



**Revitalizing Auto Communities
Environmental Response Trust**

February 26, 2015

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 2014
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 2014 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 2014 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.

Below please find selected comments provided by Ohio EPA and U.S. EPA and subsequent responses. These comments were received by Ohio EPA via an internal memorandum dated December 16, 2014 and by U.S. EPA during a teleconference on February 3, 2015.

Ohio EPA Comment:

Section 2.2.3.1.2, Source Areas

In regards to the Former Oil House area, the Ohio EPA Division of Drinking and Ground Waters (DDAGW) recommends future annual ground water monitoring reports begin discussing attainment of preliminary remediation target levels. Future discussions should at a minimum compare designated performance well and point of compliance well data to the preliminary remediation target levels for the Former Oil House area,

listed in Table B-2 of the lagoon post closure plan. The DDAGW found that the designated performance wells were in substantial attainment of target levels in 2013. In the case of the upper aquifer, the one designated point of compliance monitoring well, well GM-26 located near Holes Creek, was in attainment for all five constituents of concern: tetrachloroethene (PCE), trichloroethene (TCE), 1,1-dichloroethene (1,1-DCE), cis-1,2-dichloroethene (cis-1,2-DCE), and vinyl chloride (VC). In the case of the lower aquifer, the three designated point of compliance wells, GM-11, GM-15, and GM-20D, all located along Main Street, were also in attainment for the same constituents.

However, the DDAGW also found that designated upper aquifer monitoring well GM-16, located 4,430 feet downgradient of the Former Oil House area, did not attain the PCE preliminary remediation target level. Tetrachloroethene was reported at 0.051mg/L, above the target level of 0.033 mg/L. In addition, lower aquifer wells GM-1 and GM-3 did not attain the TCE preliminary remediation target level. The concentrations of 0.021ug/L at GM-1, and 0.015 mg/L at GM-3 were above the target level of 0.011mg/L.

Response:

The use of the established preliminary remediation target levels has been intentionally avoided in the Site-Wide Groundwater Monitoring Report for 2010-2014 (annual groundwater reports) as updated objectives have been established for the site in the 2012 Corrective Measures Proposal (2012 CMP). New remediation goals will be established after remedy selection and implementation. The annual groundwater report has been modified to compare groundwater concentrations to U.S EPA drinking water maximum contaminant levels (MCLs) for evaluation purposes. The effectiveness of current interim measures for the upper aquifer is detailed in the annual groundwater report and Appendix A. The effectiveness of lower aquifer capture to inhibit further migration of VOCs is also detailed in Section 3.2 of the annual groundwater report.

Ohio EPA Comment:

Section 2.2.3, Groundwater Monitoring Analytical Results

In order to meet the Interim Measures/Corrective Measures Report (March 2, 2001) objectives for limiting plume migration and demonstrating remedy effectiveness, the DDAGW recommends future reports begin discussing the distribution of VOCs above MCLs "beyond the existing plume boundary." To meet this objective, future reports should be updated annually with both upper and lower aquifer plume delineation maps for total VOCs, PCE, TCE, 1,1-DCE, cis-1,2-DCE, and VC.

Response:

Isoconcentration maps are provided in Appendix E of the annual groundwater report. Site knowledge, including current understanding of source distribution based on recent investigations and current interim measures, was included in these interpretations. Isoconcentration maps were unable to be generated for some constituents due to non-

detects, low concentrations, or isolated low concentrations; however, maps with posted analytical results are provided.

Ohio EPA Comment:

Section 2.2.3, Groundwater Monitoring Analytical Results

In order to meet the Interim Measures/Corrective Measures Report (March 2, 2001) objective for demonstrating remedy effectiveness, the DDAGW recommends future reports begin discussing whether the spatial extent of total VOCs, PCE, TCE, 1,1-DCE, cis-1,2-DCE, and VC are contracting or stable with time. To assist discussion, future reports should annually compare updated plume delineation maps to those from previous years, and report changes in total plume area. To ensure reporting consistency, constituent specific outer iso-contour values equivalent to respective MCLs should be applied. In addition, the iso- contour intervals should be sufficiently refined to delineate spatial trend from identified source areas.

Response:

Discussion of spatial distribution of the plume is provided in the of groundwater quality in the annual groundwater report (Sections 2.2.3.2 and 2.2.3.4). Plume maps were generated using the lowest bound contour equivalent to the respective MCL. Currently, plume distribution in the former Process Sump Area is understood by site investigation work utilizing a high resolution methodology - vertical aquifer profiling (VAP). A supplemented performance monitoring well network will be part of the remedy design implementation.

Ohio EPA Comment:

Section 1.4.2, Capture Zones, page 7

Clarification is requested as to whether extraction well DN-13 is intended to hydraulically contain both the upper and lower aquifer portions of the total VOC plume. An apparent discrepancy is present in the 2013 annual report discussion. Page 7 of Section 1.4.2 states that upper aquifer extraction well TW-2 was shut down in July 2012 because "capture of the upper aquifer will be maintained by continued operation of lower aquifer well DN-13." Yet the methodology presented in Section 3.2 for calculating the pumping rate threshold for well DN-13 accounts strictly for the lower aquifer plume area. For example, the 2013 plume area value input to Darcy's equation to calculate the minimum pumping rate, is based strictly on the morphology of the lower aquifer plume. As explained, the calculated plume area is the product of the estimated maximum lower aquifer plume width of 2,500 feet and the lower aquifer saturated thickness of 85 feet.

Response:

The annual groundwater report has been revised to indicate that interim measure lower aquifer well DN-13 is to maintain capture for the lower aquifer.

Ohio EPA Comment:

Section 3.2, Capture Zone Performance Results

Clarification is requested as to why the 2013 well DN-13 calculated minimum capture zone pumping rate of 0.76 MGD is substantially less than that initially proposed in the Final Interim Measures Design Plan of April 1995, of 2.66 MGD.

Response:

Prior to July 2008, control of DN-13 flow was managed by the owner, Montgomery County. The flow rate was estimated from a pump curve and was not monitored. After July 2008, General Motors (now RACER Trust) installed a meter to monitor flow. The capture analysis present in the annual groundwater report (Section 3.2) outlines several lines of evidence to support capture at the current flow rates being maintained at DN-13.

Ohio EPA Comment:

Section 3.2, Capture Zone Performance Results

In order to demonstrate hydraulic containment effectiveness, future reports should provide annually updated historical trends in the average annual DN-13 pumping rate, since pumping began. The historic trend in pumping should be compared to the historic trend in average annual concentration. A correlation between pumping rate and concentration will serve to demonstrate the well's effectiveness for plume interception. Average annual pumping rate and concentration will also enable calculation of annual mass removal.

Response:

The lower aquifer capture zone analysis has been modified by addition of concentration trend analysis of adjacent (side-gradient), nearby monitoring wells to add to the lines of evidence presented (Section 3.2).

Ohio EPA Comment:

Section 3.2, Capture Zone Performance Results

In order to demonstrate hydraulic containment, future reports should provide an annually updated capture zone delineation map. The capture zone delineation should be compared to the annually updated plume delineation. If capture is sufficient, the capture zone delineation should encompass the plume.

Response:

This has been addressed and added to the lower aquifer capture zone analysis of the annual groundwater report (Section 3.2).

Ohio EPA Comment:

Section 3.2, Capture Zone Performance Results

The DDAGW recommends that future annual reports begin discussing statistically significant increases in concentration in former shallow extraction well TW-2 and neighboring monitoring wells, since the July 2012 shutdown of TW-2. Clarification is requested as to whether contingencies are in place for resuming pumping should rebound occur.

Response:

The TW-2 groundwater and recovery system was shut down on July 31, 2012 (Section 2.1.2). A letter summarizing the evaluation of the results following the shutdown of the system was submitted to the U.S. EPA on April 24, 2013. The TW-2 system is not proposed as part of the final remedy included in the 2012 CMP.

U.S. EPA Comment:

The U.S. EPA has requested that MCL exceedances be highlighted on all tables, figures and appendices within the annual groundwater report.

Response:

Table 3, Figures 9 and 10, and Appendices B, D, and E in the annual groundwater report have been updated to highlight MCL exceedances. All MCL exceedances have been highlighted utilizing bold text.

U.S. EPA Comment:

The U.S. EPA has requested that wells which are on-site and off-site be easily identifiable on all Figures in the annual groundwater report.

Response:

Figures 9 and 10 of the annual groundwater report have been updated to easily differentiate between on-site and off-site wells. All other figures have the property boundary clearly displayed allowing for easy determination of on- and off-site wells. Off-site wells are highlighted yellow on Figure 2. The databoxes (Figures 9 and 10) for on-site wells and off-site wells are shaded in gray and tan, respectively.

U.S. EPA Comment:

The U.S. EPA has requested that the Property Boundary be represented on all Figures in the annual groundwater report.

Ms. Mirtha Cápiro
February 26, 2015

Response:

All figures in the annual groundwater report have been updated to include the property boundary. Figure 1 identifies the internal parcels that make up the entire property and the respective owners.

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

Sincerely,

A handwritten signature in black ink that reads "Pamela L. Barnett". The signature is written in a cursive, flowing style.

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 2014

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 26, 2015

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1. Introduction

This Site-Wide Groundwater Monitoring Report presents the groundwater monitoring activities completed in 2014 at the following Revitalizing Auto Communities Environmental Response Trust (RACER Trust) (formerly General Motors Corporation [GM Corporation]) facilities located in Moraine, Ohio (Site; 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. 2008) 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.

IRG currently leases several portions of the Site for industrial purposes. IRG sold several portions of the property in 2014. Figure 1 provides details of the established parcels and subsequent Site owners. Specifically the following transactions were completed in 2014:

- Copart of Connecticut, Inc. (Copart) acquired Lot #5433 (Parcel IDs J44 26413 0015 and J44 26413 0016) on May 2, 2014. Copart currently utilizes this lot to store cars for online auctions.

- Fuyao Asset Management A, Inc. acquired Lots #1, #2, #5438 (Parcel IDs N64 03305 0127, N64 03305 0129, and J44 26413 0023) on May 15, 2014. Fuyao currently produces and stores OEM automotive glass at this facility
- Inland Property Management, Inc. acquired Lot #5436 (Parcel IDs J44 26413 0020 and J44 26413 0021) on May 13, 2014. This lot is currently vacant.

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 the lower aquifer capture (DN-13) downgradient of property boundary;
4. Monitor the effectiveness of corrective measures activities in In-Situ Reactive Zones RZ-1, RZ-3, and RZ-4 east, 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 IM/CM (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 (ERD) process 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 feet (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 below land surface (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 2014.

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 the 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.

During the initial period of the amended injection schedule (quarterly), an evaluation was completed to confirm the estimated carbon source wash out rate and to confirm that the interim measure remained effective. This evaluation consisted of baseline sampling and a three month discontinuation from December 2013 through February 2014 of reagent injections to provide data for the establishment of organic carbon degradation trends. The organic carbon degradation trends were subsequently used to confirm the theoretical quarterly wash out rate.

To support the injection evaluation, groundwater samples were collected from injection wells RZ-1E, RZ-3D, RZ-3S, RZ-3TT, and RZ-4E for the analysis of total organic carbon (TOC). Baseline groundwater grab samples for TOC were collected on December 11, 2013, immediately following completion of the November 2013 injection in these wells. Grab groundwater samples for TOC then were collected on a monthly

basis from the same five RZ injection wells in January and February 2014. In addition, groundwater samples were collected for the analysis of TOC, methane, ethene, ethane, and VOCs from monitoring wells GM-19S, GM-21, and GM-32 during the site-wide annual groundwater monitoring event in October 2014.

Total organic carbon generally decreases on a first-order relationship. As such, first order decay rate constants were calculated and used to estimate/extrapolate when it is expected that concentrations will reach 20 milligrams per liter (mg/L) at each injection location and on a site-wide/average basis. Twenty mg/L is the optimal concentration that typically results in sufficient excess organic carbon to drive enhanced reductive dechlorination within the injection area. Ultimately, these calculations were used to document the proposed revised injection frequency.

A summary of the TOC analytical results collected during the evaluation period is provided in Appendix A. Using these data, a unique degradation half-life (k -value [day^{-1}]) was calculated for each of the sampled injection wells (RZ-3D, RZ-3S, RZ-3TT, RZ-1E, and RZ-4E). The hydraulic conductivity estimates provided in the 2012 CMP were then used to calculate the time it would take the TOC levels to drop to 20 mg/L starting from the day of the injection event. A summary of the half-life analysis is provided in Appendix A. As shown on Table A-2, the calculated required injection frequency ranges from approximately 6 to 12 months with an average of 9 months.

The organic carbon degradation trend evaluation confirmed the revised site model and that a reduced injection frequency is warranted at the Site. As a conservative initial step, the injection frequency was reduced to quarterly (e.g., as opposed to every 6 to 12 months). In addition, monitoring data collected from GM-19S, GM-21 and GM-32 during the site-wide annual sampling event in October 2014 have confirmed that the ERD process has not been adversely affected as a result of the revised injection frequency. Specifically, methane, ethane, ethene, and VOC analytical data were consistent with historic data as discussed in Appendix A. Additional injection frequency reductions may be evaluated and recommended at a future time based on the results presented herein, and future performance monitoring data.

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 National Pollution Discharge Elimination System (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 and was shut down on July 31, 2012 based on the performance of the upgradient IRZ barrier and groundwater sampling data results collected monthly over 6 months. These results were presented in a letter from RACER Trust to U.S. EPA on April 24, 2013 (ARCADIS, Inc. 2013b).

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 2014. A sample at the DN-13 outfall and the flow rate is collected on a monthly basis as a requirement of the NPDES permit and is submitted to the Ohio EPA. The approximate run-time average flow rate (pump in operation) for DN-13 in 2014 was approximately 492 gallons per minute (gpm) (0.71 million of gallons per day [MGD]) while the average period (daily) rate (total flow volume averaged over the entire year – including downtime) in 2014 was approximately 381 gpm (0.55 MGD). The average period extraction rate for DN-13 for December 2014 was approximately 580 gpm (0.84 MGD). Well DN-13 was operational throughout 2014 except for the periodic shutdowns related to power failures and for operation and maintenance activities. During October and November 2014, minor damage to the pump and a small hole in the well casing were observed and repaired, and installation of a well liner was completed on October 27 and 28, 2014. The pump was in operation the remainder of the year, except for minor maintenance to repair a pipe flange and fill in a sink hole adjacent to the pump foundation.

The lower aquifer 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 from 2001 through 2014. The latest annual groundwater monitoring was completed in October and December 2014. The 1999 baseline through 2013 groundwater quality data for the site-specific VOC parameter list are reproduced in tables in Appendix B. For 2014, the site-specific VOC groundwater data is summarized in Table 3 of this report. This information is provided 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 completed in 2014 are presented in Section 2.1 and the groundwater monitoring results are presented in Section 2.2.

2.1 Groundwater Monitoring Activities/Methodologies

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 2013 (ARCADIS, Inc. 2014a) was implemented during 2014. At the request of the Ohio EPA and the U.S. EPA via email correspondence on August 6, 20, and 26, 2014, chloroethane was added to the list of VOCs for 2014 and select wells were also analyzed for 1,4-dioxane (W-1-N, GM-23, GM-59, GM-60, GM-75S, GM-29, GM-21, GM-8, GM-31, and GM-16). The following sections summarize collection of the annual groundwater elevation measurements, monthly groundwater monitoring, and annual site-wide groundwater monitoring.

2.1.1 Groundwater Elevation Monitoring

Groundwater levels were measured on December 2 and 3, 2014. 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 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 a 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 shutdown 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 6 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 2014 due to the results of this monthly sampling. Continued shutdown of the system is recommended based on the results of the 2014 site-wide sampling event. A discussion of the 2014 monitoring well data from GM-6 is provided in Section 2.2.3.1.3.

Table 4 summarizes the VOC results for the monthly DN-13 effluent sampling during 2014. All analyses were conducted in accordance with methods specified in the NPDES Permit 1IC00008*KD.

2.1.3 Site-Wide Groundwater Monitoring

In 2014, the following changes were made, as recommended in the Site-Wide Groundwater Monitoring Report for 2013 (ARCADIS, U.S., Inc. 2014):

- 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.
- Lower aquifer monitoring well RMW-85 was included due to its proximity to the former Process Sump Area.
- 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. Although, monitoring well GM-83S was not sampled in 2014, this well was sampled previously 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 South Settling Lagoon closure monitoring presented in Section 4.2.
- Monitoring wells GM-30, GM-31, GM-51, and HR-3 were sampled in 2014 to monitor their increasing VOC concentrations.

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 2014 annual sampling event, including the number of monitoring wells and analytical parameters, is presented on Table 1. Well construction data for the wells used in the site-wide program are presented in Table 5.

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 Ohio Department of Transportation on November 21 and 22, 2013. GM-57 and GM-62R were surveyed on December 18, 2014. Well GM-28 could not be sampled due to an obstruction in the well.

Groundwater samples were collected from specified wells using low-flow methodology following procedures outlined in SOP #21 (ARCADIS G&M, Inc., 2002). 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. 2011). Field parameter data for the site-wide groundwater monitoring event are presented in Appendix C. 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) 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, PCE, toluene, 1,1,1-trichloroethane (1,1,1-TCA), TCE, vinyl chloride, and xylenes. At the request of the Ohio EPA and the U.S. EPA via email correspondence on August 6, 20, and 26, 2014, chloroethane was added to the list of VOCs for 2014 and select wells were also analyzed for 1,4-dioxane.

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, 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/Pace Analytical Energy Services, LLC in Pittsburgh, Pennsylvania. Only ethene, ethane, and methane samples were submitted to and analyzed by Microseeps/Pace Analytical. A complete set of groundwater results from 2014, including quality assurance/quality control samples, are presented in Appendix D.

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, horizontal hydraulic gradients, and vertical hydraulic gradients in and between the upper and lower aquifers. One groundwater elevation monitoring event was completed on December 2 and 3, 2014 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 December 2 and 3, 2014. Groundwater elevations ranged from 701.39 feet above mean sea level (ft AMSL) (MW-4 - southwest of the Site and west of the Great Miami River) to 710.45 ft AMSL (GM-24 - northern 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 December 2014 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 2014 monthly precipitation totals, recorded by the National Weather Service, and the deviation from calculated average amounts. The 2014 annual total precipitation recorded at the Dayton, Ohio monitoring station was 35.98 inches, which was 1.82 inches below average. Precipitation for the months of March, June, July, and September through December was below normal, while precipitation for all other months was above normal or equal to the average.

Horizontal hydraulic gradient values within the upper aquifer ranged from 2.2×10^{-4} ft/ft to 2.1×10^{-3} ft/ft (Table 8). Considering these values, the average horizontal hydraulic gradient was 5.7×10^{-4} ft/ft for the upper aquifer.

2.2.1.2 Lower Aquifer

Depth-to-water data from lower aquifer wells were collected on December 2 and 3, 2014. Groundwater elevations ranged from 705.39 ft AMSL (GM-65D - southwest of the Site) to 711.32 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 influence of the surrounding monitoring wells (Figure 8). Capture at DN-13 is discussed further in Section 3.2. A comparison of the December 2014 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 2014 ranged in magnitude from 4.5×10^{-4} ft/ft to 5.9×10^{-4} ft/ft (Table 8). Overall, an average hydraulic gradient of 4.9×10^{-4} ft/ft was calculated for the lower aquifer; however, further downgradient the hydraulic gradient increased with proximity to pumping well DN-13 (Section 3.2).

2.2.2 Vertical Hydraulic 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 December 2 and 3, 2014. Thirteen pairs of upper and lower aquifer wells were used to calculate the vertical hydraulic gradients upgradient, on-site, 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 hydraulic 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 hydraulic gradients ranged between 1.6×10^{-2} ft/ft downward to 2.9×10^{-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-65S/GM-65D, and GM-75S/GM-75D) and one off-site / downgradient well pair (GM-55/GM-56) with an upward gradient.

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, along with chloroethane and 1,4-dioxane (select wells only) in 2014 only. Table 3 presents the results for the site-wide groundwater sampling event completed in 2014 for the upper and lower aquifers. Analytical data for 1999 through 2014 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 2.2.3.3.

2.2.3.1 Upper Aquifer Groundwater Quality

Upper aquifer groundwater quality is discussed in the following sections by Site area. The groundwater quality was also posted on the upper aquifer Site map to produce isoconcentration maps to graphically show the concentration distribution in relation to Maximum Contaminant Levels (MCLs) and interim measures. These isoconcentration maps are provided in Appendix E for PCE, TCE, cis-1,2-DCE, vinyl chloride, 1,1-DCE, and total VOCs and are also discussed in the following sections. This work is not a part of the Site-Wide Groundwater Monitoring Program, but was conducted at the request of the U.S. EPA via teleconference on February 3, 2015.

2.2.3.1.1 Upgradient Contributions

Upgradient monitoring well W-1-N was sampled in 2014. Concentrations in W-1-N were below detection levels for all constituents in 2014, except for low detections of 1,1-DCA and cis-1,2-DCE at 1.8 micrograms per liter (ug/L) and 0.21 J¹ ug/L, respectively. W-1-N was also analyzed for 1,4-dioxane in 2014 with a concentration of 0.96 J ug/L. W-1-N was analyzed for chloroethane in 2014, and chloroethane was not

¹ A "J" qualifier indicates the concentration is an estimated concentration.

detected. 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

As discussed in the CMP, the groundwater source areas include the Former Oil House Area and the former Process Sump Area (ARCADIS, Inc. 2012a). To evaluate the source areas of VOCs at the Site, nine upper aquifer monitoring wells (GM-23, GM-46, GM-59, GM-60, GM-67S, GM-71, GM-72, GM-75S and GM-76S) were sampled in 2014. Monitoring wells GM-23 and GM-46 are located in the Former Oil House Area and are screened above the upper clay till. Monitoring wells GM-59, GM-60, and GM-67S 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 and GM-67S are screened above the regional clay till. Monitoring wells GM-71 and GM-72 are located north of the former Moraine Assembly Paint building and screened at the upper clay till and regional clay till, respectively. Monitoring well GM-75S is located in the southwest corner of the former Moraine Assembly building in the former Process Sump Area and is screened at the regional clay till. Monitoring well GM-76S is located in the former Moraine Assembly building 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 former 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 2014 VOC concentrations is discussed in Section 2.2.3.1.3.
- Concentrations of VOCs at GM-46 were below detection levels, except for low concentrations of cis-1-2-DCE and PCE at 0.30 J ug/L and 0.46 J ug/L, respectively. GM-46 was analyzed for chloroethane in 2014, and chloroethane was not detected. The last and only other time GM-46 was sampled was in 2006.

Since then, concentrations of 1,1-DCA, cis-1,2-DCE, trans-1,2-DCE, TCE, and vinyl chloride decreased to low concentrations or below detection limits.

- In 2014, concentrations of PCE and TCE were detected at elevated concentrations in wells GM-59, GM-60 and GM-75S.
 - PCE concentrations in GM-59 reached a peak of 1,000 ug/L in 2013, but decreased to 420 ug/L in 2014. The TCE concentration decreased from 1,100 ug/L in 2013 to 110 ug/L in 2014. Concentrations of cis-1,2-DCE have 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 6.7 J ug/L in 2014. GM-59 was also analyzed for chloroethane and 1,4-dioxane in 2014 and neither constituent was detected.
 - Concentrations of PCE in GM-60 remained consistent from 2012 to 2013 (610 ug/L and 670 ug/L, respectively), but increased to 860 ug/L in 2014. Concentrations of TCE in GM-60 increased slightly from 1,100 ug/L in 2013 to 1,400 ug/L in 2014. Concentrations of cis-1,2-DCE decreased from 400 ug/L in 2013 to 96 ug/L in 2014. GM-60 was also analyzed for 1,4-dioxane in 2014 with a concentration of 1.3 J ug/L. Chloroethane was not detected in GM-60 in 2014.
 - Concentrations of PCE at GM-75S remained consistent from 2013 to 2014 (480 ug/L and 460 ug/L, respectively). The concentration of TCE decreased from 350 ug/L in 2013 to 170 ug/L in 2014. The cis-1,2-DCE concentration in GM-75S was below detection levels in 2014. GM-75S was also analyzed for chloroethane and 1,4-dioxane in 2014 with results below detection limits.

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 2014, 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 3.6 J ug/L in 2014. TCE concentrations have decreased from 2,200 ug/L in 2001 to 4.1 J ug/L in 2014. Concentrations of cis-1,2-DCE have decreased from 19,000 ug/L in 2005 to 210 ug/L in 2014. 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 220 ug/L in 2014. Concentrations of trans-1,2-DCE had been below detection limits since introductions began in 2000; however, concentrations peaked in 2006 at 270 ug/L and have subsequently decreased to 20 ug/L in 2014. GM-23 was also analyzed for 1,4-dioxane in 2014 with a concentration of 0.87 J ug/L. Chloroethane was not detected in GM-23 in 2014.
- 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 12 J ug/L and 260 ug/L in 2014, respectively. Concentrations of cis-1,2-DCE had a peak concentration of 2,871 ug/L in 2000, and have subsequently decreased in concentration to 480 ug/L in 2014, after 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 40 ug/L in 2014. GM-29 was also analyzed for chloroethane and 1,4-dioxane in 2014 and neither constituent was detected.
- Concentrations of VOCs at GM-30 have been decreasing since the well was installed in 1999. Concentrations of 1,1-DCA (3.2 ug/L), cis -1,2-DCE (0.29 J ug/L), benzene (2.3 ug/L), ethylbenzene (54 ug/L), toluene (0.71 J ug/L), trans-1,2-DCE (0.51 ug/L), xylenes (12 ug/L), and chloroethane (3.6 ug/L) were detected in 2014. GM-30 was analyzed for 1,4-dioxane in 2014 and the constituent was not detected.

- Concentrations of 1,1,1-TCA (7.6 J ug/L), 1,1-DCA (11 ug/L), cis-1,2-DCE (82 ug/L), trans-1,2-DCE (2.7 J ug/L), TCE (220 ug/L), and vinyl chloride (6.4 J ug/L) were detected in HR-3 in 2014. HR-3 was analyzed for chloroethane in 2014, and the constituent was not detected. Concentrations of 1,1,1-TCA, cis-1,2-DCE, TCE, and vinyl chloride peaked in 2014. 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 2014 due to an obstruction in the well. It has not been sampled since 2011. Based on the 2011 data, 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 2) 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 18 ug/L in 2014. Concentrations of cis-1,2-DCE have fluctuated since a peak concentration of 100 ug/L in 2003, with a concentration of 12 ug/L in 2014. GM-21 was also analyzed for 1,4-dioxane and chloroethane in 2014 with concentrations of 1.3 J ug/L and 0.74 J ug/L, respectively.

RZ-3 West

RZ-3 West 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, along with downgradient well GM-17, 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 B.

- 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 2014. Concentrations of TCE have decreased from 78.2 ug/L in 1999 to below detection limits in 2014. 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. The current concentration of cis-1,2-DCE is 0.23 J ug/L. Concentrations of vinyl chloride were below detection levels in 2014. GM-6 was also analyzed for chloroethane in 2014, and the constituent was not detected.
- 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 the detection limit since 2007 with a current concentration of 0.58 J ug/L in 2014. GM-8 was analyzed for 1,4-dioxane and chloroethane in 2014 with concentrations of 18 ug/L and 3.1 ug/L, respectively.

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 37 ug/L in 2014. Concentrations of vinyl chloride reached a peak concentration of 17 ug/L in 2013 and decreased to 15 ug/L in 2014.

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 are HR-4 for the North Settling Lagoon and HR-17 for South Settling Lagoon (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. HR-4 was also analyzed for chloroethane in 2014, and the constituent was not detected.
- Concentrations of PCE, TCE, and daughter products at W-2-N have been low or below detection limits since 1999. W-2-N was also analyzed for chloroethane in 2014, and the constituent was not detected.
- 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 2014. Cis-1,2-DCE had a peak concentration of 291 ug/L in 1999 and has been generally decreasing to a current concentration of 31 ug/L in 2014. Vinyl chloride had a peak concentration of 24.0 ug/L in 2000 and has a current concentration of 1 ug/L in 2014. W-3-N was also analyzed for chloroethane in 2014, and the constituent was not detected.
- 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 generally decreased to 9.2 ug/L in 2014. Concentrations of cis-1,2-DCE decreased slightly since 14 ug/L in 2012 to 11 ug/L in 2014. W-4-N was also analyzed for chloroethane in 2014, and the constituent was not detected.

Closed South Settling Lagoon

- Concentrations of PCE and TCE at HR-17 increased to 170 ug/L and 160 ug/L, respectively, in 2014. Concentrations of cis-1,2-DCE peaked at 7.1 ug/L in 2004 and have been generally decreasing to a current concentration of 2.2 ug/L in 2014. Vinyl chloride has been below the detection limit since 1999. HR-17 was also analyzed for chloroethane in 2014, and the constituent was not detected.
- 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 decreased to 5 ug/L in 2014. W-2-S was also analyzed for chloroethane in 2014, and the constituent was not detected.

- Concentrations of cis-1,2-DCE and vinyl chloride in W-3-S have been low or below detection limits since 1999. Concentrations of PCE were historically low or below detection levels; however, concentrations increased to a peak of 38 ug/L in 2014. Concentrations of TCE increased from 21 ug/L in 2013 to 35 ug/L in 2014. W-3-S was also analyzed for chloroethane in 2014, and the constituent was not detected.
- Concentrations of TCE in W-4-S have increased since 1999 from 14.7 ug/L, to the current concentration of 63 ug/L in 2014. Concentrations of cis-1,2-DCE have remained relatively consistent since 1999 with concentrations of 6.1 ug/L in 2014. Concentrations of PCE have increased since 1999 from 30.5 ug/L to 65 ug/L in 2014. Concentrations of vinyl chloride have been below the detection limit since 1999. W-4-S was also analyzed for chloroethane in 2014, and the constituent was not detected.

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-44, GM-45, GM-66, GM-31, and GM-35, 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 35 ug/L in 2014. TCE concentrations had been increasing since 2004, to a peak of 230 ug/L in 2012, but decreased to 170 ug/L in 2013. The concentration of TCE in 2014 was 220 ug/L. Concentrations of cis-1,2-DCE have decreased from a peak concentration of 220 ug/L in 2010 to 25 ug/L in 2014. Vinyl chloride has been low or below the detection limit since 2004. GM-43 was also analyzed for chloroethane in 2014, and the constituent was not detected.
- Monitoring well GM-44 has been sampled three times since 2004. Concentrations of PCE have been increasing since 2004 to a peak of 100 ug/L in 2014. Concentrations of cis-1,2-DCE have been decreasing since 2004, with a current concentration of 16 ug/L. Concentrations of TCE have been generally consistent, with a concentration of 180 ug/L in 2014. Vinyl chloride has been low or below

detection limit since 2004. GM-44 was also analyzed for chloroethane in 2014, and the constituent was not detected.

- Monitoring well GM-45 has been sampled four times since 2004. Concentrations of PCE, TCE, and cis-1,2-DCE have been decreasing since 2004, with concentrations of 150 ug/L, 140 ug/L, and 37 ug/L, respectively, in 2014. GM-45 was also analyzed for chloroethane in 2014, and the constituent was not detected.
- Monitoring well GM-66 was sampled for the second time since 2007. Concentrations of cis-1,2-DCE and TCE increased to concentrations of 280 ug/L and 110 ug/L, respectively, in 2014. Concentrations of vinyl chloride decreased slightly from 4.1 ug/L to 3.0 ug/L in 2014. Concentrations of PCE were below the detection limit in 2014. GM-66 was also analyzed for chloroethane in 2014, and the constituent was not detected.
- TCE concentrations in GM-31 had been generally increasing since 2001 to a peak concentration of 120 ug/L in 2013, and then decreased to 79 ug/L in 2014. 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 54 ug/L in 2014. PCE and vinyl chloride concentrations have been low or below detection levels since 2004. GM-31 was also analyzed for 1,4-dioxane in 2014 with a concentration of 0.95 J ug/L. GM-31 was also analyzed for chloroethane in 2014, and the constituent was not detected.
- PCE concentrations in GM-35 have decreased from 37 ug/L in 2010 to 6.0 J ug/L in 2014. TCE concentrations have been generally decreasing since a peak of 270 ug/L in 2003 to 28 ug/L in 2014. Cis-1,2-DCE concentrations have been generally decreasing since a peak of 300 ug/L in 2003 to 57 ug/L in 2014. Vinyl chloride concentrations had been generally decreasing since a peak of 59 ug/L in 2003 to below detection limits in 2014. GM-35 was also analyzed for chloroethane in 2014, and the constituent was not detected.

Monitoring wells HR-1, HR-2, 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 Landfills 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).

- Concentrations of cis-1,2-DCE in HR-1 had been generally decreasing since a peak of 24 ug/L in 2004 to a concentration of 3.1 ug/L in 2013; however, the concentration of cis-1,2-DCE increased to 20 ug/L in 2014. Concentrations of PCE have been generally consistent with baseline conditions in 1999, with a concentration of 36 ug/L in 2014. Concentrations of TCE have been generally increasing since a low of 31 ug/L in 2004, to a concentration of 120 ug/L in 2014. HR-1 was also analyzed for chloroethane in 2014, and the constituent was not detected.
- Concentrations of PCE, TCE, and 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 1.8 ug/L in 2014. HR-2 was also analyzed for chloroethane in 2014, and the constituent was not detected.
- 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 2014. HR-7 was also analyzed for chloroethane in 2014, and the constituent was not detected.

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 concentrations below detection levels in 2014. Concentrations of TCE have generally decreased from 82.8 ug/L in 2000 to 2.9 ug/L in 2014. 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 cis-1,2-DCE decreased to 1.6 ug/L in 2014. Concentrations of vinyl chloride have been low or below detection limits since 1999, and it was not detected in 2014. GM-2 was also analyzed for chloroethane in 2014, and the constituent was not detected.

- The concentrations of PCE, TCE, cis-1,2-DCE, and vinyl chloride at TW-2 were low or below their respective detection limits in 2014. TW-2 was also analyzed for chloroethane in 2014, and the constituent was not detected.

Downgradient Off-Site

Monitoring wells GM-10, GM-16, GM-47, GM-50, GM-51, and GM-63 are located west of Landfill L1 and south of the closed South Settling Lagoon. GM-47 and GM-50 are paired upper aquifer wells. GM-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).

- 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 2014. Concentrations of PCE have been low since baseline conditions in 1999, with a concentration of 1 ug/L in 2014. GM-10 was also analyzed for chloroethane in 2014, and the constituent was not detected.
- 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 31 ug/L and 7.5 ug/L, respectively, in 2014. Cis-1,2-DCE concentrations have fluctuated, with a peak concentration of 43 ug/L in 2007, and a concentration of 7.7 ug/L in 2014. Concentrations of vinyl chloride have been low or below the detection limit since 1999. GM-16 was analyzed for 1,4-dioxane and chloroethane in 2014 with concentrations of 9.1 ug/L and 1.1 ug/L, respectively.
- Concentrations of PCE and TCE in GM-47 have decreased since 2006, from 78 ug/L and 50 ug/L, respectively, to 46 ug/L and 8.1 ug/L, respectively, in 2014. Concentrations of cis-1,2-DCE have fluctuated, with a peak concentration of 170 ug/L in 2007 and has decreased to 28 ug/L in 2014. Concentrations of vinyl chloride have been low or below the detection limit since installation in 2006. GM-47 was also analyzed for chloroethane in 2014, and the constituent was not detected.
- PCE concentrations in GM-50 have fluctuated since 2006, with a peak concentration of 180 ug/L in 2006, and a current concentration of 39 ug/L in 2014. Concentrations of TCE have fluctuated since 2006, with a current concentration of 5.5 ug/L in 2014. Cis-1,2-DCE concentrations have fluctuated since 2006, with a

peak concentration of 130 ug/L in 2007 and have decreased to 5.1 ug/L in 2014. Concentrations of vinyl chloride have been low or below the detection limit since the well was installed in 2006. GM-50 was also analyzed for chloroethane in 2014, and the constituent was not detected.

- Concentrations of cis-1,2-DCE and PCE in GM-51 have been generally increasing since the well was installed in 2006 to peak concentrations of 5 ug/L and 67 ug/L in 2014, respectively. Concentrations of TCE decreased from a peak of 64 ug/L in 2013 to 33 ug/L in 2014. GM-51 was also analyzed for chloroethane in 2014, and the constituent was not detected.
- Concentrations of cis-1,2-DCE in GM-63 have been generally decreasing since a peak concentration of 5.6 ug/L when the well was installed in 2006 to a concentration of 2.4 ug/L in 2014. 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 53 ug/L in 2014. Concentrations of TCE have been decreasing since a peak concentration of 140 ug/L in 2010 to a concentration of 20 ug/L in 2014. GM-63 was also analyzed for chloroethane in 2014, and the constituent was not detected.

Additional off-site wells further delineate downgradient concentrations east and west of the Great Miami River (GM-52, GM-55, GM-62R, GM-65S, GM-78, GM-79, and GM-80). Concentrations of PCE have been detected in each of these monitoring wells and range from 1 ug/L (GM-79) to 44 ug/L (GM-52) in 2014. Concentrations of TCE have been detected in monitoring wells GM-52, GM-65S, GM-79, and GM-80 and range from below detection limits (GM-55 and GM-78) to 23 ug/L (GM-79) in 2014. At the off-site downgradient well GM-26, no VOCs were detected in the 1999 baseline event, while PCE was detected at 1.3 ug/L in 2014.

2.2.3.2 Upper Aquifer Plume Distribution and MCL Comparison

At the request of the U.S. EPA, upper aquifer plume distribution is shown by isoconcentration maps by constituent in Appendix E. Isoconcentration maps were completed for PCE, TCE, cis-1,2-DCE, vinyl chloride, and total site-specific VOCs (Figures E-1 through E-4 and Figure 6). A map of concentrations for 1,1-DCE is provided in Appendix E; however, a plume was not drawn as all results were below detection levels (Figure E-5).

In upper aquifer monitoring wells, PCE was detected above the MCL (5 ug/L) in 23 wells (GM-59, GM-60, GM-71, GM-75S, GM-29, HR-17, W-3-S, W-4-S, HR-1, GM-43, GM-44, GM-45, GM-35, GM-16, GM-47, GM-50, GM-51, GM-52, GM-62R, GM-63, GM-65S, WSU-24, and GM-78). These wells are indicated on Table 3, Figure 9, and Figure E-1 in bold. Detected concentrations above the MCL ranged from 5.4 ug/L to 860 ug/L in wells GM-65S and GM-60, respectively. The data indicate that PCE is present across the Site from the former Process Sump Area, extending southwest off-site. The plume is partially bifurcated downgradient by RZ-3 and RZ-4 East.

In upper aquifer monitoring wells, TCE was detected above the MCL (5 ug/L) in 28 wells (GM-59, GM-60, GM-67S, GM-71, GM-75S, GM-29, HR-3, GM-21, W-4-N, HR-17, W-3-S, W-4-S, HR-1, GM-43, GM-44, GM-45, GM-66, GM-31, GM-35, HR-7, GM-16, GM-47, GM-50, GM-51, GM-52, GM-63, GM-79, and GM-80). These wells are indicated on Table 3, Figure 9, and Figure E-2 in bold. Detected concentrations above the MCL ranged from 5.5 ug/L to 1,400 ug/L in wells GM-50 and GM-60, respectively. The data also indicate that TCE is present across the Site from both source areas (Former Oil House Area and former Process Sump Area), extending southwest off-site. The plume is partially bifurcated downgradient by RZ-3 and RZ-4 East.

In upper aquifer monitoring wells, cis-1,2-DCE was detected above the MCL (70 ug/L) in five wells (GM-23, GM-60, GM-29, HR-3, and GM-66). These wells are indicated on Table 3, Figure 9, and Figure E-3 in bold. Detected concentrations above the MCL ranged from 82 ug/L to 480 ug/L in wells HR-3 and GM-29, respectively. As shown in Figure E-3, the data indicates that cis-1,2-DCE is present at highest concentration in active reactive zones RZ-1, with maximum concentrations exceeding 150 ug/L. The data also indicate that cis-1,2-DCE is present at the former Process Sump Area and all concentrations above the MCL are within the Site property boundary.

In upper aquifer monitoring wells, vinyl chloride was detected above the MCL (2 ug/L) in six wells (GM-19S, GM-21, GM-23, GM-29, GM-66 and HR-3). These wells are indicated on Table 3, Figure 9 and Figure E-4 in bold. Detected concentrations above the MCL ranged from 3.0 ug/L to 220 ug/L in wells GM-66 and GM-23, respectively. As shown on Figure E-4, the data indicates that vinyl chloride is present at highest concentrations near active reactive zones (IRZ-1) with maximum concentrations reaching 220 ug/L at GM-23. The data also indicate that vinyl chloride is present only on-site.

The isoconcentration map for total site-specific VOCs in the upper aquifer is shown on Figure E-6. The data indicates that VOCs are present at the highest concentrations in the former Process Sump Area.

2.2.3.3 Lower Aquifer Groundwater Quality

Lower aquifer groundwater quality is discussed in the follow sections by Site area. The groundwater quality was also posted on the lower aquifer Site map to produce isoconcentration maps to graphically show the concentration distribution in relation to drinking water standards and interim measures. These isoconcentration maps are provided in Appendix E for PCE, TCE, cis-1,2-DCE, vinyl chloride, 1,1-DCE, and total VOCs.

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 and downgradient, was added to the site-wide annual program at request of the U.S. EPA (BOW Environmental Solutions, Inc. 2010).

In 2014, the upgradient lower aquifer monitoring wells HR-12, GM-76D, and RMW-88 exhibited the presence of site-specific VOCs. The detected VOCs in HR-12 and RMW-88 in 2014 included 1,1-DCA, cis-1,2-DCE, trans-1,2-DCE, and vinyl chloride, suggesting that upgradient releases of chlorinated VOCs have occurred. 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. Monitoring well GM-76D was sampled for the second time in 2014. Concentrations of PCE and TCE increased from 0.65 J/0.63 J ug/L and 2.5/2.7 ug/L in 2007, to 35 ug/L and 8.5 ug/L, respectively. This increase is due to an unknown upgradient source. 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 upper aquifer source areas (Former Oil House Area and former Process Sump Area) that were part of the site-wide monitoring program in 2014 included GM-54, GM-67D, GM-68D, GM-75D, and RMW-85. Detected VOCs in 2014 included PCE that ranged from 0.84 J ug/L in GM-

67D to 190 ug/L in GM-75D. Concentrations of TCE ranged from below detection limits in GM-54 to 180 ug/L in GM-75D. Concentrations of cis-1,2-DCE ranged from below detection limits to 120 ug/L in GM-67D. Vinyl chloride detections were relatively low at these wells with the highest concentration at RMW-85 (5 ug/L).

Other on-site lower aquifer monitoring wells HR-15 (located south of the closed North Settling Lagoon), 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 2014. Concentrations of PCE, TCE, and cis-1,2-DCE at HR-15 were at low concentrations or below the detection limits in 2014. Concentrations of PCE and TCE at RMW-86 were detected at 29 ug/L and 140 ug/L, respectively. The detected concentration of cis-1,2-DCE at RMW-86 was 33 ug/L. Concentrations of TCE and vinyl chloride were detected in GM-19D at 5 ug/L and 4.1 ug/L, respectively. Concentrations of cis-1,2-DCE and TCE were detected in RMW-87 at 62 ug/L and 10 ug/L in 2014.

Off-site and side-gradient wells sampled in 2014 included GM-83D to the west and GM-84 and GM-77D to the east. The 2014 VOC concentrations were consistent with previous years. The only VOC detected in GM-83D was vinyl chloride (2.6 ug/L). The only VOC detected in GM-84 was TCE (4.9 ug/L). The only VOC detected in GM-77D was PCE (14 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 ranged from 3.1 ug/L in GM-20D to 17 ug/L in GM-11 in 2014. Off-site wells further downgradient that were sampled in 2014 included GM-9 and extraction well DN-13. Monitoring well GM-9 had concentrations of TCE and cis-1,2-DCE of 17 ug/L and 0.54 ug/L in 2014, respectively. Detected concentrations of PCE, TCE, cis-1,2-DCE, and vinyl chloride in extraction well DN-13 in 2014 were 3.5 ug/L, 10 ug/L, 5.9 ug/L, and 0.79 ug/L, respectively. Groundwater capture in the vicinity of these lower aquifer wells by extraction well DN-13 is discussed in Section 3.2.

2.2.3.4 Lower Aquifer Plume Distribution and MCL Comparison

Lower aquifer plume distribution is shown by isoconcentration maps by constituent in Appendix E. At the request of the U.S. EPA, isoconcentration maps were completed for the lower aquifer for PCE, TCE, and total site-specific VOCs (Figures E-7, E-8, and E-12). A map of concentrations for cis-1,2-DCE, vinyl chloride and 1,1-DCE is provided in Appendix E; however, a plume was not drawn as all results were below

detection levels or have limited results above the respective MCL (Figures E-9, E-10 and E-11).

In lower aquifer monitoring wells, PCE was detected above the MCL (5 ug/L) in 7 wells (GM-76D, GM-54, GM-68D, GM-75D, RMW-85, RMW-86, and GM-77D). These wells are indicated on Table 3, Figure 10, and Figure E-7 in bold. Detected concentrations above the MCL ranged from 14 ug/L to 190 ug/L in wells GM-77D and GM-75D, respectively. As shown in Figure E-7, the data indicate that the highest concentrations of PCE exceed 100 ug/L.

In lower aquifer monitoring wells, TCE was detected above the MCL (5 ug/L) in 9 wells (GM-76D, GM-67D, GM-75D, RMW-85, RMW-86, RMW-87, GM-9, DN-13, and GM-11). These wells are indicated on Table 3, Figure 10, and Figure E-8 in bold. Detected concentrations above the MCL ranged from 10 ug/L to 180 ug/L in wells RMW-87/DN-13 and GM-75D, respectively. As shown in Figure E-8, the data indicate that the highest concentrations of TCE exceed 100 ug/L at DN-13.

In lower aquifer wells, cis-1,2-DCE was detected above the MCL in 2 wells (RMW-88 and GM-67D). These wells are indicated on Table 3, Figure 10, and Figure E-9 in bold. Detected concentrations were 78 ug/L in RMW-88 and 120 ug/L in GM-67D. Isoconcentrations were not drawn for cis-1,2-DCE due to the isolated concentrations above the MCL (Figure E-9).

In lower aquifer wells, vinyl chloride was detected above the MCL in 3 wells (RMW-85, GM-19D, and GM-83D). These wells are indicated on Table 3, Figure 10, and Figure E-10 in bold. Detected concentrations above the MCL ranged from 2.6 ug/L to 4.1 ug/L in wells GM-83D and GM-19D, respectively. Isoconcentrations were not drawn for vinyl chloride due to the isolated concentrations above the MCL (Figure E-10).

The isoconcentration map for total VOCs in the lower aquifer is shown on Figure E-12. The data indicates that VOCs are present with maximum total VOC concentrations exceeding 100 ug/L.

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 A and summarized below.

- Aquifer conditions were strongly reducing within and downgradient of the reactive zones due to the introduction of carbohydrate, as evidenced by the presence of methane at concentrations significantly above background 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).
- Enhanced reductive dechlorination continued to achieve the desired reduction of VOC concentrations in groundwater.
- No significant change in anaerobic conditions (e.g., the concentration of methane) or treatment effectiveness (e.g., sustained reductions in chlorinated VOC concentrations with the observation of elevated ethene and/or ethane) were observed as a result of decreasing the injection frequency to quarterly.

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 in this regard, several 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, conceptual site 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; and
6. Interpret site capture.

3.2.1 Review of Site Data, Conceptual Site Model, and Interim Measure Objectives

The initial steps for this capture zone analysis included review of the conceptual site model (CSM) which consists of the hydrogeologic structure, hydrogeologic properties (e.g. hydraulic conductivity), site groundwater elevations (Table 6), site hydraulic gradients (horizontal [Tables 8 and 10] and vertical [Table 9]), and DN-13 operational data (e.g. pumping rates).

A depiction of the lower aquifer, including the location of the largely 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 approximately 260 to 440 feet/day (ft/day) (ARCADIS, Inc. 2012a and Geraghty & Miller, Inc. 1990). Site groundwater elevation contours (i.e., potentiometric surface map) for the lower aquifer are presented on Figure 8 and indicate that groundwater generally flows in a northeast to southwest direction across the Site. The approximate run-time average flow rate (pump in operation) for DN-13 in 2014 was approximately 492 gpm (0.71 MGD), while the average period (daily) rate (total flow volume averaged over the entire year – including downtime) for 2014 was approximately 381 gpm (0.55 MGD). The average period extraction rate for DN-13 for December 2014 was approximately 580 gpm (0.84 MGD). As described in Section 1.4.2, well DN-13 was operational throughout 2014 except for the periodic shutdowns related to power failures and for operation and maintenance activities. During October and November 2014, minor damage to the pump and a small hole in the well casing were observed and repaired, and installation of a well liner was completed on October 27 and 28, 2014.

3.2.2 Define Site-Specific Target Capture Zone

The target capture zone for DN-13 is defined as the extent of impacted groundwater in the lower aquifer only containing total VOC concentrations above 5 ug/L (Figure E-12 and Figure 15). The pumping program at DN-13 is intended to prevent further migration of the VOC plume and to capture the VOC impacted groundwater in the lower aquifer downgradient of the upper aquifer source areas at the Site. The maximum width (perpendicular to groundwater flow) of total VOC concentrations greater than 5 ug/L in the lower aquifer was estimated to be 2,840 ft. To account for

some uncertainty in the delineation, an additional 250 ft was added (i.e., 125 ft on each side), which results in an approximate plume width of 3,090 ft.

3.2.3 Interpret Groundwater Levels

3.2.3.1 *Potentiometric Surface Map*

Groundwater elevation data are measured on an annual basis at the Site, and this data can be used to support several lines of evidence to demonstrate hydraulic at the Site (Table 6). In general, groundwater in the lower aquifer flows primarily from the northeast to the southwest (Figure 8). Groundwater elevation data from the surrounding monitoring well network, though, indicates a localized cone of depression in the vicinity of DN-13 with groundwater flowing towards the pumping well. An inferred capture zone was delineated by drawing flow lines perpendicular to groundwater elevation contours in the lower aquifer and is shown on Figure 16. The inferred delineation results in an estimated capture width of approximately 3,250 ft just upgradient of DN-13.

3.2.3.2 *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 horizontal hydraulic gradients between sets of adjacent monitoring wells located in the vicinity of the extraction well DN-13. This triangular irregular network (TIN) analysis provides a means of evaluating observed water-level data free of bias inherent in hand-drawn potentiometric surface maps.

Generally, monitoring well pairs are used as gradient control points for capture evaluation (i.e., used to demonstrate inward gradients or inward flow towards the pumping well). However, the current distribution of monitoring wells in the vicinity of DN-13 prohibits the designation of practical well pairs. To provide an accurate measure of the extent of hydraulic influence that DN-13 has on the lower aquifer system, 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 the U.S. EPA's capture zone guidance (U.S. EPA 2008). Seven sets of adjacent monitoring wells (three per set) located in the vicinity of DN-13 were evaluated and are shown on Figure 17.

Horizontal hydraulic gradients were evaluated using 2014 groundwater elevation data. Results of the evaluation are presented, including the magnitude and direction, in Table 10 and on Figure 17. The groundwater flow directions (hydraulic gradients) in the lower aquifer indicated effective capture of groundwater by DN-13.

3.2.3.3 Vertical Hydraulic Gradients

Vertical hydraulic 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 vertical hydraulic gradients shown in Table 9 indicate that a downward (negative) gradient is present within the vicinity of DN-13. The magnitude of vertical hydraulic gradients in the vicinity of DN-13 compared to on-site are nearly one order of magnitude greater (GM-16/GM-15 and GM-18/GM-13 compared to GM-2/GM-1 and GM-6/GM-3).

3.2.4 Complete Calculations for Basis of Hydraulic Capture

To verify the interpretation of field data (i.e. potentiometric surface maps), flow calculations were also completed to evaluate the extent of capture and provide an additional line of evidence.

As outlined in the U.S. EPA guidance (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 groundwater flux moving through the cross-sectional area of the target capture zone such that a pumping rate required to capture this flux can be determined. The 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 contain the target capture zone.

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 required pumping rate/groundwater flux is 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 (cubic feet/day [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)

The *factor* term is intended to account for other contributions to the pumping well such as flux from a river or induced vertical flow from other stratigraphic units. The assumed value for this term ranges from 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, water-level data obtained cross-gradient or even up-gradient and collected during the remedy implementation may be more appropriate than pre-remedy groundwater level data for calculating regional hydraulic gradient. As such, the average horizontal hydraulic gradient, *i*, for the lower aquifer upgradient and outside the influence of DN-13 in 2014 is approximately 4.9×10^{-4} ft/ft (Table 8).

As previously noted, the hydraulic conductivity, K , for the lower aquifer ranges from approximately 260 to 440 ft/day.

As presented earlier, the width of the target capture zone, w , in the lower aquifer is conservatively estimated to be approximately 3,090 ft while the estimated saturated (and, consequently, the impacted thickness), b , is approximately 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/gpm)
2014 Minimum	260	4.9×10^{-4}	85	3,090	2	0.50/347
2014 Maximum (Conservative)	440	4.9×10^{-4}	85	3,090	2	0.85/590

Note that a maximum *factor* of 2 was applied in both cases to provide a realistic range in groundwater flux. For the given range in hydraulic conductivity values, the minimum and maximum groundwater flux through the target capture zone are estimated to be approximately 0.50 and 0.85 MGD (347 and 590 gpm), respectively. Recall that the average period (daily) extraction rate for DN-13 for 2014 was calculated to be 0.55 MGD (381 gpm) while the period rate in December 2014 was 0.84 MGD (580 gpm). Compared to the estimated DN-13 groundwater flux/required pumping rates under both hydraulic conductivity conditions, these period extraction rates fall within this range and the December 2014 period rate is consistent with the maximum groundwater flux estimate. Therefore, even after incorporating an overly conservative set of parameters and applying a maximum value for the *factor*, the results of this calculation suggests that the current operation rate of DN-13 is sufficient to capture the target capture zone.

It is important to note that this mathematical model does not and cannot account for aquifer heterogeneities (e.g., changes in transmissivity) or system complexities (e.g., boundary effects, recharge, off-site sources, and off-site pumping). Therefore, these results represent a very simplified and idealized depiction of the actual groundwater flux through the aquifer.

3.2.5 VOC Concentration Trends

Because plume migration generally follows groundwater flow towards pumping well DN-13 (Appendix E), VOC concentration trends were statistically analyzed for three monitoring wells located cross-gradient of DN-13. The goal of this trend analysis was to determine if VOC concentrations were increasing, decreasing, or stable to provide an additional line of evidence for DN-13 capture.

Concentration data were statistically analyzed from three lower aquifer monitoring wells: GM-9, GM-15, and GM-20D. These monitoring wells were chosen based on two criteria: having a sufficient number of data points to allow for statistical testing and for their location relative to DN-13.

The statistical tests were performed for the total concentration of site-specific VOCs. The individual concentrations of the site-specific VOCs were added and are presented in Table F-1 of Appendix F. Concentrations that were J-flagged were taken to be quantitative for the purposes of this statistical evaluation. Non-detections were treated as zeroes in the summation.

Groundwater quality was evaluated using the Mann-Kendall test for trends. The purpose of the test was to identify statistically significant trends in the concentrations of constituents of concern. Statistical methods were employed following *Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities - Unified Guidance*, provided by the U.S. EPA (U.S. EPA, 2009), and this document will be referred to as the "Unified Guidance".

The Mann-Kendall trend test is a non-parametric test for linear trends based upon the concept that a series of data points without a trend should fluctuate randomly around a constant mean. The test is non-parametric because there is no requirement that the data follow any specific underlying distribution. If an increasing trend were to exist, one would expect an earlier point to have a lower value than a later point. The converse would be true if a decreasing trend were present. A Mann-Kendall statistic S is computed by comparing each pair of data points in a data set and assigning a value of

+1 or -1 if the earlier data point is less than the later data point or greater than the later one, respectively. If the two data points are equal, the pair is assigned a zero. The values assigned to the pairs are summed. If the total is positive, it implies that the majority of the differences between points are positive, indicating a positive trend. Likewise, a negative sum indicates a decreasing trend. A value at or near zero indicates that the differences are roughly equal, implying that there is no trend. A critical value of S is determined based on the number of points in the data set and the level of significance (α) of the test. If the Mann-Kendall statistic S exceeds the critical S , then an upward trend is statistically significant. Conversely, if the Mann-Kendall S is negative and its absolute value is greater than the critical S , then there is a statistically significant downward trend. An alpha of 0.05 was used with 0.025 significance on each of two tails, when the data sets analyzed had 10 or more members. For data sets with eight members, an alpha of 0.10 was used with 0.05 significance on each of two tails. Details concerning this test and how to conduct it can be found in Section 17.3.2 of the Unified Guidance. All calculations were made using a commercially available statistics software package, ChemStat, version 6.3.0.0, distributed by Starpoint Software, Inc.

For each data set, the coefficient of variation index was computed by dividing the standard deviation by the arithmetic mean of the data. If no statistically significant trend could be identified by the Mann-Kendall test and if the coefficient of variation was less than or equal to 1.0, then the data set was considered to be “stable.” If no trend was identified and the coefficient of variation exceeded 1.0, then the analysis could only conclude that there was “no trend.”

The results of the statistical tests are presented in Table F-2 of Appendix F and on Figure 17. The ChemStat outputs are included in Appendix F. When the full data set was analyzed, no statistically significant trend was identified by the Mann-Kendall test for GW-9 or GM-15. Because the coefficient of variation was less than 1.0 for both monitoring wells, the VOC concentration data were determined to be stable. For GM-20D, a statistically significant decreasing trend was observed. All three monitoring well data sets were tested using Sen’s Slope Estimator as a second line of evidence. In all three cases, Sen’s Slope Estimator confirmed the results obtained using the Mann-Kendall test.

It was also of interest to examine the data set covering the period beginning in July 2008, when ARCADIS assumed control of the flow rate of DN-13, and continuing through 2014. However, there were only seven available data points for GM-15 and GM-20D for that time period, and only six data points for GM-9. The Mann-Kendall test

lacks statistical power with data sets containing fewer than eight members. Therefore, the test was run for the three wells using the most recent eight data points. The VOC concentrations were found to be stable for GM-9 and GM-15, and decreasing for GM-20D, as in the scenario in which all of the data since 1999 were used. These results were confirmed using Sen's Slope Estimator.

No statistically significant increasing trends were identified. The results were the same for both time periods and were confirmed using an alternative statistical test as a second line of evidence. These results confirm VOC plume capture at DN-13.

3.2.6 Interpret Capture

The lines of evidence evaluated indicate that DN-13 is providing sufficient capture within the lower aquifer to control and prevent further migration of the site-specific VOCs. The lines of evidence investigated as part of this analysis and their associated conclusions can be summarized as follows:

1. Interpret Groundwater Levels
 - a. Potentiometric Surface Map – the lower aquifer groundwater elevation data indicate that groundwater flows from the northeast to the southwest towards pumping well DN-13 and that the inferred capture zone encompasses the target capture zone
 - b. Horizontal Hydraulic Gradients – The horizontal hydraulic gradient evaluation indicates that DN-13 is providing effective capture in the downgradient region of the lower aquifer.
 - c. Vertical Hydraulic Gradients – The vertical hydraulic gradients calculated for monitoring well pairs in the vicinity of DN-13 indicate an overall downward (negative) vertical hydraulic gradient from the upper to the lower aquifer.
2. Groundwater Flux Calculation – The groundwater flux calculations, which were based on conservative parameter values, indicate that the 2014 average operating flow rate at DN-13 was sufficient to capture the groundwater flux of the total VOC groundwater plume moving through the target capture zone.
3. Evaluate Groundwater Concentration Trends – Results from the VOC concentration trend analysis show that VOC concentrations in the lower aquifer

in the vicinity of DN-13 are decreasing or stable (based on the full data set as well as the most recent data), thereby indicating effective plume containment/capture.

Based on these multiple lines of evidence, an interpreted capture zone was delineated and shows containment of the target capture zone on Figure 18. The results of this updated analysis are consistent with previous analysis and 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 Baseline Risk Assessment (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 are presented below.

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 former 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 2014 is presented in Section 2.2.3. Current site-specific VOC groundwater distribution within the upper aquifer above MCLs is migrating downgradient (southwest) beyond the property boundary. 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 last year 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 October 2014 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 14² data points for any monitoring well/constituent pair. The data plots for key constituents are provided on Figure G-1 for the closed North Settling Lagoon and Figure G-2 for the closed South Settling Lagoon in Appendix G.

As presented on Figure G-1, the linear regression analysis for the monitoring wells used to assess conditions at the North Settling Lagoon 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 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 G-1. The results of this test indicate a statistically significant increasing trend for the 1,1-DCA concentration in upgradient well HR-4. The increasing trends for 1,1,1-TCA, 1,1-DCA, cis-1,2-DCE, and trans-1,2-DCE in downgradient well W-4-N were also found to be statistically significant (see Table G-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 trends do not indicate any significant increases in groundwater concentrations of trans-1,2-DCE in W-2-N that would be attributable to the North Settling Lagoon.

² With the exception of W-4-S which contains eighteen data points for each constituent.

In summary, the North Settling Lagoon data indicate a statistically significant increasing trend in 1,1,1-TCA, cis-1,2-DCE, trans-1,2-DCE, and 1,1-DCA in downgradient monitoring well W-4-N. Two observations suggest a source other than the North Settling Lagoon for 1,1,1-TCA, 1,1-DCA, trans-1,2-DCE, and cis-1,2-DCE in monitoring well W-4-N:

- The absence of detections of 1,1,1-TCA, 1,1-DCA, cis-1,2-DCE, or trans-1,2-DCE above drinking water standards.
- The fact that these three constituents (1,1-DCA, cis-1,2-DCE, and trans-1,2-DCE) are daughter products of other constituents that have been detected upgradient of the North Settling Lagoon.

As presented on Figure G-2, the linear regression analysis for the monitoring wells used to assess conditions at the South Settling Lagoon suggest increasing concentrations of 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 G-1. The results confirmed that all seven of the correlated increases identified in the linear regressions are statistically significant (see Table G-1). Additionally, the Mann-Kendall test identified increasing 1,1-DCA trends in W-4-S and HR-17, an increasing TCE trend in W-3-S, and an increasing PCE trend in W-3-S.

The detected concentrations for TCE and PCE in the upgradient monitoring well HR-17 in the 2014 sampling event were 160 ug/L and 170 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 percent significance level. This correlation suggests a source other than the South Settling Lagoon 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 applicable drinking water standards. Further, the presence of 1,1-DCA, cis-1,2-DCE, and trans-1,2-DCE is expected from the natural attenuation.

Data collected from HR-1, approximately 1,000 feet upgradient of HR-17 and the South Settling Lagoon, corroborate the statistical analysis. TCE was detected at 120 ug/L and PCE was detected at 36 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 South Settling Lagoon had results comparable to W-4-S. TCE was detected at 20 ug/L in GM-63 and at 63 ug/L in W-4-S; PCE was detected at 53 ug/L in GM-63 and 65 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 concluded that concentrations downgradient of the South Settling Lagoon are due to upgradient groundwater impacts rather than being attributable to the South Settling Lagoon.

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 1.9 ug/L or less.

In conclusion, the monitoring of the closed North and South Settling Lagoons showed that the closed lagoons are 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 2014 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 2014 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 2014 monitoring, the upper aquifer conditions in the areas downgradient of the in-situ reactive zones have been converted to strongly reducing conditions through the introduction of a carbon source, as evidenced by the presence of methane at concentrations significantly above baseline data and further supported qualitatively with field parameter data (e.g., low dissolved oxygen and oxidation-reduction potential). 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 ERD has been successful in achieving a significant reduction of VOC concentrations downgradient of source areas. The frequency of substrate injections will continue to be quarterly in 2015 based on the updated transport velocities in the updated conceptual site model. The RZ performance monitoring data will continue to be evaluated in 2015 to confirm the interim measure remains effective with this amended schedule.

5.2.2 Hydraulic Capture

Groundwater elevation monitoring, horizontal and vertical hydraulic gradients, groundwater flux calculations, and lower aquifer VOC concentration trends indicate that the capture zone interim measure DN-13 continues to be effective at maintaining capture of the target capture zone in the lower aquifer.

Based on the effective performance of the pumping program during 2014, the current pumping program at DN-13 will continue to be implemented and evaluated in 2015.

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 (former 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 ERD of the VOCs. However, concentrations in upper aquifer monitoring wells immediately downgradient of the Site to the southwest, 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 continue until modifications are implemented for the final site-wide remedy proposed in the 2012 CMP. At the request of the Ohio EPA, an operation and maintenance addendum for extraction well DN-13 will be completed in 2015. The components of the addendum will include improved performance tracking and metrics to prompt maintenance activities.

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 2014 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 zone. Based on the data collected during the 2014 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 2014, the changes detailed in Section 2.1.3 were made, as recommended in the Site-Wide Groundwater Monitoring Report for 2013 (ARCADIS, U.S., Inc. 2014). A similar approach will be completed for the 2015 Site-Wide Groundwater Monitoring Program, as shown in Table 11, with the exception noted below.
 - Monitoring wells HR-1, HR-16, and GM-63 will continue to be sampled in 2015 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 were sampled in 2014 and will be included in the list of wells to be sampled in 2015.
 - As discussed in U.S. EPA Technical Fact Sheet-1,4-Dioxane (U.S. EPA 2014), 1,4-dioxane has been identified as an emergent chemical associated with industrial processes that included use of VOCs. The results of the 2014 sampling for 1,4-dioxane ranged from below detection limits (GM-59, GM-75S, and GM-29) to 18 ug/L in GM-8. In First Quarter 2015, a set of select wells will

be analyzed for 1,4-dioxane. The results of the sampling will be provided to the U.S. EPA for further discussion.

- The chloroethane results in 2014 were below detection limits, with exception of GM-30, GM-21, GM-8, and GM-16, which had low detections. Chloroethane will not be included in future groundwater sampling analyses.
- Future revisions to the site-wide groundwater monitoring program will be presented as part of final remedy implementation.

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Table 1. Site-Wide Groundwater Monitoring Program for 2014, RACER Trust, Moraine, Ohio.

2014 Site-Wide Annual Groundwater Sampling

Upper aquifer monitoring wells to be sampled for the site-specific list of VOCs⁽¹⁾ and field parameters⁽²⁾ in 2014. Biogeochemical parameters⁽³⁾ will be analyzed at select wells identified below:

W-1-N ⁽⁴⁾	HR-16	GM-10	GM-31 ⁽⁴⁾	GM-51	GM-67S
W-2-N	HR-17	GM-16 ⁽⁴⁾	GM-32*	GM-52	GM-71
W-3-N	W-2-S	GM-19S ⁽³⁾	GM-35	GM-55	GM-72
W-4-N	W-3-S	GM-21 ^{(3) (4)}	GM-43	GM-59 ^{(3) (4) (5)}	GM-75S ^{(3) (4)}
HR-1	W-4-S	GM-23 ^{(3) (4)}	GM-44	GM-60 ^{(3) (4) (5)}	GM-76S
HR-2	TW-2	GM-26	GM-45	GM-62R	GM-78
HR-3	GM-2	GM-28**	GM-46	GM-63	GM-79
HR-4	GM-6	GM-29 ^{(3) (4)}	GM-47	GM-65S	GM-80
HR-7	GM-8 ^{(3) (4)}	GM-30	GM-50	GM-66	WSU-24

Lower aquifer monitoring wells to be sampled for the site-specific list of VOCs⁽¹⁾ in 2014:

HR-12	GM-11	GM-54	GM-76D	RMW-85
HR-15	GM-15	GM-67D	GM-77D	RMW-86
DN-13	GM-19D	GM-68D	GM-83D	RMW-87
GM-9	GM-20D	GM-75D	GM-84	RMW-88

Analytical Methods

The following table presents the analytical methods to be 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
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
Nitrate	EPA Method 300
1,4-Dioxane	EPA Method 8260B SIM
Polychlorinated biphenyls	EPA Method 8082



Table 1. Site-Wide Groundwater Monitoring Program for 2014, RACER Trust, Moraine, Ohio.

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.

1 - Site-specific list of VOCs for 2014 includes: chloroethane, 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: nitrate, manganese (total and dissolved), iron (total and dissolved), sulfate, sulfide, total organic carbon, chlorides, ethane, ethene, and methane.

4 - Select wells analyzed for 1,4-dioxane in 2014.

5 - Select wells analyzed for polychlorinated biphenyls in 2014.

Location	Injection Well	January		February		March		April		May		June	
		No Injections ⁽¹⁾		No Injections ⁽²⁾		Injection Event #156 ⁽³⁾		No Injections ⁽⁴⁾		No Injections ⁽⁵⁾		Injection Event #157 ⁽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	---	NA	800	21.20	---	NA	---	NA	800	12.90
	RZ-1D	---	NA	---	NA	800	23.10	---	NA	---	NA	800	26.70
	RZ-1E	---	NA	---	NA	800	24.20	---	NA	---	NA	800	25.80
	RZ-1F	---	NA	---	NA	800	25.80	---	NA	---	NA	800	25.00
	RZ-1G	---	NA	---	NA	800	22.20	---	NA	---	NA	800	26.70
	RZ-1H	---	NA	---	NA	800	19.50	---	NA	---	NA	800	20.00
	RZ-1I	---	NA	---	NA	800	25.80	---	NA	---	NA	800	28.60
	RZ-1J	---	NA	---	NA	800	26.70	---	NA	---	NA	800	30.80
	RZ-1K	---	NA	---	NA	800	27.60	---	NA	---	NA	800	30.80
	RZ-1L	---	NA	---	NA	800	28.60	---	NA	---	NA	800	24.20
	RZ-1M	---	NA	---	NA	800	22.90	---	NA	---	NA	800	25.00
	RZ-1N	---	NA	---	NA	800	22.20	---	NA	---	NA	800	21.60
	RZ-1O	---	NA	---	NA	800	8.80	---	NA	---	NA	800	21.60
	RZ-1P	---	NA	---	NA	800	26.70	---	NA	---	NA	800	20.50
	RZ-1Q	---	NA	---	NA	800	12.50	---	NA	---	NA	800	13.60
	RZ-1R	---	NA	---	NA	800	23.50	---	NA	---	NA	800	29.60
	RZ-1S	---	NA	---	NA	800	19.50	---	NA	---	NA	800	26.70
	RZ-1T	---	NA	---	NA	800	28.60	---	NA	---	NA	800	29.60
	RZ-1U	---	NA	---	NA	800	22.20	---	NA	---	NA	800	29.60
Reactive Zone 3	RZ-3A	---	NA	---	NA	1600	35.60	---	NA	---	NA	1600	31.50
	RZ-3B	---	NA	---	NA	1600	29.40	---	NA	---	NA	1600	30.80
	RZ-3C	---	NA	---	NA	1600	29.80	---	NA	---	NA	1600	29.80
	RZ-3D	---	NA	---	NA	1600	25.60	---	NA	---	NA	1600	21.10
	RZ-3E	---	NA	---	NA	1600	26.30	---	NA	---	NA	1600	19.20
	RZ-3F	---	NA	---	NA	1600	24.00	---	NA	---	NA	1600	24.20
	RZ-3G	---	NA	---	NA	1600	24.00	---	NA	---	NA	1600	25.10
	RZ-3H	---	NA	---	NA	1600	20.70	---	NA	---	NA	1600	27.70
	RZ-3I	---	NA	---	NA	1600	27.70	---	NA	---	NA	1600	25.70
	RZ-3J	---	NA	---	NA	1600	30.80	---	NA	---	NA	1600	25.80
	RZ-3K	---	NA	---	NA	1600	28.60	---	NA	---	NA	1600	29.10
	RZ-3L	---	NA	---	NA	1600	28.10	---	NA	---	NA	1600	36.50
	RZ-3M	---	NA	---	NA	1600	31.60	---	NA	---	NA	1600	33.30
	RZ-3N	---	NA	---	NA	1600	27.70	---	NA	---	NA	1600	33.40
	RZ-3O	---	NA	---	NA	1600	33.30	---	NA	---	NA	1600	31.50
	RZ-3P	---	NA	---	NA	1600	29.20	---	NA	---	NA	1600	25.70
	RZ-3Q	---	NA	---	NA	1600	32.70	---	NA	---	NA	1600	32.70
	RZ-3R	---	NA	---	NA	1600	36.40	---	NA	---	NA	1600	34.10
	RZ-3S	---	NA	---	NA	1600	29.40	---	NA	---	NA	1600	32.70
	RZ-3T	---	NA	---	NA	1600	28.60	---	NA	---	NA	1600	29.70
	RZ-3U	---	NA	---	NA	1600	32.00	---	NA	---	NA	1600	32.10
	RZ-3V	---	NA	---	NA	1600	29.60	---	NA	---	NA	1600	30.20
	RZ-3W	---	NA	---	NA	1600	30.80	---	NA	---	NA	1600	30.20
	RZ-3X	---	NA	---	NA	1600	10.70	---	NA	---	NA	1600	19.00
	RZ-3Y	---	NA	---	NA	1600	29.70	---	NA	---	NA	1600	32.00
	RZ-3Z	---	NA	---	NA	1600	29.70	---	NA	---	NA	1600	30.80
	RZ-3AA	---	NA	---	NA	1600	32.10	---	NA	---	NA	1600	29.80
	RZ-3BB	---	NA	---	NA	1600	30.80	---	NA	---	NA	1600	31.40

Location	Injection Well	January		February		March		April		May		June	
		No Injections ⁽¹⁾		No Injections ⁽²⁾		Injection Event #156 ⁽³⁾		No Injections ⁽⁴⁾		No Injections ⁽⁵⁾		Injection Event #157 ⁽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	---	NA	1600	30.30	---	NA	---	NA	1600	31.50
	RZ-3DD	---	NA	---	NA	1600	29.10	---	NA	---	NA	1600	31.50
	RZ-3GG	---	NA	---	NA	1600	27.70	---	NA	---	NA	1600	26.40
	RZ-3HH	---	NA	---	NA	1600	30.80	---	NA	---	NA	1600	32.00
	RZ-3II	---	NA	---	NA	1600	30.80	---	NA	---	NA	1600	26.60
	RZ-3JJ	---	NA	---	NA	800	20.50	---	NA	---	NA	800	11.80
	RZ-3KK	---	NA	---	NA	1600	27.60	---	NA	---	NA	1600	27.60
	RZ-3RR	---	NA	---	NA	1600	22.90	---	NA	---	NA	1600	22.60
	RZ-3SS	---	NA	---	NA	1600	17.50	---	NA	---	NA	1600	17.30
	RZ-3TT	---	NA	---	NA	1600	16.40	---	NA	---	NA	1600	16.50
	RZ-3UU	---	NA	---	NA	1600	14.20	---	NA	---	NA	1600	12.80
	RZ-3VV	---	NA	---	NA	1600	16.80	---	NA	---	NA	1600	16.80
Reactive Zone 4	RZ-4A	---	NA	---	NA	3000	29.20	---	NA	---	NA	3000	29.00
	RZ-4B	---	NA	---	NA	3000	25.90	---	NA	---	NA	3000	29.90
	RZ-4C	---	NA	---	NA	3000	28.50	---	NA	---	NA	3000	28.60
	RZ-4D	---	NA	---	NA	3000	27.10	---	NA	---	NA	3000	30.50
	RZ-4E	---	NA	---	NA	3000	24.10	---	NA	---	NA	3000	31.90
	RZ-4F	---	NA	---	NA	3000	23.20	---	NA	---	NA	3000	27.40
	RZ-4G	---	NA	---	NA	3000	25.30	---	NA	---	NA	3000	28.50
	RZ-4H	---	NA	---	NA	3000	29.20	---	NA	---	NA	3000	33.00
Site-Wide Total		NA	NA	NA	NA	102,400	NA	NA	NA	NA	NA	102,400	NA

Location	Injection Well	July		August		September		October		November		December	
		No Injections ⁽⁷⁾		No Injections ⁽⁸⁾		Injection Event #158 ⁽⁹⁾		No Injections ⁽¹⁰⁾		Injection Event #159 ⁽¹¹⁾		No Injections ⁽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	---	NA	---	NA	800	34.20	---	NA	800	17.10	---	NA
	RZ-1D	---	NA	---	NA	800	28.00	---	NA	800	22.20	---	NA
	RZ-1E	---	NA	---	NA	800	29.60	---	NA	800	25.00	---	NA
	RZ-1F	---	NA	---	NA	800	30.80	---	NA	800	25.80	---	NA
	RZ-1G	---	NA	---	NA	800	29.60	---	NA	800	25.80	---	NA
	RZ-1H	---	NA	---	NA	800	22.20	---	NA	800	18.60	---	NA
	RZ-1I	---	NA	---	NA	800	30.80	---	NA	800	25.80	---	NA
	RZ-1J	---	NA	---	NA	800	30.80	---	NA	800	27.60	---	NA
	RZ-1K	---	NA	---	NA	800	33.30	---	NA	800	25.80	---	NA
	RZ-1L	---	NA	---	NA	800	34.80	---	NA	800	29.60	---	NA
	RZ-1M	---	NA	---	NA	800	25.00	---	NA	800	23.50	---	NA
	RZ-1N	---	NA	---	NA	800	22.90	---	NA	800	21.60	---	NA
	RZ-1O	---	NA	---	NA	800	28.60	---	NA	800	24.20	---	NA
	RZ-1P	---	NA	---	NA	800	28.60	---	NA	800	27.60	---	NA
	RZ-1Q	---	NA	---	NA	800	15.40	---	NA	800	20.00	---	NA
	RZ-1R	---	NA	---	NA	800	25.80	---	NA	800	28.60	---	NA
	RZ-1S	---	NA	---	NA	800	26.70	---	NA	800	26.70	---	NA
	RZ-1T	---	NA	---	NA	800	36.40	---	NA	800	29.60	---	NA
	RZ-1U	---	NA	---	NA	800	30.80	---	NA	800	27.60	---	NA
Reactive Zone 3	RZ-3A	---	NA	---	NA	1600	35.60	---	NA	1600	26.20	---	NA
	RZ-3B	---	NA	---	NA	1600	34.90	---	NA	1600	31.40	---	NA
	RZ-3C	---	NA	---	NA	1600	29.10	---	NA	1600	28.30	---	NA
	RZ-3D	---	NA	---	NA	1600	23.10	---	NA	1600	21.50	---	NA
	RZ-3E	---	NA	---	NA	1600	15.00	---	NA	1600	16.20	---	NA
	RZ-3F	---	NA	---	NA	1600	23.60	---	NA	1600	24.70	---	NA
	RZ-3G	---	NA	---	NA	1600	24.30	---	NA	1600	24.40	---	NA
	RZ-3H	---	NA	---	NA	1600	30.20	---	NA	1600	27.30	---	NA
	RZ-3I	---	NA	---	NA	1600	13.80	---	NA	1600	25.80	---	NA
	RZ-3J	---	NA	---	NA	1600	28.20	---	NA	1600	27.30	---	NA
	RZ-3K	---	NA	---	NA	1600	26.10	---	NA	1600	26.60	---	NA
	RZ-3L	---	NA	---	NA	1600	32.70	---	NA	1600	30.00	---	NA
	RZ-3M	---	NA	---	NA	1600	33.40	---	NA	1600	29.10	---	NA
	RZ-3N	---	NA	---	NA	1600	32.70	---	NA	1600	28.10	---	NA
	RZ-3O	---	NA	---	NA	1600	31.00	---	NA	1600	28.80	---	NA
	RZ-3P	---	NA	---	NA	1600	29.70	---	NA	1600	28.20	---	NA
	RZ-3Q	---	NA	---	NA	1600	27.50	---	NA	1600	29.40	---	NA
	RZ-3R	---	NA	---	NA	1600	32.80	---	NA	1600	29.20	---	NA
	RZ-3S	---	NA	---	NA	1600	29.70	---	NA	1600	30.20	---	NA
	RZ-3T	---	NA	---	NA	1600	27.20	---	NA	1600	28.60	---	NA
	RZ-3U	---	NA	---	NA	1600	30.80	---	NA	1600	31.40	---	NA
	RZ-3V	---	NA	---	NA	1600	29.20	---	NA	1600	30.20	---	NA
	RZ-3W	---	NA	---	NA	1600	27.20	---	NA	1600	30.80	---	NA
	RZ-3X	---	NA	---	NA	1600	19.20	---	NA	1600	13.20	---	NA
	RZ-3Y	---	NA	---	NA	1600	24.50	---	NA	1600	29.70	---	NA
	RZ-3Z	---	NA	---	NA	1600	29.10	---	NA	1600	28.60	---	NA
	RZ-3AA	---	NA	---	NA	1600	29.10	---	NA	1600	27.70	---	NA
	RZ-3BB	---	NA	---	NA	1600	28.10	---	NA	1600	27.60	---	NA

Location	Injection Well	July		August		September		October		November		December	
		No Injections ⁽⁷⁾		No Injections ⁽⁸⁾		Injection Event #158 ⁽⁹⁾		No Injections ⁽¹⁰⁾		Injection Event #159 ⁽¹¹⁾		No Injections ⁽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	---	NA	---	NA	1600	33.40	---	NA	1600	29.70	---	NA
	RZ-3DD	---	NA	---	NA	1600	31.00	---	NA	1600	26.70	---	NA
	RZ-3GG	---	NA	---	NA	1600	33.30	---	NA	1600	28.60	---	NA
	RZ-3HH	---	NA	---	NA	1600	31.50	---	NA	1000	19.60	---	NA
	RZ-3II	---	NA	---	NA	1600	33.30	---	NA	1400	33.10	---	NA
	RZ-3JJ	---	NA	---	NA	800	16.80	---	NA	1600	19.00	---	NA
	RZ-3KK	---	NA	---	NA	1600	25.10	---	NA	1600	24.30	---	NA
	RZ-3RR	---	NA	---	NA	1600	24.00	---	NA	1600	21.40	---	NA
	RZ-3SS	---	NA	---	NA	1600	19.20	---	NA	1600	17.40	---	NA
	RZ-3TT	---	NA	---	NA	1600	18.40	---	NA	1600	15.10	---	NA
	RZ-3UU	---	NA	---	NA	1600	15.00	---	NA	1600	12.80	---	NA
	RZ-3VV	---	NA	---	NA	1600	17.10	---	NA	1600	21.30	---	NA
Reactive Zone 4	RZ-4A	---	NA	---	NA	3000	27.30	---	NA	3000	23.90	---	NA
	RZ-4B	---	NA	---	NA	3000	29.60	---	NA	3000	25.20	---	NA
	RZ-4C	---	NA	---	NA	3000	28.90	---	NA	3000	25.40	---	NA
	RZ-4D	---	NA	---	NA	3000	30.10	---	NA	3000	28.30	---	NA
	RZ-4E	---	NA	---	NA	3000	29.70	---	NA	3000	26.30	---	NA
	RZ-4F	---	NA	---	NA	3000	27.60	---	NA	3000	23.60	---	NA
	RZ-4G	---	NA	---	NA	3000	33.00	---	NA	3000	23.50	---	NA
	RZ-4H	---	NA	---	NA	3000	31.10	---	NA	3000	26.40	---	NA
Site-Wide Total		NA	NA	NA	NA	102,400	NA	NA	NA	102,400	NA	NA	NA

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) No injection event scheduled.
(3) Injection Event #156 was completed on March 11th through 12th, March 14th, March 17th through 18th, March 20th through 21st, March 25th through 28th, March 31st, and April 1st through 4th, 2014.
(4) No injection event scheduled.
(5) No injection event scheduled.
(6) Injection Event #157 was completed on June 3rd through June 6th, June 9th through June 12th, June 16th through June 19th, and June 24th through June 26th, 2014.
(7) No injection event scheduled.
(8) No injection event scheduled.
(9) Injection Event #158 was completed on September 3rd through 4th, September 8th through 11th, September 16th, September 18th through 19th, September 24th through 26th, and October 2nd through 3rd, 2014.
(10) No injection event scheduled.
(11) Injection Event #159 was completed on October 30th-31st, November 4th, November 6th-7th, November 10th-12th, November 14th, November 24th-25th, December 1st-2nd, December 10th-12th, December 16th, December 18th, and December 30th, 2014 and January 15th-16th, 2015.
(12) No injection event scheduled.



Table 3. Summary of Groundwater VOC Analytical Results from Upper/Lower Aquifer Monitoring Wells in 2014, RACER Trust, Moraine, Ohio.

			Upgradient W-1-N 10/8/2014 Upper Aquifer	GM-23 10/10/2014 Upper Aquifer	GM-46 10/9/2014 Upper Aquifer	GM-59 10/10/2014 Upper Aquifer	GM-60 10/9/2014 Upper Aquifer	Source Areas GM-67S 10/10/2014 Upper Aquifer	GM-71 10/9/2014 Upper Aquifer	GM-72 10/9/2014 Upper Aquifer	GM-76S 10/9/2014 Upper Aquifer	GM-75S 10/9/2014 Upper Aquifer
	Units	MCL ¹										
Site-Specific Volatile Organic Compounds												
1,1,1-Trichloroethane	ug/L	200	< 1.0 U	< 10 U	< 1.0 U	< 13 U	< 67 U	< 5.0 U	0.31 J	< 1.0 U	< 1.0 U	< 20 U
1,1-Dichloroethane	ug/L		1.8	8.4 J	< 1.0 U	< 13 U	< 67 U	1.6 J	< 1.0 U	< 1.0 U	< 1.0 U	< 20 U
1,1-Dichloroethene	ug/L	7	< 1.0 U	< 10 U	< 1.0 U	< 13 U	< 67 U	< 5.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 20 U
Benzene	ug/L	5	< 1.0 U	< 10 U	< 1.0 U	< 13 U	< 67 U	< 5.0 U	< 1.0 U	< 1.0 U	0.39 J	< 20 U
cis-1,2-Dichloroethene	ug/L	70	0.21 J	210	0.30 J	6.7 J	96	2.3 J	0.21 J	< 1.0 U	< 1.0 U	< 20 U
Ethylbenzene	ug/L	700	< 1.0 U	< 10 U	< 1.0 U	< 13 U	< 67 U	< 5.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 20 U
Tetrachloroethene	ug/L	5	< 1.0 U	3.6 J	0.46 J	420	860	1.1 J	19	2.1	1.5	460
Toluene	ug/L	1000	< 1.0 U	< 10 U	< 1.0 U	< 13 U	< 67 U	< 5.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 20 U
trans-1,2-Dichloroethene	ug/L	100	< 1.0 U	20	< 1.0 U	< 13 U	< 67 U	< 5.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 20 U
Trichloroethene	ug/L	5	< 1.0 UB	4.1 J	< 1.0 UB	110	1400	140	12	< 1.0 UB	1.1	170
Vinyl chloride	ug/L	2	< 1.0 U	220	< 1.0 U	< 13 U	< 67 U	< 5.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 20 U
Xylene (total)	ug/L	10,000	< 2.0 U	< 20 U	< 2.0 U	< 27 U	< 130 U	< 10 U	< 2.0 U	< 2.0 U	< 2.0 U	< 40 U
Total Site-Specific VOCs	ug/L		3.0	466.1	0.8	536.7	2357.3	145.0	31.5	2.1	3.0	630.0
Additional Parameters in 2014												
Chloroethane	ug/L		< 1.0 U	< 10 U	< 1.0 U	< 13 U	< 67 UJ	< 5.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 20 U
1,4-Dioxane	ug/L	6.7	0.96 J	0.87 J	NS	< 2.0 U	1.3 J	NS	NS	NS	NS	< 2.0 U

1 - MCLs are not listed for 1,1-dichloroethane, chloroethane, or 1,4-dioxane. The Ohio EPA unrestricted potable use standard of 6.7 ug/L was used for 1,4-dioxane comparison.

ug/L - Micrograms per Liter.

All QA/QC results for 2014 data are shown in Appendix C.

MCL - Maximum Contaminant Level.

BOLD - Result above MCL.

< - 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.

NA - Not sampled.



Table 3. Summary of Groundwater VOC Analytical Results from Upper/Lower Aquifer Monitoring Wells in 2014, RACER Trust, Moraine, Ohio.

			Downgradient Reactive Zone Performance Wells						
			GM-29 10/9/2014	GM-30 10/9/2014	HR-3 10/8/2014	GM-21 10/9/2014	GM-6 10/7/2014	GM-8 10/7/2014	GM-19S 10/7/2014
	Units	MCL ¹	Upper Aquifer	Upper Aquifer	Upper Aquifer	Upper Aquifer	Upper Aquifer	Upper Aquifer	Upper Aquifer
Site-Specific Volatile Organic Compounds									
1,1,1-Trichloroethane	ug/L	200	9.1 J	< 1.4 U	7.6 J	< 1.0 U	< 1.0 U	< 1.0 U	< 1.4 U
1,1-Dichloroethane	ug/L		9.5 J	3.2	11	16	0.36 J	0.59 J	7.6
1,1-Dichloroethene	ug/L	7	< 14 U	< 1.4 U	< 10 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.4 U
Benzene	ug/L	5	< 14 U	2.3	< 10 U	< 1.0 U	< 1.0 U	1.2	< 1.4 U
cis-1,2-Dichloroethene	ug/L	70	480	0.29 J	82	12	0.23 J	0.23 J	37
Ethylbenzene	ug/L	700	< 14 U	54	< 10 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.4 U
Tetrachloroethene	ug/L	5	12 J	< 1.4 U	< 10 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.4 U
Toluene	ug/L	1000	< 14 U	0.71 J	< 10 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.4 U
trans-1,2-Dichloroethene	ug/L	100	15	0.51 J	2.7 J	1.6	< 1.0 U	< 1.0 U	0.91 J
Trichloroethene	ug/L	5	260	< 1.4 U	220	18	< 1.0 U	< 1.0 U	0.81 J
Vinyl chloride	ug/L	2	40	< 1.4 U	6.4 J	5.8	< 1.0 U	0.58 J	15
Xylene (total)	ug/L	10,000	< 29 U	12	< 20 U	< 2.0 U	< 2.0 U	< 2.0 U	< 2.9 U
Total Site-Specific VOCs	ug/L		825.6	73.0	329.7	55.4	0.6	2.6	61.3
Additional Parameters in 2014									
Chloroethane	ug/L		< 14 U	3.6	< 10 U	0.74 J	< 1.0 U	3.1	< 1.4 U
1,4-Dioxane	ug/L	6.7	< 2.0 U	NS	NS	1.3 J	NS	18	NS

1 - MCLs are not listed for 1,1-dichloroethane, chloroethane, or 1,4-dioxane. The Ohio EPA unrestricted potable use standard of 6.7 ug/L was used for 1,4-dioxane comparison.

ug/L - Micrograms per Liter.

All QA/QC results for 2014 data are shown in Appendix C.

MCL - Maximum Contaminant Level.

BOLD - Result above MCL.

< - 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.

NA - Not sampled.



Table 3. Summary of Groundwater VOC Analytical Results from Upper/Lower Aquifer Monitoring Wells in 2014, RACER Trust, Moraine, Ohio.

	Units	MCL ¹	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
			10/7/2014	10/7/2014	10/7/2014	10/7/2014	10/7/2014	10/7/2014	10/7/2014	10/7/2014	10/7/2014
			Upper Aquifer	Upper Aquifer	Upper Aquifer	Upper Aquifer	Upper Aquifer	Upper Aquifer	Upper Aquifer	Upper Aquifer	Upper Aquifer
Site-Specific Volatile Organic Compounds											
1,1,1-Trichloroethane	ug/L	200	0.71 J	< 1.0 U	< 1.0 U	< 1.0 U	0.58 J	< 5.0 U	0.79 J	0.76 J	1.4 J
1,1-Dichloroethane	ug/L		2	< 1.0 U	< 1.0 U	5.7	0.64 J	2.0 J	0.80 J	0.96 J	1.3 J
1,1-Dichloroethene	ug/L	7	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 5.0 U	< 1.0 U	< 1.0 U	< 2.5 U
Benzene	ug/L	5	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 5.0 U	< 1.0 U	< 1.0 U	< 2.5 U
cis-1,2-Dichloroethene	ug/L	70	0.26 J	1.3	31	11	0.44 J	2.2 J	1.6	2.3	6.1
Ethylbenzene	ug/L	700	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 5.0 U	< 1.0 U	< 1.0 U	< 2.5 U
Tetrachloroethene	ug/L	5	0.28 J	< 1.0 U	0.52 J	0.49 J	< 1.0 U	170	0.33 J	38	65
Toluene	ug/L	1000	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 5.0 U	< 1.0 U	< 1.0 U	< 2.5 U
trans-1,2-Dichloroethene	ug/L	100	< 1.0 U	< 1.0 U	0.47 J	0.69 J	< 1.0 U	< 5.0 U	0.34 J	0.59 J	1.1 J
Trichloroethene	ug/L	5	< 1.0 UB	0.20 J	< 1.0 U	9.2	1.9	160	5	35	63
Vinyl chloride	ug/L	2	< 1.0 U	< 1.0 U	1	< 1.0 U	< 1.0 U	< 5.0 U	< 1.0 U	< 1.0 U	< 2.5 U
Xylene (total)	ug/L	10,000	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U	< 10 U	< 2.0 U	< 2.0 U	< 5.0 U
Total Site-Specific VOCs	ug/L		3.3	1.50	33.0	27.1	3.6	334.2	8.9	77.6	137.9
Additional Parameters in 2014											
Chloroethane	ug/L		< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 5.0 U	< 1.0 U	< 1.0 U	< 2.5 U
1,4-Dioxane	ug/L	6.7	NS	NS	NS	NS	NS	NS	NS	NS	NS

1 - MCLs are not listed for 1,1-dichloroethane, chloroethane, or 1,4-dioxane. The Ohio EPA unrestricted potable use standard of 6.7 ug/L was used for 1,4-dioxane comparison.

ug/L - Micrograms per Liter.

All QA/QC results for 2014 data are shown in Appendix C.

MCL - Maximum Contaminant Level.

BOLD - Result above MCL.

< - 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.

NA - Not sampled.



Table 3. Summary of Groundwater VOC Analytical Results from Upper/Lower Aquifer Monitoring Wells in 2014, RACER Trust, Moraine, Ohio.

			Downgradient On-Site									
	Units	MCL ¹	HR-1 10/8/2014 Upper Aquifer	GM-43 10/8/2014 Upper Aquifer	GM-44 10/8/2014 Upper Aquifer	GM-45 10/8/2014 Upper Aquifer	GM-66 10/8/2014 Upper Aquifer	GM-31 10/9/2014 Upper Aquifer	GM-35 10/8/2014 Upper Aquifer	HR-2 10/8/2014 Upper Aquifer	HR-7 10/7/2014 Upper Aquifer	
Site-Specific Volatile Organic Compounds												
1,1,1-Trichloroethane	ug/L	200	1.3 J	1.8 J	< 6.7 U	3.2 J	< 10 U	3.8	< 25 U	< 1.0 U	< 1.0 U	
1,1-Dichloroethane	ug/L		1.4 J	< 5.7 U	< 6.7 U	2.2 J	12	2.8	22 U	7.3	0.27 J	
1,1-Dichloroethene	ug/L	7	< 5.0 U	< 5.7 U	< 6.7 U	< 4.0 U	< 10 U	< 2.0 U	< 25 U	< 1.0 U	< 1.0 U	
Benzene	ug/L	5	< 5.0 U	< 5.7 U	< 6.7 U	< 4.0 U	< 10 U	< 2.0 U	< 25 U	< 1.0 U	< 1.0 U	
cis-1,2-Dichloroethene	ug/L	70	20	25	16	37	280	54	57	1.8	1.7	
Ethylbenzene	ug/L	700	< 5.0 U	< 5.7 U	< 6.7 U	< 4.0 U	< 10 U	< 2.0 U	< 25 U	< 1.0 U	< 1.0 U	
Tetrachloroethene	ug/L	5	36	35	100	150	< 10 U	0.48 J	6.0 J	< 1.0 U	< 1.0 U	
Toluene	ug/L	1000	< 5.0 U	< 5.7 U	< 6.7 U	< 4.0 U	< 10 U	< 2.0 U	< 25 U	< 1.0 U	< 1.0 U	
trans-1,2-Dichloroethene	ug/L	100	1.5 J	1.5 J	< 6.7 U	2.0 J	11	1.6 J	14 J	0.29 J	< 1.0 U	
Trichloroethene	ug/L	5	120	220	180	140	110	79	28	< 1.0 UB	6.2	
Vinyl chloride	ug/L	2	< 5.0 U	< 5.7 U	< 6.7 U	< 4.0 U	3.0 J	< 2.0 U	< 25 U	< 1.0 U	< 1.0 U	
Xylene (total)	ug/L	10,000	< 10 U	< 11 U	< 13 U	< 8.0 U	< 20 U	< 4.0 U	< 50 U	< 2.0 U	< 2.0 U	
Total Site-Specific VOCs	ug/L		180.2	283.3	296.0	334.4	416.0	141.7	127.0	9.4	8.2	
Additional Parameters in 2014												
Chloroethane	ug/L		< 5.0 U	< 5.7 U	< 6.7 U	< 4.0 U	< 10 U	< 2.0 U	< 25 U	< 1.0 U	< 1.0 U	
1,4-Dioxane	ug/L	6.7	NS	NS	NS	NS	NS	0.95 J	NS	NS	NS	

1 - MCLs are not listed for 1,1-dichloroethane, chloroethane, or 1,4-dioxane. The Ohio EPA unrestricted potable use standard of 6.7 ug/L was used for 1,4-dioxane comparison.

ug/L - Micrograms per Liter.

All QA/QC results for 2014 data are shown in Appendix C.

MCL - Maximum Contaminant Level.

BOLD - Result above MCL.

< - 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.

NA - Not sampled.



Table 3. Summary of Groundwater VOC Analytical Results from Upper/Lower Aquifer Monitoring Wells in 2014, RACER Trust, Moraine, Ohio.

	Units	MCL ¹	Property Boundary		Off-Site Downgradient of the Site					
			GM-2	TW-2	GM-10	GM-16	GM-47	GM-50	GM-51	GM-52
			10/7/2014	10/9/2014	10/6/2014	10/7/2014	10/7/2014	10/7/2014	10/6/2014	10/6/2014
			Upper Aquifer	Upper Aquifer	Upper Aquifer	Upper Aquifer	Upper Aquifer	Upper Aquifer	Upper Aquifer	Upper Aquifer
Site-Specific Volatile Organic Compounds										
1,1,1-Trichloroethane	ug/L	200	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.7 U	< 1.4 U	0.70 J	< 2.0 U
1,1-Dichloroethane	ug/L		< 1.0 U	0.48 J	< 1.0 U	1.4	4.5	7.1	1.7 J	< 2.0 U
1,1-Dichloroethene	ug/L	7	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.7 U	< 1.4 U	< 2.0 U	< 2.0 U
Benzene	ug/L	5	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.7 U	< 1.4 U	< 2.0 U	< 2.0 U
cis-1,2-Dichloroethene	ug/L	70	1.6	0.56 J	< 1.0 U	7.7	28	5.1	5	< 2.0 U
Ethylbenzene	ug/L	700	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.7 U	< 1.4 U	< 2.0 U	< 2.0 U
Tetrachloroethene	ug/L	5	< 1.0 U	< 1.0 U	1	31	46	39	67	44
Toluene	ug/L	1000	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.7 U	< 1.4 U	< 2.0 U	< 2.0 U
trans-1,2-Dichloroethene	ug/L	100	< 1.0 U	< 1.0 U	< 1.0 U	0.26 J	1.8	< 1.4 U	< 2.0 U	< 2.0 U
Trichloroethene	ug/L	5	2.9	< 1.0 UB	3.1	7.5	8.1	5.5	33	8.2
Vinyl chloride	ug/L	2	< 1.0 U	0.64 J	< 1.0 U	0.97 J	< 1.7 U	1.8	< 2.0 U	< 2.0 U
Xylene (total)	ug/L	10,000	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U	< 3.3 U	< 2.9 U	< 4.0 U	< 4.0 U
Total Site-Specific VOCs	ug/L		4.5	1.7	4.1	48.8	88.4	58.5	107.4	52.2
Additional Parameters in 2014										
Chloroethane	ug/L		< 1.0 U	< 1.0 U	< 1.0 U	1.1	< 1.7 U	< 1.4 U	< 2.0 U	< 2.0 U
1,4-Dioxane	ug/L	6.7	NS	NS	NS	9.1	NS	NS	NS	NS

1 - MCLs are not listed for 1,1-dichloroethane, chloroethane, or 1,4-dioxane. The Ohio EPA unrestricted potable use standard of 6.7 ug/L was used for 1,4-dioxane comparison.

ug/L - Micrograms per Liter.

All QA/QC results for 2014 data are shown in Appendix C.

MCL - Maximum Contaminant Level.

BOLD - Result above MCL.

< - Constituent not detected above laboratory reporting limit shown.

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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.

NA - Not sampled.



Table 3. Summary of Groundwater VOC Analytical Results from Upper/Lower Aquifer Monitoring Wells in 2014, RACER Trust, Moraine, Ohio.

			Off-Site Downgradient of the Site								
			GM-62R 10/6/2014	GM-63 10/7/2014	GM-55 10/6/2014	GM-65S 10/6/2014	WSU-24 12/4/2014	GM-78 10/6/2014	GM-79 10/6/2014	GM-80 10/6/2014	GM-26 10/6/2014
	Units	MCL ¹	Upper Aquifer	Upper Aquifer	Upper Aquifer	Upper Aquifer	Upper Aquifer	Upper Aquifer	Upper Aquifer	Upper Aquifer	Upper Aquifer
Site-Specific Volatile Organic Compounds											
1,1,1-Trichloroethane	ug/L	200	<1.0 U	2.8	<1.0 U	<1.0 U	<1.0 U	<1.0 U	1	0.50 J	<1.0 U
1,1-Dichloroethane	ug/L		<1.0 U	1.9	<1.0 U	<1.0 U	<1.0 U	<1.0 U	3.2	0.66 J	<1.0 U
1,1-Dichloroethene	ug/L	7	<1.0 U	<1.4 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U
Benzene	ug/L	5	<1.0 U	<1.4 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	ug/L	70	<1.0 U	2.4	<1.0 U	<1.0 U	<1.0 U	<1.0 U	8.4	2.5	<1.0 U
Ethylbenzene	ug/L	700	<1.0 U	<1.4 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U
Tetrachloroethene	ug/L	5	12	53	3.3	5.4	7.2	9.5	1	3.5	1.3
Toluene	ug/L	1000	<1.0 U	<1.4 U	0.34 J	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U
trans-1,2-Dichloroethene	ug/L	100	<1.0 U	<1.4 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	0.43 J	<1.0 U	<1.0 U
Trichloroethene	ug/L	5	<1.0 U	20	<1.0 U	0.24 J	2.0	<1.0 U	23	12	<1.0 U
Vinyl chloride	ug/L	2	<1.0 U	<1.4 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U
Xylene (total)	ug/L	10,000	<2.0 U	<2.9 U	<2.0 U	<2.0 U	<2.0 U	<2.0 U	<2.0 U	<2.0 U	<2.0 U
Total Site-Specific VOCs	ug/L		12.0	80.1	3.6	5.6	9.2	9.5	37.0	19.2	1.3
Additional Parameters in 2014											
Chloroethane	ug/L		<1.0 U	<1.4 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U
1,4-Dioxane	ug/L	6.7	NS	NS	NS	NS	NS	NS	NS	NS	NS

1 - MCLs are not listed for 1,1-dichloroethane, chloroethane, or 1,4-dioxane. The Ohio EPA unrestricted potable use standard of 6.7 ug/L was used for 1,4-dioxane comparison.

ug/L - Micrograms per Liter.

All QA/QC results for 2014 data are shown in Appendix C.

MCL - Maximum Contaminant Level.

BOLD - Result above MCL.

< - 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.

NA - Not sampled.



Table 3. Summary of Groundwater VOC Analytical Results from Upper/Lower Aquifer Monitoring Wells in 2014, RACER Trust, Moraine, Ohio.

			Upgradient Contributions			On-Site Groundwater Quality				
	Units	MCL ¹	RMW-88 10/8/2014 Lower Aquifer	HR-12 10/8/2014 Lower Aquifer	GM-76D 10/9/2014 Lower Aquifer	GM-54 10/8/2014 Lower Aquifer	GM-67D 10/10/2014 Lower Aquifer	GM-68D 10/10/2014 Lower Aquifer	GM-75D 12/4/2014 Lower Aquifer	RMW-85 10/9/2014 Lower Aquifer
<u>Site-Specific Volatile Organic Compounds</u>										
1,1,1-Trichloroethane	ug/L	200	< 2.5 U	< 1.0 U	< 1.0 U	< 1.7 U	1.2 J	0.71 J	< 5.7 U	< 2.0 U
1,1-Dichloroethane	ug/L		32	3.4	< 1.0 U	< 1.7 U	3.7	< 1.4 U	< 5.7 U	< 2.0 U
1,1-Dichloroethene	ug/L	7	< 2.5 U	< 1.0 U	< 1.0 U	< 1.7 U	< 3.3 U	< 1.4 U	< 5.7 U	< 2.0 U
Benzene	ug/L	5	< 2.5 U	< 1.0 U	< 1.0 U	< 1.7 U	< 3.3 U	< 1.4 U	< 5.7 U	0.75 J
cis-1,2-Dichloroethene	ug/L	70	78	1.9	0.24 J	< 1.7 U	120	1.1 J	11	55
Ethylbenzene	ug/L	700	< 2.5 U	< 1.0 U	< 1.0 U	< 1.7 U	< 3.3 U	< 1.4 U	< 5.7 U	< 2.0 U
Tetrachloroethene	ug/L	5	< 2.5 U	< 1.0 U	35	66	0.84 J	36	190	40
Toluene	ug/L	1000	< 2.5 U	< 1.0 U	< 1.0 U	< 1.7 U	< 3.3 U	< 1.4 U	< 5.7 U	< 2.0 U
trans-1,2-Dichloroethene	ug/L	100	4.3	< 1.0 U	< 1.0 U	< 1.7 U	2.6 J	< 1.4 U	< 5.7 U	1.8 J
Trichloroethene	ug/L	5	< 2.5 U	< 1.0 UB	8.5	< 1.7 UB	15	3.7	180	78
Vinyl chloride	ug/L	2	1.2 J	< 1.0 U	< 1.0 U	< 1.7 U	3.5	< 1.4 U	< 5.7 U	5
Xylene (total)	ug/L	10,000	< 5.0 U	< 2.0 U	< 2.0 U	< 3.3 U	< 6.7 U	< 2.9 U	< 11 U	< 4.0 U
Total Site-Specific VOCs	ug/L		115.5	5.3	43.7	66.0	146.8	41.5	381.0	180.6
<u>Additional Parameters in 2014</u>										
Chloroethane	ug/L		< 2.5 U	< 1.0 U	< 1.0 U	< 1.7 U	< 3.3 U	< 1.4 U	< 5.7 U	< 2.0 U
1,4-Dioxane	ug/L	6.7	NS	NS	NS	NS	NS	NS	NS	NS

1 - MCLs are not listed for 1,1-dichloroethane, chloroethane, or 1,4-dioxane. The Ohio EPA unrestricted potable use standard of 6.7 ug/L was used for 1,4-dioxane comparison.

ug/L - Micrograms per Liter.

All QA/QC results for 2014 data are shown in Appendix C.

MCL - Maximum Contaminant Level.

BOLD - Result above MCL.

< - 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.

NA - Not sampled.



Table 3. Summary of Groundwater VOC Analytical Results from Upper/Lower Aquifer Monitoring Wells in 2014, RACER Trust, Moraine, Ohio.

	Units	MCL ¹	Lower Aquifer Groundwater Quality					
			HR-15 10/7/2014	GM-19D 10/7/2014	RMW-86 10/8/2014	RMW-87 10/9/2014	GM-15 10/7/2014	GM-20D 10/6/2014
			Lower Aquifer	Lower Aquifer	Lower Aquifer	Lower Aquifer	Lower Aquifer	Lower Aquifer
<u>Site-Specific Volatile Organic Compounds</u>								
1,1,1-Trichloroethane	ug/L	200	< 1.0 U	< 1.0 U	9.4	< 2.2 U	< 1.0 U	0.32 J
1,1-Dichloroethane	ug/L		< 1.0 U	0.27 J	7.6	13	1.5	< 1.0 U
1,1-Dichloroethene	ug/L	7	< 1.0 U	< 1.0 U	< 6.7 U	< 2.2 U	< 1.0 U	< 1.0 U
Benzene	ug/L	5	< 1.0 U	< 1.0 U	< 6.7 U	< 2.2 U	< 1.0 U	< 1.0 U
cis-1,2-Dichloroethene	ug/L	70	3.5	5.8	33	62	2.4	< 1.0 U
Ethylbenzene	ug/L	700	< 1.0 U	< 1.0 U	< 6.7 U	< 2.2 U	< 1.0 U	< 1.0 U
Tetrachloroethene	ug/L	5	< 1.0 U	0.36 J	29	< 2.2 U	< 1.0 U	1.7
Toluene	ug/L	1000	< 1.0 U	< 1.0 U	< 6.7 U	< 2.2 U	< 1.0 U	< 1.0 U
trans-1,2-Dichloroethene	ug/L	100	< 1.0 U	< 1.0 U	< 6.7 U	2.7	0.42 J	< 1.0 U
Trichloroethene	ug/L	5	0.71 J	5	140	10	4.1	3.1
Vinyl chloride	ug/L	2	1.9	4.1	< 6.7 U	< 2.2 U	0.38 J	< 1.0 U
Xylene (total)	ug/L	10,000	< 2.0 U	< 2.0 U	< 13 U	< 4.4 U	< 2.0 U	< 2.0 U
Total Site-Specific VOCs	ug/L		6.1	15.5	219.0	87.7	8.8	5.1
<u>Additional Parameters in 2014</u>								
Chloroethane	ug/L		< 1.0 U	< 1.0 U	< 6.7 U	< 2.2 U	< 1.0 U	< 1.0 U
1,4-Dioxane	ug/L	6.7	NS	NS	NS	NS	NS	NS

1 - MCLs are not listed for 1,1-dichloroethane, chloroethane, or 1,4-dioxane. The Ohio EPA unrestricted potable use standard of 6.7 ug/L was used for 1,4-dioxane comparison.

ug/L - Micrograms per Liter.

All QA/QC results for 2014 data are shown in Appendix C.

MCL - Maximum Contaminant Level.

BOLD - Result above MCL.

< - 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.

NA - Not sampled.



Table 3. Summary of Groundwater VOC Analytical Results from Upper/Lower Aquifer Monitoring Wells in 2014, RACER Trust, Moraine, Ohio.

	Units	MCL ¹	Downgradient Groundwater Quality					
			GM-9	DN-13	GM-83D	GM-84	GM-77D	GM-11
			10/6/2014	12/4/2014	10/9/2014	10/8/2014	10/8/2014	10/7/2014
<u>Site-Specific Volatile Organic Compounds</u>			Lower Aquifer	Lower Aquifer	Lower Aquifer	Lower Aquifer	Lower Aquifer	Lower Aquifer
1,1,1-Trichloroethane	ug/L	200	1.2	0.86 J	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
1,1-Dichloroethane	ug/L		0.39 J	1.6	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
1,1-Dichloroethene	ug/L	7	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
Benzene	ug/L	5	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
cis-1,2-Dichloroethene	ug/L	70	0.54 J	5.9	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
Ethylbenzene	ug/L	700	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
Tetrachloroethene	ug/L	5	< 1.0 U	3.5	< 1.0 U	< 1.0 U	14	1.1
Toluene	ug/L	1000	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
trans-1,2-Dichloroethene	ug/L	100	< 1.0 U	0.41 J	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
Trichloroethene	ug/L	5	17	10.0	< 1.0 U	4.9	< 1.0 U	17
Vinyl chloride	ug/L	2	< 1.0 U	0.79 J	2.6	< 1.0 U	< 1.0 U	< 1.0 U
Xylene (total)	ug/L	10,000	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U
Total Site-Specific VOCs	ug/L		19.1	23.1	2.6	4.9	14.0	18.1
<u>Additional Parameters in 2014</u>								
Chloroethane	ug/L		< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
1,4-Dioxane	ug/L	6.7	NS	NS	NS	NS	NS	NS

1 - MCLs are not listed for 1,1-dichloroethane, chloroethane, or 1,4-dioxane. The Ohio EPA unrestricted potable use standard of 6.7 ug/L was used for 1,4-dioxane comparison.

ug/L - Micrograms per Liter.

All QA/QC results for 2014 data are shown in Appendix C.

MCL - Maximum Contaminant Level.

BOLD - Result above MCL.

< - 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.

NA - Not sampled.



Table 4. DN-13 Monthly Monitoring for 2014, RACER Trust, Moraine, Ohio.

Volatile Organic Compound¹	Units	1/9/2014	2/4/2014	3/6/2014	4/1/2014	5/2/2014	6/3/2014	7/2/2014	8/3/2014	9/2/2014	10/1/2014	11/1/2014	12/22/2014
1,1,1-Trichloroethane	ug/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	NS	NS	< 5.0 U
1,1-Dichloroethane	ug/L	1.7 J	1.5 J	< 5.0 U	1.3 J	1.1 J	< 5.0 U	< 5.0 U	1.3 J	0.90 J	NS	NS	1.4 J
Benzene	ug/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	NS	NS	< 5.0 U
Chloroethane	ug/L	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	NS	NS	< 5.0 U
cis-1,2-Dichloroethene	ug/L	6.8	5.9	6.6	6.5	5.7	5.3	5.8	5.5	4.8	NS	NS	5.3
Ethylbenzene	ug/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	NS	NS	< 5.0 U
Tetrachloroethene	ug/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	NS	NS	3.1 J
Toluene	ug/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	0.92 J	NS	NS	< 5.0 U
Trichloroethene	ug/L	7.2	6.5	7.8	8.1	7.2	7.4	8.4	8.3	6.5	NS	NS	7.5
Vinyl chloride	ug/L	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	NS	NS	< 10 U
Xylene (total)	ug/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	1.3 J	NS	NS	< 5.0 U
Total VOCs	ug/L	15.7	13.9	14.4	15.9	14.0	12.7	14.2	15.1	14.42	NS	NS	17.30

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

All concentrations in micrograms per liter (ug/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.

NS - Not sampled due to well maintenance.



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	721.40	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	723.15	723.51	2	50	60	NA	NA	60	618423.9410	1482812.6470	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 2014, 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	29.88	70.00	709.14
W-2-N	731.68	22.91	59.70	708.77
W-3-N	733.66	24.87	57.60	708.79
W-4-N	731.63	24.78	66.60	706.85
HR-1	732.71	24.68	59.00	708.03
HR-2	734.75	25.82	58.70	708.93
HR-3	736.75	27.78	62.20	708.97
HR-4	742.60	33.38	66.80	709.22
HR-5	734.27	25.58	57.80	708.69
HR-6	732.66	24.54	55.45	708.12
HR-7	731.73	23.23	57.40	708.50
HR-11	743.33	33.59	69.10	709.74
HR-16	727.01	19.72	65.00	707.29
HR-17	726.43	18.81	59.55	707.62
W-1-S	729.29	21.44	59.55	707.85
W-2-S	726.64	19.82	67.00	706.82
W-3-S	729.17	22.24	76.40	706.93
W-4-S	727.92	20.69	72.50	707.23
GM-2	735.81	28.38	56.30	707.43
4S	731.36	24.26	68.40	707.10
GM-6	730.27	23.39	46.30	706.88
GM-8	735.17	28.53	50.00	706.64
GM-10	723.90	17.27	50.20	706.63
GM-16	725.30	18.82	58.00	706.48
GM-17	723.84	17.09	50.05	706.75
GM-18	723.80	17.23	54.86	706.57
GM-19S	730.92	23.46	57.00	707.46
GM-21	725.00	17.39	53.30	707.61
GM-22	731.63	23.28	57.20	708.35
GM-23	731.07	21.97	32.20	709.10
GM-24	747.29	36.84	68.05	710.45
GM-25	746.17	NM	NM	NA
GM-26	722.29	16.11	58.40	706.18
GM-27	730.57	21.41	47.10	709.16
GM-28	736.46	NM	NM	NA
GM-29	731.37	19.28	32.60	712.09
GM-30	734.79	26.19	36.00	708.60
GM-31	732.13	24.11	63.20	708.02
GM-32	732.08	24.60	56.50	707.48
GM-33	729.77	21.57	54.30	708.20
GM-34	730.56	22.64	35.25	707.92
GM-35	731.27	23.84	65.40	707.43
GM-36	731.11	23.56	34.45	707.55



Table 6. Groundwater Level Measurements Collected During 2014, 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	22.18	34.25	707.87
GM-38	729.88	22.35	56.10	707.53
GM-43	729.00	20.92	49.70	708.08
GM-44	728.77	20.93	60.90	707.84
GM-45	729.75	21.33	60.00	708.42
GM-46 ¹	727.79	12.51	27.70	NA
GM-47	726.75	20.02	59.40	706.73
GM-48	728.67	22.49	73.02	706.18
GM-49	727.88	22.04	76.29	705.84
GM-50	726.56	19.86	39.50	706.70
GM-51	728.30	21.24	44.20	707.06
GM-52	727.62	21.76	44.00	705.86
GM-53	730.35	21.96	32.55	708.39
GM-55	719.86	13.81	35.10	706.05
GM-57 ²	NM	17.30	NM	NA
GM-59	732.25	23.45	34.40	708.80
GM-60	732.24	23.59	50.40	708.65
GM-62R	NM	17.29	60.70	NA
GM-63	725.79	18.81	39.10	706.98
GM-64	725.95	19.00	58.50	706.95
GM-65S	723.58	18.19	52.10	705.39
GM-66	733.22	24.62	54.20	708.60
GM-67S	732.06	23.21	53.60	708.85
GM-68S	732.18	24.46	49.90	707.72
GM-71	736.82	27.85	61.40	708.97
GM-72	736.78	27.80	32.10	708.98
GM-74S	732.17	23.44	49.50	708.73
GM-75S	737.69	28.74	51.80	708.95
GM-76S	739.00	NM	36.80	NA
GM-77S	741.14	31.90	42.69	709.24
GM-78	721.18	14.35	49.40	706.83
GM-79	717.91	12.41	54.20	705.50
GM-80	715.82	10.22	24.50	705.60
GM-81	715.31	10.11	60.36	705.20
GM-83S	725.84	17.48	53.80	708.36
RMW-89	738.56	31.21	50.30	707.35
EAST	730.98	23.08	71.30	707.90
WEST	731.08	23.39	51.40	707.69
WSU-17	726.18	20.16	46.25	706.02
WSU-18	733.52	26.46	61.20	707.06
WSU-19	726.62	21.24	63.10	705.38
WSU-23 ¹	724.90	18.24	57.40	NA
WSU-24	724.82	17.71	66.55	707.11
TW-2	733.38	26.57	46.00	706.81
ME-2	732.08	NM	NM	NA
ME-3	731.73	NM	NM	NA
ME-4	732.24	24.26	NM	707.98
ME-6	732.68	24.75	NM	707.93



Table 6. Groundwater Level Measurements Collected During 2014, 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	28.55	103.40	707.19
GM-3	730.44	23.70	102.20	706.74
GM-4	731.46	24.76	139.50	706.70
GM-5	731.29	24.43	102.00	706.86
GM-7R	735.61	28.49	93.20	707.12
GM-9	724.07	17.68	99.60	706.39
GM-11	723.71	17.25	99.20	706.46
GM-13	723.82	17.74	100.10	706.08
GM-14	723.50	17.47	NM	706.03
GM-15	725.23	19.44	98.90	705.79
GM-19D	730.73	23.18	148.00	707.55
GM-20D	727.26	19.94	100.80	707.32
GM-39	730.95	21.84	118.40	709.11
GM-40	727.04	19.55	150.30	707.49
GM-41	733.65	25.20	16.30	708.45
GM-42	729.16	21.80	152.30	707.36
GM-54	730.29	21.80	80.00	708.49
GM-56	719.52	13.32	86.44	706.20
GM-58	735.46	26.66	82.00	708.80
GM-61	732.23	23.41	78.94	708.82
GM-65D	723.54	18.15	96.51	705.39
GM-67D	732.19	23.35	79.20	708.84
GM-68D	732.27	23.59	70.80	708.68
GM-69	732.08	23.96	100.79	708.12
GM-70	737.19	28.22	81.80	708.97
GM-73	736.97	27.93	96.50	709.04
GM-74D	732.04	23.34	80.21	708.70
GM-75D	737.68	28.65	94.30	709.03
GM-76D	738.94	NM	80.10	NA
GM-77D	740.93	31.89	86.30	709.04
GM-82	732.14	23.86	96.87	708.28
GM-83D	725.77	18.28	119.70	707.49
GM-84	739.92	31.49	106.80	708.43
RMW-85	736.65	27.57	94.40	709.08
RMW-86	729.22	21.98	80.10	707.24
RMW-87	728.01	20.30	76.10	707.71
RMW-88	739.11	29.62	102.70	709.49
HR-12	742.64	32.91	134.61	709.73
HR-13	735.03	26.00	87.00	709.03
HR-14	731.63	22.80	91.20	708.83
HR-15	733.74	25.08	102.20	708.66
M73C	716.55	10.50	NM	706.05
MT576M ¹	751.46	41.03	NM	NA
MT596M	757.73	46.41	NM	711.32



Table 6. Groundwater Level Measurements Collected During 2014, RACER Trust, Moraine, Ohio.

Well	Measuring Point Elevation	Depth-to-Water (feet)	Total Depth (feet)	Groundwater Elevation (AMSL)
<u>Production and Fire Wells</u>				
DN-13 (County Well) [ON]	727.78	52.6	NM	NA
11B	742.56	32.92	NM	709.64
12A	742.39	NM	NM	NA
31 ¹	734.05	24.5	87.2	NA
34	733.46	24.68	NM	708.78
39	732.07	23.29	NM	708.78
A	739.00	28.20	NM	710.80
FW-1A	739.89	NM	NM	NA
FW-2	737.48	28.32	NM	709.16
FW-3	739.26	29.82	NM	709.44
FW-4	731.62	23.46	NM	708.16
<u>Stream Gauge*</u>				
SG1 ¹	747.64	NM	NA	NA
SG2	709.95	2.57	NA	707.38
SG3	718.45	7.04	NA	711.41
SG4	714.78	6.13	NA	708.65
SG5 ¹	711.10	1.82	NA	NA
SG6	723.21	15.77	NA	707.44
SG7	731.55	14.66	NA	716.89
<u>IRZ Wells</u>				
RZ-3MM	726.92	19.44	48.96	707.48
RZ-4A	725.71	17.21	55.10	708.50
RZ-4D	727.07	19.60	53.90	707.47
RZ-4L	727.54	20.51	59.81	707.03
<u>Moraine City</u>				
MW-1	715.53	10.01	NM	705.52
MW-4	707.19	5.80	NM	701.39
MW-5	709.34	6.24	NM	703.10
MW-9	712.85	10.47	NM	702.38

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 December 2 to 3, 2014 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.

NM - Not Measured.

NA - Not Applicable.

*Surface water measurement.



Table 7. Summary of Precipitation Measurements Recorded by the National Weather Service, During 2014 - Dayton, Ohio.

Date	Actual Precipitation	Average Precipitation	Departure from Average
January	2.84	2.59	0.25 Above
February	2.14	2.14	0.00
March	2.62	3.22	0.06 Below
April	5.80	3.91	1.89 Above
May	4.68	4.23	0.45 Above
June	3.53	4.00	0.47 Below
July	3.23	3.72	0.49 Below
August	3.06	3.02	0.04 Above
September	0.88	2.93	2.05 Below
October	2.37	2.62	0.25 Below
November	2.04	3.03	0.99 Below
December	2.79	2.93	0.14 Below
2014 Total	35.98	38.34	1.82 Below

All precipitation measurements are reported in inches.

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

Table 8. Horizontal Gradients for Upper/Lower Aquifer Well Pairs in 2014, RACER Trust Moraine, Ohio.

Horizontal Gradients - December 2 and 3, 2014	ft./ft.
W-2-N/W-1-S	3.7E-04
W-3-N/HR-1	4.3E-04
HR-5/HR-1	4.9E-04
HR-6/W-1-S	2.2E-04
HR-4/HR-1	5.0E-04
HR-7/W-1-S	3.3E-04
W-3-N/HR-6	5.8E-04
HR-5/W-1-S	4.2E-04
HR-6/W-4-S	3.8E-04
HR-1/GM-16	5.5E-04
GM-75S/GM-68S	2.1E-03
GM-53/4S	5.4E-04
Average Hydraulic Gradient for all Upper Aquifer Wells	5.7E-04
GM-58/GM-20D	4.7E-04
GM-39/GM-1	4.5E-04
HR-15/GM-3	4.7E-04
HR-14/GM-5	4.8E-04
GM-67D/RMW-87	5.9E-04
Average Hydraulic Gradient for Lower Aquifer Wells	4.9E-04

ft. - Feet.



Table 9. Vertical Gradients for Upper/Lower Aquifer Well Pairs in 2014, RACER Trust Moraine, Ohio.

Vertical Gradients - December 2 and 3, 2014		
Upper/Lower Aquifer Wells	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
HR-3/HR-13	U	+2.4E-03
GM-2/GM-1	D	-5.3E-03
GM-6/GM-3	D	-2.6E-03
4S/GM-5	D	-5.1E-03
GM-75S/GM-75D	U	+1.9E-03
<u>Off-Site/Downgradient</u>		
GM-10/GM-9	D	-4.8E-03
GM-16/GM-15	D	-1.6E-02
GM-18/GM-13	D	-1.1E-02
GM-17/GM-11	D	-5.8E-03
GM-55/GM-56	U	+2.9E-03
GM-65S/GM-65D	NA	0.0E+00

D - Downward gradient (-).

U - Upward gradient (+).

NA - Not applicable.

ft. - Feet.

Upper/lower aquifer well pairs in the vicinity of DN-13 are GM-10/GM-9, GM-16/GM-15, GM-18/GM-13, and GM-17/GM-11.

Table 10. Lower Aquifer Triangular Irregular Network Horizontal Hydraulic Gradients in 2014, 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	1.0E-03	228
	707.55	706.70	707.19		
TIN B	GM-1	GM-4	GM-20D	1.0E-03	310
	707.19	706.70	707.32		
TIN C	GM-4	GM-20D	GM-14	1.8E-03	275
	706.70	707.32	706.03		
TIN D	GM-14	GM-20D	GM-9	1.8E-03	275
	706.03	707.32	706.39		
TIN E	GM-9	GM-14	M73C	7.0E-04	329
	706.39	706.03	706.05		
TIN F	GM-4	GM-14	GM-15	1.2E-03	236
	706.70	706.03	705.79		
TIN G	GM-19D	GM-15	GM-4	1.4E-03	225
	707.55	705.79	706.70		

TIN - Triangular irregular network.

ft. - Feet.

AMSL- Above mean sea level.



Table 11. Site-Wide Groundwater Monitoring Program for 2015, RACER Trust, Moraine, Ohio.

Upper aquifer monitoring wells to be sampled in 2015:

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 2015:

HR-12	GM-9	GM-19D	GM-68D	GM-83D	RMW-86	RMW-89
HR-15	GM-11	GM-20D	GM-75D	GM-84	RMW-87	RMW-90
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 2015 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.

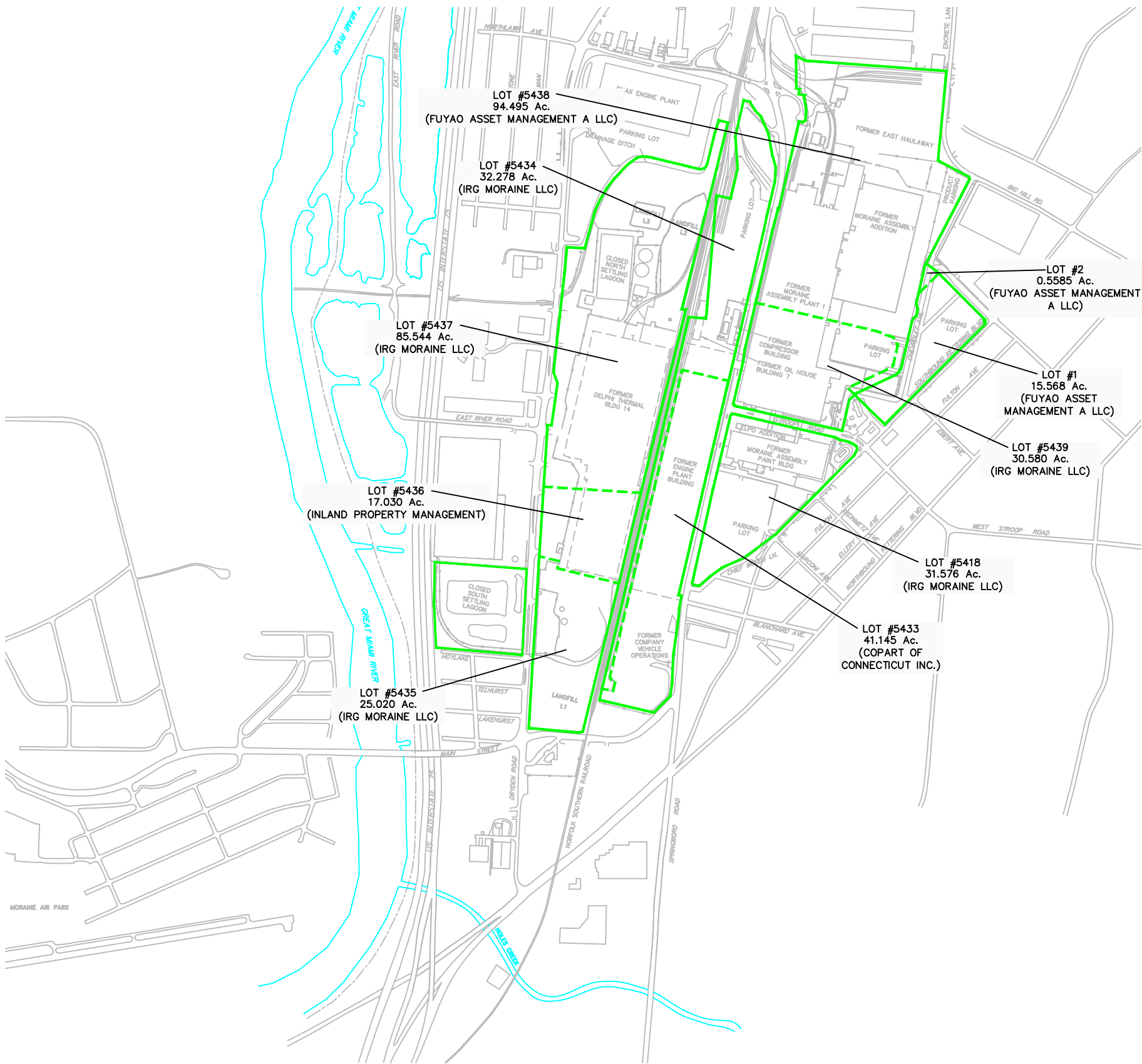
Upper aquifer monitoring wells HR-3, GM-30, GM-31, and GM-51 are included due to the observed increase in volatile organic compound concentrations observed during the 2014 Annual Site-Wide Groundwater Monitoring Program.

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.



0 200 1000ft

LEGEND

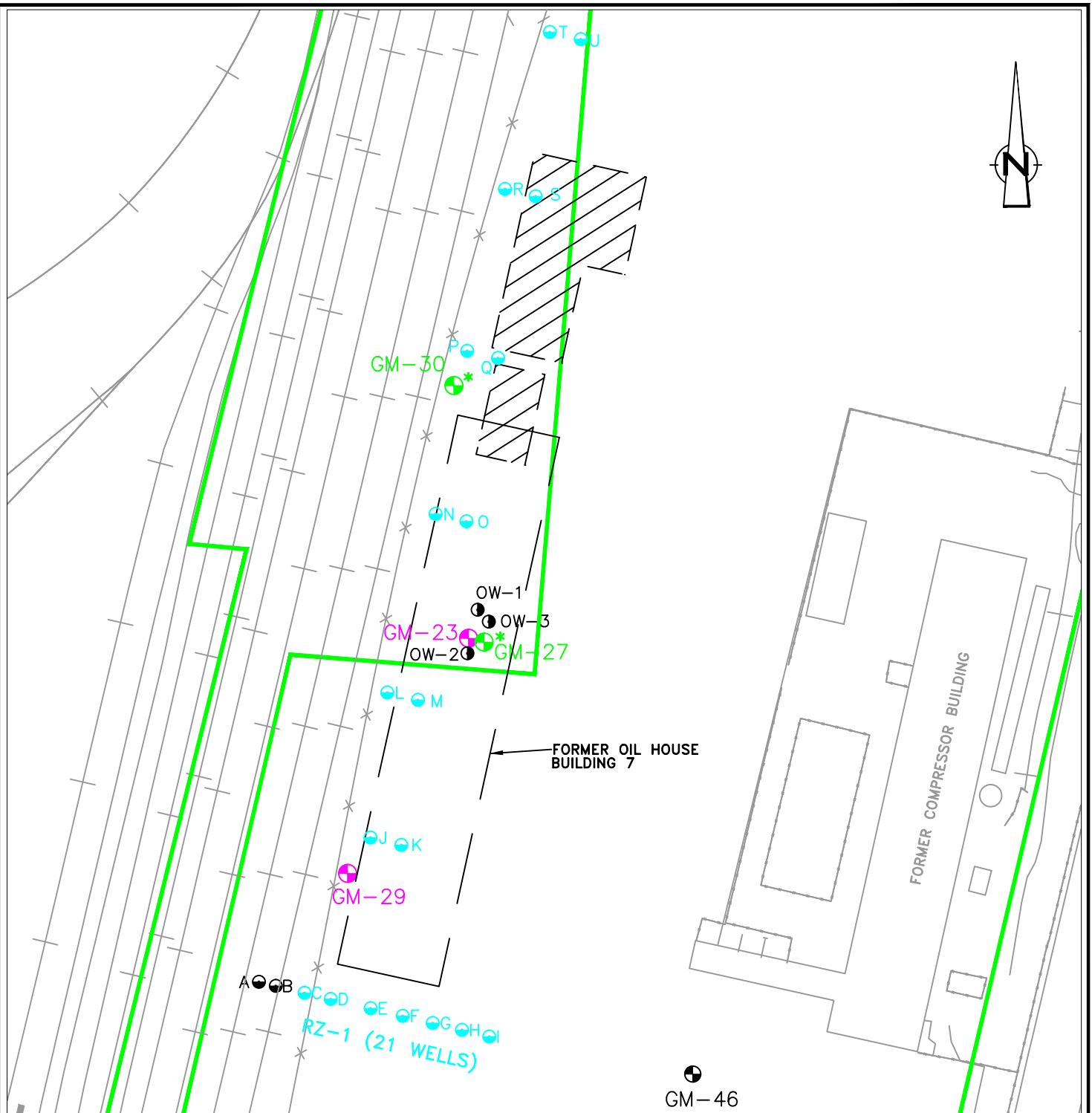
- PROPERTY BOUNDARY
- PARCEL BOUNDARY
- RIVER LEVEE
- FORMER BUILDING FOOTPRINT
- SURFACE WATER FEATURE

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SITE LAYOUT



FIGURE
2



LEGEND

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

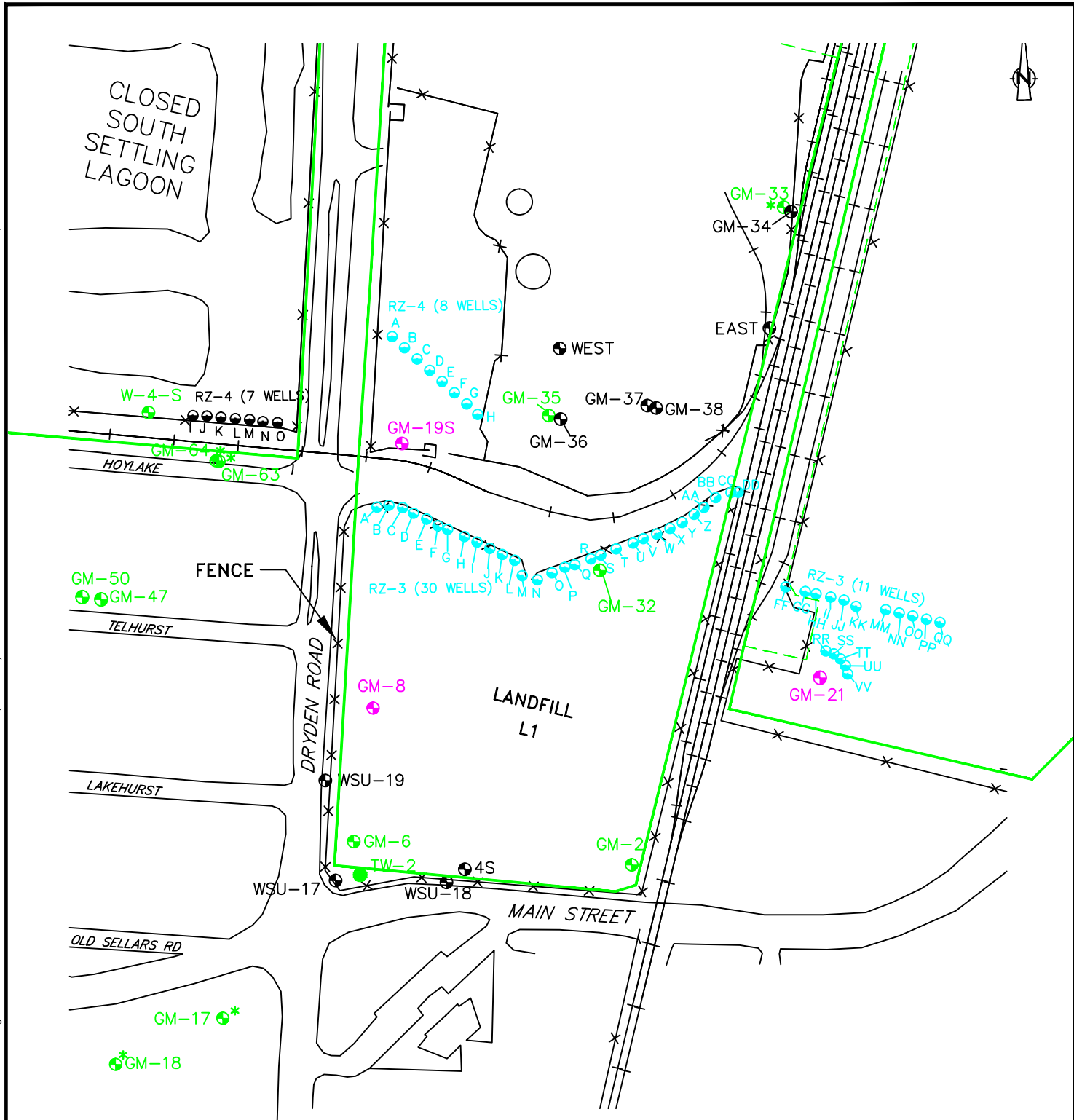
0 150 FT

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REACTIVE ZONE #1



FIGURE
3



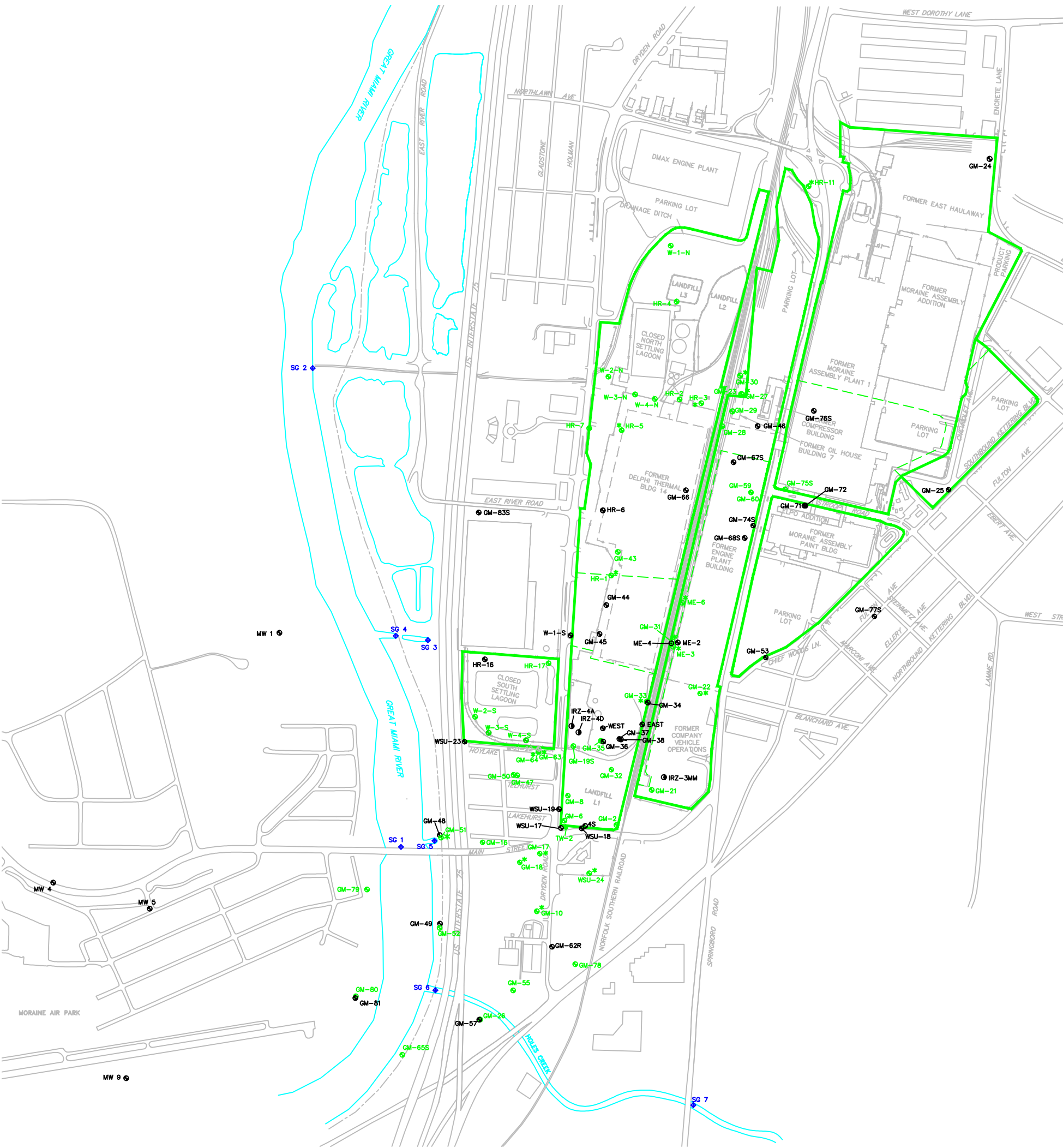
A horizontal scale bar with vertical tick marks at 0, 75, 150, 225, and 300 feet. The bar is divided into alternating black and white segments.

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REACTIVE ZONES #3 AND #4

FIGURE
4

NOTE: INTRODUCTION WELL RZ-3LL WAS NOT INSTALLED DUE TO PRESENCE OF UNDERGROUND UTILITIES.



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
- PROPERTY BOUNDARY
- PARCEL BOUNDARY

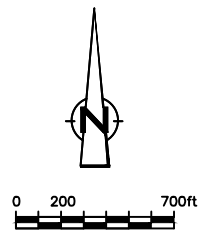


0 200 1000ft

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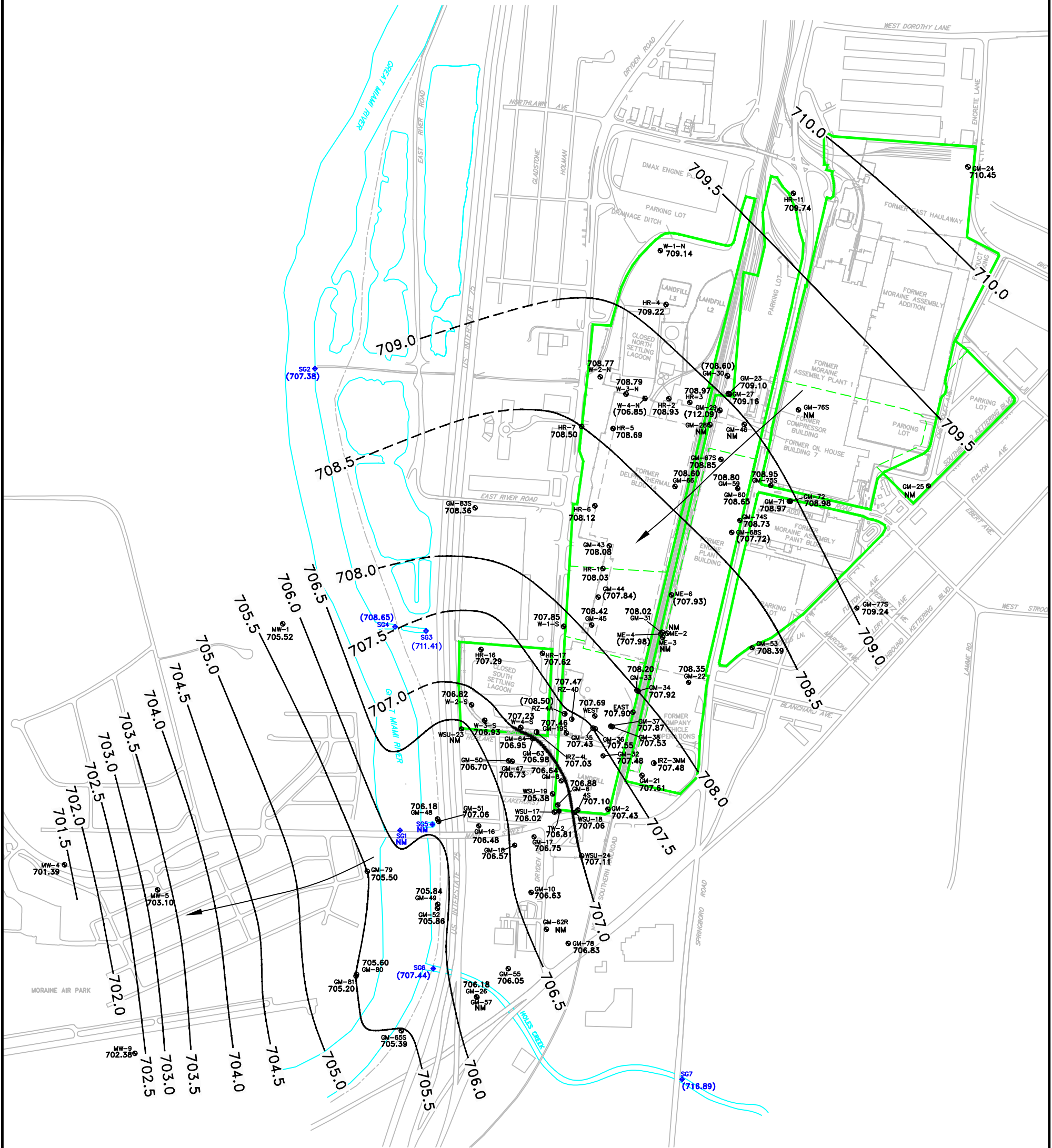
UPPER AQUIFER MONITORING WELLS
FOR SITE-WIDE GROUNDWATER
MONITORING



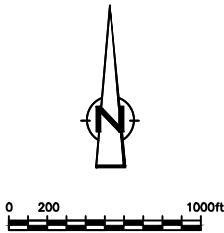


LOWER AQUIFER MONITORING WELLS FOR SITE-WIDE GROUNDWATER MONITORING





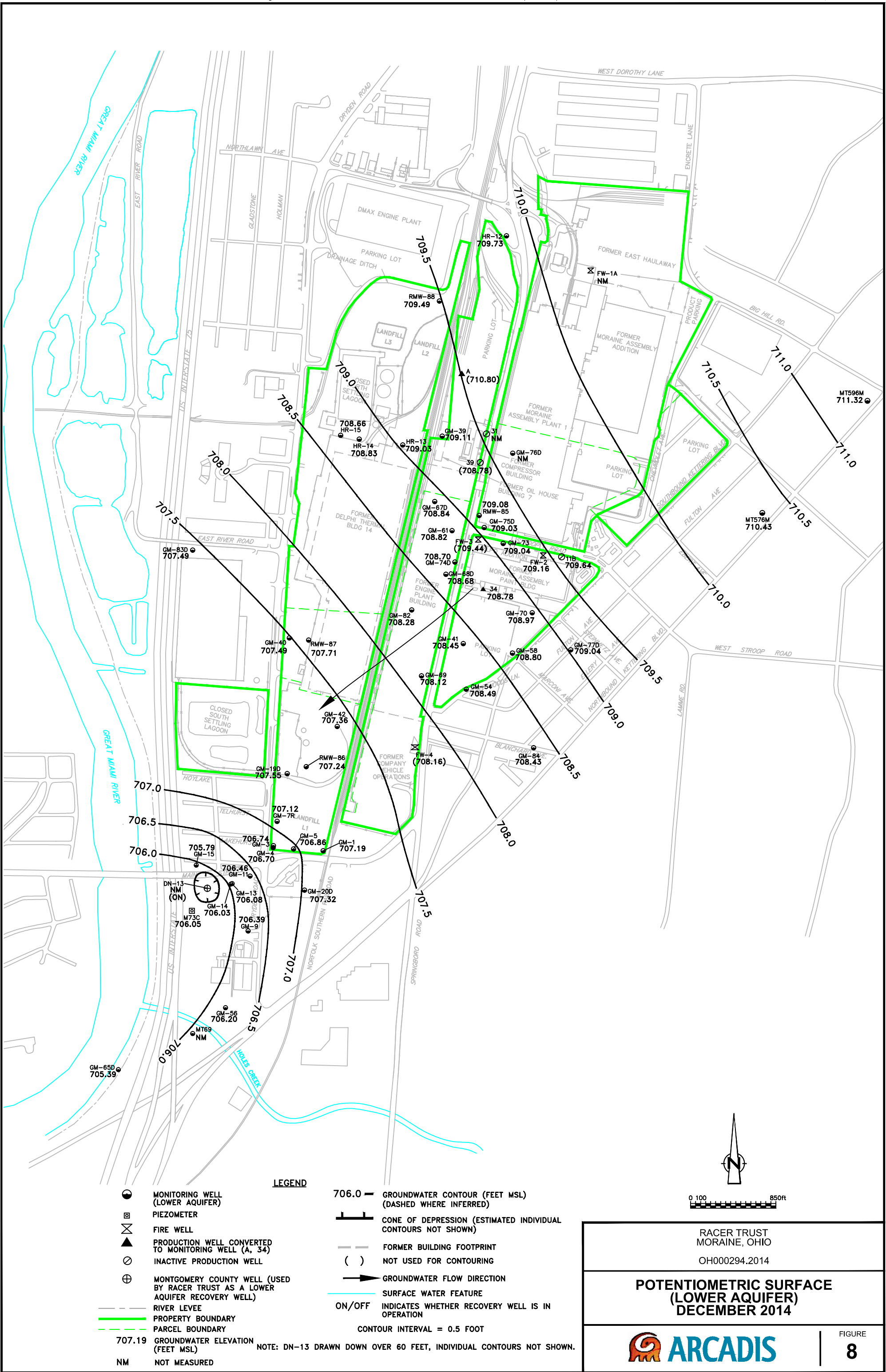
- LEGEND**
- MONITORING WELL (UPPER AQUIFER)
 - INACTIVE RECOVERY WELL (TW-2)
 - ◆ 707.94 STREAM GAUGE AND STREAM GAUGE MEASUREMENT; NOT USED FOR CONTOURING
 - CARBON INTRODUCTION WELL
 - RIVER LEVEE
 - PROPERTY BOUNDARY
 - PARCEL BOUNDARY
 - 709.14 GROUNDWATER ELEVATION (FEET MSL)
 - 706.0 GROUNDWATER 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



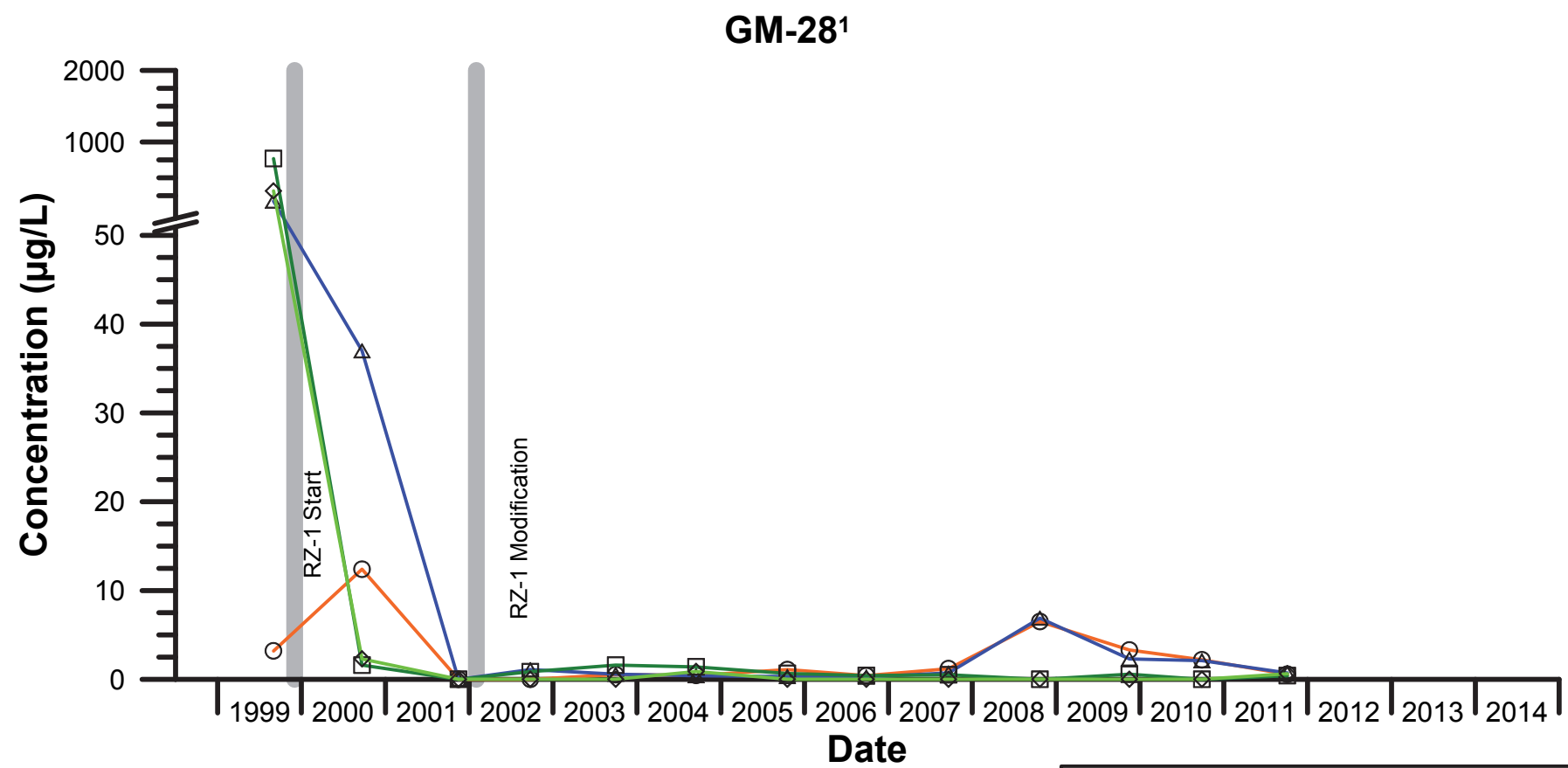
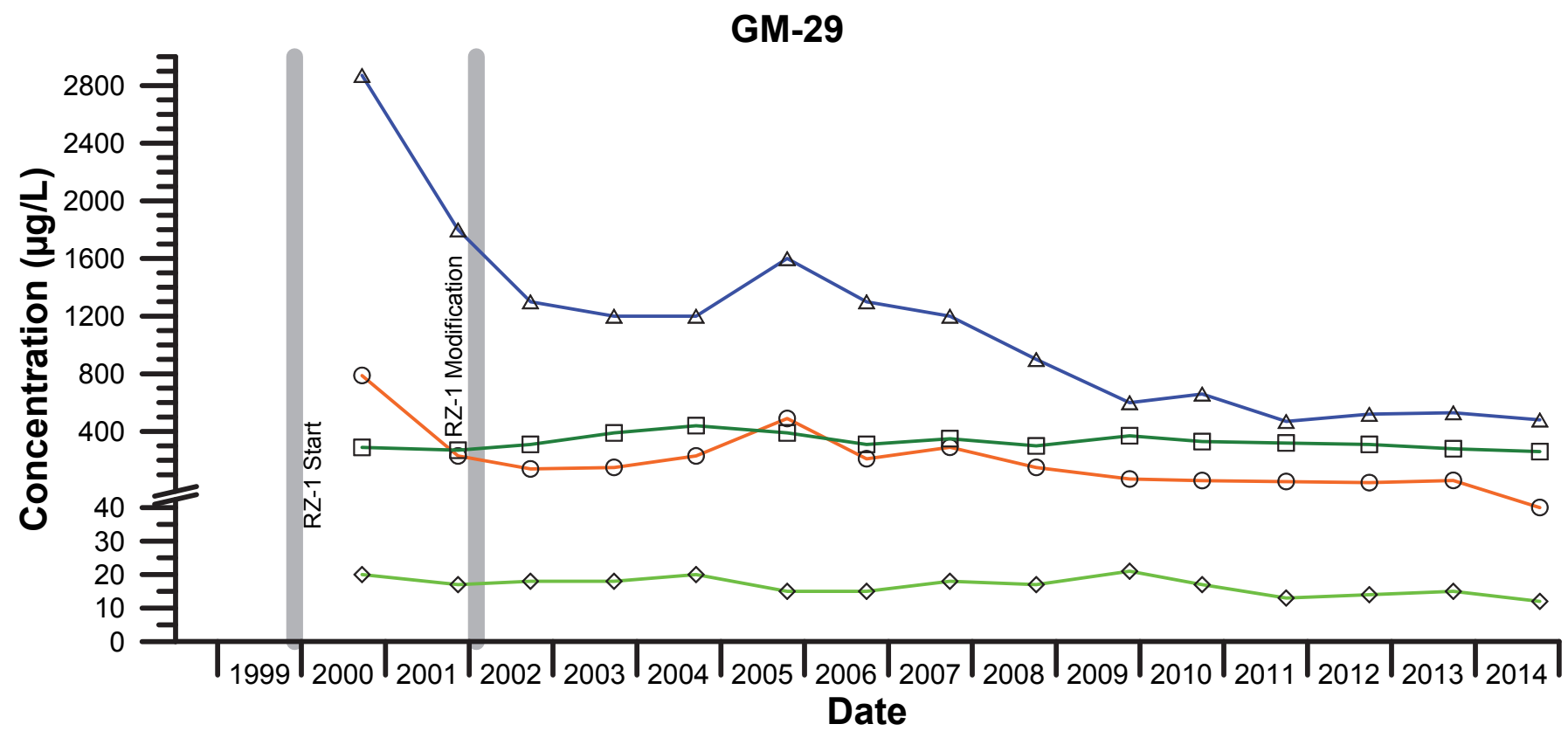
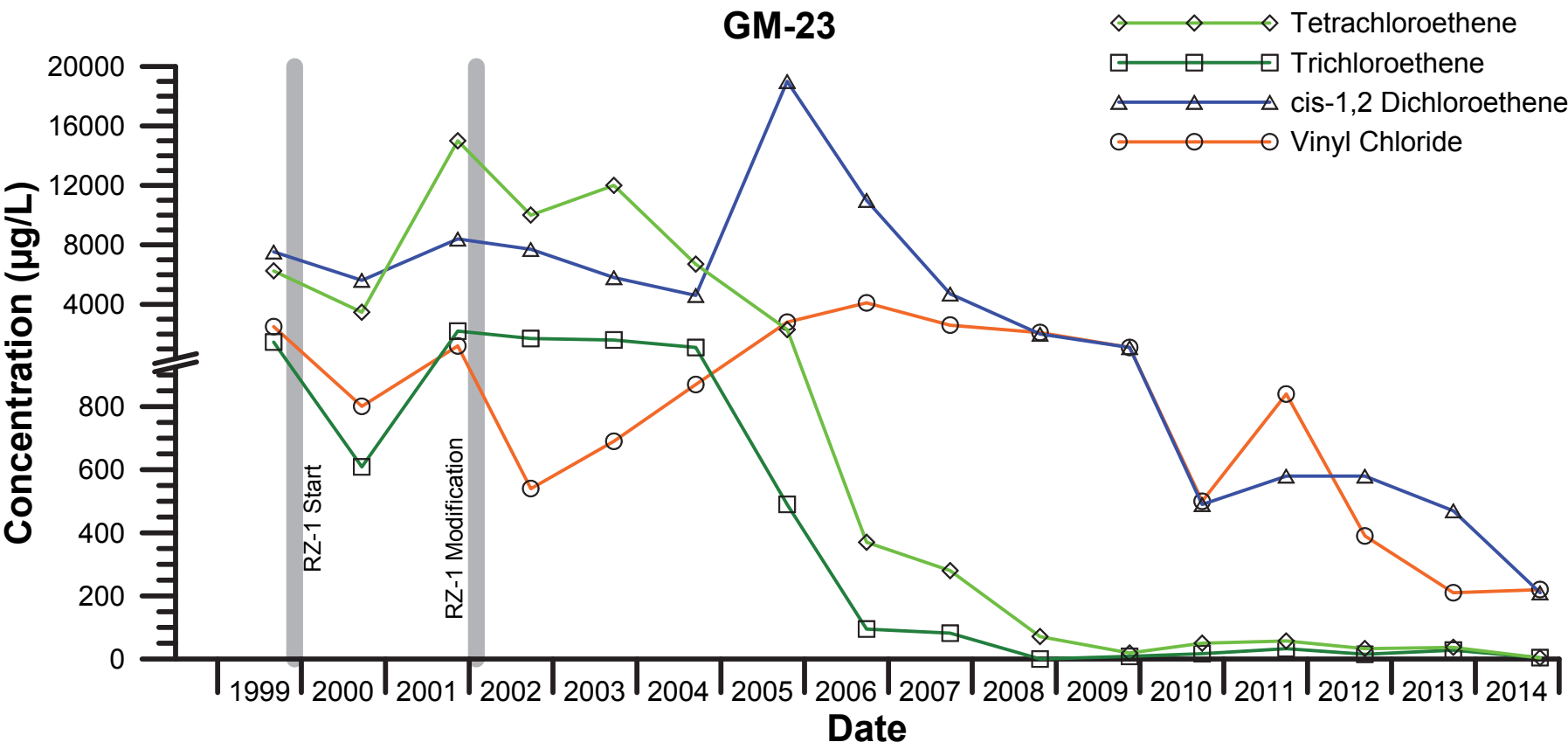
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**POTENTIOMETRIC SURFACE
(UPPER AQUIFER)
DECEMBER 2014**





Years (total)	10,000
---------------	--------



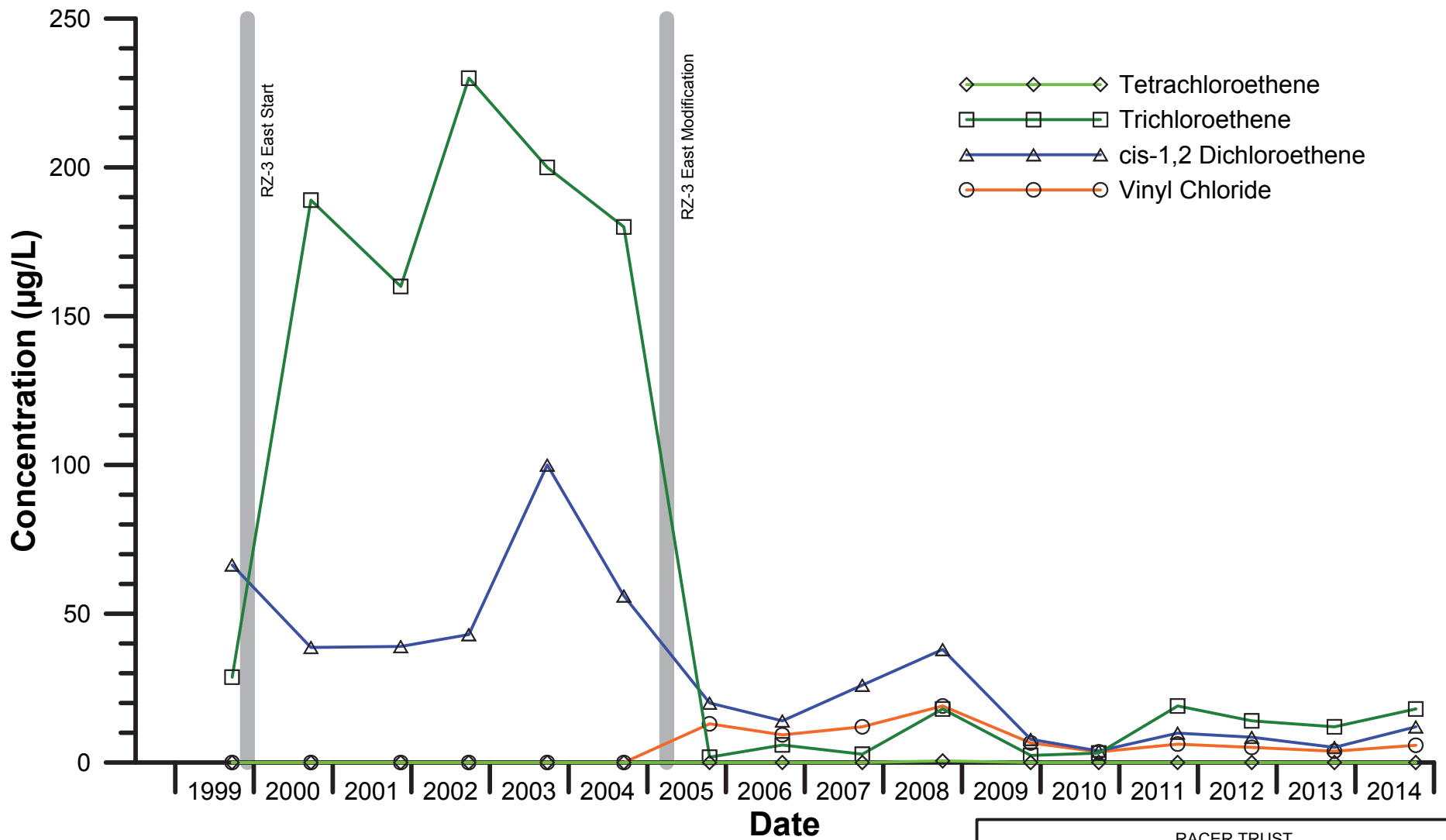
1. Performance monitoring well GM-28 was not sampled in 2012 through 2014 due to an obstruction in the well.

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**RZ-1 AREA GROUNDWATER
CONCENTRATION GRAPHS**



GM-21



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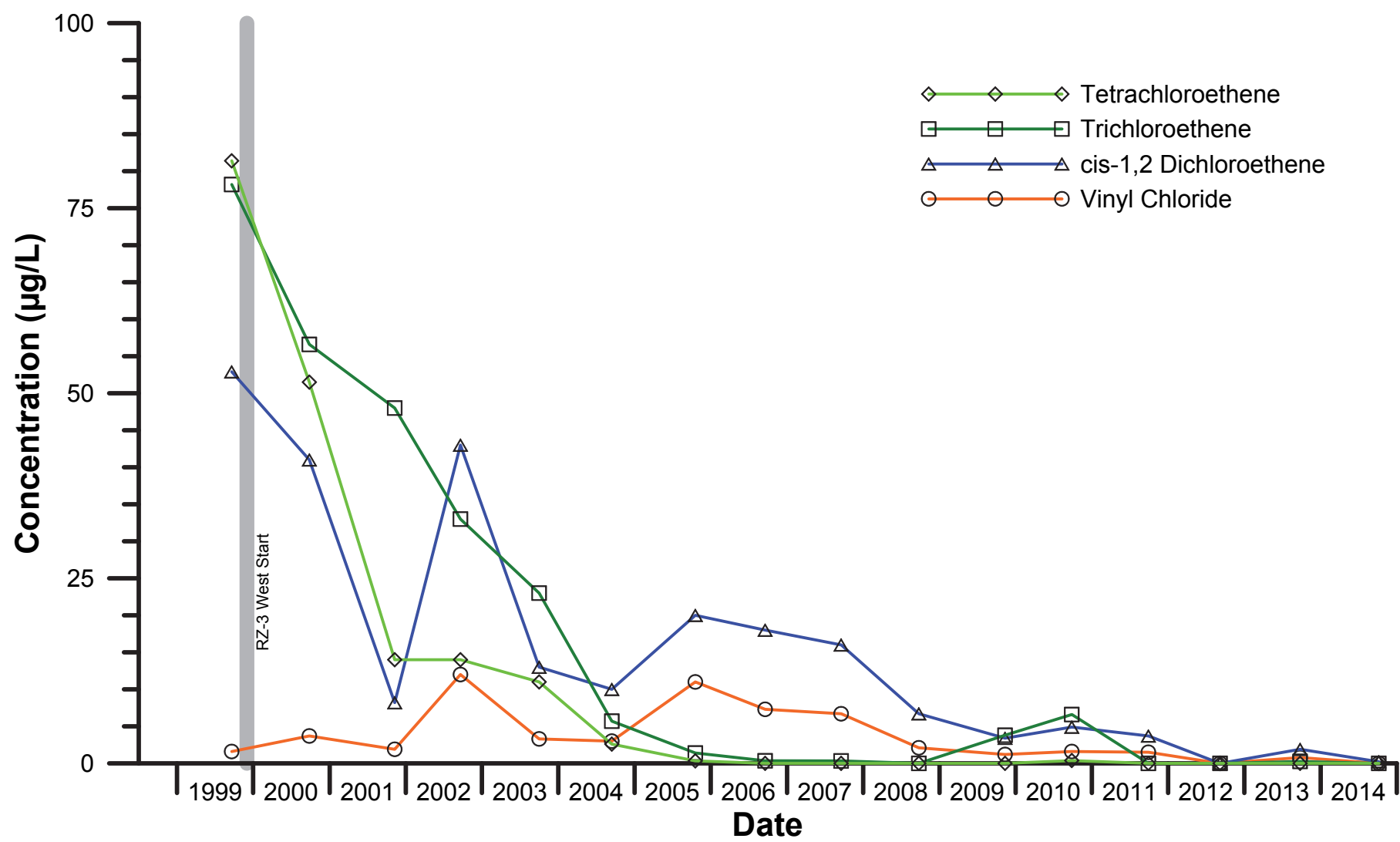
RZ-3 EAST AREA GROUNDWATER CONCENTRATION GRAPH



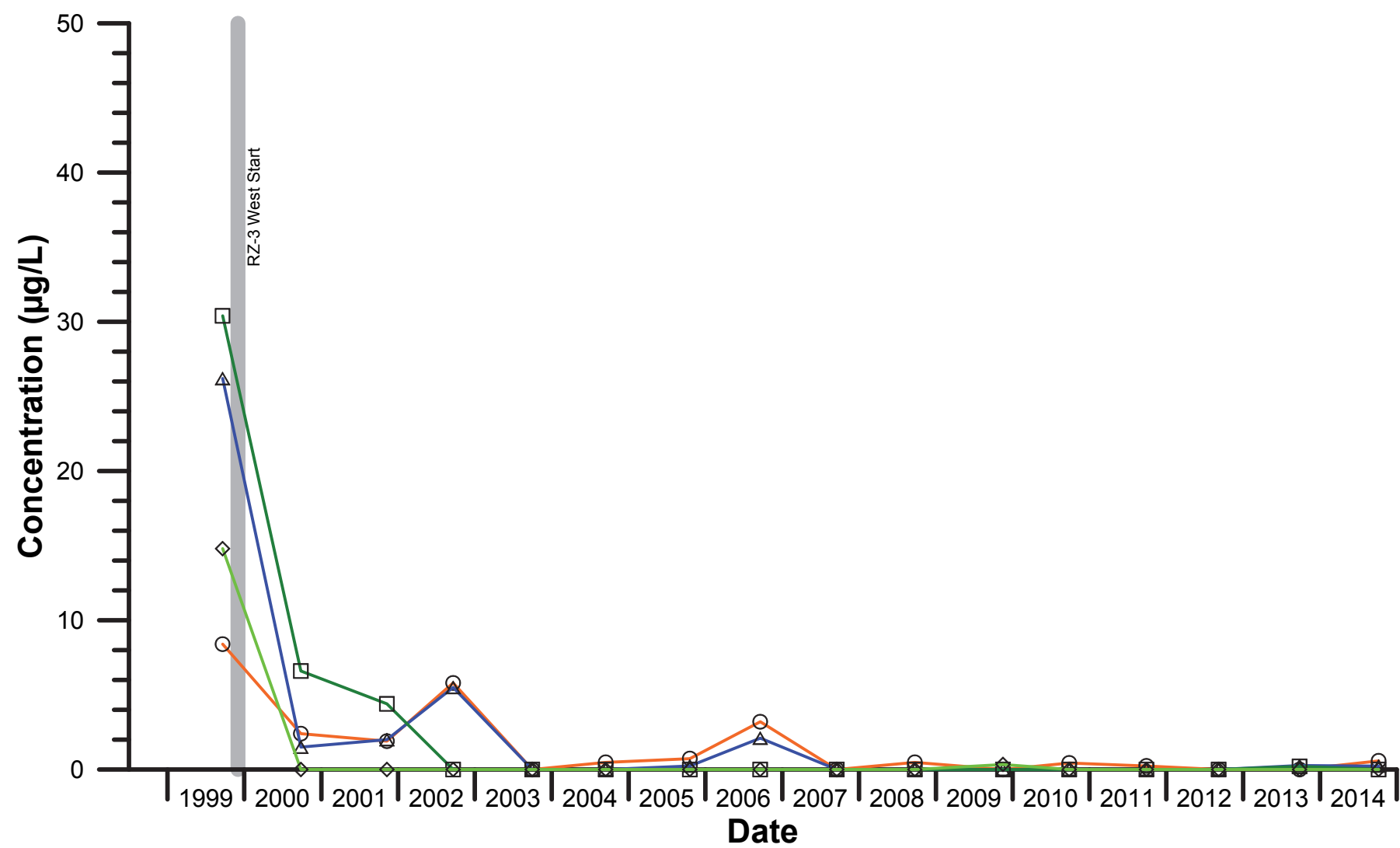
FIGURE

12

GM-6



GM-8

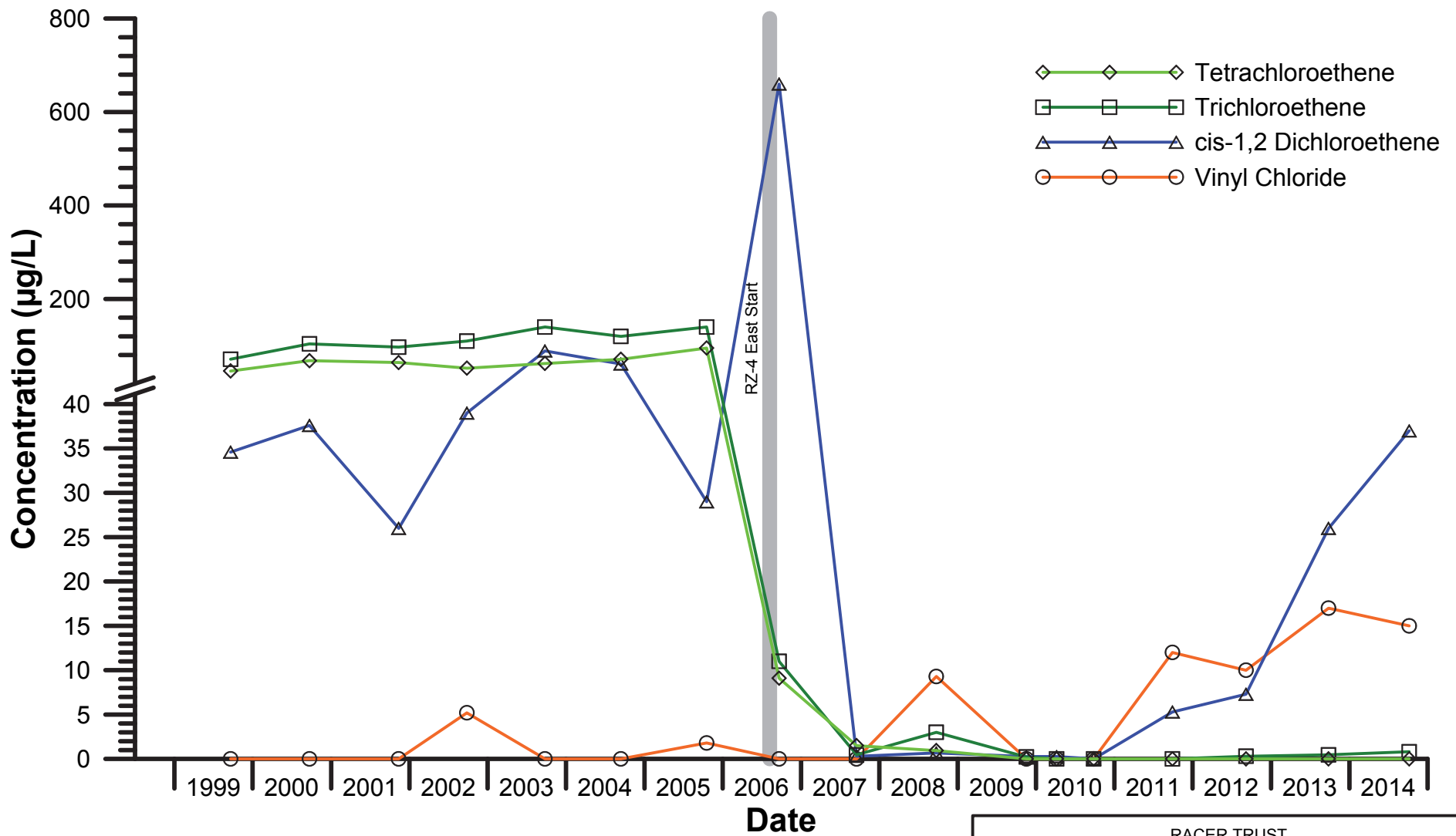


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**RZ-3 WEST AREA GROUNDWATER
CONCENTRATION GRAPHS**



GM-19S



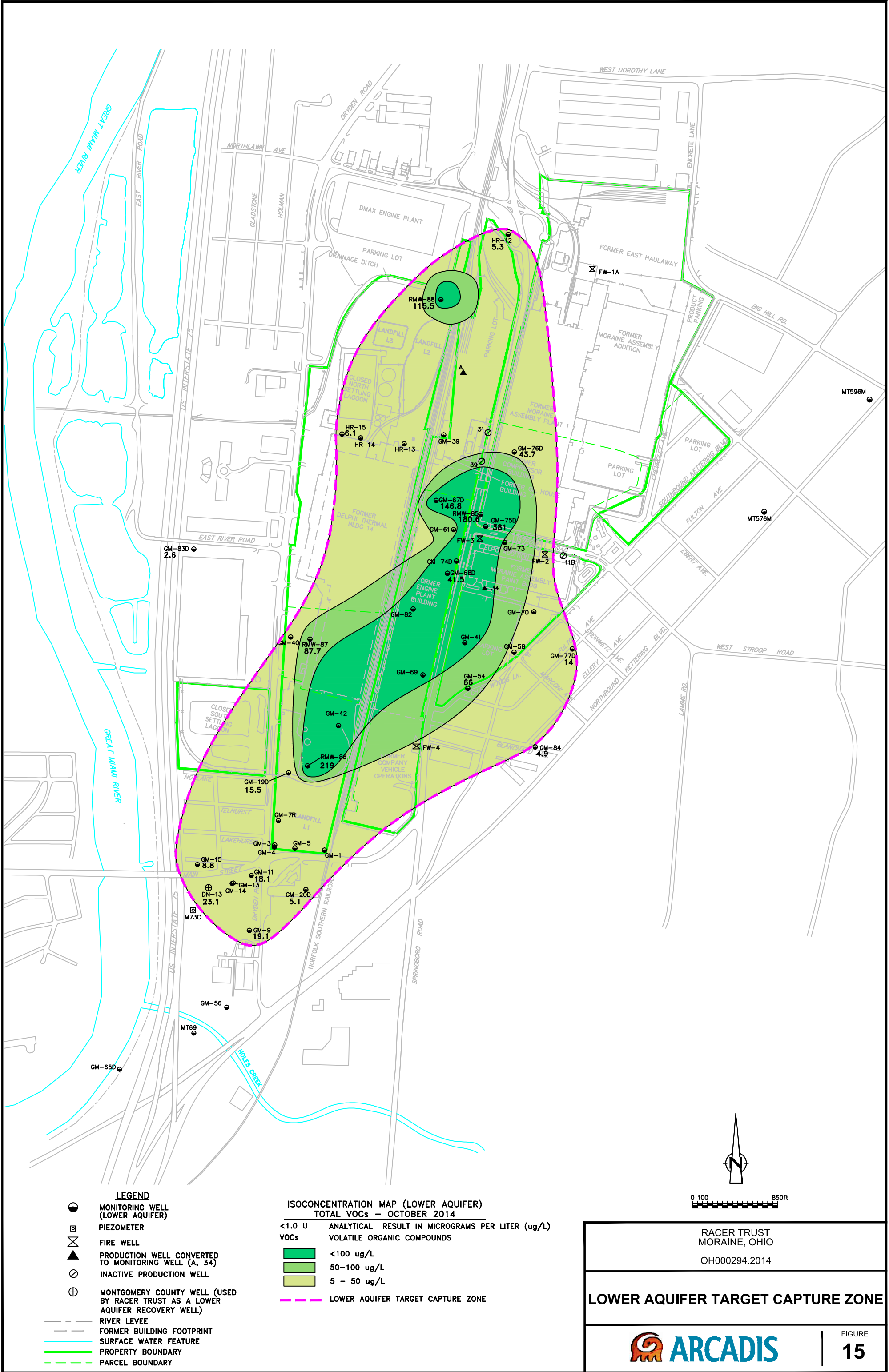
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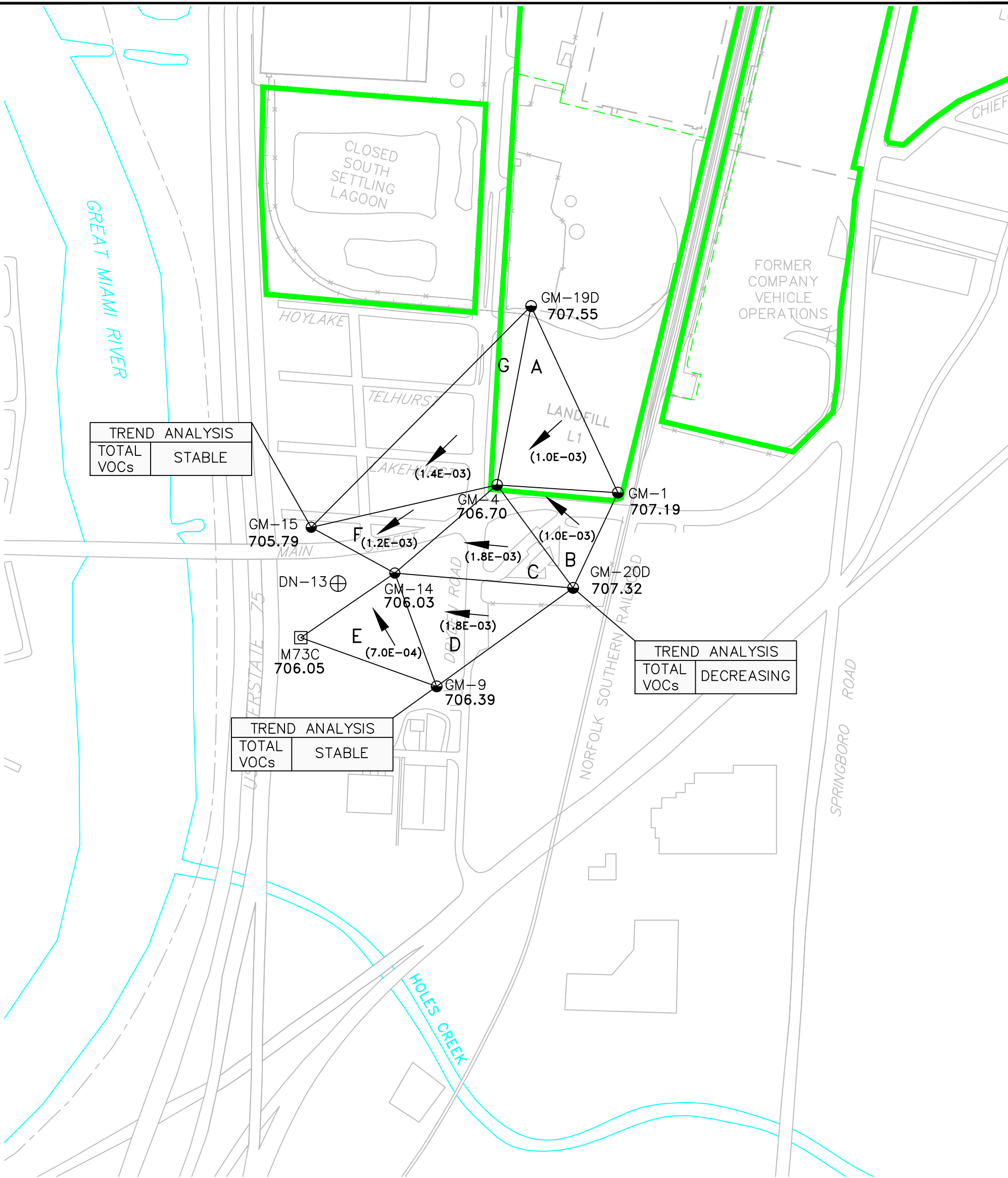
RZ-4 EAST AREA GROUNDWATER CONCENTRATION GRAPH



FIGURE

14



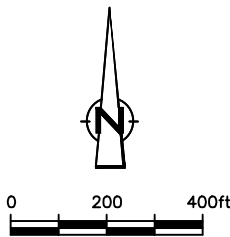


LEGEND

- GM-9 MONITORING WELL (LOWER AQUIFER)
- PIEZOMETER (LOWER AQUIFER)
- MONTGOMERY COUNTY WELL (LOWER AQUIFER CAPTURE WELL - NPDES OUTFALL DISCHARGE)
- RIVER LEVEE
- FORMER BUILDING FOOTPRINT
- SURFACE WATER FEATURE
- PROPERTY BOUNDARY
- PARCEL BOUNDARY
- A TRIANGULAR IRREGULAR NETWORK (TIN) CELL ID
- (1.0E-0.3) GRADIENT DIRECTION AND MAGNITUDE (FOOT/FOOT)

TREND ANALYSIS	
TOTAL VOCs	STABLE

MANN-KENDALL TEST RESULTS
SEE SECTION 3.2.7 OF MAIN REPORT

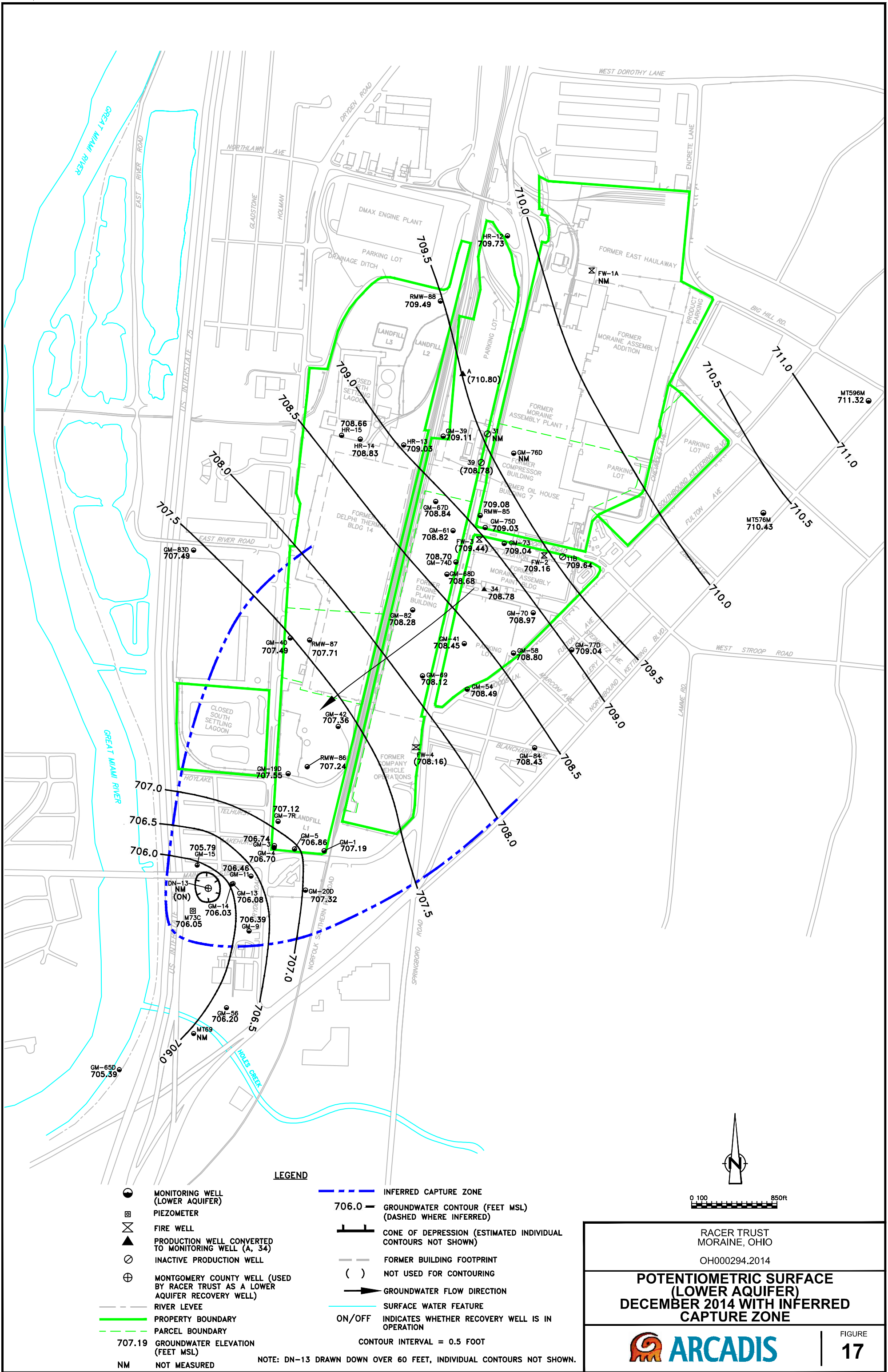


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LOWER AQUIFER HORIZONTAL
GRADIENTS AND CONCENTRATION TREND
ANALYSIS RESULTS
DECEMBER 2014

ARCADIS

FIGURE
16





Appendix A

In-Situ Reactive Zones Performance
Results for 2014

In-Situ Reactive Zones Performance Results

As described in Section 1.4 of the Site-Wide Groundwater Monitoring Report for 2014 (Monitoring Report), the carbon solution delivery network consisted of three reactive zones, RZ-1, RZ-3 (East and West), and RZ-4 (East). During 2014, 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 volatile organic compound (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 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 from the RZ monitoring wells are presented in Tables A-3 through A-6 of this appendix. The bioattenuation parameter data collected from the RZ monitoring wells are presented on Tables A-7 through A-10. 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 RZ monitoring wells is discussed below and presented graphically on Figures A-1 through A-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 2014 due to an obstruction in the well. At RZ-1, carbon is introduced into 19 injection wells designated as 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 into 30 injection wells designated as 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 into 10 injection wells which

include 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 eight injection wells designated as RZ-4A through RZ-4H.

During 2014, a target volume of 800 gallons, 1,600 gallons, 1,600 gallons, and 3,000 gallons of a 2 percent molasses solution was injected per introduction well at RZ-1, RZ-3 West, RZ-3 East, and RZ-4 East, respectively. Injections were completed on a quarterly basis during the months of March, June, September, and November 2014 in accordance with the revised injection frequency which was determined through implementation of the In-Situ Reactive Zone Interim Measure Injection Frequency Evaluation dated January 13, 2014. See Section 1.4.1 of the Monitoring Report that details the results of this evaluation with data summarized in Tables A-1 and A-2. Table A-1 is a summary of the TOC analytical results collected during the evaluation period. Table A-2 is a summary of the summary of the half-life analysis.

Table 2 in the Monitoring Report presents the carbon solution introduction volumes for different introduction wells in 2014..

Analysis of Primary Operational Monitoring Data

The primary operational data are 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 A-3 through A-10. Figures A-1 through A-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 standard units (s.u.), and the acceptable pH range extends from 5 to 9 s.u. All pH measurements collected in 2014 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 significantly above the background levels observed in these monitoring wells in 1999 (e.g., sampling before the start of carbon introductions) indicating conditions conducive for reductive dechlorination (e.g., methanogenic conditions) are being maintained.

TOC concentrations at RZ-3 West performance monitoring wells indicate concentrations ranging from background levels (monitoring well GM-8) to above background levels (monitoring well GM-32). These data are anticipated and consistent with historical data. Specifically, monitoring well GM-8 is located greater than 300 feet downgradient of the injection wells and the carbon is consumed prior to reaching this location. Conversely, monitoring well GM-32 is located in close proximity to the injection wells and it is expected that elevated TOC (e.g., >20 milligrams per liter) be observed at this location. Methane remained significantly above background conditions at monitoring well GM-8 indicating that conditions conducive for reductive dechlorination are being maintained in close proximity (e.g., just upgradient) as a result of the carbon injections at RZ-3 West.

TOC concentrations at RZ-3 East monitoring well GM-21 indicate TOC concentrations are significantly above baseline conditions and consistent with historical data. Likewise, the concentration of methane remained significantly elevated and indicate conditions conducive for reductive dechlorination are being maintained as a result of the carbon injections at RZ-3 East.

The TOC concentration at RZ-4 East monitoring well GM-19S were at background or slightly above background levels and indicate the carbon is being consumed rapidly by an active soil microbial community. The concentration of methane at monitoring well GM-19S remained above the background levels but lower when compared to other RZ performance monitoring wells at the site. Nonetheless, the concentrations of chlorinated VOCs remain significantly lower than baseline levels and the presence of ethene continues to corroborate that the complete reductive dechlorination is occurring. These data will continue to be monitored in 2015 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 A-3 for RZ-1, Table A-4 for RZ-3 West, Table A-5 for RZ-3 East, and Table A-6 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 A-1), RZ-3 West (GM-8 Figure A-2), RZ-3 East (GM-21 Figure A-2), and RZ-4 East (GM-19S Figure A-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 2014 within the RZ-1 treatment area. The total chlorinated VOC concentrations in GM-29 were slightly lower in 2014 as compared to 2013 (825.6 micrograms per liter [ug/L] in 2014 and 933.9 ug/L in 2013). Total chlorinated VOC concentrations in GM-23 decreased from 764.6 ug/L in 2013 to 466.1 ug/L in 2014. It should be noted that total chlorinated VOC concentrations in GM-23 have decreased significantly from the maximum concentration of 26,800 ug/L observed in November 2001.
- Concentrations of total chlorinated VOCs at RZ-3 West monitoring well GM-8 remained stable in 2014 (2.6 ug/L) compared to 2013 (3.3 ug/L). These data continue to document the effectiveness of the carbon injections at RZ-3 West.
- 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 increased slightly in 2014 (53.4 ug/L) when compared to 2013 (31.5 ug/L) but remained significantly lower than the maximum concentration observed in 2000 (403.3 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 52.9 ug/L in 2013 and 61.3 ug/L in 2014, 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 strongly reducing within and downgradient of the reactive zones due to the introduction of carbohydrate, as evidenced by the presence of methane at concentrations significantly above background 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;
- Enhanced reductive dechlorination continued to achieve the desired reduction of VOC concentrations in groundwater; and
- No significant change in anaerobic conditions (e.g., the concentration of methane) or treatment effectiveness (e.g., sustained reductions in chlorinated VOC concentrations with the observation of elevated ethene and/or ethane) were observed as a result of decreasing the injection frequency to quarterly. The data corroborate previous evaluations and indicate the quarterly injection frequency is appropriate for the site. However, the data will continue to be evaluated in 2015.



Table A-1. TOC Data in the Reactive Zone, RACER Trust, Moraine, Ohio.

Monitoring Location	Date	Days Since Injection	TOC (mg/L)
RZ-3D	12/11/2013	0	3200
	1/9/2014	29	940
	2/11/2014	62	720
RZ-3S	12/11/2013	0	2600
	1/9/2014	29	1800
	2/11/2014	62	980
RZ-3TT	12/11/2013	0	3600
	1/9/2014	29	1900
	2/11/2014	62	370
RZ-1E	12/11/2013	0	2800
	1/9/2014	29	560
	2/11/2014	62	420
RZ-4E	12/11/2013	0	2300
	1/9/2014	29	1300
	2/11/2014	62	840

mg/L - Milligrams per Liter.

TOC - Total Organic Carbon.



Table A-2. Reactive Zone TOC Decay and Required Carbon Introduction Frequency, RACER Trust, Moraine, Ohio.

			Calculated Half-life	Estimated Days to Reach 20 mg/L from Last Sampling Date (t) ⁽²⁾	Required Injection Frequency ⁽³⁾
Monitoring Location	Recent Injection Date	Recent Sample Collection Date	k (day ⁻¹) ⁽¹⁾	(days)	(months)
RZ-3D	12/9/2013	2/11/2014	0.0237	151.20	7.17
RZ-3S	12/9/2013	2/11/2014	0.0158	308.07	12.40
RZ-3TT	12/6/2013	2/11/2014	0.037	121.62	6.29
RZ-1E	12/9/2013	2/11/2014	0.0301	129.30	6.44
RZ-4E	12/10/2013	2/11/2014	0.0162	320.55	12.79
				Average (months) =	9.02

(1) $t = -(1/k) \ln(C/C_0)$

(2) Slope from k-value plots

(3) Required injection frequency = t + days between December 2013 injection event and February 2014 TOC sampling event



Table A-3. Summary of Annual Groundwater Analytical Results from Reactive Zone 1 Wells, RACER Trust, Moraine, Ohio.

RZ-1			GM-29																							
Constituents	Units	MCL ¹	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	10/9/14	
<u>Volatile Organic Compounds</u>																										
1,1,1-Trichloroethane	ug/L	200	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	9.1 J	
1,1-Dichloroethane	ug/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	9.5 J	
1,1-Dichloroethene	ug/L	7	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	< 14 U	
Benzene	ug/L	5	<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	< 14 U	
cis-1,2-Dichloroethene	ug/L	70	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	480	
Ethylbenzene	ug/L	700	<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	< 14 U	
Tetrachloroethene	ug/L	5	<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	12 J	
Toluene	ug/L	1000	<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	< 14 U	
trans-1,2-Dichloroethene	ug/L	100	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	15	
Trichloroethene	ug/L	5	878	758	649J	289	354	437J	270	320	380	310	280	390	440	390	310	350	300	370	330	320	310	280	260	
Vinyl chloride	ug/L	2	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	40	
Xylenes	ug/L	10,000	<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	< 29 U	
Total VOCs	ug/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	825.6	

MCL - Maximum Contaminant Level.
ug/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) MCL not listed for 1,1-dichloroethene.
(2) Well GM-28 not sampled in 2012 through 2014 due to obstruction in well.
Bold - Result above MCL.



Table A-3. Summary of Annual Groundwater Analytical Results from Reactive Zone 1 Wells, RACER Trust, Moraine, Ohio.

RZ-1			GM-23																							
Constituents	Units	MCL ¹	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	10/10/14	
Volatile Organic Compounds																										
1,1,1-Trichloroethane	ug/L	200	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	< 10 U	
1,1-Dichloroethane	ug/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	8.4 J	
1,1-Dichloroethene	ug/L	7	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	< 10 U	
Benzene	ug/L	5	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	< 10 U	
cis-1,2-Dichloroethene	ug/L	70	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	210	
Ethylbenzene	ug/L	700	< 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	< 10 U	
Tetrachloroethene	ug/L	5	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	3.6 J	
Toluene	ug/L	1000	<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	< 10 U	
trans-1,2-Dichloroethene	ug/L	100	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	20	
Trichloroethene	ug/L	5	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	4.1 J	
Vinyl chloride	ug/L	2	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	220	
Xylenes	ug/L	10,000	< 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	< 20 U	
Total VOCs			ug/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	466.1

MCL - Maximum Contaminant Level.
ug/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) MCL not listed for 1,1-dichloroethene.
(2) Well GM-28 not sampled in 2012 through 2014 due to obstruction in well.
Bold - Result above MCL.



Table A-3. Summary of Annual Groundwater Analytical Results from Reactive Zone 1 Wells, RACER Trust, Moraine, Ohio.

RZ-1			GM-28 ⁽¹⁾																				
Constituents	Units	MCL ¹	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
Volatile Organic Compounds																							
1,1,1-Trichloroethane	ug/L	200	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	ug/L		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	ug/L	7	<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	ug/L	5	<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	ug/L	70	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	ug/L	700	<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	ug/L	5	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	ug/L	1000	<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	ug/L	100	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	ug/L	5	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	ug/L	2	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	ug/L	10,000	<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	ug/L		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

MCL - Maximum Contaminant Level.
ug/L - Micrograms per Liter.
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UJ - Constituent not detected above laboratory reporting limit; reporting limit estimated.
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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) MCL not listed for 1,1-dichloroethene.
(2) Well GM-28 not sampled in 2012 through 2014 due to obstruction in well.
Bold - Result above MCL.



Table A-4. 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	MCL ¹	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	10/7/14	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	10/7/14
Volatile Organic Compounds																																				
1,1,1-Trichloroethane	ug/L	200	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	<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	<1.0 U	<1.0 U
1,1-Dichloroethane	ug/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	0.59 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	0.36 J
1,1-Dichloroethene	ug/L	7	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 U	<1.0	1.2	<1.0	<2.0	<2.0	<1.0	<1 U	<1.0 U	<1 U	<1 U	<1 U	<1.0 U	<1 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U
Benzene	ug/L	5	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	1.2	<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	<1.0 U
cis-1,2-Dichloroethene	ug/L	70	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	0.23 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	0.23 J
Ethylbenzene	ug/L	700	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 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	<1.0 U	
Tetrachloroethene	ug/L	5	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	<1.0 U	94.0	81.4	51.5	14	14	11	2.6	0.34 J	<1 U	<1 U	<1 U	<1 U	<1.0 U	0.38 J	<1.0 U	<1.0 U	<1.0 U
Toluene	ug/L	1000	<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 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	<1.0 U	
trans-1,2-Dichloroethene	ug/L	100	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	<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	<1.0 U
Trichloroethene	ug/L	5	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	<1.0 U	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	<1.0 U
Vinyl chloride	ug/L	2	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	0.58 J	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	<1.0 U
Xylenes	ug/L	10,000	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	<2.0 U	<1.0	<1.0	<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	<2.0 U	
Total VOCs		ug/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	2.6	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	0.6

MCL - Maximum Contaminant Level.
ug/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) MCL not listed for 1,1-dichloroethene.
Bold - Result above MCL.



Table A-5. Summary of Annual Groundwater Analytical Results from Reactive Zone 3 East Wells, RACER Trust, Moraine, Ohio.

RZ-3 East			GM-21																							
Constituents	Units	MCL ¹	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	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	10/9/14
<u>Volatile Organic Compounds</u>																										
1,1,1-Trichloroethane	ug/L	200	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	< 1.0 U
1,1-Dichloroethane	ug/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	16
1,1-Dichloroethene	ug/L	7	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	< 1.0 U
Benzene	ug/L	5	<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	< 1.0 U
cis-1,2-Dichloroethene	ug/L	70	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	12
Ethylbenzene	ug/L	700	<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	< 1.0 U
Tetrachloroethene	ug/L	5	<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	< 1.0 U
Toluene	ug/L	1000	<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	< 1.0 U
trans-1,2-Dichloroethene	ug/L	100	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	1.6
Trichloroethene	ug/L	5	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	18
Vinyl chloride	ug/L	2	<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	5.8
Xylenes	ug/L	10,000	<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	< 2.0 U
Total VOCs	ug/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	53.4

MCL - Maximum Contaminant Level.
ug/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) MCL not listed for 1,1-dichloroethene.
Bold - Result above MCL.



Table A-6. Summary of Annual Groundwater Analytical Results from Reactive Zone 4 East Wells, RACER Trust, Moraine, Ohio.

RZ-4 East			GM-19S																								
Constituents	Units	MCL ¹	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	10/7/14			
Volatile Organic Compounds																											
1,1,1-Trichloroethane	ug/L	200	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	<1.0 U	<1.4 U		
1,1-Dichloroethane	ug/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	7.6			
1,1-Dichloroethene	ug/L	7	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	<1.4 U			
Benzene	ug/L	5	<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	<1.4 U			
cis-1,2-Dichloroethene	ug/L	70	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	37			
Ethylbenzene	ug/L	700	<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	<1.4 U			
Tetrachloroethene	ug/L	5	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	<1.4 U			
Toluene	ug/L	1000	<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	<1.4 U			
trans-1,2-Dichloroethene	ug/L	100	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	0.91 J			
Trichloroethene	ug/L	5	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	0.81 J			
Vinyl chloride	ug/L	2	<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	15			
Xylenes	ug/L	10,000	<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	<2.9 U			
Total VOCs	ug/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	61.3			

MCL - Maximum Contaminant Level.
ug/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) MCL not listed for 1,1-dichloroethene.
Bold - Result above MCL.



Table A-7. 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	10/9/14
<u>Inorganics & TOC</u>																								
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	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	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	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	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	0.130
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	6.4
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	3.6
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	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	41
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	< 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	16
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	150
<u>Permanent Gases</u>																								
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	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	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	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	6
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	NA
<u>Light Hydrocarbon Scan</u>																								
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	180,000
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	16,000
<u>Field Parameters</u>																								
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	6.94
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	1,341
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	0.11
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	-102.1
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	17.2

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.
< - Constituent not detected above laboratory reporting limit.
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 through 2014 due to obstruction in well.



Table A-7. Bioattenuation Parameter Results for Groundwater Samples Collected in Reactive Zone 1, RACER Trust, Moraine, Ohio.

RZ-1 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	GM-23 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	10/10/14
<u>Inorganics & TOC</u>																				
Nitrate	mg/L	0.08	0	0	NA	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	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	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	0.250 B
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	0.240 B
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	4.0 B
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	4.1 B
Iron (Ferrous)	mg/L	4	0	0	NA	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	34
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	0.59 J
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	7.7
Chloride	mg/L	118	143	85	232	180	190	220	140 J	220	260	220	210	220	100	43	65	97 B	39	150 B
<u>Permanent Gases</u>																				
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	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	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	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	5.50
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
<u>Light Hydrocarbon Scan</u>																				
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	100,000
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	74,000
<u>Field Parameters</u>																				
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	6.98
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	1,321
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	0.23
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	-63.8
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	16.7

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ng/L - Nanograms per Liter.
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Samples collected in September 1999 represent baseline conditions.
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(1) Well GM-28 not sampled in 2012 through 2014 due to obstruction in well.



Table A-7. 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
<u>Inorganics & TOC</u>																						
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 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
<u>Permanent Gases</u>																						
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
<u>Light Hydrocarbon Scan</u>																						
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
<u>Field Parameters</u>																						
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.
< - Constituent not detected above laboratory reporting limit.
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 through 2014 due to obstruction in well.



Table A-8. 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	10/8/14
<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	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	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	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	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	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	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	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	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	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	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	22
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	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	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	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	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	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	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	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	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	7.26
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	1,520
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	0.72
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	-99
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	18.48

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.
< - Constituent not detected above laboratory reporting limit.
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 A-8. 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	10/7/14	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	10/7/14
<u>Inorganics & TOC</u>																											
Nitrate	mg/L	<4.4	0	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<4.4	0	NA	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	NA	<0.033	0	NA	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	NA	<0.300	<0.30	NA	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	0.061	1.07	1.11	0.27B	0.57	0.43	0.50	0.54	0.4 J	0.14	NA	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	0.061	1	0.958	0.24B	0.53	0.47	0.49	0.54	0.39 J	0.13	NA	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	2.700	1.32	0.27	0.40B	5.7	3.2	5.4	5.7	6.7	2.9	NA	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	2.500	<0.1	<0.10	0.30B	1.9	3.1	4.8	5.6	6.3	2.6	NA	NA
Iron (Ferrous)	mg/L	<0.2	0	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.2	NA	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	28	93	83	43	27	26 J	52	55	66	26	NA	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	<1.0 U	<1	<1	<1.0	<1.0	3.4	< 1.0 U	< 1 U	< 1 U	6.5	NA	NA
Total Organic Carbon	mg/L	7	8	16	20	19 J	19	16	16 J	12	15	19	17	8.2	9.8	5.8	3	4	17	12	16 J	6	7	8 J	14 J	NA	NA
Chloride	mg/L	248	216	180	180J	190	260	320	360 J	250	230	230	270	190 B	150	150	227	247	170	190J	230	290	340	400 J	250	NA	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	NA	47.4	48.44	NA	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	NA	1.57	2.23	NA	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	NA	20.5	21.77	NA	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	2.3	0.008337	0.006916	7.8	7.8	7.2	4.4 J	3.5	5.3	5.2	NA	NA
Carbon Monoxide	mg/L	<0.4	<0.40	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.4	<0.40	NA	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	12,000	47	67	10,000	2,400	5,000	870 J	520	660	13,000	NA	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	34	91	97	4,900	750	2,000	3,600 J	1,700	1,800	680	NA	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	7.44	7	7.05	7.46	7.76	7.16	6.06	6.8	6.84	7.17	7.27	7.36
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	1,419	1,422	1,493	1,658	2,080	1,830	1,880	1,920	2,130	2,160	1,900	1,318
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	0.55	0.88	0.48	0.34	0.03	0	0	0.24	0.51	1.43	3.30	0.19
Redox Potential	mV	-145	-49.8	-150.6	-137	-186	-162	-160	-125	-262	-24	-167.7	-115	-209	-42.8	-168.3	57.6	26.5	-27.7	-223	-111	-107	-111	-86	-159	-136.4	-126.5
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	15.6	18.49	21.07	19.07	17.71	16.8	16.8	17.3	17.5	16.51	16.10	16.10

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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.
< - Constituent not detected above laboratory reporting limit.
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 A-9. 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	10/9/14
<u>Inorganics & TOC</u>															
Nitrate	mg/L	0	0	0	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
Nitrogen, Ammonia	mg/L	<0.30	<0.3	<0.30	NA	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	1.1 B
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	1.1 B
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	34 B
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	34 B
Iron (Ferrous)	mg/L	0.4	0	0	NA	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	< 50 U
Sulfide	mg/L	<1	<1	<1	<1	<1	<1	1.9	1.5	4.0 J	< 1.0	< 1.0 U	14	1.0	1.6
Total Organic Carbon	mg/L	1	3	2	<1	<1	2B	1	18	45	91	100	86	120	120
Chloride	mg/L	136	145	126	129	165	140	150	240	220	230	300	240 B	290	310 B
<u>Permanent Gases</u>															
Carbon Dioxide	mg/L	37.04	37.40	18.70	NA	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	NA
Nitrogen	mg/L	23.40	21.67	23.64	NA	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	15
Carbon Monoxide	mg/L	<0.40	<0.40	<0.40	NA	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	6800
Ethene	ng/L	169	38	70	69	46	46	100	13,000	6,700	3,600	3,100	5,800	NA	5400
<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	7.12
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	2,853
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	0.28
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	-29.3
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	16.4

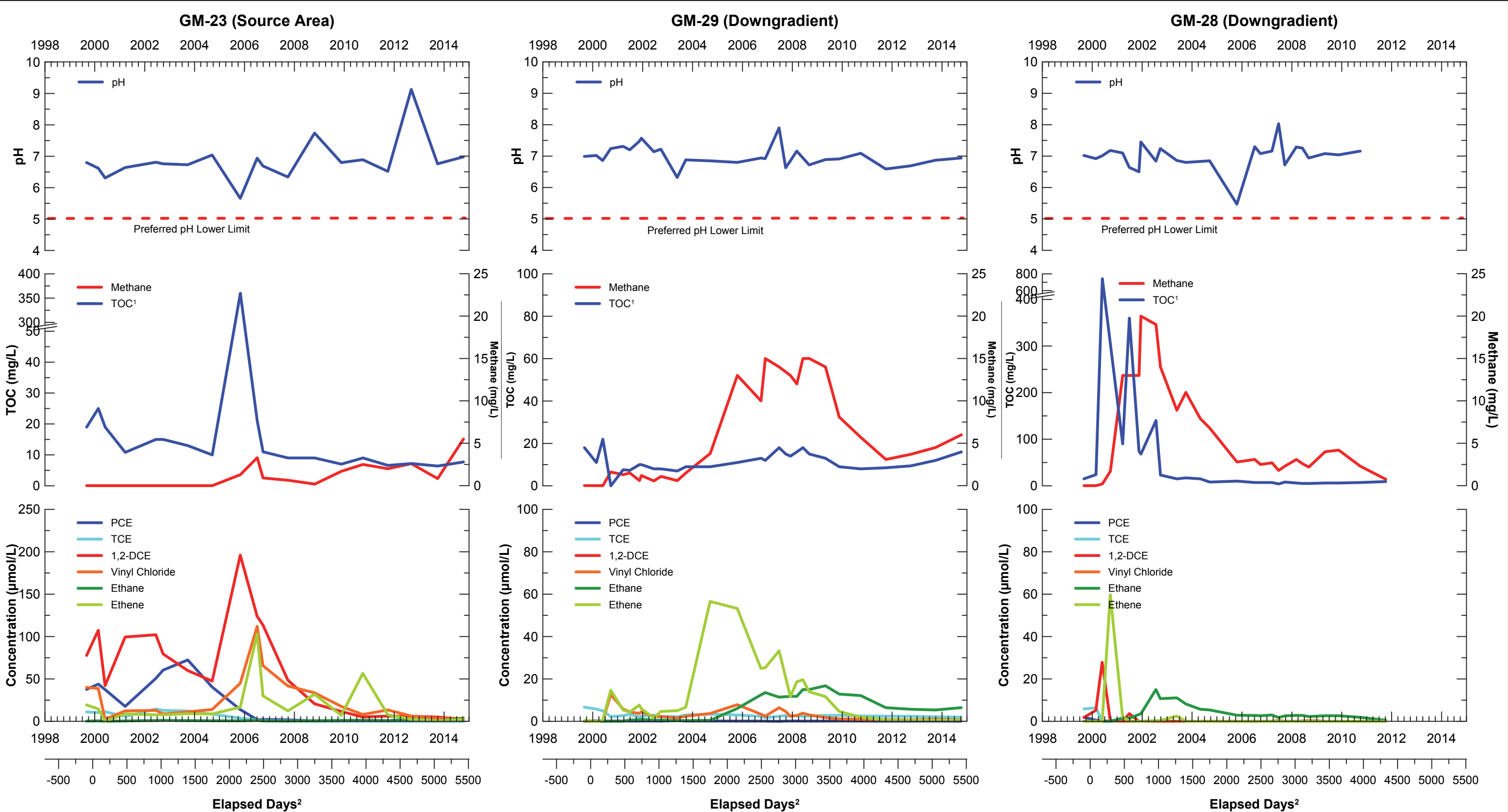
mg/L - Milligrams per Liter.
ng/L - Nanograms per Liter.
S.U. - Standard Units.
umhos/cm - Micromohs per Centimeter.
mV - Millivolts.
°C - Degrees Celsius.
J - Value is estimated.
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Samples collected in September 1999 represent baseline conditions.
Carbon source introductions began in December 1999.



Table A-10. Bioattenuation Parameter Results for Groundwater Samples Collected in Reactive Zone 4 East, RACER Trust, Moraine, Ohio.

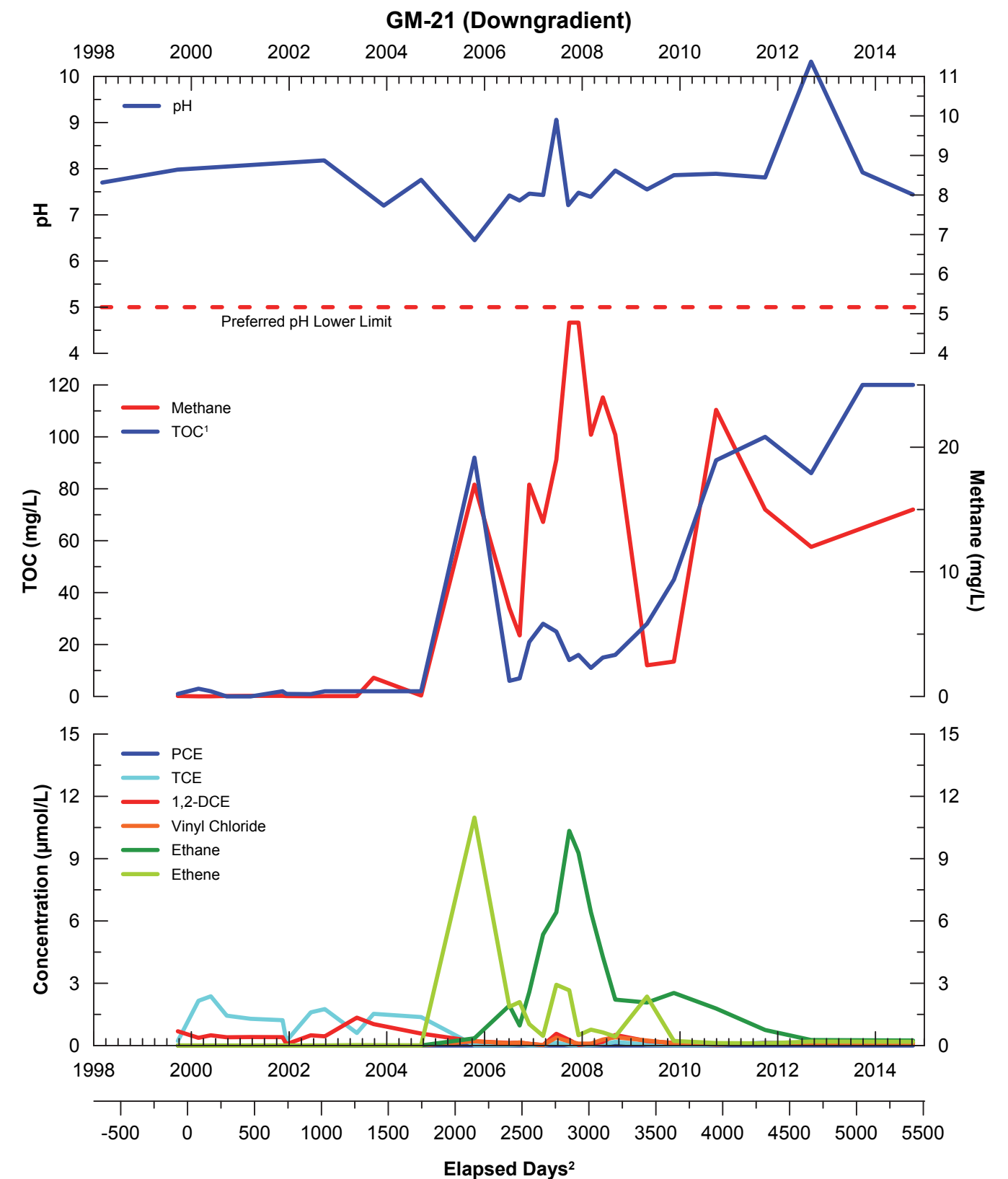
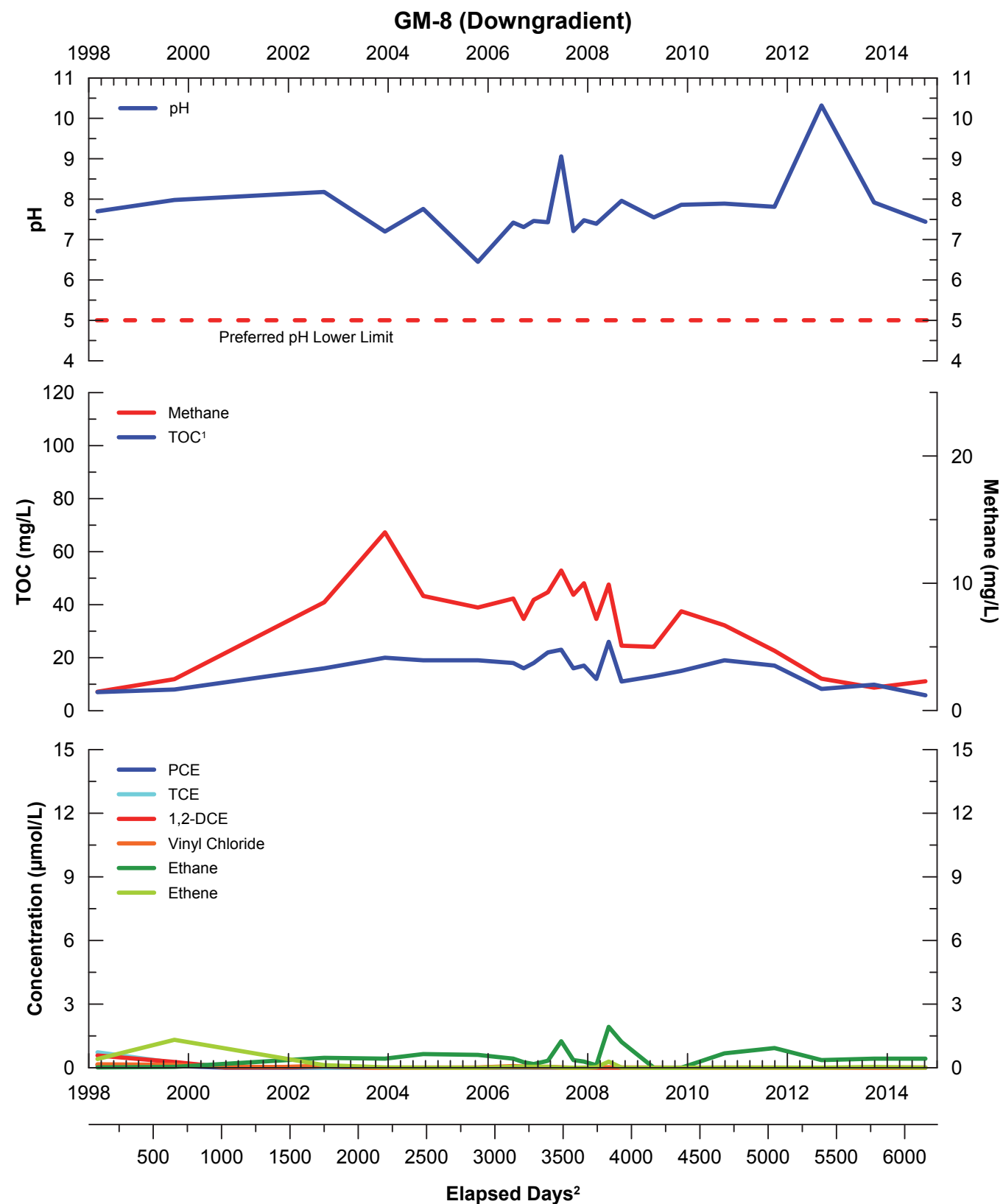
RZ-4 East		GM-19S																						
Constituents	Units	9/20/99	2/23/00	5/24/00	9/22/00	3/19/01	11/20/01	12/11/01	6/12/02	9/26/02	5/21/03	9/25/03	9/13/04	10/18/05	9/21/06	9/17/07	9/23/08	11/17/09	4/7/10	9/27/10	9/29/11	9/6/12	9/26/13	10/7/14
<u>Inorganics & TOC</u>																								
Nitrate	mg/L	11	0	0	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	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	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	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	0.15
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	0.15
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	7.4
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	5.7
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	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	43
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	< 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	2.2
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	170
<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	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	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	NA
Methane	mg/L	0.00986	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	0.54
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	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	85	91
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	590	600
<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	6.85
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	1,280
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	0.32
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	-79
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	15.3

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.
< - Constituent not detected above laboratory reporting limit.
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.

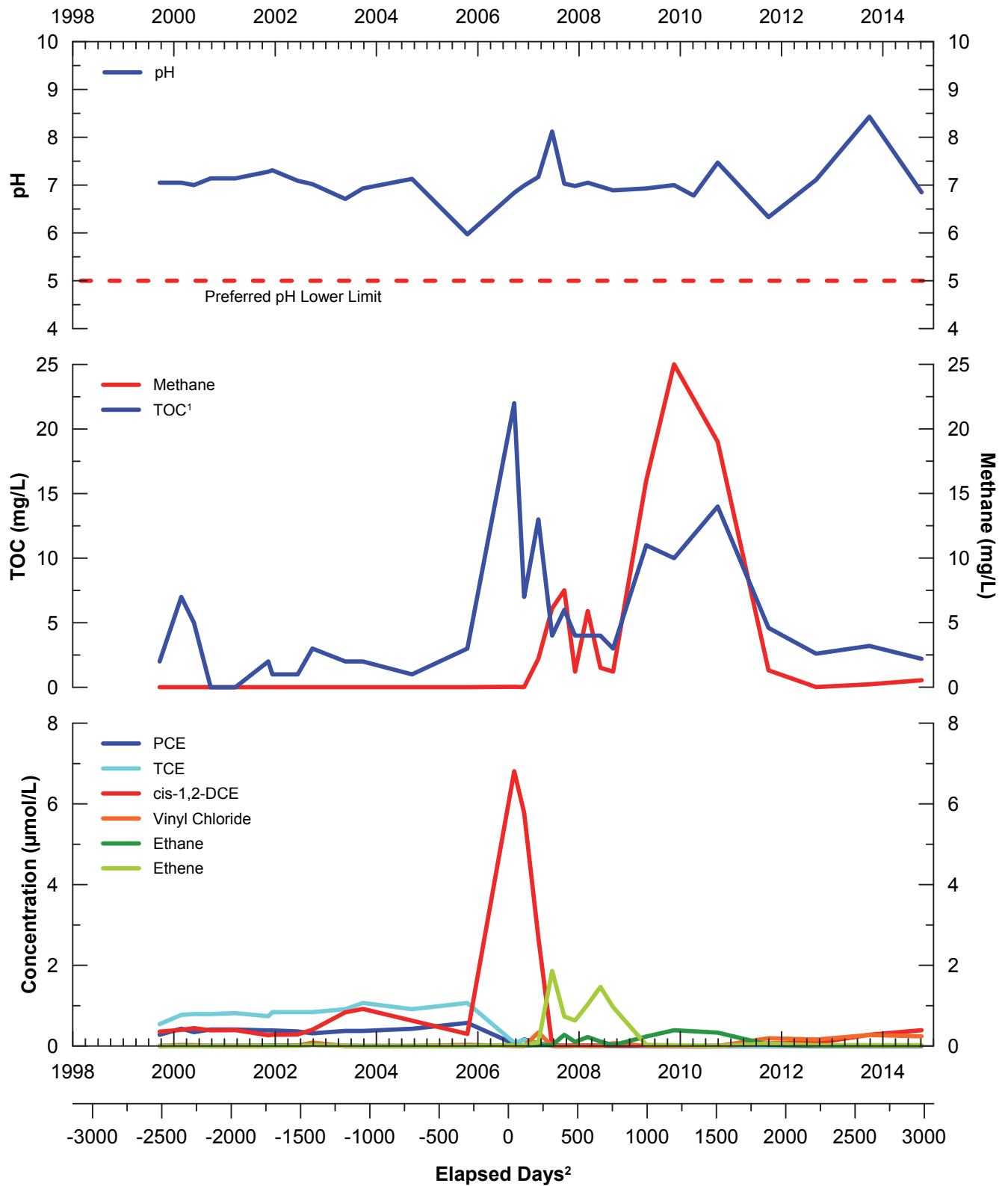
µmol/L - micromoles per liter.
 TOC - Total organic carbon.
 PCE - Tetrachloroethene.
 TCE - Trichloroethene.
 1,2-DCE - cis and trans-1,2-Dichloroethene.

Note: Ethene, ethane, and methane parameters were not collected during the 2013 annual groundwater sampling event at GM-21.

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





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.
 µmol/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
A-3



Appendix B

Site-Wide Groundwater VOC
Analytical Results from 1999 to 2013

Table B-1. Annual Groundwater Analytical Results for the Upper Aquifer Wells from 1999-2013, 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		
MCL		200		7	5	70	700	5	1000	100	5	2	10,000
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
	9/26/2013	<1.0 U	4.4	<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
	9/23/1999	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
	9/27/2013	<1.0 U	1.6	<1.0 U	<1.0 U	0.27 J	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<2.0 U
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	0.55J	<1 U	<0.5 U	0.71J	<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
	9/27/2013	0.29 J	3.0	<1.0 U	<1.0 U	<1.0 U	<1.0 U	0.21 J	<1.0 U	<1.0 U	0.27 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
	9/26/2013	<1.0 U	<1.0 U	<1.0 U	<1.0 U	0.89 J	<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	1.7J	6.6	<4 U
	9/16/2004	<4 U	<4 U	<4 U	<4 U	120	<4 U	0.94 J	<4 U	1.6J	<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	1.0 J	<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	1.9 J	<5 U	9.6	<10 U
	9/26/2007	<4 U	<4 U	<4 U	<4 U	110	<4 U	<4 U	<4 U	1.4 J	<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	1.4J	<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
	9/26/2013	<1.0 U	<1.0 U	<1.0 U	<1.0 U	34	<1.0 U	0.96 J	<1.0 U	0.64 J	<1.0 U	1.6	<2.0 U

Table B-1. Annual Groundwater Analytical Results for the Upper Aquifer Wells from 1999-2013, 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		
		200		7	5	70	700	5	1000	100	5	2	10,000
MCL 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
	9/27/2013	<1.0 U	7.1	<1.0 U	<1.0 U	11	<1.0 U	0.63 J	<1.0 U	0.76 J	7.4	0.18 J	<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
	9/27/2013	<1.0 U	7.5	<1.0 U	<1.0 U	1.6	<1.0 U	<1.0 U	<1.0 U	0.28 J	0.40 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
	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
	9/27/2013	6.9	12	0.51 J	<1.0 U	59	<1.0 U	<1.0 U	<1.0 U	2.2	190	0.93 J	<2.0 U
GM-30	9/2/1999	<10	53.8J	<10	<10	7.5J	7030J	9.5J	6950J	<10	<10	<10	23300J
	9/19/2000	<1.0	50.6	<1.0	<1.0	2.7	<1.0	2290	<1.0	98.9	<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
	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
GM-23	9/27/2013	<1.0 U	5.3	<1.0 U	4.0	<1.0 U	20	0.23 J	1.1	0.63 J	0.28 J	0.34 J	7.2
	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
	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
	9/27/2013	<1.0 U	2.6	1.7	0.28 J	470	<1.0 U	37	<1.0 U	15	28	210	<2.0 U

Table B-1. Annual Groundwater Analytical Results for the Upper Aquifer Wells from 1999-2013, 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		
MCL		200		7	5	70	700	5	1000	100	5	2	10,000
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
	9/27/2013	< 1.0 U	2.3	< 1.0 U	< 1.0 U	12	< 1.0 U	1.8	< 1.0 UB	0.51 J	42	0.18 J	< 2.0 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
	9/27/2013	15	12	1.7	0.20 J	530	< 1.0 U	15	< 1.0 U	20	280	60	< 2.0 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
GM-25	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
HR-7	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
	9/26/2013	< 1.0 U	0.35 J	< 1.0 U	< 1.0 U	1.9	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	6.2	< 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
	9/26/2013	< 1.0 U	0.70 J	< 1.0 U	< 1.0 U	7.0	< 1.0 U	0.57 J	< 1.0 U	0.63 J	14	0.36 J	< 2.0 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 B-1. Annual Groundwater Analytical Results for the Upper Aquifer Wells from 1999-2013, 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		
MCL		200		7	5	70	700	5	1000	100	5	2	10,000
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
	9/26/2013	0.99 J	1.2	<1.0 U	<1.0 U	3.1	<1.0 U	30	<1.0 U	0.90 J	100	<1.0 U	<2.0 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
	9/27/2013	5.9	20	<1.0 U	<1.0 U	1.5	<1.0 U	5.1	<1.0 U	<1.0 U	2.8	0.28 J	<2.0 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
	9/27/2013	9.8	2.3	<1.0 U	<1.0 U	21	<1.0 U	0.43 J	<1.0 U	1.2	120	<1.0 U	<2.0 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
	9/27/2013	1.0	0.41 J	<1.0 U	<1.0 U	0.35 J	<1.0 U	7.1	<1.0 U	<1.0 U	4.6	<1.0 U	<2.0 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
	9/26/2013	1.0	2.0	<1.0 U	<1.0 U	32	<1.0 U	22	<1.0 U	3.7	170	0.21 J	<2.0 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
	9/25/2013	0.61 J	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	0.14 J	<1.0 U	<1.0 U	1.3	<1.0 U	<2.0 U

Table B-1. Annual Groundwater Analytical Results for the Upper Aquifer Wells from 1999-2013, 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		
MCL		200		7	5	70	700	5	1000	100	5	2	10,000
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
	9/25/2013	1.3	0.93 J	<1.0 U	<1.0 U	1.4	<1.0 U	150	<1.0 U	0.92 J	100	<1.0 U	<2.0 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
	9/25/2013	1.8	0.86 J	<1.0 U	<1.0 U	1.1	<1.0 U	0.31 J	<1.0 U	<1.0 U	6.4	<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
	9/25/2013	0.49 J	1.2	<1.0 U	<1.0 U	1.4	<1.0 U	25	<1.0 U	0.59 J	21	<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
	9/25/2013	1.6	1.9	<1.0 U	<1.0 U	6.3	<1.0 U	60	<1.0 U	1.2	50	<1.0 U	<2.0 U

Table B-1. Annual Groundwater Analytical Results for the Upper Aquifer Wells from 1999-2013, 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-19S		200		7	5	70	700	5	1000	100	5	2	10,000
	9/20/1999	16.0	7.7	1.0	<1.0	34.6	<10	46.0	<1.0	2.3	71.1	<1.0	<10
	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
	9/26/2013	<1.0 U	8.3	<1.0 U	<1.0 U	26	<1.0 U	<1.0 U	<1.0 U	1.1	0.46 J	17	<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
	9/26/2013	3.4	1.1	<1.0 U	<1.0 U	1.3	<1.0 U	28	<1.0 U	<1.0 U	14	<1.0 U	<2.0 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
	9/26/2013	<50 U	30 J	<50 U	<50 U	69	<50 U	<50 U	<50 U	18 J	18 J	11 J	<100 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
GM-32	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
	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
GM-22	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
	9/26/2013	0.65 J	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	4.3	<1.0 U	<1.0 U	3.9	<1.0 U	<2.0 U

Table B-1. Annual Groundwater Analytical Results for the Upper Aquifer Wells from 1999-2013, 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		
MCL		200		7	5	70	700	5	1000	100	5	2	10,000
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
	9/26/2013	<1.0 U	9.5	<1.0 U	<1.0 U	5.1	<1.0 U	<1.0 U	<1.0 U	1.1	12	3.8	<2.0 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	<5 U	<5 U	<5 U	1 J	<5 U	3.2 J	<10 U	<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
	9/26/2013	<1.0 U	0.88 J	<1.0 U	1.9	0.27 J	<1.0 U	<1.0 U	<1.0 U	<1.0 U	0.21 J	<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
	9/25/2013	<1.0 U	0.66 J	<1.0 U	<1.0 U	1.9	<1.0 U	<1.0 U	<1.0 U	<1.0 U	0.26 J	0.79 J	<2.0 U
GM-53 GM-59	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
	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
	9/27/2013	1.0	<1.0 U	<1.0 U	<1.0 U	11	<1.0 U	1000	<1.0 U	0.56 J	1100	<1.0 U	<2.0 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
	9/27/2013	1.4	1.3	1.5	<1.0 U	400	<1.0 U	670	<1.0 U	4.2	1100	2.1	<2.0 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
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
	9/27/2013	1.8	0.53 J	<1.0 U	<1.0 U	4.5	<1.0 U	480	<1.0 U	0.29 J	350	<1.0 U	<2.0 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
	9/26/2013	<1.0 U	<1.0 U	<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

Table B-1. Annual Groundwater Analytical Results for the Upper Aquifer Wells from 1999-2013, 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		
MCL		200		7	5	70	700	5	1000	100	5	2	10,000
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
	9/25/2013	<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
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	1.1 J	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
	9/25/2013	<1.0 U	1.0	<1.0 U	<1.0 U	13	<1.0 U	0.31 J	<1.0 U	0.26 J	0.70 J	1.3	<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
	9/25/2013	0.36 J	4.4	<1.0 U	<1.0 U	12	<1.0 U	51	<1.0 U	0.40 J	17	0.55 J	<2.0 U

Table B-1. Annual Groundwater Analytical Results for the Upper Aquifer Wells from 1999-2013, 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		
MCL		200		7	5	70	700	5	1000	100	5	2	10,000
	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
	9/27/2013	<1.0 U	0.36 J	<1.0 U	<1.0 U	2.6	<1.0 U	2.8	<1.0 U	<1.0 U	4.7	<1.0 U	<2.0 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
	9/25/2013	0.22 J	0.68 J	<1.0 U	<1.0 U	3.7	<1.0 U	17	<1.0 U	<1.0 U	10	<1.0 U	<2.0 U
	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-22	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
WSU-23	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
	9/25/2013	0.23 J	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	13	<1.0 U	<1.0 U	2.5	<1.0 U	<2.0 U
	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
GM-10	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
	9/25/2013	0.20 J	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	1.1	<1.0 U	<1.0 U	3.1	<1.0 U	<2.0 U
	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
	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
GM-26	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
	9/25/2013	<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 B-1. Annual Groundwater Analytical Results for the Upper Aquifer Wells from 1999-2013, 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-47		200		7	5	70	700	5	1000	100	5	2	10,000
	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
	9/25/2013	0.65 J	3.7	<1.0 U	<1.0 U	26	<1.0 U	47	<1.0 U	2.4	14	0.42 J	<2.0 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
	9/25/2013	2.5	3.5	<1.0 U	<1.0 U	5.7	<1.0 U	73	<1.0 U	0.29 J	40	0.30 J	<2.0 U
	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
GM-51	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
	9/25/2013	1.9	1.8	<1.0 U	<1.0 U	2.8	<1.0 U	46	<1.0 U	0.30 J	64	<1.0 U	<2.0 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
	9/25/2013	0.47 J	1.2	<1.0 U	<1.0 U	3.1	<1.0 U	53	<1.0 U	<1.0 U	18	<1.0 U	<2.0 U
	9/14/2006	<1 U	<1 U	<1 U	<1 U	<1 U	<1 U	7.4	<1 U	<1 U	<1 U	<1 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
GM-55	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
	9/25/2013	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	4.6	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<2.0 U
	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
GM-57	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
	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
GM-62 ⁽¹⁾	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
	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
GM-63	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
	9/25/2013	4.4	1.6	<1.0 U	<1.0 U	1.9	<1.0 U	81	<1.0 U	0.33 J	48	<1.0 U	<2.0 U
	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
GM-64	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
	9/26/2013	0.71 J	4.2	<1.0 U	<1.0 U	44	<1.0 U	41	<1.0 U	2.8	31	5.8	<2.0 U
	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
GM-65S	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
	9/25/2013	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	5.6	<1.0 U	<1.0 U	0.82 J	<1.0 U	<2.0 U

Table B-1. Annual Groundwater Analytical Results for the Upper Aquifer Wells from 1999-2013, 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		
MCL		200		7	5	70	700	5	1000	100	5	2	10,000
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	<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	<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	<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	<2 U
	10/2/2008	<1 U	<1 U	<1 U	<1 U	<1 U	<1 U	11	<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 U	12	<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	<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	<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	<2.0 U
	9/25/2013	<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	<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	<2 U
	10/2/2008	0.65 J	<1 U	<1 U	<1 U	<1 U	<1 U	<1 U	<1 U	<1 U	1.8	<1 U	<2 U
	11/12/2009	0.72 J	0.31 J	<1.0 U	0.48 J	0.28 J	<1.0 U	<1.0 U	<1.0 U	<1.0 U	2.1	<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	<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	<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	<2.0 U
	9/25/2013	0.88 J	1.1	<1.0 U	<1.0 U	1.4	<1.0 U	0.31 J	<1.0 U	0.42 J	3.9	<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	<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	<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	<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	<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	<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	<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	<2.0 U
	9/25/2013	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	6.7	<1.0 U	<1.0 U	4.6	<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	<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	<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-1,2-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.

ug/L - Micrograms per Liter.

MCL - Maximum Contaminant Level.

BOLD - Result above MCL.



Table B-2. Annual Groundwater Analytical Results for the Lower Aquifer Wells from 1999-2013, RACER Trust, Moraine, Ohio.

Well	Date	VOCs (ug/L)											Xylenes
		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	
MCL		200		7	5	70	700	5	1000	100	5	2	10,000
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
	9/27/2013	< 1.0 U	35	< 1.0 U	< 1.0 U	75	< 1.0 U	< 1.0 U	< 1.0 U	4.5	< 1.0 U	2.0	< 2.0 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
	9/26/2013	< 1.0 U	1.8	< 1.0 U	< 1.0 U	0.24 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
	9/26/2013	< 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	0.75 J	1.4	< 2.0 U

Table B-2. Annual Groundwater Analytical Results for the Lower Aquifer Wells from 1999-2013, 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
MCL		200		7	5	70	700	5	1000	100	5	2	10,000
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
	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
31	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
	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
39	9/27/2002	<1	1.6	<1	<1	1.3	<1	<1	<1	<0.5	3.8	0.51J	<1
	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
GM-39	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
	9/27/2013	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	0.68 J	<1.0 U	<1.0 U	0.63 J	1.5	<2.0 U
GM-40	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
	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
GM-61	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
	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
	9/26/2013	<1.0 U	1.3	<1.0 U	<1.0 U	17	<1.0 U	7.2	<1.0 U	1.1	5.2	1.2	<2.0 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
	9/27/2013	<1.0 U	<1.0 U	<1.0 U	<1.0 U	12	<1.0 U	<1.0 U	<1.0 U	0.89 J	79	1.9	<2.0 U

Table B-2. Annual Groundwater Analytical Results for the Lower Aquifer Wells from 1999-2013, 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
MCL		200		7	5	70	700	5	1000	100	5	2	10,000
GM-58	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
	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
	9/27/2013	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	34	< 1.0 U	< 1.0 U	0.41 J	< 1.0 U	< 2.0 U
RMW-86	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
	9/26/2013	15	16	2.3	< 1.0 U	110	< 1.0 U	41	< 1.0 U	2.9	190	1.3	< 2.0 U
RMW-87	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
	9/26/2013	< 1.0 U	18	< 1.0 U	< 1.0 U	43	< 1.0 U	< 1.0 U	< 1.0 U	2.2	9.8	1.3	< 2.0 U
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
	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
9/26/2013	< 1.0 U	0.31 J	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	69	< 1.0 U	< 1.0 U	2.7	< 1.0 U	< 2.0 U	
GM-42	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
	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
	9/26/2013	< 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	1.0	7.8	< 2.0 U



Table B-2. Annual Groundwater Analytical Results for the Lower Aquifer Wells from 1999-2013, RACER Trust, Moraine, Ohio.

Well	Date	VOCs (ug/L)											Vinyl Chloride	Xylenes
		1,1,1-TCA	1,1-DCA	1,1-DCE	Benzene	cis-1,2-DCE	Ethyl-benzene	PCE	Toluene	trans-1,2-DCE	TCE			
MCL		200		7	5	70	700	5	1000	100	5	2	10,000	
GM-7R	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	
	9/26/2013	0.47 J	<1.0 U	<1.0 U	<1.0 U	0.77 J	<1.0 U	45	<1.0 U	<1.0 U	5.6	<1.0 U	<2.0 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	
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	
	9/27/2013	< 1.0 U	0.40 J	0.28 J	< 1.0 U	25	< 1.0 U	180	< 1.0 U	0.58 J	180	3.2	< 2.0 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	
	9/26/2013	0.49 J	1.4	0.60 J	< 1.0 U	41	< 1.0 U	20	< 1.0 U	1.3	56	7.4	< 2.0 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	
	9/27/2013	0.19 J	0.84 J	0.26 J	< 1.0 U	60	< 1.0 U	61	< 1.0 U	0.48 J	95	0.31 J	< 2.0 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	
	9/26/2013	< 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	1.9	< 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	
	9/26/2013	< 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	3.6	< 1.0 U	< 2.0 U	



Table B-2. Annual Groundwater Analytical Results for the Lower Aquifer Wells from 1999-2013, 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
MCL		200		7	5	70	700	5	1000	100	5	2	10,000
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
9/25/2013	0.54 J	0.86 J	< 1.0 U	< 1.0 U	1.7	< 1.0 U	2.3	< 1.0 U	0.29 J	15	< 1.0 U	< 2.0 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
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
	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
9/25/2013	0.41 J	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	0.83 J	< 1.0 U	< 1.0 U	21	< 1.0 U	< 2.0 U	
GM-15	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
	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
9/25/2013	< 1.0 U	1.3	< 1.0 U	< 1.0 U	1.8	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	4.5	0.19 J	< 2.0 U	
GM-14	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



Table B-2. Annual Groundwater Analytical Results for the Lower Aquifer Wells from 1999-2013, 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
MCL		200		7	5	70	700	5	1000	100	5	2	10,000
GM-13	9/24/1999	1.9	<1.0	<1.0	<1.0	<1.0	<1.0	3.6	<1.0	<1.0	31.0	<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
	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
	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
	9/25/2013	0.32 J	<1.0 U	<1.0 U	<1.0 U	0.40 J	<1.0 U	1.3	<1.0 U	<1.0 U	23	<1.0 U	<2.0 U
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
	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
	9/25/2013	0.32 J	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	1.3	<1.0 U	<1.0 U	5.3	<1.0 U	<2.0 U
GM-56	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
	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
GM-65D	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
	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

Table B-2. Annual Groundwater Analytical Results for the Lower Aquifer Wells from 1999-2013, 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
MCL		200		7	5	70	700	5	1000	100	5	2	10,000
DN-13	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
9/27/2013	0.93 J	1.9	< 1.0 U	< 1.0 U	6.9	< 1.0 U	0.58 J	< 1.0 U	0.55 J	8.4	1.1	< 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
	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
	9/25/2013	1.4	< 1.0 U	< 1.0 U	< 1.0 U	0.44 J	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	19	< 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



Table B-2. Annual Groundwater Analytical Results for the Lower Aquifer Wells from 1999-2013, 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
MCL		200		7	5	70	700	5	1000	100	5	2	10,000
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
	9/26/2013	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	12	< 1.0 U	< 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.

ug/L - Micrograms per Liter.

< - 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.

MCL - Maximum Contaminant Level.

BOLD - Result above MCL.



Appendix C

Groundwater Sampling Data for 2014
Site-Wide Groundwater Monitoring
Event

Table C-1. Annual Groundwater Sampling Event Field Parameter Data Sheet for 2014, 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	Sampler
Upper Aquifer Wells													
GM-2	GM-2/100714/	7.41	15.0	-57.4	1.395	0.58	0.250	10:55	11:26	2.5	10/7/2014	11:26	Sample Serve/Smith
GM-6	GM-6/100414/	7.36	16.1	-126.5	1.318	0.19	0.200	10:05	10:33	4.5	10/7/2014	10:33	Sample Serve/Smith
GM-8	GM-8/100714/	7.44	15.6	-168.3	1.419	0.55	0.200	8:43	9:18	4.0	10/7/2014	9:18	Sample Serve/Smith
GM-10	GM-10/100614/	7.23	16.5	117.9	0.908	3.98	0.200	16:03	16:37	6.0	10/6/2014	16:37	Sample Serve/Brege
GM-16	GM-16/100114/	7.14	15.4	83.1	1.260	1.00	0.200	9:23	10:01	4.0	10/7/2014	10:01	Sample Serve/Kuiper
GM-19S	GM-19S/100714/	6.85	15.3	-79.0	1.280	0.32	0.175	8:34	9:05	0.4	10/7/2014	9:05	Sample Serve/Brege
GM-21	GM-21/100914/	7.12	16.4	-29.3	2.853	0.28	0.300	11:40	12:18	8.0	10/9/2014	12:18	Sample Serve/Smith
GM-23	GM-23/101014/	6.98	16.7	-63.8	1.321	0.23	0.400	11:56	12:24	6.5	10/10/2014	12:24	Sample Serve/Brege
GM-26	GM-26/100614/	7.18	17.1	129.7	1.000	4.42	0.200	14:53	15:48	4.5	10/6/2014	15:48	Sample Serve/Kuiper
GM-28 ⁽¹⁾	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
GM-29	GM-29/100914/	6.95	17.0	-99.9	1.345	0.11	0.500	17:08	18:51	30.0	10/9/2014	18:51	Sample Serve/Brege
GM-30	GM-30/100914/	6.49	17.7	-30.0	2.406	0.15	0.400	15:05	16:11	19.5	10/9/2014	16:11	Sample Serve/Brege
GM-31	GM-31/100914/	7.45	16.9	20.8	1.566	0.15	0.250	18:05	19:22	13.0	10/9/2014	19:22	Sample Serve/Smith
GM-32	GM-32/100814/	7.26	18.48	-99.0	1.520	0.72	0.200	13:59	14:39	6.0	10/8/2014	14:39	Sample Serve/Kuiper
GM-35	GM-35/100814/	8.80	15.47	-34.1	8.100	0.05	0.200	9:36	10:10	6.5	10/8/2014	10:10	Sample Serve/Brege
GM-43	GM-43/100814/	6.73	17.6	104.9	1.196	0.17	0.300	17:20	18:28	23.0	10/8/2014	18:28	Sample Serve/Smith
GM-44	GM-44/100814/	7.08	18.4	86.0	1.360	0.62	0.400	16:28	18:07	23.0	10/8/2014	18:07	Sample Serve/Kuiper
GM-45	GM-45/100814/	7.50	19.3	54.2	1.526	1.58	0.200	15:12	16:07	7.0	10/8/2014	16:07	Sample Serve/Kuiper
GM-56	GM-46/100914/	6.93	19.2	-87.3	0.354	0.37	0.250	11:15	11:44	5.5	10/9/2014	11:44	Sample Serve/Brege
GM-47	GM-47/100714/	7.07	16.5	122.8	1.520	1.26	0.150	12:35	13:03	3.0	10/7/2014	13:03	Sample Serve/Kuiper
GM-50	GM-50/100714/	7.08	17.9	132.0	1.153	0.64	0.500	13:18	16:20	23.0	10/7/2014	16:20	Sample Serve/Kuiper
GM-51	GM-51/100614/	6.76	18.0	124.7	0.839	2.64	0.200	12:45	13:38	7.0	10/6/2014	13:38	Sample Serve/Smith
GM-52	GM-52/100614/	6.76	16.4	103.9	1.059	3.82	0.275	13:59	14:37	8.0	10/6/2014	14:37	Sample Serve/Smith
GM-55	GM-55/100614/	7.18	14.6	149.7	0.906	3.94	0.300	16:23	17:37	12.0	10/6/2014	17:37	Sample Serve/Kuiper
GM-59	GM-59/101014/	7.03	16.2	115.6	1.028	0.37	0.300	10:18	10:47	5.0	10/10/2014	10:47	Sample Serve/Smith
GM-60	GM-60/100914/	7.39	15.9	85.9	1.197	0.31	0.300	13:15	14:05	9.5	10/9/2014	14:05	Sample Serve/Smith
GM-62R	GM-62R/100614/	7.25	15.2	117.6	0.838	3.38	0.150	13:52	14:45	5.5	10/6/2014	14:45	Sample Serve/Brege
GM-63	GM-63/100714/	7.12	18.1	136.6	1.149	0.82	0.300	16:46	17:31	10.0	10/7/2014	17:31	Sample Serve/Kuiper
GM-65S	GM-65S/100614/	6.77	15.9	131.6	0.989	3.80	0.200	15:03	15:24	3.0	10/6/2014	15:24	Sample Serve/Smith
GM-66	GM-66/100814/	6.91	18.2	42.6	1.421	0.14	0.400	15:33	16:37	16.0	10/8/2014	16:37	Sample Serve/Brege
GM-67S	GM-67S/101014/	7.04	17.6	89.1	1.136	0.90	0.300	10:31	11:34	14.0	10/10/2014	11:34	Sample Serve/Kuiper
GM-71	GM-71/100914/	7.20	15.0	157.9	1.663	4.91	0.200	9:41	10:55	12.5	10/9/2014	10:55	Sample Serve/Kuiper
GM-72	GM-72/100914/	7.18	15.3	161.4	1.650	6.43	0.200	8:55	9:22	3.0	10/9/2014	9:22	Sample Serve/Kuiper
GM-75S	GM-75S/100914/	7.22	15.9	87.7	1.126	3.50	0.200	13:06	13:41	0.2	10/9/2014	13:41	Sample Serve/Kuiper
GM-76S	GM-76S/100814/	7.49	16.1	70.8	0.578	5.52	0.300	17:08	17:52	5.0	10/9/2014	17:52	Sample Serve/Kuiper
GM-78	GM-78/100614/	7.23	16.0	102.0	0.889	5.21	0.150	12:01	13:20	9.5	10/6/2014	13:20	Sample Serve/Brege
GM-79	GM-79/100614/	7.15	17.1	130.3	1.259	1.17	0.150	13:34	14:18	6.0	10/6/2014	14:18	Sample Serve/Kuiper
GM-80	GM-80/100614/	7.23	15.8	133.1	1.199	1.03	0.150	11:35	12:59	9.0	10/6/2014	12:59	Sample Serve/Kuiper
HR-2	HR-2/100814/	6.54	15.38	68.1	1.431	0.15	0.300	14:53	15:27	9.0	10/8/2014	15:27	Sample Serve/Smith
HR-3	HR-3/100814/	6.58	15.72	105.9	1.517	0.20	0.300	16:05	16:30	4.5	10/8/2014	16:30	Sample Serve/Smith
HR-4	HR-4/100714/	7.35	15.43	44.4	1.168	0.41	0.300	17:25	17:56	6.0	10/7/2014	17:56	Sample Serve/Smith
HR-7	HR-7/100714/	7.32	16.2	58.4	1.169	0.40	0.250	12:04	12:31	5.0	10/7/2014	12:31	Sample Serve/Smith
HR-16	HR-16/100714/	6.93	16.4	24.2	1.101	0.28	0.200	13:16	13:36	3.5	10/7/2014	13:36	Sample Serve/Brege
HR-17	HR-17/100714/	6.95	15.9	-8.4	1.323	0.58	0.200	12:10	12:27	3.0	10/7/2014	12:27	Sample Serve/Brege
TW-2	TW-2/100914/	7.34	16.4	-104.2	1.305	0.15	0.300	10:14	10:53	9.0	10/9/2014	10:53	Sample Serve/Smith
W-1-N	W-1-N/100814/	6.63	15.56	117.7	1.269	0.39	0.300	11:10	14:15	7.0	10/8/2014	14:15	Sample Serve/Smith
W-2-N	W-2-N/100714/	7.37	16.12	-77.1	1.172	0.11	0.300	14:25	14:57	6.5	10/7/2014	14:57	Sample Serve/Smith
W-2-S	W-2-S/100714/	6.96	15.62	37.9	1.098	0.29	0.300	14:05	14:25	6.5	10/7/2014	14:25	Sample Serve/Brege
W-3-N	W-3-N/100714/	7.33	16.2	132.0	1.120	0.21	0.300	15:21	15:48	4.5	10/7/2014	15:48	Sample Serve/Smith
W-3-S	W-3-S/100714/	6.99	15.8	52.2	1.156	0.33	0.325	15:04	15:22	5.5	10/7/2014	15:22	Sample Serve/Brege
W-4-N	W-4-N/100714/	7.37	14.7	-28.8	1.349	0.16	0.275	16:19	16:54	6.0	10/7/2014	16:54	Sample Serve/Smith
W-4-S	W-4-S/100714/	7.02	16.7	64.0	1.424	0.37	0.275	16:06	16:24	5.4	10/7/2014	16:24	Sample Serve/Brege
WSU-24	WSU-24/120414/	7.08	9.7	122.0	1.367	6.37	0.060	13:45	14:40	0.1	12/4/2014	14:40	ARCADIS/Kassel



Table C-1. Annual Groundwater Sampling Event Field Parameter Data Sheet for 2014, 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	Sampler
Lower Aquifer Wells													
DN-13	DN-13/120414/	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	ARCADIS/Kassel
GM-9	GM-9/100614/	7.25	16.4	121.0	0.933	0.86	0.200	16:54	17:16	5.0	10/6/2014	17:16	Sample Serve/Brege
GM-11	GM-11/100714/	7.11	16.1	100.8	1.024	1.53	0.150	11:01	12:05	7.0	10/7/2014	12:05	Sample Serve/Kuiper
GM-15	GM-15/100714/	6.94	14.4	28.8	1.429	1.33	0.200	8:15	8:52	3.0	10/7/2014	8:52	Sample Serve/Kuiper
GM-19D	GM-19D/100414/	6.82	15.60	-33.0	1.330	0.33	0.200	9:59	11:11	10.5	10/7/2014	11:11	Sample Serve/Brege
GM-20D	GM-20D/100614/	6.68	15.9	129.4	1.014	0.61	0.300	16:04	16:36	5.0	10/6/2014	16:36	Sample Serve/Smith
GM-54	GM-54/100814/	7.11	20.0	54.3	1.117	0.19	0.250	13:48	14:34	8.0	10/8/2014	14:34	Sample Serve/Brege
GM-54	GM-54/100814/	7.11	20.0	54.3	1.117	0.19	0.250	13:48	14:34	8.0	10/8/2014	14:34	Sample Serve/Brege
GM-67D	GM-67D/101014/	6.88	17.8	-54.1	1.345	0.70	0.250	11:29	12:21	4.5	10/10/2014	12:21	Sample Serve/Kuiper
GM-68D	GM-68D/101014/	8.99	15.7	69.1	1.024	0.48	0.375	10:34	11:18	12.5	10/10/2014	11:18	Sample Serve/Brege
GM-75D	GM-75D/100914/	6.88	15.4	46.3	1.245	0.97	0.200	11:49	12:47	8.0	10/9/2014	12:47	Sample Serve/Kuiper
GM-76D	GM-76D/100914/	7.07	15.6	81.2	1.245	1.23	0.300	18:10	19:32	8.0	10/9/2014	19:32	Sample Serve/Kuiper
GM-77D	GM-77D/100814/	6.99	18.1	56.1	1.203	0.95	0.400	10:03	13:02	7.0	10/8/2014	13:02	Sample Serve/Brege/Kuiper
GM-83D	GM-83D/100914/	7.18	14.9	-73.2	1.050	0.19	0.300	8:48	9:29	8.0	10/9/2014	9:29	Sample Serve/Smith
GM-84	GM-84/100814/	7.08	14.9	92.9	1.038	1.36	0.400	8:19	9:27	12.0	10/8/2014	9:27	Sample Serve/Kuiper
HR-1	HR-1/100814/	7.01	19.5	56.7	1.163	0.54	0.300	17:10	17:31	4.4	10/8/2014	17:31	Sample Serve/Brege
HR-12	HR-12/100814/	6.81	14.0	-11.0	1.135	0.45	0.300	8:32	8:49	4.0	10/8/2014	8:49	Sample Serve/Brege
HR-15	HR-15/100714/	7.39	15.1	-86.2	1.172	0.24	0.300	12:54	14:01	6.0	10/7/2014	14:01	Sample Serve/Smith
RMW-85	RMW-85/100912/	6.88	15.6	-19.5	1.254	0.75	0.300	14:57	15:52	8.0	10/9/2014	15:52	Sample Serve/Kuiper
RMW-86	RMW-86/100814/	6.89	17.54	-2.9	1.268	0.22	0.175	11:01	11:27	5.5	10/8/2014	11:27	Sample Serve/Brege
RMW-87	RMW-87/100914/	6.79	16.2	12.0	1.532	0.11	0.525	9:11	10:19	24.0	10/9/2014	10:19	Sample Serve/Brege
RMW-88	RMW-88/100814/	7.00	15.33	-25.7	1.162	0.16	0.300	8:10	10:45	19.0	10/8/2014	10:45	Sample Serve/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 D

Groundwater Analytical Database for
2014



Table D. Summary of Groundwater VOC Analytical Results from Upper/Lower Aquifer Monitoring Wells in 2014, RACER Trust, Moraine, Ohio.

			Upgradient W-1-N 10/8/2014 Upper Aquifer	GM-23 10/10/2014 Upper Aquifer	GM-46 10/9/2014 Upper Aquifer	GM-59 10/10/2014 Upper Aquifer	GM-60 10/9/2014 Upper Aquifer	Source Areas GM-67S 10/10/2014 Upper Aquifer	GM-71 10/9/2014 Upper Aquifer	GM-72 10/9/2014 Upper Aquifer	GM-76S 10/9/2014 Upper Aquifer	GM-75S 10/9/2014 Upper Aquifer
	Units	MCL ¹										
Site-Specific Volatile Organic Compounds												
1,1,1-Trichloroethane	ug/L	200	< 1.0 U	< 10 U	< 1.0 U	< 13 U	< 67 U	< 5.0 U	0.31 J	< 1.0 U	< 1.0 U	< 20 U
1,1-Dichloroethane	ug/L		1.8	8.4 J	< 1.0 U	< 13 U	< 67 U	1.6 J	< 1.0 U	< 1.0 U	< 1.0 U	< 20 U
1,1-Dichloroethene	ug/L	7	< 1.0 U	< 10 U	< 1.0 U	< 13 U	< 67 U	< 5.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 20 U
Benzene	ug/L	5	< 1.0 U	< 10 U	< 1.0 U	< 13 U	< 67 U	< 5.0 U	< 1.0 U	< 1.0 U	0.39 J	< 20 U
cis-1,2-Dichloroethene	ug/L	70	0.21 J	210	0.30 J	6.7 J	96	2.3 J	0.21 J	< 1.0 U	< 1.0 U	< 20 U
Ethylbenzene	ug/L	700	< 1.0 U	< 10 U	< 1.0 U	< 13 U	< 67 U	< 5.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 20 U
Tetrachloroethene	ug/L	5	< 1.0 U	3.6 J	0.46 J	420	860	1.1 J	19	2.1	1.5	460
Toluene	ug/L	1000	< 1.0 U	< 10 U	< 1.0 U	< 13 U	< 67 U	< 5.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 20 U
trans-1,2-Dichloroethene	ug/L	100	< 1.0 U	20	< 1.0 U	< 13 U	< 67 U	< 5.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 20 U
Trichloroethene	ug/L	5	< 1.0 UB	4.1 J	< 1.0 UB	110	1400	140	12	< 1.0 UB	1.1	170
Vinyl chloride	ug/L	2	< 1.0 U	220	< 1.0 U	< 13 U	< 67 U	< 5.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 20 U
Xylene (total)	ug/L	10,000	< 2.0 U	< 20 U	< 2.0 U	< 27 U	< 130 U	< 10 U	< 2.0 U	< 2.0 U	< 2.0 U	< 40 U
Total Site-Specific VOCs	ug/L		3.0	466.1	0.8	536.7	2357.3	145.0	31.5	2.1	3.0	630.0
Additional Parameters in 2014												
Chloroethane	ug/L		< 1.0 U	< 10 U	< 1.0 U	< 13 U	< 67 UJ	< 5.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 20 U
1,4-Dioxane	ug/L	6.7	0.96 J	0.87 J	NS	< 2.0 U	1.3 J	NS	NS	NS	NS	< 2.0 U

1 - MCLs are not listed for 1,1-dichloroethane, chloroethane, or 1,4-dioxane. The Ohio EPA unrestricted potable use standard of 6.7 ug/L was used for 1,4-dioxane comparison.

ug/L - Micrograms per Liter.

All QA/QC results for 2014 data are shown in Appendix D.

MCL - Maximum Contaminant Levels.

< - 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.

NA - Not sampled.

BOLD - Results above MCL.



Table D. Summary of Groundwater VOC Analytical Results from Upper/Lower Aquifer Monitoring Wells in 2014, RACER Trust, Moraine, Ohio.

			Downgradient Reactive Zone Performance Wells						
	Units	MCL ¹	GM-29 10/9/2014 Upper Aquifer	GM-30 10/9/2014 Upper Aquifer	HR-3 10/8/2014 Upper Aquifer	GM-21 10/9/2014 Upper Aquifer	GM-6 10/7/2014 Upper Aquifer	GM-8 10/7/2014 Upper Aquifer	GM-19S 10/7/2014 Upper Aquifer
Site-Specific Volatile Organic Compounds									
1,1,1-Trichloroethane	ug/L	200	9.1 J	< 1.4 U	7.6 J	< 1.0 U	< 1.0 U	< 1.0 U	< 1.4 U
1,1-Dichloroethane	ug/L		9.5 J	3.2	11	16	0.36 J	0.59 J	7.6
1,1-Dichloroethene	ug/L	7	< 14 U	< 1.4 U	< 10 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.4 U
Benzene	ug/L	5	< 14 U	2.3	< 10 U	< 1.0 U	< 1.0 U	1.2	< 1.4 U
cis-1,2-Dichloroethene	ug/L	70	480	0.29 J	82	12	0.23 J	0.23 J	37
Ethylbenzene	ug/L	700	< 14 U	54	< 10 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.4 U
Tetrachloroethene	ug/L	5	12 J	< 1.4 U	< 10 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.4 U
Toluene	ug/L	1000	< 14 U	0.71 J	< 10 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.4 U
trans-1,2-Dichloroethene	ug/L	100	15	0.51 J	2.7 J	1.6	< 1.0 U	< 1.0 U	0.91 J
Trichloroethene	ug/L	5	260	< 1.4 U	220	18	< 1.0 U	< 1.0 U	0.81 J
Vinyl chloride	ug/L	2	40	< 1.4 U	6.4 J	5.8	< 1.0 U	0.58 J	15
Xylene (total)	ug/L	10,000	< 29 U	12	< 20 U	< 2.0 U	< 2.0 U	< 2.0 U	< 2.9 U
Total Site-Specific VOCs	ug/L		825.6	73.0	329.7	55.4	0.6	2.6	61.3
Additional Parameters in 2014									
Chloroethane	ug/L		< 14 U	3.6	< 10 U	0.74 J	< 1.0 U	3.1	< 1.4 U
1,4-Dioxane	ug/L	6.7	< 2.0 U	NS	NS	1.3 J	NS	18	NS

1 - MCLs are not listed for 1,1-dichloroethane, chloroethane, or 1,4-dioxane. The Ohio EPA unrestricted potable use standard of 6.7 ug/L was used for 1,4-dioxane comparison.

ug/L - Micrograms per Liter.

All QA/QC results for 2014 data are shown in Appendix D.

MCL - Maximum Contaminant Levels.

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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.

NA - Not sampled.

BOLD - Results above MCL.



Table D. Summary of Groundwater VOC Analytical Results from Upper/Lower Aquifer Monitoring Wells in 2014, RACER Trust, Moraine, Ohio.

			Closed North Settling Lagoon Monitoring Results				Closed South Settling Lagoon Monitoring Results				
			HR-4 10/7/2014	W-2-N 10/7/2014	W-3-N 10/7/2014	W-4-N 10/7/2014	HR-16 10/7/2014	HR-17 10/7/2014	W-2-S 10/7/2014	W-3-S 10/7/2014	W-4-S 10/7/2014
	Units	MCL ¹	Upper Aquifer	Upper Aquifer	Upper Aquifer	Upper Aquifer	Upper Aquifer	Upper Aquifer	Upper Aquifer	Upper Aquifer	Upper Aquifer
Site-Specific Volatile Organic Compounds											
1,1,1-Trichloroethane	ug/L	200	0.71 J	<1.0 U	<1.0 U	<1.0 U	0.58 J	<5.0 U	0.79 J	0.76 J	1.4 J
1,1-Dichloroethane	ug/L		2	<1.0 U	<1.0 U	5.7	0.64 J	2.0 J	0.80 J	0.96 J	1.3 J
1,1-Dichloroethene	ug/L	7	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<5.0 U	<1.0 U	<1.0 U	<2.5 U
Benzene	ug/L	5	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<5.0 U	<1.0 U	<1.0 U	<2.5 U
cis-1,2-Dichloroethene	ug/L	70	0.26 J	1.3	31	11	0.44 J	2.2 J	1.6	2.3	6.1
Ethylbenzene	ug/L	700	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<5.0 U	<1.0 U	<1.0 U	<2.5 U
Tetrachloroethene	ug/L	5	0.28 J	<1.0 U	0.52 J	0.49 J	<1.0 U	170	0.33 J	38	65
Toluene	ug/L	1000	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<5.0 U	<1.0 U	<1.0 U	<2.5 U
trans-1,2-Dichloroethene	ug/L	100	<1.0 U	<1.0 U	0.47 J	0.69 J	<1.0 U	<5.0 U	0.34 J	0.59 J	1.1 J
Trichloroethene	ug/L	5	<1.0 UB	0.20 J	<1.0 U	9.2	1.9	160	5	35	63
Vinyl chloride	ug/L	2	<1.0 U	<1.0 U	1	<1.0 U	<1.0 U	<5.0 U	<1.0 U	<1.0 U	<2.5 U
Xylene (total)	ug/L	10,000	<2.0 U	<2.0 U	<2.0 U	<2.0 U	<2.0 U	<10 U	<2.0 U	<2.0 U	<5.0 U
Total Site-Specific VOCs	ug/L		3.3	1.50	33.0	27.1	3.6	334.2	8.9	77.6	137.9
Additional Parameters in 2014											
Chloroethane	ug/L		<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<5.0 U	<1.0 U	<1.0 U	<2.5 U
1,4-Dioxane	ug/L	6.7	NS	NS	NS	NS	NS	NS	NS	NS	NS

1 - MCLs are not listed for 1,1-dichloroethane, chloroethane, or 1,4-dioxane. The Ohio EPA unrestricted potable use standard of 6.7 ug/L was used for 1,4-dioxane comparison.

ug/L - Micrograms per Liter.

All QA/QC results for 2014 data are shown in Appendix D.

MCL - Maximum Contaminant Levels.

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NA - Not sampled.

BOLD - Results above MCL.



Table D. Summary of Groundwater VOC Analytical Results from Upper/Lower Aquifer Monitoring Wells in 2014, RACER Trust, Moraine, Ohio.

	Units	MCL ¹	Downgradient On-Site								HR-2 10/8/2014 Upper Aquifer	HR-7 10/7/2014 Upper Aquifer
			HR-1 10/8/2014 Upper Aquifer	GM-43 10/8/2014 Upper Aquifer	GM-44 10/8/2014 Upper Aquifer	GM-45 10/8/2014 Upper Aquifer	GM-66 10/8/2014 Upper Aquifer	GM-31 10/9/2014 Upper Aquifer	GM-35 10/8/2014 Upper Aquifer			
Site-Specific Volatile Organic Compounds												
1,1,1-Trichloroethane	ug/L	200	1.3 J	1.8 J	< 6.7 U	3.2 J	< 10 U	3.8	< 25 U	< 1.0 U	< 1.0 U	
1,1-Dichloroethane	ug/L		1.4 J	< 5.7 U	< 6.7 U	2.2 J	12	2.8	22 J	7.3	0.27 J	
1,1-Dichloroethene	ug/L	7	< 5.0 U	< 5.7 U	< 6.7 U	< 4.0 U	< 10 U	< 2.0 U	< 25 U	< 1.0 U	< 1.0 U	
Benzene	ug/L	5	< 5.0 U	< 5.7 U	< 6.7 U	< 4.0 U	< 10 U	< 2.0 U	< 25 U	< 1.0 U	< 1.0 U	
cis-1,2-Dichloroethene	ug/L	70	20	25	16	37	280	54	57	1.8	1.7	
Ethylbenzene	ug/L	700	< 5.0 U	< 5.7 U	< 6.7 U	< 4.0 U	< 10 U	< 2.0 U	< 25 U	< 1.0 U	< 1.0 U	
Tetrachloroethene	ug/L	5	36	35	100	150	< 10 U	0.48 J	6.0 J	< 1.0 U	< 1.0 U	
Toluene	ug/L	1000	< 5.0 U	< 5.7 U	< 6.7 U	< 4.0 U	< 10 U	< 2.0 U	< 25 U	< 1.0 U	< 1.0 U	
trans-1,2-Dichloroethene	ug/L	100	1.5 J	1.5 J	< 6.7 U	2.0 J	11	1.6 J	14 J	0.29 J	< 1.0 U	
Trichloroethene	ug/L	5	120	220	180	140	110	79	28	< 1.0 UB	6.2	
Vinyl chloride	ug/L	2	< 5.0 U	< 5.7 U	< 6.7 U	< 4.0 U	3.0 J	< 2.0 U	< 25 U	< 1.0 U	< 1.0 U	
Xylene (total)	ug/L	10,000	< 10 U	< 11 U	< 13 U	< 8.0 U	< 20 U	< 4.0 U	< 50 U	< 2.0 U	< 2.0 U	
Total Site-Specific VOCs	ug/L		180.2	283.3	296.0	334.4	416.0	141.7	127.0	9.4	8.2	
Additional Parameters in 2014												
Chloroethane	ug/L		< 5.0 U	< 5.7 U	< 6.7 U	< 4.0 U	< 10 U	< 2.0 U	< 25 U	< 1.0 U	< 1.0 U	
1,4-Dioxane	ug/L	6.7	NS	NS	NS	NS	NS	0.95 J	NS	NS	NS	

1 - MCLs are not listed for 1,1-dichloroethane, chloroethane, or 1,4-dioxane. The Ohio EPA unrestricted potable use standard of 6.7 ug/L was used for 1,4-dioxane comparison.

ug/L - Micrograms per Liter.

All QA/QC results for 2014 data are shown in Appendix D.

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Table D. Summary of Groundwater VOC Analytical Results from Upper/Lower Aquifer Monitoring Wells in 2014, RACER Trust, Moraine, Ohio.

			Property Boundary		Off-Site Downgradient of the Site						
			GM-2 10/7/2014	TW-2 10/9/2014	GM-10 10/6/2014	GM-16 10/7/2014	GM-47 10/7/2014	GM-50 10/7/2014	GM-51 10/6/2014	GM-52 10/6/2014	GM-62R 10/6/2014
	Units	MCL ¹	Upper Aquifer	Upper Aquifer	Upper Aquifer	Upper Aquifer	Upper Aquifer	Upper Aquifer	Upper Aquifer	Upper Aquifer	Upper Aquifer
Site-Specific Volatile Organic Compounds											
1,1,1-Trichloroethane	ug/L	200	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.7 U	<1.4 U	0.70 J	<2.0 U	<1.0 U
1,1-Dichloroethane	ug/L		<1.0 U	0.48 J	<1.0 U	1.4	4.5	7.1	1.7 J	<2.0 U	<1.0 U
1,1-Dichloroethene	ug/L	7	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.7 U	<1.4 U	<2.0 U	<2.0 U	<1.0 U
Benzene	ug/L	5	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.7 U	<1.4 U	<2.0 U	<2.0 U	<1.0 U
cis-1,2-Dichloroethene	ug/L	70	1.6	0.56 J	<1.0 U	7.7	28	5.1	5	<2.0 U	<1.0 U
Ethylbenzene	ug/L	700	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.7 U	<1.4 U	<2.0 U	<2.0 U	<1.0 U
Tetrachloroethene	ug/L	5	<1.0 U	<1.0 U	1	31	46	39	67	44	12
Toluene	ug/L	1000	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.7 U	<1.4 U	<2.0 U	<2.0 U	<1.0 U
trans-1,2-Dichloroethene	ug/L	100	<1.0 U	<1.0 U	<1.0 U	0.26 J	1.8	<1.4 U	<2.0 U	<2.0 U	<1.0 U
Trichloroethene	ug/L	5	2.9	<1.0 UB	3.1	7.5	8.1	5.5	33	8.2	<1.0 U
Vinyl chloride	ug/L	2	<1.0 U	0.64 J	<1.0 U	0.97 J	<1.7 U	1.8	<2.0 U	<2.0 U	<1.0 U
Xylene (total)	ug/L	10,000	<2.0 U	<2.0 U	<2.0 U	<2.0 U	<3.3 U	<2.9 U	<4.0 U	<4.0 U	<2.0 U
Total Site-Specific VOCs	ug/L		4.5	1.7	4.1	48.8	88.4	58.5	107.4	52.2	12.0
Additional Parameters in 2014											
Chloroethane	ug/L		<1.0 U	<1.0 U	<1.0 U	1.1	<1.7 U	<1.4 U	<2.0 U	<2.0 U	<1.0 U
1,4-Dioxane	ug/L	6.7	NS	NS	NS	9.1	NS	NS	NS	NS	NS

1 - MCLs are not listed for 1,1-dichloroethane, chloroethane, or 1,4-dioxane. The Ohio EPA unrestricted potable use standard of 6.7 ug/L was used for 1,4-dioxane comparison.

ug/L - Micrograms per Liter.

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Table D. Summary of Groundwater VOC Analytical Results from Upper/Lower Aquifer Monitoring Wells in 2014, RACER Trust, Moraine, Ohio.

			Off-Site Downgradient of the Site							
	Units	MCL ¹	GM-63 10/7/2014 Upper Aquifer	GM-55 10/6/2014 Upper Aquifer	GM-65S 10/6/2014 Upper Aquifer	WSU-24 12/4/2014 Upper Aquifer	GM-78 10/6/2014 Upper Aquifer	GM-79 10/6/2014 Upper Aquifer	GM-80 10/6/2014 Upper Aquifer	GM-26 10/6/2014 Upper Aquifer
Site-Specific Volatile Organic Compounds										
1,1,1-Trichloroethane	ug/L	200	2.8	<1.0 U	<1.0 U	<1.0 U	<1.0 U	1	0.50 J	<1.0 U
1,1-Dichloroethane	ug/L		1.9	<1.0 U	<1.0 U	<1.0 U	<1.0 U	3.2	0.66 J	<1.0 U
1,1-Dichloroethene	ug/L	7	<1.4 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U
Benzene	ug/L	5	<1.4 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	ug/L	70	2.4	<1.0 U	<1.0 U	<1.0 U	<1.0 U	8.4	2.5	<1.0 U
Ethylbenzene	ug/L	700	<1.4 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U
Tetrachloroethene	ug/L	5	53	3.3	5.4	7.2	9.5	1	3.5	1.3
Toluene	ug/L	1000	<1.4 U	0.34 J	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U
trans-1,2-Dichloroethene	ug/L	100	<1.4 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	0.43 J	<1.0 U	<1.0 U
Trichloroethene	ug/L	5	20	<1.0 U	0.24 J	2.0	<1.0 U	23	12	<1.0 U
Vinyl chloride	ug/L	2	<1.4 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U
Xylene (total)	ug/L	10,000	<2.9 U	<2.0 U	<2.0 U	<2.0 U	<2.0 U	<2.0 U	<2.0 U	<2.0 U
Total Site-Specific VOCs	ug/L		80.1	3.6	5.6	9.2	9.5	37.0	19.2	1.3
Additional Parameters in 2014										
Chloroethane	ug/L		<1.4 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U
1,4-Dioxane	ug/L	6.7	NS	NS	NS	NS	NS	NS	NS	NS

1 - MCLs are not listed for 1,1-dichloroethane, chloroethane, or 1,4-dioxane. The Ohio EPA unrestricted potable use standard of 6.7 ug/L was used for 1,4-dioxane comparison.

ug/L - Micrograms per Liter.

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

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Table D. Summary of Groundwater VOC Analytical Results from Upper/Lower Aquifer Monitoring Wells in 2014, RACER Trust, Moraine, Ohio.

			Upgradient Contributions		On-Site Groundwater Quality					
			RMW-88	HR-12	GM-54	GM-67D	GM-68D	GM-75D	GM-76D	RMW-85
	Units	MCL ¹	10/8/2014	10/8/2014	10/8/2014	10/10/2014	10/10/2014	12/4/2014	10/9/2014	10/9/2014
			Lower Aquifer	Lower Aquifer	Lower Aquifer	Lower Aquifer	Lower Aquifer	Lower Aquifer	Lower Aquifer	Lower Aquifer
Site-Specific Volatile Organic Compounds										
1,1,1-Trichloroethane	ug/L	200	< 2.5 U	< 1.0 U	< 1.7 U	1.2 J	0.71 J	< 5.7 U	< 1.0 U	< 2.0 U
1,1-Dichloroethane	ug/L		32	3.4	< 1.7 U	3.7	< 1.4 U	< 5.7 U	< 1.0 U	< 2.0 U
1,1-Dichloroethene	ug/L	7	< 2.5 U	< 1.0 U	< 1.7 U	< 3.3 U	< 1.4 U	< 5.7 U	< 1.0 U	< 2.0 U
Benzene	ug/L	5	< 2.5 U	< 1.0 U	< 1.7 U	< 3.3 U	< 1.4 U	< 5.7 U	< 1.0 U	0.75 J
cis-1,2-Dichloroethene	ug/L	70	78	1.9	< 1.7 U	120	1.1 J	11	0.24 J	55
Ethylbenzene	ug/L	700	< 2.5 U	< 1.0 U	< 1.7 U	< 3.3 U	< 1.4 U	< 5.7 U	< 1.0 U	< 2.0 U
Tetrachloroethene	ug/L	5	< 2.5 U	< 1.0 U	66	0.84 J	36	190	35	40
Toluene	ug/L	1000	< 2.5 U	< 1.0 U	< 1.7 U	< 3.3 U	< 1.4 U	< 5.7 U	< 1.0 U	< 2.0 U
trans-1,2-Dichloroethene	ug/L	100	4.3	< 1.0 U	< 1.7 U	2.6 J	< 1.4 U	< 5.7 U	< 1.0 U	1.8 J
Trichloroethene	ug/L	5	< 2.5 U	< 1.0 UB	< 1.7 UB	15	3.7	180	8.5	78
Vinyl chloride	ug/L	2	1.2 J	< 1.0 U	< 1.7 U	3.5	< 1.4 U	< 5.7 U	< 1.0 U	5
Xylene (total)	ug/L	10,000	< 5.0 U	< 2.0 U	< 3.3 U	< 6.7 U	< 2.9 U	< 11 U	< 2.0 U	< 4.0 U
Total Site-Specific VOCs	ug/L		115.5	5.3	66.0	146.8	41.5	381.0	43.7	180.6
Additional Parameters in 2014										
Chloroethane	ug/L		< 2.5 U	< 1.0 U	< 1.7 U	< 3.3 U	< 1.4 U	< 5.7 U	< 1.0 U	< 2.0 U
1,4-Dioxane	ug/L	6.7	NS	NS	NS	NS	NS	NS	NS	NS

1 - MCLs are not listed for 1,1-dichloroethane, chloroethane, or 1,4-dioxane. The Ohio EPA unrestricted potable use standard of 6.7 ug/L was used for 1,4-dioxane comparison.

ug/L - Micrograms per Liter.

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

NA - Not sampled.

BOLD - Results above MCL.



Table D. Summary of Groundwater VOC Analytical Results from Upper/Lower Aquifer Monitoring Wells in 2014, RACER Trust, Moraine, Ohio.

	Units	MCL ¹	Lower Aquifer Groundwater Quality					
			HR-15 10/7/2014	GM-19D 10/7/2014	RMW-86 10/8/2014	RMW-87 10/9/2014	GM-15 10/7/2014	GM-20D 10/6/2014
			Lower Aquifer	Lower Aquifer	Lower Aquifer	Lower Aquifer	Lower Aquifer	Lower Aquifer
Site-Specific Volatile Organic Compounds								
1,1,1-Trichloroethane	ug/L	200	<1.0 U	<1.0 U	9.4	<2.2 U	<1.0 U	0.32 J
1,1-Dichloroethane	ug/L		<1.0 U	0.27 J	7.6	13	1.5	<1.0 U
1,1-Dichloroethene	ug/L	7	<1.0 U	<1.0 U	<6.7 U	<2.2 U	<1.0 U	<1.0 U
Benzene	ug/L	5	<1.0 U	<1.0 U	<6.7 U	<2.2 U	<1.0 U	<1.0 U
cis-1,2-Dichloroethene	ug/L	70	3.5	5.8	33	62	2.4	<1.0 U
Ethylbenzene	ug/L	700	<1.0 U	<1.0 U	<6.7 U	<2.2 U	<1.0 U	<1.0 U
Tetrachloroethene	ug/L	5	<1.0 U	0.36 J	29	<2.2 U	<1.0 U	1.7
Toluene	ug/L	1000	<1.0 U	<1.0 U	<6.7 U	<2.2 U	<1.0 U	<1.0 U
trans-1,2-Dichloroethene	ug/L	100	<1.0 U	<1.0 U	<6.7 U	2.7	0.42 J	<1.0 U
Trichloroethene	ug/L	5	0.71 J	5	140	10	4.1	3.1
Vinyl chloride	ug/L	2	1.9	4.1	<6.7 U	<2.2 U	0.38 J	<1.0 U
Xylene (total)	ug/L	10,000	<2.0 U	<2.0 U	<13 U	<4.4 U	<2.0 U	<2.0 U
Total Site-Specific VOCs	ug/L		6.1	15.5	219.0	87.7	8.8	5.1
Additional Parameters in 2014								
Chloroethane	ug/L		<1.0 U	<1.0 U	<6.7 U	<2.2 U	<1.0 U	<1.0 U
1,4-Dioxane	ug/L	6.7	NS	NS	NS	NS	NS	NS

1 - MCLs are not listed for 1,1-dichloroethane, chloroethane, or 1,4-dioxane. The Ohio EPA unrestricted potable use standard of 6.7 ug/L was used for 1,4-dioxane comparison.

ug/L - Micrograms per Liter.

All QA/QC results for 2014 data are shown in Appendix D.

MCL - Maximum Contaminant Levels.

< - 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.

NA - Not sampled.

BOLD - Results above MCL.



Table D. Summary of Groundwater VOC Analytical Results from Upper/Lower Aquifer Monitoring Wells in 2014, RACER Trust, Moraine, Ohio.

			Downgradient Groundwater Quality					
	Units	MCL ¹	GM-9 10/6/2014 Lower Aquifer	DN-13 12/4/2014 Lower Aquifer	GM-83D 10/9/2014 Lower Aquifer	GM-84 10/8/2014 Lower Aquifer	GM-77D 10/8/2014 Lower Aquifer	GM-11 10/7/2014 Lower Aquifer
Site-Specific Volatile Organic Compounds								
1,1,1-Trichloroethane	ug/L	200	1.2	0.86 J	<1.0 U	<1.0 U	<1.0 U	<1.0 U
1,1-Dichloroethane	ug/L		0.39 J	1.6	<1.0 U	<1.0 U	<1.0 U	<1.0 U
1,1-Dichloroethene	ug/L	7	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U
Benzene	ug/L	5	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U
cis-1,2-Dichloroethene	ug/L	70	0.54 J	5.9	<1.0 U	<1.0 U	<1.0 U	<1.0 U
Ethylbenzene	ug/L	700	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U
Tetrachloroethene	ug/L	5	<1.0 U	3.5	<1.0 U	<1.0 U	14	1.1
Toluene	ug/L	1000	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U
trans-1,2-Dichloroethene	ug/L	100	<1.0 U	0.41 J	<1.0 U	<1.0 U	<1.0 U	<1.0 U
Trichloroethene	ug/L	5	17	10.0	<1.0 U	4.9	<1.0 U	17
Vinyl chloride	ug/L	2	<1.0 U	0.79 J	2.6	<1.0 U	<1.0 U	<1.0 U
Xylene (total)	ug/L	10,000	<2.0 U	<2.0 U	<2.0 U	<2.0 U	<2.0 U	<2.0 U
Total Site-Specific VOCs	ug/L		19.1	23.1	2.6	4.9	14.0	18.1
Additional Parameters in 2014								
Chloroethane	ug/L		<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U
1,4-Dioxane	ug/L	6.7	NS	NS	NS	NS	NS	NS

1 - MCLs are not listed for 1,1-dichloroethane, chloroethane, or 1,4-dioxane. The Ohio EPA unrestricted potable use standard of 6.7 ug/L was used for 1,4-dioxane comparison.

ug/L - Micrograms per Liter.

All QA/QC results for 2014 data are shown in Appendix D.

MCL - Maximum Contaminant Levels.

< - 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.

NA - Not sampled.

BOLD - Results above MCL.



Table D. Summary of Groundwater VOC Analytical Results from Upper/Lower Aquifer Monitoring Wells in 2014, RACER Trust, Moraine, Ohio.

			QA/QC Trip Blank 10/10/2014 QAQC	QA/QC Trip Blank 10/10/2014 QAQC	QA/QC Trip Blank 10/7/2014 QAQC	QA/QC Trip Blank 10/7/2014 QAQC	QA/QC Equipment Blank 10/7/2014 QAQC	QA/QC Equipment Blank 10/7/2014 QAQC	QA/QC Equipment Blank 10/8/2014 QAQC	QA/QC Trip Blank 10/9/2014 QAQC	QA/QC Trip Blank 10/9/2014 QAQC	QA/QC Trip Blank 10/9/2014 QAQC	QA/QC Trip Blank 10/9/2014 QAQC	QA/QC Trip Blank 12/4/2014 QAQC	QA/QC Trip Blank 12/4/2014 QAQC	QA/QC Equipment Blank 12/4/2014 QAQC	QA/QC Equipment Blank 12/4/2014 QAQC
Site-Specific Volatile Organic Compounds																	
1,1,1-Trichloroethane	ug/L	200	<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	<1.0 U	<1.0 U	<1.0 U
1,1-Dichloroethane	ug/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	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U
1,1-Dichloroethene	ug/L	7	<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	<1.0 U	<1.0 U	<1.0 U
Benzene	ug/L	5	<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	<1.0 U	<1.0 U	<1.0 U
cis-1,2-Dichloroethene	ug/L	70	<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	<1.0 U	<1.0 U	<1.0 U
Ethylbenzene	ug/L	700	<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	<1.0 U	<1.0 U	<1.0 U
Tetrachloroethene	ug/L	5	<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	<1.0 U	0.84 J	0.42 J
Toluene	ug/L	1000	<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	<1.0 U	<1.0 U	<1.0 U
trans-1,2-Dichloroethene	ug/L	100	<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	<1.0 U	<1.0 U	<1.0 U
Trichloroethene	ug/L	5	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	0.34 J	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	0.20 J	<1.0 U
Vinyl chloride	ug/L	2	<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	<1.0 U	<1.0 U	<1.0 U
Xylene (total)	ug/L	10,000	<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	<2.0 U	<2.0 U	<2.0 U	<2.0 U	<2.0 U
Total Site-Specific VOCs	ug/L		0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	1.0	0.4	
Additional Parameters in 2014																	
Chloroethane	ug/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	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U
1,4-Dioxane	ug/L	6.7	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS

1 - MCLs are not listed for 1,1-dichloroethane, chloroethane, or 1,4-dioxane. The Ohio EPA unrestricted potable use standard of 6.7 ug/L was used for 1,4-dioxane comparison.

ug/L - Micrograms per Liter.

All QA/QC results for 2014 data are shown in Appendix D.

MCL - Maximum Contaminant Levels.

< - 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.

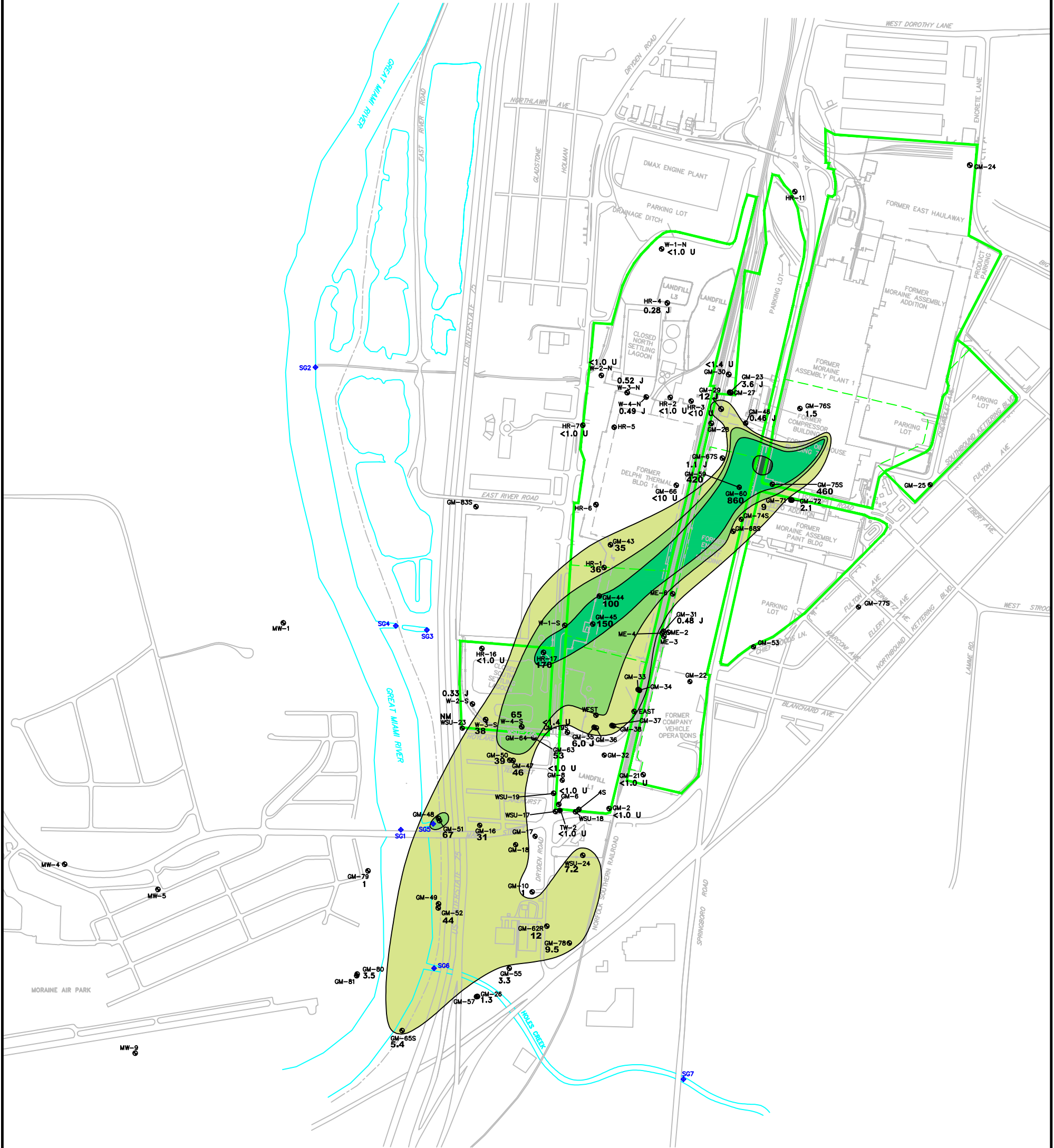
NA - Not sampled.

BOLD - Results above MCL.



Appendix E

Isoconcentration Maps



LEGEND

- MONITORING WELL (UPPER AQUIFER)
- INACTIVE RECOVERY WELL (TW-2)
- STREAM GAUGE AND STREAM GAUGE MEASUREMENT; NOT USED FOR CONTOURING
- RIVER LEVEL
- FORMER BUILDING FOOTPRINT
- SURFACE WATER FEATURE
- PROPERTY BOUNDARY
- PARCEL BOUNDARY
- <1.0 U: CONSTITUENT NOT DETECTED ABOVE LABORATORY LIMIT SHOWN
- ug/L: MICROGRAMS PER LITER
- MCL: MAXIMUM CONTAMINANT LEVEL
- BOLD: ANALYTICAL RESULT ABOVE MCL

- >1000 ug/L
- 100-1000 ug/L
- 50-100 ug/L
- 5-50 ug/L

SITE-SPECIFIC VOLATILE ORGANIC COMPOUNDS	MCL (ug/L)
1,1,1-Trichloroethane	200
1,1-Dichloroethane	--
1,1-Dichloroethene	7
Benzene	5
cis-1,2-Dichloroethene	70
Ethylbenzene	700
Tetrachloroethene	5
Toluene	1000
trans-1,2-Dichloroethene	100
Trichloroethene	5
Vinyl chloride	2
Xylene (total)	10,000



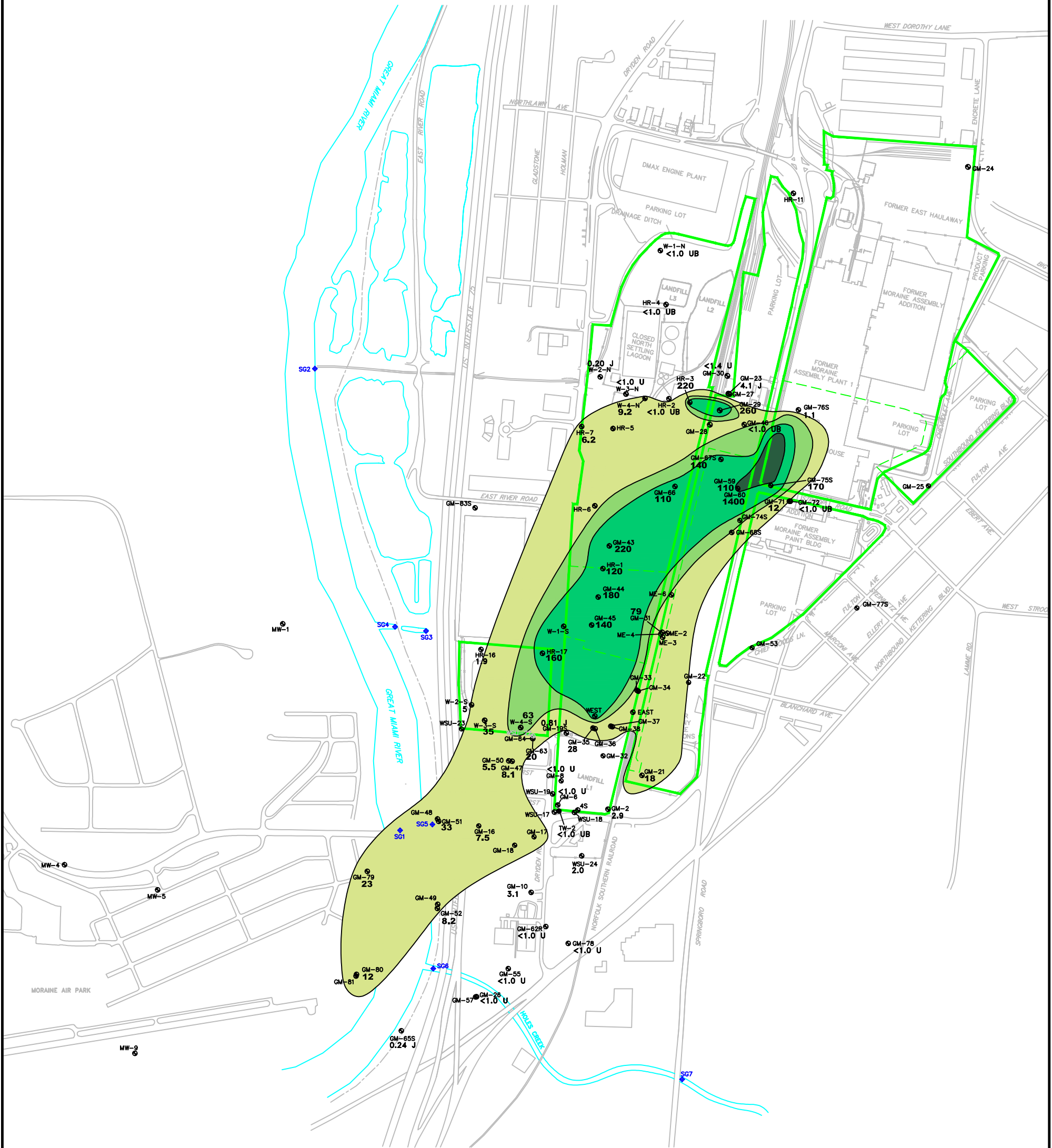
0 200 1000ft

RACER TRUST
MORaine, OHIO

OH000294.2014

ISOCONCENTRATION MAP
(UPPER AQUIFER)
TETRACHLOROETHENE
OCTOBER 2014





LEGEND

- MONITORING WELL (UPPER AQUIFER)
- INACTIVE RECOVERY WELL (TW-2)
- STREAM GAUGE AND STREAM GAUGE MEASUREMENT; NOT USED FOR CONTOURING
- CARBON INTRODUCTION WELL
- RIVER LEVEE
- FORMER BUILDING FOOTPRINT
- SURFACE WATER FEATURE
- PROPERTY BOUNDARY
- PARCEL BOUNDARY
- <1.0 U
ug/L
MCL
BOLD
ANALYTICAL RESULT ABOVE MCL
- >1000 ug/L
- 100-1000 ug/L
- 50-100 ug/L
- 5-50 ug/L

SITE-SPECIFIC VOLATILE ORGANIC COMPOUNDS	MCL (ug/L)
1,1,1-Trichloroethane	200
1,1-Dichloroethane	7
1,1-Dichloroethene	5
Benzene	70
cis-1,2-Dichloroethene	700
Ethylbenzene	5
Tetrachloroethene	1000
Toluene	100
trans-1,2-Dichloroethene	5
Trichloroethene	2
Vinyl chloride	10,000
Xylene (total)	



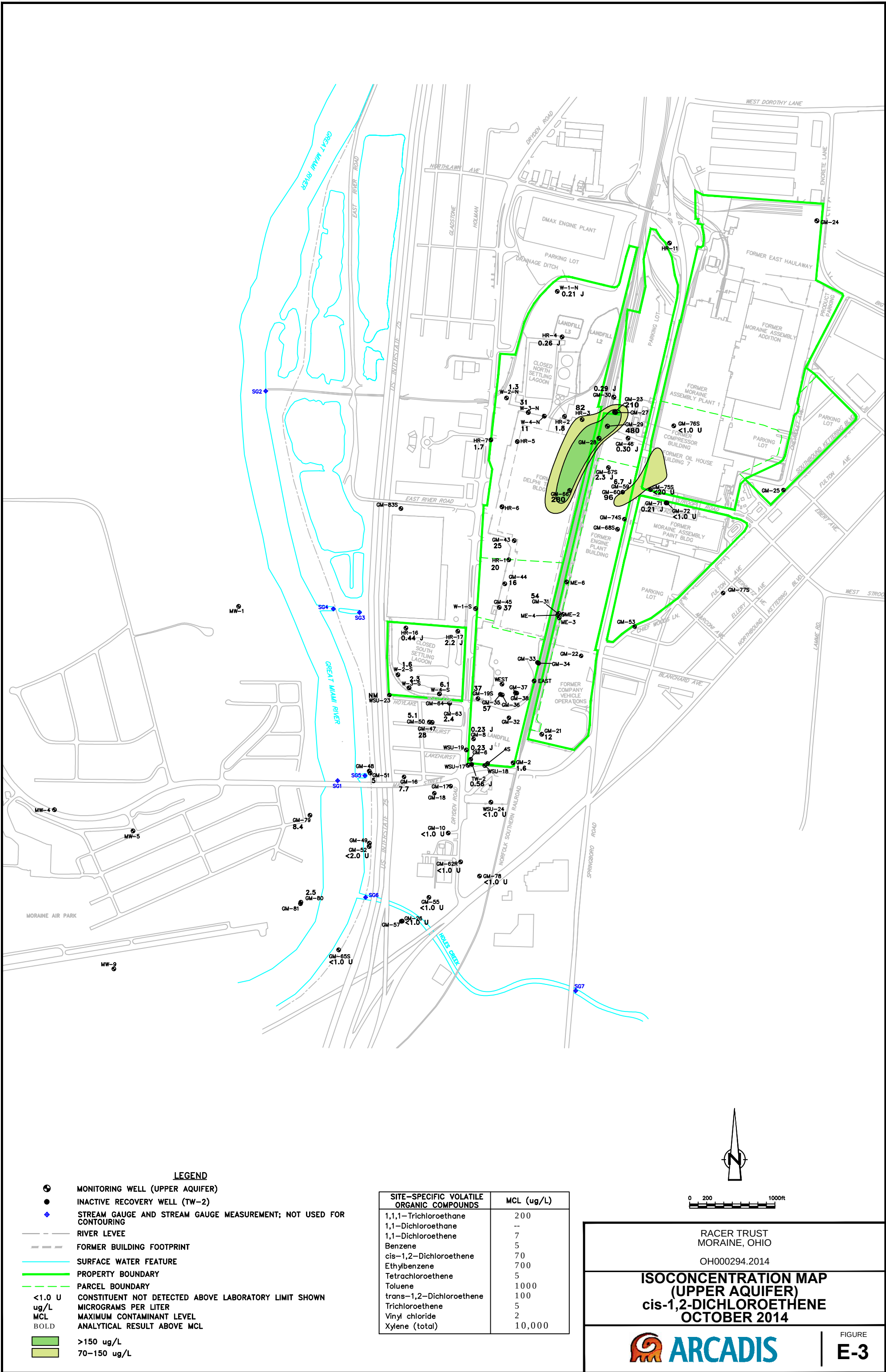
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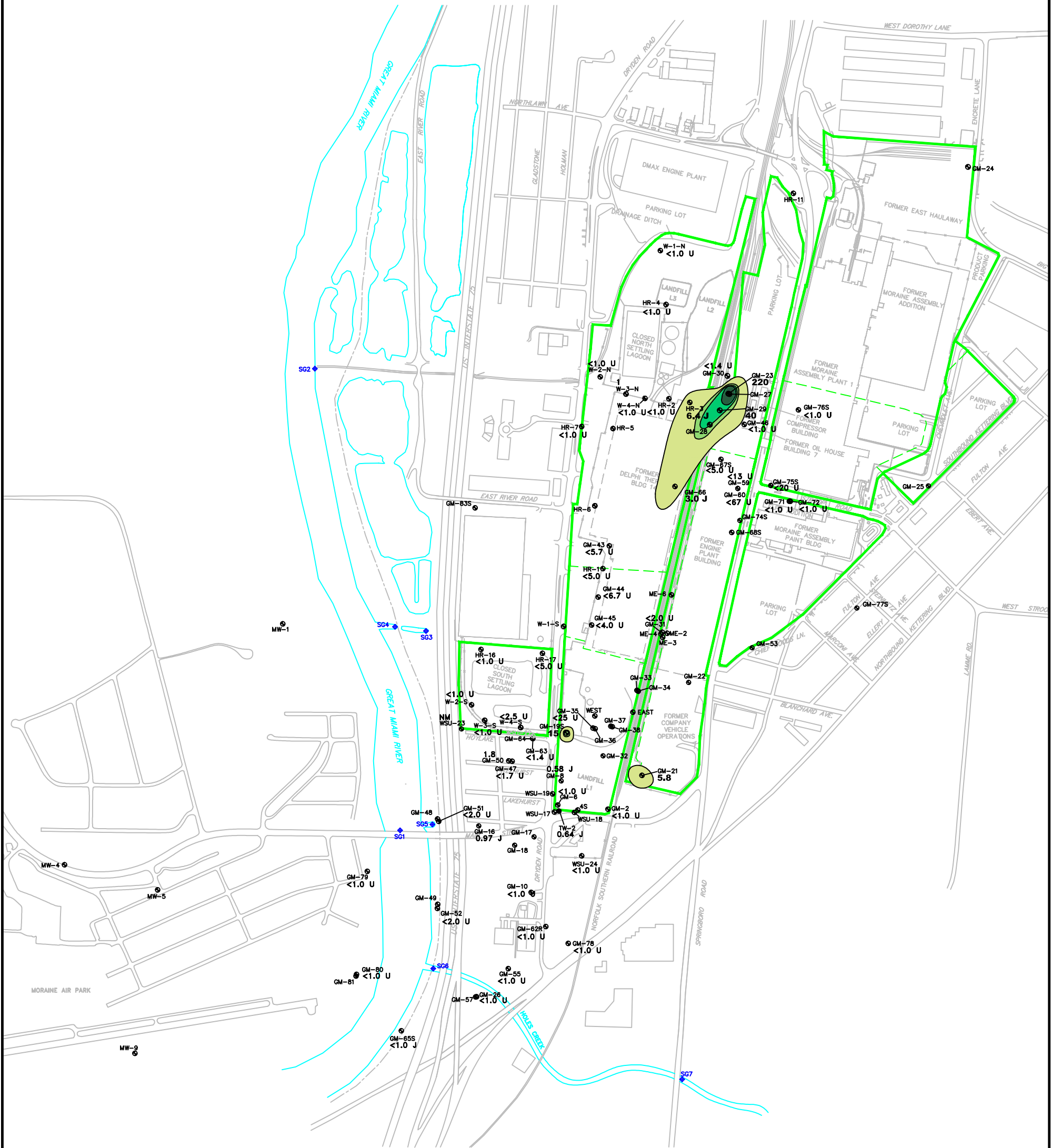
RACER TRUST
MORaine, OHIO

OH000294.2014

ISOCONCENTRATION MAP
(UPPER AQUIFER)
TRICHLOROETHENE
OCTOBER 2014







LEGEND

- MONITORING WELL (UPPER AQUIFER)
- INACTIVE RECOVERY WELL (TW-2)
- STREAM GAUGE AND STREAM GAUGE MEASUREMENT; NOT USED FOR CONTOURING
- RIVER LEVEE
- FORMER BUILDING FOOTPRINT
- SURFACE WATER FEATURE
- PROPERTY BOUNDARY
- PARCEL BOUNDARY
- CONSTITUENT NOT DETECTED ABOVE LABORATORY LIMIT SHOWN
- MICROGRAMS PER LITER
- MAXIMUM CONTAMINANT LEVEL
- ANALYTICAL RESULT ABOVE MCL
- >50 ug/L
- 20-50 ug/L
- 10-20 ug/L
- 2-10 ug/L

SITE-SPECIFIC VOLATILE ORGANIC COMPOUNDS	MCL (ug/L)
1,1,1-Trichloroethane	200
1,1-Dichloroethane	--
1,1-Dichloroethene	7
Benzene	5
cis-1,2-Dichloroethene	70
Ethylbenzene	700
Tetrachloroethene	5
Toluene	1000
trans-1,2-Dichloroethene	100
Trichloroethene	5
Vinyl chloride	2
Xylene (total)	10,000

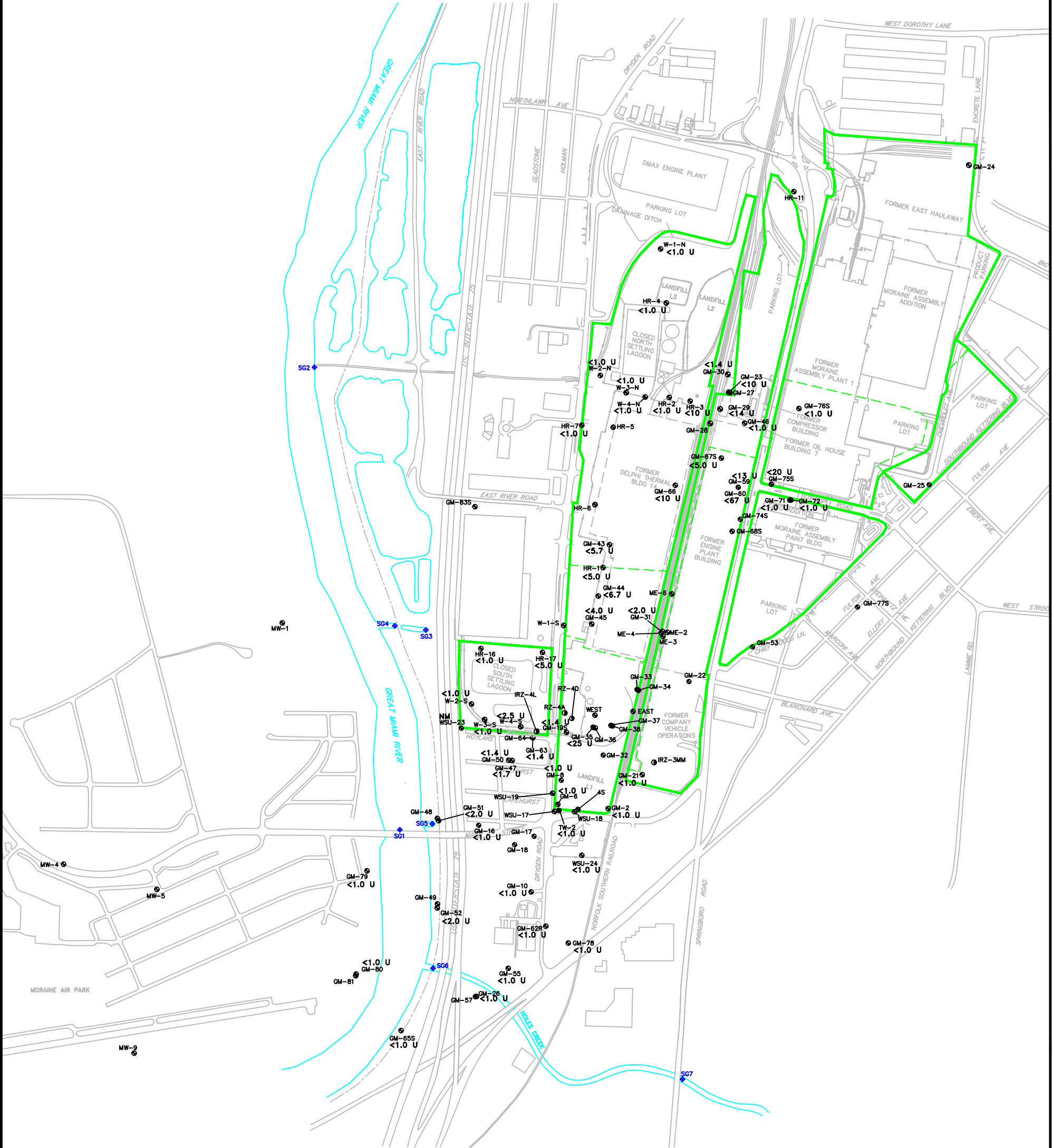


0 200 1000ft

RACER TRUST
MORaine, OHIO
OH000294.2014

ISOCONCENTRATION MAP
(UPPER AQUIFER)
VINYL CHLORIDE - OCTOBER 2014





LEGEND

- MONITORING WELL (UPPER AQUIFER)
- INACTIVE RECOVERY WELL (TW-2)
- STREAM GAUGE AND STREAM GAUGE MEASUREMENT; NOT USED FOR CONTOURING
- CARBON INTRODUCTION WELL
- RIVER LEVEE
- FORMER BUILDING FOOTPRINT
- SURFACE WATER FEATURE
- PROPERTY BOUNDARY
- PARCEL BOUNDARY
- <1.0 U
ug/L
MCL
BOLD
- CONSTITUENT NOT DETECTED ABOVE LABORATORY LIMIT SHOWN
- MICROGRAMS PER LITER
- MAXIMUM CONTAMINANT LEVEL
- ANALYTICAL RESULT ABOVE MCL

SITE-SPECIFIC VOLATILE ORGANIC COMPOUNDS	MCL (ug/L)
1,1,1-Trichloroethane	200
1,1-Dichloroethane	--
1,1-Dichloroethene	7
Benzene	5
cis-1,2-Dichloroethene	70
Ethylbenzene	700
Tetrachloroethene	5
Toluene	1000
trans-1,2-Dichloroethene	100
Trichloroethene	5
Vinyl chloride	2
Xylene (total)	10,000

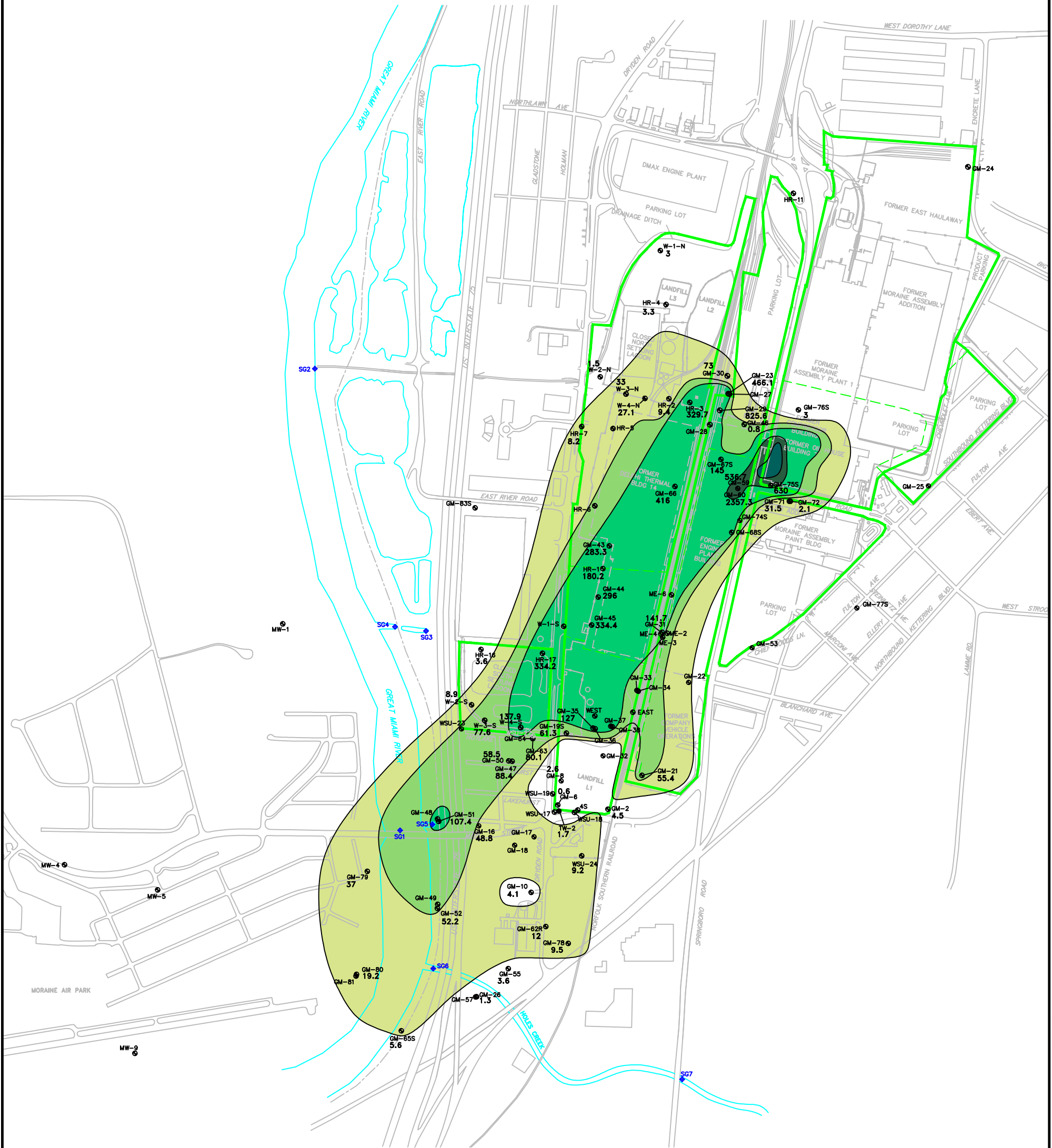


0 200 1000ft

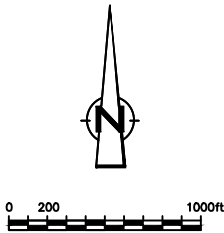
RACER TRUST
MORaine, OHIO
OH000294.2014

ISOCONCENTRATION MAP
(UPPER AQUIFER)
1,1-DICHLOROETHENE - OCTOBER 2014





- LEGEND**
- MONITORING WELL (UPPER AQUIFER)
 - INACTIVE RECOVERY WELL (TW-2)
 - ◆ STREAM GAUGE AND STREAM GAUGE MEASUREMENT; NOT USED FOR CONTOURING
 - RIVER LEVEE
 - FORMER BUILDING FOOTPRINT
 - SURFACE WATER FEATURE
 - PROPERTY BOUNDARY
 - PARCEL BOUNDARY
 - ug/L MICROGRAMS PER LITER
 - >10000 ug/L
 - 1000-10000 ug/L
 - 100-1000 ug/L
 - 50-100 ug/L
 - 5-50 ug/L

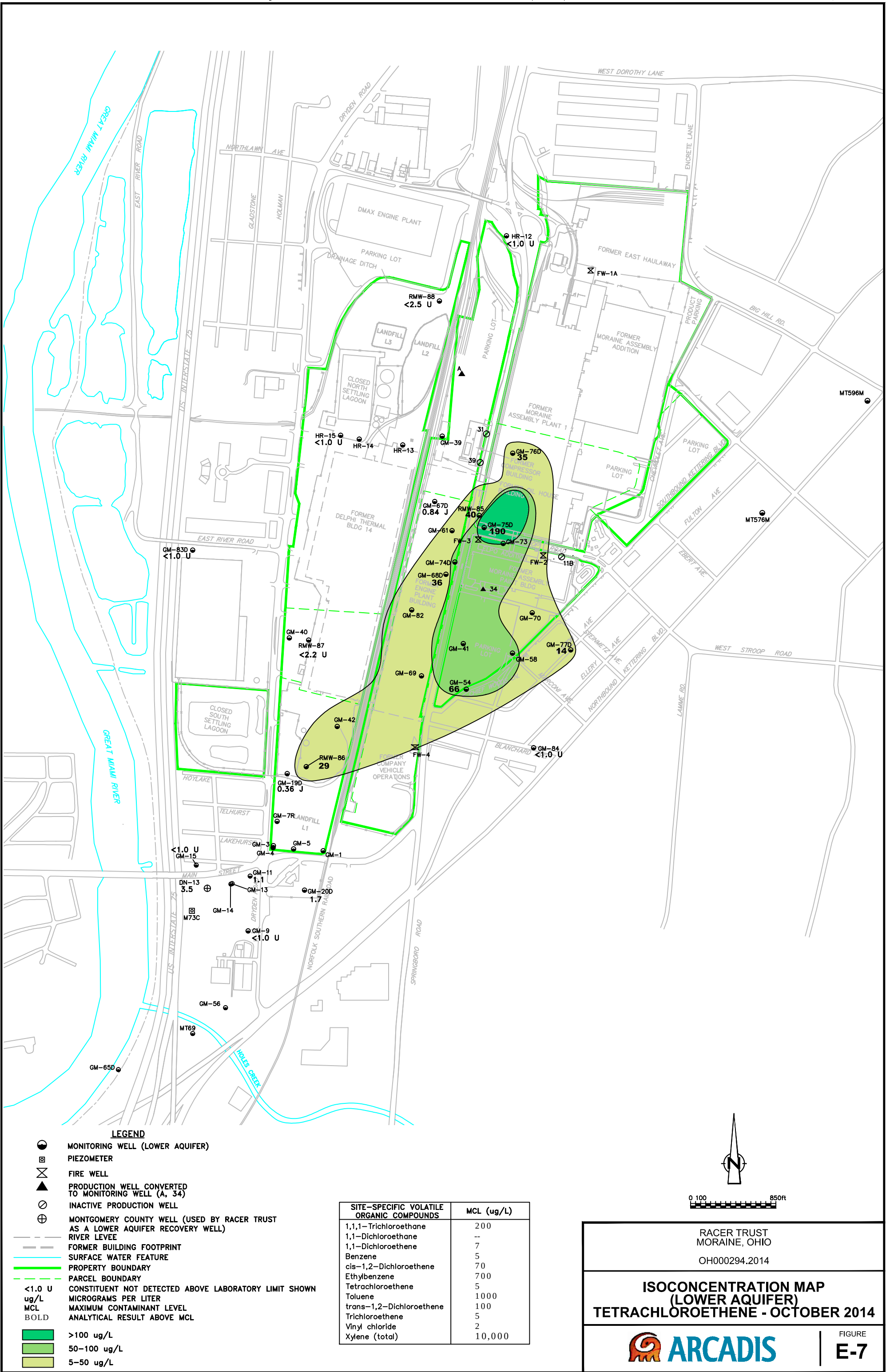


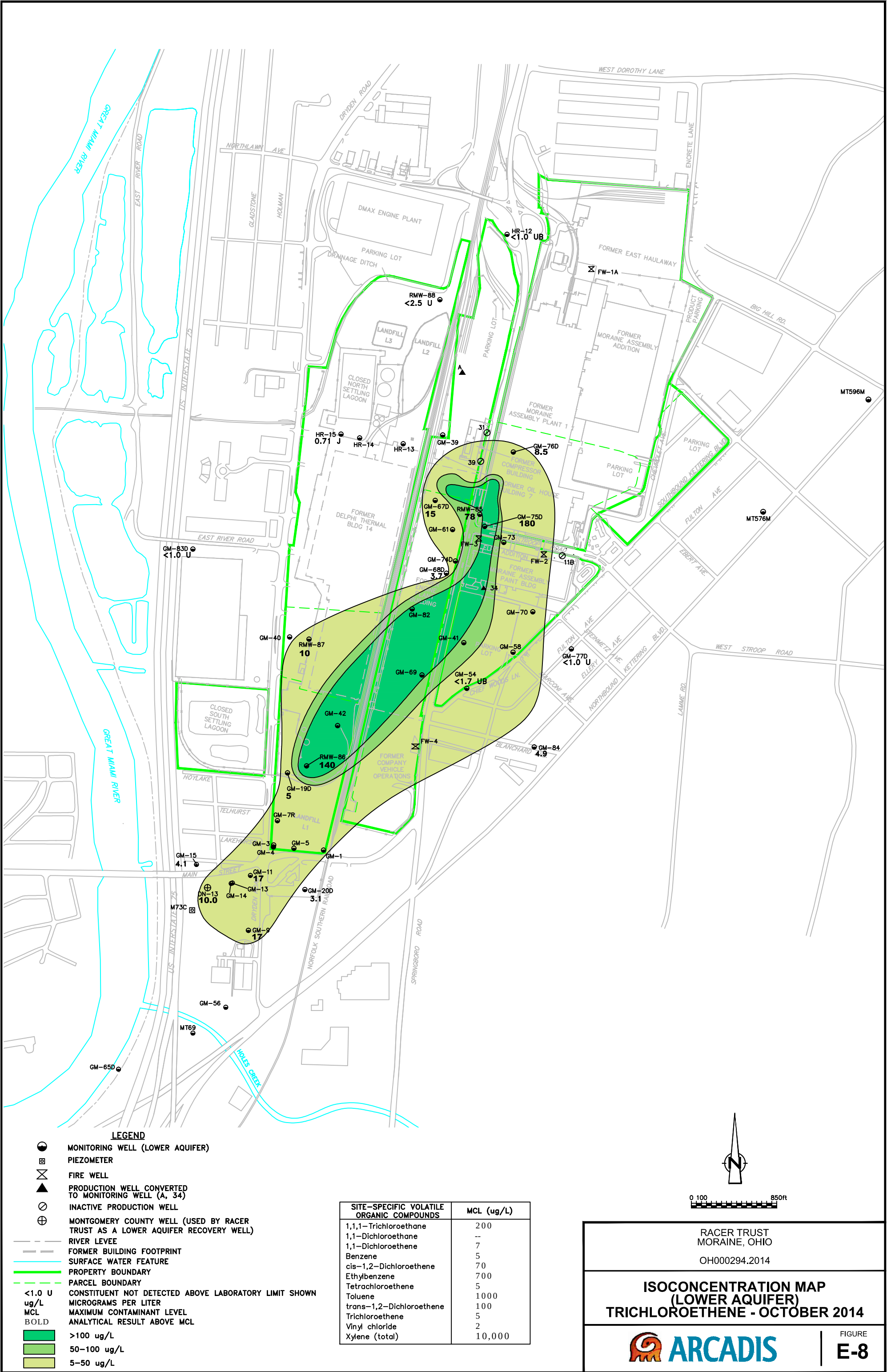
RACER TRUST
MORaine, OHIO
OH000294.2014

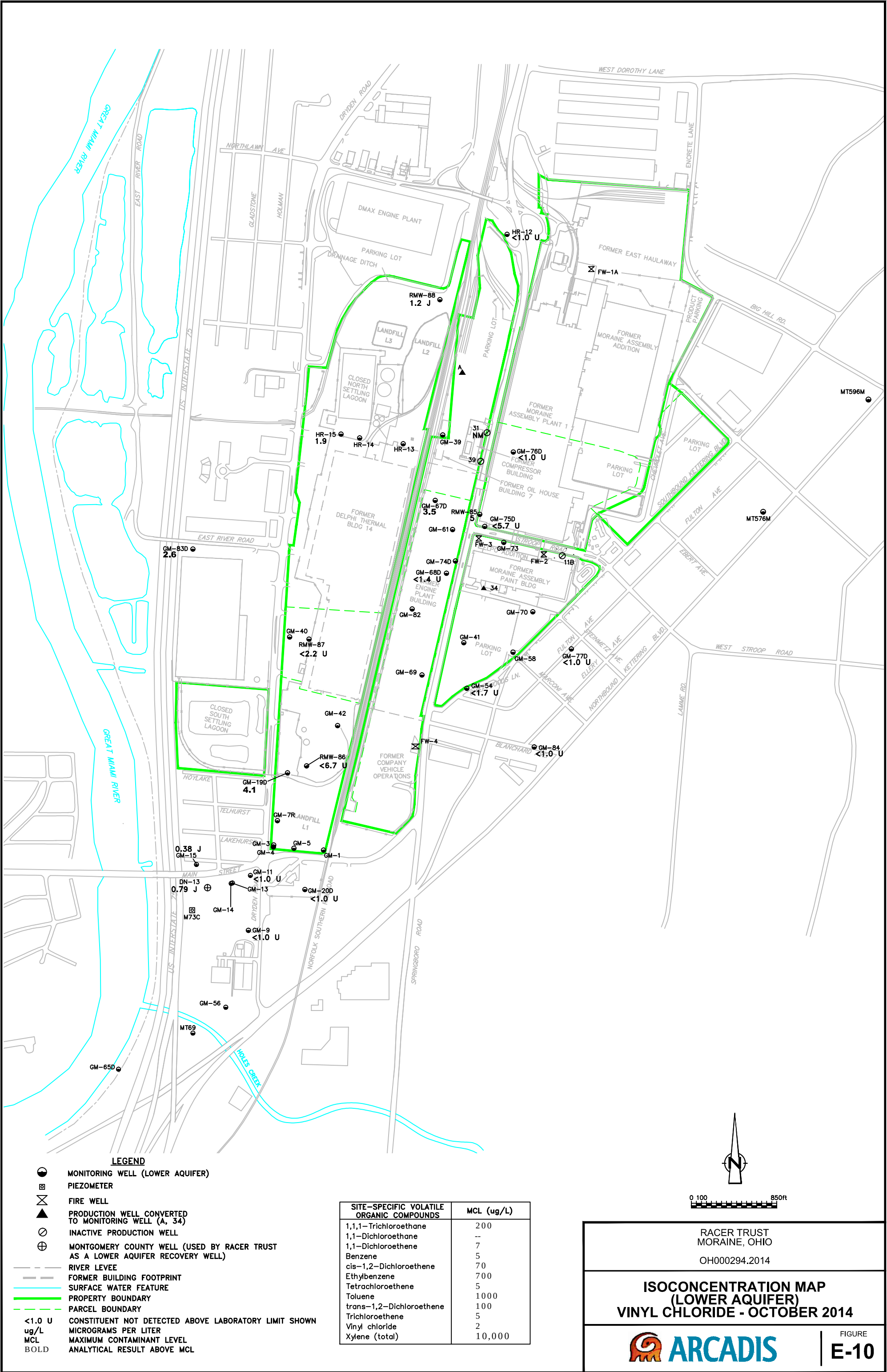
**ISOCONCENTRATION MAP
(UPPER AQUIFER)
TOTAL VOCs - OCTOBER 2014**

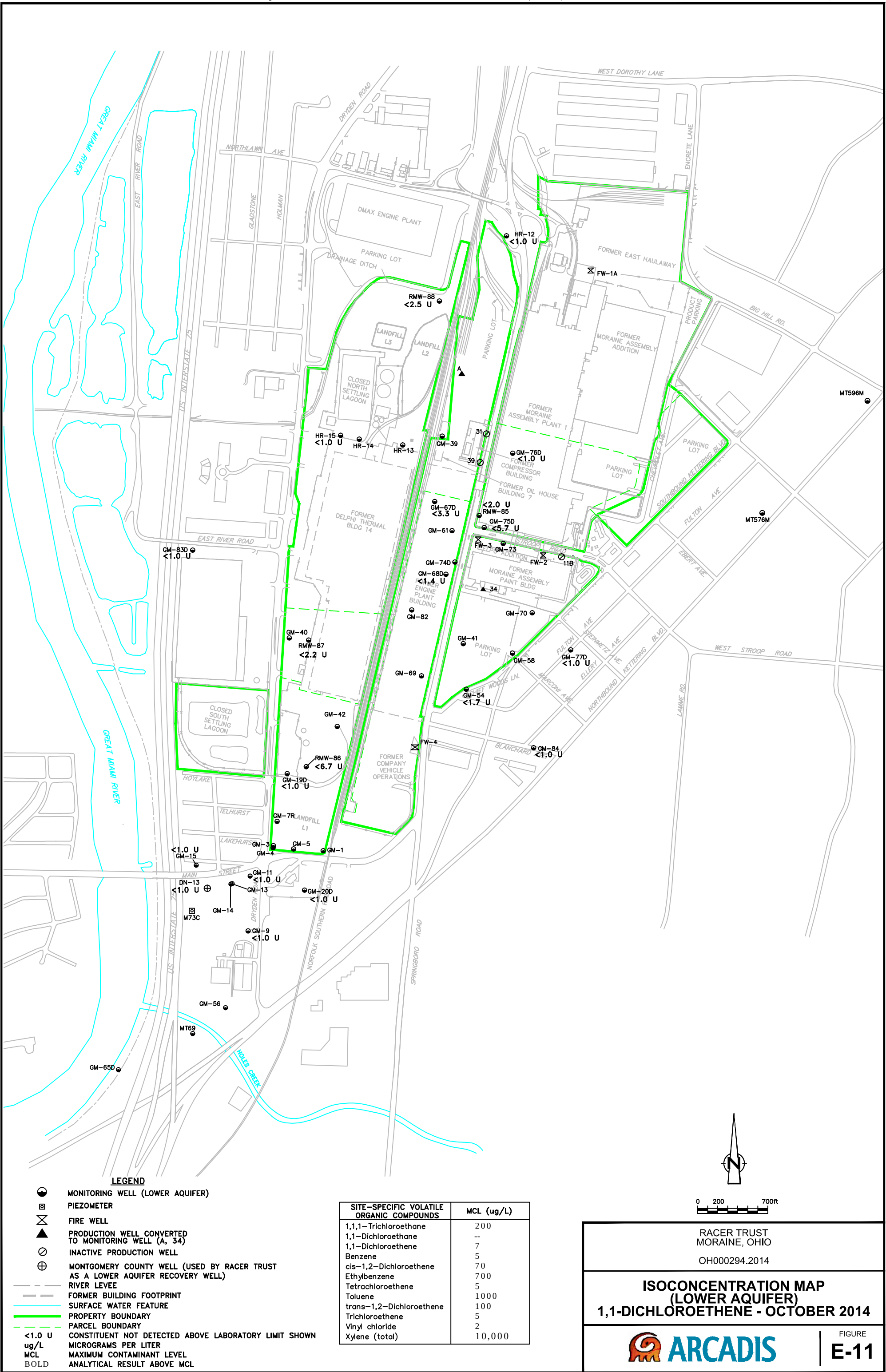
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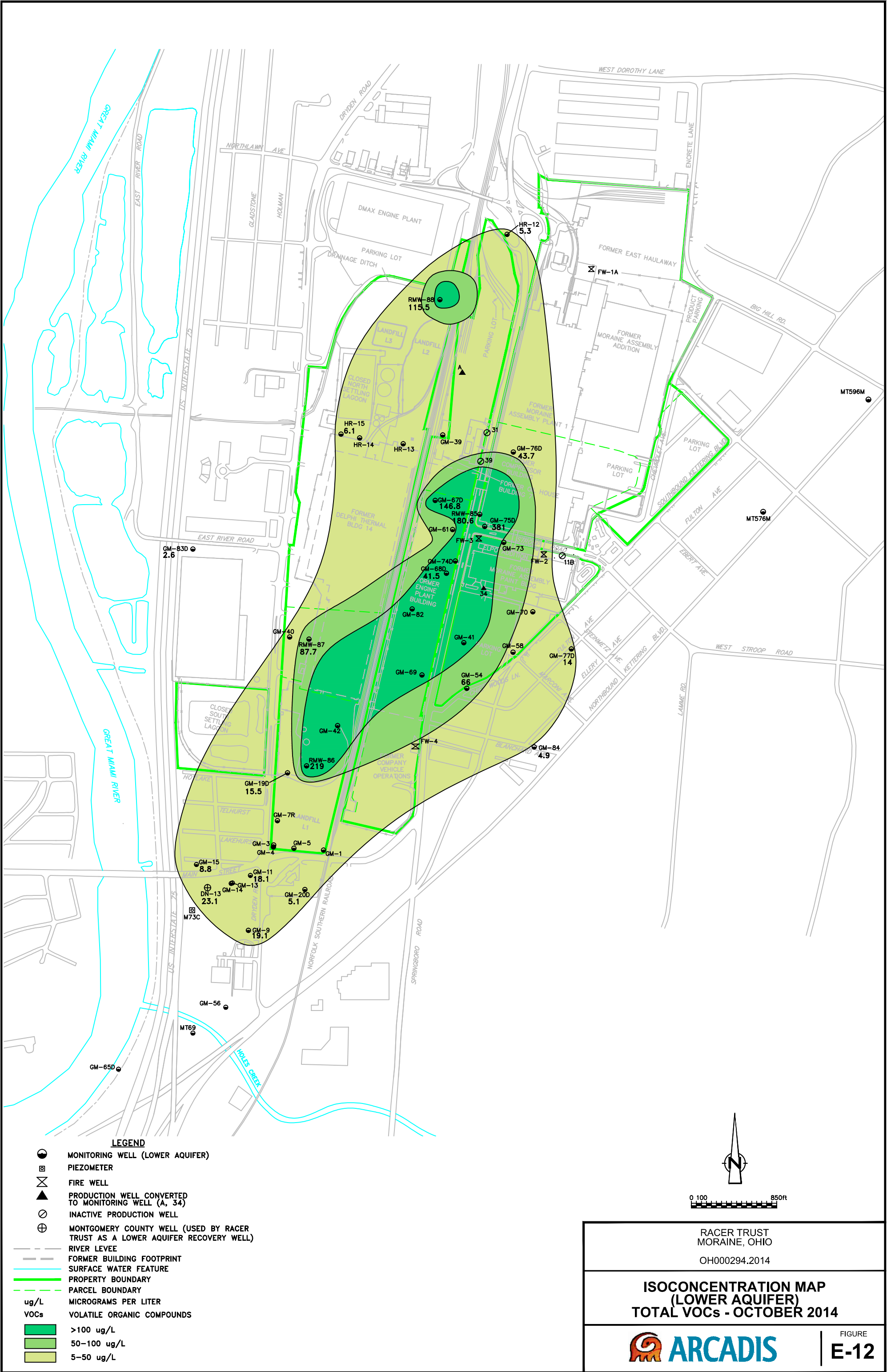
FIGURE
E-6













Appendix F

Capture Zone Trends



Table F-1. Volatile Organic Constituent Sums Used in the Statistical Evaluation, RACER Trust, Moraine, Ohio.

Date	GM-9 ug/L	Date	GM-15 ug/L	Date	GM-20D ug/L
9/24/1999	15.8	9/24/1999	10.8	9/24/1999	0
10/3/2000	18.4	10/2/2000	9.6	10/2/2000	20.1
11/14/2001	11.14	11/14/2001	6.1	11/14/2001	8.54
9/30/2002	18.13	9/27/2002	6.5	9/27/2002	5.1
9/24/2003	22.31	9/22/2003	7.5	9/22/2003	16.49
9/21/2004	18.67	9/20/2004	7.2	9/20/2004	14.86
10/26/2005	17.43	10/26/2005	7.6	10/26/2005	14.43
9/25/2006	8.37	9/18/2006	7.5	9/18/2006	13.61
9/19/2007	20.39	9/25/2007	7.7	9/25/2007	11.8
9/24/2008	19.2	9/30/2008	6.99	9/30/2008	9.65
11/13/2009	NS	11/13/2009	8.7	11/13/2009	10
9/22/2010	18.81	9/23/2010	8.7	9/23/2010	9.02
9/28/2011	14.5	9/29/2011	6.9	9/29/2011	7.2
9/26/2012	17.34	9/5/2012	10.47	9/5/2012	3.7
9/25/2013	20.84	9/25/2013	7.79	9/25/2013	6.92
10/6/2014	19.13	10/7/2014	8.8	10/6/2014	5.12

ug/L - Micrograms per liter.

NS - Not sampled.

All concentrations represent summations; see text.



Table F-2. Mann-Kendall Test Results, RACER Trust, Moraine, Ohio.

Location	Sample Size	Detection Rate	Arithmetic Mean ug/L	Standard Deviation ug/L	Coefficient of Variation	Confidence	Mann - Kendall Result	S Value
<u>Full Data Set</u>								
GM-9	15	100.0%	17.36	3.66	0.211	95%	Stable	19
GM-15	16	100.0%	8.05	1.36	0.168	95%	Stable	24
GM-20D	16	93.8%	9.78	5.23	0.535	95%	Decreasing	-46
<u>Most Recent 8 Analyses</u>								
GM-9	8	100.0%	17.32	4.12	0.238	90%	Stable	4
GM-15	8	100.0%	8.26	1.17	0.142	90%	Stable	9
GM-20D	8	100.0%	7.93	2.69	0.340	90%	Decreasing	-22

ug/L - Micrograms per liter.

S value - The Mann-Kendall S-statistic.

Mann-Kendall Trend Analysis

Parameter: VOC

Location: GM-9

Original Data (Not Transformed)

Non-Detects Replaced with Detection Limit

95% Confidence Level

Xj	Xk	Xj - Xk	Positives	Negatives
18.4	15.8	2.6	1	0
11.14	15.8	-4.66	1	1
18.13	15.8	2.33	2	1
22.31	15.8	6.51	3	1
18.67	15.8	2.87	4	1
17.43	15.8	1.63	5	1
8.37	15.8	-7.43	5	2
20.39	15.8	4.59	6	2
19.2	15.8	3.4	7	2
18.81	15.8	3.01	8	2
14.5	15.8	-1.3	8	3
17.34	15.8	1.54	9	3
20.84	15.8	5.04	10	3
19.13	15.8	3.33	11	3
11.14	18.4	-7.26	11	4
18.13	18.4	-0.27	11	5
22.31	18.4	3.91	12	5
18.67	18.4	0.27	13	5
17.43	18.4	-0.97	13	6
8.37	18.4	-10.03	13	7
20.39	18.4	1.99	14	7
19.2	18.4	0.8	15	7
18.81	18.4	0.41	16	7
14.5	18.4	-3.9	16	8
17.34	18.4	-1.06	16	9
20.84	18.4	2.44	17	9
19.13	18.4	0.73	18	9
18.13	11.14	6.99	19	9
22.31	11.14	11.17	20	9
18.67	11.14	7.53	21	9
17.43	11.14	6.29	22	9
8.37	11.14	-2.77	22	10
20.39	11.14	9.25	23	10
19.2	11.14	8.06	24	10
18.81	11.14	7.67	25	10
14.5	11.14	3.36	26	10
17.34	11.14	6.2	27	10
20.84	11.14	9.7	28	10
19.13	11.14	7.99	29	10
22.31	18.13	4.18	30	10
18.67	18.13	0.54	31	10
17.43	18.13	-0.7	31	11
8.37	18.13	-9.76	31	12

20.39	18.13	2.26	32	12
19.2	18.13	1.07	33	12
18.81	18.13	0.68	34	12
14.5	18.13	-3.63	34	13
17.34	18.13	-0.79	34	14
20.84	18.13	2.71	35	14
19.13	18.13	1	36	14
18.67	22.31	-3.64	36	15
17.43	22.31	-4.88	36	16
8.37	22.31	-13.94	36	17
20.39	22.31	-1.92	36	18
19.2	22.31	-3.11	36	19
18.81	22.31	-3.5	36	20
14.5	22.31	-7.81	36	21
17.34	22.31	-4.97	36	22
20.84	22.31	-1.47	36	23
19.13	22.31	-3.18	36	24
17.43	18.67	-1.24	36	25
8.37	18.67	-10.3	36	26
20.39	18.67	1.72	37	26
19.2	18.67	0.53	38	26
18.81	18.67	0.14	39	26
14.5	18.67	-4.17	39	27
17.34	18.67	-1.33	39	28
20.84	18.67	2.17	40	28
19.13	18.67	0.46	41	28
8.37	17.43	-9.06	41	29
20.39	17.43	2.96	42	29
19.2	17.43	1.77	43	29
18.81	17.43	1.38	44	29
14.5	17.43	-2.93	44	30
17.34	17.43	-0.09	44	31
20.84	17.43	3.41	45	31
19.13	17.43	1.7	46	31
20.39	8.37	12.02	47	31
19.2	8.37	10.83	48	31
18.81	8.37	10.44	49	31
14.5	8.37	6.13	50	31
17.34	8.37	8.97	51	31
20.84	8.37	12.47	52	31
19.13	8.37	10.76	53	31
19.2	20.39	-1.19	53	32
18.81	20.39	-1.58	53	33
14.5	20.39	-5.89	53	34
17.34	20.39	-3.05	53	35
20.84	20.39	0.45	54	35
19.13	20.39	-1.26	54	36
18.81	19.2	-0.39	54	37
14.5	19.2	-4.7	54	38
17.34	19.2	-1.86	54	39
20.84	19.2	1.64	55	39

19.13	19.2	-0.07	55	40
14.5	18.81	-4.31	55	41
17.34	18.81	-1.47	55	42
20.84	18.81	2.03	56	42
19.13	18.81	0.32	57	42
17.34	14.5	2.84	58	42
20.84	14.5	6.34	59	42
19.13	14.5	4.63	60	42
20.84	17.34	3.5	61	42
19.13	17.34	1.79	62	42
19.13	20.84	-1.71	62	43

S Statistic = 62 - 43 = 19

Tied Group Value	Members
Time Period	Observations
9/24/1999	1
10/3/2000	1
11/14/2001	1
9/30/2002	1
9/24/2003	1
9/21/2004	1
10/26/2005	1
9/25/2006	1
9/19/2007	1
9/24/2008	1
9/22/2010	1
9/28/2011	1
9/26/2012	1
9/25/2013	1
10/6/2014	1
There are 0 time periods with multiple data	

A = 0

B = 0

C = 0

D = 0

E = 0

F = 0

a = 7350

b = 24570

c = 420

Group Variance = 408.333

Z-Score = 0.890769

Comparison Level at 95% confidence level = 1.65463 (upward trend)

0.890769 <= 1.65463 indicating no evidence of an upward trend

Mann-Kendall Trend Analysis

Parameter: VOC

Location: GM-9

Original Data (Not Transformed)

Non-Detects Replaced with Detection Limit

90% Confidence Level

Xj	Xk	Xj - Xk	Positives	Negatives
20.39	8.37	12.02	1	0
19.2	8.37	10.83	2	0
18.81	8.37	10.44	3	0
14.5	8.37	6.13	4	0
17.34	8.37	8.97	5	0
20.84	8.37	12.47	6	0
19.13	8.37	10.76	7	0
19.2	20.39	-1.19	7	1
18.81	20.39	-1.58	7	2
14.5	20.39	-5.89	7	3
17.34	20.39	-3.05	7	4
20.84	20.39	0.45	8	4
19.13	20.39	-1.26	8	5
18.81	19.2	-0.39	8	6
14.5	19.2	-4.7	8	7
17.34	19.2	-1.86	8	8
20.84	19.2	1.64	9	8
19.13	19.2	-0.07	9	9
14.5	18.81	-4.31	9	10
17.34	18.81	-1.47	9	11
20.84	18.81	2.03	10	11
19.13	18.81	0.32	11	11
17.34	14.5	2.84	12	11
20.84	14.5	6.34	13	11
19.13	14.5	4.63	14	11
20.84	17.34	3.5	15	11
19.13	17.34	1.79	16	11
19.13	20.84	-1.71	16	12

S Statistic = 16 - 12 = 4

Comparing at 90% confidence level (upward trend)

Probability of obtaining $S \geq 4$ is 0.36

$S < 0$ or $0.36 \geq 0.1$ indicating no evidence of an upward trend

Mann-Kendall Trend Analysis

Parameter: VOC

Location: GM-15

Original Data (Not Transformed)

Non-Detects Replaced with Detection Limit

95% Confidence Level

Xj	Xk	Xj - Xk	Positives	Negatives
9.6	10.8	-1.2	0	1
6.1	10.8	-4.7	0	2
6.5	10.8	-4.3	0	3
7.5	10.8	-3.3	0	4
7.2	10.8	-3.6	0	5
7.6	10.8	-3.2	0	6
7.5	10.8	-3.3	0	7
7.7	10.8	-3.1	0	8
6.99	10.8	-3.81	0	9
8.7	10.8	-2.1	0	10
8.7	10.8	-2.1	0	11
6.9	10.8	-3.9	0	12
10.47	10.8	-0.33	0	13
7.79	10.8	-3.01	0	14
8.8	10.8	-2	0	15
6.1	9.6	-3.5	0	16
6.5	9.6	-3.1	0	17
7.5	9.6	-2.1	0	18
7.2	9.6	-2.4	0	19
7.6	9.6	-2	0	20
7.5	9.6	-2.1	0	21
7.7	9.6	-1.9	0	22
6.99	9.6	-2.61	0	23
8.7	9.6	-0.9	0	24
8.7	9.6	-0.9	0	25
6.9	9.6	-2.7	0	26
10.47	9.6	0.87	1	26
7.79	9.6	-1.81	1	27
8.8	9.6	-0.8	1	28
6.5	6.1	0.4	2	28
7.5	6.1	1.4	3	28
7.2	6.1	1.1	4	28
7.6	6.1	1.5	5	28
7.5	6.1	1.4	6	28
7.7	6.1	1.6	7	28
6.99	6.1	0.89	8	28
8.7	6.1	2.6	9	28
8.7	6.1	2.6	10	28
6.9	6.1	0.8	11	28
10.47	6.1	4.37	12	28
7.79	6.1	1.69	13	28
8.8	6.1	2.7	14	28
7.5	6.5	1	15	28

7.2	6.5	0.7	16	28
7.6	6.5	1.1	17	28
7.5	6.5	1	18	28
7.7	6.5	1.2	19	28
6.99	6.5	0.49	20	28
8.7	6.5	2.2	21	28
8.7	6.5	2.2	22	28
6.9	6.5	0.4	23	28
10.47	6.5	3.97	24	28
7.79	6.5	1.29	25	28
8.8	6.5	2.3	26	28
7.2	7.5	-0.3	26	29
7.6	7.5	0.1	27	29
7.5	7.5	0	27	29
7.7	7.5	0.2	28	29
6.99	7.5	-0.51	28	30
8.7	7.5	1.2	29	30
8.7	7.5	1.2	30	30
6.9	7.5	-0.6	30	31
10.47	7.5	2.97	31	31
7.79	7.5	0.29	32	31
8.8	7.5	1.3	33	31
7.6	7.2	0.4	34	31
7.5	7.2	0.3	35	31
7.7	7.2	0.5	36	31
6.99	7.2	-0.21	36	32
8.7	7.2	1.5	37	32
8.7	7.2	1.5	38	32
6.9	7.2	-0.3	38	33
10.47	7.2	3.27	39	33
7.79	7.2	0.59	40	33
8.8	7.2	1.6	41	33
7.5	7.6	-0.1	41	34
7.7	7.6	0.1	42	34
6.99	7.6	-0.61	42	35
8.7	7.6	1.1	43	35
8.7	7.6	1.1	44	35
6.9	7.6	-0.7	44	36
10.47	7.6	2.87	45	36
7.79	7.6	0.19	46	36
8.8	7.6	1.2	47	36
7.7	7.5	0.2	48	36
6.99	7.5	-0.51	48	37
8.7	7.5	1.2	49	37
8.7	7.5	1.2	50	37
6.9	7.5	-0.6	50	38
10.47	7.5	2.97	51	38
7.79	7.5	0.29	52	38
8.8	7.5	1.3	53	38
6.99	7.7	-0.71	53	39
8.7	7.7	1	54	39
8.7	7.7	1	55	39

6.9	7.7	-0.8	55	40
10.47	7.7	2.77	56	40
7.79	7.7	0.09	57	40
8.8	7.7	1.1	58	40
8.7	6.99	1.71	59	40
8.7	6.99	1.71	60	40
6.9	6.99	-0.09	60	41
10.47	6.99	3.48	61	41
7.79	6.99	0.8	62	41
8.8	6.99	1.81	63	41
8.7	8.7	0	63	41
6.9	8.7	-1.8	63	42
10.47	8.7	1.77	64	42
7.79	8.7	-0.91	64	43
8.8	8.7	0.1	65	43
6.9	8.7	-1.8	65	44
10.47	8.7	1.77	66	44
7.79	8.7	-0.91	66	45
8.8	8.7	0.1	67	45
10.47	6.9	3.57	68	45
7.79	6.9	0.89	69	45
8.8	6.9	1.9	70	45
7.79	10.47	-2.68	70	46
8.8	10.47	-1.67	70	47
8.8	7.79	1.01	71	47

S Statistic = 71 - 47 = 24

Tied Group	Value	Members
1	7.5	2
2	8.7	2

Time Period	Observations
9/24/1999	1
10/2/2000	1
11/14/2001	1
9/27/2002	1
9/22/2003	1
9/20/2004	1
10/26/2005	1
9/18/2006	1
9/25/2007	1
9/30/2008	1
11/13/2009	1
9/23/2010	1
9/29/2011	1
9/5/2012	1
9/25/2013	1
10/7/2014	1

There are 0 time periods with multiple data

A = 36
B = 0
C = 0
D = 0
E = 4
F = 0
a = 8880
b = 30240
c = 480
Group Variance = 491.333
Z-Score = 1.03762
Comparison Level at 95% confidence level = 1.65463 (upward trend)
1.03762 <= 1.65463 indicating no evidence of an upward trend

Mann-Kendall Trend Analysis

Parameter: VOC

Location: GM-15

Original Data (Not Transformed)

Non-Detects Replaced with Detection Limit

90% Confidence Level

Xj	Xk	Xj - Xk	Positives	Negatives
6.99	7.7	-0.71	0	1
8.7	7.7	1	1	1
8.7	7.7	1	2	1
6.9	7.7	-0.8	2	2
10.47	7.7	2.77	3	2
7.79	7.7	0.09	4	2
8.8	7.7	1.1	5	2
8.7	6.99	1.71	6	2
8.7	6.99	1.71	7	2
6.9	6.99	-0.09	7	3
10.47	6.99	3.48	8	3
7.79	6.99	0.8	9	3
8.8	6.99	1.81	10	3
8.7	8.7	0	10	3
6.9	8.7	-1.8	10	4
10.47	8.7	1.77	11	4
7.79	8.7	-0.91	11	5
8.8	8.7	0.1	12	5
6.9	8.7	-1.8	12	6
10.47	8.7	1.77	13	6
7.79	8.7	-0.91	13	7
8.8	8.7	0.1	14	7
10.47	6.9	3.57	15	7
7.79	6.9	0.89	16	7
8.8	6.9	1.9	17	7
7.79	10.47	-2.68	17	8
8.8	10.47	-1.67	17	9
8.8	7.79	1.01	18	9

S Statistic = 18 - 9 = 9

Comparing at 90% confidence level (upward trend)

Probability of obtaining $S \geq 9$ is 0.1685

$S < 0$ or $0.1685 \geq 0.1$ indicating no evidence of an upward trend

Mann-Kendall Trend Analysis

Parameter: VOC

Location: GM-20D

Original Data (Not Transformed)

Non-Detects Replaced with Detection Limit

95% Confidence Level

Xj	Xk	Xj - Xk	Positives	Negatives
20.1	ND<0	20.1	1	0
8.54	ND<0	8.54	2	0
5.1	ND<0	5.1	3	0
16.49	ND<0	16.49	4	0
14.86	ND<0	14.86	5	0
14.43	ND<0	14.43	6	0
13.61	ND<0	13.61	7	0
11.8	ND<0	11.8	8	0
9.65	ND<0	9.65	9	0
10	ND<0	10	10	0
9.02	ND<0	9.02	11	0
7.2	ND<0	7.2	12	0
3.7	ND<0	3.7	13	0
6.92	ND<0	6.92	14	0
5.12	ND<0	5.12	15	0
8.54	20.1	-11.56	15	1
5.1	20.1	-15	15	2
16.49	20.1	-3.61	15	3
14.86	20.1	-5.24	15	4
14.43	20.1	-5.67	15	5
13.61	20.1	-6.49	15	6
11.8	20.1	-8.3	15	7
9.65	20.1	-10.45	15	8
10	20.1	-10.1	15	9
9.02	20.1	-11.08	15	10
7.2	20.1	-12.9	15	11
3.7	20.1	-16.4	15	12
6.92	20.1	-13.18	15	13
5.12	20.1	-14.98	15	14
5.1	8.54	-3.44	15	15
16.49	8.54	7.95	16	15
14.86	8.54	6.32	17	15
14.43	8.54	5.89	18	15
13.61	8.54	5.07	19	15
11.8	8.54	3.26	20	15
9.65	8.54	1.11	21	15
10	8.54	1.46	22	15
9.02	8.54	0.48	23	15
7.2	8.54	-1.34	23	16
3.7	8.54	-4.84	23	17
6.92	8.54	-1.62	23	18
5.12	8.54	-3.42	23	19
16.49	5.1	11.39	24	19

14.86	5.1	9.76	25	19
14.43	5.1	9.33	26	19
13.61	5.1	8.51	27	19
11.8	5.1	6.7	28	19
9.65	5.1	4.55	29	19
10	5.1	4.9	30	19
9.02	5.1	3.92	31	19
7.2	5.1	2.1	32	19
3.7	5.1	-1.4	32	20
6.92	5.1	1.82	33	20
5.12	5.1	0.02	34	20
14.86	16.49	-1.63	34	21
14.43	16.49	-2.06	34	22
13.61	16.49	-2.88	34	23
11.8	16.49	-4.69	34	24
9.65	16.49	-6.84	34	25
10	16.49	-6.49	34	26
9.02	16.49	-7.47	34	27
7.2	16.49	-9.29	34	28
3.7	16.49	-12.79	34	29
6.92	16.49	-9.57	34	30
5.12	16.49	-11.37	34	31
14.43	14.86	-0.43	34	32
13.61	14.86	-1.25	34	33
11.8	14.86	-3.06	34	34
9.65	14.86	-5.21	34	35
10	14.86	-4.86	34	36
9.02	14.86	-5.84	34	37
7.2	14.86	-7.66	34	38
3.7	14.86	-11.16	34	39
6.92	14.86	-7.94	34	40
5.12	14.86	-9.74	34	41
13.61	14.43	-0.82	34	42
11.8	14.43	-2.63	34	43
9.65	14.43	-4.78	34	44
10	14.43	-4.43	34	45
9.02	14.43	-5.41	34	46
7.2	14.43	-7.23	34	47
3.7	14.43	-10.73	34	48
6.92	14.43	-7.51	34	49
5.12	14.43	-9.31	34	50
11.8	13.61	-1.81	34	51
9.65	13.61	-3.96	34	52
10	13.61	-3.61	34	53
9.02	13.61	-4.59	34	54
7.2	13.61	-6.41	34	55
3.7	13.61	-9.91	34	56
6.92	13.61	-6.69	34	57
5.12	13.61	-8.49	34	58
9.65	11.8	-2.15	34	59
10	11.8	-1.8	34	60
9.02	11.8	-2.78	34	61

7.2	11.8	-4.6	34	62
3.7	11.8	-8.1	34	63
6.92	11.8	-4.88	34	64
5.12	11.8	-6.68	34	65
10	9.65	0.35	35	65
9.02	9.65	-0.63	35	66
7.2	9.65	-2.45	35	67
3.7	9.65	-5.95	35	68
6.92	9.65	-2.73	35	69
5.12	9.65	-4.53	35	70
9.02	10	-0.98	35	71
7.2	10	-2.8	35	72
3.7	10	-6.3	35	73
6.92	10	-3.08	35	74
5.12	10	-4.88	35	75
7.2	9.02	-1.82	35	76
3.7	9.02	-5.32	35	77
6.92	9.02	-2.1	35	78
5.12	9.02	-3.9	35	79
3.7	7.2	-3.5	35	80
6.92	7.2	-0.28	35	81
5.12	7.2	-2.08	35	82
6.92	3.7	3.22	36	82
5.12	3.7	1.42	37	82
5.12	6.92	-1.8	37	83

S Statistic = 37 - 83 = -46

Tied Group Value	Members
Time Period	Observations
9/24/1999	1
10/2/2000	1
11/14/2001	1
9/27/2002	1
9/22/2003	1
9/20/2004	1
10/26/2005	1
9/18/2006	1
9/25/2007	1
9/30/2008	1
11/13/2009	1
9/23/2010	1
9/29/2011	1
9/5/2012	1
9/25/2013	1
10/7/2014	1
There are 0 time periods with multiple data	

A = 0

B = 0
C = 0
D = 0
E = 0
F = 0
a = 8880
b = 30240
c = 480
Group Variance = 493.333
Z-Score = -2.02601
Comparison Level at 95% confidence level = 1.65463 (upward trend)
-2.02601 <= 1.65463 indicating no evidence of an upward trend

Mann-Kendall Trend Analysis

Parameter: VOC

Location: GM-20D

Original Data (Not Transformed)

Non-Detects Replaced with Detection Limit

90% Confidence Level

Xj	Xk	Xj - Xk	Positives	Negatives
9.65	11.8	-2.15	0	1
10	11.8	-1.8	0	2
9.02	11.8	-2.78	0	3
7.2	11.8	-4.6	0	4
3.7	11.8	-8.1	0	5
6.92	11.8	-4.88	0	6
5.12	11.8	-6.68	0	7
10	9.65	0.35	1	7
9.02	9.65	-0.63	1	8
7.2	9.65	-2.45	1	9
3.7	9.65	-5.95	1	10
6.92	9.65	-2.73	1	11
5.12	9.65	-4.53	1	12
9.02	10	-0.98	1	13
7.2	10	-2.8	1	14
3.7	10	-6.3	1	15
6.92	10	-3.08	1	16
5.12	10	-4.88	1	17
7.2	9.02	-1.82	1	18
3.7	9.02	-5.32	1	19
6.92	9.02	-2.1	1	20
5.12	9.02	-3.9	1	21
3.7	7.2	-3.5	1	22
6.92	7.2	-0.28	1	23
5.12	7.2	-2.08	1	24
6.92	3.7	3.22	2	24
5.12	3.7	1.42	3	24
5.12	6.92	-1.8	3	25

S Statistic = 3 - 25 = -22

Comparing at 90% confidence level (downward trend)

Probability of obtaining S >= 22 is 0.0028

S < 0 and 0.0028 < 0.1 indicating a downward trend



Appendix G

Lagoon Statistics

Table G-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	14	4	29%	6	> 0.05	No Trend
North	Downgradient	W-2-N	1,1,1-Trichloroethane	14	3	21%	20	> 0.05	No Trend
North	Downgradient	W-3-N	1,1,1-Trichloroethane	14	0	0%	-69	> 0.05	No Trend
North	Downgradient	W-4-N	1,1,1-Trichloroethane	14	8	57%	42	> 0.05	Increasing Trend
North	Upgradient	HR-04	1,1-Dichloroethane	14	11	79%	54	> 0.05	Increasing Trend
North	Downgradient	W-2-N	1,1-Dichloroethane	14	6	43%	29	> 0.05	No Trend
North	Downgradient	W-3-N	1,1-Dichloroethane	14	0	0%	-69	> 0.05	No Trend
North	Downgradient	W-4-N	1,1-Dichloroethane	14	14	100%	67	> 0.05	Increasing Trend
North	Upgradient	HR-04	1,1-Dichloroethene	14	0	0%	0	> 0.05	No Trend
North	Downgradient	W-2-N	1,1-Dichloroethene	14	0	0%	0	> 0.05	No Trend
North	Downgradient	W-3-N	1,1-Dichloroethene	14	0	0%	-69	> 0.05	No Trend
North	Downgradient	W-4-N	1,1-Dichloroethene	14	0	0%	0	> 0.05	No Trend
North	Upgradient	HR-04	Benzene	14	0	0%	0	> 0.05	No Trend
North	Downgradient	W-2-N	Benzene	14	0	0%	0	> 0.05	No Trend
North	Downgradient	W-3-N	Benzene	14	0	0%	-69	> 0.05	No Trend
North	Downgradient	W-4-N	Benzene	14	0	0%	0	> 0.05	No Trend
North	Upgradient	HR-04	cis-1,2-Dichloroethene	14	5	36%	22	> 0.05	No Trend
North	Downgradient	W-2-N	cis-1,2-Dichloroethene	14	14	100%	-17	> 0.05	No Trend
North	Downgradient	W-3-N	cis-1,2-Dichloroethene	14	14	100%	-75	> 0.05	Decreasing Trend
North	Downgradient	W-4-N	cis-1,2-Dichloroethene	14	14	100%	62	> 0.05	Increasing Trend
North	Upgradient	HR-04	Ethylbenzene	14	0	0%	0	> 0.05	No Trend
North	Downgradient	W-2-N	Ethylbenzene	14	0	0%	0	> 0.05	No Trend
North	Downgradient	W-3-N	Ethylbenzene	14	0	0%	-69	> 0.05	No Trend
North	Downgradient	W-4-N	Ethylbenzene	14	0	0%	0	> 0.05	No Trend
North	Upgradient	HR-04	Tetrachloroethene	14	12	86%	-46	> 0.05	Decreasing Trend
North	Downgradient	W-2-N	Tetrachloroethene	14	1	7%	7	> 0.05	No Trend
North	Downgradient	W-3-N	Tetrachloroethene	14	8	57%	-63	> 0.05	Decreasing Trend
North	Downgradient	W-4-N	Tetrachloroethene	14	14	100%	-42	> 0.05	Decreasing 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%.

Table G-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	Toluene	14	0	0%	0	> 0.05	No Trend
North	Downgradient	W-2-N	Toluene	14	1	7%	1	> 0.05	No Trend
North	Downgradient	W-3-N	Toluene	14	0	0%	-69	> 0.05	No Trend
North	Downgradient	W-4-N	Toluene	14	0	0%	0	> 0.05	No Trend
North	Upgradient	HR-04	trans-1,2-Dichloroethene	14	0	0%	40	> 0.05	No Trend
North	Downgradient	W-2-N	trans-1,2-Dichloroethene	14	2	14%	36	> 0.05	No Trend
North	Downgradient	W-3-N	trans-1,2-Dichloroethene	14	13	93%	-73	> 0.05	Decreasing Trend
North	Downgradient	W-4-N	trans-1,2-Dichloroethene	14	11	79%	50	> 0.05	Increasing Trend
North	Upgradient	HR-04	Trichloroethene	14	12	86%	-50	> 0.05	Decreasing Trend
North	Downgradient	W-2-N	Trichloroethene	14	9	64%	-50	> 0.05	Decreasing Trend
North	Downgradient	W-3-N	Trichloroethene	14	2	14%	-64	> 0.05	Decreasing Trend
North	Downgradient	W-4-N	Trichloroethene	14	14	100%	9	> 0.05	No Trend
North	Upgradient	HR-04	Vinyl Chloride	14	0	0%	0	> 0.05	No Trend
North	Downgradient	W-2-N	Vinyl Chloride	14	0	0%	0	> 0.05	No Trend
North	Downgradient	W-3-N	Vinyl Chloride	14	14	100%	-67	> 0.05	Decreasing Trend
North	Downgradient	W-4-N	Vinyl Chloride	14	9	64%	-17	> 0.05	No Trend
North	Upgradient	HR-04	Xylene (total)	14	0	0%	40	> 0.05	No Trend
North	Downgradient	W-2-N	Xylene (total)	14	0	0%	40	> 0.05	No Trend
North	Downgradient	W-3-N	Xylene (total)	14	0	0%	-36	> 0.05	No Trend
North	Downgradient	W-4-N	Xylene (total)	14	0	0%	40	> 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%.

Table G-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	14	3	21%	31	> 0.05	No Trend
South	Downgradient	W-2-S	1,1,1-Trichloroethane	14	14	100%	-3	> 0.05	No Trend
South	Downgradient	W-3-S	1,1,1-Trichloroethane	14	14	100%	-55	> 0.05	Decreasing Trend
South	Downgradient	W-4-S	1,1,1-Trichloroethane	14	14	100%	-100	> 0.05	Decreasing Trend
South	Upgradient	HR-17	1,1-Dichloroethane	14	11	79%	40	> 0.05	Increasing Trend
South	Downgradient	W-2-S	1,1-Dichloroethane	14	14	100%	-8	> 0.05	No Trend
South	Downgradient	W-3-S	1,1-Dichloroethane	14	6	43%	26	> 0.05	No Trend
South	Downgradient	W-4-S	1,1-Dichloroethane	18	18	100%	72	> 0.05	Increasing Trend
South	Upgradient	HR-17	1,1-Dichloroethene	14	0	0%	31	> 0.05	No Trend
South	Downgradient	W-2-S	1,1-Dichloroethene	14	0	0%	0	> 0.05	No Trend
South	Downgradient	W-3-S	1,1-Dichloroethene	14	0	0%	7	> 0.05	No Trend
South	Downgradient	W-4-S	1,1-Dichloroethene	18	1	6%	24	> 0.05	No Trend
South	Upgradient	HR-17	Benzene	14	0	0%	31	> 0.05	No Trend
South	Downgradient	W-2-S	Benzene	14	1	7%	-3	> 0.05	No Trend
South	Downgradient	W-3-S	Benzene	14	0	0%	7	> 0.05	No Trend
South	Downgradient	W-4-S	Benzene	18	0	0%	31	> 0.05	No Trend
South	Upgradient	HR-17	cis-1,2-Dichloroethene	14	12	86%	-19	> 0.05	No Trend
South	Downgradient	W-2-S	cis-1,2-Dichloroethene	14	13	93%	30	> 0.05	No Trend
South	Downgradient	W-3-S	cis-1,2-Dichloroethene	14	7	50%	68	> 0.05	Increasing Trend
South	Downgradient	W-4-S	cis-1,2-Dichloroethene	18	18	100%	111	> 0.05	Increasing Trend
South	Upgradient	HR-17	Ethylbenzene	14	0	0%	31	> 0.05	No Trend
South	Downgradient	W-2-S	Ethylbenzene	14	0	0%	0	> 0.05	No Trend
South	Downgradient	W-3-S	Ethylbenzene	14	0	0%	0	> 0.05	No Trend
South	Downgradient	W-4-S	Ethylbenzene	18	0	0%	44	> 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%.

Table G-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	Tetrachloroethene	14	14	100%	65	> 0.05	Increasing Trend
South	Downgradient	W-2-S	Tetrachloroethene	14	8	57%	-52	> 0.05	Decreasing Trend
South	Downgradient	W-3-S	Tetrachloroethene	14	14	100%	63	> 0.05	Increasing Trend
South	Downgradient	W-4-S	Tetrachloroethene	18	18	100%	110	> 0.05	Increasing Trend
South	Upgradient	HR-17	Toluene	14	0	0%	31	> 0.05	No Trend
South	Downgradient	W-2-S	Toluene	14	1	7%	9	> 0.05	No Trend
South	Downgradient	W-3-S	Toluene	14	0	0%	0	> 0.05	No Trend
South	Downgradient	W-4-S	Toluene	18	1	6%	54	> 0.05	No Trend
South	Upgradient	HR-17	trans-1,2-Dichloroethene	14	10	71%	37	> 0.05	No Trend
South	Downgradient	W-2-S	trans-1,2-Dichloroethene	14	1	7%	31	> 0.05	No Trend
South	Downgradient	W-3-S	trans-1,2-Dichloroethene	14	4	29%	37	> 0.05	No Trend
South	Downgradient	W-4-S	trans-1,2-Dichloroethene	18	18	100%	81	> 0.05	Increasing Trend
South	Upgradient	HR-17	Trichloroethene	14	14	100%	66	> 0.05	Increasing Trend
South	Downgradient	W-2-S	Trichloroethene	14	14	100%	26	> 0.05	No Trend
South	Downgradient	W-3-S	Trichloroethene	14	14	100%	49	> 0.05	Increasing Trend
South	Downgradient	W-4-S	Trichloroethene	18	18	100%	115	> 0.05	Increasing Trend
South	Upgradient	HR-17	Vinyl Chloride	14	0	0%	31	> 0.05	No Trend
South	Downgradient	W-2-S	Vinyl Chloride	14	0	0%	0	> 0.05	No Trend
South	Downgradient	W-3-S	Vinyl Chloride	14	0	0%	0	> 0.05	No Trend
South	Downgradient	W-4-S	Vinyl Chloride	18	0	0%	31	> 0.05	No Trend
South	Upgradient	HR-17	Xylene (total)	14	0	0%	46	> 0.05	No Trend
South	Downgradient	W-2-S	Xylene (total)	14	0	0%	40	> 0.05	No Trend
South	Downgradient	W-3-S	Xylene (total)	14	0	0%	40	> 0.05	No Trend
South	Downgradient	W-4-S	Xylene (total)	18	0	0%	79	> 0.05	No Trend

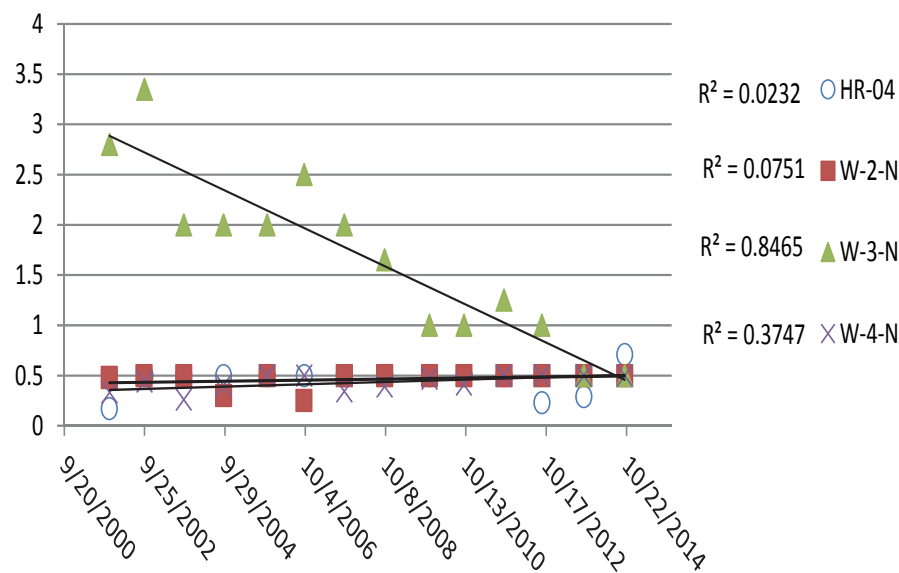
* Indicated p-value represents the significance of both the upper and lower tails combined.

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

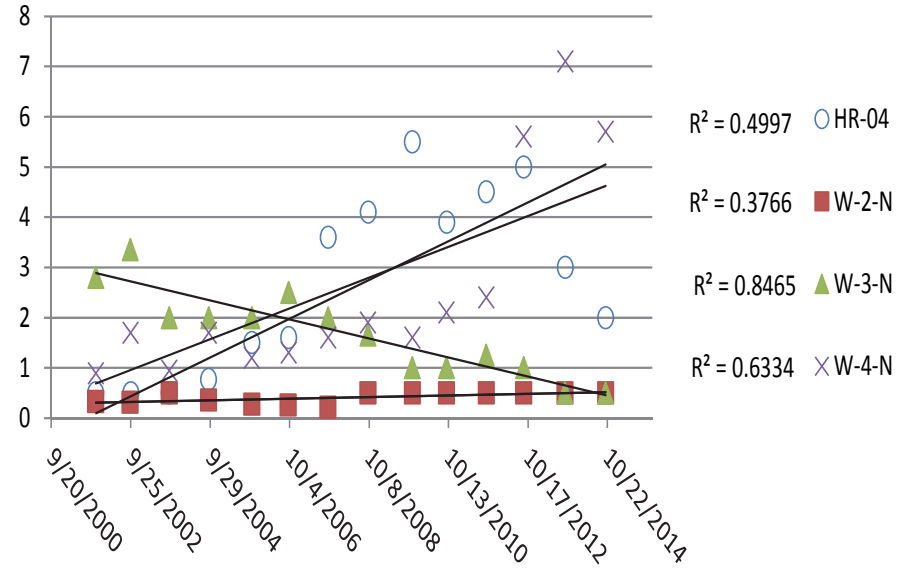
Shaded - An increasing trend is shaded if the detection frequency is 40% or greater, or if the three most recent sampling results were over the analytical detection limit.

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

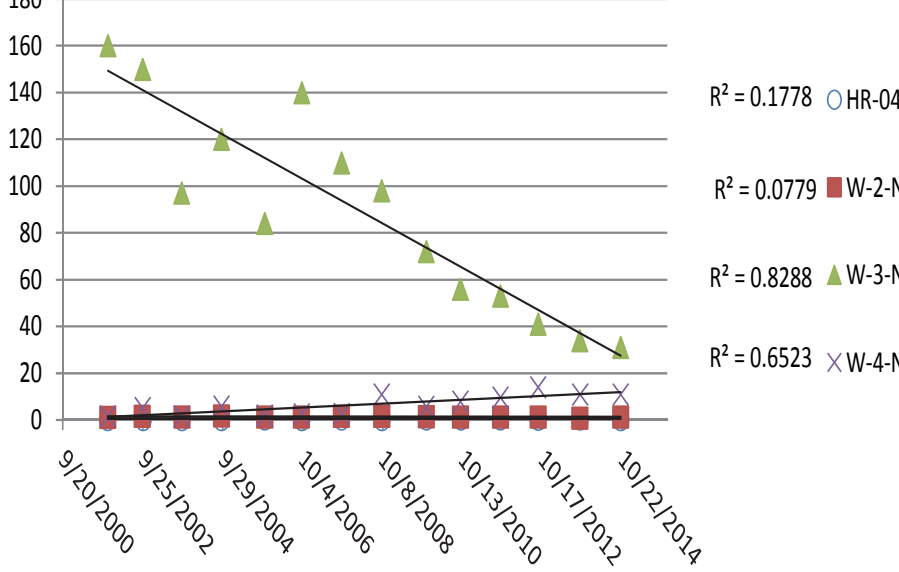
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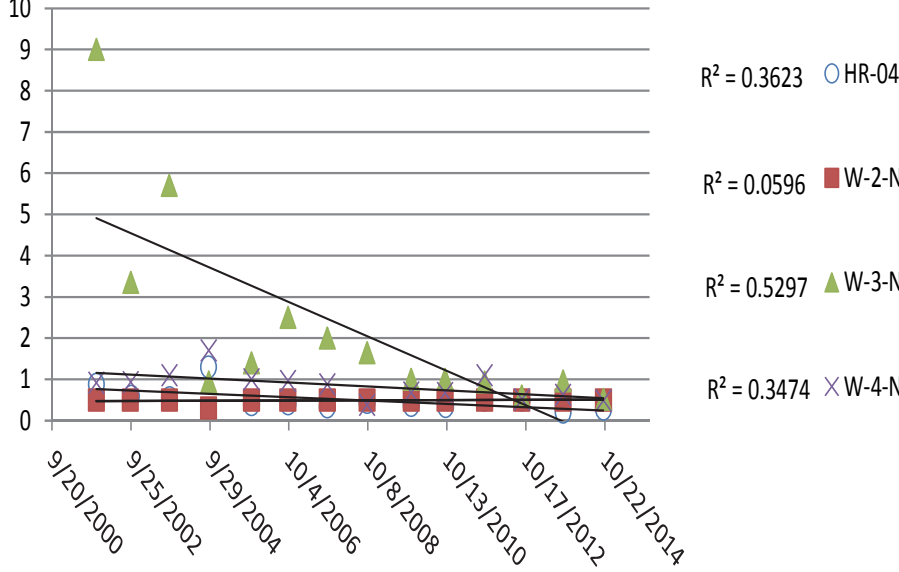
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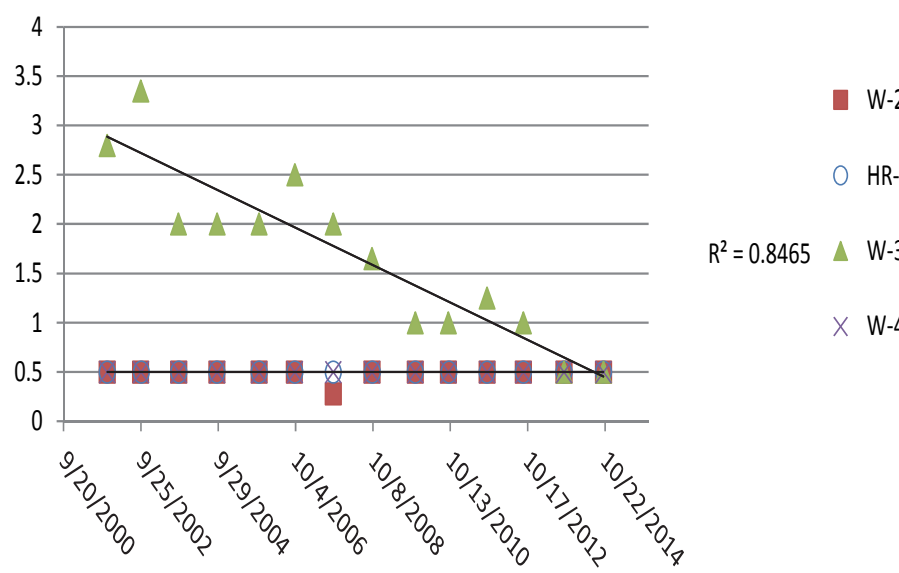
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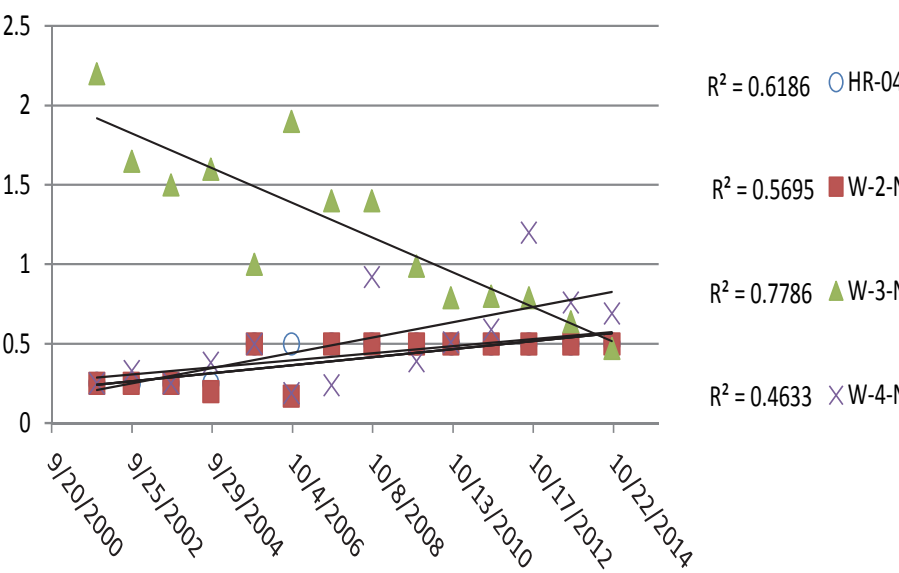
Tetrachloroethene



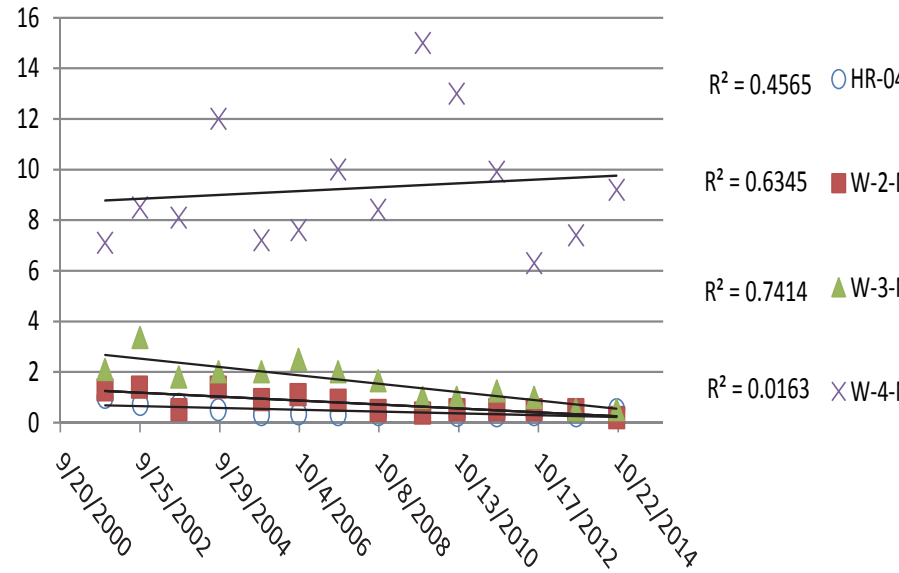
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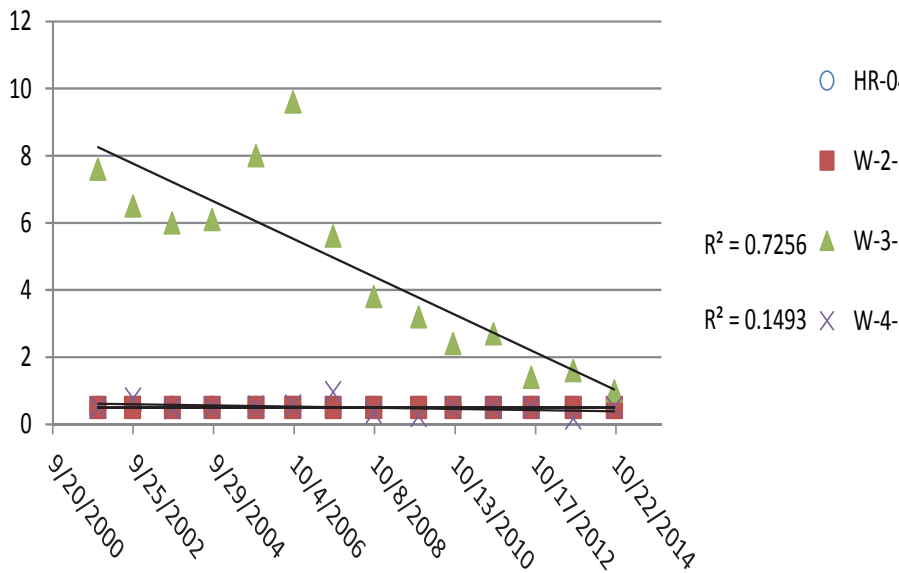
Trans-1,2-Dichloroethene



Trichloroethene



Vinyl Chloride



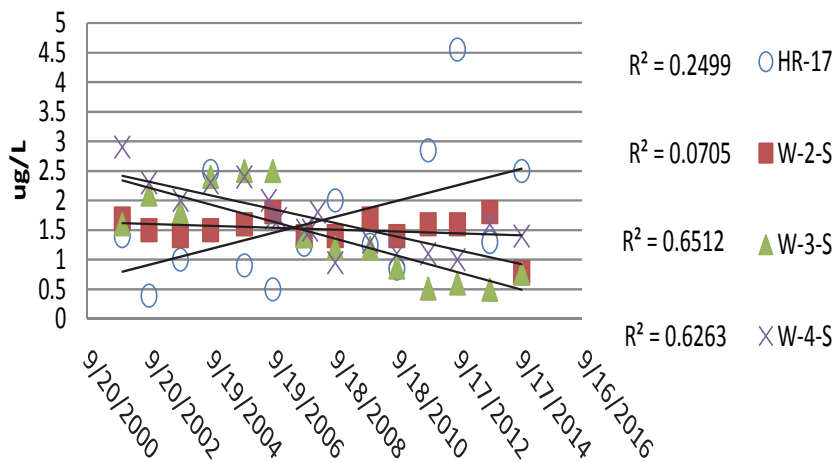
Note: $R^2 = \#N/A$ refers to a slope of zero

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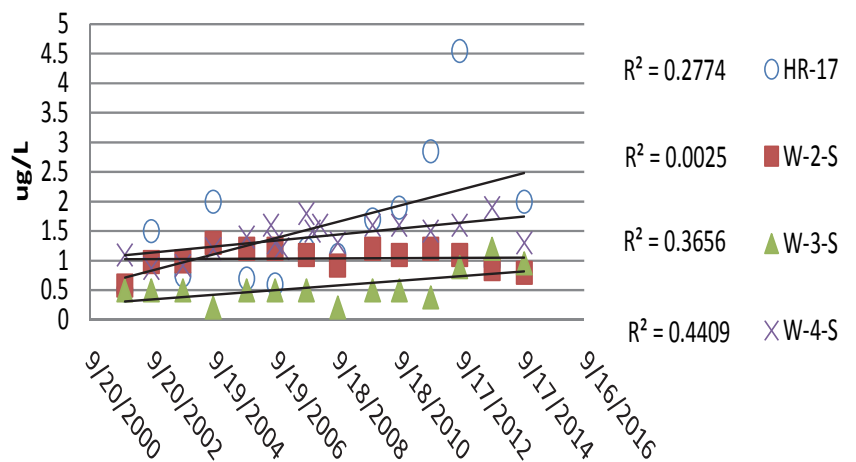
North Settling Lagoon
Linear Regression Graphs



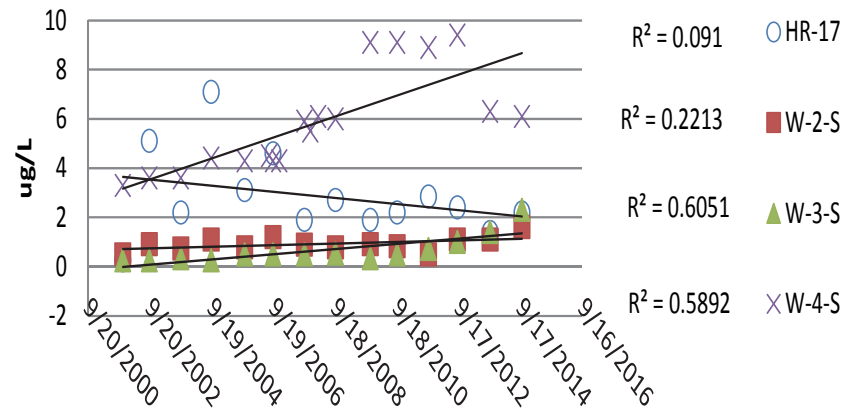
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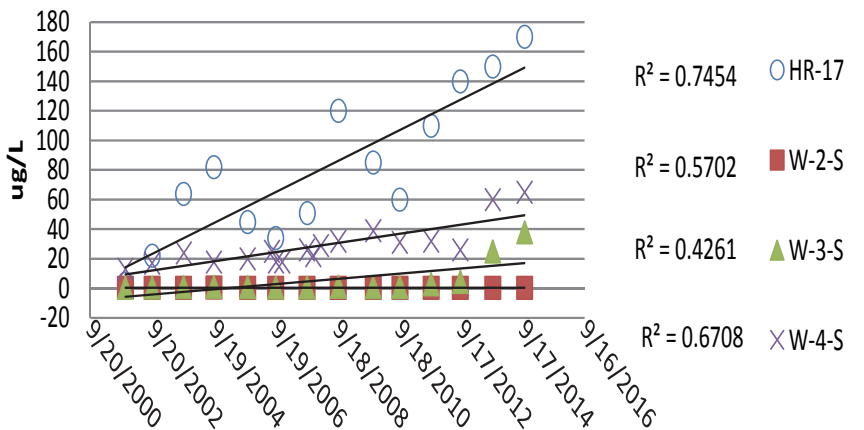
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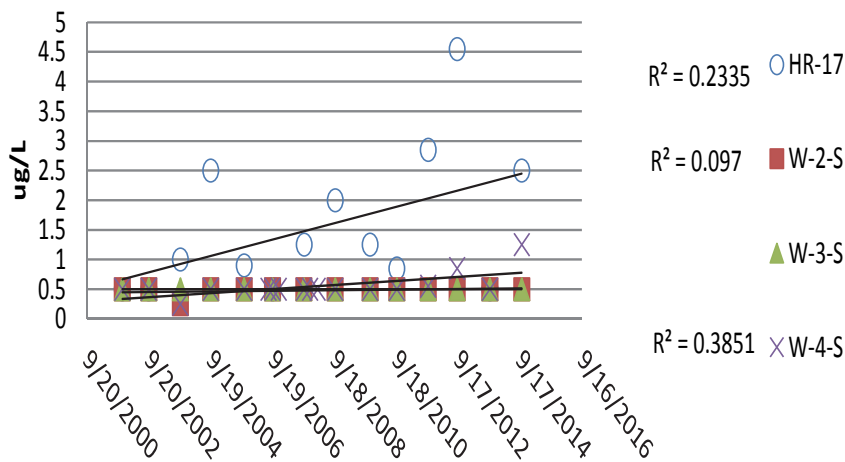
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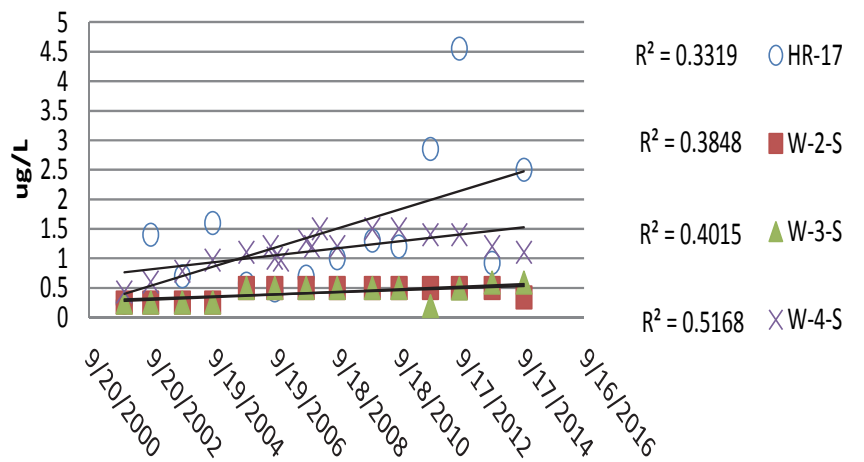
Tetrachloroethene



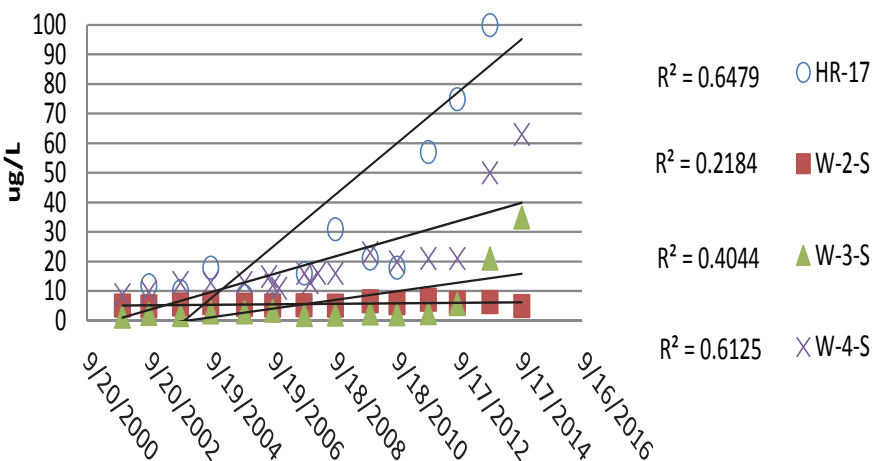
Toluene



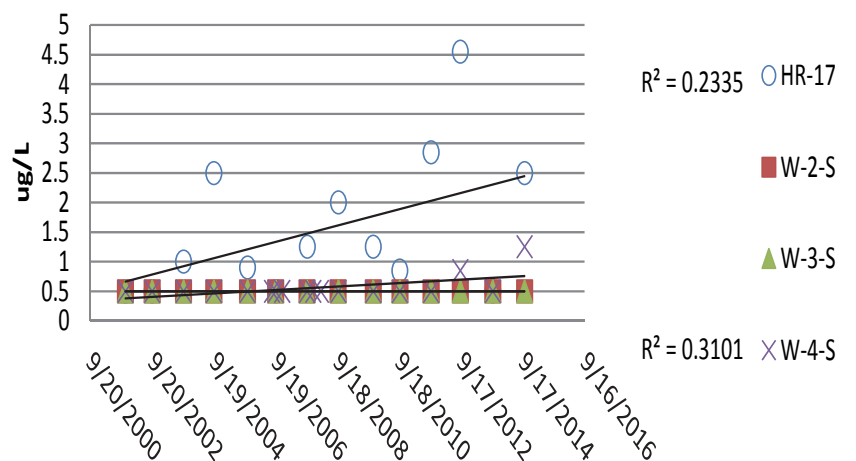
trans-1,2-Dichloroethene



Trichloroethene



Vinyl chloride



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

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South Settling Lagoon
Linear Regression Graphs



FIGURE
G-2