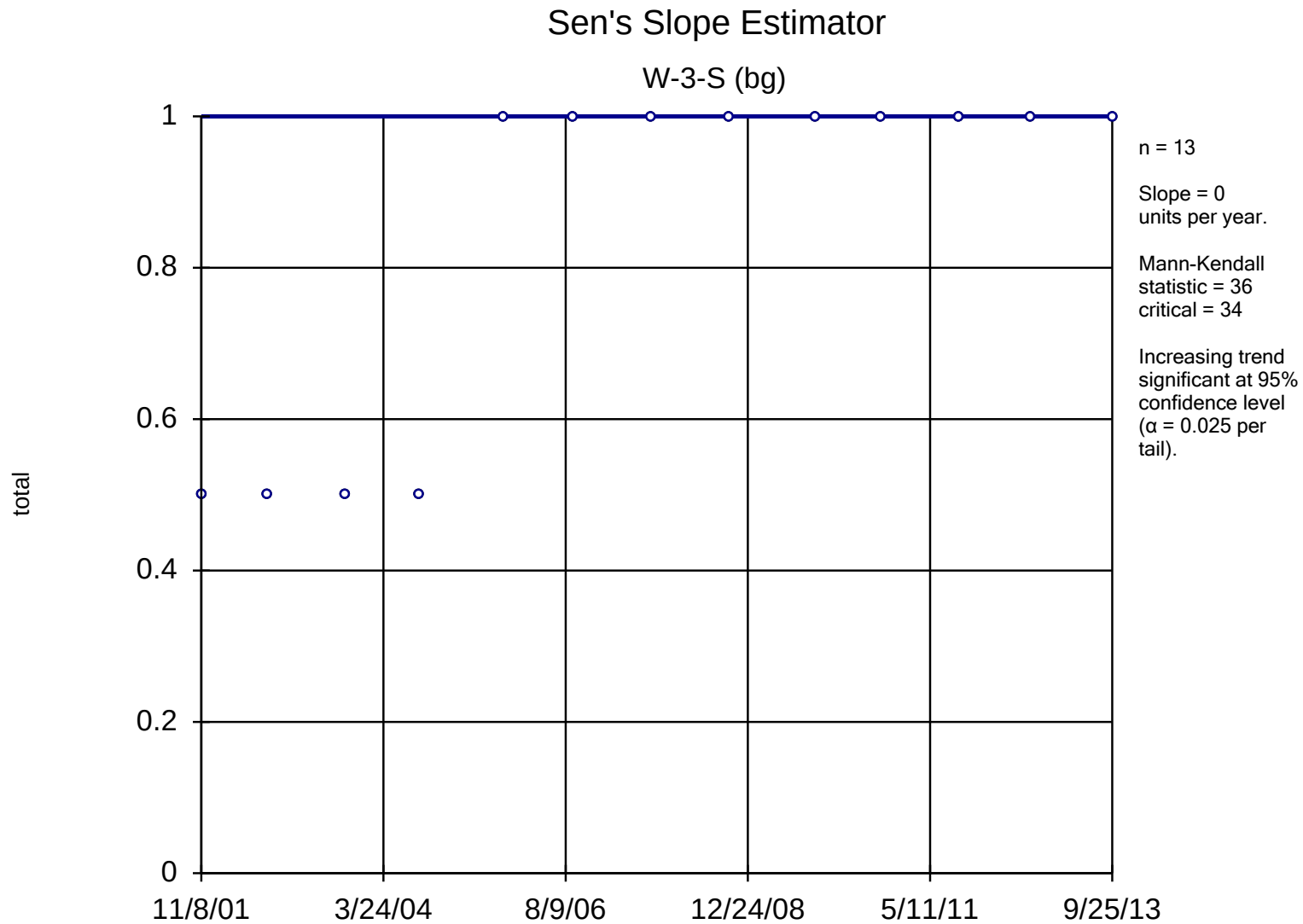
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Facility: RACER Trust Client: ARCADIS G&M, Inc. Data File: 2013Linear Regression South



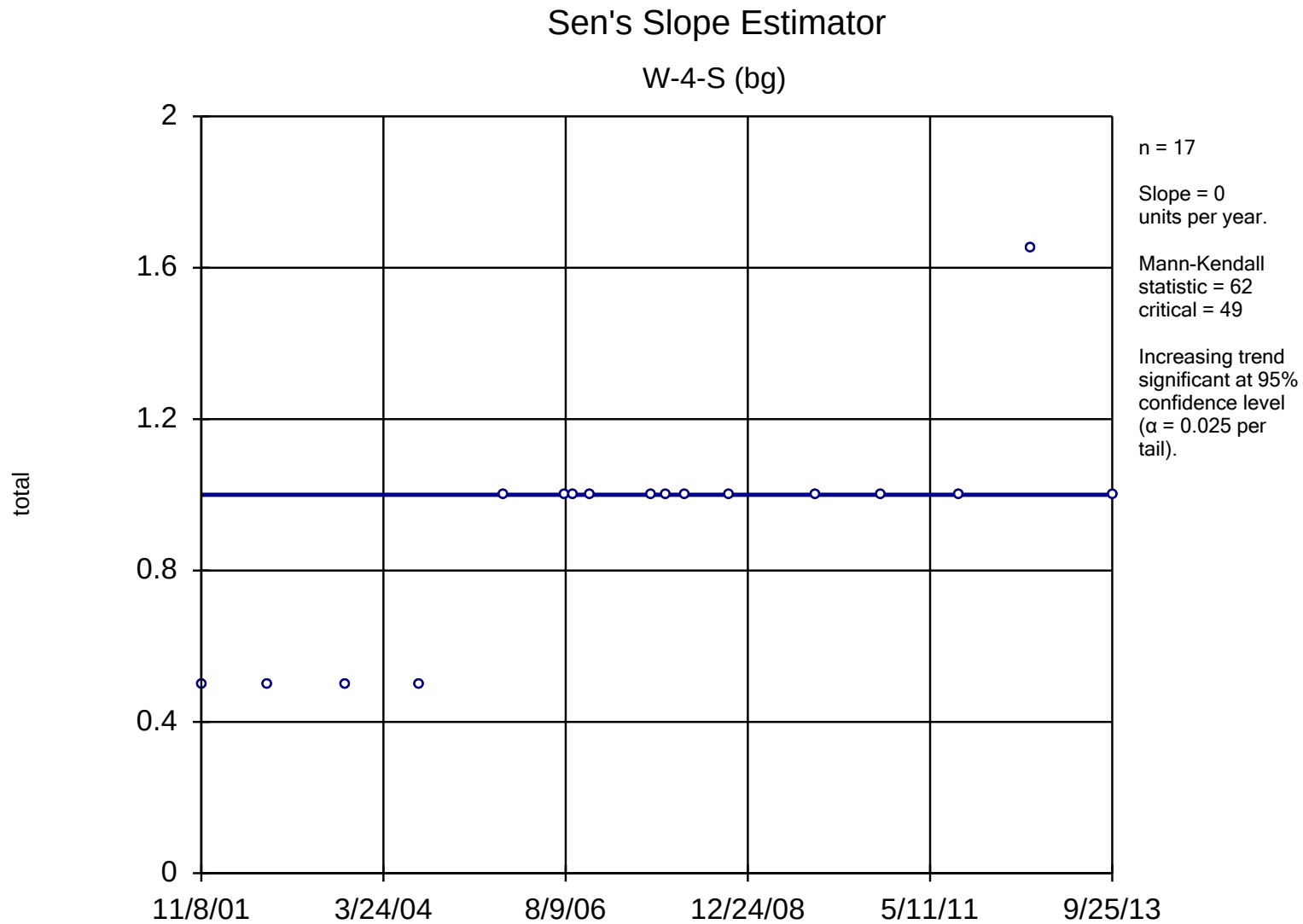
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Facility: RACER Trust Client: ARCADIS G&M, Inc. Data File: 2013Linear Regression South



Constituent: Xylene Analysis Run 1/28/2014 3:06 PM

Facility: RACER Trust Client: ARCADIS G&M, Inc. Data File: 2013Linear Regression South



Constituent: Xylene Analysis Run 1/28/2014 3:06 PM

Facility: RACER Trust Client: ARCADIS G&M, Inc. Data File: 2013Linear Regression South