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**Former Building 14
Investigation Summary
Report**

General Motors Corporation
Moraine, Ohio

March 23, 2005

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1. Introduction

The General Motors Corporation (GM) Moraine, Ohio facilities are under an Administrative Order with the United States Environmental Protection Agency (U.S. EPA) Region V, to conduct a Resource Conservation and Recovery Act (RCRA) Corrective Action. The Moraine, Ohio facilities include former Delphi Harrison Thermal Systems Moraine Plant (former Delphi Thermal Moraine [leased to Delphi Corporation between 1999 and September 2003]), the former General Motors Powertrain Group Moraine Engine Plant (former Moraine Engine), and General Motors Truck Group Moraine Assembly Plant (Moraine Assembly) (Figure 1 of the Site-Wide Groundwater Monitoring Report for 2004 [ARCADIS 2005]). One of the requirements of the Administrative Order is to evaluate the need for interim measures that can address potential environmental problems. As part of the final remedy, GM has implemented two corrective measures to address the presence of volatile organic compounds (VOCs) in groundwater at the Moraine facilities referred to as (1) the capture zone corrective measures and (2) the Area of Interest (AOI) 7 corrective measures. The capture zone corrective measures addresses the migration of groundwater containing VOCs via upper and lower aquifer recovery wells and the treatment and off-site discharge of upper aquifer groundwater through an on-site air stripper tower. The AOI 7 – Former Oil House Area corrective measures addresses in-situ treatment of VOCs in groundwater in the vicinity of and downgradient of the Former Oil House Area.

The former Delphi Thermal Moraine facility is located in Moraine, Ohio and occupies approximately 165 acres, within this total acreage the DMAX facility is 7 acres. The main manufacturing activities were conducted in the former Building 14, which was constructed in stages starting with the first structure in 1941 and the last addition completed in 1976 resulting in a total floor space of approximately two million square feet. The former Delphi Thermal Moraine's major operations, which began in 1941, included the machining and assembly of automotive air conditioning compressors, accumulator dehydrators, and miscellaneous air conditioning valves. Operations at the former Delphi Thermal Moraine Building 14 ceased in September 2003 and the building was decommissioned. As of October 1, 2003, management of the building has reverted to GM and GM remains the property owner. Demolition of Building 14 began in August 2004 and is scheduled to be completed in 2005.

As proposed in GM's July 14, 2004 submittal to U.S. EPA, a supplemental investigation was conducted at the former Delphi Thermal Moraine Building 14 (former Building 14) in August 2004. The investigation results will be used to support

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a better understanding of the groundwater quality beneath the building and to better assess the current corrective measures.

2. Building 14 Investigation Technical Approach and Methodologies

The specific objective of the former Building 14 investigation of soil and groundwater was to evaluate the groundwater chemistry beneath Building 14 after the building was vacated to better characterize the presence of VOCs in groundwater in this area of the Facility and to assess the current corrective measures at the site. As part of this investigation, soil sampling was conducted to confirm that VOC concentrations were not a concern. This soil sampling was completed by drilling seven borings and collecting soil samples (BD14-01 through BD14-04 and GM-43 through GM-45). The evaluation of groundwater quality was completed through the installation and sampling of three monitoring wells (GM-43 through GM-45) and the collection of groundwater samples from four temporary well points (BD14-01 through BD14-04). Boring and well locations are shown on Figure 1. A summary of the investigation completed at the former Building 14 is presented on Table 1. The technical approach and field methodologies for this investigation are presented below. All field work was completed in August 2004.

2.1 Soil

During the investigation completed at the former Building 14, a rotary-type drilling rig equipped with hollow-stem augers was used to advance the soil borings and split-spoon sampling equipment was used for the collection of soil samples. Soil borings were also sampled continuously for lithologic description. Frontz Drilling Company, Inc. performed the drilling while ARCADIS personnel completed oversight and soil sampling activities. All soil-sampling activities were completed as described in the Building 14 Work Plan (GM correspondence to U.S. EPA, 2004). The methodologies used to obtain soil samples are also described in this report. All soil generated during drilling was contained in labeled drums and disposed of appropriately by GM.

Prior to drilling at each location, drilling equipment (including augers, plugs, and split-spoon samplers) was decontaminated using a high-pressure steam cleaner. Following the collection of each sample, split-spoon samplers were decontaminated in accordance with the approved Supplemental RFI Work Plan (Geraghty & Miller, Inc., 1997). Disposable personal protection equipment (PPE) and sampling equipment were collected and disposed off-site. Pertinent information was recorded on a soil-sampling log for the sampling intervals submitted to the laboratory for analysis. Chain-of-custody forms were completed prior to submitting the samples to the laboratory. During soil sampling, samples were collected for Quality Assurance/Quality Control (QA/QC) purposes. All sampling results, including QA/QC samples are presented in

Table 2. Associated boring logs and soil sampling logs are provided in Appendices A and B, respectively.

When the designated sampling location was reached, personnel donned the appropriate PPE and established the exclusion zone. Plastic sheeting was placed beneath the work area for soil description and sampling activities. The appropriate sample containers were selected and labeled. During drilling activities, the hollow-stem augers were advanced to the designated sampling depth and at this point the drill bit was removed from inside the augers and the decontaminated split-spoon sampler was advanced 2 feet below the lead auger. The first split spoon sample (0 to 2 feet below land surface [ft bls] interval) was obtained prior to hollow-stem auger drilling from beneath the concrete or asphalt surface to 2 ft bls. For those drilling locations within the building, the concrete floor was up to 8 ft thick and the first soil sample was collected beneath the building floor. As drilling continued, the split spoon sampler was then driven 2 ft below the lead auger. Samples were collected using a decontaminated 24-inch long, 2-inch diameter, stainless-steel, split-spoon sampler. When the split-spoon sampler was removed a representative soil sample was placed into a disposable bag and scanned with a photoionization detector (PID). The appropriate sampling containers were then filled. The soil was described on a boring log by an ARCADIS geologist (Appendix A).

In addition to the sample collected from the 0 to 2 ft bls interval (or at a depth beneath the concrete floor), a soil sample was also collected from the interval above the water table. A third sample may have been collected based on the highest headspace readings or visual evidence of contamination. Elevated headspace readings and visual evidence of contamination were not encountered during this investigation; therefore, only two soil samples from each boring were collected. The drilling was terminated when the regional clay till was encountered. Soil samples were submitted for analysis of the Target Compound List (TCL) VOCs. Chain-of-custody forms were completed prior to submitting the samples to the laboratory. The En Core® Sampler was used to collect samples for VOC analysis. Upon completion of each borehole located inside the building (i.e., after each temporary well was installed, developed, and sampled), the borehole was grouted using the tremie method. The three boreholes located outside and west of Building 14 were converted to monitoring wells (designated as GM-43, GM-44 and GM-45).

2.2 Groundwater

All groundwater sampling activities were completed as described in the Building 14 Work Plan (GM correspondence to U.S. EPA, 2004). The methodologies used to obtain groundwater samples are described in this report. All water generated during sampling activities was contained in labeled drums and disposed of appropriately by GM. Associated well construction and groundwater sampling logs are provided in Appendices A and B, respectively.

To evaluate groundwater conditions adjacent to Building 14, three monitoring wells (GM-43 to GM-45) were installed in the asphalt driveway west of the building. Monitor well GM-43 was installed to a depth of 50 ft bls, with the well screen set immediately above the regional confining till that separates the upper and lower aquifers. Monitor well GM-44 was installed to a depth of 61 ft bls, with the well screen set immediately above the regional confining till. Monitor well GM-45 was installed to a depth of 60 ft bls, with the well screen set immediately above the regional confining till. The wells were constructed with 2-inch diameter polyvinyl chloride (PVC) casing and a 10-ft long PVC screen with 0.01 slot size. Well construction logs are presented in Appendix A. The wells were developed by pumping groundwater until pH, specific conductivity, and temperature data stabilized.

Groundwater samples were collected from the newly installed monitoring wells to characterize groundwater quality. Prior to sampling each well, monitoring equipment was decontaminated and field parameter measuring equipment was calibrated. Groundwater samples were collected using low-flow 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. Samples were submitted for laboratory analysis of TCL VOCs. During groundwater sampling, samples were collected for QA/QC purposes. All sampling results, including QA/QC samples are presented in Table 3. Chain-of-custody forms were completed prior to submitting the samples to the laboratory. Water sampling logs are provided in Appendix B.

To evaluate groundwater conditions beneath the former Building 14, screening samples were collected from four boring locations (BD14-01 through BD14-04) through the installation of a temporary well, consisting of a 2-inch diameter PVC casing with 10-foot long slotted screen. Temporary wells, BD14-01 through BD14-04, were installed to depths of 56 ft bls, 55 ft bls, 66 ft bls, and 66 ft bls, respectively, with the well screens set immediately above the regional confining till that separates the upper and

lower aquifers. A sand pack was placed around the screen and a bentonite seal was placed above the screen. The temporary wells were developed by removing water with a submersible pump. Readings were taken every well volume for conductivity, pH, turbidity, and water level. The groundwater sample was collected using a disposable Teflon bailer after the temporary well was purged. Groundwater samples were collected for analysis of TCL VOCs. All sampling results are presented in Table 3. Chain-of-custody forms were completed prior to submitting the samples to the laboratory. Water sampling logs are provided in Appendix B. Once the sample was collected, the PVC casing was removed, and the borehole was appropriately abandoned.

2.3 Laboratory Analytical Methods

During this investigation all soil and groundwater samples were submitted to Severn Trent Laboratories of North Canton, Ohio (STL North Canton) for analysis. The investigation sample analytical results and QA/QC sample results are presented on Tables 2 and 3 for soil and groundwater, respectively.

ARCADIS personnel independently validated the analytical data in accordance with the approved RFI Quality Assurance Project Plan (Geraghty & Miller, Inc., 1997). The data validation was performed at Level III (based on quality control criteria from the U.S. EPA document Data Quality Objectives for Remedial Response Activities [U.S. EPA 1987] and on quality control criteria from the U.S. EPA document Test Methods for Examining Solid Waste, SW 846 [U.S. EPA 1986 with revision updates]). In addition, the two U.S. EPA Contract Laboratory Program documents National Functional Guidelines for Inorganic Data Review (U.S. EPA 1994a) and National Functional Guidelines for Organic Data Review (U.S. EPA 1994b) were used as guidance for validating and assigning qualifier codes to the analytical results.

The majority of the Building 14 data was determined to be quantitative and acceptable for use. However, data validation qualifiers were assigned to the sample data, as appropriate, to address identified quality control deficiencies. The affected data were either qualified as estimated and flagged with a "J" if detected or a "UJ" if nondetect. The 90% completeness goal, as defined in the RFI Quality Assurance Project Plan, was achieved for the sample parameters analyzed and included in the sample delivery groups.

3. Building 14 Investigation Results

This summary includes a discussion of the former Building 14 lithology, soil analytical results, and groundwater analytical results. Soil and groundwater analytical results are presented in Tables 2 and 3, respectively, and on Figure 2.

3.1 Building 14 Lithologic Characterization

Boring logs from the former Building 14 investigation were used to determine subsurface lithology. For borings BD14-01 through BD14-04, the 0 to 8 ft depth consisted of concrete with some fill material. The lithologic data indicated the subsurface soil composition near Building 14 is primarily sand and gravel. An intermediate confining layer composed of hard silty clay was encountered at depths ranging from 34 to 41 ft bls and ranged in thickness from 3 to 9 ft. The regional clay till layer, composed of hard clay, observed at the site during previous investigations was present at depths ranging from 49 to 65 ft bls.

3.2 Building 14 Soil Results

Borings BD14-01 through BD14-04 and GM-43 through GM-45 were advanced into the regional clay till, with total depths ranging from 50 ft bls to 66 ft bls. Headspace samples were collected every 2 ft from these borings. The headspace readings were 0 parts per million (ppm). Table 2 provides the VOC results for the soil samples that were collected. The locations of these borings and VOC analytical data are depicted on Figure 2.

In soil borings BD14-01 through BD14-04 and GM-43 through GM-45, the following VOCs were detected: benzene, cyclohexane, 1,2-dichlorobenzene, 1,3-dichlorobenzene, isopropyl benzene, cis-1,2-dichloroethene, (cis-1,2-DCE), ethylbenzene, methylene chloride, methyl cyclohexane, styrene, tetrachloroethene (PCE), toluene, trichloroethene (TCE), and xylenes. The detected VOC concentrations will be evaluated and compared to soil screening criteria as discussed in Sections 4.1 and 4.3. As presented in Section 4.3, the detected concentrations in soil were not higher than the screening criteria.

3.3 Building 14 Groundwater Results

Results of the groundwater sampling event completed in August 2004 are detailed below. All groundwater samples were collected from the lower portion of the upper

aquifer above the regional clay till. Table 3 provides the VOC results for the groundwater samples that were collected. The locations of these permanent and temporary wells and VOC analytical data are depicted on Figure 2.

3.3.1 Groundwater Analytical Results from Permanent Wells

In monitoring wells GM-43 through GM-45, the following VOCs were detected: 1,1-dichloroethane (1,1-DCA), cis-1,2-DCE, trans-1,2-DCE, 1,1,1-trichloroethane (1,1,1-TCA), PCE, TCE, trifluorotrichloroethane, trichlorofluoromethane, and vinyl chloride. The detected VOC concentrations will be evaluated and compared to groundwater screening criteria as discussed in Sections 4.2 and 4.3. As presented in Section 4.3, the detected concentrations in groundwater that are higher than the screening criteria include cis-1,2-DCE, PCE, TCE, and vinyl chloride.

3.3.2 Groundwater Analytical Results from Temporary Wells

In temporary wells BD14-01 through BD14-04, the following VOCs were detected: 1,1-DCA, cis-1,2-DCE, trans-1,2-DCE, cyclohexane, methyl cyclohexane, 1,1,1-TCA, PCE, TCE, toluene, and vinyl chloride. The detected VOC concentrations will be evaluated and compared to groundwater screening criteria as discussed in Sections 4.2 and 4.3. As presented in Section 4.3, the detected concentrations in groundwater that are higher than the screening criteria include cis-1,2-DCE, PCE, TCE, and vinyl chloride.

4. Evaluation of the Building 14 Investigation Results

This section discusses the former Building 14 investigation results with respect to the corrective measures that have been implemented at the Site. Specifically, the soil and groundwater data from this investigation were compared to conservative risk-based screening criteria to support decisions regarding whether these data suggest that modifications to the on-going corrective measures at the Site are warranted.

4.1 Soil Screening Criteria

The soil screening criteria are derived from the risk-based preliminary remediation goals (PRGs) that USEPA Region 9 calculated for commercial/industrial settings (USEPA 2004). Use of the PRGs for commercial/industrial settings is consistent with the current and reasonably expected future land use at the Site (ENVIRON 2000a, 2000b). The soil PRGs for commercial/industrial settings were calculated by USEPA Region 9 using USEPA-recommended standard default exposure factors for workers, and a more conservative soil ingestion rate of 100 mg/day which is twice the standard default of 50 mg/day. The USEPA-recommended standard default exposure factors are conservative assumptions about the magnitude, frequency, and duration of exposures, which in combination provide exposure estimates that are expected to be higher than actual exposures to a large portion (90% to 99%) of workers (USEPA 1991a).

The USEPA Region 9 PRGs are based on a target cancer risk of 10^{-6} and a target hazard index (HI) of 1. The target cancer risk of 10^{-6} assumes exposure to a large number of carcinogenic chemicals at a site. According to USEPA, a target risk of 10^{-6} can be used to develop screening criteria (like the PRGs) to ensure that cumulative cancer risk from exposure to multiple human carcinogens at a site would not be above the acceptable cumulative risk of 10^{-4} (61 FR 19432, May 1, 1996; USEPA, 1996; USEPA, 1991b). This means that as many as 100 human carcinogens can be present at a site at concentrations equal to these PRGs without being above the cumulative risk goal of 10^{-4} .

However, at many sites, including this site, potential exposure is associated with far fewer human carcinogens (i.e., closer to 10 than 100) so that the screening criteria calculated using a target cancer risk of 10^{-6} are far more conservative than necessary to protect for simultaneous exposure to multiple carcinogens, and are not efficient for segregating concentrations that have a high potential for health significance from those

that do not. For these reasons, the screening criteria used in this evaluation are adjusted to a target cancer risk of 10^{-5} .

In addition to the screening criteria based on the PRGs, soil concentrations are also compared to screening criteria based on soil constituent migration to groundwater to evaluate whether soil concentrations found in the Building 14 investigation have the potential to affect groundwater quality. These criteria are derived using the methods and procedures presented in USEPA's Soil Screening Guidance. They conservatively assume that shallow groundwater is a drinking water source and a generic dilution-attenuation factor of 20.

4.2 Groundwater Screening Criteria

The groundwater screening criteria used to evaluate current groundwater concentrations in the Building 14 area are based on maximum contaminant levels (MCLs) established under the Safe Drinking Water Act, and equivalent drinking water limits for constituents without MCLs. The equivalent drinking water limits are generic risk-based drinking water concentrations calculated using conservative standard default exposure factors for estimating high-end exposure via daily drinking water consumption (USEPA 1991a), and a target cancer risk of 10^{-5} and a target hazard quotient (HQ) of 1. These groundwater screening criteria are highly conservative for evaluating shallow groundwater at the Building 14 Area because the groundwater in the uppermost aquifer underlying the site is not a current or reasonably expected future drinking water supply. However, the long-term goal of the corrective measures is to meeting drinking water criteria at the downgradient boundary of the site. As such, these criteria are relevant to the long-term corrective measures goals.

4.3 Screening Results

Tables 4 and 5 show the comparison of the soil and groundwater data with the screening criteria discussed in Sections 4.1 and 4.2, respectively. The constituents with concentrations that are higher than the screening criteria are highlighted on these tables. The spatial distribution of these constituent concentrations is shown on Figure 2.

4.3.1 Soil

Table 4 shows that none of the constituents analyzed in soil samples from the Building 14 Investigation have concentrations in soil that are higher than the screening criteria.

Therefore, these data show that constituent concentrations in soil at the investigated area do not pose a potential risk to commercial/industrial workers and are not having any adverse effect on groundwater, and therefore, do not affect the current corrective measures for the Site.

4.3.2 Groundwater

Table 5 shows that the following constituents have concentrations in groundwater that are higher than the screening criteria: cis-1,2-DCE, PCE, TCE, and vinyl chloride. Table 6 shows additional information (e.g., well location, sample date) for the samples with concentrations that are higher than the groundwater screening criteria. Figure 2 shows the spatial distribution of these constituents in the vicinity of Building 14.

Cis-1,2-DCE, PCE, and TCE were also detected in soil samples collected in the Building 14 investigation. However, as discussed in Section 4.3.1, the concentrations of these constituents in soil do not appear to represent concentrations which would be expected to adversely affect groundwater quality in this area (all soil concentrations are below the conservative soil migration to groundwater criteria). Therefore, the constituent concentrations in groundwater higher than the groundwater screening criteria may be related to releases prior to implementation of corrective measures.

5. Summary and Conclusions

The Building 14 investigation did not find any soil conditions that indicate the presence of any significant concentrations of VOCs in the vadose zone that pose a concern associated with direct exposure to routine workers or could adversely affect groundwater. The concentrations of PCE and TCE in groundwater in the vicinity of former Building 14 are somewhat higher than the current concentrations of these constituents in upgradient and downgradient groundwater. However, the PCE and TCE concentrations in the former Building 14 area are on the same order of magnitude as the concentrations found at the downgradient extent of the Former Oil House Area prior to implementation of corrective measures (i.e., at GM-28, September 1999). Therefore constituent concentrations in the Building 14 area may be related to releases prior to the implementation of corrective measures for the Former Oil House Area. The concentrations do not appear to be having a significant effect on the effectiveness of the groundwater corrective measures operating downgradient of this area, as indicated by decreases in PCE and TCE concentrations in downgradient groundwater.

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Table 1. Summary of the Building 14 Investigation, General Motors Corporation, Moraine, Ohio.

Building 14 August 2004	Soil Samples	# of Soil Samples ⁽¹⁾	Soil Analyses	Groundwater Samples	# of Groundwater Samples ⁽¹⁾	Groundwater Analyses
	BD14-01 through BD14-04	9 ⁽²⁾	TCL VOC 5035/8260B	BD14-01 through BD14-04	4	TCL VOC 8260B
	GM-43 through GM-45	7 ⁽²⁾		GM-43 through GM-45	4	

¹ QA/QC samples were collected per the following: 1 per 10 for duplicates and blanks; 1 per cooler for trip blanks; 1 per 20 for MS/MSD.

² Samples were collected at depths of 8-10 feet and above the water table for BD14-01 through BD14-04 and samples were collected at depths of 0-2 feet and above the water table for GM-43 through GM-45.

VOC - Volatile Organic Compound.

TCL - Target Compound List.

Method - SW-846.

QA/QC - Quality Assurance/Quality Control.

MS - Matrix Spike.

MSD - Matrix Spike Duplicate.

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Table 2. Soil Analytical Results for the Building 14 Investigation, General Motors Corporation, Moraine, Ohio.

Volatiles Organic Compounds	BD14-01		BD14-02		BD14-03		BD14-04		DUP-136
	8-10 ft 8/9/2004	22-24 ft 8/9/2004	8-10 ft 8/13/2004	24-26 ft 8/13/2004	8-10 ft 8/10/2004	24-26 ft 8/10/2004	8-10 ft 8/12/2004	24-26 ft 8/12/2004	24-26 ft 8/12/2004
	Units								
1,1,1-Trichloroethane	ug/kg	< 4.9 U	< 5.5 U	< 340 U	< 280 U	< 4.8 U	< 5.5 U	< 230 U	< 6.3 U
1,1,2,2-Tetrachloroethane	ug/kg	< 4.9 U	< 5.5 U	< 340 U	< 280 U	< 4.8 U	< 5.5 U	< 230 U	< 6.3 U
1,1,2-Trichloroethane	ug/kg	< 4.9 U	< 5.5 U	< 340 U	< 280 U	< 4.8 U	< 5.5 U	< 230 U	< 6.3 U
1,1-Dichloroethane	ug/kg	< 4.9 U	< 5.5 U	< 340 U	< 280 U	< 4.8 U	< 5.5 U	< 230 U	< 6.3 U
1,1-Dichloroethene	ug/kg	< 4.9 U	< 5.5 U	< 340 U	< 280 U	< 4.8 U	< 5.5 U	< 230 U	< 6.3 U
1,2,4-Trichlorobenzene	ug/kg	< 4.9 U	< 5.5 U	< 340 U	< 280 U	< 4.8 U	< 5.5 U	< 230 U	< 6.3 U
1,2-Dibromo-3-chloropropane (DBCP)	ug/kg	< 9.9 U	< 11 U	< 680 U	< 570 U	< 9.6 U	< 11 U	< 460 U	< 13 U
1,2-Dibromoethane (Ethylene Dibromide)	ug/kg	< 4.9 U	< 5.5 U	< 340 U	< 280 U	< 4.8 U	< 5.5 U	< 230 U	< 6.3 U
1,2-Dichlorobenzene	ug/kg	< 4.9 U	< 5.5 U	< 340 U	< 280 U	12	< 5.5 U	< 230 U	< 6.3 U
1,2-Dichloroethane	ug/kg	< 4.9 U	< 5.5 U	< 340 U	< 280 U	< 4.8 U	< 5.5 U	< 230 U	< 6.3 U
1,2-Dichloropropane	ug/kg	< 4.9 U	< 5.5 U	< 340 U	< 280 U	< 4.8 U	< 5.5 U	< 230 U	< 6.3 U
1,3-Dichlorobenzene	ug/kg	< 4.9 U	< 5.5 U	< 340 U	< 280 U	< 4.8 U	< 5.5 U	< 230 U	< 6.3 U
1,4-Dichlorobenzene	ug/kg	< 4.9 U	< 5.5 U	< 340 U	< 280 U	0.29 J	< 5.5 U	< 230 U	< 6.3 U
2-Butanone	ug/kg	< 4.9 U	< 5.5 U	< 340 U	< 280 U	< 4.8 U	< 5.5 U	< 230 U	< 6.3 U
2-Hexanone	ug/kg	< 20 U	< 22 U	< 1400 U	< 1100 U	< 19 U	< 22 U	< 910 U	< 25 UJ
4-Methyl-2-pentanone	ug/kg	< 20 U	< 22 U	< 1400 U	< 1100 U	< 19 U	< 22 U	< 910 U	< 25 UJ
Acetone	ug/kg	< 20 U	< 22 U	< 1400 U	< 1100 U	< 19 U	< 22 U	< 910 U	< 25 UJ
Benzene	ug/kg	0.32 J	< 5.5 U	< 340 U	< 280 U	< 4.8 U	< 5.5 U	< 230 U	< 6.3 U
Benzene, isopropyl	ug/kg	< 4.9 U	< 5.5 U	< 340 U	< 280 U	1.5 J	< 5.5 U	< 230 U	< 6.3 U
Bromodichloromethane	ug/kg	< 4.9 U	< 5.5 U	< 340 U	< 280 U	< 4.8 U	< 5.5 U	< 230 U	< 6.3 U
Bromoform	ug/kg	< 4.9 U	< 5.5 U	< 340 U	< 280 U	< 4.8 U	< 5.5 U	< 230 U	< 6.3 U
Bromomethane	ug/kg	< 4.9 U	< 5.5 U	< 340 U	< 280 U	< 4.8 U	< 5.5 U	< 230 U	< 6.3 U
Carbon disulfide	ug/kg	< 4.9 U	< 5.5 U	< 340 U	< 280 U	< 4.8 U	< 5.5 U	< 230 U	< 6.3 U
Carbon tetrachloride	ug/kg	< 4.9 U	< 5.5 U	< 340 U	< 280 U	< 4.8 U	< 5.5 U	< 230 U	< 6.3 U
Chlorobenzene	ug/kg	< 4.9 U	< 5.5 U	< 340 U	< 280 U	< 4.8 U	< 5.5 U	< 230 U	< 6.3 U
Chloroethane	ug/kg	< 4.9 U	< 5.5 U	< 340 U	< 280 U	< 4.8 U	< 5.5 U	< 230 U	< 6.3 U
Chloroform (Trichloromethane)	ug/kg	< 4.9 U	< 5.5 U	< 340 U	< 280 U	< 4.8 U	< 5.5 U	< 230 U	< 6.3 U
Chloromethane	ug/kg	< 4.9 U	< 5.5 U	< 340 U	< 280 U	< 4.8 U	< 5.5 U	< 230 U	< 6.3 U
cis-1,2-Dichloroethene	ug/kg	< 2.5 U	< 2.8 U	< 170 U	< 140 U	2.4	< 2.7 U	< 110 U	< 3.2 U
cis-1,3-Dichloropropene	ug/kg	< 4.9 U	< 5.5 U	< 340 U	< 280 U	< 4.8 U	< 5.5 U	< 230 U	< 6.3 U
Cyclohexane	ug/kg	< 9.9 U	0.56 J	< 680 U	< 570 U	< 9.6 U	< 11 U	< 460 U	< 13 U
Dibromochloromethane	ug/kg	< 4.9 U	< 5.5 U	< 340 U	< 280 U	< 4.8 U	< 5.5 U	< 230 U	< 6.3 U
Dichlorodifluoromethane (CFC-12)	ug/kg	< 4.9 U	< 5.5 U	< 340 U	< 280 U	< 4.8 UJ	< 5.5 UJ	< 230 U	< 6.3 UJ

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Table 2. Soil Analytical Results for the Building 14 Investigation, General Motors Corporation, Moraine, Ohio.

Volatiles Organic Compounds	Units	BD14-01		BD14-02		BD14-03		BD14-04		DUP-136
		8-10 ft 8/9/2004	22-24 ft 8/9/2004	8-10 ft 8/13/2004	24-26 ft 8/13/2004	8-10 ft 8/10/2004	24-26 ft 8/10/2004	8-10 ft 8/12/2004	24-26 ft 8/12/2004	24-26 ft 8/12/2004
Ethylbenzene	ug/kg	< 4.9 U	0.84 J	< 340 U	< 280 U	0.72 J	< 5.5 U	< 230 U	< 5.8 U	< 6.3 U
Methyl acetate	ug/kg	< 9.9 U	< 11 U	< 680 U	< 570 U	< 9.6 U	< 11 U	< 460 U	< 12 U	< 13 U
Methyl cyclohexane	ug/kg	< 9.9 U	0.87 J	< 680 U	< 570 U	< 9.6 U	< 11 U	< 460 U	< 12 U	< 13 U
Methyl Tert Butyl Ether	ug/kg	< 20 U	< 22 U	< 1400 U	< 1100 U	< 19 U	< 22 U	< 910 U	< 23 U	< 25 U
Methylene chloride	ug/kg	< 4.9 U	< 5.5 U	< 340 U	< 280 U	< 4.8 U	< 5.8 UJ	190 J	< 5.8 UJ	< 9 UJ
Styrene	ug/kg	< 4.9 U	0.61 J	< 340 U	< 280 U	< 4.8 U	< 5.5 U	< 230 U	< 7.9 U	< 6.3 U
Tetrachloroethene	ug/kg	12	13	410	330	9.3	32	370 J	110	56 J
Toluene	ug/kg	< 4.9 U	1.6 J	< 340 U	< 280 U	6.3 B	< 5.5 U	14 J	< 5.8 U	< 6.3 U
trans-1,2-Dichloroethene	ug/kg	< 2.5 U	< 2.8 U	< 170 U	< 140 U	< 2.4 U	< 2.7 U	< 110 U	< 2.9 U	< 3.2 U
trans-1,3-Dichloropropene	ug/kg	< 4.9 U	< 5.5 U	< 340 U	< 280 U	< 4.8 U	< 5.5 U	< 230 U	< 5.8 U	< 6.3 U
Trichloroethene	ug/kg	< 4.9 U	< 5.5 U	26 J	38 J	9.3	24	27 J	10	4.8 J
Trichlorofluoromethane (CFC-11)	ug/kg	< 4.9 U	< 5.5 U	< 340 U	< 280 U	< 4.8 U	< 5.5 U	< 230 U	< 5.8 U	< 6.3 U
Trifluorotrchloroethane (Freon 113)	ug/kg	< 4.9 U	< 5.5 U	< 340 U	< 280 U	< 4.8 U	< 5.5 U	< 230 U	< 5.8 U	< 6.3 U
Vinyl chloride	ug/kg	< 4.9 U	< 5.5 U	< 340 U	< 280 U	< 4.8 U	< 5.5 U	< 230 U	< 5.8 U	< 6.3 U
Xylene (total)	ug/kg	< 9.9 U	1.7 J	< 680 U	< 570 U	10	< 11 U	14 J	< 12 U	< 13 U

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Table 2. Soil Analytical Results for the Building 14 Investigation, General Motors Corporation, Moraine, Ohio.

Volatile Organic Compounds	Units	GM-43		GM-44		GM-44		GM-45	
		0-2 ft 8/9/2004	20-22 ft 8/9/2004	0-2 ft 8/3/2004	18-20 ft 8/3/2004	0-2 ft 8/5/2004	20-22 ft 8/5/2004		
1,1,1-Trichloroethane	ug/kg	< 4.8 U	< 5.7 U	< 4.4 U	< 4.5 U	< 4.4 U	< 4.9 U	< 4.4 U	< 4.9 U
1,1,2-Tetrachloroethane	ug/kg	< 4.8 U	< 5.7 U	< 4.4 U	< 4.5 U	< 4.4 U	< 4.9 U	< 4.4 U	< 4.9 U
1,1,2-Trichloroethane	ug/kg	< 4.8 U	< 5.7 U	< 4.4 U	< 4.5 U	< 4.4 U	< 4.9 U	< 4.4 U	< 4.9 U
1,1-Dichloroethane	ug/kg	< 4.8 U	< 5.7 U	< 4.4 U	< 4.5 U	< 4.4 U	< 4.9 U	< 4.4 U	< 4.9 U
1,1-Dichloroethene	ug/kg	< 4.8 U	< 5.7 U	< 4.4 U	< 4.5 U	< 4.4 U	< 4.9 U	< 4.4 U	< 4.9 U
1,2,4-Trichlorobenzene	ug/kg	< 4.8 U	< 5.7 U	< 4.4 U	< 4.5 U	< 4.4 U	< 4.9 U	< 4.4 U	< 4.9 U
1,2-Dibromo-3-chloropropane (DBCP)	ug/kg	< 9.6 U	< 11 U	< 8.8 U	< 9 U	< 8.8 U	< 9.8 U	< 8.8 U	< 9.8 U
1,2-Dibromoethane (Ethylene Dibromide)	ug/kg	< 4.8 U	< 5.7 U	< 4.4 U	< 4.5 U	< 4.4 U	< 4.9 U	< 4.4 U	< 4.9 U
1,2-Dichlorobenzene	ug/kg	< 4.8 U	< 5.7 U	< 4.4 U	< 4.5 U	< 4.4 U	< 4.9 U	< 4.4 U	< 4.9 U
1,2-Dichloroethane	ug/kg	< 4.8 U	< 5.7 U	< 4.4 U	< 4.5 U	< 4.4 U	< 4.9 U	< 4.4 U	< 4.9 U
1,2-Dichloropropane	ug/kg	< 4.8 U	< 5.7 U	< 4.4 U	< 4.5 U	< 4.4 U	< 4.9 U	< 4.4 U	< 4.9 U
1,3-Dichlorobenzene	ug/kg	< 4.8 U	< 5.7 U	< 4.4 U	< 4.5 U	< 4.4 U	< 4.9 U	< 4.4 U	< 4.9 U
1,4-Dichlorobenzene	ug/kg	< 4.8 U	< 5.7 U	< 4.4 U	< 4.5 U	< 4.4 U	< 4.9 U	< 4.4 U	< 4.9 U
2-Butanone	ug/kg	< 19 U	< 23 U	< 18 U	< 18 U	< 18 U	< 20 U	< 18 U	< 20 U
2-Hexanone	ug/kg	< 19 U	< 23 U	< 18 U	< 18 U	< 18 U	< 20 U	< 18 U	< 20 U
4-Methyl-2-pentanone	ug/kg	< 19 U	< 23 U	< 18 U	< 18 U	< 18 U	< 20 U	< 18 U	< 20 U
Acetone	ug/kg	< 19 U	< 23 U	< 18 U	< 18 U	< 18 U	< 24 UJ	< 18 U	< 20 U
Benzene	ug/kg	< 4.8 U	0.75 J	< 4.4 U	0.59 J	< 4.4 U	< 4.9 U	< 4.4 U	< 4.9 U
Benzene, isopropyl	ug/kg	< 4.8 U	< 5.7 U	< 4.4 U	< 4.5 U	< 4.4 U	< 4.9 U	< 4.4 U	< 4.9 U
Bromodichloromethane	ug/kg	< 4.8 U	< 5.7 U	< 4.4 U	< 4.5 U	< 4.4 U	< 4.9 U	< 4.4 U	< 4.9 U
Bromoform	ug/kg	< 4.8 U	< 5.7 U	< 4.4 U	< 4.5 U	< 4.4 U	< 4.9 U	< 4.4 U	< 4.9 U
Bromomethane	ug/kg	< 4.8 U	< 5.7 U	< 4.4 U	< 4.5 U	< 4.4 U	< 4.9 U	< 4.4 U	< 4.9 U
Carbon disulfide	ug/kg	< 4.8 U	< 5.7 U	< 4.4 U	< 4.5 U	< 4.4 U	< 4.9 U	< 4.4 U	< 4.9 U
Carbon tetrachloride	ug/kg	< 4.8 U	< 5.7 U	< 4.4 U	< 4.5 U	< 4.4 U	< 4.9 U	< 4.4 U	< 4.9 U
Chlorobenzene	ug/kg	< 4.8 U	< 5.7 U	< 4.4 U	< 4.5 U	< 4.4 U	< 4.9 U	< 4.4 U	< 4.9 U
Chloroethane	ug/kg	< 4.8 U	< 5.7 U	< 4.4 U	< 4.5 U	< 4.4 U	< 4.9 U	< 4.4 U	< 4.9 U
Chloroform (Trichloromethane)	ug/kg	< 4.8 U	< 5.7 U	< 4.4 U	< 4.5 U	< 4.4 U	< 4.9 U	< 4.4 U	< 4.9 U
Chloromethane	ug/kg	< 4.8 U	< 5.7 U	< 4.4 U	< 4.5 U	< 4.4 U	< 4.9 U	< 4.4 U	< 4.9 U
cis-1,2-Dichloroethene	ug/kg	< 2.4 U	< 2.9 U	< 2.2 U	< 2.3 U	< 2.2 U	< 2.4 U	< 2.2 U	< 2.5 U
cis-1,3-Dichloropropene	ug/kg	< 4.8 U	< 5.7 U	< 4.4 U	< 4.5 U	< 4.4 U	< 4.9 U	< 4.4 U	< 4.9 U
Cyclohexane	ug/kg	< 9.6 U	0.56 J	< 8.8 U	< 9 U	< 8.8 U	< 9.8 U	< 8.8 U	< 9.8 U
Dibromochloromethane	ug/kg	< 4.8 U	< 5.7 U	< 4.4 U	< 4.5 U	< 4.4 U	< 4.9 U	< 4.4 U	< 4.9 U
Dichlorodifluoromethane (CFC-12)	ug/kg	< 4.8 U	< 5.7 U	< 4.4 U	< 4.5 U	< 4.4 U	< 4.9 U	< 4.4 U	< 4.9 U

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Table 2. Soil Analytical Results for the Building 14 Investigation, General Motors Corporation, Moraine, Ohio.

Volatile Organic Compounds	Units	GM-43		GM-44	DUP-135	GM-44	GM-45	
		0-2 ft 8/9/2004	20-22 ft 8/9/2004	0-2 ft 8/3/2004	0-2 ft 8/3/2004	18-20 ft 8/3/2004	0-2 ft 8/5/2004	20-22 ft 8/5/2004
Ethylbenzene	ug/kg	< 4.8 U	1.2 J	< 4.4 U	< 4.9 U	0.59 J	< 4.4 U	< 4.9 U
Methyl acetate	ug/kg	< 9.6 U	< 11 U	< 8.8 U	< 9.8 U	< 9 U	< 8.8 UJ	< 9.8 UJ
Methyl cyclohexane	ug/kg	< 9.6 U	0.88 J	< 8.8 U	< 9.8 U	0.45 J	< 8.8 UJ	< 9.8 UJ
Methyl Tert Butyl Ether	ug/kg	< 19 U	< 23 U	< 18 U	< 20 U	< 18 U	< 18 U	< 20 U
Methylene chloride	ug/kg	< 4.8 U	< 5.7 U	< 4.4 U	< 4.9 U	< 7.2 U	< 4.4 U	< 4.9 U
Styrene	ug/kg	0.34 J	0.68 J	0.62 J	0.97 J	1.3 J	0.39 J	0.74 J
Tetrachloroethene	ug/kg	< 4.8 U	30	1.8 J	2.3 J	29	< 4.4 U	6.9
Toluene	ug/kg	< 4.8 U	3.6 J	< 4.4 U	< 4.9 U	1.6 J	< 4.4 U	< 4.9 U
trans-1,2-Dichloroethene	ug/kg	< 2.4 U	< 2.9 U	< 2.2 U	< 2.4 U	< 2.3 U	< 2.2 U	< 2.5 U
trans-1,3-Dichloropropene	ug/kg	< 4.8 U	< 5.7 U	< 4.4 U	< 4.9 U	< 4.5 U	< 4.4 U	< 4.9 U
Trichloroethene	ug/kg	< 4.8 U	< 5.7 U	0.39 J	1.5 J	2.2 J	0.41 J	4.4 J
Trichlorofluoromethane (CFC-11)	ug/kg	< 4.8 U	< 5.7 U	< 4.4 U	< 4.9 U	< 4.5 U	< 4.4 U	< 4.9 U
Trifluorotrchloroethane (Freon 113)	ug/kg	< 4.8 U	< 5.7 U	< 4.4 U	< 4.9 U	< 4.5 U	< 4.4 U	< 4.9 U
Vinyl chloride	ug/kg	< 4.8 U	< 5.7 U	< 4.4 U	< 4.9 U	< 4.5 U	< 4.4 U	< 4.9 U
Xylene (total)	ug/kg	< 9.6 U	2.4 J	< 8.8 U	< 9.8 U	1.1 J	< 8.8 U	< 9.8 U

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Table 2. Soil Analytical Results for the Building 14 Investigation, General Motors Corporation, Moraine, Ohio.

	Units	RB-112 8/3/2004	RB-113 8/12/2004	TB-172 8/3/2004	TB-173 8/5/2004	TB-174 8/9/2004	TB-175 8/10/2004	TB-176 8/12/2004	TB-177 8/13/2004
Volatile Organic Compounds									
1,1,1-Trichloroethane	ug/l	<1U	<1U	<1U	<1U	<1U	<1U	<1U	<1U
1,1,2,2-Tetrachloroethane	ug/l	<1U	<1U	<1U	<1U	<1U	<1U	<1U	<1U
1,1,2-Trichloroethane	ug/l	<1U	<1U	<1U	<1U	<1U	<1U	<1U	<1U
1,1-Dichloroethane	ug/l	<1U	<1U	<1U	<1U	<1U	<1U	<1U	<1U
1,1-Dichloroethene	ug/l	<1U	<1U	<1U	<1U	0.4J	0.57J	1	<1U
1,2,4-Trichlorobenzene	ug/l	<1UJ	<1U	<1UJ	<1U	<1U	<1U	<1U	<1U
1,2-Dibromo-3-chloropropane (DBCP)	ug/l	<2U	<2U	<2U	<2U	<2U	<2U	<2U	<2U
1,2-Dibromoethane (Ethylene Dibromide)	ug/l	<1U	<1U	<1U	<1U	<1U	<1U	<1U	<1U
1,2-Dichlorobenzene	ug/l	<1U	<1U	<1U	<1U	<1U	<1U	<1U	<1U
1,2-Dichloroethane	ug/l	<1U	<1U	<1U	<1U	<1U	<1U	<1U	<1U
1,2-Dichloropropane	ug/l	<1U	<1U	<1U	<1U	<1U	<1U	<1U	<1U
1,3-Dichlorobenzene	ug/l	<1U	<1U	<1U	<1U	<1U	<1U	<1U	<1U
1,4-Dichlorobenzene	ug/l	<1U	<1U	<1U	<1U	<1U	<1U	<1U	<1U
2-Butanone	ug/l	<1U	<1U	<1U	<1U	<1U	<1U	<1U	<1U
2-Hexanone	ug/l	<10U	<10U	2.2J	2.7J	4.7J	3.5J	5.1J	2.1J
4-Methyl-2-pentanone	ug/l	<10U	<10U	<10U	<10U	<10U	<10U	<10U	<10U
Acetone	ug/l	<10UJ	<10UJ	9.7J	17J	22	17J	27J	1.6J
Benzene	ug/l	<1U	<1U	<1U	<1U	<1U	<1U	<1U	<1U
Benzene, isopropyl	ug/l	<1U	<1U	<1U	<1U	<1U	<1U	<1U	<1U
Bromodichloromethane	ug/l	<1U	<1U	<1U	<1U	<1U	<1U	<1U	<1U
Bromoform	ug/l	<1U	<1U	<1U	<1U	<1U	<1U	<1U	<1U
Bromomethane	ug/l	<1U	<1U	<1U	<1U	<1U	<1U	<1U	<1U
Carbon disulfide	ug/l	<1U	<1U	<1U	<1U	<1U	<1U	<1U	<1U
Carbon tetrachloride	ug/l	<1U	<1U	<1U	<1U	<1U	<1U	<1U	<1U
Chlorobenzene	ug/l	<1U	<1U	<1U	<1U	<1U	<1U	<1U	<1U
Chloroethane	ug/l	<1U	<1U	<1U	<1U	<1U	<1UJ	<1U	<1U
Chloroform (Trichloromethane)	ug/l	<1U	<1U	<1U	<1U	<1U	<1U	<1U	<1U
Chloromethane	ug/l	<1U	<1U	<1U	<1U	<1U	<1U	<1U	<1U
cis-1,2-Dichloroethene	ug/l	<1U	<1U	<1U	<1U	<1U	<1U	<1U	<1U
cis-1,3-Dichloropropene	ug/l	<0.5U	<0.5U	<0.5U	<0.5U	<0.5U	<0.5U	<0.5U	<0.5U
Cyclohexane	ug/l	<1U	<1U	<1U	<1U	<1U	<1U	<1U	<1U
Dibromochloromethane	ug/l	<1U	<1UJ	<1U	<1U	<1U	<1U	<1U	<1UJ
Dichlorodifluoromethane (CFC-12)	ug/l	<1U	<1U	<1U	<1U	<1U	<1U	<1U	<1U

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Table 2. Soil Analytical Results for the Building 14 Investigation, General Motors Corporation, Moraine, Ohio.

	Units	RB-112 8/3/2004	RB-113 8/12/2004	TB-172 8/3/2004	TB-173 8/5/2004	TB-174 8/9/2004	TB-175 8/10/2004	TB-176 8/12/2004	TB-177 8/13/2004
<u>Volatile Organic Compounds</u>									
Ethylbenzene	ug/l	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
Methyl acetate	ug/l	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U
Methyl cyclohexane	ug/l	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
Methyl Tert Butyl Ether	ug/l	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U
Methylene chloride	ug/l	< 1 U	0.73 J	< 1 U	21 B	16 B	11 B	17	2.4
Styrene	ug/l	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
Tetrachloroethene	ug/l	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
Toluene	ug/l	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
trans-1,2-Dichloroethene	ug/l	< 1 U	< 1 U	< 1 U	0.28 J	0.24 J	0.24 J	0.29 J	< 1 U
trans-1,3-Dichloropropene	ug/l	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U
Trichloroethene	ug/l	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
Trichlorofluoromethane (CFC-11)	ug/l	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
Trifluorotrchloroethane (Freon 113)	ug/l	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
Vinyl chloride	ug/l	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
Xylene (total)	ug/l	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U

ug/kg - Micrograms per kilogram.

ug/l - Micrograms per liter.

DUP-135 - Duplicate of GM-44/0-2/.

DUP-136 - Duplicate of BD14-04/24-26/.

< - Constituent not detected above laboratory reporting limit shown.

J - Value is estimated.

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Table 3. Groundwater Analytical Results for the Building 14 Investigation, General Motors Corporation, Moraine, Ohio.

	Units	BD14-01 ⁽¹⁾ 8/10/2004	BD14-02 ⁽¹⁾ 8/13/2004	BD14-03 ⁽¹⁾ 8/11/2004	BD14-04 ⁽¹⁾ 8/12/2004	GM-43 8/19/2004	DUP-137 8/19/2004
Volatile Organic Compounds							
1,1,1-Trichloroethane	ug/l	<1 U	5.5 J	1.9 J	2.4 J	<9.1 U	<9.1 U
1,1,2,2-Tetrachloroethane	ug/l	<1 U	<20 U	<4 U	<3.3 U	<9.1 U	<9.1 U
1,1,2-Trichloroethane	ug/l	<1 U	<20 U	<4 U	<3.3 U	<9.1 U	<9.1 U
1,1-Dichloroethane	ug/l	2.5	<20 U	<4 U	<3.3 U	6.9 J	6.4 J
1,1-Dichloroethene	ug/l	<1 U	<20 U	<4 U	<3.3 U	<9.1 U	<9.1 U
1,2,4-Trichlorobenzene	ug/l	<1 U	<20 U	<4 U	<3.3 U	<9.1 UJ	<9.1 UJ
1,2-Dibromo-3-chloropropane (DBCP)	ug/l	<2 U	<40 U	<8 U	<6.7 U	<18 U	<18 U
1,2-Dibromoethane (Ethylene Dibromide)	ug/l	<1 U	<20 U	<4 U	<3.3 U	<9.1 U	<9.1 U
1,2-Dichlorobenzene	ug/l	<1 U	<20 U	<4 U	<3.3 U	<9.1 U	<9.1 U
1,2-Dichloroethane	ug/l	<1 U	<20 U	<4 U	<3.3 U	<9.1 U	<9.1 U
1,2-Dichloropropane	ug/l	<1 U	<20 U	<4 U	<3.3 U	<9.1 U	<9.1 U
1,3-Dichlorobenzene	ug/l	<1 U	<20 U	<4 U	<3.3 U	<9.1 U	<9.1 U
1,4-Dichlorobenzene	ug/l	<1 U	<20 U	<4 U	<3.3 U	<9.1 U	<9.1 U
2-Butanone	ug/l	<10 U	<200 U	<40 U	<33 U	<91 U	<91 U
2-Hexanone	ug/l	<10 U	<200 U	<40 U	<33 U	<91 U	<91 U
4-Methyl-2-pentanone	ug/l	<10 U	<200 U	<40 U	<33 U	<91 U	<91 U
Acetone	ug/l	<10 U	<200 UJ	<40 U	<33 U	<91 UJ	<91 UJ
Benzene	ug/l	<1 U	<20 U	1.7 JB	<3.3 U	<9.1 U	<9.1 U
Benzene, isopropyl	ug/l	<1 U	<20 U	<4 U	<3.3 U	<9.1 U	<9.1 U
Bromodichloromethane	ug/l	<1 U	<20 U	<4 U	<3.3 U	<9.1 U	<9.1 U
Bromoform	ug/l	<1 U	<20 U	<4 U	<3.3 U	<9.1 UJ	<9.1 UJ
Bromomethane	ug/l	<1 U	<20 U	<4 UJ	<3.3 UJ	<9.1 UJ	<9.1 UJ
Carbon disulfide	ug/l	<1 U	<20 U	<4 U	<3.3 U	<9.1 U	<9.1 U
Carbon tetrachloride	ug/l	<1 UJ	<20 U	<4 U	<3.3 U	<9.1 U	<9.1 U
Chlorobenzene	ug/l	<1 U	<20 U	<4 U	<3.3 U	<9.1 U	<9.1 U
Chloroethane	ug/l	<1 U	<20 U	<4 UJ	<3.3 UJ	<9.1 U	<9.1 U
Chloroform (Trichloromethane)	ug/l	<1 U	<20 U	<4 U	<3.3 U	<9.1 U	<9.1 U
Chloromethane	ug/l	<1 U	<20 U	<4 UJ	<3.3 UJ	<9.1 U	<9.1 U
cis-1,2-Dichloroethene	ug/l	26	43	41	12	210	210
cis-1,3-Dichloropropene	ug/l	<1 U	<20 U	<4 U	<3.3 U	<9.1 U	<9.1 U
Cyclohexane	ug/l	0.84 J	<20 UJ	<4 U	<3.3 U	<9.1 U	<9.1 U
Dibromochloromethane	ug/l	<1 U	<20 U	<4 U	<3.3 U	<9.1 UJ	<9.1 UJ
Dichlorodifluoromethane (CFC-12)	ug/l	<1 U	<20 U	<4 U	<3.3 U	<9.1 U	<9.1 U
Ethylbenzene	ug/l	<1 UJ	<20 U	<4 U	<3.3 U	<9.1 U	<9.1 U

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Table 3. Groundwater Analytical Results for the Building 14 Investigation, General Motors Corporation, Moraine, Ohio.

	Units	BD14-01 ^(U) 8/10/2004	BD14-02 ^(U) 8/13/2004	BD14-03 ^(U) 8/11/2004	BD14-04 ^(U) 8/12/2004	GM-43 8/19/2004	DUP-137 8/19/2004
<u>Volatile Organic Compounds</u>							
Methyl acetate	ug/l	< 10 U	< 200 U	< 40 U	< 33 U	< 91 U	< 91 U
Methyl cyclohexane	ug/l	0.92 J	< 20 U	< 4 U	< 3.3 U	< 9.1 UJ	< 9.1 UJ
Methyl Tert Butyl Ether	ug/l	< 5 U	< 100 U	< 20 U	< 17 U	< 45 U	< 45 U
Methylene chloride	ug/l	< 1 U	< 20 U	< 4 U	< 3.3 U	< 9.1 U	< 9.1 U
Styrene	ug/l	< 1 U	< 20 U	< 4 U	< 3.3 U	< 9.1 U	< 9.1 U
Tetrachloroethene	ug/l	1.2	630	10	37	16	17
Toluene	ug/l	< 1 U	5.1 J	< 4 U	< 3.3 U	< 9.1 U	< 9.1 U
trans-1,2-Dichloroethene	ug/l	1.6	< 10 U	< 2 U	0.87 J	8.7	8.7
trans-1,3-Dichloropropene	ug/l	< 1 U	< 20 U	< 4 U	< 3.3 U	< 9.1 U	< 9.1 U
Trichloroethene	ug/l	23	170	74	68	100	100
Trichlorofluoromethane (CFC-11)	ug/l	< 1 U	< 20 U	< 4 UJ	< 3.3 UJ	12	14
Trifluorotrchloroethane (Freon 113)	ug/l	< 1 U	< 20 U	< 4 U	< 3.3 U	< 9.1 U	< 9.1 U
Vinyl chloride	ug/l	2.6	< 20 U	< 4 U	< 3.3 U	2.8 J	< 9.1 U
Xylene (total)	ug/l	< 1 U	< 20 U	< 4 U	< 3.3 U	< 9.1 U	< 9.1 U

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Table 3. Groundwater Analytical Results for the Building 14 Investigation, General Motors Corporation, Moraine, Ohio.

	Units	GM-44 8/19/2004	GM-45 8/19/2004	TB-178 8/19/2004	RB-114 8/19/2004
<u>Volatile Organic Compounds</u>					
1,1,1-Trichloroethane	ug/l	4 J	5.8 J	<1 U	<1 U
1,1,2,2-Tetrachloroethane	ug/l	<6 U	<9.1 U	<1 U	<1 U
1,1,2-Trichloroethane	ug/l	<6 U	<9.1 U	<1 U	<1 U
1,1-Dichloroethane	ug/l	3.3 J	8.5 J	<1 U	<1 U
1,1-Dichloroethene	ug/l	<6 U	<9.1 U	<1 U	<1 U
1,2,4-Trichlorobenzene	ug/l	<6 UJ	<9.1 UJ	<1 UJ	<1 UJ
1,2-Dibromo-3-chloropropane (DBCP)	ug/l	<12 U	<18 U	<2 U	<2 U
1,2-Dibromoethane (Ethylene Dibromide)	ug/l	<6 U	<9.1 U	<1 U	<1 U
1,2-Dichlorobenzene	ug/l	<6 U	<9.1 U	<1 U	<1 U
1,2-Dichloroethane	ug/l	<6 U	<9.1 U	<1 U	<1 U
1,2-Dichloropropane	ug/l	<6 U	<9.1 U	<1 U	<1 U
1,3-Dichlorobenzene	ug/l	<6 U	<9.1 U	<1 U	<1 U
1,4-Dichlorobenzene	ug/l	<6 U	<9.1 U	<1 U	<1 U
2-Butanone	ug/l	<60 U	<91 U	2.3 J	<10 U
2-Hexanone	ug/l	<60 U	<91 U	<10 U	<10 U
4-Methyl-2-pentanone	ug/l	<60 U	<91 U	<10 U	<10 U
Acetone	ug/l	<60 UJ	<91 UJ	4.6 J	<10 UJ
Benzene	ug/l	<6 U	<9.1 U	<1 U	<1 U
Benzene, isopropyl	ug/l	<6 U	<9.1 U	<1 U	<1 U
Bromodichloromethane	ug/l	<6 U	<9.1 U	<1 U	<1 U
Bromoform	ug/l	<6 UJ	<9.1 UJ	<1 UJ	<1 UJ
Bromomethane	ug/l	<6 UJ	<9.1 UJ	<1 UJ	<1 UJ
Carbon disulfide	ug/l	<6 U	<9.1 U	<1 U	<1 U
Carbon tetrachloride	ug/l	<6 U	<9.1 U	<1 U	<1 U
Chlorobenzene	ug/l	<6 U	<9.1 U	<1 U	<1 U
Chloroethane	ug/l	<6 U	<9.1 U	<1 U	<1 U
Chloroform (Trichloromethane)	ug/l	<6 U	<9.1 U	<1 U	<1 U
Chloromethane	ug/l	<6 U	<9.1 U	<1 U	<1 U
cis-1,2-Dichloroethene	ug/l	130	79	<0.5 U	<0.5 U
cis-1,3-Dichloropropene	ug/l	<6 U	<9.1 U	<1 U	<1 U
Cyclohexane	ug/l	<6 U	<9.1 U	<1 U	<1 U
Dibromochloromethane	ug/l	<6 UJ	<9.1 UJ	<1 UJ	<1 UJ
Dichlorodifluoromethane (CFC-12)	ug/l	<6 U	<9.1 U	<1 U	<1 U
Ethylbenzene	ug/l	<6 U	<9.1 U	<1 U	<1 U

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Table 3. Groundwater Analytical Results for the Building 14 Investigation, General Motors Corporation, Moraine, Ohio.

Volatiles Organic Compounds	Units	GM-44 8/19/2004	GM-45 8/19/2004	TB-178 8/19/2004	RB-114 8/19/2004
Methyl acetate	ug/l	< 60 U	< 91 U	< 10 U	< 10 U
Methyl cyclohexane	ug/l	< 6 UJ	< 9.1 UJ	< 1 UJ	< 1 UJ
Methyl Tert Butyl Ether	ug/l	< 30 U	< 45 U	< 5 U	< 5 U
Methylene chloride	ug/l	< 6 U	< 9.1 U	< 1 UJ	< 1 U
Styrene	ug/l	< 6 U	< 9.1 U	< 1 U	< 1 U
Tetrachloroethene	ug/l	57	220	< 1 U	< 1 U
Toluene	ug/l	< 6 U	< 9.1 U	< 1 U	< 1 U
trans-1,2-Dichloroethene	ug/l	4.4	3.5 J	< 1 U	< 1 U
trans-1,3-Dichloropropene	ug/l	< 6 U	< 9.1 U	< 0.5 U	< 0.5 U
Trichloroethene	ug/l	140	220	< 1 U	< 1 U
Trichlorofluoromethane (CFC-11)	ug/l	7.5	10	< 1 U	< 1 U
Trifluorotrichloroethane (Freon 113)	ug/l	24	7.4 J	< 1 U	< 1 U
Vinyl chloride	ug/l	< 6 U	< 9.1 U	< 1 U	< 1 U
Xylene (total)	ug/l	< 6 U	< 9.1 U	< 1 U	< 1 U

(1) Groundwater sample collected from a temporary well set at the regional clay till.
 ug/l - Micrograms per liter.
 DUP 137 - Duplicate of GM-43.
 < - Constituent not detected above laboratory reporting limit shown.
 J - Value is estimated.

**Table 4: Soil Screening Results
GM Moraine Building 14, Moraine, Ohio**

Area	Chem Group	Chemical	CASRN	Carc Class	Analyzed	Detected	Min Detected (mg/kg)	Max Detected (mg/kg)	Reg 9 Based		ENVIRON		
									Industrial PRG Based Criteria (TR=1E-5 & HQ=1) (mg/kg)	Ratio of Max Detect to Industrial Criteria (1E-5)	MTGW MCL/ Tap Water (TR = 1E-5) (mg/kg)	Ratio of Max Detect to MTGW MCL/ Tap Water 1E-5	
Building 14	VOC	Acetone	67-64-1	ID	16				5.43E+04	NC			
Building 14	VOC	Benzene	71-43-2	A	16	3	3.20E-04	7.50E-04	1.41E+01	C	5.3E-05	1.31E+04	3.8E-04
Building 14	VOC	Bromodichloromethane	75-27-4	B2	16				1.83E+01	C		2.00E+00	
Building 14	VOC	Bromoform	75-25-2	B2	16				2.18E+03	C		3.20E+01	
Building 14	VOC	Bromomethane	74-83-9	D	16				1.31E+01	NC		3.20E+01	
Building 14	VOC	2-Butanone	78-93-3	ID	16				1.13E+05	NC		2.04E+01	
Building 14	VOC	Carbon Disulfide	75-15-0		16				1.20E+03	NC		8.76E+03	
Building 14	VOC	Carbon Tetrachloride	56-23-5	B2	16				5.49E+00	C		2.00E+00	
Building 14	VOC	Chlorobenzene	108-90-7	D	16				5.30E+02	NC		4.00E+01	
Building 14	VOC	Chloroethane	75-00-3		16				6.49E+01	C		5.84E+03	
Building 14	VOC	Chloroform	67-66-3	B2	16				4.70E+00	C		3.20E+01	
Building 14	VOC	Chloromethane	74-87-3	D	16				1.56E+02	NC		3.80E+02	
Building 14	VOC	Cumene	98-82-8	D	16	1	1.50E-03	1.50E-03	1.98E+03	NC	7.6E-07		
Building 14	VOC	Cyclohexane	110-82-7	ID	16	2	5.60E-04	5.60E-04	9.43E+03	NC	5.9E-08		
Building 14	VOC	1,2-Dibromo-3-chloropropane	96-12-8	B2	16				1.10E+01	NC		8.00E-02	
Building 14	VOC	Dibromochloromethane	124-48-1	C	16				2.55E+01	C		3.20E+01	
Building 14	VOC	1,2-Dibromoethane	106-93-4	B2	16				6.30E-01	C		2.00E-02	
Building 14	VOC	1,2-Dichlorobenzene	95-50-1	D	16	1	1.20E-02	1.20E-02	4.08E+03	NC	2.9E-06	2.40E+02	5.0E-05
Building 14	VOC	1,3-Dichlorobenzene	541-73-1	D	16	1	2.90E-04	2.90E-04	2.09E+03	NC	1.4E-07	4.38E+02	6.6E-07
Building 14	VOC	1,4-Dichlorobenzene	106-46-7	C	16				7.87E+01	C		3.00E+01	
Building 14	VOC	Dichlorodifluoromethane	75-71-8		16				3.08E+02	NC		2.92E+03	
Building 14	VOC	1,1-Dichloroethane	75-34-3	C	16				1.74E+03	NC		1.46E+03	
Building 14	VOC	1,2-Dichloroethane	107-06-2	B2	16				6.03E+00	C		2.00E+00	
Building 14	VOC	1,1-Dichloroethene	75-35-4	C	16				4.13E+02	NC		2.80E+00	
Building 14	VOC	cis-1,2-Dichloroethene	156-59-2	D	16	1	2.40E-03	2.40E-03	1.46E+02	NC	1.6E-05	2.80E+01	8.6E-05
Building 14	VOC	trans-1,2-Dichloroethene	156-60-5		16				2.35E+02	NC		4.00E+01	
Building 14	VOC	1,2-Dichloropropane	78-87-5	B2	16				7.42E+00	C		2.00E+00	
Building 14	VOC	1,3-Dichloropropene (total)	542-75-6	B2	16				1.76E+01	C		2.69E+00	
Building 14	VOC	Ethyl Benzene	100-41-4	D	16	4	5.90E-04	1.20E-03	7.40E+03	NC	1.6E-07	2.80E+02	4.3E-06
Building 14	VOC	2-Hexanone	591-78-6		16								
Building 14	VOC	Methyl Acetate	79-20-9		16				9.15E+04	NC		1.46E+04	
Building 14	VOC	Methyl tert-butyl ether	1634-04-4		16				7.00E+02	C		1.49E+02	
Building 14	VOC	4-Methyl-2-pentanone	108-10-1	ID	16				4.70E+04	NC		1.17E+03	
Building 14	VOC	Methylcyclohexane	108-87-2		16	3	4.50E-04	8.80E-04	8.72E+03	NC	1.0E-07		
Building 14	VOC	Methylene Chloride	75-09-2	B2	16	1	1.90E-01	1.90E-01	2.05E+02	C	9.3E-04	2.00E+00	9.5E-02
Building 14	VOC	Styrene	100-42-5		16	8	3.40E-04	1.30E-03	1.81E+04	NC	7.2E-08	4.00E+01	3.3E-05
Building 14	VOC	1,1,2,2-Tetrachloroethane	79-34-5	C	16				9.29E+00	C		1.34E+00	
Building 14	VOC	Tetrachloroethene	127-18-4	C-B2	16	14	1.80E-03	4.10E-01	1.31E+01	C	3.1E-02	2.00E+00	2.1E-01
Building 14	VOC	Toluene	108-88-3	D	16	5	1.60E-03	1.40E-02	2.21E+03	NC	6.3E-06	4.00E+02	3.5E-05
Building 14	VOC	1,2,4-Trichlorobenzene	120-82-1	D	16				2.16E+02	NC		2.80E+01	
Building 14	VOC	1,1,1-Trichloroethane	71-55-6	D	16				6.95E+03	NC		8.00E+01	
Building 14	VOC	1,1,2-Trichloroethane	79-00-5	C	16				1.61E+01	C		2.00E+00	

**Table 4: Soil Screening Results
GM Moraine Building 14, Moraine, Ohio**

Area	Chem Group	Chemical	CASRN	Carc Class	Analyzed	Detected	Min Detected (mg/kg)	Max Detected (mg/kg)	Reg 9 Based		ENVIRON		
									Industrial PRG Based Criteria (TR=1E-5 & HQ=1) (mg/kg)	Ratio of Max Detect to Industrial Criteria (1E-5)	MTGW MCL/Tap Water (TR = 1E-5) (mg/kg)	Ratio of Max Detect to MTGW MCL/Tap Water 1E-5	
Building 14	VOC	Trichloroethene	79-01-6	C-B2	16	12	3.90E-04	3.80E-02	6.12E+01	C	6.2E-04	2.00E+00	1.9E-02
Building 14	VOC	Trichlorofluoromethane	75-69-4		16				1.28E+03	NC		4.38E+03	
Building 14	VOC	1,1,2-Trichloro-1,2,2-trifluoroethane	76-13-1		16				6.87E+04	NC			
Building 14	VOC	Vinyl Chloride	75-01-4	A	16				7.46E+00	C		8.00E-01	
Building 14	VOC	Xylenes (total)	1330-20-7	ID	16	5	1.10E-03	1.40E-02	8.97E+02	NC	1.6E-05		
Notes:													
The Screening Criteria for cis-1,2-Dichloroethene were used as surrogates for 1,2-Dichloroethene (total).													
The concentrations for the Chlordane isomers (alpha and gamma) were summed before comparing to the Screening Criteria.													
The concentrations for the 1,3-Dichloropropene isomers (cis and trans) were summed before comparing to the Screening Criteria.													
c - The Screening Criterion is based on cancer risk.													
nc - The Screening Criterion is based on noncancer effects.													
Chem Group - Chemical Group													
Carc Class - EPA Weight-of-Evidence Cancer Classification													

Table 5: Groundwater Screening Results
GM Moraine Building 14, Moraine, Ohio

Area	Wellzone	Chem Group	Chemical	CASRN	Meas Basis	Carc Class	Analyzed	Detected	Min Detected (mg/L)	Max Detected (mg/L)	US EPA	OHIO	ENVIRON	Reg 9 Based		4	
											MCL FED (mg/L)	Ohio MCL (mg/L)	Solubility (mg/L)	Ratio of Max Detect to Solubility	Drinking Water Criteria (MCL or TR=1E-5 & HQ=1) (mg/L)	Ratio of Max Detect to DW Criteria E-5	
Building 14	Shallow	VOC	Acetone	67-64-1	T	ID	8										
Building 14	Shallow	VOC	Benzene	71-43-2	T	A	8	1.70E-03	1.70E-03	5.00E-03	5.00E-03	1.00E+06	9.7E-07	3.29E+01	nc		
Building 14	Shallow	VOC	Bromodichloromethane	75-27-4	T	B2	8			8.00E-02		1.75E+03		5.00E-03	sm	3.4E-01	
Building 14	Shallow	VOC	Bromofrom	75-25-2	T	B2	8			8.00E-02		6.74E+03		8.00E-02	fm		
Building 14	Shallow	VOC	Bromomethane	74-83-9	T	D	8					3.10E+03		8.00E-02	fm		
Building 14	Shallow	VOC	2-Butanone	78-93-3	T	ID	8					1.52E+04		5.11E-02	nc		
Building 14	Shallow	VOC	Carbon Disulfide	75-15-0	T		8					1.19E+03		2.19E+01	nc		
Building 14	Shallow	VOC	Carbon Tetrachloride	56-23-5	T	B2	8			5.00E-03	5.00E-03	7.93E+02		3.65E+00	nc		
Building 14	Shallow	VOC	Chlorobenzene	108-90-7	T	D	8			1.00E-01	1.00E-01	4.72E+02		5.00E-03	sm		
Building 14	Shallow	VOC	Chloroethane	75-00-3	T		8					5.68E+03		1.00E-01	sm		
Building 14	Shallow	VOC	Chloroform	67-66-3	T	B2	8			8.00E-02		7.92E+03		1.46E+01	nc		
Building 14	Shallow	VOC	Chloromethane	74-87-3	T	D	8					5.33E+03		8.00E-02	fm		
Building 14	Shallow	VOC	Cumene	98-82-8	T	D	8					6.13E+01		9.49E-01	nc		
Building 14	Shallow	VOC	Cyclohexane	110-82-7	T	ID	8	1	8.40E-04	8.40E-04			5.50E+01	1.5E-05	3.65E+00	nc	
Building 14	Shallow	VOC	1,2-Dibromo-3-chloropropane	96-12-8	T	B2	8			2.00E-04	2.00E-04	1.23E+03		6.21E+01	nc	1.4E-05	
Building 14	Shallow	VOC	Dibromochloromethane	124-48-1	T	C	8			8.00E-02		2.60E+03		2.00E-04	sm		
Building 14	Shallow	VOC	1,2-Dibromoethane	106-93-4	T	B2	8			5.00E-05	5.00E-05	4.18E+03		8.00E-02	fm		
Building 14	Shallow	VOC	1,2-Dichlorobenzene	95-50-1	T	D	8			6.00E-01	6.00E-01	1.56E+02		5.00E-05	sm		
Building 14	Shallow	VOC	1,3-Dichlorobenzene	541-73-1	T	D	8					1.33E+02		6.00E-01	sm		
Building 14	Shallow	VOC	1,4-Dichlorobenzene	106-46-7	T	C	8			7.50E-02	7.50E-02	7.38E+01		1.10E+00	nc		
Building 14	Shallow	VOC	Dichlorodifluoromethane	75-71-8	T		8					2.80E+02		7.50E-02	sm		
Building 14	Shallow	VOC	1,1-Dichloroethane	75-34-3	T	C	8	5	2.50E-03	8.50E-03			7.30E+00	nc			
Building 14	Shallow	VOC	1,2-Dichloroethane	107-06-2	T	B2	8			5.00E-03	5.00E-03	8.52E+03	1.7E-06	3.65E+00	nc	2.3E-03	
Building 14	Shallow	VOC	1,1-Dichloroethene	75-35-4	T	C	8			7.00E-03	7.00E-03	2.25E+03		5.00E-03	sm		
Building 14	Shallow	VOC	cis-1,2-Dichloroethene	156-59-2	T	D	8	8	1.20E-02	2.10E-01	7.00E-02	7.00E-02	3.50E+03	6.0E-05	7.00E-02	sm	3.0E+00
Building 14	Shallow	VOC	trans-1,2-Dichloroethene	156-60-5	T		8	6	8.70E-04	8.70E-03	1.00E-01	1.00E-01	6.30E+03	1.4E-06	1.00E-01	sm	8.7E-02
Building 14	Shallow	VOC	1,2-Dichloropropane	78-87-5	T	B2	8			5.00E-03	5.00E-03	2.80E+03		5.00E-03	sm		
Building 14	Shallow	VOC	1,3-Dichloropropene (total)	542-75-6	T	B2	8							6.72E-03	ca		
Building 14	Shallow	VOC	Ethyl Benzene	100-41-4	T	D	8			7.00E-01	7.00E-01	1.69E+02		7.00E-01	sm		
Building 14	Shallow	VOC	2-Hexanone	591-78-6	T		8										
Building 14	Shallow	VOC	Methyl Acetate	79-20-9	T		8							3.65E+01	nc		
Building 14	Shallow	VOC	Methyl tert-butyl ether	1634-04-4	T		8					5.10E+04		3.74E-01	ca		
Building 14	Shallow	VOC	4-Methyl-2-pentanone	108-10-1	T	ID	8					1.90E+04		2.92E+00	nc		
Building 14	Shallow	VOC	Methylcyclohexane	108-87-2	T		8	1	9.20E-04	9.20E-04				3.14E+01	nc	2.9E-05	
Building 14	Shallow	VOC	Methylene Chloride	75-09-2	T	B2	8			5.00E-03	5.00E-03	1.30E+04		5.00E-03	sm		
Building 14	Shallow	VOC	Styrene	100-42-5	T		8			1.00E-01	1.00E-01	3.10E+02		1.00E-01	sm		
Building 14	Shallow	VOC	1,1,2,2-Tetrachloroethane	79-34-5	T	C	8					2.97E+03		3.36E-03	ca		
Building 14	Shallow	VOC	Tetrachloroethene	127-18-4	T	C-B2	8	8	1.20E-03	6.30E-01	5.00E-03	5.00E-03	2.00E+02	3.2E-03	5.00E-03	sm	1.3E+02
Building 14	Shallow	VOC	Toluene	108-88-3	T	D	8	1	5.10E-03	5.10E-03	1.00E+00	1.00E+00	5.26E+02	9.7E-06	1.00E+00	sm	5.1E-03
Building 14	Shallow	VOC	1,2,4-Trichlorobenzene	120-82-1	T	D	8			7.00E-02	7.00E-02	3.00E+02		7.00E-02	sm		
Building 14	Shallow	VOC	1,1,1-Trichloroethane	71-55-6	T	D	8	5	1.90E-03	5.80E-03	2.00E-01	2.00E-01	1.33E+03	4.4E-06	2.00E-01	sm	2.9E-02
Building 14	Shallow	VOC	1,1,2-Trichloroethane	79-00-5	T	C	8			5.00E-03	5.00E-03	4.42E+03		5.00E-03	sm		
Building 14	Shallow	VOC	Trichloroethene	79-01-6	T	C-B2	8	8	2.30E-02	2.20E-01	5.00E-03	5.00E-03	1.10E+03	2.0E-04	5.00E-03	sm	4.4E+01
Building 14	Shallow	VOC	Trichlorofluoromethane	75-69-4	T		8	4	7.50E-03	1.40E-02			1.10E+03	1.3E-05	1.10E+01	nc	1.3E-03
Building 14	Shallow	VOC	1,1,2-Trichloro-1,2,2-trifluoroethane	76-13-1	T		8	2	7.40E-03	2.40E-02			1.70E+02	1.4E-04	1.10E+03	nc	2.2E-05
Building 14	Shallow	VOC	Vinyl Chloride	75-01-4	T	A	8	2	2.60E-03	2.80E-03	2.00E-03	2.00E-03	2.76E+03	1.0E-06	2.00E-03	sm	1.4E+00
Building 14	Shallow	VOC	Xylenes (total)	1330-20-7	T	ID	8			1.00E+01	1.00E+01			1.00E+01	sm		

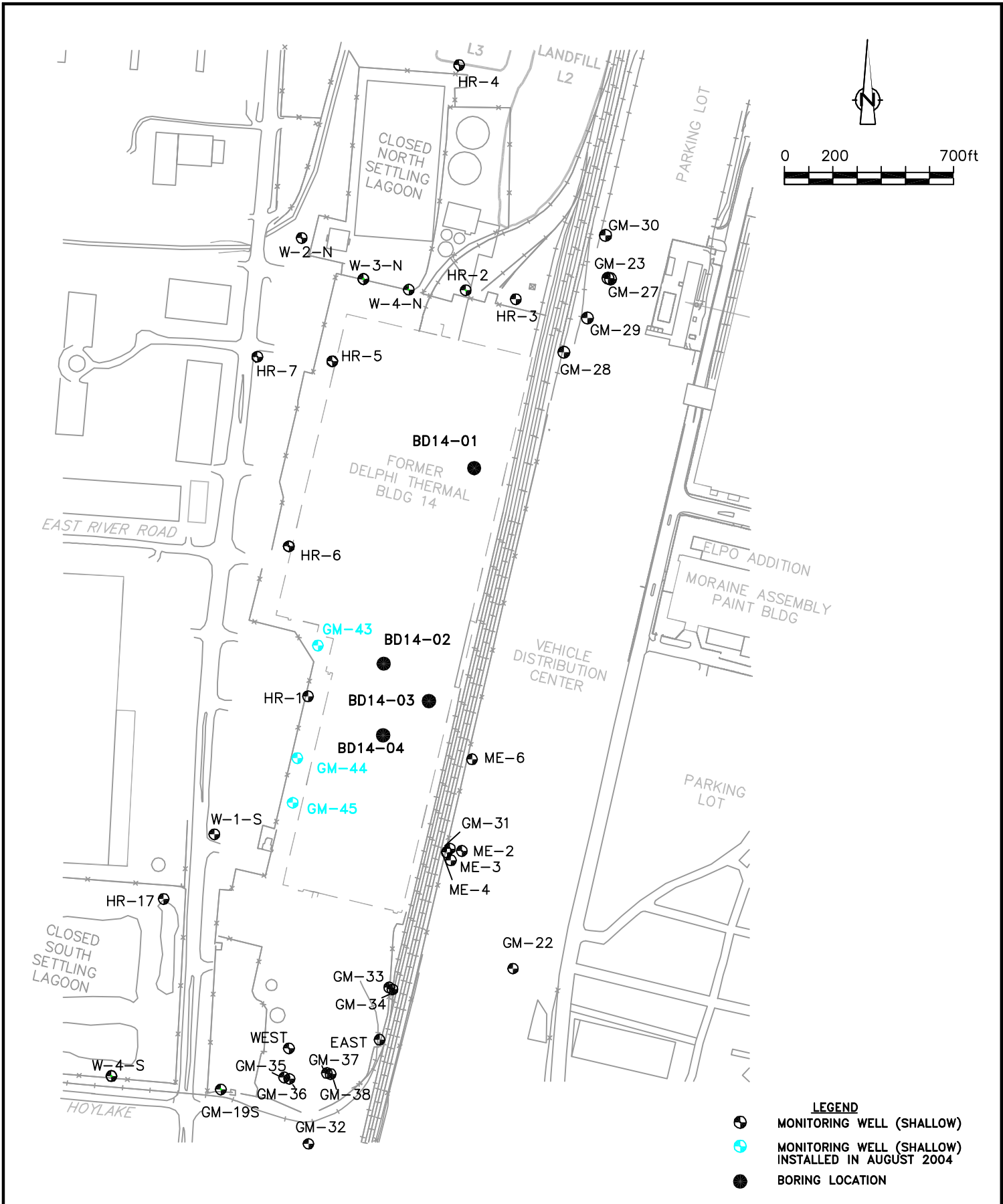
Notes:
 The Screening Criteria for cis-1,2-Dichloroethene were used as surrogates for 1,2-Dichloroethene (total).
 The concentrations for the Chlordane isomers (alpha and gamma) were summed before comparing to the Screening Criteria.
 The concentrations for the 1,3-Dichloropropene isomers (cis and trans) were summed before comparing to the Screening Criteria.

sm - The Screening Criterion is the State MCL.
 fm - The Screening Criterion is the Federal MCL.
 c - The Screening Criterion is based on cancer risk.
 nc - The Screening Criterion is based on noncancer effects.




Chem Group - Chemical Group
 Meas Basis - Measured Basis; T = Total, D = Dissolved
 Carc Class - EPA Weight-of-Evidence Cancer Classification

**Table 6: Groundwater Samples Exceeding Screening Criteria
GM Moraine Building 14, Moraine, Ohio**

													Reg 9 Based	21
Area	Wellzone	Location	Sample ID	Sample Type	Sample Date	Meas Basis	Chem Group	Chemical	CASRN	Conc (mg/L)	Qual	MRL (mg/L)	Drinking Water Criteria E-5 or HQ 1 (mg/L)	Ratio of Conc to Drinking Water Criteria E-5 or HQ 1
Building 14	Shallow	BD14-01	BD14-01/081004	N	08/10/04	T	VOC	Trichloroethene	79-01-6	2.30E-02		2.80E-04	5.00E-03	4.6E+00
Building 14	Shallow	BD14-01	BD14-01/081004	N	08/10/04	T	VOC	Vinyl Chloride	75-01-4	2.60E-03		2.10E-04	2.00E-03	1.3E+00
Building 14	Shallow	BD14-02	BD14-02/081304	N	08/13/04	T	VOC	Tetrachloroethene	127-18-4	6.30E-01		3.80E-03	5.00E-03	1.3E+02
Building 14	Shallow	BD14-02	BD14-02/081304	N	08/13/04	T	VOC	Trichloroethene	79-01-6	1.70E-01		5.60E-03	5.00E-03	3.4E+01
Building 14	Shallow	BD14-03	BD14-03/081104	N	08/11/04	T	VOC	Tetrachloroethene	127-18-4	1.00E-02		7.60E-04	5.00E-03	2.0E+00
Building 14	Shallow	BD14-03	BD14-03/081104	N	08/11/04	T	VOC	Trichloroethene	79-01-6	7.40E-02		1.10E-03	5.00E-03	1.5E+01
Building 14	Shallow	BD14-04	BD14-04/081204	N	08/12/04	T	VOC	Tetrachloroethene	127-18-4	3.70E-02		6.30E-04	5.00E-03	7.4E+00
Building 14	Shallow	BD14-04	BD14-04/081204	N	08/12/04	T	VOC	Trichloroethene	79-01-6	6.80E-02		9.30E-04	5.00E-03	1.4E+01
Building 14	Shallow	GM-43	DUP-137	FD	08/19/04	T	VOC	cis-1,2-Dichloroethene	156-59-2	2.10E-01		1.90E-03	7.00E-02	3.0E+00
Building 14	Shallow	GM-43	DUP-137	FD	08/19/04	T	VOC	Tetrachloroethene	127-18-4	1.70E-02		1.70E-03	5.00E-03	3.4E+00
Building 14	Shallow	GM-43	DUP-137	FD	08/19/04	T	VOC	Trichloroethene	79-01-6	1.00E-01		2.50E-03	5.00E-03	2.0E+01
Building 14	Shallow	GM-43	GM-43/081904	N	08/19/04	T	VOC	cis-1,2-Dichloroethene	156-59-2	2.10E-01		1.90E-03	7.00E-02	3.0E+00
Building 14	Shallow	GM-43	GM-43/081904	N	08/19/04	T	VOC	Tetrachloroethene	127-18-4	1.60E-02		1.70E-03	5.00E-03	3.2E+00
Building 14	Shallow	GM-43	GM-43/081904	N	08/19/04	T	VOC	Trichloroethene	79-01-6	1.00E-01		2.50E-03	5.00E-03	2.0E+01
Building 14	Shallow	GM-43	GM-43/081904	N	08/19/04	T	VOC	Vinyl Chloride	75-01-4	2.80E-03	J	1.90E-03	2.00E-03	1.4E+00
Building 14	Shallow	GM-44	GM-44/081904	N	08/19/04	T	VOC	cis-1,2-Dichloroethene	156-59-2	1.30E-01		1.30E-03	7.00E-02	1.9E+00
Building 14	Shallow	GM-44	GM-44/081904	N	08/19/04	T	VOC	Tetrachloroethene	127-18-4	5.70E-02		1.10E-03	5.00E-03	1.1E+01
Building 14	Shallow	GM-44	GM-44/081904	N	08/19/04	T	VOC	Trichloroethene	79-01-6	1.40E-01		1.70E-03	5.00E-03	2.8E+01
Building 14	Shallow	GM-45	GM-45/081904	N	08/19/04	T	VOC	cis-1,2-Dichloroethene	156-59-2	7.90E-02		1.90E-03	7.00E-02	1.1E+00
Building 14	Shallow	GM-45	GM-45/081904	N	08/19/04	T	VOC	Tetrachloroethene	127-18-4	2.20E-01		1.70E-03	5.00E-03	4.4E+01
Building 14	Shallow	GM-45	GM-45/081904	N	08/19/04	T	VOC	Trichloroethene	79-01-6	2.20E-01		2.50E-03	5.00E-03	4.4E+01



LEGEND

-  MONITORING WELL (SHALLOW)
-  MONITORING WELL (SHALLOW) INSTALLED IN AUGUST 2004
-  BORING LOCATION



284 Gramer Creek Court
Dublin, OH 43017
Tel: 614/784-2310 Fax: 614/784-1270

**SOIL BORING AND MONITORING WELL LOCATIONS
FOR THE BUILDING 14 INVESTIGATION
GENERAL MOTORS CORPORATION
MORaine, OHIO**

DATE 2/15/2005	PROJECT MANAGER N. GILLOTTI	DRAWING NAME ORA/BLDG14/BLD14-21
DRAWN R. SMITH	LEAD DESIGN PROF. J. REID	CHECKED N. GILLOTTI
PROJECT NUMBER OH000294.0006.0009		FIGURE NUMBER 1

GM-43	8/9/2004		8/9/2004	
	0-2 ft	20-22 ft	0-2 ft	20-22 ft
1,1,1-Trichloroethane	ND (4.8) U	ND (5.7) U	ND (4.8) U	ND (5.7) U
1,1-Dichloroethane	ND (4.8) U	ND (5.7) U	ND (4.8) U	ND (5.7) U
1,1-Dichloroethene	ND (4.8) U	ND (5.7) U	ND (4.8) U	ND (5.7) U
Benzene	ND (4.8) U	0.75 J	ND (4.8) U	0.75 J
cis-1,2-Dichloroethene	ND (2.4) U	ND (2.9) U	ND (2.4) U	ND (2.9) U
Ethylbenzene	ND (4.8) U	1.2 J	ND (4.8) U	1.2 J
Tetrachloroethene	ND (4.8) U	30	ND (4.8) U	30
Toluene	ND (4.8) U	3.6 J	ND (4.8) U	3.6 J
trans-1,2-Dichloroethene	ND (2.4) U	ND (2.9) U	ND (2.4) U	ND (2.9) U
Trichloroethene	ND (4.8) U	ND (5.7) U	ND (4.8) U	ND (5.7) U
Vinyl chloride	ND (4.8) U	ND (5.7) U	ND (4.8) U	ND (5.7) U
Xylene (total)	ND (9.6) U	2.4 J	ND (9.6) U	2.4 J

GM-44	8/19/2004	
	ug/l	
1,1,1-Trichloroethane	4 J	4 J
1,1-Dichloroethane	3.3 J	3.3 J
1,1-Dichloroethene	ND (6) U	ND (6) U
Benzene	ND (6) U	ND (6) U
cis-1,2-Dichloroethene	130	130
Ethylbenzene	ND (6) U	ND (6) U
Tetrachloroethene	57	57
Toluene	ND (6) U	ND (6) U
trans-1,2-Dichloroethene	4.4	4.4
Trichloroethene	140	140
Vinyl chloride	ND (6) U	ND (6) U
Xylene (total)	ND (6) U	ND (6) U

GM-44	8/3/2004		8/3/2004	
	0-2 ft	18-20 ft	0-2 ft	18-20 ft
1,1,1-Trichloroethane	ND (4.4) U/ND (4.9) U	ND (4.5) U	ND (4.4) U/ND (4.9) U	ND (4.5) U
1,1-Dichloroethane	ND (4.4) U/ND (4.9) U	ND (4.5) U	ND (4.4) U/ND (4.9) U	ND (4.5) U
1,1-Dichloroethene	ND (4.4) U/ND (4.9) U	ND (4.5) U	ND (4.4) U/ND (4.9) U	ND (4.5) U
Benzene	ND (4.4) U/ND (4.9) U	0.59 J	ND (4.4) U/ND (4.9) U	0.59 J
cis-1,2-Dichloroethene	ND (2.2) U/ND (2.4) U	ND (2.3) U	ND (2.2) U/ND (2.4) U	ND (2.3) U
Ethylbenzene	ND (4.4) U/ND (4.9) U	0.59 J	ND (4.4) U/ND (4.9) U	0.59 J
Tetrachloroethene	1.8 J/2.3 J	29	1.8 J/2.3 J	29
Toluene	ND (4.4) U/ND (4.9) U	1.6 J	ND (4.4) U/ND (4.9) U	1.6 J
trans-1,2-Dichloroethene	ND (2.2) U/ND (2.4) U	ND (2.3) U	ND (2.2) U/ND (2.4) U	ND (2.3) U
Trichloroethene	0.39 J/1.5 J	2.2 J	0.39 J/1.5 J	2.2 J
Vinyl chloride	ND (4.4) U/ND (4.9) U	ND (4.5) U	ND (4.4) U/ND (4.9) U	ND (4.5) U
Xylene (total)	ND (8.8) U/ND (9.8) U	1.1 J	ND (8.8) U/ND (9.8) U	1.1 J

GM-45	8/19/2004	
	ug/l	
1,1,1-Trichloroethane	5.8 J	5.8 J
1,1-Dichloroethane	8.5 J	8.5 J
1,1-Dichloroethene	ND (9.1) U	ND (9.1) U
Benzene	ND (9.1) U	ND (9.1) U
cis-1,2-Dichloroethene	79	79
Ethylbenzene	ND (9.1) U	ND (9.1) U
Tetrachloroethene	220	220
Toluene	ND (9.1) U	ND (9.1) U
trans-1,2-Dichloroethene	3.5 J	3.5 J
Trichloroethene	220	220
Vinyl chloride	ND (9.1) U	ND (9.1) U
Xylene (total)	ND (9.1) U	ND (9.1) U

GM-45	8/5/2004		8/5/2004	
	0-2 ft	20-22 ft	0-2 ft	20-22 ft
1,1,1-Trichloroethane	ND (4.4) U	ND (4.9) U	ND (4.4) U	ND (4.9) U
1,1-Dichloroethane	ND (4.4) U	ND (4.9) U	ND (4.4) U	ND (4.9) U
1,1-Dichloroethene	ND (4.4) U	ND (4.9) U	ND (4.4) U	ND (4.9) U
Benzene	ND (4.4) U	ND (4.9) U	ND (4.4) U	ND (4.9) U
cis-1,2-Dichloroethene	ND (2.2) U	ND (2.5) U	ND (2.2) U	ND (2.5) U
Ethylbenzene	ND (4.4) U	ND (4.9) U	ND (4.4) U	ND (4.9) U
Tetrachloroethene	ND (4.4) U	6.9	ND (4.4) U	6.9
Toluene	ND (4.4) U	ND (4.9) U	ND (4.4) U	ND (4.9) U
trans-1,2-Dichloroethene	ND (2.2) U	ND (2.5) U	ND (2.2) U	ND (2.5) U
Trichloroethene	0.41 J	4.4 J	0.41 J	4.4 J
Vinyl chloride	ND (4.4) U	ND (4.9) U	ND (4.4) U	ND (4.9) U
Xylene (total)	ND (8.8) U	ND (9.8) U	ND (8.8) U	ND (9.8) U

GM-43	8/19/2004	
	ug/l	
1,1,1-Trichloroethane	ND (9.1) U	ND (9.1) U
1,1-Dichloroethane	6.9 J/6.4 J	6.9 J/6.4 J
1,1-Dichloroethene	ND (9.1) U	ND (9.1) U
Benzene	ND (9.1) U	ND (9.1) U
cis-1,2-Dichloroethene	210/210	210/210
Ethylbenzene	ND (9.1) U	ND (9.1) U
Tetrachloroethene	16/17	16/17
Toluene	ND (9.1) U	ND (9.1) U
trans-1,2-Dichloroethene	8.7/8.7	8.7/8.7
Trichloroethene	100/100	100/100
Vinyl chloride	2.8 J/ND (9.1) U	2.8 J/ND (9.1) U
Xylene (total)	ND (9.1) U	ND (9.1) U

BD14-01	8/10/2004	
	ug/l	
1,1,1-Trichloroethane	ND (1) U	ND (1) U
1,1-Dichloroethane	2.5	2.5
1,1-Dichloroethene	ND (1) U	ND (1) U
Benzene	ND (1) U	ND (1) U
cis-1,2-Dichloroethene	26	26
Ethylbenzene	ND (1) U	ND (1) U
Tetrachloroethene	1.2	1.2
Toluene	ND (1) U	ND (1) U
trans-1,2-Dichloroethene	1.6	1.6
Trichloroethene	23	23
Vinyl chloride	2.6	2.6
Xylene (total)	ND (1) U	ND (1) U

BD14-01	8/9/2004		8/9/2004	
	8-10 ft	22-24 ft	8-10 ft	22-24 ft
1,1,1-Trichloroethane	ND (4.9) U	ND (5.5) U	ND (4.9) U	ND (5.5) U
1,1-Dichloroethane	ND (4.9) U	ND (5.5) U	ND (4.9) U	ND (5.5) U
1,1-Dichloroethene	ND (4.9) U	ND (5.5) U	ND (4.9) U	ND (5.5) U
Benzene	0.32 J	ND (5.5) U	0.32 J	ND (5.5) U
cis-1,2-Dichloroethene	ND (2.5) U	ND (2.8) U	ND (2.5) U	ND (2.8) U
Ethylbenzene	ND (4.9) U	0.84 J	ND (4.9) U	0.84 J
Tetrachloroethene	12	13	12	13
Toluene	ND (4.9) U	1.6 J	ND (4.9) U	1.6 J
trans-1,2-Dichloroethene	ND (2.5) U	ND (2.8) U	ND (2.5) U	ND (2.8) U
Trichloroethene	ND (4.9) U	ND (5.5) U	ND (4.9) U	ND (5.5) U
Vinyl chloride	ND (4.9) U	ND (5.5) U	ND (4.9) U	ND (5.5) U
Xylene (total)	ND (9.9) U	1.7 J	ND (9.9) U	1.7 J

BD14-02	8/13/2004	
	ug/l	
1,1,1-Trichloroethane	5.5 J	5.5 J
1,1-Dichloroethane	ND (20) U	ND (20) U
1,1-Dichloroethene	ND (20) U	ND (20) U
Benzene	ND (20) U	ND (20) U
cis-1,2-Dichloroethene	43	43
Ethylbenzene	ND (20) U	ND (20) U
Tetrachloroethene	630	630
Toluene	5.1 J	5.1 J
trans-1,2-Dichloroethene	ND (10) U	ND (10) U
Trichloroethene	170	170
Vinyl chloride	ND (20) U	ND (20) U
Xylene (total)	ND (20) U	ND (20) U

BD14-02	8/13/2004		8/13/2004	
	8-10 ft	24-26 ft	8-10 ft	24-26 ft
1,1,1-Trichloroethane	ND (340) U	ND (280) U	ND (340) U	ND (280) U
1,1-Dichloroethane	ND (340) U	ND (280) U	ND (340) U	ND (280) U
1,1-Dichloroethene	ND (340) U	ND (280) U	ND (340) U	ND (280) U
Benzene	ND (340) U	ND (280) U	ND (340) U	ND (280) U
cis-1,2-Dichloroethene	ND (170) U	ND (140) U	ND (170) U	ND (140) U
Ethylbenzene	ND (340) U	ND (280) U	ND (340) U	ND (280) U
Tetrachloroethene	410	330	410	330
Toluene	ND (340) U	ND (280) U	ND (340) U	ND (280) U
trans-1,2-Dichloroethene	ND (170) U	ND (140) U	ND (170) U	ND (140) U
Trichloroethene	26 J	38 J	26 J	38 J
Vinyl chloride	ND (340) U	ND (280) U	ND (340) U	ND (280) U
Xylene (total)	ND (680) U	ND (570) U	ND (680) U	ND (570) U

BD14-03	8/11/2004	
	ug/l	
1,1,1-Trichloroethane	1.9 J	1.9 J
1,1-Dichloroethane	ND (4) U	ND (4) U
1,1-Dichloroethene	ND (4) U	ND (4) U
Benzene	1.7 J B	1.7 J B
cis-1,2-Dichloroethene	41	41
Ethylbenzene	ND (4) U	ND (4) U
Tetrachloroethene	10	10
Toluene	ND (4) U	ND (4) U
trans-1,2-Dichloroethene	ND (2) U	ND (2) U
Trichloroethene	74	74
Vinyl chloride	ND (4) U	ND (4) U
Xylene (total)	ND (4) U	ND (4) U

BD14-03	8/10/2004		8/10/2004	
	8-10 ft	24-26 ft	8-10 ft	24-26 ft
1,1,1-Trichloroethane	ND (4.8) U	ND (5.5) U	ND (4.8) U	ND (5.5) U
1,1-Dichloroethane	ND (4.8) U	ND (5.5) U	ND (4.8) U	ND (5.5) U
1,1-Dichloroethene	ND (4.8) U	ND (5.5) U	ND (4.8) U	ND (5.5) U
Benzene	ND (4.8) U	ND (5.5) U	ND (4.8) U	ND (5.5) U
cis-1,2-Dichloroethene	2.4	ND (2.7) U	2.4	ND (2.7) U
Ethylbenzene	0.72 J	ND (5.5) U	0.72 J	ND (5.5) U
Tetrachloroethene	9.3	32	9.3	32
Toluene	6.3 B	ND (5.5) U	6.3 B	ND (5.5) U
trans-1,2-Dichloroethene	ND (2.4) U	ND (2.7) U	ND (2.4) U	ND (2.7) U
Trichloroethene	9.3	24	9.3	24
Vinyl chloride	ND (4.8) U	ND (5.5) U	ND (4.8) U	ND (5.5) U
Xylene (total)	10	ND (11) U	10	ND (11) U

BD14-04	8/12/2004	
	ug/l	
1,1,1-Trichloroethane	2.4 J	2.4 J
1,1-Dichloroethane	ND (3.3) U	ND (3.3) U
1,1-Dichloroethene	ND (3.3) U	ND (3.3) U
Benzene	ND (3.3) U	ND (3.3) U
cis-1,2-Dichloroethene	12	12
Ethylbenzene	ND (3.3) U	ND (3.3) U
Tetrachloroethene	37	37
Toluene	ND (3.3) U	ND (3.3) U
trans-1,2-Dichloroethene	0.87 J	0.87 J
Trichloroethene	68	68
Vinyl chloride	ND (3.3) U	ND (3.3) U
Xylene (total)	ND (3.3) U	ND (3.3) U

BD14-04	8/12/2004		8/12/2004	
	8-10 ft	24-26 ft	8-10 ft	24-26 ft
1,1,1-Trichloroethane	ND (230) U	ND (5.8) U/ND (6.3) U	ND (230) U	ND (5.8) U/ND (6.3) U
1,1-Dichloroethane	ND (230) U	ND (5.8) U/ND (6.3) U	ND (230) U	ND (5.8) U/ND (6.3) U
1,1-Dichloroethene	ND (230) U	ND (5.8) U/ND (6.3) U	ND (230) U	ND (5.8) U/ND (6.3) U
Benzene	ND (230) U	ND (5.8) U/ND (6.3) U	ND (230) U	ND (5.8) U/ND (6.3) U
cis-1,2-Dichloroethene	ND (110) U	ND (2.9) U/ND (3.2) U	ND (110) U	ND (2.9) U/ND (3.2) U
Ethylbenzene	ND (230) U	ND (5.8) U/ND (6.3) U	ND (230) U	ND (5.8) U/ND (6.3) U
Tetrachloroethene	370 J	110/56 J	370 J	110/56 J
Toluene	14 J	ND (5.8) U/ND (6.3) U	14 J	ND (5.8) U/ND (6.3) U
trans-1,2-Dichloroethene	ND (110) U	ND (2.9) U/ND (3.2) U	ND (110) U	ND (2.9) U/ND (3.2) U
Trichloroethene	27 J/10	10/4.8 J	27 J/10	10/4.8 J
Vinyl chloride	ND (230) U	ND (5.8) U/ND (6.3) U	ND (230) U	ND (5.8) U/ND (6.3) U
Xylene (total)	14 J	ND (12) U/ND (13) U	14 J	ND (12) U/ND (13) U



0 200 700ft

LEGEND

- MONITORING WELL (SHALLOW)
- BORING LOCATION
- ug/L MICROGRAMS PER LITER
- ug/kg MICROGRAMS PER KILOGRAM



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

**GROUNDWATER AND SOIL DATABOXES
FOR THE BUILDING 14 INVESTIGATION
GENERAL MOTORS CORPORATION
MORAIN, OHIO**

DATE 2/10/2005	PROJECT MANAGER N. GILLOTTI	DRAWING NAME CRA\BLDG14\BLD14-20
DRAWN R. SMITH	LEAD DESIGN PROF. J. REID	CHECKED N. GILLOTTI
PROJECT NUMBER OH000294.0006.0009		DRAWING NUMBER 2

ARCADIS

DRAFT

Appendix A

Building 14 Soil Boring and Well
Construction Logs

General Motors Corporation

Building 14 Investigation, 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	N/A	N/A					Concrete with #5 rebar; straight drill to 8 feet	
2	N/A	N/A	N/A					Concrete with #5 rebar	
								Brown silty clay, gravel, fill	
4	N/A	N/A	N/A					Concrete with #5 rebar	
6	N/A	N/A	N/A					Concrete with #5 rebar	
8	11, 18, 18, 16	24	0				ML	SILT Brown, clayey silt with 25% sand and gravel, well graded, fill	
10	5, 10, 10, 18	19	0				ML	SILT Brown, clayey silt with 25% sand and gravel, well graded, fill	
12									

Composite Sample to Lab

Grab Sample to Lab

Split-Spoon Not Analyzed

Page 1 of 6

Drilling Co.: Frontz Drilling

Geologist: J. Manzo

Begin Drilling: 8/9/04 @ 1721

Driller: A. Mackey

Total Depth: 60

End Drilling: 8/10/04 @ 11:31

Drilling Method: Hollow Stem Auger

Surface Elev.: _____

Converted to Well: Y Well I.D.: BD14-01

Drilling Fluid: None

North Coord.: _____

East Coord.: _____

Remarks: Samples submitted for laboratory analysis of VOCs.

Project No.: OH000294.0006.00009

Datum: _____

Filename: August 2004

General Motors Corporation

Building 14 Investigation, Moraine, Ohio

Depth (feet)	Blows (/6 in.)	Recovery (Inches)	OVA (PPM)	Sample Analysis	Sample Type	Graphic Log	Soil Class.	Description	Depth to Water
12	21,19,21,17	20	0				SM	SAND Brown, silty sand with 25% coarse grained gravel (cobble), well graded	
14	14,12,20,17	2	0				SM	SAND Brown, silty sand with 25% coarse grained gravel (cobble), well graded, poor recovery	
16	25,22,14,20	21	0				SM	SAND Brown, silty sand with 25% coarse grained gravel (cobble), well graded	
18	5,14,23,6	8	0				SM	SAND Brown, silty sand with 25% coarse grained gravel (cobble), well graded	
20	8,20,21,25	20	0				SM	SAND Brown, silty sand with 25% coarse grained gravel (cobble), well graded	
22	18,10,24,17	9	0				SM	SAND Silty sand, fine to medium grained, dry, 10% fine grained gravel, well graded	
24									

Composite Sample to Lab

Grab Sample to Lab

Split-Spoon Not Analyzed

Page 2 of 6

Drilling Co.: Frontz Drilling

Geologist: J. Manzo

Begin Drilling: 8/9/04 @ 1721

Driller: A. Mackey

Total Depth: 60

End Drilling: 8/10/04 @ 11:31

Drilling Method: Hollow Stem Auger

Surface Elev.: _____

Converted to Well: Y Well I.D.: BD14-01

Drilling Fluid: None

North Coord.: _____

East Coord.: _____

Remarks: Samples submitted for laboratory analysis of VOCs.

Project No.: OH000294.0006.00009

Datum: _____

Filename: August 2004

General Motors Corporation

Building 14 Investigation, Moraine, Ohio

Depth (feet)	Blows (/6 in.)	Recovery (Inches)	OVA (PPM)	Sample Analysis	Sample Type	Graphic Log	Soil Class.	Description	Depth to Water
24	5,9,10,14	24	0			[Dotted pattern]	SP	SAND Wet (saturated), medium grained sand with 10% fine grained gravel, poorly graded	11
26	11,14,13,14	24	0			[Dotted pattern]	SP	SAND Wet (saturated), medium grained sand with 10% fine grained gravel, poorly graded	
28	6,10,14,24	20	0			[Dotted pattern]	SP	SAND Wet (saturated), medium grained sand with 10% fine grained gravel, poorly graded	
30	N/A	6	0			[Dotted pattern]	SP	SAND Wet (saturated), medium grained sand with 10% fine grained gravel, poorly graded, poorly recovery	
32	N/A		0			[Dotted pattern]	SP	SAND Wet (saturated), medium grained sand with 10% fine grained gravel, poorly graded, poor recovery	
34	N/A		0			[Dotted pattern]	SP	SAND Wet (saturated), medium grained sand with 10% fine grained gravel, poorly graded, poor recovery	
36									

Composite Sample to Lab

Grab Sample to Lab

Split-Spoon Not Analyzed

Page 3 of 6

Drilling Co.: Frontz Drilling

Geologist: J. Manzo

Begin Drilling: 8/9/04 @ 1721

Driller: A. Mackey

Total Depth: 60

End Drilling: 8/10/04 @ 11:31

Drilling Method: Hollow Stem Auger

Surface Elev.: _____

Converted to Well: Y Well I.D.: BD14-01

Drilling Fluid: None

North Coord.: _____

East Coord.: _____

Remarks: Samples submitted for laboratory analysis of VOCs.

Project No.: OH000294.0006.00009

Datum: _____

Filename: August 2004

General Motors Corporation

Building 14 Investigation, Moraine, Ohio

Depth (feet)	Blows (/6 in.)	Recovery (inches)	OVA (PPM)	Sample Analysis	Sample Type	Graphic Log	Soil Class.	Description	Depth to Water
36								No recovery	
38	N/A		0						
40	30,50/3	12	0				CL	CLAY Gray, silty clay with 10% gravel, hard, low plasticity	
42	25,35,50/4	17	0				CL	CLAY Gray, silty clay with 10% gravel, hard, low plasticity	
44	4,16,23,27	24	0				SW	SAND Coarse grained sand (75%), fine grained gravel (25%), well graded	
46	5,9,19,23	11	0				SW	SAND Coarse grained sand (75%), fine grained gravel (25%), well graded	
48									

Composite Sample to Lab

Grab Sample to Lab

Split-Spoon Not Analyzed

Page 4 of 6

Drilling Co.: Frontz Drilling

Geologist: J. Manzo

Begin Drilling: 8/9/04 @ 1721

Driller: A. Mackey

Total Depth: 60

End Drilling: 8/10/04 @ 11:31

Drilling Method: Hollow Stem Auger

Surface Elev.: _____

Converted to Well: Y Well I.D.: BD14-01

Drilling Fluid: None

North Coord.: _____

East Coord.: _____

Remarks: Samples submitted for laboratory analysis of VOCs.

Project No.: OH000294.0006.00009

Datum: _____

Filename: August 2004

General Motors Corporation

Building 14 Investigation, Moraine, Ohio

Depth (feet)	Blows (/6 in.)	Recovery (Inches)	OVA (PPM)	Sample Analysis	Sample Type	Graphic Log	Soil Class.	Description	Depth to Water
48	10,14,17,21	12	0				SW	SAND Coarse grained sand (75%), fine grained gravel (25%), well graded	
50	15,17,20,19	11	0				SW	SAND Coarse grained sand (75%), fine grained gravel (25%), well graded	
52	12,44,26,21	10	0				GW	GRAVEL Silty sand (50%), gravel (50%), well graded	
54	20,39,50/4	6	0				SW	SAND Fine grained sand (75%), silt (25%), poorly graded	
56	24,37,47,50/3	0	0				CL	CLAY Gray, silty clay, 10% gravel, hard, low plasticity	
								No recovery	
58	36,28,50/3	11	0				CL	CLAY Gray, silty clay, 10% gravel, hard, low plasticity	
60									

Composite Sample to Lab

Grab Sample to Lab

Split-Spoon Not Analyzed

Page 5 of 6

Drilling Co.: Frontz Drilling

Geologist: J. Manzo

Begin Drilling: 8/9/04 @ 1721

Driller: A. Mackey

Total Depth: 60

End Drilling: 8/10/04 @ 11:31

Drilling Method: Hollow Stem Auger

Surface Elev.: _____

Converted to Well: Y Well I.D.: BD14-01

Drilling Fluid: None

North Coord.: _____

East Coord.: _____

Remarks: Samples submitted for laboratory analysis of VOCs.

Project No.: OH000294.0006.00009

Datum: _____

Filename: August 2004

General Motors Corporation

Building 14 Investigation, 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

Page 6 of 6

Drilling Co.: Frontz Drilling

Geologist: J. Manzo

Begin Drilling: 8/9/04 @ 17:21

Driller: A. Mackey

Total Depth: 60

End Drilling: 8/10/04 @ 11:31

Drilling Method: Hollow Stem Auger

Surface Elev.: _____

Converted to Well: Y Well I.D.: BD14-01

Drilling Fluid: None

North Coord.: _____

East Coord.: _____

Remarks: Samples submitted for laboratory analysis of VOCs.

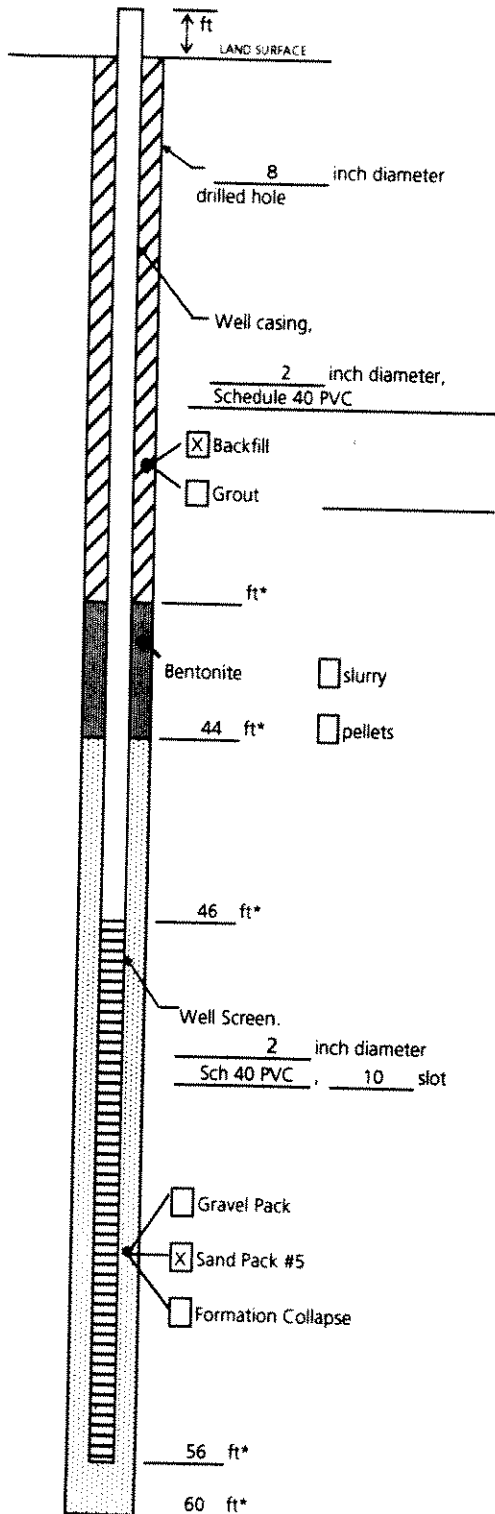
Project No.: OH000294.0006.00009

Datum: _____

Filename: August 2004

Well Construction Log

(Unconsolidated)



Measuring Point is
Top of Well Casing
Unless Otherwise Noted.

* Depth Below Land Surface

Project OH000294.0006.0009 Well BD14-01
 Town/City Moraine, Ohio
 County Montgomery State Ohio
 Permit No. n/a

Land-Surface (LS) Elevation and Datum:

nm feet Surveyed
 Estimated

Installation Date(s) 8/9/04 - 8/10/04

Drilling Method Hollow stem auger

Drilling Contractor Frontz Drilling

Drilling Fluid None

Development Technique(s) and Date(s)

Submersible pump 8/10/04

Fluid Loss During Drilling N/A gallons

Water Removed During Development 60 gallons

Static Depth to Water 27.72 feet below M.P.:

Pumping Depth to Water 27.77 feet below M.P.

Pumping Duration 1.50 hours

Yield NM gpm Date 8/10/04

Specific Capacity NM gpm/ft

Well Purpose Temporary monitoring well,

removed after sampling.

Remarks Sampled @ 1355 on 8/10/04

Prepared by J. Manzo

General Motors Corporation

Building 14 Investigation, 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	N/A	N/A					Concrete with #5 rebar, excavated to 8 feet	
2	N/A	N/A	N/A					Concrete with #5 rebar	
								Brown, clayey silt with sand and gravel, fill, dry	
4	N/A	N/A	N/A					Concrete with #5 rebar	
6	N/A	N/A	N/A					Brown, clayey silt with sand and gravel, fill, dry	
8	4,6,7,8	20	0				ML	SILT Brown, clayey silt, 25% sand and gravel, cobbles visible, dry	
10	4,4,5,6	8	0				ML	SILT Brown, clayey silt, 25% sand and gravel, cobbles visible, dry	
12									

Composite Sample to Lab

Grab Sample to Lab

Split-Spoon Not Analyzed

Page 1 of 5

Drilling Co.: Frontz Drilling

Geologist: J. Manzo

Begin Drilling: 8/13/04 @ 8:28

Driller: A. Mackey

Total Depth: 56

End Drilling: 8/13/04 @ 12:06

Drilling Method: Hollow Stem Auger

Surface Elev.: _____

Converted to Well: Y Well I.D.: BD14-02

Drilling Fluid: None

North Coord.: _____

East Coord.: _____

Remarks: Samples submitted for laboratory analysis of VOCs.

Project No.: OH000294.0006.00009

Datum: _____

Filename: August 2004

General Motors Corporation

Building 14 Investigation, Moraine, Ohio

Depth (feet)	Blows (/6 in.)	Recovery (Inches)	OVA (PPM)	Sample Analysis	Sample Type	Graphic Log	Soil Class.	Description	Depth to Water
12	12, 10, 14, 12	10	0				SW	SAND Sand (75%), coarse grained gravel (25%), dry, well graded	
14	6, 10, 14, 16	13	0				SW	SAND Sand (75%), coarse grained gravel (25%), dry, well graded	
16	10, 14, 19, 12	15	0				SW	SAND Sand (75%), coarse grained gravel (25%), dry, well graded	
18	9, 18, 23, 26	14	0				SW	SAND Sand (75%), coarse grained gravel (25%), dry, well graded	
20	8, 17, 25, 22	20	0				SW	SAND Sand (75%), coarse grained gravel (25%), dry, well graded	
22	18, 22, 22, 27	8	0				SW	SAND Sand (75%), coarse grained gravel (25%), dry, well graded	
24									

Composite Sample to Lab

Grab Sample to Lab

Split-Spoon Not Analyzed

Page 2 of 5

Drilling Co.: Frontz Drilling

Geologist: J. Manzo

Begin Drilling: 8/13/04 @ 8:28

Driller: A. Mackey

Total Depth: 56

End Drilling: 8/13/04 @ 12:06

Drilling Method: Hollow Stem Auger

Surface Elev.: _____

Converted to Well: Y Well I.D.: BD14-02

Drilling Fluid: None

North Coord.: _____

East Coord.: _____

Remarks: Samples submitted for laboratory analysis of VOCs.

Project No.: OH000294.0006.00009

Datum: _____

Filename: August 2004

General Motors Corporation

Building 14 Investigation, Moraine, Ohio

Depth (feet)	Blows (/6 in.)	Recovery (inches)	OVA (PPM)	Sample Analysis	Sample Type	Graphic Log	Soil Class.	Description	Depth to Water
24	14, 11, 15, 15	9	0				SW	SAND Sand (75%), coarse grained gravel (25%), damp, well graded	
26	5, 7, 4, 7	3	0				GW	GRAVEL Wet (saturated), poor recovery, coarse grained sand (25%), and gravel (75%), well graded	
28	9, 7, 9, 12	2	0				GW	GRAVEL Wet (saturated), poor recovery, coarse grained sand (25%), and gravel (75%), well graded	
30	5, 6, 7, 12	8	0				GW	GRAVEL Wet (saturated), poor recovery, coarse grained sand (25%), and gravel (75%), well graded	
32	9, 8, 12, 13	19	0				GW	GRAVEL Wet (saturated), poor recovery, coarse grained sand (25%), and gravel (75%), well graded	
34	10, 12, 17, 16	20	0				GW	GRAVEL Wet (saturated), poor recovery, coarse grained sand (25%), and gravel (75%), well graded	
36							CL	CLAY	

Composite Sample to Lab

Grab Sample to Lab

Split-Spoon Not Analyzed

Page 3 of 5

Drilling Co.: Frontz Drilling

Geologist: J. Manzo

Begin Drilling: 8/13/04 @ 8:28

Driller: A. Mackey

Total Depth: 56

End Drilling: 8/13/04 @ 12:06

Drilling Method: Hollow Stem Auger

Surface Elev.: _____

Converted to Well: Y Well I.D.: BD14-02

Drilling Fluid: None

North Coord.: _____

East Coord.: _____

Remarks: Samples submitted for laboratory analysis of VOCs

Project No.: OH000294.0006.00009

Datum: _____

Filename: August 2004

General Motors Corporation

Building 14 Investigation, Moraine, Ohio

Depth (feet)	Blows (/6 in.)	Recovery (Inches)	OVA (PPM)	Sample Analysis	Sample Type	Graphic Log	Soil Class.	Description	Depth to Water
36	12, 17, 24, 13	8	0				CL	Gray, clay with 10% coarse gravel, hard, low plasticity CLAY Gray, clay with 10% coarse gravel, hard, low plasticity	
38	24, 50/5	13	0				CL	CLAY Gray, clay with 10% coarse gravel, hard, low plasticity	
40	14, 32, 24, 31	20	0				CL	CLAY Gray, clay with 10% coarse gravel, hard, low plasticity	
42	3, 7, 47, 50/3	11	0				CL	CLAY Gray, clay with 10% coarse gravel, hard, low plasticity	
44	2, 11, 16, 18	17	0				SW	SAND Medium to coarse grained sand (70%), gravel (30%), well graded	
46	7, 9, 18, 14	24	0				SW	SAND Medium to coarse grained sand (70%), gravel (30%), well graded	
48									

Composite Sample to Lab

Grab Sample to Lab

Split-Spoon Not Analyzed

Page 4 of 5

Drilling Co.: Frontz Drilling

Geologist: J. Manzo

Begin Drilling: 8/13/04 @ 8:28

Driller: A. Mackey

Total Depth: 56

End Drilling: 8/13/04 @ 12:06

Drilling Method: Hollow Stem Auger

Surface Elev.: _____

Converted to Well: Y Well I.D.: BD14-02

Drilling Fluid: None

North Coord.: _____

East Coord.: _____

Remarks: Samples submitted for laboratory analysis of VOCs.

Project No.: OH000294.0006.00009

Datum: _____

Filename: August 2004

General Motors Corporation

Building 14 Investigation, Moraine, Ohio

Depth (feet)	Blows (/6 in.)	Recovery (Inches)	OVA (PPM)	Sample Analysis	Sample Type	Graphic Log	Soil Class.	Description	Depth to Water
48	16, 17, 15, 16	24	0				SW	SAND Medium to coarse grained sand (70%), gravel (30%), well graded	
50	7, 12, 24, 32	24	0				SW	SAND Medium to coarse grained sand (70%), gravel (30%), well graded	
52	7, 12, 16, 27	20	0					3" thick layer of silty clay	
54	7, 17, 26, 30	8	0				CL	CLAY Gray, clay with 10% coarse gravel, hard, low plasticity	
56								End of boring	
58									
60									

Composite Sample to Lab

Grab Sample to Lab

Split-Spoon Not Analyzed

Page 5 of 5

Drilling Co.: Frontz Drilling

Geologist: J. Manzo

Begin Drilling: 8/13/04 @ 8:28

Driller: A. Mackey

Total Depth: 56

End Drilling: 8/13/04 @ 12:06

Drilling Method: Hollow Stem Auger

Surface Elev.: _____

Converted to Well: Y Well I.D.: BD14-02

Drilling Fluid: None

North Coord.: _____

East Coord.: _____

Remarks: Samples submitted for laboratory analysis of VOCs.

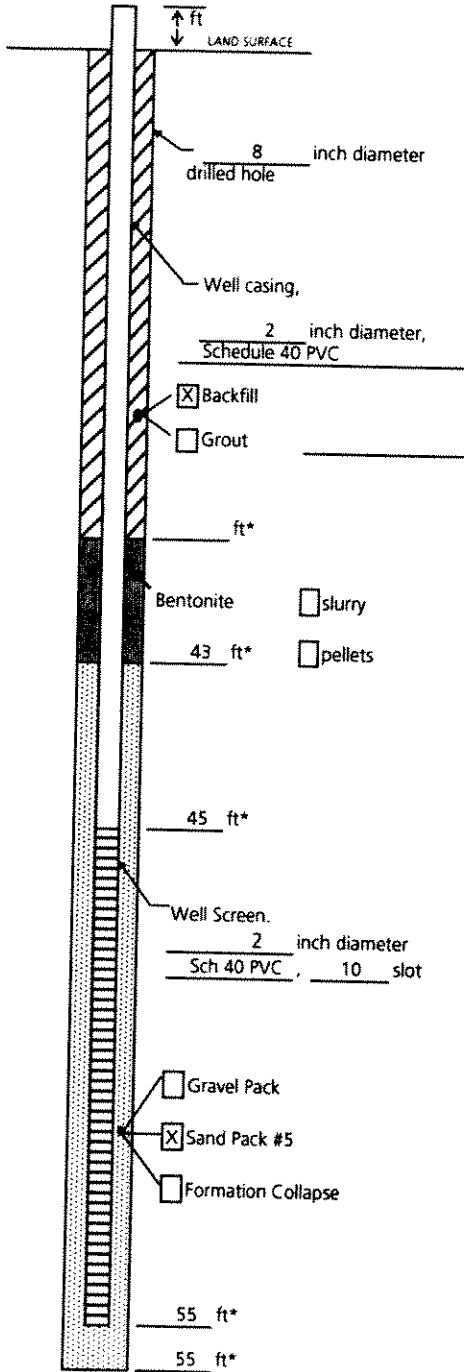
Project No.: OH000294.0006.00009

Datum: _____

Filename: August 2004

ARCADIS

Well Construction Log
(Unconsolidated)



Measuring Point is
Top of Well Casing
Unless Otherwise Noted.

* Depth Below Land Surface

Project OH000294.0006.0009 Well BD14-02

Town/City Moraine, Ohio

County Montgomery State Ohio

Permit No. n/a

Land-Surface (LS) Elevation and Datum:

 nm feet Surveyed
 Estimated

Installation Date(s) 8/13/04 - 8/16/04

Drilling Method Hollow stem auger

Drilling Contractor Frontz Drilling

Drilling Fluid None

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 28.86 feet below M.P.

Pumping Depth to Water 27.99 feet below M.P.

Pumping Duration 1 hours

Yield 2 gpm Date 8/13/04

Specific Capacity NM gpm/ft

Well Purpose Temporary monitoring well,

removed after sampling.

Remarks Sampled @ 1355 on 8/13/04

Prepared by J. Manzo

General Motors Corporation

Building 14 Investigation, 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	N/A	N/A					Concrete, straight drill through excavation to 8 feet	
2	N/A	N/A	N/A					Brown clayey silt with 25% coarse gravel, fill	
4	N/A	N/A	N/A					Brown clayey silt with 25% coarse gravel, fill	
6	N/A	N/A	N/A					Brown clayey silt with 25% coarse gravel, fill	
8	8,12,9,9	24	0				CL	CLAY Brown, silty clay with 25% sand and gravel, medium hardness, low plasticity	
10	2,2,3,4	11	0				CL	CLAY Brown, silty clay with 10% sand and gravel, damp, high plasticity, soft	
12									

Composite Sample to Lab
 Grab Sample to Lab
 Split-Spoon Not Analyzed
 Page 1 of 6

Drilling Co.: Frontz Drilling Geologist: J. Manzo Begin Drilling: 8/10/04 @ 1740
 Driller: A. Mackey Total Depth: 66 End Drilling: 8/11/04 @ 1333
 Drilling Method: Hollow Stem Auger Surface Elev.: _____ Converted to Well: Y Well I.D.: BD14-03
 Drilling Fluid: None North Coord.: _____ East Coord.: _____

Remarks: Samples submitted for laboratory analysis of VOCs.
 Project No.: OH000294.0006.00009 Datum: _____ Filename: August 2004

General Motors Corporation

Building 14 Investigation, Moraine, Ohio

Depth (feet)	Blows (/6 in.)	Recovery (inches)	OVA (PPM)	Sample Analysis	Sample Type	Graphic Log	Soil Class.	Description	Depth to Water
12	7,9,6,7	17	0				CL	CLAY Brown, silty clay with 10% sand and gravel, damp, high plasticity, soft	
14	3,2,6,6	7	0				SM	SAND Silty sand (70%), gravel coarse grained (30%), well graded, dry	
16	9,5,7,7	8	0				SM	SAND Silty sand (70%), gravel coarse grained (30%), well graded, dry	
18	7,7,9,8	8	0				SM	SAND Silty sand (70%), gravel coarse grained (30%), well graded, dry	
20	5,7,9,7	3	0				SM	SAND Silty sand (70%), gravel coarse grained (30%), well graded, dry, poor recovery	
22	4,7,20,24	6	0				SM	SAND Silty sand (70%), gravel coarse grained (30%), well graded, dry	
24									

Composite Sample to Lab

Grab Sample to Lab

Split-Spoon Not Analyzed

Page 2 of 6

Drilling Co.: Frontz Drilling

Geologist: J. Manzo

Begin Drilling: 8/10/04 @ 1740

Driller: A. Mackey

Total Depth: 66

End Drilling: 8/11/04 @ 1333

Drilling Method: Hollow Stem Auger

Surface Elev.: _____

Converted to Well: Y Well I.D.: BD14-03

Drilling Fluid: None

North Coord.: _____

East Coord.: _____

Remarks: Samples submitted for laboratory analysis of VOCs.

Project No.: OH000294.0006.00009

Datum: _____

Filename: August 2004

General Motors Corporation

Building 14 Investigation, Moraine, Ohio

Depth (feet)	Blows (/6 in.)	Recovery (Inches)	OVA (PPM)	Sample Analysis	Sample Type	Graphic Log	Soil Class.	Description	Depth to Water
24	12,9,7,7	13	0				SM	SAND Silty sand (70%), gravel coarse grained (30%), well graded, damp	
26	14,9,9,7	9	0				SW	SAND Sand (30%), gravel (70%), well graded, wet (saturated)	
28	7,8,9,14	5	0				SW	SAND Sand (30%), gravel (70%), well graded, wet (saturated)	
30	6,8,14,12	15	0				GW	GRAVEL Coarse grained sand (25%), gravel (75%), well graded	
32	15,19,12,17	14	0				GW	GRAVEL Coarse grained sand (25%), gravel (75%), well graded	
34	21,30,34,32	12	0				CL	CLAY Gray, clay with 10% coarse (pebble-sized) gravel, low plasticity, hard	
36									

Composite Sample to Lab

Grab Sample to Lab

Split-Spoon Not Analyzed

Page 3 of 6

Drilling Co.: Frontz Drilling

Geologist: J. Manzo

Begin Drilling: 8/10/04 @ 1740

Driller: A. Mackey

Total Depth: 66

End Drilling: 8/11/04 @ 1333

Drilling Method: Hollow Stem Auger

Surface Elev.: _____

Converted to Well: Y Well I.D.: BD14-03

Drilling Fluid: None

North Coord.: _____

East Coord.: _____

Remarks: Samples submitted for laboratory analysis of VOCs.







Project No.: OH000294.0006.00009

Datum: _____

Filename: August 2004

General Motors Corporation

Building 14 Investigation, Moraine, Ohio

Depth (feet)	Blows (/6 in.)	Recovery (Inches)	OVA (PPM)	Sample Analysis	Sample Type	Graphic Log	Soil Class.	Description	Depth to Water
36	22,34,33,32	13	0				CL	CLAY Gray, clay with 10% coarse (pebble-sized) gravel, low plasticity, hard	
38	27,28,30,28	24	0				CL	CLAY Gray, clay with 10% coarse (pebble-sized) gravel, low plasticity, hard	
40	30,31,50/3	24	0				CL	CLAY Sandy clay (75%) with 25% gravel, medium plasticity, medium hardness, brown	
42	14,19,20,13	18	0				GW	GRAVEL Sand (40%), gravel (60%), well graded	
44	15,38,26,25	21	0				GW	GRAVEL Sand (40%), gravel (60%), well graded	
46	10,18,13,18	9	0				GW	GRAVEL Coarse grained sand (50%), fine grained gravel (50%), well graded	
48									

Composite Sample to Lab

Grab Sample to Lab

Split-Spoon Not Analyzed

Page 4 of 6

Drilling Co.: Frontz Drilling

Geologist: J. Manzo

Begin Drilling: 8/10/04 @ 1740

Driller: A. Mackey

Total Depth: 66

End Drilling: 8/11/04 @ 1333

Drilling Method: Hollow Stem Auger

Surface Elev.: _____

Converted to Well: Y Well I.D.: BD14-03

Drilling Fluid: None

North Coor.: _____

East Coor.: _____

Remarks: Samples submitted for laboratory analysis of VOCs.

Project No.: OH000294.0006.00009

Datum: _____

Filename: August 2004

General Motors Corporation

Building 14 Investigation, Moraine, Ohio

Depth (feet)	Blows (6 in.)	Recovery (inches)	OVA (PPM)	Sample Analysis	Sample Type	Graphic Log	Soil Class.	Description	Depth to Water
48	15, 19, 17, 17	12	0				GW	GRAVEL Coarse grained sand (50%), fine grained gravel (50%), well graded	
50	9, 14, 27, 24	18	0				SM	SAND Fine grained sand (25%), silt (75%), poorly graded	
52	21, 19, 18, 20	19	0				SW	SAND Medium to coarse grained sand (75%), gravel (25%), well graded	
54	15, 21, 24, 22	24	0				SW	SAND Medium to coarse grained sand (75%), gravel (25%), well graded	
56	11, 8, 17, 19	24	0				SW	SAND Medium to coarse grained sand (75%), gravel (25%), well graded	
58	4, 11, 27, 17	22	0				SW	SAND Medium to coarse grained sand (75%), gravel (25%), well graded	
60									

Composite Sample to Lab

Grab Sample to Lab

Split-Spoon Not Analyzed

Page 5 of 6

Drilling Co.: Frontz Drilling

Geologist: J. Manzo

Begin Drilling: 8/10/04 @ 1740

Driller: A. Mackey

Total Depth: 66

End Drilling: 8/11/04 @ 1333

Drilling Method: Hollow Stem Auger

Surface Elev.: _____

Converted to Well: Y Well I.D.: BD14-03

Drilling Fluid: None

North Coord.: _____

East Coord.: _____

Remarks: Samples submitted for laboratory analysis of VOCs.

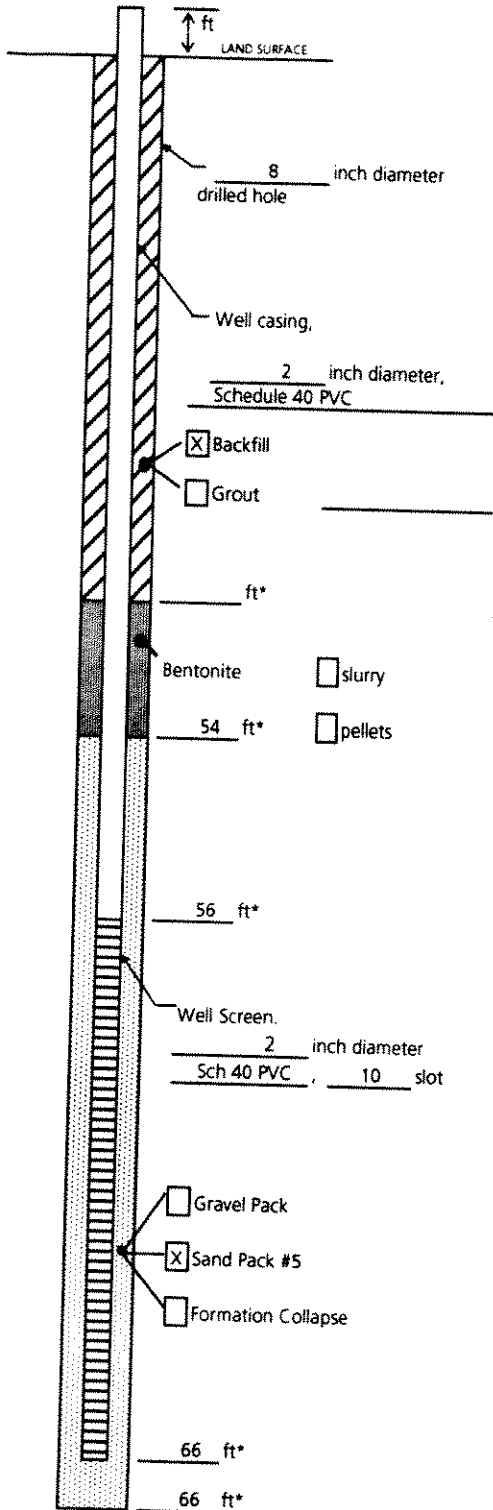
Project No.: OH000294.0006.00009

Datum: _____

Filename: August 2004

Well Construction Log

(Unconsolidated)



Measuring Point is
Top of Well Casing
Unless Otherwise Noted.

* Depth Below Land Surface

Project OH000294.0006.0009 Well BD14-03

Town/City Moraine, Ohio

County Montgomery State Ohio

Permit No. n/a

Land-Surface (LS) Elevation and Datum:

 nm feet Surveyed

Estimated

Installation Date(s) 8/10/04 - 8/11/04

Drilling Method Hollow stem auger

Drilling Contractor Frontz Drilling

Drilling Fluid Water, approx. 50 gallons

Development Technique(s) and Date(s)

Submersible pump (proactive mini-typhoon) 8/11/04

Fluid Loss During Drilling N/A gallons

Water Removed During Development 110 gallons

Static Depth to Water 28.33 feet below M.P.

Pumping Depth to Water 27.90 feet below M.P.

Pumping Duration 1.5 hours

Yield NM gpm Date 8/11/04

Specific Capacity NM gpm/ft

Well Purpose Temporary monitoring well,

removed after sampling.

Remarks Sampled @ 1700 on 8/11/04

Prepared by J. Manzo

General Motors Corporation

Building 14 Investigation, 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	N/A	N/A					Concrete with #5 rebar	
2	N/A	N/A	N/A					Brown, clayey silt with 25% sand and gravel, fill, dry	
4	N/A	N/A	N/A					Concrete	
6	N/A	N/A	N/A					Brown, clayey silt with 25% sand and gravel, fill, dry	
8	4,9,11,11	20	0				CL	CLAY Brown, silty clay with 10% coarse gravel and sand, low plasticity, hard, dry	
10	4,9,9,9	0	0					No recovery	
12									

Composite Sample to Lab

Grab Sample to Lab

Split-Spoon Not Analyzed

Page 1 of 6

Drilling Co.: Frontz Drilling

Geologist: J. Manzo

Begin Drilling: 8/12/04 @ 8:40

Driller: A. Mackey

Total Depth: 66

End Drilling: 8/12/04 @ 1410

Drilling Method: Hollow Stem Auger

Surface Elev.: _____

Converted to Well: Y Well I.D.: BD14-04

Drilling Fluid: None

North Coord.: _____

East Coord.: _____

Remarks: Samples submitted for laboratory analysis of VOCs.

Project No.: OH000294.0006.00009

Datum: _____

Filename: August 2004

General Motors Corporation

Building 14 Investigation, Moraine, Ohio

Depth (feet)	Blows (6 in.)	Recovery (inches)	OVA (PPM)	Sample Analysis	Sample Type	Graphic Log	Soil Class.	Description	Depth to Water
12	5,7,9,7	2	0				CL	CLAY Brown, silty clay with 10% coarse gravel and sand, low plasticity, hard, dry	
14	2,5,5,4	17	0				SM	SAND Silty sand, fine grained, dry, poorly graded	
16	6,4,6,5	16	0				SM	SAND Silty sand, fine grained, dry, poorly graded	
18	5,6,7,6	9	0				SM	SAND Silty sand, fine grained, dry, poorly graded	
20	2,5,14,16	11	0				SM	SAND Silty sand, fine to medium grained with 10% coarse gravel, poorly graded, dry	
22	15,16,18,11	10	0				SW	SAND Medium to coarse grained sand with 10% gravel, well graded, dry	
24									

Composite Sample to Lab

Grab Sample to Lab

Split-Spoon Not Analyzed

Page 2 of 6

Drilling Co.: Frontz Drilling

Geologist: J. Manzo

Begin Drilling: 8/12/04 @ 8:40

Driller: A. Mackey

Total Depth: 66

End Drilling: 8/12/04 @ 1410

Drilling Method: Hollow Stem Auger

Surface Elev.: _____

Converted to Well: Y Well I.D.: BD14-04

Drilling Fluid: None

North Coord.: _____

East Coord.: _____

Remarks: Samples submitted for laboratory analysis of VOCs.

Project No.: OH000294.0006.00009

Datum: _____

Filename: August 2004

General Motors Corporation

Building 14 Investigation, Moraine, Ohio

Depth (feet)	Blows (/6 in.)	Recovery (Inches)	OVA (PPM)	Sample Analysis	Sample Type	Graphic Log	Soil Class.	Description	Depth to Water
24	5,9,7,10	20	0				SW	SAND Medium to coarse grained sand with 10% gravel, well graded, dry	
26	21,19,11,16	4	0				GW	GRAVEL Wet (saturated), sand (50%), gravel (50%), well graded	
28	19,20,21,24	9	0				GW	GRAVEL Wet (saturated), sand (50%), gravel (50%), well graded	
30	3,4,11,9	5	0				GW	GRAVEL Wet (saturated), sand (50%), gravel (50%), well graded	
32	9,11,17,16	19	0				GW	GRAVEL Wet (saturated), sand (50%), gravel (50%), well graded	
34	22,26,18,15	2	0				GW	GRAVEL Wet (saturated), sand (50%), gravel (50%), well graded, poor recovery	
36									

Composite Sample to Lab

Grab Sample to Lab

Split-Spoon Not Analyzed

Page 3 of 6

Drilling Co.: Frontz Drilling

Geologist: J. Manzo

Begin Drilling: 8/12/04 @ 8:40

Driller: A. Mackey

Total Depth: 66

End Drilling: 8/12/04 @ 1410

Drilling Method: Hollow Stem Auger

Surface Elev.: _____

Converted to Well: Y Well I.D.: BD14-04

Drilling Fluid: None

North Coord.: _____

East Coord.: _____

Remarks: Samples submitted for laboratory analysis of VOCs.







Project No.: OH000294.0006.00009

Datum: _____

Filename: August 2004

General Motors Corporation

Building 14 Investigation, Moraine, Ohio

Depth (feet)	Blows (/6 in.)	Recovery (inches)	OVA (PPM)	Sample Analysis	Sample Type	Graphic Log	Soil Class.	Description	Depth to Water
36	14, 12, 12, 14	2	0				GW	GRAVEL Wet (saturated), sand (50%), gravel (50%), well graded, pushing cobble, poor recovery	
38	50/4	0	0					No recovery	
40	13, 17, 29, 31	20	0				GW	GRAVEL Wet (saturated), sand (50%), gravel (50%), well graded	
							CL	CLAY Gray, clay with 10% coarse gravel, hard, low plasticity	
42	9, 24, 34, 36	20	0				CL	CLAY Gray, clay with 10% coarse gravel, hard, low plasticity	
44	21, 50/4	9	0				CL	CLAY Gray, clay with 10% coarse gravel, hard, low plasticity	
46	4, 12, 17, 26	14	0				SW	SAND Coarse grained sand (75%), fine grained gravel (25%), well graded	
48									

Composite Sample to Lab

Grab Sample to Lab

Split-Spoon Not Analyzed

Page 4 of 6

Drilling Co.: Frontz Drilling

Geologist: J. Manzo

Begin Drilling: 8/12/04 @ 8:40

Driller: A. Mackey

Total Depth: 66

End Drilling: 8/12/04 @ 1410

Drilling Method: Hollow Stem Auger

Surface Elev.: _____

Converted to Well: Y Well I.D.: BD14-04

Drilling Fluid: None

North Coord.: _____

East Coord.: _____

Remarks: Samples submitted for laboratory analysis of VOCs.

Project No.: OH000294.0006.00009

Datum: _____

Filename: August 2004

General Motors Corporation

Building 14 Investigation, Moraine, Ohio

Depth (feet)	Blows (/6 in.)	Recovery (Inches)	OVA (PPM)	Sample Analysis	Sample Type	Graphic Log	Soil Class.	Description	Depth to Water
60	17,21,23,25	24	0				SW	SAND Medium to coarse grained sand (75%), gravel (25%), well graded	
62	50/3	24	0				SW	SAND Medium to coarse grained sand (75%), gravel (25%), well graded	
64	15,38,50/4	24	0				SW	SAND Medium to coarse grained sand (75%), gravel (25%), well graded	
66							CL	CLAY Gray, clay with 10% coarse gravel, low plasticity, hard	
66								End of boring	
68									
70									
72									

Composite Sample to Lab

Grab Sample to Lab

Split-Spoon Not Analyzed

Page 6 of 6

Drilling Co.: Frontz Drilling

Geologist: J. Manzo

Begin Drilling: 8/10/04 @ 1740

Driller: A. Mackey

Total Depth: 66

End Drilling: 8/11/04 @ 1333

Drilling Method: Hollow Stem Auger

Surface Elev.: _____

Converted to Well: Y Well I.D.: BD14-03

Drilling Fluid: None

North Coord.: _____

East Coord.: _____

Remarks: Samples submitted for laboratory analysis of VOCs.

Project No.: OH000294.0006.00009

Datum: _____

Filename: August 2004

General Motors Corporation

Building 14 Investigation, Moraine, Ohio

Depth (feet)	Blows (6 in.)	Recovery (inches)	OVA (PPM)	Sample Analysis	Sample Type	Graphic Log	Soil Class.	Description	Depth to Water
48	14,16,17, 17	18	0				SW	SAND Coarse grained sand (75%), fine grained gravel (25%), well graded	
50	16,41,34, 37	9	0				SW	SAND Coarse grained sand (75%), fine grained gravel (25%), well graded	
52	7,14,19, 21	14	0				SW	SAND Coarse grained sand (75%), fine grained gravel (25%), well graded	
54	12,50/4	4	0				SW	SAND Coarse grained sand (75%), fine grained gravel (25%), well graded	
56	5,15,21, 34	12	0				SW	SAND Coarse grained sand (75%), fine grained gravel (25%), well graded	
58	17,16,50/ 4	13	0				SW	SAND Coarse grained sand (75%), fine grained gravel (25%), well graded	
60									

Composite Sample to Lab

Grab Sample to Lab

Split-Spoon Not Analyzed

Page 5 of 6

Drilling Co.: Frontz Drilling

Geologist: J. Manzo

Begin Drilling: 8/12/04 @ 8:40

Driller: A. Mackey

Total Depth: 66

End Drilling: 8/12/04 @ 1410

Drilling Method: Hollow Stem Auger

Surface Elev.: _____

Converted to Well: Y Well I.D.: BD14-04

Drilling Fluid: None

North Coord.: _____

East Coord.: _____

Remarks: Samples submitted for laboratory analysis of VOCs.

Project No.: OH000294.0006.00009

Datum: _____

Filename: August 2004

General Motors Corporation

Building 14 Investigation, Moraine, Ohio

Depth (feet)	Blows (6 in.)	Recovery (Inches)	OVA (PPM)	Sample Analysis	Sample Type	Graphic Log	Soil Class.	Description	Depth to Water
60	7, 18, 25, 37	20	0				SW	SAND Coarse grained sand (75%), fine grained gravel (25%), well graded	
62	7, 16, 50/5	18	0				SW	SAND Coarse grained sand (75%), fine grained gravel (25%), well graded	
64	20, 26, 19, 26	20	0				SW	SAND Coarse grained sand (75%), fine grained gravel (25%), well graded	
66							CL	CLAY Gray clay, hard, low plasticity, 10% coarse gravel	
66								End of boring	
68									
70									
72									

Composite Sample to Lab

Grab Sample to Lab

Split-Spoon Not Analyzed

Page 6 of 6

Drilling Co.: Frontz Drilling

Geologist: J. Manzo

Begin Drilling: 8/12/04 @ 8:40

Driller: A. Mackey

Total Depth: 66

End Drilling: 8/12/04 @ 1410

Drilling Method: Hollow Stem Auger

Surface Elev.: _____

Converted to Well: Y Well I.D.: BD14-04

Drilling Fluid: None

North Coord.: _____

East Coord.: _____

Remarks: Samples submitted for laboratory analysis of VOCs.

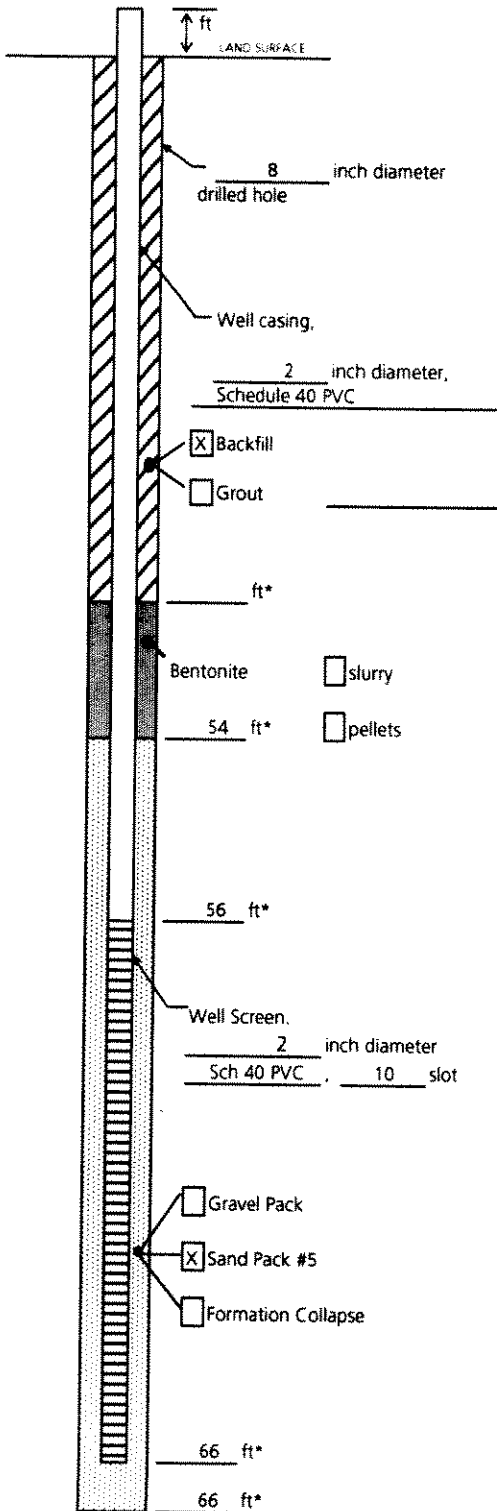
Project No.: OH000294.0006.00009

Datum: _____

Filename: August 2004

Well Construction Log

(Unconsolidated)



Measuring Point is
Top of Well Casing
Unless Otherwise Noted.

* Depth Below Land Surface

Project OH000294.0006.0009 Well BD14-04

Town/City Moraine, Ohio

County Montgomery State Ohio

Permit No. n/a

Land-Surface (LS) Elevation and Datum:

 nm feet Surveyed

Estimated

Installation Date(s) 8/12/2004

Drilling Method Hollow stem auger

Drilling Contractor Frontz Drilling

Drilling Fluid Water, approx. 50 gallons

Development Technique(s) and Date(s)

Submersible pump (proactive mini-typhoon) 8/12/04

Fluid Loss During Drilling N/A gallons

Water Removed During Development 75 gallons

Static Depth to Water 28.81 feet below M.P.

Pumping Depth to Water 28.44 feet below M.P.

Pumping Duration 1 hours

Yield 2 gpm Date 8/12/04

Specific Capacity NM gpm/ft

Well Purpose Temporary monitoring well,



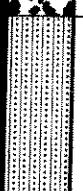

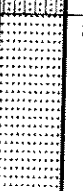
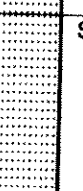
removed after sampling.

Remarks Sampled @ 1650 on 8/12/04

Prepared by J. Manzo

General Motors Corporation

Building 14 Investigation, Moraine, Ohio

Depth (feet)	Blows (/6 in.)	Recovery (Inches)	OVA (PPM)	Sample Analysis	Sample Type	Graphic Log	Soil Class.	Description	Depth to Water
0	7,14,12,8	20	0				GW	SANDY GRAVEL First 10" concrete then sandy gravel with 25% silt and clay, dry, fill	
2	8,12,11,7	4	0				GW	SANDY GRAVEL Sandy gravel with 25% silt and clay, dry, fill	
4	7,11,12,14	21	0				SM	SILTY SAND Silty sand with 25% gravel, well graded, dry	
6	12,10,7,9	12	0				SM	SILTY SAND Silty sand with 25% gravel, well graded, dry	
8	7,13,11,11	19	0				SW	SAND Medium to coarse grained sand (75%) and gravel (25%), well graded, dry	
10	7,5,4,6	15	0				SW	SAND Medium to coarse grained sand (75%) and gravel (25%), well graded, dry	
12									

Composite Sample to Lab

Grab Sample to Lab

Split-Spoon Not Analyzed

Page 1 of 5

Drilling Co.: Frontz Drilling

Geologist: J. Manzo

Begin Drilling: 8/9/04 @ 9:02

Driller: A. Mackey

Total Depth: 54

End Drilling: 8/9/04 @ 1310

Drilling Method: Hollow Stem Auger

Surface Elev.: 729.00

Converted to Well: Y Well I.D.: GM-43

Drilling Fluid: None

North Coord.: 3654.83199

East Coord.: 5210.57176

Remarks: Samples submitted for laboratory analysis of VOCs.

Project No.: OH000294.0006.00009

Datum: _____

Filename: August 2004

General Motors Corporation

Building 14 Investigation, Moraine, Ohio

Depth (feet)	Blows (/6 in.)	Recovery (Inches)	OVA (PPM)	Sample Analysis	Sample Type	Graphic Log	Soil Class.	Description	Depth to Water
12	5,4,3,4	20	0				SW	SAND Fine to medium grained sand with 10% gravel, well graded, dry	
14	4,22,22,16	18	0				SW	SAND Sand (70%) and gravel (30%), well graded, damp	
16	13,19,21,20	20	0				SW	SAND Sand (70%) and gravel (30%), well graded, damp	
18	5,17,24,21	19	0				SM	SILTY SAND Silty sand with 25% gravel, damp, well graded	
20	14,24,21,10	12	0				SM	SILTY SAND Silty sand with 25% gravel, damp, well graded	
22	14,24,12,11	20	0				GW	GRAVEL Wet (saturated), sand (50%) and gravel (50%), well graded	
24									

Composite Sample to Lab

Grab Sample to Lab

Split-Spoon Not Analyzed

Page 2 of 5

Drilling Co.: Frontz Drilling

Geologist: J. Manzo

Begin Drilling: 8/9/04 @ 9:02

Driller: A. Mackey

Total Depth: 54

End Drilling: 8/9/04 @ 1310

Drilling Method: Hollow Stem Auger

Surface Elev.: 729.00

Converted to Well: Y Well I.D.: GM-43

Drilling Fluid: None

North Coord.: 3654.83199

East Coord.: 5210.57176

Remarks: Samples submitted for laboratory analysis of VOCs.

Project No.: OH000294.0006.00009

Datum: _____

Filename: August 2004

General Motors Corporation

Building 14 Investigation, Moraine, Ohio

Depth (feet)	Blows (/6 in.)	Recovery (Inches)	OVA (PPM)	Sample Analysis	Sample Type	Graphic Log	Soil Class.	Description	Depth to Water
24	8,17,15, 14	20	0				GW	GRAVEL Wet (saturated), sand (50%) and gravel (50%), well graded	
26	10,14,7, 11	17	0				SW	SAND Medium to coarse grained sand, wet (saturated), well graded	
28	7,5,9,11	11	0				SW	SAND Medium to coarse grained sand, wet (saturated), well graded	
30	11,14,12, 12	19	0				SW	SAND Medium to coarse grained sand, wet (saturated), well graded	
32	7,11,14, 19	21	0				SW	SAND Medium to coarse grained sand, wet (saturated), well graded	
								Gray silty clay with 10% gravel, hard, low plasticity, damp	
34	21,50/4	0	0					No recovery, pushing cobble	
36									

Composite Sample to Lab

Grab Sample to Lab

Split-Spoon Not Analyzed

Page 3 of 5

Drilling Co.: Frontz Drilling

Geologist: J. Manzo

Begin Drilling: 8/9/04 @ 9:02

Driller: A. Mackey

Total Depth: 54

End Drilling: 8/9/04 @ 1310

Drilling Method: Hollow Stem Auger

Surface Elev.: 729.00

Converted to Well: Y Well I.D.: GM-43

Drilling Fluid: None

North Coord.: 3654.83199

East Coord.: 5210.57176

Remarks: Samples submitted for laboratory analysis of VOCs.






Project No.: OH000294.0006.00009

Datum: _____

Filename: August 2004

General Motors Corporation

Building 14 Investigation, Moraine, Ohio

Depth (feet)	Blows (/6 in.)	Recovery (Inches)	OVA (PPM)	Sample Analysis	Sample Type	Graphic Log	Soil Class.	Description	Depth to Water
36	12,19,17,23	20	0				SW	SAND Medium to coarse grained sand and fine grained gravel, well graded	
38	4,17,20,16	13	0				SW	SAND Medium to coarse grained sand and fine grained gravel, well graded	
40	3,6,50/3	13	0				SW	SAND Medium to coarse grained sand and fine grained gravel, well graded	
42	14,17,19,22	13	0				SW	SAND Medium to coarse grained sand and fine grained gravel, well graded	
44	12,29,50/2	15	0				GW	GRAVEL Fine to medium grained gravel (75%) and coarse grained sand (25%)	
46	7,26,50/2	5	0				SW	SAND Fine to medium grained sand (75%) and gravel, well graded	
48									

Composite Sample to Lab

Grab Sample to Lab

Split-Spoon Not Analyzed

Page 4 of 5

Drilling Co.: Frontz Drilling

Geologist: J. Manzo

Begin Drilling: 8/9/04 @ 9:02

Driller: A. Mackey

Total Depth: 54

End Drilling: 8/9/04 @ 1310

Drilling Method: Hollow Stem Auger

Surface Elev.: 729.00

Converted to Well: Y Well I.D.: GM-43

Drilling Fluid: None

North Coord.: 3654.83199

East Coord.: 5210.57176

Remarks: Samples submitted for laboratory analysis of VOCs.

Project No.: OH000294.0006.00009

Datum: _____

Filename: August 2004

General Motors Corporation

Building 14 Investigation, Moraine, Ohio

Depth (feet)	Blows (/6 in.)	Recovery (Inches)	OVA (PPM)	Sample Analysis	Sample Type	Graphic Log	Soil Class.	Description	Depth to Water
48	29, 19, 22, 32	24	0				SW	SAND Fine to medium grained sand (75%) and gravel, well graded	
50	21, 25, 27, 31	11	0				CL	CLAY Gray, silty clay with 10% gravel hard, low plasticity	
							CL	CLAY Gray, silty clay with 10% gravel hard, low plasticity	
52	22, 50/3	9	0				CL	CLAY Gray, silty clay with 25% gravel and sand, low plasticity, hard	
							CL	CLAY Gray, silty clay with 10% gravel, hard, low plasticity	
54								End of boring	
56									
58									
60									

Composite Sample to Lab

Grab Sample to Lab

Split-Spoon Not Analyzed

Page 5 of 5

Drilling Co.: Frontz Drilling

Geologist: J. Manzo

Begin Drilling: 8/9/04 @ 9:02

Driller: A. Mackey

Total Depth: 54

End Drilling: 8/9/04 @ 1310

Drilling Method: Hollow Stem Auger

Surface Elev.: 729.00

Converted to Well: Y Well I.D.: GM-43

Drilling Fluid: None

North Coord.: 3654.83199

East Coord.: 5210.57176

Remarks: Samples submitted for laboratory analysis of VOCs.

Project No.: OH000294.0006.00009

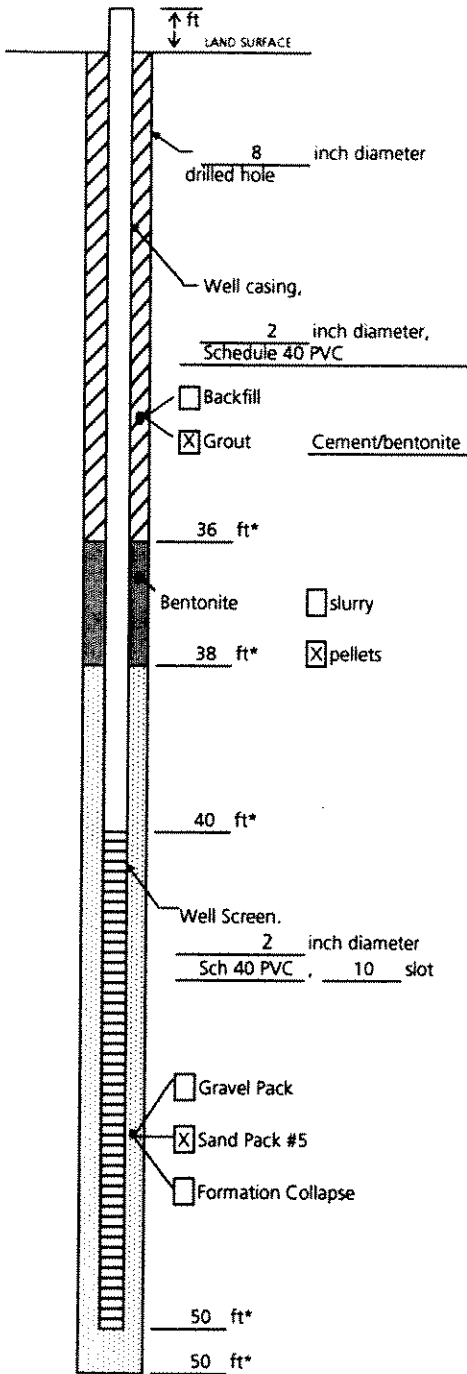
Datum: _____

Filename: August 2004

ARCADIS

Well Construction Log

(Unconsolidated)



Project OH000294.0006.0009 Well GM-43

Town/City Moraine, Ohio

County Montgomery State Ohio

Permit No. _____

Land-Surface (LS) Elevation and Datum:

729.00 feet Surveyed

Estimated

Installation Date(s) 8/9/2004

Drilling Method Hollow stem auger

Drilling Contractor Frontz Drilling

Drilling Fluid None

Development Technique(s) and Date(s)

Submersible pump (proactive mini-typhoon) 8/16/04

Fluid Loss During Drilling N/A gallons

Water Removed During Development 250 gallons

Static Depth to Water 21.69 feet below M.P..

Pumping Depth to Water 21.97 feet below M.P.

Pumping Duration 2 hours

Yield 2 gpm Date 8/16/04

Specific Capacity NM gpm/ft

Well Purpose Monitoring well

Remarks _____

Prepared by J. Manzo

General Motors Corporation

Building 14 Investigation, Moraine, Ohio

Depth (feet)	Blows (f6 in.)	Recovery (Inches)	OVA (PPM)	Sample Analysis	Sample Type	Graphic Log	Soil Class.	Description	Depth to Water
0	5,5,1,1	8	0				ML	SILT 8" of asphalt, brown, clayey-silt with 25% sand and gravel, dry, fill	
2	5,4,6,6	2	0				ML	SILT Brown, clayey-silt with 25% sand and gravel, dry, fill	
4	10,18,23,11	12	0				GM	GRAVEL Gravel (50%), sand (50%), aggregate, fill, dry (poor recovery)	
6	7,9,9,7	4	0				GM	GRAVEL Gravel (50%), sand (50%), aggregate, fill, dry (poor recovery)	
8	11,27,26,29	13	0				GW	GRAVEL Sandy gravel, no clay or silt, aggregate visible, fill, dry	
10	16,24,29,27	15	0				GW	GRAVEL Sandy gravel, no clay or silt, aggregate visible, fill, dry	
12									

Composite Sample to Lab

Grab Sample to Lab

Split-Spoon Not Analyzed

Page 1 of 6

Drilling Co.: Frontz Drilling

Geologist: J. Manzo

Begin Drilling: 8/3/04 @ 1528

Driller: A. Mackey

Total Depth: 62

End Drilling: 8/4/04 @ 8:58

Drilling Method: Hollow Stem Auger

Surface Elev.: 728.77

Converted to Well: Y Well I.D.: GM-44

Drilling Fluid: None

North Coord.: 3137.22419

East Coord.: 5217.32129

Remarks: Samples submitted for laboratory analysis of VOCs.

Project No.: OH000294.0006.00009

Datum: _____

Filename: August 2004

General Motors Corporation Building 14 Investigation, Moraine, Ohio

Depth (feet)	Blows (/6 in.)	Recovery (Inches)	OVA (PPM)	Sample Analysis	Sample Type	Graphic Log	Soil Class.	Description	Depth to Water
12	12,18,21, 27	19	0				GM	GRAVEL Gravel (25%), sand (75%) with 10% silt and clay, dry	
14	11,12,17, 16	12	0				SP	SAND Silt (30%), sand (60%), 10% gravel, dry, poorly graded	
16	14,17,21, 25	2	0				SP	SAND Silt (30%), sand (60%), 10% gravel, dry, poorly graded (poor recovery)	
18	19,29,33, 35	18	0				SP	SAND Silt (30%), sand (60%), 10% gravel, dry, poorly graded	
20	18,50/5	3	0				SW	SAND Silty sand with 25% gravel, dry, well graded, poor recovery	
22	7,10,14, 12	12	0				GW	GRAVEL Saturated, coarse grained sand (40%), gravel (60%), well graded	▼
24									

Composite Sample to Lab
 Grab Sample to Lab
 Split-Spoon Not Analyzed
 Page 2 of 6

Drilling Co.: Frontz Drilling Geologist: J. Manzo Begin Drilling: 8/3/04 @ 1528

Driller: A. Mackey Total Depth: 62 End Drilling: 8/4/04 @ 8:58

Drilling Method: Hollow Stem Auger Surface Elev.: 728.77 Converted to Well: Y Well I.D.: GM-44

Drilling Fluid: None North Coord.: 3137.22419 East Coord.: 5217.32129

Remarks: Samples submitted for laboratory analysis of VOCs.

Project No.: OH000294.0006.00009 Datum: _____ Filename: August 2004

General Motors Corporation

Building 14 Investigation, Moraine, Ohio

Depth (feet)	Blows (6 in.)	Recovery (Inches)	OVA (PPM)	Sample Analysis	Sample Type	Graphic Log	Soil Class.	Description	Depth to Water
24	9,12,11,7	18	0				GW	GRAVEL Saturated, coarse grained sand (40%), gravel (60%), well graded	
26	10,14,13,16	18	0				GW	GRAVEL Saturated, coarse grained sand (40%), gravel (60%), well graded	
28	12,14,16,14	21	0				GW	GRAVEL Saturated, coarse grained sand (40%), gravel (60%), well graded	
30	11,14,17,15	2	0				GW	GRAVEL Saturated, coarse grained sand (40%), gravel (60%), well graded, poor recovery	
32	12,16,14,19	20	0				SW	SAND Fine to medium grained sand (75%), gravel (25%), well graded	
34	10,19,20,17	21	0				SW	SAND Coarse grained sand (75%), gravel (25%), well graded	
36									

Composite Sample to Lab

Grab Sample to Lab

Split-Spoon Not Analyzed

Page 3 of 6

Drilling Co.: Frontz Drilling

Geologist: J. Manzo

Begin Drilling: 8/3/04 @ 1528

Driller: A. Mackey

Total Depth: 62

End Drilling: 8/4/04 @ 8:58

Drilling Method: Hollow Stem Auger

Surface Elev.: 728.77

Converted to Well: Y Well I.D.: GM-44

Drilling Fluid: None

North Coord.: 3137.22419

East Coord.: 5217.32129

Remarks: Samples submitted for laboratory analysis of VOCs.

Project No.: OH000294.0006.00009

Datum: _____

Filename: August 2004

General Motors Corporation

Building 14 Investigation, Moraine, Ohio

Depth (feet)	Blows (/6 in.)	Recovery (Inches)	OVA (PPM)	Sample Analysis	Sample Type	Graphic Log	Soil Class.	Description	Depth to Water
36	12, 19, 21, 26	21	0				GW	GRAVEL Fine gravel (75%), sand (25%), well graded	
38	13, 27, 50/4	4	0				GW	GRAVEL Fine gravel (75%), sand (25%), well graded, poor recovery	
40	25, 29, 50/4	20	0				SP	SAND Fine grained sand, poorly graded	
							CL	CLAY Gray clay, very hard, low plasticity, 25% gravel, dry	
42	16, 50/5	17	0				CL	CLAY Gray clay, very hard, low plasticity, 25% gravel, dry	
44	7, 14, 21, 36	24	0				GW	GRAVEL Sand (20%), fine gravel (80%), well graded	
46	7, 9, 12, 14	13	0				GW	GRAVEL Coarse grained sand (20%), gravel (80%), well graded	
48									

Composite Sample to Lab

Grab Sample to Lab

Split-Spoon Not Analyzed

Page 4 of 6

Drilling Co.: Frontz Drilling

Geologist: J. Manzo

Begin Drilling: 8/3/04 @ 1528

Driller: A. Mackey

Total Depth: 62

End Drilling: 8/4/04 @ 8:58

Drilling Method: Hollow Stem Auger

Surface Elev.: 728.77

Converted to Well: Y Well I.D.: GM-44

Drilling Fluid: None

North Coord.: 3137.22419

East Coord.: 5217.32129

Remarks: Samples submitted for laboratory analysis of VOCs.

Project No.: OH000294.0006.00009

Datum: _____

Filename: August 2004

General Motors Corporation

Building 14 Investigation, Moraine, Ohio

Depth (feet)	Blows (/6 in.)	Recovery (Inches)	OVA (PPM)	Sample Analysis	Sample Type	Graphic Log	Soil Class.	Description	Depth to Water
48	9,11,14, 21	17	0				GW	GRAVEL Coarse grained sand (20%), gravel (80%), well graded	
50	15,17,19, 23	14	0				GW	GRAVEL Coarse grained sand (20%), gravel (80%), well graded	
52	5,9,17,23	13	0				GW	GRAVEL Coarse grained sand (20%), gravel (80%), well graded	
54	14,15,34, 41	4	0				GW	GRAVEL Coarse grained sand (20%), gravel (80%), well graded	
56	5,17,50/3	5	0				GW	GRAVEL Coarse grained sand (20%), gravel (80%), well graded, pushing cobble	
58	9,50/3	2	0				GW	GRAVEL Coarse grained sand (20%), gravel (80%), well graded, pushing cobble	
60									

Composite Sample to Lab

Grab Sample to Lab

Split-Spoon Not Analyzed

Page 5 of 6

Drilling Co.: Frontz Drilling

Geologist: J. Manzo

Begin Drilling: 8/3/04 @ 1528

Driller: A. Mackey

Total Depth: 62

End Drilling: 8/4/04 @ 8:58

Drilling Method: Hollow Stem Auger

Surface Elev.: 728.77

Converted to Well: Y Well I.D.: GM-44

Drilling Fluid: None

North Coord.: 3137.22419

East Coord.: 5217.32129

Remarks: Samples submitted for laboratory analysis of VOCs.


Project No.: OH000294.0006.00009

Datum: _____

Filename: August 2004

General Motors Corporation

Building 14 Investigation, Moraine, Ohio

Depth (feet)	Blows (/6 in.)	Recovery (inches)	OVA (PPM)	Sample Analysis	Sample Type	Graphic Log	Soil Class.	Description	Depth to Water
60	23,27,30,50/3	13	0				CL	CLAY Gray clay with 10% gravel, hard, low plasticity, dry	
62								End of boring	
64									
66									
68									
70									
72									

Composite Sample to Lab
 Grab Sample to Lab
 Split-Spoon Not Analyzed
 Page 6 of 6

Drilling Co.: Frontz Drilling Geologist: J. Manzo Begin Drilling: 8/3/04 @ 1528
 Driller: A. Mackey Total Depth: 62 End Drilling: 8/4/04 @ 8:58
 Drilling Method: Hollow Stem Auger Surface Elev.: 728.77 Converted to Well: Y Well I.D.: GM-44
 Drilling Fluid: None North Coord.: 3137.22419 East Coord.: 5217.32129

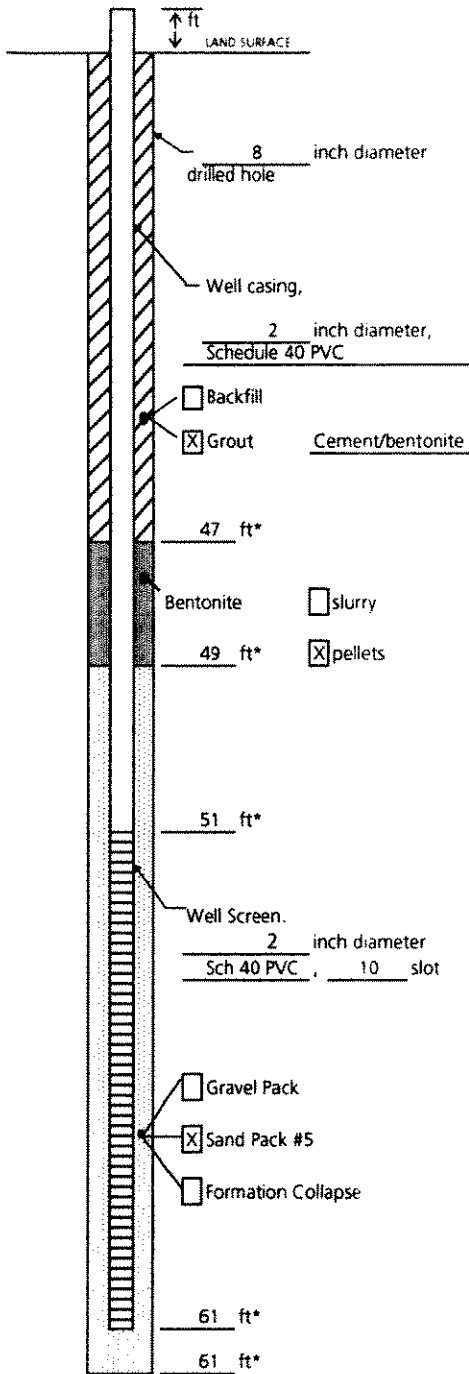
Remarks: Samples submitted for laboratory analysis of VOCs.

Project No.: OH000294.0006.00009 Datum: _____ Filename: August 2004

ARCADIS

Well Construction Log

(Unconsolidated)



Measuring Point is
Top of Well Casing
Unless Otherwise Noted

* Depth Below Land Surface

Project OH000294.0006.0009 Well GM-44

Town/City Moraine, Ohio

County Montgomery State Ohio

Permit No. _____

Land-Surface (LS) Elevation and Datum:

728.77 feet Surveyed

Estimated

Installation Date(s) 8/4/2004

Drilling Method Hollow stem auger

Drilling Contractor Frontz Drilling

Drilling Fluid None

Development Technique(s) and Date(s)

Submersible pump (proactive mini-typhoon) 8/16/04

Fluid Loss During Drilling N/A gallons

Water Removed During Development 250 gallons

Static Depth to Water 21.79 feet below M.P.

Pumping Depth to Water 21.87 feet below M.P.

Pumping Duration 2 hours

Yield 2 gpm Date 8/16/04

Specific Capacity NM gpm/ft

Well Purpose Monitoring well

Remarks _____

Prepared by J. Manzo

General Motors Corporation

Building 14 Investigation, Moraine, Ohio

Depth (feet)	Blows (6 in.)	Recovery (Inches)	OVA (PPM)	Sample Analysis	Sample Type	Graphic Log	Soil Class.	Description	Depth to Water
0	12,10,11,12	24	0				CL	CLAY 3" of asphalt then dark brown, silty clay with 10% gravel, hard, low plasticity, dry	
2	8,4,3,4	20	0				CL	CLAY Dark brown, silty clay with 10% gravel, hard, low plasticity, dry	
4	4,6,7,3	17	0				CL	CLAY Brown, silty clay, medium plasticity, medium hardness, dry	
6	6,5,7,8	16	0				SW	SAND Fine to medium grained sand, well graded, 10% gravel	
8	3,5,11,16	17	0				SW	SAND Fine to medium grained sand, well graded, 10% gravel	
10	11,16,21,34	19	0				SW	SAND Fine to medium grained sand, well graded, 10% gravel	
12									

Composite Sample to Lab

Grab Sample to Lab

Split-Spoon Not Analyzed

Page 1 of 6

Drilling Co.: Frontz Drilling

Geologist: J. Manzo

Begin Drilling: 8/5/04 @ 7:18

Driller: A. Mackey

Total Depth: 60

End Drilling: 8/5/04 @ 1358

Drilling Method: Hollow Stem Auger

Surface Elev.: 729.75

Converted to Well: Y Well I.D.: GM-45

Drilling Fluid: None

North Coord.: 2852.62955

East Coord.: 5216.73965

Remarks: Samples submitted for laboratory analysis of VOCs.

Project No.: OH000294.0006.00009

Datum: _____

Filename: August 2004

General Motors Corporation

Building 14 Investigation, Moraine, Ohio

Depth (feet)	Blows (6 in.)	Recovery (Inches)	OVA (PPM)	Sample Analysis	Sample Type	Graphic Log	Soil Class.	Description	Depth to Water
12	36,50/3	3	0				SW	SAND Fine to medium grained sand, well graded, 10% gravel, poor recovery, pushing rock	
14	13,20,19,43	11	0				SW	SAND Fine to medium grained sand, well graded, 10% gravel, poor recovery	
16	31,24,33,37	12	0				SW	SAND Fine to medium grained sand, well graded, 10% gravel, poor recovery	
18	11,10,15,14	10	0				GW	GRAVEL Sand (40%) and cobble size gravel (60%), well graded	
20	9,14,15,4	9	0				GW	GRAVEL Sand (40%) and cobble size gravel (60%), well graded	
22	11,12,10,9	7	0				GW	GRAVEL Saturated, sand (30%), gravel (70%), well graded, sand is coarse grained	
24									

Composite Sample to Lab

Grab Sample to Lab

Split-Spoon Not Analyzed

Page 2 of 6

Drilling Co.: Frontz Drilling

Geologist: J. Manzo

Begin Drilling: 8/5/04 @ 7:18

Driller: A. Mackey

Total Depth: 60

End Drilling: 8/5/04 @ 1358

Drilling Method: Hollow Stem Auger

Surface Elev.: 729.75

Converted to Well: Y Well I.D.: GM-45

Drilling Fluid: None

North Coord.: 2852.62955

East Coord.: 5216.73965

Remarks: Samples submitted for laboratory analysis of VOCs.

Project No.: OH000294.0006.00009

Datum: _____

Filename: August 2004

General Motors Corporation

Building 14 Investigation, Moraine, Ohio

Depth (feet)	Blows (6 in.)	Recovery (inches)	OVA (PPM)	Sample Analysis	Sample Type	Graphic Log	Soil Class.	Description	Depth to Water
24	9,12,23, 22	15	0				GW	GRAVEL Saturated, sand (30%), gravel (70%), well graded, sand is coarse grained	
26	12,16,19, 23	24	0				GW	GRAVEL Saturated, sand (30%), gravel (70%), well graded, sand is coarse grained	
28	15,16,32, 35	24	0				GW	GRAVEL Saturated, sand (30%), gravel (70%), well graded, sand is coarse grained	
30	5,30,24, 10	4	0				GW	GRAVEL Saturated, sand (30%), gravel (70%), well graded, sand is coarse grained	
32	5,12,8,11	13	0				GW	GRAVEL Saturated, sand (30%), gravel (70%), well graded, sand is coarse grained	
34	12,20,14, 8	17	0				GW	GRAVEL Saturated, sand (30%), gravel (70%), well graded, sand is coarse grained	
36									

Composite Sample to Lab

Grab Sample to Lab

Split-Spoon Not Analyzed

Page 3 of 6

Drilling Co.: Frontz Drilling

Geologist: J. Manzo

Begin Drilling: 8/5/04 @ 7:18

Driller: A. Mackey

Total Depth: 60

End Drilling: 8/5/04 @ 1358

Drilling Method: Hollow Stem Auger

Surface Elev.: 729.75

Converted to Well: Y Well I.D.: GM-45

Drilling Fluid: None

North Coord.: 2852.62955

East Coord.: 5216.73965

Remarks: Samples submitted for laboratory analysis of VOCs.

Project No.: OH000294.0006.00009

Datum: _____

Filename: August 2004

General Motors Corporation

Building 14 Investigation, Moraine, Ohio

Depth (feet)	Blows (/6 in.)	Recovery (Inches)	OVA (PPM)	Sample Analysis	Sample Type	Graphic Log	Soil Class.	Description	Depth to Water
36	7,50/3	11	0				GW	GRAVEL Saturated, sand (30%), gravel (70%), well graded, sand is coarse grained	
38	25,40,7/50	16	0				CL	CLAY Gray, clay with 10% gravel, hard, low plasticity	
40	25,24,30,29	20	0				CL	CLAY Gray, clay with 10% gravel, hard, low plasticity	
42	34,50/3	24	0				CL	CLAY Gravel, clay with 25% sand, hard, low plasticity	
44	8,8,16,17	24	0				GW	GRAVEL Coarse grained sand (40%), fine grained gravel (60%), wet (saturated)	
46	8,12,16,11	24	0				GW	GRAVEL Coarse grained sand (40%), fine grained gravel (60%), wet (saturated)	
48									

Composite Sample to Lab

Grab Sample to Lab

Split-Spoon Not Analyzed

Page 4 of 6

Drilling Co.: Frontz Drilling

Geologist: J. Manzo

Begin Drilling: 8/5/04 @ 7:18

Driller: A. Mackey

Total Depth: 60

End Drilling: 8/5/04 @ 1358

Drilling Method: Hollow Stem Auger

Surface Elev.: 729.75

Converted to Well: Y Well I.D.: GM-45

Drilling Fluid: None

North Coord.: 2852.62955

East Coord.: 5216.73965

Remarks: Samples submitted for laboratory analysis of VOCs.

Project No.: OH000294.0006.00009

Datum: _____

Filename: August 2004

General Motors Corporation

Building 14 Investigation, Moraine, Ohio

Depth (feet)	Blows (/6 in.)	Recovery (Inches)	OVA (PPM)	Sample Analysis	Sample Type	Graphic Log	Soil Class.	Description	Depth to Water
48	12,50/3	9	0				GW	GRAVEL Coarse grained sand (40%), fine grained gravel (60%), wet (saturated)	
50	19,25,29,27	24	0				GW	GRAVEL Coarse grained sand (40%), fine grained gravel (60%), wet (saturated)	
52	8,12,17,15	24	0				GW	GRAVEL Coarse grained sand (40%), fine grained gravel (60%), wet (saturated)	
54	7,15,9,12	12	0				GW	GRAVEL Coarse grained sand (40%), fine grained gravel (60%), wet (saturated)	
56	13,17,50/3	12	0				GW	GRAVEL Coarse grained sand (40%), fine grained gravel (60%), wet (saturated)	
58	9,11,14,12	3	0				GW	GRAVEL Coarse grained sand (40%), fine grained gravel (60%), wet (saturated), poor recovery	
60							CL	CLAY Gray, clay with 10% gravel, hard, low plasticity	

Composite Sample to Lab

Grab Sample to Lab

Split-Spoon Not Analyzed

Page 5 of 6

Drilling Co.: Frontz Drilling

Geologist: J. Manzo

Begin Drilling: 8/5/04 @ 7:18

Driller: A. Mackey

Total Depth: 60

End Drilling: 8/5/04 @ 1358

Drilling Method: Hollow Stem Auger

Surface Elev.: 729.75

Converted to Well: Y Well I.D.: GM-45

Drilling Fluid: None

North Coord.: 2852.62955

East Coord.: 5216.73965

Remarks: Samples submitted for laboratory analysis of VOCs.

Project No.: OH000294.0006.00009

Datum: _____

Filename: August 2004

General Motors Corporation

Building 14 Investigation, 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

Page 6 of 6

Drilling Co.: Frontz Drilling

Geologist: J. Manzo

Begin Drilling: 8/5/04 @ 7:18

Driller: A. Mackey

Total Depth: 60

End Drilling: 8/5/04 @ 1358

Drilling Method: Hollow Stem Auger

Surface Elev.: 729.75

Converted to Well: Y Well I.D.: GM-45

Drilling Fluid: None

North Coord.: 2852.62955

East Coord.: 5216.73965

Remarks: Samples submitted for laboratory analysis of VOCs.

Project No.: OH000294.0006.00009

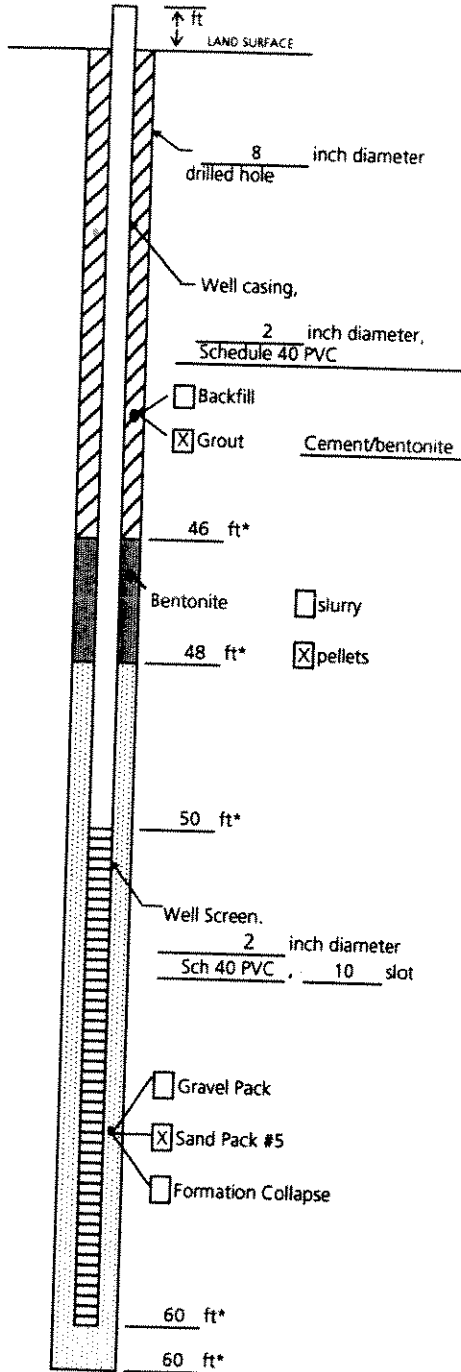
Datum: _____

Filename: August 2004

ARCADIS

Well Construction Log

(Unconsolidated)



Project OH000294.0006.0009 Well GM-45
Town/City Moraine, Ohio
County Montgomery State Ohio
Permit No. _____

Land-Surface (LS) Elevation and Datum:
729.75 feet Surveyed
 Estimated

Installation Date(s) 8/5/2004

Drilling Method Hollow stem auger

Drilling Contractor Frontz Drilling

Drilling Fluid None

Development Technique(s) and Date(s) _____

Submersible pump (proactive mini-typhoon) 8/16/04

Fluid Loss During Drilling N/A gallons

Water Removed During Development 300 gallons

Static Depth to Water 22.18 feet below M.P.

Pumping Depth to Water 22.31 feet below M.P.

Pumping Duration 2.50 hours

Yield 2 gpm Date 8/16/04

Specific Capacity NM gpm/ft

Well Purpose Monitoring well

Remarks _____

Measuring Point is
Top of Well Casing
Unless Otherwise Noted.

* Depth Below Land Surface

Prepared by J. Manzo

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Appendix B

Building 14 Soil and Groundwater
Sampling Logs

ARCADIS

Water Sampling Log

Project GM Building 14 Project No. OH00294.006.00009 Page 1 of 1
 Site Location General Motors Corporation, Moraine, Ohio Date 8/10/2004
 Site/Well No. BD14-01 Replicate No. N/A Code No. N/A
 Weather Partly cloudy, 70s Sampling Time: Begin 12:55 End 1410

Evacuation Data

Measuring Point TOC
 MP Elevation (ft) NM
 Land Surface Elevation (ft) NM
 Sounded Well Depth (ft bmp) 58.45
 Depth to Water (ft bmp) 27.66
 Water-Level Elevation (ft) NM
 Water Column in Well (ft) 30.79
 Casing Diameter/Type 2" PVC
 Gallons in Well 4.93
 Gallons Pumped/Bailed
 Prior to Sampling 55 pumped
 Sample Pump Intake
 Setting (ft bmp) 53.5'
 Purge Time begin 1300 end 1350
 Pumping Rate (gpm) 2 gallons/minute
 Evacuation Method Submersible pump

Field Parameters

Color Brown
 Odor No
 Appearance Turbid
 pH (s.u.) NM
 Conductivity (mS/cm) NM
 (µmhos/cm) NM
 Turbidity (NTU) NM
 Temperature (°C) NM
 Dissolved Oxygen (mg/L) NM
 Salinity (%) NM
 Sampling Method Disposable bailer

Remarks Sampled @ 1355

Temporary well.

Constituents Sampled	Container Description	Number	Preservative
TCL VOCs (8260)	40 mL VOA	3	HCl

Sampling Personnel D. Manzo

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	Milisiemens 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

Water Sampling Log

Project GM Building 14 Project No. OH00294.006.00009 Page 1 of 1
 Site Location General Motors Corporation, Moraine, Ohio Date 8/13/2004
 Site/Well No. BD14-02 Replicate No. N/A Code No. N/A
 Weather Clear, 70s Sampling Time: Begin 12:50 End 1410

Evacuation Data

Measuring Point TOC
 MP Elevation (ft) NM
 Land Surface Elevation (ft) NM
 Sounded Well Depth (ft bmp) 56.80
 Depth to Water (ft bmp) 28.86
 Water-Level Elevation (ft) NM
 Water Column in Well (ft) 27.94
 Casing Diameter/Type 2" PVC
 Gallons in Well 4.47
 Gallons Pumped/Bailed
 Prior to Sampling 60 pumped
 Sample Pump Intake
 Setting (ft bmp) 51'
 Purge Time begin 12:53 end 1347
 Pumping Rate (gpm) 2 gallons/minute
 Evacuation Method Submersible pump

Field Parameters

Color Brown
 Odor No
 Appearance Turbid
 pH (s.u.) NM
 Conductivity
 (mS/cm) NM
 (µmhos/cm) NM
 Turbidity (NTU) NM
 Temperature (°C) NM
 Dissolved Oxygen (mg/L) NM
 Salinity (%) NM
 Sampling Method Disposable bailer

Remarks Sampled @ 1355

Temporary well.

Constituents Sampled	Container Description	Number	Preservative
TCL VOCs (8260)	40 mL VOA	3	HCl

Sampling Personnel D. Manzo

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	Milisiemens 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

Water Sampling Log

Project GM Building 14 Project No. OH00294.006.00009 Page 1 of 1
 Site Location General Motors Corporation, Moraine, Ohio Date 8/11/2004
 Site/Well No. BD14-03 Replicate No. N/A Code No. N/A
 Weather Partly cloudy, 70s Sampling Time: Begin 1520 End 1710

Evacuation Data

Measuring Point TOC
 MP Elevation (ft) NM
 Land Surface Elevation (ft) NM
 Sounded Well Depth (ft bmp) 66.00
 Depth to Water (ft bmp) 28.33
 Water-Level Elevation (ft) NM
 Water Column in Well (ft) 37.67
 Casing Diameter/Type 2" PVC
 Gallons in Well 6.03
 Gallons Pumped/Bailed Prior to Sampling ~110 pumped
 Sample Pump Intake Setting (ft bmp) 61'
 Purge Time begin 1528 end 1643
 Pumping Rate (gpm) 2 gallons/minute
 Evacuation Method Submersible pump

Field Parameters

Color Brown
 Odor No
 Appearance Turbid
 pH (s.u.) NM
 Conductivity (mS/cm) NM
 (µmhos/cm) NM
 Turbidity (NTU) NM
 Temperature (°C) NM
 Dissolved Oxygen (mg/L) NM
 Salinity (%) NM
 Sampling Method Disposable bailer
 Remarks Sampled @ 1700

Temporary well.

Constituents Sampled	Container Description	Number	Preservative
<u>TCL VOCs (8260)</u>	<u>40 mL VOA</u>	<u>3</u>	<u>HCl</u>

Sampling Personnel D. Manzo

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 Milisiemens 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

Water Sampling Log

Project GM Building 14 Project No. OH00294.006.00009 Page 1 of 1
 Site Location General Motors Corporation, Moraine, Ohio Date 8/12/2004
 Site/Well No. BD14-04 Replicate No. N/A Code No. N/A
 Weather Clear, 60s Sampling Time: Begin 1530 End 1700

Evacuation Data

Measuring Point TOC
 MP Elevation (ft) NM
 Land Surface Elevation (ft) NM
 Sounded Well Depth (ft bmp) 68.20
 Depth to Water (ft bmp) 28.81
 Water-Level Elevation (ft) NM
 Water Column in Well (ft) 39.39
 Casing Diameter/Type 2" PVC
 Gallons in Well 6.30
 Gallons Pumped/Bailed Prior to Sampling 75 pumped
 Sample Pump Intake Setting (ft bmp) 63'
 Purge Time begin 1531 end 1630
 Pumping Rate (gpm) 2 gallons/minute
 Evacuation Method Submersible pump

Field Parameters

Color Brown
 Odor No
 Appearance Turbid
 pH (s.u.) NM
 Conductivity (mS/cm) NM
 (µmhos/cm) NM
 Turbidity (NTU) NM
 Temperature (°C) NM
 Dissolved Oxygen (mg/L) NM
 Salinity (%) NM
 Sampling Method Disposable bailer
 Remarks Sampled @ 1650

Temporary well.

Constituents Sampled	Container Description	Number	Preservative
TCL VOCs (8260)	40 mL VOA	3	HCl

Sampling Personnel D. Manzo

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	Milisiemens 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

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Water Sampling Log

Project Building 14-outside wells Project No. OH00294.006.00009 Page 1 of 1
 Site Location General Motors Corporation, Moraine, Ohio Date 8/19/2004
 Site/Well No. GM-43 Replicate No. DUP-137 Code No. N/A
 Weather Sunny, 80s Sampling Time: Begin 11:30 End 1405

Evacuation Data

Measuring Point TOC
 MP Elevation (ft) NM
 Land Surface Elevation (ft) NM
 Sounded Well Depth (ft bmp) 50.15
 Depth to Water (ft bmp) 21.87
 Water-Level Elevation (ft) n/a
 Water Column in Well (ft) 28.28
 Casing Diameter/Type 2" PVC
 Gallons in Well 4.5
 Gallons Pumped/Bailed Prior to Sampling 6 pumped
 Sample Pump Intake Setting (ft bmp) 45'
 Purge Time begin 12:55 end 1328
 Pumping Rate (gpm) 0.18
 Evacuation Method Grundfos Pump

Field Parameters

Color Colorless
 Odor None
 Appearance Clear (after pumped 3 gal)
 pH (s.u.) 6.99
 Conductivity (mS/cm) 1.446
 (µmhos/cm) NM
 Turbidity (NTU) N/A
 Temperature (°C) 20.57
 Dissolved Oxygen (mg/L) 0.07
 Salinity (%) N/A
 Sampling Method Grundfos pump and dedicated tubing
 Remarks Sampled @ 1330
MS/MSD samples collected
RB-114 at 1345

Constituents Sampled	Container Description	Number	Preservative
<u>TCL VOCs (8260)</u>	<u>40 mL VOA</u>	<u>9</u>	<u>HCl</u>

Sampling Personnel S. Clouse

Well Casing Volumes

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

bmp below measuring point ml milliliter NTU Nephelometric Turbidity Units
 °C Degrees Celsius mS/cm Milisiemens 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 OH000294.0006.00009
 Site Location General Motors, Building 14
 Monitoring Well No. GM-43 Time Pump Started 12:55
 Depth of Sampling 45' Date 8/19/2004

Parameters	Time									
	1304	1307	1310	1313	1316	1319	1322	1325	1328	
Redox Potential (millivolts)	-24.4	-28.7	-33.2	-37.0	-39.2	-40.5	-42.1	-43.2	-44.0	
Dissolved Oxygen (mg/L)	0.07	0.06	0.06	0.06	0.05	0.05	0.08	0.08	0.07	
pH (s.u.)	7.13	7.05	7.02	7.01	6.99	7.00	6.99	6.99	6.99	
Specific Conductance (mS/cm)	1.450	1.453	1.454	1.453	1.450	1.450	1.447	1.448	1.446	
Temperature (C)	19.03	20.01	20.56	20.43	20.38	20.34	20.41	20.55	20.57	

Flow Rate ~470 ml/min
 Time Sampled 1330
 Total Water Pumped 6 gallons
 Comments Water cleared up after 3 gallons was pumped.

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Water Sampling Log

Project Building 14-outside wells Project No. OH00294.006.00009 Page 1 of 1
 Site Location General Motors Corporation, Moraine, Ohio Date 8/19/2004
 Site/Well No. GM-44 Replicate No. n/a Code No. N/A
 Weather Sunny, 80s Sampling Time: Begin 1410 End 1510

Evacuation Data

Measuring Point TOC
 MP Elevation (ft) NM
 Land Surface Elevation (ft) NM
 Sounded Well Depth (ft bmp) 61.05
 Depth to Water (ft bmp) 21.00
 Water-Level Elevation (ft) n/a
 Water Column in Well (ft) 40.05
 Casing Diameter/Type 2" PVC
 Gallons in Well 6.4
 Gallons Pumped/Bailed Prior to Sampling 6 pumped
 Sample Pump Intake Setting (ft bmp) 55'
 Purge Time begin 1430 end 1459
 Pumping Rate (gpm) 0.20
 Evacuation Method Grundfos Pump

Field Parameters

Color Colorless (after 3 gallons)
 Odor None
 Appearance Clear
 pH (s.u.) 7.07
 Conductivity (mS/cm) 1.536
 (µmhos/cm) NM
 Turbidity (NTU) N/A
 Temperature (°C) 19.90
 Dissolved Oxygen (mg/L) 0.10
 Salinity (%) N/A
 Sampling Method Grundfos pump and dedicated tubing
 Remarks Sampled @ 1500

Constituents Sampled	Container Description	Number	Preservative
<u>TCL VOCs (8260)</u>	<u>40 mL VOA</u>	<u>3</u>	<u>HCl</u>
<u> </u>	<u> </u>	<u> </u>	<u> </u>
<u> </u>	<u> </u>	<u> </u>	<u> </u>
<u> </u>	<u> </u>	<u> </u>	<u> </u>
<u> </u>	<u> </u>	<u> </u>	<u> </u>

Sampling Personnel S. Clouse

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	Milisiemens 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 OH000294.0006.00009
 Site Location General Motors, Building 14
 Monitoring Well No. GM-44 Time Pump Started 1430
 Depth of Sampling 55' Date 8/19/2004

Parameters	Time									
	1435	1439	1442	1445	1448	1451	1454			
Redox Potential (millivolts)	-64.9	-59.4	-60.3	-61.6	-63.3	-64.8	-65.7			
Dissolved Oxygen (mg/L)	0.21	1.69	0.11	0.10	0.09	0.09	0.10			
pH (s.u.)	7.36	7.16	7.11	7.09	7.08	7.07	7.07			
Specific Conductance (mS/cm)	1.522	1.534	1.535	1.539	1.536	1.535	1.536			
Temperature (C)	17.92	18.40	18.63	18.90	19.17	19.47	19.90			

Flow Rate ~500 ml/min

Time Sampled 1500

Total Water Pumped 6 gallons

Comments Water cleared up with time, very silty at first.

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Water Sampling Log

Project Building 14-outside wells Project No. OH00294.006.00009 Page 1 of 1
 Site Location General Motors Corporation, Moraine, Ohio Date 8/19/2004
 Site/Well No. GM-45 Replicate No. n/a Code No. N/A
 Weather Sunny, 80s Sampling Time: Begin 1515 End 1630

Evacuation Data

Measuring Point TOC
 MP Elevation (ft) NM
 Land Surface Elevation (ft) NM
 Sounded Well Depth (ft bmp) 60.38
 Depth to Water (ft bmp) 22.38
 Water-Level Elevation (ft) n/a
 Water Column in Well (ft) 48.00
 Casing Diameter/Type 2" PVC
 Gallons in Well 7.68
 Gallons Pumped/Bailed Prior to Sampling 6 pumped
 Sample Pump Intake Setting (ft bmp) 55'
 Purge Time begin 1536 end 1601
 Pumping Rate (gpm) 0.24
 Evacuation Method Grundfos Pump

Field Parameters

Color Colorless (after 3 gallons)
 Odor None
 Appearance Clear
 pH (s.u.) 7.03
 Conductivity (mS/cm) 1.380
 (umhos/cm) NM
 Turbidity (NTU) N/A
 Temperature (°C) 20.03
 Dissolved Oxygen (mg/L) 0.12
 Salinity (%) N/A
 Sampling Method Grundfos pump and dedicated tubing
 Remarks Sampled @ 1610

Constituents Sampled

Constituents Sampled	Container Description	Number	Preservative
TCL VOCs (8260)	40 mL VOA	3	HCl

Sampling Personnel S. Clouse

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 Milisiemens 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 OH000294.0006.00009
 Site Location General Motors, Building 14
 Monitoring Well No. GM-45 Time Pump Started 1536
 Depth of Sampling 55' Date 8/19/2004

Parameters	Time									
	1540	1543	1546	1549	1552	1555	1558	1601		
Redox Potential (millivolts)	23.9	-13.4	-24.6	-29.2	-32.0	-34.1	-34.9	-36.4		
Dissolved Oxygen (mg/L)	0.40	0.18	0.14	0.13	0.11	0.12	0.12	0.12		
pH (s.u.)	7.37	7.19	7.13	7.08	7.06	7.05	7.04	7.03		
Specific Conductance (mS/cm)	1.381	1.381	1.385	1.385	1.384	1.382	1.382	1.380		
Temperature (C)	18.88	19.47	19.70	19.93	19.89	20.00	20.08	20.03		

Flow Rate ~600 ml/min
 Time Sampled 1610
 Total Water Pumped 6 gallons

Comments Water cleared up after 3 gallons were pumped.

ARCADIS Soil/Sediment/Sludge Sampling Log

Project/ Building 14 Investigation/ Date 8/9/2004-8/10/2004
 Site Location General Motors, Moraine, Ohio Project No. OH000294.0006.00009
 Sample No. BD14-01 Coded
 Time Replicate No. N/A
 Sampling Began 8/9/2004 17:21 Time
 Sampling Ended 8/10/2004 11:31

Sampling Method and Material: Split spoon (2" x 2')

From	To	Soil/Sediment/Sludge Description
8	10	Brown, Clayey-silt with 25% sand and gravel, well-graded, fill, dry
22	24	Silty-sand, fine- to medium-grained, dry, 10% fine-grained gravel, well graded.

OTHER (OVA; HNu; etc.) OVM 8-10 = 0.0 ppm; OVM 22-24 = 0.0 ppm

Constituents Sampled	Container Description	Preservative
TCL VOCs (8260)	4 oz encore sampler	Cool

Remarks
 Sample Personnel D. Manzo

ARCADIS Soil/Sediment/Sludge Sampling Log

Project/ Building 14 Investigation/ Date 8/13/2004
 Site Location General Motors, Moraine, Ohio Project No. OH000294.0006.00009
 Sample No. BD14-02 Coded
 Replicate No. N/A
 Time
 Sampling Began 8:28 Sampling Ended 12:06

Sampling Method and Material: Split spoon (2" x 2')

From	To	Soil/Sediment/Sludge Description
8	10	Brown, Clayey-silt with 25% sand and gravel, cobbles visible, dry
24	26	Sand (75%) and coarse-grained gravel (25%), damp, well-graded

OTHER (OVA; HNu; etc.) OVM 8-10 = 0.0 ppm, OVM 24-26 = 0.0 ppm

Constituents Sampled	Container Description	Preservative
TCL VOCs (8260)	4 oz encore sampler	Cool

Remarks
 Sample Personnel D. Manzo

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Soil/Sediment/Sludge Sampling Log

Project/ Building 14 Investigation/ Date 8/10/2004-8/11/2004
 Site Location General Motors, Moraine, Ohio Project No. OH000294.0006.00009
 Sample No. BD14-03 Coded _____
 Time _____ Replicate No. N/A
 Sampling Began 8/10/2004 17:40 Time _____
 Sampling Ended 8/11/2004 13:33

Sampling Method and Material: Split spoon (2" x 2')

From	To	Soil/Sediment/Sludge Description
8	10	Brown, Silty-clay with 25% sand and gravel, medium hardnes, low plasticity.
24	26	Silty-sand (70%) and coarse-grained gravel (30%), well-graded, damp

OTHER (OVA; HNu; etc.) OVM 8-10 = 0.0 ppm; OVM 24-26 = 0.0 ppm

Constituents Sampled	Container Description	Preservative
<u>TCL VOCs (8260)</u>	<u>4 oz encore sampler</u>	<u>Cool</u>
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

Remarks _____
 Sample Personnel D. Manzo

ARCADIS Soil/Sediment/Sludge Sampling Log

Project/ Building 14 Investigation/ Date 8/12/2004
 Site Location General Motors, Moraine, Ohio Project No. OH000294.0006.00009
 Sample No. BD14-04 Coded
 Replicate No. DUP-136
 Time
 Sampling Began 8:40 Time Sampling Ended 14:10

Sampling Method and Material: Split spoon (2" x 2')

From	To	Soil/Sediment/Sludge Description
8	10	Brown, Silty-clay with 10% coarse sand and gravel, hard, low plasticity, dry
24	26	Medium to coarse-grained sand with 10% gravel, well graded, dry

OTHER (OVA; HNu; etc.) OVM 8-10 = 0.0 ppm, OVM 24-26 = 0.0 ppm

Constituents Sampled	Container Description	Preservative
TCL VOCs (8260)	4 oz encore sampler	Cool

Remarks DUP-136 collected from 8-10'
 Sample Personnel D. Manzo

ARCADIS Soil/Sediment/Sludge Sampling Log

Project/ Building 14 Investigation/ Date 8/9/2004
 Site Location General Motors, Moraine, Ohio Project No. OH000294.0006.00009
 Sample No. GM-43 Coded
 Replicate No. N/A
 Time
 Sampling Began 9:02 Time
 Sampling Ended 13:10

Sampling Method and Material: Split spoon (2" x 2')

From	To	Soil/Sediment/Sludge Description
0	2	Sandy-gravel with 25% silt and clay, dry, fill
20	22	Silty-sand with 25% gravel, damp, well-graded

OTHER (OVA; HNu; etc.) OVM 0-2 = 0.0 ppm; OVM 20-22 = 0.0 ppm

Constituents Sampled	Container Description	Preservative
TCL VOCs (8260)	4 oz encore sampler	Cool

Remarks
 Sample Personnel D. Manzo

ARCADIS Soil/Sediment/Sludge Sampling Log

Project/ Building 14 Investigation/ Date 8/3/2004-8/4/2004
 Site Location General Motors, Moraine, Ohio Project No. OH000294.0006.00009
 Sample No. GM-44 Coded Replicate No. DUP-135
 Time Sampling Began 8/3/2004 15:28 Time Sampling Ended 8/4/2004 13:10

Sampling Method and Material: Split spoon (2" x 2')

From	To	Soil/Sediment/Sludge Description
0	2	Brown, Clayey-silt with 25% sand and gravel, dry, fill
18	20	Silt (30%) and sand (60%), with 10% gravel, dry, poorly-graded

OTHER (OVA; HNu; etc.) OVM 0-2 = 0.0 ppm; OVM 18-20 = 0.0 ppm

Constituents Sampled	Container Description	Preservative
TCL VOCs (8260)	4 oz encore sampler	Cool

Remarks DUP-135 collected from 0-2'
 Sample Personnel D. Manzo

ARCADIS Soil/Sediment/Sludge Sampling Log

Project/ Building 14 Investigation/ Date 8/5/2004
 Site Location General Motors, Moraine, Ohio Project No. OH000294.0006.00009
 Sample No. GM-45 Coded
 Time Replicate No. N/A
 Sampling Began 7:18 Time Sampling Ended 13:58

Sampling Method and Material: Split spoon (2" x 2')

From	To	Soil/Sediment/Sludge Description
0	2	Dark brown, silty-clay with 10% gravel, hard, low plasticity, dry
20	22	Sand (40%) and cobble-sized gravel (60%), well-graded

OTHER (OVA; HNu; etc.) OVM 0-2 = 0.0 ppm; OVM 20-22 = 0.0 ppm

Constituents Sampled	Container Description	Preservative
TCL VOCs (8260)	4 oz encore sampler	Cool

Remarks
 Sample Personnel D. Manzo