ARCADIS GERAGHTY & MILLER

Resource Conservation and Recovery Act Facility Investigation Final Report Volume I (Methodologies and Results)
Delphi Harrison Thermal Systems, Moraine, Ohio
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PREPARED FOR

General Motors Corporation

Preface Sheet – April 2000

The Draft Resource Conservation and Recovery Act (RCRA) Facility Investigation Final (RFI) Report, Volume I (Methodologies and Results) for Delphi Harrison Thermal Systems in Moraine, Ohio, was submitted to the United States Environmental Protection Agency (U.S. EPA) in February 1996. The U.S. EPA submitted comments to General Motors Corporation (GM) on June 11, 1996, on the draft report. GM responded to these comments in correspondence to the U.S. EPA, dated September 11, 1996. The U.S. EPA prepared comments on GM's response to comments and submitted them in correspondence to GM, dated October 1, 1996. To address the U.S. EPA's comments highlighted in the previously mentioned correspondences, GM incorporated these comments into the Supplemental RFI for the General Motors Powertrain Group Moraine Engine Plant and the General Motors Truck Group Moraine Assembly Plant in Moraine, Ohio (ARCADIS Geraghty & Miller, 2000). Therefore, even though the copy of this report has been printed on draft paper, the U.S. EPA has indicated to GM that this document should be considered as a final document.

Addendum 1 to this report contains two figures with volatile organic compound (VOC) results for groundwater posted next to each monitoring well that was sampled during the Delphi Harrison Thermal Systems RFI. Groundwater results presented in color indicate that the posted VOC concentrations are above the Safe Drinking Water Act Maximum Contaminant Level. Figure 1 contains groundwater results for the upper aquifer wells and Figure 2 contains groundwater results for the lower aquifer wells.

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A RFI Laboratory Analytical Results.

B RFI Data Quality Objectives.

C RFI Soil/Sediment Logs, Boring Logs, and Well Construction Log.

D RFI Geotechnical Results.

Addendum

1 VOC Results in the Upper and Lower Aquifers.

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RESOURCE CONSERVATION AND RECOVERY ACT
FACILITY INVESTIGATION FINAL REPORT
VOLUME I (METHODOLOGIES AND RESULTS)
DELPHI HARRISON THERMAL SYSTEMS
GENERAL MOTORS CORPORATION
MORAINE, OHIO

1.0 INTRODUCTION

The Delphi Harrison Thermal Systems (Delphi Thermal) of General Motors Corporation (GMC) in Moraine, Ohio, received an Administrative Order (Docket No. V-W-91R-2) from the United States Environmental Protection Agency (U.S. EPA) Region V, which became effective on January 30, 1991. The Administrative Order, issued under Section 3008 (h) of the Resource Conservation and Recovery Act (RCRA), as amended, 42 U.S.C. 6928 (h), requires Delphi Thermal to implement a RCRA Corrective Action program at the Delphi Thermal facility in Moraine that will consist of the following: (1) perform Interim Measures (IMs), (2) conduct a RCRA Facility Investigation (RFI), and (3) conduct a RCRA Corrective Measures Study (CMS), if deemed necessary. Geraghty and Miller, Inc. was retained by Delphi Thermal to implement the RFI program and ENVIRON Corporation (ENVIRON) was retained to conduct the Baseline Risk Assessment. This Draft RFI Final Report is presented in two volumes. Volume I presents the methodologies and results of the RFI, while Volume II presents the Baseline Risk Assessment.

In 1995, the six divisions that comprise GMC's Automotive Components Group were renamed under the umbrella of Delphi Automotive Systems. Accordingly, the Harrison Division is now Delphi Harrison Thermal Systems (Delphi Thermal). This is a change in name only; the facility ownership has not changed. Therefore, any reference to Harrison Division in this Draft RFI Final Report, or previously issued documents developed during implementation of the RFI program, should be considered synonymous with the Delphi Thermal facility which is covered by the Administrative Order.

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1.1 RFI OBJECTIVES

The principal objectives of the RFI were to identify potential releases from solid waste management units (SWMUs) at the facility, to determine the nature and extent of any identified releases where possible, and to evaluate the risks posed by the conditions at each SWMU. If the risks were found to exceed acceptable levels, a CMS would be recommended. A secondary objective of the RFI was to collect information necessary to support the CMS, if required, and to fulfill general requirements of the Administrative Order.

1.2 GENERAL APPROACH

To meet the objectives of the RFI, Delphi Thermal implemented a formal investigative process, which began with the preparation of a Description of Current Conditions Report (DOCC) (Geraghty & Miller, Inc. 1991a). This report presented the current state of knowledge regarding the environmental setting at the facility, the information from previous investigations at the site, and the known extent of contamination. It concluded with a description of the areas where additional data were needed to verify releases and define extent. The next step in the RFI process was to prepare a Pre-Investigation Evaluation of Corrective Measure Technologies document (PIECMT). The PIECMT (Geraghty & Miller, Inc. 1991b) identified potential corrective measure technologies that may be appropriate for the site based on information presented in the DOCC.

The RFI Work Plan (Geraghty & Miller, Inc. 1992a), which was approved by the U.S. EPA in a letter dated September 22, 1992, described the site-characterization information that would be collected to accomplish the following:

1. Support a baseline risk assessment that will be used to develop proposed Media Protection Standards for groundwater, surface water, sediment, and soil at the facility.

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2. Collect data, as discussed in the PIECMT, to support a CMS, if required.

3. Fulfill the general requirements of the RFI Scope of Work.

The RFI Work Plan included an RFI Quality Assurance Project Plan (QAPjP), a Project Management Plan, a Sampling Plan, a Data Management Plan, a Health and Safety Plan (HASP), and a Community Relations Plan.

The RFI was conducted in two phases. The first phase focused on verifying whether a release had occurred from each SWMU. It culminated in the preparation of an Interim RFI Report (Geraghty and Miller, Inc. 1993a) that was submitted to the U.S. EPA in July 1993. This report contained a summary of the SWMU release-verification results and recommendations for additional investigative work. Based on written comments from the U.S. EPA dated October 19, 1993 (received on November 2, 1993), and discussions in a meeting with the U.S. EPA on May 5, 1994, a Phase II RFI Work Plan was submitted to the U.S. EPA in June 1994.

Delphi Thermal received approval of the Phase II RFI Work Plan with modifications from the U.S. EPA on August 18, 1994. These modifications included three general comments and three specific comments which were to be incorporated in a revised work plan. Delphi Thermal submitted a revised work plan incorporating these comments to the U.S. EPA in September 1994 (Geraghty & Miller, Inc. 1994a). The scope of work for the Phase II investigation included additional sampling from selected SWMUs. In accordance with the approved work plan, field work began in September 1994 and was completed in November 1994. Sampling activities included the collection of additional background, soil, surface-water, sediment, and groundwater samples. All RFI field work was performed in accordance with the approved RFI Sampling Plan and RFI QAPjP. Oversight of all field activities was conducted for the U.S. EPA by PRC, Inc. Preliminary Phase II RFI data was provided to the U.S. EPA in an attachment to the January 1995 Monthly Technical Progress Report.

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Following the collection of field data and the evaluation of the nature and extent of releases from SWMUs to environmental media, ENVIRON conducted a baseline risk assessment (Volume II). The objective of the risk assessment is to determine whether potential risks posed by the conditions at specific SWMUs or environmental media warrant a CMS. Prior to initiating the Baseline Risk Assessment, the conceptual site model establishing reasonable future land use and groundwater use, potential exposure pathways, and potentially exposed populations were reviewed extensively with the U.S. EPA through written correspondence and conference calls. Several key aspects of the technical methodology (e.g., groundwater modeling) and key assumptions (e.g., exposure factors) pertinent to the estimation of potential exposures were also reviewed with the U.S. EPA. Approval to proceed with the baseline risk assessment was received from the U.S. EPA during a conference call on November 13, 1995.

1.3 RFI REPORT ORGANIZATION

This RFI Report is divided into eight sections. A general description of the Delphi Thermal facility, plant physiography and hydrogeology, and a summary of the SWMUs investigated are provided in Section 2.0 (Facility Description). Section 3.0 (Overview of RFI Activities) presents an overview of RFI activities including the technical approach and field investigation methodologies. Section 4.0 (Characterization of Environmental Setting Results) presents a discussion of groundwater flow, upgradient and downgradient groundwater quality, background soil results, geotechnical results, soil results from the area south of Landfill L1, and surface-water/sediment sampling results. Section 5.0 (SWMU Investigation Results) presents a discussion of the investigative strategy and analytical results for each media sampled at the SWMUs investigated during the RFI and conclusions are presented for each SWMU. Analytical data collected during the RFI and discussed in Sections 4.0 (Characterization of Environmental Setting Results) and 5.0 (SWMU Investigation Results) are included in Appendix A. Section 6.0 (Baseline Risk Assessment) presents the executive summary of the Baseline Risk Assessment (Volume II), including human health and ecological evaluations. Section 7.0 (Summary and

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Conclusions) presents a summary of the RFI findings and conclusions. Section 8.0 (References) presents references.

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2.0 FACILITY DESCRIPTION

2.1 LOCATION AND HISTORY

The Delphi Thermal site is located approximately 1 mile south of Dayton at 3600 Dryden Road in Moraine, Ohio (Figure 2-1). The facility is bounded by the following U.S. Geological Society (USGS) coordinates: latitude 39° 41' 14" N to 39° 42' 16" N; longitude 84° 13' 11" E to 84 13' 45" E. Figure 2-2 presents a layout of the facility. The Delphi Thermal site encompasses approximately 160 acres and is bounded to the north by a drainage ditch, to the west by Dryden Road and Interstate-75, to the east by Penn Central Railroad tracks, and to the south by Sellars Road.

The Delphi Thermal site is located within an area zoned for general industry (Figure 2-3). The figure shows areas are zoned for general industry, light industry, single-family dwellings, and conservation districts. A more detailed discussion of local land use is provided in the Baseline Risk Assessment (Volume II).

This site was formerly the location of the Frigidaire Division of GMC. The oldest structure on the site, shown as Building 1 on Figure 2-2, was constructed in 1916 and served as a powerhouse for Frigidaire operations. Building 14, currently the main manufacturing building at Delphi Thermal, was constructed in eight stages, starting with the first structure in 1941 and the last addition completed in 1976. In 1975, the automotive and appliance operations were split and Delco Air Conditioning Division of GMC was formed to manufacture the automotive air conditioning compressor. In 1979, the Frigidaire home appliance operations were discontinued. In 1981, Delco Air Conditioning was merged into the Harrison Division GMC. Delphi Thermal's major operations since that time have been the machining and assembly of automotive air conditioning compressors, accumulator dehydrators, and miscellaneous air conditioning valves.

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2.2 PHYSIOGRAPHY

This section presents the site physiography, including a discussion of site topography, surficial soils, and surface water and drainage features at the site and surrounding area.

2.2.1 Topography

The Delphi Thermal site is located in the Great Miami River Valley, which is bounded by bedrock valley walls and various glacial features. The area topography is shown on the Dayton South Quadrangle and the Miamisburg Quadrangle USGS topographic maps. The valley walls and overlying glacial features, approximately 1 mile east and west of the site, exhibit elevations ranging between 900 and 1,000 feet above mean sea level (msl) (Figure 2-1). The Delphi Thermal site lies on the valley flats and has little relief, with elevations ranging from 725 to 740 feet above msl.

2.2.2 Surficial Soils

The undisturbed portions of the Delphi Thermal site are underlain by soils belonging to the Fox Series (Fox silt loam soil), which are well-drained soils formed in loamy glacial outwash material (Powell and Mecker 1970). The Fox Series profile exhibits a dark yellowish-brown silt loam layer approximately 8 inches thick. Underlying subsoil layers consist of brown loam, dark-brown clay loam, and reddish-brown and brown sand clay loam that extends to the substratum. This series has a substratum of calcareous sand and gravel at a depth of 24 to 42 inches.

2.2.3 Surface-Water and Drainage Features

Moraine and the surrounding region are drained by the Great Miami River. This river flows from north to south; it lies approximately 3,600 feet west of the northern end of the Delphi Thermal site and bends as close as 700 feet near the South Settling Lagoons at the southern end

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of the site. No major tributaries to the Great Miami River pass through the Delphi Thermal site. The Flood Insurance Rate Map (FIRM) for Moraine shows that the area affected by the 100-year flood does not include the Delphi Thermal site or any of the SWMUs (FEMA 1981).

Surface-water runoff from rainfall to most paved areas and roofs at the Delphi Thermal site is collected in two concrete-lined storm-water retention basins. This water is then discharged to the Great Miami River under National Pollution Discharge Elimination System (NPDES) permit. An unnamed drainage ditch flows east to west several hundred feet north of the North Settling Lagoon, then north to south along the western side of the lagoon (Figure 2-2). This ditch originates in West Kettering, drains most of that area and eventually discharges to the Great Miami River. The ditch receives a small amount of runoff from areas immediately adjacent to it at the Delphi Thermal site.

2.3 HYDROGEOLOGY

A substantial amount of hydrogeologic data has been collected over the past 10 years at the site. The following sections provide a summary of the site hydrogeology as presented in the DOCC (Geraghty & Miller, Inc. 1991a).

2.3.1 Hydrogeologic Units

The Delphi Thermal site lies over the Great Miami River buried valley aquifer, which consists of valley fill deposits composed of sand and gravel outwash separated by locally discontinuous silt and clay units, frequently referred to as till zones. Beneath the facility, these glacial deposits have been divided into the following hydrogeologic units: the upper sand and gravel unit, the till zone, and the lower sand and gravel unit. Plates 2 and 3 in the DOCC (Geraghty & Miller, Inc. 1991a) illustrate generalized cross sections of these three geologic units. Boring logs indicated a large amount of variability in the lithology within each of the three units; however, this lithologic variability within units was generalized in the cross sections. Ordovician

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shales and limestones of the Richmond Group comprise the dominant bedrock units forming the valleys in the Dayton area. The Richmond Group is overlain by the Silurian Brassfield Limestone in upland areas. The bedrock units are not considered important sources of groundwater because their transmissivity values are lower than those of the buried valley aquifer.

The upper sand and gravel unit is generally 30 to 70 feet thick and contains minor till lenses. This unit is considered a water-table aquifer with saturated thicknesses ranging from 10 to 40 feet. Based on a review of water well logs at the Ohio Department of Natural Resources (ODNR), there are no known users of groundwater from this upper water-table aquifer in the immediate vicinity of the Delphi Thermal site.

The till zone has a varied thickness and continuity, but appears to be discernable throughout the region; it ranges from being absent to in excess of 50 feet thick beneath the Delphi Thermal site. An isopach map of the till is presented on Figure 2-4. The thickest portion of the till is centered to the east of the Delphi Thermal facility. The northeast portion of Figure 2-4 may indicate the existence of an ancient stream channel where the till has been completely eroded. A regional view of this channel is presented on Figure 2.4 in the Revised Three-Dimensional Steady-State Flow Model Construction and Calibration (Geraghty & Miller, Inc. 1994b).

Although the till deposit constitutes a relatively small portion of the valley fill deposits, it is a major hydrologic factor because it can retard recharge to the lower sand and gravel unit. These glacial till deposits are, therefore, referred to as an aquitard. Clay and silt tills have a very low permeability (10^{-7} centimeters per second [cm/sec] or less), a very high unit weight (on the order of 140 pounds per cubic feet [pcf]), and a very low void ratio, yielding a porosity of less than 20 percent (Norris and Spieker 1966). Low porosities result in the transmission of very little water through such a unit. Therefore, the till layers divide the sand and gravel deposits into two or more aquifers. Recharge from the upper aquifer to the lower aquifer can be relatively rapid

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where the till layer is absent, but regionally the till layer provides an effective barrier causing the lower aquifer to be semi-confined.

The till zone overlies at least 50 to 100 feet of sand and gravel that comprise the lower unit. The lower unit is a fully saturated semi-confined aquifer throughout most of the Dayton area; however, there are locations where the till is thin or discontinuous. In areas where the till is absent, the upper and lower aquifers respond as one hydrogeologic unit. Consequently, aquifer parameters vary with the thickness and distribution of the till layer.

2.3.2 Water Levels and Hydraulic Gradient

Water levels in accessible wells are measured on a quarterly basis at the Delphi Thermal site. These measurements indicate that the direction of groundwater flow in both aquifers at the site is generally from north to south, with a westerly bend at the southern portion of the site. This bend in the flow pattern corresponds to the trend of the buried bedrock valley.

Historically, pumping water from the lower aquifer has also influenced the flow regime substantially. Until late 1986, the flow of groundwater beneath the Delphi Thermal site was influenced primarily by the Montgomery County water-supply wells (in the North and South Dryden Road and Miami Shores Well Fields) and the Delphi Thermal water supply wells, all of which are completed in the lower aquifer. During the latter part of 1986, the county well fields were shut down; none of them has pumped on a continuous basis until March 1990 when Montgomery County initiated a Pump-to-Waste Program by pumping one well in the Dryden Road North Well Field (DN-13). The purpose for pumping this well is to protect the Miami Shores Well Field. Since 1986, the Montgomery County well fields have been used twice to supplement the water supply from the Dayton Water System during peak demand periods in the unusually dry summers of 1987 and 1988. Of the well fields located downgradient of the facility (i.e., Dryden Road North, Dryden Road South, and Miami Shores), the Dryden Road South and Miami Shores well fields were pumped intermittently at an average of approximately 2 million

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gallons per day (mgd) each during May to August 1987. During June to September 1988, the Miami Shores well field was pumped continuously at an average of approximately 10 mgd. Pumping at the Delphi Thermal site was also discontinued in late January 1987 when Delphi Thermal was connected to the municipal water supply.

When supply wells were active in the lower aquifer, as they were prior to 1986, potentiometric elevations were lowered and a vertical gradient from the upper to lower aquifer was created. Sustained pumping had the effect of lowering water levels in both aquifers because the upper aquifer recharges the lower aquifer through the semi-confining till zone. As municipal and industrial pumping slowed in 1986, water levels began to rise in both aquifers. In response to this termination of pumping in the county well field and at the Delphi Thermal site, water levels in both the upper and lower aquifers have risen. Hydrograph records for shallow wells at Delphi Thermal indicate a rise in the shallow aquifer of approximately 10 feet between 1986 and late 1989 when water levels stabilized. Historic water-level data from the deep aquifer (limited to post September 1988 water levels) for Monitor Wells HR-10, HR-12, HR-13, HR-14, and HR-15 indicate a 5-foot rise in the water levels in the deep aquifer between September 1988 and late 1989. Because of the higher water levels in the last few years, there is very little difference between the water-level elevations in the upper aquifer and the potentiometric surface in the lower aquifer. Additionally, the decrease in groundwater pumping at and near the facility has resulted in a decrease in the hydraulic gradient.

Horizontal hydraulic gradients were approximately 0.0017 feet per foot (ft/ft) in both aquifers in 1986 (Geraghty & Miller, Inc. 1991a), 0.0005 ft/ft in both aquifers in 1989, and 0.0008 ft/ft in the shallow aquifer and 0.001 ft/ft in the deep aquifer by October 1994. The 1986 hydraulic gradients show the significant influence that industrial and municipal pumping had on the shallow and deep aquifers. In 1989, when pumping at the Delphi Thermal facility and the Dryden Road North Well Field had been curtailed, it can be seen that the natural hydraulic gradient for both aquifers was much lower than under pumping conditions. Finally, the increase

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in hydraulic gradients in 1994 represents the influence of Montgomery County pumping one well in the Dryden North Well Field (DN-13) as part of their Pump-to-Waste Program.

The gradients, in each instance, vary across the site to reflect local variations in hydraulic characteristics and hydraulic stresses. The thinning of the shallow aquifer in the central portion of the Delphi Thermal facility, beneath the main manufacturing building, causes a decrease in the hydraulic transmissivity resulting in a local steepening of the hydraulic gradient. The gradient flattens out south of the building, then increases again close to DN-13, which is in operation. Using the 1994 quarterly monitoring data (Geraghty & Miller, Inc. 1995), the annual average site-wide gradient for the shallow aquifer was reported as 0.0008 ft/ft. The gradient from HR-9, near Northlawn Avenue, to the north of the Delphi Thermal manufacturing building was 0.0006 ft/ft. The gradients increased to approximately 0.0008 ft/ft at the central area of the site and decreased to approximately 0.0007 ft/ft at the south end of the site. Gradients varied locally, ranging from 0.0009 ft/ft to 0.009 ft/ft.

The hydraulic gradients in the deep aquifer displayed less variability over the site, except near DN-13 where gradients were influenced by pumping. Gradients observed were approximately 0.0007 ft/ft at the northern portion of the site, 0.0008 ft/ft in the central to southern portion of the site, and approximately 0.002 ft/ft near DN-13 in the deep aquifer.

2.3.3 Hydraulic Conductivities

To determine the hydraulic characteristics of the water-table (upper) aquifer, the lower aquifer, and the till zone in the vicinity of the Delphi Thermal site, Geraghty & Miller analyzed time-drawdown data collected during three pumping tests (Geraghty & Miller, Inc. 1990). The data were analyzed using AQTESOLV, an aquifer-test analysis software package (Duffield and Rumbaugh 1989). Upper aquifer tests were performed in June 1985 and August 1989, at the southern end of the North Settling Lagoon (Test Well 1), and south of Landfill L-1 (Test Well 2),

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respectively. The deep aquifer test was performed just north of Landfill L-1 (Production Well 45) in November 1989.

The median-hydraulic conductivity determined from the upper aquifer tests is 1,756 feet per day (ft/day), which is greater than published values for the upper aquifer in the Great Miami River Valley (Geraghty & Miller, Inc. 1990). This hydraulic conductivity value suggests the presence of a highly localized permeable feature, such as a river point-bar deposit. Point-bar deposits consist of river-washed sediments that generally have high hydraulic conductivities.

The median specific yield determined from the upper aquifer tests is 7.0×10^{-2}. Water-table aquifers typically have specific yields of 0.10 to 0.20 (Kruseman and de Ridder 1983). The drawdown response recorded in Well W-3-N may suggest a localized, semi-confined aquifer setting in the upper aquifer. However, the median value for storage determined from the upper aquifer test of 1.1×10^{-2} is well above the range for semi-confined aquifers of 1×10^{-4} to 1×10^{-6} given by Kruseman and de Ridder (1983), suggesting that the upper aquifer in the vicinity of the Delphi Thermal site responds as a water-table aquifer with localized semi-confined characteristics.

The lower aquifer test data were analyzed both for the pumping period and the recovery period after pumping. Therefore, in addition to a spatial comparison, hydraulic parameters were estimated by different methods of analyses and compared again. The median hydraulic conductivity calculated from all of the lower aquifer test analyses is 349 ft/day. This value is within the 125 to 400 ft/day range reported by Norris and Spieker (1966) for the Dayton area. The minimum and maximum estimated hydraulic conductivity values of 262 ft/day and 463 ft/day were estimated at Well GM-19D and Well 45, respectively. The values of the hydraulic parameters estimated by the drawdown data correlate very well with those estimated from the recovery data, and both sets of parameter values are consistent with published values for the Great Miami River Valley.

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The aquifer storage values determined from the lower aquifer test indicate a semi-confined aquifer. The median value of storage is 6.65×10^{-4}. Kruseman and de Ridder (1983) describe confined aquifers as having a storage coefficient of 1×10^{-4} to 1×10^{-6} and unconfined aquifer storage (specific yield) values of 0.10 to 0.20. Therefore, the median value estimated from the lower aquifer test data is at the upper limits of the range of values for a confined aquifer and is consistent with the values expected for a semi-confined aquifer. The storage values determined from the lower aquifer test are consistent with values listed in studies conducted in the Dayton area (Norris and Spieker 1966; Fidler 1975; Dover 1961). In addition, the median storage values are characteristic of those values obtained for a semi-confined aquifer.

2.4 SUMMARY OF SWMUs

All SWMUs listed in the Administrative Order for the Delphi Thermal facility were investigated during the RFI except for the Drum Storage Area and the Former Incinerator Area (Figure 2-5); the Administrative Order did not require investigation of these SWMUs because releases from these units have not occurred. Detailed descriptions of the SWMUs identified in the Administrative Order and investigated during Phase I of the RFI are provided in the DOCC (Geraghty & Miller, Inc. 1991a).

During implementation of Phase I of the RFI, Delphi Thermal became aware of information that warranted sampling at two previously unidentified potential SWMUs during Phase II of the RFI: Waste Burner and Fill Area. Detailed descriptions of these two supplemental SWMUs is included in the Interim RFI Report (Geraghty & Miller, Inc. 1993a). All SWMUs and additional areas of investigation are shown on Figure 2-6. The additional areas of investigation include the Background Area, Surface Water/Sediment Sample Locations, and the Area South of Landfill L1. The SWMUs and additional areas investigated as part of the RFI are discussed in the following sections.

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2.4.1 Landfills

Three landfills (Landfill L1, L2, and L3) on the Delphi Thermal site were investigated during the RFI (Figure 2-6); these landfills are pre-RCRA, unlined, and uncapped disposal areas. Landfill L1 is located at the southern end of the facility and covers an area of approximately 7.8 acres; it was used for the collection and disposal of wastes generated by the previous plant operator, Frigidaire, for more than 20 years. Landfill L2 is located north of Building 14 and east of the wastewater treatment facility, and covers an area of approximately 3.7 acres; it was used for the collection and disposal of waste generated by Frigidaire from 1950 to 1975. Landfill L3 is located immediately northeast of the North Settling Lagoon and northwest of Landfill L2, and covers an area of approximately 1.6 acres; it was used for the collection and disposal of sludge from the adjacent North Settling Lagoon System. An estimated 25,000 cubic yards of sludge were placed in Landfill L3 from 1972 to 1979.

2.4.2 Surface Impoundments

Two surface impoundment SWMUs, the North and South Settling Lagoon systems (Figure 2-6), were investigated during the RFI. These SWMUs are also in the process of RCRA closure as required by the Ohio Environmental Protection Agency (Ohio EPA). The North Settling Lagoon is located east of Dryden Road, west of the wastewater treatment facility, north of Building 14, and south of Northlawn Avenue. The North Settling Lagoon covers approximately 4.6 acres. The South Settling Lagoon is located east of Interstate 75, west of Dryden Road, north of Sellars Road, and south of East River Road. This lagoon covers an estimated area of 7.9 acres. Details of the operating history for these two SWMUs is provided in the DOCC (Geraghty & Miller, Inc. 1991a)

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2.4.3 Underground Storage Tanks

The Administrative Order listed 19 underground storage tanks (USTs) to be investigated under the RFI; 15 of the 19 USTs were removed before the RFI. Three of the four remaining USTs (T1 [10,000-gallon tank], T4 [10,000 gallon tank], and T12 [50,000-gallon tank]) were removed during the RFI. Only T11 is still in use. UST T11 is used as part of the oily waste collection system associated with the Waste Pile/Staging Area. USTs T1, T4, and T12 were used to hold a similar waste fluid consisting of wash water or spent detergent solution from a process that used polyester resins or potting compounds. RFI investigative activities were performed at the West Tank Farm, at the South Tank Farm, and at USTs T4, T5/T6, T11, and T12 (Figure 2-6).

2.4.4 Waste Pile/Staging Area

The Waste Pile/Staging Area (Figure 2-6) is located just north of Landfill L1 and east of Building 21. This SWMU consists of a three-sided sludge bunker (90 feet by 30 feet by 5 feet high), a concrete staging area, and drainage system associated with this area. The Waste Pile/Staging Area covers approximately 2 acres. The sludge bunker and staging area were originally constructed in 1976. This SWMU is used to manage grinding sludge from aluminum, steel, and cast iron machinery operations, steel and aluminum turnings and empty drums.

2.4.5 Liquid Waste Burner

The Liquid Waste Burner (LWB) (Figure 2-6) was in operation from approximately 1957 to 1970; its purpose was to incinerate spent solvents and oils. The liquids were transferred from on-site locations to the LWB in 55-gallon drums and emptied into two adjacent underground holding tanks for temporary storage. The liquids were then fed to the LWB and incinerated.

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2.4.6 Fill Area

Before the south parking lot was constructed, fill material was used to bring the area up to grade level. The fill material consisted of approximately 75 percent bottom ash (clinkers) from two solid waste incinerators (burned combustible solid waste, such as wood, paper, and cardboard) and approximately 25 percent porcelain sludge from an on-site manufacturing process. Figure 2-6 shows the location and approximate aerial extent of the fill area (approximately 2.9 acres).

2.4.7 Additional Areas of Investigation

Soil samples were collected from 12 borings during Phase I in the Background Area to obtain data concerning background concentrations of metals in soils. Two additional borings were drilled during Phase II of the RFI to collect soil samples for analysis of acetone, which had been detected in the background soil samples collected during Phase I. Surface water/sediment samples were collected to support the risk assessment, to determine background conditions for surface water and sediment, and to determine if further sampling was required. The area south of Landfill L1 was investigated to further define the extent of groundwater contamination in that area by collecting groundwater samples from an existing upper aquifer monitor well, WSU-24, and from a lower aquifer monitor well, GM-20D, that was installed during Phase II of the RFI. Soil samples were collected during the installation of Well GM-20D to determine whether the soil contained hazardous constituents. Figure 2-6 shows the location of these additional areas of investigation.

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3.0 OVERVIEW OF RFI ACTIVITIES

During the RFI, groundwater, surface water, sediment, soil, and waste samples were collected and analyzed as proposed in the approved RFI Work Plan (Geraghty & Miller, Inc. 1992a) and the RFI Phase II Work Plan (Geraghty & Miller, Inc. 1994a). The RFI was designed to collect the data necessary to support the Baseline Risk Assessment (Volume II), to support a CMS (if required), and to fulfill the requirements of the Administrative Order RFI Scope of Work.

3.1 TECHNICAL APPROACH

The following sections present a discussion on the site-wide technical approach to the investigative strategy for each medium. The media discussed include groundwater, surface water and sediment, soil, and waste.

3.1.1 Groundwater

The primary goals of the RFI groundwater sampling were to collect site-wide data to characterize groundwater with respect to Appendix IX constituents and to collect data that supports the Baseline Risk Assessment (Volume II). During both phases of the RFI, groundwater samples were collected on a site-wide basis with an emphasis on collecting samples upgradient of the facility, immediately upgradient and downgradient of selected SWMUs or groups of SWMUs, and downgradient of the facility. Both the upper and lower aquifers were investigated in this manner. The following SWMUs (or group of SWMUs) were investigated in relation to groundwater: Landfill L1; Landfills L2 and L3; North Settling Lagoon; South Settling Lagoon; Fill Area, LWB; South Tank Farm, T11, T12, Waste Pile/Staging Area, and West Tank Farm. A summary of the Phase I and II sampling program is presented in Table 3-1. Upper and lower aquifer monitor wells sampled during the RFI are presented on Figures 3-1 and 3-2, respectively. The analytical results for groundwater upgradient of the site are discussed in Section 4.2 (Upgradient Groundwater Quality) and the results for each SWMU are discussed in Section 5.0 (SWMU Investigation Results).

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To aid in the development of the RFI investigative strategy, a three-dimensional, steady-state groundwater flow model was constructed (Geraghty & Miller, Inc. 1989a). The model was developed in 1989 and revised in 1994 (Geraghty & Miller, Inc. 1994c). The 1989 model was a three-dimensional, finite-difference groundwater-flow model (MODFLOW) that characterized the nature of the groundwater-flow system at Delphi Thermal and was used to assess various regional water management strategies. The model was updated in 1994 utilizing new information compiled as part of the RFI activities and the Phase III Wellhead Management Modeling Project for Montgomery County (Geraghty & Miller, Inc. 1994b).

To meet the objectives of the Administrative Order, to implement IMs and to support the Baseline Risk Assessment, the revised groundwater flow model (Geraghty & Miller, Inc. 1994c) has been used to delineate groundwater flow paths from SWMUs by using particle tracking techniques. A complete mix model, MODALL (Potter 1995), was also used to compute dilution factors from specified sources to estimate exposure concentrations at downgradient receptor points. The complete mix model uses the cell-by-cell flow terms calculated by the revised groundwater model to compute the dilution factors. The revised model has also been used to demonstrate groundwater capture for various groundwater extraction alternatives for the IM being implemented at the Delphi Thermal site. Furthermore, the revised model was designed such that it could continue to be used to support the evaluation of a variety of regional groundwater management issues, if required.

3.1.2 Surface Water and Sediment

During Phases I and II, sediment and surface-water samples were collected at two locations at the northern portion of the site. One sampling location was in the drainage ditch at the upstream boundary of the site and the other was at the downstream boundary of the site (Figure 2-6). Sediment samples were collected for analysis of Target Compound List (TCL)/Target Analyte List (TAL) parameters and surface-water samples were collected for analysis of Appendix IX parameters. These data are evaluated in the Baseline Risk Assessment

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(Volume II). The analytical results for surface water and sediment are discussed in Section 4.5 (Surface-Water/Sediment Sampling).

3.1.3 Soil

During the RFI, investigations of soil conditions were performed at the West Tank Farm, South Tank Farm, T4, T5/T6, T11, T12, Waste Pile/Staging Area, Liquid Waste Burner, and Fill Area. The primary objectives of the investigations were to determine if a significant release of hazardous constituents had occurred from these SWMUs, to define the nature and extent of any hazardous constituents released, and to collect data to support the Baseline Risk Assessment (Volume II). The general approach for these investigations was to limit the scope of analyses based on previous work conducted at the site and existing site data.

Existing USTs in the West Tank Farm (five), South Tank Farm (six), T4, and T12 were removed at the beginning of the RFI. Soil samples were then collected for laboratory analysis using a judgmental sampling approach from the excavated tank areas to determine if a potentially significant release of hazardous constituents had occurred. Samples were collected from tank excavations and selected for laboratory analysis based upon field observations, which included visual inspections and screening for organic vapors using a photoionization detector (PID or HNu). If no significant release of hazardous constituents was confirmed by field observations or laboratory analysis, then sampling was considered to be complete. If a potentially significant release was identified, random/systematic sampling was to be performed around the tank areas to determine the nature and extent of the release and to collect data for the Baseline Risk Assessment. However, Phase II sampling was only required in one area of the West Tank Farm to evaluate the presence of volatile hazardous constituents between former USTs 11 and 12 (SWMU T10) removed prior to the RFI. No random/systematic sampling was required in the West Tank Farm, South Tank Farm, T4, or T12.

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A judgmental sampling approach was also used at SWMU T5/T6, the Waste Pile/Staging Area, LWB and Fill Area. T5/T6 was removed prior to the RFI. A soil sample was collected in each of the former tank locations, at a depth below the level of the former tanks for analysis of the constituents of concern associated with this SWMU. At the Waste Pile/Staging Area, three sampling locations were selected adjacent to the drainage system during Phase I, and a soil sample from just below the concrete and/or asphalt overlay (0 to 2 feet) and a sample from below the drainage system (6 to 8 feet) were collected from each borehole. Four sample locations were selected during Phase II to provide relatively even coverage over the SWMU and to target areas where releases most likely occurred. During Phase II, soil samples were collected from three depth intervals at the Waste Pile/Staging Area; from just below the overlay and from the most impacted and least impacted sample intervals, based on field screening using a PID. At the former location of the LWB, one soil boring was advanced to a depth of 14 feet below ground surface (bgs), below the depth of the two former underground holding tanks. A soil sample from a shallow (2 to 4 feet) and deep (12 to 14 feet) sampling interval was then collected for laboratory analysis. At the Fill Area, two soil borings were advanced in locations selected to provide relatively even coverage over the suspected fill area. These borings were advanced until native soil was encountered. A sample of the fill material and a native soil sample were collected for laboratory analysis based on visual inspection and screening for organic vapors using a PID. Soil samples collected at these SWMUs from shallow depths were intended to characterize soil conditions that may result in potential exposure to workers, while deeper soil samples were intended to characterize soil conditions that may affect groundwater quality.

At SWMU T-11, a random/systematic sampling approach was used. Soil samples were collected at depths of 0 to 2 feet and 14 to 16 feet bgs. These depths were selected to identify any releases of hazardous constituents to surface and subsurface soil and to define the nature and extent of any potentially significant releases of hazardous constituents from the tank. Soil samples collected at this SWMU from a depth of 0 to 2 feet were intended to characterize soil conditions that may result in potential exposure to workers; samples from 14 to 16 feet were intended to characterize soil conditions that may affect groundwater quality.

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Soil samples were collected for analysis of TCL/TAL parameters that were expected to be waste constituents associated with each particular SWMU. The analytical results for soil are discussed for each SWMU in Section 5.0 (SWMU Investigation Results).

3.1.4 Waste

Data were collected during the RFI to characterize the waste in Landfills L1, L2, and L3. A random/systematic sampling approach was implemented using a grid system. The primary objectives of waste sampling were to characterize the surficial waste in the landfills to support the Baseline Risk Assessment (Volume II). After aerial photographs of the landfills were reviewed, geophysical surveys were attempted and/or performed at each landfill to further define the areal extent of the waste. Groundwater samples were collected immediately upgradient and downgradient from the landfill and analyzed for Appendix IX parameters to characterize waste/soil impacts on groundwater from hazardous constituents at the landfills. To characterize upper waste, samples were collected at random locations on a specified sampling grid from a depth of 0 to 2 feet for analysis of TCL/TAL parameters. The analytical results for waste are discussed in Sections 5.1 (Landfill L1), 5.2 (Landfill L2), and 5.3 (Landfill L3).

3.1.5 Laboratory Analytical Methods

In accordance with the approved RFI Work Plan, all samples were analyzed by NET Environmental Laboratories, Inc. (NET) of Dayton, Ohio, or Cambridge, Massachusetts, for the parameters specified, using the appropriate analytical methods and data quality objectives. NET's Dayton Division was used for analysis of volatile organic compounds (VOCs), semivolatile organic compounds (SVOCs), polychlorinated biphenyls (PCBs)/pesticides, herbicides, and cyanide. NET's Cambridge Division was used for analysis of all metals, and SVOCs using the Gel Permeation Chromatography (GPC) cleanup method during Phase II. The RFI analytical results from NET's Dayton and Cambridge divisions are provided in Appendix A. The RFI quality assurance/quality control analytical results (QA/QC) are also in Appendix A.

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Appendix A1 contains tables providing duplicate sample identification information for Phases I and II.

Comprehensive analysis of media samples were conducted for each SWMU. Groundwater, surface-water, and sediment samples were analyzed for Appendix IX VOCs, Appendix IX SVOCs, Appendix IX PCBs/pesticides, Appendix IX herbicides, Appendix IX total and dissolved metals, and Appendix IX cyanide, where appropriate. Groundwater and surface-water samples were analyzed for VOCs by Method 8240 during Phase I and during Phase II for select samples, and by Method 8015 during Phase II. The Method 8015 analysis was used to identify three Appendix IX VOCs not detectable by Method 8240. To characterize groundwater with respect to metals, both unfiltered (total metals) and filtered (dissolved metals) samples were collected. After the unfiltered metals were analyzed, any metals detected would also be analyzed in the filtered samples. Soil samples were analyzed for TCL VOCs, TCL SVOCs, TLC PCBs/pesticides and TAL metals, and cyanide, where appropriate. Appendix IX list of constituents and the TCL/TAL list of constituents are presented in Appendix C of the QAPjP (Table 5.1) of the RFI Work Plan (Geraghty & Miller, Inc. 1992a).

The analytical data were validated by Geraghty & Miller personnel. The data validation was performed at Level III (based upon 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]). In addition, the U.S. EPA documents Laboratory Data Validation Functional Guidelines for Evaluating Organic Analyses (U.S. EPA 1988a) and Laboratory Data Validation Functional Guidelines for Evaluating Inorganic Analyses (U.S. EPA 1988b) were used as guidance for assigning any conditional qualifier codes to the analytical results. A summary of the overall data quality objectives for the RFI is provided in Appendix B.

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3.2 FIELD INVESTIGATION METHODOLOGIES

The following section provides the methodology used to collect groundwater, surface-water, sediment, and soil samples during Phase I and Phase II of the RFI at the Delphi Thermal site. Oversight was provided during all field activities by U.S. EPA personnel or their oversight contractor, PRC.

3.2.1 Groundwater Methodology

During Phase I, groundwater elevations were measured from 47 existing monitor wells and 12 historical production wells. Additionally, groundwater samples were collected from 36 monitor wells for laboratory analysis for VOCs by Method 8240, SVOCs, metals, and other analytes detailed in the RFI Work Plan (Geraghty & Miller, Inc. 1992a).

During Phase II, to further define the extent of groundwater contamination south of Landfill L1, Delphi Thermal installed deep Monitor Well GM-20D (Figure 3-2) adjacent to an existing shallow monitor well, WSU-24 (Figure 3-1). Prior to collecting a groundwater sample from Well WSU-24, the well was inspected via televiewing to determine the condition of its casing and screen and was developed. Water-level measurements were also made in these two wells during Phase II field activities.

Also during Phase II, groundwater elevations were measured from 61 monitor wells and 12 historical production wells. The additional wells available during Phase II included 12 upper aquifer (TW-2, WSU-24, ME-1, ME-2, ME-3, ME-4, ME-5, ME-6, GM-21, GM-22, GM-23, GM-24) and two lower aquifer (GM-20D, MT-69) monitor wells. Groundwater samples were collected from 42 monitor wells and analyzed for select VOCs (1,4-dioxane, acetonitrile, and isobutyl alcohol) by Method 8015 and samples from 13 monitor wells were collected and analyzed for VOCs by Method 8240.

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Phase I and Phase II RFI field activities were performed in accordance with the approved RFI Work Plan (Geraghty and Miller, Inc. 1992a). The following sections discuss methodologies used for WSU-24 development, GM-20D installation, water-level measurements, and groundwater sample collection.

3.2.1.1 Monitor Well WSU-24 Development

The purpose of monitor well development is to ensure that groundwater data are representative of the surrounding formation. Following closed-circuit inspection of Well WSU-24, the well was developed by surging. The surging involved scrubbing the inside of the entire length of screen using two rubber disks that were mechanically moved up and down. The motion of the two rubber disks forced groundwater in and out of the slotted well screen, effectively removing fine-grained formation material (silt and sand) trapped within the well screen slots.

Following surging, the well was purged on October 5, 1995. A 2-inch submersible pump and hose were decontaminated prior to placement in the well. The well was purged until the field parameters (pH, specific conductance, and temperature), which were recorded at the well head in 15-minute intervals, stabilized. The volume of water purged, clarity, field parameters, date, time, and all other pertinent information were recorded on monitoring well development logs, which are provided in Appendix C.

Monitor Well WSU-24 was purged at a rate of approximately 2 gallons per minute (gpm) for approximately 3 hours, removing 356 gallons of water. Due to the length of the screen (43 feet), the 2-inch submersible pump was raised at 10-foot intervals when field parameters stabilized during the final stages of purging. All field parameters were within 10 percent of the previous reading during the final stages of purging, indicating successful development. Discharge from the purged well remained clear during development. Development procedures were performed in accordance with the approved RFI Work Plan (Geraghty and Miller, Inc. 1992a).

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3.2.1.2 Monitor Well GM-20D Installation and Development

During Phase II, GM-20D was installed in the lower aquifer to further characterize groundwater downgradient of the Delphi Thermal site. This monitor well was installed using cable-tool drilling methods. Prior to drilling, a 10-inch diameter steel casing was decontaminated using high-pressure steam, and then was advanced into the confining till (silt and clay layer) underlying the upper aquifer to create a hydraulic seal between the upper and lower aquifer. Following the seating of the 10-inch steel casing, an 8-inch steel casing was decontaminated using high-pressure steam and advanced inside the 10-inch casing to a depth of approximately 99 feet bgs, approximately 25 feet below the confining till layer.

During drilling, a steel bail was used to remove drill cuttings from within the steel casing as it was advanced. Drill cuttings were described and the rate of casing advancement was recorded in the field by a Geraghty and Miller hydrogeologist. Drill cuttings were contained in 55-gallon drums for proper disposal. Potable water was added to the borehole during bailing to prevent the surrounding formation from entering the casing due to decreases in hydraulic head. The amount of potable water added to the borehole and the hydraulic head within the borehole during drilling was recorded in the field by a Geraghty & Miller hydrogeologist. Lithological logs are presented in Appendix C.

When the target depth (approximately 25 feet below the till confining layer) had been reached, a monitor well was installed through the inside of the 8-inch casing to the bottom of the borehole. The monitor well consisted of threaded 4-inch diameter, flush-joint, schedule 40 polyvinyl chloride (PVC) casing threaded to a 10-foot length of screen. The screen consisted of 0.010-inch slot size, schedule 40 threaded PVC. The final depth of the monitor well was set at approximately 97 feet bgs, approximately 23 feet below the base of the till confining layer.

Following the installation of the PVC monitor well, the 8-inch casing was pulled back allowing the existing sand and gravel formation to collapse around the well-screen to a depth of

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73 feet bgs, approximately 14 feet above the top of the well screen. Bentonite pellets were then added to the borehole annulus from 73 feet bgs to 69 feet bgs while the 8-inch casing was pulled back to create a hydraulic seal in the borehole annulus within the depth interval of the confining till layer. The remaining annulus was then grouted, using the tremie method, as the remaining 8-inch casing was removed from the borehole. The 10-inch outer casing was left in place (approximately 7.5 feet within the till confining unit) to hydraulically seal the upper aquifer from the lower aquifer. Monitor Well GM-20D installation was completed on October 17, 1994. The well was developed by bailing on October 28, 1994 and on November 1, 1994. A well construction log is provided in Appendix C.

3.2.1.3 Water-Level Elevation Measurements

A full round of water-level elevations were measured from existing monitor wells and production wells in the vicinity of the Delphi Thermal site on January 29, 1993 (Phase I) and October 20, 1994 (Phase II) to evaluate groundwater flow. The electronic water-level probe and tape was then decontaminated with a distilled water rinse prior to use in each well. The probe was lowered in the center of the well until contact with water was indicated, either by an audible alarm or light. The tape was then marked and held at the measuring point, designated by a mark or notch in the well casing, and the measurement was repeated. The measurement was then recorded in the field log.

A thinner tape with only 5-foot markings was needed to measure groundwater elevations from several production wells. In this case, the distance from the designated measuring point to the marked tape was measured within 0.01 feet by using a folding ruler. Decontamination and recording procedures for this probe were the same as stated above.

The total depths of the monitor wells were measured by first lowering the probe to the bottom of the well. The probe was then raised slowly until there was no slack in the tape. The bottom of the well was "felt" by gently raising and lowering the probe. All measurements were

recorded on a field-data sheet or a water-sampling log and were performed in accordance with the approved RFI Work Plan (Geraghty and Miller, Inc. 1992a).

3.2.1.4 Groundwater Sampling

Groundwater samples were collected from monitor wells during January 1993 (Phase I) and during October and November 1994 (Phase II) to characterize groundwater quality. Prior to sampling each well, monitoring equipment and field parameter equipment were tested and plastic sheeting was placed near the well and work area. The well identification number, sample identification, date, time, weather condition, and project number were recorded on a water sampling log.

The monitor well was then unlocked, the well cap was removed, and the condition of the well was noted. The water level within the well and the total depth of the well were measured as stated in Section 3.2.1.3 (Water-Level Elevation Measurements) and the volume of water in the well was calculated and recorded on a water sampling log. Water sampling logs are provided in Appendix C.

Following decontamination, a 2-inch submersible pump or a site-dedicated Teflon bailer was attached to clean polypropylene rope, allowing enough length for the pump or bailer to reach the bottom of the well. The pump or bailer was lowered slowly to the bottom of the well with a minimum of surface disturbance and three volumes of water were removed from the well. When a bailer was used, it was raised to the surface carefully; the rope was not allowed to contact the ground. The volume of water purged, its clarity, and all other pertinent data were recorded on the water sampling log.

After three well volumes of water had been evacuated, a water sample was poured into a Pyrex cup and field parameters (pH, specific conductance, and temperature) were measured and recorded on a water sampling log. Samples were collected for VOCs, SVOCs, metals, and any

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other remaining analytes in that order. During Phase I, groundwater samples were analyzed for VOCs using Method 8240. During Phase II, groundwater samples collected from wells sampled during Phase I were analyzed by Method 8015 to identify three VOCs not detectable by Method 8240 (1,4-dioxane, acetonitrile, and isobutyl alcohol) and 13 select wells were sampled and analyzed by both Method 8240 and Method 8015. The samples were poured slowly to avoid splashing of the sample. VOC samples were collected and sealed with no head space in the VOC vial. Each sample container was labeled with the following information: sample identification, date, time of sampling, sampler's initials, and method of preservation. Dissolved metal samples were poured into a Pyrex cup and filtered in the field using a peristaltic pump, silicon tubing, and a 0.45-micron membrane filter. Following sample collection, an additional set of field parameters was measured and recorded.

Metal samples were preserved and filled sample containers were placed in coolers packed with ice. The well cap and lock were then replaced. The bailer, Pyrex cup, and 2-inch submersible pump, as applicable, were decontaminated, and polypropylene rope, plastic sheeting, tubing, and filters were disposed. All paperwork, including chain-of-custody forms, was completed, and samples were delivered to NET Laboratory, Dayton, Ohio, by Geraghty and Miller sampling personnel. Groundwater sampling was conducted in accordance with the RFI Work Plan (Geraghty & Miller, Inc. 1992a).

3.2.2 Surface-Water/Sediment Sampling Methodology

The methodologies used to obtain surface-water and sediment samples during the RFI are discussed below. Surface-water and sediment sampling was performed in accordance with the RFI Work Plan (Geraghty and Miller, Inc. 1992a).

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3.2.2.1 Surface-Water Sampling

When the designated sampling location was reached, Geraghty & Miller personnel donned the appropriate personal protective equipment (PPE) and established the exclusion zone. Plastic sheeting was placed near the work area. The appropriate sample containers were selected and labeled. Sample containers were pre-preserved by the laboratory as appropriate.

Surface-water samples were collected by gently submerging a stainless-steel dipper into the total depth of water. The dipper was then slowly raised to the surface. Care was taken to avoid splashing and floating objects. The water was then poured into appropriate laboratory sample containers. During pouring, a qualitative attempt was made to transfer any suspended particles to each required laboratory container. Sample containers were placed in an iced cooler for transport to the laboratory.

After all required laboratory containers were filled, the remaining sample was poured into a Pyrex cup and temperature, pH, and specific conductivity measurements were taken. These measurements, and other pertinent sampling information, were recorded on a water sampling log. After the measurements had been made, re-usable sampling equipment was decontaminated in accordance with the standard operating procedure (SOP) found in the RFI Work Plan (Geraghty & Miller Inc. 1992a). Disposable PPE and sampling equipment were collected and discarded. Chain-of-custody documents were completed prior to submitting the samples to the laboratory.

3.2.2.2 Sediment Sampling

When the designated sampling location was reached, Geraghty & Miller personnel donned the appropriate PPE and established the exclusion zone. Plastic sheeting was placed near the work area and the appropriate sample containers were selected and labeled.

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Sediment samples were collected using a stainless-steel hand auger. Sediment was collected from the ground surface to a maximum depth of 2 feet bgs. Sediment was then retrieved from the hand auger and placed into appropriate laboratory sample containers. Sample containers were placed in an iced cooler for transport to the laboratory.

Pertinent sampling information was recorded on a soil/sediment sampling log. After the measurements were made, re-usable sampling equipment was decontaminated in accordance with the SOP in the RFI Work Plan (Geraghty and Miller Inc. 1992a). Chain-of-custody documents were completed prior to submitting the samples to the laboratory.

3.2.3 Soil and Waste Sampling

The methodologies used to obtain soil and waste samples during the RFI are discussed below. All soil and waste sampling was performed in accordance with the RFI Work Plan (Geraghty & Miller, Inc. 1992a).

3.2.3.1 UST Excavation Pit Soil Sampling

Soil samples collected from UST excavation pits (South Tank Farm, West Tank Farm, T4, and T12) were collected using a trackhoe fitted with a bucket because of health and safety considerations associated with entering an excavated pit. The Geraghty & Miller field representative instructed the trackhoe operator to scrape off a layer of soil prior to retrieving a bucket of freshly exposed soil from the selected location. The Geraghty & Miller field representative used a decontaminated stainless-steel spoon to collect a soil sample from the bucket. The sample was placed in a Ziploc™ plastic bag and then into a cooler containing ice.

Following collection of all required grab samples, the samples were removed from the cooler and allowed to warm. The concentrations of total VOCs were measured from the headspace in each bag by using a PID and recorded. Based on a review of the headspace readings

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and previously recorded field observations, the trackhoe operator was instructed to collect soil from an area within the excavated tank pit with the highest headspace reading and/or the strongest visual evidence of staining. A soil sample was collected from this bucket, placed into the appropriate laboratory container, and put in a cooler containing ice using the same procedure used to collect grab samples.

3.2.3.2 Hollow-Stem Auger Soil Sampling

Subsurface soil samples collected at SWMU T10 (Phase II at the West Tank Farm), T5/T6, T11, Waste Pile/Staging Area, LWB and Fill Area were collected using a drilling rig and conventional 4 1/4-inch inner-diameter, hollow-stem augers. Soil samples were collected using a decontaminated 24-inch long, 3-inch diameter, stainless-steel, split-spoon sampler or in some cases, a 2-inch diameter split-spoon sampler. When the designated sampling location was reached, Geraghty & Miller personnel donned the appropriate PPE and established the exclusion zone. Plastic sheeting was placed near the work area. The appropriate sample containers were selected and labeled.

During drilling, the hollow-stem augers were advanced to the designated sampling depth where the plug was removed from inside the augers and replaced with a decontaminated split-spoon sampler. The split-spoon sampler was then driven 2 feet below the bottom of the augers. When the split-spoon sampler had been removed, the soil was scanned with a PID, placed in the appropriate containers, and described on a boring log by a Geraghty & Miller field representative. The sample containers were placed in a cooler containing ice. Upon completion of each borehole, the borehole was grouted using the tremie method.

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 SOP found in the RFI Work Plan (Geraghty & Miller, Inc. 1992a). Disposable PPE and sampling

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equipment were collected and discarded. Pertinent sampling information was recorded on a soil/sediment log for samples submitted to the laboratory. Chain-of-custody documents were completed prior to submitting the samples to the laboratory. All water and soil generated during drilling and decontamination was contained in drums and disposed appropriately by Delphi Thermal.

3.2.3.3 Surficial Waste Samples

Surficial waste samples were collected at Landfills L1, L2, and L3 using a decontaminated stainless-steel hand auger. When the designated sampling location was reached, the Geraghty & Miller representative donned the appropriate PPE and established the exclusion zone. Plastic sheeting was placed near the work area. The appropriate sample containers were selected and labeled.

Waste material was collected from the ground surface to a depth of 2 feet bgs, if possible. The waste sample was then carefully retrieved from the hand auger and placed into appropriate laboratory sample containers. Sample containers were placed in an iced cooler for transport to the laboratory.

Pertinent sampling information was recorded on a soil/sediment log. Following sampling, re-usable sampling equipment was decontaminated in accordance with the SOP in the RFI Work Plan (Geraghty & Miller, Inc. 1992a). Disposable PPE and sampling equipment were collected and discarded. Chain-of-custody documents were completed prior to submitting the samples to the laboratory.

3.2.4 Geophysical Survey/Aerial Photograph Review

The RFI Work Plan specified that before collection of waste and groundwater samples at Landfills L1, L2, and L3, geophysical surveys should be conducted to delineate, if possible, the

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areal extent of each landfill. The geophysical surveys were conducted using a Geonics EM31 terrain conductivity instrument (EM31). The electromagnetic boundary interpretations were also compared with two historical aerial photographs of the Delphi Thermal site to validate the definition of areal extent. One aerial photograph was from the 1920s and the other was from 1976.

A detailed discussion of the geophysical investigations is contained in the report "Results from the Electromagnetic Survey of Landfills L1, L2, and L3, Delphi Thermal Systems - GMC, Moraine, Ohio" (Geraghty & Miller, Inc. 1992b). This report was submitted to the U.S. EPA in September 1992. The preliminary EM31 screening, EM31 results, and historical aerial photographs for each of the landfills are briefly discussed in Section 5.0 (SWMU Investigation Results).

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4.0 CHARACTERIZATION OF ENVIRONMENTAL SETTING RESULTS

The Administrative Order outlines specific data requirements necessary to further characterize the environmental setting. These requirements were met by the following methods:

1. Investigation of the site during RFI Phase I and II activities.

2. Use of published data from other sources.

3. Use of data previously collected at the site during other environmental investigations.

This section will supplement the description of the site physiographic setting presented in Section 2.0 (Facility Description) by providing a discussion of current groundwater flow characteristics, groundwater quality upgradient and downgradient of the site, background soil analytical results, site-specific geotechnical data, and surface-water/sediment results.

4.1 GROUNDWATER FLOW

Water-level elevations were measured to determine groundwater flow directions in the upper and lower aquifers and to determine vertical gradients between the two aquifers. A full round of water-level elevations was measured from 59 wells on and near the Delphi Thermal site on January 29, 1993, following the Phase I groundwater quality sampling. This included 31 monitor wells in the upper aquifer, and 16 monitor wells and 12 production wells in the lower aquifer. Water-level measurements made during Phase I of the RFI are presented in Tables 4-1 through 4-3.

During Phase II of the RFI, a full round of water-level measurements, including 14 additional wells, was made on October 20, 1994, prior to the groundwater quality sampling.

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Monitor Wells ME-1 through ME-6, GM-21, GM-22, and GM-23 at the GMC Moraine Engine Plant facility were used to measure water-level elevations in the upper aquifer. Monitor Well GM-24, located upgradient of the GMC North American Truck Group facility, Monitor Well WSU-24, located downgradient (south) of the Delphi Thermal site and Test Well TW-2 (to be used as the capture well during Interim Measures [Geraghty & Miller, Inc. 1994c]), were also used to measure water-level elevations in the upper aquifer. Lower aquifer Monitor Wells GM-20D and MT-69, located downgradient of the Delphi Thermal site, were used to measure water-level elevations during Phase II to confirm the capture area predicted by the model for the pump-to-waste Well DN-13 utilized by Montgomery County in the lower aquifer. The water-level measurements made during Phase II are presented in Tables 4-4 through 4-7.

Water-level elevations were measured using the protocols discussed in Section 3.2.1.3 (Water-Level Elevation Measurements) and the RFI Work Plan (Geraghty and Miller, Inc. 1992a). The water-level elevations measured during Phases I and II at the Delphi Thermal site are discussed in the following sections.

4.1.1 Upper Aquifer

The groundwater flow and surface configuration in the upper aquifer was determined during the Phase I and Phase II investigations and are presented on Figures 4-1 and 4-2, respectively. These studies indicate that the groundwater flow in the upper aquifer is generally to the south across the Delphi Thermal site, generally parallel to the buried valley walls. At the southern end of the facility, near the Dryden Road North Well Field, the valley and the groundwater flow direction bends to the south-southwest. The horizontal hydraulic gradient is generally consistent across the site, but steepens near the central portions of the Delphi Thermal site reflecting a decrease in aquifer transmissivity. This increased gradient is likely the result of clay lenses in the sand and gravel aquifer.

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Groundwater flow is locally modified by the Great Miami River and induced infiltration from the DN-13. The Great Miami River is approximately 0.5 feet higher than the surrounding aquifer based on interpolated river elevations using gauging stations at river mile 66.4 and 80. The gradient between the river and the upper aquifer indicates that the river is losing water to (recharging) the aquifer resulting in the groundwater flow becoming southeast along the river (Geraghty & Miller, Inc. 1994b). The Montgomery County Pump-to-Waste program at the deep aquifer Well DN-13 has developed a cone of depression in the upper aquifer due to induced infiltration through the thinning confining till layer (Figure 2-4).

4.1.2 Lower Aquifer

Groundwater flow in the lower aquifer near Delphi Thermal is generally to the south, with the flow being locally modified at the southern end of the site by Well DN-13. Similar to the upper aquifer, the groundwater flow of the lower aquifer follows the trend of the buried valley walls (Geraghty & Miller, Inc. 1994b) at the southern end of the site. Potentiometric maps of the lower aquifer during Phase I (January 1993) and Phase II (October 1994) of the RFI are presented on Figures 4-3 and 4-4, respectively.

Well DN-13, completed in the lower aquifer, is capturing groundwater south of the site as it withdraws approximately 2.6 million gallons per day (mgd) under the Montgomery County Pump-to Waste Program. This is supported by groundwater elevations in downgradient wells which indicate a cone of depression formed in the lower aquifer centered around DN-13. Additionally, water quality data for Monitor Well MT-69 collected during Phase II of the RFI showed no detectable concentration of VOCs (Section 4.3.2.1 VOCs) which indicates that VOCs have not migrated south of DN-13. DN-13 is located approximately 550 feet southwest of the southwest corner of the Delphi Thermal facility, and MT69 is approximately 1,500 feet further south from the Delphi Thermal facility (Figure 4-4). According to the Montgomery County Department of Sanitary Engineering, DN-13 is only shut down periodically for maintenance and sampling activities.

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4.1.3 Vertical Gradients

The water-level measurements collected during Phases I and II of the RFI groundwater sampling in January 1993 and October 1994, respectively, were used to determine the direction of vertical gradients for selected well pairs at the Delphi Thermal site. Vertical gradients are a comparison of potentiometric conditions between the upper and lower aquifers. The magnitude and direction of vertical gradients indicate whether the potential exists for groundwater to move from one aquifer to another through a confining unit.

At the northern (upgradient) end of the site, vertical gradients were slightly upward (0.02 ft/ft) in Well Pairs HR-9/HR-10 and HR-11/HR-12 during both Phase I and Phase II; therefore, the potential exists for groundwater to migrate upward through the confining unit to the upper aquifer in this area.

Well pairs immediately downgradient from the North Settling Lagoon (W-3-N/HR-15, W-4-N/HR-14, and HR-3/HR-13) all showed downward vertical gradients (the average downward vertical gradient was 0.19 ft/ft) with the exception of well pair HR-3/HR-13 during Phase II, which exhibited an upward vertical gradient of 0.42 ft/ft.

At the southern (downgradient) end of the site, vertical gradients were downward in all of the well pairs measured during Phases I and II (average of 1.03 ft/ft and 0.79 ft/ft, respectively); therefore, the potential exists for groundwater to migrate downward from the upper aquifer through the confining unit to the lower aquifer in this area. The well pairs were as follows: 4S/GM-5, GM-8/GM-7R, GM-10/GM-9, GM-16/GM-15, GM-2/GM-1, GM-18/GM-13, GM-17/GM-11, and GM-6/GM-3.

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4.2 UPGRADIENT GROUNDWATER QUALITY

To characterize groundwater upgradient from the Delphi Thermal site, groundwater samples were collected from six upgradient monitor wells during the RFI. These monitor wells included upper Wells HR-8, HR-9, HR-11, and W-1-N and lower Wells HR-10 and HR-12 (see Figures 3-1 and 3-2). A discussion of the investigative strategy and groundwater results is provided in the following sections.

4.2.1 Investigative Strategy

During Phase I, Monitor Wells HR-8, HR-9, HR-11, and W-1-N were used to collect groundwater samples from the upper aquifer (Figure 3-1); Monitor Wells HR-10 and HR-12 were used to collect groundwater samples from the lower aquifer (Figure 3-2). The upgradient groundwater quality samples were submitted for analysis of Appendix IX VOCs using Method 8240, SVOCs, PCBs/pesticides, herbicides, cyanide, total metals, and dissolved metals for each total metal constituent detected above the practical quantitation limit (PQL).

During Phase II, groundwater samples were collected from the six upgradient monitor wells sampled during Phase I and analyzed for VOCs by Method 8015. Lower aquifer Monitor Wells HR-10 and HR-12 were also sampled for Appendix IX total and dissolved antimony during Phase II to better characterize the upgradient or background concentrations of this constituent.

4.2.2 Groundwater Results

Analytical results for upper and lower aquifer wells sampled upgradient of the Delphi Thermal site during the RFI are discussed in the following sections; results for QA/QC samples are also included. Analytical results are provided in Appendix A2 and A6.

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4.2.2.1 VOCs

Detected VOC concentrations upgradient of the site during Phases I and II are summarized in Table 4-8 and discussed in the following sections.

4.2.2.1.1 Upper Aquifer

During Phase I, three of the four upgradient monitor wells in the upper aquifer showed detectable concentrations of VOCs using Method 8240. 1,1,1-Trichloroethane was detected in Well HR-8 and Well HR-9 at concentrations of 5.2 micrograms per liter (ug/L) and 5.4 ug/L, respectively. 1,1-Dichloroethane was detected in HR-8, HR-9, and HR-11 at detectable concentrations of 34.6 ug/L, 29.3 ug/L, and 10.7 ug/L, respectively. Chloroethane was detected at 13.7 ug/L in HR-9. Trichloroethene (TCE) was detected in HR-8 and HR-9 at 1.3 ug/L and 16.1 ug/L, respectively. No other VOCs were detected in the upper aquifer upgradient of the Delphi Thermal site.

During Phase II, no VOCs were detected in upper aquifer monitor wells upgradient of the site by Method 8015 analysis.

4.2.2.1.2 Lower Aquifer

Lower aquifer Monitor Wells HR-10 and HR-12 upgradient of the site showed detectable concentrations of carbon disulfide at 3 ug/L and 5.5 ug/L, respectively, during Phase I. No carbon disulfide was detected in Sample DUP-20, a duplicate sample of Well HR-10. Vinyl chloride was detected in HR-12 at a concentration of 6.6 ug/L. No other VOCs were detected in lower aquifer monitor wells upgradient of the site.

During Phase II, no VOCs were detected in lower aquifer monitor wells upgradient of the site by Method 8015 analysis.

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4.2.2.2 SVOCs, PCBs, Pesticides, Herbicides, and Cyanide

No SVOCs, PCBs, pesticides, herbicides, or cyanide were detected upgradient from the Delphi Thermal site during Phase I. These constituents were not analyzed for during Phase II.

4.2.2.3 Dissolved Metals

Dissolved metal results upgradient of the site during Phases I and II are summarized in Table 4-9 and discussed in the following sections.

4.2.2.3.1 Upper Aquifer

During Phase I, dissolved antimony was detected in Well HR-9 at an estimated concentration of 55.3 ug/L, which exceeds its Safe Drinking Water Act, Maximum Contaminant Level (MCL) of 6 ug/L. Dissolved barium was detected in all four of the upper aquifer wells upgradient of the site ranging from concentrations of 77.8 ug/L (HR-11) to 102 ug/L (W-1-N). Dissolved cobalt was detected in Monitor Wells HR-11 and W-1-N at detected concentrations of 9.8 ug/L and 6.1 ug/L, respectively, and in Monitor Well HR-9 at an estimated concentration of 11.9 ug/L. Dissolved selenium was detected in HR-9 at an estimated concentration of 1 ug/L.

4.2.2.3.2 Lower Aquifer

Dissolved antimony was detected in HR-12 at a concentration of 51.9 ug/L (higher than its MCL) during Phase I. Dissolved barium was detected in HR-10, its duplicate sample (DUP-20), and HR-12 at concentrations of 58 ug/L, 58.6 ug/L, and 97.7 ug/L, respectively. Dissolved cobalt was detected in HR-10, DUP-20 and HR-12 at 5.6 ug/L, 8.6 ug/L and 10.4 ug/L, respectively. No other dissolved metals were detected in the lower aquifer upgradient of the Delphi Thermal site.

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During Phase II, no total or dissolved antimony was detected in Lower Aquifer Wells HR-10 and HR-12, or its duplicate sample (DUP-36), upgradient of the site.

4.2.2.4 QA/QC Samples

Rinseate Blank RB-09 was collected following sampling-equipment decontamination after Sampling Well HR-10 and prior to Sampling Well HR-8. Rinseate blanks are samples collected as a check on the efficiency of the procedures for decontaminating the sampling equipment. Trip Blank TB-15 traveled with the laboratory bottles during sample collection and handling. Trip blanks accompany the laboratory bottles to determine if any VOC cross-contamination occurred during sample collection and handling. Analytical results for rinseate blank and trip blank samples are provided in Appendix A2.

Chloroform was detected in Rinseate Blank RB-09 at a concentration of 2.3 ug/L; it was not detected in either Well HR-8 or Well HR-10. Chloroform (detected in eight of ten rinseate blanks collected during Phase I) may have been present as a by-product of the distillation process. Chlorinated water was likely used as a source for the distilled water used in the decontamination process. No VOCs were detected in Trip Blank TB-15, indicating that no VOC cross-contamination occurred during sample collection and handling.

No SVOCs, PCBs, pesticides, herbicides, or cyanide were detected in Rinseate Blank RB-09, indicating that cross-contamination of these constituents did not occur through decontamination procedures.

Total copper and zinc were detected in RB-09 at concentrations of 32.8 ug/L and 9.5 ug/L, respectively. Total copper and zinc were also reported in Sample HR-8, which was collected following the preparation of RB-09, at concentrations of 7.8 ug/L and 9.5 ug/L, respectively. However, because of copper and zinc contamination in the rinseate blank, copper and zinc were qualified as not detected in sample HR-8 during data validation.

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No VOCs were detected in Phase II Trip Blanks TB-25 and TB-28, which indicated that no cross-contamination of VOCs occurred during the collection and handling of upgradient samples. No VOCs were detected in Phase II Rinseate Blank Samples RB-17 and RB-23, which indicated that no VOC cross-contamination occurred through equipment decontamination procedures. In addition, no total or dissolved antimony was detected in RB-23, which indicated that no total or dissolved antimony cross-contamination occurred during Phase II through equipment decontamination procedures.

4.3 DOWNGRADIENT GROUNDWATER QUALITY

To characterize groundwater downgradient from the Delphi Thermal site, groundwater samples were collected from eight monitor wells during Phase I and 11 monitor wells during Phase II of the RFI. These monitor wells are located outside the southern boundary of the Delphi Thermal site (see Figures 3-1 and 3-2). A discussion of the investigative strategy, groundwater results, and a summary of conclusions is provided in the following sections.

4.3.1 Investigative Strategy

During Phase I, upper aquifer Monitor Wells GM-10, GM-16, GM-17, and GM-18, and lower aquifer Monitor Wells GM-9, GM-11, GM-13, and GM-15 were sampled for analysis of Appendix IX VOCs by using Method 8240, SVOCs, PCBs, pesticides, herbicides, cyanide, and total metals, and dissolved metals for each total metal constituent detected above the reported PQL.

During Phase II, the same eight monitor wells sampled during Phase I were sampled for VOC analysis by Method 8015. Three additional monitor wells (GM-20D, MT-69, and WSU-24) were sampled for analysis of VOCs (by Methods 8240 and 8015), PCBs, pesticides, cyanide, and total metals, and dissolved metals for each total metal constituent detected above the reported PQL. Monitor Wells WSU-24 and GM-20D are located adjacent to one another just south of the

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Delphi Thermal site boundary and are screened in the upper and lower aquifers, respectively. Monitor Well MT-69, located some distance south of the Delphi Thermal site, is screened at a depth consistent with lower-aquifer wells; however, no till separates the upper and lower aquifers at this location.

4.3.2 Groundwater Results

Analytical results for upper and lower aquifer wells sampled downgradient of the Delphi Thermal site during the RFI are discussed in the following sections; results for QA/QC samples are also included. Phase I and Phase II analytical results are provided in Appendix A2 and A6.

4.3.2.1 VOCs

Detected VOC concentrations downgradient of the site during Phases I and II are summarized in Tables 4-10 and 4-11 and discussed in the following sections.

4.3.2.1.1 Upper Aquifer

During Phase I, eight VOCs were detected in the upper aquifer downgradient from the Delphi Thermal facility. All four monitor wells sampled were reported to contain 1,1,1-trichloroethane ranging in concentrations from 3.8 ug/L in Well GM-16 to 17.9 ug/L in Well GM-18. Three of the four upper aquifer wells were reported to contain 1,1-dichloroethane ranging in concentrations from 11.1 ug/L in GM-10 to 152 ug/L in Sample DUP-22. DUP-22 is a duplicate sample of Well GM-18. 1,1-Dichloroethane was not detected in Well GM-16. Chlorobenzene was detected in Well GM-17 and its duplicate sample (DUP-21) at concentrations of 5.7 ug/L and 2.5 ug/L, respectively. Chloroethane was detected in GM-17, GM-18 and its duplicate sample (DUP-22) at concentrations of 12.3 ug/L, 10.2 ug/L, and 11 ug/L, respectively.

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Tetrachloroethene (PCE) was detected in three of the four downgradient wells at concentrations ranging from 1.1 ug/L in GM-18 to 57 ug/L in GM-16. No PCE was detected in GM-17 and its duplicate sample (DUP-21). TCE was detected in all of the upper aquifer samples collected downgradient from the Delphi Thermal site at concentrations ranging from 25.3 ug/L in GM-17 to 85.2 ug/L in GM-10. Vinyl chloride was detected in GM-17 and its duplicate sample (DUP-21), GM-18 and its duplicate sample (DUP-22) at concentrations ranging from 6.5 ug/L in DUP-21 to 17.5 ug/L in DUP-22. Three of the four upper aquifer wells downgradient from the Delphi Thermal site were reported to contain trans-1,2-dichloroethene at concentrations ranging from 2.4 ug/L in GM-10 to 17.2 ug/L in DUP-22. Trans-1,2-Dichloroethene was not detected in Well GM-16. No other VOCs were detected in the upper aquifer downgradient from the Delphi Thermal site during Phase I. VOCs detected during Phase I in the upper aquifer downgradient of the site are summarized in Table 4-10.

During Phase II, three VOCs by Methods 8240 and 8015 were detected in upper aquifer Well WSU-24, which is located south of the Delphi Thermal site. 1,1,1-Trichloroethane, PCE, and TCE were detected at concentrations of 3.1 ug/L, 2.3 ug/L, and 20.7 ug/L, respectively. No other VOCs using Methods 8240 and 8015 were detected in the upper aquifer downgradient from the Delphi Thermal site during Phase II. VOCs detected during Phase II in the upper aquifer downgradient from the site are summarized in Table 4-10.

4.3.2.1.2 Lower Aquifer

During Phase I, five VOCs by Method 8240 were detected in lower aquifer wells downgradient from the Delphi Thermal facility. Wells GM-11 and GM-13 were reported to contain 1,1,1-trichloroethane at concentrations of 8.6 ug/L and 4.6 ug/L, respectively. Wells GM-9 and GM-15 were reported to contain concentrations of 1,1-dichloroethane at 14.5 ug/L and 2.4 ug/L, respectively. PCE was detected in Wells GM-11 and GM-13 at concentrations of 5.5 ug/L and 5.8 ug/L, respectively. TCE was detected in all four of the lower aquifer wells sampled at concentrations ranging from 3.7 ug/L in GM-15 to 29.1 ug/L in GM-11. In Well

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GM-9, trans-1,2-dichloroethene was detected at a concentration of 4.1 ug/L. No other VOCs by Method 8240 were detected in the lower aquifer downgradient from the Delphi Thermal site during Phase I. VOCs detected during Phase I in the lower aquifer downgradient from the Delphi Thermal site are summarized in Table 4-11.

During Phase II, two VOCs by Methods 8240 and 8015 were detected in Monitor Well GM-20D, which is located south of the Delphi Thermal site. PCE and TCE were detected at concentrations of 6.1 ug/L and 1.8 ug/L, respectively. No other VOCs were detected in GM-20D. The other well sampled, MT-69, showed no detectable concentration of VOCs. The VOC results from MT-69 provide an indication that the Pump-to-Waste Program using the Dryden Road North Well Field (DN-13) has been effective at controlling migration of VOCs downgradient from the Delphi Thermal site. Detected VOCs in the lower aquifer downgradient from the site are summarized in Table 4-11.

4.3.2.2 SVOCs, PCBs, Pesticides, Herbicides, and Cyanide

No SVOCs, PCBs, pesticides, or herbicides were detected in the upper and lower aquifers downgradient of the Delphi Thermal site during Phases I and II.

During Phase I, cyanide was detected in upper aquifer Well GM-18 at 0.021 milligrams per liter (mg/L); however, no cyanide was detected in the duplicate sample (DUP-22) of Well GM-18. Cyanide was not detected in any other wells downgradient from the Delphi Thermal site during Phases I and II. Detected cyanide results for the upper aquifer are provided in Table 4-12.

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4.3.2.3 Dissolved Metals

Dissolved metals results downgradient of the site during Phases I and II are summarized in Tables 4-12 and 4-13 and are discussed in the following sections.

4.3.2.3.1 Upper Aquifer

During Phase I, dissolved barium was detected in all of the upper aquifer wells at concentrations ranging from 47.7 ug/L in DUP-22 (the duplicate sample of GM-18) to an estimated 180 ug/L in GM-10. Dissolved cobalt was detected in three of the four upper aquifer wells at concentrations ranging from 5.4 ug/L in GM-16 to 14.8 ug/L in DUP-21 (the duplicate sample of GM-17). No dissolved cobalt was detected in GM-18 and DUP-22. Dissolved copper was detected in GM-17, DUP-21, GM-18, and DUP-22 at concentrations ranging from 5.4 ug/L in DUP-21 to 9.7 ug/L in GM-17. Dissolved selenium was detected in GM-18 and DUP-22 at concentrations of 2.8 ug/L and an estimated 1.1 ug/L, respectively. No other metals were detected in the upper aquifer downgradient from the Delphi Thermal facility during Phase I. Detected dissolved metal results for the upper aquifer are provided in Table 4-12.

During Phase II, dissolved barium was the only dissolved metal detected in WSU-24, at a concentration of 115 ug/L. No other metals were detected in the upper aquifer downgradient of the site during Phase II. Dissolved metals detected in the upper aquifer downgradient from the site are summarized in Table 4-12.

4.3.2.3.2 Lower Aquifer

During Phase I, dissolved antimony was detected in GM-9 and GM-11 at estimated concentrations of 53.2 ug/L and 66.2 ug/L, respectively. Dissolved barium was reported in all four of the lower aquifer wells sampled during Phase I at concentrations ranging from 71.4 ug/L to 163J ug/L. Dissolved cobalt was detected in the same four wells at concentrations ranging

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from 6.7 ug/L in GM-9 to 9.4 ug/L in GM-11. Dissolved selenium was detected in GM-13 at an estimated concentration of 1 ug/L. No other dissolved metals were detected in the lower aquifer downgradient from the Delphi Thermal site, as presented in Table 4-13.

Dissolved barium was detected in GM-20D, MT-69, and DUP-33 at concentrations of 74.8 ug/L, 113 ug/L, and 119 ug/L, respectively. DUP-33 is the duplicate sample of Well MT-69. Dissolved tin was detected in MT-69 and DUP-33 at concentrations of 20.6 ug/L and 19.9 ug/L, respectively. Dissolved zinc was detected in GM-20D at a concentration of 17.5 ug/L. No other dissolved metals were detected in the lower aquifer downgradient from the Delphi Thermal site during Phase II. Detected dissolved metals in the lower aquifer downgradient from the site are summarized in Table 4-13.

4.3.2.4 QA/QC Samples

During Phase I, no VOCs were detected in Trip Blanks TB-16 and TB-17 indicating that no cross-contamination of VOCs has occurred during sample collection and handling downgradient from the Delphi Thermal site. Chloroform was detected in Rinseate Blanks RB-10 and RB-11 at concentrations of 2.3 ug/L and 1.4 ug/L, respectively. No chloroform was detected in any wells downgradient from the site. Chloroform in rinseate blanks has been discussed in Section 4.2.2.4 (QA/QC Samples). No cross contamination of VOCs occurred during equipment decontamination.

During Phase II, no VOCs were detected in Trip Blanks TB-25, TB-26, and TB-28 indicating that no VOC contamination occurred during sample collection and handling downgradient from the site. No VOCs were detected in Rinseate Blanks RB-19, RB-20, RB-23, indicating that no cross-contamination of VOCs occurred during equipment decontamination.

No SVOCs, PCBs, pesticides, herbicides, or cyanide was detected in Phase I Rinseate Blanks RB-10 and RB-11 and Phase II Rinseate Blank RB-20. The results indicate that no cross-contamination of these constituents occurred during equipment decontamination.

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During Phase I, total copper was detected in RB-10 and RB-11 at concentrations of 30 ug/L and 28.9 ug/L, respectively. Copper detected in Phase I Samples GM-17 (collected following the preparation of RB-10) and GM-18 (collected following the preparation of RB-11) was qualified as not detected during data validation. Total zinc was detected in Rinseate Blank RB-11 at a concentration of 7.2 ug/L. Zinc was also detected in Sample GM-18 at a concentration of 44.3 ug/L. Sample GM-18 was collected following the preparation of RB-11. The zinc result for GM-18 was not qualified as non-detect because the zinc concentration in this sample was greater than five times the zinc concentration in Sample RB-11. No other total metals and no dissolved metals were detected in RB-10 and RB-11.

During Phase II, total tin was detected in RB-20 at a concentration of 26.3 ug/L. RB-20 was prepared following sample collection at MT-69 on October 27, 1994, and prior to sample collection at GM-7R on the following day. No total tin was detected in MT-69 and DUP-33. Samples collected from Well GM-7R on the following day were not analyzed for metals. In addition, no samples were collected for analysis of tin until November 1, 1994. Although tin was detected in RB-20, it appears no cross-contamination of tin occurred through equipment-decontamination procedures. No cross-contamination of metal samples collected downgradient from the site occurred through equipment decontamination.

4.4 SOILS

To characterize soil conditions at the Delphi Thermal site not associated with the SWMUs, soil samples were collected and analyzed to determine background conditions, provide geotechnical data and evaluate possible impacts of an area south of Landfill L1 on Monitor Well GM-20D. A discussion of the soil investigative strategy and results is provided in the following sections.

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4.4.1 Background Soils

Because the RFI work at Delphi Thermal included an evaluation of potential releases of inorganic hazardous constituents from certain SWMUs, the RFI Work Plan (Geraghty & Miller, Inc. 1992a) specified that background concentrations of metals in soils be established. The following sections present the findings of this phase of RFI activities.

4.4.1.1 Investigative Strategy

To obtain background soil concentrations, 12 boreholes were drilled to a total depth of 16 feet in an area believed to be unaffected by waste management activities at the Delphi Thermal site. Soil samples from each borehole were collected at depths of 0 to 2 feet bgs (upper soil samples) and 14 to 16 feet bgs (lower soil samples) and submitted for TAL metals analysis.

Upper soil samples from Borings 1, 5, 6, 8, 9, and 11 were also analyzed for TCL VOCs, TCL SVOCs, TCL pesticides/PCBs, and TAL cyanide. The lower soil samples from these same six borings were also analyzed for TAL cyanide to further characterize background conditions beyond the TAL metals analysis specified in the RFI Work Plan. Due to elevated HNu readings detected during the field investigation, additional samples were collected from Borings BKG-BH06 and BKG-BH11 at the 8 to 10 foot depth interval and analyzed for TCL VOCs. The borehole locations (Figure 4-5) were selected in the field by Delphi Thermal, PRC Inc. (representing the U.S. EPA), and Geraghty & Miller personnel. Analytical results and soil boring logs are included in the report, "Delphi Harrison Thermal Systems - GMC Soil Background Analytical Results" (Geraghty & Miller, Inc. 1993b) and are also included in Appendix A and Appendix C of this report.

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4.4.1.2 Results

Visual examination of soil samples collected during Phase I indicated no evidence of contamination in this area. However, acetone was detected during laboratory analysis in BKG-BH05-02SL (at 13,000J micrograms per kilogram [ug/kg]), BKD-BH06-10SL (740J ug/kg), BKG-BH11-02SL (at 21,000J ug/kg), and BKG-BH11-10SL (at 5,400J ug/kg). No other VOCs were detected above the laboratory method detection limit (MDL) in these samples (Appendix A3). Because acetone is a by-product from the manufacturing of isopropyl alcohol and because isopropyl alcohol can degrade to acetone over time, Geraghty & Miller believes that the source of the acetone detected in the soil background samples was the isopropyl alcohol used to decontaminate the sampling equipment, rather than from past waste management practices in the background study area. To further evaluate this hypothesis, Geraghty & Miller submitted a sample from the same batch of isopropyl alcohol used during the Delphi Thermal field activities to Ceimic Corporation (Ceimic) for analysis of acetone by Method 8240. Acetone was detected in the isopropyl alcohol at a concentration of 82 micrograms per gram (ug/g). In accordance with a verbal agreement with the U.S. EPA on May 18, 1994, the use of isopropyl alcohol as a decontamination rinse was eliminated from SOPs 9 and 10 contained in the RFI Work Plan. The two revised SOPs were included in the appendix of the Phase II RFI Work Plan (Geraghty & Miller, Inc. 1994a). Therefore, isopropyl alcohol was not used during Phase II decontamination procedures.

During Phase II, soil samples were collected using standard split-spoon sampling techniques from 0 to 2 feet, 8 to 10 feet, and 14 to 16 feet from borings BKG-BH13 and BKG-BH14 adjacent to Phase I borings BKG-BH05 and BKG-BH11, respectively. The samples were submitted to NET for analysis of acetone by Method 8240 (Appendix A4). A field blank was also collected and analyzed for acetone. Acetone was not detected above the MDL in either the soil samples or the field blank.

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Di-n-butylphthalate was detected in the following soil samples collected during the Phase I investigation (Appendix A3): BKG-BH01-02SL, BKG-BH05-02SL, BKG-BH06-02SL, DUP-3), BKG-BH08-02SL, BKG-BH09-02SL, and BKG-BH11-02SL in concentrations ranging from 740U ug/kg to 1,600U ug/kg. Di-n-butylphthalate is a common laboratory contaminant from plastic products. This constituent is flagged with a "U" unless the concentration in a sample exceeds ten times the amount of di-n-butylphalate contained in the laboratory method blank (U.S. EPA 1988a). Based on these criteria, these results have been flagged with a "U" because the sample concentrations are less than ten times the concentration of di-n-butylphthalate in the method blanks.

Total cyanide was detected in Sample BKG-BH11-02SL at a concentration of 0.4J mg/kg during Phase I (Appendix A3). Because this result is near the MDL of 0.1 mg/kg for total cyanide, during Phase II, an additional soil sample was collected from BKG-BH14 (adjacent to BKG-BH11) at the 0 to 2-foot depth interval and analyzed for cyanide. Total cyanide was not detected in Sample BKG-BH14-01SL (Appendix A4). This Phase II analytical result was flagged "R" (rejected) as a result of data validation because the matrix spike (MS) and matrix spike duplicate (MSD) results were outside of control limits (both were less than the data validation guideline of 30 percent) and the cyanide result was less than the MDL. No pesticides or PCBs were detected in any of the background soil samples analyzed for these parameters (Appendices A3 and A4).

4.4.1.3 Conclusions

Delphi Thermal believes that the area sampled for background has not been impacted by facility activities. This belief is supported by the boring logs (Appendix C) and observations that show no evidence of disturbance or any past waste management activities. Also, the source of the acetone detected in the Phase I background soil samples was most likely the isopropyl alcohol used to decontaminate the sampling equipment. The use of isopropyl alcohol was eliminated from the decontamination procedures during Phase II field activities and acetone was not detected in

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the Phase II background soil samples. The total cyanide result for Phase I Sample BKG-BH11-02SL was very close to the MDL, and there is no obvious correlation between the concentration of cyanide and the TAL metal concentrations. Therefore, the TAL metals results represent background and have been used in the RFI for evaluating background exposure to metals.

4.4.2 Geotechnical Analysis Results

Results of detailed geotechnical soil analyses performed as part of the RFI are presented in the following sections.

4.4.2.1 Investigative Strategy

Samples for geotechnical analysis were collected from Background Borings BKG-BH03, BKG-BH07, and BKG-BH10 at depth intervals of 0 to 2 feet and 14 to 16 feet. The results of the geotechnical analysis are provided in Appendix D of this report. The RFI Work Plan lists the following parameters to be determined for soils:

- Surface soil distribution.
- Soil profile, including American Society for Testing and Materials (ASTM) classification of soils.
- Transects of soil stratigraphy.
- Relative permeability.
- Porosity.
- Bulk density.
- Particle size distribution.
- Moisture content.
- Depth of water table.
- Storage capacity.

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Additionally, samples for analysis of total organic carbon (TOC) and cation-exchange capacity were collected to support the Baseline Risk Assessment.

4.4.2.2 Surface Soil Distribution, ASTM Soil Classification, and Soil Profile

Soil classification, distribution and profile(s) for Montgomery County have been compiled and published by the Division of Soil and Water Conservation, Ohio Department of Natural Resources. A review of this information for the area of Montgomery Country where the Delphi Thermal site is located indicates that the undisturbed portions of the site would be underlain by soils belonging to the Fox Series, specifically the Fox silt loam soil type, which consists of well-drained soils formed in loamy glacial outwash material (Powell and Mecker 1970). This series has a substratum of calcareous sand and gravel at a depth of 24 to 42 inches.

The Fox Series profile exhibits a dark yellow-brown silt loam layer approximately 8 inches thick. Underlying subsoil layers consist of brown loam, dark-brown clay loam, and reddish-brown and brown sand clay loam extending through the substratum.

Surface runoff is medium to rapid resulting in a moderate erosion hazard. Shrink-swell potential is low; therefore, damage from heave or settlement is not a major concern.

4.4.2.3 Transects of Soil Stratigraphy (Cross Sections)

Construction activities including buildings and parking lots have disturbed surficial soils over much of the Delphi Thermal site with the exception of the background area. Because of these construction activities, transects of natural stratigraphy cannot be generated.

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4.4.2.4 Relative Permeability and Porosity

Two soil samples were collected from Borings BKG-BH03 and BKG-BH10 at a depth of 0 to 2 feet for analysis of permeability and porosity. The permeability results for Soil Samples BKG-BH03-02 and BKG-BH10-02 are 2.7×10^{-8} cm/sec and 1.2×10^{-6} cm/sec, respectively. The porosity results for Soil Samples BKG-BH03-02 and BKG-BH10-02 are 33.1 percent and 39.5 percent, respectively.

4.4.2.5 Bulk Density, Particle Size Distribution, and Moisture Content

Six soil samples were collected from three borings, BKG-BH03, BKG-BH07, and BKG-BH10, at depths of 0 to 2 feet and 14 to 16 feet for analysis of bulk density, particle size distribution, and optimum moisture content. The results of these analyses are provided in Volume II of this report.

The bulk density results for upper Soil Samples BKG-BH03-02, BKG-BH07-02, and BKG-BH10-02 are 146.5 pounds per cubic feet (lbs/ft^3), 117.2 lbs/ft^3, and 133.8 lbs/ft^3, respectively. The average bulk density for the upper soil samples is 132.5 lbs/ft^3. The bulk density results for lower Soil Samples BKG-BH03-16, BKG-BH07-16, and BKG-BH10-16 are 137.7 lbs/ft^3, 137.0 lbs/ft^3, and 144.1 lbs/ft^3, respectively. The average bulk density for the lower soil samples is 139.6 lbs/ft^3.

The particle size distribution results for upper Soil Samples BKG-BH03-02, BKG-BH07-02, and BKG-BH10-02 range from approximately 4.72×10^{-5} inches to about 1.6 inches. The particle size distribution results for lower Soil Samples BKG-BH03-16, BKG-BH07-16, and BKG-BH10-16 range from approximately 4.72×10^{-5} inches to about 0.98 inches.

The optimum moisture content results for upper Soil Samples BKG-BH03-02, BKG-BH07-02, and BKG-BH10-02 are 5.6 percent, 13.3 percent, and 9.5 percent, respectively. The average

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optimum moisture content for the upper soil samples is 9.47 percent. The optimum moisture content results for lower Soil Samples BKG-BH03-16, BKG-BH07-16, and BKG-BH10-16 are 8.0 percent, 10.5 percent, and 6.5 percent, respectively. The average optimum moisture content for the lower soil samples is 8.33 percent.

4.4.2.6 Depth of Water Table and Storage Capacity

Depth to water table measurements were collected facility-wide during RFI Phase I and Phase II field activities (Section 3.2.1.3 [Water-Level Elevation Measurements]). These measurements indicate that the depth of the water table (upper aquifer) ranges from 19.90 feet in Well GM-17 (southwest of Delphi Thermal) to 40.74 feet in Well GM-24 (northeast of Delphi Thermal). Figures 4-1 and 4-2 show the elevation of the water table and groundwater flow direction for Phase I and Phase II, respectively. Groundwater flow direction in the water table is discussed in detail in Section 4.1 (Groundwater Flow) of this report.

The maximum storage capacity and the remaining storage capacity were determined for shallow soil in the background area. The maximum storage capacity is the maximum amount of water that a soil can contain. The remaining storage capacity is the amount of water that can be added to a soil that already exists with an initial moisture content. The maximum storage capacity is 36.3 percent and the remaining storage capacity is 25.8 percent.

4.4.2.7 TOC and Cation-Exchange Capacity

Six soil samples were collected from three borings, BKG-BH03, BKG-BH07, and BFG-BH10, at depths of 0 to 2 feet and 14 to 16 feet for analysis of TOC and cation-exchange potential. The results for these analysis are presented in Table 4-14.

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4.4.3 Area South of Landfill L1

During Phase II, Monitor Well GM-20D was installed near the Montgomery County Municipal Building, which is located south of Landfill L1 (see Figure 3-2). This well was installed to further define the extent of groundwater contamination south of Landfill L1. During the installation of GM-20D, soil samples were collected because the City of Moraine discovered that the well location may have contained waste (calcium hydroxide) from the manufacture of acetylene (which was not associated with Delphi Thermal operations). However, according to an official for the City of Moraine, this material had been excavated and the area backfilled with clean soil. To confirm that the soil did not contain hazardous constituents that may impact groundwater beneath this area, soil samples were collected during well installation at depths from 0 to 6 feet bgs and 14 to 18 feet bgs based on the sampling criteria stated in the Phase II RFI Work Plan (Geraghty & Miller, Inc. 1994a). The monitor well construction log and soil sampling log are provided in Appendix C. The soil and groundwater analytical results and conclusions for this area are discussed in the following sections. Soil and groundwater analytical results are provided in Appendices A4 and A6, respectively.

Because of the inadequate recovery from the shallow split-spoon samples not providing sufficient soil volume for all analyses, soil from 0 to 2 feet was submitted to the laboratory for analysis of TAL total cyanide and TAL metals. Soil from 2 to 4 feet was submitted to the laboratory for analysis of TCL VOCs, and soil from 4 to 6 feet was analyzed for TCL PCBs, TCL pesticides, and herbicides. A duplicate soil sample, DUP-28, was also collected at each of the three depth intervals and analyzed for the same parameters as the investigative samples. Because of the inadequate recovery from the deep split-spoon samples, soil from 14 to 16 feet was submitted to the laboratory for analysis of TAL metals and TAL total cyanide. Soil from 16 to 18 feet was submitted to the laboratory for analysis of TCL VOCs and PCBs/pesticides.

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4.4.3.1 Soil Results

Results of analysis of soil samples collected during installation of GM-20D, and the duplicate sample (DUP-28) for the shallow-sample intervals are presented below.

4.4.3.1.1 VOCs

No VOCs were detected in Soil Samples GM20D-03SL and GM20D-17SL. 1,2-Dichloroethene (total) and PCE were detected in the duplicate sample (DUP-28) for GM20D-03SL at concentrations of 9.2 ug/kg and 16.2 ug/kg, respectively.

4.4.3.1.2 PCBs, Pesticides, Herbicides, and Cyanide

No PCBs, pesticides, herbicides, or cyanide were detected in Samples GM20D-05SL, its duplicate sample (DUP-28), and GM20D-17SL.

4.4.3.1.3 Metals

The following metals were detected in Soil Samples GM20D-01Sl, its duplicate sample (DUP-28), and GM20D-15SL: aluminum, arsenic, barium, beryllium, cadmium, calcium, chromium, cobalt, copper, iron, lead, magnesium, manganese, mercury, nickel, potassium, selenium, sodium, vanadium, and zinc. Mercury was not detected in shallow Sample GM20D-01SL, and the selenium result was validated as a non-detect (flagged "UJ"). Mercury and selenium were detected in Sample GM20D-15SL at concentrations of 0.1 mg/kg and 0.58J mg/kg, respectively. Selenium was also detected in the duplicate sample (DUP-28) for GM20D-0151 at an estimated concentration of 0.53J mg/kg.

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4.4.3.1.4 QA/QC Samples

No VOCs were detected in TB-22; therefore, no cross-contamination of VOCs occurred during sample collection and handling.

4.4.3.2 Conclusions

VOCs were detected in the shallow duplicate soil sample (from the 2- to 4-foot depth interval) but not in the deep soil sample (16- to 18-foot depth interval), which was collected above the upper aquifer. Therefore, groundwater samples collected from both the deep Monitor Well GM-20D and the shallow Monitor Well WSU-24 (with top of screen at 25 feet) have not been impacted by shallow soil contamination.

4.5 SURFACE-WATER/SEDIMENT SAMPLING

During Phase I RFI activities, surface-water and sediment samples were collected from two locations in the drainage ditch found in the northwest portion of the Delphi Thermal site: one at the upstream boundary of the Delphi Thermal site and one at the downstream boundary (Figure 2-6). During Phase II, surface-water grab samples were collected from the same upstream and downstream locations and analyzed for VOCs by Method 8015. Analytical results for Phases I and II and a summary of conclusions are provided in the following sections.

4.5.1 VOCs

No VOCs by Method 8240 were detected in surface water upstream from the Delphi Thermal site. No VOCs by Method 8240 were detected in sediment upgradient from the Delphi Thermal site.

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Two surface-water samples collected downstream from the Delphi Thermal site, DD-GS02-02SW and its duplicate sample (DUP-12), were reported to contain acetone at concentrations of 93.7 ug/L and 83.6 ug/L, respectively; chloroform was detected in these same samples at concentrations of 1.2 ug/L and 1.1 ug/L, respectively. TCE was reported in the same samples at a concentration of 4.6 ug/L. No VOCs were detected in sediment samples collected downstream from the Delphi Thermal site. The likely source of the acetone detected in the surface-water samples is the equipment decontamination procedure as previously discussed in Section 4.4.1.2 (Results). VOC results for surface-water and sediment samples from Phase I are provided in Appendix A5.

No VOCs by Method 8015 were detected in surface water upstream and downstream from the Delphi Thermal site during Phase II (Appendix A6).

4.5.2 SVOCs, PCBs, Pesticides, Herbicides, and Cyanide

No SVOCs, PCBs, pesticides, herbicides, or cyanide were detected in surface-water samples collected upstream from the Delphi Thermal site. However, SVOCs were detected in Sediment Sample DD-GS-01-02SD upstream of the site. Fluoranthene, phenanthrene, and pyrene were detected at concentrations of 17,000 mg/kg, 13,000 mg/kg, and 14,000 ug/kg, respectively. Benzo(b)fluoranthene was detected at an estimated concentration of 13,000 ug/kg. The laboratory was unable to differentiate between benzo(b)fluoranthene and benzo(k)fluoranthene and reported a combined result of 13,000 ug/kg for these two isomers. Detected SVOC results from surface-water and sediment samples are provided in Appendix A5. No PCBs, pesticides, herbicides, or cyanide was detected upstream from the Delphi Thermal site.

No SVOCs, PCBs, pesticides, herbicides, or cyanide was detected in surface-water and sediment samples collected downstream from the Delphi Thermal site.

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4.5.3 Total Metals

Antimony, barium, and cobalt were detected in Surface-Water Sample DD-GS01-SW, collected upstream from the Delphi Thermal site, at concentrations of 51.4 ug/L, 144 ug/L, and 8 ug/L, respectively (Appendix A5). The upgradient Sediment Samples DD-GS01-02SD and its duplicate sample (DUP-11) were reported to contain aluminum, arsenic, barium, cadmium, calcium, cobalt, copper, iron, magnesium, nickel, potassium, selenium, sodium, and vanadium at concentrations ranging from 0.29 mg/kg of selenium in Sample DUP-11 to 99,600 mg/kg of calcium in Sample DD-GS02-01SD. Estimated concentrations of chromium (20.4J mg/kg), lead (110.2J mg/kg), manganese (161.5J mg/kg), and zinc (88.5J mg/kg) were also reported in sediment upstream from the Delphi Thermal site.

Antimony, barium, chromium, and cobalt were detected in surface water downstream of the Delphi Thermal site (Appendix A5). Antimony was detected in DD-GS02-02SW at a concentration of 57.3 ug/L; however, antimony was not detected in the duplicate sample (DUP-12). Barium was detected in DD-GS02-02SW and its duplicate sample (DUP-12) at concentrations of 88.5 ug/L and 91 ug/L, respectively; chromium was detected at concentrations of 9.2 ug/L and 8.3 ug/L, respectively; and cobalt was detected at concentrations of 8.8 ug/L and 7.5 ug/L, respectively. The same metals detected in sediment upstream from the Delphi Thermal site were detected in sediment downstream (DD-GS02-02SD) from the Delphi Thermal site. Metals detected in the downstream sediment ranged in concentration from 1.1 mg/kg of selenium to 95,400 mg/kg of calcium, both in DD-GS02-02SD. Estimated concentrations were also reported in DD-GS02-02SD for chromium (15.3J mg/kg), lead (124J mg/kg), manganese (154J mg/kg), and zinc (392J mg/kg), at concentrations ranging from 15.3 mg/kg of chromium to 392 mg/kg of zinc.

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4.5.4 QA/QC Samples

No VOCs were detected in Trip Blank TB-07, indicating that no cross-contamination of VOCs occurred during the collection and handling of the surface-water and sediment samples from the drainage ditch. No VOCs, SVOCs, PCBs, pesticides, herbicides, cyanide, or metals were detected in Rinseate Blank RB-01 (Appendix A5); indicating that no cross-contamination of these constituents occurred during equipment decontamination.

4.5.5 Conclusion

Investigative activities conducted at the drainage ditch found in the northwest portion of the Delphi Thermal site have met the RFI objectives. The two phases of sampling have provided details of upstream and downstream conditions for surface-water and sediment media, as required to support the Baseline Risk Assessment (Volume II).

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5.0 SWMU INVESTIGATION RESULTS

The following sections discuss the investigations conducted during the RFI to characterize each SWMU by sampling one or more of the following media: soil, sediment, surface water, groundwater, and waste. Since the risk evaluation is conducted on specific chemical constituents detected in each media, the information on each SWMU is organized accordingly. The investigative strategy for each SWMU is also provided in greater detail.

5.1 LANDFILL L1

The following sections summarize the investigative strategy, results, and conclusions for Landfill L1. The RFI objectives for this unit were delineation of the waste boundary and characterizing wastes and groundwater quality.

5.1.1 Investigative Strategy

To determine the boundary of the waste in Landfill L1, a preliminary EM31 survey was conducted inside and outside the chain-link fence surrounding Landfill L1 (Figure 5-1). Additionally, aerial photographs were reviewed.

To obtain data representative of the types of hazardous constituents and their concentrations in the surficial material (shallow waste) in L1, a total of five hand-augered samples and one duplicate sample were collected at this unit in December 1992. Samples were collected from a depth of 0 to 2 feet for analysis of TCL VOCs, TCL SVOCs, TCL PCBs, pesticides, TAL total metals, and TAL cyanide. Sample locations were selected using the random/systematic sampling approach outlined in the RFI Work Plan (Geraghty & Miller, Inc. 1992a). A 100- x 100-foot grid was superimposed on a map of Landfill L1, and a number was assigned to each grid cell. Five random numbers were generated to select the five sampling locations (Figure 5-2). Field HNu readings and physical descriptions were recorded for each sampling location (see Appendix C). Duplicate Sample DUP-09 was collected with Sample L1-GS01-02WT and analyzed for the same parameters as the investigative samples. Trip Blank TB-05 accompanied

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the samples in the field and was submitted to the laboratory for analysis of TCL VOCs to monitor handling and transport of the samples and laboratory quality control. Detected organic waste constituents at this unit are shown on Figure 5-3. Figure 5-4 is the explanation sheet for the parameter abbreviations shown on Figure 5-3, and subsequent figures referenced in this report.

During Phase I, to characterize groundwater quality in the vicinity of Landfill L1, groundwater samples were collected from seven monitor wells (Figure 5-2). The monitor wells included four in the shallow aquifer (East, GM-2, 4S, and GM-8) and three in the deep aquifer (GM-1, GM-5, and GM-7R). The samples were analyzed for Appendix IX VOCs (by Method 8240), PCBs, pesticides, herbicides, total and dissolved metals, and cyanide. Monitor Wells EAST and GM-2 were sampled to characterize conditions in the upper aquifer upgradient from L1, and Monitor Wells 4S and GM-8 were sampled to characterize conditions in the upper aquifer downgradient from L1. Data from 4S and GM-8 were also used to characterize impacts from lower waste and lower soil contamination at L1. Monitor Well GM-1 was sampled to characterize conditions in the lower aquifer upgradient from L1, and Monitor Wells GM-5 and GM-7R were sampled to characterize conditions in the lower aquifer downgradient from L1.

During Phase II of the RFI, the seven monitor wells sampled during Phase I were sampled for VOCs by Method 8015. In addition, four monitor wells (GM-3, GM-6, GM-7R, and East) were sampled for Appendix IX VOCs by Methods 8015 and 8240. Monitor Wells GM-3 and GM-6 were sampled during Phase II to provide additional characterization of groundwater quality in both the lower and upper aquifer, respectively, downgradient of Landfill L1. Monitor Wells EAST and GM-7R were sampled during Phase II to confirm Phase I VOC results. Detected organic groundwater constituents for the southern portion of the Delphi Thermal site, including this SWMU, are shown on Figures 5-5 (upper aquifer results) and 5-6 (lower aquifer results).

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5.1.2 L1 Boundary Determination

The boundary of Landfill L1 could not be delineated using the EM31 survey. Outside the chain-link fence, cultural interference from overhead power lines to the west and south caused the terrain conductivity reading to fluctuate. Additionally, railroad tracks to the north and east of the chain-link fence elevated the conductivity reading. Terrain conductivity values inside the chain-link fence ranged from 40 to 200 milliSiemens per meter (mS/m). Because of cultural interference, a background value could not be reliably established; therefore, a detailed EM31 survey was not performed at Landfill L1.

The EM31 survey was unable to define the boundaries of Landfill L1 because of cultural interference; however, the close correspondence between the historical aerial photographs of the site and the results of the EM31 survey at Landfills L2 and L3 suggests that the aerial photographs are reliable to define the boundaries of L1. Specifically, the 1920s aerial photograph clearly shows that the Penn Central Railroad tracks, Sellars Road, and Dryden Road all existed before L1 and, therefore, likely form its east, south, and west boundaries. The topographic relief of L1 most likely establishes the northern boundary.

5.1.3 Waste Sampling Results

Waste sampling results for L1 are presented in the following sections.

5.1.3.1 VOCs

PCE was detected in Samples L1-GS01-02WT, L1-GS02-02WT, L1-GS04-02WT, and DUP-09 (a duplicate of Sample L1-GS01-02WT) at concentrations of 37 ug/kg, 19 ug/kg, 34J ug/kg (estimated), and 41 ug/kg, respectively. Total xylenes were detected in Samples L1-GS01-02WT and DUP-09 at concentrations of 6.4 ug/kg and 13 ug/kg, respectively. TCE was reported in Samples L1-GS01-02WT, L1-GS04-02WT, L1-GS05-02WT, and DUP-09 at

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concentrations of 16 ug/kg, 73J ug/kg (estimated), 150J ug/kg (estimated), and 21 ug/kg, respectively. No VOCs were detected in Trip Blank TB-05, which was submitted with the samples, or in Sample L1-GS03-02WT. VOC results for this SWMU are provided in Appendix A7 and summarized on Figure 5-3.

5.1.3.2 SVOCs and Pesticides

Benzo(a)anthracene, benzo(a)pyrene, and chrysene were detected in Sample L1-GS01-02WT at concentrations of 6,800 ug/kg, 5,400 ug/kg, and 6,700 ug/kg, respectively. A total value for benzo(b)fluoranthene and benzo(k)fluoranthene was reported in Samples L1-GS01-02WT and DUP-09 at estimated concentrations of 11,000 ug/kg and 7,000J ug/kg, respectively. Reporting total concentration for benzo(b)fluoranthene and benzo(k)fluoranthene was required because the capillary column employed by NET for analysis of SVOCs could not resolve the individual constituent peaks due to co-elution; therefore, the laboratory reported the same calculated total concentration for these two constituents when either was detected. Fluoranthene, phenanthrene, and pyrene were detected in Sample L1-GS01-02WT at concentrations of 14,000 ug/kg, 7,600 ug/kg, and 14,000 ug/kg, respectively. Sample DUP-09 had detected concentrations of fluoranthene (9,100 ug/kg), phenanthrene (6,500 ug/kg), and pyrene (8,400 ug/kg). No SVOCs were detected in Samples L1-GS02-02WT, L1-GS03-02WT, L1-GS04-02WT, and L1-GS05-02WT. Pesticides were not detected in any of the soil samples collected at Landfill L1. SVOC and pesticide analytical results for this SWMU are found in Appendix A7 and summarized on Figure 5-3.

5.1.3.3 PCBs and Total Metals

Aroclor 1254 was detected in Samples L1-GS01-02WT, L1-GS02-02WT, L1-GS04-02WT, L1-GS05-02WT, and DUP-09 at concentrations of 6.2 mg/kg, 13.4 mg/kg, 21.3 mg/kg, 1.4 mg/kg, and 14.8 mg/kg, respectively. Appendix A7 contains the results of the PCB analyses for waste samples collected at Landfill L1.

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Total metals detected in waste samples collected at this SWMU and the corresponding analytical results are provided in Appendix A7 and summarized on Figure 5-3.

5.1.3.4 Cyanide

Cyanide was detected in Samples L1-GS01-02WT, L1-GS02-02WT, L1-GS03-02WT, L1-GS04-02WT, L1-GS05-02WT, and DUP-09 at concentrations of 0.8 mg/kg, 1.1 mg/kg, 1 mg/kg, 2 mg/kg, 1.9 mg/kg, and 0.6 mg/kg, respectively. Cyanide analytical results for this SWMU are provided in Appendix A7.

5.1.4 Groundwater Results

Groundwater results for L1 sampling are presented in the following sections.

5.1.4.1 VOCs

5.1.4.1.1 Upper Aquifer

During Phase I, the following four VOCs were detected by Method 8240 in upper aquifer groundwater samples collected from monitor wells upgradient from Landfill L1 (Appendix A2). 1,1,1-Trichloroethane was detected in Wells GM-2, DUP-17, and EAST at concentrations of 13.7 ug/L, 12.6 ug/L, and 18.9 ug/L, respectively. DUP-17 is a duplicate sample of GM-2. 1,1-Dichloroethane was detected at concentrations of 3.1 ug/L (GM-2), 2.9 ug/L (DUP-17), and 8 ug/L (EAST). PCE was detected at concentrations of 7.6 ug/L (GM-2), 7.2 ug/L (DUP-17), and 79.4 ug/L (EAST). TCE was detected at concentrations of 108 ug/L (GM-2), 94.8 ug/L (DUP-17), and 83.4 ug/L (EAST).

During Phase I, the following three VOCs were detected by Method 8240 in groundwater samples collected from the upper aquifer monitor wells downgradient from Landfill L1 (Appendix

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A2). 1,1-Dichloroethane was detected in Wells 4S and GM-8 at concentrations of 77.8 ug/L and 120 ug/L, respectively. Ethylbenzene was reported at concentrations of 45.9 ug/L (Well 4S) and 108 ug/L (Well GM-8). Total xylenes were reported at concentrations of 247 ug/L (Well 4S) and 70.6 ug/L (Well GM-8). In addition, Monitor Well GM-8 was reported as having detected concentrations of eight additional VOCs ranging in concentrations from 1.1 ug/L of toluene to 69.4 ug/L of TCE. Detected VOCs in the upper aquifer are summarized in Table 5-1 and shown on Figure 5-5.

During Phase II, using Method 8015 or 8240, the following VOCs were detected in groundwater samples from the upper aquifer, upgradient of Landfill L1 (Appendix A6): 1,1,1-trichloroethane in Well EAST and its duplicate sample (DUP-29) at concentrations of 16 ug/L and 16.1 ug/L, respectively; 1,1-dichloroethane at concentrations of 10.5 ug/L and 10.8 ug/L; respectively. PCE was reported at concentrations of 62.4 ug/L in EAST and 61.2 ug/L in it duplicate sample (DUP-29). TCE was reported at concentrations of 71.4 ug/L in East and 71.2 ug/L in DUP-29. In the upper aquifer, downgradient from Landfill L1, six VOCs were detected in GM-6. No other VOCs were detected in the upper aquifer during Phase II. Detected VOC constituents in the upper aquifer in the vicinity of L1 are presented in Appendices A2 and A6, summarized in Table 5-1 and shown on Figure 5-5.

Groundwater samples collected during Phases I and II immediately downgradient of L1 were used to characterize deep wastes in L1. The data indicates that the following constituents may be present in deep waste at L1, based on the fact that they are present in monitor wells upgradient of L1: benzene, chloroethane, ethylbenzene, toluene, and xylenes. The presence of 1,1-dichloroethane, vinyl chloride, and trans-1,2-dichloroethene in the downgradient wells may be due to the anaerobic degradation of chlorinated VOCs within groundwater moving beneath L1.

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5.1.4.1.2 Lower Aquifer

During Phase I, 1,1,1-trichloroethane, PCE, and TCE were detected in the groundwater sample collected in the lower aquifer from upgradient Monitor Well GM-1, at concentrations of 8 ug/L, 4.7 ug/L, and 42.4 ug/L, respectively. No VOCs by Method 8240 were reported in Monitor Well GM-5, located downgradient from Landfill L1; however, in the duplicate sample of GM-5 (DUP-18), 1,1-dichloroethane was detected at a concentration of 2.5 ug/L. No other VOCs were detected in the vicinity of Landfill L1 during Phase I (Appendix A2). Detected VOCs by Method 8240 in the lower aquifer are summarized in Table 5-2 and shown on Figure 5-6.

During Phase II downgradient Wells GM-3, and GM-7R and its duplicate sample (DUP-34) reported 1,1,1-trichloroethane at concentrations of 1.9 ug/L, 6 ug/L, and 6.7 ug/L, respectively. 1,1-Dichloroethane was detected at concentrations of 1.1 ug/L (GM-3), 3.8 ug/L (GM-7R), and 4 ug/L (DUP-34). TCE was reported at 4.7 ug/L (GM-3), 134 ug/L (GM-7R), and 147 ug/L (DUP-34). PCE was detected at a concentration of 1.1 ug/L in GM-3. No other VOCs were detected in the lower aquifer upgradient and downgradient of L1 during Phase II. Detected VOCs in the lower aquifer upgradient and downgradient of L1 are presented in Appendices A2 and A6, and summarized in Table 5-2 and shown on Figure 5-6.

5.1.4.2 SVOCs, PCBs, Pesticides, and Herbicides

No SVOCs, PCBs, pesticides, or herbicides were detected in groundwater samples in the upper and lower aquifers upgradient and downgradient from Landfill L1. SVOC, PCB, pesticide, and herbicide results are provided in Appendix A2.

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5.1.4.3 Cyanide

For groundwater samples collected from the upper aquifer, cyanide was detected in upgradient Monitor Well EAST at a concentration of 0.008 mg/L. Downgradient Wells 4S and GM-8 reported cyanide at concentrations of 0.014 mg/L and 0.017 mg/L, respectively.

No cyanide was detected in the lower aquifer groundwater samples upgradient and downgradient from Landfill L1. Detected cyanide results for the upper-aquifer samples upgradient and downgradient of L1 are provided in Table 5-3, and summarized in Appendix A2.

5.1.4.4 Metals

5.1.4.4.1 Upper Aquifer

Dissolved barium was detected in the upper aquifer in groundwater samples from Wells GM-2, DUP-17, and EAST at concentrations of 103 ug/L, 96 ug/L, and 90.9 ug/L, respectively. DUP-17 is the duplicate sample for GM-2. Dissolved cobalt was detected at concentrations of 8.9 ug/L (GM-2), 8.3 ug/L (DUP-17), and 9.9 ug/L (EAST). Dissolved antimony, copper, nickel, and zinc were also detected in EAST at concentrations of 56.2 ug/L, 9.4 ug/L, 15.8 ug/L, and 11.7 ug/L, respectively.

Dissolved barium was detected in downgradient upper aquifer samples from Wells 4S and GM-8 at concentrations of 237 ug/L and 129 ug/L, respectively. Dissolved cobalt was detected at concentrations of 20.8 ug/L (Well 4S) and 12.2 ug/L (Well GM-8). Dissolved arsenic was detected in Well 4S at a concentration of 23.3 ug/L. Dissolved copper was detected in Well GM-8 at a concentration of 5.6 ug/L. No other dissolved metals were detected in the upper aquifer downgradient from Landfill L1. Dissolved metal constituents detected in the upper aquifer in the vicinity of L1 are presented in Appendix A2, and summarized in Table 5-3.

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Groundwater samples collected during Phase I immediately downgradient of L1 and analyzed for dissolved metals were used to characterize deep wastes in L1. The data indicates that the following constituents may be present in deep waste at L1, based on the fact that they are not present in monitor wells upgradient of L1 or because at least a two-fold increase in concentrations was seen from upgradient to downgradient: arsenic, barium, and cobalt.

5.1.4.4.2 Lower Aquifer

Dissolved barium and cobalt were detected in the lower aquifer upgradient Monitor Well GM-1 at concentrations of 79.2 ug/L and 8.6 ug/L, respectively.

Dissolved barium was detected in the lower aquifer in downgradient Wells GM-5, DUP-18, and GM-7R at concentrations of 84 ug/L, 84.6 ug/L, and 80.6 ug/L, respectively. DUP-18 is the duplicate sample of GM-5. Dissolved cobalt was detected at concentrations of 9.1 ug/L (GM-5), 13.1 ug/L (DUP-18), and 10.7 ug/L (GM-7R). Dissolved copper and dissolved nickel were detected in GM-5 at concentrations of 10.2 ug/L and 19.5 ug/L, respectively. No other dissolved metals were detected in the vicinity of Landfill L1. Detected dissolved metals in the lower aquifer in the vicinity of L1 are presented in Appendix A2, and summarized in Table 5-4.

5.1.4.5 QA/QC Samples

For Phase I QA/QC samples, no VOCs were detected in Trip Blanks TB-11, TB-12, and TB-13, indicating that no cross-contamination of VOCs occurred during the collection and handling of Phase I groundwater samples from Landfill L1 (Appendix A2). Chloroform was detected in Rinseate Blanks RB-05, RB-06, and RB-07 at concentrations of 1.2 ug/L, 1.2 ug/L, and 2 ug/L, respectively. Chloroform was not detected in any groundwater samples collected in the vicinity of Landfill L1. Chloroform in rinseate blank samples has been previously discussed in Section 4.2.2.4 (QA/QC Samples). No cross-contamination of VOCs has occurred through equipment-decontamination procedures at Landfill L1.

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No SVOCs, PCBs, pesticides, herbicides, and cyanide were detected in Rinseate Blanks RB-05, RB-06, and RB-07, indicating that cross-contamination of these constituents has not occurred through decontamination procedures (Appendix A2).

Total copper and total zinc were detected in Rinseate Blanks RB-05, RB-06, and RB-07. Although Rinseate Blanks RB-05 and RB-06 are included in sample groups containing Landfill L1 groundwater samples, no Landfill L1 groundwater samples were collected following the preparation of these blanks. In RB-07, total copper and total zinc was detected at concentrations of 25.6 ug/L and 7 ug/L, respectively. Therefore, these same constituents in Sample GM-2, which was collected following the preparation of RB-07, were qualified as not detected due to contamination in RB-07 following U.S. EPA data validation guidelines (U.S. EPA 1988b).

For Phase II QA/QC samples, no VOCs were detected in trip blanks (TB-24, TB-26, and TB-29) and rinseate blanks (RB-16, RB-21, and RB-24) associated with Landfill L1 samples during Phase II (Appendix A6). No cross-contamination has occurred during sample collection, handling, and equipment decontamination.

5.1.5 Conclusions

Investigative activities conducted at Landfill L1 have provided sufficient detail to meet the RFI objectives, as presented below for waste and groundwater media.

1. The waste boundary of L1 has been delineated in sufficient detail to support an assessment of risks.

2. The design of the sampling approach, and the evaluation of analytical results for shallow wastes indicate that the range of constituents and their concentrations have been characterized, and no data anomalies exist. Because of this fact, the RFI waste

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sampling results provide adequate characterization of the surficial material to support the Baseline Risk Assessment (Volume II).

3. Groundwater quality in the vicinity of L1 is consistent with historical data collected in this area of the Delphi Thermal site (Geraghty & Miller, Inc. 1991a). Therefore, groundwater data collected during the RFI should be acceptable for use in the Baseline Risk Assessment (Volume II).

Based on these conclusions, no additional investigative activity is required at this SWMU.

5.2 LANDFILL L2

The following sections summarize the investigation strategy, results, and conclusions for Landfill L2. The RFI objectives for this unit were delineation of the waste boundary and characterizing wastes and groundwater quality.

5.2.1 Investigative Strategy

To determine the boundary of waste in Landfill L2, a geophysical survey was conducted at L2. Additionally, aerial photographs were reviewed.

Prior to beginning the geophysical survey, the SWMU was inspected for cultural interferences, such as surface metal debris, fences, overhead power lines, and any other conductive object that might interfere with the EM31 survey. A preliminary EM31 investigation was then conducted by slowly traversing the approximate boundaries of the landfill in an east-west and north-south direction (see Figure 5-7). The terrain conductivity readings were continuously monitored using the analog display on the instrument console until the terrain conductivity values indicated a contrast between background and fill. Once established, the boundary of the landfill

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was refined by moving stakes until each side of the landfill had been adjusted based on instrument readings.

To obtain data representative of the types of hazardous constituents and their concentrations in the surficial material, sampling of shallow wastes at Landfill L2 during Phase I consisted of collecting three samples at this unit in December 1992 using a stainless-steel hand auger. The sample locations were selected by constructing a sample grid over a map of Landfill L2 with a 100 x 100 foot grid spacing, assigning numbers to each grid cell, and randomly selecting three grid cells for sampling as discussed above for Landfill L1. Sample locations for this SWMU are shown on Figure 4-5. Samples were collected from depths of 0 to 2 feet for analysis of TCL VOCs, TCL SVOCs, TCL PCBs/pesticides, TAL total metals, and TAL cyanide. Field HNu readings and physical descriptions were recorded for each sampling location (Appendix D). Duplicate Sample DUP-10 was collected with Sample L2-GS01-02WT. Trip Blank TB-06 was analyzed for VOCs to monitor the samples during field handling, transport, and laboratory analysis. Because the samples were not analyzed for cyanide during Phase I, resampling for this constituent was conducted in February 1993. These additional samples were collected adjacent to the locations of the original samples. Detected organic waste constituents for this unit are shown on Figure 5-8.

Groundwater quality upgradient of Landfill L2 was determined from sampling monitor wells upgradient of the Delphi Thermal site. The results of the upgradient sampling are presented in Section 4.2 (Upgradient Groundwater Quality) of this report. During Phase I, downgradient groundwater quality in the upper aquifer was characterized by sampling Monitor Well HR-3 for Appendix IX VOCs by Method 8240, SVOCs, PCBs, pesticides, herbicides, cyanide, and metals (total and dissolved). Downgradient groundwater quality in the lower aquifer was characterized by sampling Monitor Well HR-13 for the same list of constituents as the upper aquifer monitor wells. During Phase II, groundwater samples were collected from these same wells and analyzed for VOCs by Method 8015. Detected organic groundwater constituents for this SWMU are shown on Figure 5-9.

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5.2.2 Geophysical Results

Figure 5-10 shows the terrain conductivity contours on the east and west side of Landfill L2. Both the east and west boundaries of the landfill were not delineated with the EM31 survey. The half-circle anomalies along the west side of the landfill (see Figure 5-7) were produced by metal fence posts supporting a chain-link fence. This fence separates the current L2 area from the wastewater treatment plant. The east boundary apparently extends further east than the reference base line; however, because of dense underbrush and the adjacent railroad tracks, it was not feasible to extend the survey lines further east. The north and south interpreted landfill boundaries are outlined in red on Figure 5-10. The north L2 boundary follows the 12.5-mS/m contour except in the northwest portion of the figure where the boundary has been drawn to follow the 15-mS/m contour. Survey lines were not extended further north of the northernmost survey line because the preliminary EM31 survey of this area showed that electromagnetic readings were consistently less than 10 mS/m.

The southern interpreted L2 boundary (see Figure 5-7) follows the 20-mS/m and 25-mS/m contours on the east and west sides of L2, respectively. On the east side of L2, the contours southeast of the 20-mS/m contour result from a railroad track that cuts across this portion of the survey. On the west side of the landfill, the southern boundary is adjacent to, and south of, a small closed contour (30 mS/m) anomaly. Between the two grids, the approximate landfill boundary to the north and south has been indicated by a dashed line.

The contour map of the in-phase data is shown on Figure 5-10. The half-circle contours on the west edge of the survey correspond to the metal fence posts. There are, however, several large positive highs within the area of the interpreted L2 boundary that are distant from cultural interference. These in-phase highs, labeled A, B, C, and D, indicate areas where metal debris may be buried. On the east side of L2, the large in-phase highs are labeled E, F, and G. Again, these anomalies are within the interpreted landfill boundary.

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The north and south boundaries of Landfill L2, as defined by the EM31 survey, correspond with the areas of activity suggested by the 1976 aerial photograph of the site. These areas of activity consist of mounds of material surrounding an area east of the northern boundary of the North Settling Lagoon. South of this area and bounded on the east by the Penn Central Railroad tracks is a region where most of the surface vegetation has been removed. No other landfill activity is visible on this photograph north of the mounded material and east of Landfill L3. Although the EM31 survey was unable to define the eastern boundary of Landfill L2, the Penn Central Railroad tracks are visible on a 1920s aerial photograph of this area. Thus, the Penn Central Railroad tracks clearly existed before Landfill L2 and therefore likely form the easternmost boundary of this landfill as shown on Figure 5-7.

5.2.3 Waste Sampling Results

Waste sampling results for L2 are presented in the following sections.

5.2.3.1 VOCs

Acetone was only detected in Sample L2-GS02-02WT at a concentration of 330 ug/kg. PCE was detected in Samples L2-GS01-02WT, L2-GS02-02WT, L2-GS03-02WT, and DUP-10 at concentrations of 5.8 ug/kg, 30 ug/kg, 19 ug/kg, and 7.8 ug/kg, respectively. Total xylenes were detected in Sample L2-GS02-02WT at a concentration of 9.1 ug/kg. No additional VOCs were detected in any of the waste samples nor in Trip Blank TB-06. VOC analytical results for this SWMU are provided in Appendix A8 and summarized on Figure 5-8.

5.2.3.2 SVOCs

No SVOCs were reported in Sample L2-GS01-02WT or its corresponding duplicate DUP-10. Benzo(a)anthracene was detected in Sample L2-GS02-02WT at a concentration of 4,000 ug/kg. A total value for benzo(b)fluoranthene and benzo(k)fluoranthene was reported in

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Sample L2-GS03-02WT at a concentration of 500 ug/kg, due to the laboratory's inability to differentiate these constituents. Chrysene, fluoranthene, phenanthrene, and pyrene were detected in Sample L2-GS02-02WT at concentrations of 3,900 ug/kg, 9,100 ug/kg, 7,900 ug/kg, and 7,400 ug/kg, respectively. Sample L2-GS03-02WT had detectable concentrations of fluoranthene and pyrene of 460 ug/kg and 450 ug/kg, respectively. No other SVOCs were detected in the samples. SVOC analytical results for this SWMU are found in Appendix A8 and summarized on Figure 5-8.

5.2.3.3 PCBs, Pesticides, Total Metals, and Cyanide

PCB Aroclor 1254 was detected in Sample L2-GS02-02WT at a concentration of 2 mg/kg. No additional PCBs, pesticides, or cyanide was detected in the samples. The PCB, pesticide, total metal, and cyanide analytical results for this SWMU are provided in Appendix A8 and summarized on Figure 5-8.

5.2.4 Groundwater Results

Groundwater results for L2 sampling are presented in the following sections.

5.2.4.1 VOCs

5.2.4.1.1 Upper Aquifer

During Phase I, four VOCs (1,1,1-trichloroethane, 1,1-dichloroethane, chloroethane and TCE) were detected by Method 8240 in groundwater in the upper aquifer upgradient of Landfill L2,in four monitor wells located upgradient of the Delphi Thermal facility. Additionally, two VOCs (carbon disulfide and vinyl chloride) were detected by Method 8240 in groundwater in two lower aquifer monitor wells located upgradient of the Delphi Thermal facility. Results for the

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upgradient monitor wells which contained VOCs are summarized on Table 4-8, presented on Figure 5-9, and discussed in Section 4.2.2.1 (VOCs).

During Phase I, no VOCs were detected by Method 8240 in the groundwater sample from Well HR-3 in the downgradient upper aquifer. Phase I results are provided in Appendix A2, summarized in Table 5-5, and shown on Figure 5-9. These data provide no supplemental information for characterizing deep wastes within Landfill L2 because no VOCs were detected.

5.2.4.1.2 Lower Aquifer

During Phase I, in the lower aquifer, downgradient of L2, four VOCs constituents were detected in Well HR-13. Concentrations of 1,1,1-trichloroethane, 1,1-dichloroethane, TCE, and trans-1,2-dichloroethene were reported at 1.6 ug/L, 43.2 ug/L, 2.4 ug/L, and 3.8 ug/L, respectively. No other VOCs were detected. Detected VOCs downgradient of Landfill L2 are provided in Appendix A2, summarized in Table 5-5 and shown on Figure 5-9.

During Phase II, no VOCs were detected in samples analyzed by Method 8015 upgradient or downgradient of Landfill L2. Phase II results are provided in Appendix A6.

5.2.4.2 SVOCs, PCBs, Pesticides, Herbicides, and Cyanide

No SVOCs, PCBs, pesticides, herbicides, or cyanide were detected in the upper and lower aquifers downgradient of Landfill L2. SVOC, PCB, pesticide, herbicide, and cyanide results for Phase I are provided in Appendix A2.

5.2.4.3 Dissolved Metals

Dissolved barium and cobalt were detected in the upper aquifer downgradient of Landfill L2 (Appendix A2). Dissolved barium was detected in Well HR-3 at a concentration of

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59.1 ug/L. Dissolved cobalt was detected in HR-3 at a concentration of 13.2 ug/L. Dissolved lead was reported at an estimated concentration of 2.2 ug/L (estimated) in Well HR-3. These data provide no supplemental information for characterizing deep wastes within Landfill L2 because the two constituents detected were present upgradient of L2 at similar concentrations.

Dissolved barium, cobalt, and lead were detected in a sample from downgradient lower aquifer Monitor Well HR-13 at concentrations of 71.7 ug/L, 8.9 ug/L, and 4.5 ug/L (estimated), respectively. Detected dissolved metals in the upper and lower aquifers downgradient of Landfill L2 and L3 are presented in Appendix A2, and summarized in Table 5-6.

5.2.4.4 QA/QC Samples

For Phase I QA/QC samples, no VOCs were detected in Trip Blank TB-10 indicating that no cross-contamination of VOCs has occurred during sample collection and handling at Landfill L2 (Appendix A2). Chloroform was detected in Rinseate Blank RB-04 at a concentration of 1.2 ug/L. No chloroform was detected in samples in the vicinity of Landfill L2. Chloroform detected in rinseate sample has been previously discussed in Section 3.2.2.4 (QA/QC Samples). No cross-contamination of VOCs in equipment has occurred through equipment-decontamination procedures.

No SVOCs, PCBs, pesticides, herbicides, or cyanide were detected in Rinseate Blank RB-04 (Appendix A2), indicating that cross-contamination of these constituents has not occurred through decontamination procedures.

Total copper and zinc were detected in Rinseate Blank RB-04 at concentrations of 34.9 ug/L and 9.7 ug/L, respectively. Although Rinseate Blank RB-04 is associated with a sample group containing Landfill L2 groundwater samples, no groundwater samples were collected in the vicinity following the preparation of RB-04. Sample GM-8 was collected following the preparation of RB-04. Total copper and zinc were detected in Sample GM-8 at concentrations

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of 39.4 ug/L and 28.2 ug/L, respectively, and were qualified as not detected through data validation procedures due to rinseate blank contamination.

For Phase II QA/QC samples, no VOCs were detected in Trip Blank TB-29 and Rinseate Blanks RB-24 and RB-25 at Landfill L2. No VOC cross-contamination has occurred during sample collection, handling, and equipment decontamination.

5.2.5 Conclusions

Investigative activities conducted at Landfill L2 have provided sufficient detail to meet the RFI objectives, as presented below for waste and groundwater media.

1. The waste boundary of L2 has been delineated in sufficient detail to support an assessment of risks.

2. The design of the sampling approach, and the evaluation of analytical results for shallow wastes indicate that the range of constituents and their concentrations have been characterized, and no data anomalies exist. Because of this fact, the RFI waste sampling results provide adequate characterization of the surficial material to support the Baseline Risk Assessment (Volume II).

3. Groundwater quality in the vicinity of L2 is consistent with historical data collected in this area of the Delphi Thermal site (Geraghty & Miller, Inc. 1991a). Therefore, groundwater data collected during the RFI should be acceptable for use in the Baseline Risk Assessment (Volume II).

Based on these conclusions, no additional investigative activity is required at this SWMU.

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5.3 LANDFILL L3

The following sections summarize the investigative strategy, results, and conclusions for Landfill L3. The RFI objectives for this unit were delineation of the waste boundary and characterizing wastes and groundwater quality.

5.3.1 Investigative Strategy

To determine the boundaries of waste in Landfill L3, a EM31 survey was conducted at L3. Additionally, aerial photographs were reviewed.

Prior to beginning the geophysical survey, the SWMU was inspected for cultural interferences, such as surface metal debris, fences, overhead power lines, and any other conductive object that might interfere with the EM31 survey. A preliminary EM31 investigation was conducted by slowly traversing the approximate boundaries of the landfills in an east-west and north-south direction (see Figure 5-7). The terrain conductivity readings were continuously monitored using the analog display on the instrument's console until the terrain conductivity values indicated a contrast between background and fill. Once established, the boundary of the landfill was refined by moving stakes until each side of the landfill had been adjusted based on instrument readings.

To obtain data representative of the types of hazardous constituents and their concentrations in the surficial materials, sampling shallow wastes at Landfill L3 during Phase I consisted of collecting three hand-augered samples at this SWMU in December 1992. The sample locations were selected by constructing a sample grid over a map of Landfill L3 with a 50 x 50 foot grid spacing, assigning numbers to each grid cell, and randomly selecting three grid cells for sampling as described for Landfill L1. Sample locations are shown on Figure 4-5. Samples were collected from depths of 0 to 2 feet for analysis of TCL VOCs, TCL SVOCs, TCL PCBs/pesticides, TAL total metals, and TAL cyanide. Field HNu readings and physical

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descriptions were recorded for each sampling location (Appendix C). Landfill L3 samples were placed in the same cooler as the samples collected at Landfill L2. Therefore, only one trip blank (TB-06) was included in the cooler and analyzed for VOCs to monitor the samples during field handling, transport, and laboratory analysis. Because Landfill L3 samples were not analyzed for cyanide during Phase I, resampling for this constituent was conducted in February 1993. These additional samples were collected adjacent to the locations of the original samples. Detected organic waste constituents at this SWMU are shown on Figure 5-8.

Groundwater quality upgradient of L3 was determined from sampling monitor wells upgradient of the Delphi Thermal site. The results of the upgradient sampling are presented in Section 4.2 (Upgradient Groundwater Quality) of this report. During Phase I, downgradient groundwater quality in the upper aquifer was characterized by sampling Monitor Well HR-4 for Appendix IX VOCs, SVOCs, PCBs, pesticides, herbicides, cyanide, and metals (total and dissolved). During Phase II, groundwater samples were collected from these same wells and analyzed for VOCs by Method 8015, which has not been done during Phase I. Detected organic groundwater constituents at this SWMU are shown on Figure 5-9.

5.3.2 Geophysical Results/Aerial Photograph Review

Figure 5-7 shows the northern portion of the Delphi Thermal site containing the contoured terrain conductivity data. Background terrain conductivity was approximately 8 mS/m. The interpreted landfill boundary is denoted by the red contour that generally follows the 20-mS/m contour except in the southeast portion of Landfill L3. Here, the landfill boundary outline abuts the "gravel mound" area. Due to the steep relief of the gravel mound, electromagnetic data could not be collected in this region nor in the "depression" area. The contours that extend through the gravel mound and depression are based on the data surrounding these areas. The landfill boundary outlines also bisect higher conductivity contours on the east side of the gravel mound. Except for the gravel mound and depression, no other obstructions or cultural interferences were present in the data collection area.

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During the preliminary investigation, a negative terrain conductivity reading was observed over a small, isolated area north of the landfill's staked boundary (see Figure 5-7). The edges of this area were staked and eight survey lines, 110 feet in length, were added to the main grid. With the addition of these lines to the main grid, the total area surveyed was approximately 2.9 acres, which extends beyond the actual landfill area, estimated to cover approximately 1.6 acres. This negative anomaly may represent upper buried metallic debris. No other negative terrain conductivity anomalies outside the staked landfill boundaries were detected during the preliminary survey.

Figure 5-10 is a contour map of the in-phase component for Landfills L2 and L3. The in-phase component is highly sensitive to conductive materials and is, therefore, very useful in the detection of buried metal debris. Because metallic materials are common constituents within many landfills, the in-phase data are used with the terrain conductivity data to define a landfill. The large positive highs, labeled A and B, represent areas where metal or highly conductive materials may be buried. These anomalies are within the area of the interpreted L3 boundary based on the terrain conductivity data. The in-phase high, labeled C, represents an area where metal may be buried and corresponds to the area labeled negative anomaly on Figure 5-7. A fourth anomaly labeled D, is a weaker in-phase high on the northeast edge of Figure 5-10 and lies outside the main landfill area. Negative terrain conductivity readings were not observed in this area during the preliminary investigation. However, the in-phase high indicates that metal debris may be buried at this location as well.

5.3.3 Waste Sampling Results

Waste sampling results for Landfill L3 are presented in the following section.

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5.3.3.1 VOCs

Acetone was only detected in Sample L3-GS02-02WT at a concentration of 330 ug/kg. PCE was detected in Samples L3-GS01-02WT and L3-GS02-02WT at concentrations of 10 ug/kg and 6.5 ug/kg, respectively. No VOCs were detected in Sample L3-GS03-02WT or in TB-06. VOC analytical results for this SWMU are provided in Appendix A9 and presented on Figure 5-9.

5.3.3.2 SVOCs, PCBs/Pesticides, Total Metals, and Cyanide

No SVOCs, PCBs/pesticides, or cyanide was detected in any of the samples. SVOCs, PCBs, pesticides, total metals, and cyanide analytical results for this SWMU are provided in Appendix A9.

5.3.4 Groundwater Results

Groundwater sampling results for Landfill L3 sampling are presented in the following section.

5.3.4.1 VOCs

During Phase I, four VOCs (1,1,1-trichloroethane, 1,1-dichloroethane, chloroethane and TCE) were detected by Method 8240 in groundwater in the upper aquifer upgradient of Landfill L2, in four monitor wells located upgradient of the Delphi Thermal facility. Additionally, two VOCs (carbon disulfide and vinyl chloride) were detected by Method 8240 in groundwater in two lower aquifer monitor wells located upgradient of the Delphi Thermal facility. Results for the upgradient monitor wells which contained VOCs are summarized on Table 4-8, presented on Figure 5-9, and discussed in Section 4.2.2.1 (VOCs).

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During Phase I, in the upper aquifer downgradient of Landfill L3, PCE was detected in Wells HR-4 and DUP-15 at concentrations of 1.6 ug/L and 2.5 ug/L, respectively (Table 5-5 and Figure 5-9). DUP-15 is a duplicate sample of HR-4. TCE was detected in HR-4 and DUP-15 at concentrations of 1.7 ug/L and 2.2 ug/L, respectively. No other VOCs were detected in the upper aquifer downgradient of L3 (Appendix A2). These data provide limited supplemental data for characterizing deep wastes in L3, but may indicate that some PCE-containing wastes may be present in these deep wastes.

During Phase II, no VOCs by Method 8015 were detected upgradient or downgradient of Landfill L3. Phase II results are provided in Appendix A6.

5.3.4.2 SVOCs, PCBs, Pesticides, Herbicides, and Cyanide

For Phase I, no SVOCs, PCBs, pesticides, herbicides, or cyanide were detected in the upper and lower aquifers downgradient of Landfill L3. SVOC, PCB, pesticide, herbicide, and cyanide results for Phase I are provided in Appendix A2.

5.3.4.3 Dissolved Metals

Dissolved barium and cobalt were detected in the upper aquifer downgradient of Landfill L3. Dissolved barium was detected in Wells HR-4 and DUP-15 at concentrations of 67.1 ug/L and 65.6 ug/L, respectively. Dissolved cobalt was detected in HR-4 and DUP-15 at concentrations of 9.9 ug/L, and 7.8 ug/L, respectively. These data provide no supplemental information for characterizing deep wastes within Landfill L3 because the two constituents detected were present upgradient of L3 at similar concentrations.

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5.3.4.4 QA/QC Samples

For Phase I QA/QC samples, no VOCs were detected in Trip Blank TB-10, indicating that no cross-contamination of VOCs has occurred during sample collection and handling at Landfill L3. Chloroform was detected in Rinseate Blank RB-04 at a concentration of 1.2 ug/L. No chloroform was detected in samples in the vicinity of Landfill L3. Chloroform detected in rinseate samples is discussed in Section 4.2.2.4 (QA/QC Samples). No cross-contamination of VOCs has occurred through equipment-decontamination procedures.

For Phase II QA/QC samples, no VOCs were detected in Trip Blank TB-29 and Rinseate Blanks RB-24 and RB-25 at Landfill L3 during Phase II. No VOC cross-contamination has occurred during sample collection, handling, and equipment decontamination.

No SVOCs, PCBs, pesticides, herbicides, or cyanide were detected in Rinseate Blank RB-04, indicating that cross-contamination of these constituents has not occurred through decontamination procedures.

5.3.5 Conclusions

Investigative activities conducted at Landfill L3 have provided sufficient detail to meet the RFI objectives, as presented below for waste and groundwater media.

1. The waste boundary of L3 has been delineated in sufficient detail to support an assessment of risks.

2. The design of the sampling approach, and the evaluation of analytical results for shallow wastes indicate that the range of constituents and their concentrations have been characterized, and no data anomalies exist. Because of this fact, the RFI waste

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sampling results provide adequate characterization of the surficial material to support the Baseline Risk Assessment (Volume II).

3. Groundwater quality in the vicinity of L3 is consistent with historical data collected in this area of the Delphi Thermal site (Geraghty & Miller, Inc. 1991a). Therefore, groundwater data collected during the RFI should be acceptable for use in the Baseline Risk Assessment (Volume II).

Based on these conclusions, no additional investigative activity is required at this SWMU.

5.4 North Settling Lagoon

The North Settling Lagoon is located east of Dryden Road, west of the wastewater treatment facility, north of Building 14 and south of Northlawn Avenue, as shown on Figure 2-5. A detailed discussion of the background history of the North Settling Lagoon is contained in the DOCC (Geraghty & Miller, Inc. 1991a). The RFI objective for this unit was limited to groundwater characterization, since waste characterization was conducted in support of the preparation of a RCRA closure plan for this SWMU.

5.4.1 Investigative Strategy

In preparation for closure of the North Settling Lagoon in 1989, Geraghty & Miller conducted an investigation consisting of a survey of the North Settling Lagoon and surrounding area, sludge and water depth measurements, sludge core sampling, subsoil sampling, and physical/chemical analysis of the sludge and subsoil. The results of this investigation are summarized in the DOCC (Geraghty & Miller, Inc. 1991a) and discussed in detail in the North Settling Lagoon Revised Closure/Post-Closure Plan (Geraghty & Miller Consulting Engineers, Inc. 1989a).

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Chemical analysis of the sludge and subsoil to support development of a closure plan was performed according to U.S. EPA approved methods and included analyses for total priority pollutants, priority pollutant analysis for VOCs only; selected metals and cyanide analysis; full RCRA Appendix IX analysis; oil and grease analysis; and percent solids and bulk density.

During the RFI, groundwater quality upgradient of the North Settling Lagoon was determined by sampling Well HR-4, which is screened in the upper aquifer downgradient from Landfill L3, and monitor wells upgradient of the Delphi Thermal site. To evaluate the groundwater quality downgradient from the North Settling Lagoon, during the RFI, four monitor wells were sampled south of the North Settling Lagoon (Figure 4-5).

During Phase I, groundwater-quality samples were collected downgradient from the North Settling Lagoon from Wells HR-14, HR-15, W-3-N, and W-4-N and analyzed for Appendix IX VOCs, SVOCs, PCBs, pesticides, herbicides, metals (total and dissolved), and cyanide. Monitor Wells W-3-N and W-4-N were sampled to evaluate groundwater quality in the upper aquifer, and Monitor Wells HR-14 and HR-15 were sampled to evaluate groundwater quality in the lower aquifer. During Phase II of the RFI, groundwater samples were collected from the same four monitor wells (HR-14, HR-15, W-3-N, and W-4-N) located downgradient of the North Settling Lagoon and analyzed for VOCs by Method 8015. Detected organic groundwater constituents at this SWMU are shown on Figure 5-9.

5.4.2 RCRA Closure Sampling Results

Analytical results for the raw sludge from the lagoon sampling program have been consolidated and summarized in Table 5-7 for the North Settling Lagoon (reprinted from the DOCC [Geraghty & Miller, Inc. 1991a]). Only constituents which were detected at least once are included in this table. This table summarizes the frequency of detection, the range of detected concentrations, the median concentration, and the location of the maximum detected concentration for each constituent.

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5.4.3 Groundwater Results

The following provides a discussion of groundwater-quality results upgradient and downgradient from the North Settling Lagoon during Phases I and II. Groundwater results for Phases I and II are provided in Appendices A2 and A6, respectively.

5.4.3.1 VOCs

During Phase I, five VOCs (1,1,1-trichloroethane, 1,1-dichloroethane, chloroethane, PCE and TCE) were detected by Method 8240 in groundwater in the upper aquifer upgradient of the North Settling Lagoon, in four monitor wells located upgradient of the Delphi Thermal facility and in HR-4, which is located downgradient of Landfill L3. Additionally, two VOCs (carbon disulfide and vinyl chloride) were detected by Method 8240 in groundwater in the two lower aquifer monitor wells located upgradient of the Delphi Thermal facility. Results for the upgradient monitor wells which contained VOCs are summarized on Table 4-8, presented on Figure 5-9, and discussed in Section 4.2.2.1 (VOCs).

During Phase I, two VOCs were detected by Method 8240 in groundwater samples collected from wells in the upper aquifer downgradient of the North Settling Lagoon. PCE was reported in Wells W-3-N and W-4-N at concentrations of 41.4 ug/L and 1.6 ug/L, respectively. TCE was detected at concentrations of 9.3 ug/L (W-4-N) and 9.1 ug/L (W-4-N). No other VOCs were detected in the upper aquifer downgradient of the North Settling Lagoon.

In the lower aquifer, carbon disulfide, TCE, and vinyl chloride were detected at low concentrations downgradient of the North Settling Lagoon. Carbon disulfide was detected in DUP-14 (the duplicate sample of HR-15) at a concentration of 2.1 ug/L. However, no carbon disulfide was detected in Sample HR-15. TCE and vinyl chloride were detected in HR-14 at concentrations of 4.6 ug/L and 7.7 ug/L, respectively. No other VOCs were detected in the lower

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aquifer downgradient of the North Settling Lagoon. Detected VOC concentrations downgradient of the North Settling Lagoon are provided in Table 5-8 and presented in Figure 5-9.

During Phase II, no VOCs were detected by Method 8015 upgradient or downgradient of the North Settling Lagoon. Phase II results are provided in Appendix A6.

5.4.3.2 SVOCs, PCBs, Pesticides, Herbicides, and Cyanide

No SVOCs, PCBs, pesticides, herbicides, or cyanide were detected upgradient or downgradient of the North Settling Lagoon. SVOCs, PCBs, pesticides, herbicides, and cyanide results for Phase I are provided in Appendix A2.

5.4.3.3 Dissolved Metals

During Phase I, dissolved metals were detected in groundwater in the upper aquifer upgradient of the North Settling Lagoon in four monitor wells located upgradient of the Delphi Thermal facility, and in HR-4, which is located downgradient of Landfill L3. Results for the upgradient monitor wells which contained dissolved metals are summarized in Table 4-9, and discussed in Section 4.2.2.3 (Dissolved Metals). Results for Monitor Well HR-4 are summarized on Table 5-6, and discussed in Section 5.3.4.3 (Dissolved Metals).

Dissolved metals detected in the upper aquifer downgradient of the North Settling Lagoon include antimony, barium, cobalt, and nickel (Table 5-9). Dissolved antimony was detected in W-3-N and W-4-N at concentrations of an estimated 57.8 ug/L and 58.8 ug/L, respectively. Dissolved barium was reported in W-3-N and W-4-N at concentrations of 91.7 ug/L and 122 ug/L, respectively. Dissolved cobalt was detected in the same wells at concentrations of 9.5 ug/L (W-3-N) and 13.1 ug/L (W-4-N). Dissolved nickel was reported in Well W-4-N at a concentration of 15.8 ug/L. No other dissolved metals were detected in the upper aquifer downgradient of the North Settling Lagoon.

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Dissolved metals detected in the lower aquifer downgradient of the North Settling Lagoon include antimony, barium, cobalt, and lead (Table 5-9). Dissolved antimony was only detected in HR-14 at a concentration of 57.6 ug/L. Dissolved barium was detected in HR-14, HR-15, and the duplicate sample (DUP-14) of HR-15 at concentrations of 85.4 ug/L, 94.4 ug/L, and 95.2 ug/L, respectively. Dissolved cobalt was reported in the same samples at concentrations of 10.1 ug/L, 6.7 ug/L, and 8 ug/L, respectively. Dissolved lead was only detected in HR-14 at a low concentration of 4.6 ug/L.

5.4.3.4 QA/QC Samples

During Phase I, no VOCs were detected in Trip Blank TB-09, indicating that no cross-contamination of VOCs has occurred during sample collection and handling at the North Settling Lagoon. In Rinseate Blank RB-03, 1,1,1-trichloroethane was detected at a concentration of 3 ug/L. However, no 1,1,1-trichloroethane was detected in samples collected directly before (W-4-N) and after (HR-15) preparation of RB-03. No cross-contamination of VOCs has occurred through equipment-decontamination procedures.

During Phase II, no VOCs were detected in Trip Blank TB-29 and Rinseate Blank RB-25 at the North Settling Lagoon during Phase II. No VOC cross contamination has occurred during sample collection, handling, and equipment decontamination.

No SVOCs, PCBs, pesticides, herbicides, or cyanide were detected in Rinseate Blank RB-03, indicating that cross-contamination of these constituents has not occurred through decontamination procedures during the RFI.

During Phase I, total copper and zinc were detected in Rinseate Blank RB-03 at concentrations of 25 ug/L and 6.2 ug/L, respectively. Total copper and zinc were also detected in Sample HR-15 (which was collected following preparation of the rinseate blank) at

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concentrations of 27.3 ug/L and 47.1 ug/L, but were qualified as not detected through data validation procedures. No other total or dissolved metals were detected in RB-03.

5.4.4 Conclusions

Investigative activities conducted at the North Settling Lagoon have provided sufficient detail to meet the RFI objectives as presented below.

1. An evaluation of the analytical results for the sludge indicates that the range of constituents and their concentrations have been characterized within this SWMU during the RCRA closure sampling activities (Geraghty & Miller Consulting Engineers, Inc. 1989a). Because of this fact, the RCRA closure sampling results provide adequate characterization of the sludge and subsoil to support the Baseline Risk Assessment (Volume II).

2. Groundwater quality in the vicinity of the North Settling Lagoon is consistent with historical data collected in this area of the Delphi Thermal site (Geraghty & Miller, Inc. 1991a). Therefore, groundwater data collected during the RFI should be acceptable for use in the Baseline Risk Assessment (Volume II).

Based on these conclusions, no additional investigative activity is required at this SWMU.

5.5 South Settling Lagoon

The South Settling Lagoon System is located east of Interstate 75, west of Dryden Road, north of Sellars Road, and south of East River Road, as shown on Figure 2-5. A detailed discussion of the background history of the South Settling Lagoon is contained in the DOCC (Geraghty & Miller, Inc. 1991a). The RFI objective for this unit was groundwater

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characterization since waste characterization was conducted in support of the preparation of a RCRA closure plan for this SWMU.

5.5.1 Investigative Strategy

To characterize the physical and chemical properties of the South Settling Lagoon sludges, and to define engineering parameters pertinent to the selection, planning, and design of the South Settling Lagoon closure, Delphi Thermal implemented a lagoon sampling program in the fall of 1988. The sampling program and investigation was similar to that conducted for the North Settling Lagoon, that is, the investigation consisted of a survey and measurements to determine waste (liquid, sludge, and soil) volumes and a visual description and chemical analysis of sludge and subsoil samples. Chemical analyses were conducted in accordance with U.S. EPA approved methods and included analysis for total priority pollutants, priority pollutant for VOCs only; selected metals and cyanide; full RCRA Appendix IX; oil and grease; and percent solids and bulk density. The results of this investigation are summarized in the DOCC (Geraghty & Miller, Inc. 1991a) and discussed in detail in the South Settling Lagoon Revised Closure Plan (Geraghty & Miller Consulting Engineers, Inc. 1989b).

To evaluate the groundwater quality in the upper aquifer upgradient and downgradient from the South Settling Lagoon, Monitor Wells HR-17, W-2-S, and W-4-S were sampled (Figure 5-11). During Phase I, Monitor Wells HR-17, W-2-S, and W-4-S were sampled for Appendix IX VOCs, SVOCs, PCBs, pesticides, herbicides, cyanide, and total and dissolved metals. Monitor Well HR-17 is located upgradient of the South Settling Lagoon, and Monitor Wells W-2-S and W-4-S are located downgradient of the South Settling Lagoon. During Phase II, Monitor Wells HR-17, W-2-S, and W-4-S were sampled for VOCs (Method 8015 and 8240) to confirm the Method 8240 analytical results and to perform VOC analysis using Method 8015 that had not been done during Phase I. Detected organic analytical results for this SWMU are shown on Figure 5-5.

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5.5.2 RCRA Closure Sampling Results

Analytical results for the raw sludge from the lagoon sampling program have been consolidated and summarized in Table 5-10 for the South Settling Lagoon. Only constituents which were detected at least once are included in this table. This table summarizes the frequency of detection, the range of detected concentrations, the median concentration, and the location of the maximum detected concentration for each constituent.

5.5.3 Groundwater Results

A discussion of groundwater results and QA/QC samples is provided below. Groundwater results for Phases I and II are provided in Appendix A2 and A6.

5.5.3.1 VOCs

During Phase I, three VOC constituents by Method 8240 were detected in Well HR-17 in the upper aquifer upgradient of this SWMU. 1,1,1-Trichloroethane was detected at a concentration of 2.6 ug/L; however, this VOC was not detected in the duplicate sample (DUP-19) of HR-17. PCE was detected in HR-17 and DUP-19 at 12.2 ug/L and 11.4 ug/L, respectively. TCE was detected in HR-17 and DUP-19 at 3.1 ug/L. No other VOCs were detected upgradient of the South Settling Lagoon.

The same three VOC constituents detected by Method 8240 analysis upgradient of the South Settling Lagoon were detected downgradient of the lagoon. In W-4-S, 1,1,1-trichloroethane was detected at a concentration of 2.5 ug/L and PCE was detected at a concentration of 166 ug/L in Well W-4-S. TCE was detected in Wells W-2-S and W-4-S at concentrations of 4.6 ug/L and 25 ug/L, respectively. Detected VOCs upgradient and downgradient from the South Settling Lagoon are summarized in Table 5-11 and shown on Figure 5-5.

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During Phase II, four VOCs were detected by Method 8240 or 8015 analysis upgradient of the South Settling Lagoon. Carbon disulfide was reported at a concentration of 1.7 ug/L in the duplicate sample of HR-17 (DUP-35); however, carbon disulfide was not reported above the detection limit in Sample HR-17. PCE was reported in both HR-17 and DUP-35 at a concentration of 10.4 ug/L; TCE was reported in the same samples at a concentration of 4.9 ug/L. Trichlorofluoromethane was detected in HR-17 and DUP-35 at concentrations of 13.4 ug/L and 10.7 ug/L, respectively.

During Phase II, two VOCs were detected in W-2-S and five VOCs were detected in W-4-S by Method 8240 or 8015 analysis downgradient of the South Settling Lagoon. In W-2-S, TCE was reported at 3.9 ug/L and 1,1,1-trichloroethane, which was not detected during Phase I, was reported at 1.2 ug/L. In W-4-S, 1,1,1-trichloroethane was reported at 2.7 ug/L, PCE was reported at 36.9 ug/L, which is much lower than the 166 ug/L concentration reported during Phase I, TCE was reported at 12.8 ug/L, and carbon disulfide and trichlorofluoromethane, which were not detected during Phase I sampling, were reported at 1.6 ug/L and 6.3 ug/L, respectively. Detected VOCs upgradient and downgradient of the South Settling Lagoon are summarized in Table 5-11 and shown on Figure 5-5.

5.5.3.2 SVOCs, PCBs, Pesticides, Herbicides, and Cyanide

SVOCs, PCBs, pesticides, herbicides, or cyanide were reported below detection limits in upgradient and downgradient samples for the South Settling Lagoon. Analytical results are provided in Appendix A2.

5.5.3.3 Dissolved Metals

Dissolved barium and cobalt were detected upgradient of the South Settling Lagoon. Dissolved barium was detected in HR-17 and DUP-19 at concentrations of 118 ug/L and 116 ug/L, respectively. DUP-19 is the duplicate sample of HR-17. Dissolved cobalt was detected in

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DUP-19 at a concentration of 5.6 ug/L; however, dissolved cobalt was not detected in HR-17. Dissolved metals detected upgradient and downgradient of the South Settling Lagoon are summarized in Table 5-12.

Dissolved barium and cobalt were detected downgradient of the South Settling Lagoon at similar concentrations to those found upgradient. Dissolved barium was reported in W-2-S and W-4-S at concentrations of 176 ug/L and 74.1 ug/L, respectively; dissolved cobalt was detected in the same wells at concentrations of 7.7 ug/L and 7.6 ug/L, respectively.

5.5.3.4 QA/QC Samples

During Phase I, no VOCs were detected in Trip Blank TB-14, indicating that no cross contamination of VOCs has occurred during sample collection and handling at the South Settling Lagoon. Chloroform was detected in Rinseate Blanks RB-06 and RB-08 at concentrations of 2.0 ug/L and 2.4 ug/L, respectively; however, no chloroform was detected in samples collected at the South Settling Lagoon. Chloroform detected in rinseate blanks is discussed in Section 3.2.1.4 (Groundwater Sampling). No cross-contamination of VOCs occurred during equipment decontamination procedures.

During Phase II, no VOCs were detected in Trip Blank TB-28 and Rinseate Blank RB-22 indicating that no cross-contamination occurred during sample collection and handling and equipment decontamination at the South Settling Lagoon during Phase II.

No SVOCs, PCBs, pesticides, herbicides, or cyanide were detected in Rinseate Blanks RB-06 and RB-08, indicating that cross-contamination of these constituents has not occurred through decontamination procedures.

Total copper and total zinc were detected in Rinseate Blank RB-06 at concentrations of 32.1 ug/L and 7.7 ug/L, respectively. Total copper and zinc were also detected in Sample HR-17

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at concentrations of 9.9 ug/L and 18.4 ug/L, respectively; however, the total copper and zinc concentrations for HR-17 were qualified as not detected through data validation procedures. Total copper and zinc were detected in Rinseate Blanks RB-08 at concentrations of 32.1 ug/L and 12.5 ug/L. Total copper and zinc were also detected in Sample W-4-S at concentrations of 10.4 ug/L and 17.4 ug/L, respectively; however, the total copper and zinc detected in Sample W-4-S was qualified as not detected through data validation procedures. No other total metals and no dissolved metals were detected in RB-06 and RB-08.

5.5.4 Conclusions

Investigative activities conducted at the South Settling Lagoon have provided sufficient detail to meet the RFI objectives as presented below.

1. An evaluation of the analytical results for the sludge indicates that the range of constituents and their concentrations have been characterized within this SWMU during the RCRA closure sampling activities (Geraghty & Miller Consulting Engineers, Inc. 1989b). Because of this fact, the RCRA closure sampling results provide adequate characterization of the sludge and subsoil to support the Baseline Risk Assessment (Volume II).

2. Groundwater quality in the vicinity of the South Settling Lagoon is consistent with historical data collected in this area of the Delphi Thermal site (Geraghty & Miller, Inc. 1991a). However, based on the results of the sludge characterization data, which indicated VOCs are not detected in the sludge, the groundwater quality data for VOCs from W-2-S and W-4-S are likely unrepresentative of any contribution from the South Settling Lagoon and may not be appropriate for use in the Baseline Risk Assessment (Volume II).

Based on these conclusions, no additional investigative activity is required at this SWMU.

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5.6 WEST TANK FARM

The West Tank Farm originally had 14 USTs; however, nine of the 14 USTs at the West Tank Farm were removed prior to the RFI. The five other tanks (Tanks 1, 2, 3, 7, and 8) were removed between June and August 1992. The location of the West Tank Farm at the Delphi Thermal site is shown on Figure 2-6. Figure 5-13 provides the location of each tank, the historical contents of each tank, grab sample locations, analytical sample locations, and organic analytical results at the West Tank Farm. The RFI objectives for this unit were release determination and characterization, and groundwater quality characterization.

5.6.1 Investigative Strategy

During the RFI, soil samples were collected from select locations at the West Tank Farm; groundwater samples were collected from two monitor wells to evaluate groundwater quality in the upper aquifer upgradient and downgradient from the West Tank Farm.

In November 1992 (Phase I), six grab samples were collected from locations most likely to detect any release of hazardous constituents. All six samples were collected below the base of the excavated pits, approximately 15 feet bgs, using a trackhoe fitted with a bucket. Of the six grab samples collected, three samples were selected for TCL VOCs, PCBs, and pesticides and TAL metals analyses by the laboratory based on HNu headspace readings and visual examination. Although pesticide analytical results were not specified for this SWMU in the RFI Work Plan, pesticide analyses were performed inadvertently by the laboratory on the samples from this SWMU during Phase I.

During Phase I, groundwater quality in the upper aquifer upgradient and downgradient from the West Tank Farm was assessed by sampling two wells (HR-1 and W-1-S) for VOCs, PCBs, and total and dissolved metals (Figure 5-12).

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During Phase II, one soil sample was collected between former USTs 11 and 12 (SWMU T10) at the West Tank Farm and analyzed for VOCs to evaluate the presence of volatile hazardous constituents at SWMU T10. This soil sample (T10-BH01-16SL) was collected from a depth of 15 to 17 feet bgs (within native soil just below the base of the SWMU T10 tanks) using hollow-stem auger methods.

During drilling, a concrete slab was encountered at approximately 13 feet bgs in Borings T10-BH01A and T10-BH01B. After discussion with the U.S. EPA, the Phase II soil sample from SWMU T10 was obtained by moving the sample location (Boring T10-BH01C) just east of the concrete slab to obtain a sample at a depth below the former tanks and in native soil. Boring logs including field HNu readings and physical descriptions for each boring are provided in Appendix C. A description of the sample collected for laboratory analysis is also provided in Appendix C.

The same two monitor wells (HR-1 and W-1-S) sampled during Phase I were sampled and analyzed for VOCs by Method 8015 during Phase II.

5.6.2 Soil Sampling Results

A discussion of soil sampling results and QA/QC samples is provided below. Soil sampling results for Phase I and II are provided in Appendices A10 and A4, respectively.

5.6.2.1 VOCs

During Phase I, PCE was detected in Sample WTF-GS8-15SL and its duplicate sample (DUP-02) at concentrations of 75 ug/kg and 1,300 ug/kg, respectively. No other VOCs were detected in soil samples collected at the West Tank Farm during Phase I. Detected VOCs in soil samples collected at the West Tank farm are summarized in Table 5-13 and shown on Figure 5-13.

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During Phase II, a total of four VOCs were detected in Sample T10-BH01-16SL. Three VOCs were detected from its duplicate sample (DUP-27). 1,2-Dichloroethene (total) was detected in T10-BH01-16SL and DUP-27 at concentrations of 1,320 ug/kg and 530 ug/kg, respectively. 2-Butanone was detected in T10-BH01-16SL at a concentration of 9,940 ug/kg. PCE was detected in T10-BH01-16SL and DUP-27 at concentrations of 6,200 ug/kg and 4,260 ug/kg, respectively. TCE was detected in the same two samples at concentrations of 1,390 ug/kg and 510 ug/kg, respectively. No other VOCs were detected. Detected VOCs in soils at the West Tank Farm are summarized in Table 5-13 and shown on Figure 5-13.

5.6.2.2 PCBs and Pesticides

No PCBs or pesticides were detected in soil samples collected at the West Tank Farm during Phase I (Appendix A10).

5.6.2.3 Metals

Metals detected at the West Tank Farm during Phase I include aluminum, arsenic, barium, cadmium, calcium, chromium, cobalt, copper, iron, lead, magnesium, manganese, nickel, potassium, silver, sodium, vanadium, and zinc. Detected metals found in soils collected at the West Tank Farm are summarized in Table 5-14.

5.6.2.4 QA/QC Samples

No VOCs were detected in Trip Blank UST-TB-04, indicating that no cross- contamination of VOCs has occurred during sample collection and handling at the West Tank Farm during Phase I.

During Phase II, no VOCs were detected in Trip Blank TB-21 indicating no cross contamination of VOCs occurred during sample collection and handling.

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5.6.3 Groundwater Results

The following sections provide a discussion of groundwater-quality results for wells sampled in the vicinity of the West Tank Farm during Phases I and II. Detected organic groundwater constituents for this SWMU are shown on Figure 5-14. A discussion of QA/QC samples is also provided.

5.6.3.1 VOCs

Six VOCs by Method 8240 were detected upgradient of the West Tank Farm during Phase I (Appendix A2). Well HR-1 and its duplicate sample (DUP-13) were reported to have 1,1,1-trichloroethane at concentrations of 4.5 ug/L and 7.7 ug/L, respectively. Carbon disulfide was detected in HR-1 at a concentration of 3.9 ug/L; however, no carbon disulfide was detected in DUP-13. PCE was detected in HR-1 and DUP-13 at concentrations of 25.6 ug/L and 46.3 ug/L, respectively. TCE was reported at concentrations of 55.8 ug/L (HR-1) and 101 ug/L (DUP-13). Trichlorofluoromethane was detected at concentrations of 2 ug/L (HR-1) and 5 ug/L (DUP-13). trans-1,2-Dichloroethene was detected at concentrations of 1.6 ug/L (HR-1) and 2.8 ug/L (DUP-13).

During Phase I, only three VOCs by Method 8240 were detected in Well W-1-S located downgradient of the West Tank Farm. PCE was detected at concentration of 34.7 ug/L; TCE was detected at a concentration of 5.2 ug/L; and trichlorofluoromethane was reported at a concentration of 29.9 ug/L. Detected VOCs at the West Tank Farm are summarized in Table 5-15 and shown on Figure 5-14.

No VOCs by Method 8015 were detected in the vicinity of the West Tank Farm during Phase II (Appendix A6).

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5.6.3.2 PCBs

No PCBs were detected in groundwater samples from the upper aquifer collected from monitor wells upgradient and downgradient from the West Tank Farm (Appendix A2).

5.6.3.3 Dissolved Metals

During Phase I, dissolved antimony was detected in the duplicate sample from Monitor Well HR-1 (DUP-13), at an estimated concentration of 69 ug/L; however, no dissolved antimony was detected in HR-1. Dissolved barium was detected in HR-1 and DUP-13 at concentrations of 89.7 ug/L and 96.7 ug/L, respectively. Dissolved cobalt was reported in the same wells at concentrations of 8.7 ug/L (HR-1) and 8 ug/L (DUP-13). Dissolved copper was detected in HR-1 at a concentration of 5.4 ug/L. No dissolved copper was detected in DUP-13. Dissolved zinc was detected in DUP-13 at a concentration of 10.1 ug/L; no dissolved zinc was detected in HR-1. No other dissolved metals were detected upgradient of the West Tank Farm.

During Phase I, dissolved antimony, barium, cobalt, and lead were detected in W-1-S at estimated concentrations of 56.9 ug/L, 123 ug/L, 7.3 ug/L, and 2 ug/L, respectively. Detected dissolved metals at the West Tank Farm are presented in Appendix A2, and summarized in Table 5-16. No other dissolved metals were detected at the West Tank Farm.

5.6.3.4 QA/QC Samples

During Phase I, no VOCs were detected in Trip Blanks TB-08 and TB-14, indicating that no cross-contamination of VOCs has occurred during sample collection and handling in the vicinity of SWMU T12 and the West Tank Farm. Also, no VOCs were detected in Rinseate Blank RB-02. Chloroform was detected in Rinseate Blank RB-08 at concentration of 2.4 ug/L. No chloroform was detected in samples collected in the vicinity of the West Tank Farm. Chloroform detected in rinseate blanks has been previously discussed in Section 4.2.2.4 (QA/QC

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Samples). Furthermore, although RB-08 is associated with the sample group containing some West Tank Farm samples, no groundwater sample was collected from the West Tank Farm following the preparation of RB-08. No cross-contamination of VOCs has occurred through equipment decontamination at the West Tank Farm during Phase I.

During Phase II, no VOCs were detected in Trip Blanks TB-24 and TB-26, indicating that no cross-contamination of VOCs occurred during sample collection and handling at the West Tank Farm. Also, no VOCs were detected in Rinseate Blanks RB-16 and RB-19, indicating that no cross-contamination of VOCs occurred during equipment decontamination during Phase II.

During Phase I, no SVOCs, PCBs, pesticides, or cyanide were detected in Rinseate Blanks RB-02 and RB-08, indicating that no cross-contamination of these constituents has occurred during equipment decontamination.

Total copper was detected in Rinseate Blank RB-02 at a concentration of 28.1 ug/L and Sample HR-1 at a concentration of 10.8 ug/L. Total copper in HR-1, collected following the preparation of RB-02, was qualified as a nondetect through data validation procedures (U.S. EPA 1988b). Total copper and total zinc were detected in RB-08; however, no West Tank Farm samples were collected immediately following the preparation of RB-08. Results for RB-08 have been previously discussed in Section 4.2.2.4 (QA/QC Samples). No other total and no other dissolved metals were detected in RB-02 and RB-08.

5.6.4 Conclusions

Investigative activities conducted at the West Tank Farm have provided sufficient detail to meet the RFI objectives, as presented below for soil and groundwater media.

1. The Phase I soil samples were collected on the basis of HNu and visual indications to locate areas in the excavation most likely to have been impacted by a release

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from the tanks at the tank farm. The Phase II soil samples were collected from a location which, based on professional judgement, would likely represent the nature of a potential release from SWMU T10 within the West Tank Farm. Therefore, analytical results from these samples would likely represent the highest concentrations of any released constituents in soil remaining at the unit (i.e., soil not previously excavated for disposal). Consequently, these data will provide a conservative bases for use in the Baseline Risk Assessment (Volume II).

2. Groundwater quality in the upper aquifer in the vicinity of Monitor Well W-1-S is consistent with historical data collected in this area of the site (Geraghty & Miller, Inc. 1991a). However, after reviewing the groundwater flow in the area of the West Tank Farm, and the location of Monitor Well W-1-S (located approximately 500 feet down- and cross-gradient), the use of this well for characterizing potential impacts to groundwater from this SWMU is not appropriate. However, this SWMU has adequate soil characterization data, that can be used to estimate the potential impact of constituents in soil at this SWMU on groundwater.

Based on these conclusions, no additional investigative activity is required at this SWMU.

5.7 SWMU T12

UST T12 was used to contain spent detergent solution and has been inactive since 1983. In October 1992 (Phase I), SWMU T12 was excavated in sections beginning with the base of the tank. The location of T12 at the Delphi Thermal site is provided on Figures 2-6 and 5-12. The RFI objectives for this unit were release determination and characterization, and groundwater quality characterization.

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5.7.1 Investigative Strategy

Following excavation of the base of SWMU T12, one soil sample was collected from the tank pit to determine if a release of constituents had occurred. Five soil grab samples were collected for HNu headspace analysis and visual inspection. Because headspace results were equal to background and no visual evidence of contamination was observed, the Geraghty & Miller field representative collected the soil sample (T12-GS1-17SL) for laboratory analysis from a location most likely to detect a release of hazardous constituents. This location was adjacent to the west wall of the excavation, close to the location of a former sump, approximately 15 to 17 feet bgs.

After excavation of the sidewalls of SWMU T12, a second sample was selected for laboratory analysis by Geraghty & Miller, in agreement with the U.S. EPA representative. Five soil grab samples were collected from the east sidewall, screened for VOCs using an HNu and inspected for visual evidence of contamination. Of the five grab samples, one sample (T12-GS2-10SL), collected at a depth of approximately 8 to 10 feet bgs, was submitted to the laboratory for analysis based on the highest HNu headspace reading and the greatest evidence of visual contamination.

Both soil samples from SWMU T12 were submitted to the laboratory for analysis of TCL VOCs and TCL metals. Soil grab samples and each corresponding HNu headspace reading collected from SWMU T12 are provided on Figure 5-15; laboratory soil samples collected at SWMU T12 are provided on Figure 5-16.

During Phase I, Well HR-6 was sampled for VOCs and metals (total and dissolved) to assess groundwater quality in the upper aquifer downgradient of SWMU T12. Analytical results for Phase I are provided in Appendix A2. During Phase II, Monitor Well HR-6 was sampled and analyzed for VOCs by Method 8015. Analytical results for Phase II are presented in Appendix A6. Monitor well locations in the vicinity of SWMU T12 are shown on Figure 5-14.

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5.7.2 Soil Sampling Results

The following sections provide a discussion of VOC and metal analytical results for soil samples collected at T12 during Phase I (Appendix A11). Figure 5-16 shows detected organic soil constituents at this SWMU. QA/QC sample results are also provided.

5.7.2.1 VOCs

Styrene was detected in soil Samples T12-GS1-17SL, T12-GS2-10SL, and DUP-01 (the duplicate of Sample T12-GS1-17SL) at concentrations of 30 ug/kg, 7.1 ug/kg, and 31 ug/kg, respectively. Ethylbenzene was detected at a concentration of 6.1 ug/kg in Sample T12-GS1-17SL and 8 ug/kg in DUP-01. Sample locations and detected VOC results are summarized in Table 5-17 and shown on Figure 5-16. No other VOCs were detected in the samples from SWMU T12.

5.7.2.2 Metals

Metals detected in T12 soils include aluminum, antimony, arsenic, barium, beryllium, cadmium, calcium, chromium, cobalt, copper, iron, lead, magnesium, manganese, sodium, vanadium, and zinc. Table 5-18 provides a summary of detected metals in soils collected at SWMU T12.

5.7.2.3 QA/QC Samples

No VOCs were detected in Trip Blanks UST-TB-2 and UST-TB-3, indicating that no cross-contamination of VOCs occurred during sample collection and handling at SWMU T12.

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5.7.3 Groundwater Results

A discussion of groundwater-quality results for downgradient Well HR-6 and for QA/QC samples during Phases I and II (Appendices A2 and A6, respectively) is provided below. A discussion of QA/QC samples is also provided. A discussion of monitor wells upgradient of SWMU T12 is provided in Section 4.2 (Upgradient Groundwater Quality).

5.7.3.1 VOCs

TCE was detected in Well HR-6, downgradient of SWMU T12, at a concentration of 4.4 ug/L during Phase I by Method 8240. Figure 5-14 provides the location of HR-6 with respect to T12 and a summary of detected VOCs. No VOCs by Method 8015 were detected downgradient of SWMU T12 during Phase II. VOC results are summarized in Table 5-15 and shown on Figure 5-14.

5.7.3.2 Dissolved Metals

Dissolved barium and dissolved cobalt were detected in Well HR-6 at concentrations of 89.1 ug/L and 7.7 ug/L, respectively. Dissolved metal results are summarized in Table 5-16. No other dissolved metals were detected downgradient of T12.

5.7.3.3 QA/QC Samples

During Phase I, no VOCs were detected in Trip Blank TB-10, indicating that no cross-contamination of VOCs has occurred during sample collection and handling in the vicinity of SWMU T12. Chloroform was detected in Rinseate Blank RB-04 at a concentrations of 1.2 ug/L. No chloroform was detected in samples collected in the vicinity of T12. Chloroform detected in rinseate blanks has been previously discussed in Section 4.2.2.4 (QA/QC Samples). In addition, no T12 sample was collected immediately following the preparation of RB-04; however, RB-04

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is associated with a sample group containing T12 samples. No cross-contamination of VOCs has occurred through equipment decontamination at T12.

During Phase II, no VOCs were detected in Trip Blank TB-29, indicating that no cross-contamination of VOCs occurred during sample collection and handling at T12. No VOCs were detected in Rinseate Blank RB-25, indicating that no cross-contamination of VOCs occurred during equipment decontamination.

Total copper and zinc were detected in RB-04 at concentrations of 34.9 ug/L and 9.7 ug/L, respectively. Although RB-04 is associated with a sample group containing T12 samples, no cross-contamination of copper and zinc through equipment decontamination is likely. No T12 sample was collected immediately following the preparation of RB-04. No other total metals and no dissolved metals were detected in RB-04.

5.7.4 Conclusions

Investigative activities conducted at SWMU T12 have provided sufficient detail to meet the RFI objectives, as presented below for soil and groundwater media.

1. The soil samples were collected during the RFI on the basis of HNu and visual indications to locate areas in the excavation mostly likely to have been impacted by a release from the tank. Therefore, analytical results from these samples would likely represent the highest concentrations of any constituents released to the soil. A review of the results from these samples indicates that there are no hazardous constituents in the soil at the unit at concentrations which would be expected to pose a threat to human health or the environment. The RFI sampling results provide no evidence of a significant release of hazardous constituents from this SWMU.

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2. Groundwater quality in the upper aquifer in the vicinity of SWMU T12 is consistent with historical data collected in this area (Geraghty & Miller, Inc. 1991a). However, based on the fact that TCE was not detected in the soil samples collected and analyzed in this SWMU, the TCE detected in groundwater may not be representative of the contribution from this SWMU because of the potential for other sources to affect the groundwater in this area.

Based on these conclusions, no additional investigative activity is required at this SWMU.

5.8 SWMU T5/T6

UST T5 was used for wastewater neutralization from acid/alkali processes; UST T6 contained spent machinery coolant. Both tanks were excavated in 1989. Figures 2-6 and 5-12 provides the location of SWMU T5/T6 at the Delphi Thermal site. The RFI objective for this SWMU was to determine if a release had occurred from the unit.

5.8.1 Investigative Strategy

To determine if a release of hazardous constituents had occurred, one soil sample was collected at each former tank location from below the level of the former tanks for analysis of TCL VOCs, SVOCs, PCBs, and TAL metals during Phase I.

One soil boring was drilled at each of the former locations of the two USTs via hollow-stem auger techniques where a split-spoon sampler was used to collect a sample from a depth of 10 to 12 feet bgs. Because of the coarse texture of the soil, spit-spoon sample recovery was poor for Samples T5/6-BH01-11SL and its duplicate sample (DUP-06). Therefore, the total metals sample was collected from 9 to 10 feet, the VOC sample was collected from 10 to 11 feet, and the SVOC and PCB samples were collected from 11 to 12 feet for both T11-BH01-11SL and DUP-06.

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Field HNu readings and physical descriptions were recorded on boring logs for each sampling location and are provided in Appendix C. Soil sampling logs for each sample sent to the laboratory are also contained in Appendix C. Subsurface soil sampling locations collected at SWMU T5/6 are shown on Figure 5-17.

No further action was required for Phase II.

5.8.2 Soil Sampling Results

The following sections provide a discussion of the analytical results for soil (Appendix A12) and QA/QC samples. Figure 5-17 shows the detected organic soil constituents for this SWMU.

5.8.2.1 VOCs

Acetone was detected in Samples T5/6-BH01-11SL and T5/6-BH02-12SL at concentrations of 280 ug/kg and 110 ug/kg, respectively. The likely source of the acetone detected in the Phase I samples has been previously discussed in Section 4.4.1.2 (Results). PCE was detected in Samples T5/6-BH01-11SL, T5/6-BH02-12SL, and DUP-06 at concentrations of 33 ug/kg, 32 ug/kg, and 55 ug/kg, respectively. Detected VOCs and SVOCs at this SWMU are summarized in Table 5-19 and presented on Figure 5-17. No other VOCs were detected at this SWMU.

5.8.2.2 SVOCs and PCBs

SVOC analysis detected bis(2-ethylhexyl)phthalate, a common laboratory contaminant, at a concentration of 350 ug/kg in both T5/6-BH01-12SL and T5/6-BH02-12SL, and at a concentration of 400 ug/kg in Sample DUP-06. No other SVOCs were detected at SWMU T5/6. No PCBs were detected at this SWMU.

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5.8.2.3 Metals

Metals detected at SWMU T5/T6 include aluminum, antimony, arsenic, barium, beryllium, cadmium, calcium, chromium, cobalt, copper, iron, lead, magnesium, manganese, nickel, potassium, sodium, vanadium, and zinc. Metals detected at this SWMU are presented in Table 5-20.

5.8.2.4 QA/QC Samples

No VOCs were detected in Trip Blank TB-03, indicating that no cross-contamination of VOCs occurred during sample collection and handling at SWMU T5/T6.

5.8.3 Conclusions

Investigative activities conducted at SWMU T5/T6 have provided sufficient detail to meet the RFI objectives, as presented below for soil. The two soil samples were collected in locations most likely to have been impacted by a release from the tanks, based on professional judgement (since the 1986 soil TPH results showed little spatial pattern). A review of the results from these samples indicates that there are no hazardous constituents in soil in the area of these former tanks at concentrations which would be expected to pose a threat to human health or the environment. The RFI sampling results provide no evidence of any significant release of hazardous constituents from this SWMU. Based on these conclusions, no additional investigative activity is required at this SWMU.

5.9 SWMU T4

UST T4 was installed in 1976 and used for the collection of wash solution generated during the pot cleaning step of the polyester potting process. In 1982, the wastewater was redirected to the Delphi Thermal wastewater pretreatment facility. At that time, the remaining

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water was removed from the tank and the sludge was left in place. UST T4 was excavated and removed in October 1992 during Phase I of the RFI. Figures 2-5 and 5-12 provides the location of SWMU T4 at the Delphi Thermal site. The RFI objective for this SWMU was to determine if a release had occurred from this unit.

5.9.1 Investigative Strategy

Following removal of UST T4 in October 1992, five soil samples were collected from the base of the pit for HNu headspace analysis. Because all HNu headspace readings were equal to background and no visual evidence of contamination was observed, the Geraghty and Miller field representative collected one soil sample at a depth of approximately 15 to 17 feet bgs from a location, selected by professional judgement, most likely to detect any release of hazardous constituents from the tank. The sample was collected for analysis of TCL VOCs and TAL metals in accordance with the RFI Work Plan (Geraghty and Miller, Inc. 1992a).

No further action was required for Phase II. Soil grab samples and laboratory soil samples collected at SWMU T4 are shown on Figure 5-18. A soil sediment description log is provided in Appendix C. Phase I analytical results are provided in Appendix A13.

5.9.2 Soil Sampling Results

The following sections provide a discussion of VOC and metals results from the soil samples collected at SWMU T4 (Appendix A13). A discussion of QA/QC samples is also provided.

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5.9.2.1 VOCs

VOC analysis of Sample T4-GS1-17SL detected only PCE at an estimated concentration of 19 ug/kg. No other VOCs were detected. VOC results are provided in Appendix A13, and presented on Figure 5-18.

5.9.2.2 Metals

Metals detected in Sample T4-GS1-17SL include aluminum, antimony, arsenic, barium, beryllium, cadmium, calcium, chromium, cobalt, copper, iron, lead, magnesium, manganese, sodium, vanadium, and zinc (Appendix A13).

5.9.2.3 QA/QC Samples

No VOCs were detected in Trip Blank UST-TB-1, indicating that no cross-contamination of VOCs has occurred during sample collection and handling.

5.9.3 Conclusions

Investigative activities conducted at SWMU T4 have provided sufficient details to meet the RFI objectives, as presented below for soil. Although HNu and field observations provided no indication of any release from the tank, the Geraghty & Miller field representative collected a soil sample in a location selected by professional judgement per the RFI Work Plan. A review of the results from this sample indicates that there are no hazardous constituents in the soil at this unit in concentrations which would be expected to pose a threat to human health or the environment. The RFI soil sampling results provide no evidence of any significant release of hazardous constituents from this SWMU. Based on these conclusions, no additional investigative activity is required at this SWMU.

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5.10 SWMU T11

UST T11 was installed by Frigidaire Division GMC in 1951 to hold a dilute sodium cyanide solution used as a neutralizing bath in a porcelain pickling operation. In approximately 1969, Frigidaire eliminated the cyanide bath and discontinued use of this holding tank. In 1976, a chip pad and empty barrel pad (waste pile and staging area) were constructed to drain to this tank. Fluids draining from the chip and empty barrel pad included drawing oils from punch press offal, machine coolants, residual oil from "empty" oil drums, and residual processing materials from "empty" drums.

The oil collected in this tank was sent off site to an oil reclaimer. In 1982, this tank was tied in to the Delphi Thermal wastewater pretreatment facility. Figures 2-6 and 5-12 provide the location of SWMU T11 at the Delphi Thermal site. The RFI objectives for this unit were release determination and characterization, and to characterize groundwater quality.

5.10.1 Investigative Strategy

SWMU T11 is still an active part of the wastewater pretreatment facility and was not excavated during the RFI. Three soil borings were drilled at this SWMU in December 1992 using standard hollow-stem auger techniques. The locations of the soil borings were selected using the random/systematic sampling approach outlined in the RFI Work Plan (Geraghty & Miller, Inc. 1992a). Soil samples were collected from each soil boring at depths of 0 to 2 feet and 14 to 16 feet bgs using stainless-steel split-spoon samplers. Soil samples collected from this SWMU from a depth of 0 to 2 feet were intended to characterize soil conditions that may result in potential exposure to workers; samples from 14 to 16 feet were intended to characterize soil conditions that may affect groundwater quality. These samples were analyzed for TCL VOCs, SVOCs, PCB/pesticides, and TAL metals and cyanide.

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Field HNu readings and physical descriptions were recorded on boring logs for each sampling location and soil sampling logs for each sample submitted to the laboratory (Appendix C). Soil sample locations and detected organic soil constituents at this SWMU are also shown on Figure 5-19.

To characterize groundwater downgradient from SWMU T11, samples were collected from Monitor Wells GM-19S and GM-19D for analysis of Appendix IX VOCs by Method 8240, SVOCs, PCBs, herbicides, pesticides, cyanide, and metals (total and dissolved) during Phase I. These wells were selected during development of the RFI Work Plan (Geraghty & Miller, Inc. 1992a) to provide representative data concerning groundwater quality from the upper and lower aquifers in the area of the facility downgradient from T11 and other SWMUs in the same vicinity, including the Waste Pile Staging Area, South Tank Farm, and Fill Area. Monitor well locations and organic analytical results for these SWMUs are provided on Figures 5-5 and 5-6. Phase I analytical results are provided in Appendix A2 and A14.

No additional soil sampling was required for T11 during Phase II; however, Monitor Wells GM-19S and GM-19D were sampled during Phase II for Appendix IX VOCs by Methods 8240 and 8015 to confirm Phase I sampling results, to further characterize groundwater quality from monitor wells not regularly sampled as part of ongoing monitoring programs, and to collect Appendix IX VOCs for analysis by Method 8015. Additionally, Monitor Well WEST was sampled during Phase II for Appendix IX VOCs by Methods 8240 and 8015 as presented in the Phase II RFI Work Plan (Geraghty & Miller, Inc. 1994a). Analytical results for Phase II are presented in Appendix A6.

5.10.2 Soil Sampling Results

The following sections provide a discussion of analytical results for soil samples collected at SWMU T11. A discussion of QA/QC samples is also provided.

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5.10.2.1 VOCs

Acetone was detected in Sample T11-BH01-02SL, its duplicate sample (DUP-08), T11-BH01-16SL, T11-BH02-16SL, T11-BH03-02SL, and T11-BH03-16SL at concentrations ranging from an estimated 710 ug/kg in T11-BH03-16SL to an estimated 8,900 ug/kg in T11-BH03-02SL. The likely source of acetone has been discussed in Section 4.4.1 (Background Soils). PCE was detected in Samples DUP-08, T11-BH01-02SL, T11-BH01-16SL, T11-BH03-02SL, and T11-BH03-16SL at concentrations ranging from an estimated 38 ug/kg in T11-BH03-16SL to 120 ug/kg in DUP-08. Toluene was detected in sample T11-BH01-16SL at a concentration of 5.8 ug/kg. Detected VOCs in soils collected from SWMU T11 are summarized in Table 5-21 and shown on Figure 5-19. No other VOCs were detected in soils at T11.

5.10.2.2 SVOCs, PCBs, Pesticides, and Cyanide

SVOC analysis detected bis(2-ethylhexyl)phthalate, a common laboratory contaminant, in Samples T11-BH01-02SL, T11-BH01-16SL, and T11-BH02-16SL at concentrations of 550 ug/kg, 580 ug/kg, and 420 ug/kg, respectively. Naphthalene and 2-methylnaphthalene were also detected in Sample T11-BH02-02SL at concentrations of 7,500 ug/kg and 7,300 ug/kg, respectively. Detected SVOCs in soil samples collected from SWMU T11 are summarized in Table 5-21 and shown on Figure 5-19. No other SVOCs were detected at SWMU T11.

No PCBs or pesticides were detected in soils from SWMU T11. Cyanide was detected at an estimated 0.8 mg/kg in Sample T11-BH02-02SL. No cyanide was detected in any other soil sample collected at T11 (Appendix A14).

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5.10.2.3 Metals

Aluminum, antimony, arsenic, barium, beryllium, cadmium, calcium, chromium, cobalt, copper, iron, lead, magnesium, manganese, nickel, potassium, sodium, vanadium, and zinc were found in T11 soil samples (Appendix A14).

5.10.2.4 QA/QC Samples

No VOCs were detected in Trip Blank TB-04, indicating that no cross-contamination of VOCs occurred during sample collection and handling.

5.10.3 Groundwater Results

The following sections provide a discussion of groundwater sampling results for Monitor Wells W-19S, W-19D, and WEST in the vicinity of T11, and the Waste Pile/Staging Area, South Tank Farm, and Fill Area SWMUs. A discussion of QA/QC samples is also provided. Groundwater results for Phases I and II are provided in Appendices A2 and A6, respectively.

5.10.3.1 VOCs

5.10.3.1.1 Upper Aquifer

Six VOCs by Method 8240 were detected in upper aquifer well GM-19S during Phase I. 1,1,1-Trichloroethane was reported at a concentration of 90.1 ug/L; 1,1-dichloroethane was detected at a concentration of 16.7 ug/L; 1,1-dichloroethene was reported above the detection limit at a concentration of 2.5 ug/L. PCE and TCE were detected at concentrations of 21.1 ug/L and 157 ug/L, respectively. Trans-1,2-dichloroethene was reported above the detection limit at a concentration of 3.2 ug/L. Detected VOCs in the upper and lower aquifer downgradient from this SWMU are summarized in Table 5-22 and shown on Figure 5-5.

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1,1,1-Trichloroethane was detected in GM-19S and WEST at concentrations of 47.8 ug/L and 196 ug/L, respectively, in the upper aquifer during Phase II. 1,1-Dichloroethane was detected in Wells GM-19S and WEST at concentrations of 20.8 ug/L and 153 ug/L, respectively; 1,1-dichloroethene was detected at 3.2 ug/L and 1.4 ug/L, respectively. Chloroethane was reported in WEST at a concentration of 32 ug/L. Chloroform was detected in GM-19S at a concentration of 1.2 ug/L. PCE was detected in GM-19S and WEST at concentrations of 166 ug/L and 52.5 ug/L, respectively. TCE was only reported in WEST at a concentration of 62.4 ug/L. trans-1,2,-Dichloroethene was reported in Wells GM-19S and WEST at concentrations of 3.4 ug/L and 1.5 ug/L, respectively. No other VOCs by Methods 8240 and 8015 were detected from the upper aquifer downgradient from this SWMU.

5.10.3.1.2 Lower Aquifer

Six VOCs by Method 8240 were detected in the lower aquifer groundwater samples collected during Phase I (Table 5-22 and Figure 5-6). 1,1,1-Trichloroethane was detected in GM-19D and DUP-16 at concentrations of 6.6 ug/L and 8 ug/L, respectively. Sample DUP-16 is a duplicate sample of GM-19D. 1,1-Dichloroethane and 1,1-dichloroethene were reported just above their detection limits at concentrations of 2.4 ug/L and 1.7 ug/L, respectively; these constituents were not detected in DUP-16. TCE was reported in GM-19D and DUP-16 at concentrations of 80.1 ug/L and 91.6 ug/L, respectively. Vinyl chloride was detected at concentrations of 25.8 ug/L (GM-190) and 25.3 ug/L (DUP-16). Total xylenes were reported above the detection limit in GM-19D and DUP-16 at concentrations of 2.4 ug/L and 2.5 ug/L, respectively. No other VOCs by Method 8240 were detected during Phase I.

In the lower aquifer, only three VOCs by Methods 8240 and 8015 were detected during Phase II. 1,1,1-Trichloroethane, TCE, and vinyl chloride were detected in Well GM-19D at concentrations of 3.3 ug/L, 56.7 ug/L, and 37.2 ug/L, respectively. Detected VOCs in the upper and lower aquifer in the vicinity of T11, and the Waste Pile/Staging Area, South Tank Farm, and Fill Area SWMUs are summarized in Table 5-22 and shown on Figure 5-5.

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5.10.3.2 SVOCs, PCBs, Pesticides, Herbicides, and Cyanide

No SVOCs, PCBs, pesticides, or herbicides were detected in Phase I groundwater samples collected from the upper aquifer (Appendix A2). Cyanide was detected in Well GM-19S at a concentration of 0.008 mg/L. Cyanide results are summarized in Table 5-22.

In the lower aquifer, the SVOC bis(2-ethylhexyl)phthalate was detected in Well GM-19D at a concentration of 29 ug/L; however, no SVOCs were detected in the duplicate sample (DUP-16). No PCBs, pesticides, herbicides, or cyanide were detected in the lower aquifer.

5.10.3.3 Dissolved Metals

Dissolved barium was detected in Well GM-19S at a concentration of 87.7 ug/L. No other dissolved metals were detected in the upper aquifer. Dissolved metals in the upper and lower aquifer in the vicinity of SWMU T11 are summarized in Table 5-23.

In the lower aquifer, dissolved barium was reported in GM-19D at an estimated concentration of 113 ug/L while dissolved barium was detected in DUP-16 at a concentration of 129 ug/L. Dissolved cobalt was reported in GM-19D at estimated concentrations of 11.1 ug/L and 12.1 ug/L, respectively. Dissolved nickel was reported in GM-19D at an estimated concentration of 14.4 ug/L, and dissolved nickel was reported in DUP-16 at a concentration of 16 ug/L. No other dissolved metals were reported in the lower aquifer.

5.10.3.4 QA/QC Samples

During Phase I, no VOCs were detected in Trip Blank TB-11, indicating that no cross-contamination of VOCs occurred during the collection and handling of groundwater samples GM-19S, GM-19D, and DUP-16 collected during Phase I. Chloroform was detected in Rinseate Blank RB-05 at concentrations of 1.2 ug/L. Chloroform in rinseate blank samples has been

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discussed in Section 4.2.2.4 (QA/QC Results). No cross-contamination of VOCs has occurred during equipment decontamination.

During Phase II, no VOCs were detected in Trip Blanks TB-24 and TB-25, indicating that no cross-contamination of VOCs occurred during sample collection and handling at this SWMU. No VOCs were detected in Rinseate Blanks RB-16 and RB-18, indicating that no cross-contamination of VOCs has occurred during equipment decontamination at SWMU T11.

No SVOCs, PCBs, pesticides, herbicides, and cyanide were detected in Rinseate Blank RB-05 during Phase I indicating that cross-contamination of these constituents has not occurred through decontamination procedures.

Total copper and zinc were detected in RB-05 at concentrations of 29.4 ug/L and 8.3 ug/L, respectively. Following the preparation of RB-05, a sample was collected from Well GM-19D. Total copper and zinc were detected in GM-19D at concentrations of 6.4 ug/L and 7.9 ug/L, respectively; however, the concentrations of total copper and zinc in GM-19D were qualified as not detected through data validation procedures. No other total metals and no dissolved metals were detected in RB-05.

5.10.5 Conclusions

Investigative activities conducted at SWMU T11 have provided sufficient detail to meet the RFI objectives, as presented below for soil and groundwater media.

1. The RFI soil samples were collected at randomly selected locations around the tank at a depths most likely to identify releases of hazardous constituents to surface and subsurface soils per the RFI Work Plan. Therefore, analytical results from these samples would likely represent the highest concentrations of any constituents released to soil that may result in potential exposure to workers or that may affect

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groundwater quality. A review of the results from these samples indicates that there are no hazardous constituents in the soil at this tank at concentrations which would be expected to pose a threat to human health or the environment. The RFI sampling results provide no evidence of any significant release of hazardous constituents from this SWMU.

2. Groundwater data collected from W-19S, W-19D, and WEST during the RFI, is not representative of the contribution of VOCs to groundwater from this SWMU. This is based on the fact that several VOCs, not detected (or detected at low concentrations) in soil samples collected and analyzed in this SWMU are present in groundwater. Additionally, the location of Monitor Wells W-19S (located over 800 feet downgradient and cross gradient) and WEST (located over 500 feet downgradient), and the fact that these wells are separated from the SWMU by Buildings 1, 16, and 21, makes them inappropriate for characterizing the contribution of constituents to groundwater from this SWMU. It is likely that the VOCs found in groundwater in this area of the facility are from other sources.

Based on these conclusions, no additional investigative activity is required at this SWMU.

5.11 WASTE PILE/STAGING AREA

The Waste Pile/Staging Area SWMU consists of a three-sided sludge bunker, a half-acre concrete pad staging area and oily waste drainage system associated with the sludge bunker and staging area. The sludge bunker and staging area pad were originally constructed in 1976 and subsequently expanded. The location of the Waste Pile/Staging Area SWMU at the Delphi Thermal site is provided on Figures 2-6 and 5-11.

Grinding sludge from aluminum, steel, and cast iron machinery operations are loaded on the floor of the sludge bunker which is sloped to allow drainage of residual oils (machine

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coolants) to a sump. After the sludge is allowed to drain, it is removed for off-site disposal as a non-hazardous waste. The residual oils flow from the sump to the local oily water sewer system and eventually into a holding tank (SWMU T11).

The staging area consists of a paved area approximately 2 acres in size, containing a concrete pad with a contained drainage system. Empty drums (containing less than 1 inch of liquid) are drained on this pad. The drums contain residual oils and residual processing materials. In addition, steel and aluminum turnings (shavings) are staged on this concrete pad prior to being hauled off site to be recycled. Residual oils, mostly cutting oils, from the turnings may drain onto the pad. The residual liquids then enter the local oily water sewer system which, along with the sludge bunker liquid, eventually drain into the holding tank (SWMU T11) referenced above. The RFI objective for this unit was release determination and characterization, and groundwater quality characterization.

5.11.1 Investigative Strategy

During Phase I of the RFI, three soil boring locations were selected adjacent to the drainage system of the Waste Pile/Staging Area. Two samples were collected from each of the three boreholes at depths of 0 to 2 feet to characterize soil conditions that may result in potential exposure to workers (just below the concrete and/or asphalt overlay) and 6 to 8 feet (below the drainage system lines) to characterize soil conditions which may affect groundwater quality using hollow-stem auger techniques. Six samples obtained from these borings via a stainless-steel, split-spoon sampler were analyzed for TCL VOCs, SVOCs, PCBs, and TAL metals. Field HNu readings and physical descriptions were recorded on boring logs for each boring location and soil sampling logs (Appendix C) for each soil sample submitted to the laboratory; these logs are provided in Appendix C. Borehole locations at the Waste Pile/Staging Area are shown on Figure 5-20.

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To characterize the nature and extent of the hazardous constituents found at the Waste Pile/Staging Area during Phase I of the RFI, additional samples were collected from four soil borings during Phase II. Phase II boring locations were spaced to provide relatively even coverage over the SWMU and to target locations where releases most likely occurred. During Phase II, soil samples were collected every 4 feet using a stainless-steel, split-spoon sampler via hollow-stem auger techniques to a depth where field HNu screening and visual examination no longer indicated the presence of contamination or where the water table was encountered. This procedure was modified at boring (BH04) advanced adjacent to boring WPSA-BH03, where the boring was advanced to 8 feet bgs before sample collection began.

Three samples from each boring (excluding WPSA-BH04) were analyzed for TCL VOCs, SVOCs, PCBs/pesticides, and TAL metals during Phase II: a sample from below the base of the surficial concrete and/or asphalt overlay, the most impacted sample, and the least impacted sample. Impacted and unimpacted samples from each boring were selected based on HNu headspace readings and visual evidence of contamination. Because Boring WPSA-BH04 was drilled adjacent to Phase I Boring WPSA-BH03 to determine the depth at which a release may have migrated, only the most impacted and unimpacted samples encountered below 8 feet bgs were submitted to the laboratory.

Groundwater characterization downgradient from the Waste Pile/Staging Area was conducted in conjunction with the sampling for SWMUs T11 and the South Tank Farm during both Phase I and Phase II of the RFI (samples were collected from Monitor Wells GM-19S and GM-19D for analysis of Appendix IX VOCs, SVOCs, PCBs, herbicides, pesticides, cyanide, and total and dissolved metals). The investigative approach for these wells has been discussed in Section 5.10.1 for SWMU T11 (Investigative Strategy), groundwater sampling results have been discussed in Section 5.10.3 (Groundwater Results).

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5.11.2 Soil Sampling Results

The following sections provide a discussion of the analytical results from soil samples collected at the Waste Pile/Staging Area during the RFI. Detected organic soil constituents at this SWMU are shown on Figure 5-20. A discussion of QA/QC samples is also included. Soil results from Phases I and II are presented in Appendices A15 and A4, respectively.

5.11.2.1 VOCs

During Phase I, eight VOCs were detected. 1,1,1-Trichloroethane was detected in Samples WPSA-BH01-08SL, WPSA-BH02-02SL, WPSA-BH03-02SL, and WPSA-BH03-08SL at concentrations ranging from 66 ug/kg in WPSA-BH02-02SL to 2,100 ug/kg in WPSA-BH03-08SL. 1,1-Dichloroethane was detected in WPSA-BH03-02SL at an estimated concentration of 3,000 ug/kg. Acetone was detected in WPSA-BH01-08SL and WPSA-BH03-02SL at estimated concentrations of 3,400 ug/kg and 12,000 ug/kg, respectively and WPSA-BH02-02SL at a concentration of 1,900 ug/kg. Benzene was detected in WPSA-BH03-02SL at a concentration of 25 ug/kg. Ethylbenzene was detected in WPSA-BH01-08SL, WPSA-BH03-02SL, and WPSA-BH03-08SL at concentrations of 65 ug/kg, 46 ug/kg, and 1,600 ug/kg. PCE was detected in six of the seven soil samples collected, including the duplicate sample (DUP-07) of Sample WPSA-BH01-02SL, at concentrations ranging from 54 ug/kg in WPSA-BH02-02SL to 200 ug/kg in WPSA-BH01-02SL. No PCE was detected in WPSA-BH03-08SL. Toluene was detected in DUP-07, WPSA-BH01-08SL, WPSA-BH03-02SL, and WPSA-BH03-08SL at concentrations ranging from 36 ug/kg in DUP-07 to 16,000 ug/kg in WPSA-BH03-08SL. Total xylenes were detected in WPSA-BH01-08SL, WPSA-BH03-02SL, and WPSA-BH03-08SL at concentrations of 130 ug/kg, 230 ug/kg, and 19,000 ug/kg, respectively.

During Phase II, 12 VOCs were detected (Appendix A4). 1,1,1-Trichloroethane was detected in WPSA-BH07-06SL and DUP-26 at concentrations of 549 ug/kg and 1,200 ug/kg, respectively. DUP-26 is the duplicate sample of WPSA-BH07-06SL. 1,1-Dichloroethane was

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detected in WPSA-BH07-02SL, WPSA-BH07-06SL, and DUP-26 at concentrations of 187 ug/kg, 141 ug/kg, and 523 ug/kg, respectively; and 1,2-dichloroethene (total) was detected at concentrations of 1,060 ug/kg, 1,090 ug/kg, and 4,250 ug/kg, respectively. 2-Butanone was detected in WPSA-BH07-06SL and DUP-26 at estimated concentrations of 2,470 ug/kg and 3,430 ug/kg, respectively. Acetone was detected in WPSA-BH06-02SL, WPSA-BH07-06SL, and DUP-26 at concentrations of 297 ug/kg, 1,950 ug/kg, and 3,630 ug/kg, respectively. Benzene and carbon disulfide were detected in WPSA-BH06-02SL at a concentration of 12 ug/kg and 27.7 ug/kg, respectively. Ethylbenzene was detected in WPSA-BH07-02SL, WPSA-BH07-06SL, and DUP-26 at concentrations of 148 ug/kg, 543 ug/kg, and 930 ug/kg, respectively. PCE was detected in WPSA-BH04-21SL, WPSA-BH07-02SL, WPSA-BH07-06SL, and DUP-26 at concentrations ranging from 5.7 ug/kg in WPSA-BH04-21SL to 395 ug/kg in DUP-26. Toluene was reported in WPSA-BH04-09SL, WPSA-BH06-02SL, WPSA-BH07-02SL, WPSA-BH07-06SL, and DUP-26 at concentrations ranging from 7.6 ug/kg in WPSA-BH04-09SL to 238 ug/kg in DUP-26. Total xylenes were detected in WPSA-BH06-02SL and WPSA-BH06-06SL at concentrations of 49.4 ug/kg and 332 ug/kg, respectively. TCE was detected in WPSA-BH07-02SL, WPSA-BH07-06SL, and DUP-26 at concentrations of 120 ug/kg, 142 ug/kg, and 322 ug/kg, respectively. Detected VOCs at the Waste Pile/Staging Area are summarized in Table 5-24 and presented on Figure 5-20. No other VOCs were detected.

The concentration of VOCs in soil has been shown to decrease with depth. VOCs detected during Phase I in soil from 0 feet to 8 feet bgs (WPSA-BH01 and WPSA-BH03) were shown to decrease rapidly in samples collected and screened in borings advanced in close proximity to the Phase I borings (WPSA-BH04 and WPSA-BH07, respectively) during Phase II. Additionally, the deepest samples collected and analyzed during Phase II showed no VOC impacts, except for a low concentration of PCE (5.7 ug/kg) in WPSA-BH04-21SL and bis(2-ethylhexyl)phthalate, a common laboratory contaminant, detected in all three samples analyzed in Boring WPSA-BH05. All soil borings were halted a minimum of 4 feet above the water table, as measured during the RFI in Monitor Well East, based on field screening which indicated that no significant levels of VOCs were present.

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5.11.2.2 SVOCs, PCBs, Pesticides, and Herbicides

During Phase I, benzo(a)pyrene and the total concentration of benzo(b)fluoranthene and benzo(k)fluoranthene were reported in WPSA-BH03-08SL at concentrations of 47,000 ug/kg and 90,000 ug/kg, respectively. Butyl benzyl phthalate was detected in DUP-07 and WPSA-BH01-02SL at concentrations of 22,000 ug/kg and 28,000 ug/kg, respectively. Chrysene was reported in WPSA-BH03-08SL at a concentration of 44,000 ug/kg. Fluoranthene, phenanthrene, and pyrene were present in the same sample at concentrations of 86,000 ug/kg, 84,000 ug/kg, and 83,000 ug/kg, respectively. Bis(2-Ethylhexyl)phthalate was detected in WPSA-BH02-02SL at a concentration of 390 ug/kg. No other SVOCs were reported during Phase I.

During Phase II, bis(2-ethylhexyl)phthalate was detected in WPSA-BH05-02SL, WPSA-BH05-10SL, and WPSA-BH05-22SL at concentrations of 1,900 ug/kg, 710 ug/kg, and 409 ug/kg, respectively. Total benzo(b)fluoranthene and benzo(k)fluoranthene, fluoranthene, and pyrene were detected in WPSA-BH06-02SL at concentrations of 6,920 ug/kg, 5,650 ug/kg, and 5,180 ug/kg, respectively. Phenanthrene was detected in WPSA-BH06-02SL and WPSA-BH06-06SL at concentrations of 5,450 ug/kg and 8,460 ug/kg, respectively. Detected SVOCs in soil samples collected at the Waste Pile/Staging Area are summarized in Table 5-24 and presented on Figure 5-20. No other SVOCs were detected during Phase II.

SVOCs were either not detected or not detected below a depth of 2 feet in three (BH-01, BH-02, and BH-07) of the seven borings advanced in this area. In the three soil samples submitted for analysis from BH-05 (2 feet, 10 feet, and 22 feet bgs), bis(2-ethylhexyl)phthalate (a common laboratory contaminant) was the only SVOC detected. In the area of BH-03 and BH-04 SVOC impacts do not extend beyond 8 feet bgs. In the area of BH-06, phenanthrene was the only SVOC detected in the sample from 6 feet bgs, and SVOCs were not detected in the sample from 14 feet bgs.

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During Phase I, two PCBs were detected at the Waste Pile/Staging Area. Aroclor-1242 was detected at a concentration of 2.5 mg/kg in WPSA-BH03-02SL. Aroclor-1260 was detected in the same sample at a concentration of 0.6 mg/kg. No PCBs were detected in soil samples below the 2-foot depth sampling interval. PCBs detected in soils collected at the Waste Pile/Staging Area are summarized in Table 5-24.

No PCBs were detected in soils collected at the Waste Pile/Staging Area during Phase II. No pesticides or herbicides were detected during Phases I and II.

5.11.2.3 Metals

During Phase I, aluminum, antimony, arsenic, barium, beryllium, cadmium, calcium, chromium, cobalt, copper, iron, lead, magnesium, manganese, nickel, potassium, sodium, vanadium, and zinc were detected in soil samples collected at the Waste Pile/Staging Area.

During Phase II, aluminum, antimony, arsenic, barium, beryllium, cadmium, calcium, chromium, cobalt, copper, iron, lead, magnesium, manganese, mercury, nickel, potassium, selenium, sodium, thallium, vanadium, and zinc were detected in soil samples collected at the Waste Pile/Staging Area. Detected metals in soils collected at the Waste Pile/Staging Area are summarized in Appendix A4 and A15.

5.11.2.4 QA/QC Samples

No VOCs were detected in Trip Blank TB-04 during Phase I and Trip Blanks TB-19 and TB-20 during Phase II, indicating that no cross-contamination of VOCs occurred during sample collection and handling.

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5.11.3 Conclusions

Investigative activities conducted at the Waste Pile/Staging Area have provided sufficient detail to meet the RFI objectives, as presented below for soil and groundwater media.

1. The RFI soil samples were collected from areas, which based on professional judgment, would likely identify potential releases, as well as represent the nature and extent of a potential release, from this SWMU. A review of the analytical results indicates that the range of constituents and areas of elevated concentrations associated with a potential release from this SWMU have been identified. Therefore, the sampling results provide adequate characterization of this SWMU to support the Baseline Risk Assessment (Appendix B).

2. The vertical extent of constituents of potential concern has been delineated. Therefore, the sampling results provide adequate characterization of this SWMU to support the Baseline Risk Assessment (Appendix B).

3. After reviewing the groundwater flow in the area of the Waste Pile Staging Area, and the location of Monitor Wells GM-19S (located over 300 feet down- and cross-gradient) and WEST (located cross-gradient and separated from the SWMU by Building 21), the use of these wells for characterizing potential impacts to groundwater from this SWMU is not appropriate. However, this SWMU has adequate soil characterization data, that can be used to estimate the potential impact of constituents in soil at this SWMU on groundwater.

Based on these conclusions, no additional investigative activity is required at this SWMU *to complete the RFI, but additional groundwater monitoring will be conducted per the Site-Wide Groundwater Monitoring Plan.*

5.12 SOUTH TANK FARM

The South Tank Farm consisted of eight tanks, labeled 1, 2, 3, 4, 5, and T1, T2, and T3, which contained washing oil, lube gear oil, Bruko D-332 drawing oil, 215 sec. hydraulic oil, Cimtech 3900 (coolant), spent detergent solution, dirty oils, and dirty oils or virgin machine coolant, respectively. Tank T1 had been inactive since 1979 with only some residual sludge remaining in it. Tanks T2 and T3 were removed in 1986. Figures 2-6 and 5-11 provides the location of the South Tank Farm SWMU at the Delphi Thermal site. The layout of the tank farm is presented on Figure 5-21. The RFI objective for this unit was release determination and characterization, and groundwater quality characterization.

5.12.1 Investigative Strategy

The six remaining tanks at the South Tank Farm (1, 2, 3, 4, 5, and T1) were removed in November 1992 at the beginning of the RFI (Phase I). Following the tank excavations, grab samples were collected from the four corners and center of each tank pit at depths of approximately 13 to 15 feet bgs by the Geraghty & Miller field representative, screened for VOCs using an HNu and inspected for visual evidence of contamination. Based on these observations and measurements, three soil samples were collected at locations most likely to detect any release from the excavated tank pits based on HNu headspace readings and visual observations. These three samples were analyzed for TCL VOCs, TCL PCBs, TCL pesticides, and TAL metals. Pesticide analytical results were not specified in the RFI Work Plan (Geraghty & Miller, Inc. 1992a) for this SWMU; however, pesticide analysis was inadvertently performed by the laboratory on the samples from this SWMU. Soil grab samples and laboratory sample locations are shown on Figure 5-21.

Groundwater characterization downgradient from the South Tank Farm was conducted in conjunction with sampling for SWMUs T11 and the Waste Pile/Staging Area during both Phase I and II of the RFI. The investigative approach for these wells has been discussed in Section 5.10.1

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(Investigation Strategy). Groundwater sampling results have been discussed in Section 5.10.3 (Groundwater Results).

5.12.2 Soil Sampling Results

The following sections provide a discussion of results for soils collected at the South Tank Farm (Appendix A16). Detected organic soil constituents for this SWMU are shown on Figure 5-21. A discussion of QA/QC sample results is also provided.

5.12.2.1 VOCs

During Phase I, PCE was detected in Soil Samples STF-GS2-15SL and STF-GS27-15SL at concentrations of 1,000 ug/kg and 6 ug/kg, respectively. No other VOCs were detected in soils collected at the South Tank Farm. VOC results are provided in Appendix A16.

5.12.2.2 PCBs and Pesticides

No PCBs and pesticides were detected in the soil samples collected from the South Tank Farm.

5.12.2.3 Metals

Detected metals found in soil samples collected at the South Tank Farm include aluminum, arsenic, barium, cadmium, calcium, chromium, cobalt, copper, iron, lead, magnesium, manganese, nickel, potassium, silver, sodium, vanadium, and zinc. Detected metals in soils collected at the South Tank Farm are summarized in Appendix A16.

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5.12.2.4 QA/QC Samples

No VOCs were detected in Trip Blank UST-TB-4 during Phase I, indicating that no cross-contamination of VOCs occurred during sample collection and handling.

5.12.3 Conclusions

Investigative activities conducted at the South Tank Farm have provided sufficient detail to meet the RFI objectives, as presented below for soil and groundwater media.

1. The RFI soil samples were collected on the basis of HNu and visual indications to locate areas in the excavation most likely to have been impacted by a release from the tanks at the tank farm. Therefore, analytical results from these samples would likely represent the highest concentrations of any constituents released to the soil. A review of the results from these samples indicates that there are no hazardous constituents in the soil at the tank farm at concentrations which would be expected to pose a threat to human health or the environment. The RFI sampling results provide no evidence of a significant release of hazardous constituents from this SWMU.

2. Groundwater data collected downgradient of the South Tank Farm, as represented by sampling of Monitor Well WEST during the RFI, may not be representative of the contribution of VOCs to groundwater from this SWMU because of the potential for other sources to affect groundwater in this area. This is based on the fact that several VOCs, not detected in soil samples collected and analyzed in this SWMU, are present in the groundwater.

Based on these conclusions, no additional investigative activity is required at this SWMU.

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5.13 LIQUID WASTE BURNER

The LWB was in operation from approximately 1957 to 1970; its purpose was to incinerate spent solvents and oils. The liquids were transferred from on-site locations to the LWB in 55-gallon drums and emptied into two adjacent underground holding tanks for temporary storage. The liquids were then fed to the LWB and incinerated. Figures 2-6 and 5-11 show the approximate former location at the Delphi Thermal site, and Figure 5-22 presents an approximation of the areal extent of the LWB.

This SWMU was identified by Delphi Thermal as a potential source of concern subsequent to Phase I field activities. It was, therefore, included with the SWMUs to be investigated during Phase II of the RFI. The RFI objective for this unit was release determination and characterization.

5.13.1 Investigative Strategy

To determine if a release of hazardous constituents has occurred in soil near the location of the former LWB, one boring was drilled in the center of the area formerly occupied by this SWMU (Figure 5-22). Boring LWB-BH01, was drilled to a depth of 14 feet using standard hollow-stem auger techniques. This depth was below the base of the two former underground holding tanks. Two soil samples were collected at depths of 2 to 4 feet and 12 to 14 feet using standard split-spoon sampling techniques. The shallow soil sample was collected from below the base of the asphalt surface to characterize soil conditions that may result in potential exposure to workers. The deep soil sample was collected from the 12- to 14-foot interval as specified in the Phase II RFI Work Plan (Geraghty & Miller, Inc. 1994a) if all HNu readings were not elevated above background to characterize soil conditions that may affect groundwater quality. Both soil samples were submitted to the laboratory for analyzes of TCL VOCs, TCL SVOCs, TCL PCBs/pesticides, and TAL metals. Field HNu readings were recorded on the boring log for this

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SWMU, and physical descriptions were recorded on soil sampling logs (Appendix C) for each soil sample submitted to the laboratory for analysis.

Monitor Well WEST was sampled for Appendix IX VOCs (Methods 8015 and 8240) to characterize groundwater in the upper aquifer upgradient from the LWB. Groundwater quality downgradient of this SWMU has been discussed along with SWMU T11, in Section 5.10.3 (Groundwater Results).

5.13.2 Soil Sampling Results

The following sections provide a discussion of the analytical results from soil samples collected at the LWB during Phase II of the RFI (Appendix A4). Detected organic soil constituents for this SWMU are shown on Figure 5-22. A discussion of QA/QC samples is also included.

5.13.2.1 VOCs

No VOCs were detected in shallow Soil Sample LWB-BH01-03SL. Ethylbenzene was detected in deep Soil Sample LWB-BH01-13SL at a concentration of 2,540 ug/kg and in DUP-24 at a concentration of 1,360 ug/kg. DUP-24 is a duplicate of Sample LWB-BH01-13SL (Appendix A3).

5.13.2.2 SVOCs, PCBs, Pesticides, and Herbicides

No SVOCs, PCBs, pesticides, or herbicides were detected in Soil Samples LWB-BH01-03SL or LWB-BH01-13SL. Aroclor-1254 was detected in DUP-24 at a concentration of 0.65 mg/kg (Appendix A4).

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5.13.2.3 Metals

The following metals were detected in Soil Samples LWB-BH01-03SL, LWB-BH01-13SL, and DUP-24: aluminum, barium, beryllium, cadmium, calcium, chromium, cobalt, copper, iron, lead, magnesium, manganese, mercury, nickel, potassium, sodium, vanadium, and zinc. Metal analytical results for soil samples collected at the LWB are contained in Appendix A4.

5.13.2.4 QA/QC Samples

No VOCs were detected in Trip Blank TB-19; therefore, no cross-contamination of VOCs occurred during sample collection and handing.

5.13.3 Conclusions

Investigative activities conducted at the LWB have provided sufficient detail to meet the RFI objectives, as presented above. The RFI soil samples were collected, based on professional judgement, from locations and depths, to characterize soil conditions that may result in potential exposure to workers or may affect groundwater quality. A review of the results from these samples indicates no significant variation in concentrations with depth, and that there are no hazardous constituents in the soil at concentrations which would be expected to pose a threat to human health or the environment. The RFI sampling results provide no evidence of any significant release of hazardous constituents from this SWMU. Based on this conclusion, no additional investigative activity is required at this SWMU.

5.14 FILL AREA

Before the south parking lot was constructed, fill material may have been used to bring the area up to grade level. The fill material consisted of approximately 75 percent ash (clinkers) from solid waste incinerators (see Section 3.1.5 of the DOCC [Geraghty & Miller, Inc. 1991a])

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and approximately 25 percent porcelain sludge from an on-site manufacturing process. Figures 2-5 and 5-23 shows the location and areal extent of the Fill Area.

This SWMU was identified by Delphi Thermal as a potential source of concern subsequent to Phase I field activities. It was, therefore, included with the SWMUs to be investigated during Phase II of the RFI. The RFI objectives for this unit were waste delineation, release determination and characterization, and groundwater quality characterization.

5.14.1 Investigative Strategy

The lateral extent of the Fill Area was determined from a review of historical information (interviews with Delphi Thermal personnel) and a review of site topographical and physical features.

To determine if a release of hazardous constituents has occurred, two borings were drilled at the locations shown on Figure 5-23. The locations were selected to provide relatively even coverage over the suspected fill area. Borings FA-BH01 and FA-BH02 were drilled using standard hollow-stem auger techniques to depths of 9 feet and 7 feet, respectively. These depths correspond to the depth at which native soil was encountered in each borehole. This determination was based on observations of the samples collected by the hydrogeologist. Samples were collected for physical descriptions and HNu headspace readings using continuous split-spoon sampling. Two samples from each boring were collected and submitted to the laboratory for analysis of TCL VOCs, TCL SVOCs, TCL PCBs/pesticides, and TAL metals. For Boring FA-BH01, a shallow sample of fill material was collected from the depth interval of 2 to 4 feet and submitted to the laboratory for analysis and an underlying native soil sample was collected from the depth interval of 7 to 9 feet and submitted to the laboratory for analysis. For Boring FA-BH02, a shallow sample of fill material was collected from the depth interval of 1 to 3 feet and submitted to the laboratory for analysis and a underlying native soil sample was collected from the depth interval of 5 to 7 feet and submitted to the laboratory for analysis. Field HNu readings

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were recorded on the boring log for this SWMU and physical descriptions were recorded on soil logs (Appendix C) for each solid sample submitted to the laboratory for analysis.

No monitor wells were specified in the Phase II RFI Work Plan (Geraghty & Miller, Inc. 1994a) to be sampled to characterize groundwater downgradient from this SWMU. However, Monitor Well Pair GM-19S and GM-19D are downgradient from this SWMU and were sampled during the RFI. The analytical results from groundwater samples collected from these wells have been discussed in Section 5.10.3 (Groundwater Results).

5.14.2 Fill and Soil Sampling Results

The following sections provide a discussion of the fill and soil analytical results from samples collected at the Fill Area during the Phase II of the RFI. Detected organic constituents for this SWMU are shown on Figure 5-23. A discussion of QA/QC samples is also included. All analytical results for this SWMU are provided in Appendix A3 and A4.

5.14.2.1 VOCs

1,2-Dichloroethene (total) was detected in shallow Sample FA-BH01-03SL (fill material) at a concentration of 2,410 ug/kg. No additional VOCs were detected in this shallow fill material sample. No VOCs were detected in deep Sample FA-BH01-08SL (native soil), and no VOCs were detected in shallow Sample FA-BH02-02SL (fill material). PCE was detected in deep Sample FA-BH02-06SL (native soil) at a concentration of 11.4 ug/kg; no additional VOCs were detected in Sample FA-BH02-06SL. No duplicate samples were collected during soil sampling at this SWMU because of the RFI Work Plan specification that duplicate samples would be collected at a rate of one per ten or fewer investigative samples or one per day, whichever is greater (Geraghty & Miller, Inc. 1994a). A duplicate sample was collected at the Waste Pile/Staging Area the same day that the Fill Area investigative samples were collected.

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5.14.2.2 SVOCs, PCBs, Pesticides, and Herbicides

No SVOCs, PCBs, pesticides, or herbicides were detected in Samples FA-BH01-08SL and FA-BH02-06SL (native soil). No SVOCs, pesticides, or herbicides were detected in Sample FA-BH01-03SL (fill material); however, Aroclor-1242 was detected in this sample at a concentration of 0.64 mg/kg. No additional PCBs were detected in Sample FA-BH01-03SL (fill material). No PCBs, pesticides, or herbicides were detected in Sample FA-BH02-02SL (fill material); however, pyrene was detected in this sample at a concentration of 3,780 ug/kg. No additional SVOCs were detected in Sample FA-BH02-02SL (fill material).

5.14.2.3 Metals

The following metals were detected in Samples FA-BH01-03SL, FA-BH01-08SL, FA-BH02-02SL, FA-BH02-06SL: aluminum, antimony, arsenic, barium, beryllium, cadmium, calcium, chromium, cobalt, copper, iron, lead, magnesium, manganese, mercury, nickel, potassium, selenium, sodium, vanadium, and zinc. Metal analytical results for fill and soil samples collected at the Fill Area are provided in Appendix A4.

5.14.2.4 QA/QC Samples

No VOCs were detected in Trip Blank TB-19 during Phase II; therefore, no cross-contamination of VOCs occurred during sample collection and handing. 2-Butanone was the only VOC detected in Rinseate Blank RB-14; therefore, this VOC was reported as a non-detect by the laboratory for the investigative samples collected at the Fill Area. No SVOCs, PCBs, pesticides, or herbicides were detected in Rinseate Blank RB-14.

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5.14.3 Conclusions

Investigative activities conducted at the Fill Area have provided sufficient detail to meet the RFI objectives, as presented below for soil and groundwater media.

1. The lateral extent of the Fill Area has been adequately characterized to be approximately 2.9 acres by the review of historical information and topographical and physical land features (such as the railroad embankment to the south and Dryden Road to the west), and is presented on Figure 5-23. The vertical extent of the Fill Area has been clearly delineated by a distinct change in soil characteristics detected during the advancement of the two soil borings (see the soil boring logs in Appendix C).

2. An evaluation of the analytical results for the fill material and subsurface native soil indicates that the range of constituents and their concentrations are relatively consistent across the samples collected within each media (fill and soil). Furthermore, the RFI sampling results provide no evidence of any significant release of hazardous constituents. The RFI sampling results provide adequate characterization to support the Baseline Risk Assessment (Volume II).

3. Groundwater data collected from GM-19S and GM-19D during the RFI, may not be representative of the contribution of VOC to groundwater associated with materials placed in the Fill Area because of the potential for other sources to affect groundwater in this area. This is based on the fact that several VOCs not detected in the fill material or underlying native soil, or detected at low concentrations in these media, are present in the groundwater.

Based on these conclusions, no additional investigative activity is required at this SWMU.

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6.0 BASELINE RISK ASSESSMENT

Volume II of the Draft RFI Final Report, prepared by ENVIRON Corporation, presents the human health baseline risk assessment and ecological assessment for the Delphi Thermal facility in Moraine, Ohio. This section provides the executive summary of the Baseline Risk Assessment presented in Volume II.

The purpose of the Baseline Risk Assessment conducted for the Delphi Thermal facility is to evaluate potential risk to human health and the environment posed by releases of hazardous waste and constituents from the SWMUs investigated in the RFI. The human health baseline risk assessment evaluates potential risk under current and reasonably anticipated future land use and groundwater use at and surrounding the facility, in the absence of corrective measures (or IMs) and institutional controls, to provide a basis for (1) determining whether corrective measures are needed, (2) identifying which potential exposure pathways need corrective measures, if any, and (3) supporting any recommendations for corrective measures. Additionally, the Baseline Risk Assessment evaluates potential risk under the current IMs to provide a basis for determining whether the IMs are necessary for the protection of human health and the environment.

The conceptual site model establishing reasonably anticipated future land use and groundwater use, potential exposure pathways, and potentially exposed populations was reviewed extensively with U.S. EPA through written correspondence between U.S. EPA and Delphi Thermal before initiating the baseline risk assessment. Several key aspects of the technical methodology (e.g., groundwater modeling) and key assumptions (e.g.. exposure factors) pertinent to the estimation of potential exposures were also reviewed with the U.S. EPA.

The procedures for data evaluation, exposure assessment, toxicity evaluation and risk characterization in the baseline risk assessment are consistent with U.S. EPA policies and guidance on risk assessment. The results of the data evaluation indicate that environmental media potentially transporting waste constituents from the SWMUs either currently or as a result of possible facility operations (e.g., removal of pavement) include:

- Soil

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- Ambient air
- Groundwater
- Surface water (Great Miami River)

Transport of waste constituents from the SWMUs to surface water or sediment via the drainage ditch at the north end of the facility is unlikely.

A comprehensive review of information pertinent to future land use patterns surrounding the facility confirms that the assumption of continued industrial land use at the facility is appropriate. As such, the potential for significant human exposure to the SWMUs at the facility is evaluated in the Baseline Risk Assessment for the following current and reasonably anticipated future land uses:

- Industrial land use at the facility
- Industrial/commercial, residential, and recreational land uses surrounding the facility

The potentially exposed populations under these land uses are:

- On-facility and off-facility workers
- Off-facility residents

Groundwater in the lower aquifer in the region surrounding the facility is a drinking water source, but the groundwater in the upper aquifer underlying the facility is not a drinking water source and is not reasonably expected to serve as a drinking water source in the future. The groundwater in the upper aquifer, however, is a medium for potential transport of constituents from the SWMUs to the lower aquifer and the Great Miami River. As such, the baseline risk assessment includes an assessment of the extent to which the hydraulic interconnections could result in migration of constituents to the lower aquifer or to the Great Miami River in concentrations of significance to human health.

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The potential for human exposure to groundwater is evaluated in the baseline risk assessment for current and potential drinking water use of groundwater extracted from the following municipal well fields:

- West Carrollton: residential drinking water supply downgradient of the facility
- Miami Shores: as a primary emergency drinking water supply for residents served by the Greater Moraine Water System (GWMS)
- Dryden Road South: as GMWS's secondary emergency drinking water supply

Although the Dryden Road North Well Field is not expected to serve as a drinking water supply or as an emergency drinking water supply, the groundwater quality at this well field is also evaluated.

The risk assessment also evaluates the potential for exposures that may occur through current and potential industrial use of groundwater extracted from the following industrial well fields:

- Delphi Thermal production wells: as a potential industrial water supply
- Truck & Bus production wells: as an industrial water supply
- Moraine Engine production well: as an industrial water supply

Potential exposures are quantitatively evaluated for incidental ingestion of and dermal contact with soil/waste and inhalation of airborne waste constituents. Potential exposures via these pathways are quantified by the product of the concentration of waste constituents in an environmental medium at locations of potential exposure over an expected period of exposure and the intake of the environmental medium by a potentially exposed population. The product of these components is combined with toxicity values to estimate potential carcinogenic risk and noncarcinogenic effects. Groundwater and surface water exposures are evaluated by comparison of exposure concentrations in groundwater and surface at potential points of contact with MCLs,

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under the Safe Drinking Water Act, or similar risk-based drinking water concentrations for constituents without MCLs.

Variability in the factors affecting exposure within a potentially exposed population is considered in estimating potential current and future exposures by quantifying both central tendency and high-end estimates of exposure, consistent with U.S. EPA guidance. In the Baseline Risk Assessment (Volume II), high-end estimates are calculated using conservative (i.e., screening-level) estimates of exposure concentrations and high-end exposure factors, while the central tendency estimates are calculated using typical exposure factors.

U.S. EPA-derived toxicity values are used when such values are available. However, many of the constituents included in the quantitative exposure assessment do not have U.S. EPA-derived toxicity values for evaluating cancer risk or noncancer effects via the inhalation route of exposure. U.S. EPA also has not established any toxicity values for evaluating risks or effects via the dermal route. To provide a quantitative analysis of the potential uncertainties in the estimates of risk (which use only U.S. EPA toxicity values), estimates of cancer risk and noncancer effects are developed using route-to-route extrapolations.

The results of the exposure assessment and toxicity assessment are combined to estimate potential cumulative cancer risk and noncancer effects for each of the potential exposure pathways. The soil- and air-related cumulative cancer and noncancer risk estimates are compared with levels that U.S. EPA has established as protective of human health. Estimated groundwater concentrations at potential points of groundwater use and estimated surface water concentrations in the Great Miami River are compared with MCLs, or similar risk-based drinking water concentrations. MCLs or risk-based drinking water concentrations are appropriate for evaluating potential drinking water exposures and are conservative screening-levels for evaluating potential non-drinking water exposures (e.g., nonpotable industrial groundwater use, surface water exposures in the Great Miami River).

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The conclusions of the human health baseline risk assessment are as follows:

- For all soil- and air-related pathways, estimates of potential cumulative cancer risk and noncancer effects, using both central tendency and high-end exposure factors, are well below the levels U.S. EPA considers protective of human health.

- Under current groundwater use conditions with or without interim measures (Scenarios 6 and 1, respectively), potential SWMU-related contributions to groundwater are estimates to result in constituent concentrations at points of groundwater use that are lower than MCLs or similar risk-based drinking water concentrations for constituents without MCLs.

- In the event that Miami Shores is used to supply water in an emergency without the need to also use Dryden Route South (Scenarios 2, 3, 7, and 8), potential SWMU-related contributions to groundwater are estimated to result in constituent concentrations at points of groundwater use that are lower than MCLs or risk-based drinking water concentrations.

- In the very unlikely event that Miami Shores and Dryden Road South are both needed to supply water in an emergency (i.e., in Scenarios 4 and 5, which are without IMs), potential SWMU-related contributions to groundwater are estimated to result in constituent concentrations at points of groundwater use that are higher than MCLs or risk-based drinking water concentrations for a few constituents. The estimates of constituent concentrations, however, are expected to overstate the potential exposures to the constituents because of the low likelihood that these well fields would be used simultaneously and in combination with the redevelopment of inactive industrial water supply wells at the facility. In the corresponding scenarios with interim measures (Scenarios 9 and 10), potential SWMU-related contributions to groundwater are estimated to result in constituent concentrations at points of

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groundwater use that are lower than MCLs or risk-based drinking water concentrations.

- In addition to the human health evaluation, a screening ecological assessment indicates no adverse impact from the SWMUs and no need for a more detailed ecological assessment.

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7.0 SUMMARY AND CONCLUSIONS

Based on the results of the RFI, including investigative activities completed prior to and during the RFI and the Baseline Risk Assessment, Delphi Thermal concludes that no significant risks to human health and the environment are posed by the presence of constituents at the SWMUs. As presented in the Baseline Risk Assessment for human health, site-related risk estimates using both central tendency and high-end exposure factors for all soil- and air-related pathways are less than U.S. EPA-established acceptable levels for cumulative cancer risk and noncancer effects. Likewise, site-related contributions to groundwater quality are not expected to exceed MCLs or risk-based drinking water concentrations under current and reasonably expected uses of groundwater at the facility and in the region, with or without operation of the current IMs. Additionally, the screening ecological assessment indicates that the ecosystems in the assessment area in the vicinity of the facility appear healthy. These conclusions are based on the results of the following media-specific evaluation conducted in support of the RFI.

Implementation of the RFI, as presented in Volume I and Volume II of this Draft RFI Final Report, has accomplished the primary objectives of the RFI as required by the Administrative Order. These objectives are enumerated in Section 1.2 (General Approach) of this report. Additionally, specific objectives for each media were presented in the RFI Work Plan (Geraghty & Miller, Inc. 1992a) as follows:

Soil

1. Determine if a release of hazardous constituents has occurred from the SWMUs.
2. Define the nature and extent of any hazardous constituents released from the SWMUs.
3. Collect data to support the Baseline Risk Assessment.

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Waste

1. Characterize shallow waste in landfills at the site for the Baseline Risk Assessment by sampling and analysis.
2. Characterize deep waste/soil contamination from hazardous constituents at landfills for the Baseline Risk Assessment by sampling groundwater immediately downgradient from the units.
3. Define the areal extent of waste in the landfills.

Sediment/Surface Water

Provide a characterization of these media to be used in the Baseline Risk Assessment.

Groundwater

1. Collect site-wide data to characterize groundwater with respect to Appendix IX constituents.
2. Collect data which will support the site-wide Baseline Risk Assessment.

The sludge present in the North and South Settling Lagoons was another medium evaluated during the RFI. Characterization data collected in support of the preparation of a RCRA closure plan for these two SWMUs was utilized in the Baseline Risk Assessment. A discussion of this medium will be presented in Section 7.2 (Waste) below.

Presented below is a discussion of how each of these media-specific objectives were achieved during the RFI and a conclusion regarding the need for supplemental investigative activities at the SWMUs. Additionally, for each media evaluated, the Baseline Risk Assessment estimated potential risk to human health and the environment posed by any hazardous constituents released from, or present within, the SWMUs under investigation. The findings of the Baseline

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Risk Assessment and an assessment regarding whether corrective measures are needed, are also provided in the following sections for each media.

7.1 SOIL

To accomplish the RFI objectives at the nine SWMUs where soil was to be considered a medium of potential concern (West Tank Farm, T12, T5/T6, T4, T11, Waste Pile/Staging Area, South Tank Farm, Liquid Waste Burner, and Fill Area), a review of historical data was completed and RFI soil sampling was conducted. Additionally, an analysis of background soil conditions was completed to provide a basis for evaluating exposure to naturally occurring constituents at these SWMUs.

Section 5.0 (SWMU Investigation Results) provides a detailed description of the investigative strategy, results, and conclusions for each SWMU under consideration. The investigative strategies used at the individual SWMUs, approved by the U.S. EPA in the RFI Work Plan (Geraghty & Miller, Inc. 1992a) and Phase II RFI Work Plan (Geraghty & Miller, Inc. 1994a), clearly indicate how the SWMU-specific objectives were achieved. The results obtained from the two rounds of RFI soil sampling provide the information necessary to complete an evaluation of the presence of any suspected release, as well as sufficient detail on the nature and extent of any release to support an evaluation of risks posed by the SWMU in the Baseline Risk Assessment (Volume II). Based on these facts, it can be concluded that for each of the SWMUs where soil was considered a potential media of concern, the RFI activities completed to date have adequately characterized the SWMU, and no supplemental investigative activity is necessary to support the Baseline Risk Assessment and an evaluation of the need for a CMS.

As described in the Baseline Risk Assessment, there are no current exposures to soil. The results of the risk assessment indicate that, using conservative, high-end exposure estimates and U.S. EPA toxicity values, the highest estimate of risk from potential future exposures to soil is 5×10^{-6} and the highest estimate of HI is 0.05. These estimates of risk and HI are well below the U.S. EPA-established acceptable levels of 10^{-4} and HI of 1, which are considered protective

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of human health. As such, no further remedial action is warranted for soil at the SWMUs; therefore, a CMS to address soil is not needed.

7.2 WASTE

Waste was considered a medium of potential concern for the three inactive landfills at the Delphi Thermal facility and the sludge present in the North and South Settling Lagoons. To accomplish the RFI objectives at Landfills L1, L2, and L3, a review of historical data was completed, a geophysical survey was completed, where possible, one round of RFI waste sampling was conducted, and two rounds of groundwater sampling were conducted.

Section 5.0 (SWMU Investigation Results) provides a detailed description of the investigative strategy, results, and conclusions for each landfill SWMU. The investigative strategies used at the landfills, approved by the U.S. EPA in the RFI Work Plan (Geraghty & Miller, Inc. 1992a), clearly indicate how the SWMU-specific objectives were achieved. The delineation of the areal extent of the landfills was adequately defined during the RFI, through a review of aerial photography and topographical and physical land features, and the geophysical assessment activities completed at L2 and L3. The verified boundaries of the landfills were then used to develop the random grid to ensure the shallow waste sampling provided a representative characterization of constituents of potential concern at these SWMUs. The deep wastes were also characterized through an evaluation of groundwater quality in monitor wells located immediately downgradient of the landfills.

For the North and South Settling Lagoons, no supplemental characterization of this medium was conducted during the RFI. Rather, sludge characterization data collected in support of the preparation of a RCRA closure plan for these two SWMUs was utilized to support the RFI Baseline Risk Assessment. This characterization data allowed a more complete evaluation of all potential risks associated with these two SWMUs to be conducted in the Baseline Risk Assessment.

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The RFI and lagoon closure plan investigative activities provide the information necessary to support an evaluation of potential risks in the Baseline Risk Assessment posed by the SWMUs containing waste materials. Therefore, for each of the SWMUs where waste was considered a potential medium of concern, the investigative activities completed to date have adequately characterized the SWMUs, and no supplemental investigative activity is necessary to support the Baseline Risk Assessment and an evaluation of the need for a CMS.

The results of the Baseline Risk Assessment indicate that, using conservative, high-end exposure estimates and U.S. EPA toxicity values, the highest estimate of risk from potential current or future exposures to waste is 7×10^{-6} and the highest estimate of HI is 0.05. Because, these estimates of risk and HI are well below the U.S. EPA-established acceptable levels of 10^{-4} and HI of 1, no further remedial action is warranted for waste at the SWMUs. Therefore, a CMS to address waste is not needed.

7.3 SURFACE WATER - SEDIMENT

Surface water and sediment were considered media of potential concern at the Delphi Thermal facility due to the presence of the drainage ditch on the north end of the facility. To accomplish the RFI objectives, surface-water and sediment samples were collected within the drainage ditch at locations upstream and downstream of the facility.

Section 4.5 (Surface-Water/Sediment Sampling) provides a detailed description of the investigative strategy, results, and conclusions for addressing these media in the RFI. The investigative strategy for surface water/sediment, approved by U.S. EPA in the RFI Work Plan (Geraghty & Miller, Inc. 1992a), clearly indicates how the specific RFI objectives were achieved. The results obtained from the RFI sampling provide the information necessary to characterize this media, and no supplemental investigative activity is necessary to support the Baseline Risk Assessment and an evaluation of the need for a CMS.

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A review of the RFI sampling for these media, indicates that constituents detected in the downstream surface-water and sediment samples are at concentrations similar to upstream concentrations. Additionally, an evaluation of topographical and land-use features between the drainage ditch and the SWMUs at the north end of the facility, and a comparison with constituents detected in these SWMUs, indicates that the concentration of constituents detected in the downstream surface-water and sediment samples likely are attributable to either natural background or off-site sources. Based on this evaluation, no remedial activities are warranted for these media. Therefore, a CMS to address surface water or sediment is not needed.

7.4 GROUNDWATER

To accomplish the RFI objectives for groundwater, two rounds of groundwater sampling were conducted from a well network which consisted of 36 monitor wells during Phase I and 42 monitor wells during Phase II. Additionally, an analysis of background groundwater conditions (Section 4.2, Upgradient Groundwater Quality) was completed to provide a basis for evaluating the presence of both naturally and non-naturally occurring constituents coming onto the Delphi Thermal facility from upgradient sources.

In accordance with the requirements of the RFI Work Plan (Geraghty & Miller, Inc. 1992a), and the Phase II RFI Work Plan (Geraghty & Miller, Inc. 1994a), the investigative strategies for characterizing site-wide groundwater quality are presented with the individual discussion in Section 5.0 (SWMU Investigation Results) for each SWMU under consideration. Likewise, the results and conclusions for each of the individual monitor wells sampled are within the SWMU specific discussions in Section 5.0 (SWMU Investigation Results). Additionally, a groundwater flow model was used in support of the Baseline Risk Assessment to estimate concentrations of constituents which may migrate from the Delphi Thermal facility. This level of groundwater data and evaluation provided a detailed understanding of the presence of constituents of potential concern beneath and downgradient of the Delphi Thermal facility.

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The Baseline Risk Assessment for groundwater determined that for all water pathways, site-related contributions to groundwater quality are not expected to exceed MCLs or risk-based drinking water concentrations under current and reasonably expected groundwater use at the facility and in the region, either in the absence or presence of IMs. As such, a CMS for groundwater is not needed, Additionally, the current IMs are unnecessary.

7.5 FINAL CONCLUSIONS

As presented in the previous sections, media of potential concern identified in the AO for the Delphi Thermal site (soil, waste, surface water/sediment and groundwater) have been adequately characterized during the RFI. The Baseline Risk Assessment (Volume II) then used this characterization data to evaluate potential risks to human health and the environment posed by releases of hazardous waste and constituents from the SWMUs investigated in the RFI. The principle conclusions of the Baseline Risk Assessment are as follows:

1. For all soil- and air-related pathways, site-related risk estimates using both central tendency and high-end exposure factors are below U.S. EPA-established acceptable risk levels for cumulative cancer risk and noncancer effects.

2. For all water pathways, site-related contributions to groundwater quality are not expected to exceed MCLs or risk-based drinking water concentrations under current and reasonably expected use conditions both in the absence or presence of IMs.

3. For the drainage ditch at the north end of the facility and an area west of the facility along the Great Miami River, there is no indication of adverse ecological impacts from the SWMUs, and, therefore, no need for a more detailed ecological assessment.

Based on the findings of the RFI, no remedial activities are warranted for any of the media evaluated per the AO. Therefore, a CMS for the Delphi Thermal facility is not required.

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Additionally, the current IMs implemented to address suspected groundwater issues are unnecessary.

Groundwater monitoring activities will be conducted across the site in the future per a Site-Wide Groundwater Monitoring Plan, with a portion of this plan focused on the Waste Pile/Staging Area.

8.0 REFERENCES

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Table 3-1. Summary of RFI Sampling Program, Harrison Division - GMC Moraine, Ohio.

SWMU	Groundwater Samples	Analyses	Soil Samples	Analyses	Surface Water/ Sediment Samples	Analyses	Waste Samples	Analyses
PHASE I								
West Tank Farm	HR-1 W-1-S DUP-13	VOCs 8240 APP. IX Metals APP. IX PCBs	4	TCL VOCs TCL PCBs TCL Pest. TAL Tot. Metals	NA	NA	NA	NA
T5/T6	NA	NA	3	TCL VOCs TCL SVOCs TCL PCBs TAL Tot. Metals	NA	NA	NA	NA
T4	NA	NA	1	TCL VOCs TAL Tot. Metals	NA	NA	NA	NA
T11	GM-19S GM-19D DUP-16	VOCs 8240 APP. IX SVOCs APP. IX PCBs APP. IX Pest. APP. IX Herb. APP. IX Cyanide APP. IX Tot. & Diss. Metals	7	TCL VOCs TCL SVOCs TCL PCBs TCL Pest. TAL Tot. Metals TAL Cyanide	NA	NA	NA	NA
T12	HR-6	VOCS 8240 APP. IX Tot. & Diss. Metals	3	TCL VOCs TAL Tot. Metals	NA	NA	NA	NA

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Table 3-1. Summary of RFI Sampling Program, Harrison Division - GMC Moraine, Ohio.

SWMU	Groundwater Samples	Analyses	Soil Samples	Analyses	Surface Water/ Sediment Samples	Analyses	Waste Samples	Analyses
Off-Site Upgradient	HR-8 HR-9 HR-10 HR-11 HR-12 W-1-N DUP-20	VOCs 8240 APP. IX SVOCs APP. IX PCBs APP. IX Pest. APP. IX Herb. APP. IX Cyanide APP. IX Tot. & Diss. Metals	NA	NA	3	APP. IX VOCs APP. IX SVOCs APP. IX PCBs APP. IX Pest. APP. IX Herb. APP. IX Cyanide APP. IX Tot. Metals	NA	NA
Off-Site Downgradient	GM-9 GM-10 GM-11 GM-13 GM-15 GM-16 GM-17 GM-18 DUP-21 DUP-22	VOCs 8240 APP. IX SVOCs APP. IX PCBs APP. IX Pest. APP. IX Herb. APP. IX Cyanide APP. IX Tot. & Diss. Metals	NA	NA	3	APP. IX VOCs APP. IX SVOCs APP. IX PCBs APP. IX Pest. APP. IX Herb. APP. IX Cyanide APP. IX Tot. Metals	NA	NA
Landfill L1	East 4S GM-1 GM-2 GM-5 GM-7R GM-8 DUP-17 DUP-18	VOCs 8240 APP. IX SVOCs APP. IX PCBs APP. IX Pest. APP. IX Herb. APP. IX Cyanide APP. IX Tot. & Diss. Metals	NA	NA	NA	NA	6	TCL VOCs TCL SVOCs TCL PCBs TCL Pest. TAL Tot. Metals TAL Cyanide

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Table 3-1. Summary of RFI Sampling Program, Harrison Division - GMC Moraine, Ohio.

SWMU	Groundwater Samples	Analyses	Soil Samples	Analyses	Surface Water/ Sediment Samples	Analyses	Waste Samples	Analyses
Landfill L2	HR-3 HR-13	VOCs 8240 APP. IX SVOCs APP. IX PCBs APP. IX Pest. APP. IX Herb. APP. IX Cyanide APP. IX Tot. & Diss. Metals	NA	NA	NA	NA	4	TCL VOCs TCL SVOCs TCL PCBs TCL Pest. TAL Tot. Metals TAL Cyanide
Landfill L3	HR-4 DUP-15	VOCs 8240 APP. IX SVOCs APP. IX PCBs APP. IX Pest. APP. IX Herb. APP. IX Cyanide APP. IX Tot. & Diss. Metals	NA	NA	NA	NA	3	TCL VOCs TCL SVOCs TCL PCBs TCL Pest. TAL Tot. Metals TAL Cyanide
North Lagoon	W-3-N W-4-N HR-14 HR-15 DUP-14	VOCs 8240 APP. IX SVOCs APP. IX PCBs APP. IX Pest. APP. IX Herb. APP. IX Cyanide APP. IX Tot. & Diss. Metals	NA	NA	NA	NA	NA	NA

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Table 3-1. Summary of RFI Sampling Program, Harrison Division - GMC Moraine, Ohio.

SWMU	Groundwater Samples	Analyses	Soil Samples	Analyses	Surface Water/ Sediment Samples	Analyses	Waste Samples	Analyses
South Lagoon	W-2-S W-4-S HR-17 DUP-19	VOCs 8240 APP. IX SVOCs APP. IX PCBs APP. IX Pest. APP. IX Herb. APP. IX Cyanide APP. IX Tot. & Diss. Metals	NA	NA	NA	NA	NA	NA
Waste Pile/ Staging Area	GM-19S GM-19D DUP-16	VOCs 8240 APP. IX SVOCs APP. IX PCBs APP. IX Pest. APP. IX Herb. APP. IX Cyanide APP. IX Tot. & Diss. Metals	7	TCL VOCs TCL SVOCs TCL PCBs TAL Tot. Metals	NA	NA	NA	NA
South Tank Farm	GM-19S GM-19D DUP-16	VOCs 8240 APP. IX SVOCs APP. IX PCBs APP. IX Pest. APP. IX Herb. APP. IX Cyanide APP. IX Tot. & Diss. Metals	3	TCL VOCs TCL PCBs TCL Pest. TAL Tot. Metals	NA	NA	NA	NA

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Table 3-1. Summary of RFI Sampling Program, Harrison Division - GMC
Moraine, Ohio.

SWMU	Groundwater Samples	Analyses	Soil Samples	Analyses	Surface Water/ Sediment Samples	Analyses	Waste Samples	Analyses
Background	NA	NA	27	TCL VOCs TCL SVOCs TCL PCBs TCL Pest. TAL Tot. Metals TAL Cyanide	NA	NA	NA	NA
PHASE II West Tank Farm	HR-1 W-1-S	VOCs 8015	NA	NA	NA	NA	NA	NA
T10	NA	NA	2	TCL VOCs	NA	NA	NA	NA
T11	GM-19S GM-19D	APP. IX VOCs	NA	NA	NA	NA	NA	NA
T12	HR-6	VOCs 8015	NA	NA	NA	NA	NA	NA
Off-Site Upgradient	HR-8 HR-9 HR-10 HR-11 HR-12 W-1-N DUP-29 DUP-36	VOCs 8015	NA	NA	1	VOCs 8015	NA	NA
	HR-10 HR-12 DUP-29 DUP-26	Total and Diss. Antimony						

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Table 3-1. Summary of RFI Sampling Program, Harrison Division - GMC Moraine, Ohio.

SWMU	Groundwater Samples	Analyses	Soil Samples	Analyses	Surface Water/ Sediment Samples	Analyses	Waste Samples	Analyses
Off-Site Downgradient	GM-9 GM-10 GM-11 GM-13 GM-15 GM-16 GM-17 GM-18 DUP-32	VOCs 8015	3	TCL VOCs TCL PCB/Pest. TAL Metals & Cyanide	2	VOCs 8015	NA	NA
	MT-69 WSU-24 DUP-33 GM-20D	APP. IX VOCs APP. IX PCBs APP. IX Pest. APP. IX Herb. APP. IX Cyanide APP. IX Total & Diss. Metals						
L1	4S GM-1 GM-2 GM-5 GM-8 DUP-37	VOCs 8015	NA	NA	NA	NA	NA	NA

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Table 3-1. Summary of RFI Sampling Program, Harrison Division - GMC Moraine, Ohio.

SWMU	Groundwater Samples	Analyses	Soil Samples	Analyses	Surface Water/ Sediment Samples	Analyses	Waste Samples	Analyses
L1 (Continued)	East GM-3 GM-6 GM-7R DUP-29 DUP-34	APP. IX VOCs	NA	NA	NA	NA	NA	NA
L2	HR-3 HR-13	VOCs 8015	NA	NA	NA	NA	NA	NA
L3	HR-4	VOCs 8015	NA	NA	NA	NA	NA	NA
North Lagoon	HR-14 HR-15 W-3-N W-4-N DUP-38	VOCs 8015	NA	NA	NA	NA	NA	NA
South Lagoon	HR-17 W-2-S W-4-S DUP-35	APP. IX VOCs	NA	NA	NA	NA	NA	NA
Waste Pile/ Staging Area	GM-19S GM-19D	APP. IX VOCs	13	TCL VOCs TCL SVOCs TCL PCBs TCL Pest. TAL Metals	NA	NA	NA	NA

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Table 3-1. Summary of RFI Sampling Program, Harrison Division - GMC Moraine, Ohio.

SWMU	Groundwater Samples	Analyses	Soil Samples	Analyses	Surface Water/ Sediment Samples	Analyses	Waste Samples	Analyses
South Tank Farm	GM-19S GM-19D	APP. IX VOCs	NA	NA	NA	NA	NA	NA
Liquid Waste Burner	West	APP. IX VOCs	3	TCL VOCs TCL SVOCs TCL PCBs TCL Pest. TAL Metals	NA	NA	NA	NA
Fill Area	NA	NA	4	TCL VOCs TCL SVOCs TCL PCBs TCL Pest. TAL Metals	NA	NA	NA	NA
Background	NA	NA	6 1	Acetone Cyanide	NA	NA	NA	NA

VOC Volatile Organic Compounds
SVOC Semivolatile Organic Compounds
PCB Polychlorinated Biphenyls
TAL Target Analyted Listed
TCL Target Compound List
Herb. Herbicides
APP Appendix
Diss. Dissolved
Tot. Total

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Table 4-1. Upper Aquifer Monitor Well Water-Level Elevations Measured During Phase I, January 1993, Harrison RFI, Harrison Division - General Motors Corporation Moraine, Ohio

Well	MP (Top of __)	MP Elevation	Depth-to-Water from MP	Water-Level Elevation
W-1-N	PVC	739.02	31.67	707.35
W-2-N	PVC	731.68	24.89	706.79
W-3-N	PVC	733.66	27.05	706.61
W-4-N	PVC	731.63	25.05	706.58
HR-1	PVC	732.71	27.44	705.27
HR-2	PVC	734.75	28.18	706.57
HR-3	PVC	736.75	30.20	706.55
HR-4	PVC	742.60	35.43	707.17
HR-5	PVC	734.27	28.00	706.27
HR-6	PVC	732.66	27.00	705.66
HR-7	PVC	731.73	25.38	706.35
HR-8	PVC	743.42	35.97	707.45
HR-9	PVC	743.51	35.60	707.91
HR-11	PVC	743.33	35.52	707.81
HR-16	PVC	727.01	32.01*	695.00*
HR-17	PVC	726.43	21.30	705.13
W-1-S	PVC	729.29	24.10	705.19
W-2-S	PVC	726.64	22.13	704.51
W-3-S	PVC	733.42	28.96	704.46
W-4-S	PVC	727.68	23.20	704.48
GM-2	PVC	735.81	31.45	704.36
4S	PVC	731.36	27.18	704.18
GM-6	PVC	730.27	26.15	704.12
GM-8	PVC	735.17	30.96	704.21
GM-10	PVC	723.90	20.30	703.60
GM-16	PVC	725.30	21.36	703.94
GM-17	PVC	723.84	19.90	703.94
GM-18	PVC	723.80	19.94	703.86
GM-19S	PVC	730.85	26.14	704.71
EAST	PVC	730.98	26.02	704.96
WEST	PVC	730.90	25.93	704.97

PVC Polyvinyl chloride.
MP Measuring point.
* Probable measurement error.
All elevations and water-level elevations reported in feet above mean sea level (msl).
Depth-to-water measurements reported in feet below MP.
All water-level measurements were collected on January 29, 1993, using an electronic water-level probe.

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Table 4-2. Lower Aquifer Monitor Well Water-Level Elevations Measured During Phase I, January 1993, Harrison RFI, Harrison Division - General Motors Corporation, Moraine, Ohio.

Well	MP (Top of __)	MP Elevation	Depth-to-Water from MP	Water-Level Elevation
GM-1	PVC	735.74	31.95	703.79
GM-3	PVC	730.44	27.17	703.27
GM-4	PVC	731.46	28.20	703.26
GM-5	PVC	731.29	27.84	703.45
GM-7R	PVC	735.61	31.89	703.72
GM-9	PVC	724.07	21.02	703.05
GM-11	PVC	723.71	21.00	702.71
GM-13	PVC	723.82	21.64	702.18
GM-14	PVC	723.50	21.36	702.14
GM-15	PVC	725.23	23.24	701.99
GM-19D	PVC	730.25	26.49	703.76
HR-10	PVC	742.81	34.88	707.93
HR-12	PVC	742.64	34.81	707.83
HR-13	PVC	735.03	28.49	706.54
HR-14	PVC	731.63	25.16	706.47
HR-15	PVC	733.74	27.36	706.38

PCV Polyvinyl chloride.
MP Measuring point.
All elevations and water-level elevations reported in feet above mean sea level (msl).
Depth-to-water measurements reported in feet below MP.
All water-level measurements were collected on January 29, 1993 using an electronic water-level probe.

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Table 4-3. Lower Aquifer Production Well Water-Level Elevations Measured During Phase I, January 1993, Harrison RFI, Harrison Division - General Motors Corporation, Moraine, Ohio

Well	MP (Top of __)	MP Elevation	Depth-to-Water from MP	Water-Level Elevation
32	Port Hole	732.10	28.20	703.90
35	Rim	733.96	29.72	704.24
37	W. Port Hole	731.24	NM (bolted shut)	NM
42	Rim	731.62	27.08	704.54
44	Port Hole	734.62	NM (inaccessible)	NM
45	Steel	731.03	27.28	703.75
46	Steel	733.34	29.56	703.78
"A"	Port Hole	739.00	32.10	706.90
FW-1	Airline Hole	740.90	33.60	707.30
FW-2	Airline Hole	737.48	32.70	704.78
FW-3	Airline Hole	739.26	NM (inaccessible)	NM
FW-4	Hole to West of Airline	731.62	26.90	704.72

MP Measuring point.
NM Not measured.
All elevations and water-level elevations reported in feet above mean sea level (msl).
Depth-to-water measurements reported in feet below MP.
All water-level measurements were collected on January 29, 1993 using an electronic water-level probe.

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Table 4-4. Upper Aquifer Monitor Well Water-Level Elevations Measured during Phase II, October 1994, Harrison RFI, Harrison Division - General Motors Corporation, Moraine, Ohio.

Well	MP (Top of __)	MP Elevation	Depth-to-Water from MP	Water-Level Elevation
W-1-N	PVC	739.02	33.82	705.20
W-2-N	PVC	731.68	27.21	704.47
W-3-N	PVC	733.66	29.36	704.30
W-4-N	PVC	731.63	27.34	704.29
HR-1	PVC	732.71	30.18	702.53
HR-2	PVC	734.75	30.44	704.31
HR-3	PVC	736.75	32.48	704.27
HR-4	PVC	742.60	37.62	704.98
HR-5	PVC	734.27	30.41	703.86
HR-6	PVC	732.66	29.68	702.98
HR-7	PVC	731.73	27.82	703.91
HR-8	PVC	743.42	38.07	705.35
HR-9	PVC	743.51	37.54	705.97
HR-11	PVC	743.33	37.40	705.93
HR-16	PVC	727.01	25.04	701.97
HR-17	PVC	726.43	24.23	702.20
W-1-S	PVC	729.29	26.97	702.32
W-2-S	PVC	726.64	25.31	701.33
W-3-S	PVC	733.42	32.15	701.27
W-4-S	PVC	727.68	26.34	701.34
GM-2	PVC	735.81	34.52	701.29
4S	PVC	731.36	30.49	700.87
GM-6	PVC	730.27	29.37	700.90
GM-8	PVC	735.17	34.18	700.99
GM-10	PVC	723.90	23.53	700.37
GM-16	PVC	725.30	24.65	700.65
GM-17	PVC	723.84	23.11	700.73
GM-18	PVC	723.80	23.19	700.61
GM-19S	PVC	730.85	29.15	701.70
EAST	PVC	730.98	28.85	702.13
WEST	PVC	730.90	28.87	702.03
TW-2	Steel Casing	NA	32.49	NA
WSU-24	PVC	725.10	23.87	701.23

PVC Polyvinyl chloride.
MP Measuring point.
All elevations and water-level elevations reported in feet above mean sea level (msl).
Depth-to-water measurements reported in feet below MP.
Water-level measurements were collected on October 20, 1994 using an electronic water-level probe.

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Table 4-5. Additional Upper Aquifer Monitor Well Water-Level Elevations Measured During Phase II, October, 1994, Harrison Division - General Motors Corporation, Moraine, Ohio.

Well	MP (Top of ___)	MP Elevation	Depth-to-Water from MP (ft)	Water-Level Elevation
ME-1	PVC	728.20	25.57	702.63
ME-2	PVC	728.60	25.95	702.65
ME-3	PVC	728.33	25.67	702.66
ME-4	PVC	728.56	25.97	702.59
ME-5	PVC	728.65	26.27	702.38
ME-6	PVC	728.60	25.93	702.67
GM-21	PVC	723.79	21.95	701.84
GM-22	PVC	728.67	25.93	702.74
GM-23	PVC	731.22	26.41	704.81
GM-24	PVC	747.61	40.74	706.87

PVC Polyvinyl chloride.
MP Measuring point.
All elevations are reported in feet above mean sea level (msl).
Depth-to-water measurements are reported in feet below MP.
Water-level measurements were collected on October 20, 1994, using an electronic water-level indicator.

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Table 4-6. Lower Aquifer Monitor Well Water-Level Elevations Measured During Phase II, October 1994, Harrison RFI, Harrison Division - General Motors Corporation, Moraine, Ohio.

Well	MP (Top of __)	MP Elevation	Depth-to-Water from MP	Water-Level Elevation
GM-1	PVC	735.74	34.82	700.92
GM-3	PVC	730.44	30.10	700.34
GM-4	PVC	731.46	31.12	700.34
GM-5	PVC	731.29	30.75	700.54
GM-7R	PVC	735.61	34.76	700.85
GM-9	PVC	724.07	24.19	699.88
GM-11	PVC	723.71	24.03	699.68
GM-13	PVC	723.82	24.72	699.10
GM-14	PVC	723.50	24.47	699.03
GM-15	PVC	725.23	26.36	698.87
GM-19D	PVC	730.25	29.20	701.05
GM-20D(1)	PVC	727.26	26.26	701.00
MT-69	Steel	722.71	23.40	699.31(2)
HR-10	PVC	742.81	36.82	705.99
HR-12	PVC	742.64	36.69	705.95
HR-13	PVC	735.03	30.34	704.69
HR-14	PVC	731.63	27.64	703.99
HR-15	PVC	733.74	29.75	703.99

PVC Polyvinyl chloride.
MP Measuring point.
All elevations and water-level elevations reported in feet above mean sea level (msl).
Depth-to-water measurements reported in feet below MP.
Water-level measurements were collected on October 20, 1994, using an electronic water-level probe.
(1) Not available during Phase I.
(2) Measured on October 27, 1994.

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Table 4-7. Lower Aquifer Production Well Water-Level Elevations Measured During Phase II, October 1994, Harrison RFI, Harrison Division - General Motors Corporation, Moraine, Ohio.

Well	MP (Top of ___)	MP Elevation	Depth-to-Water from MP	Water-Level Elevation
32	Port Hole	732.10	30.88	701.22
35	Rim	733.96	32.50	701.46
37	W. Port Hole	731.24	NM (sealed)	NM
42	Rim	731.62	30.00	701.62
44	Port Hole	734.62	NM	NM
45	Steel	731.03	30.02	701.01
46	Steel	733.34	32.16	701.18
"A"	Port Hole	739.00	34.75	704.25
FW-1	Airline Hole	740.90	35.88	705.02
FW-2	Airline Hole	737.48	35.58	701.90
FW-3	Airline Hole	739.26	36.79	702.47
FW-4	Hole to West of Airline	731.62	30.42	701.20

PVC Polyvinyl choride.
MP Measuring point.
NM Not measured.
All elevations and water-level elevations reported in feet above mean sea level (msl).
Depth-to-water measurement reported in feet below MP.
Water-level measurements were collected on October 20, 1994, using an electronic water-level probe.

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Table 4-8. Detected Volatile Organic Compound Concentrations in the Upper and Lower Aquifers Upgradient from the Harrison Site During the RFI, Harrison Division - GMC.

Parameter	Concentration Units	UPPER AQUIFER				LOWER AQUIFER		
		HR-8 Phase I	HR-9 Phase I	HR-11 Phase I	W-1-N Phase I	HR-10 Phase I	DUP-20 Phase I	HR-12 Phase I
1,1,1-Trichloroethane	ug/L	5.2	5.4	--	--	--	--	--
1,1-Dichloroethane	ug/L	34.6	29.3	10.7	--	--	--	--
Carbon disulfide	ug/L	--	--	--	--	3	--	5.5
Chloroethane	ug/L	--	13.7	--	--	--	--	--
Trichloroethene	ug/L	1.3	16.1	--	--	--	--	--
Vinyl chloride	ug/L	--	--	--	--	--	--	6.6

-- Not detected.
ug/L Micrograms per liter.
DUP-20 is the duplicate sample of HR-10 during Phase I.

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Table 4-9. Detected Dissolved Metal Concentrations in the Upper and Lower Aquifer Upgradient from the Harrison Site During the RFI, Harrison Division - GMC.

		UPPER AQUIFER				LOWER AQUIFER					
Parameter	Concentration Units	HR-8 Phase I	HR-9 Phase I	HR-11 Phase I	W-1-N Phase I	HR-10 Phase I	DUP-20 Phase I	HR-10 Phase II	HR-12 Phase I	HR-12 Phase II	DUP-36 Phase II
Antimony, dissolved	ug/L	NA	55.3 J	NA	NA	NA	NA	NA	51.9	NA	NA
Barium, dissolved	ug/L	97.9	80.8 J	77.8	102	58	58.6	NA	97.7	NA	NA
Cobalt, dissolved	ug/L	--	11.9 J	9.8	6.1	5.6	8.6	NA	10.4	NA	NA
Selenium, dissolved	ug/L	NA	1 J	NA	NA	NA	NA	NA	NA	NA	NA

NA Not analyzed.
-- Not detected.
J Estimated.
ug/L Micrograms per liter.
DUP-20 is the duplicate sample of HR-10 during Phase I.
DUP-36 is the duplicate sample of HR-12 during Phase II.

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Table 4-10. Detected Volatile Organic Compound Concentrations in the Upper Aquifer Downgradient from the Harrison Facility RFI, Harrison Division - GMC

Parameter	Concentration Units	UPPER AQUIFER GM-10 Phase I	GM-16 Phase I	GM-17 Phase I	DUP-21 Phase I	GM-18 Phase I	DUP-22 Phase I	WSU-24 Phase II
1,1,1-Trichloroethane	ug/L	8	3.8	4.3	6.4	17.9	17.4	3.1
1,1-Dichloroethane	ug/L	11.1	--	117	115	144	152	--
Chlorobenzene	ug/L	--	--	5.7	2.5	--	--	--
Chloroethane	ug/L	--	--	12.3	--	10.2	11	--
Tetrachloroethene	ug/L	2.8	57	--	--	1.1	1.3	2.3
Trichloroethene	ug/L	85.2	28.9	25.3	43.3	62.3	63.5	20.7
Vinyl chloride	ug/L	--	--	8.4	6.5	17	17.5	--
trans-1,2-Dichloroethene	ug/L	2.4	--	8.3	9.2	16.7	17.2	--

-- Not detected.
ug/L Micrograms per liter.
DUP-21 is the duplicate sample of GM-17 during Phase I.
DUP-22 is the duplicate sample of GM-18 during Phase I.

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Table 4-11. Detected Volatile Organic Compound Concentrations in the Lower Aquifer Downgradient from the Harrison Facility RFI, Harrison Division - GMC

	LOWER AQUIFER						
Parameter	GM-9 Phase I	GM-11 Phase I	GM-13 Phase I	GM-15 Phase I	GM-20D Phase II	MT-69 Phase II	DUP-33 Phase II
1,1,1-Trichloroethane	--	8.6	4.6	--	--	--	--
1,1-Dichloroethane	14.5	--	--	2.4	--	--	--
Chlorobenzene	--	--	--	--	--	--	--
Chloroethane	--	--	--	--	--	--	--
Tetrachloroethene	--	5.5	5.8	--	6.1	--	--
Trichloroethene	4.9	29.1	15.8	3.7	1.8	--	--
Vinyl chloride	--	--	--	--	--	--	--
trans-1,2-Dichloroethene	4.1	--	--	--	--	--	--

-- Not detected.
DUP-33 is the duplicate sample of MT-69 during Phase II.

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Table 4-12. Detected Dissolved Metals and Cyanide Concentrations in the Upper Aquifer Downgradient from the Harrison Facility RFI, Harrison Division - GMC.

		UPPER AQUIFER						
Parameter	Concentration Units	GM-10 Phase I	GM-16 Phase I	GM-17 Phase I	DUP-21 Phase I	GM-18 Phase I	DUP-22 Phase I	WSU-24 Phase II
Cyanide	mg/L	--	--	--	--	0.021	--	--
Barium, dissolved	ug/L	180 J	142	78.7	80.8	48.8	47.7	115
Cobalt, dissolved	ug/L	7.3	5.4	13.4	14.8	--	--	NA
Copper, dissolved	ug/L	--	--	9.7	5.4	5.7	9.2	--
Selenium, dissolved	ug/L	NA	NA	NA	--	2.8	1.1 J	NA

-- Not detected.
mg/L Milligrams per liter.
ug/L Micrograms per liter.
J Estimated.
NA - Not analyzed.
DUP-21 is the duplicate sample of GM-17 during Phase I.
DUP-22 is the duplicate sample of GM-18 during Phase I.

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Table 4-13. Detected Dissolved Metals in the Lower Aquifer Downgradient from the Harrison Facility RFI, Harrison Division - GMC.

Parameter	Concentration Units	LOWER AQUIFER GM-9 Phase I	GM-11 Phase I	GM-13 Phase I	GM-15 Phase I	GM-20D Phase II	MT-69 Phase II	DUP-33 Phase II
Antimony, dissolved	ug/L	53.2 J	66.2 J	--	NA	NA	NA	NA
Barium, dissolved	ug/L	81.4	71.4	75.9	163 J	74.8	113	119
Cobalt, dissolved	ug/L	6.7	9.4	7.2	7.5	--	NA	NA
Copper, dissolved	ug/L	--	--	--	NA	--	--	--
Selenium, dissolved	ug/L	NA	NA	1 J	NA	NA	NA	NA
Zinc, dissolved	ug/L	--	--	--	--	--	17.5	NA

-- Not detected.
ug/L Micrograms per liter.
J Estimated.
NA Not analyzed.
DUP-33 is the duplicate sample of MT-69 during Phase II.

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TABLE 4-14. SOIL BACKGROUND ANALYTICAL RESULTS
TOTAL ORGANIC CARBON AND CATION-EXCHANGE CAPACITIES
HARRISON DIVISION - GMC

Sample Name	UNITS	BKG BH03-02SL	BKG BH03-16SL	BKG BH07-02SL	BKG-BH07-16SL	BKG-BH10-02SL	BKG-BH10-16SL	DUP-05
Total Organic Carbon	MG/KG	12000	12000	13000	18000	4800	6500	12000
Cation-Exchange Capacity	UG/G N (Dry wt)	2000	990	2200	1300	2900	1900	2700

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Table 5-1. Detected Volatile Organic Compound Concentrations in the Upper Aquifer Upgradient and Downgradient from Landfill L1 RFI, Harrison Division - GMC.

Parameter	Concentration Units	UPGRADIENT					DOWNGRADIENT		
		GM-2 Phase I	DUP-17 Phase I	EAST-Phase I	EAST-Phase II	DUP-29 Phase II	4S-Phase I	GM-6 Phase II	GM-8 Phase I
1,1,1-Trichloroethane	ug/L	13.7	12.6	18.9	16	16.1	--	--	7.3
1,1-Dichloroethane	ug/L	3.1	2.9	8	10.5	10.8	77.8	218	120
Benzene	ug/L	--	--	--	--	--	--	14.3	6
Chloroethane	ug/L	--	--	--	--	--	--	--	30.8
Ethylbenzene	ug/L	--	--	--	--	--	45.9	459	108
Tetrachloroethene	ug/L	7.6	7.2	79.4	62.4	61.2	--	--	2.2
Toluene	ug/L	--	--	--	--	--	--	75.2	1.1
Trichloroethene	ug/L	108	94.8	83.4	71.4	71.2	--	--	69.4
Vinyl chloride	ug/L	--	--	--	--	--	--	--	28.3
Xylenes, total	ug/L	--	--	--	--	--	24	498	70.6
trans-1,2-Dichloroethene	ug/L	--	--	--	--	--	--	22	13

-- Not detected.
ug/L Micrograms per liter.
DUP-17 is the duplicate sample of GM-2 during Phase I.
DUP-29 is the duplicate sample of East during Phase II.

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Table 5-2. Detected Volatile Organic Compound Concentrations in the Lower Aquifer Upgradient and Downgradient from Landfill L1 RFI, Harrison Division - GMC.

Parameter	Concentration Units	UPGRADIENT GM-1 Phase I	DOWNGRADIENT GM-3 Phase II	GM-5 Phase I	DUP-18 Phase I	GM-7R Phase I	GM-7R Phase II	DUP-34 Phase II
1,1,1-Trichloroethane	ug/L	8	1.9	--	--	9.4	6	6.7
1,1-Dichloroethane	ug/L	--	1.1	--	2.5	6.9	3.8	4
1,1-Dichloroethene	ug/L	--	--	--	--	--	1.7	1.8
Tetrachloroethene	ug/L	4.7	1.1	--	--	--	--	--
Trichloroethene	ug/L	42.4	4.7	--	--	183	134	147

-- Not detected.
ug/L Micrograms per liter.
DUP-18 is the duplicate sample of GM-5 during Phase I.
DUP-34 is the duplicate sample of GM-7R during Phase II.

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Table 5-3. Detected Cyanide and Dissolved Metal Concentrations in the Upper Aquifer Upgradient and Downgradient from Landfill L1 RFI, Harrison Division - GMC.

		UPGRADIENT			DOWNGRADIENT	
Parameter	Concentration Units	GM-2 Phase I	DUP-17 Phase I	EAST- Phase I	4S- Phase I	GM-8 Phase I
Cyanide	mg/L	--	--	0.008	0.014	0.017
Antimony, dissolved	ug/L	NA	NA	56.2	NA	--
Arsenic, dissolved	ug/L		--	--	23.3	--
Barium, dissolved	ug/L	103	96	90.9	237	129
Cobalt, dissolved	ug/L	8.9	8.3	9.9	20.8	12.2
Copper, dissolved	ug/L	--	--	9.4	--	5.6
Nickel, dissolved	ug/L	--	--	15.8	--	NA
Zinc, dissolved	ug/L	--	--	11.7	--	--

NA Not analyzed.
-- Not detected.
mg/L Milligrans per liter.
ug/L Micrograms per liter.
DUP-17 is a duplicate sample of GM-2 during Phase I.

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Table 5-4. Detected Dissolved Metal Concentrations in the Lower Aquifer Upgradient and Downgradient from Landfill L1 RFI, Harrison Division - GMC.

Parameter	Concentration Units	UPGRADIENT GM-1 Phase I	DOWNGRADIENT GM-5 Phase I	DUP-18 Phase I	GM-7R Phase I
Barium, dissolved	ug/L	79.2	84	84.6	80.6
Cobalt, dissolved	ug/L	8.6	9.1	13.1	10.7
Copper, dissolved	ug/L	--	10.2	--	--
Nickel, dissolved	ug/L	--	19.5	--	--

-- Not detected.
ug/L Micrograms per liter.
DUP-18 is the duplicate sample of GM-5 during Phase I.

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Table 5-5. Detected Volatile Organic Compound Concentrations in the Upper and Lower Aquifers Downgradient from Landfills L2 and L3 RFI, Harrison Division - GMC.

		LANDFILL - L2		LANDFILL- L3	
		Upper Aquifer	Lower Aquifer	Upper Aquifer	
Parameter	Concentration Units	HR-3 Phase I	HR-13 Phase I	HR-4 Phase I	DUP-15 Phase I
1,1,1-Trichloroethane	ug/L	--	1.6	--	--
1,1-Dichloroethane	ug/L	--	43.2	--	--
Tetrachloroethene	ug/L	--	--	1.6	2.5
Trichloroethene	ug/L	--	2.4	1.7	2.2
trans-1,2-Dichloroethene	ug/L	--	3.8	--	--

-- Not detected.
ug/L Micrograms per liter.
DUP-15 is the duplicate sample of HR-4 during Phase I.

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Table 5-6. Detected Dissolved Metal Concentrations for Upper and Lower Aquifers Downgradient from Landfill L2 and Upper Aquifer Downgradient from Landfill L3 RFI, Harrison Division - GMC.

		LANDFILL - L2		LANDFILL - L3	
		Upper Aquifer	Lower Aquifer	Upper Aquifer	
Parameter	Concentration Units	HR-3 Phase I	HR-13 Phase I	HR-4 Phase I	DUP-15 Phase I
Barium, dissolved	ug/L	59.1	71.7	67.1	65.6
Cobalt, dissolved	ug/L	13.2	8.9	9.9	7.8
Lead, dissolved	ug/L	2.2 J	4.5 J	--	--

-- Not detected.
J Estimated.
ug/L Micrograms per liter.
DUP-15 is the duplicate sample of HR-4 during Phase I.

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Table 5-7. Summary of North Settling Lagoon Analytical Results, Harrison Division - GMC.

Constituent[1]	Frequency of Detection[2]	Range of Detected Concentrations[3]	Median Concentrations	Location of Maximum[4]
Metals				
Antimony	15/18	8.93-54.8	18.2	NPI-COMPL
Arsenic	18/18	8.58-158.0	94.6	NPI-2/3M
Barium	18/18	330.0-2550.0	1190.0	NPI-COMPL
Cadmium	18/18	6.57-1430.0	265.0	NSI-10L
Chromium	18/18	244.0-3630.0	562.0	NSIII-5
Cobalt	9/9	72.7-1210.0	469.0	NPI-2/3M
Copper	18/18	54.2-969.0	221.0	NSI-COMPL
Lead	18/18	160.0-5970.0	881.0	NSI-10L
Mercury	18/18	0.270-1.87	0.864	NPI-COMPL
Nickel	18/18	218.0-3250.0	1575.0	NSIII-COMPU
Selenium	5/18	2.78-76.6	14.5	NSI-10L
Silver	17/18	0.492-2.12	0.824	NPI-2U
Tin	4/9	213.0-741.0	313.5	NSI-10U
Vanadium	5/9	19.1-30.7	24.4	NSII-3U
Zinc	18/18	920.0-10501.0	7830.0	NSI-COMPM
Volatile Organics				
1,2-Dichlorobenzene	2/18	0.57-1.52	1.05	NPI-2L
Ethylbenzene	7/18	0.153-3.4	1.3	NSI-10L
Tetrachloroethene	2/18	2.05-4.7	3.38	NSI-COMPM
Toluene	7/18	0.87-10.1	3.9	NPI-2/3M
Trichloroethylene	3/18	0.55-6.66	3.3	NPI-COMPL
Xylene	6/9	0.150-9.25	5.0	NSI-COMPL
Extractable Organics				
Bis(2-ethylhexyl)Phthalate	4/9	17.4-31.2	21.8	NSII-3U
Fluoranthene	5/9	6.18-104.0	10.3	NPI-2U
Fluorene	4/9	1.6-18.5	7.15	NSII-3L
2-Methylnaphthalene	6/9	1.2-9.54	5.36	NSII-3L
Phenanthrene	7/9	2.46-41.7	5.4	NPI-2U
Pyrene	5/9	5.58-81.5	8.86	NPI-2U

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Table 5-7. Summary of North Settling Lagoon Analytical Results, Harrison Division - GMC.

Constituent[1]	Frequency of Detection[2]	Range of Detected Concentrations[3]	Median Concentrations	Location of Maximum[4]
Miscellaneous				
Cyanide	15/18	0.65-5.32	2.47	NSI-COMPL
PCB 1242	1/9	3.1-	3.1	NSI-10L
PCB 1260	6/9	5.1-27.4	7.7	NSIII-5
Sulfide	9/9	110.0-39000.0	1790.0	NSIII-5

Data from Description of Current Conditions (Geraghty & Miller, Inc. 1991a).

Notes:

1 Included only detected constituents from the Primary and Secondary, and Sludge Basins which have been grouped together.
2 Calculated by number of times constituent was detected divided by number of times constituent was tested for.
3 Units in mg/kg (dry weight).
4 NP --North Primary Basin.
NS--North Secondary Basin.

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Table 5-8. Detected Volatile Organic Compound Concentrations in the Upper and Lower Aquifers Downgradient from the North Settling Lagoon RFI, Harrison Division - GMC.

Parameter	Concentration Units	UPPER AQUIFER W-3-N Phase I	UPPER AQUIFER W-4-N Phase I	LOWER AQUIFER HR-14 Phase I	LOWER AQUIFER HR-15 Phase I	LOWER AQUIFER DUP-14 Phase I
Carbon disulfide	ug/L	--	--	--	--	2.1
Tetrachloroethene	ug/L	41.4	1.6	--	--	--
Trichloroethene	ug/L	9.3	9.1	4.6	--	--
Vinyl chloride	ug/L	--	--	7.7	--	--

-- Not detected.
ug/L Micrograms per liter.
DUP-14 is the duplicate sample of HR-15 during Phase I.

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Table 5-9. Detected Dissolved Metal Concentrations in the Upper and Lower Aquifers Downgradient from the North Settling Lagoon RFI, Harrison Division - GMC.

Parameter	Concentration Units	UPPER AQUIFER W-3-N Phase I	UPPER AQUIFER W-4-N Phase I	LOWER AQUIFER HR-14 Phase I	LOWER AQUIFER HR-15 Phase I	LOWER AQUIFER DUP-14 Phase I
Antimony, dissolved	ug/L	57.8 J	58.8	57.6	--	--
Barium, dissolved	ug/L	91.7	122	85.4	94.4	95.2
Cobalt, dissolved	ug/L	9.5	13.1	10.1	6.7	8
Lead, dissolved	ug/L	--	--	4.6	--	--
Nickel, dissolved	ug/L	NA	15.8	--	NA	NA

-- Not detected.
ug/L Micrograms per liter.
J Estimated.
NA - Not analyzed.
DUP-14 is the duplicate sample of HR-15 during Phase I.

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Table 5-10. Summary of South Settling Lagoon Analytical Results, South Settling Lagoon Harrison Division - GMC.

Constituent[1]	Frequency of Detection[2]	Range of Detected Concentrations[3]	Median Concentrations	Location of Maximum[4]
Metals				
Antimony	14/36	5.03-52.8	12.6	SSI-8L
Arsenic	36/36	3.4-157.0	33.3	SSII-7L
Barium	36/36	713.0-7310	2170.0	SSII-7L
Cadmium	36/36	0.721-26.9	12.2	SSIII-1U
Chromium	36/36	55.3-2020.0	1055.0	SSIII-5L
Cobalt	5/6	17.8-222.0	30.5	SSIII-5L
Copper	36/36	37.2-16900.0	480.0	SSIII-5L
Lead	36/36	87.1-398.0	252.0	SSI-8L
Mercury	34/36	0.081-4.03	0.41	SSII-8U
Nickel	36/36	26.3-1490.0	535.0	SSII-COMPL
Selenium	1/36	0.78-	0.78	SSII-COMPU
Silver	34/36	0.317-2.45	0.54	SSIII-5U
Tin	1/6	28.3-	28.3	SPI-1U
Zinc	36/36	157.0-2190.0	1351.0	SSIV-8U
Extractable Organics				
Bis(2-ethylhexyl)Phthalate	4/13	1.33-2.76	1.7	SPII-4L
Di-n-butyl phthalate	1/13	1.99-	1.99	SPI-1U
Miscellaneous				
Cyanide	36/36	0.562-18.9	7.0	SSIII-5L
PCB 1254	8/13	1.6-206.0	10.4	SSIII-5L
PCB 1260	2/13	1.5-4.6	3.0	SPI-1U

Data from the Description of Current Conditions (Geraghty & Miller, Inc. 1991a).

Notes:

1 Includes only detected constituents from the Primary and Secondary, and Sludge Basins which have been grouped together.
2 Calculated by number of times constituent was detected divided by number of times constituent was tested for.
3 Units in mg/kg (dry weight).
4 SP --South Primary Basin.
SS--South Secondary Basin.

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Table 5-11. Detected Volatile Organic Compound Concentrations in the Upper Aquifer Upgradient and Downgradient from the South Settling Lagoon RFI, Harrison Division - GMC.

Parameter	Concentration Units	UPGRADIENT HR-17 Phase I	UPGRADIENT DUP-19 Phase I	UPGRADIENT HR-17 Phase II	UPGRADIENT DUP-35 Phase II	DOWNGRADIENT W-2-S Phase I	DOWNGRADIENT W-2-S Phase II	DOWNGRADIENT W-4-S Phase I	DOWNGRADIENT W-4-S Phase II
1,1,1-Trichloroethane	ug/L	2.6	--	--	--	--	1.2	2.5	2.7
Carbon disulfide	ug/L	--	--	--	1.7	--	--	--	1.6
Tetrachloroethene	ug/L	12.2	11.4	10.4	10.4	--	--	166	36.9
Trichloroethene	ug/L	3.1	3.1	4.9	4.9	4.6	3.9	25	12.8
Trichlorofluoromethane	ug/L	--	--	13.4	10.7	--	--	--	6.3

-- Not detected.
ug/L Micrograms per liter.
DUP-19 is the duplicate sample of HR-17 during Phase I.
DUP-35 is the duplicate sample of HR-17 during Phase II.

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DRAFT

Table 5-12. Detected Dissolved Metal Concentrations in the Upper Aquifer Upgradient and Downgradient from the South Settling Lagoon RFI, Harrison Division - GMC.

Parameter	Concentration Units	UPGRADIENT HR-17 Phase I	UPGRADIENT DUP-19 Phase I	DOWNGRADIENT W-2-S Phase I	DOWNGRADIENT W-4-S Phase I
Barium, dissolved	ug/L	118	116	176	74.1
Cobalt, dissolved	ug/L	--	5.6	7.7	7.6

-- Not detected.
ug/L Micrograms per liter.
DUP-19 is the duplicate sample of HR-17 during Phase I.

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DRAFT

Table 5-13. Detected Volatile Organic Compound Concentrations in Soil Samples Collected at the West Tank Farm RFI, Harrison Division - GMC

Parameters	Units	WTF-GS7-15SL Phase I	WTF-GS8-15SL Phase I	DUP-02 Phase I	WTF-GS10-15SL Phase I	T10-BH01-16SL Phase II	DUP-27 Phase II
1,2-Dichloroethene (Total)	ug/kg	--	--	--	--	1320	530
2-Butanone	ug/kg	--	--	--	--	9940	--
Tetrachloroethene	ug/kg	--	75	1500	--	6200	4,260
Trichloroethene	ug/kg	--	--	--	--	1390	510

-- Not detected.
ug/kg Micrograms per kilogram.

i:\harrison\95rfi\wtfslvoc wb2

DRAFT

Table 5-14. Detected Metals in Soil Samples Collected at the West Tank Farm RFI, Harrison Division - GMC.

Parameters	Units	WTF-GS7-15SL Phase I	WTF-GS8-15SL Phase I	DUP-02 Phase I	WTF-GS10-15SL Phase I
Aluminum	mg/kg	2720	2150	2690	3600
Arsenic	mg/kg	2.1 J	3.5 J	4 J	4.6 J
Barium	mg/kg	10.1	11.5	23.6	21.9
Cadmium	mg/kg	1.7 J	2.7 J	1.8 J	2.3 J
Calcium	mg/kg	118000 J	144000 J	125000 J	105000 J
Chromium	mg/kg	2.6 J	5.2 J	5.1 J	9 J
Cobalt	mg/kg	--	2.8	3.6	2.7
Copper	mg/kg	4.9	12.7	10.7	8.8
Iron	mg/kg	5870	8790	6340	6820
Lead	mg/kg	2.5 J	6 J	5.7 J	11.5 J
Magnesium	mg/kg	49100	42600	53000	49600
Manganese	mg/kg	169	175	298	234
Nickel	mg/kg	--	9.1	12.1	11.9
Potassium	mg/kg	418	490	404	601
Silver	mg/kg	1 J	0.65 J	--	--
Sodium	mg/kg	114	146	151	143
Vanadium	mg/kg	8	6.2	8.7	9.7
Zinc	mg/kg	18 J	30.9 J	40.6 J	32.9 J

-- Not detected.
J Estimated value.
mg\kg Milligrams per kilograms.

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DRAFT

Table 5-15. Detected Volatile Organic Compound Concentrations in the Upper Aquifer in the Vicinity of SWMU T12 and the West Tank Farm RFI, Harrison Division - GMC.

		SWMU T12	WEST TANK FARM		
		DOWNGRADIENT	UPGRADIENT		DOWNGRADIENT
Parameter	Concentration Units	HR-6 Phase I	HR-1 Phase I	DUP-13 Phase I	W-1-S Phase I
1,1,1-Trichloroethane	ug/L	--	4.5	7.7	--
Carbon Disulfide	ug/L	--	3.9	--	--
Tetrachloroethene	ug/L	--	25.6	46.3	34.7
Trichloroethene	ug/L	4.4	55.8	101	5.2
Trichlorofluoromethane	ug/L	--	2	5	29.9
trans-1,2-Dichloroethene	ug/L	--	1.6	2.8	--

-- Not detected.
ug/L Micrograms per liter.
DUP-13 is the duplicate sample of HR-1 during Phase I.

DRAFT

i:\harrison\95rfi\tables\tbl5-15.wb2

Table 5-16. Detected Dissolved Metal Concentrations in the Upper Aquifer in the Vicinity of SWMU T12 and the West Tank Farm RFI, Harrison Division - GMC.

		SWMU T12	WEST TANK FARM		
		DOWNGRADIENT	UPGRADIENT		DOWNGRADIENT
	Concentration	HR-6	HR-1	DUP-13	W-1-S
Parameter	Units	Phase I	Phase I	Phase I	Phase I
Antimony, dissolved	ug/L	NA	--	69 J	56.9 J
Barium, dissolved	ug/L	89.1	89.7	96.7	123 J
Cobalt, dissolved	ug/L	7.7	8.7	8	7.3 J
Copper, dissolved	ug/L	--	5.4	--	--
Lead, dissolved	ug/L	--	--	--	2J
Zinc, dissolved	ug/L	--	--	10.1	--

-- Not detected.
J Estimated.
NA - Not analyzed.
ug/L Micrograms per liter.
DUP-13 is the duplicate sample of HR-1 during Phase I.

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DRAFT

Table 5-17. Detected Volatile Organic Compound Concentrations in Soils at SWMU T12 RFI, Harrision Division - GMC.

Parameters	Units	T12-GS1-17SL Phase I	DUP-01 Phase I	T12-GS2-10SL Phase I
Ethylbenzene	ug/kg	6.1	8	--
Styrene	ug/kg	30	31	7.1

-- Not detected.
ug\kg Micrograms per kilograms.

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DRAFT

Table 5-18 . Detected Metals in Soils at SWMU T12 RFI
Harrision Division - GMC.

Parameters	Units	T12-GS1-17SL Phase I	DUP-01 Phase I	T12-GS2-10SL Phase I
Aluminum	mg/kg	1950 J	2000 J	8940 J
Antimony	mg/kg	48.4 J	56.3 J	32.5 J
Arsenic	mg/kg	1.5 J	1.8 J	4 J
Barium	mg/kg	9.6	9.1	139
Beryllium	mg/kg	0 .35 J	0.38 J	0.54
Cadmium	mg/kg	1.1 J	0.68 J	3.4
Calcium	mg/kg	174000	184000	71900
Chromium	mg/kg	--	--	11.2
Cobalt	mg/kg	18.5 J	20 J	23.3
Copper	mg/kg	5.1 J	6.4 J	22 J
Iron	mg/kg	4370 J	4400 J	14000 J
Lead	mg/kg	3.4 J	4 J	14.9 J
Magnesium	mg/kg	58700 J	85400 J	24400 J
Manganese	mg/kg	328 J	204 J	284 J
Sodium	mg/kg	202	254	282
Vanadium	mg/kg	6.2	7.8	25
Zinc	mg/kg	15.8	14.9	80.1

-- Not detected.
J Estimated value.
mg/kg Milligrams per kilogram.

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Table 5-19. Detected Volative Organic Compound Concentrations and Semivolatile Organic Compound Concentrations in Soil Samples Collected at SWMU T5/T6 RFI, Harrision Division - GMC.

Parameters	Units	T5/6-BH01-11SL Phase I	T5/6-BH01-12SL Phase I	DUP-06 Phase I	T5/6-BH02-12SL Phase I
VOCs			NA		
Acetone	ug/kg	280		--	110
Tetrachloroethene	ug/kg	33		55	32
SVOCs		NA			
bis(2-Ethylhexyl)phthalate	ug/kg		350	400	350

-- Not detected.
NA Not analyzed.
ug/kg Micrograms per kilograms.
VOCs Volatile Organic Compound Concentrations.
SVOCs Semivolatile Organic Compound Concentrations.

i:\harrison\95rfi\tables\t56slvoc wb2

DRAFT

Table 5-20. Detected Metals in Soil Samples Collected at SWMU T5/T6 RFI, Harrison Division - GMC.

Parameters	Units	T5/6-BH01-10SL Phase I	DUP-06 Phase I	T5/6-BH02-12SL Phase I
Aluminum	mg/kg	2930	6880	3210
Antimony	mg/kg	31.2	19.4	27.3
Arsenic	mg/kg	4.6	5	11
Barium	mg/kg	17.7	39.4	12.3
Beryllium	mg/kg	0.26 J	0.39	0.3 J
Cadmium	mg/kg	2.8 J	3.9	6.1 J
Calcium	mg/kg	123000	67900	131000
Chromium	mg/kg	6.9	10.9	8.8
Cobalt	mg/kg	10.3 J	9.8	10.6 J
Copper	mg/kg	7.3	17.3	7.4
Iron	mg/kg	7650 J	10800 J	16100 J
Lead	mg/kg	4.2 J	15.1 J	4.2 J
Magnesium	mg/kg	51300	28600	40000
Manganese	mg/kg	246 J	344 J	469 J
Nickel	mg/kg	7.9	13.2	8.4
Potassium	mg/kg	632	898	592
Sodium	mg/kg	207	268	173
Vanadium	mg/kg	9.1	18.3	13.7
Zinc	mg/kg	31.3	70.2	28.1

J Estimated value.
mg/kg Milligrams per kilogram.

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Table 5-21. Detected Volatile Organic Compounds and Semivolatile Organic Compounds in Soils Collected at SWMU T11 RFI, Harrison Division - GMC.

Parameters	Units	T11-BH01-02SL Phase I	DUP-08 Phase I	T11-BH01-16S Phase I	T11-BH02-02SL Phase I	T11-BH02-16SL Phase I	T11-BH03-02SL Phase I	T11-BH03-16SL Phase I
VOCs								
Acetone	ug/kg	1800	1800	1400 J	--	1400 J	8900 J	710 J
Tetrachloroethene	ug/kg	66	120	41	--	--	110	38 J
Toluene	ug/kg	--	--	5.8	--	--	--	--
SVOCs								
2-Methylnaphthalene	ug/kg	--	--	--	7300	--	--	--
Bis(2-ethylhexyl)Phthalate	ug/kg	550	--	580	--	420	--	--
Naphthalene	ug/kg	--	--	--	7500	--	--	--

-- Not detected.
J Estimated value.
ug\kg Micrograms per kilogram.
VOCs Volatile Organic Compounds.
SVOCs Semivolatile Organic Compounds.

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Table 5-22. Detected Volatile Organic Compound Concentrations in the Upper and Lower Aquifers in the Vicinity of the Fill Area, South Tank Farm, T11, and the Waste Pile/Staging Area SWMUs RPI, Harrison Division - GMC.

		UPPER AQUIFER			LOWER AQUIFER		
Parameter	Concentration Units	GM-19S Phase I	GM-19S Phase II	WEST Phase II	GM-19D Phase I	DUP-16 Phase I	GM-19D Phase II
1,1,1-Trichloroethane	ug/L	90.1	47.8	196	6.6	8	3.3
1,1-Dichloroethane	ug/L	16.7	20.8	153	2.4	--	--
1,1-Dichloroethene	ug/L	2.5	3.2	1.4	1.7	--	--
Chloroethane	ug/L	--	--	32	--	--	--
Chloroform	ug/L	--	1.2	--	--	--	--
Tetrachloroethene	ug/L	21.1	166	52.5	--	--	--
Trichloroethene	ug/L	157	--	62.4	80.1	91.6	56.7
Vinyl chloride	ug/L	--	--	--	25.8	25.3	37.2
Xylenes, total	ug/L	--	--	--	2.4	2.5	--
trans-1,2-Dichloroethene	ug/L	3.2	3.4	1.5	--	--	--

-- Not detected.
ug/L Micrograms per liter.
DUP-16 is the duplicate sample of GM-19D during Phase I.

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Table 5-23. Detected Total and Dissolved Metals and Cyanide Concentrations in the Upper and Lower Aquifers in the Vicinity of the Fill Area, South Tank Farm, T11, and the Waste Pile/Staging Area SWMUs RFI, Harrison Division - GMC.

Parameter	Concentration Units	UPPER AQUIFER GM-19S Phase I	LOWER AQUIFER GM-19D Phase I	LOWER AQUIFER DUP-16 Phase I
Cyanide	mg/L	0.008	--	--
Barium, dissolved	ug/L	87.7	113 J	129
Cobalt, dissolved	ug/L	--	11.1 J	12.1 J
Nickel, dissolved	ug/L	--	14.4 J	16

-- Not detected.
J Estimated.
DUP-16 is the duplicate sample of GM-19D during Phase I.
ug/L Micrograms per liter.
mg/L Milligrams per liter.

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DRAFT

Table 5-24. Detected VOCs, SVOCs, and PCBs in Soils Collected at the Waste Pile/Staging Area, Harrison Divison - GMC.

Parameters	Units	WPSA-BH01-02SL Phase I	DUP-07 Phase I	WPSA-BH01-08SL Phase I	WPSA-BH02-02SL Phase I	WPSA-BH02-08SL Phase I
VOCs						
1,1,1-Trichloroethane	ug/kg	--	--	180	66	--
1,1-Dichloroethane	ug/kg	--	--	--	--	--
1,2-Dichloroethene (total)	ug/kg	--	--	--	--	--
2-Butanone	ug/kg	--	--	--	--	--
Acetone	ug/kg	--	--	3400 J	1900	--
Benzene	ug/kg	--	--	--	--	--
Carbon disulfide	ug/kg	--	--	--	--	--
Ethylbenzene	ug/kg	--	--	65	--	--
Tetrachloroethene	ug/kg	200	180	84	54	130
Toluene	ug/kg	--	36	52	--	--
Trichloroethene	ug/kg	--	--	--	--	--
Xylenes, total	ug/kg	--	--	130	--	--
SVOCs						
Benzo(a)pyrene	ug/kg	--	--	--	--	--
Benzo(b)fluoranthene(1)	ug/kg	--	--	--	--	--
bis(2-Ethylhexyl)phthalate	ug/kg	--	--	--	390	--
Butyl benzyl phthalate	ug/kg	28000	22000	--	--	--
Chrysene	ug/kg	--	--	--	--	--
Fluoranthene	ug/kg	--	--	--	--	--
Phenanthrene	ug/kg	--	--	--	--	--
Pyrene	ug/kg	--	--	--	--	--
PCBs						
Aroclor-1242	mg/kg	--	--	--	--	--
Aroclor-1260	mg/kg	--	--	--	--	--

VOCs Volatile Organic Compounds.
SVOCs Semivolatile Organic Compounds.
PCBs Polychlorinated Biphenyls.
ug/kg Micrograms per kilogram.
mg/kg Milligrams per kilogram.
(1) Represents a total of benzo(b)fluoranthene and benzo(k)fluoranthene.

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Table 5-24. Detected VOCs, SVOCs, and PCBs in Soils Collected at the Waste Pile/Staging Area, Harrison Divison - GMC.

Parameters	Units	WPSA-BH03-02SL Phase I	WPSA-BH03-08SL Phase I	WPSA-BH04-09SL Phase II	WPSA-BH04-21SL Phase II	WPSA-BH05-02SL Phase II
VOCs						
1,1,1-Trichloroethane	ug/kg	130	2100	--	--	--
1,1-Dichloroethane	ug/kg	3000 J	--	--	--	--
1,2-Dichloroethene (total)	ug/kg	--	--	--	--	--
2-Butanone	ug/kg	--	--	--	--	--
Acetone	ug/kg	12000 J	--	--	--	--
Benzene	ug/kg	25	--	--	--	--
Carbon disulfide	ug/kg	--	--	--	--	--
Ethylbenzene	ug/kg	46	1600	--	--	--
Tetrachloroethene	ug/kg	87	--	--	5.7	--
Toluene	ug/kg	520	16000	7.6	--	--
Trichloroethene	ug/kg	--	--	--	--	--
Xylenes, total	ug/kg	230	19000	--	--	--
SVOCs						
Benzo(a)pyrene	ug/kg	--	47000	--	--	--
Benzo(b)fluoranthene(1)	ug/kg	--	90000	--	--	--
bis(2-Ethylhexyl)phthalate	ug/kg	--	--	--	--	1900
Butyl benzyl phthalate	ug/kg	--	--	--	--	--
Chrysene	ug/kg	--	44000	--	--	--
Fluoranthene	ug/kg	--	86000	--	--	--
Phenanthrene	ug/kg	--	84000	--	--	--
Pyrene	ug/kg	--	83000	--	--	--
PCBs						
Aroclor-1242	mg/kg	2.5	--	--	--	--
Aroclor-1260	mg/kg	0.6	--	--	--	--

VOCs Volatile Organic Compounds.
SVOCs Semivolatile Organic Compounds.
PCBs Polychlorinated Biphenyls.
ug/kg Micrograms per kilogram.
mg/kg Milligrams per kilogram.
(1) Represents a total of benzo(b)fluoranthene and benzo(k)fluoranthene.

DRAFT

Table 5-24. Detected VOCs, SVOCs, and PCBs in Soils Collected at the Waste Pile/Staging Area, Harrison Divison - GMC.

Parameters	Units	WPSA-BH05-10SL Phase II	WPSA-BH05-22SL Phase II	DUP-25 Phase II	WPSA-BH06-02SL Phase II	WPSA-BH06-06SL Phase II
VOCs						
1,1,1-Trichloroethane	ug/kg	--	--	--	--	--
1,1-Dichloroethane	ug/kg	--	--	--	--	--
1,2-Dichloroethene (total)	ug/kg	--	--	--	--	--
2-Butanone	ug/kg	--	--	--	--	--
Acetone	ug/kg	--	--	--	297	--
Benzene	ug/kg	--	--	--	12	--
Carbon disulfide	ug/kg	--	--	--	27.7	--
Ethylbenzene	ug/kg	--	--	--	--	--
Tetrachloroethene	ug/kg	--	--	--	--	--
Toluene	ug/kg	--	--	--	15.9	--
Trichloroethene	ug/kg	--	--	--	--	--
Xylenes, total	ug/kg	--	--	--	49.4	332
SVOCs						
Benzo(a)pyrene	ug/kg	--	--	--	--	--
Benzo(b)fluoranthene(1)	ug/kg	--	--	--	6920	--
bis(2-Ethylhexyl)phthalate	ug/kg	710	409	--	--	--
Butyl benzyl phthalate	ug/kg	--	--	--	--	--
Chrysene	ug/kg	--	--	--	--	--
Fluoranthene	ug/kg	--	--	--	5650	--
Phenanthrene	ug/kg	--	--	--	5450	8460
Pyrene	ug/kg	--	--	--	5180	--
PCBs						
Aroclor-1242	mg/kg	--	--	--	--	--
Aroclor-1260	mg/kg	--	--	--	--	--

VOCs Volatile Organic Compounds.
SVOCs Semivolatile Organic Compounds.
PCBs Polychlorinated Biphenyls.
ug/kg Micrograms per kilogram.
mg/kg Milligrams per kilogram.
(1) Represents a total of benzo(b)fluoranthene and benzo(k)fluoranthene.

DRAFT

Table 5-24. Detected VOCs, SVOCs, and PCBs in Soils Collected at the Waste Pile/Staging Area, Harrison Divison - GMC.

Parameters	Units	WPSA-BH06-14SL Phase II	WPSA-BH07-02SL Phase II	WPSA-BH07-06SL Phase II	DUP-26 Phase II	WPSA-BH07-22SL Phase II
VOCs						
1,1,1-Trichloroethane	ug/kg	--	--	549	1200	--
1,1-Dichloroethane	ug/kg	--	187	141	523	--
1,2-Dichloroethene (total)	ug/kg	--	1060	1090	4250	--
2-Butanone	ug/kg	--	--	2470 J	3430 J	--
Acetone	ug/kg	--	--	1950	3630	--
Benzene	ug/kg	--	--	--	--	--
Carbon disulfide	ug/kg	--	--	--	--	--
Ethylbenzene	ug/kg	--	148	543	930	--
Tetrachloroethene	ug/kg	--	237	209	395	--
Toluene	ug/kg	--	116	128	238	--
Trichloroethene	ug/kg	--	120	142	322	--
Xylenes, total	ug/kg	--	--	--	--	--
SVOCs						
Benzo(a)pyrene	ug/kg	--	--	--	--	--
Benzo(b)fluoranthene(1)	ug/kg	--	--	--	--	--
bis(2-Ethylhexyl)phthalate	ug/kg	--	--	--	--	--
Butyl benzyl phthalate	ug/kg	--	--	--	--	--
Chrysene	ug/kg	--	--	--	--	--
Fluoranthene	ug/kg	--	--	--	--	--
Phenanthrene	ug/kg	--	--	--	--	--
Pyrene	ug/kg	--	--	--	--	--
PCBs						
Aroclor-1242	mg/kg	--	--	--	--	--
Aroclor-1260	mg/kg	--	--	--	--	--

VOCs Volatile Organic Compounds.
SVOCs Semivolatile Organic Compounds.
PCBs Polychlorinated Biphenyls.
ug/kg Micrograms per kilogram.
mg/kg Milligrams per kilogram.
(1) Represents a total of benzo(b)fluoranthene and benzo(k)fluoranthene.

DRAFT

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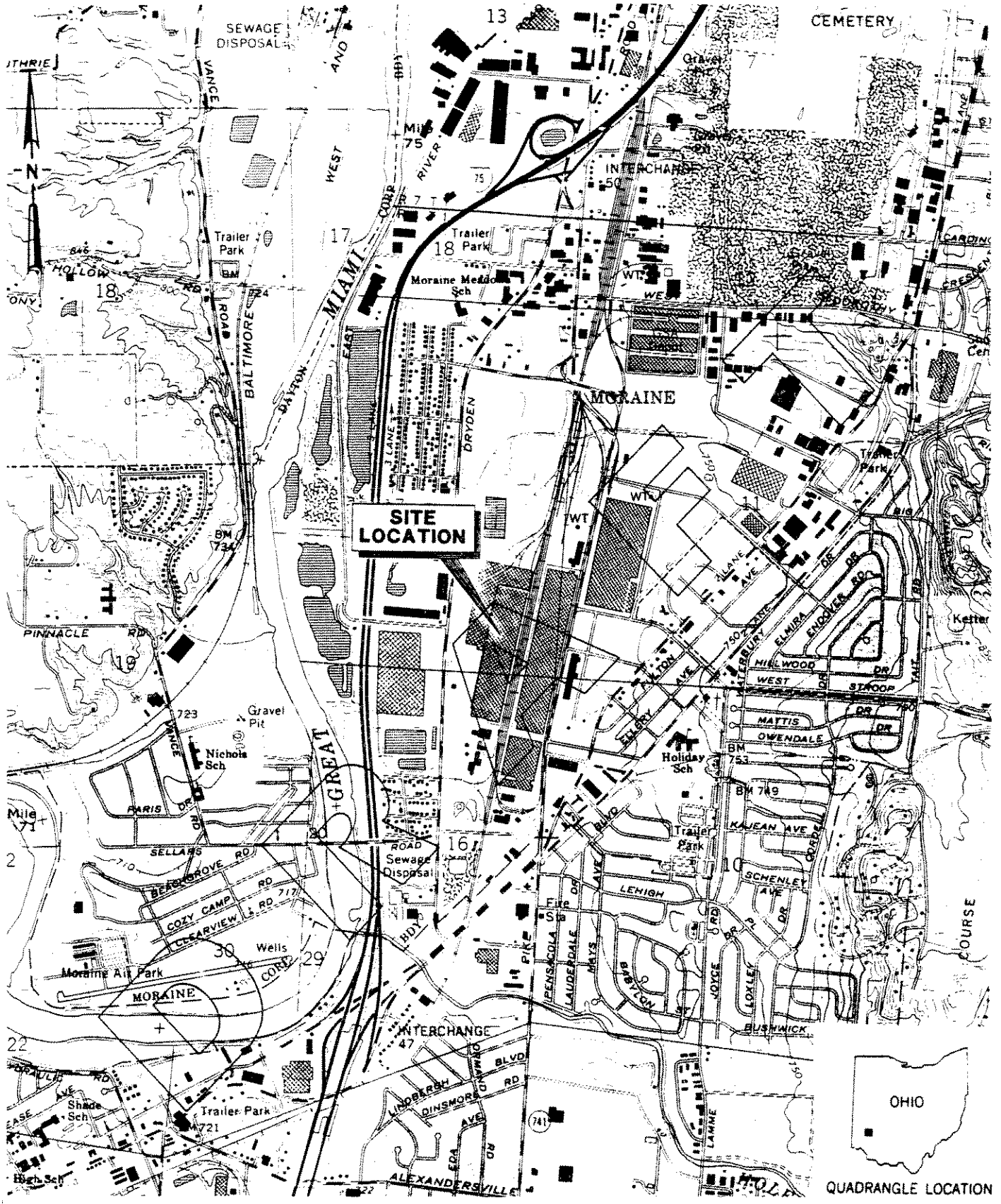


GERAGHTY & MILLER, INC.
Environmental Services

0 1/4 1/2 MILE

SITE VICINITY MAP

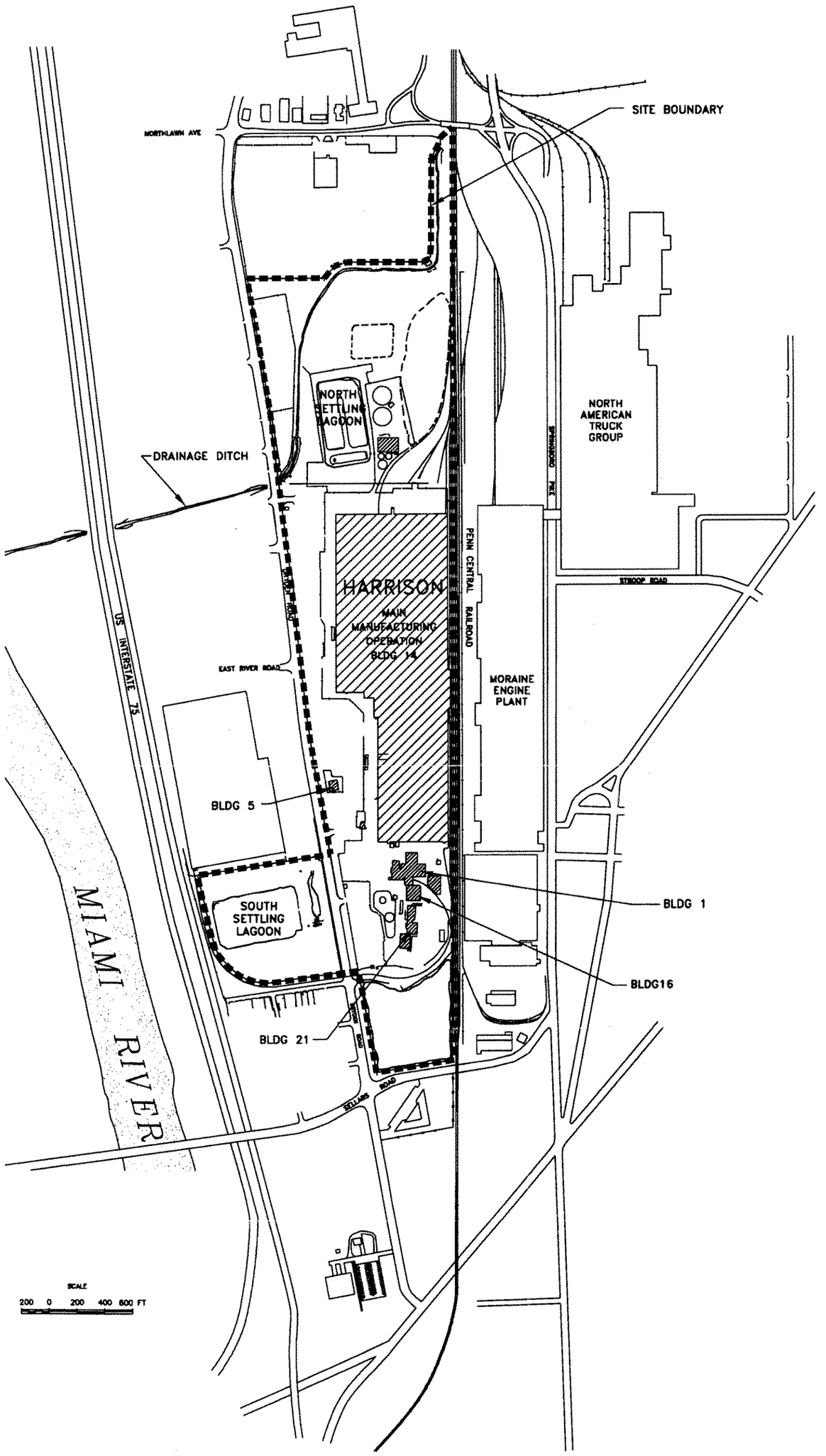
DELPHI HARRISON THERMAL SYSTEMS,
GENERAL MOTORS CORPORATION,
MORAINE, OHIO

DAYTON SOUTH QUADRANGLE
USGS 7.5 MINUTE TOPOGRAPHIC MAP

FIGURE
2-1

DRAFTING RTS | APPROVED: | CHECKED: | DRAWING: USGSBASE | FILE NO.: DWG-TEMP | PROJECT NO.: | DWG

DWG DATE: 25JAN93	PRJCT NO.: OH01918	FILE NO.: \NEW-BASE	DRAWING: SITE-X	CHECKED: J.R.	APPROVED: J.R.	DRAFTER: RTS



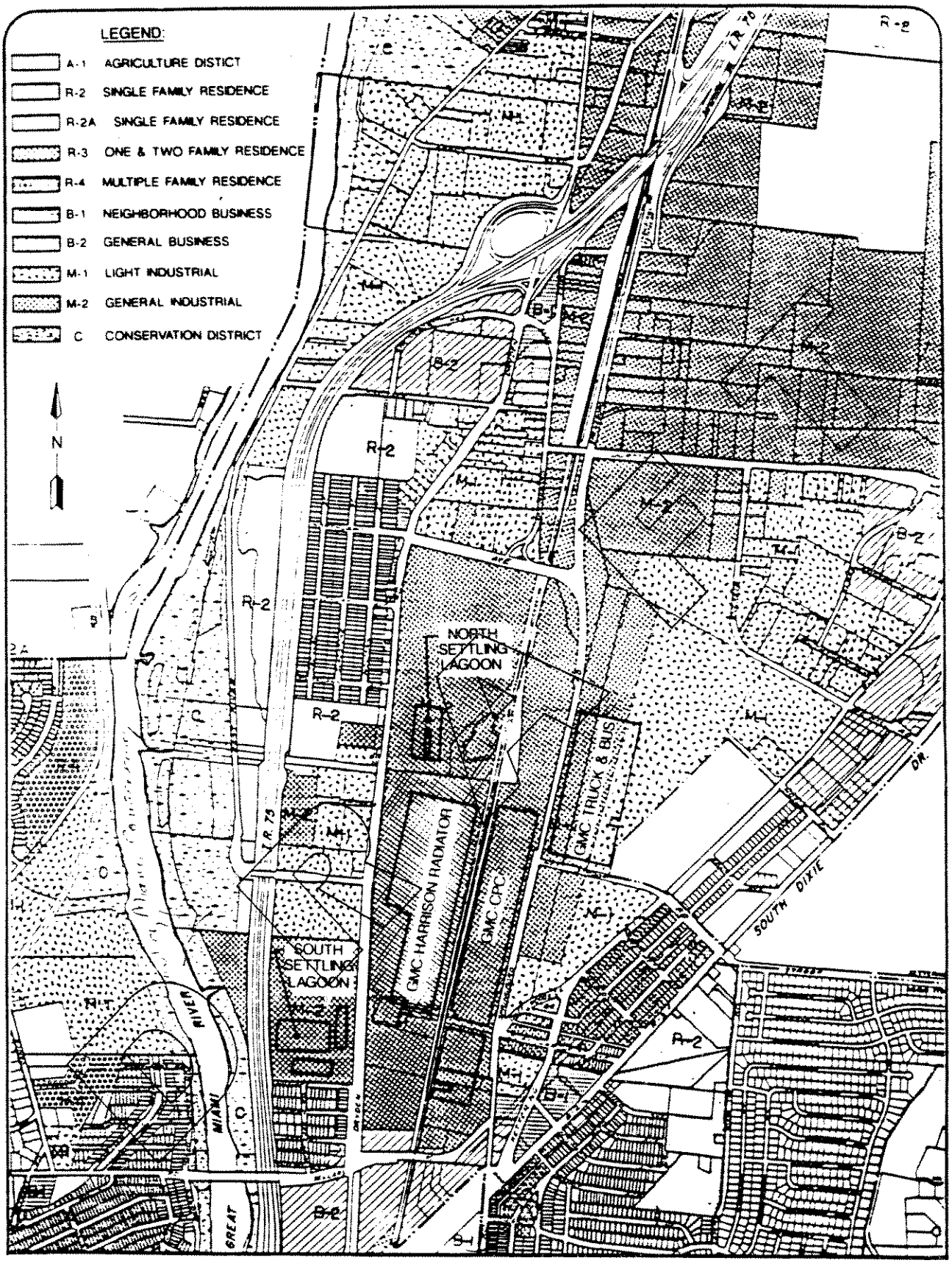
GERAGHTY & MILLER, INC.
Environmental Services

FACILITY LAYOUT MAP

DELPHI HARRISON THERMAL SYSTEMS, GENERAL MOTORS CORPORATION, MORAINE, OHIO

FIGURE
2-2

DRAFT



GERAGHTY & MILLER, INC.
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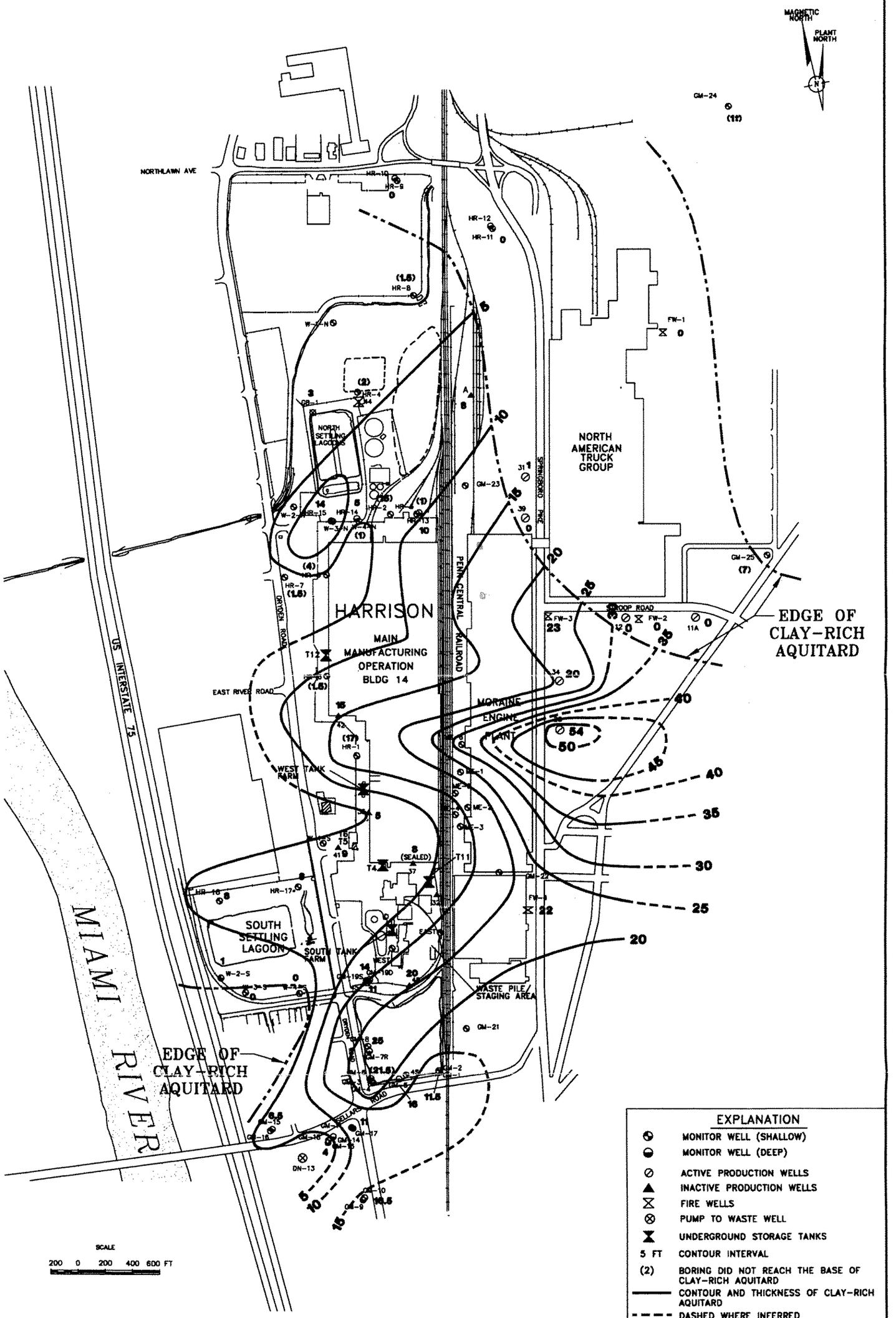
LOCAL ZONING, DELPHI HARRISON AREA

DELPHI HARRISON THERMAL SYSTEMS,
GENERAL MOTORS CORPORATION,
MORAINE, OHIO

FIGURE
2-3

DRAFT: RTS | APPROVED: | CHECKED: | BASE | DRAWING: | FILE NO.: DWG-TEMP | PRJCT NO.: | DWG

DWG DATE: 25JAN93	PRJCT NO.: OH01918	FILE NO.: \NEW-BASE	DRAWING: SITEBASE	CHECKED: J.R.	APPROVED: J.R.	DRAFTER: RTS



GERAGHTY & MILLER, INC.
Environmental Services

ISOPACH OF THE CLAY-RICH AQUITARD

AT

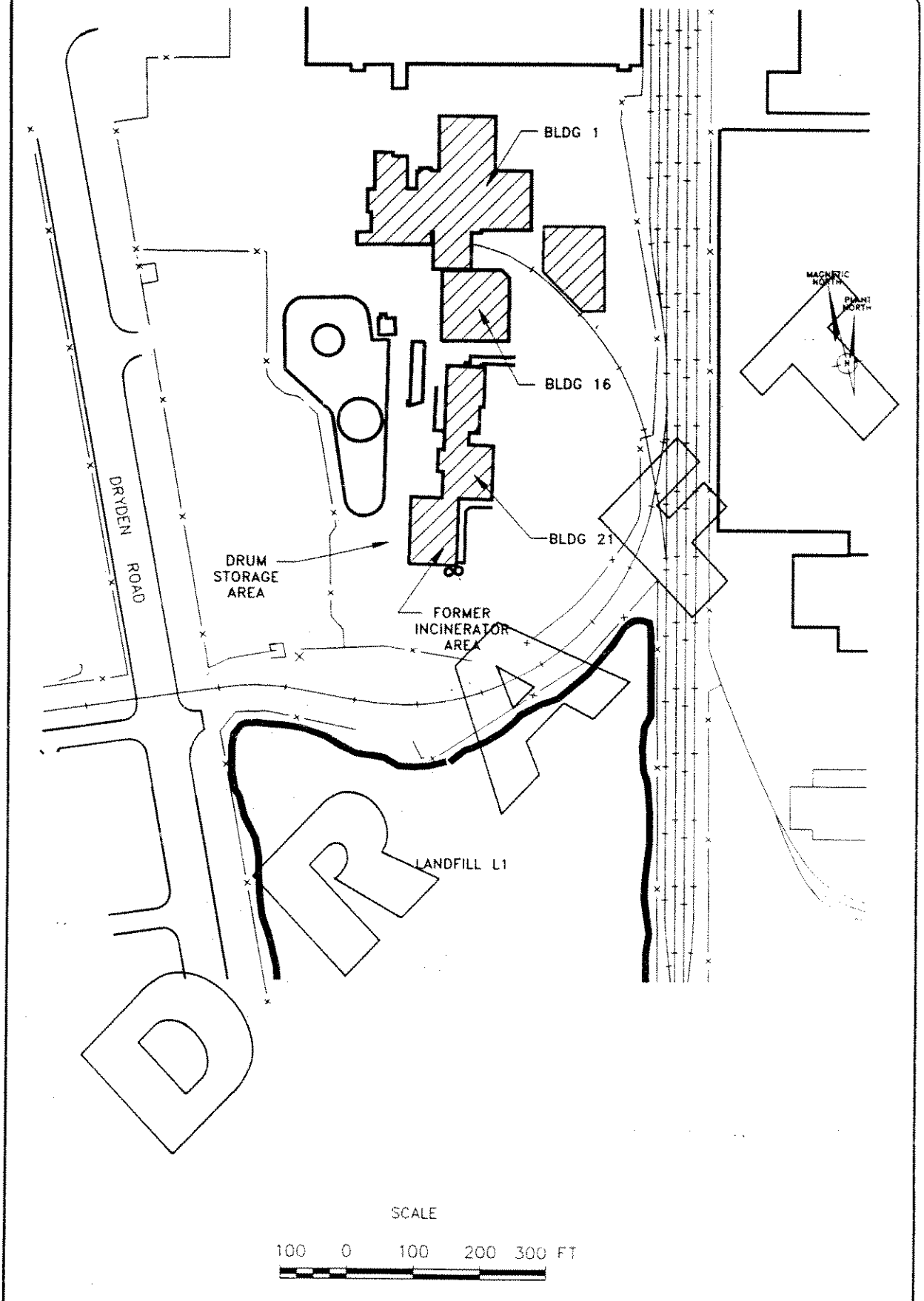
DELPHI HARRISON THERMAL SYSTEMS, GENERAL MOTORS CORPORATION, MORAINE, OHIO

FIGURE

2-4

DRAFT

DWG DATE: 25JAN93	PROJT NO.: OH01918	FILE NO.: \NEW-BASE	DRAWING: DRUMPAB	CHECKED: J.R.	APPROVED: J.R.	DRAFTER: RTS



SCALE

100 0 100 200 300 FT

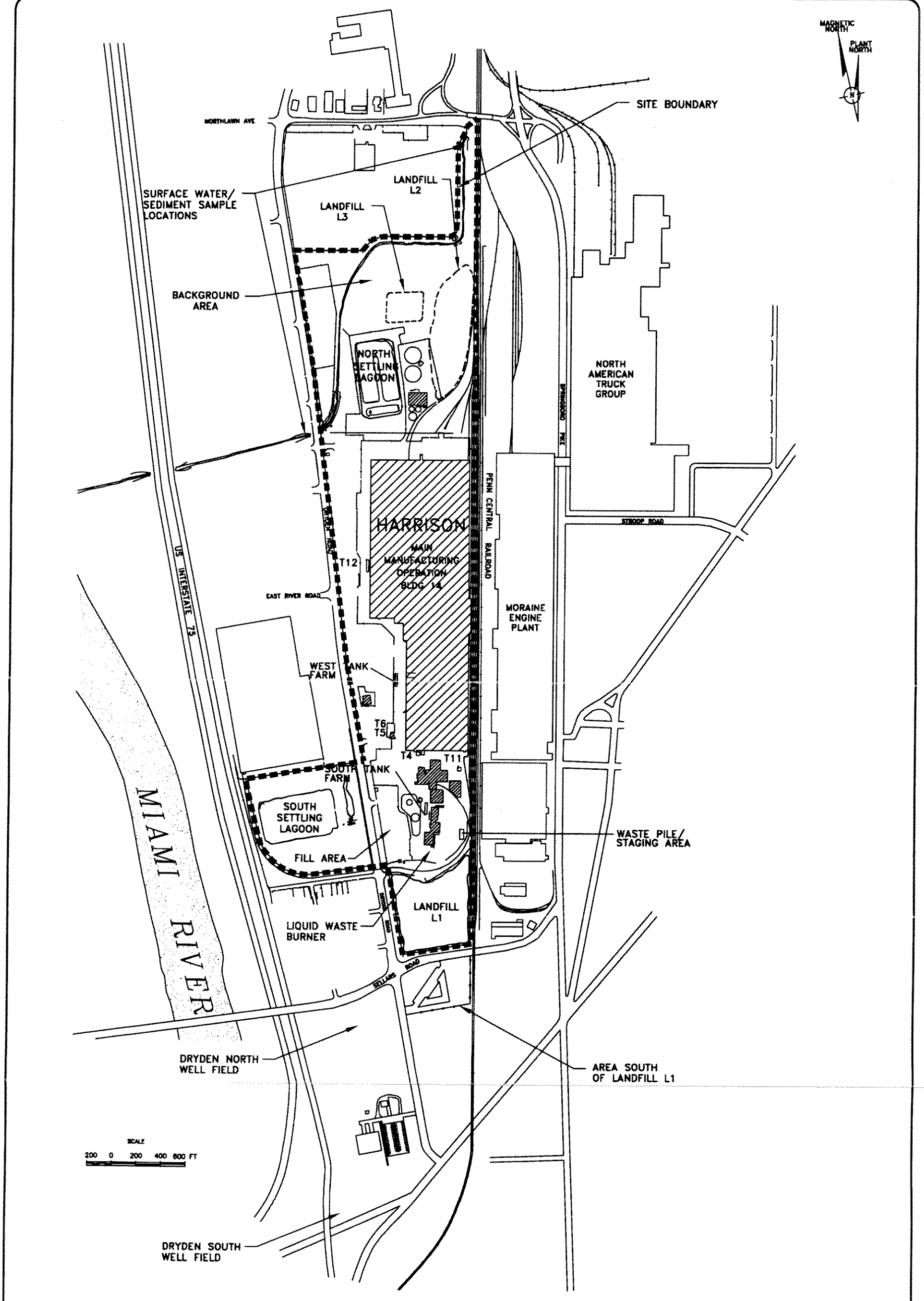
GERAGHTY & MILLER, INC.
Environmental Services

LOCATION OF DRUM STORAGE AREA AND FORMER INCINERATOR AREA

DELPHI HARRISON THERMAL SYSTEMS, GENERAL MOTORS CORPORATION, MORAINE, OHIO

FIGURE 2-5

DWG DATE: 25JAN93	PRJCT NO.: OH01918	FILE NO.: \NEW-BASE	DRAWING: SITE-X	CHECKED: J.R.	APPROVED: J.R.	DRAFTER: RTS



GERAGHTY & MILLER, INC.
Environmental Services

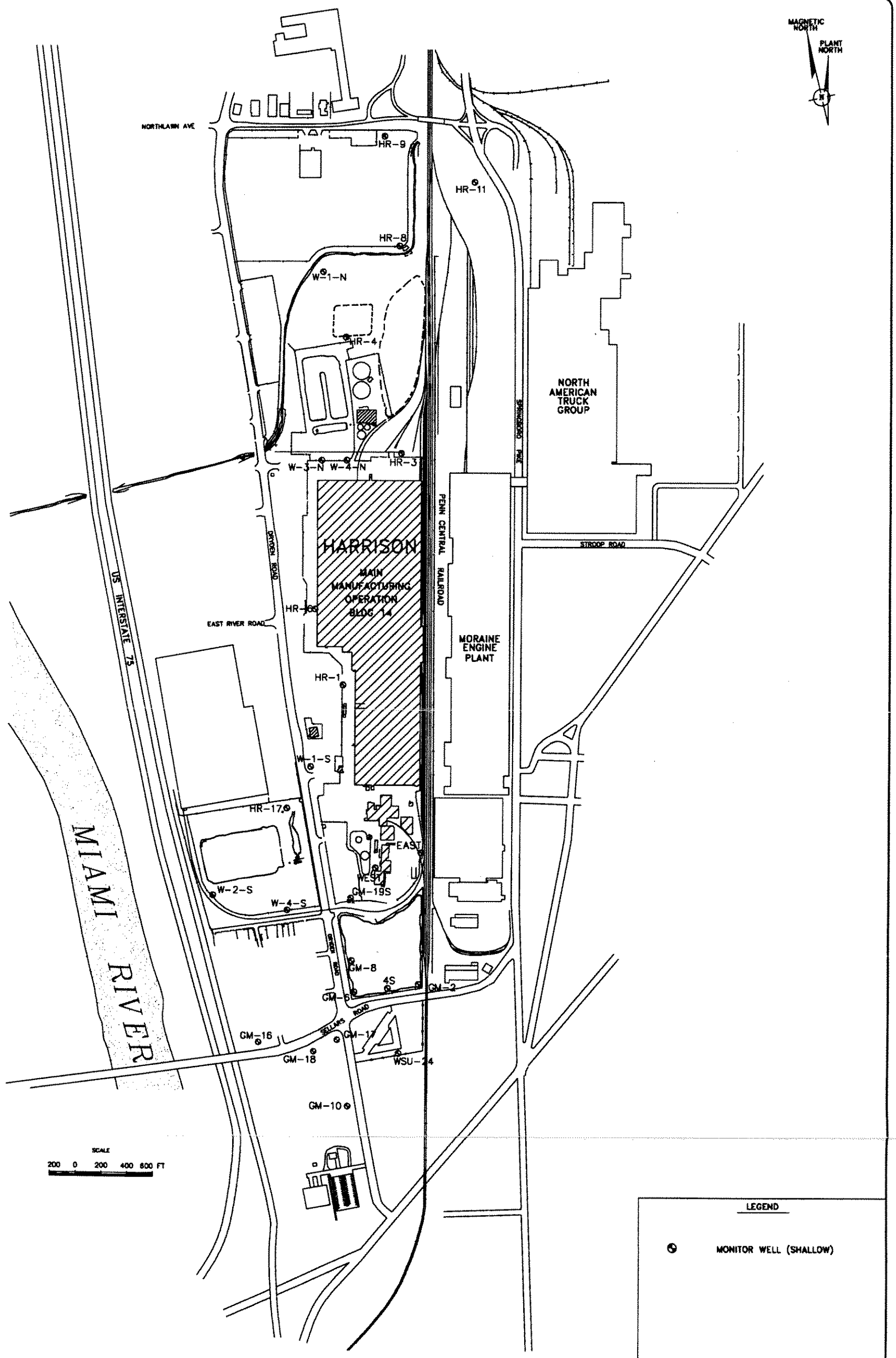
AREAS INVESTIGATED DURING PHASE I AND PHASE II OF THE RFI

DELPHI HARRISON THERMAL SYSTEMS, GENERAL MOTORS CORPORATION, MORAINE, OHIO

FIGURE
2-6

DRAFT

DWG DATE: 25JAN93	PRJCT NO.: OH01918	FILE NO.: \NEW-BASE	DRAWING: SITE-XS	CHECKED: J.R.	APPROVED: J.R.	DRAFTER: RTS



GERAGHTY & MILLER, INC.
Environmental Services

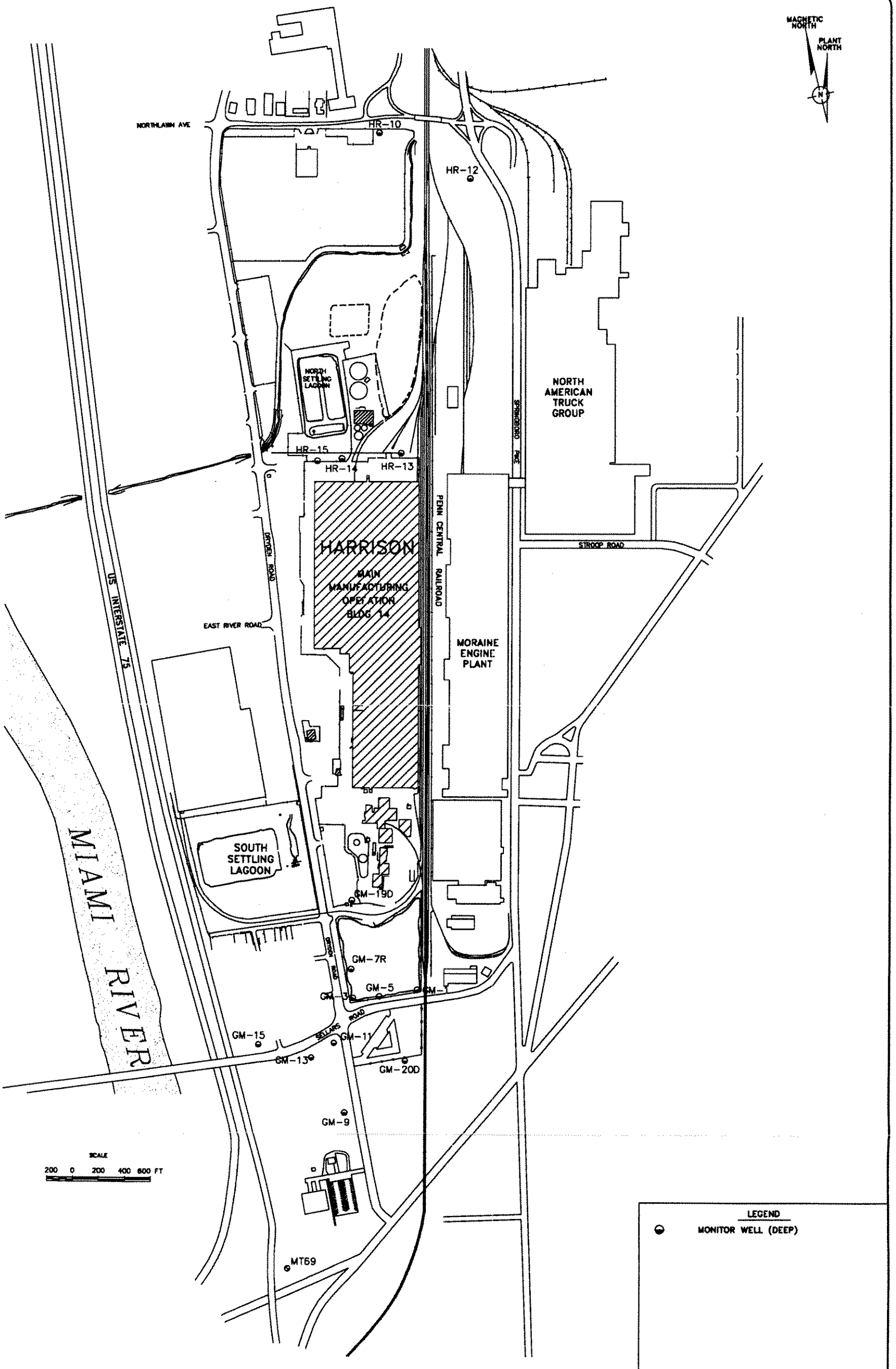
LOCATION OF UPPER AQUIFER MONITOR WELLS SAMPLED DURING RFI

DELPHI HARRISON THERMAL SYSTEMS, GENERAL MOTORS CORPORATION, MORAINE, OHIO

FIGURE 3-1

DRAFT

DWG DATE: 25JAN93	PRJCT NO.: OH01918	FILE NO.: \NEW-BASE	DRAWING: SITE-Xd	CHECKED: J.R.	APPROVED: J.R.	DRAFTER: RTS



GERAGHTY & MILLER, INC.
Environmental Services

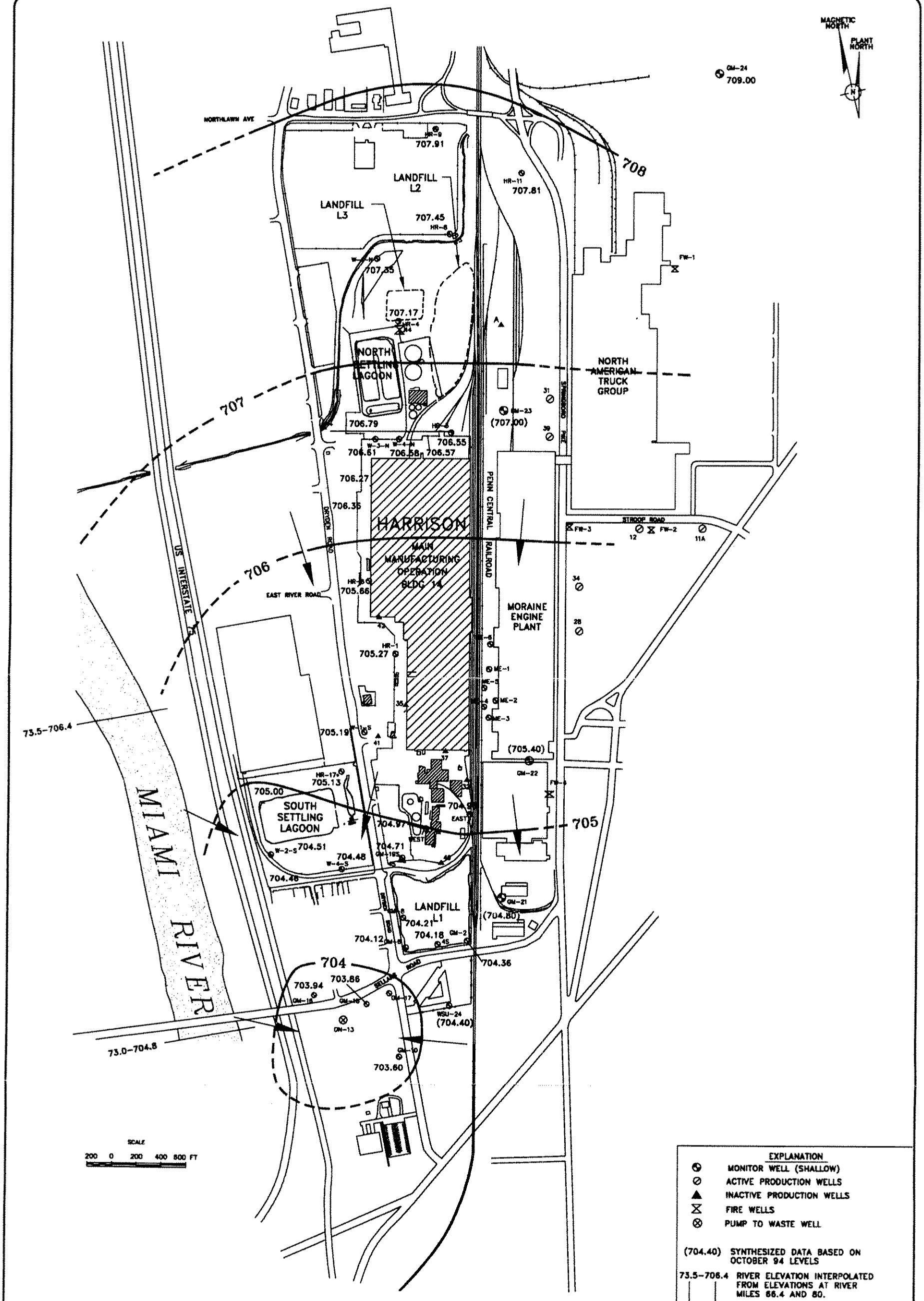
LOCATION OF LOWER AQUIFER MONITOR WELLS SAMPLED DURING RFI

DELPHI HARRISON THERMAL SYSTEMS, GENERAL MOTORS CORPORATION, MORAINE, OHIO

FIGURE 3-2

DRAFT

DWG DATE: 25JAN93	PRJCT NO.: OH01918	FILE NO.: \NEW-BASE	DRAWING: SITE-X2	CHECKED: J.R.	APPROVED: J.R.	DRAFTER: RTS



GERAGHTY & MILLER, INC.
Environmental Services

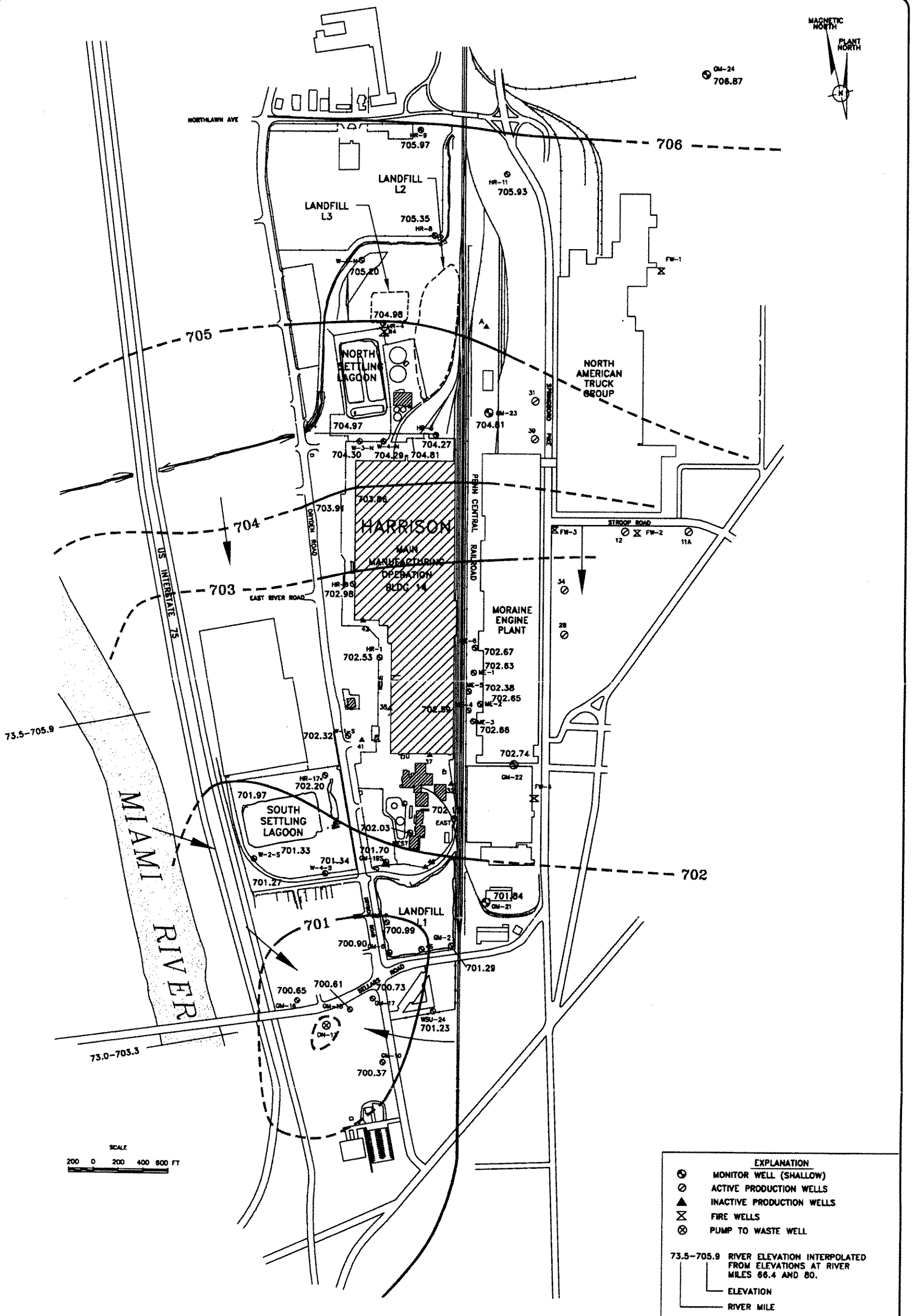
ELEVATION OF WATER-TABLE SURFACE AND DIRECTION OF GROUNDWATER FLOW, JANUARY 29, 1993

DELPHI HARRISON THERMAL SYSTEMS, GENERAL MOTORS CORPORATION, MORAINE, OHIO

FIGURE 4-1

DRAFT

DWG DATE: 25JAN93	PRJCT NO.: OH01918	FILE NO.: \NEW-BASE	DRAWING: SITE-X2	CHECKED: J.R.	APPROVED: J.R.	DRAFTER: RTS



GERAGHTY & MILLER, INC.
Environmental Services

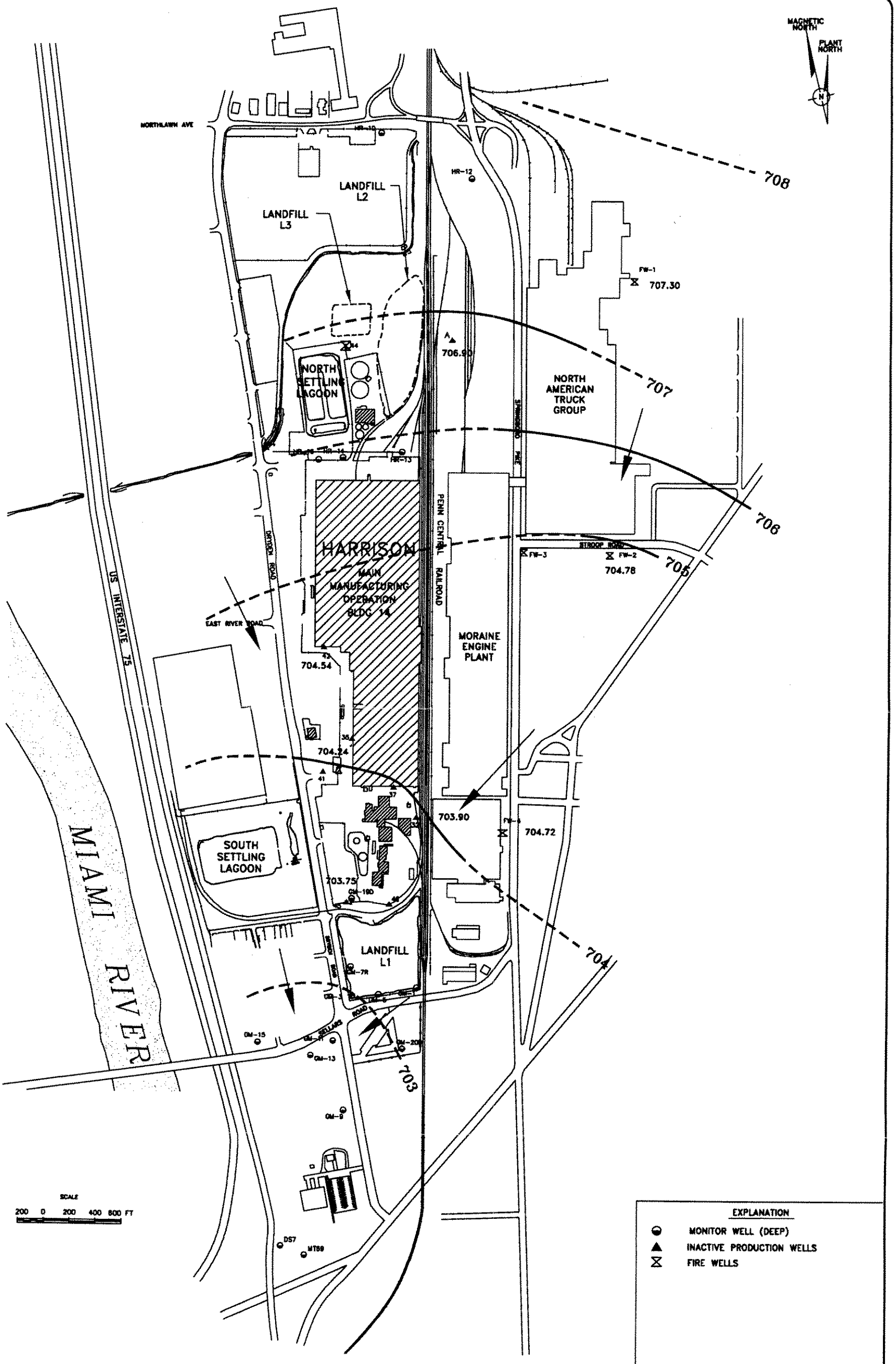
ELEVATION OF WATER-TABLE SURFACE AND DIRECTION OF GROUNDWATER FLOW, OCTOBER 20, 1994

DELPHI HARRISON THERMAL SYSTEMS, GENERAL MOTORS CORPORATION, MORAINE, OHIO

FIGURE 4-2

DRAFT

DWG DATE: 25JAN93	PRJCT NO.: OH01918	FILE NO.: \NEW-BASE	DRAWING: SITE-X2	CHECKED: J.R.	APPROVED: J.R.	DRAFTER: RTS



GERAGHTY & MILLER, INC.
Environmental Services

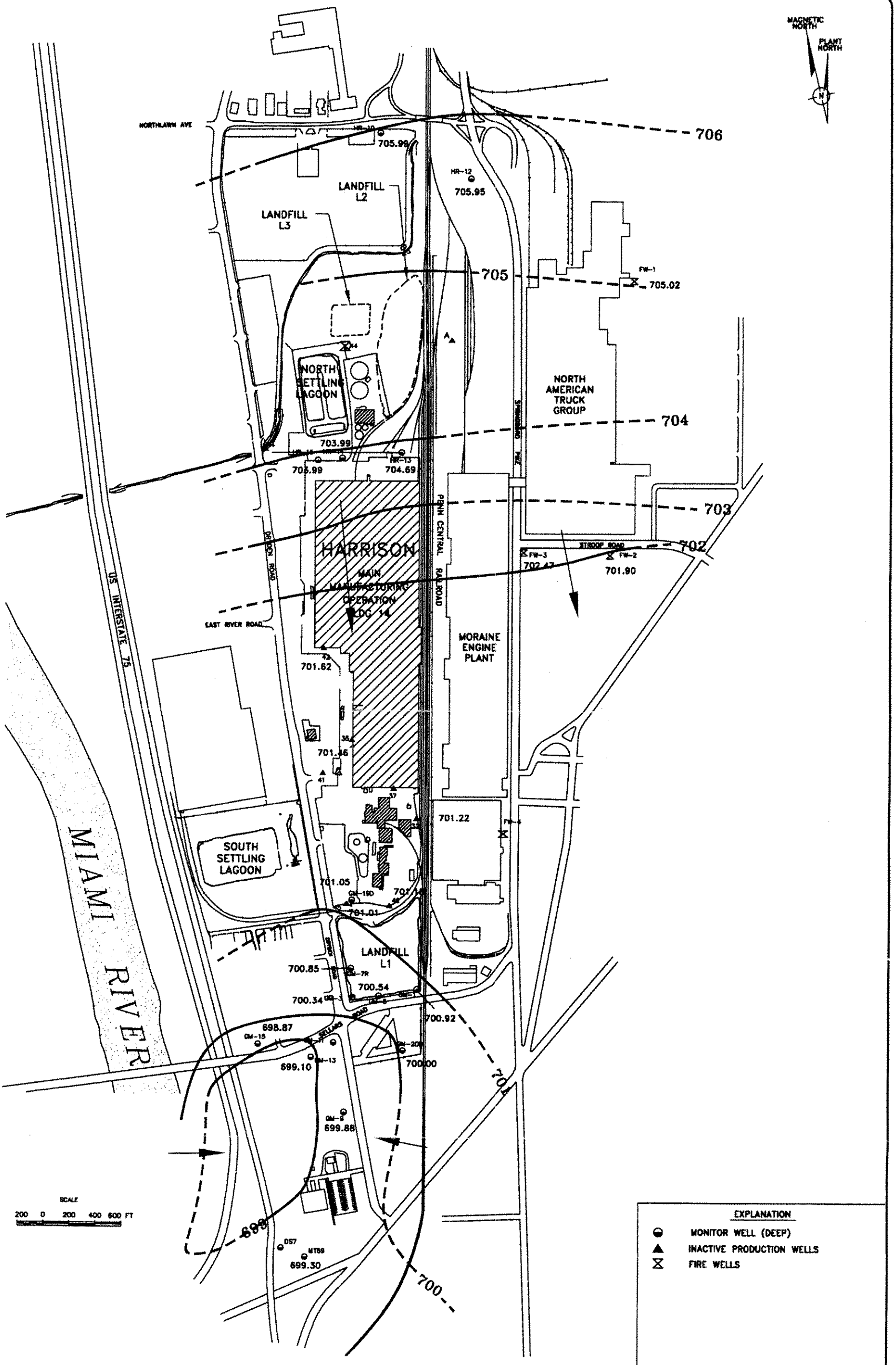
ELEVATION OF POTENTIOMETRIC SURFACE AND DIRECTION OF LOWER AQUIFER GROUNDWATER FLOW, JANUARY 29, 1993

DELPHI HARRISON THERMAL SYSTEMS, GENERAL MOTORS CORPORATION, MORAINE, OHIO

FIGURE 4-3

DRAFT

DWG DATE: 25JAN93	PRJCT NO.: OH01918	FILE NO.: \NEW-BASE	DRAWING: SITE-X2	CHECKED: J.R.	APPROVED: J.R.	DRAFTER: RTS



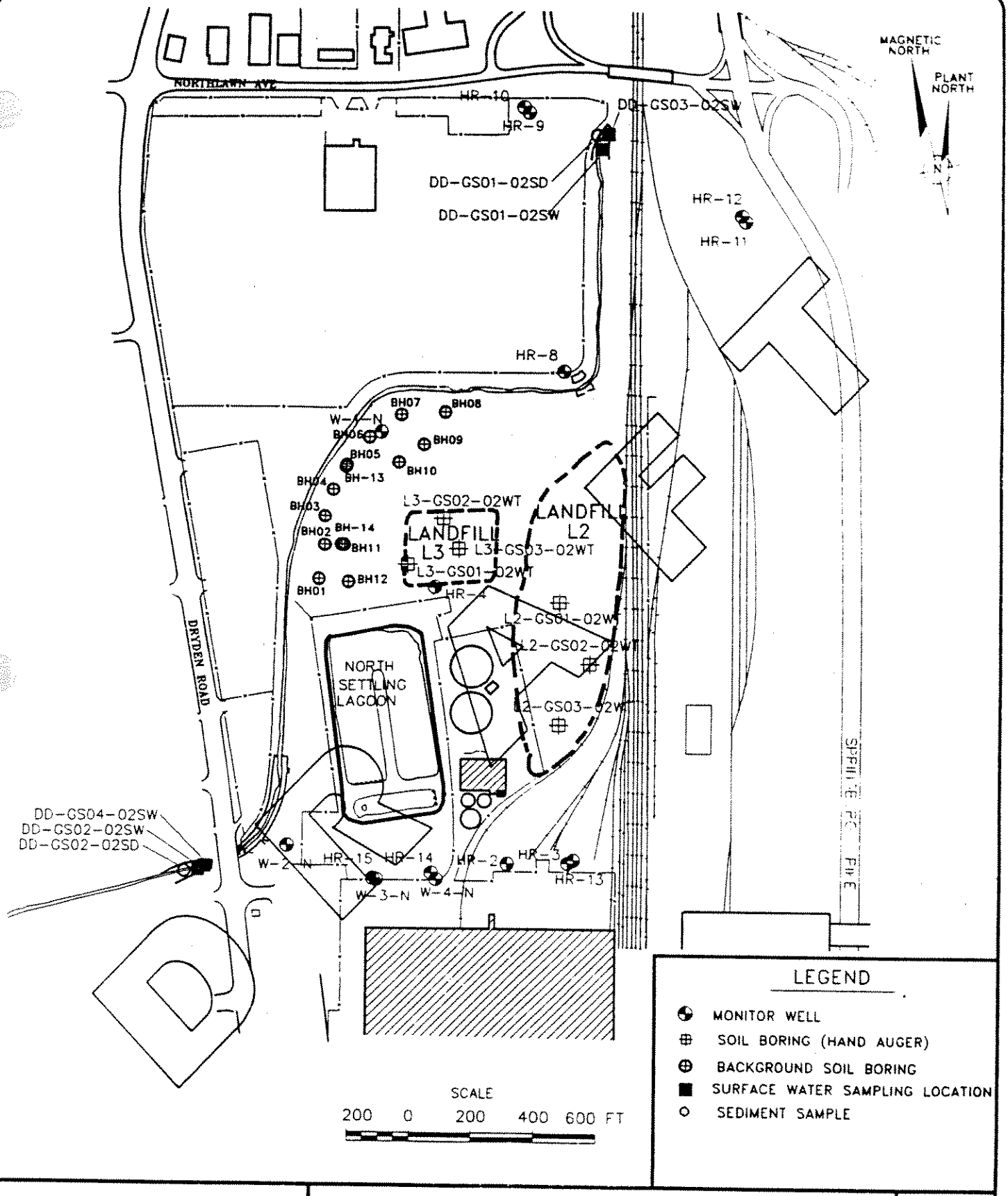
GERAGHTY & MILLER, INC.
Environmental Services

ELEVATION OF POTENTIOMETRIC SURFACE AND DIRECTION OF LOWER AQUIFER GROUNDWATER FLOW, OCTOBER 20, 1994

DELPHI HARRISON THERMAL SYSTEMS, GENERAL MOTORS CORPORATION, MORAINE, OHIO

FIGURE 4-4

DRAFT



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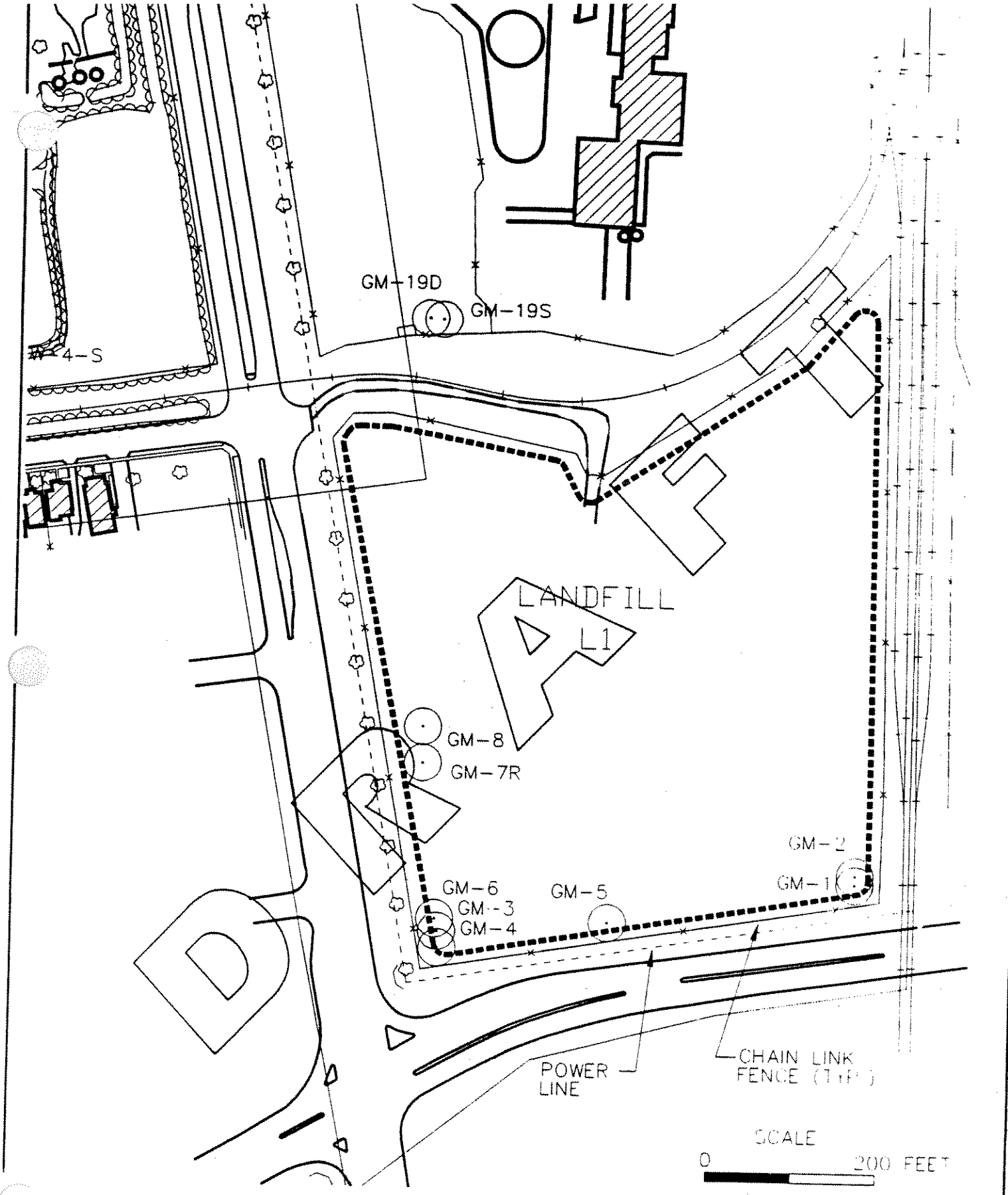
Environmental Services

RFI SAMPLE LOCATIONS IN THE NORTH PART OF THE HARRISON SITE

DELPHI HARRISON THERMAL SYSTEMS, GENERAL MOTORS CORPORATION, MORAINE, OHIO

FIGURE 4-5



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PROJECT NO.: 0H0981.2	FILE NO: H:\ARTWORK\
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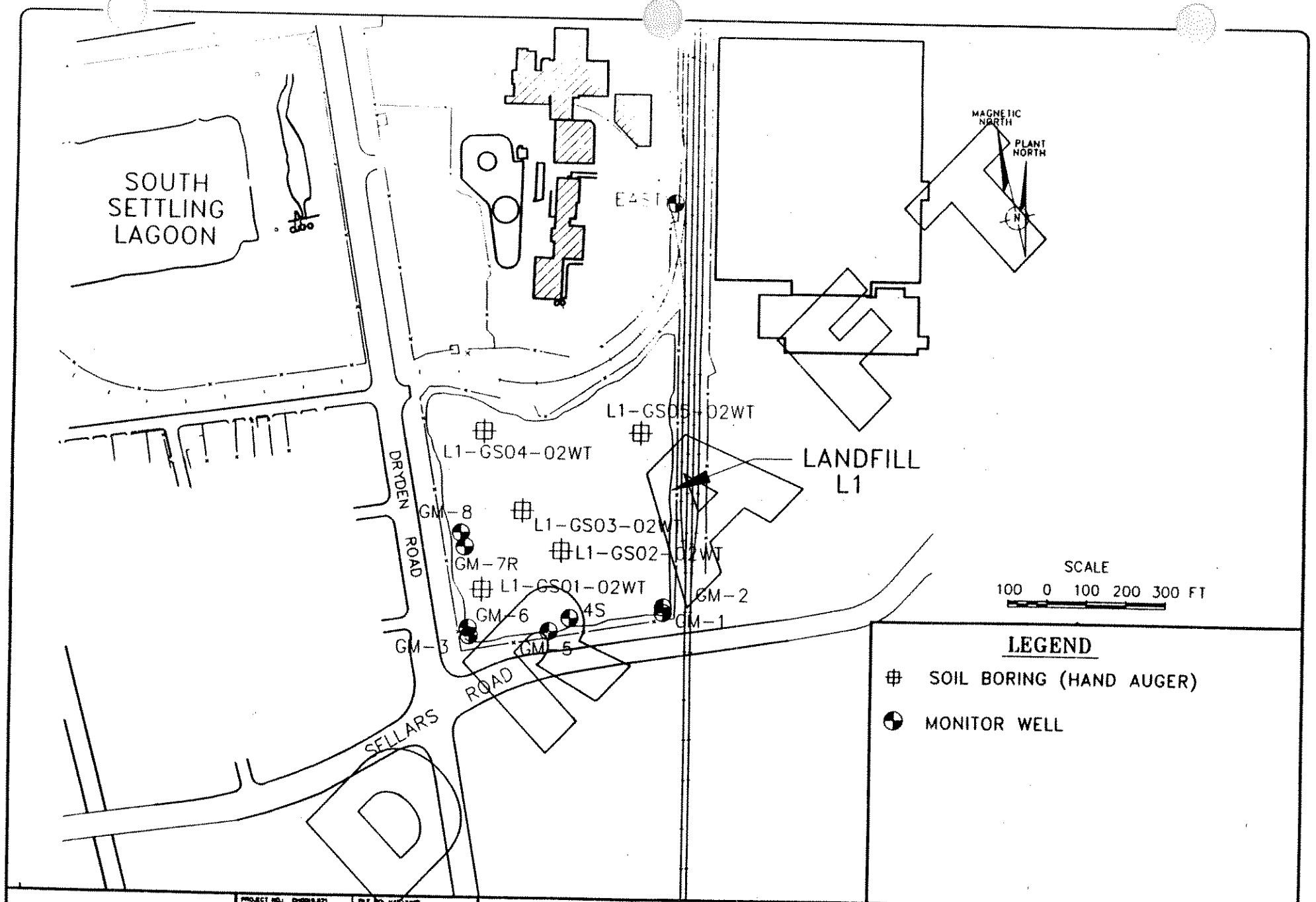
DRAFTED BY: RTS	DATE: -
CHECKED BY: R.A.	DATE: -
APPROVED BY: R.A.	DATE: -
DATE REVISED:	

EM31 SURVEY AT LANDFILL L1

DELPHI HARRISON THERMAL SYSTEMS, GENERAL MOTORS CORPORATION, MORAINE, OHIO

FIGURE 5-1



GERAGHTY & MILLER, INC.
Environmental Services

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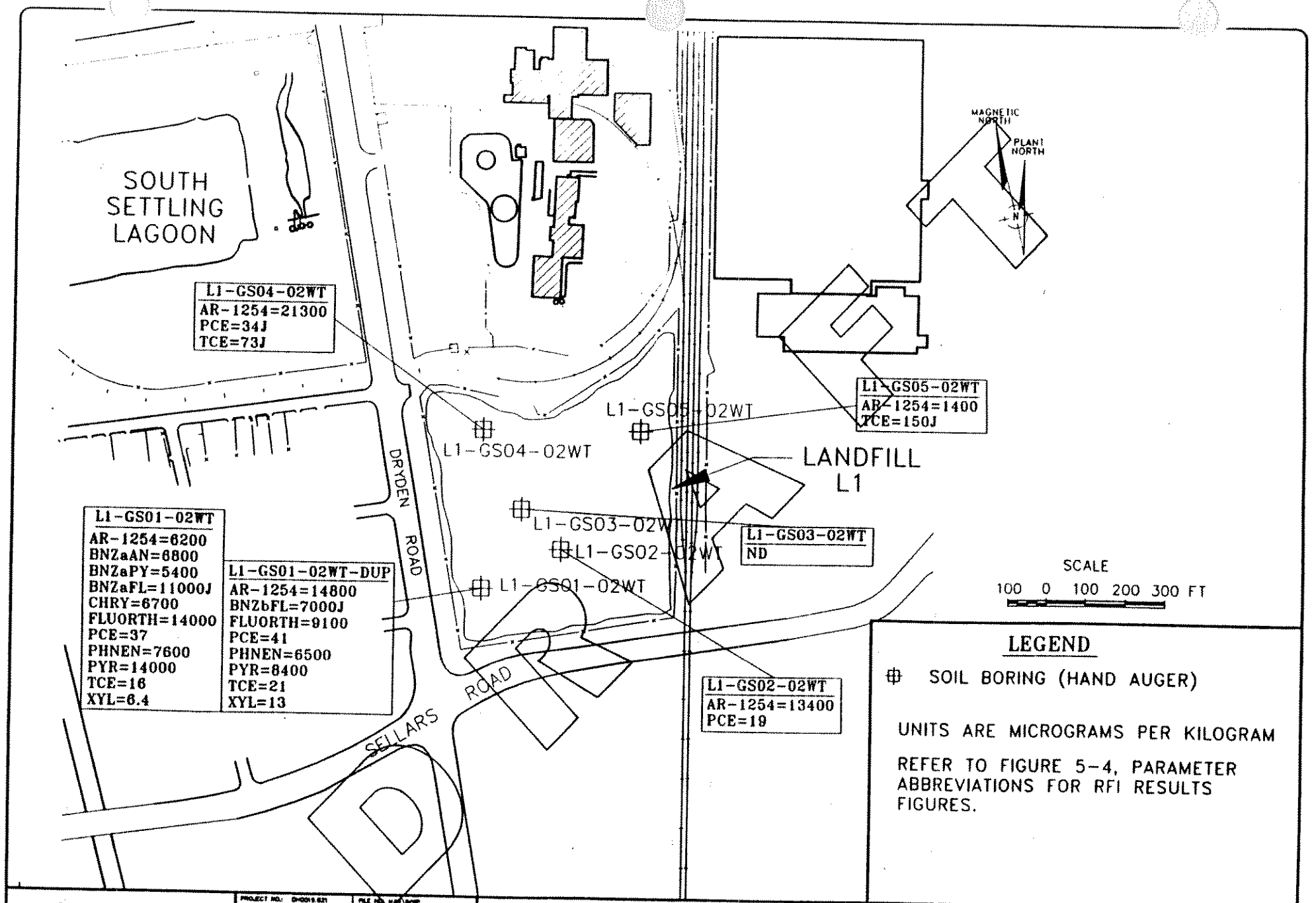
DRAWING: L1-TV-2	PLOT SIZE: -
DRAWN BY: RTS	DATE: 22DEC93
CHECKED BY: H.R.	DATE:
APPROVED BY: J.R.	DATE: -

RFI SAMPLE LOCATIONS AT LANDFILL L1

DELPHI HARRISON THERMAL SYSTEMS, GENERAL MOTORS CORPORATION, MORAINE, OHIO

FIGURE 5-2



GERAGHTY & MILLER, INC.
Environmental Services

WASTE ORGANIC ANALYTICAL RESULTS FOR LANDFILL L1

DELPHI HARRISON THERMAL SYSTEMS, GENERAL MOTORS CORPORATION, MORAINE, OHIO

FIGURE 5-3

Semivolatile Organic Carbons (SVOCs) and Polychlorinated Biphenyls (PCBs)

AR-1242 = Aroclor-1242
AR-1254 = Aroclor-1254
AR-1260 = Aroclor-1260
b2EPHT = bis(2-Ethylhexyl)phthalate
BBZPHT = Butylbenzylphthalate
BNZaAN = Benzo(a)Anthracene
BNZaPY = Benzo(a)pyrene
BNZbFL = Benzo(b)fluoranthene (Represents total concentration of Benzo (b) fluoranthene and Benzo (k) fluoranthene)
CHRY = Chrysene
FLUORTH = Fluoranthene
2-MTNPEN = 2-Methylnaphthalene
PHNEN = Phenanthrene
PYR = Pyrene

Volatile Organic Carbons (VOCs)

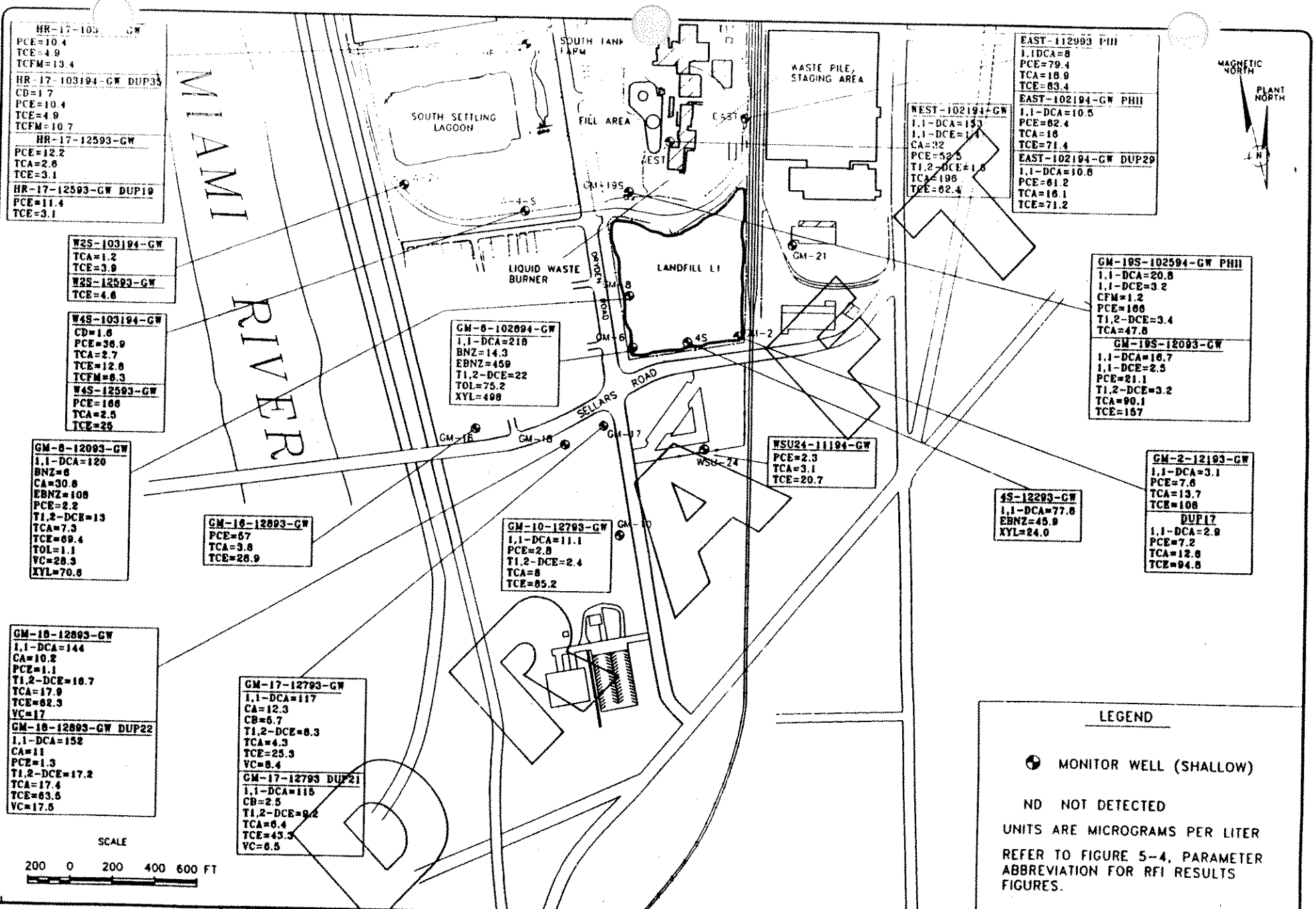
ACE = Acetone
BNZ = Benzene
CA = Chloroethane
CB = Chlorobenzene
CD = Carbon disulfide
CFM = Chloroform
1,1-DCA = 1,1-Dichloroethane
1,2-DCE = 1,2-Dichloroethene (total)
1,1-DCE = 1,1-Dichloroethene
C1,2-DCE = cis-1,2-Dichloroethene
T1,2-DCE = trans-1,2-Dichloroethene
EBNZ = Ethylbenzene
MEK = 2-Butanone
PCE = Tetrachloroethene
STY = Styrene
TCA = 1,1,1-Trichloroethane
TCE = Trichloroethene
TCFM = Trichlorofluoromethane
TOL = Toluene
VC = Vinyl Chloride
XYL = Xylene (total)

Inorganics (Metals)

Sb = Antimony
As = Arsenic
Ba = Barium
Be = Beryllium
Cd = Cadmium
Cr = Chromium
Co = Cobalt
Cu = Copper
CN = Cyanide
Hg = Mercury
Pb = Lead
Ni = Nickel
Se = Selenium
Ag = Silver
Tl = Thallium
V = Vanadium
Zn = Zinc

DRAFT

DRAFT | DWG. | PRJCT NO.: OH0019.018 | FILE NO. HAR\MWP | DRAWING | CHECKED: S.M. | APPROVED: J.R. | DRAFT | S



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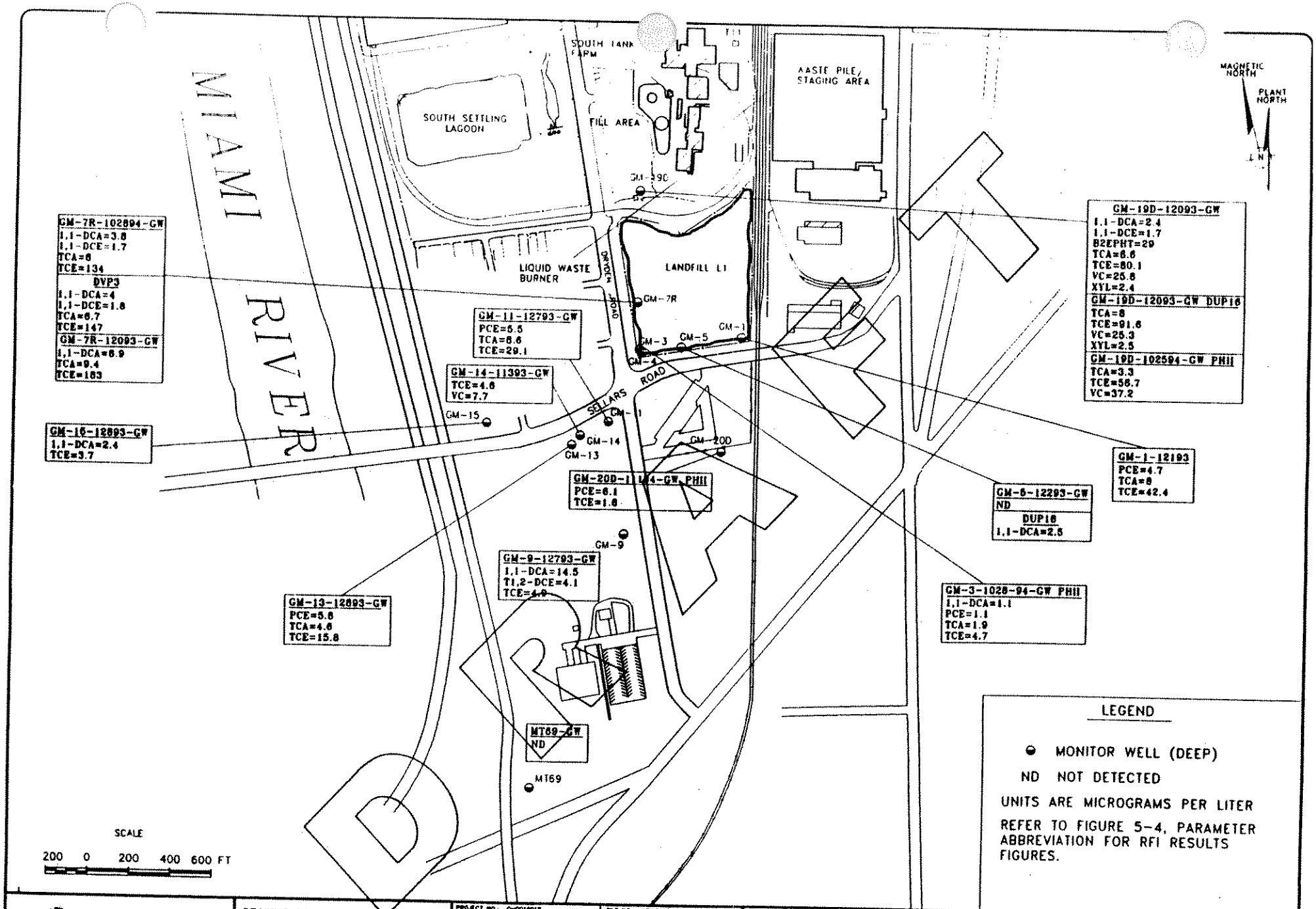
PROJECT NO.: DH0018018	FILE NO: HARRISON\RESBASE\WT\
DRAWING: RFISOUTH	PLOT SIZE: 11"
DRAFTED BY: MAJ	DATE: 11APR96
CHECKED BY: JJL	DATE: 11APR96
APPROVED BY: JJL	DATE: 12APR96

GROUNDWATER ORGANIC ANALYTICAL RESULTS FOR SHALLOW MONITOR WELLS LOCATED IN THE SOUTHERN PART OF THE HARRISON SITE AND AREA SOUTH OF SELLARS ROAD

DELPHI HARRISON THERMAL SYSTEMS, GENERAL MOTORS COPPORATION, MORAINE, OHIO

FIGUPE 5-5



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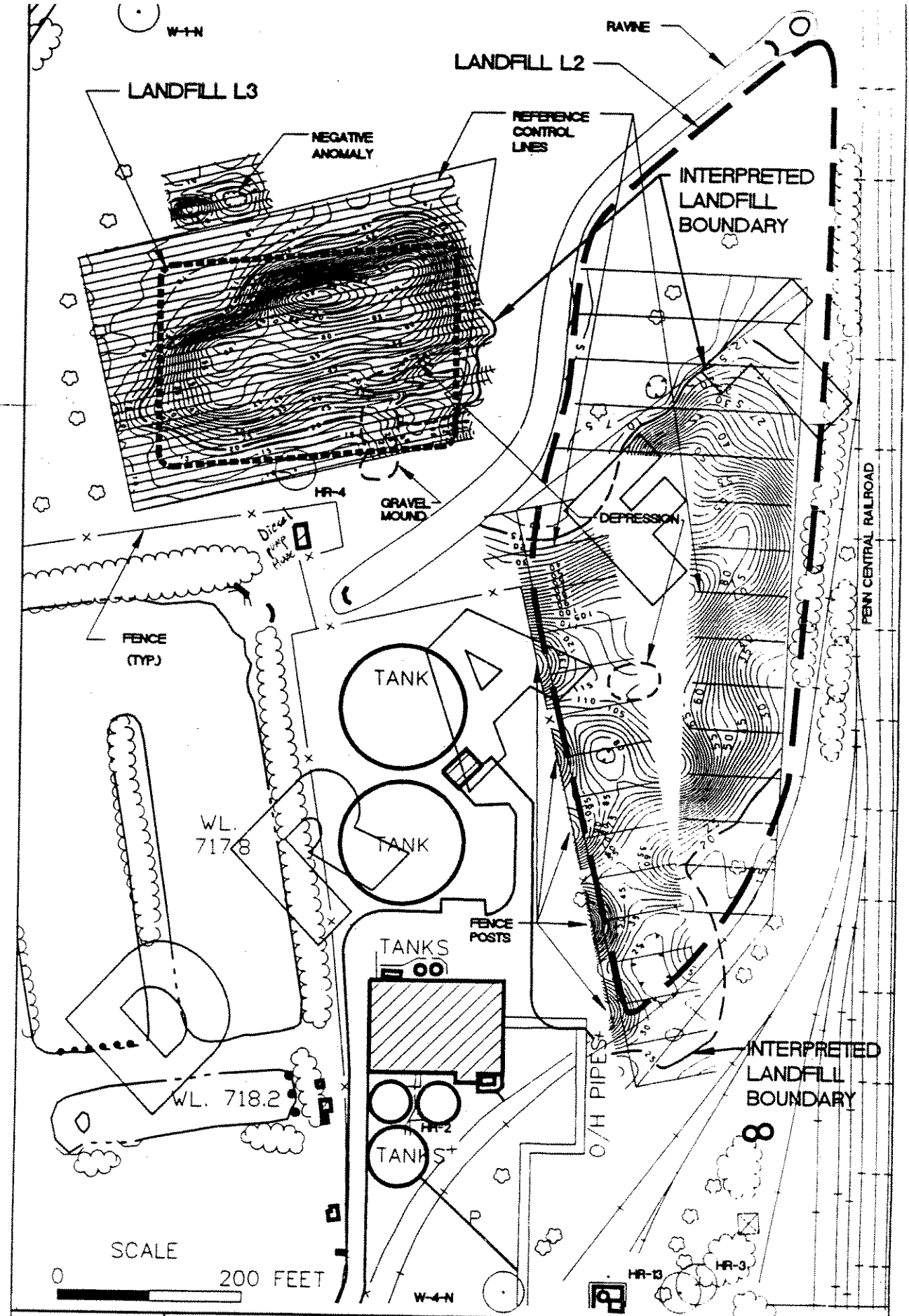
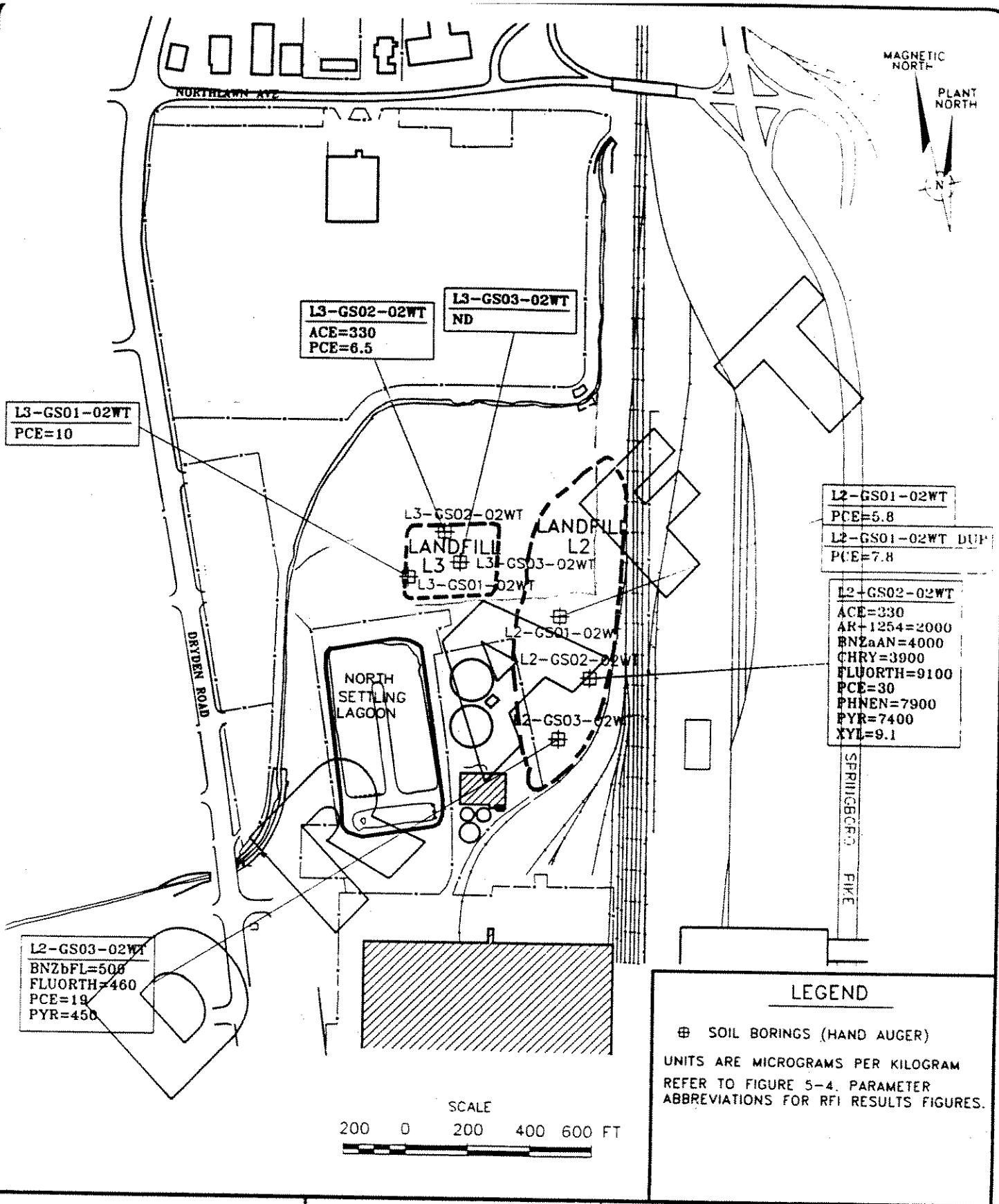
PROJECT NO.: 0-0019018	FILE NO. HARRISON\REMBASE\MT\
DRAWING: MT2SOUTH	PLOT SIZE: FIT
DRAFTED BY: MAJ	DATE: 11APR95
CHECKED BY: JR	DATE: 11APR95
APPROVED BY: JR	DATE: 12APR95

GROUNDWATER ORGANIC ANALYTICAL RESULTS FOR DEEP MONITOR WELLS LOCATED IN THE SOUTHERN PART OF THE HARRISON SITE AND AREA SOUTH OF SELLARS ROAD

DELPHI HARRISON THERMAL SYSTEMS, GENERAL MOTORS CORPORATION, MORAINE, OHIO

FIGURE 5-6


W-1-N
RAVINE
LANDFILL L2
LANDFILL L3
NEGATIVE ANOMALY
REFERENCE CONTROL LINES
INTERPRETED LANDFILL BOUNDARY
HR-4
GRAVEL MOUND
DEPRESSION
Diesel Pump House
FENCE (TYP.)
TANK
TANK
WL. 717.8
FENCE POSTS
TANKS
WL. 718.2
HR-2
TANKS
O/H PIPES
INTERPRETED LANDFILL BOUNDARY
PENN CENTRAL RAILROAD
HR-13
HR-3
W-4-N
SCALE
0
200 FEET
GERAGHTY & MILLER, INC.
Environmental Services
TERRAIN CONDUCTIVITY MAP. LANDFILLS L2 AND L3
FIGURE 5-7



DRAF S | APPROVED: J.R. | CHECKED: J.R. | DRAWIN KRISDON | FILE NO: SITE-NCS | PROJECT NO: OH01918 | 25JAN93 | DW

GERAGHTY & MILLER, INC.
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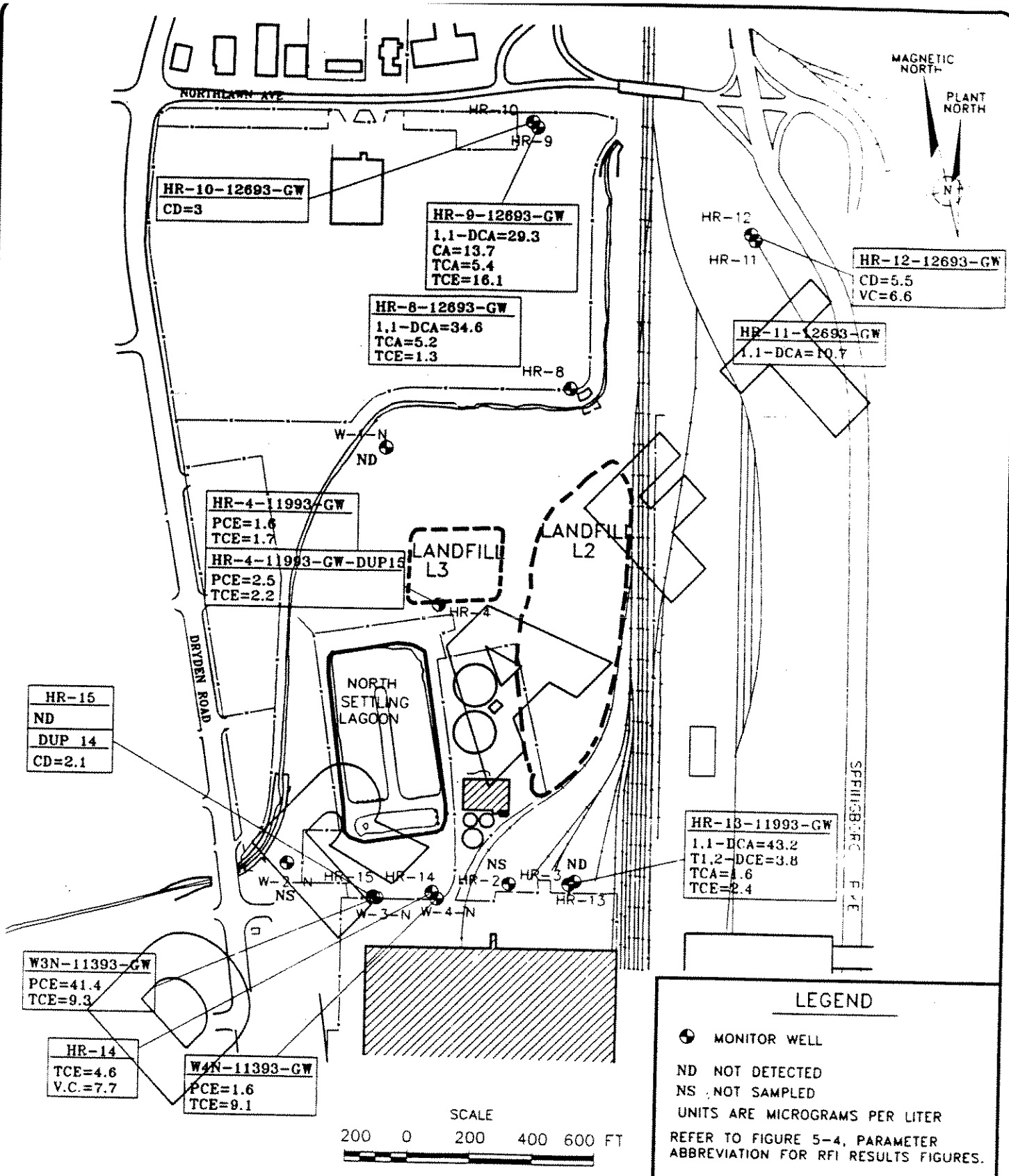
WASTE ORGANIC ANALYTICAL RESULTS FOR LANDFILLS L2 AND L3

DELPHI HARRISON THERMAL SYSTEMS, GENERAL MOTORS CORPORATION, MORAINE, OHIO

FIGURE
5-8



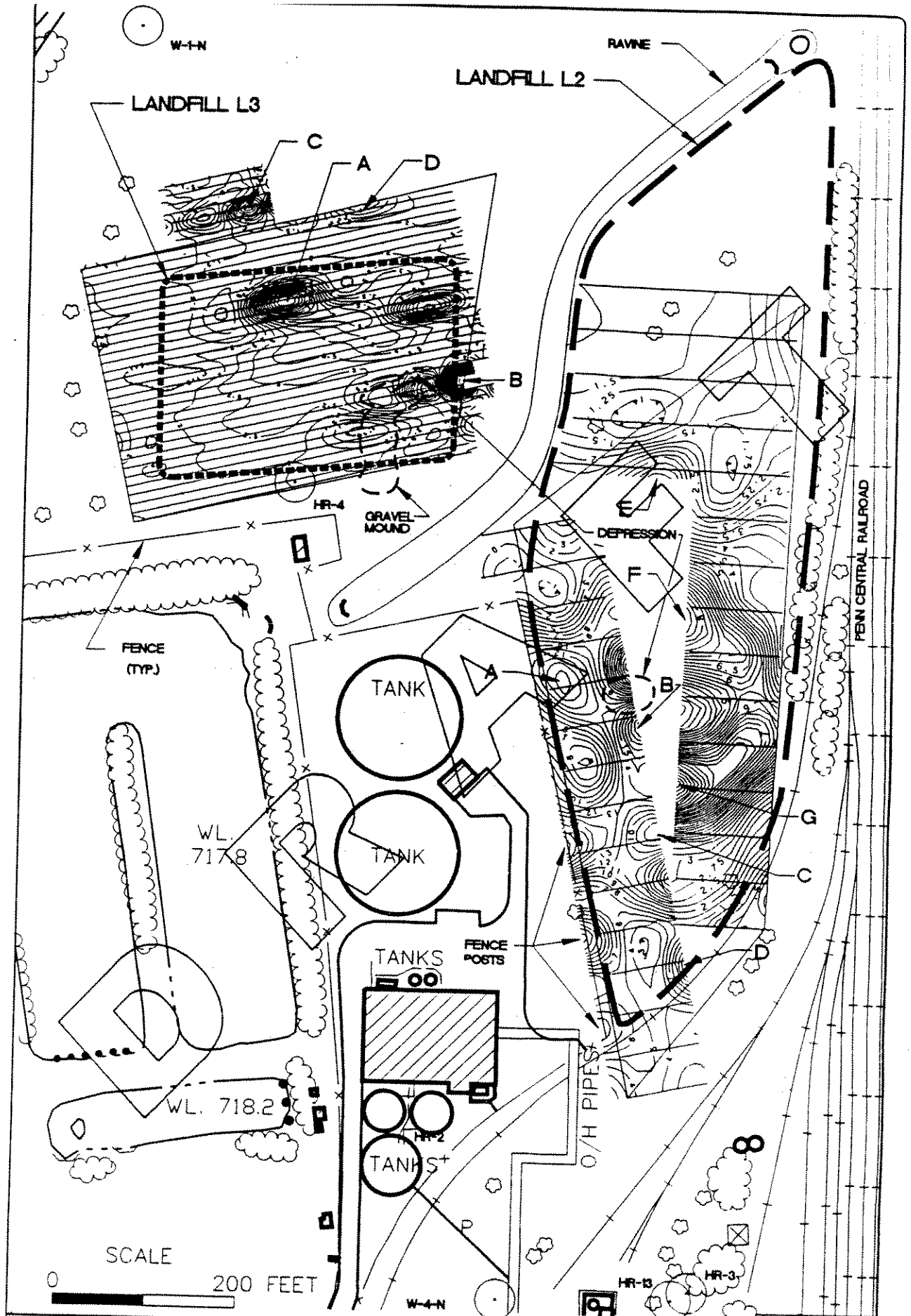
GERAGHTY & MILLER, INC.
Environmental Services

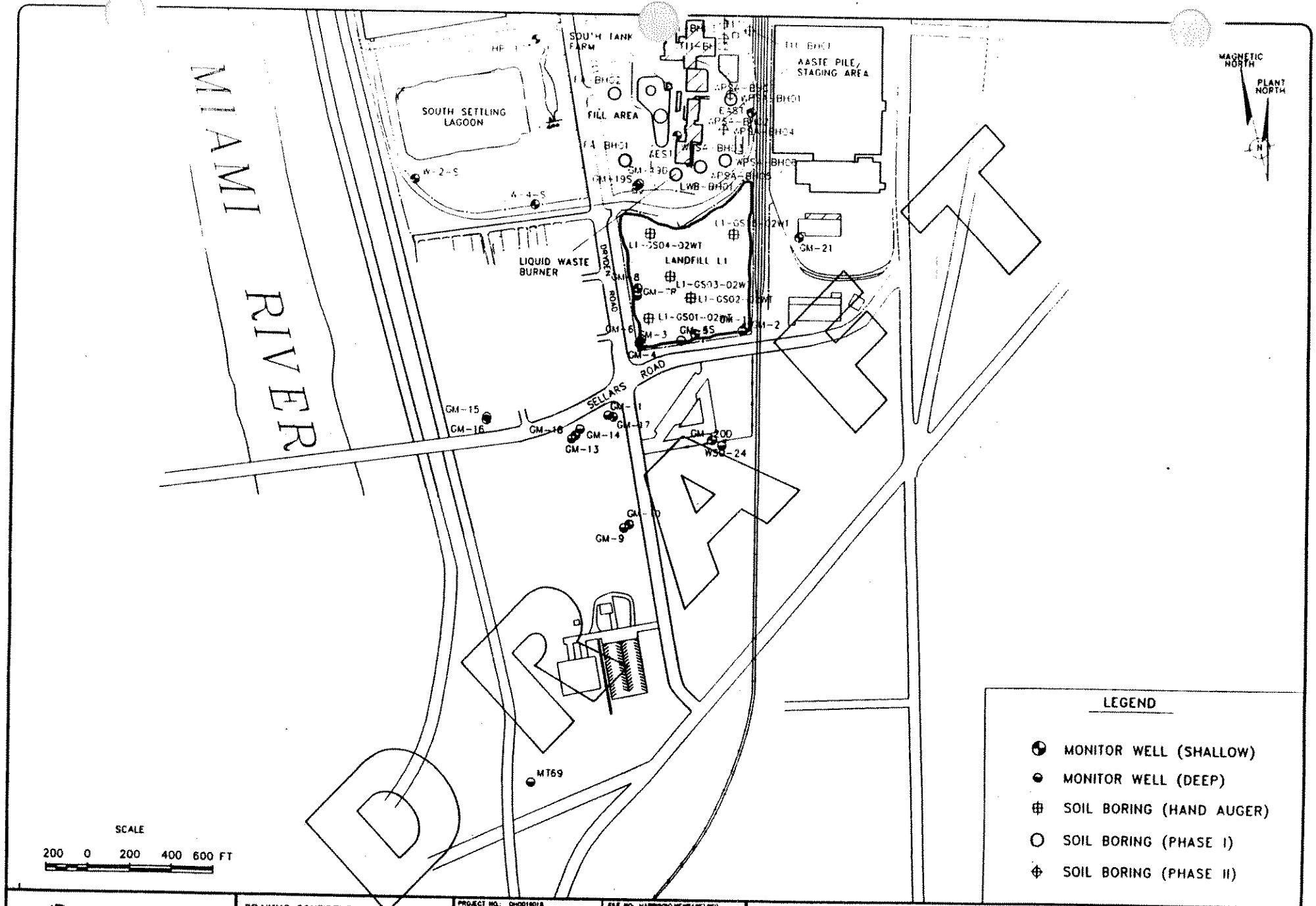
GROUNDWATER ORGANIC ANALYTICAL RESULTS FOR MONITOR WELLS LOCATED IN THE NORTHERN PART OF THE HARRISON SITE

DELPHI HARRISON THERMAL SYSTEMS, GENERAL MOTORS CORPORATION, MORAINE, OHIO

FIGURE 5-9

DRAFT | APPROVED: J.R. | CHECKED: J.R. | DRAWN: HARRISON | FILE NO. SITE-NCS | PRJCT NO. 0H01918 | DWG. 25JAN93


W-1-N
RAVINE
LANDFILL L2
LANDFILL L3
C
A
D
B
HR-4
GRAVEL MOUND
DEPRESSION
F
PENN CENTRAL RAILROAD
FENCE (TYP.)
TANK
A
B
TANK
WL. 717.8
G
C
FENCE POSTS
TANKS
D
O/H PIPES
WL. 718.2
HR-2
TANKS
SCALE
0
200 FEET
W-4-N
HR-13
HR-3
GERAGHTY & MILLER, INC.
Environmental Services
IN-PHASE COMPONENT MAP, LANDFILLS L2 AND L3
FIGURE 5-10



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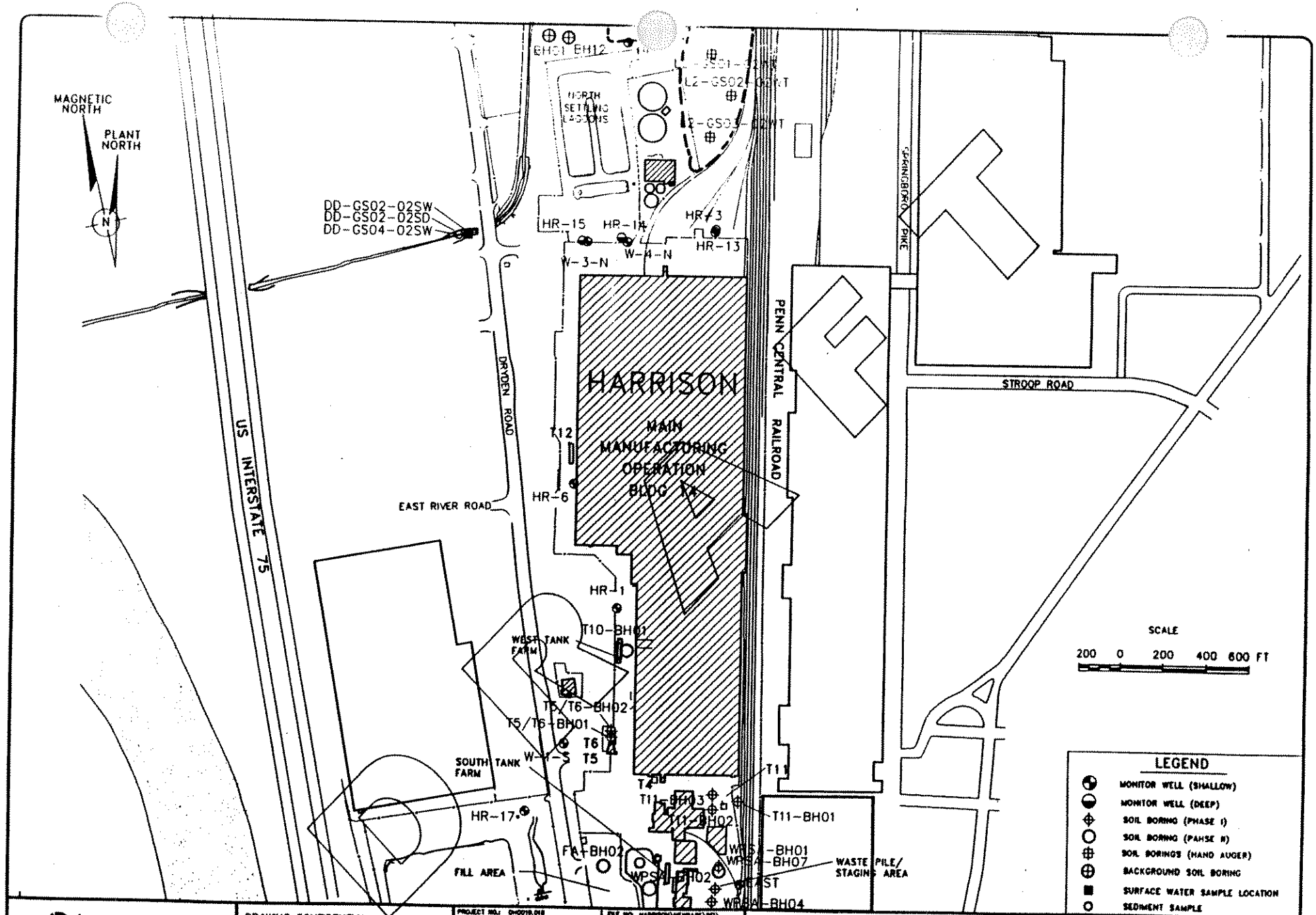
DRAWING: RFISOUTH	PLOT SIZE: FIT
DRAFTED BY: MAJ	DATE: 11APR96
CHECKED BY: J.R.	DATE: 11APR96
APPROVED BY: J.R.	DATE: 12APR96

RFI SAMPLE LOCATIONS IN THE SOUTHERN PART OF THE HARRISON SITE

DELPHI HARRISON THERMAL SYSTEMS, GENERAL MOTORS CORPORATION, MORAINE, OHIO

FIGURE 5-11



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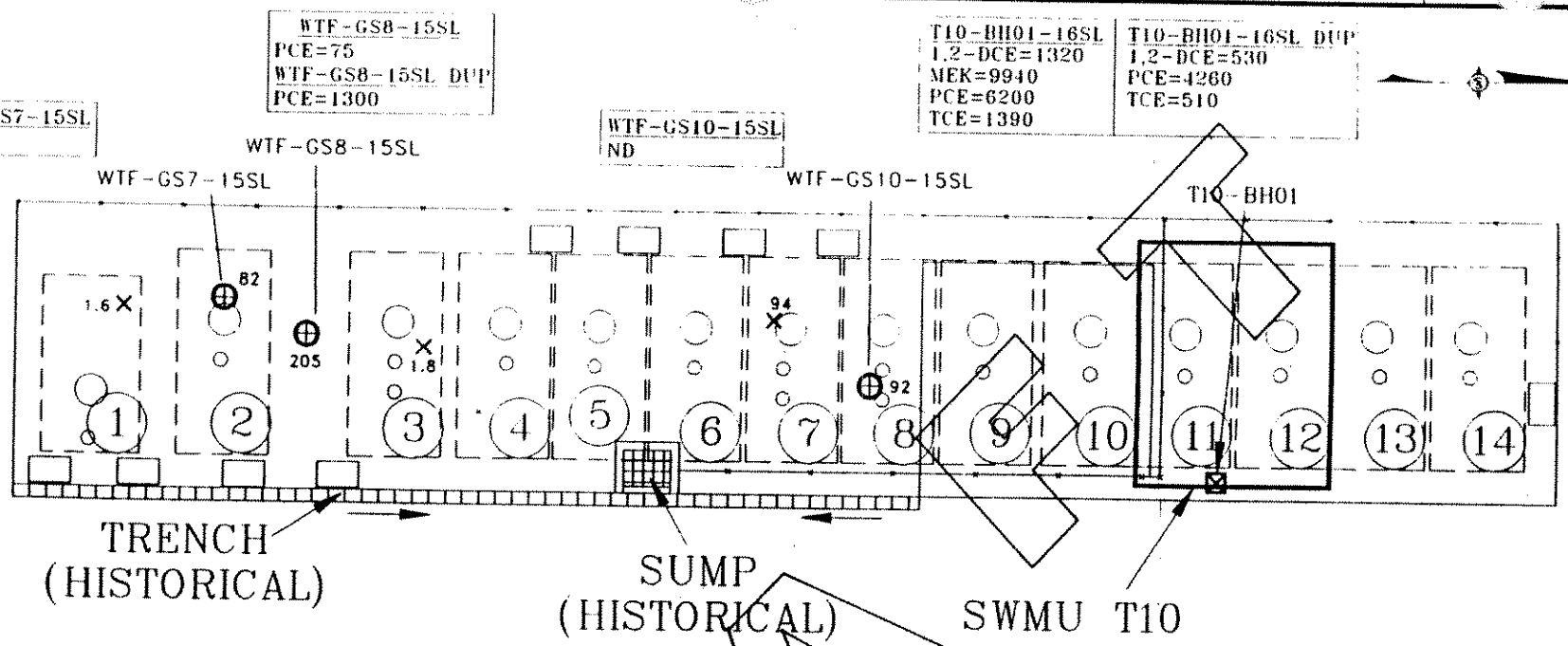
DRAFTED BY: MAJ	DATE: 11APR96
CHECKED BY: JJR	DATE: 11APR96
APPROVED BY: JJR	DATE: 12APR96

RFI SAMPLE LOCATIONS IN THE CENTRAL PART OF THE HARRISON SITE

DELPHI HARRISON THERMAL SYSTEMS, GENERAL MOTORS CORPORATION, MORAINE, OHIO

FIGURE 5-12



HISTORICAL TANK CONTENTS

1 NON-LEADED GASOLINE (REMOVED 1992)
2 DIESEL FUEL (REMOVED 1992)
3 CUTTING OIL (REMOVED 1992)
4 SWMU T8-PERCHLOROETHENE; (REMOVED 1988)
5 SWMU T8-PERCHLOROETHENE; (REMOVED 1988)
6 SWMU T7-OILY WASTE; (REMOVED 1988)
7 QUAKER 568 COOLANT; (REMOVED 1992)
8 CIMCOOL S-2 COOLANT; (REMOVED 1992)
9 SWMU T7-OILY WASTE; (REMOVED 1986)
10 SWMU T7-OILY WASTE; (REMOVED 1986)
11 SWMU T10-STODDARD SOLVENT; (REMOVED 1986)
12 SWMU T10-STODDARD SOLVENT; (REMOVED 1986)
13 SWMU T9-NAPTHALITE; (REMOVED 1986)
14 SWMU T9-NAPTHALITE; (REMOVED 1986)

LEGEND

⊠ PHASE II BORING LOCATION
⊕ PHASE I RFI SOIL SAMPLE LOCATION
(8) TANK NUMBER
× HNU GRAB SAMPLE AND HNU READING (ppm HNU UNITS)
ppm PARTS PER MILLION
ND NOT DETECTED

UNITS ARE MICROGRAMS PER KILOGRAM

REFER TO FIGURE 5-4, PARAMETER ABBREVIATIONS FOR RFI RESULTS FIGURES.

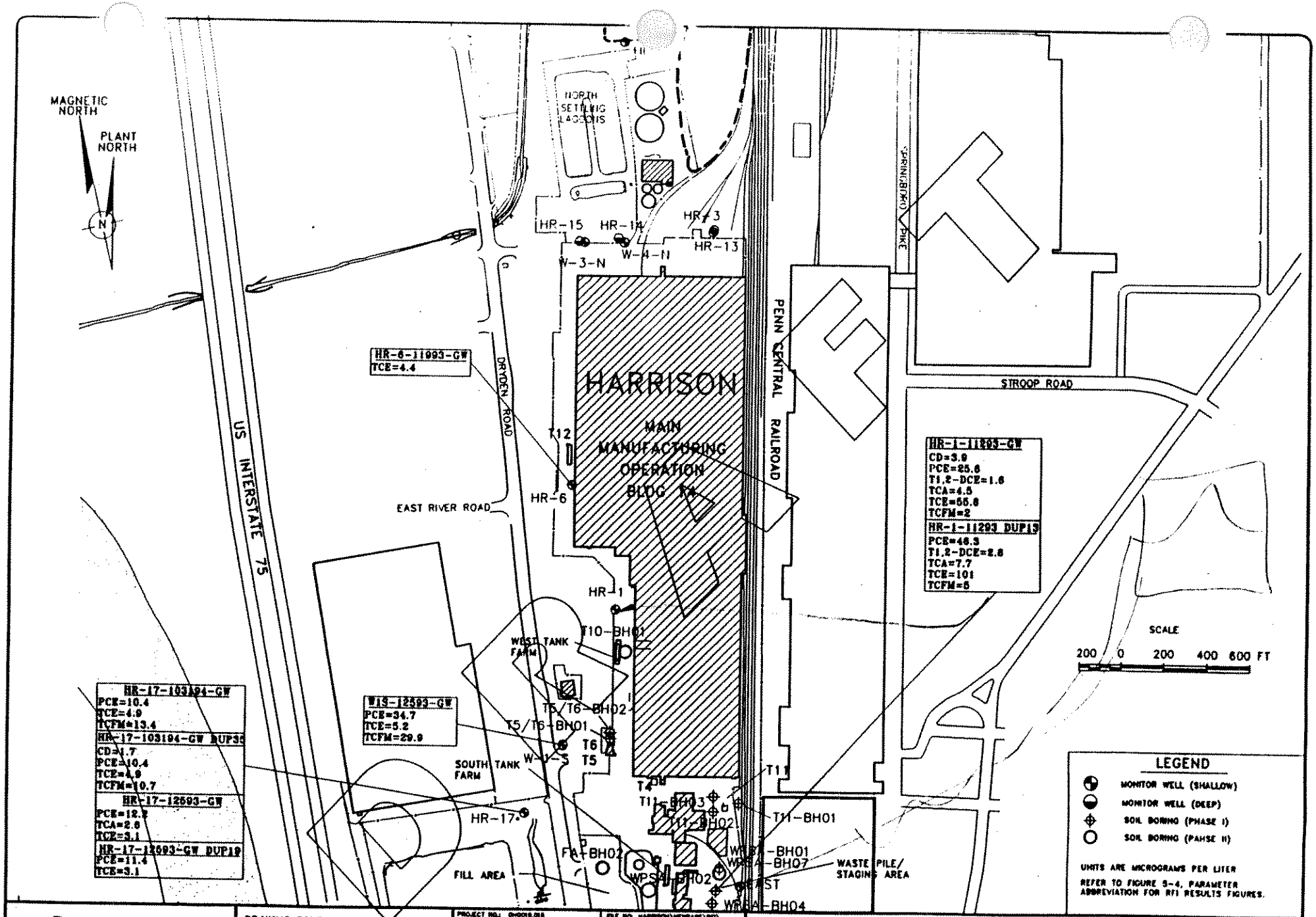
GERAGHTY & MILLER, INC.
Environmental Services

APPROXIMATE SCALE:

RFI SAMPLE LOCATIONS AND SOIL ORGANIC ANALYTICAL RESULTS FOR THE WEST TANK FARM

DELPHI HARRISON THERMAL SYSTEMS, GENERAL MOTORS CORPORATION, MORAINE, OHIO

FIGURE
5-13



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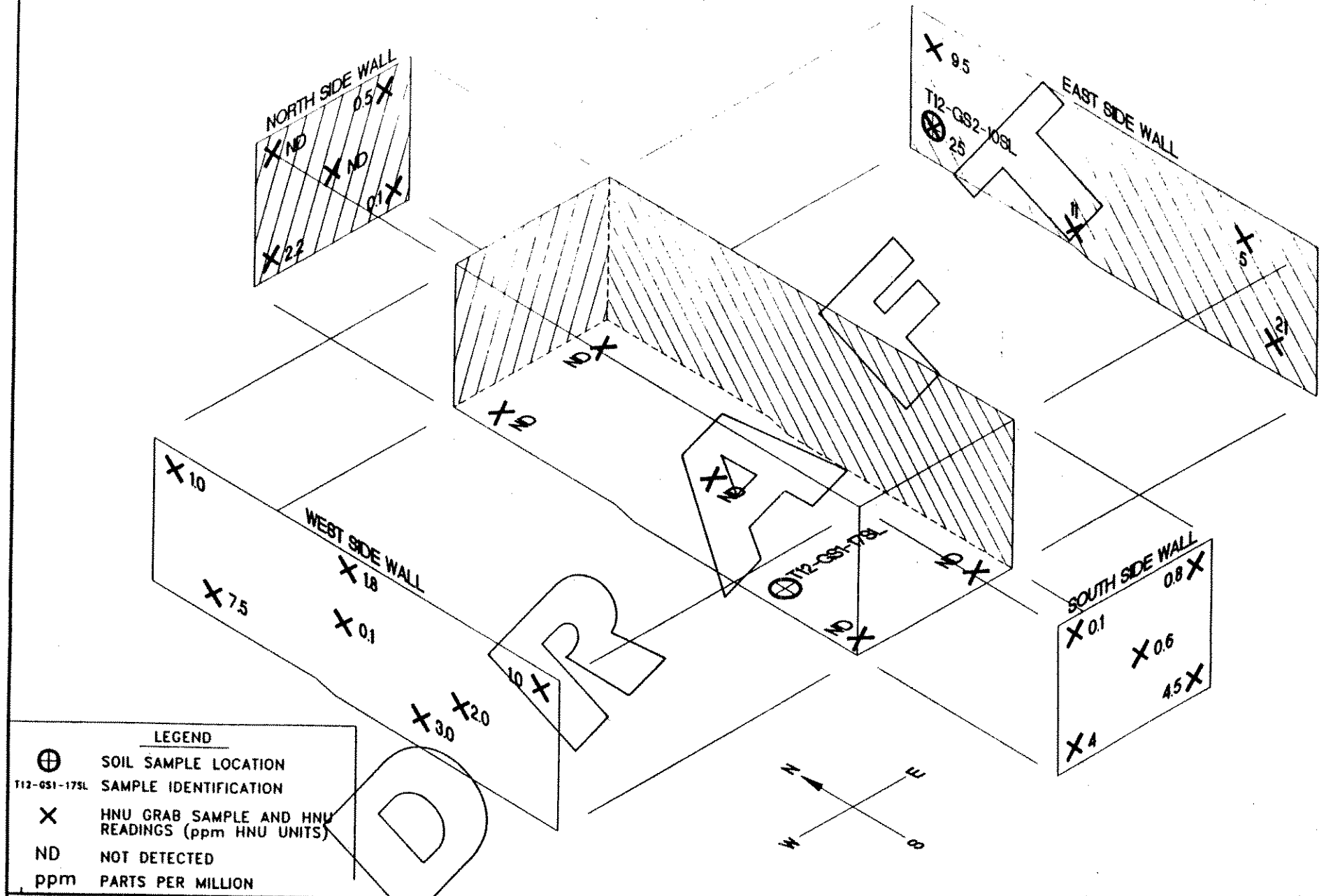
DRAWING: RFICENTRL	PLOT SIZE: FIT
DRAFTED BY: MAJ	DATE: 11APR95
CHECKED BY: JJR	DATE: 11APR95
APPROVED BY: JJR	DATE: 12APR95

GROUNDWATER ORGANIC ANALYTICAL RESULTS FOR MONITOR WELLS LOCATED IN THE CENTRAL PART OF THE HARRISON SITE

DELPHI HARRISON THERMAL SYSTEMS, GENERAL MOTORS CORPORATION, MORAINE, OHIO

FIGURE 5-14



LEGEND

- ⊕ SOIL SAMPLE LOCATION
- T12-GS1-17SL SAMPLE IDENTIFICATION
- X HNU GRAB SAMPLE AND HNU READINGS (ppm HNU UNITS)
- ND NOT DETECTED
- ppm PARTS PER MILLION

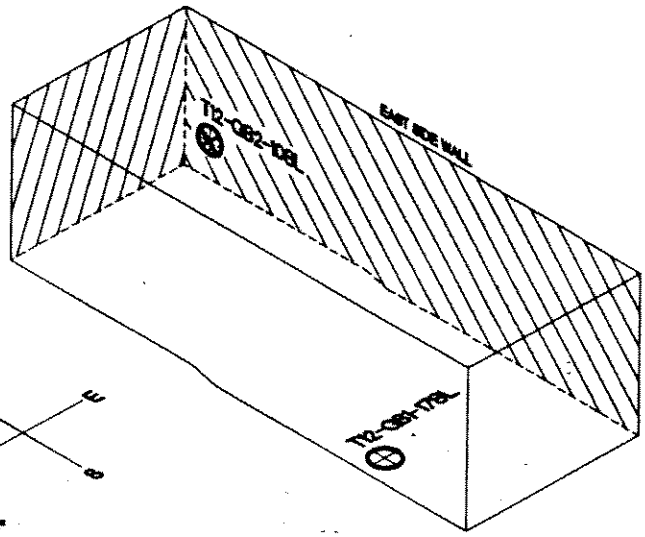
GERAGHTY & MILLER, INC.
Environmental Services

PROJECT NO.: 0-0019.0	FILE NO.: H:\#\(#)
DRAWING: T-12	PLOT DATE:
DRAFTED BY: RTS	DATE: 11-JUN93
CHECKED BY: J.R.	DATE: --
APPROVED BY: J.R.	DATE: --

RFI GRAB-SAMPLE LOCATIONS AND HNU HEADSPACE READINGS AT SWMU T12

DELPHI HARRISON THERMAL SYSTEMS, GENERAL MOTORS CORPORATION
MORAINE, OHIO

FIGURE 5-15



ISOMETRIC VIEW OF T12

MAGNETIC NORTH

PLANT NORTH

SURFACE SUMP DRAIN

T12-GS2-10SL
STY=7.1

T12-GS2-10SL

VAULT SUMP DRAIN

T12-GS1-17SL

T12-GS1-17SL
EBNZ=6.1
STY=30

T12-GS1-17SL DUP
EBNZ=8
STY=31

T12

HARRISON

MAIN

MANUFACTURING

OPERATION

BLDG 14

LEGEND

⊕ SOIL SAMPLE LOCATION

T12-GS1-17SL SAMPLE IDENTIFICATION

UNITS ARE MICROGRAMS PER KILOGRAM

REFER TO FIGURE 5-4, PARAMETER ABBREVIATION FOR RFI RESULTS FIGURES.

SCALE 0 20 FT

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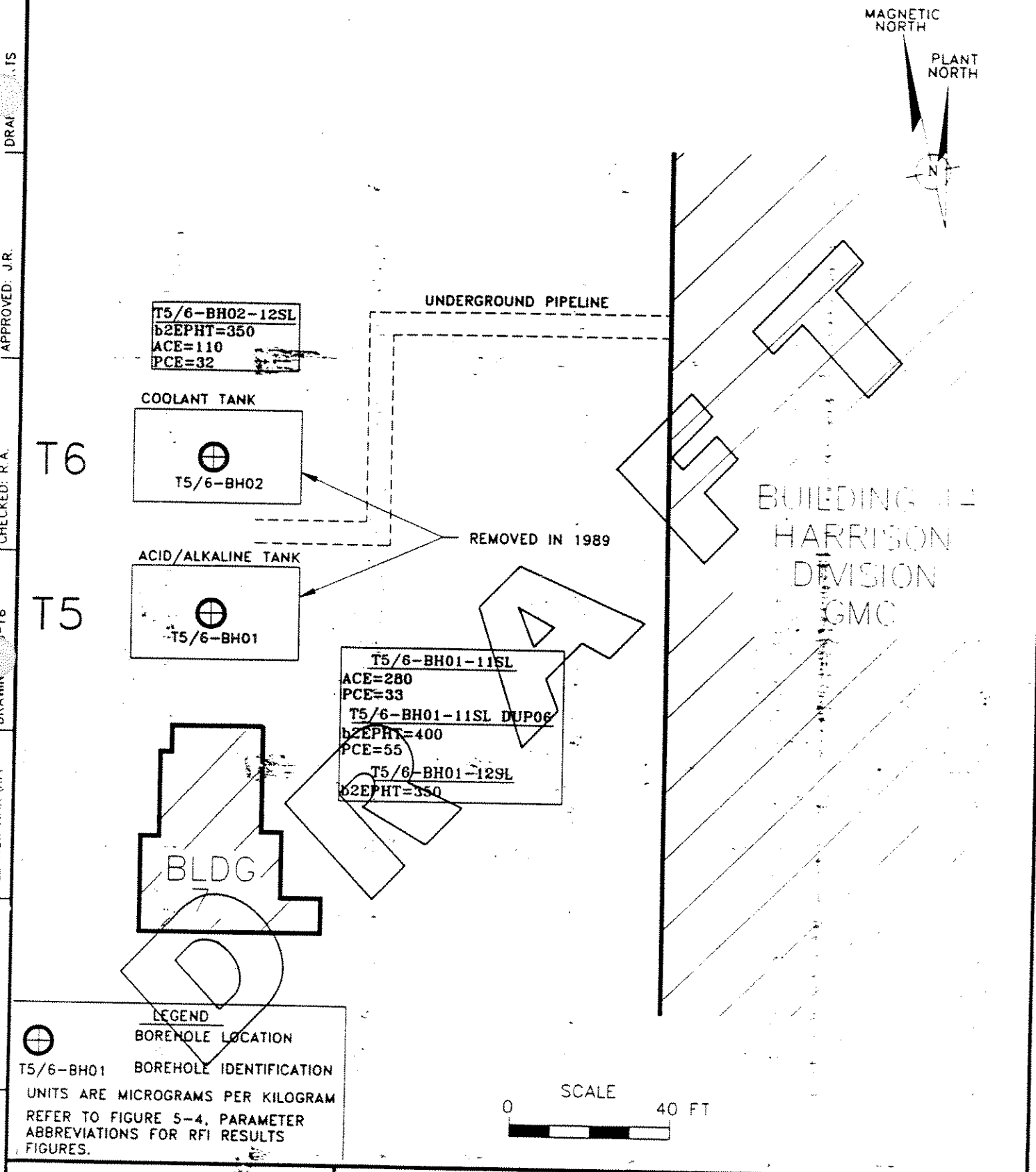
RFI SUBSURFACE SAMPLING LOCATIONS AND SOIL ORGANIC ANALYTICAL RESULTS FOR T12

DELPHI HARRISON THERMAL SYSTEMS, GENERAL MOTORS CORPORATION, MORAINE, OHIO

FIGURE 5-16

DRAFTED: KIS | APPROVED: J.R. | CHECKED: R.A. | DRAWING: 12 | FILE NO.: HAR\RFI | PRJCT NO.: OH01918 | DWG. DATE: 15APR93



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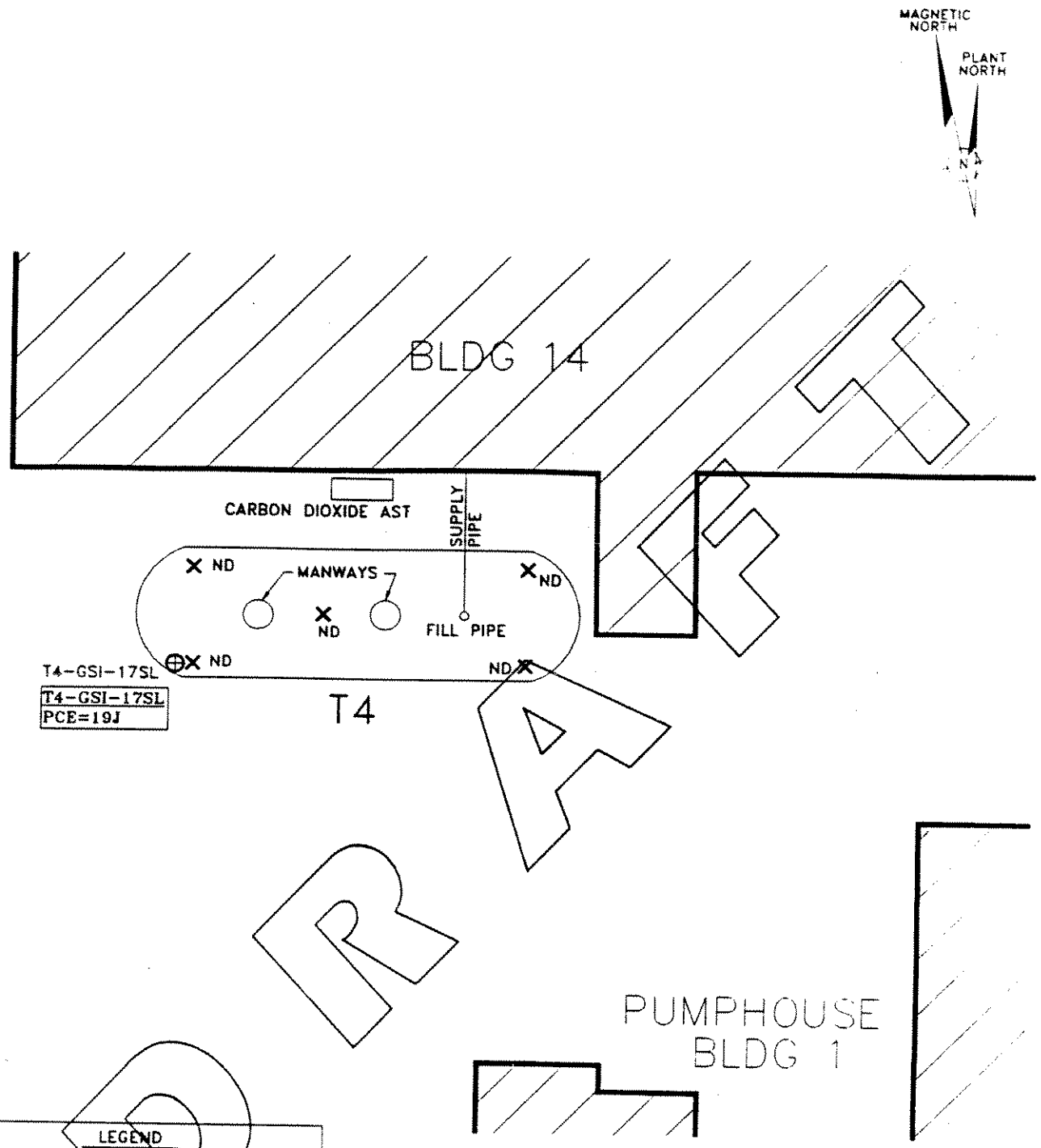
RFI SAMPLE LOCATIONS AND SOIL ORGANIC ANALYTICAL RESULTS FOR T5/T6

DELPHI HARRISON THERMAL SYSTEMS, GENERAL MOTORS CORPORATION, MORAINE, OHIO

FIGURE 5-17

DRAWN: T6
CHECKED: R.A.
APPROVED: J.R.
FILE NO. HAR\RFI
PRJCT NO. OH0191B
15APR93



LEGEND

⊕ SOIL SAMPLE LOCATION

× HNU GRAB LOCATION AND FIELD HNU READING (ppm HNU UNITS)

ND NOT DETECTED

ppm PARTS PER MILLION

UNITS ARE MICROGRAMS PER KILOGRAM REFER TO FIGURE 5-4, PARAMETER ABBREVIATIONS FOR RFI RESULTS FIGURES.

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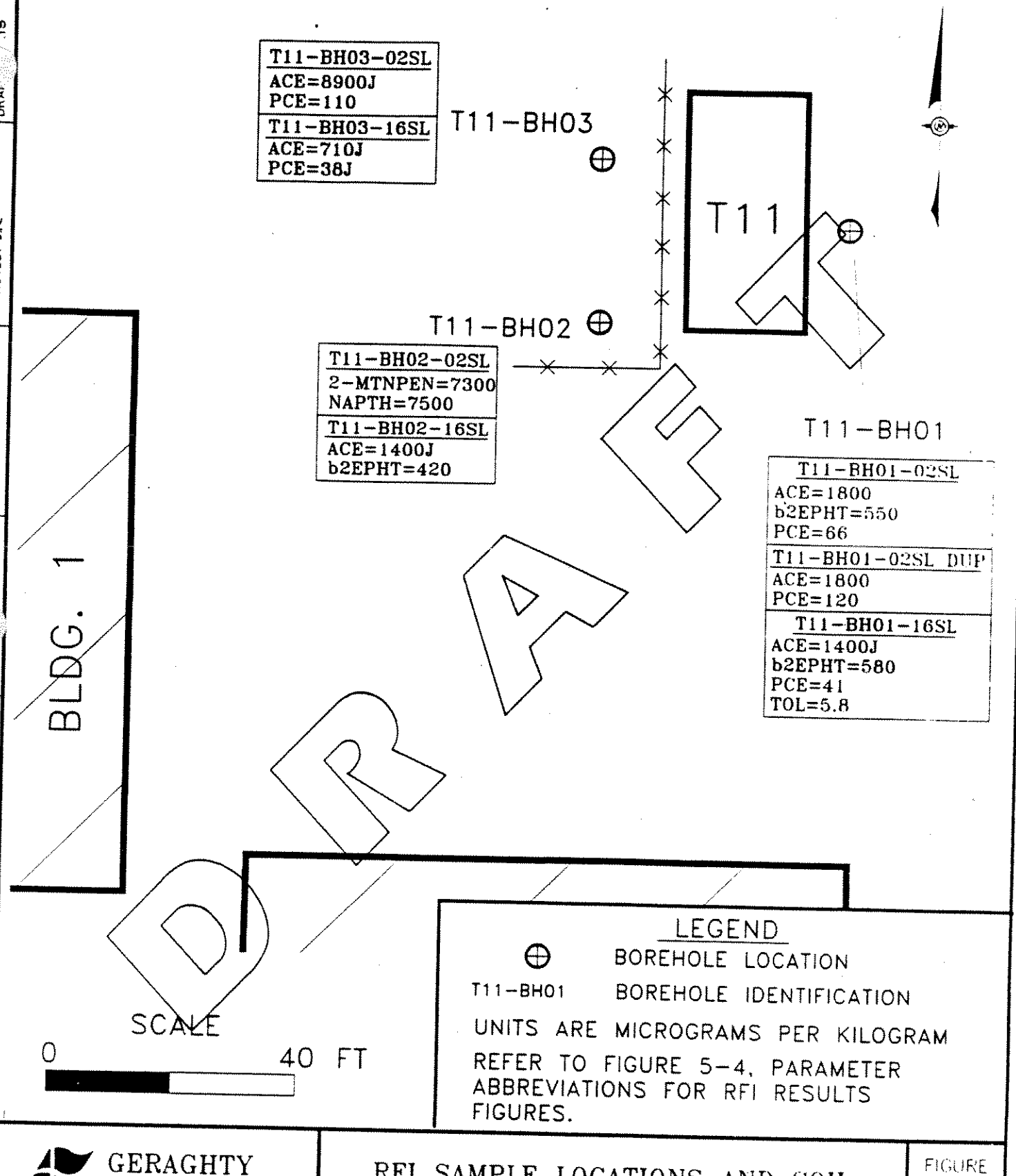
NOT TO SCALE

RFI SAMPLE LOCATIONS AND SOIL ORGANIC ANALYTICAL RESULTS FOR T4

DELPHI HARRISON THERMAL SYSTEMS, GENERAL MOTORS CORPORATION, MORAINE, OHIO

FIGURE 5-18

DRAWN: S
DRAFT
APPROVED: J.R.
CHECKED: J.R.
DRAWING I
FILE NO.: HAR\RFI
PROJECT NO.: OH01918
15APR93
DWG



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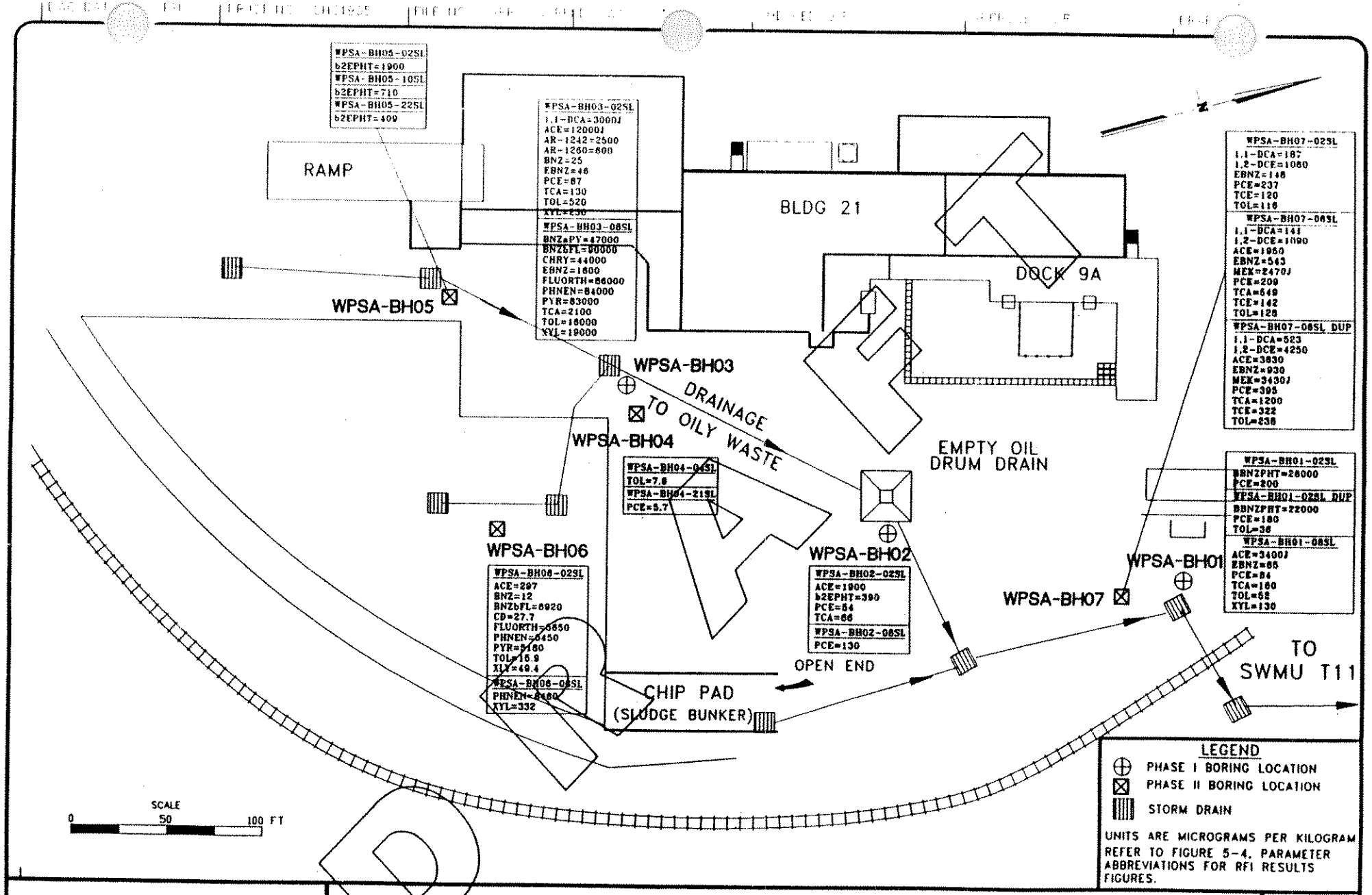
RFI SAMPLE LOCATIONS AND SOIL ORGANIC ANALYTICAL RESULTS FOR T11

DELPHI HARRISON THERMAL SYSTEMS, GENERAL MOTORS CORPORATION, MORAINE, OHIO

FIGURE 5-19

DRAI | APPROVED: JR | CHECKED: JR | DRAWI | FILE NO: HARRI½RFI | PROJ NO: OH01912 | 12NOV92 | DW



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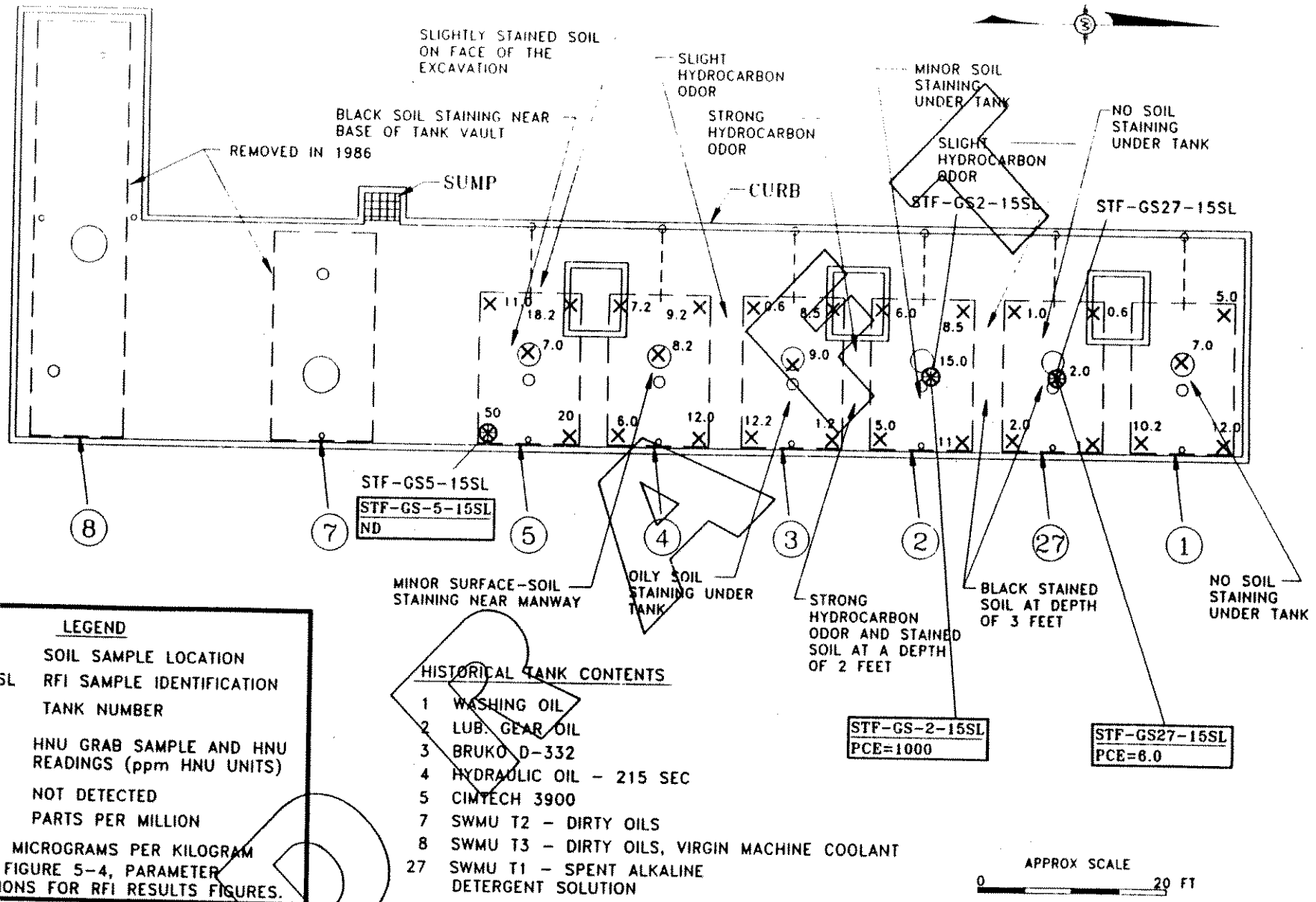
Environmental Services

RFI SAMPLE LOCATIONS AND SOIL ORGANIC ANALYTICAL RESULTS FOR THE WASTE PILE/STAGING AREA

DELPHI HARRISON THERMAL SYSTEMS, GENERAL MOTORS CORPORATION, MORAINE, OHIO

FIGURE 5-20



LEGEND

⊕	SOIL SAMPLE LOCATION
STF-GS2-15SL	RFI SAMPLE IDENTIFICATION
(27)	TANK NUMBER
× 9.2	HNU GRAB SAMPLE AND HNU READINGS (ppm HNU UNITS)
ND	NOT DETECTED
ppm	PARTS PER MILLION

UNITS ARE MICROGRAMS PER KILOGRAM
REFER TO FIGURE 5-4, PARAMETER ABBREVIATIONS FOR RFI RESULTS FIGURES.

HISTORICAL TANK CONTENTS

1	WASHING OIL
2	LUB. GEAR OIL
3	BRUKO D-332
4	HYDRAULIC OIL - 215 SEC
5	CIMTECH 3900
7	SWMU T2 - DIRTY OILS
8	SWMU T3 - DIRTY OILS, VIRGIN MACHINE COOLANT
27	SWMU T1 - SPENT ALKALINE DETERGENT SOLUTION

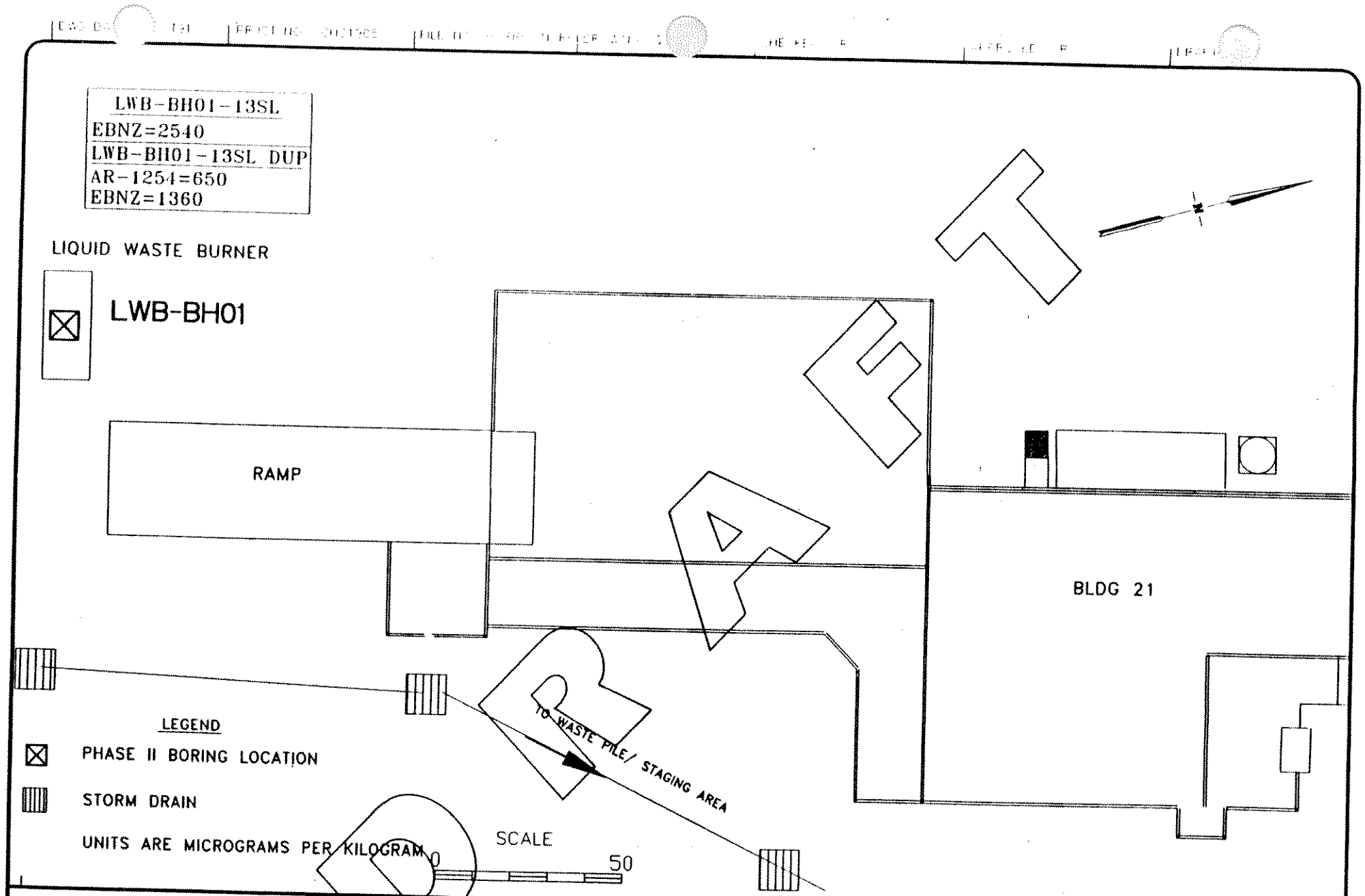
APPROX SCALE
0 20 FT

GERAGHTY & MILLER, INC.
Environmental Services

RFI SAMPLE LOCATIONS AND SOIL ORGANIC ANALYTICAL RESULTS FOR THE SOUTH TANK FARM

DELPHI HARRISON THERMAL SYSTEMS, GENERAL MOTORS CORPORATION, MORAINE, OHIO

FIGURE 5-21



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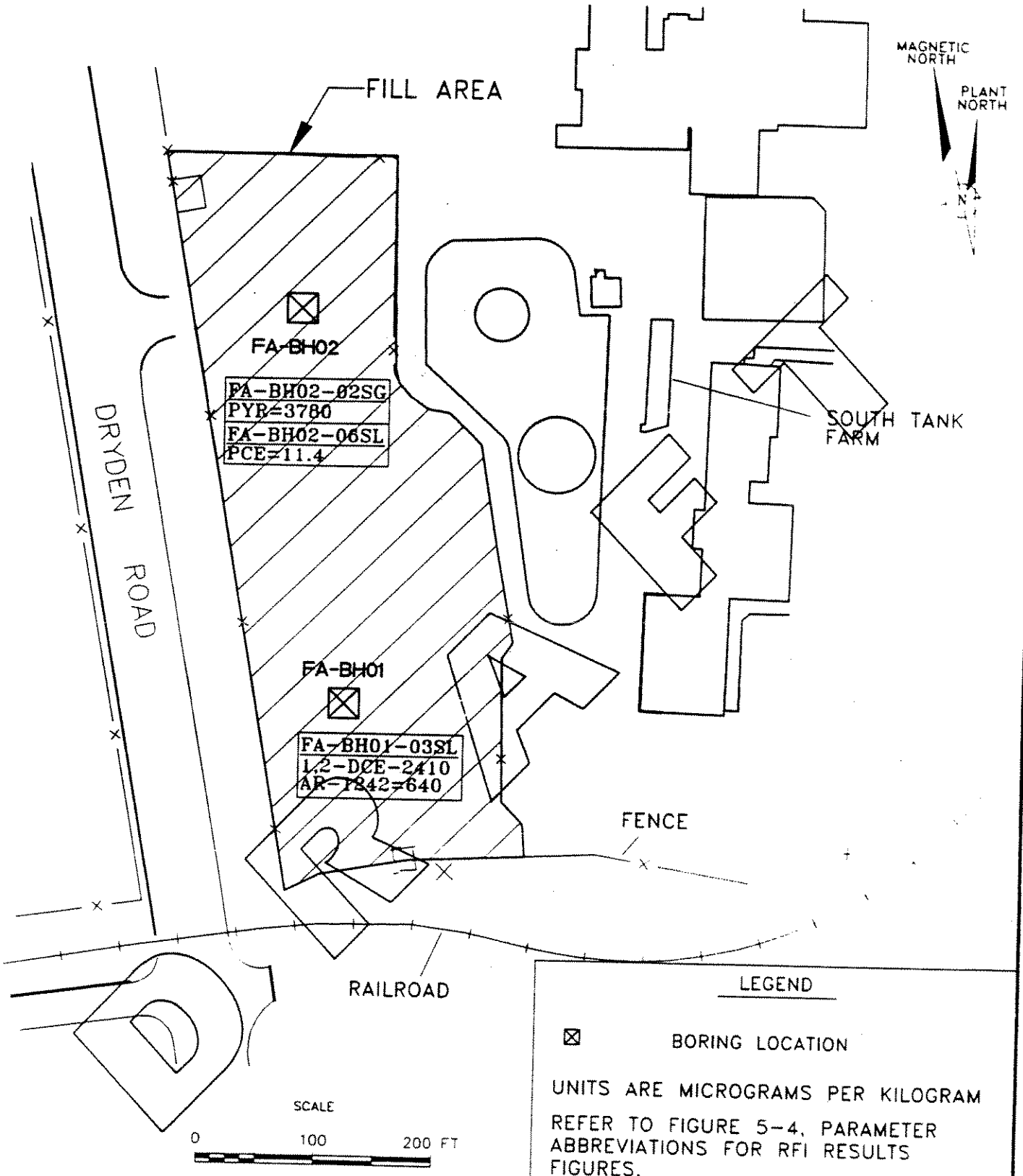
RFI SAMPLE LOCATION AND SOIL ORGANIC ANALYTICAL RESULTS FOR THE LIQUID WASTE BURNER

DELPHI HARRISON THERMAL SYSTEMS, GENERAL MOTORS CORPORATION, MORAINE, OHIO

FIGURE 5-22



DRAFTS | APPROVED: J.R. | CHECKED: J.R. | DRAWING AREA | FILE NO: HARR\NB\ | PRJCT NO: OH0019.018 | 29JUN93 | DWG

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RFI SAMPLE LOCATIONS AND SOIL ORGANIC ANALYTICAL RESULTS FOR THE FILL AREA

DELPHI HARRISON THERMAL SYSTEMS, GENERAL MOTORS CORPORATION, MORAINE, OHIO

FIGURE 5-23

APPENDIX A

RFI LABORATORY ANALYTICAL RESULTS

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APPENDIX A
RFI LABORATORY ANALYTICAL RESULTS

CONTENTS

A-1 Duplicate Sample Identifications, Harrison Division - GMC

Phase I Duplicate Sample Identifications
Phase II Duplicate Sample Identifications

A-2 Phase I Aqueous Samples

Volatile Organic Compound Results, Monitor Well, Rinseate Blank and Trip Blank Samples
Semivolatile Organic Compound Results, Monitor Well and Rinseate Blank Samples
Polychlorinated Biphenyls, Pesticides, and Herbicide Results, Monitor Well and Rinseate Blank Samples
Total Metals and Cyanide Results, Monitor Well and Rinseate Blank Samples
Dissolved Metals Results, Monitor Well and Rinseate Blank Samples

A-3 Phase I Soil Background Samples

Volatile Organic Compound Results
Semivolatile Organic Compound Results
Metals and Cyanide Results
Polychlorinated Biphenyls and Pesticide Results

A-4 Phase II Soil Samples

Volatile Organic Compound Results Background Area, Area South of Landfill L1, West Tank Farm, Waste Pile Staging Area, Liquid Waste Burner and Fill Area
Semivolatile Organic Results
Polychlorinated Biphenyls, Pesticide and Herbicide Results
Total Metals and Cyanide Results

A-5 Phase I Surface Water/Sediment Samples

Volatile Organic Compound Results
Semivolatile Organic Compound Results
Polychlorinated Biphenyls, Pesticides, and Herbicides Results
Metals and Cyanide Results

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A-6 Phase II Groundwater and Surface Water Samples

Volatile Organic Compound Results
Polychlorinated Biphenyls, Pesticides and Herbicides
Total Metals, Dissolved Metals, and Cyanide

A-7 Phase I Landfill L1 Waste Samples

Volatile Organic Compound Results
Semivolatile Organic Compound Results
Polychlorinated Biphenyls and Pesticides Results
Metals and Cyanide Results

A-8 Phase I Landfill L2 Waste Samples

Volatile Organic Compound Results
Semivolatile Organic Compound Results
Polychlorinated Biphenyls and Pesticides Results
Metals and Cyanide Results

A-9 Phase I Landfill L3 Waste Samples

Volatile Organic Compound Results
Semivolatile Organic Compound Results
Polychlorinated Biphenyls and Pesticides Results
Metals and Cyanide Results

A-10 Phase I West Tank Farm Soil Samples

Volatile Organic Compound Results
Polychlorinated Biphenyls and Pesticides Results
Metals Results

A-11 Phase I SWMU T12 Soil Samples

Volatile Organic Compound Results
Metals Results

A-12 Phase I SWMUs T5/T6 Soil Samples

Volatile Organic Compound Results
Semivolatile Organic Compound Results
Polychlorinated Biphenyls Results
Metals Results

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A-13 Phase I SWMU T4 Soil Results

Volatile Organic Compound Results
Metals Results

A-14 Phase I SWMU T11 Soil Samples

Volatile Organic Compound Results
Semivolatile Organic Compound Results
Polychlorinated Biphenyls and Pesticides Results
Metals and Cyanide Results

A-15 Phase I Waste Pile/Staging Area Soil Samples

Volatile Organic Compound Results
Semivolatile Organic Compound Results
Polychlorinated Biphenyls Results
Metals Results

A-16 Phase I South Tank Farm Soil Samples

Volatile Organic Compound Results
Polychlorinated Biphenyls and Pesticides Results
Metals Results

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PHASE I DUPLICATE SAMPLE IDENTIFICATIONS
HARRISON DIVISION - GMC

DUPLICATE SAMPLE ID	LAB ID - DUPLICATE	SAMPLE ID	LAB ID - SAMPLE
DUP-1	166214	T12-GS1-17SL	166213
DUP-2	167812	WTF-GS8-15SL	167816
DUP-3	167774	BKG-BH06-02SL	167773
DUP-4	167777	BKG-BH06-16SL	167778
DUP-5	167804	BKG-BH07-02SL	167807
DUP-6	170064	T5/6-BH01-10SL	170066
		T5/6-BH01-11SL	170067
		T5/6-BH01-12SL	170068
DUP-7	170417	WPSA-BH01-02SL	170415
DUP-8	170436	T11-BH01-02SL	170434
DUP-9	171672	L1-GS01-02WT	171667
DUP-10	171620	L2-GS01-02WT	171612
DUP-11	174840	DD-GS01-02SD	174839
DUP-12	174851	DD-GS02-02SW	174850
DUP-13	175555	RFI-HR1-11293-GW	175554
DUP-14	175435	RFI-HR15-11393-GW	175432
DUP-15	176518	RFI-HR4-11993-GW	176514
DUP-16	176784	RFI-GM19D-12093-GW	176782
DUP-17	176863	RFI-GM2-12193-GW	176862
DUP-18	176847	RFI-GM5-12293-GW	176844
DUP-19	177155	RFI-HR17-12593-GW	177156
DUP-20	177705	RFI-HR10-12693-GW	177710
DUP-21	177893	RFI-GM17-12793-GW	177897
DUP-22	178132	RFI-GM18-12893-GW	178136

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RFI PHASE II, DUPLICATE SAMPLE IDENTIFICATIONS
HARRISON DIVISION - GMC

DUPLICATE SAMPLE ID	SAMPLE ID	
DUP-24	LWB-BH01-13SL	
DUP-25	WPSA-BH05-22SL	
DUP-26	WPSA-BH07-06SL	
DUP-27	T10-BH01-16SL	
DUP-28	GM20D-01-SL	(TAL Metals & Cyanide)
DUP-28	GM20D-03SL	(TCL VOCs)
DUP-28	GM20D-05SL	(TCL PCB/Pest)
DUP-29	RFI-East-GW	
DUP-30	RFI-HR-10-GW	
DUP-31	DD-GS04-02SW	
DUP-32	RFI-GM18-GW	
DUP-33	RFI-MT69-GW	
DUP-34	RFI-GM7R-GW	
DUP-35	RFI-HR17-GW	
DUP-36	RFI-HR12-GW	
DUP-37	RFI-GM1-GW	
DUP-38	RFI-HR15-GW	

Note:

Due to poor sample recovery for the shallow soil sample from boring GM-20D, both investigative and corresponding duplicate (DUP-28) parameters were collected from the three depth intervals shown above.

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I:\HARRISON\95RFI\TABLES\SAMPIDS.XLS

PHASE I AQUEOUS SAMPLES

VOLATILE ORGANIC COMPOUND RESULTS MONITOR WELL, RINSEATE BLANK, AND TRIP BLANK SAMPLES

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PHASE I 1/93

HARRISON DIVISION - GMC
GROUND-WATER ANALYTICAL RESULTS
VOLATILE ORGANIC COMPOUNDS

Parameter	DUP-20 UG/L	DUP-21 UG/L	DUP-22 UG/L	EAST-11293-GW UG/L	GM1-12193-GW UG/L	GM10-12793-GW UG/L	GM11-12793-GW UG/L	GM13-12893-GW UG/L	GM15-12893-GW UG/L	GM16-12893-GW UG/L
1,1,1,2-Tetrachloroethane	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
1,1,1-Trichloroethane	< 1	**6.4**	**17.4**	**18.9**	**8**	**8**	**8.6**	**4.6**	< 1	**3.8**
1,1,2,2-Tetrachloroethane	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
1,1,2-Trichloroethane	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
1,1-Dichloroethane	< 1	**115**	**152**	**8**	< 1	**11.1**	< 1	< 1	**2.4**	< 1
1,1-Dichloroethene	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
1,2,3-Trichloropropane	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
1,2-Dibromo-3-chloropropane	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
1,2-Dibromoethane	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
1,2-Dichloroethane	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
1,2-Dichloropropane	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
2-Butanone	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10
2-Chloro-1,3-butadiene	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
2-Hexanone	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10
3-Chloro-1-propene	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
4-Methyl-2-Pentanone	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10
Acetone	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20
Acrolein	< 50 J	< 50 J	< 50 J	< 50	< 50 J	< 50 J	< 50 J	< 50 J	< 50 J	< 50 J
Acrylonitrile	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50
Benzene	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Bromodichloromethane	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Bromoform	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Bromomethane	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
Carbon Disulfide	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Carbon Tetrachloride	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Chlorobenzene	< 1	**2.5**	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Chloroethane	< 10	< 10	**11**	< 10	< 10	< 10	< 10	< 10	< 10	< 10
Chloroform	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Chloromethane	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10
Dibromochloromethane	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Dibromomethane	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Dichlorodifluoromethane	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10
Ethyl Methacrylate	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
Ethylbenzene	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Iodomethane	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
Methacrylonitrile	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
Methyl methacrylate	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
Methylene Chloride	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10
Pentachloroethane	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
Propionitrile	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50
Styrene	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Tetrachloroethene	< 1	< 1	**1.3**	**79.4**	**4.7**	**2.8**	**5.5**	**5.8**	< 1	**57**
Toluene	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Total Xylenes	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Trichloroethene	< 1	**43.3**	**63.5**	**83.4**	**42.4**	**85.2**	**29.1**	**15.8**	**3.7**	**28.9**
Trichlorofluoromethane	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Vinyl Acetate	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10
Vinyl Chloride	< 5	**6.5**	**17.5**	< 5	< 5	< 5	< 5	< 5	< 5	< 5
cis-1,3-Dichloropropene	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
trans-1,2-Dichloroethene	< 1	**9.2**	**17.2**	< 1	< 1	**2.4**	< 1	< 1	< 1	< 1
trans-1,3-Dichloropropene	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
trans-1,4-Dichloro-2-butene	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5

Validation codes on last page.

HARRISON DIVISION - GMC
GROUNDWATER ANALYTICAL RESULTS
VOLATILE ORGANIC COMPOUNDS

Parameter	GM17-12793-GW UG/L	GM18-12893-GW UG/L	GM2-12193-GW UG/L	GM5-12293-GW UG/L	GM7R-12093-GW UG/L	GM8-12093-GW UG/L	GM9-12793-GW UG/L
1,1,1,2-Tetrachloroethane	< 1	< 1	< 1	< 1	< 5	< 1	< 1
1,1,1-Trichloroethane	**4.3**	**17.9**	**13.7**	< 1	**9.4**	**7.3**	< 1
1,1,2,2-Tetrachloroethane	< 1	< 1	< 1	< 1	< 5	< 1	< 1
1,1,2-Trichloroethane	< 1	< 1	< 1	< 1	< 5	< 1	< 1
1,1-Dichloroethane	**117**	**144**	**3.1**	< 1	**6.9**	**120**	**14.5**
1,1-Dichloroethene	< 1	< 1	< 1	< 1	< 5	< 1	< 1
1,2,3-Trichloropropane	< 5	< 5	< 5	< 5	< 25	< 5	< 5
1,2-Dibromo-3-chloropropane	< 5	< 5	< 5	< 5	< 25	< 5	< 5
1,2-Dibromoethane	< 5	< 5	< 5	< 5	< 25	< 5	< 5
1,2-Dichloroethane	< 1	< 1	< 1	< 1	< 5	< 1	< 1
1,2-Dichloropropane	< 1	< 1	< 1	< 1	< 5	< 1	< 1
2-Butanone	< 10	< 10	< 10	< 10	< 50	< 10	< 10
2-Chloro-1,3-butadiene	< 5	< 5	< 5	< 5	< 25	< 5	< 5
2-Hexanone	< 10	< 10	< 10	< 10	< 50	< 10	< 10
3-Chloro-1-propene	< 5	< 5	< 5	< 5	< 25	< 5	< 5
4-Methyl-2-Pentanone	< 10	< 10	< 10	< 10	< 50	< 10	< 10
Acetone	< 20	< 20	< 20	< 20	< 100	< 20	< 20
Acrolein	< 50 J	< 50 J	< 50 J	< 50 J	< 250	< 50	< 50 J
Acrylonitrile	< 50	< 50	< 50	< 50	< 250	< 50	< 50
Benzene	< 1	< 1	< 1	< 1	< 5	**6**	< 1
Bromodichloromethane	< 1	< 1	< 1	< 1	< 5	< 1	< 1
Bromoform	< 1	< 1	< 1	< 1	< 5	< 1	< 1
Bromomethane	< 5	< 5	< 5	< 5	< 25	< 5	< 5
Carbon Disulfide	< 1	< 1	< 1	< 1	< 5	< 1	< 1
Carbon Tetrachloride	< 1	< 1	< 1	< 1	< 5	< 1	< 1
Chlorobenzene	**5.7**	< 1	< 1	< 1	< 5	< 1	< 1
Chloroethane	**12.3**	**10.2**	< 10	< 10	< 50	**30.8**	< 10
Chloroform	< 1	< 1	< 1	< 1	< 5	< 1	< 1
Chloromethane	< 10	< 10	< 10	< 10	< 50	< 10	< 10
Dibromochloromethane	< 1	< 1	< 1	< 1	< 5	< 1	< 1
Dibromomethane	< 1	< 1	< 1	< 1	< 5	< 1	< 1
Dichlorodifluoromethane	< 10	< 10	< 10	< 10	< 50	< 10	< 10
Ethyl Methacrylate	< 5	< 5	< 5	< 5	< 25	< 5	< 5
Ethylbenzene	< 1	< 1	< 1	< 1	< 5	**108**	< 1
Iodomethane	< 5	< 5	< 5	< 5	< 25	< 5	< 5
Methacrylonitrile	< 5	< 5	< 5	< 5	< 25	< 5	< 5
Methyl methacrylate	< 5	< 5	< 5	< 5	< 25	< 5	< 5
Methylene Chloride	< 10	< 10	< 10	< 10	< 50	< 10	< 10
Pentachloroethane	< 5	< 5	< 5	< 5	< 25	< 5	< 5
Propionitrile	< 50	< 50	< 50	< 50	< 250	< 50	< 50
Styrene	< 1	< 1	< 1	< 1	< 5	< 1	< 1
Tetrachloroethene	< 1	**1.1**	**7.6**	< 1	< 5	**2.2**	< 1
Toluene	< 1	< 1	< 1	< 1	< 5	**1.1**	< 1
Total Xylenes	< 1	< 1	< 1	< 1	< 5	**70.6**	< 1
Trichloroethene	**25.3**	**62.3**	**108**	< 1	**183**	**69.4**	**4.9**
Trichlorofluoromethane	< 1	< 1	< 1	< 1	< 5	< 1	< 1
Vinyl Acetate	< 10	< 10	< 10	< 10	< 50	< 10	< 10
Vinyl Chloride	**8.4**	**17**	< 5	< 5	< 25	**28.3**	< 5
cis-1,3-Dichloropropene	< 1	< 1	< 1	< 1	< 5	< 1	< 1
trans-1,2-Dichloroethene	**8.3**	**16.7**	< 1	< 1	< 5	**13**	**4.1**
trans-1,3-Dichloropropene	< 1	< 1	< 1	< 1	< 5	< 1	< 1
trans-1,4-Dichloro-2-butene	< 5	< 5	< 5	< 5	< 25	< 5	< 5

Validation codes on last page.

GERAGHTY & MILLER, INC.

HARRISON DIVISION - GMC
GROUNDWATER ANALYTICAL RESULTS
VOLATILE ORGANIC COMPOUNDS

Parameter	HR1-11293-GW UG/L	HR10-12693-GW UG/L	HR11-12693-GW UG/L	HR12-12693-GW UG/L	HR13-11993-GW UG/L	HR14-11393-GW UG/L	HR15-11393-GW UG/L
1,1,1,2-Tetrachloroethane	< 1	< 1	< 1	< 1	< 1	< 1	< 1
1,1,1-Trichloroethane	**4.5**	< 1	< 1	< 1	**1.6**	< 1	< 1
1,1,2,2-Tetrachloroethane	< 1	< 1	< 1	< 1	< 1	< 1	< 1
1,1,2-Trichloroethane	< 1	< 1	< 1	< 1	< 1	< 1	< 1
1,1-Dichloroethane	< 1	< 1	**10.7**	< 1	**43.2**	< 1	< 1
1,1-Dichloroethene	< 1	< 1	< 1	< 1	< 1	< 1	< 1
1,2,3-Trichloropropane	< 5	< 5	< 5	< 5	< 5	< 5	< 5
1,2-Dibromo-3-chloropropane	< 5	< 5	< 5	< 5	< 5	< 5	< 5
1,2-Dibromoethane	< 5	< 5	< 5	< 5	< 5	< 5	< 5
1,2-Dichloroethane	< 1	< 1	< 1	< 1	< 1	< 1	< 1
1,2-Dichloropropane	< 1	< 1	< 1	< 1	< 1	< 1	< 1
2-Butanone	< 10	< 10	< 10	< 10	< 10	< 10	< 10
2-Chloro-1,3-butadiene	< 5	< 5	< 5	< 5	< 5	< 5	< 5
2-Hexanone	< 10	< 10	< 10	< 10	< 10	< 10	< 10
3-Chloro-1-propene	< 5	< 5	< 5	< 5	< 5	< 5	< 5
4-Methyl-2-Pentanone	< 10	< 10	< 10	< 10	< 10	< 10	< 10
Acetone	< 20	< 20	< 20	< 20	< 20	< 20	< 20
Acrolein	< 50	< 50 J	< 50 J	< 50 J	< 50 J	< 50	< 50
Acrylonitrile	< 50	< 50	< 50	< 50	< 50	< 50	< 50
Benzene	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Bromodichloromethane	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Bromoform	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Bromomethane	< 5	< 5	< 5	< 5	< 5	< 5	< 5
Carbon Disulfide	**3.9**	**3**	< 1	**5.5**	< 1	< 1	< 1
Carbon Tetrachloride	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Chlorobenzene	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Chloroethane	< 10	< 10	< 10	< 10	< 10	< 10	< 10
Chloroform	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Chloromethane	< 10	< 10	< 10	< 10	< 10	< 10	< 10
Dibromochloromethane	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Dibromomethane	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Dichlorodifluoromethane	< 10	< 10	< 10	< 10	< 10	< 10	< 10
Ethyl Methacrylate	< 5	< 5	< 5	< 5	< 5	< 5	< 5
Ethylbenzene	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Iodomethane	< 5	< 5	< 5	< 5	< 5	< 5	< 5
Methacrylonitrile	< 5	< 5	< 5	< 5	< 5	< 5	< 5
Methyl methacrylate	< 5	< 5	< 5	< 5	< 5	< 5	< 5
Methylene Chloride	< 10	< 10	< 10	< 10	< 10	< 10	< 10
Pentachloroethane	< 5	< 5	< 5	< 5	< 5	< 5	< 5
Propionitrile	< 50	< 50	< 50	< 50	< 50	< 50	< 50
Styrene	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Tetrachloroethene	**25.6**	< 1	< 1	< 1	< 1	< 1	< 1
Toluene	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Total Xylenes	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Trichloroethene	**55.8**	< 1	< 1	< 1	**2.4**	**4.6**	< 1
Trichlorofluoromethane	**2**	< 1	< 1	< 1	< 1	< 1	< 1
Vinyl Acetate	< 10	< 10	< 10	< 10	< 10	< 10	< 10
Vinyl Chloride	< 5	< 5	< 5	**6.6**	< 5	7.7	< 5
cis-1,3-Dichloropropene	< 1	< 1	< 1	< 1	< 1	< 1	< 1
trans-1,2-Dichloroethene	**1.6**	< 1	< 1	< 1	**3.8**	< 1	< 1
trans-1,3-Dichloropropene	< 1	< 1	< 1	< 1	< 1	< 1	< 1
trans-1,4-Dichloro-2-butene	< 5	< 5	< 5	< 5	< 5	< 5	< 5

Validation codes on last page.

HARRISON DIVISION - GMC
GROUNDWATER ANALYTICAL RESULTS
VOLATILE ORGANIC COMPOUNDS

Parameter	HR17-12593-GW UG/L	HR3-11993-GW UG/L	HR4-11993-GW UG/L	HR6-11993-GW UG/L	HR8-12693-GW UG/L	HR9-12693-GW UG/L
1,1,1,2-Tetrachloroethane	< 1	< 1	< 1	< 1	< 1	< 1
1,1,1-Trichloroethane	**2.6**	< 1	< 1	< 1	**5.2**	**5.4**
1,1,2,2-Tetrachloroethane	< 1	< 1	< 1	< 1	< 1	< 1
1,1,2-Trichloroethane	< 1	< 1	< 1	< 1	< 1	< 1
1,1-Dichloroethane	< 1	< 1	< 1	< 1	**34.6**	**29.3**
1,1-Dichloroethene	< 1	< 1	< 1	< 1	< 1	< 1
1,2,3-Trichloropropane	< 5	< 5	< 5	< 5	< 5	< 5
1,2-Dibromo-3-chloropropane	< 5	< 5	< 5	< 5	< 5	< 5
1,2-Dibromoethane	< 5	< 5	< 5	< 5	< 5	< 5
1,2-Dichloroethane	< 1	< 1	< 1	< 1	< 1	< 1
1,2-Dichloropropane	< 1	< 1	< 1	< 1	< 1	< 1
2-Butanone	< 10	< 10	< 10	< 10	< 10	< 10
2-Chloro-1,3-butadiene	< 5	< 5	< 5	< 5	< 5	< 5
2-Hexanone	< 10	< 10	< 10	< 10	< 10	< 10
3-Chloro-1-propene	< 5	< 5	< 5	< 5	< 5	< 5
4-Methyl-2-Pentanone	< 10	< 10	< 10	< 10	< 10	< 10
Acetone	< 20	< 20	< 20	< 20	< 20	< 20
Acrolein	< 50 J	< 50 J	< 50 J	< 50 J	< 50 J	< 50 J
Acrylonitrile	< 50	< 50	< 50	< 50	< 50	< 50
Benzene	< 1	< 1	< 1	< 1	< 1	< 1
Bromodichloromethane	< 1	< 1	< 1	< 1	< 1	< 1
Bromoform	< 1	< 1	< 1	< 1	< 1	< 1
Bromomethane	< 5	< 5	< 5	< 5	< 5	< 5
Carbon Disulfide	< 1	< 1	< 1	< 1	< 1	< 1
Carbon Tetrachloride	< 1	< 1	< 1	< 1	< 1	< 1
Chlorobenzene	< 1	< 1	< 1	< 1	< 1	< 1
Chloroethane	< 10	< 10	< 10	< 10	< 10	**13.7**
Chloroform	< 1	< 1	< 1	< 1	< 1	< 1
Chloromethane	< 10	< 10	< 10	< 10	< 10	< 5
Dibromochloromethane	< 1	< 1	< 1	< 1	< 1	< 1
Dibromomethane	< 1	< 1	< 1	< 1	< 1	< 1
Dichlorodifluoromethane	< 10	< 10	< 10	< 10	< 10	< 10
Ethyl Methacrylate	< 5	< 5	< 5	< 5	< 5	< 5
Ethylbenzene	< 1	< 1	< 1	< 1	< 1	< 1
Iodomethane	< 5	< 5	< 5	< 5	< 5	< 5
Methacrylonitrile	< 5	< 5	< 5	< 5	< 5	< 5
Methyl methacrylate	< 5	< 5	< 5	< 5	< 5	< 5
Methylene Chloride	< 10	< 10	< 10	< 10	< 10	< 10
Pentachloroethane	< 5	< 5	< 5	< 5	< 5	< 5
Propionitrile	< 50	< 50	< 50	< 50	< 50	< 50
Styrene	< 1	< 1	< 1	< 1	< 1	< 1
Tetrachloroethene	**12.2**	< 1	**1.6**	< 1	< 1	< 1
Toluene	< 1	< 1	< 1	< 1	< 1	< 1
Total Xylenes	< 1	< 1	< 1	< 1	< 1	< 1
Trichloroethene	**3.1**	< 1	**1.7**	**4.4**	**1.3**	**16.1**
Trichlorofluoromethane	< 1	< 1	< 1	< 1	< 1	< 1
Vinyl Acetate	< 10	< 10	< 10	< 10	< 10	< 10
Vinyl Chloride	< 5	< 5	< 5	< 5	< 5	< 5
cis-1,3-Dichloropropene	< 1	< 1	< 1	< 1	< 1	< 1
trans-1,2-Dichloroethene	< 1	< 1	< 1	< 1	< 1	< 1
trans-1,3-Dichloropropene	< 1	< 1	< 1	< 1	< 1	< 1
trans-1,4-Dichloro-2-butene	< 5	< 5	< 5	< 5	< 5	< 5

Validation codes on last page.

HARRISON DIVISON - GMC
GROUNDWATER ANALYTICAL RESULTS
VOLATILE ORGANIC COMPOUNDS

Parameter	W1N-11993-GW UG/L	W1S-12593-G UG/L	W2S-12593-G UG/L	W3N-11393-GW UG/L	W4N-11393-GW UG/L	W4S-12593-GW UG/L
1,1,1,2-Tetrachloroethane	< 1	< 1	< 1	< 5	< 1	< 1
1,1,1-Trichloroethane	< 1	< 1	< 1	< 5	< 1	**2.5**
1,1,2,2-Tetrachloroethane	< 1	< 1	< 1	< 5	< 1	< 1
1,1,2-Trichloroethane	< 1	< 1	< 1	< 5	< 1	< 1
1,1-Dichloroethane	< 1	< 1	< 1	< 5	< 1	< 1
1,1-Dichloroethene	< 1	< 1	< 1	< 5	< 1	< 1
1,2,3-Trichloropropane	< 5	< 5	< 5	< 25	< 5	< 5
1,2-Dibromo-3-chloropropane	< 5	< 5	< 5	< 25	< 5	< 5
1,2-Dibromoethane	< 5	< 5	< 5	< 25	< 5	< 5
1,2-Dichloroethane	< 1	< 1	< 1	< 5	< 1	< 1
1,2-Dichloropropane	< 1	< 1	< 1	< 5	< 1	< 1
2-Butanone	< 10	< 10	< 10	< 50	< 10	< 10
2-Chloro-1,3-butadiene	< 5	< 5	< 5	< 25	< 5	< 5
2-Hexanone	< 10	< 10	< 10	< 50	< 10	< 10
3-Chloro-1-propene	< 5	< 5	< 5	< 25	< 5	< 5
4-Methyl-2-Pentanone	< 10	< 10	< 10	< 50	< 10	< 10
Acetone	< 20	< 20	< 20	< 100	< 20	< 20
Acrolein	< 50 J	< 50 J	< 50 J	< 250	< 50	< 50 J
Acrylonitrile	< 50	< 50	< 50	< 250	< 50	< 50
Benzene	< 1	< 1	< 1	< 5	< 1	< 1
Bromodichloromethane	< 1	< 1	< 1	< 5	< 1	< 1
Bromoform	< 1	< 1	< 1	< 5	< 1	< 1
Bromomethane	< 5	< 5	< 5	< 25	< 5	< 5
Carbon Disulfide	< 1	< 1	< 1	< 5	< 1	< 1
Carbon Tetrachloride	< 1	< 1	< 1	< 5	< 1	< 1
Chlorobenzene	< 1	< 1	< 1	< 5	< 1	< 1
Chloroethane	< 10	< 10	< 10	< 50	< 10	< 10
Chloroform	< 1	< 1	< 1	< 5	< 1	< 1
Chloromethane	< 10	< 10	< 10	< 50	< 10	< 10
Dibromochloromethane	< 1	< 1	< 1	< 5	< 1	< 1
Dibromomethane	< 1	< 1	< 1	< 5	< 1	< 1
Dichlorodifluoromethane	< 10	< 1	< 10	< 50	< 10	< 10
Ethyl Methacrylate	< 5	< 5	< 5	< 25	< 5	< 5
Ethylbenzene	< 1	< 1	< 1	< 5	< 1	< 1
Iodomethane	< 5	< 5	< 5	< 25	< 5	< 5
Methacrylonitrile	< 5	< 5	< 5	< 25	< 5	< 5
Methyl methacrylate	< 5	< 5	< 5	< 25	< 5	< 5
Methylene Chloride	< 10	< 10	< 10	< 50	< 10	< 10
Pentachloroethane	< 5	< 5	< 5	< 25	< 5	< 5
Propionitrile	< 50	< 50	< 50	< 250	< 50	< 50
Styrene	< 1	< 1	< 1	< 5	< 1	< 1
Tetrachloroethene	< 1	**34.7**	< 1	**41.4**	**1.6**	**166**
Toluene	< 1	< 1	< 1	< 5	< 1	< 1
Total Xylenes	< 1	< 1	< 1	< 5	< 1	< 1
Trichloroethene	< 1	**5.2**	**4.6**	**9.3**	**9.1**	**25**
Trichlorofluoromethane	< 1	**29.9**	< 1	< 5	< 1	< 1
Vinyl Acetate	< 10	< 10	< 10	< 50	< 10	< 10
Vinyl Chloride	< 5	< 5	< 5	< 25	< 5	< 5
cis-1,3-Dichloropropene	< 1	< 1	< 1	< 5	< 1	< 1
trans-1,2-Dichloroethene	< 1	< 1	< 1	< 5	< 1	< 1
trans-1,3-Dichloropropene	< 1	< 1	< 1	< 5	< 1	< 1
trans-1,4-Dichloro-2-butene	< 5	< 5	< 5	< 25	< 5	< 5

Validation codes on last page.

HARRISON DIVISION - GMC
GROUNDWATER ANALYTICAL RESULTS
VOLATILE ORGANIC COMPOUNDS

Parameter	GM19D-12093-GW UG/L	GM19S-12093-GW UG/L	4S-12293-GW UG/L	DUP-13 UG/L	DUP-14 UG/L	DUP-15 UG/L	DUP-16 UG/L	DUP-17 UG/L	DUP-18 UG/L	DUP-19 UG/L
1,1,1,2-Tetrachloroethane	<1	<1	<10	<1	<1	<1	<1	<1	<1	<1
1,1,1-Trichloroethane	**6.6**	**90.1**	<10	7.7	<1	<1	**8**	**12.6**	<1	<1
1,1,2,2-Tetrachloroethane	<1	<1	<10	<1	<1	<1	<1	<1	<1	<1
1,1,2-Trichloroethane	<1	<1	<10	<1	<1	<1	<1	<1	<1	<1
1,1-Dichloroethane	**2.4**	**16.7**	**77.8**	<1	<1	<1	<1	**2.9**	**2.5**	<1
1,1-Dichloroethene	1.7	2.5	<10	<1	<1	<1	<1	<1	<1	<1
1,2,3-Trichloropropane	<5	<5	<50	<5	<5	<5	<5	<5	<5	<5
1,2-Dibromo-3-chloropropane	<5	<5	<50	<5	<5	<5	<5	<5	<5	<5
1,2-Dibromoethane	<5	<5	<50	<5	<5	<5	<5	<5	<5	<5
1,2-Dichloroethane	<1	<1	<10	<1	<1	<1	<1	<1	<1	<1
1,2-Dichloropropane	<1	<1	<10	<1	<1	<1	<1	<1	<1	<1
2-Butanone	<10	<10	<100	<10	<10	<10	<10	<10	<10	<10
2-Chloro-1,3-butadiene	<5	<5	<50	<5	<5	<5	<5	<5	<5	<5
2-Hexanone	<10	<10	<100	<10	<10	<10	<10	<10	<10	<10
3-Chloro-1-propene	<5	<5	<50	<5	<5	<5	<5	<5	<5	<5
4-Methyl-2-Pentanone	<10	<10	<100	<10	<10	<10	<10	<10	<10	<10
Acetone	<20	<20	<200	<20	<20	<20	<20	<20	<20	<20
Acrolein	<50	<50	<500J	<50	<50	<50J	<50	<50J	<50J	<50J
Acrylonitrile	<50	<50	<500	<50	<50	<50	<50	<50	<50	<50
Benzene	<1	<1	<10	<1	<1	<1	<1	<1	<1	<1
Bromodichloromethane	<1	<1	<10	<1	<1	<1	<1	<1	<1	<1
Bromoform	<1	<1	<10	<1	<1	<1	<1	<1	<1	<1
Bromomethane	<5	<5	<50	<5	<5	<5	<5	<5	<5	<5
Carbon Disulfide	<1	<1	<10	<1	**2.1**	<1	<1	<1	<1	<1
Carbon Tetrachloride	<1	<1	<10	<1	<1	<1	<1	<1	<1	<1
Chlorobenzene	<1	<1	<10	<1	<1	<1	<1	<1	<1	<1
Chloroethane	<10	<10	<100	<10	<10	<10	<10	<10	<10	<10
Chloroform	<1	<1	<10	<1	<1	<1	<1	<1	<1	<1
Chloromethane	<10	<10	<100	<10	<10	<10	<10	<10	<10	<10
Dibromochloromethane	<1	<10	<10	<1	<1	<1	<1	<1	<1	<1
Dibromomethane	<1	<1	<10	<1	<1	<1	<1	<1	<1	<1
Dichlorodifluoromethane	<10	<10	<100	<10	<10	<10	<10	<10	<10	<10
Ethyl Methacrylate	<5	<5	<50	<5	<5	<5	<5	<5	<5	<5
Ethylbenzene	<1	<1	**45.9**	<1	<1	<1	<1	<1	<1	<1
Iodomethane	<5	<5	<50	<5	<5	<5	<5	<5	<5	<5
Methacrylonitrile	<5	<5	<50	<5	<5	<5	<5	<5	<5	<5
Methyl methacrylate	<5	<5	<50	<5	<5	<5	<5	<5	<5	<5
Methylene Chloride	<10	<10	<100	<10	<10	<10	<10	<10	<10	<10
Pentachloroethane	<5	<5	<50	<5	<5	<5	<5	<5	<5	<5
Propionitrile	<50	<50	<500	<50	<50	<50	<50	<50	<50	<50
Styrene	<1	<1	<10	<1	<1	<1	<1	<1	<1	<1
Tetrachloroethene	<1	21.1	<10	**46.3**	<1	**2.5**	<1	**7.2**	<1	**11.4**
Toluene	<1	<1	<10	<1	<1	<1	<1	<1	<1	<1
Total Xylenes	**2.4**	<1	**24**	<1	<1	<1	**2.5**	<1	<1	<1
Trichloroethene	**80.1**	**157**	<10	**101**	<1	**2.2**	**91.6**	**94.8**	<1	**3.1**
Trichlorofluoromethane	<1	<1	<10	**5**	<1	<1	<1	<1	<1	<1
Vinyl Acetate	<10	<10	<100	<10	<10	<10	<10	<10	<10	<10
Vinyl Chloride	**25.8**	<5	<50	<5	<5	<5	**25.3**	<5	<5	<5
cis-1,3-Dichloropropene	<1	<1	<10	<1	<1	<1	<1	<1	<1	<1
trans-1,2-Dichloroethene	<1	**3.2**	<10	**2.8**	<1	<1	<1	<1	<1	<1
trans-1,3-Dichloropropene	<1	<1	<10	<1	<1	<1	<1	<1	<1	<1
trans-1,4-Dichloro-2-butene	<5	<5	<50	<5	<5	<5	<5	<5	<5	<5

Validation codes on last page.

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GERAGHTY & MILLER, INC.

HARRISON DIVISION - GMC
RINSEATE BLANK RESULTS
VOLATILE ORGANIC COMPOUNDS

Parameter	RB-02 UG/L	RB-03 UG/L	RB-04 UG/L	RB-05 UG/L	RB-06 UG/L	RB-07 UG/L	RB-08 UG/L	RB-09 UG/L	RB-10 UG/L	RB-11 UG/L
1,1,1,2-Tetrachloroethane	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
1,1,1-Trichloroethane	< 1	**3**	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
1,1,2,2-Tetrachloroethane	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
1,1,2-Trichloroethane	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
1,1-Dichloroethane	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
1,1-Dichloroethene	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
1,2,3-Trichloropropane	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
1,2-Dibromo-3-chloropropane	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
1,2-Dibromoethane	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
1,2-Dichloroethane	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
1,2-Dichloropropane	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
2-Butanone	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10
2-Chloro-1,3-butadiene	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
2-Hexanone	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10
3-Chloro-1-propene	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
4-Methyl-2-Pentanone	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10
Acetone	< 20	< 20	< 20 J	< 20	< 20	< 20	< 20	< 20	< 20	< 20
Acrolein	< 50	< 50	< 50 J	< 50	< 50 J	< 50 J	< 50 J	< 50 J	< 50 J	< 50 J
Acrylonitrile	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50
Benzene	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Bromodichloromethane	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Bromoform	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Bromomethane	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
Carbon Disulfide	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Carbon Tetrachloride	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Chlorobenzene	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Chloroethane	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10
Chloroform	< 1	< 1	**1.2**	**1.2**	**2**	**2.1**	**2.4**	**2.3**	**2.3**	**1.4**
Chloromethane	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10
Dibromochloromethane	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Dibromomethane	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Dichlorodifluoromethane	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10
Ethyl Methacrylate	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
Ethylbenzene	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Iodomethane	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
Methacrylonitrile	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
Methyl methacrylate	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
Methylene Chloride	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10
Pentachloroethane	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
Propionitrile	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50
Styrene	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Tetrachloroethene	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Toluene	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Total Xylenes	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Trichloroethene	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Trichlorofluoromethane	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Vinyl Acetate	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10
Vinyl Chloride	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
cis-1,3-Dichloropropene	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
trans-1,2-Dichloroethene	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
trans-1,3-Dichloropropene	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
trans-1,4-Dichloro-2-butene	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5

Validation codes on last page.

HARRISON DIVISION - GMC
TRIP BLANK ANALYTICAL RESULTS
VOLATILE ORGANIC COMPOUNDS

Parameter	TB-08 UG/L	TB-09 UG/L	TB-10 UG/L	TB-11 UG/L	TB-12 UG/L	TB-13 UG/L	TB-14 UG/L	TB-15 UG/L	TB-16 UG/L	TB-17 UG/L
1,1,1,2-Tetrachloroethane	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
1,1,1-Trichloroethane	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
1,1,2,2-Tetrachloroethane	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
1,1,2-Trichloroethane	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
1,1-Dichloroethane	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
1,1-Dichloroethene	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
1,2,3-Trichloropropane	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
1,2-Dibromo-3-chloropropane	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
1,2-Dibromoethane	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
1,2-Dichloroethane	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
1,2-Dichloropropane	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
2-Butanone	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10
2-Chloro-1,3-butadiene	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
2-Hexanone	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10
3-Chloro-1-propene	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
4-Methyl-2-Pentanone	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10
Acetone	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20
Acrolein	< 50	< 50	< 50	< 50	< 50	< 50 J	< 50 J	< 50 J	< 50 J	< 50 J
Acrylonitrile	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50
Benzene	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Bromodichloromethane	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Bromoform	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Bromomethane	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
Carbon Disulfide	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Carbon Tetrachloride	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Chlorobenzene	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Chloroethane	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10
Chloroform	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Chloromethane	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10
Dibromochloromethane	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Dibromomethane	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Dichlorodifluoromethane	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10
Ethyl Methacrylate	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
Ethylbenzene	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Iodomethane	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
Methacrylonitrile	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
Methyl methacrylate	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
Methylene Chloride	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10
Pentachloroethane	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
Propionitrile	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50
Styrene	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Tetrachloroethene	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Toluene	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Total Xylenes	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Trichloroethene	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Trichlorofluoromethane	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Vinyl Acetate	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10
Vinyl Chloride	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
cis-1,3-Dichloropropene	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
trans-1,2-Dichloroethene	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
trans-1,3-Dichloropropene	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
trans-1,4-Dichloro-2-butene	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5

VALIDATION CODES:

J=Estimated Value

<( )J=Laboratory reported this result as below detected. Result is estimated based on data validation.

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PHASE I AQUEOUS SAMPLES

SEMIVOLATILE ORGANIC COMPOUND RESULTS
MONITOR WELLS AND RINSEATE BLANK SAMPLES

DRAFT

HARRISON DIVISION - GMC
GROUNDWATER ANAYTICAL RESULTS
SEMIVOLATILE ORGANIC COMPOUNDS

Parameter	19D-12093-GW UG/L	19S-12093-GW UG/L	4S-12293-GW UG/L	DUP-14 UG/L	DUP-15 UG/L	DUP-16 UG/L	DUP-17 UG/L	DUP-18 UG/L	DUP-19 UG/L	DUP-20 UG/L
1,2,4,5-Tetrachlorobenzene	< 22	< 20	< 200	< 20	< 20	< 20	< 20	< 20	< 20	< 20
1,2,4-Trichlorobenzene	< 11	< 10	< 100	< 10	< 10	< 10	< 10	< 10	< 10	< 10
1,2-Dichlorobenzene	< 11	< 10	< 100	< 10	< 10	< 10	< 10	< 10	< 10	< 10
1,3,5-Trinitrobenzene	< 33	< 30	< 300	< 30	< 30	< 30	< 30	< 30	< 30	< 30
1,3-Dichlorobenzene	< 11	< 10	< 100	< 10	< 10	< 10	< 10	< 10	< 10	< 10
1,3-Dinitrobenzene	< 22	< 20	< 200	< 20	< 20	< 20	< 20	< 20	< 20	< 20
1,4-Dichlorobenzene	< 11	< 10	< 100	< 10	< 10	< 10	< 10	< 10	< 10	< 10
1,4-Naphthoquinone	< 110	< 100	< 1000	< 100	< 100	< 100	< 100	< 100	< 100	< 100
1-Naphthylamine	< 33 J	< 30 J	< 300	< 30 J	< 30 J	< 30 J	< 30	< 30	< 30	< 30
2,2'-Dichlorodiisopropyl Ethe	< 11	< 10	< 100	< 10	< 10	< 10	< 10	< 10	< 10	< 10
2,3,4,6-Tetrachlorophenol	< 22	< 20	< 200	< 20	< 20	< 20	< 20	< 20	< 20	< 20
2,4,5-Trichlorophenol	< 11	< 10	< 100	< 10	< 10	< 10	< 10	< 10	< 10	< 10
2,4,6-Trichlorophenol	< 11	< 10	< 100	< 10	< 10	< 10	< 10	< 10	< 10	< 10
2,4-Dichlorophenol	< 11	< 10	< 100	< 10	< 10	< 10	< 10	< 10	< 10	< 10
2,4-Dimethylphenol	< 11	< 10	< 100	< 10	< 10	< 10	< 10	< 10	< 10	< 10
2,4-Dinitrophenol	< 11	< 10	< 100	< 10	< 10	< 10	< 10	< 10	< 10	< 10
2,4-Dinitrotoluene	< 11	< 10	< 100	< 10	< 10	< 10	< 10	< 10	< 10	< 10
2,6-Dichlorophenol	< 11	< 10	< 100	< 10	< 10	< 10	< 10	< 10	< 10	< 10
2,6-Dinitrotoluene	< 11	< 10	< 100	< 10	< 10	< 10	< 10	< 10	< 10	< 10
2-Acetylaminofluorene	< 22 J	< 20 J	< 200	< 20	< 20 J	< 20 J	< 20	< 20	< 20	< 20
2-Chloronapthalene	< 11	< 10	< 100	< 10	< 10	< 10	< 10	< 10	< 10	< 10
2-Chlorophenol	< 11	< 10	< 100	< 10	< 10	< 10	< 10	< 10	< 10	< 10
2-Methyl-4,6-Dinitrophenol	< 11	< 10	< 100	< 10	< 10	< 10	< 10	< 10	< 10	< 10
2-Methylnapthalene	< 11	< 10	< 100	< 10	< 10	< 10	< 10	< 10	< 10	< 10
2-Methylphenol	< 11	< 10	< 100	< 10	< 10	< 10	< 10	< 10	< 10	< 10
2-Naphthylamine	< 33 J	< 30 J	< 300	< 30	< 30 J	< 30 J	< 30	< 30	< 30	< 30
2-Nitroaniline	< 17	< 15	< 150	< 15	< 15 J	< 15	< 15	< 15	< 15	< 15
2-Nitrophenol	< 11	< 10	< 100	< 10	< 10	< 10	< 10	< 10	< 10	< 10
2-Picoline	< 22	< 20	< 200	< 20	< 20	< 20	< 20	< 20	< 20	< 20
3,3'-Dichlorobenzidine	< 22 J	< 20 J	< 200	< 20 J	< 20 J	< 20 J	< 20	< 20	< 20	< 20
3,3'-Dimethylbenzidine	< 22 J	< 20 J	< 200	< 20 J	< 20 J	< 20 J	< 20	< 20	< 20	< 20

Validation codes on last page.

GERAGHTY & MILLER, INC.

HARRISON DIVISION - GMC
GROUNDWATER ANAYTICAL RESULTS
SEMIVOLATILE ORGANIC COMPOUNDS

Parameter	19D-12093-GW UG/L	19S-12093-GW UG/L	4S-12293-GW UG/L	DUP-14 UG/L	DUP-15 UG/L	DUP-16 UG/L	DUP-17 UG/L	DUP-18 UG/L	DUP-19 UG/L	DUP-20 UG/L
3-Cresol	< 11	< 10	< 100	< 10	< 10	< 10	< 10	< 10	< 10	< 10
3-Methylcholanthrene	< 33 J	< 30 J	< 300	< 30	< 30	< 30 J	< 30	< 30	< 30	< 30
3-Nitroaniline	< 17	< 15	< 150	< 15 J	< 15	< 15	< 15	< 15	< 15	< 15
4-Aminobiphenyl	< 22 J	< 20 J	< 200	< 20	< 20 J	< 20 J	< 20	< 20	< 20	< 20
4-Bromophenyl-phenyl ether	< 11	< 10	< 100	< 10	< 10	< 10	< 10	< 10	< 10	< 10
4-Chloro-3-Methylphenol	< 11	< 10	< 100	< 10	< 10	< 10	< 10	< 10	< 10	< 10
4-Chloroaniline	< 11	< 10	< 100	< 10	< 10	< 10	< 10	< 10	< 10	< 10
4-Chlorophenyl-phenyl ether	< 11	< 10	< 100	< 10	< 10	< 10	< 10	< 10	< 10	< 10
4-Nitroaniline	< 17	< 15	< 150	< 15	< 15 J	< 15	< 15	< 15	< 15	< 15
4-Nitrophenol	< 11	< 10	< 100	< 10	< 10 J	< 10	< 10	< 10	< 10	< 10 J
4-Nitroquinoline-1-oxide	< 33 J	< 30 J	< 300 J	< 30	< 30 J	< 30 J	< 30 J	< 30 J	< 30 J	< 30
5-Nitro-o-toluidine	< 22	< 20	< 200	< 20	< 20	< 20	< 20	< 20	< 20	< 20
7,12-Dimethylbenz[a]anthrac	< 22 J	< 20 J	< 200	< 20	< 20	< 20 J	< 20	< 20	< 20	< 20
A,A-Dimethyl-Phenethylami	< 55 J	< 50 J	< 500	< 50 J	< 50 J	< 50 J	< 50	< 50	< 50	< 50
Acenaphthene	< 11	< 10	< 100	< 10	< 10	< 10	< 10	< 10	< 10	< 10
Acenaphthylene	< 11	< 10	< 100	< 10	< 10	< 10	< 10	< 10	< 10	< 10
Acetophenone	< 22	< 20	< 200	< 20	< 20	< 20	< 20	< 20	< 20	< 20
Aniline	< 11	< 10	< 100	< 10	< 10	< 10	< 10	< 10	< 10	< 10
Anthracene	< 11	< 10	< 100	< 10	< 10	< 10	< 10	< 10	< 10	< 10
Aramite, Total	< 17	< 15	< 150	< 15	< 15	< 15	< 15	< 15	< 15	< 15
Benzo(a)Anthracene	< 11	< 10	< 100	< 10	< 10	< 10	< 10	< 10	< 10	< 10
Benzo(a)Pyrene	< 11 J	< 10 J	< 100	< 10	< 10	< 10 J	< 10	< 10	< 10	< 10
Benzo(b)Fluoranthene	< 11 J	< 10 J	< 100	< 10	< 10	< 10 J	< 10	< 10	< 10	< 10
Benzo(g,h,i)Perylene	< 11 J	< 10 J	< 100	< 10	< 10	< 10 J	< 10	< 10	< 10	< 10
Benzo(k)Fluoranthene	< 11 J	< 10 J	< 100	< 10	< 10	< 10 J	< 10	< 10	< 10	< 10
Benzyl Alcohol	< 11	< 10	< 100	< 10	< 10	< 10	< 10	< 10	< 10	< 10
Butyl benzyl phthalate	< 11	< 10	< 100	< 10	< 10	< 10	< 10	< 10	< 10	< 10
Chrysene	< 11	< 10	< 100	< 10	< 10	< 10	< 10	< 10	< 10	< 10
Di-n-Butylphthalate	< 11 J	< 10	< 100	< 10	< 10	< 10 J	< 10	< 10	< 10	< 10
Di-n-Octyl Phthalate	< 11 J	< 10 J	< 100	< 10	< 10	< 10 J	< 10	< 10	< 10	< 10
Diallate, Total	< 33	< 30	< 300	< 30 J	< 30	< 30	< 30	< 30	< 30	< 30
Dibenz(a,h)Anthracene	< 11	< 10 J	< 100	< 10	< 10	< 10	< 10	< 10	< 10	< 10

Validation codes on last page.

HARRISON DIVISION - GMC
GROUNDWATER ANAYTICAL RESULTS
SEMIVOLATILE ORGANIC COMPOUNDS

Parameter	19D-12093-GW UG/L	19S-12093-GW UG/L	4S-12293-GW UG/L	DUP-14 UG/L	DUP-15 UG/L	DUP-16 UG/L	DUP-17 UG/L	DUP-18 UG/L	DUP-19 UG/L	DUP-20 UG/L
Dibenzofuran	< 11	< 10	< 100	< 10	< 10	< 10	< 10	< 10	< 10	< 10
Diethylphthalate	< 11	< 10	< 100	< 10	< 10	< 10	< 10	< 10	< 10	< 10
Dimethoate	< 110	< 100	< 1000	< 100	< 100	< 100	< 100	< 100	< 100	< 100
Dimethyl Phtalate	< 11	< 10	< 100	< 10	< 10	< 10	< 10	< 10	< 10	< 10
Diphenylamine	< 22	< 20	< 200	< 20	< 20	< 20	< 20	< 20	< 20	< 20
Disulfoton	< 22	< 20	< 200	< 20	< 20	< 20	< 20	< 20	< 20	< 20
Ethyl methanesulfonate	< 22	< 20	< 200	< 20	< 20	< 20	< 20	< 20	< 20	< 20
Famphur	< 11	< 10	< 100	< 10	< 10	< 10	< 10	< 10	< 10	< 10
Fluoranthene	< 11	< 10	< 100	< 10	< 10	< 10	< 10	< 10	< 10	< 10
Fluorene	< 11	< 10	< 100	< 10 J	< 10	< 10	< 10	< 10	< 10	< 10
Hexachloro-1,3-butadiene	< 11	< 10	< 100	< 10	< 10	< 10	< 10	< 10	< 10	< 10
Hexachlorobenzene	< 11	< 10	< 100	< 10	< 10	< 10	< 10	< 10	< 10	< 10
Hexachlorocyclopentadiene	< 11	< 10	< 100	< 10	< 10	< 10	< 10	< 10	< 10	< 10
Hexachloroethane	< 11	< 10	< 100	< 10	< 10	< 10	< 10	< 10	< 10	< 10
Hexachlorophene	< 550 J	< 500 J	< 5000 J	< 500 J	< 500 J	< 500 J	< 500 J	< 500 J	< 500	< 500 J
Hexachloropropene	< 33	< 30	< 300	< 30	< 30	< 30	< 30	< 30	< 30	< 30
Indeno(1,2,3-cd)Pyrene	< 11 J	< 10 J	< 100	< 10	< 10	< 10 J	< 10	< 10	< 10	< 10
Isodrin	< 33	< 30	< 300	< 30	< 30	< 30	< 30	< 30	< 30	< 30
Isophorone	< 11	< 10	< 100	< 10	< 10	< 10	< 10	< 10	< 10	< 10
Isosafrole, Total	< 22	< 20	< 200	< 20	< 20	< 20	< 20	< 20	< 20	< 20
Kepone	< 275 J	< 250 J	< 2500	< 250 J	< 250 J	< 250 J	< 250	< 250	< 250	< 250
Methapyrilene	< 110 J	< 100 J	< 1000 J	< 100	< 100 J	< 100 J	< 100 J	< 100 J	< 100 J	< 100 J
Methyl methanesulfonate	< 22	< 20	< 200	< 20	< 20	< 20	< 20	< 20	< 20	< 20
Methyl parathion	< 22	< 20	< 200	< 20	< 20	< 20	< 20	< 20	< 20	< 20
N-Nitroso-Di-n-Propylamine	< 11	< 10	< 100	< 10	< 10	< 10	< 10	< 10	< 10	< 10
N-Nitrosodi-n-butylamine	< 22	< 20	< 200	< 20	< 20	< 20	< 20	< 20	< 20	< 20
N-Nitrosodiethylamine	< 33	< 30	< 300	< 30	< 30	< 30	< 30	< 30	< 30	< 30
N-Nitrosodimethylamine	< 11	< 10	< 100	< 10	< 10	< 10	< 10	< 10	< 10	< 10
N-Nitrosodiphenylamine	< 11	< 10	< 100	< 10	< 10	< 10	< 10	< 10	< 10	< 10
N-Nitrosomethylethylamine	< 22	< 20	< 200	< 20	< 20	< 20	< 20	< 20	< 20	< 20
N-Nitrosomorpholine	< 22	< 20	< 200	< 20	< 20	< 20	< 20	< 20	< 20	< 20
N-Nitrosopiperidine	< 22	< 20	< 200	< 20	< 20	< 20	< 20	< 20	< 20	< 20

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HARRISON DIVISION - GMC
GROUNDWATER ANAYTICAL RESULTS
SEMIVOLATILE ORGANIC COMPOUNDS

Parameter	19D-12093-GW UG/L	19S-12093-GW UG/L	4S-12293-GW UG/L	DUP-14 UG/L	DUP-15 UG/L	DUP-16 UG/L	DUP-17 UG/L	DUP-18 UG/L	DUP-19 UG/L	DUP-20 UG/L
N-Nitrosopyrrolidine	< 22	< 20	< 200	< 20	< 20	< 20	< 20	< 20	< 20	< 20
Napthalene	< 11	< 10	< 100	< 10	< 10	< 10	< 10	< 10	< 10	< 10
Nitrobenzene	< 11	< 10	< 100	< 10	< 10	< 10	< 10	< 10	< 10	< 10
Triethyl phosphorothioate	< 22	< 20	< 200	< 20	< 20	< 20	< 20	< 20	< 20	< 20
Parathion	< 22	< 20	< 200	< 20	< 20	< 20	< 20	< 20	< 20	< 20
Pentachlorobenzene	< 22	< 20	< 200	< 20	< 20	< 20	< 20	< 20	< 20	< 20
Pentachloronitrobenzene	< 22	< 20	< 200	< 20	< 20	< 20	< 20	< 20	< 20	< 20
Pentachlorophenol	< 11	< 10	< 100	< 10	< 10	< 10	< 10	< 10	< 10	< 10
Phenacetin	< 22 J	< 20 J	< 200	< 20	< 20 J	< 20 J	< 20	< 20	< 20	< 20
Phenanthrene	< 11	< 10	< 100	< 10	< 10	< 10	< 10	< 10	< 10	< 10
Phenol	< 11	< 10	< 100	< 10	< 10	< 10	< 10	< 10	< 10	< 10
Phorate	< 22 J	< 20 J	< 200	< 20	< 20 J	< 20 J	< 20	< 20	< 20	< 20
Pronamide	< 22	< 20	< 200	< 20	< 20	< 20	< 20	< 20	< 20	< 20
Pyrene	< 11	< 10	< 100	< 10	< 10	< 10	< 10	< 10	< 10	< 10
Pyridine	< 11	< 10	< 100	< 10	< 10	< 10	< 10	< 10	< 10	< 10
Safrole, Total	< 22	< 20	< 200	< 20	< 20	< 20	< 20	< 20	< 20	< 20
Sulfotepp	< 22	< 20	< 200	< 20	< 20	< 20	< 20	< 20	< 20	< 20
Thionazin	< 22	< 20	< 200	< 20	< 20	< 20	< 20	< 20	< 20	< 20
bis(2-Chloroethyl)Ether	< 11	< 10	< 100	< 10	< 10	< 10	< 10	< 10	< 10	< 10
bis(2-Ethylhexyl)Phthalate	29	< 10	< 100	< 10	< 10	< 10	< 10	< 10	< 10	< 10
bis(Chloroethoxy)Methane	< 11	< 10	< 100	< 10	< 10	< 10	< 10	< 10	< 10	< 10
o-Toluidine	< 22	< 20	< 200	< 20	< 20	< 20	< 20	< 20	< 20	< 20
p-(Dimethylamino)azobenzen	< 55	< 50	< 500	< 50	< 50	< 50	< 50	< 50	< 50	< 50
p-Chlorobenzilate	< 55	< 50	< 500	< 50	< 50	< 50	< 50	< 50	< 50	< 50
p-Phenylene diamine	< 33 J	< 30 J	< 300 J	< 30 J	< 30 J	< 30 J	< 30 J	< 30 J	< 30 J	< 30

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HARRISON DIVISION - GMC
GROUNDWATER ANALYTICAL RESULTS
SEMIVOLATILE ORGANIC COMPOUNDS

Parameter	DUP-21 UG/L	DUP-22 UG/L	EAST-11293-GW UG/L	GM1-12193-GW UG/L	GM10-12793-GW UG/L	GM11-12793-GW UG/L	GM13-12893-GW UG/L	GM15-12893-GW UG/L	GM16-12893-GW UG/L	GM17-12793-GW UG/L
1,2,4,5-Tetrachlorobenzene	< 20 R	< 20	< 20	< 20	< 20	< 24 R	< 20	< 20	< 20	< 20
1,2,4-Trichlorobenzene	< 10 R	< 10	< 10	< 10	< 10	< 12 R	< 10	< 10	< 10	< 10
1,2-Dichlorobenzene	< 10 R	< 10	< 10	< 10	< 10	< 12 R	< 10	< 10	< 10	< 10
1,3,5-Trinitrobenzene	< 30 R	< 30	< 30	< 30	< 30	< 36 R	< 30	< 30	< 30	< 30
1,3-Dichlorobenzene	< 10 R	< 10	< 10	< 10	< 10	< 12 R	< 10	< 10	< 10	< 10
1,3-Dinitrobenzene	< 20 R	< 20	< 20	< 20	< 20	< 24 R	< 20 J	< 20	< 20	< 20
1,4-Dichlorobenzene	< 10 R	< 10	< 10	< 10	< 10	< 12 R	< 10	< 10	< 10	< 10
1,4-Naphthoquinone	< 100 R	< 100	< 100	< 100	< 100	< 120 R	< 100	< 100	< 100	< 100
1-Naphthylamine	< 30 R	< 30	< 30 J	< 30	< 30	< 36 R	< 30	< 30	< 30	< 30
2,2'-Dichlorodiisopropyl Ethe	< 10 R	< 10	< 10	< 10	< 10	< 12 R	< 10	< 10	< 10	< 10
2,3,4,6-Tetrachlorophenol	< 20 R	< 20	< 20	< 20	< 20 J	< 24 R	< 20	< 24	< 20	< 20 J
2,4,5-Trichlorophenol	< 10 R	< 10	< 10	< 10	< 10	< 12 R	< 10	< 12	< 10	< 10
2,4,6-Trichlorophenol	< 10 R	< 10	< 10	< 10	< 10	< 12 R	< 10	< 12	< 10	< 10
2,4-Dichlorophenol	< 10 R	< 10	< 10	< 10	< 10	< 12 R	< 10	< 12	< 10	< 10
2,4-Dimethylphenol	< 10 R	< 10	< 10	< 10	< 10	< 12 R	< 10	< 12	< 10	< 10
2,4-Dinitrophenol	< 10 R	< 10	< 10	< 10	< 10 J	< 12 R	< 10 J	< 12	< 10	< 10 J
2,4-Dinitrotoluene	< 10 R	< 10	< 10	< 10	< 10	< 12 R	< 10	< 10	< 10	< 10
2,6-Dichlorophenol	< 10 R	< 10	< 10	< 10	< 10	< 12 R	< 10	< 12	< 10	< 10
2,6-Dinitrotoluene	< 10 R	< 10	< 10	< 10	< 10	< 12 R	< 10	< 10	< 10	< 10
2-Acetylaminofluorene	< 20 R	< 20	< 20	< 20	< 20	< 24 R	< 20	< 20	< 20	< 20
2-Chloronapthalene	< 10 R	< 10	< 10	< 10	< 10	< 12 R	< 10	< 10	< 10	< 10
2-Chlorophenol	< 10 R	< 10	< 10	< 10	< 10	< 12 R	< 10	< 12	< 10	< 10
2-Methyl-4,6-Dinitrophenol	< 10 R	< 10	< 10	< 10	< 10	< 12 R	< 10	< 12	< 10	< 10
2-Methylnapthalene	< 10 R	< 10	< 10	< 10	< 10	< 12 R	< 10	< 10	< 10	< 10
2-Methylphenol	< 10 R	< 10	< 10	< 10	< 10	< 12 R	< 10	< 12	< 10	< 10
2-Naphthylamine	< 30 R	< 30	< 30	< 30	< 30	< 36 R	< 30	< 30	< 30	< 30
2-Nitroaniline	< 15 R	< 15	< 15 J	< 15	< 15	< 18 R	< 15	< 15	< 15	< 15
2-Nitrophenol	< 10 R	< 10	< 10	< 10	< 10	< 12 R	< 10	< 12	< 10	< 10
2-Picoline	< 20 R	< 20	< 20	< 20	< 20 J	< 24 R	< 20	< 20	< 20	< 20
3,3'-Dichlorobenzidine	< 20 R	< 20	< 20 J	< 20	< 20	< 24 R	< 20	< 20	< 20	< 20
3,3'-Dimethylbenzidine	< 20 R	< 20	< 20 J	< 20	< 20	< 24 R	< 20	< 20	< 20	< 20

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HARRISON DIVISION - GMC
GROUNDWATER ANALYTICAL RESULTS
SEMIVOLATILE ORGANIC COMPOUNDS

Parameter	DUP-21 UG/L	DUP-22 UG/L	EAST-11293-GW UG/L	GM1-12193-GW UG/L	GM10-12793-GW UG/L	GM11-12793-GW UG/L	GM13-12893-GW UG/L	GM15-12893-GW UG/L	GM16-12893-GW UG/L	GM17-12793-GW UG/L
3-Cresol	< 10 R	< 10	< 10	< 10	< 10	< 12 R	< 10	< 12	< 10	< 10
3-Methylcholanthrene	< 30 R	< 30	< 30	< 30	< 30	< 36 R	< 30 J	< 30	< 30	< 30
3-Nitroaniline	< 15 R	< 15	< 15	< 15	< 15	< 18 R	< 15	< 15	< 15	< 15
4-Aminobiphenyl	< 20 R	< 20	< 20	< 20	< 20	< 24 R	< 20	< 20	< 20	< 20
4-Bromophenyl-phenyl ether	< 10 R	< 10	< 10	< 10	< 10	< 12 R	< 10	< 10	< 10	< 10
4-Chloro-3-Methylphenol	< 10 R	< 10	< 10	< 10	< 10	< 12 R	< 10	< 12	< 10	< 10
4-Chloroaniline	< 10 R	< 10	< 10	< 10	< 10	< 12 R	< 10	< 10	< 10	< 10
4-Chlorophenyl-phenyl ether	< 10 R	< 10	< 10	< 10	< 10	< 12 R	< 10	< 10	< 10	< 10
4-Nitroaniline	< 15 R	< 15	< 15	< 15	< 15	< 18 R	< 15 J	< 15	< 15	< 15
4-Nitrophenol	< 10 R	< 10	< 10	< 10	< 10	< 12 R	< 10	< 12	< 10	< 10
4-Nitroquinoline-1-oxide	< 30 R	< 30 J	< 30	< 30 J	< 30 J	< 36 R	< 30 J	< 30 J	< 30 J	< 30 J
5-Nitro-o-toluidine	< 20 R	< 20	< 20	< 20	< 20	< 24 R	< 20	< 20	< 20	< 20
7,12-Dimethylbenz[a]anthrac	< 20 R	< 20	< 20	< 20	< 20	< 24 R	< 20	< 20	< 20	< 20
A,A-Dimethyl-Phenethylami	< 50 R	< 50	< 50 J	< 50	< 50	< 60 R	< 50	< 50	< 50	< 50
Acenaphthene	< 10 R	< 10	< 10	< 10	< 10	< 12 R	< 10	< 10	< 10	< 10
Acenaphthylene	< 10 R	< 10	< 10	< 10	< 10	< 12 R	< 10	< 10	< 10	< 10
Acetophenone	< 20 R	< 20	< 20	< 20	< 20	< 24 R	< 20	< 20	< 20	< 20
Aniline	< 10 R	< 10	< 10	< 10	< 10	< 12 R	< 10	< 10	< 10	< 10
Anthracene	< 10 R	< 10	< 10	< 10	< 10	< 12 R	< 10	< 10	< 10	< 10
Aramite, Total	< 15 R	< 15	< 15	< 15	< 15	< 18 R	< 15	< 15	< 15	< 15
Benzo(a)Anthracene	< 10 R	< 10	< 10	< 10	< 10	< 12 R	< 10	< 10	< 10	< 10
Benzo(a)Pyrene	< 10 R	< 10	< 10	< 10	< 10	< 12 R	< 10	< 10	< 10	< 10
Benzo(b)Fluoranthene	< 10 R	< 10	< 10	< 10	< 10	< 12 R	< 10	< 10	< 10	< 10
Benzo(g,h,i)Perylene	< 10 R	< 10	< 10	< 10	< 10	< 12 R	< 10	< 10	< 10	< 10
Benzo(k)Fluoranthene	< 10 R	< 10	< 10	< 10	< 10	< 12 R	< 10	< 10	< 10	< 10
Benzyl Alcohol	< 10 R	< 10	< 10	< 10	< 10	< 12 R	< 10	< 10	< 10	< 10
Butyl benzyl phthalate	< 10 R	< 10	< 10	< 10	< 10	< 12 R	< 10	< 10	< 10	< 10
Chrysene	< 10 R	< 10	< 10	< 10	< 10	< 12 R	< 10	< 10	< 10	< 10
Di-n-Butylphthalate	< 10 R	< 10	< 10	< 10	< 10	< 12 R	< 10	< 10	< 10	< 10
Di-n-Octyl Phthalate	< 10 R	< 10	< 10	< 10	< 10	< 12 R	< 10	< 10	< 10	< 10
Diallate, Total	< 30 R	< 30	< 30	< 30	< 30 J	< 36 R	< 30	< 30	< 30	< 30 J
Dibenz(a,h)Anthracene	< 10 R	< 10	< 10	< 10	< 10	< 12 R	< 10	< 10	< 10	< 10

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GERAGHTY & MILLER, INC.

HARRISON DIVISION - GMC
GROUNDWATER ANALYTICAL RESULTS
SEMIVOLATILE ORGANIC COMPOUNDS

Parameter	DUP-21 UG/L	DUP-22 UG/L	EAST-11293-GW UG/L	GM1-12193-GW UG/L	GM10-12793-GW UG/L	GM11-12793-GW UG/L	GM13-12893-GW UG/L	GM15-12893-GW UG/L	GM16-12893-GW UG/L	GM17-12793-GW UG/L
Dibenzofuran	< 10 R	< 10	< 10	< 10	< 10	< 12 R	< 10	< 10	< 10	< 10
Diethylphthalate	< 10 R	< 10	< 10	< 10	< 10	< 12 R	< 10	< 10	< 10	< 10
Dimethoate	< 100 R	< 100	< 100	< 100	< 100	< 120 R	< 100	< 100	< 100	< 100
Dimethyl Phtalate	< 10 R	< 10	< 10	< 10	< 10	< 12 R	< 10	< 10	< 10	< 10
Diphenylamine	< 20 R	< 20	< 20	< 20	< 20	< 24 R	< 20	< 20	< 20	< 20
Disulfoton	< 20 R	< 20	< 20	< 20	< 20	< 24 R	< 20	< 20	< 20	< 20
Ethyl methanesulfonate	< 20 R	< 20	< 20	< 20	< 20	< 24 R	< 20	< 20	< 20	< 20
Famphur	< 10 R	< 10	< 10	< 10	< 10	< 12 R	< 10	< 10	< 10	< 10
Fluoranthene	< 10 R	< 10	< 10	< 10	< 10	< 12 R	< 10	< 10	< 10	< 10
Fluorene	< 10 R	< 10	< 10 J	< 10	< 10	< 12 R	< 10	< 10	< 10	< 10
Hexachloro-1,3-butadiene	< 10 R	< 10	< 10	< 10	< 10	< 12 R	< 10	< 10	< 10	< 10
Hexachlorobenzene	< 10 R	< 10	< 10	< 10	< 10	< 12 R	< 10	< 10	< 10	< 10
Hexachlorocyclopentadiene	< 10 R	< 10	< 10	< 10	< 10	< 12 R	< 10	< 10	< 10	< 10
Hexachloroethane	< 10 R	< 10	< 10	< 10	< 10	< 12 R	< 10	< 10	< 10	< 10
Hexachlorophene	< 500 R	< 500 J	< 500	< 500 J	< 500 J	< 600 R	< 500 J	< 500 J	< 500 J	< 500 J
Hexachloropropene	< 30 R	< 30	< 30	< 30	< 30 J	< 36 R	< 30	< 30	< 30	< 30 J
Indeno(1,2,3-cd)Pyrene	< 10 R	< 10	< 10	< 10	< 10	< 12 R	< 10	< 10	< 10	< 10
Isodrin	< 30 R	< 30	< 30	< 30	< 30 J	< 36 R	< 30	< 30	< 30	< 30 J
Isophorone	< 10 R	< 10	< 10	< 10	< 10	< 12 R	< 10	< 10	< 10	< 10
Isosafrole, Total	< 20 R	< 20	< 20	< 20	< 20	< 24 R	< 20	< 20	< 20	< 20
Kepone	< 250 R	< 250	< 250	< 250	< 250 J	< 300 R	< 250 J	< 250	< 250	< 250 J
Methapyrilene	< 100 R	< 100 J	< 100	< 100 J	< 100 J	< 120 R	< 100 J	< 100 J	< 100 J	< 100 J
Methyl methanesulfonate	< 20 R	< 20	< 20	< 20	< 20	< 24 R	< 20	< 20	< 20	< 20
Methyl parathion	< 20 R	< 20	< 20	< 20	< 20	< 24 R	< 20	< 20	< 20	< 20
N-Nitroso-Di-n-Propylamine	< 10 R	< 10	< 10	< 10	< 10	< 12 R	< 10	< 10	< 10	< 10
N-Nitrosodi-n-butylamine	< 20 R	< 20	< 20	< 20	< 20	< 24 R	< 20	< 20	< 20	< 20
N-Nitrosodiethylamine	< 30 R	< 30	< 30	< 30	< 30	< 36 R	< 30	< 30	< 30	< 30
N-Nitrosodimethylamine	< 10 R	< 10	< 10	< 10	< 10	< 12 R	< 10	< 10	< 10	< 10
N-Nitrosodiphenylamine	< 10 R	< 10	< 10	< 10	< 10	< 12 R	< 10	< 10	< 10	< 10
N-Nitrosomethylethylamine	< 20 R	< 20	< 20	< 20	< 20	< 24 R	< 20	< 20	< 20	< 20
N-Nitrosomorpholine	< 20 R	< 20	< 20	< 20	< 20	< 24 R	< 20	< 20	< 20	< 20
N-Nitrosopiperidine	< 20 R	< 20	< 20	< 20	< 20	< 24 R	< 20	< 20	< 20	< 20

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HARRISON DIVISION - GMC
GROUNDWATER ANALYTICAL RESULTS
SEMIVOLATILE ORGANIC COMPOUNDS

Parameter	DUP-21 UG/L	DUP-22 UG/L	EAST-11293-GW UG/L	GM1-12193-GW UG/L	GM10-12793-GW UG/L	GM11-12793-GW UG/L	GM13-12893-GW UG/L	GM15-12893-GW UG/L	GM16-12893-GW UG/L	GM17-12793-GW UG/L
N-Nitrosopyrrolidine	< 20 R	< 20	< 20	< 20	< 20	< 24 R	< 20	< 20	< 20	< 20
Napthalene	< 10 R	< 10	< 10	< 10	< 10	< 12 R	< 10	< 10	< 10	< 10
Nitrobenzene	< 10 R	< 10	< 10	< 10	< 10	< 12 R	< 10	< 10	< 10	< 10
Triethyl phosphorothioate	< 20 R	< 20	< 20	< 20	< 20	< 24 R	< 20	< 20	< 20	< 20
Parathion	< 20 R	< 20	< 20	< 20	< 20 J	< 24 R	< 20	< 20	< 20	< 20 J
Pentachlorobenzene	< 20 R	< 20	< 20	< 20	< 20	< 24 R	< 20	< 20	< 20	< 20
Pentachloronitrobenzene	< 20 R	< 20	< 20	< 20	< 20 J	< 24 R	< 20	< 20	< 20	< 20 J
Pentachlorophenol	< 10 R	< 10	< 10	< 10	< 10	< 12 R	< 10	< 12	< 10	< 10
Phenacetin	< 20 R	< 20	< 20	< 20	< 20	< 24 R	< 20	< 20	< 20	< 20
Phenanthrene	< 10 R	< 10	< 10	< 10	< 10	< 12 R	< 10	< 10	< 10	< 10
Phenol	< 10 R	< 10	< 10	< 10	< 10	< 12 R	< 10	< 12	< 10	< 10
Phorate	< 20 R	< 20	< 20	< 20	< 20	< 24 R	< 20	< 20	< 20	< 20
Pronamide	< 20 R	< 20	< 20	< 20	< 20	< 24 R	< 20	< 20	< 20	< 20
Pyrene	< 10 R	< 10	< 10	< 10	< 10	< 12 R	< 10	< 10	< 10	< 10
Pyridine	< 10 R	< 10	< 10	< 10	< 10	< 12 R	< 10	< 10	< 10	< 10
Safrole, Total	< 20 R	< 20	< 20	< 20	< 20	< 24 R	< 20	< 20	< 20	< 20
Sulfotepp	< 20 R	< 20	< 20	< 20	< 20 J	< 24 R	< 20 J	< 20	< 20	< 20 J
Thionazin	< 20 R	< 20	< 20	< 20	< 20	< 24 R	< 20	< 20	< 20	< 20
bis(2-Chloroethyl)Ether	< 10 R	< 10	< 10	< 10	< 10	< 12 R	< 10	< 10	< 10	< 10
bis(2-Ethylhexyl)Phthalate	< 10 R	< 10	< 10	< 10	< 10	< 12 R	< 10	< 10	< 10	< 10
bis(Chloroethoxy)Methane	< 10 R	< 10	< 10	< 10	< 10	< 12 R	< 10	< 10	< 10	< 10
o-Toluidine	< 20 R	< 20	< 20	< 20	< 20	< 24 R	< 20	< 20	< 20	< 20
p-(Dimethylamino)azobenzen	< 50 R	< 50	< 50	< 50	< 50	< 60 R	< 50	< 50	< 50	< 50
p-Chlorobenzilate	< 50 R	< 50	< 50	< 50	< 50 J	< 60 R	< 50 J	< 50	< 50	< 50 J
p-Phenylene diamine	< 30 R	< 30	< 30 J	< 30 J	< 30	< 36 R	< 30 J	< 30	< 30	< 30

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HARRISON DIVISION - GMC
GROUNDWATER ANALYTICAL RESULTS
SEMIVOLATILE ORGANIC COMPOUNDS

Parameter	GM18-12893-GW UG/L	GM2-12193-GW UG/L	GM5-12293-GW UG/L	GM7R-12093-GW UG/L	GM8-12093-GW UG/L	GM9-12793-GW UG/L
1,2,4,5-Tetrachlorobenzene	< 20	< 20	< 20	< 20	< 20	< 20 J
1,2,4-Trichlorobenzene	< 10	< 10	< 10	< 10	< 10	< 10 J
1,2-Dichlorobenzene	< 10	< 10	< 10	< 10	< 10	< 10 J
1,3,5-Trinitrobenzene	< 30	< 30	< 30	< 30	< 30	< 30 J
1,3-Dichlorobenzene	< 10	< 10	< 10	< 10	< 10	< 10 J
1,3-Dinitrobenzene	< 20	< 20	< 20	< 20	< 20	< 20 J
1,4-Dichlorobenzene	< 10	< 10	< 10	< 10	< 10	< 10 J
1,4-Naphthoquinone	< 100	< 100	< 100	< 100	< 100	< 100 J
1-Naphthylamine	< 30	< 30	< 30	< 30 J	< 30 J	< 30 J
2,2'-Dichlorodiisopropyl Ether	< 10	< 10	< 10	< 10	< 10	< 10 J
2,3,4,6-Tetrachlorophenol	< 20	< 20	< 20	< 20	< 20	< 20 J
2,4,5-Trichlorophenol	< 10	< 10	< 10	< 10	< 10	< 10 J
2,4,6-Trichlorophenol	< 10	< 10	< 10	< 10	< 10	< 10 J
2,4-Dichlorophenol	< 10	< 10	< 10	< 10	< 10	< 10 J
2,4-Dimethylphenol	< 10	< 10	< 10	< 10	< 10	< 10 J
2,4-Dinitrophenol	< 10	< 10 J	< 10	< 10	< 10	< 10 J
2,4-Dinitrotoluene	< 10	< 10	< 10	< 10	< 10	< 10 J
2,6-Dichlorophenol	< 10	< 10	< 10	< 10	< 10	< 10 J
2,6-Dinitrotoluene	< 10	< 10	< 10	< 10	< 10	< 10 J
2-Acetylaminofluorene	< 20	< 20	< 20	< 20 J	< 20 J	< 20 J
2-Chloronapthalene	< 10	< 10	< 10	< 10	< 10	< 10 J
2-Chlorophenol	< 10	< 10	< 10	< 10	< 10	< 10 J
2-Methyl-4,6-Dinitrophenol	< 10	< 10	< 10	< 10	< 10	< 10 J
2-Methylnapthalene	< 10	< 10	< 10	< 10	< 10	< 10 J
2-Methylphenol	< 10	< 10	< 10	< 10	< 10	< 10 J
2-Naphthylamine	< 30	< 30	< 30	< 30 J	< 30 J	< 30 J
2-Nitroaniline	< 15	< 15	< 15	< 15	< 15	< 15 J
2-Nitrophenol	< 10	< 10	< 10	< 10	< 10	< 10 J
2-Picoline	< 20	< 20	< 20	< 20	< 20	< 20 J
3,3'-Dichlorobenzidine	< 20	< 20	< 20	< 20 J	< 20 J	< 20 J
3,3'-Dimethylbenzidine	< 20	< 20	< 20	< 20 J	< 20 J	< 20 J

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HARRISON DIVISION - GMC
GROUNDWATER ANALYTICAL RESULTS
SEMIVOLATILE ORGANIC COMPOUNDS

Parameter	GM18-12893-GW UG/L	GM2-12193-GW UG/L	GM5-12293-GW UG/L	GM7R-12093-GW UG/L	GM8-12093-GW UG/L	GM9-12793-GW UG/L
3-Cresol	< 10	< 10	< 10	< 10	< 10	< 10 J
3-Methylcholanthrene	< 30	< 30	< 30	< 30 J	< 30 J	< 30 J
3-Nitroaniline	< 15	< 15	< 15	< 15	< 15	< 15 J
4-Aminobiphenyl	< 20	< 20	< 20	< 20 J	< 20 J	< 20 J
4-Bromophenyl-phenyl ether	< 10	< 10	< 10	< 10	< 10	< 10 J
4-Chloro-3-Methylphenol	< 10	< 10	< 10	< 10	< 10	< 10 J
4-Chloroaniline	< 10	< 10	< 10	< 10	< 10	< 10 J
4-Chlorophenyl-phenyl ether	< 10	< 10	< 10	< 10	< 10	< 10 J
4-Nitroaniline	< 15	< 15 J	< 15	< 15	< 15	< 15 J
4-Nitrophenol	< 10	< 10	< 10	< 10	< 10	< 10 J
4-Nitroquinoline-1-oxide	< 30 J	< 30 J	< 30 J	< 30 J	< 30 J	< 30 J
5-Nitro-o-toluidine	< 20	< 20	< 20	< 20	< 20	< 20 J
7,12-Dimethylbenz[a]anthracene	< 20	< 20	< 20	< 20 J	< 20 J	< 20 J
A,A-Dimethyl-Phenethylamine	< 50	< 50	< 50	< 50 J	< 50 J	< 50 J
Acenaphthene	< 10	< 10	< 10	< 10	< 10	< 10 J
Acenaphthylene	< 10	< 10	< 10	< 10	< 10	< 10 J
Acetophenone	< 20	< 20	< 20	< 20	< 20	< 20 J
Aniline	< 10	< 10	< 10	< 10	< 10	< 10 J
Anthracene	< 10	< 10	< 10	< 10	< 10	< 10 J
Aramite, Total	< 15	< 15	< 15	< 15	< 15	< 15 J
Benzo(a)Anthracene	< 10	< 10	< 10	< 10	< 10	< 10 J
Benzo(a)Pyrene	< 10	< 10	< 10	< 10 J	< 10 J	< 10 J
Benzo(b)Fluoranthene	< 10	< 10	< 10	< 10 J	< 10 J	< 10 J
Benzo(g,h,i)Perylene	< 10	< 10	< 10	< 10 J	< 10 J	< 10 J
Benzo(k)Fluoranthene	< 10	< 10	< 10	< 10 J	< 10 J	< 10 J
Benzyl Alcohol	< 10	< 10	< 10	< 10	< 10	< 10 J
Butyl benzyl phthalate	< 10	< 10	< 10	< 10	< 10	< 10 J
Chrysene	< 10	< 10	< 10	< 10	< 10	< 10 J
Di-n-Butylphthalate	< 10	< 10	< 10	< 10	< 10	< 10 J
Di-n-Octyl Phthalate	< 10	< 10	< 10	< 10 J	< 10 J	< 10 J
Diallate, Total	< 30	< 30	< 30	< 30	< 30	< 30 J
Dibenz(a,h)Anthracene	< 10	< 10	< 10	< 10 J	< 10 J	< 10 J

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HARRISON DIVISION - GMC
GROUNDWATER ANALYTICAL RESULTS
SEMIVOLATILE ORGANIC COMPOUNDS

Parameter	GM18-12893-GW UG/L	GM2-12193-GW UG/L	GM5-12293-GW UG/L	GM7R-12093-GW UG/L	GM8-12093-GW UG/L	GM9-12793-GW UG/L
Dibenzofuran	< 10	< 10	< 10	< 10	< 10	< 10 J
Diethylphthalate	< 10	< 10	< 10	< 10	< 10	< 10 J
Dimethoate	< 100	< 100	< 100	< 100	< 100	< 100 J
Dimethyl Phtalate	< 10	< 10	< 10	< 10	< 10	< 10 J
Diphenylamine	< 20	< 20	< 20	< 20	< 20	< 20 J
Disulfoton	< 20	< 20	< 20	< 20	< 20	< 20 J
Ethyl methanesulfonate	< 20	< 20	< 20	< 20	< 20	< 20 J
Famphur	< 10	< 10	< 10	< 10	< 10	< 10 J
Fluoranthene	< 10	< 10	< 10	< 10	< 10	< 10 J
Fluorene	< 10	< 10	< 10	< 10	< 10	< 10 J
Hexachloro-1,3-butadiene	< 10	< 10	< 10	< 10	< 10	< 10 J
Hexachlorobenzene	< 10	< 10	< 10	< 10	< 10	< 10 J
Hexachlorocyclopentadiene	< 10	< 10	< 10	< 10	< 10	< 10 J
Hexachloroethane	< 10	< 10	< 10	< 10	< 10	< 10 J
Hexachlorophene	< 500 J	< 500	< 500 J	< 500 J	< 500 J	< 500 J
Hexachloropropene	< 30	< 30 J	< 30	< 30	< 30	< 30 J
Indeno(1,2,3-cd)Pyrene	< 10	< 10	< 10	< 10 J	< 10 J	< 10 J
Isodrin	< 30	< 30	< 30	< 30	< 30	< 30 J
Isophorone	< 10	< 10	< 10	< 10	< 10	< 10 J
Isosafrole, Total	< 20	< 20	< 20	< 20	< 20	< 20 J
Kepone	< 250	< 250 J	< 250	< 250 J	< 250 J	< 250 J
Methapyrilene	< 100 J	< 100 J	< 100 J	< 100 J	< 100 J	< 100 J
Methyl methanesulfonate	< 20	< 20	< 20	< 20	< 20	< 20 J
Methyl parathion	< 20	< 20	< 20	< 20	< 20	< 20 J
N-Nitroso-Di-n-Propylamine	< 10	< 10	< 10	< 10	< 10	< 10 J
N-Nitrosodi-n-butylamine	< 20	< 20	< 20	< 20	< 20	< 20 J
N-Nitrosodiethylamine	< 30	< 30	< 30	< 30	< 30	< 30 J
N-Nitrosodimethylamine	< 10	< 10	< 10	< 10	< 10	< 10 J
N-Nitrosodiphenylamine	< 10	< 10	< 10	< 10	< 10	< 10 J
N-Nitrosomethylethylamine	< 20	< 20	< 20	< 20	< 20	< 20 J
N-Nitrosomorpholine	< 20	< 20	< 20	< 20	< 20	< 20 J
N-Nitrosopiperidine	< 20	< 20	< 20	< 20	< 20	< 20 J

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GERAGHTY & MILLER, INC.

HARRISON DIVISION - GMC
GROUNDWATER ANALYTICAL RESULTS
SEMIVOLATILE ORGANIC COMPOUNDS

Parameter	GM18-12893-GW UG/L	GM2-12193-GW UG/L	GM5-12293-GW UG/L	GM7R-12093-GW UG/L	GM8-12093-GW UG/L	GM9-12793-GW UG/L
N-Nitrosopyrrolidine	< 20	< 20	< 20	< 20	< 20	< 20 J
Napthalene	< 10	< 10	< 10	< 10	< 10	< 10 J
Nitrobenzene	< 10	< 10	< 10	< 10	< 10	< 10 J
Triethyl phosphorothioate	< 20	< 20	< 20	< 20	< 20	< 20 J
Parathion	< 20	< 20	< 20	< 20	< 20	< 20 J
Pentachlorobenzene	< 20	< 20	< 20	< 20	< 20	< 20 J
Pentachloronitrobenzene	< 20	< 20	< 20	< 20	< 20	< 20 J
Pentachlorophenol	< 10	< 10	< 10	< 10	< 10	< 10 J
Phenacetin	< 20	< 20	< 20	< 20 J	< 20 J	< 20 J
Phenanthrene	< 10	< 10	< 10	< 10	< 10	< 10 J
Phenol	< 10	< 10	< 10	< 10	< 10	< 10 J
Phorate	< 20	< 20	< 20	< 20 J	< 20 J	< 20 J
Pronamide	< 20	< 20	< 20	< 20	< 20	< 20 J
Pyrene	< 10	< 10	< 10	< 10	< 10	< 10 J
Pyridine	< 10	< 10	< 10	< 10	< 10	< 10 J
Safrole, Total	< 20	< 20	< 20	< 20	< 20	< 20 J
Sulfotepp	< 20	< 20 J	< 20	< 20	< 20	< 20 J
Thionazin	< 20	< 20	< 20	< 20	< 20	< 20 J
bis(2-Chloroethyl)Ether	< 10	< 10	< 10	< 10	< 10	< 10 J
bis(2-Ethylhexyl)Phthalate	< 10	< 10	< 10	< 10	< 10	< 10 J
bis(Chloroethoxy)Methane	< 10	< 10	< 10	< 10	< 10	< 10 J
o-Toluidine	< 20	< 20	< 20	< 20	< 20	< 20 J
p-(Dimethylamino)azobenzene	< 50	< 50	< 50	< 50	< 50	< 50 J
p-Chlorobenzilate	< 50	< 50 J	< 50	< 50	< 50	< 50 J
p-Phenylene diamine	< 30	< 30 J	< 30 J	< 30 J	< 30 J	< 30 J

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HARRISON DIVISION - GMC
GROUNDWATER ANALYTICAL RESULTS
SEMIVOLATILE ORGANIC COMPOUNDS

Parameter	HR10-12693-GW UG/L	HR11-12693-GW UG/L	HR12-12693-GW UG/L	HR13-11993-GW UG/L	HR14-11393-GW UG/L	HR15-11393-GW UG/L	HR17-12593-GW UG/L
1,2,4,5-Tetrachlorobenzene	< 20	< 20	< 20	< 20	< 20	< 20	< 20
1,2,4-Trichlorobenzene	< 10	< 10	< 10	< 10	< 10	< 10	< 10
1,2-Dichlorobenzene	< 10	< 10	< 10	< 10	< 10	< 10	< 10
1,3,5-Trinitrobenzene	< 30	< 30	< 30	< 30	< 30	< 30	< 30
1,3-Dichlorobenzene	< 10	< 10	< 10	< 10	< 10	< 10	< 10
1,3-Dinitrobenzene	< 20	< 20	< 20	< 20	< 20	< 20	< 20
1,4-Dichlorobenzene	< 10	< 10	< 10	< 10	< 10	< 10	< 10
1,4-Naphthoquinone	< 100	< 100	< 100	< 100	< 100	< 100	< 100
1-Naphthylamine	< 30	< 30	< 30	< 30 J	< 30 J	< 30 J	< 30
2,2'-Dichlorodiisopropyl Ether	< 10	< 10	< 10	< 10	< 10	< 10	< 10
2,3,4,6-Tetrachlorophenol	< 20	< 20	< 20	< 20	< 20	< 20	< 20
2,4,5-Trichlorophenol	< 10	< 10	< 10	< 10	< 10	< 10	< 10
2,4,6-Trichlorophenol	< 10	< 10	< 10	< 10	< 10	< 10	< 10
2,4-Dichlorophenol	< 10	< 10	< 10	< 10	< 10	< 10	< 10
2,4-Dimethylphenol	< 10	< 10	< 10	< 10	< 10	< 10	< 10
2,4-Dinitrophenol	< 10	< 10	< 10	< 10	< 10	< 10	< 10
2,4-Dinitrotoluene	< 10	< 10	< 10	< 10	< 10	< 10	< 10
2,6-Dichlorophenol	< 10	< 10	< 10	< 10	< 10	< 10	< 10
2,6-Dinitrotoluene	< 10	< 10	< 10	< 10	< 10	< 10	< 10
2-Acetylaminofluorene	< 20	< 20	< 20	< 20 J	< 20	< 20	< 20
2-Chloronapthalene	< 10	< 10	< 10	< 10	< 10	< 10	< 10
2-Chlorophenol	< 10	< 10	< 10	< 10	< 10	< 10	< 10
2-Methyl-4,6-Dinitrophenol	< 10	< 10	< 10	< 10	< 10	< 10	< 10
2-Methylnapthalene	< 10	< 10	< 10	< 10	< 10	< 10	< 10
2-Methylphenol	< 10	< 10	< 10	< 10	< 10	< 10	< 10
2-Naphthylamine	< 30	< 30	< 30	< 30 J	< 30	< 30	< 30
2-Nitroaniline	< 15	< 15	< 15	< 15 J	< 15	< 15	< 15
2-Nitrophenol	< 10	< 10	< 10	< 10	< 10	< 10	< 10
2-Picoline	< 20	< 20	< 20	< 20	< 20	< 20	< 20
3,3'-Dichlorobenzidine	< 20	< 20	< 20	< 20 J	< 20 J	< 20 J	< 20
3,3'-Dimethylbenzidine	< 20	< 20	< 20	< 20 J	< 20 J	< 20 J	< 20

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HARRISON DIVISION - GMC
GROUNDWATER ANALYTICAL RESULTS
SEMIVOLATILE ORGANIC COMPOUNDS

Parameter	HR10-12693-GW UG/L	HR11-12693-GW UG/L	HR12-12693-GW UG/L	HR13-11993-GW UG/L	HR14-11393-GW UG/L	HR15-11393-GW UG/L	HR17-12593-GW UG/L
3-Cresol	< 10	< 10	< 10	< 10	< 10	< 10	< 10
3-Methylcholanthrene	< 30	< 30	< 30	< 30	< 30	< 30	< 30
3-Nitroaniline	< 15	< 15	< 15	< 15	< 15 J	< 15 J	< 15
4-Aminobiphenyl	< 20	< 20	< 20	< 20 J	< 20	< 20	< 20
4-Bromophenyl-phenyl ether	< 10	< 10	< 10	< 10	< 10	< 10	< 10
4-Chloro-3-Methylphenol	< 10	< 10	< 10	< 10	< 10	< 10	< 10
4-Chloroaniline	< 10	< 10	< 10	< 10	< 10	< 10	< 10
4-Chlorophenyl-phenyl ether	< 10	< 10	< 10	< 10	< 10	< 10	< 10
4-Nitroaniline	< 15	< 15	< 15	< 15 J	< 15	< 15	< 15
4-Nitrophenol	< 10 J	< 10 J	< 10 J	< 10 J	< 10	< 10	< 10
4-Nitroquinoline-1-oxide	< 30	< 30	< 30	< 30	< 30	< 30	< 30 J
5-Nitro-o-toluidine	< 20	< 20	< 20	< 20	< 20	< 20	< 20
7,12-Dimethylbenz[a]anthracene	< 20	< 20	< 20	< 20	< 20	< 20	< 20
A,A-Dimethyl-Phenethylamine	< 50	< 50	< 50	< 50 J	< 50 J	< 50 J	< 50
Acenaphthene	< 10	< 10	< 10	< 10	< 10	< 10	< 10
Acenaphthylene	< 10	< 10	< 10	< 10	< 10	< 10	< 10
Acetophenone	< 20	< 20	< 20	< 20	< 20	< 20	< 20
Aniline	< 10	< 10	< 10	< 10	< 10	< 10	< 10
Anthracene	< 10	< 10	< 10	< 10	< 10	< 10	< 10
Aramite, Total	< 15	< 15	< 15	< 15	< 15	< 15	< 15
Benzo(a)Anthracene	< 10	< 10	< 10	< 10	< 10	< 10	< 10
Benzo(a)Pyrene	< 10	< 10	< 10	< 10	< 10	< 10	< 10
Benzo(b)Fluoranthene	< 10	< 10	< 10	< 10	< 10	< 10	< 10
Benzo(g,h,i)Perylene	< 10	< 10	< 10	< 10	< 10	< 10	< 10
Benzo(k)Fluoranthene	< 10	< 10	< 10	< 10	< 10	< 10	< 10
Benzyl Alcohol	< 10	< 10	< 10	< 10	< 10	< 10	< 10
Butyl benzyl phthalate	< 10	< 10	< 10	< 10	< 10	< 10	< 10
Chrysene	< 10	< 10	< 10	< 10	< 10	< 10	< 10
Di-n-Butylphthalate	< 10	< 10	< 10	< 10	< 10	< 10	< 10
Di-n-Octyl Phthalate	< 10	< 10	< 10	< 10	< 10	< 10	< 10
Diallate, Total	< 30	< 30	< 30	< 30	< 30 J	< 30 J	< 30
Dibenz(a,h)Anthracene	< 10	< 10	< 10	< 10	< 10	< 10	< 10

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GROUNDWATER ANALYTICAL RESULTS
SEMIVOLATILE ORGANIC COMPOUNDS

Parameter	HR10-12693-GW UG/L	HR11-12693-GW UG/L	HR12-12693-GW UG/L	HR13-11993-GW UG/L	HR14-11393-GW UG/L	HR15-11393-GW UG/L	HR17-12593-GW UG/L
Dibenzofuran	< 10	< 10	< 10	< 10	< 10	< 10	< 10
Diethylphthalate	< 10	< 10	< 10	< 10	< 10	< 10	< 10
Dimethoate	< 100	< 100	< 100	< 100	< 100	< 100	< 100
Dimethyl Phtalate	< 10	< 10	< 10	< 10	< 10	< 10	< 10
Diphenylamine	< 20	< 20	< 20	< 20	< 20	< 20	< 20
Disulfoton	< 20	< 20	< 20	< 20	< 20	< 20	< 20
Ethyl methanesulfonate	< 20	< 20	< 20	< 20	< 20	< 20	< 20
Famphur	< 10	< 10	< 10	< 10	< 10	< 10	< 10
Fluoranthene	< 10	< 10	< 10	< 10	< 10	< 10	< 10
Fluorene	< 10	< 10	< 10	< 10	< 10 J	< 10 J	< 10
Hexachloro-1,3-butadiene	< 10	< 10	< 10	< 10	< 10	< 10	< 10
Hexachlorobenzene	< 10	< 10	< 10	< 10	< 10	< 10	< 10
Hexachlorocyclopentadiene	< 10	< 10	< 10	< 10	< 10	< 10	< 10
Hexachloroethane	< 10	< 10	< 10	< 10	< 10	< 10	< 10
Hexachlorophene	< 500	< 500 J	< 500 J	< 500 J	< 500 J	< 500 J	< 500
Hexachloropropene	< 30 J	< 30	< 30	< 30	< 30	< 30	< 30
Indeno(1,2,3-cd)Pyrene	< 10	< 10	< 10	< 10	< 10	< 10	< 10
Isodrin	< 30	< 30	< 30	< 30	< 30	< 30	< 30
Isophorone	< 10	< 10	< 10	< 10	< 10	< 10	< 10
Isosafrole, Total	< 20	< 20	< 20	< 20	< 20	< 20	< 20
Kepone	< 250	< 250	< 250	< 250 J	< 250 J	< 250 J	< 250
Methapyrilene	< 100 J	< 100 J	< 100 J	< 100 J	< 100	< 100	< 100 J
Methyl methanesulfonate	< 20	< 20	< 20	< 20	< 20	< 20	< 20
Methyl parathion	< 20	< 20	< 20	< 20	< 20	< 20	< 20
N-Nitroso-Di-n-Propylamine	< 10	< 10	< 10	< 10	< 10	< 10	< 10
N-Nitrosodi-n-butylamine	< 20	< 20	< 20	< 20	< 20	< 20	< 20
N-Nitrosodiethylamine	< 30	< 30	< 30	< 30	< 30	< 30	< 30
N-Nitrosodimethylamine	< 10	< 10	< 10	< 10	< 10	< 10	< 10
N-Nitrosodiphenylamine	< 10	< 10	< 10	< 10	< 10	< 10	< 10
N-Nitrosomethylethylamine	< 20	< 20	< 20	< 20	< 20	< 20	< 20
N-Nitrosomorpholine	< 20	< 20	< 20	< 20	< 20	< 20	< 20
N-Nitrosopiperidine	< 20	< 20	< 20	< 20	< 20	< 20	< 20

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HARRISON DIVISION - GMC
GROUNDWATER ANALYTICAL RESULTS
SEMIVOLATILE ORGANIC COMPOUNDS

Parameter	HR10-12693-GW UG/L	HR11-12693-GW UG/L	HR12-12693-GW UG/L	HR13-11993-GW UG/L	HR14-11393-GW UG/L	HR15-11393-GW UG/L	HR17-12593-GW UG/L
N-Nitrosopyrrolidine	< 20	< 20	< 20	< 20	< 20	< 20	< 20
Napthalene	< 10	< 10	< 10	< 10	< 10	< 10	< 10
Nitrobenzene	< 10	< 10	< 10	< 10	< 10	< 10	< 10
Triethyl phosphorothioate	< 20	< 20	< 20	< 20	< 20	< 20	< 20
Parathion	< 20	< 20	< 20	< 20	< 20	< 20	< 20
Pentachlorobenzene	< 20	< 20	< 20	< 20	< 20	< 20	< 20
Pentachloronitrobenzene	< 20	< 20	< 20	< 20	< 20	< 20	< 20
Pentachlorophenol	< 10	< 10	< 10	< 10	< 10	< 10	< 10
Phenacetin	< 20	< 20	< 20	< 20 J	< 20	< 20	< 20
Phenanthrene	< 10	< 10	< 10	< 10	< 10	< 10	< 10
Phenol	< 10	< 10	< 10	< 10	< 10	< 10	< 10
Phorate	< 20	< 20	< 20	< 20 J	< 20	< 20	< 20
Pronamide	< 20	< 20	< 20	< 20	< 20	< 20	< 20
Pyrene	< 10	< 10	< 10	< 10	< 10	< 10	< 10
Pyridine	< 10	< 10	< 10	< 10	< 10	< 10	< 10
Safrole, Total	< 20	< 20	< 20	< 20	< 20	< 20	< 20
Sulfotepp	< 20	< 20	< 20	< 20	< 20	< 20	< 20
Tetraethyldithiopyrophosphate	NA	NA	NA	< 20	NA	NA	NA
Thionazin	< 20	< 20	< 20	< 20	< 20	< 20	< 20
bis(2-Chloroethyl)Ether	< 10	< 10	< 10	< 10	< 10	< 10	< 10
bis(2-Ethylhexyl)Phthalate	< 10	< 10	< 10	< 10	< 10	< 10	< 10
bis(Chloroethoxy)Methane	< 10	< 10	< 10	< 10	< 10	< 10	< 10
o-Toluidine	< 20	< 20	< 20	< 20	< 20	< 20	< 20
p-(Dimethylamino)azobenzene	< 50	< 50	< 50	< 50	< 50	< 50	< 50
p-Chlorobenzilate	< 50	< 50	< 50	< 50	< 50	< 50	< 50
p-Phenylene diamine	< 30	< 30	< 30	< 30 J	< 30 J	< 30 J	< 30 J

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HARRISON DIVISION - GMC
GROUNDWATER ANALYTICAL RESULTS
SEMIVOLATILE ORGANIC COMPOUNDS

Parameter	RB-02 UG/L	RB-03 UG/L	RB-04 UG/L	RB-05 UG/L	RB-06 UG/L	RB-07 UG/L	RB-08 UG/L	RB-09 UG/L	RB-10 UG/L	RB-11 UG/L
1,2,4,5-Tetrachlorobenzene	< 20	< 20	< 20	< 22	< 20	< 20	< 20	< 20	< 20 R	< 20
1,2,4-Trichlorobenzene	< 10	< 10	< 10	< 11	< 10	< 10	< 10	< 10	< 10 R	< 10
1,2-Dichlorobenzene	< 10	< 10	< 10	< 11	< 10	< 10	< 10	< 10	< 10 R	< 10
1,3,5-Trinitrobenzene	< 30	< 30	< 30	< 33	< 30	< 30	< 30	< 30	< 30 R	< 30
1,3-Dichlorobenzene	< 10	< 10	< 10	< 11	< 10	< 10	< 10	< 10	< 10 R	< 10
1,3-Dinitrobenzene	< 20	< 20	< 20	< 22	< 20	< 20	< 20	< 20	< 20 R	< 20
1,4-Dichlorobenzene	< 10	< 10	< 10	< 11	< 10	< 10	< 10	< 10	< 10 R	< 10
1,4-Naphthoquinone	< 100	< 100	< 100	< 110	< 100	< 100	< 100	< 100	< 100 R	< 100
1-Naphthylamine	< 30 J	< 30 J	< 30 J	< 33 J	< 30	< 30	< 30	< 30	< 30 R	< 30
2,2'-Dichlorodiisopropyl Ethe	< 10	< 10	< 10	< 11	< 10	< 10	< 10	< 10	< 10 R	< 10
2,3,4,6-Tetrachlorophenol	< 20	< 20	< 20	< 22	< 20	< 20	< 20	< 20	< 20 R	< 20
2,4,5-Trichlorophenol	< 10	< 10	< 10	< 11	< 10	< 10	< 10	< 10	< 10 R	< 10
2,4,6-Trichlorophenol	< 10	< 10	< 10	< 11	< 10	< 10	< 10	< 10	< 10 R	< 10
2,4-Dichlorophenol	< 10	< 10	< 10	< 11	< 10	< 10	< 10	< 10	< 10 R	< 10
2,4-Dimethylphenol	< 10	< 10	< 10	< 11	< 10	< 10	< 10	< 10	< 10 R	< 10
2,4-Dinitrophenol	< 10	< 10	< 10	< 11	< 10	< 10	< 10	< 10	< 10 R	< 10
2,4-Dinitrotoluene	< 10	< 10	< 10	< 11	< 10	< 10	< 10	< 10	< 10 R	< 10
2,6-Dichlorophenol	< 10	< 10	< 10	< 11	< 10	< 10	< 10	< 10	< 10 R	< 10
2,6-Dinitrotoluene	< 10	< 10	< 10	< 11	< 10	< 10	< 10	< 10	< 10 R	< 10
2-Acetylaminofluorene	< 20	< 20	< 20 J	< 22 J	< 20	< 20	< 20	< 20	< 20 R	< 20
2-Chloronapthalene	< 10	< 10	< 10	< 11	< 10	< 10	< 10	< 10	< 10 R	< 10
2-Chlorophenol	< 10	< 10	< 10	< 11	< 10	< 10	< 10	< 10	< 10 R	< 10
2-Methyl-4,6-Dinitrophenol	< 10	< 10	< 10	< 11	< 10	< 10	< 10	< 10	< 10 R	< 10
2-Methylnapthalene	< 10	< 10	< 10	< 11	< 10	< 10	< 10	< 10	< 10 R	< 10
2-Methylphenol	< 10	< 10	< 10	< 11	< 10	< 10	< 10	< 10	< 10 R	< 10
2-Naphthylamine	< 30	< 30	< 30 J	< 33 J	< 30	< 30	< 30	< 30	< 30 R	< 30
2-Nitroaniline	< 15 J	< 15	< 15 J	< 17	< 15	< 15	< 15	< 15	< 15 R	< 15
2-Nitrophenol	< 10	< 10	< 10	< 11	< 10	< 10	< 10	< 10	< 10 R	< 10
2-Picoline	< 20	< 20	< 20	< 22	< 20	< 20	< 20	< 20	< 20 R	< 20
3,3'-Dichlorobenzidine	< 20 J	< 20 J	< 20 J	< 22 J	< 20	< 20	< 20	< 20	< 20 R	< 20
3,3'-Dimethylbenzidine	< 20 J	< 20 J	< 20 J	< 22 J	< 20	< 20	< 20	< 20	< 20 R	< 20

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GERAGHTY & MILLER, INC.

HARRISON DIVISION - GMC
GROUNDWATER ANALYTICAL RESULTS
SEMIVOLATILE ORGANIC COMPOUNDS

Parameter	RB-02 UG/L	RB-03 UG/L	RB-04 UG/L	RB-05 UG/L	RB-06 UG/L	RB-07 UG/L	RB-08 UG/L	RB-09 UG/L	RB-10 UG/L	RB-11 UG/L
3-Cresol	< 10	< 10	< 10	< 11	< 10	< 10	< 10	< 10	< 10 R	< 10
3-Methylcholanthrene	< 30	< 30	< 30	< 33 J	< 30	< 30	< 30	< 30	< 30 R	< 30
3-Nitroaniline	< 15	< 15 J	< 15	< 17	< 15	< 15	< 15	< 15	< 15 R	< 15
4-Aminobiphenyl	< 20	< 20	< 20 J	< 22 J	< 20	< 20	< 20	< 20	< 20 R	< 20
4-Bromophenyl-phenyl ether	< 10	< 10	< 10	< 11	< 10	< 10	< 10	< 10	< 10 R	< 10
4-Chloro-3-Methylphenol	< 10	< 10	< 10	< 11	< 10	< 10	< 10	< 10	< 10 R	< 10
4-Chloroaniline	< 10	< 10	< 10	< 11	< 10	< 10	< 10	< 10	< 10 R	< 10
4-Chlorophenyl-phenyl ether	< 10	< 10	< 10	< 11	< 10	< 10	< 10	< 10	< 10 R	< 10
4-Nitroaniline	< 15	< 15	< 15 J	< 17	< 15	< 15	< 15	< 15	< 15 R	< 15
4-Nitrophenol	< 10	< 10	< 10 J	< 11	< 10	< 10	< 10	< 10 J	< 10 R	< 10
4-Nitroquinoline-1-oxide	< 30	< 30	< 30 J	< 33 J	< 30 J	< 30 J	< 30 J	< 30	< 30 R	< 30 J
5-Nitro-o-toluidine	< 20	< 20	< 20	< 22	< 20	< 20	< 20	< 20	< 20 R	< 20
7,12-Dimethylbenz[a]anthrac	< 20	< 20	< 20	< 22 J	< 20	< 20	< 20	< 20	< 20 R	< 20
A,A-Dimethyl-Phenethylami	< 50 J	< 50 J	< 50 J	< 55 J	< 50	< 50	< 50	< 50	< 50 R	< 50
Acenaphthene	< 10	< 10	< 10	< 11	< 10	< 10	< 10	< 10	< 10 R	< 10
Acenaphthylene	< 10	< 10	< 10	< 11	< 10	< 10	< 10	< 10	< 10 R	< 10
Acetophenone	< 20	< 20	< 20	< 22	< 20	< 20	< 20	< 20	< 20 R	< 20
Aniline	< 10	< 10	< 10	< 11	< 10	< 10	< 10	< 10	< 10 R	< 10
Anthracene	< 10	< 10	< 10	< 11	< 10	< 10	< 10	< 10	< 10 R	< 10
Aramite, Total	< 15	< 15	< 15	< 17	< 15	< 15	< 15	< 15	< 15 R	< 15
Benzo(a)Anthracene	< 10	< 10	< 10	< 11	< 10	< 10	< 10	< 10	< 10 R	< 10
Benzo(a)Pyrene	< 10	< 10	< 10	< 11 J	< 10	< 10	< 10	< 10	< 10 R	< 10
Benzo(b)Fluoranthene	< 10	< 10	< 10	< 11 J	< 10	< 10	< 10	< 10	< 10 R	< 10
Benzo(g,h,i)Perylene	< 10	< 10	< 10	< 11 J	< 10	< 10	< 10	< 10	< 10 R	< 10
Benzo(k)Fluoranthene	< 10	< 10	< 10	< 11 J	< 10	< 10	< 10	< 10	< 10 R	< 10
Benzyl Alcohol	< 10	< 10	< 10	< 11	< 10	< 10	< 10	< 10	< 10 R	< 10
Butyl benzyl phthalate	< 10	< 10	< 10	< 11	< 10	< 10	< 10	< 10	< 10 R	< 10
Chrysene	< 10	< 10	< 10	< 11	< 10	< 10	< 10	< 10	< 10 R	< 10
Di-n-Butylphthalate	< 10	< 10	< 10	< 11 J	< 10	< 10	< 10	< 10	< 10 R	< 10
Di-n-Octyl Phthalate	< 10	< 10	< 10	< 11 J	< 10	< 10	< 10	< 10	< 10 R	< 10
Diallate, Total	< 30	< 30 J	< 30	< 33	< 30	< 30	< 30	< 30	< 30 R	< 30
Dibenz(a,h)Anthracene	< 10	< 10	< 10	< 11	< 10	< 10	< 10	< 10	< 10 R	< 10

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HARRISON DIVISION - GMC
GROUNDWATER ANALYTICAL RESULTS
SEMIVOLATILE ORGANIC COMPOUNDS

Parameter	RB-02 UG/L	RB-03 UG/L	RB-04 UG/L	RB-05 UG/L	RB-06 UG/L	RB-07 UG/L	RB-08 UG/L	RB-09 UG/L	RB-10 UG/L	RB-11 UG/L
Dibenzofuran	< 10	< 10	< 10	< 11	< 10	< 10	< 10	< 10	< 10 R	< 10
Diethylphthalate	< 10	< 10	< 10	< 11	< 10	< 10	< 10	< 10	< 10 R	< 10
Dimethoate	< 100	< 100	< 100	< 110	< 100	< 100	< 100	< 100	< 100 R	< 100
Dimethyl Phtalate	< 10	< 10	< 10	< 11	< 10	< 10	< 10	< 10	< 10 R	< 10
Diphenylamine	< 20	< 20	< 20	< 22	< 20	< 20	< 20	< 20	< 20 R	< 20
Disulfoton	< 20	< 20	< 20	< 22	< 20	< 20	< 20	< 20	< 20 R	< 20
Ethyl methanesulfonate	< 20	< 20	< 20	< 22	< 20	< 20	< 20	< 20	< 20 R	< 20
Famphur	< 10	< 10	< 10	< 11	< 10	< 10	< 10	< 10	< 10 R	< 10
Fluoranthene	< 10 J	< 10	< 10	< 11	< 10	< 10	< 10	< 10	< 10 R	< 10
Fluorene	< 10	< 10 J	< 10	< 11	< 10	< 10	< 10	< 10	< 10 R	< 10
Hexachloro-1,3-butadiene	< 10	< 10	< 10	< 11	< 10	< 10	< 10	< 10	< 10 R	< 10
Hexachlorobenzene	< 10	< 10	< 10	< 11	< 10	< 10	< 10	< 10	< 10 R	< 10
Hexachlorocyclopentadiene	< 10	< 10	< 10	< 11	< 10	< 10	< 10	< 10	< 10 R	< 10
Hexachloroethane	< 10	< 10	< 10	< 11	< 10	< 10	< 10	< 10	< 10 R	< 10
Hexachlorophene	< 500	< 500 J	< 500 J	< 550 J	< 500 J	< 500 J	< 500	< 500 J	< 500 R	< 500 J
Hexachloropropene	< 30	< 30	< 30	< 33	< 30	< 30	< 30	< 30	< 30 R	< 30
Indeno(1,2,3-cd)Pyrene	< 10	< 10	< 10	< 11 J	< 10	< 10	< 10	< 10	< 10 R	< 10
Isodrin	< 30	< 30	< 30	< 33	< 30	< 30	< 30	< 30	< 30 R	< 30
Isophorone	< 10	< 10	< 10	< 11	< 10	< 10	< 10	< 10	< 10 R	< 10
Isosafrole, Total	< 20	< 20	< 20	< 22	< 20	< 20	< 20	< 20	< 20 R	< 20
Kepone	< 250	< 250 J	< 250 J	< 275 J	< 250	< 250	< 250	< 250	< 250 R	< 250
Methapyrilene	< 100	< 100	< 100 J	< 110 J	< 100 J	< 100 J	< 100 J	< 100 J	< 100 R	< 100 J
Methyl methanesulfonate	< 20	< 20	< 20	< 22	< 20	< 20	< 20	< 20	< 20 R	< 20
Methyl parathion	< 20	< 20	< 20	< 22	< 20	< 20	< 20	< 20	< 20 R	< 20
N-Nitroso-Di-n-Propylamine	< 10	< 10	< 10	< 11	< 10	< 10	< 10	< 10	< 10 R	< 10
N-Nitrosodi-n-butylamine	< 20	< 20	< 20	< 22	< 20	< 20	< 20	< 20	< 20 R	< 20
N-Nitrosodiethylamine	< 30	< 30	< 30	< 33	< 30	< 30	< 30	< 30	< 30 R	< 30
N-Nitrosodimethylamine	< 10	< 10	< 10	< 11	< 10	< 10	< 10	< 10	< 10 R	< 10
N-Nitrosodiphenylamine	< 10	< 10	< 10	< 11	< 10	< 10	< 10	< 10	< 10 R	< 10
N-Nitrosomethylethylamine	< 20	< 20	< 20	< 22	< 20	< 20	< 20	< 20	< 20 R	< 20
N-Nitrosomorpholine	< 20	< 20	< 20	< 22	< 20	< 20	< 20	< 20	< 20 R	< 20
N-Nitrosopiperidine	< 20	< 20	< 20	< 22	< 20	< 20	< 20	< 20	< 20 R	< 20

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HARRISON DIVISION - GMC
GROUNDWATER ANALYTICAL RESULTS
SEMIVOLATILE ORGANIC COMPOUNDS

Parameter	RB-02 UG/L	RB-03 UG/L	RB-04 UG/L	RB-05 UG/L	RB-06 UG/L	RB-07 UG/L	RB-08 UG/L	RB-09 UG/L	RB-10 UG/L	RB-11 UG/L
N-Nitrosopyrrolidine	< 20	< 20	< 20	< 22	< 20	< 20	< 20	< 20	< 20 R	< 20
Napthalene	< 10	< 10	< 10	< 11	< 10	< 10	< 10	< 10	< 10 R	< 10
Nitrobenzene	< 10	< 10	< 10	< 11	< 10	< 10	< 10	< 10	< 10 R	< 10
Triethyl phosphorothioate	< 20	< 20	< 20	< 22	< 20	< 20	< 20	< 20	< 20 R	< 20
Parathion	< 20	< 20	< 20	< 22	< 20	< 20	< 20	< 20	< 20 R	< 20
Pentachlorobenzene	< 20	< 20	< 20	< 22	< 20	< 20	< 20	< 20	< 20 R	< 20
Pentachloronitrobenzene	< 20	< 20	< 20	< 22	< 20	< 20	< 20	< 20	< 20 R	< 20
Pentachlorophenol	< 10	< 10	< 10	< 11	< 10	< 10	< 10	< 10	< 10 R	< 10
Phenacetin	< 20	< 20	< 20 J	< 22 J	< 20	< 20	< 20	< 20	< 20 R	< 20
Phenanthrene	< 10 J	< 10	< 10	< 11	< 10	< 10	< 10	< 10	< 10 R	< 10
Phenol	< 10	< 10	< 10	< 11	< 10	< 10	< 10	< 10	< 10 R	< 10
Phorate	< 20	< 20	< 20 J	< 22 J	< 20	< 20	< 20	< 20	< 20 R	< 20
Pronamide	< 20	< 20	< 20	< 22	< 20	< 20	< 20	< 20	< 20 R	< 20
Pyrene	< 10	< 10	< 10	< 11	< 10	< 10	< 10	< 10	< 10 R	< 10
Pyridine	< 10	< 10	< 10	< 11	< 10	< 10	< 10	< 10	< 10 R	< 10
Safrole, Total	< 20	< 20	< 20	< 22	< 20	< 20	< 20	< 20	< 20 R	< 20
Sulfotepp	< 20	< 20	< 20	< 22	< 20	< 20	< 20	< 20	< 20 R	< 20
Thionazin	< 20	< 20	< 20	< 22	< 20	< 20	< 20	< 20	< 20 R	< 20
bis(2-Chloroethyl)Ether	< 10	< 10	< 10	< 11	< 10	< 10	< 10	< 10	< 10 R	< 10
bis(2-Ethylhexyl)Phthalate	< 10	< 10	< 10	< 11	< 10	< 10	< 10	< 10	< 10 R	< 10
bis(Chloroethoxy)Methane	< 10	< 10	< 10	< 11	< 10	< 10	< 10	< 10	< 10 R	< 10
o-Toluidine	< 20	< 20	< 20	< 22	< 20	< 20	< 20	< 20	< 20 R	< 20
p-(Dimethylamino)azobenzen	< 50	< 50	< 50	< 55	< 50	< 50	< 50	< 50	< 50 R	< 50
p-Chlorobenzilate	< 50	< 50	< 50	< 55	< 50	< 50	< 50	< 50	< 50 R	< 50
p-Phenylene diamine	< 30	< 30 J	< 30 J	< 33 J	< 30 J	< 30 J	< 30 J	< 30	< 30 R	< 30

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HARRISON DIVISION - GMC
GROUNDWATER ANALYTICAL RESULTS
SEMIVOLATILE ORGANIC COMPOUNDS

Parameter	HR3-11993-GW UG/L	HR4-11993-GW UG/L	HR8-12693-GW UG/L	HR9-12693-GW UG/L
1,2,4,5-Tetrachlorobenzene	< 20	< 20	< 20	< 20
1,2,4-Trichlorobenzene	< 10	< 10	< 10	< 10
1,2-Dichlorobenzene	< 10	< 10	< 10	< 10
1,3,5-Trinitrobenzene	< 30	< 30	< 30	< 30
1,3-Dichlorobenzene	< 10	< 10	< 10	< 10
1,3-Dinitrobenzene	< 20	< 20	< 20	< 20
1,4-Dichlorobenzene	< 10	< 10	< 10	< 10
1,4-Naphthoquinone	< 100	< 100	< 100	< 100
1-Naphthylamine	< 30 J	< 30 J	< 30	< 30
2,2'-Dichlorodiisopropyl Ether	< 10	< 10	< 10	< 10
2,3,4,6-Tetrachlorophenol	< 20	< 20	< 20	< 20
2,4,5-Trichlorophenol	< 10	< 10	< 10	< 10
2,4,6-Trichlorophenol	< 10	< 10	< 10	< 10
2,4-Dichlorophenol	< 10	< 10	< 10	< 10
2,4-Dimethylphenol	< 10	< 10	< 10	< 10
2,4-Dinitrophenol	< 10	< 10	< 10	< 10
2,4-Dinitrotoluene	< 10	< 10	< 10	< 10
2,6-Dichlorophenol	< 10	< 10	< 10	< 10
2,6-Dinitrotoluene	< 10	< 10	< 10	< 10
2-Acetylaminofluorene	< 20 J	< 20 J	< 20	< 20
2-Chloronapthalene	< 10	< 10	< 10	< 10
2-Chlorophenol	< 10	< 10	< 10	< 10
2-Methyl-4,6-Dinitrophenol	< 10	< 10	< 10	< 10
2-Methylnapthalene	< 10	< 10	< 10	< 10
2-Methylphenol	< 10	< 10	< 10	< 10
2-Naphthylamine	< 30 J	< 30 J	< 30	< 30
2-Nitroaniline	< 15 J	< 15 J	< 15	< 15
2-Nitrophenol	< 10	< 10	< 10	< 10
2-Picoline	< 20	< 20	< 20	< 20
3,3'-Dichlorobenzidine	< 20 J	< 20 J	< 20	< 20
3,3'-Dimethylbenzidine	< 20 J	< 20 J	< 20	< 20

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HARRISON DIVISION - GMC
GROUNDWATER ANALYTICAL RESULTS
SEMIVOLATILE ORGANIC COMPOUNDS

Parameter	HR3-11993-GW UG/L	HR4-11993-GW UG/L	HR8-12693-GW UG/L	HR9-12693-GW UG/L
3-Cresol	< 10	< 10	< 10	< 10
3-Methylcholanthrene	< 30	< 30	< 30 J	< 30
3-Nitroaniline	< 15	< 15	< 15	< 15
4-Aminobiphenyl	< 20 J	< 20 J	< 20	< 20
4-Bromophenyl-phenyl ether	< 10	< 10	< 10	< 10
4-Chloro-3-Methylphenol	< 10	< 10	< 10	< 10
4-Chloroaniline	< 10	< 10	< 10	< 10
4-Chlorophenyl-phenyl ether	< 10	< 10	< 10	< 10
4-Nitroaniline	< 15 J	< 15 J	< 15	< 15
4-Nitrophenol	< 10 J	< 10 J	< 10 J	< 10 J
4-Nitroquinoline-1-oxide	< 30	< 30 J	< 30	< 30
5-Nitro-o-toluidine	< 20	< 20	< 20	< 20
7,12-Dimethylbenz[a]anthracene	< 20	< 20	< 20 J	< 20
A,A-Dimethyl-Phenethylamine	< 50 J	< 50 J	< 50	< 50
Acenaphthene	< 10	< 10	< 10	< 10
Acenaphthylene	< 10	< 10	< 10	< 10
Acetophenone	< 20	< 20	< 20	< 20
Aniline	< 10	< 10	< 10	< 10
Anthracene	< 10	< 10	< 10	< 10
Aramite, Total	< 15	< 15	< 15	< 15
Benzo(a)Anthracene	< 10	< 10	< 10	< 10
Benzo(a)Pyrene	< 10	< 10	< 10 J	< 10
Benzo(b)Fluoranthene	< 10	< 10	< 10 J	< 10
Benzo(g,h,i)Perylene	< 10	< 10	< 10 J	< 10
Benzo(k)Fluoranthene	< 10	< 10	< 10 J	< 10
Benzyl Alcohol	< 10	< 10	< 10	< 10
Butyl benzyl phthalate	< 10	< 10	< 10	< 10
Chrysene	< 10	< 10	< 10	< 10
Di-n-Butylphthalate	< 10	< 10	< 10	< 10
Di-n-Octyl Phthalate	< 10	< 10	< 10 J	< 10
Diallate, Total	< 30	< 30	< 30	< 30
Dibenz(a,h)Anthracene	< 10	< 10	< 10 J	< 10

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GROUNDWATER ANALYTICAL RESULTS
SEMIVOLATILE ORGANIC COMPOUNDS

Parameter	HR3-11993-GW UG/L	HR4-11993-GW UG/L	HR8-12693-GW UG/L	HR9-12693-GW UG/L
Diethylphthalate	< 10	< 10	< 10	< 10
Dimethoate	< 100	< 100	< 100	< 100
Dimethyl Phtalate	< 10	< 10	< 10	< 10
Diphenylamine	< 20	< 20	< 20	< 20
Disulfoton	< 20	< 20	< 20	< 20
Ethyl methanesulfonate	< 20	< 20	< 20	< 20
Famphur	< 10	< 10	< 10	< 10
Fluoranthene	< 10	< 10	< 10	< 10
Fluorene	< 10	< 10	< 10	< 10
Hexachloro-1,3-butadiene	< 10	< 10	< 10	< 10
Hexachlorobenzene	< 10	< 10	< 10	< 10
Hexachlorocyclopentadiene	< 10	< 10	< 10	< 10
Hexachloroethane	< 10	< 10	< 10	< 10
Hexachlorophene	< 500 J	< 500 J	< 500 J	< 500 J
Hexachloropropene	< 30	< 30	< 30	< 30
Indeno(1,2,3-cd)Pyrene	< 10	< 10	< 10 J	< 10
Isodrin	< 30	< 30	< 30	< 30
Isophorone	< 10	< 10	< 10	< 10
Isosafrole, Total	< 20	< 20	< 20	< 20
Kepone	< 250 J	< 250 J	< 250	< 250
Methapyrilene	< 100 J	< 100 J	< 100 J	< 100 J
Methyl methanesulfonate	< 20	< 20	< 20	< 20
Methyl parathion	< 20	< 20	< 20	< 20
N-Nitroso-Di-n-Propylamine	< 10	< 10	< 10	< 10
N-Nitrosodi-n-butylamine	< 20	< 20	< 20	< 20
N-Nitrosodiethylamine	< 30	< 30	< 30	< 30
N-Nitrosodimethylamine	< 10	< 10	< 10	< 10
N-Nitrosodiphenylamine	< 10	< 10	< 10	< 10
N-Nitrosomethylethylamine	< 20	< 20	< 20	< 20
N-Nitrosomorpholine	< 20	< 20	< 20	< 20
N-Nitrosopiperidine	< 20	< 20	< 20	< 20

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HARRISON DIVISION - GMC
GROUNDWATER ANALYTICAL RESULTS
SEMIVOLATILE ORGANIC COMPOUNDS

Parameter	HR3-11993-GW UG/L	HR4-11993-GW UG/L	HR8-12693-GW UG/L	HR9-12693-GW UG/L
N-Nitrosopyrrolidine	< 20	< 20	< 20	< 20
Napthalene	< 10	< 10	< 10	< 10
Nitrobenzene	< 10	< 10	< 10	< 10
Triethyl phosphorothioate	< 20	< 20	< 20	< 20
Parathion	< 20	< 20	< 20	< 20
Pentachlorobenzene	< 20	< 20	< 20	< 20
Pentachloronitrobenzene	< 20	< 20	< 20	< 20
Pentachlorophenol	< 10	< 10	< 10	< 10
Phenacetin	< 20 J	< 20 J	< 20	< 20
Phenanthrene	< 10	< 10	< 10	< 10
Phenol	< 10	< 10	< 10	< 10
Phorate	< 20 J	< 20 J	< 20	< 20
Pronamide	< 20	< 20	< 20	< 20
Pyrene	< 10	< 10	< 10	< 10
Pyridine	< 10	< 10	< 10	< 10
Safrole, Total	< 20	< 20	< 20	< 20
Sulfotepp	< 20	< 20	< 20	< 20
Thionazin	< 20	< 20	< 20	< 20
bis(2-Chloroethyl)Ether	< 10	< 10	< 10	< 10
bis(2-Ethylhexyl)Phthalate	< 10	< 10	< 10	< 10
bis(Chloroethoxy)Methane	< 10	< 10	< 10	< 10
o-Toluidine	< 20	< 20	< 20	< 20
p-(Dimethylamino)azobenzene	< 50	< 50	< 50	< 50
p-Chlorobenzilate	< 50	< 50	< 50	< 50
p-Phenylene diamine	< 30 J	< 30 J	< 30	< 30

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GROUNDWATER ANALYTICAL RESULTS
SEMIVOLATILE ORGANIC COMPOUNDS

Parameter	W1N-11993-GW UG/L	W2S-12593-GW UG/L	W3N-11393-GW UG/L	W4N-11393-GW UG/L	W4S-12593-GW UG/L
1,2,4,5-Tetrachlorobenzene	< 20	< 20	< 20	< 20	< 20
1,2,4-Trichlorobenzene	< 10	< 10	< 10	< 10	< 10
1,2-Dichlorobenzene	< 10	< 10	< 10	< 10	< 10
1,3,5-Trinitrobenzene	< 30	< 30	< 30	< 30	< 30
1,3-Dichlorobenzene	< 10	< 10	< 10	< 10	< 10
1,3-Dinitrobenzene	< 20	< 20	< 20	< 20	< 20
1,4-Dichlorobenzene	< 10	< 10	< 10	< 10	< 10
1,4-Naphthoquinone	< 100	< 100	< 100	< 100	< 100
1-Naphthylamine	< 30 J	< 30	< 30 J	< 30 J	< 30
2,2'-Dichlorodiisopropyl Ether	< 10	< 10	< 10	< 10	< 10
2,3,4,6-Tetrachlorophenol	< 20	< 20	< 20	< 20	< 20
2,4,5-Trichlorophenol	< 10	< 10	< 10	< 10	< 10
2,4,6-Trichlorophenol	< 10	< 10	< 10	< 10	< 10
2,4-Dichlorophenol	< 10	< 10	< 10	< 10	< 10
2,4-Dimethylphenol	< 10	< 10	< 10	< 10	< 10
2,4-Dinitrophenol	< 10	< 10	< 10	< 10	< 10
2,4-Dinitrotoluene	< 10	< 10	< 10	< 10	< 10
2,6-Dichlorophenol	< 10	< 10	< 10	< 10	< 10
2,6-Dinitrotoluene	< 10	< 10	< 10	< 10	< 10
2-Acetylaminofluorene	< 20 J	< 20	< 20	< 20	< 20
2-Chloronapthalene	< 10	< 10	< 10	< 10	< 10
2-Chlorophenol	< 10	< 10	< 10	< 10	< 10
2-Methyl-4,6-Dinitrophenol	< 10	< 10	< 10	< 10	< 10
2-Methylnapthalene	< 10	< 10	< 10	< 10	< 10
2-Methylphenol	< 10	< 10	< 10	< 10	< 10
2-Naphthylamine	< 30 J	< 30	< 30	< 30	< 30
2-Nitroaniline	< 15 J	< 15	< 15	< 15	< 15
2-Nitrophenol	< 10	< 10	< 10	< 10	< 10
2-Picoline	< 20	< 20	< 20	< 20	< 20
3,3'-Dichlorobenzidine	< 20	< 20	< 20 J	< 20 J	< 20
3,3'-Dimethylbenzidine	< 20 J	< 20	< 20 J	< 20 J	< 20

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Validation codes on last page.

HARRISON DIVISION - GMC
GROUNDWATER ANALYTICAL RESULTS
SEMIVOLATILE ORGANIC COMPOUNDS

Parameter	W1N-11993-GW UG/L	W2S-12593-GW UG/L	W3N-11393-GW UG/L	W4N-11393-GW UG/L	W4S-12593-GW UG/L
3-Cresol	< 10	< 10	< 10	< 10	< 10
3-Methylcholanthrene	< 30	< 30	< 30	< 30	< 30
3-Nitroaniline	< 15	< 15	< 15 J	< 15 J	< 15
4-Aminobiphenyl	< 20 J	< 20	< 20	< 20	< 20
4-Bromophenyl-phenyl ether	< 10	< 10	< 10	< 10	< 10
4-Chloro-3-Methylphenol	< 10	< 10	< 10	< 10	< 10
4-Chloroaniline	< 10	< 10	< 10	< 10	< 10
4-Chlorophenyl-phenyl ether	< 10	< 10	< 10	< 10	< 10
4-Nitroaniline	< 15 J	< 15	< 15	< 15	< 15
4-Nitrophenol	< 10 J	< 10	< 10	< 10	< 10
4-Nitroquinoline-1-oxide	< 30	< 30 J	< 30	< 30	< 30 J
5-Nitro-o-toluidine	< 20	< 20	< 20	< 20	< 20
7,12-Dimethylbenz[a]anthracene	< 20	< 20	< 20	< 20	< 20
A,A-Dimethyl-Phenethylamine	< 50 J	< 50	< 50 J	< 50 J	< 50
Acenaphthene	< 10	< 10	< 10	< 10	< 10
Acenaphthylene	< 10	< 10	< 10	< 10	< 10
Acetophenone	< 20	< 20	< 20	< 20	< 20
Aniline	< 10	< 10	< 10	< 10	< 10
Anthracene	< 10	< 10	< 10	< 10	< 10
Aramite, Total	< 15	< 15	< 15	< 15	< 15
Benzo(a)Anthracene	< 10	< 10	< 10	< 10	< 10
Benzo(a)Pyrene	< 10	< 10	< 10	< 10	< 10
Benzo(b)Fluoranthene	< 10	< 10	< 10	< 10	< 10
Benzo(g,h,i)Perylene	< 10	< 10	< 10	< 10	< 10
Benzo(k)Fluoranthene	< 10	< 10	< 10	< 10	< 10
Benzyl Alcohol	< 10	< 10	< 10	< 10	< 10
Butyl benzyl phthalate	< 10	< 10	< 10	< 10	< 10
Chrysene	< 10	< 10	< 10	< 10	< 10
Di-n-Butylphthalate	< 10	< 10	< 10	< 10	< 10
Di-n-Octyl Phthalate	< 10	< 10	< 10	< 10	< 10
Diallate, Total	< 30	< 30	< 30 J	< 30 J	< 30
Dibenz(a,h)Anthracene	< 10	< 10	< 10	< 10	< 10

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Validation codes on last page.

HARRISON DIVISION - GMC
GROUNDWATER ANALYTICAL RESULTS
SEMIVOLATILE ORGANIC COMPOUNDS

Parameter	W1N-11993-GW UG/L	W2S-12593-GW UG/L	W3N-11393-GW UG/L	W4N-11393-GW UG/L	W4S-12593-GW UG/L
Dibenzofuran	< 10	< 10	< 10	< 10	< 10
Diethylphthalate	< 10	< 10	< 10	< 10	< 10
Dimethoate	< 100	< 100	< 100	< 100	< 100
Dimethyl Phtalate	< 10	< 10	< 10	< 10	< 10
Diphenylamine	< 20	< 20	< 20	< 20	< 20
Disulfoton	< 20	< 20	< 20	< 20	< 20
Ethyl methanesulfonate	< 20	< 20	< 20	< 20	< 20
Famphur	< 10	< 10	< 10	< 10	< 10
Fluoranthene	< 10	< 10	< 10	< 10	< 10
Fluorene	< 10	< 10	< 10 J	< 10 J	< 10
Hexachloro-1,3-butadiene	< 10	< 10	< 10	< 10	< 10
Hexachlorobenzene	< 10	< 10	< 10	< 10	< 10
Hexachlorocyclopentadiene	< 10	< 10	< 10	< 10	< 10
Hexachloroethane	< 10	< 10	< 10	< 10	< 10
Hexachlorophene	< 500 J	< 500	< 500 J	< 500 J	< 500
Hexachloropropene	< 30	< 30	< 30	< 30	< 30
Indeno(1,2,3-cd)Pyrene	< 10	< 10	< 10	< 10	< 10
Isodrin	< 30	< 30	< 30	< 30	< 30
Isophorone	< 10	< 10	< 10	< 10	< 10
Isosafrole, Total	< 20	< 20	< 20	< 20	< 20
Kepone	< 250 J	< 250	< 250 J	< 250 J	< 250
Methapyrilene	< 100 J	< 100 J	< 100	< 100	< 100 J
Methyl methanesulfonate	< 20	< 20	< 20	< 20	< 20
Methyl parathion	< 20	< 20	< 20	< 20	< 20
N-Nitroso-Di-n-Propylamine	< 10	< 10	< 10	< 10	< 10
N-Nitrosodi-n-butylamine	< 20	< 20	< 20	< 20	< 20
N-Nitrosodiethylamine	< 30	< 30	< 30	< 30	< 30
N-Nitrosodimethylamine	< 10	< 10	< 10	< 10	< 10
N-Nitrosodiphenylamine	< 10	< 10	< 10	< 10	< 10
N-Nitrosomethylethylamine	< 20	< 20	< 20	< 20	< 20
N-Nitrosomorpholine	< 20	< 20	< 20	< 20	< 20
N-Nitrosopiperidine	< 20	< 20	< 20	< 20	< 20

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Validation codes on last page.

HARRISON DIVISION - GMC
GROUNDWATER ANALYTICAL RESULTS
SEMIVOLATILE ORGANIC COMPOUNDS

Parameter	W1N-11993-GW UG/L	W2S-12593-GW UG/L	W3N-11393-GW UG/L	W4N-11393-GW UG/L	W4S-12593-GW UG/L
N-Nitrosopyrrolidine	< 20	< 20	< 20	< 20	< 20
Napthalene	< 10	< 10	< 10	< 10	< 10
Nitrobenzene	< 10	< 10	< 10	< 10	< 10
Triethyl phosphorothioate	< 20	< 20	< 20	< 20	< 20
Parathion	< 20	< 20	< 20	< 20	< 20
Pentachlorobenzene	< 20	< 20	< 20	< 20	< 20
Pentachloronitrobenzene	< 20	< 20	< 20	< 20	< 20
Pentachlorophenol	< 10	< 10	< 10	< 10	< 10
Phenacetin	< 20 J	< 20	< 20	< 20	< 20
Phenanthrene	< 10	< 10	< 10	< 10	< 10
Phenol	< 10	< 10	< 10	< 10	< 10
Phorate	< 20 J	< 20	< 20	< 20	< 20
Pronamide	< 20	< 20	< 20	< 20	< 20
Pyrene	< 10	< 10	< 10	< 10	< 10
Pyridine	< 10	< 10	< 10	< 10	< 10
Safrole, Total	< 20	< 20	< 20	< 20	< 20
Sulfotepp	< 20	< 20	< 20	< 20	< 20
Thionazin	< 20	< 20	< 20	< 20	< 20
bis(2-Chloroethyl)Ether	< 10	< 10	< 10	< 10	< 10
bis(2-Ethylhexyl)Phthalate	< 10	< 10	< 10	< 10	< 10
bis(Chloroethoxy)Methane	< 10	< 10	< 10	< 10	< 10
o-Toluidine	< 20	< 20	< 20	< 20	< 20
p-(Dimethylamino)azobenzene	< 50	< 50	< 50	< 50	< 50
p-Chlorobenzilate	< 50	< 50	< 50	< 50	< 50
p-Phenylene diamine	< 30 J	< 30 J	< 30 J	< 30 J	< 30 J

VALIDATION CODES:

J = Estimated Value

R = Rejected Value

<( )J = Laboratory reported this result as below detection. Result is estimated based on data validation.

<( )R = Laboratory reported this result as below detection. Result is rejected based on data validation.

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PHASE I AQUEOUS SAMPLES

POLYCHLORINATED BIPHENYLS, PESTICIDES, AND HERBICIDE RESULTS MONITOR WELL AND RINSEATE BLANK SAMPLES

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HARRISON DIVISION - GMC
GROUNDWATER ANALYTICAL RESULTS
POLYCHLORINATED BIPHENYLS, PESTICIDES, AND HERBICIDES

Parameter	19D-12093-G UG/L	19S-12093-G UG/L	4S-12293-G UG/L	DUP-13 UG/L	DUP-14 UG/L	DUP-15 UG/L	DUP-16 UG/L	DUP-17 UG/L	DUP-18 UG/L	DUP-19 UG/L
2,4,5-T	< 1 J	< 1 J	< 10	NA	< 1	< 1	< 1 J	< 1	< 1	< 1
2,4,5-TP(Silvex)	< 1 J	< 1 J	< 10 J	NA	< 1 J	< 1 J	< 1 J	< 1 J	< 1 J	< 1 J
2,4-D	< 3 J	< 3 J	< 30	NA	< 3	< 3	< 3 J	< 3	< 3	< 3
4,4'-DDD	< .1 J	< .1 J	< .1	NA	< .1	< .1	< .1 J	< .1 J	< .1	< .1 J
4,4'-DDE	< .1 J	< .1 J	< .1	NA	< .1	< .1	< .1 J	< .1 J	< .1	< .1 J
4,4-DDT	< .1	< .1	< .1	NA	< .1	< .1	< .1	< .1 J	< .1	< .1 J
Aldrin	< .05 J	< .05 J	< .05	NA	< .05	< .05	< .05 J	< .05 J	< .05	< .05 J
Aroclor-1016	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1 J	< 1	< 1 J
Aroclor-1221	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1 J	< 1	< 1 J
Aroclor-1232	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1 J	< 1	< 1 J
Aroclor-1242	< 1	< 1	< 1	< 1	< 1 J	< 1	< 1	< 1 J	< 1	< 1 J
Aroclor-1248	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1 J	< 1	< 1 J
Aroclor-1254	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1 J	< 1	< 1 J
Aroclor-1260	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1 J	< 1	< 1 J
Chlordane	< .05	< .05	< .05	NA	< .05	< .05	< .05	< .05 J	< .05	< .05 J
Dieldrin	< .1	< .1	< .1	NA	< .1	< .1	< .1	< .1 J	< .1	< .1 J
Dinoseb	< 1 J	< 1 J	< 10	NA	< 1	< 1	< 1 J	< 1	< 1	< 1
Endosulfan I	< .05	< .05	< .05	NA	< .05	< .05	< .05	< .05 J	< .05	< .05 J
Endosulfan II	< .1	< .1	< .1	NA	< .1	< .1	< .1	< .1 J	< .1	< .1 J
Endosulfan sulfate	< .1	< .1	< .1	NA	< .1	< .1	< .1	< .1 J	< .1	< .1 J
Endrin	< .1 J	< .1 J	< .1	NA	< .1	< .1	< .1 J	< .1 J	< .1	< .1 J
Endrin Aldehyde	< .1	< .1	< .1	NA	< .1	< .1	< .1	< .1 J	< .1	< .1 J
Heptachlor	< .05	< .05	< .05	NA	< .05	< .05	< .05	< .05 J	< .05	< .05 J
Heptachlor epoxide	< .05	< .05	< .05	NA	< .05	< .05	< .05	< .05 J	< .05	< .05 J
Methoxychlor	< .5	< .5	< .5	NA	< .5	< .5	< .5	< .5 J	< .5	< .5 J
Toxaphene	< 4	< 4	< 4	NA	< 4	< 4	< 4	< 4 J	< 4	< 4 J
alpha-BHC	< .05	< .05	< .05	NA	< .05	< .05	< .05	< .05 J	< .05	< .05 J
beta-BHC	< .05	< .05	< .05	NA	< .05	< .05	< .05	< .05 J	< .05	< .05 J
delta-BHC	< .05	< .05	< .05	NA	< .05	< .05	< .05	< .05 J	< .05	< .05 J
gamma-BHC(Lindan	< .05	< .05	< .05	NA	< .05 J	< .05	< .05	< .05 J	< .05	< .05 J

Validation codes on last page.

HARRISON DIVISION - GMC
GROUNDWATER ANALYTICAL RESULTS
POLYCHLORINATED BIPHENYLS, PESTICIDES, AND HERBICIDES

Parameter	DUP 20 UG/L	DUP-21 UG/L	DUP-22 UG/L	EAST-11293-GW UG/L	GM1-12193-GW UG/L	GM10-12793-GW UG/L	GM11-12793-GW UG/L	GM13-12893-GW UG/L	GM15-12893-GW UG/L	GM16-12893-GW UG/L
2,4,5-T	< 1	< 10 J	< 1	< 1	< 1	< 1	< 1	< 1	< 1 J	< 1
2,4,5-TP(Silvex)	< 1 J	< 10 J	< 1 J	< 1	< 1 J	< 1 J	< 1 J	< 1 J	< 1 J	< 1 J
2,4-D	< 3	< 30 J	< 3	< 3	< 3	< 3	< 3	< 3	< 3 J	< 3
4,4'-DDD	< .1	< .1 J	< .1	< .1	< .1 J	< .1	< .1	< .1	< .1	< .1
4,4'-DDE	< .1	< .1 J	< .1	< .1	< .1 J	< .1	< .1	< .1	< .1	< .1
4,4-DDT	< .1	< .1 J	< .1	< .1	< .1 J	< .1	< .1	< .1	< .1	< .1
Aldrin	< .05	< .05 J	< .05	< .05	< .05 J	< .05	< .05	< .05	< .05	< .05
Aroclor-1016	< 1	< 1 J	< 1	< 1	< 1 J	< 1	< 1	< 1	< 1	< 1
Aroclor-1221	< 1	< 1 J	< 1	< 1	< 1 J	< 1	< 1	< 1	< 1	< 1
Aroclor-1232	< 1	< 1 J	< 1	< 1	< 1 J	< 1	< 1	< 1	< 1	< 1
Aroclor-1242	< 1	< 1 J	< 1	< 1	< 1 J	< 1	< 1	< 1	< 1	< 1
Aroclor-1248	< 1	< 1 J	< 1	< 1	< 1 J	< 1	< 1	< 1	< 1	< 1
Aroclor-1254	< 1	< 1 J	< 1	< 1	< 1 J	< 1	< 1	< 1	< 1	< 1
Aroclor-1260	< 1	< 1 J	< 1	< 1	< 1 J	< 1	< 1	< 1	< 1	< 1
Chlordane	< .05	< .05 J	< .05	< .05	< .05 J	< .05	< .05	< .05	< .05	< .05
Dieldrin	< .1	< .1 J	< .1	< .1	< .1 J	< .1	< .1	< .1	< .1	< .1
Dinoseb	< 1	< 10 J	< 1	< 1	< 1	< 1	< 1	< 1	< 1 J	< 1
Endosulfan I	< .05	< .05 J	< .05	< .05	< .05 J	< .05	< .05	< .05	< .05	< .05
Endosulfan II	< .1	< .1 J	< .1	< .1	< .1 J	< .1	< .1	< .1	< .1	< .1
Endosulfan sulfate	< .1	< .1 J	< .1	< .1	< .1 J	< .1	< .1	< .1	< .1	< .1
Endrin	< .1	< .1 J	< .1	< .1	< .1 J	< .1	< .1	< .1	< .1	< .1
Endrin Aldehyde	< .1	< .1 J	< .1	< .1	< .1 J	< .1	< .1	< .1	< .1	< .1
Heptachlor	< .05	< .05 J	< .05	< .05	< .05 J	< .05	< .05	< .05	< .05	< .05
Heptachlor epoxide	< .05	< .05 J	< .05	< .05	< .05 J	< .05	< .05	< .05	< .05	< .05
Methoxychlor	< .5	< .5 J	< .5	< .5	< .5 J	< .5	< .5	< .5	< .5	< .5
Toxaphene	< 4	< 4 J	< 4	< 4	< 4 J	< 4	< 4	< 4	< 4	< 4
alpha-BHC	< .05	< .05 J	< .05	< .05	< .05 J	< .05	< .05	< .05	< .05	< .05
beta-BHC	< .05	< .05 J	< .05	< .05	< .05 J	< .05	< .05	< .05	< .05	< .05
delta-BHC	< .05	< .05 J	< .05	< .05	< .05 J	< .05	< .05	< .05	< .05	< .05
gamma-BHC(Lindane)	< .05	< .05 J	< .05	< .05	< .05 J	< .05	< .05	< .05	< .05	< .05

Validation codes on last page.

HARRISON DIVISION - GMC
GROUNDWATER ANALYTICAL RESULTS
POLYCHLORINATED BIPHENYLS, PESTICIDES, AND HERBICIDES

Parameter	GM17-12793-GW UG/L	GM18-12893-GW UG/L	GM2-12193-GW UG/L	GM5-12293-GW UG/L	GM7R-12093-GW UG/L	GM8-12093-GW UG/L	GM9-12793-GW UG/L	HR1-11293-GW UG/L	HR10-112693-G UG/L	HR11-12693-GW UG/L
2,4,5-T	< 1 R	< 1	< 1	< 1	< 1 J	< 1 J	< 1	NA	< 1	< 1
2,4,5-TP(Silvex)	< 1 R	< 1 J	< 1 J	< 1 J	< 1 J	< 1 J	< 1 J	NA	< 1 J	< 1 J
2,4-D	< 3 R	< 3	< 3	< 3	< 3 J	< 3 J	< 3	NA	< 3	< 3
4,4'-DDD	< .1	< .1	< .1 J	< .1	< .1 J	< .1 J	< .1 J	NA	< .1	< .1
4,4'-DDE	< .1	< .1	< .1 J	< .1	< .1 J	< .1 J	< .1 J	NA	< .1	< .1
4,4-DDT	< .1	< .1	< .1 J	< .1	< .1	< .1	< .1 J	NA	< .1	< .1
Aldrin	< .05	< .05	< .05 J	< .05	< .05 J	< .05 J	< .05 J	NA	< .05	< .05
Aroclor-1016	< 1	< 1	< 1 J	< 1	< 1	< 1	< 1 J	< 1	< 1	< 1
Aroclor-1221	< 1	< 1	< 1 J	< 1	< 1	< 1	< 1 J	< 1	< 1	< 1
Aroclor-1232	< 1	< 1	< 1 J	< 1	< 1	< 1	< 1 J	< 1	< 1	< 1
Aroclor-1242	< 1	< 1	< 1 J	< 1	< 1	< 1	< 1 J	< 1	< 1	< 1
Aroclor-1248	< 1	< 1	< 1 J	< 1	< 1	< 1	< 1 J	< 1	< 1	< 1
Aroclor-1254	< 1	< 1	< 1 J	< 1	< 1	< 1	< 1 J	< 1	< 1	< 1
Aroclor-1260	< 1	< 1	< 1 J	< 1	< 1	< 1	< 1 J	< 1	< 1	< 1
Chlordane	< .05	< .05	< .05 J	< .05	< .05	< .05	< .05 J	NA	< .05	< .05
Dieldrin	< .1	< .1	< .1 J	< .1	< .1	< .1	< .1 J	NA	< .1	< .1
Dinoseb	< 1 R	< 1	< 1	< 1	< 1 J	< 1 J	< 1	NA	< 1	< 1
Endosulfan I	< .05	< .05	< .05 J	< .05	< .05	< .05	< .05 J	NA	< .05	< .05
Endosulfan II	< .1	< .1	< .1 J	< .1	< .1	< .1	< .1 J	NA	< .1	< .1
Endosulfan sulfate	< .1	< .1	< .1 J	< .1	< .1	< .1	< .1 J	NA	< .1	< .1
Endrin	< .1	< .1	< .1 J	< .1	< .1 J	< .1 J	< .1 J	NA	< .1	< .1
Endrin Aldehyde	< .1	< .1	< .1 J	< .1	< .1	< .1	< .1 J	NA	< .1	< .1
Heptachlor	< .05	< .05	< .05 J	< .05	< .05	< .05	< .05 J	NA	< .05	< .05
Heptachlor epoxide	< .05	< .05	< .05 J	< .05	< .05	< .05	< .05 J	NA	< .05	< .05
Methoxychlor	< .5	< .5	< .5 J	< .5	< .5	< .5	< .5 J	NA	< .5	< .5
Toxaphene	< 4	< 4	< 4 J	< 4	< 4	< 4	< 4 J	NA	< 4	< 4
alpha-BHC	< .05	< .05	< .05 J	< .05	< .05	< .05	< .05 J	NA	< .05	< .05
beta-BHC	< .05	< .05	< .05 J	< .05	< .05	< .05	< .05 J	NA	< .05	< .05
delta-BHC	< .05	< .05	< .05 J	< .05	< .05	< .05	< .05 J	NA	< .05	< .05
gamma-BHC(Lindane)	< .05	< .05	< .05 J	< .05	< .05	< .05	< .05 J	NA	< .05	< .05

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HARRISON DIVISION - GMC
GROUNDWATER ANALYTICAL RESULTS
POLYCHLORINATED BIPHENYLS, PESTICIDES,AND HERBICIDES

Parameter	HR12-12693-GW UG/L	HR13-11993-GW UG/L	HR14-11393-GW UG/L	HR15-11393-GW UG/L	HR17-12593-GW UG/L	HR3-11993-GW UG/L	HR4-11993-GW UG/L	HR8-12693-GW UG/L	HR9-12693-GW UG/L
2,4,5-T	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
2,4,5-TP(Silvex)	< 1 J	< 1 J	< 1 J	< 1 J	< 1 J	< 1 J	< 1 J	< 1 J	< 1 J
2,4-D	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3
4,4'-DDD	< .1	< .1	< .1	< .1	< .1 J	< .1	< .1	< .1	< .1
4,4'-DDE	< .1	< .1	< .1	< .1	< .1 J	< .1	< .1	< .1	< .1
4,4-DDT	< .1	< .1	< .1	< .1	< .1 J	< .1	< .1	< .1	< .1
Aldrin	< .05	< .05	< .05	< .05	< .05 J	< .05	< .05	< .05	< .05
Aroclor-1016	< 1	< 1	< 1	< 1	< 1 J	< 1	< 1	< 1	< 1
Aroclor-1221	< 1	< 1	< 1	< 1	< 1 J	< 1	< 1	< 1	< 1
Aroclor-1232	< 1	< 1	< 1	< 1	< 1 J	< 1	< 1	< 1	< 1
Aroclor-1242	< 1	< 1	< 1 J	< 1 J	< 1 J	< 1	< 1	< 1	< 1
Aroclor-1248	< 1	< 1	< 1	< 1	< 1 J	< 1	< 1	< 1	< 1
Aroclor-1254	< 1	< 1	< 1	< 1	< 1 J	< 1	< 1	< 1	< 1
Aroclor-1260	< 1	< 1	< 1	< 1	< 1 J	< 1	< 1	< 1	< 1
Chlordane	< .05	< .05	< .05	< .05	< .05 J	< .05	< .05	< .05	< .05
Dieldrin	< .1	< .1	< .1	< .1	< .1 J	< .1	< .1	< .1	< .1
Dinoseb	< 1 R	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Endosulfan I	< .05	< .05	< .05	< .05	< .05 J	< .05	< .05	< .05	< .05
Endosulfan II	< .1	< .1	< .1	< .1	< .1 J	< .1	< .1	< .1	< .1
Endosulfan sulfate	< .1	< .1	< .1	< .1	< .1 J	< .1	< .1	< .1	< .1
Endrin	< .1	< .1	< .1	< .1	< .1 J	< .1	< .1	< .1	< .1
Endrin Aldehyde	< .1	< .1	< .1	< .1	< .1 J	< .1	< .1	< .1	< .1
Heptachlor	< .05	< .05	< .05	< .05	< .05 J	< .05	< .05	< .05	< .05
Heptachlor epoxide	< .05	< .05	< .05	< .05	< .05 J	< .05	< .05	< .05	< .05
Methoxychlor	< .5	< .5	< .5	< .5	< .5 J	< .5	< .5	< .5	< .5
Toxaphene	< 4	< 4	< 4	< 4	< 4 J	< 4	< 4	< 4	< 4
alpha-BHC	< .05	< .05	< .05	< .05	< .05 J	< .05	< .05	< .05	< .05
beta-BHC	< .05	< .05	< .05	< .05	< .05 J	< .05	< .05	< .05	< .05
delta-BHC	< .05	< .05	< .05	< .05	< .05 J	< .05	< .05	< .05	< .05
gamma-BHC(Lindane)	< .05	< .05	< .05 J	< .05 J	< .05 J	< .05	< .05	< .05	< .05

Validation codes on last page.

HARRISON DIVISION - GMC
GROUNDWATER ANALYTICAL RESULTS
POLYCHLORINATED BIPHENYLS, PESTICIDES, AND HERBICIDES

Parameter	RB-02 UG/L	RB-03 UG/L	RB-04 UG/L	RB-05 UG/L	RB-06 UG/L	RB-07 UG/L	RB-08 UG/L	RB-09 UG/L	RB-10 UG/L	RB-11 UG/L
2,4,5-T	< 1	< 1	< 1	< 1 J	< 1	< 1	< 1	< 1	< 1	< 1
2,4,5-TP(Silvex)	< 1	< 1 J	< 1 J	< 1 J	< 1 J	< 1 J	< 1 J	< 1 J	< 1 J	< 1 J
2,4-D	< 3	< 3	< 3	< 3 J	< 3	< 3	< 3	< 3	< 3	< 3
4,4'-DDD	< .1	< .1	< .1	< .1 J	< .1 J	< .1	< .1 J	< .1	< .1 J	< .1
4,4'-DDE	< .1	< .1	< .1	< .1 J	< .1 J	< .1	< .1 J	< .1	< .1 J	< .1
4,4-DDT	< .1	< .1	< .1	< .1	< .1 J	< .1	< .1 J	< .1	< .1 J	< .1
Aldrin	< .05	< .05	< .05	< .05 J	< .05 J	< .05	< .05 J	< .05	< .05 J	< .05
Aroclor-1016	< 1	< 1	< 1	< 1	< 1 J	< 1	< 1 J	< 1	< 1 J	< 1
Aroclor-1221	< 1	< 1	< 1	< 1	< 1 J	< 1	< 1 J	< 1	< 1 J	< 1
Aroclor-1232	< 1	< 1	< 1	< 1	< 1 J	< 1	< 1 J	< 1	< 1 J	< 1
Aroclor-1242	< 1	< 1 J	< 1	< 1	< 1 J	< 1	< 1 J	< 1	< 1 J	< 1
Aroclor-1248	< 1	< 1	< 1	< 1	< 1 J	< 1	< 1 J	< 1	< 1 J	< 1
Aroclor-1254	< 1	< 1	< 1	< 1	< 1 J	< 1	< 1 J	< 1	< 1 J	< 1
Aroclor-1260	< 1	< 1	< 1	< 1	< 1 J	< 1	< 1 J	< 1	< 1 J	< 1
Chlordane	< .05	< .05	< .05	< .05	< .05 J	< .05	< .05 J	< .05	< .05 J	< .05
Dieldrin	< .1	< .1	< .1	< .1	< .1 J	< .1	< .1 J	< .1	< .1 J	< .1
Dinoseb	< 1	< 1	< 1	< 1 J	< 1	< 1	< 1	< 1	< 1	< 1
Endosulfan I	< .05	< .05	< .05	< .05	< .05 J	< .05	< .05 J	< .05	< .05 J	< .05
Endosulfan II	< .1	< .1	< .1	< .1	< .1 J	< .1	< .1 J	< .1	< .1 J	< .1
Endosulfan sulfate	< .1	< .1	< .1	< .1	< .1 J	< .1	< .1 J	< .1	< .1 J	< .1
Endrin	< .1	< .1	< .1	< .1 J	< .1 J	< .1	< .1 J	< .1	< .1 J	< .1
Endrin Aldehyde	< .1	< .1	< .1	< .1	< .1 J	< .1	< .1 J	< .1	< .1 J	< .1
Heptachlor	< .05	< .05	< .05	< .05	< .05 J	< .05	< .05 J	< .05	< .05 J	< .05
Heptachlor epoxide	< .05	< .05	< .05	< .05	< .05 J	< .05	< .05 J	< .05	< .05 J	< .05
Methoxychlor	< .5	< .5	< .5	< .5	< .5 J	< .5	< .5 J	< .5	< .5 J	< .5
Toxaphene	< 4	< 4	< 4	< 4	< 4 J	< 4	< 4 J	< 4	< 4 J	< 4
alpha-BHC	< .05	< .05	< .05	< .05	< .05 J	< .05	< .05 J	< .05	< .05 J	< .05
beta-BHC	< .05	< .05	< .05	< .05	< .05 J	< .05	< .05 J	< .05	< .05 J	< .05
delta-BHC	< .05	< .05	< .05	< .05	< .05 J	< .05	< .05 J	< .05	< .05 J	< .05
gamma-BHC(Lindane)	< .05	< .05 J	< .05	< .05	< .05 J	< .05	< .05 J	< .05	< .05 J	< .05

Validation codes on last page.

HARRISON DIVISION - GMC
GROUNDWATER ANALYTICAL RESULTS
POLYCHLORINATED BIPHENYLS, PESTICIDES, AND HERBICIDES

Parameter	WIN-11993-GW UG/L	W1S-12593-GW UG/L	W2S-12593-GW UG/L	W3S-11393-GW UG/L	W4N-11393-GW UG/L	W4S-12593-GW UG/L
2,4,5-T	< 1	NA	< 1	< 1	< 1	< 1
2,4,5-TP(Silvex)	< 1 J	NA	< 1 J	< 1 J	< 1 J	< 1 J
2,4-D	< 3	NA	< 3	< 3	< 3	< 3
4,4'-DDD	< .1	NA	< .1 J	< .1	< .1	< .1
4,4'-DDE	< .1	NA	< .1 J	< .1	< .1	< .1
4,4-DDT	< .1	NA	< .1 J	< .1	< .1	< .1
Aldrin	< .05	NA	< .05 J	< .05	< .05	< .05
Aroclor-1016	< 1	< .2	< 1 J	< 1	< 1	< 1
Aroclor-1221	< 1	< .2	< 1 J	< 1	< 1	< 1
Aroclor-1232	< 1	< .2	< 1 J	< 1	< 1	< 1
Aroclor-1242	< 1	< .2	< 1 J	< 1 J	< 1 J	< 1
Aroclor-1248	< 1	< .2	< 1 J	< 1	< 1	< 1
Aroclor-1254	< 1	< .2	< 1 J	< 1	< 1	< 1
Aroclor-1260	< 1	< .2	< 1 J	< 1	< 1	< 1
Chlordane	< .05	NA	< .05 J	< .05	< .05	< .05
Dieldrin	< .1	NA	< .1 J	< .1	< .1	< .1
Dinoseb	< 1	NA	< 1	< 1	< 1	< 1
Endosulfan I	< .05	NA	< .05 J	< .05	< .05	< .05
Endosulfan II	< .1	NA	< .1 J	< .1	< .1	< .1
Endosulfan sulfate	< .1	NA	< .1 J	< .1	< .1	< .1
Endrin	< .1	NA	< .1 J	< .1	< .1	< .1
Endrin Aldehyde	< .1	NA	< .1 J	< .1	< .1	< .1
Heptachlor	< .05	NA	< .05 J	< .05	< .05	< .05
Heptachlor epoxide	< .05	NA	< .05 J	< .05	< .05	< .05
Methoxychlor	< .5	NA	< .5 J	< .05	< .5	< .5
Toxaphene	< 4	NA	< 4 J	< 4	< 4	< 4
alpha-BHC	< .05	NA	< .05 J	< .05	< .05	< .05
beta-BHC	< .05	NA	< .05 J	< .05	< .05	< .05
delta-BHC	< .05	NA	< .05 J	< .05	< .05	< .05
gamma-BHC(Lindane)	< .05	NA	< .05 J	< .05 J	< .05	< .05

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VALIDATION CODES:
J = Estimated Value
R = Rejected Value
<( )J = Laboratory reported this result as below detection. Result is estimated based on data validation.
< ( ) R = Laboratory reported this result as below detection. Result is rejected based on data validation.
NA = Constituent was not analyzed.

PHASE I AQUEOUS SAMPLES

TOTAL METALS AND CYANIDE RESULTS
MONITOR WELL AND RINSEATE BLANK SAMPLES

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HARRISON DIVISION - GMC
GROUNDWATER ANALYTICAL RESULTS
TOTAL METALS AND CYANIDE

Parameter	19D-12093-G UG/L	19S-12093-G UG/L	4S-12293-G UG/L	DUP-13 UG/L	DUP-14 UG/L	DUP-15 UG/L	DUP-16 UG/L	DUP-17 UG/L	DUP-18 UG/L	DUP-19 UG/L	DUP-20 UG/L
Antimony	< 50	< 50 J	< 50 J	**65.4 J**	**54.3**	< 50	< 50	< 50	< 50	**73.5**	< 50
Arsenic	**5**	**22.5 J**	**27.6 J**	3 U	< 4.8 J	**2.7**	**5.6**	**2.9**	< 2	< 2 J	**3.6 J**
Barium	**147**	**534 J**	**357 J**	**116**	**134**	**100**	**129**	**275**	**117**	**130**	**63.5**
Beryllium	< 1	**1.2 J**	< 1 J	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Cadmium	< 4	**20.4 J**	< 4 J	< 4	< 4	< 4	< 4	< 4	< 4	< 4	< 4
Chromium	< 4	**29 J**	**8.9 J**	< 4	< 4	< 4	< 4	< 4	< 4	< 4	< 4
Cobalt	11.7	**61.3 J**	**40.4 J**	**13.5**	**10.4**	**16.5**	**11 J**	**56.8**	**28.4**	**13.9**	**9.7**
Copper	6.4 U	**91.1 J**	**< 43.1 UJ**	9 U	15.9 U	13.9 U	12.9 U	27.9 U	10.9 U	8.6 U	6.9 U
Lead	< 2 J	**25.8 J**	**17.8 J**	**3.3**	5	**5.8 J**	**2**	**6**	**2.4 J**	**2.8 J**	< 2 J
Mercury	< .2	< .2 J	< .2 J	< .2	< .2	< .2	< .2	< .2	< .2	< .2 J	< .2
Nickel	**19.6**	**97.9 J**	**42.6 J**	< 14	< 14	**20.6**	**17.4**	**64**	**26.2**	< 14	< 14
Selenium	< 1 J	< 1 J	< 5 J	< 1 J	< 1 J	< 1 J	< 1 J	< 1 J	< 1 J	< 1 J	< 1 J
Silver	< 4	< 4 J	< 4 J	< 4	< 4	< 4	< 4	< 4	< 4	< 4	< 4 J
Thallium	< 2 J	< 2 J	< 2 J	< 2	< 2	< 2 J	< 2	< 2	< 2 J	< 2 J	< 2 J
Tin	< 200	< 200 J	< 200 J	< 200	< 200	< 200	< 200	< 200	< 200	< 200	< 200
Vanadium	< 5	**42 J**	**8.8 J**	< 5	**5.8**	**6.7**	< 5	**7.6**	< 5	< 5	< 5
Zinc	7.9 U	**283 J**	< 85.5 J	24.6 U	32.9 U	26.8 U	7.1 U	53.2 U	18.5 U	16 U	**12.4**
	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L
Cyanide	< .005	**0.008**	**0.014**	NA	< .005	< .005	< .005	< .005	< .005	< .005	< .005

Validation codes on last page.

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HARRISON DIVISION - GMC
GROUNDWATER ANALYTICAL RESULTS
TOTAL METALS AND CYANIDE

Parameter	DUP-21 UG/L	DUP-22 UG/L	EAST-11293-GW UG/L	GM1-12193-GW UG/L	GM10-12793-GW UG/L	GM11-12793-GW UG/L	GM13-12893-GW UG/L	GM15-12893-GW UG/L	GM16-12893-GW UG/L	GM17-12793-GW UG/L
Antimony	< 50	< 50	**192 J**	< 50	< 50	52.9 U	**53.3**	< 50	< 50	< 50 J
Arsenic	< 2 J	**7.4 J**	**11.8 J**	**2.8**	< 2 J	< 2 J	< 2 J	**2.1 J**	< 2 J	**3 J**
Barium	**87.2**	81	**548 J**	**132**	**161**	**82.1**	**105**	**137**	**158**	**78.8 J**
Beryllium	< 1	< 1	**3.2 J**	< 1	< 1	< 1	< 1	< 1	< 1	< 1 J
Cadmium	< 4	< 4	**21.6 J**	< 4	< 4	< 4	< 4	< 4	< 4	< 4 J
Chromium	< 4	**9.1**	**74.8 J**	**5.8**	< 4	< 4	< 4	< 4	< 4	< 4 J
Cobalt	**15.9**	**10.7**	**92.3 J**	**13.4**	**13**	10.5 U	**24.2**	**10.6**	**10.9**	14 J
Copper	27.2 U	25.8 U	**95.3 J**	18.7 U	6.3 U	10.6 U	6.7 U	< 5	9.9 U	25.1 UJ
Lead	< 2 J	**3.8 J**	**75.4 J**	**8.8**	**4**	2.2 U	**2.1**	< 2 J	2.8 J	< 2 J
Mercury	< .2 J	< .2	**.44 J**	< .2	< .2 J	< .2	< .2	< .2	< .2	< .2 J
Nickel	< 14	< 14	**113 J**	**24.8**	< 14	< 14	< 14	< 14	< 14	< 14 J
Selenium	**1.2 J**	**2.6 J**	< 5 J	< 1 J	< 1 J	< 1 J	**1.9 J**	< 1 J	< 1 J	< 1 J
Silver	< 4	< 4 J	< 4 J	< 4	< 4	< 4	< 4 J	< 4 J	< 4 J	< 4 J
Thallium	< 2 J	< 2 J	< 4 J	< 2 J	< 2 J	< 2	< 2 J	< 2 J	< 2 J	< 2 J
Tin	< 200	< 200	**204 J**	< 200	< 200	< 200	< 200	< 200	< 200	< 200 J
Vanadium	< 5	**6.4**	**94.5 J**	**9.5**	< 5	< 5	< 5	< 5	< 5	< 5 J
Zinc	13.4 U	**35.2**	**476 J**	31 U	25 U	13.6 U	**13.5**	**9**	**23.3**	19.5 UJ
	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L
Cyanide	< .005	< .005	**0.008**	< .005	< .005	< .005	< .005	< .005	< .005	< .005

Validation codes on last page.

HARRISON DIVISION - GMC
GROUNDWATER ANALYTICAL RESULTS
TOTAL METALS AND CYANIDE

Parameter	GM18-12893-GW UG/L	GM2-12293-GW UG/L	GM5-12293-GW UG/L	GM7R-12093-GW UG/L	GM8-12093-GW UG/L	GM9-12793-GW UG/L	HR1-11293-GW UG/L	HR10-12693-GW UG/L	HR11-12693-GW UG/L	HR12-12693-GW UG/L	HR13-12693-GW UG/L
Antimony	< 50	< 50	< 50	< 50	**63.2 J**	**50.5**	**64**	< 50	< 50	**55**	< 50
Arsenic	**7.5 J**	< 2 J	< 2	**2.1**	**13.6 J**	< 2 J	4 U	**5.2 J**	< 2 J	3 J	< 2
Barium	**81.9**	**174**	**102**	**95**	**129 J**	**89.8**	**114**	**65.4**	**83.8**	**101**	**90.7**
Beryllium	< 1	< 1	< 1	< 1	< 1 J	< 1	< 1	< 1	< 1	< 1	< 1
Cadmium	< 4	< 4	< 4	< 4	< 4 J	< 4	< 4	< 4	< 4	< 4	< 4
Chromium	**9.3**	< 4	< 4	< 4	< 4 J	< 4	< 4	< 4	< 4	< 4	**5.4**
Cobalt	**12.4**	**33.5**	**21.9**	**12.6**	**14.5 J**	**9.8**	**12.8**	**10.1**	**12.1**	**10.7**	**11.8**
Copper	24.5 U	16.1 U	11.5 U	13 U	< 39.4 J	7.9 U	10.8 U	< 5	8.7 U	8 U	22.7 U
Lead	**4.8 J**	**4.4**	< 2 J	**7.4 J**	< 2 J	**3**	**3.5**	< 2 J	< 2	< 2	**11 J**
Mercury	< .2	< .2	< .2	< .2	< .2 J	< .2 J	< .2	< .2	< .2	< .2	< .2
Nickel	< 14	**39.1**	**22.1**	**19.8**	< 14 J	< 14	< 14	< 14	< 14	< 14	**20**
Selenium	**2.8 J**	< 1 J	< 1 J	< 1 J	< 1 J	< 1 J	< 1 J	< 1 J	< 1 J	< 1 J	< 1 J
Silver	< 4 J	< 4	< 4	< 4	< 4 J	< 4	< 4	< 4 J	< 4 J	< 4 J	< 4
Thallium	< 2 J	< 2 J	< 2	< 2	< 10 J	< 2 J	< 2	< 2 J	< 2 J	< 2 J	< 2
Tin	< 200	< 200	< 200	< 200	< 200 J	< 200	< 200	< 200	< 200	< 200	< 200
Vanadium	**7.3**	< 5	< 5	**5.5**	< 5 J	< 5	< 5	< 5	< 5	< 5	**7.4**
Zinc	**44.5**	28.6 U	17.4 U	19.9 U	< 28.2 J	15.3 U	25 U	**10.2**	**14.9**	**15.6**	28.1 U
	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L
Cyanide	**0.021**	< .005	< .005	< .005	**0.017**	< .005	NA	< .005	< .005	< .005	< .005

Validation codes on last page.

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HARRISON DIVISION - GMC
GROUNDWATER ANALYTICAL RESULTS
TOTAL METALS AND CYANIDE

Parameter	HR14-11393-GW UG/L	HR15-11393-GW UG/L	HR17-12593-GW UG/L	HR3-11993-GW UG/L	HR4-11993-GW UG/L	HR6-11993-GW UG/L	HR8-12693-GW UG/L	HR9-12693-GW UG/L	W1N-11993-GW UG/L	W1S-12593-GW UG/L	W3N-11393-GW UG/L	W4N-11393-GW UG/L	W4S-12593-GW UG/L
Antimony	**61.8**	**79.1**	**82.1**	< 50	< 50	< 50	< 50	**97.7 J**	< 50	**63.2**	**54.4 J**	**144 J**	**85.3 J**
Arsenic	< 4 J	5.5 U	< 2 J	< 2	< 2 J	< 2	< 2 J	**5.1 J**	**3.8**	< 2 J	**60.8**	< 6.2 J	< 2 J
Barium	**144**	**164**	**135**	**67.9**	**92.4**	**152**	**102**	**236 J**	**140**	**156**	**130**	**322 J**	**128 J**
Beryllium	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1 J	< 1	< 1	< 1	**1.2 J**	< 1 J
Cadmium	< 4	< 4	< 4	< 4	< 4	< 4	< 4	**5.3 J**	< 4	< 4	< 4	**6.4 J**	< 4 J
Chromium	**8.3**	**9.3**	< 4	< 4	< 4	< 4	< 4	**34.5 J**	**4**	< 4	**4**	**24.3 J**	< 4 J
Cobalt	**16.6**	**17.8**	**14**	**22.8**	**14.9**	**13**	**10.3**	**40.4 J**	**15.4**	**12.3**	**13.6**	**48.8 J**	**17.6 J**
Copper	20 U	27.3 U	9.9 U	39.2 U	13.4 U	12.1 U	7.8 U	< 39.3 J	17.9 U	9.3 U	19.3 U	**166 J**	< 10.4 J
Lead	**8.3 J**	**8.4**	**2.2 J**	**2.4 J**	**5.6**	**4.6 J**	< 2 J	**12.6 J**	**9.4**	**2 J**	**21.8**	**22.1 J**	< 2 J
Mercury	< .2	< .2	< .2 J	< .2	< .2	< .2	< .2	< .2 J	< .2	< .2 J	< .2	< .2 J	< .2 J
Nickel	**14.7**	< 14	< 14	**20.5**	**20**	**22.5**	< 14	**20.2 J**	**22.6**	< 14	< 14	**52.4 J**	< 14 J
Selenium	< 1 J	< 1 J	< 5 J	< 1 J	< 1 J	< 1 J	< 1 J	**2 J**	< 1 J	< 5 J	< 1 J	**1.7 J**	< 5 J
Silver	< 4	< 4	< 4	< 4	< 4	< 4	< 4 J	< 4 J	< 4	< 4	< 4	< 4 J	< 4 J
Thallium	< 2	< 2	< 2 J	< 2 J	< 2	< 2 J	< 2 J	< 2 J	< 2 J	< 10 J	< 2	< 4 J	< 2 J
Tin	< 200	< 200	< 200	< 200	< 200	< 200	< 200	< 200 J	< 200	< 200	< 200	< 200 J	< 200 J
Vanadium	**13.7**	**11.1**	< 5	< 5	< 5	**7.6**	< 5	**17 J**	**7.7**	< 5	**5.3**	**31.4 J**	< 5 J
Zinc	46.6 U	47.1 U	19.4 U	23.7 U	20.6 U	27.8 U	9.5 U	**84 J**	35.6 U	23.8 U	28.2 U	**251 J**	< 17.4 J
	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L
Cyanide	< .005	< .005	< .005	< .005	< .005	NA	< .005	< .005	< .005	NA	< .005	< .005	< .005

Validation codes on last page.

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HARRISON DIVISION - GMC
GROUNDWATER ANALYTICAL RESULTS
TOTAL METALS AND CYANIDE

Parameter	RB-01 UG/L	RB-02 UG/L	RB-03 UG/L	RB-04 UG/L	RB-05 UG/L	RB-06 UG/L	RB-07 UG/L	RB-08 UG/L	RB-09 UG/L	RB-10 UG/L	RB-11 UG/L	W2S-12593-GW UG/L
Antimony	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	**78.8 J**
Arsenic	< 2 J	< 2 J	< 2 J	< 2	< 2	< 2 J	< 2 J	< 2 J	< 2 J	< 2 J	< 2 J	< 2 J
Barium	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	**262 J**
Beryllium	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1 J
Cadmium	< 4	< 4	< 4	< 4	< 4	< 4	< 4	< 4	< 4	< 4	< 4	< 4 J
Chromium	< 4	< 4	< 4	< 4	< 4	< 4	< 4	< 4	< 4	< 4	< 4	< 4 J
Cobalt	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	**29.8 J**
Copper	**7.1**	**28.1**	**25**	**34.9**	**29.4**	**32.1**	**25.6**	**32.1**	**32.8**	**30**	**28.9**	**9 J**
Lead	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2 J
Mercury	< .2	< .2	< .2	< .2	< .2	< .2	< .2	< .2 J	< .2	< .2 J	< .2	< .2 J
Nickel	< 14	< 14	< 14	< 14	< 14	< 14	< 14	< 14	< 14	< 14	< 14	< 14 J
Selenium	< 1	< 1	< 1	< 1 J	< 1 J	< 1 J	< 1 J	< 1 J	< 1 J	< 1 J	< 1 J	< 5 J
Silver	< 4	< 4	< 4	< 4	< 4	< 4	< 4	< 4	< 4 J	< 4	< 4 J	< 4 J
Thallium	< 2	< 2	< 2	< 2 J	< 2 J	< 2 J	< 2	< 2 J	< 2 J	< 2 J	< 2 J	< 2 J
Tin	< 200	< 200	< 200	< 200	< 200	< 200	< 200	< 200	< 200	< 200	< 200	< 200 J
Vanadium	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5 J
Zinc	**11.4**	< 6	**6.2**	**9.7**	**8.3**	**7.7**	**7**	**12.5**	**9.5**	< 6	**7.2**	**31.5 J**
	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L
Cyanide	< .005	< .005	< .005	< .005	< .005	< .005	< .005	< .005	< .005	< .005	< .005	< .005

VALIDATION CODES:

J = Estimated Value

U = Value Qualified as a Non-Detect due to Blank Contamination

<( )J = Laboratory reported this result as below detection. Result is estimated based on data validation.

UJ = Laboratory reported this result as a detected value; however, based on data validation, the result is below detection and estimated.

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PHASE I AQUEOUS SAMPLES

DISSOLVED METALS RESULTS
MONITOR WELL AND RINSEATE BLANK SAMPLES

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HARRISON DIVISION - GMC
GROUNDWATER ANALYTICAL RESULTS
DISSOLVED METALS

Parameter	19D-12093-G UG/L	19S-12093-G UG/L	4S-12293-G UG/L	DUP-13 UG/L	DUP-14 UG/L	DUP-15 UG/L	DUP-16 UG/L	DUP-17 UG/L	DUP-18 UG/L	DUP-19 UG/L	DUP-20 UG/L
Antimony, Dissolved	NA	NA	NA	69 J	< 50	NA	NA	NA	NA	< 50	NA
Arsenic, Dissolved	< 2 J	< 2	**23.3**	< 2	3.1 U	< 2	2.6 U	< 2	NA	NA	2.6 U
Barium, Dissolved	113 J	**87.7**	**237**	**96.7**	**95.2**	**65.6**	**129**	**96**	**84.6**	**116**	**58.6**
Beryllium, Dissolved	NA	< 1	NA	NA	NA	NA	NA	NA	NA	NA	NA
Cadmium, Dissolved	NA	< 4	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chromium, Dissolved	NA	< 4	< 4	NA	NA	NA	NA	NA	NA	NA	NA
Cobalt, Dissolved	11.1 J	< 5	**20.8**	**8**	**8**	**7.8**	12.1 J	**8.3**	**13.1**	**5.6**	**8.6**
Copper, Dissolved	< 6.2 J	< 5	5.7 U	< 5	6.2 U	9.9 U	7 U	< 5	8.4 U	15 U	10 U
Lead, Dissolved	NA	< 2 J	< 2 J	< 2	< 2	< 2	< 2	< 2	< 2	< 2	NA
Nickel, Dissolved	14.4 J	< 14	< 14	NA	NA	< 14	**16**	< 14	< 14	NA	NA
Vanadium, Dissolved	NA	< 5	< 5	NA	< 5	< 5	NA	< 5	NA	NA	NA
Zinc, Dissolved	< 7.9 J	< 6	8.5 U	**10.1**	10 U	8.7 U	7.5 U	7.9 U	11.8 U	< 6	8.5 U

Validation codes on last page.

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HARRISON DIVISION - GMC
GROUNDWATER ANALYTICAL RESULTS
DISSOLVED METALS

Parameter	DUP-21 UG/L	DUP-22 UG/L	EAST-11293-GW UG/L	GM1-12193-GW UG/L	GM10-12793-GW UG/L	GM11-12793-GW UG/L	GM13-12893-GW UG/L	GM15-12893-GW UG/L	GM16-12893-GW UG/L	GM17-12793-GW UG/L
Antimony, Dissolved	NA	NA	**56.2**	NA	NA	66.2 J	< 50	NA	NA	NA
Arsenic, Dissolved	NA	< 2 J	< 2	< 2	NA	NA	NA	< 2	NA	< 2
Barium, Dissolved	**80.8**	**47.7**	**90.9**	**79.2**	180 J	**71.4**	**75.9**	163 J	**142**	**78.7**
Beryllium, Dissolved	NA	NA	< 1	NA	NA	NA	NA	NA	NA	NA
Cadmium, Dissolved	NA	NA	< 4	NA	NA	NA	NA	NA	NA	NA
Chromium, Dissolved	NA	< 4	< 4	< 4	NA	NA	NA	NA	NA	NA
Cobalt, Dissolved	**14.8**	< 5	**9.9**	**8.6**	**7.3**	**9.4**	**7.2**	**7.5**	**5.4**	**13.4**
Copper, Dissolved	**5.4**	**9.2**	**9.4**	9.9 U	< 5	6.8 U	< 5	NA	< 5	**9.7**
Lead, Dissolved	NA	< 2 J	< 2	< 2	< 2	< 2	< 2	NA	< 2	NA
Mercury, Dissolved	NA	NA	< .2	NA	NA	NA	NA	NA	NA	NA
Nickel, Dissolved	NA	NA	**15.8**	< 14	NA	NA	NA	NA	NA	NA
Selenium, Dissolved	< 1	1.1 J	NA	NA	NA	NA	1 J	NA	NA	NA
Tin, Dissolved	NA	NA	< 200	NA	NA	NA	NA	NA	NA	NA
Vanadium, Dissolved	NA	< 5	< 5	< 5	NA	NA	< 5	NA	NA	NA
Zinc, Dissolved	< 6	< 6	**11.7**	8.8 U	< 6	< 6	< 6	7.6 U	< 6	< 6

Validation codes on last page.

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HARRISON DIVISION - GMC
GROUNDWATER ANALYTICAL RESULTS
DISSOLVED METALS

Parameter	GM18-12893-GW UG/L	GM2-12193-GW UG/L	GM5-12293-GW UG/L	GM7R-12093-GW UG/L	GM8-12093-GW UG/L	GM9-12793-GW UG/L	HR1-11293-GW UG/L	HR6-11993-GW UG/L	W1S-12593-GW UG/L
Antimony, Dissolved	NA	NA	NA	NA	< 50	53.2 J	< 50	NA	56.9 J
Arsenic, Dissolved	< 2	NA	NA	< 2	8.8 U	NA	< 2	NA	NA
Barium, Dissolved	**48.8**	**103**	**84**	**80.6**	**129**	**81.4**	**89.7**	**89.1**	123 J
Chromium, Dissolved	< 4	NA	NA	NA	NA	NA	**NA**	**NA**	NA
Cobalt, Dissolved	< 5	**8.9**	**9.1**	**10.7**	**12.2**	**6.7**	**8.7**	**7.7**	7.3 J
Copper, Dissolved	**5.7**	5.9 U	**10.2**	9.2 U	**5.6**	6.7 U	**5.4**	**< 5**	< 5.8 J
Lead, Dissolved	< 2 J	< 2	NA	< 2	NA	< 2	**< 2**	**< 2**	2 J
Nickel, Dissolved	NA	< 14	**19.5**	< 14	NA	NA	NA	< 14	NA
Selenium, Dissolved	**2.8**	NA	NA	NA	NA	NA	NA	NA	NA
Vanadium, Dissolved	< 5	NA	NA	< 5	NA	NA	NA	< 5	NA
Zinc, Dissolved	< 6	6.4 U	< 6	18.2 U	< 6	< 6	< 6	10.2 U	< 9.4 J

Validation codes on last page.

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HARRISON DIVISION - GMC
GROUNDWATER ANALYTICAL RESULTS
DISSOLVED METALS

Parameter	RB-02 UG/L	RB-03 UG/L	RB-04 UG/L	RB-05 UG/L	RB-06 UG/L	RB-07 UG/L
Copper, Dissolved	< 5	12.6 U	33.8 U	36.2 U	17 U	19.6 U
Zinc, Dissolved	NA	6.5 U	12 U	19.2 U	11.3 U	9.7 U

Validation codes on last page.

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HARRISON DIVISION - GMC
GROUNDWATER ANALYTICAL RESULTS
DISSOLVED METALS

Parameter	HR10-12693-GW UG/L	HR11-12693-GW UG/L	HR12-12693-GW UG/L	HR13-11993-GW UG/L	HR14-11393-GW UG/L	HR15-11393-GW UG/L	HR17-12593-GW UG/L	HR3-11993-GW UG/L	HR4-11993-GW UG/L	HR8-12693-GW UG/L
Antimony, Dissolved	NA	NA	**51.9**	NA	**57.6**	< 50	< 50	NA	NA	NA
Arsenic, Dissolved	2 U	NA	< 2	NA	< 2	2.2 U	NA	NA	NA	NA
Barium, Dissolved	**58**	**77.8**	**97.7**	**71.7**	**85.4**	**94.4**	**118**	**59.1**	**67.1**	**97.9**
Beryllium, Dissolved	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Cadmium, Dissolved	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chromium, Dissolved	NA	NA	NA	< 4	< 4	< 4	NA	NA	NA	NA
Cobalt, Dissolved	**5.6**	**9.8**	**10.4**	**8.9**	**10.1**	**6.7**	< 5	**13.2**	**9.9**	< 5
Copper, Dissolved	NA	9.2 U	6.9 U	7.2 U	6 U	5.1 U	6.2 U	10.9 U	8.4 U	11.9 U
Lead, Dissolved	NA	NA	NA	4.5 J	**4.6**	< 2	< 2	2.2 J	< 2	NA
Nickel, Dissolved	NA	NA	NA	< 14	< 14	NA	NA	< 14	< 14	NA
Selenium, Dissolved	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Vanadium, Dissolved	NA	NA	NA	< 5	< 5	< 5	NA	NA	NA	NA
Zinc, Dissolved	12 U	8.2 U	7 U	23.8 U	11.1 U	12.4 U	< 6	8.7 U	6.6 U	< 6

Validation codes on last page.

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HARRISON DIVISION - GMC
GROUNDWATER ANALYTICAL RESULTS
DISSOLVED METALS

Parameter	HR9-12693-GW UG/L	RB-08 UG/L	RB-09 UG/L	RB-10 UG/L	RB-11 UG/L	W1N-11993-GW UG/L	W2S-12593-GW UG/L	W3N-11393-GW UG/L	W4N-11393-GW UG/L	W4S-12593-GW UG/L
Antimony, Dissolved	**55.3 J**	NA	NA	NA	NA	NA	< 50	57.8 J	**58.8**	< 50
Arsenic, Dissolved	< 2 J	NA	NA	NA	NA	< 2	NA	3.1 U	< 2	NA
Barium, Dissolved	**80.8 J**	NA	NA	NA	NA	**102**	**176**	**91.7**	**122**	**74.1**
Beryllium, Dissolved	NA	NA	NA	NA	NA	NA	NA	NA	< 1	NA
Cadmium, Dissolved	< 4 J	NA	NA	NA	NA	NA	NA	NA	< 4	NA
Chromium, Dissolved	< 4 J	NA	NA	NA	NA	< 4	NA	< 4	< 4	NA
Cobalt, Dissolved	**11.9 J**	NA	NA	NA	NA	**6.1**	**7.7**	**9.5**	**13.1**	**7.6**
Copper, Dissolved	< 6.4 J	20.9 U	26.4 U	**25.2**	28.3 U	8 U	5.4 U	6.3 U	< 5	15.5 U
Lead, Dissolved	< 2 J	NA	NA	NA	NA	< 2	NA	< 2	< 2 J	NA
Nickel, Dissolved	< 14 J	NA	NA	NA	NA	< 14	NA	NA	**15.8**	NA
Selenium, Dissolved	**1 J**	NA	NA	NA	NA	NA	NA	NA	< 1	NA
Vanadium, Dissolved	< 5 J	NA	NA	NA	NA	< 5	NA	< 5	< 5	NA
Zinc, Dissolved	< 6.4 J	16.1 U	19 U	NA	10.2 U	11.6 U	7.1 U	12 U	< 6	11.5 U

VALIDATION CODES:

J = Estimated Value
U = Value Qualified as a Non-Detect due to Blank Contamination
<( )J = Laboratory reported this result as below detection. Result is estimated based on data validation.
NA = Constituent was not analyzed.

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PHASE I SOIL BACKGROUND SAMPLES

VOLATILE ORGANIC COMPOUND RESULTS

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HARRISON DIVISION - GMC
SOIL BACKGROUND ANALYTICAL RESULTS
VOLATILE ORGANIC COMPOUNDS

Compound	BKG BH01-02SL UG/KG	BKG BH05-02SL UG/KG	BKG BH06-02SL UG/KG	BKG BH06-10SL UG/KG	BKG BH08-02SL UG/KG
1,1,1-Trichloroethane	< 6.5	< 310	< 5.9	< 5.2	< 5.7
1,1,2,2-Tetrachloroethane	< 6.5	< 310	< 5.9	< 5.2	< 5.7
1,1,2-Trichloroethane	< 6.5	< 310	< 5.9	< 5.2	< 5.7
1,1-Dichloroethane	< 6.5	< 310	< 5.9	< 5.2	< 5.7
1,1-Dichloroethene	< 6.5	< 310	< 5.9	< 5.2	< 5.7
1,2-Dichloroethane	< 6.5	< 310	< 5.9	< 5.2	< 5.7
1,2-Dichloroethene (Total)	< 6.5	< 310	< 5.9	< 5.2	< 5.7
1,2-Dichloropropane	< 6.5	< 310	< 5.9	< 5.2	< 5.7
2-Butanone	< 65 J	< 3100 J	< 59 J	< 52 J	< 57
2-Hexanone	< 65 J	< 3100 J	< 59 J	< 52 J	< 57 J
4-Methyl-2-Pentanone	< 65	< 3100 J	< 59	< 52	< 57 J
Acetone	< 130 J	13000 J	< 120 J	740 J	< 110 J
Benzene	< 6.5	< 310	< 5.9	< 5.2	< 5.7
Bromodichloromethane	< 6.5	< 310	< 5.9	< 5.2	< 5.7
Bromoform	< 6.5	< 310	< 5.9	< 5.2	< 5.7
Bromomethane	< 32	< 1600	< 29	< 26	< 28
Carbon Disulfide	< 6.5	< 310	< 5.9	< 5.2	< 5.7
Carbon Tetrachloride	< 6.5	< 310	< 5.9	< 5.2	< 5.7
Chlorobenzene	< 6.5	< 310	< 5.9	< 5.2	< 5.7
Chloroethane	< 65	< 3100	< 59	< 52	< 57
Chloroform	< 6.5	< 310	< 5.9	< 5.2	< 5.7
Chloromethane	< 65	< 3100	< 59	< 52	< 57
Dibromochloromethane	< 6.5	< 310	< 5.9	< 5.2	< 5.7
Ethylbenzene	< 6.5	< 310	< 5.9	< 5.2	< 5.7
Methylene Chloride	< 65	< 3100	< 59	< 52	< 57
Styrene	< 6.5	< 310	< 5.9	< 5.2	< 5.7
Tetrachloroethene	< 6.5	< 310	< 5.9	< 5.2	< 5.7
Toluene	< 6.5	< 310	< 5.9	< 5.2	< 5.7
Total Xylenes	< 6.5	< 310	< 5.9	< 5.2	< 5.7
Trichloroethene	< 6.5	< 310	< 5.9	< 5.2	< 5.7
Vinyl Chloride	< 32	< 1600	< 29	< 26	< 28
cis-1,3-Dichloropropene	< 6.5	< 310	< 5.9	< 5.2	< 5.7
trans-1,3-Dichloropropene	< 6.5	< 310	< 5.9	< 5.2	< 5.7

Validation codes on last page.

GERAGHTY & MILLER, INC.

HARRISON DIVISION - GMC
SOIL BACKGROUND ANALYTICAL RESULTS
VOLATILE ORGANIC OMPOUNDS

Compound	BKG BH09-02SL UG/KG	BKG BH11-02SL UG/KG	BKG BH11-10SL UG/KG	DUP-3 UG/KG	BKG TB-1 UG/KG	BKG TB-2 UG/KG
1,1,1-Trichloroethane	< 6.2	< 310	< 260	< 6	< 1	< 1
1,1,2,2-Tetrachloroethane	< 6.2	< 310	< 260	< 6	< 1	< 1
1,1,2-Trichloroethane	< 6.2	< 310	< 260	< 6	< 1	< 1
1,1-Dichloroethane	< 6.2	< 310	< 260	< 6	< 1	< 1
1,1-Dichloroethene	< 6.2	< 310	< 260	< 6	< 1	< 1
1,2-Dichloroethane	< 6.2	< 310	< 260	< 6	< 1	< 1
1,2-Dichloroethene (Total)	< 6.2	< 310	< 260	< 6	< 1	< 1
1,2-Dichloropropane	< 6.2	< 310	< 260	< 6	< 1	< 1
2-Butanone	< 62 J	< 3100 J	< 2600 J	< 60 J	< 10	< 10
2-Hexanone	< 62 J	< 3100 J	< 2600 J	< 60 J	< 10	< 10
4-Methyl-2-Pentanone	< 62	< 3100 J	< 2600 J	< 60	< 10	< 10
Acetone	< 120 J	**21000 J**	**5400 J**	< 120 J	< 20	< 20
Benzene	< 6.2	< 310	< 260	< 6	< 1	< 1
Bromodichloromethane	< 6.2	< 310	< 260	< 6	< 1	< 1
Bromoform	< 6.2	< 310	< 260	< 6	< 1	< 1
Bromomethane	< 31	< 1500	< 1300	< 30	< 5	< 5
Carbon Disulfide	< 6.2	< 310	< 260	< 6	< 1	< 1
Carbon Tetrachloride	< 6.2	< 310	< 260	< 6	< 1	< 1
Chlorobenzene	< 6.2	< 310	< 260	< 6	< 1	< 1
Chloroethane	< 62	< 3100	< 2600	< 60	< 10	< 10
Chloroform	< 6.2	< 310	< 260	< 6	< 1	< 1
Chloromethane	< 62	< 3100	< 2600	< 60	< 10	< 10
Dibromochloromethane	< 6.2	< 310	< 260	< 6	< 1	< 1
Ethylbenzene	< 6.2	< 310	< 260	< 6	< 1	< 1
Methylene Chloride	< 62	< 3100	< 2600	< 60	< 10	< 10
Styrene	< 6.2	< 310	< 260	< 6	< 1	< 1
Tetrachloroethene	< 6.2	< 310	< 260	< 6	< 1	< 1
Toluene	< 6.2	< 310	< 260	< 6	< 1	< 1
Total Xylenes	< 6.2	< 310	< 260	< 6	< 1	< 1
Trichloroethene	< 6.2	< 310	< 260	< 6	< 1	< 1
Vinyl Chloride	< 31	< 1500	< 1300	< 30	< 5	< 5
cis-1,3-Dichloropropene	< 6.2	< 310	< 260	< 6	< 1	< 1
trans-1,3-Dichloropropene	< 6.2	< 310	< 260	< 6	< 1	< 1

NOTES: J = Estimated Value

<( )J = Laboratory reported this result as below detection. Result is estimated based on data validation.

PHASE I SOIL BACKGROUND SAMPLES

SEMIVOLATILE ORGANIC COMPOUND RESULTS

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HARRISON DIVISION - GMC
SOIL BACKGROUND ANALYTICAL RESULTS
SEMIVOLATILE ORGANIC COMPOUNDS

Compound	BKG BH01-02SL UG/KG	BKG BH05-02SL UG/KG	BKG BH06-02SL UG/KG	BKG BH08-02SL UG/KG	BKG BH09-02SL UG/KG	BKG BH11-02SL UG/KG	BKG DUP-3 UG/KG
1,2,4-Trichlorobenzene	< 430	< 410	< 390	< 380	< 410	< 400	< 400
1,2-Dichlorobenzene	< 430	< 410	< 390	< 380	< 410	< 400	< 400
1,3-Dichlorobenzene	< 430	< 410	< 390	< 380	< 410	< 400	< 400
1,4-Dichlorobenzene	< 430	< 410	< 390	< 380	< 410	< 400	< 400
2,4,5-Trichlorophenol	< 430	< 410	< 390	< 380	< 410	< 400	< 400
2,4,6-Trichlorophenol	< 430	< 410	< 390	< 380	< 410	< 400	< 400
2,4-Dichlorophenol	< 430	< 410	< 390	< 380	< 410	< 400	< 400
2,4-Dimethylphenol	< 430	< 410	< 390	< 380	< 410	< 400	< 400
2,4-Dinitrophenol	< 430	< 410	< 390	< 380	< 410	< 400	< 400
2,4-Dinitrotoluene	< 430	< 410	< 390	< 380	< 410	< 400	< 400
2,6-Dinitrotoluene	< 430	< 410	< 390	< 380	< 410	< 400	< 400
2-Chloronapthalene	< 430	< 410	< 390	< 380	< 410	< 400	< 400
2-Chlorophenol	< 430	< 410	< 390	< 380	< 410	< 400	< 400
2-Methyl-4,6-Dinitrophenol	< 430	< 410	< 390	< 380	< 410	< 400	< 400
2-Methylnapthalene	< 430	< 410	< 390	< 380	< 410	< 400	< 400
2-Methylphenol	< 430	< 410	< 390	< 380	< 410	< 400	< 400
2-Nitroaniline	< 640	< 610	< 580	< 560	< 610	< 610	< 600
2-Nitrophenol	< 430	< 410	< 390	< 380	< 410	< 400	< 400
3,3'-Dichlorobenzidine	< 850	< 820	< 780	< 750	< 820	< 810	< 800
3-Nitroaniline	< 640	< 610	< 580	< 560	< 610	< 610	< 600
4-Bromophenyl-phenyl ether	< 430	< 410	< 390	< 380	< 410	< 400	< 400
4-Chloro-3-Methylphenol	< 430	< 410	< 390	< 380	< 410	< 400	< 400
4-Chloroaniline	< 430	< 410	< 390	< 380	< 410	< 400	< 400
4-Chlorophenyl-phenyl ether	< 430	< 410	< 390	< 380	< 410	< 400	< 400
4-Methylphenol	< 430	< 410	< 390	< 380	< 410	< 400	< 400
4-Nitroaniline	< 640 J	< 610 J	< 580 J	< 560 J	< 610 J	< 610 J	< 600 J
4-Nitrophenol	< 430	< 410	< 390	< 380	< 410	< 400	< 400
Acenaphthene	< 430	< 410	< 390	< 380	< 410	< 400	< 400
Acenaphthylene	< 430	< 410	< 390	< 380	< 410	< 400	< 400
Anthracene	< 430	< 410	< 390	< 380	< 410	< 400	< 400
Benzo(a)Anthracene	< 430	< 410	< 390	< 380	< 410	< 400	< 400
Benzo(a)Pyrene	< 430	< 410	< 390	< 380	< 410	< 400	< 400
Benzo(b)Fluoranthene	< 430	< 410	< 390	< 380	< 410	< 400	< 400
Benzo(g,h,i)Perylene	< 430	< 410	< 390	< 380	< 410	< 400	< 400

Validation codes on last page.

GERAGHTY & MILLER, INC.

HARRISON DIVISION - GMC
SOIL BACKGROUND ANALYTICAL RESULTS
SEMIVOLATILE ORGANIC COMPOUNDS

Compound	BKG BH01-02SL	BKG BH05-02SL	BKG BH06-02SL	BKG BH08-02SL	BKG BH09-02SL	BKG BH11-02SL	BKG DUP-3
Benzo(k)Fluoranthene	< 430	< 410	< 390	< 380	< 410	< 400	< 400
Bis(2-chloroisopropyl)ether	< 430	< 410	< 390	< 380	< 410	< 400	< 400
Butyl benzyl phthalate	< 430	< 410	< 390	< 380	< 410	< 400	< 400
Carbazole	< 430	< 410	< 390	< 380	< 410	< 400	< 400
Chrysene	< 430	< 410	< 390	< 380	< 410	< 400	< 400
Di-n-Butylphthalate	940 U	1100 U	740 U	770 U	900 U	940 U	1600 U
Di-n-Octyl Phthalate	< 430	< 410	< 390	< 380	< 410	< 400	< 400
Dibenz(a,h)Anthracene	< 430	< 410	< 390	< 380	< 410	< 400	< 400
Dibenzofuran	< 430	< 410	< 390	< 380	< 410	< 400	< 400
Diethylphthalate	< 430	< 410	< 390	< 380	< 410	< 400	< 400
Dimethyl Phtalate	< 430	< 410	< 390	< 380	< 410	< 400	< 400
Fluoranthene	< 430	< 410	< 390	< 380	< 410	< 400	< 400
Fluorene	< 430	< 410	< 390	< 380	< 410	< 400	< 400
Hexachloro-1,3-butadiene	< 430	< 410	< 390	< 380	< 410	< 400	< 400
Hexachlorobenzene	< 430	< 410	< 390	< 380	< 410	< 400	< 400
Hexachlorocyclopentadiene	< 430	< 410	< 390	< 380	< 410	< 400	< 400
Hexachloroethane	< 430	< 410	< 390	< 380	< 410	< 400	< 400
Indeno(1,2,3-cd)Pyrene	< 430	< 410	< 390	< 380	< 410	< 400	< 400
Isophorone	< 430	< 410	< 390	< 380	< 410	< 400	< 400
N-Nitroso-Di-n-Propylamine	< 430	< 410	< 390	< 380	< 410	< 400	< 400
N-Nitrosodiphenylamine (1)	< 430	< 410	< 390	< 380	< 410	< 400	< 400
Napthalene	< 430	< 410	< 390	< 380	< 410	< 400	< 400
Nitrobenzene	< 430	< 410	< 390	< 380	< 410	< 400	< 400
Pentachlorophenol	< 430	< 410	< 390	< 380	< 410	< 400	< 400
Phenanthrene	< 430	< 410	< 390	< 380	< 410	< 400	< 400
Phenol	< 430	< 410	< 390	< 380	< 410	< 400	< 400
Pyrene	< 430	< 410	< 390	< 380	< 410	< 400	< 400
bis(2-Chloroethyl)Ether	< 430	< 410	< 390	< 380	< 410	< 400	< 400
bis(2-Ethylhexyl)Phthalate	< 430	< 410	< 390	< 380	< 410	< 400	< 400
bis(Chloroethoxy)Methane	< 430	< 410	< 390	< 380	< 410	< 400	< 400

NOTES: J = Estimated Value
U = Value Qualified as a Non-Detect due to Blank Contamination
<( )J = Laboratory reported this result as below detection. Result is estimated based on data validation.

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PHASE I SOIL BACKGROUND SAMPLES

METALS AND CYANIDE RESULTS

DRAFT

HARRISON DIVISION - GMC
SOIL BACKGROUND ANALYTICAL RESULTS
METALS AND CYANIDE

Compound	BKG BH01-02SL MG/KG	BKG BH01-16SL MG/KG	BKG BH02-02SL MG/KG	BKG BH02-16SL MG/KG	BKG BH03-02SL MG/KG	BKG BH03-16SL MG/KG	BKG BH04-02SL MG/KG
Aluminum	6630	1910	26100J	1700	4650	1940	16200J
Antimony	<7.2R	43J	<7.6J	40.5J	<8.7J	<8.3J	<7.1J
Arsenic	6.1	2.1	14J	3.2	5.9J	3J	10.8J
Barium	65.5	11.9	110	12.5	31.6	10	72.5
Beryllium	0.59	0.33J	1.3	0.29J	0.32	<0.21	0.93
Cadmium	3.2	1.2J	7.7	1.4J	2.1J	1.2J	5.6
Calcium	1890J	157000J	2850	118000J	82200	176000J	1480
Chromium	12.3	4.5J	32.5	7.5	7.7J	4.2J	17.9
Cobalt	10.3	17.6J	13.9	16.8J	4.3	<2.1	13.6
Copper	13J	6.4J	23.2J	9J	12.5	4.9	17J
Iron	13300	5180	32900J	6560	10300	4350	23700J
Lead	17.7J	2.8J	18.4J	4.1J	7.9J	5.1J	20.8J
Magnesium	1410	61200	4410J	59900	49500	44200	2520J
Manganese	798	221	478J	250	333	229	620J
Mercury	<0.11	<0.1J	<0.13	<0.11	<0.11	<0.1	<0.12
Nickel	<7.2	<6.4	26.2U	<6.3	13.7	6.3	22.2U
Potassium	813U	469U	1710U	167U	413	683	1210U
Selenium	<0.48	<0.42J	<0.51J	<0.42J	<0.44J	<0.41J	<0.47J
Silver	<0.72R	<0.64R	<0.76J	<0.63R	0.76	0.97J	<0.71J
Sodium	79.8U	231U	95.8	209U	138	166	56.4
Thallium	<0.48	<0.42J	<0.51J	<0.42	<0.44J	<0.41J	<0.47J
Vanadium	19.1	6.5	53.2	7.2	13	6.1	33.7
Zinc	46.2J	21.7	89.8	24	31.3J	14.2J	71.8
Cyanide	<0.2J	<0.1J	NA	NA	NA	NA	NA

Validation codes on last page.

GERAGHTY & MILLER, INC.

HARRISON DIVISION - GMC
SOIL BACKGROUND ANALYTICAL RESULTS
METALS AND CYANIDE

Compound	BKG BH04-16SL MG/KG	BKG BH05-02SL MG/KG	BKG BH05-16SL MG/KG	BKG BH06-02SL MG/KG	BKG BH06-16SL MG/KG	BKG BH07-02SL MG/KG	BKG BH07-16SL MG/KG
Aluminum	**1160J**	**9520**	**1390**	**11400J**	**1980J**	**5340**	**4440**
Antimony	**51.1J**	<7R	**42J**	<7J	**42.2J**	<8.8J	<8.4J
Arsenic	**2J**	**7.3**	**2.8**	**7.6J**	**2.1J**	**5.5J**	**4.5J**
Barium	**5.8**	**79.2**	**10.5**	**86.1**	**9.4**	**68.6**	**21**
Beryllium	**0.25J**	**0.62**	**0.27J**	**0.71**	**0.29J**	**0.56**	**0.27**
Cadmium	<0.47	**3.9**	**0.75J**	**4.2**	**1.2J**	**4J**	**3.1J**
Calcium	**151000**	**1910J**	**128000J**	**2330**	**124000**	**3190J**	**93900J**
Chromium	2.7U	**12.2**	**4.4J**	**15.5**	**5.3**	**8.5J**	**7.5J**
Cobalt	**17.8J**	**10.6**	**16.5J**	**10.7**	**16.3J**	**8.2**	**3.6**
Copper	**3.5J**	**10.9J**	**7.5J**	**10.6J**	**7.5J**	**11.6**	**12**
Iron	**3130J**	**16700**	**4780**	**18100J**	**4680J**	**11500**	**8710**
Lead	**2J**	**13.6J**	**3.2J**	**22.1J**	**2.6J**	**21.5J**	**6.3J**
Magnesium	**68200J**	**1970**	**52400**	**2360J**	**53300J**	**2040**	**43700**
Manganese	**99.6J**	**558**	**239**	**724J**	**165J**	**851**	**273**
Mercury	<0.12	<0.12	<0.1	<0.12	<0.1	<0.11	<0.1
Nickel	<7.1	<7	**6.3**	11.9U	<6.2	**13.5**	**10.2**
Potassium	241U	571U	<126	633U	320U	**420**	**650**
Selenium	<0.47J	<0.47	<0.42J	<0.47J	<0.42J	<0.44J	<0.42J
Silver	<0.71J	<0.7R	<0.63R	<0.7J	<0.62J	<0.66	0.98J
Sodium	**173**	96.1U	187U	**55.7**	**188**	**28.1**	**148**
Thallium	<0.47J	<0.47	<0.42J	<0.47J	<0.42J	0.44J	<0.42J
Vanadium	**4.4**	**24.7**	**5.2**	**30.9**	**7.1**	**16**	**11.9**
Zinc	**10.8**	**48.2J**	**17.8**	**52.4**	**18**	**37.3J**	**26.6J**
Cyanide	NA	<0.2J	<0.1J	<0.1J	<0.1J	NA	NA

Validation codes on last page.

GERAGHTY & MILLER, INC.

HARRISON DIVISION - GMC
SOIL BACKGROUND ANALYTICAL RESULTS
METALS AND CYANIDE

Compound	BKG BH08-02SL MG/KG	BKG BH08-16SL MG/KG	BKG BH09-02SL MG/KG	BKG BH09-16SL MG/KG	BKG BH10-02SL MG/KG	BKG BH10-16SL MG/KG	BKG BH11-02SL MG/KG
Aluminum	6550	1750J	12000	2140J	20400J	1550J	7180
Antimony	<6.8R	50.6J	<7.1R	45J	<7.3J	52.8J	<7R
Arsenic	5	2.6J	6	3.9J	14.4J	2.7J	8
Barium	70.9	12.7	84.2	13.2	94.4	7.5	68.7
Beryllium	0.61	0.29J	0.77	0.26J	1	0.35J	0.58
Cadmium	2.8	0.55J	4.6	1.6J	6.7	0.73J	2.9
Calcium	3200J	162000	1300J	131000	2340	171000	1800J
Chromium	9.8	4.2U	13.6	4.8U	25.9	3.7U	10.8
Cobalt	9.8	19.4J	13.4	16.9J	13	19.6J	8.7
Copper	9.8J	4.9J	9.7J	6.7J	20.4J	4.8J	11.8J
Iron	12000	4200J	19800	5920J	31000J	3330J	10700
Lead	17J	2.6J	11.9J	4.3J	30.1J	3J	16.7J
Magnesium	2090	83700J	2070	52500J	3210J	96500J	1140
Manganese	820	277J	954	210J	413J	132J	563
Mercury	<0.11	<0.1	<0.12	<0.1	<0.12	<0.1	<0.12
Nickel	8.7	6.3U	12.2	6.4U	29.9U	<6.2	<7
Potassium	917U	217U	724U	578U	1170U	231U	430U
Selenium	<0.45	<0.41J	<0.48	<0.42J	<0.49J	<0.42J	0.5
Silver	<0.68R	<0.62J	<0.71R	0.62J	<0.73J	<0.62J	<0.7R
Sodium	86.3U	213	89.8U	188	80.8	261	82.1U
Thallium	<0.45	<0.41J	<0.48	2.3J	<0.49J	<0.42J	<0.47
Vanadium	16.9	5.6	25.9	6.2	42.8	5.9	14.8
Zinc	44.9J	21.3	57.3J	21.6	90.6	13.8	82.2J
Cyanide	<0.1J	<0.1J	<0.1J	<0.1J	NA	NA	0.4J

Validation codes on last page.

GERAGHTY & MILLER, INC.

HARRISON DIVISION - GMC
SOIL BACKGROUND ANALYTICAL RESULTS
METALS AND CYANIDE

Compound	BKG BH11-16SL MG/KG	BKG BH12-02SL MG/KG	BKG BH12-16SL MG/KG	BKG DUP-3 MG/KG	BKG DUP-4 MG/KG	BKG DUP-5 MG/KG
Aluminum	1540	10700J	2100J	21900J	1990J	9280J
Antimony	49.4J	<7.5J	50.5J	<7.1J	40.4J	<6.8J
Arsenic	3.2	16.8J	3.9J	14.5J	2.7J	4.9J
Barium	11.9	151	10.4	119	9.4	87.6
Beryllium	0.34J	1.2	0.34J	1.7	0.3J	0.65
Cadmium	0.95J	4	2.1J	8.1	0.81J	3.5
Calcium	208000J	9700	167000	3420	123000	8040
Chromium	3.7J	14.3	5.9	26	5U	13.3
Cobalt	18.7J	11.4	18.7J	14.2	15.9J	11.3
Copper	7.9J	31.3J	6.2J	19.6J	5.4J	11.2J
Iron	4890	18100J	5690J	32900J	4720J	14500J
Lead	3.9J	27.7J	4.1	22.1J	2.5J	17.3J
Magnesium	69000	5960J	60800J	3770J	47700	3760J
Manganese	229	370J	205J	787J	191J	857J
Mercury	<0.1	0.69	<0.1	<0.11	<0.1	<0.11
Nickel	<6.3	19.7U	10.3U	32U	<6.2	16.1U
Potassium	219U	1010U	377U	1120U	701U	874U
Selenium	<0.42	1.5J	<0.42J	<0.47J	<0.42J	<0.45J
Silver	<0.63R	<0.75J	<0.63J	<0.71J	<0.62J	<0.68J
Sodium	242U	89	203	62.8	147	70.3
Thallium	<0.42J	<0.5J	<0.42J	<0.47J	<0.42J	<0.45J
Vanadium	6.7	24.3	7.2	41.9	7.3	28.1
Zinc	19.4	71.8	20.1	85.6	16.5	57.4
Cyanide	<0.1J	NA	NA	<0.1J	<0.1J	NA

Notes: J = Estimated Value
R = Rejected Value
U = Value Qualified as a Non-Detectdue to Blank Contamination
<( )J = Laboratory reported this result as below detection. Result is estimated based on data vlaidation.
<( ) R = Laboratory reported this result as below detection. Result is rejected based on data validation.
NA = Constituent was not analyzed.

PHASE I SOIL BACKGROUND SAMPLES

POLYCHLORINATED BIPHENYLS AND PESTICIDE RESULTS

DRAFT

HARRISON DIVISION - GMC
SOIL BACKGROUND ANALYTICAL RESULTS
POLYCHLORINATED BIPHENYLS AND PESTICIDES

Compound	BKG BH01-02SL MG/KG	BKG BH05-02SL MG/KG	BKG BH06-02SL MG/KG	BKG BH08-02SL MG/KG	BKG BH09-02SL MG/KG	BKG BH11-02SL MG/KG	BKG DUP-3 MG/KG
4,4'-DDD	< 0.6	< 0.6	< 0.6	< 0.6	< 0.6	< 0.6	< 0.6
4,4'-DDE	< 0.6	< 0.6	< 0.6	< 0.6	< 0.6	< 0.6	< 0.6
4,4-DDT	< 0.6	< 0.6	< 0.6	< 0.6	< 0.6	< 0.6	< 0.6
Aldrin	< 0.6 J	< 0.6 J	< 0.6 J	< 0.6 J	< 0.6 J	< 0.6 J	< 0.6 J
Aroclor-1016	< 0.6	< 0.6	< 0.6	< 0.6	< 0.6	< 0.6	< 0.6
Aroclor-1221	< 0.6	< 0.6	< 0.6	< 0.6	< 0.6	< 0.6	< 0.6
Aroclor-1232	< 0.6	< 0.6	< 0.6	< 0.6	< 0.6	< 0.6	< 0.6
Aroclor-1242	< 0.6	< 0.6	< 0.6	< 0.6	< 0.6	< 0.6	< 0.6
Aroclor-1248	< 0.6	< 0.6	< 0.6	< 0.6	< 0.6	< 0.6	< 0.6
Aroclor-1254	< 0.6	< 0.6	< 0.6	< 0.6	< 0.6	< 0.6	< 0.6
Aroclor-1260	< 0.6	< 0.6	< 0.6	< 0.6	< 0.6	< 0.6	< 0.6
Dieldrin	< 0.6	< 0.6	< 0.6	< 0.6	< 0.6	< 0.6	< 0.6
Endosulfan I	< 0.6	< 0.6	< 0.6	< 0.6	< 0.6	< 0.6	< 0.6
Endosulfan II	< 0.6	< 0.6	< 0.6	< 0.6	< 0.6	< 0.6	< 0.6
Endosulfan sulfate	< 0.6	< 0.6	< 0.6	< 0.6	< 0.6	< 0.6	< 0.6
Endrin	< 0.6	< 0.6	< 0.6	< 0.6	< 0.6	< 0.6	< 0.6
Endrin Aldehyde	< 0.6	< 0.6	< 0.6	< 0.6	< 0.6	< 0.6	< 0.6
Endrin ketone	< 0.6	< 0.6	< 0.6	< 0.6	< 0.6	< 0.6	< 0.6
Heptachlor	< 0.6	< 0.6	< 0.6	< 0.6	< 0.6	< 0.6	< 0.6
Heptachlor epoxide	< 0.6	< 0.6	< 0.6	< 0.6	< 0.6	< 0.6	< 0.6
Methoxychlor	< 0.6	< 0.6	< 0.6	< 0.6	< 0.6	< 0.6	< 0.6
Toxaphene	< 0.6	< 0.6	< 0.6	< 0.6	< 0.6	< 0.6	< 0.6
alpha-BHC	< 0.6	< 0.6	< 0.6	< 0.6	< 0.6	< 0.6	< 0.6
alpha-Chlordane	< 0.6	< 0.6	< 0.6	< 0.6	< 0.6	< 0.6	< 0.6
beta-BHC	< 0.6	< 0.6	< 0.6	< 0.6	< 0.6	< 0.6	< 0.6
delta-BHC	< 0.6	< 0.6	< 0.6	< 0.6	< 0.6	< 0.6	< 0.6
gamma-BHC(Lindane)	< 0.6	< 0.6	< 0.6	< 0.6	< 0.6	< 0.6	< 0.6
gamma-Chlordane	< 0.6	< 0.6	< 0.6	< 0.6	< 0.6	< 0.6	< 0.6

NOTES: J = Estimated Value
<( )J = Laboratory reported this result as below detection. Result is estimated based on data validation.

PHASE II SOIL SAMPLES

VOLATILE ORGANIC COMPOUND RESULTS
BACKGROUND AREA, AREA SOUTH OF LANDFILL L1, WEST TANK FARM, WASTE PILE STAGING AREA, LIQUID WASTE BURNER AND FILL AREA

DRAFT

HARRISON - GMC
RFI PHASE II SOIL ANALYTICAL RESULTS
VOLATILE ORGANIC COMPOUNDS

PARAMETER	UNITS	BKG-BH13-01SL	BKG-BH13-09SL	BKG-BH13-15SL	BKG-BH14-01SL	BKG-BH14-09SL	BKG-BH14-15SL	FA-BH01-03SL
1,1,1-Trichloroethane	ug/kg	NA	NA	NA	NA	NA	NA	< 310
1,1,2,2-Tetrachloroethane	ug/kg	NA	NA	NA	NA	NA	NA	< 310
1,1,2-Trichloroethane	ug/kg	NA	NA	NA	NA	NA	NA	< 310
1,1-Dichloroethane	ug/kg	NA	NA	NA	NA	NA	NA	< 310
1,1-Dichloroethene	ug/kg	NA	NA	NA	NA	NA	NA	< 310
1,2-Dichloroethane	ug/kg	NA	NA	NA	NA	NA	NA	< 310
1,2-Dichloroethene (Total)	ug/kg	NA	NA	NA	NA	NA	NA	**2410**
1,2-Dichloropropane	ug/kg	NA	NA	NA	NA	NA	NA	< 310
2-Butanone	ug/kg	NA	NA	NA	NA	NA	NA	< 3100 R
2-Hexanone	ug/kg	NA	NA	NA	NA	NA	NA	< 3100
4-Methyl-2-Pentanone	ug/kg	NA	NA	NA	NA	NA	NA	< 3100
Acetone	ug/kg	< 112	< 104	< 103	< 109	< 114	< 105	< 6200
Benzene	ug/kg	NA	NA	NA	NA	NA	NA	< 310
Bromodichloromethane	ug/kg	NA	NA	NA	NA	NA	NA	< 310
Bromoform	ug/kg	NA	NA	NA	NA	NA	NA	< 310
Bromomethane	ug/kg	NA	NA	NA	NA	NA	NA	< 1550
Carbon Disulfide	ug/kg	NA	NA	NA	NA	NA	NA	< 310
Carbon Tetrachloride	ug/kg	NA	NA	NA	NA	NA	NA	< 310
Chlorobenzene	ug/kg	NA	NA	NA	NA	NA	NA	< 310
Chloroethane	ug/kg	NA	NA	NA	NA	NA	NA	< 3100
Chloroform	ug/kg	NA	NA	NA	NA	NA	NA	< 310
Chloromethane	ug/kg	NA	NA	NA	NA	NA	NA	< 3100
Dibromochloromethane	ug/kg	NA	NA	NA	NA	NA	NA	< 310
Ethylbenzene	ug/kg	NA	NA	NA	NA	NA	NA	< 310
Methylene Chloride	ug/kg	NA	NA	NA	NA	NA	NA	< 3100
Styrene	ug/kg	NA	NA	NA	NA	NA	NA	< 310
Tetrachloroethene	ug/kg	NA	NA	NA	NA	NA	NA	< 310
Toluene	ug/kg	NA	NA	NA	NA	NA	NA	< 310
Total Xylenes	ug/kg	NA	NA	NA	NA	NA	NA	< 310
Trichloroethene	ug/kg	NA	NA	NA	NA	NA	NA	< 1550
Vinyl Chloride	ug/kg	NA	NA	NA	NA	NA	NA	< 310
cis-1,3-Dichloropropene	ug/kg	NA	NA	NA	NA	NA	NA	< 310
trans-1,3-Dichloropropene	ug/kg	NA	NA	NA	NA	NA	NA	< 310

Validation codes on last page.

GERAGHTY & MILLER, INC.

HARRISON - GMC
RFI PHASE II SOIL ANALYTICAL RESULTS
VOLATILE ORGANIC COMPOUNDS

PARAMETER	UNITS	FA-BH01-08SL	FA-BH02-02SL	FA-BH02-06SL	GM20D-03SL	DUP-28	GM20D-17SL	LWB-BH01-03SL	LWB-BH01-13SL	DUP-24
1,1,1-Trichloroethane	ug/kg	< 5.3	< 5.6	< 5.5	< 8.4	< 7.8	< 6.1	< 5.8	< 472	< 129
1,1,2,2-Tetrachloroethane	ug/kg	< 5.3	< 5.6	< 5.5	< 8.4	< 7.8	< 6.1	< 5.8	< 472	< 129
1,1,2-Trichloroethane	ug/kg	< 5.3	< 5.6	< 5.5	< 8.4	< 7.8	< 6.1	< 5.8	< 472	< 129
1,1-Dichloroethane	ug/kg	< 5.3	< 5.6	< 5.5	< 8.4	< 7.8	< 6.1	< 5.8	< 472	< 129
1,1-Dichloroethene	ug/kg	< 5.3	< 5.6	< 5.5	< 8.4	< 7.8	< 6.1	< 5.8	< 472	< 129
1,2-Dichloroethane	ug/kg	< 5.3	< 5.6	< 5.5	< 8.4	< 7.8	< 6.1	< 5.8	< 472	< 129
1,2-Dichloroethene (Total)	ug/kg	< 5.3	< 5.6	< 5.5	< 8.4	**9.2**	< 6.1	< 5.8	< 472	< 129
1,2-Dichloropropane	ug/kg	< 5.3	< 5.6	< 5.5	< 8.4	< 7.8	< 6.1	< 5.8	< 472	< 129
2-Butanone	ug/kg	< 53.1 R	< 56.1 R	< 55.5 R	< 83.8	< 78.4	< 61	< 57.9 R	< 4720 R	< 1290 R
2-Hexanone	ug/kg	< 53.1	< 56.1	< 55.5	< 83.8	< 78.4	< 61	< 57.9	< 4720	< 1290
4-Methyl-2-Pentanone	ug/kg	< 53.1	< 56.1	< 55.5	< 83.8	< 78.4	< 61	< 57.9	< 4720	< 1290
Acetone	ug/kg	< 106	< 112	< 111	< 168	< 157	< 120	< 116	< 9420	< 2570
Benzene	ug/kg	< 5.3	< 5.6	< 5.5	< 8.4	< 7.8	< 6.1	< 5.8	< 472	< 129
Bromodichloromethane	ug/kg	< 5.3	< 5.6	< 5.5	< 8.4	< 7.8	< 6.1	< 5.8	< 472	< 129
Bromoform	ug/kg	< 5.3	< 5.6	< 5.5	< 8.4	< 7.8	< 6.1	< 5.8	< 472	< 129
Bromomethane	ug/kg	< 26.6	< 28	< 27.7	< 41.9	< 39.2	< 31	< 28.9	< 2360	< 643
Carbon Disulfide	ug/kg	< 5.3	< 5.6	< 5.5	< 8.4	< 7.8	< 6.1	< 5.8	< 472	< 129
Carbon Tetrachloride	ug/kg	< 5.3	< 5.6	< 5.5	< 8.4	< 7.8	< 6.1	< 5.8	< 472	< 129
Chlorobenzene	ug/kg	< 5.3	< 5.6	< 5.5	< 8.4	< 7.8	< 6.1	< 5.8	< 472	< 129
Chloroethane	ug/kg	< 53.1	< 56.1	< 55.5	< 83.8	< 78.4	< 61	< 57.9	< 4720	< 1290
Chloroform	ug/kg	< 5.3	< 5.6	< 5.5	< 8.4	< 7.8	< 6.1	< 5.8	< 472	< 129
Chloromethane	ug/kg	< 53.1	< 56.1	< 55.5	< 83.8	< 78.4	< 61	< 57.9	< 4720	< 1290
Dibromochloromethane	ug/kg	< 5.3	< 5.6	< 5.5	< 8.4	< 7.8	< 6.1	< 5.8	< 472	< 129
Ethylbenzene	ug/kg	< 5.3	< 5.6	< 5.5	< 8.4	< 7.8	< 6.1	< 5.8	**2540**	**1360**
Methylene Chloride	ug/kg	< 53.1	< 56.1	< 55.5	< 83.8	< 78.4	< 61	< 57.9	< 4720	< 1290
Styrene	ug/kg	< 5.3	< 5.6	< 5.5	< 8.4	< 7.8	< 6.1	< 5.8	< 472	< 129
Tetrachloroethene	ug/kg	< 5.3	< 5.6	**11.4**	< 8.4	**16.2**	< 6.1	< 5.8	< 472	< 129
Toluene	ug/kg	< 5.3	< 5.6	< 5.5	< 8.4	< 7.8	< 6.1	< 5.8	< 472	< 129
Total Xylenes	ug/kg	< 5.3	< 5.6	< 5.5	< 8.4	< 7.8	< 6.1	< 5.8	< 472	< 129
Trichloroethene	ug/kg	< 5.3	< 5.6	< 5.5	< 8.4	< 7.8	< 6.1	< 5.8	< 472	< 129
Vinyl Chloride	ug/kg	< 26.6	< 28	< 27.7	< 41.9	< 39.2	< 31	< 28.9	< 2360	< 643
cis-1,3-Dichloropropene	ug/kg	< 5.3	< 5.6	< 5.5	< 8.4	< 7.8	< 6.1	< 5.8	< 472	< 129
trans-1,3-Dichloropropene	ug/kg	< 5.3	< 5.6	< 5.5	< 8.4	< 7.8	< 6.1	< 5.8	< 472	< 129

Validation codes on last page.

GERAGHTY & MILLER, INC.

HARRISON - GMC
RFI PHASE II SOIL ANALYTICAL RESULTS
VOLATILE ORGANIC COMPOUNDS

PARAMETER	UNITS	T10-BH01-16SL	DUP-27	WPSA-BH04-09SL	WPSA-BH04-21SL	WPSA-BH05-02SL	WPSA-BH05-10SL	WPSA-BH05-22SL
1,1,1-Trichloroethane	ug/kg	< 300	< 300	< 5.2	< 5.2	< 11.8	< 5.3	< 5.9
1,1,2,2-Tetrachloroethane	ug/kg	< 300	< 300	< 5.2	< 5.2	< 11.8	< 5.3	< 5.9
1,1,2-Trichloroethane	ug/kg	< 300	< 300	< 5.2	< 5.2	< 11.8	< 5.3	< 5.9
1,1-Dichloroethane	ug/kg	< 300	< 300	< 5.2	< 5.2	< 11.8	< 5.3	< 5.9
1,1-Dichloroethene	ug/kg	< 300	< 300	< 5.2	< 5.2	< 11.8	< 5.3	< 5.9
1,2-Dichloroethane	ug/kg	< 300	< 300	< 5.2	< 5.2	< 11.8	< 5.3	< 5.9
1,2-Dichloroethene (Total)	ug/kg	**1320**	**530**	< 5.2	< 5.2	< 11.8	< 5.3	< 5.9
1,2-Dichloropropane	ug/kg	< 300	< 300	< 5.2	< 5.2	< 11.8	< 5.3	< 5.9
2-Butanone	ug/kg	9940	< 3000	< 52.3 R	< 52.2 R	< 118 R	< 53.2 R	< 59.3 R
2-Hexanone	ug/kg	< 3000	< 3000	< 52.3	< 52.2	< 118	< 53.2	< 59.3
4-Methyl-2-Pentanone	ug/kg	< 3000	< 3000	< 52.3	< 52.2	< 118	< 53.2	< 59.3
Acetone	ug/kg	< 5900	< 6100	< 105	< 104	< 235	< 106	< 119
Benzene	ug/kg	< 300	< 300	< 5.2	< 5.2	< 11.8	< 5.3	< 5.9
Bromodichloromethane	ug/kg	< 300	< 300	< 5.2	< 5.2	< 11.8	< 5.3	< 5.9
Bromoform	ug/kg	< 300	< 300	< 5.2	< 5.2	< 11.8	< 5.3	< 5.9
Bromomethane	ug/kg	< 1400	< 1400	< 26.2	< 26.1	< 59	< 26.6	< 29.6
Carbon Disulfide	ug/kg	< 300	< 300	< 5.2	< 5.2	< 11.8	< 5.3	< 5.9
Carbon Tetrachloride	ug/kg	< 300	< 300	< 5.2	< 5.2	< 11.8	< 5.3	< 5.9
Chlorobenzene	ug/kg	<300	< 300	< 5.2	< 5.2	< 11.8	< 5.3	< 5.9
Chloroethane	ug/kg	< 3000	< 3000	< 52.3	< 52.2	< 118	< 53.2	< 59.3
Chloroform	ug/kg	< 300	< 300	< 5.2	< 5.2	< 11.8	< 5.3	< 5.9
Chloromethane	ug/kg	< 3000	< 3000	< 52.3	< 52.2	< 118	< 53.2	< 59.3
Dibromochloromethane	ug/kg	< 300	< 300	< 5.2	< 5.2	< 11.8	< 5.3	< 5.9
Ethylbenzene	ug/kg	< 300	< 300	< 5.2	< 5.2	< 11.8	< 5.3	< 5.9
Methylene Chloride	ug/kg	< 3000	< 3000	< 52.3	< 52.2	< 118	< 53.2	< 59.3
Styrene	ug/kg	< 300	< 300	< 5.2	< 5.2	< 11.8	< 5.3	< 5.9
Tetrachloroethene	ug/kg	**6200**	**4260**	< 5.2	**5.7**	< 11.8	< 5.3	< 5.9
Toluene	ug/kg	< 300	< 300	**7.6**	< 5.2	< 11.8	< 5.3	< 5.9
Total Xylenes	ug/kg	< 300	< 300	< 5.2	< 5.2	< 11.8	< 5.3	< 5.9
Trichloroethene	ug/kg	**1390**	**510**	< 5.2	< 5.2	< 11.8	< 5.3	< 5.9
Vinyl Chloride	ug/kg	< 1400	< 1400	< 26.2	< 26.1	< 59	< 26.6	< 29.6
cis-1,3-Dichloropropene	ug/kg	< 300	< 300	< 5.2	< 5.2	< 11.8	< 5.3	< 5.9
trans-1,3-Dichloropropene	ug/kg	< 300	< 300	< 5.2	< 5.2	< 11.8	< 5.3	< 5.9

Validation codes on last page.

GERAGHTY & MILLER, INC.

HARRISON - GMC
RFI PHASE II SOIL ANALYTICAL RESULTS
VOLATILE ORGANIC COMPOUNDS

PARAMETER	UNITS	DUP-25	WPSA-BH06-02SL	WPSA-BH06-06SL	WPSA-BH06-14SL	WPSA-BH07-02SL	WPSA-BH07-06SL	DUP-26	WPSA-BH07-22SL
1,1,1-Trichloroethane	ug/kg	< 6.2	< 12	< 59.5	< 5.3	< 58	**549**	**1200**	< 5.3
1,1,2,2-Tetrachloroethane	ug/kg	< 6.2	< 12	< 59.5	< 5.3	< 58	< 61	< 73	< 5.3
1,1,2-Trichloroethane	ug/kg	< 6.2	< 12	< 59.5	< 5.3	< 58	< 61	< 73	< 5.3
1,1-Dichloroethane	ug/kg	< 6.2	< 12	< 59.5	< 5.3	**187**	**141**	**523**	< 5.3
1,1-Dichloroethene	ug/kg	< 6.2	< 12	< 59.5	< 5.3	< 58	< 61	< 73	< 5.3
1,2-Dichloroethane	ug/kg	< 6.2	< 12	< 59.5	< 5.3	< 58	< 61	< 73	< 5.3
1,2-Dichloroethene (Total)	ug/kg	< 6.2	< 12	< 59.5	< 5.3	**1060**	**1090**	**4250**	< 5.3
1,2-Dichloropropane	ug/kg	< 6.2	< 12	< 59.5	< 5.3	< 58	< 61	< 73	< 5.3
2-Butanone	ug/kg	< 62.3 R	< 116 R	< 595 R	< 53.2 R	< 582 R	**2470 J**	**3430 J**	< 53.2 R
2-Hexanone	ug/kg	< 62.3	< 116	< 595	< 53.2	< 582	< 614	< 734	< 53.2
4-Methyl-2-Pentanone	ug/kg	< 62.3	< 116	< 595	< 53.2	< 582	< 614	< 734	< 53.2
Acetone	ug/kg	< 125	**297**	< 1190	< 106	< 1160	**1950**	**3630**	< 106
Benzene	ug/kg	< 6.2	**12**	< 59.5	< 5.3	< 58	< 61	< 73	< 5.3
Bromodichloromethane	ug/kg	< 6.2	< 12	< 59.5	< 5.3	< 58	< 61	< 73	< 5.3
Bromoform	ug/kg	< 6.2	< 12	< 59.5	< 5.3	< 58	< 61	< 73	< 5.3
Bromomethane	ug/kg	< 31.2	< 58	< 298	< 26.6	< 291	< 307	< 367	< 26.6
Carbon Disulfide	ug/kg	< 6.2	**27.7**	< 59.5	< 5.3	< 58	< 61	< 73	< 5.3
Carbon Tetrachloride	ug/kg	< 6.2	< 12	< 59.5	< 5.3	< 58	< 61	< 73	< 5.3
Chlorobenzene	ug/kg	< 6.2	< 12	< 59.5	< 5.3	< 58	< 61	< 73	< 5.3
Chloroethane	ug/kg	< 62.3	< 116	< 595	< 53.2	< 582	< 614	< 734	< 53.2
Chloroform	ug/kg	< 6.2	< 12	< 59.5	< 5.3	< 58	< 61	< 73	< 5.3
Chloromethane	ug/kg	< 62.3	< 116	< 595	< 53.2	< 582	< 614	< 734	< 53.2
Dibromochloromethane	ug/kg	< 6.2	< 12	< 59.5	< 5.3	< 58	< 61	< 73	< 5.3
Ethylbenzene	ug/kg	< 6.2	< 12	< 59.5	< 5.3	**148**	**543**	**930**	< 5.3
Methylene Chloride	ug/kg	< 62.3	< 116	< 595	< 53.2	< 582	< 614	< 734	< 53.2
Styrene	ug/kg	< 6.2	< 12	< 59.5	< 5.3	< 58	< 61	< 73	< 5.3
Tetrachloroethene	ug/kg	< 6.2	< 12	< 59.5	< 5.3	**237**	**209**	**395**	< 5.3
Toluene	ug/kg	< 6.2	**15.9**	< 59.5	< 5.3	**116**	**128**	**238**	< 5.3
Total Xylenes	ug/kg	< 6.2	**49.4**	**332**	< 5.3	< 58	< 61	< 73	< 5.3
Trichloroethene	ug/kg	< 6.2	< 12	< 59.5	< 5.3	**120**	**142**	**322**	< 5.3
Vinyl Chloride	ug/kg	< 31.2	< 58	< 298	< 26.6	< 291	< 307	< 367	< 26.6
cis-1,3-Dichloropropene	ug/kg	< 6.2	< 12	< 59.5	< 5.3	< 58	< 61	< 73	< 5.3
trans-1,3-Dichloropropene	ug/kg	< 6.2	< 12	< 59.5	< 5.3	< 58	< 61	< 73	< 5.3

Validation codes on last page.

GERAGHTY & MILLER, INC.

HARRISON - GMC
RFI PHASE II SOIL ANALYTICAL RESULTS
VOLATILE ORGANIC COMPOUNDS

PARAMETER	UNITS	DB-1	FB-01	RB-14	RB-15	TB-19	TB-20	TB-21	TB-22	TB-23	RB-13
1,1,1-Trichloroethane	ug/l	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
1,1,2,2-Tetrachloroethane	ug/l	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
1,1,2-Trichloroethane	ug/l	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
1,1-Dichloroethane	ug/l	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
1,1-Dichloroethene	ug/l	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
1,2-Dichloroethane	ug/l	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
1,2-Dichloroethene (Total)	ug/l	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
1,2-Dichloropropane	ug/l	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
2-Butanone	ug/l	<10R	<10	10.6	<10	<10	<10	<10	<10	<10	<10
2-Hexanone	ug/l	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
4-Methyl-2-Pentanone	ug/l	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
Acetone	ug/l	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20
Benzene	ug/l	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Bromodichloromethane	ug/l	4.7	<1	<1	<1	<1	<1	<1	<1	<1	<1
Bromoform	ug/l	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Bromomethane	ug/l	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Carbon Disulfide	ug/l	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Carbon Tetrachloride	ug/l	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Chlorobenzene	ug/l	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Chloroethane	ug/l	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
Chloroform	ug/l	3.8	<1	<1	<1	<1	<1	<1	<1	<1	<1
Chloromethane	ug/l	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
Dibromochloromethane	ug/l	4.4	<1	<1	<1	<1	<1	<1	<1	<1	<1
Ethylbenzene	ug/l	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Methylene Chloride	ug/l	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
Styrene	ug/l	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Tetrachloroethene	ug/l	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Toluene	ug/l	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Total Xylenes	ug/l	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Trichloroethene	ug/l	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Vinyl Chloride	ug/l	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
cis-1,3-Dichloropropene	ug/l	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
trans-1,3-Dichloropropene	ug/l	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1

Validation Codes: ug/kg: micrograms per kilogram
R = Rejected Value
J = Estimated Value
<( ) R = Laboratory reported this result as below detection. Result is rejected based on data validation.

PHASE II SOIL SAMPLES

SEMI-VOLATILE ORGANIC COMPOUND RESULTS

DRAFT

HARRISON DIVISION - GMC
RFI PHASE II SOIL ANALYTICAL RESULTS
SEMI-VOLATILE ORGANIC COMPOUNDS

PARAMETER	UNITS	FA-BH01-03SL	FA-BH01-08SL	FA-BH02-02SL	FA-BH02-06SL
1,2,4-Trichlorobenzene	ug/kg dw	< 40900 UJ	< 351	< 3700	< 366
1,2-Dichlorobenzene	ug/kg dw	< 40900 UJ	< 351	< 3700	< 366
1,3-Dichlorobenzene	ug/kg dw	< 40900 UJ	< 351	< 3700	< 366
1,4-Dichlorobenzene	ug/kg dw	< 40900 UJ	< 351	< 3700	< 366
2,4,5-Trichlorophenol	ug/kg dw	< 40900 UJ	< 351	< 3700	< 366
2,4,6-Trichlorophenol	ug/kg dw	< 40900 UJ	< 351	< 3700	< 366
2,4-Dichlorophenol	ug/kg dw	< 40900 UJ	< 351	< 3700	< 366
2,4-Dimethylphenol	ug/kg dw	< 40900 UJ	< 351	< 3700	< 366
2,4-Dinitrophenol	ug/kg dw	< 40900 UJ	< 351	< 3700	< 366
2,4-Dinitrotoluene	ug/kg dw	< 40900 UJ	< 351	< 3700	< 366
2,6-Dinitrotoluene	ug/kg dw	< 40900 UJ	< 351	< 3700	< 366
2-Chloronapthalene	ug/kg dw	< 40900 UJ	< 351	< 3700	< 366
2-Chlorophenol	ug/kg dw	< 40900 UJ	< 351	< 3700	< 366
2-Methylnapthalene	ug/kg dw	< 40900 UJ	< 351	< 3700	< 366
2-Methylphenol	ug/kg dw	< 40900 UJ	< 351	< 3700	< 366
2-Nitroaniline	ug/kg dw	< 61400 UJ	< 526	< 5600	< 549
2-Nitrophenol	ug/kg dw	< 40900 UJ	< 351	< 3700	< 366
3,3'-Dichlorobenzidine	ug/kg dw	< 81900 UJ	< 701	< 7400	< 732
3-Nitroaniline	ug/kg dw	< 61400 UJ	< 526	< 5600	< 549
4,6-Dinitro-2-Methylphenol	ug/kg dw	< 40900 UJ	< 351	< 3700	< 366
4-Bromophenyl-phenyl ether	ug/kg dw	< 40900 UJ	< 351	< 3700	< 366
4-Chloro-3-Methylphenol	ug/kg dw	< 40900 UJ	< 351	< 3700	< 366
4-Chloroaniline	ug/kg dw	< 40900 UJ	< 351	< 3700	< 366
4-Chlorophenyl-phenyl ether	ug/kg dw	< 40900 UJ	< 351	< 3700	< 366
4-Cresol	ug/kg dw	< 40900 UJ	< 351	< 3700	< 366
4-Methylphenol	ug/kg dw	< 40900 UJ	< 351	< 3700	< 366
4-Nitroaniline	ug/kg dw	< 61400 UJ	< 526	< 5600	< 549
4-Nitrophenol	ug/kg dw	< 40900 UJ	< 351	< 3700	< 366
Acenaphthene	ug/kg dw	< 40900 UJ	< 351	< 3700	< 366
Acenaphthylene	ug/kg dw	< 40900 UJ	< 351	< 3700	< 366
Anthracene	ug/kg dw	< 40900 UJ	< 351	< 3700	< 366
Benzo(a)Anthracene	ug/kg dw	< 40900 UJ	< 351	< 3700	< 366
Benzo(a)Pyrene	ug/kg dw	< 40900 UJ	< 351	< 3700	< 366
Benzo(b)Fluoranthene	ug/kg dw	< 40900 UJ	< 351	< 3700	< 366
Benzo(g,h,i)Perylene	ug/kg dw	< 40900 UJ	< 351	< 3700	< 366
Benzo(k)Fluoranthene	ug/kg dw	< 40900 UJ	< 351	< 3700	< 366
Butyl benzyl phthalate	ug/kg dw	< 40900 UJ	< 351	< 3700	< 366
Carbazole	ug/kg dw	< 40900 UJ	< 351	< 3700	< 366
Chrysene	ug/kg dw	< 40900 UJ	< 351	< 3700	< 366
Di-n-Butylphthalate	ug/kg dw	< 40900 UJ	< 351	< 3700	< 366
Di-n-Octyl Phthalate	ug/kg dw	< 40900 UJ	< 351	< 3700	< 366
Dibenz(a,h)Anthracene	ug/kg dw	< 40900 UJ	< 351	< 3700	< 366
Dibenzofuran	ug/kg dw	< 40900 UJ	< 351	< 3700	< 366
Diethylphthalate	ug/kg dw	< 40900 UJ	< 351	< 3700	< 366
Dimethyl Phtalate	ug/kg dw	< 40900 UJ	< 351	< 3700	< 366
Fluoranthene	ug/kg dw	< 40900 UJ	< 351	< 3700	< 366
Fluorene	ug/kg dw	< 40900 UJ	< 351	< 3700	< 366
Hexachloro-1,3-butadiene	ug/kg dw	< 40900 UJ	< 351	< 3700	< 366
Hexachlorobenzene	ug/kg dw	< 40900 UJ	< 351	< 3700	< 366
Hexachlorocyclopentadiene	ug/kg dw	< 40900 UJ	< 351	< 3700	< 366
Hexachloroethane	ug/kg dw	< 40900 UJ	< 351	< 3700	< 366
Indeno(1,2,3-cd)Pyrene	ug/kg dw	< 40900 UJ	< 351	< 3700	< 366
Isophorone	ug/kg dw	< 40900 UJ	< 351	< 3700	< 366
N-Nitroso-Di-n-Propylamine	ug/kg dw	< 40900 UJ	< 351	< 3700	< 366
N-Nitrosodiphenylamine (1)	ug/kg dw	< 40900 UJ	< 351	< 3700	< 366
Napthalene	ug/kg dw	< 40900 UJ	< 351	< 3700	< 366
Nitrobenzene	ug/kg dw	< 40900 UJ	< 351	< 3700	< 366
Pentachlorophenol	ug/kg dw	< 40900 UJ	< 351	< 3700	< 366
Phenanthrene	ug/kg dw	< 40900 UJ	< 351	< 3700	< 366
Phenol	ug/kg dw	< 40900 UJ	< 351	< 3700	< 366
Pyrene	ug/kg dw	< 40900 UJ	< 351	**3780**	< 366
bis(2-Chloroethyl)Ether	ug/kg dw	< 40900 UJ	< 351	< 3700	< 366
bis(2-Chloroisopropyl)Ether	ug/kg dw	< 40900 UJ	< 351	< 3700	< 366
bis(2-Ethylhexyl)Phthalate	ug/kg dw	< 40900 UJ	< 351	< 3700	< 366
bis(Chloroethoxy)Methane	ug/kg dw	< 40900 UJ	< 351	< 3700	< 366

Validation codes on last page.

HARRISON DIVISION - GMC
RFI PHASE II SOIL ANALYTICAL RESULTS
SEMI-VOLATILE ORGANIC COMPOUNDS

PARAMETER	UNITS	LWB-BH01-03SL	DUP-24	LWB-BH01-13SL	WPSA-BH04-09SL	WPSA-BH04-21S
1,2,4-Trichlorobenzene	ug/kg dw	< 382	<3500	< 3540	< 345	< 344
1,2-Dichlorobenzene	ug/kg dw	< 382	<3500	< 3540	< 345	< 344
1,3-Dichlorobenzene	ug/kg dw	< 382	<3500	< 3540	< 345	< 344
1,4-Dichlorobenzene	ug/kg dw	< 382	<3500	< 3540	< 345	< 344
2,4,5-Trichlorophenol	ug/kg dw	< 382	<3500	< 3500	< 345	< 344
2,4,6-Trichlorophenol	ug/kg dw	< 382	<3500	< 3500	< 345	< 344
2,4-Dichlorophenol	ug/kg dw	< 382	<3500	< 3500	< 345	< 344
2,4-Dimethylphenol	ug/kg dw	< 382	<3500	< 3500	< 345	< 344
2,4-Dinitrophenol	ug/kg dw	< 382	<3500	< 3500	< 345	< 344
2,4-Dinitrotoluene	ug/kg dw	< 382	<3500	< 3540	< 345	< 344
2,6-Dinitrotoluene	ug/kg dw	< 382	<3500	< 3540	< 345	< 344
2-Chloronapthalene	ug/kg dw	< 382	<3500	< 3540	< 345	< 344
2-Chlorophenol	ug/kg dw	< 382	<3500	< 3500	< 345	< 344
2-Methylnapthalene	ug/kg dw	< 382	<3500	< 3540	< 345	< 344
2-Methylphenol	ug/kg dw	< 382	<3500	< 3500	< 345	< 344
2-Nitroaniline	ug/kg dw	< 573	<5300	< 5320	< 518	< 517
2-Nitrophenol	ug/kg dw	< 382	<3500	< 3500	< 345	< 344
3,3'-Dichlorobenzidine	ug/kg dw	< 764	<7100	< 7090	< 690	< 689
3-Nitroaniline	ug/kg dw	< 573	<5300	< 5320	< 518	< 517
4,6-Dinitro-2-Methylphenol	ug/kg dw	< 382	<3500	< 3500	< 345	< 344
4-Bromophenyl-phenyl ether	ug/kg dw	< 382	<3500	< 3540	< 345	< 344
4-Chloro-3-Methylphenol	ug/kg dw	< 382	<3500	< 3500	< 345	< 344
4-Chloroaniline	ug/kg dw	< 382	<3500	< 3540	< 345	< 344
4-Chlorophenyl-phenyl ether	ug/kg dw	< 382	<3500	< 3540	< 345	< 344
4-Chlorophenyl-phenyl ether	ug/kg dw	< 382	<3500	< 3540	< 345	< 344
4-Methylphenol	ug/kg dw	< 382	<5300	< 3540	< 345	< 344
4-Nitroaniline	ug/kg dw	< 573	<3500	< 5320	< 518	< 517
4-Nitrophenol	ug/kg dw	< 382	<3500	< 3500	< 345	< 344
Acenaphthene	ug/kg dw	< 382	<3500	< 3540	< 345	< 344
Acenaphthylene	ug/kg dw	< 382	<3500	< 3540	< 345	< 344
Anthracene	ug/kg dw	< 382	<3500	< 3540	< 345	< 344
Benzo(a)Anthracene	ug/kg dw	< 382	<3500	< 3540	< 345	< 344
Benzo(a)Pyrene	ug/kg dw	< 382	<3500	< 3540	< 345	< 344
Benzo(b)Fluoranthene	ug/kg dw	< 382	<3500	< 3540	< 345	< 344
Benzo(g,h,i)Perylene	ug/kg dw	< 382	<3500	< 3540	< 345	< 344
Benzo(k)Fluoranthene	ug/kg dw	< 382	<3500	< 3540	< 345	< 344
Butyl benzyl phthalate	ug/kg dw	< 382	<3500	< 3540	< 345	< 344
Carbazole	ug/kg dw	< 382	<3500	< 3540	< 345	< 344
Chrysene	ug/kg dw	< 382	<3500	< 3540	< 345	< 344
Di-n-Butylphthalate	ug/kg dw	< 382	<3500	< 3540	< 345	< 344
Di-n-Octyl Phthalate	ug/kg dw	< 382	<3500	< 3540	< 345	< 344
Dibenz(a,h)Anthracene	ug/kg dw	< 382	<3500	< 3540	< 345	< 344
Dibenzofuran	ug/kg dw	< 382	<3500	< 3540	< 345	< 344
Diethylphthalate	ug/kg dw	< 382	<3500	< 3540	< 345	< 344
Dimethyl Phtalate	ug/kg dw	< 382	<3500	< 3540	< 345	< 344
Fluoranthene	ug/kg dw	< 382	<3500	< 3540	< 345	< 344
Fluorene	ug/kg dw	< 382	<3500	< 3540	< 345	< 344
Hexachloro-1,3-butadiene	ug/kg dw	< 382	<3500	< 3540	< 345	< 344
Hexachlorobenzene	ug/kg dw	< 382	<3500	< 3540	< 345	< 344
Hexachlorocyclopentadiene	ug/kg dw	< 382	<3500	< 3540	< 345	< 344
Hexachloroethane	ug/kg dw	< 382	<3500	< 3540	< 345	< 344
Indeno(1,2,3-cd)Pyrene	ug/kg dw	< 382	<3500	< 3540	< 345	< 344
Isophorone	ug/kg dw	< 382	<3500	< 3540	< 345	< 344
N-Nitroso-Di-n-Propylamine	ug/kg dw	< 382	<3500	< 3540	< 345	< 344
N-Nitrosodiphenylamine (1)	ug/kg dw	< 382	<3500	< 3540	< 345	< 344
Napthalene	ug/kg dw	< 382	<3500	< 3540	< 345	< 344
Nitrobenzene	ug/kg dw	< 382	<3500	< 3540	< 345	< 344
Pentachlorophenol	ug/kg dw	< 382	<3500	< 3500	< 345	< 344
Phenanthrene	ug/kg dw	< 382	<3500	< 3540	< 345	< 344
Phenol	ug/kg dw	< 382	<3500	< 3500	< 345	< 344
Pyrene	ug/kg dw	< 382	<3500	< 3540	< 345	< 344
bis(2-Chloroethyl)Ether	ug/kg dw	< 382	<3500	< 3540	< 345	< 344
bis(2-Chloroisopropyl)Ether	ug/kg dw	< 382	<3500	< 3540	< 345	< 344
bis(2-Ethylhexyl)Phthalate	ug/kg dw	< 382	<3500	< 3540	< 345	< 344
bis(Chloroethoxy)Methane	ug/kg dw	< 382	<3500	< 3540	< 345	< 344

Validation codes on last page.

HARRISON DIVISION - GMC
RFI PHASE II SOIL ANALYTICAL RESULTS
SEMI-VOLATILE ORGANIC COMPOUNDS

PARAMETER	UNITS	WPSA-BH05-02SL	WPSA-BH05-10SL	WPSA-BH05-22SL	DUP-25
1,2,4-Trichlorobenzene	ug/kg dw	< 354	< 351	< 391	< 411
1,2-Dichlorobenzene	ug/kg dw	< 354	< 351	< 391	< 411
1,3-Dichlorobenzene	ug/kg dw	< 354	< 351	< 391	< 411
1,4-Dichlorobenzene	ug/kg dw	< 354	< 351	< 391	< 411
2,4,5-Trichlorophenol	ug/kg dw	< 354	< 351	< 391	< 411
2,4,6-Trichlorophenol	ug/kg dw	< 354	< 351	< 391	< 411
2,4-Dichlorophenol	ug/kg dw	< 354	< 351	< 391	< 411
2,4-Dimethylphenol	ug/kg dw	< 354	< 351	< 391	< 411
2,4-Dinitrophenol	ug/kg dw	< 354	< 351	< 391	< 411
2,4-Dinitrotoluene	ug/kg dw	< 354	< 351	< 391	< 411
2,6-Dinitrotoluene	ug/kg dw	< 354	< 351	< 391	< 411
2-Chloronapthalene	ug/kg dw	< 354	< 351	< 391	< 411
2-Chlorophenol	ug/kg dw	< 354	< 351	< 391	< 411
2-Methylnapthalene	ug/kg dw	< 354	< 351	< 391	< 411
2-Methylphenol	ug/kg dw	< 354	< 351	< 391	< 411
2-Nitroaniline	ug/kg dw	< 531	< 527	< 587	< 617
2-Nitrophenol	ug/kg dw	< 354	< 351	< 391	< 411
3,3'-Dichlorobenzidine	ug/kg dw	< 708	< 703	< 783	< 823
3-Nitroaniline	ug/kg dw	< 531	< 527	< 587	< 617
4,6-Dinitro-2-Methylphenol	ug/kg dw	< 354	< 351	< 391	< 411
4-Bromophenyl-phenyl ether	ug/kg dw	< 354	< 351	< 391	< 411
4-Chloro-3-Methylphenol	ug/kg dw	< 354	< 351	< 391	< 411
4-Chloroaniline	ug/kg dw	< 354	< 351	< 391	< 411
4-Chlorophenyl-phenyl ether	ug/kg dw	< 354	< 351	< 391	< 411
4-Chlorophenyl-phenyl ether	ug/kg dw	< 354	< 351	< 391	< 411
4-Methylphenol	ug/kg dw	< 354	< 351	< 391	< 411
4-Nitroaniline	ug/kg dw	< 531	< 527	< 587	< 617
4-Nitrophenol	ug/kg dw	< 354	< 351	< 391	< 411
Acenaphthene	ug/kg dw	< 354	< 351	< 391	< 411
Acenaphthylene	ug/kg dw	< 354	< 351	< 391	< 411
Anthracene	ug/kg dw	< 354	< 351	< 391	< 411
Benzo(a)Anthracene	ug/kg dw	< 354	< 351	< 391	< 411
Benzo(a)Pyrene	ug/kg dw	< 354	< 351	< 391	< 411
Benzo(b)Fluoranthene	ug/kg dw	< 354	< 351	< 391	< 411
Benzo(g,h,i)Perylene	ug/kg dw	< 354	< 351	< 391	< 411
Benzo(k)Fluoranthene	ug/kg dw	< 354	< 351	< 391	< 411
Butyl benzyl phthalate	ug/kg dw	< 354	< 351	< 391	< 411
Carbazole	ug/kg dw	< 354	< 351	< 391	< 411
Chrysene	ug/kg dw	< 354	< 351	< 391	< 411
Di-n-Butylphthalate	ug/kg dw	< 354	< 351	< 391	< 411
Di-n-Octyl Phthalate	ug/kg dw	< 354	< 351	< 391	< 411
Dibenz(a,h)Anthracene	ug/kg dw	< 354	< 351	< 391	< 411
Dibenzofuran	ug/kg dw	< 354	< 351	< 391	< 411
Diethylphthalate	ug/kg dw	< 354	< 351	< 391	< 411
Dimethyl Phtalate	ug/kg dw	< 354	< 351	< 391	< 411
Fluoranthene	ug/kg dw	< 354	< 351	< 391	< 411
Fluorene	ug/kg dw	< 354	< 351	< 391	< 411
Hexachloro-1,3-butadiene	ug/kg dw	< 354	< 351	< 391	< 411
Hexachlorobenzene	ug/kg dw	< 354	< 351	< 391	< 411
Hexachlorocyclopentadiene	ug/kg dw	< 354	< 351	< 391	< 411
Hexachloroethane	ug/kg dw	< 354	< 351	< 391	< 411
Indeno(1,2,3-cd)Pyrene	ug/kg dw	< 354	< 351	< 391	< 411
Isophorone	ug/kg dw	< 354	< 351	< 391	< 411
N-Nitroso-Di-n-Propylamine	ug/kg dw	< 354	< 351	< 391	< 411
N-Nitrosodiphenylamine (1)	ug/kg dw	< 354	< 351	< 391	< 411
Napthalene	ug/kg dw	< 354	< 351	< 391	< 411
Nitrobenzene	ug/kg dw	< 354	< 351	< 391	< 411
Pentachlorophenol	ug/kg dw	< 354	< 351	< 391	< 411
Phenanthrene	ug/kg dw	< 354	< 351	< 391	< 411
Phenol	ug/kg dw	< 354	< 351	< 391	< 411
Pyrene	ug/kg dw	< 354	< 351	< 391	< 411
bis(2-Chloroethyl)Ether	ug/kg dw	< 354	< 351	< 391	< 411
bis(2-Chloroisopropyl)Ether	ug/kg dw	< 354	< 351	< 391	< 411
bis(2-Ethylhexyl)Phthalate	ug/kg dw	**1900**	**710**	**409**	< 411
bis(Chloroethoxy)Methane	ug/kg dw	< 354	< 351	< 391	< 411

Validation codes on last page.

HARRISON DIVISION - GMC
RFI PHASE II SOIL ANALYTICAL RESULTS
SEMI-VOLATILE ORGANIC COMPOUNDS

PARAMETER	UNITS	WPSA-BH06-02SL	WPSA-BH06-06SL	WPSA-BH06-14SL	WPSA-BH07-02SL
1,2,4-Trichlorobenzene	ug/kg dw	< 4400	< 3900	< 351	< 38400 UJ
1,2-Dichlorobenzene	ug/kg dw	< 4400	< 3900	< 351	< 38400 UJ
1,3-Dichlorobenzene	ug/kg dw	< 4400	< 3900	< 351	< 38400 UJ
1,4-Dichlorobenzene	ug/kg dw	< 4400	< 3900	< 351	< 38400 UJ
2,4,5-Trichlorophenol	ug/kg dw	< 4400	< 3900	< 351	< 38400 UJ
2,4,6-Trichlorophenol	ug/kg dw	< 4400	< 3900	< 351	< 38400 UJ
2,4-Dichlorophenol	ug/kg dw	< 4400	< 3900	< 351	< 38400 UJ
2,4-Dimethylphenol	ug/kg dw	< 4400	< 3900	< 351	< 38400 UJ
2,4-Dinitrophenol	ug/kg dw	< 4400	< 3900	< 351	< 38400 UJ
2,4-Dinitrotoluene	ug/kg dw	< 4400	< 3900	< 351	< 38400 UJ
2,6-Dinitrotoluene	ug/kg dw	< 4400	< 3900	< 351	< 38400 UJ
2-Chloronapthalene	ug/kg dw	< 4400	< 3900	< 351	< 38400 UJ
2-Chlorophenol	ug/kg dw	< 4400	< 3900	< 351	< 38400 UJ
2-Methylnapthalene	ug/kg dw	< 4400	< 3900	< 351	< 38400 UJ
2-Methylphenol	ug/kg dw	< 4400	< 3900	< 351	< 38400 UJ
2-Nitroaniline	ug/kg dw	< 6700	< 5900	< 526	< 57600 UJ
2-Nitrophenol	ug/kg dw	< 4400	< 3900	< 351	< 38400 UJ
3,3'-Dichlorobenzidine	ug/kg dw	< 8900	< 7900	< 702	< 76800 UJ
3-Nitroaniline	ug/kg dw	< 6700	< 5900	< 526	< 57600 UJ
4,6-Dinitro-2-Methylphenol	ug/kg dw	< 4400	< 3900	< 351	< 38400 UJ
4-Bromophenyl-phenyl ether	ug/kg dw	< 4400	< 3900	< 351	< 38400 UJ
4-Chloro-3-Methylphenol	ug/kg dw	< 4400	< 3900	< 351	< 38400 UJ
4-Chloroaniline	ug/kg dw	< 4400	< 3900	< 351	< 38400 UJ
4-Chlorophenyl-phenyl ether	ug/kg dw	< 4400	< 3900	< 351	< 38400 UJ
4-Chlorophenyl-phenyl ether	ug/kg dw	< 4400	< 3900	< 351	< 38400 UJ
4-Methylphenol	ug/kg dw	< 4400	< 3900	< 351	< 38400 UJ
4-Nitroaniline	ug/kg dw	< 6700	< 5900	< 526	< 57600 UJ
4-Nitrophenol	ug/kg dw	< 4400	< 3900	< 351	< 38400 UJ
Acenaphthene	ug/kg dw	< 4400	< 3900	< 351	< 38400 UJ
Acenaphthylene	ug/kg dw	< 4400	< 3900	< 351	< 38400 UJ
Anthracene	ug/kg dw	< 4400	< 3900	< 351	< 38400 UJ
Benzo(a)Anthracene	ug/kg dw	< 4400	< 3900	< 351	< 38400 UJ
Benzo(a)Pyrene	ug/kg dw	< 4400	< 3900	< 351	< 38400 UJ
Benzo(b)Fluoranthene	ug/kg dw	**6920**	< 3900	< 351	< 38400 UJ
Benzo(g,h,i)Perylene	ug/kg dw	< 4400	< 3900	< 351	< 38400 UJ
Benzo(k)Fluoranthene	ug/kg dw	< 4400	< 3900	< 351	< 38400 UJ
Butyl benzyl phthalate	ug/kg dw	< 4400	< 3900	< 351	< 38400 UJ
Carbazole	ug/kg dw	< 4400	< 3900	< 351	< 38400 UJ
Chrysene	ug/kg dw	< 4400	< 3900	< 351	< 38400 UJ
Di-n-Butylphthalate	ug/kg dw	< 4400	< 3900	< 351	< 38400 UJ
Di-n-Octyl Phthalate	ug/kg dw	< 4400	< 3900	< 351	< 38400 UJ
Dibenz(a,h)Anthracene	ug/kg dw	< 4400	< 3900	< 351	< 38400 UJ
Dibenzofuran	ug/kg dw	< 4400	< 3900	< 351	< 38400 UJ
Diethylphthalate	ug/kg dw	< 4400	< 3900	< 351	< 38400 UJ
Dimethyl Phtalate	ug/kg dw	< 4400	< 3900	< 351	< 38400 UJ
Fluoranthene	ug/kg dw	**5650**	< 3900	< 351	< 38400 UJ
Fluorene	ug/kg dw	< 4400	< 3900	< 351	< 38400 UJ
Hexachloro-1,3-butadiene	ug/kg dw	< 4400	< 3900	< 351	< 38400 UJ
Hexachlorobenzene	ug/kg dw	< 4400	< 3900	< 351	< 38400 UJ
Hexachlorocyclopentadiene	ug/kg dw	< 4400	< 3900	< 351	< 38400 UJ
Hexachloroethane	ug/kg dw	< 4400	< 3900	< 351	< 38400 UJ
Indeno(1,2,3-cd)Pyrene	ug/kg dw	< 4400	< 3900	< 351	< 38400 UJ
Isophorone	ug/kg dw	< 4400	< 3900	< 351	< 38400 UJ
N-Nitroso-Di-n-Propylamine	ug/kg dw	< 4400	< 3900	< 351	< 38400 UJ
N-Nitrosodiphenylamine (1)	ug/kg dw	< 4400	< 3900	< 351	< 38400 UJ
Napthalene	ug/kg dw	< 4400	< 3900	< 351	< 38400 UJ
Nitrobenzene	ug/kg dw	< 4400	< 3900	< 351	< 38400 UJ
Pentachlorophenol	ug/kg dw	< 4400	< 3900	< 351	< 38400 UJ
Phenanthrene	ug/kg dw	**5450**	**8460**	< 351	< 38400 UJ
Phenol	ug/kg dw	< 4400	< 3900	< 351	< 38400 UJ
Pyrene	ug/kg dw	**5180**	< 3900	< 351	< 38400 UJ
bis(2-Chloroethyl)Ether	ug/kg dw	< 4400	< 3900	< 351	< 38400 UJ
bis(2-Chloroisopropyl)Ether	ug/kg dw	< 4400	< 3900	< 351	< 38400 UJ
bis(2-Ethylhexyl)Phthalate	ug/kg dw	< 4400	< 3900	< 351	< 38400 UJ
bis(Chloroethoxy)Methane	ug/kg dw	< 4400	< 3900	< 351	< 38400 UJ

Validation codes on last page.

HARRISON DIVISION - GMC
RFI PHASE II SOIL ANALYTICAL RESULTS
SEMI-VOLATILE ORGANIC COMPOUNDS

PARAMETER	UNITS	WPSA-BH07-06SL	DUP-26	WPSA-BH07-22SL
1,2,4-Trichlorobenzene	ug/kg dw	< 40500 UJ	< 41800	< 3500
1,2-Dichlorobenzene	ug/kg dw	< 40500 UJ	< 41800	< 3500
1,3-Dichlorobenzene	ug/kg dw	< 40500 UJ	< 41800	< 3500
1,4-Dichlorobenzene	ug/kg dw	< 40500 UJ	< 41800	< 3500
2,4,5-Trichlorophenol	ug/kg dw	< 40500 UJ	< 41800	< 3500
2,4,6-Trichlorophenol	ug/kg dw	< 40500 UJ	< 41800	< 3500
2,4-Dichlorophenol	ug/kg dw	< 40500 UJ	< 41800	< 3500
2,4-Dimethylphenol	ug/kg dw	< 40500 UJ	< 41800	< 3500
2,4-Dinitrophenol	ug/kg dw	< 40500 UJ	< 41800	< 3500
2,4-Dinitrotoluene	ug/kg dw	< 40500 UJ	< 41800	< 3500
2,6-Dinitrotoluene	ug/kg dw	< 40500 UJ	< 41800	< 3500
2-Chloronapthalene	ug/kg dw	< 40500 UJ	< 41800	< 3500
2-Chlorophenol	ug/kg dw	< 40500 UJ	< 41800	< 3500
2-Methylnapthalene	ug/kg dw	< 40500 UJ	< 41800	< 3500
2-Methylphenol	ug/kg dw	< 40500 UJ	< 41800	< 3500
2-Nitroaniline	ug/kg dw	< 60800 UJ	< 62600	< 5300
2-Nitrophenol	ug/kg dw	< 40500 UJ	< 41800	< 3500
3,3'-Dichlorobenzidine	ug/kg dw	< 81100 UJ	< 83500	< 7000
3-Nitroaniline	ug/kg dw	< 60800 UJ	< 62600	< 5300
4,6-Dinitro-2-Methylphenol	ug/kg dw	< 40500 UJ	< 41800	< 3500
4-Bromophenyl-phenyl ether	ug/kg dw	< 40500 UJ	< 41800	< 3500
4-Chloro-3-Methylphenol	ug/kg dw	< 40500 UJ	< 41800	< 3500
4-Chloroaniline	ug/kg dw	< 40500 UJ	< 41800	< 3500
4-Chlorophenyl-phenyl ether	ug/kg dw	< 40500 UJ	< 41800	< 3500
4-Chlorophenyl-phenyl ether	ug/kg dw	< 40500 UJ	< 41800	< 3500
4-Methylphenol	ug/kg dw	< 40500 UJ	< 41800	< 3500
4-Nitroaniline	ug/kg dw	< 60800 UJ	< 62600	< 5300
4-Nitrophenol	ug/kg dw	< 40500 UJ	< 41800	< 3500
Acenaphthene	ug/kg dw	< 40500 UJ	< 41800	< 3500
Acenaphthylene	ug/kg dw	< 40500 UJ	< 41800	< 3500
Anthracene	ug/kg dw	< 40500 UJ	< 41800	< 3500
Benzo(a)Anthracene	ug/kg dw	< 40500 UJ	< 41800	< 3500
Benzo(a)Pyrene	ug/kg dw	< 40500 UJ	< 41800	< 3500
Benzo(b)Fluoranthene	ug/kg dw	< 40500 UJ	< 41800	< 3500
Benzo(g,h,i)Perylene	ug/kg dw	< 40500 UJ	< 41800	< 3500
Benzo(k)Fluoranthene	ug/kg dw	< 40500 UJ	< 41800	< 3500
Butyl benzyl phthalate	ug/kg dw	< 40500 UJ	< 41800	< 3500
Carbazole	ug/kg dw	< 40500 UJ	< 41800	< 3500
Chrysene	ug/kg dw	< 40500 UJ	< 41800	< 3500
Di-n-Butylphthalate	ug/kg dw	< 40500 UJ	< 41800	< 3500
Di-n-Octyl Phthalate	ug/kg dw	< 40500 UJ	< 41800	< 3500
Dibenz(a,h)Anthracene	ug/kg dw	< 40500 UJ	< 41800	< 3500
Dibenzofuran	ug/kg dw	< 40500 UJ	< 41800	< 3500
Diethylphthalate	ug/kg dw	< 40500 UJ	< 41800	< 3500
Dimethyl Phtalate	ug/kg dw	< 40500 UJ	< 41800	< 3500
Fluoranthene	ug/kg dw	< 40500 UJ	< 41800	< 3500
Fluorene	ug/kg dw	< 40500 UJ	< 41800	< 3500
Hexachloro-1,3-butadiene	ug/kg dw	< 40500 UJ	< 41800	< 3500
Hexachlorobenzene	ug/kg dw	< 40500 UJ	< 41800	< 3500
Hexachlorocyclopentadiene	ug/kg dw	< 40500 UJ	< 41800	< 3500
Hexachloroethane	ug/kg dw	< 40500 UJ	< 41800	< 3500
Indeno(1,2,3-cd)Pyrene	ug/kg dw	< 40500 UJ	< 41800	< 3500
Isophorone	ug/kg dw	< 40500 UJ	< 41800	< 3500
N-Nitroso-Di-n-Propylamine	ug/kg dw	< 40500 UJ	< 41800	< 3500
N-Nitrosodiphenylamine (1)	ug/kg dw	< 40500 UJ	< 41800	< 3500
Napthalene	ug/kg dw	< 40500 UJ	< 41800	< 3500
Nitrobenzene	ug/kg dw	< 40500 UJ	< 41800	< 3500
Pentachlorophenol	ug/kg dw	< 40500 UJ	< 41800	< 3500
Phenanthrene	ug/kg dw	< 40500 UJ	< 41800	< 3500
Phenol	ug/kg dw	< 40500 UJ	< 41800	< 3500
Pyrene	ug/kg dw	< 40500 UJ	< 41800	< 3500
bis(2-Chloroethyl)Ether	ug/kg dw	< 40500 UJ	< 41800	< 3500
bis(2-Chloroisopropyl)Ether	ug/kg dw	< 40500 UJ	< 41800	< 3500
bis(2-Ethylhexyl)Phthalate	ug/kg dw	< 40500 UJ	< 41800	< 3500
bis(Chloroethoxy)Methane	ug/kg dw	< 40500 UJ	< 41800	< 3500

Validation codes on last page.

HARRISON DIVISION - GMC
RFI PHASE II SOIL ANALYTICAL RESULTS
SEMI-VOLATILE ORGANIC COMPOUNDS

PARAMETER	UNITS	RB-13	RB-14
1,2,4-Trichlorobenzene	ug/l	< 10	< 10
1,2-Dichlorobenzene	ug/l	< 10	< 10
1,3-Dichlorobenzene	ug/l	< 10	< 10
1,4-Dichlorobenzene	ug/l	< 10	< 10
2,4,5-Trichlorophenol	ug/l	< 10	< 10
2,4,6-Trichlorophenol	ug/l	< 10	< 10
2,4-Dichlorophenol	ug/l	< 10	< 10
2,4-Dimethylphenol	ug/l	< 10	< 10
2,4-Dinitrophenol	ug/l	< 10	< 10
2,4-Dinitrotoluene	ug/l	< 10	< 10
2,6-Dinitrotoluene	ug/l	< 10	< 10
2-Chloronapthalene	ug/l	< 10	< 10
2-Chlorophenol	ug/l	< 10	< 10
2-Methylnapthalene	ug/l	< 10	< 10
2-Methylphenol	ug/l	< 10	< 10
2-Nitroaniline	ug/l	< 15	< 15
2-Nitrophenol	ug/l	< 10	< 10
3,3'-Dichlorobenzidine	ug/l	< 20	< 20
3-Nitroaniline	ug/l	< 15	< 15
4,6-Dinitro-2-Methylphenol	ug/l	< 10	< 10
4-Bromophenyl-phenyl ether	ug/l	< 10	< 10
4-Chloro-3-Methylphenol	ug/l	< 10	< 10
4-Chloroaniline	ug/l	< 10	< 10
4-Chlorophenyl-phenyl ether	ug/l	< 10	< 10
4-Chlorophenyl-phenyl ether	ug/l	< 10	< 10
4-Methylphenol	ug/l	< 10	< 10
4-Nitroaniline	ug/l	< 15	< 15
4-Nitrophenol	ug/l	< 10	< 10
Acenaphthene	ug/l	< 10	< 10
Acenaphthylene	ug/l	< 10	< 10
Anthracene	ug/l	< 10	< 10
Benzo(a)Anthracene	ug/l	< 10	< 10
Benzo(a)Pyrene	ug/l	< 10	< 10
Benzo(b)Fluoranthene	ug/l	< 10	< 10
Benzo(g,h,i)Perylene	ug/l	< 10	< 10
Benzo(k)Fluoranthene	ug/l	< 10	< 10
Butyl benzyl phthalate	ug/l	< 10	< 10
Carbazole	ug/l	< 10	< 10
Chrysene	ug/l	< 10	< 10
Di-n-Butylphthalate	ug/l	< 10	< 10
Di-n-Octyl Phthalate	ug/l	< 10	< 10
Dibenz(a,h)Anthracene	ug/l	< 10	< 10
Dibenzofuran	ug/l	< 10	< 10
Diethylphthalate	ug/l	< 10	< 10
Dimethyl Phtalate	ug/l	< 10	< 10
Fluoranthene	ug/l	< 10	< 10
Fluorene	ug/l	< 10	< 10
Hexachloro-1,3-butadiene	ug/l	< 10	< 10
Hexachlorobenzene	ug/l	< 10	< 10
Hexachlorocyclopentadiene	ug/l	< 10	< 10
Hexachloroethane	ug/l	< 10	< 10
Indeno(1,2,3-cd)Pyrene	ug/l	< 10	< 10
Isophorone	ug/l	< 10	< 10
N-Nitroso-Di-n-Propylamine	ug/l	< 10	< 10
N-Nitrosodiphenylamine (1)	ug/l	< 10	< 10
Napthalene	ug/l	< 10	< 10
Nitrobenzene	ug/l	< 10	< 10
Pentachlorophenol	ug/l	< 10	< 10
Phenanthrene	ug/l	< 10	< 10
Phenol	ug/l	< 10	< 10
Pyrene	ug/l	< 10	< 10
bis(2-Chloroethyl)Ether	ug/l	< 10	< 10
bis(2-Chloroisopropyl)Ether	ug/l	< 10	< 10
bis(2-Ethylhexyl)Phthalate	ug/l	< 10	< 10
bis(Chloroethoxy)Methane	ug/l	< 10	< 10

Validation Codes: ug/kg dw = micrograms per kilogram dry weight

Samples RB-13 and RB-14 are in ug/l (microgram per liter)

UJ = Laboratory reported this result as a detected value; however, based on data validation, the result is below detection and estimated.

GERAGHTY & MILLER, INC.

DRAFT

PHASE II SOIL SAMPLES

POLYCHLORINATED BIPHENYLS, PESTICIDES, AND HERBICIDE RESULTS

DRAFT

HARRISON DIVISION - GMC
RFI PHASE II SOIL ANALYTICAL RESULTS
POLYCHLORINATED BIPHENYLS, PESTICIDES AND HERBICIDES

PARAMETERS	UNITS	FA-BH01-03SL	FA-BH01-08SL	FA-BH02-02SL	FA-BH02-06SL	GM20D-05SL	DUP-28
4,4'-DDD	mg/kg dw	< .62	< .53	< .56	< .55	< .55	< .52
4,4'-DDE	mg/kg dw	< .62	< .53	< .56	< .55	< .55	< .52
4,4-DDT	mg/kg dw	< .62	< .53	< .56	< .55	< .55	< .52
Aldrin	mg/kg dw	< .62	< .53	< .56	< .55	< .55	< .52
Aroclor-1016	mg/kg dw	< .62	< .53	< .56	< .55	< .55	< .52
Aroclor-1221	mg/kg dw	< .62	< .53	< .56	< .55	< .55	< .52
Aroclor-1232	mg/kg dw	< .62	< .53	< .56	< .55	< .55	< .52
Aroclor-1242	mg/kg dw	**.64**	< .53	< .56	< .55	< .55	< .52
Aroclor-1248	mg/kg dw	< .62	< .53	< .56	< .55	< .55	< .52
Aroclor-1254	mg/kg dw	< .62	< .53	< .56	< .55	< .55	< .52
Aroclor-1260	mg/kg dw	< .62	< .53	< .56	< .55	< .55	< .52
Dieldrin	mg/kg dw	< .62	< .53	< .56	< .55	< .55	< .52
Endosulfan I	mg/kg dw	< .62	< .53	< .56	< .55	< .55	< .52
Endosulfan II	mg/kg dw	< .62	< .53	< .56	< .55	< .55	< .52
Endosulfan sulfate	mg/kg dw	< .62	< .53	< .56	< .55	< .55	< .52
Endrin	mg/kg dw	< .62	< .53	< .56	< .55	< .55	< .52
Endrin Aldehyde	mg/kg dw	< .62	< .53	< .56	< .55	< .55	< .52
Endrin ketone	mg/kg dw	< .62	< .53	< .56	< .55	< .55	< .52
Heptachlor	mg/kg dw	< .62	< .53	< .56	< .55	< .55	< .52
Heptachlor epoxide	mg/kg dw	< .62	< .53	< .56	< .55	< .55	< .52
Lindane	mg/kg dw	< .62	< .53	< .56	< .55	< .55	< .52
Methoxychlor	mg/kg dw	< .62	< .53	< .56	< .55	< .55	< .52
Toxaphene	mg/kg dw	< .62	< .53	< .56	< .55	< .55	< .52
alpha-BHC	mg/kg dw	< .62	< .53	< .56	< .55	< .55	< .52
alpha-Chlordane	mg/kg dw	< .62	< .53	< .56	< .55	< .55	< .52
beta-BHC	mg/kg dw	< .62	< .53	< .56	< .55	< .55	< .52
delta-BHC	mg/kg dw	< .62	< .53	< .56	< .55	< .55	< .52
gamma-BHC(Lindane)	mg/kg dw	< .62	< .53	< .56	< .55	< .55	< .52
gamma-Chlordane	mg/kg dw	< .62	< .53	< .56	< .55	< .55	< .52

Validation codes on last page.

GERAGHTY & MILLER, INC.

HARRISON DIVISION - GMC
RFI PHASE II SOIL ANALYTICAL RESULTS
POLYCHLORINATED BIPHENYLS, PESTICIDES AND HERBICIDES

PARAMETER	UNITS	GM20D-17SL	LWB-BH01-03SL	DUP-24	LWB-BH01-13SL	WPSA-BH04-09SL	WPSA-BH04-21SL
4,4'-DDD	mg/kg dw	< .52	< .58	<0.54	< .54	< .52	< .52
4,4'-DDE	mg/kg dw	< .52	< .58	<0.54	< .54	< .52	< .52
4,4-DDT	mg/kg dw	< .52	< .58	<0.54	< .54	< .52	< .52
Aldrin	mg/kg dw	< .52	< .58	<0.54	< .54	< .52	< .52
Aroclor-1016	mg/kg dw	< .52	< .58	<0.54	< .54	< .52	< .52
Aroclor-1221	mg/kg dw	< .52	< .58	<0.54	< .54	< .52	< .52
Aroclor-1232	mg/kg dw	< .52	< .58	<0.54	< .54	< .52	< .52
Aroclor-1242	mg/kg dw	< .52	< .58	<0.54	< .54	< .52	< .52
Aroclor-1248	mg/kg dw	< .52	< .58	<0.54	< .54	< .52	< .52
Aroclor-1254	mg/kg dw	< .52	< .58	0.65	< .54	< .52	< .52
Aroclor-1260	mg/kg dw	< .52	< .58	<0.54	< .54	< .52	< .52
Dieldrin	mg/kg dw	< .52	< .58	<0.54	< .54	< .52	< .52
Endosulfan I	mg/kg dw	< .52	< .58	<0.54	< .54	< .52	< .52
Endosulfan II	mg/kg dw	< .52	< .58	<0.54	< .54	< .52	< .52
Endosulfan sulfate	mg/kg dw	< .52	< .58	<0.54	< .54	< .52	< .52
Endrin	mg/kg dw	< .52	< .58	<0.54	< .54	< .52	< .52
Endrin Aldehyde	mg/kg dw	< .52	< .58	<0.54	< .54	< .52	< .52
Endrin ketone	mg/kg dw	< .52	< .58	<0.54	< .54	< .52	< .52
Heptachlor	mg/kg dw	< .52	< .58	<0.54	< .54	< .52	< .52
Heptachlor epoxide	mg/kg dw	< .52	< .58	<0.54	< .54	< .52	< .52
Lindane	mg/kg dw	< .52	< .58	<0.54	< .54	< .52	< .52
Methoxychlor	mg/kg dw	< .52	< .58	<0.54	< .54	< .52	< .52
Toxaphene	mg/kg dw	< .52	< .58	<0.54	< .54	< .52	< .52
alpha-BHC	mg/kg dw	< .52	< .58	<0.54	< .54	< .52	< .52
alpha-Chlordane	mg/kg dw	< .52	< .58	<0.54	< .54	< .52	< .52
beta-BHC	mg/kg dw	< .52	< .58	<0.54	< .54	< .52	< .52
delta-BHC	mg/kg dw	< .52	< .58	<0.54	< .54	< .52	< .52
gamma-BHC(Lindane)	mg/kg dw	< .52	< .58	<0.54	< .54	< .52	< .52
gamma-Chlordane	mg/kg dw	< .52	< .58	<0.54	< .54	< .52	< .52

Validation codes on last page.

GERAGHTY & MILLER, INC.

HARRISON DIVISION - GMC
RFI PHASE II SOIL ANALYTICAL RESULTS
POLYCHLORINATED BIPHENYLS, PESTICIDES AND HERBICIDES

PARAMETER	UNITS	WPSA-BH05-02SL	WPSA-BH05-10SL	WPSA-BH05-22SL	DUP-25	WPSA-BH06-02SL	WPSA-BH06-06SL
4,4'-DDD	mg/kg dw	< .54	< .53	< .59	< .62	< .67	< .6
4,4'-DDE	mg/kg dw	< .54	< .53	< .59	< .62	< .67	< .6
4,4-DDT	mg/kg dw	< .54	< .53	< .59	< .62	< .67	< .6
Aldrin	mg/kg dw	< .54	< .53	< .59	< .62	< .67	< .6
Aroclor-1016	mg/kg dw	< .54	< .53	< .59	< .62	< .67	< .6
Aroclor-1221	mg/kg dw	< .54	< .53	< .59	< .62	< .67	< .6
Aroclor-1232	mg/kg dw	< .54	< .53	< .59	< .62	< .67	< .6
Aroclor-1242	mg/kg dw	< .54	< .53	< .59	< .62	< .67	< .6
Aroclor-1248	mg/kg dw	< .54	< .53	< .59	< .62	< .67	< .6
Aroclor-1254	mg/kg dw	< .54	< .53	< .59	< .62	< .67	< .6
Aroclor-1260	mg/kg dw	< .54	< .53	< .59	< .62	< .67	< .6
Dieldrin	mg/kg dw	< .54	< .53	< .59	< .62	< .67	< .6
Endosulfan I	mg/kg dw	< .54	< .53	< .59	< .62	< .67	< .6
Endosulfan II	mg/kg dw	< .54	< .53	< .59	< .62	< .67	< .6
Endosulfan sulfate	mg/kg dw	< .54	< .53	< .59	< .62	< .67	< .6
Endrin	mg/kg dw	< .54	< .53	< .59	< .62	< .67	< .6
Endrin Aldehyde	mg/kg dw	< .54	< .53	< .59	< .62	< .67	< .6
Endrin ketone	mg/kg dw	< .54	< .53	< .59	< .62	< .67	< .6
Heptachlor	mg/kg dw	< .54	< .53	< .59	< .62	< .67	< .6
Heptachlor epoxide	mg/kg dw	< .54	< .53	< .59	< .62	< .67	< .6
Lindane	mg/kg dw	< .54	< .53	< .59	< .62	< .67	< .6
Methoxychlor	mg/kg dw	< .54	< .53	< .59	< .62	< .67	< .6
Toxaphene	mg/kg dw	< .54	< .53	< .59	< .62	< .67	< .6
alpha-BHC	mg/kg dw	< .54	< .53	< .59	< .62	< .67	< .6
alpha-Chlordane	mg/kg dw	< .54	< .53	< .59	< .62	< .67	< .6
beta-BHC	mg/kg dw	< .54	< .53	< .59	< .62	< .67	< .6
delta-BHC	mg/kg dw	< .54	< .53	< .59	< .62	< .67	< .6
gamma-BHC(Lindane)	mg/kg dw	< .54	< .53	< .59	< .62	< .67	< .6
gamma-Chlordane	mg/kg dw	< .54	< .53	< .59	< .62	< .67	< .6

Validation codes on last page.

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HARRISON DIVISION - GMC
RFI PHASE II SOIL ANALYTICAL RESULTS
POLYCHLORINATED BIPHENYLS, PESTICIDES AND HERBICIDES

PARAMETER	UNITS	WPSA-BH06-14SL	WPSA-BH07-02SL	WPSA-BH07-06SL	DUP-26	WPSA-BH07-22SL
4,4'-DDD	mg/kg dw	< .53	< .58	< .61	<6.30	< .53
4,4'-DDE	mg/kg dw	< .53	< .58	< .61	<6.30	< .53
4,4-DDT	mg/kg dw	< .53	< .58	< .61	<6.30	< .53
Aldrin	mg/kg dw	< .53	< .58	< .61	<6.30	< .53
Aroclor-1016	mg/kg dw	< .53	< .58 UJ	< .61 UJ	<.63	< .53
Aroclor-1221	mg/kg dw	< .53	< .58 UJ	< .61 UJ	<.63	< .53
Aroclor-1232	mg/kg dw	< .53	< .58 UJ	< .61 UJ	<.63	< .53
Aroclor-1242	mg/kg dw	< .53	< .58 UJ	< .61 UJ	<.63	< .53
Aroclor-1248	mg/kg dw	< .53	< .58 UJ	< .61 UJ	<.63	< .53
Aroclor-1254	mg/kg dw	< .53	< .58 UJ	< .61 UJ	<.63	< .53
Aroclor-1260	mg/kg dw	< .53	< .58 UJ	< .61 UJ	<.63	< .53
Dieldrin	mg/kg dw	< .53	< .58	< .61	<6.30	< .53
Endosulfan I	mg/kg dw	< .53	< .58	< .61	<6.30	< .53
Endosulfan II	mg/kg dw	< .53	< .58	< .61	<6.30	< .53
Endosulfan sulfate	mg/kg dw	< .53	< .58	< .61	<6.30	< .53
Endrin	mg/kg dw	< .53	< .58	< .61	<6.30	< .53
Endrin Aldehyde	mg/kg dw	< .53	< .58	< .61	<6.30	< .53
Endrin ketone	mg/kg dw	< .53	< .58	< .61	<6.30	< .53
Heptachlor	mg/kg dw	< .53	< .58	< .61	<6.30	< .53
Heptachlor epoxide	mg/kg dw	< .53	< .58	< .61	<6.30	< .53
Lindane	mg/kg dw	< .53	< .58	< .61	<6.30	< .53
Methoxychlor	mg/kg dw	< .53	< .58	< .61	<6.30	< .53
Toxaphene	mg/kg dw	< .53	< .58	< .61	<6.30	< .53
alpha-BHC	mg/kg dw	< .53	< .58	< .61	<6.30	< .53
alpha-Chlordane	mg/kg dw	< .53	< .58	< .61	<6.30	< .53
beta-BHC	mg/kg dw	< .53	< .58	< .61	<6.30	< .53
delta-BHC	mg/kg dw	< .53	< .58	< .61	<6.30	< .53
gamma-BHC(Lindane)	mg/kg dw	< .53	< .58	< .61	<6.30	< .53
gamma-Chlordane	mg/kg dw	< .53	< .58	< .61	<6.30	< .53

Validation codes on last page.

GERAGHTY & MILLER, INC.

HARRISON DIVISION - GMC
RFI PHASE II SOIL ANALYTICAL RESULTS
POLYCHLORINATED BIPHENYLS, PESTICIDES AND HERBICIDES

PARAMETERS	UNITS	RB-13	RB-14
4,4'-DDD	ug/l	<0.1	< .1
4,4'-DDE	ug/l	<0.1	< .1
4,4-DDT	ug/l	<0.1	< .1
Aldrin	ug/l	<0.05	< .05
Aroclor-1016	ug/l	<1	< 1
Aroclor-1221	ug/l	<1	< 1
Aroclor-1232	ug/l	<1	< 1
Aroclor-1242	ug/l	<1	< 1
Aroclor-1248	ug/l	<1	< 1
Aroclor-1254	ug/l	<1	< 1
Aroclor-1260	ug/l	<1	< 1
Dieldrin	ug/l	<0.1	< .1
Endosulfan I	ug/l	<0.05	< .05
Endosulfan II	ug/l	<0.1	< .1
Endosulfan sulfate	ug/l	<0.1	< .1
Endrin	ug/l	<0.1	< .1
Endrin Aldehyde	ug/l	<0.1	< .1
Endrin ketone	ug/l	<0.1	< .1
Heptachlor	ug/l	<0.05	< .05
Heptachlor epoxide	ug/l	<0.05	< .05
Lindane	ug/l	<0.05	< .05
Methoxychlor	ug/l	0.5	< .5
Toxaphene	ug/l	<4	< 4
alpha-BHC	ug/l	<0.05	< .05
alpha-Chlordane	ug/l	<0.05	< .05
beta-BHC	ug/l	<0.05	< .05
delta-BHC	ug/l	<0.05	< .05
gamma-BHC(Lindane)	ug/l	<0.05	< .05
gamma-Chlordane	ug/l	<0.05	< .05

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Validation Codes:

mg/kg dw: milligrams per kilogram dry weight

UJ = Laboratory reported this result as a detected value; however, based on data validation, the result is below detection and estimate

PHASE II SOIL SAMPLES

TOTAL METALS AND CYANIDE RESULTS

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HARRISON DIVISION - GMC
RFI PHASE II SOIL ANALYTICAL DATA
TOTAL METALS AND CYANIDE

PARAMETER	UNITS	DUP-24	DUP-25	DUP-26	DUP-28	FA-BH01-03SL	FA-BH01-08SL	FA-BH02-02SL
Aluminum	mg/kg dw	2350	15300	19200	7300	15600	3480	4880
Antimony	mg/kg dw	<3.2 UJ	<3.8 UJ	<3.4 UJ	<3.1 UJ	101 J	<3.2 UJ	13 J
Arsenic	mg/kg dw	3.7 U	10.6 U	6.5 J	5.4	11.1 J	5.2 J	6.9 J
Barium	mg/kg dw	19.3 J	70 J	86.4	49.6	6230	17.6	473
Beryllium	mg/kg dw	<0.11	.78	0.55 J	0.37	<0.13 UJ	0.24 J	.83 J
Cadmium	mg/kg dw	0.43	1.1	1.6 U	.88	54.3	.6 U	6.3
Calcium	mg/kg dw	423000	4600	2410	137000	73800	115000	53900
Chromium	mg/kg dw	5.2	18.5	20.7	8.5	59.4	5.6	50
Cobalt	mg/kg dw	3 J	10.2 J	10	4.7	62.5	3.1	9
Copper	mg/kg dw	31.5	31.4 U	16.2	12.3	2510	10.9	103
Cyanide	mg/kg dw	NA	NA	NA	<.13 R	NA	NA	NA
Iron	mg/kg dw	5670	23800	25300	10500	38700	7420	18000
Lead	mg/kg dw	10.8	18.3	12.1	38.6 J	21500	87	659
Magnesium	mg/kg dw	49800	4290	2750	41400	26700	49900	26400
Manganese	mg/kg dw	182	582	1170	433	673	221	173
Mercury	mg/kg dw	<0.04	<0.05	.06 J	<0.1	1.7 J	0.05 J	1 J
Nickel	mg/kg dw	13.6 J	22.2 J	20.4	10.8	540	9.2	52
Potassium	mg/kg dw	627	1440	2020	919	4630	685	702
Selenium	mg/kg dw	1.3 UJ	.33 UJ	0.38 J	0.53 J	1.8 J	0.38	.58
Silver	mg/kg dw	0.36 UJ	.43 UJ	<0.34	<0.31 R	6.2 U	<0.32	<.34
Sodium	mg/kg dw	321	157	257	158	4180	294	1020
Thallium	mg/kg dw	<1.1	<0.25	<0.23	<0.21 UJ	<0.25 UJ	<1.1	<.23
Vanadium	mg/kg dw	7.3	31.3	46.2	19.9	27.6	11.8	12.9
Zinc	mg/kg dw	45.1 J	69.5 J	59	46.3	40400	31.7	1680

Validation codes on last page.

GERAGHTY & MILLER, INC.

HARRISON DIVISION - GMC
RFI PHASE II SOIL ANALYTICAL DATA
TOTAL METALS AND CYANIDE

PARAMETER	UNITS	FA-BH02-06SL	BKG-BH14-01SL	GM20D-01SL	GM20D-15SL	LWB-BH01-03S	LWB-BH01-13SL	WPSA-BH04-09SL
Aluminum	mg/kg dw	3640	NA	9730	10200	689	1810	3530
Antimony	mg/kg dw	<3.2 UJ	NA	<3.1 UJ	3.1 UJ	<3.2 UJ	<3.2 UJ	<3.1 UJ
Arsenic	mg/kg dw	4 UJ	NA	5.8	5.5	1.6 U	3.4 U	4.1 J
Barium	mg/kg dw	14.8	NA	60.7	63.9	4.8 J	20.6 J	91.7
Beryllium	mg/kg dw	0.28 J	NA	0.46	.46	<0.11	0.11	0.3 J
Cadmium	mg/kg dw	.56 U	NA	.62	.82	<0.32	.64	0.92 U
Calcium	mg/kg dw	98600	NA	74500	81800	741000	494000	124000
Chromium	mg/kg dw	9.9	NA	11.2	12.8	4.8	4.1	7.4
Cobalt	mg/kg dw	3.4	NA	5.8	6.3	.55 J	2.5 J	3.9
Copper	mg/kg dw	9.7	NA	14.4	15.6	3.9 U	27.1	51.3
Cyanide	mg/kg dw	NA	< .136 R	< .127 R	< .127 R	NA	NA	NA
Iron	mg/kg dw	7750	NA	12800	13400	3160	6200 U	8690
Lead	mg/kg dw	7.4	NA	28.6 J	21.4 J	4.2	6.1	8.2
Magnesium	mg/kg dw	36300	NA	31100	29300	97400	52500	39600
Manganese	mg/kg dw	249	NA	447	461	129	210	294
Mercury	mg/kg dw	<0.04 UJ	NA	<0.1	.1	<0.04	.05	<0.04 UJ
Nickel	mg/kg dw	10.3	NA	14.1	15.2	7.7 J	9.3 J	10.9
Potassium	mg/kg dw	653	NA	1200	1330	351	459	783
Selenium	mg/kg dw	0.17 J	NA	0.27 UJ	.58 J	1.4 UJ	1.4 UJ	0.23 J
Silver	mg/kg dw	<0.32	NA	0.31 R	0.31 R	0.32 UJ	0.48 UJ	<0.31
Sodium	mg/kg dw	225	NA	107	130	273	296	390
Thallium	mg/kg dw	<0.21 UJ	NA	< 0.21 UJ	0.21 UJ	<0.21	<0.21	<0.21 UJ
Vanadium	mg/kg dw	11.3	NA	26.6	27.6	3.9	6.2	12.6
Zinc	mg/kg dw	27.7	NA	52.3	62.2	<0.32 UJ	39.8 UJ	70.4

Validation codes on last page.

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HARRISON DIVISION - GMC
RFI PHASE II SOIL ANALYTICAL DATA
TOTAL METALS AND CYANIDE

PARAMETER	UNITS	WPSA-BH04-21SL	WPSA-BH05-02SL	WPSA-BH05-10SL	WPSA-BH05-22SL	WPSA-BH06-02SL	WPSA-BH06-06SL
Aluminum	mg/kg dw	2550	2730	1710	15400	7060	41400
Antimony	mg/kg dw	<3.1 UJ	<3.2 UJ	<3.3 UJ	<3.8 UJ	<3.4 UJ	<3.7 UJ
Arsenic	mg/kg dw	4.1 J	4.5 U	5.8 U	13.5	13.6 U	25.6 U
Barium	mg/kg dw	31.7	233 J	94.5 J	74.8 J	433 J	421 J
Beryllium	mg/kg dw	0.36 J	<0.11	0.12	0.82	0.16	0.58
Cadmium	mg/kg dw	0.46 U	1.1	0.47	1.1	16.9	74.2
Calcium	mg/kg dw	159000	664000	415000	2570	19100	18600
Chromium	mg/kg dw	4.4	26.5	4.3	18.3	754	1010
Cobalt	mg/kg dw	2.1	5.7 J	2.7 J	11.2 J	28.7 J	41.1 J
Copper	mg/kg dw	14.6	156	17.9 U	29.9 U	1240	62700
Cyanide	mg/kg dw	NA	NA	NA	NA	NA	NA
Iron	mg/kg dw	6750	7590	6720	25300	40000	577000
Lead	mg/kg dw	10.7	55.9	5.3	18.5	1090	2790
Magnesium	mg/kg dw	71300	70800	33300	3330	7210	9420
Manganese	mg/kg dw	189	176	145	647	449	1340
Mercury	mg/kg dw	0.05 J	0.1	<0.04	<0.05	0.33	0.07
Nickel	mg/kg dw	6.9	45.2 J	11.1 J	26.7 J	438 J	2600 J
Potassium	mg/kg dw	848	316	305	1290	635	939
Selenium	mg/kg dw	0.2	0.92 UJ	0.7 UJ	0.40 UJ	2.5 UJ	1.2 UJ
Silver	mg/kg dw	<0.31	2.9 UJ	0.36 UJ	0.43 UJ	4.8 UJ	15.7 UJ
Sodium	mg/kg dw	267	431	150	151	786	856
Thallium	mg/kg dw	<1	<0.21	<0.22	0.25	<0.23	<0.25
Vanadium	mg/kg dw	8.5	6.1	6.7	31.1	21	14.2
Zinc	mg/kg dw	25.4	239 J	28.1 UJ	74.2 J	900 J	1170 J

Validation codes on last page.

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HARRISON DIVISION - GMC
RFI PHASE II SOIL ANALYTICAL DATA
TOTAL METALS AND CYANIDE

PARAMETER	UNITS	WPSA-BH06-14SL	WPSA-BH07-02SL	WPSA-BH07-06SL	WPSA-BH07-22SL
Aluminum	mg/kg dw	**2420**	**10600**	**11300**	**1680**
Antimony	mg/kg dw	<3.2 UJ	**6.8 J**	<3.6 UJ	<3.1 UJ
Arsenic	mg/kg dw	7.5 U	**5.3 J**	**7.6 J**	**2 J**
Barium	mg/kg dw	**12.1 J**	**73**	**76.3**	**9.8**
Beryllium	mg/kg dw	**0.16**	**0.51 J**	**0.51 J**	**0.22 J**
Cadmium	mg/kg dw	**0.44**	2.4 U	1.3 U	<0.31
Calcium	mg/kg dw	**426000**	**80100**	**1740**	**174000**
Chromium	mg/kg dw	**9.5**	**25.8**	**17.3**	**4.2**
Cobalt	mg/kg dw	**2.5 J**	**7.5**	**9.2**	**1.6**
Copper	mg/kg dw	17.1 U	**93.3**	**15.5**	**6.8**
Cyanide	mg/kg dw	NA	NA	NA	NA
Iron	mg/kg dw	**6480**	**27000**	**19500**	**4880**
Lead	mg/kg dw	**6**	**40.4**	**9.8 J**	**3.3 J**
Magnesium	mg/kg dw	**39300**	**25600**	**2260**	**59700**
Manganese	mg/kg dw	**171**	**607**	**266**	**187**
Mercury	mg/kg dw	<0.04	**.09 J**	<0.05 UJ	<0.04 UJ
Nickel	mg/kg dw	**13.6 J**	**24.8**	**16.2**	**5**
Potassium	mg/kg dw	**635**	**1140**	**952**	**476**
Selenium	mg/kg dw	0.26 UJ	0.17 J	**0.43**	**0.22**
Silver	mg/kg dw	<0.32 UJ	<0.36	<0.36	<0.31
Sodium	mg/kg dw	**193**	**182**	**290**	**213**
Thallium	mg/kg dw	<0.21	<0.24UJ	<0.24	<1
Vanadium	mg/kg dw	**8.9**	**25.4**	**29.6**	**5.8**
Zinc	mg/kg dw	20.9 UJ	**63.3**	**51**	**10.7**

Validation codes on last page.

GERAGHTY & MILLER, INC.

HARRISON DIVISION - GMC
RFI PHASE II SOIL ANALYTICAL DATA
TOTAL METALS AND CYANIDE

PARAMETER	UNITS	RB-14	RB-15	FB-01
Aluminum	ug/l	**74.4**	NA	NA
Antimony	ug/l	<30	NA	NA
Arsenic	ug/l	<2	NA	NA
Barium	ug/l	**12.4**	NA	NA
Beryllium	ug/l	<1	NA	NA
Cadmium	ug/l	<3	NA	NA
Calcium	ug/l	**1830**	NA	NA
Chromium	ug/l	<6	NA	NA
Cobalt	ug/l	**8.3**	NA	NA
Copper	ug/l	**6.8**	NA	NA
Cyanide	mg/l	N/A	<.01	<.01
Iron	ug/l	**271**	NA	NA
Lead	ug/l	**14.1**	NA	NA
Magnesium	ug/l	**820**	NA	NA
Manganese	ug/l	**10**	NA	NA
Mercury	ug/l	<0.2	NA	NA
Nickel	ug/l	<15	NA	NA
Potassium	ug/l	<400	NA	NA
Selenium	ug/l	<1	NA	NA
Silver	ug/l	<3	NA	NA
Sodium	ug/l	**231**	NA	NA
Thallium	ug/l	<2	NA	NA
Vanadium	ug/l	<3	NA	NA
Zinc	ug/l	**27.5**	NA	NA

VALIDATION CODES:

J = Estimated Value

R = Rejected Value

U = Value qualified as a non-detect due to blank contamination.

UJ = Laboratory reported this result as a detected value; however, based on data validation, the result is below detection and estimated.

<( ) R = Laboratory reported this result as below detection. Result is rejected based on data validation.

NA = Not Analyzed

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PHASE I SURFACE WATER/SEDIMENT SAMPLES

VOLATILE ORGANIC COMPOUND RESULTS

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HARRISON DIVISION - GMC
SURFACE WATER/SEDIMENT ANALYTICAL RESULTS
VOLATILE ORGANIC COMPOUNDS

Parameter	DD-GS01-SW UG/L	DD-GS02-SW UG/L	DUP-12 UG/L	DD-GS01-02SD UG/KG DW	DD-GS02-02SD UG/KG DW	DUP-11 UG/KG DW	TB-07 UG/L	RB-01 UG/L
1,1,1,2-Tetrachloroethane	< 1	< 1	< 1	NA	NA	NA	< 1	< 1
1,1,1-Trichloroethane	< 1	< 1	< 1	< 6.7	< 9	< 5.9	< 1	< 1
1,1,2,2-Tetrachloroethane	< 1	< 1	< 1	< 6.7	< 9	< 5.9	< 1	< 1
1,1,2-Trichloroethane	< 1	< 1	< 1	< 6.7	< 9	< 5.9	< 1	< 1
1,1-Dichloroethane	< 1	< 1	< 1	< 6.7	< 9	< 5.9	< 1	< 1
1,1-Dichloroethene	< 1	< 1	< 1	< 6.7	< 9	< 5.9	< 1	< 1
1,2,3-Trichloropropane	< 5	< 5	< 5	NA	NA	NA	< 5	< 5
1,2-Dibromo-3-chloropropane	< 5	< 20	< 20	NA	NA	NA	< 20	< 20
1,2-Dibromoethane	< 5	< 20	< 20	NA	NA	NA	< 20	< 20
1,2-Dichloroethane	< 1	< 1	< 1	< 6.7	< 9	< 5.9	< 1	< 1
1,2-Dichloroethene (Total)	NA	NA	NA	< 6.7	< 9	< 5.9	NA	NA
1,2-Dichloropropane	< 1	< 1	< 1	< 6.7	< 9	< 5.9	< 1	< 1
2-Butanone	< 10	< 10	< 10	< 67	< 90	< 59	< 10	< 10
2-Chloro-1,3-butadiene	< 5	< 20	< 20	NA	NA	NA	< 20	< 20
2-Hexanone	< 10	< 10	< 10	< 67	< 90	< 59	< 10	< 10
3-Chloro-1-propene	< 5	< 5	< 5	NA	NA	NA	< 5	< 5
4-Methyl-2-Pentanone	< 10	< 10	< 10	< 67	< 90	< 59	< 10	< 10
Acetone	< 20	**93.7**	**83.6**	< 130	< 180	< 120	< 20	< 20
Acrolein	< 50	< 50	< 50	NA	NA	NA	< 50	< 50
Acrylonitrile	< 50	< 50	< 50	NA	NA	NA	< 50	< 50
Benzene	< 1	< 1	< 1	< 6.7	< 9	< 5.9	< 1	< 1
Bromodichloromethane	< 1	< 1	< 1	< 6.7	< 9	< 5.9	< 1	< 1
Bromoform	< 1	< 1	< 1	< 6.7	< 9	< 5.9	< 1	< 1
Bromomethane	< 5	< 5	< 5	< 33	< 45	< 30	< 5	< 5
Carbon Disulfide	< 1	< 1	< 1	< 6.7	< 9	< 5.9	< 1	< 1
Carbon Tetrachloride	< 1	< 1	< 1	< 6.7	< 9	< 5.9	< 1	< 1
Chlorobenzene	< 1	< 1	< 1	< 6.7	< 9	< 5.9	< 1	< 1
Chloroethane	< 10	< 10	< 10	< 67	< 90	< 59	< 10	< 10
Chloroform	< 1	**1.2**	**1.1**	< 6.7	< 9	< 5.9	< 1	< 1
Chloromethane	< 10	< 10	< 10	< 67	< 90	< 59	< 10	< 10

HARRISON DIVISION - GMC
SURFACE WATER/SEDIMENT ANALYTICAL RESULTS
VOLATILE ORGANIC COMPOUNDS

Parameter	DD-GS01-SW UG/L	DD-GS02-SW UG/L	DUP-12 UG/L	DD-GS01-02SD UG/KG DW	DD-GS02-02SD UG/KG DW	DUP-11 UG/KG DW	TB-07 UG/L	RB-01 UG/L
Dibromochloromethane	< 1	< 1	< 1	< 6.7	< 9	< 5.9	< 1	< 1
Dibromomethane	< 1	< 1	< 1	NA	NA	NA	< 1	< 1
Dichlorodifluoromethane	< 10	< 10	< 10	NA	NA	NA	< 10	< 10
Ethyl Methacrylate	< 5	< 5	< 5	NA	NA	NA	< 5	< 5
Ethylbenzene	< 1	< 1	< 1	< 6.7	< 9	< 5.9	< 1	< 1
Iodomethane	< 5	< 5	< 5	NA	NA	NA	< 5	< 5
Methacrylonitrile	< 5	< 5	< 5	NA	NA	NA	< 5	< 5
Methyl methacrylate	< 5	< 5	< 5	NA	NA	NA	< 5	< 5
Methylene Chloride	< 10	< 10	< 10	< 67	< 90	< 59	< 10	< 10
Pentachloroethane	< 5	< 5	< 5	NA	NA	NA	< 5	< 5
Propionitrile	< 50	< 50	< 50	NA	NA	NA	< 50	< 50
Styrene	< 1	< 1	< 1	< 6.7	< 9	< 5.9	< 1	< 1
Tetrachloroethene	< 1	< 1	< 1	< 6.7	< 9	< 5.9	< 1	< 1
Toluene	< 1	< 1	< 1	< 6.7	< 9	< 5.9	< 1	< 1
Total Xylenes	< 1	< 1	< 1	< 6.7	< 9	< 5.9	< 1	< 1
Trichloroethene	< 1	4.6	4.6	< 6.7	< 9	< 5.9	< 1	< 1
Trichlorofluoromethane	< 1	< 1	< 1	NA	NA	NA	< 1	< 1
Vinyl Acetate	< 10	< 10	< 10	NA	NA	NA	< 10	< 10
Vinyl Chloride	< 5	< 5	< 5	< 33	< 45	< 30	< 5	< 5
cis-1,3-Dichloropropene	< 1	< 1	< 1	< 6.7	< 9	< 5.9	< 1	< 1
trans-1,2-Dichloroethene	< 1	< 1	< 1	NA	NA	NA	< 1	< 1
trans-1,3-Dichloropropene	< 1	< 1	< 1	< 6.7	< 9	< 5.9	< 1	< 1
trans-1,4-Dichloro-2-butene	< 5	< 5	< 5	NA	NA	NA	< 5	< 5

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PHASE I SURFACE WATER/SEDIMENT SAMPLES

SEMIVOLATILE ORGANIC COMPOUND RESULTS

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HARRISION DIVISION - GMC
SURFACE WATER/SEDIMENT ANALYTICAL RESULTS
SEMIVOLATILE ORGANIC COMPOUNDS

Parameter	DD-GS01-SW UG/L	DD-GS02-SW UG/L	DUP-12 UG/L	DD-GS01-02SD UG/KG DW	DD-GS02-02SD UG/KG DW	DUP-11 UG/KG DW	RB-01 UG/L
1,2,4,5-Tetrachlorobenzene	< 20	< 20	< 20	NA	NA	NA	< 20
1,2,4-Trichlorobenzene	< 10	< 10	< 10	< 11000	< 5900	< 99000	< 10
1,2-Dichlorobenzene	< 10	< 10	< 10	< 11000	< 5900	< 99000	< 10
1,3,5-Trinitrobenzene	< 30	< 30	< 30	NA	NA	NA	< 30
1,3-Dichlorobenzene	< 10	< 10	< 10	< 11000	< 5900	< 99000	< 10
1,3-Dinitrobenzene	< 20	< 20	< 20	NA	NA	NA	< 20
1,4-Dichlorobenzene	< 10	< 10	< 10	< 11000	< 5900	< 99000	< 10
1,4-Naphthoquinone	< 100	< 100	< 100	NA	NA	NA	< 100
1-Naphthylamine	< 30 J	< 30 J	< 30 J	NA	NA	NA	< 30 J
2,2'-Dichlorodiisopropyl Ether	< 10	< 10	< 10	NA	NA	NA	< 10
2,3,4,6-Tetrachlorophenol	< 20	< 20	< 20	NA	NA	NA	< 20
2,4,5-Trichlorophenol	< 10	< 10	< 10	< 11000	< 5900	< 99000	< 10
2,4,6-Trichlorophenol	< 10	< 10	< 10	< 11000	< 5900	< 99000	< 10
2,4-Dichlorophenol	< 10	< 10	< 10	< 11000	< 5900	< 99000	< 10
2,4-Dimethylphenol	< 10	< 10	< 10	< 11000	< 5900	< 99000	< 10
2,4-Dinitrophenol	< 10	< 10	< 10	< 11000	< 5900	< 99000	< 10
2,4-Dinitrotoluene	< 10	< 10	< 10	< 11000	< 5900	< 99000	< 10
2,6-Dichlorophenol	< 10	< 10	< 10	NA	NA	NA	< 10
2,6-Dinitrotoluene	< 10	< 10	< 10	< 11000	< 5900	< 99000	< 10
2-Acetylaminofluorene	< 20	< 20	< 20	NA	NA	NA	< 20
2-Chloronapthalene	< 10	< 10	< 10	< 11000	< 5900	< 99000	< 10
2-Chlorophenol	< 10	< 10	< 10	< 11000	< 5900	< 99000	< 10
2-Methyl-4,6-Dinitrophenol	< 10	< 10	< 10	< 11000	< 5900	< 99000	< 10
2-Methylnapthalene	< 10	< 10	< 10	< 11000	< 5900	< 99000	< 10
2-Methylphenol	< 10	< 10	< 10	< 11000	< 5900	< 99000	< 10
2-Naphthylamine	< 30	< 30	< 30	NA	NA	NA	< 30
2-Nitroaniline	< 15	< 15	< 15	< 17000	< 8900	< 150000	< 15
2-Nitrophenol	< 10	< 10	< 10	< 11000	< 5900	< 99000	< 10
2-Picoline	< 20	< 20	< 20	NA	NA	NA	< 20
3,3'-Dichlorobenzidine	< 20 J	< 20 J	< 20 J	< 22000	< 12000	< 200000	< 20 J
3,3'-Dimethylbenzidine	< 20 J	< 20 J	< 20 J	NA	NA	NA	< 20 J
3-Cresol	< 10	< 10	< 10	NA	NA	NA	< 10
3-Methylcholanthrene	< 30	< 30	< 30	NA	NA	NA	< 30
3-Nitroaniline	< 15 J	< 15 J	< 15 J	< 17000	< 8900	< 150000	< 15 J
4-Aminobiphenyl	< 20	< 20	< 20	NA	NA	NA	< 20
4-Bromophenyl-phenyl ether	< 10	< 10	< 10	< 11000	< 5900	< 99000	< 10
4-Chloro-3-Methylphenol	< 10	< 10	< 10	< 11000	< 5900	< 99000	< 10
4-Chloroaniline	< 10	< 10	< 10	< 11000	< 5900	< 99000	< 10
4-Chlorophenyl-phenyl ether	< 10	< 10	< 10	< 11000	< 5900	< 99000	< 10
4-Methylphenol	NA	NA	NA	< 11000	< 5900	< 99000	NA
4-Nitroaniline	< 15	< 15	< 15	< 17000	< 8900	< 150000	< 15
4-Nitrophenol	< 10	< 10	< 10	< 11000	< 5900	< 99000	< 10
4-Nitroquinoline-1-oxide	< 30	< 30	< 30	NA	NA	NA	< 30
5-Nitro-o-toluidine	< 20	< 20	< 20	NA	NA	NA	< 20
7,12-Dimethylbenz[a]anthracene	< 20	< 20	< 20	NA	NA	NA	< 20

Validation codes on last page.

HARRISION DIVISION - GMC
SURFACE WATER/SEDIMENT ANALYTICAL RESULTS
SEMIVOLATILE ORGANIC COMPOUNDS

Parameter	DD-GS01-SW UG/L	DD-GS02-SW UG/L	DUP-12 UG/L	DD-GS01-02SD UG/KG DW	DD-GS02-02SD UG/KG DW	DUP-11 UG/KG DW	RB-01 UG/L
A,A-Dimethyl-Phenethylamine	< 50 J	< 50 J	< 50 J	NA	NA	NA	< 50 J
Acenaphthene	< 10	< 10	< 10	< 11000	< 5900	< 99000	< 10
Acenaphthylene	< 10	< 10	< 10	< 11000	< 5900	< 99000	< 10
Acetophenone	< 20	< 20	< 20	NA	NA	NA	< 20
Aniline	< 10	< 10	< 10	NA	NA	NA	< 10
Anthracene	< 10	< 10	< 10	< 11000	< 5900	< 99000	< 10
Aramite, Total	< 15	< 15	< 15	NA	NA	NA	< 15
Benzo(a)Anthracene	< 10	< 10	< 10	< 11000	< 5900	< 99000	< 10
Benzo(a)Pyrene	< 10	< 10	< 10	< 11000 J	< 5900 J	< 99000 J	< 10
Benzo(b)Fluoranthene	< 10	< 10	< 10	**13000 J**	< 5900 J	< 99000 J	< 10
Benzo(g,h,i)Perylene	< 10	< 10	< 10	< 11000 J	< 5900	< 99000 J	< 10
Benzo(k)Fluoranthene	< 10	< 10	< 10	NOTE	< 5900 J	< 99000 J	< 10
Benzyl Alcohol	< 10	< 10	< 10	NA	NA	NA	< 10
Butyl benzyl phthalate	< 10	< 10	< 10	< 11000	< 5900	< 99000	<10
Carbazole	**NA**	**NA**	**NA**	< 11000	< 5900	< 99000	NA
Chrysene	< 10	< 10	< 10	< 11000	< 5900	< 99000	< 10
Di-n-Butylphthalate	< 10	< 10	< 10	< 11000	< 5900	< 99000	< 10
Di-n-Octyl Phthalate	< 10	< 10	< 10	< 11000 J	< 5900 J	< 99000 J	< 10
Dialiate, Total	< 30 J	< 30 J	< 30 J	NA	NA	NA	< 30 J
Dibenz(a,h)Anthracene	< 10	< 10	< 10	< 11000 J	< 5900 J	< 99000 J	< 10
Dibenzofuran	< 10	< 10	< 10	< 11000	< 5900	< 99000	< 10
Diethylphthalate	< 10	< 10	< 10	< 11000	< 5900	< 99000	< 10
Dimethoate	< 100	< 100	< 100	NA	NA	NA	< 100
Dimethyl Phtalate	< 10	< 10	< 10	< 11000	< 5900	< 99000	< 10
Diphenylamine	< 20	< 20	< 20	NA	NA	NA	< 20
Disulfoton	< 20	< 20	< 20	NA	NA	NA	< 20
Ethyl methanesulfonate	< 20	< 20	< 20	NA	NA	NA	< 20
Famphur	< 10	< 10	< 10	NA	NA	NA	< 10
Fluoranthene	< 10	< 10	< 10	**17000**	< 5900	< 99000	< 10
Fluorene	< 10	< 10	< 10	< 11000	< 5900	< 99000	< 10
Hexachloro-1,3-butadiene	< 10	< 10	< 10	< 11000	< 5900	< 99000	< 10
Hexachlorobenzene	< 10	< 10	< 10	< 11000	< 5900	< 99000	< 10
Hexachlorocyclopentadiene	< 10	< 10	< 10	< 11000	< 5900	< 99000	< 10
Hexachloroethane	< 10	< 10	< 10	< 11000	< 5900	< 99000	< 10
Hexachlorophene	< 500 J	< 500 J	< 500 J	NA	NA	NA	< 500 J
Hexachloropropene	< 30	< 30	< 30	NA	NA	NA	< 30
Indeno(1,2,3-cd)Pyrene	< 10	< 10	< 10	< 11000 J	< 5900 J	< 99000 J	< 10
Isodrin	< 30	< 30	< 30	< 11000	< 5900	< 99000	< 30
Isophorone	< 10	< 10	< 10	NA	NA	NA	< 10
Isosafrole, Total	< 20	< 20	< 20	NA	NA	NA	< 20
Kepone	< 250 J	< 250 J	< 250 J	NA	NA	NA	< 250 J
Methapyrilene	< 100 J	< 100 J	< 100 J	NA	NA	NA	< 100 J
Methyl methanesulfonate	< 20	< 20	< 20	NA	NA	NA	< 20
Methyl parathion	< 20	< 20	< 20	NA	NA	NA	< 20
N-Nitroso-Di-n-Propylamine	< 10	< 10	< 10	< 11000	< 5900	< 99000	< 10

Validation codes on last page.

GERAGHTY & MILLER, INC.

HARRISION DIVISION - GMC
SURFACE WATER/SEDIMENT ANALYTICAL RESULTS
SEMIVOLATILE ORGANIC COMPOUNDS

Parameter	DD-GS01-SW UG/L	DD-GS02-SW UG/L	DUP-12 UG/L	DD-GS01-02SD UG/KG DW	DD-GS02-02SD UG/KG DW	DUP-11 UG/KG DW	RB-01 UG/L
N-Nitrosodi-n-butylamine	< 20	< 20	< 20	NA	NA	NA	< 20
N-Nitrosodiethylamine	< 30	< 30	< 30	NA	NA	NA	< 30
N-Nitrosodimethylamine	< 10	< 10	< 10	NA	NA	NA	< 10
N-Nitrosodiphenylamine (1)	< 10	< 10	< 10	< 11000	< 5900	< 99000	< 10
N-Nitrosomethylethylamine	< 20	< 20	< 20	NA	NA	NA	< 20
N-Nitrosomorpholine	< 20	< 20	< 20	NA	NA	NA	< 20
N-Nitrosopiperidine	< 20	< 20	< 20	NA	NA	NA	< 20
N-Nitrosopyrrolidine	< 20	< 20	< 20	NA	NA	NA	< 20
Napthalene	< 10	< 10	< 10	< 11000	< 5900	< 99000	< 10
Nitrobenzene	< 10	< 10	< 10	< 11000	< 5900	< 99000	< 10
Triethylphosphorothioate	< 20	< 20	< 20	NA	NA	NA	< 20
Parathion	< 20	< 20	< 20	NA	NA	NA	< 20
Pentachlorobenzene	< 20	< 20	< 20	NA	NA	NA	< 20
Pentachloronitrobenzene	< 20	< 20	< 20	NA	NA	NA	< 20
Pentachlorophenol	< 10	< 10	< 10	< 11000	< 5900	< 99000	< 10
Phenacetin	< 20	< 20	< 20	NA	NA	NA	< 20
Phenanthrene	< 10	< 10	< 10	**13000**	< 5900	< 99000	< 10
Phenol	< 10	< 10	< 10	< 11000	< 5900	< 99000	< 10
Phorate	< 20	< 20	< 20	NA	NA	NA	< 20
Pronamide	< 20	< 20	< 20	NA	NA	NA	< 20
Pyrene	< 10	< 10	< 10	**14000**	< 5900	< 99000	< 10
Pyridine	< 10	< 10	< 10	NA	NA	NA	< 10
Safrole, Total	< 20	< 20	< 20	NA	NA	NA	< 20
Sulfotepp	< 20	< 20	< 20	NA	NA	NA	< 20
Thionazin	< 20	< 20	< 20	NA	NA	NA	< 20
bis(2-Chloroethyl)Ether	< 10	< 10	< 10	< 11000	< 5900	< 99000	< 10
bis(2-Chloroisopropyl)Ether	NA	NA	NA	< 11000	< 5900	< 99000	NA
bis(2-Ethylhexyl)Phthalate	< 10	< 10	< 10	< 11000	< 5900	< 99000	< 10
bis(Chloroethoxy)Methane	< 10	< 10	< 10	< 11000	< 5900	< 99000	< 10
o-Toluidine	< 20	< 20	< 20	NA	NA	NA	< 20
p-(Dimethylamino)azobenzene	< 50	< 50	< 50	NA	NA	NA	< 50
p-Chlorobenzilate	< 50	< 50	< 50	NA	NA	NA	< 50
p-Phenylene diamine	< 30 J	< 30 J	< 30 J	NA	NA	NA	< 30 J

VALIDATION CODES:

J = Estimated Value

<( )J = Laboratory reported this result as below detection. Result is estimated based on data validation.

NA = Constituent was not analyzed.

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PHASE I SURFACE WATER/SEDIMENT SAMPLES

POLYCHLORINATED BIPHENYLS, PESTICIDES, AND HERBICIDE RESULTS

DRAFT

HARRISON DIVISION - GMC
SURFACE WATER/SEDIMENT ANALYTICAL RESULTS
POLYCHLORINATED BIPHENYLS, PESTICIDES, AND HERBICIDES

Parameter	DD-GS01-SW UG/L	DD-GS02-SW UG/L	DUP-12 UG/L	DD-GS01-02SD MG/KG DW	DD-GS02-02SD MG/KG DW	DUP-11 MG/KG DW	RB-01 UG/L
2,4,5-T	< 1	< 1	< 1	NA	NA	NA	< 1
2,4,5-TP(Silvex)	< 1	< 1	< 1	NA	NA	NA	< 1
2,4-D	< 3	< 3	< 3	NA	NA	NA	< 3
4,4'-DDD	< .1	< .1	< .1	< .7	< .9	< .6	< .1
4,4'-DDE	< .1	< .1	< .1	< .7	< .9	< .6	< .1
4,4-DDT	< .1	< .1	< .1	< .7	< .9	< .6	< .1
Aldrin	< .05	< .05	< .05	< .7	< .9	< .6	< .05
Aroclor-1016	< 1	< 1	< 1	< .7	< .9	< .6	< 1
Aroclor-1221	< 1	< 1	< 1	< .7	< .9	< .6	< 1
Aroclor-1232	< 1	< 1	< 1	< .7	< .9	< .6	< 1
Aroclor-1242	< 1	< 1	< 1	< .7	< .9	< .6	< 1
Aroclor-1248	< 1	< 1	< 1	< .7	< .9	< .6	< 1
Aroclor-1254	< 1	< 1	< 1	< .7	< .9	< .6	< 1
Aroclor-1260	< 1	< 1	< 1	< .7	< .9	< .6	< 1
Chlordane	< .05	< .05	< .05	NA	NA	NA	< .05
Dieldrin	< .1	< .1	< .1	< .7	< .9	< .6	< .1
Dinoseb	< 1	< 1	< 1	NA	NA	NA	< 1
Endosulfan I	< .05	< .05	< .05	< .7	< .9	< .6	< .05
Endosulfan II	< .1	< .1	< .1	< .7	< .9	< .6	< .1
Endosulfan sulfate	< .1	< .1	< .1	< .7	< .9	< .6	< .1
Endrin	< .1	< .1	< .1	< .7	< .9	< .6	< .1
Endrin Aldehyde	< .1	< .1	< .1	< .7	< .9	< .6	< .1
Endrin ketone	NA	NA	NA	< .7	< .9	< .6	NA
Heptachlor	< .05	< .05	< .05	< .7	< .9	< .6	< .05
Heptachlor epoxide	< .05	< .05	< .05	< .7	< .9	< .6	< .05
Methoxychlor	< .5	< .5	< .5	< .7	< .9	< .6	< .5
Toxaphene	< 4	< 4	< 4	< .7	< .9	< .6	< 4
alpha-BHC	< .05	< .05	< .05	< .7	< .9	< .6	< .05
alpha-Chlordane	NA	NA	NA	< .7	< .9	< .6	NA
beta-BHC	< .05	< .05	< .05	< .7	< .9	< .6	< .05
delta-BHC	< .05	< .05	< .05	< .7	< .9	< .6	< .05
gamma-BHC(Lindane)	< .05	< .05	< .05	< .7 J	< .9 J	< .6 J	< .05
gamma-Chlordane	NA	NA	NA	< .7	< .9	< .6	NA

VALIDATION CODES:

J = Estimated Value

<( )J = Laboratory reported this result as below detection. Result is estimated based on data validation.

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PHASE I SURFACE WATER/SEDIMENT SAMPLES

METALS AND CYANIDE RESULTS

DRAFT

HARRISON DIVISION - GMC
SURFACE WATER/SEDIMENT ANALYTICAL RESULTS
METALS AND CYANIDE

Parameter	DD-GS01-SW UG/L	DD-GS02-SW UG/L	DUP-12 UG/L	DD-GS01-02SD MG/KG	DD-GS02-02SD MG/KG	DUP-11 MG/KG	RB-01 UG/L
Aluminum	NA	NA	NA	**2620**	**3450**	**2030**	NA
Antimony	**51.4**	**57.3**	< 50	< 12.8 J	< 18 J	< 11.9 J	< 50
Arsenic	< 2	< 2	< 2	**3.2**	**6.1**	**4.8**	< 2
Barium	**144**	**88.5**	**91**	**32.2**	**52**	**33.4**	< 3
Beryllium	< 1	< 1	< 1	< .26	< .36	< .24	< 1
Cadmium	< 4	< 4	< 4	**1.9**	**4.3**	**2.2**	< 4
Calcium	NA	NA	NA	**99600**	**95400**	**97800**	NA
Chromium	< 4	**9.2**	**8.3**	**20.4 J**	**15.3 J**	**8.1 J**	< 4
Cobalt	**8**	**8.8**	**7.5**	**3.4**	**3.5**	**2.2**	< 5
Copper	7.3 U	11.4 U	10.3 U	**25.2**	**47.3**	**16.2**	7.1 U
Iron	NA	NA	NA	**9360**	**5830**	**6100**	NA
Lead	< 2	< 2 J	< 2 J	**110.2 J**	**124 J**	**34.1 J**	< 2
Magnesium	NA	NA	NA	**36200**	**37300**	**32600**	NA
Manganese	NA	NA	NA	**161 J**	**154 J**	**160 J**	NA
Mercury	< .2	< .2	< .2	< .13	< .18	< .12	< .2
Nickel	< 14	< 14	< 14	**11.8**	**18.7**	**4.8**	< 14
Potassium	NA	NA	NA	**527**	**526**	**384**	NA
Selenium	< 1 J	< 1 J	< 1 J	**0.88**	**1.1**	**0.29**	< 1
Silver	< 4	< 4	< 4	1.7 U	3.5 U	1.8 U	< 4
Sodium	NA	NA	NA	**180**	**255**	**181**	NA
Thallium	< 2	< 2	< 2	< .51 J	< .72 J	< .48 J	< 2
Tin	< 200	< 200	< 200	NA	NA	NA	< 200
Vanadium	< 5	< 5	< 5	**8.4**	**8.3**	**6**	< 5
Zinc	8.6 U	18.1 U	16.1 U	**88.5 J**	**392 J**	**78.2 J**	11.4 U
Cyanide	< .005	< .005	< .005	< .2 R	< .2	< .3 R	< .005

VALIDATION CODES:

J = Estimated Value
R = Rejected Value
U = Value Qualified as a Non-Detect due to Blank Contamination
<( )J = Laboratory reported this result as below detection. Result is estimated based on data validation.
<( )R = Laboratory reported this result as below detection. Result is rejected based on data validation.
NA = Constituent was not analyzed.

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PHASE II GROUNDWATER AND SURFACE WATER SAMPLES

VOLATILE ORGANIC COMPOUND RESULTS

DRAFT

HARRISON DIVISION - GMC
RFI PHASE II GROUNDWATER AND SURFACE WATER
ANALYTICAL RESULTS,
VOLATILE ORGANIC COMPOUNDS METHOD 8015

PARAMETER	UNITS	DD-GS03-03SW-GW	DD-GS04-02SW-GW	East-102194-GW	DUP-29	RFI-4S-GW	RFI-WSU24-GW	RFI-GM01-GW
1,4-Dioxane	mg/l	< 3	< 3	< 3	< 3	< 3	<3	< 3
Acetonitrile	mg/l	< 3	< 3	< 3	< 3	< 3	<3	< 3
Isobutyl Alcohol	mg/l	< 3	< 3	< 3	< 3	< 3	<3	< 3

PARAMETER	UNITS	DUP-37	RFI-GM02-GW	RFI-GM03-GW	RFI-GM05-GW	RFI-GM06-GW	RFI-GM07R-GW	RFI-GM08-GW
1,4-Dioxane	mg/l	< 3	< 3	< 3	< 3	< 3	< 3	< 3
Acetonitrile	mg/l	< 3	< 3	< 3	< 3	< 3	< 3	< 3
Isobutyl Alcohol	mg/l	< 3	< 3	< 3	< 3	< 3	< 3	< 3

PARAMETER	UNITS	DUP-34	RFI-GM09-GW	RFI-GM10-GW	RFI-GM11-GW	RFI-GM13-GW	RFI-GM15-GW	RFI-GM16-GW
1,4-Dioxane	mg/l	< 3	< 3	< 3	< 3	< 3	< 3	< 3
Acetonitrile	mg/l	< 3	< 3	< 3	< 3	< 3	< 3	< 3
Isobutyl Alcohol	mg/l	< 3	< 3	< 3	< 3	< 3	< 3	< 3

PARAMETER	UNITS	RFI-GM17-GW	RFI-GM18-GW	DUP-32	FI-GM19D-G	RFI-GM19S-GW	West-102194-GW	FI-GM20D-GW
1,4-Dioxane	mg/l	< 3	< 3	< 3	< 3	< 3	<3	< 3
Acetonitrile	mg/l	< 3	< 3	< 3	< 3	< 3	<3	< 3
Isobutyl Alcohol	mg/l	< 3	< 3	< 3	< 3	< 3	<3	< 3

PARAMETER	UNITS	RFI-HR01-GW	RFI-HR03-GW	RFI-HR04-GW	RFI-HR06-GW	RFI-HR08-GW	RFI-HR09-GW	RFI-HR10-GW
1,4-Dioxane	mg/l	< 3	< 3	< 3	< 3	< 3	< 3	< 3
Acetonitrile	mg/l	< 3	< 3	< 3	< 3	< 3	< 3	< 3
Isobutyl Alcohol	mg/l	< 3	< 3	< 3	< 3	< 3	< 3	< 3

PARAMETER	UNITS	DUP-30	RFI-HR11-GW	RFI-HR12-GW	DUP-36	RFI-HR13-GW	RFI-HR14-GW	RFI-HR15-GW
1,4-Dioxane	mg/l	< 3	< 3	< 3	< 3	< 3	< 3	< 3
Acetonitrile	mg/l	< 3	< 3	< 3	< 3	< 3	< 3	< 3
Isobutyl Alcohol	mg/l	< 3	< 3	< 3	< 3	< 3	< 3	< 3

PARAMETER	UNITS	DUP-38	RFI-HR17-GW	DUP-35	RFI-MT69-GW	DUP-33	RFI-W1N-GW	RFI-W1S-GW
1,4-Dioxane	mg/l	< 3	< 3	<3	<3	< 3	<3	<3
Acetonitrile	mg/l	< 3	< 3	<3	<3	< 3	<3	<3
Isobutyl Alcohol	mg/l	< 3	< 3	<3	<3	< 3	<3	<3

PARAMETER	UNITS	RFI-W2S-GW	RFI-W3N-GW	RFI-W4N-GW	RFI-W4S-GW	TB-26	TB-28	RB-16
1,4-Dioxane	mg/l	<3	<3	<3	<3	< 3	< 3	< 3
Acetonitrile	mg/l	<3	<3	<3	<3	< 3	< 3	< 3
Isobutyl Alcohol	mg/l	<3	<3	<3	<3	< 3	< 3	< 3

PARAMETER	UNITS	RB-17	RB-18	RB-19	RB-20	RB-21	TB-25	RB-22
1,4-Dioxane	mg/l	< 3	< 3	< 3	< 3	< 3	< 3	< 3
Acetonitrile	mg/l	< 3	< 3	< 3	< 3	< 3	< 3	< 3
Isobutyl Alcohol	mg/l	< 3	< 3	< 3	< 3	< 3	< 3	< 3

PARAMETER	UNITS	RB-23	RB-24	RB-25	TB-24	TB-29	DUP-31
1,4-Dioxane	mg/l	< 3	< 3	< 3	< 3	< 3	<3
Acetonitrile	mg/l	< 3	< 3	< 3	< 3	< 3	<3
Isobutyl Alcohol	mg/l	< 3	< 3	< 3	< 3	< 3	<3

Notes:

mg/l: milligram per liter

PHASE II 10/94

HARRISON DIVISION - GMC

RFI PHASE II GROUNDWATER ANALYTICAL RESULTS

VOLATILE ORGANIC COMPOUNDS METHOD 8240

PARAMETER	UNITS	East-102194-GW	DUP-29	RFI-GM03-GW	RFI-GM06-GW	RFI-GM07R-GW
1,1,1,2-Tetrachloroethane	ug/l	< 1	< 1	< 1	< 1	< 1
1,1,1-Trichloroethane	ug/l	**16**	**16.1**	**1.9**	< 1	**6**
1,1,2,2-Tetrachloroethane	ug/l	< 1	< 1	< 1	< 1	< 1
1,1,2-Trichloroethane	ug/l	< 1	< 1	< 1	< 1	< 1
1,1-Dichloroethane	ug/l	**10.5**	**10.8**	**1.1**	**218**	**3.8**
1,1-Dichloroethene	ug/l	< 1	< 1	< 1	< 1	**1.7**
1,2,3-Trichloropropane	ug/l	< 5	< 5	< 5	< 5	< 5
1,2-Dibromo-3-chloropropane	ug/l	< 5	< 5	< 5	< 5	< 5
1,2-Dibromoethane	ug/l	< 5	< 5	< 5	< 5	< 5
1,2-Dichloroethane	ug/l	< 1	< 1	< 1	< 1	< 1
1,2-Dichloropropane	ug/l	< 1	< 1	< 1	< 1	< 1
2-Butanone	ug/l	< 10 R	< 10 R	< 10 R	< 10 R	< 10 R
2-Chloro-1,3-butadiene	ug/l	< 5	< 5	< 5	< 5	< 5
2-Hexanone	ug/l	< 10	< 10	< 10	< 10	< 10
3-Chloro-1-propene	ug/l	< 5	< 5	< 5	< 5	< 5
4-Methyl-2-Pentanone	ug/l	< 10	< 10	< 10	< 10	< 10
Acetone	ug/l	< 20	< 20	< 20	< 20	< 20
Acrolein	ug/l	< 50	< 50	< 50	< 50	< 50
Acrylonitrile	ug/l	< 50	< 50	< 50	< 50	< 50
Benzene	ug/l	< 1	< 1	< 1	**14.3**	< 1
Bromodichloromethane	ug/l	< 1	< 1	< 1	< 1	< 1
Bromoform	ug/l	< 1	< 1	< 1	< 1	< 1
Bromomethane	ug/l	< 5	< 5	< 5	< 5	< 5
Carbon Disulfide	ug/l	< 1	< 1	< 1	< 1	< 1
Carbon Tetrachloride	ug/l	< 1	< 1	< 1	< 1	< 1
Chlorobenzene	ug/l	< 1	< 1	< 1	< 1	< 1
Chloroethane	ug/l	< 10	< 10	< 10	< 10	< 10
Chloroform	ug/l	< 1	< 1	< 1	< 1	< 1
Chloromethane	ug/l	< 10	< 10	< 10	< 10	< 10
Dibromochloromethane	ug/l	< 1	< 1	< 1	< 1	< 1
Dibromomethane	ug/l	< 1	< 1	< 1	< 1	< 1
Dichlorodifluoromethane	ug/l	< 10	< 10	< 10	< 10	< 10
Ethyl Methacrylate	ug/l	< 5	< 5	< 5	< 5	< 5
Ethylbenzene	ug/l	< 1	< 1	< 1	**459**	< 1
Iodomethane	ug/l	< 5	< 5	< 5	< 5	< 5
Methacrylonitrile	ug/l	< 5	< 5	< 5	< 5	< 5
Methyl methacrylate	ug/l	< 5	< 5	< 5	< 5	< 5
Methylene Chloride	ug/l	< 10	< 10	< 10	< 10	< 10
Pentachloroethane	ug/l	< 5	< 5	< 5	< 5	< 5
Propionitrile	ug/l	< 50	< 50	< 50	< 50	< 50
Styrene	ug/l	< 1	< 1	< 1	< 1	< 1
Tetrachloroethene	ug/l	**62.4**	**61.2**	**1.1**	< 1	< 1
Toluene	ug/l	< 1	< 1	< 1	**75.2**	< 1
Total Xylenes	ug/l	< 1	< 1	< 1	**498**	< 1
Trichloroethene	ug/l	**71.4**	**71.2**	**4.7**	< 1	**134**
Trichlorofluoromethane	ug/l	< 1	< 1	< 1	< 1	< 1
Vinyl Acetate	ug/l	< 10	< 10	< 10	< 10	< 10
Vinyl Chloride	ug/l	< 5	< 5	< 5	< 5	< 5
cis-1,3-Dichloropropene	ug/l	< 1	< 1	< 1	< 1	< 1
trans-1,2-Dichloroethene	ug/l	< 1	< 1	< 1	**22**	< 1
trans-1,3-Dichloropropene	ug/l	< 1	< 1	< 1	< 1	< 1
trans-1,4-Dichloro-2-butene	ug/l	< 5	< 5	< 5	< 5	< 5

Validation codes on last page.

HARRISON DIVISION - GMC

RFI PHASE II GROUNDWATER ANALYTICAL RESULTS

VOLATILE ORGANIC COMPOUNDS METHOD 8240

PARAMETER	UNITS	DUP-34	RFI-GM19D-GW	RFI-GM19S-GW	RFI-GM20D-GW	RFI-HR17-GW
1,1,1,2-Tetrachloroethane	ug/l	< 1	< 1	< 1	< 1	< 1
1,1,1-Trichloroethane	ug/l	**6.7**	**3.3**	**47.8**	< 1	< 1
1,1,2,2-Tetrachloroethane	ug/l	< 1	< 1	< 1	< 1	< 1
1,1,2-Trichloroethane	ug/l	< 1	< 1	< 1	< 1	< 1
1,1-Dichloroethane	ug/l	**4**	< 1	**20.8**	< 1	< 1
1,1-Dichloroethene	ug/l	**1.8**	< 1	**3.2**	< 1	< 1
1,2,3-Trichloropropane	ug/l	< 5	< 5	< 5	< 5	< 5
1,2-Dibromo-3-chloropropane	ug/l	< 5	< 5	< 5	< 5	< 5
1,2-Dibromoethane	ug/l	< 5	< 5	< 5	< 5	< 5
1,2-Dichloroethane	ug/l	< 1	< 1	< 1	< 1	< 1
1,2-Dichloropropane	ug/l	< 1	< 1	< 1	< 1	< 1
2-Butanone	ug/l	< 10 R	< 10 R	< 10 R	< 10 R	< 10 R
2-Chloro-1,3-butadiene	ug/l	< 5	< 5	< 5	< 5	< 5
2-Hexanone	ug/l	< 10	< 10	< 10	< 10	< 10
3-Chloro-1-propene	ug/l	< 5	< 5	< 5	< 5	< 5
4-Methyl-2-Pentanone	ug/l	< 10	< 10	< 10	< 10	< 10
Acetone	ug/l	< 20	< 20	< 20	< 20	< 20 UJ
Acrolein	ug/l	< 50	< 50	< 50	< 50	< 50
Acrylonitrile	ug/l	< 50	< 50	< 50	< 50	< 50
Benzene	ug/l	< 1	< 1	< 1	< 1	< 1
Bromodichloromethane	ug/l	< 1	< 1	< 1	< 1	< 1
Bromoform	ug/l	< 1	< 1	< 1	< 1	< 1
Bromomethane	ug/l	< 5	< 5	< 5	< 5	< 5
Carbon Disulfide	ug/l	< 1	< 1	< 1	< 1	< 1
Carbon Tetrachloride	ug/l	< 1	< 1	< 1	< 1	< 1
Chlorobenzene	ug/l	< 1	< 1	< 1	< 1	< 1
Chloroethane	ug/l	< 10	< 10	< 10	< 10	< 10
Chloroform	ug/l	< 1	< 1	**1.2**	< 1	< 1
Chloromethane	ug/l	< 10	< 10	< 10	< 10	< 10
Dibromochloromethane	ug/l	< 1	< 1	< 1	< 1	< 1
Dibromomethane	ug/l	< 1	< 1	< 1	< 1	< 1
Dichlorodifluoromethane	ug/l	< 10	< 10	< 10	< 10	< 10
Ethyl Methacrylate	ug/l	< 5	< 5	< 5	< 5	< 5
Ethylbenzene	ug/l	< 1	< 1	< 1	< 1	< 1
Iodomethane	ug/l	< 5	< 5	< 5	< 5	< 5
Methacrylonitrile	ug/l	< 5	< 5	< 5	< 5	< 5
Methyl methacrylate	ug/l	< 5	< 5	< 5	< 5	< 5
Methylene Chloride	ug/l	< 10	< 10	< 10	< 10	< 10
Pentachloroethane	ug/l	< 5	< 5	< 5	< 5	< 5
Propionitrile	ug/l	< 50	< 50	< 50	< 50	< 50
Styrene	ug/l	< 1	< 1	< 1	< 1	< 1
Tetrachloroethene	ug/l	< 1	< 1	**166**	**6.1**	**10.4**
Toluene	ug/l	< 1	< 1	< 1	< 1	< 1
Total Xylenes	ug/l	< 1	< 1	< 1	< 1	< 1
Trichloroethene	ug/l	**147**	**56.7**	< 1	**1.8**	**4.9**
Trichlorofluoromethane	ug/l	< 1	< 1	< 1	< 1	**13.4**
Vinyl Acetate	ug/l	< 10	< 10	< 10	< 10	< 10
Vinyl Chloride	ug/l	< 5	**37.2**	< 5	< 5	< 5
cis-1,3-Dichloropropene	ug/l	< 1	< 1	< 1	< 1	< 1
trans-1,2-Dichloroethene	ug/l	< 1	< 1	**3.4**	< 1	< 1
trans-1,3-Dichloropropene	ug/l	< 1	< 1	< 1	< 1	< 1
trans-1,4-Dichloro-2-butene	ug/l	< 5	< 5	< 5	< 5	< 5

Validation codes on last page.

HARRISON DIVISION - GMC

RFI PHASE II GROUNDWATER ANALYTICAL RESULTS

VOLATILE ORGANIC COMPOUNDS METHOD 8240

PARAMETER	UNITS	DUP-35	RFI-MT69-GW	DUP-33	RFI-W2S-GW	RFI-W4S-GW	RFI-WSU24-GW
1,1,1,2-Tetrachloroethane	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
1,1,1-Trichloroethane	ug/l	< 1	< 1	< 1	**1.2**	**2.7**	**3.1**
1,1,2,2-Tetrachloroethane	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
1,1,2-Trichloroethane	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
1,1-Dichloroethane	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
1,1-Dichloroethene	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
1,2,3-Trichloropropane	ug/l	< 5	< 5	< 5	< 5	< 5	< 5
1,2-Dibromo-3-chloropropane	ug/l	< 5	< 5	< 5	< 5	< 5	< 5
1,2-Dibromoethane	ug/l	< 5	< 5	< 5	< 5	< 5	< 5
1,2-Dichloroethane	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
1,2-Dichloropropane	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
2-Butanone	ug/l	< 10 R	< 10 R	< 10 R	< 10 R	< 10 R	< 10 R
2-Chloro-1,3-butadiene	ug/l	< 5	< 5	< 5	< 5	< 5	< 5
2-Hexanone	ug/l	< 10	< 10	< 10	< 10	< 10	< 10
3-Chloro-1-propene	ug/l	< 5	< 5	< 5	< 5	< 5	< 5
4-Methyl-2-Pentanone	ug/l	< 10	< 10	< 10	< 10	< 10	< 10
Acetone	ug/l	< 20	< 20 UJ	< 20 UJ	< 20	< 20	< 20
Acrolein	ug/l	< 50	< 50	< 50	< 50	< 50	< 50
Acrylonitrile	ug/l	< 50	< 50	< 50	< 50	< 50	< 50
Benzene	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
Bromodichloromethane	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
Bromoform	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
Bromomethane	ug/l	< 5	< 5	< 5	< 5	< 5	< 5
Carbon Disulfide	ug/l	**1.7**	< 1	< 1	< 1	**1.6**	< 1
Carbon Tetrachloride	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
Chlorobenzene	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
Chloroethane	ug/l	< 10	< 10	< 10	< 10	< 10	< 10
Chloroform	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
Chloromethane	ug/l	< 10	< 10	< 10	< 10	< 10	< 10
Dibromochloromethane	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
Dibromomethane	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
Dichlorodifluoromethane	ug/l	< 10	< 10	< 10	< 10	< 10	< 10
Ethyl Methacrylate	ug/l	< 5	< 5	< 5	< 5	< 5	< 5
Ethylbenzene	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
Iodomethane	ug/l	< 5	< 5	< 5	< 5	< 5	< 5
Methacrylonitrile	ug/l	< 5	< 5	< 5	< 5	< 5	< 5
Methyl methacrylate	ug/l	< 5	< 5	< 5	< 5	< 5	< 5
Methylene Chloride	ug/l	< 10	< 10	< 10	< 10	< 10	< 10
Pentachloroethane	ug/l	< 5	< 5	< 5	< 5	< 5	< 5
Propionitrile	ug/l	< 50	< 50	< 50	< 50	< 50	< 50
Styrene	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
Tetrachloroethene	ug/l	**10.4**	< 1	< 1	< 1	**36.9**	**2.3**
Toluene	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
Total Xylenes	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
Trichloroethene	ug/l	**4.9**	< 1	< 1	**3.9**	**12.8**	**20.7**
Trichlorofluoromethane	ug/l	**10.7**	< 1	< 1	< 1	**6.3**	< 1
Vinyl Acetate	ug/l	< 10	< 10	< 10	< 10	< 10	< 10
Vinyl Chloride	ug/l	< 5	< 5	< 5	< 5	< 5	< 5
cis-1,3-Dichloropropene	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
trans-1,2-Dichloroethene	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
trans-1,3-Dichloropropene	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
trans-1,4-Dichloro-2-butene	ug/l	< 5	< 5	< 5	< 5	< 5	< 5

Validation codes on last page.

HARRISON DIVISION - GMC
RFI PHASE II GROUNDWATER ANALYTICAL RESULTS
VOLATILE ORGANIC COMPOUNDS METHOD 8240

PARAMETER	UNITS	West-102194	RB-16	RB-20	RB-21	RB-22	TB-24	TB-26	TB-28
1,1,1,2-Tetrachloroethane	ug/l	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
1,1,1-Trichloroethane	ug/l	**196**	< 1	< 1	< 1	< 1	< 1	< 1	< 1
1,1,2,2-Tetrachloroethane	ug/l	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
1,1,2-Trichloroethane	ug/l	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
1,1-Dichloroethane	ug/l	**153**	< 1	< 1	< 1	< 1	< 1	< 1	< 1
1,1-Dichloroethene	ug/l	**1.4**	< 1	< 1	< 1	< 1	< 1	< 1	< 1
1,2,3-Trichloropropane	ug/l	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
1,2-Dibromo-3-chloropropane	ug/l	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
1,2-Dibromoethane	ug/l	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
1,2-Dichloroethane	ug/l	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
1,2-Dichloropropane	ug/l	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
2-Butanone	ug/l	< 10 R	< 10	< 10	< 10	< 10	< 10	< 10	< 10
2-Chloro-1,3-butadiene	ug/l	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
2-Hexanone	ug/l	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10
3-Chloro-1-propene	ug/l	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
4-Methyl-2-Pentanone	ug/l	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10
Acetone	ug/l	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20
Acrolein	ug/l	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50
Acrylonitrile	ug/l	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50
Benzene	ug/l	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Bromodichloromethane	ug/l	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Bromoform	ug/l	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Bromomethane	ug/l	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
Carbon Disulfide	ug/l	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Carbon Tetrachloride	ug/l	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Chlorobenzene	ug/l	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Chloroethane	ug/l	**32**	< 10	< 10	< 10	< 10	< 10	< 10	< 10
Chloroform	ug/l	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Chloromethane	ug/l	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10
Dibromochloromethane	ug/l	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Dibromomethane	ug/l	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Dichlorodifluoromethane	ug/l	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10
Ethyl Methacrylate	ug/l	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
Ethylbenzene	ug/l	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Iodomethane	ug/l	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
Methacrylonitrile	ug/l	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
Methyl methacrylate	ug/l	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
Methylene Chloride	ug/l	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10
Pentachloroethane	ug/l	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
Propionitrile	ug/l	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50
Styrene	ug/l	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Tetrachloroethene	ug/l	**52.5**	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Toluene	ug/l	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Total Xylenes	ug/l	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Trichloroethene	ug/l	**62.4**	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Trichlorofluoromethane	ug/l	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Vinyl Acetate	ug/l	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10
Vinyl Chloride	ug/l	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
cis-1,3-Dichloropropene	ug/l	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
trans-1,2-Dichloroethene	ug/l	**1.5**	< 1	< 1	< 1	< 1	< 1	< 1	< 1
trans-1,3-Dichloropropene	ug/l	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
trans-1,4-Dichloro-2-butene	ug/l	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5

Validation Codes: ug/l: micrograms per liter
ug/l: micrograms per liter
J = Estimated Value
R = Rejected Value
U = Value Qualified as a Non-Detect due to Blank Contamination.
<( ) R = Laboratory reported this result as below detection. Result is rejected based on data validation.

PHASE II GROUNDWATER SAMPLES

POLYCHLORINATED BIPHENYLS, PESTICIDES AND HERBICIDES

DRAFT

HARRISON DIVISION - GMC
RFI PHASE II GROUNDWATER ANALYTICAL RESULTS
POLYCHLORINATED BIPHENYLS, PESTICIDES AND HERICIDES

PARAMETER	UNITS	RFI-GM20D-GW	RFI-MT69-GW	DUP-33	RFI-WSU24-GW	RB-20
4,4'-DDD	ug/l	< .1	< .1	< .1	< .1	< .1
4,4'-DDE	ug/l	< .1	< .1	< .1	< .1	< .1
4,4-DDT	ug/l	< .1	< .1	< .1	< .1	< .1
Aldrin	ug/l	< .05	< .05	< .05	< .05	< .05
Aroclor-1016	ug/l	< 1	< 1	< 1	< 1	< 1
Aroclor-1221	ug/l	< 1	< 1	< 1	< 1	< 1
Aroclor-1232	ug/l	< 1	< 1	< 1	< 1	< 1
Aroclor-1242	ug/l	< 1	< 1	< 1	< 1	< 1
Aroclor-1248	ug/l	< 1	< 1	< 1	< 1	< 1
Aroclor-1254	ug/l	< 1	< 1	< 1	< 1	< 1
Aroclor-1260	ug/l	< 1	< 1	< 1	< 1	< 1
Chlordane	ug/l	< .1	< .1	< .1	< .1	< .1
Dieldrin	ug/l	< .1	< .1	< .1	< .1	< .1
Endosulfan I	ug/l	< .05	< .05	< .05	< .05	< .05
Endosulfan II	ug/l	< .1	< .1	< .1	< .1	< .1
Endosulfan sulfate	ug/l	< .1	< .1	< .1	< .1	< .1
Endrin	ug/l	< .1	< .1	< .1	< .1	< .1
Endrin Aldehyde	ug/l	< .1	< .1	< .1	< .1	< .1
Heptachlor	ug/l	< .05	< .05	< .05	< .05	< .05
Heptachlor epoxide	ug/l	< .05	< .05	< .05	< .05	< .05
Lindane	ug/l	< .05	< .05	< .05	< .05	< .05
Methoxychlor	ug/l	< .5	< .5	< .5	< .5	< .5
Toxaphene	ug/l	< 4	< 4	< 4	< 4	< 4
alpha-BHC	ug/l	< .05	< .05	< .05	< .05	< .05
beta-BHC	ug/l	< .05	< .05	< .05	< .05	< .05
delta-BHC	ug/l	< .05	< .05	< .05	< .05	< .05
gamma-BHC(Lindane)	ug/l	< .05	< .05	< .05	< .05	< .05

Notes:
ug/l: microgram per liter

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PHASE II GROUNDWATER SAMPLES

TOTAL METALS, DISSOLVED METALS, AND CYANIDE

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HARRISON DIVISION - GMC
RFI PHASE II GROUNDWATER ANALYTICAL RESULTS
TOTAL METALS, DISSOLVED METALS, AND CYANIDE

PARAMETER	UNITS	RFI-GM20D-GW	RFI-HR10-GW	DUP-30	RFI-HR12-GW	DUP-36	RFI-MT69-GW	DUP-33	RFI-WSU24-GW	RB-20	RB-23
Cyanide	mg/l	< .005	NA	NA	NA	NA	< .005	< .005	< .005	< .005	NA
Aluminum	ug/l	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Antimony	ug/l	<25	<25	<25	<25	<25	<25	<25	27.5 U	<25	<25
Antimony, Dissolved	ug/l	NA	<25	<25	<25	<25	NA	NA	<25	NA	<25
Arsenic	ug/l	<2	NA	NA	NA	NA	<2	<2	<2	<2	NA
Barium	ug/l	**1070**	NA	NA	NA	NA	**126**	**120**	**127**	<4	NA
Barium, Dissolved	ug/l	**74.8**	NA	NA	NA	NA	**113**	**119**	**115**	NA	NA
Beryllium	ug/l	**3.1**	NA	NA	NA	NA	<1	<1	<1	<1	NA
Beryllium, Dissolved	ug/l	<1	NA	NA	NA	NA	NA	NA	NA	NA	NA
Cadmium	ug/l	**4.1**	NA	NA	NA	NA	<3	<3	<3	<3	NA
Cadmium, Dissolved	ug/l	<3	NA	NA	NA	NA	NA	NA	NA	NA	NA
Calcium	ug/l	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chromium	ug/l	**81.3**	NA	NA	NA	NA	<6	<6	<6	<6	NA
Chromium, Dissolved	ug/l	<6	NA	NA	NA	NA	NA	NA	NA	NA	NA
Cobalt	ug/l	**48.5**	NA	NA	NA	NA	<3	<3	<3	<3	NA
Cobalt, Dissolved	ug/l	<3	NA	NA	NA	NA	NA	NA	NA	NA	NA
Copper	ug/l	**249**	NA	NA	NA	NA	5.2 U	4.5 U	7.1 U	<3	NA
Copper, Dissolved	ug/l	<3	NA	NA	NA	NA	<3	<3	<3	NA	NA
Iron	ug/l	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Lead	ug/l	<2	NA	NA	NA	NA	**2.8**	<2	**3.8**	<2	NA
Lead, Dissolved	ug/l	NA	NA	NA	NA	NA	<2	NA	<2	NA	NA
Magnesium	ug/l	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Manganese	ug/l	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Mercury	ug/l	**.43**	NA	NA	NA	NA	<0.2	<0.2	<0.2	<0.2	NA
Mercury, Dissolved	ug/l	<0.2	NA	NA	NA	NA	NA	NA	NA	NA	NA
Nickel	ug/l	**124**	NA	NA	NA	NA	<15	<15	<15	<15	NA
Nickel, Dissolved	ug/l	<15	NA	NA	NA	NA	NA	NA	NA	NA	NA
Potassium	ug/l	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Selenium	ug/l	<10	NA	NA	NA	NA	<2	<2	<2	<2	NA
Silver	ug/l	<3	NA	NA	NA	NA	<3	<3	<3	<3	NA
Sodium	ug/l	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Thallium	ug/l	<2	NA	NA	NA	NA	<2	<2	<2	<2	NA
Tin	ug/l	**315**	NA	NA	NA	NA	32.2 U	52.4 U	**27**	*** 26.3**	NA
Tin, Dissolved	ug/l	<15	NA	NA	NA	NA	**20.6**	**19.9**	<15	<15	NA
Vanadium	ug/l	**114**	NA	NA	NA	NA	<5	<5	<5	<5	NA
Vanadium, Dissolved	ug/l	<5	NA	NA	NA	NA	NA	NA	NA	NA	NA
Zinc	ug/l	**761**	NA	NA	NA	NA	**9.1**	<5	<5	<5	NA
Zinc, Dissolved	ug/l	<5	NA	NA	NA	NA	**17.5**	NA	NA	NA	NA

Validation Codes: mg/l: milligrams per liter
ug/l: micrograms per liter
Value qualified as a non-detect due to Blank Contamination.
NA: Not Analyzed

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PHASE I LANDFILL L1 WASTE SAMPLES

VOLATILE ORGANIC COMPOUND RESULTS

DRAFT

HARRISON DIVISION - GMC

LANDFILL L1 ANALYTICAL RESULTS, VOLATILE ORGANIC COMPOUNDS

Parameter	DUP-09 UG/KG	L1-GS01-02WT UG/KG	L1-GS02-02WT UG/KG	L1-GS03-02WT UG/KG	L1-GS04-02WT UG/KG	L1-GS05-02WT UG/KG	TB-05 UG/L
1,1,1-Trichloroethane	< 6.3	< 5.9	< 6.8	< 31 J	< 31 J	< 28 J	< 1
1,1,2,2-Tetrachloroethane	< 6.3	< 5.9	< 6.8	< 31 J	< 31 J	< 28 J	< 1
1,1,2-Trichloroethane	< 6.3	< 5.9	< 6.8	< 31 J	< 31 J	< 28 J	< 1
1,1-Dichloroethane	< 6.3	< 5.9	< 6.8	< 31 J	< 31 J	< 28 J	< 1
1,1-Dichloroethene	< 6.3	< 5.9	< 6.8	< 31 J	< 31 J	< 28 J	< 1
1,2-Dichloroethane	< 6.3	< 5.9	< 6.8	< 31 J	< 31 J	< 28 J	< 1
1,2-Dichloroethene (Total)	< 6.3	< 5.9	< 6.8	< 31 J	< 31 J	< 28 J	< 1
1,2-Dichloropropane	< 6.3	< 5.9	< 6.8	< 31 J	< 31 J	< 28 J	< 1
2-Butanone	< 63	< 59	< 68	< 310 J	< 310 J	< 280 J	< 10
2-Hexanone	< 63	< 59	< 68	< 310 J	< 310 J	< 280 J	< 10
4-Methyl-2-Pentanone	< 63	< 59	< 68	< 310 J	< 310 J	< 280 J	< 10
Acetone	< 130	< 120	< 140	< 620 J	< 620 J	< 560 J	< 20
Benzene	< 6.3	< 5.9	< 6.8	< 31 J	< 31 J	< 28 J	< 1
Bromodichloromethane	< 6.3	< 5.9	< 6.8	< 31 J	< 31 J	< 28 J	< 1
Bromoform	< 6.3	< 5.9	< 6.8	< 31 J	< 31 J	< 28 J	< 1
Bromomethane	< 31	< 30	< 34	< 160 J	< 160 J	< 140 J	< 5
Carbon Disulfide	< 6.3	< 5.9	< 6.8	< 31 J	< 31 J	< 28 J	< 1
Carbon Tetrachloride	< 6.3	< 5.9	< 6.8	< 31 J	< 31 J	< 28 J	< 1
Chlorobenzene	< 6.3	< 5.9	< 6.8	< 31 J	< 31 J	< 28 J	< 1
Chloroethane	< 63	< 59	< 68	< 310 J	< 310 J	< 280 J	< 10
Chloroform	< 6.3	< 5.9	< 6.8	< 31 J	< 31 J	< 28 J	< 1
Chloromethane	< 63	< 59	< 68	< 310 J	< 310 J	< 280 J	< 10
Dibromochloromethane	< 6.3	< 5.9	< 6.8	< 31 J	< 31 J	< 28 J	< 1
Ethylbenzene	< 6.3	< 5.9	< 6.8	< 31 J	< 31 J	< 28 J	< 1
Methylene Chloride	< 63	< 59	< 68	< 310 J	< 310 J	< 280 J	< 10
Styrene	< 6.3	< 5.9	< 6.8	< 31 J	< 31 J	< 28 J	< 1
Tetrachloroethene	**41**	**37**	**19**	< 31 J	**34 J**	< 28 J	< 1
Toluene	< 6.3	< 5.9	< 6.8	< 31 J	< 31 J	< 28 J	< 1
Total Xylenes	**13**	**6.4**	< 6.8	< 31 J	< 31 J	< 28 J	< 1
Trichloroethene	**21**	**16**	< 6.8	< 31 J	**73 J**	**150 J**	< 1
Vinyl Chloride	< 31	< 30	< 34	< 160 J	< 160 J	< 140 J	< 5
cis-1,3-Dichloropropene	< 6.3	< 5.9	< 6.8	< 31 J	< 31 J	< 28 J	< 1
trans-1,3-Dichloropropene	< 6.3	< 5.9	< 6.8	< 31 J	< 31 J	< 28 J	< 1

VALIDATION CODES:

J = Estimated Value

<( )J = Laboratory reported this result as below detection. Result is estimated based on data validation.

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PHASE I LANDFILL L1 WASTE SAMPLES

SEMIVOLATILE ORGANIC COMPOUND RESULTS

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HARRISON DIVISION - GMC
LANDFILL L1 ANALYTICAL RESULTS, SEMIVOLATILE ORGANIC COMPOUNDS

Parameter	DUP-09 UG/KG	L1-GS01-02WT UG/KG	L1-GS02-02WT UG/KG	L1-GS03-02WT UG/KG	L1-GS04-02WT UG/KG	L1-GS05-02WT UG/KG
1,2,4-Trichlorobenzene	< 4100	< 3900	< 4500	< 4100	< 4100	< 3700
1,2-Dichlorobenzene	< 4100	< 3900	< 4500	< 4100	< 4100	< 3700
1,3-Dichlorobenzene	< 4100	< 3900	< 4500	< 4100	< 4100	< 3700
1,4-Dichlorobenzene	< 4100	< 3900	< 4500	< 4100	< 4100	< 3700
2,4,5-Trichlorophenol	< 4100	< 3900	< 4500	< 4100	< 4100	< 3700
2,4,6-Trichlorophenol	< 4100	< 3900	< 4500	< 4100	< 4100	< 3700
2,4-Dichlorophenol	< 4100	< 3900	< 4500	< 4100	< 4100	< 3700
2,4-Dimethylphenol	< 4100	< 3900	< 4500	< 4100	< 4100	< 3700
2,4-Dinitrophenol	< 4100	< 3900	< 4500	< 4100	< 4100	< 3700
2,4-Dinitrotoluene	< 4100	< 3900	< 4500	< 4100	< 4100	< 3700
2,6-Dinitrotoluene	< 4100	< 3900	< 4500	< 4100	< 4100	< 3700
2-Chloronapthalene	< 4100	< 3900	< 4500	< 4100	< 4100	< 3700
2-Chlorophenol	< 4100	< 3900	< 4500	< 4100	< 4100	< 3700
2-Methyl-4,6-Dinitrophenol	< 4100	< 3900	< 4500	< 4100	< 4100	< 3700
2-Methylnapthalene	< 4100	< 3900	< 4500	< 4100	< 4100	< 3700
2-Methylphenol	< 4100	< 3900	< 4500	< 4100	< 4100	< 3700
2-Nitroaniline	< 6200	< 5900	< 6800	< 6200	< 6200	< 5600
2-Nitrophenol	< 4100	< 3900	< 4500	< 4100	< 4100	< 3700
3,3'-Dichlorobenzidine	< 8300	< 7800	< 9000	< 8200	< 8200	< 7400
3-Nitroaniline	< 6200	< 5900	< 6800	< 6200	< 6200	< 5600
4-Bromophenyl-phenyl ether	< 4100	< 3900	< 4500	< 4100	< 4100	< 3700
4-Chloro-3-Methylphenol	< 4100	< 3900	< 4500	< 4100	< 4100	< 3700
4-Chloroaniline	< 4100	< 3900	< 4500	< 4100	< 4100	< 3700
4-Chlorophenyl-phenyl ether	< 4100	< 3900	< 4500	< 4100	< 4100	< 3700
4-Methylphenol	< 4100	< 3900	< 4500	< 4100	< 4100	< 3700
4-Nitroaniline	< 6200	< 5900	< 6800	< 6200	< 6200	< 5600
4-Nitrophenol	< 4100	< 3900	< 4500	< 4100	< 4100	< 3700
Acenaphthene	< 4100	< 3900	< 4500	< 4100	< 4100	< 3700
Acenaphthylene	< 4100	< 3900	< 4500	< 4100	< 4100	< 3700
Anthracene	< 4100	< 3900	< 4500	< 4100	< 4100	< 3700
Benzo(a)Anthracene	< 4100	**6800**	< 4500	< 4100	< 4100	< 3700
Benzo(a)Pyrene	< 4100	**5400**	< 4500	< 4100	< 4100	< 3700
Benzo(b)Fluoranthene	**7000 J**	**11000 J**	< 4500	< 4100	< 4100	< 3700
Benzo(g,h,i)Perylene	< 4100	< 3900	< 4500	< 4100	< 4100	< 3700

Validation codes on last page.

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HARRISON DIVISION - GMC
LANDFILL L1 ANALYTICAL RESULTS, SEMIVOLATILE ORGANIC COMPOUNDS

Parameter	DUP-09 UG/KG	L1-GS01-02WT UG/KG	L1-GS02-02WT UG/KG	L1-GS03-02WT UG/KG	L1-GS04-02WT UG/KG	L1-GS05-02WT UG/KG
Benzo(k)Fluoranthene	NOTE	NOTE	< 4500	< 4100	< 4100	< 3700
Butyl benzyl phthalate	< 4100	< 3900	< 4500	< 4100	< 4100	< 3700
Carbazole	< 4100	< 3900	< 4500	< 4100	< 4100	< 3700
Chrysene	< 4100	**6700**	< 4500	< 4100	< 4100	< 3700
Di-n-Butylphthalate	< 4100	< 3900	< 4500	< 4100	< 4100	< 3700
Di-n-Octyl Phthalate	< 4100	< 3900	< 4500	< 4100	< 4100	< 3700
Dibenz(a,h)Anthracene	< 4100	< 3900	< 4500	< 4100	< 4100	< 3700
Dibenzofuran	< 4100	< 3900	< 4500	< 4100	< 4100	< 3700
Diethylphthalate	< 4100	< 3900	< 4500	< 4100	< 4100	< 3700
Dimethyl Phtalate	< 4100	< 3900	< 4500	< 4100	< 4100	< 3700
Fluoranthene	**9100**	**14000**	< 4500	< 4100	< 4100	< 3700
Fluorene	< 4100	< 3900	< 4500	< 4100	< 4100	< 3700
Hexachloro-1,3-butadiene	< 4100	< 3900	< 4500	< 4100	< 4100	< 3700
Hexachlorobenzene	< 4100	< 3900	< 4500	< 4100	< 4100	< 3700
Hexachlorocyclopentadiene	< 4100	< 3900	< 4500	< 4100	< 4100	< 3700
Hexachloroethane	< 4100	< 3900	< 4500	< 4100	< 4100	< 3700
Indeno(1,2,3-cd)Pyrene	< 4100	< 3900	< 4500	< 4100	< 4100	< 3700
Isophorone	< 4100	< 3900	< 4500	< 4100	< 4100	< 3700
N-Nitroso-Di-n-Propylamine	< 4100	< 3900	< 4500	< 4100	< 4100	< 3700
N-Nitrosodiphenylamine (1)	< 4100	< 3900	< 4500	< 4100	< 4100	< 3700
Napthalene	< 4100	< 3900	< 4500	< 4100	< 4100	< 3700
Nitrobenzene	< 4100	< 3900	< 4500	< 4100	< 4100	< 3700
Pentachlorophenol	< 4100	< 3900	< 4500	< 4100	< 4100	< 3700
Phenanthrene	**6500**	**7600**	< 4500	< 4100	< 4100	< 3700
Phenol	< 4100	< 3900	< 4500	< 4100	< 4100	< 3700
Pyrene	**8400**	**14000**	< 4500	< 4100	< 4100	< 3700
bis(2-Chloroethyl)Ether	< 4100	< 3900	< 4500	< 4100	< 4100	< 3700
bis(2-Chloroisopropyl)Ether	< 4100	< 3900	< 4500	< 4100	< 4100	< 3700
bis(2-Ethylhexyl)Phthalate	< 4100	< 3900	< 4500	< 4100	< 4100	< 3700
bis(Chloroethoxy)Methane	< 4100	< 3900	< 4500	< 4100	< 4100	< 3700

VALIDATION CODES:

J = Estimated Value
NOTE = Total concentration of benzo(b)fluoranthene and benzo(k)fluoranthene is reported as benzo(b)fluoranthene.

PHASE I LANDFILL L1 WASTE SAMPLES

POLYCHLORINATED BIPHENYLS AND PESTICIDE RESULTS

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HARRISON DIVISION - GMC
WASTE SAMPLING - LANDFILL L1 ANALYTICAL RESULTS
POLYCHLORINATED BIPHENYLS AND PESTICIDES

Parameter	DUP-09 MG/KG	L1-GS01-02WT MG/KG	L1-GS02-02WT MG/KG	L1-GS03-02WT MG/KG	L1-GS04-02WT MG/KG	L1-GS05-02WT MG/KG
4,4'-DDD	< 31	< 30	< 34	< 31	< 31	< 28
4,4'-DDE	< 31	< 30	< 34	< 31	< 31	< 28
4,4-DDT	< 31	< 30	< 34	< 31	< 31	< 28
Aldrin	< 31	< 30	< 34	< 31	< 31	< 28
Aroclor-1016	< 3.1	< 3	< 3.4	< 31	< 3.1	< .6
Aroclor-1221	< 3.1	< 3	< 3.4	< 31	< 3.1	< .6
Aroclor-1232	< 3.1	< 3	< 3.4	< 31	< 3.1	< .6
Aroclor-1242	< 3.1	< 3	< 3.4	< 31	< 3.1	< .6
Aroclor-1248	< 3.1	< 3	< 3.4	< 31	< 3.1	< .6
Aroclor-1254	**14.8**	**6.2**	**13.4**	< 31	**21.3**	**1.4**
Aroclor-1260	< 3.1	< 3	< 3.4	< 31	< 3.1	< .6
Dieldrin	< 31	< 30	< 34	< 31	< 31	< 28
Endosulfan I	< 31	< 30	< 34	< 31	< 31	< 28
Endosulfan II	< 31	< 30	< 34	< 31	< 31	< 28
Endosulfan sulfate	< 31	< 30	< 34	< 31	< 31	< 28
Endrin	< 31	< 30	< 34	< 31	< 31	< 28
Endrin Aldehyde	< 31	< 30	< 34	< 31	< 31	< 28
Endrin ketone	< 31	< 30	< 34	< 31	< 31	< 28
Heptachlor	< 31	< 30	< 34	< 31	< 31	< 28
Heptachlor epoxide	< 31	< 30	< 34	< 31	< 31	< 28
Methoxychlor	< 31	< 30	< 34	< 31	< 31	< 28
Toxaphene	< 31	< 30	< 34	< 31	< 31	< 28
alpha-BHC	< 31	< 30	< 34	< 31	< 31	< 28
alpha-Chlordane	< 31	< 30	< 34	< 31	< 31	< 28
beta-BHC	< 31	< 30	< 34	< 31	< 31	< 28
delta-BHC	< 31	< 30	< 34	< 31	< 31	< 28
gamma-BHC(Lindane)	< 31	< 30	< 34	< 31	< 31	< 28
gamma-Chlordane	< 31	< 30	< 34	< 31	< 31	< 28

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PHASE I LANDFILL L1 WASTE SAMPLES

METALS AND CYANIDE RESULTS

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HARRISON DIVISION - GMC
LANDFILL L1 ANALYTICAL RESULTS
METALS AND CYANIDE

Parameter	DUP-09 MG/KG	L1-GS01-02WT MG/KG	L1-GS02-02WT MG/KG	L1-GS03-02WT MG/KG	L1-GS04-02WT MG/KG	L1-GS05-02WT MG/KG
Aluminum	16000 J	10600 J	8330 J	12900 J	14500 J	9380 J
Antimony	32.6 J	19.2 J	28.3 J	14.7 J	30.4 J	20.8 J
Arsenic	22.9 J	16.3 J	48 J	15.4 J	34.5 J	9.4 J
Barium	3690 J	2210 J	1190 J	1290 J	5860 J	359 J
Beryllium	.25 J	< .24	< .26	1.4 J	< .25	.32 J
Cadmium	15.4 J	12.1 J	20 J	6.7 J	31.9 J	5.1 J
Calcium	41300	47700	8370	16400	18500	57000
Chromium	338	158	95.9	28.1	84.8	20.6
Cobalt	378 J	229 J	1030 J	88 J	344 J	18.6 J
Copper	562 J	435 J	191 J	345 J	2600 J	77.6 J
Iron	33000 J	26500 J	22700 J	18700 J	44400 J	13900 J
Lead	260 J	1220 J	627 J	139 J	673 J	71.7 J
Magnesium	13100	22200	1410	5930	6080	26500
Manganese	963 J	675 J	856 J	278 J	854 J	514 J
Mercury	0.17	0.22	< .14	< .16	1.2	< .11
Nickel	539	319	1210	145	481	42.8
Potassium	9330	5230	12200	3940	5800	1600
Selenium	< .88 J	< .77 J	< .9 J	< .88 J	< 1.7 J	< .55 J
Silver	< .73	< .73	< .79	< .94	< .75	< .66
Sodium	10100	5650	23200	3190	7070	254
Thallium	.54 J	< .48 J	< .53 J	< .62 J	< .5 J	< .44 J
Vanadium	41.1 J	30.8 J	24.2 J	36.7 J	28 J	23.8 J
Zinc	2050 J	1110 J	3990 J	722 J	2800 J	317 J
Cyanide	0.6	0.8	1.1	1	2	1.9

VALIDATION CODES:

J = Estimated Value
<( )J = Laboratory reported this result as below detection. Result is estimated based on data validation.

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PHASE I LANDFILL L2 WASTE SAMPLES

VOLATILE ORGANIC COMPOUND RESULTS

DRAFT

HARRISON DIVISION - GMC
LANDFILL L2 ANALYTICAL RESULTS
VOLATILE ORGANIC COMPOUNDS

Parameter	DUP-10 UG/KG	L2-GS01-02WT UG/KG	L2-GS02-02WT UG/KG	L2-GS03-02WT UG/KG	TB-06 UG/L
1,1,1-Trichloroethane	< 5.8	< 5.8	< 5.4	< 5.8	< 1
1,1,2,2-Tetrachloroethane	< 5.8	< 5.8	< 5.4	< 5.8	< 1
1,1,2-Trichloroethane	< 5.8	< 5.8	< 5.4	< 5.8	< 1
1,1-Dichloroethane	< 5.8	< 5.8	< 5.4	< 5.8	< 1
1,1-Dichloroethene	< 5.8	< 5.8	< 5.4	< 5.8	< 1
1,2-Dichloroethane	< 5.8	< 5.8	< 5.4	< 5.8	< 1
1,2-Dichloroethene (Total)	< 5.8	< 5.8	< 5.4	< 5.8	< 1
1,2-Dichloropropane	< 5.8	< 5.8	< 5.4	< 5.8	< 1
2-Butanone	< 58	< 58	< 54	< 58	< 10
2-Hexanone	< 58	< 58	< 54	< 58	< 10
4-Methyl-2-Pentanone	< 58	< 58	< 54	< 58	< 10
Acetone	< 120	< 120	**330**	< 120	< 20
Benzene	< 5.8	< 5.8	< 5.4	< 5.8	< 1
Bromodichloromethane	< 5.8	< 5.8	< 5.4	< 5.8	< 1
Bromoform	< 5.8	< 5.8	< 5.4	< 5.8	< 1
Bromomethane	< 29	< 29	< 27	< 29	< 5
Carbon Disulfide	< 5.8	< 5.8	< 5.4	< 5.8	< 1
Carbon Tetrachloride	< 5.8	< 5.8	< 5.4	< 5.8	< 1
Chlorobenzene	< 5.8	< 5.8	< 5.4	< 5.8	< 1
Chloroethane	< 58	< 58	< 54	< 58	< 10
Chloroform	< 5.8	< 5.8	< 5.4	< 5.8	< 1
Chloromethane	< 58	< 58	< 54	< 58	< 10
Dibromochloromethane	< 5.8	< 5.8	< 5.4	< 5.8	< 1
Ethylbenzene	< 5.8	< 5.8	< 5.4	< 5.8	< 1
Methylene Chloride	< 58	< 58	< 54	< 58	< 10
Styrene	< 5.8	< 5.8	< 5.4	< 5.8	< 1
Tetrachloroethene	**7.8**	**5.8**	**30**	**19**	< 1
Toluene	< 5.8	< 5.8	< 5.4	< 5.8	< 1
Total Xylenes	< 5.8	< 5.8	**9.1**	< 5.8	< 1
Trichloroethene	< 5.8	< 5.8	< 5.4	< 5.8	< 1
Vinyl Chloride	< 29	< 29	< 27	< 29	< 5
cis-1,3-Dichloropropene	< 5.8	< 5.8	< 5.4	< 5.8	< 1
trans-1,3-Dichloropropene	< 5.8	< 5.8	< 5.4	< 5.8	< 1

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PHASE I LANDFILL L2 WASTE SAMPLES

SEMIVOLATILE ORGANIC COMPOUND RESULTS

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HARRISION DIVISION - GMC
LANDFILL L2 ANALYTICAL RESULTS
SEMIVOLTILE ORGANIC COMPOUNDS

Parameter	DUP-10 UG/KG	L2-GS01-02WT UG/KG	L2-GS02-02WT UG/KG	L2-GS03-02WT UG/KG
1,2,4-Trichlorobenzene	< 380	< 3800	< 3600	< 380
1,2-Dichlorobenzene	< 380	< 3800	< 3600	< 380
1,3-Dichlorobenzene	< 380	< 3800	< 3600	< 380
1,4-Dichlorobenzene	< 380	< 3800	< 3600	< 380
2,4,5-Trichlorophenol	< 380	< 3800	< 3600	< 380
2,4,6-Trichlorophenol	< 380	< 3800	< 3600	< 380
2,4-Dichlorophenol	< 380	< 3800	< 3600	< 380
2,4-Dimethylphenol	< 380	< 3800	< 3600	< 380
2,4-Dinitrophenol	< 380	< 3800	< 3600	< 380
2,4-Dinitrotoluene	< 380	< 3800	< 3600	< 380
2,6-Dinitrotoluene	< 380	< 3800	< 3600	< 380
2-Chloronapthalene	< 380	< 3800	< 3600	< 380
2-Chlorophenol	< 380	< 3800	< 3600	< 380
2-Methyl-4,6-Dinitrophenol	< 380	< 3800	< 3600	< 380
2-Methylnapthalene	< 380	< 3800	< 3600	< 380
2-Methylphenol	< 380	< 3800	< 3600	< 380
2-Nitroaniline	< 570	< 5800	< 5400	< 570
2-Nitrophenol	< 380	< 3800	< 3600	< 380
3,3'-Dichlorobenzidine	< 760	< 7700	< 7100	< 760
3-Nitroaniline	< 570	< 5800	< 5400	< 570
4-Bromophenyl-phenyl ether	< 380	< 3800	< 3600	< 380
4-Chloro-3-Methylphenol	< 380	< 3800	< 3600	< 380
4-Chloroaniline	< 380	< 3800	< 3600	< 380
4-Chlorophenyl-phenyl ether	< 380	< 3800	< 3600	< 380
4-Methylphenol	< 380	< 3800	< 3600	< 380
4-Nitroaniline	< 570	< 5800	< 5400	< 570
4-Nitrophenol	< 380	< 3800	< 3600	< 380
Acenaphthene	< 380	< 3800	< 3600	< 380
Acenaphthylene	< 380	< 3800	< 3600	< 380
Anthracene	< 380	< 3800	< 3600	< 380
Benzo(a)Anthracene	< 380	< 3800	**4000**	< 380
Benzo(a)Pyrene	< 380	< 3800	< 3600	< 380
Benzo(b)Fluoranthene	< 380	< 3800	< 3600	**500**
Benzo(g,h,i)Perylene	< 380	< 3800	< 3600	< 380
Benzo(k)Fluoranthene	< 380	< 3800	< 3600	NOTE
Butyl benzyl phthalate	< 380	< 3800	< 3600	< 380
Carbazole	< 380	< 3800	< 3600	< 380
Chrysene	< 380	< 3800	**3900**	< 380
Di-n-Butylphthalate	< 380	< 3800	< 3600	< 380
Di-n-Octyl Phthalate	< 380	< 3800	< 3600	< 380
Dibenz(a,h)Anthracene	< 380	< 3800	< 3600	< 380
Dibenzofuran	< 380	< 3800	< 3600	< 380
Diethylphthalate	< 380	< 3800	< 3600	< 380
Dimethyl Phtalate	< 380	< 3800	< 3600	< 380
Fluoranthene	< 380	< 3800	**9100**	**460**
Fluorene	< 380	< 3800	< 3600	< 380

Notes on last page.

HARRISION DIVISION - GMC
LANDFILL L2 ANALYTICAL RESULTS
SEMIVOLTILE ORGANIC COMPOUNDS

Parameter	DUP-10 UG/KG	L2-GS01-02WT UG/KG	L2-GS02-02WT UG/KG	L2-GS03-02WT UG/KG
Hexachloro-1,3-butadiene	< 380	< 3800	< 3600	< 380
Hexachlorobenzene	< 380	< 3800	< 3600	< 380
Hexachlorocyclopentadiene	< 380	< 3800	< 3600	< 380
Hexachloroethane	< 380	< 3800	< 3600	< 380
Indeno(1,2,3-cd)Pyrene	< 380	< 3800	< 3600	< 380
Isophorone	< 380	< 3800	< 3600	< 380
N-Nitroso-Di-n-Propylamine	< 380	< 3800	< 3600	< 380
N-Nitrosodiphenylamine (1)	< 380	< 3800	< 3600	< 380
Napthalene	< 380	< 3800	< 3600	< 380
Nitrobenzene	< 380	< 3800	< 3600	< 380
Pentachlorophenol	< 380	< 3800	< 3600	< 380
Phenanthrene	< 380	< 3800	**7900**	< 380
Phenol	< 380	< 3800	< 3600	< 380
Pyrene	< 380	< 3800	**7400**	**450**
bis(2-Chloroethyl)Ether	< 380	< 3800	< 3600	< 380
bis(2-Chloroisopropyl)Ether	< 380	< 3800	< 3600	< 380
bis(2-Ethylhexyl)Phthalate	< 380	< 3800	< 3600	< 380
bis(Chloroethoxy)Methane	< 380	< 3800	< 3600	< 380

NOTE = Total concentration of benzo(b)fluoranthene and benzo(k)fluoranthene is reported as benzo(b)fluoranthene.

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PHASE I LANDFILL L2 WASTE SAMPLES

POLYCHLORINATED BIPHENYLS AND PESTICIDES RESULTS

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HARRISON DIVISION - GMC
LANDFILL L2 ANALYTICAL RESULTS
POLYCHLORINATED BIPHENYLS AND PESTICIDES

Parameter	DUP-10 MG/KG	L2-GS01-02WT MG/KG	L2-GS02-02WT MG/KG	L2-GS03-02WT MG/KG
4,4'-DDD	< .6	< .6	< 27	< .6
4,4'-DDE	< .6	< .6	< 27	< .6
4,4-DDT	< .6	< .6	< 27	< .6
Aldrin	< .6	< .6	< 27	< .6
Aroclor-1016	< .6	< .6	< .6	< .6
Aroclor-1221	< .6	< .6	< .6	< .6
Aroclor-1232	< .6	< .6	< .6	< .6
Aroclor-1242	< .6	< .6	< .6	< .6
Aroclor-1248	< .6	< .6	< .6	< .6
Aroclor-1254	< .6	< .6	2	< .6
Aroclor-1260	< .6	< .6	< .6	< .6
Dieldrin	< .6	< .6	< 27	< .6
Endosulfan I	< .6	< .6	< 27	< .6
Endosulfan II	< .6	< .6	< 27	< .6
Endosulfan sulfate	< .6	< .6	< 27	< .6
Endrin	< .6	< .6	< 27	< .6
Endrin Aldehyde	< .6	< .6	< 27	< .6
Endrin ketone	< .6	< .6	< 27	< .6
Heptachlor	< .6	< .6	< 27	< .6
Heptachlor epoxide	< .6	< .6	< 27	< .6
Methoxychlor	< .6	< .6	< 27	< .6
Toxaphene	< .6	< .6	< 27	< .6
alpha-BHC	< .6	< .6	< 27	< .6
alpha-Chlordane	< .6	< .6	< 27	< .6
beta-BHC	< .6	< .6	< 27	< .6
delta-BHC	< .6	< .6	< 27	< .6
gamma-BHC(Lindane)	< .6	< .6	< 27	< .6
gamma-Chlordane	< .6	< .6	< 27	< .6

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PHASE I LANDFILL L2 WASTE SAMPLES

METALS AND CYANIDE RESULTS

DRAFT

HARRISON DIVISION - GMC
LANDFILL L2 ANALYTICAL RESULTS
METALS AND CYANIDE

Parameter	DUP-10 MG/KG	L2-GS01-02WT MG/KG	L2-GS02-02WT MG/KG	L2-GS03-02WT MG/KG
Aluminum	14700 J	21200 J	10200 J	7920 J
Antimony	< 6.7	< 7.1	24 J	29.9 J
Arsenic	6.8 J	6 J	5.5 J	10 J
Barium	145 J	161 J	91.4 J	35.4 J
Beryllium	.96 J	1.1 J	.72 J	.59 J
Cadmium	5.7 J	6.5 J	6 J	3.2 J
Calcium	39200	8470	106000	102000
Chromium	20.1	25.4	51.2	14.3
Cobalt	12.4 J	10.8 J	14.8 J	10.9 J
Copper	17.6 J	13.7 J	768 J	9.2 J
Iron	20200 J	21100 J	16400 J	10800 J
Lead	21.9 J	12.9 J	47 J	11.9 J
Magnesium	16200	5100	45200	54400
Manganese	468 J	385 J	391 J	261 J
Mercury	< .11	< .12	< .11	< .11
Nickel	17.2	17	28.6	11.1
Potassium	1950	3280	1610	1150
Selenium	< .32 J	< .24 J	< .46 J	< .35 J
Silver	< .67	< .71	< .64	< .68
Sodium	110	105	250	210
Thallium	< .44 J	< .47 J	< .43 J	< .46 J
Vanadium	34.3 J	46.9 J	23.8 J	20.4 J
Zinc	80 J	75.6 J	360 J	40.9 J
Cyanide	< .1	< .2 J	< .2 J	< .1 J

VALIDATION CODES:

J = Estimated Value
<( )J = Laboratory reported this result as below detection. Result is estimated based on data validation.

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PHASE I LANDFILL L3 WASTE SAMPLES

SEMIVOLATILE ORGANIC COMPOUND RESULTS

DRAFT

HARRISON DIVISION - GMC
LANDFILL L3 ANALYTICAL RESULTS
SEMIVOLATILE ORGANIC COMPOUNDS

Parameter	L3-GS01-02WT UG/KG	L3-GS02-02WT UG/KG	L3-GS03-02WT UG/KG
1,2,4-Trichlorobenzene	< 370	< 380	< 3700
1,2-Dichlorobenzene	< 370	< 380	< 3700
1,3-Dichlorobenzene	< 370	< 380	< 3700
1,4-Dichlorobenzene	< 370	< 380	< 3700
2,4,5-Trichlorophenol	< 370	< 380	< 3700
2,4,6-Trichlorophenol	< 370	< 380	< 3700
2,4-Dichlorophenol	< 370	< 380	< 3700
2,4-Dimethylphenol	< 370	< 380	< 3700
2,4-Dinitrophenol	< 370	< 380	< 3700
2,4-Dinitrotoluene	< 370	< 380	< 3700
2,6-Dinitrotoluene	< 370	< 380	< 3700
2-Chloronapthalene	< 370	< 380	< 3700
2-Chlorophenol	< 370	< 380	< 3700
2-Methyl-4,6-Dinitrophenol	< 370	< 380	< 3700
2-Methylnapthalene	< 370	< 380	< 3700
2-Methylphenol	< 370	< 380	< 3700
2-Nitroaniline	< 550	< 570	< 5600
2-Nitrophenol	< 370	< 380	< 3700
3,3'-Dichlorobenzidine	< 730	< 760	< 7500
3-Nitroaniline	< 550	< 570	< 5600
4-Bromophenyl-phenyl ether	< 370	< 380	< 3700
4-Chloro-3-Methylphenol	< 370	< 380	< 3700
4-Chloroaniline	< 370	< 380	< 3700
4-Chlorophenyl-phenyl ether	< 370	< 380	< 3700
4-Methylphenol	< 370	< 380	< 3700
4-Nitroaniline	< 550	< 570	< 5600
4-Nitrophenol	< 370	< 380	< 3700
Acenaphthene	< 370	< 380	< 3700
Acenaphthylene	< 370	< 380	< 3700
Anthracene	< 370	< 380	< 3700
Benzo(a)Anthracene	< 370	< 380	< 3700
Benzo(a)Pyrene	< 370	< 380	< 3700
Benzo(b)Fluoranthene	< 370	< 380	< 3700
Benzo(g,h,i)Perylene	< 370	< 380	< 3700

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HARRISON DIVISION - GMC
LANDFILL L3 ANALYTICAL RESULTS
SEMIVOLATILE ORGANIC COMPOUNDS

Parameter	L3-GS01-02WT UG/KG	L3-GS02-02WT UG/KG	L3-GS03-02WT UG/KG
Benzo(k)Fluoranthene	< 370	< 380	< 3700
Butyl benzyl phthalate	< 370	< 380	< 3700
Carbazole	< 370	< 380	< 3700
Chrysene	< 370	< 380	< 3700
Di-n-Butylphthalate	< 370	< 380	< 3700
Di-n-Octyl Phthalate	< 370	< 380	< 3700
Dibenz(a,h)Anthracene	< 370	< 380	< 3700
Dibenzofuran	< 370	< 380	< 3700
Diethylphthalate	< 370	< 380	< 3700
Dimethyl Phtalate	< 370	< 380	< 3700
Fluoranthene	< 370	< 380	< 3700
Fluorene	< 370	< 380	< 3700
Hexachloro-1,3-butadiene	< 370	< 380	< 3700
Hexachlorobenzene	< 370	< 380	< 3700
Hexachlorocyclopentadiene	< 370	< 380	< 3700
Hexachloroethane	< 370	< 380	< 3700
Indeno(1,2,3-cd)Pyrene	< 370	< 380	< 3700
Isophorone	< 370	< 380	< 3700
N-Nitroso-Di-n-Propylamine	< 370	< 380	< 3700
N-Nitrosodiphenylamine	< 370	< 380	< 3700
Napthalene	< 370	< 380	< 3700
Nitrobenzene	< 370	< 380	< 3700
Pentachlorophenol	< 370	< 380	< 3700
Phenanthrene	< 370	< 380	< 3700
Phenol	< 370	< 380	< 3700
Pyrene	< 370	< 380	< 3700
bis(2-Chloroethyl)Ether	< 370	< 380	< 3700
bis(2-Chloroisopropyl)Ether	< 370	< 380	< 3700
bis(2-Ethylhexyl)Phthalate	< 370	< 380	< 3700
bis(Chloroethoxy)Methane	< 370	< 380	< 3700

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PHASE I LANDFILL L3 WASTE SAMPLES

POLYCHLORINATED BIPHENYLS AND PESTICIDES RESULTS

DRAFT

HARRISON DIVISION - GMC
LANDFILL L3 ANALYTICAL RESULTS
POLYCHLORINATED BIPHENYLS AND PESTICIDES

Parameter	L3-GS01-02WT MG/KG	L3-GS02-02WT MG/KG	L3-GS03-02WT MG/KG
4,4'-DDD	< .6	< .6	< 28
4,4'-DDE	< .6	< .6	< 28
4,4-DDT	< .6	< .6	< 28
Aldrin	< .6	< .6	< 28
Aroclor-1016	< .6	< .6	< .6
Aroclor-1221	< .6	< .6	< .6
Aroclor-1232	< .6	< .6	< .6
Aroclor-1242	< .6	< .6	< .6
Aroclor-1248	< .6	< .6	< .6
Aroclor-1254	< .6	< .6	< .6
Aroclor-1260	< .6	< .6	< .6
Dieldrin	< .6	< .6	< 28
Endosulfan I	< .6	< .6	< 28
Endosulfan II	< .6	< .6	< 28
Endosulfan sulfate	< .6	< .6	< 28
Endrin	< .6	< .6	< 28
Endrin Aldehyde	< .6	< .6	< 28
Endrin ketone	< .6	< .6	< 28
Heptachlor	< .6	< .6	< 28
Heptachlor epoxide	< .6	< .6	< 28
Methoxychlor	< .6	< .6	< 28
Toxaphene	< .6	< .6	< 28
alpha-BHC	< .6	< .6	< 28
alpha-Chlordane	< .6	< .6	< 28
beta-BHC	< .6	< .6	< 28
delta-BHC	< .6	< .6	< 28
gamma-BHC(Lindane)	< .6	< .6	< 28
gamma-Chlordane	< .6	< .6	< 28

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PHASE I LANDFILL L3 WASTE SAMPLES

METALS AND CYANIDE RESULTS

DRAFT

HARRISON DIVISION - GMC
LANDFILL L3 ANALYTICAL REUSLTS
METALS AND CYANIDE

Parameter	L3-GS01-02WT MG/KG	L3-GS02-02WT MG/KG	L3-GS03-02WT MG/KG
Aluminum	**11300 J**	**18700 J**	**7060 J**
Antimony	**7.1 J**	**< 6.9**	**23.2 J**
Arsenic	**9.4 J**	**9 J**	**11.6 J**
Barium	**68.2 J**	**80.5 J**	**60.6 J**
Beryllium	**.74 J**	**1 J**	**0.51**
Cadmium	**3.9 J**	**5.6 J**	**3.8 J**
Calcium	**31500**	**8350**	**93600**
Chromium	**17.8**	**22.1**	**18.5**
Cobalt	**10 J**	**10.2 J**	**11.2 J**
Copper	**11.9 J**	**14.9 J**	**37.9 J**
Iron	**15500 J**	**21300 J**	**12300 J**
Lead	**16.2 J**	**13.3 J**	**47.6 J**
Magnesium	**14400**	**6450**	**36300**
Manganese	**567 J**	**496 J**	**333 J**
Mercury	< .11	< .11	< .11
Nickel	**14.3**	**17.6**	**15.6**
Potassium	**1280**	**1900**	**1140**
Selenium	< .24 J	< .41 J	< .34 J
Silver	< .67	< .69	< .67
Sodium	**156**	**113**	**175**
Thallium	< .44 J	< .46 J	< .45 J
Vanadium	**30.2 J**	**44.8 J**	**20 J**
Zinc	**56.7 J**	**67.5 J**	**99.3 J**
Cyanide	< .2 J	< .2 J	< .1 J

VALIDATION CODES:

J = Estimated Value
<( )J = Laboratory reported this result as below detection. Result is estimated based on data validation.

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PHASE I LANDFILL L3 WASTE SAMPLES

VOLATILE ORGANIC COMPOUND RESULTS

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HARRISON DIVISION - GMC
LANDFILL L3 ANALYTICAL RESULTS
VOLATILE ORGANIC COMPOUNDS

Parameter	L3-GS01-02WT UG/KG	L3-GS02-02WT UG/KG	L3-GS03-02WT UG/KG	TB-06 UG/L
1,1,1-Trichloroethane	< 5.6	< 5.8	< 5.6	< 1
1,1,2,2-Tetrachloroethane	< 5.6	< 5.8	< 5.6	< 1
1,1,2-Trichloroethane	< 5.6	< 5.8	< 5.6	< 1
1,1-Dichloroethane	< 5.6	< 5.8	< 5.6	< 1
1,1-Dichloroethene	< 5.6	< 5.8	< 5.6	< 1
1,2-Dichloroethane	< 5.6	< 5.8	< 5.6	< 1
1,2-Dichloroethene (Total)	< 5.6	< 5.8	< 5.6	< 1
1,2-Dichloropropane	< 5.6	< 5.8	< 5.6	< 1
2-Butanone	< 56	< 58	< 56	< 10
2-Hexanone	< 56	< 58	< 56	< 10
4-Methyl-2-Pentanone	< 56	< 58	< 56	< 10
Acetone	< 110	**330**	< 110	< 20
Benzene	< 5.6	< 5.8	< 5.6	< 1
Bromodichloromethane	< 5.6	< 5.8	< 5.6	< 1
Bromoform	< 5.6	< 5.8	< 5.6	< 1
Bromomethane	< 28	< 29	< 28	< 5
Carbon Disulfide	< 5.6	< 5.8	< 5.6	< 1
Carbon Tetrachloride	< 5.6	< 5.8	< 5.6	< 1
Chlorobenzene	< 5.6	< 5.8	< 5.6	< 1
Chloroethane	< 56	< 58	< 56	< 10
Chloroform	< 5.6	< 5.8	< 5.6	< 1
Chloromethane	< 56	< 58	< 56	< 10
Dibromochloromethane	< 5.6	< 5.8	< 5.6	< 1
Ethylbenzene	< 5.6	< 5.8	< 5.6	< 1
Methylene Chloride	< 56	< 58	< 56	< 10
Styrene	< 5.6	< 5.8	< 5.6	< 1
Tetrachloroethene	**10**	**6.5**	< 5.6	< 1
Toluene	< 5.6	< 5.8	< 5.6	< 1
Total Xylenes	< 5.6	< 5.8	< 5.6	< 1
Trichloroethene	< 5.6	< 5.8	< 5.6	< 1
Vinyl Chloride	< 28	< 29	< 28	< 5
cis-1,3-Dichloropropene	< 5.6	< 5.8	< 5.6	< 1
trans-1,3-Dichloropropene	< 5.6	< 5.8	< 5.6	< 1

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PHASE I WEST TANK FARM SOIL SAMPLES

VOLATILE ORGANIC COMPOUND RESULTS

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HARRISON DIVISION - GMC
WEST TANK FARM ANALYTICAL RESULTS
VOLATILE ORGANIC COMPOUNDS

Parameter	DUP-02 UG/KG	WTF-GS10-15SL UG/KG	WTF-GS7-15SL UG/KG	WTF-GS8-15SL UG/KG	UST-TB-4 UG/L
1,1,1-Trichloroethane	< 28	< 270	< 5.2	< 5.5	< 1
1,1,2,2-Tetrachloroethane	< 28	< 270	< 5.2	< 5.5	< 1
1,1,2-Trichloroethane	< 28	< 270	< 5.2	< 5.5	< 1
1,1-Dichloroethane	< 28	< 270	< 5.2	< 5.5	< 1
1,1-Dichloroethene	< 28	< 270	< 5.2	< 5.5	< 1
1,2-Dichloroethane	< 28	< 270	< 5.2	< 5.5	< 1
1,2-Dichloroethene (Total)	< 28	< 270	< 5.2	< 5.5	< 1
1,2-Dichloropropane	< 28	< 270	< 5.2	< 5.5	< 1
2-Butanone	< 280 J	< 2700 J	< 52 J	< 55 J	< 10
2-Hexanone	< 280 J	< 2700 J	< 52 J	< 55 J	< 10
4-Methyl-2-Pentanone	< 280 J	< 2700 J	< 52 J	< 55 J	< 10
Acetone	< 550 J	< 5400 J	< 100 J	< 110 J	< 20
Benzene	< 28	< 270	< 5.2	< 5.5	< 1
Bromodichloromethane	< 28	< 270	< 5.2	< 5.5	< 1
Bromoform	< 28	< 270	< 5.2	< 5.5	< 1
Bromomethane	< 140	< 1300	< 26	< 27	< 5
Carbon Disulfide	< 28	< 270	< 5.2	< 5.5	< 1
Carbon Tetrachloride	< 28	< 270	< 5.2	< 5.5	< 1
Chlorobenzene	< 28	< 270	< 5.2	< 5.5	< 1
Chloroethane	< 280	< 2700	< 52	< 55	< 10
Chloroform	< 28	< 270	< 5.2	< 5.5	< 1
Chloromethane	< 280	< 2700	< 52	< 55	< 10
Dibromochloromethane	< 28	< 270	< 5.2	< 5.5	< 1
Ethylbenzene	< 28	< 270	< 5.2	< 5.5	< 1
Methylene Chloride	< 280	< 2700	< 52	< 55	< 10
Styrene	< 28	< 270	< 5.2	< 5.5	< 1
Tetrachloroethene	**1300**	< 270	< 5.2	**75**	< 1
Toluene	< 28	< 270	< 5.2	< 5.5	< 1
Total Xylenes	< 28	< 270	< 5.2	< 5.5	< 1
Trichloroethene	< 28	< 270	< 5.2	< 5.5	< 1
Vinyl Chloride	< 140	< 1300	< 26	< 27	< 5
cis-1,3-Dichloropropene	< 28	< 270	< 5.2	< 5.5	< 1
trans-1,3-Dichloropropene	< 28	< 270	< 5.2	< 5.5	< 1

VALIDATION CODES:

J = Estimated Value
<( )J = Laboratory reported this result as below detection. Result is estimated based on data validation.

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PHASE I WEST TANK FARM SOIL SAMPLES

POLYCHLORINATED BIPHENYLS AND PESTICIDES RESULTS

DRAFT

HARRISON DIVISION - GMC
WEST TANK FARM ANALYTICAL RESULTS
POLYCHLORINATED BIPHENYLS AND PESTICIDES

Parameter	DUP-02 MG/KG	WTF-GS10-15SL MG/KG	WTF-GS7-15SL MG/KG	WTF-GS8-15SL MG/KG
4,4'-DDD	< 5.5	< 5.4	< .5	< 5.5
4,4'-DDE	< 5.5	< 5.4	< .5	< 5.5
4,4-DDT	< 5.5	< 5.4	< .5	< 5.5
Aldrin	< 5.5 J	< 5.4 J	< .5 J	< 5.5 J
Aroclor-1016	< 5.5	< 5.4	< .5	< 5.5
Aroclor-1221	< 5.5	< 5.4	< .5	< 5.5
Aroclor-1232	< 5.5	< 5.4	< .5	< 5.5
Aroclor-1242	< 5.5	< 5.4	< .5	< 5.5
Aroclor-1248	< 5.5	< 5.4	< .5	< 5.5
Aroclor-1254	< 5.5	< 5.4	< .5	< 5.5
Aroclor-1260	< 5.5	< 5.4	< .5	< 5.5
Dieldrin	< 5.5	< 5.4	< .5	< 5.5
Endosulfan I	< 5.5	< 5.4	< .5	< 5.5
Endosulfan II	< 5.5	< 5.4	< .5	< 5.5
Endosulfan sulfate	< 5.5	< 5.4	< .5	< 5.5
Endrin	< 5.5	< 5.4	< .5	< 5.5
Endrin Aldehyde	< 5.5	< 5.4	< .5	< 5.5
Endrin ketone	< 5.5	< 5.4	< .5	< 5.5
Heptachlor	< 5.5	< 5.4	< .5	< 5.5
Heptachlor epoxide	< 5.5	< 5.4	< .5	< 5.5
Methoxychlor	< 5.5	< 5.4	< .5	< 5.5
Toxaphene	< 5.5	< 5.4	< .5	< 5.5
alpha-BHC	< 5.5	< 5.4	< .5	< 5.5
alpha-Chlordane	< 5.5	< 5.4	< .5	< 5.5
beta-BHC	< 5.5	< 5.4	< .5	< 5.5
delta-BHC	< 5.5	< 5.4	< .5	< 5.5
gamma-BHC (Linda	< 5.5	< 5.4	< .5	< 5.5
gamma-Chlordane	< 5.5	< 5.4	< .5	< 5.5

VALIDATION CODES:

J = Estimated Value
< ( ) J = Laboratory reported this result as below detection. Result is estimated based on data validation.

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PHASE I WEST TANK FARM SOIL SAMPLES

METALS RESULTS

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HARRISON DIVISION - GMC
WEST TANK FARM ANALYTICAL RESULTS
METALS

Parameter	DUP-02 MG/KG	WTF-GS10-15 MG/KG	WTF-GS7-15 MG/KG	WTF-GS8-15S MG/KG
Aluminum	**2690**	**3600**	**2720**	**2150**
Antimony	< 8.6 J	< 8.7 J	< 8.5 J	< 8.6 J
Arsenic	**4 J**	**4.6 J**	**2.1 J**	**3.5 J**
Barium	**23.6**	**21.9**	**10.1**	**11.5**
Beryllium	< .21	< .22	< .21	< .22
Cadmium	**1.8 J**	**2.3 J**	**1.7 J**	**2.7 J**
Calcium	**125000 J**	**105000 J**	**118000 J**	**144000 J**
Chromium	**5.1 J**	**9 J**	**2.6 J**	**5.2 J**
Cobalt	**3.6**	**2.7**	< 2.1	**2.8**
Copper	**10.7**	**8.8**	**4.9**	**12.7**
Iron	**6340**	**6820**	**5870**	**8790**
Lead	**5.7 J**	**11.5 J**	**2.5 J**	**6 J**
Magnesium	**53000**	**49600**	**49100**	**42600**
Manganese	**298**	**234**	**169**	**175**
Mercury	< .11	< .1	< .11	< .11
Nickel	**12.1**	**11.9**	< 6.4	9.1
Potassium	**404**	**601**	**418**	**490**
Selenium	< .43 J	< .43 J	< .42 J	< .43 J
Silver	< .64	< .65	**1 J**	**.65 J**
Sodium	**151**	**143**	**114**	**146**
Thallium	< .43 J	< .43 J	< .42 J	< .43 J
Vanadium	**8.7**	**9.7**	**8**	**6.2**
Zinc	**40.6 J**	**32.9 J**	**18 J**	**30.9 J**

VALIDATION CODES:

J = Estimated Value
< ( ) J = Laboratory reported this result as below detection. Result is estimated on data validation.

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DRAFT

PHASE I SWMU T12 SOIL SAMPLES

VOLATILE ORGANIC COMPOUND RESULTS

DRAFT

HARRISON DIVISION - GMC
SWMU 12 ANALYTICAL RESULTS, VOLATILE ORGANIC COMPOUNDS

Parameter	DUP-01 UG/KG	T12-GS1-17S UG/KG	T12-GS2-10S UG/KG	UST-TB-2 UG/L	UST-TB-3 UG/L
1,1,1-Trichloroethane	< 5.2	< 5.2	< 5.9	< 1	< 1
1,1,2,2-Tetrachloroethane	< 5.2	< 5.2	< 5.9	< 1	< 1
1,1,2-Trichloroethane	< 5.2	< 5.2	< 5.9	< 1	< 1
1,1-Dichloroethane	< 5.2	< 5.2	< 5.9	< 1	< 1
1,1-Dichloroethene	< 5.2	< 5.2	< 5.9	< 1	< 1
1,2-Dichloroethane	< 5.2	< 5.2	< 5.9	< 1	< 1
1,2-Dichloroethene (Total)	< 5.2	< 5.2	< 5.9	< 1	< 1
1,2-Dichloropropane	< 5.2	< 5.2	< 5.9	< 1	< 1
2-Butanone	< 52	< 52	< 59	< 10	< 10
2-Hexanone	< 52	< 52	< 59	< 10	< 10
4-Methyl-2-Pentanone	< 52	< 52	< 59	< 10	< 10
Acetone	< 100	< 100	< 120	< 20	< 20
Benzene	< 5.2	< 5.2	< 5.9	< 1	< 1
Bromodichloromethane	< 5.2	< 5.2	< 5.9	< 1	< 1
Bromoform	< 5.2	< 5.2	< 5.9	< 1	< 1
Bromomethane	< 26	< 26	< 29	< 5	< 5
Carbon Disulfide	< 5.2	< 5.2	< 5.9	< 1	< 1
Carbon Tetrachloride	< 5.2	< 5.2	< 5.9	< 1	< 1
Chlorobenzene	< 5.2	< 5.2	< 5.9	< 1	< 1
Chloroethane	< 52	< 52	< 59	< 10	< 10
Chloroform	< 5.2	< 5.2	< 5.9	< 1	< 1
Chloromethane	< 52	< 52	< 59	< 10	< 10
Dibromochloromethane	< 5.2	< 5.2	< 5.9	< 1	< 1
Ethylbenzene	**8**	**6.1**	< 5.9	< 1	< 1
Methylene Chloride	< 52	< 52	< 59	< 10	< 10
Styrene	**31**	**30**	**7.1**	< 1	< 1
Tetrachloroethene	< 5.2 J	< 5.2 J	< 5.9 J	< 1	< 1 J
Toluene	< 5.2	< 5.2	< 5.9	< 1	< 1
Total Xylenes	< 5.2	< 5.2	< 5.9	< 1	< 1
Trichloroethene	< 5.2	< 5.2	< 5.9	< 1	< 1
Vinyl Chloride	< 26	< 26	< 29	< 5	< 5
cis-1,3-Dichloropropene	< 5.2	< 5.2	< 5.9	< 1	< 1
trans-1,3-Dichloropropene	< 5.2	< 5.2	< 5.9	< 1	< 1

VALIDATION CODES:

J = Estimated Value
<( )J = Laboratory reported this result as below detection. Result is estimated based on data validation.

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PHASE I - SWMU T12 SOIL SAMPLES

METALS RESULTS

DRAFT

HARRISON DIVISION - GMC
SWMU T12 ANALYTICAL RESULTS, METALS

Parameter	DUP-01 MG/KG	T12-GS1-17SL MG/KG	T12-GS2-10SL MG/KG
Aluminum	**2000 J**	**1950 J**	8940 J
Antimony	**56.3 J**	**48.4 J**	32.5 J
Arsenic	**1.8 J**	**1.5 J**	4 J
Barium	**9.1**	**9.6**	**139**
Beryllium	**.38 J**	**.35 J**	**0.54**
Cadmium	**.68 J**	**1.1 J**	**3.4**
Calcium	**184000**	**174000**	**71900**
Chromium	4.6 U	4.2 U	**11.2**
Cobalt	**20 J**	**18.5 J**	**23.3**
Copper	**6.4 J**	**5.1 J**	**22 J**
Iron	**4400 J**	**4370 J**	**14000 J**
Lead	**4 J**	**3.4 J**	**14.9 J**
Magnesium	**85400 J**	**58700 J**	**24400 J**
Manganese	**204 J**	**328 J**	**284 J**
Mercury	< .1	< .1	< 0.11
Nickel	< 6.2	< 6.2	30.9 U
Potassium	617 U	462 U	1730 U
Selenium	< .42 J	< .42 J	< .46 J
Silver	< .62 J	< .62 J	< .68 J
Sodium	**254**	**202**	**282**
Thallium	< .42 J	< .42 J	< .46 J
Vanadium	**7.8**	**6.2**	**25**
Zinc	**14.9**	**15.8**	**80.1**

VALIDATION CODES:

J = Estimated Value
U = Value Qualified as a Non-Detect due to Blank Contamination
<( )J = Laboratory reported this result as below detection. Result is estimated based on data validation.

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PHASE I SWMUs T5/T6 SOIL SAMPLES

VOLATILE ORGANIC COMPOUND RESULTS

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HARRISON DIVISION - GMC
ANALYTICAL RESULTS FOR SWMUs T5/T6
VOLATILE ORGANIC COMPOUNDS

Parameter	DUP-06 UG/KG	T5/6-BH01-11SL UG/KG	T5/6-BH02-12SL UG/KG	TB-03 UG/L
1,1,1-Trichloroethane	< 5.2	< 5.2	< 5.2	< 1
1,1,2,2-Tetrachloroethane	< 5.2	< 5.2	< 5.2	< 1
1,1,2-Trichloroethane	< 5.2	< 5.2	< 5.2	< 1
1,1-Dichloroethane	< 5.2	< 5.2	< 5.2	< 1
1,1-Dichloroethene	< 5.2	< 5.2	< 5.2	< 1
1,2-Dichloroethane	< 5.2	< 5.2	< 5.2	< 1
1,2-Dichloroethene (Total)	< 5.2	< 5.2	< 5.2	< 1
1,2-Dichloropropane	< 5.2	< 5.2	< 5.2	< 1
2-Butanone	< 52 J	< 52 J	< 52 J	< 10 J
2-Hexanone	< 52 J	< 52 J	< 52 J	< 10 J
4-Methyl-2-Pentanone	< 52 J	< 52 J	< 52 J	< 10 J
Acetone	< 100	**280**	**110**	< 20
Benzene	< 5.2	< 5.2	< 5.2	< 1
Bromodichloromethane	< 5.2	< 5.2	< 5.2	< 1
Bromoform	< 5.2	< 5.2	< 5.2	< 1
Bromomethane	< 26	< 26	< 26	< 5
Carbon Disulfide	< 5.2	< 5.2	< 5.2	< 1
Carbon Tetrachloride	< 5.2	< 5.2	< 5.2	< 1
Chlorobenzene	< 5.2	< 5.2	< 5.2	< 1
Chloroethane	< 52	< 52	< 52	< 10
Chloroform	< 5.2	< 5.2	< 5.2	< 1
Chloromethane	< 52	< 52	< 52	< 10
Dibromochloromethane	< 5.2	< 5.2	< 5.2	< 1
Ethylbenzene	< 5.2	< 5.2	< 5.2	< 1
Methylene Chloride	< 52	< 52	< 52	< 10
Styrene	< 5.2	< 5.2	< 5.2	< 1
Tetrachloroethene	**55**	**33**	**32**	< 1
Toluene	< 5.2	< 5.2	< 5.2	< 1
Total Xylenes	< 5.2	< 5.2	< 5.2	< 1
Trichloroethene	< 5.2	< 5.2	< 5.2	< 1
Vinyl Chloride	< 26	< 26	< 26	< 5
cis-1,3-Dichloropropene	< 5.2	< 5.2	< 5.2	< 1
trans-1,3-Dichloropropene	< 5.2	< 5.2	< 5.2	< 1

VALIDATION CODES:

J = Estimated Value
<( )J = Laboratory reported this result as below detection. Result is estimated based on data validation.

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PHASE I SWMUs T5/T6 SOIL SAMPLES

SEMIVOLATILE ORGANIC COMPOUND RESULTS

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HARRISON DIVISION - GMC
ANALYTICAL RESULTS FOR SWMUs T5/T6
SEMIVOLATILE ORGANIC COMPOUNDS

Parameter	DUP-06 UG/KG	T5/6-BH01-12SL UG/KG	T5/6-BH02-12SL UG/KG
1,2,4-Trichlorobenzene	< 340	< 340	< 340
1,2-Dichlorobenzene	< 340	< 340	< 340
1,3-Dichlorobenzene	< 340	< 340	< 340
1,4-Dichlorobenzene	< 340	< 340	< 340
2,4,5-Trichlorophenol	< 340	< 340	< 340
2,4,6-Trichlorophenol	< 340	< 340	< 340
2,4-Dichlorophenol	< 340	< 340	< 340
2,4-Dimethylphenol	< 340	< 340	< 340
2,4-Dinitrophenol	< 340	< 340	< 340
2,4-Dinitrotoluene	< 340	< 340	< 340
2,6-Dinitrotoluene	< 340	< 340	< 340
2-Chloronapthalene	< 340	< 340	< 340
2-Chlorophenol	< 340	< 340	< 340
2-Methyl-4,6-Dinitrophenol	< 340	< 340	< 340
2-Methylnapthalene	< 340	< 340	< 340
2-Methylphenol	< 340	< 340	< 340
2-Nitroaniline	< 510	< 510	< 510
2-Nitrophenol	< 340	< 340	< 340
3,3'-Dichlorobenzidine	< 680	< 680	< 680
3-Nitroaniline	< 510	< 510	< 510
4-Bromophenyl-phenyl ether	< 340	< 340	< 340
4-Chloro-3-Methylphenol	< 340	< 340	< 340
4-Chloroaniline	< 340	< 340	< 340
4-Chlorophenyl-phenyl ether	< 340	< 340	< 340
4-Methylphenol	< 340	< 340	< 340
4-Nitroaniline	< 510	< 510	< 510
4-Nitrophenol	< 340	< 340	< 340
Acenaphthene	< 340	< 340	< 340
Acenaphthylene	< 340	< 340	< 340
Anthracene	< 340	< 340	< 340
Benzo(a)Anthracene	< 340	< 340	< 340
Benzo(a)Pyrene	< 340	< 340	< 340
Benzo(b)Fluoranthene	< 340	< 340	< 340
Benzo(g,h,i)Perylene	< 340	< 340	< 340

HARRISON DIVISION - GMC
ANALYTICAL RESULTS FOR SWMUs T5/T6
SEMIVOLATILE ORGANIC COMPOUNDS

Parameter	DUP-06 UG/KG	T5/6-BH01-12SL UG/KG	T5/6-BH02-12SL UG/KG
Benzo(k)Fluoranthene	< 340	< 340	< 340
Butyl benzyl phthalate	< 340	< 340	< 340
Carbazole	< 340	< 340	< 340
Chrysene	< 340	< 340	< 340
Di-n-Butylphthalate	< 340	< 340	< 340
Di-n-Octyl Phthalate	< 340	< 340	< 340
Dibenz(a,h)Anthracene	< 340	< 340	< 340
Dibenzofuran	< 340	< 340	< 340
Diethylphthalate	< 340	< 340	< 340
Dimethyl Phtalate	< 340	< 340	< 340
Fluoranthene	< 340	< 340	< 340
Fluorene	< 340	< 340	< 340
Hexachloro-1,3-butadiene	< 340	< 340	< 340
Hexachlorobenzene	< 340	< 340	< 340
Hexachlorocyclopentadiene	< 340	< 340	< 340
Hexachloroethane	< 340	< 340	< 340
Indeno(1,2,3-cd)Pyrene	< 340	< 340	< 340
Isophorone	< 340	< 340	< 340
N-Nitroso-Di-n-Propylamine	< 340	< 340	< 340
N-Nitrosodiphenylamine (1)	< 340	< 340	< 340
Napthalene	< 340	< 340	< 340
Nitrobenzene	< 340	< 340	< 340
Pentachlorophenol	< 340	< 340	< 340
Phenanthrene	< 340	< 340	< 340
Phenol	< 340	< 340	< 340
Pyrene	< 340	< 340	< 340
bis(2-Chloroethyl)Ether	< 340	< 340	< 340
bis(2-Chloroisopropyl)Ether	< 340	< 340	< 340
bis(2-Ethylhexyl)Phthalate	**400**	**350**	**350**
bis(Chloroethoxy)Methane	< 340	< 340	< 340

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PHASE I SWMUs T5/T6 SOIL SAMPLES

POLYCHLORINATED BIPHENYLS RESULTS

DRAFT

HARRISON DIVISION - GMC
ANALYTICAL RESULTS FOR SWMUs T5/T6
POLYCHLORINATED BIPHENYLS

Parameter	DUP-06 MG/KG	T5/6-BH01-12SL MG/KG	T5/6-BH02-12SL MG/KG
Aroclor-1016	< .5	< .5	< .5
Aroclor-1221	< .5	< .5	< .5
Aroclor-1232	< .5	< .5	< .5
Aroclor-1242	< .5	< .5	< .5
Aroclor-1248	< .5	< .5	< .5
Aroclor-1254	< .5	< .5	< .5
Aroclor-1260	< .5	< .5	< .5

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PHASE I SWMUs T5/T6 SOIL SAMPLES

METALS RESULTS

DRAFT

HARRISON DIVISION - GMC
ANALYTICAL RESULTS FOR SWMUs T5/T6, METALS

Parameter	DUP-06 MG/KG	T5/6-BH01-10SL MG/KG	T5/6-BH02-12SL MG/KG
Aluminum	**6880**	**2930**	**3210**
Antimony	**19.4**	**31.2**	**27.3**
Arsenic	**5**	**4.6**	**11**
Barium	**39.4**	**17.7**	**12.3**
Beryllium	**0.39**	**.26 J**	**.3 J**
Cadmium	**3.9**	**2.8 J**	**6.1 J**
Calcium	**67900**	**123000**	**131000**
Chromium	**10.9**	**6.9**	**8.8**
Cobalt	**9.8**	**10.3 J**	**10.6 J**
Copper	**17.3**	**7.3**	**7.4**
Iron	**10800 J**	**7650 J**	16100 J
Lead	**15.1 J**	**4.2 J**	**4.2 J**
Magnesium	**28600**	**51300**	**40000**
Manganese	**344 J**	**246 J**	**469 J**
Mercury	< .1	< .1	< .1
Nickel	**13.2**	**7.9**	**8.4**
Potassium	**898**	**632**	**592**
Selenium	< .42 J	< .42 J	< .41 J
Silver	< .63 J	< .63 J	< .62 J
Sodium	**268**	**207**	**173**
Thallium	< .42 J	< .42 J	< .41 J
Vanadium	**18.3**	**9.1**	**13.7**
Zinc	**70.2**	**31.3**	**28.1**

VALIDATION CODES:

J = Estimated Value
<( )J = Laboratory reported this result as below detection. Result is estimated b on data validation.

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PHASE I - SWMU T4 SOIL RESULTS

VOLATILE ORGANIC COMPOUND RESULTS

DRAFT

HARRISON DIVISION - GMC
SWMU T4 ANALYTICAL RESULTS
VOLATILE ORGANIC COMPOUNDS

Parameter	T4-GS1-17SL UG/KG	UST-TB-1 UG/L
1,1,1-Trichloroethane	< 5.8	< 1
1,1,2,2-Tetrachloroethane	< 5.8	< 1
1,1,2-Trichloroethane	< 5.8	< 1
1,1-Dichloroethane	< 5.8	< 1
1,1-Dichloroethene	< 5.8	< 1
1,2-Dichloroethane	< 5.8	< 1
1,2-Dichloroethene (Total)	< 5.8	< 1
1,2-Dichloropropane	< 5.8	< 1
2-Butanone	< 58	< 10
2-Hexanone	< 58	< 10
4-Methyl-2-Pentanone	< 58	< 10
Acetone	< 120	< 20
Benzene	< 5.8	< 1
Bromodichloromethane	< 5.8	< 1
Bromoform	< 5.8	< 1
Bromomethane	< 29	< 5
Carbon Disulfide	< 5.8	< 1
Carbon Tetrachloride	< 5.8	< 1
Chlorobenzene	< 5.8	< 1
Chloroethane	< 58	< 10
Chloroform	< 5.8	< 1
Chloromethane	< 58	< 10
Dibromochloromethane	< 5.8	< 1
Ethylbenzene	< 5.8	< 1
Methylene Chloride	< 58	< 10
Styrene	< 5.8	< 1
Tetrachloroethene	**19 J**	< 1
Toluene	< 5.8	< 1
Total Xylenes	< 5.8	< 1
Trichloroethene	< 5.8	< 1
Vinyl Chloride	< 29	< 5
cis-1,3-Dichloropropene	< 5.8	< 1
trans-1,3-Dichloropropene	< 5.8	< 1

VALIDATION CODES:

J = Estimated Value

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FINAL

PHASE I SWMU T4 SOIL RESULTS

METALS RESULTS

DRAFT

HARRISON DIVISION - GMC
SWMU T4 ANALYTICAL RESULTS, METALS

Parameter	T4-GS1-17SL MG/KG
Aluminum	**11100 J**
Antimony	**22.4 J**
Arsenic	**6.5 J**
Barium	**65.6**
Beryllium	**.65**
Cadmium	**4.2**
Calcium	**42000**
Chromium	**14.1**
Cobalt	**18.2**
Copper	**19 J**
Iron	**17400 J**
Lead	**13.5 J**
Magnesium	**23800 J**
Manganese	**541 J**
Mercury	< .12
Nickel	19.8 U
Potassium	1560 U
Selenium	< .47 J
Silver	< .7 J
Sodium	**271**
Thallium	< .47 J
Vanadium	**26.7**
Zinc	**70.8**

VALIDATION CODES:

J = Estimated Value
U = Value Qualified as a Non-Detect due to Blank Contamination
<( )J = Laboratory reported this result as below detection. Result is estimated based on data validation.

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PHASE I SWMU T11 SOIL SAMPLES

VOLATILE ORGANIC COMPOUND RESULTS

DRAFT

HARRISON DIVISION - GMC
SWMU T11 ANALYTICAL RESULTS, VOLATILE ORGANIC COMPOUNDS

Parameters	DUP-08 UG/KG	T11-BH01-02SL UG/KG	T11-BH01-16SL UG/KG	T11-BH02-02SL UG/KG	T11-BH02-16SL UG/KG	T11-BH03-02SL UG/KG	T11-BH03-16SL UG/KG	TB-04 UG/L
1,1,1-Trichloroethane	< 28	< 28	< 5.3	< 290	< 5.2	< 12	< 5.3	< 1
1,1,2,2-Tetrachloroethane	< 28	< 28	< 5.3	< 290	< 5.2	< 12	< 5.3	< 1
1,1,2-Trichloroethane	< 28	< 28	< 5.3	< 290	< 5.2	< 12	< 5.3	< 1
1,1-Dichloroethane	< 28	< 28	< 5.3	< 290	< 5.2	< 12	< 5.3	< 1
1,1-Dichloroethene	< 28	< 28	< 5.3	< 290	< 5.2	< 12	< 5.3	< 1
1,2-Dichloroethane	< 28	< 28	< 5.3	< 290	< 5.2	< 12	< 5.3	< 1
1,2-Dichloroethene (Total)	< 28	< 28	< 5.3	< 290	< 5.2	< 12	< 5.3	< 1
1,2-Dichloropropane	< 28	< 28	< 5.3	< 290	< 5.2	< 12	< 5.3	< 1
2-Butanone	< 280 J	< 280 J	< 53 J	< 2900 J	< 52	< 120	< 53	< 10
2-Hexanone	< 280 J	< 280 J	< 53	< 2900 J	< 52	< 120	< 53	< 10
4-Methyl-2-Pentanone	< 280 J	< 280 J	< 53 J	< 2900 J	< 52	< 120	< 53	< 10
Acetone	**1800**	**1800**	1400 J	< 5700	**1400 J**	**8900 J**	**710 J**	< 20
Benzene	< 28	< 28	< 5.3	< 290	< 5.2	< 12	< 5.3	< 1
Bromodichloromethane	< 28	< 28	< 5.3	< 290	< 5.2	< 12	< 5.3	< 1
Bromoform	< 28	< 28	< 5.3	< 290	< 5.2	< 12	< 5.3	< 1
Bromomethane	< 140	< 140	< 26	< 1400	< 26	< 58	< 26 J	< 5
Carbon Disulfide	< 28	< 28	< 5.3	< 290	< 5.2	< 12	< 5.3	< 1
Carbon Tetrachloride	< 28	< 28	< 5.3	< 290	< 5.2	< 12	< 5.3 J	< 1
Chlorobenzene	< 28	< 28	< 5.3	< 290	< 5.2	< 12	< 5.3	< 1
Chloroethane	< 280	< 280	< 53	< 2900	< 52	< 120	< 53	< 10
Chloroform	< 28	< 28	< 5.3	< 290	< 5.2	< 12	< 5.3	< 1
Chloromethane	< 280	< 280	< 53	< 2900	< 52	< 120	< 53	< 10
Dibromochloromethane	< 28	< 28	< 5.3	< 290	< 5.2	< 12	< 5.3	< 1
Ethylbenzene	< 28	< 28	< 5.3	< 290	< 5.2	< 12	< 5.3	< 1
Methylene Chloride	< 280	< 280	< 53	< 2900	< 52	< 120	< 53	< 10
Styrene	< 28	< 28	< 5.3	< 290	< 5.2	< 12	< 5.3	< 1
Tetrachloroethene	**120**	**66**	**41**	< 290	< 5.2	**110**	**38 J**	< 1
Toluene	< 28	< 28	**5.8**	< 290	< 5.2	< 12	< 5.3	< 1
Total Xylenes	< 28	< 28	< 5.3	< 290	< 5.2	< 12	< 5.3	< 1
Trichloroethene	< 28	< 28	< 5.3	< 290	< 5.2	< 12	< 5.3	< 1
Vinyl Chloride	< 140	< 140	< 26	< 1400	< 26	< 58	< 26	< 5
cis-1,3-Dichloropropene	< 28	< 28	< 5.3	< 290	< 5.2	< 12	< 5.3	< 1
trans-1,3-Dichloropropene	< 28	< 28	< 5.3	< 290	< 5.2	< 12	< 5.3	< 1

VALIDATION CODES:

J = Estimated Value

<( )J = Laboratory reported this result as below detection. Result is estimated based on data validation.

PHASE I SWMU T11 SOIL SAMPLES

SEMIVOLATILE ORGANIC COMPOUND RESULTS

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HARRISON DIVISION - GMC
SWMU T11 ANALYTICAL RESULTS, SEMIVOLATILE ORGANIC COMPOUNDS

Parameter	DUP-08 UG/KG	T11-BH01-02SL UG/KG	T11-BH01-16SL UG/KG	T11-BH02-02SL UG/KG	T11-BH02-16SL UG/KG	T11-BH03-02SL UG/KG	T11-BH03-16SL UG/KG
1,2,4-Trichlorobenzene	< 370	< 370	< 350	< 3800	< 340	< 3800	< 350
1,2-Dichlorobenzene	< 370	< 370	< 350	< 3800	< 340	< 3800	< 350
1,3-Dichlorobenzene	< 370	< 370	< 350	< 3800	< 340	< 3800	< 350
1,4-Dichlorobenzene	< 370	< 370	< 350	< 3800	< 340	< 3800	< 350
2,4,5-Trichlorophenol	< 370	< 370	< 350	< 3800	< 340	< 3800	< 350
2,4,6-Trichlorophenol	< 370	< 370	< 350	< 3800	< 340	< 3800	< 350
2,4-Dichlorophenol	< 370	< 370	< 350	< 3800	< 340	< 3800	< 350
2,4-Dimethylphenol	< 370	< 370	< 350	< 3800	< 340	< 3800	< 350
2,4-Dinitrophenol	< 370	< 370	< 350	< 3800	< 340	< 3800	< 350
2,4-Dinitrotoluene	< 370	< 370	< 350	< 3800	< 340	< 3800	< 350
2,6-Dinitrotoluene	< 370	< 370	< 350	< 3800	< 340	< 3800	< 350
2-Chloronapthalene	< 370	< 370	< 350	< 3800	< 340	< 3800	< 350
2-Chlorophenol	< 370	< 370	< 350	< 3800	< 340	< 3800	< 350
2-Methyl-4,6-Dinitrophenol	< 370	< 370	< 350	< 3800	< 340	< 3800	< 350
2-Methylnaphthalene	< 370	< 370	< 350	**7300**	< 340	< 3800	< 350
2-Methylphenol	< 370	< 370	< 350	< 3800	< 340	< 3800	< 350
2-Nitroaniline	< 550	< 560	< 520	< 5700	< 510	< 5700	< 520
2-Nitrophenol	< 370	< 370	< 350	< 3800	< 340	< 3800	< 350
3,3'-Dichlorobenzidine	< 740	< 750	< 700	< 7600	< 680	< 7600	< 690
3-Nitroaniline	< 550	< 560	< 520	< 5700	< 510	< 5700	< 520
4-Bromophenyl-phenyl ether	< 370	< 370	< 350	< 3800	< 340	< 3800	< 350
4-Chloro-3-Methylphenol	< 370	< 370	< 350	< 3800	< 340	< 3800	< 350
4-Chloroaniline	< 370	< 370	< 350	< 3800	< 340	< 3800	< 350
4-Chlorophenyl-phenyl ether	< 370	< 370	< 350	< 3800	< 340	< 3800	< 350
4-Methylphenol	< 370	< 370	< 350	< 3800	< 340	< 3800	< 350
4-Nitroaniline	< 550	< 560	< 520	< 5700	< 510	< 5700	< 520
4-Nitrophenol	< 370	< 370	< 350	< 3800	< 340	< 3800	< 350
Acenaphthene	< 370	< 370	< 350	< 3800	< 340	< 3800	< 350
Acenaphthylene	< 370	< 370	< 350	< 3800	< 340	< 3800	< 350
Anthracene	< 370	< 370	< 350	< 3800	< 340	< 3800	< 350
Benzo(a)Anthracene	< 370	< 370	< 350	< 3800	< 340	< 3800	< 350
Benzo(a)Pyrene	< 370	< 370	< 350	< 3800	< 340	< 3800	< 350
Benzo(b)Fluoranthene	< 370	< 370	< 350	< 3800	< 340	< 3800	< 350
Benzo(g,h,i)Perylene	< 370	< 370	< 350	< 3800	< 340	< 3800	< 350

HARRISON DIVISION - GMC
SWMU T11 ANALYTICAL RESULTS, SEMIVOLATILE ORGANIC COMPOUNDS

Parameter	DUP-08 UG/KG	T11-BH01-02SL UG/KG	T11-BH01-16SL UG/KG	T11-BH02-02SL UG/KG	T11-BH02-16SL UG/KG	T11-BH03-02SL UG/KG	T11-BH03-16SL UG/KG
Benzo(k)Fluoranthene	< 370	< 370	< 350	< 3800	< 340	< 3800	< 350
Butyl benzyl phthalate	< 370	< 370	< 350	< 3800	< 340	< 3800	< 350
Carbazole	< 370	< 370	< 350	< 3800	< 340	< 3800	< 350
Chrysene	< 370	< 370	< 350	< 3800	< 340	< 3800	< 350
Di-n-Butylphthalate	< 370	< 370	< 350	< 3800	< 340	< 3800	< 350
Di-n-Octyl Phthalate	< 370	< 370	< 350	< 3800	< 340	< 3800	< 350
Dibenz(a,h)Anthracene	< 370	< 370	< 350	< 3800	< 340	< 3800	< 350
Dibenzofuran	< 370	< 370	< 350	< 3800	< 340	< 3800	< 350
Diethylphthalate	< 370	< 370	< 350	< 3800	< 340	< 3800	< 350
Dimethyl Phtalate	< 370	< 370	< 350	< 3800	< 340	< 3800	< 350
Fluoranthene	< 370	< 370	< 350	< 3800	< 340	< 3800	< 350
Fluorene	< 370	< 370	< 350	< 3800	< 340	< 3800	< 350
Hexachloro-1,3-butadiene	< 370	< 370	< 350	< 3800	< 340	< 3800	< 350
Hexachlorobenzene	< 370	< 370	< 350	< 3800	< 340	< 3800	< 350
Hexachlorocyclopentadiene	< 370	< 370	< 350	< 3800	< 340	< 3800	< 350
Hexachloroethane	< 370	< 370	< 350	< 3800	< 340	< 3800	< 350
Indeno(1,2,3-cd)Pyrene	< 370	< 370	< 350	< 3800	< 340	< 3800	< 350
Isophorone	< 370	< 370	< 350	< 3800	< 340	< 3800	< 350
N-Nitroso-Di-n-Propylamine	< 370	< 370	< 350	< 3800	< 340	< 3800	< 350
N-Nitrosodiphenylamine	< 370	< 370	< 350	< 3800	< 340	< 3800	< 350
Napthalene	< 370	< 370	< 350	**7500**	< 340	< 3800	< 350
Nitrobenzene	< 370	< 370	< 350	< 3800	< 340	< 3800	< 350
Pentachlorophenol	< 370	< 370	< 350	< 3800	< 340	< 3800	< 350
Phenanthrene	< 370	< 370	< 350	< 3800	< 340	< 3800	< 350
Phenol	< 370	< 370	< 350	< 3800	< 340	< 3800	< 350
Pyrene	< 370	< 370	< 350	< 3800	< 340	< 3800	< 350
bis(2-Chloroethyl)Ether	< 370	< 370	< 350	< 3800	< 340	< 3800	< 350
bis(2-Chloroisopropyl)Ether	< 370	< 370	< 350	< 3800	< 340	< 3800	< 350
bis(2-Ethylhexyl)Phthalate	< 370	**550**	**580**	< 3800	**420**	< 3800	< 350
bis(Chloroethoxy)Methane	< 370	< 370	< 350	< 3800	< 340	< 3800	< 350

FINAL

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PHASE I SWMU T11 SOIL SAMPLES

POLYCHLORINATED BIPHENYLS AND PESTICIDES RESULTS

DRAFT

HARRISON DIVISION - GMC

SWMU T11 ANALYTICAL RESULTS

POLYCHLORINATED BIPHENYLS AND PESTICIDES

Parameter	DUP-08 MG/KG	T11-BH01-02SL MG/KG	T11-BH01-16SL MG/KG	T11-BH02-02SL MG/KG	T11-BH02-16SL MG/KG	T11-BH03-02SL MG/KG	T11-BH03-16SL MG/KG
4,4'-DDD	< .6	< 5.7	< .5	< .6	< .5	< 58	< 5.3
4,4'-DDE	< .6	< 5.7	< .5	< .6	< .5	< 58	< 5.3
4,4-DDT	< .6	< 5.7	< .5	< .6	< .5	< 58	< 5.3
Aldrin	< .6	< 5.7	< .5	< .6	< .5	< 58	< 5.3
Aroclor-1016	< .6	< 5.7	< .5	< .6	< .5	< 58	< 5.3
Aroclor-1221	< .6	< 5.7	< .5	< .6	< .5	< 58	< 5.3
Aroclor-1232	< .6	< 5.7	< .5	< .6	< .5	< 58	< 5.3
Aroclor-1242	< .6	< 5.7	< .5	< .6	< .5	< 58	< 5.3
Aroclor-1248	< .6	< 5.7	< .5	< .6	< .5	< 58	< 5.3
Aroclor-1254	< .6	< 5.7	< .5	< .6	< .5	< 58	< 5.3
Aroclor-1260	< .6	< 5.7	< .5	< .6	< .5	< 58	< 5.3
Dieldrin	< .6	< 5.7	< .5	< .6	< .5	< 58	< 5.3
Endosulfan I	< .6	< 5.7	< .5	< .6	< .5	< 58	< 5.3
Endosulfan II	< .6	< 5.7	< .5	< .6	< .5	< 58	< 5.3
Endosulfan sulfate	< .6	< 5.7	< .5	< .6	< .5	< 58	< 5.3
Endrin	< .6	< 5.7	< .5	< .6	< .5	< 58	< 5.3
Endrin Aldehyde	< .6	< 5.7	< .5	< .6	< .5	< 58	< 5.3
Endrin ketone	< .6	< 5.7	< .5	< .6	< .5	< 58	< 5.3
Heptachlor	< .6	< 5.7	< .5	< .6	< .5	< 58	< 5.3
Heptachlor epoxide	< .6	< 5.7	< .5	< .6	< .5	< 58	< 5.3
Methoxychlor	< .6	< 5.7	< .5	< .6	< .5	< 58	< 5.3
Toxaphene	< .6	< 5.7	< .5	< .6	< .5	< 58	< 5.3
alpha-BHC	< .6	< 5.7	< .5	< .6	< .5	< 58	< 5.3
alpha-Chlordane	< .6	< 5.7	< .5	< .6	< .5	< 58	< 5.3
beta-BHC	< .6	< 5.7	< .5	< .6	< .5	< 58	< 5.3
delta-BHC	< .6	< 5.7	< .5	< .6	< .5	< 58	< 5.3
gamma-BHC(Lindane)	< .6	< 5.7	< .5	< .6	< .5	< 58	< 5.3
gamma-Chlordane	< .6	< 5.7	< .5	< .6	< .5	< 58	< 5.3

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PHASE I SWMU T11 SOIL SAMPLES

METALS AND CYANIDE RESULTS

DRAFT

HARRISON DIVISION - GMC
SWMU T11 ANALYTICAL RESULTS, METALS AND CYANIDE

Parameter	DUP-08 MG/KG	T11-BH01-02SL MG/KG	T11-BH01-16SL MG/KG	T11-BH02-02SL MG/KG	T11-BH02-16SL MG/KG	T11-BH03-02SL MG/KG	T11-BH03-16SL MG/KG
Aluminum	9450	8940	2040	9650	2360	8290	2200
Antimony	11.8	17.5	29.3	< 6.8	37.5	20.6	39.7
Arsenic	8.9	7.2	5.5	9.4	3.7	7.3	2.8
Barium	57.8	40	543	104	12.2	84.2	10.6
Beryllium	0.54	0.47	< .21	0.69	.26 J	0.49	.28 J
Cadmium	5.5	5.1	2.1 J	4.8	2.3 J	4.5	1.9 J
Calcium	41800	60000	143000	6610	146000	93400	162000
Chromium	12.8	11.3	3.4	14.5	6.3	11.2	5
Cobalt	10.5	10.5	9 J	11.5	10.1 J	11.5	11.2 J
Copper	16	13	8.6	25.9	8.2	18.3	6.9
Iron	15600 J	12900 J	6340 J	14500 J	5610 J	12200 J	5190 J
Lead	9.6 J	6.3 J	3.4 J	20.9 J	2.9 J	12.1 J	2.5 J
Magnesium	20800	27200	30500	3510	57400	27700	66600
Manganese	470 J	350 J	345 J	814 J	311 J	502 J	202 J
Mercury	< .11	< .11	< .11	< .12	< .1	< .11	< .1
Nickel	15.9	15.2	6.8	33.5	9.5	17.5	6.2
Potassium	778	903	515	1130	464	1050	544
Selenium	< 2.2 J	< .43 J	< .42 J	< 2.3 J	< .42 J	< .45 J	< .42 J
Silver	< .67 J	< .65 J	< .64 J	< .68 J	< .63 J	< .68 J	< .63 J
Sodium	148	221	161	110	191	156	214
Thallium	< .44 J	< .43 J	< .42 J	< .46 J	< .42 J	< .45 J	< .42 J
Vanadium	21	19.1	7	27.8	8.8	19.4	7.1
Zinc	58.1	45.9	23.8	77.6	29.7	57.8	20.9
Cyanide	< .1 J	< .1 J	< .1 J	.8 J	< .1 J	< .1 J	< .1 J

VALIDATION CODES:

J = Estimated Value
<( )J = Laboratory reported this result as below detection. Result is estimated based on data validation.

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PHASE I WASTE PILE/STAGING AREA SOIL SAMPLES

VOLATILE ORGANIC COMPOUND RESULTS

DRAFT

HARRISON DIVISION - GMC
WASTE PILE/STAGING AREA ANALYTICAL RESULTS
VOLATILE ORGANIC OMPOUNDS

Parameter	DUP-07 UG/KG	WPSA-BH01-02SL UG/KG	WPSA-BH01-08SL UG/KG	WPSA-BH02-02SL UG/KG	WPSA-BH02-08SL UG/KG	WPSA-BH03-02SL UG/KG	WPSA-BH03-08SL UG/KG	TB-04 UG/L
1,1,1-Trichloroethane	<26	< 26	**180**	**66**	< 30	**130**	**2100**	< 1
1,1,2,2-Tetrachloroethane	< 26	< 26	< 31	< 27	< 30	< 25	< 310	< 1
1,1,2-Trichloroethane	< 26	< 26	< 31	< 27	< 30	< 25	< 310	< 1
1,1-Dichloroethane	< 26	< 26	< 31	< 27	< 30	**3000**	< 310	< 1
1,1-Dichloroethene	< 26	< 26	< 31	< 27	< 30	< 25	< 310	< 1
1,2-Dichloroethane	<26	< 26	< 31	< 27	< 30	< 25	< 310	< 1
1,2-Dichloroethene (Total)	<26	< 26	< 31	< 27	< 30	< 25	< 310	< 1
1,2-Dichloropropane	<26	< 26	< 31	< 27	< 30	< 25	< 310	< 1
2-Butanone	<260J	< 260 J	< 310 J	< 270 J	< 300 J	< 240 J	< 3100 J	< 10
2-Hexanone	<260J	< 260 J	< 310 J	< 270 J	< 300 J	< 240	< 3100	< 10
4-Methyl-2-Pentanone	< 280 J	< 260 J	< 310 J	< 270 J	< 300 J	< 240	< 3100	< 10
Acetone	<520	< 510	**3400 J**	**1900**	< 600	**12000 J**	< 6200	< 20
Benzene	<26	< 26	< 31	< 27	< 30	**25**	< 310	< 1
Bromodichloromethane	<26	< 26	< 31	< 27	< 30	< 25	< 310	< 1
Bromoform	<26	< 26	< 31	< 27	< 30	< 25	< 310	< 1
Bromomethane	<130	< 130	< 160	< 130	< 150	< 120	< 1600	< 5
Carbon Disulfide	<26	< 26	< 31	< 27	< 30	< 25	< 310	< 1
Carbon Tetrachloride	<26	< 26	< 31	< 27	< 30	< 25	< 310	< 1
Chlorobenzene	<26	< 26	< 31	< 27	< 30	< 25	< 310	< 1
Chloroethane	<260	< 260	< 310	< 270	< 300	< 240	< 3100	< 10
Chloroform	<26	< 26	< 31	< 27	< 30	< 25	< 310	< 1
Chloromethane	<260	< 260	< 310	< 270	< 300	< 240	< 3100	< 10
Dibromochloromethane	<26	< 26	< 31	< 27	< 30	< 25	< 310	< 1
Ethylbenzene	<26	< 26	**65**	< 27	< 30	**46**	**1600**	< 1
Methylene Chloride	<260	< 260	< 310	< 270	< 300	< 240	< 3100	< 10
Styrene	<26	< 26	< 31	< 27	< 30	< 25	< 310	< 1
Tetrachloroethene	**180**	**200**	**84**	**54**	**130**	**87**	< 310	< 1
Toluene	**36**	< 26	**52**	< 27	< 30	**520**	**16000**	< 1
Total Xylenes	<26	< 26	**130**	< 27	< 30	**230**	**19000**	< 1
Trichloroethene	<26	< 26	< 31	< 27	< 30	< 25	< 310	< 1
Vinyl Chloride	<130	< 130	< 160	< 130	< 150	< 120	< 1600	< 5
cis-1,3-Dichloropropene	<26	< 26	< 31	< 27	< 30	< 25	< 310	< 1
trans-1,3-Dichloropropene	<26	< 26	< 31	< 27	< 30	< 25	< 310	< 1

VALIDATION CODES:

J = Estimated Value

<( )J = Laboratory reported this result as below detection. Result is estimated based on data validation.

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PHASE I WASTE PILE/STAGING AREA SOIL SAMPLES

SEMIVOLATILE ORGANIC COMPOUND RESULTS

DRAFT

HARRISON DIVISION - GMC
WASTE PILE/STAGING AREA ANALYTICAL RESULTS
SEMIVOLATILE ORGANIC COMPOUNDS

Parameter	DUP-07 UG/KG	WPSA-BH01-02S UG/KG	WPSA-BH01-08S UG/KG	WPSA-BH02-02S UG/KG	WPSA-BH02-08S UG/KG	WPSA-BH03-02S UG/KG	WPSA-BH03-08S UG/KG
1,2,4-Trichlorobenzene	< 17000	< 17000	< 4200	< 350	< 390	< 18000	< 41000
1,2-Dichlorobenzene	< 17000	< 17000	< 4200	< 350	< 390	< 18000	< 41000
1,3-Dichlorobenzene	< 17000	< 17000	< 4200	< 350	< 390	< 18000	< 41000
1,4-Dichlorobenzene	< 17000	< 17000	< 4200	< 350	< 390	< 18000	< 41000
2,4,5-Trichlorophenol	< 17000	< 17000	< 4200	< 350	< 390	< 18000	< 41000
2,4,6-Trichlorophenol	< 17000	< 17000	< 4200	< 350	< 390	< 18000	< 41000
2,4-Dichlorophenol	< 17000	< 17000	< 4200	< 350	< 390	< 18000	< 41000
2,4-Dimethylphenol	< 17000	< 17000	< 4200	< 350	< 390	< 18000	< 41000
2,4-Dinitrophenol	< 17000	< 17000	< 4200	< 350	< 390	< 18000	< 41000
2,4-Dinitrotoluene	< 17000	< 17000	< 4200	< 350	< 390	< 18000	< 41000
2,6-Dinitrotoluene	< 17000	< 17000	< 4200	< 350	< 390	< 18000	< 41000
2-Chloronapthalene	< 17000	< 17000	< 4200	< 350	< 390	< 18000	< 41000
2-Chlorophenol	< 17000	< 17000	< 4200	< 350	< 390	< 18000	< 41000
2-Methyl-4,6-Dinitrophenol	< 17000	< 17000	< 4200	< 350	< 390	< 18000	< 41000
2-Methylnapthalene	< 17000	< 17000	< 4200	< 350	< 390	< 18000	< 41000
2-Methylphenol	< 17000	< 17000	< 4200	< 350	< 390	< 18000	< 41000
2-Nitroaniline	< 25000	< 25000	< 6200	< 530	< 590	< 26000	< 62000
2-Nitrophenol	< 17000	< 17000	< 4200	< 350	< 390	< 18000	< 41000
3,3'-Dichlorobenzidine	< 34000	< 34000	< 8300	< 700	< 790	< 35000	< 82000
3-Nitroaniline	< 25000	< 25000	< 6200	< 530	< 590	< 26000	< 62000
4-Bromophenyl-phenyl ethe	< 17000	< 17000	< 4200	< 350	< 390	< 18000	< 41000
4-Chloro-3-Methylphenol	< 17000	< 17000	< 4200	< 350	< 390	< 18000	< 41000
4-Chloroaniline	< 17000	< 17000	< 4200	< 350	< 390	< 18000	< 41000
4-Chlorophenyl-phenyl ethe	< 17000	< 17000	< 4200	< 350	< 390	< 18000	< 41000
4-Methylphenol	< 17000	< 17000	< 4200	< 350	< 390	< 18000	< 41000
4-Nitroaniline	< 25000	< 25000	< 6200	< 530	< 590	< 26000	< 62000
4-Nitrophenol	< 17000	< 17000	< 4200	< 350	< 390	< 18000	< 41000
Acenaphthene	< 17000	< 17000	< 4200	< 350	< 390	< 18000	< 41000
Acenaphthylene	< 17000	< 17000	< 4200	< 350	< 390	< 18000	< 41000
Anthracene	< 17000	< 17000	< 4200	< 350	< 390	< 18000	< 41000
Benzo(a)Anthracene	< 17000	< 17000	< 4200	< 350	< 390	< 18000	< 41000
Benzo(a)Pyrene	< 17000	< 17000	< 4200	< 350	< 390	< 18000	**47000**
Benzo(b)Fluoranthene	< 17000	< 17000	< 4200	< 350	< 390	< 18000	**90000**
Benzo(g,h,i)Perylene	< 17000	< 17000	< 4200	< 350	< 390	< 18000	< 41000

DRAFT FINAL

HARRISON DIVISION - GMC
WASTE PILE/STAGING AREA ANALYTICAL RESULTS
SEMIVOLATILE ORGANIC COMPOUNDS

Parameter	DUP-07 UG/KG	WPSA-BH01-02S UG/KG	WPSA-BH01-08S UG/KG	WPSA-BH02-02S UG/KG	WPSA-BH02-08S UG/KG	WPSA-BH03-02S UG/KG	WPSA-BH03-08S UG/KG
Benzo(k)Fluoranthene	< 17000	< 17000	< 4200	< 350	< 390	< 18000	< 41000
Butyl benzyl phthalate	**22000**	**28000**	< 4200	< 350	< 390	< 18000	< 41000
Carbazole	< 17000	< 17000	< 4200	< 350	< 390	< 18000	< 41000
Chrysene	< 17000	< 17000	< 4200	< 350	< 390	< 18000	**44000**
Di-n-Butylphthalate	< 17000	< 17000	< 4200	< 350	< 390	< 18000	< 41000
Di-n-Octyl Phthalate	< 17000	< 17000	< 4200	< 350	< 390	< 18000	< 41000
Dibenz(a,h)Anthracene	< 17000	< 17000	< 4200	< 350	< 390	< 18000	< 41000
Dibenzofuran	< 17000	< 17000	< 4200	< 350	< 390	< 18000	< 41000
Diethylphthalate	< 17000	< 17000	< 4200	< 350	< 390	< 18000	< 41000
Dimethyl Phtalate	< 17000	< 17000	< 4200	< 350	< 390	< 18000	< 41000
Fluoranthene	< 17000	< 17000	< 4200	< 350	< 390	< 18000	**86000**
Fluorene	< 17000	< 17000	< 4200	< 350	< 390	< 18000	< 41000
Hexachloro-1,3-butadiene	< 17000	< 17000	< 4200	< 350	< 390	< 18000	< 41000
Hexachlorobenzene	< 17000	< 17000	< 4200	< 350	< 390	< 18000	< 41000
Hexachlorocyclopentadiene	< 17000	< 17000	< 4200	< 350	< 390	< 18000	< 41000
Hexachloroethane	< 17000	< 17000	< 4200	< 350	< 390	< 18000	< 41000
Indeno(1,2,3-cd)Pyrene	< 17000	< 17000	< 4200	< 350	< 390	< 18000	< 41000
Isophorone	< 17000	< 17000	< 4200	< 350	< 390	< 18000	< 41000
N-Nitroso-Di-n-Propylamin	< 17000	< 17000	< 4200	< 350	< 390	< 18000	< 41000
N-Nitrosodiphenylamine (1)	< 17000	< 17000	< 4200	< 350	< 390	< 18000	< 41000
Napthalene	< 17000	< 17000	< 4200	< 350	< 390	< 18000	< 41000
Nitrobenzene	< 17000	< 17000	< 4200	< 350	< 390	< 18000	< 41000
Pentachlorophenol	< 17000	< 17000	< 4200	< 350	< 390	< 18000	< 41000
Phenanthrene	< 17000	< 17000	< 4200	< 350	< 390	< 18000	**84000**
Phenol	< 17000	< 17000	< 4200	< 350	< 390	< 18000	< 41000
Pyrene	< 17000	< 17000	< 4200	< 350	< 390	< 18000	**83000**
bis(2-Chloroethyl)Ether	< 17000	< 17000	< 4200	< 350	< 390	< 18000	< 41000
bis(2-Chloroisopropyl)Ether	< 17000	< 17000	< 4200	< 350	< 390	< 18000	< 41000
bis(2-Ethylhexyl)Phthalate	< 17000	< 17000	< 4200	**390**	< 390	< 18000	< 41000
bis(Chloroethoxy)Methane	< 17000	< 17000	< 4200	< 350	< 390	< 18000	< 41000

DRAFT

PHASE I WASTE PILE/STAGING AREA SOIL SAMPLES

POLYCHLORINATED BIPHENYLS RESULTS

DRAFT

HARRISON DIVISION - GM
WASTE PILE/STAGING AREA ANALYTICAL RESULTS
POLYCHLORINATED BIPHENYLS

Parameter	DUP-07 MG/KG	WPSA-BH01-02 MG/KG	WPSA-BH01-08 MG/KG	WPSA-BH02-02 MG/KG	WPSA-BH02-08 MG/KG	WPSA-BH03-02 MG/KG	WPSA-BH03-08 MG/KG
Aroclor-1016	<10	< 10	< .6	< .5	< .6	< .5	< .6
Aroclor-1221	<10	< 10	< .6	< .5	< .6	< .5	< .6
Aroclor-1232	<10	< 10	< .6	< .5	< .6	< .5	< .6
Aroclor-1242	<10	< 10	< .6	< .5	< .6	**2.5**	< .6
Aroclor-1248	<10	< 10	< .6	< .5	< .6	< .5	< .6
Aroclor-1254	<10	< 10	< .6	< .5	< .6	< .5	< .6
Aroclor-1260	<10	< 10	< .6	< .5	< .6	**0.6**	< .6

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PHASE I WASTE PILE/STAGING AREA SOIL SAMPLES

METALS RESULTS

DRAFT

HARRISON DIVISION - GMC
WASTE PILE/STAGING AREA ANALYTICAL RESULTS
METALS

Parameter	DUP-07 MG/KG	WPSA-BH01-02 MG/KG	WPSA-BH01-08 MG/KG	WPSA-BH02-02 MG/KG	WPSA-BH02-08 MG/KG	WPSA-BH03-02 MG/KG	WPSA-BH03-08 MG/KG
Aluminum	859	3240	12400	2300	18900	5510	10500
Antimony	40.3	26.1	23.1	38	294	21.8	7.3
Arsenic	1.9	2.8	7.5	3.4	9.1	10	9.6
Barium	5.8	18.3	64.6	18.8	90.8	2620	886
Beryllium	<0.21	.26 J	0.58	.25 J	0.85	< .22	0.68
Cadmium	1.2J	3.9 J	7	1.8 J	8.4	21.9	7.7
Calcium	208000	113000	61100	172000	4560	50100	2660
Chromium	2.7	6.9	17.6	4.9	24.9	111	20.4
Cobalt	9.1J	9.9 J	12.8	10.1 J	14.6	22.1	17.4
Copper	3.5	13.4	12.3	5.4	25.7	339	169
Iron	2820J	9780 J	19200 J	5470 J	25400 J	51700 J	18000 J
Lead	6.0J	16.3 J	20.1 J	4.6 J	26.9 J	174 J	50.7 J
Magnesium	44400	32500	33200	53800	4330	17400	1790
Manganese	413J	445 J	900 J	370 J	363 J	400 J	938 J
Mercury	<1.0	< .11	< .13	< .1	< .12	< .11	< .12
Nickel	2.9	11.3	16.9	6.5	43.1	106	25.5
Potassium	257	723	1230	505	1920	801	1160
Selenium	<.41J	< .42 J	< .51 J	< .42 J	< .5 J	< .43 J	< .48 J
Silver	<.62J	< .63 J	< .77 J	< .63 J	< .75 J	< .65 J	< .71 J
Sodium	163	148	162	187	1120	1590	1500
Thallium	<.41J	< .42 J	< .51 J	< .42 J	< .5 J	< .43 J	< .48 J
Vanadium	2.9	7.4	24.8	7.8	43.9	19.5	27.6
Zinc	16	40.1	55.7	19.5	115	689	707

VALIDATION CODES:

J = Estimated Value
<( )J = Laboratory reported this result as below detection. Result is estimated based on data validation.

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PHASE I SOUTH TANK FARM SOIL SAMPLES

VOLATILE ORGANIC COMPOUND RESULTS

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HARRISON DIVISION - GMC
SOUTH TANK FARM ANALYTICAL RESULTS
VOLATILE ORGANIC COMPOUNDS

Parameter	STF-GS2-15SL UG/KG	STF-GS27-15SL UG/KG	STF-GS5-15SL UG/KG	UST-TB-4 UG/L
1,1,1-Trichloroethane	< 270	< 5.3	< 5.3	< 1
1,1,2,2-Tetrachloroethane	< 270	< 5.3	< 5.3	< 1
1,1,2-Trichloroethane	< 270	< 5.3	< 5.3	< 1
1,1-Dichloroethane	< 270	< 5.3	< 5.3	< 1
1,1-Dichloroethene	< 270	< 5.3	< 5.3	< 1
1,2-Dichloroethane	< 270	< 5.3	< 5.3	< 1
1,2-Dichloroethene (Total)	< 270	< 5.3	< 5.3	< 1
1,2-Dichloropropane	< 270	< 5.3	< 5.3	< 1
2-Butanone	< 2700 J	< 53 J	< 53 J	< 10
2-Hexanone	< 2700 J	< 53 J	< 53 J	< 10
4-Methyl-2-Pentanone	< 2700 J	< 53 J	< 53 J	< 10
Acetone	< 5400 J	< 110 J	< 110 J	< 20
Benzene	< 270	< 5.3	< 5.3	< 1
Bromodichloromethane	< 270	< 5.3	< 5.3	< 1
Bromoform	< 270	< 5.3	< 5.3	< 1
Bromomethane	< 1300	< 27	< 26	< 5
Carbon Disulfide	< 270	< 5.3	< 5.3	< 1
Carbon Tetrachloride	< 270	< 5.3	< 5.3	< 1
Chlorobenzene	< 270	< 5.3	< 5.3	< 1
Chloroethane	< 2700	< 53	< 53	< 10
Chloroform	< 270	< 5.3	< 5.3	< 1
Chloromethane	< 2700	< 53	< 53	< 10
Dibromochloromethane	< 270	< 5.3	< 5.3	< 1
Ethylbenzene	< 270	< 5.3	< 5.3	< 1
Methylene Chloride	< 2700	< 53	< 53	< 10
Styrene	< 270	< 5.3	< 5.3	< 1
Tetrachloroethene	**1000**	**6**	< 5.3	< 1
Toluene	< 270	< 5.3	< 5.3	< 1
Total Xylenes	< 270	< 5.3	< 5.3	< 1
Trichloroethene	< 270	< 5.3	< 5.3	< 1
Vinyl Chloride	< 1300	< 27	< 26	< 5
cis-1,3-Dichloropropene	< 270	< 5.3	< 5.3	< 1
trans-1,3-Dichloropropene	< 270	< 5.3	< 5.3	< 1

VALIDATION CODES:

J = Estimated Value

<( )J = Laboratory reported this result as below detection. Result is estimated based on data validation.

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PHASE I SOUTH TANK FARM SOIL SAMPLES

POLYCHLORINATED BIPHENYLS AND PESTICIDES RESULTS

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HARRISON DIVISION - GMC

SOUTH TANK FARM ANALYTICAL RESULTS

POLYCHLORINATED BIPHENYLS AND PESTICIDES

Parameter	STF-GS2-15SL MG/KG	STF-GS27-15SL MG/KG	STF-GS5-15SL MG/KG
4,4'-DDD	< 5.4	< .5	< .5
4,4'-DDE	< 5.4	< .5	< .5
4,4-DDT	< 5.4	< .5	< .5
Aldrin	< 5.4 J	< .5 J	< .5 J
Aroclor-1016	< 5.4	< .5	< .5
Aroclor-1221	< 5.4	< .5	< .5
Aroclor-1232	< 5.4	< .5	< .5
Aroclor-1242	< 5.4	< .5	< .5
Aroclor-1248	< 5.4	< .5	< .5
Aroclor-1254	< 5.4	< .5	< .5
Aroclor-1260	< 5.4	< .5	< .5
Dieldrin	< 5.4	< .5	< .5
Endosulfan I	< 5.4	< .5	< .5
Endosulfan II	< 5.4	< .5	< .5
Endosulfan sulfate	< 5.4	< .5	< .5
Endrin	< 5.4	< .5	< .5
Endrin Aldehyde	< 5.4	< .5	< .5
Endrin ketone	< 5.4	< .5	< .5
Heptachlor	< 5.4	< .5	< .5
Heptachlor epoxide	< 5.4	< .5	< .5
Methoxychlor	< 5.4	< .5	< .5
Toxaphene	< 5.4	< .5	< .5
alpha-BHC	< 5.4	< .5	< .5
alpha-Chlordane	< 5.4	< .5	< .5
beta-BHC	< 5.4	< .5	< .5
delta-BHC	< 5.4	< .5	< .5
gamma-BHC (Lindane)	< 5.4	< .5	< .5
gamma-Chlordane	< 5.4	< .5	< .5

VALIDATION CODES:

J = Estimated Value

<( )J = Laboratory reported this result as below detection. Result is estimated based on data validation.

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PHASE I SOUTH TANK FARM SOIL SAMPLES

METALS RESULTS

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HARRISON DIVISION - GMC
SOUTH TANK FARM ANALYTICAL RESULTS
METALS

Parameter	STF-GS2-15SL MG/KG	STF-GS27-15SL MG/KG	STF-GS5-15SL MG/KG
Aluminum	**1900**	**2140**	**2400**
Antimony	< 8.5 J	< 8.5 J	< 8.4 J
Arsenic	**4.4 J**	**6.6 J**	**2.9 J**
Barium	**13.7**	**22.7**	**56.8**
Beryllium	< .21	< .21	< .21
Cadmium	**2.6 J**	**2 J**	< .84 J
Calcium	**168000 J**	**160000 J**	**148000 J**
Chromium	**3.7 J**	**2.6 J**	**4.7 J**
Cobalt	< 2.1	**2.4**	**3.8**
Copper	**7.9**	**9.6**	**11.9**
Iron	**4960**	**7340**	**5110**
Lead	**2.8 J**	**12.8 J**	**1.2 J**
Magnesium	**60800**	**47000**	**42300**
Manganese	**221**	**249**	**1330**
Mercury	< .11	< .11	< .1
Nickel	< 6.4	**10.6**	**25.4**
Potassium	**503**	**361**	**657**
Selenium	< .42 J	< .43 J	< .42 J
Silver	**1.2 J**	**.74 J**	**.68 J**
Sodium	**181**	**147**	**166**
Thallium	< .42 J	< .43 J	< .42 J
Vanadium	**5.7**	**7.7**	**6.9**
Zinc	**18.8 J**	**38.9 J**	**23.9 J**

VALIDATION CODES:

J = Estimated Value

< ( ) J = Laboratory reported this result as below detection. Result is estimated based on data validation.

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APPENDIX B

RFI DATA QUALITY OBJECTIVES

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APPENDIX B

DATA QUALITY OBJECTIVES SUMMARY REPORT

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B-4. Data Quality Objectives for Completeness of Field Measurements during RFI Phase I and Phase II at Harrison Division - GMC, Moraine, Ohio.

B-5. RFI Phase I Percent Completeness per Sample Matrix and Parameter Analyzed, Harrison Division - GMC, Moraine, Ohio.

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ATTACHMENTS

A. RFI Quality Assurance Audit No. 1

B. RFI Quality Assurance Audit No. 2

C. RFI Quality Assurance Audit No. 3

D. Phase II RFI Quality Assurance Audit No. 1

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1.0 DATA QUALITY OBJECTIVES

1.1 INTRODUCTION

In accordance with the Harrison RCRA Facility Investigation (RFI) Work Plan (Geraghty & Miller, Inc. 1992), which includes the Quality Assurance Project Plan (QAPjP) in Appendix B and the Data Management Plan in Appendix D, laboratory and field data collected during RFI Phase I and Phase II field activities were evaluated by Geraghty & Miller, Inc. to determine precision, accuracy, representativeness, completeness, and comparability. Measurements of data precision are necessary to demonstrate the reproducibility of the data. Accuracy is the relationship of the reported data to the "true" value. All data obtained during the RFI phases should be representative of actual site conditions, which is a qualitative measurement of data representativeness. Completeness is a measure of the amount of valid data obtained from a measurement program compared to the total amount that was designed to be collected. Comparability of data is achieved by utilizing standardized sampling and analysis methods and data reporting format. Field data and subsequent laboratory data measurements collected during RFI Phase I and Phase II will be discussed in terms of the above Data Quality Objectives (DQOs).

1.2 REVIEW OF FIELD MEASUREMENTS

Standard operating procedures outlined in the Sampling Plan (Appendix C) of the RFI Work Plan (Geraghty & Miller, Inc. 1992) were developed to provide as precise and accurate field measurements as possible. Field sampling documentation was reviewed by Geraghty & Miller to determine that all of the protocols detailed in the RFI Work Plan were followed during Phase I and Phase II field activities. The following sections describe the DQO results of the review of field data for precision, accuracy, representativeness, completeness, and comparability.

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1.2.1 Precision of Field Measurements

As previously stated, measurements of data precision are necessary to demonstrate the reproducibility of the data. The precision of field measurements including pH, specific conductivity, depth to water, and HNu headspace readings, were assessed qualitatively to verify that replicate field measurements were collected at a frequency of 20 percent or one per five measurements. Duplicate samples were also to be collected and analyzed at a rate of 10 percent or one per ten or fewer investigative samples to quantitatively assess the overall precision of field and laboratory procedures. Standard deviations were calculated for depth to water measurements and quadruplicate pH measurements while relative standard deviation was calculated for quadruplicate specific conductivity measurements. The DQO requirements for these parameters are less than or equal to 0.1 for pH and ± 25 percent for specific conductance.

1.2.1.1 Phase I

The DQO for the rate of duplicate field measurements and laboratory samples is a minimum of 20 percent and 10 percent, respectively. A round of water-levels measurements was collected on January 29, 1993 from 56 on- and off-site wells. The percentage of field measurements for depth-to-water measurements was duplicated at a frequency of 21 percent. During groundwater and surface-water sampling, the rate of precision of duplicate field measurements for depth to water, pH, and specific conductivity measurements was determined to be 21 percent, 24 percent, and 22 percent, respectively. Laboratory samples were duplicated at rates of 20 percent for soil samples, 28 percent for groundwater samples, and 50 percent for surface-water samples. All samples collected during the RFI Phase I conform to the precision requirements for field and laboratory replication. Table B-1 presents the results of the DQO analysis for precision in the rate of duplicate field measurements and laboratory samples during RFI Phase I.

To assess the variation between sample measurements and duplicate measurements, standard deviations were calculated for quadruplicate pH measurements while relative standard

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deviation (RSD) or relative percent difference (RPD) was calculated for quadruplicate specific conductivity measurements. The DQO requirements for these parameters are less than or equal to 0.1 for pH and ± 25 percent for specific conductance. RSD calculations for pH measurements resulted in a range from 0 to 0.205 with a mean standard deviation of 0.067. A summary of the standard deviation calculations for pH is presented in Table B-2. RSD results were calculated from the specific conductivity measurements resulting in a range from 0 percent to 8.36 percent. The average relative standard deviation for the specific conductivity measurements was 1.85 percent. Specific conductivity calculations for RSD are presented in Table B-3. All of the field measurements listed above have met their DQO requirements for precision.

1.2.1.2 Phase II

The DQO for the rate of duplicate field measurements and laboratory samples, a minimum of 20 percent and 10 percent, respectively, for all samples has been met and even surpassed by 40 percent in one case. A round of water levels measurements was collected on October 20, 1994 from 70 on- and off-site wells. The percentage of field measurements for depth-to-water measurements was duplicated at a rate of 24 percent. During groundwater and surface-water sampling, both pH and specific conductivity duplicate measurements were taken at a rate of 20 percent. Duplicate HNu headspace readings were taken at a rate of 29 percent during soil sampling. Laboratory samples were duplicated at rates of 21 percent for soil and groundwater samples and 50 percent for surface-water samples. The DQO for the rate of duplicate field measurements and laboratory samples during RFI Phase II is presented in Table C-1.

To assess the variation between sample measurements and duplicate measurements, standard deviations were calculated for quadruplicate pH measurements while RSD or RPD was calculated for quadruplicate specific conductivity measurements. The DQO requirements for these parameters are less than or equal to 0.1 for pH and ± 25 percent for specific conductance. RSD calculations for pH measurements resulted in a range from 0 to 0.099 with a mean

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standard deviation of 0.015. A summary of the standard deviation calculations for pH is presented in Table B-2. RSDs were calculated from the specific conductivity measurements resulting in a percentage range from 0 to 0.6096 percent. The average relative standard deviation for the specific conductivity measurements was 0.1612 percent. Specific conductivity calculations for RSD are presented in Table B-3. All of the field measurements listed above have met their DQO requirements for precision.

1.2.2 Accuracy of Field Measurements

Accuracy is the relationship of the reported data to the "true" value. The accuracy of field measurements of pH and specific conductivity were assessed by daily calibrations and post-calibration verifications using standard solutions. In accordance with the RFI Work Plan, all pH quality assurance/quality control (QA/QC) measurements must be within ± 0.1 standard units of the standard solution values used during calibration. All specific conductivity QA/QC measurements must be within ± 10 umhos of the standard solution values used during calibration. Both pH and specific conductivity QA/QC measurements were to be performed twice per day or every 4 hours during sampling. The accuracy of the HNu meter was to be assessed through hourly calibration checks where readings were to be found within ± 20 percent of the isobutylene calibrant gas concentration. If the accuracy of the HNu meter could not be assessed through hourly calibration checks due to strict adherence to RFI standard operating procedures (SOPs) for sampling, calibration checks were to be performed immediately upon reaching each sample location.

1.2.2.1 Phase I

The frequency of calibration checks for both pH and specific conductivity met and in some cases even surpassed the requirements stated in the RFI Work Plan. Calibration standards of 4.0 and 7.0 standard units were used for calibrating the pH meter. The deviation between these two standards and the calibration readings were all within the control limits stated in the

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RFI Work Plan. All of the specific conductivity calibration readings using the 447-umhos standard solution were found to be well within the required control limits.

During the groundwater sampling event, the HNu was not functioning properly due to adverse weather conditions. Therefore, HNu readings were not collected. Overall RFI Phase I HNu calibration checks within ± 20 percent were found to be 90 percent complete.

1.2.2.2 Phase II

Deviations between the 4.0 and 7.0 standard unit solutions used in the calibration of the pH meter were all within the control limits stated in the RFI Work Plan. All of the specific conductivity calibration readings using the 447-umhos standard solution were found to be well within the required control limits.

Nine of the frequency intervals for the HNu calibration could not be made within a 1 hour period because soil samples were being collected in strict accordance with SOP 17 for soil sampling from a split-spoon sampler. However, each of the following calibration checks performed after the missed frequency interval were found to be within the required control limits. In those instances where hourly calibration checks could not be made, the HNu was calibrated immediately upon reaching each sample location. The HNu was outside of the required control limit 7 times out of a total of 72 readings.

1.2.3 Representativeness of Field Data

All field data obtained during Phase I and Phase II of the RFI is representative of actual site conditions. Considerations for evaluating the representativeness of the data include sample locations, sampling methods, and the appropriateness of the analytical method to the type of sample obtained. The sampling strategy outlined in the RFI Work Plan was designed to provide data representative of site conditions. Consideration was given to past waste disposal practices, physical setting, and existing analytical data during development of this strategy. The

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procedures used to obtain the planned analytical data, as documented in the RFI Work Plan, have provided representative data.

The representativeness of all data was qualitatively assessed by Geraghty & Miller to determine if the data was consistent with known or anticipated hydrogeologic or chemical conditions and accepted principles. Field measurements were also checked for completeness of procedures and documentation of procedures and results. In both cases, data collected during RFI Phases I and II were deemed representative of actual site conditions.

1.2.4 Completeness of Field Data

To determine the completeness of field measurements, field documentation was compared to the DQOs presented in Table 5-1 of the QAPjP (Appendix B) of the RFI Work Plan (Geraghty & Miller, Inc. 1992). Field documentation (sampling logs) is included in Appendix B of this RFI Final Report. The completeness of the collected data will be defined as the number of satisfactory field measurements (pH, specific conductivity, depth to water, HNu screening) recorded compared to the number of measurements intended to be collected under the RFI Work Plan. The completeness comparison should yield a result of at least 90 percent. The following section summarizes the results of this comparison.

1.2.4.1 Phase I

pH measurements for all aqueous samples were found to be 100 percent complete. pH calibration checks using 4.0 and 7.0 standard unit solutions were found to be 100 percent complete. Specific conductivity measurements for all aqueous samples were found to be 100 percent complete. Specific conductivity calibration was found to be 100 percent complete using a 447 umhos standard solution for calibration. Depth-to-water measurements were found to be 100 percent complete. HNu measurements for headspace screening of soil samples were found to be 100 percent complete. HNu calibration checks within ±20 percent were found to be 90

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percent complete. The results of DQOs for completeness for Phase I sampling activities are presented in Table B-4.

1.2.4.2 Phase II

Measurements of pH for all aqueous samples were found to be 100 percent complete. pH calibration checks using 4.0 and 7.0 standard unit solutions were found to be 100 percent complete. Specific conductivity measurements for all aqueous samples were found to be 100 percent complete. Specific conductivity calibration was found to be 100 percent complete using a 447-umhos standard solution for calibration. Depth-to-water measurements were found to be 100 percent complete. HNu measurements for headspace screening of soil samples were found to be 100 percent complete. HNu calibration checks within ±20 percent were found to be 90 percent complete. Table B-4 presents the results of DQOs for completeness for Phase II sampling activities. Field parameters collected during Phases I and II of the RFI met the required completeness DQO as reported by the RFI Work Plan.

1.2.5 Comparability of Field Data

Comparability was achieved by utilizing standardized sampling and analysis methods and data reporting format. Soil, surface water, surface sediment, and groundwater samples were all obtained following the standardized sampling procedures stated in the RFI Work Plan. All field measurements, calibrations, and calibration measurements (including depth to water, pH, specific conductivity, and HNu readings) were performed and recorded in a standardized format in accordance with the RFI Work Plan. Paper copies of all field records collected during Phase I and Phase II field activities were prepared and kept in files for review and management by Geraghty & Miller.

To ensure that proper sampling and analysis methods were implemented, four field audits were conducted. These field audits confirm that field personnel are collecting data in strict accordance with the SOPs outlined in the RFI Work Plan. Two field audits were

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conducted for each phase of the RFI. In all cases, the methods and techniques employed by the field personnel were found to be satisfactory. The results of these field audits are included as Attachments A through D in this appendix.

1.3 REVIEW OF LABORATORY DATA

The investigative samples collected by Geraghty & Miller personnel during Phase I and Phase II field activities were analyzed by NET at the Dayton, Ohio and Cambridge, Massachusetts laboratories. The resulting analytical data were validated by Geraghty & Miller personnel. The data validation was performed at Level III (based upon quality control criteria from the U.S. Environmental Protection Agency (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). In addition, the U.S. EPA documents *Laboratory Data Validation Functional Guidelines for Evaluating Organic Analyses,* February 1988 (U.S. EPA 1988a) and *Laboratory Data Validation Functional Guidelines for Evaluating Inorganic Analyses,* July 1988 (U.S. EPA 1988b) were used as guidance for assigning any conditional qualifier codes to the analytical results. The samples analyzed for this project included both aqueous and non-aqueous matrices (groundwater, surface water, soil, and sediment).

In deriving DQO results for Phase I and Phase II laboratory data, the laboratory measures precision and accuracy through its own analytical techniques. The DQO results are in the form of laboratory reporting packets that discuss the procedures of analytical testing and subsequent sample results. It is then the task of the data validator (Geraghty & Miller) to review the techniques and results for reliability. Level III data validation of the organic and inorganic data includes the examination of samples extraction and analysis holding times; results of method blanks, trip blanks, field duplicates, surrogate spike recoveries (organics), matrix spike (MS) recoveries, and matrix spike duplicate (MSD) recoveries, as well as the relative percent difference between the MS and MSD. In addition, the tuning, initial calibration and continuing calibration data are reviewed to ensure proper instrument response for each volatile

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and semivolatile analysis. The inorganic data review also includes the initial and continuing calibration, percent recovery of the ICP interference check sample, the ICP serial dilution, and post-digestion spike recoveries for the furnace AA metals. (A thorough discussion of the above analytical techniques can be found in the U.S. EPA data validation criteria documents listed above.) Completeness of the laboratory data can then be determined by Geraghty & Miller since the laboratory has a somewhat limited control of the number of valid measurements it can return due to instrument error. As with review of the field data, representativeness and comparability are qualitative measures that help to ensure that samples are representative of site conditions and have been collected following strict SOPs.

The majority of the data was determined to be quantitative and acceptable for use for all DQOs. However, qualifications of some results were required because of various quality control deficiencies. The qualified data were qualified as estimated and flagged with a "J" (estimated) or a "UJ" (undetected but estimated). However, in extreme cases, the data were qualified as unusable and flagged with an "R" (rejected).

1.3.1 Precision of Phase I and II Laboratory Data

Precision of RFI data was determined using the results of replicate MS's and comparing the results of field duplicates. An MS is a portion of the sample that has a known quantity of analyte added to it. For a detailed discussion on general laboratory precision reporting, see Section 14 of the QAPjP in Appendix B of RFI Work Plan (Geraghty & Miller, Inc. 1992). DQO results for precision were reviewed by a Geraghty & Miller data validator. Those results that were not qualified with a "J" or "UJ" as being estimated met precision DQO requirements as determined by laboratory control checks. Results of DQOs for precision during RFI Phases I and II are included in the corresponding laboratory sample result packets.

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1.3.2 Accuracy of Phase I and II Laboratory Data

Accuracy of the RFI data was determined during data validation by evaluating the results of replicate MS and surrogates. For a detailed discussion on general laboratory accuracy reporting, see Section 14 of the QAPjP in Appendix B, of the RFI Work Plan (Geraghty & Miller, Inc. 1992). DQO results for accuracy were reviewed by a qualified Geraghty & Miller, Inc. data validator. Those results that were not qualified with a "J" or "UJ" as being estimated met accuracy DQO requirements as determined by laboratory control checks. Results of DQOs for accuracy during RFI Phases I and II are included in the corresponding laboratory sample result packets.

1.3.3 Representativeness of Phase I and II Laboratory Data

Representativeness of the collected data was qualitatively assessed by comparing the data to existing site data to ensure that the data collected is consistent with known hydrogeologic or chemical conditions at the site. Proper documentation establishing the integrity of the sample, to ensure that it is in fact representative, was also reviewed. In all cases, proper protocols were followed during both phases to preserve the representativeness of the samples.

1.3.4 Completeness of Analytical Data

Completeness was evaluated by comparing the amount of valid analytical data acquired to the stated project objectives specified in the RFI Work Plan (Geraghty & Miller, Inc. 1992). Percent completeness was calculated per sample matrix and per parameter for analytical data collected during Phase I and Phase II RFI. Completeness per sample matrix was calculated using the number of valid analytical results for that matrix ("R" flagged data was not counted) divided by the total number of analytical results for the same matrix. Completeness per parameter was calculated using the number of valid parameter analytical results ("R" flagged data was not counted) divided by the total number of analytical results for the same parameter. The two different levels of completeness were calculated to ensure that this DQO had been

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thoroughly analyzed. Quality control samples (rinseate blanks and trip blanks) were not included in eight of the completeness calculation methods. As specified in Section 5.0 of the QAPjP, Appendix B of the RFI Work Plan (Geraghty & Miller, Inc. 1992), percent completeness should be equal to or exceed 90 percent.

1.3.4.1 Phase I

Completeness for aqueous, solid, sediments, and combined matrix (aqueous/solid/sediments) samples were 97.8 percent, 99.8 percent, 99.6 percent, and 98.6 percent, respectively. Completeness for the volatile organic compound (VOC) parameters in aqueous, solid, sediments, and combined was 100 percent. Completeness for semi-volatile organic compound (SVOC) parameters in aqueous, solid, sediments, and combined were 95.8 percent, 100 percent, 100 percent, and 97.2 percent, respectively. Completeness for pesticide/PCBs/herbicides in aqueous, solid, sediments, and combined were 99.7 percent, 100 percent, 100 percent, and 99.8 percent, respectively. Completeness for cyanide in aqueous, solid, sediment, and combined was 100 percent, 100 percent, 33 percent, and 98.7 percent, respectively. Completeness for metals in aqueous, solid, sediments, and combined were 100 percent, 99.1 percent, 100 percent, and 99.5 percent, respectively. Completeness for all parameters was above 90 percent except for cyanide in sediments samples. Cyanide was analyzed by spectrophotometer methodology. Two sample results, DD-GS01-02SD and DUP-11, were qualified as unusable due to very low recoveries of the MS, or poor reproducibility between the sample and the corresponding laboratory duplicate. Completeness results for sample matrix and parameter analyzed for during RFI Phase I are summarized in Table B-5.

1.3.4.2 Phase II

Completeness for aqueous, solid, and combined matrix (aqueous/solid) samples were 98.7 percent, 99.2 percent, and 99.1 percent, respectively. Completeness for the VOC parameters in aqueous, solid, and combined was 98.4 percent, 97.8 percent, and 98.1 percent,

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respectively. Completeness for SVOC parameters in both solid and combined were 100 percent. The aqueous samples were not analyzed for SVOCs in the Phase II RFI. Completeness for pesticide/PCBs/herbicides in aqueous, solid, and combined were 100 percent. Completeness for cyanide in aqueous, solid, and combined was 100, 0, and 50 percent, respectively. Completeness for metals for aqueous, solid, and combined were 100 percent, 99.4 percent, and 99.5 percent, respectively. Completeness for all parameters were above 90 percent except for cyanide in solids. All solid cyanide results were qualified as unusable during the data validation because the matrix spike percent recoveries for solid cyanide analyses were less than 30 percent. The U.S. EPA National Functional Guidelines for evaluations in organic data states that if the matrix spike percent recoveries are less than 30 percent, and the sample results are below the detection limit, the results are unusable (U.S. EPA 1988a). Completeness results for sample matrix and parameter analyzed during Phase II of the RFI are summarized in Table B-5.

1.3.5 Comparability of Phase I and II Laboratory Data

Comparability was achieved by utilizing standardized sampling and analytical methods, as well as a standardized reporting format that is strictly adhered to by the NET Laboratory. DQO results for comparability were reviewed by a qualified Geraghty & Miller data validator. Those results that were not qualified with a "J" or "UJ" as being estimated met comparability DQO requirements as determined by laboratory control checks. QA/QC guidelines followed by NET and their analytical techniques that directly relate to the DQO for comparability are included in RFI Phases I and II laboratory sample result packets.

1.3.6 Practical Quantitation Limits Evaluation

The reported RFI sample data has several samples and parameters that were reported with practical quantitation limits (PQL) outside of QAPjP-specified limits. The PQL is calculated from results obtained by analyzing standards of differing levels prepared from known solutions of the specified parameters. The results from the detection limits study are

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incorporated into a statistical analysis to produce the method detection limit (MDL). The MDL along with a multiplier (usually 5 or 10) will produce the PQL.

PQLs will be affected by many issues associated with site samples. These issues may include, but are not limited to: physical or chemical matrix interference, presence of high levels of target compounds, presence of high levels of non-target compounds, excessively low percent solids, extraction efficiency, and "cleanup" of sample extracts.

Data associated with the RFI has results affected by many of the above conditions. NET has reported results outside the QAPjP limits and has explained that data has been affected by the presence of high levels of non-target compounds; thus the samples required dilution to eliminate the interfering peaks. Dilution of samples almost always results in an elevated detection limit which, in turn, results in a higher quantitation limit. Other samples had internal standard recoveries below or above the acceptance limits, and the laboratory used sample dilution as a method of eliminating the interference preventing peak resolution. Some samples required "cleanup" of interfering, non-target compounds, resulting in higher detection limits.

The laboratory also made pre-analysis judgments for sample dilutions based on the appearance of the sample or sample extracts. This procedure also results in higher detection limits because of the dilution.

While some of the sample PQLs are outside of QAPjP-specified limits, the QAPjP is a guidance document and the methods referenced in the QAPjP allow for professional judgment in sample analysis and sample data validation. Based on Geraghty & Miller's review, it appears the laboratory has followed appropriate technical procedures in analyzing the RFI samples, including using judgment as a criterion in determining whether a sample requires dilution; therefore, data with PQLs outside of the limits specified in the QAPjP should be acceptable for use in the RFI.

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1.4 REFERENCES

Geraghty & Miller, Inc. 1992. RCRA Facility Investigation Work Plan, Harrison Division - General Motors Corporation, Moraine, Ohio. November 1992.

U.S. Environmental Protection Agency (USEPA) 1987. Data Quality Objectives for Remedial Response Activities. EPA/540/G-87/004. March 1987.

U.S. Environmental Protection Agency (USEPA). Test Methods for Examining Solid Waste, SW-846. November 1986.

U.S. Environmental Protection Agency (USEPA). 1988a. Laboratory Data Validation Functional Guidelines for Evaluating Organic Analyses. February 1988.

U.S. Environmental Protection Agency (USEPA). 1988b. Laboratory Data Validation Functional Guidelines for Evaluating Inorganic Analyses. July 1988.

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TABLES

Table B-1. Data Quality Objectives for Precision in the Rate of Duplicate Field Measurements and Laboratory Samples for RFI Phase I and Phase II at Harrison Division - GMC, Moraine, Ohio.

Parameter	Precision	Matrix	RFI Replicate Rate for Phase I	RFI Replicate Rate for Phase II
pH	One replicate measurement of pH quadruplicate must be collected at a frequency of 20% or made one per five or fewer investigative measurements.		24%	20%
Specific Conductivity	One replicate measurement of specific conductivity quadruplicate must be collected at a frequency of 20% or made one per five or fewer investigative measurements.		22%	20%
Depth to water	One replicate measurement must be collected at a frequency of 20% or made one per five or fewer investigative measurements.		21%	24%
HNU Screening	One replicate measurement must be collected at a frequency of 20% or made one per five or fewer investigative measurements.		22%	29%
Laboratory Samples	Duplicate samples will be collected and analyzed at a frequency of 10% or a rate of one per ten or fewer investigative samples.	Soil Groundwater Surface Water	20% 28% 50%	21% 21% 50%

See Section 5.0 of the Harrison RFI QAPjP (Geraghty & Miller, Inc. 1992) for more detailed discussion of precision.

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Table B-2. Standard Deviations and Data Quality Objectives for Precision of Sample and Duplicate Field pH Measurements, RFI Phase I and Phase II at Harrison Division - GMC, Moraine, Ohio.

Parameter	Precision	RFI Precision		
		Phase I		Phase II
pH	Standard deviation of quadruplicate measurement must be less than or equal to 0.1.	0.000	Lowest Std. Dev.	0.000
		0.205	Highest Std. Dev.	0.099
		0.067	Mean Std. Dev.	0.015

See Section 5.0 of the Harrison RFI QAPjP (Geraghty & Miller, Inc. 1992) for more detailed discussion of precision.

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Table B-3. Relative Standard Deviations and Data Quality Objectives for Precision of Sample and Duplicate Field-Specific Conductivity Measurements, RFI Phase I and Phase II at Harrison Division - GMC, Moraine, Ohio.

Parameter	Precision	RFI Precision		
		Phase I		Phase II
Specific Conductivity	Standard deviation of quadruplicate measurements must be +/- 25%.	0.00%	Lowest RSD%	0.00%
		8.36%	Highest RSD%	0.06%
		1.85%	Average RSD%	0.16%

See Section 5.0 of the Harrison RFI QAPjP (Geraghty & Miller, Inc.1992) for more detailed discussion of precision.
RSD Relative Standard Deviations

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Table B-4. Data Quality Objectives for Completeness of Field Measurements during RFI Phase I and Phase II at Harrison Division - GMC, Moraine, Ohio.

Parameter	Data Quality Objective for Completeness	RFI Phase I Completeness	RFI Phase II Completeness
pH sample measurements	90%	100%	100%
pH calibration checks	90%	100%	100%
SCON sample measurements	90%	100%	100%
SCON calibration checks	90%	100%	100%
Depth to water	90%	100%	100%
HNU screening	90%	100%	100%
HNU calibration checks (+/- 20%)	90%	90%	90%

SCON Specific Conductivity

See Section 5.0 of the Harrison RFI QAPjP (Geraghty & Miller, Inc. 1992) for more detailed discussion of completeness.

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Table B-5. RFI Phase I Percent Completeness per Sample Matrix and Parame
Harrison Division - GMC, Moraine, Ohio.

Matrix	Completene
AQUEOUS	97.8%
Parameter	
Volatile Organic Compounds	100.0%
Semivolatile Compounds	95.8%
Pesticide/PCBs/Herbicides	99.7%
Cyanide	100.0%
Metals	100.0%
SOLID	99.8%
Parameter	
Volatile Organic Compounds	100.0%
Semivolatile Compounds	100.0%
Pesticide/PCBs/Herbicides	100.0%
Cyanide	100.0%
Metals	99.1%
SEDIMENTS	99.6%
Parameter	
Volatile Organic Compounds	100.0%
Semivolatile Compounds	100.0%
Pesticide/PCBs/Herbicides	100.0%
Cyanide	33.0%
Metals	100.0%
COMBINED (Aqueous, Solids, Sediments)	98.6%
Parameter	
Volatile Organic Compounds	100.0%
Semivolatile Compounds	97.2%
Pesticide/PCBs/Herbicides	99.8%
Cyanide	98.7%
Metals	99.5%

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Table B-6. RFI Phase II Percent Completeness per Sample Matrix and Param
Harrison Division - GMC, Moraine, Ohio.

Matrix	Completene
AQUEOUS	98.7%
Parameter	
Volatile Organic Compounds	98.4%
Pesticide/PCBs/Herbicides	100.0%
Cyanide	100.0%
Metals - Dissolved and Total	100.0%
SOLID	99.2%
Parameter	
Volatile Organic Compounds	97.8%
Semivolatile Compounds	100.0%
Pesticide/PCBs/Herbicides	100.0%
Cyanide	0.0%
Metals - Total	99.4%
COMBINED (Aqueous, Solids, Sediments)	99.1%
Parameter	
Volatile Organic Compounds	98.1%
Semivolatile Compounds	100.0%
Pesticide/PCBs/Herbicides	100.0%
Cyanide	50.0%
Metals - Dissolved and Total	99.5%

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ATTACHMENTS

ATTACHMENT A

RFI QUALITY ASSURANCE AUDIT No. 1
OCTOBER 26, 1992
HARRISON DIVISION - GMC, MORAINE, OHIO

SUMMARY OF FINDINGS

On October 26, 1992, the first RFI Quality Assurance (QA) Audit was conducted during the removal of a concrete vault (RFI Solid Waste Management Unit [SWMU] T12) on the west side of Building 14 at the Harrison facility in Moraine, Ohio. At the time of the audit, no soil sampling was performed, so an interview was conducted with the Geraghty & Miller field oversight representative, Mr. Bill Peterson, and the T12 vault removal operations were observed. Prior to arrival at the site, a QA checklist was prepared, and this checklist was the basis for the audit interview. As stated in Section 12.0 of the Harrison RFI QAPjP (Geraghty & Miller, Inc. 1992), field audits may address the following areas:

- Subcontractor performance
- Field operations and records
- Identification and control of samples
- Numerical analyses
- Transmittal of information
- Document control and retention
- Health and safety procedures

Results of the field audit and interview of site personnel are discussed below.

Upon arrival at the site, the subcontractor was installing sheet piling around the outside of the concrete vault at SWMU T12. The site was encircled by wooden barriers and barricade tape to prevent access to the area by unauthorized personnel. A group of onlookers were observing the operations from a ramp located immediately north of the excavation site. Mr. Peterson

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indicated that this ramp area would be closed off the following day when work was being conducted at the north end of the work site.

The Harrison RFI Work Plan indicates that a number of project references will be on-site during field operations. The first section of the QA checklist includes a number of documents that should be on-site during all tasks of the project. Of the items included in this list, only the subcontractor training records were not on-site at the time of the audit. The training records, including certificates of completion for the 40-hour and 8-hour update safety training, respirator fit test results, and physician's letter required by CFR 1910.120 for each member of the subcontractor crew are located at the Dublin Geraghty & Miller Office and are available upon request. Mr. Peterson indicated that he would check for each crew member's driver's license at the next daily health and safety tailgate meeting.

The next topic of the interview was the completion of field documentation. Mr. Peterson is responsible for submitting packages of field paperwork each week for QA review and submittal to the RFI Evidence file. The project QA officer is responsible for review of field documents and will recommend revisions, if necessary. Each of the items listed on the QA checklist were found in the field packages submitted. In addition to the list of field documentation listed on the QA Audit Checklist, Mr. Peterson is maintaining a project logbook, from which he prepares his soil/sediment sampling logs. The logbook will be submitted to the Final Evidence file at the completion of this phase of work. To ensure that samples are identified in a consistent manner, the sample identification plan was reviewed, and Tables 1.1 and 1.2 from the RFI Sampling Plan were given to Mr. Peterson as a quick field reference to use when identifying samples for laboratory analysis.

The QA interview then reviewed the frequency of QA sample collection. Mr. Peterson indicated that trip blanks are being sent with each shipment of samples analyzed for VOCs. Duplicates are being collected at a minimum frequency of one duplicate per ten investigative samples from the locations indicated on Table 3.1 of the Harrison RFI QAPP. Matrix spikes and matrix spike duplicates (MS/MSD) will be prepared and analyzed by the laboratory; however, it

is not necessary to collect extra sample volume for MS/MSD analyses on soil samples. Rinseate blanks are not required for the soil sampling conducted at the RFI tank excavation sites.

The remainder of the QA Audit consisted of inquiries to determine field aspects of project quality assurance, such as precision, accuracy, representativeness, completeness, and comparability. To evaluate precision, HNu readings will be performed in duplicate for 20% of the field headspace readings obtained. Accuracy of the HNu measurements is controlled by performing frequent calibration checks, and recalibrating when readings of calibrant deviate more than 20% from the concentration of the calibration gas. Mr. Peterson had been performing a calibration check prior to taking headspace readings due to the elapsed time between headspace readings. Representativeness can be qualitatively evaluated by looking at interferences that may be present at the site (i.e. are HNu readings elevated by the presence of exhaust fumes at the work site?). At T12, no HNu readings above background had been recorded at the time of the first audit. Completeness will be evaluated during field work by careful review of the field paperwork to see that all the appropriate information has been recorded. Comparability will be evaluated by making sure that various project personnel conform to the procedures presented in the RFI Sampling Plan, ensuring that field data collected now will be comparable to data collected in the future.

In summary, the QA Audit found that minor deficiencies exist in the field documentation, and efforts are underway to correct these items. Most of the deficiencies consisted of incorrect dates on the field forms (some forms were dated September 1992 before being corrected), or in incomplete transfer of information from the field log book used for UST soil sampling to the RFI field forms. To correct this problem, a copy of the field log book used for the UST soil sampling will be inserted into the RFI protect file. It appears that the project field personnel are conforming to the necessary procedures and methods that will ensure that the project goals and data quality objectives are met.

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SOIL SAMPLING QA AUDIT CHECKLIST

Audit Number:	Harrison RFI Field Audit No. 1
Group Audited:	Geraghty & Miller Field Sampling Team: B. Peterson
Audit Subject:	RFI Field Sampling QA Audit; Oversight of T12 Vault Removal
Auditor:	A.J. Waldhauer (QAO)
Date:	October 26, 1992
Audit Scope:	Assure validity of soil sample collection and documentation procedures, and adherence to the RFI Work Plan

Projects/Activities to be Audited:

Health and Safety Plan (HASP) On-Site

Y Copy of HASP available?
Y Correct HASP for this project?
Comments: Project documents appear to be in order in the field file.

HASP and Sampling Strategy Meeting (Tailgate Meeting)

NA Tailgate Meeting held first day of sampling?
NA Tailgate Meeting held on successive days?
NA Tailgate Meeting covers Health and Safety monitoring?
NA Tailgate Meeting covers Action Levels and Responses?
NA Tailgate Meeting covers Sampling Strategy?
Comments: B. Peterson was aware of health and safety issues.

Health and Safety Monitoring Equipment Calibration and Usage

Y HNu calibration acceptable?
Y Measurements made at scheduled intervals?
Y Documentation of calibration?
Y Documentation of analyses?
Y Maintenance documentation available?
Comments: HNu calibrations performed according to RFI Work plan.

Field Sample Collection and Documentation

Y Correct parameter collected for each required sample location?
Y Daily Checklist completed?
NA Sampling Log completed for each well?
NA SOP followed for well purging?
Y SOP followed for sample collection?
NA SOP followed for sample filtration?
Y SOP followed for sampling equipment decon?
Y Field replicate(s) collected?
NA Field replicate(s) notes on Water Sampling Log?
Comments: Soil sampling during T12 vault operations performed according to RFI Work Plan

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Quality Control Sample Preparation, Collection, and Documentation

NA Trip blank(s) provided for lab for VOC sampling?
NA Equipment rinseate blank(s) collected?
NA Blanks noted on Water Sampling Logs and on Daily Log?
NA Blanks identified on Chain-of-Custody (COC) forms?
Comments: Rinseate blanks not required for soil sampling conducted at RFI tank excavation sites.

Field Instrument Calibration, Analyses, and Documentation

NA pH Meter calibration every 4 hours?
NA Conductivity meter check every 4 hours?
Y HNu calibrated as per SOP?
Y Calibrations, analyses, and maintenance noted in logbook(s)?
Y Field analyses performed at scheduled intervals?
Y Results of field calibration and sample analyses meet QC limits?
Comments: pH and conductivity meters not used.

Sample Labeling and Preservation

Y* Sample bottle label filled out at site?
Y Matrix, parameters, and preservation noted on label?
Y Date, time, site, location, and sampler noted on label?
Y Is the label legible?
NA Does the label for each sample match the Water Sampling Log?
NA Has each sample fraction been properly preserved?
Comments: Soil sampling documentation appears to be in order.
*Sampling labels preprinted - only the date and time needed to be filled out.

Chain-of-Custody (COC) Record Keeping

Y COC filled out for each sampling location?
Y All sample information included on COC form?
Y Does the COC match the Water Sampling Log and sample bottle labels?
Y* Date, time, site, project number, and laboratory task order (LTO) reference included on COC?
Y COC signed and dated by sampler?
Y Field custody maintained as per QAPP?
Y** Correct COC sealed in each cooler?
Comments: *No LTO: Lab is not a Geraghty & Miller subcontractor.
**Samples and COCs hand delivered, unsealed; samples checked in by lab at the time they are dropped off.

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ADDITIONAL CONSIDERATIONS

	Yes or No
Planning and Preparation	
1. Was a study plan, work plan, site operations plan, etc. issued for this investigation?	Y
Date Issued: 1992	
Sampling (General Procedures)	
1. Were sampling locations properly selected?	Y
2. Were new disposable gloves worn during collection of all samples?	Y
3. Was sampling equipment wrapped in aluminum foil and protected from possible contamination prior to sample collection?	Y
4. If equipment was cleaned in the field, were proper procedures used?	Y
5. What field instruments were used during this investigation?	
HNu	
6. Were field instruments properly calibrated?	Y
7. Were calibration procedures documented in the field notes?	Y
8. Were the samples chemically field preserved?	N
9. Were the samples iced?	Y
10. Were samples for selected parameters field filtered?	NA
Well Sampling	
1. Was depth of well determined?	NA
2. Was depth to water determined?	NA
3. Were the above depths to water converted to water-level elevations common to all wells?	NA
Describe how the depths were determined.	NA

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ADDITIONAL CONSIDERATIONS

Yes or No

Well Sampling (continued)

4. How was the volume of water originally present in each well determined? NA

5. Was the volume determined correctly? NA

6. How was completeness of purging determined? NA
   - Volume ____
   - Measure ____ (for bailing wells)
   - Time/Flow Rate ____ (for pumping wells)

7. Was a sufficient volume purged?
   Was the well over-purged? NA

8. Was a dedicated (in-place) pump utilized? NA

9. How were the samples collected? NA
   - Open Top ____
   - Closed Top ____
   - Other ____

10. If a pump was used, describe how it was cleaned before and/or between wells. NA

11. Was the sample properly transferred from bailer to sample bottle (i.e., was the purgeable sample agitated, etc.)? NA

12. Was the rope or line allowed to touch the ground? NA

13. Was any wetted rope or line discarded after use at each well? NA

14. How many wells were sampled? NA

Quality Assurance/Quality Control

While all of these QA/QC procedures are not necessarily used, please identify the specific techniques which were employed by sampling personnel.

1. Did the sampling personnel utilize any field trip blanks? Y

   Included in each cooler of VOCs.

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ADDITIONAL CONSIDERATIONS

	Yes or No
Quality Assurance/Quality Control (continued)	
2. Did the sampling personnel utilize preservative blanks?	N
3. Were any equipment blanks collected?	N
4. Were any duplicate samples collected?	Y
Full parameter set (soils) collected 1:10 or once/day, whichever greater.	
5. Were any spiked samples utilized?	N
Field Documentation and Chain-of-Custody	
1. Were chain-of-custody records completed for all samples?	Y
2. Were all samples properly sealed at the time of collection?	Y
3. Were samples locked in vehicle or kept in a secure place after collection?	Y
4. Were all sample labels and chain-of-custody forms signed by sample collector(s)?	Y
5. Were sampling locations adequately documented?	Y
6. Was sampling documented with photographs?	N
If yes, was a photo log maintained?	
7. Were the samples shipped to a contract laboratory?	NA
Were the traffic report forms filled out properly?	NA
Were the samples properly packed for shipment?	NA

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ATTACHMENT B

RFI QUALITY ASSURANCE AUDIT NO. 2
NOVEMBER 9, 1992
HARRISON DIVISION - GMC, MORAINE, OHIO

SUMMARY OF FINDINGS

On November 9, 1994, a second quality assurance (QA) audit was conducted as a follow-up to the initial site audit conducted on October 26, 1992. RFI field activities that were audited were soil sampling conducted at the South Tank Farm and West Tank Farm. Minor deficiencies in the field documentation were corrected by the field personnel and the revisions were reviewed by the project QA officer.

Soil sampling conducted at the South Tank Farm and West Tank Farm consisted of the collection of six investigative soil samples, plus a soil duplicate sample. In addition, one sample was identified on the chain-of-custody form for analysis of a matrix spike/matrix spike duplicate by the laboratory. A trip blank was submitted to the laboratory for analysis with the samples collected at the West Tank Farm and South Tank Farm.

Field headspace screening with an HNu was conducted on soils from each area where laboratory samples were taken. Hourly HNu calibration checks using isobutylene calibrant were performed, and recalibration was performed when a deviation of 20% or more from the concentration of the isobutylene was observed. Duplicate HNu headspace readings were performed on two of the seven soil samples prepared, which exceeds the 20% minimum specified in the work plan.

Two QA deficiencies were identified during the second field audit. The first problem was that field personnel were late in submitting the packages of RFI field documentation. Frequent phone conversations between field personnel and field management have alleviated this problem to some degree. The other QA deficiency noted during this audit was that some of the sample identifications on the chain-of-custody records did not conform to the RFI sample identification plan. During the first audit, the sample identification plan was reviewed with the field personnel;

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however, QA samples such as trip blanks and duplicates were still being incorrectly named. To correct this problem, two actions will be taken; first, all new or retuming field staff will be rebriefed on the sample identification system prior to any RFI sampling; and second, sample labels will be prepared before field work for each task commences. In addition, the laboratory has been requested to fax copies of the chain-of-custody forms to the project QA officer during the laboratory check-in process. The chain-of-custody forms will be reviewed, and any necessary corrections will be made and transmitted back to the laboratory.

In summary, the results of the second QA audit are that field personnel are conducting the RFI field work in accordance with the procedures and frequencies stated in the RFI work plan. The QA deficiencies noted in this report have been addressed, and it appears that these problems have been resolved. QA checks will continue to be conducted throughout the course of the RFI, including routine audits of field documentation and one more additional field QA audit.

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SOIL SAMPLING QA AUDIT CHECKLIST

Audit Number:	Harrison RFI Field Audit No. 2
Group Audited:	Geraghty & Miller Field Sampling Team: B. Peterson
Audit Subject:	RFI Field Sampling QA Audit; Soil sampling at South and West Tank Farm
Auditor:	A.J. Waldhauer (QAO)
Date:	November 9, 1992
Audit Scope:	Assure validity of soil sample collection and documentation procedures, and adherence to the RFI Work Plan

Projects/Activities to be Audited:

Health and Safety Plan (HASP) On-Site

Y Copy of HASP available?
Y Correct HASP for this project?
Comments: Project documents in order.

HASP and Sampling Strategy Meeting (Tailgate Meeting)

Y Tailgate Meeting held first day of sampling?
Y Tailgate Meeting held on successive days?
Y Tailgate Meeting covers Health and Safety monitoring?
Y Tailgate Meeting covers Action Levels and Responses?
Y Tailgate Meeting covers Sampling Strategy?
Comments: None.

Health and Safety Monitoring Equipment Calibration and Usage

Y HNu calibration acceptable?
Y Measurements made at scheduled intervals?
Y Documentation of calibration?
Y Documentation of analyses?
Y Maintenance documentation available?
Comments: Meter calibrations and documentation in order.

Field Sample Collection and Documentation

Y Correct parameter collected for each required sample location?
Y Daily Checklist completed?
NA Sampling Log completed for each well?
NA SOP followed for well purging?
Y SOP followed for sample collection?
NA SOP followed for sample filtration?
Y SOP followed for sampling equipment decon?
Y Field replicate(s) collected?
NA Field replicate(s) notes on Water Sampling Log?
Comments: Soil sampling followed objectives in RFI Work Plan.

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Quality Control Sample Preparation, Collection, and Documentation

Y Trip blank(s) provided for lab for VOC sampling?
NA Equipment rinseate blank(s) collected?
NA Blanks noted on Water Sampling Logs and on Daily Log?
Y Blanks identified on Chain-of-Custody (COC) forms?
Comments: Quality control sample documentation in order.

Field Instrument Calibration, Analyses, and Documentation

NA pH Meter calibration every 4 hours?
NA Conductivity meter check every 4 hours?
Y HNu calibrated as per SOP?
Y Calibrations, analyses, and maintenance noted in logbook(s)?
Y Field analyses performed at scheduled intervals?
Y Results of field calibration and sample analyses meet QC limits?
Comments: pH and conductivity meters not used.

Sample Labeling and Preservation

Y* Sample bottle label filled out at site?
Y Matrix, parameters, and preservation noted on label?
Y Date, time, site, location, and sampler noted on label?
Y Is the label legible?
NA Does the label for each sample match the Water Sampling Log?
NA Has each sample fraction been properly preserved?
Comments: *Sampling labels preprinted - only the date and time needed to be filled out.

Chain-of-Custody (COC) Record Keeping

Y COC filled out for each sampling location?
Y All sample information included on COC form?
Y Does the COC match the Water Sampling Log and sample bottle labels?
Y* Date, time, site, project number, and laboratory task order (LTO) reference included on COC?
Y COC signed and dated by sampler?
Y Field custody maintained as per QAPP?
Y** Correct COC sealed in each cooler?
Comments: *No LTO: Lab is not a Geraghty & Miller subcontractor.
**Samples and COCs hand delivered, unsealed; samples checked in by lab at the time they are dropped off.

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ADDITIONAL CONSIDERATIONS

	Yes or No
Planning and Preparation	
1. Was a study plan, work plan, site operations plan, etc. issued for this investigation?	Y
Date Issued: 1992	
Sampling (General Procedures)	
1. Were sampling locations properly selected?	Y
2. Were new disposable gloves worn during collection of all samples?	Y
3. Was sampling equipment wrapped in aluminum foil and protected from possible contamination prior to sample collection?	Y
4. If equipment was cleaned in the field, were proper procedures used?	Y
5. What field instruments were used during this investigation?	
HNu	
6. Were field instruments properly calibrated?	Y
7. Were calibration procedures documented in the field notes?	Y
8. Were the samples chemically field preserved?	N
9. Were the samples iced?	Y
10. Were samples for selected parameters field filtered?	NA
Well Sampling	
1. Was depth of well determined?	NA
2. Was depth to water determined?	NA

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ADDITIONAL CONSIDERATIONS

Well Sampling (continued)

		Yes or No
3.	Were the above depths to water converted to water-level elevations common to all wells?	NA
	Describe how the depths were determined.	NA
4.	How was the volume of water originally present in each well determined?	NA
5.	Was the volume determined correctly?	NA
6.	How was completeness of purging determined? Volume ____ Measure ____ (for bailing wells) Time/Flow Rate ____ (for pumping wells)	NA
7.	Was a sufficient volume purged? Was the well over-purged?	NA
8.	Was a dedicated (in-place) pump utilized?	NA
9.	How were the samples collected? Open Top ____ Closed Top ____ Other ____	NA
10.	If a pump was used, describe how it was cleaned before and/or between wells.	NA
11.	Was the sample properly transferred from bailer to sample bottle (i.e., was the purgeable sample agitated, etc.)?	NA
12.	Was the rope or line allowed to touch the ground?	NA
13.	Was any wetted rope or line discarded after use at each well?	NA
14.	How many wells were sampled?	NA

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ADDITIONAL CONSIDERATIONS

	Yes or No
Quality Assurance/Quality Control	
While all of these QA/QC procedures are not necessarily used, please identify the specific techniques which were employed by sampling personnel.	
1. Did the sampling personnel utilize any field trip blanks?	Y
Included in each cooler of VOCs.	
2. Did the sampling personnel utilize preservative blanks?	N
3. Were any equipment blanks collected?	N
4. Were any duplicate samples collected?	Y
5. Were any spiked samples utilized?	Y
Field Documentation and Chain-of-Custody	
1. Were chain-of-custody records completed for all samples?	Y
2. Were all samples properly sealed at the time of collection?	Y
3. Were samples locked in vehicle or kept in a secure place after collection?	Y
4. Were all sample labels and chain-of-custody forms signed by sample collector(s)?	Y
5. Were sampling locations adequately documented?	Y
6. Was sampling documented with photographs?	N
If yes, was a photo log maintained?	
7. Were the samples shipped to a contract laboratory?	N
Were the traffic report forms filled out properly?	NA
Were the samples properly packed for shipment?	NA

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ATTACHMENT C
RFI QUALITY ASSURANCE AUDIT NO. 3
JANUARY 20, 1993
HARRISON DIVISION - GMC, MORAINE, OHIO

SUMMARY OF FINDINGS

On January 20, 1993, the third and final RFI Quality Assurance (QA) Audit was conducted by Geraghty & Miller during groundwater sampling at Monitor Wells GM-19S and GM-19D. The auditor observed sampling activities at a shallow monitor well (GM-19S) and a deep monitor well (GM-19D) to evaluate the specific procedures required for each type of well. At the time of the audit, the field sampling team was also observed by U.S. EPA oversight representative, Toby Droughton, from PRC. Prior to arrival at the site, a QA checklist was prepared, and this checklist was the basis for inquiries during the audit. Results of the field audit and the completed QA Audit checklist are presented below.

PERFORMANCE OF THE FIELD TEAM

Upon arrival at the site, the field sampling team began setting up equipment to sample groundwater from Monitor Well GM-19S. Prior to unlocking the protective cover on the well, an attempt was made to calibrate the HNu, but the field team was unable to calibrate the limit within project specific control limits. The field team planned to rent a replacement unit if the HNu could not be properly calibrated by the end of the day. Downtime for the HNu was limited to January 20, 1993. All other field instruments were calibrated with no problem.

Prior to the QA Audit, the field team realized they were out of compliance with respect to step 12A from SOP #3 - Ground-Water Sampling (RFI Work Plan - Appendix C). The oversight was detected during a routine review of project procedures after the first few days of sampling. This step in the procedure requires the measurement of pH, specific conductance, and temperature after evacuation of the monitor well, but prior to sample collection. This issue was resolved by the field team prior to the third Quality Assurance Audit.

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In general, the performance of the field team was found to be satisfactory. The team has been careful to precisely follow the standard operating procedures and requirements of the RFI Work Plan with the exception of the items mentioned above. Review of field documentation indicates that sampling at each location has been properly documented, and that the correct parameters have been collected at each sampling station and submitted to the laboratory.

LABORATORY PERFORMANCE

During the field QA Audit, the field team was asked to comment on the performance of the laboratory in terms of the delivery of sample bottle orders and the sample check-in procedures. The team indicated that the orders were ready for pick up at the scheduled time, but that sample bottles and trip blanks were frequently missing from the bottle orders. The field team was supplied with the bottle orders sent to the laboratory in order to check the number and type of bottles in each order. The laboratory did, however, supply the field team with the additional bottles and trip blanks required to complete the field sampling.

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GROUNDWATER SAMPLING QA AUDIT CHECKLIST

Audit Number:	Harrison RFI Field Audit No. 3
Group Audited:	Geraghty & Miller Field Sampling Team: R. Astle, C. Standard
Audit Subject:	RFI Field Sampling QA Audit
Auditor:	A.J. Waldhauer (QAO)
Date:	January 20, 1993
Audit Scope:	Assure validity of soil sample collection and documentation procedures, and adherence to the RFI Work Plan

Projects/Activities to be Audited:

Health and Safety Plan (HASP) On-Site

Y Copy of HASP available?
Y Correct HASP for this project?
Comments: Project documents appear to be in order in the field file.

HASP and Sampling Strategy Meeting (Tailgate Meeting)

NA Tailgate Meeting held first day of sampling?
NA Tailgate Meeting held on successive days?
NA Tailgate Meeting covers Health and Safety monitoring?
NA Tailgate Meeting covers Action Levels and Responses?
NA Tailgate Meeting covers Sampling Strategy?
Comments: Health and safety issues and strategy were discussed in the van on the way to the site each morning.

Health and Safety Monitoring Equipment Calibration and Usage

Y HNu calibration acceptable?
Y Measurements made at scheduled intervals?
Y Documentation of calibration?
Y Documentation of analyses?
Y Maintenance documentation available?
Comments: HNu calibrations not observed--see discussion of results.

Field Sample Collection and Documentation

Y Correct parameter collected for each required sample location?
Y Daily Checklist completed?
Y Sampling Log completed for each well?
Y SOP followed for well purging?
Y SOP followed for sample collection?
Y SOP followed for sample filtration?
Y SOP followed for sampling equipment decon?
Y Field replicate(s) collected?
Y Field replicate(s) notes on Water Sampling Log?
Comments: Daily checklists were filled out for each day of sampling. In the procedures for field filtration, a decontaminated Pyrex flask was substituted for a decontaminated Pyrex beaker.

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Quality Control Sample Preparation, Collection, and Documentation

Y Trip blank(s) provided for lab for VOC sampling?
Y Equipment rinseate blank(s) collected?
Y Blanks noted on Water Sampling Logs and on Daily Log?
Y Blanks identified on Chain-of-Custody (COC) forms?

Comments: Information such as the number of wells sampled per day plus well ID and the duplicated wells were also called in to the Project Manager, Bob Bartman, at the Dublin office.

Field Instrument Calibration, Analyses, and Documentation

Y pH Meter calibration every 4 hours?
Y Conductivity meter check every 4 hours?
___ HNu calibrated as per SOP?
Y* Calibrations, analyses, and maintenance noted in logbook(s)?
Y** Field analyses performed at scheduled intervals?
Y Results of field calibration and sample analyses meet QC limits?

Comments: *HNu not observed while operating; however, equipment maintenance logs indicate that proper calibration was performed.
**The field team discovered prior to the QA Audit that they were out of compliance with Step 12A from SOP #3. They had already corrected the problem prior to the QA Audit. See the discussion of results.

Sample Labeling and Preservation

Y* Sample bottle label filled out at site?
Y Matrix, parameters, and preservation noted on label?
Y Date, time, site, location, and sampler noted on label?
Y Is the label legible?
Y Does the label for each sample match the Water Sampling Log?
Y** Has each sample fraction been properly preserved?

Comments: *Sample labels were preprinted--only the date and time needed to be filled out.
**Bottles were prepreserved by the laboratory.

Chain-of-Custody (COC) Record Keeping

Y* COC filled out for each sampling location?
Y All sample information included on COC form?
Y Does the COC match the Water Sampling Log and sample bottle labels?
Y** Date, time, site, project number, and laboratory task order (LTO) reference included on COC?
Y COC signed and dated by sampler?
Y Field custody maintained as per QAPP?
Y*** Correct COC sealed in each cooler?

Comments: *COC filled out at end of day. Samples stored within visual contact.
**No LTO -- Lab is not a Geraghty & Miller subcontractor.
**Samples and COCs hand delivered, unsealed; the sample bottles are checked by lab at the time they are dropped off.

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ADDITIONAL CONSIDERATIONS

Yes or No

Planning and Preparation

1. Was a study plan, work plan, site operations plan, etc. issued for this investigation? Y

   Date Issued: September 1992

Sampling (General Procedures)

1. Were sampling locations properly selected? Y

2. Were new disposable gloves worn during collection of all samples? Y

   Latex gloves were used.

3. Was sampling equipment wrapped in aluminum foil and protected from possible contamination prior to sample collection? N*

   *Bailer is protected in site dedicated PVC bailer case, submersible pump and hose is stored in a dedicated plastic container.

4. If equipment was cleaned in the field, were proper procedures used? Y

   Used solvent was stored in a safety container and periodically dropped off at Harrison's Hazardous Waste Storage Cage.

5. What field instruments were used during this investigation?

   Specific conductivity meter, pH meter, thermometer, centrifugal pump (for filtering), submersible pump (for well evaluation), generator.

6. Were field instruments properly calibrated? N

   HNu calibration was not observed. All other instruments were calibrated and operated properly.

7. Were calibration procedures documented in the field notes? Y

   Yes. Instrument specific calibration forms were used.

8. Were the samples chemically field preserved? Y

   Pre-preserved bottles were used.

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9. Were the samples iced? Y

10. Were samples for selected parameters field filtered? Y

Performed per SOP, except that a decontaminated Pyrex flask was substituted for a decontaminated Pyrex beaker to hold the sample prior to filtering. This procedure was approved by a representative from PRC.

Well Sampling

1. Was depth of well determined? Y

2. Was depth to water determined? Y

At each well site, will also do complete water-level round after sampling is complete.

3. Were the above depths to water converted to water-level elevations common to all wells? Y

Not in field; this was done in the office.

Describe how the depths were determined.

M Scope.

4. How was the volume of water originally present in each well determined?

Total depth (ft) - depth to water (ft) x gal/ft coefficient from sampling log.

5. Was the volume determined correctly? Y

6. How was completeness of purging determined?

Volume	X	
Measure	X	(for bailing wells)
Time/Flow Rate	X	(for pumping wells)

7. Was a sufficient volume purged? Y
Was the well over-purged? N

8. Was a dedicated (in-place) pump utilized? N

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ADDITIONAL CONSIDERATIONS

Yes or No

Well Sampling (continued)

9. How were the samples collected?
   - Bailer X
   - Pump ___
   - Combination ___

   Construction material of bailer: Teflon site dedicated

   Design of bailer:
   - Open Top X
   - Closed Top ___
   - Other ___

10. If a pump was used, describe how it was cleaned before and/or between wells.

    Scrubbed with solution of lab soap and distilled water, and rinsed with copious amounts of distilled water.

11. Was the sample properly transferred from bailer to sample bottle (i.e., was the purgeable sample agitated, etc.)? Y

    Sample agitation was minimized.

12. Was the rope or line allowed to touch the ground? N

13. Was any wetted rope or line discarded after use at each well? Y

14. How many wells were sampled?

    During field audit - 1 shallow and 1 deep (2 total)

Quality Assurance/Quality Control

While all of these QA/QC procedures are not necessarily used, please identify the specific techniques which were employed by sampling personnel.

1. Did the sampling personnel utilize any field trip blanks? Y

   Included in each cooler of VOCs.

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ADDITIONAL CONSIDERATIONS

Yes or No

Quality Assurance/Quality Control (continued)

2. Did the sampling personnel utilize preservative blanks? N

   Trip blanks carried in cooler with samples until dropped off at lab. Trip blanks were labeled TB, plus a consecutive number.

3. Were any equipment blanks collected? Y

   Bailer rinseate blanks were labeled RB, plus consecutive number.

4. Were any duplicate samples collected? Y

   Full parameter set (soils) collected 1:10 or once/day, whichever greater.

5. Were any spiked samples utilized? N

Field Documentation and Chain-of-Custody

1. Were chain-of-custody records completed for all samples? Y

2. Were all samples properly sealed at the time of collection? Y

3. Were samples locked in vehicle or kept in a secure place after collection? Y

4. Were all sample labels and chain-of-custody forms signed by sample collector(s)? Y

5. Were sampling locations adequately documented? Y

   EPA oversight (PRC) has been taking photos.

6. Was sampling documented with photographs? N
   If yes, was a photo log maintained?

   PRC had been maintaining a photo log.

7. Were the samples shipped to a contract laboratory? N
   Were the traffic report forms filled out properly? Y
   Were the samples properly packed for shipment? Y

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ATTACHMENT D
PHASE II RFI QUALITY ASSURANCE AUDIT NO. 1
OCTOBER 27, 1994
HARRISON DIVISION - GMC, MORAINE, OHIO

SUMMARY OF FINDINGS

On October 27, 1994, the first and only RFI Phase II Quality Assurance Field Audit was conducted by Geraghty & Miller, Inc. during groundwater sampling at Monitor Wells GM-20D and MT-69. The auditor observed sampling activities to evaluate the specific procedures required. Sampling activities were only observed at deep Monitoring Well MT-69. Problems with the construction and development of Well GM-20D prohibited sampling at the time of the field audit. At the time of the audit, the field sampling team was also observed by U.S. EPA oversight representative, Mr. Stan Lynn, from PRC. Also scheduled for Well GM-20D was EPA split sampling. Mr. Chris Cotton and Mr. Jay Cavender, both representing the U.S. EPA, were present to split sample Well GM-20D. Because of the problems encountered at Well GM-20D, the split sampling had to be rescheduled. Prior to arrival at the site, an audit checklist was prepared, and this checklist was the basis for inquiries during the audit. The results of the audit and the completed checklist are presented below.

PERFORMANCE OF THE FIELD TEAM

Upon arrival at the site by the auditor, the field sampling team was prepared to sample GM-20D. The field parameters were being collected and analyzed. At this time it was noted that the pH of the sample was 11.7. The high pH alerted the sampling team to a potential problem. It was believed that bentonite pellets may have inadvertently entered the well. A decision was made not to sample at this time and to have Reynolds Inc. fully purge the Well to remove any bentonite pellets within the casing.

The sampling team moved to Well MT-69 and began setting up equipment to sample groundwater. After Ms. Janna Heeg, a Miami Conservancy representative, unlocked the well,

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the sampling team began setting up a pump to purge the well. The sampling team began to evacuate the well water before taking a reading from the HNu. This oversight was noted by the sampling team, and will be corrected for future sampling.

In general, the performance of the field team was found to be satisfactory. The team has been careful to follow the standard operations procedures and requirements of the RFI Work Plan with the exception of the item mentioned above. Review of field documentation indicates that sampling at each location has been properly documented and that the correct parameters have been collected at each sampling station and submitted to the laboratory.

DRAFT

GROUNDWATER SAMPLING QA AUDIT CHECKLIST

Audit Number:	Harrison Phase II RFI Field Audit No. 4
Group Audited:	Geraghty & Miller Field Sampling Team: R. Astle, C. Standard
Audit Subject:	RFI Field Sampling QA Audit
Auditor:	M. Salem (QAO)
Date:	October 17, 1994
Audit Scope:	Assure validity of soil sample collection and documentation procedures, and adherence to the RFI Work Plan

Projects/Activities to be Audited:

Health and Safety Plan (HASP) On-Site

Y Copy of HASP available?

Y Correct HASP for this project?

Comments: Field project documents are in order.

HASP and Sampling Strategy Meeting (Tailgate Meeting)

Y Tailgate Meeting held first day of sampling?

Y Tailgate Meeting held on successive days?

Y Tailgate Meeting covers Health and Safety monitoring?

Y Tailgate Meeting covers Action Levels and Responses?

Y Tailgate Meeting covers Sampling Strategy?

Comments: Health and safety meetings held at the start of each day, also covering sampling strategy.

Health and Safety Monitoring Equipment Calibration and Usage

Y HNu calibration acceptable?

N Measurements made at scheduled intervals?

Y Documentation of calibration?

Y Documentation of analyses?

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Y Maintenance documentation available?

Comments: Well evacuation was started prior to taking HNu reading.

Field Sample Collection and Documentation

Y Correct parameter collected for each required sample location?

Y Daily Checklist completed?

Y Sampling Log completed for each well?

Y SOP followed for well purging?

Y SOP followed for sample collection?

Y SOP followed for sample filtration?

Y SOP followed for sampling equipment decon?

Y Field replicate(s) collected?

Y Field replicate(s) notes on Water Sampling Log?

Comments: One field replicate was collected for each day of sampling.

Quality Control Sample Preparation, Collection, and Documentation

Y Trip blank(s) provided for lab for VOC sampling?

Y Equipment rinseate blank(s) collected?

Y Blanks noted on Water Sampling Logs and on Daily Log?

Y Blanks identified on Chain-of-Custody (COC) forms?

Comments: One equipment blank collected on each day of sampling.

Field Instrument Calibration, Analyses, and Documentation

Y pH Meter calibration every 4 hours?

Y Conductivity meter check every 4 hours?

Y HNu calibrated as per SOP?

Y Calibrations, analyses, and maintenance noted in logbook(s)?

Y Field analyses performed at scheduled intervals?

Y Results of field calibration and sample analyses meet QC limits?

Comments: Calibrations and checklists are in order in the field file.

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Sample Labeling and Preservation

Y Sample bottle label filled out at site?

Y Matrix, parameters, and preservation noted on label?

Y Date, time, site, location, and sampler noted on label?

Y Is the label legible?

Y Does the label for each sample match the Water Sampling Log?

Y Has each sample fraction been properly preserved?

Comments: Bottles were preserved by the laboratory.

Chain-of-Custody (COC) Record Keeping

Y COC filled out for each sampling location?

Y All sample information included on COC form?

Y Does the COC match the Water Sampling Log and sample bottle labels?

N Date, time, site, project number, and laboratory task order (LTO) reference included on COC?

Y COC signed and dated by sampler?

Y Field custody maintained as per QAPP?

Y Correct COC sealed in each cooler?

Comments: LTO not included as part of field custody. Laboratory is not a G&M subcontractor.

Planning and Preparation

1. Was a study plan, work plan, site operations plan, etc. issued for this investigation? Y

Date Issued: September 1992

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ADDITIONAL CONSIDERATIONS

		Yes or No
Sampling (General Procedures)		
1.	Were sampling locations properly selected?	Y
2.	Were new disposable gloves worn during collection of all samples?	Y
3.	Was sampling equipment wrapped in aluminum foil and protected from possible contamination prior to sample collection?	N
	Bailer is protected in site dedicated PVC bailer case.	
4.	If equipment was cleaned in the field, were proper procedures used?	Y
5.	What field instruments were used during this investigation?	
	Specific conductivity meter, pH meter, thermometer, HNu, centrifugal, and submersible pump.	
6.	Were field instruments properly calibrated?	Y
7.	Were calibration procedures documented in the field notes?	Y
8.	Were the samples chemically field preserved?	N
	Bottles were preserved in the laboratory.	
9.	Were the samples iced?	Y
10.	Were samples for selected parameters field filtered?	Y
Well Sampling		
1.	Was depth of well determined?	Y
2.	Was depth to water determined?	Y

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ADDITIONAL CONSIDERATIONS

Well Sampling (continued)

Yes or No

3. Were the above depths to water converted to water-level elevations common to all wells? N

   This was done in the office.

   Describe how the depths were determined.

   M Scope.

4. How was the volume of water originally present in each well determined?

   Total depth (ft) - depth to water (ft) x gal/ft coefficient from sampling log.

5. Was the volume determined correctly? Y

6. How was completeness of purging determined?
   - Volume X
   - Measure X (for bailing wells)
   - Time/Flow Rate X (for pumping wells)

7. Was a sufficient volume purged? Y
   Was the well over-purged? N

8. Was a dedicated (in-place) pump utilized? N

9. How were the samples collected?
   - Bailer X
   - Pump ___
   - Combination ___

10. Was the sample properly transferred from bailer to sample bottle (i.e., was the purgeable sample agitated, etc.)? Y

11. Was the rope or line allowed to touch the ground? N

12. Was any wetted rope or line discarded after use at each well? Y

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ADDITIONAL CONSIDERATIONS

Yes or No

Quality Assurance/Quality Control

While all of these QA/QC procedures are not necessarily used, please identify the specific techniques which were employed by sampling personnel.

1. Did the sampling personnel utilize any field trip blanks? Y
2. Did the sampling personnel utilize preservative blanks? N
3. Were any equipment blanks collected? Y
4. Were any duplicate samples collected? Y
5. Were any spiked samples utilized? N

Field Documentation and Chain-of-Custody

1. Were chain-of-custody records completed for all samples? Y
2. Were all samples properly sealed at the time of collection? Y
3. Were samples locked in vehicle or kept in a secure place after collection? Y
4. Were all sample labels and chain-of-custody forms signed by sample collector(s)? Y
5. Were sampling locations adequately documented? Y
6. Was sampling documented with photographs? N
   If yes, was a photo log maintained?
7. Were the samples shipped to a contract laboratory? N

   Samples were hand delivered to the laboratory.

   Were the traffic report forms filled out properly? Y
   Were the samples properly packed for shipment? Y

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APPENDIX C

RFI SOIL/SEDIMENT LOGS

BORING LOGS, AND WELL CONSTRUCTION LOG

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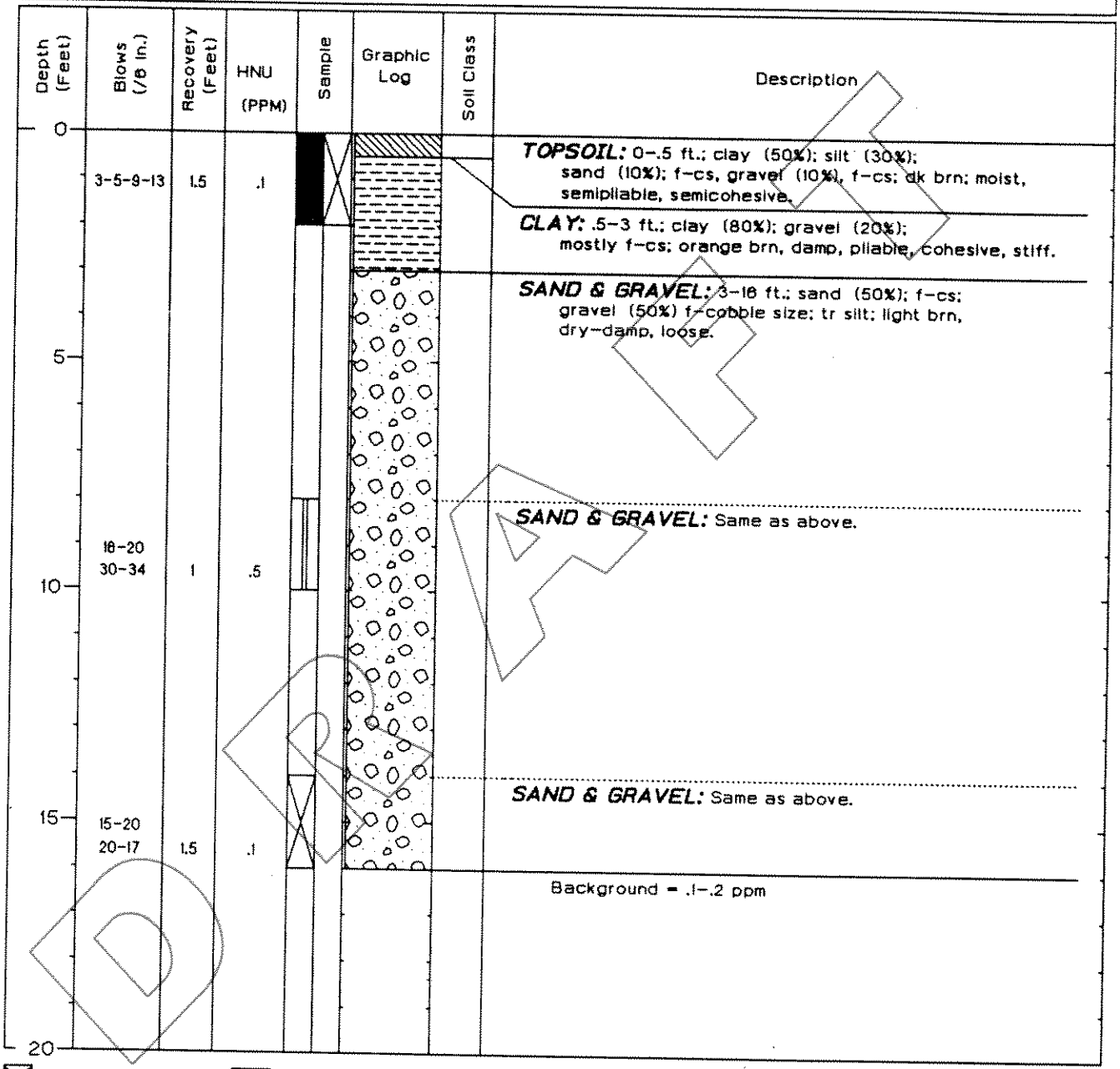
Geraghty & Miller, Inc.
Environmental Services

Log of Boring: BKG-BH01

HARRISON RFI

Moraine, Ohio



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☒ Composite to Lab ■ VOC to Lab ▥ Split-Spoon Not Analyzed

Drilling Co.: Belasco
Driller: G. Mayle
Drilling Method: HSA 4 1/4"
Drilling Fluid: None
Remarks:

Geologist: R. Astle
Total Depth: 16
Surface Elev.:
Datum: Feet, MSL
West Coor.:

Begin Drilling: 11/08/92
End Drilling: 11/08/92
Converted to Well: No
Well Name:
South Coor.:

OH019.12

harrison

SOIL/SEDIMENT SAMPLING LOG

Project/No. Harrison / OH019.12 Page 1 of 2

Site Location Moraine, Ohio

Sample No. DD-GS01-02SD Coded/ Replicate No. DUP-11 Date 1-5-93

Weather Cloudy, 40s F Time Sampling Began 4:30 p.m. Time Sampling Completed 5:30 p.m.

Sampling Method and Material 2.75-inch diameter stainless steel hand auger

Grab X Composite ____

From	To	Soil/Sediment Description
0	2 ft	Sand (40%), f-cs; gravel (30%), f-cobble size; silt (20%); tr clay; dark gray to light brown, wet.

Other (OVA; HNU; etc.) HNU = .6 ppm = background.

Constituents Sampled	Container Description From Lab X or G&M ____	Preservative
TCL VOCs	4 oz glass jar	Ice
TCL SVOCs & PCB/Pest.	4 oz glass jar	Ice
TAL Metals & Cyanide	16 oz glass jar	Ice

Remarks MS/MSD sample.

Sampling Personnel R. Astle, S. Ackers

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SOIL/SEDIMENT SAMPLING LOG

Project/No. Harrison / OH019.12 Page 2 of 2

Site Location Moraine, Ohio

Sample No. DD-GS02-02SD Coded/ Replicate No. _____ Date 1-5-93

Weather Cloudy, 40s F Time Sampling Began 3:00 p.m. Time Sampling Completed 3:45 p.m.

Sampling Method and Material 2.75-inch diameter stainless steel hand auger

Grab X Composite ____

From	To	Soil/Sediment Description
0	.5 ft	Gravel (40%), f-cobble; sand (40%), f-cs; silt (15%); tr clay; tr decaying plants; lt brn to dark brown, wet.

Other (OVA; HNU; etc.) HNU = .6 ppm = background.

Constituents Sampled	Container Description From Lab X or G&M ____	Preservative
TCL VOCs	4 oz glass jar	Ice
TCL SVOCs, PCB/Pest.	4 oz glass jar	Ice
TAL Metals & Cyanide	16 oz glass jar	Ice

Remarks

Sampling Personnel R. Astle, S. Ackers

DRAFT

WATER SAMPLING LOG

PROJECT/NO. Harrison RFI / OH019.12 PAGE 37 OF 38

SITE LOCATION Moraine, Ohio

SITE/WELL NO. DD-GS01-SW CODED/ REPLICATE NO. DATE 1/7/93

WEATHER Cloudy, 40sF TIME SAMPLING BEGAN 2:00 p.m. TIME SAMPLING COMPLETED 3:00 p.m.

EVACUATION DATA

DESCRIPTION OF MEASURING POINT (MP) NA

HEIGHT OF MP ABOVE/BELOW LAND SURFACE NA MP ELEVATION NA

TOTAL SOUNDED DEPTH OF WELL BELOW MP NA WATER-LEVEL ELEVATION NA

HELD ____ DEPTH TO WATER BELOW MP NA DIAMETER OF CASING NA

WET ____ WATER COLUMN IN WELL NA GALLONS PUMPED/BAILED PRIOR TO SAMPLING NA

GALLONS PER FOOT NA

GALLONS IN WELL NA SAMPLING PUMP INTAKE SETTING (FEET BELOW LAND SURFACE) NA

EVACUATION METHOD Stainless-steel dipper

SAMPLING DATA/FIELD PARAMETERS

COLOR Clear ODOR None APPEARANCE Clear TEMPERATURE 49.7 °F/°C

OTHER (SPECIFIC ION; OVA; HNU; ETC.) HNU = .6 ppm = background

SPECIFIC CONDUCTANCE, UMHOS/CM 1096/1093/1092/1091 pH 8.13/8.13/8.14/8.14

SAMPLING METHOD AND MATERIAL Stainless steel dipper

CONSTITUENTS SAMPLED	CONTAINER DESCRIPTION FROM LAB X OR G&M	PRESERVATIVE
VOCs	(3) 40 ml glass vial	HCl, Ice
SVOCs	1 liter amber glass	Ice
Total Metals	1 liter plastic	HNO_3, Ice
Dissolved Metals	1 liter plastic	HNO_3, Ice
PCB/Pest.	1 liter amber glass	Ice
Herbicides	1 liter amber glass	Ice
Cyanide	500 ml plastic	H_2SO_4, Ice

REMARKS Dissolved metals field filtered. Collected triple volume for MS/MSD spike.

SAMPLING PERSONNEL R. Astle, M. Slemmons

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	3-¼" = 0.50	6" = 1.47

DRAFT

WATER SAMPLING LOG

PROJECT/NO. Harrison RFI / OH019.12 PAGE 38 OF 38

SITE LOCATION Moraine, Ohio

SITE/WELL NO. DD-GS02-SW CODED/ REPLICATE NO. DUP-12 DATE 1/7/93

WEATHER P-Cloudy, 50sF TIME SAMPLING BEGAN 1:00 p.m. TIME SAMPLING COMPLETED 1:30 p.m.

EVACUATION DATA

DESCRIPTION OF MEASURING POINT (MP) NA

HEIGHT OF MP ABOVE/BELOW LAND SURFACE NA MP ELEVATION NA

TOTAL SOUNDED DEPTH OF WELL BELOW MP NA WATER-LEVEL ELEVATION NA

HELD ____ DEPTH TO WATER BELOW MP NA DIAMETER OF CASING NA

WET ____ WATER COLUMN IN WELL NA GALLONS PUMPED/BAILED PRIOR TO SAMPLING NA

GALLONS PER FOOT NA

GALLONS IN WELL NA SAMPLING PUMP INTAKE SETTING (FEET BELOW LAND SURFACE) NA

EVACUATION METHOD Stainless-steel dipper

SAMPLING DATA/FIELD PARAMETERS

COLOR Clear ODOR None APPEARANCE Clear TEMPERATURE 53.3 °F/°C

OTHER (SPECIFIC ION; OVA; HNU; ETC.) HNU = .6 ppm = background

SPECIFIC CONDUCTANCE, UMHOS/CM 1335/1333/1332/1332 pH 7.45/7.45/7.51/7.46

SAMPLING METHOD AND MATERIAL Stainless steel dipper

CONSTITUENTS SAMPLED	CONTAINER DESCRIPTION FROM LAB X OR G&M	PRESERVATIVE
VOCs	(3) 40 ml glass vial	HCl, Ice
SVOCs	1 liter amber glass	Ice
Total Metals	1 liter plastic	HNO_3, Ice
Dissolved Metals	1 liter plastic	HNO_3, Ice
PCB/Pest.	1 liter amber glass	Ice
Herbicides	1 liter amber glass	Ice
Cyanide	500 ml plastic	H_2SO_4, Ice

REMARKS Dissolved metals field filtered. Took RB-01 after sampling.

SAMPLING PERSONNEL R. Astle, M. Slemmons

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

DRAFT

WATER SAMPLING LOG

Project/No. **Harrison Phase II RFI / 000050.0OH** Page **44** of **44**

Site Location **Moraine, Ohio**

Site/Well No. **DD-GS04-02SW** Coded/ Replicate No. **DUP-31** Date **10/25/94**

Weather **Cloudy, 40's °F** Time Sampling Began **3:00 p.m.** Time Sampling Completed **3:20 p.m.**

EVACUATION DATA

Description of Measuring Point (MP) **N/A**

Height of MP Above/Below Land Surface **NA** MP Elevation **NA**

Total Sounded Depth of Well Below MP **NA** Water-Level Elevation **NA**

Held_____ Depth to Water Below MP **NA** Diameter of Casing **NA**

Wet_____ Water Column in Well **NA** Gallons Pumped/Bailed Prior to Sampling **NA**

Gallons per Foot **NA** Pump On: _____ Rate: _____

Gallons in Well **NA** Pump Off: _____ Sampling Pump Intake Setting (feet below land surface) _____

Evacuation Method **Stainless-steel dipper**

SAMPLING DATA/FIELD PARAMETERS

Color **Clear** Odor **None** Appearance **Trace sheen; Clear** Temperature **57.3** °F/°C

Other (specific ion; OVA; HNU; etc.) **Background and breathing zone = 0.8 ppm**

Specific Conductance, umhos/cm **(A) 1009/995/1017/1017** pH **(A) 7.50/8.00/8.10/8.17**
umhos/cm **(B) 1010/994/1016/1018** pH **(B) 7.48/8.04/8.11/8.17**

Sampling Method and Material **Stainless-steel dipper**

Constituents Sampled	Container Description From Lab X or G&M	Preservative
VOCs 8015	(3) 40 ml glass vial	HCl, cool

Remarks **Duplicate pH and SpC readings taken immediately after filling sample bottles. Surface-water sample collected triple volume for MS/MSD. Rinseate Blank (RB-18) sampled after DD-GC04-02SW (downgradient). Surface-water sample was taken (3:40 p.m.).**

Sampling Personnel **R. Astle, C. Standard**

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

DRAFT

WATER SAMPLING LOG

Project/No. **Harrison Phase II RFI / 000050.0OH** Page **43** of **44**

Site Location **Moraine, Ohio**

Site/Well No. **DD-GS03-02SW** Coded/ Replicate No. **DUP-31** Date **10/25/94**

Weather **Cloudy, 40's °F** Time Sampling Began **3:50 p.m.** Time Sampling Completed **4:00 p.m.**

EVACUATION DATA

Description of Measuring Point (MP) **N/A**

Height of MP Above/Below Land Surface **NA** MP Elevation **NA**

Total Sounded Depth of Well Below MP **NA** Water-Level Elevation **NA**

Held____ Depth to Water Below MP **NA** Diameter of Casing **NA**

Wet____ Water Column in Well **NA** Gallons Pumped/Bailed Prior to Sampling **NA**

Gallons per Foot **NA** Pump On: ____ Rate: ____

Pump Off: ____

Gallons in Well **NA** Sampling Pump Intake Setting (feet below land surface) ____

Evacuation Method **Stainless-steel dipper**

SAMPLING DATA/FIELD PARAMETERS

Color **Clear** Odor **None** Appearance **Trace sheen/Clear** Temperature **56.0** °F/°C

Other (specific ion; OVA; HNU; etc.) **Background and breathing zone = 0.9 ppm**

Specific Conductance, umhos/cm **1072/1073/1095/1094** pH **7.87/7.93/7.97/8.02**

Sampling Method and Material **Stainless-steel dipper.**

Constituents Sampled	Container Description From Lab X or G&M	Preservative
VOCs 8015	(3) 40 ml glass vial	HCl, cool

Remarks **pH and SpC taken immediately after filling sample bottles. Upgradient surface-water samples.**

Sampling Personnel **R. Astle, C. Standard**

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

DRAFT

SOIL/SEDIMENT SAMPLING LOG

Project/No. Harrison / OH019.12 Page 1 of 2

Site Location Moraine, Ohio

Sample No. BKG-BH01-02SL Coded/ Replicate No. _____ Date 11-6-92

Weather Cloudy, 40sF Time Sampling Began 9:30 a.m. Time Sampling Completed 9:40 a.m.

Sampling Method and Material 3" diameter split spoon

Grab ____ Composite X

From	To	Soil/Sediment Description
0	2	Clay; some silt; some gravel, f-cs; little sand, f-cs; dk brown to orange brn, damp to moist, pliable, cohesive.

Other (OVA; HNU; etc.) HNU in spoon = .1 ppm. Background = .1 ppm.

Constituents Sampled	Container Description From Lab X or G&M ____	Preservative
TCL VOCs	4 cz glass jar	Ice
TCL SVOCs/PCBs/Pesticides	4 oz glass jar	Ice
TAL Metals & Cyanide	16 oz glass jar	Ice

Remarks

Sampling Personnel R. Astle

DRAFT

SOIL/SEDIMENT SAMPLING LOG

Project/No. Harrison / OH019.12 Page 2 of 2

Site Location Moraine, Ohio

Sample No. BKG-BH01-16SL Coded/ Replicate No. _____ Date 11-6-92

Weather Cloudy, 40sF Time Sampling Began 10:50 a.m. Time Sampling Completed 11:00 a.m.

Sampling Method and Material 2" diameter split spoon

Grab ____ Composite X

From	To	Soil/Sediment Description
14	16	Sand (50%), f-cs; gravel (50%), f-cobble size; silt (10%); tr silt; lt brn, dry-damp, loose.

Other (OVA; HNU; etc.) HNU in spoon = .1 ppm. Background = 1.1 ppm.

Constituents Sampled	Container Description From Lab X or G&M ____	Preservative
TAL Metals & Cyanide	16 oz glass jar	Ice

Remarks

Sampling Personnel R. Astle

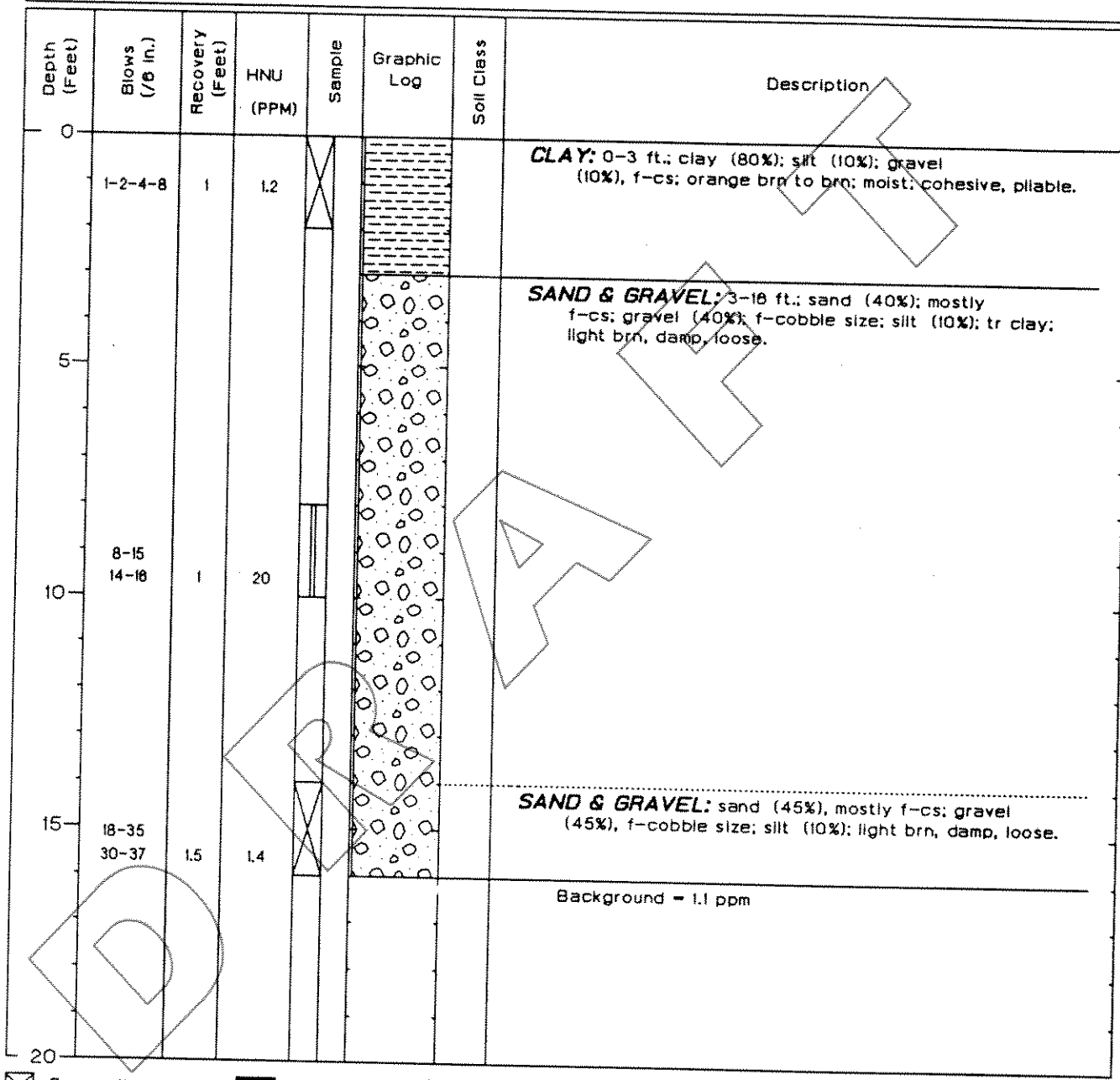
DRAFT

Geraghty & Miller, Inc.
Environmental Services

Log of Boring: BKG-BH02

HARRISON RFI

Moraine, Ohio



DRAFT

☒ Composite to Lab ■ VOC to Lab ▥ Split-Spoon Not Analyzed

Drilling Co.: Belasco
Driller: G. Mayle
Drilling Method: HSA 4 1/4"
Drilling Fluid: None
Remarks:

Geologist: R. Astle
Total Depth: 16
Surface Elev.:
Datum: Feet, MSL
West Coor.:

Begin Drilling: 11/06/92
End Drilling: 11/06/92
Converted to Well: No
Well Name:
South Coor.:

OH019.12

harrison

SOIL/SEDIMENT SAMPLING LOG

Project/No. Harrison / OH019.12 Page 1 of 2

Site Location Moraine, Ohio

Sample No. BKG-BH02-02SL Coded/ Replicate No. _____ Date 11-5-92

Weather Cloudy, 40sF Time Sampling Began 3:00 p.m. Time Sampling Completed 4:00 p.m.

Sampling Method and Material 2" diameter split spoon

Grab X Composite ____

From	To	Soil/Sediment Description
0	2	Clay (80%); silt (10%); gravel (10%), f-cs; orange brn to brn, moist, cohesive, pliable.

Other (OVA; HNU; etc.) HNU in spoon = 1.2 ppm. Background = 1.1 ppm.

Constituents Sampled	Container Description From Lab X or G&M ____	Preservative
TAL Metals	16 oz glass jar	Ice

Remarks _____

Sampling Personnel R. Astle

DRAFT

SOIL/SEDIMENT SAMPLING LOG

Project/No. Harrison / OH019.12 Page 2 of 2

Site Location Moraine, Ohio

Sample No. BKG-BH02-16SL Coded/ Replicate No. _____ Date 11-5-92

Weather Cloudy, 40sF Time Sampling Began 3:00 p.m. Time Sampling Completed 4:00 p.m.

Sampling Method and Material 3" diameter split spoon

Grab ____ Composite X

From	To	Soil/Sediment Description
14	16	Sand (45%), mostly fine-cs; gravel (45%), f-cs; silt (10%); light brown, damp, loose.

Other (OVA; HNU; etc.) HNU in spoon = 1.4 ppm. Background = 1.1 ppm.

Constituents Sampled	Container Description From Lab X or G&M ____	Preservative
TCL VOCs	4 oz glass jar	Ice
TAL Metals	16 oz glass jar	Ice

Remarks

Sampling Personnel R. Astle

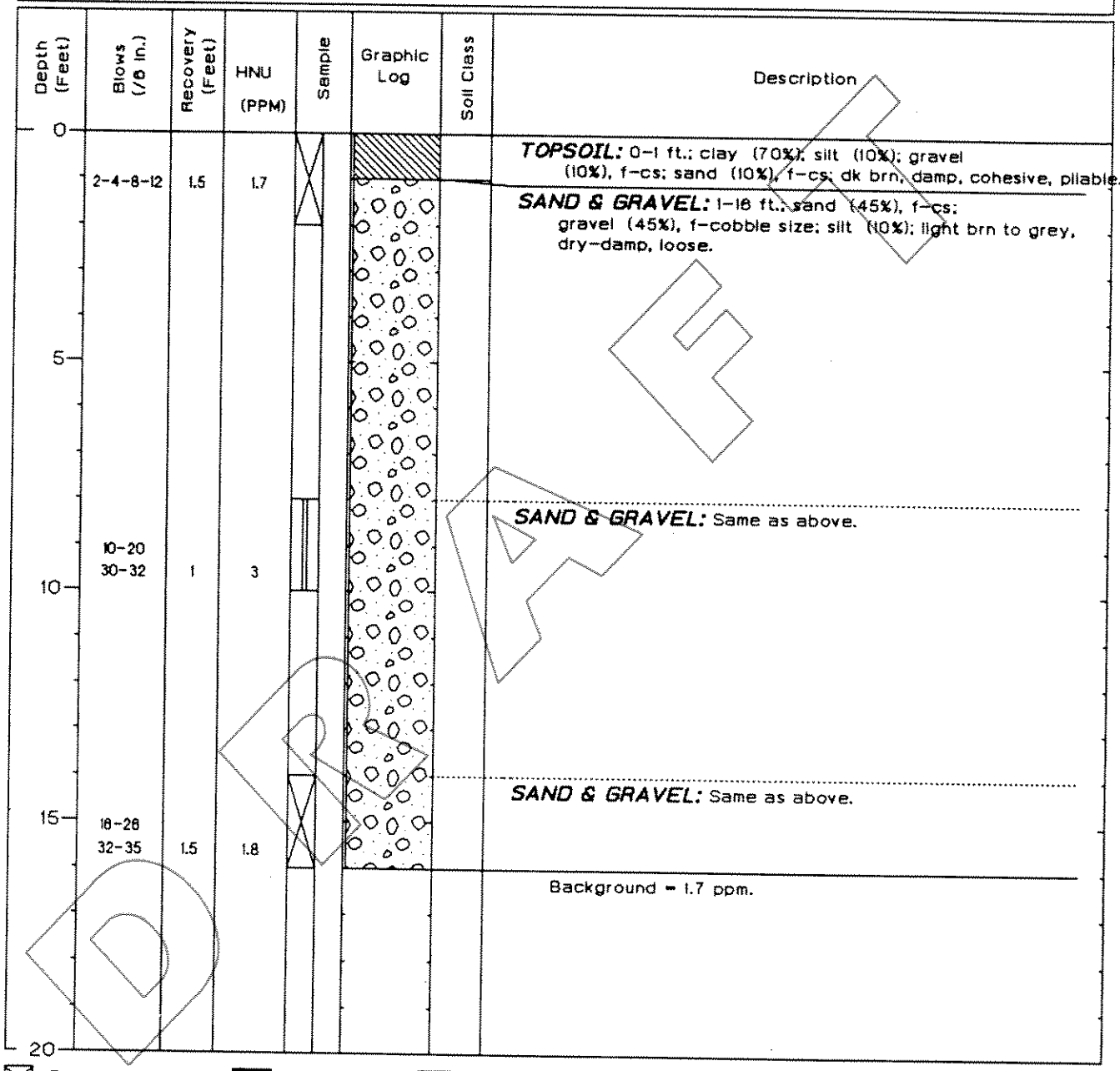
DRAFT

Geraghty & Miller, Inc.
Environmental Services

Log of Boring: BKG-BH03

HARRISON RFI

Moraine, Ohio



DRAFT

☒ Composite to Lab ■ VOC to Lab ▥ Split-Spoon Not Analyzed

Drilling Co.: Belasco
Driller: G. Mayle
Drilling Method: HSA 4 1/4"
Drilling Fluid: None
Remarks:

Geologist: R. Astle
Total Depth: 16
Surface Elev.:
Datum: Feet, MSL
West Coor.:

Begin Drilling: 11/10/92
End Drilling: 11/10/92
Converted to Well: No
Well Name:
South Coor.:

OH019.12

harrison

SOIL/SEDIMENT SAMPLING LOG

Project/No. Harrison / OH019.12 Page 1 of 2

Site Location Moraine, Ohio

Sample No. BKG-BH03-02SL Coded/ Replicate No. _____ Date 11-10-92

Weather Rain, 50sF Time Sampling Began 2:00 p.m. Time Sampling Completed 2:10 p.m.

Sampling Method and Material 2" diameter split spoon

Grab ____ Composite X

From	To	Soil/Sediment Description
0	2	Clay; sand, f-cs; gravel, f-cs; little silt; dk brown to light brown, damp, cohesive, pliable to loose, crumbly.

Other (OVA; HNU; etc.) HNU = 1.7 ppm in spoon. Background = 1.7 ppm.

Constituents Sampled	Container Description From Lab X or G&M ____	Preservative
TAL Metals, TOC, CEC	16 oz glass jar	Ice
Bulk Density, Particle Size	5 gallon bucket	--
Moisture Content	1 liter glass jar	--
Porosity	Shelby tube	--

Remarks

Sampling Personnel R. Astle

DRAFT

SOIL/SEDIMENT SAMPLING LOG

Project/No. Harrison / OH019.12 Page 2 of 2

Site Location Moraine, Ohio

Sample No. BKG-BH03-16SL Coded/ Replicate No. _____ Date 11-10-92

Weather Rain, 50sF Time Sampling Began 3:20 p.m. Time Sampling Completed 3:30 p.m.

Sampling Method and Material 2" diameter split spoon

Grab ____ Composite X

From	To	Soil/Sediment Description
14	16	Sand, f-cs; gravel, f-cs; little silt; light brown-gray, damp, loose.

Other (OVA; HNU; etc.) HNU = 1.8 ppm. Background HNU = 1.7 ppm.

Constituents Sampled	Container Description From Lab X or G&M ____	Preservative
TAL Metals, TOC, CEC	16 oz glass jar	Ice
Bulk Density, Particle Size	5 gallon bucket	--
Moisture Content	1 liter glass jar	--

Remarks Shelby tube refusal.

Sampling Personnel R. Astle

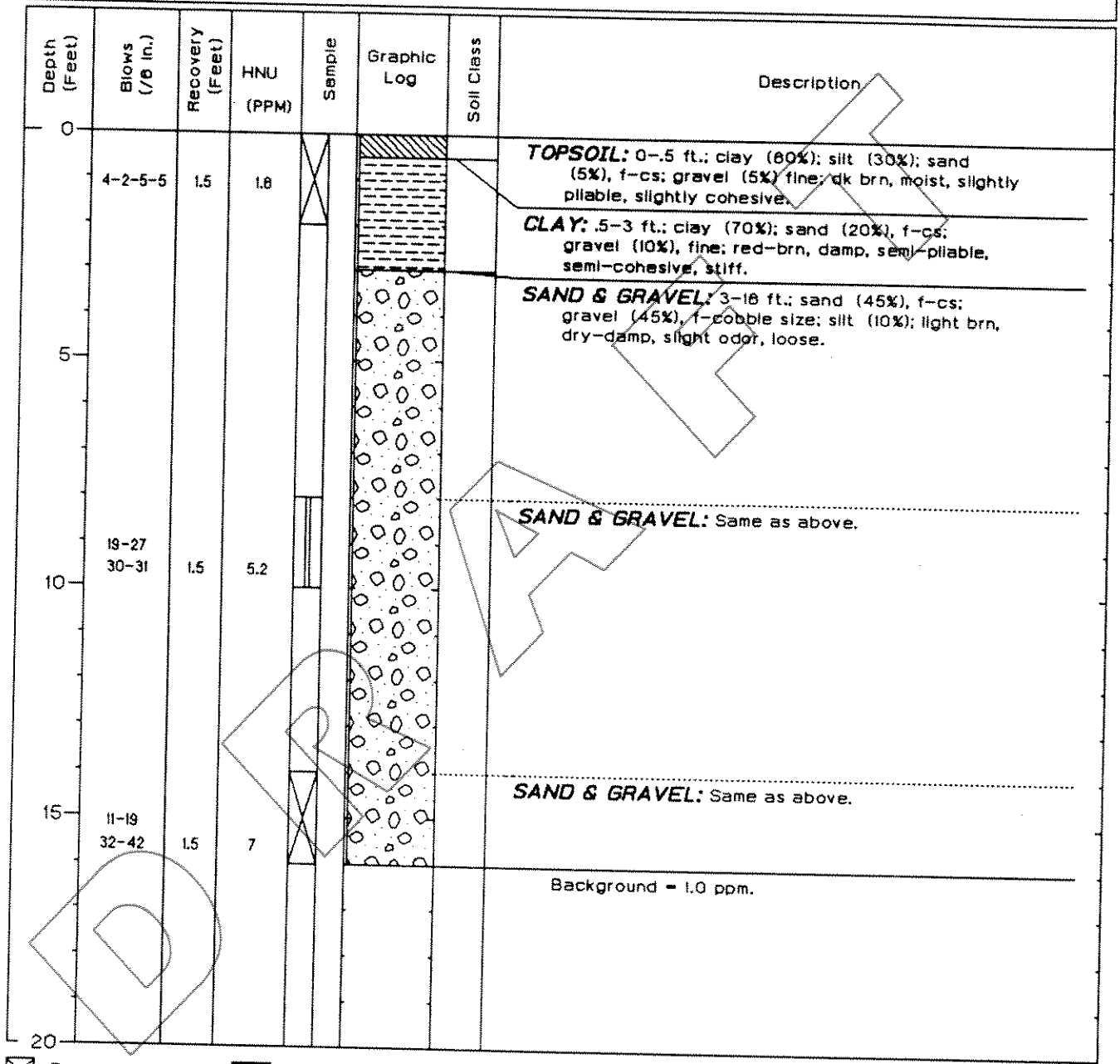
DRAFT

Geraghty & Miller, Inc.
Environmental Services

Log of Boring: BKG-BH04

HARRISON RFI

Moraine, Ohio



DRAFT

☒ Composite to Lab ■ VOC to Lab ▥ Split-Spoon Not Analyzed

Drilling Co.: Belasco
Driller: G. Mayle
Drilling Method: HSA 4 1/4"
Drilling Fluid: None
Remarks:

Geologist: R. Astle
Total Depth: 18
Surface Elev.:
Datum: Feet, MSL
West Coor.:

Begin Drilling: 11/05/92
End Drilling: 11/05/92
Converted to Well: No
Well Name:
South Coor.:

OH019.12

harrison

SOIL/SEDIMENT SAMPLING LOG

Project/No. Harrison / OH019.12 Page 1 of 2

Site Location Moraine, Ohio

Sample No. BKG-BH04-02SL Coded/ Replicate No. _____ Date 11-5-92

Weather Cloudy, 40sF Time Sampling Began 4:30 p.m. Time Sampling Completed 5:30 p.m.

Sampling Method and Material 2" diameter split spoon

Grab X Composite ____

From	To	Soil/Sediment Description
0	2	Clay; little silt; little sand, f-cs; little gravel, f-cs; red brown to dk brn, damp to moist, semipliable, semicohesive.

Other (OVA; HNU; etc.) HNU in spoon = 1.6 ppm. Background = 1.0 ppm.

Constituents Sampled	Container Description From Lab X or G&M ____	Preservative
TAL Metals	16 oz glass jar	Ice

Remarks _____

Sampling Personnel R. Astle

DRAFT

SOIL/SEDIMENT SAMPLING LOG

Project/No. Harrison / OH019.12 Page 2 of 2

Site Location Moraine, Ohio

Sample No. BKG-BH04-16SL Coded/ Replicate No. _____ Date 11-5-92

Weather Cloudy, 40sF Time Sampling Began 4:30 p.m. Time Sampling Completed 5:30 p.m.

Sampling Method and Material 2" diameter split spoon

Grab X Composite ____

From	To	Soil/Sediment Description
14	16	Sand (40%), f-cs; gravel (40%), f-cobble size; silt (10%); tr clay, lt brn, dry-damp, sl odor, loose.

Other (OVA; HNU; etc.) HNU in spoon = 5.2 ppm. Background = 1.0 ppm.

Constituents Sampled	Container Description From Lab X or G&M ____	Preservative
TAL Metals	16 oz glass jar	Ice

Remarks

Sampling Personnel R. Astle

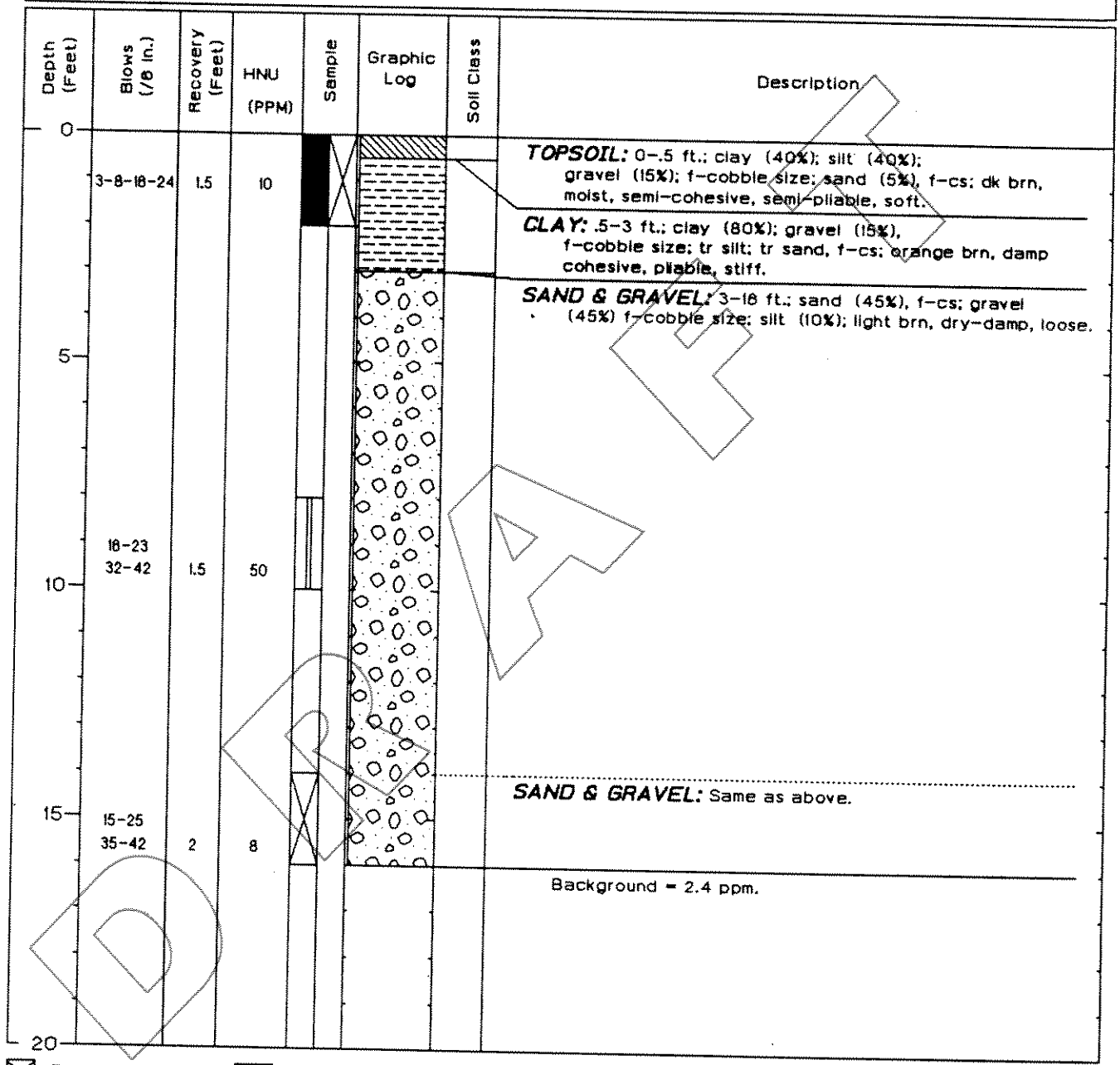
DRAFT

Geraghty & Miller, Inc.
Environmental Services

Log of Boring: BKG-BH05

HARRISON RFI

Moraine, Ohio



DRAFT

☒ Composite to Lab ■ VOC to Lab ▥ Split-Spoon Not Analyzed

Drilling Co.: Belasco
Driller: G. Mayle
Drilling Method: HSA 4 1/4"
Drilling Fluid: None
Remarks:

Geologist: R. Astle
Total Depth: 18
Surface Elev.:
Datum: Feet, MSL
West Coor.:

Begin Drilling: 11/06/92
End Drilling: 11/06/92
Converted to Well: No
Well Name:
South Coor.:

OH019.12

harrison

SOIL/SEDIMENT SAMPLING LOG

Project/No. Harrison / OH019.12 Page 1 of 2

Site Location Moraine, Ohio

Sample No. BKG-BH05-02SL Coded/ Replicate No. _____ Date 11-6-92

Weather Cloudy, 40sF Time Sampling Began 11:50 a.m. Time Sampling Completed 12:00 p.m.

Sampling Method and Material 3" diameter split spoon

Grab ____ Composite X

From	To	Soil/Sediment Description
0	2	Clay; silt; little gravel, f-cs; little sand, f-cs; dk brown to orange brown, moist-damp, pliable, cohesive.

Other (OVA; HNU; etc.) HNU in spoon = 10 ppm. Background = 2.4 ppm.

Constituents Sampled	Container Description From Lab X or G&M ____	Preservative
TCL VOCs	4 oz glass jar	Ice
TCL SVOCs, TCL PCB/Pest.	4 oz glass jar	Ice
TAL Metals/Cyanide	16 oz glass jar	Ice

Remarks

Sampling Personnel R. Astle

DRAFT

SOIL/SEDIMENT SAMPLING LOG

Project/No. Harrison / OH019.12 Page 2 of 2

Site Location Moraine, Ohio

Sample No. BKG-BH05-16SL Coded/ Replicate No. _____ Date 11-6-92

Weather Cloudy, 40sF Time Sampling Began 12:50 p.m. Time Sampling Completed 1:00 p.m.

Sampling Method and Material 2" diameter split spoon

Grab ____ Composite X

From	To	Soil/Sediment Description
14	16	Sand (45%), f-cs; gravel (45%), f-cobble size; silt (10%); lt brn, dry-damp, loose.

Other (OVA; HNU; etc.) HNU in spoon = 8 ppm. Background = 2.4 ppm.

Constituents Sampled	Container Description From Lab X or G&M ____	Preservative
TAL Metals & Cyanide	16 oz glass jar	Ice

Remarks

Sampling Personnel R. Astle

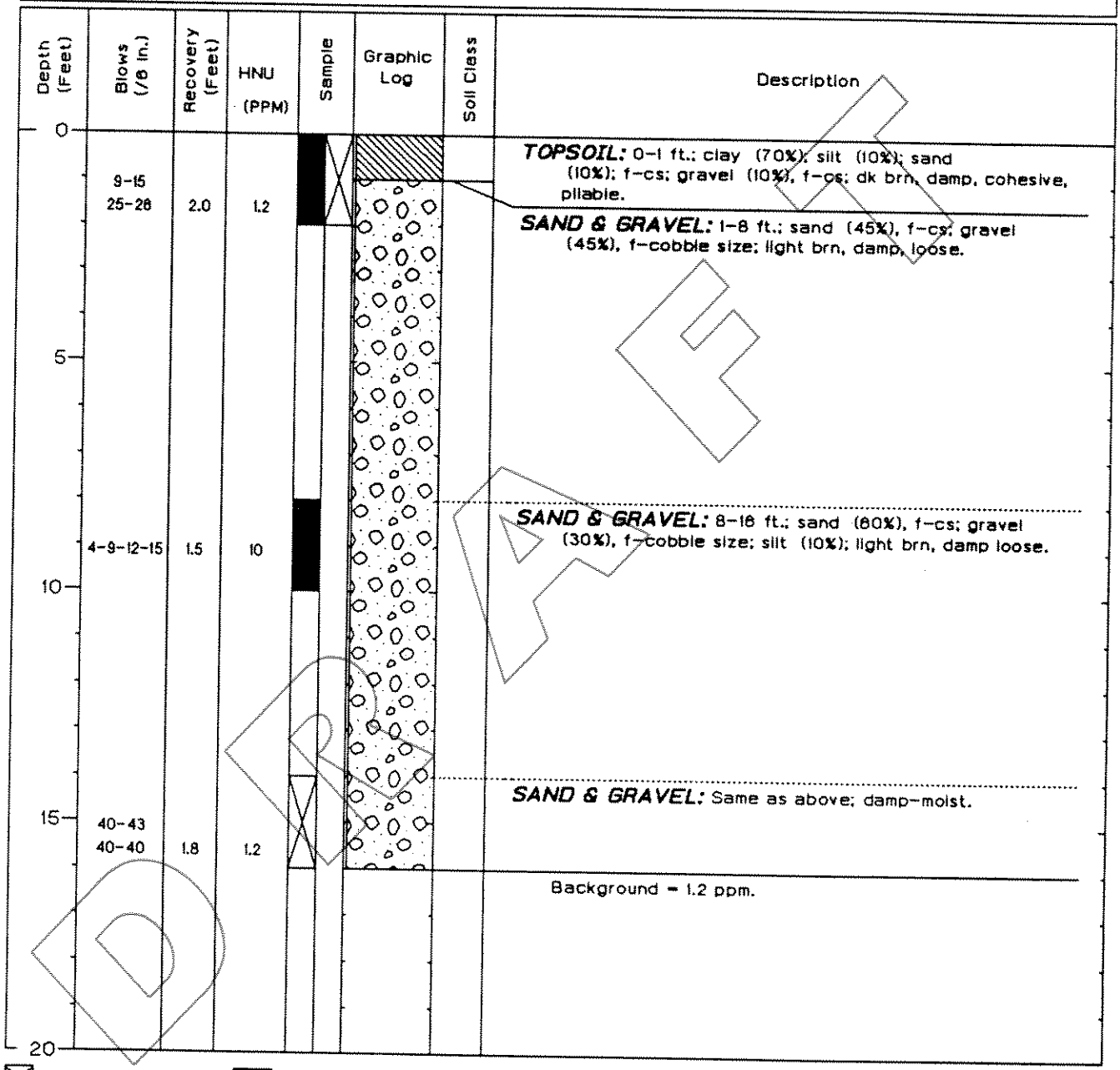
DRAFT

Geraghty & Miller, Inc.
Environmental Services

Log of Boring: BKG-BH06

HARRISON RFI

Moraine, Ohio



DRAFT

☒ Composite to Lab ■ VOC to Lab ▥ Split-Spoon Not Analyzed

Drilling Co.: Belasco
Driller: G. Mayle
Drilling Method: HSA 4 1/4"
Drilling Fluid: None
Remarks:

Geologist: R. Astle
Total Depth: 18
Surface Elev.:
Datum: Feet, MSL
West Coor.:

Begin Drilling: 11/09/92
End Drilling: 11/09/92
Converted to Well: No
Well Name:
South Coor.:

OH019.12

harrison

SOIL/SEDIMENT SAMPLING LOG

Project/No. Harrison / OH019.12 Page 1 of 3

Site Location Moraine, Ohio

Sample No. BKG-BH06-02SL Coded/ Replicate No. DUP-3 Date 11-9-92

Weather Cloudy, 40sF Time Sampling Began 3:20 p.m. Time Sampling Completed 3:30 p.m.

Sampling Method and Material 3" diameter split spoon

Grab ____ Composite X

From	To	Soil/Sediment Description
0	2	Clay; little silt; dk brown, damp, cohesive, pliable; sand, f-cs; gravel, f-cs; light brown to gray, damp, loose.

Other (OVA; HNU; etc.) HNU in spoon = 1.2 ppm. Background = 1.2 ppm.

Constituents Sampled	Container Description From Lab X or G&M ____	Preservative
TCL VOCs	4 oz glass jar	Ice
TCL SVOCs, PCB/Pest.	4 oz glass jar	Ice
TAL Metals & Cyanide	16 oz glass jar	Ice

Remarks

Sampling Personnel R. Astle

DRAFT

SOIL/SEDIMENT SAMPLING LOG

Project/No. Harrison / OH019.12 Page 2 of 3

Site Location Moraine, Ohio

Sample No. BKG-BH06-10SL Coded/ Replicate No. _____ Date 11-9-92

Weather Cloudy, 40s F Time Sampling Began 3:30 p.m. Time Sampling Completed 3:40 p.m.

Sampling Method and Material 2" diameter split spoon

Grab ____ Composite X

From	To	Soil/Sediment Description
8	10	Sand, f-cs; gravel, f-cs; little silt; light brown, damp, loose.

Other (OVA; HNU; etc.) HNU in spoon = 10 ppm. Background = 1.2 ppm.

Constituents Sampled	Container Description From Lab X or G&M ____	Preservative
TCL VOCs	4 oz glass jar	Ice

Remarks _____

Sampling Personnel R. Astle

DRAFT

SOIL/SEDIMENT SAMPLING LOG

Project/No. Harrison / OH019.12 Page 3 of 3

Site Location Moraine, Ohio

Sample No. BKG-BH06-16SL Coded/ Replicate No. DUP-4 Date 11-9-92

Weather Cloudy, 40sF Time Sampling Began 3:50 p.m. Time Sampling Completed 4:00 p.m.

Sampling Method and Material 3" diameter split spoon

Grab ____ Composite X

From	To	Soil/Sediment Description
14	16	Sand, f-cs; gravel, f-cs; little silt; light brown to gray; damp, loose.

Other (OVA; HNU; etc.) HNU in spoon = 1.2 ppm. Background = 1.2 ppm.

Constituents Sampled	Container Description From Lab X or G&M ____	Preservative
TAL Metals & Cyanide	16 oz glass jar	Ice

Remarks

Sampling Personnel R. Astle

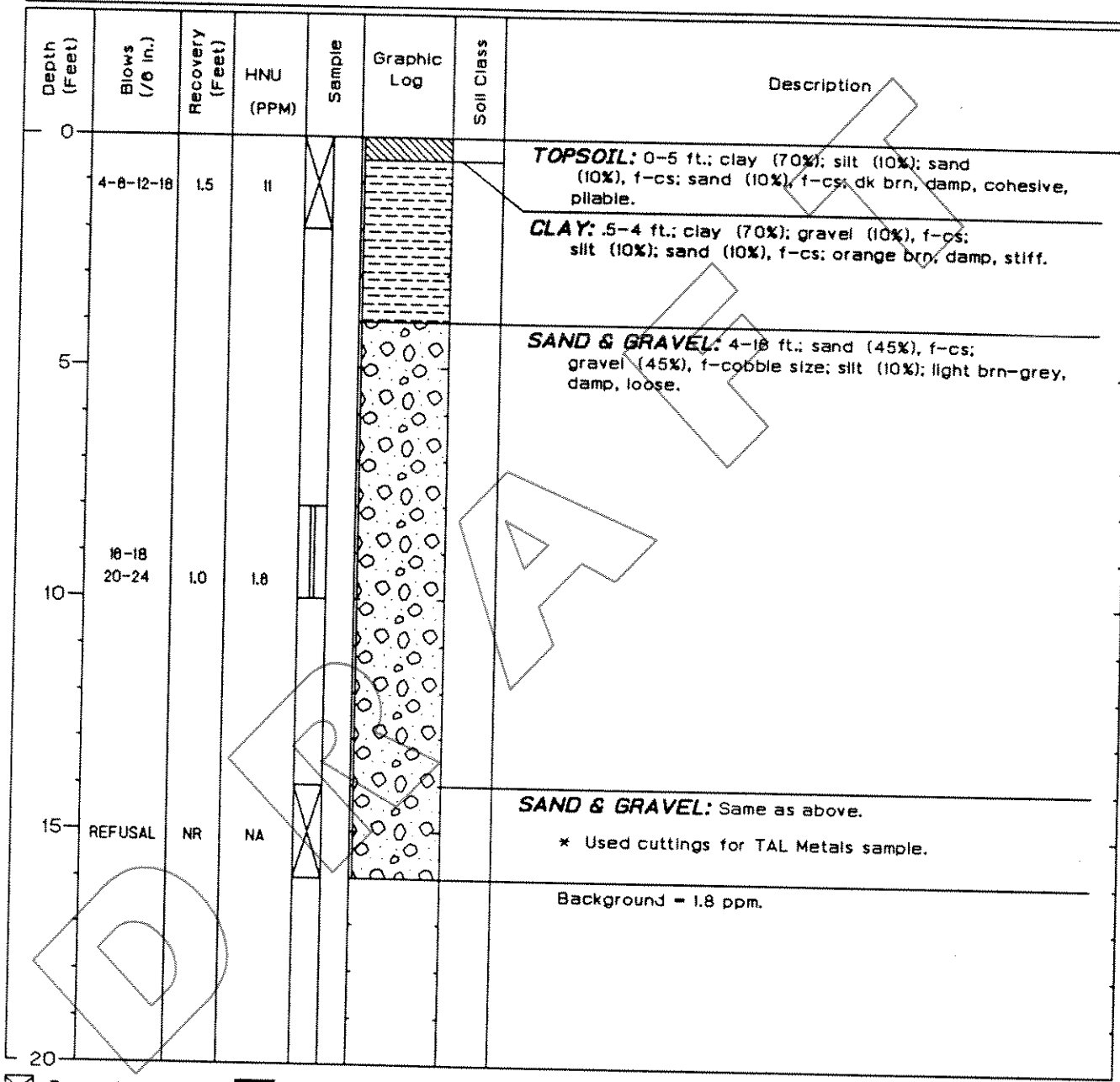
DRAFT

Geraghty & Miller, Inc.
Environmental Services

Log of Boring: BKG-BH07

HARRISON RFI

Moraine, Ohio



DRAFT

☒ Composite to Lab ■ VOC to Lab ▥ Split-Spoon Not Analyzed

Drilling Co.: Belasco
Driller: G. Mayle
Drilling Method: HSA 4 1/4"
Drilling Fluid: None
Remarks:

Geologist: R. Astle
Total Depth: 18
Surface Elev.:
Datum: Feet, MSL
West Coor.:

Begin Drilling: 11/10/92
End Drilling: 11/10/92
Converted to Well: No
Well Name:
South Coor.:

OH019.12

harrison

SOIL/SEDIMENT SAMPLING LOG

Project/No. Harrison / OH019.12 Page 1 of 2

Site Location Moraine, Ohio

Sample No. BKG-BH07-02SL Coded/ Replicate No. DUP-5 Date 11-10-92

Weather Rain, 50sF Time Sampling Began 11:30 a.m. Time Sampling Completed 11:40 a.m.

Sampling Method and Material 2" diameter split spoon

Grab ____ Composite X

From	To	Soil/Sediment Description
0	2	Clay; little silt, little sand, f-cs; little gravel, f-cs; dk brn to orange brown, damp, semicohesive, semipliable.

Other (OVA; HNU; etc.) HNU = 11 ppm in spoon. Background = 2.2 ppm.

Constituents Sampled	Container Description From Lab X or G&M ____	Preservative
TAL Metals, TOC, CEC	16 oz glass jar	Ice
Bulk Density, Particle Size	5 gallon bucket	--
Moisture Content	1 liter glass jar	--
Porosity	Shelby tube	--

Remarks

Sampling Personnel R. Astle

DRAFT

SOIL/SEDIMENT SAMPLING LOG

Project/No. Harrison / OH019.12 Page 2 of 2

Site Location Moraine, Ohio

Sample No. BKG-BH07-16SL Coded/ Replicate No. _____ Date 11-10-92

Weather Rain, 50sF Time Sampling Began 1:20 p.m. Time Sampling Completed 1:30 p.m.

Sampling Method and Material 2" diameter split spoon

Grab ____ Composite X

From	To	Soil/Sediment Description
14	16	Sand, f-cs; gravel, f-cs; little silt; light brown, damp, loose.

Other (OVA; HNU; etc.) NA - spoon refused.

Constituents Sampled	Container Description From Lab X or G&M ____	Preservative
TAL Metals, TOC, CEC	16 oz glass jar	Ice
Bulk Density, Particle Size	5 gallon bucket	--
Moisture Content	1 liter glass jar	--

Remarks Used drill cutting for sample. Split spoon & shelby tube refusal.

Sampling Personnel R. Astle

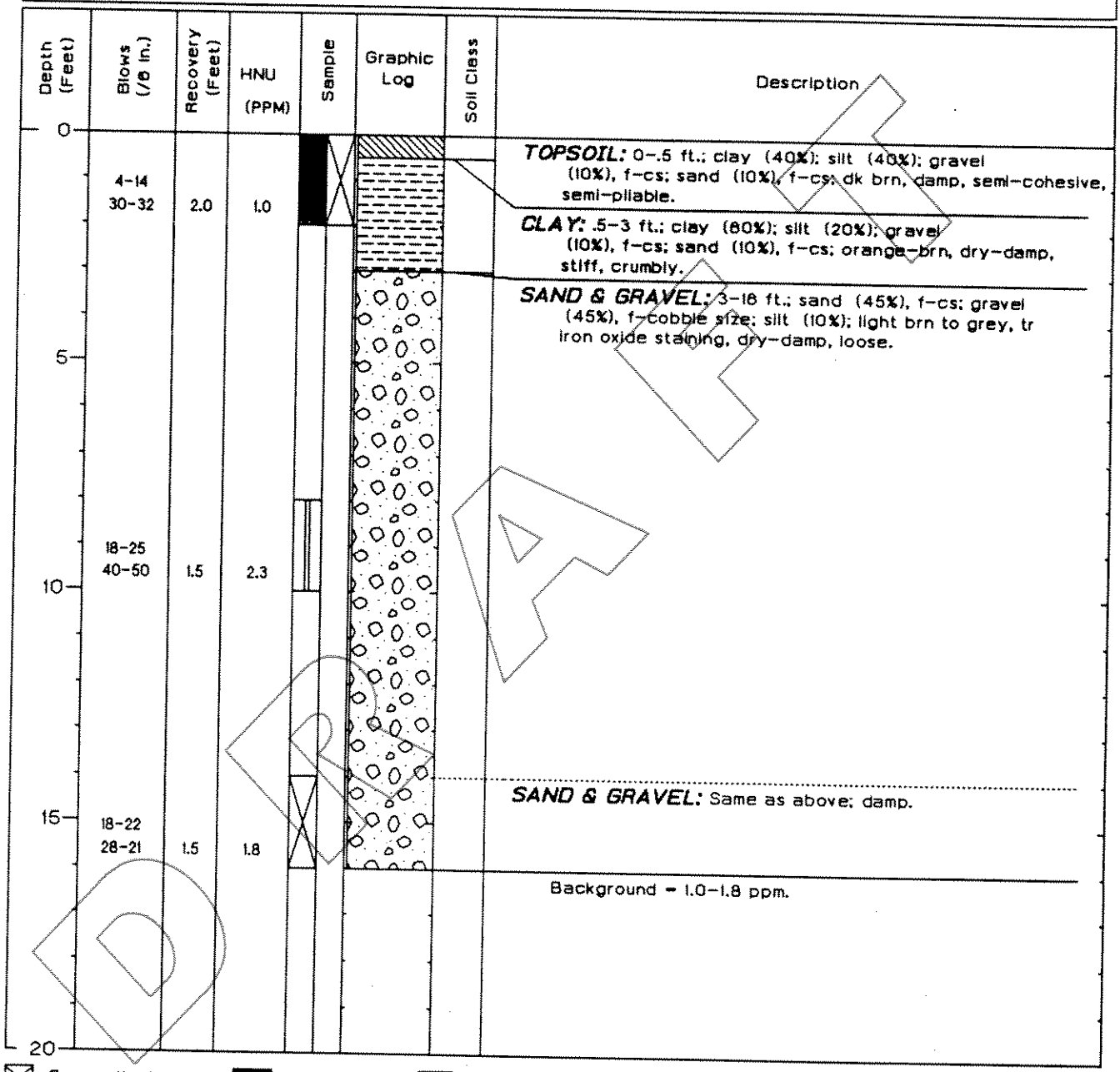
DRAFT

Geraghty & Miller, Inc.
Environmental Services

Log of Boring: BKG-BH08

HARRISON RFI

Moraine, Ohio



DRAFT

☒ Composite to Lab ■ VOC to Lab ▥ Split-Spoon Not Analyzed

Drilling Co.: Belasco
Driller: G. Mayle
Drilling Method: HSA 4 1/4"
Drilling Fluid: None
Remarks:

Geologist: R. Astle
Total Depth: 18
Surface Elev.:
Datum: Feet, MSL
West Coor.:

Begin Drilling: 11/09/92
End Drilling: 11/09/92
Converted to Well: No
Well Name:
South Coor.:

OH019.12

harrison

SOIL/SEDIMENT SAMPLING LOG

Project/No. Harrison / OH019.12 Page 1 of 2

Site Location Moraine, Ohio

Sample No. BKG-BH08-02SL Coded/ Replicate No. _____ Date 11-9-92

Weather Cloudy, 40sF Time Sampling Began 3:20 p.m. Time Sampling Completed 3:30 p.m.

Sampling Method and Material 3" diameter split spoon

Grab ____ Composite X

From	To	Soil/Sediment Description
0	2	Clay; Silt; little sand, f-cs; little gravel, f-cs; dk brn to orange brown, damp, semi-cohesive; semipliable.

Other (OVA; HNU; etc.) HNU in spoon = 1 ppm. Background = 1 ppm.

Constituents Sampled	Container Description From Lab X or G&M ____	Preservative
TCL VOCs	4 oz glass jar	Ice
TCL SVOCs & PCB/Pest.	4 oz glass jar	Ice
TAL Metals & Cyanide	16 oz glass jar	Ice

Remarks OEPA split TAL metals sample.

Sampling Personnel R. Astle

DRAFT

SOIL/SEDIMENT SAMPLING LOG

Project/No. Harrison / OH019.12 Page 2 of 2

Site Location Moraine, Ohio

Sample No. BKG-BH08-16SL Coded/ Replicate No. _____ Date 11-9-92

Weather Cloudy, 40sF Time Sampling Began 1:35 p.m. Time Sampling Completed 1:45 p.m.

Sampling Method and Material 3" diameter split spoon

Grab ____ Composite X

From	To	Soil/Sediment Description
14	16	Sand, f-cs; gravel, f-cs; little silt; light brown to gray; damp, loose.

Other (OVA; HNU; etc.) HNU in spoon = 1.8 ppm. Background = 1.3 ppm.

Constituents Sampled	Container Description From Lab X or G&M ____	Preservative
TAL Metals & Cyanide	16 oz glass jar	Ice

Remarks OEPA split TAL metals sample.

Sampling Personnel R. Astle

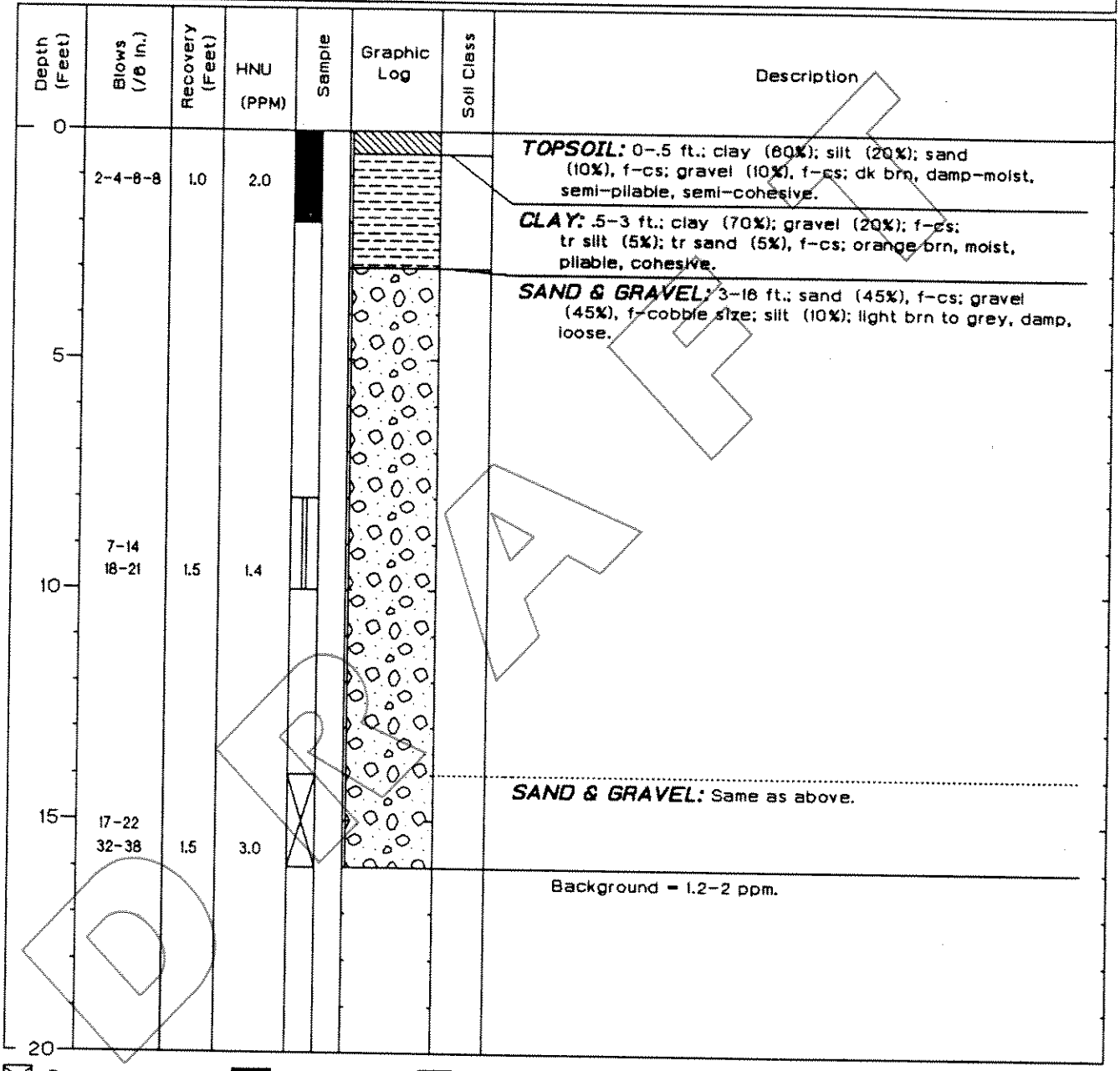
DRAFT

Geraghty & Miller, Inc.
Environmental Services

Log of Boring: BKG-BH09

HARRISON RFI

Moraine, Ohio



DRAFT

☒ Composite to Lab ■ VOC to Lab ▥ Split-Spoon Not Analyzed

Drilling Co.: Belasco
Driller: G. Mayle
Drilling Method: HSA 4 1/4"
Drilling Fluid: None
Remarks:

Geologist: R. Astle
Total Depth: 18
Surface Elev.:
Datum: Feet, MSL
West Coor.:

Begin Drilling: 11/09/92
End Drilling: 11/09/92
Converted to Well: No
Well Name:
South Coor.:

OH019.12

harrison

SOIL/SEDIMENT SAMPLING LOG

Project/No. Harrison / OH019.12 Page 1 of 2

Site Location Moraine, Ohio

Sample No. BKG-BH09-02SL Coded/ Replicate No. _____ Date 11-9-92

Weather Cloudy, 40sF Time Sampling Began 1:50 p.m. Time Sampling Completed 2:00 p.m.

Sampling Method and Material 3" diameter split spoon

Grab ____ Composite X

From	To	Soil/Sediment Description
0	2	Clay; little silt; little sand, f-cs; little gravel, f-cs; dk brn to orange brn, damp-moist, pliable, cohesive.

Other (OVA; HNU; etc.) HNU in spoon = 2 ppm. Background = 2 ppm.

Constituents Sampled	Container Description From Lab X or G&M ____	Preservative
TCL VOCs	4 oz glass jar	Ice
TCL SVOCs & PCB/Pest.	4 oz glass jar	Ice
TAL Metals & Cyanide	16 oz glass jar	Ice

Remarks MS/MSD sample.

Sampling Personnel R. Astle

DRAFT

SOIL/SEDIMENT SAMPLING LOG

Project/No. Harrison / OH019.12 Page 2 of 2

Site Location Moraine, Ohio

Sample No. BKG-BH09-16SL Coded/ Replicate No. _____ Date 11-9-92

Weather Cloudy, 40sF Time Sampling Began 2:40 p.m. Time Sampling Completed 2:50 p.m.

Sampling Method and Material 2" diameter split spoon

Grab ____ Composite X

From	To	Soil/Sediment Description
14	16	Sand, f-cs; gravel, f-cs; little silt; light brown to dk gray; damp; loose.

Other (OVA; HNU; etc.) HNU in spoon = 3 ppm. Background = 2 ppm.

Constituents Sampled	Container Description From Lab X or G&M ____	Preservative
TAL Metals & Cyanide	16 oz glass jar	Ice

Remarks _____

Sampling Personnel R. Astle

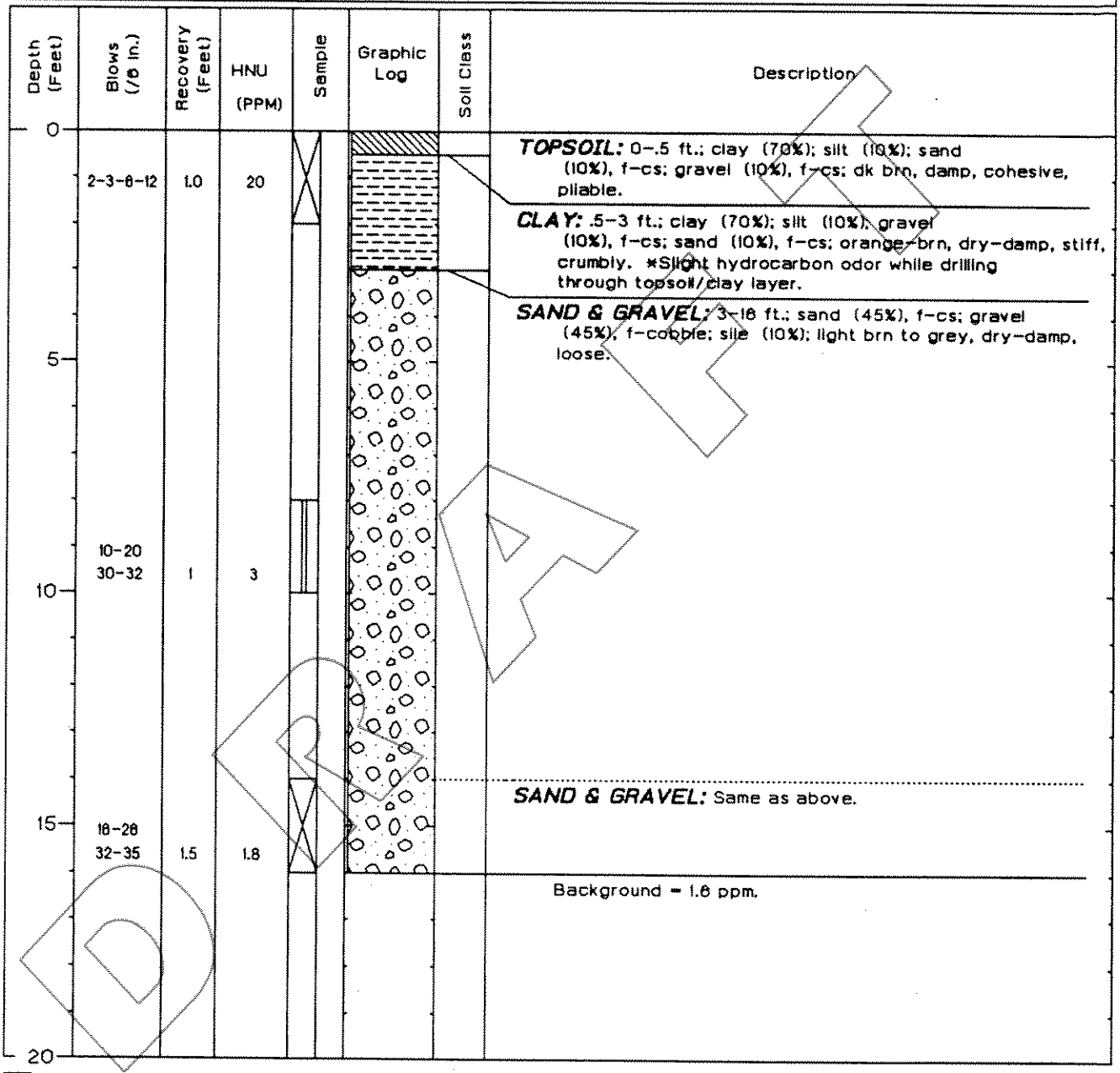
DRAFT

Geraghty & Miller, Inc.
Environmental Services

Log of Boring: BKG-BH10

HARRISON RFI

Moraine, Ohio



DRAFT

☒ Composite to Lab ■ VOC to Lab ▥ Split-Spoon Not Analyzed

Drilling Co.: Belasco
Driller: G. Mayle
Drilling Method: HSA 4 1/4"
Drilling Fluid: None
Remarks:

Geologist: R. Astle
Total Depth: 18
Surface Elev.:
Datum: Feet, MSL
West Coor.:

Begin Drilling: 11/10/92
End Drilling: 11/10/92
Converted to Well: No
Well Name:
South Coor.:

OH019.12

harrison

SOIL/SEDIMENT SAMPLING LOG

Project/No. Harrison / OH019.12 Page 1 of 2

Site Location Moraine, Ohio

Sample No. BKG-BH10-02SL Coded/ Replicate No. _____ Date 11-10-92

Weather Rain, 50sF Time Sampling Began 4:00 p.m. Time Sampling Completed 4:10 p.m.

Sampling Method and Material 2" diameter split spoon

Grab ____ Composite X

From	To	Soil/Sediment Description
0	2	Clay; little silt, little sand, f-cs; little gravel, f-cs; dk brn to orange brown, damp, semipliable; semicohesive.

Other (OVA; HNU; etc.) HNU = 20 ppm in spoon. Slight hydrocarbon odor while breaking through clay layer.

Constituents Sampled	Container Description From Lab X or G&M ____	Preservative
TAL Metals, TOC, CEC	16 oz glass jar	Ice
Bulk Density, Particle Size	5 gallon bucket	--
Moisture Content	1 liter glass jar	--
Porosity	Shelby tube	--

Remarks HNU = 1.6 ppm for background.

Sampling Personnel R. Astle

DRAFT

SOIL/SEDIMENT SAMPLING LOG

Project/No. Harrison / OH019.12 Page 2 of 2

Site Location Moraine, Ohio

Sample No. BKG-BH10-16SL Coded/ Replicate No. _____ Date 11-10-92

Weather Rain, 50sF Time Sampling Began 5:20 p.m. Time Sampling Completed 5:30 p.m.

Sampling Method and Material 2" diameter split spoon

Grab ____ Composite X

From	To	Soil/Sediment Description
14	16	Sand, f-cs; gravel, f-cs; little silt; light brown to gray, damp, loose.

Other (OVA; HNU; etc.) HNU in spoon = 1.8 ppm. Background = 1.6 ppm.

Constituents Sampled	Container Description From Lab X or G&M ____	Preservative
TAL Metals, TOC, CEC	16 oz glass jar	Ice
Bulk Density, Particle Size	5 gallon bucket	--
Moisture Content	1 liter glass jar	--

Remarks Shelby tube refusal.

Sampling Personnel R. Astle

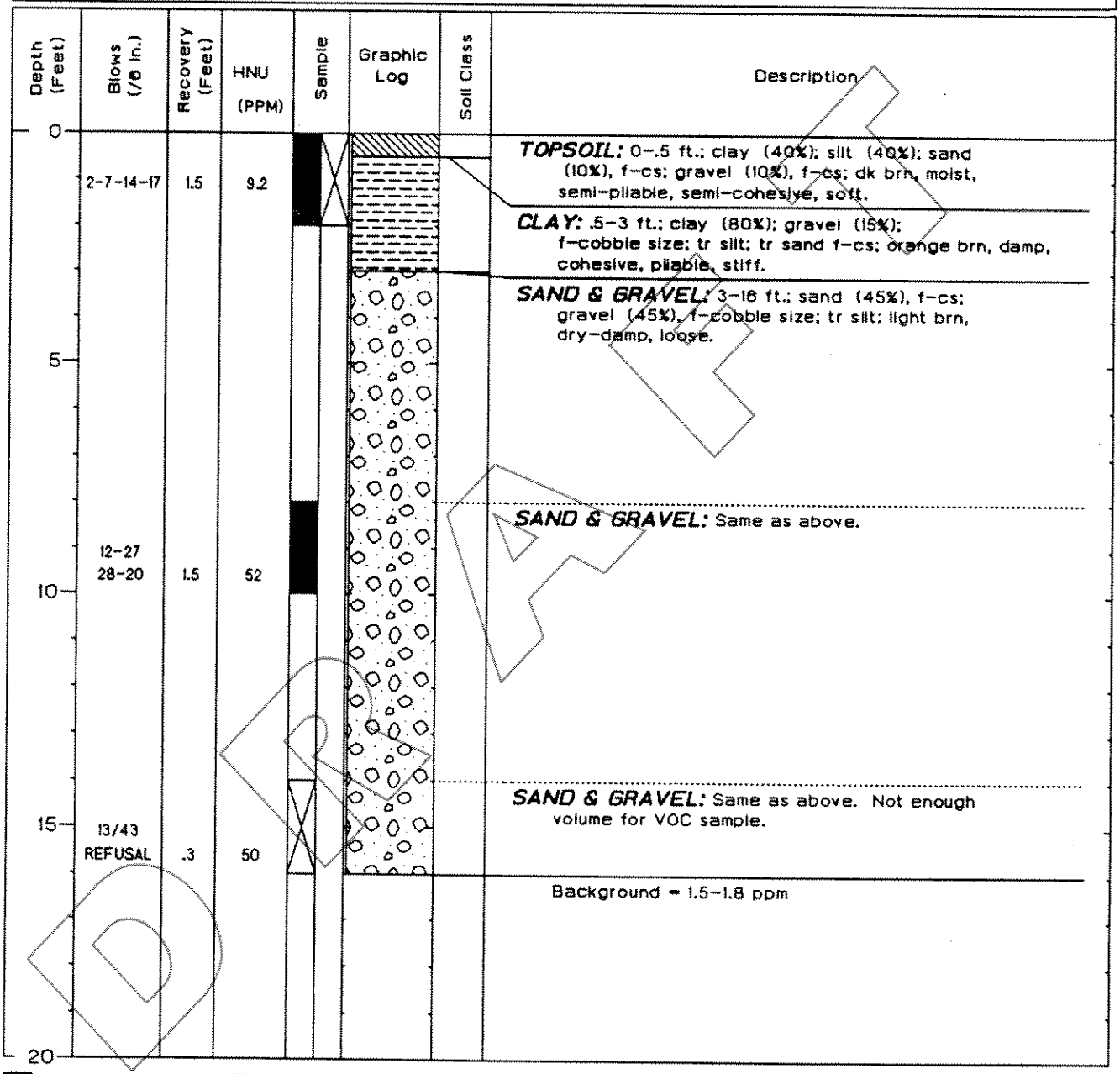
DRAFT

Geraghty & Miller, Inc.
Environmental Services

Log of Boring: BKG-BH11

HARRISON RFI

Moraine, Ohio



DRAFT

☒ Composite to Lab ■ VOC to Lab ▥ Split-Spoon Not Analyzed

Drilling Co.: Belasco
Driller: G. Mayle
Drilling Method: HSA 4 1/4"
Drilling Fluid: None
Remarks:

Geologist: R. Astle
Total Depth: 18
Surface Elev.:
Datum: Feet, MSL
West Coor.:

Begin Drilling: 11/06/92
End Drilling: 11/06/92
Converted to Well: No
Well Name:
South Coor.:

OH019.12

harrison

SOIL/SEDIMENT SAMPLING LOG

Project/No. Harrison / OH019.12 Page 1 of 2

Site Location Moraine, Ohio

Sample No. BKG-BH11-02SL Coded/ Replicate No. _____ Date 11-6-92

Weather Cloudy, 40sF Time Sampling Began 10:40 a.m. Time Sampling Completed 10:50 a.m.

Sampling Method and Material 3" diameter split spoon

Grab _____ Composite X

From	To	Soil/Sediment Description
0	2	Clay; some silt; some gravel, f-cs; little sand, f-cs; dk brn to orange brown, damp to moist, pliable, cohesive.

Other (OVA; HNU; etc.) HNU in spoon = 9.2 ppm. Background = 1.5 ppm.

Constituents Sampled	Container Description From Lab X or G&M _____	Preservative
TCL VOCs	4 oz glass jar	Ice
TCL SVOCs & PCB/Pest.	4 oz glass jar	Ice
TAL Metals & Cyanide	16 oz glass jar	Ice

Remarks _____

Sampling Personnel R. Astle

DRAFT

SOIL/SEDIMENT SAMPLING LOG

Project/No. Harrison / OH019.12 Page 2 of 2

Site Location Moraine, Ohio

Sample No. BKG-BH11-16SL Coded/ Replicate No. _____ Date 11-6-92

Weather Cloudy, 40sF Time Sampling Began 11:40 a.m. Time Sampling Completed 11:50 a.m.

Sampling Method and Material 2" diameter split spoon

Grab ____ Composite X

From	To	Soil/Sediment Description
14	16	Sand (45%), f-cs; gravel (45%), f-cobble size; silt (10%); lt brn, dry-damp, loose.

Other (OVA; HNU; etc.) HNU in spoon = 50 ppm. Background = 1.8 ppm.

Constituents Sampled	Container Description From Lab X or G&M ____	Preservative
TAL Metals & Cyanide	16 oz glass jar	Ice

Remarks _____

Sampling Personnel R. Astle

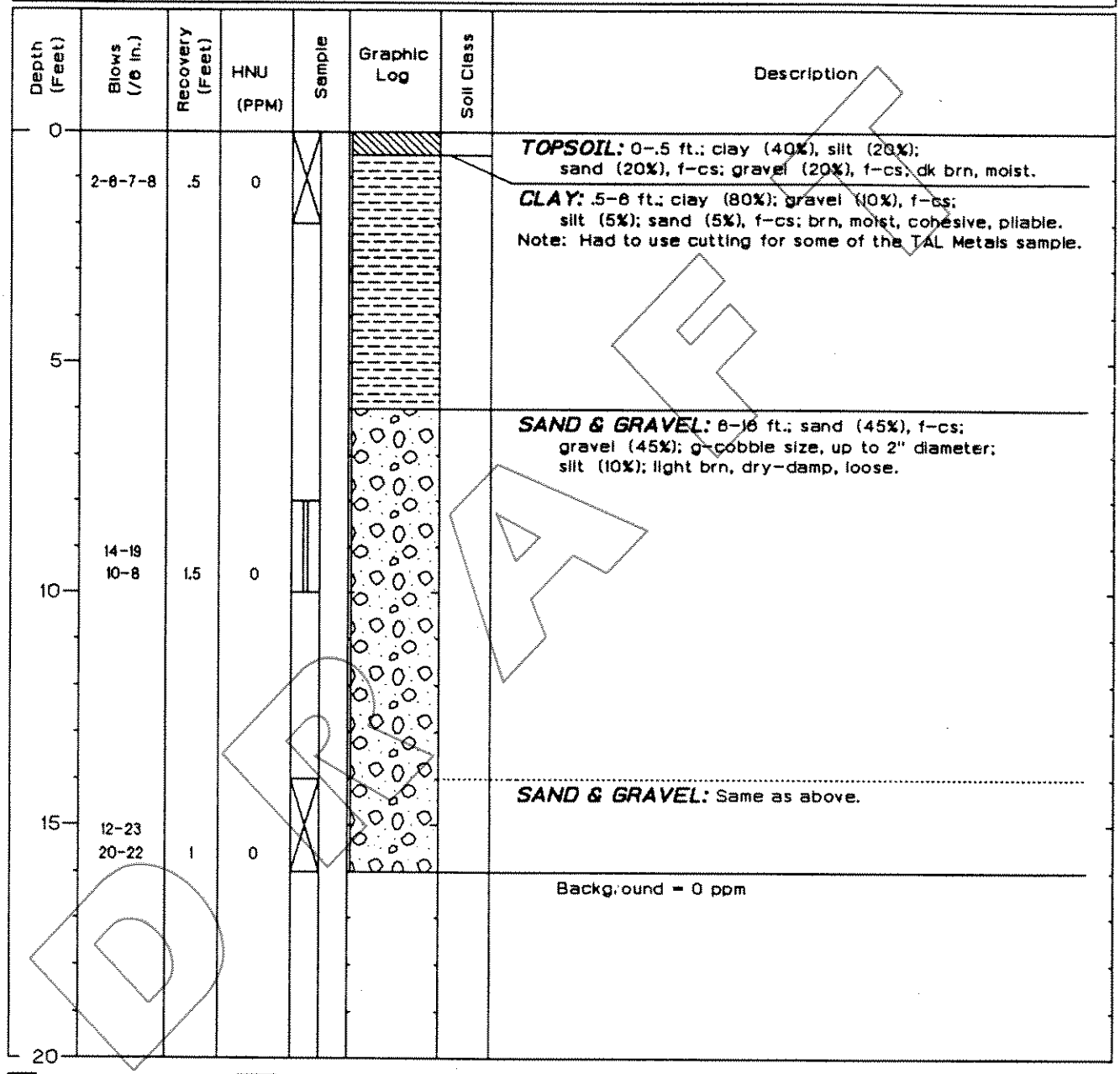
DRAFT

Geraghty & Miller, Inc.
Environmental Services

Log of Boring: BKG-BH12

HARRISON RFI

Moraine, Ohio



DRAFT

☒ Composite to Lab ■ VOC to Lab ▥ Split-Spoon Not Analyzed

Drilling Co.: Belasco
Driller: G. Mayle
Drilling Method: HSA 4 1/4"
Drilling Fluid: None
Geologist: R. Astle
Total Depth: 16
Surface Elev.:
Datum: Feet, MSL
Begin Drilling: 11/05/92
End Drilling: 11/05/92
Converted to Well: No
Well Name:
Remarks:
West Coor.:
South Coor.:

OH019.12

harrison

SOIL/SEDIMENT SAMPLING LOG

Project/No. Harrison / OH019.12 Page 1 of 2

Site Location Moraine, Ohio

Sample No. BKG-BH12-02SL Coded/ Replicate No. _____ Date 11-5-92

Weather Cloudy, 40sF Time Sampling Began 1:30 p.m. Time Sampling Completed 2:30 p.m.

Sampling Method and Material 2" diameter split spoon

Grab X Composite ____

From	To	Soil/Sediment Description
0	2	Clay; little silt; little sand, f-cs; little gravel, f-cs; dk brn to brn, moist, cohesive, pliable.

Other (OVA; HNU; etc.) HNU in spoon = 0 ppm.

Constituents Sampled	Container Description From Lab X or G&M ____	Preservative
TAL Metals	16 oz glass jar	Ice

Remarks Had to use some cuttings to completely fill jar.

Sampling Personnel R. Astle

DRAFT

SOIL/SEDIMENT SAMPLING LOG

Project/No. Harrison / OH019.12 Page 2 of 2

Site Location Moraine, Ohio

Sample No. BKG-BH12-16SL Coded/ Replicate No. _____ Date 11-5-92

Weather Cloudy, 40sF Time Sampling Began 1:30 p.m. Time Sampling Completed 2:30 p.m.

Sampling Method and Material 2" diameter split spoon

Grab X Composite ____

From	To	Soil/Sediment Description
14	16	Sand (45%), f-cs; gravel (45%), f-cobble size; silt (10%); lt brn, dry-damp, loose.

Other (OVA; HNU; etc.) HNU in spoon = 0 ppm.

Constituents Sampled	Container Description From Lab X or G&M ____	Preservative
TAL Metals	16 oz glass jar	Ice

Remarks

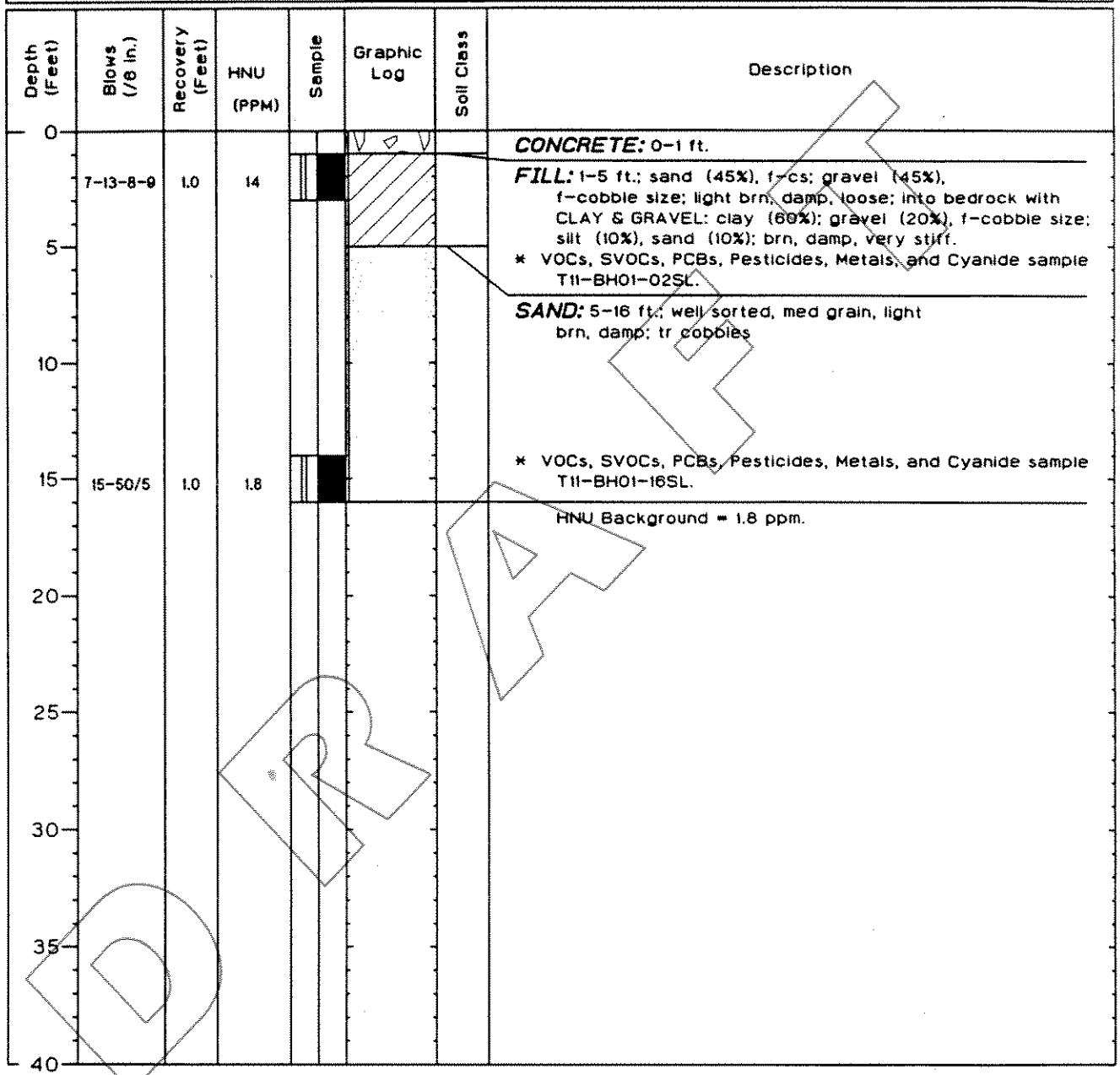
Sampling Personnel R. Astle

DRAFT

Geraghty & Miller, Inc.
Environmental Services

Log of Boring: T11-BH01

HARRISON RFI — Moraine, Ohio



DRAFT

☒ Composite to Lab ■ VOC to Lab ▥ Split-Spoon Not Analyzed

Drilling Co.: Belasco
Driller: G. Mayle
Drilling Method: HSA 4 1/4"
Drilling Fluid: None
Remarks:

Geologist: R. Astle
Total Depth: 16
Surface Elev.:
Datum: Feet, MSL
West Coor.:

Begin Drilling: 12/02/92
End Drilling: 12/02/92
Converted to Well: No
Well Name:
South Coor.:

OH019.12

harrison

SOIL/SEDIMENT SAMPLING LOG

Project/No. Harrison / OH019.12 Page 1 of 2

Site Location Moraine, Ohio

Sample No. T11-BH01-02SL Coded/ Replicate No. DUP-8 Date 12-2-92

Weather Ice, 30sF Time Sampling Began 1:00 p.m. Time Sampling Completed 2:00 p.m.

Sampling Method and Material 3" diameter split spoon

Grab X Composite ____

From	To	Soil/Sediment Description
0	2	Sand and gravel, clay and gravel, light brown, damp.

Other (OVA; HNU; etc.) HNU in spoon = 14 ppm. Background = 1.8 ppm.

Constituents Sampled	Container Description From Lab X or G&M ____	Preservative
TCL VOCs	4 oz glass jar	Ice
TCL SVOCs & PCB/Pest.	4 oz glass jar	Ice
TAL Metals & Cyanide	16 oz glass jar	Ice

Remarks Actual sampling interval 1-3'. 1' asphalt overlay. Drove 2 spoons for duplicate.

Sampling Personnel R. Astle

DRAFT

SOIL/SEDIMENT SAMPLING LOG

Project/No. Harrison / OH019.12 Page 2 of 2

Site Location Moraine, Ohio

Sample No. T11-BH01-16SL Coded/ Replicate No. _____ Date 12-2-92

Weather Ice, 30sF Time Sampling Began 1:00 p.m. Time Sampling Completed 2:00 p.m.

Sampling Method and Material 3" diameter split spoon

Grab X Composite ____

From	To	Soil/Sediment Description
14	16	Sand, well sorted, medium grain, light brown, damp.

Other (OVA; HNU; etc.) HNU in spoon = 1.8 ppm. Background = 1.8 ppm.

Constituents Sampled	Container Description From Lab X or G&M ____	Preservative
TCL VOCs	4 oz glass jar	Ice
TCL SVOCs & PCB/Pest.	4 oz glass jar	Ice
TAL Metals & Cyanide	16 oz glass jar	Ice

Remarks _____

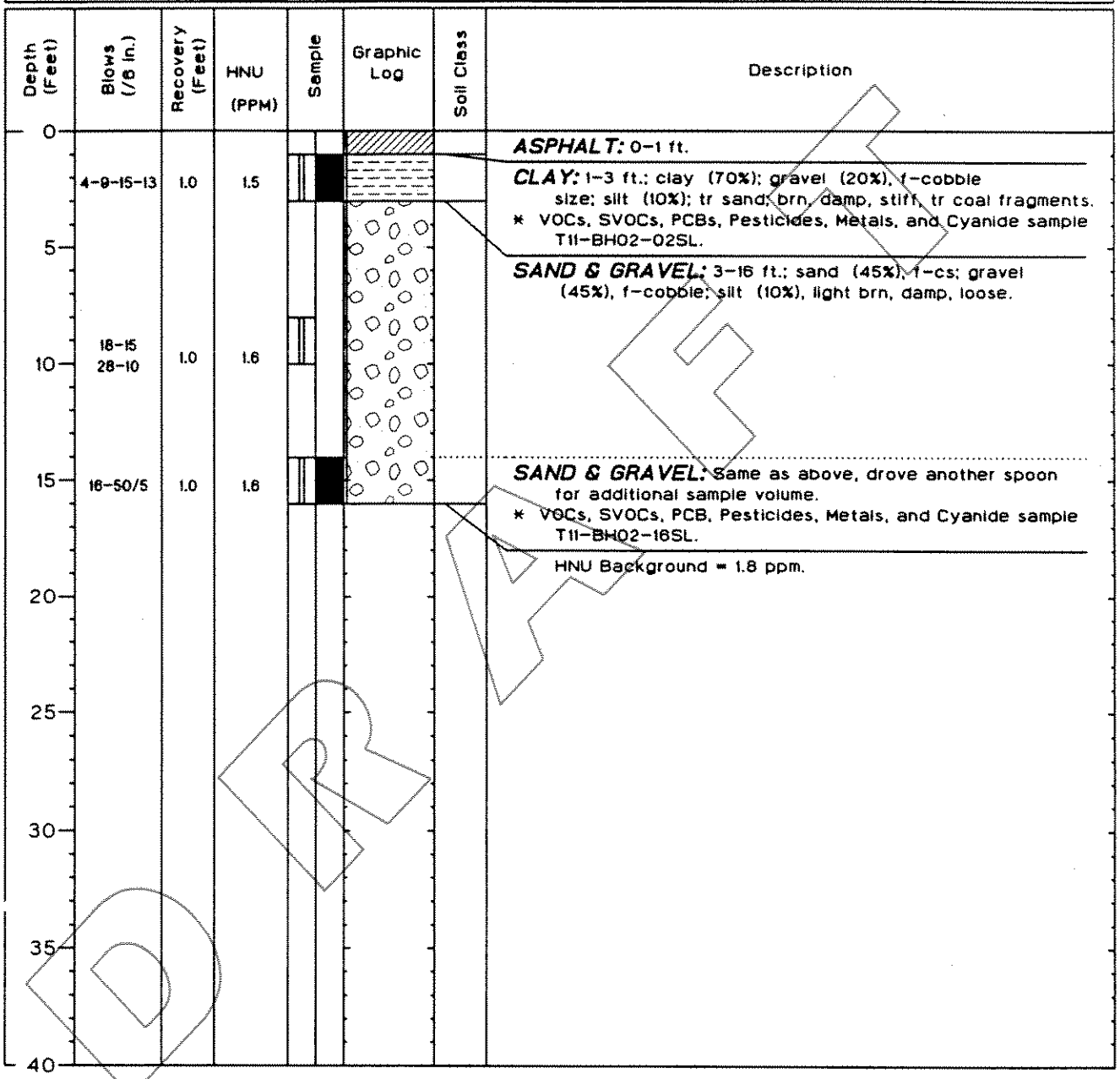
Sampling Personnel R. Astle

DRAFT

Geraghty & Miller, Inc.
Environmental Services

Log of Boring: T11-BH02

HARRISON RFI — Moraine, Ohio



DRAFT

☒ Composite to Lab ■ VOC to Lab ▥ Split-Spoon Not Analyzed

Drilling Co.: Belasco
Driller: G. Mayle
Drilling Method: HSA 4 1/4"
Drilling Fluid: None
Geologist: R. Astle
Total Depth: 16
Surface Elev.:
Datum: Feet, MSL
Begin Drilling: 12/02/92
End Drilling: 12/02/92
Converted to Well: No
Well Name:
Remarks:
West Coor.:
South Coor.:

OH019.12
harrison

SOIL/SEDIMENT SAMPLING LOG

Project/No. Harrison / OH019.12 Page 1 of 2

Site Location Moraine, Ohio

Sample No. T11-BH02-02SL Coded/ Replicate No. _____ Date 12-2-92

Weather Cloudy, 30sF Time Sampling Began 2:00 p.m. Time Sampling Completed 3:00 p.m.

Sampling Method and Material 3" diameter split spoon

Grab X Composite ____

From	To	Soil/Sediment Description
0	2	Clay (70%); gravel (20%), f-cobble size;
		silt (10%); tr sand; brown, damp, stiff, tr
		coal fragments.

Other (OVA; HNU; etc.) HNU in spoon = 1.8 ppm. Background = 1.8 ppm.

Constituents Sampled	Container Description From Lab X or G&M ____	Preservative
TCL VOCs	4 oz glass jar	Ice
TCL SVOCs & PCB/Pest.	4 oz glass jar	Ice
TAL Metals & Cyanide	16 oz glass jar	Ice

Remarks Actual sampling interval 1-3'. 1' asphalt overlay.

Sampling Personnel R. Astle

DRAFT

SOIL/SEDIMENT SAMPLING LOG

Project/No. Harrison / OH019.12 Page 2 of 2

Site Location Moraine, Ohio

Sample No. T11-BH02-16SL Coded/ Replicate No. _____ Date 12-2-92

Weather Cloudy, 30sF Time Sampling Began 2:00 p.m. Time Sampling Completed 3:00 p.m.

Sampling Method and Material 3" diameter split spoon

Grab X Composite ____

From	To	Soil/Sediment Description
14	16	Sand (45%), f-cs; gravel (45%), f-cobble size; silt (10%); light brown, dry-damp, loose.

Other (OVA; HNU; etc.) HNU in spoon = 1.6 ppm. Background = 1.8 ppm.

Constituents Sampled	Container Description From Lab X or G&M ____	Preservative
TCL VOCs	4 oz glass jar	Ice
TCL SVOCs & PCB/Pest.	4 oz glass jar	Ice
TAL Metals & Cyanide	16 oz glass jar	Ice

Remarks _____

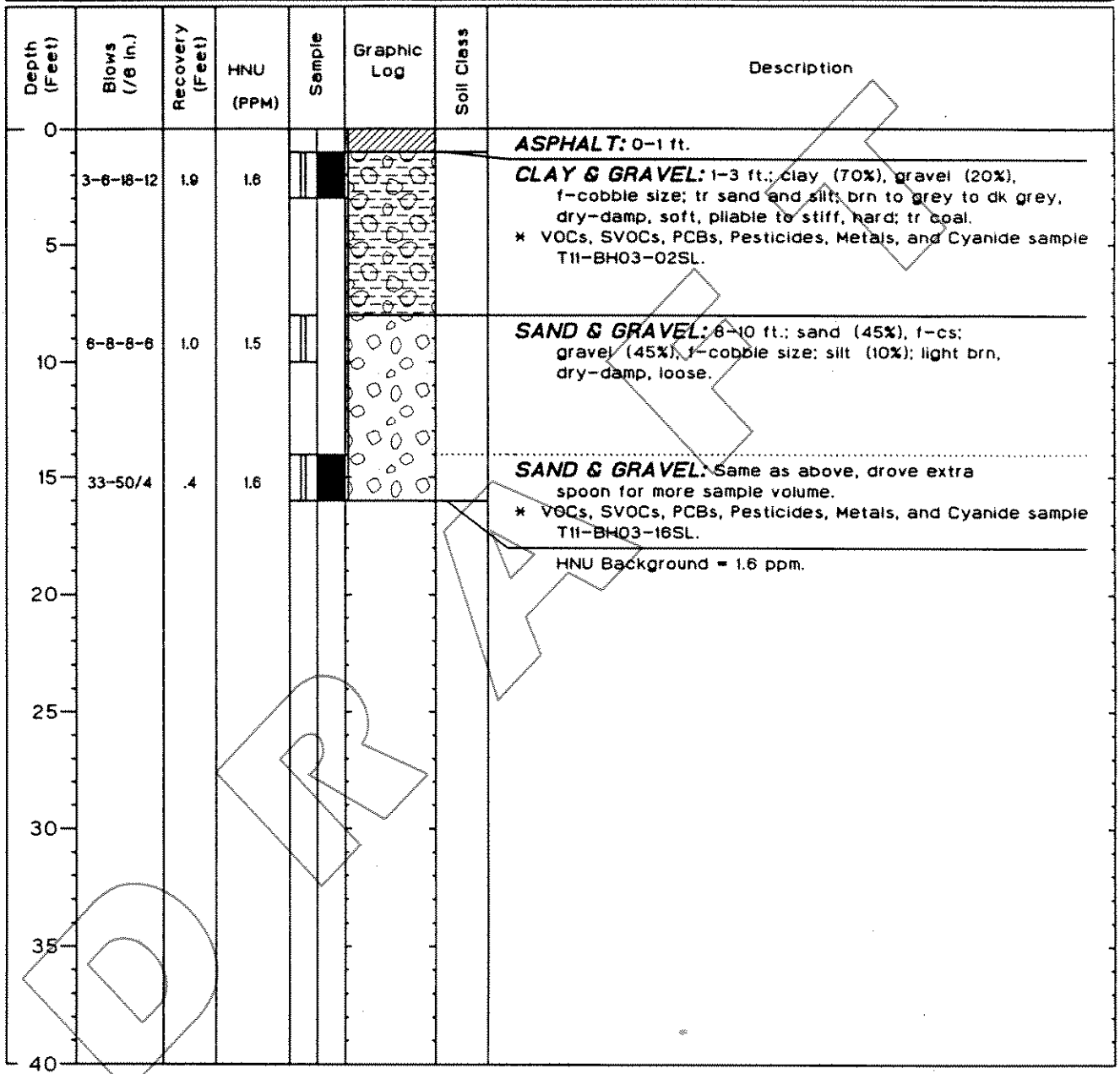
Sampling Personnel R. Astle

DRAFT

Geraghty & Miller, Inc.
Environmental Services

Log of Boring: T11-BH03

HARRISON RFI — Moraine, Ohio



DRAFT

☒ Composite to Lab ■ VOC to Lab ▯▯ Split-Spoon Not Analyzed

Drilling Co.: Belasco
Geologist: R. Astle
Begin Drilling: 12/02/92
Driller: G. Mayle
Total Depth: 16
End Drilling: 12/02/92
Drilling Method: HSA 4 1/4"
Surface Elev.:
Converted to Well: No
Drilling Fluid: None
Datum: Feet, MSL
Well Name:
Remarks:
West Coor.:
South Coor.:
OH019.12
harrison

SOIL/SEDIMENT SAMPLING LOG

Project/No. Harrison / OH019.12 Page 1 of 2

Site Location Moraine, Ohio

Sample No. T11-BH03-02SL Coded/ Replicate No. _____ Date 12-2-92

Weather Snow, 30sF Time Sampling Began 3:00 p.m. Time Sampling Completed 4:00 p.m.

Sampling Method and Material 3" diameter split spoon

Grab X Composite ____

From	To	Soil/Sediment Description
0	2	Clay (70%); gravel (20%), f-cobble size; tr sand & silt; brn, gray, & dk gray, dry-damp, soft, pliable to hard, stiff; tr coal.

Other (OVA; HNU; etc.) HNU in spoon = 1.6 ppm. Background = 1.6 ppm.

Constituents Sampled	Container Description From Lab X or G&M ____	Preservative
TCL VOCs	4 oz glass jar	Ice
TCL SVOCs & PCB/Pest.	4 oz glass jar	Ice
TAL Metals & Cyanide	16 oz glass jar	Ice

Remarks Actual sampling interval 1-3'. 1' asphalt overlay.

Sampling Personnel R. Astle

DRAFT

SOIL/SEDIMENT SAMPLING LOG

Project/No. Harrison / OH019.12 Page 2 of 2

Site Location Moraine, Ohio

Sample No. T11-BH03-16SL Coded/ Replicate No. _____ Date 12-2-92

Weather Snow, 30sF Time Sampling Began 3:00 p.m. Time Sampling Completed 4:00 p.m.

Sampling Method and Material 3" diameter split spoon

Grab X Composite ____

From	To	Soil/Sediment Description
14	16	Sand (45%), f-cs; gravel (45%), f-cobble size
		silt (10%); light brown, dry-damp, loose.

Other (OVA; HNU; etc.) HNU in spoon = 1.6 ppm. Background = 1.6 ppm.

Constituents Sampled	Container Description From Lab X or G&M ____	Preservative
TCL VOCs	4 oz glass jar	Ice
TCL SVOCs & PCB/Pest.	4 oz glass jar	Ice
TAL Metals	16 oz glass jar	Ice

Remarks

Sampling Personnel R. Astle

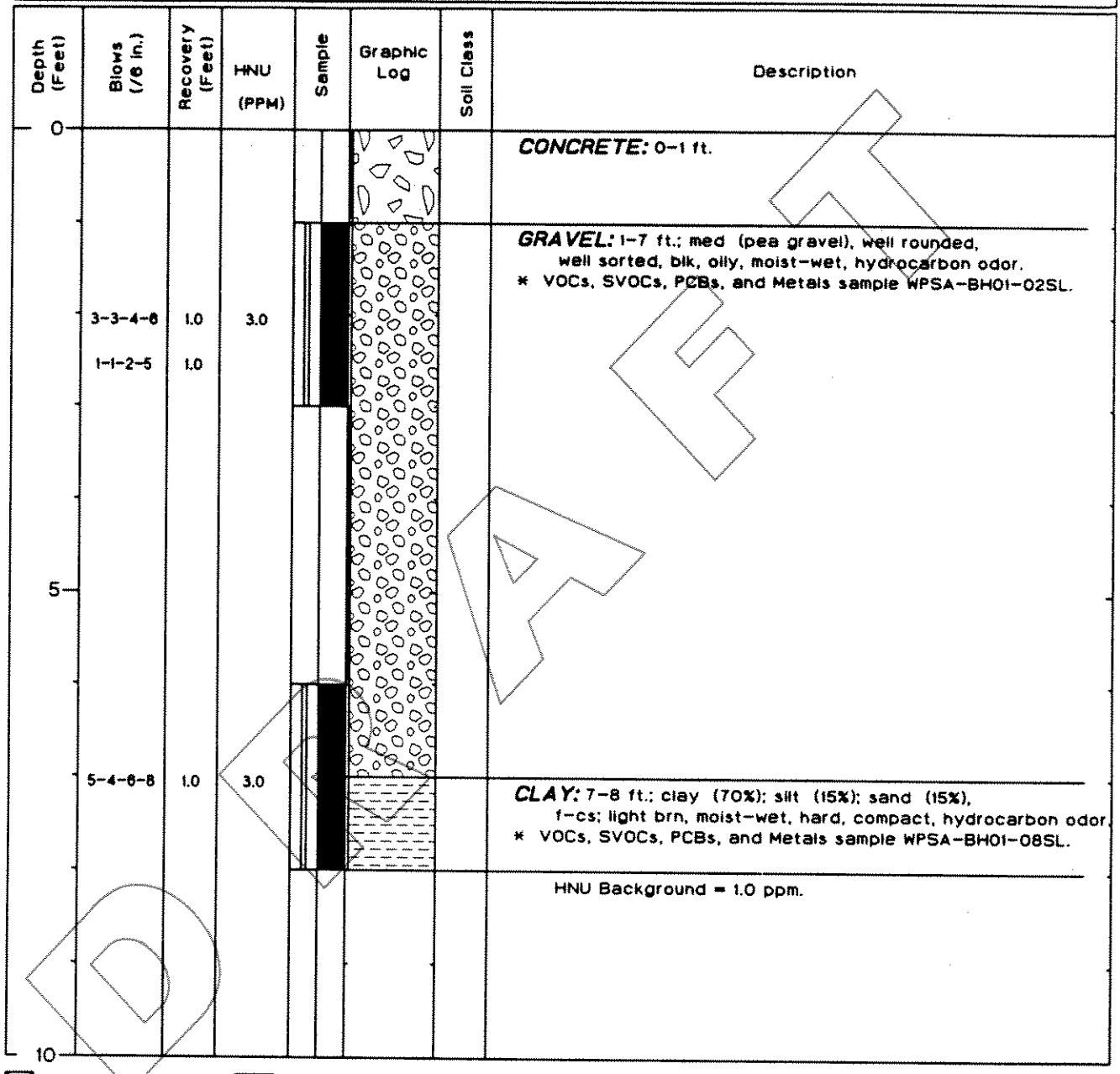
DRAFT

Geraghty & Miller, Inc.
Environmental Services

Log of Boring: WPSA-BH01

HARRISON RFI

Moraine, Ohio



DRAFT

☒ Composite to Lab ■ VOC to Lab ▥ Split-Spoon Not Analyzed

Drilling Co.: Belasco
Driller: G. Mayle
Drilling Method: HSA 4 1/4"
Drilling Fluid: None
Geologist: R. Astle
Total Depth: 8
Surface Elev.:
Datum: Feet, MSL
Begin Drilling: 12/02/92
End Drilling: 12/02/92
Converted to Well: No
Well Name:
Remarks:
West Coor.:
South Coor.:

OH019.12

harrison

SOIL/SEDIMENT SAMPLING LOG

Project/No. Harrison / OH019.12 Page 1 of 2

Site Location Moraine, Ohio

Sample No. WPSA-BH01-02SL Coded/ Replicate No. DUP-7 Date 12-2-92

Weather Snow, 30sF Time Sampling Began 8:30 a.m. Time Sampling Completed 9:30 a.m.

Sampling Method and Material 3" diameter split spoon

Grab X Composite ____

From	To	Soil/Sediment Description
1	3	Gravel, med. (pea gravel), well rounded, well sorted, black, oily, moist-wet, hydrocarbon odor.

Other (OVA; HNU; etc.) HNU in spoon = 3.0 ppm. Background = 1.0 ppm.

Constituents Sampled	Container Description From Lab X or G&M ____	Preservative
TCL VOCs	4 oz glass jar	Ice
TCL SVOCs & PCBs	4 oz glass jar	Ice
TAL Metals	16 oz glass jar	Ice

Remarks 1' of concrete at ground surface. Drove 2 spoons to collect duplicate.

Sampling Personnel R. Astle

DRAFT

SOIL/SEDIMENT SAMPLING LOG

Project/No. Harrison / OH019.12 Page 2 of 2

Site Location Moraine, Ohio

Sample No. WPSA-BH01-08SL Coded/ Replicate No. _____ Date 12-2-92

Weather Snow, 30°F Time Sampling Began 8:30 a.m. Time Sampling Completed 9:30 a.m.

Sampling Method and Material 3" diameter split spoon

Grab X Composite ____

From	To	Soil/Sediment Description
7	8	Clay (70%); silt (15%); sand (15%), f-cs; light brown, moist-wet, hard, compact, hydrocarbon odor.

Other (OVA; HNU; etc.) HNU in spoon = 3.0 ppm. Background = 1.0 ppm.

Constituents Sampled	Container Description From Lab X or G&M ____	Preservative
TCL VOCs	4 oz glass jar	Ice
TCL SVOCs & PCBs	4 oz glass jar	Ice
TAL Metals	16 oz glass jar	Ice

Remarks

Sampling Personnel R. Astle

DRAFT

Geraghty & Miller, Inc.
Environmental Services

Log of Boring: WPSA-BH02

HARRISON RFI — Moraine, Ohio

Depth (Feet)	Blows (/6 in.)	Recovery (Feet)	HNU (PPM)	Sample	Graphic Log	Soil Class	Description
0							***CONCRETE:*** 0–1 ft.
							GRAVEL: 1–6 ft.; f–med (pea size), light brn, moist to wet, looks clean. * VOCs, SVOCs, PCBs, Pesticides, and Metals sample WPSA-BH02-02SL.
	15-50/5	.8	5.0				
5							***CLAY & GRAVEL:*** 6–7 ft.; clay (50%), gravel (50%), f–cobble size; light brn, moist–wet, stiff to semi–pliable, hydrocarbon odor.
	15-27-33						***SAND & GRAVEL:*** 7–8 ft.; sand (45%), f–cs; gravel (45%), f–cs; silt (10%); light brn, moist–wet. * VOCs, SVOCs, PCBs, Pesticides, and Metals sample WPSA-BH02-08SL.
	50/5	1.8	12				
10							HNU Background = 3.8 ppm.

DRAFT

☒ Composite to Lab ■ VOC to Lab ▥ Split-Spoon Not Analyzed

Drilling Co.: Belasco
Driller: G. Mayle
Drilling Method: HSA 4 1/4"
Drilling Fluid: None
Remarks:

Geologist: R. Astle
Total Depth: 8
Surface Elev.:
Datum: Feet, MSL
West Coor.:

Begin Drilling: 12/02/92
End Drilling: 12/02/92
Converted to Well: No
Well Name:
South Coor.:

OH019.12
harrison

SOIL/SEDIMENT SAMPLING LOG

Project/No. Harrison / OH019.12 Page 1 of 2

Site Location Moraine, Ohio

Sample No. WPSA-BH02-02SL Coded/ Replicate No. _____ Date 12-2-92

Weather Cloudy, 30sF Time Sampling Began 9:30 a.m. Time Sampling Completed 10:30 a.m.

Sampling Method and Material 3" diameter split spoon

Grab X Composite ____

From	To	Soil/Sediment Description
1	3	Gravel, f-med (pea size), light brn, moist-wet.

Other (OVA; HNU; etc.) HNU in spoon = 5.0 ppm. Background = 3.6 ppm.

Constituents Sampled	Container Description From Lab X or G&M ____	Preservative
TCL VOCs	4 oz glass jar	Ice
TCL SVOCs & PCBs	4 oz glass jar	Ice
TAL Metals	16 oz glass jar	Ice

Remarks 1' concrete at ground surface.

Sampling Personnel R. Astle

DRAFT

SOIL/SEDIMENT SAMPLING LOG

Project/No. Harrison / OH019.12 Page 2 of 2

Site Location Moraine, Ohio

Sample No. WPSA-BH02-08SL Coded/ Replicate No. _____ Date 12-2-92

Weather Cloudy, 30sF Time Sampling Began 9:30 a.m. Time Sampling Completed 10:30 a.m.

Sampling Method and Material 3" diameter split spoon

Grab X Composite ____

From	To	Soil/Sediment Description
6	8	Clay; gravel, f-cs; sand, f-cs; tr silt; light brown, moist-wet, hydrocarbon odor.

Other (OVA; HNU; etc.) HNU in spoon = 12 ppm. Background = 3.6 ppm.

Constituents Sampled	Container Description From Lab X or G&M ____	Preservative
TCL VOCs	4 oz glass jar	Ice
TCL SVOCs & PCBs	4 oz glass jar	Ice
TAL Metals	16 oz glass jar	Ice

Remarks

Sampling Personnel R. Astle

DRAFT

Geraghty & Miller, Inc.
Environmental Services

Log of Boring: WPSA-BH03

HARRISON RFI — Moraine, Ohio

Depth (Feet)	Blows (/6 in.)	Recovery (Feet)	HNU (PPM)	Sample	Graphic Log	Soil Class	Description
0							***CONCRETE:*** 0–1 ft.
	15–50/5	.8	8.0				***FILL:*** clay (60%); silt (20%); gravel (10%), f–cobble size; sand (10%), f–cs; dk brn, dry–damp, stiff, debris: wood, glass, metal. * VOCs, SVOCs, PCBs, and Metals sample WPSA–BH03–02SL.
5							***CLAY & GRAVEL:*** clay (60%); gravel (20%), f–cobble size; silt (10%); sand (10%), f–cs; dk, oily, moist–wet, very cohesive, very pliable, hydrocarbon odor.
	8–6–6–10	1.0	200				* VOCs, SVOCs, PCBs, and Metals sample WPSA–BH03–02SL.
							HNU Background = 1.4 ppm.
10							

DRAFT

☒ Composite to Lab ■ VOC to Lab ▥ Split–Spoon Not Analyzed

Drilling Co.: Belasco
Driller: G. Mayle
Drilling Method: HSA 4 1/4"
Drilling Fluid: None
Remarks:

Geologist: R. Astle
Total Depth: 8
Surface Elev.:
Datum: Feet, MSL
West Coor.:

Begin Drilling: 12/02/92
End Drilling: 12/02/92
Converted to Well: No
Well Name:
South Coor.:

OH019.12

harrison

SOIL/SEDIMENT SAMPLING LOG

Project/No. Harrison / OH019.12 Page 1 of 2

Site Location Moraine, Ohio

Sample No. WPSA-BH03-02SL Coded/ Replicate No. _____ Date 12-2-92

Weather Cloudy, 30sF Time Sampling Began 11:00 a.m. Time Sampling Completed 12:00 p.m.

Sampling Method and Material 3" diameter split spoon

Grab X Composite ____

From	To	Soil/Sediment Description
1	3	Clay (60%); silt (20%); gravel (10%), f-cobble size; sand (10%), f-cs; dark brown, dry-damp, stiff, debris: wood, glass, metal.

Other (OVA; HNU; etc.) HNU in spoon = 8 ppm. Background = 1.4 ppm.

Constituents Sampled	Container Description From Lab X or G&M ____	Preservative
TCL VOCs	4 oz glass jar	Ice
TCL SVOCs & PCB	4 oz glass jar	Ice
TAL Metals	16 oz glass jar	Ice

Remarks 1' concrete at ground surface.

Sampling Personnel R. Astle

DRAFT

SOIL/SEDIMENT SAMPLING LOG

Project/No. Harrison / OH019.12 Page 2 of 2

Site Location Moraine, Ohio

Sample No. WPSA-BH03-08SL Coded/ Replicate No. _____ Date 12-2-92

Weather Cloudy, 30sF Time Sampling Began 11:00 a.m. Time Sampling Completed 12:00 p.m.

Sampling Method and Material 3" diameter split spoon

Grab X Composite ____

From	To	Soil/Sediment Description
6	8	Clay (60%); gravel (20%), f-cobble size; silt (10%); sand (10%), f-cs; dk oily, moist-wet, very cohesive, very pliable, hydrocarbon odor.

Other (OVA; HNU; etc.) HNU in spoon = 200 ppm. Background = 1.4 ppm.

Constituents Sampled	Container Description From Lab X or G&M ____	Preservative
TCL VOCs	4 oz glass jar	Ice
TCL SVOCs & PCBs	4 oz glass jar	Ice
TAL Metals	16 oz glass jar	Ice

Remarks

Sampling Personnel R. Astle

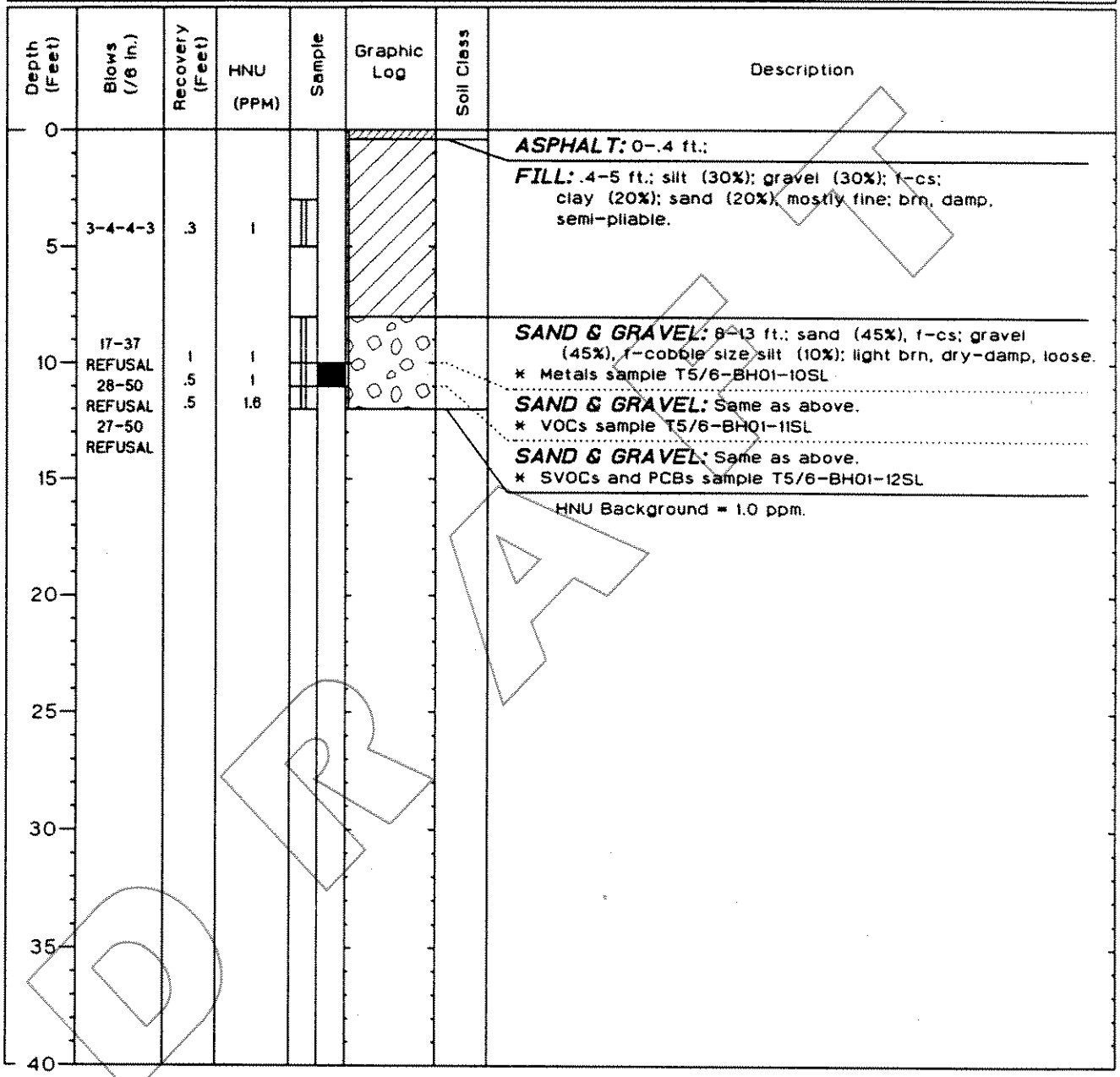
DRAFT

Geraghty & Miller, Inc.
Environmental Services

Log of Boring: T5/6-BH01

HARRISON RFI

Moraine, Ohio



DRAFT

☒ Composite to Lab ■ VOC to Lab ▥ Split-Spoon Not Analyzed

Drilling Co.: Belasco
Driller: G. Mayle
Drilling Method: HSA 4 1/4"
Drilling Fluid: None
Remarks:

Geologist: R. Astle
Total Depth: 12
Surface Elev.:
Datum: Feet, MSL
West Coor.:

Begin Drilling: 12/01/92
End Drilling: 12/01/92
Converted to Well: No
Well Name:
South Coor.:

OH019.12

harrison

SOIL/SEDIMENT SAMPLING LOG

Project/No. Harrison / OH019.12 Page 1 of 3

Site Location Moraine, Ohio

Sample No. T5/6-BH01-10SL Coded/ Replicate No. DUP-6 Date 12-1-92

Weather Cloudy, 30s F Time Sampling Began 12:30 p.m. Time Sampling Completed 2:30 p.m.

Sampling Method and Material 3" diameter split spoon

Grab X Composite ____

From	To	Soil/Sediment Description
8	10	Sand (45%), f-cs; gravel (45%), f-cobble size; silt (10%); lt brn, dry-damp, loose.

Other (OVA; HNU; etc.) HNU in spoon = 1.0 ppm. Background = 1.0 ppm.

Constituents Sampled	Container Description From Lab X or G&M ____	Preservative
TAL Metals	16 oz glass jar	Ice

Remarks Had to drive 3 intervals of spoons to fill duplicate.

Sampling Personnel R. Astle

DRAFT

SOIL/SEDIMENT SAMPLING LOG

Project/No. Harrison / OH019.12 Page 2 of 3

Site Location Moraine, Ohio

Sample No. T5/6-BH01-11SL Coded/ Replicate No. DUP-6 Date 12-1-92

Weather Cloudy, 30s F Time Sampling Began 12:30 p.m. Time Sampling Completed 2:30 p.m.

Sampling Method and Material 3" diameter split spoon

Grab X Composite ____

From	To	Soil/Sediment Description
10	11	Sand (45%), f-cs; gravel (45%), f-cobble size; silt (10%); light brown, dry-damp, loose

Other (OVA; HNU; etc.) HNU in spoon = 1.0 ppm. Background = 1.0 ppm.

Constituents Sampled	Container Description From Lab X or G&M ____	Preservative
TCL VOCs	4 oz glass jar	Ice

Remarks Had to drive 3 intervals of spoons to fill duplicate.

Sampling Personnel R. Astle

DRAFT

SOIL/SEDIMENT SAMPLING LOG

Project/No. Harrison / OH019.12 Page 3 of 3

Site Location Moraine, Ohio

Sample No. T5/6-BH01-12SL Coded/ Replicate No. DUP-6 Date 12-1-92

Weather Cloudy, 30sF Time Sampling Began 12:30 p.m. Time Sampling Completed 2:30 p.m.

Sampling Method and Material 3" diameter split spoon

Grab X Composite ____

From	To	Soil/Sediment Description
11	12	Sand (45%), f-cs; gravel (45%), f-cobble size; silt (10%); lt brn, dry-damp, loose.

Other (OVA; HNU; etc.) HNU in spoon = 1.6 ppm. Background = 1.0 ppm.

Constituents Sampled	Container Description From Lab X or G&M ____	Preservative
TCL SVOC & PCB/Pesticides	4 oz glass jar	Ice

Remarks Had to drive 3 spoons to fill duplicate sample.

Sampling Personnel R. Astle

DRAFT

Geraghty & Miller, Inc.
Environmental Services

Log of Boring: T5/6-BH02

HARRISON RFI — Moraine, Ohio

Depth (Feet)	Blows (/6 in.)	Recovery (Feet)	HNU (PPM)	Sample	Graphic Log	Soil Class	Description
0							***ASPHALT:*** 0–.4 ft.
							FILL: .4–5 ft.; sand (50%), f–cs; gravel (40%), f–cs; silt (10%); damp, light brn, loose.
5	4-4-4-5	1.0	1.8				***SAND & GRAVEL:*** 5–12 ft.; sand (45%), f–cs; gravel (45%), f–cobble size; silt (10%); light brn, dry–damp, loose.
10	27-50 REFUSAL	.5	1.0				* VOCs, SVOCs, PCBs, and Metals sample T5/6-BH02-12SL.
							HNU Background = 1.1 ppm.
15							
20							
25							
30							
35							
40							

DRAFT

☒ Composite to Lab ■ VOC to Lab ▯▯ Split-Spoon Not Analyzed

Drilling Co.: Belasco
Driller: G. Mayle
Drilling Method: HSA 4 1/4"
Drilling Fluid: None
Remarks:

Geologist: R. Astle
Total Depth: 12
Surface Elev.:
Datum: Feet, MSL
West Coor.:

Begin Drilling: 12/01/92
End Drilling: 12/01/92
Converted to Well: No
Well Name:
South Coor.:

OH019.12

harrison

SOIL/SEDIMENT SAMPLING LOG

Project/No. Harrison / OH019.12 Page 1 of 1

Site Location Moraine, Ohio

Sample No. T5/6-BH02-12SL Coded/ Replicate No. _____ Date 12-1-92

Weather Cloudy, 30°F Time Sampling Began 2:30 p.m. Time Sampling Completed 3:30 p.m.

Sampling Method and Material 3" diameter split spoon

Grab X Composite ____

From	To	Soil/Sediment Description
10	12	Sand (45%), f-cs; gravel (45%), f-cobble size; silt (10%); lt brn, dry-damp, loose.

Other (OVA; HNU; etc.) HNU in spoon = 1.0 ppm. Background = 1.1 ppm.

Constituents Sampled	Container Description From Lab X or G&M ____	Preservative
TCL VOCs	4 oz glass jar	Ice
TCL SVOCs & PCB/Pesticides	4 oz glass jar	Ice
TAL Metals	16 oz glass jar	Ice

Remarks

Sampling Personnel R. Astle

DRAFT

SOIL/SEDIMENT SAMPLING LOG

Project/No. Harrison / OH019.12 Page 1 of 5

Site Location Moraine, Ohio

Sample No. L1-GS01-02WT Coded/ Replicate No. DUP-9 Date 10-12-92

Weather Cloudy, 30sF Time Sampling Began 1:30 p.m. Time Sampling Completed 2:10 p.m.

Sampling Method and Material 2.75-inch diameter stainless steel hand auger.

Grab ____ Composite ____

From	To	Soil/Sediment Description
0	2	Silt (50%); clay (30%); gravel (11%), f-cobble; tr ceramic pieces, metal; brn to gray, damp, semicohesive, semipliable.

Other (OVA; HNU; etc.) HNU in spoon = .2 ppm. Background = .2 ppm.

Constituents Sampled	Container Description From Lab X or G&M ____	Preservative
TCL VOCs	4 oz glass jar	Ice
TCL SVOCs & PCB/Pest.	4 oz glass jar	Ice
TAL Metals & Cyanide	16 oz glass jar	Ice

Remarks

Sampling Personnel R. Astle, C. Standard

DRAFT

SOIL/SEDIMENT SAMPLING LOG

Project/No. Harrison / OH019.12 Page 2 of 5

Site Location Moraine, Ohio

Sample No. L1-GS02-02WT Coded/ Replicate No. _____ Date 12-10-92

Weather Cloudy, 30sF Time Sampling Began 3:00 p.m. Time Sampling Completed 3:30 p.m.

Sampling Method and Material 2.75-inch diameter stainless steel hand auger.

Grab X Composite ____

From	To	Soil/Sediment Description
0	2	Silt (75%); clay (20%); tr gravel, ceramic fragments, metal; gray, damp, very slightly cohesive, very slightly pliable.

Other (OVA; HNU; etc.) HNU in spoon = 0 ppm. Background = .2 ppm.

Constituents Sampled	Container Description From Lab X or G&M ____	Preservative
TCL VOCs	4 oz glass jar	Ice
TCL SVOCs & PCB/Pest.	4 oz glass jar	Ice
TAL Metals & Cyanide	16 oz glass jar	Ice

Remarks HNU deflection.

Sampling Personnel R. Astle, C. Standard

DRAFT

SOIL/SEDIMENT SAMPLING LOG

Project/No. Harrison / OH019.12 Page 3 of 5

Site Location Moraine, Ohio

Sample No. L1-GS03-02WT Coded/ Replicate No. _____ Date 12-10-92

Weather Cloudy, 30sF Time Sampling Began 2:30 p.m. Time Sampling Completed 3:00 p.m.

Sampling Method and Material 2.75-inch diameter stainless steel hand auger.

Grab X Composite ____

From	To	Soil/Sediment Description
0	2	Silt (70%); clay (20%); gravel (10%), f-cobble;
		tr ceramic waste, lt brn clay, gray silt,
		damp-moist, sl pliable, sl cohesive.

Other (OVA; HNU; etc.) HNU in spoon = .2 ppm. Background = .2 ppm.

Constituents Sampled	Container Description From Lab X or G&M ____	Preservative
TCL VOCs	4 oz glass jar	Ice
TCL SVOCs & PCB/Pest.	4 oz glass jar	Ice
TAL Metals & Cyanide	16 oz glass jar	Ice

Remarks _____

Sampling Personnel R. Astle, C. Standard

DRAFT

SOIL/SEDIMENT SAMPLING LOG

Project/No. Harrison / OH019.12 Page 4 of 5

Site Location Moraine, Ohio

Sample No. L1-GS04-02WT Coded/ Replicate No. _____ Date 12-10-92

Weather Cloudy, 30sF Time Sampling Began 4:00 p.m. Time Sampling Completed 4:30 p.m.

Sampling Method and Material 2.75-inch diameter stainless steel hand auger.

Grab X Composite ____

From	To	Soil/Sediment Description
0	1	Clay (60%); gravel (30%), f-cobble size; silt (10%); tr ceramic fragments & metal; brown, damp, stiff, hard.

Other (OVA; HNU; etc.) HNU in spoon = .5 ppm. Background = .5 ppm.

Constituents Sampled	Container Description From Lab X or G&M ____	Preservative
TCL VOCs	4 oz glass jar	Ice
TCL SVOCs & PCB/Pest.	4 oz glass jar	Ice
TAL Metals & Cyanide	16 oz glass jar	Ice

Remarks Refusal at 1'.

Sampling Personnel R. Astle, C. Standard

DRAFT

SOIL/SEDIMENT SAMPLING LOG

Project/No. Harrison / OH019.12 Page 5 of 5

Site Location Moraine, Ohio

Sample No. L1-GS05-02WT Coded/ Replicate No. _____ Date 12-10-92

Weather Cloudy, 30sF Time Sampling Began 3:30 p.m. Time Sampling Completed 4:00 p.m.

Sampling Method and Material 2.75-inch diameter stainless steel hand auger.

Grab X Composite ____

From	To	Soil/Sediment Description
0	2	Clay (50%); gravel (30%), f-cobble size; silt (20%); brown, damp, stiff, hard.

Other (OVA; HNU; etc.) HNU in spoon = .5 ppm. Background = .5 ppm.

Constituents Sampled	Container Description From Lab X or G&M ____	Preservative
TCL VOCs	4 oz glass jar	Ice
TCL SVOCs & PCB/Pest.	4 oz glass jar	Ice
TAL Metals & Cyanide	16 oz glass jar	Ice

Remarks _____

Sampling Personnel R. Astle, C. Standard

DRAFT

SOIL/SEDIMENT SAMPLING LOG

Project/No. Harrison / OH019.12 Page 1 of 6

Site Location Moraine, Ohio

Sample No. L2-GS01-02WT Coded/ Replicate No. DUP-10 Date 12-11-92

Weather Cloudy, 30sF Time Sampling Began 11:45 a.m. Time Sampling Completed 12:00 p.m.

Sampling Method and Material 2.75-inch diameter stainless steel hand auger.

Grab X Composite ____

From	To	Soil/Sediment Description
0	1.25	Clay (60%); gravel (20%), f-cobble size; silt (10%); sand (10%), f-cs; brown to dark brown, damp, pliable, cohesive.

Other (OVA; HNU; etc.) HNU in spoon = .5 ppm. Background = .5 ppm.

Constituents Sampled	Container Description From Lab X or G&M ____	Preservative
TCL VOCs	4 oz glass jar	Ice
TCL SVOCs & PCB/Pest.	4 oz glass jar	Ice
TAL Metals	16 oz glass jar	Ice

Remarks

Sampling Personnel R. Astle, C. Standard

DRAFT

SOIL/SEDIMENT SAMPLING LOG

Project/No. Harrison / OH019.12 Page 2 of 6

Site Location Moraine, Ohio

Sample No. L2-GS02-02WT Coded/ Replicate No. _____ Date 12-11-92

Weather Cloudy, 30sF Time Sampling Began 11:15 a.m. Time Sampling Completed 11:40 a.m.

Sampling Method and Material 2.75-inch diameter stainless steel hand auger.

Grab X Composite ____

From	To	Soil/Sediment Description
0	1.5	Clay (40%); gravel (40%), f-cobble size; silt (10%); sand (10%), f-cs; tr brick, roots; brown, damp, semicohesive, semipliable.

Other (OVA; HNU; etc.) HNU in spoon = .5 ppm. Background = .5 ppm.

Constituents Sampled	Container Description From Lab X or G&M ____	Preservative
TCL VOCs	4 oz glass jar	Ice
TCL SVOCs & PCB/Pest.	4 oz glass jar	Ice
TAL Metals	16 oz glass jar	Ice

Remarks Refusal at 1.5 feet.

Sampling Personnel R. Astle, C. Standard

DRAFT

SOIL/SEDIMENT SAMPLING LOG

Project/No. Harrison / OH019.12 Page 3 of 6

Site Location Moraine, Ohio

Sample No. L2-GS03-02WT Coded/ Replicate No. _____ Date 12-11-92

Weather Cloudy, 30sF Time Sampling Began 11:00 a.m. Time Sampling Completed 11:15 a.m.

Sampling Method and Material 2.75-inch diameter stainless steel hand auger.

Grab X Composite ____

From	To	Soil/Sediment Description
0	1.1	Clay (50%), f-cobble size; clay (30%); silt (10%); sand (10%), f-cs; brown, damp, slightly cohesive, slightly pliable.

Other (OVA; HNU; etc.) HNU in spoon = .5 ppm. Background = .5 ppm.

Constituents Sampled	Container Description From Lab X or G&M ____	Preservative
TCL VOCs	4 oz glass jar	Ice
TCL SVOCs & PCB/Pest.	4 oz glass jar	Ice
TAL Metals	16 oz glass jar	Ice

Remarks Refusal at 1.1 feet.

Sampling Personnel R. Astle, C. Standard

DRAFT

SOIL/SEDIMENT SAMPLING LOG

Project/No. NET / OH225.01 Page 4 of 6

Site Location Moraine, Ohio

Sample No. L2-GS01-02WT Coded/ Replicate No. DUP-10 Date 2/24/93

Weather Sunny, 20sF Time Sampling Began 2:15 p.m. Time Sampling Completed 2:30 p.m.

Sampling Method and Material One-man power auger

Grab ____ Composite X

From	To	Soil/Sediment Description
0	2	Clay (60%); gravel (30%), f-cobble size; silt (10%); sand (10%), f-cs; brown to dark brown, damp, pliable, cohesive.

Other (OVA; HNU; etc.) HNU = .2 ppm = background

Constituents Sampled	Container Description From Lab X or G&M ____	Preservative
TAL Cyanide	16 oz Glass Jar	Ice

Remarks

Sampling Personnel R. Astle, H. Sharifi

DRAFT

SOIL/SEDIMENT SAMPLING LOG

Project/No. NET / OH225.01 Page 5 of 6

Site Location Moraine, Ohio

Sample No. L2-GS02-02WT Coded/ Replicate No. _____ Date 2/24/93

Weather Sunny, 20sF Time Sampling Began 2:00 p.m. Time Sampling Completed 2:15 p.m.

Sampling Method and Material One-man power auger

Grab ____ Composite X

From	To	Soil/Sediment Description
0	2	Clay (40%); gravel (40%), f-cobble size; silt (10%); sand (10%), f-cs; tr brick, roots; brn, damp, semicohesive, semipliable.

Other (OVA; HNU; etc.) HNU = .4 ppm = background

Constituents Sampled	Container Description From Lab X or G&M ____	Preservative
TAL Cyanide	16 oz Glass Jar	Ice

Remarks

Sampling Personnel R. Astle, H. Sharifi

DRAFT

SOIL/SEDIMENT SAMPLING LOG

Project/No. NET / OH225.01 Page 6 of 6

Site Location Moraine, Ohio

Sample No. L2-GS03-02WT Coded/ Replicate No. _____ Date 2/24/93

Weather Sunny, 20sF Time Sampling Began 1:45 p.m. Time Sampling Completed 2:00 p.m.

Sampling Method and Material One-man power auger

Grab ____ Composite X

From	To	Soil/Sediment Description
0	2	Clay (50%), f-cobble size; clay (30%); silt (10%); sand (10%), f-cs; brown, damp, slightly cohesive, slightly pliable.

Other (OVA; HNU; etc.) HNU = .7 ppm in bowl. Background = .6 ppm.

Constituents Sampled	Container Description From Lab X or G&M ____	Preservative
TAL Cyanide	16 oz Glass Jar	Ice

Remarks

Sampling Personnel R. Astle, H. Sharifi

DRAFT

SOIL/SEDIMENT SAMPLING LOG

Project/No. Harrison / OH019.12 Page 1 of 6

Site Location Moraine, Ohio

Sample No. L3-GS01-02WT Coded/ Replicate No. _____ Date 12-11-92

Weather Cloudy, 30sF Time Sampling Began 8:45 a.m. Time Sampling Completed 9:30 a.m.

Sampling Method and Material 2.75-inch diameter stainless steel hand auger.

Grab X Composite ____

From	To	Soil/Sediment Description
0	1.3	Clay (40%); gravel (30%), f-cs; silt (15%); sand, f-cs (15%); brown, damp, semipliable, semicohesive.

Other (OVA; HNU; etc.) HNU in spoon = .9 ppm. Background = .9 ppm.

Constituents Sampled	Container Description From Lab X or G&M ____	Preservative
TCL VOCs	4 oz glass jar	Ice
TCL SVOCs & PCB/Pest.	4 oz glass jar	Ice
TAL Metals	16 oz glass jar	Ice

Remarks Refusal at 1.3 feet.

Sampling Personnel R. Astle, C. Standard

DRAFT

SOIL/SEDIMENT SAMPLING LOG

Project/No. Harrison / OH019.12 Page 2 of 6

Site Location Moraine, Ohio

Sample No. L3-GS02-02WT Coded/ Replicate No. _____ Date 12-11-92

Weather Cloudy, 30sF Time Sampling Began 9:30 a.m. Time Sampling Completed 10:30 a.m.

Sampling Method and Material 2.75-inch diameter stainless steel hand auger.

Grab X Composite ____

From	To	Soil/Sediment Description
0	1.1	Clay (50%); gravel (30%), f-cobble size; silt (10%); sand (10%), f-cs; brown, damp, stiff.

Other (OVA; HNU; etc.) HNU in spoon = .2 ppm. Background = .2 ppm.

Constituents Sampled	Container Description From Lab X or G&M ____	Preservative
TCL VOCs	4 oz glass jar	Ice
TCL SVOCs & PCB/Pest.	4 oz glass jar	Ice
TAL Metals	16 oz glass jar	Ice

Remarks Refusal at 1.1 feet.

Sampling Personnel R. Astle, C. Standard

DRAFT

SOIL/SEDIMENT SAMPLING LOG

Project/No. Harrison / OH019.12 Page 3 of 6

Site Location Moraine, Ohio

Sample No. L3-GS03-02WT Coded/ Replicate No. _____ Date 12-11-92

Weather Cloudy, 30sF Time Sampling Began 10:00 a.m. Time Sampling Completed 10:30 a.m.

Sampling Method and Material 2.75-inch diameter stainless steel hand auger.

Grab X Composite ____

From	To	Soil/Sediment Description
0	1.3	Clay (50%); gravel (30%), f-cobble size; silt (10%); sand (10%), f-cs; brown, damp to wet w/depth, semipliable, semicohesive.

Other (OVA; HNU; etc.) HNU in spoon = .5 ppm. Background = .5 ppm.

Constituents Sampled	Container Description From Lab X or G&M ____	Preservative
TCL VOCs	4 oz glass jar	Ice
TCL SVOCs & PCB/Pest.	4 oz glass jar	Ice
TAL Metals	16 oz glass jar	Ice

Remarks Water at 1.3 feet. Refusal at 1.5 feet. MS/MSD sample.

Sampling Personnel R. Astle, C. Standard

DRAFT

SOIL/SEDIMENT SAMPLING LOG

Project/No. NET / OH225.01 Page 4 of 6

Site Location Moraine, Ohio

Sample No. L3-GS01-02WT Coded/ Replicate No. _____ Date 2/24/93

Weather Sunny, 20sF Time Sampling Began 3:00 p.m. Time Sampling Completed 3:10 p.m.

Sampling Method and Material One-man power auger

Grab ____ Composite X

From	To	Soil/Sediment Description
0	2	Clay (40%), gravel (30%), f-cs; silt (15%), sand (15%), f-cs; brown, damp, semipliable, semicohesive.

Other (OVA; HNU; etc.) HNU = 1.3 to 2.0 ppm in bowl. Background = 1.3 ppm.

Constituents Sampled	Container Description From Lab X or G&M ____	Preservative
TAL Cyanide	16 oz Glass Jar	Ice

Remarks _____

Sampling Personnel R. Astle, H. Sharifi

DRAFT

SOIL/SEDIMENT SAMPLING LOG

Project/No. NET / OH225.01 Page 5 of 6

Site Location Moraine, Ohio

Sample No. L3-GS02-02WT Coded/ Replicate No. _____ Date 2/24/93

Weather Sunny, 20sF Time Sampling Began 3:10 p.m. Time Sampling Completed 3:20 p.m.

Sampling Method and Material One-man power auger

Grab ____ Composite X

From	To	Soil/Sediment Description
0	2	Clay (50%), gravel (30%), f-cobble size; silt (10%); sand (10%), f-cs; brown, damp, stiff.

Other (OVA; HNU; etc.) HNU = 4 ppm in bowl. Background = 1.2 ppm.

Constituents Sampled	Container Description From Lab X or G&M ____	Preservative
TAL Cyanide	16 oz Glass Jar	Ice

Remarks

Sampling Personnel R. Astle, H. Sharifi

DRAFT

SOIL/SEDIMENT SAMPLING LOG

Project/No. NET / OH225.01 Page 6 of 6

Site Location Moraine, Ohio

Sample No. L3-GS03-02WT Coded/ Replicate No. _____ Date 2/24/93

Weather Sunny, 20sF Time Sampling Began 3:30 p.m. Time Sampling Completed 3:30 p.m.

Sampling Method and Material One-man power auger

Grab ____ Composite X

From	To	Soil/Sediment Description
0	2	Clay (50%), gravel (30%), f-cobble size; silt (10%); sand (10%), f-cs; brown, damp, semi-pliable, semicohesive.

Other (OVA; HNU; etc.) HNU = 20 ppm in bowl. Background = 1.3 ppm

Constituents Sampled	Container Description From Lab X or G&M ____	Preservative
TAL Cyanide	16 oz Glass Jar	Ice

Remarks Run MS/MSD spike on this sample.

Sampling Personnel R. Astle

DRAFT

WATER SAMPLING LOG

PROJECT/No. Harrison RFI / OH019.12 PAGE 1 OF 38

SITE LOCATION Moraine, Ohio

SITE/WELL No. EAST-11293-GW CODED/ REPLICATE No. DATE 1/12/93

WEATHER Mist, 30sF TIME SAMPLING BEGAN 1:00 p.m. TIME SAMPLING COMPLETED 2:45 p.m.

EVACUATION DATA

DESCRIPTION OF MEASURING POINT (MP) Top of PVC

HEIGHT OF MP ABOVE/BELOW LAND SURFACE _____ MP ELEVATION _____

TOTAL SOUNDED DEPTH OF WELL BELOW MP 71.02 (71.02) WATER-LEVEL ELEVATION _____

HELD _____ DEPTH TO WATER BELOW MP 26.16 (26.16) DIAMETER OF CASING 2"

WET _____ WATER COLUMN IN WELL 44.86 GALLONS PUMPED/BAILED PRIOR TO SAMPLING (21.5) 22

GALLONS PER FOOT 0.16

GALLONS IN WELL 7.18 (x3) SAMPLING PUMP INTAKE SETTING (FEET BELOW LAND SURFACE) _____

EVACUATION METHOD Site dedicated Teflon bailer (No. 1) + polypropylene rope

SAMPLING DATA/FIELD PARAMETERS

COLOR Lt. Brown ODOR None APPEARANCE Cloudy, silty TEMPERATURE 12.2 °F/°C

OTHER (SPECIFIC ION; OVA; HNU; ETC.) HNU = .4 ppm = background

SPECIFIC CONDUCTANCE, UMHOS/CM 1) 760/750/740/750 2) 760/740/750/750

pH 1) 6.77/6.80/6.81/6.82 2) 6.78/6.80/6.81/6.82

SAMPLING METHOD AND MATERIAL Site dedicated Teflon bailer (No. 1) + polypropylene rope

CONSTITUENTS SAMPLED	CONTAINER DESCRIPTION FROM LAB X OR G&M	PRESERVATIVE
VOCs	(3) 40 ml glass vial	HCl, Ice
SVOCs	1 liter amber glass	Ice
Total Metals	1 liter plastic	HNO_3, Ice
Dissolved Metals	1 liter plastic	HNO_3, Ice
PCB/Pest.	1 liter amber glass	Ice
Herbicides	1 liter amber glass	Ice
Cyanide	500 ml plastic	H_2SO_4, Ice

REMARKS Dissolved Metals field filtered. Took rinseate blank (RB-02) after sampling this well (3:15). Duplicate pH and SpC after sampling. Duplicate depth to water and total depth shown in parentheses.

SAMPLING PERSONNEL C. Standard, R. Astle

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

DRAFT

WATER SAMPLING LOG

PROJECT/NO. Harrison RFI / OH019.12 PAGE 2 OF 38

SITE LOCATION Moraine, Ohio

SITE/WELL NO. 4S-12293-GW CODED/ REPLICATE NO. _____ DATE 1/22/93

WEATHER Rain, snow, 30sF TIME SAMPLING BEGAN 11:00 a.m. TIME SAMPLING COMPLETED 1:30 p.m.

EVACUATION DATA

DESCRIPTION OF MEASURING POINT (MP) Top of PVC

HEIGHT OF MP ABOVE/BELOW LAND SURFACE _____ MP ELEVATION _____

TOTAL SOUNDED DEPTH OF WELL BELOW MP 66.32 (66.32) WATER-LEVEL ELEVATION _____

HELD _____ DEPTH TO WATER BELOW MP 27.40 (27.40) DIAMETER OF CASING 4"

WET _____ WATER COLUMN IN WELL 38.92 GALLONS PUMPED/BAILED PRIOR TO SAMPLING (75.89) 80

Pump on: 11:22

GALLONS PER FOOT 0.65 Pump off: 11:30 10 gpm

SAMPLING PUMP INTAKE SETTING

GALLONS IN WELL 25.30 (x3) (FEET BELOW LAND SURFACE) _____

EVACUATION METHOD Submersible pump, hose, and polypropylene rope.

SAMPLING DATA/FIELD PARAMETERS

COLOR Foamy, brn gray ODOR None APPEARANCE Cloudy TEMPERATURE 12.4 °F/°C

OTHER (SPECIFIC ION; OVA; HNU; ETC.) NA

SPECIFIC CONDUCTANCE, UMHOS/CM B) 1580/1540/1520/1500 A) 1580/1520/1500/1480

pH B) 8.31/8.29/8.28/8.27 A) 8.32/8.29/8.28/8.27

SAMPLING METHOD AND MATERIAL Site dedicated Teflon bailer (No. 1) + polypropylene rope

CONSTITUENTS SAMPLED	CONTAINER DESCRIPTION FROM LAB X OR G&M	PRESERVATIVE
VOCs	(3) 40 ml glass vial	HCl, Ice
SVOCs	1 liter amber glass	Ice
Total Metals	1 liter plastic	HNO_3, Ice
Dissolved Metals	1 liter plastic	HNO_3, Ice
PCB/Pest.	1 liter amber glass	Ice
Herbicides	1 liter amber glass	Ice
Cyanide	500 ml plastic	H_2SO_4, Ice

REMARKS Dissolved Metals field filtered. Took rinseate blank (RB-07) after sampling. pH and SpC B taken before sampling; A taken after sampling. Duplicate depth to water and total depth readings in parentheses.

SAMPLING PERSONNEL R. Astle, C. Standard

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

DRAFT

WATER SAMPLING LOG

PROJECT/NO. Harrison RFI / OH019.12 PAGE 3 OF 38

SITE LOCATION Moraine, Ohio

SITE/WELL NO. WIN-11993-GW CODED/ REPLICATE NO. DATE 1/19/93

WEATHER Sunny, 30sF TIME SAMPLING BEGAN 1:15 p.m. TIME SAMPLING COMPLETED 2:15 p.m.

EVACUATION DATA

DESCRIPTION OF MEASURING POINT (MP) Top of PVC

HEIGHT OF MP ABOVE/BELOW LAND SURFACE _____ MP ELEVATION _____

TOTAL SOUNDED DEPTH OF WELL BELOW 74.12 WATER-LEVEL ELEVATION _____

HELD _____ DEPTH TO WATER BELOW MP 31.84 DIAMETER OF CASING 4"

WET _____ WATER COLUMN IN WELL 42.28 GALLONS PUMPED/BAILED PRIOR TO SAMPLING (82.46) 90

Pump on: 1:24

GALLONS PER FOOT 0.65 Pump off: 1:33 10 gpm

GALLONS IN WELL 27.48 (x3) SAMPLING PUMP INTAKE SETTING (FEET BELOW LAND SURFACE) _____

EVACUATION METHOD Submersible pump, hose, and polypropylene rope.

SAMPLING DATA/FIELD PARAMETERS

COLOR Light brown ODOR None APPEARANCE Sl. cloudy TEMPERATURE 13.1 °F/°C

OTHER (SPECIFIC ION; OVA; HNU; ETC.) HNU = .6 ppm = background.

SPECIFIC CONDUCTANCE, UMHOS/CM 660/660/660/670 pH 7.22/7.25/7.31/7.32

SAMPLING METHOD AND MATERIAL Site dedicated Teflon bailer (No. 1) + polypropylene rope

CONSTITUENTS SAMPLED	CONTAINER DESCRIPTION FROM LAB X OR G&M	PRESERVATIVE
VOCs	(3) 40 ml glass vial	HCl, Ice
SVOCs	1 liter amber glass	Ice
Total Metals	1 liter plastic	HNO_3, Ice
Dissolved Metals	1 liter plastic	HNO_3, Ice
PCB/Pest.	1 liter amber glass	Ice
Herbicides	1 liter amber glass	Ice
Cyanide	500 ml plastic	H_2SO_4, Ice

REMARKS Dissolved Metals field filtered. pH and SpC taken after sampling.

SAMPLING PERSONNEL R. Astle, C. Standard

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

DRAFT

WATER SAMPLING LOG

PROJECT/NO. Harrison RFI / OH019.12 PAGE 4 OF 38

SITE LOCATION Moraine, Ohio

SITE/WELL NO. WIS-11993-GW CODED/ REPLICATE NO. _____ DATE 1/25/93

WEATHER Sunny, 30sF TIME SAMPLING BEGAN 4:20 p.m. TIME SAMPLING COMPLETED 5:20 p.m.

EVACUATION DATA

DESCRIPTION OF MEASURING POINT (MP) Top of PVC

HEIGHT OF MP ABOVE/BELOW LAND SURFACE _____ MP ELEVATION _____

TOTAL SOUNDED DEPTH OF WELL BELOW MP 58.80 WATER-LEVEL ELEVATION _____

HELD _____ DEPTH TO WATER BELOW MP 24.13 DIAMETER OF CASING 4"

WET _____ WATER COLUMN IN WELL 34.87 GALLONS PUMPED/BAILED PRIOR TO SAMPLING (67.61) 70

Pump on: 4:32

GALLONS PER FOOT 0.65 Pump off: 4:39 10 gpm

GALLONS IN WELL 22.54 (x3) SAMPLING PUMP INTAKE SETTING (FEET BELOW LAND SURFACE) _____

EVACUATION METHOD Submersible pump, hose, and polypropylene rope.

SAMPLING DATA/FIELD PARAMETERS

COLOR Light brown ODOR None APPEARANCE Cloudy TEMPERATURE 14.4 °F/°C

OTHER (SPECIFIC ION; OVA; HNU; ETC.) NA

SPECIFIC CONDUCTANCE, UMHOS/CM B) 1140/1120/1110/1110 pH B) 7.05/7.18/7.20/7.19

A) 1170/1140/1130/1130 A) 7.21/7.18/7.21/7.21

SAMPLING METHOD AND MATERIAL Site dedicated Teflon bailer (No. 1) + polypropylene rope

CONSTITUENTS SAMPLED	CONTAINER DESCRIPTION FROM LAB X OR G&M	PRESERVATIVE
VOCs	(3) 40 ml glass vial	HCl, Ice
Total Metals	1 liter plastic	HNO_3, Ice
Dissolved Metals	1 liter plastic	HNO_3, Ice
PCBs	1 liter plastic	Ice

REMARKS Dissolved Metals field filtered. pH and SpC B taken before sampling; A taken after sampling.

SAMPLING PERSONNEL R. Astle, C. Standard

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

DRAFT

WATER SAMPLING LOG

PROJECT/NO. Harrison RFI / OH019.12 PAGE 5 OF 38

SITE LOCATION Moraine, Ohio

SITE/WELL NO. W2S-12593-GW CODED/ REPLICATE NO. _____ DATE 1/25/93

WEATHER Sunny, 30sF TIME SAMPLING BEGAN 1:20 p.m. TIME SAMPLING COMPLETED 2:20 p.m.

EVACUATION DATA

DESCRIPTION OF MEASURING POINT (MP) Top of PVC

HEIGHT OF MP ABOVE/BELOW LAND SURFACE _____ MP ELEVATION _____

TOTAL SOUNDED DEPTH OF WELL BELOW MP 67.26 WATER-LEVEL ELEVATION _____

HELD _____ DEPTH TO WATER BELOW MP 22.10 DIAMETER OF CASING 4"

WET _____ WATER COLUMN IN WELL 45.16 GALLONS PUMPED/BAILED PRIOR TO SAMPLING (88.06) 90

Pump on: 1:27

GALLONS PER FOOT 0.65 Pump off: 1:30 10 gpm

GALLONS IN WELL 29.35 (x3) SAMPLING PUMP INTAKE SETTING (FEET BELOW LAND SURFACE) _____

EVACUATION METHOD Submersible pump, hose, and polypropylene rope.

SAMPLING DATA/FIELD PARAMETERS

COLOR Light brown ODOR None APPEARANCE Cloudy TEMPERATURE 10.2 °F/°C

OTHER (SPECIFIC ION; OVA; HNU; ETC.) NA

SPECIFIC CONDUCTANCE, UMHOS/CM B) 990/980/970/960 A) 990/980/960/960 pH B) 7.17/7.16/7.15/7.19 A) 7.24/7.26/7.25/7.26

SAMPLING METHOD AND MATERIAL Site dedicated Teflon bailer (No. 1) + polypropylene rope

CONSTITUENTS SAMPLED	CONTAINER DESCRIPTION FROM LAB X OR G&M	PRESERVATIVE
VOCs	(3) 40 ml glass vial	HCl, Ice
SVOCs	1 liter amber glass	Ice
Total Metals	1 liter plastic	HNO_3, Ice
Dissolved Metals	1 liter plastic	HNO_3, Ice
PCB/Pest.	1 liter amber glass	Ice
Herbicides	1 liter amber glass	Ice
Cyanide	500 ml plastic	H_2SO_4, Ice

REMARKS Dissolved Metals field filtered. Took rinseate blank (RB-08) after sampling (2:40). pH and SpC B taken before sampling; A taken after sampling.

SAMPLING PERSONNEL R. Astle, C. Standard

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

DRAFT

WATER SAMPLING LOG

PROJECT/NO. Harrison RFI / OH019.12 PAGE 6 OF 38

SITE LOCATION Moraine, Ohio

SITE/WELL NO. W3N-11393-GW CODED/ REPLICATE NO. DATE 1/13/93

WEATHER Cloudy, Windy 30sF TIME SAMPLING BEGAN 3:30 p.m. TIME SAMPLING COMPLETED 4:50 p.m.

EVACUATION DATA

DESCRIPTION OF MEASURING POINT (MP) Top of PVC

HEIGHT OF MP ABOVE/BELOW LAND SURFACE MP ELEVATION

TOTAL SOUNDED DEPTH OF WELL BELOW 67.15 WATER-LEVEL ELEVATION

HELD DEPTH TO WATER BELOW MP 27.18 DIAMETER OF CASING 4"

WET WATER COLUMN IN WELL 39.97 GALLONS PUMPED/BAILED PRIOR TO SAMPLING (77.9) 90

Pump on: 3:49

GALLONS PER FOOT 0.65 Pump off: 3:58 10 gpm

GALLONS IN WELL 25.98 (x3) SAMPLING PUMP INTAKE SETTING (FEET BELOW LAND SURFACE)

EVACUATION METHOD Submersible pump, hose, and polypropylene rope.

SAMPLING DATA/FIELD PARAMETERS

COLOR Brn, orange ODOR None APPEARANCE Sl. cloudy TEMPERATURE 11.0 °F/°C

OTHER (SPECIFIC ION; OVA; HNU; ETC.) HNU not functioning due to adverse weather conditions.

SPECIFIC CONDUCTANCE, UMHOS/CM 810/790/780/770 pH 7.09/7.08/7.08/7.09

SAMPLING METHOD AND MATERIAL Site dedicated Teflon bailer (No. 1) + polypropylene rope

CONSTITUENTS SAMPLED	CONTAINER DESCRIPTION FROM LAB X OR G&M	PRESERVATIVE
VOCs	(3) 40 ml glass vial	HCl, Ice
SVOCs	1 liter amber glass	Ice
Total Metals	1 liter plastic	HNO_3, Ice
Dissolved Metals	1 liter plastic	HNO_3, Ice
PCB/Pest.	1 liter amber glass	Ice
Herbicides	1 liter amber glass	Ice
Cyanide	500 ml plastic	H_2SO_4, Ice

REMARKS Dissolved Metals field filtered. pH and SpC taken after sampling. Orange colored discharge.

SAMPLING PERSONNEL R. Astle, C. Standard

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

DRAFT

WATER SAMPLING LOG

PROJECT/NO. Harrison RFI / OH019.12 PAGE 7 OF 38

SITE LOCATION Moraine, Ohio

SITE/WELL NO. W4N-11393-GW CODED/ REPLICATE NO. DATE 1/13/93

WEATHER P-Cloudy, 30sF TIME SAMPLING BEGAN 11:00 a.m. TIME SAMPLING COMPLETED 12:00 p.m.

EVACUATION DATA

DESCRIPTION OF MEASURING POINT (MP) Top of PVC

HEIGHT OF MP ABOVE/BELOW LAND SURFACE MP ELEVATION

TOTAL SOUNDED DEPTH OF WELL BELOW 66.60 WATER-LEVEL ELEVATION

HELD DEPTH TO WATER BELOW MP 25.17 DIAMETER OF CASING 4"

WET WATER COLUMN IN WELL 41.43 GALLONS PUMPED/BAILED PRIOR TO SAMPLING (80.79) 85

Pump on: 11:10

GALLONS PER FOOT 0.65 Pump off: 11:18:30 10 gpm

GALLONS IN WELL 26.93 (x3) SAMPLING PUMP INTAKE SETTING (FEET BELOW LAND SURFACE)

EVACUATION METHOD Submersible pump, hose, and polypropylene rope.

SAMPLING DATA/FIELD PARAMETERS

COLOR Lt. gray ODOR None APPEARANCE Sl. cloudy TEMPERATURE 10.7 °F/°C

OTHER (SPECIFIC ION; OVA; HNU; ETC.) HNU = .4 ppm = background.

SPECIFIC CONDUCTANCE, UMHOS/CM 870/820/830/820 pH 6.68/6.63/6.67/6.71

SAMPLING METHOD AND MATERIAL Site dedicated Teflon bailer (No. 1) + polypropylene rope

CONSTITUENTS SAMPLED	CONTAINER DESCRIPTION FROM LAB X OR G&M	PRESERVATIVE
VOCs	(3) 40 ml glass vial	HCl, Ice
SVOCs	1 liter amber glass	Ice
Total Metals	1 liter plastic	HNO_3, Ice
Dissolved Metals	1 liter plastic	HNO_3, Ice
PCB/Pest.	1 liter amber glass	Ice
Herbicides	1 liter amber glass	Ice
Cyanide	500 ml plastic	H_2SO_4, Ice

REMARKS Dissolved Metals field filtered. pH and SpC taken after sampling. Took rinseate blank (RB-03) after sampling (1:30).

SAMPLING PERSONNEL R. Astle, C. Standard

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

DRAFT

WATER SAMPLING LOG

PROJECT/NO. Harrison RFI / OH019.12 PAGE 8 OF 38

SITE LOCATION Moraine, Ohio

SITE/WELL NO. W4S-12593-GW CODED/ REPLICATE NO. _____ DATE 1/25/93

WEATHER Sunny, 30sF TIME SAMPLING BEGAN 2:50 p.m. TIME SAMPLING COMPLETED 3:50 p.m.

EVACUATION DATA

DESCRIPTION OF MEASURING POINT (MP) Top of PVC

HEIGHT OF MP ABOVE/BELOW LAND SURFACE _____ MP ELEVATION _____

TOTAL SOUNDED DEPTH OF WELL BELOW MP 71.31 WATER-LEVEL ELEVATION _____

HELD _____ DEPTH TO WATER BELOW MP 23.21 DIAMETER OF CASING 4"

WET _____ WATER COLUMN IN WELL 48.10 GALLONS PUMPED/BAILED PRIOR TO SAMPLING (93.80) 100

Pump on: 3:00

GALLONS PER FOOT 0.65 Pump off: 3:10 10 gpm

GALLONS IN WELL 31.27 (x3) SAMPLING PUMP INTAKE SETTING (FEET BELOW LAND SURFACE) _____

EVACUATION METHOD Submersible pump, hose, and polypropylene rope.

SAMPLING DATA/FIELD PARAMETERS

COLOR Light brown ODOR None APPEARANCE Sl. cloudy TEMPERATURE 3.4 °F/°C

OTHER (SPECIFIC ION; OVA; HNU; ETC.) NA

SPECIFIC CONDUCTANCE, UMHOS/CM B) 1080/1070/1060/1040 pH B) 7.28/7.29/7.26/7.29

A) 1100/1080/1080/1060 A) 7.31/7.29/7.31/7.32

SAMPLING METHOD AND MATERIAL Site dedicated Teflon bailer (No. 1) + polypropylene rope

CONSTITUENTS SAMPLED	CONTAINER DESCRIPTION FROM LAB X OR G&M	PRESERVATIVE
VOCs	(3) 40 ml glass vial	HCl, Ice
SVOCs	1 liter amber glass	Ice
Total Metals	1 liter plastic	HNO_3, Ice
Dissolved Metals	1 liter plastic	HNO_3, Ice
PCB/Pest.	1 liter amber glass	Ice
Herbicides	1 liter amber glass	Ice
Cyanide	500 ml plastic	H_2SO_4, Ice

REMARKS Dissolved Metals field filtered. pH and SpC B taken before sampling; A taken after sampling.

SAMPLING PERSONNEL R. Astle, C. Standard

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

DRAFT

WATER SAMPLING LOG

PROJECT/NO. Harrison RFI / OH019.12 PAGE 9 OF 38

SITE LOCATION Moraine, Ohio

SITE/WELL NO. GM1-12193-GW CODED/ REPLICATE NO. _____ DATE 1/21/93

WEATHER Light rain, 40sF TIME SAMPLING BEGAN 12:30 p.m. TIME SAMPLING COMPLETED 4:00 p.m.

EVACUATION DATA

DESCRIPTION OF MEASURING POINT (MP) Top of PVC

HEIGHT OF MP ABOVE/BELOW LAND SURFACE _____ MP ELEVATION _____

TOTAL SOUNDED DEPTH OF WELL BELOW MP 101.96 (101.96) WATER-LEVEL ELEVATION _____

HELD _____ DEPTH TO WATER BELOW MP 32.21 (32.21) DIAMETER OF CASING 2"

WET _____ WATER COLUMN IN WELL 69.75 GALLONS PUMPED/BAILED PRIOR TO SAMPLING (33.48) 34

GALLONS PER FOOT 0.16

GALLONS IN WELL 11.16 (x3) SAMPLING PUMP INTAKE SETTING (FEET BELOW LAND SURFACE) _____

EVACUATION METHOD Site dedicated Teflon bailer (No. 1) + polypropylene rope

SAMPLING DATA/FIELD PARAMETERS

COLOR Clear ODOR None APPEARANCE Clear TEMPERATURE 13.4 °F/°C

OTHER (SPECIFIC ION; OVA; HNU; ETC.) NA

SPECIFIC CONDUCTANCE, UMHOS/CM B) 1010/980/990/980 A) 1020/1000/1000/1000 pH B) 7.01/7.00/7.01/6.99 A) 7.04/7.03/7.05/7.06

SAMPLING METHOD AND MATERIAL Site dedicated Teflon bailer (No. 1) + polypropylene rope

CONSTITUENTS SAMPLED	CONTAINER DESCRIPTION FROM LAB X OR G&M	PRESERVATIVE
VOCs	(3) 40 ml glass vial	HCl, Ice
SVOCs	1 liter amber glass	Ice
Total Metals	1 liter plastic	HNO_3, Ice
Dissolved Metals	1 liter plastic	HNO_3, Ice
PCB/Pest.	1 liter amber glass	Ice
Herbicides	1 liter amber glass	Ice
Cyanide	500 ml plastic	H_2SO_4, Ice

REMARKS Dissolved Metals field filtered. Took rinseate blank (RB-05) after sampling. pH and SpC B taken before sampling; A taken after sampling. Duplicate depth to water and total depth readings shown in parentheses.

SAMPLING PERSONNEL R. Astle, C. Standard

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

DRAFT

WATER SAMPLING LOG

PROJECT/NO. Harrison RFI / OH019.12 PAGE 10 OF 38

SITE LOCATION Moraine, Ohio

SITE/WELL NO. GM2-12193-GW CODED/ REPLICATE NO. DUP-17 DATE 1/21/93

WEATHER Lt. rain, 40sF TIME SAMPLING BEGAN 1:15 p.m. TIME SAMPLING COMPLETED 2:45 p.m.

EVACUATION DATA

DESCRIPTION OF MEASURING POINT (MP) Top of PVC

HEIGHT OF MP ABOVE/BELOW LAND SURFACE _____ MP ELEVATION _____

TOTAL SOUNDED DEPTH OF WELL BELOW MP 56.61 WATER-LEVEL ELEVATION _____

HELD _____ DEPTH TO WATER BELOW MP 31.74 DIAMETER OF CASING 2"

WET _____ WATER COLUMN IN WELL 24.87 GALLONS PUMPED/BAILED PRIOR TO SAMPLING (11.94) 12

GALLONS PER FOOT 0.16

GALLONS IN WELL 3.98 (x3) SAMPLING PUMP INTAKE SETTING (FEET BELOW LAND SURFACE) _____

EVACUATION METHOD Site dedicated Teflon bailer (No. 1) + polypropylene rope.

SAMPLING DATA/FIELD PARAMETERS

COLOR Light brown ODOR None APPEARANCE Sl. cloudy TEMPERATURE 13.8 °F/°C

OTHER (SPECIFIC ION; OVA; HNU; ETC.) NA

SPECIFIC CONDUCTANCE, UMHOS/CM "B" 1) 980/950/940/950
2) 960/950/950/950

pH "B" 1) 7.15/7.15/7.13/7.17
2) 7.16/7.15/7.17/7.18

"A" 1) 960/960/960/950
2) 960/960/960/950

"A" 1) 7.02/7.03/7.05/7.03
2) 7.01/7.03/7.03/7.04

SAMPLING METHOD AND MATERIAL Site dedicated Teflon bailer (No. 1) + polypropylene rope

CONSTITUENTS SAMPLED	CONTAINER DESCRIPTION FROM LAB X OR G&M	PRESERVATIVE
VOCs	(3) 40 ml glass vial	HCl, Ice
SVOCs	1 liter amber glass	Ice
Total Metals	1 liter plastic	HNO_3, Ice
Dissolved Metals	1 liter plastic	HNO_3, Ice
PCB/Pest.	1 liter amber glass	Ice
Herbicides	1 liter amber glass	Ice
Cyanide	500 ml plastic	H_2SO_4, Ice

REMARKS Dissolved Metals field filtered. Early discharge is light gray. pH and SpC "B" taken before sampling; "A" taken after sampling. Duplicate pH and SpC reading taken.

SAMPLING PERSONNEL R. Astle, C. Standard

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

DRAFT

WATER SAMPLING LOG

PROJECT/No. Harrison RFI / OH019.12 PAGE 11 OF 38

SITE LOCATION Moraine, Ohio

SITE/WELL No. GM5-12293-GW CODED/ REPLICATE No. DUP-18 DATE 1/22/93

WEATHER Rain, snow, 30sF TIME SAMPLING BEGAN 9:40 a.m. TIME SAMPLING COMPLETED 12:50 p.m.

EVACUATION DATA

DESCRIPTION OF MEASURING POINT (MP) Top of PVC

HEIGHT OF MP ABOVE/BELOW LAND SURFACE _____ MP ELEVATION _____

TOTAL SOUNDED DEPTH OF WELL BELOW MP 101.18 WATER-LEVEL ELEVATION _____

HELD _____ DEPTH TO WATER BELOW MP 27.98 DIAMETER OF CASING 2"

WET _____ WATER COLUMN IN WELL 73.20 GALLONS PUMPED/BAILED PRIOR TO SAMPLING (35.14) 35.5

GALLONS PER FOOT 0.16

GALLONS IN WELL 11.71 (x3) SAMPLING PUMP INTAKE SETTING (FEET BELOW LAND SURFACE) _____

EVACUATION METHOD Site dedicated Teflon bailer (No. 1) + polypropylene rope.

SAMPLING DATA/FIELD PARAMETERS

COLOR Clear ODOR None APPEARANCE Clear TEMPERATURE 12.2 °F/℃

OTHER (SPECIFIC ION; OVA; HNU; ETC.) NA

SPECIFIC CONDUCTANCE, UMHOS/CM "B" 1) 1060/1030/1020/1020
2) 1030/1030/1020/1020

pH "B" 1) 6.62/6.69/6.75/6.74
2) 6.63/6.70/6.71/6.73

"A" 1) 1070/1040/1020/1000
2) 1060/1030/1020/1010

"A" 1) 6.84/6.85/6.86/6.86
2) 6.82/6.85/6.86/6.89

SAMPLING METHOD AND MATERIAL Site dedicated Teflon bailer (No. 1) + polypropylene rope

CONSTITUENTS SAMPLED	CONTAINER DESCRIPTION FROM LAB X OR G&M	PRESERVATIVE
VOCs	(3) 40 ml glass vial	HCl, Ice
BNAs	1 liter amber glass	Ice
Total Metals	1 liter plastic	HNO_3, Ice
Dissolved Metals	1 liter plastic	HNO_3, Ice
PCB/Pest.	1 liter amber glass	Ice
Herbicides	1 liter amber glass	Ice
Cyanide	500 ml plastic	H_2SO_4, Ice

REMARKS Dissolved Metals field filtered. pH and SpC B taken before sampling; A taken after sampling. Duplicate pH and SpC readings taken.

SAMPLING PERSONNEL R. Astle, C. Standard

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

DRAFT

WATER SAMPLING LOG

PROJECT/No. Harrison RFI / OH019.12 PAGE 12 OF 38

SITE LOCATION Moraine, Ohio

SITE/WELL No. GM7R-12093-GW CODED/ REPLICATE No. DATE 1/20/93

WEATHER P-cloudy, 20sF TIME SAMPLING BEGAN 11:45 a.m. TIME SAMPLING COMPLETED 12:50 p.m.

EVACUATION DATA

DESCRIPTION OF MEASURING POINT (MP) Top of PVC

HEIGHT OF MP ABOVE/BELOW LAND SURFACE _____ MP ELEVATION _____

TOTAL SOUNDED DEPTH OF WELL BELOW MP 91.64 WATER-LEVEL ELEVATION _____

HELD _____ DEPTH TO WATER BELOW MP 32.30 DIAMETER OF CASING 4"

WET _____ WATER COLUMN IN WELL 59.34 GALLONS PUMPED/BAILED PRIOR TO SAMPLING (115.71) 120

Pump on: 11:02

GALLONS PER FOOT 0.65 Pump off: 11:14 10 gpm

GALLONS IN WELL 38.57 (x3) SAMPLING PUMP INTAKE SETTING (FEET BELOW LAND SURFACE) _____

EVACUATION METHOD Submersible pump, hose, and polypropylene rope.

SAMPLING DATA/FIELD PARAMETERS

COLOR Light brown ODOR None APPEARANCE Sl. cloudy TEMPERATURE 13.2 °F/°C

OTHER (SPECIFIC ION; OVA; HNU; ETC.) NA

SPECIFIC CONDUCTANCE, UMHOS/CM B) 810/800/790/790 A) 840/810/820/810 pH B) 6.90/6.98/6.97/6.98 A) 7.03/7.00/7.02/7.05

SAMPLING METHOD AND MATERIAL Site dedicated Teflon bailer (No. 1) + polypropylene rope

CONSTITUENTS SAMPLED	CONTAINER DESCRIPTION FROM LAB X OR G&M	PRESERVATIVE
VOCs	(3) 40 ml glass vial	HCl, Ice
SVOCs	1 liter amber glass	Ice
Total Metals	1 liter plastic	HNO_3, Ice
Dissolved Metals	1 liter plastic	HNO_3, Ice
PCB/Pest.	1 liter amber glass	Ice
Herbicides	1 liter amber glass	Ice
Cyanide	500 ml plastic	H_2SO_4, Ice

REMARKS Dissolved Metals field filtered. Triple volume taken for MS/MSD spike. pH and SpC "B" taken before sampling; "A" taken after sampling.

SAMPLING PERSONNEL R. Astle, C. Standard

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

DRAFT

WATER SAMPLING LOG

PROJECT/NO. Harrison RFI / OH019.12 PAGE 13 OF 38

SITE LOCATION Moraine, Ohio

SITE/WELL NO. GMB-12093-GW CODED/ REPLICATE NO. _____ DATE 1/20/93

WEATHER Sunny, 20sF TIME SAMPLING BEGAN 9:30 a.m. TIME SAMPLING COMPLETED 10:40 a.m.

EVACUATION DATA

DESCRIPTION OF MEASURING POINT (MP) Top of PVC

HEIGHT OF MP ABOVE/BELOW LAND SURFACE _____ MP ELEVATION _____

TOTAL SOUNDED DEPTH OF WELL BELOW 51.64 (51.64) WATER-LEVEL ELEVATION _____

HELD _____ DEPTH TO WATER BELOW MP 31.36 (31.36) DIAMETER OF CASING 2"

WET _____ WATER COLUMN IN WELL 20.28 GALLONS PUMPED/BAILED PRIOR TO SAMPLING (9.73) 10

GALLONS PER FOOT 0.16

GALLONS IN WELL 3.24 (x3) SAMPLING PUMP INTAKE SETTING (FEET BELOW LAND SURFACE) _____

EVACUATION METHOD Site dedicated Teflon bailer (No. 1) + polypropylene rope.

SAMPLING DATA/FIELD PARAMETERS

COLOR Light brown ODOR None APPEARANCE Foam/Sl. cloudy TEMPERATURE 12.9 °F/°C

OTHER (SPECIFIC ION; OVA; HNU; ETC.) NA

SPECIFIC CONDUCTANCE, UMHOS/CM "B" 1) 1440/1360/1340/1300
2) 1380/1340/1310/1290

pH "B" 1) 8.62/8.61/8.60/8.60
2) 8.62/8.63/8.62/8.64

"A" 1) 1260/1210/1200/1180
2) 1220/1200/1180/1180

"A" 1) 8.55/8.49/8.49/8.49
2) 8.46/8.46/8.47/8.47

SAMPLING METHOD AND MATERIAL Site dedicated Teflon bailer (No. 1) + polypropylene rope

CONSTITUENTS SAMPLED	CONTAINER DESCRIPTION FROM LAB X OR G&M	PRESERVATIVE
VOCs	(3) 40 ml glass vial	HCl, Ice
SVOCs	1 liter amber glass	Ice
Total Metals	1 liter plastic	HNO_3, Ice
Dissolved Metals	1 liter plastic	HNO_3, Ice
PCB/Pest.	1 liter amber glass	Ice
Herbicides	1 liter amber glass	Ice
Cyanide	500 ml plastic	H_2SO_4, Ice

REMARKS Dissolved Metals field filtered. Foamy discharge; slight sheen. pH and SpC "B" taken before sampling; "A" taken after sampling. Duplicate pH and SpC reading taken. Duplicate total depth and depth to water readings in parentheses.

SAMPLING PERSONNEL R. Astle, C. Standard

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

DRAFT

WATER SAMPLING LOG

PROJECT/No. Harrison RFI / OH019.12 PAGE 14 OF 38

SITE LOCATION Moraine, Ohio

SITE/WELL No. GM9-12793-GW CODED/ REPLICATE No. DATE 1/27/93

WEATHER Cloudy, 30sF TIME SAMPLING BEGAN 9:30 a.m. TIME SAMPLING COMPLETED 1:00 p.m.

EVACUATION DATA

DESCRIPTION OF MEASURING POINT (MP) Top of PVC

HEIGHT OF MP ABOVE/BELOW LAND SURFACE MP ELEVATION

TOTAL SOUNDED DEPTH OF WELL BELOW MP 99.80 WATER-LEVEL ELEVATION

HELD DEPTH TO WATER BELOW MP 20.90 DIAMETER OF CASING 2"

WET WATER COLUMN IN WELL 78.90 GALLONS PUMPED/BAILED PRIOR TO SAMPLING (37.87) 38

GALLONS PER FOOT 0.16

GALLONS IN WELL 12.62 (x3) SAMPLING PUMP INTAKE SETTING (FEET BELOW LAND SURFACE)

EVACUATION METHOD Site dedicated Teflon bailer (No. 1) + polypropylene rope

SAMPLING DATA/FIELD PARAMETERS

COLOR Clear ODOR None APPEARANCE Clear TEMPERATURE 12.0 °F/℃

OTHER (SPECIFIC ION; OVA; HNU; ETC.) NA

SPECIFIC CONDUCTANCE, UMHOS/CM "B" 1) 940/940/960/980
2) 1000/980/980/980

pH "B" 1) 7.00/7.07/7.10/7.12
2) 7.12/7.16/7.18/7.19

SAMPLING METHOD AND MATERIAL Site dedicated Teflon bailer (No. 1) + polypropylene rope

CONSTITUENTS SAMPLED	CONTAINER DESCRIPTION FROM LAB X OR G&M	PRESERVATIVE
VOCs	(3) 40 ml glass vial	HCl, Ice
SVOCs	1 liter amber glass	Ice
Total Metals	1 liter plastic	HNO_3, Ice
Dissolved Metals	1 liter plastic	HNO_3, Ice
PCB/Pest.	1 liter amber glass	Ice
Herbicides	1 liter amber glass	Ice
Cyanide	500 ml plastic	H_2SO_4, Ice

REMARKS Dissolved Metals field filtered. pH and SpC B taken before sampling; A taken after sampling. Took RB-10 (rinseate blank) after sampling this well (2:45). NOTE: Sample bailer used for sampling GM-10 was used for rinseate blank.

SAMPLING PERSONNEL R. Astle, C. Standard

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

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WATER SAMPLING LOG

PROJECT/NO. Harrison RFI / OH019.12 PAGE 15 OF 38

SITE LOCATION Moraine, Ohio

SITE/WELL NO. GM10-12793-GW CODED/REPLICATE NO. _____ DATE 1/27/93

WEATHER Cloudy, 30sF TIME SAMPLING BEGAN 10:15 a.m. TIME SAMPLING COMPLETED 11:30 a.m.

EVACUATION DATA

DESCRIPTION OF MEASURING POINT (MP) Top of PVC

HEIGHT OF MP ABOVE/BELOW LAND SURFACE _____ MP ELEVATION _____

TOTAL SOUNDED DEPTH OF WELL BELOW MP 49.80 (49.80) WATER-LEVEL ELEVATION _____

HELD _____ DEPTH TO WATER BELOW MP 20.20 (20.20) DIAMETER OF CASING 2"

WET _____ WATER COLUMN IN WELL 29.60 GALLONS PUMPED/BAILED PRIOR TO SAMPLING (14.20) 15

GALLONS PER FOOT 0.16

GALLONS IN WELL 4.73 (x3) SAMPLING PUMP INTAKE SETTING (FEET BELOW LAND SURFACE) _____

EVACUATION METHOD Site dedicated Teflon bailer (No. 1) + polypropylene rope

SAMPLING DATA/FIELD PARAMETERS

COLOR Clear ODOR None APPEARANCE Clear TEMPERATURE 12.0 °F/℃

OTHER (SPECIFIC ION; OVA; HNU; ETC.) NA

SPECIFIC CONDUCTANCE, UMHOS/CM "B" 1) 1120/1120/1120/1120
2) 1120/1120/1120/1120

pH "B" 1) 7.21/7.23/7.25/7.28
2) 7.22/7.22/7.25/7.26

"A" 1) 1100/1100/1100/1100
2) 1100/1100/1100/1100

"A" 1) 7.29/7.29/7.31/7.31
2) 7.30/7.30/7.32/7.33

SAMPLING METHOD AND MATERIAL Site dedicated Teflon bailer (No. 1) + polypropylene rope

CONSTITUENTS SAMPLED	CONTAINER DESCRIPTION FROM LAB X OR G&M	PRESERVATIVE
VOCs	(3) 40 ml glass vial	HCl, Ice
SVOCs	1 liter amber glass	Ice
Total Metals	1 liter plastic	HNO_3, Ice
Dissolved Metals	1 liter plastic	HNO_3, Ice
PCB/Pest.	1 liter amber glass	Ice
Herbicides	1 liter amber glass	Ice
Cyanide	500 ml plastic	H_2SO_4, Ice

REMARKS Dissolved Metals field filtered. pH and SpC B taken before sampling; A taken after sampling. Duplicate pH and SpC readings taken. Duplicate total depth and depth to water readings shown in parentheses.

SAMPLING PERSONNEL R. Astle, C. Standard

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

WATER SAMPLING LOG

PROJECT/No. Harrison RFI / OH019.12 PAGE 16 OF 38

SITE LOCATION Moraine, Ohio

SITE/WELL No. GM11-12793-GW CODED/ REPLICATE No. DATE 1/27/93

WEATHER Sunny, 30sF TIME SAMPLING BEGAN 2:00 p.m. TIME SAMPLING COMPLETED 5:20 p.m.

EVACUATION DATA

DESCRIPTION OF MEASURING POINT (MP) Top of PVC

HEIGHT OF MP ABOVE/BELOW LAND SURFACE MP ELEVATION

TOTAL SOUNDED DEPTH OF WELL BELOW MP 99.54 WATER-LEVEL ELEVATION

HELD DEPTH TO WATER BELOW MP 20.86 DIAMETER OF CASING 2"

WET WATER COLUMN IN WELL 78.68 GALLONS PUMPED/BAILED PRIOR TO SAMPLING (37.77) 38

GALLONS PER FOOT 0.16

GALLONS IN WELL 12.59 (x3) SAMPLING PUMP INTAKE SETTING (FEET BELOW LAND SURFACE)

EVACUATION METHOD Site dedicated Teflon bailer (No. 1) + polypropylene rope

SAMPLING DATA/FIELD PARAMETERS

COLOR V. lt. gray-brn ODOR None APPEARANCE Mostly clear TEMPERATURE 13.9 °F/℃

OTHER (SPECIFIC ION; OVA; HNU; ETC.) NA

SPECIFIC CONDUCTANCE, UMHOS/CM "B" 1) 940/940/940/930
2) 980/950/960/950

pH "B" 1) 6.72/6.75/6.78/6.79
2) 6.96/6.98/7.00/7.01

SAMPLING METHOD AND MATERIAL Site dedicated Teflon bailer (No. 1) + polypropylene rope

CONSTITUENTS SAMPLED	CONTAINER DESCRIPTION FROM LAB X OR G&M	PRESERVATIVE
VOCs	(3) 40 ml glass vial	HCl, Ice
SVOCs	1 liter amber glass	Ice
Total Metals	1 liter plastic	HNO_3, Ice
Dissolved Metals	1 liter plastic	HNO_3, Ice
PCB/Pest.	1 liter amber glass	Ice
Herbicides	1 liter amber glass	Ice
Cyanide	500 ml plastic	H_2SO_4, Ice

REMARKS Dissolved Metals field filtered. pH and SpC B taken before sampling; A taken after sampling.

SAMPLING PERSONNEL R. Astle, C. Standard

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

DRAFT

WATER SAMPLING LOG

PROJECT/NO. Harrison RFI / OH019.12 PAGE 17 OF 38

SITE LOCATION Moraine, Ohio

SITE/WELL NO. GM13-12893-GW CODED/ REPLICATE NO. _____ DATE 1/28/93

WEATHER Sunny, 30sF TIME SAMPLING BEGAN 9:40 a.m. TIME SAMPLING COMPLETED 11:50 a.m.

EVACUATION DATA

DESCRIPTION OF MEASURING POINT (MP) Top of PVC

HEIGHT OF MP ABOVE/BELOW LAND SURFACE _____ MP ELEVATION _____

TOTAL SOUNDED DEPTH OF WELL BELOW MP 99.38 (99.38) WATER-LEVEL ELEVATION _____

HELD _____ DEPTH TO WATER BELOW MP 21.51 (21.51) DIAMETER OF CASING 2"

WET _____ WATER COLUMN IN WELL 77.87 GALLONS PUMPED/BAILED PRIOR TO SAMPLING (37) 38

GALLONS PER FOOT 0.16

GALLONS IN WELL 12.46 (x3) SAMPLING PUMP INTAKE SETTING (FEET BELOW LAND SURFACE) _____

EVACUATION METHOD Site dedicated Teflon bailer (No. 1) + polypropylene rope

SAMPLING DATA/FIELD PARAMETERS

COLOR Clear ODOR None APPEARANCE Clear TEMPERATURE 11.2 °F/°C

OTHER (SPECIFIC ION; OVA; HNU; ETC.) NA

SPECIFIC CONDUCTANCE, UMHOS/CM "B" 1) 1020/1000/990/980
2) 1000/990/990/980

pH "B" 1) 7.00/7.04/7.05/7.07
2) 7.02/7.04/7.06/7.07

"A" 1) 1000/980/980/980
2) 1000/980/970/960

"A" 1) 7.10/7.11/7.12/7.12
2) 7.11/7.11/7.13/7.15

SAMPLING METHOD AND MATERIAL Site dedicated Teflon bailer (No. 1) + polypropylene rope

CONSTITUENTS SAMPLED	CONTAINER DESCRIPTION FROM LAB X OR G&M	PRESERVATIVE
VOCs	(3) 40 ml glass vial	HCl, Ice
SVOCs	1 liter amber glass	Ice
Total Metals	1 liter plastic	HNO_3, Ice
Dissolved Metals	1 liter plastic	HNO_3, Ice
PCB/Pest.	1 liter amber glass	Ice
Herbicides	1 liter amber glass	Ice
Cyanide	500 ml plastic	H_2SO_4, Ice

REMARKS Dissolved Metals field filtered. pH and SpC B taken before sampling; A taken after sampling. Took rinseate blank (RB-11) after sampling this well. Duplicate pH and SpC readings taken. Duplicate depth to water and total depth readings taken.

SAMPLING PERSONNEL R. Astle, C. Standard

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

WATER SAMPLING LOG

PROJECT/NO. Harrison RFI / OH019.12 PAGE 18 OF 38

SITE LOCATION Moraine, Ohio

SITE/WELL NO. GM15-12893-GW CODED/ REPLICATE NO. _____ DATE 1/28/93

WEATHER Sunny, 40sF TIME SAMPLING BEGAN 3:00 p.m. TIME SAMPLING COMPLETED 5:50 p.m.

EVACUATION DATA

DESCRIPTION OF MEASURING POINT (MP) Top of PVC

HEIGHT OF MP ABOVE/BELOW LAND SURFACE _____ MP ELEVATION _____

TOTAL SOUNDED DEPTH OF WELL BELOW MP 99.50 WATER-LEVEL ELEVATION _____

HELD _____ DEPTH TO WATER BELOW MP 23.11 DIAMETER OF CASING 2"

WET _____ WATER COLUMN IN WELL 76.39 GALLONS PUMPED/BAILED PRIOR TO SAMPLING (36.67) 37

GALLONS PER FOOT 0.16

GALLONS IN WELL 12.22 (x3) SAMPLING PUMP INTAKE SETTING (FEET BELOW LAND SURFACE) _____

EVACUATION METHOD Site dedicated Teflon bailer (No. 1) + polypropylene rope

SAMPLING DATA/FIELD PARAMETERS

COLOR Clear ODOR None APPEARANCE Clear TEMPERATURE 14.4 °F/°C

OTHER (SPECIFIC ION; OVA; HNU; ETC.) NA

SPECIFIC CONDUCTANCE, UMHOS/CM "B" 1) 980/960/960/960
2) 930/930/920/920

pH "B" 1) 6.91/6.99/7.01/7.02
2) 7.01/7.02/7.02/7.01

SAMPLING METHOD AND MATERIAL Site dedicated Teflon bailer (No. 1) + polypropylene rope

CONSTITUENTS SAMPLED	CONTAINER DESCRIPTION FROM LAB X OR G&M	PRESERVATIVE
VOCs	(3) 40 ml glass vial	HCl, Ice
SVOCs	1 liter amber glass	Ice
Total Metals	1 liter plastic	HNO_3, Ice
Dissolved Metals	1 liter plastic	HNO_3, Ice
PCB/Pest.	1 liter amber glass	Ice
Herbicides	1 liter amber glass	Ice
Cyanide	500 ml plastic	H_2SO_4, Ice

REMARKS Dissolved Metals field filtered. pH and SpC B taken before sampling; A taken after sampling.

SAMPLING PERSONNEL R. Astle, C. Standard

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

DRAFT

WATER SAMPLING LOG

PROJECT/NO. Harrison RFI / OH019.12 PAGE 19 OF 38

SITE LOCATION Moraine, Ohio

SITE/WELL NO. GM16-12893-GW CODED/REPLICATE NO. _____ DATE 1/28/93

WEATHER Sunny, 40sF TIME SAMPLING BEGAN 2:20 p.m. TIME SAMPLING COMPLETED 3:50 p.m.

EVACUATION DATA

DESCRIPTION OF MEASURING POINT (MP) Top of PVC

HEIGHT OF MP ABOVE/BELOW LAND SURFACE _____ MP ELEVATION _____

TOTAL SOUNDED DEPTH OF WELL BELOW MP 66.93 WATER-LEVEL ELEVATION _____

HELD _____ DEPTH TO WATER BELOW MP 21.26 DIAMETER OF CASING 2"

WET _____ WATER COLUMN IN WELL 45.67 GALLONS PUMPED/BAILED PRIOR TO SAMPLING (21.92) 22

GALLONS PER FOOT 0.16

GALLONS IN WELL 7.30 (x3) SAMPLING PUMP INTAKE SETTING (FEET BELOW LAND SURFACE) _____

EVACUATION METHOD Site dedicated Teflon bailer (No. 1) + polypropylene rope

SAMPLING DATA/FIELD PARAMETERS

COLOR Clear ODOR None APPEARANCE Clear TEMPERATURE 15.0 °F/°C

OTHER (SPECIFIC ION; OVA; HNU; ETC.) NA

SPECIFIC CONDUCTANCE, UMHOS/CM "B" 1) 940/940/940/920
2) 920/920/920/920

pH "B" 1) 7.18/7.23/7.19/7.21
2) 7.16/7.17/7.23/7.23

SAMPLING METHOD AND MATERIAL Site dedicated Teflon bailer (No. 1) + polypropylene rope

CONSTITUENTS SAMPLED	CONTAINER DESCRIPTION FROM LAB X OR G&M	PRESERVATIVE
VOCs	(3) 40 ml glass vial	HCl, Ice
SVOCs	1 liter amber glass	Ice
Total Metals	1 liter plastic	HNO_3, Ice
Dissolved Metals	1 liter plastic	HNO_3, Ice
PCB/Pest.	1 liter amber glass	Ice
Herbicides	1 liter amber glass	Ice
Cyanide	500 ml plastic	H_2SO_4, Ice

REMARKS Dissolved Metals field filtered. pH and SpC B taken before sampling; A taken after sampling.

SAMPLING PERSONNEL R. Astle, C. Standard

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

DRAFT

WATER SAMPLING LOG

PROJECT/NO. Harrison RFI / OH019.12 PAGE 20 OF 38

SITE LOCATION Moraine, Ohio

SITE/WELL NO. GM17-12793-GW CODED/ REPLICATE NO. DUP-21 DATE 1/27/93

WEATHER Sunny, 30sF TIME SAMPLING BEGAN 3:15 p.m. TIME SAMPLING COMPLETED 4:15 p.m.

EVACUATION DATA

DESCRIPTION OF MEASURING POINT (MP) Top of PVC

HEIGHT OF MP ABOVE/BELOW LAND SURFACE _____ MP ELEVATION _____

TOTAL SOUNDED DEPTH OF WELL BELOW MP 49.86 WATER-LEVEL ELEVATION _____

HELD _____ DEPTH TO WATER BELOW MP 19.80 DIAMETER OF CASING 2"

WET _____ WATER COLUMN IN WELL 30.06 GALLONS PUMPED/BAILED PRIOR TO SAMPLING (14.42) 15

GALLONS PER FOOT 0.16

GALLONS IN WELL 4.81 (x3) SAMPLING PUMP INTAKE SETTING (FEET BELOW LAND SURFACE) _____

EVACUATION METHOD Site dedicated Teflon bailer (No. 1) + polypropylene rope

SAMPLING DATA/FIELD PARAMETERS

COLOR Transparent ODOR None APPEARANCE Sl. foamy TEMPERATURE 15.0 °F/°C

OTHER (SPECIFIC ION; OVA; HNU; ETC.) NA

SPECIFIC CONDUCTANCE, UMHOS/CM "B" 1) 1560/1560/1560/1560
2) 1680/1660/1660/1640

pH "B" 1) 7.40/7.44/7.44/7.48
2) 7.72/7.72/7.73/7.74

SAMPLING METHOD AND MATERIAL Site dedicated Teflon bailer (No. 1) + polypropylene rope

CONSTITUENTS SAMPLED	CONTAINER DESCRIPTION FROM LAB X OR G&M	PRESERVATIVE
VOCs	(3) 40 ml glass vial	HCl, Ice
SVOCs	1 liter amber glass	Ice
Total Metals	1 liter plastic	HNO_3, Ice
Dissolved Metals	1 liter plastic	HNO_3, Ice
PCB/Pest.	1 liter amber glass	Ice
Herbicides	1 liter amber glass	Ice
Cyanide	500 ml plastic	H_2SO_4, Ice

REMARKS Dissolved Metals field filtered. pH and SpC B taken before sampling; A taken after sampling.

SAMPLING PERSONNEL R. Astle, C. Standard

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

DRAFT

WATER SAMPLING LOG

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SITE LOCATION Moraine, Ohio

SITE/WELL NO. GM18-12893-GW CODED/ REPLICATE NO. DUP-22 DATE 1/28/93

WEATHER Sunny, 30sF TIME SAMPLING BEGAN 11:50 a.m. TIME SAMPLING COMPLETED 1:00 p.m.

EVACUATION DATA

DESCRIPTION OF MEASURING POINT (MP) Top of PVC

HEIGHT OF MP ABOVE/BELOW LAND SURFACE _____ MP ELEVATION _____

TOTAL SOUNDED DEPTH OF WELL BELOW MP 54.32 WATER-LEVEL ELEVATION _____

HELD _____ DEPTH TO WATER BELOW MP 19.82 DIAMETER OF CASING 2"

WET _____ WATER COLUMN IN WELL 34.50 GALLONS PUMPED/BAILED PRIOR TO SAMPLING (16.56) 17

GALLONS PER FOOT 0.16

GALLONS IN WELL 5.52 (x3) SAMPLING PUMP INTAKE SETTING (FEET BELOW LAND SURFACE) _____

EVACUATION METHOD Site dedicated Teflon bailer (No. 1) + polypropylene rope

SAMPLING DATA/FIELD PARAMETERS

COLOR Tan ODOR None APPEARANCE Foamy/sl. cloudy TEMPERATURE 14.4 °F/°C

OTHER (SPECIFIC ION; OVA; HNU; ETC.) NA

SPECIFIC CONDUCTANCE, UMHOS/CM "B" 1) 1500/1480/1460/1450 2) 1480/1440/1460/1450

pH "B" 1) 8.06/8.05/8.04/8.03 2) 8.12/8.10/8.10/8.08

SAMPLING METHOD AND MATERIAL Site dedicated Teflon bailer (No. 1) + polypropylene rope

CONSTITUENTS SAMPLED	CONTAINER DESCRIPTION FROM LAB X OR G&M	PRESERVATIVE
VOCs	(3) 40 ml glass vial	HCl, Ice
SVOCs	1 liter amber glass	Ice
Total Metals	1 liter plastic	HNO_3, Ice
Dissolved Metals	1 liter plastic	HNO_3, Ice
PCB/Pest.	1 liter amber glass	Ice
Herbicides	1 liter amber glass	Ice
Cyanide	500 ml plastic	H_2SO_4, Ice

REMARKS Dissolved Metals field filtered. pH and SpC B taken before sampling; A taken after sampling. Foamy discharge.

SAMPLING PERSONNEL R. Astle, C. Standard

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

DRAFT

WATER SAMPLING LOG

PROJECT/No. Harrison RFI / OH019.12 PAGE 22 OF 38

SITE LOCATION Moraine, Ohio

SITE/WELL No. GM19S-12093-GW CODED/ REPLICATE No. DATE 1/20/93

WEATHER P-cloudy, 30sF TIME SAMPLING BEGAN 2:00 p.m. TIME SAMPLING COMPLETED 3:30 p.m.

EVACUATION DATA

DESCRIPTION OF MEASURING POINT (MP) Top of PVC

HEIGHT OF MP ABOVE/BELOW LAND SURFACE _____ MP ELEVATION _____

TOTAL SOUNDED DEPTH OF WELL BELOW 54.59 WATER-LEVEL ELEVATION _____

HELD _____ DEPTH TO WATER BELOW MP 26.45 DIAMETER OF CASING 2"

WET _____ WATER COLUMN IN WELL 28.14 GALLONS PUMPED/BAILED PRIOR TO SAMPLING (13.51) 14

GALLONS PER FOOT 0.16

GALLONS IN WELL 4.50 (x3) SAMPLING PUMP INTAKE SETTING (FEET BELOW LAND SURFACE) _____

EVACUATION METHOD Site dedicated Teflon bailer (No. 1) + polypropylene rope.

SAMPLING DATA/FIELD PARAMETERS

COLOR Yellow brown ODOR None APPEARANCE Cloudy TEMPERATURE 14.0 °F/°C

OTHER (SPECIFIC ION; OVA; HNU; ETC.) NA

SPECIFIC CONDUCTANCE, UMHOS/CM 1) 980/940/940/950
2) 980/980/960/950

pH 1) 6.97/6.99/7.03/7.04
2) 7.09/7.12/7.14/7.14

SAMPLING METHOD AND MATERIAL Site dedicated Teflon bailer (No. 1) + polypropylene rope

CONSTITUENTS SAMPLED	CONTAINER DESCRIPTION FROM LAB X OR G&M	PRESERVATIVE
VOCs	(3) 40 ml glass vial	HCl, Ice
SVOCs	1 liter amber glass	Ice
Total Metals	1 liter plastic	HNO_3, Ice
Dissolved Metals	1 liter plastic	HNO_3, Ice
PCB/Pest.	1 liter amber glass	Ice
Herbicides	1 liter amber glass	Ice
Cyanide	500 ml plastic	H_2SO_4, Ice

REMARKS Dissolved Metals field filtered. Took rinseate blank (RB-05) after sampling (4:30). pH and SpC "B" taken before sampling; pH and SpC "A" taken after sampling.

SAMPLING PERSONNEL R. Astle, C. Standard

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	

DRAFT

WATER SAMPLING LOG

PROJECT/NO. Harrison RFI / OH019.12 PAGE 23 OF 38

SITE LOCATION Moraine, Ohio

SITE/WELL NO. GM19D-12093-GW CODED/ REPLICATE NO. DUP-16 DATE 1/20/93

WEATHER P-cloudy, 30sF TIME SAMPLING BEGAN 4:15 p.m. TIME SAMPLING COMPLETED 6:00 p.m.

EVACUATION DATA

DESCRIPTION OF MEASURING POINT (MP) Top of PVC

HEIGHT OF MP ABOVE/BELOW LAND SURFACE _____ MP ELEVATION _____

TOTAL SOUNDED DEPTH OF WELL BELOW 148.40 WATER-LEVEL ELEVATION _____

HELD _____ DEPTH TO WATER BELOW MP 26.80 DIAMETER OF CASING 4"

WET _____ WATER COLUMN IN WELL 121.06 GALLONS PUMPED/BAILED PRIOR TO SAMPLING (237.12) 240

Pump on: 4:21

GALLONS PER FOOT 0.65 Pump off: 4:45 10 gpm

SAMPLING PUMP INTAKE SETTING

GALLONS IN WELL 79.04 (x3) (FEET BELOW LAND SURFACE) _____

EVACUATION METHOD Submersible pump, hose, and polypropylene rope

SAMPLING DATA/FIELD PARAMETERS

COLOR Clear ODOR None APPEARANCE Clear TEMPERATURE 14.2 °F/°C

OTHER (SPECIFIC ION; OVA; HNU; ETC.) NA

SPECIFIC CONDUCTANCE, UMHOS/CM 1000/980/960/950 pH 7.45/7.46/7.50/7.51

SAMPLING METHOD AND MATERIAL Site dedicated Teflon bailer (No. 1) + polypropylene rope

CONSTITUENTS SAMPLED	CONTAINER DESCRIPTION FROM LAB X OR G&M	PRESERVATIVE
VOCs	(3) 40 ml glass vial	HCl, Ice
BNAs	1 liter glass	Ice
Total Metals	1 liter plastic	HNO_3, Ice
Dissolved Metals	1 liter plastic	HNO_3, Ice
PCB/Pest.	1 liter amber glass	Ice
Herbicides	1 liter amber glass	Ice
Cyanide	500 ml plastic	H_2SO_4, Ice

REMARKS Dissolved Metals field filtered. pH and SpC taken after sampling.

SAMPLING PERSONNEL R. Astle, C. Standard

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

DRAFT

WATER SAMPLING LOG

PROJECT/NO. Harrison RFI / OH019.12 PAGE 24 OF 38

SITE LOCATION Moraine, Ohio

SITE/WELL NO. HR1-11293-GW CODED/ REPLICATE NO. DUP-13 DATE 1/12/93

WEATHER Mist, 30sF TIME SAMPLING BEGAN 4:00 p.m. TIME SAMPLING COMPLETED 5:00 p.m.

EVACUATION DATA

DESCRIPTION OF MEASURING POINT (MP) Top of PVC

HEIGHT OF MP ABOVE/BELOW LAND SURFACE _____ MP ELEVATION _____

TOTAL SOUNDED DEPTH OF WELL BELOW 59.18 WATER-LEVEL ELEVATION _____

HELD _____ DEPTH TO WATER BELOW MP 27.56 DIAMETER OF CASING 2"

WET _____ WATER COLUMN IN WELL 31.62 GALLONS PUMPED/BAILED PRIOR TO SAMPLING (15.18) 16

GALLONS PER FOOT 0.16

GALLONS IN WELL 5.06 (x3) SAMPLING PUMP INTAKE SETTING (FEET BELOW LAND SURFACE) _____

EVACUATION METHOD Site dedicated Teflon bailer (No. 1) + polypropylene rope

SAMPLING DATA/FIELD PARAMETERS

COLOR Lt. gray ODOR None APPEARANCE Sl. cloudy TEMPERATURE 12.0 °F/°C

OTHER (SPECIFIC ION; OVA; HNU; ETC.) No reading from HNU probably due to moisture.

SPECIFIC CONDUCTANCE, UMHOS/CM 780/760/770/770 pH 6.70/6.73/6.75/6.76

SAMPLING METHOD AND MATERIAL Site dedicated Teflon bailer (No. 1) + polypropylene rope

CONSTITUENTS SAMPLED	CONTAINER DESCRIPTION FROM LAB X OR G&M	PRESERVATIVE
VOCs	(3) 40 ml glass vial	HCl, Ice
Total Metals	1 liter plastic	HNO_3, Ice
Dissolved Metals	1 liter plastic	HNO_3, Ice
PCBs	1 liter amber glass	Ice

REMARKS Dissolved Metals field filtered. pH and SpC taken after sampling.

SAMPLING PERSONNEL C. Standard, S. Ackers

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

DRAFT

WATER SAMPLING LOG

PROJECT/No. Harrison RFI / OH019.12 PAGE 25 OF 38

SITE LOCATION Moraine, Ohio

SITE/WELL No. HR3-11993-GW CODED/ REPLICATE No. DATE 1/19/93

WEATHER Sunny, 20sF TIME SAMPLING BEGAN 10:40 a.m. TIME SAMPLING COMPLETED 11:45 a.m.

EVACUATION DATA

DESCRIPTION OF MEASURING POINT (MP) Top of PVC

HEIGHT OF MP ABOVE/BELOW LAND SURFACE _____ MP ELEVATION _____

TOTAL SOUNDED DEPTH OF WELL BELOW 62.26 WATER-LEVEL ELEVATION _____

HELD _____ DEPTH TO WATER BELOW MP 30.38 DIAMETER OF CASING 2"

WET _____ WATER COLUMN IN WELL 31.88 GALLONS PUMPED/BAILED PRIOR TO SAMPLING (15.3) 15.5

GALLONS PER FOOT 0.16

GALLONS IN WELL 5.10 (x3) SAMPLING PUMP INTAKE SETTING (FEET BELOW LAND SURFACE) _____

EVACUATION METHOD Site dedicated Teflon bailer (No. 1) + polypropylene rope.

SAMPLING DATA/FIELD PARAMETERS

COLOR Very lt. gray ODOR None APPEARANCE Very sl. cloudy TEMPERATURE 10.8 °F/°C

OTHER (SPECIFIC ION; OVA; HNU; ETC.) HNU = 0 ppm = background.

SPECIFIC CONDUCTANCE, UMHOS/CM 660/660/650/650 pH 7.04/7.05/7.04/7.09

SAMPLING METHOD AND MATERIAL Site dedicated Teflon bailer (No. 1) + polypropylene rope

CONSTITUENTS SAMPLED	CONTAINER DESCRIPTION FROM LAB X OR G&M	PRESERVATIVE
VOCs	(3) 40 ml glass vial	HCl, Ice
SVOCs	1 liter amber glass	Ice
Total Metals	1 liter plastic	HNO_3, Ice
Dissolved Metals	1 liter plastic	HNO_3, Ice
PCB/Pest.	1 liter amber glass	Ice
Herbicides	1 liter amber glass	Ice
Cyanide	500 ml plastic	H_2SO_4, Ice

REMARKS Dissolved Metals field filtered. pH and SpC taken after sampling.

SAMPLING PERSONNEL R. Astle, C. Standard

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

DRAFT

WATER SAMPLING LOG

PROJECT/NO. Harrison RFI / OH019.12 PAGE 26 OF 38

SITE LOCATION Moraine, Ohio

SITE/WELL NO. HR4-11993-GW CODED/ REPLICATE NO. DUP-15 DATE 1/19/93

WEATHER Sunny, 30sF TIME SAMPLING BEGAN 2:40 p.m. TIME SAMPLING COMPLETED 4:00 p.m.

EVACUATION DATA

DESCRIPTION OF MEASURING POINT (MP) Top of PVC

HEIGHT OF MP ABOVE/BELOW LAND SURFACE _____ MP ELEVATION _____

TOTAL SOUNDED DEPTH OF WELL BELOW 67.14 WATER-LEVEL ELEVATION _____

HELD _____ DEPTH TO WATER BELOW MP 35.57 DIAMETER OF CASING 2"

WET _____ WATER COLUMN IN WELL 31.57 GALLONS PUMPED/BAILED PRIOR TO SAMPLING (15.15) 15.15

GALLONS PER FOOT 0.16

GALLONS IN WELL 5.05 (x3) SAMPLING PUMP INTAKE SETTING (FEET BELOW LAND SURFACE) _____

EVACUATION METHOD Site dedicated Teflon bailer (No. 1) + polypropylene rope.

SAMPLING DATA/FIELD PARAMETERS

COLOR Clear ODOR None APPEARANCE Clear TEMPERATURE 12.4 °F/°C

OTHER (SPECIFIC ION; OVA; HNU; ETC.) HNU = .5 ppm = background.

SPECIFIC CONDUCTANCE, UMHOS/CM 730/700/700/700 pH 6.80/6.84/6.93/6.94

SAMPLING METHOD AND MATERIAL Site dedicated Teflon bailer (No. 1) + polypropylene rope

CONSTITUENTS SAMPLED	CONTAINER DESCRIPTION FROM LAB X OR G&M	PRESERVATIVE
VOCs	(3) 40 ml glass vial	HCl, Ice
SVOCs	1 liter amber glass	Ice
Total Metals	1 liter plastic	HNO_3, Ice
Dissolved Metals	1 liter plastic	HNO_3, Ice
PCB/Pest.	1 liter amber glass	Ice
Herbicides	1 liter amber glass	Ice
Cyanide	500 ml plastic	H_2SO_4, Ice

REMARKS Dissolved Metals field filtered. pH and SpC taken after sampling.

SAMPLING PERSONNEL R. Astle, C. Standard

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

DRAFT

WATER SAMPLING LOG

PROJECT/NO. Harrison RFI / OH019.12 PAGE 27 OF 38

SITE LOCATION Moraine, Ohio

SITE/WELL NO. HR6-11993-GW CODED/ REPLICATE NO. DATE 1/19/93

WEATHER Sunny, 30sF TIME SAMPLING BEGAN 4:25 p.m. TIME SAMPLING COMPLETED 5:19 p.m.

EVACUATION DATA

DESCRIPTION OF MEASURING POINT (MP) Top of PVC

HEIGHT OF MP ABOVE/BELOW LAND SURFACE MP ELEVATION

TOTAL SOUNDED DEPTH OF WELL BELOW 55.46 WATER-LEVEL ELEVATION

HELD DEPTH TO WATER BELOW MP 27.26 DIAMETER OF CASING 2"

WET WATER COLUMN IN WELL 28.22 GALLONS PUMPED/BAILED PRIOR TO SAMPLING (13.55) 14

GALLONS PER FOOT 0.16

GALLONS IN WELL 4.52 (x3) SAMPLING PUMP INTAKE SETTING (FEET BELOW LAND SURFACE)

EVACUATION METHOD Site dedicated Teflon bailer (No. 1) + polypropylene rope.

SAMPLING DATA/FIELD PARAMETERS

COLOR Light gray ODOR None APPEARANCE Sl. cloudy TEMPERATURE 12.0 °F/°C

OTHER (SPECIFIC ION; OVA; HNU; ETC.) HNU = 1.2 ppm = background.

SPECIFIC CONDUCTANCE, UMHOS/CM 760/760/740/740 pH 6.90/6.99/7.01/7.05

SAMPLING METHOD AND MATERIAL Site dedicated Teflon bailer (No. 1) + polypropylene rope

CONSTITUENTS SAMPLED	CONTAINER DESCRIPTION FROM LAB X OR G&M	PRESERVATIVE
VOCs	(3) 40 ml glass vial	HCl, Ice
Total Metals	1 liter plastic	HNO_3, Ice
Dissolved Metals	1 liter plastic	HNO_3, Ice

REMARKS Dissolved Metals field filtered. pH and SpC taken after sampling. Took rinseate blank (RB-04) after sampling.

SAMPLING PERSONNEL R. Astle, C. Standard

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

DRAFT

WATER SAMPLING LOG

PROJECT/NO. Harrison RFI / OH019.12 PAGE 28 OF 38

SITE LOCATION Moraine, Ohio

SITE/WELL NO. HR8-12693-GW CODED/ REPLICATE NO. _____ DATE 1/26/93

WEATHER Sunny, 30sF TIME SAMPLING BEGAN 5:30 p.m. TIME SAMPLING COMPLETED 6:15 p.m.

EVACUATION DATA

DESCRIPTION OF MEASURING POINT (MP) Top of PVC

HEIGHT OF MP ABOVE/BELOW LAND SURFACE _____ MP ELEVATION _____

TOTAL SOUNDED DEPTH OF WELL BELOW MP 66.43 WATER-LEVEL ELEVATION _____

HELD _____ DEPTH TO WATER BELOW MP 35.88 DIAMETER OF CASING 2"

WET _____ WATER COLUMN IN WELL 30.55 GALLONS PUMPED/BAILED PRIOR TO SAMPLING (14.66) 15

GALLONS PER FOOT 0.16

GALLONS IN WELL 4.8 (x3) SAMPLING PUMP INTAKE SETTING (FEET BELOW LAND SURFACE) _____

EVACUATION METHOD Site dedicated Teflon bailer (No. 1) + polypropylene rope

SAMPLING DATA/FIELD PARAMETERS

COLOR Clear ODOR None APPEARANCE Clear TEMPERATURE 15.0 °F/°C

OTHER (SPECIFIC ION; OVA; HNU; ETC.) NA

SPECIFIC CONDUCTANCE, UMHOS/CM "B" 1) 800/900/900/900
2) 980/1960/1000/1000

pH "B" 1) 6.95/6.98/7.03/7.04
2) 6.94/7.00/7.03/7.08

SAMPLING METHOD AND MATERIAL Site dedicated Teflon bailer (No. 1) + polypropylene rope

CONSTITUENTS SAMPLED	CONTAINER DESCRIPTION FROM LAB X OR G&M	PRESERVATIVE
VOCs	(3) 40 ml glass vial	HCl, Ice
SVOCs	1 liter amber glass	Ice
Total Metals	1 liter plastic	HNO_3, Ice
Dissolved Metals	1 liter plastic	HNO_3, Ice
PCB/Pest.	1 liter amber glass	Ice
Herbicides	1 liter amber glass	Ice
Cyanide	500 ml plastic	H_2SO_4, Ice

REMARKS Dissolved Metals field filtered. pH and SpC B taken before sampling; A taken after sampling.

SAMPLING PERSONNEL R. Astle, C. Standard

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

DRAFT

WATER SAMPLING LOG

PROJECT/NO. Harrison RFI / OH019.12 PAGE 29 OF 38

SITE LOCATION Moraine, Ohio

SITE/WELL NO. HR9-12693-GW CODED/ REPLICATE NO. _____ DATE 1/26/93

WEATHER Sunny, 30sF TIME SAMPLING BEGAN 1:30 p.m. TIME SAMPLING COMPLETED 3:40 p.m.

EVACUATION DATA

DESCRIPTION OF MEASURING POINT (MP) Top of PVC

HEIGHT OF MP ABOVE/BELOW LAND SURFACE _____ MP ELEVATION _____

TOTAL SOUNDED DEPTH OF WELL BELOW MP 70.12 WATER-LEVEL ELEVATION _____

HELD _____ DEPTH TO WATER BELOW MP 35.52 DIAMETER OF CASING 2"

WET _____ WATER COLUMN IN WELL 34.60 GALLONS PUMPED/BAILED PRIOR TO SAMPLING (16.62) 17

GALLONS PER FOOT 0.16

GALLONS IN WELL 5.54 (x3) SAMPLING PUMP INTAKE SETTING (FEET BELOW LAND SURFACE) _____

EVACUATION METHOD Site dedicated Teflon bailer (No. 1) + polypropylene rope

SAMPLING DATA/FIELD PARAMETERS

COLOR Tan ODOR None APPEARANCE Sl. cloudy TEMPERATURE 12.5 °F/°C

OTHER (SPECIFIC ION; OVA; HNU; ETC.) NA

SPECIFIC CONDUCTANCE, UMHOS/CM B) 1150/1150/1150/1140 A) 1180/1170/1160/1160 pH B) 6.91/6.94/6.96/6.95 A) 7.03/7.04/7.05/7.06

SAMPLING METHOD AND MATERIAL Site dedicated Teflon bailer (No. 1) + polypropylene rope

CONSTITUENTS SAMPLED	CONTAINER DESCRIPTION FROM LAB X OR G&M	PRESERVATIVE
VOCs	(3) 40 ml glass vial	HCl, Ice
BNAs	1 liter amber glass	Ice
Total Metals	1 liter plastic	HNO_3, Ice
Dissolved Metals	1 liter plastic	HNO_3, Ice
PCB/Pest.	1 liter amber glass	Ice
Herbicides	1 liter amber glass	Ice
Cyanide	500 ml plastic	H_2SO_4, Ice

REMARKS Dissolved Metals field filtered. Triple sample volume taken for MS/MSD spike. pH and SpC B taken before sampling; A taken after sampling.

SAMPLING PERSONNEL R. Astle, C. Standard

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

DRAFT

WATER SAMPLING LOG

PROJECT/NO. Harrison RFI / OH019.12 PAGE 30 OF 38

SITE LOCATION Moraine, Ohio

SITE/WELL NO. HR10-12693-GW CODED/ REPLICATE NO. DUP-20 DATE 1/26/93

WEATHER Sunny, 30sF TIME SAMPLING BEGAN 1:45 p.m. TIME SAMPLING COMPLETED 4:45 p.m.

EVACUATION DATA

DESCRIPTION OF MEASURING POINT (MP) Top of PVC

HEIGHT OF MP ABOVE/BELOW LAND SURFACE _____ MP ELEVATION _____

TOTAL SOUNDED DEPTH OF WELL BELOW MP 126.66 WATER-LEVEL ELEVATION _____

HELD _____ DEPTH TO WATER BELOW MP 34.80 DIAMETER OF CASING 4"

WET _____ WATER COLUMN IN WELL 91.86 GALLONS PUMPED/BAILED PRIOR TO SAMPLING (179) 190

Pump on: 1:52

GALLONS PER FOOT 0.65 Pump off: 2:11 10 gpm

GALLONS IN WELL 59.71 (x3) SAMPLING PUMP INTAKE SETTING (FEET BELOW LAND SURFACE) _____

EVACUATION METHOD Submersible pump, hose, and polypropylene rope.

SAMPLING DATA/FIELD PARAMETERS

COLOR Clear ODOR None APPEARANCE Clear TEMPERATURE 13.2 °F/℃

OTHER (SPECIFIC ION; OVA; HNU; ETC.) NA

SPECIFIC CONDUCTANCE, UMHOS/CM B) 800/780/820/810 A) 830/830/830/830 pH B) 6.86/7.06/7.10/7.10 A) 7.10/7.13/7.14/7.14

SAMPLING METHOD AND MATERIAL Site dedicated Teflon bailer (No. 1) + polypropylene rope

CONSTITUENTS SAMPLED	CONTAINER DESCRIPTION FROM LAB X OR G&M	PRESERVATIVE
VOCs	(3) 40 ml glass vial	HCl, Ice
SVOCs	1 liter amber glass	Ice
Total Metals	1 liter plastic	HNO_3, Ice
Dissolved Metals	1 liter plastic	HNO_3, Ice
PCB/Pest.	1 liter amber glass	Ice
Herbicides	1 liter amber glass	Ice
Cyanide	500 ml plastic	H_2SO_4, Ice

REMARKS Dissolved Metals field filtered. pH and SpC B taken before sampling; A taken after sampling.

SAMPLING PERSONNEL R. Astle, C. Standard

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

DRAFT

WATER SAMPLING LOG

PROJECT/NO. Harrison RFI / OH019.12 PAGE 31 OF 38

SITE LOCATION Moraine, Ohio

SITE/WELL NO. HR11-12693-GW CODED/ REPLICATE NO. _____ DATE 1/26/93

WEATHER Sunny, 20sF TIME SAMPLING BEGAN 9:00 a.m. TIME SAMPLING COMPLETED 10:40 a.m.

EVACUATION DATA

DESCRIPTION OF MEASURING POINT (MP) Top of PVC

HEIGHT OF MP ABOVE/BELOW LAND SURFACE _____ MP ELEVATION _____

TOTAL SOUNDED DEPTH OF WELL BELOW MP 69.24 (69.24) WATER-LEVEL ELEVATION _____

HELD _____ DEPTH TO WATER BELOW MP 35.48 (35.48) DIAMETER OF CASING 2"

WET _____ WATER COLUMN IN WELL 33.76 GALLONS PUMPED/BAILED PRIOR TO SAMPLING (16.20) 16.5

GALLONS PER FOOT 0.16

GALLONS IN WELL 5.40 (x3) SAMPLING PUMP INTAKE SETTING (FEET BELOW LAND SURFACE) _____

EVACUATION METHOD Site dedicated Teflon bailer (No. 1) + polypropylene rope

SAMPLING DATA/FIELD PARAMETERS

COLOR Clear ODOR None APPEARANCE Clear TEMPERATURE 11.1 °F/℃

OTHER (SPECIFIC ION; OVA; HNU; ETC.) NA

SPECIFIC CONDUCTANCE, UMHOS/CM "B" 1) 1140/1100/1080/1080
2) 1120/1090/1090/1080

pH "B" 1) 6.63/6.69/6.73/6.77
2) 6.62/6.67/6.70/6.74

"A" 1) 1140/1100/1080/1080
2) 1100/1100/1090/1080

"A" 1) 6.80/6.80/6.82/6.84
2) 6.79/6.81/6.83/6.85

SAMPLING METHOD AND MATERIAL Site dedicated Teflon bailer (No. 1) + polypropylene rope

CONSTITUENTS SAMPLED	CONTAINER DESCRIPTION FROM LAB X OR G&M ____	PRESERVATIVE
VOCs	(3) 40 ml glass vial	HCl, Ice
SVOCs	1 liter amber glass	Ice
Total Metals	1 liter plastic	HNO_3, Ice
Dissolved Metals	1 liter plastic	HNO_3, Ice
PCB/Pest.	1 liter amber glass	Ice
Herbicides	1 liter amber glass	Ice
Cyanide	500 ml plastic	H_2SO_4, Ice

REMARKS Dissolved Metals field filtered. pH and SpC B taken before sampling; A taken after sampling. Duplicate pH and SpC readings taken. Duplicate total depth and depth to water readings shown in parentheses.

SAMPLING PERSONNEL R. Astle, C. Standard

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	

WATER SAMPLING LOG

PROJECT/NO. Harrison RFI / OH019.12 PAGE 32 OF 38

SITE LOCATION Moraine, Ohio

SITE/WELL NO. HR12-12693-GW CODED/ REPLICATE NO. _____ DATE 1/26/93

WEATHER Sunny, 20sF TIME SAMPLING BEGAN 9:45 a.m. TIME SAMPLING COMPLETED 11:30 a.m.

EVACUATION DATA

DESCRIPTION OF MEASURING POINT (MP) Top of PVC

HEIGHT OF MP ABOVE/BELOW LAND SURFACE _____ MP ELEVATION _____

TOTAL SOUNDED DEPTH OF WELL BELOW MP 130.38 WATER-LEVEL ELEVATION _____

HELD _____ DEPTH TO WATER BELOW MP 34.77 DIAMETER OF CASING 4"

WET _____ WATER COLUMN IN WELL 95.61 GALLONS PUMPED/BAILED PRIOR TO SAMPLING (186.44) 190

Pump on: 9:54

GALLONS PER FOOT 0.65 Pump off: 10:13 10 gpm

GALLONS IN WELL 62.15 (x3) SAMPLING PUMP INTAKE SETTING (FEET BELOW LAND SURFACE) _____

EVACUATION METHOD Submersible pump, hose, and polypropylene rope.

SAMPLING DATA/FIELD PARAMETERS

COLOR Clear ODOR None APPEARANCE Clear TEMPERATURE 10.3 °F/°C

OTHER (SPECIFIC ION; OVA; HNU; ETC.) NA

SPECIFIC CONDUCTANCE, UMHOS/CM B) 1320/1300/1280/1270 A) 1300/1260/1260/1240 pH B) 6.82/6.86/6.85/6.88 A) 6.95/6.93/6.93/6.95

SAMPLING METHOD AND MATERIAL Site dedicated Teflon bailer (No. 1) + polypropylene rope

CONSTITUENTS SAMPLED	CONTAINER DESCRIPTION FROM LAB X OR G&M	PRESERVATIVE
VOCs	(3) 40 ml glass vial	HCl, Ice
BNAs	1 liter amber glass	Ice
Total Metals	1 liter plastic	HNO_3, Ice
Dissolved Metals	1 liter plastic	HNO_3, Ice
PCB/Pest.	1 liter amber glass	Ice
Herbicides	1 liter amber glass	Ice
Cyanide	500 ml plastic	H_2SO_4, Ice

REMARKS Dissolved Metals field filtered. pH and SpC B taken before sampling; A taken after sampling.

SAMPLING PERSONNEL R. Astle, C. Standard

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

DRAFT

WATER SAMPLING LOG

PROJECT/NO. Harrison RFI / 0H019.12 PAGE 33 OF 38

SITE LOCATION Moraine, Ohio

SITE/WELL NO. HR13-11993-GW CODED/ REPLICATE NO. _____ DATE 1/19/93

WEATHER Sunny, 10sF TIME SAMPLING BEGAN 9:15 a.m. TIME SAMPLING COMPLETED 10:30 a.m.

EVACUATION DATA

DESCRIPTION OF MEASURING POINT (MP) Top of PVC

HEIGHT OF MP ABOVE/BELOW LAND SURFACE _____ MP ELEVATION _____

TOTAL SOUNDED DEPTH OF WELL BELOW MP 86.42 (86.42) WATER-LEVEL ELEVATION _____

HELD _____ DEPTH TO WATER BELOW MP 28.69 (28.69) DIAMETER OF CASING 4"

WET _____ WATER COLUMN IN WELL 57.73 GALLONS PUMPED/BAILED PRIOR TO SAMPLING (112.57) 120

Pump on: 9:30

GALLONS PER FOOT 0.65 Pump off: 9:42 10 gpm

SAMPLING PUMP INTAKE SETTING

GALLONS IN WELL 37.52 (x3) (FEET BELOW LAND SURFACE) _____

EVACUATION METHOD Submersible pump, hose, and polypropylene rope.

SAMPLING DATA/FIELD PARAMETERS

COLOR Lt. gray ODOR None APPEARANCE Sl. cloudy TEMPERATURE 10.3 °F/℃

OTHER (SPECIFIC ION; OVA; HNU; ETC.) HNU = 0 ppm = background

SPECIFIC CONDUCTANCE, UMHOS/CM 1) 740/720/710/690 2) 730/720/700/680 pH 1) 7.01/7.02/7.11/7.08 2) 7.02/7.05/7.10/7.14

SAMPLING METHOD AND MATERIAL Site dedicated Teflon bailer (No. 1) + polypropylene rope

CONSTITUENTS SAMPLED	CONTAINER DESCRIPTION FROM LAB X OR G&M	PRESERVATIVE
VOCs	(3) 40 ml glass vial	HCl, Ice
SVOCs	1 liter amber glass	Ice
Total Metals	1 liter plastic	HNO_3, Ice
Dissolved Metals	1 liter plastic	HNO_3, Ice
PCB/Pest.	1 liter amber glass	Ice
Herbicides	1 liter amber glass	Ice
Cyanide	500 ml plastic	H_2SO_4, Ice

REMARKS Dissolved Metals field filtered. Duplicate pH and SpC readings taken after sampling. Duplicate depth to water and total depth readings shown in parentheses.

SAMPLING PERSONNEL R. Astle, C. Standard

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

DRAFT

WATER SAMPLING LOG

PROJECT/NO. Harrison RFI / OH019.12 PAGE 34 OF 38

SITE LOCATION Moraine, Ohio

SITE/WELL NO. HR14-11393-GW CODED/ REPLICATE NO. _____ DATE 1/13/93

WEATHER Cloudy, 30sF TIME SAMPLING BEGAN 9:00 a.m. TIME SAMPLING COMPLETED 10:45 a.m.

EVACUATION DATA

DESCRIPTION OF MEASURING POINT (MP) Top of PVC

HEIGHT OF MP ABOVE/BELOW LAND SURFACE _____ MP ELEVATION _____

TOTAL SOUNDED DEPTH OF WELL BELOW MP 89.36 (89.36) WATER-LEVEL ELEVATION _____

HELD _____ DEPTH TO WATER BELOW MP 25.24 (25.24) DIAMETER OF CASING 4"

WET _____ WATER COLUMN IN WELL 64.12 GALLONS PUMPED/BAILED PRIOR TO SAMPLING (125) 130

Pump on: 9:29

GALLONS PER FOOT 0.65 Pump off: 9:48 7 gpm

GALLONS IN WELL 41.68 (x3) SAMPLING PUMP INTAKE SETTING (FEET BELOW LAND SURFACE) _____

EVACUATION METHOD Submersible pump, hose, and polypropylene rope.

SAMPLING DATA/FIELD PARAMETERS

COLOR Tan ODOR None APPEARANCE Sl. cloudy TEMPERATURE 10.3 °F/℃

OTHER (SPECIFIC ION; OVA; HNU; ETC.) HNU = .4 ppm = background

SPECIFIC CONDUCTANCE, UMHOS/CM 1) 810/780/770/780 2) 800/760/770/760

pH 1) 6.82/6.82/6.83/6.88 2) 6.80/6.91/6.83/6.91

SAMPLING METHOD AND MATERIAL Site dedicated Teflon bailer (No. 1) + polypropylene rope

CONSTITUENTS SAMPLED	CONTAINER DESCRIPTION FROM LAB X OR G&M	PRESERVATIVE
VOCs	(3) 40 ml glass vial	HCl, Ice
SVOCs	1 liter amber glass	Ice
Total Metals	1 liter plastic	HNO_3, Ice
Dissolved Metals	1 liter plastic	HNO_3, Ice
PCB/Pest.	1 liter amber glass	Ice
Herbicides	1 liter amber glass	Ice
Cyanide	500 ml plastic	H_2SO_4, Ice

REMARKS Dissolved Metals field filtered. Duplicate pH and SpC readings taken after sampling. Duplicate depth to water and total depth readings shown in parentheses.

SAMPLING PERSONNEL C. Standard, R. Astle

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

DRAFT

WATER SAMPLING LOG

PROJECT/No. Harrison RFI / OH019.12 PAGE 35 OF 38

SITE LOCATION Moraine, Ohio

SITE/WELL No. HR15-11393-GW CODED/ REPLICATE No. DATE 1/13/93

WEATHER Cloudy, Windy 30sF TIME SAMPLING BEGAN 2:00 p.m. TIME SAMPLING COMPLETED 3:30 p.m.

EVACUATION DATA

DESCRIPTION OF MEASURING POINT (MP) Top of PVC

HEIGHT OF MP ABOVE/BELOW LAND SURFACE _____ MP ELEVATION _____

TOTAL SOUNDED DEPTH OF WELL BELOW 102.10 WATER-LEVEL ELEVATION _____

HELD _____ DEPTH TO WATER BELOW MP 27.44 DIAMETER OF CASING 4"

WET _____ WATER COLUMN IN WELL 74.66 GALLONS PUMPED/BAILED PRIOR TO SAMPLING (145.59) 150

Pump on: 2:14

GALLONS PER FOOT 0.65 Pump off: 2:29 7 gpm

GALLONS IN WELL 48.53 (x3) SAMPLING PUMP INTAKE SETTING (FEET BELOW LAND SURFACE) _____

EVACUATION METHOD Submersible pump, hose, and polypropylene rope.

SAMPLING DATA/FIELD PARAMETERS

COLOR Lt. tan ODOR None APPEARANCE Sl. cloudy TEMPERATURE 11.1 °F/°C

OTHER (SPECIFIC ION; OVA; HNU; ETC.) HNU = .4 ppm = background.

SPECIFIC CONDUCTANCE, UMHOS/CM 780/780/760/760 pH 6.82/6.84/6.85/6.89

SAMPLING METHOD AND MATERIAL Site dedicated Teflon bailer (No. 1) + polypropylene rope

CONSTITUENTS SAMPLED	CONTAINER DESCRIPTION FROM LAB X OR G&M	PRESERVATIVE
VOCs	(3) 40 ml glass vial	HCl, Ice
SVOCs	1 liter amber glass	Ice
Total Metals	1 liter plastic	HNO_3, Ice
Dissolved Metals	1 liter plastic	HNO_3, Ice
PCB/Pest.	1 liter amber glass	Ice
Herbicides	1 liter amber glass	Ice
Cyanide	500 ml plastic	H_2SO_4, Ice

REMARKS Dissolved Metals field filtered. pH and SpC taken after sampling. Slight odor from early discharge.

SAMPLING PERSONNEL R. Astle, C. Standard

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

DRAFT

WATER SAMPLING LOG

PROJECT/NO. Harrison RFI / OH019.12 PAGE 36 OF 38

SITE LOCATION Moraine, Ohio

SITE/WELL NO. HR17-12593-GW CODED/ REPLICATE NO. DUP-19 DATE 1/25/93

WEATHER Sunny, 30sF TIME SAMPLING BEGAN 11:40 a.m. TIME SAMPLING COMPLETED 1:00 p.m.

EVACUATION DATA

DESCRIPTION OF MEASURING POINT (MP) Top of PVC

HEIGHT OF MP ABOVE/BELOW LAND SURFACE _____ MP ELEVATION _____

TOTAL SOUNDED DEPTH OF WELL BELOW MP 48.64 (48.64) WATER-LEVEL ELEVATION _____

HELD _____ DEPTH TO WATER BELOW MP 21.33 (21.33) DIAMETER OF CASING 4"

WET _____ WATER COLUMN IN WELL 27.31 GALLONS PUMPED/BAILED PRIOR TO SAMPLING (53.25) 60

Pump on: 11:48

GALLONS PER FOOT 0.65 Pump off: 11:54 10 gpm

GALLONS IN WELL 17.75 (x3) SAMPLING PUMP INTAKE SETTING (FEET BELOW LAND SURFACE) _____

EVACUATION METHOD Submersible pump, hose, and polypropylene rope

SAMPLING DATA/FIELD PARAMETERS

COLOR Tan ODOR None APPEARANCE Sl. cloudy TEMPERATURE 13.4 °F/℃

OTHER (SPECIFIC ION; OVA; HNU; ETC.) NA

SPECIFIC CONDUCTANCE, UMHOS/CM "B" 1) 880/880/870/870
2) 900/880/890/880

pH "B" 1) 6.90/6.95/6.97/7.00
2) 6.91/6.94/6.97/6.98

"A" 1) 960/940/940/
2) 820/940/940/

"A" 1) 7.08/7.10/7.11/7.13
2) 7.06/7.11/7.11/7.12

SAMPLING METHOD AND MATERIAL Site dedicated Teflon bailer (No. 1) + polypropylene rope

CONSTITUENTS SAMPLED	CONTAINER DESCRIPTION FROM LAB X OR G&M	PRESERVATIVE
VOCs	(3) 40 ml glass vial	HCl, Ice
BNAs	1 liter amber glass	Ice
Total Metals	1 liter plastic	HNO_3, Ice
Dissolved Metals	1 liter plastic	HNO_3, Ice
PCB/Pest.	1 liter amber glass	Ice
Herbicides	1 liter amber glass	Ice
Cyanide	500 ml plastic	H_2SO_4, Ice

REMARKS Dissolved Metals field filtered. pH and SpC B taken before sampling; A taken after sampling. Duplicate pH and SpC readings taken. Duplicate total depth and depth to water readings shown in parentheses.

SAMPLING PERSONNEL R. Astle, C. Standard

WELL CASING VOLUMES

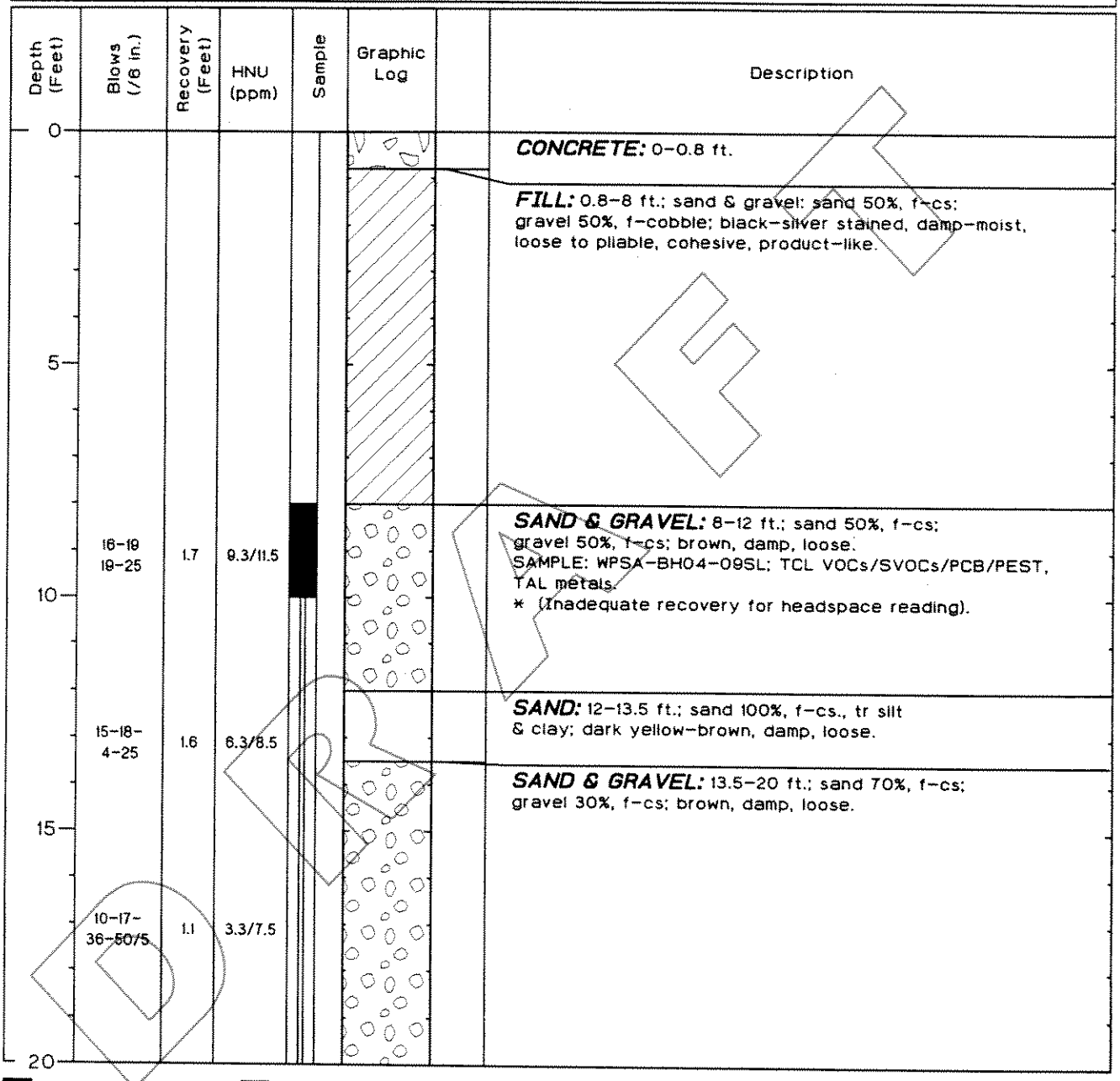
GAL./FT.				
	1-¼"= 0.06	2" = 0.16	3" = 0.37	4" = 0.65
	1-½"= 0.09	2-½"= 0.26	3-½"= 0.50	6" = 1.47

DRAFT

Geraghty & Miller, Inc.
Environmental Services

Log of Boring: WPSA-BH04

HARRISON RADIATOR – OH0019.018 Moraine, Ohio



DRAFT

■ Sample to Lab ▯▯ Sample Not Analyzed

Drilling Co.: Belasco Drilling
Driller: L. Bell
Drilling Method: Hollow-Stem Auger
Drilling Fluid: Plant Potable Water
Remarks: Split-Spoon

Geologist: R. Astle
Total Depth: 30
Surface Elev.:
Datum:
West Coor.:

Begin Drilling: 09/23/94
End Drilling: 09/23/94
Converted to Well: No
Well Name:
South Coor.:

OH0019.018

Geraghty & Miller, Inc.
Environmental Services

Log of Boring: WPSA-BH04

HARRISON RADIATOR – OH0019.018 Moraine, Ohio

Depth (Feet)	Blows (/6 in.)	Recovery (Feet)	HNU (ppm)	Sample	Graphic Log	Description
20	25-50/5	0.5	1.3/3.1			***SAND & GRAVEL:*** 20-24 ft.; sand 50%, f-cs; gravel 50%, f-cobble; tr silt & clay; brown, damp, loose. SAMPLE WPSA-BH04-21SL; TCL VOCs/SVOCs/PCB/PEST, TAL metals. * Wet sample, headspace not applicable.
25	50/6	0.1	0.1/NA			***SILT, CLAYEY SAND, & GRAVEL:*** 24-30 ft.; sand 40%, f-cs; gravel 40%, f-cobble; silt & clay 20%; gray-brown, moist, loose to semi-pliable, semi-cohesive.
30	25-25-50/6	1.5	1.5/NA **			** HNU Scan/HNU Headspace
35						
40						

DRAFT

■ Sample to Lab ▯▯ Sample Not Analyzed

Drilling Co.: Belasco Drilling
Driller: L. Bell
Drilling Method: Hollow-Stem Auger
Drilling Fluid: Plant Potable Water
Remarks: Split-Spoon

Geologist: R. Astle
Total Depth: 30
Surface Elev.:
Datum:
West Coor.:

Begin Drilling: 09/23/94
End Drilling: 09/23/94
Converted to Well: No
Well Name:
South Coor.:

OH0019.018

SOIL/SEDIMENT SAMPLING LOG

Project/No. Harrison/OH0019.018 Page 1 of 2

Site Location Moraine, Ohio

Sample No. WPSA-BH04-09SL Coded/ Replicate No. _____ Date 9/23/94

Weather Cool; Overcast Time Sampling Began 8:50 a.m. Time Sampling Completed 9:00 a.m.

Sampling Method and Material 3 " stainless steel split spoon

Grab x Composite ___

From	To	Soil/Sediment Description
8'	10'	Sand, fine-coarse; gravel, fine-coarse; brown; damp; loose.

Other (OVA; HNU; etc.) HNU scan: 9.3 ppm; HNU headspace: 11.5 ppm

Constituents Sampled	Container Description From Lab x or G&M ___	Preservative
TCL VOCs	4 oz glass jar	cool
TCL SVOCs/PCBs/Pesticides	8 oz glass jar	cool
TAL Metals	16 oz glass jar	cool

Remarks Highest headspace reading at waste pile staging area; boring No. 4, 8-10 ft.

Sampling Personnel R. Astle

DRAFT

SOIL/SEDIMENT SAMPLING LOG

Project/No. Harrison/OH0019.018 Page 2 of 2

Site Location Moraine, Ohio

Sample No. WPSA-BH04-21SL Coded/ Replicate No. _____ Date 9/23/94

Weather Cool; Overcast Time Sampling Began 9:10 a.m. Time Sampling Completed 9:20 a.m.

Sampling Method and Material 3" stainless steel split spoon

Grab x Composite ____

From	To	Soil/Sediment Description
20'	22'	Sand, fine-coarse; gravel, fine-cobble; trace silt and clay; brown; damp; loose.

Other (OVA; HNU; etc.) HNU scan: 1.3 ppm; HNU headspace: 3.1 ppm

Constituents Sampled	Container Description From Lab x or G&M ____	Preservative
TCL VOCs	4 oz glass jar	cool
TCL SVOCs/PCBs/Pesticides	8 oz glass jar	cool
TAL Metals	16 oz glass jar	cool

Remarks Lowest headspace reading at waste pile staging area; Boring No. 4, 20-22 ft.

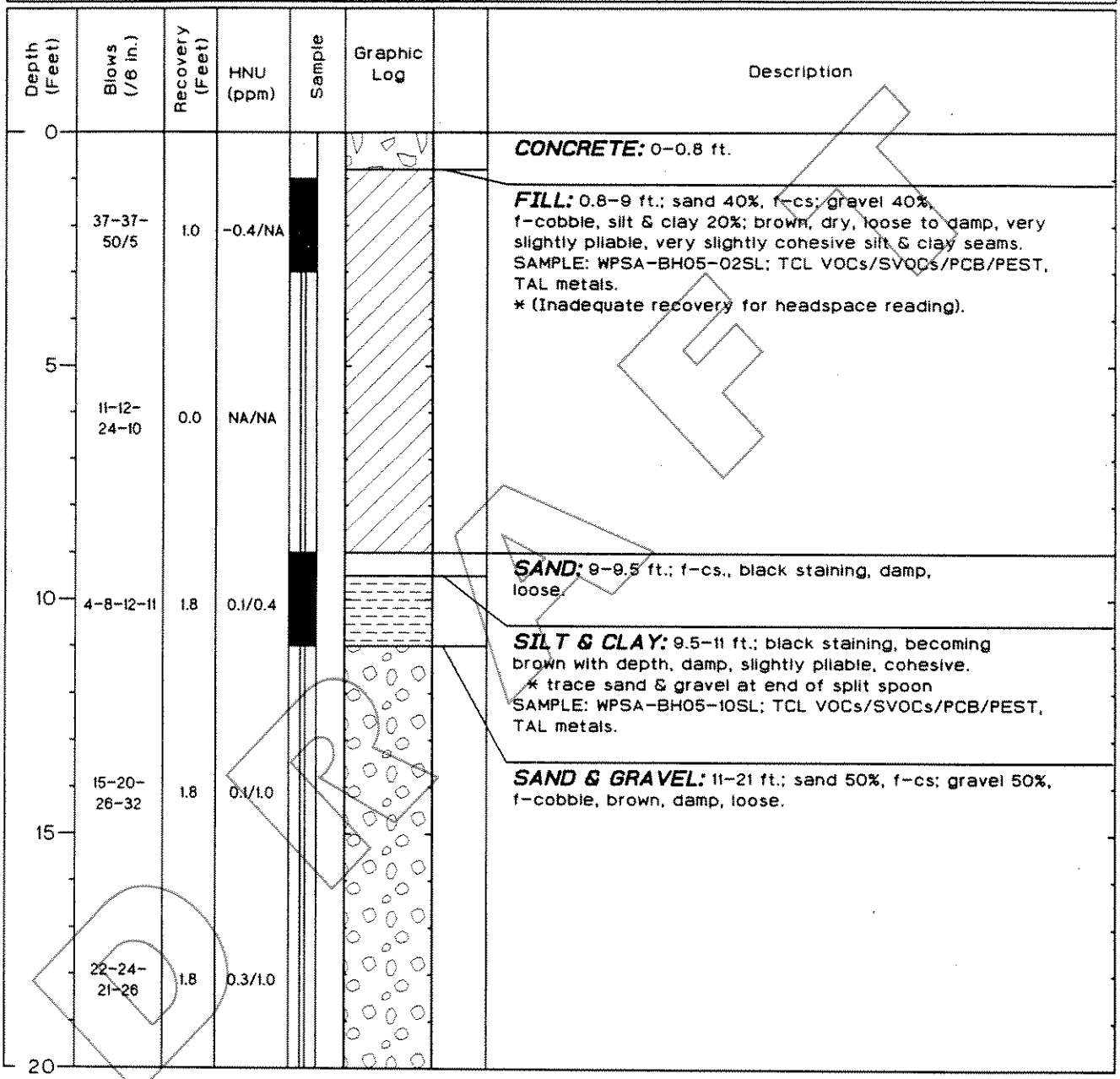
Sampling Personnel R. Astle

DRAFT

Geraghty & Miller, Inc.
Environmental Services

Log of Boring: WPSA-BH05

HARRISON RADIATOR – OH0019.018 Moraine, Ohio



DRAFT

■ Sample to Lab ▯ Sample Not Analyzed

Drilling Co.: Belasco Drilling
Driller: L. Bell
Drilling Method: Hollow-Stem Auger
Drilling Fluid: Plant Potable Water
Remarks: Split-Spoon

Geologist: R. Astle
Total Depth: 26
Surface Elev.:
Datum:
West Coor.:

Begin Drilling: 09/22/94
End Drilling: 09/22/94
Converted to Well: No
Well Name:
South Coor.:

OH0019.018

Geraghty & Miller, Inc.
Environmental Services

Log of Boring: WPSA-BH05

HARRISON RADIATOR - OH0019.018 Moraine, Ohio

Depth (Feet)	Blows (/6 in.)	Recovery (Feet)	HNU (ppm)	Sample	Graphic Log	Description
20						
	23-27-50/6	1.8	0.2/1.2			***SAND:*** 21-23 ft.; f-cs, brown, damp, loose SAMPLE: WPSA-BH05-22SL; TCL VOCs/SVOCs/PCB/PEST, TAL metals.
25						
	REFUSAL	0.0	NA/NA **			AUGER REFUSAL AT 26 ft. ** HNU Scan/HNU Headspace
30						
35						
40						

DRAFT

■ Sample to Lab ▯▯ Sample Not Analyzed

Drilling Co.: Belasco Drilling
Driller: L. Bell
Drilling Method: Hollow-Stem Auger
Drilling Fluid: Plant Potable Water
Remarks: Split-Spoon

Geologist: R. Astle
Total Depth: 26
Surface Elev.:
Datum:
West Coor.:

Begin Drilling: 09/22/94
End Drilling: 09/22/94
Converted to Well: No
Well Name:
South Coor.:

OH0019.018

SOIL/SEDIMENT SAMPLING LOG

Project/No. Harrison/OH0019.018 Page 1 of 3

Site Location Moraine, Ohio

Sample No. WPSA-BH05-02SL Coded/ Replicate No. _____ Date 9/22/94

Weather Cool; Overcast Time Sampling Began 12:00 p.m. Time Sampling Completed 2:10 p.m.

Sampling Method and Material 3 " stainless steel split spoon

Grab x Composite ___

From	To	Soil/Sediment Description
1'	3'	Sand, fine-coarse; gravel, fine-coarse; trace silt and clay; brown; dry to damp; loose to slightly pliable; semi-cohesive.

Other (OVA; HNU; etc.) HNU scan: 0.4 ppm; HNU headspace not available due to inadequate recovery.

Constituents Sampled	Container Description From Lab x or G&M ___	Preservative
TCL VOCs	4 oz glass jar	cool
TCL SVOCs/PCBs/Pesticides	8 oz glass jar	cool
TAL Metals	16 oz glass jar	cool

Remarks Sample waste pile staging area; boring No. 5, 1-3 ft.

Sampling Personnel R. Astle

DRAFT

SOIL/SEDIMENT SAMPLING LOG

Project/No. Harrison/OH0019.018 Page 2 of 3

Site Location Moraine, Ohio

Sample No. WPSA-BH05-10SL Coded/ Replicate No. _____ Date 9/22/94

Weather Cool; Overcast Time Sampling Began 1:50 p.m. Time Sampling Completed 2:00 p.m.

Sampling Method and Material 3 " stainless steel split spoon

Grab x Composite ____

From	To	Soil/Sediment Description
9'	11'	Silt and clay; black stained to brown; damp; slightly pliable; cohesive.

Other (OVA; HNU; etc.) HNU scan: 0.1 ppm; HNU headspace: 0.4 ppm

Constituents Sampled	Container Description From Lab x or G&M ____	Preservative
TCL VOCs	4 oz glass jar	cool
TCL SVOCs/PCBs/Pesticides	8 oz glass jar	cool
TAL Metals	16 oz glass jar	cool

Remarks Lowest headspace reading at waste pile staging area; boring No. 5, 9-11 ft.

Sampling Personnel R. Astle

DRAFT

SOIL/SEDIMENT SAMPLING LOG

Project/No. Harrison/OH0019.018 Page 3 of 3

Site Location Moraine, Ohio

Sample No. WPSA-BH05-22SL Coded/ Replicate No. DUP-25 Date 9/22/94

Weather Cool; Overcast Time Sampling Began 2:30 .m. Time Sampling Completed 2:40 .m.

Sampling Method and Material 3 " stainless steel split spoon

Grab x Composite ___

From	To	Soil/Sediment Description
21'	23'	Sand, fine-coarse; brown; damp; loose.

Other (OVA; HNU; etc.) HNU scan: 0.2 ppm; HNU headspace: 1.2 ppm

Constituents Sampled	Container Description From Lab x or G&M ___	Preservative
TCL VOCs	4 oz glass jar	cool
TCL SVOCs/PCBs/Pesticides	4 oz glass jar	cool
TAL Metals	16 oz glass jar	cool

Remarks Highest headspace reading at waste pile staging area; Boring No. 5, 21-23 ft.

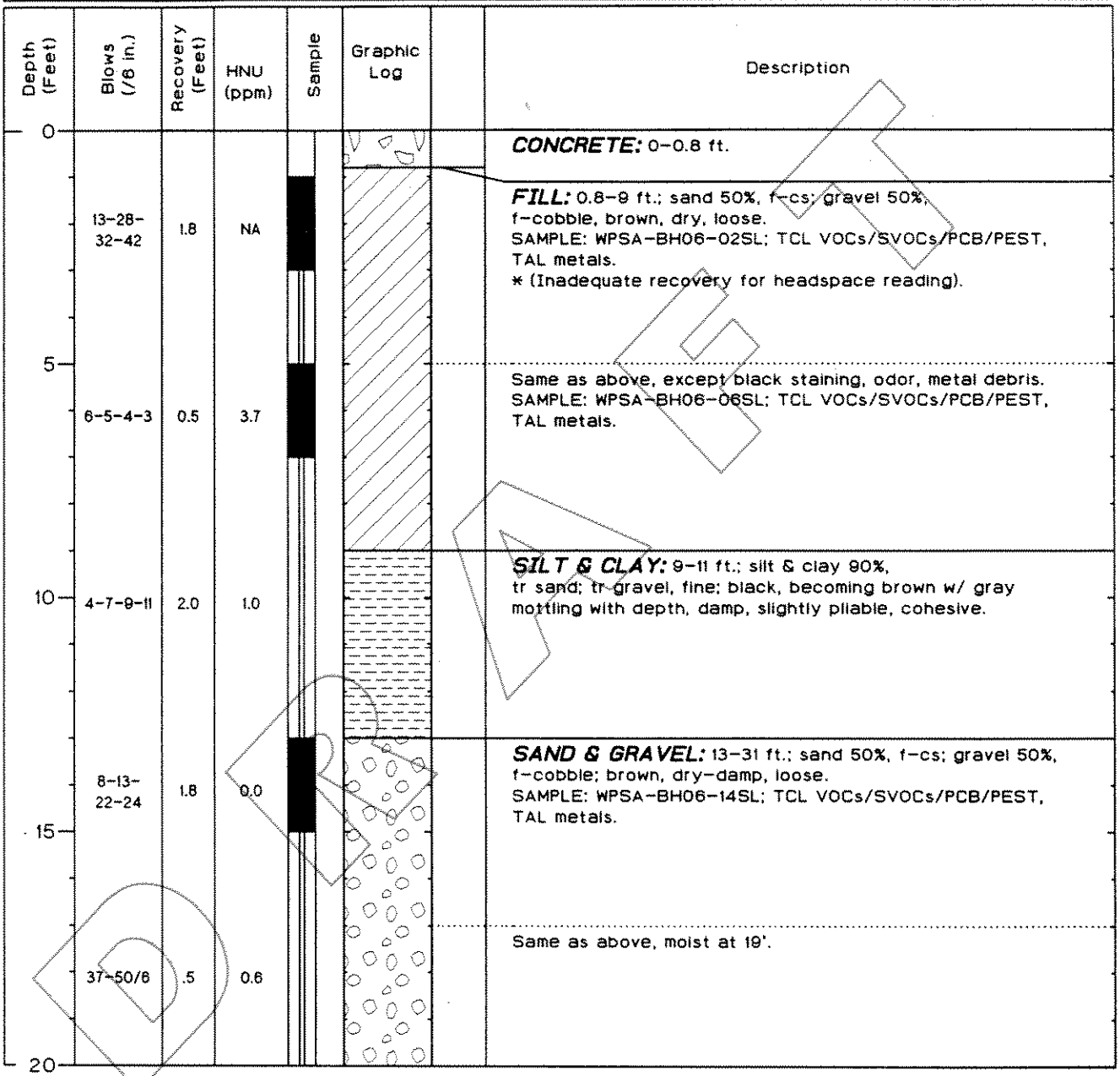
Sampling Personnel R. Astle

DRAFT

Geraghty & Miller, Inc.
Environmental Services

Log of Boring: WPSA-BH06

HARRISON RADIATOR – OH0019.018 Moraine, Ohio



DRAFT

■ Sample to Lab ▯▯ Sample Not Analyzed

Drilling Co.: Belasco Drilling
Driller: L. Bell
Drilling Method: Hollow-Stem Auger
Drilling Fluid: Plant Potable Water
Remarks: Split-Spoon

Geologist: R. Astle
Total Depth: 31
Surface Elev.:
Datum:
West Coor.:

Begin Drilling: 09/21/94
End Drilling: 09/21/94
Converted to Well: No
Well Name:
South Coor.:

OH0019.018

Geraghty & Miller, Inc.
Environmental Services

Log of Boring: WPSA-BH06

HARRISON RADIATOR – OH0019.018 Moraine, Ohio

Depth (Feet)	Blows (/6 in.)	Recovery (Feet)	HNU (ppm)	Sample	Graphic Log	Description
20	40-50/5	0.5	0.7			Same as above, damp.
25	15-56	0.5	1.0			Same as above, moist.
30	55	0.5	2.0			Same as above, moist-wet. NOTE: No HNU scan due to low battery. HNU battery OK during headspace readings.
35						
40						

DRAFT

■ Sample to Lab ▯ Sample Not Analyzed

Drilling Co.: Belasco Drilling
Driller: L. Bell
Drilling Method: Hollow-Stem Auger
Drilling Fluid: Plant Potable Water
Remarks: Split-Spoon

Geologist: R. Astle
Total Depth: 31
Surface Elev.:
Datum:
West Coor.:

Begin Drilling: 09/21/94
End Drilling: 09/21/94
Converted to Well: No
Well Name:
South Coor.:

OH0019.018

SOIL/SEDIMENT SAMPLING LOG

Project/No. Harrison/OH0019.018 Page 1 of 3

Site Location Moraine, Ohio

Sample No. WPSA-BH06-02SL Coded/ Replicate No. _____ Date 9/21/94

Weather Cool; Overcast Time Sampling Began 3:55 p.m. Time Sampling Completed 4:10 p.m.

Sampling Method and Material 3 " stainless steel split spoon

Grab x Composite ____

From	To	Soil/Sediment Description
1'	3'	Sand, fine-coarse; gravel, fine-cobble; brown; dry; loose.

Other (OVA; HNU; etc.) No HNU scan reading due to low battery; no HNU headspace reading due to inadequate sample recovery.

Constituents Sampled	Container Description From Lab x or G&M ____	Preservative
TCL VOCs	4 oz glass jar	cool
TCL SVOCs/PCBs/Pesticides	8 oz glass jar	cool
TAL Metals	16 oz glass jar	cool

Remarks Waste pile staging area; Boring No. 6, 1-3 ft.

Sampling Personnel R. Astle

DRAFT

SOIL/SEDIMENT SAMPLING LOG

Project/No. Harrison/OH0019.018 Page 2 of 3

Site Location Moraine, Ohio

Sample No. WPSA-BH06-06SL Coded/ Replicate No. _____ Date 9/21/94

Weather Cool; Overcast Time Sampling Began 4:10 p.m. Time Sampling Completed 4:20 p.m.

Sampling Method and Material 3 " stainless steel split spoon

Grab x Composite ____

From	To	Soil/Sediment Description
5'	7'	Sand, fine-coarse; gravel, fine-cobble; trace silt and clay; dark staining; dry; loose; odor; metal debris.

Other (OVA; HNU; etc.) No HNU scan reading due to low battery; HNU headspace: 3.7ppm

Constituents Sampled	Container Description From Lab x or G&M ____	Preservative
TCL VOCs	4 oz glass jar	cool
TCL SVOCs/PCBs/Pesticides	8 oz glass jar	cool
TAL Metals	16 oz glass jar	cool

Remarks Highest headspace sample reading at waste pile staging area; Boring No. 6, 5-7 ft.

Sampling Personnel R. Astle

DRAFT

SOIL/SEDIMENT SAMPLING LOG

Project/No. Harrison/OH0019.018 Page 3 of 3

Site Location Moraine, Ohio

Sample No. WPSA-BH06-14SL Coded/ Replicate No. _____ Date 9/21/94

Weather Cool; Overcast Time Sampling Began 4:30 p.m. Time Sampling Completed 4:40 p.m.

Sampling Method and Material 3 " stainless steel split spoon

Grab x Composite ___

From	To	Soil/Sediment Description
13'	15'	Sand, fine-coarse; gravel, fine-cobble; brown; dry-damp; loose.

Other (OVA; HNU; etc.) No HNU scan reading due to low battery; HNU headspace: 0 ppm

Constituents Sampled	Container Description From Lab x or G&M ___	Preservative
TCL VOCs	4 oz glass jar	cool
TCL SVOCs/PCBs/Pesticides	4 oz glass jar	cool
TAL Metals	16 oz glass jar	cool

Remarks Lowest headspace sample reading at waste pile staging area; Boring No. 6, 13-15 ft.

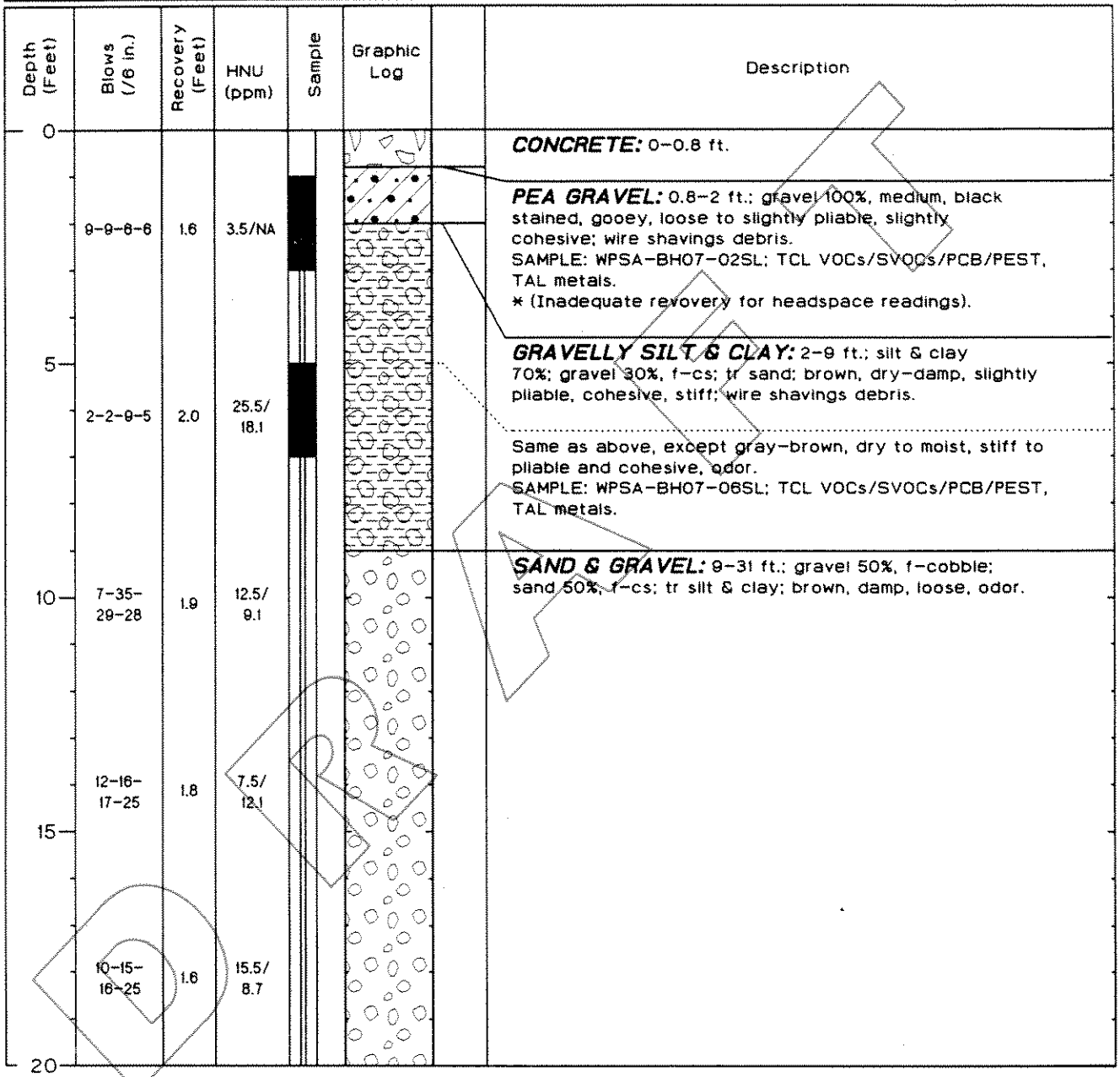
Sampling Personnel R. Astle

DRAFT

Geraghty & Miller, Inc.
Environmental Services

Log of Boring: WPSA-BH07

HARRISON RADIATOR – OH0019.018 Moraine, Ohio



DRAFT

■ Sample to Lab ▯ Sample Not Analyzed

Drilling Co.: Belasco Drilling
Driller: L. Bell
Drilling Method: Hollow-Stem Auger
Drilling Fluid: Plant Potable Water
Remarks: Split-Spoon

Geologist: R. Astle
Total Depth: 31
Surface Elev.:
Datum:
West Coor.:

Begin Drilling: 09/23/94
End Drilling: 09/23/94
Converted to Well: No
Well Name:
South Coor.:

OH0019.018

Geraghty & Miller, Inc.
Environmental Services

Log of Boring: WPSA-BH07

HARRISON RADIATOR – 0H0019.018 Moraine, Ohio

Depth (Feet)	Blows (/6 in.)	Recovery (Feet)	HNU (ppm)	Sample	Graphic Log	Description
20						
	25-25-32-30	1.9	6.5/5.1			Same as above, except stained black from 22.5 to 23 ft. SAMPLE: WPSA-BH07-22SL: TCL VOCs/SVOCs/PCB/PEST, TAL metals.
25	26-27-32-44	1.8	6.5/13.1			
						Water at 29', turbid, thick, oil-like.
30	29-32-38-40	1.9	6.5/11.1			
			**			** HNU Scan/HNU Headspace
35						
40						

DRAFT

■ Sample to Lab ▯▯ Sample Not Analyzed

Drilling Co.: Belasco Drilling
Driller: L. Bell
Drilling Method: Hollow-Stem Auger
Drilling Fluid: Plant Potable Water
Remarks: Split-Spoon

Geologist: R. Astle
Total Depth: 31
Surface Elev.:
Datum:
West Coor.:

Begin Drilling: 09/23/94
End Drilling: 09/23/94
Converted to Well: No
Well Name:
South Coor.:

0H0019.018

SOIL/SEDIMENT SAMPLING LOG

Project/No. Harrison/OH0019.018 Page 1 of 3

Site Location Moraine, Ohio

Sample No. WPSA-BH07-06SL Coded/ Replicate No. _____ Date 9/23/94

Weather Cool; Overcast Time Sampling Began 11:50 a.m. Time Sampling Completed 12:00 p.m.

Sampling Method and Material 3" stainless steel split spoon

Grab x Composite ____

From	To	Soil/Sediment Description
5'	7'	Gravelly silt and clay, trace sand; gray-brown; dry-moist; stiff to pliable and cohesive; odor.

Other (OVA; HNU; etc.) HNU scan: 25.5 ppm, HNU headspace: 18.1 ppm

Constituents Sampled	Container Description From Lab x or G&M ___	Preservative
TCL VOCs	4 oz glass jar	cool
TCL SVOCs/PCBs/Pesticides	8 oz glass jar	cool
TAL Metals	16 oz glass jar	cool

Remarks Highest headspace reading at waste pile staging area; Boring No. 7, 5-7 ft.

Sampling Personnel R. Astle

DRAFT

SOIL/SEDIMENT SAMPLING LOG

Project/No. Harrison/OH0019.018 Page 2 of 3

Site Location Moraine, Ohio

Sample No. WPSA-BH07-02SL Coded/ Replicate No. _____ Date 9/23/94

Weather Cool; Overcast Time Sampling Began 11:40 a.m. Time Sampling Completed 11:50 a.m.

Sampling Method and Material 3 " stainless-steel split spoon

Grab x Composite ___

From	To	Soil/Sediment Description
1'	3'	Gravel, medium; black stained; gooey; loose to slightly pliable; and cohesive with gravelly silt and clay; brown; dry-damp; slightly pliable; slightly cohesive; wire debris.

Other (OVA; HNU; etc.) HNU scan: 3.5 ppm, inadequate recovery for headspace reading.

Constituents Sampled	Container Description From Lab x or G&M ___	Preservative
TCL VOCs	4 oz glass jar	cool
TCL SVOCs/PCBs/Pesticides	8 oz glass jar	cool
TAL Metals	16 oz glass jar	cool

Remarks Sampled waste pile staging area; Boring No. 7, 1-3 ft.

Sampling Personnel R. Astle

DRAFT

SOIL/SEDIMENT SAMPLING LOG

Project/No. Harrison/OH0019.018 Page 3 of 3

Site Location Moraine, Ohio

Sample No. WPSA-BH07-22SL Coded/ Replicate No. _____ Date 9/23/94

Weather Cool; Overcast Time Sampling Began 1:45 p.m. Time Sampling Completed 2:00 p.m.

Sampling Method and Material 3 " stainless steel split spoon

Grab x Composite ___

From	To	Soil/Sediment Description
21'	23'	Sand, fine-coarse; gravel, fine-cobble; trace silt and clay; black stained; damp; loose; odor.

Other (OVA; HNU; etc.) HNU scan: 6.5 ppm, HNU headspace: 5.1 ppm

Constituents Sampled	Container Description From Lab x or G&M ___	Preservative
TCL VOCs	4 oz glass jar	cool
TCL SVOCs/PCBs/Pesticides	8 oz glass jar	cool
TAL Metals	16 oz glass jar	cool

Remarks Lowest headspace reading at waste pile staging area; Boring No. 7, 21-23 ft

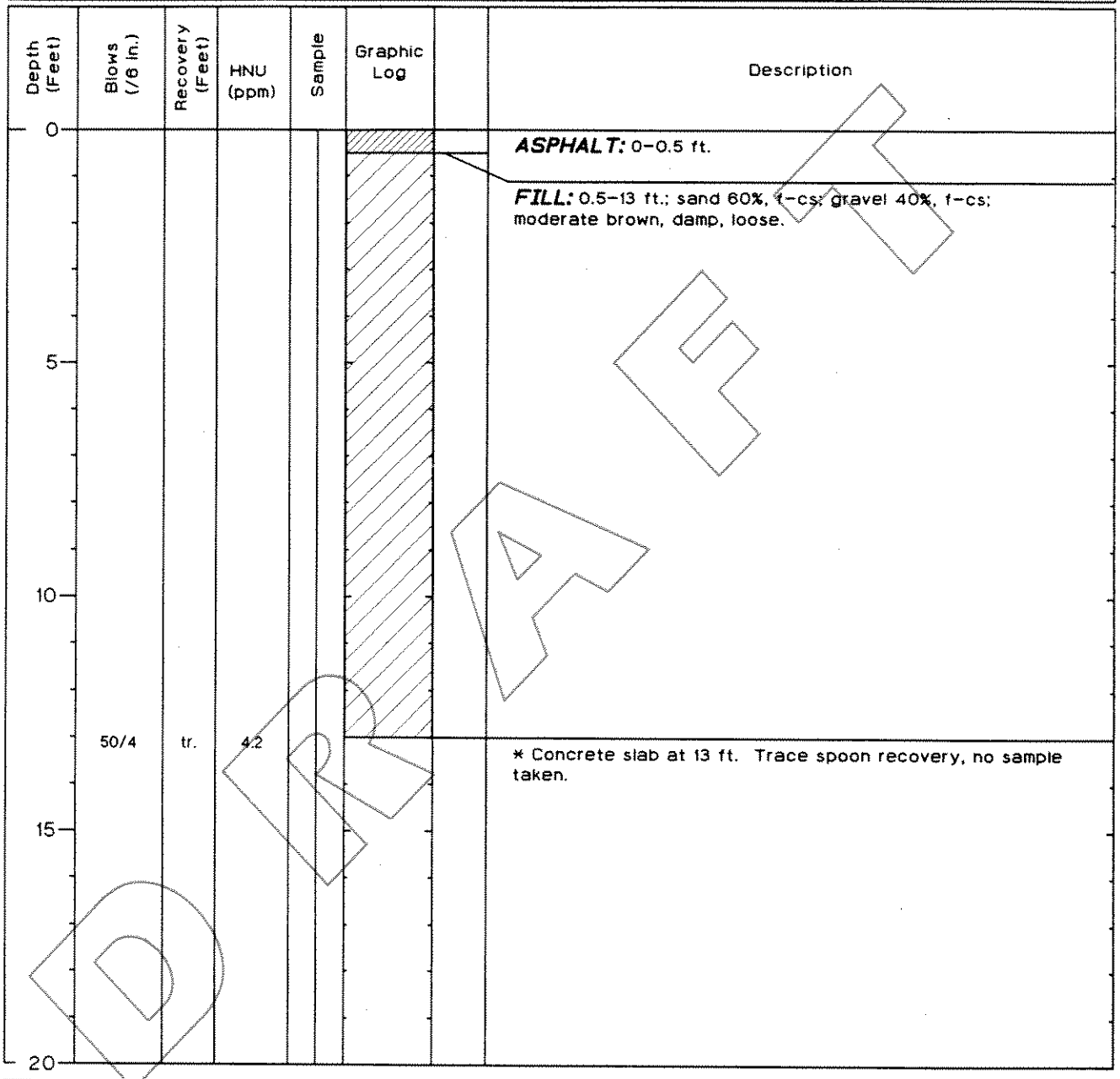
Sampling Personnel R. Astle

DRAFT

Geraghty & Miller, Inc.
Environmental Services

Log of Boring: T10-BH01A

HARRISON RADIATOR - OH0019.018 Moraine, Ohio



DRAFT

■ Sample to Lab ▯▯ Sample Not Analyzed

Drilling Co.: Belasco Drilling
Driller: L. Bell
Drilling Method: Hollow-Stem Auger
Drilling Fluid: None
Remarks: Split-Spoon

Geologist: R. Astle
Total Depth: 13
Surface Elev.:
Datum:
West Coor.:

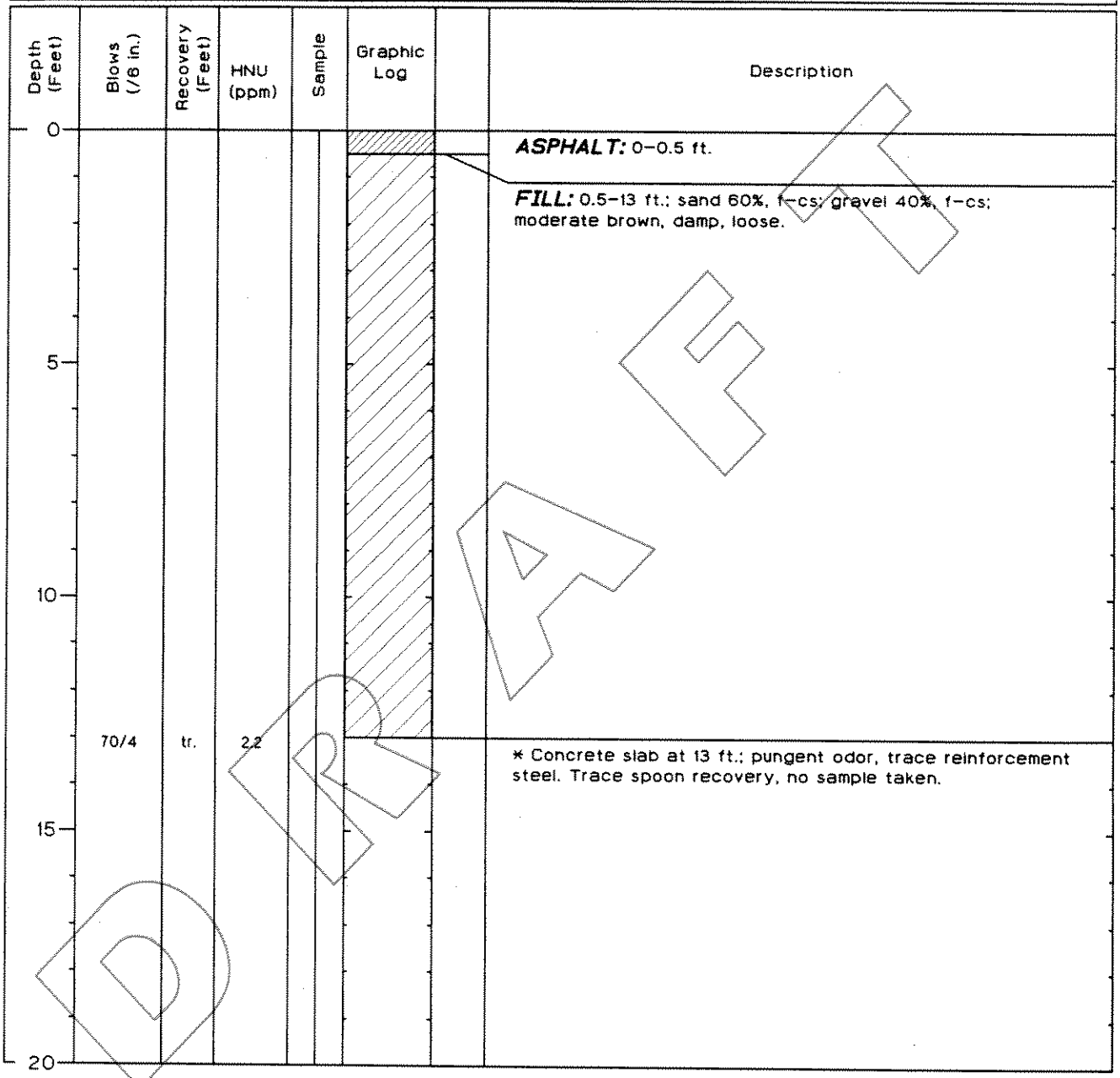
Begin Drilling: 09/20/94
End Drilling: 09/20/94
Converted to Well: No
Well Name:
South Coor.:

OH0019.018

Geraghty & Miller, Inc.
Environmental Services

Log of Boring: T10-BH01B

HARRISON RADIATOR - OH0019.018 Moraine, Ohio



DRAFT

■ Sample to Lab ▯ Sample Not Analyzed

Drilling Co.: Belasco Drilling
Driller: L. Bell
Drilling Method: Hollow-Stem Auger
Drilling Fluid: None
Remarks: Split-Spoon

Geologist: R. Astle
Total Depth: 13
Surface Elev.:
Datum:
West Coor.:

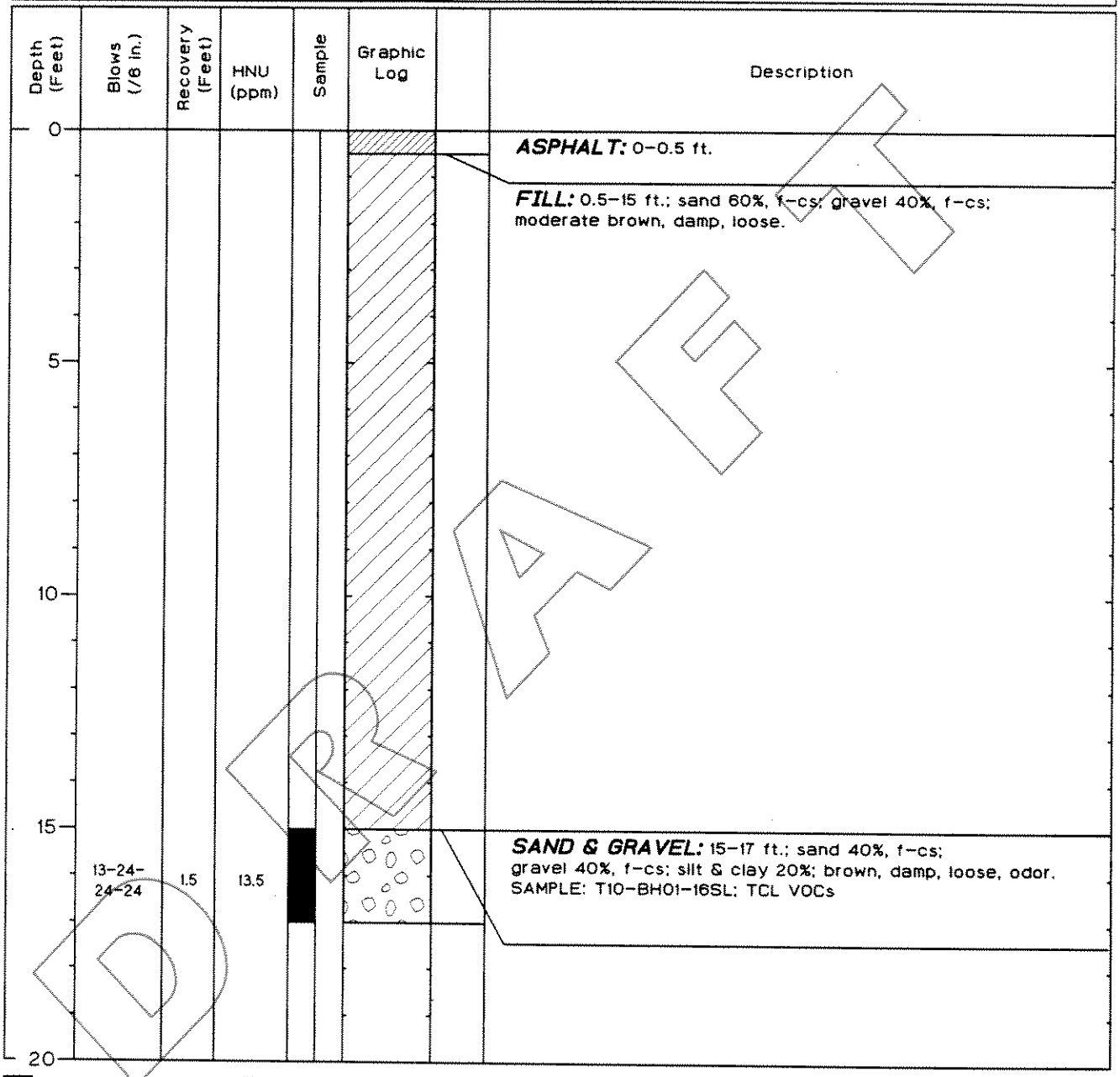
Begin Drilling: 09/20/94
End Drilling: 09/20/94
Converted to Well: No
Well Name:
South Coor.:

OH0019.018

Geraghty & Miller, Inc.
Environmental Services

Log of Boring: T10-BH01C

HARRISON RADIATOR - OH0019.018 Moraine, Ohio



DRAFT

■ Sample to Lab ▯ Sample Not Analyzed

Drilling Co.: Belasco Drilling
Driller: L. Bell
Drilling Method: Hollow-Stem Auger
Drilling Fluid: None
Remarks: Split-Spoon

Geologist: R. Astle
Total Depth: 17
Surface Elev.:
Datum:
West Coor.:

Begin Drilling: 09/20/94
End Drilling: 09/20/94
Converted to Well: No
Well Name:
South Coor.:

OH0019.018

SOIL/SEDIMENT SAMPLING LOG

Project/No. Harrison/OH0019.018 Page 1 of 1

Site Location Moraine, Ohio

Sample No. T10-BH-01-16SL Coded/ Replicate No. DUP-27 Date 9/27/94

Weather Cool; Overcast Time Sampling Began 1:30p.m. Time Sampling Completed 1:40p.m.

Sampling Method and Material 2" stainless steel split spoon

Grab x Composite ___

From	To	Soil/Sediment Description
15'	17'	Sand (40%) fine-coarse; gravel (40%) fine-coarse; silt and clay (20%); brown; damp; loose; odor.

Other (OVA; HNU; etc.) HNU scan: 13.5 ppm

Constituents Sampled	Container Description From Lab x or G&M ___	Preservative
TCL VOCs	4 oz glass jar	cool

Remarks Sample taken on third attempt (T10-BH01L) due to cement slab obstruction

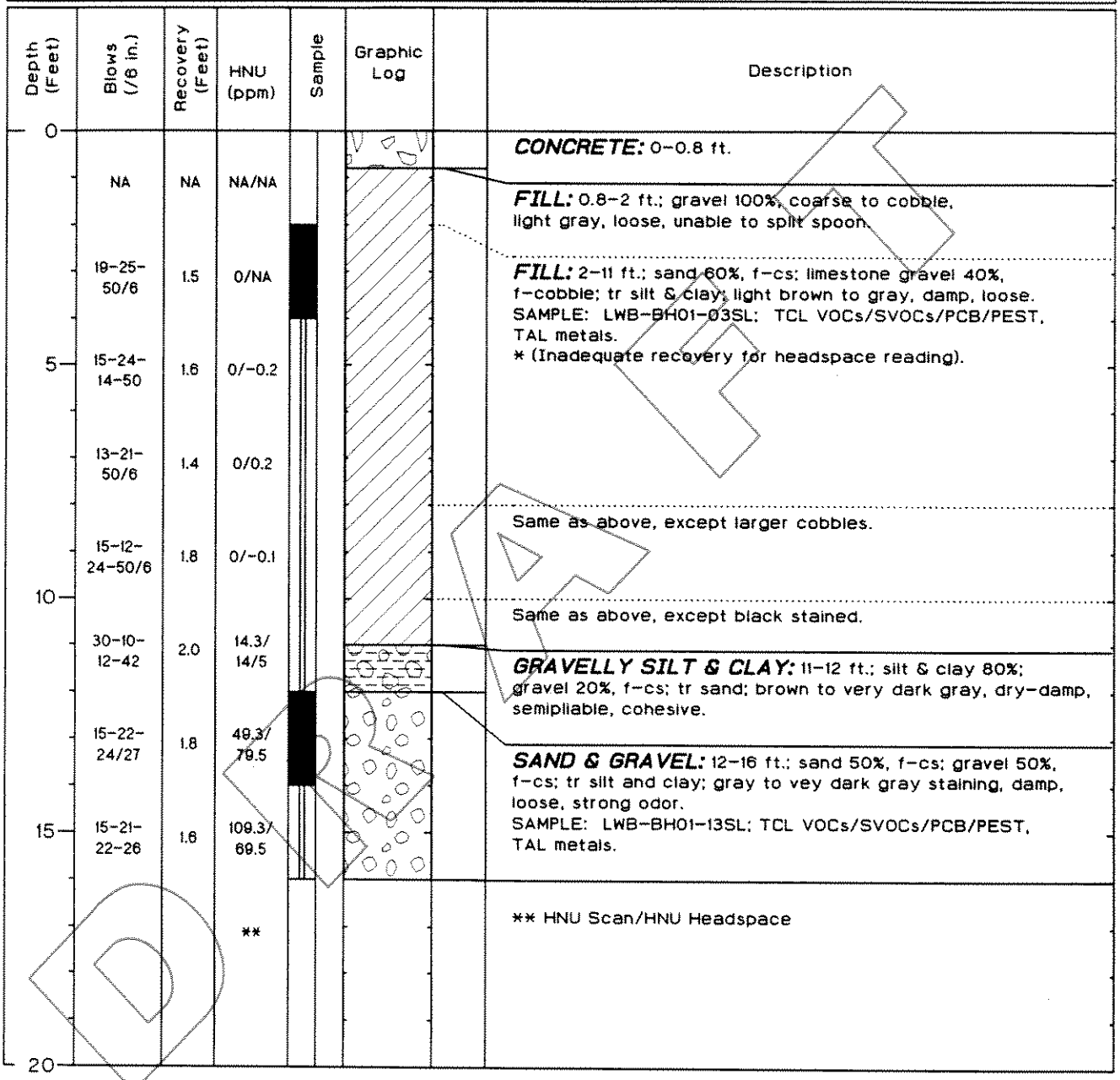
Sampling Personnel R. Astle

DRAFT

Geraghty & Miller, Inc.
Environmental Services

Log of Boring: LWB-BH01

HARRISON RADIATOR - OH0019.018 Moraine, Ohio



DRAFT

■ Sample to Lab ▯ Sample Not Analyzed

Drilling Co.: Belasco Drilling
Driller: L. Bell
Drilling Method: Hollow-Stem Auger
Drilling Fluid: None
Remarks: Split Spoon

Geologist: R. Astle
Total Depth: 16
Surface Elev.:
Datum:
West Coor.:

Begin Drilling: 09/21/94
End Drilling: 09/21/94
Converted to Well: No
Well Name:
South Coor.:

OH0019.018

SOIL/SEDIMENT SAMPLING LOG

Project/No. Harrison/OH0019.018 Page 1 of 2

Site Location Moraine, Ohio

Sample No. LWB-BH01-03SL Coded/ Replicate No. _____ Date 9/21/94

Weather Cool; Overcast Time Sampling Began 9:25 a.m. Time Sampling Completed 9:35 a.m.

Sampling Method and Material 3 " stainless steel split spoon

Grab x Composite ___

From	To	Soil/Sediment Description
2'	4'	Fill: sand, fine-coarse; gravel, fine-cobble; trace silt and clay; light brown to gray; damp; loose.

Other (OVA; HNU; etc.) HNU scan: 0 ppm; HNU headspace: NA *Inadequate recovery to headspace reading

Constituents Sampled	Container Description From Lab x or G&M ___	Preservative
TCL VOCs	4 oz glass jar	cool
TCL SVOCs/PCBs/Pesticides	8 oz glass jar	cool
TAL Metals	16 oz glass jar	cool

Remarks Liquid waste burner, boring No. 1, 2-4ft. Unable to sample until 2 ft. below ground surface. Concrete 0-1 ft.; large cobbles 1-2ft.

Sampling Personnel R. Astle

DRAFT

SOIL/SEDIMENT SAMPLING LOG

Project/No. Harrison/OH0019.018 Page 2 of 2

Site Location Moraine, Ohio

Sample No. LWB-BH01-13SL Coded/ Replicate No. DUP-24 Date 9/21/94

Weather Cool; Overcast Time Sampling Began 9:50 a.m. Time Sampling Completed 10:10 a.m.

Sampling Method and Material 3 " stainless steel split spoon

Grab x Composite ___

From	To	Soil/Sediment Description
12'	14'	Sand and gravel: sand, fine-coarse; gravel, fine-coarse; trace silt and clay; gray to very dark gray staining; damp; loose; strong odor.

Other (OVA; HNU; etc.) HNU scan: 49.3 ppm; HNU headspace: 79.5 ppm

Constituents Sampled	Container Description From Lab x or G&M ___	Preservative
TCL VOCs	4 oz glass jar	cool
TCL SVOCs/PCBs/Pesticides	8 oz glass jar	cool
TAL Metals	16 oz glass jar	cool

Remarks Highest headspace reading at liquid waste burner; boring no. 1, 12-14 ft.

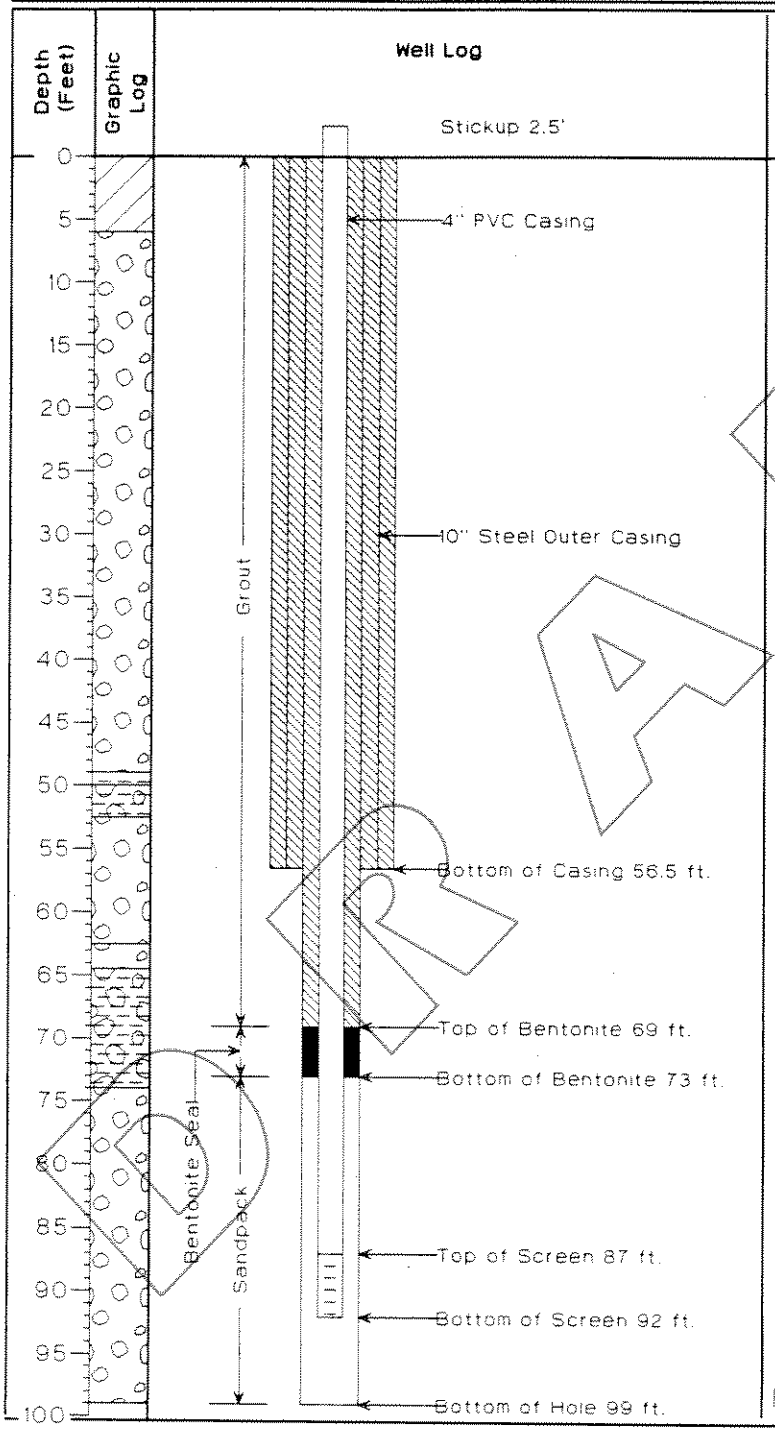
Sampling Personnel R. Astle

DRAFT

Geraghty & Miller, Inc.
Environmental Services

Well Construction Log: GM-20D

HARRISON RADIATOR - OH0019.018 Moraine, Ohio



Well Construction Details

Well Type: Monitor Well
Total Depth Drilled: 99
Surface Elev.:
Meas. Point Elev.:
Meas. Point Desc.:
Datum:
Drilling Co.: Belasco Drilling/Reynolds
Driller: R. Fisher/S. Belt
Drilling Method: Hollow-Stem/Cable
Drilling Fluid: None/Plant Potable Water
Begin Drilling: 10/03/94
End Drilling: 10/13/94
Begin Well Instal.: 10/14/94
End Well Instal.: 10/14/94
Development Tech.: 2' Submersible Pump/Bailer
Begin Development: 10/19/94
End Development: 11/01/94
Fluid Loss: 1750 (1000 in Lower Aquifer)
Fluid Developed: 1190
Pumping DTW: 36.33
Pumping Duration: 6 hrs.
Yield: 2
Specific Capacity:
Static Water Level: 26.25
Fracture Zones:

DRAFT

For Lithologic Descriptions See Log of Boring: *GM-20D*

Page 1 of 1

West Coor.: South Coor.:

Remarks: Bentonite fell into well; removed w/ bailer.

Geologist: R. Astle

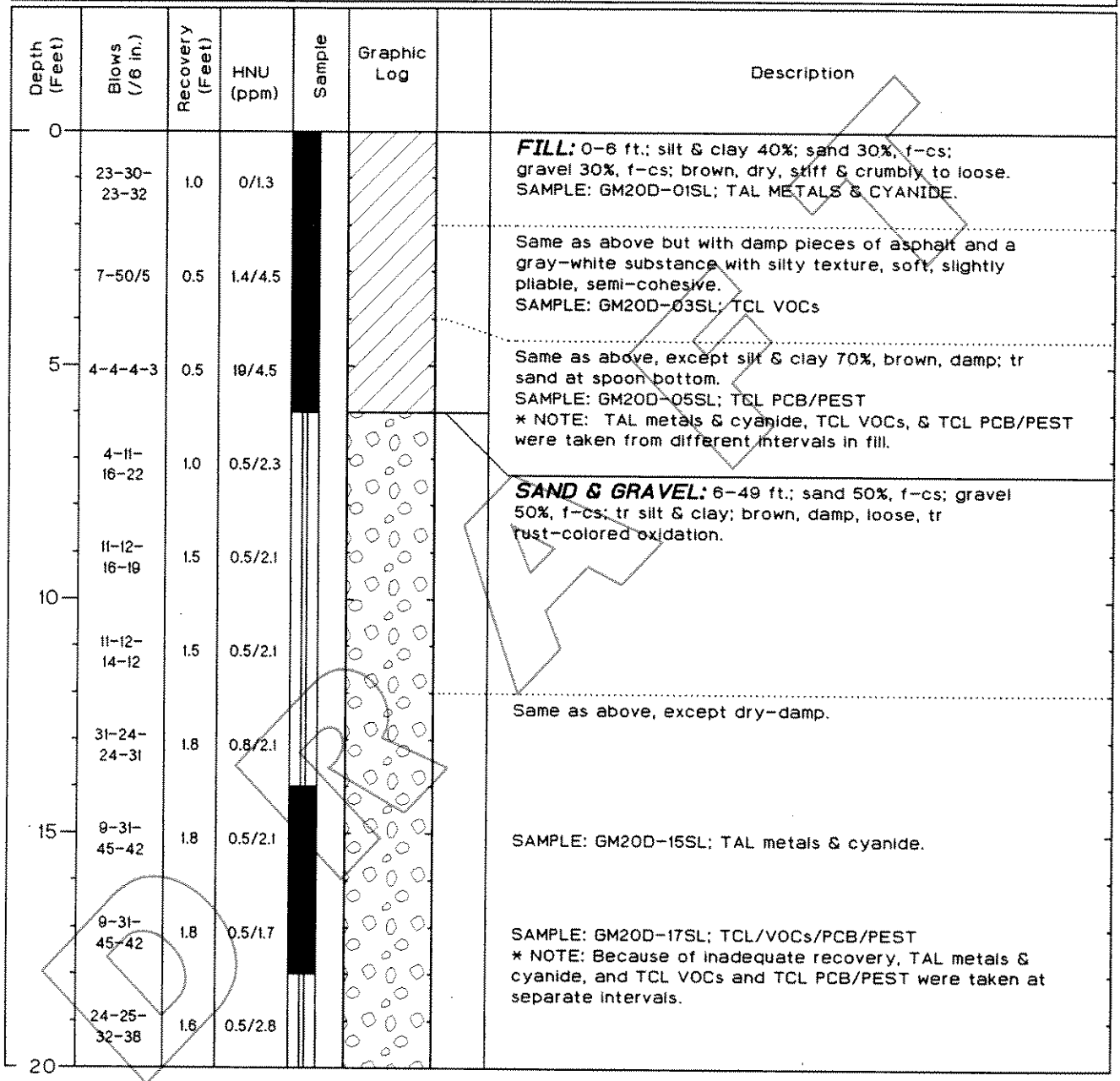
OH0019.018

GM-20D

Geraghty & Miller, Inc.
Environmental Services

Log of Boring: GM-20D

HARRISON RADIATOR – OH0019.018 Moraine, Ohio



DRAFT

■ Sample to Lab ▯ Sample Not Analyzed

Drilling Co.: Belasco Drilling/Reynolds
Driller: R. Fisher/S. Belt
Drilling Method: Hollow-Stem/Cable
Drilling Fluid: None/Plant Potable Water
Remarks: Split-Spoon to 36'. Cable to 99'.
OH0019.018

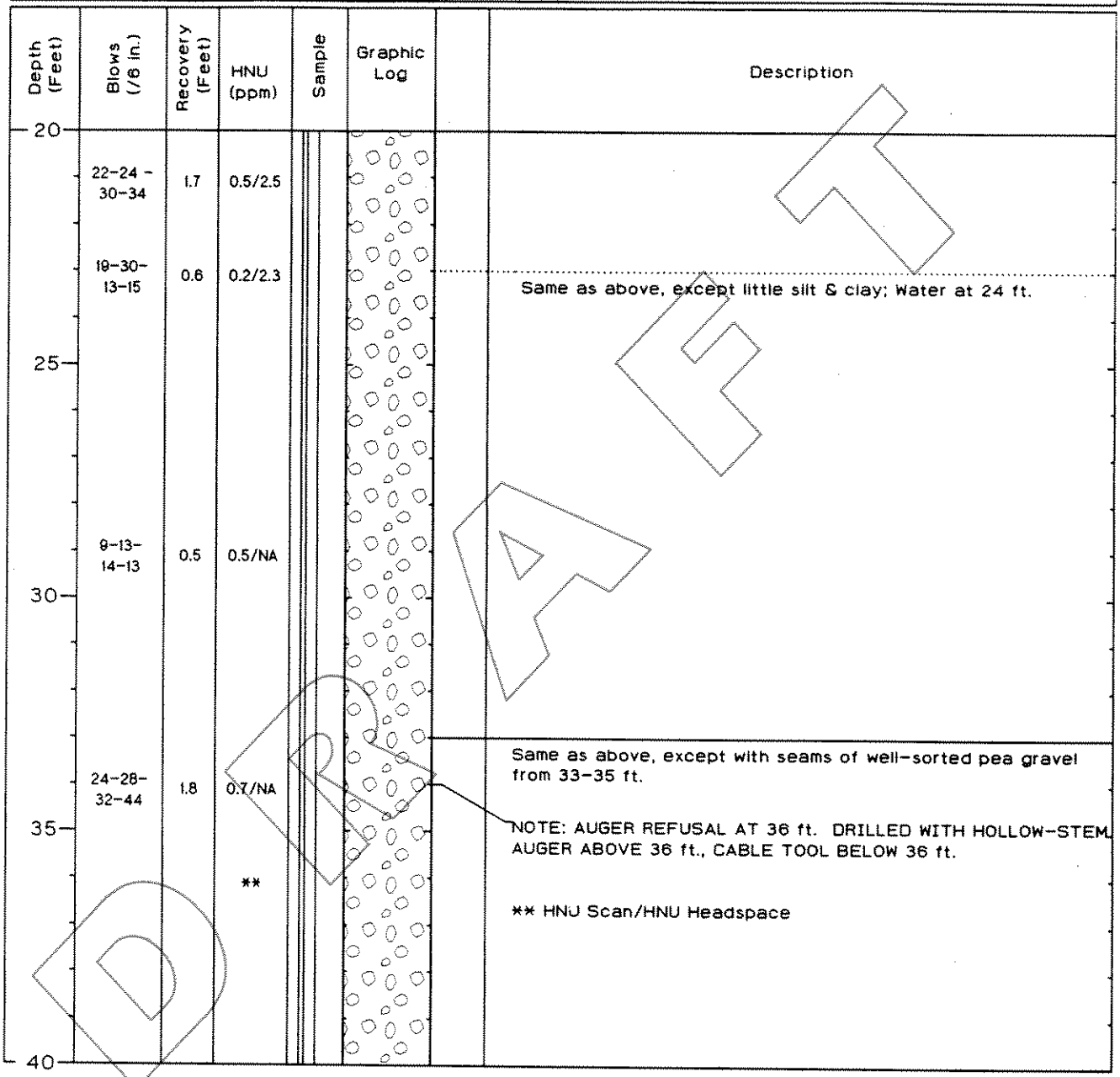
Geologist: R. Astle
Total Depth: 99
Surface Elev.:
Datum:
West Coor.:

Begin Drilling: 10/03/94
End Drilling: 10/13/94
Converted to Well: Yes
Well Name: GM-20D
South Coor.:
GM-20D

Geraghty & Miller, Inc.
Environmental Services

Log of Boring: GM-20D

HARRISON RADIATOR – OH0019.018 Moraine, Ohio



DRAFT

■ Sample to Lab ▯ Sample Not Analyzed

Drilling Co.: Belasco Drilling/Reynolds
Driller: R. Fisher/S. Belt
Drilling Method: Hollow-Stem/Cable
Drilling Fluid: None/Plant Potable Water
Remarks: Split-Spoon to 36'. Cable to 99'.
OH0019.018

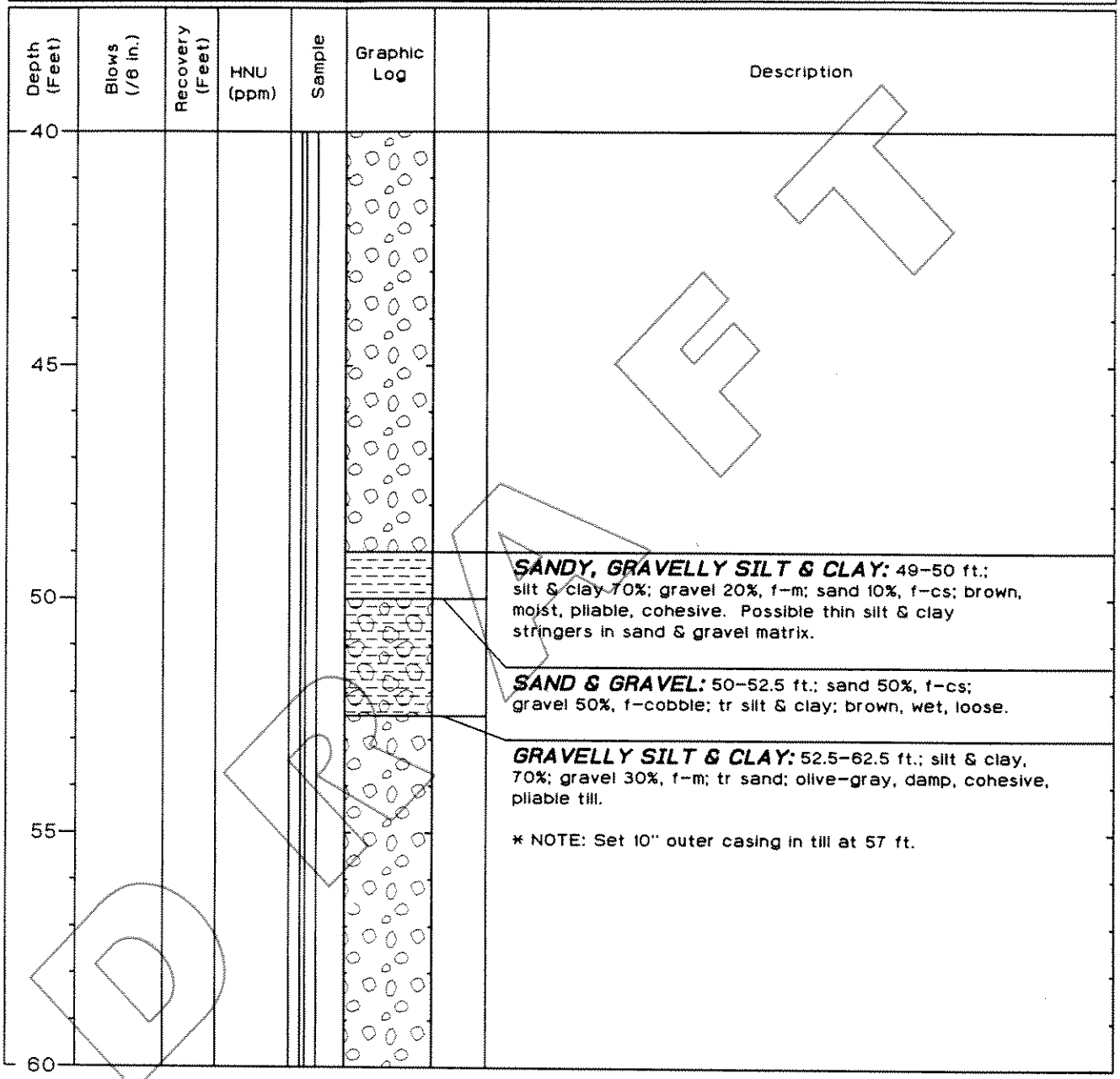
Geologist: R. Astle
Total Depth: 99
Surface Elev.:
Datum:
West Coor.:

Begin Drilling: 10/03/94
End Drilling: 10/13/94
Converted to Well: Yes
Well Name: GM-20D
South Coor.:
GM-20D

Geraghty & Miller, Inc.
Environmental Services

Log of Boring: GM-20D

HARRISON RADIATOR - OH0019.018 Moraine, Ohio



■ Sample to Lab ▯ Sample Not Analyzed

Drilling Co.: Belasco Drilling/Reynolds
Driller: R. Fisher/S. Belt
Drilling Method: Hollow-Stem/Cable
Drilling Fluid: None/Plant Potable Water
Remarks: Split-Spoon to 36'. Cable to 99'.
OH0019.018

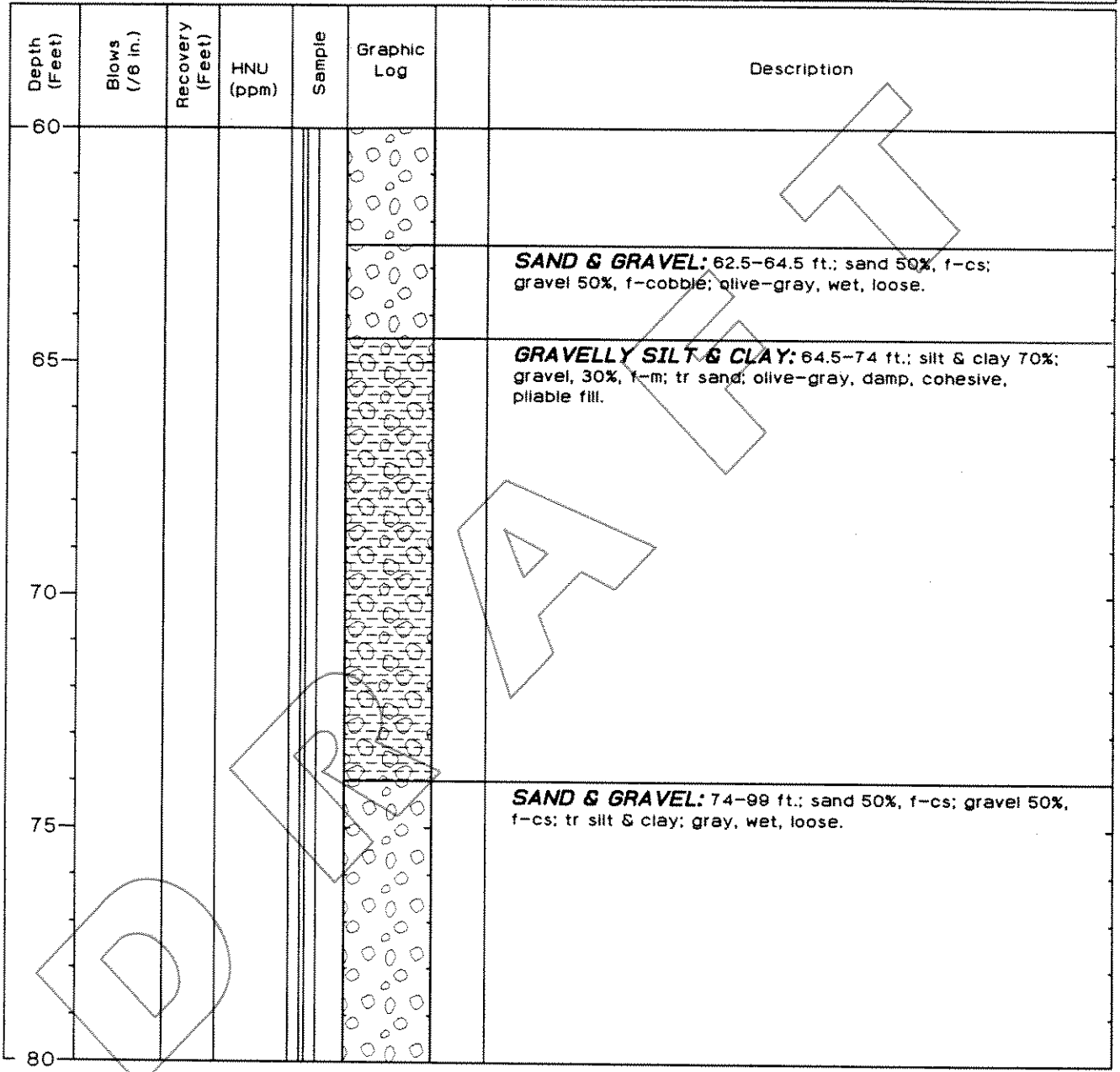
Geologist: R. Astle
Total Depth: 99
Surface Elev.:
Datum:
West Coor.:

Begin Drilling: 10/03/94
End Drilling: 10/13/94
Converted to Well: Yes
Well Name: GM-20D
South Coor.:
GM-20D

Geraghty & Miller, Inc.
Environmental Services

Log of Boring: GM-20D

HARRISON RADIATOR – OH0019.018 Moraine, Ohio



DRAFT

■ Sample to Lab ▯ Sample Not Analyzed

Drilling Co.: Belasco Drilling/Reynolds
Driller: R. Fisher/S. Belt
Drilling Method: Hollow-Stem/Cable
Drilling Fluid: None/Plant Potable Water
Remarks: Split-Spoon to 36'. Cable to 99'.
OH0019.018

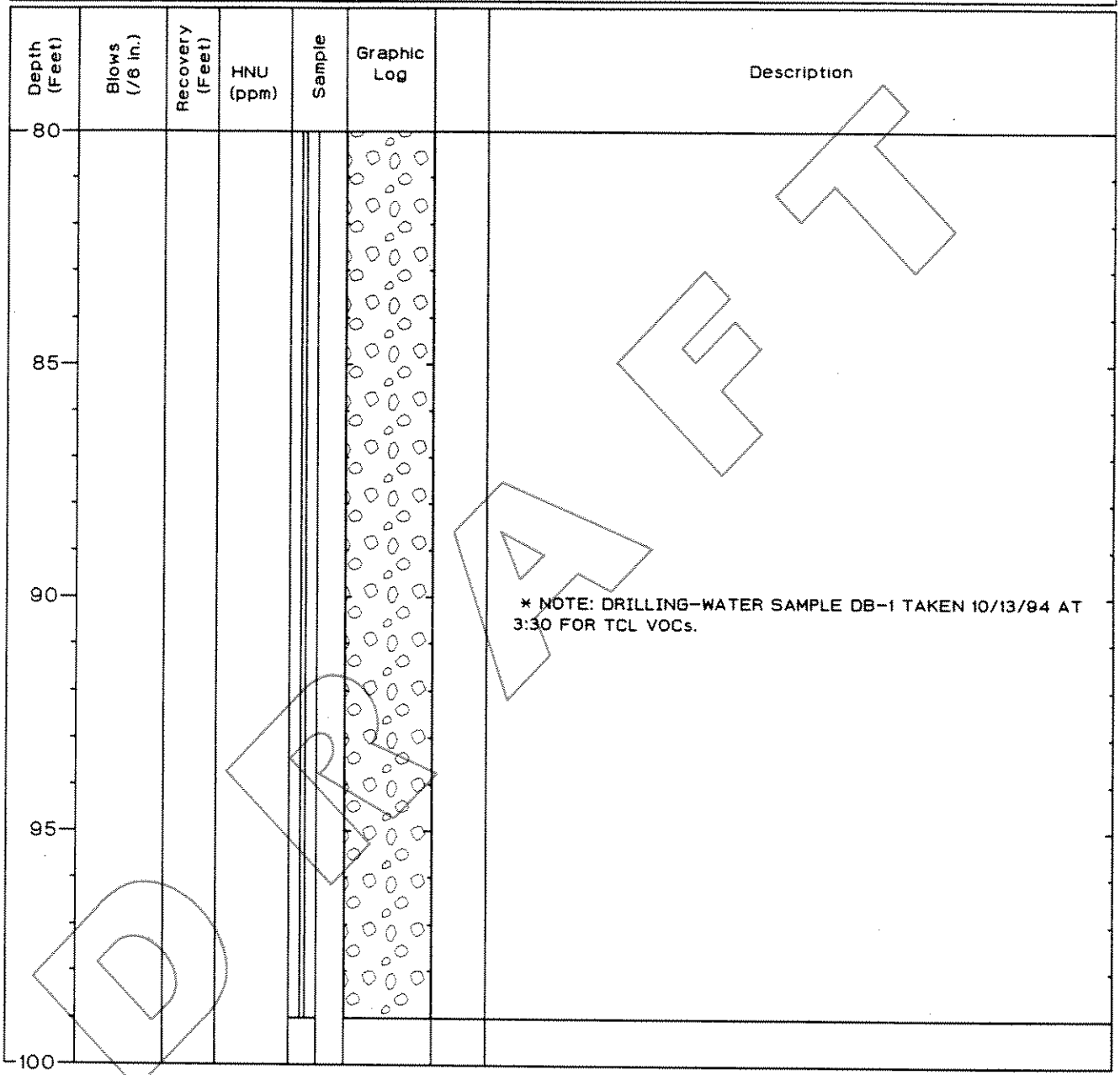
Geologist: R. Astle
Total Depth: 99
Surface Elev.:
Datum:
West Coor.:

Begin Drilling: 10/03/94
End Drilling: 10/13/94
Converted to Well: Yes
Well Name: GM-20D
South Coor.:
GM-20D

Geraghty & Miller, Inc.
Environmental Services

Log of Boring: GM-20D

HARRISON RADIATOR - OH0019.018 Moraine, Ohio



DRAFT

■ Sample to Lab ▯ Sample Not Analyzed

Drilling Co.: Belasco Drilling/Reynolds
Driller: R. Fisher/S. Belt
Drilling Method: Hollow-Stem/Cable
Drilling Fluid: None/Plant Potable Water
Remarks: Split-Spoon to 36'. Cable to 99'.
OH0019.018

Geologist: R. Astle
Total Depth: 99
Surface Elev.:
Datum:
West Coor.:

Begin Drilling: 10/03/94
End Drilling: 10/13/94
Converted to Well: Yes
Well Name: GM-20D
South Coor.:
GM-20D

SOIL/SEDIMENT SAMPLING LOG

Project/No. Harrison/OH0019.018 Page 1 of 5

Site Location Moraine, Ohio

Sample No. GM20D-01SL Coded/ Replicate No. DUP-28 Date 10/3/94

Weather Cool; Overcast Time Sampling Began 11:50 a.m. Time Sampling Completed 12:00 p.m.

Sampling Method and Material 2" stainless steel split spoon

Grab x Composite ___

From	To	Soil/Sediment Description
0'	2'	Sand, gravel and silt and clay, brown, dry, stiff, crubly to loose.

Other (OVA; HNU; etc.) HNu scan: 2.4 ppp; HNu headspace

Constituents Sampled	Container Description From Lab x or G&M ___	Preservative
TCL VOCs	4 oz glass jar	cool

Remarks Highest headspace reading 2-4 ft. and 4-6 ft., only TCL VOCs were taken due to poor recovery.

Sampling Personnel R. Astle

DRAFT

SOIL/SEDIMENT SAMPLING LOG

Project/No. Harrison/OH0019.018 Page 2 of 5

Site Location Moraine, Ohio

Sample No. GM20D-03SL Coded/ Replicate No. DUP-28 Date 10/3/94

Weather Cool; Overcast Time Sampling Began 12:30 p.m. Time Sampling Completed 12:40 p.m.

Sampling Method and Material 2" stainless steel split spoon

Grab x Composite ___

From	To	Soil/Sediment Description
4'	6'	Silt and clay with sand and gravel; brown; damp.

Other (OVA; HNU; etc.) HNU scan: 19 ppm; HNU headspace: 4.5 ppm

Constituents Sampled	Container Description From Lab x or G&M ___	Preservative
TCL PCBs/Pesticides	8 oz glass jar	cool

Remarks Highest headspace reading 2-4 ft. and 4-6 ft., only TCL PCBs/Pesticides were taken due to poor recovery.

Sampling Personnel R. Astle

DRAFT

SOIL/SEDIMENT SAMPLING LOG

Project/No. Harrison/OH0019.018 Page 3 of 5

Site Location Moraine, Ohio

Sample No. GM20D-03SL Coded/ Replicate No. DUP-28 Date 10/3/94

Weather Cool; Overcast Time Sampling Began 12:10 p.m. Time Sampling Completed 12:20 p.m.

Sampling Method and Material 2" stainless-steel split spoon

Grab x Composite ___

From	To	Soil/Sediment Description
2'	4'	Sand, gravel, silt and clay with asphalt and gray-white substance with silt-like texture; brown; damp, soft, slightly pliable, semi-cohesive.

Other (OVA; HNU; etc.) HNU scan: 2.4 ppm

Constituents Sampled	Container Description From Lab x or G&M ___	Preservative
TCL VOCs	4 oz glass jar	cool

Remarks Highest headspace reading 2-4 ft. and 4-6 ft.; only TCL VOCs were taken due to poor recovery.

Sampling Personnel R. Astle

SOIL/SEDIMENT SAMPLING LOG

Project/No. Harrison/OH0019.018 Page 4 of 5

Site Location Moraine, Ohio

Sample No. GM20D-15SL Coded/ Replicate No. Date 10/3/94

Weather Cool; Overcast Time Sampling Began 2:00 p.m. Time Sampling Completed 2:10 p.m.

Sampling Method and Material 2" stainless steel split spoon

Grab x Composite

From	To	Soil/Sediment Description
14'	16'	Sand and gravel; fine-coarse; brown; damp; loose.

Other (OVA; HNU; etc.) HNU scan: 0.5 ppm; HNU headspace: 2.1 ppm

Constituents Sampled	Container Description From Lab x or G&M	Preservative
TAL Metals & TAL Total Cyanide	16 oz glass jar	cool

Remarks Lowest headspace reading 16-18 ft. Because of inadequate recovery, TAL metals and TAL Total cyanide were sampled from 14-16 ft. TCL VOCs and PCBs/Pesticides were sampled from 16-18 ft.

Sampling Personnel R. Astle

DRAFT

SOIL/SEDIMENT SAMPLING LOG

Project/No. Harrison/OH0019.018 Page 5 of 5

Site Location Moraine, Ohio

Sample No. GM20D-17SL Coded/ Replicate No. Date 10/3/94

Weather Cool; Overcast Time Sampling Began 2:10 p.m. Time Sampling Completed 2:20 p.m.

Sampling Method and Material 2" stainless steel split spoon

Grab x Composite

From	To	Soil/Sediment Description
16'	18'	Sand and gravel; fine-coarse; brown; damp; loose.

Other (OVA; HNU; etc.) HNU scan: 0.5 ppm; HNU headspace: 1.7 ppm

Constituents Sampled	Container Description From Lab x or G&M	Preservative
TCL VOCs	4 oz glass jar	cool
TCL PCBs/Pesticides	8 oz glass jar	cool

Remarks Lowest headspace reading 16-18 ft. Only TCL VOCs and PCBs/Pesticides sampled due to inadequate recovery. TAL metals and cyanide were sampled from 16-18 ft.

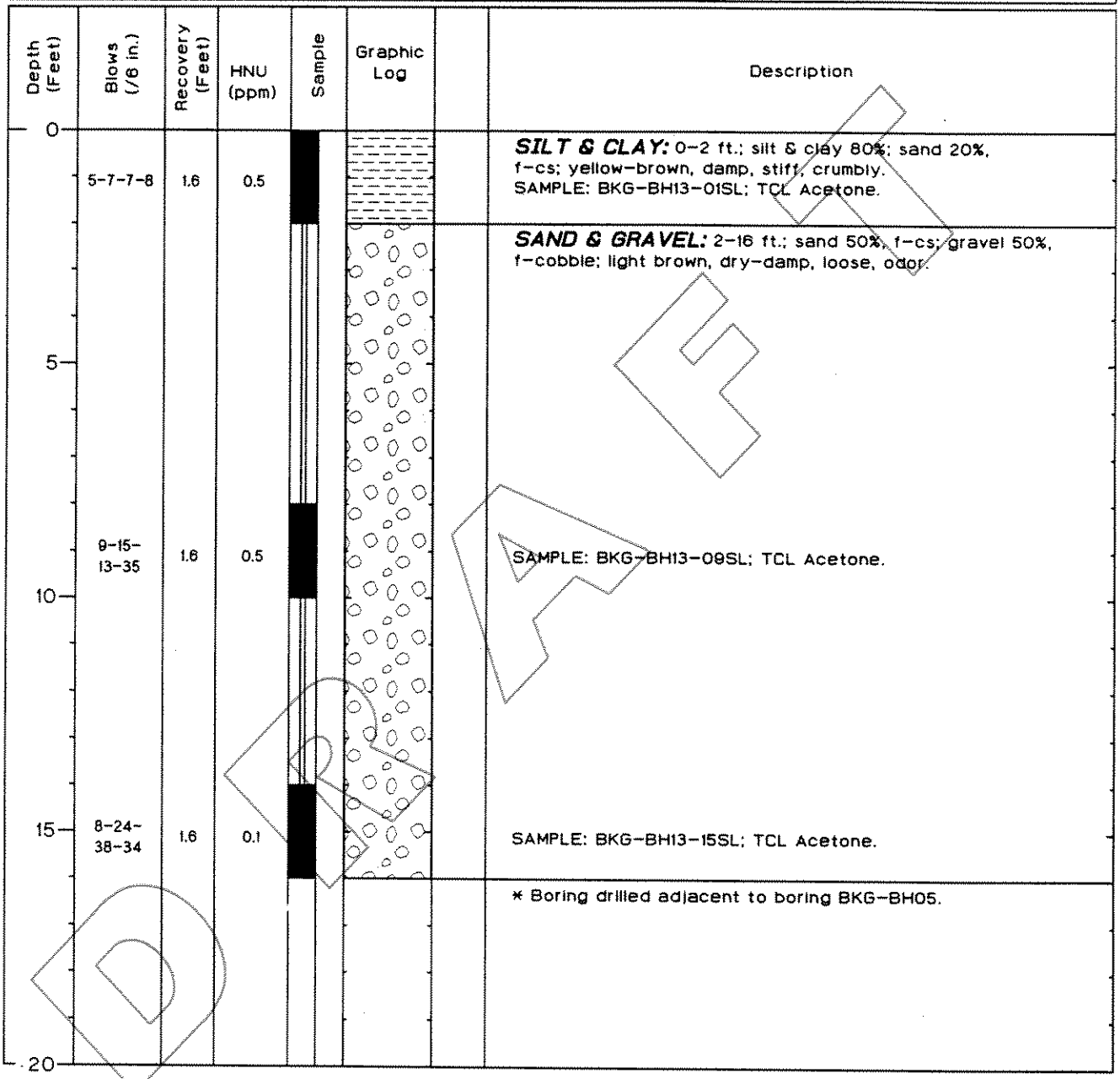
Sampling Personnel R. Astle

DRAFT

Geraghty & Miller, Inc.
Environmental Services

Log of Boring: BKG-BH13

HARRISON RADIATOR - OH0019.018 Moraine, Ohio



DRAFT

■ Sample to Lab ▯ Sample Not Analyzed

Drilling Co.: Belasco Drilling
Driller: R. Fisher
Drilling Method: Hollow-Stem Auger
Drilling Fluid: None
Remarks: Split-Spoon

Geologist: R. Astle
Total Depth: 16
Surface Elev.:
Datum:
West Coor.:

Begin Drilling: 09/27/94
End Drilling: 09/27/94
Converted to Well: No
Well Name:
South Coor.:

OH0019.018

SOIL/SEDIMENT SAMPLING LOG

Project/No. Harrison/OH0019.018 Page 1 of 3

Site Location Moraine, Ohio

Sample No. BKG-BH13-01SL Coded/ Replicate No. Date 9/27/94

Weather Cool; Overcast Time Sampling Began 3:10p.m. Time Sampling Completed 3:20p.m.

Sampling Method and Material 2" stainless steel split spoon

Grab x Composite

From	To	Soil/Sediment Description
0'	2'	Silt and clay; rare sand, fine-coarse; yellow brown; damp; stiff; crumbly.

Other (OVA; HNU; etc.) HNU scan: 0.5 ppm

Constituents Sampled	Container Description From Lab x or G&M	Preservative
TCL Acetone	4 oz glass jar	cool

Remarks Sample adjacent to boring BKG-BH05

Sampling Personnel R. Astle

DRAFT

SOIL/SEDIMENT SAMPLING LOG

Project/No. Harrison/OH0019.018 Page 2 of 3

Site Location Moraine, Ohio

Sample No. BKG-BH13-09SL Coded/ Replicate No. Date 9/27/94

Weather Cool; Overcast Time Sampling Began 3:20 p.m. Time Sampling Completed 3:30 p.m.

Sampling Method and Material 2" stainless-steel split spoon

Grab x Composite

From	To	Soil/Sediment Description
8'	10'	Sand, fine-coarse; gravel, fine-coarse; light brown; dry-damp; loose; odor.

Other (OVA; HNU; etc.) HNU scan: 0.5 ppm

Constituents Sampled	Container Description From Lab x or G&M	Preservative
TCL Acetone	4 oz glass jar	cool

Remarks Sample adjacent to boring BKG-BH05

Sampling Personnel R. Astle

DRAFT

SOIL/SEDIMENT SAMPLING LOG

Project/No. Harrison/OH0019.018 Page 3 of 3

Site Location Moraine, Ohio

Sample No. BKG-BH13-15SL Coded/ Replicate No. Date 9/27/94

Weather Cool; Overcast Time Sampling Began 3:30p.m. Time Sampling Completed 3:40p.m.

Sampling Method and Material 2" stainless steel split spoon

Grab x Composite

From	To	Soil/Sediment Description
14'	16'	Sand, fine-coarse; gravel, fine-coarse; light brown; dry-damp; loose.

Other (OVA; HNU; etc.) HNU scan: 0.1 ppm

Constituents Sampled	Container Description From Lab x or G&M	Preservative
TCL Acetone	4 oz glass jar	cool

Remarks Sample adjacent to boring BKG-BH05

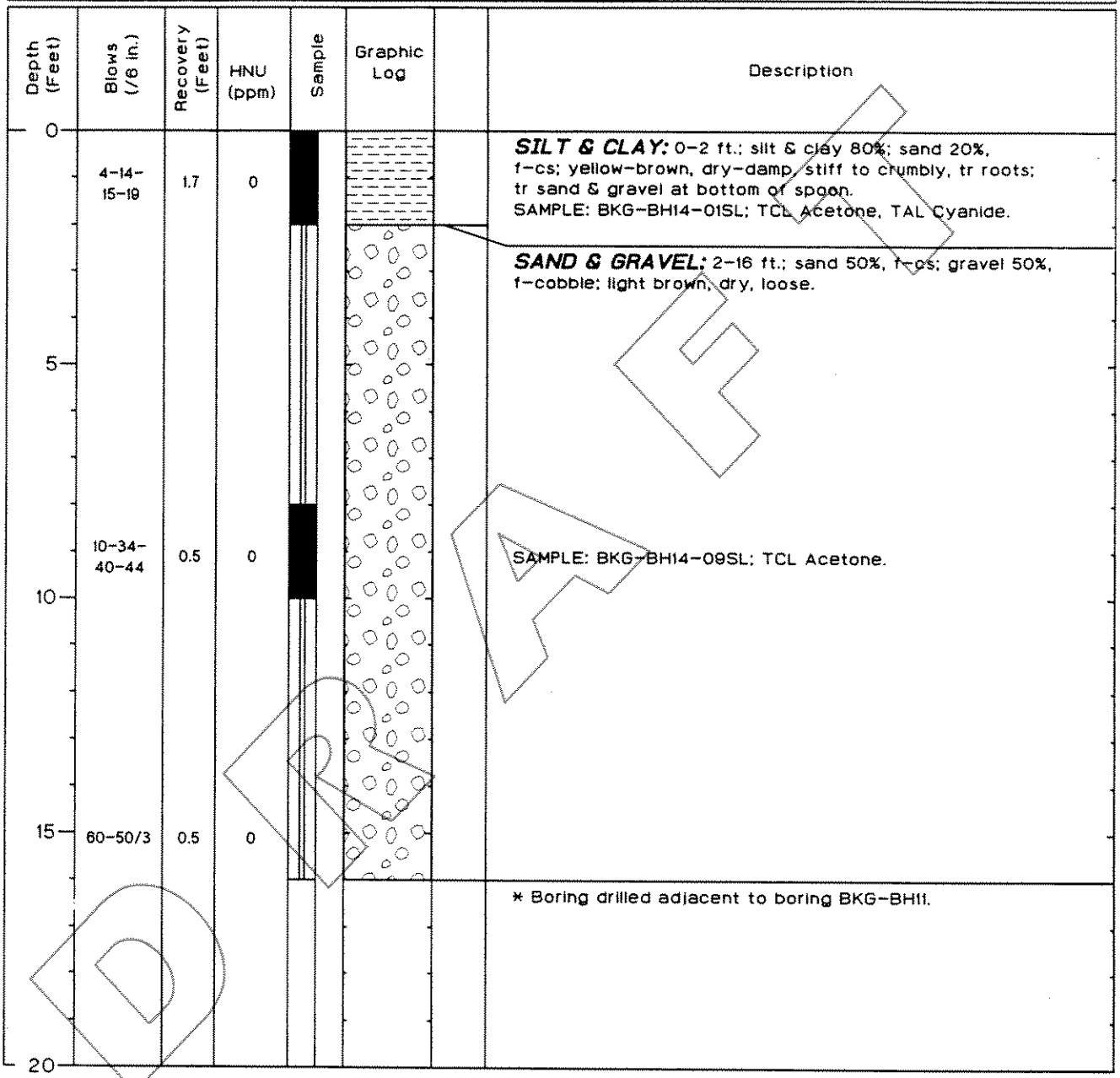
Sampling Personnel R. Astle

DRAFT

Geraghty & Miller, Inc.
Environmental Services

Log of Boring: BKG-BH14

HARRISON RADIATOR – OH0019.018 Moraine, Ohio



DRAFT

■ Sample to Lab ▯ Sample Not Analyzed

Drilling Co.: Belasco Drilling
Driller: R. Fisher
Drilling Method: Hollow-Stem Auger
Drilling Fluid: None
Remarks: Split-Spoon

Geologist: R. Astle
Total Depth: 16
Surface Elev.:
Datum:
West Coor.:

Begin Drilling: 09/27/94
End Drilling: 09/27/94
Converted to Well: No
Well Name:
South Coor.:

OH0019.018

SOIL/SEDIMENT SAMPLING LOG

Project/No. Harrison/OH0019.018 Page 1 of 3

Site Location Moraine, Ohio

Sample No. BKG-BH14-09SL Coded/ Replicate No. Date 9/27/94

Weather Cool; Overcast Time Sampling Began 4:50 p.m. Time Sampling Completed 5:00 p.m.

Sampling Method and Material 2" stainless steel split spoon

Grab x Composite

From	To	Soil/Sediment Description
8'	10'	Sand, fine-coarse; gravel, fine-coarse; light brown; dry; loose.

Other (OVA; HNU; etc.) HNU scan: 0 ppm

Constituents Sampled	Container Description From Lab x or G&M	Preservative
TCL Acetone	4 oz glass jar	cool

Remarks Boring drilled adjacent to boring BKG-BH11

Sampling Personnel R. Astle

DRAFT

SOIL/SEDIMENT SAMPLING LOG

Project/No. Harrison/OH0019.018 Page 2 of 3

Site Location Moraine, Ohio

Sample No. BKG-BH14-015L Coded/ Replicate No. Date 9/27/94

Weather Cool; Overcast Time Sampling Began 4:40 p.m. Time Sampling Completed 4:50 p.m.

Sampling Method and Material 2" stainless-steel split spoon

Grab x Composite

From	To	Soil/Sediment Description
0'	2'	Silt and clay; little sand, fine-coarse; yellow-brown; dry-damp; crumbly and stiff; tree roots.

Other (OVA; HNU; etc.) HNU scan: 0 ppm

Constituents Sampled	Container Description From Lab x or G&M	Preservative
TCL Acetone	4 oz glass jar	cool
TCL Total Cyanide	16 oz glass jar	cool

Remarks Boring drilled adjacent to boring BKG-BH11

Sampling Personnel R. Astle

DRAFT

SOIL/SEDIMENT SAMPLING LOG

Project/No. Harrison/OH0019.018 Page 3 of 3

Site Location Moraine, Ohio

Sample No. BKG-BH14-15SL Coded/ Replicate No. Date 9/27/94

Weather Cool; Overcast Time Sampling Began 5:00 p.m. Time Sampling Completed 5:10 p.m.

Sampling Method and Material 2" stainless-steel split spoon

Grab x Composite

From	To	Soil/Sediment Description
14'	16'	Sand, fine-coarse; gravel, fine-coarse; light brown; dry; loose.

Other (OVA; HNU; etc.) HNU scan: 0 ppm

Constituents Sampled	Container Description From Lab x or G&M	Preservative
TCL Acetone	4 oz glass jar	cool

Remarks Boring drilled adjacent to boring BKG-BH11

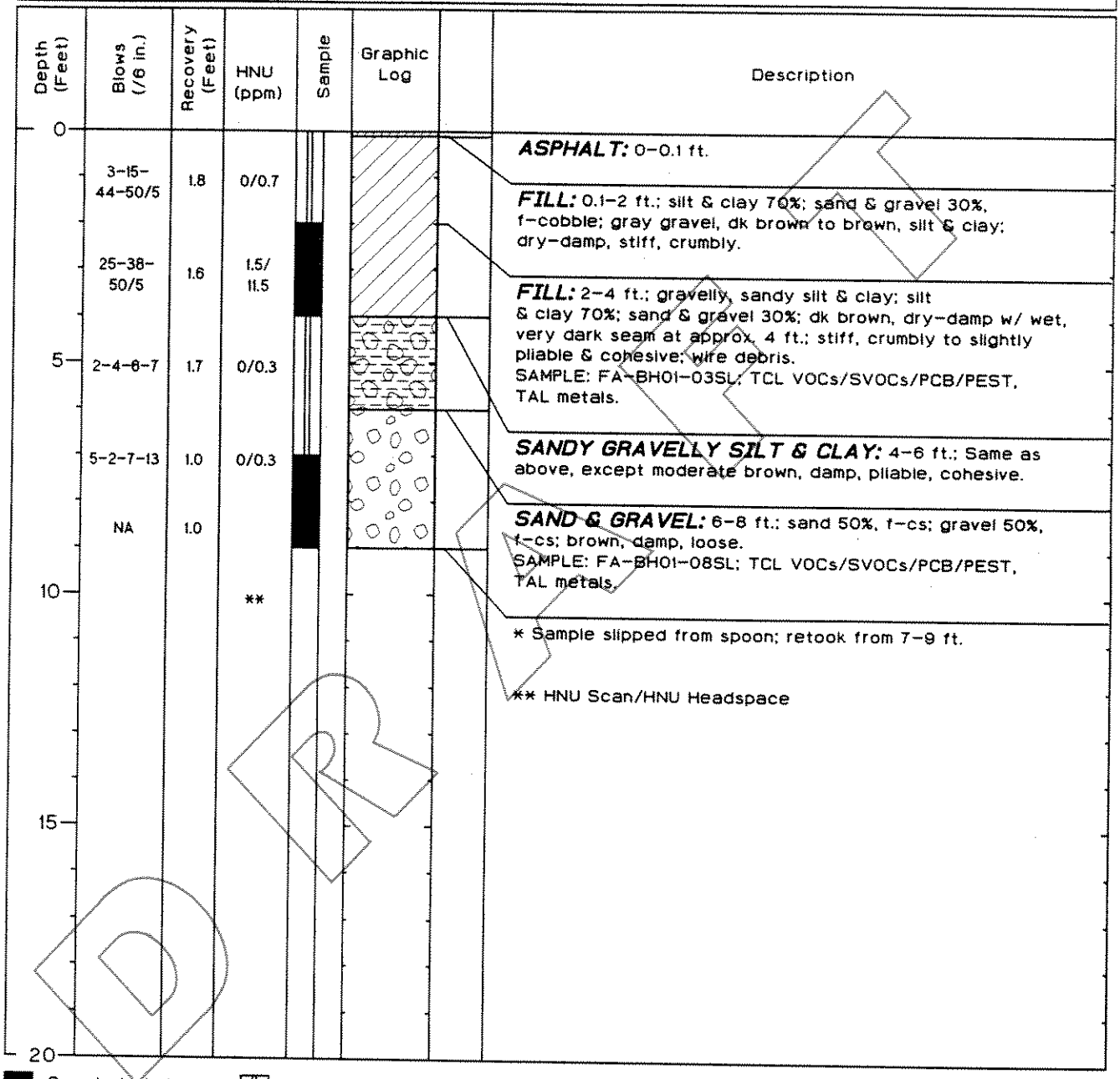
Sampling Personnel R. Astle

DRAFT

Geraghty & Miller, Inc.
Environmental Services

Log of Boring: FA-BH01

HARRISON RADIATOR - OH0019.018 Moraine, Ohio



DRAFT

■ Sample to Lab ▯ Sample Not Analyzed

Drilling Co.: Belasco Drilling
Driller: R. Fisher
Drilling Method: Hollow-Stem Auger
Drilling Fluid: None
Remarks: Split-Spoon

Geologist: R. Astle
Total Depth: 9
Surface Elev.:
Datum:
West Coor.:

Begin Drilling: 09/27/94
End Drilling: 09/27/94
Converted to Well: No
Well Name:
South Coor.:

OH0019.018

SOIL/SEDIMENT SAMPLING LOG

Project/No. Harrison/OH0019.018 Page 1 of 2

Site Location Moraine, Ohio

Sample No. FA-BH01-03SL Coded/ Replicate No. _____ Date 9/27/94

Weather Cool; Overcast Time Sampling Began 9:10 a.m. Time Sampling Completed 9:20 a.m.

Sampling Method and Material 3 " stainless steel split spoon

Grab x Composite ___

From	To	Soil/Sediment Description
2'	4'	Gravelly, sandy silt and clay; dark brown to dark stained; dry-damp to wet; pliable; cohesive to crumbly; trace wire debris.

Other (OVA; HNU; etc.) HNU scan: 1.5 ppm; HNU headspace 11.5 ppm

Constituents Sampled	Container Description From Lab x or G&M ___	Preservative
TCL VOCs	4 oz glass jar	cool
TCL SVOCs/PCBs/Pesticides	8 oz glass jar	cool
TAL Metals	16 oz glass jar	cool

Remarks Highest headspace reading: fill area, boring no.1, 2-4 ft.

Sampling Personnel R. Astle

DRAFT

SOIL/SEDIMENT SAMPLING LOG

Project/No. Harrison/OH0019.018 Page 2 of 2

Site Location Moraine, Ohio

Sample No. FA-BH01-08SL Coded/ Replicate No. _____ Date 9/27/94

Weather Cool; Overcast Time Sampling Began 9:30 a.m. Time Sampling Completed 9:40 a.m.

Sampling Method and Material 3 " stainless steel split spoon

Grab x Composite ____

From	To	Soil/Sediment Description
7'	9'	Sand, fine-coarse; gravel, fine-coarse; brown; damp; loose.

Other (OVA; HNU; etc.) HNU scan: 0 ppm; HNU headspace 0.3 ppm

Constituents Sampled	Container Description From Lab x or G&M ___	Preservative
TCL VOCs	4 oz glass jar	cool
TCL SVOCs/PCBs/Pesticides	8 oz glass jar	cool
TAL Metals	16 oz glass jar	cool

Remarks Lowest headspace reading: fill area, boring no.1, 7-9 ft.

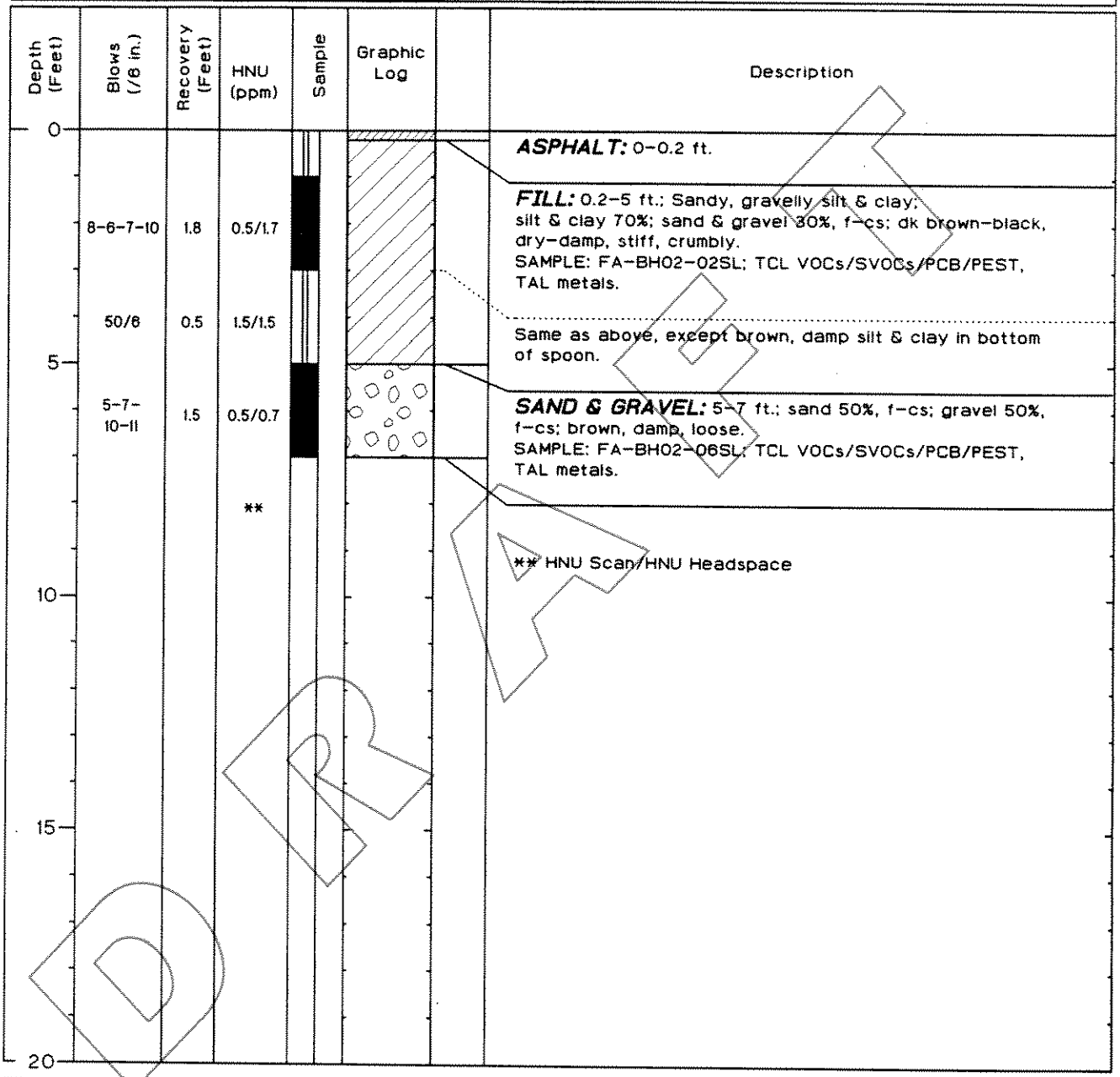
Sampling Personnel R. Astle

DRAFT

Geraghty & Miller, Inc.
Environmental Services

Log of Boring: FA-BH02

HARRISON RADIATOR – OH0019.018 Moraine, Ohio



DRAFT

■ Sample to Lab ▯ Sample Not Analyzed

Drilling Co.: Belasco Drilling
Driller: R. Fisher
Drilling Method: Hollow-Stem Auger
Drilling Fluid: None
Remarks: Split-Spoon

Geologist: R. Astle
Total Depth: 7
Surface Elev.:
Datum:
West Coor.:

Begin Drilling: 09/27/94
End Drilling: 09/27/94
Converted to Well: No
Well Name:
South Coor.:

OH0019.018

SOIL/SEDIMENT SAMPLING LOG

Project/No. Harrison/OH0019.018 Page 1 of 2

Site Location Moraine, Ohio

Sample No. FA-BH02-02SL Coded/ Replicate No. _____ Date 9/27/94

Weather Cool; Overcast Time Sampling Began 10:30 a.m. Time Sampling Completed 10:40 a.m.

Sampling Method and Material 3 " stainless steel split spoon

Grab x Composite ____

From	To	Soil/Sediment Description
1'	3'	Sandy, gravelly, silt and clay; dark brown-black, dry-damp, stiff, crumbly.

Other (OVA; HNU; etc.) HNU scan: 0.5 ppm; HNU headspace 1.7 ppm

Constituents Sampled	Container Description From Lab x or G&M ____	Preservative
TCL VOCs	4 oz glass jar	cool
TCL SVOCs/PCBs/Pesticides	8 oz glass jar	cool
TAL Metals	16 oz glass jar	cool

Remarks Highest headspace reading: fill area, boring no.2, 1-3 ft.

Sampling Personnel R. Astle

DRAFT

SOIL/SEDIMENT SAMPLING LOG

Project/No. Harrison/OH0019.018 Page 2 of 2

Site Location Moraine, Ohio

Sample No. FA-BH02-06SL Coded/ Replicate No. _____ Date 9/27/94

Weather Cool; Overcast Time Sampling Began 11:00 a.m. Time Sampling Completed 11:10 a.m.

Sampling Method and Material 3 " stainless steel split spoon

Grab x Composite ____

From	To	Soil/Sediment Description
5'	7'	Sand and gravel; brown, damp, loose

Other (OVA; HNU; etc.) HNU scan: 0.5 ppm; HNU headspace 0.7 ppm

Constituents Sampled	Container Description From Lab x or G&M ____	Preservative
TCL VOCs	4 oz glass jar	cool
TCL SVOCs/PCBs/Pesticides	8 oz glass jar	cool
TAL Metals	16 oz glass jar	cool

Remarks Lowest headspace reading: fill area, boring no.2, 5-7 ft.

Sampling Personnel R. Astle

DRAFT

WATER SAMPLING LOG

Project/No. **Harrison Phase II RFI / OH0019.018** Page **1** of **44**

Site Location **Moraine, Ohio**

Site/Well No. **East** Coded/ Replicate No. **DUP-29** Date **10/21/94**

Weather **Sunny, 60's °F** Time Sampling Began **10:00 a.m.** Time Sampling Completed **11:50 a.m.**

EVACUATION DATA

Description of Measuring Point (MP) **Top of PVC casing**

Height of MP Above/Below Land Surface _____ MP Elevation _____

Total Sounded Depth of Well Below MP **71.64/71.64** Water-Level Elevation _____

Held_____ Depth to Water Below MP **28.85** Diameter of Casing **2"**

Gallons Pumped/Bailed

Wet_____ Water Column in Well **42.79** Prior to Sampling **(19.55) 20 bailed**

Pump On: _____ Rate: _____

Gallons per Foot **0.16** Pump Off: _____

Sampling Pump Intake Setting

Gallons in Well **6.85 (x3)** (feet below land surface) _____

Evacuation Method **Site dedicated Teflon bailer and polypropylene rope**

SAMPLING DATA/FIELD PARAMETERS

Color **Moderate Brown** Odor **None** Appearance **Very Turbid** Temperature **70.2/70.3** °F/°C

Other (specific ion; OVA; HNU; etc.) **Inside well casing = 4.0 ppm; Background = 2.0 ppm; Breathing zone = 2.0 ppm**

Specific Conductance, umhos/cm **(A) 1386/1364/1377/1372** pH **(A) 7.16/7.15/7.18/7.14**

(A) 1388/1362/1379/1376 pH **(B) 7.15/7.14/7.15/7.14**

Sampling Method and Material **Site dedicated Teflon bailer and polypropylene rope.**

Constituents Sampled	Container Description From Lab X or G&M ____	Preservative
VOCs 8015	(3) 40 ml glass vial	HCl, cool
VOCs 8240	(3) 40 ml glass vial	HCl, cool

Remarks **Took Rinseate Blank RB-16 after sampling EAST at 12:00 p.m.; Duplicate pH and SpC readings taken immediately after filling sample bottles. Duplicate total sounded depth of well taken; sand, fine to coarse, coming up with bailer (possible screen damage).**

Sampling Personnel **R. Astle, D. Johnson**

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

DRAFT

WATER SAMPLING LOG

Project/No. **Harrison Phase II RFI / OH0019.018** Page **2** of **44**

Site Location **Moraine, Ohio**

Site/Well No. **West** Coded/ Replicate No. _____ Date **10/21/94**

Weather **Sunny, 70's °F** Time Sampling Began **1:10 p.m.** Time Sampling Completed **2:05 p.m.**

EVACUATION DATA

Description of Measuring Point (MP) **Top of PVC casing**

Height of MP Above/Below Land Surface _____ MP Elevation _____

Total Sounded Depth of Well Below MP **51.70** Water-Level Elevation _____

Held_____ Depth to Water Below MP **28.87** Diameter of Casing **2"**

Wet_____ Water Column in Well **22.83** Gallons Pumped/Bailed Prior to Sampling **(10.95) 11 bailed**

Pump On: _____ Rate: _____

Gallons per Foot **0.16** Pump Off: _____

Sampling Pump Intake Setting

Gallons in Well **3.65 (x3)** (feet below land surface) _____

Evacuation Method **Site dedicated Teflon bailer and polypropylene rope**

SAMPLING DATA/FIELD PARAMETERS

Color **Moderate brown** Odor **None** Appearance **Turbid** Temperature **66.3** °F/°C

Other (specific ion; OVA; HNU; etc.) **Inside well casing= 2.0 ppm; Background = 1.6 ppm; Breathing zone = 1.6 ppm**

Specific Conductance, umhos/cm **1316/1278/1307/1306** pH **7.14/7.10/7.09/7.09**

Sampling Method and Material **Site dedicated Teflon bailer and polypropylene rope.**

Constituents Sampled	Container Description From Lab X or G&M ____	Preservative
VOCs 8015	(3) 40 ml glass vial	HCl, cool
VOCs 8240	(3) 40 ml glass vial	HCl, cool

Remarks **Fine to course sand - fine gravel brought up in bailer, possible screen damage; pH and SpC taken immediately after filling sample bottles**

Sampling Personnel **R. Astle, D. Johnson**

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

DRAFT

WATER SAMPLING LOG

Project/No. **Harrison Phase II RFI / 000050.0OH** Page **3** of **44**

Site Location **Moraine, Ohio**

Site/Well No. **MT-69** Coded/ Replicate No. **DUP-33** Date **10/27/94**

Weather **Sunny, 50's °F** Time Sampling Began **1:10 p.m.** Time Sampling Completed **6:00 p.m.**

EVACUATION DATA

Description of Measuring Point (MP) **Top of PVC casing**

Height of MP Above/Below Land Surface _____ MP Elevation _____

Total Sounded Depth of Well Below MP **117.94** Water-Level Elevation _____

Held_____ Depth to Water Below MP **23.40/23.40** Diameter of Casing **8"**

Wet_____ Water Column in Well **94.54** Gallons Pumped/Bailed Prior to Sampling **(744) 800 pumped**

Pump On: **1:25** Rate: **3.75 gpm**

Gallons per Foot **2.62** Pump Off: **5:00**

Gallons in Well **248 (x3)** Sampling Pump Intake Setting (feet below land surface) _____

Evacuation Method **Two-inch submersible pump, hose, and polypropylene rope.**

SAMPLING DATA/FIELD PARAMETERS

Color **Very light yellow** Odor **None** Appearance **Slightly Turbid** Temperature **58.4** °F/°C

Other (specific ion; OVA; HNU; etc.) **Inside well casing, background and breathing zone = 0.5 ppm**

Specific Conductance, umhos/cm **1. (A) 486/476/480/481** pH **1. (A) 7.50/7.76/7.92/7.93**

umhos/cm **(B) 486/476/480/481** pH **(B) 7.51/7.77/7.92/7.93**

umhos/cm **2. (A) 528/536/533/498** pH **2. (A) 7.44/7.39/7.38/7.39**

umhos/cm **(B) 526/536/533/498** pH **(B) 7.42/7.39/7.38/7.39**

Sampling Method and Material **Site dedicated Teflon bailer and polypropylene rope.**

Constituents Sampled	Container Description From Lab X or G&M ___	Preservative
VOCs 8015	(3) 40 ml glass vial	HCl, Cool
VOCs 8240	(3) 40 ml glass vial	HCl, Cool
Total Metals	(1) 1 liter plastic	HNO_3, cool
Dissolved Metals	(1) 1 liter plastic	HNO_3, cool
Cyanide	(1) 1 liter plastic	NaOH, cool
PCB/Pesticides	(1) 1 liter plastic	Cool

Remarks **Filled triple volume for MS/MSD - Dissolved metals field filtered. Took Rinseate Blank RB-20 before sampling (4:00 p.m.). Bailer has been in GM-200 prior to sampling. Duplicate pH and SpC readings taken immediately before and after filling sample bottles. Duplicate depth to water level measurement taken.**

Sampling Personnel **R. Astle, C. Standard**

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

DRAFT

WATER SAMPLING LOG

Project/No. **Harrison Phase II RFI / OH0019.018** Page **4** of **44**

Site Location **Moraine, Ohio**

Site/Well No. **WSU-24** Coded/ Replicate No. _____ Date **11/01/94**

Weather **Cloudy, 40's °F** Time Sampling Began **3:20 p.m.** Time Sampling Completed **4:30 p.m.**

EVACUATION DATA

Description of Measuring Point (MP) **Top of PVC casing**

Height of MP Above/Below Land Surface _____ MP Elevation _____

Total Sounded Depth of Well Below MP **66.12** Water-Level Elevation _____

Held_____ Depth to Water Below MP **24.38** Diameter of Casing **2"**

Gallons Pumped/Bailed

Wet_____ Water Column in Well **41.74** Prior to Sampling **(20.04) 45 pumped**

Pump On: **3:32** Rate: **5 gpm**

Gallons per Foot **0.16** Pump Off: **3:41**

Sampling Pump Intake Setting

Gallons in Well **6.68 (x3)** (feet below land surface) _____

Evacuation Method **Two-inch submersible pump, hose, and polypropylene rope.**

SAMPLING DATA/FIELD PARAMETERS

Color **Light Brown** Odor **None** Appearance **Turbid** Temperature **56.6** °F/°C

Other (specific ion; OVA; HNU; etc.) **Inside well casing = 1.2 ppm; Background and breathing zone = 1.3 ppm**

Specific Conductance, umhos/cm **(A) 1071/1086/1081/1059** pH **(A) 6.95/7.01/7.15/6.75**

umhos/cm **(B) 1063/1065/1031/1056** pH **(B) 6.90/6.95/6.90/6.90**

Sampling Method and Material **Site dedicated Teflon bailer and polypropylene rope.**

Constituents Sampled	Container Description From Lab X or G&M ___	Preservative
VOCs 8260 (OEPA Split)	(3) 40 ml glass vial	HCl, Cool
VOC 8015	(3) 40 ml glass vial	HCl, Cool
VOC 8240	(3) 40 ml glass vial	HCl, Cool
Total Metals	1 liter plastic	HNO_3, Cool
Dissolved Metals	1 liter plastic	HNO_3, Cool
PCB/Pesticides	1 liter amber glass	Cool
Cyanide	1 liter plastic	NaOH, Cool

Remarks **pH and SpC readings taken immediately before and after filling sample bottles. Dissolved metals field filtered. VOCs 8260 split with OEPA. Short period of dark discharge while purging - became clear.**

Sampling Personnel **R. Astle, C. Standard; H. Sharifi**

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

DRAFT

WATER SAMPLING LOG

Project/No. **Harrison Phase II RFI / 000050.0OH** Page **5** of **44**

Site Location **Moraine, Ohio**

Site/Well No. **4S** Coded/ Replicate No. _____ Date **11/02/94**

Weather **Sunny, 42 °F** Time Sampling Began **11:00 a.m.** Time Sampling Completed **11:35 p.m.**

EVACUATION DATA

Description of Measuring Point (MP) **Top of PVC casing**

Height of MP Above/Below Land Surface _____ MP Elevation _____

Total Sounded Depth of Well Below MP **66.38** Water-Level Elevation _____

Held_____ Depth to Water Below MP **30.83** Diameter of Casing **4"**

Wet_____ Water Column in Well **35.55** Gallons Pumped/Bailed Prior to Sampling **(69.32) 65 pumped**

Pump On: _____ Rate: **6.5 gpm**

Gallons per Foot **0.65** Pump Off: _____

Gallons in Well **23.10 (x3)** Sampling Pump Intake Setting (feet below land surface) **Bottom of well**

Evacuation Method **Two-inch submersible pump, hose, and polypropylene rope.**

SAMPLING DATA/FIELD PARAMETERS

Color **Clear** Odor **None** Appearance **Clean** Temperature **16.0** °F/°C

Other (specific ion; OVA; HNU; etc.) **Inside well casing = 1.6 ppm; Background and breathing zone = 0.7 pm**

Specific Conductance, umhos/cm **(A) 2150/2140/2160/2160** pH **(A) 8.60/8.70/8.60/8.60**

umhos/cm **(B) 2360/2370/2380/2370** pH **(B) 8.60/8.60/8.70/8.70**

Sampling Method and Material **Site dedicated Teflon bailer and polypropylene rope.**

Constituents Sampled	Container Description From Lab X or G&M ___	Preservative
VOCs 8015	(3) 40 ml glass vial	HCl

Remarks **pH and SpC readings taken immediately before and after filling sample bottles.**

Sampling Personnel **H. Sharifi, C. Standard**

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

DRAFT

WATER SAMPLING LOG

Project/No. **Harrison Phase II RFI / 000050.0OH** Page **6** of **44**

Site Location **Moraine, Ohio**

Site/Well No. **W-1-N** Coded/ Replicate No. _____ Date **11/02/94**

Weather **Sunny, 65 °F** Time Sampling Began **3:10 p.m.** Time Sampling Completed **3:40 p.m.**

EVACUATION DATA

Description of Measuring Point (MP) **Mark of PVC casing**

Height of MP Above/Below Land Surface _____ MP Elevation _____

Total Sounded Depth of Well Below MP **71.90** Water-Level Elevation _____

Held_____ Depth to Water Below MP **34.29** Diameter of Casing **4"**

Wet_____ Water Column in Well **37.61** Gallons Pumped/Bailed Prior to Sampling **(73.33) 75 pumped**

Gallons per Foot **0.65** Pump On: **3:07** Rate: **5 gpm**

Pump Off: **3:22**

Gallons in Well **24.41 (x3)** Sampling Pump Intake Setting (feet below land surface) **Bottom of well**

Evacuation Method **Two-inch submersible pump, hose, and polypropylene rope.**

SAMPLING DATA/FIELD PARAMETERS

Color **Clear** Odor **None** Appearance **Clear** Temperature **15** °F/°C

Other (specific ion; OVA; HNU; etc.) **Inside well casing, background, and breathing zone = 0.4 ppm**

Specific Conductance, umhos/cm **(A) 1025/975/963/960** pH **(A) 7.38/7.21/7.15/7.13**

umhos/cm **(B) 930/932/932/931** pH **(B) 7.14/7.16/7.12/7.11**

Sampling Method and Material **Site dedicated Teflon bailer and polypropylene rope.**

Constituents Sampled	Container Description From Lab X or G&M ____	Preservative
VOCs 8015	(3) 40 ml glass vial	HCl, Cool

Remarks **pH and SpC readings taken immediately before and after filling sample bottles. Rinseable Blank RB-24 was collected after sampling W-1-N.**

Sampling Personnel **H. Sharifi, C. Standard**

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

DRAFT

WATER SAMPLING LOG

Project/No. **Harrison Phase II RFI / 000050.0OH** Page **7** of **44**

Site Location **Moraine, Ohio**

Site/Well No. **W-1-S** Coded/ Replicate No. _____ Date **10/26/94**

Weather **Cloudy, 50's °F** Time Sampling Began **4:30 p.m.** Time Sampling Completed **5:10 p.m.**

EVACUATION DATA

Description of Measuring Point (MP) **Top of PVC casing**

Height of MP Above/Below Land Surface _____ MP Elevation _____

Total Sounded Depth of Well Below MP **58.88** Water-Level Elevation _____

Held_____ Depth to Water Below MP **27.41/27.41** Diameter of Casing **4"**

Wet_____ Water Column in Well **31.47** Gallons Pumped/Bailed Prior to Sampling **(61.37) 67.5 pumped**

Pump On: **4:43** Rate: **7.5 gpm**

Gallons per Foot **0.65** Pump Off: **4:52**

Gallons in Well **20.46 (x3)** Sampling Pump Intake Setting (feet below land surface) _____

Evacuation Method **Two-inch submersible pump, hose, and polypropylene rope.**

SAMPLING DATA/FIELD PARAMETERS

Color **Light brown** Odor **None** Appearance **Slightly turbid** Temperature **60.8** °F/°C

Other (specific ion; OVA; HNU; etc.) **Inside well casing, background and breathing zone = 0.9 ppm**

Specific Conductance, umhos/cm **1. (A) 794/809/804/813** pH **1. (A) 6.88/6.88/6.97/6.98**

umhos/cm **(B) 793/809/803/813** pH **(B) 6.88/6.89/6.97/6.97**

umhos/cm **2. (A) 803/804/796/796** pH **2. (A) 6.95/6.97/6.99/7.08**

umhos/cm **(B) 802/803/796/796** pH **(B) 6.95/6.97/6.99/7.07**

Sampling Method and Material **Site dedicated Teflon bailer and polypropylene rope.**

Constituents Sampled	Container Description From Lab X or G&M ____	Preservative
VOCs 8015	(3) 40 ml glass vial	HCl, Cool

Remarks **Duplicate pH and SpC readings taken immediately before and after filling sample bottles. Duplicate depth to water level measurement taken.**

Sampling Personnel **R. Astle, C. Standard**

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

DRAFT

WATER SAMPLING LOG

Project/No. **Harrison Phase II RFI / 000050.0OH** Page **8** of **44**

Site Location **Moraine, Ohio**

Site/Well No. **W-2-S** Coded/ Replicate No. _____ Date **10/31/94**

Weather **Cloudy, 50's °F** Time Sampling Began **3:00 p.m.** Time Sampling Completed **4:00 p.m.**

EVACUATION DATA

Description of Measuring Point (MP) **Top of PVC casing**

Height of MP Above/Below Land Surface _____ MP Elevation _____

Total Sounded Depth of Well Below MP **67.60** Water-Level Elevation _____

Held_____ Depth to Water Below MP **24.82** Diameter of Casing **4"**

Wet_____ Water Column in Well **42.78** Gallons Pumped/Bailed Prior to Sampling **(83.42) 90 pumped**

Gallons per Foot **0.65** Pump On: **3:34** Rate: **10 gpm** Pump Off: **3:43**

Gallons in Well **27.81 (x3)** Sampling Pump Intake Setting (feet below land surface) _____

Evacuation Method **Two-inch submersible pump, hose, and polypropylene rope.**

SAMPLING DATA/FIELD PARAMETERS

Color **Light brown-gray** Odor **None** Appearance **Slightly turbid** Temperature **61.4** °F/°C

Other (specific ion; OVA; HNU; etc.) **Inside well casing = 0.9 ppm; Background and breathing zone = 0.9 ppm**

Specific Conductance, umhos/cm **(A) 944/945/949/950** pH **(A) 7.02/7.05/7.07/6.95**

umhos/cm **(B) 935/909/910/910** pH **(B) 6.92/6.99/7.06/7.06**

Sampling Method and Material **Site dedicated Teflon bailer and polypropylene rope.**

Constituents Sampled	Container Description From Lab X or G&M ___	Preservative
VOCs 8240	(3) 40 ml glass vial	HCl, Cool
VOCs 8015	(3) 40 ml glass vial	HCl, Cool

Remarks **pH and SpC readings taken immediately before and after filling sample bottles.**

Sampling Personnel **R. Astle, C. Standard**

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

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WATER SAMPLING LOG

Project/No. **Harrison Phase II RFI / 000050.0OH** Page **9** of **44**

Site Location **Moraine, Ohio**

Site/Well No. **W-4-S** Coded/ Replicate No. _____ Date **10/31/94**

Weather **Cloudy, 50's °F** Time Sampling Began **4:30 p.m.** Time Sampling Completed **5:15 p.m.**

EVACUATION DATA

Description of Measuring Point (MP) **Top of PVC casing**

Height of MP Above/Below Land Surface _____ MP Elevation _____

Total Sounded Depth of Well Below MP **71.38** Water-Level Elevation _____

Held_____ Depth to Water Below MP **26.87** Diameter of Casing **4"**

Wet_____ Water Column in Well **44.51** Gallons Pumped/Bailed Prior to Sampling **(86.79) 90 pumped**

Pump On: **4:45** Rate: **10 gpm**

Gallons per Foot **0.65** Pump Off: **4:54**

Gallons in Well **28.93 (x3)** Sampling Pump Intake Setting (feet below land surface) _____

Evacuation Method **Two-inch submersible pump, hose, and polypropylene rope.**

SAMPLING DATA/FIELD PARAMETERS

Color **Brown** Odor **None** Appearance **Turbid** Temperature **61** °F/°C

Other (specific ion; OVA; HNU; etc.) **Inside well casing = 0 ppm (deflection); Background and breathing zone = 0.2 ppm**

Specific Conductance, umhos/cm **(A) 1114/1115/1123/1112** pH **(A) 6.85/6.86/7.00/7.03**

umhos/cm **(B) 1089/1120/1122/1083** pH **(B) 6.87/6.96/6.98/7.04**

Sampling Method and Material **Site dedicated Teflon bailer and polypropylene rope.**

Constituents Sampled	Container Description From Lab X or G&M ____	Preservative
VOCs 8015	(3) 40 ml glass vial	HCl, Cool
VOCs 8240	(3) 40 ml glass vial	HCl, Cool

Remarks **pH and SpC readings taken immediately before and after filling sample bottles.**

Sampling Personnel **R. Astle, C. Standard**

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

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WATER SAMPLING LOG

Project/No. **Harrison Phase II RFI / 000050.0OH** Page **11** of **44**

Site Location **Moraine, Ohio**

Site/Well No. **W-4-N** Coded/ Replicate No. _____ Date **11/03/94**

Weather **Cloudy, 64 °F** Time Sampling Began **11:10 a.m.** Time Sampling Completed **11:30 a.m.**

EVACUATION DATA

Description of Measuring Point (MP) **Mark of PVC casing**

Height of MP Above/Below Land Surface _____ MP Elevation _____

Total Sounded Depth of Well Below MP **66.92** Water-Level Elevation _____

Held_____ Depth to Water Below MP **27.81** Diameter of Casing **4"**

Wet_____ Water Column in Well **39.11** Gallons Pumped/Bailed Prior to Sampling **(76.26) 112.5 pumped**

Gallons per Foot **0.65** Pump On: **11:10** Rate: **7.5 gpm** Pump Off: **11:25**

Gallons in Well **25.42 (x3)** Sampling Pump Intake Setting (feet below land surface) **Bottom of well**

Evacuation Method **Two-inch submersible pump, hose, and polypropylene rope.**

SAMPLING DATA/FIELD PARAMETERS

Color **Clear** Odor **None** Appearance **Clear** Temperature **15** °F/°C

Other (specific ion; OVA; HNU; etc.) **Inside well casing = 0.1 ppm; Background = 0.2 ppm; Breathing zone = 0.1 ppm**

Specific Conductance, umhos/cm **(A) 1224/1223/1224/1223** pH **(A) 7.03/7.01/7.01/7.01**

umhos/cm **(B) 1137/1180/1182/1182** pH **(B) 7.05/7.07/7.08/7.08**

Sampling Method and Material **Site dedicated Teflon bailer and polypropylene rope.**

Constituents Sampled	Container Description From Lab X or G&M ____	Preservative
VOCs 8015	(3) 40 ml glass vial	HCl

Remarks **pH and SpC readings taken immediately before and after filling sample bottles.**

Sampling Personnel **H. Sharifi, C. Standard**

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

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WATER SAMPLING LOG

Project/No. **Harrison Phase II RFI / 000050.0OH** Page **12** of **44**

Site Location **Moraine, Ohio**

Site/Well No. **GM-1** Coded/ Replicate No. **DUP-37** Date **11/02/94**

Weather **Sunny, 40's °F** Time Sampling Began **9:10 a.m.** Time Sampling Completed **9:40 a.m.**

EVACUATION DATA

Description of Measuring Point (MP) **Top of PVC casing**

Height of MP Above/Below Land Surface _____ MP Elevation _____

Total Sounded Depth of Well Below MP **102.12** Water-Level Elevation _____

Held_____ Depth to Water Below MP **35.35/35.35** Diameter of Casing **2"**

Wet_____ Water Column in Well **66.77** Gallons Pumped/Bailed Prior to Sampling **(32.04) 35 pumped**

Pump On: _____ Rate: **5 gpm**

Gallons per Foot **0.16** Pump Off: _____

Gallons in Well **60.68 (x3)** Sampling Pump Intake Setting (feet below land surface) **Bottom of well**

Evacuation Method **Two-inch submersible pump, hose, and polypropylene rope.**

SAMPLING DATA/FIELD PARAMETERS

Color **Light Brown** Odor **None** Appearance **Slightly Cloudy** Temperature **14** °F/°C

Other (specific ion; OVA; HNU; etc.) **Inside well casing = 0.4 ppm; Background and breathing zone = 0.4 ppm**

Specific Conductance, umhos/cm **1. (A) 1263/1254/1250/1248** pH **1. (A) 7.50/7.48/7.49/7.51**

umhos/cm **(B) 1254/1243/1246/1247** pH **(B) 7.51/7.50/7.52/7.50**

umhos/cm **2. (A) 1259/1243/1245/1250** pH **2. (A) 7.48/7.49/7.50/7.49**

umhos/cm **(B) 1160/1259/1255/1252** pH **(B) 7.49/7.50/7.50/7.50**

Sampling Method and Material **Site dedicated Teflon bailer and polypropylene rope.**

Constituents Sampled	Container Description From Lab X or G&M ___	Preservative
VOCs 8015	(3) 40 ml glass vial	HCl, Cool

Remarks **Duplicate pH and SpC readings taken immediately before and after filling sample bottles. Duplicate depth to water level measurement taken.**

Sampling Personnel **H. Sharifi, C. Standard**

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

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WATER SAMPLING LOG

Project/No. **Harrison Phase II RFI / 000050.0OH** Page **13** of **44**

Site Location **Moraine, Ohio**

Site/Well No. **GM-2** Coded/ Replicate No. _____ Date **11/02/94**

Weather **Sunny, 40's °F** Time Sampling Began **10:00 a.m.** Time Sampling Completed **10:30 p.m.**

EVACUATION DATA

Description of Measuring Point (MP) **Top of PVC casing**

Height of MP Above/Below Land Surface _____ MP Elevation _____

Total Sounded Depth of Well Below MP **56.65** Water-Level Elevation _____

Held_____ Depth to Water Below MP **35.05** Diameter of Casing **2"**

Wet_____ Water Column in Well **21.6** Gallons Pumped/Bailed Prior to Sampling **(10.36) 15 pumped**

Gallons per Foot **0.16** Pump On: _____ Rate: **5 gpm** Pump Off: _____

Gallons in Well **3.45 (x3)** Sampling Pump Intake Setting (feet below land surface) **Bottom of well**

Evacuation Method **Two-inch submersible pump, hose, and polypropylene rope.**

SAMPLING DATA/FIELD PARAMETERS

Color **Clear** Odor **None** Appearance **Clean** Temperature **14.0** °F/°C

Other (specific ion; OVA; HNU; etc.) **Inside well casing = 0.1 ppm; Background and breathing zone = 0 pm**

Specific Conductance, umhos/cm **(A) 1142/1500/1495/1505** pH **(A) 6.90/6.90/7.00/7.01**

umhos/cm **(B) 1530/1518/1540/1540** pH **(B) 6.90/7.0/7.01/7.01**

Sampling Method and Material **Site dedicated Teflon bailer and polypropylene rope.**

Constituents Sampled	Container Description From Lab X or G&M ____	Preservative
VOCs 8015	(3) 40 ml glass vial	HCl, Cool

Remarks **pH and SpC readings taken immediately before and after filling sample bottles.**

Sampling Personnel **H. Sharifi, C. Standard**

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

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WATER SAMPLING LOG

Project/No. **Harrison Phase II RFI / OH0019.018** Page **14** of **44**

Site Location **Moraine, Ohio**

Site/Well No. **GM-3** Coded/ Replicate No. _____ Date **10/28/94**

Weather **Sunny, 40's °F** Time Sampling Began **10:50 a.m.** Time Sampling Completed **11:45 a.m.**

EVACUATION DATA

Description of Measuring Point (MP) **Top of PVC casing**

Height of MP Above/Below Land Surface _____ MP Elevation _____

Total Sounded Depth of Well Below MP **101.36** Water-Level Elevation _____

Held_____ Depth to Water Below MP **30.53** Diameter of Casing **2"**

Gallons Pumped/Bailed

Wet_____ Water Column in Well **70.83** Prior to Sampling **(34.00) 37.92 pumped**

Pump On: **11:00** Rate: **4.76 gpm**

Gallons per Foot **0.16** Pump Off: **11:08**

Sampling Pump Intake Setting

Gallons in Well **11.33 (x3)** (feet below land surface) _____

Evacuation Method **Two-inch submersible pump, hose, and polypropylene rope.**

SAMPLING DATA/FIELD PARAMETERS

Color **Very light brown** Odor **None** Appearance **Slightly turbid** Temperature **58.2** °F/°C

Other (specific ion; OVA; HNU; etc.) **Inside well casing = 0.6 ppm (deflection); Background and breathing zone = 0.8 to 1.0 ppm**

Specific Conductance, umhos/cm **(A) 727/732/714/720** pH **(A) 7.00/7.05/7.03/7.06**

umhos/cm **(B) 719/719/723/722** pH **(B) 7.10/7.14/7.11/7.15**

Sampling Method and Material **Site dedicated Teflon bailer and polypropylene rope.**

Constituents Sampled	Container Description From Lab X or G&M ___	Preservative
VOCs 8015	(3) 40 ml glass vial	HCl, Cool
VOCs 8240	(3) 40 ml glass vial	HCl, Cool

Remarks **pH and SpC readings taken immediately before and after filling sample bottles.**

Sampling Personnel **R. Astle, C. Standard**

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

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WATER SAMPLING LOG

Project/No. **Harrison Phase II RFI / 000050.0OH** Page **15** of **44**

Site Location **Moraine, Ohio**

Site/Well No. **GM-5** Coded/ Replicate No. _____ Date **11/02/94**

Weather **Sunny, 42 °F** Time Sampling Began **11:40 a.m.** Time Sampling Completed **12:00 p.m.**

EVACUATION DATA

Description of Measuring Point (MP) **Top of PVC casing**

Height of MP Above/Below Land Surface _____ MP Elevation _____

Total Sounded Depth of Well Below MP **101.24** Water-Level Elevation _____

Held_____ Depth to Water Below MP **31.24** Diameter of Casing **2"**

Gallons Pumped/Bailed

Wet_____ Water Column in Well **70** Prior to Sampling **(33.60) 60 pumped**

Pump On: **11:40** Rate: **4 gpm**

Gallons per Foot **0.16** Pump Off: **11:55**

Sampling Pump Intake Setting

Gallons in Well **11.2 (x3)** (feet below land surface) **Bottom of pump**

Evacuation Method **Two-inch submersible pump, hose, and polypropylene rope.**

SAMPLING DATA/FIELD PARAMETERS

Color **Clear** Odor **None** Appearance **Clear** Temperature **15.0** °F/°C

Other (specific ion; OVA; HNU; etc.) **Inside well casing = 0.9 ppm; Background and breathing zone = 1.1 pm**

Specific Conductance, umhos/cm **(A) 2040/2050/2020/2010** pH **(A) 7.60/7.60/7.80/7.61**

umhos/cm **(B) 1980/1960/1960/1965** pH **(B) 7.80/7.91/7.91/8.00**

Sampling Method and Material **Site dedicated Teflon bailer and polypropylene rope.**

Constituents Sampled	Container Description From Lab X or G&M ____	Preservative
VOCs 8015	(3) 40 ml glass vial	HCl

Remarks **pH and SpC readings taken immediately before and after filling sample bottles.**

Sampling Personnel **H. Sharifi, C. Standard**

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

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WATER SAMPLING LOG

Project/No. **Harrison Phase II RFI / 000050.0OH** Page **16** of **44**

Site Location **Moraine, Ohio**

Site/Well No. **GM-6** Coded/ Replicate No. _____ Date **10/28/94**

Weather **Sunny, 40's °F** Time Sampling Began **11:15 a.m.** Time Sampling Completed **12:10 p.m.**

EVACUATION DATA

Description of Measuring Point (MP) **Top of PVC casing**

Height of MP Above/Below Land Surface _____ MP Elevation _____

Total Sounded Depth of Well Below MP **46.48** Water-Level Elevation _____

Held_____ Depth to Water Below MP **29.82** Diameter of Casing **2"**

Wet_____ Water Column in Well **16.66** Gallons Pumped/Bailed Prior to Sampling **(8.00) 10 pumped**

Gallons per Foot **0.16** Pump On: **11:20** Rate: **2 gpm**

Gallons in Well **2.67 (x3)** Pump Off: **11:22**

Sampling Pump Intake Setting (feet below land surface) _____

Evacuation Method **Two-inch submersible pump, hose, and polypropylene rope.**

SAMPLING DATA/FIELD PARAMETERS

Color **Brown-yellow** Odor **None** Appearance **Turbid, foamy** Temperature **57.0** °F/°C

Other (specific ion; OVA; HNU; etc.) **Inside well casing = 1.3 ppm; Background and breathing zone = 0.8 to 1.0 ppm.**

Specific Conductance, umhos/cm **(A) 1546/1598/1606/1607** pH **(A) 8.42/8.43/8.42/8.43**

umhos/cm **(B) 1639/1670/1659/1605** pH **(B) 8.39/8.45/8.46/8.46**

Sampling Method and Material **Site dedicated Teflon bailer and polypropylene rope.**

Constituents Sampled	Container Description From Lab X or G&M ___	Preservative
VOCs 8015	(3) 40 ml glass vial	HCl, Cool
VOCs 8240	(3) 40 ml glass vial	HCl, Cool

Remarks **pH and SpC readings taken immediately before and after filling sample bottles.**

Sampling Personnel **R. Astle, C. Standard**

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

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WATER SAMPLING LOG

Project/No. **Harrison Phase II RFI / OH0019.018** Page **17** of **44**

Site Location **Moraine, Ohio**

Site/Well No. **GM-7R** Coded/ Replicate No. _____ Date **10/28/94**

Weather **Sunny, 30's °F** Time Sampling Began **8:30 p.m.** Time Sampling Completed **9:50 p.m.**

EVACUATION DATA

Description of Measuring Point (MP) **Top of PVC casing**

Height of MP Above/Below Land Surface _____ MP Elevation _____

Total Sounded Depth of Well Below MP **91.72** Water-Level Elevation _____

Held_____ Depth to Water Below MP **35.21/35.21** Diameter of Casing **4"**

Wet_____ Water Column in Well **56.51** Gallons Pumped/Bailed Prior to Sampling **(110.19) 114.45 pumped**

Gallons per Foot **0.65** Pump On: **8:49** Rate: **5.45 gpm**

Gallons in Well **36.73(x3)** Pump Off: **9:10**

Sampling Pump Intake Setting (feet below land surface) _____

Evacuation Method **Two-inch submersible pump, hose, and polypropylene rope.**

SAMPLING DATA/FIELD PARAMETERS

Color **Moderate Brown** Odor **None** Appearance **Turbid** Temperature **56.3** °F/°C

Other (specific ion; OVA; HNU; etc.) **Inside well casing = 1.2 ppm; Background and breathing zone = 1.0 ppm**

Specific Conductance, umhos/cm **1. (A) 776/747/754/776** pH **1. (A) 6.94/6.94/7.00/7.00**

umhos/cm **(B) 775/747/753/774** pH **(B) 6.94/6.93/6.99/7.00**

umhos/cm **2. (A) 751/792/798/795** pH **2. (A) 7.94/7.98/7.00/7.00**

umhos/cm **(B) 751/792/797/795** pH **(B) 7.94/7.98/7.00/7.00**

Sampling Method and Material **Site dedicated Teflon bailer and polypropylene rope.**

Constituents Sampled	Container Description From Lab X or G&M ____	Preservative
VOCs 8015	(3) 40 ml glass vial	HCl, Cool
VOCs 8240	(3) 40 ml glass vial	HCl, Cool

Remarks **Duplicate pH and SpC readings taken immediately before and after filling sample bottles. Duplicate depth to water level measurement taken.**

Sampling Personnel **R. Astle, C. Standard**

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

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WATER SAMPLING LOG

Project/No. **Harrison Phase II RFI / 000050.0OH** Page **18** of **44**

Site Location **Moraine, Ohio**

Site/Well No. **GM-8** Coded/ Replicate No. **DUP-34** Date **10/28/94**

Weather **Sunny 30's °F** Time Sampling Began **9:55 a.m.** Time Sampling Completed **10:25 a.m.**

EVACUATION DATA

Description of Measuring Point (MP) **Top of PVC casing**

Height of MP Above/Below Land Surface _____ MP Elevation _____

Total Sounded Depth of Well Below MP **51.68** Water-Level Elevation _____

Held_____ Depth to Water Below MP **34.65** Diameter of Casing **2"**

Wet_____ Water Column in Well **17.03** Gallons Pumped/Bailed Prior to Sampling **(8.17) 10 pumped**

Gallons per Foot **0.16** Pump On: **9:57** Rate: **2 gpm**

Gallons in Well **2.72 (x3)** Pump Off: **9:59**

Sampling Pump Intake Setting (feet below land surface) _____

Evacuation Method **Two-inch submersible pump, hose, and polypropylene rope.**

SAMPLING DATA/FIELD PARAMETERS

Color **Light Yellow-Brown** Odor **None** Appearance **Slightly turbid; foamy** Temperature **58.2** °F/°C

Other (specific ion; OVA; HNU; etc.) **Inside well casing = 1.3 ppm; Background and breathing zone = 1.0 ppm**

Specific Conductance, umhos/cm **(A) 1282/1299/1305/1308** pH **(A) 8.51/8.50/8.52/8.54**

umhos/cm **(B) 1296/1306/1307/1308** pH **(B) 8.55/8.53/8.57/8.55**

Sampling Method and Material **Site dedicated Teflon bailer and polypropylene rope.**

Constituents Sampled	Container Description From Lab X or G&M ___	Preservative
VOCs 8015	(3) 40 ml glass vial	HCl, Cool

Remarks **pH and SpC readings taken immediately before and after filling sample bottles. Took Rinseate Blank RB-21 at 10:30 after sampling GM-8.**

Sampling Personnel **R. Astle, C. Standard**

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

DRAFT

WATER SAMPLING LOG

Project/No. **Harrison Phase II RFI / 000050.0OH** Page **19** of **44**

Site Location **Moraine, Ohio**

Site/Well No. **GM-9** Coded/ Replicate No. _____ Date **10/26/94**

Weather **Cloudy, 40's °F** Time Sampling Began **8:15 a.m.** Time Sampling Completed **9:10 a.m.**

EVACUATION DATA

Description of Measuring Point (MP) **Top of PVC casing**

Height of MP Above/Below Land Surface _____ MP Elevation _____

Total Sounded Depth of Well Below MP **99.90** Water-Level Elevation _____

Held_____ Depth to Water Below MP **24.62** Diameter of Casing **2"**

Wet_____ Water Column in Well **75.28** Gallons Pumped/Bailed Prior to Sampling **(36.13) 37 pumped**

Gallons per Foot **0.16** Pump On: **8:34** Rate: **2.88 gpm**

Gallons in Well **12.04 (x3)** Pump Off: **8:47**

Sampling Pump Intake Setting (feet below land surface) _____

Evacuation Method **Two-inch submersible pump, hose, and polypropylene rope.**

SAMPLING DATA/FIELD PARAMETERS

Color **Very light gray** Odor **None** Appearance **Slightly turbid** Temperature **55.6** °F/°C

Other (specific ion; OVA; HNU; etc.) **Inside well casing = 0.9 ppm; Background and Breathing zone = 0.9 ppm**

Specific Conductance, umhos/cm **(A) 1066/1068/1081/1085** pH **(A) 7.00/7.04/7.00/7.02**

umhos/cm **(B) 1057/1069/1073/1073** pH **(B) 6.98/7.08/7.06/7.05**

Sampling Method and Material **Site dedicated Teflon bailer and polypropylene rope.**

Constituents Sampled	Container Description From Lab X or G&M ____	Preservative
VOCs 8015	(3) 40 ml glass vial	HCl, Ice

Remarks **pH and SpC readings taken immediately before and after filling sample bottles.**

Sampling Personnel **R. Astle, C. Standard**

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

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WATER SAMPLING LOG

Project/No. **Harrison Phase II RFI / 000050.0OH** Page **20** of **44**

Site Location **Moraine, Ohio**

Site/Well No. **GM-10** Coded/ Replicate No. _____ Date **10/26/94**

Weather **Cloudy, 40's °F** Time Sampling Began **9:15 a.m.** Time Sampling Completed **9:45 a.m.**

EVACUATION DATA

Description of Measuring Point (MP) **Top of PVC casing**

Height of MP Above/Below Land Surface _____ MP Elevation _____

Total Sounded Depth of Well Below MP **49.88** Water-Level Elevation _____

Held_____ Depth to Water Below MP **23.98** Diameter of Casing **2"**

Wet_____ Water Column in Well **25.90** Gallons Pumped/Bailed Prior to Sampling **(12.43) 15 pumped**

Gallons per Foot **0.16** Pump On: **9:27** Rate: **3 gpm**

Gallons in Well **4.14 (x3)** Pump Off: **9:30**

Sampling Pump Intake Setting (feet below land surface) _____

Evacuation Method **Two-inch submersible pump, hose, and polypropylene rope.**

SAMPLING DATA/FIELD PARAMETERS

Color **Very light brown** Odor **None** Appearance **Trace sheen/slightly turbid** Temperature **53.7** °F/°C

Other (specific ion; OVA; HNU; etc.) **inside well casing = 0.9 ppm; Background and breathing zone = 0.8 ppm**

Specific Conductance, umhos/cm **(A) 732/749/757/763** pH **(A) 6.84/6.99/7.02/7.04**

umhos/cm **(B) 764/776/772/775** pH **(B) 7.01/7.11/7.12/7.11**

Sampling Method and Material **Site dedicated Teflon bailer and polypropylene rope.**

Constituents Sampled	Container Description From Lab X or G&M ___	Preservative
VOCs 8015	(3) 40 ml glass vial	HCl, Cool

Remarks **pH and SpC readings taken immediately before and after filling sample bottles. Black particles suspended in water, probably ant carcasses.**

Sampling Personnel **R. Astle, C. Standard**

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

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WATER SAMPLING LOG

Project/No. **Harrison Phase II RFI / 000050.0OH** Page **21** of **44**

Site Location **Moraine, Ohio**

Site/Well No. **GM-11** Coded/ Replicate No. _____ Date **10/26/94**

Weather **Partly Cloudy, 40's °F** Time Sampling Began **10:20 a.m.** Time Sampling Completed **10:50 a.m.**

EVACUATION DATA

Description of Measuring Point (MP) **Top of PVC casing**

Height of MP Above/Below Land Surface _____ MP Elevation _____

Total Sounded Depth of Well Below MP **99.65** Water-Level Elevation _____

Held_____ Depth to Water Below MP **24.48** Diameter of Casing **2"**

Gallons Pumped/Bailed

Wet_____ Water Column in Well **75.17** Prior to Sampling **(36.08) 37 pumped**

Pump On: **10:24** Rate: **4.62 gpm**

Gallons per Foot **0.16** Pump Off: **10:32**

Gallons in Well **12.03 (x3)** Sampling Pump Intake Setting (feet below land surface) _____

Evacuation Method **Two-inch submersible pump, hose, and polypropylene rope.**

SAMPLING DATA/FIELD PARAMETERS

Color **Moderate brown** Odor **None** Appearance **Turbid** Temperature **57.2** °F/°C

Other (specific ion; OVA; HNU; etc.) **Inside well casing = 0.9 ppm; Background and breathing zone = 0.9 ppm**

Specific Conductance, umhos/cm **(A) 683/696/702/704** pH **(A) 6.90/6.96/7.03/7.00**

umhos/cm **(B) 684/634/700/701** pH **(B) 6.97/7.10/7.09/7.06**

Sampling Method and Material **Site dedicated Teflon bailer and polypropylene rope.**

Constituents Sampled	Container Description From Lab X or G&M ____	Preservative
VOCs 8015	(3) 40 ml glass vial	HCl, Cool

Remarks **pH and SpC readings taken immediately before and after filling sample bottles.**

Sampling Personnel **R. Astle, C. Standard**

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

DRAFT

WATER SAMPLING LOG

Project/No. **Harrison Phase II RFI / 000050.0OH** Page **22** of **44**

Site Location **Moraine, Ohio**

Site/Well No. **GM-13** Coded/ Replicate No. _____ Date **10/26/94**

Weather **Partly Cloudy, 50's °F** Time Sampling Began **1:10 p.m.** Time Sampling Completed **1:50 p.m.**

EVACUATION DATA

Description of Measuring Point (MP) **Top of PVC casing**

Height of MP Above/Below Land Surface _____ MP Elevation _____

Total Sounded Depth of Well Below MP **99.50** Water-Level Elevation _____

Held _____ Depth to Water Below MP **23.17** Diameter of Casing **2"**

Wet _____ Water Column in Well **74.33** Gallons Pumped/Bailed Prior to Sampling **(35.67) 37.5 pumped**

Gallons per Foot **0.16** Pump On: **1:26** Rate: **5.36 gpm**

Gallons in Well **11.89 (x3)** Pump Off: **1:33**

Sampling Pump Intake Setting (feet below land surface) _____

Evacuation Method **Two-inch submersible pump, hose, and polypropylene rope.**

SAMPLING DATA/FIELD PARAMETERS

Color **Clear** Odor **None** Appearance **Black suspended particles, mostly clear** Temperature **59.2** °F/°C

Other (specific ion; OVA; HNU; etc.) **Inside well casing = 0.7 ppm; Background and breathing zone = 0.8 ppm**

Specific Conductance, umhos/cm **(A) 723/723/732/731** pH **(A) 6.93/6.96/7.01/7.01**

umhos/cm **(B) 724/729/730/730** pH **(B) 6.98/7.00/7.04/7.04**

Sampling Method and Material **Site dedicated Teflon bailer and polypropylene rope.**

Constituents Sampled	Container Description From Lab X or G&M ___	Preservative
VOCs 8015	(3) 40 ml glass vial	HCl, Cool

Remarks **pH and SpC readings taken immediately before and after filling sample bottles.**

Sampling Personnel **R. Astle, C. Standard**

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

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WATER SAMPLING LOG

Project/No. **Harrison Phase II RFI / 000050.0OH** Page **23** of **44**

Site Location **Moraine, Ohio**

Site/Well No. **GM-15** Coded/ Replicate No. _____ Date **10/26/94**

Weather **Mostly Cloudy, 50's °F** Time Sampling Began **3:15 p.m.** Time Sampling Completed **3:45 p.m.**

EVACUATION DATA

Description of Measuring Point (MP) **Top of PVC casing**

Height of MP Above/Below Land Surface _____ MP Elevation _____

Total Sounded Depth of Well Below MP **99.62** Water-Level Elevation _____

Held_____ Depth to Water Below MP **26.76** Diameter of Casing **2"**

Wet_____ Water Column in Well **72.86** Gallons Pumped/Bailed Prior to Sampling **(34.97) 38 pumped**

Gallons per Foot **0.16** Pump On: **3:20** Rate: **3.79 gpm**

Gallons in Well **11.66 (x3)** Pump Off: **3:30**

Sampling Pump Intake Setting (feet below land surface) _____

Evacuation Method **Two-inch submersible pump, hose, and polypropylene rope.**

SAMPLING DATA/FIELD PARAMETERS

Color **Clear** Odor **None** Appearance **Clear with suspended particles** Temperature **59.1** °F/°C

Other (specific ion; OVA; HNU; etc.) **Inside well casing = 1.0 ppm; Background and breathing zone = 0.7 ppm**

Specific Conductance, umhos/cm **(A) 778/782/782/783** pH **(A) 7.04/7.00/7.07/7.14**

umhos/cm **(B) 770/770/746/750** pH **(B) 7.00/7.04/7.04/7.11**

Sampling Method and Material **Site dedicated Teflon bailer and polypropylene rope.**

Constituents Sampled	Container Description From Lab X or G&M ___	Preservative
VOCs 8015	(3) 40 ml glass vial	HCl, Cool

Remarks **pH and SpC readings taken immediately before and after filling sample bottles. Suspended particles, probably bug carcasses.**

Sampling Personnel **R. Astle, C. Standard**

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

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WATER SAMPLING LOG

Project/No. **Harrison Phase II RFI / 000050.0OH** Page **24** of **44**

Site Location **Moraine, Ohio**

Site/Well No. **GM-16** Coded/ Replicate No. _____ Date **10/26/94**

Weather **Mostly Cloudy, 50's °F** Time Sampling Began **3:45 p.m.** Time Sampling Completed **4:10 p.m.**

EVACUATION DATA

Description of Measuring Point (MP) **Top of PVC casing**

Height of MP Above/Below Land Surface _____ MP Elevation _____

Total Sounded Depth of Well Below MP **57.34** Water-Level Elevation _____

Held_____ Depth to Water Below MP **25.06** Diameter of Casing **2"**

Wet_____ Water Column in Well **32.28** Gallons Pumped/Bailed Prior to Sampling **(15.49) 15 pumped**

Pump On: _____ Rate: **3 gpm**

Gallons per Foot **0.16** Pump Off: _____

Gallons in Well **5.16 (x3)** Sampling Pump Intake Setting (feet below land surface) _____

Evacuation Method **Two-inch submersible pump, hose, and polypropylene rope.**

SAMPLING DATA/FIELD PARAMETERS

Color **Light brown** Odor **None** Appearance **Slightly turbid** Temperature **59.3** °F/°C

Other (specific ion; OVA; HNU; etc.) **Inside well casing = 1.4 ppm; Background and breathing zone = 0.7 ppm**

Specific Conductance, umhos/cm **(A) 743/777/764/763** pH **(A) 6.81/6.81/6.90/6.93**

umhos/cm **(B) 767/783/764/763** pH **(B) 7.02/6.67/7.00/7.00**

Sampling Method and Material **Site dedicated Teflon bailer and polypropylene rope.**

Constituents Sampled	Container Description From Lab X or G&M ___	Preservative
VOCs 8015	(3) 40 ml glass vial	HCl, Cool

Remarks **pH and SpC readings taken immediately before and after filling sample bottles.**

Sampling Personnel **R. Astle, C. Standard**

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

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WATER SAMPLING LOG

Project/No. **Harrison Phase II RFI / 000050.0OH** Page **25** of **44**

Site Location **Moraine, Ohio**

Site/Well No. **GM-17** Coded/ Replicate No. _____ Date **10/26/94**

Weather **Mostly Cloudy, 40's °F** Time Sampling Began **10:55 a.m.** Time Sampling Completed **11:15 a.m.**

EVACUATION DATA

Description of Measuring Point (MP) **Top of PVC casing**

Height of MP Above/Below Land Surface _____ MP Elevation _____

Total Sounded Depth of Well Below MP **49.90** Water-Level Elevation _____

Held_____ Depth to Water Below MP **23.56** Diameter of Casing **2"**

Wet_____ Water Column in Well **26.34** Gallons Pumped/Bailed Prior to Sampling **(12.64) 15 pumped**

Gallons per Foot **0.16** Pump On: _____ Rate: **3 gpm**

Gallons in Well **4.21 (x3)** Pump Off: _____

Sampling Pump Intake Setting (feet below land surface) _____

Evacuation Method **Two-inch submersible pump, hose, and polypropylene rope.**

SAMPLING DATA/FIELD PARAMETERS

Color **Gray brown** Odor **None** Appearance **Foamy, turbid** Temperature **58.1** °F/°C

Other (specific ion; OVA; HNU; etc.) **Inside well casing = 0.9 ppm; Background and Breathing zone = 0.9 ppm**

Specific Conductance, umhos/cm **(A) 1024/1023/1023/1024** pH **(A) 7.67/7.69/7.71/7.71**

umhos/cm **(B) 987/997/1083/1085** pH **(B) 7.72/7.79/7.76/7.76**

Sampling Method and Material **Site dedicated Teflon bailer and polypropylene rope.**

Constituents Sampled	Container Description From Lab X or G&M ___	Preservative
VOCs 8015	(3) 40 ml glass vial	HCl, Cool

Remarks **pH and SpC readings taken immediately before and after filling sample bottles.**

Sampling Personnel **R. Astle, C. Standard**

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

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WATER SAMPLING LOG

Project/No. **Harrison Phase II RFI / 000050.0OH** Page **26** of **44**

Site Location **Moraine, Ohio**

Site/Well No. **GM-18** Coded/ Replicate No. **DUP-32** Date **10/26/94**

Weather **Mostly Cloudy, 50's °F** Time Sampling Began **1:50 p.m.** Time Sampling Completed **2:25 p.m.**

EVACUATION DATA

Description of Measuring Point (MP) **Top of PVC casing**

Height of MP Above/Below Land Surface _____ MP Elevation _____

Total Sounded Depth of Well Below MP **54.40** Water-Level Elevation _____

Held_____ Depth to Water Below MP **23.63** Diameter of Casing **2"**

Wet_____ Water Column in Well **30.77** Gallons Pumped/Bailed Prior to Sampling **(14.77) 15 pumped**

Gallons per Foot **0.16** Pump On: **1:55** Rate: **3 gpm** Pump Off: **1:58**

Gallons in Well **4.92 (x3)** Sampling Pump Intake Setting (feet below land surface) _____

Evacuation Method **Two-inch submersible pump, hose, and polypropylene rope.**

SAMPLING DATA/FIELD PARAMETERS

Color **Light Brown** Odor **None** Appearance **Foamy,trace suspended black particles/slightly turbid** Temperature **59.4** °F/°C

Other (specific ion; OVA; HNU; etc.) **Inside well casing = 0.8 ppm; Background and breathing zone = 0.8 ppm**

Specific Conductance, umhos/cm **(A) 1058/1065/1111/1118** pH **(A) 7.65/7.65/7.66/7.67**
umhos/cm **(B) 1095/1094/1094/1130** pH **(B) 7.65/7.66/7.66/7.69**

Sampling Method and Material **Site dedicated Teflon bailer and polypropylene rope.**

Constituents Sampled	Container Description From Lab X or G&M ___	Preservative
VOCs 8015	(3) 40 ml glass vial	HCl, Cool

Remarks **pH and SpC readings taken immediately before and after filling sample bottles. Took Rinseate Blank RB-19 (2:30) after sampling well**

Sampling Personnel **R. Astle, C. Standard**

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

DRAFT

WATER SAMPLING LOG

Project/No. **Harrison Phase II RFI / OH0019.018** Page **27** of **44**

Site Location **Moraine, Ohio**

Site/Well No. **GM-19S** Coded/ Replicate No. _____ Date **10/25/94**

Time Sampling Began **9:20 a.m.** Time Sampling Completed **10:40 a.m.**

Weather **Sunny, 40's °F**

EVACUATION DATA

Description of Measuring Point (MP) **Top of PVC casing**

Height of MP Above/Below Land Surface _____ MP Elevation _____

Total Sounded Depth of Well Below MP **55.04/55.04** Water-Level Elevation _____

Held _____ Depth to Water Below MP **29.56/29.56** Diameter of Casing **4"**

Wet _____ Water Column in Well **25.48** Gallons Pumped/Bailed Prior to Sampling **(12.23) 15.4 pumped**

Gallons per Foot **0.16** Pump On: **9:55** Rate: **3.85 gpm**

Gallons in Well **4.07 (x3)** Pump Off: **9:59**

Sampling Pump Intake Setting (feet below land surface) _____

Evacuation Method **Two-inch submersible pump, hose, and polypropylene rope.**

SAMPLING DATA/FIELD PARAMETERS

Color **Brown** Odor **None** Appearance **Turbid** Temperature **58.5** °F/°C

Other (specific ion; OVA; HNU; etc.) **Inside well casing = 1.2 ppm; Background and breathing zone = 1.2 ppm**

Specific Conductance, umhos/cm **(A) 814/812/818/815** pH **(A) 7.02/7.04/7.11/7.09**

umhos/cm **(B) 797/806/818/810** pH **(B) 6.98/7.05/7.06/7.07**

Sampling Method and Material **Site dedicated Teflon bailer and polypropylene rope.**

Constituents Sampled	Container Description From Lab X or G&M ___	Preservative
VOCs 8015	(3) 40 ml glass vial	HCl, cool
VOCs 8240	(3) 40 ml glass vial	HCl, cool

Remarks **Duplicate pH and SpC readings taken immediately after filling sample bottles. Duplicate depth to water level and total sounded depth of well measurements taken.**

Sampling Personnel **R. Astle, C. Standard**

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

DRAFT

WATER SAMPLING LOG

Project/No. **Harrison Phase II RFI / OH0019.018** Page **28** of **44**

Site Location **Moraine, Ohio**

Site/Well No. **GM-19D** Coded/ Replicate No. _____ Date **10/25/94**

Weather **Cloudy, 40's °F** Time Sampling Began **4:20 p.m.** Time Sampling Completed **5:30 p.m.**

EVACUATION DATA

Description of Measuring Point (MP) **Top of PVC casing**

Height of MP Above/Below Land Surface _____ MP Elevation _____

Total Sounded Depth of Well Below MP **148.46** Water-Level Elevation _____

Held_____ Depth to Water Below MP **29.56** Diameter of Casing **4"**

Gallons Pumped/Bailed

Wet_____ Water Column in Well **118.90** Prior to Sampling **(231.86) 233 pumped**

Pump On: **4:32** Rate: **6.67 gpm**

Gallons per Foot **0.65** Pump Off: **5:07**

Sampling Pump Intake Setting

Gallons in Well **77.29 (x3)** (feet below land surface) _____

Evacuation Method **Two-inch submersible pump, hose, and polypropylene rope.**

SAMPLING DATA/FIELD PARAMETERS

Color **Light Brown** Odor **None** Appearance **Semi Turbid** Temperature **56.1** °F/°C

Other (specific ion; OVA; HNU; etc.) **Inside well casing = 0.9 ppm; Background = 0.8 ppm; Breathing zone = 0.8 ppm**

Specific Conductance, umhos/cm **(A) 1286/1283/1307/1304** pH **(A) 6.85/6.88/6.85/6.90**

umhos/cm **(B) 1314/1332/1337/1324** pH **(B) 6.89/6.93/6.91/6.97**

Sampling Method and Material **Site dedicated Teflon bailer and polypropylene rope.**

Constituents Sampled	Container Description From Lab X or G&M ____	Preservative
VOCs 8015	(3) 40 ml glass vial	HCl, Ice
VOCs 8240	(3) 40 ml glass vial	HCl, Ice

Remarks **pH and SpC readings taken immediately before and after filling sample bottles.**

Sampling Personnel **R. Astle, C. Standard**

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

DRAFT

WATER SAMPLING LOG

Project/No. **Harrison Phase II RFI / 000050.0OH** Page **29** of **44**

Site Location **Moraine, Ohio**

Site/Well No. **GM-20D** Coded/ Replicate No. _____ Date **11/01/94**

Weather **Rain, cloudy, 40's °F** Time Sampling Began **1:10 p.m.** Time Sampling Completed **3:10 p.m.**

EVACUATION DATA

Description of Measuring Point (MP) **Top of PVC casing**

Height of MP Above/Below Land Surface _____ MP Elevation _____

Total Sounded Depth of Well Below MP **100.18** Water-Level Elevation _____

Held_____ Depth to Water Below MP **26.78** Diameter of Casing **4"**

Gallons Pumped/Bailed

Wet_____ Water Column in Well **73.40** Prior to Sampling **(143.13) 200 pumped**

Pump On: **1:29** Rate: **5 gpm**

Gallons per Foot **0.65** Pump Off: **2:29**

Sampling Pump Intake Setting

Gallons in Well **47.71 (x3)** (feet below land surface) _____

Evacuation Method **Two-inch submersible pump, hose, and polypropylene rope.**

SAMPLING DATA/FIELD PARAMETERS

Color **Brown** Odor **None** Appearance **Turbid** Temperature **57.3** °F/°C

Other (specific ion; OVA; HNU; etc.) **Inside well casing = 1.1 ppm; Background and breathing zone = 1.0 ppm.**

Specific Conductance, umhos/cm **(A) 850/842/897/798** pH **(A) 7.00/6.99/7.05/7.03**

umhos/cm **(B) 841/818/850/848** pH **(B) 7.01/7.05/7.05/7.02**

Sampling Method and Material **Site dedicated Teflon bailer and polypropylene rope.**

Constituents Sampled	Container Description From Lab X or G&M ___	Preservative
VOCs 8260	(3) 40 ml glass vial	HCl, Cool
VOC 8015	(3) 40 ml glass vial	HCl, Cool
VOC 8240	(3) 40 ml glass vial	HCl, Cool
PCB/Pesticides	1 liter amber glass	Cool
Cyanide	1 liter plastic	NaOH, Cool
Total Metals	1 liter plastic	HNO_3, Cool
Dissolved Metals	1 liter plastic	HNO_3, Cool

Remarks **pH and SpC readings taken immediately before and after filling sample bottles. Dissolved metals field filtered. Split VOCs 8260 with Chris Cotton (OEPA), Sample ID GM20D-split.**

Sampling Personnel **R. Astle, C. Standard**

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

DRAFT

WATER SAMPLING LOG

Project/No. **Harrison Phase II RFI / 000050.0OH** Page **30** of **44**

Site Location **Moraine, Ohio**

Site/Well No. **HR-1** Coded/ Replicate No. _____ Date **10/21/94**

Weather **Sunny, 70's °F** Time Sampling Began **2:15 p.m.** Time Sampling Completed **3:15 p.m.**

EVACUATION DATA

Description of Measuring Point (MP) **Top of PVC casing**

Height of MP Above/Below Land Surface _____ MP Elevation _____

Total Sounded Depth of Well Below MP **59.47** Water-Level Elevation _____

Held_____ Depth to Water Below MP **30.18** Diameter of Casing **2"**

Gallons Pumped/Bailed

Wet_____ Water Column in Well **29.29** Prior to Sampling **(14.07) 14.5 bailed**

Pump On: _____ Rate: _____

Gallons per Foot **0.16** Pump Off: _____

Sampling Pump Intake Setting

Gallons in Well **4.69 (x3)** (feet below land surface) _____

Evacuation Method **Site dedicated Teflon bailer and polypropylene rope**

SAMPLING DATA/FIELD PARAMETERS

Color **Light Brown** Odor **Yes** Appearance **Semi-turbid; foamy** Temperature **70.9** °F/°C

Other (specific ion; OVA; HNU; etc.) **Inside well casing = 2.2 ppm; Background and breathing zone = 1.6 ppm**

Specific Conductance, umhos/cm **1134/1143/1137/1142** pH **7.35/7.23/7.16/7.14**

Sampling Method and Material **Site dedicated Teflon bailer and polypropylene rope.**

Constituents Sampled	Container Description From Lab X or G&M ____	Preservative
VOCs 8015	(3) 40 ml glass vial	HCl, cool

Remarks **pH and SpC readings taken immediately after filling sample bottles**

Sampling Personnel **R. Astle, D. Johnson**

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

DRAFT

WATER SAMPLING LOG

Project/No. **Harrison Phase II RFI / 000050.0OH** Page **31** of **44**

Site Location **Moraine, Ohio**

Site/Well No. **HR-3** Coded/ Replicate No. _____ Date **11/03/94**

Weather **Cloudy, 64 °F** Time Sampling Began **1:20 p.m.** Time Sampling Completed **1:45 p.m.**

EVACUATION DATA

Description of Measuring Point (MP) **Mark of PVC casing**

Height of MP Above/Below Land Surface _____ MP Elevation _____

Total Sounded Depth of Well Below MP **62.35** Water-Level Elevation _____

Held_____ Depth to Water Below MP **32.95** Diameter of Casing **2"**

Wet_____ Water Column in Well **24.40** Gallons Pumped/Bailed Prior to Sampling **(14.1) 15 pumped**

Gallons per Foot **0.16** Pump On: _____ Rate: **3 gpm**

Gallons in Well **4.7 (x3)** Pump Off: _____

Sampling Pump Intake Setting (feet below land surface) **Bottom of well**

Evacuation Method **Two-inch submersible pump, hose, and polypropylene rope.**

SAMPLING DATA/FIELD PARAMETERS

Color **Clear** Odor **None** Appearance **Clear** Temperature **16** °F/°C

Other (specific ion; OVA; HNU; etc.) **Inside well casing = 0.9 ppm; Background and breathing zone = 1.1 ppm**

Specific Conductance, umhos/cm **(A) 984/993/992/993** pH **(A) 7.14/7.00/6.98/6.97**

umhos/cm **(B) 975/972/973/975** pH **(B) 7.01/6.96/6.97/6.97**

Sampling Method and Material **Site dedicated Teflon bailer and polypropylene rope.**

Constituents Sampled	Container Description From Lab X or G&M ____	Preservative
VOCs 8015	(3) 40 ml glass vial	HCl

Remarks **pH and SpC readings taken immediately before and after filling sample bottles.**

Sampling Personnel **H. Sharifi, C. Standard**

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

DRAFT

WATER SAMPLING LOG

Project/No. **Harrison Phase II RFI / 000050.0OH** Page **32** of **44**

Site Location **Moraine, Ohio**

Site/Well No. **HR-4** Coded/ Replicate No. _____ Date **11/02/94**

Weather **Sunny, 65 °F** Time Sampling Began **4:15 p.m.** Time Sampling Completed **4:35 p.m.**

EVACUATION DATA

Description of Measuring Point (MP) **Top of PVC casing**

Height of MP Above/Below Land Surface _____ MP Elevation _____

Total Sounded Depth of Well Below MP **67.20** Water-Level Elevation _____

Held _____ Depth to Water Below MP **38.09** Diameter of Casing **2"**

Wet _____ Water Column in Well **29.11** Gallons Pumped/Bailed Prior to Sampling **(13.97) 15 pumped**

Gallons per Foot **0.16** Pump On: _____ Rate: **3 gpm**

Gallons in Well **4.65 (x3)** Pump Off: _____

Sampling Pump Intake Setting (feet below land surface) **Bottom of well**

Evacuation Method **Two-inch submersible pump, hose, and polypropylene rope.**

SAMPLING DATA/FIELD PARAMETERS

Color **Little Brown** Odor **None** Appearance **Slightly Turbid** Temperature **16** °F/°C

Other (specific ion; OVA; HNU; etc.) **Inside PVC casing = 1.0 ppm; Background = 0.8 ppm**

Specific Conductance, umhos/cm **(A) 969/960/960/960** pH **(A) 7.15/7.09/7.08/7.08**

umhos/cm **(B) 954/954/952/951** pH **(B) 7.07/7.05/7.02/7.05**

Sampling Method and Material **Site dedicated Teflon bailer and polypropylene rope.**

Constituents Sampled	Container Description From Lab X or G&M ____	Preservative
VOCs 8015	(3) 40 ml glass vial	HCl, Cool

Remarks **pH and SpC readings taken immediately before and after filling sample bottles.**

Sampling Personnel **H. Sharifi, C. Standard**

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

DRAFT

WATER SAMPLING LOG

Project/No. **Harrison Phase II RFI / 000050.0OH** Page **33** of **44**

Site Location **Moraine, Ohio**

Site/Well No. **HR-6** Coded/ Replicate No. _____ Date **11/03/94**

Weather **Cloudy, 64 °F** Time Sampling Began **3:30 p.m.** Time Sampling Completed **3:45 p.m.**

EVACUATION DATA

Description of Measuring Point (MP) **Mark of PVC casing**

Height of MP Above/Below Land Surface _____ MP Elevation _____

Total Sounded Depth of Well Below MP **55.52** Water-Level Elevation _____

Held_____ Depth to Water Below MP **30.18** Diameter of Casing **2"**

Wet_____ Water Column in Well **25.34** Gallons Pumped/Bailed Prior to Sampling **(12.16) 15 pumped**

Gallons per Foot **0.16** Pump On: **3:20** Rate: **3 gpm**

Pump Off: **3:25**

Gallons in Well **4.05 (x3)** Sampling Pump Intake Setting (feet below land surface) **Bottom of well**

Evacuation Method **Two-inch submersible pump, hose, and polypropylene rope.**

SAMPLING DATA/FIELD PARAMETERS

Color **Light Brown** Odor **None** Appearance **Clear** Temperature **16** °F/°C

Other (specific ion; OVA; HNU; etc.) **Inside well casing = 1.0 ppm; Background and breathing zone = 0.8 ppm**

Specific Conductance, umhos/cm **(A) 1264/1264/1260/1236** pH **(A) 7.2/7.12/7.07/7.07**

umhos/cm **(B) 1216/1218/1215/1214** pH **(B) 7.08/7.06/7.05/7.05**

Sampling Method and Material **Site dedicated Teflon bailer and polypropylene rope.**

Constituents Sampled	Container Description From Lab X or G&M ____	Preservative
VOCs 8015	(3) 40 ml glass vial	HCl

Remarks **pH and SpC readings taken immediately before and after filling sample bottles.**

Sampling Personnel **H. Sharifi, C. Standard**

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

DRAFT

WATER SAMPLING LOG

Project/No. **Harrison Phase II RFI / 000050.0OH** Page **34** of **44**

Site Location **Moraine, Ohio**

Site/Well No. **HR-8** Coded/ Replicate No. _____ Date **10/24/94**

Weather **Partly Cloudy, 50's °F** Time Sampling Began **2:15 p.m.** Time Sampling Completed **2:50 p.m.**

EVACUATION DATA

Description of Measuring Point (MP) **Top of PVC casing**

Height of MP Above/Below Land Surface _____ MP Elevation _____

Total Sounded Depth of Well Below MP **66.65** Water-Level Elevation _____

Held_____ Depth to Water Below MP **38.07/38.07** Diameter of Casing **2"**

Gallons Pumped/Bailed

Wet_____ Water Column in Well **28.58** Prior to Sampling **(13.7) 14.3 pumped**

Pump On: **2:20** Rate: **2.86 gpm**

Gallons per Foot **0.16** Pump Off: **2:25**

Sampling Pump Intake Setting

Gallons in Well **4.58 (x3)** (feet below land surface) _____

Evacuation Method **Two-inch submersible pump, hose, and polypropylene rope.**

SAMPLING DATA/FIELD PARAMETERS

Color **Very light gray** Odor **None** Appearance **Slightly turbid** Temperature **61.4** °F/°C

Other (specific ion; OVA; HNU; etc.) **Inside well casing = 1.8 ppm; Background = 1.0 ppm; Breathing zone = 1.0 ppm**

Specific Conductance, umhos/cm **1233/1233/1234/1233** pH **7.05/7.11/7.15/7.15**

Sampling Method and Material **Site dedicated Teflon bailer and polypropylene rope.**

Constituents Sampled	Container Description From Lab X or G&M ___	Preservative
VOCs 8015	(3) 40 ml glass vial	HCl, cool

Remarks **pH and SpC readings taken immediately after filling sample bottles; Duplicate depth to water level measurement taken.**

Sampling Personnel **R. Astle, C. Standard**

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

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WATER SAMPLING LOG

Project/No. **Harrison Phase II RFI / 000050.0OH** Page **35** of **44**

Site Location **Moraine, Ohio**

Site/Well No. **HR-9** Coded/ Replicate No. _____ Date **10/24/94**

Weather **Light Rain, 50's °F** Time Sampling Began **3:05 p.m.** Time Sampling Completed **3:35 p.m.**

EVACUATION DATA

Description of Measuring Point (MP) **Top of PVC casing**

Height of MP Above/Below Land Surface _____ MP Elevation _____

Total Sounded Depth of Well Below MP **70.04** Water-Level Elevation _____

Held_____ Depth to Water Below MP **37.44** Diameter of Casing **2"**

Wet_____ Water Column in Well **32.60** Gallons Pumped/Bailed Prior to Sampling **(15.6) 17.16 pumped**

Gallons per Foot **0.16** Pump On: **3:05** Rate: **2.86 gpm**

Gallons in Well **5.22 (x3)** Pump Off: **3:11**

Sampling Pump Intake Setting (feet below land surface) _____

Evacuation Method **Two-inch submersible pump, hose, and polypropylene rope.**

SAMPLING DATA/FIELD PARAMETERS

Color **Moderate Brown** Odor **None** Appearance **Turbid** Temperature **59.3** °F/°C

Other (specific ion; OVA; HNU; etc.) **Inside well casing = 1.8 ppm; Background = 1.2 ppm; Breathing zone = 1.2 ppm**

Specific Conductance, umhos/cm **946/946/945/945** pH **6.70/6.70/6.75/6.75**

Sampling Method and Material **Site dedicated Teflon bailer and polypropylene rope.**

Constituents Sampled	Container Description From Lab X or G&M ___	Preservative
VOCs 8015	(3) 40 ml glass vial	HCl, cool

Remarks **Took Rinseate Blank RB-17 after sampling (3:50 p.m.) pH and SpC readings taken immediately after filling sample bottles.**

Sampling Personnel **R. Astle, C. Standard**

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

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WATER SAMPLING LOG

Project/No. **Harrison Phase II RFI / 000050.0OH** Page **36** of **44**

Site Location **Moraine, Ohio**

Site/Well No. **HR-10** Coded/ Replicate No. **DUP-30** Date **10/24/94**

Weather **Overcast, trace rain, 50's °F** Time Sampling Began **3:35 p.m.** Time Sampling Completed **5:25 p.m.**

EVACUATION DATA

Description of Measuring Point (MP) **Top of PVC casing**

Height of MP Above/Below Land Surface _____ MP Elevation _____

Total Sounded Depth of Well Below MP **126.66** Water-Level Elevation _____

Held_____ Depth to Water Below MP **37.16** Diameter of Casing **4"**

Wet_____ Water Column in Well **89.5** Gallons Pumped/Bailed Prior to Sampling **(174.5) 175 pumped**

Pump On: **3:38** Rate: **5 gpm**

Gallons per Foot **0.65** Pump Off: **4:13**

Gallons in Well **58.18 (x3)** Sampling Pump Intake Setting (feet below land surface) _____

Evacuation Method **Two-inch submersible pump, hose, and polypropylene rope.**

SAMPLING DATA/FIELD PARAMETERS

Color **Gray-Brown** Odor **None** Appearance **Turbid** Temperature **56.0** °F/°C

Other (specific ion; OVA; HNU; etc.) **Inside well casing = 1.2 ppm; Background = 1.1 ppm; Breathing zone = 1.1 ppm**

Specific Conductance, umhos/cm **702/703/699/698** pH **6.75/6.79/6.81/6.83**

Sampling Method and Material **Site dedicated Teflon bailer and polypropylene rope.**

Constituents Sampled	Container Description From Lab X or G&M ___	Preservative
VOCs 8015	(3) 40 ml glass vial	HCl, cool
Total Antimony	(1) 1 liter plastic	HNO_3, cool
Dissolved Antimony	(1) 1 liter plastic	HNO_3, cool

Remarks **Dissolved antimony field filtered (0.45 microns). pH and SpC taken immediately after filling sample bottles.**

Sampling Personnel **R. Astle, C. Standard**

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

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WATER SAMPLING LOG

Project/No. **Harrison Phase II RFI / 000050.0OH** Page **37** of **44**

Site Location **Moraine, Ohio**

Site/Well No. **HR-11** Coded/ Replicate No. _____ Date **11/01/94**

Weather **Cloudy, light rain, 40's °F** Time Sampling Began **9:50 a.m.** Time Sampling Completed **10:30 a.m.**

EVACUATION DATA

Description of Measuring Point (MP) **Top of PVC casing**

Height of MP Above/Below Land Surface _____ MP Elevation _____

Total Sounded Depth of Well Below MP **68.86** Water-Level Elevation _____

Held_____ Depth to Water Below MP **37.82/37.82** Diameter of Casing **2"**

Wet_____ Water Column in Well **31.04** Gallons Pumped/Bailed Prior to Sampling **(14.90) 15 pumped**

Pump On: **9:55** Rate: **3 gpm**

Gallons per Foot **0.16** Pump Off: **10:00**

Gallons in Well **4.97 (x3)** Sampling Pump Intake Setting (feet below land surface) _____

Evacuation Method **Two-inch submersible pump, hose, and polypropylene rope.**

SAMPLING DATA/FIELD PARAMETERS

Color **Brown** Odor **None** Appearance **Turbid** Temperature **55.0** °F/°C

Other (specific ion; OVA; HNU; etc.) **Inside well casing = 0.2 ppm; Background and breathing zone = 0.1 ppm.**

Specific Conductance, umhos/cm **1. (A) 1212/1216/1217/1228** pH **1. (A) 6.68/6.80/6.81/6.85**

umhos/cm **(B) 1210/1216/1216/1226** pH **(B) 6.70/6.81/6.82/6.86**

umhos/cm **2. (A) 1170/1200/1168/1181** pH **2. (A) 6.78/6.71/6.70/6.72**

umhos/cm **(B) 1170/1200/1168/1181** pH **(B) 6.78/6.71/6.70/6.72**

Sampling Method and Material **Site dedicated Teflon bailer and polypropylene rope.**

Constituents Sampled	Container Description From Lab X or G&M ____	Preservative
VOCs 8015	(3) 40 ml glass vial	HCl, Cool

Remarks **Duplicate pH and SpC readings taken immediately before and after filling sample bottles. Duplicate depth to water level measurement taken.**

Sampling Personnel **R. Astle, C. Standard**

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

DRAFT

WATER SAMPLING LOG

Project/No. **Harrison Phase II RFI / 000050.0OH** Page **38** of **44**

Site Location **Moraine, Ohio**

Site/Well No. **HR-12** Coded/ Replicate No. **DUP-36** Date **11/01/94**

Weather **Cloudy, light rain, 40's °F** Time Sampling Began **10:10 a.m.** Time Sampling Completed **11:10 a.m.**

EVACUATION DATA

Description of Measuring Point (MP) **Top of PVC casing**

Height of MP Above/Below Land Surface _____ MP Elevation _____

Total Sounded Depth of Well Below MP **130.46** Water-Level Elevation _____

Held_____ Depth to Water Below MP **37.12** Diameter of Casing **4"**

Wet_____ Water Column in Well **93.34** Gallons Pumped/Bailed Prior to Sampling **(182.01) 185 pumped**

Gallons per Foot **0.65** Pump On: **10:11** Rate: **5 gpm** Pump Off: **10:48**

Gallons in Well **60.67 (x3)** Sampling Pump Intake Setting (feet below land surface) _____

Evacuation Method **Two-inch submersible pump, hose, and polypropylene rope.**

SAMPLING DATA/FIELD PARAMETERS

Color **Gray** Odor **Slight H_2S** Appearance **Turbid, foamy** Temperature **54.3** °F/°C

Other (specific ion; OVA; HNU; etc.) **Inside well casing = 0.1 ppm; Background and breathing zone = 0.1 ppm.**

Specific Conductance, umhos/cm **(A) 1338/1325/1326/1355** pH **(A) 6.54/6.55/6.80/6.84**

umhos/cm **(B) 1385/1382/1385/1380** pH **(B) 6.80/6.90/7.01/7.05**

Sampling Method and Material **Site dedicated Teflon bailer and polypropylene rope.**

Constituents Sampled	Container Description From Lab X or G&M ____	Preservative
VOCs 8015	(3) 40 ml glass vial	HCl, Cool
Total Antimony	1 liter plastic	HNO_3, Cool
Dissolved Antimony	1 liter plastic	HNO_3, Cool

Remarks **pH and SpC readings taken immediately before and after filling sample bottles. Triple volume collected for MS/MSD. Rinseate Blank RB-23 taken after sampling at 11:30 a.m.**

Sampling Personnel **R. Astle, C. Standard**

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

DRAFT

WATER SAMPLING LOG

Project/No. **Harrison Phase II RFI / 000050.0OH** Page **39** of **44**

Site Location **Moraine, Ohio**

Site/Well No. **HR-13** Coded/ Replicate No. _____ Date **11/03/94**

Weather **Cloudy, 64 °F** Time Sampling Began **1:50 p.m.** Time Sampling Completed **2:05 p.m.**

EVACUATION DATA

Description of Measuring Point (MP) **Mark of PVC casing**

Height of MP Above/Below Land Surface _____ MP Elevation _____

Total Sounded Depth of Well Below MP **86.37** Water-Level Elevation _____

Held_____ Depth to Water Below MP **31.26** Diameter of Casing **4"**

Wet_____ Water Column in Well **55.11** Gallons Pumped/Bailed Prior to Sampling **(107.46) 130 pumped**

Gallons per Foot **0.65** Pump On: **1:45** Rate: **6.5 gpm**

Pump Off: **2:05**

Gallons in Well **35.82 (x3)** Sampling Pump Intake Setting (feet below land surface) **Bottom of well**

Evacuation Method **Two-inch submersible pump, hose, and polypropylene rope.**

SAMPLING DATA/FIELD PARAMETERS

Color **Clear** Odor **None** Appearance **Clear** Temperature **15** °F/°C

Other (specific ion; OVA; HNU; etc.) **Inside of well = 0.8 ppm; Background = 0.9 ppm**

Specific Conductance, umhos/cm **(A) 1125/1120/1116/1112** pH **(A) 6.94/7.00/6.94/7.01**

umhos/cm **(B) 1112/1114/1116/1118** pH **(B) 7.01/7.01/7.00/7.01**

Sampling Method and Material **Site dedicated Teflon bailer and polypropylene rope.**

Constituents Sampled	Container Description From Lab X or G&M ___	Preservative
VOCs 8015	(3) 40 ml glass vial	HCl

Remarks **pH and SpC readings taken immediately before and after filling sample bottles.**

Sampling Personnel **H. Sharifi, C. Standard**

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

DRAFT

WATER SAMPLING LOG

Project/No. Harrison Phase II RFI / 000050.0OH

Site Location Moraine, Ohio

Site/Well No. HR-14

Coded/ Replicate No. _____

Date 11/03/94

Weather Cloudy, 64 °F

Time Sampling Began 10:40 a.m.

Time Sampling Completed 11:05 a.m.

EVACUATION DATA

Description of Measuring Point (MP) Top of PVC casing

Height of MP Above/Below Land Surface _____

MP Elevation _____

Total Sounded Depth of Well Below MP 84.72

Water-Level Elevation _____

Held _____ Depth to Water Below MP 27.97

Diameter of Casing 4"

Wet _____ Water Column in Well 61.75

Gallons Pumped/Bailed Prior to Sampling (120.39) 127.5 pumped

Pump On: 10:40 Rate: 7.5 gpm

Gallons per Foot 0.65

Pump Off: 10:57

Gallons in Well 40.13 (x3)

Sampling Pump Intake Setting (feet below land surface) Bottom of well

Evacuation Method Two-inch submersible pump, hose, and polypropylene rope.

SAMPLING DATA/FIELD PARAMETERS

Color Clear Odor None Appearance Clear Temperature 16 °F/°C

Other (specific ion; OVA; HNU; etc.) inside well casing = 0.2 ppm; Background and breathing zone = 0.2 ppm

Specific Conductance, umhos/cm (A) 1067/1042/1093/1044 pH (A) 6.51/6.70/6.82/6.84

umhos/cm (B) 1092/1092/1091/1092 pH (B) 6.85/6.91/6.93/6.93

Sampling Method and Material Site dedicated Teflon bailer and polypropylene rope.

Constituents Sampled	Container Description From Lab X or G&M ___	Preservative
VOCs 8015	(3) 40 ml glass vial	HCl

Remarks pH and SpC readings taken immediately before and after filling sample bottles.

Sampling Personnel H. Sharifi, C. Standard

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

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WATER SAMPLING LOG

Project/No. Harrison Phase II RFI / 000050.0OH

Site Location Moraine, Ohio

Site/Well No. HR-15

Coded/
Replicate No. DUP-38

Date 11/03/94

Weather Cloudy, 55 °F

Time Sampling
Began 8:45 a.m.

Time Sampling
Completed 9:25 a.m.

EVACUATION DATA

Description of Measuring Point (MP) Mark of PVC casing

Height of MP Above/Below Land Surface _____

MP Elevation _____

Total Sounded Depth of Well Below MP 102.47

Water-Level Elevation _____

Held _____ Depth to Water Below MP 34.14/34.14

Diameter of Casing 4"

Wet _____ Water Column in Well 68.33

Gallons Pumped/Bailed
Prior to Sampling (133.24) 150 pumped

Pump On: 8:40 Rate: 6 gpm

Gallons per Foot 0.65

Pump Off: 9:05

Gallons in Well 44.41 (x3)

Sampling Pump Intake Setting
(feet below land surface) Bottom of well

Evacuation Method Two-inch submersible pump, hose, and polypropylene rope.

SAMPLING DATA/FIELD PARAMETERS

Color Gray Odor None Appearance Turbid Temperature 11 °F/°C

Other (specific ion; OVA; HNU; etc.) Inside well casing = 1.2 ppm; Background and breathing zone = 0.7 ppm

Specific Conductance, umhos/cm 1. (A) 1105/1087/1088/1085 pH 1. (A) 6.84/6.95/7.02/7.05
umhos/cm (B) 1090/1087/1091/1080 pH (B) 7.09/7.11/7.12/7.13
umhos/cm 2. (A) 1046/1040/1053/1050 pH 2. (A) 7.06/7.05/7.05/7.04
umhos/cm (B) 1053/1050/1054/1052 pH (B) 7.05/7.05/7.03/7.05

Sampling Method and Material Site dedicated Teflon bailer and polypropylene rope.

Constituents Sampled	Container Description From Lab X or G&M ___	Preservative
VOCs 8015	(3) 40 ml glass vial	HCl

Remarks Duplicate pH and SpC readings taken immediately before and after filling sample bottles. RB-25 was collected after sampling HR-15. Duplicate depth to water level measurement taken.

Sampling Personnel H. Sharifi, C. Standard

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

DRAFT

WATER SAMPLING LOG

Project/No. **Harrison Phase II RFI / 000050.0OH** Page **42** of **44**

Site Location **Moraine, Ohio**

Site/Well No. **HR-17** Coded/ Replicate No. **DUP-35** Date **10/31/94**

Weather **Cloudy, 50's °F** Time Sampling Began **1:30 p.m.** Time Sampling Completed **2:10 p.m.**

EVACUATION DATA

Description of Measuring Point (MP) **Top of PVC casing**

Height of MP Above/Below Land Surface _____ MP Elevation _____

Total Sounded Depth of Well Below MP **48.48** Water-Level Elevation _____

Held_____ Depth to Water Below MP **24.72/24.72** Diameter of Casing **4"**

Wet_____ Water Column in Well **23.76** Gallons Pumped/Bailed Prior to Sampling **(46.33) 48 pumped**

Pump On: **1:38** Rate: **2.83 gpm**

Gallons per Foot **0.65** Pump Off: **1:55**

Gallons in Well **15.44 (x3)** Sampling Pump Intake Setting (feet below land surface) _____

Evacuation Method **Two-inch submersible pump, hose, and polypropylene rope.**

SAMPLING DATA/FIELD PARAMETERS

Color **Brown** Odor **None** Appearance **Turbid** Temperature **64.1** °F/°C

Other (specific ion; OVA; HNU; etc.) **Inside well casing = 1.2 ppm; Background and breathing zone = 1.2 ppm.**

Specific Conductance, umhos/cm **1. (A) 1193/1197/1195/1172** pH **1. (A) 6.91/7.06/7.11/7.11**

umhos/cm **(B) 1193/1191/1195/1172** pH **(B) 6.91/7.06/7.09/7.12**

umhos/cm **2. (A) 1184/1176/1183/1157** pH **2. (A) 6.87/6.96/7.03/7.11**

umhos/cm **(B) 1184/1177/1182/1157** pH **(B) 6.88/6.96/7.03/7.11**

Sampling Method and Material **Site dedicated Teflon bailer and polypropylene rope.**

Constituents Sampled	Container Description From Lab X or G&M ___	Preservative
VOCs 8015	(3) 40 ml glass vial	HCl, Cool
VOCs 8240	(3) 40 ml glass vial	HCl, Cool

Remarks **Duplicate pH and SpC readings taken immediately before and after filling sample bottles. Took Rinseate Blank RB-22 after sampling well (2:15 p.m.). Duplicate depth to water level measurement taken.**

Sampling Personnel **R. Astle, C. Standard**

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

DRAFT

APPENDIX D

RFI GEOTECHNICAL RESULTS

DRAFT

THE LABORATORY DATA WAS GENERATED
BY SOLAR TESTING LABORATORIES, INC.
HILLIARD, OHIO

DRAFT

SOLAR TESTING LABORATORIES, INC.

4299 Reynolds Drive, Hilliard, Ohio 43026
Telephone: (614) 777-6013 • FAX: (614) 777-6160

HARRISON RADIATOR
C92060X12

IDENTIFICATION	PERMEABILITY	POROSITY
BKG-BH03-02	$2.7X10^{-8}$CM/SEC	33.1%
BKG-BH10-02	$1.2X10^{-6}$CM/SEC	39.5%

Gene Vandayburg
Laboratory Manager

H. W

SOLAR TESTING LABORATORIES, INC.

4299 Reynolds Drive, Columbus, Ohio 43026
Telephone: (614) 777-6013 • FAX: (614) 777-6160

PROJECT: HARRISON RADIATOR **FILE NO.:** C92060

TEST PERFORMED: MOISTURE CONTENT **REPORT NO.:** C-13

TECHNICIAN: BRIAN COLLINS **DATE:** 1-7-93

SUMMARY OF INSPECTION

SAMPLE I.D. NUMBER	MOISTURE CONTENT
BKG-BH10-16	3.5
BKG-BH10-02	16.9
BKG-BH07-02	18.4
BKG-BH07-16	5.4
BKG-BH03-16	3.5
BKG-BH03-02	4.0

STATE OF OHIO
STEVEN W CARTER 47607
PROFESSIONAL ENGINEER

SOLAR TESTING LABORATORIES, INC.

Paul Selegue, Laboratory Manager
Columbus Division

SOLAR TESTING LABORATORIES, INC.

4299 Reynolds Drive, Columbus, Ohio 43026
Telephone: (614) 777-6013 • FAX: (614) 777-6160

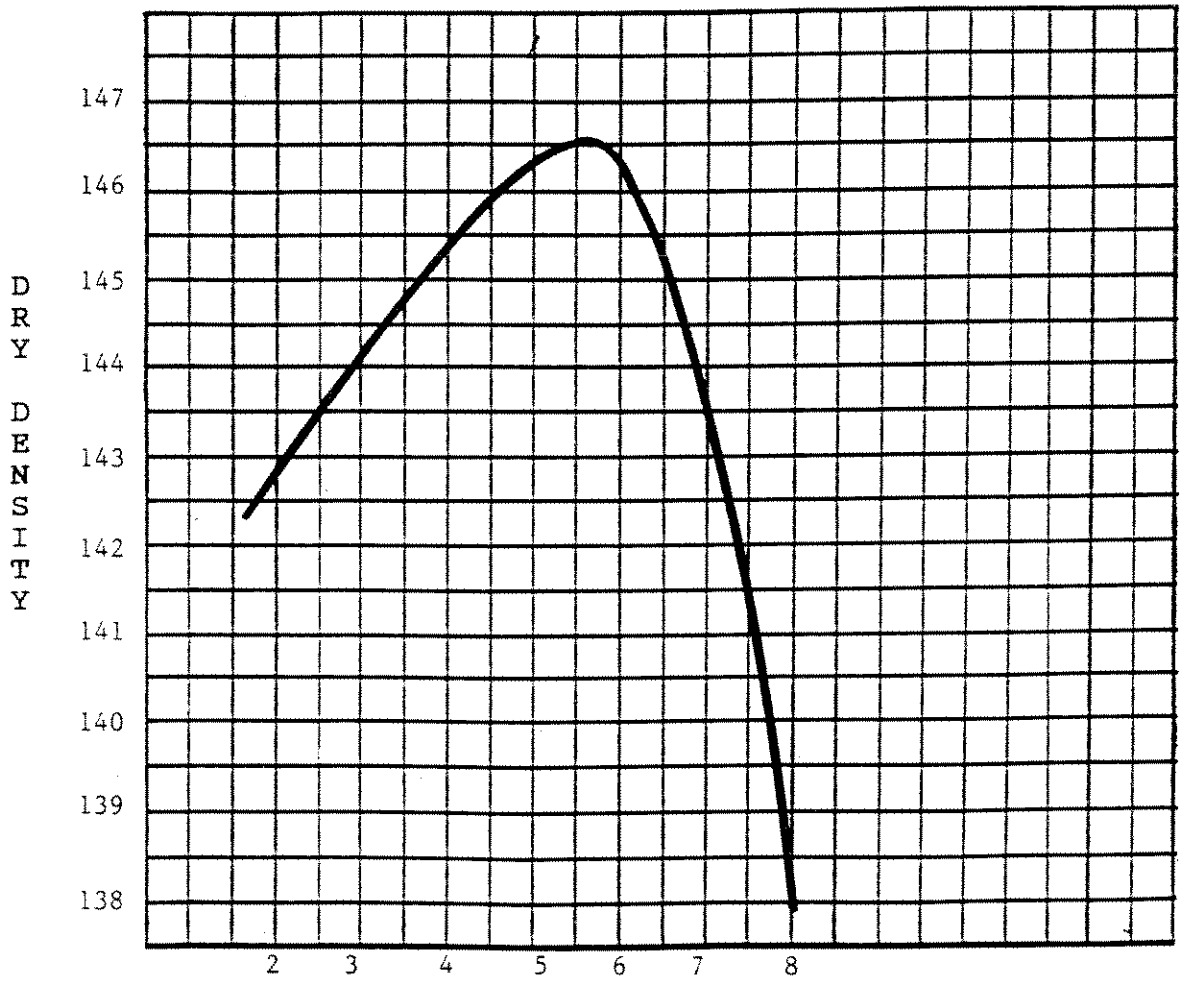
PROJECT: HARRISON RADIATOR **FILE NO.** C92060

TEST PERFORMED: MOISTURE-DENSITY RELATIONSHIP ASTM-D 698-C

REPORT NO. C-4 **DATE:** 12-8-92 **CURVE NO.**

TECHNICIAN: GENE VANDAYBURG

MAX. DRY DENSITY
146.5 LBS/CU.FT.
OPTIMUM MOISTURE
5.6 %



SOIL DESCRIPTION: BROWN GRAVELLY SAND

LOCATION: BKG-BH03-02

STATE OF OHIO
STEVEN W CARTER
47807
PROFESSIONAL ENGINEER
Steven W. Carter

JAN -

SOLAR TESTING LABORATORIES, INC.

4299 Reynolds Drive, Columbus, Ohio 43026

Telephone: (614) 777-6013 • FAX: (614) 777-6160

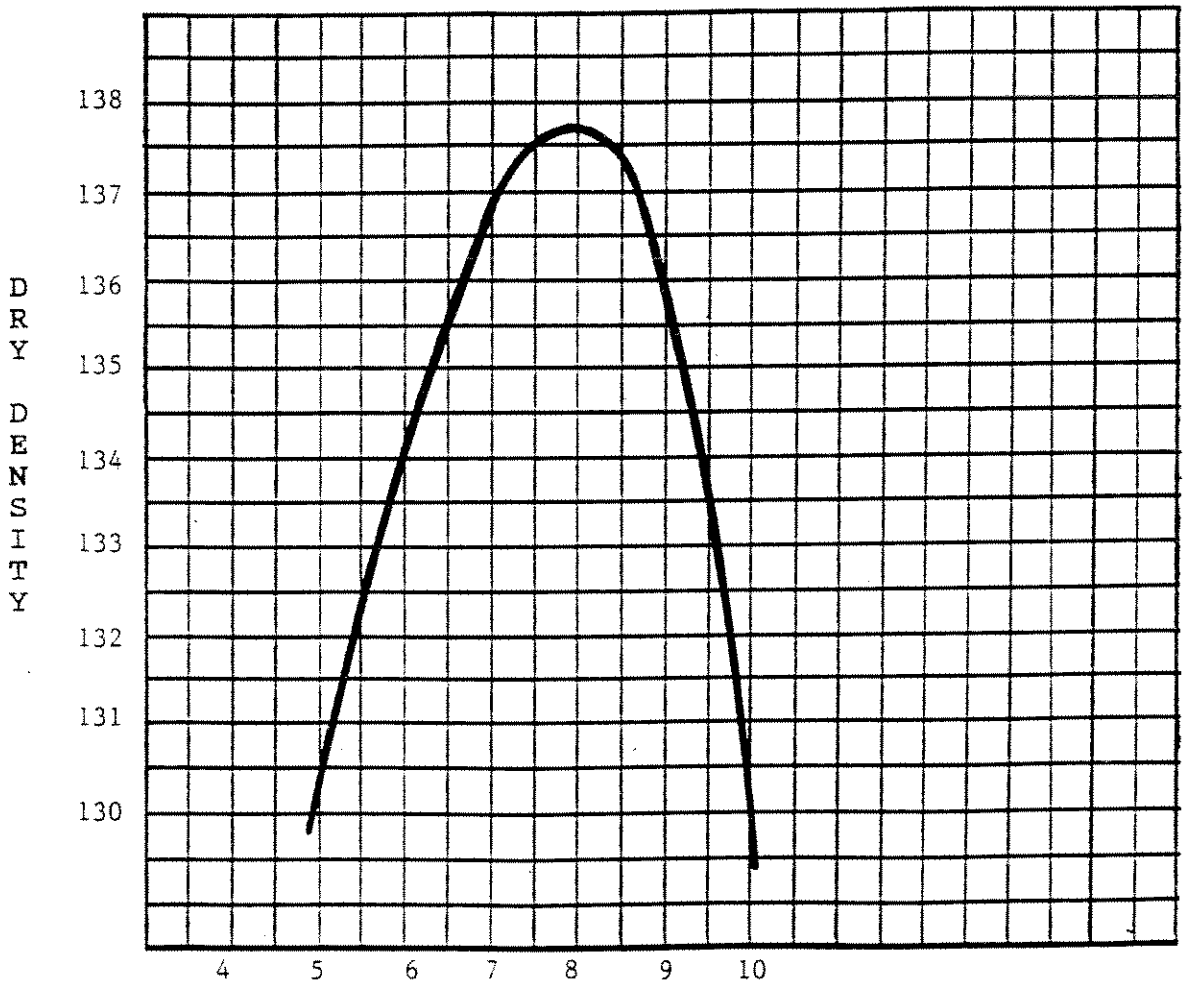
PROJECT: HARRISON RADIATOR **FILE NO.** C92060

TEST PERFORMED: MOISTURE-DENSITY RELATIONSHIP ASTM-D 698-C

REPORT NO. C-1 **DATE:** 12-8-92 **CURVE NO.**

TECHNICIAN: GENE VANDAYBURG

MAX. DRY DENSITY
137.7 **LBS/CU.FT.**
OPTIMUM MOISTURE
8.0 **%**



SOIL DESCRIPTION: BROWN CLAYEY SAND, LITTLE GRAVEL

LOCATION: BKG-BH03-16

STATE OF OHIO
STEVEN
PROFESSIONAL ENGINEER

RECEIVED
JAN - 1993

SOLAR TESTING LABORATORIES, INC.

4299 Reynolds Drive, Columbus, Ohio 43026

Telephone: (614) 777-6013 • FAX: (614) 777-6160

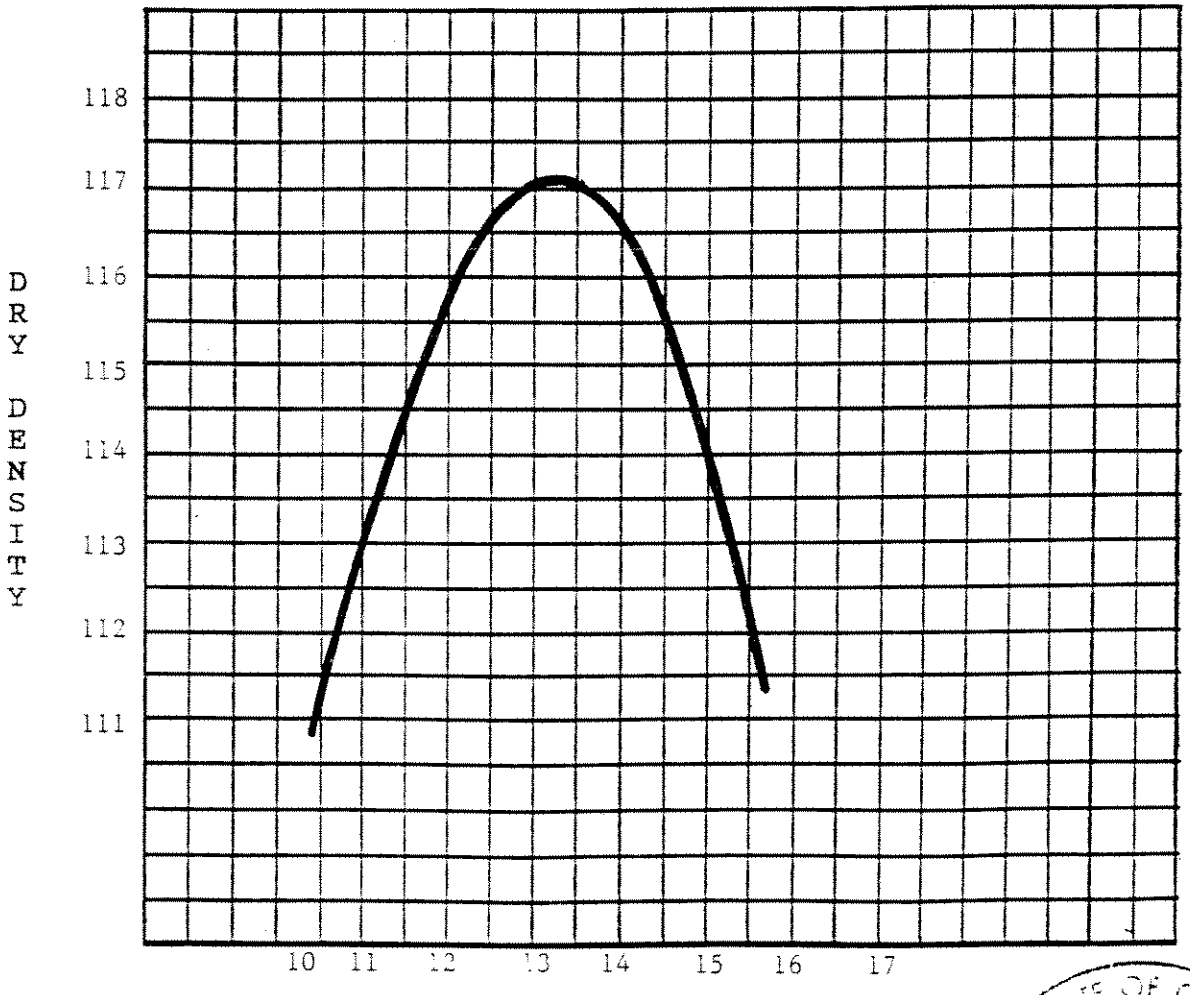
PROJECT: HARRISON RADIATOR **FILE NO.** C92060

TEST PERFORMED: MOISTURE-DENSITY RELATIONSHIP ASTM-D698-C

REPORT NO. C-6 **DATE:** 12-8-92 **CURVE NO.**

TECHNICIAN: GENE VANDAYBURG

MAX. DRY DENSITY
117.2 **LBS/CU.FT.**
OPTIMUM MOISTURE
13.3 %



SOIL DESCRIPTION: DARK BROWN SILTY CLAY WITH MEDIUM GRAVEL

LOCATION: BKG-BH07-02

STATE OF OHIO
STEVEN W CARTER
17603
REGISTERED PROFESSIONAL ENGINEER
Steven W. Carter

SOLAR TESTING LABORATORIES, INC.

4299 Reynolds Drive, Columbus, Ohio 43026

Telephone: (614) 777-6013 • FAX: (614) 777-6160

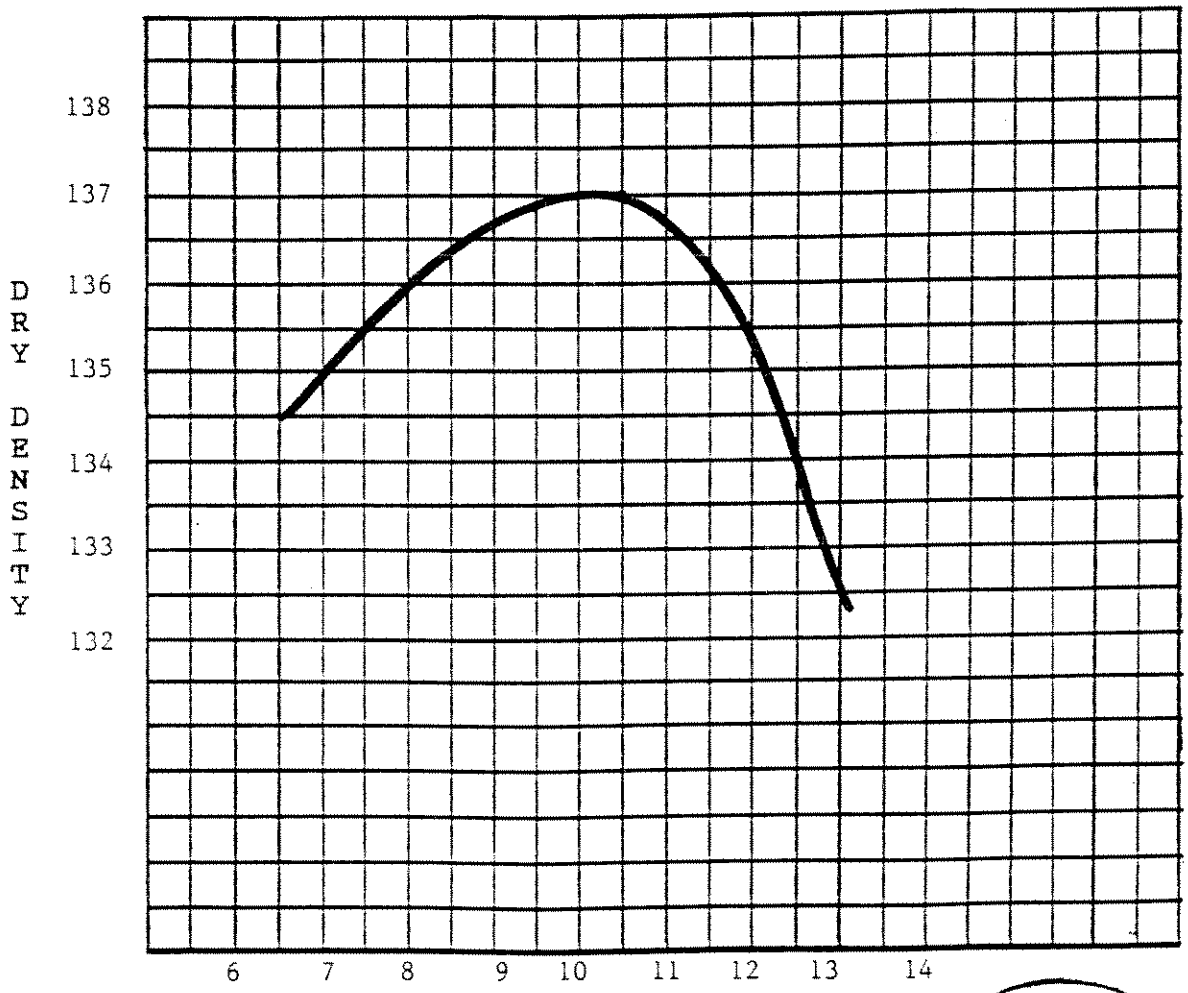
PROJECT: HARRISON RADIATOR **FILE NO.** C92060

TEST PERFORMED: MOISTURE-DENSITY RELATIONSHIP ASTM-D 698-C

REPORT NO. C-5 **DATE:** 12-8-92 **CURVE NO.**

TECHNICIAN: GENE VANDAYBURG

MAX. DRY DENSITY
137.0 LBS/CU.FT.
OPTIMUM MOISTURE
10.5 %



SOIL DESCRIPTION: SANDY BROWN MATERIAL

LOCATION: BKG-BH-7-16

STATE OF OHIO
STEVEN W CARTER 47607
PROFESSIONAL ENGINEER

JAN -

SOLAR TESTING LABORATORIES, INC.

4299 Reynolds Drive, Columbus, Ohio 43026

Telephone: (614) 777-6013 • FAX: (614) 777-6160

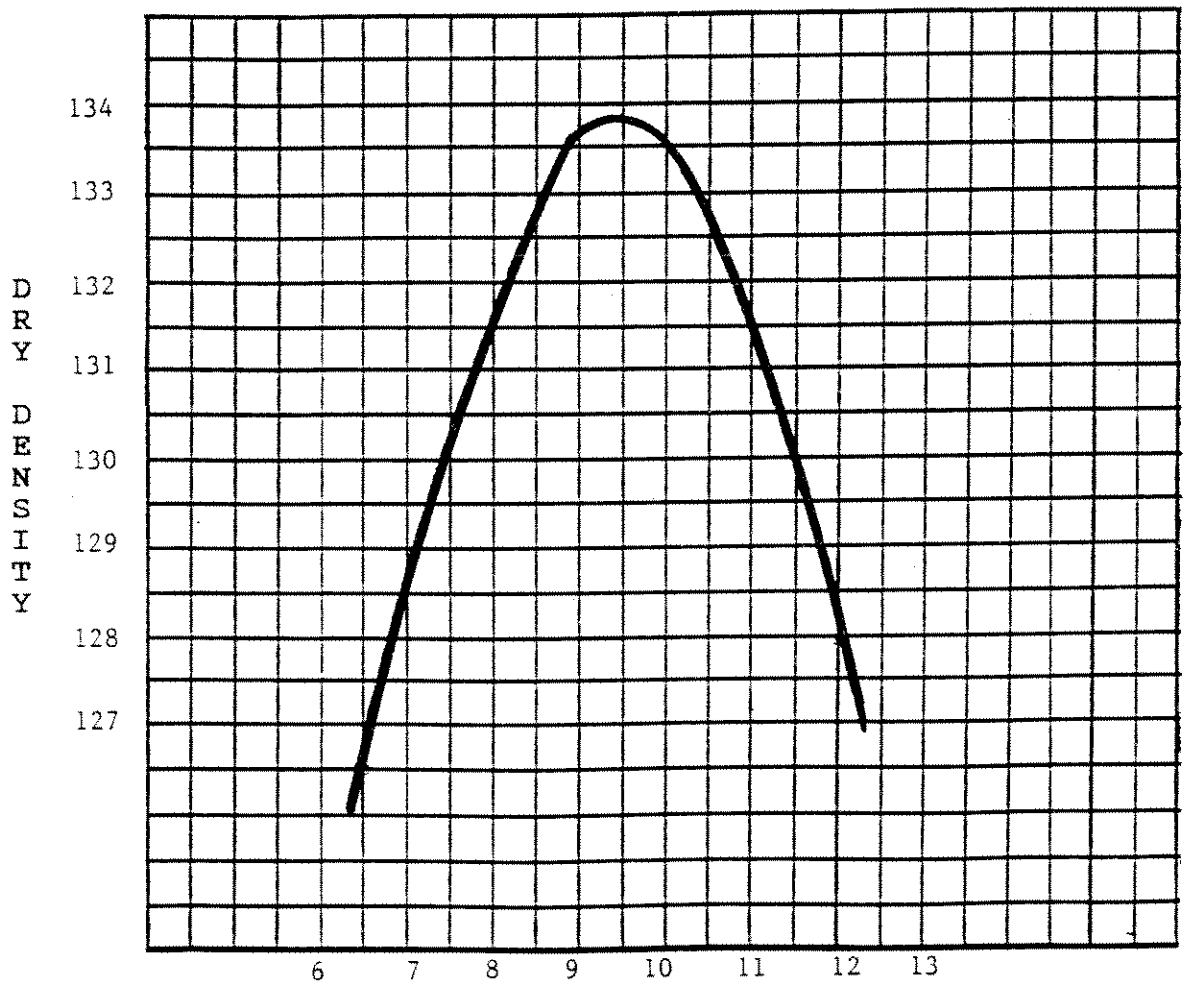
PROJECT: HARRISON RADIATOR **FILE NO.** C92060

TEST PERFORMED: MOISTURE-DENSITY RELATIONSHIP ASTM-D698-C

REPORT NO. C-2 **DATE:** 12-8-92 **CURVE NO.**

TECHNICIAN: GENE VANDAYBURG

MAX. DRY DENSITY
133.8 LBS/CU.FT.
OPTIMUM MOISTURE
9.5 %



SOIL DESCRIPTION: BROWN GRAVELLY CLAY

LOCATION: BKG-BH10-02

STATE OF OHIO
STEVEN W. CARTER
47807
PROFESSIONAL ENGINEER

Steven W. Carter

1993

SOLAR TESTING LABORATORIES, INC.

4299 Reynolds Drive, Columbus, Ohio 43026

Telephone: (614) 777-6013 • FAX: (614) 777-6160

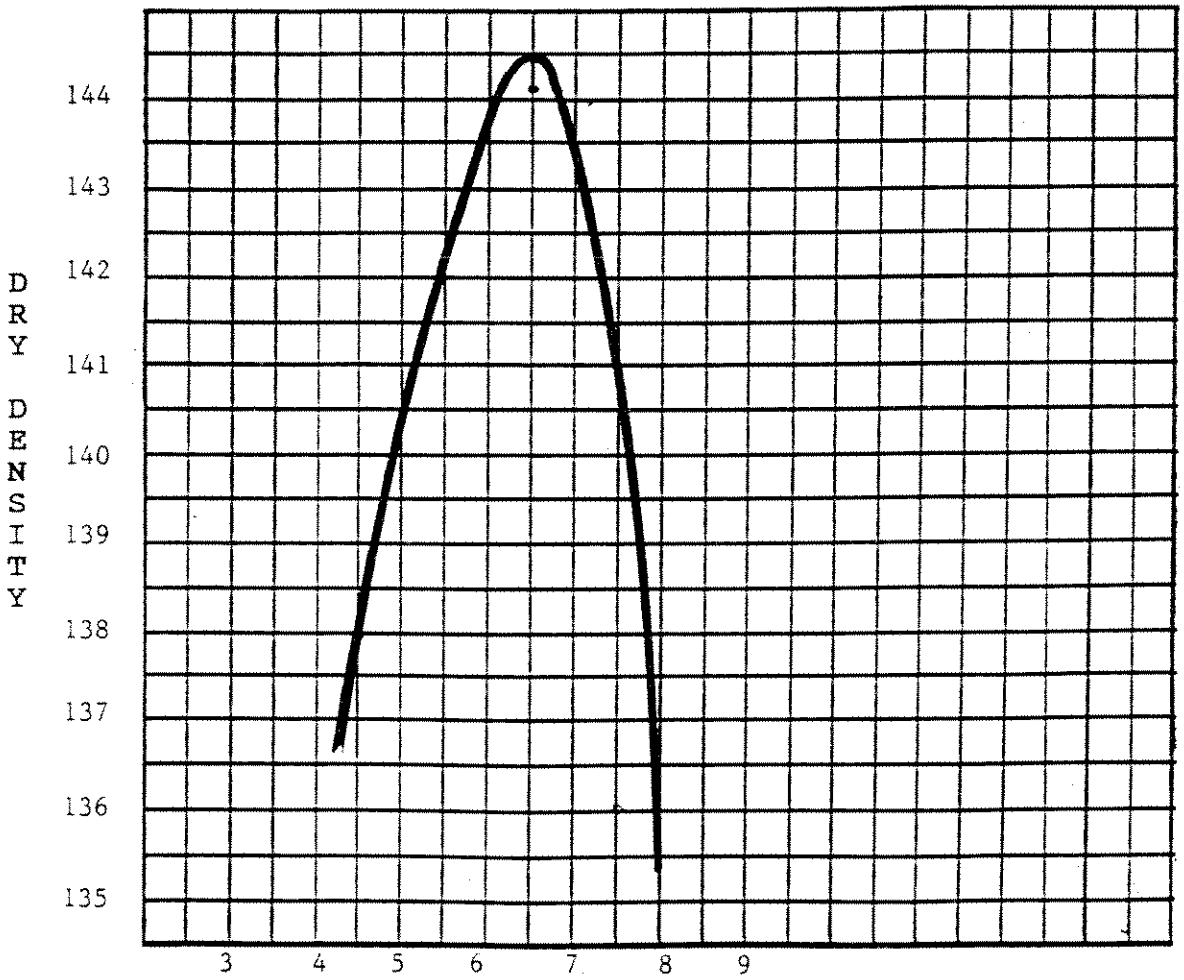
PROJECT: HARRISON RADIATOR **FILE NO.** C92060

TEST PERFORMED: MOISTURE-DENSITY RELATIONSHIP ASTM-D 698-C

REPORT NO. C-3 **DATE:** 12-8-92 **CURVE NO.**

TECHNICIAN: GENE VANDAYBURG

MAX. DRY DENSITY
144.1 **LBS/CU.FT.**
OPTIMUM MOISTURE
6.5 %

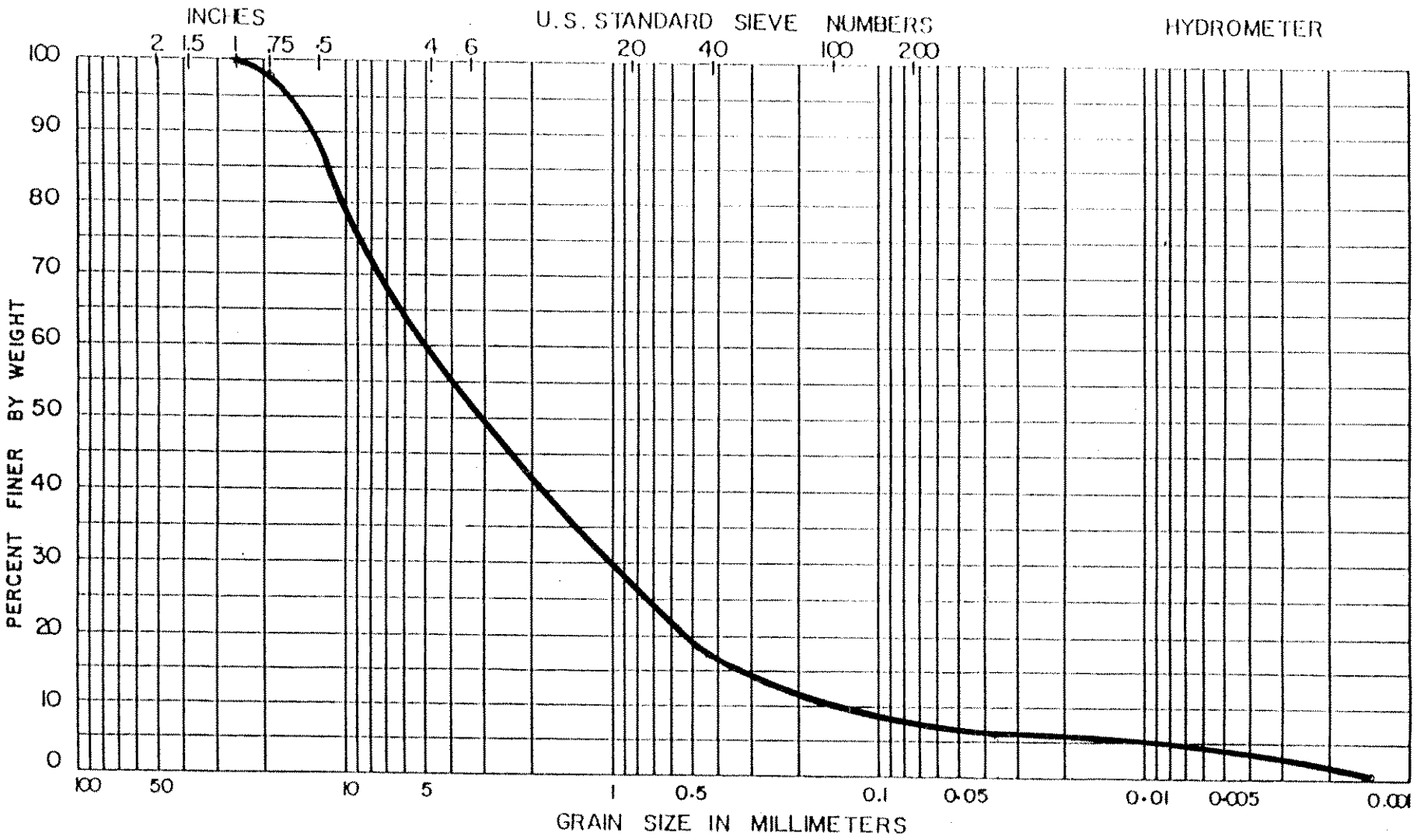


SOIL DESCRIPTION: BROWN GRAVELLY SAND WITH CLAY

LOCATION: BKG-BH10-16

STATE OF OHIO
STEVEN W CARTER
47607
PROFESSIONAL ENGINEER

Steven W. Carter



GRAVEL		SAND			SILT	CLAY
COARSE	FINE	COARSE	MEDIUM	FINE		

OWNER General Motors Corporation

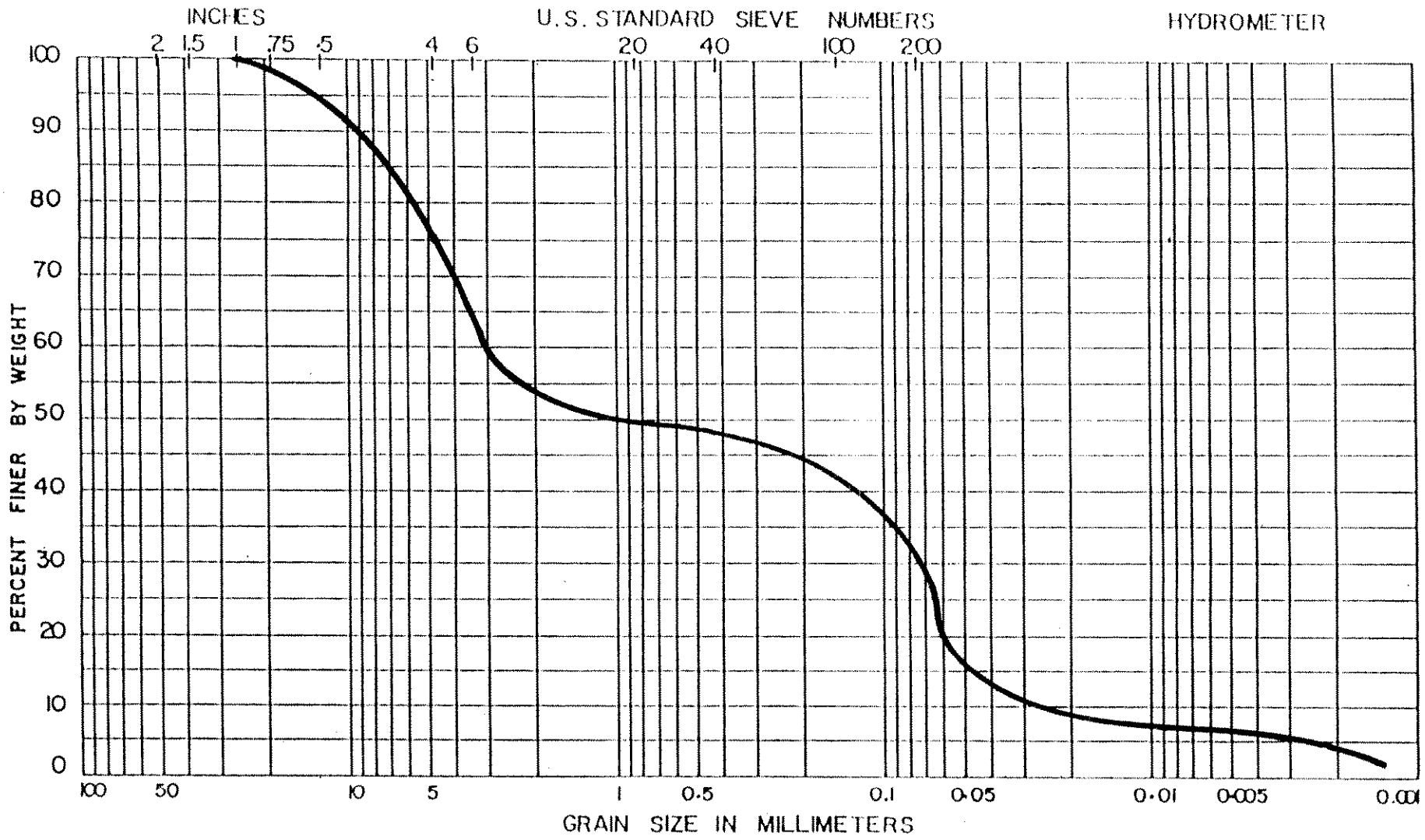
PROJECT Harrison Radiator C92060

LOCATION Moraine, Ohio

BORING NO. -- SAMPLE NO. BKG-BH03-02

SOLAR TESTING LABORATORIES, INC.

RECEIVED
JAN 1

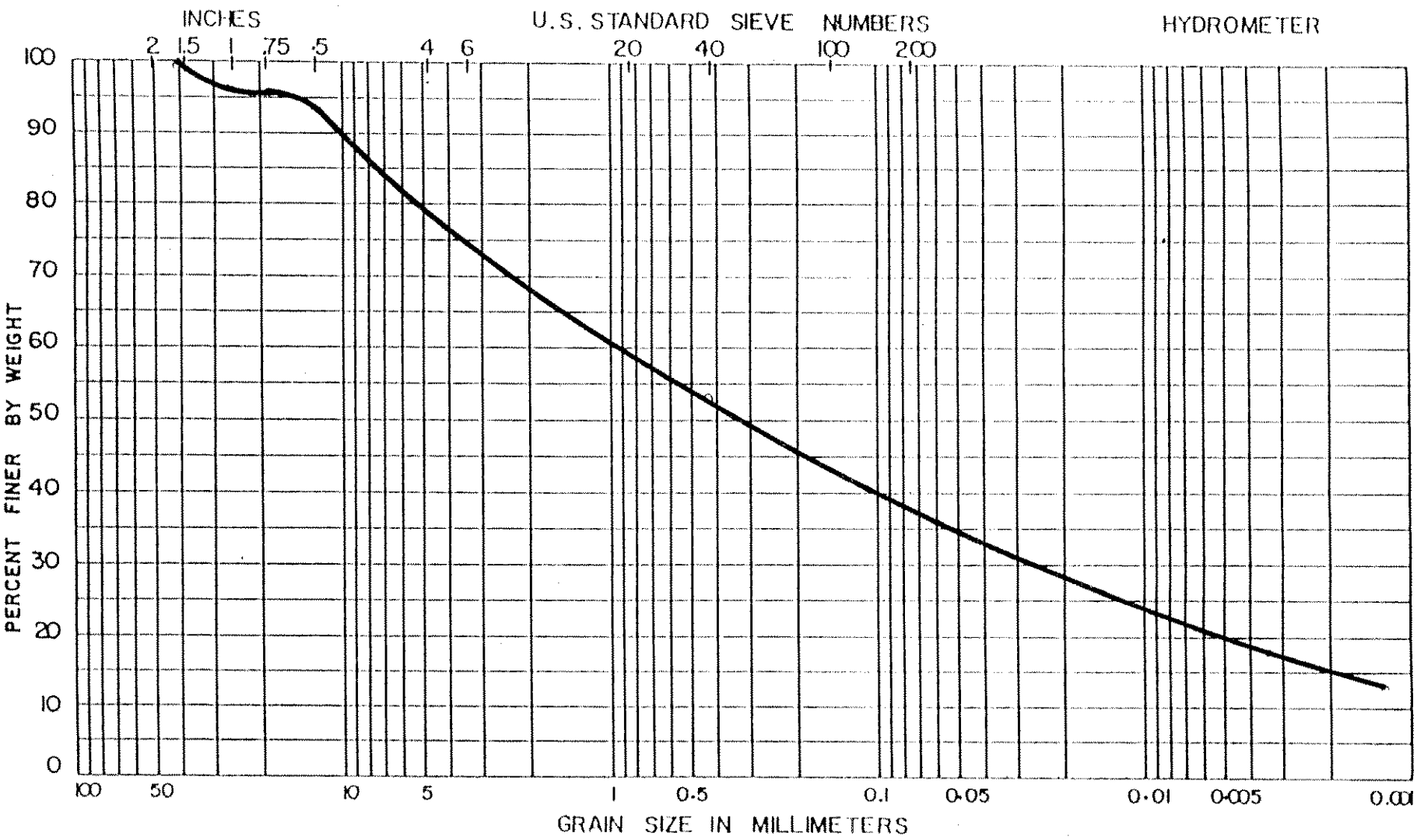


GRAVEL		SAND			SILT	CLAY
COARSE	FINE	COARSE	MEDIUM	FINE		

OWNER General Motors Corporation PROJECT Harrison Radiator C92060

LOCATION Moraine, Ohio BORING NO. -- SAMPLE NO. BKG-BH03-16

SOLAR TESTING LABORATORIES, INC.

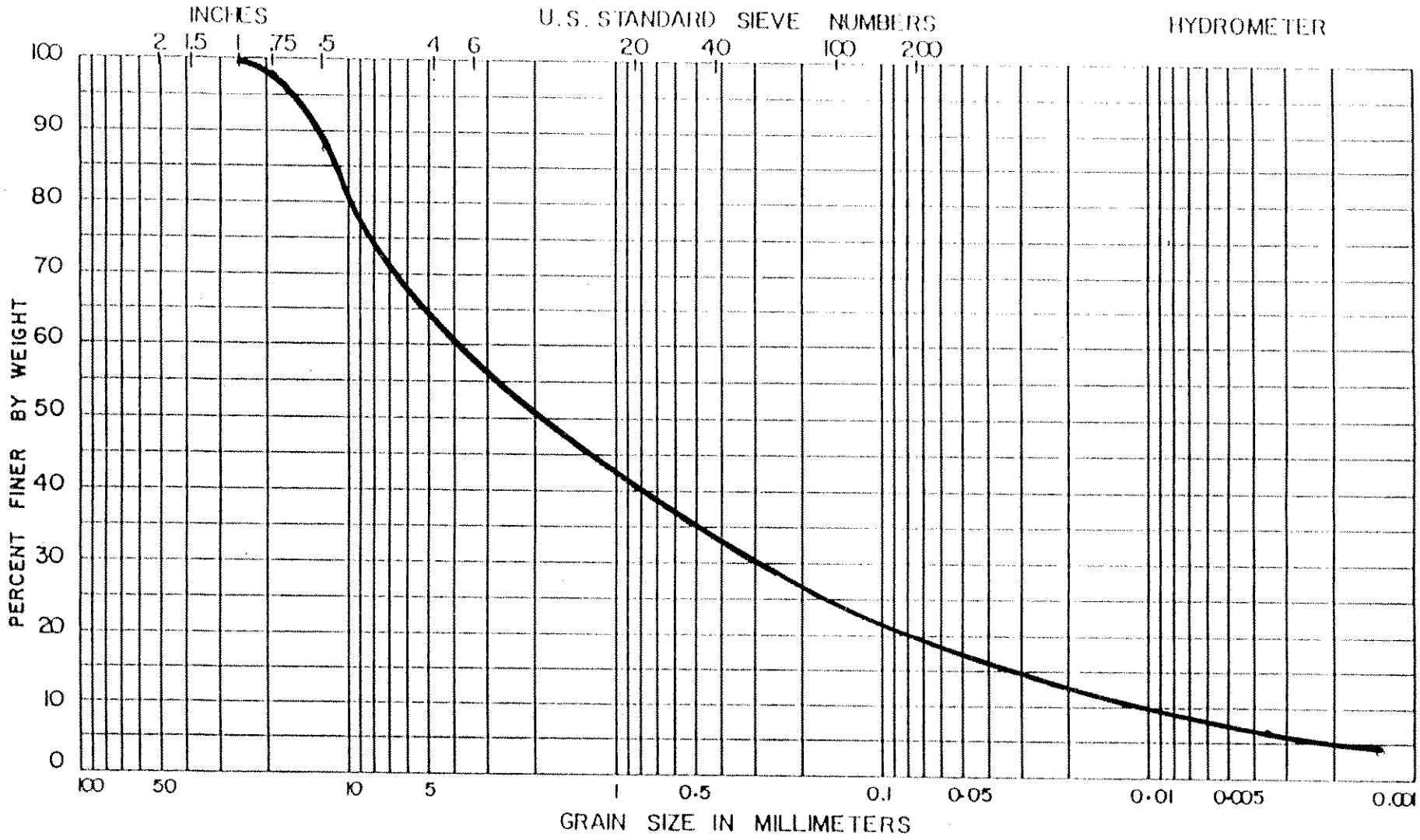


GRAVEL		SAND			SILT	CLAY
COARSE	FINE	COARSE	MEDIUM	FINE		

OWNER General Motors Corporation PROJECT Harrison Radiator C92060

LOCATION Moraine, Ohio BORING NO. -- SAMPLE NO. BKG-BH07-02

SOLAR TESTING LABORATORIES, INC. C-10



GRAVEL		SAND			SILT	CLAY
COARSE	FINE	COARSE	MEDIUM	FINE		

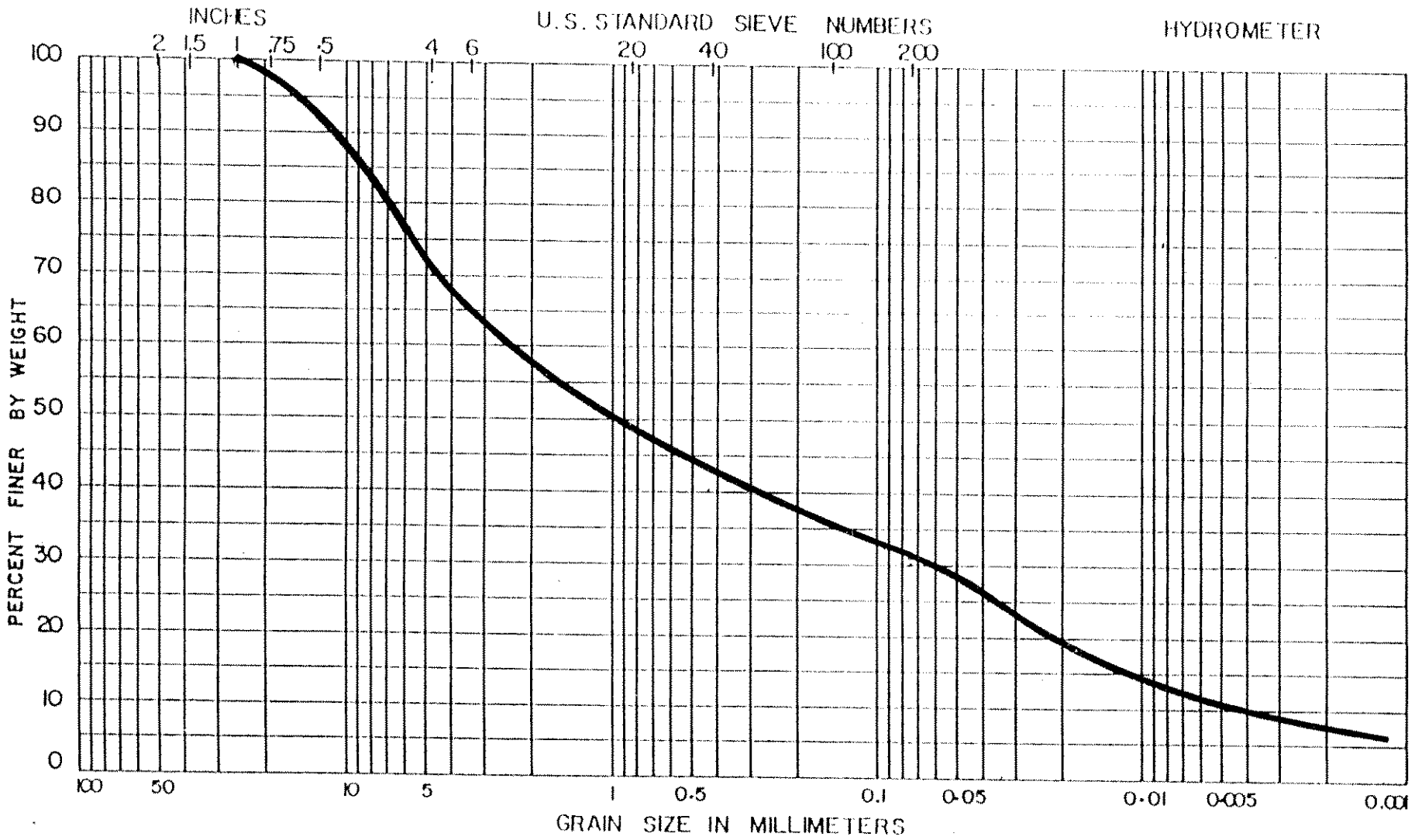
OWNER General Motors Corporation

PROJECT Harrison Radiator C92060

LOCATION Moraine, Ohio

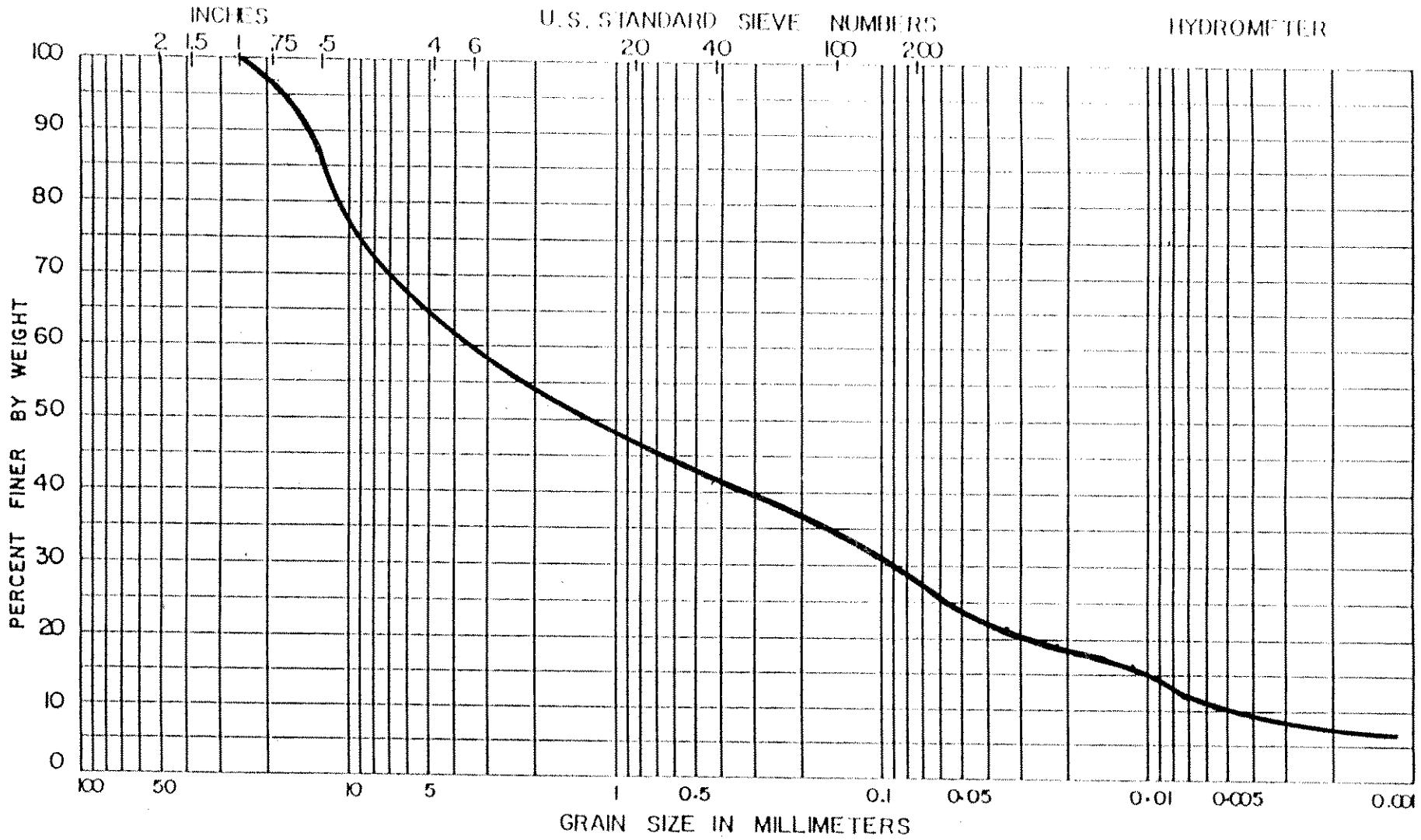
BORING NO. -- SAMPLE NO. BKG-BH07-16

SOLAR TESTING LABORATORIES, INC. c-8



GRAVEL		SAND			SILT	CLAY
COARSE	FINE	COARSE	MEDIUM	FINE		

OWNER	General Motors Corporation	PROJECT	Harrison Radiator C92060
LOCATION	Moraine, Ohio	BORING NO. --	SAMPLE NO. BKG-BH10-02
		SOLAR TESTING LABORATORIES, INC.	C-9



GRAVEL		SAND			SILT	CLAY
COARSE	FINE	COARSE	MEDIUM	FINE		

OWNER General Motors Corporation

PROJECT Harrison Radiator C92060

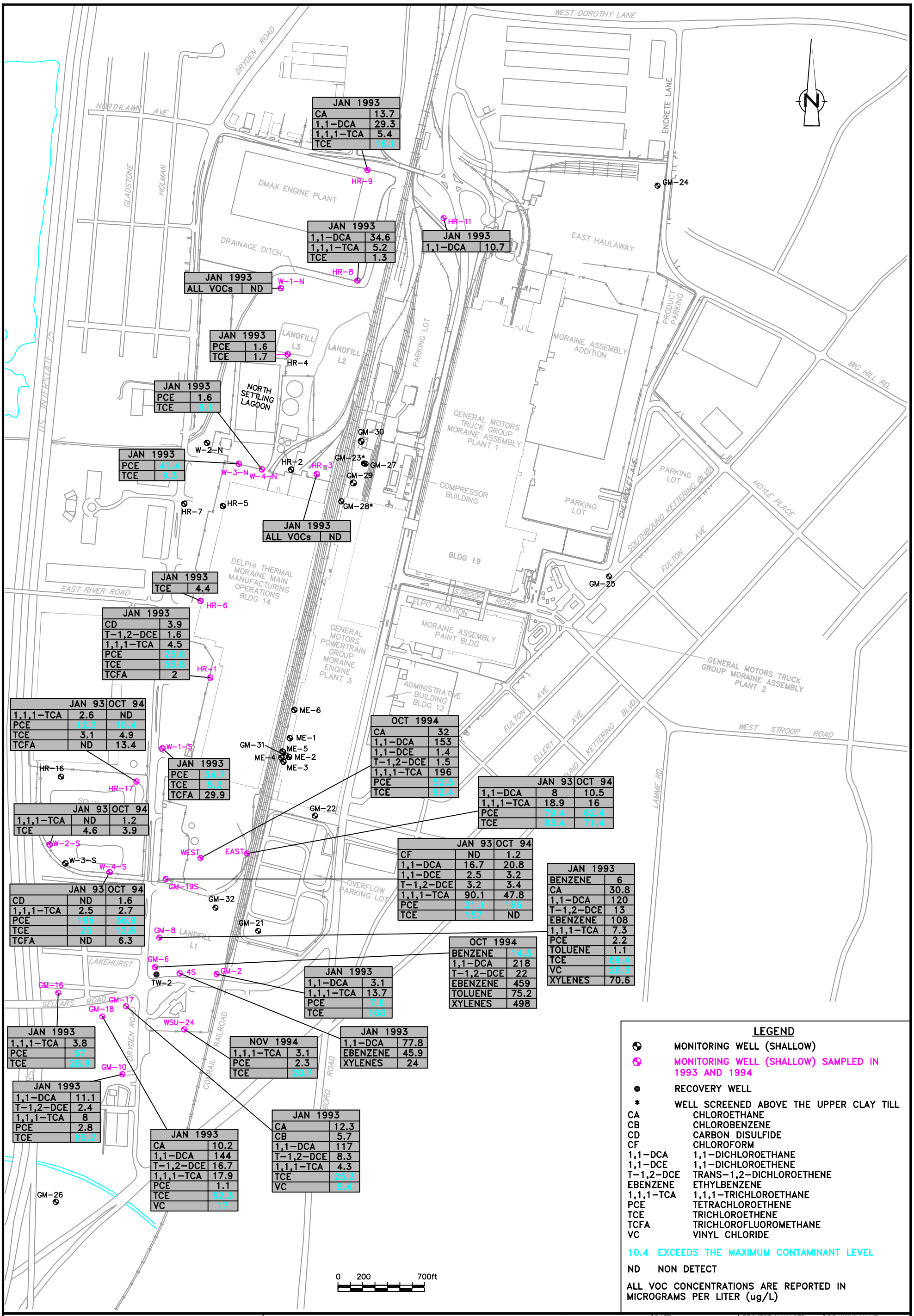
LOCATION Moraine, Ohio

BORING NO. ___ SAMPLE NO. BKG-BH10-16

SOLAR TESTING LABORATORIES, INC.

Addendum 1

VOC Results in the Upper and Lower Aquifers



JAN 1993	
CA	13.7
1,1-DCA	29.3
1,1,1-TCA	5.4
TCE	16.1

JAN 1993	
1,1-DCA	34.6
1,1,1-TCA	5.2
TCE	1.3

JAN 1993	
1,1-DCA	10.7

JAN 1993	
ALL VOCs	ND

JAN 1993	
PCE	1.6
TCE	1.7

JAN 1993	
PCE	1.6
TCE	9.1

JAN 1993	
PCE	41.4
TCE	9.3

JAN 1993	
ALL VOCs	ND

JAN 1993	
TCE	4.4

JAN 1993	
CD	3.9
T-1,2-DCE	1.6
1,1,1-TCA	4.5
PCE	25.6
TCE	55.8
TCFA	2

	JAN 93	OCT 94
1,1,1-TCA	2.6	ND
PCE	12.2	10.4
TCE	3.1	4.9
TCFA	ND	13.4

JAN 1993	
PCE	34.7
TCE	5.2
TCFA	29.9

OCT 1994	
CA	32
1,1-DCA	153
1,1-DCE	1.4
T-1,2-DCE	1.5
1,1,1-TCA	196
PCE	52.5
TCE	62.4

	JAN 93	OCT 94
1,1-DCA	8	10.5
1,1,1-TCA	18.9	16
PCE	79.4	62.4
TCE	83.4	71.4

	JAN 93	OCT 94
1,1,1-TCA	ND	1.2
TCE	4.6	3.9

	JAN 93	OCT 94
CF	ND	1.2
1,1-DCA	16.7	20.8
1,1-DCE	2.5	3.2
T-1,2-DCE	3.2	3.4
1,1,1-TCA	90.1	47.8
PCE	21.1	166
TCE	157	ND

	JAN 93	OCT 94
CD	ND	1.6
1,1,1-TCA	2.5	2.7
PCE	1.66	36.9
TCE	25	12.8
TCFA	ND	6.3

JAN 1993	
BENZENE	6
CA	30.8
1,1-DCA	120
T-1,2-DCE	13
EBENZENE	108
1,1,1-TCA	7.3
PCE	2.2
TOLUENE	1.1
TCE	69.4
VC	26.3
XYLENES	70.6

OCT 1994	
BENZENE	14.3
1,1-DCA	218
T-1,2-DCE	22
EBENZENE	459
TOLUENE	75.2
XYLENES	498

JAN 1993	
1,1-DCA	3.1
1,1,1-TCA	13.7
PCE	7.6
TCE	108

JAN 1993	
1,1,1-TCA	3.8
PCE	57
TCE	28.9

NOV 1994	
1,1,1-TCA	3.1
PCE	2.3
TCE	20.7

JAN 1993	
1,1-DCA	77.8
EBENZENE	45.9
XYLENES	24

JAN 1993	
1,1-DCA	11.1
T-1,2-DCE	2.4
1,1,1-TCA	8
PCE	2.8
TCE	85.2

JAN 1993	
CA	10.2
1,1-DCA	144
T-1,2-DCE	16.7
1,1,1-TCA	17.9
PCE	1.1
TCE	62.5
VC	17

JAN 1993	
CA	12.3
CB	5.7
1,1-DCA	117
T-1,2-DCE	8.3
1,1,1-TCA	4.3
TCE	25.3
VC	8.4

LEGEND

- MONITORING WELL (SHALLOW)
- MONITORING WELL (SHALLOW) SAMPLED IN 1993 AND 1994
- RECOVERY WELL
- * WELL SCREENED ABOVE THE UPPER CLAY TILL

CA	CHLOROETHANE
CB	CHLOROBENZENE
CD	CARBON DISULFIDE
CF	CHLOROFORM
1,1-DCA	1,1-DICHLOROETHANE
1,1-DCE	1,1-DICHLOROETHENE
T-1,2-DCE	TRANS-1,2-DICHLOROETHENE
EBENZENE	ETHYLBENZENE
1,1,1-TCA	1,1,1-TRICHLOROETHANE
PCE	TETRACHLOROETHENE
TCE	TRICHLOROETHENE
TCFA	TRICHLOROFLUOROMETHANE
VC	VINYL CHLORIDE

10.4 EXCEEDS THE MAXIMUM CONTAMINANT LEVEL

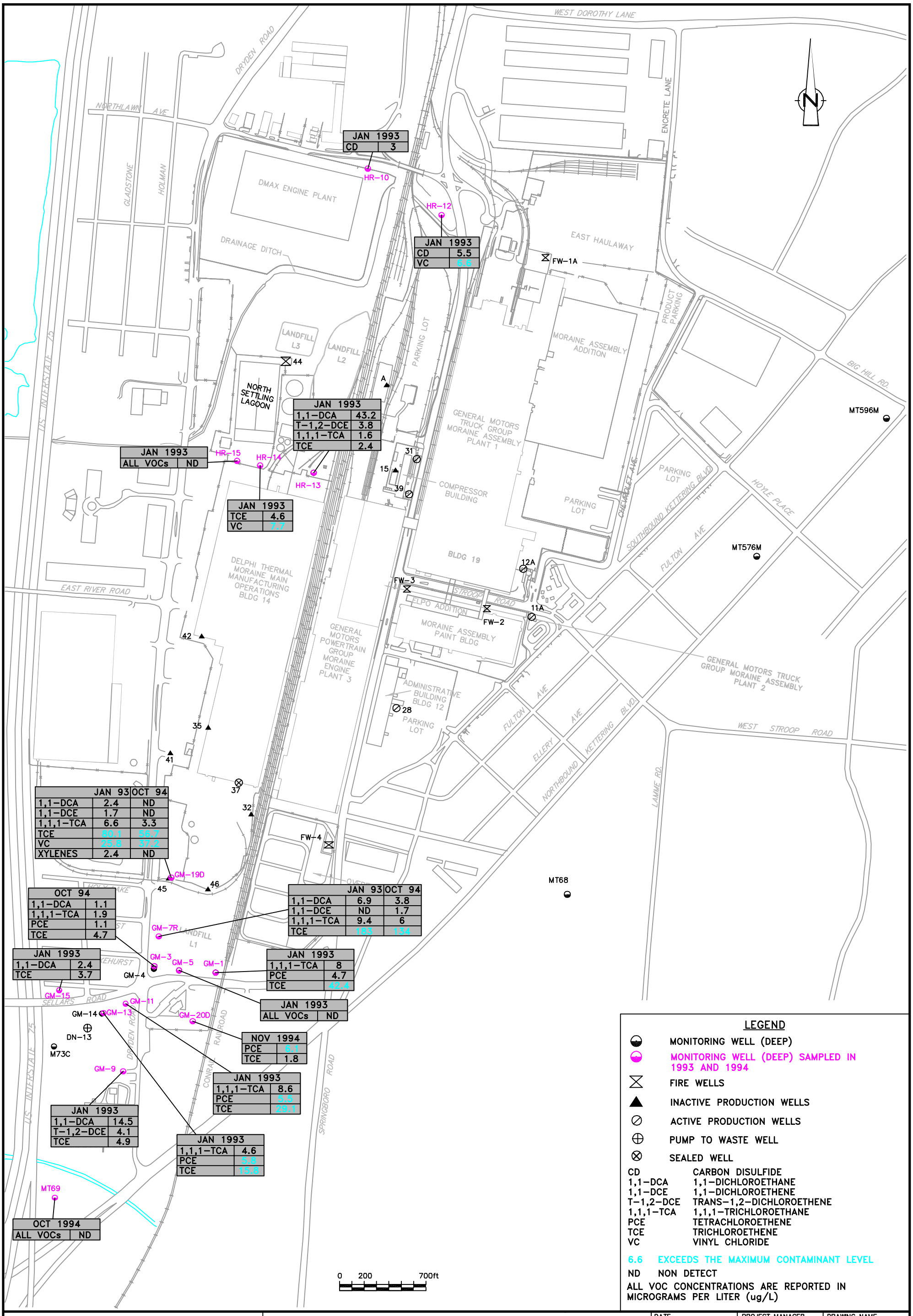
ND NON DETECT

ALL VOC CONCENTRATIONS ARE REPORTED IN MICROGRAMS PER LITER (ug/L)

ARCADIS GERAGHTY & MILLER
6397 Emerald Parkway
Suite 150, Dublin, OH 43016
Tel: 614/764-2310 Fax: 614/764-1270

VOC CONCENTRATIONS IN UPPER AQUIFER MONITORING WELLS DELPHI THERMAL MORAINE RFI, GENERAL MOTORS CORPORATION, MORAINE, OHIO

DATE	PROJECT MANAGER	DRAWING NAME
13MAR00	N. GILLOTTI	CRA\EPA-FIGS\EPA-01
DRAWN	LEAD DESIGN PROF.	CHECKED
R. SMITH		N. GILLOTTI
PROJECT NUMBER		FIGURE NUMBER
OH000294.0002.0001		1



LEGEND

- MONITORING WELL (DEEP)
- MONITORING WELL (DEEP) SAMPLED IN 1993 AND 1994
- FIRE WELLS
- INACTIVE PRODUCTION WELLS
- ACTIVE PRODUCTION WELLS
- PUMP TO WASTE WELL
- SEALED WELL

CD	CARBON DISULFIDE
1,1-DCA	1,1-DICHLOROETHANE
1,1-DCE	1,1-DICHLOROETHENE
T-1,2-DCE	TRANS-1,2-DICHLOROETHENE
1,1,1-TCA	1,1,1-TRICHLOROETHANE
PCE	TETRACHLOROETHENE
TCE	TRICHLOROETHENE
VC	VINYL CHLORIDE

6.6 EXCEEDS THE MAXIMUM CONTAMINANT LEVEL

ND NON DETECT

ALL VOC CONCENTRATIONS ARE REPORTED IN MICROGRAMS PER LITER (ug/L)

ARCADIS GERAGHTY&MILLER
6397 Emerald Parkway
Suite 150, Dublin, OH 43016
Tel: 614/764-2310 Fax: 614/764-1270

VOC CONCENTRATIONS IN LOWER AQUIFER MONITORING WELLS DELPHI THERMAL MORAINE RFI, GENERAL MOTORS CORPORATION, MORAINE, OHIO

DATE 13MAR00	PROJECT MANAGER N. GILLOTTI	DRAWING NAME CRA\EPA-FIGS\EPA-02	
DRAWN R. SMITH	LEAD DESIGN PROF.	CHECKED N. GILLOTTI	
PROJECT NUMBER 0H000294.0002.0001		FIGURE NUMBER 2	

D R A F T

RESOURCE CONSERVATION AND RECOVERY ACT FACILITY INVESTIGATION FINAL REPORT VOLUME II (BASELINE RISK ASSESSMENT) DELPHI HARRISON THERMAL SYSTEMS GENERAL MOTORS CORPORATION MORAINE, OHIO

Prepared for

Delphi Harrison Thermal Systems
General Motors Corporation
Moraine, Ohio

Prepared by
ENVIRON Corporation
214 Carnegie Center
Princeton, New Jersey

February 1996

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EXECUTIVE SUMMARY

Volume II of the draft *RFI Final Report* presents the human health baseline risk assessment and ecological assessment for the Delphi Harrison Thermal Systems (Delphi Thermal) facility in Moraine, Ohio (the Facility). The purpose of the baseline risk assessment is to evaluate potential risk to human health and the environment posed by releases of hazardous waste and constituents from the solid waste management units (SWMUs) investigated in the RCRA Facility Investigation (RFI). The human health baseline risk assessment evaluates potential risk under current and reasonably anticipated future land use and ground water use at and surrounding the Facility, in the absence of corrective measures (or interim measures) and institutional controls, to provide a basis for (1) determining whether corrective measures are needed, (2) identifying which potential exposure pathways need corrective measures, if any, and (3) supporting any recommendations for corrective measures. Additionally, the baseline risk assessment evaluates potential risk under the current interim measures to provide a basis for determining whether the interim measures are necessary for the protection of human health and the environment.

The conceptual site model establishing reasonably anticipated future land use and ground water use, potential exposure pathways, and potentially exposed populations was reviewed extensively with USEPA through written correspondence between USEPA and Delphi Thermal before initiating the baseline risk assessment. Key aspects of the technical methodology (e.g., ground water modeling) and key assumptions (e.g., exposure factors) pertinent to estimating potential exposures were also reviewed with USEPA.

The procedures for data evaluation, exposure assessment, toxicity assessment, and risk characterization in the baseline risk assessment are consistent with USEPA policies and guidance on risk assessment. The results of the data evaluation indicate that environmental media potentially transporting waste constituents from the SWMUs either currently or as a result of possible Facility operations (e.g., removal of pavement) include:

- Soil
- Ambient air
- Ground water
- Surface water (Great Miami River)

Sediment and surface water in the drainage ditch at the north end of the Facility are not media that would likely transport waste constituents from the SWMUs.

A comprehensive review of information pertinent to future land use patterns surrounding the Facility confirms that the assumption of continued industrial land use at the Facility is appropriate. As such, the potential for significant human exposure to the SWMUs at the Facility is evaluated in the baseline risk assessment for the following current and reasonably anticipated future land uses:

- Industrial land use at the Facility
- Industrial/commercial, residential, and recreational land uses surrounding the Facility

The potentially exposed populations under these land uses are:

- On-facility and off-facility workers
- Off-facility residents

Ground water in the lower aquifer in the region surrounding the Facility is a drinking and industrial water source; but the ground water in the upper aquifer underlying the Facility is not a drinking or industrial water source and is not reasonably expected to serve as either type of water source in the future. The ground water in the upper aquifer, however, is a medium for potential transport of constituents from the SWMUs to the lower aquifer and the Great Miami River. As such, the baseline risk assessment includes an assessment of the extent to which the hydraulic interconnections could result in migration of constituents to the lower aquifer or to the River in concentrations of significance to human health.

The potential for human exposure to ground water is evaluated in the baseline risk assessment for current and potential drinking water use of ground water extracted from the following municipal well fields:

- West Carrollton: residential drinking water supply downgradient of the Facility
- Miami Shores: as a primary emergency drinking water supply for residents served by the Greater Moraine Water System (GWMS)
- Dryden Road South: as GMWS's secondary emergency drinking water supply

Although the Dryden Road North well field is not expected to serve as a drinking water supply or as an emergency drinking water supply, the ground water quality at this well field is also evaluated.

The risk assessment also evaluates the potential for exposures that may occur through current and potential industrial use of ground water extracted from the following industrial well fields:

- Delphi Thermal production wells: as a potential industrial water supply
- Truck & Bus production wells: as an industrial water supply
- Moraine Engine production well: as an industrial water supply

Potential exposures are quantitatively evaluated for incidental ingestion of and dermal contact with soil/waste and inhalation of airborne waste constituents. Potential exposures via these pathways are quantified by the product of the concentration of waste constituents in an environmental medium at locations of potential exposure over an expected period of exposure and the intake of the environmental medium by a potentially exposed population. The product of these components is combined with toxicity values to estimate potential carcinogenic risk and noncarcinogenic effects. Ground water and surface water exposures are evaluated by comparison of exposure concentrations in ground water and surface water at potential points of contact with maximum contaminant levels (MCLs) under the Safe Drinking Water Act, or similar risk-based drinking water concentrations for constituents without MCLs.

Variability in the factors affecting exposure within a potentially exposed population is considered in estimating potential current and future exposures by quantifying both central tendency and high-end estimates of exposure, consistent with USEPA guidance. In the baseline risk assessment, high-end estimates are calculated using conservative (i.e., screening-level) estimates of exposure concentrations and high-end exposure factors, while the central tendency estimates are calculated using typical exposure factors.

USEPA-derived toxicity values are used when such values are available. However, many of the constituents included in the quantitative exposure assessment do not have USEPA-derived toxicity values for evaluating cancer risk or noncancer effects via the inhalation route of exposure. USEPA also has not established any toxicity values for evaluating risks or effects via the dermal route. To provide a quantitative analysis of the potential uncertainties in the estimates of risk (which use only USEPA toxicity values), estimates of cancer risk and noncancer effects are developed using route-to-route extrapolations.

The results of the exposure assessment and toxicity assessment are combined to estimate potential cumulative cancer risk and noncancer effects for each of the potential exposure pathways. The soil- and air-related cumulative cancer and noncancer risk estimates are compared with levels that USEPA has established as protective of human health (i.e., site-related cumulative cancer risk of 10^{-4}, and hazard index of 1). Estimated ground water concentrations at potential points of ground water use and estimated surface water concentrations in the Great Miami River are compared with MCLs, or similar risk-based

drinking water concentrations. MCLs or risk-based drinking water concentrations are appropriate for evaluating potential drinking water exposures and are conservative screening-levels for evaluating potential non-drinking water exposures (e.g., nonpotable industrial ground water use, surface water exposures in the Great Miami River).

The conclusions of the human health baseline risk assessment are as follows:

- For all soil- and air-related pathways, estimates of potential cumulative cancer risk and noncancer effects, using both central tendency and high-end exposure factors, are well below the levels USEPA considers protective of human health.

- Under current ground water use conditions with or without interim measures (Scenarios 6 and 1, respectively), potential SWMU-related contributions to ground water are estimated to result in constituent concentrations at points of ground water use that are lower than MCLs or similar risk-based drinking water concentrations for constituents without MCLs.

- In the event that Miami Shores is used to supply water in an emergency without the need to also use Dryden Road South (Scenarios 2, 3, 7, and 8), potential SWMU-related contributions to ground water are estimated to result in constituent concentrations at points of ground water use that are lower than MCLs or risk-based drinking water concentrations.

- In the very unlikely event that Miami Shores and Dryden Road South are both needed to supply water in an emergency, (i.e., in Scenarios 4 and 5, which are without interim measures), potential SWMU-related contributions to ground water are estimated to result in constituent concentrations at points of ground water use that are higher than MCLs or risk-based drinking water concentrations for a few constituents. The estimates of constituent concentrations, however, are expected to overstate the potential exposures to the constituents because of the low likelihood that these well fields would be used simultaneously and in combination with the redevelopment of inactive industrial water supply wells at the Facility. In the corresponding scenarios with interim measures (Scenarios 9 and 10), potential SWMU-related contributions to ground water are estimated to result in constituent concentrations at points of ground water use that are lower than MCLs or risk-based drinking water concentrations.

- In addition to the human health evaluation, a screening ecological assessment indicates no adverse impact from the SWMUs and no need for a more detailed ecological assessment.

1.0 INTRODUCTION

This second volume of the draft *RFI Final Report* presents the baseline risk assessment for the Delphi Harrison Thermal Systems (Delphi Thermal) facility in Moraine, Ohio (the Facility). The purpose of the baseline risk assessment is to evaluate potential risk to human health and the environment posed by releases of hazardous waste and constituents from the solid waste management units (SWMUs) investigated in the RCRA Facility Investigation (RFI). The baseline risk assessment evaluates potential risk under current and reasonably anticipated future land use and ground water use at and surrounding the Facility, in the absence of corrective measures (or interim measures) and institutional controls, to provide a basis for (1) determining whether corrective measures are needed, (2) identifying which potential exposure pathways need corrective measures, if any, and (3) supporting any recommendations for corrective measures. Additionally, the baseline risk assessment evaluates potential risk under the current interim measures to provide a basis for determining whether the interim measures are necessary for the protection of human health and the environment.

The conceptual site model establishing reasonably anticipated future land use and ground water use, potential exposure pathways, and potentially exposed populations was reviewed extensively through written correspondence between USEPA and Delphi Thermal before initiation of the baseline risk assessment. Several key aspects of the technical methodology (e.g., ground water modeling) and key assumptions (e.g., exposure factors) pertinent to the estimation of potential exposures were also reviewed with USEPA.

The baseline risk assessment presented herein is consistent with USEPA policies and guidance on risk assessment. The procedures for evaluating the data collected during the RFI for usability in the risk assessment and for identifying hazardous waste constituents for quantitative risk assessment follow USEPA guidance. The procedures and results of the data evaluation and constituent identification are presented in Section 2.

Section 3 presents the detailed conceptual site model and the estimation of potential exposures to the constituents in the environmental media identified in Section 2. It presents (1) the rationale supporting the determination of reasonably anticipated future land use and ground water use at and surrounding the Facility, (2) exposure pathways for which potential exposures are estimated, (3) estimates of constituent concentrations in each environmental medium at potential points of exposure, and (4) estimates of constituent intake for each potential exposure pathway.

Section 4 presents the toxicity values that are used to evaluate potential cancer risk and chronic (i.e., long-term) noncancer effects associated with the potential exposures estimated in Section 3. It presents the sources of the toxicity values for the constituents identified in Section 2, as well as methods for evaluating constituents lacking USEPA-derived toxicity values.

Section 5 combines the results of the exposure assessment and toxicity assessment to estimate potential cumulative cancer risk and noncancer effects for each of the potential exposure pathways identified in Section 3. The soil- and air-related cumulative cancer and noncancer risk estimates are compared with levels that USEPA has established as protective of human health. Estimated constituent concentrations in ground water and surface water at potential points of ground water use or surface water exposure are compared with maximum contaminant levels (MCLs) established by USEPA under the Safe Drinking Water Act, or similar risk-based drinking water concentrations for constituents without MCLs. Section 5 also includes a qualitative and quantitative analysis of uncertainties for key aspects of the baseline risk assessment.

Section 6 lists the references cited in this volume of the draft *RFI Final Report*. The references cited in the Appendices to this volume are listed in Section 6 as well. Additional information supporting the baseline risk assessment is provided in three Appendices to this volume. Appendix A describes the screening-level ecological assessment conducted to evaluate the need for additional assessment. Appendix B provides the calculations of cumulative cancer risks and noncancer effects. Appendix C provides the calculations of constituent concentrations in ground water and surface water at potential points of exposure.

2.0 IDENTIFICATION OF HAZARDOUS WASTE CONSTITUENTS

The analytical data collected during the RFI to characterize waste and soil at the SWMUs and to characterize ground water, sediment, and surface water at the Facility are evaluated in this section to identify the hazardous waste constituents appropriate for quantitative human health risk assessment. Analytical data collected to characterize the sludge in the North Settling Lagoon and South Settling Lagoon during preparation of the RCRA closure plans for these SWMUs are also evaluated. All characterization data collected during the RFI are reported in Appendix A of the draft *RFI Final Report, Volume I.*

The objectives and strategies for the collection of the RFI data are discussed in Section 5 of the draft *RFI Final Report, Volume I.* The procedures used in the evaluation and reporting of data quality for analytical data collected during the RFI and the results of the evaluation are discussed in Appendix C of the draft *RFI Final Report, Volume I.* Validation of the RFI data was performed by Geraghty & Miller in accordance with the procedures in Appendix D of the *RFI Work Plan* (G&M 199_).

Section 2.1 describes the procedures used in evaluating the usability of the validated RFI data and the basis for selecting constituents for the quantitative risk assessment. Section 2.2 compares the characterization data with constituent concentrations in natural background soil and in upstream sediment and surface water samples. Section 2.3 summarizes the constituents that are included in the exposure assessment presented in Section 3 and the toxicity assessment presented in Section 4.

2.1 Data Evaluation

The evaluation of the analytical data to identify waste constituents appropriate for quantitative risk assessment follows USEPA's *Guidance for Data Useability in Risk Assessment* (USEPA 1992C) and *Risk Assessment Guidance for Superfund* (USEPA 1989A). Considerations pertinent to the evaluation of the RFI data include the following:

- Qualified Data

  Data that were qualified as estimated during data validation (i.e., J-qualified data) are included for evaluation. Data that were qualified as rejected during data validation (i.e., R-qualified data) are eliminated. Measured concentrations that were qualified as not detected during data validation (i.e., U-qualified) due to contamination in

associated quality control blanks (e.g., analytical method blanks) are considered not detected to minimize the potential for false positive determinations.

- Field Duplicate Samples

  Data in duplicate samples are averaged to obtain a representative datum for the sample location. When only one datum in a duplicate pair had a detected concentration, the detected concentration is averaged with the reported sample quantitation limit (SQL) for the sample in which the analyte was not detected, and the result is considered a detected concentration to minimize the potential for false negative determinations.

- Benzo(b)fluoranthene and Benzo(k)fluoranthene

  The laboratory was unable to determine the concentrations of these two analytes separately and, therefore, reported the total concentration of both analytes as a single concentration. In the quantitative risk assessment, the total concentration is assigned to benzo(b)fluoranthene, which according to USEPA guidance (USEPA 1993B) has a cancer potency 10 times higher than that for benzo(k)fluoranthene. Evaluating the total concentration as benzo(b)fluoranthene may overestimate cancer risk by up to 10-fold. All concentrations of benzo(b)fluoranthene cited in the baseline risk assessment refer to total benzo(b)fluoranthene and benzo(k)fluoranthene concentrations.

- Constituents Not Detected in Any Sample

  The analytical data for each environmental medium are reviewed for constituents that were not detected in any sample in the medium. For the purposes of this review, waste (i.e., material at Landfills L1, L2, and L3, fill material at the Fill Area, and sludge at the North Settling Lagoon and at the South Settling Lagoon) and soil are considered one medium. Constituents not detected in any sample in a medium are excluded from the quantitative risk assessment of that medium.

- Major Earth Elements and Essential Nutrients

  Naturally occurring elements that comprise the major elemental content of the earth's crust and that are essential nutrients or typical components in normal diet are excluded from the quantitative risk assessment. These elements include:

  - Aluminum
  - Calcium
  - Iron
  - Magnesium

- Potassium
- Sodium

Each of these elements exists naturally in soil at concentrations of several percent without posing significant public health concerns. USEPA has not established toxicity values for these elements.

2.2 Background Levels

The following subsections present (1) comparisons of the concentrations of constituents detected in waste, soil, sediment, and surface water samples with naturally occurring concentrations that represent background levels of exposure, and (2) evaluations of the extent to which the detected concentrations may be attributable to non-SWMU sources. Discussion of the RFI ground water quality data with respect to these considerations is presented in Sections 4 and 5 of the draft *RFI Final Report, Volume I.*

2.2.1 Soil

Samples of background soil were collected during the RFI to assess naturally occurring levels of inorganic constituents (i.e., metals and cyanide) in soil at the Facility. These samples were collected from 12 soil borings installed in an area of the Facility where no waste management activities are known to have occurred. Surface (0 to 2 feet) and subsurface (14 to 16 feet) soil samples were taken from each boring. The collection of these samples is discussed in Section 4.4.1 of the draft *RFI Final Report, Volume I* and the results are reported in Appendices A and D of the draft *RFI Final Report, Volume I.*

For evaluating background exposure to inorganic constituents in soil at the Facility, the results of surface background soil samples, rather than the subsurface samples, are used to estimate the background levels of inorganic constituents. Concentrations of inorganic constituents in surface soil are representative of background exposures, since contact with subsurface soil (e.g., soil at 14 to 16 feet below ground surface) would be expected only during major excavations, which would occur, if at all, rarely and for short durations.

The comparison of concentrations of inorganic constituents in investigative samples of waste and soil with background levels is conducted using one-sided 99% upper prediction limits, consistent with the *RFI Work Plan* (G&M 1992). A 99% upper prediction limit (UPL) for a specific constituent is a statistical limit calculated from the surface background concentrations of the constituent that will be higher than a future measurement of background concentration, with a 99% level of confidence (USEPA 1989D, Hahn and Meeker 1991). Concentrations of the inorganic constituent in investigative waste or soil samples from a SWMU that are lower than the 99% UPL for the constituent are considered to be within

background levels; concentrations higher than the 99% UPL are considered to be above background levels.

When the calculation of the 99% UPL includes nondetected measurements, the SQL for the measurement is used. Because the concentrations of inorganic constituents in natural background soil and in contaminated soil are often lognormally distributed, the 99% UPLs are calculated using natural-log-transformed data (USEPA 1992E). The calculated 99% UPLs are presented in Table 2-1, along with the maximum concentrations measured in waste or soil samples at each SWMU.

A 99% UPL is not calculated for antimony, cyanide, mercury, and thallium for the following reasons:

- Antimony was not detected in the seven valid surface background samples, with SQLs ranging from 7.1 mg/kg to 8.7 mg/kg. The maximum concentration of antimony detected in the subsurface background soil was an estimated 52.8 mg/kg. A background level for antimony is not included in Table 2-1.

- Cyanide was detected in only one of six valid surface background samples at an estimated concentration of 0.4 mg/kg. It was not detected in the six subsurface background samples. The detected concentration of 0.4 mg/kg is used to represent the background level of cyanide in Table 2-1.

- Mercury was detected in only one of the 12 valid surface background samples at a concentration of 0.69 mg/kg. It was not detected in the 12 subsurface background samples. The detected concentration of 0.69 mg/kg is used to represent the background level of mercury in Table 2-1.

- Thallium was not detected in any of the 12 valid surface background samples, with SQLs ranging from 0.44 mg/kg to 0.51 mg/kg. It was detected in one of the 12 subsurface background samples at an estimated concentration of 2.3 mg/kg. A background level of thallium is not included in Table 2-1.

The following SWMUs have concentrations of inorganic constituents in waste or soil samples that are all below background levels:

- Landfill L3
- Liquid Waste Burner
- T4
- T5/T6

- T12

The maximum concentrations of the following metals in waste or soil samples at all the SWMUs are below background levels:

- Beryllium
- Manganese
- Vanadium

These three metals are included in the risk assessment, along with the other inorganic constituents. The contribution by natural background levels of inorganic constituents in soil to estimates of risks developed in the risk assessment are evaluated in Section 5.3.

2.2.2 Sediment and Surface Water

One upstream and one downstream sediment sample, and one upstream and one downstream surface water sample were collected from the drainage ditch at the north end of the Facility, which originates in the City of Kettering. Because the ditch drains surface runoff from most of the western portion of Kettering and collects only a small amount of runoff from the areas of the Facility immediately adjacent to the ditch, the constituents detected in the sediment and surface water in the segment of the drainage ditch at the Facility may be attributable to sources upstream of the Facility. The purpose of the upstream sediment and surface water samples is to evaluate the potential that the concentrations of constituents detected in the downstream sediment and surface water samples are attributable to off-site sources.

Four semivolatile organic compounds (SVOCs) were detected in the upstream sediment sample and no organic constituents were detected in the downstream sediment sample. All metals detected in the downstream sediment sample had concentrations that are either lower than their concentrations in the upstream sample or lower than background levels in surface soil at the Facility, except for copper, lead, and zinc. The concentrations of these metals in the downstream sediment sample are somewhat above either the upstream sediment concentrations or background soil levels. The comparison of constituent concentrations in the downstream sediment sample with concentrations in the upstream sample and soil background levels is presented in Table 2-2.

The concentrations of copper, lead, and zinc in the downstream sample are probably not attributable to transport from the SWMUs near the ditch, which are Landfill L2, Landfill L3, and the North Settling Lagoon. Transport of surface material in runoff from Landfill L2 and the North Settling Lagoon to the ditch is unlikely because the topography between these SWMUs and the ditch does not promote runoff to the ditch. Although surface runoff may carry material from Landfill L3 to the drainage ditch, the maximum detected concentrations of

copper, lead, and zinc in the surface samples from Landfill L3 are all below soil background levels. For these reasons, the concentrations of copper, lead, and zinc detected in the downstream sediment sample are unlikely to have resulted from transport of surface material from Landfills L2, L3, or the North Settling Lagoon.

The concentrations of the four metals detected in the downstream surface water sample are either lower than or approximately the same as their SQLs or concentrations in the upstream surface water sample. Organic constituents were not detected in the upstream surface water sample, but the following organic constituents were detected in the downstream sample:

- Acetone 0.094 mg/L
- Chloroform 0.001 mg/L
- Trichloroethene 0.005 mg/L

These concentrations are at or slightly above the SQLs of 0.001 mg/L for chloroform and trichloroethene, and 0.02 mg/L for acetone. The comparison of constituent concentrations in the downstream surface water sample with concentrations in the upstream sample is presented in Table 2-3.

The concentrations of acetone, chloroform, and trichloroethene detected in the surface water are probably not attributable to Landfill L3, since only acetone was detected in the surface samples from Landfill L3 (in only one of three samples at a concentration of 0.33 mg/kg). Transport of dissolved constituents in surface runoff from Landfill L2 and the North Settling Lagoon to the ditch is unlikely because of the topography between these SWMUs and the ditch.

Because the constituents detected in the downstream sediment and surface water samples are at concentrations that are comparable to those in upstream samples or natural surface soil, or are likely to have originated off-site, the sediment and surface water data are excluded from the quantitative risk assessment. However, a preliminary screening ecological assessment was conducted to characterize the ecological resources along the drainage ditch and the strip of land along the Great Miami River (through which the ditch flows before discharging to the River), and to determine by field reconnaissance whether a more detailed ecological assessment is appropriate. The conclusion of the preliminary screening ecological assessment is that the ecosystems in the reviewed areas appear healthy and no additional assessment is warranted. The details of the ecological assessment are presented in Appendix A.

2.3 Summary of Constituents Included in Quantitative Assessment

The waste constituents in waste/soil and ground water that are evaluated in the quantitative risk assessment are summarized in Tables 2-4 and 2-5, respectively. The summary tables include the following summary information for each constituent:

- Number of valid sample results
- Number of detections
- Minimum detected concentration (mg/kg or mg/L)
- Maximum detected concentration (mg/kg or mg/L)
- Minimum SQL for nondetected measurements (mg/kg or mg/L)
- Maximum SQL for nondetected measurements (mg/kg or mg/L)

Table 2-4a presents the summary data by SWMU for constituents detected in waste/soil. For SWMUs with both surface and subsurface characterization data (i.e., Fill Area, Liquid Waste Burner, T11, and Waste Pile Staging Area), Table 2-4b summarizes the characterization data for only the surface samples, which are used differently than the combined surface/subsurface data in the exposure assessment (as discussed in Section 3.3). The frequency of detection and the range of detected concentrations for constituents in the sludge at the North Settling Lagoon and South Settling Lagoon are presented in Tables 5-7 and 5-10, respectively, of the draft *RFI Final Report, Volume I.*

3.0 EXPOSURE ASSESSMENT

The purpose of the exposure assessment is to estimate the type and magnitude of potential exposures to releases of hazardous constituents from the SWMUs investigated in the RFI. The exposure assessment consists of three parts, which are presented in the following sections:

3.1 Characterization of Exposure Setting
3.2 Identification of Potential Exposure Pathways
3.3 Quantification of Potential Exposures

The results of the exposure assessment are combined with the results of the toxicity assessment (Section 4) to characterize potential risk (Section 5).

3.1 Characterization of Exposure Setting

The exposure setting is characterized with respect to (1) the general physical characteristics of the Facility and its surroundings and (2) the characteristics of the populations at and near the Facility. Section 3.1.1 summarizes briefly the types of information on the physical setting at the Facility that has been previously presented to USEPA.

The locations and types of potentially exposed human populations are characterized with respect to current and reasonably anticipated future land use and ground water use at and surrounding the Facility, in the following sections:

3.1.2 Land Use
3.1.3 Ground Water Use

A summary of the characteristics of the potentially exposed populations is included at the end of each of these two sections.

3.1.1 Physical Setting

Characterization of the physical setting has been presented in Section 2 of the *Description of Current Conditions* (DOCC) report prepared by Geraghty & Miller (G&M 1991) and submitted to USEPA in 1991. Section 2 of the DOCC report (entitled Site Characterization) provided the following site information:

- Location
- Description of facility ownership and operations
- Topography
- Climate
- Surficial soils
- Surface water and drainage features
- Hydrogeology

3.1.2 Land Use

Historical and current land use at the Facility is described in Section 3.1.2.1. This information is combined with consideration of local land use development patterns to establish reasonably anticipated future land use at the Facility. In particular, the likelihood of future residential and recreational land use at the Facility is evaluated.

According to USEPA (55 FR 8666, March 8, 1990, p. 8710), "the assumption of future residential land use is not a requirement" and "may not be justifiable if the probability that the site will support residential use in the future is small." In addition, USEPA (1992C, 1991B) states that "sites that are surrounded by operating industrial facilities can be assumed to remain as industrial areas unless there is an indication that this assumption is not appropriate."

Accordingly, a comprehensive review of information pertinent to future land use patterns surrounding the Facility was conducted to evaluate the appropriateness of assuming continued industrial land use at the Facility. The evaluation considered the sources and types of information identified in USEPA guidance (USEPA 1995H). The primary sources of information consulted include the following:

- Comprehensive Plan for the City of Moraine
- City of Moraine Zoning Ordinance
- Official Zoning Map for the City of Moraine
- City Planner of Moraine

Although the Facility is located in the City of Moraine, the following sources of information for the City of West Carrollton, which borders the City of Moraine to the south of the Facility, were also consulted:

- Comprehensive Plan for the City of West Carrollton
- Official Zoning Map for the City of West Carrollton
- Wellhead Protection Plan for the City of West Carrollton
- City Planner of West Carrollton

The types of information identified in USEPA guidance (USEPA 1995H), as provided in these sources of information, were considered and are discussed in the following sections:

3.1.2.1 Historical and Current Land Use
- Current land use
- Zoning maps
- Historical and recent development patterns
- Site location in relation to urban, residential, commercial, industrial, agricultural, and recreational areas

3.1.2.2 Zoning and Future Land Use Plans
- Zoning laws
- Comprehensive community master plans

3.1.2.3 Likelihood of Future Residential Use
- Population growth patterns and projections
- Accessibility of site to existing infrastructure

3.1.2.4 Other Information Potentially Related to Land Use
- Federal/State land use designation
- Cultural factors
- Natural resources information
- Location of wellhead protection areas
- Environmental justice issues
- Location of on-site or nearby wetlands
- Proximity of site to a floodplain
- Proximity of site to critical habitats of endangered or threatened species
- Geologic and hydrogeologic information

3.1.2.1 Historical and Current Land Use

The Facility is located in an area of the City of Moraine (Moraine) that historically has been and currently is developed largely for industrial and commercial uses. The part of Moraine in which the Facility is located is referred to as "Subarea A" in the *Comprehensive Plan for Moraine, Ohio, 1995-2015* (the Moraine Plan, BWSC 1994). Approximately 70%, or about 1,200 acres, of the land in Subarea A is currently under industrial use. The Facility occupies approximately 160 acres of this area (Figure 3-1, Study Area Map for Moraine).

The land occupied by the Facility has been under industrial use since 1916 and has been under GM ownership since 1928. Through the nearly 70 years of continuous operation, GM has modernized, modified, and expanded the operations at the Facility. For example, Building 16, the main manufacturing building, has undergone seven expansions to increase floor space to the current two million square feet. As a result, GM has established a strong and

consistent presence in Moraine, despite widespread changes in the automobile industry. GM plans to continue operations at the Facility.

Land use surrounding the Facility in Subarea A, shown in the Official Zoning Map of the City of Moraine (dated April 1994), is zoned almost entirely for industrial and commercial uses, with only a few small areas zoned for residential use (Figure 3-2). In contrast to Subarea A, other parts of Moraine have more varied land use. Subarea B, which is west of the Great Miami River and east of Soldier's Home/Miamisburg Roads, consists of a mix of residential, commercial, agricultural, and industrial uses. Subarea C, which is west of Soldier's Home/Miamisburg Roads, consists mostly of farmland and open space and is known as the "rural west" of Moraine.

According to the Moraine Plan, the inventory of residential and industrial/commercial land use in Moraine between 1967 and 1993 was as follows:

Inventory of Residential and Industrial/Commercial Land Use City of Moraine, Ohio

Land Use Classification	Acreage		% of Developed Area		% of Total Area	
	1967	1993	1967	1993	1967	1993
Total Residential	641	862	19.5	22.0	13.2	14.6
Total Industrial/Commercial	1,227	1,506	37.4	40.5	23.5	25.5

Adapted from BWSC 1994.

Of the 1967 and 1993 inventory of total industrial/commercial acreage, 93% and 83%, respectively, were classified as industrial (as opposed to commercial). Overall, the mix of residential and industrial/commercial land use in Moraine since 1967 has changed little. In terms of the percentage of developed area and the percentage of total area, industrial/commercial growth has actually outpaced residential growth slightly during the 26-year period.

The City of West Carrollton borders the City of Moraine to the south. The area of West Carrollton adjoining Moraine has historically been and is currently under industrial and commercial land use. As shown in the Official Zoning District Map for West Carrollton (Figure 3-3), the land adjoining Moraine is zoned solely for manufacturing and commercial uses and, as such, separates the industrialized Subarea A of Moraine from residential land use further south in West Carrollton.

3.1.2.2 Zoning and Future Land Use Plans

The City of Moraine recently adopted the Moraine Plan as a guide for long-range, future land use planning, following a comprehensive planning process which involved 20 public meetings

and interviews with 20 key stakeholders from both public and private sectors in the Moraine area. The Moraine Plan sets forth the goals and policies developed during the planning process. Although it does not change any existing zoning, the Moraine Plan recommends amendments to the Moraine Zoning Ordinance that would require the ordinance itself and any amendments to the ordinance to be consistent with the Moraine Plan.

For Subarea A, where the Facility is located, the Moraine Plan aims to maintain existing industries and businesses while expanding commercial/industrial development to promote new business growth. The goal of enhancing industrial/commercial growth in Subarea A, and elsewhere in Moraine, is consistent not only with Moraine's history of maintaining a favorable business environment but also with the importance of business growth to Moraine. During the 1980s, Moraine experienced a 24% increase in employment while the Dayton Economic Trade Area (ETA), which includes seven other neighboring cities, experienced only a 5% increase. The ratio of workers to residents in Moraine was approximately 2.8 in 1990, which is about 4 to 13 times higher than the ratio for the other cities in the Dayton ETA.

Because Subarea A is already heavily developed for industrial and commercial use, the primary strategy for promoting further economic growth is redevelopment of underutilized properties. Such redevelopment may include industrial redevelopment of selected residential neighborhoods (including a mobile home park near the Facility) and construction of new commercial strips to service existing businesses and industries in the area. Consistent with the goals for Subarea A, the Moraine Plan envisions no expansion of residential land use in Subarea A. Potential residential growth in Moraine is planned for Subareas B and C, which are several miles west of the Facility.

Like the Moraine Plan, the *Comprehensive Plan for West Carrollton, Ohio 2010* (West Carrollton Plan, West Carrollton 1994) does not dictate regulatory measures, but rather, provides general policy, guidelines, and recommendations for zoning changes. For example, the West Carrollton Plan includes implementation plans for updating certain zoning codes, regulations, and ordinances to be consistent with the West Carrollton Plan.

3.1.2.3 Likelihood of Future Residential Use

- Importance of the Facility to the Local Economy

  The Facility is not only an important part of GM's operations but also represents a large part of Moraine's job base. It is a major employer in Moraine, employing over 3,000 people, or approximately 20% of the city's workforce. GM plans to continue operations at the Facility and remain an important part of the business community in Moraine and the surrounding area. However, in the unlikely event that GM should cease operations at this location, the Moraine Plan's goal for economic growth in

Subarea A suggests that substantial community support would be forthcoming for maintaining a similar job base for skilled workers at this location.

- Suitability for Residential Development

There are several structures or features on or near the Facility that are incompatible with potential residential development, in the unlikely event that the Facility were to cease operations. First, the Facility has three landfills (Landfills L1, L2, and L3) and two RCRA surface impoundments (North Settling Lagoon and South Settling Lagoon) that would render the location unattractive for potential residential development. Second, the Facility borders a major north/south Conrail freight line, which would also tend to hinder potential residential development because of potential concerns with noise and safety. (Conversely, the Facility's proximity to the Conrail line and Interstate-75 makes its location ideal for commerce and continued industrial use.) Third, the Facility is in the flight path of the Montgomery County Airport located just west of the Great Miami River, which would likewise present noise and safety issues to potential residential development. Fourth, the Moraine Plan establishes a policy that "buffers should be provided when a proposed development could result in a land use conflict with adjacent activities," such as buffering between manufacturing or commercial uses and adjacent residential areas. Because the Facility is virtually surrounded by industrial and commercial development and major transportation arteries, the required buffer areas would significantly limit any land area at the Facility that would remain available for new residential development.

- Historical and Predicted Population Trends

Trends in Moraine's population indicate that the probability of future residential land use at the Facility is small. Between 1970 and 1990, Moraine experienced a slight decrease in population density from 1.4 to 1.3 persons per acre (BWSC 1994). Although Moraine's population increased 23% during this period, it was the result of the Moraine's annexation of property in what is now called Subareas B and C (rather than Subarea A) which increased the total land area by 28%. Therefore, for the 20-year period, Moraine experienced no real population growth. According to the Moraine Plan, the absence of real growth can be attributed to several factors, including current land uses not conducive to residential growth (e.g., Pinnacle Road landfill in Subarea B, sludge pits, etc.) and a lack of efficient access to potential residential areas in Subarea C (BWSC 1994).

As a result of these and other factors, projected population densities and growth rates are similarly low. In fact, the population density is projected to remain

virtually unchanged from 1.3 persons per acre in 1990 to 1.4 persons per acre in 2015. Moraine's population growth rate is projected to be only 0.5% per year through the year 2000, and is optimistically assumed to increase to an average rate of 2.2% per year from year 2000 to 2015. Residential growth, if any actually occurs, is planned for Subareas B and C, rather than for Subarea A where the Facility is located. The Moraine Plan states that "it is unlikely that the population projections from 2000 to 2015 will be attained because Moraine has no school district, and children from Moraine currently attend school in three other school districts" (BWSC 1994). Furthermore, the Moraine Plan contains no specific provisions or recommendations for creating a school district. Future residential growth could also be limited if construction of the proposed Route 892 through Subarea C is delayed, since the proposed highway is necessary to access residential developments in that area.

The residential population of West Carrollton is growing at a much slower rate than in previous decades (22% between 1970 and 1980 versus 10% between 1980 and 1990). Much of this growth has occurred in the southern portion of West Carrollton. Because there are very few vacant sites suitable for residential development, the number of housing units added each decade is predicted to be very small. Instead, the West Carrollton Plan proposes annexation of additional land from unincorporated townships to West Carrollton as the most practical method to increase housing stock. Property maintenance efforts are also suggested as a way to maintain housing stock.

- Potential Future Recreational Use

The probability of future recreational land use on any portion of the Facility is small for two reasons. First, most of Moraine in Subarea A is adequately served by existing parks and any future recreational facilities needed to accommodate potential residential growth in Subareas B and C are planned for Subarea B (BWSC 1994). Hence, Moraine projects no need for recreational facilities at or near the Facility. Second, the highly industrial character of the land surrounding the Facility and the proximity to Interstate-75 make the location unattractive for recreational facilities. For these reasons, the City Planner of Moraine considers it "highly unlikely" that any portion of the Facility would be developed for recreational use (Watson 1995).

3.1.2.4 Other Information Potentially Related to Land Use

The following sources and types of information are considered to be not pertinent to the determination of future land use at the Facility.

- Federal/State land use designation

  Based on review of the Moraine Plan and West Carrollton Plan, the Facility is not located on or near land controlled by the Federal or State government.

- Cultural factors

  Based on review of the Moraine Plan and West Carrollton Plan, the Facility does not appear to be located near historical or Native American religious sites.

- Natural resources information

  The Moraine Plan and West Carrollton Plan do not identify any specific natural resources, as defined in CERCLA Section 101, at or near the Facility. Ground water and drinking water supplies are discussed in Section 3.1.3.

- Location of wellhead protection areas

  Section 1428 of the Safe Drinking Water Act requires each State to develop a State program to protect wellhead areas within its jurisdiction from contaminants that may adversely affect human health. Ohio has developed an Ohio Wellhead Protection Program (OEPA 1992, 1994), which requires owners/operators of public water supplies that are derived from ground water to develop and implement local wellhead protection plans. The Ohio Wellhead Protection Program requires a local wellhead protection plan to include (1) a wellhead protection area delineated by ground water time-of-travel, (2) an inventory of potential pollution sources, and (3) a strategy for managing the wellhead protection area to prevent adverse impacts to water supply wells. Management options for wellhead protection areas may include the control of land use, although the Ohio Wellhead Protection Program does not specify any particular activities that are prohibited in wellhead protection areas.

  The City of Moraine has established regulations on land use within a "WP" Well Field Protection Overlay District to protect public water supplies located in Moraine (Moraine Zoning Code Section 1129.12). The Well Field Protection Overlay District includes existing public water supply wells and their 1-year ground water capture area. As shown on the Official Zoning Map of the City of Moraine (Figure 3-2), the Facility is not located within the Well Field Protection Overlay. As such, ground water protection regulations governing the use (storage, handling, and use/production) of chemicals within the wellhead protection area are not applicable to the Facility. Even if the Facility were located within the Well Field Protection Overlay District, the regulations governing chemical use allow existing "nonconforming" uses to continue to run with the land.

The nearest public water supply wells in use downgradient of the Facility are those in the City of West Carrollton. The City of West Carrollton's Wellhead Protection Plan (CH2M Hill 1993) includes wellhead protection areas delineated by 1-year, 5-year, and 10-year ground water times-of-travel. The Facility is not located within any of these wellhead protection areas.

- Environmental justice issues

  According to the Moraine Plan and the West Carrollton Plan, the "white" populations of both cities in 1990 were approximately 95% of the total, 12% higher than the average for the region (i.e., the Dayton Economic Trade Area) and 10% higher than the average for Ohio. The percentages of families below the poverty level were approximately 11% for Moraine and 5% for West Carrollton. For comparison, approximately 10% of families in Ohio were below the poverty level. The Plans provide no information on the geographic distribution of minority or low-income communities within these cities. The City Planners of Moraine and West Carrollton provided no information that indicates the existence of environmental justice issues near the Facility (Humphries 1995; Watson 1995).

- Location of on-site or nearby wetlands

  The SWMUs are not located near any wetlands. The Facility is located over one-half mile from a strip of land bordering the Great Miami River that extends north from Sellars Road for approximately 1.3 miles. This strip of land contains several small ponds and is divided into different lots, which are owned by the Miami Conservancy, Montgomery County, and private industries.

- Proximity of site to a floodplain

  The Facility is not located in a 100-year floodplain. The Flood Insurance Rate Map for Moraine shows the area that would be affected by a 100-year flood and the proximity of the area to the Facility (Figure 2-3 of the DOCC report).

- Proximity of site to critical habitats of endangered or threatened species

  The Ohio Department of Natural Resources, Division of Natural Areas and Preserves, which maintains records on rare and endangered species, and high-quality plant species, has stated that it has no records of rare and endangered species in the area around the Facility (ODNR 1993).

- Geologic and hydrogeologic information

  A detailed description of the geology and hydrogeology at and surrounding the Facility is provided in Sections 2.3.3 and 2.3.5 of the DOCC report. There are no known geologic features (e.g., seismic features) at or near the Facility that would be pertinent to the determination of future land use at the Facility.

3.1.2.5 Summary of Potentially Exposed Populations

A comprehensive review of information pertinent to future land use patterns surrounding the Facility confirms that the assumption of continued industrial land use at the Facility is appropriate. Given the long history of industrial land use at the Facility, GM's plans for continuing operations, the City of Moraine's plans for enhancing industrial/commercial development surrounding the Facility, the local economic importance of the Facility, and the unsuitability of the Facility's location for potential residential development, the probability is small that the location of the Facility will support residential use in the future. The limited population growth expected in the future and Moraine's plans to direct the potential growth to parts of the city away from the Facility and surrounding industrial/commercial development further underscore the small probability of future residential or recreational land use at the Facility.

The potential for human exposure to the SWMUs is evaluated in the baseline risk assessment for the following current and reasonably anticipated future land uses:

- Industrial land use at the Facility; and
- Industrial/commercial, residential, and recreational land uses surrounding the Facility

The potentially exposed populations under these land uses are:

- On-facility and off-facility workers

  The vast majority of workers at the Facility are employed in manufacturing functions which take place within manufacturing buildings. These workers rarely, if ever, perform job functions that would bring them into contact with the SWMUs. Routine incidental contact with outdoor areas at the Facility may occur during lunch, breaks, and walks to and from parking lots. The extent of such outdoor activities is expected to vary seasonally.

  A small number of the Facility's workers may come into contact with certain SWMUs through routine solid waste management functions (e.g., inspections), maintenance (e.g., groundskeeping), or occasional excavation (e.g., replacing pavement). The extent of contact is expected to vary seasonally.

Based on the similarity of industrial and commercial land use surrounding the Facility, workers at neighboring facilities are expected to have activity patterns similar to those for the majority of the Facility's workers, who rarely come into contact with the SWMUs.

- Off-facility residents
  The nearest residents to the Facility are in the few low- and medium-density residential areas on Dryden Road west of the Facility and the areas south and southeast of the Facility that are beyond adjacent industrial and commercial areas. Trespassing by residents onto the Facility is expected to be unlikely because public access to the Facility is controlled by perimeter fencing and guards.

3.1.3 Ground Water Use

Ground water underlying the Facility is found primarily in two aquifers, as described in Section 2.3.5 of the DOCC report. A shallow water-table aquifer (upper aquifer) underlies the Facility and is largely separated by an aquitard from a deeper semi-confined aquifer (lower aquifer). The determination of whether a potential exists for human exposure to ground water in the upper and lower aquifers is based on consideration of actual and reasonably expected uses of the ground water. Factors considered in this determination include those described in *EPA's Ground-Water Protection Principles* (USEPA 1991C), *Ground-Water Protection Strategy* (USEPA 1984), and *Guidelines for Ground-Water Classification under the EPA Ground-Water Protection Strategy* (USEPA 1986). Also considered were the criteria set forth in Section 3746.04(10) of enacted Ohio Senate Bill 221, which directs Ohio EPA to establish a State of Ohio classification system for characterizing ground water according to its capability to support human use. The specific factors considered include the following:

- Regional availability of alternative sources of drinking water;
- Historical and existing uses of ground water;
- Productivity of the aquifers;
- Quality and treatability of the ground water;
- Local laws governing ground water use; and
- Degree of interconnection between the aquifers.

3.1.3.1 Lower Aquifer

The lower aquifer in the vicinity of the Facility was historically used as a municipal drinking water supply. The Greater Moraine Water System (GMWS) of Montgomery County has four well fields that, until late 1986, withdrew ground water from the lower aquifer to serve the

cities of Moraine, Kettering, and Centerville. The GMWS service area is shown in Figure 3-4 (Water Infrastructure for Moraine). The capacity of the GMWS well fields while they were active, in million gallons per day (MGD), was as follows:

- Lamme Road 8 MGD
- Dryden Road (North and South) 13 MGD
- Miami Shores 26 MGD

The combined average water pumpage from these well fields in 1981 was about 20 MGD (CH2M Hill 1982). In 1981, the average water quality from the four GMWS well fields was:

- Total hardness 400 mg/L as $CaCO_3$
- Iron 0.3 mg/L as Fe
- Manganese 0.1 mg/L as Mn

Ground water from the Miami Shores wells has levels of iron as high as 0.7 mg/L and manganese as high as 0.3 mg/L (CH2M Hill 1982). Ohio secondary maximum contaminant levels (SMCLs) for iron and manganese are 0.3 mg/L and 0.05 mg/L, respectively (OAC Chapter 3745-82).

Faced with the need to construct treatment capacity to reduce the natural hardness, iron, and manganese content of the water provided to its customers who were unhappy with the water quality, Montgomery County conducted a feasibility study (CH2M Hill 1982) of alternatives for supplying drinking water to its customers. The alternative determined to be the most cost-effective and practical for meeting the water quantity and water quality demands of the GMWS customers was use of treated water produced by the Dayton Water System (DWS). For comparison with the water produced by the GMWS well fields, the average water quality in 1981 from the DWS was:

- Total hardness 145 mg/L as $CaCO_3$
- Iron < 0.03 mg/L as Fe
- Manganese < 0.002 mg/L as Mn

Through a February 1983 Agreement between the City of Dayton and the Board of County Commissioners of Montgomery County, the DWS became the source of water to the GMWS. The City of Dayton and Montgomery County developed water production, treatment, and delivery capacity in the DWS to ensure delivery of 52 MGD of treated water to the GMWS to meet forecasted average-day demand of 26 MGD and maximum-day demand of 42

MGD to the year 2000 (CH2M Hill 1982). During late 1986, customers of the GMWS began obtaining drinking water produced by the City of Dayton.

Since 1986, the GMWS well fields have been used twice to supplement the water supply from the DWS during peak demand periods in the unusually dry summers of 1987 and 1988. Of the well fields located downgradient of the Facility (i.e., Dryden Road North, Dryden Road South, and Miami Shores), the Dryden Road South and Miami Shores well fields were pumped intermittently at an average rate of approximately 2 MGD each during May to August, 1987. During June to September, 1988, the Miami Shores well field was pumped continuously at an average rate of approximately 10 MGD.

More recently, the capacity of the DWS has been increased to ensure delivery of approximately 74 MGD of treated water to the GMWS to meet forecasted demand to the year 2005 (Merrill 1995). Since 1988, the GMWS well fields have not been used to supplement the water supply from the DWS. With the increased delivery capacity of the DWS, future use of the GMWS well fields to supplement the DWS supply of drinking water is expected to be even more infrequent than in the past, but some future use to supply water in emergencies is possible.

In case ground water from the GMWS well fields is needed in an emergency, Montgomery County plans to use the Miami Shores well field as the primary emergency supply, as it did in 1988. Miami Shores' pumping capacity (26 MGD) is twice that of Dryden Road North and South combined (13 MGD) and is capable of fulfilling, by itself, the average water demand in the GMWS. As such, use of Miami Shores as the primary emergency water supply is expected to meet any likely emergency water demand. In the rare event of an emergency in which the use of Miami Shores is insufficient to meet demand, Montgomery County would institute voluntary and/or mandatory water use restrictions to reduce demand to a level that could be met by Miami Shores. If water use restrictions were unsuccessful, Montgomery County might consider using Dryden Road South as a secondary emergency water supply. The need to use Dryden Road North to supplement both Miami Shores and Dryden Road South in an emergency is expected to be very unlikely (Westerfield 1995).

Approximately 2 miles south of the Facility is the nearest downgradient, active municipal well field, which is the City of West Carrollton's water supply. According to West Carrollton's Wellhead Protection Plan (CH2M Hill 1993), the Facility is not located within any of West Carrollton's wellhead protection areas, which include areas delineated by 1-year, 5-year, and 10-year ground water times-of-travel. West Carrollton currently operates three wells, with a total capacity of approximately 3.6 MGD. Based on monthly Drinking Water Operation Reports for 1994, monthly pumpage in 1994 ranged from 0.9 MGD to 2.7 MGD. Iron and manganese concentrations measured in April 1988 at two of the wells were:

- Iron < 0.05 mg/L to 0.587 mg/L as Fe
- Manganese 0.088 mg/L to 0.153 mg/L as Mn

Iron and manganese concentrations following water treatment, based on data from 1988, 1991, and 1994 monthly Drinking Water Operations Reports, were < 0.050 mg/L as Fe and < 0.015 mg/L to 0.151 mg/L as Mn.

The lower aquifer in the region is also used as an industrial water supply. The Facility has several inactive wells that historically withdrew ground water from the lower aquifer for use in its manufacturing operations. In early 1987, with the GMWS's ability to deliver higher quality water from the DWS, the Facility began obtaining water for both potable and nonpotable uses from the GMWS rather than its own wells. General Motors' manufacturing facilities immediately east of the Facility also have switched to water from the DWS for potable use, although they have several wells in the lower aquifer that currently withdraw water for nonpotable, industrial uses. Treatment of the ground water, however, is necessary for some of these industrial uses because of the naturally high mineral content of the ground water.

Water for potable use at these facilities is expected to continue to be supplied by the GMWS, with the DWS as the water source, because of the higher quality of water and because redevelopment of the industrial wells to supply potable water would be subject to control under Ohio laws discussed in Section 3.1.3.2. As such, future potable use of ground water from the industrial wells at the Facility and neighboring facilities is not reasonably expected. However, continued nonpotable industrial use of the lower aquifer can be reasonably expected.

3.1.3.2 Upper Aquifer

In contrast to the lower aquifer, the upper aquifer in the vicinity of the Facility has not been used historically, and is not used currently, as a municipal or industrial water supply. Historical development of the lower rather than the upper aquifer for such uses is likely attributable to the upper aquifer's relatively low sustainable yield. Based on a regional hydraulic conductivity of about 150 feet/day and saturated thickness of only 10 to 40 feet, an estimated sustainable yield for the upper aquifer would be approximately 100 gallons per minute, or about 0.1 MGD. For comparison, the pumping rates for typical industrial water supply wells in the region range from 1 to 3 MGD (Norris and Spieker 1966). The well fields in the GMWS were designed to withdraw ground water at even higher rates. Heavy ground water pumping required to support these uses cannot be sustained by the upper aquifer.

Future development of the upper aquifer as an industrial or municipal water supply is not reasonably expected not only because of limited sustainable yield, but also due to the

availability of dependable and higher quality water from the DWS and the availability of the GMWS well fields to provide emergency capacity. Furthermore, the development of public water systems using ground water as a source is governed by Ohio statute (Chapter 6109 of the Ohio Revised Code), and Ohio EPA regulations and guidelines adopted thereunder (OAC Chapters 3745-1 through 3745-82, OEPA 1991). Likewise, the installation of private water wells is governed by Ohio Department of Health regulations (OAC Chapter 3701-28).

Regulatory control over the development of ground water systems includes the following key features:

- Plans for system development must be approved by the Ohio EPA or Ohio Department of Health to ensure protection of human health.

- A public ground water system may be developed only if connection to an existing public water system is economically infeasible.

- A public water system must remove Fe and Mn from the ground water if the ground water has (1) Fe content exceeding 0.3 mg/L; (2) Mn content exceeding 0.05 mg/L; or (3) total Fe and Mn content exceeding 0.3 mg/L.

- A well cannot be located within 50 feet to 300 feet of any known or possible source of contamination, depending on the expected water usage rate.

- A well owner must own the land within the isolation radius of possible sources of contamination, and OEPA must approve land use within the radius.

These controls, alone and in combination, make improbable the development of drinking water wells in the upper aquifer, or redevelopment of industrial wells in the lower aquifer for potable use, at and in the vicinity of the Facility. The principal reasons are as follows:

- Because the Facility and the surrounding community are served by the GMWS (which is supplied by the DWS), residential and commercial/industrial connection to the GMWS, rather than development of new drinking water wells, is expected to be economically feasible, and therefore, would be required by Ohio EPA.

- The natural hardness, Fe, and Mn contents of the ground water in the upper aquifer are similar to those of the lower aquifer. Therefore, the ground water is expected to require treatment for potable use; such treatment was previously determined to be non-cost-effective relative to the use of treated water from the DWS.

- There are many potential sources of ground water contamination in the area around the Facility, which would severely limit the locations suitable for development of drinking water wells. As indicated in Section 4.2 and Figure 4-14 of the DOCC report (G&M 1991), several active and inactive landfills and other waste management facilities are located around the Facility. Of these, more than a dozen are located in the City of Moraine, including the South Sanitary Landfill on Cardington Road (upgradient of the Facility), which is a Superfund site.

According to the Montgomery County Health Department (Hut 1995), no private water wells have been installed in the GMWS service area based on a search of records since 1983, when Montgomery County established the Agreement to use water from the DWS.

Although it is not a current or potential source of drinking water, the upper aquifer is hydraulically interconnected to the lower aquifer, which is considered a potential drinking water source. Over many parts of the region and in the vicinity of the Facility, the upper aquifer is separated from the lower aquifer by a clay-rich aquitard, which acts as a leaky confining unit restricting the degree of hydraulic connection with the lower aquifer. Based on work conducted by Geraghty & Miller during the development and calibration of a ground water flow model for the Facility (G&M 1994), the regional characteristics of the aquitard are as follows:

- Thickness: from 0 to 75 feet; typically from 10 to 15 feet
- Vertical conductivity: 0.012 to 3.3 feet/day

The degree of hydraulic interconnection estimated by the ground water flow model was summarized in a water budget analysis (G&M 1994, Figure 4.12). According to that analysis, the regional net flow of water from the upper aquifer to the lower aquifer is approximately 9 MGD. The ground water flow model also indicates that the upper aquifer is hydraulically connected to the Great Miami River.

3.1.3.3 Summary of Potential Ground Water Exposures

Consideration of factors pertinent to potential regional ground water use indicates that the use of the lower aquifer as a drinking water source is reasonably expected, but the use of the upper aquifer as a drinking water source is not reasonably expected. Given the regional availability of alternative sources of drinking water that are more dependable and of higher quality, and local laws governing ground water use, human exposure to upper aquifer ground water is not reasonably expected. However, because the upper aquifer is a medium for potential transport of constituents from the SWMUs to the lower aquifer and the Great Miami River, the baseline risk assessment includes an assessment of the extent to which the hydraulic

interconnections could result in migration of constituents to the lower aquifer or to the River in concentrations of significance to human health.

The potential for human exposure to ground water is evaluated in the baseline risk assessment for current and potential drinking water use of ground water extracted from the following municipal well fields:

- West Carrollton: as West Carrollton's drinking water supply
- Miami Shores: as GMWS's primary emergency drinking water supply
- Dryden Road South: as GMWS's secondary emergency drinking water supply

Although the Dryden Road North well field is expected to not serve as a drinking water supply or as an emergency drinking water supply, the ground water quality at this well field is also evaluated, as discussed in Section 3.3.3.1. The risk assessment also evaluates the potential for exposures that may occur through current and potential industrial use of ground water extracted from the following industrial wells:

- Delphi Thermal production wells: as a potential industrial water supply
- Truck & Bus production wells: as an industrial water supply
- Moraine Engine production well: as an industrial water supply

The significance of waste constituents potentially transported to the Great Miami River via ground water flow from the upper aquifer is also evaluated.

3.2 Identification of Potential Exposure Pathways

An exposure pathway generally requires the existence of (1) a waste source and a mechanism of waste constituent release, (2) a transport medium, (3) a point of potential human contact with the affected medium, and (4) an exposure route at the point of contact. The characteristics of the SWMUs investigated in the RFI were described in Section 3.1 of the DOCC report. Sections 3.2.1 through 3.2.7 below describe the potential presence of hazardous waste constituents at the SWMUs, the potential transport of waste constituents to environmental media, and the potential exposure pathways that are evaluated in the baseline risk assessment. The potential exposures identified for the quantitative exposure assessment for each SWMU are also presented in Table 3-1. Section 3.2.8 describes the potential ground water and surface water exposure pathways that are evaluated in the exposure assessment.

3.2.1 Fill Area

Under current conditions, waste constituents in the fill are unlikely to migrate. Pavement over the area precludes airborne transport and limits surface infiltration, thereby limiting migration

to deeper soil and ground water. If the pavement were removed from the area, waste constituents in the fill might volatilize into the air or become airborne in waste particles as a result of wind erosion, and might also migrate with surface infiltration to underlying soil and ground water.

Pavement over the fill area currently prevents any human exposure to the fill material. If the pavement were removed in the future, potential exposure to workers might occur during removal of the pavement. If the area remained unpaved, potential exposure to workers at the area might occur during routine industrial activities. Potential routes of exposure to workers would include incidental ingestion and dermal contact with the fill material, and inhalation of any vapor and particulate emitted from the fill. These potential exposures to on-facility workers are evaluated in the baseline risk assessment.

Potential exposure to off-facility workers and residents might occur via inhalation of vapor and particulate emitted from the Fill Area, if the pavement were removed. These potential exposures are evaluated in the baseline risk assessment by estimating exposure to hypothetical off-facility residential receptors who are located as near the Fill Area as possible (i.e., outside the Facility boundary, allowing for existing highways and railroad tracks along the boundary). Because the exposures estimated for the hypothetical case are expected to be higher than exposures estimated based on actual types and locations of receptors, the potential off-facility exposures estimated in this risk assessment are considered conservative screening-level estimates.

3.2.2 Inactive Landfills L1, L2, and L3

Constituents of wastes in the inactive landfills may be present in the surface material. Volatile constituents at and near the surface may volatilize into the air, and constituents on soil/waste particles on unvegetated surfaces may become airborne as a result of wind erosion. Surface infiltration may transport waste constituents to underlying soil and ground water.

Exposures to on-facility workers performing routine industrial work are not expected to occur at the inactive landfills, since industrial activities do not take place at the landfills. Excavation at the inactive landfills is also not expected; therefore, exposure to workers performing excavation at the landfills is not evaluated in the risk assessment. Potential exposures to workers may occur currently during groundskeeping at the landfills, which takes place during the summer months. Potential routes of exposure to workers performing groundskeeping at the landfills include incidental ingestion and dermal contact with surface material, and inhalation of vapor and particulate emitted from the surface. These current and future potential exposures to on-facility workers are evaluated in the baseline risk assessment.

Potential exposure to off-facility workers and residents may occur via inhalation of vapor and particulates emitted from the inactive landfills. These potential exposures, like those associated with the Fill Area, are evaluated in the baseline risk assessment by estimating

exposure to hypothetical off-facility residential receptors who are located as near each inactive landfill as possible. The potential off-facility exposures estimated in this way are considered conservative screening-level estimates.

3.2.3 Former Liquid Waste Burner

If a release from the liquid burner operations occurred, waste constituents in the soil around the former Liquid Waste Burner would be unlikely to migrate because of the pavement over this area. If the pavement were removed, residual waste constituents in soil might volatilize into the air or become airborne with surface soil particles as a result of wind erosion, and might also migrate with surface infiltration to deeper soil and ground water.

Pavement over the area at the former Liquid Waste Burner currently prevents any human exposure to the underlying soil. If the pavement were removed in the future, potential exposure to workers might occur during removal of the pavement. If the area remained unpaved, potential exposure to workers might occur during routine industrial activities at the area. Potential routes of exposure to workers would include incidental ingestion and dermal contact with the underlying soil, and inhalation of vapor and particulate emitted from the soil. These potential exposures to on-facility workers are evaluated in the baseline risk assessment.

Potential exposure to off-facility workers and residents might occur via inhalation of vapor and particulates emitted from the soil in the former Liquid Waste Burner area, if the pavement were removed. These potential exposures, like those for the SWMUs discussed above, are evaluated in the baseline risk assessment by estimating exposure to hypothetical off-facility residential receptors who are located as near the area of the former Liquid Waste Burner as possible. The potential off-facility exposures estimated in this way are considered conservative screening-level estimates.

3.2.4 Inactive Surface Impoundments

The North Settling Lagoon and the South Settling Lagoon no longer contain or receive any process wastewater. The sludge remaining at these inactive impoundments contains waste constituents that may volatilize into the air or become airborne in particles as a result of wind erosion. Surface infiltration may transport constituents to underlying soil and ground water.

Exposures to on-facility workers performing routine industrial work are not expected to occur at the inactive surface impoundments, since industrial activities do not take place at the impoundments. Excavation of sludge at the inactive impoundments is also not expected; therefore, exposure to workers performing excavation at the impoundments is not evaluated in the risk assessment. Potential exposures to workers may occur currently during groundskeeping at the North Settling Lagoon, which takes place during the summer months, and during daily inspection of freeboard at both impoundments. Potential exposure to workers performing groundskeeping and inspections at the impoundments is limited to

inhalation of vapor and particulate emitted from the surface sludge. Direct contact with sludge does not occur at either impoundment during groundskeeping and inspections. Potential inhalation exposure to on-facility workers performing groundskeeping at both inactive impoundments is evaluated in the baseline risk assessment. Evaluation of inhalation exposure to workers performing inspection of the impoundments is unnecessary, since potential exposure during inspections is expected to be lower than that during groundskeeping.

Potential exposure to off-facility workers and residents may occur via inhalation of vapor and particulates emitted from the inactive impoundments. These potential exposures, like those for the SWMUs discussed above, are evaluated in the baseline risk assessment by estimating exposure to hypothetical off-facility residential receptors who are located as near each impoundment as possible. The potential off-facility exposures estimated in this way are considered conservative screening-level estimates.

3.2.5 Former Underground Storage Tank (UST) Areas

The former UST areas include the South Tank Farm, T4, T5/T6, T12, and the West Tank Farm. Because the USTs in these areas have been removed either before or during the RFI, only residual hazardous waste constituents may remain in the soil left in place after removal of the USTs and the surrounding soil. Any residual constituents in these areas would be deep below ground surface (typically about 15 feet). Migration of these constituents is currently unlikely. The depth of the soil precludes airborne transport of constituents, unless future excavation extends to the depth of the residual constituents. Pavement over these areas limits surface infiltration, thereby limiting migration to deeper soil and ground water. If the pavement were removed from these areas, surface infiltration might transport residual constituents to deeper soil and ground water.

Pavement and backfill over the former UST areas prevent any human exposure to the underlying soil. If the soil in these areas were excavated to the depth of the residual constituents remaining after tank removal, potential exposure to workers might occur during excavation. Potential routes of exposure to workers would include incidental ingestion and dermal contact with soil, and inhalation of vapor and particulate emitted from the soil. These potential exposures to on-facility workers are evaluated in the baseline risk assessment.

Potential exposure to off-facility workers and residents might occur via inhalation of vapor and particulates emitted from the soil in the former UST areas, if soil were excavated to the depth of the residual constituents. These potential exposures, like those for the SWMUs discussed above, are evaluated in the baseline risk assessment by estimating exposure to hypothetical off-facility residential receptors who are located as near the area of the former USTs as possible. The potential off-facility exposures estimated in this way are considered conservative screening-level estimates.

3.2.6 Tank T11

If a release from the tank occurred, waste constituents in the soil around the tank would be unlikely to migrate. Pavement over the area precludes airborne transport and limits surface infiltration, thereby limiting migration to deeper soil and ground water. If the pavement were removed, waste constituents might volatilize into the air or become airborne with surface soil particles as a result of wind erosion, and might also migrate with surface infiltration to underlying soil and ground water.

Pavement around T11 currently prevents any human exposure to the underlying soil. If the pavement were removed in the future, potential exposure to workers might occur during removal of the pavement. If the area remains unpaved, potential exposure to workers might occur during routine industrial activities at the area. Potential routes of exposure to workers would include incidental ingestion and dermal contact with the underlying soil, and inhalation of vapor and particulate emitted from the soil. These potential exposures to on-facility workers are evaluated in the baseline risk assessment.

Potential exposure to off-facility workers and residents might occur via inhalation of vapor and particulates emitted from the soil at T11, if the pavement were removed. These potential exposures, like those for the SWMUs discussed above, are evaluated in the baseline risk assessment by estimating exposure to hypothetical off-facility residential receptors who are located as near T11 as possible. The potential off-facility exposures estimated in this way are considered conservative screening-level estimates.

3.2.7 Waste Pile Staging Area

Pavement over the staging area precludes airborne transport of any waste constituents in underlying soil and limits surface infiltration, thereby limiting constituent migration to deeper soil and ground water. If the pavement were removed from the area, waste constituents in the soil might volatilize into the air or become airborne with surface soil particles as a result of wind erosion, and might also migrate with surface infiltration to deeper soil and ground water.

Pavement over the Waste Pile Staging Area currently prevents any human exposure to the underlying soil. If the pavement were removed in the future, potential exposure to workers might occur during removal of the pavement. If the area remains unpaved, potential exposure to workers might occur during routine industrial activities at the area. Potential routes of exposure to workers would include incidental ingestion and dermal contact with the underlying soil, and inhalation of vapor and particulate emitted from the soil. These potential exposures to on-facility workers are evaluated in the baseline risk assessment.

Potential exposure to off-facility workers and residents might occur via inhalation of vapor and particulates emitted from the soil in the Waste Pile Staging Area, if the pavement were removed. These potential exposures, like those for the SWMUs discussed above, are evaluated in the baseline risk assessment by estimating exposure to hypothetical off-facility

residential receptors who are located as near the Waste Pile Staging Area as possible. The potential off-facility exposures estimated in this way are considered conservative screening-level estimates.

3.2.8 Ground Water and Surface Water

The potential points of exposure to ground water, as discussed in Sections 3.1.3, include municipal wells and industrial wells. Potential routes of exposures to ground water from municipal wells include ingestion, and dermal contact and inhalation of vapor during showering. Potential routes of exposures to ground water from industrial wells include inhalation of vapor from ground water by workers during nonpotable use of ground water in manufacturing operations. Potential dermal exposure to ground water used in manufacturing operations is also possible. Potential routes of exposures to surface water in the Great Miami River would include incidental ingestion of and dermal contact with surface water during swimming, although swimming in the River is expected to be very infrequent because of serious drowning hazards (Bebbington 1995).

In this baseline risk assessment, potential drinking water exposures are evaluated using maximum contaminant levels (MCLs) established by USEPA under the Safe Drinking Water Act, or similar risk-based drinking water concentrations for constituents without MCLs. To streamline the assessment of the other potential routes of exposure to ground water and surface water, the potential non-drinking water exposures (e.g., nonpotable industrial ground water use) are also evaluated as drinking water exposures in this baseline risk assessment, using MCLs or risk-based drinking water concentrations as conservative screening-levels.

3.3 Quantification of Potential Exposures

Potential exposures via the pathways identified in Section 3.2 are quantified by the product of (1) the concentrations of waste constituents in an environmental medium at locations of potential exposure over an expected duration of exposure, and (2) the intake of the environmental medium by a potentially exposed population. The product of these components is called the potential dose (USEPA 1992D). The potential dose is combined with toxicity values (presented in Section 4) to estimate potential exposure risk (presented in Section 5).

The potential dose is calculated differently for evaluating potential carcinogenic risk and for evaluating noncarcinogenic effects. For evaluating carcinogenic risk, intake is averaged over a lifetime (USEPA 1989A) and the dose is called the lifetime average daily dose (LADD). For evaluating noncarcinogenic effects, intake is averaged over the period of exposure and the dose is called the average daily dose (ADD). The LADD and ADD of a constituent for a specific route of exposure (e.g., soil ingestion) are given by:

$$LADD_{route} = Concentration_{medium} \cdot Intake_{lifetime,\ route}$$

$$ADD_{route} = Concentration_{medium} \cdot Intake_{exposure\ duration,\ route}$$

For evaluating dermal exposures to soil, the potential dose is converted to an absorbed dose by multiplying the potential dose by an absorption fraction (AF_{derm}), which is the fraction of the potential dose that is absorbed through the skin. Because chemical-specific dermal absorption fractions are generally unavailable, USEPA default values of 1% for organic constituents and 0.1% for inorganic constituents are used (USEPA 1995D).

The estimation of exposure concentrations is presented in the following sections:

3.3.1 Exposure Concentrations in Soil
3.3.2 Exposure Concentrations in Ambient Air
3.3.3 Exposure Concentrations in Ground Water
3.3.4 Exposure Concentrations in Surface Water

The general method for estimating media intakes is discussed in Section 3.3.5. The exposure factors for estimating intake of each medium are presented in the following sections:

3.3.6 Intake of Soil
3.3.7 Intake of Ambient Air
3.3.8 Intake of Drinking Water

Exposure factors representing central tendency values and factors representing high-end values are developed in Sections 3.3.6 and 3.3.7 to allow calculation of central tendency intakes and high-end intakes for the soil- and air-related potential exposures. The exposure factors presented in Section 3.3.8 are the "standard" factors USEPA uses for calculating risk-based drinking water concentrations for constituents that do not have MCLs.

3.3.1 Exposure Concentrations in Soil

According to USEPA guidance (USEPA 1989A), the exposure concentration is best represented by the arithmetic mean when evaluating exposures over the long-term, and the 95% UCL on the mean should be used in estimating chemical intakes, although the maximum concentration should be used when the 95% UCL exceeds the maximum concentration.

Two types of soil/waste sampling were conducted at the SWMUs to generate the RFI data: judgmental sampling and random sampling. The judgmental sampling conducted at the former underground storage tank areas (i.e., the South Tank Farm, West Tank Farm, T4,

T5/T6, and T12), the former Liquid Waste Burner, and the Waste Pile Staging Area was based on field observations and professional judgment and was intended to measure the highest constituent concentrations at a SWMU. Few samples were typically needed at each SWMU and the frequency of detection for each constituent was low (i.e., each constituent was detected in a very small number of samples). Random sampling was conducted at the inactive Landfills L1, L2, and L3, inactive surface impoundments (North and South Settling Lagoons), the Fill Area, and T11 to characterize the average concentrations of constituents at these SWMUs. However, the number of samples was relatively small in most cases, and detection frequencies for most constituents were also very low.

Because of the small number of samples and low frequencies of detection of most constituents at each SWMU (see Tables 2-4a and 2-4b), the distribution of the data (e.g., normal, lognormal, etc.) is difficult to determine. This complicates the calculation and interpretation of the 95% UCLs. For example, the 95% UCLs calculated using the log-transform of the RFI data often exceed the maximum concentration, sometimes by large margins. Therefore, consistent with USEPA guidance, the maximum concentration, which is the simplest and most conservative estimate of the exposure concentration, is used in calculations of soil-related LADDs and ADDs. When combined with high-end exposure factors, these exposure concentrations provide estimates of maximum high-end LADDs and ADDs. As shown in Section 5, the maximum high-end LADDs and ADDs present no significant cancer risk or noncancer effects; therefore, more refined estimation of exposure concentrations is unnecessary.

The maximum concentration of each constituent detected in soil or surface waste at each SWMU is presented in Table 3-2. For a SWMU that has surface and subsurface characterization data (i.e., Fill Area, Liquid Waste Burner, T11, and Waste Pile Staging Area), the maximum constituent concentrations in the surface data are used to evaluate potential exposures during routine facility operations, while the maximum constituent concentrations among both the surface and subsurface data are used to evaluate potential exposures during excavation at the SWMU. The North Settling Lagoon and the South Settling Lagoon have sludge characterization data for multiple strata, which were collected to support potential RCRA closure of these SWMUs. However, in the baseline risk assessment, excavation of the sludge in these SWMUs is assumed to be unnecessary. Therefore, the maximum constituent concentrations from the upper stratum sludge samples are used, because these data are the most appropriate for estimating potential worker exposures at these SWMUs.

3.3.2 Exposure Concentrations in Ambient Air

Exposure concentrations in ambient air resulting from potential vapor and particulate emission from surface soil or waste are estimated using mathematical models in combination with the exposure concentrations in soil discussed above in Section 3.3.1. The vapor emission model

and the particulate emission model are both used by USEPA for screening-level analysis (USEPA 1994C, 1992F). The details of these models are presented in Appendix B. The air dispersion model for estimating on-source and off-source air concentrations is also a USEPA screening-level model (USEPA 1994C, 1995C). The following discussion summarizes the major features and assumptions in the emission and dispersion models.

The screening-level model for estimating vapor emission from soil is a model USEPA used in its draft *Soil Screening Guidance* (USEPA 1994C). It estimates annual average vapor flux from the soil surface over a specific period of exposure under unsteady-state conditions, with the assumption that contaminants in soil extend to an infinite depth. The assumption of infinite contaminant depth is expected to overestimate average vapor fluxes from the SWMUs but can be used for screening-level analysis. Site-specific soil properties (i.e., porosity, fraction of organic carbon, and soil moisture) and chemical-specific transport properties (i.e., K_{oc}, Henry's law constant, diffusivity in air, and solubility in water) compiled by USEPA (1994) are used in the calculation of vapor flux.

The particulate emission model is based on the suspension of surface soil or waste by wind erosion. It estimates the emission of respirable soil particles, defined as being 10 μm in diameter or smaller (i.e., PM_{10}). The key parameters in the model that influence particulate emission are the threshold friction velocity for the soil and the mean annual wind speed. For the threshold friction velocity, which is correlated to the mode of the soil aggregate size distribution, USEPA's default mode aggregate size of 0.5 mm is used. A mean annual wind speed of 9.9 miles per hour (or 4.4 m/s) from the National Oceanic and Atmospheric Administration (NOAA 1993) for Dayton, Ohio is used. USEPA default values are used for other model parameters.

Particulate emission resulting from potential on-facility excavation is conservatively estimated using data compiled by USEPA (USEPA 1985, 1989C). The data indicate that dust emission from "heavy construction operations" is 1.2 tons per acre of construction per month of activity (or 1×10^{-7} kg-soil/m^2-sec) and consists of particles that are 30 μm in diameter and smaller. The respirable fraction of the dust is estimated to be approximately 0.5 (USEPA 1989C). Therefore, the emission flux of respirable particles is estimated as 5×10^{-8} kg-soil/m^2-sec.

On-source and off-source air concentrations are estimated using USEPA's SCREEN3 air dispersion model (USEPA 1995C). The area source algorithm in SCREEN3 is used with worst-case meteorological conditions (selected by the model) and rural dispersion to estimate maximum 1-hour concentrations at ground level at each SWMU and at the nearest off-facility location, regardless of wind direction, from the boundary of each SWMU. The SWMUs are approximated as square source areas. The approximate areas and off-facility distances for each SWMU are shown in Appendix B. The maximum 1-hour air concentrations calculated by SCREEN3 are converted to maximum annual average air concentrations using a

conservative factor of 0.2 for on-source air concentrations and concentrations within a distance that is one-half the length of the source. This conversion results in on-source air concentrations that match the 90th percentile on-source air concentrations calculated by USEPA (1994C) for use in its draft *Soil Screening Guidance*. A conversion factor of 0.08 (USEPA 1995C) was used for distances beyond a half-source distance.

The estimated concentrations of constituents in ambient air for each SWMU at the SWMU (on-source) and at the nearest off-facility distance from the SWMU (off-source) are presented in Table 3-3. The exposure concentrations in ambient air at each SWMU are combined with estimates of air intake by workers to estimate the LADDs and ADDs to workers due to their activities at a SWMU. Exposure concentrations in air at the Facility boundary attributable to a SWMU are combined with estimates of air intake by off-facility residents to estimate the LADDs and ADDs from the SWMU to these receptors. These estimates of LADDs and ADDs are combined with toxicity values (presented in Section 4) to estimate potential exposure risk (presented in Section 5).

3.3.3 Exposure Concentrations in Ground Water

Potential exposures to ground water under current and reasonably expected future ground water uses at the Facility and in the region are described in Section 3.1.3. To estimate the magnitude of the potential exposures at the identified exposure points, mathematical models are used in combination with soil and ground water monitoring data collected during the RFI. In particular, the MODFLOW ground water flow model developed by Geraghty & Miller for the Facility is used to support the estimation of potential concentrations in ground water at the identified points of potential ground water use. On June 6, 1994 USEPA notified Delphi Thermal that the ground water flow model described in the *Revised Three-Dimensional Steady-State Flow Model Report* (Flow Model Report, G&M 1994) is adequate for use in evaluating environmental decisions for the Facility.

3.3.3.1 Ground Water Modeling Scenarios

Ten ground water modeling scenarios are evaluated to predict potential waste constituent migration from the SWMUs at the Facility to potential points of ground water exposure under various ground water pumping patterns in the region. Table 3-4 presents the 10 modeling scenarios. Each modeling scenario is defined by (1) a ground water use scenario, (2) a set of wells that are expected to be pumping under the ground water use scenario, and (3) a set of associated ground water exposure points that are evaluated in the risk assessment.

The first ground water modeling scenario (Scenario 1) in Table 3-4 is the baseline ground water use scenario, which represents current ground water use conditions as discussed in Section 3.1.3. The baseline scenario evaluates ground water conditions in the absence of interim measures (i.e., without wells TW2 and DN13). Scenario 2 is the baseline condition

with the addition of the Miami Shores well field pumping as an emergency drinking water supply. Scenario 3 represents a more unlikely condition in which Miami Shores is pumping as an emergency drinking water supply and the Facility places its currently inactive wells into service as an industrial water supply. Scenarios 4 and 5 represent even less likely conditions in which the Dryden Road South well field is added to the conditions modeled in Scenarios 2 and 3 as a secondary emergency drinking water supply to supplement Miami Shores as the primary emergency drinking water supply.

Five additional ground water modeling scenarios (Scenarios 6 through 10) are evaluated in which interim measures are implemented (i.e., with wells TW2 and DN13 acting as ground water recovery wells). These scenarios are identical to Scenarios 1 through 5, except that the interim measures wells are assumed to be pumping.

The estimated pumping rates for the pumping locations identified in Table 3-4 are presented in Appendix C. The pumping rates are based on information provided with the Flow Model Report for active wells or estimated usage for wells that may become active in the future. They represent the estimated total average daily ground water withdrawal rates for the pumping locations. For a pumping location with multiple wells (i.e., a well field), the total rate is divided among the individual pumping wells, as appropriate, for the model simulations. The pumping rates for the interim measures wells are taken from the USEPA-approved *Interim Measures Work Plan* (G&M 1994).

In addition to allowing an exposure assessment of current and reasonably expected future use of ground water, the modeling scenarios in Table 3-4 also allow USEPA (per its February 8, 1995 comments) to consider the unlikely case of ground water use from the Dryden Road North well field or nonemergency use of ground water from the Miami Shores and Dryden Road South well fields, although such use of ground water is unlikely for the reasons previously discussed in Section 3.1.3. The Dryden Road North well field is evaluated as a worst-case scenario. Concentrations in ground water extracted from the Dryden Road North well field on a continuous basis are estimated using the ground water concentrations predicted for the interim measures well DN13 (which is in the Dryden Road North well field) in Scenarios 6 through 10. The concentrations from well DN13 are used to provide a bounding estimate of exposure, which USEPA defines as beyond a high-end estimate (i.e., greater than the 99.9th percentile of potential exposures in a population, 57 FR 22888, May 29, 1992).

3.3.3.2 Modeling Methodology

The MODFLOW model developed by Geraghty & Miller to evaluate ground water flow at the Facility and in the region under various pumping conditions is used in this exposure assessment as the basis for approximating the transport of waste constituents from the SWMUs to potential points of ground water use.

The ground water flow model facilitates the approximation of transport of constituents in ground water by allowing the calculation of source reduction factors that account for the natural dilution of constituents as they move in ground water from under the Facility to potential exposure points. The source reduction factors are calculated by using the MODFLOW model for the Facility in combination with MODALL (Potter 1995), a complete-mix model designed to work with MODFLOW. The MODALL model uses the cell-by-cell flow terms computed by MODFLOW to calculate source reduction factors for a specified source within each downgradient cell or block in the finite difference domain of the MODFLOW model. The source reduction factors are computed for steady state transport (without dispersion) with the following conservative assumptions:

- Each SWMU provides a continuous, steady-state flux of constituents into the aquifer.
- No degradation of constituents occurs during transport.
- No dispersion of constituents occurs during transport.

The source reduction factors are computed by setting the concentration of the ground water beneath a source to a constant, unit concentration (or dimensionless concentration C/C_0), such that the calculated concentration at an exposure point ranges from zero to one. This concentration estimated at the potential exposure point for a unit source concentration is equivalent to the source reduction factor for that source and exposure point combination.

The source reduction factors computed by Geraghty & Miller for each combination of SWMU and potential ground water exposure point for each of the 10 ground water modeling scenarios are presented in Appendix C. The estimated exposure concentration at an exposure point attributable to a SWMU is obtained by multiplying the ground water concentration at the SWMU with the source reduction factor.

3.3.3.3 Ground Water Source Concentrations

The ground water concentrations at a SWMU are generally estimated using ground water monitoring data collected from shallow monitoring well(s) immediately downgradient of the SWMU, if such data were collected during the RFI. Only monitoring wells located immediately downgradient of a SWMU are used, to ensure that the most appropriate ground water concentrations at the SWMU are combined with the source reduction factor for the SWMU. Appendix C shows the monitoring wells that are assigned to a SWMU for the purposes of estimating ground water source concentrations.

If a constituent was not detected in the ground water in the shallow monitoring well(s) immediately downgradient of a SWMU, the constituent is eliminated from the evaluation of the SWMU. In some cases, the constituents detected in ground water at monitoring wells immediately downgradient of a SWMU were not detected in the soil or waste characterization

samples collected at the SWMU. For example, the volatile organic compounds (e.g., tetrachloroethene at 0.166 mg/L and 0.036 mg/L) detected during the RFI in well W-4-S, which is immediately downgradient of the South Settling Lagoon, were not detected in any of the sludge characterization samples for the South Settling Lagoon. Similarly, the volatile organic compounds (e.g., tetrachloroethene at 0.166 mg/L and 0.021 mg/L) detected in well 19S, which is immediately downgradient of the Fill Area, were not detected in any sample of the fill material and at a low concentration in one sample of native soil under the fill. In such cases, the constituent concentrations in the downgradient well are more likely a result of contributions from an upgradient source and, therefore, are not assigned to the SWMU being evaluated. For Landfills L1, L2, and L3, ground water quality data are always used because waste characterization at these SWMUs was limited to the surface material.

The ground water concentration under the SWMU is also conservatively estimated as the concentration in the soil moisture that is calculated by equilibrium-partitioning of any residual constituents measured in the soil to the soil moisture in the vadose zone. Using the constituent concentration in soil moisture as an approximation of the concentration in ground water under the SWMU is conservative since this ignores attenuation of the constituent concentration in the vadose zone and dilution at the water table. Where appropriate data on a constituent's concentration in ground water data and estimates of its concentration in soil moisture are both available, the lower of the two estimates is use for the ground water source concentration, to ensure the use of the most representative estimate of potential contribution to ground water.

Regardless of the approach used for estimating the ground water source concentration, the source strength is assumed to remain constant. This approach is conservative particularly for SWMUs that are former waste management units where only residual constituents remain in the soil (e.g., former underground storage tank areas). The ground water source concentrations assigned to each SWMU for evaluating exposure concentrations associated with the ground water pathway are presented in Appendix C. Ground water quality data that could not be appropriately assigned to a SWMU are also identified in Appendix C.

3.3.3.4 Ground Water Concentrations at Pumping Wells

The ground water concentrations of constituents from each SWMU at each point of potential ground water use under each of the 10 modeling scenarios are presented in Appendix C. The aggregate effect of all the SWMUs on the ground water concentration at each potential exposure point is shown on Tables 3-5 through 3-14. The aggregate effect is calculated by adding the concentration contributions from the individual SWMUs. The resulting exposure concentrations in ground water at the potential points of exposure are compared to ground water protection standards (discussed in Section 5).

For ground water that is or could be used as a drinking water supply, the appropriate ground water protection standards are the MCLs, or similar risk-based drinking water concentrations for constituents without MCLs. As discussed in Section 3.2, potential exposures to ground water include non-drinking water exposures (e.g., ground water use for industrial production processes). Ground water for such uses does not need to meet MCLs or risk-based drinking water concentrations. However, to streamline the assessment of these ground water uses, the potential non-drinking water exposures are also compared with MCLs or risk-based drinking water concentrations, which are considered conservative screening-levels for these ground water uses.

3.3.4 Exposure Concentrations in Surface Water

Exposure concentrations in the Great Miami River resulting from ground water flow are estimated using an approach similar to the methodology for estimating ground water exposure concentrations discussed in Section 3.3.3. Surface water concentrations in the River are estimated for each of the ground water modeling scenarios described in Section 3.3.3.1 using mass loading factors calculated by the MODFLOW and MODALL models. The mass loading factors are calculated based on the predicted mass flow of a constituent in ground water into the River, with the ground water concentration of the constituent under a SWMU set to a constant, unit concentration. The mass flow rate into the River is divided by the river flow rate to obtain the mass loading factor. The 50-year annual average river flow rate of 2,454 ft^3/s is used (Shindel et al. 1987) to calculate the mass loading factor. The estimated surface water exposure concentrations attributable to a SWMU for each modeling scenario are calculated by multiplying the ground water source concentrations (see Section 3.3.3.3) for the SWMU by the mass loading factor. The exposure concentrations in the River are calculated by summing the contributions from the individual SWMUs. As shown in Appendix C, the highest estimated constituent concentration in the Great Miami River is 0.0000006 mg/L. The human health significance of these estimated concentrations is discussed in Section 5.

3.3.5 Estimation of Media Intake

Estimates of media intake are developed for the following potentially exposed populations (receptors) and exposure scenarios, as identified in Section 3.2:

- On-facility worker (routine industrial)
  - incidental soil ingestion
  - dermal contact with soil
  - inhalation of ambient air
- On-facility worker (excavation)
  - incidental soil ingestion

- dermal contact with soil
- inhalation of ambient air

- On-facility worker (groundskeeping)
  - incidental soil ingestion
  - dermal contact with soil
  - inhalation of ambient air
- Off-facility adult resident
  - inhalation of ambient air
  - ingestion of drinking water

The general equation for estimating intake of an environmental medium for each receptor by each exposure route is as follows:

$$Intake = \frac{CR \cdot EF \cdot FC \cdot ED}{BW \cdot AT}$$

where:

CR	=	contact rate, which is either: - soil ingestion rate (IR) - skin surface area (SA) and soil-to-skin adherence (AD) - ambient air inhalation rate (BR) - drinking water rate (DR)
EF	=	exposure frequency
FC	=	fraction of medium ingested, contacted, or inhaled at or from a SWMU
ED	=	exposure duration
BW	=	body weight
AT	=	averaging time; AT_{carc} (carcinogens) is equal to lifetime of 70 years, and $AT_{noncarc}$ (noncarcinogens) is equal to exposure duration, ED

The specific equations used to calculate media intakes for each route of exposure are presented in Appendix B.

Variability in the factors affecting exposure within a potentially exposed population should be considered in estimating potential current and future exposures. As one means of characterizing the distribution of possible exposures in a population, USEPA (1995B) recommends that central tendency and high-end estimates of exposure be developed. Central tendency (i.e., typical) estimates represent the average, or most likely, exposures in the population. High-end (often referred to as reasonable maximum) estimates represent the exposures "above the 90th percentile of the population distribution, but not higher than the individual in the population who has the highest exposure." (USEPA 1995D) The exposure

factors for estimating typical and high-end intakes of soil, ambient air, and ground water are presented in the following sections and summarized in Tables 3-15 and 3-16.

3.3.6 Intake of Soil/Waste

3.3.6.1 Soil/Waste Ingestion Rates

Consistent with USEPA guidance (1993A, 1991A), the typical and high-end soil ingestion rates of 25 mg/day and 50 mg/day, respectively, used in this assessment for adult workers during non-excavation activities (e.g., routine industrial activities and groundskeeping) are based on the same study (Calabrese et al. 1990) that USEPA uses for deriving ingestion rates for adults in residential settings, but are adjusted by half to account for an 8-hour work day (USEPA 1991). The typical soil ingestion rate of 100 mg/day used for adult workers during excavation activities is taken from USEPA (1993A), which is presumably based on the high-end value used for adult residents. The high-end soil ingestion rate of 480 mg/day used for workers performing excavation is taken from USEPA (1993A, 1991A).

3.3.6.2 Dermal Contact Rates

Dermal contact rate is calculated as the product of exposed skin surface area and soil-to-skin adherence, which yields an effective mass of soil per day, analogous to the daily intake of soil from ingestion. The typical and high-end values for soil adherence of 0.2 mg/cm^2 and 1 mg/cm^2, respectively, are taken from USEPA (1992A). The soil adherence factor is inversely related to the absorption fraction, which is the fraction of the dose that is absorbed into the skin (USEPA 1992A). That is, the higher the mass loading on the skin, the lower the fraction of chemicals that will be absorbed from the soil into the skin.

In the absence of USEPA guidance on exposed surface area for worker scenarios, USEPA (1992A, 1989A) guidance on adult clothing scenarios for outdoor activities and site-specific information is used as a basis to estimate exposed skin surface area throughout a work day. For non-excavation workers, the typical and high-end values are based on current practices at the Facility regarding the clothing worn by workers at GM facilities, which are expected to be representative of clothing worn by workers in industrial facilities in general. The typical value of 1,400 cm^2 is estimated using the face and hands of an average adult, based on data presented by USEPA (USEPA 1992A, Table 8-3). This is similar to the typical scenario recommended by USEPA (1992A), except that exposure is estimated to occur to the face only (rather than the whole head). The high-end value of 3,000 cm^2 is based on the surface areas of the forearms, head, and hands. This is similar to the high-end scenario recommended by USEPA (1992A), except that shorts are expected not to be worn at work.

For the excavation worker, the typical value of 600 cm^2 is based on a worker who wears Level D personal protective equipment, as described in the Health and Safety Plan for the

RFI. A representative Level D ensemble includes coverall, gloves, boots/shoes, safety glasses/goggles, and hard hat. Accordingly, the typical scenario is based on the surface area of the face of an average adult. The associated high-end value of 3,000 cm^2 is based on exposure of forearms, head, and hands (because contact can occur when gloves are removed). USEPA's (1992A) recommendation to use 25% of total body surface as a high-end value is not pertinent at the Facility because it is based on wearing shorts and on potential exposures where contaminants are carried in a fine dust or liquid suspension, which may be able to penetrate clothing (as found in studies with pesticide workers). Soil conditions, as well as routine and excavation activities at the Facility, are expected to not result in such high penetration of clothing. However, use of 25% of total body surface as a high-end value is evaluated as part of the uncertainty analysis in Section 5.

3.3.6.3 Exposure Frequencies

The typical and high-end values of 250 days/year for workers performing routine work is based on a 5-day work week for 50 weeks per year, consistent with USEPA (1993A, 1991A) guidance. As discussed in Section 3.3.6.4 below, the estimate of the actual number of days per year a worker is potentially exposed to a SWMU is obtained by adjusting this "standard" exposure frequency by a "fractional contact" term to account for site-specific factors.

The typical and high-end values for excavation activities for certain SWMUs are based on the duration and frequency of previous excavations at the Facility. The typical number of days that a worker is expected to excavate at one SWMU for routine maintenance or minor construction (e.g., repairing or replacing pavement) during his typical work life of 4 years at the Facility is estimated to be 2 days. Based on the number of days required to remove underground storage tanks from tank farms at the Facility in the past, the high-end value is 10 days during the reasonable maximum work life of 21 years.

Direct contact with sludge in the North Settling Lagoon and South Settling Lagoon does not occur currently and is not reasonably expected in the future. However, direct contact with surface material at the inactive landfills may potentially occur during groundskeeping. Currently, groundskeeping is performed on two areas on-site: on Landfill L1, and on Landfills L2, L3 and around the North Settling Lagoon. The typical frequency of groundskeeping in each of these two areas is based on current and reasonably expected future facility practices. Control of vegetation typically takes place twice per month from June to September, for an exposure frequency of 8 days/year per area. The high-end exposure frequency for a groundskeeper is based on the conservative assumption that the same worker performs these functions each time at both areas. The typical value is based on the assumption that the same worker does not perform these functions each time at both areas.

3.3.6.4 Fraction Ingested, Contacted, or Inhaled (FC)

Consistent with USEPA (1993A, 1989A) guidance, the intake of an environmental medium is multiplied by a fractional contact (FC) term to estimate the fraction of the total intake that is attributable to a specific SWMU. The FC term generally consists of several parts that may include site-specific meteorological factors, behavioral factors, and SWMU-specific factors. In this assessment, the FC term for estimating soil/waste intake from a specific SWMU includes the following factors:

- Actual work days at the facility, e.g., to account for holidays and sick days;
- Days per year when soil/waste is available for contact, e.g., ground not frozen or snow-covered;
- Fraction of work day that a worker spends outdoors, e.g., based on job duties, inclement weather, etc.; and
- Area of a SWMU relative to the total area where intake of soil/waste may occur.

The first three factors are not SWMU-specific. They estimate the fraction of the "standard" intake that is expected from both SWMUs and non-SWMU areas of the Facility. The basis for these factors and their use in estimating intake are discussed below.

Actual work days are calculated by subtracting days off from work (e.g., due to holidays and sick days) from the USEPA default value of 250 days per year (which already accounts for weekends and 10 vacation days). For estimating typical exposures in this assessment, 16 days are subtracted from the default value of 250 days. This is expected to be somewhat conservative, since the adjustment accounts for only the Facility's 16 days of holidays scheduled in 1997 and does not account for any sick days. For estimating high-end exposures, adjustment for holidays and sick days is not made.

The fraction of the year that soil is available for contact (F_{avail}) is estimated based on days per year when temperatures are below freezing in Ohio, during which contact with outdoor soil would be unlikely. According to data compiled by NOAA (1993), temperatures are below freezing for 116 days per year (or approximately 4 months per year), based on 30 years of data. This fraction is used for both typical and high-end estimates.

A typical value for the fraction of time spent outdoors (F_{out}) is 0.125 (i.e., 1 hour per 8-hour work day). This value is based on mean hours per day outdoors (1.8 hours) presented in USEPA (1991A) and is adjusted by approximately one-half to account for an 8-hour work day out of 16 waking hours that could be spent outdoors. A high-end value is 0.19 (i.e., 1.5 hours per 8-hour work day), based on professional judgment.

The adjustments for work days, days when soil is available for contact, and fraction of work day spent outdoors give the following expression for the facility-specific (but non-SWMU specific) portion of the FC term:

$$FC_f = Work\ days \cdot F_{avail} \cdot F_{out}$$

where:

Work days	=	Actual work days
F_{avail}	=	Fraction of year that soil is available for contact
F_{out}	=	Fraction of time spent outdoors

The facility-specific part of the FC term, FC_f, when combined with the default exposure frequency, provides an estimate of the amount of time a worker spends outdoors at the Facility, during which contact with soil/waste at a SWMU may occur.

During the time spent outdoors, the worker may spend only a fraction of the time at a particular SWMU. The fraction of time that a worker may spend at a SWMU during routine industrial work, over the long term, could be assumed to be proportional to the area of that SWMU relative to the total outdoor area where intake unrelated to the SWMU is expected to occur. In this case, the SWMU-specific part of the FC term would be as follows:

$$FC_i = \frac{A_i}{A_{out}}$$

where:

A_i	=	Area of the *i*th SWMU
A_{out}	=	Total outdoor area at the Facility

Based on the potential exposure pathways identified in Section 3.2, there are four SWMUs that workers may contact during routine industrial work: the Fill Area, the former Liquid Waste Burner area, the area around T11, and the Waste Pile Staging Area. For estimating typical exposures, the ratio of the area of each SWMU to the outdoor area that a worker may contact during routine industrial activities is used to calculate each FC_i term. The approximate areas of the SWMUs and the outdoor area are provided in Appendix B. For estimating potential high-end exposures, the worker is assumed to spend his time outdoors equally divided among the four SWMUs (i.e., each FC_i is 0.25).

Potential exposures during groundskeeping and excavation are expected to be less dependent on actual work days or daily weather conditions, so the FC terms for these potential exposures are based on different factors. Groundskeeping at Landfills L1, L2, L3, and the North Settling Lagoon (and potentially at the South Settling Lagoon in the future) is expected to not vary significantly as a function of actual work days or daily weather conditions. The FC_f for groundskeeping (0.5) is based on current practice at the Facility, which is approximately 4 hours of an 8-hour work day. The SWMU-specific FC_i for each of

the three SWMUs (Landfills L2 and L3, and the North Settling Lagoon), where the exposure frequency of 8 days per year of groundskeeping applies to the SWMUs together, is estimated as the ratio of the SWMU's area to the total area of the three SWMUs.

For workers excavating at a SWMU, the typical value for FC of 0.5 is based on the assumption that a worker typically spends 4 hours of an 8-hour day excavating at the SWMU. The high-end value of 1 is based on a full work day of excavation.

3.3.6.5 Exposure Durations

The typical and high-end values of 4 years and 21 years for workers are the median and 90th percentile number of years workers work at one location (USDOL 1992).

3.3.6.6 Body Weights

The value of 70 kg for adult workers is taken from USEPA (1993A, 1990) and is used in estimating both typical and high-end exposures.

3.3.6.7 Averaging Times

The averaging time for evaluating carcinogenic risks is equal to a lifetime of 70 years. The averaging time for evaluating noncarcinogenic effects is equal to the exposure duration.

3.3.7 Intake of Ambient Air

3.3.7.1 Breathing Rates

The typical value for workers performing non-excavation activities (1.3 m^3/hour, which is 10.4 m^3 per work day) corresponds to the mean inhalation rate for an average adult (male or female) combined with average activity patterns while outdoors, calculated using data compiled by USEPA (USEPA 1990, Tables 3-1 and 3-2). The high-end value is 20 m^3 per work day (or 2.5 m^3/hour), which is a reasonable upper-bound inhalation rate for occupational settings (USEPA 1991A), based on worst-case activity patterns combined with average adult inhalation rates.

The typical inhalation rate of 2.1 m^3/hour (or 16.8 m^3 per work day) for workers performing excavation is based on an inhalation rate representative of moderate activities for an average adult (male or female) (USEPA 1990, Table 3-1); this value is also representative of an average adult male "digging with a spade" (USEPA 1990). The high-end value is 20 m^3 per work day (or 2.5 m^3/hour) based on USEPA (1991A). Potential inhalation exposure by off-facility residents is estimated based on adult, as opposed to child, exposure factors. Risk estimates based on exposures of adults and children would be similar for carcinogens. For noncarcinogens, USEPA's reference doses (RfDs) and reference concentrations (RfCs) already incorporate an uncertainty factor specifically to protect sensitive subpopulations, including

children. Combining high-end exposure factors for children with chronic RfDs would result in overly conservative estimates of exposure risk. Further, USEPA guidance states that potential exposures to children 6 years of age are not considered chronic exposures and should not be evaluated using chronic RfDs. As such, the high-end inhalation rate for adults combined with the RfD or RfC should provide adequate conservatism.

The typical value of 0.68 m^3/hour for off-facility residents is based on mean adult inhalation rates combined with the mix of daily activity patterns while indoors and outdoors, calculated using data from Tables 3-1 and 3-2 of USEPA (1990). The high-end value of 0.83 m^3/hour for off-facility residents is taken from USEPA (1993A, 1991A) and, according to USEPA (1991A), is based on mean inhalation rates combined with worst-case activity patterns.

3.3.7.2 Exposure Frequencies

The exposure frequencies for intake of ambient air by workers are as presented above in Section 3.3.6.3 for estimating potential intake from direct contact with soil/waste. For the North Settling Lagoon and South Settling Lagoon, where exposure is expected to be limited to the inhalation route, the exposure frequency of 8 days/year discussed in Section 3.3.6.3 for groundskeeping is also used for estimating potential inhalation exposures during groundskeeping at the Lagoons. Groundskeeping is currently not performed at the South Settling Lagoon, but may occur in the future and, therefore, is assessed for the same potential exposures as the North Settling Lagoon.

During routine activities of on-facility workers, the typical and high-end exposure frequencies of 350 days/year for off-facility residents are taken from USEPA (1993A). For estimating typical exposures, the "standard" frequency for residents is adjusted as described in the next section. During periods of excavation, the typical and high-end exposure frequencies for off-facility residents are the same as the corresponding values for estimating excavation exposures to workers.

3.3.7.3 Fraction Ingested, Contacted, or Inhaled (FC)

The FC terms for intake of ambient air are as presented in Section 3.3.6.4 for workers performing routine industrial, excavation, and groundskeeping activities. For inspection of freeboard at the South Settling Lagoon, a worker currently takes about 5 minutes; therefore, an appropriate value for FC is 0.01 (i.e., 5 minutes/[8 hours x 60 minutes/hour]). Inspection of the North Settling Lagoon is performed at a window from inside a building and thus, no exposure from inspection of this SWMU occurs. If inspection were to take place at the North Settling Lagoon in the future, the value for FC would be expected to be the same as that for inspection of the South Settling Lagoon. The typical and high-end values of FC would be the same, due to the relatively uniform nature of these activities.

When the FC of 0.01 is combined with a breathing rate of 20 m^3/day, an exposure frequency of 250 days/year, and an exposure duration of 21 years, the estimated high-end intake from inspection would be lower than the estimated high-end intake from groundskeeping at the two surface impoundments. Likewise, the estimated typical intake from inspection would be lower than the estimated typical intake from groundskeeping. Because the potential inhalation exposures from inspection are lower than the potential inhalation exposures to workers performing groundskeeping at the North Settling Lagoon and South Settling Lagoon, the assessment of potential exposure during inspections is unnecessary.

Consistent with USEPA (1993A), a typical value for FC for off-facility residents for routine exposure is the average percent of time spent at home (64% or 15.4 hours/day), calculated from time use data compiled in USEPA (1990). The high-end value of 1 is based on persons who spend the majority of their day at home. The same FC terms apply for estimating potential exposures to off-facility residents during any potential excavation at a SWMU.

3.3.7.4 Exposure Durations

The typical and high-end values for workers are as presented in the corresponding section above. The typical and high-end values of 9 years and 30 years for off-facility residents are the median and 90th percentile number of years, respectively, that individuals live at one residence, as recommended by USEPA (1993A, 1991A, 1989A).

3.3.7.5 Body Weights

The value of 70 kg for adult workers and adult residents is taken from USEPA (1993A, 1990) and is used in estimating both typical and high-end exposures.

3.3.7.6 Averaging Times

The averaging time for evaluating carcinogenic risks is equal to a lifetime of 70 years. The averaging time for evaluating non-carcinogenic effects is equal to the exposure duration.

3.3.8 Intake of Drinking Water

As discussed in Section 3.3.3.4, potential ground water and surface water exposures are evaluated by comparing estimated ground water and surface water exposure concentrations to MCLs. For constituents that do not have MCLs, risk-based drinking water concentrations are calculated using estimates of drinking water intake. The exposure factors for estimating drinking water intake are 2 L/day, 350 days/year, for 30 years, for an adult of 70 kg (USEPA 1993A, 1991A).

4.0 TOXICITY ASSESSMENT

The purpose of a toxicity assessment is (1) to determine whether exposure to a chemical can cause an increased incidence of adverse human health effects and (2) to establish a quantitative dose-response relationship for the chemical so that a toxicity value can be derived for estimating the incidence or potential for adverse effects as a function of exposure to the chemical. Because USEPA has performed toxicity assessments for all of the waste constituents identified in Section 2 and has established toxicity values for many of the constituents for oral and inhalation exposures, the baseline risk assessment uses USEPA-derived toxicity values when such values are available (USEPA 1989A). The following sections discuss the compilation of USEPA-derived toxicity values and the approach to evaluating potential cancer risk and noncancer effects when USEPA-derived toxicity values are unavailable for a chemical or are unavailable for a specific route of exposure.

4.1 USEPA Toxicity Values

The USEPA Integrated Risk Information System (IRIS) is used as the primary source of USEPA-derived toxicity values for the waste constituents identified in Section 2. When a toxicity value is not available in IRIS for a constituent, the most current USEPA Health Effects Assessment Summary Tables (HEAST) is used to obtain toxicity values. The toxicity values compiled from IRIS are current as of January 1996. The toxicity values compiled from HEAST are current as of the November 1995 supplement to the annual edition published in May 1995.

For evaluating carcinogenic risks associated with the potential exposures discussed in Section 3, USEPA-derived cancer slope factors (SFs) are compiled for constituents having an USEPA weight-of-evidence classification of group A, B, or C. The SFs are 95% upper confidence bounds on the risk per unit dose. For evaluating noncarcinogenic effects associated with the potential exposures discussed in Section 3, USEPA-derived chronic reference doses (RfDs) are used. The RfD represents a conservative estimate of the daily exposure to the human population, including sensitive subpopulations, that is likely to be without an appreciable risk of deleterious effects during a lifetime. USEPA's derivation of RfDs incorporates several uncertainty (or safety) factors which, in combination, can be as large as 10,000-fold.

Oral SFs and oral RfDs are used for evaluating oral exposures. Inhalation SFs and inhalation RfDs are used for evaluating inhalation exposures. When an USEPA-derived inhalation toxicity value is expressed as an air unit risk or inhalation reference concentration (RfC), these values are converted to inhalation SFs and inhalation RfDs as follows:

$$Inhalation\ SF\ (mg/kg/day)^{-1} = Unit\ Risk\ (\mu g/m^3)^{-1} \cdot \frac{70\ kg}{20\ m^3/day} \cdot 1000\ \mu g/mg$$

$$Inhalation\ RfD\ (mg/kg/day) = RfC\ (mg/m^3) \cdot \frac{20\ m^3/day}{70\ kg}$$

The oral and inhalation SFs and chronic RfDs compiled from IRIS and HEAST are presented in Table 4-1, along with their associated reference citations.

Several of the constituents identified in Section 2 do not have toxicity values in IRIS or HEAST. The toxicity values for these constituents, presented in Table 4-1, are taken from similar chemicals with toxicity values in IRIS or HEAST, or from guidance by USEPA's National Center for Environmental Assessment (NCEA), as follows:

- Aroclors 1242, 1254, and 1260
  The oral SF for Aroclor 1242 and Aroclor 1254 is the value from IRIS for polychlorinated biphenyls (PCBs). Because the oral SF for PCBs in IRIS is based on Aroclor 1260, which has higher cancer potency than other Aroclors according to USEPA, using the oral SF for PCBs to evaluate Aroclor 1242 and Aroclor 1254 is expected to overestimate cancer risk for these Aroclors. USEPA is currently reassessing the potency of PCBs and expects to develop a range of SFs for various Aroclors (USEPA 1995G). The oral RfD for Aroclor 1016 is used as a surrogate for Aroclor 1242, and the oral RfD for Aroclor 1254 is used as a surrogate for Aroclor 1260, following guidance from NCEA.

- Benzo(a)anthracene, Benzo(b)fluoranthene, Benzo(k)fluoranthene, and Chrysene
  These carcinogenic polycyclic aromatic hydrocarbons (PAHs) are assigned toxicity values following USEPA guidance (1993B), which provides cancer potency values for carcinogenic PAHs relative to benzo(a)pyrene. According to USEPA, benzo(b)fluoranthene and benzo(k)fluoranthene have relative potencies differing by 10-fold. Because the laboratory reported the concentrations of these two PAHs as a single, total concentration, the higher potency of benzo(b)fluoranthene is used for evaluating the total concentration, which may overestimate cancer risk for these concentrations by up to 10-fold.

- 2-Methylnaphthalene, Naphthalene, and Phenanthrene
  The oral RfD for naphthalene is a value that has been withdrawn from HEAST but recommended for use as a provisional RfD by NCEA. The provisional RfD for naphthalene is also used to evaluate 2-methylnaphthalene and phenanthrene, based on the structural similarity of these substances.

- Tetrachloroethene
  The oral and inhalation SFs are from NCEA.

- 1,1,1-Trichloroethane
  The oral RfD is from the 1992 HEAST (USEPA 1992B). The inhalation RfD is converted from an inhalation RfC provided by NCEA.

- Trichloroethene
  The oral and inhalation SFs, and the oral RfD are from NCEA.

- Cobalt
  The oral RfD is from NCEA. The inhalation RfD is converted from an inhalation RfC provided by NCEA.

- Copper
  The oral RfD is from USEPA's Office of Research and Development.

- Chromium (total)
  The toxicity values (SFs and RfDs) for chromium (total) are the USEPA-derived toxicity values for hexavalent chromium. Hexavalent chromium has an oral RfD that is 200-fold lower than that for trivalent chromium and, unlike trivalent chromium, is evaluated by USEPA as a human carcinogen. Because a large fraction of chromium in environmental samples typically exists as trivalent chromium, using the toxicity values for hexavalent chromium is expected to overestimate cancer risk and noncancer effects.

- Thallium
  The oral RfD for thallium is derived using USEPA methodology and based on the subchronic dietary rat study USEPA used in developing the maximum contaminant level (MCL) for thallium. It is calculated by dividing the no-observed-adverse-effect-level by USEPA's uncertainty factor of 3,000.

4.2 Constituents Without USEPA Toxicity Values

4.2.1 Route-to-Route Extrapolation

USEPA-derived inhalation toxicity values are not available for several of the constituents identified in Section 2, and USEPA-derived dermal toxicity values are not available for any chemical. Therefore, quantitative evaluation of cancer risk and noncancer effects for these combinations of constituents and routes of exposure is not possible without performing independent evaluations of toxicity data in the open literature to derive toxicity values. USEPA guidance (1989A) does not require performing independent toxicity assessments to derive toxicity values.

According to USEPA (1989A), toxicity values available for one route of exposure may be used to approximate toxicity values for another route. However, such extrapolations introduce significant uncertainties because the toxicity of a chemical may differ from one route of exposure to another. USEPA guidance (USEPA 1989A) does not require route-to-route extrapolation.

Because potential inhalation and dermal risks (cancer and noncancer) may contribute to the overall risk associated with the potential exposures estimated in Section 3, route-to-route extrapolation using available USEPA-derived toxicity values is performed to allow a quantitative uncertainty analysis of the potential cancer risk and noncancer effects for these combinations of constituents and routes of exposure. For the uncertainty analysis, route-to-route extrapolation using USEPA-derived toxicity values is performed as follows:

- Oral SFs and RfDs are used for the inhalation route, for constituents lacking inhalation SFs or RfDs.

- Oral SFs and RfDs are used for dermal exposures.

4.2.2 Lead

USEPA evaluates the health effects of lead using blood lead levels as an index of exposure rather than by comparison of lead uptake to an RfD. For evaluating exposure of children to lead in soil, other environmental media, and diet, USEPA has developed an Integrated Exposure Uptake Biokinetic (IEUBK) model to predict blood lead levels resulting from such exposures (USEPA 1994A). The 95th percentile blood lead level predicted by the model is compared with a criterion of 10 μg/dL to evaluate allowable lead concentrations in media to which children may be exposed. Using the IEUBK model, USEPA has determined that a soil lead concentration of 400 mg/kg is a conservative risk-based screening level protective of children in residential settings (USEPA 1994B).

The IEUBK model, however, cannot be used for predicting adult blood lead levels resulting from the potential exposures of adults at and near the Facility estimated in Section 3 because the IEUBK model includes a number of pharmacokinetic parameters for predicting the distribution of lead in children that would be inappropriate for adults. Also, the 10 μg/dL blood lead criterion for children is not applicable to adults. Although the multiple compartment distribution approach used in the IEUBK model could be adapted to predict adult blood lead levels by using appropriate pharmacokinetic parameters, Bowers et al. (1994) developed a simpler method in which blood lead levels resulting from exposure to lead at a site are estimated as the sum of a baseline component and a site-related component.

The baseline blood lead level accounts for non-site-related, or background, uptake of lead through diet, air, water, and soil/dust. The site-related contribution to blood lead level is predicted by correlating site-related uptake of lead with blood lead level using a biokinetic slope factor (BSF). For the potential exposure pathways identified in Section 3, site-related lead uptake may occur through soil ingestion and inhalation of airborne particulate. The calculation of total blood lead level is as follows:

$$PbB = PbB_{baseline} + BSF \cdot (Uptake_{soil} + Uptake_{air})$$

where:

PbB	=	blood lead level (μg Pb/dL blood);
$PbB_{baseline}$	=	baseline blood lead level (μg Pb/dL blood);
BSF	=	biokinetic slope factor (μg Pb/dL blood per μg Pb/day);
$Uptake_{soil}$	=	site-related uptake of lead through ingestion of soil (μg Pb/day).
$Uptake_{air}$	=	site-related uptake of lead through inhalation (μg Pb/day);

The calculation of medium-specific uptake of lead is the same as the calculation of medium-specific average daily dose (ADD) for all other constituents, except that the ADD is adjusted for absorption fraction of lead from each medium, rather than using a default absorption fraction of 100%. For this evaluation, the absorption of lead from ingested soil is 8%, and the absorption of lead from inhaled particulate is 32%, based on information on the absorption of lead in adults (Bowers et al. 1994).

Uptake of lead for workers via dermal uptake is excluded because it is believed to not pose a significant potential exposure pathway for lead, and is not included in USEPA's IEUBK model. Exposures to off-facility adult residents, as opposed to children, are evaluated because inhalation of particulate lead is a more significant pathway for adults than children (i.e., it increases blood lead levels in adults more than in children).

Values for the parameters used to calculate blood lead levels using Bowers' method are briefly discussed below.

- Baseline blood lead level: A geometric mean baseline blood lead level of 2.6 μg/dL is used. This value is taken from data for male and females ages 20 to 49 from Phase 1 of the Third National Health and Nutritional Examination Survey (NHANES III) and Brody et al. (1994).

- Biokinetic slope factor (BSF): A BSF of 0.32 μg/dL per ug/day is used. This value is the average of the values reported in the following three studies: 0.375 reported by Pocock et al. (1983); 0.26 reported by Harley and Kneip (1985); and 0.34 reported by Chamberlain and Heard (1981).

The estimation of blood lead distributions for potentially exposed Facility workers and off-facility residents is presented in Section 5.

5.0 RISK CHARACTERIZATION

The human health significance of the potential exposures estimated in Section 3 is evaluated in this section. For potential exposures to waste constituents (except lead) via soil- and air-related pathways, estimates of dose of constituents for each potential route of exposure are combined with the toxicity values identified in Section 4 to estimate potential cancer risks and noncancer effects. The characterization of these potential cancer risks and noncancer effects is presented in Section 5.1.1, along with a comparison to USEPA-established acceptable levels. The significance of potential soil- and air-related exposures to lead is presented in Section 5.1.2. For potential exposures via the ground water pathway, estimates of exposure concentrations at well fields and in the Great Miami River are compared with ground water protection standards in Section 5.2. Uncertainties in the risk characterization are presented in Section 5.3.

5.1 Potential Soil and Ambient Air Exposures

5.1.1 Cancer Risks and Noncancer Effects

Estimates of lifetime average daily dose (LADD) for each constituent for each route of potential exposure are multiplied by the route-specific cancer slope factor (SF) for the constituent to estimate potential cancer risk, as follows:

$$Cancer\ Risk = LADD_{route} \cdot SF_{route}$$

Estimates of average daily dose (ADD) for each constituent for each route of potential exposure are divided by the route-specific reference dose (RfD) for the constituent to estimate potential noncancer effect as a hazard quotient (HQ), as follows:

$$Hazard\ Quotient = \frac{ADD_{route}}{RfD_{route}}$$

The estimation of LADDs and ADDs for the potential exposures identified in Section 3.2 is discussed in Section 3.3. To provide a characterization of variabilities in the LADDs and ADDs resulting from variabilities in the factors affecting exposure within a potentially exposed population, central tendency and high-end estimates of LADDs and ADDs are calculated using the central tendency and high-end exposure factors presented in Section 3.3.

The calculated LADDs and ADDs for each constituent for each route of exposure for each SWMU are presented in Appendix B. Corresponding central tendency and high-end estimates of potential cancer risks and noncancer effects are also presented in Appendix B. The central tendency estimates of cancer risk and noncancer effects, however, account for only variabilities in exposures and do not account for variabilities in susceptibility (i.e., toxicity) in the population. USEPA toxicity values are used in calculating both the central tendency and high-end estimates. These USEPA toxicity values include safety factors and, therefore, are considered to be conservative, i.e., more likely to overestimate than to underestimate risk.

The potential cancer and noncancer effects that may result from exposure to the combination of constituents at each SWMU are estimated following USEPA guidance (USEPA 1989A), as follows:

$$Risk_{cumulative} = \sum Risk_i$$

$$HI = \sum HQ_i$$

where:

$Risk_{cumulative}$	=	estimated cumulative cancer risk from all constituents
$Risk_i$	=	estimated cancer risk for the *i*th constituent
HI	=	hazard index from all constituents
HQ_i	=	hazard quotient for the *i*th constituent

According to USEPA (1989A, 1991B), the cumulative baseline cancer risk and HI for a site should include all media and pathways that the high-end exposure scenario indicates are appropriate to combine. However, high-end cancer and noncancer risk estimates for more than one pathway should not be combined unless an individual is likely to consistently face the high-end exposure via more than one pathway simultaneously. As such, the estimates of cumulative cancer risk and HI for the soil ingestion pathway and the inhalation pathway are kept separate (i.e., not summed) in this baseline risk assessment. As discussed in Section 3, the estimates of worker exposure via each pathway are derived using maximum concentrations of constituents in each medium. The estimated exposures to the maximum concentrations in each medium, however, will generally occur at different locations at a SWMU. Specifically, the maximum concentration of a constituent in air is predicted at the hypothetical downwind edge of a SWMU, as discussed in Section 3.3.2, while the maximum concentration in soil/waste is usually not at the SWMU boundary. Because the estimates of exposure for each pathway are derived for exposures at different locations at a SWMU, combining the estimates of ingestion and inhalation exposures would result in a highly unlikely and overly conservative estimate of potential worker exposure.

The USEPA-established acceptable levels for cumulative cancer risk and noncancer effects from exposure to multiple constituents are 10^{-4} and HI of 1 or less, respectively, based on high-end exposures for both current and future land use. Site-related baseline risks below these levels do not warrant response action (40 CFR 300.430(e)(2); USEPA 1991B). Likewise, for RCRA corrective action, USEPA has established that cumulative site-related cancer risks less than 10^{-4} and an HI of 1 or less are protective of human health and, therefore, do not warrant corrective measures (55 FR 30798, July 27, 1990).

The central tendency and high-end estimates of cumulative cancer risks and HIs for each potentially exposed population are presented by route of exposure and by SWMU in Tables 5-1 and 5-2. These estimates include only calculations using USEPA-derived toxicity values, which are unavailable for the dermal route for any constituent and unavailable for the inhalation route for some constituents. Estimates that also include calculations using dermal and/or inhalation toxicity values obtained by route-to-route extrapolation from USEPA-derived oral toxicity values, as discussed in Section 4.2.1, are provided in the quantitative uncertainty analysis in Section 5.3. The following is a summary of the cumulative cancer risks and HIs for each potentially exposed population.

Summary of Cumulative Cancer Risks and Hazard Indices

	Cumulative Cancer Risk		Hazard Index	
	Central	High-End	Central	High-End
On-Facility Worker				
Routine Industrial:				
Ingestion of soil/waste	3×10^{-9}	4×10^{-7}	1×10^{-3}	2×10^{-2}
Inhalation of ambient air	7×10^{-10}	7×10^{-8}	9×10^{-5}	2×10^{-3}
Excavation:				
Ingestion of soil/waste	3×10^{-8}	1×10^{-6}	3×10^{-3}	3×10^{-2}
Inhalation of ambient air	4×10^{-7}	5×10^{-6}	2×10^{-2}	5×10^{-2}
Groundskeeping:				
Ingestion of soil/waste	6×10^{-8}	7×10^{-7}	6×10^{-3}	1×10^{-2}
Inhalation of ambient air	2×10^{-9}	2×10^{-7}	6×10^{-4}	2×10^{-3}
Off-Facility Resident				
Inhalation of ambient air	1×10^{-6}	7×10^{-6}	3×10^{-2}	5×10^{-2}

The following are explanatory notes to the above summary:

- Both current and future potential risks are included in the summary. The current potential on-facility and off-facility risks are those associated with inactive Landfills L1, L2, L3, North Settling Lagoon, and South Settling Lagoon, which are presented in Tables 5-1 and 5-2. All other risks are associated with exposures that currently do not exist but are possible under current and future land use at the Facility.

- For the routine industrial scenario, the estimates of cumulative cancer risk and HI are the sums of the cumulative cancer risks and HIs for the four SWMUs (i.e., Fill Area, former Liquid Waste Burner area, tank T11, and the Waste Pile Staging Area) where worker exposure during routine industrial operations may be possible in the future.

- For the excavation scenario, the estimates of cumulative cancer risks and HIs are those estimated for the Waste Pile Staging Area, and are the maximums among the SWMUs where excavation may be possible in the future. Summation of the estimates of risk and HI across all the SWMUs is inappropriate for this scenario since it is unlikely that an individual worker would receive the estimated excavation exposures from more than one SWMU given the expected infrequency of excavation at SWMUs.

- For the groundskeeping scenario, the high-end estimates of cumulative cancer risk and HI are the sums of the cumulative risks and HIs for the five SWMUs (i.e., Landfills L1, L2, L3, North Settling Lagoon, and the South Settling Lagoon) where groundskeeping currently occurs or may occur in the future. This assumes that an individual worker performs groundskeeping at all five SWMUs. The central tendency estimates are the central tendency estimates of risk and HI for Landfill L1, and are the highest estimates among the five SWMUs. This assumes that a worker does not perform groundskeeping at all five SWMUs.

- For the off-Facility residential exposure scenario, the central tendency and high-end estimates of cumulative cancer risk are for potential exposure from the South Settling Lagoon, and are the maximum among all SWMUs. The central tendency and high-end estimates of HI are for potential exposures from Landfill L1. Summation of the estimates of risks and HIs across all of the SWMUs is inappropriate for this scenario because the exposure estimates for each SWMU are developed based on the assumption that an off-facility receptor is located at the

nearest Facility boundary to the SWMU, and therefore, would not be located adjacent to other SWMUs.

The estimates of cumulative risk and HI in the above summary and in Tables 5-1 and 5-2 include both SWMU-related as well as natural background cancer and noncancer risks. An estimate of the contribution from natural background levels of constituents in soil is presented in Section 5.3.

As shown in the above summary, the high-end estimates of cumulative cancer risk and noncancer effects are well within USEPA's acceptable levels. The central tendency estimates of cumulative risks are approximately 10 to 100-fold below the high-end estimates, indicating the potential range of variability between typical (i.e., most likely) and high-end exposures. The central tendency estimates of HI are approximately 1 to 10-fold below the high-end estimates. For both the estimates of cumulative risks and HIs, the largest difference between the central tendency and high-end estimates is in the estimation of potential worker exposures during routine industrial activities.

The estimates of high-end risks developed in this assessment are derived using conservative estimates of exposure concentrations and exposure assumptions that are combined with conservative estimates of toxicity. As such, they are considered screening-level estimates, which are expected to be above the 90th percentile of the distribution of population risks and potentially higher than risks to the maximally exposed individual. Had the screening-level estimates of high-end risks exceeded the levels established by USEPA as protective of human health, further characterization of the variability of the potential distributions of risk in the potentially exposed populations (e.g., by using Monte Carlo-type techniques) would have been performed to derive high-end estimates of risks that, according to USEPA (1992D), are "above the 90th percentile of the population distribution, but not higher than the individual in the population who has the highest exposure." A rigorous characterization of the high-end of the risk distribution is unnecessary in this case, since the screening-level estimates are well within USEPA's acceptable range. The highest estimates of cumulative risk and HI are approximately 20-fold below the levels USEPA has established as protective. The uncertainties in the risk characterization using the screening-level estimates are discussed in Section 5.3.

5.1.2 Blood Lead Levels

The blood lead level calculated using the method described in Section 4.2.2 is intended to represent a geometric mean corresponding to typical exposure patterns and typical lead concentrations in the environmental media contacted at a site. The estimate of the geometric mean blood lead level is obtained by using the central tendency exposure factors presented in Section 3.3 to calculate lead uptake. Variations in blood lead level within an adult

population (e.g., workers) are then estimated by multiplying the calculated geometric mean with an appropriate geometric standard deviation (GSD), as follows:

$$PbB(p) = PbB \cdot GSD^{z}$$

where:

PbB(p)	=	blood lead level at *p*th percentile of population (μg Pb/dL blood)
GSD	=	geometric standard deviation of blood lead in an adult population
z	=	standard normal deviate

In this assessment, a geometric standard deviation (GSD) of 1.37 from NHANES II is used, which according to USEPA (1989B) represents a reasonable estimate for adult men and women.

Table 5-3 summarizes the estimation of distributions of blood lead concentrations for workers and off-facility adult residents. As shown in Table 5-3, the estimated 50th percentile blood lead level in exposed workers is approximately 2.7 μg/dL, which is virtually unchanged from the baseline level of 2.6 μg/dL (see Section 4.2.2). The 90th and 95th percentile blood lead levels are estimated to be approximately 4.1 and 4.6 μg/dL, respectively. These are expected to be conservative estimates because they are derived using the maximum lead concentrations at the SWMUs and they combine worker exposures among all SWMUs, even though an individual worker would not be expected to perform all activities at all SWMUs.

The estimated 90th and 95th percentile blood lead levels are slightly above the corresponding baseline level at these percentiles (3.9 and 4.4 μg/dL) and are still well below the Occupational Safety and Health Administration (OSHA) nonmandatory criterion of 30 μg/dL blood lead for exposed workers. According to 29 CFR 1910.1025, the blood lead level of workers (male and female) planning to have children should remain below 30 μg/dL, although the permissible level is 40 μg/dL.

Table 5-3 shows that the estimated 50th percentile blood lead level for the potentially exposed off-facility adult residents is approximately 2.6 μg/dL, or unchanged from the baseline level of 2.6 μg/dL. The 90th and 95th percentile estimates of blood lead (3.9 and 4.4 μg/dL, respectively) reflect the baseline variation in blood lead levels predicted using the selected GSD, rather than exposure to lead from the Facility.

5.2 Potential Ground Water Exposures

As discussed in Section 3.3.3, potential exposures via the ground water pathway are evaluated for 10 ground water use scenarios (Table 3-4). The 10 scenarios are divided into two groups of five scenarios. One group (Scenarios 6 through 10) includes interim measures (i.e., operation of wells TW2 and DN13 for hydraulic control) in each scenario and the other

group does not include interim measures (Scenarios 1 through 5). The first scenario (Scenario 1) is the baseline ground water use scenario, which represents current ground water use conditions as discussed in Section 3.1.3. Scenario 2 is the baseline condition with the addition of the Miami Shores well field pumping as an emergency drinking water supply. Scenario 3 represents a more unlikely condition in which Miami Shores is pumping as an emergency drinking water supply and the Facility places its currently inactive wells into service as an industrial water supply. Scenarios 4 and 5 represent even less likely conditions in which the Dryden Road South well field is added to the conditions modeled in Scenarios 2 and 3 as a secondary emergency drinking water supply to supplement Miami Shores as the primary emergency drinking water supply.

Estimates of constituent concentrations in ground water at each point of ground water use in each ground water use scenario are calculated as described in Section 3.3.3, and are shown in Tables 3-5 to 3-14. The SWMU-by-SWMU contributions to the exposure concentrations at each point of exposure in each ground water use scenario are presented in Appendix C. Estimates of constituent concentrations in the Great Miami River resulting from ground water flow to the River from beneath the Facility are calculated as described in Section 3.3.4. As noted in Section 3.3.4, the highest estimated SWMU-related constituent concentration in the Great Miami River is extremely low.

Acceptable concentrations of constituents in drinking water are established as maximum contaminant levels (MCLs) in regulations promulgated under the Safe Drinking Water Act. Although some of the potential exposures via the ground water pathways that are evaluated in the baseline risk assessment are not drinking water exposures (i.e., nonpotable industrial ground water use, water contact during swimming in the Great Miami River), MCLs are used as conservative screening-level criteria to evaluate the estimated exposure concentrations at all potential points of ground water and surface water exposure.

For constituents that do not have MCLs, comparable risk-based drinking water concentrations are calculated using the drinking water intake assumptions presented in Section 3.3.8. Risk-specific drinking water concentrations are calculated using a HQ of 1 and a cancer risk level of 10^{-6}. For a constituent whose calculated risk-specific drinking water concentration is lower than levels that typically can be measured, the practical quantitation limit (PQL) for the constituent in ground water that is specified in the *RFI Work Plan's* Quality Assurance Project Plan (QAPjP) is used instead. However, in no case is a risk-based drinking water concentration set above the 10^{-4} risk level, consistent with USEPA policy under the Safe Drinking Water Act. The MCLs, risk-based drinking water concentrations, and PQLs used for the screening evaluation of the estimated ground water and surface water exposure concentrations are presented in Table 5-4.

As noted above, the estimated constituent concentrations in the Great Miami River are extremely low in all 10 ground water modeling scenarios and are several orders of magnitude

lower than the MCLs or risk-based drinking water concentrations. The estimated constituent concentrations in ground water at potential points of ground water use that are higher than MCLs or risk-based drinking water concentrations are summarized below for each of the 10 ground water use scenarios.

	Dryden Road North	Dryden Road South	Miami Shores	Truck & Bus	Moraine Engine	Harrison Thermal	West Carrollton
Scenario 1	--	--	--			--	
Scenario 2	--	--				--	
Scenario 3	--	--					
Scenario 4	--	PCE, TCE, DCE, VC, Sb, Cr				--	
Scenario 5	--	PCE, TCE, DCE, VC, Sb, Cr					
Scenario 6		--	--			--	
Scenario 7	DCE, Sb	--				--	
Scenario 8	DCE, Sb	--					
Scenario 9	DCE, Sb					--	
Scenario 10	DCE, Sb						

A blank in the above summary means that all estimated constituent concentrations are lower than MCLs and risk-based drinking water concentrations. Dashes (--) mean that the well field is not pumping in a scenario. The acronyms in the summary represent the following: tetrachloroethene (PCE); trichloroethene (TCE); 1,2-dichloroethene (total) (DCE); vinyl chloride (VC); antimony (Sb); and chromium (total) (Cr).

As shown in the summary table, the results of the modeling analysis indicate that under current ground water use conditions (with or without interim measures, Scenarios 6 and 1, respectively), the conservative estimates of constituent concentrations in ground water at points of ground water use do not exceed MCLs or risk-based drinking water concentrations. Under some unlikely future pumping conditions, however, the conservative estimates of ground water concentrations at the following well fields may exceed MCLs for certain constituents:

- Dryden Road South in Scenarios 4 and 5
- Dryden Road North (interim measures well DN-13) in Scenarios 7, 8, 9, and 10

The constituents that may exceed MCLs at the Dryden Road South well field, based on the conservative screening-level modeling approach, are tetrachloroethene (PCE), trichloroethene (TCE), 1,2-dichloroethene (1,2-DCE), vinyl chloride, antimony, and chromium. The constituents that may exceed the MCLs at the Dryden Road North well field are 1,2-DCE and antimony.

The modeling results for the Dryden Road South well field under Scenarios 4 and 5 provided the following information regarding the individual source contributions to the ground water exposure pathway:

- The primary contributors of PCE concentrations are the West Tank Farm and the Waste Pile Staging Area, neither of which individually contribute a concentration exceeding the MCL for PCE. The likely source of residual PCE in soil at the West Tank Farm is T8, which are tanks that were removed with surrounding soil during the completion of the RCRA clean closure in 1992.

- The primary contributor of TCE concentration is Landfill L1, based on ground water quality data from monitoring wells immediately downgradient of the landfill.

- The primary contributors of 1,2-DCE are the Fill Area and the Waste Pile Staging Area.

- The only contributor of vinyl chloride concentrations is Landfill L1, based on ground water quality data from monitoring wells immediately downgradient of the landfill.

- The primary contributor of antimony and chromium concentrations is the Waste Pile Staging Area.

It should be noted that Scenarios 4 and 5 represent the unlikely event that the Dryden Road South well field is used as an emergency supply to supplement the Miami Shores well field under emergency water supply conditions. In addition, it should be noted that neither the West Tank Farm nor the Waste Pile Staging Area currently contain a source of PCE or 1,2-DCE. All tanks have been removed from the West Tank Farm and the Waste Pile Staging Area is used only for staging of aluminum, steel, and cast iron grinding sludge and aluminum and steel turnings. Drum management (staging of empty drums) no longer takes

place at the Waste Pile Staging Area. As such, the assumption in the ground water model that the source strength at these SWMUs is constant is conservative and is expected to overestimate the concentrations of these constituents in ground water at the Dryden Road South well field.

The results for the Dryden Road North well field (interim measures well DN-13) under Scenarios 7 through 10 indicated that the primary contributor of antimony concentrations is the Waste Pile Staging Area. The primary contributors of 1,2-DCE are the Fill Area and the Waste Pile Staging Area, neither of which individually contribute a concentration exceeding the MCL. The estimated contribution of 1,2-DCE from these SWMUs is based on equilibrium partitioning using the maximum concentration of the constituent detect in soil samples. In the Fill Area, 1,2-DCE was detected in only one of four samples at a concentration of 2.4 mg/kg. In the Waste Pile Staging Area, 1,2-DCE was detected in only 2 of 17 samples at a maximum concentration of 2.7 mg/kg. Based on the soil characterization data, these SWMUs are not significant sources of 1,2-DCE and their estimated contributions to the ground water concentration at the Dryden Road North well field are likely the result of the conservative approach to estimating the source term for these SWMUs in the ground water modeling calculations.

It should be noted that Scenarios 7 through 10 represent the use of well DN-13 as a continuous ground water recovery well, and that the estimated concentrations are expected to overestimate the concentrations associated with using the Dryden Road North well field as a drinking water source under emergency conditions. As discussed previously, there is no foreseeable need to use the Dryden Road North well field to supply drinking water under non-emergency or emergency conditions.

Because the wells at which constituent concentrations are estimated to be higher than MCLs or risk-based drinking water concentrations are those that are expected to be used infrequently, if at all, as emergency drinking water supplies, the estimated concentrations of constituents at these well fields overstate potential risks. The effect of the low probability of potential exposures at these well field is discussed in Section 5.3.6 below.

5.3 Uncertainty Analysis

5.3.1 Cumulative Risks

The summation of cancer risks and noncancer effects for multiple constituents is based on dose additivity, which assumes that there are no synergistic or antagonistic interactions among the constituents in a mixture and that each constituent has the same mode of action and elicits the same health effects (USEPA 1989C). The cumulative estimates are considered screening-level estimates because they tend to overestimate cumulative cancer risks and noncancer effects.

For example, the estimate of cumulative cancer risk is a sum of upper bound estimates of cancer risk, which are calculated with slope factors representing upper 95% confidence bounds of cancer potency. Constituents with lesser evidence of human carcinogenicity are treated the same as constituents with greater evidence (i.e., USEPA weight-of-evidence Groups B and C carcinogens are given the same weight as Group A carcinogens). Similarly, constituents with RfDs of lower confidence (i.e., larger uncertainty factors) are treated the same as constituents with RfDs of higher confidence. The estimates of HIs presented in this baseline risk assessment include constituents that may induce different health effects or that may act by different mechanisms. However, refinement of the screening-level HIs by segregating constituents by effects and mechanisms of actions is unnecessary in this case, because cumulative HI is less than 1 for all scenarios, as discussed in Section 5.1.1.

5.3.2 Background Risks

As discussed in Section 2.2.1, inorganic constituents at naturally occurring background levels are included in the constituent concentrations used in deriving the estimates of cumulative risk and noncancer effects presented in Section 5.1.1 above. As such, these estimates include a background component that is not SWMU-related. The background component of the risk estimates is quantified by applying the methods and assumptions that are discussed in Sections 3, 4, and 5.1.1 to the background levels of inorganics presented in Table 2-1. For the types of potential exposures evaluated in this baseline risk assessment and assuming background levels of inorganics at each SWMU, the highest central tendency estimates of background cumulative risk is 3×10^{-8}. The highest high-end estimate of cumulative risk is 1×10^{-6}. The highest central tendency estimate of background HI is 2×10^{-2}. The highest high-end estimate of HI is 5×10^{-2}. These estimates are calculated using only USEPA-derived toxicity data (i.e., without any route-to-route extrapolation). Comparison of these estimates with those summarized in Section 5.1.1 shows that natural background contributes a significant component to many of the estimates of cumulative cancer risk and HI.

5.3.3 Extrapolated Inhalation and Dermal Toxicity Values

As noted in Section 4, many of the constituents included in the quantitative exposure assessment do not have USEPA-derived toxicity values for evaluating cancer risk or noncancer effects via the inhalation route of exposure. USEPA also has not established any toxicity values for evaluating risks or effects via the dermal route. To provide a quantitative analysis of the potential uncertainties in the estimates of risk discussed in Section 5.1 above (which use only USEPA toxicity values), estimates of cancer risk and noncancer effects are developed using the route-to-route extrapolations discussed in Section 4.2.1.

The calculations of cumulative risk and HI using both the USEPA-derived toxicity values and the extrapolated toxicity values are presented in Appendix B. A summary of the results

is presented in Tables 5-5 and 5-6. A comparison of the estimates obtained with and without the use of extrapolated toxicity data shows the following:

- Using extrapolated toxicity values, the highest central tendency estimate of cumulative risk for the inhalation route increases from 1×10^{-6} to 2×10^{-6}, primarily as a result of using an inhalation toxicity value for Aroclor 1254 that is extrapolated from an oral SF that USEPA extrapolated from the Aroclor (1260) that has been shown to have the highest cancer potency among the Aroclors.

- Using extrapolated toxicity values, the highest high-end estimate of cumulative risk for the inhalation route increases from 7×10^{-6} to 1×10^{-5}, also primarily as a result of using an inhalation toxicity value for Aroclor 1254 that is extrapolated from an oral SF that USEPA extrapolated from the Aroclor (1260) that has been shown to have the highest cancer potency among the Aroclors.

- Using extrapolated toxicity values, the highest central tendency estimate of cumulative risk for the dermal route is 6×10^{-9} and the highest high-end estimate is 3×10^{-7}. Both of these estimates are primarily the result of using a dermal toxicity value for Aroclor 1254 that is extrapolated from an oral SF that USEPA extrapolated from the Aroclor (1260) that has been shown to have the highest cancer potency among the Aroclors.

- Using extrapolated toxicity values, the highest central tendency estimate of HI for the inhalation route increased from 3×10^{-2} to 1×10^{-1}, primarily as a result of using an inhalation toxicity value for Aroclor 1254 that is extrapolated from the oral RfD.

- Using extrapolated toxicity values, the highest high-end estimate of HI for the inhalation route increased from 5×10^{-2} to 1×10^{-1}, also primarily as a result of using an extrapolated inhalation toxicity value for Aroclor 1254 that is extrapolated from the oral RfD.

- Using extrapolated toxicity values, the highest central tendency estimate of HI for the dermal route is 5×10^{-4} and the highest high-end estimate is 6×10^{-3}. Both of these estimates are primarily the result of using a dermal toxicity value for Aroclor 1254 that is extrapolated from the oral RfD.

As discussed in Section 4.2.1, the extrapolation of toxicity values from one route to another introduces significant uncertainties because the toxicity of a chemical may differ from one

route of exposure to another. As such, the estimates of cumulative cancer risk and noncancer effects obtained with extrapolated toxicity values should not be combined with the estimates obtained without extrapolation.

5.3.4 Skin Surface Area

The skin surface area used in the calculation of the high-end estimates of potential dermal exposures is 3,000 cm^2 because USEPA's basis for its recommendation to use 25% of the body surface (i.e., 5,800 cm^2) as a high-end value is expected to be not pertinent to the work conditions at the Facility, as discussed in Section 3.3.6.2. Using 5,800 cm^2, however, would not significantly alter the conclusions of the assessment because doubling the skin surface area would double the highest high-end estimate of cumulative risk for the dermal route from 3×10^{-7} to 6×10^{-7} and the highest high-end estimate of HI from 6×10^{-3} to 1×10^{-2}. These higher estimates are still well below USEPA-established levels for protection of human health. Additionally, the uncertainties in the estimates of dermal risks (cancer and noncancer) are dominated by uncertainties in dermal toxicity, rather than by uncertainties in exposure.

5.3.5 Chromium

In the RFI, chromium was measured as chromium (total) and is evaluated in the risk assessment as hexavalent chromium. Hexavalent chromium has an oral RfD that is 200-fold lower than that for trivalent chromium and, unlike trivalent chromium, is evaluated by USEPA as a human carcinogen. As such, potential cancer risks and non-cancer effects for chromium (total) are likely to be overestimated in this assessment because chromium detected at the Facility is likely to be largely in the trivalent, rather than hexavalent, form. For example, for screening purposes, USEPA assumes that environmental samples contain 6 times as much trivalent as hexavalent chromium. (USEPA 1995_). The highest high-end cancer risk estimated for potential exposures to chromium is approximately 6×10^{-6}. Therefore, using USEPA's screening assumption regarding ratios of trivalent to hexavalent chromium, this risk estimate would drop 6-fold. Hazard quotients estimated for chromium would also drop significantly, because of the higher RfD for trivalent chromium.

5.3.6 Ground Water Exposures

As discussed in Section 5.2, under certain unlikely pumping scenarios (Scenarios 4 and 5, and 7 through 10), which include the hypothetical use of the Miami Shores, Dryden Road South, and/or Dryden Road North well fields, the conservative estimates of ground water concentrations may exceed MCLs for certain constituents. These estimates of constituent concentrations, however, are expected to overstate the potential exposures to the constituents

because of the low probability of occurrence of these scenarios. The low likelihood of these scenarios is discussed in detail in Section 3.1.3 and is summarized below:

- For Scenario 4 to occur, the Miami Shores (as a primary emergency drinking water supply) and Dryden Road South well fields (as a secondary emergency supply) would have to be pumping at the same time. Because the Miami Shores well field was used during only two summers in the past 9 years, the probability that this well field would be used in an emergency could be conservatively estimated to be 2 events/9 years. This would be conservative for several reasons, including: (1) it does not account for the decreased probability of use of this well field due to increased delivery capacity of the Dayton Water System (DWS) since Miami Shores was last used; and (2) the Montgomery County Water Department has indicated it would institute water curtailment measures before resorting to alternate water supplies if the DWS were not able to meet demand (Westerfield 1995).

  Because Montgomery County has indicated that Miami Shores is the primary emergency well field, it is even less likely that Dryden Road South would be used. However, since this well field was used intermittently one summer in the last nine years (before the increase in the delivery capacity of the DWS), the probability of use of this well field could be conservatively estimated to be 1 event/9 years. This estimate would be conservative for the same reasons listed above. The joint probability of these two well fields pumping simultaneously could be conservatively estimated to be no more than about 2% (i.e., 2/9 x 1/9).

- Scenario 5 is even less likely because it would require not only the simultaneous pumping of Miami Shores and Dryden Road South, but also the simultaneous redevelopment of industrial wells at the Facility that have been inactive for nearly 10 years. That is, the probability of these three unlikely events occurring simultaneously is expected to be much less than 1%.

- In Scenarios 7 through 10, Dryden Road North (well DN-13) is an interim measures well. Although the estimated constituent concentrations in ground water at this well could be compared with MCLs or risk-based drinking water concentrations, such comparison would greatly overstate potential exposure because Dryden Road North is not expected to be used as a drinking water source. As explained in Section 3.1.3.1, Montgomery County has indicated that the need to use Dryden Road North to supplement both Miami Shores and Dryden Road South in an emergency is expected to be very unlikely (Westerfield 1995). Again, the probability of multiple unlikely events occurring simultaneously is extremely low (i.e., much less than 1%).

5.4 Conclusions

The conclusions of the human health baseline risk assessment are as follows:

- For all soil- and air-related pathways, estimates of potential cumulative cancer risk and noncancer effects, using both central tendency and high-end exposure factors, are well below the levels USEPA considers protective of human health.

- Under current ground water use conditions with or without interim measures (Scenarios 6 and 1, respectively), potential SWMU-related contributions to ground water are estimated to result in constituent concentrations at points of ground water use that are lower than MCLs or similar risk-based drinking water concentrations for constituents without MCLs.

- In the event that Miami Shores is used to supply water in an emergency without the need to also use Dryden Road South (Scenarios 2, 3, 7, and 8), potential SWMU-related contributions to ground water are estimated to result in constituent concentrations at points of ground water use that are lower than MCLs or risk-based drinking water concentrations.

- In the very unlikely event that Miami Shores and Dryden Road South are both needed to supply water in an emergency without interim measures (Scenarios 4 and 5), potential SWMU-related contributions to ground water are estimated to result in constituent concentrations at points of ground water use that are higher than MCLs or risk-based drinking water concentrations for a few constituents. The estimates of constituent concentrations, however, are expected to overstate the potential exposures to the constituents because of the low likelihood that these well fields would be used simultaneously and in combination with the redevelopment of inactive industrial water supply wells at the Facility. In the corresponding scenarios with interim measures (Scenarios 9 and 10), potential SWMU-related contributions to ground water are estimated to result in constituent concentrations at points of ground water use that are lower than MCLs or risk-based drinking water concentrations.

- In addition to the human health evaluation, a screening ecological assessment indicates no adverse impact from the SWMUs and no need for a more detailed ecological assessment.

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Table 2-1: Comparison of Maximum Concentrations (mg/kg) of Inorganics in Waste/Soil at SWMUs with Background Levels
Harrison Division-GMC, Moraine, Ohio

Constituent	CASRN	Background Level	Fill Area	Landfill L1	Landfill L2	Landfill L3	Liq Waste Burner	N Settling Lagoon	S Settling Lagoon	S Tank Farm	T04	T05/T06	T11	T12	WPSA	W Tank Farm
Antimony	7440-36-0		101	30.4	29.9	23.2		24.5	13.8		22.4	27.3	39.7	52.35	294	
Arsenic	7440-38-2	**28.5**	11.1	48	10	11.6		94.8	103	6.6	6.5	11	9.4	4	12.05	4.6
Barium	7440-39-3	**229**	6230	5860	153	80.5	19.95	1430	4400	56.8	65.6	28.55	543	139	2620	21.9
Beryllium	7440-41-7	**2.41**	0.83	1.4	1.03	1	0.11				0.65	0.325	0.69	0.54	0.85	
Cadmium	7440-43-9	**12.6**	54.3	31.9	6.1	5.6	0.535	327	26.9	2.6	4.2	6.1	5.3	3.4	74.2	2.3
Chromium (total)	7440-47-3	**47.4**	59.4	248	51.2	22.1	4.8	3630	1990	4.7	14.1	8.9	14.5	11.2	1010	9
Cobalt	7440-48-4	**26.0**	62.5	1030	14.8	11.2	2.75	367	91.9	3.8	18.2	10.6	11.5	23.3	41.1	3.2
Copper	7440-50-8	**41.0**	2510	2600	768	37.9	29.3	453	1390	11.9	19	12.3	25.9	22	62700	11.7
Cyanide (total)	57-12-5	**0.4**		2				4.61	12.3				0.8			
Lead	7439-92-1	**49.1**	21500	740	47	47.6	8.45	2290	388	12.8	13.5	9.65	20.9	14.9	2790	11.5
Manganese	7439-96-5	**1600**	673	856	426.5	567	196			1330	541	469	814	284	1340	236.5
Mercury	7439-97-6	**0.69**	1.7	1.2			0.045	1.62	4.03						0.33	
Nickel	7440-02-0	**63.7**	540	1210	28.6	17.6	11.45	3250	1330	25.4		10.55	33.5		2600	11.9
Selenium	7782-49-2	**1.5**	1.8					5.49	0.78						0.405	
Silver	7440-22-4	**0.76**						2.12	2.45	1.2						1
Thallium	7440-28-0			0.51											0.25	
Vanadium	7440-62-2	**84.4**	27.6	36.7	40.6	44.8	6.75	30.7		7.7	26.7	13.7	27.8	25	43.9	9.7
Zinc	7440-66-6	**152**	40400	3990	360	99.3	42.45	9732	2190	38.9	70.8	50.75	77.6	80.1	1170	35.75

Note: A blank means the constituent was not detected.

Table 2-2: Comparison of Constituents in Downstream Sediment with Upstream Sediment and Soil Background Harrison Division-GMC, Moraine, Ohio

TCL/TAL Group	Constituent	CASRN	Downstream Concentration (mg/kg)	Upstream Concentration (mg/kg)	Soil Background (mg/kg)
SVOC	Benzo(b)fluoranthene	205-99-2	***5.90***	13.00	
SVOC	Fluoranthene	206-44-0	***5.90***	17.00	
SVOC	Phenanthrene	85-01-8	***5.90***	13.00	
SVOC	Pyrene	129-00-0	***5.90***	14.00	
INORG	Arsenic	7440-38-2	6.10	3.20	28.5
INORG	Barium	7440-39-3	52.00	32.20	229
INORG	Cadmium	7440-43-9	4.30	1.90	12.6
INORG	Chromium (total)	7440-47-3	15.30	20.40	47.4
INORG	Cobalt	7440-48-4	3.50	3.40	26.0
INORG	Copper	7440-50-8	47.30	25.20	41.0
INORG	Lead	7439-92-1	124.00	110.20	49.1
INORG	Manganese	7439-96-5	154.00	161.00	1600
INORG	Nickel	7440-02-0	18.70	11.80	63.7
INORG	Selenium	7782-49-2	1.10	0.88	1.5
INORG	Vanadium	7440-62-2	8.30	8.40	84.4
INORG	Zinc	7440-66-6	392.00	88.50	152

Note: Concentration in bold-italic is sample quantitation limit.

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Table 2-3: Comparison of Constituents in Downstream Surface Water with Upstream Surface Water Harrison Division-GMC, Moraine, Ohio

TCL/TAL Group	Constituent	CASRN	Downstream Concentration (mg/L)	Upstream Concentration (mg/L)
VOC	Acetone	67-64-1	0.094	***0.020***
VOC	Chloroform	67-66-3	0.001	***0.001***
VOC	Trichloroethene	79-01-6	0.005	***0.001***
INORG	Antimony	7440-36-0	0.051	0.057
INORG	Barium	7440-39-3	0.144	0.089
INORG	Chromium (total)	7440-47-3	0.009	***0.004***
INORG	Cobalt	7440-48-4	0.008	0.009

Note: Concentration in bold-italic is sample quantitation limit.

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Table 2-4a: Summary of Constituents in Waste/Soil Evaluated in Risk Assessment
Harrison Division - GMC, Moraine, Ohio

SWMU	TCL/TAL Group	Constituent	CASRN	Number of Valid Results	Number of Detections	Minimum Detected (mg/kg)	Maximum Detected (mg/kg)	Min SQL for Nondetects (mg/kg)	Max SQL for Nondetects (mg/kg)	Sample ID for Maximum Detected Value
Fill Area	VOC	1,2-Dichloroethene (total)	540-59-0	4	1	2.410	2.410	0.005	0.006	FA-BH01-03SL
Fill Area	VOC	Tetrachloroethene	127-18-4	4	1	0.011	0.011	0.005	0.310	FA-BH02-06SL
Fill Area	SVOC	Pyrene	129-00-0	4	1	3.780	3.780	0.351	40.900	FA-BH02-02SL
Fill Area	PCB	Aroclor-1242	53469-21-9	4	1	0.640	0.640	0.530	0.560	FA-BH01-03SL
Fill Area	INORG	Antimony	7440-36-0	4	2	13.000	101.000	3.200	3.200	FA-BH01-03SL
Fill Area	INORG	Arsenic	7440-38-2	4	3	5.200	11.100	4.000	4.000	FA-BH01-03SL
Fill Area	INORG	Barium	7440-39-3	4	4	14.800	6230.000			FA-BH01-03SL
Fill Area	INORG	Beryllium	7440-41-7	4	3	0.240	0.830	0.130	0.130	FA-BH02-02SL
Fill Area	INORG	Cadmium	7440-43-9	4	1	54.300	54.300	0.560	6.300	FA-BH01-03SL
Fill Area	INORG	Chromium (total)	7440-47-3	4	4	5.600	59.400			FA-BH01-03SL
Fill Area	INORG	Cobalt	7440-48-4	4	4	3.100	62.500			FA-BH01-03SL
Fill Area	INORG	Copper	7440-50-8	4	4	9.700	2510.000			FA-BH01-03SL
Fill Area	INORG	Lead	7439-92-1	4	4	7.400	21500.000			FA-BH01-03SL
Fill Area	INORG	Manganese	7439-96-5	4	4	173.000	673.000			FA-BH01-03SL
Fill Area	INORG	Mercury	7439-97-6	4	3	0.050	1.700	0.040	0.040	FA-BH01-03SL
Fill Area	INORG	Nickel	7440-02-0	4	4	9.200	540.000			FA-BH01-03SL
Fill Area	INORG	Selenium	7782-49-2	4	4	0.170	1.800			FA-BH01-03SL
Fill Area	INORG	Vanadium	7440-62-2	4	4	11.300	27.600			FA-BH01-03SL
Fill Area	INORG	Zinc	7440-66-6	4	4	27.700	40400.000			FA-BH01-03SL
Landfill L1	VOC	Tetrachloroethene	127-18-4	5	3	0.019	0.039	0.028	0.031	L1-GS01-02WT
Landfill L1	VOC	Trichloroethene	79-01-6	5	3	0.019	0.150	0.007	0.031	L1-GS05-02WT
Landfill L1	VOC	Xylenes (total)	1330-20-7	5	1	0.010	0.010	0.007	0.031	L1-GS01-02WT
Landfill L1	SVOC	Benzo(a)anthracene	56-55-3	5	1	5.450	5.450	3.700	4.500	L1-GS01-02WT
Landfill L1	SVOC	Benzo(a)pyrene	50-32-8	5	1	4.750	4.750	3.700	4.500	L1-GS01-02WT
Landfill L1	SVOC	Benzo(b)fluoranthene	205-99-2	5	1	9.000	9.000	3.700	4.500	L1-GS01-02WT
Landfill L1	SVOC	Chrysene	218-01-9	5	1	5.400	5.400	3.700	4.500	L1-GS01-02WT
Landfill L1	SVOC	Fluoranthene	206-44-0	5	1	11.550	11.550	3.700	4.500	L1-GS01-02WT
Landfill L1	SVOC	Phenanthrene	85-01-8	5	1	7.050	7.050	3.700	4.500	L1-GS01-02WT
Landfill L1	SVOC	Pyrene	129-00-0	5	1	11.200	11.200	3.700	4.500	L1-GS01-02WT
Landfill L1	PCB	Aroclor-1254	11097-69-1	5	4	1.400	21.300	31.000	31.000	L1-GS04-02WT
Landfill L1	INORG	Antimony	7440-36-0	5	5	14.700	30.400			L1-GS04-02WT
Landfill L1	INORG	Arsenic	7440-38-2	5	5	9.400	48.000			L1-GS02-02WT
Landfill L1	INORG	Barium	7440-39-3	5	5	359.000	5860.000			L1-GS04-02WT
Landfill L1	INORG	Beryllium	7440-41-7	5	3	0.245	1.400	0.250	0.260	L1-GS03-02WT
Landfill L1	INORG	Cadmium	7440-43-9	5	5	5.100	31.900			L1-GS04-02WT
Landfill L1	INORG	Chromium (total)	7440-47-3	5	5	20.600	248.000			L1-GS01-02WT
Landfill L1	INORG	Cobalt	7440-48-4	5	5	18.600	1030.000			L1-GS02-02WT
Landfill L1	INORG	Copper	7440-50-8	5	5	77.600	2600.000			L1-GS04-02WT
Landfill L1	INORG	Cyanide (total)	57-12-5	5	5	0.700	2.000			L1-GS04-02WT

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Table 2-4a: Summary of Constituents in Waste/Soil Evaluated in Risk Assessment
Harrison Division - GMC, Moraine, Ohio

SWMU	TCL/TAL Group	Constituent	CASRN	Number of Valid Results	Number of Detections	Minimum Detected (mg/kg)	Maximum Detected (mg/kg)	Min SQL for Nondetects (mg/kg)	Max SQL for Nondetects (mg/kg)	Sample ID for Maximum Detected Value
Landfill L1	INORG	Lead	7439-92-1	5	5	71.700	740.000			L1-GS01-02WT
Landfill L1	INORG	Manganese	7439-96-5	5	5	278.000	856.000			L1-GS02-02WT
Landfill L1	INORG	Mercury	7439-97-6	5	2	0.195	1.200	0.110	0.160	L1-GS04-02WT
Landfill L1	INORG	Nickel	7440-02-0	5	5	42.800	1210.000			L1-GS02-02WT
Landfill L1	INORG	Thallium	7440-28-0	5	1	0.510	0.510	0.440	0.620	L1-GS01-02WT
Landfill L1	INORG	Vanadium	7440-62-2	5	5	23.800	36.700			L1-GS03-02WT
Landfill L1	INORG	Zinc	7440-66-6	5	5	317.000	3990.000			L1-GS02-02WT
Landfill L2	VOC	Acetone	67-64-1	3	1	0.330	0.330	0.120	0.120	L2-GS02-02WT-921211
Landfill L2	VOC	Tetrachloroethene	127-18-4	3	3	0.007	0.030			L2-GS02-02WT-921211
Landfill L2	VOC	Xylenes (total)	1330-20-7	3	1	0.009	0.009	0.006	0.006	L2-GS02-02WT-921211
Landfill L2	SVOC	Benzo(a)anthracene	56-55-3	3	1	4.000	4.000	0.380	2.090	L2-GS02-02WT-921211
Landfill L2	SVOC	Benzo(b)fluoranthene	205-99-2	3	1	0.500	0.500	2.090	3.600	L2-GS03-02WT-921211
Landfill L2	SVOC	Chrysene	218-01-9	3	1	3.900	3.900	0.380	2.090	L2-GS02-02WT-921211
Landfill L2	SVOC	Fluoranthene	206-44-0	3	2	0.460	9.100	2.090	2.090	L2-GS02-02WT-921211
Landfill L2	SVOC	Phenanthrene	85-01-8	3	1	7.900	7.900	0.380	2.090	L2-GS02-02WT-921211
Landfill L2	SVOC	Pyrene	129-00-0	3	2	0.450	7.400	2.090	2.090	L2-GS02-02WT-921211
Landfill L2	PCB	Aroclor-1254	11097-69-1	3	1	2.000	2.000	0.600	0.600	L2-GS02-02WT-921211
Landfill L2	INORG	Antimony	7440-36-0	3	2	24.000	29.900	6.900	6.900	L2-GS03-02WT-921211
Landfill L2	INORG	Arsenic	7440-38-2	3	3	5.500	10.000			L2-GS03-02WT-921211
Landfill L2	INORG	Barium	7440-39-3	3	3	35.400	153.000			L2-GS01-02WT-921211
Landfill L2	INORG	Beryllium	7440-41-7	3	3	0.590	1.030			L2-GS01-02WT-921211
Landfill L2	INORG	Cadmium	7440-43-9	3	3	3.200	6.100			L2-GS01-02WT-921211
Landfill L2	INORG	Chromium (total)	7440-47-3	3	3	14.300	51.200			L2-GS02-02WT-921211
Landfill L2	INORG	Cobalt	7440-48-4	3	3	10.900	14.800			L2-GS02-02WT-921211
Landfill L2	INORG	Copper	7440-50-8	3	3	9.200	768.000			L2-GS02-02WT-921211
Landfill L2	INORG	Lead	7439-92-1	3	3	11.900	47.000			L2-GS02-02WT-921211
Landfill L2	INORG	Manganese	7439-96-5	3	3	261.000	426.500			L2-GS01-02WT-921211
Landfill L2	INORG	Nickel	7440-02-0	3	3	11.100	28.600			L2-GS02-02WT-921211
Landfill L2	INORG	Vanadium	7440-62-2	3	3	20.400	40.600			L2-GS01-02WT-921211
Landfill L2	INORG	Zinc	7440-66-6	3	3	40.900	360.000			L2-GS02-02WT-921211
Landfill L3	VOC	Acetone	67-64-1	3	1	0.330	0.330	0.110	0.110	L3-GS02-02WT-921211
Landfill L3	VOC	Tetrachloroethene	127-18-4	3	2	0.007	0.010	0.006	0.006	L3-GS01-02WT-921211
Landfill L3	INORG	Antimony	7440-36-0	3	2	7.100	23.200	6.900	6.900	L3-GS03-02WT-921211
Landfill L3	INORG	Arsenic	7440-38-2	3	3	9.000	11.600			L3-GS03-02WT-921211
Landfill L3	INORG	Barium	7440-39-3	3	3	60.600	80.500			L3-GS02-02WT-921211
Landfill L3	INORG	Beryllium	7440-41-7	3	3	0.510	1.000			L3-GS02-02WT-921211
Landfill L3	INORG	Cadmium	7440-43-9	3	3	3.800	5.600			L3-GS02-02WT-921211
Landfill L3	INORG	Chromium (total)	7440-47-3	3	3	17.800	22.100			L3-GS02-02WT-921211
Landfill L3	INORG	Cobalt	7440-48-4	3	3	10.000	11.200			L3-GS03-02WT-921211

Table 2-4a: Summary of Constituents in Waste/Soil Evaluated in Risk Assessment
Harrison Division - GMC, Moraine, Ohio

SWMU	TCL/TAL Group	Constituent	CASRN	Number of Valid Results	Number of Detections	Minimum Detected (mg/kg)	Maximum Detected (mg/kg)	Min SQL for Nondetects (mg/kg)	Max SQL for Nondetects (mg/kg)	Sample ID for Maximum Detected Value
Landfill L3	INORG	Copper	7440-50-8	3	3	11.900	37.900			L3-GS03-02WT-921211
Landfill L3	INORG	Lead	7439-92-1	3	3	13.300	47.600			L3-GS03-02WT-921211
Landfill L3	INORG	Manganese	7439-96-5	3	3	333.000	567.000			L3-GS01-02WT-921211
Landfill L3	INORG	Nickel	7440-02-0	3	3	14.300	17.600			L3-GS02-02WT-921211
Landfill L3	INORG	Vanadium	7440-62-2	3	3	20.000	44.800			L3-GS02-02WT-921211
Landfill L3	INORG	Zinc	7440-66-6	3	3	56.700	99.300			L3-GS03-02WT-921211
Liquid Waste Burner	VOC	Ethyl Benzene	100-41-4	2	1	1.950	1.950	0.006	0.006	LWB-BH01-13SL
Liquid Waste Burner	PCB	Aroclor-1254	11097-69-1	2	1	0.595	0.595	0.580	0.580	LWB-BH01-13SL
Liquid Waste Burner	INORG	Barium	7440-39-3	2	2	4.800	19.950			LWB-BH01-13SL
Liquid Waste Burner	INORG	Beryllium	7440-41-7	2	1	0.110	0.110	0.110	0.110	LWB-BH01-13SL
Liquid Waste Burner	INORG	Cadmium	7440-43-9	2	1	0.535	0.535	0.320	0.320	LWB-BH01-13SL
Liquid Waste Burner	INORG	Chromium (total)	7440-47-3	2	2	4.650	4.800			LWB-BH01-03SL
Liquid Waste Burner	INORG	Cobalt	7440-48-4	2	2	0.550	2.750			LWB-BH01-13SL
Liquid Waste Burner	INORG	Copper	7440-50-8	2	1	29.300	29.300	3.900	3.900	LWB-BH01-13SL
Liquid Waste Burner	INORG	Lead	7439-92-1	2	2	4.200	8.450			LWB-BH01-13SL
Liquid Waste Burner	INORG	Manganese	7439-96-5	2	2	129.000	196.000			LWB-BH01-13SL
Liquid Waste Burner	INORG	Mercury	7439-97-6	2	1	0.045	0.045	0.040	0.040	LWB-BH01-13SL
Liquid Waste Burner	INORG	Nickel	7440-02-0	2	2	7.700	11.450			LWB-BH01-13SL
Liquid Waste Burner	INORG	Vanadium	7440-62-2	2	2	3.900	6.750			LWB-BH01-13SL
Liquid Waste Burner	INORG	Zinc	7440-66-6	2	1	42.450	42.450	0.320	0.320	LWB-BH01-13SL
South Tank Farm	VOC	Tetrachloroethene	127-18-4	3	2	0.006	1.000	0.005	0.005	STF-GS2-15SL
South Tank Farm	INORG	Arsenic	7440-38-2	3	3	2.900	6.600			STF-GS27-15SL
South Tank Farm	INORG	Barium	7440-39-3	3	3	13.700	56.800			STF-GS5-15SL
South Tank Farm	INORG	Cadmium	7440-43-9	3	2	2.000	2.600	0.840	0.840	STF-GS2-15SL
South Tank Farm	INORG	Chromium (total)	7440-47-3	3	3	2.600	4.700			STF-GS5-15SL
South Tank Farm	INORG	Cobalt	7440-48-4	3	2	2.400	3.800	2.100	2.100	STF-GS5-15SL
South Tank Farm	INORG	Copper	7440-50-8	3	3	7.900	11.900			STF-GS5-15SL
South Tank Farm	INORG	Lead	7439-92-1	3	3	1.200	12.800			STF-GS27-15SL
South Tank Farm	INORG	Manganese	7439-96-5	3	3	221.000	1330.000			STF-GS5-15SL
South Tank Farm	INORG	Nickel	7440-02-0	3	2	10.600	25.400	6.400	6.400	STF-GS5-15SL
South Tank Farm	INORG	Silver	7440-22-4	3	3	0.680	1.200			STF-GS2-15SL
South Tank Farm	INORG	Vanadium	7440-62-2	3	3	5.700	7.700			STF-GS27-15SL
South Tank Farm	INORG	Zinc	7440-66-6	3	3	18.800	38.900			STF-GS27-15SL
T04	VOC	Tetrachloroethene	127-18-4	1	1	0.019	0.019			T4-GS1-17SL
T04	INORG	Antimony	7440-36-0	1	1	22.400	22.400			T4-GS1-17SL
T04	INORG	Arsenic	7440-38-2	1	1	6.500	6.500			T4-GS1-17SL
T04	INORG	Barium	7440-39-3	1	1	65.600	65.600			T4-GS1-17SL
T04	INORG	Beryllium	7440-41-7	1	1	0.650	0.650			T4-GS1-17SL
T04	INORG	Cadmium	7440-43-9	1	1	4.200	4.200			T4-GS1-17SL

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Table 2-4a: Summary of Constituents in Waste/Soil Evaluated in Risk Assessment
Harrison Division - GMC, Moraine, Ohio

SWMU	TCL/TAL Group	Constituent	CASRN	Number of Valid Results	Number of Detections	Minimum Detected (mg/kg)	Maximum Detected (mg/kg)	Min SQL for Nondetects (mg/kg)	Max SQL for Nondetects (mg/kg)	Sample ID for Maximum Detected Value
T04	INORG	Chromium (total)	7440-47-3	1	1	14.100	14.100			T4-GS1-17SL
T04	INORG	Cobalt	7440-48-4	1	1	18.200	18.200			T4-GS1-17SL
T04	INORG	Copper	7440-50-8	1	1	19.000	19.000			T4-GS1-17SL
T04	INORG	Lead	7439-92-1	1	1	13.500	13.500			T4-GS1-17SL
T04	INORG	Manganese	7439-96-5	1	1	541.000	541.000			T4-GS1-17SL
T04	INORG	Vanadium	7440-62-2	1	1	26.700	26.700			T4-GS1-17SL
T04	INORG	Zinc	7440-66-6	1	1	70.800	70.800			T4-GS1-17SL
T05/T06	VOC	Acetone	67-64-1	2	2	0.110	0.190			T5/6-BH01-11SL
T05/T06	VOC	Tetrachloroethene	127-18-4	2	2	0.032	0.044			T5/6-BH01-11SL
T05/T06	SVOC	bis(2-Ethylhexyl)phthalate	117-81-7	2	2	0.350	0.375			T5/6-BH01-12SL
T05/T06	INORG	Antimony	7440-36-0	2	2	25.300	27.300			T5/6-BH02-12SL
T05/T06	INORG	Arsenic	7440-38-2	2	2	4.800	11.000			T5/6-BH02-12SL
T05/T06	INORG	Barium	7440-39-3	2	2	12.300	28.550			T5/6-BH01-10SL
T05/T06	INORG	Beryllium	7440-41-7	2	2	0.300	0.325			T5/6-BH01-10SL
T05/T06	INORG	Cadmium	7440-43-9	2	2	3.350	6.100			T5/6-BH02-12SL
T05/T06	INORG	Chromium (total)	7440-47-3	2	2	8.800	8.900			T5/6-BH01-10SL
T05/T06	INORG	Cobalt	7440-48-4	2	2	10.050	10.600			T5/6-BH02-12SL
T05/T06	INORG	Copper	7440-50-8	2	2	7.400	12.300			T5/6-BH01-10SL
T05/T06	INORG	Lead	7439-92-1	2	2	4.200	9.650			T5/6-BH01-10SL
T05/T06	INORG	Manganese	7439-96-5	2	2	295.000	469.000			T5/6-BH02-12SL
T05/T06	INORG	Nickel	7440-02-0	2	2	8.400	10.550			T5/6-BH01-10SL
T05/T06	INORG	Vanadium	7440-62-2	2	2	13.700	13.700			T5/6-BH01-10SL T5/6-BH02-12SL
T05/T06	INORG	Zinc	7440-66-6	2	2	28.100	50.750			T5/6-BH01-10SL
T11	VOC	Acetone	67-64-1	6	5	0.710	8.900	5.700	5.700	T11-BH03-02SL
T11	VOC	Tetrachloroethene	127-18-4	6	4	0.038	0.110	0.005	0.290	T11-BH03-02SL
T11	VOC	Toluene	108-88-3	6	1	0.006	0.006	0.005	0.290	T11-BH01-16SL
T11	SVOC	2-Methylnaphthalene	91-57-6	6	1	7.300	7.300	0.340	3.800	T11-BH02-02SL
T11	SVOC	bis(2-Ethylhexyl)phthalate	117-81-7	6	3	0.420	0.580	0.350	3.800	T11-BH01-16SL
T11	SVOC	Naphthalene	91-20-3	6	1	7.500	7.500	0.340	3.800	T11-BH02-02SL
T11	INORG	Antimony	7440-36-0	6	5	14.650	39.700	6.800	6.800	T11-BH03-16SL
T11	INORG	Arsenic	7440-38-2	6	6	2.800	9.400			T11-BH02-02SL
T11	INORG	Barium	7440-39-3	6	6	10.600	543.000			T11-BH01-16SL
T11	INORG	Beryllium	7440-41-7	6	5	0.260	0.690	0.210	0.210	T11-BH02-02SL
T11	INORG	Cadmium	7440-43-9	6	6	1.900	5.300			T11-BH01-02SL
T11	INORG	Chromium (total)	7440-47-3	6	6	3.400	14.500			T11-BH02-02SL
T11	INORG	Cobalt	7440-48-4	6	6	9.000	11.500			T11-BH02-02SL T11-BH03-02SL
T11	INORG	Copper	7440-50-8	6	6	6.900	25.900			T11-BH02-02SL

Table 2-4a: Summary of Constituents in Waste/Soil Evaluated in Risk Assessment
Harrison Division - GMC, Moraine, Ohio

SWMU	TCL/TAL Group	Constituent	CASRN	Number of Valid Results	Number of Detections	Minimum Detected (mg/kg)	Maximum Detected (mg/kg)	Min SQL for Nondetects (mg/kg)	Max SQL for Nondetects (mg/kg)	Sample ID for Maximum Detected Value
T11	INORG	Cyanide (total)	57-12-5	6	1	0.800	0.800	0.100	0.100	T11-BH02-02SL
T11	INORG	Lead	7439-92-1	6	6	2.500	20.900			T11-BH02-02SL
T11	INORG	Manganese	7439-96-5	6	6	202.000	814.000			T11-BH02-02SL
T11	INORG	Nickel	7440-02-0	6	6	6.200	33.500			T11-BH02-02SL
T11	INORG	Vanadium	7440-62-2	6	6	7.000	27.800			T11-BH02-02SL
T11	INORG	Zinc	7440-66-6	6	6	20.900	77.600			T11-BH02-02SL
T12	VOC	Ethyl Benzene	100-41-4	2	1	0.007	0.007	0.006	0.006	T12-GS1-17SL
T12	VOC	Styrene	100-42-5	2	2	0.007	0.031			T12-GS1-17SL
T12	INORG	Antimony	7440-36-0	2	2	32.500	52.350			T12-GS1-17SL
T12	INORG	Arsenic	7440-38-2	2	2	1.650	4.000			T12-GS2-10SL
T12	INORG	Barium	7440-39-3	2	2	9.350	139.000			T12-GS2-10SL
T12	INORG	Beryllium	7440-41-7	2	2	0.365	0.540			T12-GS2-10SL
T12	INORG	Cadmium	7440-43-9	2	2	0.890	3.400			T12-GS2-10SL
T12	INORG	Chromium (total)	7440-47-3	2	1	11.200	11.200	4.400	4.400	T12-GS2-10SL
T12	INORG	Cobalt	7440-48-4	2	2	19.250	23.300			T12-GS2-10SL
T12	INORG	Copper	7440-50-8	2	2	5.750	22.000			T12-GS2-10SL
T12	INORG	Lead	7439-92-1	2	2	3.700	14.900			T12-GS2-10SL
T12	INORG	Manganese	7439-96-5	2	2	266.000	284.000			T12-GS2-10SL
T12	INORG	Vanadium	7440-62-2	2	2	7.000	25.000			T12-GS2-10SL
T12	INORG	Zinc	7440-66-6	2	2	15.350	80.100			T12-GS2-10SL
Waste Pile Staging Area	VOC	1,1,1-Trichloroethane	71-55-6	17	5	0.066	2.100	0.005	0.060	WPSA-BH03-08SL
Waste Pile Staging Area	VOC	1,1-Dichloroethane	75-34-3	17	3	0.187	3.000	0.005	0.310	WPSA-BH03-02SL
Waste Pile Staging Area	VOC	1,2-Dichloroethene (total)	540-59-0	17	2	1.060	2.670	0.005	0.310	WPSA-BH07-06SL
Waste Pile Staging Area	VOC	2-Butanone	78-93-3	7	1	2.950	2.950	0.240	3.100	WPSA-BH07-06SL
Waste Pile Staging Area	VOC	Acetone	67-64-1	17	5	0.297	12.000	0.104	6.200	WPSA-BH03-02SL
Waste Pile Staging Area	VOC	Benzene	71-43-2	17	2	0.012	0.025	0.005	0.310	WPSA-BH03-02SL
Waste Pile Staging Area	VOC	Carbon Disulfide	75-15-0	17	1	0.028	0.028	0.005	0.310	WPSA-BH06-02SL
Waste Pile Staging Area	VOC	Ethyl Benzene	100-41-4	17	5	0.046	1.600	0.005	0.060	WPSA-BH03-08SL
Waste Pile Staging Area	VOC	Tetrachloroethene	127-18-4	17	8	0.006	0.302	0.005	0.310	WPSA-BH07-06SL
Waste Pile Staging Area	VOC	Toluene	108-88-3	17	8	0.008	16.000	0.005	0.060	WPSA-BH03-08SL
Waste Pile Staging Area	VOC	Trichloroethene	79-01-6	17	2	0.120	0.232	0.005	0.310	WPSA-BH07-06SL
Waste Pile Staging Area	VOC	Xylenes (total)	1330-20-7	17	5	0.049	19.000	0.005	0.067	WPSA-BH03-08SL
Waste Pile Staging Area	SVOC	Benzo(a)pyrene	50-32-8	17	1	47.000	47.000	0.344	41.150	WPSA-BH03-08SL
Waste Pile Staging Area	SVOC	Benzo(b)fluoranthene	205-99-2	17	2	6.920	90.000	0.344	41.150	WPSA-BH03-08SL
Waste Pile Staging Area	SVOC	bis(2-Ethylhexyl)phthalate	117-81-7	17	4	0.390	1.900	0.344	41.150	WPSA-BH05-02SL
Waste Pile Staging Area	SVOC	Butylbenzylphthalate	85-68-7	17	1	25.000	25.000	0.344	41.150	WPSA-BH01-02SL
Waste Pile Staging Area	SVOC	Chrysene	218-01-9	17	1	44.000	44.000	0.344	41.150	WPSA-BH03-08SL
Waste Pile Staging Area	SVOC	Fluoranthene	206-44-0	17	2	5.650	86.000	0.344	41.150	WPSA-BH03-08SL
Waste Pile Staging Area	SVOC	Phenanthrene	85-01-8	17	3	5.450	84.000	0.344	41.150	WPSA-BH03-08SL

Table 2-4a: Summary of Constituents in Waste/Soil Evaluated in Risk Assessment
Harrison Division - GMC, Moraine, Ohio

SWMU	TCL/TAL Group	Constituent	CASRN	Number of Valid Results	Number of Detections	Minimum Detected (mg/kg)	Maximum Detected (mg/kg)	Min SQL for Nondetects (mg/kg)	Max SQL for Nondetects (mg/kg)	Sample ID for Maximum Detected Value
Waste Pile Staging Area	SVOC	Pyrene	129-00-0	17	2	5.180	83.000	0.344	41.150	WPSA-BH03-08SL
Waste Pile Staging Area	PCB	Aroclor-1242	53469-21-9	17	1	2.500	2.500	0.500	10.000	WPSA-BH03-02SL
Waste Pile Staging Area	PCB	Aroclor-1260	11096-82-5	17	1	0.600	0.600	0.500	10.000	WPSA-BH03-02SL
Waste Pile Staging Area	INORG	Antimony	7440-36-0	17	7	6.800	294.000	3.100	3.800	WPSA-BH02-08SL
Waste Pile Staging Area	INORG	Arsenic	7440-38-2	17	12	2.000	12.050	4.500	25.600	WPSA-BH05-22SL
Waste Pile Staging Area	INORG	Barium	7440-39-3	17	17	9.800	2620.000			WPSA-BH03-02SL
Waste Pile Staging Area	INORG	Beryllium	7440-41-7	17	15	0.120	0.850	0.110	0.220	WPSA-BH02-08SL
Waste Pile Staging Area	INORG	Cadmium	7440-43-9	17	12	0.440	74.200	0.310	2.400	WPSA-BH06-06SL
Waste Pile Staging Area	INORG	Chromium (total)	7440-47-3	17	17	4.200	1010.000			WPSA-BH06-06SL
Waste Pile Staging Area	INORG	Cobalt	7440-48-4	17	17	1.600	41.100			WPSA-BH06-06SL
Waste Pile Staging Area	INORG	Copper	7440-50-8	17	14	5.400	62700.000	17.100	30.650	WPSA-BH06-06SL
Waste Pile Staging Area	INORG	Lead	7439-92-1	17	17	3.300	2790.000			WPSA-BH06-06SL
Waste Pile Staging Area	INORG	Manganese	7439-96-5	17	17	145.000	1340.000			WPSA-BH06-06SL
Waste Pile Staging Area	INORG	Mercury	7439-97-6	17	6	0.050	0.330	0.040	0.130	WPSA-BH06-02SL
Waste Pile Staging Area	INORG	Nickel	7440-02-0	17	17	5.000	2600.000			WPSA-BH06-06SL
Waste Pile Staging Area	INORG	Selenium	7782-49-2	17	5	0.170	0.405	0.260	2.500	WPSA-BH07-06SL
Waste Pile Staging Area	INORG	Thallium	7440-28-0	17	1	0.250	0.250	0.210	1.000	WPSA-BH05-22SL
Waste Pile Staging Area	INORG	Vanadium	7440-62-2	17	17	5.150	43.900			WPSA-BH02-08SL
Waste Pile Staging Area	INORG	Zinc	7440-66-6	17	15	10.700	1170.000	20.900	28.100	WPSA-BH06-06SL
West Tank Farm	VOC	1,2-Dichloroethene (total)	540-59-0	4	1	0.925	0.925	0.005	0.270	T10-BH01-16SL
West Tank Farm	VOC	2-Butanone	78-93-3	4	1	6.470	6.470	0.052	2.700	T10-BH01-16SL
West Tank Farm	VOC	Tetrachloroethene	127-18-4	4	2	0.688	5.230	0.005	0.270	T10-BH01-16SL
West Tank Farm	VOC	Trichloroethene	79-01-6	4	1	0.950	0.950	0.005	0.270	T10-BH01-16SL
West Tank Farm	INORG	Arsenic	7440-38-2	3	3	2.100	4.600			WTF-GS10-15SL
West Tank Farm	INORG	Barium	7440-39-3	3	3	10.100	21.900			WTF-GS10-15SL
West Tank Farm	INORG	Cadmium	7440-43-9	3	3	1.700	2.300			WTF-GS10-15SL
West Tank Farm	INORG	Chromium (total)	7440-47-3	3	3	2.600	9.000			WTF-GS10-15SL
West Tank Farm	INORG	Cobalt	7440-48-4	3	2	2.700	3.200	2.100	2.100	WTF-GS8-15SL
West Tank Farm	INORG	Copper	7440-50-8	3	3	4.900	11.700			WTF-GS8-15SL
West Tank Farm	INORG	Lead	7439-92-1	3	3	2.500	11.500			WTF-GS10-15SL
West Tank Farm	INORG	Manganese	7439-96-5	3	3	169.000	236.500			WTF-GS8-15SL
West Tank Farm	INORG	Nickel	7440-02-0	3	2	10.600	11.900	6.400	6.400	WTF-GS10-15SL
West Tank Farm	INORG	Silver	7440-22-4	3	2	0.645	1.000	0.650	0.650	WTF-GS7-15SL
West Tank Farm	INORG	Vanadium	7440-62-2	3	3	7.450	9.700			WTF-GS10-15SL
West Tank Farm	INORG	Zinc	7440-66-6	3	3	18.000	35.750			WTF-GS8-15SL

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Table 2-4b: Summary of Constituents in Surface Waste/Soil Evaluated in Risk Assessment
Harrison Division - GMC, Moraine, Ohio

SWMU	TCL/TAL Group	Constituent	CASRN	Number of Valid Results	Number of Detections	Minimum Detected (mg/kg)	Maximum Detected (mg/kg)	Min SQL for Nondetects (mg/kg)	Max SQL for Nondetects (mg/kg)	Sample ID for Maximum Detected Value
Fill Area	VOC	1,2-Dichloroethene (total)	540-59-0	2	1	2.410	2.410	0.006	0.006	FA-BH01-03SL
Fill Area	SVOC	Pyrene	129-00-0	2	1	3.780	3.780	40.900	40.900	FA-BH02-02SL
Fill Area	PCB	Aroclor-1242	53469-21-9	2	1	0.640	0.640	0.560	0.560	FA-BH01-03SL
Fill Area	INORG	Antimony	7440-36-0	2	2	13.000	101.000			FA-BH01-03SL
Fill Area	INORG	Arsenic	7440-38-2	2	2	6.900	11.100			FA-BH01-03SL
Fill Area	INORG	Barium	7440-39-3	2	2	473.000	6230.000			FA-BH01-03SL
Fill Area	INORG	Beryllium	7440-41-7	2	1	0.830	0.830	0.130	0.130	FA-BH02-02SL
Fill Area	INORG	Cadmium	7440-43-9	2	1	54.300	54.300	6.300	6.300	FA-BH01-03SL
Fill Area	INORG	Chromium (total)	7440-47-3	2	2	50.000	59.400			FA-BH01-03SL
Fill Area	INORG	Cobalt	7440-48-4	2	2	9.000	62.500			FA-BH01-03SL
Fill Area	INORG	Copper	7440-50-8	2	2	103.000	2510.000			FA-BH01-03SL
Fill Area	INORG	Lead	7439-92-1	2	2	659.000	21500.000			FA-BH01-03SL
Fill Area	INORG	Manganese	7439-96-5	2	2	173.000	673.000			FA-BH01-03SL
Fill Area	INORG	Mercury	7439-97-6	2	2	1.000	1.700			FA-BH01-03SL
Fill Area	INORG	Nickel	7440-02-0	2	2	52.000	540.000			FA-BH01-03SL
Fill Area	INORG	Selenium	7782-49-2	2	2	0.580	1.800			FA-BH01-03SL
Fill Area	INORG	Vanadium	7440-62-2	2	2	12.900	27.600			FA-BH01-03SL
Fill Area	INORG	Zinc	7440-66-6	2	2	1680.000	40400.000			FA-BH01-03SL
Liquid Waste Burner	INORG	Barium	7440-39-3	1	1	4.800	4.800			LWB-BH01-03SL
Liquid Waste Burner	INORG	Chromium (total)	7440-47-3	1	1	4.800	4.800			LWB-BH01-03SL
Liquid Waste Burner	INORG	Cobalt	7440-48-4	1	1	0.550	0.550			LWB-BH01-03SL
Liquid Waste Burner	INORG	Lead	7439-92-1	1	1	4.200	4.200			LWB-BH01-03SL
Liquid Waste Burner	INORG	Manganese	7439-96-5	1	1	129.000	129.000			LWB-BH01-03SL
Liquid Waste Burner	INORG	Nickel	7440-02-0	1	1	7.700	7.700			LWB-BH01-03SL
Liquid Waste Burner	INORG	Vanadium	7440-62-2	1	1	3.900	3.900			LWB-BH01-03SL
T11	VOC	Acetone	67-64-1	3	2	1.800	8.900	5.700	5.700	T11-BH03-02SL
T11	VOC	Tetrachloroethene	127-18-4	3	2	0.093	0.110	0.290	0.290	T11-BH03-02SL
T11	SVOC	2-Methylnaphthalene	91-57-6	3	1	7.300	7.300	0.370	3.800	T11-BH02-02SL
T11	SVOC	bis(2-Ethylhexyl)phthalate	117-81-7	3	1	0.460	0.460	3.800	3.800	T11-BH01-02SL
T11	SVOC	Naphthalene	91-20-3	3	1	7.500	7.500	0.370	3.800	T11-BH02-02SL
T11	INORG	Antimony	7440-36-0	3	2	14.650	20.600	6.800	6.800	T11-BH03-02SL
T11	INORG	Arsenic	7440-38-2	3	3	7.300	9.400			T11-BH02-02SL
T11	INORG	Barium	7440-39-3	3	3	48.900	104.000			T11-BH02-02SL
T11	INORG	Beryllium	7440-41-7	3	3	0.490	0.690			T11-BH02-02SL
T11	INORG	Cadmium	7440-43-9	3	3	4.500	5.300			T11-BH01-02SL
T11	INORG	Chromium (total)	7440-47-3	3	3	11.200	14.500			T11-BH02-02SL
T11	INORG	Cobalt	7440-48-4	3	3	10.500	11.500			T11-BH02-02SL T11-BH03-02SL
T11	INORG	Copper	7440-50-8	3	3	14.500	25.900			T11-BH02-02SL
T11	INORG	Cyanide (total)	57-12-5	3	1	0.800	0.800	0.100	0.100	T11-BH02-02SL
T11	INORG	Lead	7439-92-1	3	3	7.950	20.900			T11-BH02-02SL
T11	INORG	Manganese	7439-96-5	3	3	410.000	814.000			T11-BH02-02SL

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Table 2-4b: Summary of Constituents in Surface Waste/Soil Evaluated in Risk Assessment
Harrison Division - GMC, Moraine, Ohio

SWMU	TCL/TAL Group	Constituent	CASRN	Number of Valid Results	Number of Detections	Minimum Detected (mg/kg)	Maximum Detected (mg/kg)	Min SQL for Nondetects (mg/kg)	Max SQL for Nondetects (mg/kg)	Sample ID for Maximum Detected Value
T11	INORG	Nickel	7440-02-0	3	3	15.550	33.500			T11-BH02-02SL
T11	INORG	Vanadium	7440-62-2	3	3	19.400	27.800			T11-BH02-02SL
T11	INORG	Zinc	7440-66-6	3	3	52.000	77.600			T11-BH02-02SL
Waste Pile Staging Area	VOC	1,1,1-Trichloroethane	71-55-6	6	2	0.066	0.130	0.012	0.058	WPSA-BH03-02SL
Waste Pile Staging Area	VOC	1,1-Dichloroethane	75-34-3	6	2	0.187	3.000	0.012	0.027	WPSA-BH03-02SL
Waste Pile Staging Area	VOC	1,2-Dichloroethene (total)	540-59-0	6	1	1.060	1.060	0.012	0.027	WPSA-BH07-02SL
Waste Pile Staging Area	VOC	Acetone	67-64-1	6	3	0.297	12.000	0.235	1.160	WPSA-BH03-02SL
Waste Pile Staging Area	VOC	Benzene	71-43-2	6	2	0.012	0.025	0.012	0.058	WPSA-BH03-02SL
Waste Pile Staging Area	VOC	Carbon Disulfide	75-15-0	6	1	0.028	0.028	0.012	0.058	WPSA-BH06-02SL
Waste Pile Staging Area	VOC	Ethyl Benzene	100-41-4	6	2	0.046	0.148	0.012	0.027	WPSA-BH07-02SL
Waste Pile Staging Area	VOC	Tetrachloroethene	127-18-4	6	4	0.054	0.237	0.012	0.012	WPSA-BH07-02SL
Waste Pile Staging Area	VOC	Toluene	108-88-3	6	4	0.016	0.520	0.012	0.027	WPSA-BH03-02SL
Waste Pile Staging Area	VOC	Trichloroethene	79-01-6	6	1	0.120	0.120	0.012	0.027	WPSA-BH07-02SL
Waste Pile Staging Area	VOC	Xylenes (total)	1330-20-7	6	2	0.049	0.230	0.012	0.058	WPSA-BH03-02SL
Waste Pile Staging Area	SVOC	Benzo(b)fluoranthene	205-99-2	6	1	6.920	6.920	0.350	38.400	WPSA-BH06-02SL
Waste Pile Staging Area	SVOC	bis(2-Ethylhexyl)phthalate	117-81-7	6	2	0.390	1.900	4.400	38.400	WPSA-BH05-02SL
Waste Pile Staging Area	SVOC	Butylbenzylphthalate	85-68-7	6	1	25.000	25.000	0.350	38.400	WPSA-BH01-02SL
Waste Pile Staging Area	SVOC	Fluoranthene	206-44-0	6	1	5.650	5.650	0.350	38.400	WPSA-BH06-02SL
Waste Pile Staging Area	SVOC	Phenanthrene	85-01-8	6	1	5.450	5.450	0.350	38.400	WPSA-BH06-02SL
Waste Pile Staging Area	SVOC	Pyrene	129-00-0	6	1	5.180	5.180	0.350	38.400	WPSA-BH06-02SL
Waste Pile Staging Area	PCB	Aroclor-1242	53469-21-9	6	1	2.500	2.500	0.500	10.000	WPSA-BH03-02SL
Waste Pile Staging Area	PCB	Aroclor-1260	11096-82-5	6	1	0.600	0.600	0.500	10.000	WPSA-BH03-02SL
Waste Pile Staging Area	INORG	Antimony	7440-36-0	6	4	6.800	38.000	3.200	3.400	WPSA-BH02-02SL
Waste Pile Staging Area	INORG	Arsenic	7440-38-2	6	4	2.350	10.000	4.500	13.600	WPSA-BH03-02SL
Waste Pile Staging Area	INORG	Barium	7440-39-3	6	6	12.050	2620.000			WPSA-BH03-02SL
Waste Pile Staging Area	INORG	Beryllium	7440-41-7	6	4	0.160	0.510	0.110	0.220	WPSA-BH07-02SL
Waste Pile Staging Area	INORG	Cadmium	7440-43-9	6	5	1.100	21.900	2.400	2.400	WPSA-BH03-02SL
Waste Pile Staging Area	INORG	Chromium (total)	7440-47-3	6	6	4.800	754.000			WPSA-BH06-02SL
Waste Pile Staging Area	INORG	Cobalt	7440-48-4	6	6	5.700	28.700			WPSA-BH06-02SL
Waste Pile Staging Area	INORG	Copper	7440-50-8	6	6	5.400	1240.000			WPSA-BH06-02SL
Waste Pile Staging Area	INORG	Lead	7439-92-1	6	6	4.600	1090.000			WPSA-BH06-02SL
Waste Pile Staging Area	INORG	Manganese	7439-96-5	6	6	176.000	607.000			WPSA-BH07-02SL
Waste Pile Staging Area	INORG	Mercury	7439-97-6	6	3	0.090	0.330	0.100	0.110	WPSA-BH06-02SL
Waste Pile Staging Area	INORG	Nickel	7440-02-0	6	6	6.500	438.000			WPSA-BH06-02SL
Waste Pile Staging Area	INORG	Selenium	7782-49-2	6	1	0.170	0.170	0.415	2.500	WPSA-BH07-02SL
Waste Pile Staging Area	INORG	Vanadium	7440-62-2	6	6	5.150	25.400			WPSA-BH07-02SL
Waste Pile Staging Area	INORG	Zinc	7440-66-6	6	6	19.500	900.000			WPSA-BH06-02SL

Table 2-5: Summary of Constituents in Ground Water Evaluated in Risk Assessment
Harrison Division-GMC, Moraine, Ohio

TCL/TAL Group	Constituent	CASRN	Number of Valid Results	Number of Detections	Minimum Detected (mg/L)	Maximum Detected (mg/L)	Min SQL for Nondetects (mg/L)	Max SQL for Nondetects (mg/L)
VOC	1,1,1-Trichloroethane	71-55-6	49	28	0.001	0.196	0.001	0.010
VOC	1,1-Dichloroethane	75-34-3	49	22	0.001	0.218	0.001	0.005
VOC	1,1-Dichloroethene	75-35-4	49	5	0.001	0.003	0.001	0.010
VOC	Benzene	71-43-2	49	2	0.006	0.014	0.001	0.010
VOC	Carbon Disulfide	75-15-0	49	4	0.002	0.006	0.001	0.010
VOC	Chlorobenzene	108-90-7	49	1	0.006	0.006	0.001	0.010
VOC	Chloroethane	75-00-3	49	5	0.010	0.032	0.010	0.100
VOC	Chloroform	67-66-3	49	1	0.001	0.001	0.001	0.010
VOC	Ethyl Benzene	100-41-4	49	3	0.046	0.459	0.001	0.005
VOC	Tetrachloroethene	127-18-4	49	25	0.001	0.166	0.001	0.010
VOC	Toluene	108-88-3	49	2	0.001	0.075	0.001	0.010
VOC	trans-1,2-Dichloroethene	156-60-5	49	11	0.002	0.022	0.001	0.010
VOC	Trichloroethene	79-01-6	49	38	0.001	0.183	0.001	0.010
VOC	Trichlorofluoromethane	75-69-4	49	4	0.002	0.030	0.001	0.010
VOC	Vinyl Chloride	75-01-4	49	7	0.007	0.037	0.005	0.050
VOC	Xylenes (total)	1330-20-7	49	4	0.002	0.498	0.001	0.005
SVOC	bis(2-Ethylhexyl)phthalate	117-81-7	32	1	0.029	0.029	0.010	0.100
INORG	Antimony	7440-36-0	40	15	0.051	0.192	0.025	0.053
INORG	Arsenic	7440-38-2	39	15	0.002	0.061	0.002	0.006
INORG	Barium	7440-39-3	39	39	0.065	1.070		
INORG	Beryllium	7440-41-7	39	4	0.001	0.003	0.001	0.001
INORG	Cadmium	7440-43-9	39	5	0.004	0.022	0.003	0.004
INORG	Chromium (total)	7440-47-3	39	12	0.004	0.081	0.004	0.006
INORG	Cobalt	7440-48-4	39	36	0.010	0.092	0.003	0.011
INORG	Copper	7440-50-8	39	5	0.009	0.249	0.005	0.043
INORG	Cyanide (total)	57-12-5	36	5	0.008	0.021	0.005	0.005
INORG	Lead	7439-92-1	39	25	0.002	0.075	0.002	0.002
INORG	Mercury	7439-97-6	39	2	0.000	0.000	0.000	0.000
INORG	Nickel	7440-02-0	39	17	0.015	0.124	0.014	0.015
INORG	Selenium	7782-49-2	39	4	0.002	0.003	0.001	0.010
INORG	Tin	7440-31-5	39	4	0.021	0.315	0.200	0.200
INORG	Vanadium	7440-62-2	39	15	0.005	0.114	0.005	0.005
INORG	Zinc	7440-66-6	39	15	0.009	0.761	0.005	0.086
DISSOLVED	Antimony	7440-36-0	18	9	0.052	0.066	0.025	0.050
DISSOLVED	Arsenic	7440-38-2	19	1	0.023	0.023	0.002	0.009

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Table 2-5: Summary of Constituents in Ground Water Evaluated in Risk Assessment
Harrison Division-GMC, Moraine, Ohio

TCL/TAL Group	Constituent	CASRN	Number of Valid Results	Number of Detections	Minimum Detected (mg/L)	Maximum Detected (mg/L)	Min SQL for Nondetects (mg/L)	Max SQL for Nondetects (mg/L)
DISSOLVED	Barium	7440-39-3	39	39	0.049	0.237		
DISSOLVED	Chromium (total)	7440-47-3	13	1	0.009	0.009	0.004	0.006
DISSOLVED	Cobalt	7440-48-4	37	32	0.005	0.021	0.003	0.005
DISSOLVED	Copper	7440-50-8	37	6	0.005	0.010	0.003	0.016
DISSOLVED	Lead	7439-92-1	27	4	0.002	0.005	0.002	0.002
DISSOLVED	Nickel	7440-02-0	17	4	0.014	0.020	0.014	0.015
DISSOLVED	Selenium	7782-49-2	4	3	0.001	0.003	0.001	0.001
DISSOLVED	Zinc	7440-66-6	38	2	0.009	0.012	0.005	0.024

Table 3-1: Potential Exposures to Soil/Waste by Direct Contact or Inhalation of Ambient Air
Harrison Division-GMC, Moraine, Ohio

	On-Facility									Off-Facility
	Routine Industrial			Excavation			Groundskeeping			Residential
SWMU	Ingestion	Dermal	Inhalation	Ingestion	Dermal	Inhalation	Ingestion	Dermal	Inhalation	Inhalation
Fill Area	Yes	Yes	Yes	Yes	Yes	Yes				Yes
Landfill L1							Yes	Yes	Yes	Yes
Landfill L2							Yes	Yes	Yes	Yes
Landfill L3							Yes	Yes	Yes	Yes
Liquid Waste Burner	Yes	Yes	Yes	Yes	Yes	Yes				Yes
North Settling Lagoon									Yes	Yes
South Settling Lagoon									Yes	Yes
South Tank Farm				Yes	Yes	Yes				Yes
T04				Yes	Yes	Yes				Yes
T05/T06				Yes	Yes	Yes				Yes
T11	Yes	Yes	Yes	Yes	Yes	Yes				Yes
T12				Yes	Yes	Yes				Yes
Waste Pile Staging Area	Yes	Yes	Yes	Yes	Yes	Yes				Yes
West Tank Farm				Yes	Yes	Yes				Yes

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Table 3-2: Maximum Concentrations (mg/kg) in Soil and Waste at SWMUs
Harrison Division-GMC, Moraine, Ohio

TCL/TAL Group	Constituent	CASRN	Fill Area (surface)	Fill Area (all)	Landfill L1	Landfill L2	Landfill L3	LWB (surface)	LWB (all)	N Settling Lagoon	S Settling Lagoon	S Tank Farm	T04	T05/T06	T11 (surface)	T11 (all)	T12	WPSA (surface)	WPSA (all)	W Tank Farm
VOC	1,1,1-Trichloroethane	71-55-6																0.13	2.1	
VOC	1,1-Dichloroethane	75-34-3																3	3	
VOC	1,2-Dichloroethene (total)	540-59-0	2.41	2.41														1.06	2.67	0.925
VOC	2-Butanone	78-93-3																	2.95	6.47
VOC	Acetone	67-64-1				0.33	0.33							0.19	8.9	8.9		12	12	
VOC	Benzene	71-43-2																0.025	0.025	
VOC	Carbon Disulfide	75-15-0																0.0277	0.0277	
VOC	Ethyl Benzene	100-41-4							1.95	0.48							0.00705	0.148	1.6	
VOC	Styrene	100-42-5															0.031			
VOC	Tetrachloroethene	127-18-4		0.0114	0.039	0.03	0.01					1	0.019	0.044	0.11	0.11		0.237	0.302	5.23
VOC	Toluene	108-88-3														0.0058		0.520	16	
VOC	Trichloroethene	79-01-6			0.15													0.12	0.232	0.95
VOC	Xylenes (total)	1330-20-7			0.0097	0.0091												0.23	19	
SVOC	2-Methylnaphthalene	91-57-6								7.9					7.3	7.3				
SVOC	Benzo(a)anthracene	56-55-3			5.45	4														
SVOC	Benzo(a)pyrene	50-32-8			4.75														47	
SVOC	Benzo(b)fluoranthene	205-99-2			9	0.5												6.92	90	
SVOC	bis(2-Ethylhexyl)phthalate	117-81-7								31.2	1.95			0.375	0.46	0.58		1.9	1.9	
SVOC	Butylbenzylphthalate	85-68-7																25	25	
SVOC	Chrysene	218-01-9			5.4	3.9													44	
SVOC	Di-n-butylphthalate	84-74-2									1.99									
SVOC	Fluoranthene	206-44-0			11.55	9.1				104								5.65	86	
SVOC	Fluorene	86-73-7								7.59										
SVOC	Naphthalene	91-20-3													7.5	7.5				
SVOC	Phenanthrene	85-01-8			7.05	7.9				41.7								5.45	84	
SVOC	Pyrene	129-00-0	3.78	3.78	11.2	7.4				81.5								5.18	83	
PCB	Aroclor-1242	53469-21-9	0.64	0.64														2.5	2.5	
PCB	Aroclor-1254	11097-69-1			21.3	2			0.595		15.2									
PCB	Aroclor-1260	11096-82-5								27.4	4.6							0.6	0.6	
INORG	Antimony	7440-36-0	101	101	30.4	29.9	23.2			24.5	13.8		22.4	27.3	20.6	39.7	52.35	38	294	
INORG	Arsenic	7440-38-2	11.1	11.1	48	10	11.6			94.8	103	6.6	6.5	11	9.4	9.4	4	10	12.05	4.6
INORG	Barium	7440-39-3	6230	6230	5860	153	80.5	4.8	19.95	1430	4400	56.8	65.6	28.55	104	543	139	2620	2620	21.9
INORG	Beryllium	7440-41-7	0.83	0.83	1.4	1.03	1		0.11				0.65	0.325	0.69	0.69	0.54	0.51	0.85	
INORG	Cadmium	7440-43-9	54.3	54.3	31.9	6.1	5.6		0.535	327	26.9	2.6	4.2	6.1	5.3	5.3	3.4	21.9	74.2	2.3
INORG	Chromium (total)	7440-47-3	59.4	59.4	248	51.2	22.1	4.8	4.8	3630	1990	4.7	14.1	8.9	14.5	14.5	11.2	754	1010	9
INORG	Cobalt	7440-48-4	62.5	62.5	1030	14.8	11.2	0.55	2.75	367	91.9	3.8	18.2	10.6	11.5	11.5	23.3	28.7	41.1	3.2
INORG	Copper	7440-50-8	2510	2510	2600	768	37.9		29.3	453	1390	11.9	19	12.3	25.9	25.9	22	1240	62700	11.7
INORG	Cyanide (total)	57-12-5			2					4.61	12.3				0.8	0.8				
INORG	Lead	7439-92-1	21500	21500	740	47	47.6	4.2	8.45	2290	388	12.8	13.5	9.65	20.9	20.9	14.9	1090	2790	11.5
INORG	Manganese	7439-96-5	673	673	856	426.5	567	129	196			1330	541	469	814	814	284	607	1340	236.5
INORG	Mercury	7439-97-6	1.7	1.7	1.2				0.045	1.62	4.03							0.33	0.33	
INORG	Nickel	7440-02-0	540	540	1210	28.6	17.6	7.7	11.45	3250	1330	25.4		10.55	33.5	33.5		438	2600	11.9
INORG	Selenium	7782-49-2	1.8	1.8						5.49	0.78							0.17	0.405	
INORG	Silver	7440-22-4								2.12	2.45	1.2								1
INORG	Thallium	7440-28-0			0.51														0.25	
INORG	Vanadium	7440-62-2	27.6	27.6	36.7	40.6	44.8	3.9	6.75	30.7		7.7	26.7	13.7	27.8	27.8	25	25.4	43.9	9.7
INORG	Zinc	7440-66-6	40400	40400	3990	360	99.3		42.45	9732	2190	38.9	70.8	50.75	77.6	77.6	80.1	900	1170	35.75

Table 3-3: Estimated Maximum Constituent Concentrations (mg/m^3) in Air
Harrison Division-GMC, Moraine, Ohio

			Fill Area-Routine		Fill Area-Excavation		Landfill L1		Landfill L2		Landfill L3		Liq Wst Burnr-Routine		Liq Wst Burnr-Excavtn		N Settling Lagoon	
			At SWMU	Off-Facility	At SWMU	Off-Facility	At SWMU	Off-Facility	At SWMU	Off-Facility	At SWMU	Off-Facility	At SWMU	Off-Facility	At SWMU	Off-Facility	At SWMU	Off-Facility
	C/Q (kg/m^3 per $kg/m^2/s$):		2.2E+01	7.7E+00	2.2E+01	7.7E+00	2.5E+01	1.3E+01	2.4E+01	1.4E+01	2.0E+01	1.4E+00	5.5E+00	4.0E-02	5.5E+00	4.0E-02	2.4E+01	2.3E+00
TCL/TAL Group	Constituent	CASRN	C_{air} (mg/m^3)	C_{air} (mg/m^3)	C_{air} (mg/m^3)	C_{air} (mg/m^3)	C_{air} (mg/m^3)	C_{air} (mg/m^3)	C_{air} (mg/m^3)	C_{air} (mg/m^3)	C_{air} (mg/m^3)	C_{air} (mg/m^3)	C_{air} (mg/m^3)	C_{air} (mg/m^3)	C_{air} (mg/m^3)	C_{air} (mg/m^3)	C_{air} (mg/m^3)	C_{air} (mg/m^3)
VOC	1,1,1-Trichloroethane	71-55-6																
VOC	1,1-Dichloroethane	75-34-3																
VOC	1,2-Dichloroethene (total)	540-59-0	2.5E-03	5.8E-04	6.8E-02	2.4E-02												
VOC	2-Butanone	78-93-3																
VOC	Acetone	67-64-1							1.7E-04	6.5E-05	1.4E-04	6.5E-06						
VOC	Benzene	71-43-2																
VOC	Carbon Disulfide	75-15-0																
VOC	Ethyl Benzene	100-41-4													7.8E-03	5.7E-05	3.1E-04	2.0E-05
VOC	Styrene	100-42-5																
VOC	Tetrachloroethene	127-18-4			2.3E-04	8.0E-05	3.3E-05	1.1E-05	2.4E-05	9.5E-06	6.8E-06	3.2E-07						
VOC	Toluene	108-88-3																
VOC	Trichloroethene	79-01-6					1.9E-04	6.5E-05										
VOC	Xylenes (total)	1330-20-7					5.2E-06	1.8E-06	4.7E-06	1.8E-06								
SVOC	2-Methylnaphthalene	91-57-6															1.9E-04	1.2E-05
SVOC	Benzo(a)anthracene	56-55-3					1.6E-06	5.6E-07	1.1E-06	4.5E-07								
SVOC	Benzo(a)pyrene	50-32-8					3.9E-07	1.4E-07										
SVOC	Benzo(b)fluoranthene	205-99-2					1.5E-06	5.1E-07	7.9E-08	3.1E-08								
SVOC	bis(2-Ethylhexyl)phthalate	117-81-7															2.2E-05	1.4E-06
SVOC	Butylbenzylphthalate	85-68-7																
SVOC	Chrysene	218-01-9					7.0E-07	2.4E-07	4.8E-07	1.9E-07								
SVOC	Di-n-butylphthalate	84-74-2																
SVOC	Fluoranthene	206-44-0					1.1E-05	3.9E-06	8.6E-06	3.3E-06							9.8E-05	6.3E-06
SVOC	Fluorene	86-73-7															5.5E-05	3.5E-06
SVOC	Naphthalene	91-20-3																
SVOC	Phenanthrene	85-01-8					3.4E-05	1.2E-05	3.7E-05	1.4E-05							1.9E-04	1.2E-05
SVOC	Pyrene	129-00-0	2.5E-06	5.8E-07	7.1E-05	2.5E-05	8.4E-06	2.9E-06	5.3E-06	2.1E-06							5.9E-05	3.7E-06
PCB	Aroclor-1242	53469-21-9	4.9E-06	1.1E-06	1.3E-04	4.7E-05												
PCB	Aroclor-1254	11097-69-1					3.0E-05	1.0E-05	2.7E-06	1.0E-06					5.1E-06	3.7E-08		
PCB	Aroclor-1260	11096-82-5															7.9E-06	5.0E-07
INORG	Antimony	7440-36-0	1.1E-07	3.9E-08	1.1E-04	3.9E-05	3.8E-08	2.0E-08	3.6E-08	2.1E-08	2.3E-08	1.6E-09					2.9E-08	2.8E-09
INORG	Arsenic	7440-38-2	1.2E-08	4.3E-09	1.2E-05	4.3E-06	6.0E-08	3.1E-08	1.2E-08	7.0E-09	1.2E-08	8.1E-10					1.1E-07	1.1E-08
INORG	Barium	7440-39-3	6.8E-06	2.4E-06	6.9E-03	2.4E-03	7.3E-06	3.8E-06	1.8E-07	1.1E-07	8.0E-08	5.6E-09	1.3E-09	9.6E-12	5.5E-06	4.0E-08	1.7E-06	1.6E-07
INORG	Beryllium	7440-41-7	9.1E-10	3.2E-10	9.1E-07	3.2E-07	1.7E-09	9.1E-10	1.2E-09	7.2E-10	1.0E-09	7.0E-11			3.0E-08	2.2E-10		
INORG	Cadmium	7440-43-9	6.0E-08	2.1E-08	6.0E-05	2.1E-05	4.0E-08	2.1E-08	7.3E-09	4.3E-09	5.6E-09	3.9E-10			1.5E-07	1.1E-09	3.9E-07	3.7E-08
INORG	Chromium (total)	7440-47-3	6.5E-08	2.3E-08	6.5E-05	2.3E-05	3.1E-07	1.6E-07	6.1E-08	3.6E-08	2.2E-08	1.5E-09	1.3E-09	9.6E-12	1.3E-06	9.6E-09	4.3E-06	4.2E-07
INORG	Cobalt	7440-48-4	6.9E-08	2.4E-08	6.9E-05	2.4E-05	1.3E-06	6.7E-07	1.8E-08	1.0E-08	1.1E-08	7.8E-10	1.5E-10	1.1E-12	7.6E-07	5.5E-09	4.4E-07	4.2E-08
INORG	Copper	7440-50-8	2.8E-06	9.6E-07	2.8E-03	9.7E-04	3.2E-06	1.7E-06	9.2E-07	5.4E-07	3.8E-08	2.6E-09			8.1E-06	5.9E-08	5.4E-07	5.2E-08
INORG	Cyanide (total)	57-12-5					2.5E-09	1.3E-09									5.5E-09	5.3E-10
INORG	Lead	7439-92-1	2.4E-05	8.3E-06	2.4E-02	8.3E-03	9.2E-07	4.8E-07	5.6E-08	3.3E-08	4.7E-08	3.3E-09	1.2E-09	8.4E-12	2.3E-06	1.7E-08	2.7E-06	2.6E-07
INORG	Manganese	7439-96-5	7.4E-07	2.6E-07	7.4E-04	2.6E-04	1.1E-06	5.5E-07	5.1E-07	3.0E-07	5.7E-07	4.0E-08	3.5E-08	2.6E-10	5.4E-05	3.9E-07		
INORG	Mercury	7439-97-6	1.9E-09	6.5E-10	1.9E-06	6.5E-07	1.5E-09	7.8E-10							1.2E-08	9.0E-11	1.9E-09	1.9E-10
INORG	Nickel	7440-02-0	5.9E-07	2.1E-07	5.9E-04	2.1E-04	1.5E-06	7.8E-07	3.4E-08	2.0E-08	1.8E-08	1.2E-09	2.1E-09	1.5E-11	3.1E-06	2.3E-08	3.9E-06	3.7E-07
INORG	Selenium	7782-49-2	2.0E-09	6.9E-10	2.0E-06	6.9E-07											6.6E-09	6.3E-10
INORG	Silver	7440-22-4															2.5E-09	2.4E-10
INORG	Thallium	7440-28-0					6.4E-10	3.3E-10										
INORG	Vanadium	7440-62-2	3.0E-08	1.1E-08	3.0E-05	1.1E-05	4.6E-08	2.4E-08	4.9E-08	2.8E-08	4.5E-08	3.1E-09	1.1E-09	7.8E-12	1.9E-06	1.4E-08	3.7E-08	3.5E-09
INORG	Zinc	7440-66-6	4.4E-05	1.6E-05	4.4E-02	1.6E-02	5.0E-06	2.6E-06	4.3E-07	2.5E-07	9.9E-08	6.9E-09			1.2E-05	8.5E-08	1.2E-05	1.1E-06

			S Settling Lagoon		S Tank Farm		T04		T05/T06		T11-Routine		T11-Excavation		T12	
			At SWMU	Off-Facility	At SWMU	Off-Facility	At SWMU	Off-Facility	At SWMU	Off-Facility	At SWMU	Off-Facility	At SWMU	Off-Facility	At SWMU	Off-Facility
	C/Q (kg/m^3 per kg/m^2/s):		2.5E+01	1.3E+01	9.5E+00	2.3E-01	5.4E+00	2.8E-02	9.5E+00	3.4E-01	1.0E+01	6.0E-01	1.0E+01	6.0E-01	6.7E+00	1.2E-01
TCL/TAL Group	Constituent	CASRN	C_{air} (mg/m^3)	C_{air} (mg/m^3)	C_{air} (mg/m^3)	C_{air} (mg/m^3)	C_{air} (mg/m^3)	C_{air} (mg/m^3)	C_{air} (mg/m^3)	C_{air} (mg/m^3)	C_{air} (mg/m^3)	C_{air} (mg/m^3)	C_{air} (mg/m^3)	C_{air} (mg/m^3)	C_{air} (mg/m^3)	C_{air} (mg/m^3)
VOC	1,1,1-Trichloroethane	71-55-6														
VOC	1,1-Dichloroethane	75-34-3														
VOC	1,2-Dichloroethene (total)	540-59-0														
VOC	2-Butanone	78-93-3														
VOC	Acetone	67-64-1							1.0E-03	3.7E-05	1.9E-03	7.6E-05	5.1E-02	3.1E-03		
VOC	Benzene	71-43-2														
VOC	Carbon Disulfide	75-15-0														
VOC	Ethyl Benzene	100-41-4													3.4E-05	6.2E-07
VOC	Styrene	100-42-5													4.7E-05	8.4E-07
VOC	Tetrachloroethene	127-18-4			8.7E-03	2.1E-04	9.4E-05	4.9E-07	3.8E-04	1.4E-05	3.7E-05	1.5E-06	1.0E-03	6.0E-05		
VOC	Toluene	108-88-3											5.2E-05	3.1E-06		
VOC	Trichloroethene	79-01-6														
VOC	Xylenes (total)	1330-20-7														
SVOC	2-Methylnaphthalene	91-57-6									7.4E-05	2.9E-06	2.0E-03	1.2E-04		
SVOC	Benzo(a)anthracene	56-55-3														
SVOC	Benzo(a)pyrene	50-32-8														
SVOC	Benzo(b)fluoranthene	205-99-2														
SVOC	bis(2-Ethylhexyl)phthalate	117-81-7	1.5E-06	5.1E-07					3.1E-06	1.1E-07	1.4E-07	5.5E-09	5.0E-06	3.0E-07		
SVOC	Butylbenzylphthalate	85-68-7														
SVOC	Chrysene	218-01-9														
SVOC	Di-n-butylphthalate	84-74-2	5.2E-06	1.8E-06												
SVOC	Fluoranthene	206-44-0														
SVOC	Fluorene	86-73-7														
SVOC	Naphthalene	91-20-3									2.1E-04	8.5E-06	5.8E-03	3.5E-04		
SVOC	Phenanthrene	85-01-8														
SVOC	Pyrene	129-00-0														
PCB	Aroclor-1242	53469-21-9														
PCB	Aroclor-1254	11097-69-1	2.1E-05	7.4E-06												
PCB	Aroclor-1260	11096-82-5	1.4E-06	4.8E-07												
INORG	Antimony	7440-36-0	1.7E-08	8.9E-09			6.0E-06	3.1E-08	1.3E-05	4.6E-07	1.0E-08	6.2E-10	2.0E-05	1.2E-06	1.8E-05	3.1E-07
INORG	Arsenic	7440-38-2	1.3E-07	6.7E-08	3.1E-06	7.6E-08	1.8E-06	9.1E-09	5.2E-06	1.9E-07	4.7E-09	2.8E-10	4.7E-06	2.8E-07	1.3E-06	2.4E-08
INORG	Barium	7440-39-3	5.5E-06	2.9E-06	2.7E-05	6.5E-07	1.8E-05	9.2E-08	1.4E-05	4.9E-07	5.2E-08	3.1E-09	2.7E-04	1.6E-05	4.7E-05	8.3E-07
INORG	Beryllium	7440-41-7					1.8E-07	9.1E-10	1.5E-07	5.5E-09	3.4E-10	2.1E-11	3.5E-07	2.1E-08	1.8E-07	3.2E-09
INORG	Cadmium	7440-43-9	3.4E-08	1.7E-08	1.2E-06	3.0E-08	1.1E-06	5.9E-09	2.9E-06	1.0E-07	2.6E-09	1.6E-10	2.7E-06	1.6E-07	1.1E-06	2.0E-08
INORG	Chromium (total)	7440-47-3	2.5E-06	1.3E-06	2.2E-06	5.4E-08	3.8E-06	2.0E-08	4.2E-06	1.5E-07	7.2E-09	4.3E-10	7.3E-06	4.4E-07	3.8E-06	6.7E-08
INORG	Cobalt	7440-48-4	1.1E-07	6.0E-08	1.8E-06	4.4E-08	4.9E-06	2.5E-08	5.0E-06	1.8E-07	5.7E-09	3.4E-10	5.8E-06	3.5E-07	7.8E-06	1.4E-07
INORG	Copper	7440-50-8	1.7E-06	9.0E-07	5.7E-06	1.4E-07	5.1E-06	2.7E-08	5.8E-06	2.1E-07	1.3E-08	7.7E-10	1.3E-05	7.8E-07	7.4E-06	1.3E-07
INORG	Cyanide (total)	57-12-5	1.5E-08	8.0E-09							4.0E-10	2.4E-11	4.0E-07	2.4E-08		
INORG	Lead	7439-92-1	4.8E-07	2.5E-07	6.1E-06	1.5E-07	3.6E-06	1.9E-08	4.6E-06	1.6E-07	1.0E-08	6.3E-10	1.0E-05	6.3E-07	5.0E-06	8.9E-08
INORG	Manganese	7439-96-5			6.3E-04	1.5E-05	1.5E-04	7.6E-07	2.2E-04	8.0E-06	4.1E-07	2.4E-08	4.1E-04	2.4E-05	9.5E-05	1.7E-06
INORG	Mercury	7439-97-6	5.0E-09	2.6E-09												
INORG	Nickel	7440-02-0	1.7E-06	8.6E-07	1.2E-05	2.9E-07			5.0E-06	1.8E-07	1.7E-08	1.0E-09	1.7E-05	1.0E-06		
INORG	Selenium	7782-49-2	9.7E-10	5.1E-10												
INORG	Silver	7440-22-4	3.1E-09	1.6E-09	5.7E-07	1.4E-08										
INORG	Thallium	7440-28-0														
INORG	Vanadium	7440-62-2			3.7E-06	8.9E-08	7.2E-06	3.7E-08	6.5E-06	2.3E-07	1.4E-08	8.3E-10	1.4E-05	8.3E-07	8.4E-06	1.5E-07
INORG	Zinc	7440-66-6	2.7E-06	1.4E-06	1.8E-05	4.5E-07	1.9E-05	9.9E-08	2.4E-05	8.6E-07	3.9E-08	2.3E-09	3.9E-05	2.3E-06	2.7E-05	4.8E-07

			WPSA-Routine		WPSA-Excavation		W Tank Farm	
			At SWMU	Off-Facility	At SWMU	Off-Facility	At SWMU	Off-Facility
	C/Q (kg/m^3 per kg/m^2/s):		2.0E+01	2.5E+00	2.0E+01	2.5E+00	1.2E+01	4.0E-01
TCL/TAL Group	Constituent	CASRN	C_{air} (mg/m^3)	C_{air} (mg/m^3)	C_{air} (mg/m^3)	C_{air} (mg/m^3)	C_{air} (mg/m^3)	C_{air} (mg/m^3)
VOC	1,1,1-Trichloroethane	71-55-6	1.7E-04	1.4E-05	7.4E-02	9.2E-03		
VOC	1,1-Dichloroethane	75-34-3	2.9E-03	2.4E-04	7.9E-02	9.8E-03		
VOC	1,2-Dichloroethene (total)	540-59-0	1.0E-03	8.3E-05	6.8E-02	8.5E-03	1.4E-02	4.7E-04
VOC	2-Butanone	78-93-3			2.8E-02	3.5E-03	3.7E-02	1.2E-03
VOC	Acetone	67-64-1	5.1E-03	4.2E-04	1.4E-01	1.7E-02		
VOC	Benzene	71-43-2	2.4E-05	2.0E-06	6.5E-04	8.1E-05		
VOC	Carbon Disulfide	75-15-0	4.8E-05	4.0E-06	1.3E-03	1.6E-04		
VOC	Ethyl Benzene	100-41-4	8.0E-05	6.6E-06	2.3E-02	2.9E-03		
VOC	Styrene	100-42-5						
VOC	Tetrachloroethene	127-18-4	1.6E-04	1.3E-05	5.5E-03	6.9E-04	5.7E-02	1.9E-03
VOC	Toluene	108-88-3	3.5E-04	2.9E-05	2.9E-01	3.6E-02		
VOC	Trichloroethene	79-01-6	1.2E-04	1.0E-05	6.2E-03	7.8E-04	1.5E-02	5.1E-04
VOC	Xylenes (total)	1330-20-7	9.9E-05	8.2E-06	2.2E-01	2.8E-02		
SVOC	2-Methylnaphthalene	91-57-6						
SVOC	Benzo(a)anthracene	56-55-3						
SVOC	Benzo(a)pyrene	50-32-8			1.3E-04	1.6E-05		
SVOC	Benzo(b)fluoranthene	205-99-2	9.1E-07	7.6E-08	4.1E-04	5.1E-05		
SVOC	bis(2-Ethylhexyl)phthalate	117-81-7	1.1E-06	9.5E-08	3.3E-05	4.1E-06		
SVOC	Butylbenzylphthalate	85-68-7	8.1E-06	6.7E-07	2.4E-04	3.0E-05		
SVOC	Chrysene	218-01-9			1.7E-04	2.1E-05		
SVOC	Di-n-butylphthalate	84-74-2						
SVOC	Fluoranthene	206-44-0	4.4E-06	3.7E-07	1.9E-03	2.4E-04		
SVOC	Fluorene	86-73-7						
SVOC	Naphthalene	91-20-3						
SVOC	Phenanthrene	85-01-8	2.1E-05	1.8E-06	8.9E-03	1.1E-03		
SVOC	Pyrene	129-00-0	3.1E-06	2.6E-07	1.4E-03	1.8E-04		
PCB	Aroclor-1242	53469-21-9	1.7E-05	1.4E-06	4.7E-04	5.9E-05		
PCB	Aroclor-1254	11097-69-1						
PCB	Aroclor-1260	11096-82-5	1.4E-07	1.2E-08	4.5E-06	5.6E-07		
INORG	Antimony	7440-36-0	3.8E-08	4.7E-09	2.9E-04	3.7E-05		
INORG	Arsenic	7440-38-2	1.0E-08	1.2E-09	1.2E-05	1.5E-06	2.8E-06	9.2E-08
INORG	Barium	7440-39-3	2.6E-06	3.3E-07	2.6E-03	3.3E-04	1.3E-05	4.4E-07
INORG	Beryllium	7440-41-7	5.1E-10	6.4E-11	8.5E-07	1.1E-07		
INORG	Cadmium	7440-43-9	2.2E-08	2.7E-09	7.4E-05	9.3E-06	1.4E-06	4.6E-08
INORG	Chromium (total)	7440-47-3	7.5E-07	9.4E-08	1.0E-03	1.3E-04	5.4E-06	1.8E-07
INORG	Cobalt	7440-48-4	2.9E-08	3.6E-09	4.1E-05	5.1E-06	1.9E-06	6.4E-08
INORG	Copper	7440-50-8	1.2E-06	1.5E-07	6.3E-02	7.8E-03	7.0E-06	2.3E-07
INORG	Cyanide (total)	57-12-5						
INORG	Lead	7439-92-1	1.1E-06	1.4E-07	2.8E-03	3.5E-04	6.9E-06	2.3E-07
INORG	Manganese	7439-96-5	6.1E-07	7.6E-08	1.3E-03	1.7E-04	1.4E-04	4.7E-06
INORG	Mercury	7439-97-6	3.3E-10	4.1E-11	3.3E-07	4.1E-08		
INORG	Nickel	7440-02-0	4.4E-07	5.5E-08	2.6E-03	3.3E-04	7.1E-06	2.4E-07
INORG	Selenium	7782-49-2	1.7E-10	2.1E-11	4.1E-07	5.1E-08		
INORG	Silver	7440-22-4					6.0E-07	2.0E-08
INORG	Thallium	7440-28-0			2.5E-07	3.1E-08		
INORG	Vanadium	7440-62-2	2.5E-08	3.2E-09	4.4E-05	5.5E-06	5.8E-06	1.9E-07
INORG	Zinc	7440-66-6	9.0E-07	1.1E-07	1.2E-03	1.5E-04	2.1E-05	7.2E-07

Table 3-4: Ground Water Modeling Scenarios
Harrison Division-GMC, Moraine, Ohio

Ground Water Use Scenario	Pumping Locations	Potential Exposure Points
Scenario 1: Baseline conditions	• Baseline wells[1]	• West Carrollton municipal well field • Truck & Bus industrial wells • Moraine Engine industrial wells
Scenario 2: Potential use of Miami Shores in emergency	• Baseline wells • Miami Shores	• West Carrollton municipal well field • Truck & Bus industrial wells • Moraine Engine industrial wells • Miami Shores well field
Scenario 3: Potential use of Miami Shores in emergency and redevelopment of Delphi Thermal wells	• Baseline wells • Miami Shores • Delphi Thermal wells	• West Carrollton municipal well field • Truck & Bus industrial wells • Moraine Engine industrial wells • Miami Shores well field • Delphi Thermal industrial wells
Scenario 4: Potential use of Miami Shores with Dryden Rd South in severe emergency	• Baseline wells • Miami Shores • Dryden Rd South	• West Carrollton municipal well field • Truck & Bus industrial wells • Moraine Engine industrial wells • Miami Shores well field • Dryden Rd South well field
Scenario 5: Potential use of Miami Shores with Dryden Rd South in severe emergency and redevelopment of Delphi Thermal wells	• Baseline wells • Miami Shores • Dryden Rd South • Delphi Thermal wells	• West Carrollton municipal well field • Truck & Bus industrial wells • Moraine Engine industrial wells • Miami Shores well field • Dryden Rd South well field • Delphi Thermal industrial wells
Scenario 6: Same as Scenario 1 but with interim measures	• Same as Scenario 1 • TW2 and DN13	• Same as in Scenario 1
Scenario 7: Same as Scenario 2 but with interim measures	• Same as Scenario 2 • TW2 and DN13	• Same as in Scenario 2
Scenario 8: Same as Scenario 3 but with interim measures	• Same as Scenario 3 • TW2 and DN13	• Same as in Scenario 3
Scenario 9: Same as Scenario 4 but with interim measures	• Same as Scenario 4 • TW2 and DN13	• Same as in Scenario 4
Scenario 10: Same as Scenario 5 but with interim measures	• Same as Scenario 5 • TW2 and DN13	• Same as in Scenario 5

[1]Baseline wells include: Appleton Paper, Beerman Realty, Cains Mobile Home Park, Moraine Engine, Truck & Bus, Miami Paper, Moraine Country Club, NCR Country Club, Siebenthaler Nursery, City of West Carrollton, West Carrollton Parchment (G&M 1994)

Table 3-5: Summary of Estimated Ground Water Concentrations (mg/L) for Ground Water Use Evaluated in Scenario 1 Harrison Division-GMC, Moraine, Ohio

TCL/TAL Group	Constituent	CASRN	Truck & Bus	Moraine Engine	West Carrollton
VOC	1,1,1-Trichloroethane	71-55-6	0.	0.	0.
VOC	1,1-Dichloroethane	75-34-3	0.	0.	0.
VOC	1,1-Dichloroethene	75-35-4	0.	0.	0.
VOC	1,2-Dichloroethene (total)	540-59-0	0.	0.	0.
VOC	2-Butanone	78-93-3	0.	0.	0.0001
VOC	Acetone	67-64-1	0.	0.	0.0002
VOC	Benzene	71-43-2	0.	0.	0.
VOC	Carbon Disulfide	75-15-0	0.	0.	0.
VOC	Chlorobenzene	108-90-7	0.	0.	0.
VOC	Chloroethane	75-00-3	0.	0.	0.
VOC	Chloroform	67-66-3	0.	0.	0.
VOC	Ethyl Benzene	100-41-4	0.	0.	0.
VOC	Styrene	100-42-5	0.	0.	0.
VOC	Tetrachloroethene	127-18-4	0.	0.	0.
VOC	Toluene	108-88-3	0.	0.	0.
VOC	trans-1,2-Dichloroethene	156-60-5	0.	0.	0.
VOC	Trichloroethene	79-01-6	0.	0.	0.
VOC	Trichlorofluoromethane	75-69-4	0.	0.	0.
VOC	Vinyl Chloride	75-01-4	0.	0.	0.
VOC	Xylenes (total)	1330-20-7	0.	0.	0.
SVOC	1,2-Dichlorobenzene	95-50-1	0.	0.	0.
SVOC	2-Methylnaphthalene	91-57-6	0.	0.	0.
SVOC	Benzo(a)anthracene	56-55-3	0.	0.	0.
SVOC	Benzo(a)pyrene	50-32-8	0.	0.	0.
SVOC	Benzo(b)fluoranthene	205-99-2	0.	0.	0.
SVOC	bis(2-Ethylhexyl)phthalate	117-81-7	0.	0.	0.
SVOC	Butylbenzylphthalate	85-68-7	0.	0.	0.
SVOC	Chrysene	218-01-9	0.	0.	0.
SVOC	Di-n-butylphthalate	84-74-2	0.	0.	0.
SVOC	Fluoranthene	206-44-0	0.	0.	0.
SVOC	Fluorene	86-73-7	0.	0.	0.
SVOC	Naphthalene	91-20-3	0.	0.	0.
SVOC	Phenanthrene	85-01-8	0.	0.	0.
SVOC	Pyrene	129-00-0	0.	0.	0.
PCB	Aroclor-1242	53469-21-9	0.	0.	0.
PCB	Aroclor-1254	11097-69-1	0.	0.	0.
PCB	Aroclor-1260	11096-82-5	0.	0.	0.
INORG	Antimony	7440-36-0	0.	0.	0.
INORG	Arsenic	7440-38-2	0.	0.	0.
INORG	Barium	7440-39-3	0.0013	0.0006	0.0006
INORG	Beryllium	7440-41-7	0.	0.	0.
INORG	Cadmium	7440-43-9	0.	0.	0.
INORG	Chromium (total)	7440-47-3	0.	0.	0.0001
INORG	Cobalt	7440-48-4	0.0003	0.0001	0.
INORG	Copper	7440-50-8	0.	0.	0.
INORG	Cyanide (total)	57-12-5	0.	0.	0.
INORG	Lead	7439-92-1	0.	0.	0.
INORG	Mercury	7439-97-6	0.	0.	0.
INORG	Nickel	7440-02-0	0.	0.	0.
INORG	Selenium	7782-49-2	0.	0.	0.
INORG	Silver	7440-22-4	0.	0.	0.
INORG	Thallium	7440-28-0	0.	0.	0.
INORG	Tin	7440-31-5	0.	0.	0.
INORG	Vanadium	7440-62-2	0.	0.	0.
INORG	Zinc	7440-66-6	0.	0.	0.

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Table 3-6: Summary of Estimated Ground Water Concentrations (mg/L) for Ground Water Use Evaluated in Scenario 2
Harrison Division-GMC, Moraine, Ohio

TCL/TAL Group	Constituent	CASRN	Miami Shores	Truck & Bus	Moraine Engine	West Carrollton
VOC	1,1,1-Trichloroethane	71-55-6	0.0046	0.	0.	0.
VOC	1,1-Dichloroethane	75-34-3	0.0136	0.	0.	0.0001
VOC	1,1-Dichloroethene	75-35-4	0.	0.	0.	0.
VOC	1,2-Dichloroethene (total)	540-59-0	0.0504	0.	0.	0.0002
VOC	2-Butanone	78-93-3	0.0903	0.	0.	0.0004
VOC	Acetone	67-64-1	0.0761	0.	0.	0.0004
VOC	Benzene	71-43-2	0.0002	0.	0.	0.
VOC	Carbon Disulfide	75-15-0	0.0002	0.	0.	0.
VOC	Chlorobenzene	108-90-7	0.	0.	0.	0.
VOC	Chloroethane	75-00-3	0.0003	0.	0.	0.
VOC	Chloroform	67-66-3	0.	0.	0.	0.
VOC	Ethyl Benzene	100-41-4	0.0071	0.	0.	0.
VOC	Styrene	100-42-5	0.	0.	0.	0.
VOC	Tetrachloroethene	127-18-4	0.0009	0.	0.	0.
VOC	Toluene	108-88-3	0.0284	0.	0.	0.0001
VOC	trans-1,2-Dichloroethene	156-60-5	0.0002	0.	0.	0.
VOC	Trichloroethene	79-01-6	0.0018	0.	0.	0.
VOC	Trichlorofluoromethane	75-69-4	0.0002	0.	0.	0.
VOC	Vinyl Chloride	75-01-4	0.0003	0.	0.	0.
VOC	Xylenes (total)	1330-20-7	0.0221	0.	0.	0.0001
SVOC	1,2-Dichlorobenzene	95-50-1	0.	0.	0.	0.
SVOC	2-Methylnaphthalene	91-57-6	0.	0.	0.	0.
SVOC	Benzo(a)anthracene	56-55-3	0.	0.	0.	0.
SVOC	Benzo(a)pyrene	50-32-8	0.	0.	0.	0.
SVOC	Benzo(b)fluoranthene	205-99-2	0.	0.	0.	0.
SVOC	bis(2-Ethylhexyl)phthalate	117-81-7	0.	0.	0.	0.
SVOC	Butylbenzylphthalate	85-68-7	0.0002	0.	0.	0.
SVOC	Chrysene	218-01-9	0.	0.	0.	0.
SVOC	Di-n-butylphthalate	84-74-2	0.	0.	0.	0.
SVOC	Fluoranthene	206-44-0	0.0004	0.	0.	0.
SVOC	Fluorene	86-73-7	0.	0.	0.	0.
SVOC	Naphthalene	91-20-3	0.0004	0.	0.	0.
SVOC	Phenanthrene	85-01-8	0.0015	0.	0.	0.
SVOC	Pyrene	129-00-0	0.0003	0.	0.	0.
PCB	Aroclor-1242	53469-21-9	0.	0.	0.	0.
PCB	Aroclor-1254	11097-69-1	0.	0.	0.	0.
PCB	Aroclor-1260	11096-82-5	0.	0.	0.	0.
INORG	Antimony	7440-36-0	0.0049	0.	0.	0.
INORG	Arsenic	7440-38-2	0.0025	0.	0.	0.
INORG	Barium	7440-39-3	0.1259	0.0014	0.0006	0.0011
INORG	Beryllium	7440-41-7	0.	0.	0.	0.
INORG	Cadmium	7440-43-9	0.0004	0.	0.	0.
INORG	Chromium (total)	7440-47-3	0.0345	0.	0.	0.0001
INORG	Cobalt	7440-48-4	0.0038	0.0003	0.0001	0.
INORG	Copper	7440-50-8	0.0156	0.	0.	0.0001
INORG	Cyanide (total)	57-12-5	0.0029	0.	0.	0.
INORG	Lead	7439-92-1	0.0008	0.	0.	0.
INORG	Mercury	7439-97-6	0.	0.	0.	0.
INORG	Nickel	7440-02-0	0.0275	0.	0.	0.0001
INORG	Selenium	7782-49-2	0.0002	0.	0.	0.
INORG	Silver	7440-22-4	0.	0.	0.	0.
INORG	Thallium	7440-28-0	0.	0.	0.	0.
INORG	Tin	7440-31-5	0.	0.	0.	0.
INORG	Vanadium	7440-62-2	0.0002	0.	0.	0.
INORG	Zinc	7440-66-6	0.0076	0.	0.	0.

Table 3-7: Summary of Estimated Ground Water Concentrations (mg/L) for Ground Water Use Evaluated in Scenario 3
Harrison Division-GMC, Moraine, Ohio

TCL/TAL Group	Constituent	CASRN	Miami Shores	Truck & Bus	Moraine Engine	Delphi Thermal	West Carrollton
VOC	1,1,1-Trichloroethane	71-55-6	0.0034	0.	0.	0.0033	0.
VOC	1,1-Dichloroethane	75-34-3	0.01	0.	0.	0.0087	0.
VOC	1,1-Dichloroethene	75-35-4	0.	0.	0.	0.	0.
VOC	1,2-Dichloroethene (total)	540-59-0	0.0353	0.	0.	0.0472	0.0001
VOC	2-Butanone	78-93-3	0.0635	0.	0.	0.1581	0.0002
VOC	Acetone	67-64-1	0.0518	0.	0.	0.1061	0.0002
VOC	Benzene	71-43-2	0.0002	0.	0.	0.0001	0.
VOC	Carbon Disulfide	75-15-0	0.0001	0.	0.	0.0002	0.
VOC	Chlorobenzene	108-90-7	0.	0.	0.	0.	0.
VOC	Chloroethane	75-00-3	0.0002	0.	0.	0.	0.
VOC	Chloroform	67-66-3	0.	0.	0.	0.	0.
VOC	Ethyl Benzene	100-41-4	0.0052	0.	0.	0.002	0.
VOC	Styrene	100-42-5	0.	0.	0.	0.	0.
VOC	Tetrachloroethene	127-18-4	0.0006	0.	0.	0.0027	0.
VOC	Toluene	108-88-3	0.0209	0.	0.	0.0206	0.0001
VOC	trans-1,2-Dichloroethene	156-60-5	0.0002	0.	0.	0.	0.
VOC	Trichloroethene	79-01-6	0.0013	0.	0.	0.0015	0.
VOC	Trichlorofluoromethane	75-69-4	0.0002	0.	0.	0.0005	0.
VOC	Vinyl Chloride	75-01-4	0.0002	0.	0.	0.	0.
VOC	Xylenes (total)	1330-20-7	0.0161	0.	0.	0.0133	0.0001
SVOC	1,2-Dichlorobenzene	95-50-1	0.	0.	0.	0.	0.
SVOC	2-Methylnaphthalene	91-57-6	0.	0.	0.	0.0001	0.
SVOC	Benzo(a)anthracene	56-55-3	0.	0.	0.	0.	0.
SVOC	Benzo(a)pyrene	50-32-8	0.	0.	0.	0.	0.
SVOC	Benzo(b)fluoranthene	205-99-2	0.	0.	0.	0.	0.
SVOC	bis(2-Ethylhexyl)phthalate	117-81-7	0.	0.	0.	0.	0.
SVOC	Butylbenzylphthalate	85-68-7	0.0001	0.	0.	0.0001	0.
SVOC	Chrysene	218-01-9	0.	0.	0.	0.	0.
SVOC	Di-n-butylphthalate	84-74-2	0.	0.	0.	0.	0.
SVOC	Fluoranthene	206-44-0	0.0003	0.	0.	0.0003	0.
SVOC	Fluorene	86-73-7	0.	0.	0.	0.	0.
SVOC	Naphthalene	91-20-3	0.0002	0.	0.	0.0008	0.
SVOC	Phenanthrene	85-01-8	0.0011	0.	0.	0.0011	0.
SVOC	Pyrene	129-00-0	0.0002	0.	0.	0.0002	0.
PCB	Aroclor-1242	53469-21-9	0.	0.	0.	0.	0.
PCB	Aroclor-1254	11097-69-1	0.	0.	0.	0.	0.
PCB	Aroclor-1260	11096-82-5	0.	0.	0.	0.	0.
INORG	Antimony	7440-36-0	0.0036	0.	0.	0.0054	0.
INORG	Arsenic	7440-38-2	0.0018	0.	0.	0.0019	0.
INORG	Barium	7440-39-3	0.0923	0.0016	0.0005	0.1134	0.0008
INORG	Beryllium	7440-41-7	0.	0.	0.	0.	0.
INORG	Cadmium	7440-43-9	0.0003	0.	0.	0.0003	0.
INORG	Chromium (total)	7440-47-3	0.0253	0.	0.	0.0269	0.0001
INORG	Cobalt	7440-48-4	0.0028	0.0004	0.0001	0.0041	0.
INORG	Copper	7440-50-8	0.0115	0.	0.	0.0116	0.
INORG	Cyanide (total)	57-12-5	0.0018	0.	0.	0.0058	0.
INORG	Lead	7439-92-1	0.0006	0.0001	0.	0.0006	0.
INORG	Mercury	7439-97-6	0.	0.	0.	0.	0.
INORG	Nickel	7440-02-0	0.0202	0.	0.	0.0221	0.0001
INORG	Selenium	7782-49-2	0.0001	0.	0.	0.0001	0.
INORG	Silver	7440-22-4	0.	0.	0.	0.0001	0.
INORG	Thallium	7440-28-0	0.	0.	0.	0.	0.
INORG	Tin	7440-31-5	0.	0.	0.	0.	0.
INORG	Vanadium	7440-62-2	0.0001	0.	0.	0.0002	0.
INORG	Zinc	7440-66-6	0.0056	0.	0.	0.0059	0.

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Table 3-8: Summary of Estimated Ground Water Concentrations (mg/L) for Ground Water Use Evaluated in Scenario 4
Harrison Division-GMC, Moraine, Ohio

TCL/TAL Group	Constituent	CASRN	Dryden Road South	Miami Shores	Truck & Bus	Moraine Engine	West Carrollton
VOC	1,1,1-Trichloroethane	71-55-6	0.0609	0.0039	0.	0.	0.
VOC	1,1-Dichloroethane	75-34-3	0.1787	0.0114	0.	0.	0.
VOC	1,1-Dichloroethene	75-35-4	0.	0.	0.	0.	0.
VOC	1,2-Dichloroethene (total)	540-59-0	0.4487	0.0212	0.	0.	0.
VOC	2-Butanone	78-93-3	1.1248	0.0681	0.	0.	0.0001
VOC	Acetone	67-64-1	1.0487	0.0775	0.	0.	0.0002
VOC	Benzene	71-43-2	0.0028	0.0002	0.	0.	0.
VOC	Carbon Disulfide	75-15-0	0.0015	0.0001	0.	0.	0.
VOC	Chlorobenzene	108-90-7	0.	0.	0.	0.	0.
VOC	Chloroethane	75-00-3	0.0035	0.0002	0.	0.	0.
VOC	Chloroform	67-66-3	0.	0.	0.	0.	0.
VOC	Ethyl Benzene	100-41-4	0.0853	0.0047	0.	0.	0.
VOC	Styrene	100-42-5	0.	0.	0.	0.	0.
VOC	Tetrachloroethene	127-18-4	0.0102	0.0006	0.	0.	0.
VOC	Toluene	108-88-3	0.378	0.0245	0.	0.	0.
VOC	trans-1,2-Dichloroethene	156-60-5	0.0028	0.0001	0.	0.	0.
VOC	Trichloroethene	79-01-6	0.022	0.0013	0.	0.	0.
VOC	Trichlorofluoromethane	75-69-4	0.0006	0.0002	0.	0.	0.
VOC	Vinyl Chloride	75-01-4	0.0032	0.0002	0.	0.	0.
VOC	Xylenes (total)	1330-20-7	0.2875	0.0181	0.	0.	0.
SVOC	1,2-Dichlorobenzene	95-50-1	0.	0.	0.	0.	0.
SVOC	2-Methylnaphthalene	91-57-6	0.0007	0.0001	0.	0.	0.
SVOC	Benzo(a)anthracene	56-55-3	0.	0.	0.	0.	0.
SVOC	Benzo(a)pyrene	50-32-8	0.0002	0.	0.	0.	0.
SVOC	Benzo(b)fluoranthene	205-99-2	0.0003	0.	0.	0.	0.
SVOC	bis(2-Ethylhexyl)phthalate	117-81-7	0.0001	0.	0.	0.	0.
SVOC	Butylbenzylphthalate	85-68-7	0.0024	0.0002	0.	0.	0.
SVOC	Chrysene	218-01-9	0.0005	0.	0.	0.	0.
SVOC	Di-n-butylphthalate	84-74-2	0.	0.	0.	0.	0.
SVOC	Fluoranthene	206-44-0	0.0058	0.0004	0.	0.	0.
SVOC	Fluorene	86-73-7	0.	0.	0.	0.	0.
SVOC	Naphthalene	91-20-3	0.0056	0.0005	0.	0.	0.
SVOC	Phenanthrene	85-01-8	0.0199	0.0013	0.	0.	0.
SVOC	Pyrene	129-00-0	0.004	0.0003	0.	0.	0.
PCB	Aroclor-1242	53469-21-9	0.0002	0.	0.	0.	0.
PCB	Aroclor-1254	11097-69-1	0.	0.	0.	0.	0.
PCB	Aroclor-1260	11096-82-5	0.	0.	0.	0.	0.
INORG	Antimony	7440-36-0	0.0612	0.0038	0.	0.	0.
INORG	Arsenic	7440-38-2	0.0296	0.0017	0.	0.	0.
INORG	Barium	7440-39-3	1.5981	0.1082	0.0013	0.0006	0.0006
INORG	Beryllium	7440-41-7	0.	0.	0.	0.	0.
INORG	Cadmium	7440-43-9	0.0042	0.0002	0.	0.	0.
INORG	Chromium (total)	7440-47-3	0.4538	0.0291	0.	0.	0.0001
INORG	Cobalt	7440-48-4	0.0445	0.0029	0.0003	0.0001	0.
INORG	Copper	7440-50-8	0.2083	0.0135	0.	0.	0.
INORG	Cyanide (total)	57-12-5	0.0415	0.0034	0.	0.	0.
INORG	Lead	7439-92-1	0.0107	0.0007	0.	0.	0.
INORG	Mercury	7439-97-6	0.0001	0.	0.	0.	0.
INORG	Nickel	7440-02-0	0.358	0.0228	0.	0.	0.
INORG	Selenium	7782-49-2	0.0026	0.0002	0.	0.	0.
INORG	Silver	7440-22-4	0.0005	0.	0.	0.	0.
INORG	Thallium	7440-28-0	0.0001	0.	0.	0.	0.
INORG	Tin	7440-31-5	0.	0.	0.	0.	0.
INORG	Vanadium	7440-62-2	0.0023	0.0001	0.	0.	0.
INORG	Zinc	7440-66-6	0.1	0.0064	0.	0.	0.

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Table 3-9: Summary of Estimated Ground Water Concentrations (mg/L) for Ground Water Use Evaluated in Scenario 5
Harrison Division-GMC, Moraine, Ohio

TCL/TAL Group	Constituent	CASRN	Dryden Road South	Miami Shores	Truck & Bus	Moraine Engine	Delphi Thermal	West Carrollton
VOC	1,1,1-Trichloroethane	71-55-6	0.0565	0.0034	0.	0.	0.0027	0.
VOC	1,1-Dichloroethane	75-34-3	0.1656	0.0097	0.	0.	0.007	0.
VOC	1,1-Dichloroethene	75-35-4	0.	0.	0.	0.	0.	0.
VOC	1,2-Dichloroethene (total)	540-59-0	0.4227	0.0165	0.	0.	0.035	0.
VOC	2-Butanone	78-93-3	1.0143	0.0578	0.	0.	0.146	0.0001
VOC	Acetone	67-64-1	0.9784	0.0646	0.	0.	0.0865	0.
VOC	Benzene	71-43-2	0.0026	0.0001	0.	0.	0.0001	0.
VOC	Carbon Disulfide	75-15-0	0.0015	0.0001	0.	0.	0.0002	0.
VOC	Chlorobenzene	108-90-7	0.	0.	0.	0.	0.	0.
VOC	Chloroethane	75-00-3	0.0032	0.0002	0.	0.	0.	0.
VOC	Chloroform	67-66-3	0.	0.	0.	0.	0.	0.
VOC	Ethyl Benzene	100-41-4	0.0791	0.004	0.	0.	0.0015	0.
VOC	Styrene	100-42-5	0.	0.	0.	0.	0.	0.
VOC	Tetrachloroethene	127-18-4	0.009	0.0005	0.	0.	0.0024	0.
VOC	Toluene	108-88-3	0.3506	0.021	0.	0.	0.0165	0.
VOC	trans-1,2-Dichloroethene	156-60-5	0.0025	0.0001	0.	0.	0.	0.
VOC	Trichloroethene	79-01-6	0.0201	0.0011	0.	0.	0.0013	0.
VOC	Trichlorofluoromethane	75-69-4	0.0008	0.0001	0.	0.	0.0004	0.
VOC	Vinyl Chloride	75-01-4	0.0029	0.0001	0.	0.	0.	0.
VOC	Xylenes (total)	1330-20-7	0.2663	0.0155	0.	0.	0.0105	0.
SVOC	1,2-Dichlorobenzene	95-50-1	0.	0.	0.	0.	0.	0.
SVOC	2-Methylnaphthalene	91-57-6	0.0007	0.	0.	0.	0.0001	0.
SVOC	Benzo(a)anthracene	56-55-3	0.	0.	0.	0.	0.	0.
SVOC	Benzo(a)pyrene	50-32-8	0.0002	0.	0.	0.	0.	0.
SVOC	Benzo(b)fluoranthene	205-99-2	0.0003	0.	0.	0.	0.	0.
SVOC	bis(2-Ethylhexyl)phthalate	117-81-7	0.0001	0.	0.	0.	0.	0.
SVOC	Butylbenzylphthalate	85-68-7	0.0023	0.0001	0.	0.	0.0001	0.
SVOC	Chrysene	218-01-9	0.0004	0.	0.	0.	0.	0.
SVOC	Di-n-butylphthalate	84-74-2	0.	0.	0.	0.	0.	0.
SVOC	Fluoranthene	206-44-0	0.0054	0.0003	0.	0.	0.0003	0.
SVOC	Fluorene	86-73-7	0.	0.	0.	0.	0.	0.
SVOC	Naphthalene	91-20-3	0.0053	0.0004	0.	0.	0.0007	0.
SVOC	Phenanthrene	85-01-8	0.0185	0.0011	0.	0.	0.0009	0.
SVOC	Pyrene	129-00-0	0.0038	0.0002	0.	0.	0.0002	0.
PCB	Aroclor-1242	53469-21-9	0.0002	0.	0.	0.	0.	0.
PCB	Aroclor-1254	11097-69-1	0.	0.	0.	0.	0.	0.
PCB	Aroclor-1260	11096-82-5	0.	0.	0.	0.	0.	0.
INORG	Antimony	7440-36-0	0.0571	0.0032	0.	0.	0.0046	0.
INORG	Arsenic	7440-38-2	0.0276	0.0014	0.	0.	0.0017	0.
INORG	Barium	7440-39-3	1.4909	0.0914	0.0014	0.0005	0.093	0.0005
INORG	Beryllium	7440-41-7	0.	0.	0.	0.	0.	0.
INORG	Cadmium	7440-43-9	0.0039	0.0002	0.	0.	0.0002	0.
INORG	Chromium (total)	7440-47-3	0.4213	0.0249	0.	0.	0.0219	0.
INORG	Cobalt	7440-48-4	0.0417	0.0024	0.0003	0.0001	0.0034	0.
INORG	Copper	7440-50-8	0.1932	0.0116	0.	0.	0.0093	0.
INORG	Cyanide (total)	57-12-5	0.0388	0.0028	0.	0.	0.0048	0.
INORG	Lead	7439-92-1	0.0099	0.0006	0.	0.	0.0005	0.
INORG	Mercury	7439-97-6	0.0001	0.	0.	0.	0.	0.
INORG	Nickel	7440-02-0	0.3325	0.0195	0.	0.	0.0181	0.
INORG	Selenium	7782-49-2	0.0024	0.0001	0.	0.	0.0001	0.
INORG	Silver	7440-22-4	0.0004	0.	0.	0.	0.0001	0.
INORG	Thallium	7440-28-0	0.0001	0.	0.	0.	0.	0.
INORG	Tin	7440-31-5	0.	0.	0.	0.	0.	0.
INORG	Vanadium	7440-62-2	0.0022	0.0001	0.	0.	0.0002	0.
INORG	Zinc	7440-66-6	0.0928	0.0055	0.	0.	0.0048	0.

Table 3-10: Summary of Estimated Ground Water Concentrations (mg/L) for Ground Water Use Evaluated Use Evaluated in Scenario 6 Harrison Division-GMC, Moraine, Ohio

TCL/TAL Group	Constituent	CASRN	Dryden Road North	Truck & Bus	Moraine Engine	West Carrollton
VOC	1,1,1-Trichloroethane	71-55-6	0.0034	0.	0.	0.
VOC	1,1-Dichloroethane	75-34-3	0.0114	0.	0.	0.
VOC	1,1-Dichloroethene	75-35-4	0.	0.	0.	0.
VOC	1,2-Dichloroethene (total)	540-59-0	0.0822	0.	0.	0.
VOC	2-Butanone	78-93-3	0.0802	0.	0.	0.
VOC	Acetone	67-64-1	0.0919	0.	0.	0.
VOC	Benzene	71-43-2	0.0003	0.	0.	0.
VOC	Carbon Disulfide	75-15-0	0.0002	0.	0.	0.
VOC	Chlorobenzene	108-90-7	0.	0.	0.	0.
VOC	Chloroethane	75-00-3	0.0004	0.	0.	0.
VOC	Chloroform	67-66-3	0.	0.	0.	0.
VOC	Ethyl Benzene	100-41-4	0.0085	0.	0.	0.
VOC	Styrene	100-42-5	0.	0.	0.	0.
VOC	Tetrachloroethene	127-18-4	0.0014	0.	0.	0.
VOC	Toluene	108-88-3	0.021	0.	0.	0.
VOC	trans-1,2-Dichloroethene	156-60-5	0.0004	0.	0.	0.
VOC	Trichloroethene	79-01-6	0.0023	0.	0.	0.
VOC	Trichlorofluoromethane	75-69-4	0.0007	0.	0.	0.
VOC	Vinyl Chloride	75-01-4	0.0004	0.	0.	0.
VOC	Xylenes (total)	1330-20-7	0.0194	0.	0.	0.
SVOC	1,2-Dichlorobenzene	95-50-1	0.	0.	0.	0.
SVOC	2-Methylnaphthalene	91-57-6	0.0001	0.	0.	0.
SVOC	Benzo(a)anthracene	56-55-3	0.	0.	0.	0.
SVOC	Benzo(a)pyrene	50-32-8	0.	0.	0.	0.
SVOC	Benzo(b)fluoranthene	205-99-2	0.	0.	0.	0.
SVOC	bis(2-Ethylhexyl)phthalate	117-81-7	0.	0.	0.	0.
SVOC	Butylbenzylphthalate	85-68-7	0.0001	0.	0.	0.
SVOC	Chrysene	218-01-9	0.	0.	0.	0.
SVOC	Di-n-butylphthalate	84-74-2	0.	0.	0.	0.
SVOC	Fluoranthene	206-44-0	0.0003	0.	0.	0.
SVOC	Fluorene	86-73-7	0.	0.	0.	0.
SVOC	Naphthalene	91-20-3	0.0007	0.	0.	0.
SVOC	Phenanthrene	85-01-8	0.0011	0.	0.	0.
SVOC	Pyrene	129-00-0	0.0002	0.	0.	0.
PCB	Aroclor-1242	53469-21-9	0.	0.	0.	0.
PCB	Aroclor-1254	11097-69-1	0.	0.	0.	0.
PCB	Aroclor-1260	11096-82-5	0.	0.	0.	0.
INORG	Antimony	7440-36-0	0.0053	0.	0.	0.
INORG	Arsenic	7440-38-2	0.0027	0.	0.	0.
INORG	Barium	7440-39-3	0.1164	0.0004	0.0005	0.
INORG	Beryllium	7440-41-7	0.	0.	0.	0.
INORG	Cadmium	7440-43-9	0.0003	0.	0.	0.
INORG	Chromium (total)	7440-47-3	0.026	0.	0.	0.
INORG	Cobalt	7440-48-4	0.0045	0.0001	0.0001	0.
INORG	Copper	7440-50-8	0.0112	0.	0.	0.
INORG	Cyanide (total)	57-12-5	0.0049	0.	0.	0.
INORG	Lead	7439-92-1	0.0007	0.	0.	0.
INORG	Mercury	7439-97-6	0.	0.	0.	0.
INORG	Nickel	7440-02-0	0.0218	0.	0.	0.
INORG	Selenium	7782-49-2	0.0001	0.	0.	0.
INORG	Silver	7440-22-4	0.	0.	0.	0.
INORG	Thallium	7440-28-0	0.	0.	0.	0.
INORG	Tin	7440-31-5	0.	0.	0.	0.
INORG	Vanadium	7440-62-2	0.0002	0.	0.	0.
INORG	Zinc	7440-66-6	0.0058	0.	0.	0.

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Table 3-11: Summary of Estimated Ground Water Concentrations (mg/L) for Ground Water Use Evaluated in Scenario 7
Harrison Division-GMC, Moraine, Ohio

TCL/TAL Group	Constituent	CASRN	Dryden Road North	Miami Shores	Truck & Bus	Moraine Engine	West Carrollton
VOC	1,1,1-Trichloroethane	71-55-6	0.0062	0.	0.	0.	0.
VOC	1,1-Dichloroethane	75-34-3	0.0206	0.	0.	0.	0.
VOC	1,1-Dichloroethene	75-35-4	0.	0.	0.	0.	0.
VOC	1,2-Dichloroethene (total)	540-59-0	0.1025	0.	0.	0.	0.
VOC	2-Butanone	78-93-3	0.1188	0.	0.	0.	0.
VOC	Acetone	67-64-1	0.1778	0.	0.	0.	0.
VOC	Benzene	71-43-2	0.0005	0.	0.	0.	0.
VOC	Carbon Disulfide	75-15-0	0.0003	0.	0.	0.	0.
VOC	Chlorobenzene	108-90-7	0.	0.	0.	0.	0.
VOC	Chloroethane	75-00-3	0.0008	0.	0.	0.	0.
VOC	Chloroform	67-66-3	0.	0.	0.	0.	0.
VOC	Ethyl Benzene	100-41-4	0.0149	0.	0.	0.	0.
VOC	Styrene	100-42-5	0.	0.	0.	0.	0.
VOC	Tetrachloroethene	127-18-4	0.002	0.	0.	0.	0.
VOC	Toluene	108-88-3	0.0381	0.	0.	0.	0.
VOC	trans-1,2-Dichloroethene	156-60-5	0.0006	0.	0.	0.	0.
VOC	Trichloroethene	79-01-6	0.0039	0.	0.	0.	0.
VOC	Trichlorofluoromethane	75-69-4	0.0008	0.	0.	0.	0.
VOC	Vinyl Chloride	75-01-4	0.0007	0.	0.	0.	0.
VOC	Xylenes (total)	1330-20-7	0.0353	0.	0.	0.	0.
SVOC	1,2-Dichlorobenzene	95-50-1	0.	0.	0.	0.	0.
SVOC	2-Methylnaphthalene	91-57-6	0.0002	0.	0.	0.	0.
SVOC	Benzo(a)anthracene	56-55-3	0.	0.	0.	0.	0.
SVOC	Benzo(a)pyrene	50-32-8	0.	0.	0.	0.	0.
SVOC	Benzo(b)fluoranthene	205-99-2	0.	0.	0.	0.	0.
SVOC	bis(2-Ethylhexyl)phthalate	117-81-7	0.	0.	0.	0.	0.
SVOC	Butylbenzylphthalate	85-68-7	0.0002	0.	0.	0.	0.
SVOC	Chrysene	218-01-9	0.	0.	0.	0.	0.
SVOC	Di-n-butylphthalate	84-74-2	0.	0.	0.	0.	0.
SVOC	Fluoranthene	206-44-0	0.0006	0.	0.	0.	0.
SVOC	Fluorene	86-73-7	0.	0.	0.	0.	0.
SVOC	Naphthalene	91-20-3	0.0013	0.	0.	0.	0.
SVOC	Phenanthrene	85-01-8	0.0019	0.	0.	0.	0.
SVOC	Pyrene	129-00-0	0.0004	0.	0.	0.	0.
PCB	Aroclor-1242	53469-21-9	0.	0.	0.	0.	0.
PCB	Aroclor-1254	11097-69-1	0.	0.	0.	0.	0.
PCB	Aroclor-1260	11096-82-5	0.	0.	0.	0.	0.
INORG	Antimony	7440-36-0	0.0085	0.	0.	0.	0.
INORG	Arsenic	7440-38-2	0.004	0.	0.	0.	0.
INORG	Barium	7440-39-3	0.1961	0.0003	0.0003	0.0005	0.
INORG	Beryllium	7440-41-7	0.	0.	0.	0.	0.
INORG	Cadmium	7440-43-9	0.0005	0.	0.	0.	0.
INORG	Chromium (total)	7440-47-3	0.0458	0.	0.	0.	0.
INORG	Cobalt	7440-48-4	0.0068	0.	0.0001	0.0001	0.
INORG	Copper	7440-50-8	0.0204	0.	0.	0.	0.
INORG	Cyanide (total)	57-12-5	0.0098	0.	0.	0.	0.
INORG	Lead	7439-92-1	0.0012	0.	0.	0.	0.
INORG	Mercury	7439-97-6	0.	0.	0.	0.	0.
INORG	Nickel	7440-02-0	0.0376	0.	0.	0.	0.
INORG	Selenium	7782-49-2	0.0003	0.	0.	0.	0.
INORG	Silver	7440-22-4	0.0001	0.	0.	0.	0.
INORG	Thallium	7440-28-0	0.	0.	0.	0.	0.
INORG	Tin	7440-31-5	0.	0.	0.	0.	0.
INORG	Vanadium	7440-62-2	0.0003	0.	0.	0.	0.
INORG	Zinc	7440-66-6	0.0101	0.	0.	0.	0.

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Table 3-12: Summary of Estimated Ground Water Concentrations (mg/L) for Ground Water Use Evaluated in Scenario 8
Harrison Division-GMC, Moraine, Ohio

TCL/TAL Group	Constituent	CASRN	Dryden Road North	Miami Shores	Truck & Bus	Moraine Engine	Delphi Thermal	West Carrollton
VOC	1,1,1-Trichloroethane	71-55-6	0.0054	0.	0.	0.	0.0014	0.
VOC	1,1-Dichloroethane	75-34-3	0.0179	0.	0.	0.	0.0036	0.
VOC	1,1-Dichloroethene	75-35-4	0.	0.	0.	0.	0.	0.
VOC	1,2-Dichloroethene (total)	540-59-0	0.1036	0.	0.	0.	0.019	0.
VOC	2-Butanone	78-93-3	0.0993	0.	0.	0.	0.1121	0.
VOC	Acetone	67-64-1	0.1491	0.	0.	0.	0.0458	0.
VOC	Benzene	71-43-2	0.0004	0.	0.	0.	0.	0.
VOC	Carbon Disulfide	75-15-0	0.0003	0.	0.	0.	0.0001	0.
VOC	Chlorobenzene	108-90-7	0.	0.	0.	0.	0.	0.
VOC	Chloroethane	75-00-3	0.0007	0.	0.	0.	0.	0.
VOC	Chloroform	67-66-3	0.	0.	0.	0.	0.	0.
VOC	Ethyl Benzene	100-41-4	0.0129	0.	0.	0.	0.0007	0.
VOC	Styrene	100-42-5	0.	0.	0.	0.	0.	0.
VOC	Tetrachloroethene	127-18-4	0.0017	0.	0.	0.	0.0019	0.
VOC	Toluene	108-88-3	0.0333	0.	0.	0.	0.0086	0.
VOC	trans-1,2-Dichloroethene	156-60-5	0.0005	0.	0.	0.	0.	0.
VOC	Trichloroethene	79-01-6	0.0033	0.	0.	0.	0.0009	0.
VOC	Trichlorofluoromethane	75-69-4	0.0008	0.	0.	0.	0.0001	0.
VOC	Vinyl Chloride	75-01-4	0.0006	0.	0.	0.	0.	0.
VOC	Xylenes (total)	1330-20-7	0.0305	0.	0.	0.	0.0054	0.
SVOC	1,2-Dichlorobenzene	95-50-1	0.	0.	0.	0.	0.	0.
SVOC	2-Methylnaphthalene	91-57-6	0.0001	0.	0.	0.	0.	0.
SVOC	Benzo(a)anthracene	56-55-3	0.	0.	0.	0.	0.	0.
SVOC	Benzo(a)pyrene	50-32-8	0.	0.	0.	0.	0.	0.
SVOC	Benzo(b)fluoranthene	205-99-2	0.	0.	0.	0.	0.	0.
SVOC	bis(2-Ethylhexyl)phthalate	117-81-7	0.	0.	0.	0.	0.	0.
SVOC	Butylbenzylphthalate	85-68-7	0.0002	0.	0.	0.	0.0001	0.
SVOC	Chrysene	218-01-9	0.	0.	0.	0.	0.	0.
SVOC	Di-n-butylphthalate	84-74-2	0.	0.	0.	0.	0.	0.
SVOC	Fluoranthene	206-44-0	0.0005	0.	0.	0.	0.0001	0.
SVOC	Fluorene	86-73-7	0.	0.	0.	0.	0.	0.
SVOC	Naphthalene	91-20-3	0.0011	0.	0.	0.	0.0004	0.
SVOC	Phenanthrene	85-01-8	0.0017	0.	0.	0.	0.0005	0.
SVOC	Pyrene	129-00-0	0.0003	0.	0.	0.	0.0001	0.
PCB	Aroclor-1242	53469-21-9	0.	0.	0.	0.	0.	0.
PCB	Aroclor-1254	11097-69-1	0.	0.	0.	0.	0.	0.
PCB	Aroclor-1260	11096-82-5	0.	0.	0.	0.	0.	0.
INORG	Antimony	7440-36-0	0.0075	0.	0.	0.	0.0029	0.
INORG	Arsenic	7440-38-2	0.0036	0.	0.	0.	0.0011	0.
INORG	Barium	7440-39-3	0.1749	0.0001	0.0004	0.0004	0.0475	0.
INORG	Beryllium	7440-41-7	0.	0.	0.	0.	0.	0.
INORG	Cadmium	7440-43-9	0.0005	0.	0.	0.	0.0002	0.
INORG	Chromium (total)	7440-47-3	0.0404	0.	0.	0.	0.012	0.
INORG	Cobalt	7440-48-4	0.0062	0.	0.0001	0.0001	0.002	0.
INORG	Copper	7440-50-8	0.0179	0.	0.	0.	0.0048	0.
INORG	Cyanide (total)	57-12-5	0.0081	0.	0.	0.	0.0025	0.
INORG	Lead	7439-92-1	0.0011	0.	0.	0.	0.0003	0.
INORG	Mercury	7439-97-6	0.	0.	0.	0.	0.	0.
INORG	Nickel	7440-02-0	0.0333	0.	0.	0.	0.0102	0.
INORG	Selenium	7782-49-2	0.0002	0.	0.	0.	0.0001	0.
INORG	Silver	7440-22-4	0.	0.	0.	0.	0.0001	0.
INORG	Thallium	7440-28-0	0.	0.	0.	0.	0.	0.
INORG	Tin	7440-31-5	0.	0.	0.	0.	0.	0.
INORG	Vanadium	7440-62-2	0.0002	0.	0.	0.	0.0001	0.
INORG	Zinc	7440-66-6	0.0089	0.	0.	0.	0.0026	0.

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Table 4-1: USEPA Toxicity Values for Constituents Identified for Risk Assessment
Harrison Division-GMC, Moraine, Ohio

			SF_o (mg/kg/d)$^{-1}$				SF_i (mg/kg/d)$^{-1}$				RFD_o (mg/kg/d)			RFD_i (mg/kg/d)		
TCL/TAL Group	Constituent	CASRN	EPA Group	Value	Notes	Ref	EPA Group	Value	Notes	Ref	Value	Notes	Ref	Value	Notes	Ref
VOC	1,1,1-Trichloroethane	71-55-6	D				D				9.0E-02	26	13	2.9E-01	6	45
VOC	1,1-Dichloroethane	75-34-3	C				C				1.0E-01	26,6	2	1.0E-01	3,6	2
VOC	1,2-Dichloroethene (total)	540-59-0									9.0E-03		2			
VOC	2-Butanone	78-93-3	D				D				6.0E-01		1	2.9E-01		1
VOC	Acetone	67-64-1	D				D				1.0E-01		1			
VOC	Benzene	71-43-2	A	2.9E-02	26	1	A	2.9E-02		1		6			6	
VOC	Carbon Disulfide	75-15-0									1.0E-01		1	2.0E-01		1
VOC	Ethyl Benzene	100-41-4	D				D				1.0E-01		1	2.9E-01		1
VOC	Styrene	100-42-5									2.0E-01		1	2.9E-01		1
VOC	Tetrachloroethene	127-18-4	C-B2	5.2E-02		51	C-B2	2.0E-03		51	1.0E-02		1			
VOC	Toluene	108-88-3	D				D				2.0E-01		1	1.1E-01		1
VOC	Trichloroethene	79-01-6	C-B2	1.1E-02	18	49	C-B2	6.0E-03	18	49	6.0E-03	6	46			
VOC	Xylenes (total)	1330-20-7	D				D				2.0E+00		1			
SVOC	2-Methylnaphthalene	91-57-6									4.0E-02	9,21				
SVOC	Benzo(a)anthracene	56-55-3	B2	7.3E-01	5	10										
SVOC	Benzo(a)pyrene	50-32-8	B2	7.3E+00		1										
SVOC	Benzo(b)fluoranthene	205-99-2	B2	7.3E-01	5	10										
SVOC	bis(2-Ethylhexyl)phthalate	117-81-7	B2	1.4E-02		1					2.0E-02		1			
SVOC	Butylbenzylphthalate	85-68-7	C				C				2.0E-01		1			
SVOC	Chrysene	218-01-9	B2	7.3E-03	5	10										
SVOC	Di-n-butylphthalate	84-74-2	D				D				1.0E-01	6	1			
SVOC	Fluoranthene	206-44-0	D				D				4.0E-02		1			
SVOC	Fluorene	86-73-7	D				D				4.0E-02		1			
SVOC	Naphthalene	91-20-3	D				D				4.0E-02		43			
SVOC	Phenanthrene	85-01-8	D				D				4.0E-02	9				
SVOC	Pyrene	129-00-0	D				D				3.0E-02		1			
PCB	Aroclor-1242	53469-21-9	B2	7.7E+00	25						7.0E-05	16	9			
PCB	Aroclor-1254	11097-69-1	B2	7.7E+00	25						2.0E-05		1			
PCB	Aroclor-1260	11096-82-5	B2	7.7E+00	25						2.0E-05	17	9			
INORG	Antimony	7440-36-0									4.0E-04		1			
INORG	Arsenic	7440-38-2	A	1.5E+00		1	A	1.5E+01		1	3.0E-04		1			
INORG	Barium	7440-39-3									7.0E-02		1	1.0E-04	3,6	2
INORG	Beryllium	7440-41-7	B2	4.3E+00		1	B2	8.4E+00		1	5.0E-03		1			
INORG	Cadmium	7440-43-9	B1				B1	6.3E+00		1	1.0E-03		1			
INORG	Chromium (total)	7440-47-3					A	4.2E+01	8		5.0E-03	8				
INORG	Cobalt	7440-48-4									6.0E-02		37	5.7E-06		36
INORG	Copper	7440-50-8	D				D				3.8E-02		50			
INORG	Cyanide (total)	57-12-5	D				D				2.0E-02		1			
INORG	Lead	7439-92-1														
INORG	Manganese	7439-96-5	D				D				1.4E-01		1			
INORG	Mercury	7439-97-6	D				D				3.0E-04	6	2	8.6E-05		1
INORG	Nickel	7440-02-0	A				A	8.4E-01		1	2.0E-02		1			
INORG	Selenium	7782-49-2	D				D				5.0E-03		1			
INORG	Silver	7440-22-4	D				D				5.0E-03		1			
INORG	Thallium	7440-28-0									6.7E-05		52			
INORG	Vanadium	7440-62-2									7.0E-03	6	2			
INORG	Zinc	7440-66-6	D				D				3.0E-01		1			

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Note	Comment
3	HEAST Alternate Method.
5	Based on analogy to Benzo(a)pyrene [CASRN 50-32-8] using USEPA relative potency scheme described in Reference 10.
6	Under review, according to IRIS.
8	ENVIRON used Chromium VI [CASRN 18540-29-9] value as a surrogate.
9	ENVIRON used Naphthalene [CASRN 91-20-3] value as a surrogate.
16	USEPA used Aroclor 1016 [CASRN 12674-11-2] value as a surrogate.
17	USEPA used Aroclor 1254 [CASRN 11097-69-1] value as a surrogate.
18	Not verifiable, according to IRIS.
21	NCEA's Risk Assessment Issue Paper for: 2-Methylnapthalene [CASRN 91-57-6] states that use of Naphthalene as a surrogate for 2-Methylnaphthalene was considered, but the uncertainties in such an approach appear to be too great to warrant its adoption.
25	USEPA used value for Polychlorinated biphenyls [1336-36-3] as a surrogate.
26	USEPA obtained value by route-to-route extrapolation.

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Reference	Comment
1	USEPA. Integrated Risk Information System (IRIS). On-line database.
2	USEPA. 1995. Health Effects Assessment Summary Tables (HEAST). EPA 540/R-95/036. May. and FY-1995 Supplement to HEAST. EPA/540/R-95/142. November.
9	Personal communication between R. Shuler of ENVIRON and J. Cicmanec of OHEA on August 26 and August 30, 1994.
10	USEPA. 1993. Provisional Guidance for Quantitative Risk Assessment of Polycyclic Aromatic Hydrocarbons. EPA/600/2-93/089. July.
13	USEPA. 1992. HEAST. Annual FY 1992. OERR 9200.6-303 (92-1). March.
36	USEPA. NCEA. 1994. Risk Assessment Issue paper for: Derivation of a Provisional RfC for Cobalt [CASRN 7440-48-4]. August 4.
37	USEPA. NCEA. 1992. Oral Toxicity Assessment for Cobalt. March 12.
43	USEPA. NCEA. 1995. Risk Assessment Issue paper for: Provisional Oral RfD for Napthalene [CASRN 91-20-3]. Paper received on February 3, 1995.
45	USEPA. NCEA. 1992. Risk Assessment Issue paper for: Derivation of an Inhalation Concentration for 1,1,1-Trichloroethane (CASRN 71-55-6). August 5. Paper received on February 3, 1995.
46	USEPA. NCEA. 1995. Risk Assessment Issue paper for: Provisional oral RfD for Trichloroethylene (CASRN 79-01-6). Facsimile from R. Smith, Region III received on October 6, 1995.
49	USEPA. NCEA. 1995. Risk Assessment Issue paper for: Carcinogenicity Information for Trichloroethylene (TCE) [CASRN 79-01-6]. (Facsimile.) September 6.
50	USEPA. 1995. D.J. Reisman, ORD, (IRIS Contact for Copper) indicated that an Oral RfD of 3.8e-02 can be derived from a LOAEL of 0.076 mg/kg-day based on Chuttani et al. (1965) and an uncertainty factor of 2. August. Communication with D. Arsnow, ENVIRON.
51	USEPA. NCEA. 1995. Risk Assessment Issue paper for: Carcinogenicity Information for Tetrachloroethylene (perchloroethylene, PERC) [CASRN 127-18-4]. (Facsimile) September 11.
52	USEPA. Office of Water. 1995. Drinking Water Regulations and Health Advisories. May.

Table 5-1: Central Tendency Cumulative Cancer Risks and Hazard Index Estimates
Harrison Division-GMC, Moraine, Ohio

Cumulative Cancer Risks

	Routine Industrial			Excavation			Groundskeeping			Residential
SWMU	**Ingestion**	**Dermal**	**Inhalation**	**Ingestion**	**Dermal**	**Inhalation**	**Ingestion**	**Dermal**	**Inhalation**	**Inhalation**
Fill Area	1E-09		9E-11	1E-09		4E-08				4E-08
Landfill L1							6E-08		2E-09	2E-07
Landfill L2							4E-09		1E-10	3E-08
Landfill L3							8E-10		2E-11	2E-09
Liquid Waste Burner			5E-15	3E-10		6E-10				1E-11
North Settling Lagoon									7E-09	3E-07
South Settling Lagoon									1E-08	**1E-06**
South Tank Farm				6E-10		2E-09				5E-11
T04				7E-10		2E-09				1E-11
T05/T06				1E-09		3E-09				1E-10
T11	2E-11		3E-13	1E-09		4E-09				8E-10
T12				5E-10		2E-09				4E-11
Waste Pile Staging Area	2E-09		6E-10	**3E-08**		**4E-07**				1E-07
West Tank Farm				4E-10		5E-09				2E-10
Sum:	**3E-09**		**7E-10**				**7E-08**		**2E-08**	

Hazard Indices

	Routine Industrial			Excavation			Groundskeeping			Residential
SWMU	**Ingestion**	**Dermal**	**Inhalation**	**Ingestion**	**Dermal**	**Inhalation**	**Ingestion**	**Dermal**	**Inhalation**	**Inhalation**
Fill Area	7E-04		6E-05	7E-04		2E-02				1E-02
Landfill L1							6E-03		6E-04	**3E-02**
Landfill L2							5E-04		3E-05	3E-03
Landfill L3							8E-05		1E-05	4E-04
Liquid Waste Burner	1E-08		4E-09	3E-05		7E-04				3E-06
North Settling Lagoon									6E-05	1E-03
South Settling Lagoon									1E-04	6E-03
South Tank Farm				4E-05		8E-03				1E-04
T04				9E-05		2E-03				5E-06
T05/T06				1E-04		3E-03				5E-05
T11	2E-06		3E-07	2E-04		5E-03				2E-04
T12				2E-04		1E-03				1E-05
Waste Pile Staging Area	3E-04		3E-05	**3E-03**		**2E-02**				3E-03
West Tank Farm				2E-05		2E-03				3E-05
Sum:	**1E-03**		**9E-05**				**7E-03**		**8E-04**	

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Table 5-2: High-End Cumulative Cancer Risks and Hazard Index Estimates
Harrison Division-GMC, Moraine, Ohio

Cumulative Cancer Risks

	Routine Industrial			Excavation			Groundskeeping			Residential
SWMU	Ingestion	Dermal	Inhalation	Ingestion	Dermal	Inhalation	Ingestion	Dermal	Inhalation	Inhalation
Fill Area	1E-07		7E-09	7E-08		4E-07				3E-07
Landfill L1							7E-07		1E-08	1E-06
Landfill L2							4E-08		1E-09	2E-07
Landfill L3							8E-09		2E-10	1E-08
Liquid Waste Burner			1E-10	1E-08		7E-09				1E-10
North Settling Lagoon									7E-08	2E-06
South Settling Lagoon									1E-07	**7E-06**
South Tank Farm				3E-08		2E-08				5E-10
T04				3E-08		2E-08				1E-10
T05/T06				5E-08		3E-08				1E-09
T11	8E-08		8E-10	5E-08		5E-08				6E-09
T12				2E-08		2E-08				4E-10
Waste Pile Staging Area	2E-07		6E-08	**1E-06**		**5E-06**				1E-06
West Tank Farm				2E-08		4E-08				1E-09
Sum:	**4E-07**		**7E-08**				**7E-07**		**2E-07**	

Hazard Indices

	Routine Industrial			Excavation			Groundskeeping			Residential
SWMU	Ingestion	Dermal	Inhalation	Ingestion	Dermal	Inhalation	Ingestion	Dermal	Inhalation	Inhalation
Fill Area	1E-02		8E-04	6E-03		5E-02				2E-02
Landfill L1							1E-02		1E-03	**5E-02**
Landfill L2							9E-04		6E-05	7E-03
Landfill L3							2E-04		2E-05	8E-04
Liquid Waste Burner	4E-05		2E-05	3E-04		2E-03				8E-06
North Settling Lagoon									1E-04	2E-03
South Settling Lagoon									2E-04	1E-02
South Tank Farm				3E-04		2E-02				3E-04
T04				8E-04		4E-03				2E-05
T05/T06				1E-03		6E-03				2E-04
T11	2E-03		2E-04	1E-03		1E-02				5E-04
T12				1E-03		3E-03				4E-05
Waste Pile Staging Area	7E-03		5E-04	**3E-02**		**5E-02**				7E-03
West Tank Farm				2E-04		4E-03				9E-05
Sum:	**2E-02**		**2E-03**				**1E-02**		**2E-03**	

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Table 5-3: Estimated Distributions of Blood Lead Concentrations (ug/dL)
Harrison Division-GMC, Moraine, Ohio

Estimated Lead Uptake

SWMU	Exposure	On-Facility Worker ADD_{oral} (mg/kg/d)	On-Facility Worker ADD_{inh} (mg/kg/d)	Off-Facility ADD_{inh} (mg/kg/d)
Fill Area	Industrial	2.21E-05	1.01E-08	1.18E-06
Fill Area	Excavation	2.10E-05	3.89E-06	7.51E-07
Landfill L1	Groundskeeping	2.90E-06	1.50E-09	6.85E-08
North Settling Lagoon	Groundskeeping	0.00E+00	1.74E-09	3.75E-08
South Settling Lagoon	Groundskeeping	0.00E+00	7.87E-10	3.59E-08
Waste Pile Staging Area	Industrial	8.00E-07	3.32E-10	1.94E-08
Waste Pile Staging Area	Excavation	2.73E-06	4.59E-07	3.16E-08
	Total:	4.96E-05	4.36E-06	2.12E-06
	Absorption Fraction:	0.08	0.32	0.32
	Body Weight (kg):	70	70	70
	Lead Uptake (ug/d):	2.77E-01	9.77E-02	4.76E-02

Estimated Blood Lead Concentrations

		Worker	Resident
Total Lead Uptake (ug/d)	ADD_{total}	3.75E-01	4.76E-02
Biokinetic Slope Factor (ug/dL per ug/d)	BSF	0.32	0.32
Baseline Blood Lead (ug/dL)	$PbB_{baseline}$	2.6	2.6
Geometric Standard Deviation	GSD	1.37	1.37

Distribution Percentile	z	Worker PbB (ug/dL)	Resident PbB (ug/dL)
1	-2.33	1.3	1.3
5	-1.64	1.6	1.6
10	-1.28	1.8	1.7
20	-0.84	2.1	2.0
30	-0.52	2.3	2.2
40	-0.25	2.5	2.4
50	0.00	2.7	2.6
60	0.25	2.9	2.8
70	0.52	3.2	3.1
80	0.84	3.5	3.4
90	1.28	4.1	3.9
95	1.64	4.6	4.4
99	2.33	5.7	5.4

Table 5-4: Acceptable Drinking Water Concentrations (mg/L)
Harrison Division-GMC, Moraine, Ohio

TCL/TAL Group	Constituent	CASRN	Federal MCL	10^{-6} Risk Level	10^{-4} Risk Level	HQ of 1	PQL (Water)	Criterion Used
VOC	1,1,1-Trichloroethane	71-55-6	0.2			3.285	0.001	**0.2**
VOC	1,1-Dichloroethane	75-34-3				3.65	0.001	**3.65**
VOC	1,1-Dichloroethene	75-35-4	0.007	0.0001	0.0142	0.3285	0.001	**0.007**
VOC	1,2-Dichloroethene (total)	540-59-0	0.1			0.3285	0.001	**0.1**
VOC	2-Butanone	78-93-3				21.9	0.01	**21.9**
VOC	Acetone	67-64-1				3.65	0.02	**3.65**
VOC	Benzene	71-43-2	0.005	0.0029	0.2937		0.001	**0.005**
VOC	Carbon Disulfide	75-15-0				3.65	0.001	**3.65**
VOC	Chlorobenzene	108-90-7				0.73	0.001	**0.73**
VOC	Chloroethane	75-00-3					0.01	**0.01**
VOC	Chloroform	67-66-3		0.014	1.3962	0.365	0.001	**0.014**
VOC	Ethyl Benzene	100-41-4	0.7			3.65	0.001	**0.7**
VOC	Styrene	100-42-5	0.1			7.3	0.001	**0.1**
VOC	Tetrachloroethene	127-18-4	0.005	0.0016	0.1638	0.365	0.001	**0.005**
VOC	Toluene	108-88-3	1.			7.3	0.001	**1.**
VOC	trans-1,2-Dichloroethene	156-60-5	0.1			0.73	0.001	**0.1**
VOC	Trichloroethene	79-01-6	0.005	0.0077	0.7742	0.219	0.001	**0.005**
VOC	Trichlorofluoromethane	75-69-4				10.95	0.001	**10.95**
VOC	Vinyl Chloride	75-01-4	0.002	0.00004	0.0045		0.005	**0.002**
VOC	Xylenes (total)	1330-20-7	10.			73.	0.001	**10.**
SVOC	1,2-Dichlorobenzene	95-50-1	0.6			3.285	0.01	**0.6**
SVOC	2-Methylnaphthalene	91-57-6				1.46	0.01	**1.46**
SVOC	Benzo(a)anthracene	56-55-3		0.0001	0.0117		0.01	**0.01**
SVOC	Benzo(a)pyrene	50-32-8	0.0002	0.00001	0.0012		0.01	**0.0002**
SVOC	Benzo(b)fluoranthene	205-99-2		0.0001	0.0117		0.01	**0.01**
SVOC	bis(2-Ethylhexyl)phthalate	117-81-7	0.006	0.0061	0.6083	0.73	0.01	**0.006**
SVOC	Butylbenzylphthalate	85-68-7				7.3	0.01	**7.3**
SVOC	Chrysene	218-01-9		0.0117	1.1667		0.01	**0.0117**
SVOC	Di-n-butylphthalate	84-74-2				3.7	0.33	**3.7**
SVOC	Fluoranthene	206-44-0					0.01	**0.01**
SVOC	Fluorene	86-73-7				1.5	0.33	**1.5**
SVOC	Naphthalene	91-20-3				1.46	0.01	**1.46**
SVOC	Phenanthrene	85-01-8				1.46	0.01	**1.46**
SVOC	Pyrene	129-00-0				1.095	0.01	**1.095**
PCB	Aroclor-1242	53469-21-9	0.0005	0.00001	0.0011	0.0026	0.001	**0.0005**
PCB	Aroclor-1254	11097-69-1	0.0005	0.00001	0.0011	0.0007	0.001	**0.0005**
PCB	Aroclor-1260	11096-82-5	0.0005	0.00001	0.0011	0.0007	0.001	**0.0005**
INORG	Antimony	7440-36-0	0.006			0.0146	0.03	**0.006**
INORG	Arsenic	7440-38-2	0.05	0.0001	0.0057	0.011	0.002	**0.05**
INORG	Barium	7440-39-3	2.			2.555	0.01	**2.**
INORG	Beryllium	7440-41-7	0.004	0.00002	0.002	0.1825	0.001	**0.004**
INORG	Cadmium	7440-43-9	0.005			0.0183	0.003	**0.005**
INORG	Chromium (total)	7440-47-3	0.1			0.1825	0.005	**0.1**
INORG	Cobalt	7440-48-4				2.19	0.005	**2.19**
INORG	Copper	7440-50-8	1.3			1.387	0.005	**1.3**
INORG	Cyanide (total)	57-12-5	0.2			0.73	0.005	**0.2**
INORG	Lead	7439-92-1	0.015				0.002	**0.015**
INORG	Mercury	7439-97-6	0.002			0.011	0.0002	**0.002**
INORG	Nickel	7440-02-0				0.73	0.005	**0.73**
INORG	Selenium	7782-49-2	0.05			0.1825	0.001	**0.05**
INORG	Silver	7440-22-4				0.1825	0.005	**0.1825**
INORG	Thallium	7440-28-0	0.002			0.0024	0.002	**0.002**
INORG	Tin	7440-31-5				21.9	0.05	**21.9**
INORG	Vanadium	7440-62-2				0.2555	0.005	**0.2555**
INORG	Zinc	7440-66-6				10.95	0.005	**10.95**

Total PCBs

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Table 5-5: Uncertainty Analysis of Central Tendency Cumulative Cancer Risks and Hazard Index Estimates
Harrison Division-GMC, Moraine, Ohio

Cumulative Cancer Risks

	Routine Industrial			Excavation			Groundskeeping			Residential
SWMU	**Ingestion**	**Dermal**	**Inhalation**	**Ingestion**	**Dermal**	**Inhalation**	**Ingestion**	**Dermal**	**Inhalation**	**Inhalation**
Fill Area	1E-09	5E-11	1E-09	1E-09	5E-12	5E-08				2E-07
Landfill L1							6E-08	5E-09	2E-08	2E-06
Landfill L2							4E-09	2E-10	1E-09	2E-07
Landfill L3							8E-10	9E-12	2E-11	2E-09
Liquid Waste Burner			5E-15	3E-10	3E-12	9E-10				2E-11
North Settling Lagoon									9E-09	4E-07
South Settling Lagoon									3E-08	**2E-06**
South Tank Farm				6E-10	7E-13	2E-09				5E-11
T04				7E-10	8E-13	2E-09				1E-11
T05/T06				1E-09	1E-12	3E-09				1E-10
T11	2E-11	2E-13	3E-13	1E-09	1E-12	4E-09				8E-10
T12				5E-10	6E-13	2E-09				4E-11
Waste Pile Staging Area	2E-09	1E-10	3E-09	**3E-08**	**3E-10**	**5E-07**				4E-07
West Tank Farm				4E-10	7E-13	5E-09				2E-10
Sum:	**3E-09**	**2E-10**	**4E-09**				**7E-08**	**6E-09**	**6E-08**	

Hazard Indices

	Routine Industrial			Excavation			Groundskeeping			Residential
SWMU	**Ingestion**	**Dermal**	**Inhalation**	**Ingestion**	**Dermal**	**Inhalation**	**Ingestion**	**Dermal**	**Inhalation**	**Inhalation**
Fill Area	7E-04	9E-06	2E-04	7E-04	9E-07	2E-02				2E-02
Landfill L1							6E-03	5E-04	3E-03	**1E-01**
Landfill L2							5E-04	2E-05	1E-04	1E-02
Landfill L3							8E-05	8E-07	1E-05	4E-04
Liquid Waste Burner	1E-08	1E-10	4E-09	3E-05	4E-07	7E-04				3E-06
North Settling Lagoon									3E-04	5E-03
South Settling Lagoon									2E-03	6E-02
South Tank Farm				4E-05	5E-08	8E-03				1E-04
T04				9E-05	1E-07	2E-03				5E-06
T05/T06				1E-04	1E-07	3E-03				6E-05
T11	2E-06	3E-08	6E-07	2E-04	2E-07	6E-03				2E-04
T12				2E-04	2E-07	1E-03				1E-05
Waste Pile Staging Area	3E-04	9E-06	2E-04	**3E-03**	**4E-06**	**3E-02**				9E-03
West Tank Farm				2E-05	4E-08	3E-03				6E-05
Sum:	**1E-03**	**2E-05**	**4E-04**				**7E-03**	**5E-04**	**6E-03**	

DRAFT

Table 5-6: Uncertainty Analysis of High-End Cumulative Cancer Risks and Hazard Index Estimates
Harrison Division-GMC, Moraine, Ohio

Cumulative Cancer Risks

	Routine Industrial			Excavation			Groundskeeping			Residential
SWMU	**Ingestion**	**Dermal**	**Inhalation**	**Ingestion**	**Dermal**	**Inhalation**	**Ingestion**	**Dermal**	**Inhalation**	**Inhalation**
Fill Area	1E-07	2E-08	4E-08	7E-08	1E-09	5E-07				9E-07
Landfill L1							7E-07	3E-07	1E-07	6E-06
Landfill L2							4E-08	1E-08	5E-09	7E-07
Landfill L3							8E-09	5E-10	2E-10	1E-08
Liquid Waste Burner			1E-10	1E-08	8E-10	9E-09				1E-10
North Settling Lagoon									8E-08	2E-06
South Settling Lagoon									2E-07	**1E-05**
South Tank Farm				3E-08	2E-10	2E-08				5E-10
T04				3E-08	2E-10	2E-08				1E-10
T05/T06				5E-08	3E-10	3E-08				1E-09
T11	8E-08	5E-09	8E-10	5E-08	3E-10	5E-08				6E-09
T12				2E-08	1E-10	2E-08				4E-10
Waste Pile Staging Area	2E-07	8E-08	2E-07	**1E-06**	**7E-08**	**5E-06**				2E-06
West Tank Farm				2E-08	2E-10	4E-08				1E-09
Sum:	**4E-07**	**1E-07**	**2E-07**				**7E-07**	**3E-07**	**4E-07**	

Hazard Indices

	Routine Industrial			Excavation			Groundskeeping			Residential
SWMU	**Ingestion**	**Dermal**	**Inhalation**	**Ingestion**	**Dermal**	**Inhalation**	**Ingestion**	**Dermal**	**Inhalation**	**Inhalation**
Fill Area	1E-02	7E-04	2E-03	6E-03	4E-05	5E-02				4E-02
Landfill L1							1E-02	5E-03	3E-03	**1E-01**
Landfill L2							9E-04	2E-04	1E-04	1E-02
Landfill L3							2E-04	9E-06	2E-05	8E-04
Liquid Waste Burner	4E-05	3E-06	2E-05	3E-04	2E-05	2E-03				8E-06
North Settling Lagoon									3E-04	6E-03
South Settling Lagoon									2E-03	7E-02
South Tank Farm				3E-04	2E-06	2E-02				3E-04
T04				8E-04	5E-06	4E-03				2E-05
T05/T06				1E-03	7E-06	6E-03				2E-04
T11	2E-03	1E-04	3E-04	1E-03	9E-06	1E-02				5E-04
T12				1E-03	9E-06	3E-03				4E-05
Waste Pile Staging Area	7E-03	1E-03	2E-03	**3E-02**	**2E-04**	**5E-02**				1E-02
West Tank Farm				2E-04	2E-06	6E-03				1E-04
Sum:	**2E-02**	**2E-03**	**4E-03**				**1E-02**	**6E-03**	**6E-03**	

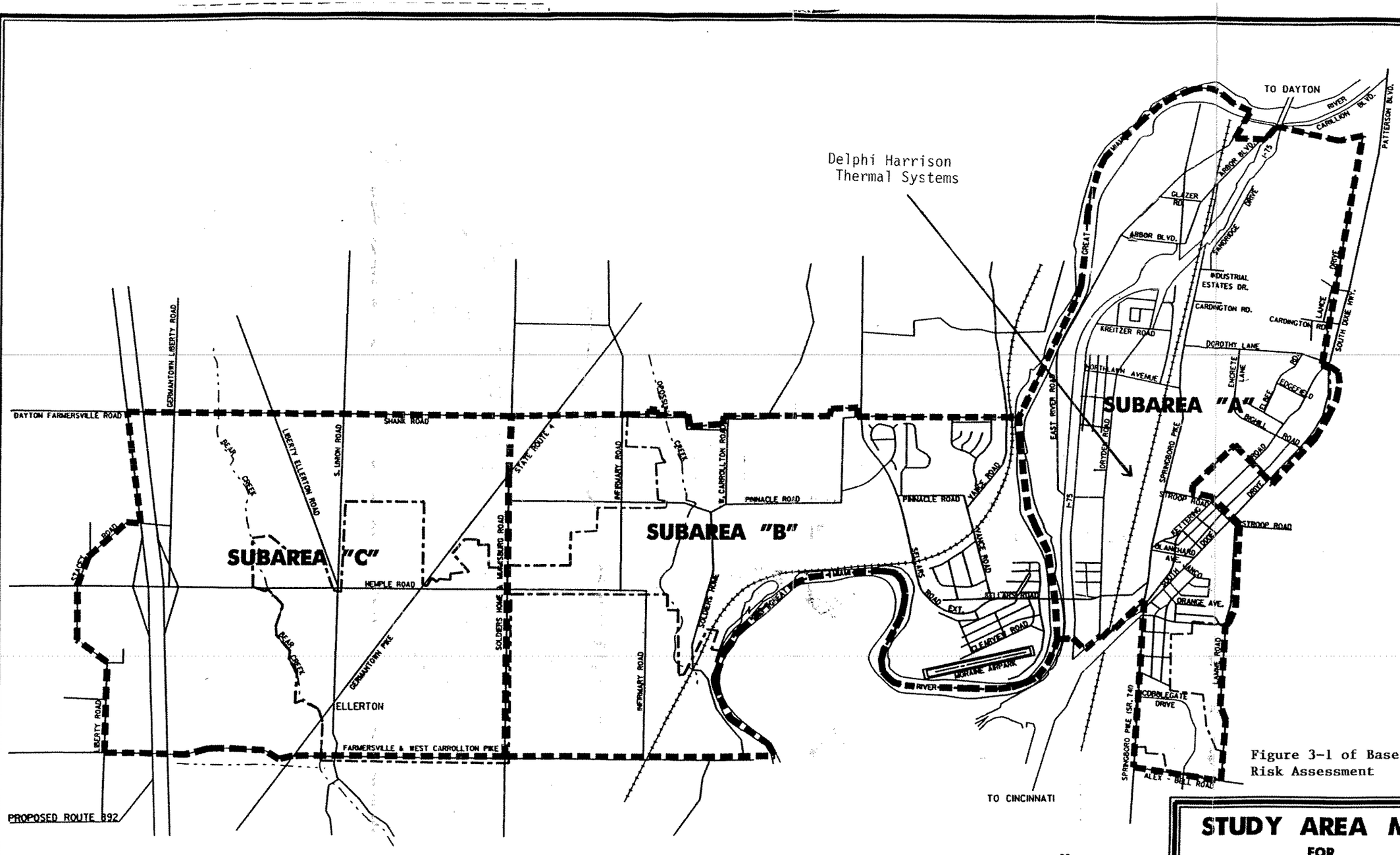
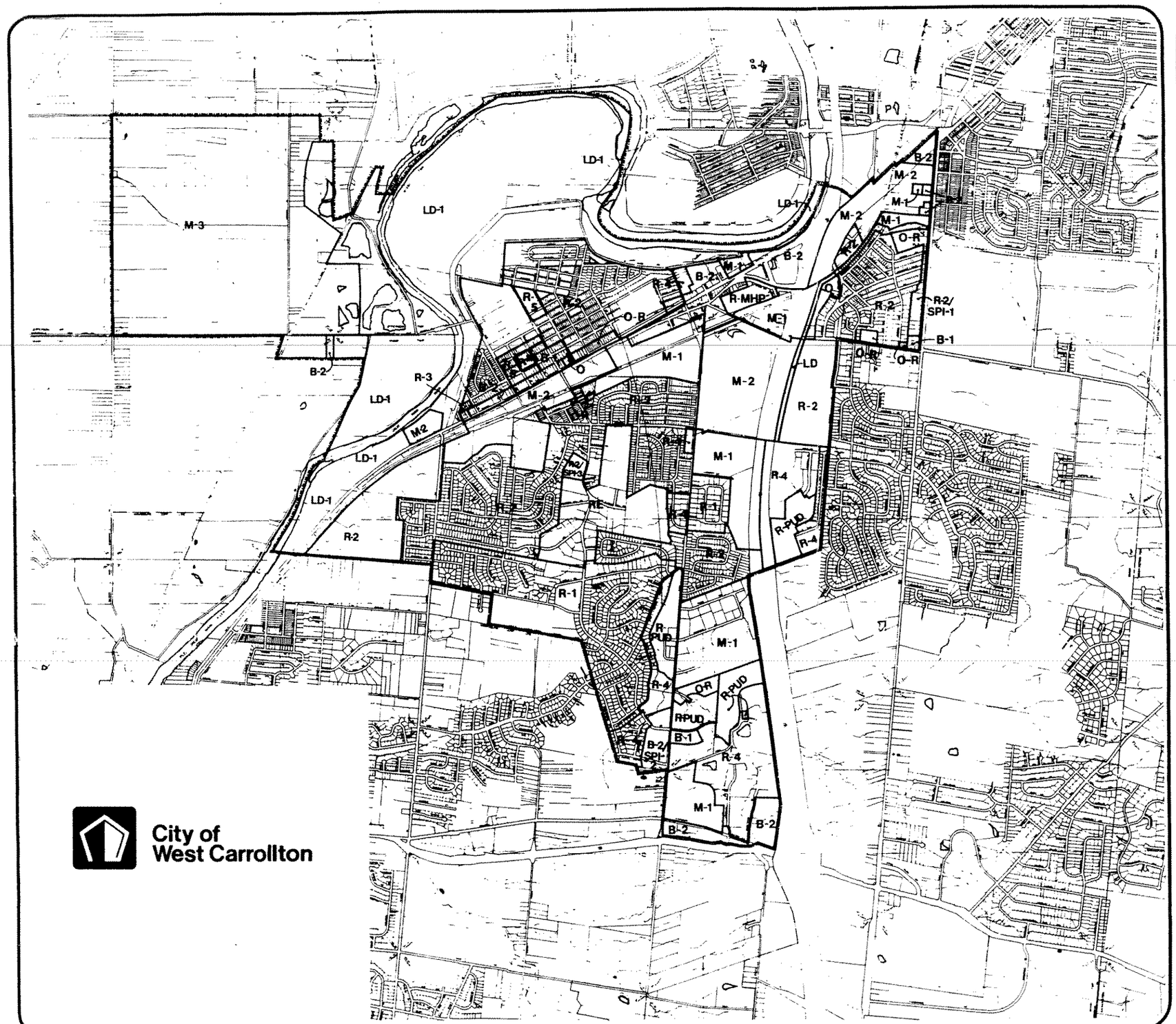


Figure 3-1 of Baseline Risk Assessment

STUDY AREA MAP
FOR
CITY OF MORAINE, OHIO
COMPREHENSIVE PLAN

Barge Waggoner Sumner and Cannon Inc.

ILLUSTRATION NO.	PAGE:
1	1-4



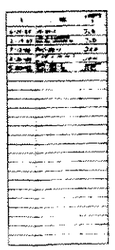
WEST CARROLLTON 2010

A
Comprehensive Plan
For
West Carrollton, Ohio

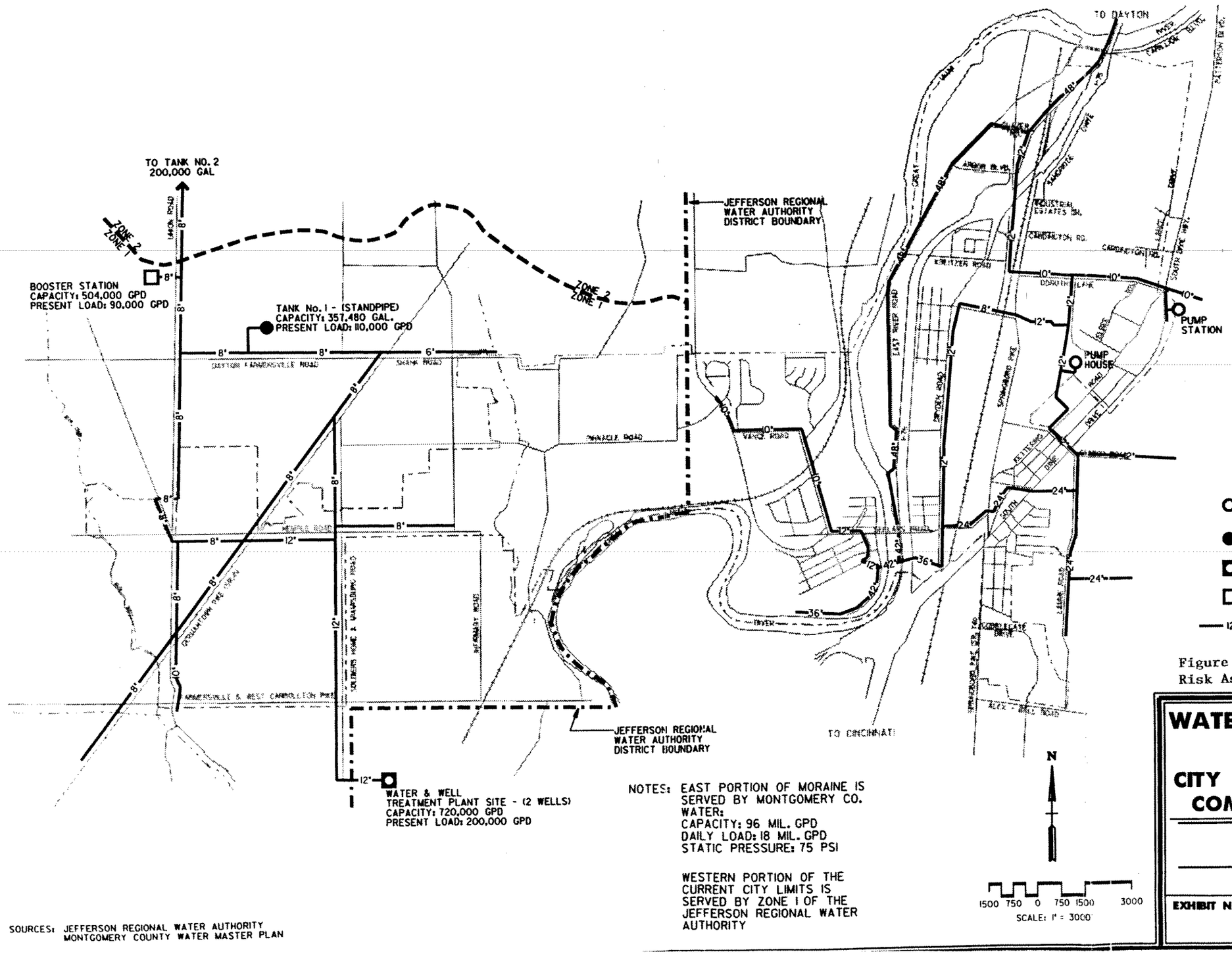
Figure 4-2
OFFICIAL ZONING DISTRICT MAP

M-2	MANUFACTURING DISTRICT
M-1	INDUSTRIAL PARK DISTRICT
B-2	GENERAL COMMERCIAL DISTRICT
B-1	CONVENIENCE COMMERCIAL DISTRICT
O	OFFICE DISTRICT
O-R	OFFICE RESIDENTIAL DISTRICT
R-MHP	MOBILE HOME PARK DISTRICT
R-PUD	PLANNED UNIT DEVELOPMENT DISTRICT
R-5	MULTIPLE FAMILY RESIDENTIAL DISTRICT
R-4	MULTIPLE FAMILY RESIDENTIAL DISTRICT
R-3	RESIDENTIAL DISTRICT
R-2	SINGLE FAMILY RESIDENTIAL DISTRICT
R-1	SINGLE FAMILY RESIDENTIAL DISTRICT
RE	RESIDENTIAL ESTATE DISTRICT
A-1	AGRICULTURAL DISTRICT
LD	LIMITED DEVELOPMENT DISTRICT
M-3	RURAL MANUFACTURING DISTRICT
R-MHP-1	MOBILE HOME PARK DISTRICT
SPI	SPECIAL INTEREST DISTRICT

Figure 3-3 of Baseline
Risk Assessment



JUNE, 1977



LEGEND

- EXISTING PUMPSTATION/ PUMP HOUSE
- STORAGE TANK
- WELL AND TREATMENT SITE
- BOOSTER STATION
- 12" — WATER LINE AND SIZE

NOTES: EAST PORTION OF MORAINE IS SERVED BY MONTGOMERY CO. WATER:
CAPACITY: 96 MIL. GPD
DAILY LOAD: 18 MIL. GPD
STATIC PRESSURE: 75 PSI

WESTERN PORTION OF THE CURRENT CITY LIMITS IS SERVED BY ZONE 1 OF THE JEFFERSON REGIONAL WATER AUTHORITY

SOURCES: JEFFERSON REGIONAL WATER AUTHORITY
MONTGOMERY COUNTY WATER MASTER PLAN

Figure 3-4 of Baseline Risk Assessment

WATER INFRASTRUCTURE

FOR

CITY OF MORAINE, OHIO COMPREHENSIVE PLAN

Barge Waggoner Sumner and Cannon Inc.

EXHIBIT NO.	PAGE:
IV	2-20

APPENDIX A
ECOLOGICAL ASSESSMENT

1.0 Introduction

As part of the RCRA Facility Investigation (RFI), a preliminary screening ecological assessment was conducted in the vicinity of the Delphi Harrison Thermal Systems (Delphi Thermal) facility in Moraine, Ohio (the Facility) to characterize any ecologically significant resources and to determine by field reconnaissance whether a more detailed ecological assessment is needed. The ecological assessment was conducted of a drainage ditch at the north end of the Facility and an area west of the Facility along the Great Miami River extending approximately 1.3 miles north from Sellers Road through which the drainage ditch flows before discharging to the River (Figure A-1). The screening ecological assessment was conducted following USEPA guidance (USEPA 1989D, 1991D). (The references mentioned in this appendix are listed in Section 6 of the draft *RFI Baseline Risk Assessment*.)

Characterization of the Facility's physical setting has been presented in Section 2 of the *Description of Current Conditions* (DOCC) report prepared by Geraghty & Miller (G&M 1991) and submitted to USEPA in 1991. Section 2 of the DOCC report provided the following site information:

- Location
- Description of facility ownership and operations
- Topography
- Climate
- Surficial soils
- Surface water and drainage features
- Hydrogeology

Descriptions of the solid waste management units (SWMUs) investigated in the RFI are presented in Section 3 of the DOCC report and Section 2.4 of the draft *RFI Final Report, Volume I*. The SWMUs described include:

- Fill Area
- Landfill L1 (inactive)
- Landfill L2 (inactive)
- Landfill L3 (inactive)
- Liquid Waste Burner (former)
- North Settling Lagoon (inactive)
- South Settling Lagoon (inactive)
- South Tank Farm (former)
- T4 (former tank)
- T5/T6 (former tank)
- T11 (tank)
- T12 (former tank)
- Waste Pile Staging Area
- West Tank Farm (former)

Of these SWMUs, only the inactive Landfills L2 and L3 and the North Settling Lagoon are located near the drainage ditch that was characterized in the ecological assessment.

As discussed in Section 2 of the draft *RFI Final Report, Volume II (RFI Baseline Risk Assessment)*, the topography between the drainage ditch and Landfill L2 and the North Settling Lagoon does not promote transport of surficial material in surface runoff from the SWMUs to the ditch. While runoff from Landfill L3 could reach the ditch, data indicate that surficial material at Landfill L3 is not impacting the ditch. That is, the RFI data show that the surficial material at Landfill L3 contains inorganic constituents that are all within natural background levels in soil. Additionally, the data indicate that very few organic constituents are present (i.e., acetone in one of three samples at 0.33 mg/kg and tetrachloroethene in two of three samples at a maximum of 0.01 mg/kg).

2.0 Ecological Resource Characterization

The drainage ditch originates in the City of Kettering and drains surface runoff from the western portion of Kettering before passing along the north end of the Facility on its way to the Great Miami River. Between the Facility and the Great Miami River, the drainage ditch flows through a strip of land that contains several small ponds and consists of several lots which are owned by the Miami Conservancy, Montgomery County, and private industries. This strip of land, including the portion of the drainage ditch that runs through it, is the only ecological resource of possible interest in the vicinity of the Facility. As discussed in detail in Section 3 of the *RFI Baseline Risk Assessment*, the Facility is located in an area of Moraine where the vast majority of land use is industrial and commercial.

The characterization of ecological resources along the drainage ditch and the strip of land was conducted in two phases. The first phase consisted of a review of published maps, literature, and other information obtained through the Ohio Environmental Protection Agency and the Ohio Department of Natural Resources. Through this review, lists of typical plant and animal species that may be found in the vicinity of the Facility were compiled. These lists are presented in Tables A-1 through A-5. The Ohio Department of Natural Resources, Division of Natural Areas and Preserves, provided information stating that it had no records of rare and endangered species in the area of the ecological assessment (ODNR 1993).

The second phase of the ecological assessment consisted of a field verification, which was conducted by ENVIRON personnel on October 27, 1993. In conducting the field verification, the assessment area was divided into six subareas (Figure A-1). The following subsections describe the ecological resources and the general health of the ecosystem observed in each of the subareas. Tables A-1 through A-5 identify the plant and animal species noted during the field verification.

2.1 Subarea 1: Drainage ditch at north end of Facility

The drainage ditch runs through a disturbed upland area with vegetation characteristic of a disturbed upland site. Vegetative cover includes fescue grasses, goldenrod species, teasel, queen Anne's Lace, asters, crown vetch, and thistles.

The ditch is approximately 10 feet wide in this area with a depth of 1 to 8 inches. The sediment consists of sand, silt, and gravel. Because of the depth, most of the ditch in this area is characterized as a run with infrequent riffles. The banks of the ditch are steeply sloped in this area and approximately 10 to 15 feet high. Both banks are lined with an erosion control fabric (coarse mesh) that has been covered by vegetation and stabilized soil.

Vegetative cover along the banks of the ditch at the north end of the Facility consists of small trees (less than 4 inches diameter at breast height) and shrub/scrub with canopy closure of approximately 80-90% over the ditch. Plant species observed along the ditch banks during the site investigation included honeysuckle or arum, silver maple, sumac, boxelder, eastern cottonwood, black cherry, black willow and American elm. Moderately dense periphyton was observed to be present throughout the ditch.

Evidence observed during the field investigation indicated that animal species are present in Subarea 1. Raccoon tracks were observed in the emergent sediments of the ditch, woodchuck burrows were found on the high banks, and fox scat was observed above the ditch. No fish were noted in the ditch.

Vegetation observed in Subarea 1 during the field investigation did not exhibit signs of stress, and animal species apparently present are typical of those in undeveloped land

near urban areas. Based on the observations during the field verification, the ecosystem is apparently healthy.

2.2 Subarea 2: Drainage Ditch West of Dryden Road and East of I-75

The ditch is approximately 10 feet wide in this area with an average depth of approximately 1.5 feet. The bottom substrate is a mixture of areas of sand, silt, and cobbles. The flow characteristic is essentially that of a long, slow pool. As the ditch nears I-75, however, the characteristics change, with the ditch widening to 12-15 feet, the depth decreasing to less than 12 inches and the substrate changing to predominantly gravel. Flow in the ditch also changes to more closely resemble a run and riffle area. The banks of the ditch are steep and approximately 10 to 15 feet high. Evidence of scouring of the banks extends up to approximately 3 feet above the observed water surface.

Vegetative cover along the banks at the eastern half of the ditch in this subarea is primarily small trees and shrub scrub that give way to trees with diameters exceeding 4 inches at breast height. Canopy closure over the ditch is nearly 100%. This tree cover extends 30 to 50 feet out from the ditch channel. Beyond this distance from the ditch, the landscape consists of maintained grassy rights-of-way or parking lots. Plant species noted in this area during the field investigation included boxelder, silver maple, American elm, honeysuckle, and phlox. Much of the ditch substrate, both cobble and gravel, was covered by periphyton.

Animal species observed in the area during the field investigation were a belted kingfisher and a killdeer, which was noted by its call. No fish were observed in the ditch in Subarea 2.

No vegetative stress was observed in this Subarea 2, and animal species observed were typical of those in undeveloped land near urban areas. Based on the observations during the field verification, the ecosystem is apparently healthy.

2.3 Subarea 3: Privately owned property between I-75 and East River Road

The southern portion of this property, up to 0.5 miles north of East River Road, is a maintained grassy area planted in fescue grasses. Mourning doves, a common crow, starlings, and common grackles were observed in this area during the field investigation.

The northern portion of this property is a pond area. The east shore of the pond runs near the I-75 right-of-way and consists of a belt of shrub/scrub vegetation from 30 to 60 feet wide. The north and south shores show a dominant overstory of sycamores, black willow, and silver maples. The west shore exhibits scattered silver maples and

crabapples that appear to be plantings in a surrounding area of maintained grass. Cattails are present in isolated stands on the western shoreline of the pond.

No vegetative stress was observed in these subareas during the field investigation, and animal species apparently present are typical of those in undeveloped land near urban areas. Based on the observations during the field verification, the ecosystem is apparently healthy.

2.4 Subarea 4: Area North of the Drainage Ditch Outfall and West of East River Road

A bicycle path divides this Subarea 4 into two parts. East of the bicycle path is a pond that is heavily wooded about its periphery except at the southeastern corner, which is primarily shrub/scrub vegetation. Islands in this pond exhibit standing dead trees, some of which have cavities. Wood ducks and mallards were noted in the pond's waters during the field investigation. Land west of the bicycle path is a bank that slopes steeply down to the Great Miami River. This entire area is heavily wooded. Black capped chickadees and a great blue heron were observed in this area during the field investigation.

Tree species observed in both parts of Subarea 4 included silver maple, boxelder, hackberry, honeylocust, black cherry, white mulberry, black walnut, eastern cottonwood, black willow, and sycamore.

No vegetative stress was observed in this area during the field investigation, and animal species apparently present are typical of those in undeveloped land near urban areas. Based on the observations during the field verification, the ecosystem is apparently healthy.

2.5 Subarea 5: Area South of Drainage Outfall and West of East River Road

The southern portion of this area, extending from Sellars Road north for approximately 600 to 700 yards, is a maintained grassy area extending from the north/south bicycle path west to the bank of the Great Miami River. Although the area appeared to be regularly mowed and was predominantly in fescue grasses, smartweed and panic-grass were noted on the river's edge during the field investigation. A red-tailed hawk was observed repeatedly in the air above this grassy zone, and five great blue herons were observed along the river bank. Both species are typical of undeveloped land near urban areas.

Two ponds are located east of the bicycle path in Subarea 5. The northern pond has shrub/scrub vegetation consisting of honeysuckle and black willows along its northern shoreline. All along the eastern shoreline of the pond is shrub/scrub vegetation consisting of honeylocust, boxelder, sycamore, cottonwood, and black cherry. This vegetation belt along the pond shoreline is approximately 10-20 feet wide. On the western bank of this pond, the vegetation consists of mowed grass with occasional trees

of the same species seen along the other shores of the pond. Mallards and four pied-billed grebes were observed in the waters of this pond during the field investigation, and people were noted fishing from the north shore of the pond.

There is restricted access to the southern pond, which is surrounded by a fence. A mowed area is located along the western shore of this pond, but the other shores exhibit an approximately 10-foot-thick vegetation belt of honeylocust, boxelder, sycamore, cottonwood, and black cherry. Three house finches were observed on the fence surrounding the pond during the field investigation.

The slope is gradual from the bicycle path down to the river. An area immediately adjacent to the bicycle path about 10 to 30 feet wide is mowed grasses. Beyond the mowed area and down to the river's edge are tree and shrub/scrub species including sycamore, boxelder, silver maple, hackberry, white mulberry, eastern cottonwood, osage orange and honeysuckle. Vines and herbaceous plants observed in this area during the field investigation included pokeweed and river bank grape.

During the field investigation, two red foxes were observed traveling through the shrub/scrub approximately 20 yards west of the bicycle path. Cottontail rabbit scat was observed in the mowed area along the bicycle path, and raccoon tracks were observed on the river bank.

No vegetative stress was observed in this subarea during the field investigation, and animal species apparently present are typical of those in undeveloped land near urban areas. Based on the observations during the field verification, the ecosystem is apparently healthy.

2.6 Subarea 6: The Drainage Ditch West of I-75

The ditch is approximately 10 to 20 feet wide in this area with variable depth from 3 inches to over 2 feet at the mouth. The bottom substrate is a mix of cobble and gravel upstream of the mouth and sand/silt at the mouth. The flow characteristics are a mixture of runs, riffles, and pools.

The ditch banks are steep and approximately 10 to 15 feet high. The canopy closure approaches 90% over the ditch. The vegetation is characterized by stands of large trees and middle story shrub/scrub consisting primarily of honeysuckle. Tree species present in this area include silver maple, hackberry, boxelder, American elm, and black willow.

No fish were observed in the ditch during the field investigation. However, an individual fishing at the mouth of the ditch reported catching rock bass and largemouth bass from the Great Miami River in this vicinity.

No vegetative stress was observed in Subarea 6 during the field investigation. Based on the observations during the field verification, the ecosystem is apparently healthy.

3.0 Conclusion

The ecological assessment area (i.e., all six subareas) is apparently healthy, based on the field verification. The area has a diverse plant community, and the animal species that are apparently present are typical of undeveloped land near urban areas. No stressed vegetation was observed in the area as a whole during the field investigation.

Additionally, as discussed in Section 2 of the *RFI Baseline Risk Assessment*, the SWMUs at the Facility are unlikely to have any impact on the area. The surface transport of waste constituents from a SWMU to the ditch is possible only for inactive Landfill L3, but the RFI data characterizing the surface material at Landfill L3 show this material to be within natural background levels of inorganic constituents in soil and to contain very low concentrations of organic constituents. Results of grab samples of sediment and surface water collected during the RFI from the ditch immediately upstream and downstream of the Facility show that the concentrations of constituents in the downstream samples were lower than or similar to those in the upstream samples, or were within natural background levels in soil.

Based on the results of preliminary screening ecological assessment and the lack of potential for the SWMUs to impact adversely the drainage ditch, further ecological assessment of the ditch or the other subareas is unnecessary.

Table A-1: Partial List of Birds that May Be Found in the Vicinity of the Facility Harrison Division-GMC, Moraine, Ohio	
Common Name	**Scientific Name**
Accipitridae (Hawk, eagle, kite, and harrier Family)	
Red-tailed hawk*	*Buteo jamaicensis*
Alcedinidae (Kingfisher Family)	
Belted kingfisher*	*Megaceryle alcyon*
Anatidae (Swan, goose, and duck Family)	
Canada Goose	*Branta Canadensis*
Wood duck*	*Aix sponsa*
Mallard*	*Anas platyrhynchos*
Apodidae (Swift Family)	
Chimney swift	*Chaetura pelagica*
Ardeidae (Herron and bittern Family)	
Green heron	*Butorides striatus*
Great blue heron*	*Ardea herodias*
Yellow-crowned night heron†	*Nyctanassa violacea*
Caprimulgidae (Nightjar Family)	
Common nighthawk	*Chordeiles minor*
Cathartidae (New world vulture Family)	
Turkey vulture	*Cathartes aura*
Charadriidae (Plovers Family)	
Killdeer*	*Charadrius vociferus*
Columbidae (Pigeon and dove Family)	
Mourning Dove*	*Zenaida macroura*
Rock dove	*Columba livia*
Corvidae (Crow, magpie, and jay Family)	
American crow*	*Corvus brachyrhynchos*
Blue jay	*Cyanocitta cristata*

Table A-1: Partial List of Birds that May Be Found in the Vicinity of the Facility Harrison Division-GMC, Moraine, Ohio	
Common Name	**Scientific Name**
Falconidae (Falcon Family)	
American kestrel	*Falco sparverius*
Fringillidae (Grossbeak, bunting, finch, and sparrow Family)	
Field sparrow	*Spizella pusilla*
Grasshopper sparrow	*Ammodramus savannarum*
Song sparrow*	*Melospiza melodia*
House finch*	*Carpodacus mexicanus*
House sparrow	*Passer domesticus*
American goldfinch	*Carduelis tristis*
Cardinal*	*Cardinalis cardinalis*
Slate-colored junco*	*Junco hyemalis*
Hirundinidae (Swallow Family)	
Barn swallow	*Hirundo rustica*
Northern rough-winged swallow	*Stelgidopteryx serripennis*
Purple martin	*Progne subis*
Icteridae (Oriole and blackbird Family)	
Red-winged blackbird	*Agelaius phoeniceus*
Common grackle*	*Quiscalus quiscula*
Brown-headed cowbird	*Molothrus ater*
Mimidae (Mockingbird and thrasher Family)	
Catbird	*Dumetella carolinensis*
Mockingbird	*Mimus polyglottos*
Paridae (Chickadee Family)	
Black-capped chickadee*	*Parus atricapillus*

Table A-1: Partial List of Birds that May Be Found in the Vicinity of the Facility Harrison Division-GMC, Moraine, Ohio

Common Name	Scientific Name
Parulidae (Wood warbler Family)	
Common yellowthroat	*Geothlypis trichas*
Yellow-throated warbler	*Dendroica dominica*
Yellow warbler	*Dendroica petechia*
Podicipedidae (Grebe Family)	
Pied-billed grebe*	*Podilymbus podiceps*
Rallidae (Rail, gallinule, and coot Family)	
American coot	*Fulica americana*
Scolopacidae (Sandpiper Family)	
Spotted sandpiper	*Actitis macularia*
Sturnidae (Starling Family)	
European starling*	*Sturnus vulgaris*
Turdidae (Thrush Family)	
American robin*	*Turdus migratorius*
Tyrannidae (Tyrant flycatcher Family)	
Eastern kingbird	*Tyrannus tyrannus*

Source:

Peterjohn, B.G., and D.L. Rice. 1991. *The Ohio Breeding Bird Atlas.* The Ohio Department of Natural Resources, Division of Natural Areas and Preserved. Columbus, Ohio.

* Spotted or identified by call during field verification.
† Considered by the State of Ohio to be an endangered species.

Table A-2: Partial List of Mammals that May Be Found in the Vicinity of the Facility Harrison Division-GMC, Moraine, Ohio	
Common Name	**Scientific Name**
Canidae (Dog, fox, and wolf Family)	
Red fox*	*Vulpes vulpes*
Cervidae (Deer Family)	
White-tailed deer*	*Odocoileus virginianus*
Didelphidae (Possum family)	
Possum	*Didelphis virginiana*
Soricidae (Shrew Family)	
Short-tailed shrew	*Blarina brevicauda*
Talpidae (Mole Family)	
Eastern mole	*Scalopus aquaticus*
Verspertilionidae (Bat Family)	
Little brown bat	*Myotis lucifugus*
Big brown bat	*Eptesicus fuscus*
Lagomorpha orders (Pikas, rabbits, and hares)	
Leporidae (Rabbit and hare Family)	
Cottontail rabbit*	*Sylvilagus floridanus*
Rodentia Order (Rodents)	
Sciuridae (Squirrel Family)	
Eastern chipmunk	*Tamias striatus*
Woodchuck*	*Marmota monax*
Ground squirrel	*Spermophilus tridecemlineatus*
Gray squirrel	*Sciurus carolinensis*
Fox squirrel	*Sciurus niger*
Red squirrel	*Tamiasciurus hudsonicus*

Table A-3: Partial List of Plants that May Be Found in the Vicinity of the Facility Harrison Division-GMC, Moraine, Ohio	
Common Name	**Scientific Name**
Aceraceae (Maple Family)	
Red maple	*Acer rubrum*
Sugar maple	*Acer saccharum*
Silver maple*	*Acer saccharinum*
Boxelder*	*Acer negundo*
Anacardiaceae (Cashew Family)	
Sumac*	*Rhus sp.*
Poison ivy	*Rhus radicans*
Apiaceae (Parsley Family)	
Queen Anne's lace*	*Daucus carota*
Asteraceae (Sunflower Family)	
Tall ironweed	*Vernonia gigantea*
Joe-pye weed	*Eupatorium fistulosum*
Common boneset	*Eupatorium perfoliatum*
Crooked-stem aster	*Aster prenanthoides*
Common horseweed	*Conyza canadensis*
Goldenrod	*Solidago sp.*
Thistle*	*Cirsium sp.*
Small-flowered white aster*	*Aster vimineus*
Betulaceae (Birch Family)	
American hornbeam	*Carpinus caroliniana*
Bignoniaceae (Bignonia Family)	
Trumpet-creeper	*Campsis radicans*
Caprifoliaceae (Honeysuckle Family)	
Blackhaw	*Vibernum prunifolium*
Honeysuckle*	*Lonicera sp.*

Table A-3: Partial List of Plants that May Be Found in the Vicinity of the Facility Harrison Division-GMC, Moraine, Ohio	
Common Name	**Scientific Name**
Celastraceae (Bittersweet Family)	
Bittersweet	*Celastrus scandens*
Running strawberry-bush	*Euonymus obovatus*
Burningbush	*Euonymus atropurpureus*
Cornaceae (Dogwood Family)	
Flowering dogwood	*Cornus florida*
Alternate-leaf dogwood	*Cornus alternifolia*
Roughleaf dogwood	*Cornus drummondi*
Blackgum	*Nyssa sylvatica*
Cyperaceae (Sedge Family)	
Sedge*	*Cyperus sp.*
Soft-stem bulrush*	*Scirpus validus*
Cupressaceae (Cypress Family)	
Red cedar	*Juniperus virginiana*
Dipsacaceae (Teasel Family)	
Teasel*	*Disacus sylvestris*
Fabaceae (Pea Family)	
Crown vetch*	*Coronilla varia*
Fagaceae (Beech Family)	
American beech	*Fagus grandifolia*
White oak	*Quercus alba*
Bur oak	*Quercus macrocarpa*
Swamp white oak	*Quercus bicolor*
Pin oak	*Quercus palustris*
Hippocastanaceae (Buckeye Family)	
Ohio buckeye	*Aesculus glabra*

Table A-3: Partial List of Plants that May Be Found in the Vicinity of the Facility Harrison Division-GMC, Moraine, Ohio	
Common Name	**Scientific Name**
Juglandaceae (Walnut Family)	
Butternut	*Juglans cinerea*
Black walnut*	*Juglans nigra*
Lauraceae (Laurel Family)	
Sassafras	*Sassafrass albidum*
Leguminosae (Legume Family)	
Honeylocust*	*Gleditsia triacanthos*
Redbud	*Cercis canadensis*
Black locust	*Robinia pseudo-acacia*
Liliaceae (Lily Family)	
Bristly greenbrier	*Smilax hispida*
Magnoliaceae (Magnolia Family)	
Tuliptree	*Liriodendron tulipfera*
Moraceae (Mulberry Family)	
Red mulberry	*Morus rubra*
Osage orange*	*Maclura pomifera*
White mulberry*	*Morus alba*
Oleaceae (Olive Family)	
Blue ash	*Fraxinus quadrangulata*
Black ash	*Fraxinus nigra*
Green ash	*Fraxinus pennsylvanica*
Phytolaccaceae (Pokeweed Family)	
Pokeweed*	*Phytolacca americana*
Platanaceae (Sycamore Family)	
American sycamore*	*Platanus occidentalis*
Polemoniaceae (Phlox Family)	
Fall phlox*	*Phlox paniculata*

Table A-3: Partial List of Plants that May Be Found in the Vicinity of the Facility Harrison Division-GMC, Moraine, Ohio	
Common Name	**Scientific Name**
Polygonaceae (Buckwheat Family)	
Smartweed*	*Polygonum sp.*
Rosaceae (Rose Family)	
Ninebark	*Physocarpus opulifolius*
Wild crab	*Pyrus coronaria*
Washington hawthorn	*Crataegus phaenopyrum*
Dotted hawthorn	*Crataegus punctata*
Downy hawthorn	*Crataegus mollis*
Black raspberry	*Rubus occidentalis*
Dewberry	*Rubus flagellaris*
Swamp rose	*Rosa palustris*
Black cherry*	*Prunus serotina*
Choke cherry	*Prunus virginiana*
Wild plum	*Prunus americana*
Sweet crabapple*	*Pyrus coronaria*
Salicaceae (Willow Family)	
Sandbar willow	*Salix interior*
Pussy willow	*Salix dicolor*
Big-toothed aspen*	*Populus grandidentata*
Black willow*	*Salix nigra*
Eastern cottonwood*	*Populus deltoides*
Saxifragaceae (Hydrangea Family)	
Wild hydrangea	*Hydrangea arborescens*
Wild black currant	*Ribes americanum*
Wild gooseberry	*Ribes cynobasti*
Scrophulariaceae (Snapdragon Family)	
Common mullein*	*Verbascum Thapsus*

Table A-3: Partial List of Plants that May Be Found in the Vicinity of the Facility Harrison Division-GMC, Moraine, Ohio

Common Name	Scientific Name
Staphyleaceae (Bladdernut Family)	
American bladdernut	*Staphylea trifolia*
Typhaceae (Cattail Family)	
Common cattail*	*Typha latifolia*
Ulmaceae (Elm Family)	
Hackberry*	*Celtis occidentalis*
American elm*	*Ulmus americana*
Slippery elm	*Ulmus rubra*
Vitaceae (Grape Family)	
Virginia creeper	*Parthenocissus quinquefolia*
Frost grape	*Vitis vulpina*
Riverbank grape*	*Vitis riparia*

Sources:

Braun, E.L. 1961, 1989. *The Woody Plants of Ohio*. Ohio State University Press.
Fisher, T.R. 1988. *The* Dicotyledoneae *of Ohio Part 3. Asteraceae*. Ohio State University Press.
Little, E.L. 1980. *The Audubon Society Field Guide to North American Trees*. New York: Alfred A. Knopf.

* Identified during field verification.

Table A-4: Partial List of Reptiles and Amphibians that May Be Found in the Vicinity of the Facility Harrison Division-GMC, Moraine, Ohio	
Common Name	**Scientific Name**
Amphibia Class (Amphibian)	
Caudata Order (Salamander)	
Ambystomidae (Mole salamander Family)	
Jefferson salamander	*Ambystomia jeffersonianum*
Spotted salamander	*Ambystomia maculatum*
Marbled salamander	*Ambystomia opacum*
Plethodontidae (Lungless salamander Family)	
Dusky salamander	*Desmognathus fuscus*
Two-lined salamander	*Eurycea bislineata*
Four-toed salamander	*Hemidactylium scutatum*
Red-backed salamander	*Plethodon cinereus*
Proteidae (Mudpuppy and Waterdog Family)	
Mudpuppy	*Necturus maculosus*
Salamandridae (Newt Family)	
Red-spotted newt	*Notophthalmus viridescens*
Salentia Order (Frogs and Toads)	
Bufonidae (Toad Family)	
American toad	*Bufo americanus*
Fowler's toad	*Bufo woodhousei*
Hylidae (Tree frog Family)	
Spring peeper	*Hyla Crucifer*
Cope's gray treefrog	*Hyla chrysoscelis*
Common gray treefrog	*Hyla versicolor*

Table A-4: Partial List of Reptiles and Amphibians that May Be Found in the Vicinity of the Facility Harrison Division-GMC, Moraine, Ohio

Common Name	Scientific Name
Ranidae (True frog Family)	
Bullfrog	*Rana catesbeiana*
Green frog	*Rana clamitans*
Pickerel frog	*Rana palustris*
Wood frog	*Rana sylvatica*

Source:

Behler, J.L., and F.W. King. 1979. *The Audubon Society Field Guide to North American Reptiles and Amphibians.* New York: Alfred A. Knopf, Inc.

Table A-5: Partial List of Fish that May Be Found in the Great Miami River in the Vicinity of the Facility Harrison Division-GMC, Moraine, Ohio	
Common Name	**Scientific Name**
Clupeidae (Herring Family)	
Gizzard shad	*Dorosoma cepedianum*
Catostomidae (Sucker Family)	
Golden redhorse	*Maxostoma erythrurum*
Quillback carpsucker	*Carpiodes cyprinus*
Shorthead redhorse	*Maxostoma macrolepidotum*
Spotted sucker	*Minytrema melanops*
White sucker	*Catostomus commersoni*
Centrarchidae (Sunfish Family)	
White crappie	*Pomoxis annularis*
Rock bass	*Ambloplites rupestris*
Smallmouth bass	*Micropterus dolomieui*
Largemouth bass	*Micropterus salmoides*
Green sunfish	*Lepomis cyanellus*
Bluegill sunfish	*Lepomis macrochirus*
Orangespotted sunfish	*Lepomis humilis*
Longear sunfish	*Lepomis megalotis*
Cyprinidae (Minnow Family)	
Common carp	*Cyprinus carpio*
Goldfish	*Carassius auratus*
Golden shiner	*Notemigonus crysoleucas*
Striped shiner	*Notropis chrysocephalus*
Spotfin shiner	*Notropis spilopterus*
Bluntnose minnow	*Pimephales notatus*

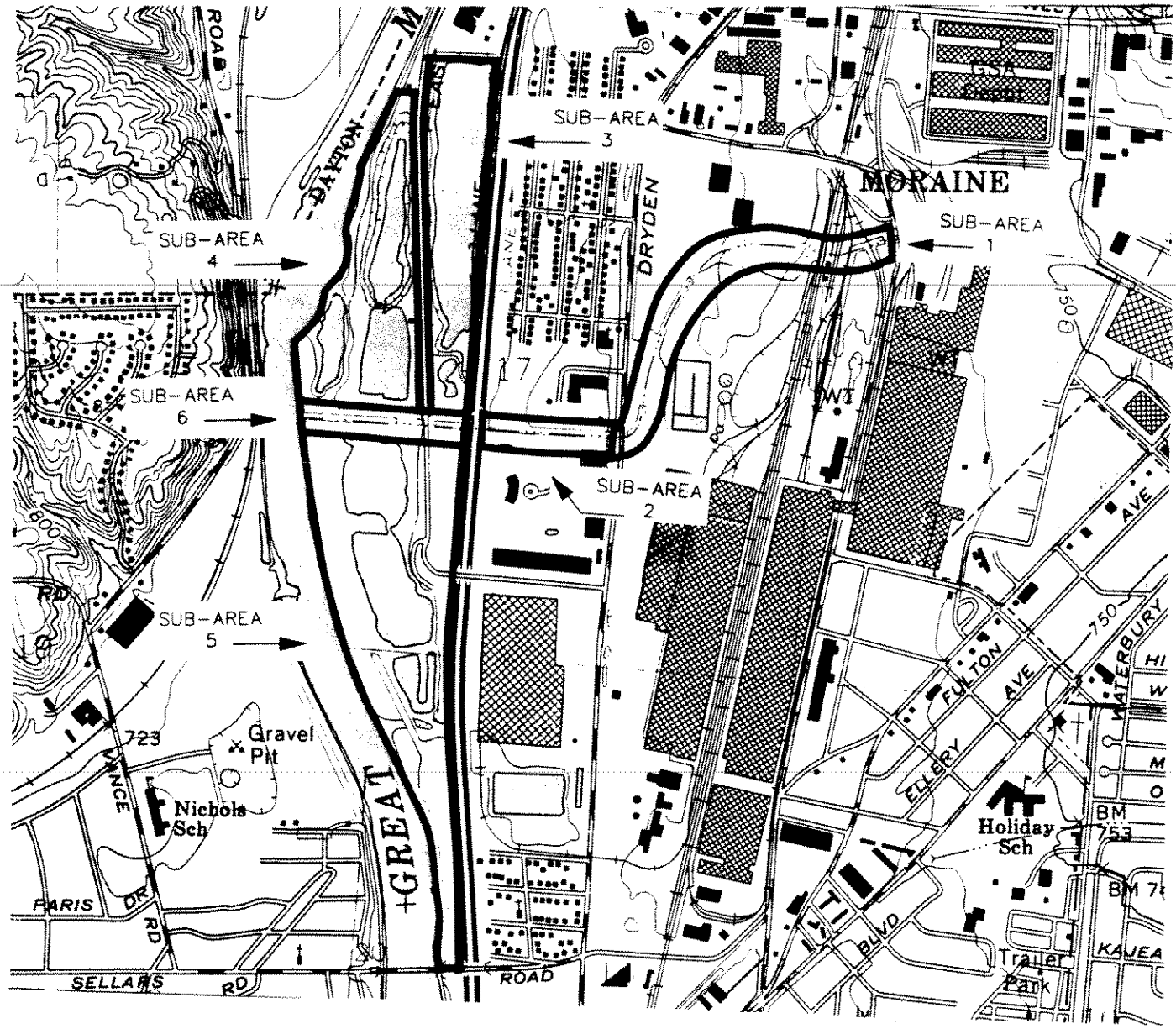
Table A-5: Partial List of Fish that May Be Found in the Great Miami River in the Vicinity of the Facility Harrison Division-GMC, Moraine, Ohio

Common Name	Scientific Name
Ictaluridae (Bullhead catfish Family)	
Channel catfish	*Ictalurus punctatus*
Brown bullhead	*Ictalurus nebulosus*

Source:

Ohio Department of Environmental Protection. 1993. Letter from H.B. Trimble regarding drainage ditch and local fish populations. December 7.

Lee, D.S., C.R. Gilbert, C.H. Hocutt, R.E. Jenkins, D.E. McAlister, J.R. Stauffer, Jr. 1980. *Atlas of North American Freshwater Fishes*. North Carolina Biological Survey.



SOURCE: USGS: DAYTON SOUTH, OHIO. 1966, 1991.

NOTE: ALL SUB AREAS ARE APPROXIMATED

ENVIRON

DRAFTED BY: JP/MC | DATE: 3/1/96

ECOLOGICAL ASSESSMENT SUBAREAS
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