DRAFT
Site-Wide Groundwater Monitoring Report for 2005

General Motors Corporation
Moraine, Ohio

February 28, 2006

ARCADIS
Infrastructure, environment, buildings

Table of Contents

Executive Summary ES-1

1. Introduction 1

1.1 Site Description 2

1.2 Groundwater Monitoring Program Objectives 3

2. Groundwater Monitoring Summary 4

2.1 Groundwater Monitoring Activities/Methodologies 4

2.1.1 Water-Level Measurements 5

2.1.2 Monthly Groundwater Recovery System Monitoring 5

2.1.3 Site-Wide Groundwater Monitoring 6

2.1.4 Laboratory Analytical Methods 6

2.2 Groundwater Monitoring Program Results 7

2.2.1 Groundwater Elevation Monitoring 7

2.2.2 Vertical Gradients 10

2.2.3 Groundwater Monitoring Analytical Results 11

3. Corrective Measures Implementation and Performance 18

3.1 Corrective Measures Implementation 18

3.1.1 In-Situ Reactive Zones 18

3.1.2 Capture Zones 21

3.2 Corrective Measures Performance 22

3.2.1 In-Situ Reactive Zones Performance Results 22

3.2.2 Capture Zone Performance Results 23

4. Corrective Action Completion Strategy 25

4.1 Effectiveness of Corrective Measures Activities 25

4.1.1 Background and Objectives 25

4.1.2 Methodology 26

4.1.3 Results 28

4.2 Monitoring of Land-Based Waste Management Units 31

4.2.1 Background and Objectives 31

4.2.2 Methodology 32

4.2.3 Results 33

5. Conclusions and Recommendations 35

5.1 Land-Based Waste Management Units 35

5.2 Corrective Measures Performance 35

5.2.1 In-Situ Treatment 35

5.2.2 Hydraulic Control 36

5.3 Reassessment of Site-Wide Groundwater Monitoring Program 37

6. References 39

Tables

1 Site-Wide Groundwater Monitoring Events in 2005.

2 Influent Monitoring of the Air Stripper Tower for 2005.

3 NPDES Permit Effluent Monitoring of the Air Stripper Tower for 2005.

4 DN-13 Monthly Monitoring for 2005.

5 Monitoring Well Construction Details.

6 Water-Level Measurements Collected During April 2005.

7 Water-Level Measurements Collected During October 2005

8 Summary of Precipitation Measurements Recorded by the National Weather Service, During 2005 – Dayton, Ohio.

9 Vertical Gradients for Shallow/Deep Well Pairs in 2005.

10 Summary of Groundwater VOC Analytical Results from Reactive Zone 1 Wells.

11 Summary of Groundwater VOC Analytical Results from Reactive Zone 2 Wells.

12 Summary of Groundwater VOC Analytical Results from Reactive Zone 3 West Wells.

13 Summary of Groundwater VOC Analytical Results from Reactive Zone 3 East Wells.

14 Bioattenuation Parameter Results for Groundwater Samples Collected in Reactive Zone 1.

15 Bioattenuation Parameter Results for Groundwater Samples Collected in Reactive Zone 2.

16 Bioattenuation Parameter Results for Groundwater Samples Collected in Reactive Zone 3 West.

17 Bioattenuation Parameter Results for Groundwater Samples Collected in Reactive Zone 3 East.

18 Summary of Groundwater VOC Analytical Results from Upper/Lower Aquifer Monitoring Wells in October 2005.

19 Carbon Source Solution Introduction Volumes for 2005.

20 Corrective Action Monitoring Results for Comparison to Remediation Target Levels (RTLs).

21 In-Place Waste Management Unit Assessment.

22 Summary of Site-Wide Groundwater Monitoring Plan.

Figures

1 Site Layout.

2 Site-Wide Corrective Measures.

3 Upper Aquifer Wells for Site-Wide Groundwater Monitoring.

4 Lower Aquifer Wells For Site-Wide Groundwater Monitoring.

5 VOC Concentrations at the Influent to Air Stripper Tower Since System Start-Up, Groundwater Recovery and Treatment System.

6 Water Table Surface (Upper Aquifer) on April 6 and 7, 2005.

7 Water Table Surface (Upper Aquifer) on October 12 and 13, 2005.

8 Potentiometric Surface (Lower Aquifer) on April 6 and 7, 2005.

9 Potentiometric Surface (Lower Aquifer) on October 12 and 13, 2005.

10 VOC Databoxes for Upper Aquifer Wells.

11 VOC Databoxes for Lower Aquifer Wells.

12 Reactive Zone #1.

13 Reactive Zone #2.

14 Reactive Zones #3 West and #3 East.

Appendices

A Site-Wide Groundwater VOC Analytical Results from 1999 to 2004 Sampling Events

B Groundwater Sampling Logs for 2005

C Groundwater Analytical Database for 2005

D Soil Boring and Well Construction Logs for RZ-3 Expansion Wells

E In-Situ Reactive Zones Performance Results for 2005

F Supporting Documentation for Corrective Action Completion Evaluation

Executive Summary

This Site-Wide Groundwater Monitoring Report presents the groundwater monitoring activities completed in 2005 at the following General Motors Corporation (GM) facilities located in Moraine, Ohio (Figure 1): former Delphi Harrison Thermal Systems Moraine Plant (former Delphi Thermal Moraine [leased to Delphi Corporation between 1999 and September 2003]), former General Motors Powertrain Group, Moraine Engine Plant (former Moraine Engine), and General Motors Truck Group, Moraine Assembly Plant (Moraine Assembly). These monitoring activities were completed as part of the Resource Conservation and Recovery Act (RCRA) Corrective Action being implemented at the facilities. The U.S. EPA approved the Site-Wide Groundwater Monitoring Plan in a letter dated June 16, 2000. The site-wide groundwater monitoring is also designed to meet the objectives of Ohio EPA's RCRA post-closure monitoring at the two closed lagoons located at the Delphi Thermal Moraine facility. Ohio EPA approved the Site-Wide Groundwater Monitoring Plan in a letter dated December 24, 2003. The objectives of groundwater monitoring at the GM Moraine Facilities are as follows:

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

2. Monitor groundwater quality upgradient and downgradient of Landfills L1, L2, and L3;

3. Monitor the effectiveness of and the need for current groundwater capture systems in the upper and lower aquifers at the southern, downgradient property boundary;

4. Monitor the effectiveness of corrective measures activities in Reactive Zones (RZ) RZ-1, RZ-2 and RZ-3, to address volatile organic compounds (VOCs) related to the Former Oil House Area; and

5. Monitor an appropriate list of wells once corrective measures objectives (defined in the Draft Interim Measures/Corrective Measures Report [ARCADIS Geraghty & Miller, Inc. 2001] and the Revised Corrective Measures Proposal – Addendum [BOW Environmental Solutions, Inc., 2005a]) have been met to verify that these objectives continue to be met without active measures

The groundwater monitoring conducted in 2005 met these objectives, with the following results:

- Using the methodology developed in the RCRA Facility Investigation (RFI) baseline risk assessment for assessing potential impacts to groundwater receptors from releases at the Moraine Facilities, GM determined that the data from the wells downgradient of the closed North and South Settling Lagoons has re-confirmed that these units are not significantly affecting groundwater quality. Therefore, no changes in the monitoring program for these closed lagoons are proposed.

- Data collected from upper and lower aquifer wells located upgradient of the facilities confirms that upgradient sources of VOCs, not related to GM operations, continue to exist in the local area. Notwithstanding these upgradient contributions of VOCs to on-site groundwater, the monitoring data indicate a site-wide decrease in total VOC concentrations since the baseline sampling event conducted in 1999. GM has re-confirmed that Landfills L1, L2, and L3 are not significantly affecting groundwater quality. In addition, VOC concentrations at the off-site downgradient upper aquifer well GM-26 (the point of compliance [POC] well for the upper aquifer) have remained below Safe Drinking Water Act, Maximum Contaminant Levels (MCLs), although, concentrations of trichloroethene remained above MCLs in downgradient lower aquifer wells GM-11, GM-15 and GM-20D (the point of compliance wells for the lower aquifer). However, groundwater downgradient of these POC wells is continued to be captured by the lower aquifer capture well, DN-13.

- Groundwater elevation monitoring indicates that the capture zone corrective measures continue to be effective at maintaining hydraulic control in both the upper and lower aquifers at the southern end of the former Delphi Thermal Moraine. Further, the decreasing concentrations in the wells downgradient of the site, compared to the RFI data and 1999 baseline groundwater sampling data, is likely attributable to the effects of corrective measures pumping at TW-2, pumping at DN-13, the effects of the in-situ reactive zones and on-going natural attenuation of the VOCs. Based on the effective performance of the pumping program during the 2005 monitoring period, no changes to the hydraulic control component of the ongoing corrective measures are proposed. In 2006, GM will look at possibly changing the TW-2 discharge permit so that this groundwater could be discharged without treatment or with modified treatment since the levels in TW-2 have dropped significantly.

- Groundwater quality monitoring at and downgradient of the reductive dechlorination treatment zones (RZ-1, RZ-2 and RZ-3) indicates that this in-situ treatment program has been effective at developing reducing conditions in the

upper aquifer that have led to reductions in the VOC concentrations in groundwater and this in-situ component of the corrective measures will be continued.

- Based on the data collected during the 2005 monitoring period, GM believes that the monitoring program defined for the site, in terms of the monitoring locations, the constituents monitored and the frequency of monitoring, provide appropriate data for a comprehensive evaluation of the corrective action goals.

1. Introduction

This Site-Wide Groundwater Monitoring Report presents the groundwater monitoring activities completed in 2005 at the following General Motors Corporation (GM) facilities located in Moraine, Ohio (Figure 1): former Delphi Harrison Thermal Systems Moraine Plant (former Delphi Thermal Moraine [leased to Delphi Corporation between January 1999 and September 2003]), former General Motors Powertrain Group, Moraine Engine Plant (former Moraine Engine), and General Motors Truck Group, Moraine Assembly Plant (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 June 2000 (ARCADIS Geraghty & Miller, Inc. 2000a and b, ENVIRON 2000a and b). The 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 Baseline Risk Assessment concluded that under current conditions there was no unacceptable risk associated with constituents detected in soil/waste at the AOIs and Solid Waste Management Units (SWMUs) investigated in the RFI. However, constituents detected in groundwater at the Former Oil House Area may migrate to the extent that reasonably expected future uses of groundwater might be affected. Therefore, the focus of the Interim Measures/Corrective Measures Report (ARCADIS Geraghty & Miller, Inc. 2001) was a site-wide remedy that addressed the source of the VOCs in groundwater and the downgradient plume. The final remedy incorporates:

- The Former Oil House Area corrective measures (in-situ remediation of groundwater in the Oil House Area and downgradient of the Oil House Area, Figure 2);
- The capture zone corrective measures (hydraulic control with a pump and treat system for the upper aquifer and hydraulic control for the lower aquifer, Figure 2) until no longer required;
- Institutional actions (the site will remain industrial and groundwater use will be restricted to nonpotable purposes); and
- A site-wide groundwater monitoring program.

This report addresses several components of the final remedy, including the site-wide groundwater monitoring program (Table 1) and the performance of the corrective measures. 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 2004 (ARCADIS G&M, Inc. 2005).

1.1 Site Description

The former Moraine Engine and Moraine Assembly facilities occupy approximately 300 acres, while the adjacent former Delphi Thermal Moraine facility occupies approximately 165 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.

The GM site has been used for industrial purposes since the property was acquired in the mid-1920's. Frigidaire (a former division of GM) produced appliances from the late 1920's until 1979. GM announced the shut down 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. Former Moraine Engine operations 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. GM operates a regional haulaway at the location of the former Moraine Engine plant, which is now referred to as the Vehicle Distribution Center. Since 1981, Moraine Assembly operations included the manufacture, assembly, and painting of small trucks. Currently Chevrolet TrailBlazers, GM Envoys, Buick Rainiers, Isuzu Ascenders, and SAAB 9-7x's are produced at this facility. 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. Delphi Corporation leased the property from GM from January 1999 through October 2003. Operations at the former Delphi Thermal Moraine Building 14 ceased in September 2003 and the building was decommissioned. As of October 1, 2003, management of the building has reverted to GM and GM remains the property owner. Demolition of Building 14 was completed in 2005.

1.2 Groundwater Monitoring Program Objectives

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

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

2. Monitor groundwater quality upgradient and downgradient of Landfills L1, L2, and L3;

3. Monitor the effectiveness of and the need for current groundwater capture systems in the upper and lower aquifers at the southern, downgradient property boundary;

4. Monitor the effectiveness of corrective measures activities in In-Situ Reactive Zones (RZ) RZ-1, RZ-2 and RZ-3, to address VOCs related to the Former Oil House Area; and

5. Monitor an appropriate list of wells once corrective measures objectives (defined in the Draft Interim Measures/Corrective Measures Report [ARCADIS Geraghty & Miller, Inc. 2001] and the Revised Corrective Measures Proposal – Addendum [BOW Environmental Solutions, Inc., 2005a]) have been met to verify that these objectives continue to be met without active measures.

2. Groundwater Monitoring Summary

In accordance with the Site-Wide Groundwater Monitoring Plan (ARCADIS G&M, Inc. 2002), groundwater monitoring was conducted in 2005 to evaluate groundwater quality upgradient and downgradient of the closed lagoons, performance of the RZs and the performance of the capture zones (as discussed in Section 3.2). A summary of the activities and methodologies that were completed in 2005 are presented in Section 2.1 and the groundwater monitoring results are presented in Section 2.2.

To provide a basis for evaluating the performance of the Corrective Measures, a comprehensive site-wide groundwater sampling event for VOCs was conducted 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 Draft Interim Measures/Corrective Measures Report (ARCADIS Geraghty & Miller, Inc. 2001). As presented in the Site-Wide Groundwater Monitoring Plan, rounds of groundwater sampling were also completed in 2001 through 2004. The analytical results from these sampling events are presented in the Site-Wide Groundwater Monitoring Report for 2004 (ARCADIS G&M, Inc. 2005). The 1999 baseline through 2004 groundwater quality data for the site-specific VOC parameter list are reproduced in tables in Appendix A of this report to support the evaluation of the on-going remedial activities.

2.1 Groundwater Monitoring Activities/Methodologies

In order to meet the objectives of the groundwater monitoring program, the scope of work presented in Section 3.0 of the Site-Wide Groundwater Monitoring Plan and Section 5.0 of the Site-Wide Groundwater Monitoring Report for 2004, was implemented during 2005. The following sections summarize the collection of water-level measurements, the monthly groundwater monitoring, and the annual site-wide groundwater monitoring.

2.1.1 Water-Level Measurements

Water-level elevations were measured twice in 2005. The first well gauging event occurred on April 6 and 7, 2005; the second event occurred on October 12 and 13, 2005. The measured wells included all on-site and off-site monitoring wells at the three facilities as shown on Figure 3 (upper aquifer monitoring wells) and Figure 4 (lower aquifer wells). Water-level elevations were also measured in former Delphi Thermal Moraine production wells (where accessible), Moraine Assembly fire wells, two lower aquifer wells (MT596M, and MT576M) located east of the Moraine Assembly and the former Moraine Engine plants, and one lower aquifer well (MT69) located south of the Dryden Road North Wellfield. Water-level measurements were collected in accordance with procedures defined in the RFI Sampling and Analysis Plan, Standard Operating Procedure (SOP) #4 (Geraghty & Miller, Inc. 1997a) and recorded on a field data sheet.

2.1.2 Monthly Groundwater Recovery System Monitoring

The National Pollution Discharge Elimination System (NPDES) Permit issued to GM for the groundwater recovery and treatment system requires periodic monitoring and reporting of water quality in the effluent stream and pumping flow rates. Samples of groundwater being pumped through the air stripping treatment tower were collected and analyzed monthly for the parameters required in the permit. GM's air permit for the air stripper tower expired on June 20, 2003 and the Regional Air Pollution Control Agency approved renewal of this permit through June 20, 2008 as a registration status permit due to the negligible organic compound emissions from the tower. GM continued to collect influent tower samples during the 2005 sampling events to evaluate the tower performance. Table 2 summarizes the VOC results for the monthly air stripper tower influent stream during 2005. The monthly air stripper influent data is also presented in Figure 5, for the period from the initial start-up in January 1996 through December 2005. Table 3 summarizes the VOC results for the monthly air stripper tower effluent stream during 2005. Table 4 summarizes the VOC results for the monthly DN-13 sampling during 2005. All analyses were conducted in accordance with methods specified in the Final Interim Measures Design Plans (Geraghty & Miller, Inc. 1995). In 2006, GM will look at possibly changing the TW-2 discharge permit so that this groundwater could be discharged without treatment or with modified treatment since the levels in TW-2 have dropped significantly.

2.1.3 Site-Wide Groundwater Monitoring

In accordance with the Site-Wide Groundwater Monitoring Plan (ARCADIS G&M, Inc. 2002), monitoring wells were sampled in October 2005. A summary of the 2005 sampling events, including number of wells and analytical parameters are presented on Table 1. Well construction and survey data for the wells used in the site-wide program are presented in Table 5.

Groundwater samples were collected from specified wells using low-flow or bailing sampling procedures. Field parameters including pH, specific conductance, temperature, oxidation/reduction potential, and dissolved oxygen were measured during purging of each well using a multi-parameter flow-through cell. SOP #21 was followed when sampling monitoring wells (ARCADIS G&M, Inc., 2002). One groundwater sample from a production well 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). The Supplemental RFI Quality Assurance Project Plan will be followed until the Draft Quality Assurance Project Plan for RCRA Corrective Action is approved by the U.S. EPA (draft report was submitted to the U.S. EPA on December 23, 2003). All pertinent field data were recorded on groundwater sampling logs. The sampling logs for 2005 are presented in Appendix B. Analytical results are presented and discussed in Section 2.2.3.

2.1.4 Laboratory Analytical Methods

Groundwater samples were analyzed for the site-specific parameter list using SW 846 Method 8260. This parameter list was developed after evaluating data from the September 1999 baseline groundwater sampling event and the one-time sampling event conducted in September/October 2000 (which included analysis of Appendix IX VOCs and cis-1,2-DCE, SVOCs, and metals), conducted as part of the Former Oil House Area corrective measures. The site-specific parameter list includes: benzene, 1,1-dichloroethane (1,1-DCA), 1,1-dichloroethene (1,1-DCE), cis-1,2-DCE, trans-1,2-dichloroethene (trans-1,2-DCE), ethylbenzene, tetrachloroethene (PCE), toluene, 1,1,1-trichloroethane (1,1,1-TCA), trichloroethene (TCE), vinyl chloride, and xylenes. Select groundwater samples from upper aquifer monitoring wells were also analyzed for the biogeochemical indicator parameters manganese (total and dissolved), iron

(total and dissolved), sulfate, sulfide, total organic carbon (TOC), chlorides, light hydrocarbons (ethane and ethene), and methane. Groundwater samples from select upper aquifer wells were analyzed for arsenic and barium in both 2003 and 2004 to demonstrate that the isolated detection of these two metals does not pose a concern at the site; therefore, as discussed in the Site-Wide Groundwater Monitoring Report for 2004, these metals were not analyzed in 2005. Table 1 lists specific field, laboratory, and biogeochemical indicator parameters, and field and laboratory analytical methods. All samples were submitted to Severn Trent Laboratory in North Canton, Ohio (STL North Canton) or Microseeps in Pittsburgh, Pennsylvania for ethene, ethane, methane analysis only. The complete set of groundwater results, including quality assurance/quality control (QA/QC) samples, is presented in Appendix C.

2.2 Groundwater Monitoring Program Results

2.2.1 Groundwater Elevation Monitoring

As part of the site-wide assessment of current groundwater conditions, water-level elevations were measured to determine groundwater flow directions in the upper and lower aquifers and to determine vertical gradients between the two aquifers. Water-level measurements from 2005 are presented on Tables 6 and 7.

2.2.1.1 Upper Aquifer

The water-table surface on April 6 and 7, 2005 (Figure 6) and on October 12 and 13, 2005 (Figure 7) show that flow in the upper aquifer is generally from northeast to southwest. A southwestern deflection in groundwater flow occurs north of Landfill L1 and trends towards capture well TW-2, located near the southwest corner of Landfill L1. A groundwater capture zone, centered on well TW-2, encompassed the southwest corner of Landfill L1. TW-2 was in operation during water-level elevation measurement collection in October 2005, but not in April 2005. Water-level measurements from October 2005 show the water level in TW-2 is lower than the water levels to the west in monitoring well GM-16, to the southwest in monitoring well GM-17, and to the south in monitoring well WSU-24, indicating a reversal of groundwater flow (i.e., to the north) south and southwest of well TW-2. A comparison of the October 2005 groundwater flow conditions to the September 2004 groundwater flow map for the upper aquifer (ARCADIS G&M, Inc. 2004) indicates that the high groundwater table in 2004 led to a steeper gradient across the site in 2004 than in 2005 (only considering the fall gauging event). The 2005 upper aquifer flow patterns are

generally consistent with groundwater flow conditions since TW-2 operation was initiated.

Table 8 presents the 2005 monthly precipitation totals, recorded by the National Weather Service, and the deviation from calculated average amounts. The 2005 annual total precipitation recorded at the Dayton, Ohio monitoring station was 45.28 inches, which was 5.70 inches above average. Precipitation for the months of January, August, September, October and November was above normal, while precipitation for all other months was below normal.

The average hydraulic gradient of the upper aquifer, calculated from site-wide groundwater elevation measurements in April and October 2005 were 0.0004 and 0.0007 foot/foot (ft/ft), respectively. The groundwater flow velocity for the upper aquifer was calculated using the following equation:

$$V_w = Ki/N_e$$

where

V_w = groundwater flow velocity (feet per day [ft/day])

K = hydraulic conductivity (ft/day)

i = hydraulic gradient (ft/ft)

N_e = effective porosity

Hydraulic characteristics of the upper aquifer were determined by evaluation of data from pumping tests conducted in 1985 and in 1989. The median hydraulic conductivity value estimated from pumping test data was 1,650 ft/day, and effective porosity was assumed to be 0.3 to 0.5. Using hydraulic gradients for April and October 2005, groundwater flow velocities in the upper aquifer ranged from 1.37 ft/day to 2.28 ft/day and 2.20 ft/day to 3.66 ft/day, respectively. Assuming the most extreme condition (i.e., no retardation or retardation factor [R_d] equal to 0), the rate of VOC migration could equal the rate of groundwater flow. However, some soil-VOC interaction is occurring, and, therefore, the actual VOC migration rates are slower than that of groundwater flow. Most of the VOCs detected in the upper aquifer at the GM facilities are likely to have a R_d ranging from 2 to 10 (Walton 1985), so the rate of

migration of the VOCs in the upper aquifer in April and October 2005 could be as low as 0.14 ft/day and 0.22 ft/day, respectively.

During the Supplemental RFI, as part of the August 1998 investigation at the Former Oil House Area, slug tests were conducted on three monitor wells (GM-23, GM-27 and GM-28) to assess groundwater flow conditions in this area of the site. These slug tests determined that hydraulic conductivity in the upper aquifer in this area is lower than the hydraulic conductivity calculated on a site-wide basis. Hydraulic conductivity of the portion of the aquifer above the upper clay till at the Former Oil House Area was determined to be approximately 43 ft/day. Below the upper clay till, the hydraulic conductivity was determined to be 54 ft/day. Using hydraulic gradients from October 2005, groundwater flow velocities in the upper aquifer above the upper clay till ranged from 0.005 ft/day to 0.008 ft/day.

2.2.1.2 Lower Aquifer

The potentiometric surface (lower aquifer) on April 6 and 7, 2005 (Figure 8) and on October 12 and 13, 2005 (Figure 9) shows groundwater flow in the lower aquifer to be generally from northeast to southwest, with a groundwater capture zone centered around well DN-13. County Well DN-13, located south of the former Delphi Thermal facility in the Dryden Road North Wellfield, was in operation during water-level elevation measurement collections in 2005. No significant change in the overall flow conditions across the northern to central portion of the site were noted in the 2005 lower aquifer groundwater elevation data. It should be noted that GM was using production wells for the Moraine Assembly Plant in 2005 (production wells 11B and 12A). At the time of the April 2005 sampling event, production well 11B was in operation and a localized cone-of-depression associated with this well was likely present. During the October 2005 sampling event, production well 12A was in operation and a localized cone-of-depression associated with this well is observed.

The average hydraulic gradient of the potentiometric surface in the lower aquifer, calculated from groundwater elevation measurements in April 2005 and October 2005 was 0.00057 ft/ft and 0.00059 ft/ft, respectively. Assuming a porosity of 0.3 to 0.5 and using the equation presented earlier ($V_w = Ki/N_e$), groundwater flow velocity in the lower aquifer for April 2005 ranged between 0.46 ft/day and 0.76 ft/day. For October 2005, the groundwater flow velocity in the lower aquifer ranged from 0.47 ft/day to 0.78 ft/day. As discussed above, most of the VOCs detected in the upper aquifer groundwater at the GM facilities are likely to have a R_d ranging from 2 to 10 (Walton

1985), so the rate of migration of the VOCs in the lower aquifer in April 2005 and in October 2005 could be as low as 0.05 ft/day.

2.2.2 Vertical Gradients

The water-level measurements collected on April 6 and 7, 2005 and on October 12 and 13, 2005, were used to determine the direction and magnitude of vertical gradients between the upper and lower aquifers (Table 9). The magnitude and direction of vertical gradients indicate whether the potential exists for groundwater to move from one aquifer to another through a confining unit, and which direction it will move.

At the northern (upgradient) end of the site, vertical gradients were upward in shallow/deep monitoring well pairs HR- 9/HR-10 and HR-11/HR-12 in April 2005. In October 2005, the vertical gradients were downward in these well pairs The vertical gradient in these monitoring well pairs has always fluctuated from upward to no vertical gradient to downward, with the predominant direction being upward.

In April 2005, well pairs immediately downgradient (south) of the closed North Settling Lagoon (W-3-N/HR-15 and W-4-N/HR-14) showed downward vertical gradients (consistent with historical data). The vertical gradient at well pair HR-3/HR-13 (side gradient to the closed North Settling Lagoon) was also downward. Well pairs in the vicinity of Landfill L1 (GM-16/GM-15, GM-2/GM-1, GM-18/GM-13, GM-17/GM-11, GM-6/GM-3) all showed downward vertical gradients, with the exception of well pair GM-8/GM-7R which showed an upward gradient (since June 1995 the vertical gradient in this well pair was upward 50 percent of the time and downward 50 percent of the time). The downward vertical gradient at the other six well pairs near Landfill L1 is likely due to the proximity of these well pairs to lower aquifer extraction well DN-13. Downgradient of the site, the vertical gradient was downward in well pairs GM-10/GM-9 and GM-26/MT-69 in April 2005.

In October 2005, well pairs immediately downgradient (south) of the closed North Settling Lagoon (W-3-N/HR-15 and W-4-N/HR-14) showed downward vertical gradients. The vertical gradient at well pair HR-3/HR-13 (side gradient to the closed North Settling Lagoon) was upward. Well pairs in the vicinity of Landfill L1 (GM-8/GM-7R, GM-2/GM-1, GM-18/GM-13, GM-17/GM-11, GM-10/GM-9) all showed downward vertical gradients, with the exception of well pairs GM-16/GM-15 and GM-6/GM-3 which showed upward gradients. The vertical gradient at well pair GM-16/GM-15 is usually downward; therefore, this upward gradient was unexpected and may have been due to a measurement error. As a result, water level measurements in

this well pair were rechecked by ARCADIS on November 28, 2005 and the vertical gradient was determined to be downward based on that data. The vertical gradient in well pair GM-6/GM-3 has typically been upward for the last 10 years. Downgradient of the site, the vertical gradient was downward in well pairs GM-10/GM-9 and GM-26/MT69 in October 2005.

At the Former Oil House Area, water-level measurements in upper aquifer well pair GM-23/GM-27 (above the upper clay till/beneath the upper clay till) were used to evaluate the vertical gradient in the upper aquifer. An upward vertical gradient was present in the upper aquifer across the upper clay till present at the Former Oil House Area, both in April 2005 and in October 2005. Well pair GM-23/GM-39 was used to evaluate the vertical gradient in the lower aquifer compared to the upper aquifer. An upward vertical gradient was present across both the upper clay till and regional clay till in April 2005 and October 2005.

2.2.3 Groundwater Monitoring Analytical Results

As described in Section 2.1.4, groundwater at the site was evaluated for the presence of the site-specific list of VOCs. Tables 10 through 13 present the VOC results upgradient and downgradient of the RZs. Tables 14 through 17 present the bioattenuation parameter results upgradient and downgradient of the RZs. These results are discussed in Section 3.2.1 as they pertain to the performance of the RZ corrective measures. Table 18 presents the VOC results for the site-wide groundwater sampling event completed in October 2005 for the upper and lower aquifer wells. Data for 1999 through 2005 groundwater sampling events are presented on Figures 10 and 11 for the upper and lower aquifer wells, respectively. The groundwater results are presented in this section and evaluated based on groundwater quality upgradient of the site, on site, and downgradient of the site. The complete set of groundwater results, including QA/QC samples, is presented in Appendix C. The 1999 baseline sampling data used as a point of comparison for the 2005 groundwater results are presented in Appendix A.

2.2.3.1 Upper Aquifer Groundwater Quality

The following sections include a discussion of the groundwater quality in upper aquifer monitoring wells shown on Figure 3 that are part of the site-wide program.

2.2.3.1.1 Upgradient Groundwater Quality

In 2005, two upgradient upper aquifer monitoring wells exhibited the presence of VOCs:

- HR-9, total VOCs were 91.23 micrograms per liter (ug/L) in 2005, compared to a 1999 baseline total VOC concentration of 116 ug/L.

- HR-11, total VOCs were 13.22 ug/L in 2005, compared to a 1999 baseline total VOC concentration of 17.3 ug/L.

Two key observations can be made relative to upgradient groundwater quality. First, the detected 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 GM Moraine facilities (including the 1999 baseline sampling results). This confirms that upgradient sources of VOCs not related to GM operations continue to exist in the local area. The highest concentrations of upgradient VOCs are 1,1,1-TCA, TCE and the breakdown products DCA and cis-1,2-DCE, suggesting that the upgradient releases have been migrating long enough to allow for degradation of the chlorinated VOCs 1,1,1-TCA and TCE to occur. Second, 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.

2.2.3.1.2 On-Site Groundwater Quality

To evaluate the primary source area of VOCs at the site (Former Oil House Area), five upper aquifer monitoring wells (GM-23, GM-27, GM-28, GM-29, GM-30) were sampled in 2005. With the exception of GM-27, all of these wells are screened above the upper clay till present at the Former Oil House Area.

- GM-30 (northern most Former Oil House Area well, located next to the former tank farm) - total VOC concentrations decreased from 37,350 ug/L in the 1999 baseline to 4,443 ug/L in 2005. This well predominantly contained ethylbenzene, xylenes, and DCA.

- GM-23 (located next to the Former Oil House building) - total VOC concentrations increased from 17,853.3 ug/L in the 1999 baseline sampling to 24,590 ug/L in 2005 primarily due to an increase in daughter products cis-1,2-DCE

and vinyl chloride; however, TCE and PCE concentrations have decreased. This well predominantly contained PCE, TCE, cis-1,2-DCE, and vinyl chloride. This well is upgradient to the original RZ-1 barrier and is within the zone of influence of carbon introductions conducted in the Former Oil House Area which results in solubilizing previously adsorbed VOCs for biodegradation.

- GM-27 (paired with GM-23 and screened below the upper clay till) - exhibited a decrease of total VOCs between the 1999 baseline (145.7 ug/L) and 2005 (94.45 ug/L). GM-27 predominantly contains TCE, cis-1,2-DCE, and DCA. This well is upgradient to RZ-1.

- GM-29 (serves as an upgradient well for RZ-1) - total VOC concentrations increased from 1,256.3 ug/L in the 1999 baseline to 2,559 ug/L in 2005 primarily due to an increase in daughter products; however, TCE concentrations have decreased since the baseline sampling event. This well is upgradient to the original RZ-1 barrier and is within the zone of influence of carbon introductions conducted in the Former Oil House Area after RZ-1 was expanded, which results in solubilizing previously adsorbed VOCs for biodegradation.

- GM-28 (serves as the downgradient well for RZ-1; the VOC and bioattenuation parameter results for this well are discussed in greater detail in Section 3.3) - total VOC concentrations decreased from 1,292.4 ug/L in 1999 to 6.71 ug/L in 2005.

Based on historical and current groundwater flow directions, on-site wells located south of the Former Oil House Area, including wells ME-6, ME-3, GM-22, EAST, GM-21 and GM-2, are potentially hydraulically downgradient of GM-23. In addition, historical flow could have had a southwesterly trend under the influence of Montgomery County pumping (i.e., at Miami Shores), which may make impacts to HR-1, W-1-S and HR-17 from the Former Oil House Area possible. Of the wells identified as downgradient from the Former Oil House Area in the southerly direction toward the property boundary, the total VOC concentrations have decreased, as discussed below.

- ME-6, total VOCs were 944.9 ug/L in the 1999 baseline sampling event, then decreasing to 63.53 ug/L in 2005.

- ME-3, total VOCs were 159.7 ug/L in the 1999 baseline sampling event, then decreasing to 21.2 ug/L in 2005.

- EAST, total VOCs were 152.6 ug/L in the 1999 baseline sampling event, then decreasing to 83.2 ug/L in 2005.

- GM-33, total VOCs were 292.1 ug/L in 2001 (this well was installed after the 1999 baseline sampling event), decreasing to 154.85 ug/L in 2005.

- GM-35, total VOCs were 732.8 ug/L in 2001 (this well was installed after the 1999 baseline sampling event), decreasing to 541.1 ug/L in 2005.

- GM-8, total VOCs were 150.3 ug/L in the 1999 baseline sampling event, then decreasing to 50.85 ug/L in 2005.

- GM-2, total VOCs were 82.9 ug/L in the 1999 baseline sampling event, then decreasing to 17.5 ug/L in 2005.

These data indicate that VOC concentrations in monitoring wells hydraulically downgradient of the Former Oil House Area and RZ-1 decreased from the 1999 baseline to 2005. Wells GM-21 and GM-22, located south of and sidegradient to the Former Oil House Area, exhibited a decrease and slight increase in total VOC concentrations, respectively. In well GM-22, total VOCs were 7.6 ug/L in 1999 baseline and slightly increased to 10.62 ug/L in 2005. In well GM-21, total VOCs were 168.9 ug/L in 1999 baseline and decreased to 64.5 ug/L in 2005. The significance of these concentrations is further discussed in Section 4.0 and Appendix E.

The following total VOC concentrations are noted in monitor wells hydraulically downgradient of the Former Oil House Area to the southwest and upgradient of the closed South Settling Lagoon:

- HR-1, total VOCs were 114 ug/L in the 1999 baseline event, decreasing to 97.3 ug/L in 2005.

- HR-17, total VOCs were 29.1 ug/L in the 1999 baseline event, increasing to 57.67 ug/L in 2005.

The following total VOC concentrations are noted in monitor wells hydraulically side-gradient of the Former Oil House Area to the west and east of the closed North Settling Lagoon:

- HR-2, total VOC concentrations were 15 ug/L in the 1999 baseline event and 10.82 ug/L in 2005.
- HR-3, total VOC concentrations were 12.3 ug/L in the 1999 baseline event and 40.84 ug/L in 2005.
- HR-4, total VOC concentrations were 2.6 ug/L in the 1999 baseline event and 2.21 ug/L in 2005.

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. Total VOC concentrations in wells downgradient of the closed North Settling Lagoon, ranged from 3.3 ug/L to 308.9 ug/L in the 1999 baseline event and in 2005, ranged from 2.49 ug/L to 94.4 ug/L. The detected VOCs included DCA, DCE compounds, TCE, PCE, and vinyl chloride. Total VOC concentrations in wells downgradient of the closed South Settling Lagoon, ranged from 6.5 ug/L to 52.9 ug/L in the 1999 baseline event and 6.4 ug/L to 42.2 ug/L in 2005. The detected VOCs included DCA, DCE compounds, TCE, PCE, and 1,1,1-TCA. The significance of these concentrations is further discussed in Section 4.0.

2.2.3.1.3 Downgradient Groundwater Quality

On-site downgradient wells (GM-6, TW-2, 4S, GM-2) and off-site downgradient wells (GM-16, GM-17, GM-18, WSU-24, GM-10) in the upper aquifer exhibited concentrations of PCE, TCE, 1,1,1-TCA and their associated daughter products. In the 1999 baseline event, total VOC concentrations in these wells ranged from 16.5 ug/L to 266.3 ug/L. In 2005, total VOC concentrations in these wells ranged from 6.45 ug/L to 161.5 ug/L. The off-site downgradient well GM-26, serves as the point of compliance well for the upper aquifer. In 1999 no VOCs were detected, while in 2005, PCE (1 ug/L) was detected in GM-26. The decreasing concentrations in the wells downgradient of the site (GM-6, TW-2, GM-2, GM-18, and GM-10) compared to the RFI data (ARCADIS Geraghty & Miller, Inc. 2000a) and the 1999 baseline conditions, is likely attributable to the effects of corrective measures pumping at TW-2 which began in January 1996, pumping at DN-13, the effects of the RZs and on-going natural attenuation of the VOCs. Concentrations in wells GM-17 and WSU-24 showed slight but not significant increases above the 2004 results. Concentrations in well 4S decreased in 2005 compared to 2004. PCE and TCE concentrations in GM-16

decreased in 2005 compared to 2004 but are still greater than the 1999 baseline concentrations.

2.2.3.2 Lower Aquifer Groundwater Quality

This section includes a discussion of the groundwater quality in lower aquifer monitoring wells shown on Figure 4 that are part of the site-wide program. In 1999 and 2005, the upgradient lower aquifer monitor well HR-12 exhibited the presence of VOCs (total VOCs of 7.4 ug/L and 3.96 ug/L, respectively). The detected VOCs included DCA, cis-1,2-DCE, and vinyl chloride, suggesting that degradation of the chlorinated VOCs from upgradient releases has 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 GM Moraine facilities. This confirms that upgradient sources of VOCs, not related to GM 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. VOCs were not detected in upgradient lower aquifer well HR-10 in 2005.

On-site lower-aquifer monitor wells that were part of the site-wide evaluation in October 2005 included HR-15, HR-13, GM-39, GM-40, GM-41, GM-42 and GM-19D. Detected VOCs included PCE, TCE, 1,1,1-TCA and their associated daughter products. In 1999 (baseline conditions) the total VOC concentrations in these wells ranged from 13.5 ug/L to 70.3 ug/L. In 2005, total VOC concentrations in these wells ranged from 0.77 ug/L to 266 ug/L. Wells GM-39, GM-40, GM-41, and GM-42 were installed in November 2003, after the 1999 baseline sampling event. The increase in the concentration range in 2005 compared to baseline is due to the sampling data from the new wells, specifically GM-41.

On-site downgradient wells (GM-3, GM-1) and off-site downgradient wells (GM-15, GM-11, GM-20D, DN-13, GM-9) exhibited similar concentrations of total VOCs when compared to the on-site groundwater quality. In 1999 (baseline conditions) the total VOC concentrations in these wells ranged from non-detect to 115 ug/L. In 2005, total VOC concentrations in these wells decreased (total VOCs ranged from 9.3 ug/L to 37.05 ug/L). VOCs were not detected in off-site, downgradient well MT-69 in 1999 and 2005. The off-site downgradient wells GM-15, GM-11, and GM-20D, serve as the point of compliance wells for the lower aquifer. The MCL for TCE was exceeded in

wells GM-15, GM-11, and GM-20D in 2005. However, groundwater downgradient of these wells is captured in the lower aquifer capture zone well, DN-13. All other detected VOCs in these point of compliance wells were below MCLs.

3. Corrective Measures Implementation and Performance

To address the source of VOCs in groundwater (Former Oil House Area Source Area) and the associated downgradient plume, GM continued to operate the corrective measures systems in 2005. This involved operation of the RZs and capture zones, as presented in Section 3.1. To meet the objectives defined in Section 4.0 of the Site-Wide Groundwater Monitoring Plan, the data collected in 2005 (described in Section 2.0 of this report) are evaluated in Sections 3.2 and 4.0 to assess the ongoing effectiveness of and the need for continuation of these corrective measures. The corrective measures performance is summarized in Section 3.2 and presented in more detail in Appendix E.

3.1 Corrective Measures Implementation

3.1.1 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 PCE, TCE, cis-1,2-DCE, and vinyl chloride. This enhanced reductive dechlorination process has been developed at the GM Moraine 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 as a component of the Former Oil House Area corrective 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); and 3) at a downgradient location south of former Delphi Thermal Moraine (RZ-3 West) and the former Moraine Engine plant (RZ-3 East). The RZ locations are shown on Figure 2. The actual layouts of each RZ are shown on Figures 12, 13, and 14, and discussed below:

- At RZ-1, the molasses solution was introduced into the upper aquifer, above the upper clay till. The carbon injection level was set by screening the injection wells in the lower 10 ft of the upper aquifer, which is 4 ft to 12 ft thick. RZ-1 has 21 introduction wells, of which 12 wells were added in 2002 to the original 9 wells, to

expand RZ-1. Several monthly carbon introductions were completed in existing wells upgradient of GM-23 (OW-1, OW-2, and OW-3) to demonstrate the ability to solubilize and biodegrade the previously adsorbed VOCs in this area. An additional monitoring well (GM-46) is being installed in 2006 east of RZ-1 to ensure that all impacted groundwater upgradient of RZ-1 is being treated.

- RZ-2 consists of four existing monitoring wells, 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-3 consists of 46 introduction wells, 30 wells in RZ-3 West and 16 wells in RZ-3 East. At RZ-3, the upper clay till is not present, and the carbon injection wells were screened from the aquifer surface to a depth of 46 ft to 68 ft, allowing carbon introduction through the entire thickness of the upper aquifer. In April 2005, an additional five introduction wells were installed in RZ-3 East making a total of 16 wells in this area. The new introduction wells were screened from 34 ft to 54 ft. Soil boring and well construction logs for the new introduction wells, RZ-3RR through RZ-3VV, are included in Appendix D. Wells RZ-3RR through RZ-3VV replaced existing wells RZ-3MM through RZ-3QQ; therefore, of the 16 wells, only 11 are active.

To sustain dechlorinating conditions within the RZs, a readily degradable carbon source solution (molasses) was periodically introduced 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 mixture 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 (using a 10 to 1 mixture) continued in October, November, and December 2000, and subsequently from June 2001 through December 2001, from June 2002 through January 2003, from May 2003 through December 2003, from January 2004 through December 2004, and from January 2005 through December 2005.

Introductions in RZ-1 were modified in the fall of 2003 after review of the site-wide groundwater results. Due to the success of RZ-1, GM implemented an every other month introduction routine and periodically monitored GM-28 (April 2004 and September 2004) to ensure reducing conditions are sustaining the dechlorination

process. In May 2005, the introduction routine was changed to two injections every quarter to ensure reducing conditions are maintained and sufficient carbon is available to allow for complete degradation of the VOCs.

Carbon source introductions in RZ-2 were not completed in 2005 based on the operational data that was collected in 2004. Continuation of or enhancements to RZ-2 will be further evaluated in 2006 after completion of the supplemental groundwater investigation.

Introductions continued throughout 2005 on a monthly introduction schedule in RZ-3. Desired reduction in VOC concentrations had not been noted in well GM-21, which serves as the downgradient monitoring well for RZ-3 East. As mentioned above, in April 2005, additional introduction wells (RZ-3RR through RZ-3VV) were installed to enhance this RZ to address the localized source area upgradient of monitoring well GM-21. Monthly introductions began in May 2005 in these new replacement wells and introductions were discontinued in RZ-3MM through RZ-3QQ due to their distance from GM-21 and the lack of achieving the desired VOC reduction in GM-21.

In November 2005, a more dilute molasses solution (20:1 water to molasses ratio) was used during the introduction event. Previously a 10:1 water to molasses ratio was used in the solution. Adjustments to the introduction procedures were made based upon evaluation of monitoring results and the variability in acceptance rates of the more concentrated solution into the formation. ARCADIS has observed at other sites utilizing ERD technology, that a lower solution concentration of molasses in the injectate is sufficient, and in many cases better, to achieve distribution of carbon in the subsurface. A more dilute molasses solution will reduce fermentation by-products, such as carbon dioxide and organic acids that causes reduction in pH, and in some instances may limit distribution of the carbon solution due to gas building up in soil pore space. By lowering the molasses concentration a reduction in fermentation by-products is achieved, which is shown to improve the delivery of organic carbon to the desired locations. The decreased concentration was coupled with an increase in the volume introduced with the intent of "pushing" the carbon solution radially further from the introduction wells, where deemed necessary. This modification was made prior to the November 2005 event and as a result, an improvement in the delivery of the carbon solution was noted in December 2005.

ARCADIS completed the carbon introductions from January through December 2005. The molasses is now stored on-site and mixed with potable water prior to injections.

Details regarding the frequency and strength of carbon source introductions are provided in Table 19 for 2005. Additional discussion is presented in Appendix E.

3.1.2 Capture Zones

The capture zone corrective measure for the upper aquifer consists of groundwater extraction at the property boundary using well TW-2; treatment through an air stripper tower; and discharge through GM's NPDES permitted outfall to the Great Miami River. Groundwater recovery from TW-2 began on January 31, 1996. During the ten years of operation (January 31, 1996 through December 31, 2005), the system has recovered and treated a total of 686,179,800 gallons of groundwater at an average flowrate of 143.9 gallons per minute (gpm). Annual total gallons recovered and average flow rate during 2005 were 55,375,031 gallons and approximately 150.1 gpm, respectively. The location of recovery well TW-2 is shown on Figure 2.

From November 1996 through the end of this reporting period, GM has monitored the water level in TW-2 and adjusted the TW-2 flow rate as recommended in the October 1996 Monthly Technical Progress Report (Geraghty & Miller, Inc. 1996) and approved by U.S. EPA (Personal Communication, 1996). This procedure was implemented to avoid excessive drawdown within the well, which could cause damage to the well screen and/or the pump. The flow rate from TW-2 is adjusted as necessary to maintain the water level in TW-2 at least 0.5 feet above the top of the well screen.

Between January 1, 2005 and December 31, 2005, the TW-2 component of the remediation system was in operation except the following shutdowns: the tower was shutdown briefly twice (total of 130 minutes) for maintenance in January; the tower was shutdown on February 7th through 11th to replace an influent flow control valve; the tower was shutdown on March 9th to repair a leak in the TW-2 influent line; the system remained shutdown in April and was restarted on May 18th after the necessary repairs were completed; the system was shutdown from June 5th through June 10th due to electrical problems; in July the system was off until July 6th due to a power failure; In September the system was down for seven days starting September 16th for tower cleaning and packing removal; during November the system was shutdown for 6.5 days (November 4th through November 7th to replace tubing connected to the pressure sensor and November 29th and November 30th to clean the tubing connection to the tower and the tubing for the pressure sensor); and, during December the system was down for approximately 12 days (on December 5th the tower was down for 8 hours to clean the distributor tray and from December 20th through the end of 2005 to further evaluate the effluent data before restarting the system).

Well DN-13 is a lower aquifer well that Montgomery County has been using in a Pump-to-Waste Program since March 1990. The capture zone corrective measure for the lower aquifer consists of continued pumping of DN-13 at a rate of 2.7 million gallons per day. Well DN-13 was operational throughout 2005 except for the following shutdowns: a temporary shutdown on February 24th when the system was down for 96 hours; on June 28th to July 1st; on July 17th to July 18th; and, on August 3rd to August 10th. As further discussed in Section 3.2.2, these temporary shut downs did not have long-term effects on the capture zone around well DN-13. The location of well DN-13 is shown on Figure 2.

3.2 Corrective Measures Performance

3.2.1 In-Situ Reactive Zones Performance Results

As described earlier in Section 3.1.1, the carbon solution delivery network consists of three reactive zones, RZ-1, RZ-2, and RZ-3 (West and East). Molasses was introduced in 2005 into the groundwater through introduction points shown on Figures 12 and 14 for RZ-1 and RZ-3, respectively. Operation of the RZs 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). A detailed assessment of the effectiveness of the In-situ Reactive Zones and the results of this monitoring are presented in Appendix E and summarized below:

- Existing aquifer conditions have been converted to more reducing conditions within and downgradient of the reactive zones through the introduction of a carbon source, as evidenced by the changes in field and bioattenuation parameters;
- The target compounds (PCE and TCE) have been effectively reduced to daughter products (cis-1,2-DCE and vinyl chloride) and ultimately to end products (ethene and ethane) based on a review of the VOC results;
- Levels of vinyl chloride were consistently low to non-detect in all downgradient wells, indicating degradation of cis-1,2-DCE to ethene and ethane, without production of significant vinyl chloride peaks;
- The primary and secondary operational monitoring data from RZ-2 will continue to be evaluated, along with the results of the 2006 supplemental investigation, to determine if the carbon source introduction schedule should be resumed; and

- VOC concentrations at RZ-3 East (GM-21) are decreasing in response to carbon introductions, since the enhanced design of the introduction system in RZ-3 East. TOC levels, as well as other primary and secondary operational monitoring data, indicate that the effects of carbon introductions are now reaching the GM-21 downgradient monitoring location.

Overall, the process of enhanced reductive dechlorination at this site has been successful in achieving the desired reduction of VOC concentrations.

3.2.2 Capture Zone Performance Results

Figures 6 through 9 indicate that the capture zone corrective measures continue to be effective at maintaining hydraulic control at the southern end of the former Delphi Thermal Moraine site. Additionally, it should be noted that these flow maps are consistent with the flow conditions predicted by the capture zone modeling, presented on Figures 2 and 3 of the Final Interim Measures Design Plans (Geraghty & Miller, Inc. 1995). A comparison of the actual groundwater flow contours in the upper and lower aquifers to the predicted flow lines from the particle tracking analysis in the upper aquifer and the predicted zones of capture for DN-13 in the upper and lower aquifers indicates that the predicted influence within each aquifer at the southern end of the former Delphi Thermal Moraine site is being achieved by the corrective measures pumping.

Seasonal weather conditions vary throughout the year and this variation will have an impact on the groundwater elevations observed at the site (Table 8). The observed elevation differences in 2005 are a result of the above average precipitation in 2005 (as observed in 2004, also). Water-level elevations in TW-2 are regularly monitored to ensure the water level does not fall below the well screen. If the water level approaches the well screen, the pumping rate is reduced for protection of the pump. Due to higher groundwater elevation in 2005, pumping rate adjustments were not necessary as discussed previously in Section 3.1. The pumping rate for DN-13 was not adjusted; therefore, only seasonal variations influence water level elevations at DN-13. Effective capture has been maintained in spite of seasonal variations in both the upper and lower aquifers.

Figure 5 presents a graph of the influent concentration of total chlorinated VOCs and benzene, toluene, ethylbenzene, and xylene (BTEX) compounds in TW-2 since start up of the recovery and treatment system in January 1996. The data shows a steady decline in total chlorinated VOCs and a significant decrease in BTEX concentrations. The data

indicates that the remediation at the site is continuing to provide VOC mass reduction downgradient of RZ-3 West. In 2006, GM will look at possibly changing the TW-2 discharge permit so that this groundwater could be discharged without treatment or with modified treatment since the levels in TW-2 have dropped significantly.

4. Corrective Action Completion Strategy

4.1 Effectiveness of Corrective Measures Activities

4.1.1 Background and Objectives

The goal of the corrective measures at this Site is to reduce existing site-related groundwater concentrations to levels that are protective of reasonably expected future uses of groundwater. GM's approach for achieving this goal is being met through a combination of the corrective measures that achieve plume migration control, reduce existing plume concentrations, and monitor performance of these measures. Once on-site groundwater concentrations are reduced sufficiently by active corrective measures to ensure continued protection of reasonably expected groundwater uses, some or all of the active measures will be terminated. Groundwater monitoring as described in the Site-Wide Groundwater Monitoring Plan will continue to verify that groundwater conditions remain acceptable, and that ultimately, groundwater concentrations at the downgradient property boundary decline below appropriately protective levels (i.e., appropriate for the protection of the groundwater resource and its reasonably expected future uses). Data have been acquired during the implementation of the site-wide groundwater monitoring program to evaluate progress towards achieving this goal.

The need for continued operation of the remedial measures described in Section 2 will be determined based on achieving and maintaining the following conditions:

1. Upper aquifer: consistent with the criterion stated in the approved RCRA Corrective Action Environmental Indicator Determination – Migration of Contaminated Groundwater Under Control (CA 750), the condition to be met in the upper aquifer is no migration of VOCs at concentrations exceeding appropriately protective levels (i.e., appropriate for the protection of the groundwater resource and its reasonably expected future uses as characterized in the RFI) beyond the existing area of contaminated groundwater. Based on the groundwater conditions established during the September 1999 baseline sampling event, the existing well GM-26 will serve as the point of compliance (POC) monitoring point for ensuring that this condition is maintained.

2. Lower aquifer: consistent with the goal to maintain a usable aquifer, including off-site drinking water use, the condition to be met in the lower aquifer is no VOC concentrations exceeding appropriate protective levels (i.e., appropriate for the protection of the groundwater resource and its reasonably expected future uses as

characterized in the RFI) beyond the existing area of contaminated groundwater. Based on the groundwater conditions established during the September 1999 baseline sampling event, the existing wells GM-15, GM-11, and GM-20D will serve as the POC monitoring points for ensuring that this condition is maintained.

Once on-site groundwater concentrations are reduced sufficiently by active measures to be protective of reasonably expected future uses, some or all of these active measures will be terminated. Following termination of any active measures, GM will continue its groundwater monitoring program to confirm that the conditions in the upper and lower aquifer continue to be met without these active measures.

4.1.2 Methodology

In accordance with the Site-Wide Groundwater Monitoring Plan, groundwater data are compared to remediation target levels (RTLs) developed to ensure compliance with the above-stated conditions without active corrective measures. As defined in the Site-Wide Groundwater Monitoring Plan, these RTLs have been calculated using the groundwater assessment methods developed in the Baseline and Supplemental Baseline Risk Assessments (ENVIRON 2000a, b) taking into consideration the current pumping conditions at and in the vicinity of the facility. Specifically, the MODFLOW groundwater flow model (Geraghty & Miller, Inc. 1994) developed for Delphi Thermal Moraine and the surrounding region (including former Moraine Engine and Moraine Assembly) is used to support estimation of RTLs which are concentrations in on-site groundwater at locations downgradient of the Former Oil House Area that would not be expected to result in exceedances of the MCL at the designated monitoring points. Using this approach and considering the scope of the annual groundwater monitoring program, GM developed RTLs for the following remediation monitoring zones in both the upper and lower aquifer at and downgradient of the Former Oil House Area:

- Upper Aquifer
  - Former Oil House Area, Shallow: the Former Oil House Area source area (wells GM-23, GM-29 and GM-30),
  - Zone S1: the monitoring zone immediately downgradient of RZ-1 (well GM-28),
  - Zone S1 to Zone S2: the monitoring zone between RZ-1 and RZ-2 (wells GM-28, ME-6),

- Zone S2: the monitoring zone immediately downgradient of RZ-2 (wells ME-6, ME-3, GM-31),
- Zone S2 to Zone S3: the monitoring zone between RZ-2 and RZ-3 (wells ME-6, ME-3, GM-31, GM-22, GM-19S, EAST, GM-33, GM-35),
- Zone S3: the monitoring zone immediately downgradient of RZ-3 (wells GM-32, GM-21),
- Zone S3 to GM-10: the monitoring zone between RZ-3 and GM-10 (wells GM-32, GM-21, GM-8, GM-6, 4S, GM-2, GM-16, GM-18, WSU-24, and GM-10),
- GM-10: the monitoring zone downgradient of RZ-3 (well GM-10), and
- POC Shallow: monitoring at well GM-26.

- Lower Aquifer

  - Former Oil House Area, Deep: the Former Oil House Area source area (wells GM-23, GM-29, and GM-30),
  - Zone D1: the monitoring zone encompassing GM-19D,
  - Zone GM-40/41: the monitoring zone encompassing GM-40 and GM-41,
  - Zone GM-42: the monitoring zone encompassing GM-42,
  - Zone D2: the monitoring zone encompassing wells GM-1 and GM-3, and
  - POC Deep: monitoring at wells GM-11, GM-15 and GM-20D.

The following steps were conducted to assess the site-wide monitoring data for the purpose of determining the extent to which each remedial measure is contributing to achievement of the conditions outlined above for the upper and lower aquifers:

- Groundwater pumping conditions at the facility and surrounding area were reviewed to confirm that the basis for the RTLs remain valid. As discussed in Section 2, groundwater flow patterns remain the same as those evaluated during the 1999 baseline sampling. However, changes in on-site pumping was implemented during this monitoring period. Specifically, GM production wells 31 and 39 are no longer in continuous operation and pumping rates at the Moraine Assembly Plant wells 11B and 12A have changed; therefore, wells 31 and 39 were modeled as being "off" and wells 11B and 12A were modeled to reflect current operating conditions. In addition, ARCADIS contacted the Ohio Department of Natural Resources (ODNR) regarding the current operations of the nearby well

fields. Based on information provided, the pumping rates at the West Carrollton well field were also adjusted to better reflect current operations.

- Based on the updated information on current pumping conditions at and near the Facility, the groundwater model for the scenario used for the assessment of corrective measures performance (i.e., Scenario 1 – baseline conditions without interim measures pumping) was updated. The updated pumping conditions are summarized on Table F-1 in Appendix F. Table F-1 also provides the updated source reduction factors used to assess potential hypothetical concentrations at receptor wells that are attributable to the land-based units (i.e., North and South Settling Lagoons, and Landfills L1, L2 and L3). The updated groundwater modeling results were also used to revise the RTL values for each of the zones defined above. The RTLs, updated in 2005, are presented on Table F-4 in Appendix F.

- Mean constituent concentrations in each remediation monitoring zone were calculated based on data collected during the 2005 monitoring period. One-half sample quantitation limits were used for non-detect results.

- Minimum, mean and maximum constituent concentrations were compared against the RTLs developed for each remediation monitoring zone.

4.1.3 Results

The results for groundwater quality data collected in 2005 in each remediation monitoring zone wells are discussed in Section 2.2.3. A comparison of the minimum, mean and maximum concentrations for each parameter in each remediation monitoring zone to the RTLs is presented on Table 20. These results and relative change in these results in comparison with the 2004 monitoring period are discussed below and presented on Table 20. For reference, Table 20 also presents a comparison with the results from the 1999 baseline sampling event.

The comparison of the 2005 shallow zone monitoring data with the updated RTLs indicates the following:

AOI 7, Shallow (wells GM-23, GM-29 and GM-30):

- As compared to 2004, the maximum and average concentrations of cis-1,2-DCE and vinyl chloride have increased and remain above the updated RTLs.

- As compared to 2004, the maximum and average concentrations of PCE and TCE in the source area have decreased but remain above the updated RTLs.

Zone S1 (well GM-28):

- Consistent with 2004, all concentrations remain below the updated RTLs.

Zone S1 to S2 (wells GM-28, ME-6):

- Consistent with 2004, all concentrations remain below updated RTLs.

Zone S2 (wells ME-6, ME-3, GM-31):

- As compared to 2004, the concentration of TCE has increased and the maximum reported TCE concentration is now above the updated RTL.

Zone S2 to S3 (wells ME-6, ME-3, GM-31, GM-22, GM-19S, EAST, GM-33, GM-35):

- As compared to 2004, the maximum and average concentrations of PCE and TCE have increased slightly and remain above the updated RTLs.

- As compared to 2004, the maximum concentration of vinyl chloride has decreased but remains above the updated RTL.

Zone S3 (wells GM-32, GM-21):

- As compared to 2004, the maximum and average concentrations of TCE have decreased and are now below the updated RTL.

- As compared to 2004, the maximum concentration of vinyl chloride has increased and is now above the updated RTL.

Zone S3 to GM-10 (wells GM-32, GM-21, GM-8, GM-6, W-4-S, 4S, GM-2, GM-16, GM-18, WSU-24, and GM-10):

- As compared to 2004, the maximum concentrations of PCE and TCE have decreased, but remain above the updated RTLs.

- As compared to 2004, the average concentration of TCE has decreased, but remains above the updated RTL.

- As compared to 2004, the concentrations of vinyl chloride have increased and the maximum reported concentration is above the updated RTL.

GM-10:

- As compared to 2004, the detected concentration of TCE has decreased, but remains above the updated RTL.

POC Shallow (well GM-26):

- Consistent with 2004, all concentrations remain below the updated RTLs.

The comparison of the 2005 deep zone monitoring data with the updated RTLs indicates the following:

AOI 7, Deep (wells GM-23, GM-29, and GM-30):

- As compared to 2004, the maximum and average concentrations of cis-1,2-DCE have increased and are now above the updated RTL.

- As compared to 2004, the maximum and average concentrations of PCE and TCE have decreased but remain above the updated RTLs.

- As compared to 2004, the maximum and average concentrations of vinyl chloride have increased and remain above the updated RTL.

Zone GM-40/41:

- As compared to 2004, the maximum and average concentrations of TCE remain above the updated RTL.

GM-42:

- Consistent with 2004, all concentrations remain below the updated RTLs.

Zone D1 (well GM-19D):

- As compared to 2004, the detected concentration of vinyl chloride has decreased slightly but remains above the updated RTL.

Zone D2 (wells GM-1 and GM-3):

- As compared to 2004, the concentrations of TCE have not changed significantly and remain above the updated RTL.

POC Deep (wells GM-11, GM-15 and GM-20D):

- As compared to 2004, the concentrations of TCE have not changed significantly and remain above the updated RTL.

As indicated by the comparison of groundwater monitoring data with the updated RTLs presented on Table 20, concentrations at the upper aquifer POC well remain below updated RTLs. However, concentrations in the monitoring zone immediately upgradient of the upper aquifer POC, as well as concentrations at the lower aquifer POC wells are above the updated RTLs. Therefore, active corrective measures are still required to maintain the short-term objective in the upper aquifer, and to achieve the short-term corrective action objective in the lower aquifer.

Concentrations in the AOI 7 area remain above levels necessary to achieve the updated RTLs at the downgradient upper and lower aquifer POCs. However, concentrations downgradient of RZ-1 are below the RTLs, thus indicating that RZ-1 has been effective at remediating groundwater impacts from AOI 7 in the upper aquifer. Continued corrective measures are also required downgradient of RZ-1 (i.e., at RZ-3) to address residual impacts in the downgradient upper aquifer plume area.

4.2 Monitoring of Land-Based Waste Management Units

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). Although the RFI and Supplemental RFI determined that the wastes at these units do not contribute constituents to groundwater at levels that would have a significant effect on current and reasonably expected future groundwater uses, the monitoring program includes

monitoring wells that are used to confirm these findings. In addition, the Site-Wide Groundwater Monitoring Plan was developed to meet the objectives of Ohio EPA's 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.

In addition, in accordance with the Site-Wide Groundwater Monitoring Plan, the monitoring wells located immediately downgradient of the in-place waste management units are evaluated to determine whether these units are significantly affecting groundwater quality. Specifically, the potential health significance of constituents detected in monitoring wells immediately downgradient of these units to current and reasonably expected groundwater uses on-site and off-site are evaluated using the groundwater assessment methods developed in the Supplemental RFI Baseline Risk Assessment (ENVIRON 2000b). If this evaluation identifies detected concentrations that indicate one of these units may be having a potentially significant impact on downgradient groundwater quality, then a review of groundwater quality from monitoring wells upgradient and downgradient of the particular unit would be conducted to identify whether the unit is affecting groundwater quality. The monitoring wells identified in the Site-Wide Groundwater Monitoring Plan for monitoring each of the waste management units are:

- Closed North Settling Lagoon: HR-5, W-2-N, W-3-N, and W-4-N.
- Closed South Settling Lagoon: W-2-S, W-3-S, and W-4-S.
- Landfill L1: TW-2, GM-6, and 4S.

- Landfill L2: W-4-N and HR-2.
- Landfill L3: W-4-N, HR-2, and HR-4.

Consistent with the groundwater exposure evaluation conducted for the Supplemental Baseline Risk Assessment, groundwater concentrations reported for each set of downgradient monitoring wells are assumed to represent source concentrations associated with each unit. These source concentrations are combined with source reduction factors developed for the base case exposure scenario (i.e., current groundwater use conditions without corrective measures pumping) to estimate exposure concentrations at the points of groundwater use (e.g., downgradient municipal well fields and on-site industrial wells). For the current evaluation, the maximum concentrations detected during the 2005 sampling events in each set of monitoring wells are used as the source concentration and combined with the updated source reduction factors presented on Table F-1 (as described in Section 4.1.2). The estimated exposure concentrations are then compared with MCLs or risk-based equivalent drinking water levels (EDWLs).

4.2.3 Results

As proposed in the Site-Wide Groundwater Monitoring Plan, post-closure monitoring data collected from those wells assigned to the closed North and South Settling Lagoons were reviewed for temporal trends (see Section 2.2.3.1.2). Data considered in the evaluation included results from the October 2005 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 five data points for any monitoring well/constituent pair; the data plots for key constituents are provided on Figure F-1 for the North Settling Lagoon and Figure F-2 for the South Settling Lagoon. In general, the linear regression analysis for the NSL using the available data indicates either declining concentrations or little significant change over time; any positive slope to the regression lines appears to be a result of analytical variability. Similarly for the SSL, changes in concentrations in the wells immediately downgradient of this unit appear to correspond to changes in concentration in the upgradient well (HR-17). These concentration trend lines do not indicate that there is any significant increases in groundwater concentrations that would be attributable to the units.

Using the methodology developed in the RFI baseline risk assessment for assessing potential impacts to groundwater receptors from releases at the Moraine facilities, GM

determined that the data from the wells downgradient of the closed North and South Settling Lagoons do not indicate that these units are significantly affecting groundwater quality. The potential significance of concentrations detected during the 2005 sampling events in each set of downgradient monitoring wells for the lagoons and landfills were assessed. Based on the maximum concentrations detected during the 2005 sampling events at each of these units, exposure concentrations at water supply wells representing current pumping conditions were estimated. The estimated combined groundwater concentrations at each of the receptor wells are presented on Table 21 in comparison with MCLs or EDWLs. As shown on Table 21, the maximum concentrations detected downgradient of each of the land-based waste disposal units do not contribute significantly to concentrations at these points of potential exposure. Therefore, the data from the wells downgradient of the waste management units indicate that these units are not significantly affecting groundwater quality. Supporting calculations for this assessment are provided in Appendix F.

5. Conclusions and Recommendations

This summary report presents the groundwater monitoring activities completed in 2005 at the GM 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 waste management units, corrective measures, and on-going site-wide groundwater monitoring in the following sections.

5.1 Land-Based Waste Management Units

As proposed in the Site-Wide Groundwater Monitoring Plan (ARCADIS G&M, Inc. 2002), monitoring data collected immediately downgradient of the closed North and South Settling Lagoons, and Landfills L1, L2 and L3 were evaluated to determine if these units may be contributing constituents to groundwater at levels that would have a significant effect on current and reasonably expected future groundwater uses. Using the methodology developed in the RFI baseline risk assessment for assessing potential impacts to groundwater receptors from releases at the Moraine facilities, the potential significance of observed groundwater concentrations downgradient of these units was evaluated.

This evaluation determined that data from the wells downgradient of the in-place waste management units indicate that these units are not significantly affecting groundwater quality. Based on the results from the 2005 monitoring, no changes in the monitoring program for the waste management units are proposed.

5.2 Corrective Measures Performance

GM's approach for achieving its corrective action goals for the Moraine facilities is based on a combination of corrective 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 2005 monitoring, the upper aquifer conditions in the areas downgradient of the in-situ reactive zones have been converted to more reducing conditions through the

introduction of a carbon source, as evidenced by the changes in field and bioattenuation indicator parameters. Further, the VOC results indicate that the target compounds (PCE and TCE) have been effectively reduced to daughter products (cis-1,2-DCE and vinyl chloride) and ultimately to ethene and ethane.

Overall, the process of enhanced reductive dechlorination at this site has been successful in achieving the desired reduction of VOC concentrations. GM will evaluate if modifications to the IRZs are needed based on the supplemental groundwater investigation to be completed in 2006.

5.2.2 Hydraulic Control

Groundwater elevation monitoring indicates that the capture zone corrective measures continue to be effective at maintaining hydraulic control in both the upper and lower aquifers at the southern end of the former Delphi Thermal Moraine. Additionally, the observed flow conditions are consistent with the conditions predicted by the capture zone modeling performed in developing the corrective measures pumping plan, which confirms the continued utility of the previously developed groundwater flow model as a predictive tool.

Based on the effective performance of the pumping program during the 2005 monitoring and exceedences of RTLs at the Former Oil House Area and in Zones S2 to S3, S3 to GM-10, Zone GM-40/-41, Zone GM-19D, Zone D2, and POC monitoring points in the deep aquifer (GM-11, GM-15, GM-20D), no changes to the hydraulic control component of the ongoing corrective measures are proposed at this time.

GM's 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 GM Moraine facilities, as well as on-site and downgradient of the facilities. Data collected from upper and lower aquifer wells located upgradient of the facilities confirms that upgradient sources of VOCs, not related to GM operations, continue to exist 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. In addition, VOC concentrations at the off-site downgradient upper aquifer well GM-26 remained below MCLs. Concentrations of TCE remained above the MCL in downgradient lower aquifer wells GM-11, GM-15 and GM-20D, however, groundwater downgradient of these wells is contained by the lower aquifer capture zone well DN-13.

The decreasing concentrations in the wells downgradient of the site, compared to the RFI data, is likely attributable to the combined effects of corrective measures pumping at TW-2 which began in January 1996, pumping at DN-13, and on-going enhanced natural attenuation of the VOCs. However, concentrations in the monitoring zone immediately upgradient of the upper aquifer POC, as well as concentrations at the lower aquifer POC wells remain above the RTLs. Therefore, active corrective measures are still required to achieve the corrective action objectives.

Based on the evaluation of the site-wide groundwater quality, both the in-situ treatment and hydraulic control components of the corrective action program will be continued.

5.3 Reassessment of Site-Wide Groundwater Monitoring Program

In accordance with the Site-Wide Groundwater Monitoring Plan (ARCADIS G&M, Inc. 2002), groundwater monitoring was conducted in 2005 to evaluate groundwater quality upgradient and downgradient of the closed lagoons and landfills, performance of the in-situ reactive zones, and performance of the capture zones. Based on the data collected during the 2005 monitoring period, GM believes that the monitoring program has provided sufficient data for a comprehensive evaluation of these corrective action objectives. The site-wide groundwater monitoring program summary is presented in Table 22. To reassess the monitoring program in support of the final remedy, GM recommends the following:

- In 2006, GM will implement the Supplemental Groundwater Investigation Work Plan (BOW Environmental Solutions, Inc. 2005b and 2006) to collect data that will further refine the available information on groundwater flow and quality in the following study areas: upper aquifer monitoring well GM-16 located downgradient of the GM Moraine Facilities, and on the southeastern side of the Former Oil House Area. The data collected from this supplemental investigation is expected to be used to further evaluate and refine, if necessary, the current corrective measures.

- GM will continue to assess the need for additional monitoring wells in the lower aquifer in support of the final remedy and to ultimately terminate active measures.

- In 2006, GM will also review the groundwater flow patterns and groundwater pumping conditions using the previously developed groundwater flow model to confirm that the basis for the RTLs remain valid.

- In 2006, GM will look at possibly changing the TW-2 discharge permit so that this groundwater could be discharged without treatment or with modified treatment since the levels in TW-2 have dropped significantly.

6. References

ARCADIS, Inc., 2005. Draft Site-Wide Groundwater Monitoring Report for 2004, General Motors Corporation, Moraine, Ohio. March 2005.

ARCADIS, Inc., 2004. Draft Site-Wide Groundwater Monitoring Report for 2003, General Motors Corporation, Moraine, Ohio. February 2004.

ARCADIS, Inc., 2003. Draft Site-Wide Groundwater Monitoring Report for 2001/2002, General Motors Corporation, Moraine, Ohio. June 2003.

ARCADIS Geraghty & Miller, Inc., 2000a. Resource Conservation and Recovery Act Facility Investigation Report - Volume I (Methodologies and Results) Delphi Harrison Thermal Systems, General Motors Corporation, Moraine, Ohio. April 2000.

ARCADIS Geraghty & Miller, Inc., 2000b. Supplemental RFI - Volume I (Methodologies and Results) General Motors Powertrain Group Moraine Engine Plant and General Motors Truck Group Moraine Assembly Plant, Moraine, Ohio. April 2000.

ARCADIS Geraghty & Miller, Inc., 2001. Draft Interim Measures/Corrective Measures Report, General Motors Corporation, Moraine, Ohio. March 2001.

ARCADIS G&M, Inc., 2002. Draft Site-Wide Groundwater Monitoring Plan, General Motors Corporation, Moraine, Ohio. May 2002.

BOW Environmental Solutions, Inc., 2005a. Draft Revised Corrective Measures Proposal – Addendum, General Motors Corporation, Moraine, Ohio. June 30, 2005.

BOW Environmental Solutions, Inc., 2005b. Supplemental Groundwater Investigation Work Plan, General Motors Corporation, Moraine, Ohio. July 1, 2005.

BOW Environmental Solutions, Inc., 2006. Supplemental Groundwater Investigation, General Motors Corporation, Moraine, Ohio. January 23, 2006.

CH_2M Hill, Inc., 1986. Environmental Protection Program Plan Report for the City of Dayton, Ohio, August 1986.

Cox, C. A. and G. H. Colvin, 1996. Evaluation of Background Metal Concentrations in Ohio Soils, June 21, 1996.

Dragun, J. and A. Chiasson, 1991. Elements of North American Soils. Hazardous Materials Control Resources Institute. Greenbelt, MD. 1991.

ENVIRON Corporation, 2000a. RCRA Facility Investigation Final Report Volume II (Baseline Risk Assessment), Delphi Harrison Thermal Systems, General Motors Corporation, Moraine, Ohio. April 2000.

ENVIRON Corporation, 2000b. Supplemental Resource Conservation and Recovery Act Facility Investigation Report, Volume II Supplemental Baseline Risk Assessment, General Motors Powertrain Group Moraine Engine Plant and General Motors Truck Group Moraine Assembly Plant, Moraine, Ohio. April 2000.

Geraghty & Miller, Inc. 1991. Description of Current Conditions Task 1 of the RCRA Facility Investigation for Harrison Radiator Division – GMC, Moraine, Ohio. January 1991.

Geraghty & Miller, Inc. 1995. Final Interim Measures Design Plans, Harrison Division – GMC, Moraine, Ohio. April 1995.

Geraghty & Miller, Inc. 1996. Monthly Technical Progress Report, October 1996, RCRA Facility Investigation, Delphi Harrison Thermal Systems, General Motors Corporation, Moraine, Ohio. November 1996.

Geraghty & Miller, Inc., 1997a. Supplemental RFI Work Plan, General Motors Powertrain Group Moraine Engine Plant and General Motors Truck Group Moraine Assembly Plant, Moraine, Ohio. July 1997.

Geraghty & Miller, Inc., 1997b. Supplemental DOCC for General Motors Powertrain Group Moraine Engine Plant and General Motors Truck Group Moraine Assembly Plant, Moraine, Ohio. July 1997.

Personal Communication. 1996. Personal Communication between Mr. William Buller of the U.S. EPA and Mr. James Reid of Geraghty & Miller, Inc. November 1996.

Shacklett, H. T. and J. Boerngen, 1984. Element Concentrations in Soils and Other Surficial Materials of the Conterminous United States, 1984.

Walton, William C., 1985. Practical Aspects of Ground-Water Modeling – Second Edition, N.W.W.A., Dublin, Ohio.

Welch, A. H., D. B. Westjohn, D. R. Helsel, and R. B. Wanty, 2000. Arsenic in Ground Water of the United States: Occurrence and Geochemistry. Ground Water v. 38 no. 4, p. 589-604.

ARCADIS

Table 1. Site-Wide Groundwater Monitoring Events in 2005, General Motors Corporation, Moraine, Ohio.

April 2005 Site-Wide Groundwater Elevation

Groundwater elevations were measured on April 6 and 7, 2005.

October 2005 Site-Wide Annual Groundwater Sampling

Groundwater elevations were measured on October 12 and 13, 2005. Site-specific list of VOCs[1] and field parameters[2] were analyzed during these sampling events from the following upper aquifer monitoring wells. Biogeochemical parameters[3] were analyzed at wells denoted with an asterisk(*):

W-2-N	HR-11	GM-16	GM-22*	GM-33
W-3-N	HR-17	GM-17	GM-23*	GM-35
W-4-N	W-2-S	GM-18	GM-26	
HR-1	W-3-S	GM-19S*	GM-27	
HR-2	W-4-S	EAST*	GM-28*	
HR-3	GM-2	WSU-24	GM-29*	
HR-4	TW-2	ME-3*	GM-30*	
HR-5	GM-6*	ME-6*	GM-31*	
HR-8	GM-8*	4S	GM-32*	
HR-9	GM-10	GM-21*		

Site-specific list of VOCs[1] were analyzed during this sampling event from the following list of lower aquifer monitoring wells:

HR-10	GM-19D	GM-11	MT69	GM-42
HR-12	GM-3	GM-20D	GM-39	
HR-13	GM-1	DN-13	GM-40	
HR-15	GM-15	GM-9	GM-41	

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

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

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

Table 1. Site-Wide Groundwater Monitoring Events in 2005, General Motors Corporation, Moraine, Ohio.

DN-13 Monthly Groundwater Sampling

Appendix IX VOCs and cis-1,2-DCE were analyzed during these sampling events from DN-13.

Air Stripper Tower Influent and Effluent Monthly Groundwater Sampling

Benzene, chloroethane, 1,1-dichloroethane, cis-1,2-dichloroethene, trans-1,2-dichloroethene, ethylbenzene, tetrachloroethene, toluene, 1,1,1-trichloroethane, trichloroethene, vinyl chloride, and xylenes were analyzed during the influent sampling events from the air stripper tower by EPA Method 8260B. The stripping tower effluent sample was analyzed for oil and grease and the following list of VOCs: benzene, chloroethane, 1,1-dichloroethane, cis-1,2-dichloroethene, trans-1,2-dichloroethene, ethylbenzene, tetrachloroethene, toluene, 1,1,1-trichloroethane, trichloroethene, vinyl chloride, and xylenes. The effluent sample was analyzed by EPA Methods 8260B and 624 (drinking water standard).

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

g:\public\gmotors\annual groundwater\2005\annual report\tables\tab1 gw summary 2005.doc

ARCADIS

Table 2. Influent Monitoring of the Air Stripper Tower for 2005, General Motors Corporation, Moraine, Ohio.

Constituent	Units	1/5/05	2/16/05	3/1/05	4/1/05[3]	5/24/05	6/16/05	7/14/05	8/9/05	9/21/05	10/3/05	11/1/05	12/7/05
Oil & Grease[1]	mg/L	<5.0	<5.0	<5.0	NS	<5.0	0.91	<5.0	<5.0	2.0	<5.0	<5.0	<5.0
VOCs[2]													
Benzene	ug/L	1.3	1.3	1.7	NS	2.3	3.0	1.6	1.8	1.6	1.3	1.2	1.2
Chloroethane	ug/L	4.1	7.2	6.2	NS	15	14	13	14	13.0	9.5	7.2	8.1
1,1-Dichloroethane	ug/L	9.1	7.7	8.2	NS	5.3	6.5	6.3	7.1	8.2	9.2	9.9	12
cis-1,2-Dichloroethene	ug/L	10	26	18	NS	12	13	11	11	9.4	11.0	9.9	12
trans-1,2-Dichloroethene	ug/L	0.67	0.92	0.87	NS	0.81	1.3	0.79	0.83	0.91	0.92	0.91	0.67
Ethylbenzene	ug/L	<1.0	<1.0	1.3	NS	<2.5	0.58	0.71	0.81	1.3	2.2	2.9	2.8
Tetrachloroethene	ug/L	4.8	6.2	5.9	NS	2.5	3.8	2.7	2.6	3.4	3.9	5	5.1
Toluene	ug/L	<1.0	<1.0	<1.0	NS	<2.5	0.86	0.18	<1.0	<1.0	0.39	0.78	0.29
1,1,1-Trichloroethane	ug/L	<1.0	<1.0	<1.0	NS	<2.5	<1.0	<1.0	<1.0	<1.0	<1.0	1.1	0.3
Trichloroethene	ug/L	8.4	25	19	NS	6.8	9.4	7.4	6.9	7.2	9.8	11	11
Vinyl chloride	ug/L	2.1	11	5	NS	2	2.4	1.8	2	2.7	3.0	3.3	3.1
Xylenes	ug/L	<1.0	1.4	1.6	NS	<2.5	1.6	1.3	1.6	1.4	2.1	1.7	1.2
Total VOCs	ug/L	40.47	86.72	67.77	0.00	46.71	56.44	46.78	48.64	49.11	53.31	54.89	57.76

1 Analytical method for oil & grease is EPA 1664A.
2 Analytical method for VOC analysis is SW-846 Method 8260B.
3 Samples were not collected in April as the system was shut down.
All concentrations in micrograms per liter (ug/L) as reported by the laboratory.
-- Not analyzed.
NS Not Sampled

ARCADIS

Table 3. NPDES Permit Effluent Monitoring of the Air Stripper Tower for 2005, General Motors Corporation, Moraine, Ohio.

Constituent	Units	Permit Limit	1/5/05	2/16/05	3/1/05	4/1/05[4]	5/24/05	6/16/05	7/14/05	8/9/05	9/21/05	10/3/05	11/1/05	12/7/05[5]	12/20/05
Oil & Grease[1]	mg/L	10	<5.0	<5.0	<5.0	NS	0.95	0.59	0.76	<5.0	1.1	<5.0	2.1	<5.0	NA
pH[2]	S.U.	6.5 - 9.0 S.U.	8.01	7.46	6.68	NS	8.57	6.75	6.75	6.70	6.80	6.93	6.80	6.80	NA
VOCs[3]															
Benzene	ug/L	10	<1.0	<1.0	<1.0	NS	<1.0	0.84	<1.0	<1.0	<1.0	<1.0	<1.0	1.2	<1.0
Chloroethane	ug/L	10	<1.0	<1.0	<1.0	NS	<1.0	0.64	1.5	0.89	<1.0	<1.0	<1.0	8.5	<1.0
1,1-Dichloroethane	ug/L	10	<1.0	<1.0	<1.0	NS	<1.0	0.52	0.85	0.70	0.34	0.27	0.44	12	0.33
cis-1,2-Dichloroethene	ug/L	10	0.6	3.8	1.6	NS	1.4	1.30	1.70	1.30	0.42	0.38	0.56	12	0.54
trans-1,2-Dichloroethene	ug/L	10	<0.5	<0.5	<0.5	NS	<0.5	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	0.59	<1.0
Ethylbenzene	ug/L	10	<1.0	<1.0	<1.0	NS	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	2.7	<1.0
Tetrachloroethene	ug/L	10	<1.0	<1.0	<1.0	NS	<1.0	0.20	0.2	0.19	<1.0	<1.0	<1.0	4.9	<1.0
Toluene	ug/L	10	<1.0	<1.0	<1.0	NS	<1.0	0.75	<1.0	<1.0	<1.0	<1.0	0.18	0.3	<1.0
1,1,1-Trichloroethane	ug/L	10	<1.0	<1.0	<1.0	NS	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	0.28	<1.0
Trichloroethene	ug/L	10	<1.0	2.3	1.0	NS	0.72	0.57	0.78	0.56	<1.0	<1.0	0.43	11	0.31
Vinyl Chloride	ug/L	10	<1.0	<1.0	<1.0	NS	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	3.2	<1.0
Xylenes	ug/L	10	<1.0	<1.0	<1.0	NS	<1.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	1.3	<2.0

mg/L Milligrams per Liter.
S.U. Standard Units.
ug/L Micrograms per Liter.
1 Analytical method for oil & grease is EPA 1664A.
2 Analytical method for pH is EPA 150.1.
3 Analytical method for volatile organic compounds (VOCs) is SW-846 Method 8260B.
4 Samples were not collected in April as the system was shut down.
5 It is suspected that the analytical results presented for the effluent were actually for the influent sample and the sample bottles were switched.
NS Not Sampled

ARCADIS

Table 4. DN-13 Monthly Monitoring for 2005, General Motors Corporation, Moraine, Ohio.

Volatile Organic Compound[1]	Units	1/5/05	2/16/05	3/1/05	4/17/05	5/11/05	6/16/05	7/14/05	8/9/05	9/19/05	10/3/05	11/1/05	12/7/05[2]
Acetone	ug/L	<10	<10	<10	<10	<10	<10	0.85	<10	<10	<10	2.6	<10
Acetonitrile	ug/L	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20
Acrolein	ug/L	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20
Acrylonitrile	ug/L	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20
Allyl chloride	ug/L	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Benzene	ug/L	<1.0	<1.0	<1.0	<1.0	<1.0	0.63	<1.0	<1.0	<1.0	<1.0	<1.0	1.1
Bromodichloromethane	ug/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Bromoform	ug/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Bromomethane	ug/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
2-Butanone	ug/L	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
Carbon disulfide	ug/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Carbon tetrachloride	ug/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Chlorobenzene	ug/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	0.62
Chloroethane	ug/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	8.2
Chloroform	ug/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Chloromethane	ug/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Chloroprene	ug/L	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Dibromochloromethane	ug/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Dibromomethane	ug/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Dichlorodifluoromethane	ug/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
1,2-Dibromo-3-chloropropane	ug/L	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
1,2-Dibromoethane (EDB)	ug/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
trans-1,4-Dichloro-2-butene	ug/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
1,1-Dichloroethane	ug/L	2.2	2.2	1.7	1.8	2.2	1.8	1.8	1.8	1.8	1.9	2.0	12
1,2-Dichloroethane	ug/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
1,1-Dichloroethene	ug/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
cis-1,2-Dichloroethene	ug/L	7.3	6.90	5.80	6.0	6.90	6.6	5.80	6.0	6.20	6.30	7.0	12
trans-1,2-Dichloroethene	ug/L	<0.5	<0.5	0.50	0.45	0.45	0.49	0.37	0.39	0.38	0.39	0.46	0.63
1,2-Dichloropropane	ug/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
cis-1,3-Dichloropropene	ug/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0

ARCADIS

Table 4. DN-13 Monthly Monitoring for 2005, General Motors Corporation, Moraine, Ohio.

Volatile Organic Compound[1]	Units	1/5/05	2/16/05	3/1/05	4/17/05	5/11/05	6/16/05	7/14/05	8/9/05	9/19/05	10/3/05	11/1/05	12/7/05[2]
trans-1,3-Dichloropropene	ug/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
1,4-Dioxane	ug/L	<200	<200	<200	<200	<200	<200	<200	<200	<200	17	<200	<200
Ethyl methacrylate	ug/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Ethylbenzene	ug/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	2.7
2-Hexanone	ug/L	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
Iodomethane	ug/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Isobutyl alcohol	ug/L	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50
Methacrylonitrile	ug/L	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Methylene chloride	ug/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
4-Methyl-2-pentanone	ug/L	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
Methyl methacrylate	ug/L	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Propionitrile	ug/L	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0
Styrene	ug/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
1,1,1,2-Tetrachloroethane	ug/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
1,1,2,2-Tetrachloroethane	ug/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Tetrachloroethene	ug/L	<1.0	<1.0	<1.0	0.37	0.36	0.35	0.39	0.32	0.39	0.42	0.42	4.90
Toluene	ug/L	<1.0	<1.0	<1.0	<1.0	<1.0	0.71	<1.0	<1.0	<1.0	<1.0	<1.0	0.32
1,1,1-Trichloroethane	ug/L	<1.0	<1.0	<1.0	0.72	0.94	0.75	0.77	0.6	0.71	0.84	0.75	0.32
1,1,2-Trichloroethane	ug/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Trichloroethene	ug/L	6.3	6.6	6.6	5.8	6.9	6.6	5.9	5.9	5.9	6.4	6.6	11.0
Trichlorofluoromethane	ug/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
1,2,3-Trichloropropane	ug/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Vinyl acetate	ug/L	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Vinyl chloride	ug/L	2.0	1.9	1.6	1.6	1.9	2.1	1.7	2.1	2.0	2.0	2.2	3.3
Xylenes (total)	ug/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	1.3
Total VOCs	**ug/L**	**17.80**	**17.60**	**16.20**	**16.74**	**19.65**	**20.03**	**17.58**	**17.11**	**17.38**	**35.25**	**22.03**	**58.39**

1 Analytical method for VOC analysis is SW-846 Method 8260B.
2 It is suspected that the analytical results presented for DN-13 were actually for the influent sample and the sample bottles were switched.
All concentrations in micrograms per liter (ug/L) as reported by the laboratory.
< - Value below laboratory reporting limits.

ARCADIS

Table 5. Monitoring Well Construction Details, General Motors Corporation, Moraine, Ohio.

Well ID #	Surface Elevation ft msl	TOC Elevation ft msl	Well Diameter Inches	Screened Interval ft bls	Total Well Depth ft bls	Northing y	Easting x
Upper Aquifer Wells							
W-1-N	737.61	739.02	4	35-70	70	6618	5037
W-2-N	729.68	731.68	4	35-60	60	5264	4744
W-3-N	731.98	733.66	4	32-57	57	5157	5032
W-4-N	729.88	731.63	4	40-65	65	5157	5224
HR-1	730.10	732.71	2	47-57	57	3420	5205
HR-2	732.62	734.75	2	47-57	57	5209	5455
HR-3	734.31	736.75	2	50-60	60	5211	5648
HR-4	740.61	742.60	2	55-65	65	6111	5214
HR-5	730.95	734.27	2	44-54	54	4760	4985
HR-6	730.18	732.66	2	43-53	53	4009	4985
HR-7	731.00	731.73	2	47-57	57	4743	4678
HR-8	740.84	743.42	2	54-64	64	6819	5626
HR-9	741.00	743.51	2	58-68	68	7669	5508
HR-11	740.90	743.33	2	60-70	70	7313	6207
HR-16	724.60	727.01	4	42-62	62	2354	4198
HR-17	725.40	726.43	4	27-47	47	2457	4776
W-1-S	728.23	729.29	4	25-60	60	2777	4958
W-2-S	725.01	726.64	4	30-65	65	1786	4207
W-3-S	731.47	733.45	4	36-76	76	1678	4386
W-4-S	726.66	727.68	4	30-70	70	1671	4783
GM-2	NM	735.81	2	45-55	55	1102	5803
4S	NM	731.36	4	30-65	65	1071	5564
GM-6	NM	730.27	2	35-45	45	1042	5306
GM-8	735.17	735.35	2	40-50	50	1283	5285
GM-10	NM	723.90	2	40-50	50	162	5258
GM-16	NM	725.30	2	48-58	58	652	4566
GM-17	NM	723.84	2	40-50	50	672	5174
GM-18	NM	723.80	2	45-55	55	583	4993
GM-19S	NM	730.85	2	47-57	57	1767	5274
EAST	NM	730.98	2	NA	71	2120	5818
WEST	NM	731.08	2	NA	52	2004	5463
WSU-24	725.10	724.82	2	NA	66	574	5663

Table 5. Monitoring Well Construction Details, General Motors Corporation, Moraine, Ohio.

Well ID #	Surface Elevation ft msl	TOC Elevation ft msl	Well Diameter Inches	Screened Interval ft bls	Total Well Depth ft bls	Northing y	Easting x
Upper Aquifer Wells							
WS-17	NM	726.18	2	NA	66	970	5279
WS-18	NM	733.52	2	NA	61	1004	5458
WS-19	NM	726.62	2	NA	62	1182	5212
TW-2	NM	733.38	10	35-45	45	1027	5337
RW-10	729.29	728.53	4	22-32	32	2147	5751
RW-11	730.02	729.74	4	22-32	32	2121	5773
GM-21	723.79	723.50	2	45-55	55	1449	6079
GM-22	731.84	731.63	2	44-54	54	2531	6285
GM-23	NM	731.00	2	24-34	34	5393	6018
GM-24	747.61	747.29	2	58-68	68	8122	7812
GM-25	747.05	746.17	2	48-58	58	4930	8170
GM-26	722.29	722.29	2	50-60	60	-988	4961
GM-27	731.03	730.57	2	40-50	50	5393	6029
GM-28	NM	738.02	2	22-32	32	5041	5916
GM-29	731.31	730.78	2	28-38	38	5209	5974
GM-30[1]	NM	734.73	2	30-40	40	5559	5970
GM-31[1]	NM	735.23	2	58-68	68	2939	5913
GM-32	732.47	732.08	2	51-61	61	3486	6070
GM-33	730.30	729.77	2	48-58	58	2278	5762
GM-34	731.06	730.56	2	26-36	36	2278	5770
GM-35	731.56	731.27	2	57-67	67	1750	5510
GM-36	731.44	731.11	2	25-35	35	1755	5551
GM-37	730.36	730.05	2	46-56	56	1857	5696
GM-38	730.31	729.88	2	24-34	34	1858	5686
GM-43	NM	729.00	2	40-50	50	3655	5211
GM-44	NM	728.77	2	51-61	61	3137	5217
GM-45	NM	729.75	2	50-60	60	2853	5217
ME-2[1]	732.38	732.08	2	27-37	37	2945	5973
ME-3[1]	NM	732.59	2	29-39	39	2897	5938
ME-4[1]	NM	732.74	2	26-36	36	2925	5913
ME-6[1]	NM	735.91	2	29-39	39	3325	5927

Table 5. Monitoring Well Construction Details, General Motors Corporation, Moraine, Ohio.

Well ID #	Surface Elevation ft msl	TOC Elevation ft msl	Well Diameter Inches	Screened Interval ft bls	Total Well Depth ft bls	Northing y	Easting x
Deep Aquifer Wells							
GM-1	NM	735.74	2	90-100	100	1087	5803
GM-3	NM	730.44	2	90-100	100	1023	5309
GM-4	NM	731.46	2	140-150	150	1010	5322
GM-5	NM	731.29	2	90-100	100	1037	5512
GM-7R	NM	735.61	2	80-90	91	1247	5295
GM-9	NM	724.07	2	90-100	100	146	5247
GM-11	NM	723.71	2	90-100	100	679	5164
GM-13	NM	723.82	2	90-100	100	566	4990
GM-14	NM	723.5	2	140-150	150	611	5030
GM-15	NM	725.23	2	90-100	100	664	4581
GM-19D	NM	730.25	4	145-150	150	1775	5298
GM-20D	NM	727.26	4	87-92	92	619	5699
GM-39	731.15	730.95	2	106-116	116	5396	6006
GM-40	727.28	727.04	2	140-150	150	3089	4984
GM-41	731.22	733.65	2	104-114	114	3430	6684
GM-42	729.48	729.16	2	140-150	150	2338	5651
HR-10	740.9	742.81	4	115-125	125	7686	5492
HR-12	741	742.64	4	120-130	130	7333	6194
HR-13	733.2	735.03	4	75-85	85	5221	5665
HR-14	729.9	731.63	4	78-88	88	5178	5209
HR-15	732.1	733.74	4	88-98	98	5161	5020
M73C	NM	716.55	NA	NA	NA	180	4539
MT68	743.68	746.45	5	NA	135	2163	8847
MT69	719.84	722.71	8	NA	158	-988	5020
MT576M	750	751.46	5	NA	114	4804	9620
MT596M*	759.18	757.73	5	NA	89	6438	10644
DN-13	NM	NM	NA	NA	NA	NM	NM

TOC - Top of Casing.
ft bls - Feet Below Land Surface.
ft msl - Feet Above Mean Sea Level.
NA - Not Available.
NM - Not Measured.
(1) - Depth of screened interval and total well depth have been modified from the well log due to site construction.
* Measuring point is top of cement housing.

Table 6. Water-Level Measurements Collected During April 2005, General Motors Corporation, Moraine, Ohio.

Well	Measuring Point Elevation	Depth-to-Water (feet)	Water-Level Elevation
Shallow Aquifer Wells			
W-1-N	739.02	28.93	710.09
W-2-N	731.68	21.96	709.72
W-3-N	733.66	24.02	709.64
W-4-N	731.63	21.94	709.69
HR-1	732.71	23.97	708.74
HR-2	734.75	25.01	709.74
HR-3	736.75	27.02	709.73
HR-4	742.60	32.53	710.07
HR-5	734.27	24.86	709.41
HR-6	732.66	23.68	708.98
HR-7	731.73	22.27	709.46
HR-8	743.42	33.12	710.3
HR-9	743.51	32.92	710.59
HR-11	743.33	32.61	710.72
HR-16	727.01	18.66	708.35
HR-17	726.43	17.89	708.54
W-1-S	729.29	20.66	708.63
W-2-S	726.64	18.79	707.85
W-3-S	733.42	21.28	712.14
W-4-S	727.68	19.76	707.92
GM-2	735.31	27.74	708.07
4S	731.36	23.53	707.83
GM-6	730.27	22.60	707.67
GM-8	735.17	27.46	707.71
GM-10	723.90	16.58	707.32
GM-16	725.30	17.90	707.4
GM-17	723.84	16.30	707.54
GM-18	723.80	16.36	707.44
GM-19S	730.85	22.59	708.26
EAST	730.98	22.41	708.57
WEST	731.08	22.49	708.59
WSU-24	724.82	17.02	707.8
WS-17	726.18	18.50	707.68
WS-18	733.52	25.73	707.79
WS-19	726.62	18.97	707.65
TW-2	733.38	25.70	707.68
RW-10	728.53	NM	NM
RW-11	729.74	NM	NM
GM-21	723.50	16.71	706.79
GM-22	731.63	22.86	708.77
GM-23	731.07	22.60	708.47
GM-24	747.29	35.96	711.33
GM-25	746.17	36.12	710.05
GM-26	722.29	15.58	706.71
GM-27	730.57	20.71	709.86

Table 6. Water-Level Measurements Collected During April 2005, General Motors Corporation, Moraine, Ohio.

Well	Measuring Point Elevation	Depth-to-Water (feet)	Water-Level Elevation
GM-28	736.46	26.72	709.74
GM-29	731.37	21.47	709.9
GM-30	734.79	24.76	710.03
GM-31	735.23	22.33	712.9
GM-32	732.08	24.20	707.88
GM-33	729.77	21.15	708.62
GM-34	730.56	21.85	708.71
GM-35	731.27	23.08	708.19
GM-36	731.11	22.83	708.28
GM-37	730.05	21.50	708.55
GM-38	729.88	21.65	708.23
GM-43	729.00	NM	NM
GM-44	728.77	20.09	708.68
GM-45	729.75	20.44	709.31
ME-2	732.08	NM	NM
ME-3	732.59	22.91	709.68
ME-4	732.74	23.51	709.23
ME-6	735.91	23.95	711.96
Deep Aquifer Wells			
GM-1	735.74	27.92	707.82
GM-3	730.44	23.01	707.43
GM-4	731.46	24.02	707.44
GM-5	731.29	23.72	707.57
GM-7R	735.61	27.75	707.86
GM-9	724.07	16.95	707.12
GM-11	723.71	16.57	707.14
GM-13	723.82	16.97	706.85
GM-14	723.50	16.74	706.76
GM-15	725.23	18.59	706.64
GM-19D	730.25	22.42	707.83
GM-20D	727.26	19.28	707.98
GM-39	730.95	21.17	709.78
GM-40	727.04	18.78	708.26
GM-41	733.65	24.65	709
GM-42	729.16	21.04	708.12
HR-10	742.81	32.18	710.63
HR-12	742.64	31.91	710.73
HR-13	735.03	25.31	709.72
HR-14	731.63	22.05	709.58
HR-15	733.74	24.26	709.48
M73C	716.55	9.83	706.72
MT69	722.71	16.15	706.56
MT576M	751.46	40.51	710.95
MT596M*	757.73	66.20	691.53

Table 6. Water-Level Measurements Collected During April 2005, General Motors Corporation, Moraine, Ohio.

Well	Measuring Point Elevation	Depth-to-Water (feet)	Water-Level Elevation
Production and Fire Wells			
11B	NS	NM	On
12A	742.35	NM	Off
31	734.05	NM	Off
32	732.10	23.74	708.36
37	731.24	NM	NM
39	732.07	NM	Off
42	731.62	NM	NM
44	734.62	NM	NM
45	731.03	23.23	707.8
46	733.34	25.44	707.9
A	739.00	NM	NM
FW-1A	739.89	29.9	709.99
FW-2	737.48	27.62	709.86
FW-3	739.26	29.63	709.63
FW-4	731.62	22.94	708.68

Measuring point is to top of the PVC Casing.
Water-level elevations are reported in feet above mean sea level (msl).
Depth-to-water elevations were measured on April 6-7, 2005 using an electronic water level indicator.
Depth-to-water measurements are reported in feet below the measuring point.
NS - Not Surveyed.
NM - Not measured.
*Measuring point is top of cement housing.

Table 7. Water-Level Measurements Collected During October 2005, General Motors Corporation, Moraine, Ohio.

Well	Measuring Point Elevation	Depth-to-Water (feet)	Water-Level Elevation
Shallow Aquifer Wells			
W-1-N	739.02	31.24	707.78
W-2-N	731.68	24.35	707.33
W-3-N	733.66	26.41	707.25
W-4-N	731.63	24.31	707.32
HR-1	732.71	26.62	706.09
HR-2	734.75	27.45	707.3
HR-3	736.75	29.46	707.29
HR-4	742.60	34.81	707.79
HR-5	734.27	27.30	706.97
HR-6	732.66	26.21	706.45
HR-7	731.73	24.74	706.99
HR-8	743.42	35.44	707.98
HR-9	743.51	35.18	708.33
HR-11	743.33	34.91	708.42
HR-16	727.01	21.30	705.71
HR-17	726.43	20.58	705.85
W-1-S	729.29	23.31	705.98
W-2-S	726.64	21.54	705.1
W-3-S	733.42	24.03	709.39
W-4-S	727.68	22.52	705.16
GM-2	735.81	30.67	705.14
4S	731.36	26.51	704.85
GM-6	730.27	25.71	704.56
GM-8	735.17	33.90	701.27
GM-10	723.90	19.54	704.36
GM-16	725.30	27.50	697.8
GM-17	723.84	19.21	704.63
GM-18	723.80	19.26	704.54
GM-19S	730.85	25.41	705.44
EAST	730.98	25.12	705.86
WEST	731.08	25.34	705.74
WSU-24	724.82	20.00	704.82
WS-17	726.18	21.50	704.68
WS-18	733.52	28.71	704.81
WS-19	726.62	21.85	704.77
TW-2	733.38	33.30	700.08
RW-10	728.53	ABD	NA
RW-11	729.74	ABD	NA
GM-21	723.50	19.56	703.94
GM-22	731.63	25.60	706.03
GM-23	731.07	24.02	707.05
GM-24	747.29	38.26	709.03
GM-25	746.17	38.66	707.51
GM-26	722.29	18.49	703.80
GM-27	730.57	23.10	707.47

Table 7. Water-Level Measurements Collected During October 2005, General Motors Corporation, Moraine, Ohio.

Well	Measuring Point Elevation	Depth-to-Water (feet)	Water-Level Elevation
GM-28	736.46	29.22	707.24
GM-29	731.37	24.09	707.28
GM-30	734.79	27.19	707.60
GM-31	735.23	26.07	709.16
GM-32	732.08	26.45	705.63
GM-33	729.77	23.87	705.90
GM-34	730.56	24.65	705.91
GM-35	731.27	25.86	705.41
GM-36	731.11	25.61	705.50
GM-37	730.05	24.27	705.78
GM-38	729.88	24.41	705.47
GM-43	729.00	NM	NM
GM-44	728.77	22.71	706.06
GM-45	729.75	23.06	706.69
ME-2	732.08	25.87	706.21
ME-3	732.59	25.66	706.93
ME-4	732.74	26.24	706.50
ME-6	735.91	26.68	709.23
Deep Aquifer Wells			
GM-1	735.74	37.20	698.54
GM-3	730.44	25.80	704.64
GM-4	731.46	26.80	704.66
GM-5	731.29	26.51	704.78
GM-7R	735.61	35.20	700.41
GM-9	724.07	19.80	704.27
GM-11	723.71	19.31	704.40
GM-13	723.82	19.74	704.08
GM-14	723.50	19.45	704.05
GM-15	725.23	21.29	703.94
GM-19D	730.25	25.15	705.10
GM-20D	727.26	22.12	705.14
GM-39	730.95	23.52	707.43
GM-40	727.04	21.32	705.72
GM-41	733.65	27.23	706.42
GM-42	729.16	23.94	705.22
HR-10	742.81	34.49	708.32
HR-12	742.64	34.25	708.39
HR-13	735.03	27.72	707.31
HR-14	731.63	24.45	707.18
HR-15	733.74	26.64	707.10
M73C	716.55	12.60	703.95
MT69	722.71	19.10	703.61
MT576M	751.46	43.01	708.45
MT596M*	757.73	48.11	709.62

Table 7. Water-Level Measurements Collected During October 2005, General Motors Corporation, Moraine, Ohio.

Well	Measuring Point Elevation	Depth-to-Water (feet)	Water-Level Elevation
Production and Fire Wells			
11B	NS	NM	On
12A	742.35	NM	On
31	734.05	26.51	707.54
32	732.10	ABD	NA
37	731.24	ABD	NA
39	732.07	NM	Off
42	731.62	ABD	NA
44	734.62	NM	NM
45	731.03	ABD	NA
46	733.34	ABD	NA
A	739.00	NM	NM
FW-1A	739.89	32.45	707.44
FW-2	737.48	31.32	706.16
FW-3	739.26	32.27	706.99
FW-4	731.62	25.72	705.9

Measuring point is to top of the PVC Casing.
Water-level elevations are reported in feet above mean sea level (msl).
Depth-to-water elevations were measured on October 12-13, 2005 using an electronic water level indicator.
Depth-to-water measurements are reported in feet below the measuring point.
NS - Not Surveyed.
NM - Not measured.
*Measuring point is top of cement housing.
ABD - Well was abandoned.
NA - Not applicable.

Table 8. Summary of Precipitation Measurements Recorded by the National Weather Service, During 2005 - Dayton, Ohio.

Date	Actual Precipitation	Average Precipitation	Departure from Average
January	9.22	6.62	6.62 above average
February	1.63	2.29	0.66 below average
March	2.31	3.29	0.98 below average
April	3.97	4.03	0.06 below average
May	2.31	4.17	1.86 below average
June	3.49	4.21	0.72 below average
July	1.95	3.75	1.80 below average
August	4.40	3.49	0.91 above average
September	7.37	2.65	4.72 above average
October	3.11	2.72	0.39 above average
November	3.64	3.30	0.34 above average
December	1.88	3.08	1.20 below average
2005 Total	**45.28**	**39.58**	**5.70 above average**

All precipitation measurements are reported in inches.
Information obtained from the NOAA Website (www.erh.noaa.gov on 01/26/06)

Table 9. Vertical Gradients For Shallow/Deep Well Pairs During 2005, General Motors Corporation, Moraine, Ohio.

Shallow/Deep Wells	Vertical Gradient in April 2005 [1]		Vertical Gradient in October 2005 [2]	
	Direction	Difference (feet)	Direction	Difference (feet)
Ugradient				
HR-9/HR-10	U	0.04	D	-0.01
HR-11/HR-12	U	0.01	D	-0.03
On-Site				
W-3-N/HR-15	D	-0.16	D	-0.15
W-4-N/HR-14	D	-0.11	D	-0.14
HR-3/HR-13	D	-0.01	U	0.02
GM-8/GM-7R	U	0.15	D	-0.86
GM-16/GM-15	D	-0.76	D	-0.52[3]
GM-2/GM-1	D	-0.25	D	-0.09[3]
GM-18/GM-13	D	-0.59	D	-0.46
GM-17/GM-11	D	-0.40	D	-0.23
GM-6/GM-3	D	-0.24	U	0.08
4S/GM-5	D	-0.26	D	-0.07
Former Oil House Area				
GM-23/GM-27	U	1.39	U	0.42
GM-23/GM-39	U	1.31	U	0.38
Downgradient				
GM-10/GM-9	D	-0.20	D	-0.09
GM-26/MT-69	D	-0.15	D	-0.19

D - Downward gradient (-).

U - Upward gradient (+).

[1] - Water-level measurements collected on April 6-7, 2005.

[2] - Water-level measurements collected on October 12-13, 2005.

[3] - Due to water-level measurement errors on October 12-13, 2005, these wells were remeasured on November 28, 2005. Gradients presented are from the November 28, 2005 gauging.

ARCADIS

Table 10. Summary of Groundwater Analytical Results from Reactive Zone 1 Wells, General Motors Corporation, Moraine, Ohio.

RZ-1		Upgradient Well 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**
Volatile Organic Compounds															
Benzene	ug/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0UJ	<50	<50	<50	<40	< 50	<33	< 50 U	< 50 U
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
1,1-Dichloroethene	ug/L	1.3	1.1	1.6	3.1	3.5	3.0J	<50	<50	<50	<40	< 50	<33	< 50 U	< 50 U
cis-1,2-Dichloroethene	ug/L	320	223	1,190J	2,871	2,170	2050J	1,800	1,800	1600	1300	950	1200	1200	1600
trans-1,2-Dichloroethene	ug/L	11.1	9.1	8.9	14.4	20.4	25.6J	26	24J	21	21	< 25	20	21 J	27 J
Ethylbenzene	ug/L	<1.0	1.4	<1.0	<1.0	<1.0	<1.0UJ	21J	<50	<50	<40	< 50	<33	< 50 U	< 50 U
Tetrachloroethene	ug/L	<20	38.7	24.6	20.0	24.4	24.8J	17J	22J	22	18J	47J	18J	20 J	15 J
Toluene	ug/L	<1.0	<1.0	<1.0	2.2	<1.0	<1.0UJ	<50	<50	<50	<40	< 50	<33	< 50 U	< 50 U
1,1,1-Trichloroethane	ug/L	37.8	36.0	32.5	24.5	27.0	23.8J	<50	19J	17	16J	< 50	18J	21 J	19 J
Trichloroethene	ug/L	878	758	649J	289	354	437J	270	320	380	310	280	390	440	390
Vinyl chloride	ug/L	3.8	1.0	1.7	788	362	276J	230	280	140	140	99	150	230	490
Xylenes	ug/L	<1.0	6.0	<1.0	<1.0	<1.0	<1.0UJ	52	<50	<50	<40	< 50	<33	< 50 U	< 100 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**

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.
Samples collected in September and October 1999 represent baseline conditions.
Carbon source introductions began in December 1999.

Table 10. Summary of Groundwater Analytical Results from Reactive Zone 1 Wells, General Motors Corporation, Moraine, Ohio.

RZ-1		Downgradient Well GM-28														
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**	**9/14/04**	**10/18/05**
Volatile Organic Compounds																
Benzene	ug/L	<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
1,1-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
1,1-Dichloroethene	ug/L	<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
cis-1,2-Dichloroethene	ug/L	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
trans-1,2-Dichloroethene	ug/L	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
Ethylbenzene	ug/L	<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
Tetrachloroethene	ug/L	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
Toluene	ug/L	<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
1,1,1-Trichloroethane	ug/L	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
Trichloroethene	ug/L	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
Vinyl chloride	ug/L	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
Xylenes	ug/L	<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
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**

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.
Samples collected in September and October 1999 represent baseline conditions.
Carbon source introductions began in December 1999.

ARCADIS

Table 11. Summary of Groundwater Analytical Results from Reactive Zone 2 Wells, General Motors Corporation, Moraine, Ohio.

RZ-2		Introduction Well ME-6													Introduction Well ME-1		
Constituents	**Units**	**8/31/99**	**2/22/00**	**5/25/00**	**9/21/00**	**03/20/01**	**6/26/01**	**11/15/01**	**12/12/01**	**9/25/02**	**5/22/03**	**10/1/03**	**9/15/04**	**10/18/05**	**8/31/99**	**2/22/00**	**5/25/00**
Volatile Organic Compounds																	
Benzene	ug/L	<1.0	<10	<5.0	<1.0	<1.0	<1.0	<2.0	<3.3	<10	< 1	0.46J	< 1 U	< 1.0 U	<1.0	<10	<5.0
1,1-Dichloroethane	ug/L	<1.0	<10	1.4J	<1.0	1.6	1.8	2.7	4.8	<10	1.7	7.2	6.3	7.0	2.4	<10	<5.0
1,1-Dichloroethene	ug/L	<1.0	<10	<5.0	<1.0	<1.0	<1.0	<2.0	<3.3	<10	< 1	<2.0	0.26 J	< 1.0 U	<1.0	<10	<5.0
cis-1,2-Dichloroethene	ug/L	255	541	712	98.8	171	67.0	65	86	5.2	3.3	20	14	13	38.2	459	537
trans-1,2-Dichloroethene	ug/L	<1.0	<10	6.1	2.5	4.3	1.8	1.8	2.0	<5	< 0.5	<1.0	0.56	0.93 J	1.5	<10	4.2J
Ethylbenzene	ug/L	<1.0	<10	<5.0	<1.0	<1.0	<1.0	<2.0	<3.3	<10	< 1	0.54J	< 1 U	< 1.0 U	<1.0	<10	1.5J
Tetrachloroethene	ug/L	213	18.3	16.2	6.7	34.0	<1.0	8.2	6.1	<10	< 1	12	5.3	9.8	83.6	<10	1.8J
Toluene	ug/L	<1.0	<10	<5.0	1.9	<1.0	2.1	0.42J	1.5J	6.6J	1.8	3.4	< 1 U	< 1.0 U	<1.0	<10	1.4J
1,1,1-Trichloroethane	ug/L	2.9	<10	<5.0	<1.0	1.3	1.2	2.2	2.9J	<10	0.83J	13	4.1	2.2	13.5	<10	<5.0
Trichloroethene	ug/L	474	39.0	28.0	19.0	66.0	4.8	23	19	<10	0.69J	31	9.2	25	292	<10	5.8
Vinyl chloride	ug/L	<1.0	<10	10.8	6.1	27.7	13.3	13	22	<10	1.8	2.9	2.4	5.6	36	<10	9.1
Xylenes	ug/L	<1.0	<10	<5.0	<1.0	<1.0	2.9	<2.0	<3.3	<10	0.93J	3.2	< 1 U	< 2.0 U	<1.0	<10	<5.0
Total VOCs	**ug/L**	**944.9**	**598.3**	**774.5**	**135**	**305.9**	**94.9**	**116.32**	**144.3**	**11.8**	**11.05**	**93.7**	**42.12**	**63.53**	**467.2**	**459**	**560.8**

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.
Samples collected in September and October 1999 represent baseline conditions.
Carbon source introductions began in December 1999.

Table 11. Summary of Groundwater Analytical Results from Reactive Zone 2 Wells, General Motors Corporation, Moraine, Ohio.

RZ-2		Introduction Well ME-3												Introduction Well ME-5
Constituents	Units	8/31/99	2/22/00	5/25/00	9/21/00	11/15/01	12/12/01	7/21/02	9/24/02	5/21/03	10/1/03	9/15/04	10/18/05	6/26/01
Volatile Organic Compounds														
Benzene	ug/L	<1.0	<10	<1.0	<1.0	<1.0	<1.0	<40	<2.5	< 1	0.60J	< 1 U	< 1.0 U	<1.0
1,1-Dichloroethane	ug/L	6.1	12.4	4.7	3.4	5.9	5.6	<40	<2.5	19	24	18	15	<1.0
1,1-Dichloroethene	ug/L	<1.0	<10	<1.0	<1.0	<1.0	<1.0	<40	<2.5	< 1	<1.0	< 1 U	< 1.0 U	<1.0
cis-1,2-Dichloroethene	ug/L	5.7	105	100	2.9	16	22	<20	<1.2	1.3	0.96	2.2	1.1	1.8
trans-1,2-Dichloroethene	ug/L	<1.0	<10	7.5	2.9	2.7	2.8	<20	<1.2	< 0.5	<0.50	< 0.5 U	< 1.0 U	<1.0
Ethylbenzene	ug/L	<1.0	<10	<1.0	<1.0	<1.0	<1.0	<40	<2.5	< 1	0.52J	< 1 U	< 1.0 U	<1.0
Tetrachloroethene	ug/L	57.9	<10	<1.0	<1.0	1.3	3.4	<40	<2.5	< 1	<1.0	0.21 J	< 1.0 U	<1.0
Toluene	ug/L	<1.0	<10	<1.0	1.4	0.34J	0.19J	<40	<2.5	< 1	2.8	< 1 U	< 1.0 U	3.8
1,1,1-Trichloroethane	ug/L	42.5	16.0	4.8	6.4	1.6	1.9	<40	<2.5	< 1	0.31J	0.53 J	1.6	<1.0
Trichloroethene	ug/L	47.5	<10	4.3	<1.0	3.8	9.7	<40	<2.5	1.2	1.5	1.5	1.9	<1.0
Vinyl chloride	ug/L	<1.0	<10	54.7	2.1	7.3	11	<40	<2.5	0.36J	<1.0	1.1	1.6	<1.0
Xylenes	ug/L	<1.0	<10	<1.0	<1.0	<1.0	<1.0	<40	<2.5	< 1	2.8	< 1 U	< 2.0 U	4.3
Total VOCs	**ug/L**	**159.7**	**133.4**	**176**	**19.1**	**38.94**	**56.59**	**0**	**0**	**21.86**	**33.49**	**23.54**	**21.2**	**9.9**

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.
Samples collected in September and October 1999 represent baseline conditions.
Carbon source introductions began in December 1999.

Table 11. Summary of Groundwater Analytical Results from Reactive Zone 2 Wells, General Motors Corporation, Moraine, Ohio.

RZ-2		Below Introduction Zone GM-31								
Constituents	**Units**	**9/1/99**	**2/23/00**	**5/31/00**	**9/21/00**	**11/15/01**	**9/24/02**	**10/1/03**	**9/15/04**	**10/18/2005**
Volatile Organic Compounds										
Benzene	ug/L	<1.0	<1.0	<1.0	<1.0	<4.0	<6	<5.0	< 5 U	< 2.0 U
1,1-Dichloroethane	ug/L	1.3	1.4	1.8	1.1	3.1J	5.9J	6.0	4 J	6.2
1,1-Dichloroethene	ug/L	<1.0	<1.0	<1.0	<1.0	<4.0	<6	<5.0	< 5 U	0.42 J
cis-1,2-Dichloroethene	ug/L	7.80	27.8	48.1	40.2	120	200	170	120	120
trans-1,2-Dichloroethene	ug/L	<1.0	<1.0	<1.0	<1.0	1.8J	3.5	3.5	2.7	3.7
Ethylbenzene	ug/L	<1.0	<1.0	<1.0	<1.0	<4.0	<6	<5.0	< 5 U	< 2.0 U
Tetrachloroethene	ug/L	1.3	<1.0	<1.0	<1.0	<4.0	<6	<5.0	2.5 J	< 2.0 U
Toluene	ug/L	<1.0	<1.0	1.5	<1.0	<4.0	<6	1.3J	< 5 U	< 2.0 U
1,1,1-Trichloroethane	ug/L	<1.0	<1.0	<1.0	<1.0	<4.0	<6	<5.0	1.4 J	3.4
Trichloroethene	ug/L	27.2	13.6	8.4	8.5	11	10	28	29	67
Vinyl chloride	ug/L	<1.0	<1.0	<1.0	<1.0	7.4	19	10	2.4 J	3.1
Xylenes	ug/L	<1.0	1.1	1.6	<1.0	<4.0	<6	<5.0	< 5 U	< 4.0 U
Total VOCs	**ug/L**	**37.6**	**43.9**	**61.4**	**49.8**	**143.3**	**238.4**	**218.8**	**162**	**203.82**

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.
Samples collected in September and October 1999 represent baseline conditions.
Carbon source introductions began in December 1999.

ARCADIS

Table 12. Summary of Groundwater Analytical Results from Reactive Zone 3 West Wells, General Motors Corporation, Moraine, Ohio.

RZ-3 West		Upgradient Well EAST														Upgradient Well WEST		
Constituents	**Units**	**09/21/99**	**02/23/00**	**05/25/00**	**09/22/00**	**03/19/01**	**6/25/01**	**11/12/01**	**12/11/01**	**6/12/02**	**9/23/02**	**5/21/03**	**9/25/03**	**9/13/04**	**10/18/05**	**09/21/99**	**02/23/00**	**05/25/00**
Volatile Organic Compounds																		
Benzene	ug/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<3.3	<3.3	<2.5	<2	< 1.4	<2.0	< 1 U	< 1.0 U	<1.0	<1.0	<1.0
1,1-Dichloroethane	ug/L	5.4	7.3	7.7	7.7	5.9	5.5	6.2	5.3	6.0	3.9	1.9	2.3	0.72 J	3.0	25.6	24.5	32.5
1,1-Dichloroethene	ug/L	<1.0	<1.0	1.02J	1.2	1.2	<1.0	0.90J	<3.3	1.3	0.73J	< 1.4	<2.0	0.34 J	< 1.0 U	<1.0	<1.0	<1.0
cis-1,2-Dichloroethene	ug/L	9.1	24.0	32.0	77.3	117	80.1	51	51	33	8.8	4.5	4.3	1.6	3.1	125	34.5	29.0
trans-1,2-Dichloroethene	ug/L	<1.0	2.0	1.5	1.8	5.8	3.3	2.7	2.4	1.3	<1	< 0.72	<1.0	< 0.5 U	< 1.0 U	<1.0	1.7	1.3
Ethylbenzene	ug/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<3.3	<3.3	<2.5	<2	< 1.4	<2.0	< 1	< 1.0 U	<1.0	<1.0	<1.0
Tetrachloroethene	ug/L	61.0	77.1	54.6	55.8	49.9	59.3	56	49	37	49	42	47	40	47	41.3	53.9	37.7
Toluene	ug/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<3.3	<3.3	<2.5	<2	< 1.4	<2.0	< 1 U	< 1.0 U	<1.0	<1.0	<1.0
1,1,1-Trichloroethane	ug/L	21.0	20.6	20.5	22.2	19.3	16.7	13	12	14	10	6.2	7.1	5.7	5.9	24.8	25.1	27.4
Trichloroethene	ug/L	56.1	90.1	81.3	97.2	105	117	92	94	75	46	29	35	23	23	37.3	108	103.0
Vinyl chloride	ug/L	<1.0	5.3	1.2	3.0	4.8	<1.0	1.5J	0.66J	0.48	<2	< 1.4	<2.0	< 1 U	1.2	<1.0	<1.0	<1.0
Xylenes	ug/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<3.3	<3.3	<2.5	<2	< 1.4	<2.0	< 1 U	< 2.0 U	<1.0	<1.0	<1.0
Total VOCs	**ug/L**	**152.6**	**226.4**	**199.82**	**266.2**	**308.9**	**281.9**	**223.3**	**214.36**	**168.08**	**118.43**	**83.6**	**95.7**	**71.36**	**83.2**	**254**	**247.7**	**230.9**

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.
Samples collected in September and October 1999 represent baseline conditions.
Carbon source introductions began in December 1999.

Table 12. Summary of Groundwater Analytical Results from Reactive Zone 3 West Wells, General Motors Corporation, Moraine, Ohio.

RZ-3 West		Upgradient Well GM-19S													
Constituents	**Units**	**09/20/99**	**02/23/00**	**05/24/00**	**09/22/00**	**03/19/01**	**06/25/01**	**11/12/01**	**12/11/01**	**06/12/02**	**09/26/02**	**05/21/03**	**09/25/03**	**09/13/04**	**10/18/05**
Volatile Organic Compounds															
Benzene	ug/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<3.3	<3.3	0.62	<4	< 4	<5.0	< 4 U	< 1.7 U
1,1-Dichloroethane	ug/L	7.7	7.3	7.0	4.4	4.1	2.9	2.9J	2.8J	3.7	6.3	8.4	8.3	8.1	9.0
1,1-Dichloroethene	ug/L	1.0	1.0	1.1	<1.0	<1.0	<1.0	<3.3	<3.3	0.98	<4	< 4	1.6J	1.9 J	1.2 J
cis-1,2-Dichloroethene	ug/L	34.6	38.8	42.9	37.6	38.2	31.5	26	27	28	39	81	89	61	29
trans-1,2-Dichloroethene	ug/L	2.3	2.3	2.7	2.6	3.0	2.4	2.0	2.0	2.3	2.7	2.5	2.9	2.4	1.0 J
Ethylbenzene	ug/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<3.3	<3.3	<3.3	<4	< 4	<5.0	< 4 U	< 1.7 U
Tetrachloroethene	ug/L	46.0	71.3	57.1	68.0	67.6	71.7	64	64	60	52	62	62	71	95
Toluene	ug/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<3.3	<3.3	<3.3	<4	< 4	<5.0	< 4 U	< 1.7 U
1,1,1-Trichloroethane	ug/L	16.0	16.9	17.9	14.5	11.9	9.6	7.6	7.5	7.2	6.3	12	13	14	13
Trichloroethene	ug/L	71.1	101	104	104	107	121	97	110	110	110	120	140	120	140
Vinyl chloride	ug/L	<1.0	1.7	1.4	<1.0	<1.0	<1.0	<3.3	0.66J	0.70	5.2	< 4	<5.0	< 4 U	1.8
Xylenes	ug/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<3.3	<3.3	<3.3	<4	< 4	<5.0	< 4 U	< 3.3 U
Total VOCs	**ug/L**	**178.7**	**240.3**	**234.1**	**231.1**	**231.8**	**239.1**	**199.5**	**213.96**	**213.5**	**221.5**	**285.9**	**316.8**	**278.4**	**290**

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.
Samples collected in September and October 1999 represent baseline conditions.
Carbon source introductions began in December 1999.

ARCADIS

Table 12. Summary of Groundwater Analytical Results from Reactive Zone 3 West Wells, General Motors Corporation, Moraine, Ohio.

RZ-3 West		Downgradient Well GM-32													
Constituents	**Units**	**09/22/99**	**02/28/00**	**05/30/00**	**09/25/00**	**03/19/01**	**06/25/01**	**11/12/01**	**12/11/01**	**6/12/02**	**9/20/02**	**5/23/03**	**10/1/03**	**9/14/04**	**10/19/05**
Volatile Organic Compounds															
Benzene	ug/L	<1.0	<10	<100	<1.0	<50	<1.0	4.3J	<100	4.0	<10	1.6	1.5J	< 10 U	< 10 U
1,1-Dichloroethane	ug/L	3.3	101	46.0J	35.9	<50	3.1	6.2	<100	12	9.7J	5.5	5.5	3 J	4.9 J
1,1-Dichloroethene	ug/L	<1.0	<10	<100	<1.0	<50	<1.0	<5.0	<100	<20	<10	< 1 U	<2.0	< 10 U	< 10 U
cis-1,2-Dichloroethene	ug/L	2.6	<10	<100	<1.0	<50	32.0	<2.5	<50	<10	<5	0.66	<1.0	< 5 U	< 10 U
trans-1,2-Dichloroethene	ug/L	4.2	111	41.0J	20.3	<50	2.5	2.9	<50	3.0	<5	1.6	1.0	< 5 U	< 10 U
Ethylbenzene	ug/L	<1.0	<10	<100	<1.0	<50	<1.0	0.79J	<100	<20	<10	0.65J	0.73J	< 10 U	< 10 U
Tetrachloroethene	ug/L	1.2	<10	<100	<1.0	<50	37.6	<5.0	<100	<20	<10	< 1 U	<2.0	< 10 U	< 10 U
Toluene	ug/L	1.0	20.6	<100	10.4	<50	<1.0	12	<100	4.9	<10	2.2	2.3	< 10 U	< 10 U
1,1,1-Trichloroethane	ug/L	<1.0	<10	<100	<1.0	<50	9.2	<5.0	<100	<20	<10	< 1 U	<2.0	< 10 U	< 10 U
Trichloroethene	ug/L	3.2	<10	<100	<1.0	<50	107	<5.0	<100	<20	<10	< 1 U	<2.0	< 10 U	< 10 U
Vinyl chloride	ug/L	3.0	<10	<100	<1.0	<50	<1.0	1.1J	<100	3.0	<10	< 1 U	<2.0	< 10 U	< 10 U
Xylenes	ug/L	<1.0	<10	<100	<1.0	<50	<1.0	3.0J	<100	<20	<10	2.1	3.6	< 10 U	< 20 U
Total VOCs	**ug/L**	**18.5**	**232.6**	**87**	**66.6**	**0**	**191.4**	**30.29**	**0**	**26.9**	**9.7**	**14.31**	**14.63**	**3**	**4.9**

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.
Samples collected in September and October 1999 represent baseline conditions.
Carbon source introductions began in December 1999.

ARCADIS

Table 12. Summary of Groundwater Analytical Results from Reactive Zone 3 West Wells, General Motors Corporation, Moraine, Ohio.

RZ-3 West		Downgradient Well GM-8								Downgradient Well GM-6							
Constituents	**Units**	**3/6/98**	**9/20/99**	**9/26/00**	**11/9/01**	**9/20/02**	**10/1/03**	**9/14/04**	**10/19/05**	**3/6/98**	**9/20/99**	**9/26/00**	**11/9/01**	**9/20/02**	**10/2/03**	**9/14/04**	**10/19/05**
Volatile Organic Compounds																	
Benzene	ug/L	2.3	3.4	1.1	0.78J	5.5	5.4	4.2	3.5	<1.0	<1.0	<1.0	< 2.0	2.2	1.0	1.7	0.49 J
1,1-Dichloroethane	ug/L	49.3	30.2	36.5	40	63	48	15	16	35.3	33.2	13.0	14	60	20	18	21
1,1-Dichloroethene	ug/L	1.0	<1.0	<1.0	< 1.0	<2.0	<2.0	< 1 U	< 1.0 U	<1.0	1.2	<1.0	< 2.0	<2.0	<1.0	< 1 U	< 1.0 U
cis-1,2-Dichloroethene	ug/L	56.1	26.2	1.5	2.0	5.5	<1.0	< 0.5	0.24 J	82.4	52.9	41.0	8.2	43	13	10	20
trans-1,2-Dichloroethene	ug/L	10.1	12.0	5.4	3.6	9	4.4	1.1	0.99 J	2.4	2.0	2.2	1.8	8.6	2.5	1.9	2.1
Ethylbenzene	ug/L	28.9	20.7	12.5	0.40J	7.5	11	19	29	<1.0	<1.0	<1.0	< 2.0	<2.0	0.22J	< 1 U	< 1.0 U
Tetrachloroethene	ug/L	20.0	14.8	<1.0	< 1.0	<2.0	<2.0	< 1 U	< 1.0 U	94.0	81.4	51.5	14	14	11	2.6	0.34 J
Toluene	ug/L	<1.0	<1.0	<1.0	< 1.0	1.8J	1.2J	< 1 U	0.39 J	<1.0	<1.0	<1.0	< 2.0	<2.0	0.83J	< 1 U	< 1.0 U
1,1,1-Trichloroethane	ug/L	6.7	1.9	<1.0	0.40J	<2.0	<2.0	< 1 U	< 1.0 U	36.2	24.6	12.1	3.9	1.4J	0.19J	< 1 U	< 1.0 U
Trichloroethene	ug/L	95.2	30.4	6.6	4.4	<2.0	<2.0	< 1 U	< 1.0 U	119	78.2	56.6	48	33	23	5.7	1.4
Vinyl chloride	ug/L	10.1	8.4	2.4	1.9	5.8	<2.0	0.48 J	0.73 J	2.3	1.6	3.7	1.9J	12	3.3	3	11
Xylenes	ug/L	10.3	2.3	1.9	0.39J	1.5J	2.0	1.1	< 2.0 U	<1.0	<10	<1.0	< 2.0	< 2.0	1.0	< 1 U	< 2.0 U
Total VOCs	**ug/L**	**290**	**150.3**	**67.9**	**53.87**	**99.6**	**72**	**40.88**	**50.85**	**371.6**	**275.1**	**180.1**	**91.8**	**174.2**	**76.04**	**42.9**	**56.33**

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.
Samples collected in September and October 1999 represent baseline conditions.
Carbon source introductions began in December 1999.

ARCADIS

Table 13. Summary of Groundwater Analytical Results from Reactive Zone 3 East Wells, General Motors Corporation, Moraine, Ohio.

RZ-3 East		Upgradient Well GM-22													
Constituents	**Units**	**09/01/99**	**02/23/00**	**05/25/00**	**09/21/00**	**03/20/01**	**06/26/01**	**11/13/01**	**12/12/01**	**6/13/02**	**9/25/02**	**5/22/03**	**9/24/03**	**9/14/04**	**10/17/05**
Volatile Organic Compounds															
Benzene	ug/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<2	< 1	<1.0	< 1 U	< 1.0 U
1,1-Dichloroethane	ug/L	<1.0	2.2	2.8	2.4	3.8	4.7	6.8	6.6	4.1	<2	1.2	1.0	2.1	1.0
1,1-Dichloroethene	ug/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	0.58J	0.32J	<1.0	<2	< 1	<1.0	< 1 U	< 1.0 U
cis-1,2-Dichloroethene	ug/L	<1.0	3.1	4.0	1.9	3.5	5.1	8.5	7.8	3.6	<1	0.46J	0.45J	0.9	0.36 J
trans-1,2-Dichloroethene	ug/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	0.17J	<0.50	<0.50	<1	< 0.5	<0.50	< 0.5 U	< 1.0 U
Ethylbenzene	ug/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<2	< 1	<1.0	< 1 U	< 1.0 U
Tetrachloroethene	ug/L	3.6	2.8	3.0	1.6	2.2	3.2	4.9	2.9	1.9	2.3	2.5	2.9	2.9	3.6
Toluene	ug/L	<1.0	<1.0	<1.0	<1.0	<1.0	1.1	<1.0	0.32J	<1.0	<2	0.49J	<1.0	< 1 U	< 1.0 U
1,1,1-Trichloroethane	ug/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	4.4	0.63J	0.47	0.93J	0.61J	1.2	1.7	0.96 J
Trichloroethene	ug/L	4.0	2.5	3.6	<1.0	1.6	2.8	7.5	2.3	2.1	7.6	6	7.6	10	4.7
Vinyl chloride	ug/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	0.60J	0.85J	0.38	<2	< 1	<1.0	< 1 U	< 1.0 U
Xylenes	ug/L	<1.0	1.2	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<2	< 1	<1.0	< 1 U	< 2.0 U
Total VOCs	**ug/L**	**7.6**	**11.8**	**13.4**	**5.9**	**11.1**	**16.9**	**33.45**	**21.72**	**12.55**	**10.83**	**11.26**	**13.15**	**17.6**	**10.62**

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.
Samples collected in September and October 1999 represent baseline conditions.
Carbon source introductions began in December 1999.

Table 13. Summary of Groundwater Analytical Results from Reactive Zone 3 East Wells, General Motors Corporation, Moraine, Ohio.

RZ-3 East		Downgradient Well GM-21													
Constituents	**Units**	**09/22/99**	**02/23/00**	**05/26/00**	**09/22/00**	**03/19/01**	**06/25/01**	**11/13/01**	**12/11/01**	**6/12/02**	**9/25/02**	**5/22/03**	**9/24/03**	**9/14/04**	**10/17/05**
Volatile Organic Compounds															
Benzene	ug/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<5.0	<1.0	<6.0	<6.7	< 6.7	<8.0	< 9.1 U	< 1.0 U
1,1-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
1,1-Dichloroethene	ug/L	3.9	1.6	2.4	1.6	1.2	<1.0	<5.0	<1.0	3.6	2.6J	< 6.7	2.0J	3.1 J	< 1.0 U
cis-1,2-Dichloroethene	ug/L	66.4	35.9	47.8	38.7	39.5	37.8	39	6.5	48	43	130	100	56	20
trans-1,2-Dichloroethene	ug/L	7.8	9.3	7.4	12.9	16.4	15.7	15	2.8	8.3	5.1	2.2J	2.9J	7.9	22
Ethylbenzene	ug/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<5.0	<1.0	<6.0	<6.7	< 6.7	<8.0	< 9.1 U	< 1.0 U
Tetrachloroethene	ug/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<5.0	<1.0	<6.0	<6.7	< 6.7	<8.0	< 9.1 U	< 1.0 U
Toluene	ug/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<5.0	<1.0	<6.0	<6.7	< 6.7	<8.0	< 9.1 U	< 1.0 U
1,1,1-Trichloroethane	ug/L	53.1	15.4	27.9	15.7	7.0	7.7	6.9	1.2	23	31	18	31	26	4.3
Trichloroethene	ug/L	28.7	283	311	189	169	158	160	28	210	230	79	200	180	1.8
Vinyl chloride	ug/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<5.0	<1.0	<6.0	<6.7	< 6.7	<8.0	< 9.1 U	13
Xylenes	ug/L	<1.0	2.3	<1.0	<1.0	<1.0	<1.0	<5.0	<1.0	<6.0	<6.7	< 6.7	<8.0	< 9.1 U	< 2.0 U
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**

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.
Samples collected in September and October 1999 represent baseline conditions.
Carbon source introductions began in December 1999.

Table 14. Bioattenuation Parameter Results for Groundwater Samples Collected in Reactive Zone 1, General Motors Corporation, Moraine, Ohio.

RZ-1		Upgradient Well 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**
Inorganics & TOC															
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	<0.30	<0.30	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
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
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
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
Iron (Ferrous)	mg/l	0.02	0	2.2	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
Sulfide	mg/l	<4	<1	<1	<1	<1.0	<1	1.3	<1.0	<1.0	<1.0	0.54B	1.6	< 1 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
Chloride	mg/l	254	426	508	373	337	262	600B	460	490	490	490	560J	540	370
Permanent Gases															
Carbon Dioxide	mg/l	46.52	49.87	44.05	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
Nitrogen	mg/l	20.29	18.7	15.61	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
Carbon Monoxide	mg/l	<0.40	<0.40	<0.40	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Light Hydrocarbon Scan															
Ethane	ng/l	5641	1861	751	639	460	17000	20000	28000	14000	16000	7400	9900	13000	170000
Ethene	ng/l	9769	1275	12098	441796	160000	130000	230000	180000	48000	140000	150000	200000	1700000	1600000 J
Field Parameters															
pH	S.U.	6.99	7.02	6.86	7.24	7.31	7.20	7.47	7.57	7.14	7.22	6.32	6.88	6.85	6.80
Specific Conductivity	umhos/cm	1502	3044	2388	1942	1733	1291	2703	2860	1977	2354	2303	2278	2580	2200
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
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
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

mg/l - milligrams per liter.
S.U. - Standard Units.
mV - Millivolts.
°C - Degrees Celsius.
J - Value is estimated.
B - Blank contamination.
NA - Not Analyzed.
umhos/cm - Micromohs/centimeter.
ng/l - nanograms per liter.
Samples collected in September 1999 represent baseline conditions.
Carbon source introductions began in December 1999.

ARCADIS

Table 14. Bioattenuation Parameter Results for Groundwater Samples Collected in Reactive Zone 1, General Motors Corporation, Moraine, Ohio.

RZ-1		Downgradient Well GM-28														
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**
Inorganics & TOC																
Nitrate	mg/l	0.08	0	0	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
Nitrogen, Ammonia	mg/l	<0.30	<0.30	0.68	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
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
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
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
Iron (Ferrous)	mg/l	0	0.03	2.6	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
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
Total Organic Carbon	mg/l	15	24	742	571	90.0	360	74	68B	140	23	15	17	15 J	8	10
Chloride	mg/l	208	664	805	782	1030	508	730B	560	370	450	350	270J	320	340	320
Permanent Gases																
Carbon Dioxide	mg/l	41.52	63.57	16.51	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
Nitrogen	mg/l	19.42	16.39	19.82	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
Carbon Monoxide	mg/l	<0.40	<0.40	<0.40	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Light Hydrocarbon Scan																
Ethane	ng/l	750	493	865	1198	42000	39000	91000	98000	420000	300000	310000	230000	160000	150000	81000
Ethene	ng/l	48	98	646	1794606	57000	5000	1100	1400	8800	12000	74000	430	160	54	< 210 U
Field Parameters																
pH	S.U.	7.02	6.92	7.01	7.18	7.10	6.64	6.50	7.45	6.84	7.24	6.86	6.80	NA	6.85	5.47
Specific Conductivity	umhos/cm	1359	3124	4402	4538	3724	3216	3136	3700	2187	2195	2132	1501	NA	2030	2230
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
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
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

mg/l - milligrams per liter.
S.U. - Standard Units.
mV - Millivolts.
°C - Degrees Celsius.
J - Value is estimated.
B - Blank contamination.
NA - Not Analyzed.
umhos/cm - Micromohs/centimeter.
ng/l - nanograms per liter.
Samples collected in September 1999 represent baseline conditions.
Carbon source introductions began in December 1999.

ARCADIS

Table 15. Bioattenuation Parameter Results for Groundwater Samples Collected in Reactive Zone 2, General Motors Corporation, Moraine, Ohio.

RZ-2		Introduction Well ME-6													Introduction Well ME-1		
Constituents	**Units**	**8/31/99**	**2/22/00**	**5/25/00**	**9/21/00**	**3/20/01**	**6/26/01**	**11/15/01**	**12/12/01**	**9/25/02**	**5/22/03**	**10/1/03**	**9/15/04**	**10/18/05**	**8/31/99**	**2/22/00**	**5/25/00**
Inorganics & TOC																	
Nitrate	mg/l	0.08	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	13.2	NA	NA
Nitrite	mg/l	0.06	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.333	NA	NA
Nitrogen, Ammonia	mg/l	<0.30	10.9	23.4	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.62	3.70	27.8
Manganese (Total)	mg/l	0.502	4.19	1.44	0.46	0.276	0.245	0.33	0.34	1.9B	0.77J	0.42J	0.28	0.26	0.5	2.40	2.23
Manganese (Dissolved)	mg/l	<0.010	3.60	1.34	0.456	0.277	0.222	0.30	0.32	1.6B	0.63J	0.40J	0.33	0.25	0.493	1.93	1.06
Iron (Total)	mg/l	8.17	67.1	46.3	6.4	1.25	3.52	5.5	4.6	37.2	30.3	6.7J	9.6	26.2	<0.10	96.6	134
Iron (Dissolved)	mg/l	<0.10	46.5	42.8	6.66	0.63	1.74	3.9	2.8	7.3	6.5	6.1J	2.9	2.8	<0.10	63.4	20.4
Iron (Ferrous)	mg/l	0.02	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0	NA	NA
Sulfate	mg/l	139	111	34	91	128	165	400	220	<5	<5	91J	64 J	78	143	41	16
Sulfide	mg/l	<2	2.00	1.11	1.58	<1.0	<1	<1.0	<1.0	1.7	0.86B	6.7	3.7 U	7.0	<1	<1	1.52
Total Organic Carbon	mg/l	9	1,560	374	35	21.5	38	41	34	1500	250	56	11	14	2	985	219
Chloride	mg/l	182	350	302	196	261	289	390B	320	430	370	220J	290	230	177	467	324
Permanent Gases																	
Carbon Dioxide	mg/l	51.08	173.39	156.4	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	49.95	350.8	247.8
Oxygen	mg/l	0.84	0.45	0.52	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	1.27	0.40	0.41
Nitrogen	mg/l	18.57	12.44	9.03	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	19.14	10.6	5.32
Methane	mg/l	0.002063	0.56	12.2	0.33	8.30	0.25	0.160	0.65	1.6	12	5.1	2.9	1.5	0.000627	1.11	15.6
Carbon Monoxide	mg/l	<0.40	<0.40	<0.40	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.40	<0.40	<0.40
Light Hydrocarbon Scan																	
Ethane	ng/l	134	97	<5	134	4900	3600	4600	16000	26	2600	2000	4300	< 1100 U	32	164	<5
Ethene	ng/l	134	164	3508	3316	7600	1900	4000	20000	340	810	1400	1700	< 1300 U	40	293	129
Field Parameters																	
pH	S.U.	7.02	6.64	6.58	7.00	7.06	6.82	6.92	7.50	6.78	6.73	6.90	6.49	5.85	7.03	6.19	6.49
Specific Conductivity	umhos/cm	1424	4645	3118	1864	1922	2630	3004	3000	6309	3428	1735	1710	1730	1385	5030	2580
Dissolved Oxygen	mg/l	0.66	7.12	0.84	1.19	4.83	0.33	0.67	0.48	0.59	2.49	0.35	2.51	NA	0.52	7.00	4.78
Redox Potential	mV	109.1	-85.8	-133.8	-200.6	-294.0	43.5	-80.4	-129	-107.2	-101.4	-133.4	-4	NA	108.4	-81.7	-157.8
Temperature	°C	27.51	18.59	22.60	18.98	21.68	19.42	20.01	19.74	22.17	19.1	17.58	17.4	15.3	25.46	19.25	21.27

mg/l - milligrams per liter.
S.U. - Standard Units.
mV - Millivolts.
°C - Degrees Celsius.
J - Value is estimated.
B - Blank contamination.
NA - Not Analyzed.
umhos/cm - Micromohs/centimeter.
ng/l - nanograms per liter.
Samples collected in September 1999 represent baseline conditions.
Carbon source introductions began in December 1999.

Table 15. Bioattenuation Parameter Results for Groundwater Samples Collected in Reactive Zone 2, General Motors Corporation, Moraine, Ohio.

RZ-2		Introduction Well ME-3												Introduction Well ME-5
Constituents	Units	8/31/99	2/22/00	5/25/00	9/21/00	11/15/01	12/12/01	7/21/02	9/24/02	5/21/03	10/1/03	9/15/04	10/18/05	6/26/01
Inorganics & TOC														
Nitrate	mg/l	22	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Nitrite	mg/l	0.1665	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Nitrogen, Ammonia	mg/l	<0.30	3.10	12.6	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Manganese (Total)	mg/l	0.016	0.870	1.16	0.556	0.580	0.60	3.0	0.67B	0.21J	0.28J	0.47	0.42	0.258
Manganese (Dissolved)	mg/l	<0.010	0.702	0.436	0.543	0.620	0.610	3.4	0.69B	0.23J	0.28J	0.47	0.41	0.225
Iron (Total)	mg/l	<0.10	20.5	38.2	4.9	3.9	3.6	162	41.1	5.9	1.9J	3.2	11.2	8.98
Iron (Dissolved)	mg/l	<0.10	15.3	10.3	4.45	4.10	3.40	133	36.2	4.7	1.7J	2.8	3.8	7.57
Iron (Ferrous)	mg/l	0	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Sulfate	mg/l	152	60	34	87	160	150	71B	<5	45J	79J	71 J	68	219
Sulfide	mg/l	<1	1.39	1.32	<1	<1	<1.0	0.32J	<1.0	1.70	0.98B	3.4 U	< 1.0 U	<1
Total Organic Carbon	mg/l	1	162	69	4	<1	6	1100	340	15	9	4	8	65
Chloride	mg/l	336	208	235	184	260B	330	370	380	290	340J	440	480	297
Permanent Gases														
Carbon Dioxide	mg/l	57.26	183.76	85.52	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Oxygen	mg/l	1.72	0.47	0.78	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Nitrogen	mg/l	16.44	13.39	13.0	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Methane	mg/l	0.000129	0.01088	9.68	0.001226	0.0430	0.0160	1.6	7	1.8	1.2	0.81	0.25	0.15
Carbon Monoxide	mg/l	<0.40	<0.40	<0.40	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Light Hydrocarbon Scan														
Ethane	ng/l	10	73	138	47	520	470	370	210	830	540	170	< 140 U	560
Ethene	ng/l	<5	109	96276	218	23000	38000	1500	200	120	73	270	< 350 U	620
Field Parameters														
pH	S.U.	6.96	6.75	6.89	7.15	6.52	7.40	5.77	6.96	6.70	6.97	6.88	6.39	6.87
Specific Conductivity	umhos/cm	1889	2305	1752	1509	1477	2280	4081	3454	1662	1413	2130	2340	2679
Dissolved Oxygen	mg/l	2.01	4.06	0.59	1.11	1.70	0.19	1.60	2.41	2.92	2.93	3.12	NA	0.49
Redox Potential	mV	80.9	-96.8	-136.7	-193.2	-36.1	-127.0	-103.4	-59.7	-30.6	-89.7	-6.2	NA	167.5
Temperature	°C	22.86	19.28	20.00	21.09	18.63	20.05	20.82	21.65	17.18	17.74	17.4	16.0	23.07

mg/l - milligrams per liter.
S.U. - Standard Units.
mV - Millivolts.
°C - Degrees Celsius.
J - Value is estimated.
B - Blank contamination.
NA - Not Analyzed.
umhos/cm - Micromohs/centimeter.
ng/l - nanograms per liter.
Samples collected in September 1999 represent baseline conditions.
Carbon source introductions began in December 1999.

Table 15. Bioattenuation Parameter Results for Groundwater Samples Collected in Reactive Zone 2, General Motors Corporation, Moraine, Ohio.

RZ-2		Below Introduction Zone								
					GM-31					
Constituents	Units	9/1/99	2/23/00	5/31/00	9/21/00	11/15/01	9/24/02	10/1/03	9/15/04	10/18/05
Inorganics & TOC										
Nitrate	mg/l	0	0	0	NA	NA	NA	NA	NA	NA
Nitrite	mg/l	0	0	0	NA	NA	NA	NA	NA	NA
Nitrogen, Ammonia	mg/l	0.41	<0.3	<0.30	NA	NA	NA	NA	NA	NA
Manganese (Total)	mg/l	7.45	0.53	0.899	0.605	0.470	0.97B	1.6J	0.38	0.43
Manganese (Dissolved)	mg/l	0.293	0.208	0.189	0.163	0.19	0.27B	0.24J	0.29	0.32
Iron (Total)	mg/l	288	17.4	34.9	18.7	16.3	33.4	35.9J	4.6 J	6.2
Iron (Dissolved)	mg/l	0.27	1.87	2.37	2.51	3.2	2.8	0.79J	1.4	1.0
Iron (Ferrous)	mg/l	0	1.6	1.6	NA	NA	NA	NA	NA	NA
Sulfate	mg/l	118	105	131	105	120	130	140J	98 J	88
Sulfide	mg/l	<4	<1	1.06	<1	<1	<1.0	7.5	< 1 U	< 1.0 U
Total Organic Carbon	mg/l	176	4	12	<1	3B	3	2	< 1 U	3
Chloride	mg/l	240	249	259	221	190B	240	290J	300	380
Permanent Gases										
Carbon Dioxide	mg/l	32.12	49.58	38.89	NA	NA	NA	NA	NA	NA
Oxygen	mg/l	0.60	0.61	0.66	NA	NA	NA	NA	NA	NA
Nitrogen	mg/l	16.05	19.79	23.03	NA	NA	NA	NA	NA	NA
Methane	mg/l	0.0124	0.03339	0.08616	0.04758	0.034	0.11	0.075	0.059	<0.017 U
Carbon Monoxide	mg/l	<0.40	<0.40	<0.40	NA	NA	NA	NA	NA	NA
Light Hydrocarbon Scan										
Ethane	ng/l	2472	4550	9895	2507	1900	1300	740	430	< 300 U
Ethene	ng/l	2295	1283	2439	413	500	2000	260	190	< 260 U
Field Parameters										
pH	S.U.	7.25	7.19	7.03	7.30	6.70	6.80	6.99	7.04	6.47
Specific Conductivity	umhos/cm	1514	1786	1538	1580	1275	1635	1321	1790	2200
Dissolved Oxygen	mg/l	1.61	0.39	0.81	1.71	ME	0.31	0.25	0.41	0
Redox Potential	mV	-328.2	-61.9	-73.7	-188.5	-82.1	-66.2	-69.7	-86	-65
Temperature	°C	28.93	20.75	21.91	21.11	19.45	20.87	18.74	18.3	17.6

mg/l - milligrams per liter.
S.U. - Standard Units.
mV - Millivolts.
°C - Degrees Celsius.
J - Value is estimated.
B - Blank contamination.
NA - Not Analyzed.
umhos/cm - Micromohs/centimeter.
ng/l - nanograms per liter.
Samples collected in September 1999 represent baseline conditions.
Carbon source introductions began in December 1999.

Table 16. Bioattenuation Parameter Results for Groundwater Samples Collected in Reactive Zone 3 West, General Motors Corporation, Moraine, Ohio.

RZ-3 West		Upgradient Well EAST													Upgradient Well WEST		
Constituents	**Units**	**9/21/99**	**2/23/00**	**5/25/00**	**9/22/00**	**3/19/01**	**11/12/01**	**12/11/01**	**6/12/02**	**9/23/02**	**5/21/03**	**9/25/03**	**9/13/04**	**10/18/05**	**9/21/99**	**2/23/00**	**5/25/00**
Inorganics & TOC																	
Nitrate	mg/l	0	0	0	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0	0	0
Nitrite	mg/l	0	0	0	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	17.6	0	0
Nitrogen, Ammonia	mg/l	<0.30	<0.30	<0.30	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.30	<0.30	<0.30
Manganese (Total)	mg/l	0.627	0.474	0.361	0.227	0.182	0.20B	0.21B	0.56B	0.28B	0.12J	0.23J	0.19	1.4	0.391	0.038	0.029
Manganese (Dissolved)	mg/l	0.098	0.157	0.116	0.136	0.129	0.18B	0.17B	0.20B	0.16B	0.041J	0.096	0.047	0.10	0.383	<0.010	<0.010
Iron (Total)	mg/l	4.82	5.55	5.3	2.26	1.17	0.21	0.29	7.9	0.89	0.16	0.64	0.4	5.1	0.27	0.40	0.37
Iron (Dissolved)	mg/l	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<1.0	<0.10	< 0.1 U	< 0.10 U	<0.10	<0.10	<0.10
Iron (Ferrous)	mg/l	0	0	0	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0	0	0
Sulfate	mg/l	75	130	117	96	101	130	120	170	95	63J	110	54 J	130	73	129	155
Sulfide	mg/l	<1	<1	<1	<1	<1.0	1.2	1.6	<1.0	<1.0	<1	2.1	< 1 U	< 1.0 U	<1	<1	<1
Total Organic Carbon	mg/l	3	10	4	<1	<1.0	3B	2	4	2	<1	1	0.5 B	4	2	7	3
Chloride	mg/l	283	254	194	196	198	190B	180	270	310	250	310J	290	370	260	166	164
Permanent Gases																	
Carbon Dioxide	mg/l	34.69	58.08	52.02	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	50.41	67.57	61.09
Oxygen	mg/l	1.88	0.97	1.26	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	1.30	1.50	2.20
Nitrogen	mg/l	17.88	17.50	19.1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	13.24	13.74	17.1
Methane	mg/l	0.000571	0.003269	0.01158	1.08	1.100	0.310	0.15	0.0042	0.0027	0.00055	0.0013	0.0012	< 0.0058 U	0.001409	0.000217	0.002179
Carbon Monoxide	mg/l	<0.40	<0.40	<0.40	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.40	<0.40	<0.40
Light Hydrocarbon Scan																	
Ethane	ng/l	32	39	118	126	2600	2000	1800	440	50	13	14	20	< 76 U	37	33	57
Ethene	ng/l	18	107	57	73	190	150	56	170	37	34	21	20	< 210 U	100	17	47
Field Parameters																	
pH	S.U.	6.99	7.04	7.00	7.11	7.34	7.15	7.32	7.02	7.18	6.69	6.94	7.18	6.17	6.89	6.97	6.97
Specific Conductivity	umhos/cm	1777	1955	1503	1133	1189	1363	1480	1439	1467	1506	1548	1700	2190	1759	1640	1547
Dissolved Oxygen	mg/l	0.30	0.37	2.76	1.68	1.00	1.73	0.05	1.05	1.82	1.79	1.04	0.94	0	0.41	1.73	1.50
Redox Potential	mV	14.9	122.9	144.5	143.7	468.4	177.1	86	306.5	215.6	201	147.6	195	189	106.2	139.1	198.3
Temperature	°C	21.21	19.38	19.32	20.30	19.60	18.68	18.69	19.61	19.62	19.45	18.47	17.4	17.5	21.44	19.90	19.75

mg/l - milligrams per liter.
S.U. - Standard Units.
mV - Millivolts.
°C - Degrees Celsius.
J - Value is estimated.
B - Blank contamination.
NA - Not Analyzed.
umhos/cm - Micromohs/centimeter.
ng/l - nanograms per liter.
Samples collected in September 1999 represent baseline conditions.
Carbon source introductions began in December 1999.

Table 16. Bioattenuation Parameter Results for Groundwater Samples Collected in Reactive Zone 3 West, General Motors Corporation, Moraine, Ohio.

RZ-3 West		Upgradient Well 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**
Inorganics & TOC														
Nitrate	mg/l	11	0	0	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Nitrite	mg/l	0	0	0	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Nitrogen, Ammonia	mg/l	<0.30	<0.30	<0.30	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Manganese (Total)	mg/l	0.726	1.09	0.247	0.238	0.191	0.20	0.21B	0.25B	0.39B	0.3J	0.23J	0.25	0.24
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	0.20
Iron (Total)	mg/l	16.9	39.4	1.19	0.40	0.90	0.091	0.18	0.26	0.44	0.17	0.96	3	0.38
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
Iron (Ferrous)	mg/l	0	0	0	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
Sulfide	mg/l	<1	<1	<1	<1	<1	<1	0.96J	<1.0	<1.0	<1	1.3	1.6	< 1.0 U
Total Organic Carbon	mg/l	2	7	5	<1	<1	2B	1	1	3	2	2	1	3
Chloride	mg/l	247	197	168	165	158	130B	150	140	210	270	300J	310	320
Permanent Gases														
Carbon Dioxide	mg/l	41.85	57.12	50.12	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
Nitrogen	mg/l	20.87	17.07	17.13	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Methane	mg/l	0.009863	0.002712	0.003325	0.003706	0.039	0.005	0.0088	0.002	0.46	0.0021	0.0022	0.0014	< 0.0065 U
Carbon Monoxide	mg/l	<0.40	<0.40	<0.40	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Light Hydrocarbon Scan														
Ethane	ng/l	71	104	139	184	210	300	350	410	730	170	80	48	< 250 U
Ethene	ng/l	55	45	43	36	61	34	27	130	770	78	45	51	< 220 U
Field Parameters														
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
Specific Conductivity	umhos/cm	1500	1784	1548	1235	1097	1190	1350	1052	1474	1706	1726	1970	1940
Dissolved Oxygen	mg/l	0.92	0.30	1.94	1.36	0.96	1.75	0.06	0.90	0.47	2.01	1.87	0	0
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
Temperature	°C	20.85	18.69	20.80	20.09	20.14	19.24	19.10	20.39	20.36	20.22	19.57	18.6	17.6

mg/l - milligrams per liter.
S.U. - Standard Units.
mV - Millivolts.
°C - Degrees Celsius.
J - Value is estimated.
B - Blank contamination.
NA - Not Analyzed.
umhos/cm - Micromohs/centimeter.
ng/l - nanograms per liter.
Samples collected in September 1999 represent baseline conditions.
Carbon source introductions began in December 1999.

Table 16. Bioattenuation Parameter Results for Groundwater Samples Collected in Reactive Zone 3 West, General Motors Corporation, Moraine, Ohio.

RZ-3 West		Downgradient Well 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**
Inorganics & TOC														
Nitrate	mg/l	0	0	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
Nitrogen, Ammonia	mg/l	2.29	2.00	19.3	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
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
Iron (Total)	mg/l	8.14	42.4	18.4	81.0	13.0	16.5	10.5	7.5	8.4B	21.3	31.4J	33.9	22.0
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
Iron (Ferrous)	mg/l	1.8	2.2	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
Sulfide	mg/l	<1	<10	<1	<1	1.60	<1	<1.0	0.50J	1.3	0.86B	7.3	16	4.1
Total Organic Carbon	mg/l	68	1200	2020	2720	1120	320B	250	240	160	150	170	240 J	300
Chloride	mg/l	317	638	740	740	798	700B	630	470	510	390	510J	530	550
Permanent Gases														
Carbon Dioxide	mg/l	39.79	8.94	24.32	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
Nitrogen	mg/l	14.93	15.23	2.40	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
Carbon Monoxide	mg/l	<0.40	<0.40	<0.40	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Light Hydrocarbon Scan														
Ethane	ng/l	1649	9965	1029	189	7900	42000	72000	84000	94000	74000	46000	57000	85000 J
Ethene	ng/l	86509	163855	472312	510593	150000	130000	90000	93000	49000	9900	3400	2000	1900 J
Field Parameters														
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	6.3
Specific Conductivity	umhos/cm	2750	9030	9195	9225	7483	6874	6200	5432	4289	3908	3192	4210	4810
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
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
Temperature	°C	19.27	19.72	23.48	19.27	19.30	18.84	18.62	20.83	19.81	19.31	18.47	17.2	17.0

mg/l - milligrams per liter.
S.U. - Standard Units.
mV - Millivolts.
°C - Degrees Celsius.
J - Value is estimated.
B - Blank contamination.
NA - Not Analyzed.
umhos/cm - Micromohs/centimeter.
ng/l - nanograms per liter.
Samples collected in September 1999 represent baseline conditions.
Carbon source introductions began in December 1999.

Table 16. Bioattenuation Parameter Results for Groundwater Samples Collected in Reactive Zone 3 West, General Motors Corporation, Moraine, Ohio.

RZ-3 West		Downgradient Well GM-8						Downgradient Well GM-6					
Constituents	Units	3/6/98	9/20/99	9/20/02	12/9/03	9/14/04	10/19/05	3/6/98	9/20/99	9/20/02	12/9/03	9/14/04	10/19/05
Inorganics & TOC													
Nitrate	mg/l	<4.4	0	NA	NA	NA	NA	<4.4	0	NA	NA	NA	NA
Nitrite	mg/l	<0.033	0	NA	NA	NA	NA	<0.033	0	NA	NA	NA	NA
Nitrogen, Ammonia	mg/l	1.69	1.95	NA	NA	NA	NA	<0.300	<0.30	NA	NA	NA	NA
Manganese (Total)	mg/l	0.204	0.125	0.085B	0.21	0.13	0.17	1.07	1.11	0.27B	0.57	0.43	0.50
Manganese (Dissolved)	mg/l	0.229	0.125	0.084B	0.21	0.14	0.15	1	0.958	0.24B	0.53	0.47	0.49
Iron (Total)	mg/l	1.01	0.27	0.55B	1.9	1.8	3.2	1.32	0.27	0.40B	5.7	3.2	5.4
Iron (Dissolved)	mg/l	1.22	0.26	0.52B	1.9	1.8	2.8	<0.1	<0.10	0.30B	1.9	3.1	4.8
Iron (Ferrous)	mg/l	<0.2	0	NA	NA	NA	NA	<0.2	NA	NA	NA	NA	NA
Sulfate	mg/l	59	54	59	<5	13 J	27	93	83	43	27	26 J	52
Sulfide	mg/l	<1	<1	<1.0	<1.0	2	< 1.0 U	<1	<1	<1.0	<1.0	3.4	< 1.0 U
Total Organic Carbon	mg/l	7	8	16	20	19 J	19	3	4	17	12	16 J	6
Chloride	mg/l	248	216	180	180J	190	260	227	247	170	190J	230	290
Permanent Gases													
Carbon Dioxide	mg/l	15.8	9.91	NA	NA	NA	NA	47.4	48.44	NA	NA	NA	NA
Oxygen	mg/l	1.1	0.92	NA	NA	NA	NA	1.57	2.23	NA	NA	NA	NA
Nitrogen	mg/l	19.7	25.42	NA	NA	NA	NA	20.5	21.77	NA	NA	NA	NA
Methane	mg/l	1.48	2.47	8.5	14	9	8.1 J	0.008337	0.006916	7.8	7.8	7.2	4.4 J
Carbon Monoxide	mg/l	<0.4	<0.40	NA	NA	NA	NA	<0.4	<0.40	NA	NA	NA	NA
Light Hydrocarbon Scan													
Ethane	ng/l	370	1134	13000	12000	18000	17000 J	47	67	10000	2400	5000	870 J
Ethene	ng/l	12233	39617	3700	440	56	< 76 U J	91	97	4900	750	2000	3600 J
Field Parameters													
pH	S.U.	7.7	7.98	8.18	7.2	7.76	6.45	7	7.05	7.46	7.76	7.16	6.06
Specific Conductivity	umhos/cm	1539	1584	1734	1870	1900	2080	1422	1493	1658	2080	1830	1880
Dissolved Oxygen	mg/l	0.16	0.28	0.37	0.04	0	0	0.88	0.48	0.34	0.03	0	0
Redox Potential	mV	-145	-49.8	-150.6	-137	-186	-162	57.6	26.5	-27.7	-223	-111	-107
Temperature	°C	17.53	19.09	19.20	18.17	16.6	16.3	18.49	21.07	19.07	17.71	16.8	16.8

mg/l - milligrams per liter.
S.U. - Standard Units.
mV - Millivolts.
°C - Degrees Celsius.
J - Value is estimated.
B - Blank contamination.
NA - Not Analyzed.
umhos/cm - Micromohs/centimeter.
ng/l - nanograms per liter.
Samples collected in September 1999 represent baseline conditions.
Carbon source introductions began in December 1999.

Table 17. Bioattenuation Parameter Results for Groundwater Samples Collected in Reactive Zone 3 East, General Motors Corporation, Moraine, Ohio.

RZ-3 East		Upgradient Well GM-22												
Constituents	**Units**	**9/1/99**	**2/23/00**	**5/25/00**	**9/21/00**	**3/20/01**	**11/13/01**	**12/12/01**	**6/13/02**	**9/25/02**	**5/22/03**	**9/24/03**	**9/14/04**	**10/17/05**
Inorganics & TOC														
Nitrate	mg/l	0	0	0	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Nitrite	mg/l	0	0	0	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Nitrogen, Ammonia	mg/l	<0.30	<0.30	<0.30	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Manganese (Total)	mg/l	0.089	0.273	0.355	0.422	0.458	0.74B	0.63	0.38B	0.029B	0.031J	0.027J	0.1 J	0.040
Manganese (Dissolved)	mg/l	0.096	0.263	0.328	0.403	0.413	0.73B	0.62	0.40B	0.093B	0.023J	0.020J	0.035 J	0.026
Iron (Total)	mg/l	<0.10	0.16	0.96	0.94	0.28	<0.10	<0.10	0.11B	0.18	0.22	0.23	1.6	0.19
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
Iron (Ferrous)	mg/l	0.6	0	0	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Sulfate	mg/l	49	125	120	117	99	300	150	120	70	72J	77	49 J	52
Sulfide	mg/l	<1	<1	<1	<1	<1.0	<1	<1.0	<1.0	0.40J	0.54B	1.6	< 1 U	< 1.0 U
Total Organic Carbon	mg/l	6	4	4	<1	<1.0	16B	6B	3	2	<1	1	1 J	2
Chloride	mg/l	246	270	279	248	326	220B	280	290	370	350	350J	370	330
Permanent Gases														
Carbon Dioxide	mg/l	40.15	43.99	40.20	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Oxygen	mg/l	1.05	0.86	1.28	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Nitrogen	mg/l	23.38	19.43	21.3	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Methane	mg/l	0.05818	0.23	0.18	0.000967	0.280	0.067	0.16	0.039	0.014	0.00039	1.2	0.02	< 0.012 U
Carbon Monoxide	mg/l	<0.40	<0.40	<0.40	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Light Hydrocarbon Scan														
Ethane	ng/l	42	91	69	29	83	130	120	140	270	13	8.4	340	< 810 U
Ethene	ng/l	67	32	64	111	39	210	12	54	62	27	11	12	< 810 U
Field Parameters														
pH	S.U.	7.12	7.15	7.08	7.17	7.00	7.33	7.39	7.21	7.02	6.89	7.04	7.10	6.88
Specific Conductivity	umhos/cm	1373	1975	1671	1684	1610	1753	2020	1415	1720	1730	1597	1760	1930
Dissolved Oxygen	mg/l	0.32	0.46	0.49	1.73	0.82	0.01	0.15	0.94	2.14	1.04	1.2	0	0
Redox Potential	mV	62.2	70.2	26.1	-80.8	175.1	54.8	-110	105.2	181.2	116.6	74.6	62	68
Temperature	°C	19.41	18.87	20.87	22.28	20.79	19.45	18.99	20.29	19.49	18.62	18.45	17.2	16.9

mg/l - milligrams per liter.
S.U. - Standard Units.
mV - Millivolts.
°C - Degrees Celsius.
J - Value is estimated.
B - Blank contamination.
NA - Not Analyzed.
umhos/cm - Micromohs/centimeter.

ng/l - nanograms per liter.
Samples collected in September 1999 represent baseline conditions.
Carbon source introductions began in December 1999.

Table 17. Bioattenuation Parameter Results for Groundwater Samples Collected in Reactive Zone 3 East, General Motors Corporation, Moraine, Ohio.

RZ-3 East		Downgradient Well 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	6/12/02	9/25/02	5/22/03	9/24/03	9/14/04	10/17/05
Inorganics & TOC														
Nitrate	mg/l	0	0	0	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Nitrite	mg/l	0	0	0	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Nitrogen, Ammonia	mg/l	<0.30	<0.3	<0.30	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Manganese (Total)	mg/l	0.321	0.233	0.215	0.336	0.298	0.30B	0.30B	0.31B	0.29B	0.32J	0.37J	0.35 J	0.17
Manganese (Dissolved)	mg/l	0.273	0.225	0.212	0.312	0.291	0.32B	0.29B	0.29B	0.25B	0.26J	0.38J	0.33 J	0.16
Iron (Total)	mg/l	2.58	0.30	0.83	0.63	0.11	<0.10	0.16	0.65	0.56	12.6	0.27	2.3	26.9
Iron (Dissolved)	mg/l	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	0.11	<0.10	<0.10	1.4	0.47	< 0.1 U	25.5
Iron (Ferrous)	mg/l	0.4	0	0	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Sulfate	mg/l	103	102	80	102	118	120	100	76	76	55J	82	79 J	< 5 U
Sulfide	mg/l	<1	<1	<1	<1	<1	<1	1.9	0.50J	0.40J	0.54B	1.5	2.9	< 1.0 U
Total Organic Carbon	mg/l	1	3	2	<1	<1	2B	1	0.9J	2	2	2	2 J	92
Chloride	mg/l	136	145	126	129	165	140	150	170	180	160	190J	190	190
Permanent Gases														
Carbon Dioxide	mg/l	37.04	37.40	18.70	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Oxygen	mg/l	1.41	0.99	1.89	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Nitrogen	mg/l	23.40	21.67	23.64	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Methane	mg/l	0.03744	0.01769	0.01370	0.04218	0.048	0.049	0.035	0.022	0.03	0.031	1.5	0.077	17
Carbon Monoxide	mg/l	<0.40	<0.40	<0.40	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Light Hydrocarbon Scan														
Ethane	ng/l	72	67	84	72	82	76	120	150	120	130	30	140	9800
Ethene	ng/l	169	38	70	69	46	46	100	120	64	570	520	250	330000
Field Parameters														
pH	S.U.	6.99	7.22	7.06	7.21	7.85	7.50	7.45	7.22	7.09	6.76	7.05	7.19	6.73
Specific Conductivity	umhos/cm	1188	1299	1048	1096	1067	1190	1360	1045	1245	968	1181	1180	1640
Dissolved Oxygen	mg/l	0.66	0.60	0.40	0.99	0.57	0.04	0.04	0.63	0.41	0.83	0.75	0	0
Redox Potential	mV	-26.9	113.3	167.1	153.9	218.5	168.8	-25	373.8	238.1	77.1	-26.7	-7	-140
Temperature	°C	20.43	18.43	17.92	19.03	17.59	16.73	15.82	18.67	18.67	17.54	18.39	17.1	16.4

mg/l - milligrams per liter.
S.U. - Standard Units.
mV - Millivolts.
°C - Degrees Celsius.
J - Value is estimated.
B - Blank contamination.
NA - Not Analyzed.
umhos/cm - Micromohs/centimeter.

ng/l - nanograms per liter.
Samples collected in September 1999 represent baseline conditions.
Carbon source introductions began in December 1999.

Table 18. Summary of Groundwater VOC Analytical Results from Upper/Lower Aquifer Monitoring Wells in October 2005, General Motors Corporation, Moraine, Ohio.

		Upgradient of the Site		On-Site			
	Units	HR-9 10/19/2005 Upper Aquifer	HR-11 10/17/2005 Upper Aquifer	HR-8 10/19/2005 Upper Aquifer	HR-4 10/20/2005 Upper Aquifer	W-2-N 10/20/2005 Upper Aquifer	W-3-N 10/20/2005 Upper Aquifer
Volatile Organic Compounds							
Benzene	ug/l	< 1.2 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 4.0 U
1,1-Dichloroethane	ug/l	42	6.5	5.5	1.5	0.28 J	< 4.0 U
1,1-Dichloroethene	ug/l	0.97 J	< 1.0 U	0.19 J	< 1.0 U	< 1.0 U	< 4.0 U
cis-1,2-Dichloroethene	ug/l	19	0.72 J	1.3	< 1.0 U	1.3	84
trans-1,2-Dichloroethene	ug/l	2.8	< 1.0 U	0.28 J	< 1.0 U	< 1.0 U	1.0 J
Ethylbenzene	ug/l	< 1.2 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 4.0 U
Tetrachloroethene	ug/l	< 1.2 U	6.0	0.24 J	0.39 J	< 1.0 U	1.4 J
Toluene	ug/l	< 1.2 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 4.0 U
1,1,1-Trichloroethane	ug/l	14	< 1.0 U	4.4	< 1.0 U	< 1.0 U	< 4.0 U
Trichloroethene	ug/l	12	< 1.0 U	0.66 J	0.32 J	0.91 J	< 4.0 U
Vinyl chloride	ug/l	0.46 J	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	8.0
Xylene (total)	ug/l	< 2.5 U	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U	< 8.0 U
Total VOCs	**ug/l**	**91.23**	**13.22**	**12.57**	**2.21**	**2.49**	**94.4**

ug/l - Micrograms per liter.
All QA/QC results for 2005 data are shown in Appendix C.
< - Constituent not detected above laboratory reporting limit shown.
J - Value is estimated.
U - Constituent not detected above laboratory reporting limit shown.

Table 18. Summary of Groundwater VOC Analytical Results from Upper/Lower Aquifer Monitoring Wells in October 2005, General Motors Corporation, Moraine, Ohio.

		On-Site					
	Units	W-4-N 10/20/2005 Upper Aquifer	HR-2 10/20/2005 Upper Aquifer	HR-5 10/18/2005 Upper Aquifer	HR-3 10/20/2005 Upper Aquifer	HR-1 10/18/2005 Upper Aquifer	GM-30 10/17/2005 Upper Aquifer
Volatile Organic Compounds							
Benzene	ug/l	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 50 U
1,1-Dichloroethane	ug/l	1.2	4.4	0.54 J	18	2.7	23 J
1,1-Dichloroethene	ug/l	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 50 U
cis-1,2-Dichloroethene	ug/l	2.0	5.0	4.6	11	19	< 50 U
trans-1,2-Dichloroethene	ug/l	< 1.0 U	0.78 J	0.52 J	1.5	2.3	< 50 U
Ethylbenzene	ug/l	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	620
Tetrachloroethene	ug/l	1.0	< 1.0 U	< 1.0 U	< 1.0 U	28	< 50 U
Toluene	ug/l	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 50 U
1,1,1-Trichloroethane	ug/l	< 1.0 U	< 1.0 U	< 1.0 U	0.34 J	1.2	< 50 U
Trichloroethene	ug/l	7.2	0.35 J	13	10	43	< 50 U
Vinyl chloride	ug/l	0.54 J	0.29 J	1.1	< 1.0 U	1.1	< 50 U
Xylene (total)	ug/l	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U	3800
Total VOCs	**ug/l**	**11.94**	**10.82**	**19.76**	**40.84**	**97.3**	**4,443**

ug/l - Micrograms per liter.
All QA/QC results for 2005 data are shown in Appendix C.
< - Constituent not detected above laboratory reporting limit shown.
J - Value is estimated.
U - Constituent not detected above laboratory reporting limit shown.

Table 18. Summary of Groundwater VOC Analytical Results from Upper/Lower Aquifer Monitoring Wells in October 2005, General Motors Corporation, Moraine, Ohio.

		On-Site					
	Units	GM-23 10/17/2005 Upper Aquifer	GM-27 10/17/2005 Upper Aquifer	GM-29 10/17/2005 Upper Aquifer	GM-28 10/18/2005 Upper Aquifer	ME-6 10/18/2005 Upper Aquifer	GM-31 10/18/2005 Upper Aquifer
Volatile Organic Compounds							
Benzene	ug/l	< 560 U	< 2.5 U	< 50 U	< 1.0 U	< 1.0 U	< 2.0 U
1,1-Dichloroethane	ug/l	< 560 U	2.2 J	18 J	4.0	7.0	6.2
1,1-Dichloroethene	ug/l	< 560 U	< 2.5 U	< 50 U	< 1.0 U	< 1.0 U	0.42 J
cis-1,2-Dichloroethene	ug/l	19000	14	1600	0.32 J	13	120
trans-1,2-Dichloroethene	ug/l	< 560 U	0.49 J	27 J	0.63 J	0.93 J	3.7
Ethylbenzene	ug/l	< 560 U	< 2.5 U	< 50 U	< 1.0 U	< 1.0 U	< 2.0 U
Tetrachloroethene	ug/l	2300	0.94 J	15 J	< 1.0 U	9.8	< 2.0 U
Toluene	ug/l	< 560 U	< 2.5 U	< 50 U	< 1.0 U	< 1.0 U	< 2.0 U
1,1,1-Trichloroethane	ug/l	< 560 U	< 2.5 U	19 J	< 1.0 U	2.2	3.4
Trichloroethene	ug/l	490 J	76	390	0.66 J	25	67
Vinyl chloride	ug/l	2800	0.82 J	490	1.1	5.6	3.1
Xylene (total)	ug/l	< 1100 U	< 5.0 U	< 100 U	< 2.0 U	< 2.0 U	< 4.0 U
Total VOCs	**ug/l**	**24,590**	**94.45**	**2,559**	**6.71**	**63.53**	**203.82**

ug/l - Micrograms per liter.
All QA/QC results for 2005 data are shown in Appendix C.
< - Constituent not detected above laboratory reporting limit shown.
J - Value is estimated.
U - Constituent not detected above laboratory reporting limit shown.

Table 18. Summary of Groundwater VOC Analytical Results from Upper/Lower Aquifer Monitoring Wells in October 2005, General Motors Corporation, Moraine, Ohio.

		On-Site					
	Units	ME-3 10/18/2005 Upper Aquifer	GM-22 10/17/2005 Upper Aquifer	GM-19S 10/18/2005 Upper Aquifer	EAST 10/18/2005 Upper Aquifer	GM-33 10/18/2005 Upper Aquifer	GM-35 10/18/2005 Upper Aquifer
Volatile Organic Compounds							
Benzene	ug/l	< 1.0 U	< 1.0 U	< 1.7 U	< 1.0 U	< 1.0 U	< 5.0 U
1,1-Dichloroethane	ug/l	15	1.0	9.0	3.0	6.4	36
1,1-Dichloroethene	ug/l	< 1.0 U	< 1.0 U	1.2 J	< 1.0 U	0.69 J	1.8 J
cis-1,2-Dichloroethene	ug/l	1.1	0.36 J	29	3.1	7.4	190
trans-1,2-Dichloroethene	ug/l	< 1.0 U	< 1.0 U	1.0 J	< 1.0 U	0.36 J	9.3
Ethylbenzene	ug/l	< 1.0 U	< 1.0 U	< 1.7 U	< 1.0 U	< 1.0 U	< 5.0 U
Tetrachloroethene	ug/l	< 1.0 U	3.6	95	47	50	29
Toluene	ug/l	< 1.0 U	< 1.0 U	< 1.7 U	< 1.0 U	< 1.0 U	< 5.0 U
1,1,1-Trichloroethane	ug/l	1.6	0.96 J	13	5.9	18	12
Trichloroethene	ug/l	1.9	4.7	140	23	71	240
Vinyl chloride	ug/l	1.6	< 1.0 U	1.8	1.2	1.0	23
Xylene (total)	ug/l	< 2.0 U	< 2.0 U	< 3.3 U	< 2.0 U	< 2.0 U	< 10 U
Total VOCs	**ug/l**	**21.2**	**10.62**	**290**	**83.2**	**154.85**	**541.1**

ug/l - Micrograms per liter.
All QA/QC results for 2005 data are shown in Appendix C.
< - Constituent not detected above laboratory reporting limit shown.
J - Value is estimated.
U - Constituent not detected above laboratory reporting limit shown.

Table 18. Summary of Groundwater VOC Analytical Results from Upper/Lower Aquifer Monitoring Wells in October 2005, General Motors Corporation, Moraine, Ohio.

		On-Site					
	Units	GM-32 10/19/2005 Upper Aquifer	GM-21 10/17/2005 Upper Aquifer	HR-17 10/19/2005 Upper Aquifer	W-2-S 10/19/2005 Upper Aquifer	W-3-S 10/19/2005 Upper Aquifer	W-4-S 10/19/2005 Upper Aquifer
Volatile Organic Compounds							
Benzene	ug/l	< 10 U	< 1.0 U	< 1.8 U	< 1.0 U	< 1.0 U	< 1.0 U
1,1-Dichloroethane	ug/l	4.9 J	3.4	0.70 J	1.2	< 1.0 U	1.4
1,1-Dichloroethene	ug/l	< 10 U	< 1.0 U	< 1.8 U	< 1.0 U	< 1.0 U	< 1.0 U
cis-1,2-Dichloroethene	ug/l	< 10 U	20	3.1	0.78 J	< 1.0 U	4.3
trans-1,2-Dichloroethene	ug/l	< 10 U	22	0.57 J	< 1.0 U	< 1.0 U	1.1
Ethylbenzene	ug/l	< 10 U	< 1.0 U	< 1.8 U	< 1.0 U	< 1.0 U	< 1.0 U
Tetrachloroethene	ug/l	< 10 U	< 1.0 U	45	0.36 J	1.0	20
Toluene	ug/l	< 10 U	< 1.0 U	< 1.8 U	< 1.0 U	< 1.0 U	< 1.0 U
1,1,1-Trichloroethane	ug/l	< 10 U	4.3	< 1.8 U	1.6	2.5	2.4
Trichloroethene	ug/l	< 10 U	1.8	8.3	5.4	2.9	13
Vinyl chloride	ug/l	< 10 U	13	< 1.8 U	< 1.0 U	< 1.0 U	< 1.0 U
Xylene (total)	ug/l	< 20 U	< 2.0 U	< 3.7 U	< 2.0 U	< 2.0 U	< 2.0 U
Total VOCs	**ug/l**	**4.9**	**64.5**	**57.67**	**9.34**	**6.4**	**42.2**

ug/l - Micrograms per liter.
All QA/QC results for 2005 data are shown in Appendix C.
< - Constituent not detected above laboratory reporting limit shown.
J - Value is estimated.
U - Constituent not detected above laboratory reporting limit shown.

Table 18. Summary of Groundwater VOC Analytical Results from Upper/Lower Aquifer Monitoring Wells in October 2005, General Motors Corporation, Moraine, Ohio.

		Downgradient of the Site					
	Units	GM-8 10/19/2005 Upper Aquifer	GM-6 10/19/2005 Upper Aquifer	TW-2 10/20/2005 Upper Aquifer	4S 10/19/2005 Upper Aquifer	GM-2 10/19/2005 Upper Aquifer	GM-16 10/19/2005 Upper Aquifer
Volatile Organic Compounds							
Benzene	ug/l	3.5	0.49 J	2.5	1.6 J	< 1.0 U	< 3.3 U
1,1-Dichloroethane	ug/l	16	21	12	2.3 J	2.0	1.1 J
1,1-Dichloroethene	ug/l	< 1.0 U	< 1.0 U	< 1.0 U	< 4.0 U	< 1.0 U	< 3.3 U
cis-1,2-Dichloroethene	ug/l	0.24 J	20	5.3	< 4.0 U	6.8	2.8 J
trans-1,2-Dichloroethene	ug/l	0.99 J	2.1	1.4	0.95 J	0.26 J	0.90 J
Ethylbenzene	ug/l	29	< 1.0 U	12	1.6 J	< 1.0 U	< 3.3 U
Tetrachloroethene	ug/l	< 1.0 U	0.34 J	< 1.0 U	< 4.0 U	3.6	100
Toluene	ug/l	0.39 J	< 1.0 U	3.4	< 4.0 U	< 1.0 U	< 3.3 U
1,1,1-Trichloroethane	ug/l	< 1.0 U	< 1.0 U	< 1.0 U	< 4.0 U	< 1.0 U	1.7 J
Trichloroethene	ug/l	< 1.0 U	1.4	< 1.0 U	< 4.0 U	4.6	55
Vinyl chloride	ug/l	0.73 J	11	4.4	< 4.0 U	0.24 J	< 3.3 U
Xylene (total)	ug/l	< 2.0 U	< 2.0 U	5.0	< 8.0 U	< 2.0 U	< 6.7 U
Total VOCs	**ug/l**	**50.85**	**56.33**	**46**	**6.45**	**17.5**	**161.5**

ug/l - Micrograms per liter.
All QA/QC results for 2005 data are shown in Appendix C.
< - Constituent not detected above laboratory reporting limit shown.
J - Value is estimated.
U - Constituent not detected above laboratory reporting limit shown.

Table 18. Summary of Groundwater VOC Analytical Results from Upper/Lower Aquifer Monitoring Wells in October 2005, General Motors Corporation, Moraine, Ohio.

		Downgradient of the Site				
	Units	GM-17 10/20/2005 Upper Aquifer	GM-18 10/20/2005 Upper Aquifer	WSU-24 10/20/2005 Upper Aquifer	GM-10 10/20/2005 Upper Aquifer	GM-26 10/20/2005 Upper Aquifer
Volatile Organic Compounds						
Benzene	ug/l	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
1,1-Dichloroethane	ug/l	5.5	15	< 1.0 U	< 1.0 U	< 1.0 U
1,1-Dichloroethene	ug/l	< 1.0 U	0.30 J	< 1.0 U	< 1.0 U	< 1.0 U
cis-1,2-Dichloroethene	ug/l	9.0	14	< 1.0 U	0.31 J	< 1.0 U
trans-1,2-Dichloroethene	ug/l	0.57 J	1.2	< 1.0 U	< 1.0 U	< 1.0 U
Ethylbenzene	ug/l	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
Tetrachloroethene	ug/l	8.1	21	1.2	1.2	1.0
Toluene	ug/l	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
1,1,1-Trichloroethane	ug/l	1.4	7.0	1.5	1.6	< 1.0 U
Trichloroethene	ug/l	29	70 J	11	12	< 1.0 U
Vinyl chloride	ug/l	2.0	3.0	< 1.0 U	< 1.0 U	< 1.0 U
Xylene (total)	ug/l	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U
Total VOCs	**ug/l**	**55.57**	**131.5**	**13.7**	**15.11**	**1**

ug/l - Micrograms per liter.
All QA/QC results for 2005 data are shown in Appendix C.
< - Constituent not detected above laboratory reporting limit shown.
J - Value is estimated.
U - Constituent not detected above laboratory reporting limit shown.

Table 18. Summary of Groundwater VOC Analytical Results from Upper/Lower Aquifer Monitoring Wells in October 2005, General Motors Corporation, Moraine, Ohio.

		Upgradient of the Site		On-Site			
	Units	HR-10 10/24/2005 Lower Aquifer	HR-12 10/24/2005 Lower Aquifer	HR-15 10/25/2005 Lower Aquifer	HR-13 10/25/2005 Lower Aquifer	GM-39 10/24/2005 Lower Aquifer	GM-40 10/25/2005 Lower Aquifer
Volatile Organic Compounds							
Benzene	ug/l	< 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	2.1	< 1.0 U	25	< 1.0 U	< 1.0 U
1,1-Dichloroethene	ug/l	< 1.0 U	< 1.0 U	< 1.0 U	0.25 J	< 1.0 U	< 1.0 U
cis-1,2-Dichloroethene	ug/l	< 1.0 U	1.5	2.2	11	< 1.0 U	< 1.0 U
trans-1,2-Dichloroethene	ug/l	< 1.0 U	< 1.0 U	< 1.0 U	1.5	< 1.0 U	< 1.0 U
Ethylbenzene	ug/l	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
Tetrachloroethene	ug/l	< 1.0 U	< 1.0 U	< 1.0 U	0.20 J	< 1.0 U	< 1.0 U
Toluene	ug/l	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
1,1,1-Trichloroethane	ug/l	< 1.0 U	< 1.0 U	< 1.0 U	2.3	< 1.0 U	< 1.0 U
Trichloroethene	ug/l	< 1.0 U	< 1.0 U	0.40 J	20	< 1.0 U	< 1.0 U
Vinyl chloride	ug/l	< 1.0 U	0.36 J	14	< 1.0 U	0.77 J	2.9
Xylene (total)	ug/l	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U
Total VOCs	**ug/l**	**0**	**3.96**	**16.6**	**60.25**	**0.77**	**2.9**

ug/l - Micrograms per liter.
All QA/QC results for 2005 data are shown in Appendix C.
< - Constituent not detected above laboratory reporting limit shown.
J - Value is estimated.
U - Constituent not detected above laboratory reporting limit shown.

Table 18. Summary of Groundwater VOC Analytical Results from Upper/Lower Aquifer Monitoring Wells in October 2005, General Motors Corporation, Moraine, Ohio.

		On-Site			Downgradient of the Site		
	Units	GM-41 10/24/2005 Lower Aquifer	GM-42 10/25/2005 Lower Aquifer	GM-19D 10/25/2005 Lower Aquifer	GM-3 10/25/2005 Lower Aquifer	GM-1 10/25/2005 Lower Aquifer	GM-15 10/26/2005 Lower Aquifer
Volatile Organic Compounds							
Benzene	ug/l	< 10 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
1,1-Dichloroethane	ug/l	< 10 U	0.64 J	< 1.0 U	1.6	< 1.0 U	1.7
1,1-Dichloroethene	ug/l	< 10 U	0.21 J	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
cis-1,2-Dichloroethene	ug/l	16	17	2.7	4.7	< 1.0 U	1.7
trans-1,2-Dichloroethene	ug/l	< 10 U	0.59 J	< 1.0 U	0.66 J	< 1.0 U	< 1.0 U
Ethylbenzene	ug/l	< 10 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
Tetrachloroethene	ug/l	< 10 U	0.19 J	< 1.0 U	2.0	2.1	< 1.0 U
Toluene	ug/l	< 10 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
1,1,1-Trichloroethane	ug/l	< 10 U	< 1.0 U	< 1.0 U	0.83 J	0.95 J	< 1.0 U
Trichloroethene	ug/l	250	0.85 J	1.2	14	34	5.9
Vinyl chloride	ug/l	< 10 U	0.56 J	15	< 1.0 U	< 1.0 U	< 1.0 U
Xylene (total)	ug/l	< 20 U	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U
Total VOCs	**ug/l**	**266**	**20.04**	**18.9**	**23.79**	**37.05**	**9.3**

ug/l - Micrograms per liter.
All QA/QC results for 2005 data are shown in Appendix C.
< - Constituent not detected above laboratory reporting limit shown.
J - Value is estimated.
U - Constituent not detected above laboratory reporting limit shown.

Table 18. Summary of Groundwater VOC Analytical Results from Upper/Lower Aquifer Monitoring Wells in October 2005, General Motors Corporation, Moraine, Ohio.

		Downgradient of the Site				
	Units	GM-11 10/26/2005 Lower Aquifer	GM-20D 10/26/2005 Lower Aquifer	DN-13 10/20/2005 Lower Aquifer	GM-9 10/26/2005 Lower Aquifer	MT-69 10/24/2005 Lower Aquifer
Volatile Organic Compounds						
Benzene	ug/l	< 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	2.0	0.59 J	< 1.0 U
1,1-Dichloroethene	ug/l	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
cis-1,2-Dichloroethene	ug/l	< 1.0 U	< 1.0 U	5.5	0.99 J	< 1.0 U
trans-1,2-Dichloroethene	ug/l	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
Ethylbenzene	ug/l	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
Tetrachloroethene	ug/l	1.7	2.7	0.38 J	< 1.0 U	< 1.0 U
Toluene	ug/l	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
1,1,1-Trichloroethane	ug/l	0.75 J	0.73 J	1.5	0.85 J	< 1.0 U
Trichloroethene	ug/l	32	11	7.2	15	< 1.0 U
Vinyl chloride	ug/l	< 1.0 U	< 1.0 U	2.6	< 1.0 U	< 1.0 U
Xylene (total)	ug/l	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U
Total VOCs	**ug/l**	**34.45**	**14.43**	**19.18**	**17.43**	**0**

ug/l - Micrograms per liter.
All QA/QC results for 2005 data are shown in Appendix C.
< - Constituent not detected above laboratory reporting limit shown.
J - Value is estimated.
U - Constituent not detected above laboratory reporting limit shown.

ARCADIS

Table 19. Carbon Source Solution Introduction Volumes for 2005, General Motors Corporation, Moraine, Ohio.

Location	Injection Well	January		February		March		April	
		Injection Event #57[1]		Injection Event #58[2]		Injection Event #59[3]		Injection Event #60[4]	
		Volume (gal.)	Flow Rate (gpm)	Volume (gal.)	Flow Rate (gpm)	Volume (gal.)	Flow Rate (gpm)	Volume (gal.)	Flow Rate (gpm)
Reactive Zone 1									
	RZ-1A	500	17.2	--	--	500	25.0	--	NA
	RZ-1B	500	22.7	--	--	500	21.7	--	NA
	RZ-1C	500	15.2	--	--	750	25.0	--	NA
	RZ-1D	500	14.3	--	--	500	17.2	--	NA
	RZ-1E	(13)	NA	500	25.0	500	17.2	--	NA
	RZ-1F	500	20.0	--	--	500	23.8	--	NA
	RZ-1G	500	18.5	--	--	500	22.7	--	NA
	RZ-1H	500	21.7	--	--	500	25.0	--	NA
	RZ-1I	500	23.8	--	--	500	23.8	--	NA
	RZ-1J	500	16.7	--	--	500	26.3	--	NA
	RZ-1K	500	23.8	--	--	500	22.7	--	NA
	RZ-1L	500	23.8	--	--	500	22.7	--	NA
	RZ-1M	500	22.7	--	--	500	20.0	--	NA
	RZ-1N	500	27.7	--	--	500	22.7	--	NA
	RZ-1O	500	20.0	--	--	500	19.2	--	NA
	RZ-1P	500	26.3	--	--	500	25.0	--	NA
	RZ-1Q	500	20.8	--	--	500	23.8	--	NA
	RZ-1R	500	23.8	--	--	500	19.2	--	NA
	RZ-1S	500	31.3	--	--	20[16]	3.0	--	NA
	RZ-1T	500	23.8	--	--	500	20.0	--	NA
	RZ-1U	500	27.7	--	--	500	16.7	--	NA
	OW-1	--	--	--	--	--	--	--	--
	OW-2	--	--	--	--	--	--	--	--
	OW-3	--	--	--	--	--	--	--	--
Reactive Zone 2									
	ME-2	--	NA	--	NA	--	NA	--	NA
	ME-4	--	NA	--	NA	--	NA	--	NA

Table 19. Carbon Source Solution Introduction Volumes for 2005, General Motors Corporation, Moraine, Ohio.

Location	Injection Well	January		February		March		April	
		Injection Event #57[1]		Injection Event #58[2]		Injection Event #59[3]		Injection Event #60[4]	
		Volume (gal.)	Flow Rate (gpm)	Volume (gal.)	Flow Rate (gpm)	Volume (gal.)	Flow Rate (gpm)	Volume (gal.)	Flow Rate (gpm)
Reactive Zone 3									
	RZ-3A	950	52.7	950	41.3	950	32.8	950	47.5
	RZ-3B	950	43.2	950	38.0	950	35.2	950	39.6
	RZ-3C	950	31.7	950	39.5	950	38.0	950	39.6
	RZ-3D	950	43.2	950	47.5	950	26.4	950	23.2
	RZ-3E	950	38.0	950	35.1	950	31.7	950	38.0
	RZ-3F	950	35.2	950	31.6	950	38.0	950	23.8
	RZ-3G	950	31.7	950	--	950	36.5	950	21.1
	RZ-3H	950	26.4	950	19.8	950	39.6	950	31.7
	RZ-3I	800	35.2	950	43.1	950	39.6	950	30.7
	RZ-3J	950	38.0	950	32.7	950	45.2	950	31.7
	RZ-3K	950	43.1	950	38.0	950	18.3	60	4.6
	RZ-3L	950	43.1	950	38.0	950	41.3	950	36.5
	RZ-3M	950	38.0	950	38.0	950	47.5	950	26.4
	RZ-3N	950	79.1	950	35.1	950	35.2	950	27.9
	RZ-3O	950	38.0	950	30.6	950	29.7	950	22.1
	RZ-3P	950	35.1	950	31.6	950	21.6	950	41.3
	RZ-3Q	950	43.1	950	15.8	950	43.2	950	41.3
	RZ-3R	950	31.6	950	36.5	950	32.8	950	39.6
	RZ-3S	950	28.7	950	39.5	950	32.8	950	47.5
	RZ-3T	950	47.5	950	31.6	950	31.7	950	27.1
	RZ-3U	950	35.1	950	31.6	950	45.2	950	41.3
	RZ-3V	950	33.9	950	25.0	950	45.2	950	52.8
	RZ-3W	950	41.3	950	30.6	950	24.4	950	29.7
	RZ-3X	950	45.2	950	39.5	950	23.8	950	33.9
	RZ-3Y	950	39.6	950	41.3	950	32.8	950	27.9
	RZ-3Z	950	41.3	950	39.5	950	26.4	950	38.0
	RZ-3AA	950	38.0	950	45.2	950	41.3	950	38.0
	RZ-3BB	950	47.5	950	39.5	950	39.6	950	14.6

Table 19. Carbon Source Solution Introduction Volumes for 2005, General Motors Corporation, Moraine, Ohio.

Location	Injection Well	January		February		March		April	
		Injection Event #57[1]		Injection Event #58[2]		Injection Event #59[3]		Injection Event #60[4]	
		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	950	30.6	950	36.5	950	35.2	950	35.2
	RZ-3DD	950	35.1	950	32.7	950	38.0	950	27.1
	RZ-3FF	950	33.9	(15)	--	950	31.7	950	31.7
	RZ-3GG	(14)	NA	(15)	--	(17)	NA	(18)	NA
	RZ-3HH	950	38.0	950	20.6	950	39.6	950	39.6
	RZ-3II	950	41.3	950	39.5	950	32.8	950	39.6
	RZ-3JJ	950	36.5	950	36.5	950	33.9	950	47.5
	RZ-3KK	950	33.9	950	30.6	950	35.2	950	43.2
	RZ-3MM	950	21.1	950	23.1	950	36.5	950	45.2
	RZ-3NN	950	25.0	950	20.2	950	45.2	950	35.2
	RZ-3OO	950	NA	950	31.6	950	41.3	950	19.0
	RZ-3PP	950	NA	950	36.5	950	50.0	950	33.9
	RZ-3QQ	950	NA	950	38.0	950	31.7	950	38.0
	RZ-3RR								
	RZ-3SS								
	RZ-3TT								
	RZ-3UU								
	RZ-3VV								
Site-Wide Total		47,850		37,550		47,300		37,110	

Table 19. Carbon Source Solution Introduction Volumes for 2005, General Motors Corporation, Moraine, Ohio.

Location	Injection Well	May		June		July		August	
		Injection Event #61[5]		Injection Event #62[6]		Injection Event #63[7]		Injection Event #64[8]	
		Volume (gal.)	Flow Rate (gpm)	Volume (gal.)	Flow Rate (gpm)	Volume (gal.)	Flow Rate (gpm)	Volume (gal.)	Flow Rate (gpm)
Reactive Zone 1									
	RZ-1A	500	22.7	--	NA	--	NA	(22)	NA
	RZ-1B	500	21.7	--	NA	--	NA	(22)	NA
	RZ-1C	500	27.8	950	29.7	--	NA	500	7.8
	RZ-1D	500	19.2	500	31.3	--	NA	500	20.8
	RZ-1E	500	25.0	500	31.3	--	NA	500	23.8
	RZ-1F	500	22.7	500	31.3	--	NA	500	20.8
	RZ-1G	500	NA	500	31.3	--	NA	500	17.2
	RZ-1H	500	25.0	500	27.8	--	NA	500	23.8
	RZ-1I	500	25.0	500	27.8	--	NA	500	25.0
	RZ-1J	500	20.8	500	25.0	--	NA	500	15.2
	RZ-1K	500	25.0	500	22.7	--	NA	500	20.0
	RZ-1L	500	29.4	500	31.3	--	NA	500	23.8
	RZ-1M	500	23.8	500	23.8	--	NA	500	15.2
	RZ-1N	500	17.9	500	16.7	--	NA	(22)	NA
	RZ-1O	500	27.8	500	23.8	--	NA	(22)	NA
	RZ-1P	500	23.8	500	23.8	--	NA	(22)	NA
	RZ-1Q	500	25.0	500	26.3	--	NA	(22)	NA
	RZ-1R	500	33.3	500	29.4	--	NA	(22)	NA
	RZ-1S	(19)	NA	(20)	NA	--	NA	(22)	NA
	RZ-1T	500	23.8	500	29.4	--	NA	(22)	NA
	RZ-1U	500	22.7	500	31.3	--	NA	(22)	NA
	OW-1	--	--	500	10.0	--	NA	250	17.9
	OW-2	--	--	50-60	4.2	--	NA	(22)	NA
	OW-3	--	--	--	NA	--	NA	(22)	NA
Reactive Zone 2									
	ME-2	--	NA	--	NA	--	NA	--	NA
	ME-4	--	NA	--	NA	--	NA	--	NA

Table 19. Carbon Source Solution Introduction Volumes for 2005, General Motors Corporation, Moraine, Ohio.

Location	Injection Well	May		June		July		August	
		Injection Event #61[5]		Injection Event #62[6]		Injection Event #63[7]		Injection Event #64[8]	
		Volume (gal.)	Flow Rate (gpm)	Volume (gal.)	Flow Rate (gpm)	Volume (gal.)	Flow Rate (gpm)	Volume (gal.)	Flow Rate (gpm)
Reactive Zone 3									
	RZ-3A	950	38.0	950	39.6	950	41.3	950	33.9
	RZ-3B	950	33.9	950	30.6	950	39.6	950	31.7
	RZ-3C	950	35.2	950	41.3	950	43.2	950	41.3
	RZ-3D	950	31.7	950	38.0	950	38.0	950	36.5
	RZ-3E	950	38.0	950	31.7	950	33.9	950	35.2
	RZ-3F	950	30.6	950	39.6	950	45.2	950	45.2
	RZ-3G	950	36.5	950	36.5	950	45.2	950	43.2
	RZ-3H	950	36.5	950	39.6	950	30.6	950	27.1
	RZ-3I	(19)	NA	950	28.8	--	NA	950	41.3
	RZ-3J	950	36.5	950	31.7	--	NA	--	NA
	RZ-3K	950	20.2	950	32.8	950	30.6	950	29.7
	RZ-3L	950	33.9	950	32.8	950	24.4	950	47.5
	RZ-3M	950	32.8	950	38.0	950	32.8	950	39.6
	RZ-3N	950	25.7	950	36.5	950	31.7	950	43.2
	RZ-3O	950	21.6	950	14.6	950	45.2	950	38.0
	RZ-3P	950	24.4	950	27.9	950	41.3	950	38.0
	RZ-3Q	950	21.1	950	28.8	950	33.9	950	41.3
	RZ-3R	950	38.0	950	27.1	950	39.6	950	45.2
	RZ-3S	950	30.6	950	28.8	950	38.0	950	41.3
	RZ-3T	(19)	NA	950	43.2	950	38.0	950	43.2
	RZ-3U	950	25.7	950	36.5	950	41.3	950	32.8
	RZ-3V	950	23.8	950	27.1	950	43.2	950	29.7
	RZ-3W	950	32.8	950	36.5	950	38.0	950	35.2
	RZ-3X	950	36.5	950	36.5	950	31.7	950	17.6
	RZ-3Y	950	45.2	950	38.0	950	27.1	950	38.0
	RZ-3Z	950	43.2	950	45.2	950	23.8	950	35.2
	RZ-3AA	950	39.6	950	39.6	950	23.8	950	25.0
	RZ-3BB	950	27.9	950	38.0	950	21.6	950	9.7

Table 19. Carbon Source Solution Introduction Volumes for 2005, General Motors Corporation, Moraine, Ohio.

Location	Injection Well	May		June		July		August	
		Injection Event #61[5]		Injection Event #62[6]		Injection Event #63[7]		Injection Event #64[8]	
		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	950	25.0	950	30.6	950	23.2	950	12.0
	RZ-3DD	950	39.6	950	25.7	950	38.0	950	27.1
	RZ-3FF	950	18.3	(20)	NA	950	23.8	(22)	NA
	RZ-3GG	(19)	NA	(20)	NA	(21)	NA	(22)	NA
	RZ-3HH	950	38.0	950	31.7	950	22.6	950	35.2
	RZ-3II	950	45.2	950	31.7	950	27.1	950	39.6
	RZ-3JJ	950	50.0	950	38.0	950	36.5	950	43.2
	RZ-3KK	950	23.8	950	25.0	950	15.8	950	38.0
	RZ-3MM	--	NA	--	NA	--	NA	--	NA
	RZ-3NN	--	NA	--	NA	--	NA	--	NA
	RZ-3OO	--	NA	--	NA	--	NA	--	NA
	RZ-3PP	--	NA	--	NA	--	NA	--	NA
	RZ-3QQ	--	NA	--	NA	--	NA	--	NA
	RZ-3RR	850	13.8	950	17.9	950	17.9	950	14.4
	RZ-3SS	850	7.9	950	17.0	950	13.2	950	18.6
	RZ-3TT	850	9.0	950	16.7	950	14.4	950	20.7
	RZ-3UU	850	19.4	950	26.4	950	14.0	950	20.2
	RZ-3VV	850	9.7	950	30.6	950	12.5	950	17.9
Site-Wide Total		45,600		47,000		36,100		41,850	

Table 19. Carbon Source Solution Introduction Volumes for 2005, General Motors Corporation, Moraine, Ohio.

Location	Injection Well	September		October		November		December	
		Injection Event #65[9]		Injection Event #66[10]		Injection Event #67[11]		Injection Event #68[12]	
		Volume (gal.)	Flow Rate (gpm)	Volume (gal.)	Flow Rate (gpm)	Volume (gal.)	Flow Rate (gpm)	Volume (gal.)	Flow Rate (gpm)
Reactive Zone 1									
	RZ-1A	500	22.8	--	NA	500	33.3	(30)	NA
	RZ-1B	500	21.7	--	NA	500	25.0	(30)	NA
	RZ-1C	500	22.7	--	NA	950	35.2	900	28.1
	RZ-1D	550	12.8	--	NA	950	32.8	900	33.3
	RZ-1E	450	10.2	--	NA	950	36.5	900	32.1
	RZ-1F	500	13.5	--	NA	950	27.1	900	32.1
	RZ-1G	500	20.8	--	NA	950	39.6	900	30.0
	RZ-1H	500	21.7	--	NA	950	38.0	900	21.4
	RZ-1I	500	26.3	--	NA	950	41.3	900	36.0
	RZ-1J	500	26.3	--	NA	950	39.6	900	37.5
	RZ-1K	500	22.7	--	NA	950	33.9	900	37.5
	RZ-1L	500	17.9	--	NA	950	29.7	900	26.5
	RZ-1M	500	10.9	--	NA	950	31.7	900	40.9
	RZ-1N	500	16.1	--	NA	950	23.8	900	37.5
	RZ-1O	500	23.8	--	NA	950	38.0	900	37.5
	RZ-1P	500	29.4	--	NA	950	31.7	900	37.5
	RZ-1Q	500	23.8	--	NA	550	13.8	900	39.1
	RZ-1R	(23)	NA	--	NA	950	27.1	900	36.0
	RZ-1S	(23)	NA	--	NA	400	8.0	500	16.6
	RZ-1T	(23)	NA	--	NA	950	33.9	450	17.3
	RZ-1U	(23)	NA	--	NA	950	38.0	900	33.3
	OW-1	(23)	NA	--	NA	500/500	25.00/14.29	450[31]	15.0
	OW-2	(23)	NA	--	NA	450/450	21.42/16.07	450[31]	13.6
	OW-3	(23)	NA	--	NA	500/500	25.00/16.13	(32)	NA
Reactive Zone 2									
	ME-2	--	NA	--	NA	--	NA	--	NA
	ME-4	--	NA	--	NA	--	NA	--	NA

Table 19. Carbon Source Solution Introduction Volumes for 2005, General Motors Corporation, Moraine, Ohio.

Location	Injection Well	September		October		November		December	
		Injection Event #65[9]		Injection Event #66[10]		Injection Event #67[11]		Injection Event #68[12]	
		Volume (gal.)	Flow Rate (gpm)	Volume (gal.)	Flow Rate (gpm)	Volume (gal.)	Flow Rate (gpm)	Volume (gal.)	Flow Rate (gpm)
Reactive Zone 3									
	RZ-3A	950	36.5	950	43.2	900/950	34.62/33.93	900/900	33.33/31.03
	RZ-3B	950	38.0	950	43.2	900/950	42.86/28.79	900/900	40.90/33.33
	RZ-3C	950	38.0	950	43.2	900/950	36.00/27.94	900/900	33.33/36.00
	RZ-3D	950	32.8	950	38.0	900/950	37.50/33.93	900/900	39.13/26.47
	RZ-3E	950	39.6	950	39.6	900/950	27.27/36.54	900/900	31.03/30.00
	RZ-3F	950	34.6	950	45.2	900/950	36.00/39.58	900/900	30.00/36.00
	RZ-3G	950	34.6	950	45.2	900/950	25.71/39.58	900/900	27.27/30.00
	RZ-3H	950	31.7	950	45.2	900/950	37.50/45.24	900/900	37.50/26.47
	RZ-3I	950	33.9	950	35.2	900/950	34.62/36.54	(32)	NA
	RZ-3J	(24)	NA	(25)	NA	900/950	36.00/33.93	900/900	30.00/39.13
	RZ-3K	950	38.0	(25)	NA	900/950	37.50/29.69	(32)	NA
	RZ-3L	950	43.2	(25)	NA	900/950	30.00/28.79	(32)	NA
	RZ-3M	950	38.0	950	27.9	900/950	36.00/36.54	900/900	30.00/33.33
	RZ-3N	950	38.0	(25)	NA	900/950	27.27/(29)	900/900	18.75/27.27
	RZ-3O	950	47.5	950	35.2	900/950	34.62/38.00	900/900	26.47/39.13
	RZ-3P	950	38.2	950	35.2	900/950	27.27/31.67	900/(30)	37.50/NA[30]
	RZ-3Q	(23)	NA	950	43.2	900/950	28.13/38.00	900/900	25.71/30.00
	RZ-3R	950	39.6	950	45.2	900/950	36.00/32.76	900/900	40.90/34.61
	RZ-3S	950	31.7	950	26.4	900/950	22.50/38.00	900/900	31.03/31.03
	RZ-3T	950	33.9	950	32.8	900/950	36.00/38.00	900/900	32.14/25.00
	RZ-3U	950	32.8	950	47.5	900/950	33.33/43.18	900/900	34.61/34.61
	RZ-3V	950	38.0	950	38.0	900/950	36.00/41.30	900/900	36.00/37.50
	RZ-3W	950	39.6	950	21.1	900/950	40.91/38.00	900/900	32.14/34.61
	RZ-3X	950	36.5	950	36.5	900/950	34.62/39.58	900/900	30.00/33.33
	RZ-3Y	950	36.5	950	31.7	900/950	26.47/36.54	--	NA
	RZ-3Z	950	39.6	950	41.3	900/950	28.13/33.93	--	NA
	RZ-3AA	(24)	NA	(25)	NA	900/950	37.50/39.58	900/900	34.61/20.00
	RZ-3BB	950	45.2	950	41.3	900/950	37.50/33.93	900/900	37.50/25.71

Table 19. Carbon Source Solution Introduction Volumes for 2005, General Motors Corporation, Moraine, Ohio.

Location	Injection Well	September		October		November		December	
		Injection Event #65[9]		Injection Event #66[10]		Injection Event #67[11]		Injection Event #68[12]	
		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	950	47.5	950	33.9	900/950	36.00/39.58	900/900	36.00/25.00
	RZ-3DD	950	36.5	950	33.9	900/950	36.0	900/(29)	36.00/NA
	RZ-3FF	(23)	NA	(26)	NA	900/950	36.00(28)	(28)	NA
	RZ-3GG	(23)	NA	(26)	NA	900/950	16.37/(28)	900/(28)	37.50/NA
	RZ-3HH	950	35.2	950	34.6	900/950	34.62/35.19	900/900	18.00/34.61
	RZ-3II	950	28.8	950	43.2	900/950	25.71/39.58	900/900	36.00/33.33
	RZ-3JJ	950	38.0	950	47.5	900/950	27.28/35.19	900/900	30.00/30.00
	RZ-3KK	950	33.9	950	32.9	900/950	37.50/(28)	900/900	37.50/42.85
	RZ-3MM	--	NA	--	NA	--	NA	--	NA
	RZ-3NN	--	NA	--	NA	--	NA	--	NA
	RZ-3OO	--	NA	--	NA	--	NA	--	NA
	RZ-3PP	--	NA	--	NA	--	NA	--	NA
	RZ-3QQ	--	NA	--	NA	--	NA	--	NA
	RZ-3RR	950	10.3	500[27]	9.4	900/(28)	20.45/NA	900/900	26.47/30.00
	RZ-3SS	950	22.6	450[27]	11.3	900/(28)	32.14/NA	900/900	17.30/27.27
	RZ-3TT	950	24.4	-25	NA	450/900	26.90/21.95	(28)	NA
	RZ-3UU	950/450	32.14/27.38	950[27]	19.4	900/(28)	32.14/NA	(28)	NA
	RZ-3VV	500	11.6	950[27]	23.8	450/900	11.25/30.00	(28)/900	NA/30.00
Site-Wide Total		41,300		27,525		18,100		16,250	

Table 19. Carbon Source Solution Introduction Volumes for 2005, General Motors Corporation, Moraine, Ohio.

Notes:
Carbon source introduced into each well is a 10 to 1 solution (potable water to molasses) between January and October, and a 20 to 1 solution (potable water to molasses) in November and December.
NA Not Applicable
-- Introduction well was not selected for introduction during this event.
(1) Injection Event #57 was completed from January 11, 2005 to January 27, 2005.
(2) Injection Event #58 was completed from February 7, 2005 to February 11, 2005, and from February 16, 2005 to February 17, 2005.
(3) Injection Event #59 was completed from March 2, 2005 to March 3, 2005, and from March 9, 2005 to March 15, 2005.
(4) Injection Event #60 was completed on March 31 and April 4 through April 7, 2005.
(5) Injection Event #61 was completed from May 3, 2005 to May 6, 2005 and from May 9, 2005 to May 12, 2005.
(6) Injection Event #62 was completed on May 31, 2005, June 1 through 2, and June 6 through 9, 2005.
(7) Injection Event #63 was completed on July 5 through 7, and July 12 through 15, 2005.
(8) Injection Event #64 was completed on August 2 through 5, and August 8 through 10, 2005.
(9) Injection Event #65 was completed September 7 through 9, 12 through 15, and 19, 2005.
(10) Injection Event #66 was completed October 3 through 6 and 10, 2005.
(11) Injection Event #67 was completed October 31 through November 3, 8 through 11, 15 and 16, 2005.
(12) Injection Event #68 was completed December 1, 2, 5 through 8, 12 through 21, 2005.
(13) Well inadvertently skipped this month. Introduction into well will be completed in February.
(14) Well not accessible due to broken down trailer over well.
(15) Well not accessible due to broken down trailer over well.
(16) Well repairs needed.
(17) Well not accessible.
(18) Well not accessible due to broken down trailer parked over well.
(19) Introduction not completed due to accessiblity or damage to the introduction well.
(20) Introduction not completed due to accessiblity or damage to the introduction well.
(21) Introduction not completed due to accessiblity or damage to the introduction well.
(22) Introduction not completed due to accessiblity.
(23) Introduction not completed due to accessiblity.
(24) Indroduction not completed because well would not accept solution.
(25) Indroduction not completed because well would not accept solution.
(26) Introduction not completed due to accessiblity.
(27) Well flushed with potable water instead of carbon solution.
(28) Introduction not completed due to accessibility.
(29) Introduction not completed because well would not accept solution.
(30) Introduction not completed due to accessibility.
(31) Well flushed with potable water.
(32) Introduction not completed because well would not accept solution.

Table 20: Corrective Action Monitoring Results for Comparison to Remediation Target Levels (RTLs)
General Motors Corporation - Moraine, Ohio

Aquifer	Remediation Zone	Chemical	Num of Analyses	Num of Detects	Min of 2005 Value (mg/l)	Mean 2005 Value (mg/L)	Max of 2005 Value (mg/l)	Min of 2004 Value (mg/l)	Mean 2004 Value (mg/L)	Max of 2004 Value (mg/l)	Min of 1999 Value (mg/l)	Mean 1999 Value (mg/l)	Max of 1999 Value (mg/l)	RTL1 (mg/L)	Ratio: Min 2005 Value to RTL	Ratio: Mean 2005 Value to RTL	Ratio: Max 2005 Value to RTL	Ratio: Min 2004 Value to RTL	Ratio: Mean 2004 Value to RTL	Ratio: Max 2004 Value to RTL	Ratio: Min 1999 Value to RTL	Ratio: Mean 1999 Value to RTL	Ratio: Max 1999 Value to RTL
SHALLOW	AOI 7 SHALLOW	1,1-Dichloroethene	3		4.5E-03	2.0E-02	5.0E-02	3.6E-03	1.8E-02	4.5E-02	1.3E-03	2.4E-02	5.0E-02	1.4E-01	3.3E-02	1.4E-01	3.6E-01	2.6E-02	1.3E-01	3.3E-01	9.5E-03	1.7E-01	3.6E-01
SHALLOW	AOI 7 SHALLOW	cis-1,2-Dichloroethene	3	2	5.0E-03	6.9E+00	1.9E+01	4.2E-03	1.9E+00	4.6E+00	7.5E-03	6.0E+00	9.7E+00	1.4E+00	3.6E-03	[illegible]	[illegible]	3.1E-03	[illegible]	[illegible]	5.5E-03	[illegible]	[illegible]
SHALLOW	AOI 7 SHALLOW	Tetrachloroethene	3	2	4.8E-03	7.7E-01	2.3E+00	3.8E-03	2.2E+00	6.7E+00	9.5E-03	4.5E+00	7.1E+00	9.8E-02	4.8E-02	[illegible]	[illegible]	3.9E-02	[illegible]	[illegible]	9.7E-02	[illegible]	[illegible]
SHALLOW	AOI 7 SHALLOW	Trichloroethene	3	2	7.0E-03	3.0E-01	4.9E-01	5.5E-03	5.2E-01	1.1E+00	5.0E-03	1.0E+00	1.5E+00	9.8E-02	7.1E-02	[illegible]	[illegible]	5.6E-02	[illegible]	[illegible]	5.1E-02	[illegible]	[illegible]
SHALLOW	AOI 7 SHALLOW	Vinyl Chloride	3	2	5.0E-03	1.1E+00	2.8E+00	4.2E-03	3.7E-01	8.7E-01	3.8E-03	1.6E+00	2.6E+00	3.9E-02	1.3E-01	[illegible]	[illegible]	1.1E-01	[illegible]	[illegible]	9.7E-02	[illegible]	[illegible]
SHALLOW	ZONE S1	1,1-Dichloroethene	1		9.0E-05	9.0E-05	9.0E-05	9.0E-05	1.0E-04	1.1E-04	5.0E-04	5.0E-04	5.0E-04	1.2E-01	7.3E-04	7.3E-04	7.3E-04	7.3E-04	8.1E-04	8.9E-04	4.0E-03	4.0E-03	4.0E-03
SHALLOW	ZONE S1	cis-1,2-Dichloroethene	1	1	3.2E-04	3.2E-04	3.2E-04	4.1E-04	4.2E-04	4.3E-04	1.8E-01	1.8E-01	1.8E-01	1.2E+00	2.6E-04	2.6E-04	2.6E-04	3.3E-04	3.4E-04	3.5E-04	1.4E-01	1.4E-01	1.4E-01
SHALLOW	ZONE S1	Tetrachloroethene	1		9.5E-05	9.5E-05	9.5E-05	6.0E-05	4.7E-04	8.8E-04	3.2E-01	3.2E-01	3.2E-01	8.8E-02	1.1E-03	1.1E-03	1.1E-03	6.8E-04	5.3E-03	1.0E-02	[illegible]	[illegible]	[illegible]
SHALLOW	ZONE S1	Trichloroethene	1	1	6.6E-04	6.6E-04	6.6E-04	1.4E-03	1.5E-03	1.7E-03	7.7E-01	7.7E-01	7.7E-01	8.8E-02	7.5E-03	7.5E-03	7.5E-03	1.6E-02	1.7E-02	1.9E-02	[illegible]	[illegible]	[illegible]
SHALLOW	ZONE S1	Vinyl Chloride	1	1	1.1E-03	1.1E-03	1.1E-03	1.3E-04	2.9E-04	4.4E-04	3.2E-03	3.2E-03	3.2E-03	3.5E-02	3.1E-02	3.1E-02	3.1E-02	3.7E-03	8.1E-03	1.3E-02	9.1E-02	9.1E-02	9.1E-02
SHALLOW	ZONE S1 TO ZONE S2	1,1-Dichloroethene	2		9.0E-05	9.0E-05	9.0E-05	9.0E-05	1.5E-04	2.6E-04	5.0E-04	5.0E-04	5.0E-04	6.5E-02	1.4E-03	1.4E-03	1.4E-03	1.4E-03	2.4E-03	4.0E-03	7.7E-03	7.7E-03	7.7E-03
SHALLOW	ZONE S1 TO ZONE S2	cis-1,2-Dichloroethene	2	2	3.2E-04	6.7E-03	1.3E-02	4.1E-04	4.9E-03	1.4E-02	1.8E-01	2.2E-01	2.6E-01	6.5E-01	5.0E-04	1.0E-02	2.0E-02	6.4E-04	7.7E-03	2.2E-02	2.7E-01	3.3E-01	4.0E-01
SHALLOW	ZONE S1 TO ZONE S2	Tetrachloroethene	2	1	9.5E-05	5.0E-03	9.8E-03	6.0E-05	2.1E-03	5.3E-03	2.1E-01	2.6E-01	3.2E-01	4.6E-02	2.1E-03	1.1E-01	2.1E-01	1.3E-03	4.5E-02	1.2E-01	[illegible]	[illegible]	[illegible]
SHALLOW	ZONE S1 TO ZONE S2	Trichloroethene	2	2	6.6E-04	1.3E-02	2.5E-02	1.4E-03	4.1E-03	9.2E-03	4.7E-01	6.2E-01	7.7E-01	4.6E-02	1.4E-02	2.8E-01	5.4E-01	3.0E-02	8.9E-02	2.0E-01	[illegible]	[illegible]	[illegible]
SHALLOW	ZONE S1 TO ZONE S2	Vinyl Chloride	2	2	1.1E-03	3.4E-03	5.6E-03	1.3E-04	9.9E-04	2.4E-03	5.0E-04	1.9E-03	3.2E-03	1.8E-02	6.1E-02	1.9E-01	3.1E-01	7.2E-03	5.5E-02	1.3E-01	2.8E-02	1.0E-01	1.8E-01
SHALLOW	ZONE S2	1,1-Dichloroethene	3	1	9.0E-05	2.0E-04	4.2E-04	9.0E-05	2.7E-04	4.5E-04	5.0E-04	5.0E-04	5.0E-04	5.5E-02	1.6E-03	3.6E-03	7.6E-03	1.6E-03	4.8E-03	8.2E-03	9.1E-03	9.1E-03	9.1E-03
SHALLOW	ZONE S2	cis-1,2-Dichloroethene	3	3	1.1E-03	4.5E-02	1.2E-01	2.2E-03	4.7E-02	1.3E-01	5.7E-03	8.9E-02	2.6E-01	5.5E-01	2.0E-03	8.1E-02	2.2E-01	4.0E-03	8.6E-02	2.3E-01	1.0E-02	1.6E-01	4.6E-01
SHALLOW	ZONE S2	Tetrachloroethene	3	1	9.5E-05	3.4E-03	9.8E-03	2.1E-04	2.9E-03	5.3E-03	1.3E-03	9.1E-02	2.1E-01	3.9E-02	2.4E-03	8.6E-02	2.5E-01	5.4E-03	7.3E-02	1.4E-01	3.3E-02	[illegible]	[illegible]
SHALLOW	ZONE S2	Trichloroethene	3	3	1.9E-03	3.1E-02	6.7E-02	1.5E-03	1.4E-02	3.2E-02	2.7E-02	1.8E-01	4.7E-01	3.9E-02	4.9E-02	8.0E-01	[illegible]	3.8E-02	3.6E-01	8.2E-01	7.0E-01	[illegible]	[illegible]
SHALLOW	ZONE S2	Vinyl Chloride	3	3	1.6E-03	3.4E-03	5.6E-03	1.1E-03	2.2E-03	3.1E-03	5.0E-04	5.0E-04	5.0E-04	1.6E-02	1.0E-01	2.1E-01	3.5E-01	6.9E-02	1.4E-01	1.9E-01	3.1E-02	3.1E-02	3.1E-02
SHALLOW	ZONE S2 TO ZONE S3	1,1-Dichloroethene	8	4	9.0E-05	5.6E-04	1.8E-03	9.0E-05	1.0E-03	4.1E-03	5.0E-04	5.8E-04	1.0E-03	3.7E-02	2.4E-03	1.5E-02	4.9E-02	2.4E-03	2.8E-02	1.1E-01	1.4E-02	1.6E-02	2.7E-02
SHALLOW	ZONE S2 TO ZONE S3	cis-1,2-Dichloroethene	8	8	3.6E-04	4.6E-02	1.9E-01	9.0E-04	6.1E-02	2.7E-01	5.0E-04	5.2E-02	2.6E-01	3.7E-01	9.7E-04	1.2E-01	5.1E-01	2.4E-03	1.6E-01	7.3E-01	1.3E-03	1.4E-01	6.9E-01
SHALLOW	ZONE S2 TO ZONE S3	Tetrachloroethene	8	6	9.5E-05	2.9E-02	9.5E-02	2.1E-04	2.3E-02	7.1E-02	1.3E-03	6.4E-02	2.1E-01	2.6E-02	3.7E-03	[illegible]	[illegible]	8.1E-03	8.7E-01	[illegible]	5.0E-02	[illegible]	[illegible]
SHALLOW	ZONE S2 TO ZONE S3	Trichloroethene	8	8	1.9E-03	7.2E-02	2.4E-01	1.5E-03	6.0E-02	2.3E-01	4.0E-03	1.1E-01	4.7E-01	2.6E-02	7.3E-02	[illegible]	[illegible]	5.8E-02	[illegible]	[illegible]	1.5E-01	[illegible]	[illegible]
SHALLOW	ZONE S2 TO ZONE S3	Vinyl Chloride	8	7	1.1E-04	4.7E-03	2.3E-02	1.1E-04	7.2E-03	5.0E-02	5.0E-04	5.0E-04	5.0E-04	1.1E-02	9.5E-03	4.3E-01	[illegible]	9.5E-03	6.5E-01	[illegible]	4.5E-02	4.5E-02	4.5E-02
SHALLOW	ZONE S3	1,1-Dichloroethene	2		9.0E-05	5.0E-04	9.0E-04	9.0E-04	2.0E-03	3.1E-03	5.0E-04	2.2E-03	3.9E-03	2.6E-02	3.5E-03	1.9E-02	3.5E-02	3.5E-02	7.7E-02	1.2E-01	1.9E-02	8.5E-02	1.5E-01
SHALLOW	ZONE S3	cis-1,2-Dichloroethene	2	1	1.1E-03	1.1E-02	2.0E-02	1.1E-03	2.9E-02	5.6E-02	2.6E-03	3.5E-02	6.6E-02	2.6E-01	4.0E-03	4.0E-02	7.7E-02	4.0E-03	1.1E-01	2.1E-01	1.0E-02	1.3E-01	2.5E-01
SHALLOW	ZONE S3	Tetrachloroethene	2		9.5E-05	5.2E-04	9.5E-04	8.5E-04	9.0E-04	9.5E-04	5.0E-04	8.5E-04	1.2E-03	1.9E-02	5.0E-03	2.8E-02	5.0E-02	4.5E-02	4.7E-02	5.0E-02	2.6E-02	4.5E-02	6.3E-02
SHALLOW	ZONE S3	Trichloroethene	2	1	1.4E-03	1.6E-03	1.8E-03	1.4E-03	9.1E-02	1.8E-01	3.2E-03	1.6E-02	2.9E-02	1.9E-02	7.4E-02	8.4E-02	9.5E-02	7.4E-02	[illegible]	[illegible]	1.7E-01	8.4E-01	[illegible]
SHALLOW	ZONE S3	Vinyl Chloride	2	1	1.1E-03	7.0E-03	1.3E-02	9.5E-04	1.0E-03	1.1E-03	5.0E-04	1.8E-03	3.0E-03	7.0E-03	1.5E-01	1.0E+00	[illegible]	1.4E-01	1.4E-01	1.5E-01	7.1E-02	2.5E-01	4.3E-01
SHALLOW	ZONE S3 TO GM-10	1,1-Dichloroethene	11	1	9.0E-05	2.0E-04	9.0E-04	9.0E-05	4.9E-04	3.1E-03	5.0E-04	9.9E-04	3.9E-03	2.1E-02	4.3E-03	9.6E-03	4.3E-02	4.3E-03	2.3E-02	1.5E-01	2.4E-02	4.7E-02	1.9E-01
SHALLOW	ZONE S3 TO GM-10	cis-1,2-Dichloroethene	11	9	1.1E-04	7.2E-03	2.0E-02	1.1E-04	9.3E-03	5.6E-02	5.0E-04	2.2E-02	6.6E-02	2.1E-01	5.1E-04	3.5E-02	9.7E-02	5.1E-04	4.5E-02	2.7E-01	2.4E-03	1.1E-01	3.2E-01
SHALLOW	ZONE S3 TO GM-10	Tetrachloroethene	11	8	9.5E-05	1.4E-02	1.0E-01	9.5E-05	1.7E-02	1.3E-01	5.0E-04	1.8E-02	8.1E-02	1.5E-02	6.3E-03	9.5E-01	[illegible]	6.3E-03	[illegible]	[illegible]	3.3E-02	[illegible]	[illegible]
SHALLOW	ZONE S3 TO GM-10	Trichloroethene	11	9	1.4E-04	1.8E-02	7.0E-02	1.4E-04	3.6E-02	1.8E-01	3.2E-03	3.5E-02	1.3E-01	1.5E-02	9.3E-03	[illegible]	[illegible]	9.3E-03	[illegible]	[illegible]	2.1E-01	[illegible]	[illegible]
SHALLOW	ZONE S3 TO GM-10	Vinyl Chloride	11	6	1.1E-04	2.9E-03	1.3E-02	1.1E-04	6.3E-04	3.0E-03	5.0E-04	1.7E-03	8.4E-03	6.0E-03	1.8E-02	4.8E-01	[illegible]	1.8E-02	1.1E-01	5.0E-01	8.3E-02	2.9E-01	[illegible]
SHALLOW	GM-10	1,1-Dichloroethene	1		9.0E-05	9.0E-05	9.0E-05	9.0E-05	9.0E-05	9.0E-05	5.0E-04	5.0E-04	5.0E-04	1.5E-02	6.0E-03	6.0E-03	6.0E-03	6.0E-03	6.0E-03	6.0E-03	3.3E-02	3.3E-02	3.3E-02
SHALLOW	GM-10	cis-1,2-Dichloroethene	1	1	3.1E-04	3.1E-04	3.1E-04	3.8E-04	3.8E-04	3.8E-04	5.0E-04	5.0E-04	5.0E-04	1.5E-01	2.1E-03	2.1E-03	2.1E-03	2.5E-03	2.5E-03	2.5E-03	3.3E-03	3.3E-03	3.3E-03
SHALLOW	GM-10	Tetrachloroethene	1	1	1.2E-03	1.2E-03	1.2E-03	1.5E-03	1.5E-03	1.5E-03	5.0E-04	5.0E-04	5.0E-04	1.1E-02	1.1E-01	1.1E-01	1.1E-01	1.4E-01	1.4E-01	1.4E-01	4.5E-02	4.5E-02	4.5E-02
SHALLOW	GM-10	Trichloroethene	1	1	1.2E-02	1.2E-02	1.2E-02	1.5E-02	1.5E-02	1.5E-02	1.4E-02	1.4E-02	1.4E-02	1.1E-02	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
SHALLOW	GM-10	Vinyl Chloride	1		1.1E-04	1.1E-04	1.1E-04	1.1E-04	1.1E-04	1.1E-04	5.0E-04	5.0E-04	5.0E-04	4.0E-03	2.6E-02	2.6E-02	2.6E-02	2.6E-02	2.6E-02	2.6E-02	1.3E-01	1.3E-01	1.3E-01
SHALLOW	POC SHALLOW	1,1-Dichloroethene	1		9.0E-05	9.0E-05	9.0E-05	9.0E-05	9.0E-05	9.0E-05	5.0E-04	5.0E-04	5.0E-04	7.0E-03	1.3E-02	1.3E-02	1.3E-02	1.3E-02	1.3E-02	1.3E-02	7.1E-02	7.1E-02	7.1E-02
SHALLOW	POC SHALLOW	cis-1,2-Dichloroethene	1		1.1E-04	1.1E-04	1.1E-04	1.1E-04	1.1E-04	1.1E-04	5.0E-04	5.0E-04	5.0E-04	7.0E-02	1.5E-03	1.5E-03	1.5E-03	1.5E-03	1.5E-03	1.5E-03	7.1E-03	7.1E-03	7.1E-03
SHALLOW	POC SHALLOW	Tetrachloroethene	1	1	1.0E-03	1.0E-03	1.0E-03	1.3E-03	1.3E-03	1.3E-03	5.0E-04	5.0E-04	5.0E-04	5.0E-03	2.0E-01	2.0E-01	2.0E-01	2.6E-01	2.6E-01	2.6E-01	1.0E-01	1.0E-01	1.0E-01
SHALLOW	POC SHALLOW	Trichloroethene	1		1.4E-04	1.4E-04	1.4E-04	1.4E-04	1.4E-04	1.4E-04	5.0E-04	5.0E-04	5.0E-04	5.0E-03	2.8E-02	2.8E-02	2.8E-02	2.8E-02	2.8E-02	2.8E-02	1.0E-01	1.0E-01	1.0E-01
SHALLOW	POC SHALLOW	Vinyl Chloride	1		1.1E-04	1.1E-04	1.1E-04	1.1E-04	1.1E-04	1.1E-04	5.0E-04	5.0E-04	5.0E-04	2.0E-03	5.3E-02	5.3E-02	5.3E-02	5.3E-02	5.3E-02	5.3E-02	2.5E-01	2.5E-01	2.5E-01

Table 20: Corrective Action Monitoring Results for Comparison to Remediation Target Levels (RTLs)
General Motors Corporation - Moraine, Ohio

Aquifer	Remediation Zone	Chemical	Num of Analyses	Num of Detects	Min of 2005 Value (mg/l)	Mean 2005 Value (mg/L)	Max of 2005 Value (mg/l)	Min of 2004 Value (mg/l)	Mean 2004 Value (mg/L)	Max of 2004 Value (mg/l)	Min of 1999 Value (mg/l)	Mean 1999 Value (mg/l)	Max of 1999 Value (mg/l)	RTL1 (mg/L)	Ratio: Min 2005 Value to RTL	Ratio: Mean 2005 Value to RTL	Ratio: Max 2005 Value to RTL	Ratio: Min 2004 Value to RTL	Ratio: Mean 2004 Value to RTL	Ratio: Max 2004 Value to RTL	Ratio: Min 1999 Value to RTL	Ratio: Mean 1999 Value to RTL	Ratio: Max 1999 Value to RTL
DEEP	AOI 7 DEEP	1,1-Dichloroethene	3		4.5E-03	2.0E-02	5.0E-02	3.6E-03	1.8E-02	4.5E-02	1.3E-03	2.4E-02	5.0E-02	1.8E-01	2.5E-02	1.1E-01	2.8E-01	2.0E-02	9.9E-02	2.5E-01	7.3E-03	1.3E-01	2.8E-01
DEEP	AOI 7 DEEP	cis-1,2-Dichloroethene	3	2	5.0E-03	6.9E+00	1.9E+01	4.2E-03	1.9E+00	4.6E+00	7.5E-03	6.0E+00	9.7E+00	1.8E+00	2.8E-03	[redacted]	[redacted]	2.3E-03	[redacted]	[redacted]	4.2E-03	[redacted]	[redacted]
DEEP	AOI 7 DEEP	Tetrachloroethene	3	2	4.8E-03	7.7E-01	2.3E+00	3.8E-03	2.2E+00	6.7E+00	9.5E-03	4.5E+00	7.1E+00	1.3E-01	3.7E-02	[redacted]	[redacted]	3.0E-02	[redacted]	[redacted]	7.4E-02	[redacted]	[redacted]
DEEP	AOI 7 DEEP	Trichloroethene	3	2	7.0E-03	3.0E-01	4.9E-01	5.5E-03	5.2E-01	1.1E+00	5.0E-03	1.0E+00	1.5E+00	1.3E-01	5.5E-02	[redacted]	[redacted]	4.3E-02	[redacted]	[redacted]	3.9E-02	[redacted]	[redacted]
DEEP	AOI 7 DEEP	Vinyl Chloride	3	2	5.0E-03	1.1E+00	2.8E+00	4.2E-03	3.7E-01	8.7E-01	3.8E-03	1.6E+00	2.6E+00	5.1E-02	9.8E-02	[redacted]	[redacted]	8.2E-02	[redacted]	[redacted]	7.5E-02	[redacted]	[redacted]
DEEP	GM-40/41	1,1-Dichloroethene	2		9.0E-05	5.0E-04	9.0E-04	9.0E-05	5.1E-04	9.0E-04				3.2E-02	2.8E-03	1.5E-02	2.8E-02	2.8E-03	1.6E-02	2.8E-02			
DEEP	GM-40/41	cis-1,2-Dichloroethene	2	1	1.1E-04	8.1E-03	1.6E-02	1.1E-04	1.3E-02	2.4E-02				3.2E-01	3.3E-04	2.5E-02	5.0E-02	3.3E-04	4.1E-02	7.4E-02			
DEEP	GM-40/41	Tetrachloroethene	2		9.5E-05	5.2E-04	9.5E-04	9.5E-05	3.9E-04	6.0E-04				2.3E-02	4.1E-03	2.3E-02	4.1E-02	4.1E-03	1.7E-02	2.6E-02			
DEEP	GM-40/41	Trichloroethene	2	1	1.4E-04	1.3E-01	2.5E-01	1.4E-04	1.4E-01	2.5E-01				2.3E-02	6.1E-03	[redacted]	[redacted]	6.1E-03	[redacted]	[redacted]			
DEEP	GM-40/41	Vinyl Chloride	2	1	1.1E-03	2.0E-03	2.9E-03	6.5E-04	1.6E-03	3.2E-03				9.0E-03	1.2E-01	2.2E-01	3.2E-01	7.2E-02	1.8E-01	3.6E-01			
DEEP	GM-42	1,1-Dichloroethene	1	1	2.1E-04	2.1E-04	2.1E-04	2.5E-04	2.5E-04	2.5E-04				1.1E-02	1.9E-02	1.9E-02	1.9E-02	2.3E-02	2.3E-02	2.3E-02			
DEEP	GM-42	cis-1,2-Dichloroethene	1	1	1.7E-02	1.7E-02	1.7E-02	1.6E-02	1.6E-02	1.6E-02				1.1E-01	1.6E-01	1.6E-01	1.6E-01	1.5E-01	1.5E-01	1.5E-01			
DEEP	GM-42	Tetrachloroethene	1	1	1.9E-04	1.9E-04	1.9E-04	9.5E-05	9.5E-05	9.5E-05				8.0E-03	2.4E-02	2.4E-02	2.4E-02	1.2E-02	1.2E-02	1.2E-02			
DEEP	GM-42	Trichloroethene	1	1	8.5E-04	8.5E-04	8.5E-04	4.3E-04	4.3E-04	4.3E-04				8.0E-03	1.1E-01	1.1E-01	1.1E-01	5.4E-02	5.4E-02	5.4E-02			
DEEP	GM-42	Vinyl Chloride	1	1	5.6E-04	5.6E-04	5.6E-04	9.2E-04	9.2E-04	9.2E-04				3.0E-03	1.9E-01	1.9E-01	1.9E-01	3.1E-01	3.1E-01	3.1E-01			
DEEP	GM-19D	1,1-Dichloroethene	1		9.0E-05	9.0E-05	9.0E-05	9.0E-05	9.0E-05	9.0E-05	5.0E-04	5.0E-04	5.0E-04	8.0E-03	1.1E-02	1.1E-02	1.1E-02	1.1E-02	1.1E-02	1.1E-02	6.3E-02	6.3E-02	6.3E-02
DEEP	GM-19D	cis-1,2-Dichloroethene	1	1	2.7E-03	2.7E-03	2.7E-03	2.0E-03	2.0E-03	2.0E-03	1.2E-03	1.2E-03	1.2E-03	8.3E-02	3.3E-02	3.3E-02	3.3E-02	2.4E-02	2.4E-02	2.4E-02	1.4E-02	1.4E-02	1.4E-02
DEEP	GM-19D	Tetrachloroethene	1		9.5E-05	9.5E-05	9.5E-05	9.5E-05	9.5E-05	9.5E-05	5.0E-04	5.0E-04	5.0E-04	6.0E-03	1.6E-02	1.6E-02	1.6E-02	1.6E-02	1.6E-02	1.6E-02	8.3E-02	8.3E-02	8.3E-02
DEEP	GM-19D	Trichloroethene	1	1	1.2E-03	1.2E-03	1.2E-03	3.5E-03	3.5E-03	3.5E-03	1.4E-02	1.4E-02	1.4E-02	6.0E-03	2.0E-01	2.0E-01	2.0E-01	5.8E-01	5.8E-01	5.8E-01	[redacted]	[redacted]	[redacted]
DEEP	GM-19D	Vinyl Chloride	1	1	1.5E-02	1.5E-02	1.5E-02	1.8E-02	1.8E-02	1.8E-02	1.5E-03	1.5E-03	1.5E-03	2.0E-03	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	7.5E-01	7.5E-01	7.5E-01
DEEP	ZONE D2	1,1-Dichloroethene	2		9.0E-05	9.0E-05	9.0E-05	9.0E-05	9.0E-05	9.0E-05	5.0E-04	5.0E-04	5.0E-04	8.0E-03	1.1E-02	1.1E-02	1.1E-02	1.1E-02	1.1E-02	1.1E-02	6.3E-02	6.3E-02	6.3E-02
DEEP	ZONE D2	cis-1,2-Dichloroethene	2	1	1.1E-04	2.4E-03	4.7E-03	1.1E-04	2.5E-03	4.9E-03	5.0E-04	8.0E-04	1.1E-03	7.5E-02	1.4E-03	3.2E-02	6.3E-02	1.4E-03	3.3E-02	6.5E-02	6.7E-03	1.1E-02	1.5E-02
DEEP	ZONE D2	Tetrachloroethene	2	2	2.0E-03	2.1E-03	2.1E-03	2.0E-03	2.1E-03	2.1E-03	1.2E-03	1.6E-03	2.0E-03	5.0E-03	4.0E-01	4.1E-01	4.2E-01	4.0E-01	4.1E-01	4.2E-01	2.4E-01	3.2E-01	4.0E-01
DEEP	ZONE D2	Trichloroethene	2	2	1.4E-02	2.4E-02	3.4E-02	1.3E-02	2.4E-02	3.5E-02	7.5E-03	1.9E-02	3.1E-02	5.0E-03	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
DEEP	ZONE D2	Vinyl Chloride	2		1.1E-04	1.1E-04	1.1E-04	1.1E-04	1.1E-04	1.1E-04	5.0E-04	5.0E-04	5.0E-04	2.0E-03	5.3E-02	5.3E-02	5.3E-02	5.3E-02	5.3E-02	5.3E-02	2.5E-01	2.5E-01	2.5E-01
DEEP	POC DEEP	1,1-Dichloroethene	3		9.0E-05	9.0E-05	9.0E-05	9.0E-05	9.0E-05	9.0E-05	5.0E-04	5.0E-04	5.0E-04	7.0E-03	1.3E-02	1.3E-02	1.3E-02	1.3E-02	1.3E-02	1.3E-02	7.1E-02	7.1E-02	7.1E-02
DEEP	POC DEEP	cis-1,2-Dichloroethene	3	1	1.1E-04	6.4E-04	1.7E-03	1.1E-04	5.4E-04	1.4E-03	5.0E-04	1.8E-03	4.3E-03	7.0E-02	1.5E-03	9.1E-03	2.4E-02	1.5E-03	7.7E-03	2.0E-02	7.1E-03	2.5E-02	6.1E-02
DEEP	POC DEEP	Tetrachloroethene	3	2	9.5E-05	1.5E-03	2.7E-03	9.5E-05	1.7E-03	2.9E-03	5.0E-04	8.3E-04	1.5E-03	5.0E-03	1.9E-02	3.0E-01	5.4E-01	1.9E-02	3.4E-01	5.8E-01	1.0E-01	1.7E-01	3.0E-01
DEEP	POC DEEP	Trichloroethene	3	3	5.9E-03	1.6E-02	3.2E-02	5.8E-03	1.7E-02	3.3E-02	5.0E-04	6.4E-03	1.5E-02	5.0E-03	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	1.0E-01	[redacted]	[redacted]
DEEP	POC DEEP	Vinyl Chloride	3		1.1E-04	1.1E-04	1.1E-04	1.1E-04	1.1E-04	1.1E-04	5.0E-04	5.0E-04	5.0E-04	2.0E-03	5.3E-02	5.3E-02	5.3E-02	5.3E-02	5.3E-02	5.3E-02	2.5E-01	2.5E-01	2.5E-01

NOTES

1. RTL reflects updated groundwater modeling conducted to reflect current pumping conditions (see Appendix F, Table F-4)

Table 21: In-Place Waste Management Unit Assessment
Summary of Downgradient Ground Water Concentrations (mg/L) for Current Ground Water Use[1]
Delphi Thermal, Moraine Engine and Moraine Assembly Plants - GMC, Moraine, Ohio

TCL/TAL Group	Constituent	CASRN	Moraine Assembly	Moraine Engine	West Carrollton	Criteria	Flag
VOC	1,1,1-Trichloroethane	71-55-6	0.	0.	0.	0.2	
VOC	1,1-Dichloroethane	75-34-3	0.	0.	0.	3.65	
VOC	1,1-Dichloroethene	75-35-4	0.	0.	0.	0.007	
VOC	1,2-Dichloroethene (total)	540-59-0	0.	0.	0.	0.07	
VOC	2-Butanone	78-93-3	0.	0.	0.	21.9	
VOC	Acetone	67-64-1	0.	0.	0.	3.65	
VOC	Benzene	71-43-2	0.	0.	0.	0.005	
VOC	Carbon Disulfide	75-15-0	0.	0.	0.	3.65	
VOC	Chlorobenzene	108-90-7	0.	0.	0.	0.1	
VOC	Chloroethane	75-00-3	0.	0.	0.	0.01	
VOC	Chloroform	67-66-3	0.	0.	0.	0.1	
VOC	cis-1,2-Dichloroethene	156-59-2	0.0001	0.	0.	0.07	
VOC	Ethyl Benzene	100-41-4	0.	0.	0.	0.7	
VOC	Styrene	100-42-5	0.	0.	0.	0.1	
VOC	Tetrachloroethene	127-18-4	0.	0.	0.0001	0.005	
VOC	Toluene	108-88-3	0.	0.	0.	1.	
VOC	trans-1,2-Dichloroethene	156-60-5	0.	0.	0.	0.1	
VOC	Trichloroethene	79-01-6	0.0001	0.	0.	0.005	
VOC	Trichlorofluoromethane	75-69-4	0.	0.	0.	10.95	
VOC	Vinyl Chloride	75-01-4	0.	0.	0.	0.002	
VOC	Xylenes (total)	1330-20-7	0.	0.	0.	10.	
SVOC	1,2-Dichlorobenzene	95-50-1	0.	0.	0.	0.6	
SVOC	2-Methylnaphthalene	91-57-6	0.	0.	0.	0.73	
SVOC	Benzo(a)anthracene	56-55-3	0.	0.	0.	0.01	
SVOC	Benzo(a)pyrene	50-32-8	0.	0.	0.	0.0002	
SVOC	Benzo(b)fluoranthene	205-99-2	0.	0.	0.	0.01	
SVOC	bis(2-Ethylhexyl)phthalate	117-81-7	0.	0.	0.	0.006	
SVOC	Butylbenzylphthalate	85-68-7	0.	0.	0.	7.3	
SVOC	Chrysene	218-01-9	0.	0.	0.	0.0117	
SVOC	Di-n-butylphthalate	84-74-2	0.	0.	0.	3.65	
SVOC	Fluoranthene	206-44-0	0.	0.	0.	1.46	
SVOC	Fluorene	86-73-7	0.	0.	0.	1.46	
SVOC	Naphthalene	91-20-3	0.	0.	0.	0.73	
SVOC	Phenanthrene	85-01-8	0.	0.	0.	1.095	
SVOC	Pyrene	129-00-0	0.	0.	0.	1.095	
P/PCB	Aroclor-1242	53469-21-9	0.	0.	0.	0.0005	
P/PCB	Aroclor-1254	11097-69-1	0.	0.	0.	0.0005	
P/PCB	Aroclor-1260	11096-82-5	0.	0.	0.	0.0005	
INORG	Antimony	7440-36-0	0.	0.	0.	0.006	
INORG	Arsenic	7440-38-2	0.	0.	0.	0.05	
INORG	Barium	7440-39-3	0.	0.	0.	2.	
INORG	Beryllium	7440-41-7	0.	0.	0.	0.004	
INORG	Cadmium	7440-43-9	0.	0.	0.	0.005	
INORG	Chromium (total)	7440-47-3	0.	0.	0.	0.1	
INORG	Cobalt	7440-48-4	0.	0.	0.	2.19	
INORG	Copper	7440-50-8	0.	0.	0.	1.3	
INORG	Cyanide (total)	57-12-5	0.	0.	0.	0.2	
INORG	Lead	7439-92-1	0.	0.	0.	0.015	
INORG	Manganese	7439-96-5	0.	0.	0.0002	5.11	
INORG	Mercury	7439-97-6	0.	0.	0.	0.002	
INORG	Nickel	7440-02-0	0.	0.	0.	0.1	
INORG	Selenium	7782-49-2	0.	0.	0.	0.05	
INORG	Silver	7440-22-4	0.	0.	0.	0.1825	
INORG	Thallium	7440-28-0	0.	0.	0.	0.002	
INORG	Vanadium	7440-62-2	0.	0.	0.	0.2555	
INORG	Zinc	7440-66-6	0.	0.	0.	10.95	

Note:

1 Supplemental Baseline Risk Assessment (ENVIRON 2001b). Groundwater Exposure Scenario 1 - Baseline wells (West Carrollton municipal well field and Moraine Assembly industrial wells (11A, 12A)).

Table 22. Summary of Site-Wide Groundwater Monitoring Plan, General Motors Corporation, Moraine, Ohio.

Monitoring Wells	Reason for Monitoring	Monitoring Frequency	Parameter List
Upper Aquifer Wells			
HR-9	Monitoring groundwater quality upgradient of the site.	Annual	VOCs[1]
HR-11	Monitoring groundwater quality upgradient of the site.	Annual	VOCs[1]
HR-8	Monitoring of groundwater quality upgradient of the North Settling Lagoon and Landfills L2 and L3.	Annual	VOCs[1]
HR-4	Monitoring of groundwater quality upgradient of the North Settling Lagoon and downgradient of Landfill L3.	Annual	VOCs[1]
W-2-N	Monitoring of groundwater quality downgradient of the North Settling Lagoon.	Annual	VOCs[1]
W-3-N	Monitoring of groundwater quality downgradient of the North Settling Lagoon.	Annual	VOCs[1]
W-4-N	Monitoring of groundwater quality downgradient of the North Settling Lagoon and Landfills L2 and L3.	Annual	VOCs[1]
HR-2	Monitoring groundwater quality downgradient of Landfills L2 and L3.	Annual	VOCs[1]
HR-5	Monitoring of groundwater quality downgradient of the North Settling Lagoon.	Annual	VOCs[1]
HR-3	Monitoring groundwater quality in the central portion of the site.	Annual	VOCs[1]
HR-1	Monitoring groundwater quality in the central portion of the site.	Annual	VOCs[1]
GM-30	Monitoring effectiveness of interim measures at AOI 7.	Annual	VOCs[1] Biogeochemical[2]
GM-23	Monitoring effectiveness of interim measures at AOI 7.	Annual	VOCs[1] Biogeochemical[2]

Table 22. Summary of Site-Wide Groundwater Monitoring Plan, General Motors Corporation, Moraine, Ohio.

Monitoring Wells	Reason for Monitoring	Monitoring Frequency	Parameter List
Upper Aquifer Wells			
GM-27	Monitoring effectiveness of interim measures at AOI 7 in lower portion of the upper aquifer.	Annual	VOCs[1]
GM-29	Monitoring effectiveness of interim measures upgradient of RZ-1.	Annual	VOCs[1] Biogeochemical[2]
GM-28	Monitoring effectiveness of interim measures downgradient of RZ-1.	Annual	VOCs[1] Biogeochemical[2]
ME-6	Monitoring effectiveness of interim measures at the upgradient boundary of RZ-2.	Annual	VOCs[1] Biogeochemical[2]
GM-31	Monitoring effectiveness of interim measures within RZ-2.	Annual	VOCs[1] Biogeochemical[2]
ME-3	Monitoring effectiveness of interim measures at the downgradient boundary of RZ-2.	Annual	VOCs[1] Biogeochemical[2]
GM-22	Monitoring effectiveness of interim measures upgradient of RZ-3.	Annual	VOCs[1] Biogeochemical[2]
GM-19S	Monitoring effectiveness of interim measures upgradient of RZ-3 and groundwater quality upgradient of Landfill L1.	Annual	VOCs[1] Biogeochemical[2]
EAST	Monitoring effectiveness of interim measures upgradient of RZ-3 and groundwater quality upgradient of Landfill L1.	Annual	VOCs[1] Biogeochemical[2]

Table 22. Summary of Site-Wide Groundwater Monitoring Plan, General Motors Corporation, Moraine, Ohio.

Monitoring Wells	Reason for Monitoring	Monitoring Frequency	Parameter List
Upper Aquifer Wells			
GM-33	Monitoring effectiveness of interim measures upgradient of RZ-3 and groundwater quality upgradient of Landfill L1.	Annual	VOCs[1]
GM-35	Monitoring effectiveness of interim measures upgradient of RZ-3 and groundwater quality upgradient of Landfill L1.	Annual	VOCs[1]
GM-32	Monitoring effectiveness of interim measures downgradient of RZ-3 and groundwater quality upgradient of Landfill L1.	Annual	VOCs[1] Biogeochemical[2]
GM-21	Monitoring effectiveness of interim measures downgradient of RZ-3.	Annual	VOCs[1] Biogeochemical[2]
HR-17	Monitoring of groundwater quality upgradient of the South Settling Lagoon.	Annual	VOCs[1]
W-2-S	Monitoring of groundwater quality downgradient of the South Settling Lagoon.	Annual	VOCs[1]
W-3-S	Monitoring of groundwater quality downgradient of the South Settling Lagoon.	Annual	VOCs[1]
W-4-S	Monitoring of groundwater quality downgradient of the South Settling Lagoon.	Annual	VOCs[1]
GM-8	Monitoring groundwater quality downgradient of the site and within Landfill L1.	Annual	VOCs[1] Biogeochemical[2
GM-6	Monitoring groundwater quality downgradient of the site and Landfill L1.	Annual	VOCs[1] Biogeochemical[2]

Table 22. Summary of Site-Wide Groundwater Monitoring Plan, General Motors Corporation, Moraine, Ohio.

Monitoring Wells	Reason for Monitoring	Monitoring Frequency	Parameter List
Upper Aquifer Wells			
TW-2	Monitoring groundwater quality downgradient of the site and Landfill L1.	Annual	VOCs[1]
4S	Monitoring groundwater quality downgradient of the site and Landfill L1.	Annual	VOCs[1]
GM-2	Monitoring groundwater quality downgradient of the site.	Annual	VOCs[1]
GM-16	Monitoring groundwater quality downgradient of the site.	Annual	VOCs[1]
GM-17	Monitoring groundwater quality downgradient of the site.	Annual	VOCs[1]
GM-18	Monitoring groundwater quality downgradient of the site.	Annual	VOCs[1]
WSU-24	Monitoring groundwater quality downgradient of the site.	Annual	VOCs[1]
GM-10	Monitoring groundwater quality downgradient of the site.	Annual	VOCs[1]
GM-26	Monitoring groundwater quality downgradient of the site.	Annual	VOCs[1]
Lower Aquifer Wells			
HR-10	Monitoring groundwater quality upgradient of the site.	Annual	VOCs[1]
HR-12	Monitoring groundwater quality upgradient of the site.	Annual	VOCs[1]
HR-15	Monitoring groundwater quality in the central portion of the site.	Annual	VOCs[1]
HR-13	Monitoring groundwater quality in the central portion of the site.	Annual	VOCs[1]

Table 22. Summary of Site-Wide Groundwater Monitoring Plan, General Motors Corporation, Moraine, Ohio.

Monitoring Wells	Reason for Monitoring	Monitoring Frequency	Parameter List
Lower Aquifer Wells			
GM-39	Monitoring groundwater quality in the central portion of the site.	Annual	VOCs[1]
GM-40	Monitoring groundwater quality in the central portion of the site.	Annual	VOCs[1]
GM-41	Monitoring groundwater quality in the central portion of the site.	Annual	VOCs[1]
GM-42	Monitoring groundwater quality in the central portion of the site.	Annual	VOCs[1]
GM-19D	Monitoring groundwater quality downgradient of the site.	Annual	VOCs[1]
GM-3	Monitoring groundwater quality downgradient of the site.	Annual	VOCs[1]
GM-1	Monitoring groundwater quality downgradient of the site.	Annual	VOCs[1]
GM-15	Monitoring groundwater quality downgradient of the site.	Annual	VOCs[1]
GM-11	Monitoring groundwater quality downgradient of the site.	Annual	VOCs[1]
GM-20D	Monitoring groundwater quality downgradient of the site.	Annual	VOCs[1]
DN-13	Monitoring groundwater quality downgradient of the site.	Annual	VOCs[1]
GM-9	Monitoring groundwater quality downgradient of the site.	Annual	VOCs[1]
MT-69	Monitoring groundwater quality downgradient of the site.	Annual	VOCs[1]

VOCs - Volatile organic compounds.

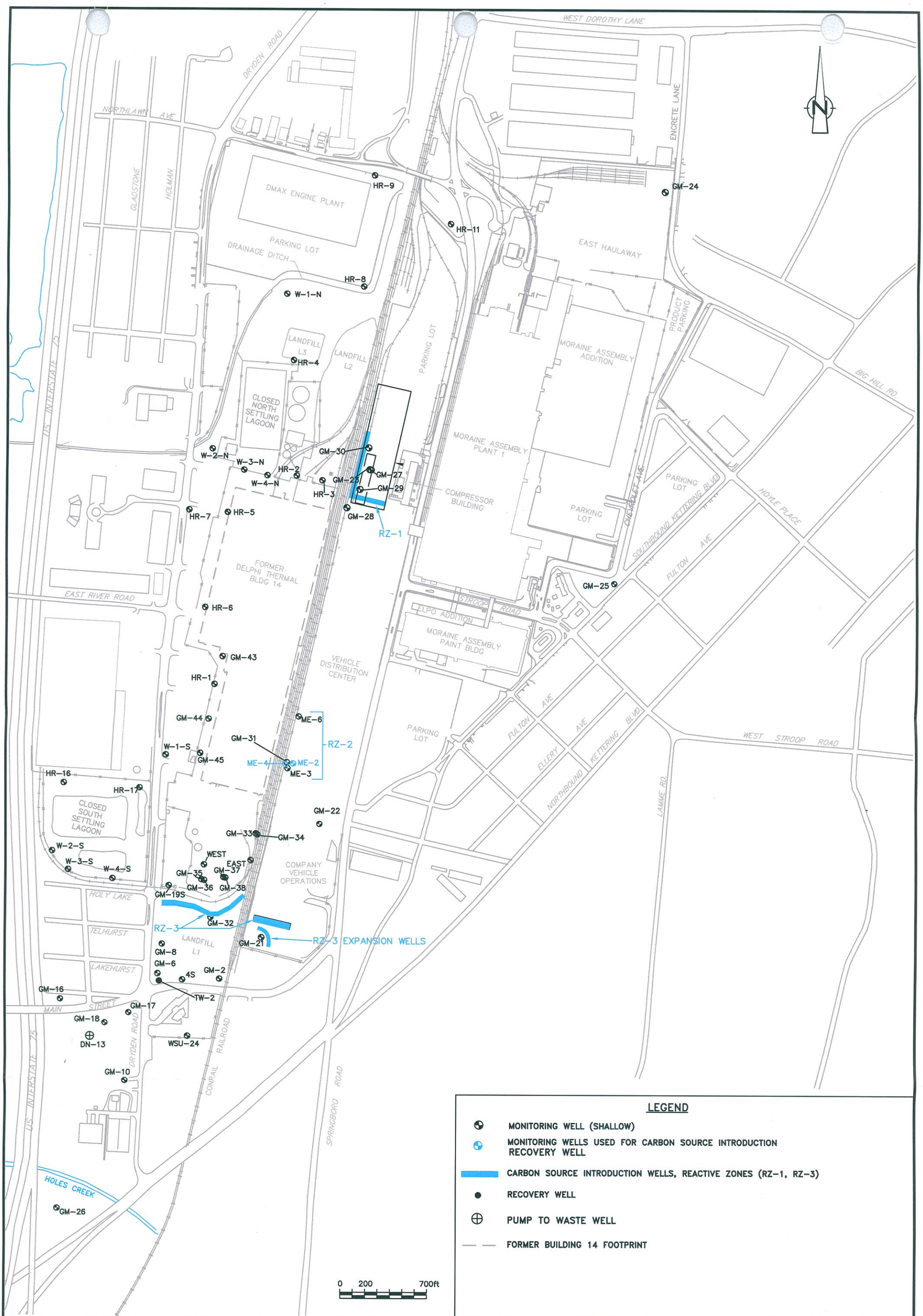
(1) The parameters for the remaining annual sampling events will include the site-specific list of VOCs: benzene, 1,1,-dichloroethane, 1,1-dichloroethene, cis-1,2-dichloroethene, trans-1,2-dichloroethene, ethylbenzene, tetrachloroethene, toluene, 1,1,1-trichloroethane, trichloroethene, vinyl chloride, and xylenes.

(2) The biogeochemical list includes the field and laboratory parameters presented on Table 1.

ARCADIS
284 Cramer Creek Court
Dublin, OH 43017
Tel: 614/764-2310 Fax: 614/764-1270

SITE LAYOUT
GENERAL MOTORS CORPORATION
MORAINE, OHIO

DATE	PROJECT MANAGER	DRAWING NAME
2/3/2006	N. GILLOTTI	CRA\ANN05\ANN05-03
DRAWN	LEAD DESIGN PROF.	CHECKED
R. SMITH	J. REID	N. GILLOTTI
PROJECT NUMBER		DRAWING NUMBER
0H000294.0008.0003		1



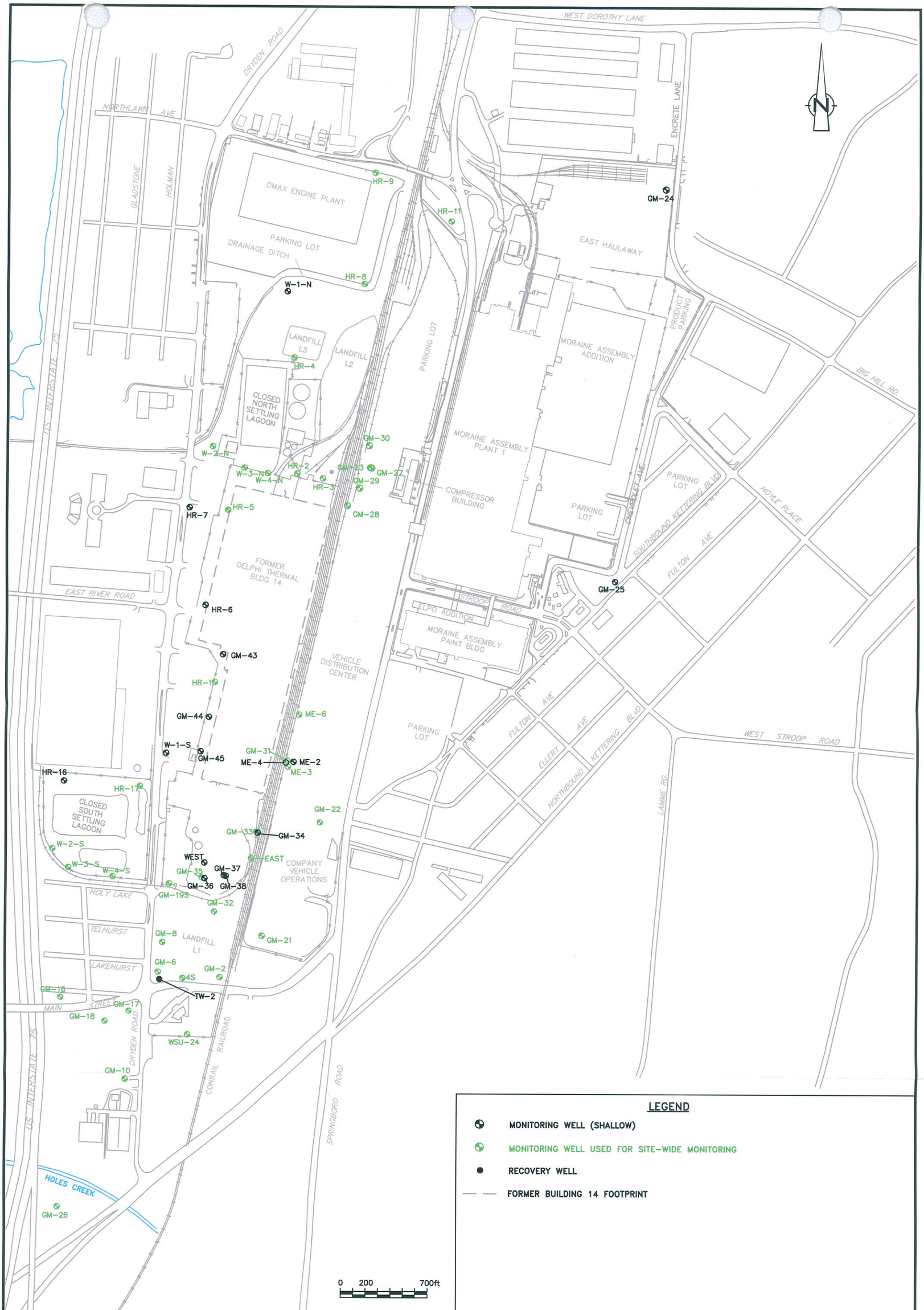
LEGEND

- MONITORING WELL (SHALLOW)
- MONITORING WELLS USED FOR CARBON SOURCE INTRODUCTION RECOVERY WELL
- CARBON SOURCE INTRODUCTION WELLS, REACTIVE ZONES (RZ-1, RZ-3)
- RECOVERY WELL
- PUMP TO WASTE WELL
- FORMER BUILDING 14 FOOTPRINT

ARCADIS
284 Cramer Creek Court
Dublin, OH 43017
Tel: 614/764-2310 Fax: 614/764-1270

SITE-WIDE CORRECTIVE MEASURES
GENERAL MOTORS CORPORATION
MORAINE, OHIO

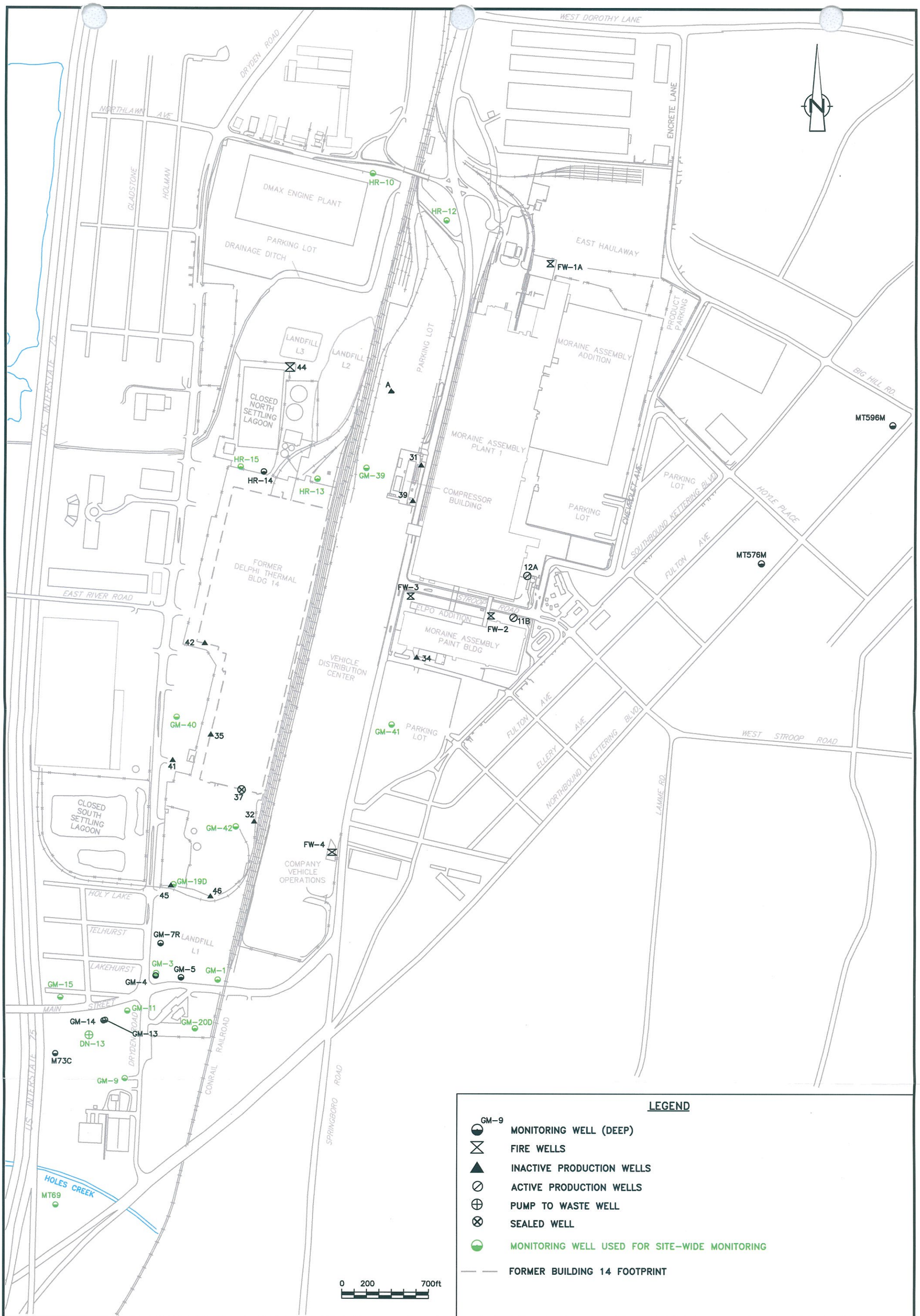
DATE	PROJECT MANAGER	DRAWING NAME
2/3/2006	N. GILLOTTI	CRA\ANN05\ANN05-04
DRAWN	LEAD DESIGN PROF.	CHECKED
R. SMITH	J. REID	N. GILLOTTI
PROJECT NUMBER		DRAWING NUMBER
OH000294.0008.0003		2



ARCADIS
284 Cramer Creek Court
Dublin, OH 43017
Tel: 614/764-2310 Fax: 614/764-1270

UPPER AQUIFER MONITORING WELLS FOR SITE-WIDE GROUNDWATER MONITORING GENERAL MOTORS CORPORATION MORAINE, OHIO

DATE 2/3/2006	PROJECT MANAGER N. GILLOTTI	DRAWING NAME CRA\ANN05\ANN05-05
DRAWN R. SMITH	LEAD DESIGN PROF. J. REID	CHECKED N. GILLOTTI
PROJECT NUMBER OH000294.0008.0003		DRAWING NUMBER 3



LEGEND

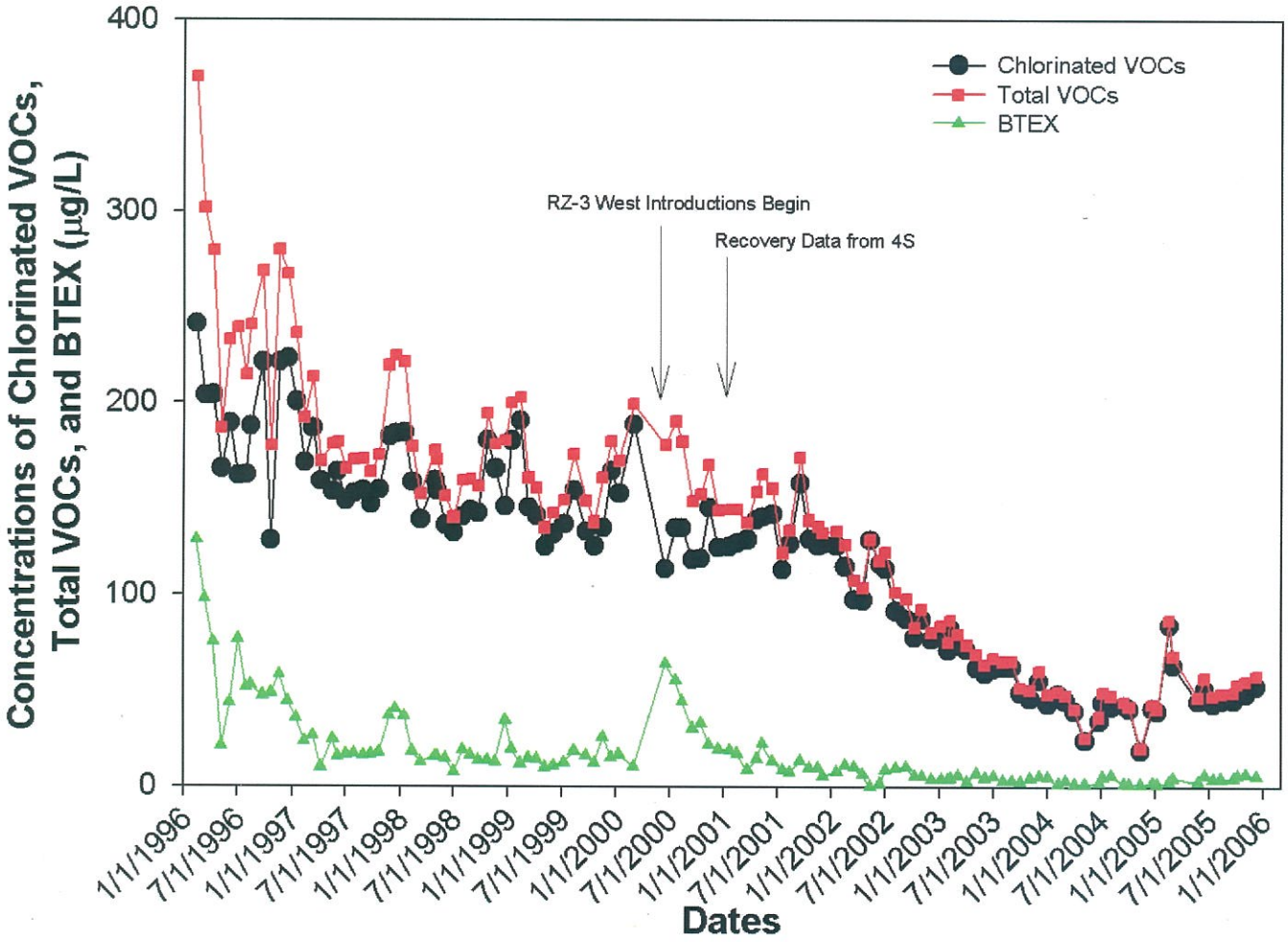
- GM-9 — MONITORING WELL (DEEP)
- FIRE WELLS
- INACTIVE PRODUCTION WELLS
- ACTIVE PRODUCTION WELLS
- PUMP TO WASTE WELL
- SEALED WELL
- MONITORING WELL USED FOR SITE-WIDE MONITORING
- FORMER BUILDING 14 FOOTPRINT

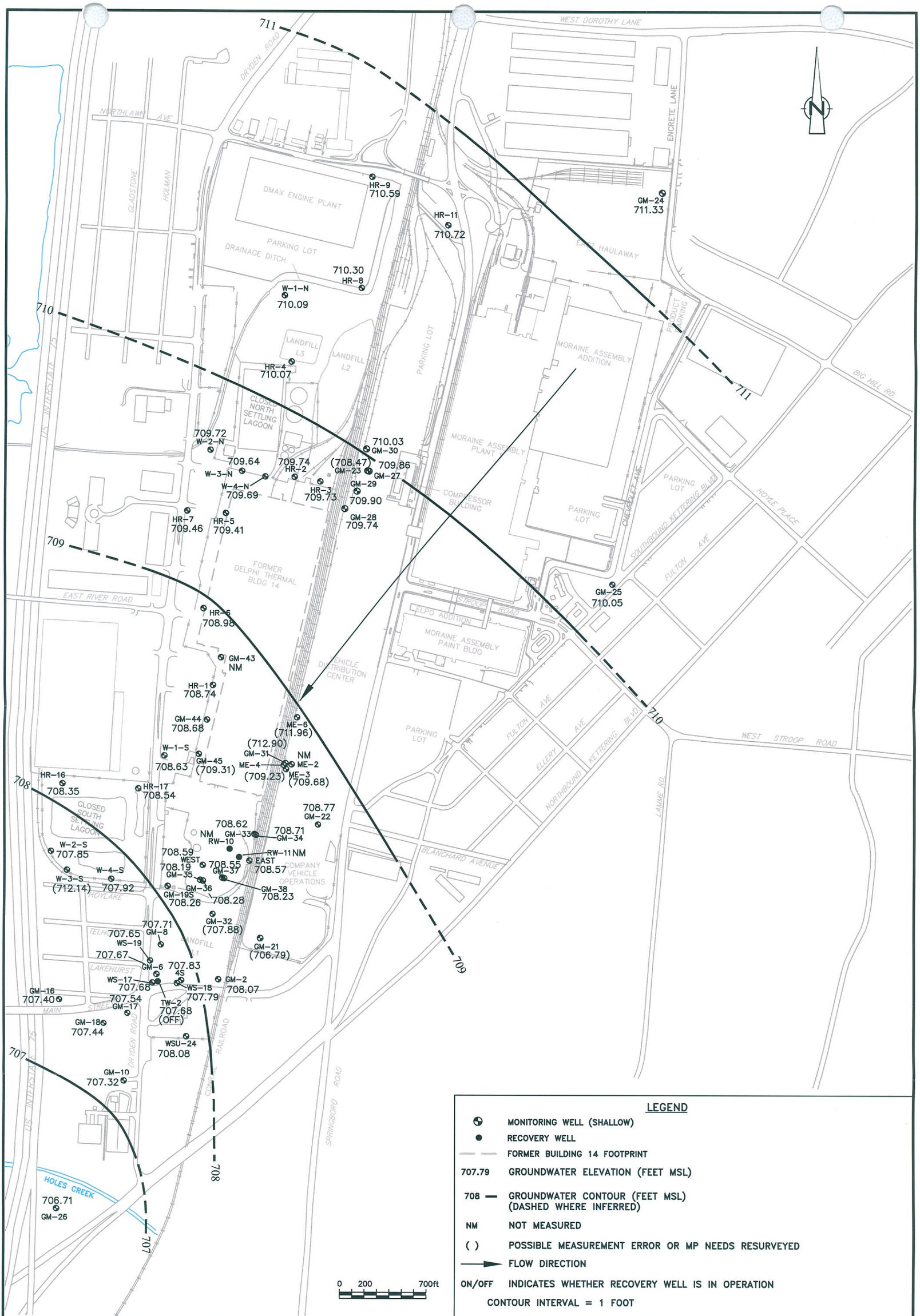
ARCADIS
284 Cramer Creek Court
Dublin, OH 43017
Tel: 614/764-2310 Fax: 614/764-1270

LOWER AQUIFER MONITORING WELLS FOR SITE-WIDE GROUNDWATER MONITORING GENERAL MOTORS CORPORATION MORAINE, OHIO

DATE	PROJECT MANAGER	DRAWING NAME
2/3/2006	N. GILLOTTI	CRA\ANN05\ANN05-06
DRAWN	LEAD DESIGN PROF.	CHECKED
R. SMITH	J. REID	N. GILLOTTI
PROJECT NUMBER		DRAWING NUMBER
0H000294.0008.0003		4

Figure 5. VOC Concentrations at the Influent to Air Stripper Tower Since System Start-up, Groundwater Recovery, and Treatment System





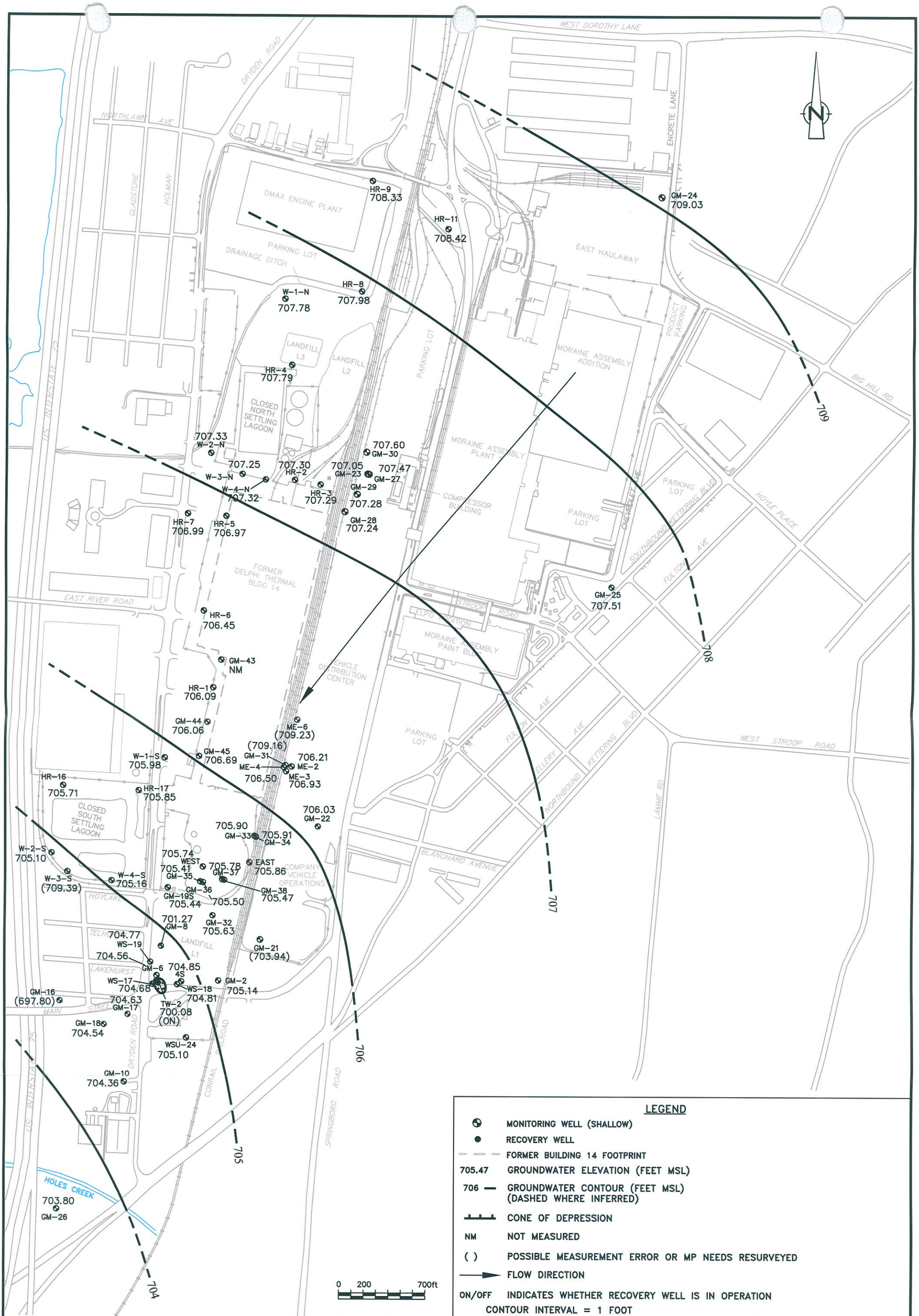
LEGEND

- MONITORING WELL (SHALLOW)
- RECOVERY WELL
- FORMER BUILDING 14 FOOTPRINT
- 707.79 GROUNDWATER ELEVATION (FEET MSL)
- 708 GROUNDWATER CONTOUR (FEET MSL) (DASHED WHERE INFERRED)
- NM NOT MEASURED
- ( ) POSSIBLE MEASUREMENT ERROR OR MP NEEDS RESURVEYED
- FLOW DIRECTION
- ON/OFF INDICATES WHETHER RECOVERY WELL IS IN OPERATION
- CONTOUR INTERVAL = 1 FOOT

ARCADIS
284 Cramer Creek Court
Dublin, OH 43017
Tel: 614/764-2310 Fax: 614/764-1270

WATER TABLE SURFACE (UPPER AQUIFER) ON APRIL 6 AND 7, 2005 GENERAL MOTORS CORPORATION MORAINE, OHIO

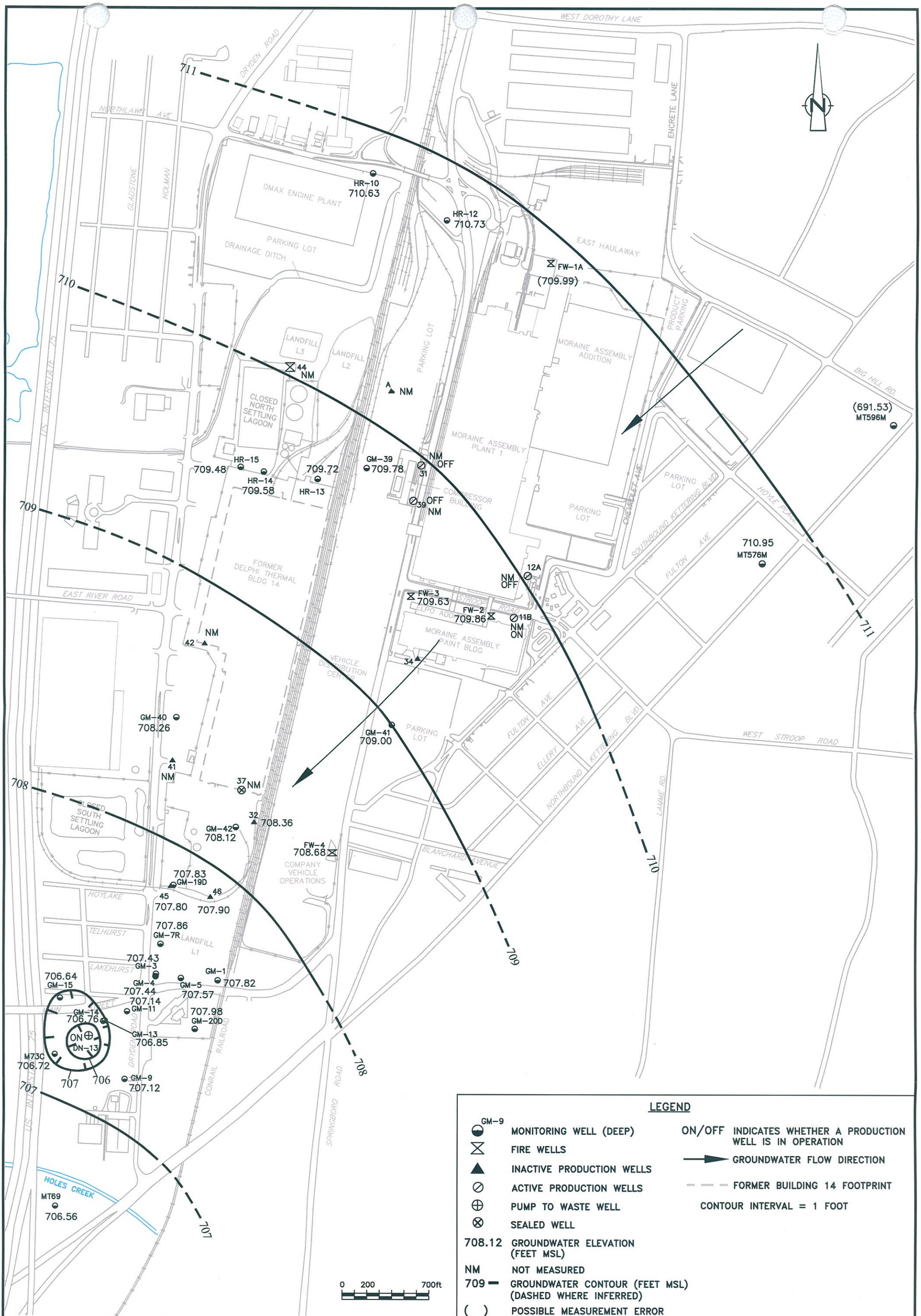
DATE 2/3/2006	PROJECT MANAGER N. GILLOTTI	DRAWING NAME CRA\ANN05\ANN05-07
DRAWN R. SMITH	LEAD DESIGN PROF. J. REID	CHECKED S. CLOUSE
PROJECT NUMBER 0H000294.0008.0003		DRAWING NUMBER 6



ARCADIS
284 Cramer Creek Court
Dublin, OH 43017
Tel: 614/764-2310 Fax: 614/764-1270

WATER TABLE SURFACE (UPPER AQUIFER) ON OCTOBER 12-13, 2005 GENERAL MOTORS CORPORATION MORAINE, OHIO

DATE 2/3/2006	PROJECT MANAGER N. GILLOTTI		DRAWING NAME CRA\ANN05\ANN05-07
DRAWN R. SMITH	LEAD DESIGN PROF. J. REID		CHECKED S. CLOUSE
PROJECT NUMBER 0H000294.0008.0003			DRAWING NUMBER 7



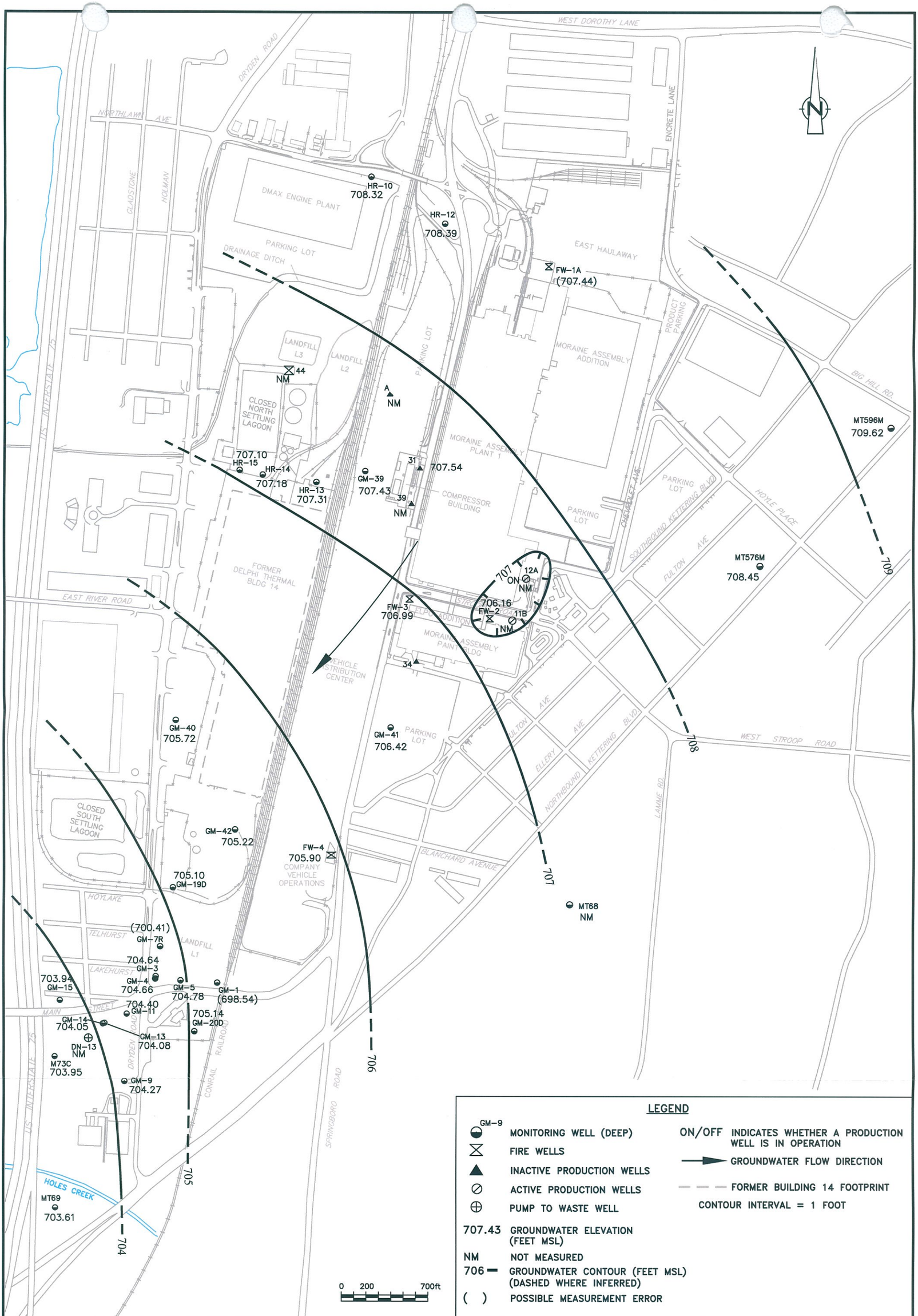
LEGEND

- GM-9 — MONITORING WELL (DEEP)
- FIRE WELLS
- INACTIVE PRODUCTION WELLS
- ACTIVE PRODUCTION WELLS
- PUMP TO WASTE WELL
- SEALED WELL
- 708.12 — GROUNDWATER ELEVATION (FEET MSL)
- NM — NOT MEASURED
- 709 — GROUNDWATER CONTOUR (FEET MSL) (DASHED WHERE INFERRED)
- ( ) — POSSIBLE MEASUREMENT ERROR
- ON/OFF — INDICATES WHETHER A PRODUCTION WELL IS IN OPERATION
- GROUNDWATER FLOW DIRECTION
- FORMER BUILDING 14 FOOTPRINT
- CONTOUR INTERVAL = 1 FOOT

ARCADIS
284 Cramer Creek Court
Dublin, OH 43017
Tel: 614/764-2310 Fax: 614/764-1270

POTENTIOMETRIC SURFACE (LOWER AQUIFER) ON APRIL 6 AND 7, 2005 GENERAL MOTORS CORPORATION MORAINE, OHIO

DATE	PROJECT MANAGER	DRAWING NAME
2/3/2006	N. GILLOTTI	CRA\ANN05\ANN05-08
DRAWN	LEAD DESIGN PROF.	CHECKED
R. SMITH	J. REID	S. CLOUSE
PROJECT NUMBER		DRAWING NUMBER
0H000294.0008.0003		8



LEGEND

- GM-9 — MONITORING WELL (DEEP)
- FIRE WELLS
- INACTIVE PRODUCTION WELLS
- ACTIVE PRODUCTION WELLS
- PUMP TO WASTE WELL
- 707.43 — GROUNDWATER ELEVATION (FEET MSL)
- NM — NOT MEASURED
- 706 — GROUNDWATER CONTOUR (FEET MSL) (DASHED WHERE INFERRED)
- ( ) — POSSIBLE MEASUREMENT ERROR
- ON/OFF — INDICATES WHETHER A PRODUCTION WELL IS IN OPERATION
- GROUNDWATER FLOW DIRECTION
- FORMER BUILDING 14 FOOTPRINT
- CONTOUR INTERVAL = 1 FOOT

ARCADIS
284 Cramer Creek Court
Dublin, OH 43017
Tel: 614/764-2310 Fax: 614/764-1270

POTENTIOMETRIC SURFACE (LOWER AQUIFER) ON OCTOBER 12-13, 2005 GENERAL MOTORS CORPORATION MORAINE, OHIO

DATE	PROJECT MANAGER	DRAWING NAME
2/3/2006	N. GILLOTTI	CRA\ANN05\ANN05-08
DRAWN	LEAD DESIGN PROF.	CHECKED
R. SMITH	J. REID	S. CLOUSE
PROJECT NUMBER		DRAWING NUMBER
0H000294.0008.0003		9

HR-4	9/14/1999	9/20/2000	11/6/2001	9/27/2002	9/18/2003	9/16/2004	10/20/2005
	UG/L	UG/L	UG/L	UG/L	ug/l	ug/l	ug/L
1,1,1-Trichloroethane	ND (1.0) U	ND (1.00) U	0.17 J	ND (1) U	ND (1) U	ND (1) U	ND (1.0) U
1,1-Dichloroethane	ND (1.0) U	ND (1.00) U	ND (1.0) U	ND (1) U	ND (1) U	0.77 J	1.5
1,1-Dichloroethene	ND (1.0) U	ND (1.00) U	ND (1.0) U	ND (1) U	ND (1) U	ND (1) U	ND (1.0) U
Benzene	ND (1.0) U	ND (1.00) U	ND (1.0) U	ND (1) U	ND (1) U	ND (1) U	ND (1.0) U
cis-1,2-Dichloroethene	ND (1.0) U	ND (1.00) U	0.28 J	ND (0.5) U	ND (0.5) U	ND (0.5) U	ND (1.0) U
Ethylbenzene	ND (1.0) U	ND (1.00) U	ND (1.0) U	ND (1) U	ND (1) U	ND (1) U	ND (1.0) U
Tetrachloroethene	1.2	ND (1.00) U	0.88 J	0.59 J	0.55 J	1.3	0.39 J
Toluene	ND (1.0) U	ND (1.00) U	ND (1.0) U	0.95 J	ND (1) U	ND (1) U	ND (1.0) U
trans-1,2-Dichloroethene	ND (1.0) U	ND (1.00) U	ND (0.50) U	ND (0.5) U	ND (0.5) U	ND (0.5) U	ND (1.0) U
Trichloroethene	1.4	ND (1.00) U	1.0	0.71 J	0.71 J	0.5 J	0.32 J
Vinyl chloride	ND (1.0) U	ND (1.00) U	ND (1.0) U	ND (1) U	ND (1) U	ND (1) U	ND (1.0) U
Xylene (total)	ND (1.0) U	ND (1.00) U	ND (1.0) U	ND (1) U	ND (1) U	ND (1) U	ND (2.0) U

HR-3	9/16/1999	9/19/2000	11/7/2001	9/24/2002	9/16/2003	9/16/2004	10/20/2005
	UG/L	UG/L	UG/L	UG/L	ug/l	ug/l	ug/L
1,1,1-Trichloroethane	ND (1.0) U	ND (1.00) U	ND (1.0) U	ND (1) U	ND (1) U	0.27 J	0.34 J
1,1-Dichloroethane	6.2	5.1	6.9	15	13	23	18
1,1-Dichloroethene	ND (1.0) U	ND (1.00) U	ND (1.0) U	ND (1) U	ND (1) U	ND (1) U	ND (1.0) U
Benzene	ND (1.0) U	ND (1.00) U	ND (1.0) U	ND (1) U	ND (1) U	ND (1) U	ND (1.0) U
cis-1,2-Dichloroethene	6.1	4.6	5.1	9.9	9.9	18	11
Ethylbenzene	ND (1.0) U	ND (1.00) U	ND (1.0) U	ND (1) U	ND (1) U	ND (1) U	ND (1.0) U
Tetrachloroethene	ND (1.0) U	ND (1.00) U	ND (1.0) U	ND (1) U	ND (1) U	0.32 J	ND (1.0) U
Toluene	ND (1.0) U	ND (1.00) U	ND (1.0) U	0.53 U	ND (1) U	ND (1) U	ND (1.0) U
trans-1,2-Dichloroethene	ND (1.0) U	ND (1.00) U	0.60 J		1.1	1.8	1.5
Trichloroethene	ND (1.0) U	ND (1.00) U	0.66 J	1.4	1.6	8.1	10
Vinyl chloride	ND (1.0) U	ND (1.00) U	ND (1.0) U	ND (1) U	ND (1) U	ND (1) U	ND (1.0) U
Xylene (total)	ND (1.0) U	ND (1.00) U	ND (1.0) U	ND (1) U	ND (1) U	ND (1) U	ND (2.0) U

HR-2	9/16/1999	9/19/2000	11/7/2001	9/24/2002	9/16/2003	9/16/2004	10/20/2005
	UG/L	UG/L	UG/L	UG/L	ug/l	ug/l	ug/L
1,1,1-Trichloroethane	ND (1.0) U	ND (1.00) U	ND (1.0) U	ND (1) U	ND (1) U	ND (1) U	ND (1.0) U/ND (1.0) U
1,1-Dichloroethane	3.9	4.6	4.2	4.9	4.5	5.6	4.4/4.5
1,1-Dichloroethene	ND (1.0) U	ND (1.00) U	ND (1.0) U	ND (1) U	ND (1) U	ND (1) U	ND (1.0) U/ND (1.0) U
Benzene	ND (1.0) U	ND (1.00) U	ND (1.0) U	ND (1) U	ND (1) U	ND (1) U	ND (1.0) U/ND (1.0) U
cis-1,2-Dichloroethene	9.6	8.6	8.3	8.8	7.2	7.8	5.0/5.1
Ethylbenzene	ND (1.0) U	ND (1.00) U	ND (1.0) U	ND (1) U	ND (1) U	ND (1) U	ND (1.0) U/ND (1.0) U
Tetrachloroethene	ND (1.0) U	ND (1.00) U	ND (1.0) U	ND (1) U	0.37 J	ND (1.0) U	ND (1.0) U/ND (1.0) U
Toluene	ND (1.0) U	ND (1.00) U	ND (1.0) U	0.47 U	ND (1) U	ND (1) U	ND (1.0) U/ND (1.0) U
trans-1,2-Dichloroethene	1.5	1.1	1.1	1.2	0.96	1.1	0.78 J/0.80 J
Trichloroethene	ND (1.0) U	ND (1.00) U	0.56 J	0.46 J	0.4 J	0.53 J	0.35 J/0.40 J
Vinyl chloride	ND (1.0) U	ND (1.00) U	ND (1.0) U	ND (1) U	ND (1) U	0.23 J	0.29 J/0.25 J
Xylene (total)	ND (1.0) U	ND (1.00) U	ND (1.0) U	ND (1) U	ND (1) U	ND (1) U	ND (2.0) U/ND (2.0) U

W-4-N	9/17/1999	9/19/2000	11/7/2001	9/24/2002	9/17/2003	9/16/2004	10/20/2005
	UG/L	UG/L	UG/L	UG/L	ug/l	ug/l	ug/L
1,1,1-Trichloroethane	ND (1.0) U	ND (1.00) U	0.33 J	0.44 J	0.26 J	0.4 J	ND (1.0) U
1,1-Dichloroethane	1.3	ND (1.00) U	0.89 J	1.7	0.94 J	1.7	1.2
1,1-Dichloroethene	ND (1.0) U	ND (1.00) U	ND (1.0) U	ND (1) U	ND (1) U	ND (1) U	ND (1.0) U
Benzene	ND (1.0) U	ND (1.00) U	ND (1.0) U	ND (1) U	ND (1) U	ND (1) U	ND (1.0) U
cis-1,2-Dichloroethene	2.2	2.0	1.6	5.2	1.7	5.8	2.0
Ethylbenzene	ND (1.0) U	ND (1.00) U	ND (1.0) U	ND (1) U	ND (1) U	ND (1) U	ND (1.0) U
Tetrachloroethene	2.1	ND (1.00) U	0.92 J	0.94 J	1.1	1.7	1.0
Toluene	ND (1.0) U	ND (1.00) U	ND (1.0) U	0.81 U	ND (1) U	ND (1) U	ND (1.0) U
trans-1,2-Dichloroethene	ND (1.0) U	ND (1.00) U	ND (0.50) U	0.33 J	ND (0.5) U	0.38 J	ND (1.0) U
Trichloroethene	9.8	7.3	7.1	8.5	8.1	12	7.2
Vinyl chloride	ND (1.0) U	ND (1.00) U	ND (1.0) U	0.77 J	0.48 J	0.49 J	0.54 J
Xylene (total)	ND (1.0) U	ND (1.00) U	ND (1.0) U	0.71 U	ND (1) U	ND (1) U	ND (2.0) U

W-3-N	9/17/1999	9/19/2000	11/7/2001	9/23/2002	9/17/2003	9/16/2004	10/20/2005
	UG/L	UG/L	UG/L	UG/L	ug/l	ug/l	ug/L
1,1,1-Trichloroethane	ND (1.0) U	ND (1.00) U	ND (5.6) U	ND (6.7) U	ND (4) U	ND (4) U	ND (4.0) U
1,1-Dichloroethane	ND (1.0) U	ND (1.00) U	ND (5.6) U	ND (6.7) U	ND (4) U	ND (4) U	ND (4.0) U
1,1-Dichloroethene	ND (1.0) U	ND (1.00) U	ND (5.6) U	ND (6.7) U	ND (4) U	ND (4) U	ND (4.0) U
Benzene	ND (1.0) U	ND (1.00) U	ND (5.6) U	ND (6.7) U	ND (4) U	ND (4) U	ND (4.0) U
cis-1,2-Dichloroethene	291	282	160	150	100	120	84
Ethylbenzene	ND (1.0) U	ND (1.00) U	ND (5.6) U	ND (6.7) U	ND (4) U	ND (4) U	ND (4.0) U
Tetrachloroethene	2.5	ND (1.00) U	9.0	ND (6.7) U	5.1	0.94 J	1.4 U
Toluene	ND (1.0) U	ND (1.00) U	ND (5.6) U	ND (6.7) U	ND (4) U	ND (4) U	ND (4.0) U
trans-1,2-Dichloroethene	2.6	3.9	2.2 J	ND (3.3) U	1.6 J	1.6 J	1.0 J
Trichloroethene	ND (1.0) U	ND (1.00) U	2.1 J	ND (6.7) U	1.7 J	ND (4) U	ND (4.0) U
Vinyl chloride	12.8	24.0	7.6	6.5 J	6.6	6.1	8.0
Xylene (total)	ND (1.0) U	ND (1.00) U	ND (5.6) U	ND (6.7) U	ND (4) U	ND (4) U	ND (8.0) U

W-2-N	9/14/1999	9/19/2000	11/6/2001	9/19/2002	9/18/2003	9/16/2004	10/20/2005
	UG/L	UG/L	UG/L	UG/L	ug/l	ug/l	ug/L
1,1,1-Trichloroethane	ND (1.0) U	ND (1.00) U	0.48 J	ND (1.0) U	ND (1) U	0.3 J	ND (1.0) U
1,1-Dichloroethane	ND (1.0) U	ND (1.00) U	0.33 J	0.31 J	ND (1) U	0.36 J	0.28 J
1,1-Dichloroethene	ND (1.0) U	ND (1.00) U	ND (1.0) U	ND (1.0) U	ND (1) U	ND (1) U	ND (1.0) U
Benzene	ND (1.0) U	ND (1.00) U	ND (1.0) U	ND (1.0) U	ND (1) U	ND (1) U	ND (1.0) U
cis-1,2-Dichloroethene	1.6	1.2	1.1	1.6	1.3	1.8	1.3
Ethylbenzene	ND (1.0) U	ND (1.00) U	ND (1.0) U	ND (1.0) U	ND (1) U	ND (1) U	ND (1.0) U
Tetrachloroethene	ND (1.0) U	ND (1.00) U	ND (1.0) U	ND (1.0) U	ND (1) U	0.31 J	ND (1.0) U
Toluene	ND (1.0) U	ND (1.00) U	ND (1.0) U	ND (1.0) U	ND (1) U	ND (1) U	ND (1.0) U
trans-1,2-Dichloroethene	ND (1.0) U	ND (1.00) U	ND (0.50) U	ND (0.50) U	ND (0.5) U	0.2 J	ND (1.0) U
Trichloroethene	1.7	ND (1.00) U	1.3	1.4	ND (1) U	1.4	0.91 J
Vinyl chloride	ND (1.0) U	ND (1.00) U	ND (1.0) U	ND (1.0) U	ND (1) U	ND (1) U	ND (1.0) U
Xylene (total)	ND (1.0) U	ND (1.00) U	ND (1.0) U	ND (1.0) U	ND (1) U	ND (1) U	ND (2.0) U

HR-5	9/16/1999	9/19/2000	11/7/2001	9/23/2002	9/18/2003	9/13/2004	10/18/2005
	UG/L	UG/L	UG/L	UG/L	ug/l	ug/l	ug/L
1,1,1-Trichloroethane	ND (1.0) U	ND (1.00) U	0.17 J/ND (1.0) U	ND (1) U	ND (1) U	ND (1) U	ND (1.0) U
1,1-Dichloroethane	ND (1.0) U	ND (1.00) U	0.51 J/0.55 J	0.55 J	0.42 J	0.43 J	0.54 J
1,1-Dichloroethene	ND (1.0) U	ND (1.00) U	ND (1.0) U	ND (1) U	ND (1) U	ND (1) U	ND (1.0) U
Benzene	ND (1.0) U	ND (1.00) U	ND (1.0) U	ND (1) U	ND (1) U	ND (1) U	ND (1.0) U
cis-1,2-Dichloroethene	10.5	5.6	7.7/7.8	7.5	5	4.8	4.6
Ethylbenzene	ND (1.0) U	ND (1.00) U	ND (1.0) U	ND (1) U	ND (1) U	ND (1) U	ND (1.0) U
Tetrachloroethene	ND (1.0) U	ND (1.00) U	ND (1.0) U	ND (1) U	ND (1) U	ND (1) U	ND (1.0) U
Toluene	ND (1.0) U	3.0	ND (1.0) U	ND (1) U	ND (1) U	ND (1) U	ND (1.0) U
trans-1,2-Dichloroethene	1.1	ND (1.00) U	0.67/0.74	0.58	0.46 J	0.44 J	0.52 J
Trichloroethene	12.0	8.1	11	13	11	11	13
Vinyl chloride	ND (1.0) U	ND (1.00) U	ND (1.0) U	ND (1) U	ND (1) U	ND (1) U	1.1
Xylene (total)	ND (1.0) U	2.0	ND (1.0) U	ND (1) U	ND (1) U	ND (1) U	ND (2.0) U

HR-6	9/16/1999	9/23/2002
	UG/L	UG/L
1,1,1-Trichloroethane	ND (1.0) U	ND (1) U
1,1-Dichloroethane	ND (1.0) U	ND (1) U
1,1-Dichloroethene	ND (1.0) U	ND (1) U
Benzene	ND (1.0) U	ND (1) U
cis-1,2-Dichloroethene	ND (1.0) U	ND (0.5) U
Ethylbenzene	ND (1.0) U	ND (1) U
Tetrachloroethene	ND (1.0) U	ND (1) U
Toluene	ND (1.0) U	ND (1) U
trans-1,2-Dichloroethene	ND (1.0) U	ND (0.5) U
Trichloroethene	2.0	1.5
Vinyl chloride	ND (1.0) U	ND (1) U
Xylene (total)	ND (1.0) U	ND (1) U

HR-7	9/17/1999	9/19/2002
	UG/L	UG/L
1,1,1-Trichloroethane	ND (1.0) U	ND (1.0) U
1,1-Dichloroethane	ND (1.0) U	ND (1.0) U
1,1-Dichloroethene	ND (1.0) U	ND (1.0) U
Benzene	ND (1.0) U	0.65
cis-1,2-Dichloroethene	ND (1.0) U	ND (1.0) U
Ethylbenzene	ND (1.0) U	ND (1.0) U
Tetrachloroethene	ND (1.0) U	ND (1.0) U
Toluene	ND (1.0) U	ND (1.0) U
trans-1,2-Dichloroethene	ND (1.0) U	ND (0.50) U
Trichloroethene	9.8	9.4
Vinyl chloride	ND (1.0) U	ND (1.0) U
Xylene (total)	ND (1.0) U	ND (1.0) U

HR-1	9/16/1999	9/25/2000	11/8/2001	9/23/2002	9/18/2003	9/13/2004	10/18/2005
	UG/L	UG/L	UG/L	UG/L	ug/l	ug/l	ug/L
1,1,1-Trichloroethane	1.5/1.6	1.3	2.2 J	ND (2) U	1 J	0.56 J/0.56 J	1.2
1,1-Dichloroethane	2.4/2.5	2.4	2.8 J	2.8	2.6	2.5/2.5	2.7
1,1-Dichloroethene	ND (1.0) U	ND (1.00) U	ND (3.3) U	ND (2) U	ND (2) U	ND (1) U	ND (1.0) U
Benzene	ND (1.0) U	ND (1.00) U	ND (3.3) U	ND (2) U	ND (2) U	ND (1) U/ND (1) U	ND (1.0) U
cis-1,2-Dichloroethene	5.8/6.1	8.5	9.9	4.5	2.3	24/24	19
Ethylbenzene	ND (1.0) U	ND (1.00) U	ND (3.3) U	ND (2) U	ND (2) U	ND (1) U	ND (1.0) U
Tetrachloroethene	40.5/44.3	32.6	36	33	27	23/24	28
Toluene	ND (1.0) U	ND (1.00) U	ND (3.3) U	ND (2) U	ND (2) U	ND (1) U	ND (1.0) U
trans-1,2-Dichloroethene	3.9/4.0	3.2	2.8	3.2	3.2	2.3/2.4	2.3
Trichloroethene	53.5/56.0	56.4	86 B	33	56	30/31	43
Vinyl chloride	ND (1.0) U	ND (1.00) U	ND (3.3) U	ND (2) U	ND (2) U	0.55 J/0.61 J	1.1
Xylene (total)	ND (1.0) U	ND (1.00) U	ND (3.3) U	ND (2) U	ND (2) U	ND (1) U	ND (2.0) U

HR-16	9/23/1999	9/18/2002
	UG/L	UG/L
1,1,1-Trichloroethane	ND (1.0) U	ND (1.0) U
1,1-Dichloroethane	ND (1.0) U	ND (1.0) U
1,1-Dichloroethene	ND (1.0) U	ND (1.0) U
Benzene	ND (1.0) U	ND (1.0) U
cis-1,2-Dichloroethene	ND (1.0) U	0.46 J
Ethylbenzene	ND (1.0) U	ND (1.0) U
Tetrachloroethene	ND (1.0) U	ND (1.0) U
Toluene	ND (1.0) U	ND (1.0) U
trans-1,2-Dichloroethene	ND (1.0) U	ND (0.50) U
Trichloroethene	2.7	1.5
Vinyl chloride	ND (1.0) U	ND (1.0) U
Xylene (total)	ND (1.0) U	ND (1.0) U

HR-17	9/23/1999	9/28/2000	11/8/2001	9/18/2002	9/25/2003	9/17/2004	10/19/2005
	UG/L	UG/L	UG/L	UG/L	ug/l	ug/l	ug/L
1,1,1-Trichloroethane	ND (1.0) U	1.9	1.4	0.39 J	ND (2) U	ND (5) U	ND (1.8) U
1,1-Dichloroethane	ND (1.0) U	ND (1.00) U	ND (1.0) U	1.5	0.75 J	2 J	0.70 J
1,1-Dichloroethene	ND (1.0) U	ND (1.00) U	ND (1.0) U	ND (1.0) U	ND (2) U	ND (5) U	ND (1.8) U
Benzene	ND (1.0) U	ND (1.00) U	ND (1.0) U	ND (1.0) U	ND (2) U	ND (5) U	ND (1.8) U
cis-1,2-Dichloroethene	6.2	ND (1.00) U	ND (0.50) U	5.5	2.2	7.1	3.1
Ethylbenzene	ND (1.0) U	ND (1.00) U	ND (1.0) U	ND (1.0) U	ND (2) U	ND (5) U	ND (1.8) U
Tetrachloroethene	15.5	3.7	3.3	22	64	82	45
Toluene	ND (1.0) U	ND (1.00) U	ND (1.0) U	ND (1.0) U	ND (2) U	ND (5) U	ND (1.8) U
trans-1,2-Dichloroethene	ND (1.0) U	ND (1.00) U	ND (0.50) U	1.4	0.7 J	1.6 J	0.57 J
Trichloroethene	7.4	4.4	4.2 B	12	10	18	8.3
Vinyl chloride	ND (1.0) U	ND (1.00) U	ND (1.0) U	ND (1.0) U	ND (2) U	ND (5) U	ND (1.8) U
Xylene (total)	ND (1.0) U	ND (1.00) U	ND (1.0) U	ND (1.0) U	ND (2) U	ND (5) U	ND (3.7) U

W-2-S	9/23/1999	9/27/2000	11/8/2001	9/18/2002	9/26/2003	9/17/2004	10/19/2005
	UG/L	UG/L	UG/L	UG/L	ug/l	ug/l	ug/L
1,1,1-Trichloroethane	1.9	1.6/1.7	1.7	1.5	1.4	1.5	1.6
1,1-Dichloroethane	ND (1.0) U	ND (1.00) U	0.58 J	0.98 J	0.99 J	1.3	1.2
1,1-Dichloroethene	ND (1.0) U	ND (1.00) U	ND (1.0) U	ND (1.0) U	ND (1) U	ND (1) U	ND (1.0) U
Benzene	ND (1.0) U	ND (1.00) U	ND (1.0) U	ND (1.0) U	ND (1) U	ND (1) U	ND (1.0) U
cis-1,2-Dichloroethene	ND (1.0) U	ND (1.00) U	0.49 J	0.90	0.74	1.1	0.78 J
Ethylbenzene	ND (1.0) U	ND (1.00) U	ND (1.0) U	ND (1.0) U	ND (1) U	ND (1) U	ND (1.0) U
Tetrachloroethene	ND (1.0) U	ND (1.00) U	ND (1.0) U	ND (1.0) U	ND (1) U	0.55 J	0.36 J
Toluene	ND (1.0) U	ND (1.00) U	ND (1.0) U	ND (1.0) U	0.25 J	ND (1) U	ND (1.0) U
trans-1,2-Dichloroethene	ND (1.0) U	ND (1.00) U	ND (0.50) U	ND (0.50) U	ND (0.5) U	ND (0.5) U	ND (1.0) U
Trichloroethene	6.1	5.0	5.2 B	4.9	5.5	6	5.4
Vinyl chloride	ND (1.0) U	ND (1.00) U	ND (1.0) U	ND (1.0) U	ND (1) U	ND (1) U	ND (1.0) U
Xylene (total)	ND (1.0) U	ND (1.00) U	ND (1.0) U	ND (1.0) U	ND (1) U	ND (1) U	ND (2.0) U

W-3-S	9/23/1999	9/28/2000	11/8/2001	9/18/2002	9/26/2003	9/17/2004	10/19/2005
	UG/L	UG/L	UG/L	UG/L	ug/l	ug/l	ug/L
1,1,1-Trichloroethane	3.9	2.8	1.6	2.1	1.8	2.4	2.5
1,1-Dichloroethane	ND (1.0) U	ND (1.00) U	ND (1.0) U	ND (1.0) U	ND (1) U	0.21 J	ND (1.0) U
1,1-Dichloroethene	ND (1.0) U	ND (1.00) U	ND (1.0) U	ND (1.0) U	ND (1) U	ND (1) U	ND (1.0) U
Benzene	ND (1.0) U	ND (1.00) U	ND (1.0) U	ND (1.0) U	ND (1) U	ND (1) U	ND (1.0) U
cis-1,2-Dichloroethene	ND (1.0) U	ND (1.00) U	ND (0.50) U	ND (0.50) U	0.34 J	ND (0.5) U	ND (1.0) U
Ethylbenzene	ND (1.0) U	ND (1.00) U	ND (1.0) U	ND (1.0) U	ND (1) U	ND (1) U	ND (1.0) U
Tetrachloroethene	1.1	ND (1.00) U	0.44 J	0.61 J	0.81 J	1.2	1.0
Toluene	ND (1.0) U	ND (1.00) U	ND (1.0) U	ND (1.0) U	ND (1) U	ND (1) U	ND (1.0) U
trans-1,2-Dichloroethene	ND (1.0) U	ND (1.00) U	ND (0.50) U	ND (0.50) U	ND (0.5) U	ND (0.5) U	ND (1.0) U
Trichloroethene	2.6	2.5	1.5 B	2.4	2	2.9	2.9
Vinyl chloride	ND (1.0) U	ND (1.00) U	ND (1.0) U	ND (1.0) U	ND (1) U	ND (1) U	ND (2.0) U
Xylene (total)	ND (1.0) U	ND (1.00) U	ND (1.0) U	ND (1.0) U	ND (1) U	ND (1) U	ND (2.0) U

W-4-S	9/23/1999	9/28/2000	11/8/2001	9/18/2002	9/26/2003	9/17/2004	10/19/2005
	UG/L	UG/L	UG/L	UG/L	ug/l	ug/l	ug/L
1,1,1-Trichloroethane	3.3/3.4	3.0	2.9	2.3	2	2.3	2.4
1,1-Dichloroethane	1.2	1.0	1.1	0.87 J	0.92 J	1.2	1.4
1,1-Dichloroethene	ND (1.0) U	ND (1.00) U	ND (1.0) U	ND (1.0) U	ND (1) U	ND (1) U	ND (1.0) U
Benzene	ND (1.0) U	ND (1.00) U	ND (1.0) U	ND (1.0) U	ND (1) U	ND (1) U	ND (1.0) U
cis-1,2-Dichloroethene	4.3/4.4	4.0	3.3	3.6	3.6	4.4	4.3
Ethylbenzene	ND (1.0) U	ND (1.00) U	ND (1.0) U	ND (1.0) U	ND (1) U	ND (1) U	ND (1.0) U
Tetrachloroethene	29.6/30.5	15.4	13	17	24	18	20
Toluene	ND (1.0) U	ND (1.00) U	ND (1.0) U	ND (1.0) U	0.25 J	ND (1) U	ND (1.0) U
trans-1,2-Dichloroethene	ND (1.0) U	ND (1.00) U	0.43 J	0.60	0.78	0.97	1.1
Trichloroethene	14.6/14.7	11.3	8.9 B	9.8	13	13	13
Vinyl chloride	ND (1.0) U	ND (1.00) U	ND (1.0) U	ND (1.0) U	ND (1) U	ND (1) U	ND (1.0) U
Xylene (total)	ND (1.0) U	ND (1.00) U	ND (1.0) U	ND (1.0) U	ND (1) U	ND (1) U	ND (2.0) U

GM-18	9/22/1999	9/27/2000	11/8/2001	9/19/2002	9/22/2003	9/15/2004	10/20/2005
	UG/L	UG/L	UG/L	UG/L	ug/l	ug/l	ug/L
1,1,1-Trichloroethane	42.6	31.8	23	18	10	5.2	7.0/7.6
1,1-Dichloroethane	22.6	10.4	3.3	6.0	3.7	2.2	15/15
1,1-Dichloroethene	1.3	ND (1.00) U	1.3 J	ND (3.3) U	ND (2) U	0.46 J	0.30 J/0.32 J
Benzene	ND (1.0) U	ND (1.00) U	ND (3.3) U	ND (3.3) U	ND (2) U	ND (2) U	ND (1.0) U/ND (1.0) U
cis-1,2-Dichloroethene	35.3	23.9	14	15	8.8	5.9	14/14
Ethylbenzene	ND (1.0) U	ND (1.00) U	ND (3.3) U	ND (3.3) U	ND (2) U	ND (2) U	ND (1.0) U/ND (1.0) U
Tetrachloroethene	4.9	7.8	12	28	24	20	21/21
Toluene	ND (1.0) U	ND (1.00) U	ND (3.3) U	ND (3.3) U	ND (2) U	ND (2) U	ND (1.0) U/ND (1.0) U
trans-1,2-Dichloroethene	2.2	1.8	1.6 J	1.6 J	ND (1) U	ND (1) U	1.2/1.2
Trichloroethene	131	115	93	98	77	53	70J/73
Vinyl chloride	ND (1.0) U	ND (1.00) U	ND (3.3) U	ND (3.3) U	0.75 J	ND (2) U	3.0/3.0
Xylene (total)	ND (1.0) U	ND (1.00) U	ND (3.3) U	ND (3.3) U	ND (2) U	ND (2) U	ND (2.0) U/ND (2.0) U

W-1-S	9/22/1999	9/19/2002
	UG/L	UG/L
1,1,1-Trichloroethane	ND (1.0) U	ND (2.0) U
1,1-Dichloroethane	ND (1.0) U	0.97 J/1.0 J
1,1-Dichloroethene	ND (1.0) U	ND (2.0) U
Benzene	ND (1.0) U	ND (2.0) U
cis-1,2-Dichloroethene	7.8/8.0	6.0/6.1
Ethylbenzene	ND (1.0) U	ND (2.0) U
Tetrachloroethene	28.4/30.9	61/62
Toluene	ND (1.0) U	ND (2.0) U
trans-1,2-Dichloroethene	1.1	1.3
Trichloroethene	11.6	16
Vinyl chloride	ND (1.0) U	ND (2.0) U
Xylene (total)	ND (1.0) U	ND (2.0) U

W-2-N	9/14/1999	9/19/2000	11/6/2001	9/19/2002	9/18/2003	9/16/2004	10/20/2005
	UG/L	UG/L	UG/L	UG/L	ug/l	ug/l	ug/L
1,1,1-Trichloroethane	ND (1.0) U	ND (1.00) U	0.48 J	ND (1.0) U	ND (1) U	0.3 J	ND (1.0) U
1,1-Dichloroethane	ND (1.0) U	ND (1.00) U	0.33 J	0.31 J	ND (1) U	0.36 J	0.28 J
1,1-Dichloroethene	ND (1.0) U	ND (1.00) U	ND (1.0) U	ND (1.0) U	ND (1) U	ND (1) U	ND (1.0) U
Benzene	ND (1.0) U	ND (1.00) U	ND (1.0) U	ND (1.0) U	ND (1) U	ND (1) U	ND (1.0) U
cis-1,2-Dichloroethene	1.6	1.2	1.1	1.6	1.3	1.8	1.3
Ethylbenzene	ND (1.0) U	ND (1.00) U	ND (1.0) U	ND (1.0) U	ND (1) U	ND (1) U	ND (1.0) U
Tetrachloroethene	ND (1.0) U	ND (1.00) U	ND (1.0) U	ND (1.0) U	ND (1) U	0.31 J	ND (1.0) U
Toluene	ND (1.0) U	ND (1.00) U	ND (1.0) U	ND (1.0) U	ND (1) U	ND (1) U	ND (1.0) U
trans-1,2-Dichloroethene	ND (1.0) U	ND (1.00) U	ND (0.50) U	ND (0.50) U	ND (0.5) U	0.2 J	ND (1.0) U
Trichloroethene	1.7	ND (1.00) U	1.3	1.4	ND (1) U	1.4	0.91 J
Vinyl chloride	ND (1.0) U	ND (1.00) U	ND (1.0) U	ND (1.0) U	ND (1) U	ND (1) U	ND (1.0) U
Xylene (total)	ND (1.0) U	ND (1.00) U	ND (1.0) U	ND (1.0) U	ND (1) U	ND (1) U	ND (2.0) U

HR-5	9/16/1999	9/19/2000	11/7/2001	9/23/2002	9/18/2003	9/13/2004	10/18/2005
	UG/L	UG/L	UG/L	UG/L	ug/l	ug/l	ug/L
1,1,1-Trichloroethane	ND (1.0) U	ND (1.00) U	0.17 J/ND (1.0) U	ND (1) U	ND (1) U	ND (1) U	ND (1.0) U
1,1-Dichloroethane	ND (1.0) U	ND (1.00) U	0.51 J/0.55 J	0.55 J	0.42 J	0.43 J	0.54 J
1,1-Dichloroethene	ND (1.0) U	ND (1.00) U	ND (1.0) U	ND (1) U	ND (1) U	ND (1) U	ND (1.0) U
Benzene	ND (1.0) U	ND (1.00) U	ND (1.0) U	ND (1) U	ND (1) U	ND (1) U	ND (1.0) U
cis-1,2-Dichloroethene	10.5	5.6	7.7/7.8	7.5	5	4.8	4.6
Ethylbenzene	ND (1.0) U	ND (1.00) U	ND (1.0) U	ND (1) U	ND (1) U	ND (1) U	ND (1.0) U
Tetrachloroethene	ND (1.0) U	ND (1.00) U	ND (1.0) U	ND (1) U	ND (1) U	ND (1) U	ND (1.0) U
Toluene	ND (1.0) U	3.0	ND (1.0) U	ND (1) U	ND (1) U	ND (1) U	ND (1.0) U
trans-1,2-Dichloroethene	1.1	ND (1.00) U	0.67/0.74	0.58	0.46 J	0.44 J	0.52 J
Trichloroethene	12.0	8.1	11	13	11	11	13
Vinyl chloride	ND (1.0) U	ND (1.00) U	ND (1.0) U	ND (1) U	ND (1) U	ND (1) U	1.1
Xylene (total)	ND (1.0) U	2.0	ND (1.0) U	ND (1) U	ND (1) U	ND (1) U	ND (2.0) U

HR-9	9/16/1999	9/18/2000	11/6/2001	9/19/2002	9/17/2003	9/13/2004	10/19/2005
	UG/L	UG/L	UG/L	UG/L	ug/l	ug/l	ug/L
1,1,1-Trichloroethane	20.3	20.5	17	13	12	15	14
1,1-Dichloroethane	52.2	51.0	38	46	35	45	42
1,1-Dichloroethene	ND (1.0) U	ND (1.00) U	0.95 J	1.1 J	ND (1.2) U	1 J	0.97 J
Benzene	ND (1.0) U	ND (1.00) U	ND (1.4) U	ND (1.7) U	ND (1.2) U	ND (2) U	ND (1.2) U
cis-1,2-Dichloroethene	20.3	16.3	12	17	11	17	19
Ethylbenzene	ND (1.0) U	ND (1.00) U	ND (1.4) U	ND (1.7) U	ND (1.2) U	ND (2) U	ND (1.2) U
Tetrachloroethene	ND (1.0) U	ND (1.00) U	ND (1.4) U	ND (1.

HR–10	9/15/1999 UG/L	9/29/2000 UG/L	11/14/2001 UG/L	9/27/2002 UG/L	9/17/2003 ug/l	9/20/2004 ug/l	10/24/2005 ug/L
1,1,1–Trichloroethane	ND (1.0) U	ND (1.00) U	ND (1.0) U	ND (1) U	ND (1) U	ND (1) U	ND (1.0) U
1,1–Dichloroethane	ND (1.0) U	ND (1.00) U	ND (1.0) U	ND (1) U	ND (1) U	ND (1) U	ND (1.0) U
1,1–Dichloroethene	ND (1.0) U	ND (1.00) U	ND (1.0) U	ND (1) U	ND (1) U	ND (1) U	ND (1.0) U
Benzene	ND (1.0) U	ND (1.00) U	ND (1.0) U	ND (1) U	ND (1) U	ND (1) U	ND (1.0) U
cis–1,2–Dichloroethene	ND (1.0) U	ND (1.00) U	ND (0.50) U	ND (0.5) U	ND (0.5) U	ND (0.5) U	ND (1.0) U
Ethylbenzene	ND (1.0) U	ND (1.00) U	ND (1.0) U	ND (1) U	ND (1) U	ND (1) U	ND (1.0) U
Tetrachloroethene	ND (1.0) U	ND (1.00) U	ND (1.0) U	ND (1) U	ND (1) U	ND (1) U	ND (1.0) U
Toluene	ND (1.0) U	ND (1.00) U	ND (1.0) U	ND (1) U	ND (1) U	ND (1) U	ND (1.0) U
trans–1,2–Dichloroethene	ND (1.0) U	ND (1.00) U	ND (0.50) U	ND (0.5) U	ND (0.5) U	ND (0.5) U	ND (1.0) U
Trichloroethene	ND (1.0) U	ND (1.00) U	ND (1.0) U	ND (1) U	ND (1) U	ND (1) U	ND (1.0) U
Vinyl chloride	ND (1.0) U	ND (1.00) U	ND (1.0) U	ND (1) U	ND (1) U	ND (1) U	ND (1.0) U
Xylene (total)	ND (1.0) U	ND (1.00) U	ND (1.0) U	ND (1) U	ND (1) U	ND (1) U	ND (2.0) U

HR–12	9/14/1999 UG/L	9/28/2000 UG/L	11/14/2001 UG/L	9/26/2002 UG/L	9/18/2003 ug/l	9/21/2004 ug/l	10/24/2005 ug/L
1,1,1–Trichloroethane	ND (1.0) U	ND (1.00) U	ND (1.0) U	ND (1) U	ND (1) U	ND (1) U	ND (1.0) U
1,1–Dichloroethane	2.7	2.0/2.2	3.6	2.4/2.5	1.7	1.8	2.1
1,1–Dichloroethene	ND (1.0) U	ND (1.00) U	ND (1.0) U	ND (1) U	ND (1) U	ND (1) U	ND (1.0) U
Benzene	1.2	ND (1.00) U	ND (1.0) U	ND (1) U	ND (1) U	ND (1) U	ND (1.0) U
cis–1,2–Dichloroethene	1.8	1.8/2.0	2.7	2.1/2.2	1.4	1.2	1.5
Ethylbenzene	ND (1.0) U	ND (1.00) U	ND (1.0) U	ND (1) U	ND (1) U	ND (1) U	ND (1.0) U
Tetrachloroethene	ND (1.0) U	ND (1.00) U	ND (1.0) U	ND (1) U	ND (1) U	ND (1) U	ND (1.0) U
Toluene	ND (1.0) U	ND (1.00) U	ND (1.0) U	ND (1) U	ND (1) U	ND (1) U	ND (1.0) U
trans–1,2–Dichloroethene	ND (1.0) U	ND (1.00) U	0.23 J	ND (0.5) U	ND (0.5) U	ND (0.5) U	ND (1.0) U
Trichloroethene	ND (1.0) U	ND (1.00) U	ND (1.0) U	ND (1) U	ND (1) U	ND (1) U	ND (1.0) U
Vinyl chloride	1.7	2.5/2.6	3.8	1.7/1.8	1.6	1.1	0.36 J
Xylene (total)	ND (1.0) U	ND (1.00) U	ND (1.0) U	ND (1) U	ND (1) U	ND (1) U	ND (2.0) U

HR–15	9/15/1999 UG/L	9/29/2000 UG/L	11/14/2001 UG/L	9/30/2002 UG/L	9/17/2003 ug/l	9/21/2004 ug/l	10/25/2005 ug/L
1,1,1–Trichloroethane	ND (1.0) U	ND (1.00) U	ND (1.0) U	ND (1) U	ND (1) U	ND (1) U	ND (1.0) U
1,1–Dichloroethane	ND (1.0) U	ND (1.00) U	ND (1.0) U	ND (1) U/ND (1) UJ	ND (1) U	ND (1) U	ND (1.0) U
1,1–Dichloroethene	ND (1.0) U	ND (1.00) U	ND (1.0) U	ND (1) U	ND (1) U	ND (1) U	ND (1.0) U
Benzene	ND (1.0) U	ND (1.00) U	ND (1.0) U	ND (1) U	ND (1) U	ND (1) U	ND (1.0) U
cis–1,2–Dichloroethene	2.5	2.8	0.86	0.98/1	2.2	2.5	2.2
Ethylbenzene	ND (1.0) U	ND (1.00) U	ND (1.0) U	ND (1) U	ND (1) U	ND (1) U	ND (1.0) U
Tetrachloroethene	ND (1.0) U	ND (1.00) U	ND (1.0) U	ND (1) U	ND (1) U	ND (1) U	ND (1.0) U
Toluene	ND (1.0) U	ND (1.00) U	ND (1.0) U	ND (1) U	ND (1) U	ND (1) U	ND (1.0) U
trans–1,2–Dichloroethene	ND (1.0) U	ND (1.00) U	ND (0.50) U	ND (0.5) U	ND (0.5) U	ND (0.5) U	ND (1.0) U
Trichloroethene	ND (1.0) U	ND (1.00) U	ND (1.0) U	ND (1) U	0.29 J	0.38 J	0.40 J
Vinyl chloride	11.0	11.2	ND (1.0) U	0.38 J/ND (1) U	14	19	14
Xylene (total)	ND (1.0) U	ND (1.00) U	ND (1.0) U	ND (1) U	ND (1) U	ND (1) U	ND (2.0) U

GM–39	12/10/2003 ug/l	9/20/2004 ug/l	10/24/2005 ug/L
1,1,1–Trichloroethane	ND (1) U	ND (1) U	ND (1.0) U
1,1–Dichloroethane	ND (1) U	ND (1) U	ND (1.0) U
1,1–Dichloroethene	ND (1) U	ND (1) U	ND (1.0) U
Benzene	ND (1) U	ND (1) U	ND (1.0) U
cis–1,2–Dichloroethene	ND (0.5) U	ND (0.5) U	ND (1.0) U
Ethylbenzene	ND (1) U	ND (1) U	ND (1.0) U
Tetrachloroethene	ND (1) U	ND (1) U	ND (1.0) U
Toluene	0.18 J	ND (1) U	ND (1.0) U
trans–1,2–Dichloroethene	ND (0.5) U	ND (0.5) U	ND (1.0) U
Trichloroethene	ND (1) U	ND (1) U	ND (1.0) U
Vinyl chloride	1.3	1.8	0.77 J
Xylene (total)	ND (1) U	ND (1) U	ND (2.0) U

HR–13	9/15/1999 UG/L	9/29/2000 UG/L	11/14/2001 UG/L	9/30/2002 UG/L	9/16/2003 ug/l	9/21/2004 ug/l	10/25/2005 ug/L
1,1,1–Trichloroethane	1.6/1.6	1.7	0.74 J	1.4	2.2	2.6	2.3
1,1–Dichloroethane	41.4/42.8	39.5	15	25	33	30	25
1,1–Dichloroethene	ND (1.0) U	ND (1.00) U	ND (1.0) U	ND (1) U	ND (1) U	0.27 J	0.25 J
Benzene	ND (1.0) U	ND (1.00) U	0.18 J	ND (1) U	ND (1) U	ND (1) U	ND (1.0) U
cis–1,2–Dichloroethene	20.8/21.2	14.1	6.5	11	12	12	11
Ethylbenzene	ND (1.0) U	ND (1.00) U	ND (1.0) U	ND (1) U	ND (1) U	ND (1) U	ND (1.0) U
Tetrachloroethene	ND (1.0) U	ND (1.00) U	ND (1.0) U	ND (1) U	ND (1) U	ND (1) U	0.20 J
Toluene	ND (1.0) U	ND (1.00) U	ND (1.0) U	0.4 U	ND (1) U	ND (1) U	ND (1.0) U
trans–1,2–Dichloroethene	3.1/3.3	2.5	0.65	1.4	1.8	1.5	1.5
Trichloroethene	3.3/3.4	2.0	1.2	3.6	5.7	21	20
Vinyl chloride	ND (1.0) U	ND (1.00) U	ND (1.0) U	ND (1) U	ND (1) U	0.43 J	ND (1.0) U
Xylene (total)	ND (1.0) U	ND (1.00) U	ND (1.0) U	ND (1) U	ND (1) U	ND (1) U	ND (2.0) U

HR–14	9/15/1999 ug/l	9/30/2002 ug/l
1,1,1–Trichloroethane	ND (1) U	ND (1) U
1,1–Dichloroethane	ND (1) U	ND (1) U
1,1–Dichloroethene	ND (1) U	ND (1) U
Benzene	ND (1) U	ND (1) U
cis–1,2–Dichloroethene	7.9	3.6
Ethylbenzene	ND (1) U	ND (1) U
Tetrachloroethene	ND (1) U	ND (1) U
Toluene	ND (1) U	0.57 U
trans–1,2–Dichloroethene	ND (1) U	ND (0.5) U
Trichloroethene	3.4	1.2
Vinyl chloride	11.5	ND (1) U
Xylene (total)	ND (1) U	ND (1) U

31	9/29/2000 UG/L	11/15/2001 UG/L
1,1,1–Trichloroethane	ND (1.00) U	ND (1) U
1,1–Dichloroethane	7.4	3.1
1,1–Dichloroethene	ND (1.00) U	ND (1) U
Benzene	ND (1.00) U	ND (1) U
cis–1,2–Dichloroethene	8.4	2.4
Ethylbenzene	ND (1.00) U	ND (1) U
Tetrachloroethene	ND (1.00) U	ND (1) U
Toluene	ND (1.00) U	ND (1) U
trans–1,2–Dichloroethene	ND (1.00) U	ND (0.5) U
Trichloroethene	12.9	5.1
Vinyl chloride	4.4	2.5
Xylene (total)	ND (1.00) U	ND (1) U

39	9/27/2002 UG/L	9/24/2003 ug/l
1,1,1–Trichloroethane	ND (1.0) U	ND (1) U
1,1–Dichloroethane	1.6	0.58 J
1,1–Dichloroethene	ND (1.0) U	ND (1) U
Benzene	ND (1.0) U	ND (1) U
cis–1,2–Dichloroethene	1.3	0.71
Ethylbenzene	ND (1.0) U	ND (1) U
Tetrachloroethene	ND (1.0) U	ND (1) U
Toluene	ND (1.0) U	ND (1) U
trans–1,2–Dichloroethene	ND (0.5) U	ND (0.5) U
Trichloroethene	3.8	0.89 J
Vinyl chloride	0.51 J	ND (1) U
Xylene (total)	ND (1.0) U	ND (1) U

GM–42	12/9/2003 ug/l	9/20/2004 ug/l	10/25/2005 ug/L
1,1,1–Trichloroethane	ND (1) U	ND (1) U	ND (1.0) U
1,1–Dichloroethane	0.46 J	0.7 J	0.64 J
1,1–Dichloroethene	ND (1) U	0.25 J	0.21 J
Benzene	ND (1) U	ND (1) U	ND (1.0) U
cis–1,2–Dichloroethene	11	16	17
Ethylbenzene	ND (1) U	ND (1) U	ND (1.0) U
Tetrachloroethene	0.27 J	ND (1) U	0.19 J
Toluene	ND (1) U	ND (1) U	ND (1.0) U
trans–1,2–Dichloroethene	0.34 J	0.44 J	0.59 J
Trichloroethene	0.37 J	0.43 J	0.85 J
Vinyl chloride	1	0.92 J	0.56 J
Xylene (total)	ND (1) U	ND (1) U	ND (2.0) U

GM–41	12/10/2003 ug/l	9/21/2004 ug/l	10/24/2005 ug/L
1,1,1–Trichloroethane	ND (11) U	ND (6.2) U	ND (10) U/ND (10) U
1,1–Dichloroethane	ND (11) U	ND (6.2) U	ND (10) U/ND (10) U
1,1–Dichloroethene	ND (11) U	ND (6.2) U	ND (10) U/ND (10) U
Benzene	ND (11) U	ND (6.2) U	ND (10) U/ND (10) U
cis–1,2–Dichloroethene	10	24	16/17
Ethylbenzene	ND (11) U	ND (6.2) U	ND (10) U/ND (10) U
Tetrachloroethene	ND (11) U	ND (6.2) U	ND (10) U/ND (10) U
Toluene	ND (11) U	ND (6.2) U	ND (10) U/ND (10) U
trans–1,2–Dichloroethene	ND (5.6) U	ND (3.1) U	ND (10) U/ND (10) U
Trichloroethene	320	180	250/290
Vinyl chloride	ND (11) U	ND (6.2) U	ND (10) U/ND (10) U
Xylene (total)	ND (11) U	ND (6.2) U	ND (20) U/ND (20) U

GM–40	12/10/2003 ug/l	9/20/2004 ug/l	10/25/2005 ug/L
1,1,1–Trichloroethane	ND (1) U	ND (1) U	ND (1.0) U
1,1–Dichloroethane	ND (1) U	ND (1) U	ND (1.0) U
1,1–Dichloroethene	ND (1) U	ND (1) U	ND (1.0) U
Benzene	ND (1) U	ND (1) U	ND (1.0) U
cis–1,2–Dichloroethene	ND (0.5) U	ND (0.5) U	ND (1.0) U
Ethylbenzene	ND (1) U	ND (1) U	ND (1.0) U
Tetrachloroethene	ND (1) U	ND (1) U	ND (1.0) U
Toluene	ND (1) U	ND (1) U	ND (1.0) U
trans–1,2–Dichloroethene	ND (0.5) U	ND (0.5) U	ND (1.0) U
Trichloroethene	ND (1) U	ND (1) U	ND (1.0) U
Vinyl chloride	3.1	3.2	2.9
Xylene (total)	ND (1) U	ND (1) U	ND (2.0) U

GM–19D	9/28/1999 UG/L	10/2/2000 UG/L	11/14/2001 UG/L	9/26/2002 UG/L	9/25/2003 ug/l	9/20/2004 ug/l	10/25/2005 ug/L
1,1,1–Trichloroethane	ND (1.0) U	ND (1.00) U	0.18 J	ND (1) U	ND (1) U	0.31 J	ND (1.0) U
1,1–Dichloroethane	ND (1.0) U	ND (1.00) U	ND (1.0) U	ND (1) U	ND (1) U	ND (1) U	ND (1.0) U
1,1–Dichloroethene	ND (1.0) U	ND (1.00) U	ND (1.0) U	ND (1) U	ND (1) U	ND (1) U	ND (1.0) U
Benzene	ND (1.0) U	ND (1.00) U	ND (1.0) U	ND (1) U	ND (1) U	ND (1) U	ND (1.0) U
cis–1,2–Dichloroethene	1.2	3.5	0.92	0.81	1.8	2	2.7
Ethylbenzene	ND (1.0) U	ND (1.00) U	ND (1.0) U	ND (1) U	ND (1) U	ND (1) U	ND (1.0) U
Tetrachloroethene	ND (1.0) U	ND (1.00) U	ND (1.0) U	ND (1) U	ND (1) U	ND (1) U	ND (1.0) U
Toluene	ND (1.0) U	ND (1.00) U	0.38 J	ND (1) U	ND (1) U	ND (1) U	ND (1.0) U
trans–1,2–Dichloroethene	ND (1.0) U	ND (1.00) U	ND (0.50) U	ND (0.5) U	ND (0.5) U	ND (0.5) U	ND (1.0) U
Trichloroethene	13.5	2.9	3.7	3.1	0.24 J	3.5	1.2
Vinyl chloride	1.5	15.7	13	0.36 J	17	18	15
Xylene (total)	ND (1.0) U	ND (1.00) U	ND (1.0) U	ND (1) U	ND (1) U	ND (1) U	ND (2.0) U

GM–7R	9/28/1999 UG/L
1,1,1–Trichloroethane	4.2/4.8
1,1–Dichloroethane	1.1/ND (1.0) U
1,1–Dichloroethene	ND (1.0) U
Benzene	ND (1.0) U
cis–1,2–Dichloroethene	2.1/2.3
Ethylbenzene	ND (1.0) U
Tetrachloroethene	ND (1.0) U
Toluene	ND (1.0) U
trans–1,2–Dichloroethene	ND (1.0) U
Trichloroethene	76.1/76.8
Vinyl chloride	ND (1.0) U
Xylene (total)	ND (1.0) U

GM–1	9/28/1999 UG/L	10/2/2000 UG/L	11/14/2001 UG/L	10/1/2002 UG/L	10/2/2003 ug/l	9/21/2004 ug/l	10/25/2005 ug/L
1,1,1–Trichloroethane	1.1	2.2	0.80 J	1.3 J	1.2	1.2	0.95 J/1.0
1,1–Dichloroethane	ND (1.0) U	ND (1.00) U	0.29 J	0.48 J	ND (1) U	ND (1) U	ND (1.0) U/ND (1.0) U
1,1–Dichloroethene	ND (1.0) U	ND (1.00) U	ND (1.0) U	ND (1.4) U	ND (1) U	ND (1) U	ND (1.0) U/ND (1.0) U
Benzene	ND (1.0) U	ND (1.00) U	ND (1.0) U	ND (1.4) U	ND (1) U	ND (1) U	ND (1.0) U/ND (1.0) U
cis–1,2–Dichloroethene	ND (1.0) U	ND (1.00) U	ND (0.50) U	0.95	ND (0.5) U	ND (0.5) U	ND (1.0) U/ND (1.0) U
Ethylbenzene	ND (1.0) U	ND (1.00) U	ND (1.0) U	ND (1.4) U	ND (1) U	ND (1) U	ND (1.0) U/ND (1.0) U
Tetrachloroethene	2.0	2.8	1.3	2.3	2	2.1	2.1/2.0
Toluene	5.2	ND (1.00) U	ND (1.0) U	ND (1.4) U	ND (1) U	ND (1) U	ND (1.0) U/ND (1.0) U
trans–1,2–Dichloroethene	ND (1.0) U	ND (1.00) U	ND (0.50) U	ND (0.72) U	ND (0.5) U	ND (0.5) U	ND (1.0) U/ND (1.0) U
Trichloroethene	30.6	37.2	19	39.0	34	35	34/34
Vinyl chloride	ND (1.0) U	ND (1.00) U	ND (1.0) U	ND (1.4) U	ND (1) U	ND (1) U	ND (1.0) U/ND (1.0) U
Xylene (total)	ND (1.0) U	ND (1.00) U	ND (1.0) U	ND (1.4) U	ND (1) U	ND (1) U	ND (2.0) U/ND (2.0) U

GM–15	9/24/1999 UG/L	10/2/2000 UG/L	11/14/2001 UG/L	9/27/2002 UG/L	9/22/2003 ug/l	9/20/2004 ug/l	10/26/2005 ug/L
1,1,1–Trichloroethane	ND (1.0) U	ND (1.00) U	ND (1.0) U	ND (1) U	ND (1) U	ND (1) U	ND (1.0) U
1,1–Dichloroethane	2.4	2.2/2.3	1.4	1.6	1.7	1.8	1.7
1,1–Dichloroethene	ND (1.0) U	ND (1.00) U	ND (1.0) U	ND (1) U	ND (1) U	ND (1) U	ND (1.0) U
Benzene	ND (1.0) U	ND (1.00) U	ND (1.0) U	ND (1) U	ND (1) U	ND (1) U	ND (1.0) U
cis–1,2–Dichloroethene	4.3	2.6/3.8	1.2	1.8	1.6	1.4	1.7
Ethylbenzene	ND (1.0) U	ND (1.00) U	ND (1.0) U	ND (1) U	ND (1) U	ND (1) U	ND (1.0) U
Tetrachloroethene	ND (1.0) U	ND (1.00) U	ND (1.0) U	ND (1) U	ND (1) U	ND (1) U	ND (1.0) U
Toluene	ND (1.0) U	ND (1.00) U	ND (1.0) U	ND (1) U	ND (1) U	ND (1) U	ND (1.0) U
trans–1,2–Dichloroethene	ND (1.0) U	ND (1.00) U	ND (0.50) U	ND (0.5) U	ND (0.5) U	ND (0.5) U	ND (1.0) U
Trichloroethene	4.1	4.5/4.7	4.9	4.7	5.9	5.8	5.9
Vinyl chloride	ND (1.0) U	ND (1.00) U	ND (1.0) U	ND (1) U	ND (1) U	ND (1) U	ND (1.0) U
Xylene (total)	ND (1.0) U	ND (1.00) U	ND (1.0) U	ND (1) U	ND (1) U	ND (1) U	ND (2.0) U

GM–5	9/28/1999 UG/L
1,1,1–Trichloroethane	ND (1.0) U
1,1–Dichloroethane	ND (1.0) U
1,1–Dichloroethene	ND (1.0) U
Benzene	ND (1.0) U
cis–1,2–Dichloroethene	ND (1.0) U
Ethylbenzene	ND (1.0) U
Tetrachloroethene	ND (1.0) U
Toluene	3.9
trans–1,2–Dichloroethene	ND (1.0) U
Trichloroethene	1.3
Vinyl chloride	ND (1.0) U
Xylene (total)	ND (1.0) U

GM–3	9/28/1999 UG/L	10/2/2000 UG/L	11/14/2001 UG/L	10/1/2002 UG/L	10/2/2003 ug/l	9/21/2004 ug/l	10/25/2005 ug/L
1,1,1–Trichloroethane	1.7	1.0	0.16 J	0.74 J	0.96 J	1	0.83 J
1,1–Dichloroethane	ND (1.0) U	2.1	0.95 J	1.8	1.6	1.8	1.6
1,1–Dichloroethene	ND (1.0) U	ND (1.00) U	ND (1.0) U	ND (1.0) U	ND (1) U	ND (1) U	ND (1.0) U
Benzene	ND (1.0) U	ND (1.00) U	ND (1.0) U	ND (1.0) U	ND (1) U	ND (1) U	ND (1.0) U
cis–1,2–Dichloroethene	1.1	8.3	2.6	8.9	5.5	4.9	4.7
Ethylbenzene	ND (1.0) U	ND (1.00) U	ND (1.0) U	ND (1.0) U	0.26 J	ND (1) U	ND (1.0) U
Tetrachloroethene	1.2	1.5	0.48 J	1.4	1.7	2	2.0
Toluene	ND (1.0) U	ND (1.00) U	ND (1.0) U	ND (1.0) U	ND (1) U	ND (1) U	ND (1.0) U
trans–1,2–Dichloroethene	ND (1.0) U	1.1	0.25 J	1.2	0.77	0.75	0.66 J
Trichloroethene	7.5	9.4	2.9	9.5	12	13	14
Vinyl chloride	ND (1.0) U	ND (1.00) U	ND (1.0) U	0.63 J	ND (1) U	ND (1) U	ND (1.0) U
Xylene (total)	ND (1.0) U	ND (1.00) U	ND (1.0) U	ND (1.0) U	ND (1) U	ND (1) U	ND (2.0) U

GM–20D	9/24/1999 UG/L	10/3/2000 UG/L	11/14/2001 UG/L	9/30/2002 UG/L	9/22/2003 ug/l	9/21/2004 ug/l	10/26/2005 ug/L
1,1,1–Trichloroethane	ND (1.0) U	1.6	0.64 J	ND (1) U	0.89 J	0.96 J	0.73 J
1,1–Dichloroethane	ND (1.0) U	ND (1.00) U	ND (1.0) U	ND (1) U	ND (1) U	ND (1) U	ND (1.0) U
1,1–Dichloroethene	ND (1.0) U	ND (1.00) U	ND (1.0) U	ND (1) U	ND (1) U	ND (1) U	ND (1.0) U
Benzene	ND (1.0) U	ND (1.00) U	ND (1.0) U	ND (1) U	ND (1) U	ND (1) U	ND (1.0) U
cis–1,2–Dichloroethene	ND (1.0) U	ND (1.00) U	ND (0.50) U	ND (0.5) U	ND (0.5) U	ND (0.5) U	ND (1.0) U
Ethylbenzene	ND (1.0) U	ND (1.00) U	ND (1.0) U	ND (1) U	ND (1) U	ND (1) U	ND (1.0) U
Tetrachloroethene	ND (1.0) U	4.2	2.0	1.3	3.6	2.9	2.7
Toluene	ND (1.0) U	ND (1.00) U	ND (1.0) U	ND (1) U	ND (1) U	ND (1) U	ND (1.0) U
trans–1,2–Dichloroethene	ND (1.0) U	ND (1.00) U	ND (0.50) U	ND (0.5) U	ND (0.5) U	ND (0.5) U	ND (1.0) U
Trichloroethene	ND (1.0) U	14.3	5.9	3.8	12	11	11
Vinyl chloride	ND (1.0) U	ND (1.00) U	ND (1.0) U	ND (1) U	ND (1) U	ND (1) U	ND (1.0) U
Xylene (total)	ND (1.0) U	ND (1.00) U	ND (1.0) U	ND (1) U	ND (1) U	ND (1) U	ND (2.0) U

GM–4	9/28/1999 UG/L
1,1,1–Trichloroethane	ND (1.0) U
1,1–Dichloroethane	ND (1.0) U
1,1–Dichloroethene	ND (1.0) U
Benzene	ND (1.0) U
cis–1,2–Dichloroethene	2.3
Ethylbenzene	ND (1.0) U
Tetrachloroethene	ND (1.0) U
Toluene	ND (1.0) U
trans–1,2–Dichloroethene	ND (1.0) U
Trichloroethene	13.4
Vinyl chloride	ND (1.0) U
Xylene (total)	ND (1.0) U

GM–11	9/24/1999 UG/L	10/2/2000 UG/L	11/14/2001 UG/L	10/1/2002 UG/L	9/24/2003 ug/l	9/21/2004 ug/l	10/26/2005 ug/L
1,1,1–Trichloroethane	ND (1.0) U	1.4	0.33 J	1	0.96 J	0.89 J	0.75 J
1,1–Dichloroethane	ND (1.0) U	ND (1.00) U	ND (1.0) U	0.34 J	ND (1) U	ND (1) U	ND (1.0) U
1,1–Dichloroethene	ND (1.0) U	ND (1.00) U	ND (1.0) U	ND (1) U	ND (1) U	ND (1) U	ND (1.0) U
Benzene	ND (1.0) U	ND (1.00) U	ND (1.0) U	ND (1) U	ND (1) U	ND (1) U	ND (1.0) U
cis–1,2–Dichloroethene	ND (1.0) U	ND (1.00) U	ND (0.50) U	0.62	ND (0.5) U	ND (0.5) U	ND (1.0) U
Ethylbenzene	ND (1.0) U	ND (1.00) U	ND (1.0) U	ND (1) U	ND (1) U	ND (1) U	ND (1.0) U
Tetrachloroethene	1.5	3.0	1.0	2.2	2.2	2.1	1.7
Toluene	ND (1.0) U	ND (1.00) U	ND (1.0) U	0.55 U	ND (1) U	ND (1) U	ND (1.0) U
trans–1,2–Dichloroethene	ND (1.0) U	ND (1.00) U	ND (0.50) U	ND (0.5) U	ND (0.5) U	ND (0.5) U	ND (1.0) U
Trichloroethene	14.5	41.3	12	35	33	33	32
Vinyl chloride	ND (1.0) U	ND (1.00) U	ND (1.0) U	ND (1) U	ND (1) U	ND (1) U	ND (1.0) U
Xylene (total)	ND (1.0) U	ND (1.00) U	ND (1.0) U	0.85 U	ND (1) U	ND (1) U	ND (2.0) U

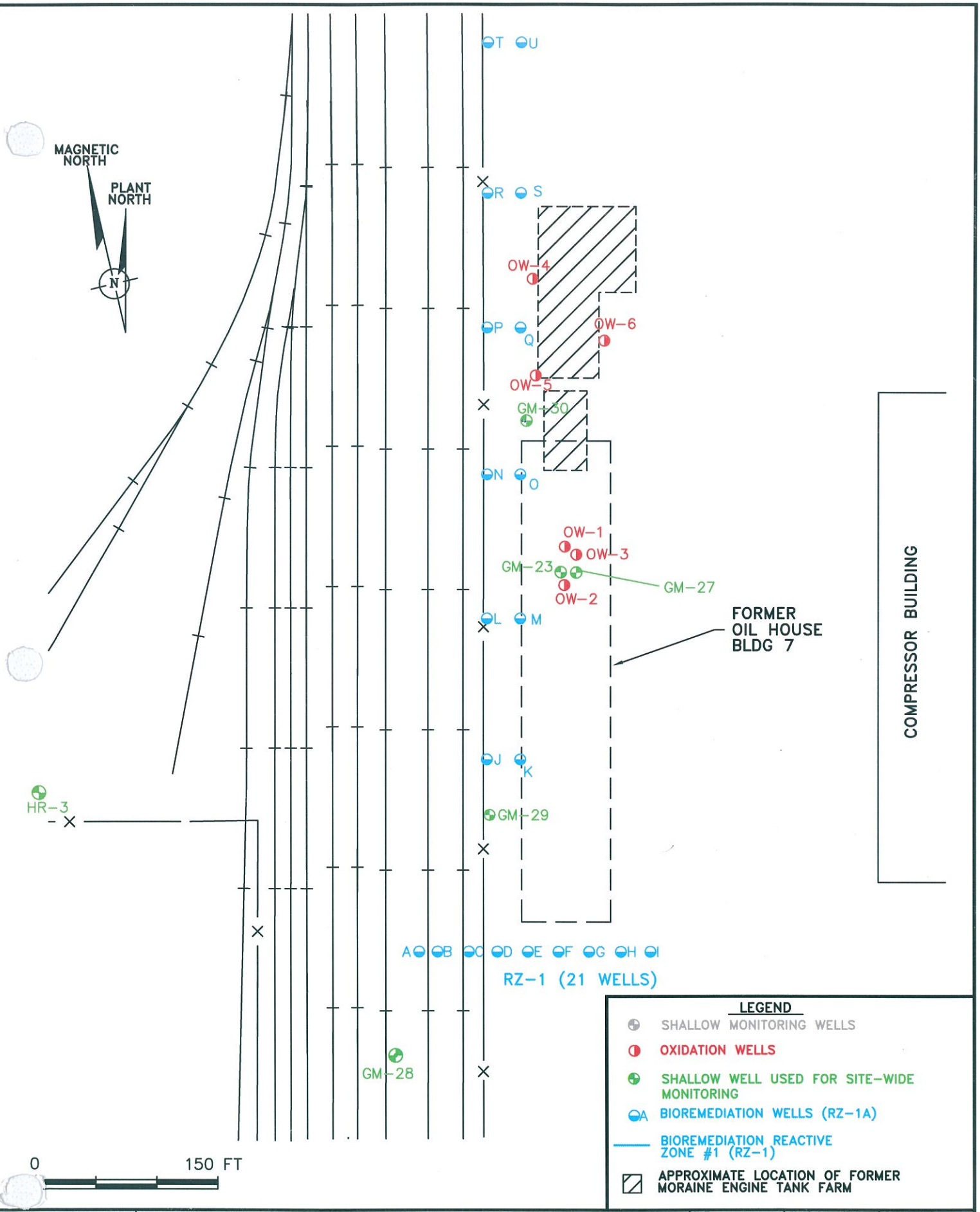
GM–14	9/24/1999 UG/L
1,1,1–Trichloroethane	ND (1.0) U
1,1–Dichloroethane	ND (1.0) U
1,1–Dichloroethene	ND (1.0) U
Benzene	ND (1.0) U
cis–1,2–Dichloroethene	ND (1.0) U
Ethylbenzene	ND (1.0) U
Tetrachloroethene	ND (1.0) U
Toluene	ND (1.0) U
trans–1,2–Dichloroethene	ND (1.0) U
Trichloroethene	ND (1.0) U
Vinyl chloride	ND (1.0) U
Xylene (total)	ND (1.0) U

GM–13	9/24/1999 UG/L
1,1,1–Trichloroethane	1.9
1,1–Dichloroethane	ND (1.0) U
1,1–Dichloroethene	ND (1.0) U
Benzene	ND (1.0) U
cis–1,2–Dichloroethene	ND (1.0) U
Ethylbenzene	ND (1.0) U
Tetrachloroethene	3.6
Toluene	ND (1.0) U
trans–1,2–Dichloroethene	ND (1.0) U
Trichloroethene	31.0
Vinyl chloride	ND (1.0) U
Xylene (total)	ND (1.0) U

DN–13	11/14/2001 ug/l	9/27/2002 ug/l	9/22/2003 ug/l	9/16/2004 ug/l	10/20/2005 ug/L
1,1,1–Trichloroethane	1.1	1.1	1.1	0.84 J	1.5
1,1–Dichloroethane	2.5	2.5	2.4	2.2	2.0
1,1–Dichloroethene	ND (1.0) U	ND (1) U	ND (1) U	ND (1) U	ND (1.0) U
Benzene	ND (1.0) U	ND (1) U	ND (1) U	ND (1) U	ND (1.0) U
cis–1,2–Dichloroethene	6.2	7.3	6.8	6.7	5.5
Ethylbenzene	ND (1.0) U	ND (1) U	ND (1) U	ND (1) U	ND (1.0) U
Tetrachloroethene	ND (1.0) U	ND (1) U	0.31 J	0.44 J	0.38 J
Toluene	ND (1.0) U	ND (1) U	ND (1) U	ND (1) U	ND (1.0) U
trans–1,2–Dichloroethene	0.37 J	0.48 J	0.4 J	0.49 J	ND (1.0) U
Trichloroethene	5.0	6.1	6.4	6.8	7.2
Vinyl chloride	1.2	1.3	1.1	2.1	2.6
Xylene (total)	ND (1.0) U	ND (1) U	ND (1) U	ND (1) U	ND (2.0) U

MT–69	9/24/1999 UG/L	10/3/2000 UG/L	11/15/2001 UG/L	9/30/2002 UG/L	10/1/2003 ug/l	9/27/2004 ug/l	10/24/2005 ug/L
1,1,1–Trichloroethane	ND (1.0) U	ND (1.00) U	ND (1.0) U	ND (1) U	ND (1) U	ND (1) U	ND (1.0) U
1,1–Dichloroethane	ND (1.0) U	ND (1.00) U	ND (1.0) U	ND (1) U	ND (1) U	ND (1) U	ND (1.0) U
1,1–Dichloroethene	ND (1.0) U	ND (1.00) U	ND (1.0) U	ND (1) U	ND (1) U	ND (1) U	ND (1.0) U
Benzene	ND (1.0) U	ND (1.00) U	ND (1.0) U	ND (1) U	ND (1) U	ND (1) U	ND (1.0) U
cis–1,2–Dichloroethene	ND (1.0) U	ND (1.00) U	ND (0.50) U	ND (0.5) U	ND (0.5) U	ND (0.5) U	ND (1.0) U
Ethylbenzene	ND (1.0) U	ND (1.00) U	ND (1.0) U	ND (1) U	ND (1) U	ND (1) U	ND (1.0) U
Tetrachloroethene	ND (1.0) U	ND (1.00) U	ND (1.0) U	ND (1) U	ND (1) U	ND (1) U	ND (1.0) U
Toluene	ND (1.0) U	ND (1.00) U	ND (1.0) U	ND (1) U	ND (1) U	ND (1) U	ND (1.0) U
trans–1,2–Dichloroethene	ND (1.0) U	ND (1.00) U	ND (0.50) U	ND (0.5) U	ND (0.5) U	ND (0.5) U	ND (1.0) U
Trichloroethene	ND (1.0) U	ND (1.00) U	ND (1.0) U	ND (1) U	ND (1) U	ND (1) U	ND (1.0) U
Vinyl chloride	ND (1.0) U	ND (1.00) U	ND (1.0) U	ND (1) U	ND (1) U	ND (1) U	ND (1.0) U
Xylene (total)	ND (1.0) U	ND (1.00) U	ND (1.0) U	ND (1) U	ND (1) U	ND (1) U	ND (2.0) U

GM–9	9/24/1999 UG/L	10/3/2000 UG/L	11/14/2001 UG/L	9/30/2002 UG/L	9/24/2003 ug/l	9/21/2004 ug/l	10/26/2005 ug/L
1,1,1–Trichloroethane	1.0	1.2	0.48 J	0.99 J	1.3	1.1/1.2	0.85 J
1,1–Dichloroethane	ND (1.0) U	ND (1.00) U	0.58 J	0.48 J	0.45 J	0.6 J/0.7 J	0.59 J
1,1–Dichloroethene	ND (1.0) U	ND (1.00) U	ND (1.0) U	ND (1) U	ND (1) U	ND (1) U	ND (1.0) U
Benzene	ND (1.0) U	ND (1.00) U	ND (1.0) U	ND (1) U	ND (1) U	ND (1) U	ND (1.0) U
cis–1,2–Dichloroethene	1.0	ND (1.00) U	1.1	0.66	0.56	0.97/0.83	0.99 J
Ethylbenzene	ND (1.0) U	ND (1.00) U	ND (1.0) U	ND (1) U	ND (1) U	ND (1) U	ND (1.0) U
Tetrachloroethene	ND (1.0) U	ND (1.00) U	0.38 J	ND (1) U	ND (1) U	ND (1) U	ND (1.0) U
Toluene	ND (1.0) U	ND (1.00) U	ND (1.0) U	ND (1) U	ND (1) U	ND (1) U	ND (1.0) U
trans–1,2–Dichloroethene	ND (1.0



ARCADIS
284 Cramer Creek Court
Dublin, OH 43017
Tel: 614/764-2310 Fax: 614/764-1270

REACTIVE ZONE #1
GENERAL MOTORS CORPORATION
MORAINE, OHIO

DATE	PROJECT MANAGER	DRAWING NAME
2/3/2006	N. GILLOTTI	CRA\ANN05\ANN05-09
DRAWN	LEAD DESIGN PROF.	CHECKED
R. SMITH	J. REID	N. GILLOTTI
PROJECT NUMBER		FIGURE NUMBER
0H000294.0008.0003		12

LEGEND

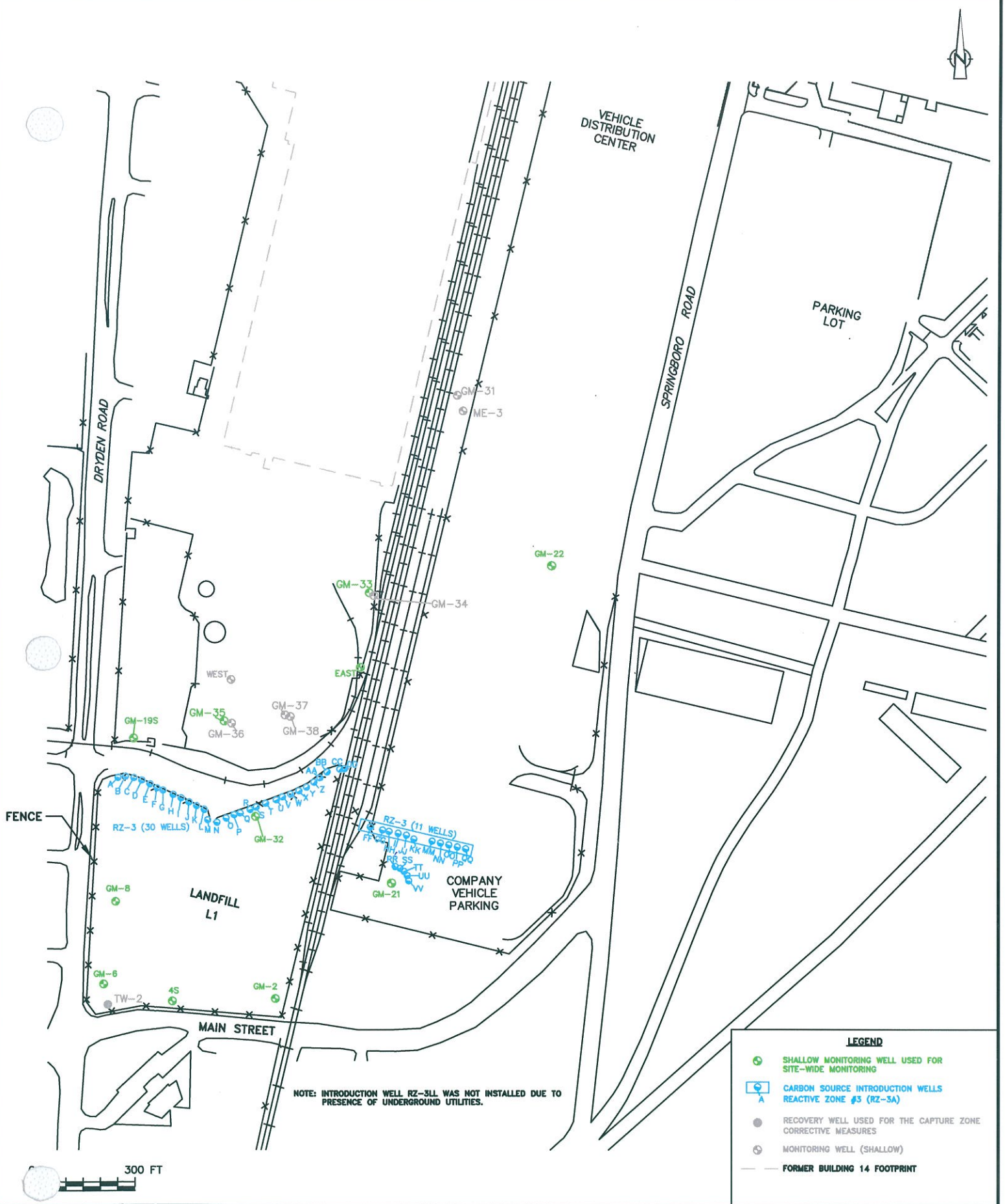
- MONITORING WELL (SHALLOW)
- MONITORING WELL USED FOR SITE-WIDE MONITORING
- FORMER BUILDING 14 FOOTPRINT

ARCADIS

284 Cramer Creek Court
Dublin, OH 43017
Tel: 614/764-2310 Fax: 614/764-1270

REACTIVE ZONE #2
GENERAL MOTORS CORPORATION
MORAINE, OHIO

DATE	PROJECT MANAGER	DRAWING NAME
2/3/2006	N. GILLOTTI	CRA\ANN05\ANN05-10
DRAWN	LEAD DESIGN PROF.	CHECKED
R. SMITH	J. REID	N. GILLOTTI
PROJECT NUMBER		FIGURE NUMBER
0H000294.0008.0003		13



ARCADIS
284 Cramer Creek Court
Dublin, OH 43017
Tel: 614/764-2310 Fax: 614/764-1270

REACTIVE ZONES #3 WEST AND #3 EAST
GENERAL MOTORS CORPORATION
MORAINE, OHIO

DATE	PROJECT MANAGER	DRAWING NAME
2/3/2006	N. GILLOTTI	CRA\ANN05\ANN05-11
DRAWN	LEAD DESIGN PROF.	CHECKED
R. SMITH	J. REID	N. GILLOTTI
PROJECT NUMBER		FIGURE NUMBER
0H000294.0008.0003		14

Appendix A

Site-Wide Groundwater VOC
Analytical Results from 1999 to 2004
Sampling Events

ARCADIS

Table A-1. Groundwater Analytical Results for the Upper Aquifer Wells from 1999-2004, General Motors Corporation, Moraine, Ohio.

		Compound											
Well	Date	Benzene	1,1-DCA	1,1-DCE	cis-1,2-DCE	trans-1,2-DCE	Ethyl-benzene	PCE	Toluene	1,1,1-TCA	TCE	Vinyl Chloride	Xylenes
Upgradient of the Site													
HR-9	9/16/1999	<1.0	52.2	<1.0	20.3	3.2	<1.0	<1.0	<1.0	20.3	18.1	<1.0	<1.0
HR-9	9/18/2000	<1.0	51.0	<1.0	16.3	2.6	<1.0	<1.0	<1.0	20.5	16.9	<1.0	<1.0
HR-9	11/6/2001	< 1.4	38	0.95J	12	1.7	< 1.4	< 1.4	< 1.4	17	14	< 1.4	< 1.4
HR-9	9/19/2002	< 1.7	46	1.1J	17	2.5	< 1.7	< 1.7	< 1.7	13	15	< 1.7	< 1.7
HR-9	9/17/2003	< 1.2 U	35	< 1.2 U	11	1.5	< 1.2 U	< 1.2 U	< 1.2 U	12	11	< 1.2 U	< 1.2 U
HR-9	9/13/2004	< 2 U	45	1 J	17	2.5	< 2 U	< 2 U	< 2 U	15	13	0.44 J	< 2 U
HR-11	9/14/1999	<1.0	13.5	<1.0	3.3	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
HR-11	9/18/2000	<1.0	32.9	<1.0	18.5	2.6	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
DUP-89	9/18/2000	<1.0	36.8	<1.0	20.9	2.8	<1.0	<1.0	1.6	<1.0	<1.0	<1.0	<1.0
HR-11	11/6/2001	< 1.0	33	<1.0	18	2.3	< 1.0	< 1.0	< 1.0	0.30J	< 1.0	< 1.0	< 1.0
HR-11	9/26/2002	< 1	18	< 1	6.1	0.72	< 1	< 1	< 1	< 1	< 1	< 1	< 1
HR-11	9/18/2003	< 1 U	10	< 1 U	1.7	< 0.5 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
HR-11	9/15/2004	< 1 U	7.3	< 1 U	0.45 J	< 0.5 U	< 1 U	2.2	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
GM-24	9/23/1999	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	2.7	<1.0	<1.0	<1.0
On-Site													
HR-8	9/16/1999	<1.0	26.4	<1.0	4.4	1.5	<1.0	<1.0	<1.0	10.6	1.6	<1.0	<1.0
HR-8	9/18/2000	<1.0	29.0	<1.0	5.6	1.8	<1.0	<1.0	<1.0	9.9	1.1	<1.0	<1.0
HR-8	11/6/2001	< 1.0	26	< 1.0	5.4	1.3	< 1.0	< 1.0	< 1.0	10	1.4	< 1.0	< 1.0
HR-8	9/19/2002	< 1.0	18	0.44J	4.8	0.85	< 1.0	< 1.0	< 1.0	11	1.8	< 1.0	< 1.0
HR-8	9/17/2003	< 1 U	13	< 1 U	2.8	0.63	< 1 U	< 1 U	< 1 U	7.8	1.3	< 1 U	< 1 U
HR-8	9/13/2004	< 1 U	8.6	0.32 J	1.5	0.45 J	< 1 U	< 1 U	< 1 U	6.4	1	< 1 U	< 1 U
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
W-1-N	9/19/2002	< 1.0	0.36J	< 1.0	< 0.50	< 0.50	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
HR-4	9/14/1999	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	1.2	<1.0	<1.0	1.4	<1.0	<1.0
HR-4	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
HR-4	11/6/2001	< 1.0	< 1.0	< 1.0	0.28J	< 0.50	< 1.0	0.88J	< 1.0	0.17J	1.0	< 1.0	< 1.0
HR-4	9/27/2002	< 1	< 1	< 1	< 0.5	< 0.5	< 1	0.59J	< 1	< 1	0.71J	< 1	< 1
HR-4	9/18/2003	< 1 U	< 1 U	< 1 U	< 0.5 U	< 0.5 U	< 1 U	0.55 J	< 1 U	< 1 U	0.71 J	< 1 U	< 1 U
HR-4	9/16/2004	< 1 U	0.77 J	< 1 U	< 0.5 U	< 0.5 U	< 1 U	1.3	< 1 U	< 1 U	0.5 J	< 1 U	< 1 U

Table A-1. Groundwater Analytical Results for the Upper Aquifer Wells from 1999-2004, General Motors Corporation, Moraine, Ohio.

		Compound											
Well	Date	Benzene	1,1-DCA	1,1-DCE	cis-1,2-DCE	trans-1,2-DCE	Ethyl-benzene	PCE	Toluene	1,1,1-TCA	TCE	Vinyl Chloride	Xylenes
W-2-N	9/14/1999	<1.0	<1.0	<1.0	1.6	<1.0	<1.0	<1.0	<1.0	<1.0	1.7	<1.0	<1.0
W-2-N	9/19/2000	<1.0	<1.0	<1.0	1.2	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
W-2-N	11/6/2001	< 1.0	0.33J	< 1.0	1.1	< 0.50	< 1.0	< 1.0	< 1.0	0.48J	1.3	< 1.0	< 1.0
W-2-N	9/19/2002	< 1.0	0.31J	< 1.0	1.6	< 0.50	< 1.0	< 1.0	< 1.0	< 1.0	1.4	< 1.0	< 1.0
W-2-N	9/18/2003	< 1 U	< 1 U	< 1 U	1.3	< 0.5 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
W-2-N	9/16/2004	< 1 U	0.36 J	< 1 U	1.8	0.2 J	< 1 U	0.31 J	< 1 U	0.3 J	1.4	< 1 U	< 1 U
W-3-N	9/17/1999	<1.0	<1.0	<1.0	291	2.6	<1.0	2.5	<1.0	<1.0	<1.0	12.8	<1.0
W-3-N	9/19/2000	<1.0	<1.0	<1.0	282	3.9	<1.0	<1.0	<1.0	<1.0	<1.0	24.0	<1.0
W-3-N	11/7/2001	< 5.6	< 5.6	< 5.6	160	2.2J	< 5.6	9.0	< 5.6	< 5.6	2.1J	7.6	< 5.6
W-3-N	9/23/2002	< 6.7	< 6.7	< 6.7	150	< 3.3	< 6.7	< 6.7	< 6.7	< 6.7	< 6.7	6.5J	< 6.7
W-3-N	9/17/2003	< 4 U	< 4 U	< 4 U	100	1.6 J	< 4 U	5.1	< 4 U	< 4 U	1.7 J	6.6	< 4 U
W-3-N	9/16/2004	< 4 U	< 4 U	< 4 U	120	1.6 J	< 4 U	0.94 J	< 4 U	< 4 U	< 4 U	6.1	< 4 U
W-4-N	9/17/1999	<1.0	1.3	<1.0	2.2	<1.0	<1.0	2.1	<1.0	<1.0	9.8	<1.0	<1.0
W-4-N	9/19/2000	<1.0	<1.0	<1.0	2.0	<1.0	<1.0	<1.0	<1.0	<1.0	7.3	<1.0	<1.0
W-4-N	11/7/2001	< 1.0	0.89J	< 1.0	1.6	< 0.50	< 1.0	0.92J	< 1.0	0.33J	7.1	< 1.0	< 1.0
W-4-N	9/24/2002	< 1	1.7	< 1	5.2	0.33J	< 1	0.94J	< 1	0.44J	8.5	0.77J	< 1
W-4-N	9/17/2003	< 1 U	0.94 J	< 1 U	1.7	< 0.5 U	< 1 U	1.1	< 1 U	0.26 J	8.1	0.48 J	< 1 U
W-4-N	9/16/2004	< 1 U	1.7	< 1 U	5.8	0.38 J	< 1 U	1.7	< 1 U	0.4 J	12	0.49 J	< 1 U
HR-2	9/16/1999	<1.0	3.9	<1.0	9.6	1.5	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
HR-2	9/19/2000	<1.0	4.6	<1.0	8.6	1.1	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
HR-2	11/7/2001	< 1.0	4.2	< 1.0	8.3	1.1	< 1.0	< 1.0	< 1.0	< 1.0	0.56J	< 1.0	< 1.0
HR-2	9/24/2002	< 1	4.9	< 1	8.8	1.2	< 1	< 1	< 1	< 1	0.46J	< 1	< 1
HR-2	9/16/2003	< 1 U	4.5	< 1 U	7.2	0.96	< 1 U	< 1 U	< 1 U	< 1 U	0.4 J	< 1 U	< 1 U
HR-2	9/16/2004	< 1 U	5.6	< 1 U	7.8	1.1	< 1 U	0.37 J	< 1 U	< 1 U	0.53 J	0.23 J	< 1 U
HR-3	9/16/1999	<1.0	6.2	<1.0	6.1	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
HR-3	9/19/2000	<1.0	5.1	<1.0	4.6	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
HR-3	11/7/2001	< 1.0	6.9	< 1.0	5.1	0.60	< 1.0	< 1.0	< 1.0	< 1.0	0.66J	< 1.0	< 1.0
HR-3	9/24/2002	< 1	15	< 1	9.9	1	< 1	< 1	< 1	< 1	1.4	< 1	< 1
HR-3	9/16/2003	< 1 U	13	< 1 U	9.9	1.1	< 1 U	< 1 U	< 1 U	< 1 U	1.6	< 1 U	< 1 U
HR-3	9/16/2004	< 1 U	23	< 1 U	18	1.8	< 1 U	0.32 J	< 1 U	0.27 J	8.1	< 1 U	< 1 U
GM-30	9/2/1999	<10	53.8J	<10	7.5J	<10	7030J	9.5J	6950J	<10	<10	<10	23300J
GM-30	9/20/2000	2.7	50.6	<1.0	<1.0	<1.0	2290	<1.0	98.9	<1.0	<1.0	<1.0	6770
GM-30	11/13/2001	< 25	31	< 25	< 12	< 12	840	< 25	5.0J	< 25	12J	< 25	2000
GM-30	9/27/2002	< 33	34	< 33	< 17	< 17	350	< 33	< 33	< 33	< 33	< 33	1400
GM-30	9/23/2003	< 120 U	< 120 U	< 120 U	< 62 U	< 62 U	1000	< 120 U	240	< 120 U	< 120 U	< 120 U	7000
GM-30	9/14/2004	< 40 U	33 J	< 40 U	< 20 U	< 20 U	530	< 40 U	< 40 U	< 40 U	< 40 U	< 40 U	3000

Table A-1. Groundwater Analytical Results for the Upper Aquifer Wells from 1999-2004, General Motors Corporation, Moraine, Ohio.

		Compound											
Well	Date	Benzene	1,1-DCA	1,1-DCE	cis-1,2-DCE	trans-1,2-DCE	Ethyl-benzene	PCE	Toluene	1,1,1-TCA	TCE	Vinyl Chloride	Xylenes
GM-23	9/2/1999	1.9	32.5	17.2	7530	54.5	<1.0	6250	<1.0	7.2	1460	2500	<1.0
GM-23	9/20/2000	<1.0	16.3	5.1	5620	33.2	<1.0	3470	<1.0	2.0	609	801	<1.0
GM-23	11/12/2001	< 420	< 420	< 420	8400	< 210	< 420	15000	< 420	< 420	2200	1200	< 420
GM-23	9/26/2002	< 400	< 400	< 400	7700	< 200	< 400	10000	< 400	< 400	1700	540	< 400
GM-23	9/23/2003	< 500 U	< 500 U	< 500 U	5800	< 250 U	< 500 U	12000	< 500 U	< 500 U	1600	690	< 500 U
GM-23	9/14/2004	< 500 U	< 500 U	< 500 U	4600	< 250 U	< 500 U	6700	< 500 U	< 500 U	1100	870	< 500 U
GM-27	9/1/1999	<1.0	2.4	<1.0	20.6	<1.0	<1.0	1.7	<1.0	<1.0	121	<1.0	<1.0
GM-27	9/20/2000	<1.0	2.2	<1.0	13.9	<1.0	<1.0	1.2	<1.0	<1.0	112	<1.0	<1.0
GM-27	11/13/2001	< 3.3	1.8J	< 3.3	13	< 1.7	< 3.3	6.8	< 3.3	< 3.3	110	< 3.3	< 3.3
GM-27	9/26/2002	< 3.3	1.7J	< 3.3	14	< 1.7	< 3.3	< 3.3	< 3.3	< 3.3	100	< 3.3	< 3.3
GM-27	9/23/2003	< 5 U	1.9 J	< 5 U	12	< 2.5 U	< 5 U	2.1 J	< 5 U	< 5 U	100	< 5 U	< 5 U
GM-27	9/15/2004	< 3.3 U	2 J	< 3.3 U	13	< 1.7 U	< 3.3 U	1.8 J	< 3.3 U	< 3.3 U	81	< 3.3 U	< 3.3 U
GM-29	9/1/1999	<1.0	4.3	1.3	320	11.1	<1.0	<20	<1.0	37.8	878	3.8	<1.0
GM-29	9/21/2000	<1.0	16.6	3.1	2871	14.4	<1.0	20.0	2.2	24.5	289	788	<1.0
GM-29	11/13/2001	< 50	< 50	< 50	1800	26	21J	17J	< 50	< 50	270	230	52
GM-29	9/25/2002	< 40	< 40	< 40	1300	21	< 40	18J	< 40	16J	310	140	< 40
GM-29	9/24/2003	< 33 U	< 33 U	< 33 U	1200	20	< 33 U	18 J	< 33 U	18 J	390	150	< 33 U
GM-29	9/15/2004	< 50 U	< 50 U	< 50 U	1200	21 J	< 50 U	20 J	< 50 U	21 J	440	230	< 50 U
GM-28	9/1/1999	<1.0	3.3	<1.0	175	9.2	<1.0	316	<1.0	17.7	768	3.2	<1.0
GM-28	9/21/2000	<1.0	9.9	<1.0	37.0	22.3	<1.0	2.3	<1.0	5.0	1.6	12.4	<1.0
GM-28	11/15/2001	< 10	< 10	< 10	< 5.0	11	< 10	< 10	< 10	< 10	< 10	< 10	< 10
GM-28	9/24/2002	< 1	2.7	< 1	1.1	11	< 1	< 1	< 1.3 U	< 1	0.86J	< 1	< 1.2 U
GM-28	10/1/2003	< 1 U	3.3	< 1 U	0.58	4	< 1 U	< 1 U	< 1 U	< 1 U	1.6	0.53 J	< 1 U
GM-28	9/15/2004	< 1 U	3.3	< 1 U	0.41 J	1.2	< 1 U	0.88 J	< 1 U	< 1 U	1.4	0.44 J	< 1 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
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
HR-7	9/19/2002	< 1.0	< 1.0	< 1.0	0.65	< 0.50	< 1.0	< 1.0	< 1.0	< 1.0	9.4	< 1.0	< 1.0
HR-5	9/16/1999	<1.0	<1.0	<1.0	10.5	1.1	<1.0	<1.0	<1.0	<1.0	12.0	<1.0	<1.0
HR-5	9/19/2000	<1.0	<1.0	<1.0	5.6	<1.0	<1.0	<1.0	3.0	<1.0	8.1	<1.0	2.0
HR-5	11/7/2001	< 1.0	0.55J	< 1.0	7.8	0.74	< 1.0	< 1.0	< 1.0	0.17J	11	< 1.0	< 1.0
HR-5	9/23/2002	< 1	0.55J	< 1	7.5	0.58	< 1	< 1	< 1	< 1	13	< 1	< 1
HR-5	9/18/2003	< 1 U	0.42 J	< 1 U	5	0.46 J	< 1 U	< 1 U	< 1 U	< 1 U	11	< 1 U	< 1 U
HR-5	9/13/2004	< 1 U	0.43 J	< 1 U	4.8	0.44 J	< 1 U	< 1 U	< 1 U	< 1 U	11	< 1 U	< 1 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
HR-6	9/23/2002	< 1	< 1	< 1	< 0.5	< 0.5	< 1	< 1	< 1	< 1	1.5	< 1	< 1

Table A-1. Groundwater Analytical Results for the Upper Aquifer Wells from 1999-2004, General Motors Corporation, Moraine, Ohio.

		Compound											
Well	Date	Benzene	1,1-DCA	1,1-DCE	cis-1,2-DCE	trans-1,2-DCE	Ethyl-benzene	PCE	Toluene	1,1,1-TCA	TCE	Vinyl Chloride	Xylenes
HR-1	9/16/1999	<1.0	2.4	<1.0	5.8	3.9	<1.0	44.3	<1.0	1.6	56.0	<1.0	<1.0
HR-1	9/25/2000	<1.0	2.4	<1.0	8.5	3.2	<1.0	32.6	<1.0	1.3	56.4	<1.0	<1.0
HR-1	11/8/2001	< 3.3	2.8J	< 3.3	9.9	2.8	< 3.3	36	< 3.3	2.2J	86B	< 3.3	< 3.3
HR-1	9/23/2002	< 2	2.8	< 2	4.5	3.2	< 2	33	< 2	< 2	33	< 2	< 2
HR-1	9/18/2003	< 2 U	2.6	< 2 U	2.3	3.2	< 2 U	27	< 2 U	1 J	56	< 2 U	< 2 U
HR-1	9/13/2004	< 1 UJ	2.5	< 1 U	24	2.3	< 1 U	23	< 1 U	0.56 J	30	0.55 J	< 1 U
W-1-S	9/22/1999	<1.0	<1.0	<1.0	8.0	1.1	<1.0	30.9	<1.0	<1.0	11.6	<1.0	<1.0
W-1-S	9/19/2002	< 2.0	0.97J	< 2.0	6.0	1.3	< 2.0	62	< 2.0	< 2.0	16	< 2.0	< 2.0
ME-6	8/31/1999	<1.0	<1.0	<1.0	255	<1.0	<1.0	213	<1.0	2.9	474	<1.0	<1.0
ME-6	9/21/2000	<1.0	<1.0	<1.0	98.8	2.5	<1.0	6.7	1.9	<1.0	19.0	6.1	<1.0
ME-6	11/15/2001	< 2.0	2.7	< 2.0	65	1.8	< 2.0	8.2	0.42J	2.2	23	13	< 2.0
ME-6	9/25/2002	< 10	< 10	< 10	5.2	< 5	< 10	< 10	6.6J	< 10	< 10	< 10	< 10
ME-6	10/1/2003	0.46 J	7.2	< 2 U	20	< 1 U	< 2 U	12	< 2 U	13	31	2.9	< 2 U
ME-6	9/15/2004	< 1 U	6.3	0.26 J	14	0.56	< 1 U	5.3	< 1 U	4.1	9.2	2.4	< 1 U
ME-1	8/31/1999	<1.0	2.4	<1.0	38.2	1.5	<1.0	83.6	<1.0	13.5	292	36	<1.0
GM-31	9/1/1999	<1.0	1.3	<1.0	7.8	<1.0	<1.0	1.3	<1.0	<1.0	27.2	<1.0	<1.0
GM-31	9/21/2000	<1.0	1.1	<1.0	40.2	<1.0	<1.0	<1.0	<1.0	<1.0	8.5	<1.0	<1.0
GM-31	11/15/2001	< 4.0	3.1J	< 4.0	120	1.8J	< 4.0	< 4.0	< 4.0	< 4.0	11	7.4	< 4.0
GM-31	9/24/2002	< 6	5.9J	< 6	200	3.5	< 6	< 6	< 6	< 6	10	19	< 6
GM-31	10/1/2003	< 5 U	6	< 5 U	170	3.5	< 5 U	< 5 U	< 5 U	< 5 U	28	10	< 5 U
GM-31	9/15/2004	< 5 U	4 J	< 5 U	120	2.7	< 5 U	2.5 J	< 5 U	1.4 J	29	2.4 J	< 5 U
ME-3	8/31/1999	<1.0	6.1	<1.0	5.7	<1.0	<1.0	57.9	<1.0	42.5	47.5	<1.0	<1.0
ME-3	9/21/2000	<1.0	3.4	<1.0	2.9	2.9	<1.0	<1.0	1.4	6.4	<1.0	2.1	<1.0
ME-3	11/15/2001	< 1.0	5.9	< 1.0	16	2.7	< 1.0	1.3	0.34J	1.6	3.8	7.3	< 1.0
ME-3	9/24/2002	< 2.5	< 2.5	< 2.5	< 1.2	< 1.2	< 2.5	< 2.5	< 2.5	< 2.5	< 2.5	< 2.5	< 2.5
ME-3	10/1/2003	0.6 J	24	< 1 U	0.96	< 0.5 U	< 1 U	< 1 U	< 1 U	0.31 J	1.5	< 1 U	< 1 U
ME-3	9/15/2004	< 1 U	18	< 1 U	2.2	< 0.5 U	< 1 U	0.21 J	< 1 U	0.53 J	1.5	1.1	< 1 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
HR-16	9/18/2002	< 1.0	< 1.0	< 1.0	0.46J	< 0.50	< 1.0	< 1.0	< 1.0	< 1.0	1.5	< 1.0	< 1.0
HR-17	9/23/1999	<1.0	<1.0	<1.0	6.2	<1.0	<1.0	15.5	<1.0	<1.0	7.4	<1.0	<1.0
HR-17	9/28/2000	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	3.7	<1.0	1.9	4.4	<1.0	<1.0
HR-17	11/8/2001	< 1.0	< 1.0	< 1.0	< 0.50	< 0.50	< 1.0	3.3	< 1.0	1.4	4.2B	< 1.0	< 1.0
HR-17	9/18/2002	< 1.0	1.5	< 1.0	5.1	1.4	< 1.0	22	< 1.0	0.39J	12	< 1.0	< 1.0
HR-17	9/25/2003	< 2 U	0.75 J	< 2 U	2.2	0.7 J	< 2 U	64	< 2 U	< 2 U	10	< 2 U	< 2 U
HR-17	9/17/2004	< 5 U	2 J	< 5 U	7.1	1.6 J	< 5 U	82	< 5 U	< 5 U	18	< 5 U	< 5 U

Table A-1. Groundwater Analytical Results for the Upper Aquifer Wells from 1999-2004, General Motors Corporation, Moraine, Ohio.

		Compound											
Well	Date	Benzene	1,1-DCA	1,1-DCE	cis-1,2-DCE	trans-1,2-DCE	Ethyl-benzene	PCE	Toluene	1,1,1-TCA	TCE	Vinyl Chloride	Xylenes
W-2-S	9/23/1999	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	1.9J	6.1	<1.0	<1.0
W-2-S	9/27/2000	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	1.6	5.0	<1.0	<1.0
W-2-S	11/8/2001	< 1.0	0.58J	< 1.0	0.49J	< 0.50	< 1.0	< 1.0	< 1.0	1.7	5.2B	< 1.0	< 1.0
W-2-S	9/18/2002	< 1.0	0.98J	< 1.0	0.90	< 0.50	< 1.0	< 1.0	< 1.0	1.5	4.9	< 1.0	< 1.0
W-2-S	9/26/2003	< 1 U	0.99 J	< 1 U	0.74	< 0.5 U	< 1 U	< 1 U	0.25 J	1.4	5.5	< 1 U	< 1 U
W-2-S	9/17/2004	< 1 U	1.3	< 1 U	1.1	< 0.5 U	< 1 U	0.55 J	< 1 U	1.5	6	< 1 U	< 1 U
W-3-S	9/23/1999	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	1.1	<1.0	3.9	2.6	<1.0	<1.0
W-3-S	9/28/2000	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	2.8	2.5	<1.0	<1.0
W-3-S	11/8/2001	< 1.0	< 1.0	< 1.0	< 0.50	< 0.50	< 1.0	0.44J	< 1.0	1.6	1.5B	< 1.0	< 1.0
W-3-S	9/18/2002	< 1.0	< 1.0	< 1.0	< 0.50	< 0.50	< 1.0	0.61J	< 1.0	2.1	2.4	< 1.0	< 1.0
W-3-S	9/26/2003	< 1 U	< 1 U	< 1 U	0.34 J	< 0.5 U	< 1 U	0.81 J	< 1 U	1.8	2	< 1 U	< 1 U
W-3-S	9/17/2004	< 1 U	0.21 J	< 1 U	< 0.5 U	< 0.5 U	< 1 U	1.2	< 1 U	2.4	2.9	< 1 U	< 1 U
W-4-S	9/23/1999	<1.0	1.2	<1.0	4.4	<1.0	<1.0	30.5J	<1.0	3.3	14.7J	<1.0	<1.0
W-4-S	9/28/2000	<1.0	1.0	<1.0	4.0	<1.0	<1.0	15.4	<1.0	3.0	11.3	<1.0	<1.0
W-4-S	11/8/2001	< 1.0	1.1	< 1.0	3.3	0.43J	< 1.0	13	< 1.0	2.9	8.9B	< 1.0	< 1.0
W-4-S	9/18/2002	< 1.0	0.87J	< 1.0	3.6	0.60	< 1.0	17	< 1.0	2.3	9.8	< 1.0	< 1.0
W-4-S	9/26/2003	< 1 U	0.92 J	< 1 U	3.6	0.78	< 1 U	24	0.25 J	2	13	< 1 U	< 1 U
W-4-S	9/17/2004	< 1 U	1.2	< 1 U	4.4	0.97	< 1 U	18	< 1 U	2.3	13	< 1 U	< 1 U
GM-19S	9/20/1999	<1.0	7.7	1.0	34.6	2.3	<10	46.0	<1.0	16.0	71.1	<1.0	<10
GM-19S	9/22/2000	<1.0	4.4	<1.0	37.6	2.6	<1.0	68.0	<1.0	14.5	104	<1.0	<1.0
GM-19S	11/12/2001	< 3.3	2.9J	< 3.3	26	2.0	< 3.3	64	< 3.3	7.6	97	< 3.3	< 3.3
GM-19S	9/26/2002	< 4	6.3	< 4	39	2.7	< 4	52	< 4	6.3	110	5.2	< 4
GM-19S	9/25/2003	< 5 U	8.3	1.6 J	89	2.9	< 5 U	62	< 5 U	13	140	< 5 U	< 5 U
GM-19S	9/13/2004	< 4 U	8.1	1.9 J	61	2.4	< 4 U	71	< 4 U	14	120	< 4 U	< 4 U
EAST	9/21/1999	<1.0	5.4	<1.0	9.1	<1.0	<1.0	61.0	<1.0	21.0	56.1	<1.0	<1.0
EAST	9/22/2000	<1.0	7.7	1.2	77.3	1.8	<1.0	55.8	<1.0	22.2	97.2	3.0	<1.0
EAST	11/12/2001	< 3.3	6.2	0.90J	51	2.7	< 3.3	56	< 3.3	13	92	1.5J	< 3.3
EAST	9/23/2002	< 2	3.9	0.73J	8.8	< 1	< 2	49	< 2	10	46	< 2	< 2
EAST	9/25/2003	< 2 U	2.3	< 2 U	4.3	< 1 U	< 2 U	47	< 2 U	7.1	35	< 2 U	< 2 U
EAST	9/13/2004	< 1 U	0.72 J	0.34 J	1.6	< 0.5 U	< 1 U	40	< 1 U	5.7	23	< 1 U	< 1 U
WEST	9/21/1999	<1.0	25.6	<1.0	125	<1.0	<1.0	41.3	<1.0	24.8	37.3	<1.0	<1.0
GM-33	9/25/2003	< 2.5 U	8.4	1 J	19	0.72 J	< 2.5 U	37	< 2.5 U	21	75	< 2.5 U	< 2.5 U
GM-33	9/13/2004	< 2 U	5.4	1.1 J	9.5	0.45 J	< 2 U	37	< 2 U	17	55	< 2 U	< 2 U
GM-35	9/25/2003	< 8 U	46	4 J	300	12	< 8 U	21	< 8 U	17	270	59	< 8 U
GM-35	9/13/2004	< 11 U	36	4.1 J	270	9.1	< 11 U	21	< 11 U	17	230	50	< 11 U

Table A-1. Groundwater Analytical Results for the Upper Aquifer Wells from 1999-2004, General Motors Corporation, Moraine, Ohio.

		Compound											
Well	Date	Benzene	1,1-DCA	1,1-DCE	cis-1,2-DCE	trans-1,2-DCE	Ethyl-benzene	PCE	Toluene	1,1,1-TCA	TCE	Vinyl Chloride	Xylenes
GM-32	9/22/1999	<1.0	3.3	<1.0	2.6	4.2	<1.0	1.2	1.0	<1.0	3.2	3.0	<1.0
GM-32	9/25/2000	<1.0	35.9	<1.0	<1.0	20.3	<1.0	<1.0	10.4	<1.0	<1.0	<1.0	<1.0
GM-32	11/12/2001	4.3J	6.2	< 5.0	< 2.5	2.9	0.79J	< 5.0	12	< 5.0	< 5.0	1.1J	3.0J
GM-32	9/20/2002	< 10	9.7J	< 10	< 5	< 5	< 10	< 10	< 10	< 10	< 10	< 10	< 10
GM-32	10/1/2003	1.5 J	5.5	< 2 U	< 1 U	1	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U
GM-32	9/14/2004	< 10 U	3 J	< 10 U	< 5 U	< 5 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U
GM-22	9/1/1999	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	3.6	<1.0	<1.0	4.0	<1.0	<1.0
GM-22	9/21/2000	<1.0	2.4	<1.0	1.9	<1.0	<1.0	1.6	<1.0	<1.0	<1.0	<1.0	<1.0
GM-22	11/13/2001	< 1.0	6.8	0.58J	8.5	0.17J	< 1.0	4.9	< 1.0	4.4	7.5	0.60J	< 1.0
GM-22	9/25/2002	< 2	< 2	< 2	< 1	< 1	< 2	2.3	< 2	0.93J	7.6	< 2	< 2
GM-22	9/24/2003	< 1 U	1	< 1 U	0.45 J	< 0.5 U	< 1 U	2.9	< 1 U	1.2	7.6	< 1 U	< 1 U
GM-22	9/14/2004	< 1 U	2.1	< 1 U	0.9	< 0.5 U	< 1 U	2.9	< 1 U	1.7	10	< 1 U	< 1 U
GM-21	9/22/1999	<1.0	9.0	3.9	66.4	7.8	<1.0	<1.0	<1.0	53.1	28.7	<1.0	<1.0
GM-21	9/22/2000	<1.0	5.6	1.6	38.7	12.9	<1.0	<1.0	<1.0	15.7	189	<1.0	<1.0
GM-21	11/13/2001	< 5.0	3.8J	< 5.0	39	15	< 5.0	< 5.0	< 5.0	6.9	160	< 5.0	< 5.0
GM-21	9/25/2002	< 6.7	5J	2.6J	43	5.1	< 6.7	< 6.7	< 6.7	31	230	< 6.7	< 6.7
GM-21	9/24/2003	< 8 U	6.9 J	2 J	100	2.9 J	< 8 U	< 8 U	< 8 U	31	200	< 8 U	< 8 U
GM-21	9/14/2004	< 9.1 U	4.2 J	3.1 J	56	7.9	< 9.1 U	< 9.1 U	< 9.1 U	26	180	< 9.1 U	< 9.1 U
GM-8	9/20/1999	3.4	30.2	<1.0	26.2	12.0	20.7	14.8	<1.0	1.9	30.4	8.4	2.3
GM-8	9/26/2000	1.1	36.5	<1.0	1.5	5.4	12.5	<1.0	<1.0	<1.0	6.6	2.4	1.9
GM-8	11/9/2001	0.78J	40	< 1.0	2.0	3.6	0.40J	< 1.0	< 1.0	0.40J	4.4	1.9	0.39J
GM-8	9/20/2002	5.5	63	< 2	5.5	9	7.5	< 2	1.8J	< 2	< 2	5.8	1.5J
GM-8	10/1/2003	5.4	48	< 2 U	< 1 U	4.4	11	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U
GM-8	9/14/2004	4.2	15	< 1 U	< 0.5 U	1.1	19	< 1 U	< 1 U	< 1 U	< 1 U	0.48 J	1.1
GM-6	9/20/1999	<1.0	33.2	1.2	52.9	2.0	<10	81.4	<1.0	24.6	78.2	1.6	<10
GM-6	9/26/2000	<1.0	13.0	<1.0	41.0	2.2	<1.0	51.5	<1.0	12.1	56.6	3.7	<1.0
GM-6	11/9/2001	< 2.0	14	< 2.0	8.2	1.8	< 2.0	14	< 2.0	3.9	48	1.9J	< 2.0
GM-6	9/20/2002	2.2	60	< 2	43	8.6	< 2	14	< 2	1.4J	33	12	< 2
GM-6	10/2/2003	1	20	< 1 U	13	2.5	0.22 J	11	< 1 U	0.19 J	23	3.3	< 1 U
GM-6	9/14/2004	1.7	18	< 1 U	10	1.9	< 1 U	2.6	< 1 U	< 1 U	5.7	3	< 1 U
Downgradient of the Site													
TW-2	9/26/2000	<1.0	27.8	<1.0	22.5	2.9	10.4	5.0	<1.0	4.5	43.1	5.9	3.2
TW-2	11/9/2001	< 2.0	20	< 2.0	8.8	2.4	0.38J	8.5	< 2.0	3.9	48	2.7	< 2.0
TW-2	9/20/2002	< 2	9	< 2	26	1.4	< 2	5.9	< 2	2.2	70	2.5	< 2
TW-2	10/2/2003	1.5	5.7	< 1 U	8.3	0.59	0.86 J	4.7	< 1 U	0.66 J	24	1.4	< 1 U
TW-2	9/14/2004	2.9	22	< 1 U	5.5	2	< 1 U	< 1 U	< 1 U	< 1 U	1.5	2.5	< 1 U

Table A-1. Groundwater Analytical Results for the Upper Aquifer Wells from 1999-2004, General Motors Corporation, Moraine, Ohio.

		Compound											
Well	Date	Benzene	1,1-DCA	1,1-DCE	cis-1,2-DCE	trans-1,2-DCE	Ethyl-benzene	PCE	Toluene	1,1,1-TCA	TCE	Vinyl Chloride	Xylenes
4S	9/20/1999	1.6	1.6	<1.0	<1.0	<1.0	<10	<1.0	<1.0	<1.0	<1.0	<1.0	<10
4S	10/2/2003	1.6 J	7	< 2 U	< 1 U	1.7	1.7 J	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U
4S	9/14/2004	4.5 J	7.5	< 5 U	< 2.5 U	< 2.5 U	4.7 J	< 5 U	1.1 J	< 5 U	< 5 U	< 5 U	2.4 J
GM-2	9/20/1999	<1.0	1.4	<1.0	8.4	<1.0	<10	6.0	<1.0	5.5	61.6	<1.0	<10
GM-2	9/25/2000	<1.0	3.7	<1.0	39.2	1.3	<1.0	7.7	<1.0	5.7	82.8	1.7	<1.0
GM-2	11/9/2001	< 3.3	6.1	< 3.3	26	1.1J	< 3.3	8.4	< 3.3	6.1	65	< 3.3	< 3.3
GM-2	9/20/2002	< 1	3.4	< 1	7.6	0.37J	< 1	8.7	< 1	0.75J	26	< 1	< 1
GM-2	10/2/2003	< 1 U	1.7	< 1 U	4.7	< 0.5 U	0.21 J	5.7	< 1 U	0.21 J	13	0.46 J	< 1 U
GM-2	9/14/2004	< 1 U	1.6	< 1 U	5.6	0.23 J	< 1 U	4	< 1 U	< 1 U	6.2	< 1 U	< 1 U
GM-16	9/21/1999	<1.0	<1.0	<1.0	1.7	<1.0	<1.0	44.1	<1.0	2.2	8.5	<1.0	<1.0
GM-16	9/26/2000	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	16.2	<1.0	2.5	3.5	<1.0	<1.0
GM-16	11/8/2001	< 1.0	0.31J	< 1.0	0.39J	< 0.50	< 1.0	17	< 1.0	2.2	3.6	< 1.0	< 1.0
GM-16	9/24/2002	< 2	4.1	< 2	6.2	1.6	< 2	63	< 2	1.4J	28	< 2	< 2
GM-16	9/22/2003	< 4 U	2.8 J	< 4 U	5.8	1.1 J	< 4 U	110	< 4 U	1.9 J	57	< 4 U	< 4 U
GM-16	9/16/2004	< 3.3 U	4.3	< 3.3 U	7.4	1 J	< 3.3 U	130	< 3.3 U	3.1 J	90	< 3.3 U	< 3.3 U
GM-17	9/21/1999	<1.0	26.4	<1.0	30.0	2.6	<1.0	<1.0	<1.0	6.4	28.7	1.4	<1.0
GM-17	9/27/2000	<1.0	23.9	<1.0	41.6	2.5	<1.0	24.6	<1.0	6.7	48.4	<1.0	<1.0
GM-17	11/8/2001	< 3.3	7.3	< 3.3	16	1.8	< 3.3	48	< 3.3	6.8	79	< 3.3	< 3.3
GM-17	9/19/2002	< 1.2	6.0	< 1.2	13	0.67	< 1.2	22	< 1.2	2.3	39	0.79J	< 1.2
GM-17	9/24/2003	< 1 U	1.2	< 1 U	2.9	< 0.5 U	< 1 U	12	< 1 U	1.3	24	< 1 U	< 1 U
GM-17	9/15/2004	< 1 U	4	< 1 U	11	0.64	< 1 U	3.6	< 1 U	1.1	22	0.49 J	< 1 U
GM-18	9/22/1999	<1.0	22.6	1.3	35.3	2.2	<1.0	4.9	<1.0	42.6	131	<1.0	<1.0
GM-18	9/27/2000	<1.0	10.4	<1.0	23.9	1.8	<1.0	7.8	<1.0	31.8	115	<1.0	<1.0
GM-18	11/8/2001	< 3.3	3.3	1.3J	14	1.6J	< 3.3	12	< 3.3	23	93	< 3.3	< 3.3
GM-18	9/19/2002	< 3.3	6.0	< 3.3	15	1.6J	< 3.3	28	< 3.3	18	98	< 3.3	< 3.3
GM-18	9/22/2003	< 2 U	3.7	< 2 U	8.8	< 1 U	< 2 U	24	< 2 U	10	77	0.75 J	< 2 U
GM-18	9/15/2004	< 2 U	2.2	0.46 J	5.9	< 1 U	< 2 U	20	< 2 U	5.2	53	< 2 U	< 2 U
WSU-24	9/23/1999	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	1.9	<1.0	2.4	17.0	<1.0	<1.0
WSU-24	9/26/2000	<1.0	<1.0	<1.0	2.7	<1.0	<1.0	1.2.	<1.0	2.1	16.8	<1.0	<1.0
WSU-24	11/9/2001	< 1.0	0.81J	< 1.0	4.0	< 0.50	< 1.0	1.6	< 1.0	2.4	18	< 1.0	< 1.0
WSU-24	9/24/2002	< 1	< 1	< 1	< 0.5	< 0.5	< 1	1.2	< 1	1.4	13	< 1	< 1
WSU-24	9/22/2003	< 1 U	< 1 U	< 1 U	< 0.5 U	< 0.5 U	< 1 U	1	< 1 U	0.67 J	7.9	< 1 U	< 1 U
WSU-24	9/16/2004	< 1 U	< 1 U	< 1 U	< 0.5 U	< 0.5 U	< 1 U	1.3	< 1 U	0.58 J	8	< 1 U	< 1 U

Table A-1. Groundwater Analytical Results for the Upper Aquifer Wells from 1999-2004, General Motors Corporation, Moraine, Ohio.

		Compound											
Well	Date	Benzene	1,1-DCA	1,1-DCE	cis-1,2-DCE	trans-1,2-DCE	Ethyl-benzene	PCE	Toluene	1,1,1-TCA	TCE	Vinyl Chloride	Xylenes
GM-10	9/21/1999	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	1.7	14.8	<1.0	<1.0
GM-10	9/27/2000	<1.0	1.4	<1.0	5.7	<1.0	<1.0	1.4	<1.0	2.5	23.2	<1.0	<1.0
GM-10	11/8/2001	< 1.0	3.4	< 1.0	16	0.93	< 1.0	1.9	< 1.0	2.7	27	1.2	< 1.0
GM-10	9/18/2002	< 1.0	0.61J	< 1.0	2.3	< 0.50	< 1.0	1.1	< 1.0	1.8	19	< 1.0	< 1.0
GM-10	9/24/2003	< 1 U	< 1 U	< 1 U	< 0.5 U	< 0.5 U	< 1 U	2.2	< 1 U	0.96 J	33	< 1 U	< 1 U
GM-10	9/14/2004	< 1 U	< 1 U	< 1 U	0.38 J	< 0.5 U	< 1 U	1.5	< 1 U	1.2	15	< 1 U	< 1 U
GM-26	9/22/1999	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
GM-26	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	< 1.0	< 1.0	< 1.0	< 0.50	< 0.50	< 1.0	1.1	< 1.0	0.19J	< 1.0	< 1.0	< 1.0
GM-26	9/25/2002	< 1	< 1	< 1	< 0.5	< 0.5	< 1	0.92J	< 1	< 1	< 1	< 1	< 1
GM-26	10/1/2003	< 1 U	< 1 U	< 1 U	< 0.5 U	< 0.5 U	< 1 U	0.85 J	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
GM-26	9/16/2004	< 1 U	< 1 U	< 1 U	< 0.5 U	< 0.5 U	< 1 U	1.3	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U

1,1-DCA - 1,1-Dichloroethane.
1,1-DCE - 1,1-Dichloroethene.
cis-1,2-DCE - cis-1,1-Dichloroethene.
trans-1,2-DCE - trans-1,2-Dichloroethene.
PCE - Tetrachloroethene.
1,1,1-TCA - 1,1,1-Trichloroethane.
TCE - Trichloroethene.
VOCs - Volatile Organic Compounds.

ARCADIS

Table A-2. Groundwater Analytical Results for the Lower Aquifer Wells from 1999-2004, General Motors Corporation, Moraine, Ohio.

		Compound											
Well	Date	Benzene	1,1-DCA	1,1-DCE	cis-1,2-DCE	trans-1,2-DCE	Ethyl-benzene	PCE	Toluene	1,1,1-TCA	TCE	Vinyl Chloride	Xylenes
Upgradient of the Site													
HR-10	9/15/1999	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
HR-10	9/29/2000	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
HR-10	11/14/2001	< 1.0	< 1.0	< 1.0	< 0.50	< 0.50	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
HR-10	9/27/2002	< 1	< 1	< 1	< 0.5	< 0.5	< 1	< 1	< 1	< 1	< 1	< 1	< 1
HR-10	9/17/2003	< 1 U	< 1 U	< 1 U	< 0.5 U	< 0.5 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
HR-10	9/20/2004	< 1 U	< 1 U	< 1 U	< 0.5 U	< 0.5 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
HR-12	9/14/1999	1.2	2.7	<1.0	1.8	<1.0	<1.0	<1.0	<1.0	<1.0UJ	<1.0	1.7	<1.0
HR-12	9/28/2000	<1.0	2.2	<1.0	2.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	2.5	<1.0
HR-12	11/14/2001	< 1.0	3.6	< 1.0	2.7	0.23	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	3.8	< 1.0
HR-12	11/14/2001	< 1.0	3.6	< 1.0	2.7	0.23J	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	3.8	< 1.0
HR-12	9/26/2002	< 1	2.4	< 1	2.1	< 0.5	< 1	< 1	< 1	< 1	< 1	1.7	< 1
HR-12	9/18/2003	< 1 U	1.7	< 1 U	1.4	< 0.5 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	1.6	< 1 U
HR-12	9/21/2004	< 1 U	1.8	< 1 U	1.2	< 0.5 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	1.1	< 1 U
On-Site													
HR-14	9/15/1999	<1.0	<1.0	<1.0	7.9	<1.0	<1.0	<1.0	<1.0	<1.0	3.4	11.5	<1.0
HR-14	9/30/2002	< 1	< 1	< 1	3.6	< 0.5	< 1	< 1	< 1	< 1	1.2	< 1	< 1
HR-15	9/15/1999	<1.0	<1.0	<1.0	2.5	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	11.0	<1.0
HR-15	9/29/2000	<1.0	<1.0	<1.0	2.8	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	11.2	<1.0
HR-15	11/14/2001	< 1.0	< 1.0	< 1.0	0.86	< 0.50	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
HR-15	9/30/2002	< 1	< 1UJ	< 1	1	< 0.5	< 1	< 1	< 1	< 1	< 1	< 1	< 1
HR-15	9/17/2003	< 1 U	< 1 U	< 1 U	2.2	< 0.5 U	< 1 U	< 1 U	< 1 U	< 1 U	0.29 J	14	< 1 U
HR-15	9/21/2004	< 1 U	< 1 U	< 1 U	2.5	< 0.5 U	< 1 U	< 1 U	< 1 U	< 1 U	0.38 J	19	< 1 U
HR-13	9/15/1999	<1.0	41.4	<1.0	20.8	3.1	<1.0	<1.0	<1.0	1.6	3.4	<1.0	<1.0
HR-13	9/29/2000	<1.0	39.5	<1.0	14.1	2.5	<1.0	<1.0	<1.0	1.7	2.0	<1.0	<1.0
HR-13	11/14/2001	0.18J	15	< 1.0	6.5	0.65	< 1.0	< 1.0	< 1.0	0.74J	1.2	< 1.0	< 1.0
HR-13	9/30/2002	< 1	25	< 1	11	1.4	< 1	< 1	< 1	1.4	3.6	< 1	< 1
HR-13	9/16/2003	< 1 U	33	< 1 U	12	1.8	< 1 U	< 1 U	< 1 U	2.2	5.7	< 1 U	< 1 U
HR-13	9/21/2004	< 1 U	30	0.27 J	12	1.5	< 1 U	< 1 U	< 1 U	2.6	21	0.43 J	< 1 U
31	9/29/2000	<1.0	7.4	<1.0	8.4	<1.0	<1.0	<1.0	<1.0	<1.0	12.9	4.4	<1.0
31	11/15/2001	< 1.0	3.1	< 1.0	2.4	< 0.50	< 1.0	< 1.0	< 1.0	< 1.0	5.1	2.5	< 1.0
39	9/27/2002	< 1	1.6	< 1	1.3	< 0.5	< 1	< 1	< 1	< 1	3.8	0.51J	< 1
39	9/24/2003	< 1 U	0.58 J	< 1 U	0.71	< 0.5 U	< 1 U	< 1 U	< 1 U	< 1 U	0.89 J	< 1 U	< 1 U
GM-39	12/10/2003	< 1 U	< 1 U	< 1 U	< 0.5 U	< 0.5 U	< 1 U	< 1 U	0.18 J	< 1 U	< 1 U	1.3	< 1 U
GM-39	9/20/2004	< 1 U	< 1 U	< 1 U	< 0.5 U	< 0.5 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	1.8	< 1 U

Table A-2. Groundwater Analytical Results for the Lower Aquifer Wells from 1999-2004, General Motors Corporation, Moraine, Ohio.

		Compound											
Well	Date	Benzene	1,1-DCA	1,1-DCE	cis-1,2-DCE	trans-1,2-DCE	Ethyl-benzene	PCE	Toluene	1,1,1-TCA	TCE	Vinyl Chloride	Xylenes
GM-40	12/10/2003	< 1 U	< 1 U	< 1 U	< 0.5 U	< 0.5 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	3.1	< 1 U
GM-40	9/20/2004	< 1 U	< 1 U	< 1 U	< 0.5 U	< 0.5 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	3.2	< 1 U
GM-41	12/10/2003	< 1 U	< 11 U	< 11 U	10	< 5.6 U	< 11 U	< 11 U	< 11 U	< 11 U	320	< 11 U	< 11 U
GM-41	9/21/2004	< 6.2 U	< 6.2 U	< 6.2 U	24	< 3.1 U	< 6.2 U	< 6.2 U	< 6.2 U	< 6.2 U	180	< 6.2 U	< 6.2 U
GM-42	12/9/2003	< 1 U	0.46 J	< 1 U	11	0.34 J	< 1 U	0.27 J	< 1 U	< 1 U	0.37 J	1	< 1 U
GM-42	9/20/2004	< 1 U	0.7 J	0.25 J	16	0.44 J	< 1 U	< 1 U	< 1 U	< 1 U	0.43 J	0.92 J	< 1 U
GM-19D	9/28/1999	<1.0	<1.0	<1.0	1.2	<1.0	<1.0	<1.0	<1.0	<1.0	13.5	1.5	<1.0
GM-19D	10/2/2000	<1.0	<1.0	<1.0	3.5	<1.0	<1.0	<1.0	<1.0	<1.0	2.9	15.7	<1.0
GM-19D	11/14/2001	< 1.0	< 1.0	< 1.0	0.92	< 0.50	< 1.0	< 1.0	0.38J	0.18J	3.7	13	< 1.0
GM-19D	9/26/2002	< 1	< 1	< 1	0.81	< 0.5	< 1	< 1	< 1	< 1	3.1	0.36J	< 1
GM-19D	9/25/2003	< 1 U	< 1 U	< 1 U	1.8	< 0.5 U	< 1 U	< 1 U	< 1 U	< 1 U	0.24 J	17	< 1 U
GM-19D	9/20/2004	< 1 U	< 1 U	< 1 U	2	< 0.5 U	< 1 U	< 1 U	< 1 U	0.31 J	3.5	18	< 1 U
GM-7R	9/28/1999	<1.0	<1.0	<1.0	2.1	<1.0	<1.0	<1.0	<1.0	4.2	76.1	<1.0	<1.0
Downgradient of the Site													
GM-3	9/28/1999	<1.0	<1.0	<1.0	1.1	<1.0	<1.0	1.2	<1.0	1.7	7.5	<1.0	<1.0
GM-3	10/2/2000	<1.0	2.1	<1.0	8.3	1.1	<1.0	1.5	<1.0	1.0	9.4	<1.0	<1.0
GM-3	11/14/2001	< 1.0	0.95J	< 1.0	2.6	0.25J	< 1.0	0.48J	< 1.0	0.16J	2.9	< 1.0	< 1.0
GM-3	10/1/2002	< 1	1.8	< 1	8.9	1.2	< 1	1.4	< 1	0.74J	9.5	0.63J	< 1
GM-3	10/2/2003	< 1 U	1.6	< 1 U	5.5	0.77	0.26 J	1.7	< 1 U	0.96 J	12	< 1 U	< 1 U
GM-3	9/21/2004	< 1 U	1.8	< 1 U	4.9	0.75	< 1 U	2	< 1 U	1	13	< 1 U	< 1 U
GM-4	9/28/1999	<1.0	<1.0	<1.0	2.3	<1.0	<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	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	2.0	5.2	1.1	30.6	<1.0	<1.0
GM-1	10/2/2000	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	2.8	<1.0	2.2	37.2	<1.0	<1.0
GM-1	11/14/2001	< 1.0	0.29J	< 1.0	< 0.50	< 0.50	< 1.0	1.3	< 1.0	0.80J	19	< 1.0	< 1.0
GM-1	10/1/2002	< 1.4 U	0.48 J	< 1.4 U	0.95	< 0.72 U	< 1.4 U	2.3	< 1.4 U	1.3 J	39	< 1.4 U	< 1.4 U
GM-1	10/2/2003	< 1 U	< 1 U	< 1 U	< 0.5 U	< 0.5 U	< 1 U	2	< 1 U	1.2	34	< 1 U	< 1 U
GM-1	9/21/2004	< 1 U	< 1 U	< 1 U	< 0.5 U	< 0.5 U	< 1 U	2.1	< 1 U	1.2	35	< 1 U	< 1 U
GM-15	9/24/1999	<1.0	2.4	<1.0	4.3	<1.0	<1.0	<1.0	<1.0	<1.0	4.1	<1.0	<1.0
GM-15	10/2/2000	<1.0	2.3	<1.0	2.6	<1.0	<1.0	<1.0	<1.0	<1.0	4.7	<1.0	<1.0
GM-15	11/14/2001	< 1.0	1.4	< 1.0	1.2	< 0.50	< 1.0	< 1.0	< 1.0	< 1.0	4.9	< 1.0	< 1.0
GM-15	9/27/2002	< 1	1.6	< 1	1.8	< 0.5	< 1	< 1	< 1	< 1	4.7	< 1	< 1
GM-15	9/22/2003	< 1 U	1.7	< 1 U	1.6	< 0.5 U	< 1 U	< 1 U	< 1 U	< 1 U	5.9	< 1 U	< 1 U
GM-15	9/20/2004	< 1 U	1.8	< 1 U	1.4	< 0.5 U	< 1 U	< 1 U	< 1 U	< 1 U	5.8	< 1 U	< 1 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
GM-13	9/24/1999	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	3.6	<1.0	1.9	31.0	<1.0	<1.0

Table A-2. Groundwater Analytical Results for the Lower Aquifer Wells from 1999-2004, General Motors Corporation, Moraine, Ohio.

		Compound											
Well	Date	Benzene	1,1-DCA	1,1-DCE	cis-1,2-DCE	trans-1,2-DCE	Ethyl-benzene	PCE	Toluene	1,1,1-TCA	TCE	Vinyl Chloride	Xylenes
GM-11	9/24/1999	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	1.5	<1.0	<1.0	14.5	<1.0	<1.0
GM-11	10/2/2000	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	3.0	<1.0	1.4	41.3	<1.0	<1.0
GM-11	11/14/2001	< 1.0	< 1.0	< 1.0	< 0.50	< 0.50	< 1.0	1.0	< 1.0	0.33J	12	< 1.0	< 1.0
GM-11	10/1/2002	< 1	0.34J	< 1	0.62	< 0.5	< 1	2.2	< 1	1	35	< 1	< 1
GM-11	9/24/2003	< 1 U	< 1 U	< 1 U	< 0.5 U	< 0.5 U	< 1 U	2.2	< 1 U	0.96 J	33	< 1 U	< 1 U
GM-11	9/21/2004	< 1 U	< 1 U	< 1 U	< 0.5 U	< 0.5 U	< 1 U	2.1	< 1 U	0.89 J	33	< 1 U	< 1 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
GM-20D	10/3/2000	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	4.2	<1.0	1.6	14.3	<1.0	<1.0
GM-20D	11/14/2001	< 1.0	< 1.0	< 1.0	< 0.50	< 0.50	< 1.0	2.0	< 1.0	0.64J	5.9	< 1.0	< 1.0
GM-20D	9/30/2002	< 1	< 1	< 1	< 0.5	< 0.5	< 1	1.3	< 1	< 1	3.8	< 1	< 1
GM-20D	9/22/2003	< 1 U	< 1 U	< 1 U	< 0.5 U	< 0.5 U	< 1 U	3.6	< 1 U	0.89 J	12	< 1 U	< 1 U
GM-20D	9/21/2004	< 1 U	< 1 U	< 1 U	< 0.5 U	< 0.5 U	< 1 U	2.9	< 1 U	0.96 J	11	< 1 U	< 1 U
DN-13	11/14/2001	< 1.0	2.5	< 1.0	6.2	0.37J	< 1.0	< 1.0	< 1.0	1.1	5.0	1.2	< 1.0
DN-13	9/27/2002	< 1	2.5	< 1	7.3	0.48J	< 1	< 1	< 1	1.1	6.1	1.3	< 1
DN-13	9/22/2003	< 1 U	2.4	< 1 U	6.8	0.4 J	< 1 U	0.31 J	< 1 U	1.1	6.4	1.1	< 1 U
DN-13	9/16/2004	< 1 U	2.2	< 1 U	6.7	0.49 J	< 1 U	0.44 J	< 1 U	0.84 J	6.8	2.1	< 1 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
GM-9	10/3/2000	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	1.2	17.2	<1.0	<1.0
GM-9	11/14/2001	< 1.0	0.58J	< 1.0	1.1	< 0.50	< 1.0	0.38J	< 1.0	0.48J	8.6	< 1.0	< 1.0
GM-9	9/30/2002	< 1	0.48J	< 1	0.66	< 0.5	< 1	< 1	< 1	0.99J	16	< 1	< 1
GM-9	9/24/2003	< 1 U	0.45 J	< 1 U	0.56	< 0.5 U	< 1 U	< 1 U	< 1 U	1.3	20	< 1 U	< 1 U
GM-9	9/21/2004	< 1 U	0.6 J	< 1 U	0.97	< 0.5 U	< 1 U	< 1 U	< 1 U	1.1	16	< 1 U	< 1 U
MT-69	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
MT-69	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
MT-69	11/15/2001	< 1.0	< 1.0	< 1.0	< 0.50	< 0.50	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
MT-69	9/30/2002	< 1	< 1	< 1	< 0.5	< 0.5	< 1	< 1	< 1	< 1	< 1	< 1	< 1
MT-69	10/1/2003	< 1 U	< 1 U	< 1 U	< 0.5 U	< 0.5 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
MT-69	9/27/2004	< 1 U	< 1 U	< 1 U	< 0.5 U	< 0.5 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U

1,1-DCA - 1,1-Dichloroethane.
1,1-DCE - 1,1-Dichloroethene.
cis-1,2-DCE - cis-1,1-Dichloroethene.
trans-1,2-DCE - trans-1,2-Dichloroethene.
PCE - Tetrachloroethene.
1,1,1-TCA - 1,1,1-Trichloroethane.
TCE - Trichloroethene.
VOCs - Volatile Organic Compounds.

ARCADIS

Appendix B

Groundwater Sampling Logs for 2005

ARCADIS

Water Sampling Log

Project	GM Sitewide Groundwater	Project No.	OH000294.08.02	Page	1 of 1
Site Location	Moraine, Ohio			Date	10/17/05
Site/Well No.	GM-22	Replicate No.	Dup-1	Code No.	Na
Weather	50's; clear	Sampling Time:	Begin 0945	End	1045

Evacuation Data

Measuring Point	Top of Casing
MP Elevation (ft)	731.63
Land Surface Elevation (ft)	NM
Sounded Well Depth (ft bmp)	56.51
Depth to Water (ft bmp)	25.72
Water-Level Elevation (ft)	705.91
Water Column in Well (ft)	30.79
Casing Diameter/Type	2"
Gallons in Well	4.93
Gallons Pumped/Bailed Prior to Sampling	10g
Sample Pump Intake Setting (ft bmp)	middle of screen
Purge Time	begin 10:07 end 10:27
Pumping Rate (gpm)	1100 ml/min
Evacuation Method	~~Bladder pump~~ Peristaltic pump (Submersable)

Field Parameters

Color	~~Clear~~ None
Odor	None
Appearance	Clear
pH (s.u.)	6.88
Conductivity (mS/cm)	~~1.93~~ N/A
(µmhos/cm)	~~N/A~~ 1930
Turbidity (NTU)	N/A
Temperature (°C)	16.9
Dissolved Oxygen (mg/L)	~~N/A~~ 0.0
ORP (mV)	~~N/A~~ 68
Sampling Method	Low Flow
Remarks	Sample time @ 10:28
	DTW final = 25.72
	pump stopped @ 10:11 - restarted @ 10:15

Constituents Sampled	Container Description	Number	Preservative
Site-Specific VOCs (8260)	40 ml glass vial	3 (3)	Cool, HCl
Fe/Mn-Total	1 L plastic	1 (1)	HNO_3
Fe/Mn-dissolved	1 L plastic	1 (1)	HNO_3
Sulfate	250 mL plastic	1 (1)	none
Chlorides	"	"	"
Sulfide	500 mL plastic	1 (1)	ZnAc/NaOH
TOC	40 mL voa	2 (2)	H_2SO_4
Ethene/Ethane/Methane	40 mL amber voa	2 (2)	BAK

Sampling Personnel: J. Manzo/T. Fortner

Well Casing Volumes

Gal./Ft.				
1-¼" = 0.06	2" = 0.16	3" = 0.37	4" = 0.65	
1-½" = 0.09	2-½" = 0.26	3-½" = 0.50	6" = 1.47	

bmp	below measuring point	ml	milliliter	NTU	Nephelometric Turbidity Units
°C	Degrees Celsius	mS/cm	Millisiemens per centimeter	PVC	Polyvinyl chloride
ft	feet	msl	mean sea-level	s.u.	Standard units
gpm	Gallons per minute	N/A	Not Applicable	umhos/cm	Micromhos per centimeter
mg/L	Milligrams per liter	NR	Not Recorded	VOC	Volatile Organic Compounds

LOW FLOW SAMPLING
GROUNDWATER FIELD PARAMETER LOG

Project Number: 01t000294.08.02

Site Location: GM Moraine, OH

Monitoring Well No.: GM-22

Depth of Sampling: middle of screen

Time Pump Started: 10:07

Date: 10/17/05

Parameters

Time

	10:08	10:15 ~~10:11~~	10:18 ~~10:14~~	10:21	10:24	10:27					
Redox Potential (millivolts)	236	68 ~~+77~~	71	71	69	68					
Dissolved Oxygen (mg/L)	0.47	0.44 ~~7.40~~	0.0	0.0	0.0	0.0					
pH (s.u.)	6.55	6.82 ~~6.02~~	6.83	6.85	6.86	6.88					
Specific Conductance (uS/cm)	1660	1880 ~~0.0~~	1910	1920	1920	1930					
Temperature (C)	16.5	17.0 ~~15.7~~	16.9	16.9	16.9	16.9					

Flow Rate: 1100 mL/min

Time Sampled: 10:28

Total Water Pumped: 10 gal.

Comments: Pumped stopped @ 10:11 - restarted @ 10:15

ARCADIS

Water Sampling Log

Project	GM Sitewide Groundwater	Project No.	OH000294.08.02	Page	1 of 1
Site Location	Moraine, Ohio			Date	10/17/05
Site/Well No.	GM-21	Replicate No.	NA	Code No.	NA
Weather	50's; clear	Sampling Time: Begin	1106	End	11:50

Evacuation Data

Measuring Point	Top of Casing
MP Elevation (ft)	724.70
Land Surface Elevation (ft)	NM
Sounded Well Depth (ft bmp)	54.79
Depth to Water (ft bmp)	19.70
Water-Level Elevation (ft)	TF 705.0
Water Column in Well (ft)	35.09
Casing Diameter/Type	2"
Gallons in Well	5.6
Gallons Pumped/Bailed Prior to Sampling	7g
Sample Pump Intake Setting (ft bmp)	middle of screen
Purge Time	begin 11:17 end 11:36
Pumping Rate (gpm)	800ml/min
Evacuation Method	Submersible pump

Field Parameters

Color	None
Odor	Slight Organic odor
Appearance	Clear w black specks
pH (s.u.)	6.73
Conductivity (mS/cm)	~~1.64~~ TF N/A
(µmhos/cm)	~~N/A~~ 1640
Turbidity (NTU)	N/A
Temperature (°C) TF	16.4
Dissolved Oxygen (mg/L) TF	~~N/A~~ 0.0
ORP (mV)	~~N/A~~ 140
Sampling Method	Low Flow
Remarks	Sample time @ 11:37
	DTW final = 19.70

Constituents Sampled	Container Description	Number	Preservative
Site-Specific VOCs (8260)	40 ml glass vial	3	Cool, HCl
Fe/Mn-Total	1L plastic	1	HNO_3
Fe/Mn-dissolved	1L plastic	1	HNO_3
Sulfate	250 ml plastic	1	none
Chlorides	"	"	"
Sulfide	500 ml plastic	1	$ZnAc/NaOH$
TOC	40 ml voa	2	H_2SO_4
Ethene/Ethane/Methane	40 ml amber voa	2	BAK

Sampling Personnel: J. Manzo/ T. Fortner

Well Casing Volumes

Gal./Ft.				
	1-¼" = 0.06	2" = 0.16	3" = 0.37	4" = 0.65
	1-½" = 0.09	2-½" = 0.26	3-½" = 0.50	6" = 1.47

bmp	below measuring point	ml	milliliter	NTU	Nephelometric Turbidity Units
°C	Degrees Celsius	mS/cm	Millisiemens per centimeter	PVC	Polyvinyl chloride
ft	feet	msl	mean sea-level	s.u.	Standard units
gpm	Gallons per minute	N/A	Not Applicable	umhos/cm	Micromhos per centimeter
mg/L	Milligrams per liter	NR	Not Recorded	VOC	Volatile Organic Compounds

LOW FLOW SAMPLING
GROUNDWATER FIELD PARAMETER LOG

Project Number: OH000294.08.02

Site Location: GM Moraine, OH

Monitoring Well No.: GM-21

Time Pump Started: 11:17

Depth of Sampling: middle of screen

Date: 10/17/05

Parameters

Time

	11:18	11:21	11:24	11:27	11:30	11:33	11:36				
Redox Potential (millivolts)	-133	-137	~~-92~~ -119	-124	-132	-137	-140				
Dissolved Oxygen (mg/L)	1.18	0.23	~~0.0~~ ~~7.25~~ 2.90	0.0	0.0	0.0	0.0				
pH (s.u.)	6.68	6.71	~~6.44~~ 6.71	6.73	6.72	6.74	6.73				
Specific Conductance (uS/cm)	2050	1860	1900	1820	1750	1690	1640				
Temperature (C)	16.6	16.6	~~17.7~~ 16.9	16.5	16.3	16.4	16.4				

Flow Rate: 800 ml/min

Time Sampled: 11:37

Total Water Pumped: 7 g

Comments:

21

ARCADIS

Water Sampling Log

Project	GM Sitewide Groundwater	Project No.	OH000294.08.02	Page	1 of 1
Site Location	Moraine, Ohio			Date	10/17/05
Site/Well No.	GM-30	Replicate No.	NM	Code No.	NM
Weather	60's ; clear	Sampling Time:	Begin 1250	End	1330

Evacuation Data

Measuring Point	Top of Casing
MP Elevation (ft)	734.73
Land Surface Elevation (ft)	NM
Sounded Well Depth (ft bmp)	36.91
Depth to Water (ft bmp)	27.30
Water-Level Elevation (ft)	707.43
Water Column in Well (ft)	9.61
Casing Diameter/Type	2"
Gallons in Well	1.54
Gallons Pumped/Bailed Prior to Sampling	7 gal
Sample Pump Intake Setting (ft bmp)	middle of screen
Purge Time	begin 1300 end 1316
Pumping Rate (gpm)	900 ml/min
Evacuation Method	Submersible pump

Field Parameters

Color	light brown
Odor	Hydrocarbon
Appearance	Slightly turbid
pH (s.u.)	6.47 TF ~~N/A~~ 6.47
Conductivity (mS/cm)	2.22 TF N/A
(µmhos/cm)	~~N/A~~ 2220
Turbidity (NTU)	N/A
Temperature (°C)	17.3
Dissolved Oxygen (mg/L)	~~N/A~~ 0.0
ORP (mV)	~~N/A~~ -97
Sampling Method	Low Flow
Remarks	Sample time @ 13:17
	DTW final = 27.62

Constituents Sampled	Container Description	Number	Preservative
Site-Specific VOCs (8260)	40 ml glass vial	3	Cool, HCl
Fe/Mn-Total	1 L plastic	1	HNO_3
Fe/Mn-dissolved	1 L plastic	1	HNO_3
Sulfate	250 mL plastic	1	none
Chlorides	"	"	"
Sulfide	500 mL plastic	1	ZnAc/NaOH
TOC	40 mL Voa	2	H_2SO_4
Ethene/Ethane/Methane	40 mL amber voa	2	BAK

Sampling Personnel: J. Manzo/T. Fortner

Well Casing Volumes

Gal./Ft.				
	1-¼" = 0.06	2" = 0.16	3" = 0.37	4" = 0.65
	1-½" = 0.09	2-½" = 0.26	3-½" = 0.50	6" = 1.47

bmp	below measuring point	ml	milliliter	NTU	Nephelometric Turbidity Units
°C	Degrees Celsius	mS/cm	Millisiemens per centimeter	PVC	Polyvinyl chloride
ft	feet	msl	mean sea-level	s.u.	Standard units
gpm	Gallons per minute	N/A	Not Applicable	umhos/cm	Micromhos per centimeter
mg/L	Milligrams per liter	NR	Not Recorded	VOC	Volatile Organic Compounds

LOW FLOW SAMPLING
GROUNDWATER FIELD PARAMETER LOG

Project Number: OH000294.08.02

Site Location: GM Moraine, OH

Monitoring Well No.: GM-30

Time Pump Started: 1300

Depth of Sampling: middle of screen

Date: 10/17/05

Parameters

Time

	1301	1304	1307	1310	1313	1316					
Redox Potential (millivolts)	-78	-83	-89	-93	-95	-97					
Dissolved Oxygen (mg/L)	0.5	0.23	0.12	0.0	0.0	0.0					
pH (s.u.)	6.50	6.48	6.48	6.47	6.46	6.47					
Specific Conductance (uS/cm)	2600	2550	2480	2370	2290	2220					
Temperature (C)	17.2	17.1	17.1	17.1	17.0	17.3					

Flow Rate: 900 ml/min

Time Sampled: 13:17

Total Water Pumped: 7 gal.

Comments:

ARCADIS

Water Sampling Log

Project	GM Sitewide Groundwater	Project No.	OH000294.08.02	Page	1 of 1
Site Location	Moraine, Ohio			Date	10/17/05
Site/Well No.	GM-29	Replicate No.	NA	Code No.	NA
Weather	60's; clear	Sampling Time:	Begin 1345	End	1425

Evacuation Data

Measuring Point	Top of Casing
MP Elevation (ft)	730.78
Land Surface Elevation (ft)	NM
Sounded Well Depth (ft bmp)	33.78
Depth to Water (ft bmp)	24.01
Water-Level Elevation (ft)	706.77
Water Column in Well (ft)	9.77
Casing Diameter/Type	2"
Gallons in Well	1.56
Gallons Pumped/Bailed Prior to Sampling	5 gal.
Sample Pump Intake Setting (ft bmp)	middle of screen
Purge Time	begin 1352 end 1408
Pumping Rate (gpm)	1000 ml/min
Evacuation Method	Submersible pump

Field Parameters

Color	None
Odor	None
Appearance	Non turbid/clear
pH (s.u.)	6.80
Conductivity (mS/cm)	~~2.20~~ N/A
(µmhos/cm)	~~N/A~~ 2200
Turbidity (NTU)	N/A
Temperature (°F)	16.8
Dissolved Oxygen (mg/L)	~~N/A~~ 0.0
ORP (mV)	~~N/A~~ -153
Sampling Method	Low Flow
Remarks	Sample time @ 1409
	DTW final = 24.01

Constituents Sampled	Container Description	Number	Preservative
Site-Specific VOCs (8260)	40 ml glass vial	3	Cool, HCl
Fe/Mn-total	1 L plastic	1	HNO_3
Fe/Mn-dissolve	1 L plastic	1	HNO_3
Sulfate	250 mL plastic	1	none
Chlorides	"	"	"
Sulfide	500 mL plastic	1	ZnAc/NaOH
TOC	40 mL vial	2	H_2SO_4
Ethene/Ethane/Methane	40 mL amber vial	2	HCl

Sampling Personnel: J. Manzo/T. Fortner

Well Casing Volumes

Gal./Ft.				
	1-¼" = 0.06	2" = 0.16	3" = 0.37	4" = 0.65
	1-½" = 0.09	2-½" = 0.26	3-½" = 0.50	6" = 1.47

bmp	below measuring point	ml	milliliter	NTU	Nephelometric Turbidity Units
°C	Degrees Celsius	mS/cm	Millisiemens per centimeter	PVC	Polyvinyl chloride
ft	feet	msl	mean sea-level	s.u.	Standard units
gpm	Gallons per minute	N/A	Not Applicable	umhos/cm	Micromhos per centimeter
mg/L	Milligrams per liter	NR	Not Recorded	VOC	Volatile Organic Compounds

LOW FLOW SAMPLING
GROUNDWATER FIELD PARAMETER LOG

Project Number: 0H000294.08.02

Site Location: GM Moraine, OH

Monitoring Well No.: GM-29

Time Pump Started: 13:52

Depth of Sampling: Middle of screen

Date: 10/17/05

Parameters

Time

	13:53	1356	1359	1402	1405	1408					
Redox Potential (millivolts)	-122	-136	-145	-150	-152	-153					
Dissolved Oxygen (mg/L)	1.63	0.53	0.20	0.0	0.0	0.0					
pH (s.u.)	6.47	6.82	6.83	6.83	6.82	6.80					
Specific Conductance (uS/cm)	2270	2260	2240	2200	2190	2200					
Temperature (C)	16.5	16.6	16.7	16.7	16.8	16.8					

Flow Rate: 1000 ml/min

Time Sampled: 1409

Total Water Pumped: 5 gal.

Comments:

ARCADIS

Water Sampling Log

Project	GM Sitewide Groundwater	Project No.	OH000294.08.02	Page	1 of 1
Site Location	Moraine, Ohio			Date	10/17/05
Site/Well No.	GM-27	Replicate No.	NA	Code No.	NA
Weather	60's; clear	Sampling Time:	Begin 1435	End	1512

Evacuation Data

Measuring Point	Top of Casing
MP Elevation (ft)	730.57
Land Surface Elevation (ft)	NM
Sounded Well Depth (ft bmp)	47.49
Depth to Water (ft bmp)	23.16
Water-Level Elevation (ft)	707.41
Water Column in Well (ft)	24.33
Casing Diameter/Type	2"
Gallons in Well	3.89
Gallons Pumped/Bailed Prior to Sampling	6 gal.
Sample Pump Intake Setting (ft bmp)	middle of screen TF
Purge Time	begin 1443 end 1602 TF
Pumping Rate (gpm)	1000 mL/min
Evacuation Method	Submersible pump

Field Parameters

Color	None
Odor	None
Appearance	Non-turbid - clear
pH (s.u.)	5.77
Conductivity (mS/cm)	~~1.58~~ TF N/A
(µmhos/cm)	~~N/A~~ 1580
Turbidity (NTU)	N/A
Temperature (°C) TF	16.2
Dissolved Oxygen (mg/L) TF	~~N/A~~ 0.0
ORP (mV)	~~N/A~~ 15
Sampling Method	Low Flow
Remarks	Sample time @ TF 1605
	DTW final = 23.16

Constituents Sampled	Container Description	Number	Preservative
Site-Specific VOCs (8260)	40 ml glass vial	3	Cool, HCl

Sampling Personnel: J. Manzo/T. Fortner

Well Casing Volumes

Gal./Ft.				
	1-¼" = 0.06	2" = 0.16	3" = 0.37	4" = 0.65
	1-½" = 0.09	2-½" = 0.26	3-½" = 0.50	6" = 1.47

bmp	below measuring point	ml	milliliter	NTU	Nephelometric Turbidity Units
°C	Degrees Celsius	mS/cm	Millisiemens per centimeter	PVC	Polyvinyl chloride
ft	feet	msl	mean sea-level	s.u.	Standard units
gpm	Gallons per minute	N/A	Not Applicable	umhos/cm	Micromhos per centimeter
mg/L	Milligrams per liter	NR	Not Recorded	VOC	Volatile Organic Compounds

OTW-23,16

LOW FLOW SAMPLING
GROUNDWATER FIELD PARAMETER LOG

Project Number: OH000294.08.02

Site Location: GM Moraine, OH

Monitoring Well No.: GM-27

Time Pump Started: 1443

Depth of Sampling: middle of screen

Date: 10/17/05

Parameters

Time

	1444	1447	1450	1453	1456	1459	1502				
Redox Potential (millivolts)	90	61	33	22	19	16	15				
Dissolved Oxygen (mg/L)	2.00	0.80	0.19	0.02	0.0	0.0	0.0				
pH (s.u.)	6.42	5.95	5.78	5.57	5.61	5.75	5.77				
Specific Conductance (uS/cm)	1570	1590	1580	1570	1590	1590	1580				
Temperature (C)	16.2	16.1	16.1	16.2	16.2	16.2	16.2				

Flow Rate: 1000 mL/min

Time Sampled: 1503

Total Water Pumped: 6 gal.

Comments:

ARCADIS

Water Sampling Log

Project	GM Sitewide Groundwater	Project No.	OH000294.08.02	Page	1 of 1
Site Location	Moraine, Ohio			Date	10/17/05
Site/Well No.	GM-23	Replicate No.	NA	Code No.	NA
Weather	60's; clear	Sampling Time:	Begin ~~1452~~ TF 1513	End	1552

Evacuation Data

Measuring Point	Top of Casing
MP Elevation (ft)	731
Land Surface Elevation (ft)	NM
Sounded Well Depth (ft bmp)	NM
Depth to Water (ft bmp)	24.02
Water-Level Elevation (ft)	706.98
Water Column in Well (ft)	NM
Casing Diameter/Type	2"
Gallons in Well	NA
Gallons Pumped/Bailed Prior to Sampling	7 gal
Sample Pump Intake Setting (ft bmp)	middle of screen
Purge Time	begin 1515 end 1531
Pumping Rate (gpm)	1000 mL/min
Evacuation Method	Submersible pump

Field Parameters

Color	None
Odor	Hydrocarbon
Appearance	~~None~~ TF None, Non turbid/clear-product visible
pH (s.u.)	5.66
Conductivity (mS/cm)	~~2.57~~ TF N/A
(µmhos/cm)	~~N/A~~ 2570
Turbidity (NTU)	N/A
Temperature (°C)	16.5
Dissolved Oxygen (mg/L)	~~N/A~~ 0.0 TF
ORP (mV)	~~N/A~~ -108
Sampling Method	Low Flow
Remarks	Sample time @ 1532
	DTW final = 24.02

Constituents Sampled	Container Description	Number	Preservative
Site-Specific VOCs (8260)	40 ml glass vial	3	Cool, HCl
Fe/Mn-Total	1 L plastic	1	HNO_3
Fe/Mn-dissolved	1 L plastic	1	HNO_3
Sulfate	250 ml plastic	1	none
Chlorides	"	"	"
Sulfide	500 mL plastic	1	NaOH/ZnAc
TOC	40 ml voa	2	H_2SO_4
Ethene/Ethane/Methane	40 ml amber voa	2	BAK

Sampling Personnel: J. Manzo/T. Fortner

Well Casing Volumes

Gal./Ft.				
	1-¼" = 0.06	2" = 0.16	3" = 0.37	4" = 0.65
	1-½" = 0.09	2-½" = 0.26	3-½" = 0.50	6" = 1.47

bmp	below measuring point	ml	milliliter	NTU	Nephelometric Turbidity Units
°C	Degrees Celsius	mS/cm	Millisiemens per centimeter	PVC	Polyvinyl chloride
ft	feet	msl	mean sea-level	s.u.	Standard units
gpm	Gallons per minute	N/A	Not Applicable	umhos/cm	Micromhos per centimeter
mg/L	Milligrams per liter	NR	Not Recorded	VOC	Volatile Organic Compounds

LOW FLOW SAMPLING
GROUNDWATER FIELD PARAMETER LOG

Project Number: OH000294-08.02

Site Location: GM Moraine, OH

Monitoring Well No.: GM-23

Time Pump Started: 1515

Depth of Sampling: middle of Screen

Date: 10/17/05

Parameters

Time

	1516	1519	1522	1525	1528	1531	TF 1534				
Redox Potential (millivolts)	-37	-86	-101	-104	-106	-108					
Dissolved Oxygen (mg/L)	1.93	0.77	0.33	0.16	0.02	0.0					
pH (s.u.)	5.79	5.80	5.82	5.79	5.77	5.66					
Specific Conductance (uS/cm)	2170	2420	2550	2590	2560	2570					
Temperature (C)	16.9	16.8	16.8	16.6	16.5	16.5					

Flow Rate: 1000 mL/min

Time Sampled: 1532

Total Water Pumped: 7 gal.

Comments:

ARCADIS

Water Sampling Log

Project	GM Sitewide Groundwater	Project No.	OH000294.08.02	Page	1 of 1
Site Location	Moraine, Ohio			Date	10/17/05
Site/Well No.	HR-11	Replicate No.	NA	Code No.	NA
Weather	60's; clear	Sampling Time:	Begin 1600	End	1640

Evacuation Data

Measuring Point	Top of Casing
MP Elevation (ft)	743.33
Land Surface Elevation (ft)	NM
Sounded Well Depth (ft bmp)	69.95
Depth to Water (ft bmp)	35.00
Water-Level Elevation (ft)	708.33
Water Column in Well (ft)	34.95
Casing Diameter/Type	2"
Gallons in Well	5.59
Gallons Pumped/Bailed Prior to Sampling	7 gal.
Sample Pump Intake Setting (ft bmp)	middle of screen
Purge Time	begin 1605 end 1624
Pumping Rate (gpm)	1100 mL/min
Evacuation Method	Submersible pump

Field Parameters

Color	None
Odor	None
Appearance	Non-turbid/clear
pH (s.u.)	6.45
Conductivity (mS/cm)	~~1.22~~ TF N/A
(µmhos/cm)	~~N/A~~ 1220
Turbidity (NTU)	N/A
Temperature (°F)	16.2
Dissolved Oxygen (mg/L)	~~N/A~~ 0.0 TF
ORP (mV)	~~N/A~~ 30
Sampling Method	Low Flow
Remarks	Sample time @ 1625
	DTW final = 35.00

Constituents Sampled	Container Description	Number	Preservative
Site-Specific VOCs (8260)	40 ml glass vial	3	Cool, HCl

Sampling Personnel: J. Manzo/T. Fortner

Well Casing Volumes

Gal./Ft.				
	1-¼" = 0.06	2" = 0.16	3" = 0.37	4" = 0.65
	1-½" = 0.09	2-½" = 0.26	3-½" = 0.50	6" = 1.47

bmp	below measuring point	ml	milliliter	NTU	Nephelometric Turbidity Units
°C	Degrees Celsius	mS/cm	Millisiemens per centimeter	PVC	Polyvinyl chloride
ft	feet	msl	mean sea-level	s.u.	Standard units
gpm	Gallons per minute	N/A	Not Applicable	umhos/cm	Micromhos per centimeter
mg/L	Milligrams per liter	NR	Not Recorded	VOC	Volatile Organic Compounds

LOW FLOW SAMPLING
GROUNDWATER FIELD PARAMETER LOG

Project Number: OH000294.08.02

Site Location: GM Moraine, OH

Monitoring Well No.: HR-11

Time Pump Started: 1605

Depth of Sampling: Middle of Screen

Date: 10/17/05

Parameters

Time

	1606	1609	1612	1615	1618	1621	1624				
Redox Potential (millivolts)	57	42	39	35	33	31	30				
Dissolved Oxygen (mg/L)	3.40	0.46	0.46	0.14	0.0	0.0	0.0				
pH (s.u.)	6.66	6.38	6.40	6.40	6.45	6.45	6.45				
Specific Conductance (uS/cm)	1230	1230	1230	1220	1220	1220	1220				
Temperature (C)	16.4	16.2	16.2	16.2	16.4	16.2	16.2				

Flow Rate: 1100 mL/min

Time Sampled: 1625

Total Water Pumped: 7 gal.

Comments:

ARCADIS

Water Sampling Log

Project	GM Sitewide Groundwater	Project No.	OH000294.08.02	Page	1 of 1
Site Location	Moraine, Ohio			Date	10/18/05
Site/Well No.	ME-6	Replicate No.	NA	Code No.	NA
Weather	50's; clear	Sampling Time:	Begin 0824	End	0925

Evacuation Data

Measuring Point	Top of Casing
MP Elevation (ft)	735.91
Land Surface Elevation (ft)	NM
Sounded Well Depth (ft bmp)	NM
Depth to Water (ft bmp)	26.83
Water-Level Elevation (ft)	709.08
Water Column in Well (ft)	NM
Casing Diameter/Type	2"
Gallons in Well	NA
Gallons Pumped/Bailed Prior to Sampling	2 gal.
Sample Pump Intake Setting (ft bmp)	~~middle of screen~~ TF N/A
Purge Time	begin 0840 end 0859
Pumping Rate (gpm)	N/A
Evacuation Method	~~Submersible pump~~ TF Disposable Bailer

Field Parameters

Color	Brown-gray
Odor	Organic
Appearance	Turbid w black specks
pH (s.u.)	5.85
Conductivity (mS/cm)	~~1.73~~ TF N/A
(µmhos/cm)	~~N/A~~ 1730
Turbidity (NTU)	C N/A
Temperature (°C)	TF 15.3
Dissolved Oxygen (mg/L)	N/A
ORP (mV)	N/A
Sampling Method	TF ~~Low flow~~ Disposable Bailer

Remarks: Sample time @ 0900

DTW final = NM

Constituents Sampled	Container Description	Number	Preservative
Site-Specific VOCs (8260)	40 ml glass vial	3	Cool, HCl
Fe/Mn - Total	1 L plastic	1	HNO_3
Fe/Mn - dissolved	1 L plastic	1	HNO_3
Sulfate	~~none~~ DUP 250mL plastic	1	none
Chlorides	"	"	"
Sulfide	500 mL plastic	1	ZnAc/NaOH
TOC	40 ml voa	2	H_2SO_4
Ethene/Ethane/Methane	40 ml amber voa	2	BAK

Sampling Personnel: J. Manzo/T. Fortner

Well Casing Volumes

Gal./Ft.				
	1-¼" = 0.06	2" = 0.16	3" = 0.37	4" = 0.65
	1-½" = 0.09	2-½" = 0.26	3-½" = 0.50	6" = 1.47

bmp	below measuring point	ml	milliliter	NTU	Nephelometric Turbidity Units
°C	Degrees Celsius	mS/cm	Millisiemens per centimeter	PVC	Polyvinyl chloride
ft	feet	msl	mean sea-level	s.u.	Standard units
gpm	Gallons per minute	N/A	Not Applicable	umhos/cm	Micromhos per centimeter
mg/L	Milligrams per liter	NR	Not Recorded	VOC	Volatile Organic Compounds

Disposable Bailer
~~LOW FLOW SAMPLING~~

GROUNDWATER FIELD PARAMETER LOG

Project Number: OH000294.08.02

Site Location: GM Moraine, OH

Monitoring Well No.: ME-6

Time Pump Started: N/A

Depth of Sampling: N/A

Date: 10/18/05

Parameters

Time

	0859										
Redox Potential (millivolts)	NM										
Dissolved Oxygen (mg/L)	NM										
pH (s.u.)	5.85										
Specific Conductance (uS/cm)	1730										
Temperature (C)	15.3										

Flow Rate: N/A

Time Sampled: 0900

Total Water Pumped: N/A

Comments:

ARCADIS

Water Sampling Log

Project	GM Sitewide Groundwater	Project No.	OH000294.08.02	Page	1 of 1
Site Location	Moraine, Ohio			Date	10/18/05
Site/Well No.	ME-3	Replicate No.	N/A	Code No.	NA
Weather	50's; clear	Sampling Time:	Begin 0935	End	1010

Evacuation Data

Measuring Point	Top of Casing
MP Elevation (ft)	732.59
Land Surface Elevation (ft)	NM
Sounded Well Depth (ft bmp)	NM
Depth to Water (ft bmp)	25.82
Water-Level Elevation (ft)	706.77
Water Column in Well (ft)	NM
Casing Diameter/Type	2"
Gallons in Well	NA
Gallons Pumped/Bailed Prior to Sampling	2 gal. bailed
Sample Pump Intake Setting (ft bmp)	N/A ~~middle of screen~~ TF
Purge Time	begin 0945 end 0954
Pumping Rate (gpm)	N/A
Evacuation Method	~~Submersible pump~~ TF ~~Disposable~~ Bailer

Field Parameters

Color	light brown - orange
Odor	Organic
Appearance	Slightly turbid - black specks
pH (s.u.)	6.39
Conductivity (mS/cm)	~~2.34~~ TF N/A
(µmhos/cm)	~~N/A~~ 2340
Turbidity (NTU)	N/A
Temperature (°C) TF	16.0
Dissolved Oxygen (mg/L)	N/A
ORP (mV)	N/A
Sampling Method	TF ~~Low Flow~~ Disposable Bailer
Remarks	Sample time @ 0955
	DTW final = NM

Constituents Sampled	Container Description	Number	Preservative
Site-Specific VOCs (8260)	40 ml glass vial	3	Cool, HCl
Fe/Mn - Total	1 L plastic	1	HNO_3
Fe/Mn - dissolved	1 L plastic	1	HNO_3
Sulfate	250 ml plastic	1	none
Chlorides	"	"	"
Sulfide	500 ml plastic	1	ZnAc/NaOH
TOC	40 ml voa	2	H_2SO_4
Ethene/Ethane/Methane	40 ml amber voa	2	BAK

Sampling Personnel: J. Manzo/T. Fortner

Well Casing Volumes

Gal./Ft.				
	1-¼" = 0.06	2" = 0.16	3" = 0.37	4" = 0.65
	1-½" = 0.09	2-½" = 0.26	3-½" = 0.50	6" = 1.47

bmp	below measuring point	ml	milliliter	NTU	Nephelometric Turbidity Units
°C	Degrees Celsius	mS/cm	Millisiemens per centimeter	PVC	Polyvinyl chloride
ft	feet	msl	mean sea-level	s.u.	Standard units
gpm	Gallons per minute	N/A	Not Applicable	umhos/cm	Micromhos per centimeter
mg/L	Milligrams per liter	NR	Not Recorded	VOC	Volatile Organic Compounds

Disposable Bailer
~~LOW FLOW SAMPLING~~ TF

GROUNDWATER FIELD PARAMETER LOG

Project Number: DH000294.08.02

Site Location: GM Moraine, OH

Monitoring Well No.: ME-3

Time Pump Started: N/A

Depth of Sampling: N/A

Date: 10/18/05

Parameters

Time

	0954										
Redox Potential (millivolts)	NM										
Dissolved Oxygen (mg/L)	NM										
pH (s.u.)	6.39										
Specific Conductance (uS/cm)	2340										
Temperature (C)	16.0										

Flow Rate: N/A.

Time Sampled: 0955

Total Water Pumped: N/A

Comments:

ARCADIS

Water Sampling Log

Project	GM Sitewide Groundwater	Project No.	OH000294.08.02	Page	1 of 1
Site Location	Moraine, Ohio			Date	10/18/05
Site/Well No.	GM-31	Replicate No.	NA	Code No.	NA
Weather	50's & clear	Sampling Time:	Begin 1015	End	1107

Evacuation Data

Measuring Point	Top of Casing
MP Elevation (ft)	735.23
Land Surface Elevation (ft)	NM
Sounded Well Depth (ft bmp)	64
Depth to Water (ft bmp)	27.60
Water-Level Elevation (ft)	707.63
Water Column in Well (ft)	36.40
Casing Diameter/Type	2"
Gallons in Well	5.8
Gallons Pumped/Bailed Prior to Sampling	6 gal.
Sample Pump Intake Setting (ft bmp)	middle of screen
Purge Time	begin 10:26 end 10:48
Pumping Rate (gpm)	1000 ml/min
Evacuation Method	Submersible pump

Field Parameters

Color	None
Odor	None
Appearance	Non-turbid/clear
pH (s.u.)	6.47
Conductivity (mS/cm)	~~2.20~~ TF N/A
(µmhos/cm)	~~N/A~~ 2200
Turbidity (NTU)	N/A
Temperature (°C)	17.6 TF
Dissolved Oxygen (mg/L)	~~N/A~~ 0.0 TF
ORP (mV)	~~N/A~~ -65
Sampling Method	Low Flow
Remarks	Sample time @ 10:49
	DTW final = 27.60

Constituents Sampled	Container Description	Number	Preservative
Site-Specific VOCs (8260)	40 ml glass vial	3	Cool, HCl
Fe/Mn-total	1L plastic	1	HNO_3
Fe/Mn-dissolved	1L plastic	1	HNO_3
Sulfate	250 mL plastic	1	None
Chlorides	"	"	"
Sulfide	500 mL plastic	1	NaOH/ZnAc
TOC	40 mL vog	2	H_2SO_4
Ethene/Ethane/Methane	40 mL amber vog	2	BAK

Sampling Personnel: J. Manzo/T. Fortner

Well Casing Volumes

Gal./Ft.				
	1-¼" = 0.06	2" = 0.16	3" = 0.37	4" = 0.65
	1-½" = 0.09	2-½" = 0.26	3-½" = 0.50	6" = 1.47

bmp	below measuring point	ml	milliliter	NTU	Nephelometric Turbidity Units
°C	Degrees Celsius	mS/cm	Millisiemens per centimeter	PVC	Polyvinyl chloride
ft	feet	msl	mean sea-level	s.u.	Standard units
gpm	Gallons per minute	N/A	Not Applicable	umhos/cm	Micromhos per centimeter
mg/L	Milligrams per liter	NR	Not Recorded	VOC	Volatile Organic Compounds

LOW FLOW SAMPLING
GROUNDWATER FIELD PARAMETER LOG

Project Number: OH000294.08.02

Site Location: GM Moraine, OH

Monitoring Well No.: GM-31

Time Pump Started: 10:26

Depth of Sampling: Middle of screen

Date: 10/18/05

Parameters / Time

	10:27	10:30	10:33	10:36	10:39	10:42	10:45	10:48			
Redox Potential (millivolts)	144	128	103	26	-30	-49	-60	-65			
Dissolved Oxygen (TF mg/L)	4.52	1.62	0.70	0.40	0.20	0.0	0.0	0.0			
pH (s.u.)	6.43	6.41	6.42	6.44	6.46	6.46	6.46	6.47			
Specific Conductance (uS/cm)	2290	2280	2250	2230	2220	2210	2200	2200			
Temperature (C)	17.3	17.5	17.5	17.6	17.6	17.6	17.7	17.6			

Flow Rate: 1000 mL/min

Time Sampled: 10:49

Total Water Pumped: 6 gal.

Comments:

ARCADIS

Water Sampling Log

Project	GM Sitewide Groundwater	Project No.	OH000294.08.02	Page	1 of 1
Site Location	Moraine, Ohio			Date	10/18/05
Site/Well No.	GM-28	Replicate No.	NA	Code No.	NA
Weather	60's; clear	Sampling Time:	Begin 11:20	End	11:50

Evacuation Data

Measuring Point	Top of Casing
MP Elevation (ft)	738.02
Land Surface Elevation (ft)	NM
Sounded Well Depth (ft bmp)	47.15
Depth to Water (ft bmp)	29.36
Water-Level Elevation (ft)	708.66
Water Column in Well (ft)	17.79
Casing Diameter/Type	2"
Gallons in Well	2.85
Gallons Pumped/Bailed Prior to Sampling	5 gal. pumped
Sample Pump Intake Setting (ft bmp)	middle of screen
Purge Time	begin 11:26 end 11:39
Pumping Rate (gpm)	800 mL/min
Evacuation Method	Submersible pump

Field Parameters

Color	None
Odor	None
Appearance	Nonturbid/clear
pH (s.u.)	5.47
Conductivity (mS/cm)	~~2.23~~ °F N/A
(µmhos/cm)	N/A 2230
Turbidity (NTU)	N/A
Temperature (°F) °C	15.9
Dissolved Oxygen (mg/L)	~~N/A~~ 0.0
ORP (mV)	~~N/A~~ -166
Sampling Method	Low Flow
Remarks	Sample time @ 11:40
	DTW final = 29.33

Constituents Sampled	Container Description	Number	Preservative
Site-Specific VOCs (8260)	40 ml glass vial	3	Cool, HCl
Fe/Mn-Total	1 L plastic	1	HNO_3
Fe/Mn-dissolved	1 L plastic	1	HNO_3
Sulfate	250 mL plastic	1	none
Chlorides	"	"	"
Sulfide	500 mL plastic	1	2nAc/NaOH
TOC	40 mL voa	2	H_2SO_4
Ethene/Ethane/Methane	40 mL amber voa	2	BAK

Sampling Personnel: J. Manzo/T. Fortner

Well Casing Volumes

Gal./Ft.				
	1-¼" = 0.06	2" = 0.16	3" = 0.37	4" = 0.65
	1-½" = 0.09	2-½" = 0.26	3-½" = 0.50	6" = 1.47

bmp	below measuring point	ml	milliliter	NTU	Nephelometric Turbidity Units
°C	Degrees Celsius	mS/cm	Millisiemens per centimeter	PVC	Polyvinyl chloride
ft	feet	msl	mean sea-level	s.u.	Standard units
gpm	Gallons per minute	N/A	Not Applicable	umhos/cm	Micromhos per centimeter
mg/L	Milligrams per liter	NR	Not Recorded	VOC	Volatile Organic Compounds

LOW FLOW SAMPLING
GROUNDWATER FIELD PARAMETER LOG

Project Number: OH000294.08.02

Site Location: GM Moraine, OH

Monitoring Well No.: GM-28

Depth of Sampling: middle of screen

Time Pump Started: 11:26

Date: 10/18/05

Parameters / Time

	11:27	11:30	11:33	11:36	11:39						
Redox Potential (millivolts)	-148	-161	-166	-166	-166						
Dissolved Oxygen (TF mg/L)	1.69	0.35	0.0	0.0	0.0						
pH (s.u.)	6.56	~~5.63~~ 5.83	5.89	5.81	5.47						
Specific Conductance (uS/cm)	2390	2320	2290	2260	2230						
Temperature (C)	16.3	16.0	16.0	15.9	15.9						

Flow Rate: 800 ml/min

Time Sampled: 11:40

Total Water Pumped: 5 gal.

Comments:

ARCADIS

Water Sampling Log

Project: GM Sitewide Groundwater | Project No.: OH000294.08.02 | Page: 1 of 1

Site Location: Moraine, Ohio | Date: 10/18/05

Site/Well No.: GA-19S | Replicate No.: DUP2, EB2 | Code No.: NA

Weather: 60's; Clear | Sampling Time: Begin 12:39 End 1334

Evacuation Data

Measuring Point	Top of Casing
MP Elevation (ft)	730.85
Land Surface Elevation (ft)	NM
Sounded Well Depth (ft bmp)	55.04
Depth to Water (ft bmp)	25.53
Water-Level Elevation (ft)	705.32
Water Column in Well (ft)	29.51
Casing Diameter/Type	2"
Gallons in Well	4.72
Gallons Pumped/Bailed Prior to Sampling	5 gal. pumped
Sample Pump Intake Setting (ft bmp)	middle of screen
Purge Time	begin 12:45 end 13:01
Pumping Rate (gpm)	900 mL/min
Evacuation Method	Submersible pump

Field Parameters

Color	None
Odor	None
Appearance	Non-turbid/Clear
pH (s.u.)	5.97
Conductivity (mS/cm)	~~1.94~~ 1.94 TF N/A
(µmhos/cm)	~~N/A~~ 1940
Turbidity (NTU)	N/A
Temperature (°C)	17.6 TF
Dissolved Oxygen (mg/L)	~~N/A~~ 0.0 TF
ORP (mV)	~~N/A~~ 122
Sampling Method	Low Flow
Remarks	Sample time @ 13:02
	DTW final = 25.~~53~~ TF 25.53
	EB2 sampled @ 1320

Constituents Sampled	Container Description	Number	Preservative
Site-Specific VOCs (8260)	40 ml glass vial	3 (3)	Cool, HCl
Fe/Mn-Total	1 L plastic	1 (1)	HNO_3
Fe/Mn-dissolved	1 L plastic	1 (1)	HNO_3
Sulfate	250 ml plastic	1 (1)	none
Chlorides	"	"	"
Sulfide	500 ml plastic	1 (1)	ZnAc/NaOH
TOC	40 ml voa	2 (2)	H_2SO_4
Ethene/Ethane/Methane	40 ml amber voa	2 (2)	BAK

Sampling Personnel: J. Manzo/T. Fortner

Well Casing Volumes

Gal./Ft.				
	1-¼" = 0.06	2" = 0.16	3" = 0.37	4" = 0.65
	1-½" = 0.09	2-½" = 0.26	3-½" = 0.50	6" = 1.47

bmp	below measuring point	ml	milliliter	NTU	Nephelometric Turbidity Units
°C	Degrees Celsius	mS/cm	Millisiemens per centimeter	PVC	Polyvinyl chloride
ft	feet	msl	mean sea-level	s.u.	Standard units
gpm	Gallons per minute	N/A	Not Applicable	umhos/cm	Micromhos per centimeter
mg/L	Milligrams per liter	NR	Not Recorded	VOC	Volatile Organic Compounds

LOW FLOW SAMPLING
GROUNDWATER FIELD PARAMETER LOG

Project Number: 060000294.08.02

Site Location: GM Moraine, OH

Monitoring Well No.: GM-19S

Time Pump Started: 12:45

Depth of Sampling: middle of screen

Date: 10/18/05

Parameters

Time

	12:46	12:49	12:52	12:55	12:58	13:01					
Redox Potential (millivolts)	175	161	149	138	128	122					
Dissolved Oxygen (mg/L)	2.26	0.65	0.20	0.0	0.0	0.0					
pH (s.u.)	6.26	6.04	6.08	6.02	5.99	5.97					
Specific Conductance (uS/cm)	1980	1960	1960	1960	1950	1940					
Temperature (C)	17.5	17.5	17.6	17.5	17.6	17.6					

Flow Rate: 900 mL/min

Time Sampled: 13:02

Total Water Pumped: 5 gal.

Comments:

ARCADIS

Water Sampling Log

Project	GM Sitewide Groundwater	Project No.	OH000294.08.02	Page	1 of 1
Site Location	Moraine, Ohio			Date	10/18/05
Site/Well No.	EAST	Replicate No.	NA	Code No.	NA
Weather	70's; clear	Sampling Time:	Begin 14:07	End	14:45

Evacuation Data

Measuring Point	Top of Casing
MP Elevation (ft)	730.98
Land Surface Elevation (ft)	NM
Sounded Well Depth (ft bmp)	72.28
Depth to Water (ft bmp)	25.31
Water-Level Elevation (ft)	705.67
Water Column in Well (ft)	46.97
Casing Diameter/Type	2"
Gallons in Well	7.52
Gallons Pumped/Bailed Prior to Sampling	5 gal. pumped
Sample Pump Intake Setting (ft bmp)	middle of screen
Purge Time	begin TF 1416 1415 end 1431
Pumping Rate (gpm)	1100 ml/min
Evacuation Method	Submersible pump

Field Parameters

Color	Light brown
Odor	None
Appearance	Slightly turbid
pH (s.u.)	6.17
Conductivity (mS/cm)	2.19 TF N/A
(µmhos/cm)	~~N/A~~ 2190
Turbidity (NTU)	N/A
Temperature (°F) TF C	17.5
Dissolved Oxygen (mg/L) TF	~~N/A~~ 0.0
ORP (mV)	~~N/A~~ 189
Sampling Method	Low Flow
Remarks	Sample time @ 14:31
	DTW final = 25.31

Constituents Sampled	Container Description	Number	Preservative
Site-Specific VOCs (8260)	40 ml glass vial	3	Cool, HCl
Fe/Mn-Total	1 L plastic	1	HNO_3
Fe/Mn-dissolved	1 L plastic	1	HNO_3
Sulfate	250 ml plastic	1	none
Chlorides	"	"	"
Sulfide	500 ml plastic	1	ZnAc/NaOH
TOC	40 ml voa	2	H_2SO_4
Ethene/Ethane/Methane	40 ml amber voa	2	BAK

Sampling Personnel: J. Manzo/T. Fortner

Well Casing Volumes

Gal./Ft.				
	1-¼" = 0.06	2" = 0.16	3" = 0.37	4" = 0.65
	1-½" = 0.09	2-½" = 0.26	3-½" = 0.50	6" = 1.47

bmp	below measuring point	ml	milliliter	NTU	Nephelometric Turbidity Units
°C	Degrees Celsius	mS/cm	Millisiemens per centimeter	PVC	Polyvinyl chloride
ft	feet	msl	mean sea-level	s.u.	Standard units
gpm	Gallons per minute	N/A	Not Applicable	umhos/cm	Micromhos per centimeter
mg/L	Milligrams per liter	NR	Not Recorded	VOC	Volatile Organic Compounds

LOW FLOW SAMPLING
GROUNDWATER FIELD PARAMETER LOG

Project Number: 01H000.294.08.02

Site Location: GM Moraine, OH

Monitoring Well No.: EAST

Depth of Sampling: middle of Screen

Time Pump Started: 1415

Date: 10/18/05

Parameters / Time

	14:16	14:19	14:22	14:25	14:28	14:31					
Redox Potential (millivolts)	228	217	207	198	188	189					
Dissolved Oxygen (mg/L)	2.45	0.62	0.23	0.0	0.0	0.0					
pH (s.u.)	6.59	6.20	6.18	6.18	6.17	6.17					
Specific Conductance (uS/cm)	2190	2170	2190	2130	2130	2190					
Temperature (C)	17.5	17.3	17.4	17.4	17.4	17.5					

Flow Rate: 1100 ml/min

Time Sampled: 14:31

Total Water Pumped: 5 gal.

Comments:

ARCADIS

Water Sampling Log

Project: GM Sitewide Groundwater | Project No: OH000294.08.02 | Page: 1 of 1

Site Location: Moraine, OH | Date: 10/18/05

Site/Well No.: GM-35 | Replicate No: N/A | Code No.: N/A

Weather: 70's; clear | Sampling Time: Begin 1450 End 15:17

Evacuation Data

Measuring Point	TOC
MP Elevation (ft)	731.27
Land Surface Elevation (ft)	NM
Sounded Well Depth (ft bmp)	66.80
Depth to Water (ft bmp)	26.03
Water-Level Elevation (ft)	705.24
Water Column in Well (ft)	40.77
Casing Diameter/Type	2" PVC
Gallons in Well	6.52
Gallons Pumped/Bailed Prior to Sampling	5gal. pumped
Sample Pump Intake Setting (ft bmp)	Middle of screen
Purge Time	begin 14:55 end 15:08
Pumping Rate (gpm)	1000 ml/min
Evacuation Method	Submersible pump

Field Parameters

Color	TF ~~None~~ Amber
Odor	None
Appearance	Non-turbid/Clear
pH (s.u.)	7.67
Conductivity (mS/cm)	TF ~~5.48~~ N/A
(µmhos/cm)	~~N/A~~ 5480
Turbidity (NTU)	NM
Temperature (°C)	17.5
Dissolved Oxygen (mg/L)	TF ~~NM~~ 0.0
Salinity (%)	NM
Sampling Method	Low Flow
Remarks	sampled @ 15:09
	DTW final: 26.05
	ORP (mV) = -249

Constituents Sampled	Container Description	Number	Preservative
VOC's (8260)	40 ml vog	3	HCl

Sampling Personnel: Manzo/Fortna

Well Casing Volumes

Gal./Ft.				
	1-¼" = 0.06	2" = 0.16	3" = 0.37	4" = 0.65
	1-½" = 0.09	2-½" = 0.26	3-½" = 0.50	6" = 1.47

bmp	below measuring point	ml	milliliter	NTU	Nephelometric Turbidity Units
°C	Degrees Celsius	mS/cm	Millisiemens per centimeter	PVC	Polyvinyl chloride
ft	feet	msl	mean sea-level	s.u.	Standard units
gpm	Gallons per minute	N/A	Not Applicable	umhos/cm	Micromhos per centimeter
mg/L	Milligrams per liter	NM	Not Measured	VOC	Volatile Organic Compounds

LOW FLOW SAMPLING
GROUNDWATER FIELD PARAMETER LOG

Project Number: OH000294.08.02

Site Location: GM Moraine, OH

Monitoring Well No.: GM-35

Depth of Sampling: middle of screen

Time Pump Started: ~~15~~ 14 14:55

Date: 10/18/05

Parameters

	Time										
	14:56	14:59	15:02	15:05	15:08						
Redox Potential (millivolts)	-44	-135	-204	-240	-249						
Dissolved Oxygen (mg/L)	2.32	0.49	0.0	0.0	0.0						
pH (s.u.)	6.90	7.18	7.50	7.66	7.67						
Specific Conductance (uS/cm)	2750	4870	5280	5360	5480						
Temperature (C)	18.0	17.6	17.5	17.5	17.5						

Flow Rate: 1000 ml/min

Time Sampled: 15:09

Total Water Pumped: 5 gal.

Comments:

ARCADIS

Water Sampling Log

Project: GM sitewide Groundwater | Project No.: OH000294.08.02 | Page: 1 of 1

Site Location: Moraine, OH | Date: 10/18/05

Site/Well No.: GM-33 | Replicate No.: NA | Code No.: NA

Weather: 70's; clear | Sampling Time: Begin 1524 | End TF 1552

Evacuation Data

Measuring Point	TOC
MP Elevation (ft)	729.77
Land Surface Elevation (ft)	NM
Sounded Well Depth (ft bmp)	55.40
Depth to Water (ft bmp)	24.01
Water-Level Elevation (ft)	705.76
Water Column in Well (ft)	31.39
Casing Diameter/Type	2" PVC
Gallons in Well	5.02
Gallons Pumped/Bailed Prior to Sampling	5 gal. pumped
Sample Pump Intake Setting (ft bmp)	middle of screen
Purge Time	begin 1530 end 15:43
Pumping Rate (gpm)	1100 mL/min
Evacuation Method	Submersible pump

Field Parameters

Color	None
Odor	None
Appearance	Non-turbid/Clear
pH (s.u.)	6.41
Conductivity (mS/cm)	~~2.04~~ TF N/A
(µmhos/cm)	~~N/A~~ 2040
Turbidity (NTU)	NM
Temperature (°C)	17.1
Dissolved Oxygen (mg/L)	~~NM~~ 0.0
Salinity (%)	TF NM
Sampling Method	Low Flow
Remarks	Sampled @ 15:44
	DTW final: 24.01
	ORP (mV) = 40

Constituents Sampled	Container Description	Number	Preservative
VOC's (8260)	40 ml VOA	3	HCl

Sampling Personnel: Manzo/Fortner

Well Casing Volumes

Gal./Ft.				
1-¼" = 0.06	2" = 0.16	3" = 0.37	4" = 0.65	
1-½" = 0.09	2-½" = 0.26	3-½" = 0.50	6" = 1.47	

bmp	below measuring point	ml	milliliter	NTU	Nephelometric Turbidity Units
°C	Degrees Celsius	mS/cm	Millisiemens per centimeter	PVC	Polyvinyl chloride
ft	feet	msl	mean sea-level	s.u	Standard units
gpm	Gallons per minute	N/A	Not Applicable	umhos/cm	Micromhos per centimeter
mg/L	Milligrams per liter	NM	Not Measured	VOC	Volatile Organic Compounds

LOW FLOW SAMPLING
GROUNDWATER FIELD PARAMETER LOG

Project Number: OH000294.08.02

Site Location: GM Moraine, OH

Monitoring Well No.: GM-33

Time Pump Started: 15:30

Depth of Sampling: middle of screen

Date: 10/18/05

Parameters

Time

	15:31	15:34	15:37	15:40	15:43						
Redox Potential (millivolts)	84	68	53	47	40						
Dissolved Oxygen (~~mg~~ TF /L)	2.49	0.42	0.0	0.0	0.0						
pH (s.u.)	6.97	6.61	6.48	6.45	6.41						
Specific Conductance (uS/cm)	2050	2050	2040	2040	2040						
Temperature (C)	17.3	17.2	17.1	17.1	17.1						

Flow Rate: 1100 ml/min

Time Sampled: 15:44

Total Water Pumped: 5 gal.

Comments:

ARCADIS

Water Sampling Log

Project	GM Sitewide Groundwater	Project No.	OH000294.08.02	Page	1 of 1
Site Location	Moraine, Ohio			Date	10/18/05
Site/Well No.	HR-1	Replicate No.	NA	Code No.	NA
Weather	70's; clear	Sampling Time:	Begin 15:57	End	16:25

Evacuation Data

Measuring Point	Top of Casing
MP Elevation (ft)	732.71
Land Surface Elevation (ft)	NM
Sounded Well Depth (ft bmp)	59.36
Depth to Water (ft bmp)	26.75
Water-Level Elevation (ft)	705.96
Water Column in Well (ft)	32.61
Casing Diameter/Type	2"
Gallons in Well	5.22
Gallons Pumped/Bailed Prior to Sampling	5 gal. pumped
Sample Pump Intake Setting (ft bmp)	Middle of screen
Purge Time	begin 16:02 end 16:15
Pumping Rate (gpm)	1100 ml/min
Evacuation Method	Submersible pump

Field Parameters

Color	None
Odor	None
Appearance	Non-turbid/clear
pH (s.u.)	6.30
Conductivity (mS/cm)	~~1.47~~ TF N/A
(µmhos/cm)	~~N/A~~ 1470
Turbidity (NTU) TF	N/A
Temperature (°C)	16.7
Dissolved Oxygen (mg/L) TF	~~N/A~~ 0.0
ORP (mV)	~~N/A~~ TF ~~20~~ 141
Sampling Method	Low Flow
Remarks	Sample time @ 16:16
	DTW final = 26.75

Constituents Sampled	Container Description	Number	Preservative
Site-Specific VOCs (8260)	40 ml glass vial	3	Cool, HCl

Sampling Personnel: J. Manzo/T. Fortner

Well Casing Volumes

Gal./Ft.				
	1-¼" = 0.06	2" = 0.16	3" = 0.37	4" = 0.65
	1-½" = 0.09	2-½" = 0.26	3-½" = 0.50	6" = 1.47

bmp	below measuring point	ml	milliliter	NTU	Nephelometric Turbidity Units
°C	Degrees Celsius	mS/cm	Millisiemens per centimeter	PVC	Polyvinyl chloride
ft	feet	msl	mean sea-level	s.u.	Standard units
gpm	Gallons per minute	N/A	Not Applicable	umhos/cm	Micromhos per centimeter
mg/L	Milligrams per liter	NR	Not Recorded	VOC	Volatile Organic Compounds

LOW FLOW SAMPLING
GROUNDWATER FIELD PARAMETER LOG

Project Number: DH000294.08.02

Site Location: GM Moraine, OH

Monitoring Well No.: HR-1

Time Pump Started: 16:02

Depth of Sampling: middle of screen

Date: 10/18/05

Parameters

Time

	16:03	16:06	16:09	16:12	16:15						
Redox Potential (millivolts)	130	176	161	146	141						
Dissolved Oxygen (mg/L)	2.56	0.81	0.0	0.0	0.0						
pH (s.u.)	6.65	6.43	6.36	6.33	6.30						
Specific Conductance (uS/cm)	1490	1470	1470	1470	1470						
Temperature (C)	17.8	16.9	16.8	16.7	16.7						

Flow Rate: 1100 ml/min

Time Sampled: 16:16

Total Water Pumped: 5 gal.

Comments:

ARCADIS

Water Sampling Log

Project	GM Sitewide Groundwater	Project No.	OH000294.08.02	Page	1 of 1
Site Location	Moraine, Ohio			Date	10/18/05
Site/Well No.	HR-5	Replicate No.	NA	Code No.	NA
Weather	70's; clear	Sampling Time: Begin	1628	End	16:55

Evacuation Data

Measuring Point	Top of Casing
MP Elevation (ft)	734.27
Land Surface Elevation (ft)	NM
Sounded Well Depth (ft bmp)	57.7
Depth to Water (ft bmp)	27.44
Water-Level Elevation (ft)	706.83
Water Column in Well (ft)	30.26
Casing Diameter/Type	2"
Gallons in Well	4.84
Gallons Pumped/Bailed Prior to Sampling	4.5 gal. pumped
Sample Pump Intake Setting (ft bmp)	middle of screen
Purge Time	begin 16:34 end 16:47
Pumping Rate (gpm)	1200 mL/min
Evacuation Method	Submersible pump

Field Parameters

Color	Light tan
Odor	None
Appearance	Slightly turbid
pH (s.u.)	6.00
Conductivity (mS/cm)	~~1.25~~ N/A
(µmhos/cm)	~~N/A~~ 1250
Turbidity (NTU)	N/A
Temperature (°C)	15.7
Dissolved Oxygen (mg/L)	~~N/A~~ 0.0
ORP (mV)	~~N/A~~ -20
Sampling Method	Low Flow
Remarks	Sample time @ 16:48
	DTW final = 27.44

Constituents Sampled	Container Description	Number	Preservative
Site-Specific VOCs (8260)	40 ml glass vial	3	Cool, HCl

Sampling Personnel: J. Manzo/T. Fortner

Well Casing Volumes

Gal./Ft.				
	1-¼" = 0.06	2" = 0.16	3" = 0.37	4" = 0.65
	1-½" = 0.09	2-½" = 0.26	3-½" = 0.50	6" = 1.47

bmp	below measuring point	ml	milliliter	NTU	Nephelometric Turbidity Units
°C	Degrees Celsius	mS/cm	Millisiemens per centimeter	PVC	Polyvinyl chloride
ft	feet	msl	mean sea-level	s.u.	Standard units
gpm	Gallons per minute	N/A	Not Applicable	umhos/cm	Micromhos per centimeter
mg/L	Milligrams per liter	NR	Not Recorded	VOC	Volatile Organic Compounds

LOW FLOW SAMPLING
GROUNDWATER FIELD PARAMETER LOG

Project Number: OH000294.08.02

Site Location: GM Moraine, OH

Monitoring Well No.: HR-5

Time Pump Started: 16:34

Depth of Sampling: Middle of screen

Date: 10/18/05

Parameters

Time

	16:35	16:38	16:41	16:44	16:47						
Redox Potential (millivolts)	197	84	32	-5	-20						
Dissolved Oxygen (TF mg/L)	2.75	0.16	0.0	0.0	0.0						
pH (s.u.)	6.47	6.22	5.89	5.95	6.00						
Specific Conductance (uS/cm)	1250	1250	1250	1250	1250						
Temperature (C)	15.9	15.7	15.7	15.7	15.7						

Flow Rate: 1200 ml/min

Time Sampled: 16:48

Total Water Pumped: 4.5 gal

Comments:

ARCADIS

Water Sampling Log

Project	GM Sitewide Groundwater	Project No.	OH000294.08.02	Page	1 of 1
Site Location	Moraine, Ohio			Date	10/19/05
Site/Well No.	GM-8	Replicate No.	NA	Code No.	NA
Weather	50's ; clear	Sampling Time:	Begin 0812	End	0852

Evacuation Data

Measuring Point	Top of Casing
MP Elevation (ft)	735.17
Land Surface Elevation (ft)	NM
Sounded Well Depth (ft bmp)	51.4
Depth to Water (ft bmp)	30.55
Water-Level Elevation (ft)	704.62
Water Column in Well (ft)	20.85
Casing Diameter/Type	2"
Gallons in Well	3.34
Gallons Pumped/Bailed Prior to Sampling	4 gal. pumped
Sample Pump Intake Setting (ft bmp)	middle of screen
Purge Time	begin 0823 end 0836
Pumping Rate (gpm)	900 mL/min
Evacuation Method	Submersible pump

Field Parameters

Color	None
Odor	None
Appearance	Non turbid / clear
pH (s.u.)	6.45
Conductivity (mS/cm)	~~2.08~~ N/R
(µmhos/cm)	~~N/A~~ 2080
Turbidity (NTU)	N/A
Temperature (°F)	16.3
Dissolved Oxygen (mg/L)	~~N/A~~ 0.0
ORP (mV)	~~N/A~~ -162
Sampling Method	Low Flow
Remarks	Sample time @ 0837
	DTW final = 30.55

Constituents Sampled	Container Description	Number	Preservative
Site-Specific VOCs (8260)	40 ml glass vial	3	Cool, HCl
Fe/Mn-Total	1 L plastic	1	HNO_3
Fe/Mn-Dissolved	1 L plastic	1	HNO_3
Sulfate	250 mL plastic	1	none
Chlorides	"	"	"
Sulfide	500 mL plastic	1	ZnAc/NaOH
TOC	40 mL glass voa	2	H_2SO_4
Ethene/Ethane/Methane	40 mL amber voa	2	BAK

Sampling Personnel: J. Manzo/T. Fortner

Well Casing Volumes

Gal./Ft.				
	1-¼" = 0.06	2" = 0.16	3" = 0.37	4" = 0.65
	1-½" = 0.09	2-½" = 0.26	3-½" = 0.50	6" = 1.47

bmp	below measuring point	ml	milliliter	NTU	Nephelometric Turbidity Units
°C	Degrees Celsius	mS/cm	Millisiemens per centimeter	PVC	Polyvinyl chloride
ft	feet	msl	mean sea-level	s.u.	Standard units
gpm	Gallons per minute	N/A	Not Applicable	umhos/cm	Micromhos per centimeter
mg/L	Milligrams per liter	NR	Not Recorded	VOC	Volatile Organic Compounds

LOW FLOW SAMPLING
GROUNDWATER FIELD PARAMETER LOG

Project Number: CHCC0294.05.02

Site Location: GM Moraine, OH

Monitoring Well No.: GM-8

Time Pump Started: 0823

Depth of Sampling: Middle of screen

Date: 10/19/05

Parameters

Time

	0824	0827	0830	0833	0836						
Redox Potential (millivolts)	22	-73	-124	-154	-162						
Dissolved Oxygen (mg/L)	1.53	0.0	0.0	0.0	0.0						
pH (s.u.)	5.88	6.24	6.39	6.46	6.45						
Specific Conductance (uS/cm)	2010	2050	2070	2080	2080						
Temperature (C)	15.8	16.1	16.2	16.3	16.3						

Flow Rate: 900 ml/min

Time Sampled: 0837

Total Water Pumped: 4 gal.

Comments:

ARCADIS

Water Sampling Log

Project	GM Sitewide Groundwater	Project No.	OH000294.08.02	Page	1 of 1
Site Location	Moraine, Ohio			Date	10/19/05
Site/Well No.	GM-6	Replicate No.	NA	Code No.	NA
Weather	50's, Clear	Sampling Time:	Begin 0853	End	0928

Evacuation Data

Measuring Point	Top of Casing
MP Elevation (ft)	730.27
Land Surface Elevation (ft)	NM
Sounded Well Depth (ft bmp)	46
Depth to Water (ft bmp)	25.84
Water-Level Elevation (ft)	704.43
Water Column in Well (ft)	20.16
Casing Diameter/Type	2"
Gallons in Well	3.23
Gallons Pumped/Bailed Prior to Sampling	4 gal. pumped
Sample Pump Intake Setting (ft bmp)	middle of screen
Purge Time	begin 0900 end 0913
Pumping Rate (gpm)	1000 mL/min
Evacuation Method	Submersible pump

Field Parameters

Color	None
Odor	None
Appearance	Non-turbid/Clear
pH (s.u.)	6.06
Conductivity (mS/cm)	~~1.88~~ °F N/A
(µmhos/cm)	~~N/A~~ 1880
Turbidity (NTU)	N/A
Temperature (°F)	16.8
Dissolved Oxygen (mg/L)	~~N/A~~ 0.0
ORP (mV)	~~N/A~~ -107
Sampling Method	Low Flow
Remarks	Sample time @ 0914
	DTW final = 25.84

Constituents Sampled	Container Description	Number	Preservative
Site-Specific VOCs (8260)	40 ml glass vial	3	Cool, HCl
Fe/Mn-total	1 L plastic	1	HNO_3
Fe/Mn-dissolved	1 L plastic	1	HNO_3
Sulfate	250 mL plastic	1	none
Chlorides	"	"	"
Sulfide	500 mL plastic	1	ZnAc/NaOH
TOC	40 mL glass vial	2	H_2SO_4
Ethene/Ethane/Methane	40 mL amber vial	2	HCl

Sampling Personnel: J. Manzo/T. Fortner

Well Casing Volumes

Gal./Ft.	1-¼" = 0.06	2" = 0.16	3" = 0.37	4" = 0.65
	1-½" = 0.09	2-½" = 0.26	3-½" = 0.50	6" = 1.47

bmp	below measuring point	ml	milliliter	NTU	Nephelometric Turbidity Units
°C	Degrees Celsius	mS/cm	Millisiemens per centimeter	PVC	Polyvinyl chloride
ft	feet	msl	mean sea-level	s.u.	Standard units
gpm	Gallons per minute	N/A	Not Applicable	umhos/cm	Micromhos per centimeter
mg/L	Milligrams per liter	NR	Not Recorded	VOC	Volatile Organic Compounds

LOW FLOW SAMPLING
GROUNDWATER FIELD PARAMETER LOG

Project Number: OHc000294.08.02

Site Location: GM Moraine, OH

Monitoring Well No.: GM-6

Time Pump Started: 0900

Depth of Sampling: middle of screen

Date: 10/19/05

Parameters

Time

	0901	0904	0907	0910	0913						
Redox Potential (millivolts)	-46	-91	-101	-104	-107						
Dissolved Oxygen (mg/L)	1.47	0.0	0.0	0.0	0.0						
pH (s.u.)	6.42	6.11	6.07	6.07	6.06						
Specific Conductance (uS/cm)	1890	1890	1880	1880	1880						
Temperature (C)	16.4	16.6	16.8	16.8	16.8						

Flow Rate: 1000 ml/min

Time Sampled: 0914

Total Water Pumped: 4 gal.

Comments:

ARCADIS

Water Sampling Log

Project: GM Site-wide Groundwater | Project No.: 01b000294.08.02 | Page: 1 of 1

Site Location: Moraine, OH | Date: 10/19/05

Site/Well No.: 4S | Replicate No.: DUP3, EB3 | Code No.: NA

Weather: 50's; clear | Sampling Time: Begin 0933 End 10:12

Evacuation Data

Measuring Point	TOC
MP Elevation (ft)	731.36
Land Surface Elevation (ft)	~~*~~ TF NM
Sounded Well Depth (ft bmp)	66.0
Depth to Water (ft bmp)	26.68
Water-Level Elevation (ft)	704.68
Water Column in Well (ft)	39.32
Casing Diameter/Type	4" PVC
Gallons in Well	25.56
Gallons Pumped/Bailed Prior to Sampling	3.5 gal. pumped
Sample Pump Intake Setting (ft bmp)	middle of screen
Purge Time	begin 0939 end 0952
Pumping Rate (gpm)	800 mL/min
Evacuation Method	submersible pump

Field Parameters

Color	~~None~~ TF Amber
Odor	None
Appearance	~~Non-turbid / clear~~ TF Slightly turbid black specks
pH (s.u.)	7.19
Conductivity (mS/cm)	~~2.98~~ TF N/A
(µmhos/cm)	~~N/A~~ 2980
Turbidity (NTU)	NM
Temperature (°C)	16.0
Dissolved Oxygen (mg/L)	~~N/A~~ TF 0.0
Salinity (%)	NM
Sampling Method	Low Flow
Remarks	Sampled @ 0953
	TF DTW final:
	EB3 sampled @ 10:05
	MS/MSD ORP(mV) = -268

Constituents Sampled	Container Description	Number	Preservative
VOC's (8260)	40mL glass vod	3(6)(3)	HCl, cool

Sampling Personnel: Manzo/Fortner

Well Casing Volumes

Gal./Ft.				
	1-¼" = 0.06	2" = 0.16	3" = 0.37	4" = 0.65
	1-½" = 0.09	2-½" = 0.26	3-½" = 0.50	6" = 1.47

bmp	below measuring point	ml	milliliter	NTU	Nephelometric Turbidity Units
°C	Degrees Celsius	mS/cm	Millisiemens per centimeter	PVC	Polyvinyl chloride
ft	feet	msl	mean sea-level	s.u.	Standard units
gpm	Gallons per minute	N/A	Not Applicable	umhos/cm	Micromhos per centimeter
mg/L	Miligrams per liter	NM	Not Measured	VOC	Volatile Organic Compounds

LOW FLOW SAMPLING
GROUNDWATER FIELD PARAMETER LOG

Project Number: CH000294.08.02

Site Location: GM Moraine, OH

Monitoring Well No.: 4S

Depth of Sampling: ~~30'~~ TF Middle of screen

Time Pump Started: TF ~~0922~~ 0939

Date: 10/19/05

Parameters

Time

	0940	0943	0946	0949	0952						
Redox Potential (millivolts)	-195	-225	-255	-267	-268						
Dissolved Oxygen (mg/L) TF	0.74	0.0	0.0	0.0	0.0						
pH (s.u.)	7.05	7.25	7.26	7.21	7.19						
Specific Conductance (uS/cm)	3470	3570	3300	2980	2980						
Temperature (C)	15.7	15.8	15.9	16.0	16.0						

Flow Rate: 800 mL/min

Time Sampled: 0953

Total Water Pumped: 3.5 gal

Comments:

ARCADIS

Water Sampling Log

Project	GM Sitewide Groundwater	Project No.	OH000294.08.02	Page	1 of 1
Site Location	Moraine, Ohio			Date	10/19/05
Site/Well No.	GM-2	Replicate No.	N/A	Code No.	N/A
Weather	60's, Clear	Sampling Time:	Begin 1015	End	1046

Evacuation Data

Measuring Point	Top of Casing
MP Elevation (ft)	735.81
Land Surface Elevation (ft)	NM
Sounded Well Depth (ft bmp)	56.2
Depth to Water (ft bmp)	30.86
Water-Level Elevation (ft)	704.95
Water Column in Well (ft)	25.34
Casing Diameter/Type	2"
Gallons in Well	4.05
Gallons Pumped/Bailed Prior to Sampling	4 gal. pump
Sample Pump Intake Setting (ft bmp)	middle of screen
Purge Time	begin 1020 end 1033
Pumping Rate (gpm)	1000 mL/min
Evacuation Method	Submersible pump

Field Parameters

Color	None
Odor	None
Appearance	Non-turbid/clear
pH (s.u.)	6.07
Conductivity (mS/cm)	~~1.23~~ TF N/A
(µmhos/cm)	~~N/A~~ 1620
Turbidity (NTU)	N/A
Temperature (°C) TF	16.1
Dissolved Oxygen (mg/L) TF	~~N/A~~ 0.0
ORP (mV)	~~N/A~~ 17
Sampling Method	Low Flow
Remarks	Sample time @ 1034
	DTW final = 30.85

Constituents Sampled	Container Description	Number	Preservative
Site-Specific VOCs (8260)	40 ml glass vial	3	Cool, HCl

Sampling Personnel: J. Manzo/T. Fortner

Well Casing Volumes

Gal./Ft.				
	1-¼" = 0.06	2" = 0.16	3" = 0.37	4" = 0.65
	1-½" = 0.09	2-½" = 0.26	3-½" = 0.50	6" = 1.47

bmp	below measuring point	ml	milliliter	NTU	Nephelometric Turbidity Units
°C	Degrees Celsius	mS/cm	Millisiemens per centimeter	PVC	Polyvinyl chloride
ft	feet	msl	mean sea-level	s.u.	Standard units
gpm	Gallons per minute	N/A	Not Applicable	umhos/cm	Micromhos per centimeter
mg/L	Milligrams per liter	NR	Not Recorded	VOC	Volatile Organic Compounds

LOW FLOW SAMPLING
GROUNDWATER FIELD PARAMETER LOG

Project Number ~~OH0009~~ TF OH000294.08.02

Site Location GM Moraine, OH

Monitoring Well No. GM-2

Depth of Sampling Middle of Screen

Time Pump Started 10:20

Date 10/19/05

Parameters

Time

	10:21	10:24	10:27	10:30	10:33						
Redox Potential (millivolts)	65	48	30	24	17						
Dissolved Oxygen (~~mg~~/L) TF	2.04	0.0	0.0	0.0	0.0						
pH (s.u.)	6.63	6.26	6.13	6.11	6.07						
Specific Conductance (uS/cm)	1610	1600	1620	1620	1620						
Temperature (C)	16.0	16.0	16.1	16.1	16.1						

Flow Rate 1000 mL/min

Time Sampled 10:34

Total Water Pumped 4 gal.

Comments

ARCADIS

Water Sampling Log

Project	GM Sitewide Groundwater	Project No.	OH000294.08.02	Page	1 of 1
Site Location	Moraine, Ohio			Date	10/19/05
Site/Well No.	GM-32	Replicate No.	N/A	Code No.	N/A
Weather	60's ; clear	Sampling Time:	Begin 10:48	End	11:20

Evacuation Data

Measuring Point	Top of Casing
MP Elevation (ft)	732.08
Land Surface Elevation (ft)	NM
Sounded Well Depth (ft bmp)	59.7
Depth to Water (ft bmp)	26.84
Water-Level Elevation (ft)	705.24
Water Column in Well (ft)	32.86
Casing Diameter/Type	2"
Gallons in Well	5.25
Gallons Pumped/Bailed Prior to Sampling	4.5 gal. pump
Sample Pump Intake Setting (ft bmp)	middle of screen
Purge Time	begin 1054 end 11:07
Pumping Rate (gpm)	1100 mL/min
Evacuation Method	Submersible pump

Field Parameters

Color	Amber
Odor	Organic
Appearance	clear - Non-turbid
pH (s.u.)	6.30
Conductivity (mS/cm)	~~4.31~~ IF N/A
(µmhos/cm)	~~N/A~~ 4810
Turbidity (NTU)	N/A
Temperature (°F)	17.0
Dissolved Oxygen (mg/L)	~~N/A~~ 0.0
ORP (mV)	~~N/A~~ -191
Sampling Method	Low Flow
Remarks	Sample time @ 1108
	DTW final = 26.86

Constituents Sampled	Container Description	Number	Preservative
Site-Specific VOCs (8260)	40 ml glass vial	3	Cool, HCl
Fe/Mn-Total	1 L plastic	1	HNO_3
Fe/Mn-dissolved	1 L plastic	1	HNO_3
Sulfate	500 mL plastic	1	ZnAc/NaOH
Chlorides	250 mL plastic	1	none
Sulfide	"	"	none
TOC	40 mL voa	2	H_2SO_4
Ethene/Ethane/Methane	40 mL amber voa	2	BAK

Sampling Personnel J. Manzo/T. Fortner

Well Casing Volumes

Gal./Ft.				
	1-¼" = 0.06	2" = 0.16	3" = 0.37	4" = 0.65
	1-½" = 0.09	2-½" = 0.26	3-½" = 0.50	6" = 1.47

bmp	below measuring point	ml	milliliter	NTU	Nephelometric Turbidity Units
°C	Degrees Celsius	mS/cm	Millisiemens per centimeter	PVC	Polyvinyl chloride
ft	feet	msl	mean sea-level	s.u.	Standard units
gpm	Gallons per minute	N/A	Not Applicable	umhos/cm	Micromhos per centimeter
mg/L	Milligrams per liter	NR	Not Recorded	VOC	Volatile Organic Compounds

LOW FLOW SAMPLING
GROUNDWATER FIELD PARAMETER LOG

Project Number: OHOOO 294.08.02

Site Location: GM Moraine, OH

Monitoring Well No.: GM-32

Depth of Sampling: middle of Screen

Time Pump Started: 10:54

Date: 10/19/05

Parameters

	Time										
	10:55	10:58	11:01	11:04	11:07						
Redox Potential (millivolts)	-183	-198	-198	-193	-191						
Dissolved Oxygen (mg/L)	1.37	0.0	0.0	0.0	0.0						
pH (s.u.)	6.29	6.46	6.43	6.32	6.30						
Specific Conductance (uS/cm)	4960	5430	5190	4820	4810						
Temperature (C)	16.7	16.8	16.9	16.9	17.0						

Flow Rate: 1100 mL/min

Time Sampled: 11:08

Total Water Pumped: 4.5 gal.

Comments:

ARCADIS

Water Sampling Log

Project	GM Sitewide Groundwater	Project No.	OH000294.08.02	Page	1 of 1
Site Location	Moraine, Ohio			Date	10/19/05
Site/Well No.	W-4-S	Replicate No.	N/A	Code No.	N/A
Weather	60's; clear	Sampling Time:	Begin 12:08	End	12:45

Evacuation Data

Measuring Point	Top of Casing
MP Elevation (ft)	727.68
Land Surface Elevation (ft)	NM
Sounded Well Depth (ft bmp)	71.00
Depth to Water (ft bmp)	22.72
Water-Level Elevation (ft)	704.96
Water Column in Well (ft)	48.28
Casing Diameter/Type	~~2"~~ 4" PVC
Gallons in Well	31.38
Gallons Pumped/Bailed Prior to Sampling	4 gal. pumped
Sample Pump Intake Setting (ft bmp)	middle of screen
Purge Time	begin 1216 end 1229
Pumping Rate (gpm)	900 mL/min
Evacuation Method	Submersible pump

Field Parameters

Color	None
Odor	None
Appearance	Slightly turbid - black specks
pH (s.u.)	6.15
Conductivity (mS/cm)	~~1.34~~ N/A
(µmhos/cm)	~~N/A~~ 1340
Turbidity (NTU)	N/A
Temperature (°F)	17.4
Dissolved Oxygen (mg/L)	~~N/A~~ 0.0
ORP (mV)	~~N/A~~ 82
Sampling Method	Low Flow
Remarks	Sample time @ 12:30
	DTW final = 22.75

Constituents Sampled	Container Description	Number	Preservative
Site-Specific VOCs (8260)	40 ml glass vial	3	Cool, HCl

Sampling Personnel: J. Manzo/T. Fortner

Well Casing Volumes

Gal./Ft.				
	1-¼" = 0.06	2" = 0.16	3" = 0.37	4" = 0.65
	1-½" = 0.09	2-½" = 0.26	3-½" = 0.50	6" = 1.47

bmp	below measuring point	ml	milliliter	NTU	Nephelometric Turbidity Units
°C	Degrees Celsius	mS/cm	Millisiemens per centimeter	PVC	Polyvinyl chloride
ft	feet	msl	mean sea-level	s.u.	Standard units
gpm	Gallons per minute	N/A	Not Applicable	umhos/cm	Micromhos per centimeter
mg/L	Milligrams per liter	NR	Not Recorded	VOC	Volatile Organic Compounds

LOW FLOW SAMPLING
GROUNDWATER FIELD PARAMETER LOG

Project Number: 0140000294.08.02

Site Location: GM Moraine, OH

Monitoring Well No.: W-4-S

Depth of Sampling: middle of screen

Time Pump Started: 12:16

Date: 10/19/05

Parameters / Time

	12:17	12:20	12:23	12:26	12:29						
Redox Potential (millivolts)	116	115	99	90	82						
Dissolved Oxygen (~~mg~~ TF /L)	1.88	0.76	0.0	0.0	0.0						
pH (s.u.)	6.69	6.46	6.22	6.18	6.15						
Specific Conductance (uS/cm)	1370	1360	1340	1340	1340						
Temperature (C)	17.8	17.8	17.4	17.5	17.4						

Flow Rate: 900 mL/min

Time Sampled: 12:30

Total Water Pumped: 4 gal.

Comments:

ARCADIS

Water Sampling Log

Project	GM Sitewide Groundwater	Project No.	OH000294.08.02	Page	1 of 1
Site Location	Moraine, Ohio			Date	10/19/05
Site/Well No.	W-3-S	Replicate No.	N/A	Code No.	N/A
Weather	60's; Clear	Sampling Time:	Begin 12:47	End	13:20

Evacuation Data

Measuring Point	Top of Casing
MP Elevation (ft)	733.42
Land Surface Elevation (ft)	NM
Sounded Well Depth (ft bmp)	73.41
Depth to Water (ft bmp)	24.17
Water-Level Elevation (ft)	709.25
Water Column in Well (ft)	49.24
Casing Diameter/Type	~~2"~~ TF 4" PVC
Gallons in Well	32.00
Gallons Pumped/Bailed Prior to Sampling	5 gal. pumped
Sample Pump Intake Setting (ft bmp)	middle of screen
Purge Time	begin 12:49 end 13:08
Pumping Rate (gpm)	1000 mL/min
Evacuation Method	Submersible pump

Field Parameters

Color	None
Odor	None
Appearance	Non-turbid
pH (s.u.)	6.00
Conductivity (mS/cm)	~~1.27~~ TF N/A
(µmhos/cm)	~~N/A~~ 1270
Turbidity (NTU)	N/A
Temperature (°C)	TF 15.5
Dissolved Oxygen (mg/L)	~~N/A~~ TF 0.95
ORP (mV)	~~N/A~~ 86
Sampling Method	Low Flow
Remarks	Sample time @ 13:09
	DTW final = 24.21

Constituents Sampled	Container Description	Number	Preservative
Site-Specific VOCs (8260)	40 ml glass vial	3	Cool, HCl

Sampling Personnel: J. Manzo/T. Fortner

Well Casing Volumes

Gal./Ft.				
	1-¼" = 0.06	2" = 0.16	3" = 0.37	4" = 0.65
	1-½" = 0.09	2-½" = 0.26	3-½" = 0.50	6" = 1.47

bmp	below measuring point	ml	milliliter	NTU	Nephelometric Turbidity Units
°C	Degrees Celsius	mS/cm	Millisiemens per centimeter	PVC	Polyvinyl chloride
ft	feet	msl	mean sea-level	s.u.	Standard units
gpm	Gallons per minute	N/A	Not Applicable	umhos/cm	Micromhos per centimeter
mg/L	Milligrams per liter	NR	Not Recorded	VOC	Volatile Organic Compounds

LOW FLOW SAMPLING
GROUNDWATER FIELD PARAMETER LOG

Project Number: OH000294.08.02

Site Location: GM Moraine, Oh

Monitoring Well No.: W-3-S

Time Pump Started: 12:49

Depth of Sampling: middle of Screen

Date: 10/19/05

Parameters

Time

	12:50	12:53	12:56	12:59	13:02	13:05	13:08				
Redox Potential (millivolts)	167	150	141	123	110	97	86				
Dissolved Oxygen (mg/L)	3.50	2.14	1.74	1.43	1.22	1.12	0.95				
pH (s.u.)	6.23	6.10	6.06	6.04	6.02	6.01	6.00				
Specific Conductance (uS/cm)	1280	1270	1270	1270	1270 ~~12.78~~	1270	1270				
Temperature (C)	16.1	15.5	15.6	15.6	15.5	15.5	15.5				

Flow Rate: 1000 mL/min

Time Sampled: 13:09

Total Water Pumped: 5 gal.

Comments:

ARCADIS

Water Sampling Log

Project	GM Sitewide Groundwater	Project No.	OH000294.08.02	Page	1 of 1
Site Location	Moraine, Ohio			Date	10/19/05
Site/Well No.	W-2-S	Replicate No.	N/A	Code No.	N/A
Weather	70's; clear	Sampling Time:	Begin 13:23	End	13:49

Evacuation Data

Measuring Point	Top of Casing
MP Elevation (ft)	726.64
Land Surface Elevation (ft)	NM
Sounded Well Depth (ft bmp)	67.09
Depth to Water (ft bmp)	21.72
Water-Level Elevation (ft)	704.92
Water Column in Well (ft)	45.37
Casing Diameter/Type	~~2"~~ 4" PVC
Gallons in Well	~~45~~ TF 25.49
Gallons Pumped/Bailed Prior to Sampling	5 gal.
Sample Pump Intake Setting (ft bmp)	middle of screen
Purge Time	begin 1328 end 13:41
Pumping Rate (gpm)	1200 mL/min
Evacuation Method	Submersible pump

Field Parameters

Color	None
Odor	None
Appearance	Non-turbid / clear
pH (s.u.)	4.86
Conductivity (mS/cm)	1.31 TF N/A
(µmhos/cm)	~~N/A~~ 1310
Turbidity (NTU)	N/A
Temperature (°F) TF	15.5
Dissolved Oxygen (mg/L) TF	~~N/A~~ 0.0
ORP (mV)	~~N/A~~ 118
Sampling Method	Low Flow
Remarks	Sample time @ 13:42
	DTW final = 21.69

Constituents Sampled	Container Description	Number	Preservative
Site-Specific VOCs (8260)	40 ml glass vial	3	Cool, HCl

Sampling Personnel: J. Manzo/T. Fortner

Well Casing Volumes

Gal./Ft.				
	1-¼" = 0.06	2" = 0.16	3" = 0.37	4" = 0.65
	1-½" = 0.09	2-½" = 0.26	3-½" = 0.50	6" = 1.47

bmp	below measuring point	ml	milliliter	NTU	Nephelometric Turbidity Units
°C	Degrees Celsius	mS/cm	Millisiemens per centimeter	PVC	Polyvinyl chloride
ft	feet	msl	mean sea-level	s.u.	Standard units
gpm	Gallons per minute	N/A	Not Applicable	umhos/cm	Micromhos per centimeter
mg/L	Milligrams per liter	NR	Not Recorded	VOC	Volatile Organic Compounds

LOW FLOW SAMPLING
GROUNDWATER FIELD PARAMETER LOG

Project Number: OH000294.08-02

Site Location: GM Moraine, OH

Monitoring Well No.: ~~W-3~~ TF MW-2-S

Depth of Sampling: middle of screen

Time Pump Started: 13:28 TF ~~13:28~~

Date: 10/19/05

Parameters / Time

	13:29	13:32	13:35	13:38	13:41						
Redox Potential (millivolts)	164	157	140	131	118						
Dissolved Oxygen (~~mg~~/L) TF	1.47	0.18	0.0	0.0	0.0						
pH (s.u.)	4.90	4.89	4.99	5.06	4.86						
Specific Conductance (uS/cm)	1340	1320	1310	1310	1310						
Temperature (C)	15.8	15.5	15.3	15.4	15.5						

Flow Rate: 1200 mL/min

Time Sampled: 13:42

Total Water Pumped: 5 gal.

Comments:

ARCADIS

Water Sampling Log

Project	GM Sitewide Groundwater	Project No.	OH000294.08.02	Page	1 of 1
Site Location	Moraine, Ohio			Date	10/19/05
Site/Well No.	HR-17	Replicate No.	N/A	Code No.	N/A
Weather	70's; clear	Sampling Time:	Begin 13:55	End	14:25

Evacuation Data

Measuring Point	Top of Casing
MP Elevation (ft)	726.43
Land Surface Elevation (ft)	NM
Sounded Well Depth (ft bmp)	48.02
Depth to Water (ft bmp)	20.72
Water-Level Elevation (ft)	705.71
Water Column in Well (ft)	27.3
Casing Diameter/Type	~~2"~~ 4" PVC
Gallons in Well	17.75
Gallons Pumped/Bailed Prior to Sampling	5 gal. pumped
Sample Pump Intake Setting (ft bmp)	middle of screen
Purge Time	begin 14:00 end 14:16
Pumping Rate (gpm)	1000 mL/min
Evacuation Method	Submersible pump

Field Parameters

Color	None
Odor	None
Appearance	Non-turbid/clear
pH (s.u.)	5.15
Conductivity (mS/cm)	~~1.19~~ N/A
(µmhos/cm)	~~N/A~~ 1190
Turbidity (NTU)	N/A
Temperature (°F)	17.2
Dissolved Oxygen (mg/L)	~~N/A~~ 0.0
ORP (mV)	~~N/A~~ 94
Sampling Method	Low Flow
Remarks	Sample time @ 14:17
	DTW final = 20.72

Constituents Sampled	Container Description	Number	Preservative
Site-Specific VOCs (8260)	40 ml glass vial	3	Cool, HCl

Sampling Personnel: J. Manzo/T. Fortner

Well Casing Volumes

Gal./Ft.				
	1-¼" = 0.06	2" = 0.16	3" = 0.37	4" = 0.65
	1-½" = 0.09	2-½" = 0.26	3-½" = 0.50	6" = 1.47

bmp	below measuring point	ml	milliliter	NTU	Nephelometric Turbidity Units
°C	Degrees Celsius	mS/cm	Millisiemens per centimeter	PVC	Polyvinyl chloride
ft	feet	msl	mean sea-level	s.u.	Standard units
gpm	Gallons per minute	N/A	Not Applicable	umhos/cm	Micromhos per centimeter
mg/L	Milligrams per liter	NR	Not Recorded	VOC	Volatile Organic Compounds

LOW FLOW SAMPLING
GROUNDWATER FIELD PARAMETER LOG

Project Number: OH000294.08.02

Site Location: GM Moraine, OH

Monitoring Well No.: HR-17

Time Pump Started: 14:00

Depth of Sampling: Middle of Screen

Date: 10/19/05

Parameters

Time

	14:01	14:04	14:07	14:10	14:13	14:16					
Redox Potential (millivolts)	163	142	126	111	103	94					
Dissolved Oxygen (TF mg/L)	2.03	0.53	0.28	0.10	0.11	0.0					
pH (s.u.)	4.71	4.72	5.01	5.13	5.15	5.15					
Specific Conductance (uS/cm)	1240	1200	1200	~~1100~~ TF 1200	1190	1190					
Temperature (C)	17.4	17.2	17.2	17.2	17.1	17.2					

Flow Rate: 1000 mL/min

Time Sampled: 14:17

Total Water Pumped: 5 gal.

Comments:

ARCADIS

Water Sampling Log

Project	GM Sitewide Groundwater	Project No.	OH000294.08.02	Page	1 of 1
Site Location	Moraine, Ohio			Date	10/19/05
Site/Well No.	HR-8	Replicate No.	N/A	Code No.	N/A
Weather	70's; clear	Sampling Time: Begin	1437	End	15:03

Evacuation Data

Measuring Point	Top of Casing
MP Elevation (ft)	743.42
Land Surface Elevation (ft)	NM
Sounded Well Depth (ft bmp)	66.15
Depth to Water (ft bmp)	35.55
Water-Level Elevation (ft)	707.87
Water Column in Well (ft)	30.6
Casing Diameter/Type	2"
Gallons in Well	4.89
Gallons Pumped/Bailed Prior to Sampling	4.5gal. pumped
Sample Pump Intake Setting (ft bmp)	middle of screen
Purge Time	begin 14:38 end 14:51
Pumping Rate (gpm)	1000 mL/min
Evacuation Method	Submersible pump

Field Parameters

Color	None
Odor	None
Appearance	Non-turbid/Clear
pH (s.u.)	5.33
Conductivity (mS/cm)	~~1.17~~ TF N/A
(µmhos/cm)	~~N/A~~ 1170
Turbidity (NTU)	N/A
Temperature (°F) (°C) TF	15.7
Dissolved Oxygen (mg/L) TF	~~N/A~~ 4.40
ORP (mV)	~~N/A~~ 198
Sampling Method	Low Flow
Remarks	Sample time @ 14:52
	DTW final = 35.55

Constituents Sampled	Container Description	Number	Preservative
Site-Specific VOCs (8260)	40 ml glass vial	3	Cool, HCl

Sampling Personnel: J. Manzo/T. Fortner

Well Casing Volumes

Gal./Ft.				
	1-¼" = 0.06	2" = 0.16	3" = 0.37	4" = 0.65
	1-½" = 0.09	2-½" = 0.26	3-½" = 0.50	6" = 1.47

bmp	below measuring point	ml	milliliter	NTU	Nephelometric Turbidity Units
°C	Degrees Celsius	mS/cm	Millisiemens per centimeter	PVC	Polyvinyl chloride
ft	feet	msl	mean sea-level	s.u.	Standard units
gpm	Gallons per minute	N/A	Not Applicable	umhos/cm	Micromhos per centimeter
mg/L	Milligrams per liter	NR	Not Recorded	VOC	Volatile Organic Compounds

LOW FLOW SAMPLING
GROUNDWATER FIELD PARAMETER LOG

Project Number: OH000294.08.02

Site Location: GM Moraine, OH

Monitoring Well No.: HR-8

Depth of Sampling: middle of screen

Time Pump Started: 14:38

Date: 10/19/05

Parameters / Time

	14:39	14:42	14:45	14:48	14:51						
Redox Potential (millivolts)	210	200	198	198	198						
Dissolved Oxygen (mg/L)	4.25	4.10	4.32	4.42	4.40						
pH (s.u.)	5.48	5.27	5.24	5.26	5.33						
Specific Conductance (uS/cm)	1110	1160	1160	1170	1170						
Temperature (C)	17.1	16.0	16.0	15.8	15.7						

Flow Rate: 1000 mL/min

Time Sampled: 14:52

Total Water Pumped: 4.5 gal.

Comments:

ARCADIS

Water Sampling Log

Project	GM Sitewide Groundwater	Project No.	OH000294.08.02	Page	1 of 1
Site Location	Moraine, Ohio			Date	10/19/05
Site/Well No.	HR-9	Replicate No.	N/A	Code No.	N/A
Weather	70's; clear	Sampling Time:	Begin 15:04	End	15:29

Evacuation Data

Measuring Point	Top of Casing
MP Elevation (ft)	743.51
Land Surface Elevation (ft)	NM
Sounded Well Depth (ft bmp)	69.61
Depth to Water (ft bmp)	35.31
Water-Level Elevation (ft)	708.2
Water Column in Well (ft)	34.3
Casing Diameter/Type	2"
Gallons in Well	5.49
Gallons Pumped/Bailed Prior to Sampling	5gal. pump
Sample Pump Intake Setting (ft bmp)	middle of screen
Purge Time	begin 15:09 end 15:22
Pumping Rate (gpm)	1200 mL/min
Evacuation Method	Submersible pump

Field Parameters

Color	None
Odor	None
Appearance	Non-turbid/clear
pH (s.u.)	5.32
Conductivity (mS/cm)	~~1.36~~ TF N/A
(µmhos/cm)	~~N/A~~ 1360
Turbidity (NTU)	N/A
Temperature (°C)	TF 15.6
Dissolved Oxygen (mg/L)	~~N/A~~ 0.0 TF
ORP (mV)	~~N/A~~ 202
Sampling Method	Low Flow
Remarks	Sample time @ 15:23
	DTW final = 35.30

Constituents Sampled	Container Description	Number	Preservative
Site-Specific VOCs (8260)	40 ml glass vial	3	Cool, HCl

Sampling Personnel: J. Manzo/T. Fortner

Well Casing Volumes

Gal./Ft.				
	1-¼" = 0.06	2" = 0.16	3" = 0.37	4" = 0.65
	1-½" = 0.09	2-½" = 0.26	3-½" = 0.50	6" = 1.47

bmp	below measuring point	ml	milliliter	NTU	Nephelometric Turbidity Units
°C	Degrees Celsius	mS/cm	Millisiemens per centimeter	PVC	Polyvinyl chloride
ft	feet	msl	mean sea-level	s.u.	Standard units
gpm	Gallons per minute	N/A	Not Applicable	umhos/cm	Micromhos per centimeter
mg/L	Milligrams per liter	NR	Not Recorded	VOC	Volatile Organic Compounds

LOW FLOW SAMPLING
GROUNDWATER FIELD PARAMETER LOG

Project Number: OH000294-08.02

Site Location: GM Moraine, OH

Monitoring Well No.: HR-9

Time Pump Started: 15:09

Depth of Sampling: middle of screen

Date: 10/19/05

Parameters

Time

	15:10	15:13	15:16	15:19	15:22						
Redox Potential (millivolts)	235	227	218	208	202						
Dissolved Oxygen (TF mg/L)	2.10	0.27	0.0	0.0	0.0						
pH (s.u.)	5.48	5.39	5.33	5.33	5.32						
Specific Conductance (uS/cm)	1330	1350	1360	1370	1360						
Temperature (C)	15.9	15.7	15.7	15.7	15.6						

Flow Rate: 1200 mL/min

Time Sampled: 15:23

Total Water Pumped: 5 gal.

Comments:

ARCADIS

Water Sampling Log

Project	GM Sitewide Groundwater	Project No.	OH000294.08.02	Page	1 of 1
Site Location	Moraine, Ohio			Date	10/19/05
Site/Well No.	GM-16	Replicate No.	N/A	Code No.	N/A
Weather	70's; clear	Sampling Time:	Begin 15:40	End	16:12

Evacuation Data

Measuring Point	Top of Casing
MP Elevation (ft)	722.30
Land Surface Elevation (ft)	NM
Sounded Well Depth (ft bmp)	58.44
Depth to Water (ft bmp)	20.93
Water-Level Elevation (ft)	701.37
Water Column in Well (ft)	37.51
Casing Diameter/Type	2"
Gallons in Well	6.00
Gallons Pumped/Bailed Prior to Sampling	5 gal. pumped
Sample Pump Intake Setting (ft bmp)	middle of screen
Purge Time	begin 15:46 end 15:58
Pumping Rate (gpm)	1200 mL/min
Evacuation Method	Submersible pump

Field Parameters

Color	None
Odor	None
Appearance	Non-turbid/clear
pH (s.u.)	5.64
Conductivity (mS/cm)	~~1.30~~ TF N/A
(µmhos/cm)	~~N/A~~ 1300
Turbidity (NTU)	N/A
Temperature (°C)	17.2 TF
Dissolved Oxygen (mg/L)	~~N/A~~ 0.0 TF
ORP (mV)	~~N/A~~ 199
Sampling Method	Low Flow
Remarks	Sample time @ 15:59
	DTW final = 20.93

Constituents Sampled	Container Description	Number	Preservative
Site-Specific VOCs (8260)	40 ml glass vial	3	Cool, HCl

Sampling Personnel: J. Manzo/T. Fortner

Well Casing Volumes

Gal./Ft.				
	1-¼" = 0.06	2" = 0.16	3" = 0.37	4" = 0.65
	1-½" = 0.09	2-½" = 0.26	3-½" = 0.50	6" = 1.47

bmp	below measuring point	ml	milliliter	NTU	Nephelometric Turbidity Units
°C	Degrees Celsius	mS/cm	Millisiemens per centimeter	PVC	Polyvinyl chloride
ft	feet	msl	mean sea-level	s.u.	Standard units
gpm	Gallons per minute	N/A	Not Applicable	umhos/cm	Micromhos per centimeter
mg/L	Milligrams per liter	NR	Not Recorded	VOC	Volatile Organic Compounds

LOW FLOW SAMPLING
GROUNDWATER FIELD PARAMETER LOG

Project Number: OH000.294.08.02

Site Location: GM Moraine, OH

Monitoring Well No.: ~~MW-16~~ GM-16

Time Pump Started: 15:45

Depth of Sampling: middle of screen

Date: 10/19/05

Parameters

Time

	15:46	15:49	15:52	15:55	15:58						
Redox Potential (millivolts)	242	233	223	208	199						
Dissolved Oxygen (mg/L)	2.24	0.35	0.0	0.0	0.0						
pH (s.u.)	5.69	5.60	5.58	5.68	5.64						
Specific Conductance (uS/cm)	1340	1310	1310	1300	1300						
Temperature (C)	17.3	17.2	17.2	17.2	17.2						

Flow Rate: 1200 mL/min

Time Sampled: 15:59

Total Water Pumped: 5 gal.

Comments:

RCADIS

Water Sampling Log

Project	GM Sitewide Groundwater	Project No.	OH000294.08.02	Page	1 of 1
Site Location	Moraine, Ohio			Date	10/20/05
Site/Well No.	HR-2	Replicate No.	Dup 4, EB4	Code No.	N/A
Weather	40's; cloudy-rain	Sampling Time:	Begin 0800	End	TF ~~0835~~ 0835

Evacuation Data

Measuring Point	Top of Casing
MP Elevation (ft)	734.75
Land Surface Elevation (ft)	NM
Sounded Well Depth (ft bmp)	58.45
Depth to Water (ft bmp)	27.61
Water-Level Elevation (ft)	707.14
Water Column in Well (ft)	30.84
Casing Diameter/Type	2"
Gallons in Well	4.93
Gallons Pumped/Bailed Prior to Sampling	4 gal. pumped
Sample Pump Intake Setting (ft bmp)	middle of screen
Purge Time	begin 0810 end 0821
Pumping Rate (gpm)	900 ml/min
Evacuation Method	Submersible pump

Field Parameters

Color	None
Odor	None
Appearance	Non-turbid/clear
pH (s.u.)	6.04
Conductivity (mS/cm)	~~1.20~~ TF N/A
(µmhos/cm)	~~N/A~~ 1200
Turbidity (NTU)	N/A
Temperature (°C)	TF 13.8
Dissolved Oxygen (mg/L)	~~N/A~~ 0.0
ORP (mV)	TF ~~N/A~~ 291
Sampling Method	Low Flow
Remarks	Sample time @ 0822
	DTW final = 27.61
	EB4 sampled @ 0830

Constituents Sampled	Container Description	Number	Preservative
Site-Specific VOCs (8260)	40 ml glass vial	3	Cool, HCl

Sampling Personnel: J. Manzo/T. Fortner

Well Casing Volumes

Gal./Ft.				
	1-¼" = 0.06	2" = 0.16	3" = 0.37	4" = 0.65
	1-½" = 0.09	2-½" = 0.26	3-½" = 0.50	6" = 1.47

bmp	below measuring point	ml	milliliter	NTU	Nephelometric Turbidity Units
°C	Degrees Celsius	mS/cm	Millisiemens per centimeter	PVC	Polyvinyl chloride
ft	feet	msl	mean sea-level	s.u.	Standard units
gpm	Gallons per minute	N/A	Not Applicable	umhos/cm	Micromhos per centimeter
mg/L	Milligrams per liter	NR	Not Recorded	VOC	Volatile Organic Compounds

LOW FLOW SAMPLING
GROUNDWATER FIELD PARAMETER LOG

Project Number: 01C00294.08-02

Site Location: GM Moraine, OH

Monitoring Well No.: HR-2

Time Pump Started: 0809

Depth of Sampling: middle of screen

Date: 10/20/05

Parameters

Time

	0810	0813	0816	0819	0821						
Redox Potential (millivolts)	305	304	299	294	291						
Dissolved Oxygen (TF mg/L)	0.35	0.0	0.0	0.0	0.0						
pH (s.u.)	5.81	5.91	5.97	6.03	6.04						
Specific Conductance (uS/cm)	1120	1160	1180	1200	1200						
Temperature (C)	13.5	13.6	13.7	13.8	13.8						

Flow Rate: 400 mL/min

Time Sampled: 0822

Total Water Pumped: 4 gal.

Comments:

ARCADIS

Water Sampling Log

Project	GM Sitewide Groundwater	Project No.	OH000294.08.02	Page	1 of 1
Site Location	Moraine, Ohio			Date	10/20/05
Site/Well No.	HR-3	Replicate No.	N/A	Code No.	N/A
Weather	50's; cloudy	Sampling Time:	Begin 0837	End	0906

Evacuation Data

Measuring Point	Top of Casing
MP Elevation (ft)	736.75
Land Surface Elevation (ft)	NM
Sounded Well Depth (ft bmp)	61.95
Depth to Water (ft bmp)	29.61
Water-Level Elevation (ft)	707.14
Water Column in Well (ft)	32.34
Casing Diameter/Type	2"
Gallons in Well	5.17
Gallons Pumped/Bailed Prior to Sampling	3.5 gal-pumped
Sample Pump Intake Setting (ft bmp)	middle of screen
Purge Time	begin 0843 end 0856
Pumping Rate (gpm)	900 ml/min
Evacuation Method	Submersible pump

Field Parameters

Color	None
Odor	None
Appearance	Non-turbid/clear
pH (s.u.)	6.14
Conductivity (mS/cm)	~~1.31~~ TF N/A
(µmhos/cm)	~~N/A~~ 1310
Turbidity (NTU)	N/A
Temperature (°C)	TF 14.3
Dissolved Oxygen (~~mg~~/L)	~~N/A~~ 0.0 TF
ORP (mV)	~~N/A~~ 206
Sampling Method	Low Flow
Remarks	Sample time @ 0857
	DTW final = 29.61

Constituents Sampled	Container Description	Number	Preservative
Site-Specific VOCs (8260)	40 ml glass vial	3	Cool, HCl

Sampling Personnel: J. Manzo/T. Fortner

Well Casing Volumes

Gal./Ft.				
	1-¼" = 0.06	2" = 0.16	3" = 0.37	4" = 0.65
	1-½" = 0.09	2-½" = 0.26	3-½" = 0.50	6" = 1.47

bmp	below measuring point	ml	milliliter	NTU	Nephelometric Turbidity Units
°C	Degrees Celsius	mS/cm	Millisiemens per centimeter	PVC	Polyvinyl chloride
ft	feet	msl	mean sea-level	s.u.	Standard units
gpm	Gallons per minute	N/A	Not Applicable	umhos/cm	Micromhos per centimeter
mg/L	Milligrams per liter	NR	Not Recorded	VOC	Volatile Organic Compounds

LOW FLOW SAMPLING
GROUNDWATER FIELD PARAMETER LOG

Project Number: OH000294.08.02

Site Location: GM Moraine, OH

Monitoring Well No.: HR-3

Time Pump Started: 0843

Depth of Sampling: middle of screen

Date: 10/20/05

Parameters

Time

	0844	0847	0850	0853	0856						
Redox Potential (millivolts)	263	250	231	220	206						
Dissolved Oxygen (mg/L) TF	0.0	0.0	0.0	0.0	0.0						
pH (s.u.)	6.18	6.15	6.14	6.14	6.14						
Specific Conductance (uS/cm)	1270	1300	1300	1310	1310						
Temperature (C)	13.8	13.0	14.3	14.3	14.3						

Flow Rate: 900 mL/min

Time Sampled: 0857

Total Water Pumped: 3.5 gal.

Comments:

ARCADIS

Water Sampling Log

Project	GM Sitewide Groundwater	Project No.	OH000294.08.02	Page	1 of 1
Site Location	Moraine, Ohio			Date	10/20/05
Site/Well No.	HR-4	Replicate No.	N/A	Code No.	N/A
Weather	50's; cloudy	Sampling Time:	Begin 0910	End	0939

Evacuation Data

Measuring Point	Top of Casing
MP Elevation (ft)	742.60
Land Surface Elevation (ft)	NM
Sounded Well Depth (ft bmp)	66.69
Depth to Water (ft bmp)	35.00
Water-Level Elevation (ft)	707.60
Water Column in Well (ft)	31.69
Casing Diameter/Type	2"
Gallons in Well	5.07
Gallons Pumped/Bailed Prior to Sampling	5 gal. pumped
Sample Pump Intake Setting (ft bmp)	middle of screen
Purge Time	begin 0915 end 0928
Pumping Rate (gpm)	1200 ml/min
Evacuation Method	Submersible pump

Field Parameters

Color	None
Odor	None
Appearance	Non-turbid/Clear
pH (s.u.)	6.25
Conductivity (mS/cm)	~~1.36~~ TF N/A
(µmhos/cm)	~~N/A~~ 1360
Turbidity (NTU)	N/A
Temperature (°C)	TF 14.9
Dissolved Oxygen (mg/L)	~~N/A~~ 0.0
ORP (mV)	TF ~~N/A~~ 253
Sampling Method	Low Flow
Remarks	Sample time @ 0929
	DTW final = 35.01

Constituents Sampled	Container Description	Number	Preservative
Site-Specific VOCs (8260)	40 ml glass vial	3	Cool, HCl

Sampling Personnel: J. Manzo/T. Fortner

Well Casing Volumes

Gal./Ft.				
	1-¼" = 0.06	2" = 0.16	3" = 0.37	4" = 0.65
	1-½" = 0.09	2-½" = 0.26	3-½" = 0.50	6" = 1.47

bmp	below measuring point	ml	milliliter	NTU	Nephelometric Turbidity Units
°C	Degrees Celsius	mS/cm	Millisiemens per centimeter	PVC	Polyvinyl chloride
ft	feet	msl	mean sea-level	s.u.	Standard units
gpm	Gallons per minute	N/A	Not Applicable	umhos/cm	Micromhos per centimeter
mg/L	Milligrams per liter	NR	Not Recorded	VOC	Volatile Organic Compounds

LOW FLOW SAMPLING
GROUNDWATER FIELD PARAMETER LOG

Project Number: OH000294.08.02

Site Location: GM Moraine, OH

Monitoring Well No.: HR-4

Time Pump Started: 9:15

Depth of Sampling: middle of screen

Date: 10/26/05

Parameters

Time

	0916	0919	0922	0925	0928						
Redox Potential (millivolts)	282	274	262	259	253						
Dissolved Oxygen (~~mg~~ TF /L)	1.18	0.0	0.0	0.0	0.0						
pH (s.u.)	6.36	6.29	6.26	6.25	6.25						
Specific Conductance (uS/cm)	1350	1350	1360	1360	1360						
Temperature (C)	14.4	14.7	14.8	14.8	14.9						

Flow Rate: 1200 mL/min

Time Sampled: 0929

Total Water Pumped: 5 gal.

Comments:

ARCADIS

Water Sampling Log

Project	GM Sitewide Groundwater	Project No.	OH000294.08.02	Page	1 of 1
Site Location	Moraine, Ohio			Date	10/20/05
Site/Well No.	W-4-N	Replicate No.	N/A	Code No.	N/A
Weather	50's; ~~clear~~ TF Cloudy	Sampling Time:	Begin 0944	End	1008

Evacuation Data

Measuring Point	Top of Casing
MP Elevation (ft)	731.63
Land Surface Elevation (ft)	NM
Sounded Well Depth (ft bmp)	66.2
Depth to Water (ft bmp)	24.49
Water-Level Elevation (ft)	707.14
Water Column in Well (ft)	41.71
Casing Diameter/Type	2" 4" PVC
Gallons in Well	27.1
Gallons Pumped/Bailed Prior to Sampling	3.5 gal. pumped
Sample Pump Intake Setting (ft bmp)	middle of screen
Purge Time	begin 0947 end 1000
Pumping Rate (gpm)	800 ml/min
Evacuation Method	Submersible pump

Field Parameters

Color	Light tan
Odor	None
Appearance	Slightly turbid
pH (s.u.)	6.25
Conductivity (mS/cm)	1.24 TF N/A
(µmhos/cm)	~~N/A~~ 1240
Turbidity (NTU)	N/A
Temperature (°F) TF (°C)	15.1
Dissolved Oxygen (~~mg~~/L)	~~N/A~~ 0.0
ORP (mV) TF	~~N/A~~ 3
Sampling Method	Low Flow
Remarks	Sample time @ 10:01
	DTW final = 24.50

Constituents Sampled	Container Description	Number	Preservative
Site-Specific VOCs (8260)	40 ml glass vial	3	Cool, HCl

Sampling Personnel: J. Manzo/T. Fortner

Well Casing Volumes

Gal./Ft.				
	1-¼" = 0.06	2" = 0.16	3" = 0.37	4" = 0.65
	1-½" = 0.09	2-½" = 0.26	3-½" = 0.50	6" = 1.47

bmp	below measuring point	ml	milliliter	NTU	Nephelometric Turbidity Units
°C	Degrees Celsius	mS/cm	Millisiemens per centimeter	PVC	Polyvinyl chloride
ft	feet	msl	mean sea-level	s.u.	Standard units
gpm	Gallons per minute	N/A	Not Applicable	umhos/cm	Micromhos per centimeter
mg/L	Milligrams per liter	NR	Not Recorded	VOC	Volatile Organic Compounds

LOW FLOW SAMPLING
GROUNDWATER FIELD PARAMETER LOG

Project Number: OH000294.08.02

Site Location: GM Moraine, OH

Monitoring Well No.: W-4-N

Time Pump Started: 0947

Depth of Sampling: middle of screen

Date: 10/20/05

Parameters

Time

	0948	0951	0954	0957	1000						
Redox Potential (millivolts)	262	188	72	34	3						
Dissolved Oxygen (mg/L)	0.0	0.0	0.0	0.0	0.0						
pH (s.u.)	6.35	6.28	6.25	6.25	6.25						
Specific Conductance (uS/cm)	1210	1230	1240	1240	1240						
Temperature (C)	14.6	14.8	14.9	15.0	15.1						

Flow Rate: 800 mL/min

Time Sampled: 10:01

Total Water Pumped: 3.5 gal.

Comments:

ARCADIS

Water Sampling Log

Project	GM Sitewide Groundwater	Project No.	OH000294.08.02	Page	1 of 1
Site Location	Moraine, Ohio			Date	10/20/05
Site/Well No.	W-3-N	Replicate No.	N/A	Code No.	N/A
Weather	50's, cloudy	Sampling Time:	Begin 10:12	End	10:34

Evacuation Data

Measuring Point	Top of Casing
MP Elevation (ft)	733.66
Land Surface Elevation (ft)	NM
Sounded Well Depth (ft bmp)	57.3
Depth to Water (ft bmp)	26.56
Water-Level Elevation (ft)	707.1
Water Column in Well (ft)	30.74
Casing Diameter/Type	TF 2" 4" PVC
Gallons in Well	19.98
Gallons Pumped/Bailed Prior to Sampling	41 gal
Sample Pump Intake Setting (ft bmp)	middle of screen
Purge Time	begin 1014 end 1027
Pumping Rate (gpm)	1000 mL/min
Evacuation Method	Submersible pump

Field Parameters

Color	Rust
Odor	None
Appearance	Turbid
pH (s.u.)	6.37
Conductivity (mS/cm)	1.16 TF N/A
(µmhos/cm)	~~N/A~~ 1160
Turbidity (NTU)	N/A
Temperature (°C)	TF 15.2
Dissolved Oxygen (mg/L)	~~N/A~~ 0.0 TF
ORP (mV)	~~N/A~~ -120
Sampling Method	Low Flow
Remarks	Sample time @ 1028
	DTW final = 26.56

Constituents Sampled	Container Description	Number	Preservative
Site-Specific VOCs (8260)	40 ml glass vial	3	Cool, HCl

Sampling Personnel: J. Manzo/T. Fortner

Well Casing Volumes

Gal./Ft.				
	1-¼" = 0.06	2" = 0.16	3" = 0.37	4" = 0.65
	1-½" = 0.09	2-½" = 0.26	3-½" = 0.50	6" = 1.47

bmp	below measuring point	ml	milliliter	NTU	Nephelometric Turbidity Units
°C	Degrees Celsius	mS/cm	Millisiemens per centimeter	PVC	Polyvinyl chloride
ft	feet	msl	mean sea-level	s.u.	Standard units
gpm	Gallons per minute	N/A	Not Applicable	umhos/cm	Micromhos per centimeter
mg/L	Milligrams per liter	NR	Not Recorded	VOC	Volatile Organic Compounds

LOW FLOW SAMPLING
GROUNDWATER FIELD PARAMETER LOG

Project Number: 0H5002244.08.02

Site Location: GM Moraine, OH

Monitoring Well No.: W-3-N

Depth of Sampling: middle of screen

Time Pump Started: 10:14

Date: 10/20/05

Parameters

Time

	10:15	10:18	10:21	10:24	10:27						
Redox Potential (millivolts)	-10	-91	-109	-116	-120						
Dissolved Oxygen (mg/L)	0.51	0.0	0.0	0.0	0.0						
pH (s.u.)	6.46	6.40	6.38	6.37	6.37						
Specific Conductance (uS/cm)	1170	1170	1160	1160	1160						
Temperature (C)	14.8	15.0	15.2	15.2	15.2						

Flow Rate: 1000 mL/min

Time Sampled: 10:28

Total Water Pumped: 4 gal.

Comments:

ARCADIS

Water Sampling Log

Project	GM Sitewide Groundwater	Project No.	OH000294.08.02	Page	1 of 1
Site Location	Moraine, Ohio			Date	10/20/05
Site/Well No.	W-2-N	Replicate No.	N/A	Code No.	N/A
Weather	50's, cloudy	Sampling Time:	Begin 1037	End	1103

Evacuation Data

Measuring Point	Top of Casing
MP Elevation (ft)	731.68
Land Surface Elevation (ft)	NM
Sounded Well Depth (ft bmp)	59.44
Depth to Water (ft bmp)	24.52
Water-Level Elevation (ft)	707.16
Water Column in Well (ft)	34.92
Casing Diameter/Type	TF 2" 4" PVC
Gallons in Well	22.70
Gallons Pumped/Bailed Prior to Sampling	5 gal. pumped
Sample Pump Intake Setting (ft bmp)	middle of screen
Purge Time	begin 1040 end 1053
Pumping Rate (gpm)	1.200 mL/min
Evacuation Method	Submersible pump

Field Parameters

Color	None
Odor	None
Appearance	Non-turbid/clear
pH (s.u.)	6.33
Conductivity (mS/cm)	1.19 TF N/A
(µmhos/cm)	N/A 1190
Turbidity (NTU)	N/A
Temperature (°F)	TF 14.6
Dissolved Oxygen (mg/L)	~~N/A~~ 0.0
ORP (mV)	TF ~~N/A~~ -105
Sampling Method	Low Flow
Remarks	Sample time @ 10.54
	DTW final = 24.54

Constituents Sampled	Container Description	Number	Preservative
Site-Specific VOCs (8260)	40 ml glass vial	3	Cool, HCl

Sampling Personnel: J. Manzo/T. Fortner

Well Casing Volumes

Gal./Ft.				
	1-¼" = 0.06	2" = 0.16	3" = 0.37	4" = 0.65
	1-½" = 0.09	2-½" = 0.26	3-½" = 0.50	6" = 1.47

bmp	below measuring point	ml	milliliter	NTU	Nephelometric Turbidity Units
°C	Degrees Celsius	mS/cm	Millisiemens per centimeter	PVC	Polyvinyl chloride
ft	feet	msl	mean sea-level	s.u.	Standard units
gpm	Gallons per minute	N/A	Not Applicable	umhos/cm	Micromhos per centimeter
mg/L	Milligrams per liter	NR	Not Recorded	VOC	Volatile Organic Compounds

LOW FLOW SAMPLING
GROUNDWATER FIELD PARAMETER LOG

Project Number: OH000294.08.02

Site Location: GM Moraine, OH

Monitoring Well No.: W-2-N

Depth of Sampling: middle of screen

Time Pump Started: 10:40

Date: 10/20/05

Parameters

Time

	1041	1044	1047	1050	1053						
Redox Potential (millivolts)	3	68	-94	-102	-105						
Dissolved Oxygen (mg/L)	1.08	0.0	0.0	0.0	0.0						
pH (s.u.)	6.42	6.38	6.35	6.34	6.33						
Specific Conductance (uS/cm)	1210	1210	1200	1190	1190						
Temperature (C)	14.4	14.5	14.6	14.6	14.6						

Flow Rate: 1200 mL/min

Time Sampled: 10.54

Total Water Pumped: 5 gal.

Comments:

ARCADIS

Water Sampling Log

Project	GM Sitewide Groundwater	Project No.	OH000294.08.02	Page	1 of 1
Site Location	Moraine, Ohio			Date	10/20/05
Site/Well No.	TW2	Replicate No.	N/A	Code No.	N/A
Weather	50's; cloudy	Sampling Time:	Begin 1108	End	1138

Evacuation Data

Measuring Point	Top of Casing
MP Elevation (ft)	733.38
Land Surface Elevation (ft)	NM
Sounded Well Depth (ft bmp)	NM
Depth to Water (ft bmp)	33.42
Water-Level Elevation (ft)	699.96
Water Column in Well (ft)	N/A
Casing Diameter/Type	TF 2" 12" 10" Steel
Gallons in Well	N/A
Gallons Pumped/Bailed Prior to Sampling	5 gal.
Sample Pump Intake Setting (ft bmp)	middle of screen
Purge Time	begin 1114 end 1127
Pumping Rate (gpm)	1100 mL/min
Evacuation Method	Submersible pump

Field Parameters

Color	None
Odor	None
Appearance	Non-turbid/clear
pH (s.u.)	6.61
Conductivity (mS/cm)	~~1.99~~ TF N/A
(µmhos/cm)	~~N/A~~ 1990
Turbidity (NTU)	N/A
Temperature (°F)	TF 16.5
Dissolved Oxygen (~~mg~~/L)	~~N/A~~ TF 0.0
ORP (mV)	~~N/A~~ -168
Sampling Method	Low Flow
Remarks	Sample time @ 1128
	DTW final = 33.42

Constituents Sampled	Container Description	Number	Preservative
Site-Specific VOCs (8260)	40 ml glass vial	3	Cool, HCl

Sampling Personnel: J. Manzo/T. Fortner

Well Casing Volumes

Gal./Ft.				
1-¼" = 0.06	2" = 0.16	3" = 0.37	4" = 0.65	
1-½" = 0.09	2-½" = 0.26	3-½" = 0.50	6" = 1.47	

bmp	below measuring point	ml	milliliter	NTU	Nephelometric Turbidity Units
°C	Degrees Celsius	mS/cm	Millisiemens per centimeter	PVC	Polyvinyl chloride
ft	feet	msl	mean sea-level	s.u.	Standard units
gpm	Gallons per minute	N/A	Not Applicable	umhos/cm	Micromhos per centimeter
mg/L	Milligrams per liter	NR	Not Recorded	VOC	Volatile Organic Compounds

LOW FLOW SAMPLING
GROUNDWATER FIELD PARAMETER LOG

Project Number: 01l000294.08.02

Site Location: GM Moraine, OH

Monitoring Well No.: TW2

Time Pump Started: 11:14

Depth of Sampling: middle of screen

Date: 10/20/05

Parameters / Time

	11:15	11:18	11:21	11:24	11:27						
Redox Potential (millivolts)	17	-142	-161	-166	-168						
Dissolved Oxygen (mg/L)	0.48	0.0	0.0	0.0	0.0						
pH (s.u.)	6.37	6.57	6.61	6.61	6.61						
Specific Conductance (uS/cm)	1640	1920	1990	1980	1990						
Temperature (C)	16.0	16.5	16.4	16.5	16.5						

Flow Rate: 1100 ml/min

Time Sampled: 11:28

Total Water Pumped: 5 gal.

Comments:

ARCADIS

Water Sampling Log

Project	GM Sitewide Groundwater	Project No.	OH000294.08.02	Page	1 of 1
Site Location	Moraine, Ohio			Date	10/20/05
Site/Well No.	WSU-24	Replicate No.	N/A	Code No.	N/A
Weather	50's, cloudy	Sampling Time:	Begin 12:13	End	12:40

Evacuation Data

Measuring Point	Top of Casing
MP Elevation (ft)	725.10
Land Surface Elevation (ft)	NM
Sounded Well Depth (ft bmp)	65.51
Depth to Water (ft bmp)	20.20
Water-Level Elevation (ft)	704.90
Water Column in Well (ft)	45.31
Casing Diameter/Type	2"
Gallons in Well	7.25
Gallons Pumped/Bailed Prior to Sampling	5.25 gal. pumped
Sample Pump Intake Setting (ft bmp)	middle of screen
Purge Time	begin 1215 end 12:34
Pumping Rate (gpm)	1000 mL/min
Evacuation Method	Submersible pump

Field Parameters

Color	None
Odor	None
Appearance	Non-turbid/clear
pH (s.u.)	6.21
Conductivity (mS/cm)	~~1.35~~ TF N/A
(µmhos/cm)	~~N/A~~ 1350
Turbidity (NTU)	N/A
Temperature (°F)	TF 15.5 C
Dissolved Oxygen (mg/L)	~~N/A~~ 3.89
ORP (mV)	TF ~~N/A~~ 182
Sampling Method	Low Flow
Remarks	Sample time @ 12:35
	DTW final = 20.20

Constituents Sampled	Container Description	Number	Preservative
Site-Specific VOCs (8260)	40 ml glass vial	3	Cool, HCl

Sampling Personnel: J. Manzo/T. Fortner

Well Casing \ J. Manzo/T. Fortner

Gal./Ft.				
	1-¼" = 0.06	2" = 0.16	3" = 0.37	4" = 0.65
	1-½" = 0.09	2-½" = 0.26	3-½" = 0.50	6" = 1.47

bmp	below measuring point	ml	milliliter	NTU	Nephelometric Turbidity Units
°C	Degrees Celsius	mS/cm	Millisiemens per centimeter	PVC	Polyvinyl chloride
ft	feet	msl	mean sea-level	s.u.	Standard units
gpm	Gallons per minute	N/A	Not Applicable	umhos/cm	Micromhos per centimeter
mg/L	Milligrams per liter	NR	Not Recorded	VOC	Volatile Organic Compounds

LOW FLOW SAMPLING
GROUNDWATER FIELD PARAMETER LOG

Project Number: OH0002144.08.02

Site Location: GM Moraine, OH

Monitoring Well No.: WSU-24

Time Pump Started: 12:15

Depth of Sampling: Middle of screen

Date: 10/20/05

Parameters

Time

	12:16	12:19	12:22	12:25	12:28	12:31	12:34				
Redox Potential (millivolts)	177	174	173	175	176	179	182				
Dissolved Oxygen (mg/L)	6.24	4.94 ~~6.3~~ TF	4.62	4.23	4.12	4.00	3.89				
pH (s.u.)	6.71	6.34	6.29	6.23	6.22	6.20	6.21				
Specific Conductance (uS/cm)	1390	1370	1370	1360	1350	1350	1350				
Temperature (C)	15.6	15.6	15.5	15.5	15.5	15.6	15.5				

Flow Rate: 1000 mL/min

Time Sampled: 12:35

Total Water Pumped: 5.25 gal.

Comments:

ARCADIS

Water Sampling Log

Project	GM Sitewide Groundwater	Project No.	OH000294.08.02	Page	1 of 1
Site Location	Moraine, Ohio			Date	10/20/05
Site/Well No.	GM-10	Replicate No.	N/A	Code No.	N/A
Weather	50's ; cloudy	Sampling Time:	Begin 12:43	End	13:11

Evacuation Data

Measuring Point	Top of Casing
MP Elevation (ft)	723.90
Land Surface Elevation (ft)	NM
Sounded Well Depth (ft bmp)	49.54
Depth to Water (ft bmp)	19.72
Water-Level Elevation (ft)	704.18
Water Column in Well (ft)	29.82
Casing Diameter/Type	2"
Gallons in Well	4.77
Gallons Pumped/Bailed Prior to Sampling	5 gal. pumped
Sample Pump Intake Setting (ft bmp)	middle of screen
Purge Time	begin 1246 end 1305
Pumping Rate (gpm)	1000 mL/min
Evacuation Method	Submersible pump

Field Parameters

Color	None
Odor	None
Appearance	Non-turbid/Clear
pH (s.u.)	6.24
Conductivity (mS/cm)	~~1.53~~ TF N/A
(µmhos/cm)	~~N/A~~ 1530
Turbidity (NTU)	N/A
Temperature (°C) TF	15.3
Dissolved Oxygen (~~mg~~/L)	~~N/A~~ 0.80
ORP (mV) TF	~~N/A~~ 201
Sampling Method	Low Flow
Remarks	Sample time @ 1306
	DTW final = 19.65

Constituents Sampled	Container Description	Number	Preservative
Site-Specific VOCs (8260)	40 ml glass vial	3	Cool, HCl

Sampling Personnel: J. Manzo/T. Fortner

Well Casing Volumes

Gal./Ft.				
	1-¼" = 0.06	2" = 0.16	3" = 0.37	4" = 0.65
	1-½" = 0.09	2-½" = 0.26	3-½" = 0.50	6" = 1.47

bmp	below measuring point	ml	milliliter	NTU	Nephelometric Turbidity Units
°C	Degrees Celsius	mS/cm	Millisiemens per centimeter	PVC	Polyvinyl chloride
ft	feet	msl	mean sea-level	s.u.	Standard units
gpm	Gallons per minute	N/A	Not Applicable	umhos/cm	Micromhos per centimeter
mg/L	Milligrams per liter	NR	Not Recorded	VOC	Volatile Organic Compounds

LOW FLOW SAMPLING
GROUNDWATER FIELD PARAMETER LOG

Project Number: OH000294.08.02

Site Location: GM Moraine, OH

Monitoring Well No.: GM-10

Time Pump Started: 12:46

Depth of Sampling: middle of screen

Date: 10/20/05

Parameters

Time

	12:47	12:50	12:53	12:56	12:59	13:02	1305				
Redox Potential (millivolts)	224	219	213	208	206	203	201				
Dissolved Oxygen (mg/L)	3.84	1.94	1.30	1.02	0.92	0.83	0.80				
pH (s.u.)	6.37	6.28	6.26	6.27	6.26	6.25	6.24				
Specific Conductance (uS/cm)	1510	1520	1520	1520	1520	1530	1530				
Temperature (C)	15.3	15.4	15.4	15.3	15.3	15.3	15.3				

Flow Rate: 1000 ml/min

Time Sampled: 13:06

Total Water Pumped: 5 gal.

Comments:

ARCADIS

Water Sampling Log

Project	GM Sitewide Groundwater	Project No.	OH000294.08.02	Page	1 of 1
Site Location	Moraine, Ohio			Date	10/20/05
Site/Well No.	GM-17	Replicate No.	N/A	Code No.	N/A
Weather	50's ; cloudy	Sampling Time:	Begin 1312	End	1335

Evacuation Data

Measuring Point	Top of Casing
MP Elevation (ft)	723.84
Land Surface Elevation (ft)	NM
Sounded Well Depth (ft bmp)	39.4
Depth to Water (ft bmp)	19.45
Water-Level Elevation (ft)	704.39
Water Column in Well (ft)	19.95
Casing Diameter/Type	2"
Gallons in Well	3.19
Gallons Pumped/Bailed Prior to Sampling	3.5 gal. ~~b~~ TF pumped
Sample Pump Intake Setting (ft bmp)	middle of screen
Purge Time	begin 1315 end 1328
Pumping Rate (gpm)	~~1500~~ 1100 mL/min
Evacuation Method	Submersible pump

Field Parameters

Color	None
Odor	None
Appearance	Non-turbid/clear
pH (s.u.)	6.26
Conductivity (mS/cm)	~~1.57~~ TF N/A
(µmhos/cm)	~~N/A~~ 1570
Turbidity (NTU)	N/A
Temperature (°C)	TF 16.3
Dissolved Oxygen (mg/L)	~~N/A~~ TF 0.0
ORP (mV)	~~N/A~~ 191
Sampling Method	Low Flow
Remarks	Sample time @ 1329
	DTW final = 19.45

Constituents Sampled	Container Description	Number	Preservative
Site-Specific VOCs (8260)	40 ml glass vial	3	Cool, HCl

Sampling Personnel: J. Manzo/T. Fortner

Well Casing Volumes

Gal./Ft.				
	1-¼" = 0.06	2" = 0.16	3" = 0.37	4" = 0.65
	1-½" = 0.09	2-½" = 0.26	3-½" = 0.50	6" = 1.47

bmp	below measuring point	ml	milliliter	NTU	Nephelometric Turbidity Units
°C	Degrees Celsius	mS/cm	Millisiemens per centimeter	PVC	Polyvinyl chloride
ft	feet	msl	mean sea-level	s.u.	Standard units
gpm	Gallons per minute	N/A	Not Applicable	umhos/cm	Micromhos per centimeter
mg/L	Milligrams per liter	NR	Not Recorded	VOC	Volatile Organic Compounds

LOW FLOW SAMPLING
GROUNDWATER FIELD PARAMETER LOG

Project Number: OH 000 294.08.02

Site Location: GM Moraine, OH

Monitoring Well No.: GM-17

Depth of Sampling: middle of screen

Time Pump Started: 13:15

Date: 10/20/05

Parameters

Time

	1316	1319	1322	1325	1328						
Redox Potential (millivolts)	243	232	216	201	191						
Dissolved Oxygen (mg/L)	1.49	0.0	0.0	0.0	0.0						
pH (s.u.)	6.35	6.29	6.27	6.26	6.26						
Specific Conductance (uS/cm)	1520	1560	1550	1560	1570						
Temperature (C)	16.0	16.2	16.3	16.3	16.3						

Flow Rate: 1100 mL/min

Time Sampled: 13:29

Total Water Pumped: 3.5 gal.

Comments:

\RCADIS

Water Sampling Log

Project	GM Sitewide Groundwater	Project No.	OH000294.08.02	Page	1 of 1
Site Location	Moraine, Ohio			Date	10/20/05
Site/Well No.	GM-18	Replicate No.	EB5, DUP5, MS/MSD	Code No.	N/A
Weather	50's; Cloudy	Sampling Time:	Begin 1336	End	14:03

Evacuation Data

Measuring Point	Top of Casing
MP Elevation (ft)	723.80
Land Surface Elevation (ft)	NM
Sounded Well Depth (ft bmp)	53.99
Depth to Water (ft bmp)	19.44
Water-Level Elevation (ft)	704.36
Water Column in Well (ft)	34.55
Casing Diameter/Type	2"
Gallons in Well	5.53
Gallons Pumped/Bailed Prior to Sampling	4 gal. pumped
Sample Pump Intake Setting (ft bmp)	middle of screen
Purge Time	begin 1339 end 1352
Pumping Rate (gpm)	1000 ml/min
Evacuation Method	Submersible pump

Field Parameters

Color	None
Odor	None
Appearance	Non-turbid/clear
pH (s.u.)	6.20
Conductivity (mS/cm)	1.71 TF N/A
(µmhos/cm)	~~N/A~~ 1710
Turbidity (NTU)	N/A
Temperature (°F)	16.3
Dissolved Oxygen (mg/L)	~~N/A~~ 0.0 TF
ORP (mV)	~~N/A~~ 197
Sampling Method	Low Flow
Remarks	Sample time @ 13.53
	DTW final = 19.45
	EB5 sampled @ 13:55

Constituents Sampled	Container Description	Number	Preservative
Site-Specific VOCs (8260)	40 ml glass vial	3	Cool, HCl

Sampling Personnel: J. Manzo/T. Fortner

Well Casing Volumes

Gal./Ft.				
	1-¼" = 0.06	2" = 0.16	3" = 0.37	4" = 0.65
	1-½" = 0.09	2-½" = 0.26	3-½" = 0.50	6" = 1.47

bmp	below measuring point	ml	milliliter	NTU	Nephelometric Turbidity Units
°C	Degrees Celsius	mS/cm	Millisiemens per centimeter	PVC	Polyvinyl chloride
ft	feet	msl	mean sea-level	s.u.	Standard units
gpm	Gallons per minute	N/A	Not Applicable	umhos/cm	Micromhos per centimeter
mg/L	Milligrams per liter	NR	Not Recorded	VOC	Volatile Organic Compounds

LOW FLOW SAMPLING
GROUNDWATER FIELD PARAMETER LOG

Project Number: OH000.294.08.02

Site Location: GM Moraine, OH

Monitoring Well No.: GM-18

Depth of Sampling: Middle of screen

Time Pump Started: TF 12: 13:39

Date: 10/20/05

Parameters

Time

	13:40	1343	1346	1349	1352						
Redox Potential (millivolts)	241	234	222	204	197						
Dissolved Oxygen (mg/L)	1.38	0.0	0.0	0.0	0 0						
pH (s.u.)	6.31	6.24	6.22	6.21	6.20						
Specific Conductance (uS/cm)	1580	1700	1700	1700	1710						
Temperature (C)	16.1	16.2	16.2	16.3	16.3						

Flow Rate: 10700 mL/min

Time Sampled: 1353

Total Water Pumped: 4 gal.

Comments:

ARCADIS

Water Sampling Log

Project	GM Sitewide Groundwater	Project No.	OH000294.08.02	Page	1 of 1
Site Location	Moraine, Ohio			Date	10/20/05
Site/Well No.	DN-13	Replicate No.	N/A	Code No.	N/A
Weather	50's; cloudy	Sampling Time:	Begin 14:04	End	14:06

Evacuation Data

Measuring Point	Top of casing
MP Elevation (ft)	NM
Land Surface Elevation (ft)	NM
Sounded Well Depth (ft bmp)	NM
Depth to Water (ft bmp)	NM
Water-Level Elevation (ft)	NM
Water Column in Well (ft)	NM
Casing Diameter/Type	TF 2" N/A
Gallons in Well	N/A
Gallons Pumped/Bailed Prior to Sampling	NM
Sample Pump Intake Setting (ft bmp)	TF N/A ~~middle of screen~~
Purge Time	begin N/A end N/A
Pumping Rate (gpm)	N/A
Evacuation Method	~~Submersible Pump~~ TF tap

Field Parameters

Color	None
Odor	None
Appearance	Non-turbid
pH (s.u.)	N/A
Conductivity (mS/cm)	N/A
(µmhos/cm)	N/A
Turbidity (NTU)	N/A
Temperature (°C)	N/A
Dissolved Oxygen (mg/L)	N/A
ORP (mV)	N/A
Sampling Method	TF ~~Low Flow~~ Tap
Remarks	Sample time @ 14:05
	TF ~~DTW final =~~

Constituents Sampled	Container Description	Number	Preservative
Site-Specific VOCs (8260)	40 ml glass vial	3	Cool, HCl

Sampling Personnel: J. Manzo/T. Fortner

Well Casing Volumes

Gal./Ft.				
	1-¼" = 0.06	2" = 0.16	3" = 0.37	4" = 0.65
	1-½" = 0.09	2-½" = 0.26	3-½" = 0.50	6" = 1.47

bmp	below measuring point	ml	milliliter	NTU	Nephelometric Turbidity Units
°C	Degrees Celsius	mS/cm	Millisiemens per centimeter	PVC	Polyvinyl chloride
ft	feet	msl	mean sea-level	s.u.	Standard units
gpm	Gallons per minute	N/A	Not Applicable	umhos/cm	Micromhos per centimeter
mg/L	Milligrams per liter	NR	Not Recorded	VOC	Volatile Organic Compounds

ARCADIS

Water Sampling Log

Project	GM Sitewide Groundwater	Project No.	OH000294.08.02	Page	1 of 1
Site Location	Moraine, Ohio			Date	10/20/05
Site/Well No.	GM-26	Replicate No.	N/A	Code No.	N/A
Weather	50's ; cloudy	Sampling Time:	Begin 14:13	End	14:45

Evacuation Data

Measuring Point	Top of Casing
MP Elevation (ft)	722.29
Land Surface Elevation (ft)	NM
Sounded Well Depth (ft bmp)	58.44
Depth to Water (ft bmp)	18.72
Water-Level Elevation (ft)	703.57
Water Column in Well (ft)	39.72
Casing Diameter/Type	2"
Gallons in Well	~~6.49~~ TF 6.35
Gallons Pumped/Bailed Prior to Sampling	5 gal. pumped
Sample Pump Intake Setting (ft bmp)	middle of screen
Purge Time	begin 1415 end 1434
Pumping Rate (gpm)	1100 mL/min
Evacuation Method	Submersible pump

Field Parameters

Color	TF ~~colorless~~ None
Odor	none
Appearance	clear
pH (s.u.)	6.28
Conductivity (mS/cm)	~~1.22~~ TF N/A
(µmhos/cm)	~~N/A~~ 1220
Turbidity (NTU)	N/A
Temperature (°F/C)	TF 14.5
Dissolved Oxygen (mg/L)	~~N/A~~ 4.88 TF
ORP (mV)	~~N/A~~ 264
Sampling Method	Low Flow
Remarks	Sample time @ 1435
	DTW final = 18.72

Constituents Sampled	Container Description	Number	Preservative
Site-Specific VOCs (8260)	40 ml glass vial	3	Cool, HCl

Sampling Personnel J. Manzo/T. Fortner

Well Casing Volumes

Gal./Ft.				
	1-¼" = 0.06	2" = 0.16	3" = 0.37	4" = 0.65
	1-½" = 0.09	2-½" = 0.26	3-½" = 0.50	6" = 1.47

bmp	below measuring point	ml	milliliter	NTU	Nephelometric Turbidity Units
°C	Degrees Celsius	mS/cm	Millisiemens per centimeter	PVC	Polyvinyl chloride
ft	feet	msl	mean sea-level	s.u.	Standard units
gpm	Gallons per minute	N/A	Not Applicable	umhos/cm	Micromhos per centimeter
mg/L	Milligrams per liter	NR	Not Recorded	VOC	Volatile Organic Compounds

LOW FLOW SAMPLING
GROUNDWATER FIELD PARAMETER LOG

Project Number: OH000.294.08.02

Site Location: GM Moraine, OH

Monitoring Well No.: GM-26

Depth of Sampling: Middle of Screen

Time Pump Started: 14:15

Date: 10/20/05

Parameters

Time	14:16	1419	1422	1425	1428	1431	1434				
Redox Potential (millivolts)	264	262	262	262	263	263	264				
Dissolved Oxygen (TF mg/L)	6.10	5.30	5.24	5.02	4.94	4.98	4.88				
pH (s.u.)	6.50	6.35	6.32	6.29	6.27	6.28	6.28				
Specific Conductance (uS/cm)	1200	1210	1210	1220	1220	1220	1220				
Temperature (C)	14.8	15.0	15.1	14.7	14.6	14.6	14.5				

Flow Rate: 1100 mL/min

Time Sampled: 1435

Total Water Pumped: 5 gal.

Comments:

ARCADIS

Water Sampling Log

Project: GM sitewide Groundwater | Project No.: OH000294.0802 | Page: 1 of 1

Site Location: GM Moraine, OH | Date: 10/28/05

Site/Well No.: GM-41 | Replicate No.: DUP6 | Code No.: NA

Weather: 50's; cloudy | Sampling Time: Begin 8:57 | End 955

Evacuation Data

Measuring Point	TOC
MP Elevation (ft)	733.65
Land Surface Elevation (ft)	NM
Sounded Well Depth (ft bmp)	118.36
Depth to Water (ft bmp)	27.42
Water-Level Elevation (ft)	706.23
Water Column in Well (ft)	90.94
Casing Diameter/Type	2" PVC
Gallons in Well	14.55
Gallons Pumped/Bailed Prior to Sampling	4.5 pumped
Sample Pump Intake Setting (ft bmp)	middle of screen
Purge Time	begin 917 end 933
Pumping Rate (gpm)	1600 mL/min
Evacuation Method	Submersible pump

Field Parameters

Color	Tan
Odor	no
Appearance	slightly turbid
pH (s.u.)	6.04
Conductivity (mS/cm)	~~1350~~ TF N/A
(µmhos/cm)	~~NM~~ 1380
Turbidity (NTU)	NM
Temperature (°C)	16.7
Dissolved Oxygen (mg/L)	~~NM~~ 0.00 TF
Salinity (%)	NM
Sampling Method	Low Flow
Remarks	Sampled @ 934
	DTW final: 27.44
	EB6 @ 9:40

Constituents Sampled	Container Description	Number	Preservative
Site-Specific VOCs (8260)	40mL glass vial	3	Cool, HCl

Sampling Personnel: Manzo / Fortner

Well Casing Volumes

Gal./Ft.				
	1-¼" = 0.06	2" = 0.16	3" = 0.37	4" = 0.65
	1-½" = 0.09	2-½" = 0.26	3-½" = 0.50	6" = 1.47

bmp	below measuring point	ml	milliliter	NTU	Nephelometric Turbidity Units
°C	Degrees Celsius	mS/cm	Millisiemens per centimeter	PVC	Polyvinyl chloride
ft	feet	msl	mean sea-level	s.u.	Standard units
gpm	Gallons per minute	N/A	Not Applicable	umhos/cm	Micromhos per centimeter
mg/L	Milligrams per liter	NM	Not Measured	VOC	Volatile Organic Compounds

LOW FLOW SAMPLING
GROUNDWATER FIELD PARAMETER LOG

Project Number: OH000294.08.02

Site Location: GM Moraine, OH

Monitoring Well No.: GM-41

Depth of Sampling: middle of screen

Time Pump Started: 937

Date: ~~10/26~~ 10/23/05

Parameters

	Time										
	921	924	927	930	933						
Redox Potential (millivolts)	187	113	22	-16	-34						
Dissolved Oxygen (mg/L)	0.00	0.00	0.00	0.00	0.00						
pH (s.u.)	5.76	5.92	5.98	6.02	6.04						
Specific Conductance (uS/cm)	1360	1390	1390	1390	1380						
Temperature (C)	16.0	16.3	16.5	16.7	16.7						

Flow Rate: 1100 mL/min

Time Sampled: 934

Total Water Pumped: 4.5 gal.

Comments: DUP6, EB6=9:40

ARCADIS

Water Sampling Log

Project	GM Sitewide Groundwater	Project No.	OH000294.08.02	Page	1 of 1
Site Location	Moraine, Ohio			Date	10/24/05
Site/Well No.	HR-12	Replicate No.	NA	Code No.	N/A
Weather	40's, overcast	Sampling Time:	Begin ~~1000~~ 1335	End	1340

Evacuation Data

Measuring Point	Top of Casing
MP Elevation (ft)	742.64
Land Surface Elevation (ft)	NM
Sounded Well Depth (ft bmp)	134.5
Depth to Water (ft bmp)	34.38
Water-Level Elevation (ft)	708.26
Water Column in Well (ft)	100.12
Casing Diameter/Type	2" 4"
Gallons in Well	65.08
Gallons Pumped/Bailed Prior to Sampling	4.5 pumped
Sample Pump Intake Setting (ft bmp)	middle of screen
Purge Time	begin ~~1305~~ 1310 end 1315
Pumping Rate (gpm)	1200 mL/min
Evacuation Method	Submersible Pump

Field Parameters

Color	colorless
Odor	none
Appearance	clear
pH (s.u.)	6.27
Conductivity (mS/cm)	~~1350~~ TF N/A
(µmhos/cm)	~~N/A~~ 1350
Turbidity (NTU)	N/A
Temperature (°F/°C)	TF 15.2
Dissolved Oxygen (mg/L)	N/A 0.0
ORP (mV)	TF N/A -32
Sampling Method	Low Flow
Remarks	Sample time @ 1321
	DTW final = 34.49

Constituents Sampled	Container Description	Number	Preservative
Site-Specific VOCs (8260)	40 ml glass vial	3	Cool, HCl

Sampling Personnel: J. Manzo/T. Fortner

Well Casing Volumes

Gal./Ft.				
1-¼" = 0.06	2" = 0.16	3" = 0.37	4" = 0.65	
1-½" = 0.09	2-½" = 0.26	3-½" = 0.50	6" = 1.47	

bmp	below measuring point	ml	milliliter	NTU	Nephelometric Turbidity Units
°C	Degrees Celsius	mS/cm	Millisiemens per centimeter	PVC	Polyvinyl chloride
ft	feet	msl	mean sea-level	s.u.	Standard units
gpm	Gallons per minute	N/A	Not Applicable	umhos/cm	Micromhos per centimeter
mg/L	Milligrams per liter	NR	Not Recorded	VOC	Volatile Organic Compounds

ARCADIS

LOW FLOW SAMPLING
GROUNDWATER FIELD PARAMETER LOG

Project Number: OH000294.0008.00002

Site Location: General Motors Corporation, Moraine, Ohio

Monitoring Well No.: HR-12

Time Pump Started: 13:01

Depth of Sampling: middle of screen

Date: 10/24/2005

Parameters / Time

	13:03	13:06	13:09	13:12	13:15						
Redox Potential (millivolts)	12.0	-62.0	-73.0	-79.0	-82.0						
Dissolved Oxygen (mg/L)	0.00	0.00	0.00	0.00	0.00						
pH (s.u.)	6.40	6.34	6.31	6.30	6.29						
Specific Conductance (uS/cm)	1,360	1,360	1,350	1,350	1,350						
Temperature (C)	14.90	15.10	15.20	15.20	15.20						

Flow Rate: 1200 mL/min

Total Depth of Well: 134.5

Time Sampled: 13:16

Depth to Water Before Purging: 34.38

Total Water Pumped: 5 gallons

Depth to Water After Purging: 34.38

Comments:

ARCADIS

Water Sampling Log

Project	GM Sitewide Groundwater	Project No.	OH000294.08.02	Page	1 of 1
Site Location	Moraine, Ohio			Date	10/24/05
Site/Well No.	MT-69	Replicate No.	N/A	Code No.	N/A
Weather	40's, rain	Sampling Time:	Begin 1350	End	1420

Evacuation Data

Measuring Point	Top of Casing
MP Elevation (ft)	722.71
Land Surface Elevation (ft)	NM
Sounded Well Depth (ft bmp)	~~NM~~ NM
Depth to Water (ft bmp)	19.32
Water-Level Elevation (ft)	703.39
Water Column in Well (ft)	NM
Casing Diameter/Type	2" 6"
Gallons in Well	NM
Gallons Pumped/Bailed Prior to Sampling	5 pumped
Sample Pump Intake Setting (ft bmp)	middle of screen
Purge Time	begin 1345 end 1402
Pumping Rate (gpm)	100 mL/min
Evacuation Method	Submersible Pump

Field Parameters

Color	Brown
Odor	none
Appearance	turbid
pH (s.u.)	7.47
Conductivity (mS/cm)	~~478~~ TF N/A
(µmhos/cm)	~~N/A~~ 478
Turbidity (NTU)	N/A
Temperature (°C)	14.70
Dissolved Oxygen (~~mg~~/L)	~~N/A~~ 0.0 TF
ORP (mV)	~~N/A~~ -332.0
Sampling Method	Low Flow
Remarks	Sample time @ 1403
	DTW final = 19.32

Constituents Sampled	Container Description	Number	Preservative
Site-Specific VOCs (8260)	40 ml glass vial	3	Cool, HCl

Sampling Personnel: J. Manzo/T. Fortner

Well Casing Volumes

Gal./Ft.				
1-¼" = 0.06	2" = 0.16	3" = 0.37	4" = 0.65	
1-½" = 0.09	2-½" = 0.26	3-½" = 0.50	6" = 1.47	

bmp	below measuring point	ml	milliliter	NTU	Nephelometric Turbidity Units
°C	Degrees Celsius	mS/cm	Millisiemens per centimeter	PVC	Polyvinyl chloride
ft	feet	msl	mean sea-level	s.u.	Standard units
gpm	Gallons per minute	N/A	Not Applicable	umhos/cm	Micromhos per centimeter
mg/L	Milligrams per liter	NR	Not Recorded	VOC	Volatile Organic Compounds

ARCADIS

LOW FLOW SAMPLING
GROUNDWATER FIELD PARAMETER LOG

Project Number: OH000294.0008.00002

Site Location: General Motors Corporation, Moraine, Ohio

Monitoring Well No.: MT-69

Time Pump Started: 13:48

Depth of Sampling: middle of screen

Date: 10/24/2005

Parameters / Time

	13:50	13:53	13:56	13:59	14:02						
Redox Potential (millivolts)	-29.0	-307.0	-324.0	-333.0	-332.0						
Dissolved Oxygen (mg/L)	0.00	0.00	0.00	0.00	0.00						
pH (s.u.)	7.42	7.46	7.48	7.50	7.47						
Specific Conductance (uS/cm)	480	482	482	481	478						
Temperature (C)	14.50	14.60	14.70	14.60	14.70						

Flow Rate: 1100 mL/min

Total Depth of Well: NM

Time Sampled: 14:03

Depth to Water Before Purging: 19.32

Total Water Pumped: 5 gallons

Depth to Water After Purging: 19.32

Comments:

ARCADIS

Water Sampling Log

Project: GM Sitewide Groundwater | Project No.: OH000294.08.02 | Page: 1 of 1

Site Location: Moraine, Ohio | Date: 10/24/05

Site/Well No: MW39 | Replicate No.: N/A | Code No.: NA

Weather: 40's, rain | Sampling Time: Begin 1445 End 1540

Evacuation Data

Measuring Point	Top of casing
MP Elevation (ft)	730.95
Land Surface Elevation (ft)	~~NE~~ NM
Sounded Well Depth (ft bmp)	118.82
Depth to Water (ft bmp)	23.52
Water-Level Elevation (ft)	707.43
Water Column in Well (ft)	95.30
Casing Diameter/Type	2"
Gallons in Well	15.25
Gallons Pumped/Bailed Prior to Sampling	35 pumped
Sample Pump Intake Setting (ft bmp)	middle of screen
Purge Time	begin 1448 end 1502
Pumping Rate (gpm)	600 mL/min
Evacuation Method	Submersible Pump

Field Parameters

Color	Colorless
Odor	none
Appearance	clear
pH (s.u.)	6.32
Conductivity (mS/cm)	~~1502~~ TF N/A
(µmhos/cm)	~~N/A~~ 1502
Turbidity (NTU)	N/A
Temperature (°C)	TF 15.3
Dissolved Oxygen (mg/L)	~~N/A~~ 0.0 TF
ORP (mV)	~~N/A~~ -149
Sampling Method	Low Flow
Remarks	Sample time @ 15 03
	DTW final = 23.53

Constituents Sampled	Container Description	Number	Preservative
Site-Specific VOCs (8260)	40 ml glass vial	3	Cool, HCl

Sampling Personnel: J. Manzo/T. Fortner

Well Casing Volumes

Gal./Ft.				
	1-¼" = 0.06	2" = 0.16	3" = 0.37	4" = 0.65
	1-½" = 0.09	2-½" = 0.26	3-½" = 0.50	6" = 1.47

bmp	below measuring point	ml	milliliter	NTU	Nephelometric Turbidity Units
°C	Degrees Celsius	mS/cm	Millisiemens per centimeter	PVC	Polyvinyl chloride
ft	feet	msl	mean sea-level	s.u.	Standard units
gpm	Gallons per minute	N/A	Not Applicable	umhos/cm	Micromhos per centimeter
mg/L	Milligrams per liter	NR	Not Recorded	VOC	Volatile Organic Compounds

ARCADIS

LOW FLOW SAMPLING
GROUNDWATER FIELD PARAMETER LOG

Project Number: OH000294.0007.00002

Site Location: General Motors Corporation, Moraine, Ohio

Monitoring Well No.: GM-39

Time Pump Started: 14:48

Depth of Sampling: middle of screen

Date: 10/24/2005

Parameters	Time										
	14:50	14:53	14:56	14:59	15:02						
Redox Potential (millivolts)	-132.0	-139.0	-150.0	-150.0	-149.0						
Dissolved Oxygen (mg/L)	0.00	0.00	0.00	0.00	0.00						
pH (s.u.)	6.48	6.41	6.39	6.34	6.32						
Specific Conductance (uS/cm)	1,570	1,570	1,590	1,600	1,590						
Temperature (C)	14.90	15.00	15.20	15.20	15.30						

Flow Rate: 600 mL/min

Total Depth of Well: 118.82

Time Sampled: 15:03

Depth to Water Before Purging: 23.52

Total Water Pumped: 3.5 gallons

Depth to Water After Purging: 23.52

Comments:

ARCADIS

Water Sampling Log

Project	GM Sitewide Groundwater	Project No.	OH000294.08.02	Page	1 of 1
Site Location	Moraine, Ohio			Date	10/24/05
Site/Well No.	HR-10	Replicate No.	NA	Code No.	NA
Weather	~~Sun~~ 40s ; rain	Sampling Time:	Begin 1535	End	1625

Evacuation Data

Measuring Point	Top of Casing
MP Elevation (ft)	742.81
Land Surface Elevation (ft)	NM
Sounded Well Depth (ft bmp)	126.9
Depth to Water (ft bmp)	34.65
Water-Level Elevation (ft)	708.16
Water Column in Well (ft)	92.25
Casing Diameter/Type	~~2"~~ 4"
Gallons in Well	59.96
Gallons Pumped/Bailed Prior to Sampling	4 pumped
Sample Pump Intake Setting (ft bmp)	middle of screen
Purge Time	begin 1535 end 1553
Pumping Rate (gpm)	600 mL/min
Evacuation Method	Submersible pump

Field Parameters

Color	Colorless
Odor	none
Appearance	clear
pH (s.u.)	6.35
Conductivity (mS/cm)	~~1.280~~ TF N/A
(µmhos/cm)	~~N/A~~ 1280
Turbidity (NTU)	N/A
Temperature (°C) TF	14.20
Dissolved Oxygen (mg/L)	~~N/A~~ 0.0
ORP (mV) TF	~~N/A~~ -127.0
Sampling Method	Low Flow
Remarks	Sample time @1554
	DTW final = 34.69

Constituents Sampled	Container Description	Number	Preservative
Site-Specific VOCs (8260)	40 ml glass vial	3	Cool, HCl

Sampling Personnel: J. Manzo/T. Fortner

Well Casing Volumes

Gal./Ft.				
	1-¼" = 0.06	2" = 0.16	3" = 0.37	4" = 0.65
	1-½" = 0.09	2-½" = 0.26	3-½" = 0.50	6" = 1.47

bmp	below measuring point	ml	milliliter	NTU	Nephelometric Turbidity Units
°C	Degrees Celsius	mS/cm	Millisiemens per centimeter	PVC	Polyvinyl chloride
ft	feet	msl	mean sea-level	s.u.	Standard units
gpm	Gallons per minute	N/A	Not Applicable	umhos/cm	Micromhos per centimeter
mg/L	Milligrams per liter	NR	Not Recorded	VOC	Volatile Organic Compounds

ARCADIS

LOW FLOW SAMPLING
GROUNDWATER FIELD PARAMETER LOG

Project Number: OH000294.0007.00002

Site Location: General Motors Corporation, Moraine, Ohio

Monitoring Well No.: HR-10

Time Pump Started: 15:38

Depth of Sampling: middle of s creen

Date: 10/24/2005

Parameters / Time

	15:41	15:44	15:47	15:50	15:53						
Redox Potential (millivolts)	-112.0	-119.0	-125.0	-125.0	-127.0						
Dissolved Oxygen (mg/L)	0.00	0.00	0.00	0.00	0.00						
pH (s.u.)	6.51	6.39	6.37	6.36	6.35						
Specific Conductance (uS/cm)	1,260	1,270	1,270	1,270	1,280						
Temperature (C)	13.70	14.00	14.30	14.30	14.20						

Flow Rate: 600 mL/min

Total Depth of Well: 126.90

Time Sampled: 15:54

Depth to Water Before Purging: 34.65

Total Water Pumped: 4 gallons

Depth to Water After Purging: 34.65

Comments:

ARCADIS

Water Sampling Log

Project	GM-Annual GW Sampling	Project No.	OH000314.05.02	Page	1 of 1
Site Location	Moraine, Ohio			Date	10/25/05
Site/Well No.	GM-42	Replicate No.	NA	Code No.	NA
Weather	40's, rain	Sampling Time: Begin	935	End	~~1035~~ 925

Evacuation Data

Measuring Point	TOC
MP Elevation (ft)	729.16
Land Surface Elevation (ft)	NM
Sounded Well Depth (ft bmp)	152.48
Depth to Water (ft bmp)	23.75
Water-Level Elevation (ft)	705.41
Water Column in Well (ft)	128.73
Casing Diameter/Type	2" pvc
Gallons in Well	20.60
Gallons Pumped/Bailed Prior to Sampling	5 pumped
Sample Pump Intake Setting (ft bmp)	middle of screen
Purge Time	begin 849 end ~~1006~~ 906
Pumping Rate (gpm)	1100 mL/min
Evacuation Method	submersible pump

Field Parameters

Color	colorless
Odor	none
Appearance	clear
pH (s.u.)	6.27
Conductivity (mS/cm)	NA
(µmhos/cm)	1240
Turbidity (NTU)	NA
Temperature (°C)	16.10
Dissolved Oxygen (mg/L)	0.0
Salinity (%)	NA
Sampling Method	Low Flow
Remarks	sampled @ ~~1007~~ 907
	Final DTW = 23.71

Constituents Sampled	Container Description	Number	Preservative
VOCs (8260B)	40 mL VOA	3	HCl

Sampling Personnel: Manzo / Fortner

Well Casing Volumes

Gal./Ft.				
	1-¼" = 0.06	2" = 0.16	3" = 0.37	4" = 0.65
	1-½" = 0.09	2-½" = 0.26	3-½" = 0.50	6" = 1.47

bmp	below measuring point	ml	milliliter	NTU	Nephelometric Turbidity Units
°C	Degrees Celsius	mS/cm	Millisiemens per centimeter	PVC	Polyvinyl chloride
ft	feet	msl	mean sea-level	s u	Standard units
gpm	Gallons per minute	N/A	Not Applicable	umhos/cm	Micromhos per centimeter
mg/L	Miligrams per liter	NM	Not Measured	VOC	Volatile Organic Compounds

ARCADIS

LOW FLOW SAMPLING
GROUNDWATER FIELD PARAMETER LOG

Project Number: OH000294.0008.00002

Site Location: General Motors Corporation, Moraine, Ohio

Monitoring Well No.: GM-42

Time Pump Started: 8:48

Depth of Sampling: middle of screen

Date: 10/25/2005

Parameters / Time

	8:51	8:54	8:57	9:00	9:03	9:06					
Redox Potential (millivolts)	20.0	-23.0	-60.0	-67.0	-70.0	-71.0					
Dissolved Oxygen (mg/L)	0.00	0.00	0.00	0.00	0.00	0.00					
pH (s.u.)	5.94	6.09	6.20	6.24	6.26	6.27					
Specific Conductance (uS/cm)	1,150	1,220	1,220	1,240	1,240	1,240					
Temperature (C)	15.60	15.70	16.00	16.10	16.10	16.10					

Flow Rate: 1100 mL/min

Total Depth of Well: 152.48

Time Sampled: 9:07

Depth to Water Before Purging: 23.75

Total Water Pumped: 5 gallons

Depth to Water After Purging: 23.71

Comments:

ARCADIS

Water Sampling Log

Project	GM Sitewide Groundwater	Project No.	OH000294.08.02	Page	1 of 1
Site Location	Moraine, Ohio			Date	10/25/05
Site/Well No.	HR-13	Replicate No.	NA	Code No.	NA
Weather	40's ; Rain	Sampling Time:	Begin 940	End	1030

Evacuation Data

Measuring Point	Top of PVC Casing
MP Elevation (ft)	735.03
Land Surface Elevation (ft)	NM
Sounded Well Depth (ft bmp)	86.85
Depth to Water (ft bmp)	27.84
Water-Level Elevation (ft)	707.19
Water Column in Well (ft)	59.01
Casing Diameter/Type	~~2"~~ 4"
Gallons in Well	38.36
Gallons Pumped/Bailed Prior to Sampling	4 pumped
Sample Pump Intake Setting (ft bmp)	middle of screen
Purge Time	begin 953 end 1010
Pumping Rate (gpm)	800 mL/min
Evacuation Method	Submersible Pump

Field Parameters

Color	Colorless
Odor	none
Appearance	clear
pH (s.u.)	6.17
Conductivity (mS/cm)	~~350~~ TF N/R
(µmhos/cm)	~~N/A~~ 1350
Turbidity (NTU)	N/A
Temperature (°C) TF	14.4
Dissolved Oxygen (~~mg~~/L)	~~N/A~~ 0.0
ORP (mV) TF	~~N/A~~ 134
Sampling Method	Low Flow
Remarks	Sample time @ 1011
	DTW final = 27.86

Constituents Sampled	Container Description	Number	Preservative
Site-Specific VOCs (8260)	40 ml glass vial	3	Cool, HCl

Sampling Personnel: J. Manzo/T. Fortner

Well Casing Volumes

Gal./Ft.				
	1-¼" = 0.06	2" = 0.16	3" = 0.37	4" = 0.65
	1-½" = 0.09	2-½" = 0.26	3-½" = 0.50	6" = 1.47

bmp	below measuring point	ml	milliliter	NTU	Nephelometric Turbidity Units
°C	Degrees Celsius	mS/cm	Millisiemens per centimeter	PVC	Polyvinyl chloride
ft	feet	msl	mean sea-level	s.u.	Standard units
gpm	Gallons per minute	N/A	Not Applicable	umhos/cm	Micromhos per centimeter
mg/L	Milligrams per liter	NR	Not Recorded	VOC	Volatile Organic Compounds

ARCADIS

LOW FLOW SAMPLING
GROUNDWATER FIELD PARAMETER LOG

Project Number: OH000294.0008.00002

Site Location: General Motors Corporation, Moraine, Ohio

Monitoring Well No.: HR-13

Time Pump Started: 9:53

Depth of Sampling: middle of screen

Date: 10/25/2005

Parameters / Time

	9:55	9:58	10:01	10:04	10:07	10:10					
Redox Potential (millivolts)	191.0	178.0	165.0	154.0	147.0	134.0					
Dissolved Oxygen (mg/L)	0.00	0.00	0.00	0.00	0.00	0.00					
pH (s.u.)	6.29	6.23	6.21	6.19	6.18	6.17					
Specific Conductance (uS/cm)	1,320	1,330	1,340	1,340	1,350	1,350					
Temperature (C)	13.40	13.70	14.10	14.20	14.20	14.40					

Flow Rate: 800 mL/min

Total Depth of Well: 86.85

Time Sampled: 10:11

Depth to Water Before Purging: 27.84

Total Water Pumped: 4 gallons

Depth to Water After Purging: 27.86

Comments:

ARCADIS

Water Sampling Log

Project	GM Sitewide Groundwater	Project No.	OH000294.08.02	Page	1 of 1
Site Location	Moraine, Ohio			Date	10/25/05
Site/Well No.	GM-19D	Replicate No.	NA	Code No.	NA
Weather	40s, light rain	Sampling Time:	Begin 1030	End	1230

Evacuation Data

Measuring Point	Top of Casing
MP Elevation (ft)	730.25
Land Surface Elevation (ft)	NM
Sounded Well Depth (ft bmp)	151
Depth to Water (ft bmp)	25.11
Water-Level Elevation (ft)	705.14
Water Column in Well (ft)	125.89
Casing Diameter/Type	2" 4"
Gallons in Well	81.83
Gallons Pumped/Bailed Prior to Sampling	4 pumped
Sample Pump Intake Setting (ft bmp)	middle of screen
Purge Time	begin 1101 end
Pumping Rate (gpm)	1000 mL/min
Evacuation Method	Submersible Pump

Field Parameters

Color	Colorless
Odor	none
Appearance	clear
pH (s.u.)	6.33
Conductivity (mS/cm)	~~1290~~ TF N/A
(µmhos/cm)	~~N/A~~ 1290
Turbidity (NTU)	N/A
Temperature (°C)	16.7
Dissolved Oxygen (~~mg~~/L)	~~N/A~~ 0.0
ORP (mV)	TF ~~N/A~~ -119
Sampling Method	Low Flow
Remarks	Sample time @ 1125
	DTW final = 25.10

Constituents Sampled	Container Description	Number	Preservative
Site-Specific VOCs (8260)	40 ml glass vial	3	Cool, HCl

Sampling Personnel: J. Manzo/T. Fortner

Well Casing Volumes

Gal./Ft.				
	1-¼" = 0.06	2" = 0.16	3" = 0.37	4" = 0.65
	1-½" = 0.09	2-½" = 0.26	3-½" = 0.50	6" = 1.47

bmp	below measuring point	ml	milliliter	NTU	Nephelometric Turbidity Units
°C	Degrees Celsius	mS/cm	Millisiemens per centimeter	PVC	Polyvinyl chloride
ft	feet	msl	mean sea-level	s.u.	Standard units
gpm	Gallons per minute	N/A	Not Applicable	umhos/cm	Micromhos per centimeter
mg/L	Milligrams per liter	NR	Not Recorded	VOC	Volatile Organic Compounds

ARCADIS

LOW FLOW SAMPLING
GROUNDWATER FIELD PARAMETER LOG

Project Number: OH000294.0008.00002

Site Location: General Motors Corporation, Moraine, Ohio

Monitoring Well No.: GM-19D

Time Pump Started: 11:09

Depth of Sampling: middle of screen

Date: 10/25/2005

Parameters / Time

	11:12	11:15	11:18	11:21	11:24						
Redox Potential (millivolts)	-65.0	-104.0	-114.0	-118.0	-119.0						
Dissolved Oxygen (mg/L)	0.00	0.00	0.00	0.00	0.00						
pH (s.u.)	6.41	6.37	6.35	6.33	6.32						
Specific Conductance (uS/cm)	1,300	1,260	1,290	1,290	1,290						
Temperature (C)	16.30	16.50	16.70	16.60	16.70						

Flow Rate: 1000 mL/min

Total Depth of Well: 151

Time Sampled: 11:25

Depth to Water Before Purging: 25.11

Total Water Pumped: 5.5 gallons

Depth to Water After Purging: 25.10

Comments:

ARCADIS

Water Sampling Log

Project	GM Sitewide Groundwater	Project No.	OH000294.08.02	Page	1 of 1
Site Location	Moraine, Ohio			Date	10/25/05
Site/Well No.	HR-15	Replicate No.	NA	Code No.	NA
Weather	40's, overcast	Sampling Time:	Begin 1320	End	1410

Evacuation Data

Measuring Point	Top of Casing
MP Elevation (ft)	733.74
Land Surface Elevation (ft)	NM
Sounded Well Depth (ft bmp)	101.69
Depth to Water (ft bmp)	26.64
Water-Level Elevation (ft)	707.10
Water Column in Well (ft)	75.05
Casing Diameter/Type	~~2"~~ 4"
Gallons in Well	48.78
Gallons Pumped/Bailed Prior to Sampling	3.5 pumped
Sample Pump Intake Setting (ft bmp)	middle of screen
Purge Time	begin 1336 end 1350
Pumping Rate (gpm)	800 mL/min
Evacuation Method	Submersible Pump

Field Parameters

Color	Colorless
Odor	none
Appearance	clear
pH (s.u.)	6.37
Conductivity (mS/cm)	~~1170~~ TF N/A
(µmhos/cm)	~~N/A~~ 1170
Turbidity (NTU)	N/A
Temperature (°F) °C TF	15.3
Dissolved Oxygen (~~mg~~/L) TF	~~N/A~~ 0.0
ORP (mV)	~~N/A~~ -117
Sampling Method	Low Flow
Remarks	Sample time @ 13:51
	DTW final = 26.65

Constituents Sampled	Container Description	Number	Preservative
Site-Specific VOCs (8260)	40 ml glass vial	3	Cool, HCl

Sampling Personnel: J. Manzo/T. Fortner

Well Casing Volumes

Gal./Ft.				
	1-¼" = 0.06	2" = 0.16	3" = 0.37	4" = 0.65
	1-½" = 0.09	2-½" = 0.26	3-½" = 0.50	6" = 1.47

bmp	below measuring point	ml	milliliter	NTU	Nephelometric Turbidity Units
°C	Degrees Celsius	mS/cm	Millisiemens per centimeter	PVC	Polyvinyl chloride
ft	feet	msl	mean sea-level	s.u.	Standard units
gpm	Gallons per minute	N/A	Not Applicable	umhos/cm	Micromhos per centimeter
mg/L	Milligrams per liter	NR	Not Recorded	VOC	Volatile Organic Compounds

ARCADIS

LOW FLOW SAMPLING
GROUNDWATER FIELD PARAMETER LOG

Project Number: OH000294.0008.00002

Site Location: General Motors Corporation, Moraine, Ohio

Monitoring Well No.: HR-15

Time Pump Started: 13:36

Depth of Sampling: middle of screen

Date: 10/25/2005

Parameters	Time										
	13:38	13:41	13:44	13:47	13:50						
Redox Potential (millivolts)	-80.0	-97.0	-110.0	-114.0	-117.0						
Dissolved Oxygen (mg/L)	0.00	0.00	0.00	0.00	0.00						
pH (s.u.)	6.45	6.41	6.38	6.38	6.37						
Specific Conductance (uS/cm)	1,110	1,150	1,160	1,170	1,170						
Temperature (C)	14.60	14.80	15.10	15.20	15.30						

Flow Rate: 800 mL/min

Total Depth of Well: 101.69

Time Sampled: 13:51

Depth to Water Before Purging: 26.64

Total Water Pumped: 3.5 gallons

Depth to Water After Purging: 26.65

Comments:

ARCADIS

Water Sampling Log

Project: GM-Annual GW sampling | Project No.: 0100274.08.02 | Page: 1 of 1

Site Location: Moraine, Ohio | Date: 10/25/05

Site/Well No.: GM-40 | Replicate No.: NA | Code No.: NA

Weather: 40's; overcast | Sampling Time: Begin 1405 End 1455

Evacuation Data

Measuring Point	TOC
MP Elevation (ft)	727.04
Land Surface Elevation (ft)	NM
Sounded Well Depth (ft bmp)	152
Depth to Water (ft bmp)	21.26
Water-Level Elevation (ft)	705.78
Water Column in Well (ft)	130.74
Casing Diameter/Type	2" pvc
Gallons in Well	20.92
Gallons Pumped/Bailed Prior to Sampling	4 pumped
Sample Pump Intake Setting (ft bmp)	middle of screen
Purge Time	begin 1418 end 1435
Pumping Rate (gpm)	800 ml/min
Evacuation Method	Submersible pump

Field Parameters

Color	Tan
Odor	none
Appearance	slightly turbid
pH (s.u.)	6.38
Conductivity (mS/cm)	NA
(µmhos/cm)	1,220
Turbidity (NTU)	NA
Temperature (°C)	16.00
Dissolved Oxygen (mg/L)	0.0
Salinity (%)	NA
Sampling Method	Low Flow
Remarks	sampled @1436
	DTW Final = 21.26

Constituents Sampled	Container Description	Number	Preservative
VOC (8260B)	40 mL vial	3	HCl; cool

Sampling Personnel: Manzo / Fortner

Well Casing Volumes

Gal./Ft.				
	1-¼" = 0.06	2" = 0.16	3" = 0.37	4" = 0.65
	1-½" = 0.09	2-½" = 0.26	3-½" = 0.50	6" = 1.47

bmp	below measuring point	ml	milliliter	NTU	Nephelometric Turbidity Units
°C	Degrees Celsius	mS/cm	Millisiemens per centimeter	PVC	Polyvinyl chloride
ft	feet	msl	mean sea-level	s.u.	Standard units
gpm	Gallons per minute	N/A	Not Applicable	umhos/cm	Micromhos per centimeter
mg/L	Milligrams per liter	NM	Not Measured	VOC	Volatile Organic Compounds

ARCADIS

LOW FLOW SAMPLING
GROUNDWATER FIELD PARAMETER LOG

Project Number: OH000294.0008.00002

Site Location: General Motors Corporation, Moraine, Ohio

Monitoring Well No.: GM-40

Time Pump Started: 14:18

Depth of Sampling: middle of screen

Date: 10/25/2005

Parameters / Time

	14:20	14:23	14:26	14:29	14:32	14:35					
Redox Potential (millivolts)	-173.0	-170.0	-172.0	-168.0	-164.0	-162.0					
Dissolved Oxygen (mg/L)	0.00	0.00	0.00	0.00	0.00	0.00					
pH (s.u.)	6.56	6.49	6.46	6.42	6.39	6.38					
Specific Conductance (uS/cm)	1,160	1,180	1,190	1,220	1,220	1,220					
Temperature (C)	16.10	16.00	15.90	16.00	16.00	16.00					

Flow Rate: 800 mL/min

Total Depth of Well: 152

Time Sampled: 14:36

Depth to Water Before Purging: 21.26

Total Water Pumped: 4 gallons

Depth to Water After Purging: 21.26

Comments:

ARCADIS

Water Sampling Log

Project	GM Sitewide Groundwater	Project No.	OH000294.08.02	Page	1 of 1
Site Location	Moraine, Ohio			Date	10/25/05
Site/Well No.	GM-3	Replicate No.	NA	Code No.	NA
Weather	40's, overcast	Sampling Time:	Begin 1500	End	1540

Evacuation Data

Measuring Point	Top of Casing
MP Elevation (ft)	730.44
Land Surface Elevation (ft)	N.M
Sounded Well Depth (ft bmp)	101.8
Depth to Water (ft bmp)	25.66
Water-Level Elevation (ft)	704.78
Water Column in Well (ft)	99.23
Casing Diameter/Type	2"
Gallons in Well	15.88
Gallons Pumped/Bailed Prior to Sampling	4.5 pumped
Sample Pump Intake Setting (ft bmp)	middle of screen
Purge Time	begin 1506 end 1520
Pumping Rate (gpm)	1100 mL/min
Evacuation Method	Submersible Pump

Field Parameters

Color	Tan
Odor	none
Appearance	Slightly turbid
pH (s.u.)	6.27
Conductivity (mS/cm)	~~1200~~ TF N/A
(µmhos/cm)	~~N/A~~ 1200
Turbidity (NTU)	N/A
Temperature (°C)	16.0
Dissolved Oxygen (mg/L)	~~N/A~~ 0.0
ORP (mV)	TF ~~N/A~~ 24
Sampling Method	Low Flow
Remarks	Sample time @ 1521
	DTW final = 25.69

Constituents Sampled	Container Description	Number	Preservative
Site-Specific VOCs (8260)	40 ml glass vial	3	Cool, HCl

Sampling Personnel: J. Manzo/T. Fortner

Well Casing Volumes

Gal./Ft.				
	1-¼" = 0.06	2" = 0.16	3" = 0.37	4" = 0.65
	1-½" = 0.09	2-½" = 0.26	3-½" = 0.50	6" = 1.47

bmp	below measuring point	ml	milliliter	NTU	Nephelometric Turbidity Units
°C	Degrees Celsius	mS/cm	Millisiemens per centimeter	PVC	Polyvinyl chloride
ft	feet	msl	mean sea-level	s.u.	Standard units
gpm	Gallons per minute	N/A	Not Applicable	umhos/cm	Micromhos per centimeter
mg/L	Milligrams per liter	NR	Not Recorded	VOC	Volatile Organic Compounds

ARCADIS

LOW FLOW SAMPLING
GROUNDWATER FIELD PARAMETER LOG

Project Number: OH000294.0008.00002

Site Location: General Motors Corporation, Moraine, Ohio

Monitoring Well No.: GM-3

Time Pump Started: 15:06

Depth of Sampling: middle of screen

Date: 10/25/2005

Parameters / Time

	15:08	15:11	15:14	15:17	15:20						
Redox Potential (millivolts)	60.0	57.0	40.0	30.0	24.0						
Dissolved Oxygen (mg/L)	0.78	0.00	0.00	0.00	0.00						
pH (s.u.)	6.40	6.32	6.29	6.28	6.27						
Specific Conductance (uS/cm)	1,210	1,210	1,210	1,210	1,200						
Temperature (C)	15.90	15.90	16.00	16.00	16.00						

Flow Rate: 1100 mL/min

Total Depth of Well: 101.8

Time Sampled: 15:21

Depth to Water Before Purging: 25.66

Total Water Pumped: 4 gallons

Depth to Water After Purging: 25.69

Comments:

ARCADIS

Water Sampling Log

Project	GM Sitewide Groundwater	Project No.	OH000294.08.02	Page	1 of 1
Site Location	Moraine, Ohio			Date	10/25/05
Site/Well No.	GM-1	Replicate No.	DUP1	Code No.	NA
Weather	40's, overcast	Sampling Time:	Begin 1535	End	1635

Evacuation Data

Measuring Point	Top of Casing
MP Elevation (ft)	735.74
Land Surface Elevation (ft)	NM
Sounded Well Depth (ft bmp)	101.86
Depth to Water (ft bmp)	30.73
Water-Level Elevation (ft)	705.01
Water Column in Well (ft)	71.13
Casing Diameter/Type	2"
Gallons in Well	11.38
Gallons Pumped/Bailed Prior to Sampling	Pumped
Sample Pump Intake Setting (ft bmp)	middle of screen
Purge Time	begin 1541 end 1559
Pumping Rate (gpm)	900 mL/min
Evacuation Method	Submersible Pump

Field Parameters

Color	Colorless
Odor	none
Appearance	clear
pH (s.u.)	6.31
Conductivity (mS/cm)	~~1160~~ TF N/A
(µmhos/cm)	~~N/A~~ 1160
Turbidity (NTU)	N/A
Temperature (°C)	15.9
Dissolved Oxygen (~~mg~~/L)	~~N/A~~ 0.0
ORP (mV)	TF ~~N/A~~ 121
Sampling Method	Low Flow
Remarks	Sample time @ 16:00
	DTW final = 30.71
	EB7@ 16:05
	MS/MSD

Constituents Sampled	Container Description	Number	Preservative
Site-Specific VOCs (8260)	40 ml glass vial	9 (3)X	Cool, HCl

Sampling Personnel: J. Manzo/T. Fortner

Well Casing Volumes

Gal./Ft.				
	1-¼" = 0.06	2" = 0.16	3" = 0.37	4" = 0.65
	1-½" = 0.09	2-½" = 0.26	3-½" = 0.50	6" = 1.47

bmp	below measuring point	ml	milliliter	NTU	Nephelometric Turbidity Units
°C	Degrees Celsius	mS/cm	Millisiemens per centimeter	PVC	Polyvinyl chloride
ft	feet	msl	mean sea-level	s.u.	Standard units
gpm	Gallons per minute	N/A	Not Applicable	umhos/cm	Micromhos per centimeter
mg/L	Milligrams per liter	NR	Not Recorded	VOC	Volatile Organic Compounds

ARCADIS

LOW FLOW SAMPLING
GROUNDWATER FIELD PARAMETER LOG

Project Number: OH000294.0008.00002

Site Location: General Motors Corporation, Moraine, Ohio

Monitoring Well No.: GM-1

Time Pump Started: 15:41

Depth of Sampling: middle of screen

Date: 10/25/2005

Parameters / Time

	15:44	15:47	15:50	15:53	15:56	15:59					
Redox Potential (millivolts)	174.0	170.0	150.0	137.0	130.0	121.0					
Dissolved Oxygen (mg/L)	0.00	0.00	0.00	0.00	0.00	0.00					
pH (s.u.)	6.42	6.40	6.36	6.33	6.32	6.31					
Specific Conductance (uS/cm)	1,090	1,110	1,120	1,140	1,160	1,160					
Temperature (C)	15.30	15.30	15.90	15.90	15.90	15.90					

Flow Rate: 900 mL/min

Total Depth of Well: 101.86

Time Sampled: 16:00

Depth to Water Before Purging: 30.73

Total Water Pumped: 4 gallons

Depth to Water After Purging: 30.76

Comments:

ARCADIS

Water Sampling Log

Project	GM Sitewide Groundwater	Project No.	OH000294.08.02	Page	1 of 1
Site Location	Moraine, Ohio			Date	10/26/05
Site/Well No.	GM-15	Replicate No.	N/A	Code No.	N/A
Weather	40 s, clear	Sampling Time:	Begin 830	End	930

Evacuation Data

Measuring Point	Top of Casing
MP Elevation (ft)	725.23
Land Surface Elevation (ft)	NM
Sounded Well Depth (ft bmp)	98.32
Depth to Water (ft bmp)	19.98
Water-Level Elevation (ft)	705.22
Water Column in Well (ft)	78.34
Casing Diameter/Type	2"
Gallons in Well	12.53
Gallons Pumped/Bailed Prior to Sampling	5 pumped
Sample Pump Intake Setting (ft bmp)	middle of screen
Purge Time	begin 856 end 917
Pumping Rate (gpm)	300 ml/min
Evacuation Method	Submersible Pump

Field Parameters

Color	colorless
Odor	none
Appearance	clear
pH (s.u.)	6.62
Conductivity (mS/cm)	~~1230~~ TF N/A
(µmhos/cm)	~~N/A~~ 1230
Turbidity (NTU)	N/A
Temperature (°C)	17.0
Dissolved Oxygen (~~mg~~/L)	~~N/A~~ 0.0
ORP (mV)	TF ~~N/A~~ -59
Sampling Method	Low Flow
Remarks	Sample time @ 918
	DTW final = 20.89

Constituents Sampled	Container Description	Number	Preservative
Site-Specific VOCs (8260)	40 ml glass vial	3	Cool, HCl

Sampling Personnel: J. Manzo/T. Fortner

Well Casing Volumes

Gal./Ft.				
	1-¼" = 0.06	2" = 0.16	3" = 0.37	4" = 0.65
	1-½" = 0.09	2-½" = 0.26	3-½" = 0.50	6" = 1.47

bmp	below measuring point	ml	milliliter	NTU	Nephelometric Turbidity Units
°C	Degrees Celsius	mS/cm	Millisiemens per centimeter	PVC	Polyvinyl chloride
ft	feet	msl	mean sea-level	s.u.	Standard units
gpm	Gallons per minute	N/A	Not Applicable	umhos/cm	Micromhos per centimeter
mg/L	Milligrams per liter	NR	Not Recorded	VOC	Volatile Organic Compounds

ARCADIS

Water Sampling Log

Project	GM Sitewide Groundwater	Project No.	OH000294.08.02	Page	1 of 1
Site Location	Moraine, Ohio			Date	10/26/05
Site/Well No.	GM-9	Replicate No.	NA	Code No.	NA
Weather	40's, clear	Sampling Time:	Begin 930	End	1015

Evacuation Data

Measuring Point	Top of Casing
MP Elevation (ft)	724.07
Land Surface Elevation (ft)	NM
Sounded Well Depth (ft bmp)	99.41
Depth to Water (ft bmp)	19.62
Water-Level Elevation (ft)	704.45
Water Column in Well (ft)	79.79
Casing Diameter/Type	2"
Gallons in Well	12.77
Gallons Pumped/Bailed Prior to Sampling	4 pumped
Sample Pump Intake Setting (ft bmp)	middle of screen
Purge Time	begin 940 end 955
Pumping Rate (gpm)	1,200 mL/min
Evacuation Method	Submersible Pump

Field Parameters

Color	colorless
Odor	none
Appearance	clear
pH (s.u.)	6.82
Conductivity (mS/cm)	~~1.080~~ TF N/A
(µmhos/cm)	~~N/A~~ 1080
Turbidity (NTU)	N/A
Temperature (°C)	15.00
Dissolved Oxygen (~~mg~~/L)	~~N/A~~ 0.0
ORP (mV)	TF ~~N/A~~ 3
Sampling Method	Low Flow
Remarks	Sample time @ 9:56
	DTW final = 19.65

Constituents Sampled	Container Description	Number	Preservative
Site-Specific VOCs (8260)	40 ml glass vial	3	Cool, HCl

Sampling Personnel: J. Manzo/T. Fortner

Well Casing Volumes

Gal./Ft.				
	1-¼" = 0.06	2" = 0.16	3" = 0.37	4" = 0.65
	1-½" = 0.09	2-½" = 0.26	3-½" = 0.50	6" = 1.47

bmp	below measuring point	ml	milliliter	NTU	Nephelometric Turbidity Units
°C	Degrees Celsius	mS/cm	Millisiemens per centimeter	PVC	Polyvinyl chloride
ft	feet	msl	mean sea-level	s.u.	Standard units
gpm	Gallons per minute	N/A	Not Applicable	umhos/cm	Micromhos per centimeter
mg/L	Milligrams per liter	NR	Not Recorded	VOC	Volatile Organic Compounds

ARCADIS

Water Sampling Log

Project	GM Sitewide Groundwater	Project No.	OH000294.08.02	Page	1 of 1
Site Location	Moraine, Ohio			Date	10/26/05
Site/Well No.	GM-11	Replicate No.	NA	Code No.	NA
Weather	40's, clear	Sampling Time: Begin	1010	End	1050

Evacuation Data

Measuring Point	Top of Casing
MP Elevation (ft)	723.71
Land Surface Elevation (ft)	NM
Sounded Well Depth (ft bmp)	100
Depth to Water (ft bmp)	19.20
Water-Level Elevation (ft)	704.51
Water Column in Well (ft)	80.8
Casing Diameter/Type	2"
Gallons in Well	12.93
Gallons Pumped/Bailed Prior to Sampling	5 pumped
Sample Pump Intake Setting (ft bmp)	middle of screen
Purge Time	begin 1013 end 1030
Pumping Rate (gpm)	1200 mL/min
Evacuation Method	Submersible Pump

Field Parameters

Color	Tan
Odor	none
Appearance	slightly turbid
pH (s.u.)	6.71
Conductivity (mS/cm)	~~1030~~ TF N/A
(µmhos/cm)	~~N/A~~ 1030
Turbidity (NTU)	N/A
Temperature (°C)	15.5
Dissolved Oxygen (~~mg~~/L)	~~N/A~~ 0.0
ORP (mV)	TF ~~N/A~~ 164
Sampling Method	Low Flow
Remarks	Sample time @ 1031
	DTW final = 19.19

Constituents Sampled	Container Description	Number	Preservative
Site-Specific VOCs (8260)	40 ml glass vial	3	Cool, HCl

Sampling Personnel: J. Manzo/T. Fortner

Well Casing Volumes

Gal./Ft.				
	1-¼" = 0.06	2" = 0.16	3" = 0.37	4" = 0.65
	1-½" = 0.09	2-½" = 0.26	3-½" = 0.50	6" = 1.47

bmp	below measuring point	ml	milliliter	NTU	Nephelometric Turbidity Units
°C	Degrees Celsius	mS/cm	Millisiemens per centimeter	PVC	Polyvinyl chloride
ft	feet	msl	mean sea-level	s.u.	Standard units
gpm	Gallons per minute	N/A	Not Applicable	umhos/cm	Micromhos per centimeter
mg/L	Milligrams per liter	NR	Not Recorded	VOC	Volatile Organic Compounds

ARCADIS

Water Sampling Log

Project	GM Sitewide Groundwater	Project No.	OH000294.08.02	Page	1 of 1
Site Location	Moraine, Ohio			Date	10/26/05
Site/Well No.	GM-20D	Replicate No.	NA	Code No.	NA
Weather	50's; clear	Sampling Time:	Begin 1045	End	1135

Evacuation Data

Measuring Point	Top of Casing
MP Elevation (ft)	727.26
Land Surface Elevation (ft)	NM
Sounded Well Depth (ft bmp)	99.6
Depth to Water (ft bmp)	22.05
Water-Level Elevation (ft)	705.21
Water Column in Well (ft)	77.1
Casing Diameter/Type	2" 4"
Gallons in Well	50.12
Gallons Pumped/Bailed Prior to Sampling	4 pumped
Sample Pump Intake Setting (ft bmp)	middle of screen
Purge Time	begin 1041 end 1106
Pumping Rate (gpm)	1100 ml/min
Evacuation Method	Submersible Pump

Field Parameters

Color	Colorless
Odor	none
Appearance	clear
pH (s.u.)	6.77
Conductivity (mS/cm)	~~1070~~ TF N/A
(µmhos/cm)	~~N/A~~ 1070
Turbidity (NTU)	N/A
Temperature (°C)	15.1
Dissolved Oxygen (mg/L)	~~N/A~~ 0.0
ORP (mV)	TF ~~N/A~~ 216
Sampling Method	Low Flow
Remarks	Sample time @ 11:07
	DTW final = 22.05

Constituents Sampled	Container Description	Number	Preservative
Site-Specific VOCs (8260)	40 ml glass vial	3	Cool, HCl

Sampling Personnel: J. Manzo/T. Fortner

Well Casing Volumes

Gal./Ft.				
	1-¼" = 0.06	2" = 0.16	3" = 0.37	4" = 0.65
	1-½" = 0.09	2-½" = 0.26	3-½" = 0.50	6" = 1.47

bmp	below measuring point	ml	milliliter	NTU	Nephelometric Turbidity Units
°C	Degrees Celsius	mS/cm	Millisiemens per centimeter	PVC	Polyvinyl chloride
ft	feet	msl	mean sea-level	s.u.	Standard units
gpm	Gallons per minute	N/A	Not Applicable	umhos/cm	Micromhos per centimeter
mg/L	Milligrams per liter	NR	Not Recorded	VOC	Volatile Organic Compounds

ARCADIS

Appendix C

Groundwater Analytical Database for 2005

Table C-1. Summary of Groundwater VOC Analytical Results from Upper/Lower Aquifer Monitoring Wells in October 2005, General Motors Corporation, Moraine, Ohio.

		Upgradient of the Site		On-Site			
	Units	HR-9 10/19/2005 Upper Aquifer	HR-11 10/17/2005 Upper Aquifer	HR-8 10/19/2005 Upper Aquifer	HR-4 10/20/2005 Upper Aquifer	W-2-N 10/20/2005 Upper Aquifer	W-3-N 10/20/2005 Upper Aquifer
Volatile Organic Compounds							
Benzene	ug/l	< 1.2 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 4.0 U
1,1-Dichloroethane	ug/l	42	6.5	5.5	1.5	0.28 J	< 4.0 U
1,1-Dichloroethene	ug/l	0.97 J	< 1.0 U	0.19 J	< 1.0 U	< 1.0 U	< 4.0 U
cis-1,2-Dichloroethene	ug/l	19	0.72 J	1.3	< 1.0 U	1.3	84
trans-1,2-Dichloroethene	ug/l	2.8	< 1.0 U	0.28 J	< 1.0 U	< 1.0 U	1.0 J
Ethylbenzene	ug/l	< 1.2 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 4.0 U
Tetrachloroethene	ug/l	< 1.2 U	6.0	0.24 J	0.39 J	< 1.0 U	1.4 J
Toluene	ug/l	< 1.2 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 4.0 U
1,1,1-Trichloroethane	ug/l	14	< 1.0 U	4.4	< 1.0 U	< 1.0 U	< 4.0 U
Trichloroethene	ug/l	12	< 1.0 U	0.66 J	0.32 J	0.91 J	< 4.0 U
Vinyl chloride	ug/l	0.46 J	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	8.0
Xylene (total)	ug/l	< 2.5 U	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U	< 8.0 U

ug/l - Micrograms per liter.
All QA/QC results for 2005 data are shown in Appendix C.
< - Constituent not detected above laboratory reporting limit shown.
J - Value is estimated.
U - Constituent not detected above laboratory reporting limit shown.

Table C-1. Summary of Groundwater VOC Analytical Results from Upper/Lower Aquifer Monitoring Wells in October 2005, General Motors Corporation, Moraine, Ohio.

	Units	On-Site W-4-N 10/20/2005 Upper Aquifer	HR-2 10/20/2005 Upper Aquifer	DUP 10/20/2005 QA/QC	HR-5 10/18/2005 Upper Aquifer	HR-3 10/20/2005 Upper Aquifer	HR-1 10/18/2005 Upper Aquifer
Volatile Organic Compounds							
Benzene	ug/l	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
1,1-Dichloroethane	ug/l	1.2	4.4	4.5	0.54 J	18	2.7
1,1-Dichloroethene	ug/l	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
cis-1,2-Dichloroethene	ug/l	2.0	5.0	5.1	4.6	11	19
trans-1,2-Dichloroethene	ug/l	< 1.0 U	0.78 J	0.80 J	0.52 J	1.5	2.3
Ethylbenzene	ug/l	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
Tetrachloroethene	ug/l	1.0	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	28
Toluene	ug/l	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
1,1,1-Trichloroethane	ug/l	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	0.34 J	1.2
Trichloroethene	ug/l	7.2	0.35 J	0.40 J	13	10	43
Vinyl chloride	ug/l	0.54 J	0.29 J	0.25 J	1.1	< 1.0 U	1.1
Xylene (total)	ug/l	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U

ug/l - Micrograms per liter.
All QA/QC results for 2005 data are shown in Appendix C.
< - Constituent not detected above laboratory reporting limit shown.
J - Value is estimated.
U - Constituent not detected above laboratory reporting limit shown.

Table C-1. Summary of Groundwater VOC Analytical Results from Upper/Lower Aquifer Monitoring Wells in October 2005, General Motors Corporation, Moraine, Ohio.

		On-Site					
	Units	GM-30 10/17/2005 Upper Aquifer	GM-23 10/17/2005 Upper Aquifer	GM-27 10/17/2005 Upper Aquifer	GM-29 10/17/2005 Upper Aquifer	GM-28 10/18/2005 Upper Aquifer	ME-6 10/18/2005 Upper Aquifer
Volatile Organic Compounds							
Benzene	ug/l	< 50 U	< 560 U	< 2.5 U	< 50 U	< 1.0 U	< 1.0 U
1,1-Dichloroethane	ug/l	23 J	< 560 U	2.2 J	18 J	4.0	7.0
1,1-Dichloroethene	ug/l	< 50 U	< 560 U	< 2.5 U	< 50 U	< 1.0 U	< 1.0 U
cis-1,2-Dichloroethene	ug/l	< 50 U	19000	14	1600	0.32 J	13
trans-1,2-Dichloroethene	ug/l	< 50 U	< 560 U	0.49 J	27 J	0.63 J	0.93 J
Ethylbenzene	ug/l	620	< 560 U	< 2.5 U	< 50 U	< 1.0 U	< 1.0 U
Tetrachloroethene	ug/l	< 50 U	2300	0.94 J	15 J	< 1.0 U	9.8
Toluene	ug/l	< 50 U	< 560 U	< 2.5 U	< 50 U	< 1.0 U	< 1.0 U
1,1,1-Trichloroethane	ug/l	< 50 U	< 560 U	< 2.5 U	19 J	< 1.0 U	2.2
Trichloroethene	ug/l	< 50 U	490 J	76	390	0.66 J	25
Vinyl chloride	ug/l	< 50 U	2800	0.82 J	490	1.1	5.6
Xylene (total)	ug/l	3800	< 1100 U	< 5.0 U	< 100 U	< 2.0 U	< 2.0 U

ug/l - Micrograms per liter.
All QA/QC results for 2005 data are shown in Appendix C.
< - Constituent not detected above laboratory reporting limit shown.
J - Value is estimated.
U - Constituent not detected above laboratory reporting limit shown.

Table C-1. Summary of Groundwater VOC Analytical Results from Upper/Lower Aquifer Monitoring Wells in October 2005, General Motors Corporation, Moraine, Ohio.

		On-Site					
	Units	GM-31 10/18/2005 Upper Aquifer	ME-3 10/18/2005 Upper Aquifer	GM-22 10/17/2005 Upper Aquifer	DUP 10/17/2005 QA/QC	GM-19S 10/18/2005 Upper Aquifer	DUP 10/18/2005 QA/QC
Volatile Organic Compounds							
Benzene	ug/l	< 2.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.7 U	< 2.0 U
1,1-Dichloroethane	ug/l	6.2	15	1.0	1	9.0	9.2
1,1-Dichloroethene	ug/l	0.42 J	< 1.0 U	< 1.0 U	< 1.0 U	1.2 J	1.5 J
cis-1,2-Dichloroethene	ug/l	120	1.1	0.36 J	0.39 J	29	28
trans-1,2-Dichloroethene	ug/l	3.7	< 1.0 U	< 1.0 U	< 1.0 U	1.0 J	1.0 J
Ethylbenzene	ug/l	< 2.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.7 U	< 2.0 U
Tetrachloroethene	ug/l	< 2.0 U	< 1.0 U	3.6	3.9	95	96
Toluene	ug/l	< 2.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.7 U	< 2.0 U
1,1,1-Trichloroethane	ug/l	3.4	1.6	0.96 J	0.97 J	13	13
Trichloroethene	ug/l	67	1.9	4.7	4.7	140	140
Vinyl chloride	ug/l	3.1	1.6	< 1.0 U	< 1.0 U	1.8	2.1
Xylene (total)	ug/l	< 4.0 U	< 2.0 U	< 2.0 U	< 2.0 U	< 3.3 U	< 4.0 U

ug/l - Micrograms per liter.
All QA/QC results for 2005 data are shown in Appendix C.
< - Constituent not detected above laboratory reporting limit shown.
J - Value is estimated.
U - Constituent not detected above laboratory reporting limit shown.

Table C-1. Summary of Groundwater VOC Analytical Results from Upper/Lower Aquifer Monitoring Wells in October 2005, General Motors Corporation, Moraine, Ohio.

		On-Site					
	Units	EAST 10/18/2005 Upper Aquifer	GM-33 10/18/2005 Upper Aquifer	GM-35 10/18/2005 Upper Aquifer	GM-32 10/19/2005 Upper Aquifer	GM-21 10/17/2005 Upper Aquifer	HR-17 10/19/2005 Upper Aquifer
Volatile Organic Compounds							
Benzene	ug/l	< 1.0 U	< 1.0 U	< 5.0 U	< 10 U	< 1.0 U	< 1.8 U
1,1-Dichloroethane	ug/l	3.0	6.4	36	4.9 J	3.4	0.70 J
1,1-Dichloroethene	ug/l	< 1.0 U	0.69 J	1.8 J	< 10 U	< 1.0 U	< 1.8 U
cis-1,2-Dichloroethene	ug/l	3.1	7.4	190	< 10 U	20	3.1
trans-1,2-Dichloroethene	ug/l	< 1.0 U	0.36 J	9.3	< 10 U	22	0.57 J
Ethylbenzene	ug/l	< 1.0 U	< 1.0 U	< 5.0 U	< 10 U	< 1.0 U	< 1.8 U
Tetrachloroethene	ug/l	47	50	29	< 10 U	< 1.0 U	45
Toluene	ug/l	< 1.0 U	< 1.0 U	< 5.0 U	< 10 U	< 1.0 U	< 1.8 U
1,1,1-Trichloroethane	ug/l	5.9	18	12	< 10 U	4.3	< 1.8 U
Trichloroethene	ug/l	23	71	240	< 10 U	1.8	8.3
Vinyl chloride	ug/l	1.2	1.0	23	< 10 U	13	< 1.8 U
Xylene (total)	ug/l	< 2.0 U	< 2.0 U	< 10 U	< 20 U	< 2.0 U	< 3.7 U

ug/l - Micrograms per liter.
All QA/QC results for 2005 data are shown in Appendix C.
< - Constituent not detected above laboratory reporting limit shown.
J - Value is estimated.
U - Constituent not detected above laboratory reporting limit shown.

Table C-1. Summary of Groundwater VOC Analytical Results from Upper/Lower Aquifer Monitoring Wells in October 2005, General Motors Corporation, Moraine, Ohio.

		On-Site			Downgradient of the Site		
	Units	W-2-S 10/19/2005 Upper Aquifer	W-3-S 10/19/2005 Upper Aquifer	W-4-S 10/19/2005 Upper Aquifer	GM-8 10/19/2005 Upper Aquifer	GM-6 10/19/2005 Upper Aquifer	TW-2 10/20/2005 Upper Aquifer
Volatile Organic Compounds							
Benzene	ug/l	< 1.0 U	< 1.0 U	< 1.0 U	3.5	0.49 J	2.5
1,1-Dichloroethane	ug/l	1.2	< 1.0 U	1.4	16	21	12
1,1-Dichloroethene	ug/l	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
cis-1,2-Dichloroethene	ug/l	0.78 J	< 1.0 U	4.3	0.24 J	20	5.3
trans-1,2-Dichloroethene	ug/l	< 1.0 U	< 1.0 U	1.1	0.99 J	2.1	1.4
Ethylbenzene	ug/l	< 1.0 U	< 1.0 U	< 1.0 U	29	< 1.0 U	12
Tetrachloroethene	ug/l	0.36 J	1.0	20	< 1.0 U	0.34 J	< 1.0 U
Toluene	ug/l	< 1.0 U	< 1.0 U	< 1.0 U	0.39 J	< 1.0 U	3.4
1,1,1-Trichloroethane	ug/l	1.6	2.5	2.4	< 1.0 U	< 1.0 U	< 1.0 U
Trichloroethene	ug/l	5.4	2.9	13	< 1.0 U	1.4	< 1.0 U
Vinyl chloride	ug/l	< 1.0 U	< 1.0 U	< 1.0 U	0.73 J	11	4.4
Xylene (total)	ug/l	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U	5.0

ug/l - Micrograms per liter.
All QA/QC results for 2005 data are shown in Appendix C.
< - Constituent not detected above laboratory reporting limit shown.
J - Value is estimated.
U - Constituent not detected above laboratory reporting limit shown.

Table C-1. Summary of Groundwater VOC Analytical Results from Upper/Lower Aquifer Monitoring Wells in October 2005, General Motors Corporation, Moraine, Ohio.

		Downgradient of the Site				
	Units	4S 10/19/2005 Upper Aquifer	DUP 10/19/2005	GM-2 10/19/2005 Upper Aquifer	GM-16 10/19/2005 Upper Aquifer	GM-17 10/20/2005 Upper Aquifer
Volatile Organic Compounds						
Benzene	ug/l	1.6 J	1.6 J	< 1.0 U	< 3.3 U	< 1.0 U
1,1-Dichloroethane	ug/l	2.3 J	2.1	2.0	1.1 J	5.5
1,1-Dichloroethene	ug/l	< 4.0 U	< 2.0 U	< 1.0 U	< 3.3 U	< 1.0 U
cis-1,2-Dichloroethene	ug/l	< 4.0 U	< 2.0 U	6.8	2.8 J	9.0
trans-1,2-Dichloroethene	ug/l	0.95 J	1.0 J	0.26 J	0.90 J	0.57 J
Ethylbenzene	ug/l	1.6 J	1.8 J	< 1.0 U	< 3.3 U	< 1.0 U
Tetrachloroethene	ug/l	< 4.0 U	< 2.0 U	3.6	100	8.1
Toluene	ug/l	< 4.0 U	0.36 J	< 1.0 U	< 3.3 U	< 1.0 U
1,1,1-Trichloroethane	ug/l	< 4.0 U	< 2.0 U	< 1.0 U	1.7 J	1.4
Trichloroethene	ug/l	< 4.0 U	< 2.0 U	4.6	55	29
Vinyl chloride	ug/l	< 4.0 U	< 2.0 U	0.24 J	< 3.3 U	2.0
Xylene (total)	ug/l	< 8.0 U	< 4.0 U	< 2.0 U	< 6.7 U	< 2.0 U

ug/l - Micrograms per liter.
All QA/QC results for 2005 data are shown in Appendix C.
< - Constituent not detected above laboratory reporting limit shown.
J - Value is estimated.
U - Constituent not detected above laboratory reporting limit shown.

Table C-1. Summary of Groundwater VOC Analytical Results from Upper/Lower Aquifer Monitoring Wells in October 2005, General Motors Corporation, Moraine, Ohio.

		Downgradient of the Site				
	Units	GM-18 10/20/2005 Upper Aquifer	DUP 10/20/2005 QA/QC	WSU-24 10/20/2005 Upper Aquifer	GM-10 10/20/2005 Upper Aquifer	GM-26 10/20/2005 Upper Aquifer
Volatile Organic Compounds						
Benzene	ug/l	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
1,1-Dichloroethane	ug/l	15	15	< 1.0 U	< 1.0 U	< 1.0 U
1,1-Dichloroethene	ug/l	0.30 J	0.32 J	< 1.0 U	< 1.0 U	< 1.0 U
cis-1,2-Dichloroethene	ug/l	14	14	< 1.0 U	0.31 J	< 1.0 U
trans-1,2-Dichloroethene	ug/l	1.2	1.2	< 1.0 U	< 1.0 U	< 1.0 U
Ethylbenzene	ug/l	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
Tetrachloroethene	ug/l	21	21	1.2	1.2	1.0
Toluene	ug/l	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
1,1,1-Trichloroethane	ug/l	7.0	7.6	1.5	1.6	< 1.0 U
Trichloroethene	ug/l	70 J	73	11	12	< 1.0 U
Vinyl chloride	ug/l	3.0	3	< 1.0 U	< 1.0 U	< 1.0 U
Xylene (total)	ug/l	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U

ug/l - Micrograms per liter.
All QA/QC results for 2005 data are shown in Appendix C.
< - Constituent not detected above laboratory reporting limit shown.
J - Value is estimated.
U - Constituent not detected above laboratory reporting limit shown.

Table C-1. Summary of Groundwater VOC Analytical Results from Upper/Lower Aquifer Monitoring Wells in October 2005, General Motors Corporation, Moraine, Ohio.

		Downgradient of the Site		On-Site			
	Units	HR-10 10/24/2005 Lower Aquifer	HR-12 10/24/2005 Lower Aquifer	HR-15 10/25/2005 Lower Aquifer	HR-13 10/25/2005 Lower Aquifer	GM-39 10/24/2005 Lower Aquifer	GM-40 10/25/2005 Lower Aquifer
Volatile Organic Compounds							
Benzene	ug/l	< 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	2.1	< 1.0 U	25	< 1.0 U	< 1.0 U
1,1-Dichloroethene	ug/l	< 1.0 U	< 1.0 U	< 1.0 U	0.25 J	< 1.0 U	< 1.0 U
cis-1,2-Dichloroethene	ug/l	< 1.0 U	1.5	2.2	11	< 1.0 U	< 1.0 U
trans-1,2-Dichloroethene	ug/l	< 1.0 U	< 1.0 U	< 1.0 U	1.5	< 1.0 U	< 1.0 U
Ethylbenzene	ug/l	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
Tetrachloroethene	ug/l	< 1.0 U	< 1.0 U	< 1.0 U	0.20 J	< 1.0 U	< 1.0 U
Toluene	ug/l	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
1,1,1-Trichloroethane	ug/l	< 1.0 U	< 1.0 U	< [illegible]	2.3	< 1.0 U	< 1.0 U
Trichloroethene	ug/l	< 1.0 U	< 1.0 U	0.40 J	20	< 1.0 U	< 1.0 U
Vinyl chloride	ug/l	< 1.0 U	0.36 J	14	< 1.0 U	0.77 J	2.9
Xylene (total)	ug/l	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U

ug/l - Micrograms per liter.
All QA/QC results for 2005 data are shown in Appendix C.
< - Constituent not detected above laboratory reporting limit shown.
J - Value is estimated.
U - Constituent not detected above laboratory reporting limit shown.

Table C-1. Summary of Groundwater VOC Analytical Results from Upper/Lower Aquifer Monitoring Wells in October 2005, General Motors Corporation, Moraine, Ohio.

		On-Site				Downgradient of the Site	
	Units	GM-41 10/24/2005 Lower Aquifer	DUP 10/24/2005 QA/QC	GM-42 10/25/2005 Lower Aquifer	GM-19D 10/25/2005 Lower Aquifer	GM-3 10/25/2005 Lower Aquifer	GM-1 10/25/2005 Lower Aquifer
Volatile Organic Compounds							
Benzene	ug/l	< 10 U	< 10 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
1,1-Dichloroethane	ug/l	< 10 U	< 10 U	0.64 J	< 1.0 U	1.6	< 1.0 U
1,1-Dichloroethene	ug/l	< 10 U	< 10 U	0.21 J	< 1.0 U	< 1.0 U	< 1.0 U
cis-1,2-Dichloroethene	ug/l	16	17	17	2.7	4.7	< 1.0 U
trans-1,2-Dichloroethene	ug/l	< 10 U	< 10 U	0.59 J	< 1.0 U	0.66 J	< 1.0 U
Ethylbenzene	ug/l	< 10 U	< 10 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
Tetrachloroethene	ug/l	< 10 U	< 10 U	0.19 J	< 1.0 U	2.0	2.1
Toluene	ug/l	< 10 U	< 10 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
1,1,1-Trichloroethane	ug/l	< 10 U	< 10 U	< 1.0 U	< 1.0 U	0.83 J	0.95 J
Trichloroethene	ug/l	250	290	0.85 J	1.2	14	34
Vinyl chloride	ug/l	< 10 U	< 10 U	0.56 J	15	< 1.0 U	< 1.0 U
Xylene (total)	ug/l	< 20 U	< 20 U	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U

ug/l - Micrograms per liter.
All QA/QC results for 2005 data are shown in Appendix C.
< - Constituent not detected above laboratory reporting limit shown.
J - Value is estimated.
U - Constituent not detected above laboratory reporting limit shown.

Table C-1. Summary of Groundwater VOC Analytical Results from Upper/Lower Aquifer Monitoring Wells in October 2005, General Motors Corporation, Moraine, Ohio.

		Downgradient of the Site						
	Units	DUP 10/25/2005 QA/QC	GM-15 10/26/2005 Lower Aquifer	GM-11 10/26/2005 Lower Aquifer	GM-20D 10/26/2005 Lower Aquifer	DN-13 10/20/2005 Lower Aquifer	GM-9 10/26/2005 Lower Aquifer	MT-69 10/24/2005 Lower Aquifer
Volatile Organic Compounds								
Benzene	ug/l	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
1,1-Dichloroethane	ug/l	< 1.0 U	1.7	< 1.0 U	< 1.0 U	2.0	0.59 J	< 1.0 U
1,1-Dichloroethene	ug/l	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
cis-1,2-Dichloroethene	ug/l	< 1.0 U	1.7	< 1.0 U	< 1.0 U	5.5	0.99 J	< 1.0 U
trans-1,2-Dichloroethene	ug/l	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
Ethylbenzene	ug/l	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
Tetrachloroethene	ug/l	2	< 1.0 U	1.7	2.7	0.38 J	< 1.0 U	< 1.0 U
Toluene	ug/l	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
1,1,1-Trichloroethane	ug/l	1	< 1.0 U	0.75 J	0.73 J	1.5	0.85 J	< 1.0 U
Trichloroethene	ug/l	34	5.9	32	11	7.2	15	< 1.0 U
Vinyl chloride	ug/l	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	2.6	< 1.0 U	< 1.0 U
Xylene (total)	ug/l	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U

ug/l - Micrograms per liter.
All QA/QC results for 2005 data are shown in Appendix C.
< - Constituent not detected above laboratory reporting limit shown.
J - Value is estimated.
U - Constituent not detected above laboratory reporting limit shown.

Table C-1. Summary of Groundwater VOC Analytical Results from Upper/Lower Aquifer Monitoring Wells in October 2005, General Motors Corporation, Moraine, Ohio.

		Equipment Blanks						
	Units	EB 10/18/2005 QA/QC	EB 10/18/2005 QA/QC	EB 10/19/2005 QA/QC	EB 10/20/2005 QA/QC	EB 10/20/2005 QA/QC	EB 10/24/2005 QA/QC	EB 10/25/2005 QA/QC
Volatile Organic Compounds								
Benzene	ug/l	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
1,1-Dichloroethane	ug/l	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
1,1-Dichloroethene	ug/l	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
cis-1,2-Dichloroethene	ug/l	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
trans-1,2-Dichloroethene	ug/l	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
Ethylbenzene	ug/l	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
Tetrachloroethene	ug/l	< 1.0 U	0.77 J	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
Toluene	ug/l	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	0.33 J
1,1,1-Trichloroethane	ug/l	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
Trichloroethene	ug/l	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
Vinyl chloride	ug/l	< 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	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U

ug/l - Micrograms per liter.
All QA/QC results for 2005 data are shown in Appendix C.
< - Constituent not detected above laboratory reporting limit shown.
J - Value is estimated.
U - Constituent not detected above laboratory reporting limit shown.

Table C-1. Summary of Groundwater VOC Analytical Results from Upper/Lower Aquifer Monitoring Wells in October 2005, General Motors Corporation, Moraine, Ohio.

		Trip Blanks				
	Units	TB 10/17/2005 QA/QC	TB 10/18/2005 QA/QC	TB 10/19/2005 QA/QC	TB 10/20/2005 QA/QC	TB 10/24/2005 QA/QC
Volatile Organic Compounds						
Benzene	ug/l	< 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
1,1-Dichloroethene	ug/l	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
cis-1,2-Dichloroethene	ug/l	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
trans-1,2-Dichloroethene	ug/l	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
Ethylbenzene	ug/l	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
Tetrachloroethene	ug/l	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
Toluene	ug/l	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
1,1,1-Trichloroethane	ug/l	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
Trichloroethene	ug/l	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
Vinyl chloride	ug/l	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
Xylene (total)	ug/l	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U

ug/l - Micrograms per liter.
All QA/QC results for 2005 data are shown in Appendix C.
< - Constituent not detected above laboratory reporting limit shown.
J - Value is estimated.
U - Constituent not detected above laboratory reporting limit shown.

Appendix D

Soil Boring and Well Construction Logs for RZ-3 Expansion

ARCADIS

Log of Boring: RZ-3RR

General Motors Corporation — Moraine, Ohio

Depth (feet)	Blows (/6 in.)	Recovery (Inches)	OVA (PPM)	Soil Class.	Description	Depth to Water
0	N/A	24	-		ASPHALT	
				FILL	FILL Brown, gravely clay with sand and gravel, fill, dry	
2	N/A	24	-		CONCRETE	
				ML	SILT Brown, clayey silt with sand and gravel, hard, no plasticity, dry	
4	N/A	24	1.1	ML	SILT Brown, clayey silt with sand and gravel, hard, no plasticity, dry	
6	N/A	24	1.0	SW	SAND Fine to coarse grained sand (60%) and gravel (40%), dry, well graded	
8	N/A	24	2.3	SW	SAND Fine to coarse grained sand (60%) and gravel (40%), dry, well graded	
10	N/A	24	2.8	SW	SAND Fine to coarse grained sand (80%) and cobble-sized gravel (20%), dry, well graded	
12						

☒ Composite Sample to Lab ■ Grab Sample to Lab ▯ Split-Spoon Not Analyzed

Drilling Co.: Prosonic
Driller: D. O'Mara
Drilling Method: Rotosonic
Drilling Fluid: Water

Geologist: D. Manzo
Total Depth: 60
Surface Elev.: 724.61
North Coor.: 39°41'22.213"

Begin Drilling: 5/2/05 @ 1443
End Drilling: 5/2/05 @ 1525
Converted to Well: Y Well I.D.: RZ-3RR
East Coor.: 84°13'21.312"

Remarks:

Project No.: OH000294.0007.00008 Datum: Filename: RZ May 2005 Soil Boring

ARCADIS

Log of Boring: RZ-3RR

General Motors Corporation — Moraine, Ohio

Depth (feet)	Blows (/6 in.)	Recovery (Inches)	OVA (PPM)	Sample Analysis	Sample Type	Graphic Log	Soil Class.	Description	Depth to Water
12	N/A	24	2.3				SW	SAND Fine to coarse grained sand (80%) and cobble-sized gravel (20%), dry, well graded	
14	N/A	24	1.8				SW	SAND Fine to coarse grained sand (80%) and cobble-sized gravel (20%), dry, well graded	
16	N/A	24	1.0				SW	SAND Fine to coarse grained sand (80%) and cobble-sized gravel (20%), dry, well graded	
18	N/A	24	1.8				SW	SAND Fine to coarse grained sand (80%) and cobble-sized gravel (20%), dry, well graded	
20	N/A	24	0.8				SW	SAND Wet (saturated), medium to coarse grained sand (75%) and gravel (25%), cobbles visible, well graded	▼
22	N/A	24	2.2				SW	SAND Wet (saturated), medium to coarse grained sand (75%) and gravel (25%), cobbles visible, well graded	
24									

☒ Composite Sample to Lab ■ Grab Sample to Lab ▯ Split-Spoon Not Analyzed

Drilling Co.: Prosonic
Driller: D. O'Mara
Drilling Method: Rotosonic
Drilling Fluid: Water

Geologist: D. Manzo
Total Depth: 60
Surface Elev.: 724.61
North Coor.: 39°41'22.213"

Begin Drilling: 5/2/05 @ 1443
End Drilling: 5/2/05 @ 1525
Converted to Well: Y Well I.D.: RZ-3RR
East Coor.: 84°13'21.312"

Remarks:

Project No.: OH000294.0007.00008 Datum: Filename: RZ May 2005 Soil Boring

ARCADIS

Log of Boring: RZ-3RR

General Motors Corporation — Moraine, Ohio

Depth (feet)	Blows (/6 in.)	Recovery (Inches)	OVA (PPM)	Sample Analysis	Sample Type	Graphic Log	Soil Class.	Description	Depth to Water
24	N/A	24	1.1				SW	SAND Wet (saturated), medium to coarse grained sand (75%) and gravel (25%), cobbles visible, well graded	
26	N/A	24	0.8				GW	GRAVEL Wet (saturated), medium to coarse grained sand (25%) and gravel (75), cobbles visible, well graded	
28	N/A	24	1.1				SW	SAND Wet (saturated), medium to coarse grained sand (75%) and gravel (25%), cobbles visible, well graded	
30	N/A	24	1.1				SW	SAND Wet (saturated), medium to coarse grained sand (75%) and gravel (25%), cobbles visible, well graded	
32	N/A	24	1.3				SW	SAND Wet (saturated), medium to coarse grained sand (75%) and gravel (25%), cobbles visible, well graded	
34	N/A	24	1.1				SW	SAND Wet (saturated), medium to coarse grained sand (75%) and gravel (25%), cobbles visible, well graded	
36									

☒ Composite Sample to Lab ■ Grab Sample to Lab ▥ Split-Spoon Not Analyzed

Drilling Co.: Prosonic
Driller: D. O'Mara
Drilling Method: Rotosonic
Drilling Fluid: Water

Geologist: D. Manzo
Total Depth: 60
Surface Elev.: 724.61
North Coor.: 39°41'22.213"

Begin Drilling: 5/2/05 @ 1443
End Drilling: 5/2/05 @ 1525
Converted to Well: Y Well I.D.: RZ-3RR
East Coor.: 84°13'21.312"

Remarks:

Project No.: OH000294.0007.00008 Datum: Filename: RZ May 2005 Soil Boring

ARCADIS

Log of Boring: RZ-3RR

General Motors Corporation — Moraine, Ohio

Depth (feet)	Blows (/6 in.)	Recovery (Inches)	OVA (PPM)	Sample Analysis	Sample Type	Graphic Log	Soil Class.	Description	Depth to Water
36	N/A	24	1.1				SW	SAND Wet (saturated), medium to coarse grained sand (75%) and gravel (25%), cobbles visible, well graded	
38	N/A	24	1.3				SW	SAND Wet (saturated), medium to coarse grained sand (75%) and gravel (25%), cobbles visible, well graded	
40	N/A	24	0.8				SW	SAND Wet (saturated), medium to coarse grained sand (75%) and gravel (25%), cobbles visible, well graded	
42	N/A	24	1.1				SW	SAND Wet (saturated), medium to coarse grained sand (75%) and gravel (25%), cobbles visible, well graded	
44	N/A	24	1.1				SP	SAND Fine to medium grained sand (90%) and gravel (10%), cobbles visible, wet (saturated), poorly graded	
46	N/A	24	0.8				SP	SAND Fine to medium grained sand (90%) and gravel (10%), cobbles visible, wet (saturated), poorly graded	
48									

☒ Composite Sample to Lab ■ Grab Sample to Lab ▯ Split-Spoon Not Analyzed

Drilling Co.: Prosonic
Driller: D. O'Mara
Drilling Method: Rotosonic
Drilling Fluid: Water

Geologist: D. Manzo
Total Depth: 60
Surface Elev.: 724.61
North Coor.: 39°41'22.213"

Begin Drilling: 5/2/05 @ 1443
End Drilling: 5/2/05 @ 1525
Converted to Well: Y Well I.D.: RZ-3RR
East Coor.: 84°13'21.312"

Remarks:

Project No.: OH000294.0007.00008 Datum: Filename: RZ May 2005 Soil Boring

ARCADIS

Log of Boring: RZ-3RR

General Motors Corporation — Moraine, Ohio

Depth (feet)	Blows (/6 in.)	Recovery (Inches)	OVA (PPM)	Sample Analysis	Sample Type	Graphic Log	Soil Class.	Description	Depth to Water
48	N/A	24	1.3				SP	SAND Fine to medium grained sand (90%) and gravel (10%), cobbles visible, wet (saturated), poorly graded	
50	N/A	24	1.1				SW	SAND Medium to coarse grained sand (60%) and gravel (40%), wet (saturated), cobbles visible, well graded	
52	N/A	24	1.1				CL	CLAY Gray, clayey silt, hard, no plasticity, 10% gravel, dry, till	
54	N/A	24	0.8				CL	CLAY Gray, clayey silt, hard, no plasticity, 10% gravel, dry, till	
56	N/A	24	1.1				CL	CLAY Gray, clayey silt, hard, no plasticity, 10% gravel, dry, till	
58	N/A	24	0.8				CL	CLAY Gray, clayey silt, hard, no plasticity, 10% gravel, dry, till	
60									

☒ Composite Sample to Lab ■ Grab Sample to Lab ▥ Split-Spoon Not Analyzed

Drilling Co.: Prosonic
Driller: D. O'Mara
Drilling Method: Rotosonic
Drilling Fluid: Water

Geologist: D. Manzo
Total Depth: 60
Surface Elev.: 724.61
North Coor.: 39°41'22.213"

Begin Drilling: 5/2/05 @ 1443
End Drilling: 5/2/05 @ 1525
Converted to Well: Y Well I.D.: RZ-3RR
East Coor.: 84°13'21.312"

Remarks:

Project No.: OH000294.0007.00008 Datum: Filename: RZ May 2005 Soil Boring

ARCADIS

Log of Boring: RZ-3RR

General Motors Corporation — Moraine, Ohio

Depth (feet)	Blows (/6 in.)	Recovery (Inches)	OVA (PPM)	Sample Analysis	Sample Type	Graphic Log	Soil Class.	Description	Depth to Water
60								End of boring	
62									
64									
66									
68									
70									
72									

☒ Composite Sample to Lab ■ Grab Sample to Lab ▯ Split-Spoon Not Analyzed

Drilling Co.: Prosonic
Driller: D. O'Mara
Drilling Method: Rotosonic
Drilling Fluid: Water
Remarks:

Geologist: D. Manzo
Total Depth: 60
Surface Elev.: 724.61
North Coor.: 39°41'22.213"

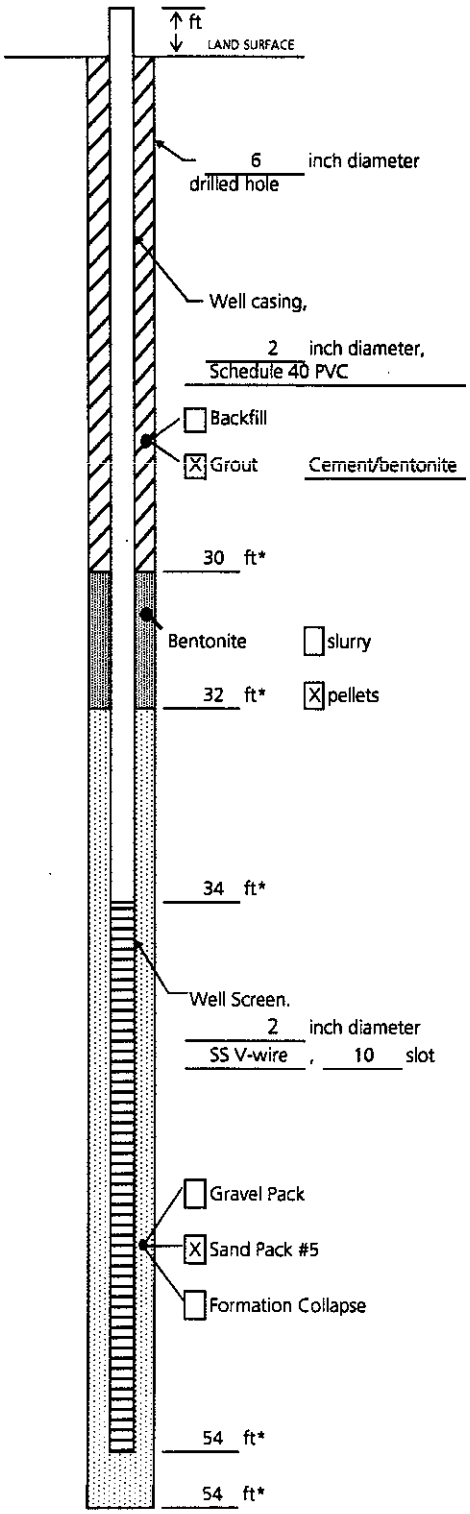
Begin Drilling: 5/2/05 @ 1443
End Drilling: 5/2/05 @ 1525
Converted to Well: Y Well I.D.: RZ-3RR
East Coor.: 84°13'21.312"

Project No.: OH000294.0007.00008 Datum: Filename: RZ May 2005 Soil Boring

ARCADIS

Well Construction Log

(Unconsolidated)



Measuring Point is
Top of Well Casing
Unless Otherwise Noted.

* Depth Below Land Surface

Project OH000294.0007.00008 Well RZ-3RR

Town/City Moraine

County Montgomery State Ohio

Permit No.

Land-Surface (LS) Elevation and Datum:

724.61 feet [X] Surveyed

[ ] Estimated

Installation Date(s) 5/2/2005

Drilling Method Rotosonic

Drilling Contractor Prosonic

Drilling Fluid Potable water

(approximately 125 gallons)

Development Technique(s) and Date(s)

Submersible pump (proactive mini-typhoon)

Fluid Loss During Drilling N/A gallons

Water Removed During Development 60 gallons

Static Depth to Water NM feet below M.P.

Pumping Depth to Water NM feet below M.P.

Pumping Duration 0.50 hours

Yield 2 gpm Date 5/2/2005

Specific Capacity NM gpm/ft

Well Purpose Introduction well

Remarks

Prepared by J. Manzo

ARCADIS

Log of Boring: RZ-3SS

General Motors Corporation — Moraine, Ohio

Depth (feet)	Blows (/6 in.)	Recovery (Inches)	OVA (PPM)	Sample Analysis	Sample Type	Graphic Log	Soil Class.	Description	Depth to Water
0	N/A	24	-					ASPHALT	
							FILL	FILL Gravely sand with silt, dry	
2	N/A	24	1.0				FILL	FILL 8" asphalt, gravely sand with silt, dry Concrete	
							ML	SILT Dark gray, clayey silt, dry, no plasticity, hard, 10% sand and gravel	
4	N/A	24	1.1				ML	SILT Dark gray, clayey silt, dry, no plasticity, hard, 10% sand and gravel	
6	N/A	24	0.8				ML	SILT Dark gray, clayey silt, dry, no plasticity, hard, 10% sand and gravel	
8	N/A	24	1.0				SW	SAND Fine to coarse grained sand (75%) and gravel (25%), cobbles visible, dry, well graded	
10	N/A	24	1.1				SW	SAND Fine to coarse grained sand (75%) and gravel (25%), cobbles visible, dry, well graded	
12									

☒ Composite Sample to Lab ■ Grab Sample to Lab ▯ Split-Spoon Not Analyzed

Drilling Co.: Prosonic
Driller: D. O'Mara
Drilling Method: Rotosonic
Drilling Fluid: Water

Geologist: D. Manzo
Total Depth: 60
Surface Elev.: 724.57
North Coor.: 39°41'22.124"

Begin Drilling: 5/2/05 @ 10:15
End Drilling: 5/2/05 @ 10:58
Converted to Well: Y Well I.D.: RZ-3SS
East Coor.: 84°13'21.149"

Remarks:

Project No.: OH000294.0007.00008 Datum: Filename: RZ May 2005 Soil Boring

ARCADIS

Log of Boring: RZ-3SS

General Motors Corporation — Moraine, Ohio

Depth (feet)	Blows (/6 in.)	Recovery (Inches)	OVA (PPM)	Sample Analysis	Sample Type	Graphic Log	Soil Class.	Description	Depth to Water
12	N/A	24	2.3				SW	SAND Fine to coarse grained sand (75%) and gravel (25%), cobbles visible, dry, well graded	
14	N/A	24	2.0				SW	SAND Fine to coarse grained sand (75%) and gravel (25%), cobbles visible, dry, well graded	
16	N/A	24	1.8				SW	SAND Fine to coarse grained sand (75%) and gravel (25%), cobbles visible, dry, well graded	
18	N/A	24	1.0				SW	SAND Fine to coarse grained sand (75%) and gravel (25%), cobbles visible, dry, well graded	
20	N/A	24	1.0				SW	SAND Medium to coarse-grained sand (80%) and gravel (20%), wet (saturated), cobbles visible	▼
22	N/A	24	1.3				SW	SAND Medium to coarse-grained sand (80%) and gravel (20%), wet (saturated), cobbles visible	
24									

☒ Composite Sample to Lab ■ Grab Sample to Lab ▯ Split-Spoon Not Analyzed

Drilling Co.: Prosonic
Driller: D. O'Mara
Drilling Method: Rotosonic
Drilling Fluid: Water

Geologist: D. Manzo
Total Depth: 60
Surface Elev.: 724.57
North Coor.: 39°41'22.124"

Begin Drilling: 5/2/05 @ 10:15
End Drilling: 5/2/05 @ 10:58
Converted to Well: Y Well I.D.: RZ-3SS
East Coor.: 84°13'21.149"

Remarks:

Project No.: OH000294.0007.00008 Datum: Filename: RZ May 2005 Soil Boring

ARCADIS

Log of Boring: RZ-3SS

General Motors Corporation — Moraine, Ohio

Depth (feet)	Blows (/6 in.)	Recovery (Inches)	OVA (PPM)	Sample Analysis	Sample Type	Graphic Log	Soil Class.	Description	Depth to Water
24	N/A	24	0.8				SW	SAND Medium to coarse-grained sand (80%) and gravel (20%), wet (saturated), cobbles visible	
26	N/A	24	1.1				SW	SAND Medium to coarse-grained sand (80%) and gravel (20%), wet (saturated), cobbles visible	
28	N/A	24	0.8				SW	SAND Medium to coarse-grained sand (80%) and gravel (20%), wet (saturated), cobbles visible	
30	N/A	24	1.1				SW	SAND Medium to coarse-grained sand (80%) and gravel (20%), wet (saturated), cobbles visible	
32	N/A	24	0.8				SW	SAND Medium to coarse-grained sand (80%) and gravel (20%), wet (saturated), cobbles visible	
34	N/A	24	0.8				SW	SAND Medium to coarse-grained sand (80%) and gravel (20%), wet (saturated), cobbles visible	
36									

☒ Composite Sample to Lab ■ Grab Sample to Lab ▯ Split-Spoon Not Analyzed

Drilling Co.: Prosonic
Driller: D. O'Mara
Drilling Method: Rotosonic
Drilling Fluid: Water

Geologist: D. Manzo
Total Depth: 60
Surface Elev.: 724.57
North Coor.: 39°41'22.124"

Begin Drilling: 5/2/05 @ 10:15
End Drilling: 5/2/05 @ 10:58
Converted to Well: Y Well I.D.: RZ-3SS
East Coor.: 84°13'21.149"

Remarks:

Project No.: OH000294.0007.00008 Datum: Filename: RZ May 2005 Soil Boring

ARCADIS

Log of Boring: RZ-3SS

General Motors Corporation — Moraine, Ohio

Depth (feet)	Blows (/6 in.)	Recovery (Inches)	OVA (PPM)	Sample Analysis	Sample Type	Graphic Log	Soil Class.	Description	Depth to Water
36	N/A	24	1.0				SW	SAND Medium to coarse-grained sand (80%) and gravel (20%), wet (saturated), cobbles visible	
38	N/A	24	1.3				SW	SAND Medium to coarse-grained sand (80%) and gravel (20%), wet (saturated), very large cobbles visible	
40	N/A	24	0.8				SP	SAND Fine grained sand and silt, 10% gravel, poorly sorted, wet (saturated), cobbles visible	
42	N/A	24	1.3				SP	SAND Fine grained sand and silt, 10% gravel, poorly sorted, wet (saturated), cobbles visible	
44	N/A	24	1.3				SP	SAND Fine grained sand and silt, 10% gravel, poorly sorted, wet (saturated), cobbles visible	
46	N/A	24	0.8				SP	SAND Fine grained sand and silt, 10% gravel, poorly sorted, wet (saturated), cobbles visible	
48									

☒ Composite Sample to Lab ■ Grab Sample to Lab ▥ Split-Spoon Not Analyzed

Drilling Co.: Prosonic
Driller: D. O'Mara
Drilling Method: Rotosonic
Drilling Fluid: Water

Geologist: D. Manzo
Total Depth: 60
Surface Elev.: 724.57
North Coor.: 39°41'22.124"

Begin Drilling: 5/2/05 @ 10:15
End Drilling: 5/2/05 @ 10:58
Converted to Well: Y Well I.D.: RZ-3SS
East Coor.: 84°13'21.149"

Remarks:

Project No.: OH000294.0007.00008 Datum: Filename: RZ May 2005 Soil Boring

ARCADIS

Log of Boring: RZ-3SS

General Motors Corporation — Moraine, Ohio

Depth (feet)	Blows (/6 in.)	Recovery (Inches)	OVA (PPM)	Sample Analysis	Sample Type	Graphic Log	Soil Class.	Description	Depth to Water
48	N/A	24	1.1				SP	SAND Fine grained sand and silt, 10% gravel, poorly sorted, wet (saturated), cobbles visible	
50	N/A	24	0.8				SW	SAND medium to coarse grained sand and gravel, wet (saturated), well graded	
52	N/A	24	1.3				CL	CLAY Gray, clayey silt, hard, no plasticity, dry, till, 10% gravel	
54	N/A	24	1.1				CL	CLAY Gray, clayey silt, hard, no plasticity, dry, till, 10% gravel	
56	N/A	24	1.1				CL	CLAY Gray, clayey silt, hard, no plasticity, dry, till, 10% gravel	
58	N/A	24	0.8				CL	CLAY Gray, clayey silt, hard, no plasticity, dry, till, 10% gravel	
60									

☒ Composite Sample to Lab ■ Grab Sample to Lab ▯ Split-Spoon Not Analyzed

Drilling Co.: Prosonic
Driller: D. O'Mara
Drilling Method: Rotosonic
Drilling Fluid: Water

Geologist: D. Manzo
Total Depth: 60
Surface Elev.: 724.57
North Coor.: 39°41'22.124"

Begin Drilling: 5/2/05 @ 10:15
End Drilling: 5/2/05 @ 10:58
Converted to Well: Y Well I.D.: RZ-3SS
East Coor.: 84°13'21.149"

Remarks:

Project No.: OH000294.0007.00008 Datum: Filename: RZ May 2005 Soil Boring

ARCADIS

Log of Boring: RZ-3SS

General Motors Corporation — Moraine, Ohio

Depth (feet)	Blows (/6 in.)	Recovery (Inches)	OVA (PPM)	Sample Analysis	Sample Type	Graphic Log	Soil Class.	Description	Depth to Water
60								End of boring	
62									
64									
66									
68									
70									
72									

☒ Composite Sample to Lab ■ Grab Sample to Lab ▯ Split-Spoon Not Analyzed

Drilling Co.: Prosonic
Driller: D. O'Mara
Drilling Method: Rotosonic
Drilling Fluid: Water

Geologist: D. Manzo
Total Depth: 60
Surface Elev.: 724.57
North Coor.: 39°41'22.124"

Begin Drilling: 5/2/05 @ 10:15
End Drilling: 5/2/05 @ 10:58
Converted to Well: Y Well I.D.: RZ-3SS
East Coor.: 84°13'21.149"

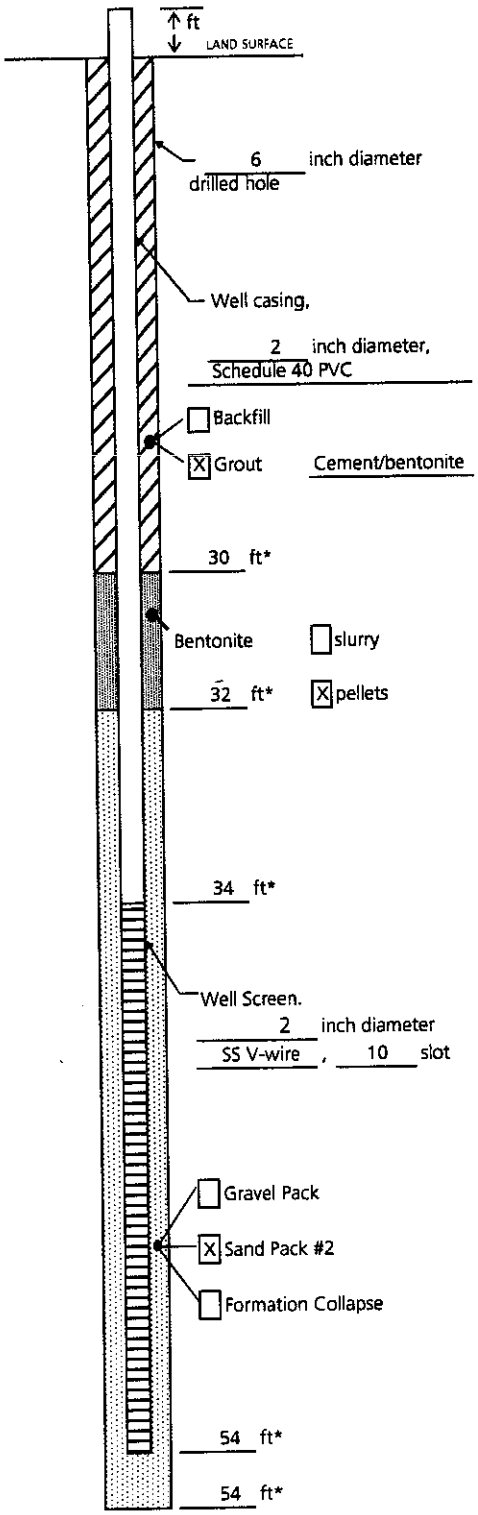
Remarks:

Project No.: OH000294.0007.00008 Datum: Filename: RZ May 2005 Soil Boring

ARCADIS

Well Construction Log

(Unconsolidated)



Measuring Point is
Top of Well Casing
Unless Otherwise Noted.

* Depth Below Land Surface

Project OH000294.0007.00008 Well RZ-3SS

Town/City Moraine

County Montgomery State Ohio

Permit No.

Land-Surface (LS) Elevation and Datum:

724.57 feet [X] Surveyed [ ] Estimated

Installation Date(s) 5/2/2005

Drilling Method Rotosonic

Drilling Contractor Prosonic

Drilling Fluid Potable water

(approximately 120 gallons)

Development Technique(s) and Date(s)

Submersible pump (proactive mini-typhoon)

Fluid Loss During Drilling N/A gallons

Water Removed During Development 60 gallons

Static Depth to Water NM feet below M.P.

Pumping Depth to Water NM feet below M.P.

Pumping Duration 0.50 hours

Yield 2 gpm Date 5/2/2005

Specific Capacity NM gpm/ft

Well Purpose Introduction well

Remarks

Prepared by J. Manzo

ARCADIS

Log of Boring: RZ-3TT

General Motors Corporation — Moraine, Ohio

Depth (feet)	Blows (/6 in.)	Recovery (Inches)	OVA (PPM)	Sample Analysis	Sample Type	Graphic Log	Soil Class.	Description	Depth to Water
0	N/A	24	-					ASPHALT	
							FILL	FILL Concrete and limestone aggregate	
2	N/A	24	1.0				FILL	FILL Black, sandy silt with clay, no plasticity, poorly sorted, pea gravel visible, fill, dry	
4	N/A	24	1.1				ML	SILT Dark gray, clayey silt with sand, no plasticity, medium hardness, dry	
6	N/A	24	1.0				ML	SILT Dark gray, clayey silt with sand, no plasticity, medium hardness, dry	
8	N/A	24	1.1				ML	SILT Brown, clayey silt, low plasticity, dry, medium hardness	
10	N/A	24	1.0				ML	SILT Brown, clayey silt, low plasticity, dry, medium hardness	
							SW	SAND Dry, fine to medium grained sand (50%) and gravel (50%), cobbles visible	
12									

☒ Composite Sample to Lab ■ Grab Sample to Lab ▥ Split-Spoon Not Analyzed

Drilling Co.: Prosonic
Driller: D. O'Mara
Drilling Method: Rotosonic
Drilling Fluid: Water

Geologist: D. Manzo
Total Depth: 60
Surface Elev.: 724.53
North Coor.: 39°41'22.034"

Begin Drilling: 4/29/05 @ 8:04
End Drilling: 4/29/05 @ 9:03
Converted to Well: Y Well I.D.: RZ-3TT
East Coor.: 84°13'21.022"

Remarks:

Project No.: OH000294.0007.00008 Datum: Filename: RZ May 2005 Soil Boring

ARCADIS

Log of Boring: RZ-3TT

General Motors Corporation — Moraine, Ohio

Depth (feet)	Blows (/6 in.)	Recovery (Inches)	OVA (PPM)	Sample Analysis	Sample Type	Graphic Log	Soil Class.	Description	Depth to Water
12	N/A	24	1.1				SW	SAND Dry, fine to medium grained sand (50%) and gravel (50%), cobbles visible	
14	N/A	24	1.1				SW	SAND Dry, fine to medium grained sand (50%) and gravel (50%), cobbles visible	
16	N/A	24	1.4				SW	SAND Dry, fine to medium grained sand (50%) and gravel (50%), cobbles visible	
18	N/A	24	1.8				SW	SAND Dry, fine to medium grained sand (50%) and gravel (50%), cobbles visible	
20	N/A	24	1.1				GW	GRAVEL Wet (saturated), coarse-grained gravel (60%), cobbles and fine to coarse grained sand (40%), well graded	▼
22	N/A	24	1.1				GW	GRAVEL Wet (saturated), coarse-grained gravel (60%), cobbles and fine to coarse grained sand (40%), well graded	
24									

☒ Composite Sample to Lab ■ Grab Sample to Lab ☐ Split-Spoon Not Analyzed

Drilling Co.: Prosonic
Driller: D. O'Mara
Drilling Method: Rotosonic
Drilling Fluid: Water

Geologist: D. Manzo
Total Depth: 60
Surface Elev.: 724.53
North Coor.: 39°41'22.034"

Begin Drilling: 4/29/05 @ 8:04
End Drilling: 4/29/05 @ 9:03
Converted to Well: Y Well I.D.: RZ-3TT
East Coor.: 84°13'21.022"

Remarks:

Project No.: OH000294.0007.00008 Datum: Filename: RZ May 2005 Soil Boring

ARCADIS

Log of Boring: RZ-3TT

General Motors Corporation — Moraine, Ohio

Depth (feet)	Blows (/6 in.)	Recovery (Inches)	OVA (PPM)	Sample Analysis	Sample Type	Graphic Log	Soil Class.	Description	Depth to Water
24	N/A	24	1.0				SW	SAND Fine to coarse grained sand (75%) and gravel (25%), wet (saturated), well graded	
26	N/A	24	1.1				SW	SAND Fine to coarse grained sand (75%) and gravel (25%), wet (saturated), well graded	
28	N/A	24	0.8				SW	SAND Fine to coarse grained sand (75%) and gravel (25%), wet (saturated), well graded	
30	N/A	24	1.1				SW	SAND Fine to coarse grained sand (75%) and gravel (25%), wet (saturated), well graded	
32	N/A	24	0.8				SW	SAND Fine to coarse grained sand (75%) and gravel (25%), wet (saturated), well graded	
34	N/A	24	1.0				GW	GRAVEL Medium grained gravel (80%) and medium to coarse grained sand (20%), wet (saturated)	
36									

☒ Composite Sample to Lab ■ Grab Sample to Lab ▥ Split-Spoon Not Analyzed

Drilling Co.: Prosonic
Driller: D. O'Mara
Drilling Method: Rotosonic
Drilling Fluid: Water

Geologist: D. Manzo
Total Depth: 60
Surface Elev.: 724.53
North Coor.: 39°41'22.034"

Begin Drilling: 4/29/05 @ 8:04
End Drilling: 4/29/05 @ 9:03
Converted to Well: Y Well I.D.: RZ-3TT
East Coor.: 84°13'21.022"

Remarks:

Project No.: OH000294.0007.00008 Datum: Filename: RZ May 2005 Soil Boring

ARCADIS

Log of Boring: RZ-3TT

General Motors Corporation — Moraine, Ohio

Depth (feet)	Blows (/6 in.)	Recovery (Inches)	OVA (PPM)	Sample Analysis	Sample Type	Graphic Log	Soil Class.	Description	Depth to Water
36	N/A	24	0.8				GW	GRAVEL Medium grained gravel (80%) and medium to coarse grained sand (20%), wet (saturated)	
							SW	SAND Fine to coarse sand (75%) and gravel (25%), wet (saturated), well graded	
38	N/A	24	0.8				SW	SAND Fine to coarse sand (75%) and gravel (25%), wet (saturated), well graded	
40	N/A	24	0.8				SW	SAND Fine to coarse sand (75%) and gravel (25%), wet (saturated), well graded	
42	N/A	24	1.1				SW	SAND Fine to medium grained sand (90%) and gravel (10%), wet (saturated), cobbles visible	
44	N/A	24	1.1				SP	SAND Fine grained sand (90%) and gravel (10%), wet (saturated), poorly graded	
46	N/A	24	1.0				SP	SAND Fine grained sand (90%) and gravel (10%), wet (saturated), poorly graded	
48									

☒ Composite Sample to Lab ■ Grab Sample to Lab ▥ Split-Spoon Not Analyzed

Drilling Co.: Prosonic
Driller: D. O'Mara
Drilling Method: Rotosonic
Drilling Fluid: Water

Geologist: D. Manzo
Total Depth: 60
Surface Elev.: 724.53
North Coor.: 39°41'22.034"

Begin Drilling: 4/29/05 @ 8:04
End Drilling: 4/29/05 @ 9:03
Converted to Well: Y Well I.D.: RZ-3TT
East Coor.: 84°13'21.022"

Remarks:

Project No.: OH000294.0007.00008 Datum: Filename: RZ May 2005 Soil Boring

ARCADIS

Log of Boring: RZ-3TT

General Motors Corporation — Moraine, Ohio

Depth (feet)	Blows (/6 in.)	Recovery (Inches)	OVA (PPM)	Sample Analysis	Sample Type	Graphic Log	Soil Class.	Description	Depth to Water
48	N/A	24	1.1				SP	SAND Fine grained sand (90%) and gravel (10%), wet (saturated), poorly graded	
50	N/A	24	0.8				SW	SAND Coarse grained sand and gravel with gray clay, no plasticity, well graded, wet (saturated)	
52	N/A	24	1.1				ML	CLAY Gray, clayey silt, hard, no plasticity, dry, 10% gravel, till	
54	N/A	24	0.8				ML	CLAY Gray, clayey silt, hard, no plasticity, dry, 10% gravel, till	
56	N/A	24	1.0				ML	CLAY Gray, clayey silt, hard, no plasticity, dry, 10% gravel, till	
58	N/A	24	1.0				ML	CLAY Gray, clayey silt, hard, no plasticity, dry, 10% gravel, till	
60									

☒ Composite Sample to Lab ■ Grab Sample to Lab ▯ Split-Spoon Not Analyzed

Drilling Co.: Prosonic
Driller: D. O'Mara
Drilling Method: Rotosonic
Drilling Fluid: Water

Geologist: D. Manzo
Total Depth: 60
Surface Elev.: 724.53
North Coor.: 39°41'22.034"

Begin Drilling: 4/29/05 @ 8:04
End Drilling: 4/29/05 @ 9:03
Converted to Well: Y Well I.D.: RZ-3TT
East Coor.: 84°13'21.022"

Remarks:

Project No.: OH000294.0007.00008 Datum: Filename: RZ May 2005 Soil Boring

ARCADIS

Log of Boring: RZ-3TT

General Motors Corporation — Moraine, Ohio

Depth (feet)	Blows (/6 in.)	Recovery (Inches)	OVA (PPM)	Sample Analysis	Sample Type	Graphic Log	Soil Class.	Description	Depth to Water
60								End of boring	
62									
64									
66									
68									
70									
72									

☒ Composite Sample to Lab ■ Grab Sample to Lab ▯ Split-Spoon Not Analyzed

Drilling Co.: Prosonic
Driller: D. O'Mara
Drilling Method: Rotosonic
Drilling Fluid: Water

Geologist: D. Manzo
Total Depth: 60
Surface Elev.: 724.53
North Coor.: 39°41'22.034"

Begin Drilling: 4/29/05 @ 8:04
End Drilling: 4/29/05 @ 9:03
Converted to Well: Y Well I.D.: RZ-3TT
East Coor.: 84°13'21.022"

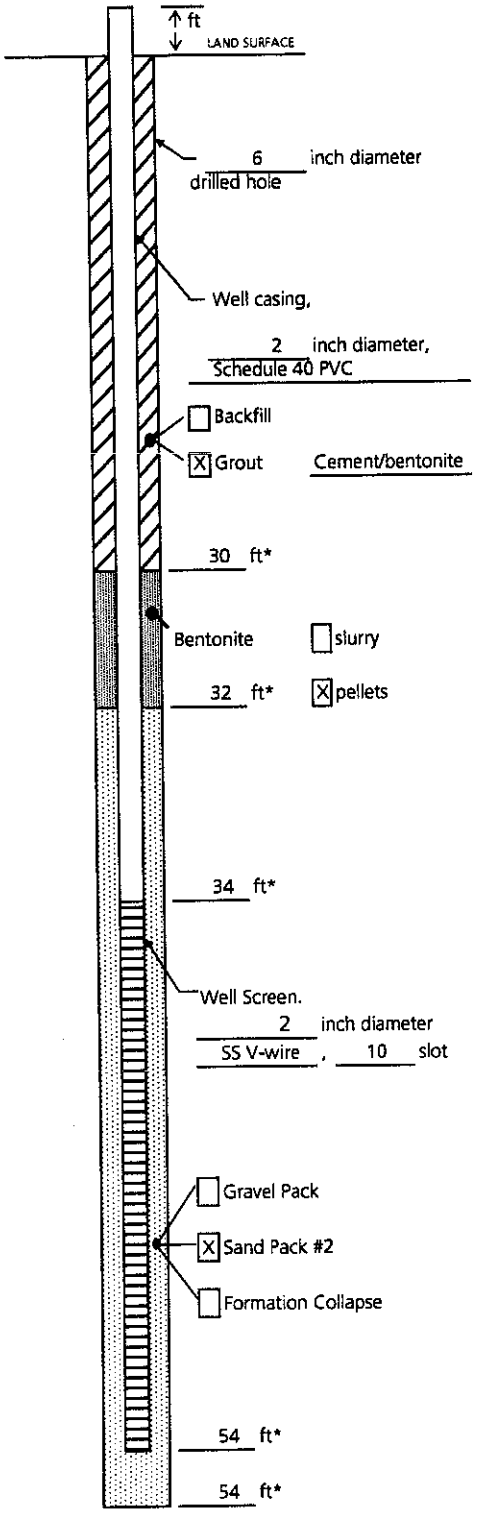
Remarks:

Project No.: OH000294.0007.00008 Datum: Filename: RZ May 2005 Soil Boring

ARCADIS

Well Construction Log

(Unconsolidated)



Measuring Point is
Top of Well Casing
Unless Otherwise Noted.

* Depth Below Land Surface

Project OH000294.0007.00008 Well RZ-3TT

Town/City Moraine

County Montgomery State Ohio

Permit No.

Land-Surface (LS) Elevation and Datum:

724.53 feet ☒ Surveyed ☐ Estimated

Installation Date(s) 4/29/2005

Drilling Method Rotosonic

Drilling Contractor Prosonic

Drilling Fluid Potable water

(approximately 120 gallons)

Development Technique(s) and Date(s)

Submersible pump (proactive mini-typhoon)

Fluid Loss During Drilling N/A gallons

Water Removed During Development 60 gallons

Static Depth to Water NM feet below M.P.

Pumping Depth to Water NM feet below M.P.

Pumping Duration 0.50 hours

Yield 2 gpm Date 5/2/2005

Specific Capacity NM gpm/ft

Well Purpose Introduction well

Remarks

Prepared by J. Manzo

ARCADIS

Log of Boring: RZ-3UU

General Motors Corporation — Moraine, Ohio

Depth (feet)	Blows (/6 in.)	Recovery (Inches)	OVA (PPM)	Sample Analysis	Sample Type	Graphic Log	Soil Class.	Description	Depth to Water
0	N/A	24	9.3					ASPHALT	
							FILL	FILL Brown, clay silt with gravel, concrete, brick present	
2	N/A	24	7.8				ML	SILT Black, clayey silt with gravel, hard, no plasticity, dry	
4	N/A	24	6.5				ML	SILT Black, clayey silt with gravel, hard, no plasticity, dry	
6	N/A	24	38.5				ML	SILT Black, clayey silt with gravel, hard, no plasticity, dry, hydrocarbon odor present	
8	N/A	24	44.5				ML	SILT Black, clayey silt with gravel, hard, no plasticity, dry, hydrocarbon odor present	
10	N/A	24	20.9				ML	SILT Brown, clayey silt, medium hardness, dry, slight plasticity	
12									

☒ Composite Sample to Lab ■ Grab Sample to Lab ▯ Split-Spoon Not Analyzed

Drilling Co.: Prosonic
Driller: D. O'Mara
Drilling Method: Rotosonic
Drilling Fluid: Water

Geologist: D. Manzo
Total Depth: 60
Surface Elev.: 723.97
North Coor.: 39°41'21.899"

Begin Drilling: 4/28/05 @ 1448
End Drilling: 4/28/05 @ 1531
Converted to Well: Y Well I.D.: RZ-3UU
East Coor.: 84°13'20.915"

Remarks:

Project No.: OH000294.0007.00008 Datum: Filename: RZ May 2005 Soil Boring

ARCADIS

Log of Boring: RZ-3UU

General Motors Corporation — Moraine, Ohio

Depth (feet)	Blows (/6 in.)	Recovery (Inches)	OVA (PPM)	Sample Analysis	Sample Type	Graphic Log	Soil Class.	Description	Depth to Water
12	N/A	24	14.1				SW	SAND Fine to coarse grained sand (75%) and gravel (25%), cobbles visible, dry, well graded	
14	N/A	24	4.2				SW	SAND Fine to coarse grained sand (75%) and gravel (25%), cobbles visible, dry, well graded	
16	N/A	24	1.8				SW	SAND Fine to coarse grained sand (75%) and gravel (25%), cobbles visible, dry, well graded	
18	N/A	24	1.3				SW	SAND Fine to coarse grained sand (75%) and gravel (25%), cobbles visible, dry, well graded	
20	N/A	24	1.0				SW	SAND Fine to coarse sand (50%) and gravel (50%), well graded, cobbles visible	▼
22	N/A	24	2.1				SW	SAND Fine to coarse sand (50%) and gravel (50%), well graded, cobbles visible	
24									

☒ Composite Sample to Lab ■ Grab Sample to Lab ▯ Split-Spoon Not Analyzed

Drilling Co.: Prosonic
Driller: D. O'Mara
Drilling Method: Rotosonic
Drilling Fluid: Water

Geologist: D. Manzo
Total Depth: 60
Surface Elev.: 723.97
North Coor.: 39°41'21.899"

Begin Drilling: 4/28/05 @ 1448
End Drilling: 4/28/05 @ 1531
Converted to Well: Y Well I.D.: RZ-3UU
East Coor.: 84°13'20.915"

Remarks:

Project No.: OH000294.0007.00008 Datum: Filename: RZ May 2005 Soil Boring

ARCADIS

Log of Boring: RZ-3UU

General Motors Corporation — Moraine, Ohio

Depth (feet)	Blows (/6 in.)	Recovery (Inches)	OVA (PPM)	Sample Analysis	Sample Type	Graphic Log	Soil Class.	Description	Depth to Water
24	N/A	24	2.4				SW	SAND Fine to coarse sand (50%) and gravel (50%), well graded, cobbles visible	
26	N/A	24	1.7				SW	SAND Fine to coarse sand (75%) and gravel (25%), cobbles visible, wet (saturated), well graded	
28	N/A	24	1.1				SW	SAND Fine to coarse sand (75%) and gravel (25%), cobbles visible, wet (saturated), well graded	
30	N/A	24	1.9				GW	GRAVEL Fine to coarse grained sand (25%) and gravel (75%), cobbles visible, well graded, wet (saturated)	
32	N/A	24	1.7				GW	GRAVEL Fine to coarse grained sand (25%) and gravel (75%), cobbles visible, well graded, wet (saturated)	
34	N/A	24	2.1				GW	GRAVEL Fine to coarse grained sand (25%) and gravel (75%), cobbles visible, well graded, wet (saturated)	
36									

☒ Composite Sample to Lab ■ Grab Sample to Lab ▯ Split-Spoon Not Analyzed

Drilling Co.: Prosonic
Driller: D. O'Mara
Drilling Method: Rotosonic
Drilling Fluid: Water

Geologist: D. Manzo
Total Depth: 60
Surface Elev.: 723.97
North Coor.: 39°41'21.899"

Begin Drilling: 4/28/05 @ 1448
End Drilling: 4/28/05 @ 1531
Converted to Well: Y Well I.D.: RZ-3UU
East Coor.: 84°13'20.915"

Remarks:

Project No.: OH000294.0007.00008 Datum: Filename: RZ May 2005 Soil Boring

ARCADIS

Log of Boring: RZ-3UU

General Motors Corporation — Moraine, Ohio

Depth (feet)	Blows (/6 in.)	Recovery (Inches)	OVA (PPM)	Sample Analysis	Sample Type	Graphic Log	Soil Class.	Description	Depth to Water
36	N/A	24	1.3				SW	SAND Fine to coarse grained sand (90%) and gravel (10%), cobbles visible, well graded, wet (saturated)	
38	N/A	24	1.1				SW	SAND Fine to coarse grained sand (90%) and gravel (10%), cobbles visible, well graded, wet (saturated)	
40	N/A	24	1.6				SP	SAND Fine to medium grained sand (90%) and gravel (10%), poorly sorted, wet (saturated)	
42	N/A	24	2.2				SP	SAND Fine to medium grained sand (90%) and gravel (10%), poorly sorted, wet (saturated)	
44	N/A	24	1.9				SP	SAND Fine to medium grained sand (90%) and gravel (10%), poorly sorted, wet (saturated)	
46	N/A	24	1.7				SP	SAND Fine to medium grained sand (90%) and gravel (10%), poorly sorted, wet (saturated)	
48									

☒ Composite Sample to Lab ■ Grab Sample to Lab ▯ Split-Spoon Not Analyzed

Drilling Co.: Prosonic
Driller: D. O'Mara
Drilling Method: Rotosonic
Drilling Fluid: Water

Geologist: D. Manzo
Total Depth: 60
Surface Elev.: 723.97
North Coor.: 39°41'21.899"

Begin Drilling: 4/28/05 @ 1448
End Drilling: 4/28/05 @ 1531
Converted to Well: Y Well I.D.: RZ-3UU
East Coor.: 84°13'20.915"

Remarks:

Project No.: OH000294.0007.00008 Datum: Filename: RZ May 2005 Soil Boring

ARCADIS

Log of Boring: RZ-3UU

General Motors Corporation — Moraine, Ohio

Depth (feet)	Blows (/6 in.)	Recovery (Inches)	OVA (PPM)	Soil Class.	Description	Depth to Water
48	N/A	24	1.0	SP	SAND Fine to medium grained sand (90%) and gravel (10%), poorly sorted, wet (saturated)	
50	N/A	24	1.5	SP	SAND Fine to medium grained sand (90%) and gravel (10%), poorly sorted, wet (saturated)	
52	N/A	24	1.2	SW	SAND Interbedded gray clay (till), sand and gravel, wet (saturated), well graded	
54	N/A	24	1.7	SW	SAND Interbedded gray clay (till), sand and gravel, wet (saturated), well graded	
				CL	CLAY Gray, clayey silt, hard, no plasticity, 10% gravel, till	
56	N/A	24	1.0	CL	CLAY Gray, clayey silt, hard, no plasticity, 10% gravel, till	
58	N/A	24	1.5	CL	CLAY Gray, clayey silt, hard, no plasticity, 10% gravel, till	
60						

☒ Composite Sample to Lab ■ Grab Sample to Lab ▥ Split-Spoon Not Analyzed

Drilling Co.: Prosonic
Driller: D. O'Mara
Drilling Method: Rotosonic
Drilling Fluid: Water

Geologist: D. Manzo
Total Depth: 60
Surface Elev.: 723.97
North Coor.: 39°41'21.899"

Begin Drilling: 4/28/05 @ 1448
End Drilling: 4/28/05 @ 1531
Converted to Well: Y Well I.D.: RZ-3UU
East Coor.: 84°13'20.915"

Remarks:

Project No.: OH000294.0007.00008 Datum: Filename: RZ May 2005 Soil Boring

ARCADIS

Log of Boring: RZ-3UU

General Motors Corporation — Moraine, Ohio

Depth (feet)	Blows (/6 in.)	Recovery (Inches)	OVA (PPM)	Sample Analysis	Sample Type	Graphic Log	Soil Class.	Description	Depth to Water
60								End of boring	
62									
64									
66									
68									
70									
72									

☒ Composite Sample to Lab ■ Grab Sample to Lab ▥ Split-Spoon Not Analyzed

Drilling Co.: Prosonic
Driller: D. O'Mara
Drilling Method: Rotosonic
Drilling Fluid: Water

Geologist: D. Manzo
Total Depth: 60
Surface Elev.: 723.97
North Coor.: 39°41'21.899"

Begin Drilling: 4/28/05 @ 1448
End Drilling: 4/28/05 @ 1531
Converted to Well: Y Well I.D.: RZ-3UU
East Coor.: 84°13'20.915"

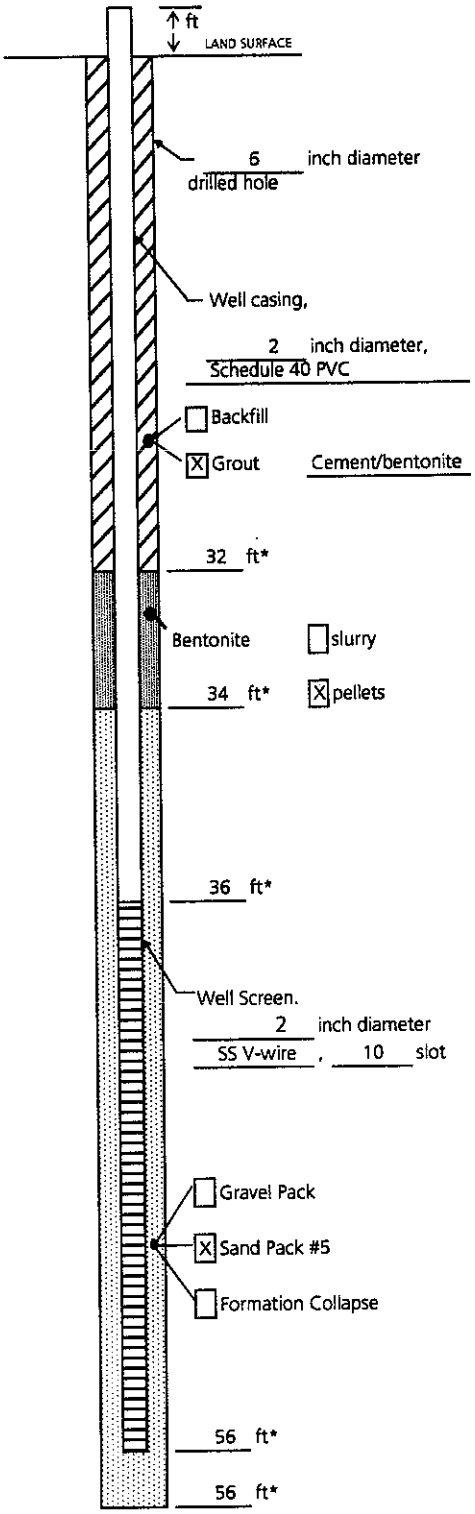
Remarks:

Project No.: OH000294.0007.00008 Datum: Filename: RZ May 2005 Soil Boring

ARCADIS

Well Construction Log

(Unconsolidated)



Measuring Point is
Top of Well Casing
Unless Otherwise Noted.

* Depth Below Land Surface

Project OH000294.0007.00008 Well RZ-3UU

Town/City Moraine

County Montgomery State Ohio

Permit No.

Land-Surface (LS) Elevation and Datum:

724.45 feet [X] Surveyed [ ] Estimated

Installation Date(s) 4/28/2005

Drilling Method Rotosonic

Drilling Contractor Prosonic

Drilling Fluid Potable water

(approximately 120 gallons)

Development Technique(s) and Date(s)

Submersible pump (proactive mini-typhoon)

Fluid Loss During Drilling N/A gallons

Water Removed During Development 60 gallons

Static Depth to Water 17.83 feet below M.P.

Pumping Depth to Water NM feet below M.P.

Pumping Duration 0.50 hours

Yield 2 gpm Date 5/2/2005

Specific Capacity NM gpm/ft

Well Purpose Introduction well

Remarks

Prepared by J. Manzo

ARCADIS

Log of Boring: RZ-3VV

General Motors Corporation — Moraine, Ohio

Depth (feet)	Blows (/6 in.)	Recovery (Inches)	OVA (PPM)	Soil Class.	Description	Depth to Water
0	N/A	24	0.8		ASPHALT	
				FILL	FILL Damp, pea gravel to coarse gravel with sand	
2	N/A	24	1.4	CL	CLAY Brown, silty clay, medium plasticity, medium hardness, dry to damp	
4	N/A	24	0.4	CL	CLAY Brown, silty clay, medium plasticity, medium hardness, dry to damp	
6	N/A	24	0.1	ML	SILT Gray, clayey silt with fine sand, dry, low plasticity, medium hardness	
8	N/A	24	1.4	ML	SILT Gray, clayey silt with fine sand, dry	
10	N/A	24	0.8	ML	SILT Gray, clayey silt with fine sand, dry	
12						

☒ Composite Sample to Lab ■ Grab Sample to Lab ▯ Split-Spoon Not Analyzed

Drilling Co.: Prosonic
Driller: D. O'Mara
Drilling Method: Rotosonic
Drilling Fluid: Water

Geologist: D. Manzo
Total Depth: 60
Surface Elev.: 724.17
North Coor.: 39°41'21.751"

Begin Drilling: 4/28/05 @ 9:37
End Drilling: 4/28/05 @ 11:04
Converted to Well: Y Well I.D.: RZ-3VV
East Coor.: 84°13'20.929"

Remarks:

Project No.: OH000294.0007.00008 Datum: Filename: RZ May 2005 Soil Boring

ARCADIS

Log of Boring: RZ-3VV

General Motors Corporation — Moraine, Ohio

Depth (feet)	Blows (/6 in.)	Recovery (Inches)	OVA (PPM)	Soil Class.	Description	Depth to Water
12	N/A	24	0.7	ML	SILT Brown, clayey silt, medium plasticity, medium hardness, dry	
14	N/A	24	1.0	ML	SILT Brown, clayey silt, medium plasticity, medium hardness, dry	
16	N/A	24	1.0	ML	SILT Brown, clayey silt, medium plasticity, medium hardness, dry	
18	N/A	24	0.8	ML	SILT Brown, clayey silt, medium plasticity, medium hardness, dry	
20	N/A	24	1.0	GW	GRAVEL Wet (saturated), coarse grained sand (40%) and gravel (60%), well graded	▼
22	N/A	24	1.3	GW	GRAVEL Wet (saturated), coarse grained sand (40%) and gravel (60%), well graded	
24						

☒ Composite Sample to Lab ■ Grab Sample to Lab ▥ Split-Spoon Not Analyzed

Drilling Co.: Prosonic
Driller: D. O'Mara
Drilling Method: Rotosonic
Drilling Fluid: Water

Geologist: D. Manzo
Total Depth: 60
Surface Elev.: 724.17
North Coor.: 39°41'21.751"

Begin Drilling: 4/28/05 @ 9:37
End Drilling: 4/28/05 @ 11:04
Converted to Well: Y Well I.D.: RZ-3VV
East Coor.: 84°13'20.929"

Remarks:

Project No.: OH000294.0007.00008 Datum: Filename: RZ May 2005 Soil Boring

ARCADIS

Log of Boring: RZ-3VV

General Motors Corporation — Moraine, Ohio

Depth (feet)	Blows (/6 in.)	Recovery (Inches)	OVA (PPM)	Sample Analysis	Sample Type	Graphic Log	Soil Class.	Description	Depth to Water
24	N/A	24	1.1				GW	GRAVEL Wet (saturated), coarse grained sand (40%) and gravel (60%), well graded	
26	N/A	24	1.0				SW	SAND Wet (saturated), fine to coarse grained sand (75%) and gravel (25%), well graded	
28	N/A	24	1.3				SW	SAND Wet (saturated), fine to coarse grained sand (75%) and gravel (25%), well graded	
30	N/A	24	1.9				SW	SAND Wet (saturated), fine to coarse grained sand (75%) and gravel (25%), well graded	
32	N/A	24	1.7				SW	SAND Wet (saturated), fine to coarse grained sand (75%) and gravel (25%), well graded	
34	N/A	24	1.4				SW	SAND Wet (saturated), medium to coarse grained sand (70%) and fine to coarse grained gravel (25%), cobbles visible, well graded	
36									

☒ Composite Sample to Lab ■ Grab Sample to Lab ▥ Split-Spoon Not Analyzed

Drilling Co.: Prosonic
Driller: D. O'Mara
Drilling Method: Rotosonic
Drilling Fluid: Water

Geologist: D. Manzo
Total Depth: 60
Surface Elev.: 724.17
North Coor.: 39°41'21.751"

Begin Drilling: 4/28/05 @ 9:37
End Drilling: 4/28/05 @ 11:04
Converted to Well: Y Well I.D.: RZ-3VV
East Coor.: 84°13'20.929"

Remarks:

Project No.: OH000294.0007.00008 Datum: Filename: RZ May 2005 Soil Boring

ARCADIS

Log of Boring: RZ-3VV

General Motors Corporation — Moraine, Ohio

Depth (feet)	Blows (/6 in.)	Recovery (inches)	OVA (PPM)	Sample Analysis	Sample Type	Graphic Log	Soil Class.	Description	Depth to Water
36	N/A	24	1.7				SW	SAND Wet (saturated), medium to coarse grained sand (70%) and fine to coarse grained gravel (25%), cobbles visible, well graded	
38	N/A	24	1.7				SW	SAND Wet (saturated), medium to coarse grained sand (70%) and fine to coarse grained gravel (25%), cobbles visible, well graded	
40	N/A	24	2.9				SW	SAND Wet (saturated), fine to medium grained sand (80%) with coarse gravel (20%), cobbles visible, well graded	
42	N/A	24	3.2				SP	SAND Wet (saturated), fine grained sand (90%) and gravel (10%), poorly graded, cobbles visible	
44	N/A	24	4.7				SP	SAND Wet (saturated), fine grained sand (90%) and gravel (10%), poorly graded, cobbles visible	
46	N/A	24	4.2				SP	SAND Wet (saturated), fine grained sand (90%) and gravel (10%), poorly graded, cobbles visible	
48									

☒ Composite Sample to Lab ■ Grab Sample to Lab ▥ Split-Spoon Not Analyzed

Drilling Co.: Prosonic
Driller: D. O'Mara
Drilling Method: Rotosonic
Drilling Fluid: Water

Geologist: D. Manzo
Total Depth: 60
Surface Elev.: 724.17
North Coor.: 39°41'21.751"

Begin Drilling: 4/28/05 @ 9:37
End Drilling: 4/28/05 @ 11:04
Converted to Well: Y Well I.D.: RZ-3VV
East Coor.: 84°13'20.929"

Remarks:

Project No.: OH000294.0007.00008 Datum: Filename: RZ May 2005 Soil Boring

ARCADIS

Log of Boring: RZ-3VV

General Motors Corporation — Moraine, Ohio

Depth (feet)	Blows (/6 in.)	Recovery (Inches)	OVA (PPM)	Soil Class.	Description	Depth to Water
48	N/A	24	3.9	SP	SAND Wet (saturated), fine grained sand (90%) and gravel (10%), poorly graded, cobbles visible	
50	N/A	24	3.8	SW	SAND Fine to coarse grained sand (75%) and gravel (25%), wet (saturated), well graded	
52	N/A	24	3.4	GW	GRAVEL Medium to coarse grained sand (25%) and gravel (75%), cobbles visible, well graded, wet (saturated)	
54	N/A	24	3.4	GW	GRAVEL Medium to coarse grained sand (25%) and gravel (75%), cobbles visible, well graded, wet (saturated)	
				CL	CLAY Gray, silty clay, hard, no plasticity, 10% gravel, till, dry	
56	N/A	24	2.6	CL	CLAY Gray, silty clay, hard, no plasticity, 10% gravel, till, dry	
58	N/A	24	2.1	CL	CLAY Gray, silty clay, hard, no plasticity, 10% gravel, till, dry	
60						

☒ Composite Sample to Lab ■ Grab Sample to Lab ▦ Split-Spoon Not Analyzed

Drilling Co.: Prosonic
Driller: D. O'Mara
Drilling Method: Rotosonic
Drilling Fluid: Water

Geologist: D. Manzo
Total Depth: 60
Surface Elev.: 724.17
North Coor.: 39°41'21.751"

Begin Drilling: 4/28/05 @ 9:37
End Drilling: 4/28/05 @ 11:04
Converted to Well: Y Well I.D.: RZ-3VV
East Coor.: 84°13'20.929"

Remarks:

Project No.: OH000294.0007.00008 Datum: Filename: RZ May 2005 Soil Boring

ARCADIS

Log of Boring: RZ-3VV

General Motors Corporation — Moraine, Ohio

Depth (feet)	Blows (/6 in.)	Recovery (Inches)	OVA (PPM)	Sample Analysis	Sample Type	Graphic Log	Soil Class.	Description	Depth to Water
60								End of boring	
62									
64									
66									
68									
70									
72									

☒ Composite Sample to Lab ■ Grab Sample to Lab ▥ Split-Spoon Not Analyzed

Drilling Co.: Prosonic
Driller: D. O'Mara
Drilling Method: Rotosonic
Drilling Fluid: Water
Remarks:

Geologist: D. Manzo
Total Depth: 60
Surface Elev.: 724.17
North Coor.: 39°41'21.751"

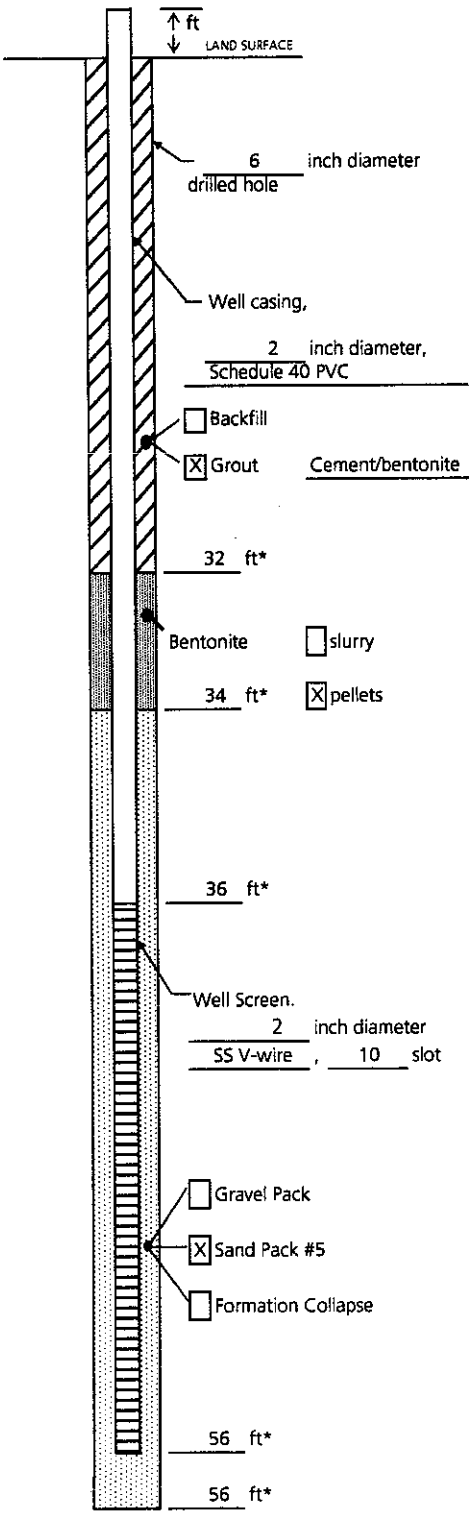
Begin Drilling: 4/28/05 @ 9:37
End Drilling: 4/28/05 @ 11:04
Converted to Well: Y Well I.D.: RZ-3VV
East Coor.: 84°13'20.929"

Project No.: OH000294.0007.00008 Datum: Filename: RZ May 2005 Soil Boring

ARCADIS

Well Construction Log

(Unconsolidated)



Measuring Point is
Top of Well Casing
Unless Otherwise Noted.

* Depth Below Land Surface

Project OH000294.0007.00008 Well RZ-3VV

Town/City Moraine

County Montgomery State Ohio

Permit No.

Land-Surface (LS) Elevation and Datum:

724.17 feet [X] Surveyed [ ] Estimated

Installation Date(s) 4/28/2005

Drilling Method Rotosonic

Drilling Contractor Prosonic

Drilling Fluid Potable water

(approximately 120 gallons)

Development Technique(s) and Date(s)

Submersible pump (proactive mini-typhoon)

Fluid Loss During Drilling N/A gallons

Water Removed During Development 60 gallons

Static Depth to Water 17.83 feet below M.P.

Pumping Depth to Water NM feet below M.P.

Pumping Duration 0.50 hours

Yield 2 gpm Date 5/2/2005

Specific Capacity NM gpm/ft

Well Purpose Introduction well

Remarks

Prepared by J. Manzo

G:\PUBLIC\GMOTORS\RZ Remediation\well cstr may 2005

ARCADIS

Appendix E

In-Situ Reactive Zones Performance Results for 2005

In-Situ Reactive Zones Performance Results

As described in Section 3.1.1 of the Site-Wide Groundwater Monitoring Report for 2005 (Monitoring Report), the carbon solution delivery network consists of three reactive zones, RZ-1, RZ-2, and RZ-3 (West and East). During 2005, molasses was introduced into the groundwater through introduction points at RZ-1 and RZ-3 (East and West) shown on Figures 12 and 14 of the Monitoring Report, respectively. No molasses was introduced into RZ-2 (Figure 13) in 2005 based on the operational data that was collected since 2003. 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 ERD technology, RZ-1 was expanded into portions of the Former Oil House Area source area by the addition of 12 introduction points in 2002. RZ-3 was originally installed in 1999 and has been operated as a cut-off barrier (30 wells in RZ-3 East and 11 wells in RZ-3 West) to mitigate further downgradient VOC migration. In 2005, RZ-3 East was modified by the addition of 5 introduction wells (RZ-3RR through RZ-3VV) and cessation of introduction in 5 existing wells (RZ-3MM through RZ-3QQ) to improve performance at the far eastern edge of the plume. The following sections discuss the monitoring completed to assess the effectiveness of the in-situ reactive zones and the results of this monitoring.

Reactive Zone Monitoring

Operation of the reactive zones was monitored through the collection of field parameter measurements, and laboratory analyses of biogeochemical indicator parameters and volatile organic compounds (VOCs), according to the Site-Wide Groundwater Monitoring Plan (ARCADIS G&M, Inc. 2002). Field parameter measurements included: pH, specific conductivity, dissolved oxygen (DO), oxidation-reduction potential (ORP), and temperature. Biogeochemical parameters included manganese (total and dissolved), iron (total and dissolved), sulfate, sulfide, total organic carbon (TOC), chlorides, light hydrocarbons (ethane and ethene), and methane. The monitored VOCs included: benzene, toluene, ethylbenzene, xylenes, tetrachloroethene (PCE), trichloroethene (TCE), cis-1,2-dichloroethene (cis-1,2-DCE), vinyl chloride, 1,1,1-trichloroethane (1,1,1-TCA), 1,1-dichloroethane (1,1-DCA), 1,1-dichloroethene (1,1-DCE), and trans-1,2-dichloroethene (trans-1,2-DCE). The VOC data collected are presented in Tables 10 through 13 of the Monitoring Report and Figures E-1 through E-10, for RZ-1, RZ-2, RZ-3 West and RZ-3 East. The bioattenuation parameter data is presented on Tables 14 through 17 of the Monitoring Report and Figures E-11 through E-20 for RZ-1, RZ-2, RZ-3 West and RZ-3 East. 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 purpose of upgradient and downgradient monitor wells, separate from the introduction points within the reactive zones, is to collect and compare data before and after biodegradation by the stimulated microbial population. Locations of these wells are shown on Figures 12, 13, and 14 of the Monitoring Report.

- At RZ-1, GM-29 is designated as the upgradient monitor well, while GM-28 is designated as the downgradient monitor well. These wells are ideally positioned, relative to estimated groundwater travel time, approximately 100 days upgradient and 100 days downgradient from the original introduction wells installed to create the RZ-1 introduction zone (line of nine introduction wells, RZ-1A through 1I, placed in an East-West direction). GM-29 is located within the area of the RZ-1 expansion wells (twelve introduction wells placed in two rows north of the original nine wells, RZ-1J through 1U). Existing wells OW-1 through OW-3, which are upgradient of GM-23, were used for carbon introductions from June through November 2005 to demonstrate the effectiveness of these wells to address VOCs detected in GM-23.

- At RZ-2, existing monitor wells, screened at the top of the water table, were used for introduction points in this area during the initial phase of this remedial action. After a period of introduction in all ME-series wells, it was decided to stop introducing and the most upgradient (ME-6) and downgradient (ME-3) wells are currently used for RZ-2 monitoring. Groundwater quality was also monitored at GM-31, which is an upper aquifer monitor well screened at the top of the regional clay till, below the RZ-2 introduction zone.

- For RZ-3 West, monitor wells EAST and GM-19S are used as the upgradient wells. At RZ-3 West, 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 monitor well. Results at GM-32 are analyzed with caution, as this well is located in the early stages of the reactive zone due to its proximity to the introduction points. Annual data collected from GM-8 and GM-6, which are further downgradient from the introduction zone and located along the west side of Landfill L1, have also been evaluated with respect to monitoring the performance of RZ-3 West. At RZ-3 West, molasses solution is introduced in thirty wells, RZ-3A through RZ-2DD.

- For RZ-3 East, GM-22 is designated as the upgradient monitor well and GM-21 is designated as the downgradient monitor well. At RZ-3 East, molasses solution is introduced in the original wells, RZ-3FF through RZ-3KK, and five new wells, RZ-3RR through RZ-3VV.

Analysis of Primary Operational Monitoring Data

The primary operational data is comprised of a limited number of variables that are monitored at a frequency necessary to supply the information required for the operation of the remediation system. The entire data set is presented in Tables 10 through 17 of the Monitoring Report. These tables are organized such that upgradient and downgradient changes can be easily identified for each reactive zone from 1999 to 2005.

pH

The preferred pH range for reductive dechlorination is between 6 and 8, and the acceptable pH range extends from 5 to 9. All pH measurements, except pH measurements collected from GM-28 (downgradient well at RZ-1), ME-6 (well at RZ-2), and GM-19S (upgradient well at RZ-3 West), were in the preferred pH range, and the pH measurements collected during 2005 for these three wells were in the acceptable pH range.

Total Organic Carbon

In 2005, 500 gallons of 10 percent molasses solution was injected into the introduction wells of RZ-1 during January, March, May, June, August, and September, and 900 to 950 gallons of 5 percent molasses solution was injected during November and December. No molasses was injected in RZ-2 during 2005. The introduction wells at RZ-3 received 950 gallons of 10 percent molasses solution monthly in January through October, and 1800 to 1850 gallons of 5 percent molasses solution in November and December. Adjustments to the introduction procedures were made based upon evaluation of monitoring results and the variability in acceptance rates of the more concentrated solution into the formation. ARCADIS has observed at other sites utilizing ERD technology, that a lower solution concentration of molasses in the injectate is sufficient, and in many cases better, to achieve distribution of carbon in the subsurface. A more dilute molasses solution will reduce fermentation by-products, such as carbon dioxide and organic acids that causes reduction in pH, and in some instances may limit distribution of the carbon solution due to gas building up in soil pore space. By lowering the molasses concentration a reduction in fermentation by-products is achieved, which is shown to improve the delivery of organic carbon to the desired locations. The decreased concentration was coupled with an increase in the volume introduced with the intent of "pushing" the carbon solution radially further from the introduction wells, where deemed necessary. This modification was made prior to the November 2005 event and as a result, an improvement in the delivery of the carbon solution was noted in December 2005. Table 19 presents the molasses solution introduction volumes for different wells.

At RZ-1, the reductive dechlorination process is continuing effectively even though the TOC levels at the designated downgradient well, GM-28, is at 10 milligrams per liter (mg/L). Considering the differences in the VOC concentrations at the upgradient well, GM-29, and GM-28, the molasses introduction zone is acting as an effective barrier, reducing the VOC concentrations from approximately 2,559 micrograms per liter (μg/L) in GM-29 (October 2005)

to less than 7 µg/L at GM-28 (October 2005). Based on the TOC values, it can be said that the carbon is consumed at a high rate and the reactive zone ends at some location in between the RZ-1 introduction wells and GM-28.

As indicated earlier, no molasses was injected in the RZ-2 wells during 2005, resulting in an overall reduction of TOC in this area. Despite a decrease in TOC concentrations, the concentrations of chlorinated VOCs at ME-3, which is the RZ-2 downgradient monitor well, remained at concentrations similar to those observed during 2004.

Concentrations of TOC concentrations at RZ-3 West downgradient well GM-32 was at 300 mg/L, compared to 240 mg/L of TOC measured during 2004. This can be attributed to the monthly molasses introductions. Additionally, TOC concentrations observed at further downgradient wells, GM-8, were at the same level as observed during 2004, though a decrease in TOC concentrations was observed at GM-6.

Significant increases in TOC concentrations were observed at GM-21, which is the downgradient well for RZ-3 East. The concentrations of TOC increased from 2 mg/L in 2004 to 92 mg/L in 2005. This increase in TOC can be attributed to the molasses introduction at the new RZ-3 East introduction wells (RZ-3RR to RZ-3VV), placed approximately 50 feet upgradient of GM-21.

VOC Analytical Results

The groundwater analytical data for the site-specific list of VOCs are presented in Table 10 for RZ-1, Table 11 for RZ-2, Table 12 for RZ-3 West, and Table 13 for RZ-3 East in the Monitoring Report. 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 for the upgradient and downgradient monitor wells in RZ-1, RZ-2, RZ-3 West and RZ-3 East on Figures E-1 through E-10, respectively.

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

- Comparing the 2005 profiles of chlorinated compounds in the upgradient and downgradient wells in RZ-1 (Figures E-1 and E-2, respectively), it was found that degradation of the chlorinated VOCs was sustained throughout 2005. The concentrations of PCE, TCE, and 1,1,1-TCA in GM-28 were all below 1.0 µg/L, while vinyl chloride was detected at a concentration of 1.1 µg/L. Concentrations of the final end products (ethene and ethane) decreased in 2005 to 81 µg/L from 150 µg/L in 2004. This decrease in end-products was due to the absence of parent product, indicating that most of VOCs originally present at the location have degraded. Additionally, the high ethene concentration noted at GM-29 in 2004 persisted in 2005 (1,700 µg/L in 2004 and 1,600 µg/L in 2005). This increased ethene concentration is possibly due to the carbon introduction at the RZ-1 expansion wells (RZ-1J through RZ-1U), which are located

west and north of GM-29. The introduction of carbon at these wells is likely resulting in a redox recovery zone near GM-29 and the presence of higher ethene and methane concentrations noted in GM-29. Total VOC concentrations in GM-23 increased from 17,853.3 ug/L in the 1999 baseline sampling to 24,590 ug/L in 2005 primarily due to an increase in daughter products cis-1,2-DCE and vinyl chloride; however, TCE and PCE concentrations have decreased. This well predominantly contained PCE, TCE, cis-1,2-DCE, and vinyl chloride. This well is upgradient to the original RZ-1 barrier and is within the zone of influence of carbon introductions conducted in the Former Oil House Area which results in solubilizing previously adsorbed VOCs for biodegradation.

- The concentrations of PCE, TCE, cis-1,2-DCE, and vinyl chloride at the monitor well ME-3 in RZ-2 decreased to non-detectable levels by the end of 2002. No molasses was injected since 2003. The latest data at ME-3 show total VOCs of 21.2 µg/L, with the maximum contributor being 1,1-DCA (concentration at 15 µg/L), which is a daughter product of 1,1,1-TCA degradation.

- At RZ-3 West, concentrations of PCE, TCE, 1,1,1-TCA, cis-1,2-DCE, and vinyl chloride monitored at GM-32, located within the influence of the introduction zone, remained at non-detectable levels at the end of 2005 (Table 12 of the Monitoring Report). The only VOC detected at GM-32 was 1,1-DCA at a concentration of 4.9 µg/L. It is important to note that GM-32 is close to the introduction zone, and the fact that PCE, TCE, cis-1,2-DCE, and vinyl chloride are below detection at GM-32 indicates the dechlorination is proceeding very rapidly in this area.

- Data from monitor wells GM-8 and GM-6, which are located further downgradient of RZ-3 West along the west side of Landfill L1, are also being considered to evaluate the effect of carbon introductions at RZ-3 West. Concentrations of PCE, TCE, and 1,1,1-TCA at GM-8 remained below their respective detection limits at the end of 2005. Though GM-6 is located further downgradient, concentrations of PCE and TCE have consistently decreased since 1998. Significant decreases in parent products were noted in 2005, with increases in concentrations of cis-1,2-DCE and vinyl chloride at GM-6. It is expected that consistent molasses introduction at RZ-3 West will eventually reduce the concentrations of all chlorinated VOCs at GM-6. It is important to realize that though GM-6 is located in the redox recovery zone for RZ-3 West (because of the distance from the introduction zone), the effectiveness of the enhanced reductive dechlorination in this downgradient area may be adversely affected by the proximity of GM-6 to groundwater recovery well TW-2 which draws fresh, oxygenated groundwater into the area, thereby limiting the ability to develop the desired reducing conditions.

- Significant decrease in concentrations of chlorinated VOCs was evident from the data collected from GM-21, which is the downgradient monitor well for RZ-3 East, in 2005. Concentrations of total VOCs decreased to 64.5 µg/L in 2005 from 277.2 µg/L in 2004. Notable decrease was observed for TCE concentrations, which decreased from 180 µg/L to 1.8 µg/L. Concentrations of vinyl chloride increased from non-detect level to 13 µg/L in 2005. Ethene and ethane

concentrations increased to approximately 340 µg/L in 2005 from 0.4 µg/L in 2004. Decreased parent product coupled with increased degradation and end-products indicates that degradation of VOCs have commenced in 2005 due to the introduction of molasses solution in the newly installed introduction wells.

- The concentrations of VOCs at the influent to the air-stripper tower are being monitored on a monthly basis since the startup of the air stripper unit on January 31, 1996 (Figure 5 of the Monitoring Report). The first monitoring event was in February 1996, and the introduction of molasses in RZ-3 commenced in December 1999. On reviewing the data presented in Figure 5, it is seen that the concentrations of VOCs remained approximately similar to those observed in 2004.

Bioattenuation Indicator Parameter Diagrams of Secondary Operational Monitoring Data

Figures E-11 through E-20 show the trends for biogeochemical indicator parameters for RZ-1, RZ-2, RZ-3 West, and RZ-3 East, respectively, as a means of demonstrating the interaction of the bioattenuation indicator parameters discussed above. These indicators show that the biogeochemistry of the upper aquifer at the Moraine facilities has been altered to more reducing conditions, and thereby, more conducive to enhanced reductive dechlorination. These figures have been developed to include dissolved manganese, dissolved iron, sulfate, and methane.

Figures E-11 and E-12 illustrate conditions upgradient and downgradient of the RZ-1 introduction wells, respectively. The shapes of the plots for the two wells in RZ-1 indicate that increases in dissolved manganese and iron coincide with the introduction of molasses, with high levels of the reduced form persisting in the period between introductions. The increase in sulfate concentrations noted at GM-28 coincidental with molasses introduction is probably due to high sulfate content of the molasses itself. Decrease in methane concentrations were noted in GM-28 since 2004.

Figures E-13 and E-14 illustrate conditions in RZ-2. No significant trends are noted in these secondary parameters as molasses was not introduced in RZ-2 during 2005.

Figures E-15 and E-16 represent the upgradient and immediate downgradient conditions in RZ-3 West, respectively. Increases in dissolved iron concentrations were found coincident with molasses introduction. On comparing the plots for concentrations of methane, which is the distinct evidence of ongoing methanogenesis, it was found that methane concentrations in GM-32 were significantly higher than the upgradient well, EAST. Additionally, an increasing trend in methane concentration is observed since 2003. Biogeochemical conditions at GM-8 and GM-6, which are located downgradient to RZ-3 West, are shown in Figures E-17 and E-18. Significant increases in methane production have occurred since molasses introduction has commenced at RZ-3 West wells. Consistent decreases in sulfate concentration in the same period also indicate favorable conditions for the reductive dechlorination process.

The biogeochemical conditions existing at the upgradient and downgradient wells of RZ-3 East are shown in Figures E-19 and E-20. Significant increase in methane concentration at GM-21 is observed during 2005, indicative of methanogenesis. In the same period, the concentration of dissolved iron increased and concentration of sulfate decreased, indicating the presence of reducing conditions.

Conclusions

The following observations and conclusions can be made:

- Existing aquifer conditions have been converted to more reducing conditions within and downgradient of the reactive zones through the introduction of a carbon source, as evidenced by the changes in field and bioattenuation parameters;

- 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 based on a review of the VOC results;

- Levels of vinyl chloride were consistently low to non-detect in all downgradient wells, indicating degradation of cis-1,2-DCE to ethene and ethane, without production of significant vinyl chloride peaks;

- The primary and secondary operational monitoring data from RZ-2 will continue to be evaluated to determine if the carbon source introduction schedule should be resumed; and

- VOC concentrations at RZ-3 East have significantly decreased in response to molasses introductions at the newly installed introduction wells. TOC levels, as well as other primary and secondary operational monitoring data, indicate that the effects of molasses introductions are reaching the GM-21 downgradient monitoring location.

Overall, the process of enhanced reductive dechlorination at this site has been successful in achieving the desired reduction of VOC concentrations. GM will evaluate if modifications to the IRZs are needed based on review of the supplemental groundwater investigation to be completed in 2006.

Figure E-1: Reductive Dechlorination at GM-29 - Upgradient Well in RZ-1

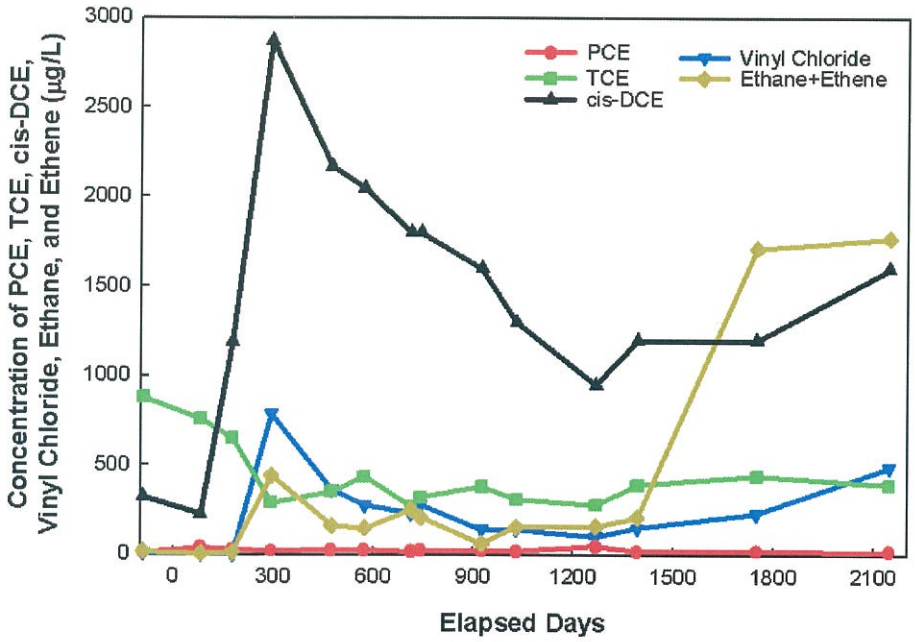


Figure E-2: Reductive Dechlorination at GM-28 - Downgradient Well in RZ-1

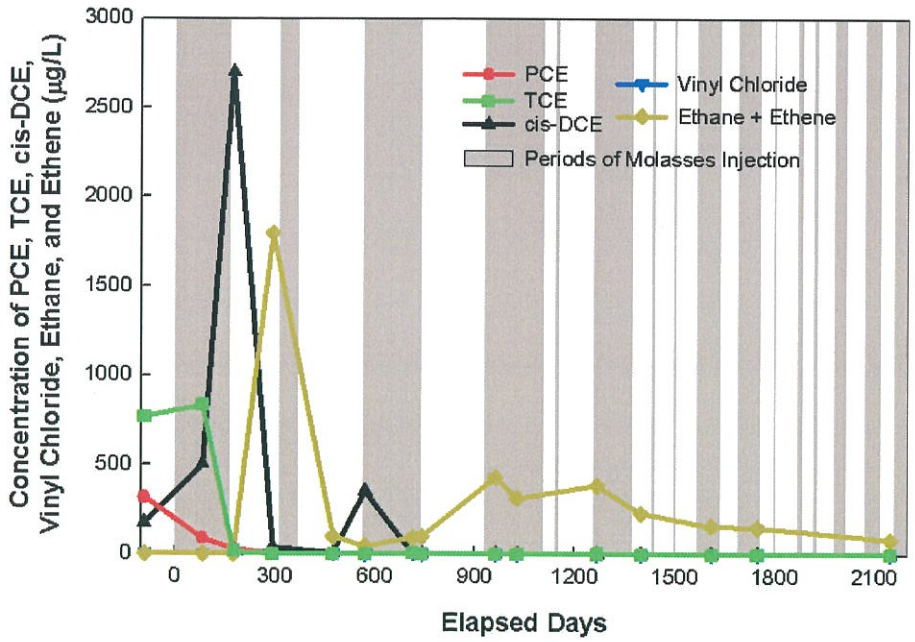


Figure E-3. Reductive Dechlorination at ME-6 - Upgradient Well in RZ-2

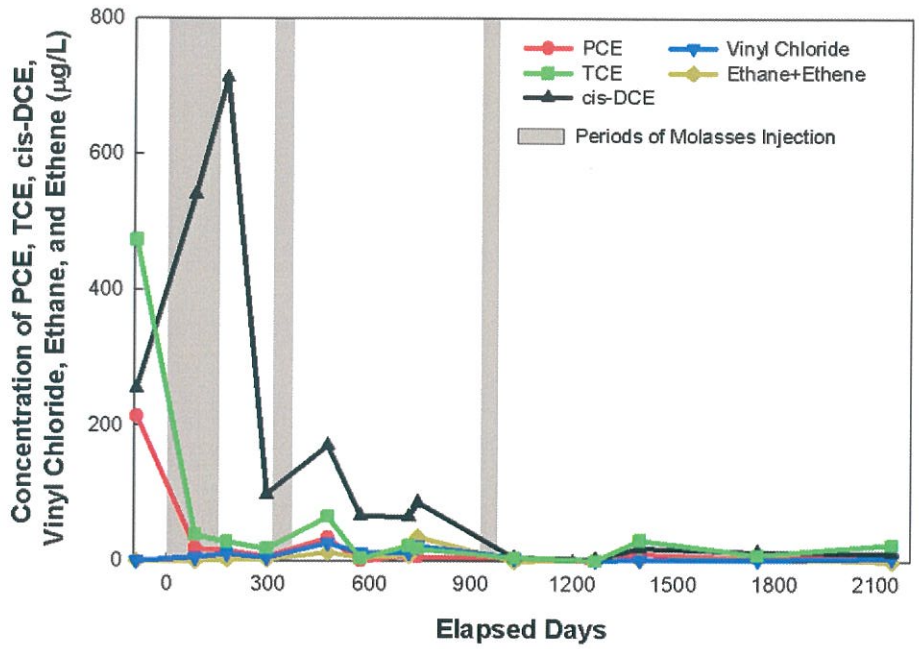


Figure E-4. Reductive Dechlorination at ME-3 - Downgradient Well in RZ-2

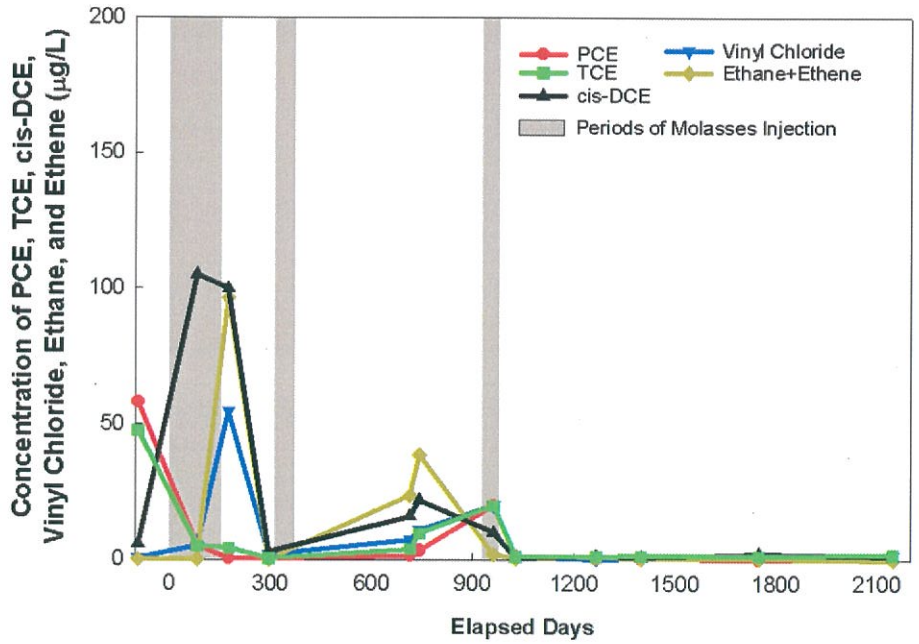


Figure E-5. Reductive Dechlorination at EAST - Upgradient Well in RZ-3 West

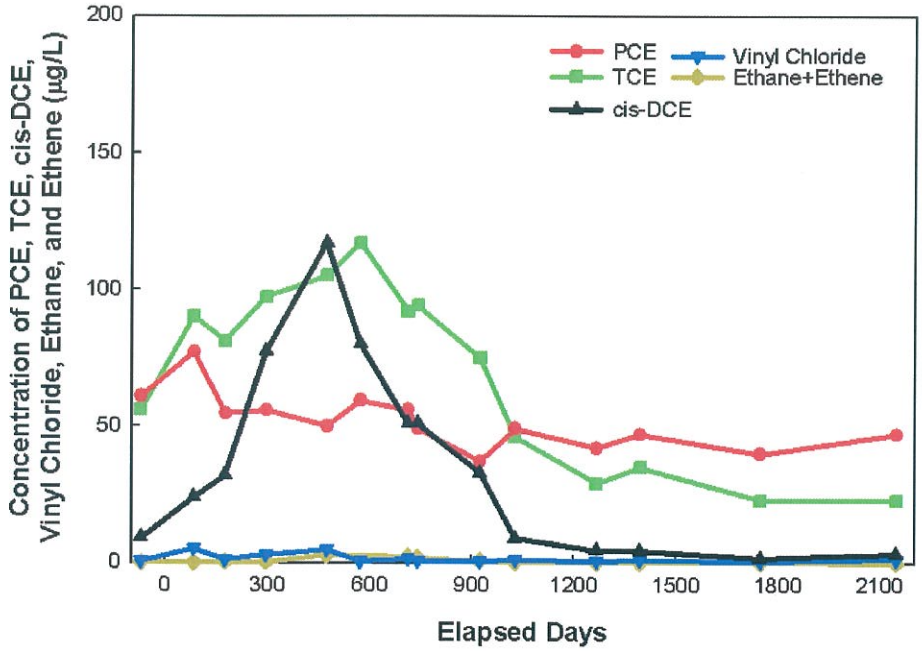


Figure E-6. Reductive Dechlorination at GM-32 - Downgradient Well in RZ-3 West

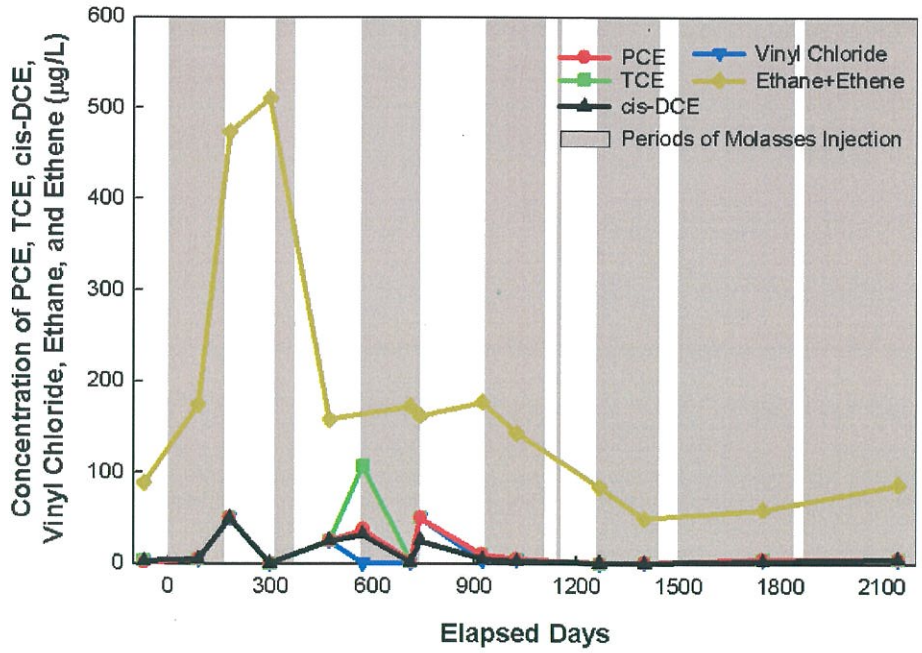


Figure E-7: Reductive Dechlorination at GM-8 - Downgradient to RZ-3 West

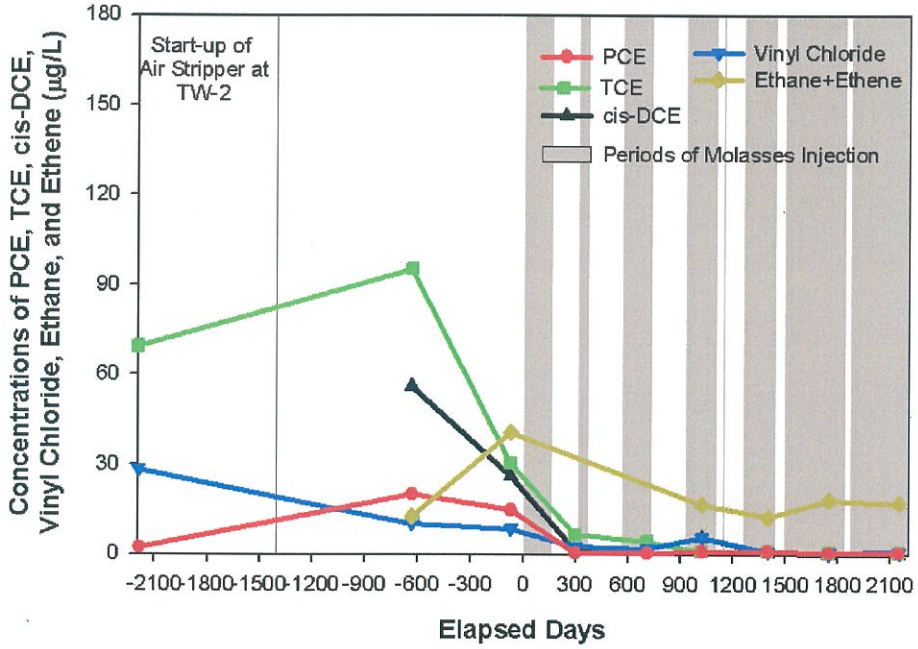


Figure E-8: Reductive Dechlorination at GM-6 - Downgradient to RZ-3 West

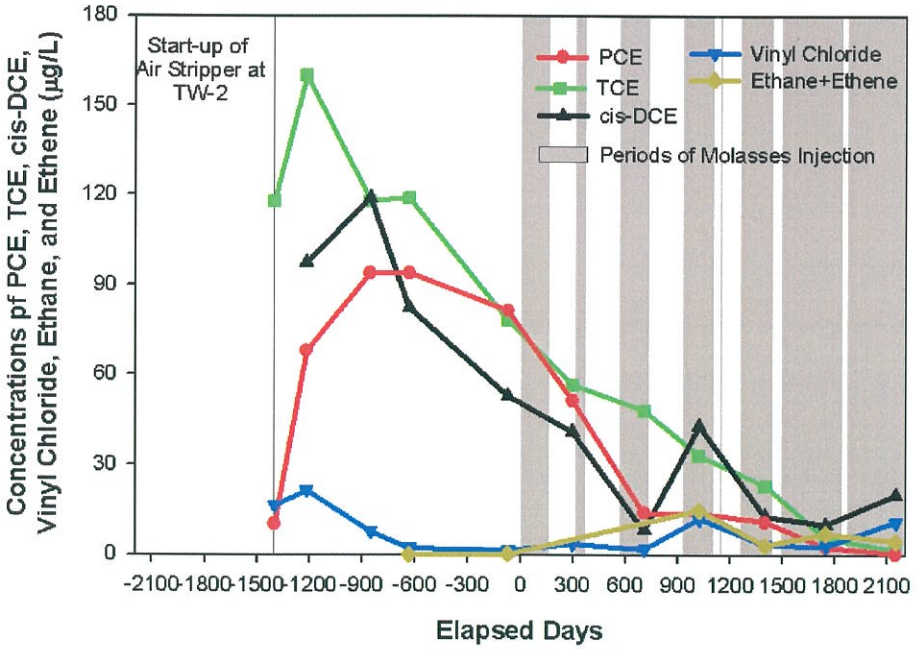


Figure E-9. Reductive Dechlorination at GM-22 - Upgradient Well in RZ-3 East

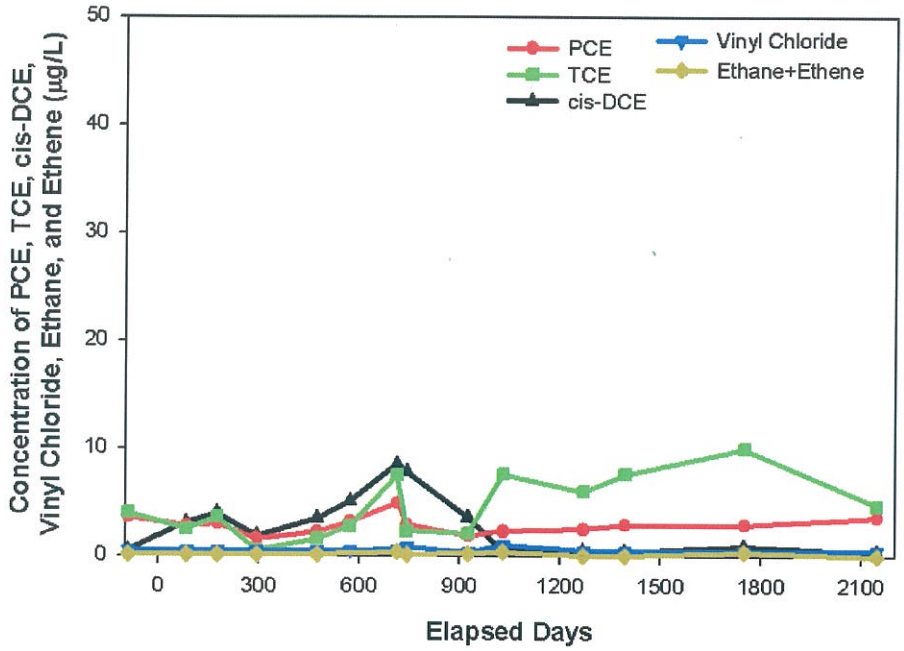


Figure E-10. Reductive Dechlorination at GM-21 - Downgradient Well in RZ-3 East

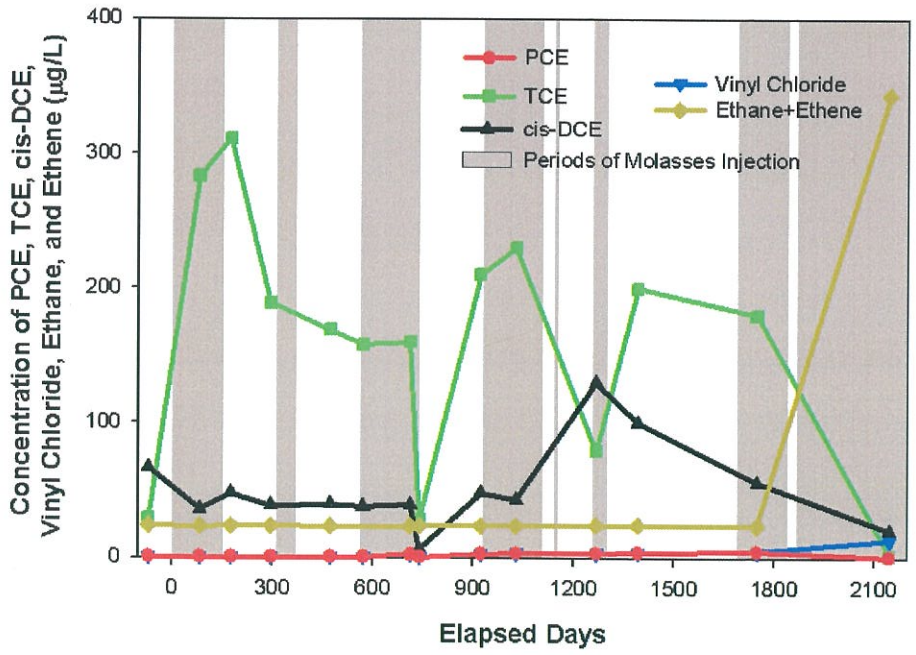


Figure E-11. Bioattenuation Parameters at GM-29 - Upgradient Well in RZ-1

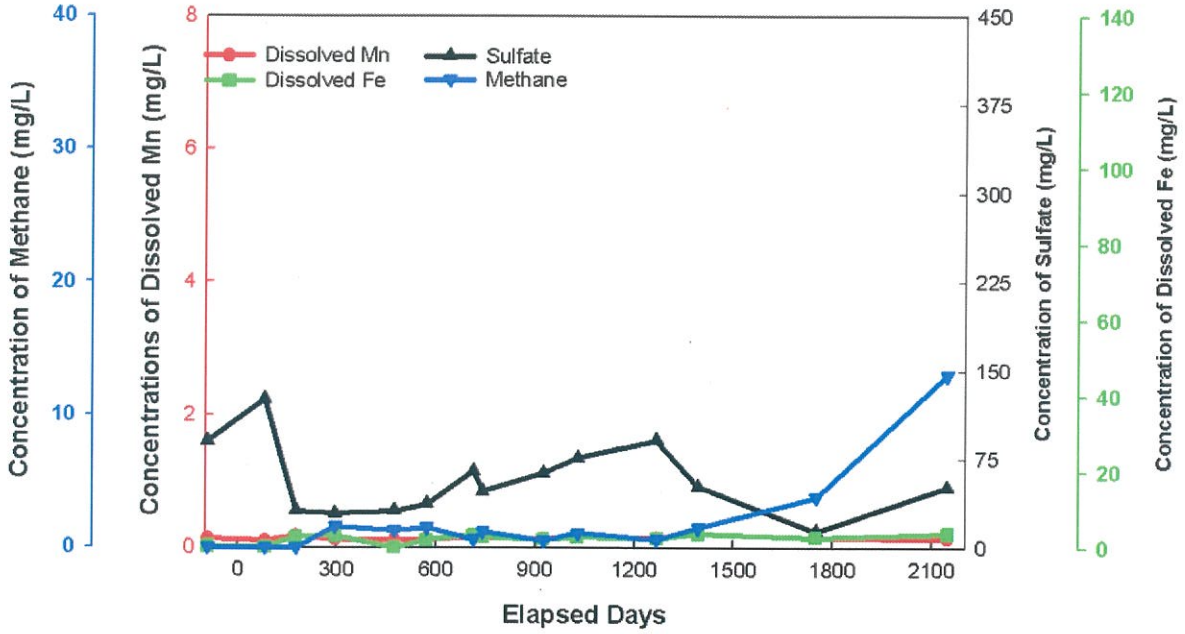


Figure E-12. Bioattenuation Parameters at GM-28 - Downgradient Well in RZ-1

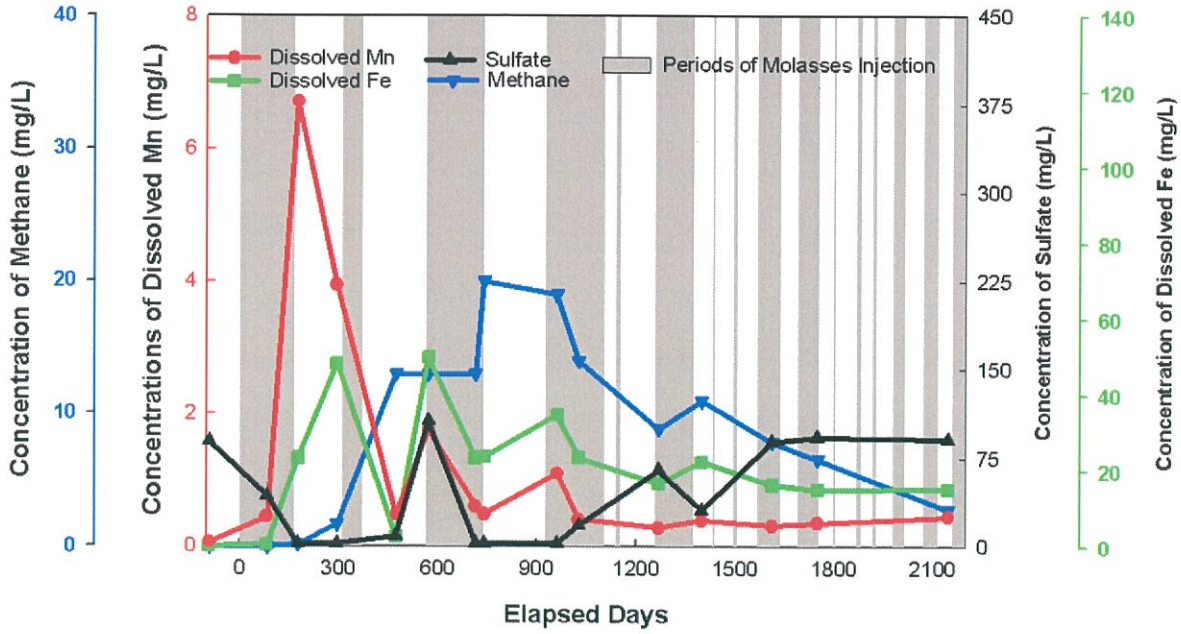


Figure E-13. Bioattenuation Parameters at ME-6 - Upgradient Well in RZ-2

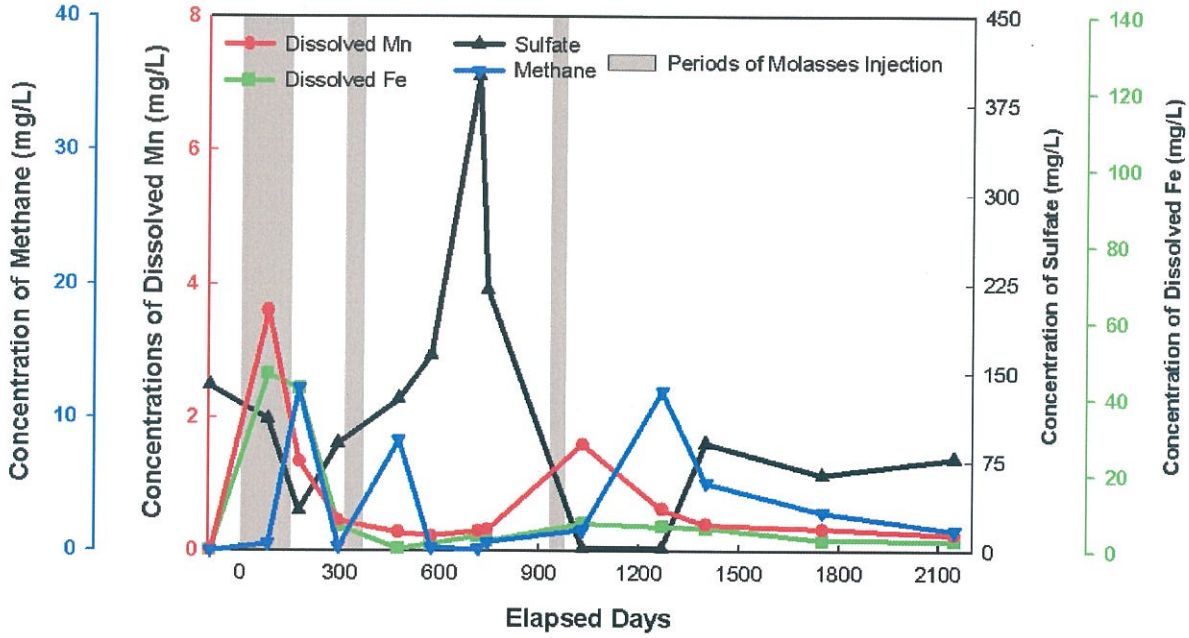


Figure E-14. Bioattenuation Parameters at ME-3 - Downgradient Well in RZ-2

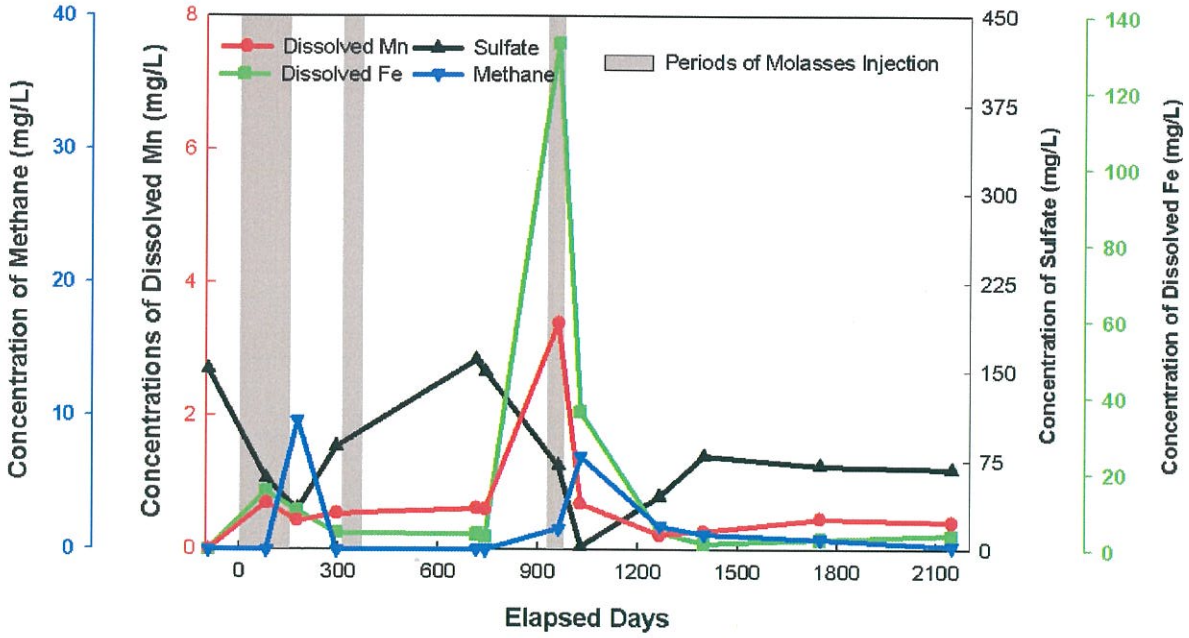


Figure E-15. Bioattenuation Parameters at EAST - Upgradient Well in RZ-3 West

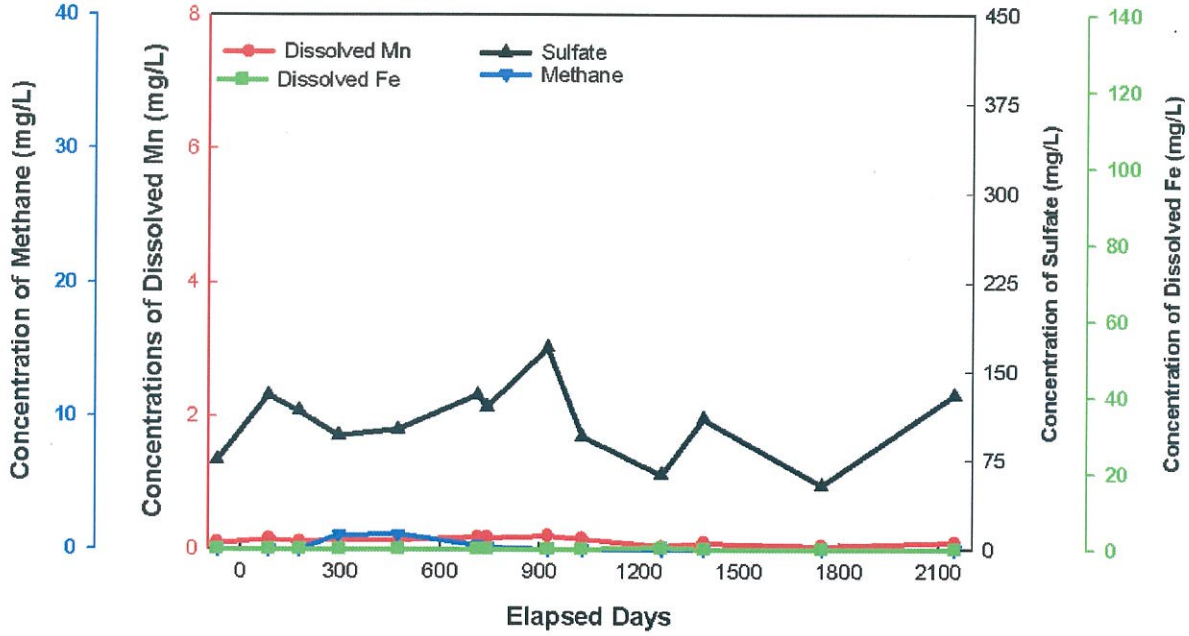


Figure E-16. Bioattenuation Parameters at GM-32 - Downgradient Well in RZ-3 West

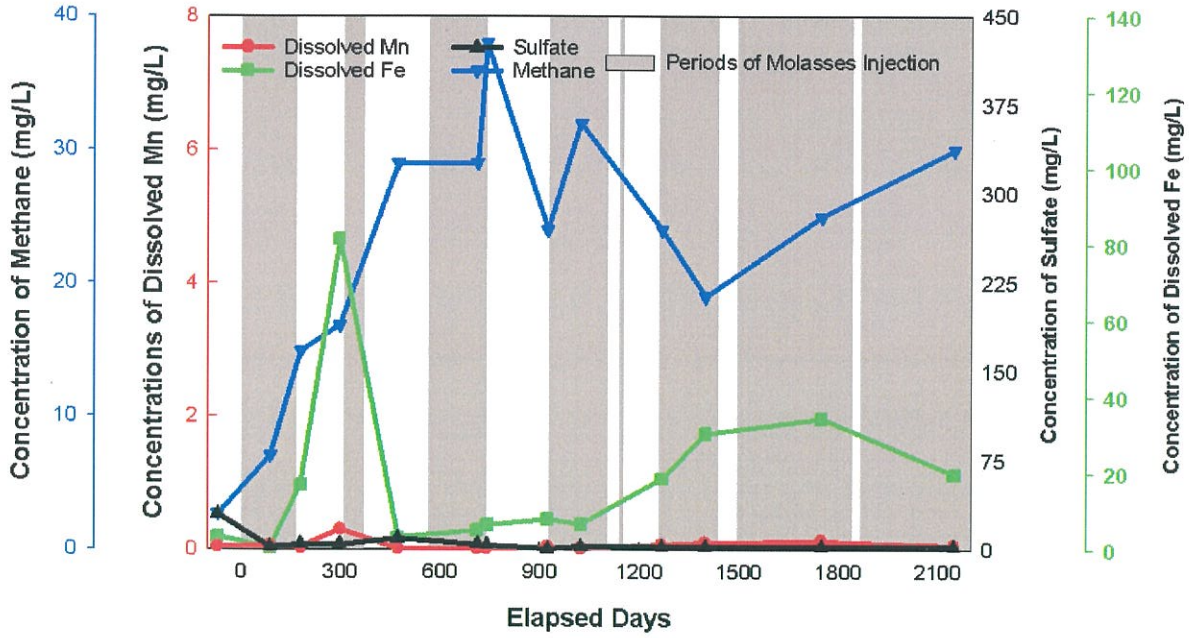


Figure E-17. Bioattenuation Parameters at GM-8 - Downgradient to RZ-3 West

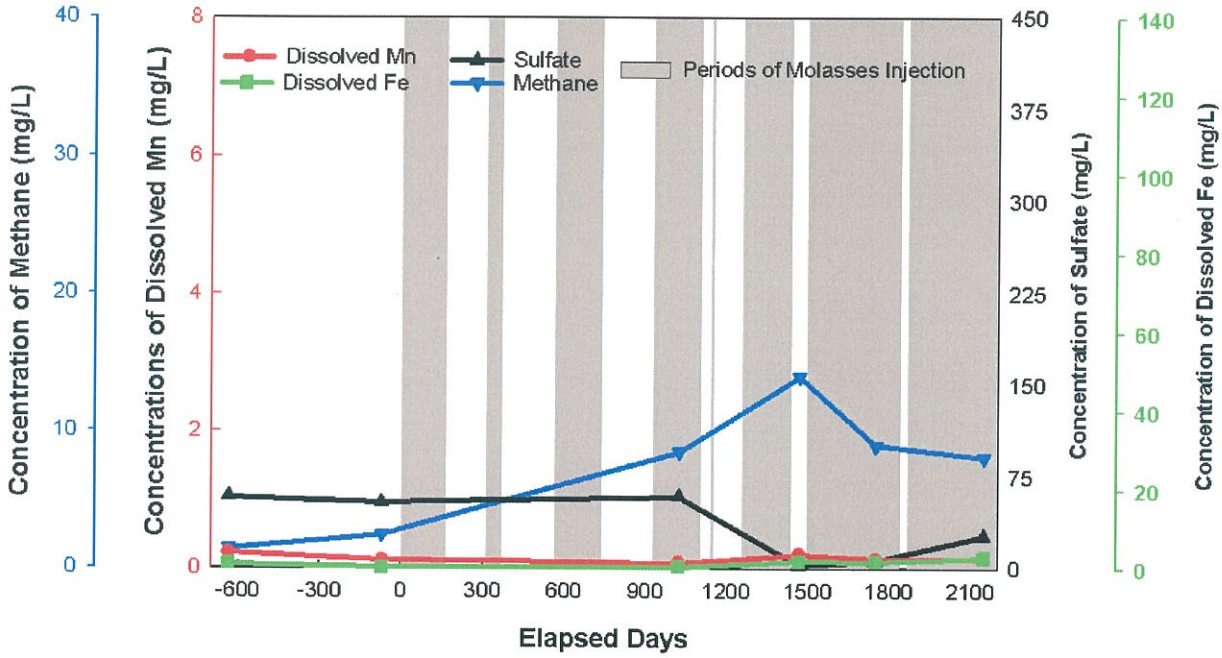


Figure E-18. Bioattenuation Parameters at GM-6 - Downgradient to RZ-3 West

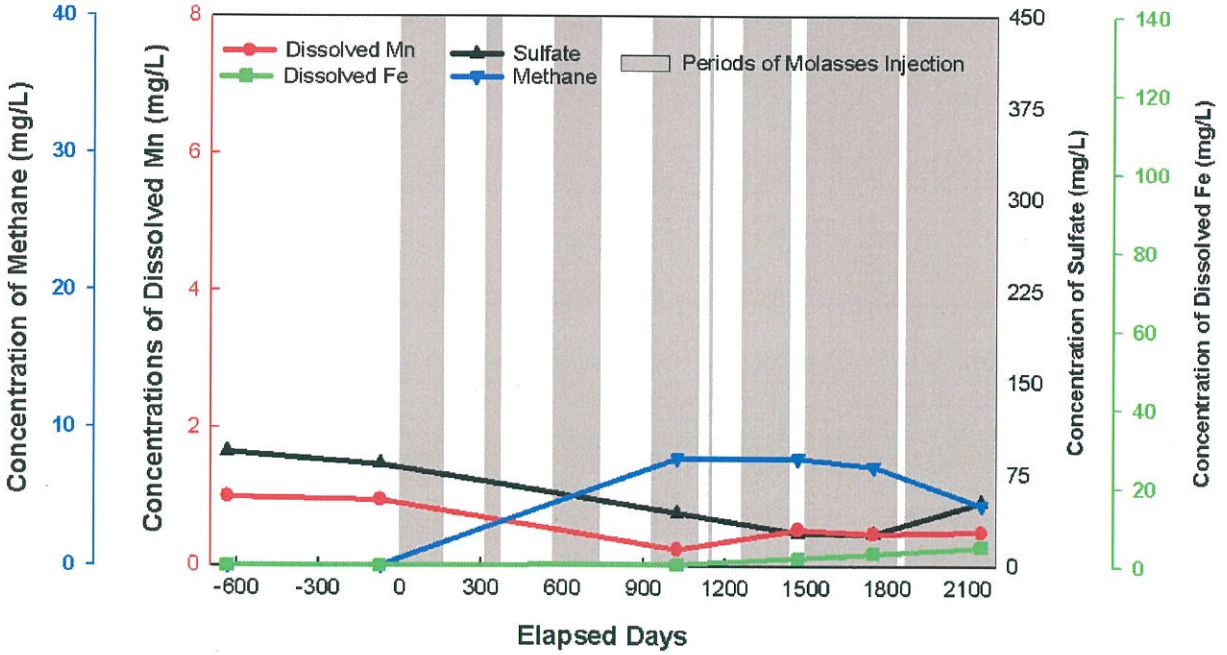


Figure E-19. Bioattenuation Parameters at GM-22 - Upgradient Well in RZ-3 East

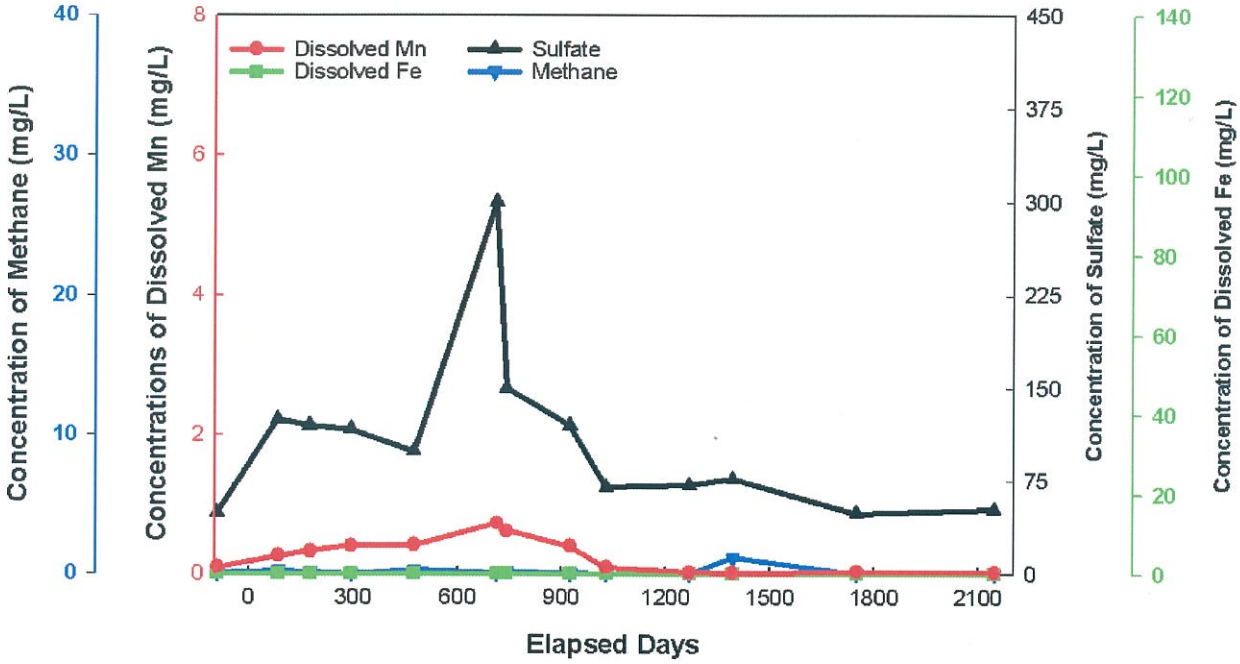
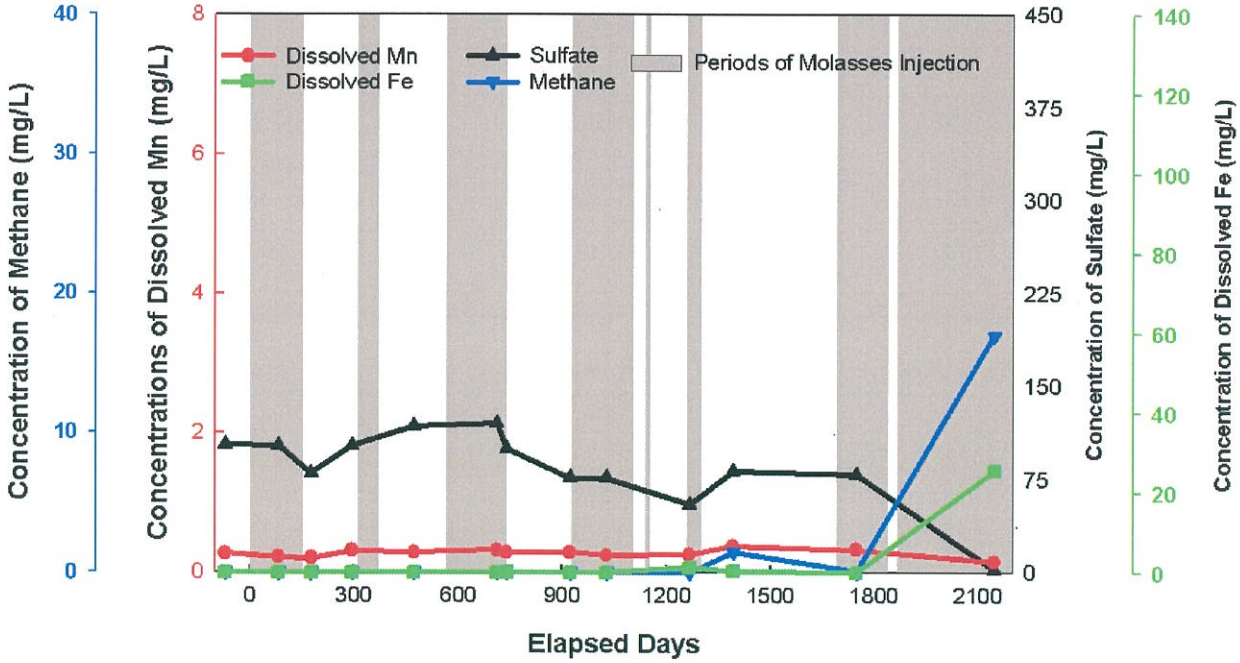


Figure E-20. Bioattenuation Parameters at GM-21 - Downgradient Well in RZ-3 East



ARCADIS

Appendix F

Supporting Documentation for Corrective Action Completion Evaluation

Supporting Calculations
Table F-1: Source Reduction Factors

Potential Receptors Points	Well ID	Model Location (row, column, layer)	Pumping Rates	Potential Source Areas				
				Landfill 1	Landfill 2	Landfill 3	North Settling Lagoon	South Settling Lagoon
Proposed Shallow Well	TW-2	(82,55,1)	150	0.00E+00	2.59E-03	1.21E-02	5.36E-02	0.00E+00
Dryden North Well	DW-13	(89,46,3)	1400	9.67E-02	1.51E-03	5.44E-03	7.38E-03	3.16E-01
Dryden South Well	DS-7	(98,43,3)	0	1.85E-02	3.06E-04	8.74E-04	1.28E-03	2.95E-02
Miami Shores Well Field	MS-14 MS-15	(98,38,3)	0.6	5.73E-03	1.04E-04	3.23E-04	4.59E-04	1.55E-02
	MS-16 MS-17	(98,35,3)	0.6	5.34E-03	9.96E-05	3.32E-04	4.77E-04	2.61E-02
	MS-18 MS-19 MS-20	(100,37,3)	0.6	5.35E-03	9.26E-05	2.73E-04	3.98E-04	1.11E-02
	MS-21	(100,34,3)	0.6	4.68E-03	8.37E-05	2.59E-04	3.74E-04	1.42E-02
	MS-22	(101,33,3)	0.6	4.01E-03	7.08E-05	2.14E-04	3.11E-04	1.06E-02
Moraine Assembly Production Wells	11A	(50,94,3)	325	0.00E+00	1.68E-02	4.04E-04	2.12E-05	0.00E+00
	12A	(46,93,3)	240	0.00E+00	2.84E-06	1.64E-08	5.00E-10	0.00E+00
Moraine Engine Well 28	28	(56,80,3)	0	0.00E+00	2.49E-02	1.20E-01	6.10E-04	0.00E+00
Moraine Engine Plant	31	(37,82,3)	0	0.00E+00	1.74E-03	0.00E+00	0.00E+00	0.00E+00
	39	(40,81,3)	0	0.00E+00	7.88E-06	1.60E-03	0.00E+00	0.00E+00
Harrison Production Wells	44	(29,70,3)	0	0.00E+00	7.62E-04	1.31E-02	0.00E+00	0.00E+00
	42	(54,59,3)	0	0.00E+00	7.71E-04	1.66E-02	5.44E-02	0.00E+00
	45	(74,56,3)	0	0.00E+00	2.20E-02	3.76E-02	3.58E-02	0.00E+00
West Carrollton Well Field	MI-41AP	(111, 21, 3)	317	4.35E-04	0.00E+00	0.00E+00	1.52E-05	2.21E-03
	MI-41CP	(111, 20, 3)	317	5.94E-04	0.00E+00	0.00E+00	1.32E-05	4.47E-03
	MI-41DP	(112, 19, 3)	317	4.67E-04	0.00E+00	7.39E-08	1.47E-05	3.63E-03
Miami River	-	-	0	3.59E-01	1.05E-01	2.19E-01	1.08E-02	0.00E+00

NOTES:

1. Source Reduction Factors reflect updated groundwater model results generated using current site pumping conditions without interim measures pumping (Pumping Scenario 1; updated Feb 2006)
2. Shaded cells indicate those potential receptor wells which are not pumping in Pumping Scenario 1 (i.e., current conditions without interim measures pumping).
3. Dilution factors reported for the Miami River are mass loading factors to the river [$^{lb/day}/_{mg/L}$]

Supporting Calculations
Table F-2: Source Concentrations for In-Place Waste Management Units
(Based on 2005 Sampling Data)

SWMU	TCL/TAL Group	Constituent	CASRN	Maximum Downgradient Ground Water Concentration (mg/L)
Landfill L1	VOC	Benzene	71-43-2	**2.5E-03**
Landfill L1	VOC	1,1-Dichloroethane	75-34-3	**2.1E-02**
Landfill L1	VOC	cis-1,2-Dichloroethene	156-59-2	**2.0E-02**
Landfill L1	VOC	trans-1,2-Dichloroethene	156-60-5	**2.1E-03**
Landfill L1	VOC	Ethyl Benzene	100-41-4	**1.2E-02**
Landfill L1	VOC	Tetrachloroethene	127-18-4	**3.4E-04**
Landfill L1	VOC	Toluene	108-88-3	**3.4E-03**
Landfill L1	VOC	Trichloroethene	79-01-6	**1.4E-03**
Landfill L1	VOC	Vinyl Chloride	75-01-4	**1.1E-02**
Landfill L1	VOC	Xylenes (total)	1330-20-7	**5.0E-03**
Landfill L1	INORG	Manganese	7439-96-5	**5.0E-01**
Landfill L2	VOC	1,1-Dichloroethane	75-34-3	**4.5E-03**
Landfill L2	VOC	cis-1,2-Dichloroethene	156-59-2	**5.1E-03**
Landfill L2	VOC	trans-1,2-Dichloroethene	156-60-5	**7.9E-04**
Landfill L2	VOC	Tetrachloroethene	127-18-4	**1.0E-03**
Landfill L2	VOC	Trichloroethene	79-01-6	**7.2E-03**
Landfill L2	VOC	Vinyl Chloride	75-01-4	**5.4E-04**
Landfill L3	VOC	1,1-Dichloroethane	75-34-3	**4.5E-03**
Landfill L3	VOC	cis-1,2-Dichloroethene	156-59-2	**5.1E-03**
Landfill L3	VOC	trans-1,2-Dichloroethene	156-60-5	**7.9E-04**
Landfill L3	VOC	Tetrachloroethene	127-18-4	**1.0E-03**
Landfill L3	VOC	Trichloroethene	79-01-6	**7.2E-03**
Landfill L3	VOC	Vinyl Chloride	75-01-4	**5.4E-04**
North Settling Lagoon	VOC	1,1-Dichloroethane	75-34-3	**1.2E-03**
North Settling Lagoon	VOC	cis-1,2-Dichloroethene	156-59-2	**8.4E-02**
North Settling Lagoon	VOC	trans-1,2-Dichloroethene	156-60-5	**1.0E-03**
North Settling Lagoon	VOC	Tetrachloroethene	127-18-4	**1.4E-03**
North Settling Lagoon	VOC	Trichloroethene	79-01-6	**1.3E-02**
North Settling Lagoon	VOC	Vinyl Chloride	75-01-4	**8.0E-03**
South Settling Lagoon	VOC	1,1-Dichloroethane	75-34-3	**1.4E-03**
South Settling Lagoon	VOC	cis-1,2-Dichloroethene	156-59-2	**4.3E-03**
South Settling Lagoon	VOC	trans-1,2-Dichloroethene	156-60-5	**1.1E-03**
South Settling Lagoon	VOC	Tetrachloroethene	127-18-4	**2.0E-02**
South Settling Lagoon	VOC	1,1,1-Trichloroethane	71-55-6	**2.5E-03**
South Settling Lagoon	VOC	Trichloroethene	79-01-6	**1.3E-02**

Supporting Calculations

Table F-3a: Estimated Contributions to Ground Water Concentrations (mg/L) at Moraine Assembly Receptor Point (Pumping Scenario 1)

TCL/TAL Group	Constituent	CASRN	Landfill L1	Landfill L2	Landfill L3	N Settling Lagoon	S Settling Lagoon	Total	Criteria	Flag
VOC	1,1,1-Trichloroethane	71-55-6							0.2	
VOC	1,1-Dichloroethane	75-34-3		4.30E-05	1.03E-06	1.46E-08		0.00004	3.65	
VOC	1,1-Dichloroethene	75-35-4							0.007	
VOC	1,2-Dichloroethene (total)	540-59-0							0.07	
VOC	2-Butanone	78-93-3							21.9	
VOC	Acetone	67-64-1							3.65	
VOC	Benzene	71-43-2							0.005	
VOC	Carbon Disulfide	75-15-0							3.65	
VOC	Chlorobenzene	108-90-7							0.1	
VOC	Chloroethane	75-00-3							0.01	
VOC	Chloroform	67-66-3							0.1	
VOC	cis-1,2-Dichloroethene	156-59-2		4.88E-05	1.17E-06	1.02E-06		0.0001	0.07	
VOC	Ethyl Benzene	100-41-4							0.7	
VOC	Styrene	100-42-5							0.1	
VOC	Tetrachloroethene	127-18-4		9.66E-06	2.32E-07	1.71E-08		0.00001	0.005	
VOC	Toluene	108-88-3							1.	
VOC	trans-1,2-Dichloroethene	156-60-5		7.64E-06	1.84E-07	1.22E-08		0.00001	0.1	
VOC	Trichloroethene	79-01-6		6.96E-05	1.67E-06	1.59E-07		0.0001	0.005	
VOC	Trichlorofluoromethane	75-69-4							10.95	
VOC	Vinyl Chloride	75-01-4		5.22E-06	1.25E-07	9.76E-08		0.00001	0.002	
VOC	Xylenes (total)	1330-20-7							10.	
SVOC	1,2-Dichlorobenzene	95-50-1							0.6	
SVOC	2-Methylnaphthalene	91-57-6							0.73	
SVOC	Benzo(a)anthracene	56-55-3							0.01	
SVOC	Benzo(a)pyrene	50-32-8							0.0002	
SVOC	Benzo(b)fluoranthene	205-99-2							0.01	
SVOC	bis(2-Ethylhexyl)phthalate	117-81-7							0.006	
SVOC	Butylbenzylphthalate	85-68-7							7.3	
SVOC	Chrysene	218-01-9							0.0117	
SVOC	Di-n-butylphthalate	84-74-2							3.65	
SVOC	Fluoranthene	206-44-0							1.46	
SVOC	Fluorene	86-73-7							1.46	
SVOC	Naphthalene	91-20-3							0.73	
SVOC	Phenanthrene	85-01-8							1.095	
SVOC	Pyrene	129-00-0							1.095	
P/PCB	Aroclor-1242	53469-21-9							0.0005	
P/PCB	Aroclor-1254	11097-69-1							0.0005	
P/PCB	Aroclor-1260	11096-82-5							0.0005	
INORG	Antimony	7440-36-0							0.006	
INORG	Arsenic	7440-38-2							0.05	
INORG	Barium	7440-39-3							2.	
INORG	Beryllium	7440-41-7							0.004	
INORG	Cadmium	7440-43-9							0.005	
INORG	Chromium (total)	7440-47-3							0.1	
INORG	Cobalt	7440-48-4							2.19	
INORG	Copper	7440-50-8							1.3	
INORG	Cyanide (total)	57-12-5							0.2	
INORG	Lead	7439-92-1							0.015	
INORG	Manganese	7439-96-5							5.11	
INORG	Mercury	7439-97-6							0.002	
INORG	Nickel	7440-02-0							0.1	
INORG	Selenium	7782-49-2							0.05	
INORG	Silver	7440-22-4							0.1825	
INORG	Thallium	7440-28-0							0.002	
INORG	Vanadium	7440-62-2							0.2555	
INORG	Zinc	7440-66-6							10.95	

Supporting Calculations

Table F-3b: Estimated Contributions to Ground Water Concentrations (mg/L) at Moraine Engine Receptor Point (Pumping Scenario 1)

TCL/TAL Group	Constituent	CASRN	Landfill L1	Landfill L2	Landfill L3	N Settling Lagoon	S Settling Lagoon	Total	Criteria	Flag
VOC	1,1,1-Trichloroethane	71-55-6							0.2	
VOC	1,1-Dichloroethane	75-34-3		1.76E-08	4.01E-12			0.	3.65	
VOC	1,1-Dichloroethene	75-35-4							0.007	
VOC	1,2-Dichloroethene (total)	540-59-0							0.07	
VOC	2-Butanone	78-93-3							21.9	
VOC	Acetone	67-64-1							3.65	
VOC	Benzene	71-43-2							0.005	
VOC	Carbon Disulfide	75-15-0							3.65	
VOC	Chlorobenzene	108-90-7							0.1	
VOC	Chloroethane	75-00-3							0.01	
VOC	Chloroform	67-66-3							0.1	
VOC	cis-1,2-Dichloroethene	156-59-2		2.00E-08	4.55E-12			0.	0.07	
VOC	Ethyl Benzene	100-41-4							0.7	
VOC	Styrene	100-42-5							0.1	
VOC	Tetrachloroethene	127-18-4		3.96E-09	9.00E-13			0.	0.005	
VOC	Toluene	108-88-3							1.	
VOC	trans-1,2-Dichloroethene	156-60-5		3.13E-09	7.11E-13			0.	0.1	
VOC	Trichloroethene	79-01-6		2.85E-08	6.48E-12			0.	0.005	
VOC	Trichlorofluoromethane	75-69-4							10.95	
VOC	Vinyl Chloride	75-01-4		2.14E-09	4.86E-13			0.	0.002	
VOC	Xylenes (total)	1330-20-7							10.	
SVOC	1,2-Dichlorobenzene	95-50-1							0.6	
SVOC	2-Methylnaphthalene	91-57-6							0.73	
SVOC	Benzo(a)anthracene	56-55-3							0.01	
SVOC	Benzo(a)pyrene	50-32-8							0.0002	
SVOC	Benzo(b)fluoranthene	205-99-2							0.01	
SVOC	bis(2-Ethylhexyl)phthalate	117-81-7							0.006	
SVOC	Butylbenzylphthalate	85-68-7							7.3	
SVOC	Chrysene	218-01-9							0.0117	
SVOC	Di-n-butylphthalate	84-74-2							3.65	
SVOC	Fluoranthene	206-44-0							1.46	
SVOC	Fluorene	86-73-7							1.46	
SVOC	Naphthalene	91-20-3							0.73	
SVOC	Phenanthrene	85-01-8							1.095	
SVOC	Pyrene	129-00-0							1.095	
P/PCB	Aroclor-1242	53469-21-9							0.0005	
P/PCB	Aroclor-1254	11097-69-1							0.0005	
P/PCB	Aroclor-1260	11096-82-5							0.0005	
INORG	Antimony	7440-36-0							0.006	
INORG	Arsenic	7440-38-2							0.05	
INORG	Barium	7440-39-3							2.	
INORG	Beryllium	7440-41-7							0.004	
INORG	Cadmium	7440-43-9							0.005	
INORG	Chromium (total)	7440-47-3							0.1	
INORG	Cobalt	7440-48-4							2.19	
INORG	Copper	7440-50-8							1.3	
INORG	Cyanide (total)	57-12-5							0.2	
INORG	Lead	7439-92-1							0.015	
INORG	Manganese	7439-96-5							5.11	
INORG	Mercury	7439-97-6							0.002	
INORG	Nickel	7440-02-0							0.1	
INORG	Selenium	7782-49-2							0.05	
INORG	Silver	7440-22-4							0.1825	
INORG	Thallium	7440-28-0							0.002	
INORG	Vanadium	7440-62-2							0.2555	
INORG	Zinc	7440-66-6							10.95	

Supporting Calculations

Table F-3c: Estimated Contributions to Ground Water Concentrations (mg/L) at West Carrollton Receptor Point (Pumping Scenario 1)

TCL/TAL Group	Constituent	CASRN	Landfill L1	Landfill L2	Landfill L3	N Settling Lagoon	S Settling Lagoon	Total	Criteria	Flag
VOC	1,1,1-Trichloroethane	71-55-6					8.59E-06	0.00001	0.2	
VOC	1,1-Dichloroethane	75-34-3	1.05E-05		1.10E-10	1.72E-08	4.81E-06	0.00002	3.65	
VOC	1,1-Dichloroethene	75-35-4							0.007	
VOC	1,2-Dichloroethene (total)	540-59-0							0.07	
VOC	2-Butanone	78-93-3							21.9	
VOC	Acetone	67-64-1							3.65	
VOC	Benzene	71-43-2	1.25E-06					0.	0.005	
VOC	Carbon Disulfide	75-15-0							3.65	
VOC	Chlorobenzene	108-90-7							0.1	
VOC	Chloroethane	75-00-3							0.01	
VOC	Chloroform	67-66-3							0.1	
VOC	cis-1,2-Dichloroethene	156-59-2	9.97E-06		1.24E-10	1.21E-06	1.48E-05	0.00003	0.07	
VOC	Ethyl Benzene	100-41-4	5.98E-06					0.00001	0.7	
VOC	Styrene	100-42-5							0.1	
VOC	Tetrachloroethene	127-18-4	1.70E-07		2.46E-11	2.01E-08	6.87E-05	0.0001	0.005	
VOC	Toluene	108-88-3	1.70E-06					0.	1.	
VOC	trans-1,2-Dichloroethene	156-60-5	1.05E-06		1.95E-11	1.44E-08	3.78E-06	0.	0.1	
VOC	Trichloroethene	79-01-6	6.98E-07		1.77E-10	1.87E-07	4.47E-05	0.00005	0.005	
VOC	Trichlorofluoromethane	75-69-4							10.95	
VOC	Vinyl Chloride	75-01-4	5.49E-06		1.33E-11	1.15E-07		0.00001	0.002	
VOC	Xylenes (total)	1330-20-7	2.49E-06					0.	10.	
SVOC	1,2-Dichlorobenzene	95-50-1							0.6	
SVOC	2-Methylnaphthalene	91-57-6							0.73	
SVOC	Benzo(a)anthracene	56-55-3							0.01	
SVOC	Benzo(a)pyrene	50-32-8							0.0002	
SVOC	Benzo(b)fluoranthene	205-99-2							0.01	
SVOC	bis(2-Ethylhexyl)phthalate	117-81-7							0.006	
SVOC	Butylbenzylphthalate	85-68-7							7.3	
SVOC	Chrysene	218-01-9							0.0117	
SVOC	Di-n-butylphthalate	84-74-2							3.65	
SVOC	Fluoranthene	206-44-0							1.46	
SVOC	Fluorene	86-73-7							1.46	
SVOC	Naphthalene	91-20-3							0.73	
SVOC	Phenanthrene	85-01-8							1.095	
SVOC	Pyrene	129-00-0							1.095	
P/PCB	Aroclor-1242	53469-21-9							0.0005	
P/PCB	Aroclor-1254	11097-69-1							0.0005	
P/PCB	Aroclor-1260	11096-82-5							0.0005	
INORG	Antimony	7440-36-0							0.006	
INORG	Arsenic	7440-38-2							0.05	
INORG	Barium	7440-39-3							2.	
INORG	Beryllium	7440-41-7							0.004	
INORG	Cadmium	7440-43-9							0.005	
INORG	Chromium (total)	7440-47-3							0.1	
INORG	Cobalt	7440-48-4							2.19	
INORG	Copper	7440-50-8							1.3	
INORG	Cyanide (total)	57-12-5							0.2	
INORG	Lead	7439-92-1							0.015	
INORG	Manganese	7439-96-5	2.44E-04					0.0002	5.11	
INORG	Mercury	7439-97-6							0.002	
INORG	Nickel	7440-02-0							0.1	
INORG	Selenium	7782-49-2							0.05	
INORG	Silver	7440-22-4							0.1825	
INORG	Thallium	7440-28-0							0.002	
INORG	Vanadium	7440-62-2							0.2555	
INORG	Zinc	7440-66-6							10.95	

Supporting Calculations

Table F-3d: Estimated Contributions to Ground Water Concentrations (mg/L) at Great Miami River Receptor Point (Pumping Scenario 1)

TCL/TAL Group	Constituent	CASRN	Landfill L1	Landfill L2	Landfill L3	N Settling Lagoon	S Settling Lagoon	Total	Criteria	Flag
VOC	1,1,1-Trichloroethane	71-55-6							0.2	
VOC	1,1-Dichloroethane	75-34-3	5.70E-09	2.03E-13	1.07E-10	1.52E-09		0.	3.65	
VOC	1,1-Dichloroethene	75-35-4							0.007	
VOC	1,2-Dichloroethene (total)	540-59-0							0.07	
VOC	2-Butanone	78-93-3							21.9	
VOC	Acetone	67-64-1							3.65	
VOC	Benzene	71-43-2	6.78E-10					0.	0.005	
VOC	Carbon Disulfide	75-15-0							3.65	
VOC	Chlorobenzene	108-90-7							0.1	
VOC	Chloroethane	75-00-3							0.01	
VOC	Chloroform	67-66-3							0.1	
VOC	cis-1,2-Dichloroethene	156-59-2	5.42E-09	2.31E-13	1.21E-10	1.07E-07		0.	0.07	
VOC	Ethyl Benzene	100-41-4	3.25E-09					0.	0.7	
VOC	Styrene	100-42-5							0.1	
VOC	Tetrachloroethene	127-18-4	9.22E-11	4.57E-14	2.40E-11	1.78E-09		0.	0.005	
VOC	Toluene	108-88-3	9.22E-10					0.	1.	
VOC	trans-1,2-Dichloroethene	156-60-5	5.70E-10	3.61E-14	1.90E-11	1.27E-09		0.	0.1	
VOC	Trichloroethene	79-01-6	3.80E-10	3.29E-13	1.73E-10	1.65E-08		0.	0.005	
VOC	Trichlorofluoromethane	75-69-4							10.95	
VOC	Vinyl Chloride	75-01-4	2.98E-09	2.47E-14	1.30E-11	1.02E-08		0.	0.002	
VOC	Xylenes (total)	1330-20-7	1.36E-09					0.	10.	
SVOC	1,2-Dichlorobenzene	95-50-1							0.6	
SVOC	2-Methylnaphthalene	91-57-6							0.73	
SVOC	Benzo(a)anthracene	56-55-3							0.01	
SVOC	Benzo(a)pyrene	50-32-8							0.0002	
SVOC	Benzo(b)fluoranthene	205-99-2							0.01	
SVOC	bis(2-Ethylhexyl)phthalate	117-81-7							0.006	
SVOC	Butylbenzylphthalate	85-68-7							7.3	
SVOC	Chrysene	218-01-9							0.0117	
SVOC	Di-n-butylphthalate	84-74-2							3.65	
SVOC	Fluoranthene	206-44-0							1.46	
SVOC	Fluorene	86-73-7							1.46	
SVOC	Naphthalene	91-20-3							0.73	
SVOC	Phenanthrene	85-01-8							1.095	
SVOC	Pyrene	129-00-0							1.095	
P/PCB	Aroclor-1242	53469-21-9							0.0005	
P/PCB	Aroclor-1254	11097-69-1							0.0005	
P/PCB	Aroclor-1260	11096-82-5							0.0005	
INORG	Antimony	7440-36-0							0.006	
INORG	Arsenic	7440-38-2							0.05	
INORG	Barium	7440-39-3							2.	
INORG	Beryllium	7440-41-7							0.004	
INORG	Cadmium	7440-43-9							0.005	
INORG	Chromium (total)	7440-47-3							0.1	
INORG	Cobalt	7440-48-4							2.19	
INORG	Copper	7440-50-8							1.3	
INORG	Cyanide (total)	57-12-5							0.2	
INORG	Lead	7439-92-1							0.015	
INORG	Manganese	7439-96-5	1.33E-07					0.	5.11	
INORG	Mercury	7439-97-6							0.002	
INORG	Nickel	7440-02-0							0.1	
INORG	Selenium	7782-49-2							0.05	
INORG	Silver	7440-22-4							0.1825	
INORG	Thallium	7440-28-0							0.002	
INORG	Vanadium	7440-62-2							0.2555	
INORG	Zinc	7440-66-6							10.95	

TABLE F-4: Preliminary Remediation Target Levels (Updated February 2006)

Remediation Target Levels (mg/L) - Upper Aquifer

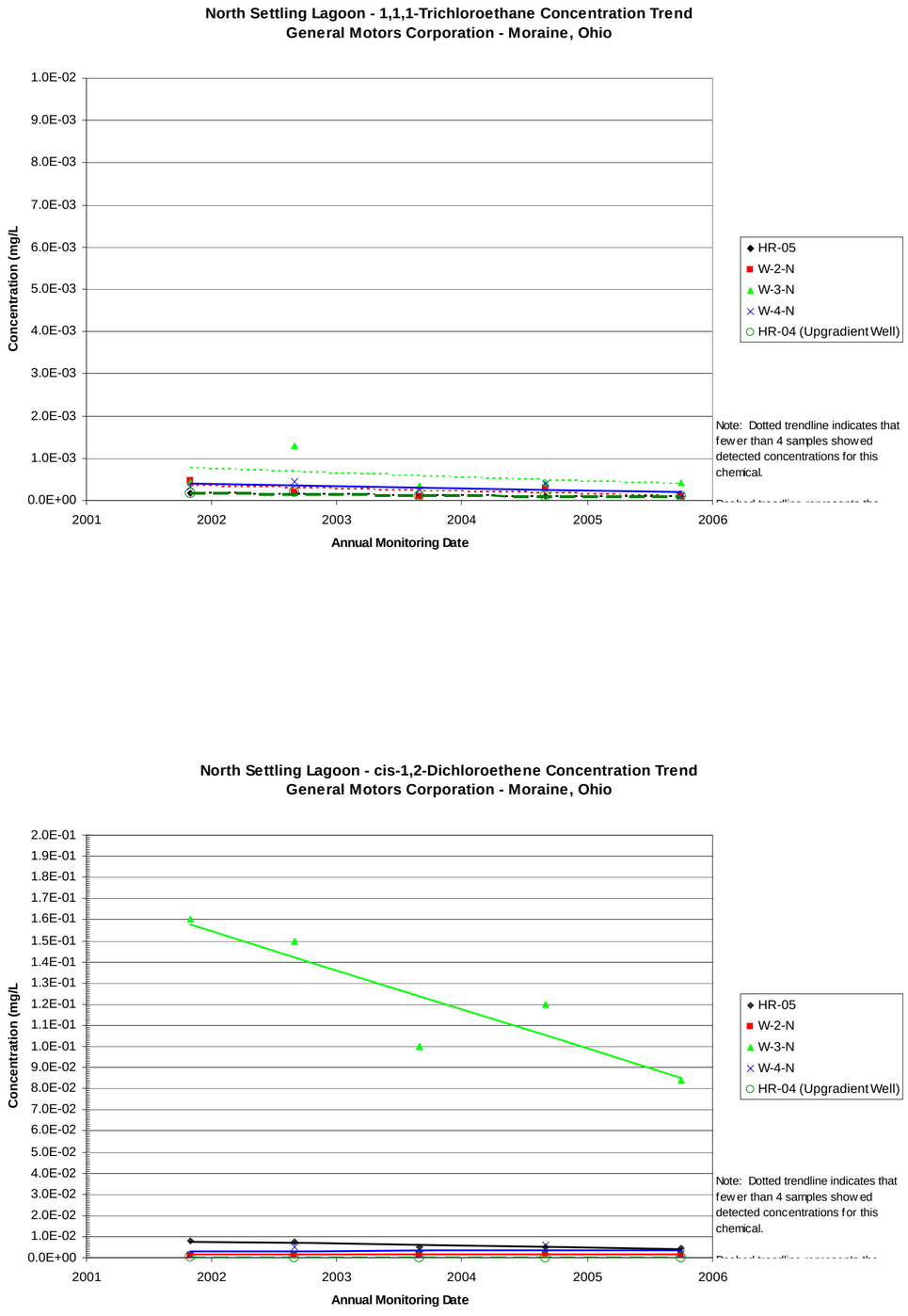
			Constituent of Concern					
Point of Compliance	***GM-26***		***PCE***	***TCE***	***1,1-DCE***	***cis-1,2-DCE***	***Vinyl Chloride***	**monitoring wells**
Allowable POC Concentration (mg/L):			***0.005***	***0.005***	***0.007***	***0.070***	***0.002***	
Estimated Remediation Target Level at AOI 7 (mg/L):			***0.098***	***0.098***	***0.137***	***1.373***	***0.039***	GM-23, GM-29 and GM-30
Distance from AOI 7 (monitoring zone)	**Source Reduction Factor[1]**	**Normalized Remediation Target**	**Remediation Target (mg/L)**	**Remediation Target (mg/L)**	**Remediation Target (mg/L)**	**Remediation Target (mg/L)**	**Remediation Target (mg/L)**	
140 ft (Zone S1)	0.9	18	0.088	0.088	0.124	1.235	0.035	GM-28
1190 ft (Zone S1 to Zone S2)	0.47	9	0.046	0.046	0.065	0.645	0.018	GM-28, ME-6
2240 ft (Zone S2)	0.4	8	0.039	0.039	0.055	0.549	0.016	ME-6, ME-3, GM-31
2940 ft (Zone S2 to Zone S3)	0.27	5	0.026	0.026	0.037	0.371	0.011	ME-6, ME-3, GM-31, GM-22, GM-19S, and EAST
3640 ft (Zone S3)	0.19	4	0.019	0.019	0.026	0.261	0.007	GM-32, GM-21
4430 ft (Zone S3 to GM-10)	0.15	3	0.015	0.015	0.021	0.206	0.006	GM-32, GM-21, GM-8, GM-6, 4S, GM-2, GM-16, GM-17, GM-18, WSU-24, and GM-10
5215 ft (GM-10)	0.11	2	0.011	0.011	0.015	0.151	0.004	GM-10
6370 ft (POC)	0.051	1	0.005	0.005	0.007	0.070	0.002	GM-26

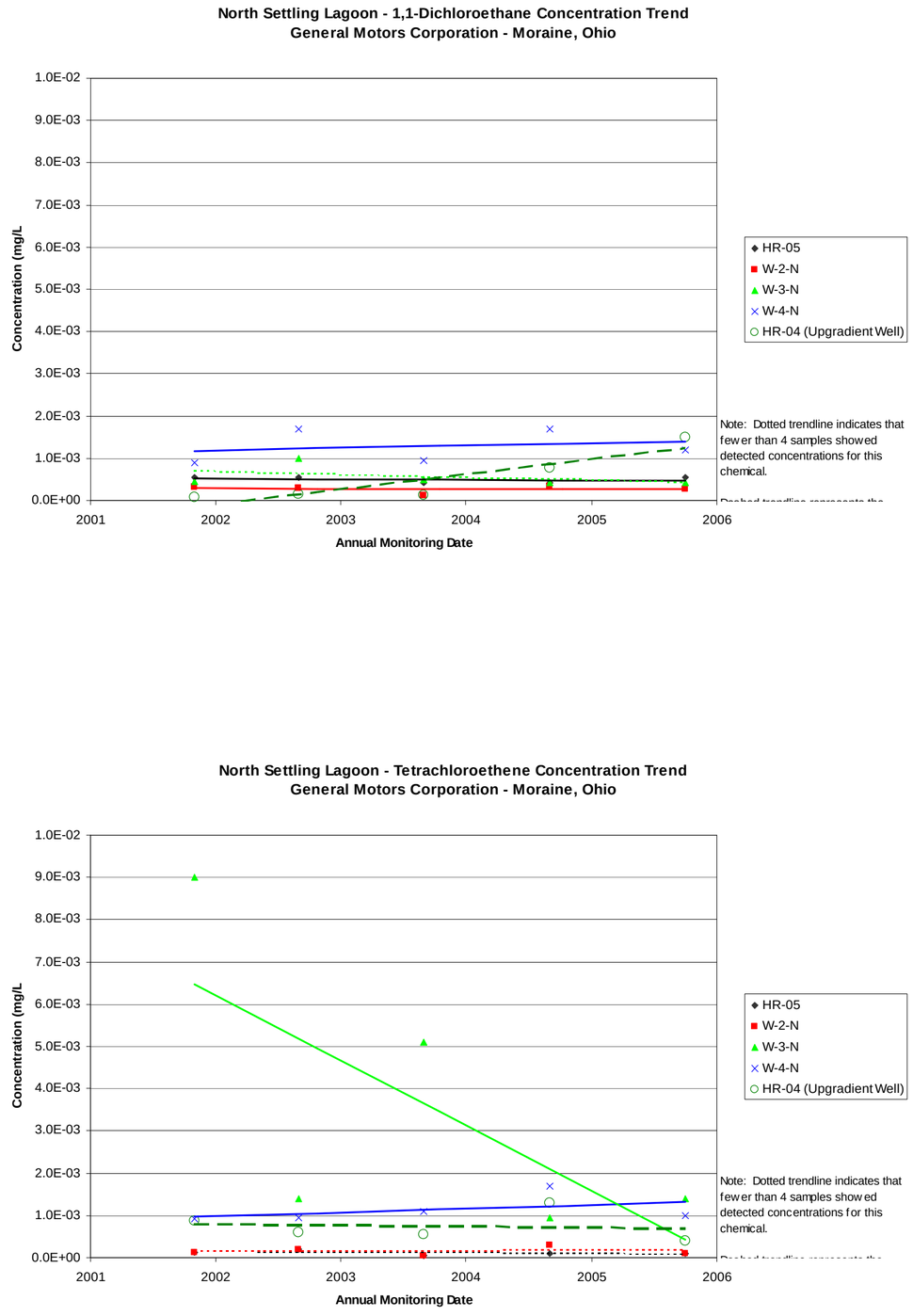
Remediation Target Level (mg/L) - Lower Aquifer

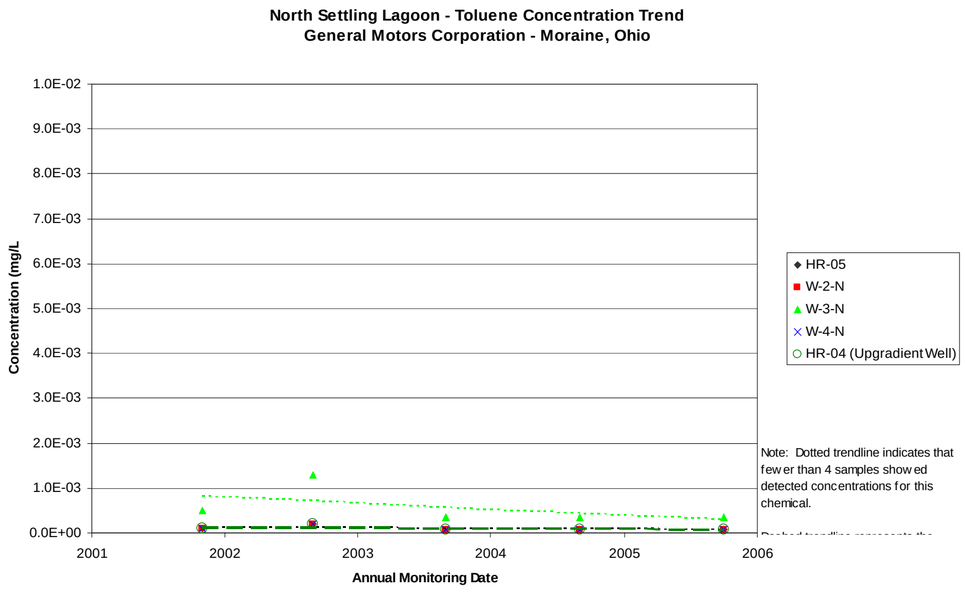
			Constituent of Concern					
Point of Compliance	***GM-11, GM-15 and GM-20D***		***PCE***	***TCE***	***1,1-DCE***	***cis-1,2-DCE***	***Vinyl Chloride***	**monitoring wells**
Allowable POC Concentration (mg/L):			***0.005***	***0.005***	***0.007***	***0.070***	***0.002***	
Estimated Remediation Target Level at AOI 7 (mg/L):			***0.128***	***0.128***	***0.179***	***1.795***	***0.051***	GM-23, GM-29 and GM-30
Distance from AOI 7 (monitoring zone)	**Source Reduction Factor[1]**	**Normalized Remediation Target**	**Remediation Target (mg/L)**	**Remediation Target (mg/L)**	**Remediation Target (mg/L)**	**Remediation Target (mg/L)**	**Remediation Target (mg/L)**	
2000 ft (Well GM-41)	0.18	4.6	0.023	0.023	0.032	0.323	0.009	GM-41
2900 ft (Well GM-42)	0.06	1.5	0.008	0.008	0.011	0.108	0.003	GM-42 (replaces Well 32)
3600 ft (Well GM-19D)	0.046	1.2	0.006	0.006	0.008	0.083	0.002	GM-19D
4250 ft (Zone D2)	0.042	1.1	0.005	0.005	0.008	0.075	0.002	GM-1 and GM-3
4900 ft (P0C)	0.039	1.0	0.005	0.005	0.007	0.070	0.002	GM-11, GM-15 and GM-20D

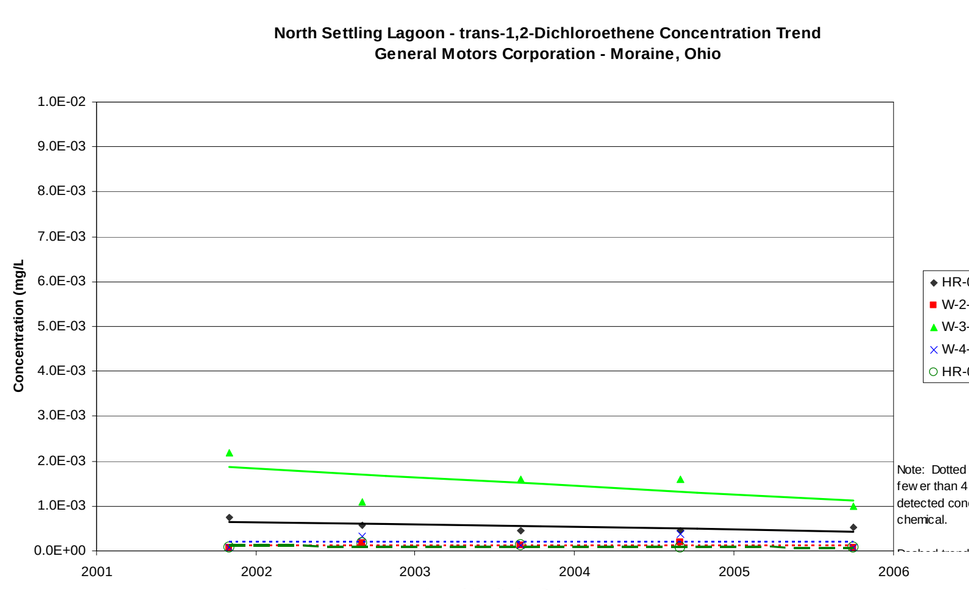
Note
1. Source Reduction Factors reflect updated groundwater model results generated using current site pumping conditions without interim measures pumping (Pumping Scenario 1; updated Feb 2006)

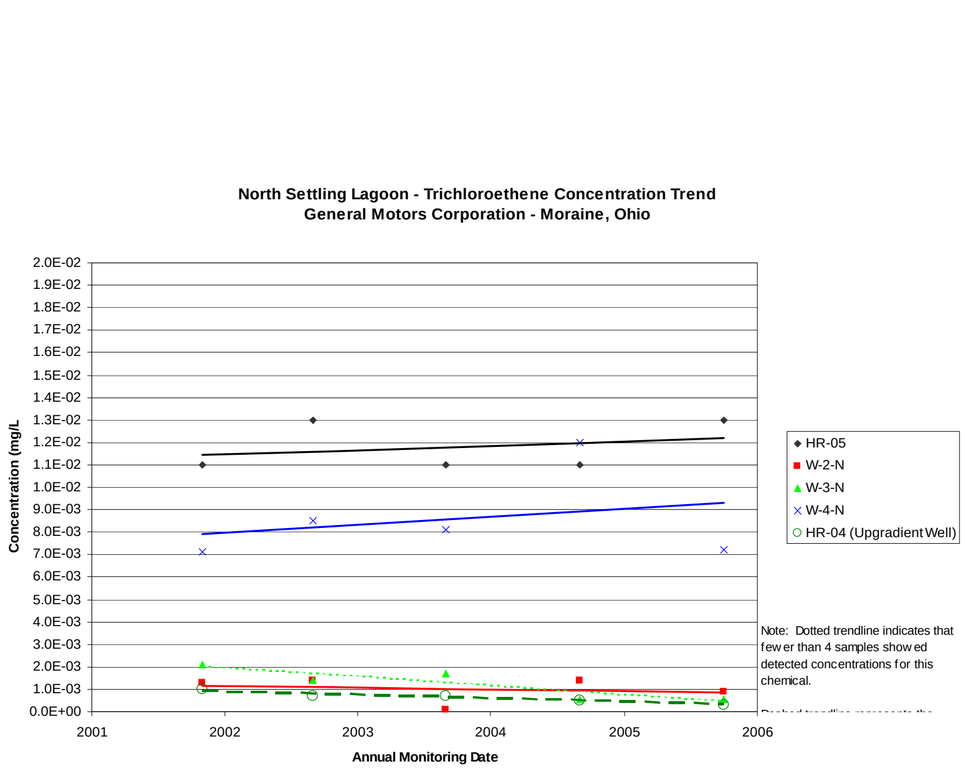
North Settling Lagoon

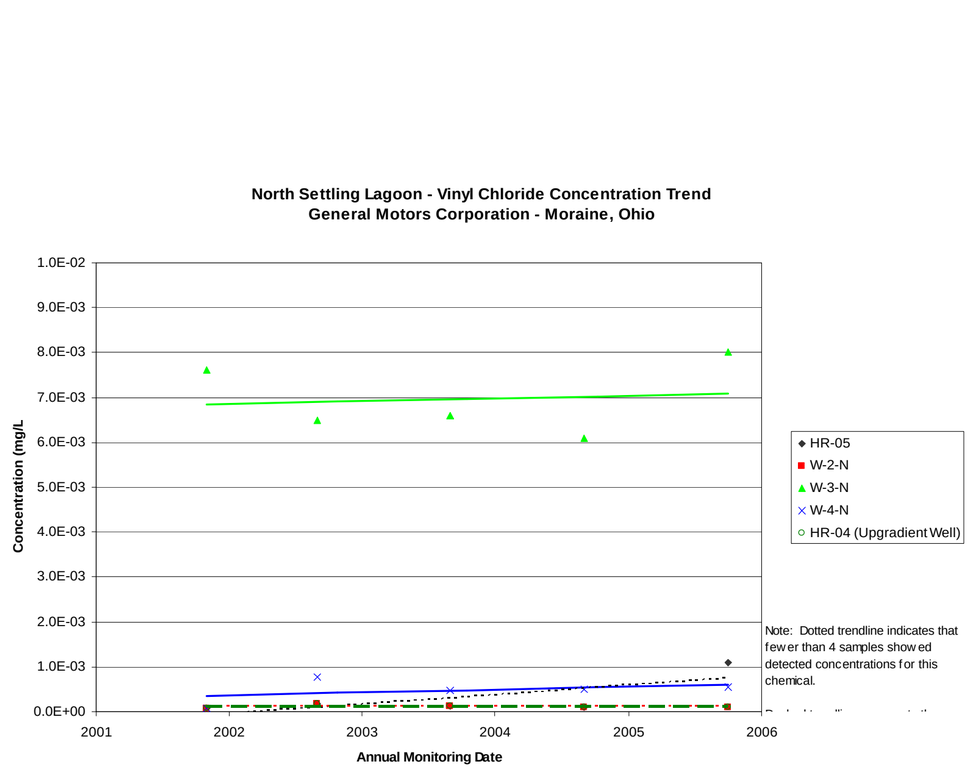












South Settling Lagoon