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ENGINEERS, INC.

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Transmittal

.9830 Grand River Avenue / Suite B-2 / Novi, MI 48375 / (810) 426-8970 FAX (810) 426-8997

To: MR. ERIC VAN RIPER
Michigan Department of Environmental Quality
Shiawassee District Headquarters
10650 Bennett Drive
Morrice, MI 48857-9792

Date: August 16, 1996

File: 6009007 #2

Re: FINAL Remedial Action Plan
(RAP) Addendum

We are sending you _____ herewith _____ under separate cover

_____ drawings _____ descriptive literature _____ letters

Quan.	Identifying Number	Title	Action*
2		Final Remedial Action Plan (RAP) Addendum	I

* Action lettercode: **R**-reviewed **N**-reviewed and noted **I**-for your information
S-resubmit **J**-rejected **Y**-for your approval

Remarks: On behalf of General Motors Corporation, O'Brien and Gere Engineers, Inc. is submitting the Final Remedial Action Plan (RAP) Addendum to the MDEQ. Please call Scott Cormier at (810) 426-8970 if you have any questions.

If material received is not as listed, please notify us at once.

JP Walle/ MS Oberc
cc-AM Noel/ C Reinholm
RS Metcalf
EE Peterson AJ Finch
JM Polito MB Robison
SL Cormier
SW Kaczmar
K LaValle

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Very truly yours,
O'Brien & Gere Engineers, Inc.

Michael Robison
Mike Robison
Geologist

ADDENDUM Shane Noreen

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Addendum to the Remedial Action Plan for a Limited Residential Closure

**Windiate Park
Flint, Michigan**

August 1996

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Addendum
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Addendum to the Remedial Action Plan for a Limited Residential Closure

*Windiate Park
Flint, Michigan*

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for / Swiatoslaw W. Kaczmar, PhD, CIH.
Vice President

August 1996



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Executive Summary

This Remedial Action Plan Addendum (RAP Addendum) was prepared to supplement the "Remedial Investigation and Feasibility Study for Windiate Park, Flint, Michigan" (RI/FS) dated February 1996 and the "Remedial Action Plan for a Limited Residential Closure for Windiate Park, Flint, Michigan" (RAP) dated February 1996. This RAP Addendum serves two purposes. First, this report presents additional data pertaining to the regional confining unit and the shallow water bearing unit in Windiate Park (Park). Second, this report identifies the proposed annexation of three parcels of land to the Park and their inclusion in the RAP. The following paragraphs provide a brief summary of the information presented in this RAP Addendum.

Subsequent to the submittal of the RI/FS and the RAP to the MDEQ in February 1996, the MDEQ requested confirmation of the regional clay confining unit in the Park and further assessment of the ground water quality in the lower portion of the upper water bearing zone in the Park. Pursuant to the MDEQ approved work plan, two soil borings were installed in the Park to confirm the presence of the regional confining unit and perform vertical ground water profiling. The clay confining unit was observed from approximately 30 ft below grade (fbg) to 34 fbg at the first boring location and from approximately 19 fbg to 23 fbg at the second boring location. Ground water data from vertical profiling performed at the two boring locations confirmed that ground water in the lower portion of the upper water bearing zone was not adversely impacted. Following MDEQ review of the preliminary data from these investigations, the RAP was approved.

Subsequent to the submittal of the RI/FS and the RAP to the MDEQ in February 1996, GM acquired three parcels of land that adjoin the Park. GM proposes to donate the properties to the City of Flint with the intent that the parcels will be annexed to the Park. Since substances of potential concern (SOPCs) were identified on two of the three parcels, remedial action was implemented on the

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two impacted parcels to attain the closure criteria required for a "Limited Residential" closure as referenced in Section 20120 of Part 201 of PA 451.

The remedial action which has been performed on the two impacted parcels included the installation of a 2 ft thick soil cover, the implementation of deed restrictions, and the performance of maintenance activities. Evaluating the two remediated parcels against the closure criteria required for a "Limited Residential" closure, indicates that these closure criteria have been achieved. The three parcels will be annexed to the Park, pending MDEQ approval of this RAP Addendum.

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1. Introduction

1.1. General

This document serves as an addendum to the "Remedial Action Plan for a Limited Residential Closure" (RAP) dated February 1996 for the Windiate Park (Park) property in Flint, Michigan. A Site Location Map is attached as Figure 1. The RAP identified the final remedy to address the environmental conditions within the limits of the Park and is compliant with Part 201 of the Natural Environmental Resources Act, 1994 PA 451 (Part 201, PA 451). The RAP was submitted to the Michigan Department of Environmental Quality (MDEQ) in February 1996.

The purpose of this Remedial Action Plan Addendum (RAP Addendum) is twofold. First, this RAP Addendum presents the results of further testing that was requested by the MDEQ since the submittal of the RAP and the "Remedial Investigation/Feasibility Study for Windiate Park, Flint, Michigan" (RI/FS) dated February 1996 which the testing confirmed the presence of a regional confining unit and that the lower portion of the upper water bearing zone was not adversely impacted.

Secondly, subsequent to submittal of the RAP, GM acquired three parcels of land that adjoin the Park. After acquiring the parcels, GM proposed to donate the properties to the City of Flint with the intent that the parcels would be annexed to the Park.

This RAP Addendum demonstrates that three vacant parcels of land proposed to be annexed to the Park meet the criteria for a "Limited Residential" closure, as referenced in Section 20120a of Part 201, PA 451.

This RAP Addendum is submitted in accordance with Part 201, PA 451 and Section 3.2 "Changes to the RAP" from the February 1996 RAP. As identified in Section 3.2 of the RAP, the remedial action plan will be modified to address new data, if necessary.

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2. Regional Confining Unit Confirmation and Vertical Ground Water Profiling

2.1. General

Subsequent to submittal of the RI/FS and RAP in February 1996, the MDEQ requested further site specific information to confirm the presence of a regional confining unit and the performance of vertical ground water profiling in the Park. Pursuant to the MDEQ request and approved work plan, two additional soil borings were installed in the Park to confirm the presence of the regional clay confining unit and to further assess ground water quality in the lower portion of the upper water bearing zone. Work was performed in accordance with the February 13, 1996 and May 21, 1996 letter work plans submitted to the MDEQ. The work plans were verbally approved by the MDEQ.

The following sections discuss the methods and findings of the regional confining unit confirmation and vertical ground water profiling investigations.

2.2. Regional Confining Unit Confirmation

2.2.1. Field Activities

On May 29, 1996, two additional soil borings (CUSB-1 and CUSB-2) were installed in the Park at the locations shown on Figure 2. The borings were installed at areas in the Park where a shallow clay confining unit was not confirmed during previous remedial investigation (RI) activities. The borings were installed using 4.25 inch inside diameter hollow stem augers, with sampling initiated at a depth approximately equal to the top of screen of the nearest previously installed monitoring well. Continuous splitspoon sampling was performed in 2 ft intervals to a depth of approximately 4 ft into the encountered confining unit for confirmation that a substantial unit exists. Sampling was conducted in accordance with ASTM

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method D2488-93. Soil samples from the 2 ft intervals were field screened using sensory and photoionization detector (PID) methods as the borings were advanced. The Microtip model PID was calibrated following manufacturer's instruction prior to usage. The PID was used for a preliminary indication of volatile organic presence and relative concentration. Soil samples were not submitted to a laboratory for analysis as field screening did not indicate the presence of impact. Decontamination procedures were performed in accordance with the February 13, 1996 letter work plan.

The soil samples from CUSB-1 and CUSB-2 were logged in accordance with the Unconsolidated Soil Classification System (USCS) by an O'Brien and Gere Engineers, Inc. (O'Brien & Gere) geologist. Soil boring logs which include detailed descriptions of the subsurface materials and PID readings at each soil boring location are included as Appendix A.

Soil cuttings and decontamination fluids produced during soil boring installation activities were containerized in DOT approved 55 gal steel drums to be disposed of properly at a later date.

2.2.2. Summary of Geologic Data and Confining Unit

At CUSB-1, splitspoon sampling was initiated at a depth of 6 ft below grade (fbg). The top of the confining unit was observed at approximately 30 fbg. Although the work plan proposed boring 2 ft into the regional clay unit, it was decided that an additional 2 ft split spoon sample of the clay should be collected for additional confirmation. Therefore, the top 4 ft of the clay confining unit was visually inspected. A clay unit was also observed at CUSB-1 from 23 fbg to 24.5 fbg; however, since this clay unit was less than 2 ft thick, it was not considered to be sufficient as a confining unit.

At CUSB-2, splitspoon sampling was initiated at a depth of 7 fbg. The confining unit was observed from approximately 19 fbg to 23 fbg, the bottom of the boring. Although the work plan proposed boring 2 ft into the regional clay unit, it was decided that an additional 2 ft split spoon sample of the clay should be collected for additional confirmation. Therefore, the top 4 ft of the clay confining unit was visually inspected.

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The observed confining unit consisted of a brownish-grey clay, and is consistent with local water well records and information obtained during RI activities in the park. Site geology observed in the borings was consistent with the previous RI activities at the park. Overburden materials consisted of intermixed soils including sands, silts, clays, and organic materials (peats and marls). Fill material consisting of glass fragments was observed in CUSB-1 from approximately 6.5 fbg to 6.75 fbg. Fill material was not observed in CUSB-2.

The plan view of a geologic cross-section in the Park is presented on Figure 3. The geologic cross-section depicting subsurface materials is presented on Figure 4. The cross-section incorporates soil data from CUSB-1 and CUSB-2 with the soil data from the geologic cross-section referenced as Figure 22 in the "Remedial Investigation/Feasibility Study" (RI/FS) report dated February 1996.

2.3. Vertical Ground Water Profiling

2.3.1. Sampling Methods

Vertical ground water profiling was performed in the soil borings installed to confirm the confining unit. Ground water profiling was performed in accordance with the auger advance method described in the draft MDEQ ERD Hydrogeologic Study Guidance Document dated November 1990, procedures outlined in the May 21, 1996 letter work plan, and MDEQ comments.

Vertical ground water profiling was accomplished by installing temporary monitoring wells in each soil boring subsequent to the confirmation of the confining unit in each boring. The borings were completed by methods described in section 2.2.1. The temporary monitoring wells were constructed of 2 inch diameter, schedule 40 threaded flush joint stainless steel riser casing with 5 ft of 0.010 inch stainless steel slot screen. The initial temporary monitoring wells were installed in each boring with the bottom of each well screen set at the top of the confining unit.

Subsequent to setting the well screen with appropriate riser length at the desired sampling depth within the augers, the augers were retracted to approximately 2 to 3 ft above the top of the temporary well screen and the formation was allowed to collapse around the well screen and riser.

The temporary well was then developed to remove fine grained materials from the well screen. Development was accomplished by utilizing a surge block/pumping method. Well development enhances the hydraulic connection between the well and the surrounding water bearing unit allowing transmission of representative ground water for sampling.

Following development, and after allowing a short period of time for recharge in the well, the depth to ground water was measured at the well using a water indicator probe. A length of polyethylene tubing was then connected to a peristaltic pump and inserted into the well and pumping was initiated. Approximately three volumes of water from the well casing was removed. Ground water samples were then collected for laboratory analysis. During each sampling event, the MDEQ was on site to collect split samples for separate analysis. Following ground water sample collection at the temporary well, the well materials were then removed from within the augers and decontaminated using high pressure steam cleaning methods.

A second temporary monitoring well was then installed in CUSB-1 to screen a shallower interval in the water bearing zone. Subsequent to steam cleaning the well materials, the augers were retracted to the bottom of the next highest water bearing interval to be sampled (approximately 2 ft above the top of the previous well screen). The formation collapsed in the borehole as the augers were retracted, which minimizes mixing of the ground water intervals. The well screen with appropriate riser length was then set at the specified sampling depth within the augers. The augers were subsequently retracted to approximately 2 to 3 ft above the top of the temporary well screen and the formation was allowed to collapse around the well screen and riser. The second temporary well was then sampled in the same manner as the first temporary well. In order to sufficiently conduct vertical profiling in the shallow water bearing unit, two temporary monitoring wells were needed to augment existing ground water data, following the procedures approved by the MDEQ.

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Based on the field observations (discussed in Section 2.3.2) at CUSB-2, a second temporary well was not installed at that boring location.

The ground water samples were submitted to O'Brien and Gere Laboratories, Inc. of Syracuse, New York for analysis of volatile organic compounds by EPA method 8260, semi volatile organic compounds by EPA method 8270, and dissolved lead, arsenic and barium by EPA methods 6000/7000. The ground water sample collected for dissolved lead, arsenic, and barium analysis was field filtered.

Quality assurance/quality control (QA/QC) samples consisting of matrix spike, matrix spike duplicate, blind duplicate, equipment rinsate blank and trip blank samples were collected in accordance with the Quality Assurance Project Plan (QAPP) provided in the November 1994 Windiate Park work plan. Samples selected for laboratory analysis were logged onto the chain-of-custody (COC) form upon labeling. The samples were then placed in an ice-cooled laboratory sample chest and packed for transportation to the laboratory.

Laboratory analyses were performed by O'Brien and Gere Laboratories, and included a Level III data package. The data were independently validated by O'Brien and Gere and summarized in accordance with the MDEQ approved Data Management Plan, a component of the November 1994 Windiate Park RI/FS work plan. The analytical data generated for this sampling event was evaluated based on quality assurance/quality control (QA/QC) criteria established by the United States Environmental Protection Agency (USEPA) and MDEQ.

2.3.2. Field Observations

Based on the installation of soil borings CUSB-1 and CUSB-2, the following field observations were noted:

- Since the confining unit was observed at approximately 30 fbg at CUSB-1, a temporary well was installed with the well screen set at a depth from approximately 25 fbg to 30 fbg. In addition, a clay unit was observed at boring location CUSB-1 from 23 fbg to 24.5 fbg and a second temporary well was installed with the well screen set at a depth from approximately 17 fbg to 22 fbg. Ground water was observed

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at approximately 10 fbg in the well during both sampling events. No sheen or odor was observed from the ground water removed from the well during both sampling events.

A third temporary well was not placed higher in the shallow water bearing zone that was observed from 17 fbg to approximately 10 fbg. In accordance with the work plan, temporary well screens were proposed to begin 3 ft below the base of the nearest permanent well screen. The nearest permanent well screen (MW006) is set from approximately 6.7 to 11.7 fbg, and the top of a third well screen would be set less than 3 ft below the base of MW006.

- Since the top of the confining unit was observed at approximately 19 fbg at CUSB-2, a temporary monitoring well was installed with the screen set from approximately 14 fbg to 19 fbg. Ground water was observed at approximately 9 fbg in the well. No sheen or odor was observed from the ground water removed.

A second temporary well was not placed higher in the shallow water bearing zone, as the nearest permanent well screen is set from approximately 10.3 to 15.3 fbg (MW004), and a second well screen would overlap the screened interval of the first temporary well at CUSB-2.

2.3.3. Analytical Results

The validated analytical data without qualifiers or qualified by a "J" designation indicate that concentrations of the substances analyzed are below Generic Residential Health Based Drinking Water Values. These data combined with the previous data confirm that the upper water bearing zone in the Park has not been adversely impacted by the presence of fill material. Validated ground water analytical data, including data validation qualifiers, are summarized on Table 1. Copies of the laboratory reports and COCs are included in Appendix B. A copy of the Data Validation Memorandum for the analytical data is included in Appendix C.

3. Parcels to be Annexed to the Park

3.1. Background

Subsequent to submittal of the RAP to the MDEQ in February 1996, GM acquired three parcels of land adjacent to the Park identified as Parcel A, Parcel B, and Parcel C on Figure 2. After acquiring the parcels, GM proposed to donate the properties to the City of Flint with the intent that the parcels would be annexed to the Park.

As part of the RI activities performed in the Park and adjacent residential properties, several environmental investigations were conducted on Parcel A, Parcel B, and Parcel C. These investigations identified fill material and substances of potential concern (SOPCs) on Parcel A (arsenic, lead, and benzo(a)pyrene) and Parcel B (arsenic and lead). Neither fill material or SOPCs were identified on Parcel C. For purposes of screening, the SOPCs are defined as substances for which the maximum detected concentrations exceed the Generic Residential Direct Contact Value, per Operational Memorandum 8, Revision 4, dated June 5, 1995, or in the case of arsenic, the Site Specific Background Value as established in the RI/FS Report.

Since SOPCs were identified on Parcel A and Parcel B, remedial action was performed to facilitate annexation of the parcels. After performing site clearing activities, which included the demolition of residential structures on Parcel A and on Parcel B, a 2 ft thick soil cover, topsoil and sod layer was installed on the two impacted parcels.

3.2. Objective

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The objective of this section is to demonstrate that the remedial action implemented on the two impacted parcels (Parcels A and B) resulted in the attainment of the closure criteria required for a "Limited Residential" closure as referenced in Part 201, PA 451 and that Parcel C needs no remedial action prior to annexing the parcels to the Park. The attainment of these closure criteria are discussed in detail in this section.

Also discussed in this section of the RAP Addendum are the parcel descriptions and history, subsurface investigation data, nature and extent of fill material and SOPCs, remedial action implemented, attainment of closure criteria, deed restrictions implemented, soil cover maintenance plan, and schedule of remedial action implementation.

3.3. Parcel Descriptions and History

The three parcels donated to the City of Flint and subsequently annexed to the Park are located within Section 29 and 30 of Township 7 North, Range 7 East in the City of Flint in Genesee County, Michigan. Parcel A and Parcel B are zoned for two family residential and Parcel C is zoned for single family residential. A Site Location Map which identifies the Park property is included as Figure 1. The three parcels are identified as Parcel A, Parcel B, and Parcel C on Figure 2. Legal descriptions of the three parcels are included in Appendix D.

Parcel A is approximately 0.4 acres in size. The surface topography of this parcel is generally flat. The parcel is covered with sod. A two story wood-framed boarding house (4123 Milton Drive) was formerly located on Parcel A. Review of historical information, including aerial photographs and tax records, indicate that the house was constructed in 1928. A gravel parking lot was formerly located south of the house. The remainder of Parcel A was formerly covered with grass, shrubs, and trees. The boarding house was demolished to grade in July 1996. The basement walls were collapsed to 3 fbg, the basement was filled with sand, and a permeable soil cover and sod were placed over the extent of the parcel. The soil cover was tied into the soil cover that was installed on the Park during the winter of 1995 and spring of 1996.

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Parcel B is approximately 1.2 acres. The surface topography of this parcel moderately slopes downward toward the Park. The parcel is covered with sod. A single story wood-framed residential house (428 Shelly Lane) and the end section of Shelly Lane were formerly located on Parcel B. Based on review of historical aerial photographs, a house appeared to have existed in the vicinity of the former 428 Shelly Lane residence in 1925. The 428 Shelly Lane residence was located at the end of that former street. The remainder of Parcel B was formerly covered with grass, shrubs, and trees. Shelly Lane was vacated and the house was demolished to grade in July 1996. The basement walls were collapsed to 3 fbg, the basement was filled with sand, and a permeable soil cover and sod were placed over the extent of the parcel. The soil cover was tied into the existing soil cover previously installed in the Park.

Parcel C is approximately 0.6 acres. The surface topography of this parcel is moderately sloped upward from the former Park boundary to the residential properties southeast of the parcel. The extent of the parcel is covered with grass. Review of historical information, including aerial photographs and tax records, indicate that the property has been vacant dating back to the 1920s, the earliest known aerial photograph available.

3.3. Subsurface Investigation Data

3.3.1. Soil Investigations

Environmental investigations, including surface soil sampling, geoprobe boring installation, soil boring installation, soil vapor sampling, and vertical profile soil sampling, were conducted on nine separate occasions which included one or more of the three parcels. Eight of the nine investigations were conducted from August 1994 to June 1995 as part of the RI activities for the Park. Since the submittal of the Park RAP in February 1996, one surface soil investigation was conducted on Parcel C. The following Table 3-1 summarizes the environmental investigations which included Parcel A, Parcel B, and Parcel C.

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Table 3-1. Summary of Soil Investigations

Parcel	Investigation	Date
A	Surface soil (MDEQ split)	August 1994
	Surface soil (MDEQ split)	November 1994
	Geoprobe borings	June 1995
B	Surface soil (MDEQ split)	August 1994
	Soil vapor survey	October 1994
	Surface soil (MDEQ split)	November 1994
	Surface soil	February 1995
	Soil boring	March 1995
	Geoprobe borings	June 1995
	Vertical profile borings	June 1995
C	Surface soil (MDEQ split)	August 1994
	Geoprobe borings	June 1995
	Surface soil	May 1996

The sampling locations for the investigations summarized in Table 3-1 are shown on Figure 2. The analytical data generated from the investigations are summarized in Tables 2 through 9 attached. The data summarized in Tables 2 through 8 were independently validated by O'Brien & Gere (Table 9 consists of soil vapor survey data which was not validated). These data were evaluated based on QA/QC criteria established by the USEPA and MDEQ. A copy of the Data Validation Report for the analytical data in Tables 2 through 7 is included in Appendix C of the RI/FS. A copy of the laboratory report forms and Data Validation Memorandum for the analytical data summarized in Table 8 are included as Appendices E and F, respectively. The results of the investigations identified in Table 3-1 are summarized in the following sections.

3.3.2. Nature and Extent of Fill Material

As part of the remedial action implemented on Parcel A and Parcel B (discussed in Section 3.4), site clearing activities were conducted on Parcel A and Parcel B in July 1996. A 2 ft thick soil cover with topsoil and sod was subsequently installed over the limits of Parcel A and Parcel B during August 1996. The soil cover installed on Parcel A and Parcel B was tied into the soil cover installed on the Park during the fall of 1995 and spring of 1996. As discussed in Section 3.4.1, a soil cover was not installed on Parcel C as part of a remedial action. However, some topsoil and sod was placed on this parcel to maintain proper Park drainage during installation of the soil cover on the Park as shown on Figure 6.

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The new surface soil on Parcel A and Parcel B consists of clean silty sand and topsoil that was specified for the soil cover final remedy identified in Section 3 of the RAP. Analytical results of the soil cover and topsoil material indicate that metals are present at naturally occurring levels, below Generic Residential Direct Contact Values. These analytical results are discussed further in Section 3.4.4.

Subsurface fill material was identified on Parcel A from geoprobe borings installed during RI activities in June 1995. Subsurface fill material was identified on Parcel B from soil borings (March 1995), geoprobe borings (June 1995), and vertical profile borings (June 1995) installed during RI activities conducted for the Park. Subsurface fill material was not identified in geoprobe borings (June 1995) installed on Parcel C. Subsurface fill material extends from the Park underneath Parcels A and B to the estimated limits identified on Figure 2. The nature of the fill material consists of concrete, glass, rubber, rebar, cloth, slag material, general trash, wood, and tin cans intermixed with soil. The material was placed in the Park in the late 1940s and early 1950s.

Subsurface fill material on Parcel A was generally observed between 2 fbg to 6 fbg. Subsurface fill material on Parcel B was generally observed at several locations between 2 fbg to 5.5 fbg.

3.3.3. Identification of Substances of Potential Concern (SOPCs)

SOPCs in the soil and fill material were identified from extensive investigations and numerous samples collected on Parcel A and Parcel B. No SOPCs were identified from samples collected on Parcel C.

Based on the comparison of the soil data to the Generic Residential Direct Contact Values as shown in Tables 2 through 8 attached, the following SOPCs were identified for soil:

- Parcel A:
 - benzo(a)pyrene
 - arsenic and lead

- Parcel B:
 - arsenic and lead
- Parcel C:
 - No SOPCs were identified (i.e. all substances are below the Generic Residential Direct Contact Values)

The SOPCs identified above were evaluated with regard to potential migration and exposure pathways at Parcel A and Parcel B. The following paragraphs discuss these pathways in detail.

Leaching of substances to ground water The ground water monitoring well network in the Park is positioned such that ground water impacts on Parcel A and Parcel B, if ground water impacts exist, would likely be detected in down gradient monitoring wells in the Park. Ground water investigations (discussed in Section 2.2 of this RAP Addendum and Sections 5.4 and 6.3 of the RI/FS) demonstrated that although the fill material in the Park area has been in place for 40 to 50 years under shallow water table conditions, no substances were detected in the ground water at concentrations exceeding Generic Residential Health Based Drinking Water Criteria. Based on these investigations, it is evident that SOPCs in the material underlying the soil cover on the Park, Parcel A and Parcel B have not leached to ground water and therefore it is unlikely they will leach to ground water in significant concentrations in the future. Therefore, this migration pathway is not a concern for Parcel A and Parcel B.

Migration of substances to surface water Since surface water does not exist on or adjacent to Parcel A or Parcel B, the potential for migration to surface water does not exist. The presence of the soil cover on Parcel A and Parcel B prevents the potential for SOPCs to enter stormwater catch basins in the vicinity of these parcels.

Inhalation of substances Based on the low vapor pressure and high organic carbon partitioning coefficient (K_{oc}) and concentrations detected of the SOPCs identified in the soil on Parcel A and Parcel B, these substances are likely to be adsorbed to the soil particles and not likely to be in the vapor

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phase. Therefore, these substances are not likely to be emitted to the atmosphere. In addition, the presence of the soil cover prevents the inhalation of particulates that may have SOPCs adsorbed onto them. The inhalation exposure pathway does not exist for SOPCs on Parcel A and Parcel B.

Ingestion and direct contact SOPCs are present in the soil and fill material on Parcel A and Parcel B, the presence of the soil cover eliminates the potential for ingestion and direct contact, thereby eliminating this exposure pathway.

3.3.4. Ground Water Investigations

Ground water monitoring wells were not installed on Parcel A, Parcel B, or Parcel C. However, as part of the RI activities conducted in the Park, nine ground water monitoring wells (MW001 through MW009) were installed to assess ground water quality and estimate flow conditions in the Park. As discussed in Section 5.9 of the RI/FS, the ground water in the southern area of the Park flows in an easterly direction and ground water in the central area and northern area of the Park flows northward toward a low lying area between MW001 and MW002 as shown on the ground water flow map included as Figure 4. The ground water monitoring well network in the Park is positioned such that ground water impacts on Parcel A, Parcel B, and Parcel C, if ground water impacts exist, would likely be detected in down gradient monitoring wells in the Park.

Ground water sample analytical results from two rounds of sampling from the monitoring wells did not indicate levels of substances above Generic Residential Health Based Drinking Water Values. The ground water results indicate that substances identified in subsurface soil and fill material have not adversely impacted ground water. This is consistent with testing on the fill areas within the Park in that ground water has not been adversely affected. Therefore, the substances in the subsurface soil and fill materials do not present a significant concern for leaching into the ground water.

3.4. Remedial Action

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3.4.1. Remedial Action Objective

SOPCs were identified on Parcel A and Parcel B. SOPCs were not identified on Parcel C. Since SOPCs were identified on Parcel A and Parcel B, remedial action was conducted to achieve the requirements of Part 201, Act 451 for a "Limited Residential" closure prior to annexing these parcels to the Park. Since no SOPCs were identified on Parcel C, remedial action was not conducted on this parcel (Parcel C is not a "facility" as defined by Part 201, PA 451 and therefore response actions are not necessary).

In preparation for annexation to the Park, remedial measures were conducted on Parcel A and Parcel B to achieve the following remedial action objectives:

- Prevent exposure to impacted media by recreational users of the Park; and
- Prevent migration of impacted media off-site.

The remedial action in the Park, which achieved the objectives above, included the installation of a soil cover with topsoil and sod, the implementation of deed restrictions, and the performance of routine maintenance activities on the soil cover. The remedial action implemented in the Park achieves the "Limited Residential" criteria with deed restrictions for recreational use, in accordance with Part 201, PA 451. This section demonstrates how the extension of the soil cover from the Park to Parcel A and Parcel B would also be protective to recreational users and prevent potential migration of impacted media off-site, and thus achieves the same categorical criteria as the Park; "Limited Residential" closure with deed restrictions limiting the property to recreational use. Also discussed in this section are the zoning requirements, future use, soil cover construction, proposed deed restrictions, the maintenance plan, and the schedule of implementation specific to Parcel A and Parcel B. The proposed annexation of Parcel C, which does not require remediation, will be discussed as appropriate to maintain continuity throughout the Park.

3.4.2. Property Zoning

In accordance with Section 20120(a)(6) of Part 201, PA 451, a property for which a remedial action plan is proposed must have zoning that is consistent with the proposed categorical criteria. A "Limited Residential" closure with deed restrictions limiting the property to recreational use is proposed for Parcel A and Parcel B. Although Parcel C is not a facility (as defined by Part 201, PA 451) and thus does not require response activities, deed restrictions will be similar to the Park. Parcel A and Parcel B are zoned for two family residential and Parcel C is zoned for single family residential. Therefore, the limited residential (with recreational deed restrictions) closure proposed for Parcel A and Parcel B is consistent with the City of Flint's zoning designation. Deed restrictions will be implemented for the three parcels as outlined in Section 3.4.6. for the continued use of the property as a "Park".

3.4.3. Future Use

The intended future use of Parcel A, Parcel B, and Parcel C is recreational, which is consistent with the intended future use of the Park. The City of Flint is currently preparing plans for the enhancement of the Park and annexed parcels. Park enhancements considered include the installation of walking paths, basketball courts, picnic areas, child play areas, and trees/shrubs. One or more of these enhancements may be installed on portions of these three annexed parcels.

3.4.4. Soil Cover Construction and Analytical Data

Preparation of Parcel A and Parcel B for the soil cover installation included the demolition of the boarding house at 4123 Milton Drive and the residence at 428 Shelly Lane, abandonment of underground and aboveground utilities, and clearing and grubbing the areas. A minimum of 18 inches of soil cover and 6 inches of topsoil (minimum 24 inches total) was placed over the extent of the two parcels. Sod was then placed over the topsoil. The soil cover on each parcel was tied into the existing soil cover installed on the Park during the winter of 1995 and spring of 1996. Figure 6 identifies the approximate design thickness of the soil cover on Parcel A and Parcel B.

Samples of the soil cover material and the topsoil used in the construction of the cover were submitted to a laboratory for analysis. The soil cover material used on Parcel A and Parcel B was obtained from the same off-site borrow area that was used for the soil cover installed in the Park. Prior to the construction of the soil cover in the Park, one sample of the soil cover material was analyzed for the waste characterization parameters specified in 40 CFR 261.20 through 261.24 and total Michigan "10" metals, since metals are naturally occurring. The off-site borrow area for the topsoil was different than that used for the soil cover in the Park. One sample of the topsoil was analyzed for the parameters identified above. The laboratory analyses of the soil cover and topsoil materials confirmed that these media were not impacted. The laboratory analytical data forms for the samples of the soil cover material and the topsoil are included as Appendix G.

3.4.5. Attainment of Closure Criteria

Based on the investigations described in Section 2.2 of this report, SOPCs were detected in the material underlying the soil cover on Parcel A and Parcel B. Ground water investigations conducted in the Park area demonstrated that the fill material has not adversely impacted the ground water. No SOPCs were detected in the ground water at concentrations exceeding the Generic Residential Health Based Drinking Water Criteria.

In accordance with Part 201, PA 451, to obtain closure of a site the SOPCs remaining in the soil must be protective considering migration and exposure pathways pertinent to the site. In general, the potential migration and exposure pathways include: leaching of substances from soil to ground water, migration of substances in soil to surface water, inhalation of substances, direct contact with substances and ingestion of substances.

Based on the analysis of these migration and exposure pathways discussed in detail in Section 3.3 of this report, the closure criteria are achieved with the presence of the soil cover on Parcel A and Parcel B. Additionally, the implementation of deed restrictions on the parcels and the performance of maintenance on the soil covers are incorporated. These measures prevent uncontrolled excavation activities and provide for reparation of potential damages to the soil cover.

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3.4.6. Deed Restrictions

Land use restrictions will be implemented for Parcel A, Parcel B, and Parcel C consistent with those for the Park. In accordance with Rule 299.5719, the land use restrictions will be detailed in a restrictive covenant recorded by the City of Flint and approved by MDEQ that will include:

- Restrictions on site activities which may potentially affect the integrity of the soil cover or interfere with maintenance activities;
- A requirement to provide notice to the MDEQ of the intent to convey property, such as; conveyance of title, easement or other;
- Permission for the MDEQ to access the Park and to inspect records;
- Descriptions of applicable land use or resource criteria use restrictions, including:
 - the prohibition of uncontrolled excavation or other activities which may potentially damage the soil cover; and
 - the notification of the MDEQ prior to performing sampling and analysis of impacted materials in the event transportation and/or disposal is performed.
- Notice that the property will be restricted to recreational use.

The deed restrictions will be implemented indefinitely. Modifications to the deed restrictions will be submitted to the MDEQ for approval.

The agreement between GM and the City of Flint and the agreement between GM, the City of Flint, and the Genesee County Drain Commission as discussed in Section 4.2 of the RAP will remain in effect as modified to accommodate the three parcels to be annexed.

3.4.7. Maintenance Plan

The maintenance activities outlined in Section 5 of the RAP will be implemented for Parcel A, Parcel B, and Parcel C. In summary, these maintenance activities will be performed by the City of Flint and include inspections of the soil cover on Parcel A and Parcel B, and regular mowing, hedging, and fertilizing on Parcel A, Parcel B, and Parcel C.

3.4.8. Schedule of Implementation

The remedial action for Parcel A and Parcel B is currently underway with the installation of the soil cover. The soil cover construction and placement of sod will be completed in August 1996.

At the completion of the soil cover installation in August 1996, the following inspection schedule for the Park, including Parcels A, B, and C, will be implemented by the City of Flint:

Table 3-2. Inspection Schedule

1996	1997	1998	> 1999
November 1	May 1	May 1	May 1
	November 1	November 1	

Inspection after the year 1999 will be performed on an annual level, or more frequently if conditions indicate a more frequent rate is necessary. Routine landscape care will be performed regularly during the spring, summer, and fall months.

3.4.9. Summary of Remedial Action

SOPCs were identified on Parcel A and Parcel B. SOPCs were not identified on Parcel C. In preparation for the annexation of Parcel A and Parcel B to the Park, remedial action was performed to attain the closure criteria necessary for a "Limited Residential" closure with recreational deed restrictions, the same categorical closure approved by the MDEQ for the Park. The MDEQ-approved remedial action implemented for the Park was also implemented for Parcel A and Parcel B. Evaluation of the potential migration and exposure

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pathways pertinent to Parcel A and Parcel B indicate that the closure criteria have been achieved with the installation of the soil cover and implementation of deed restrictions and maintenance on these parcels.

Based on the evaluation of the potential migration and exposure pathways and attainment of closure criteria necessary for a "Limited Residential" closure, the remedial action objectives identified in Section 3.4.1 have been achieved with the remedial action implemented for Parcel A and Parcel B.

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TABLES

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Table 1A
Windiate Park Area
Vertical Profile Samples
SW8260 Volatile Organic Compound Data

Analyte	Target Method ug/l	Health Based Drinking Water Value ug/l	Health Based DW /Target MDL - Highest Value ug/l	CUSB-1 05/29/96 17 - 22 ft ug/l	CUSB-2 05/30/96 14 - 19 ft ug/l
1,1,1-Trichloroethane	1	200{C}	200{C}	0.50 U	0.50 U
1,1,2,2-Tetrachloroethane	1	4.3	4.3	0.50 U	0.50 U
1,1,2-Trichloroethane	1	5{C}	5{C}	0.50 U	0.50 U
1,1-Dichloroethane	1	880	880	0.50 U	0.50 U
1,1-Dichloroethene	1	7{C}	7{C}	0.50 U	0.50 U
1,2-Dichloroethane	1	5{C}	5{C}	0.50 U	0.50 U
1,2-Dichloropropane	1	5{C}	5{C}	0.50 U	0.50 U
2-Butanone (MEK)	50	13000	13000	R	R
2-Hexanone	50	1000	1000	5.0 U	5.0 U
4-Methyl-pentanone (MIBK)	50	370	370	5.0 U	5.0 U
Acetone	100	730	730	6.2 U	14 U
Benzene	5	5{C}	5{C}	0.50 U	0.50 U
Bromodichloromethane	1	100{C,S}	100{C,S}	0.50 U	0.50 U
Bromoform	1	100{C,S}	100{C,S}	0.50 U	0.50 U
Bromomethane	1	10	10	1.0 U	1.0 U
Carbon disulfide	50	800	800	0.50 U	0.50 U
Carbon tetrachloride	1	5{C}	5{C}	0.50 U	0.50 U
Chlorobenzene	1	100{C}	100{C}	0.50 U	0.50 U
Chloroethane	1	220	220	1.0 U	1.0 U
Chloroform	1	100{C,S}	100{C,S}	0.50 U	0.50 U
Chloromethane	1	66	66	1.0 U	1.0 U
Dibromochloromethane	1	100{C,S}	100{C,S}	0.50 U	0.50 U
Ethylbenzene	1	700	700	0.50 U	0.50 U
Methylene chloride	5	5{C}	5{C}	1.0 U	0.26 U
Styrene	1	100	100	0.50 U	0.50 U

NOTES: Data Qualifier Definitions and MDEQ Cleanup Criteria footnotes included at end of table.

[] exceeds the higher of the Health Based Drinking Water Value and Target Method Detection Limit.

--- denotes MDEQ criteria not established. Database 6009.009/Jetform VPRO8260.PRQ

Table 1A
Windiate Park Area
Vertical Profile Samples
SW8260 Volatile Organic Compound Data

Analyte	Target Method Detection Limit ug/l	Health Based Drinking Water Value ug/l	Health Based DW Target MDL - Highest Value ug/l	CUSB-1 05/29/96 25 - 30 ft ug/l	CUSB-2 05/30/96 14 - 19 ft ug/l
Tetrachloroethene	1	5{C}	5{C}	0.50 U	0.50 U
Toluene	1	1000{C}	1000{C}	0.50 U	0.50 U
Trichloroethene	1	5{C}	5{C}	0.50 U	0.50 U
Vinyl chloride	1	2{C}	2{C}	1.0 U	1.0 U
Xylene (total)	3	10000{C}	10000{C}	0.50 U	0.50 U
cis-1,2-Dichloroethene	1	70{C}	70{C}	0.50 U	0.50 U
cis-1,3-Dichloropropene	1	4.7	4.7	0.50 U	0.50 U
trans-1,2-Dichloroethene	1	100{C}	100{C}	0.50 U	0.50 U
trans-1,3-Dichloropropene	1	4.7	4.7	0.50 U	0.50 U

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NOTES: Data Qualifier Definitions and MDEQ Cleanup Criteria footnotes included at end of table.
[] exceeds the higher of the Health Based Drinking Water Value and Target Method Detection Limit.
--- denotes MDEQ criteria not established. Database 6009.009/Jetform VPRO8260.PRG

Table 1B
Windiate Park Area
Vertical Profile Samples
SW8270 Semivolatile Organic Compound Data

Analyte	Target Method ug/l	Health Based Drinking Water Value ug/l	Health Based DW /Target MDL - Highest Value ug/l	CUSB-1 05/29/96 17 - 22 ft ug/l	CUSB-1 05/29/96 25 - 30 ft ug/l	CUSB-2 05/30/96 14 - 19 ft ug/l
1,2,4-Trichlorobenzene	5	70{C}	70{C}	5.5 U	5.3 U	5.3 U
1,2-Dichlorobenzene	1	600{C}	600{C}	5.5 U	5.3 U	5.3 U
1,3-Dichlorobenzene	1	600{C}	600{C}	5.5 U	5.3 U	5.3 U
1,4-Dichlorobenzene	1	75{C}	75{C}	5.5 U	5.3 U	5.3 U
2,4,5-Trichlorophenol	50	730	730	27 U	26 U	27 U
2,4,6-Trichlorophenol	5	77	77	5.5 U	5.3 U	5.3 U
2,4-Dichlorophenol	5	73	73	5.5 U	5.3 U	5.3 U
2,4-Dimethylphenol	5	370	370	5.5 U	5.3 U	5.3 U
2,4-Dinitrophenol	---	---	---	22 U	21 U	21 U
2,4-Dinitrotoluene	5	1.3	5	[5.3 U]	[5.3 U]	[5.3 U]
2,6-Dinitrotoluene	---	---	---	5.5 U	5.3 U	5.3 U
2-Chloronaphthalene	---	---	---	5.5 U	5.3 U	5.3 U
2-Chlorophenol	5	45	45	5.5 U	5.3 U	5.3 U
2-Methyl-naphthalene	5	ID	5	[5.5 U]	[5.3 U]	[5.3 U]
2-Methylphenol	5	370	370	5.5 U	5.3 U	5.3 U
2-Nitroaniline	---	---	---	22 U	21 U	21 U
2-Nitrophenol	5	20	20	5.5 U	5.3 U	5.3 U
3,3-Dichlorobenzidine	20	1.9	20	11 U	11 U	R
3-Nitroaniline	---	---	---	22 U	21 U	21 U
4,6-Dinitro-2-methylphenol	20	2.6	20	[22 U]	[21 U]	[21 U]
4-Bromophenyl phenyl ether	---	---	---	5.5 U	5.3 U	5.3 U
4-Chloro-3-methylphenol	5	150	150	5.5 U	5.3 U	5.3 U
4-Chloroaniline	---	---	---	5.5 U	5.3 U	5.3 U
4-Chlorophenyl phenyl ether	---	---	---	5.5 U	5.3 U	5.3 U
4-Methylphenol	5	37	37	5.5 U	5.3 U	5.3 U

NOTES: Data Qualifier Definitions and MDEQ Cleanup Criteria footnotes included at end of table.

[] exceeds the higher of the Health Based Drinking Water Value and Target Method Detection Limit.

--- Denotes MDEQ Criteria Not established. Database 6009.009/Jrtrform VPRO8270.PRG

Table 1B
Windiate Park Area
Vertical Profile Samples
SW8270 Semivolatile Organic Compound Data

Analyte	Target Method Detection Limit ug/l	Health Based Drinking Water Value ug/l	Health Based DW /Target MDL - Highest Value ug/l	CUSB-1 05/29/96 17 - 22 ft ug/l	CUSB-1 05/29/96 25 - 30 ft ug/l	CUSB-2 05/30/96 14 - 19 ft ug/l
4-Nitroaniline	---	---	---	22 U	21 U	21 U
4-Nitrophenol	---	---	---	22 U	21 U	21 U
Acenaphthene	5	1300	1300	5.5 U	5.3 U	5.3 U
Acenaphthylene	5	26	26	5.5 U	5.3 U	5.3 U
Anthracene	5	7300	7300	5.5 U	5.3 U	5.3 U
Benzo(a)anthracene	5	1.2	5	[5.5 U]	[5.3 U]	[5.3 U]
Benzo(a)pyrene	5	0.2{C}	5	[5.5 U]	[5.3 U]	[5.3 U]
Benzo(b)fluoranthene	5	1.2	5	[5.5 U]	[5.3 U]	[5.3 U]
Benzo(ghi)perylene	5	26	26	5.5 U	5.3 U	5.3 U
Benzo(k)fluoranthene	5	12	12	5.5 U	5.3 U	5.3 U
Butylbenzyl phthalate	5	1200	1200	5.5 U	5.3 U	5.3 U
Carbazole	---	---	---	11 U	11 U	11 U
Chrysene	5	120	120	5.5 U	5.3 U	5.3 U
Di-n-butyl phthalate	5	880	880	5.5 U	5.3 U	10 U
Di-n-octyl phthalate	5	130	130	5.5 U	5.3 U	5.3 U
Dibenzo(a,h)anthracene	5	0.12	5	[5.5 U]	[5.3 U]	[5.3 U]
Dibenzofuran	5	ID	5	[5.5 U]	[5.3 U]	[5.3 U]
Diethyl phthalate	5	5500	5500	5.5 U	5.3 U	5.3 U
Dimethyl phthalate	5	73000	73000	5.5 U	5.3 U	5.3 U
Fluoranthene	5	880	880	5.5 U	5.3 U	5.3 U
Fluorene	5	880	880	5.5 U	5.3 U	5.3 U
Hexachlorobenzene	{K}	1{C}	1{C}	[5.5 U]	[5.3 U]	[5.3 U]
Hexachlorobutadiene	{K}	11	11	5.5 U	5.3 U	5.3 U
Hexachlorocyclopentadiene	{K}	50{C}	50{C}	5.5 U	5.3 U	5.3 U
Hexachloroethane	2	61	61	5.5 U	5.3 U	5.3 U

NOTES: Data Qualifier Definitions and MDEQ Cleanup Criteria footnotes included at end of table.

[] exceeds the higher of the Health Based Drinking Water Value and Target Method Detection Limit.

--- Denotes MDEQ Criteria Not established. Database 6009.009/Irrform VPRO8270.PRG

Table 1B
Windiate Park Area
Vertical Profile Samples
SW8270 Semivolatile Organic Compound Data

Analyte	Target Method Detection Limit ug/l	Health Based Drinking Water Value ug/l	Health Based DW Target MDL - Highest Value ug/l	CUSB-1 05/29/96 17 - 22 ft ug/l	CUSB-1 05/29/96 25 - 30 ft ug/l	CUSB-2 05/30/96 14 - 19 ft ug/l
Indeno(1,2,3-cd)pyrene	5	1.2	5	[5.5 U]	[5.3 U]	[5.3 U]
Isophorone	5	900	900	5.5 U	5.3 U	5.3 U
N-Nitrosodipropylamine	5	0.12	5	[5.5 U]	[5.3 U]	[5.3 U]
N-Nitrosodiphenylamine	5	170	170	5.5 U	5.3 U	5.3 U
Naphthalene	5	260	260	5.5 U	5.3 U	5.3 U
Nitrobenzene	5	3.4	5	[5.5 U]	[5.3 U]	[5.3 U]
Pentachlorophenol	20	1{C}	20	[22 U]	[21 U]	[21 U]
Phenanthrene	5	26	26	5.5 U	5.3 U	5.3 U
Phenol	5	4400	4400	5.5 U	5.3 U	5.3 U
Pyrene	5	550	550	5.5 U	5.3 U	5.3 U
Bis(2-chloroethoxy)methane	---	---	---	5.5 U	5.3 U	5.3 U
Bis(2-chloroethoxy)ether	5	0.77	5	[5.5 U]	[5.3 U]	[5.3 U]
Bis(2-chloroisopropyl) ether	---	---	---	5.5 U	5.3 U	5.3 U
Bis(2-ethoxyhexyl)phthalate (BEHP)	5	6{C}	6{C}	5.5 U	5.3 U	5.3 U
NOTES: Data Qualifier Definitions and MDEQ Cleanup Criteria footnotes included at end of table. □ exceeds the higher of the Health Based Drinking Water Value and Target Method Detection Limit. --- Denotes MDEQ Criteria Not established. Database 6009.009/Irtform VPRO8270.PRG						

Table 1C
Windiate Park Area
Vertical Profile Samples
SW6010A Dissolved Metals Data

Analyte	Health Based Drinking Water Value mg/l	Target Method Detection Limit mg/l	Health Based DW / Target MDL - Highest Value mg/l	CUSB-1 05/29/96 17 - 22 ft mg/l	CUSB-2 05/30/96 14 - 19 ft mg/l
Arsenic	0.050{A,C}	0.005	0.050{A,C}	0.005 U	0.009
Barium	2{A,C}	0.2	2{A,C}	0.5	0.7
Lead	0.004{A,L}	0.003	0.004{A,L}	0.003 U	0.003 U

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NOTES: NC = No criteria U = Not detected J = Estimated
[] exceeds the higher of the Health Based Drinking Water Value and Target Method Detection Limit.
Database 6009.009/Jetform VPRO6010.PRG

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- {A} Background, as defined in Rule 701(c), may be substituted if higher than the cleanup criteria.
- {B} Chemical has either not been evaluated or an inadequate data base precludes the development of a GSI value. Contact an ERD toxicologist for assistance.
- {C} State of Michigan Drinking Water Standard established pursuant to Section 5 of the Safe Drinking Water Act, Act No. 399 of the Public Acts of 1976 used as the default.
- {D} GSI value is pH, temperature, or water hardness dependent. Contact an ERD toxicologist for details.
- {E} Chemical, due to its physicochemical properties, is not expected to leach through soils to groundwater under most conditions.
- {F} Professional judgment used to determine that 50 ppb of aluminum in drinking water is protective of human health.
- {G} Criteria exceeds 100% in soil, hence it is reduced to 100%.
- {H} Criteria is based on agricultural impacts (phytotoxicity), not 20X groundwater criterion.
- {I} Valence-specific chromium data (Cr III and Cr VI) must be compared to the same valence-specific cleanup criteria. If analytical data are provided for "total" chromium only, then values for chromium VI must be applied as the cleanup criteria. Chromium III cleanup criteria can only be used at sites where groundwater is prevented from being used as a public water supply, currently or in the future.
- {J} Chemical may be present in several isomer forms. Isomer specific concentrations must be combined for comparison to criteria. Contact an ERD toxicologist for further explanation.
- {K} Two different analytical methods and target method detection limits are available for this chemical. Refer to Operational Memorandum #6 for details.
- {L} Criteria developed using the U.S. EPA Integrated Uptake Biokinetic Model for children. No risk assessment method(s) is currently available to evaluate lead toxicity in adults. Higher level may be acceptable if soil concentration is less than 400 ppm and groundwater migrating off-site will not impact adjacent properties. Contact an ERD toxicologist for further explanation.
- {M} Also known as MBOCA.
- {N} Also known as Silvex.
- {O} Use 2,3,7,8-TCDD "toxicity equivalence factors" (TEFs) for other chlorinated and /or brominated dibenzo-p-dioxins and chlorinated and/or brominated dibenzofurans for comparison to cleanup criteria. Contact an ERD toxicologist for details.
- {P} All potential sources of nitrogen-nitrate must be combined and compared to nitrate criteria. Contact an ERD toxicologist for details.
- {Q} Criteria for carcinogenic polynuclear aromatic hydrocarbons (PAHs) were developed using "relative potential potencies" (RPPs) to benzo(a)pyrene.
- {R} Chemical may be reactive in soil.
- {S} Concentrations of trihalomethanes in groundwater must be combined to determine compliance with the health-based drinking water value of 100 ppb.
- {T} Toxic Substances Control Act, Subpart G - PCB Spill Cleanup Policy standards may be more restrictive.

ID = Inadequate data to develop criterion; NA = Not available.

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Data Validation Qualifiers

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The following qualifiers may be applied to the analytical data during the data validation process.

- R** Indicates that the previously reported detection limit or sample result has been determined to be unusable due to a major deficiency in the data generation procedure. The data should not be used for any qualitative or quantitative purposes.
- U** Indicates that the compound was analyzed for, but was not detected. The sample quantitation limit is presented and adjusted for dilution and percent moisture, as appropriate.
- J** Indicates that the result should be considered approximated. This qualifier is used when the data validation process identifies a deficiency in the data generation process. Additionally, for organic analysis, this qualifier is used either when estimating a concentration for tentatively identified compounds, or when the mass spectra data indicate the presence of a compound that meets identification criteria but the sample result is less than the sample-specific compound quantitation limit, as adjusted for dilution and percent moisture, as appropriate. For inorganic analysis, this qualifier is used when the analyte is detected greater than the method detection limit, but less than the sample-specific analyte quantitation limit, as adjusted for dilution and percent moisture, as appropriate.
- UJ** Indicates that the detection limit for the analyte in the sample should be considered approximated. This qualifier is used when the data validation process identifies a deficiency in the data generation process.
- "NJ"** Indicates that the compound has been tentatively identified at an estimated concentration. This qualifier is used for organic analyses when the reported compound has exceeded the retention time window on one or both of the chromatographic columns.

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Table 2
Surface Soil Sample Results - Metals
Windiate Park Area
Flint, Mi

LOCATION	MDEQ SOIL GENERIC RESIDENTIAL CRITERIA			Parcel A												Parcel B				Parcel C	
	Analytical Parameter	Method	Target MDL	Direct Contact Value Criteria	Highest Value	SS-85a	SS-86a	SS-87a	SS-76a	SS-77a	SS-78a	SS-79a	SS-80a	SS-82a	SS-83a					SS-32a	
Arsenic	7060		100	6.6(A)	6.6(A)	(9)	(12)	(9)	(10)	(8)	(11)	(10)	(12)	(13)	(31)					(9)	
Barium	6010		1	3.0E+04	3.0E+04	-	316	-	-	67	-	83	-	-	-					-	
Cadmium	6010		.05	210	210	-	<2	-	-	<2	-	<2	-	-	-					-	
Chromium	6010		.050	6.3E+05	6.3E+05	-	19	-	-	11	-	13	-	-	-					-	
Copper	6010		2.5	1.6E+04	1.6E+04	-	54	-	-	17	-	14	-	-	-					-	
Lead	6010		1	400	400	(698)	(1310)	(305)	(545)	232	(564)	(580)	(660)	(1010)	(3570)					48	
Mercury	7471		100	130	130	-	0.13	-	-	<0.05	-	0.06	-	-	-					-	
Selenium	270.2		500	2100	2100	-	0.67	-	-	<0.5	-	<0.5	-	-	-					-	
Silver	6010		500	2000	2000	-	<0.25	-	-	<0.25	-	<0.25	-	-	-					-	
Zinc	6010		NA	NA	NA	4.8	2.0	13	7.7	0.78	8.3	-	2.1	17	140					140	
			1	1.4E+05	1.4E+05	-	320	-	-	98.5	-	66.5	-	-	-					-	

Notes:

1. All concentrations are shown in parts per million (mg/kg).
2. Samples collected on August 29 and 30, 1994 by O'Brien & Gere Engineers, Inc.
3. Analysis performed by the Michigan Department of Environmental Quality.
4. "<" denotes less than the indicated detection limit of test.
5. "-" denotes not analyzed.
6. NA denotes not available.
7. "(j)" denotes results that exceed Direct Contact Value Criteria.
8. {A} denotes Arsenic Direct Contact Value per June 26, 1995 MDEQ Toxicology Unit Memo.
9. "MDL" denotes method detection limit.

JSRGM:SSPARC:WQ1

Table 3
MDEQ Split: Surface Soil Results (November 26, 1994)-Metals
Windiate Park Area
Flint, Michigan

Analyte	MDEQ Soil Generic Residential Criteria				Parcel B		Parcel A	
	Target MDL mg/kg	Direct Contact Value mg/kg	Target MDL Direct Contact -Highest Value mg/kg		U5260 SS-19(b) mg/kg		U5261 SS-20(b) mg/kg	
Aluminum	0.7	ID	0.7		5900		4100	
Antimony	0.5	150	150		7 U		13 J	
Arsenic	0.1	6.6	6.6		(7.3)		(11)	
Barium	1	3*E4	3*E4		90		140	
Beryllium	0.2	2.3	2.3		1 U		1 U	
Cadmium	0.05	210	210		1 U		1 U	
Calcium	NA	NA	NA		52000		57000	
Chromium	2.5	6.3*E5	6.3*E5		35		12	
Cobalt	0.5	2.1*E3	2.1*E3		6 U		6 U	
Copper	1	1.6*E4	1.5*E4		34		46	
Iron	2	ID	2		13000		16000	
Lead	1	400	400		250		(770)	
Magnesium	3	1*E6(G)	1*E6(G)		13000		14000	
Manganese	2	2*E3	2*E3		530 J		330 J	
Mercury	0.1	130	130		0.1 U		0.1 U	
Nickel	1	3.2*E4	3.2*E4		12		16	
Potassium	NA	NA	NA		1600		1400	
Selenium	0.5	2.1*E3	2.1*E3		5.6 U		0.6 U	
Silver	0.5	2000	2000		1 U		1 U	
Sodium	NA	1*E6	1*E6		600		400	
Thallium	0.5	28	28		1		13	
Tin	NA	NA	NA		9		36	
Vanadium	1	3.7*E3	3.7*E3		17		14	
Zinc	1	1.4*E5	1.4*E5		130		170	

"(J)" denotes results that exceed Direct Contact Value Criteria

Results reported in ppm (mg/kg)
 Refer to Page 6 of 6 for notes

Table 3
MDEQ SPLIT: SURFACE SOIL RESULTS(November 16, 1994)-PESTICIDES/PCB DATA
WINDIATE PARK AREA
FLINT, MI

Compound	MDEQ Soil Generic Residential Criteria			
	Target MDL ug/kg	Direct Contact Value ug/kg	Target MDL/ Direct Contact -Highest Value ug/kg	Parcel B U5260 SS-19(b) ug/kg
a-BHC	NA	NA	NA	45 U
γ-BHC	NA	NA	NA	45 U
δ-BHC	NA	NA	NA	45 U
Lindane	20	7,600	7,600	9.6 U
Heptachlor	20	2,200	2,200	9.6 U
Aldrin	20	580	580	9.6 U
Heptachlor epoxide	20	1,100	1,100	9.6 U
Endosulfan I	3.3(U)	97,000(U)	97,000(U)	19 U
Dieldrin	20	620	620	19 U
4-4-DDP	20	29,000	29,000	100 U
Endrin	20	72,000	72,000	19 U
Endosulfan II	3.3(U)	97,000(U)	97,000(U)	19 U
4-4-DDD	20	41,000	41,000	19 U
Endosulfan sulfate	NA	NA	NA	90 U
4-4-DDT	20	29,000	29,000	97 U
Methoxychlor	50	2,117	2,117	280 U
Endrin ketone	NA	NA	NA	90 U
γ-Chlordane	10	7,600	7,600	30 U
γ-Chlordane	10	7,600	7,600	19 U
Toxaphene	170	2,300	2,300	130 U
PCB-1016	NA	NA	NA	450 U
PCB-1221	NA	NA	NA	450 U
PCB-1232	NA	NA	NA	450 U
PCB-1242	NA	NA	NA	450 U
PCB-1248	NA	NA	NA	450 U
PCB-1254	NA	NA	NA	800 U
PCB-1260	NA	NA	NA	900 U

"(U)" denotes results that exceed Direct Contact Value Criteria

Results reported in ppb (ug/kg)
Refer to Page 6 of 6 for notes

JSRGM:SSPCBR.WQ1

Table 3
MDEQ SPLIT: SURFACE SOIL RESULTS(November 16, 1994)- VOLATILE DATA
WINDIATE PARK AREA
FLINT, MI

Analyte	MDEQ Soil Generic Residential Criteria			Parcel B	Parcel A
	Target MDL ug/kg	Direct Contact Value ug/kg	Target MDL/ Direct Contact -Highest Value ug/kg	U5260 SS-19(b) ug/kg	U5261 SS-20(b) ug/kg
Chloromethane	10	200,000	200,000	3 U	3 U
Bromomethane	10	150,000	150,000	3 U	3 U
Vinyl chloride	10	1,200	1,200	3 U	3 U
Chloroethane	10	670,000	670,000	3 U	3 U
Methylene chloride	10	340,000	340,000	6 U	6 U
Acetone	10	1.1E7	1.1E7	6 U	6 U
Carbon disulfide	1(R)	1.2E7(R)	1.2E7(R)	6 UJ	6 UJ
1,1-Dichloroethene	NA	NA	NA	6 U	6 U
1,1-Dichloroethane	10	1.3E7	1.3E7	6 U	6 U
1,2-Dichloroethene (total)	NA	NA	NA	6 U	6 U
Chloroform	10	420,000	420,000	6 U	6 U
1,2-Dichloroethane	10	28,000	28,000	6 U	6 U
2-Butanone	100	2.0E8	2.0E8	11 U	11 U
1,1,1-Trichloroethane	10	3.1E6	3.1E6	6 U	6 U
Carbon tetrachloride	10	20,000	20,000	6 U	6 U
Vinyl acetate	100	9.7E6	9.7E6	11 U	11 U
Bromodichloromethane	10	41,000	41,000	6 U	6 U
1,2-Dichloropropane	10	38,000	38,000	6 U	6 U
c-1,3-Dichloropropene	NA	NA	NA	6 U	6 U
Benzene	10	88,000	88,000	6 U	6 U
Trichloroethene	NA	NA	NA	6 U	6 U
Dibromochloromethane	10	31,000	31,000	6 U	6 U
trans-1,3-Dichloropropene	NA	NA	NA	6 U	6 U
1,1,2-Trichloroethane	10	45,000	45,000	6 U	6 U
Bromoform	10	320,000	320,000	6 U	6 U
4-Methyl-2-Pentanone	100	5.5E6	5.5E6	11 U	11 U
2-Hexanone	100	1.5E7	1.5E7	11 UJ	11 UJ
Tetrachloroethene	NA	NA	NA	6 U	6 U
1,1,2,2-Tetrachloroethane	10	13,000	13,000	6 U	6 U
Toluene	10	2.4E7	2.4E7	6 U	6 U
Chlorobenzene	10	2.1E6	2.1E6	6 U	6 U
Ethylbenzene	10	1.1E7	1.1E7	6 U	6 U
Styrene	10	85,000	85,000	6 U	6 U
Xylene (total)	30	2.0E8	2.0E8	6 U	6 U

"(") denotes results that exceed Direct Contact Value Criteria

Results reported in ppb (ug/kg)

Refer to Page 6 of 6 for notes

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Table 3
MDEQ Split: Surface Soil Results(November 16, 1994)- Semivolatile Data
Windlate Park Area
Flint, Michigan

Analyte	MDEQ Soil Generic Residential Criteria				Parcel B	Parcel A
	Target MDL ug/kg	Direct Contact Value ug/kg	Target MDL/ Direct Contact -Highest Value ug/kg	U5260 SS-19(b) ug/kg	U5261DL SS-20(b) ug/kg	
bis(2-Chloroethyl)ether	330	2,300	2,300	180 U	1800 U	
Phenol	330	6.6*E7	6.6*E7	180 U	1800 U	
2-Chlorophenol	330	6.8*E7	6.8*E7	180 U	1800 U	
1,3-Dichlorobenzene	10	630,000	630,000	180 U	1800 U	
1,4-Dichlorobenzene	10	110,000	110,000	180 U	1800 U	
1,2-Dichlorobenzene	10	9.4*E6	9.4*E6	180 U	1800 U	
Benzyl alcohol	1,300	1.6*E8	1.6*E8	180 U	1800 U	
bis(2-Chloroisopropyl)ether	NA	NA	NA	180 U	1800 U	
2-Methylnaphthalene	330	5.5*E6	5.5*E6	180 U	1800 U	
Hexachloroethane	50	1.8*E5	1.8*E5	180 U	1800 U	
N-Nitroso-di-n-propylamine	330	370	370	180 U	1800 U	
4-Methylnaphthalene	330	2.1*E6	2.1*E6	180 U	1800 U	
Nitrobenzene	330	51,000	51,000	180 U	1800 U	
Isophorone	330	2.7*E6	2.7*E6	180 U	1800 U	
2-Nitrophenol	330	1.2*E6	1.2*E6	180 U	1800 U	
2,4-Dimethylphenol	330	2.1*E7	2.1*E7	180 U	1800 U	
Benzoic Acid	330	1.0*E9(G)	1.0*E9(G)	900 U	8900 U	
bis(2-Chloroethoxy)methane	NA	NA	NA	180 U	1800 U	
2,4-Dichlorophenol	330	4.2*E6	4.2*E6	180 U	1800 U	
1,2,4-Trichlorobenzene	330	6.3*E6	6.3*E6	180 U	1800 U	
Naphthalene	330	1.5*E7	1.5*E7	87 U	1800 U	
4-Chloroaniline	NA	NA	NA	180 U	1800 U	
Hexachlorobutadiene	{K}	130,000	130,000	180 U	1800 U	
4-Chloro-3-methylphenol	330	2.2*E6	2.2*E6	180 U	1800 U	
2-Methylnaphthalene	NA	NA	NA	130 U	1800 U	
Hexachlorocyclopentadiene	{K}	3.0*E6	3.0*E6	180 U	1800 U	
2,4,6-Trichlorophenol	330	900,000	900,000	180 U	1800 U	
2,4,5-Trichlorophenol	1,700	4.2*E7	4.2*E7	900 U	8900 U	
2-Chloronaphthalene	NA	NA	NA	180 U	1800 U	
2-Nitroaniline	NA	NA	NA	900 U	8900 U	
Acenaphthylene	330	1.5*E6	1.5*E6	180 U	1800 U	
Dimethylnaphthalene	330	1.0*E9(G)	1.0*E9(G)	180 U	1800 U	
2,6-Dinitrotoluene	NA	NA	NA	180 U	1800 U	
Acenaphthene	330	7.6*E7	7.6*E7	180 U	1800 U	

"(") denotes results that exceed Direct Contact Value Criteria

Results reported in ppb (ug/kg)

Refer to Page 6 of 6 for notes

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Table 3
MDEQ Split: Surface Soil Results(November 16, 1994)- Semivolatle Data
Windiate Park Area
Flint, Michigan

Analyte	MDEQ Soil Generic Residential Criteria				Parcel A	
	Target MDL ug/kg	Direct Contact Value ug/kg	Target MDL/ Direct Contact -Highest Value ug/kg	Parcel B U5260 SS-19(b) ug/kg	Parcel A U5261DL SS-20(b) ug/kg	
3-Nitroaniline	NA	NA	NA	900 U	8900 U	
2,4-Dinitrophenol	NA	NA	NA	900 U	8900 U	
Dibenzofuran	330	ID	ID	41 J	1300 J	
2,4-Dinitrotoluene	330	15,000	15,000	180 U	1800 U	
4-Nitrophenol	NA	NA	NA	900 U	8900 U	
Fluorene	330	5.1*E7	5.1*E7	180 U	3000 J	
4-Chlorophenyl-phenylether	NA	NA	NA	180 U	1800 U	
Diethylphthalate	330	3.2*E8	3.2*E8	180 U	1800 U	
4-Nitroaniline	NA	NA	NA	900 U	8900 U	
4,6-Dinitro-2-methylphenol	NA	NA	NA	900 U	8900 U	
n-Nitrosodiphenylamine	330	520,000	520,000	180 U	1800 U	
4-Bromophenyl-phenylether	NA	NA	NA	180 U	1800 U	
Hexachlorobenzene	{K}	6,200	6,200	180 U	1800 U	
Pentachlorophenol	3,400	82,000	82,000	900 U	8900 U	
Phenanthrene	330	1.5*E6	1.5*E6	360	21000	
Anthracene	330	4.2*E8	4.2*E8	81 J	6300	
Di-n-butylphthalate	330	5.1*E7	5.1*E7	120 J	1800 U	
Fluoranthene	330	5.1*E7	5.1*E7	50	24000	
Pyrene	330	3.2*E7	3.2*E7	460	20000	
Butylbenzylphthalate	330	6.8*E7	6.8*E7	750	4300	
3,3'-Dichlorobenzidine	2,000	5,700	5,700	370 U	3700 U	
Benzol(a)anthracene	330(Q)	14,000(Q)	14,000(Q)	240	9700	
Chrysene	330(Q)	1*E6(Q)	1*E6(Q)	240	9000	
bis(2-Ethylhexyl)phthalate	330	700,000	700,000	210	3700 U	
Di-n-octylphthalate	330	7.6*E6	7.6*E6	180 U	1800 U	
Benzol(b)fluoranthene	330(Q)	14,000(Q)	14,000(Q)	180 U	9700	
Benzol(k)fluoranthene	330(Q)	140,000(Q)	140,000(Q)	180 U	5800	
Benzol(a)pyrene	330(Q)	1,400(Q)	1,400(Q)	180 U	(7600)	
Indeno[1,2,3-cd]pyrene	330(Q)	14,000(Q)	14,000(Q)	180 U	4700	
Dibenz(a,h)anthracene	330(Q)	1,400(Q)	1,400(Q)	180 U	1800 U	
Benzol(g,h,i)perylene	330	1.5*E6	1.5*E6	180 U	4700	

"(Q)" denotes results that exceed Direct Contact Value Criteria

Results reported in pbb (ug/kg)

Refer to Page 6 of 6 for notes

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Notes:

1. {A} background, as defined in Rule 701(c), may be substituted if higher than the cleanup criteria.
2. {G} criteria exceeds 100% in soil, hence it is reduced to 100%.
3. {J} chemical may be present in several isomer forms. Isomer specific concentrations must be combined for comparison to criteria. Contact an ERD toxicologist for further explanation.
4. {R} chemical may be reactive in soil.
5. {Q} criteria for carcinogenic polynuclear aromatic hydrocarbons (PAHs) were developed using "relative potential potencies (RPPs) to benzo(a)pyrene.
6. "J" indicates that the result should be considered to be approximate. This qualifier is used when the data validation process identifies a deficiency in the data generation process. Additionally, for organic analysis, this qualifier is used either when estimating a concentration for tentatively identified compounds, or when the mass spectra data indicate the presence of a compound that meets identification criteria but the sample result is less than the sample-specific compound quantitation limit, as adjusted for dilution and percent moisture, as appropriate. For inorganic analysis, this qualifier is used when the analyte is detected greater than the method detection limit, but less than the sample-specific analyte detection limit, as adjusted for dilution and percent moisture, as appropriate.
7. "R" indicates that the previously reported detection limit or sample result has been determined to be unusable due to a major deficiency in the data generation procedure. The data should not be used for any qualitative or quantitative purposes.
8. "U" indicates that the compound was analyzed for, but was not detected. The sample quantitation limit is presented and adjusted for dilution and percent moisture, as appropriate.
9. ID = Inadequate data to develop criterion
10. "MDL" denotes Method Detection Limit.

Analyte	Target Method Detection Limit mg/kg	Direct Contact Value mg/kg	Target MDL/Direct Contact -Highest Value mg/kg	VP-02 Parcel B 06/15/95 12 - 18 in. mg/kg	VP-02 Parcel B 06/15/95 3 - 6 in. mg/kg	VP-02 Parcel B 06/15/95 6 - 12 in. mg/kg	VP-03 Parcel B 06/15/95 0 - 3 in. mg/kg
Lead	1.0	4E+2	4E+2	7 J	240 J	16 J	[580 J]

NOTES: ☐ Exceeds higher of Target MDL and Direct Contact Value.
 Data qualifier definitions included at end of table.
 Database 6009.002/Jetform RAPADD1.PRG

Analyte	Target Method Detection Limit mg/kg	Direct Contact Value mg/kg	Target MDL/Direct Contact -Highest Value mg/kg	VP-03 Parcel B 06/15/95 12 - 18 in. mg/kg	VP-03 Parcel B 06/15/95 3 - 6 in. mg/kg	VP-03 Parcel B 06/15/95 6 - 12 in. mg/kg	VP-04 Parcel B 06/15/95 0 - 3 in. mg/kg	VP-04 Parcel B 06/15/95 12 - 18 in. mg/kg
Lead	1.0	4E+2	4E+2	22	390 J	15 J	[700]	120

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NOTES: ☐ Exceeds higher of Target MDL and Direct Contact Value.
 Data qualifier definitions included at end of table.
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Analyte	Target Method Detection Limit mg/kg	Direct Contact Value mg/kg	Target MDL/Direct Contact -Highest Value mg/kg	VP-04 Parcel B 06/15/95 3 - 6 in. mg/kg	VP-04 Parcel B 06/15/95 6 - 12 in. mg/kg	VP-05 Parcel B 06/15/95 0 - 3 in. mg/kg	VP-05 Parcel B 06/15/95 12 - 18 in. mg/kg	VP-05 Parcel B 06/15/95 3 - 6 in. mg/kg
Lead	1.0	4E+2	4E+2	[510]	400	400	11	78

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NOTES: ☐ Exceeds higher of Target MDL and Direct Contact Value.
 Data qualifier definitions included at end of table.
 Database 6009.002/teform RAPADD1.PRG

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Analyte	Target Method Detection Limit mg/kg	Direct Contact Value mg/kg	Target MDL/ Direct Contact -Highest Value mg/kg	VP-05 Parcel B 06/15/95 6 - 12 in. mg/kg
Lead	1.0	4E+2	4E+2	7

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NOTES: ☐ Exceeds higher of Target MDL and Direct Contact Value.
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- (A) Background, as defined in Rule 701(c), may be substituted if higher than the cleanup criteria.
- (B) Chemical has either not been evaluated or an inadequate data base precludes the development of a GSI value. Contact an ERD toxicologist for assistance.
- (C) State of Michigan Drinking Water Standard established pursuant to Section 5 of the Safe Drinking Water Act, Act No. 399 of the Public Acts of 1976 used as the default.
- (D) GSI value is pH, temperature, or water hardness dependent. Contact an ERD toxicologist for details.
- (E) Chemical, due to its physicochemical properties, is not expected to leach through soils to groundwater under most conditions.
- (F) Professional judgment used to determine that 50 ppb of aluminum in drinking water is protective of human health.
- (G) Criteria exceeds 100% in soil, hence it is reduced to 100%.
- (H) Criteria is based on agricultural impacts (phytotoxicity), not 20X groundwater criterion.
- (I) Valence-specific chromium data (Cr III and Cr VI) must be compared to the same valence-specific cleanup criteria. If analytical data are provided for "total" chromium only, then values for chromium VI must be applied as the cleanup criteria. Chromium III cleanup criteria can only be used at sites where groundwater is prevented from being used as a public water supply, currently or in the future.
- (J) Chemical may be present in several isomer forms. Isomer specific concentrations must be combined for comparison to criteria. Contact an ERD toxicologist for further explanation.
- (K) Two different analytical methods and target method detection limits are available for this chemical. Refer to Operational Memorandum #6 for details.
- (L) Criteria developed using the U.S. EPA Integrated Uptake Biokinetic Model for children. No risk assessment method(s) is currently available to evaluate lead toxicity in adults. Higher level may be acceptable if soil concentration is less than 400 ppm and groundwater migrating off-site will not impact adjacent properties. Contact an ERD toxicologist for further explanation.
- (M) Also known as MBOCA.
- (N) Also known as Silvex.
- (O) Use 2,3,7,8-TCDD "toxicity equivalence factors" (TEFs) for other chlorinated and/or brominated dibenzo-p-dioxins and chlorinated and/or brominated dibenzofurans for comparison to cleanup criteria. Contact an ERD toxicologist for details.
- (P) All potential sources of nitrogen-nitrate must be combined and compared to nitrate criteria. Contact an ERD toxicologist for details.
- (Q) Criteria for carcinogenic polynuclear aromatic hydrocarbons (PAHs) were developed using "relative potential potencies" (RPPs) to benzo(a)pyrene.
- (R) Chemical may be reactive in soil.
- (S) Concentrations of trihalomethanes in groundwater must be combined to determine compliance with the health-based drinking water value of 100 ppb.
- (T) Toxic Substances Control Act, Subpart G - PCB Spill Cleanup Policy standards may be more restrictive.

ID = Inadequate data to develop criterion; NA = Not available.

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Data Validation Qualifiers

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The following qualifiers may be applied to the analytical data during the data validation process.

- R** Indicates that the previously reported detection limit or sample result has been determined to be unusable due to a major deficiency in the data generation procedure. The data should not be used for any qualitative or quantitative purposes.
- U** Indicates that the compound was analyzed for, but was not detected. The sample quantitation limit is presented and adjusted for dilution and percent moisture, as appropriate.
- J** Indicates that the result should be considered approximated. This qualifier is used when the data validation process identifies a deficiency in the data generation process. Additionally, for organic analysis, this qualifier is used either when estimating a concentration for tentatively identified compounds, or when the mass spectra data indicate the presence of a compound that meets identification criteria but the sample result is less than the sample-specific compound quantitation limit, as adjusted for dilution and percent moisture, as appropriate. For inorganic analysis, this qualifier is used when the analyte is detected greater than the method detection limit, but less than the sample-specific analyte quantitation limit, as adjusted for dilution and percent moisture, as appropriate.
- UJ** Indicates that the detection limit for the analyte in the sample should be considered approximated. This qualifier is used when the data validation process identifies a deficiency in the data generation process.
- "NJ"** Indicates that the compound has been tentatively identified at an estimated concentration. This qualifier is used for organic analyses when the reported compound has exceeded the retention time window on one or both of the chromatographic columns.

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Table 5A
Windiate Park Area
Soil Boring
SW8260 Volatile Organic Compound Data

Analyte	Target Method Detection Limit ug/kg	Direct Contact Value ug/kg	Target MDL/ Direct Contact Value ug/kg	SB007 Parcel B 03/21/95 12 - 14 ft. ug/kg	SB007 Parcel B 03/21/95 8 - 10 ft. ug/kg
Acetone	100	1.1E+7	1.1E+7	740 U	1700 UJ
Benzene	10	88000	88000	15 U	350 U
Bromodichloromethane	10	41000	41000	15 U	350 U
Bromoform	10	3.2E+5	3.2E+5	15 UJ	350 UJ
Carbon disulfide	100	1.2E+7	1.2E+7	15 UJ	350 U
Carbon tetrachloride	10	20000	20000	15 U	350 U
Chlorobenzene	10	2.1E+6	2.1E+6	15 U	350 U
Chloroethane	10	6.7E+5	6.7E+5	29 UJ	710 U
Chloroform	10	4.2E+5	4.2E+5	15 U	350 U
Dibromochloromethane	10	31000	31000	15 U	350 U
1,1-Dichloroethane	10	1.3E+7	1.3E+7	15 U	350 U
1,2-Dichloroethane	10	28000	28000	15 U	350 U
1,1-Dichloroethene	10	1.1E+5	1.1E+5	15 U	350 U
cis-1,2-Dichloroethene	10	1.2E+6	1.2E+6	15 U	350 U
trans-1,2-Dichloroethene	10	1.9E+6	1.9E+6	15 U	350 U
1,2-Dichloropropane	10	38000	38000	15 U	350 U
cis-1,3-Dichloropropene	10	14000	14000	29 U	710 U
trans-1,3-Dichloropropene	10	14000	14000	15 U	350 U
Ethylbenzene	10	1.1E+7	1.1E+7	15 U	350 U
2-Hexanone	100	1.5E+7	1.5E+7	29 UJ	710 UJ
Bromomethane	10	1.5E+5	1.5E+5	29 U	710 U
Chloromethane	10	2.0E+5	2.0E+5	29 U	710 U
2-Butanone (MEK)	100	2.0E+8	2.0E+8	59 U	1400 UJ
4-Methyl-2-pentanone (MIBK)	100	5.5E+6	5.5E+6	29 U	710 UJ
Methylene chloride	10	3.4E+5	3.4E+5	29 U	710 U

NOTES: Data Qualifier Definitions and MDEQ Cleanup Criteria footnotes included at end of table.

□ Exceeds higher of Direct Contact Value and Target MDL.

---- denotes MDEQ criteria not established. Database 6009.003\etform RAPADD2.PRG

Table 5A
Windiate Park Area
Soil Boring
SW8260 Volatile Organic Compound Data

Analyte	Target Method Detection Limit ug/kg	Direct Contact Value ug/kg	Target MDL/Direct Contact -Highest Value ug/kg	SB007 Parcel B 03/21/95 12 - 14 ft. ug/kg	SB007 Parcel B 03/21/95 8 - 10 ft. ug/kg
Styrene	10	85000	85000	15 U	350 U
1,1,2,2-Tetrachloroethane	10	13000	13000	15 UJ	350 UJ
Tetrachloroethene	10	50000	50000	15 U	350 U
Toluene	10	2.4E+7	2.4E+7	15 U	350 U
1,1,1-Trichloroethane	10	3.1E+6	3.1E+6	15 U	350 U
1,1,2-Trichloroethane	10	45000	45000	15 U	350 U
Trichloroethene	10	1.6E+5	1.6E+5	15 U	350 U
Vinyl chloride	10	1200	1200	29 U	710 U
Xylene (total)	30	2.0E+8	2.0E+8	15 U	350 U

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NOTES: Data Qualifier Definitions and MDEQ Cleanup Criteria footnotes included at end of table.
 [] Exceeds higher of Direct Contact Value and Target MDL.
 --- denotes MDEQ criteria not established. Database 6009.003\etform RAPADD2.PRG

Table 5B
Windiate Park Area
Soil Boring
SW8270 Semivolatile Organic Compound Data

Analyte	Target Method Detection Limit ug/kg	Direct Contact Value ug/kg	Target MDL/ Direct Contact -Highest Value ug/kg	SB007 Parcel B 03/21/95 12 - 14 ft. ug/kg	SB007 Parcel B 03/21/95 8 - 10 ft. ug/kg
Acenaphthene	330	7.6E+7	7.6E+7	190 U	180 U
Acenaphthylene	330	1.5E+6	1.5E+6	190 U	180 U
Anthracene	330	4.2E+8	4.2E+8	190 U	180 U
Benzo(a)anthracene	330	14000	14000	190 U	180 U
Benzo[a]pyrene	330	1400	1400	190 U	180 U
Benzo(b)fluoranthene	330	14000	14000	190 U	180 U
Benzo(ghi)perylene	330	1.5E+6	1.5E+6	190 U	180 U
Benzo(k)fluoranthene	330	1.4E+5	1.4E+5	190 U	180 U
Bis(2-chloroethoxy)methane	---	---	---	190 U	180 U
Bis(2-chloroethyl)ether	330	2300	2300	190 U	180 U
Bis(2-chloroisopropyl) ether	---	---	---	190 U	180 U
Bis(2-ethylhexyl)phthalate (BEHP)	330	7.0E+5	NA	190 U	180 U
4-Bromophenyl phenyl ether	---	---	---	190 U	180 U
Butyl benzyl phthalate	330	6.8E+7	6.8E+7	190 U	180 U
Carbazole	---	---	---	390 U	370 U
4-Chloroaniline	---	---	---	190 U	180 U
4-Chloro-3-methylphenol	330	2.2E+6	2.2E+6	190 U	180 U
2-Chloronaphthalene	---	---	---	190 U	180 U
2-Chlorophenol	330	6.8E+5	6.8E+5	190 U	180 U
4-Chlorophenyl phenyl ether	---	---	---	190 U	180 U
Chrysene	330	1.4E+6	1.4E+6	190 U	180 U
2-Methylphenol	330	5.5E+6	5.5E+6	190 U	180 U
4-Methylphenol	330	2.1E+6	2.1E+6	190 U	180 U
Dibenzo(a,h)anthracene	330	1400	1400	190 U	180 U
Dibenzofuran	330	ID	ID	190 U	180 U

NOTES: Data Qualifier Definitions and MDEQ Cleanup Criteria footnotes included at end of table.

□ Exceeds higher of Direct Contact Value and Target MDL.

--- Denotes MDEQ criteria not established/Database 6009.003/Jetform RAPADD2.PRG

Table 5B
Windiate Park Area
Soil Boring
SW8270 Semivolatile Organic Compound Data

Analyte	Target Method Detection Limit ug/kg	Direct Contact Value ug/kg	Target MDL/Direct Contact -Highest Value ug/kg	SB007 Parcel B 03/21/95 12 - 14 ft. ug/kg	SB007 Parcel B 03/21/95 8 - 10 ft. ug/kg
1,2-Dichlorobenzene	10	9.4E+6	9.4E+6	190 U	180 U
1,4-Dichlorobenzene	10	1.1E+5	1.1E+5	190 U	180 U
1,3-Dichlorobenzene	10	9.4E+6	9.4E+6	190 U	180 U
3,3-Dichlorobenzidine	2000	5700	5700	390 U	180 U
2,4-Dichlorophenol	330	4.2E+6	4.2E+6	190 U	180 U
Diethyl phthalate	330	3.2E+8	3.2E+8	190 U	180 U
Dimethyl phthalate	330	1E+9{G}	1E+9{G}	190 U	180 U
2,4-Dimethylphenol	330	2.1E+7	2.1E+7	190 U	180 U
Di-n-butyl phthalate	330	5.1E+7	5.1E+7	190 U	180 U
Di-n-octyl phthalate	330	7.6E+6	7.6E+6	190 U	180 U
4,6-Dinitro-2-methylphenol	1700	1.5E+5	1.5E+5	940 U	900 U
2,4-Dinitrophenol	---	---	---	940 U	900 U
2,4-Dinitrotoluene	330	15000	15000	190 U	180 U
2,6-Dinitrotoluene	---	---	---	190 U	180 U
Fluoranthene	330	5.1E+7	5.1E+7	190 U	180 U
Fluorene	330	5.1E+7	5.1E+7	190 U	180 U
Hexachlorobenzene	{K}	6200	6200	190 U	180 U
Hexachlorobutadiene	{K}	1.3E+5	1.3E+5	190 U	180 U
Hexachlorocyclopentadiene	{K}	3.0E+6	3.0E+6	190 U	180 U
Hexachloroethane	50	1.8E+5	1.8E+5	190 U	180 U
Indeno(1,2,3-cd)pyrene	330	14000	14000	190 U	180 U
Isophorone	330	2.7E+6	2.7E+6	190 U	180 U
2-Methylnaphthalene	330	ID	ID	190 U	180 U
Naphthalene	330	1.5E+7	1.5E+7	190 U	180 U
2-Nitroaniline	---	---	---	940 U	900 U

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NOTES: Data Qualifier Definitions and MDEQ Cleanup Criteria footnotes included at end of table.

[] Exceeds higher of Direct Contact Value and Target MDL.

--- Denotes MDEQ criteria not established/Database 6009.003/Jetform RAPADD2.PRG

Analyte	Target Method Detection Limit ug/kg	Direct Contact Value ug/kg	Target MDL/ Direct Contact Highest Value ug/kg	SB007 Parcel B 03/21/95 12 - 14 ft. ug/kg	SB007 Parcel B 03/21/95 8 - 10 ft. ug/kg
3-Nitroaniline	---	---	---	940 U	900 U
4-Nitroaniline	---	---	---	940 U	900 U
Nitrobenzene	330	51000	51000	190 U	180 U
2-Nitrophenol	330	1.2E+6	1.2E+6	190 U	180 U
4-Nitrophenol	---	---	---	940 U	900 U
N-Nitrosodiphenylamine	330	5.2E+5	5.2E+5	190 U	180 U
N-Nitrosodipropylamine	330	370	370	190 U	180 U
Pentachlorophenol	3400	82000	82000	940 U	900 U
Phenanthrene	330	1.5E+6	1.5E+6	190 U	180 U
Phenol	330	6.6E+7	6.6E+7	190 U	180 U
Pyrene	330	3.2E+7	3.2E+7	190 U	180 U
1,2,4-Trichlorobenzene	330	6.3E+6	6.3E+6	190 U	180 U
2,4,6-Trichlorophenol	330	9.0E+5	9.0E+5	190 U	180 U
2,4,5-Trichlorophenol	1700	4.2E+7	4.2E+7	940 U	900 U

NOTES: Data Qualifier Definitions and MDEQ Cleanup Criteria footnotes included at end of table.
 [] Exceeds higher of Direct Contact Value and Target MDL.
 --- Denotes MDEQ criteria not established/Database 6009.003/Jetform RAPADD2.PRG

Analyte	SB007 Parcel B 03/21/95 12 14 ft. mg/kg	SB007 Parcel B 03/21/95 8 10 ft. mg/kg
Aroclor 1016	0.19 U	0.18 U
Aroclor 1221	0.19 U	0.18 U
Aroclor 1232	0.19 U	0.18 U
Aroclor 1242	0.19 U	0.18 U
Aroclor 1248	0.19 U	0.18 U
Aroclor 1254	0.19 U	0.18 U
Aroclor 1260	0.19 U	0.18 U

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NOTES: Data Qualifier Definitions and MDEQ Cleanup Criteria footnotes included at end of table.
 Direct Contact Value for total aroclors is equal to 2.3 mg/kg.
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Table 5D
Windiate Park Area
Soil Boring
SW6010, SW7000 Series, and SW9010 Metals Data

Analyte	Target Method Detection Limit mg/kg	Direct Contact Value mg/kg	Target MDL/ Direct Contact -Highest Value mg/kg	SB007 Parcel B 03/21/95 12 - 14 in. mg/kg	SB007 Parcel B 03/21/95 8 - 10 in. mg/kg
Arsenic	0.1	6.6	6.6	[6.7 J]	3.9 J
Barium	1	3.0E+4	3.0E+4	59 J	30 J
Cadmium	0.05	2.1E+2	2.1E+2	0.09	0.08
Chromium	2.5	6.3E+5	6.3E+5	18 J	11 J
Copper	1	1.6E+4	1.6E+4	15 J	11 J
Lead	1	4E+2	4E+2	7 J	6 J
Mercury	0.1	130	130	0.1 U	0.1 U
Selenium	0.5	2.1E+3	2.1E+3	0.6 U	0.6 U
Silver	0.5	2000	2000	0.6 U	0.6 U
Zinc	1	1.4E+5	1.4E+5	35	35
Cyanide	0.5	9.3E+3	9.3E+3	---	---

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NOTES: Data Qualifier Definitions and MDEQ Cleanup Criteria footnotes included at end of table.
☐ Exceeds higher of Direct Contact Value and Target MDL.
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- (A) Background, as defined in Rule 701(c), may be substituted if higher than the cleanup criteria.
- (B) Chemical has either not been evaluated or an inadequate data base precludes the development of a GSI value. Contact an ERD toxicologist for assistance. **Aug 07, 2009 17:05**
- (C) State of Michigan Drinking Water Standard established pursuant to Section 5 of the Safe Drinking Water Act, Act No. 399 of the Public Acts of 1976 used as the default.
- (D) GSI value is pH, temperature, or water hardness dependent. Contact an ERD toxicologist for details.
- (E) Chemical, due to its physicochemical properties, is not expected to leach through soils to groundwater under most conditions.
- (F) Professional judgment used to determine that 50 ppb of aluminum in drinking water is protective of human health.
- (G) Criteria exceeds 100% in soil, hence it is reduced to 100%.
- (H) Criteria is based on agricultural impacts (phytotoxicity), not 20X groundwater criterion.
- (I) Valence-specific chromium data (Cr III and Cr VI) must be compared to the same valence-specific cleanup criteria. If analytical data are provided for "total" chromium only, then values for chromium VI must be applied as the cleanup criteria. Chromium III cleanup criteria can only be used at sites where groundwater is prevented from being used as a public water supply, currently or in the future.
- (J) Chemical may be present in several isomer forms. Isomer specific concentrations must be combined for comparison to criteria. Contact an ERD toxicologist for further explanation.
- (K) Two different analytical methods and target method detection limits are available for this chemical. Refer to Operational Memorandum #6 for details.
- (L) Criteria developed using the U.S. EPA Integrated Uptake Biokinetic Model for children. No risk assessment method(s) is currently available to evaluate lead toxicity in adults. Higher level may be acceptable if soil concentration is less than 400 ppm and groundwater migrating off-site will not impact adjacent properties. Contact an ERD toxicologist for further explanation.
- (M) Also known as MBOCA.
- (N) Also known as Silvex.
- (O) Use 2,3,7,8-TCDD "toxicity equivalence factors" (TEFs) for other chlorinated and /or brominated dibenzo-p-dioxins and chlorinated and/or brominated dibenzofurans for comparison to cleanup criteria. Contact an ERD toxicologist for details.
- (P) All potential sources of nitrogen-nitrate must be combined and compared to nitrate criteria. Contact an ERD toxicologist for details.
- (Q) Criteria for carcinogenic polynuclear aromatic hydrocarbons (PAHs) were developed using "relative potential potencies" (RPPs) to benzo(a)pyrene.
- (R) Chemical may be reactive in soil.
- (S) Concentrations of trihalomethanes in groundwater must be combined to determine compliance with the health-based drinking water value of 100 ppb.
- (T) Toxic Substances Control Act, Subpart G - PCB Spill Cleanup Policy standards may be more restrictive.

ID = inadequate data to develop criterion; NA = Not available. **Aug 07, 2009 17:05**

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Data Validation Qualifiers

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The following qualifiers may be applied to the analytical data during the data validation process.

- R** Indicates that the previously reported detection limit or sample result has been determined to be unusable due to a major deficiency in the data generation procedure. The data should not be used for any qualitative or quantitative purposes.
- U** Indicates that the compound was analyzed for, but was not detected. The sample quantitation limit is presented and adjusted for dilution and percent moisture, as appropriate.
- J** Indicates that the result should be considered approximated. This qualifier is used when the data validation process identifies a deficiency in the data generation process. Additionally, for organic analysis, this qualifier is used either when estimating a concentration for tentatively identified compounds or when the mass spectra data indicate the presence of a compound that meets identification criteria but the sample result is less than the sample-specific compound quantitation limit, as adjusted for dilution and percent moisture, as appropriate. For inorganic analysis, this qualifier is used when the analyte is detected greater than the method detection limit, but less than the sample-specific analyte quantitation limit, as adjusted for dilution and percent moisture, as appropriate.
- UJ** Indicates that the detection limit for the analyte in the sample should be considered approximated. This qualifier is used when the data validation process identifies a deficiency in the data generation process.
- "NJ"** Indicates that the compound has been tentatively identified at an estimated concentration. This qualifier is used for organic analyses when the reported compound has exceeded the retention time window on one or both of the chromatographic columns.

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Table 6A
Windiate Park Area
Geoprobe Borings
SW8260 Volatile Organic Compound Data

Analyte	Target Method Detection Limit ug/kg	Direct Contact Value ug/kg	Target MDL/Direct Contact Value ug/kg	GB-10C Parcel B 3 - 5 ft. ug/kg	GB-11C Parcel B 06/08/95 3 - 5 ft. ug/kg	GB-12C Parcel A 06/09/95 3 - 5 ft. ug/kg	GB-17C Parcel C 06/09/95 3 - 5 ft. ug/kg
Acetone	100	1.1E+7	1.1E+7	11 U	11 U	12 U	12 UJ
Benzene	10	88000	88000	2.8 U	2.8 U	3 U	3.1 UJ
Bromodichloromethane	10	41000	41000	2.8 U	2.8 U	3 U	3.1 UJ
Bromoform	10	3.2E+5	3.2E+5	2.8 U	2.8 U	3 U	3.1 UJ
Carbon disulfide	100	1.2E+7	1.2E+7	2.8 U	2.8 U	3 U	3.1 UJ
Carbon tetrachloride	10	20000	20000	2.8 U	2.8 U	3 U	3.1 UJ
Chlorobenzene	10	2.1E+6	2.1E+6	2.8 U	2.8 U	3 U	3.1 UJ
Chloroethane	10	6.7E+5	6.7E+5	5.6 U	5.5 U	6 U	6.2 UJ
Chloroform	10	4.2E+5	4.2E+5	2.8 U	2.8 U	3 U	3.1 UJ
Dibromochloromethane	10	31000	31000	2.8 U	2.8 U	3 U	3.1 UJ
1,1,1-Trichloroethane	10	1.3E+7	1.3E+7	2.8 U	2.8 U	3 U	3.1 UJ
1,2-Dichloroethane	10	28000	28000	2.8 U	2.8 U	3 U	3.1 UJ
1,1-Dichloroethene	10	1.1E+5	1.1E+5	2.8 U	2.8 U	3 U	3.1 UJ
cis-1,2-Dichloroethene	10	1.2E+6	1.2E+6	2.8 U	2.8 U	3 U	3.1 UJ
trans-1,2-Dichloroethene	10	1.9E+6	1.9E+6	2.8 U	2.8 U	3 U	3.1 UJ
1,2-Dichloropropane	10	38000	38000	2.8 U	2.8 U	3 U	3.1 UJ
cis-1,3-Dichloropropene	10	14000	14000	2.8 U	2.8 U	3 U	3.1 UJ
trans-1,3-Dichloropropene	10	14000	14000	2.8 U	2.8 U	3 U	3.1 UJ
Ethylbenzene	10	1.1E+7	1.1E+7	2.8 U	2.8 U	3 U	3.1 UJ
2-Hexanone	100	1.5E+7	1.5E+7	5.6 U	5.5 U	6 U	6.2 UJ
Bromomethane	10	1.5E+5	1.5E+5	5.6 U	5.5 U	6 U	6.2 UJ
Chloromethane	10	2.0E+5	2.0E+5	5.6 U	5.5 U	6 U	6.2 UJ
2-Butanone (MEK)	100	2.0E+8	2.0E+8	11 U	11 U	12 U	12 UJ
4-Methyl-2-pentanone (MIBK)	100	5.5E+6	5.5E+6	5.6 U	5.5 U	6 U	6.2 UJ
Methylene chloride	10	3.4E+5	3.4E+5	5.6 U	5.5 U	6 U	1.3 J

NOTES: Data Qualifier Definitions and MDEQ Cleanup Criteria footnotes included at end of table.

□ exceeds the higher of the Direct Contact and Target Method Detection Limit.

--- denotes MDEQ criteria not established. Database 6009.004\etform RAPADD8.PRG

Table 6A
Windiate Park Area
Geoprobe Borings
SW8260 Volatile Organic Compound Data

Analyte	Target Method Detection Limit ug/kg	Direct Contact Value ug/kg	Target MDL/ Direct Contact -Highest Value ug/kg	GB-10C Parcel B 06/08/95 3 - 5 ft. ug/kg	GB-11C Parcel B 06/08/95 3 - 5 ft. ug/kg	GB-12C Parcel A 06/08/95 3 - 5 ft. ug/kg	GB-17C Parcel C 06/09/95 3 - 5 ft. ug/kg
Styrene	10	85000	85000	2.8 U	2.8 U	3 U	3.1 UJ
1,1,2,2-Tetrachloroethane	10	13000	13000	2.8 U	2.8 U	3 U	3.1 UJ
Tetrachloroethene	10	50000	50000	2.8 U	2.8 U	3 U	3.1 UJ
Toluene	10	2.4E+7	2.4E+7	2.8 U	2.8 U	3 U	3.1 UJ
1,1,1-Trichloroethane	10	3.1E+6	3.1E+6	2.8 U	2.8 U	3 U	3.1 UJ
1,1,2-Trichloroethane	10	45000	45000	2.8 U	2.8 U	3 U	3.1 UJ
Trichloroethene	10	1.6E+5	1.6E+5	2.8 U	2.8 U	3 U	3.1 UJ
Vinyl chloride	10	1200	1200	5.5 U	5.5 U	6 U	6.2 UJ
Cyclohexane (total)	30	2.0E+8	2.0E+8	2.8 U	2.8 U	3 U	3.1 UJ
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NOTES: Data Qualifier Definitions and MDEQ Cleanup Criteria footnotes included at end of table.
 □ exceeds the higher of the Direct Contact and Target Method Detection Limit.
 --- denotes MDEQ criteria not established. Database 6009.004\Jetform RAPADD8.PRG

Table 6B
Windiate Park Area
Geoprobe Boring
SW8270 Semivolatile Organic Compound Data

Analyte	Target Method Detection Limit ug/kg	Direct Contact Value ug/kg	Target MDL/ Direct Contact -Highest Value ug/kg	GB-10C Parcel B 3 - 5 ft. ug/kg	GB-11C Parcel B 3 - 5 ft. ug/kg	GB-12C Parcel A 06/08/95 3 - 5 ft. ug/kg	GB-17C Parcel C 06/09/95 3 - 5 ft. ug/kg
Acenaphthene	330	7.6E+7	7.6E+7	180 U	180 U	190 U	200 U
Acenaphthylene	330	1.5E+6	1.5E+6	180 U	180 U	190 U	200 U
Anthracene	330	4.2E+8	4.2E+8	180 U	180 U	190 U	200 U
Benzo(a)anthracene	330	14000	14000	24 J	64 J	55 J	200 U
Benzo(a)pyrene	330	1400	1400	180 U	180 U	190 U	200 U
Benzo(b)fluoranthene	330	14000	14000	180 U	180 U	190 U	200 U
Benzo(ghi)perylene	330	1.5E+6	1.5E+6	180 U	180 U	190 U	200 U
Benzo(k)fluoranthene	330	1.4E+5	1.4E+5	180 U	180 U	190 U	200 U
Bis(2-chloroethoxy)methane	---	---	---	180 U	180 U	190 U	200 U
Bis(2-chloroethyl)ether	330	2300	2300	180 U	180 U	190 U	200 U
Bis(2-chloroisopropyl) ether	---	---	---	180 U	180 U	190 U	200 U
Bis(2-ethylhexyl)phthalate (BEHP)	330	7.0E+5	NA	180 U	180 U	190 U	200 U
4-Bromophenyl phenyl ether	---	---	---	180 U	180 U	190 U	200 U
Butyl benzyl phthalate	330	6.8E+7	6.8E+7	180 U	180 U	190 U	200 U
Carbazole	---	---	---	370 UJ	560 UJ	390 UJ	410 UJ
4-Chloroaniline	---	---	---	180 U	180 U	190 U	200 UJ
4-Chloro-3-methylphenol	330	2.2E+6	2.2E+6	180 U	180 U	190 U	200 U
2-Chloronaphthalene	---	---	---	180 U	180 U	190 U	200 U
2-Chlorophenol	330	6.8E+5	6.8E+5	180 U	180 U	190 U	200 U
4-Chlorophenyl phenyl ether	---	---	---	180 U	180 U	190 U	200 U
Chrysene	330	1.4E+6	1.4E+6	180 U	73 J	51 J	200 U
2-Methylphenol	330	5.5E+6	5.5E+6	180 U	180 U	190 U	200 U
4-Methylphenol	330	2.1E+6	2.1E+6	180 U	180 U	190 U	200 U
Dibenzo(a,h)anthracene	330	1400	1400	180 U	180 U	190 U	200 U
Dibenzofuran	330	ID	ID	180 U	180 U	190 U	200 U

NOTES: Data Qualifier Definitions and MDEQ Cleanup Criteria footnotes included at end of table.

□ exceeds the higher of Direct Contact and Target Method Detection Limit.

--- denotes MDEQ criteria not established. Database 6009.004\Jeffform RAPADD7.PRQ.

Table 6B
Windiate Park Area
Geoprobe Boring
SW8270 Semivolatile Organic Compound Data

Analyte	Target Method Detection Limit ug/kg	Direct Contact Value ug/kg	Target MDL/Direct Contact Highest Value ug/kg	GB-10C Parcel B 06/08/95 3 - 5 ft. ug/kg	GB-11C Parcel C 06/08/95 3 - 5 ft. ug/kg	GB-12C Parcel A 06/08/95 3 - 5 ft. ug/kg	GB-17C Parcel C 06/09/95 3 - 5 ft. ug/kg
1,2-Dichlorobenzene	10	9.4E+6	9.4E+6	180 U	180 U	190 U	200 U
1,4-Dichlorobenzene	10	1.1E+5	1.1E+5	180 U	180 U	190 U	200 U
1,3-Dichlorobenzene	10	9.4E+6	9.4E+6	180 U	180 U	190 U	200 U
3,3-Dichlorobenzidine	2000	5700	5700	370 U	360 U	390 U	410 U
2,4-Dichlorophenol	330	4.2E+6	4.2E+6	180 U	180 U	190 U	200 U
Diethyl phthalate	330	3.2E+8	3.2E+8	180 U	180 U	190 U	350
Dimethyl phthalate	330	1E+9{G}	1E+9{G}	180 U	180 U	190 U	200 U
2,4-Dimethylphenol	330	2.1E+7	2.1E+7	180 U	180 U	190 U	200 U
Di-n-butyl phthalate	330	5.1E+7	5.1E+7	180 U	96 J	190 U	74 J
Di-n-octyl phthalate	330	7.6E+6	7.6E+6	180 U	180 U	190 U	200 U
4,6-Dinitro-2-methylphenol	1700	1.5E+5	1.5E+5	890 U	880 U	950 U	990 UJ
2,4-Dinitrophenol	---	---	---	890 UJ	880 UJ	950 UJ	990 U
2,4-Dinitrotoluene	330	15000	15000	180 U	180 U	190 U	200 U
2,6-Dinitrotoluene	---	---	---	130 U	130 U	190 U	200 U
Fluoranthene	330	5.1E+7	5.1E+7	180 U	130 J	110 J	93 J
Fluorene	330	5.1E+7	5.1E+7	180 U	180 U	190 U	200 U
Hexachlorobenzene	{K}	6200	6200	180 U	180 U	190 U	200 U
Hexachlorobutadiene	{K}	1.3E+5	1.3E+5	180 U	180 U	190 U	200 U
Hexachlorocyclopentadiene	{K}	3.0E+6	3.0E+6	180 U	180 U	190 U	200 U
Hexachloroethane	50	1.8E+5	1.8E+5	180 U	180 U	190 U	200 U
Indeno(1,2,3-cd)pyrene	330	14000	14000	180 U	180 U	190 U	200 U
Isophorone	330	2.7E+6	2.7E+6	180 U	180 U	190 U	200 U
2-Methylnaphthalene	330	ID	ID	180 U	180 U	190 U	200 U
Naphthalene	330	1.5E+7	1.5E+7	180 U	180 U	190 U	200 U
2-Nitroaniline	---	---	---	890 U	880 U	950 U	990 U

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NOTES: Data Qualifier Definitions and MDEQ Cleanup Criteria footnotes included at end of table.

□ exceeds the higher of Direct Contact and Target Method Detection Limit.

--- denotes MDEQ criteria not established. Database 6009.004\etform RAPADD7.PRG.

Analyte	Target Method Detection Limit ug/kg	Direct Contact Value ug/kg	Target MDL Direct Contact Highest Value ug/kg	GB-10C Parcel B 06/08/95 3 - 5 ft. ug/kg	GB-11C Parcel B 06/08/95 3 - 5 ft. ug/kg	GB-12C Parcel A 06/08/95 3 - 5 ft. ug/kg	GB-17C Parcel C 06/09/95 3 - 5 ft. ug/kg
3-Nitroaniline	---	---	---	890 U	880 U	950 U	990 U
4-Nitroaniline	---	---	---	890 U	880 U	950 U	990 U
Nitrobenzene	330	51000	51000	180 U	180 U	190 U	200 U
2-Nitrophenol	330	1.2E+6	1.2E+6	180 U	180 U	190 U	200 U
4-Nitrophenol	---	---	---	890 U	880 U	950 U	990 U
N-Nitrosodiphenylamine	330	5.2E+5	5.2E+5	180 U	180 U	190 U	200 U
N-Nitrosodipropylamine	330	370	370	180 U	180 U	190 U	200 U
Pentachlorophenol	3400	82000	82000	890 U	880 U	950 U	990 U
Phenanthrene	330	1.5E+6	1.5E+6	180 U	55 J	43 J	74 J
Phenol	330	6.6E+7	6.6E+7	180 U	180 U	190 U	200 U
Pyrene	330	3.2E+7	3.2E+7	32 J	110 J	100 J	75 J
1,2,3-Trichlorobenzene	330	6.3E+6	6.3E+6	180 U	180 U	190 U	200 U
2,4,6-Trichlorophenol	330	9.0E+5	9.0E+5	180 U	180 U	190 U	200 U
2,4,5-Trichlorophenol	1700	4.2E+7	4.2E+7	190 U	880 U	950 U	990 U

NOTES: Data Qualifier Definitions and MDEQ Cleanup Criteria footnotes included at end of table.
 □ exceeds the higher of Direct Contact and Target Method Detection Limit.
 --- denotes MDEQ criteria not established. Database 6009.004Jetform RAPADD7.PRG.

NOTES: Data Qualifier Definitions and MDEQ Cleanup Criteria footnotes included at end of table.
 [] exceeds the higher of Direct Contact and Target Method Detection Limit.
 --- denotes MDEQ criteria not established. Database 6009.004\etform RAPADD7.PRG.

Table 6C
Windiate Park Area
Geoprobe Boring
SW6010 and SW7000 Series Metals Data

Analyte	Target Method Detection Limit mg/kg	Direct Contact Value mg/kg	Target MDL/Direct Contact -Highest Value mg/kg	GB-10C Parcel B 06/08/95 3 - 5 ft. mg/kg	GB-11C Parcel B 06/08/95 3 - 5 ft. mg/kg	GB-12C Parcel A 06/08/95 3 - 5 ft. mg/kg	GB-17C Parcel C 06/09/95 3 - 5 ft. mg/kg
Arsenic	0.1	6.6	6.6	6.4 J	[11 J]	3.6 J	[30 J]
Barium	1	3.0E+4	3.0E+4	32	63	48	270
Cadmium	0.05	2.1E+2	2.1E+2	0.22 J	0.25 J	0.23 J	0.06 U
Chromium	2.5	6.3E+5	6.3E+5	11	16	10	15
Copper	1	1.6E+4	1.6E+4	11	18	8	33
Lead	1	4E+2	4E+2	91	160 J	32 J	69 J
Mercury	0.1	130	130	0.1 U	0.1 U	0.1 U	0.1 U
Selenium	0.5	2.1E+3	2.1E+3	0.6 U	0.6 U	0.6 U	1.9
Silver	0.5	2000	2000	0.6 U	0.6 U	0.6 U	0.6 U
Zinc	1	1.4E+5	1.4E+5	38	61	38	91
Cyanide	0.5	9.3E+3	9.3E+3	---	---	---	---

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NOTES: Data Qualifier Definitions and MDEQ Cleanup Criteria footnotes included at end of table.
 [] exceeds higher of Direct Contact Value and Target Method Detection Limit.
 --- denotes MDEQ criteria not established. Database 6009.004/Jetform RAPADD6.PRG

- (A) Background, as defined in Rule 701(c), may be substituted if higher than the cleanup criteria.
- (B) Chemical has either not been evaluated or an inadequate data base precludes the development of a GSI value. Contact an ERD toxicologist for assistance. **Aug 07, 2009 17:05**
- (C) State of Michigan Drinking Water Standard established pursuant to Section 5 of the Safe Drinking Water Act, Act No. 399 of the Public Acts of 1976 used as the default.
- (D) GSI value is pH, temperature, or water hardness dependent. Contact an ERD toxicologist for details.
- (E) Chemical, due to its physicochemical properties, is not expected to leach through soils to groundwater under most conditions.
- (F) Professional judgment used to determine that 50 ppb of aluminum in drinking water is protective of human health.
- (G) Criteria exceeds 100% in soil, hence it is reduced to 100%.
- (H) Criteria is based on agricultural impacts (phytotoxicity), not 20X groundwater criterion.
- (I) Valence-specific chromium data (Cr III and Cr VI) must be compared to the same valence-specific cleanup criteria. If analytical data are provided for "total" chromium only, then values for chromium VI must be applied as the cleanup criteria. Chromium III cleanup criteria can only be used at sites where groundwater is prevented from being used as a public water supply, currently or in the future.
- (J) Chemical may be present in several isomer forms. Isomer specific concentrations must be combined for comparison to criteria. Contact an ERD toxicologist for further explanation.
- (K) Two different analytical methods and target method detection limits are available for this chemical. Refer to Operational Memorandum #6 for details.
- (L) Criteria developed using the U.S. EPA Integrated Uptake Biokinetic Model for children. No risk assessment method(s) is currently available to evaluate lead toxicity in adults. Higher level may be acceptable if soil concentration is less than 400 ppm and groundwater migrating off-site will not impact adjacent properties. Contact an ERD toxicologist for further explanation.
- (M) Also known as MBOCA.
- (N) Also known as Silvex.
- (O) Use 2,3,7,8-TCDD "toxicity equivalence factors" (TEFs) for other chlorinated and /or brominated dibenzo-p-dioxins and chlorinated and/or brominated dibenzofurans for comparison to cleanup criteria. Contact an ERD toxicologist for details.
- (P) All potential sources of nitrogen-nitrate must be combined and compared to nitrate criteria. Contact an ERD toxicologist for details.
- (Q) Criteria for carcinogenic polynuclear aromatic hydrocarbons (PAHs) were developed using "relative potential potencies" (RPPs) to benzo(a)pyrene.
- (R) Chemical may be reactive in soil.
- (S) Concentrations of trihalomethanes in groundwater must be combined to determine compliance with the health-based drinking water value of 100 ppb.
- (T) Toxic Substances Control Act, Subpart G - PCB Spill Cleanup Policy standards may be more restrictive.

ID = Inadequate data to develop criterion; NA = Not available. **Confidential under FOIA**

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Data Validation Qualifiers

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The following qualifiers may be applied to the analytical data during the data validation process.

- R** Indicates that the previously reported detection limit or sample result has been determined to be unusable due to a major deficiency in the data generation procedure. The data should not be used for any qualitative or quantitative purposes.
- U** Indicates that the compound was analyzed for, but was not detected. The sample quantitation limit is presented and adjusted for dilution and percent moisture, as appropriate.
- J** Indicates that the result should be considered approximated. This qualifier is used when the data validation process identifies a deficiency in the data generation process. Additionally, for organic analysis, this qualifier is used either when estimating a concentration for tentatively identified compounds, or when the mass spectra data indicate the presence of a compound that meets identification criteria but the sample result is less than the sample-specific compound quantitation limit, as adjusted for dilution and percent moisture, as appropriate. For inorganic analysis, this qualifier is used when the analyte is detected greater than the method detection limit, but less than the sample-specific analyte quantitation limit, as adjusted for dilution and percent moisture, as appropriate.
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- "NJ"** Indicates that the compound has been tentatively identified at an estimated concentration. This qualifier is used for organic analyses when the reported compound has exceeded the retention time window on one or both of the chromatographic columns.

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Table 7
Windiate Park Area
Surface Soil
Lead Data (2/23/95)

Analyte	Target Method Detection Limit mg/kg	Direct Contact Value mg/kg	Target MDL/ Direct Contact -Highest Value mg/kg	SS-221C Parcel B 02/23/95 0.0 - 0.5 ft. mg/kg	SS-222C Parcel B 02/23/95 0.0 - 0.5 ft. mg/kg	SS-223C Parcel B 02/23/95 0.0 - 0.5 ft. mg/kg	SS-224C Parcel B 02/23/95 0.0 - 0.5 ft. mg/kg	SS-225C Parcel B 02/23/95 0.0 - 0.5 ft. mg/kg
Lead	1	4E+2	4E+2	180	63	[720]	[560]	[430]
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NOTES: ☐ exceeds higher of Direct Contact Value and Target Method Detection Limit.
 Database 6009.005/Jetform RAPADD9.PRG

Analyte	Target Method Detection Limit mg/kg	Direct Contact Value mg/kg	Target MDL/ Direct Contact -Highest Value mg/kg	SS-226C Parcel B 02/23/95 0.0 - 0.5 ft. mg/kg	SS-227C Parcel B 02/23/95 0.0 - 0.5 ft. mg/kg	SS-228C Parcel B 02/23/95 0.0 - 0.5 ft. mg/kg	SS-229C Parcel B 02/23/95 0.0 - 0.5 ft. mg/kg	SS-230C Parcel B 02/23/95 0.0 - 0.5 ft. mg/kg
Lead	1	4E+2	4E+2	[470]	[800]	[670]	[550]	[570]

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NOTES: ☐ exceeds higher of Direct Contact Value and Target Method Detection Limit.
 Database 6009 005/Jetform RAPADD9.PRQ

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- (A) Background, as defined in Rule 701(c), may be substituted if higher than the cleanup criteria.
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- (M) Also known as MBOCA.
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- (T) Toxic Substances Control Act, Subpart G - PCB Spill Cleanup Policy standards may be more restrictive.

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Database 6009.010/Jeffform PARKLEAD.PRG

Table 8
Windiate Park Area
Surface Soil
Lead Data (5/15/96)

Analyte	Target Method mg/kg	Direct Contact Value mg/kg	Target MDL/ Direct Contact -Highest Value mg/kg	SS-06P Parcel C 05/15/96 12 - 18 in. mg/kg	SS-07P Parcel C 05/15/96 0 - 6 in. mg/kg	SS-08P Parcel C 05/15/96 0 - 6 in. mg/kg	SS-09P Parcel C 05/15/96 0 - 6 in. mg/kg	SS-10P Parcel C 05/15/96 0 - 6 in. mg/kg
Lead	1	4E+2	4E+2	270	230	250	280	210
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NOTES: ☐ exceeds the higher of the Direct Contact Value and Target Method Detection Limit. Database 6009 010/Jetform PARKLEAD.PRG								

Table 8
Windiate Park Area
Surface Soil
Lead Data (5/15/96)

Analyte	Target Method Detection Limit mg/kg	Direct Contact Value mg/kg	Target MDL/Direct Contact -Highest Value mg/kg	SS-11P Parcel C 05/15/96 0 - 6 in. mg/kg	SS-12P Parcel C 05/15/96 0 - 6 in. mg/kg
Lead	1	4E+2	4E+2	170	240
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NOTES: ☐ exceeds the higher of the Direct Contact Value and Target Method Detection Limit. Database 6009.010/Jeffform PARKLEAD.PRG					

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- (A) Background, as defined in Rule 701(c), may be substituted if higher than the cleanup criteria.
- (B) Chemical has either not been evaluated or an inadequate data base precludes the development of a GSI value. Contact an ERD toxicologist for assistance.
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- (D) GSI value is pH, temperature, or water hardness dependent. Contact an ERD toxicologist for details.
- (E) Chemical, due to its physicochemical properties, is not expected to leach through soils to groundwater under most conditions.
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- (M) Also known as MBOCA.
- (N) Also known as Slivex.
- (O) Use 2,3,7,8-TCDD "toxicity equivalence factors" (TEFs) for other chlorinated and /or brominated dibenzo-p-dioxins and chlorinated and/or brominated dibenzofurans for comparison to cleanup criteria. Contact an ERD toxicologist for details.
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TABLE 9
WINDIATE PARK AREA
SOIL VAPOR SURVEY RESULTS
FLINT, MICHIGAN

ADDRESS	SAMPLE	1,1,1-TCA (ppm)	BENZENE (ppm)	TCE (ppm)	MIBK (ppm)	TOLUENE (ppm)	PCE (ppm)	CHLORO- BENZENE (ppm)	ETHYL- BENZENE (ppm)	XYLENE (m, p) (ppm)	XYLENE (o) (ppm)	OTHER VOCs (ppm)	TOTAL VOCs (ppm)
428 SHELLY (Parcel B)	VP127	<0.009	<0.095	<0.014	<0.486	<0.440	<0.010	<0.632	<0.508	<0.453	<0.446	<0.005	<0.005
	VP128	<0.009	<0.095	<0.014	<0.486	<0.440	<0.010	<0.632	<0.508	<0.453	<0.446	<0.005	<0.005
	VP129	<0.009	<0.095	<0.014	<0.486	<0.440	<0.010	<0.632	<0.508	<0.453	<0.446	<0.005	<0.005
	VP130	<0.009	<0.095	<0.014	<0.486	<0.440	<0.010	<0.632	<0.508	<0.453	<0.446	<0.005	<0.005

NOTES:

- 1) Concentrations are measured in parts per million (ppm) by volume.
- 2) 1,1,1-TCA denotes 1,1,1-Trichloroethane.
- 3) TCE denotes Trichloroethene.
- 4) MIBK denotes 4-methyl-2-pentanone.
- 5) PCE denotes Tetrachloroethene.
- 6) VOCs denotes Volatile Organic Compounds.
- 7) VP denotes Vapor Point.
- 8) Samples collected on October 26-31, 1994.

GMW/PRES:SHELLY.WQ1

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FIGURES

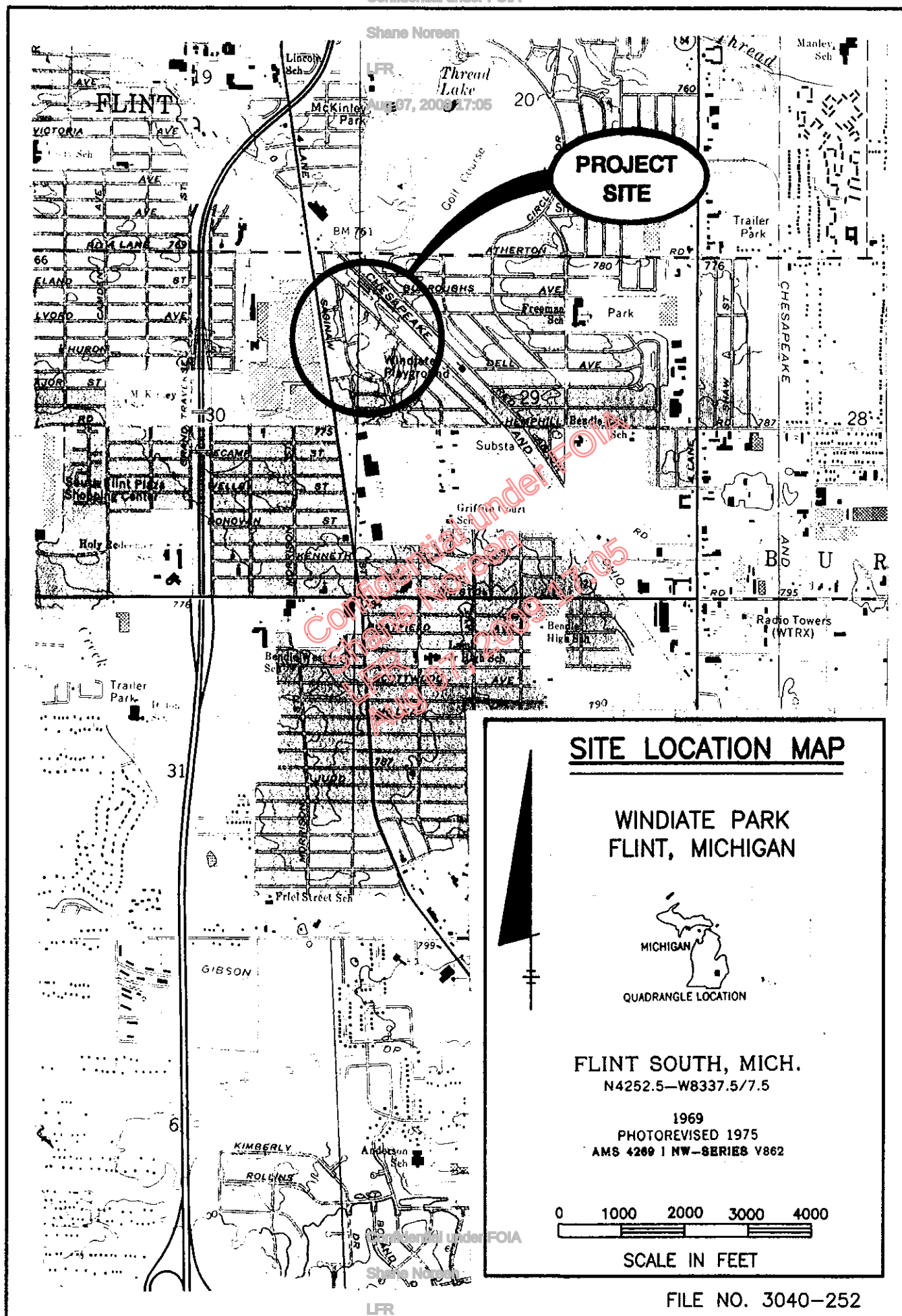
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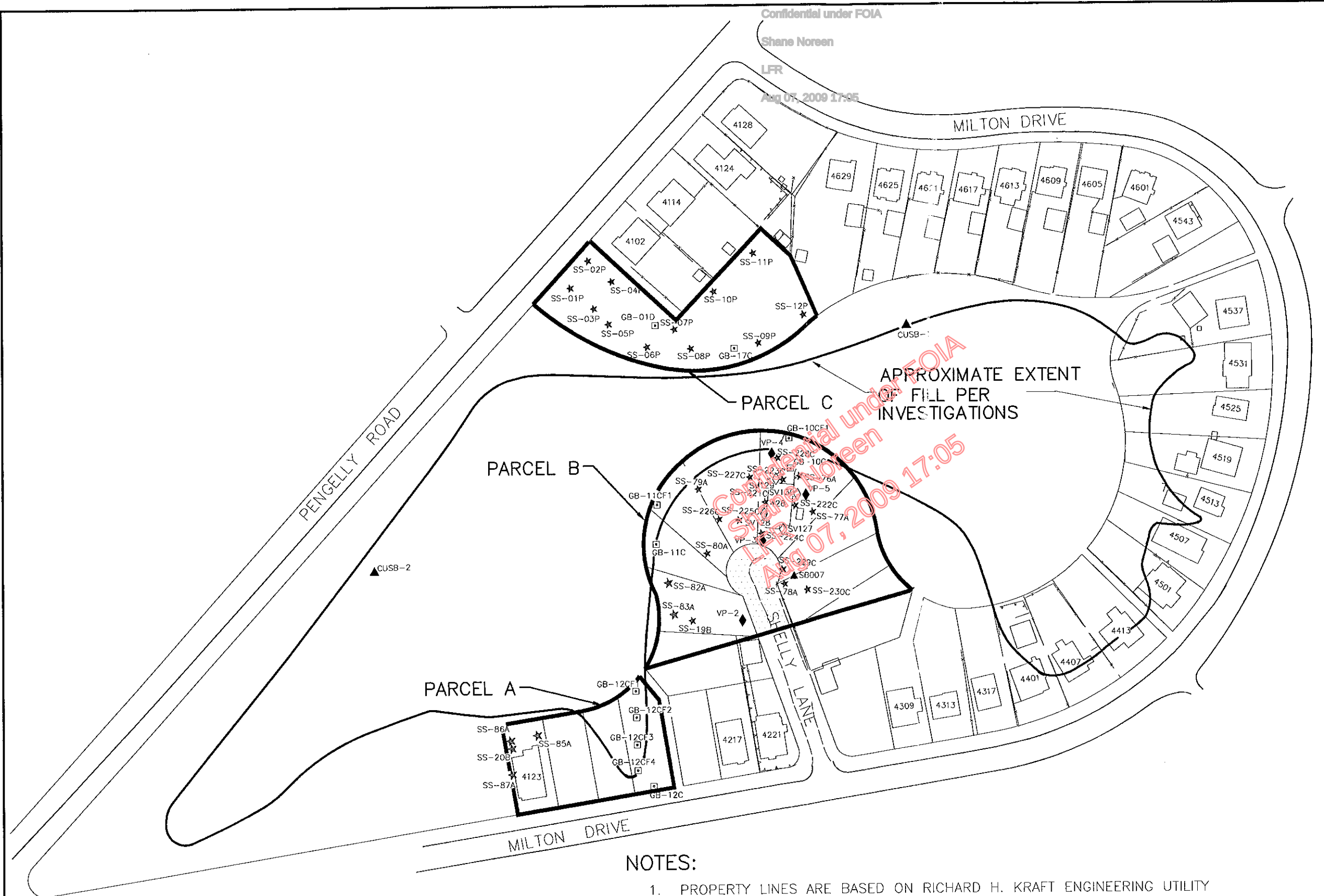
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LEGEND

- | | |
|----------|-------------------------------------|
| ▲ SB007 | SOIL BORING LOCATION |
| ■ GB-10C | GEOPROBE BORING LOCATION |
| ◆ VP-3 | VERTICAL PROFILE BORING LOCATION |
| ★ SS-80A | SURFACE SOIL SAMPLE LOCATION |
| ▲ CUSB-1 | CONFINING UNIT SOIL BORING LOCATION |
| ◇ SV128 | SOIL VAPOR SAMPLE LOCATION |

WINDIATE PARK AREA
FLINT, MICHIGAN

SITE PLAN

NOTES:

1. PROPERTY LINES ARE BASED ON RICHARD H. KRAFT ENGINEERING UTILITY LOCATION SURVEY DATED FEBRUARY 2, 1996.
2. SOIL BORINGS, CONFINING UNIT SOIL BORINGS, AND GEOPROBE BORINGS SURVEYED BY BARTOW & KING ENGINEERS.
3. VERTICAL PROFILE BORINGS AND SURFACE SOIL SAMPLE LOCATIONS ARE APPROXIMATE.
4. SOIL SAMPLES FROM GEOPROBE BORINGS GB-10CF1, GB-11CF1, GB-12CF1, GB-12CF2, GB-12CF3 AND GB-12CF4 WERE NOT SUBMITTED FOR ANALYSIS.

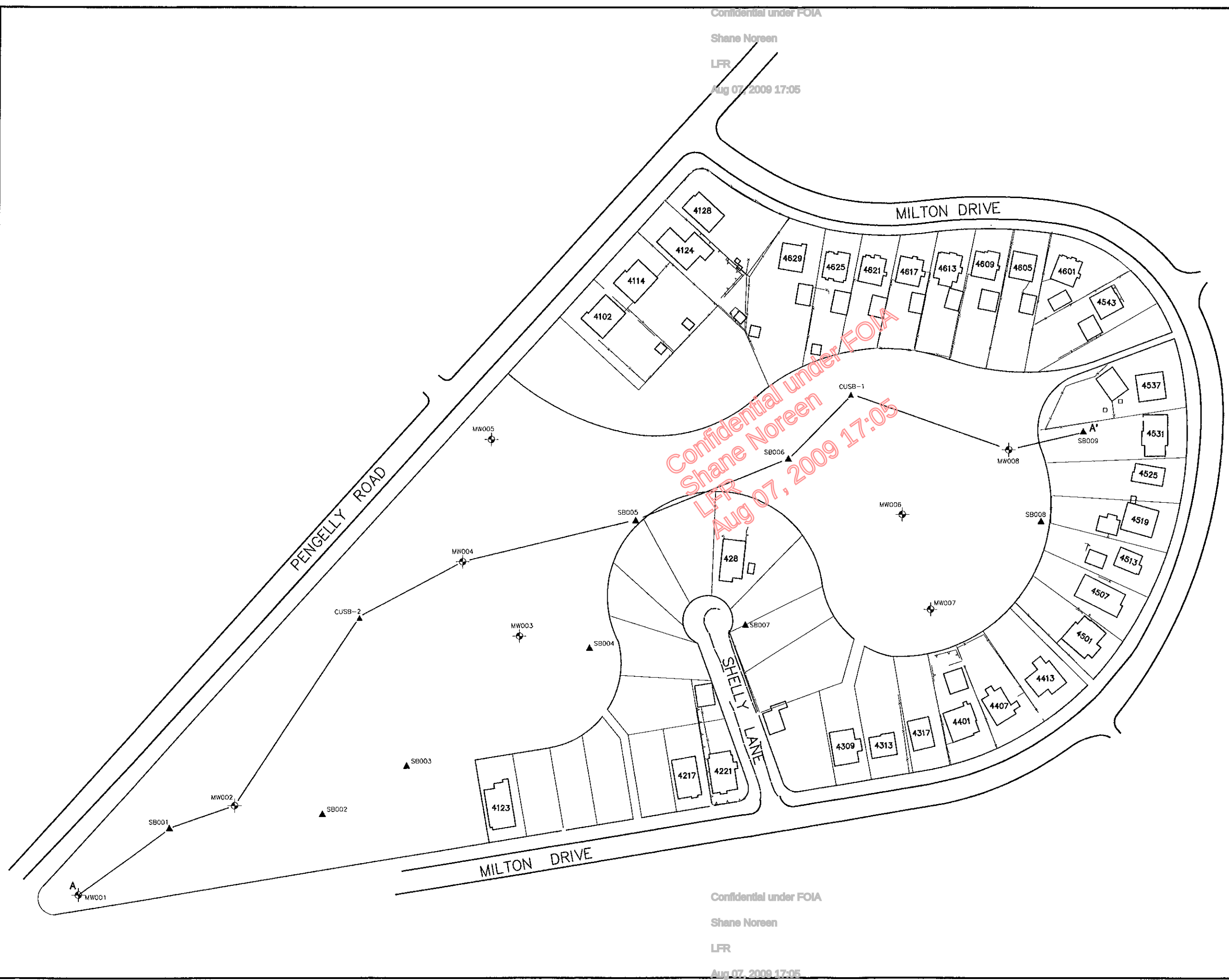
110 0 110

APPROXIMATE SCALE IN FEET

FILE NO. 6009-007-120



FIGURE 3

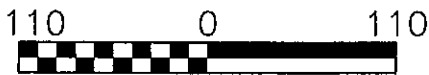


LEGEND

- MW004 MONITORING WELL LOCATION
- SB008 SOIL BORING LOCATION
- CUSB-1 CONFINING UNIT SOIL BORING
- A - A' GEOLOGIC CROSS SECTION LINE

WINDIATE PARK AREA
FLINT, MICHIGAN

PLAN VIEW OF
GEOLOGIC CROSS
SECTION A - A'

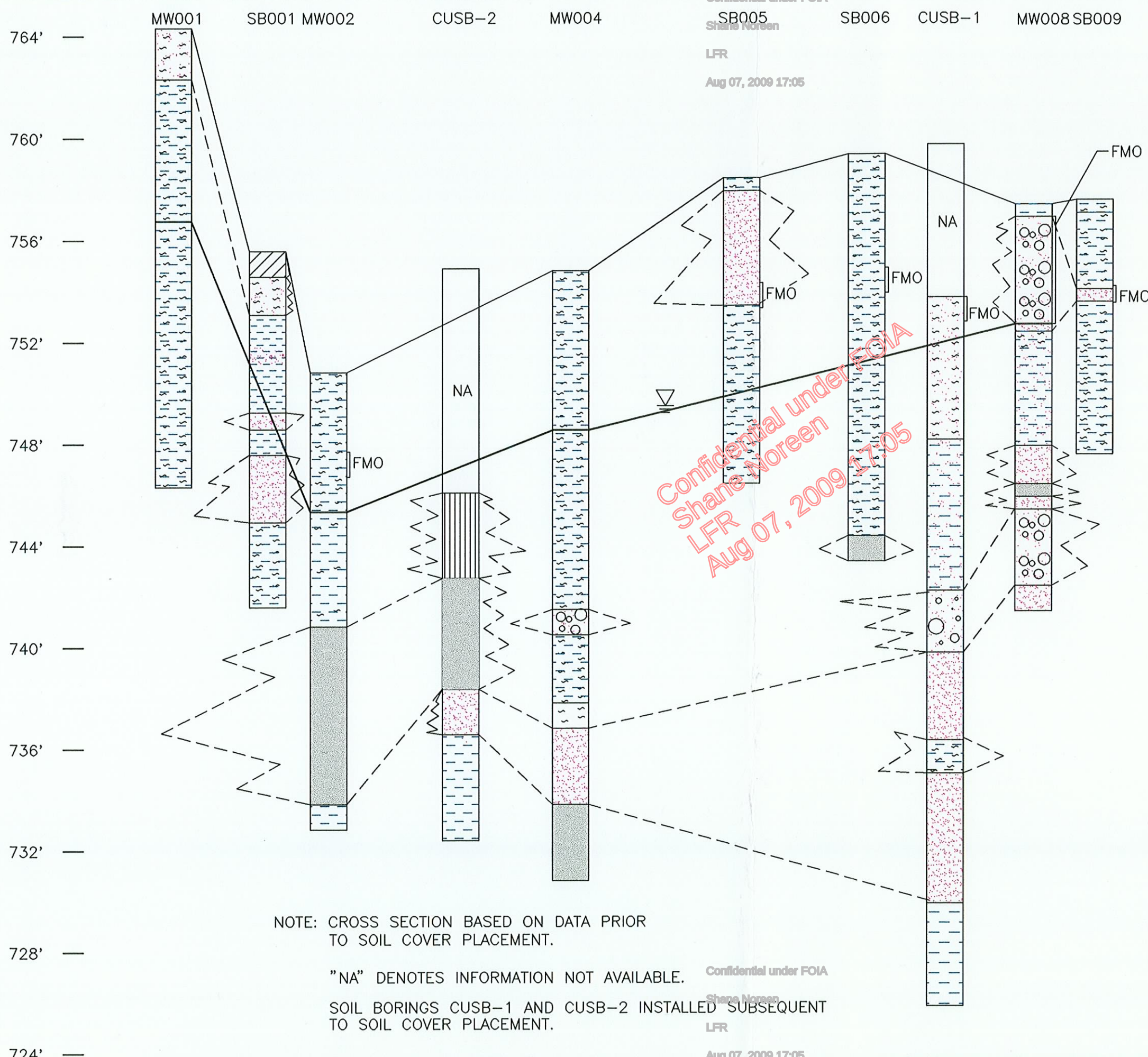


APPROXIMATE SCALE IN FEET

FILE NO. 6009-007-122



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NOTE: CROSS SECTION BASED ON DATA PRIOR
TO SOIL COVER PLACEMENT.

"NA" DENOTES INFORMATION NOT AVAILABLE.

SOIL BORINGS CUSB-1 AND CUSB-2 INSTALLED SUBSEQUENT
TO SOIL COVER PLACEMENT.

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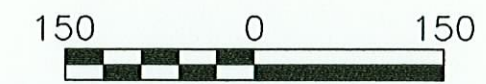
FIGURE 4

LEGEND

- SAND
- SILTY CLAY/
CLAYEY SILT
- SANDY SILT/
SILTY SAND
- TOPSOIL
- CLAY
- GRAVEL
- SANDY CLAY
- MARL
- PEAT
- APPARENT GROUND
WATER TABLE
- FMO

WINDIATE PARK AREA
FLINT, MICHIGAN

**GEOLOGIC
CROSS SECTION
A - A'**



APPROX. HORIZONTAL SCALE IN FEET



APPROX. VERTICAL SCALE IN FEET

FILE NO. 6009-007-121



FIGURE 5

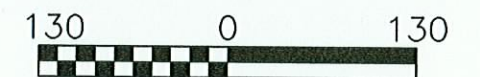


LEGEND

-  MW004 MONITORING WELL LOCATION
-  (753.30) GROUND WATER ELEVATION VALUE
-  748.50 GROUND WATER ELEVATION CONTOUR VALUE
-  APPARENT GROUND WATER FLOW DIRECTION

WINDIATE PARK AREA
FLINT, MICHIGAN

**GROUND WATER
ELEVATION
CONTOUR MAP**



APPROXIMATE SCALE IN FEET

FILE NO. 6009-007-127



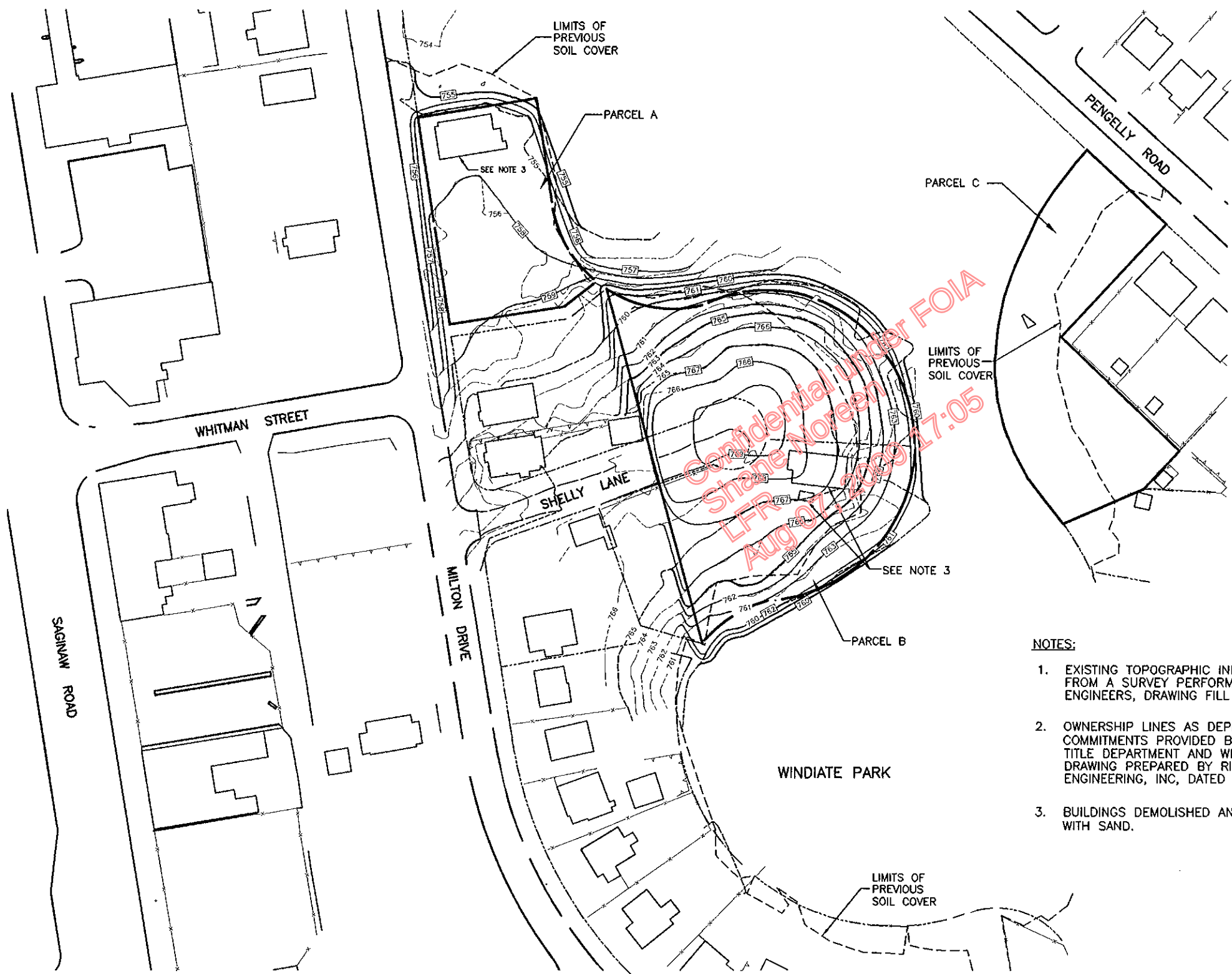
1. GROUND WATER ELEVATION DATA COLLECTED ON MARCH 28, 1995.
2. PROPERTY LINES ARE BASED ON RICHARD H. KRAFT ENGINEERING UTILITY LOCATION SURVEY DATED FEBRUARY 2, 1996.

FIGURE 6



LEGEND

- 761 — PROPOSED CONTOUR
- - - 757 - - - EXISTING CONTOUR
- - - - - APPROXIMATE PROPERTY LINE



- NOTES:**
1. EXISTING TOPOGRAPHIC INFORMATION WAS TAKEN FROM A SURVEY PERFORMED BY BARTOW & KING ENGINEERS, DRAWING FILL DWG DATED MAY, 1996
 2. OWNERSHIP LINES AS DEPICTED ARE FROM TITLE COMMITMENTS PROVIDED BY GENERAL MOTORS AND TITLE DEPARTMENT AND WERE TAKEN FROM A DRAWING PREPARED BY RICHARD H. KRAFT ENGINEERING, INC, DATED FEB. 2, 1996.
 3. BUILDINGS DEMOLISHED AND BASEMENT FILLED WITH SAND.

WINDIATE PARK AREA
FLINT, MICHIGAN

**GRADING PLAN
(DONATED PARCELS
A, B, AND C)**



APPROXIMATE SCALE IN FEET

FILE NO. 6009-007-123



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APPENDICES

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APPENDIX A

Soil Boring Logs

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O'BRIEN & GERE ENGINEERS, INC.		Confidential under FOIA SOIL BORING LOG Shane Noreen		LOG NUMBER: CUSB-1	
CLIENT General Motors Corporation PROJECT LOCATION Windiate Park Flint, Michigan		GROUND WATER DATE LFR DEPTH ELEVATION 5/29/96 Approx. 10' NA Aug 07, 2009 17:05		SHEET 1 OF 2 FILE No.: 6009.007 DRILLING METHOD: Hollow Stem Auger SAMPLER TYPE: 2" Splitspoon HAMMER: 140 lbs FALL: 30"	

O'BRIEN & GERE GEOLOGIST: Michael B. Robison BORING CO.: Carlo Environmental Technologies FOREMAN: Paul Libby	BORING LOCATION: South-East area of park, near east side of former baseball diamond. GROUND ELEVATION: 759.79' DATES: STARTED: 5/29/96 ENDED: 5/29/96
---	---

DEPTH	SAMPLE					SAMPLE DESCRIPTION	STRATUM CHANGE DEPTH	EQUIPMENT INSTALLED	PID	R M K S*
	No.	DEPTH	BLOWS /6"	PENETRATION RECOVERY	*N" VALUE					
0	-	0'-6'	NA	NA	NA	Augered from grade to 6 feet below grade Began splitspoon sample collection at 6'-8'				
	1	6'-8'	2	24"/6"	3	Dark greenish grey, damp, silty SAND, few glass pieces	6'		0.0	
			1							
			2							
			1							
	2	8'-10'	1	24"/NR	2	No recovery, very soft material	8'		0.0	
			1							
10			1							
			1							
	3	10'-12'	1	24"/12"	3	Dark greenish grey, moist, silty SAND	10'		0.0	
			2							
			1							
			1							
	4	12'-14'	1	24"/4"	2	Dark greenish grey, moist, silty SAND	12'		0.0	
			1							
			1							
			4							
	5	14'-16'	2	24"/24"	5	Olive/grey, moist, sandy CLAY	14'		0.0	
			2							
15			3							
			3							
	6	16'-18'	2	24"/18"	6	Olive/grey, wet, sandy CLAY, little gravel(<1/4"dia.)	16'		0.0	
			3							
			3			Brownish/grey, wet, sandy GRAVEL(<1/4"dia.)	17'	SEE NOTE 4		*
			4							
	7	18'-20'	1/2	24"/18"	1.5	Brownish/grey, wet, sandy GRAVEL(<1/4"dia.)	18'		0.0	
			1/2							
			1							
			1							
20	8	20'-22'	1	24"/18"	4	Brownish/grey, wet, medium-coarse SAND, with 2" seam of clay observed at 21'8" - 21'10"	20'		0.0	
			1							
			3							
			3							
	9	22'-24'	1/2	24"/24"	4.5	Brownish/grey, wet, medium-coarse SAND	22'		0.0	
			1/2							
			4							
			5			Brownish/grey, damp, silty CLAY, little gravel(<1/4"dia.)	23'			

(Boring log continued on page 2/2)

Notes:

1. PID readings shown in parts per million (ppm).
2. PID background is 0.0 ppm.
3. "NA" denotes not applicable.
4. Installed temporary monitoring well constructed of 2" diameter, schedule 40 stainless steel well casing with 5' of 0.010" slot well screen extending from 17' to 22'.
5. "*" denotes water sample collected for analysis from temporary monitoring well.

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MBR16:CUSB-1

O'BRIEN & GERE ENGINEERS, INC.

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SOIL BORING LOG

Shane Noreen

LOG NUMBER: CUSB-1

SHEET 2 OF 2

CLIENT

General Motors Corporation

PROJECT LOCATION

Windiate Park

Flint, Michigan

GROUND WATER

DATE LFR

5/29/96

DEPTH

Approx. 10'

ELEVATION

NA

Aug 07, 2009 17:05

FILE No.: 6009.007

DRILLING METHOD: Hollow Stem Auger

SAMPLER TYPE: 2" Splitspoon

HAMMER: 140 lbs FALL: 30"

O'BRIEN & GERE GEOLOGIST: Michael B. Robison

BORING CO.: Carlo Environmental Technologies

FOREMAN: Paul Libby

BORING LOCATION: South-East area of park, near east side of former baseball diamond.

GROUND ELEVATION: 759.79'

DATES: STARTED: 5/29/96 ENDED: 5/29/96

DEPTH	SAMPLE					SAMPLE DESCRIPTION	STRATUM CHANGE DEPTH	EQUIPMENT INSTALLED	PID	R M K S*
	No.	DEPTH	BLOWS /6"	PENETRATION RECOVERY	*N* VALUE					
	10	24'-26'	1	24"/18"	9	Brownish/grey, damp, silty CLAY, little gravel(<1/4" dia.)	24'	SEE NOTE 4	0.0	*
			4			Brownish/grey, wet, well graded SAND	24'6"			
25			5							
			6							
	11	26'-28'	4	24"/18"	11	Brownish/grey, wet, well graded SAND, little clay	26'		0.0	
			4							
			7							
			8							
	12	28'-30'	1	24"/18"	9	Brownish/grey, wet, fine-medium SAND, little clay	28'		0.0	
			4							
			5							
			5							
30	13	30'-32'	3	24"/18"	10	Brownish/grey, moist, silty CLAY	30'		0.0	
			4							
			6							
			6							
	14	32'-34'	2	24"/18"	7	Brownish/grey, moist, silty CLAY	32'			
			2							
			5							
			7							
						BOH @ 34 fbg				

Notes:

1. PID readings shown in parts per million (ppm).
2. PID background is 0.0 ppm.
3. "NA" denotes not applicable.
4. Installed temporary monitoring well constructed of 2" diameter, schedule 40 stainless steel well casing with 5' of 0.010" slot well screen extending from 25' to 30'.
5. "*" denotes water sample collected for analysis from temporary monitoring well.

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MBR16:CUSB-1

O'BRIEN & GERE ENGINEERS, INC.						SOIL BORING LOG		LOG NUMBER: CUSB-2		
CLIENT General Motors Corporation PROJECT LOCATION Windiate Park Flint, Michigan						GROUND WATER		SHEET 1 OF 1		
O'BRIEN & GERE GEOLOGIST: Michael B. Robison BORING CO.: Carlo Environmental Technologies FOREMAN: Paul Libby						DATE 5/30/96		FILE No.: 6009.007		
						DEPTH Approx. 9'		DRILLING METHOD: Hollow Stem Auger SAMPLER TYPE: 2" Splitspoon HAMMER: 140 lbs FALL: 30"		
						ELEVATION NA				
						Aug 07, 2009 17:05				
BORING LOCATION: North-Central area of park, approximately 110' east of Pengelly Rd.						GROUND ELEVATION: 755.63'				
DATES: STARTED: 5/30/96 ENDED: 5/30/96										
DEPTH	No.	DEPTH	BLOWS /6"	PENETRATION RECOVERY	"N" VALUE	SAMPLE DESCRIPTION	STRATUM CHANGE DEPTH	EQUIPMENT INSTALLED	PID	R M K S*
0	-	0'-7'	NA	NA	NA	Augered from grade to 7 feet below grade Began splitspoon sample collection at 7'-9'				
	1	7'-9'	1	24"/NR	2	No recovery, very soft material	7'		0.0	
			1							
			1							
			1							
	2	9'-11'	1/2	24"/6"	1	Dusky yellowish brown, moist, PEAT/organics	9'		0.0	
			1/2							
10			1/2							
			1/2							
	3	11'-13'	1/2	24"/24"	1	Dusky yellowish brown, moist, PEAT/organics	11'		0.0	
			1/2							
			1/2							
	4	13'-15'	Push	24"/24"	-	Pale yellowish brown, moist, MARL/organics with shells Pale yellowish brown, moist-wet, MARL/organics with shells	12'6" 13'		0.0	
								SEE NOTE 4		*
15	5	15'-17'	Push	24"/24"	-	Pale yellowish brown, moist-wet, MARL/organics with shells	15'		0.0	
	6	17'-19'	5	24"/24"	6	Brownish/grey, wet, fine-medium SAND	17'		0.0	
			3							
			3							
			4							
	7	19'-21'	1	24"/24"	5	Brownish/grey, damp, silty CLAY, little gravel(<1/4"dia.) Brownish/grey, damp, silty CLAY, little gravel(<1/4"dia.)	18'8" 19'		0.0	
			2							
20			3							
			4							
	8	21'-23'	1	24"/24"	5	Brownish/grey, moist, silty CLAY, little gravel(<1/4"dia.)	21'		0.0	
			2							
			3							
			4							
	9					EOB @ 23 fbg				
25	10									

- Notes:
1. PID readings shown in parts per million (ppm).
 2. PID background is 0.0 ppm.
 3. "NA" denotes not applicable.
 4. Installed temporary monitoring well constructed of 2" diameter, schedule 40 stainless steel well casing with 5' of 0.010" slot well screen extending from 14' to 19'.
 5. "*" denotes water sample collected for analysis from temporary monitoring well.

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APPENDIX B
Laboratory Report Forms -
Vertical Profile Ground Water Data

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CROSS REFERENCE TABLE

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Site	Sample Number	Date Collected	Date Received	Package
CUSB-1 25'-30'	Z1230	05/29/96	05/30/96	9995
CUSB-1 17'-22'	Z1231	05/29/96	05/30/96	9995
Field Dup	Z1232	05/29/96	05/30/96	9995
Equipment Blank	Z1233	05/29/96	05/30/96	9995
QC Trip Blank	Z1234	-----	05/30/96	9995
CUSB-2 14'-19'	Z1609	05/30/96	06/01/96	22
CUSB-2 14'-19'	Z1609MS	05/30/96	06/01/96	22
CUSB-2 14'-19'	Z1609MSD	05/30/96	06/01/96	22
CUSB-2 14'-19'	Z1609D	05/30/96	06/01/96	22
Equipment Blank	Z1610	05/30/96	06/01/96	22
QC Trip Blank	Z1611	-----	06/01/96	22

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ANALYTICAL RESULTS

8260W

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Page 1 of 5

Job No: 6009.4.517 Pkg: 9995 Sample: Z1230 Desc: CUS8-1 25'-30' Number of parameters: 37
 QC Batch: 060396W1 Extracted: 06/03/96 Instrument: HP5972A GCMS#5 Sample size: 25 mL

Parameter	Result	Units	Wt	Date	Notes
Chloromethane	<1.0	ug/L	W	Jun-03	
Vinyl chloride	<1.0	ug/L	W	Jun-03	
Bromomethane	<1.0	ug/L	W	Jun-03	
Chloroethane	<1.0	ug/L	W	Jun-03	
Acetone	5.3	ug/L	W	Jun-03	
1,1-Dichloroethene	<.50	ug/L	W	Jun-03	
Methylene chloride	<1.0	ug/L	W	Jun-03	
Carbon disulfide	<.50	ug/L	W	Jun-03	
trans-1,2-Dichloroethene	<.50	ug/L	W	Jun-03	
1,1-Dichloroethane	<.50	ug/L	W	Jun-03	
2-Butanone	<10.	ug/L	W	Jun-03	
cis-1,2-Dichloroethene	<.50	ug/L	W	Jun-03	
Chloroform	<.50	ug/L	W	Jun-03	
1,2-Dichloroethane	<.50	ug/L	W	Jun-03	
1,1,1-Trichloroethane	<.50	ug/L	W	Jun-03	
Carbon tetrachloride	<.50	ug/L	W	Jun-03	
Benzene	<.50	ug/L	W	Jun-03	
1,2-Dichloropropane	<.50	ug/L	W	Jun-03	
Trichloroethene	<.50	ug/L	W	Jun-03	
Bromodichloromethane	<.50	ug/L	W	Jun-03	
cis-1,3-Dichloropropene	<.50	ug/L	W	Jun-03	
4-Methyl-2-pentanone	<5.0	ug/L	W	Jun-03	
trans-1,3-Dichloropropene	<.50	ug/L	W	Jun-03	
1,1,2-Trichloroethane	<.50	ug/L	W	Jun-03	
Toluene	<.50	ug/L	W	Jun-03	
Dibromochloromethane	<.50	ug/L	W	Jun-03	
2-Hexanone	<5.0	ug/L	W	Jun-03	
Tetrachloroethene	<.50	ug/L	W	Jun-03	
Chlorobenzene	<.50	ug/L	W	Jun-03	
Ethylbenzene	<.50	ug/L	W	Jun-03	
Bromoform	<.50	ug/L	W	Jun-03	
Xylene (total)	<.50	ug/L	W	Jun-03	
Styrene	<.50	ug/L	W	Jun-03	
1,1,2,2-Tetrachloroethane	<.50	ug/L	W	Jun-03	
Dibromofluoromethane (surrogate)	95.	%	W	Jun-03	
Toluene-d8 (surrogate)	100.	%	W	Jun-03	
Bromofluorobenzene (surrogate)	96.	%	W	Jun-03	

Package Notes:

Sample Notes:

Tentatively Identified Compound (LSC) summary

Operator ID: SG Date Acquired: 3 Jun 96 14:29

Data File: H:\HPCHEM\1\DATA\G7805.D

Name: Z1230

Misc: V2658

Method: G529VOCW

Title: VOC's w/J & W DB-VRX: 0.45 mm x 75 m

Library Searched: NBS75K.L

TIC Top Hit name	RT	EstConc	Units	Area	IntStd	ISRT	ISArea	ISConc
------------------	----	---------	-------	------	--------	------	--------	--------

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ANALYTICAL RESULTS

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8260w

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Page 2 of 5

Job No: 6009.4.517 Pkg: 9995 Sample: Z1231 Desc: CUSB-1 17'-22' Number of parameters: 37
 QC Batch: 060396W1 Extracted: 06/03/96 Instrument: HP5972A GCMS#5 Sample size: 25 mL

Parameter	Result	Units	Wt	Date	Notes
Chloromethane	<1.0	ug/L	W	Jun-03	
Vinyl chloride	<1.0	ug/L	W	Jun-03	
Bromomethane	<1.0	ug/L	W	Jun-03	
Chloroethane	<1.0	ug/L	W	Jun-03	
Acetone	6.2	ug/L	W	Jun-03	
1,1-Dichloroethene	<.50	ug/L	W	Jun-03	
Methylene chloride	<1.0	ug/L	W	Jun-03	
Carbon disulfide	<.50	ug/L	W	Jun-03	
trans-1,2-Dichloroethene	<.50	ug/L	W	Jun-03	
1,1-Dichloroethane	<.50	ug/L	W	Jun-03	
2-Butanone	<10.	ug/L	W	Jun-03	
cis-1,2-Dichloroethene	<.50	ug/L	W	Jun-03	
Chloroform	<.50	ug/L	W	Jun-03	
1,2-Dichloroethane	<.50	ug/L	W	Jun-03	
1,1,1-Trichloroethane	<.50	ug/L	W	Jun-03	
Carbon tetrachloride	<.50	ug/L	W	Jun-03	
Benzene	<.50	ug/L	W	Jun-03	
1,2-Dichloropropane	<.50	ug/L	W	Jun-03	
Trichloroethene	<.50	ug/L	W	Jun-03	
Bromodichloromethane	<.50	ug/L	W	Jun-03	
cis-1,3-Dichloropropene	<.50	ug/L	W	Jun-03	
4-Methyl-2-pentanone	<5.0	ug/L	W	Jun-03	
trans-1,3-Dichloropropene	<.50	ug/L	W	Jun-03	
1,1,2-Trichloroethane	<.50	ug/L	W	Jun-03	
Toluene	<.50	ug/L	W	Jun-03	
Dibromochloromethane	<.50	ug/L	W	Jun-03	
2-Hexanone	<5.0	ug/L	W	Jun-03	
Tetrachloroethene	<.50	ug/L	W	Jun-03	
Chlorobenzene	<.50	ug/L	W	Jun-03	
Ethylbenzene	<.50	ug/L	W	Jun-03	
Bromoform	<.50	ug/L	W	Jun-03	
Xylene (total)	<.50	ug/L	W	Jun-03	
Styrene	<.50	ug/L	W	Jun-03	
1,1,2,2-Tetrachloroethane	<.50	ug/L	W	Jun-03	
Dibromofluoromethane (surrogate)	98.	%	W	Jun-03	
Toluene-d8 (surrogate)	99.	%	W	Jun-03	
Bromofluorobenzene (surrogate)	95.	%	W	Jun-03	

Package Notes:

Sample Notes:

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007

Tentatively Identified Compound (LSC) summary

Operator ID: SG Date Acquired: 3 Jun 96 15:11
 Data File: H:\HPCHEM\1\DATA\G7806.D
 Name: Z1231
 Disc: V2658
 Method: G529VOCW
 Title: VOC's w/J & W DB-VRX: 0.45 mm x 75 m
 Library Searched: NBS75K.L

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TIC Top Hit name	RT	EstConc	Units	Area	IntStd	ISRT	ISArea	ISConc
------------------	----	---------	-------	------	--------	------	--------	--------

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ANALYTICAL RESULTS

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8260W

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Page 3 of 5

Job No: 6009.4.517 Pkg: 9995 Sample: Z1232 Desc: Field Dup Number of parameters: 37
 QC Batch: 060396W1 Extracted: 06/03/96 Instrument: HP5972A GCMS#5 Sample size: 25 mL

Parameter	Result	Units	Wt	Date	Notes
Chloromethane	<1.0	ug/L	W	Jun-03	
Vinyl chloride	<1.0	ug/L	W	Jun-03	
Bromomethane	<1.0	ug/L	W	Jun-03	
Chloroethane	<1.0	ug/L	W	Jun-03	
Acetone	4.6	ug/L	W	Jun-03	
1,1-Dichloroethene	<.50	ug/L	W	Jun-03	
Methylene chloride	<1.0	ug/L	W	Jun-03	
Carbon disulfide	.54	ug/L	W	Jun-03	
trans-1,2-Dichloroethene	<.50	ug/L	W	Jun-03	
1,1-Dichloroethane	<.50	ug/L	W	Jun-03	
2-Butanone	<10.	ug/L	W	Jun-03	
cis-1,2-Dichloroethene	<.50	ug/L	W	Jun-03	
Chloroform	<.50	ug/L	W	Jun-03	
1,2-Dichloroethane	<.50	ug/L	W	Jun-03	
1,1,1-Trichloroethane	<.50	ug/L	W	Jun-03	
Carbon tetrachloride	<.50	ug/L	W	Jun-03	
Benzene	<.50	ug/L	W	Jun-03	
1,2-Dichloropropane	<.50	ug/L	W	Jun-03	
Trichloroethene	<.50	ug/L	W	Jun-03	
Bromodichloromethane	<.50	ug/L	W	Jun-03	
cis-1,3-Dichloropropene	<.50	ug/L	W	Jun-03	
4-Methyl-2-pentanone	<5.0	ug/L	W	Jun-03	
trans-1,3-Dichloropropene	<.50	ug/L	W	Jun-03	
1,1,2-Trichloroethane	<.50	ug/L	W	Jun-03	
Toluene	<.50	ug/L	W	Jun-03	
Dibromochloromethane	<.50	ug/L	W	Jun-03	
2-Hexanone	<5.0	ug/L	W	Jun-03	
Tetrachloroethene	<.50	ug/L	W	Jun-03	
Chlorobenzene	<.50	ug/L	W	Jun-03	
Ethylbenzene	<.50	ug/L	W	Jun-03	
Bromoform	<.50	ug/L	W	Jun-03	
Xylene (total)	<.50	ug/L	W	Jun-03	
Styrene	<.50	ug/L	W	Jun-03	
1,1,2,2-Tetrachloroethane	<.50	ug/L	W	Jun-03	
Dibromofluoromethane (surrogate)	99.	%	W	Jun-03	
Toluene-d8 (surrogate)	100.	%	W	Jun-03	
Bromofluorobenzene (surrogate)	96.	%	W	Jun-03	

Package Notes:

Sample Notes:

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Tentatively Identified Compound (LSC) summary
Operator ID: SG Date Acquired: 3 Jun 96 16:42
Data File: H:\HPCHEM\1\DATA\G7808.D
Name: Z1232
Disc: V2658
Method: G529VOCW
Title: VOC's w/J & W DB-VRX: 0.45 mm x 75 m
Library Searched: NBS75K.L

TIC Top Hit name	RT	EstConc	Units	Area	IntStd	ISRT	ISArea	ISConc
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Job No: 6009.4.517 Pkg: 9995 Sample: Z1233 Desc: Equipment Blank Number of parameters: 37
 QC Batch: 060396W1 Extracted: 06/03/96 Instrument: HP5972A GCMS#5 Sample size: 25 mL

Parameter	Result	Units	Wt	Date	Notes
Chloromethane	<1.0	ug/L	W	Jun-03	
Vinyl chloride	<1.0	ug/L	W	Jun-03	
Bromomethane	<1.0	ug/L	W	Jun-03	
Chloroethane	<1.0	ug/L	W	Jun-03	
Acetone	J 1.3	ug/L	W	Jun-03	
1,1-Dichloroethene	<.50	ug/L	W	Jun-03	
Methylene chloride	J .49	ug/L	W	Jun-03	
Carbon disulfide	<.50	ug/L	W	Jun-03	
trans-1,2-Dichloroethene	<.50	ug/L	W	Jun-03	
1,1-Dichloroethane	<.50	ug/L	W	Jun-03	
2-Butanone	<10.	ug/L	W	Jun-03	
cis-1,2-Dichloroethene	<.50	ug/L	W	Jun-03	
Chloroform	<.50	ug/L	W	Jun-03	
1,2-Dichloroethane	<.50	ug/L	W	Jun-03	
1,1,1-Trichloroethane	<.50	ug/L	W	Jun-03	
Carbon tetrachloride	<.50	ug/L	W	Jun-03	
Benzene	<.50	ug/L	W	Jun-03	
1,2-Dichloropropane	<.50	ug/L	W	Jun-03	
Trichloroethene	<.50	ug/L	W	Jun-03	
Bromodichloromethane	<.50	ug/L	W	Jun-03	
cis-1,3-Dichloropropene	<.50	ug/L	W	Jun-03	
4-Methyl-2-pentanone	<5.0	ug/L	W	Jun-03	
trans-1,3-Dichloropropene	<.50	ug/L	W	Jun-03	
1,1,2-Trichloroethane	<.50	ug/L	W	Jun-03	
Toluene	<.50	ug/L	W	Jun-03	
Dibromochloromethane	<.50	ug/L	W	Jun-03	
2-Hexanone	<5.0	ug/L	W	Jun-03	
Tetrachloroethene	<.50	ug/L	W	Jun-03	
Chlorobenzene	<.50	ug/L	W	Jun-03	
Ethylbenzene	<.50	ug/L	W	Jun-03	
Bromoform	<.50	ug/L	W	Jun-03	
Xylene (total)	<.50	ug/L	W	Jun-03	
Styrene	<.50	ug/L	W	Jun-03	
1,1,2,2-Tetrachloroethane	<.50	ug/L	W	Jun-03	
Dibromofluoromethane (surrogate)	95.	%	W	Jun-03	
Toluene-d8 (surrogate)	99.	%	W	Jun-03	
Bromofluorobenzene (surrogate)	96.	%	W	Jun-03	

Package Notes:

Sample Notes:

Tentatively Identified Compound (LSC) summary

Operator ID: SG Date Acquired: 3 Jun 96 13:47
Data File: H:\HPCHEM\1\DATA\G7804.D
Name: Z1233
Disc: V2658
Method: G529VOCW
Title: VOC's w/J & W DB-VRX: 0.45 mm x 75 m
Library Searched: NBS75K.L

TIC Top Hit name	RT	EstConc	Units	Area	IntStd	ISRT	ISArea	ISConc
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Job No: 6009.4.517 Pkg: 9995 Sample: Z1234 Desc: QC Trip Blank Number of parameters: 37
 QC Batch: 060396W1 Extracted: 06/03/96 Instrument: HP5972A GCMS#5 Sample size: 25 mL

Parameter	Result	Units	Wt	Date	Notes
Chloromethane	<1.0	ug/L	W	Jun-03	
Vinyl chloride	<1.0	ug/L	W	Jun-03	
Bromomethane	<1.0	ug/L	W	Jun-03	
Chloroethane	<1.0	ug/L	W	Jun-03	
Acetone	J .99	ug/L	W	Jun-03	
1,1-Dichloroethene	<.50	ug/L	W	Jun-03	
Methylene chloride	J .45	ug/L	W	Jun-03	
Carbon disulfide	<.50	ug/L	W	Jun-03	
trans-1,2-Dichloroethene	<.50	ug/L	W	Jun-03	
1,1-Dichloroethane	<.50	ug/L	W	Jun-03	
2-Butanone	<10.	ug/L	W	Jun-03	
cis-1,2-Dichloroethene	<.50	ug/L	W	Jun-03	
Chloroform	<.50	ug/L	W	Jun-03	
1,2-Dichloroethane	<.50	ug/L	W	Jun-03	
1,1,1-Trichloroethane	<.50	ug/L	W	Jun-03	
Carbon tetrachloride	<.50	ug/L	W	Jun-03	
Benzene	<.50	ug/L	W	Jun-03	
1,2-Dichloropropane	<.50	ug/L	W	Jun-03	
Trichloroethene	<.50	ug/L	W	Jun-03	
Bromodichloromethane	<.50	ug/L	W	Jun-03	
cis-1,3-Dichloropropene	<.50	ug/L	W	Jun-03	
4-Methyl-2-pentanone	<5.0	ug/L	W	Jun-03	
trans-1,3-Dichloropropene	<.50	ug/L	W	Jun-03	
1,1,2-Trichloroethane	<.50	ug/L	W	Jun-03	
Toluene	<.50	ug/L	W	Jun-03	
Dibromochloromethane	<.50	ug/L	W	Jun-03	
2-Hexanone	<5.0	ug/L	W	Jun-03	
Tetrachloroethene	<.50	ug/L	W	Jun-03	
Chlorobenzene	<.50	ug/L	W	Jun-03	
Ethylbenzene	<.50	ug/L	W	Jun-03	
Bromoform	<.50	ug/L	W	Jun-03	
Xylene (total)	<.50	ug/L	W	Jun-03	
Styrene	<.50	ug/L	W	Jun-03	
1,1,2,2-Tetrachloroethane	<.50	ug/L	W	Jun-03	
Dibromofluoromethane (surrogate)	94.	%	W	Jun-03	
Toluene-d8 (surrogate)	100.	%	W	Jun-03	
Bromofluorobenzene (surrogate)	98.	%	W	Jun-03	

Package Notes:

Sample Notes:

Tentatively Identified Compound (LSC) summary

Operator ID: SG Date Acquired: 3 Jun 96 13:02
Data File: H:\HPCHEM\1\DATA\G7803.D
Name: Z1234
Disc: V2658
Method: G529VOCW
Title: VOC's w/J & W DB-VRX: 0.45 mm x 75 m
Library Searched: NBS75K.L

TIC Top Hit name	RT	EstConc	Units	Area	IntStd	ISRT	ISArea	ISConc
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Job No: 6009.4.517 Pkg: 22 Sample: Z1609 Desc: CUSB-2 141-191
 QC Batch: 060396W1 Extracted: 06/03/96 Instrument: HP5972A GCMS#5 Number of parameters: 37
 Sample size: 25 mL

Parameter	Result	Units	Wt	Date	Notes
Chloromethane	<1.0	ug/L	W	Jun-03	
Vinyl chloride	<1.0	ug/L	W	Jun-03	
Bromomethane	<1.0	ug/L	W	Jun-03	
Chloroethane	<1.0	ug/L	W	Jun-03	
Acetone	14.	ug/L	W	Jun-03	
1,1-Dichloroethene	<.50	ug/L	W	Jun-03	
Methylene chloride	J .26	ug/L	W	Jun-03	
Carbon disulfide	<.50	ug/L	W	Jun-03	
trans-1,2-Dichloroethene	<.50	ug/L	W	Jun-03	
1,1-Dichloroethane	<.50	ug/L	W	Jun-03	
2-Butanone	<10.	ug/L	W	Jun-03	
cis-1,2-Dichloroethene	<.50	ug/L	W	Jun-03	
Chloroform	<.50	ug/L	W	Jun-03	
1,2-Dichloroethane	<.50	ug/L	W	Jun-03	
1,1,1-Trichloroethane	<.50	ug/L	W	Jun-03	
Carbon tetrachloride	<.50	ug/L	W	Jun-03	
Benzene	<.50	ug/L	W	Jun-03	
1,2-Dichloropropane	<.50	ug/L	W	Jun-03	
Trichloroethene	<.50	ug/L	W	Jun-03	
Bromodichloromethane	<.50	ug/L	W	Jun-03	
cis-1,3-Dichloropropene	<.50	ug/L	W	Jun-03	
4-Methyl-2-pentanone	<5.0	ug/L	W	Jun-03	
trans-1,3-Dichloropropene	<.50	ug/L	W	Jun-03	
1,1,2-Trichloroethane	<.50	ug/L	W	Jun-03	
Toluene	<.50	ug/L	W	Jun-03	
Dibromochloromethane	<.50	ug/L	W	Jun-03	
2-Hexanone	<5.0	ug/L	W	Jun-03	
Tetrachloroethene	<.50	ug/L	W	Jun-03	
Chlorobenzene	<.50	ug/L	W	Jun-03	
Ethylbenzene	<.50	ug/L	W	Jun-03	
Bromoform	<.50	ug/L	W	Jun-03	
Xylene (total)	<.50	ug/L	W	Jun-03	
Styrene	<.50	ug/L	W	Jun-03	
1,1,2,2-Tetrachloroethane	<.50	ug/L	W	Jun-03	
Dibromofluoromethane (surrogate)	97.	%	W	Jun-03	
Toluene-d8 (surrogate)	99.	%	W	Jun-03	
Bromofluorobenzene (surrogate)	95.	%	W	Jun-03	

Package Notes:

Sample Notes:

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Tentatively Identified Compound (LSC) summary

Operator ID: SG Date Acquired: 3 Jun 96 17:27
Data File: H:\HPCHEM\1\DATA\G7809.D
Name: Z1609
isc: V2658
Method: G529VOCW
Title: VOC's w/J & W DB-VRX: 0.45 mm x 75 m
Library Searched: NBS75K.L

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TIC Top Hit name	RT	EstConc	Units	Area	IntStd	ISRT	ISArea	ISConc
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Job No: 6009.4.517 Pkg: 22 Sample: Z1610 Desc: Equipment Blank Number of parameters: 37
 QC Batch: 060396W1 Extracted: 06/03/96 Instrument: HP5972A GCMS#5 Sample size: 25 ml

Parameter	Result	Units	Wt	Date	Notes
Chloromethane	<1.0	ug/L	W	Jun-03	
Vinyl chloride	<1.0	ug/L	W	Jun-03	
Bromomethane	<1.0	ug/L	W	Jun-03	
Chloroethane	<1.0	ug/L	W	Jun-03	
Acetone	4.4	ug/L	W	Jun-03	
1,1-Dichloroethene	<.50	ug/L	W	Jun-03	
Methylene chloride	1.57	ug/L	W	Jun-03	
Carbon disulfide	<.50	ug/L	W	Jun-03	
trans-1,2-Dichloroethene	<.50	ug/L	W	Jun-03	
1,1-Dichloroethane	<.50	ug/L	W	Jun-03	
2-Butanone	<10.	ug/L	W	Jun-03	
cis-1,2-Dichloroethene	<.50	ug/L	W	Jun-03	
Chloroform	<.50	ug/L	W	Jun-03	
1,2-Dichloroethane	<.50	ug/L	W	Jun-03	
1,1,1-Trichloroethane	<.50	ug/L	W	Jun-03	
Carbon tetrachloride	<.50	ug/L	W	Jun-03	
Benzene	<.50	ug/L	W	Jun-03	
1,2-Dichloropropane	<.50	ug/L	W	Jun-03	
Trichloroethene	<.50	ug/L	W	Jun-03	
Bromodichloromethane	<.50	ug/L	W	Jun-03	
cis-1,3-Dichloropropene	<.50	ug/L	W	Jun-03	
4-Methyl-2-pentanone	<5.0	ug/L	W	Jun-03	
trans-1,3-Dichloropropene	<.50	ug/L	W	Jun-03	
1,1,2-Trichloroethane	<.50	ug/L	W	Jun-03	
Toluene	<.50	ug/L	W	Jun-03	
Dibromochloromethane	<.50	ug/L	W	Jun-03	
2-Hexanone	<5.0	ug/L	W	Jun-03	
Tetrachloroethene	<.50	ug/L	W	Jun-03	
Chlorobenzene	<.50	ug/L	W	Jun-03	
Ethylbenzene	<.50	ug/L	W	Jun-03	
Bromoform	<.50	ug/L	W	Jun-03	
Xylene (total)	<.50	ug/L	W	Jun-03	
Styrene	<.50	ug/L	W	Jun-03	
1,1,2,2-Tetrachloroethane	<.50	ug/L	W	Jun-03	
Dibromofluoromethane (surrogate)	98.	%	W	Jun-03	
Toluene-d8 (surrogate)	99.	%	W	Jun-03	
Bromofluorobenzene (surrogate)	97.	%	W	Jun-03	

Package Notes:
 Sample Notes:

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017

Tentatively Identified Compound (LSC) summary

Operator ID: SG Date Acquired: 3 Jun 96 18:11
Data File: H:\HPCHEM\1\DATA\G7810.D

Name: Z1610
isc: V2658

Method: G529VOCW

Title: VOC's w/J & W DB-VRX: 0.45 mm x 75 m
Library Searched: NBS75K.L

TIC Top Hit name	RT	EstConc	Units	Area	IntStd	ISRT	ISArea	ISConc
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Job No: 6009.4.517 Pkg: 22 Sample: Z1611 Desc: QC Trip Blank Number of parameters: 37
 QC Batch: 060396W1 Extracted: 06/03/96 Instrument: HP5972A GCMS#5 Sample size: 25 mL

Parameter	Result	Units	Wt	Date	Notes
Chloromethane	<1.0	ug/L	W	Jun-03	
Vinyl chloride	<1.0	ug/L	W	Jun-03	
Bromomethane	<1.0	ug/L	W	Jun-03	
Chloroethane	<1.0	ug/L	W	Jun-03	
Acetone	J 2.5	ug/L	W	Jun-03	
1,1-Dichloroethene	<.50	ug/L	W	Jun-03	
Methylene chloride	<1.0	ug/L	W	Jun-03	
Carbon disulfide	<.50	ug/L	W	Jun-03	
trans-1,2-Dichloroethene	<.50	ug/L	W	Jun-03	
1,1-Dichloroethane	<.50	ug/L	W	Jun-03	
2-Butanone	<10.	ug/L	W	Jun-03	
cis-1,2-Dichloroethene	<.50	ug/L	W	Jun-03	
Chloroform	<.50	ug/L	W	Jun-03	
1,2-Dichloroethane	<.50	ug/L	W	Jun-03	
1,1,1-Trichloroethane	<.50	ug/L	W	Jun-03	
Carbon tetrachloride	<.50	ug/L	W	Jun-03	
Benzene	<.50	ug/L	W	Jun-03	
1,2-Dichloropropane	<.50	ug/L	W	Jun-03	
Trichloroethene	<.50	ug/L	W	Jun-03	
Bromodichloromethane	<.50	ug/L	W	Jun-03	
cis-1,3-Dichloropropene	<.50	ug/L	W	Jun-03	
4-Methyl-2-pentanone	<5.0	ug/L	W	Jun-03	
trans-1,3-Dichloropropene	<.50	ug/L	W	Jun-03	
1,1,2-Trichloroethane	<.50	ug/L	W	Jun-03	
Toluene	<.50	ug/L	W	Jun-03	
Dibromochloromethane	<.50	ug/L	W	Jun-03	
2-Hexanone	<5.0	ug/L	W	Jun-03	
Tetrachloroethene	<.50	ug/L	W	Jun-03	
Chlorobenzene	<.50	ug/L	W	Jun-03	
Ethylbenzene	<.50	ug/L	W	Jun-03	
Bromoform	<.50	ug/L	W	Jun-03	
Xylene (total)	<.50	ug/L	W	Jun-03	
Styrene	<.50	ug/L	W	Jun-03	
1,1,2,2-Tetrachloroethane	<.50	ug/L	W	Jun-03	
Dibromofluoromethane (surrogate)	96.	%	W	Jun-03	
Toluene-d8 (surrogate)	99.	%	W	Jun-03	
Bromofluorobenzene (surrogate)	95.	%	W	Jun-03	

Package Notes:

Sample Notes:

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Tentatively Identified Compound (LSC) summary
Operator ID: SG Date Acquired: 3 Jun 96 15:58
Data File: H:\HPCHEM\1\DATA\G7807.D
Name: Z1611
Misc: V2658
Method: G529VOCW
Title: VOC's w/J & W DB-VRX: 0.45 mm x 75 m
Library Searched: NBS75K.L

TIC Top Hit name	RT	EstConc	Units	Area	IntStd	ISRT	ISArea	ISConc
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Job No: 6009.4.517 Pkg: 9995 Sample: Z1230 Desc: CUSB-1 25'-30'
 QC Batch: 053096W1 Extracted: 05/30/96 Instrument: HP5972 GC/MS# Sample size: .95 L Number of parameters: 70

Parameter	Result	Units	Wt	Date	Notes
bis(2-Chloroethyl)ether	<5.3	ug/L	W	Jun-03	
Phenol	<5.3	ug/L	W	Jun-03	
2-Chlorophenol	<5.3	ug/L	W	Jun-03	
1,3-Dichlorobenzene	<5.3	ug/L	W	Jun-03	
1,4-Dichlorobenzene	<5.3	ug/L	W	Jun-03	
1,2-Dichlorobenzene	<5.3	ug/L	W	Jun-03	
2-Methylphenol	<5.3	ug/L	W	Jun-03	
bis(2-Chloroisopropyl)ether	<5.3	ug/L	W	Jun-03	
4-Methylphenol	<5.3	ug/L	W	Jun-03	
N-Nitroso-di-n-propylamine	<5.3	ug/L	W	Jun-03	
Hexachloroethane	<5.3	ug/L	W	Jun-03	
Nitrobenzene	<5.3	ug/L	W	Jun-03	
Isophorone	<5.3	ug/L	W	Jun-03	
2-Nitrophenol	<5.3	ug/L	W	Jun-03	
2,4-Dimethylphenol	<5.3	ug/L	W	Jun-03	
bis(2-Chloroethoxy)methane	<5.3	ug/L	W	Jun-03	
2,4-Dichlorophenol	<5.3	ug/L	W	Jun-03	
1,2,4-Trichlorobenzene	<5.3	ug/L	W	Jun-03	
Naphthalene	<5.3	ug/L	W	Jun-03	
4-Chloroaniline	<5.3	ug/L	W	Jun-03	
Hexachlorobutadiene	<5.3	ug/L	W	Jun-03	
4-Chloro-3-methylphenol	<5.3	ug/L	W	Jun-03	
2-Methylnaphthalene	<5.3	ug/L	W	Jun-03	
Hexachlorocyclopentadiene	<5.3	ug/L	W	Jun-03	
2,4,6-Trichlorophenol	<5.3	ug/L	W	Jun-03	
2,4,5-Trichlorophenol	<26.	ug/L	W	Jun-03	
2-Chloronaphthalene	<5.3	ug/L	W	Jun-03	
2-Nitroaniline	<21.	ug/L	W	Jun-03	
Dimethyl phthalate	<5.3	ug/L	W	Jun-03	
Acenaphthylene	<5.3	ug/L	W	Jun-03	
2,6-Dinitrotoluene	<5.3	ug/L	W	Jun-03	
3-Nitroaniline	<21.	ug/L	W	Jun-03	
Acenaphthene	<5.3	ug/L	W	Jun-03	
2,4-Dinitrophenol	<21.	ug/L	W	Jun-03	
4-Nitrophenol	<21.	ug/L	W	Jun-03	
Dibenzofuran	<5.3	ug/L	W	Jun-03	
2,4-Dinitrotoluene	<5.3	ug/L	W	Jun-03	
Diethyl phthalate	<5.3	ug/L	W	Jun-03	
Fluorene	<5.3	ug/L	W	Jun-03	
4-Chlorophenyl phenyl ether	<5.3	ug/L	W	Jun-03	
4-Nitroaniline	<21.	ug/L	W	Jun-03	
4,6-Dinitro-2-methylphenol	<21.	ug/L	W	Jun-03	
N-Nitrosodiphenylamine	<5.3	ug/L	W	Jun-03	
4-Bromophenyl phenyl ether	<5.3	ug/L	W	Jun-03	

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ANALYTICAL RESULTS

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Job No: 6009.4.517 Pkg: 9995 Sample: Z1230 Desc: CUSB-1 251-301
 QC Batch: 053096W1 Extracted: 05/30/96 Instrument: HP5972 GC/MS#6 Sample size: .95 L Number of parameters: 70

Parameter	Result	Units	Wt	Date	Notes
Hexachlorobenzene	<5.3	ug/L	W	Jun-03	
Pentachlorophenol	<21.	ug/L	W	Jun-03	
Phenanthrene	<5.3	ug/L	W	Jun-03	
Anthracene	<5.3	ug/L	W	Jun-03	
Carbazole	<11.	ug/L	W	Jun-03	
Di-n-butyl phthalate	<5.3	ug/L	W	Jun-03	
Fluoranthene	<5.3	ug/L	W	Jun-03	
Pyrene	<5.3	ug/L	W	Jun-03	
Butyl benzyl phthalate	<5.3	ug/L	W	Jun-03	
3,3'-Dichlorobenzidine	<11.	ug/L	W	Jun-03	
Benzo[a]anthracene	<5.3	ug/L	W	Jun-03	
Chrysene	<5.3	ug/L	W	Jun-03	
bis(2-Ethylhexyl)phthalate	<5.3	ug/L	W	Jun-03	
Di-n-octyl phthalate	<5.3	ug/L	W	Jun-03	
Benzo[b]fluoranthene	<5.3	ug/L	W	Jun-03	
Benzo[k]fluoranthene	<5.3	ug/L	W	Jun-03	
Benzo[a]pyrene	<5.3	ug/L	W	Jun-03	
Indeno[1,2,3-cd]pyrene	<5.3	ug/L	W	Jun-03	
Dibenz[a,h]anthracene	<5.3	ug/L	W	Jun-03	
Benzo[g,h,i]perylene	<5.3	ug/L	W	Jun-03	
2-Fluorophenol (surrogate)	75.	%	W	Jun-03	
Phenol-d5 (surrogate)	78.	%	W	Jun-03	
2,4,6-Tribromophenol (surrogate)	82.	%	W	Jun-03	
Nitrobenzene-d5 (surrogate)	93.	%	W	Jun-03	
2-Fluorobiphenyl (surrogate)	94.	%	W	Jun-03	
Terphenyl-d14 (surrogate)	86.	%	W	Jun-03	

Package Notes:

Sample Notes:

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Tentatively Identified Compound (LSC) summary

Operator ID: RJP Date Acquired: 3 Jun 96 17:17
Data File: C:\HPCHEM\1\DATA\S2193.D

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Sample Name: Z1230

Disc:

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Method: S521HSL

Aug 07, 2009 17:05

Title: BNA 8270/625 Calibration

Library Searched: NBS75K.L

TIC Top Hit name	RT	EstConc	Units	Area	IntStd	ISRT	ISArea	ISConc
ethyl Acetate	4.18	54.8	ug/mL	3444569	ISTD01	7.90	1257056	20.0
hexane, 3-bromo-	6.04	3.2	ug/mL	201264	ISTD01	7.90	1257056	20.0
2-Propanol, 1-(2-met	7.61	6.0	ug/mL	375175	ISTD01	7.90	1257056	20.0
-Propanol, 1-(2-met	7.65	6.3	ug/mL	395233	ISTD01	7.90	1257056	20.0
di-sec-butyl ether	7.81	3.5	ug/mL	222868	ISTD01	7.90	1257056	20.0
2(3H)-Benzothiazolon	14.97	23.2	ug/mL	2167467	ISTD04	15.93	1870187	20.0
hexadecanoic acid	17.05	2.1	ug/mL	192101	ISTD04	15.93	1870187	20.0
(2H)-Naphthalenone,	17.41	2.1	ug/mL	197724	ISTD04	15.93	1870187	20.0
9-Octadecenamide, (Z	22.22	2.4	ug/mL	221580	ISTD06	23.09	1833055	20.0

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ANALYTICAL RESULTS

8270W

04-JUN-06

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Job No: 6009.4.517 Pkg: 9995 Sample: Z1231 Desc: CUSB-1 171-221 Number of parameters: 70
 QC Batch: 053096W1 Extracted: 05/30/96 Instrument: HP5972 GC/MS#6 Sample size: .91 L

Parameter Result Units Wt Date Notes

bis(2-Chloroethyl)ether	<5.5	ug/L	W	Jun-03	
Phenol	<5.5	ug/L	W	Jun-03	
2-Chlorophenol	<5.5	ug/L	W	Jun-03	
1,3-Dichlorobenzene	<5.5	ug/L	W	Jun-03	
1,4-Dichlorobenzene	<5.5	ug/L	W	Jun-03	
1,2-Dichlorobenzene	<5.5	ug/L	W	Jun-03	
2-Methylphenol	<5.5	ug/L	W	Jun-03	
bis(2-Chloroisopropyl)ether	<5.5	ug/L	W	Jun-03	
4-Methylphenol	<5.5	ug/L	W	Jun-03	
N-Nitroso-di-n-propylamine	<5.5	ug/L	W	Jun-03	
Hexachloroethane	<5.5	ug/L	W	Jun-03	
Nitrobenzene	<5.5	ug/L	W	Jun-03	
Isophorone	<5.5	ug/L	W	Jun-03	
2-Nitrophenol	<5.5	ug/L	W	Jun-03	
2,4-Dimethylphenol	<5.5	ug/L	W	Jun-03	
bis(2-Chloroethoxy)methane	<5.5	ug/L	W	Jun-03	
2,4-Dichlorophenol	<5.5	ug/L	W	Jun-03	
1,2,4-Trichlorobenzene	<5.5	ug/L	W	Jun-03	
Naphthalene	<5.5	ug/L	W	Jun-03	
4-Chloroaniline	<5.5	ug/L	W	Jun-03	
Hexachlorobutadiene	<5.5	ug/L	W	Jun-03	
4-Chloro-3-methylphenol	<5.5	ug/L	W	Jun-03	
2-Methylnaphthalene	<5.5	ug/L	W	Jun-03	
Hexachlorocyclopentadiene	<5.5	ug/L	W	Jun-03	
2,4,6-Trichlorophenol	<5.5	ug/L	W	Jun-03	
2,4,5-Trichlorophenol	<27.	ug/L	W	Jun-03	
2-Chloronaphthalene	<5.5	ug/L	W	Jun-03	
2-Nitroaniline	<22.	ug/L	W	Jun-03	
Dimethyl phthalate	<5.5	ug/L	W	Jun-03	
Acenaphthylene	<5.5	ug/L	W	Jun-03	
2,6-Dinitrotoluene	<5.5	ug/L	W	Jun-03	
3-Nitroaniline	<22.	ug/L	W	Jun-03	
Acenaphthene	<5.5	ug/L	W	Jun-03	
2,4-Dinitrophenol	<22.	ug/L	W	Jun-03	
4-Nitrophenol	<22.	ug/L	W	Jun-03	
Dibenzofuran	<5.5	ug/L	W	Jun-03	
2,4-Dinitrotoluene	<5.5	ug/L	W	Jun-03	
Diethyl phthalate	<5.5	ug/L	W	Jun-03	
Fluorene	<5.5	ug/L	W	Jun-03	
4-Chlorophenyl phenyl ether	<5.5	ug/L	W	Jun-03	
4-Nitroaniline	<22.	ug/L	W	Jun-03	
4,6-Dinitro-2-methylphenol	<22.	ug/L	W	Jun-03	
N-Nitrosodiphenylamine	<5.5	ug/L	W	Jun-03	
4-Bromophenyl phenyl ether	<5.5	ug/L	W	Jun-03	

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Job No: 6009.4.517 Pkg: 9995 Sample: Z1231 Desc: CUSB-1 17'-22' Number of parameters: 70
 QC Batch: 053096W1 Extracted: 05/30/96 Instrument: HP5972 GC/MS#6 Sample size: .91 L

Parameter	Result	Units	Wt	Date	Notes
Hexachlorobenzene	<5.5	ug/L	W	Jun-03	
Pentachlorophenol	<22.	ug/L	W	Jun-03	
Phenanthrene	<5.5	ug/L	W	Jun-03	
Anthracene	<5.5	ug/L	W	Jun-03	
Carbazole	<11.	ug/L	W	Jun-03	
Di-n-butyl phthalate	<5.5	ug/L	W	Jun-03	
Fluoranthene	<5.5	ug/L	W	Jun-03	
Pyrene	<5.5	ug/L	W	Jun-03	
Butyl benzyl phthalate	<5.5	ug/L	W	Jun-03	
3,3'-Dichlorobenzidine	<11.	ug/L	W	Jun-03	
Benzo[a]anthracene	<5.5	ug/L	W	Jun-03	
Chrysene	<5.5	ug/L	W	Jun-03	
bis(2-Ethylhexyl)phthalate	<5.5	ug/L	W	Jun-03	
Di-n-octyl phthalate	<5.5	ug/L	W	Jun-03	
Benzo[b]fluoranthene	<5.5	ug/L	W	Jun-03	
Benzo[k]fluoranthene	<5.5	ug/L	W	Jun-03	
Benzo[a]pyrene	<5.5	ug/L	W	Jun-03	
Indeno[1,2,3-cd]pyrene	<5.5	ug/L	W	Jun-03	
Dibenz[a,h]anthracene	<5.5	ug/L	W	Jun-03	
Benzo[g,h,i]perylene	<5.5	ug/L	W	Jun-03	
2-Fluorophenol (surrogate)	75.	%	W	Jun-03	
Phenol-d5 (surrogate)	80.	%	W	Jun-03	
2,4,6-Tribromophenol (surrogate)	81.	%	W	Jun-03	
Nitrobenzene-d5 (surrogate)	96.	%	W	Jun-03	
2-Fluorobiphenyl (surrogate)	95.	%	W	Jun-03	
Terphenyl-d14 (surrogate)	88.	%	W	Jun-03	

Package Notes:

Sample Notes:

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Tentatively Identified Compound (LSC) summary

Operator ID: RJP Date Acquired: 3 Jun 96 17:50
 Data File: C:\HPCHEM\1\DATA\S2194.D
 Name: Z1231
 Disc:
 Method: S521HSL
 Title: BNA 8270/625 Calibration
 Library Searched: NBS75K.L

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TIC Top Hit name	RT	EstConc	Units	Area	IntStd	ISRT	ISArea	ISConc
ethyl Acetate	4.16	42.0	ug/mL	2689401	ISTD01	7.90	1280060	20.0
phenol, p-tert-butyl	11.19	2.4	ug/mL	202083	ISTD02	10.11	1690164	20.0
2(3H)-Benzothiazolon	14.97	21.4	ug/mL	2192821	ISTD04	15.93	2052287	20.0
Pentanamide, 4-methy	22.23	2.9	ug/mL	241878	ISTD06	23.09	1679895	20.0

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ANALYTICAL RESULTS

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Job No: 6009.4.517 Pkg: 9995 Sample: Z1232 Desc: Field Dup Number of parameters: 70
 QC Batch: 053096W1 Extracted: 05/30/96 Instrument: HP5972 GC/MS#6 Sample size: .94 L

Parameter	Result	Units	Wt	Date	Notes
bis(2-Chloroethyl)ether	<5.3	ug/L	W	Jun-03	
Phenol	<5.3	ug/L	W	Jun-03	
2-Chlorophenol	<5.3	ug/L	W	Jun-03	
1,3-Dichlorobenzene	<5.3	ug/L	W	Jun-03	
1,4-Dichlorobenzene	<5.3	ug/L	W	Jun-03	
1,2-Dichlorobenzene	<5.3	ug/L	W	Jun-03	
2-Methylphenol	<5.3	ug/L	W	Jun-03	
bis(2-Chloroisopropyl)ether	<5.3	ug/L	W	Jun-03	
4-Methylphenol	<5.3	ug/L	W	Jun-03	
N-Nitroso-di-n-propylamine	<5.3	ug/L	W	Jun-03	
Hexachloroethane	<5.3	ug/L	W	Jun-03	
Nitrobenzene	<5.3	ug/L	W	Jun-03	
Isophorone	<5.3	ug/L	W	Jun-03	
2-Nitrophenol	<5.3	ug/L	W	Jun-03	
2,4-Dimethylphenol	<5.3	ug/L	W	Jun-03	
bis(2-Chloroethoxy)methane	<5.3	ug/L	W	Jun-03	
2,4-Dichlorophenol	<5.3	ug/L	W	Jun-03	
1,2,4-Trichlorobenzene	<5.3	ug/L	W	Jun-03	
Naphthalene	<5.3	ug/L	W	Jun-03	
4-Chloroaniline	<5.3	ug/L	W	Jun-03	
Hexachlorobutadiene	<5.3	ug/L	W	Jun-03	
4-Chloro-3-methylphenol	<5.3	ug/L	W	Jun-03	
2-Methylnaphthalene	<5.3	ug/L	W	Jun-03	
Hexachlorocyclopentadiene	<5.3	ug/L	W	Jun-03	
2,4,6-Trichlorophenol	<5.3	ug/L	W	Jun-03	
2,4,5-Trichlorophenol	<27.	ug/L	W	Jun-03	
2-Chloronaphthalene	<5.3	ug/L	W	Jun-03	
2-Nitroaniline	<21.	ug/L	W	Jun-03	
Dimethyl phthalate	<5.3	ug/L	W	Jun-03	
Acenaphthylene	<5.3	ug/L	W	Jun-03	
2,6-Dinitrotoluene	<5.3	ug/L	W	Jun-03	
3-Nitroaniline	<21.	ug/L	W	Jun-03	
Acenaphthene	<5.3	ug/L	W	Jun-03	
2,4-Dinitrophenol	<21.	ug/L	W	Jun-03	
4-Nitrophenol	<21.	ug/L	W	Jun-03	
Dibenzofuran	<5.3	ug/L	W	Jun-03	
2,4-Dinitrotoluene	<5.3	ug/L	W	Jun-03	
Diethyl phthalate	<5.3	ug/L	W	Jun-03	
Fluorene	<5.3	ug/L	W	Jun-03	
4-Chlorophenyl phenyl ether	<5.3	ug/L	W	Jun-03	
4-Nitroaniline	<21.	ug/L	W	Jun-03	
4,6-Dinitro-2-methylphenol	<21.	ug/L	W	Jun-03	
N-Nitrosodiphenylamine	<5.3	ug/L	W	Jun-03	
4-Bromophenyl phenyl ether	<5.3	ug/L			

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ANALYTICAL RESULTS

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Job No: 6009.4.517 Pkg: 9995 Sample: 21232 Desc: Field Dup
 QC Batch: 053096W1 Extracted: 05/30/96 Instrument: HP5972 GC/MS#6 Sample size: .94 L Number of parameters: 70

Parameter	Result	Units	Wt	Date	Notes
Hexachlorobenzene	<5.3	ug/L	W	Jun-03	
Pentachlorophenol	<21.	ug/L	W	Jun-03	
Phenanthrene	<5.3	ug/L	W	Jun-03	
Anthracene	<5.3	ug/L	W	Jun-03	
Carbazole	<11.	ug/L	W	Jun-03	
Di-n-butyl phthalate	<5.3	ug/L	W	Jun-03	
Fluoranthene	<5.3	ug/L	W	Jun-03	
Pyrene	<5.3	ug/L	W	Jun-03	
Butyl benzyl phthalate	<5.3	ug/L	W	Jun-03	
3,3'-Dichlorobenzidine	<11.	ug/L	W	Jun-03	
Benzo[a]anthracene	<5.3	ug/L	W	Jun-03	
Chrysene	<5.3	ug/L	W	Jun-03	
bis(2-Ethylhexyl)phthalate	<5.3	ug/L	W	Jun-03	
Di-n-octyl phthalate	<5.3	ug/L	W	Jun-03	
Benzo[b]fluoranthene	<5.3	ug/L	W	Jun-03	
Benzo[k]fluoranthene	<5.3	ug/L	W	Jun-03	
Benzo[a]pyrene	<5.3	ug/L	W	Jun-03	
Indeno[1,2,3-cd]pyrene	<5.3	ug/L	W	Jun-03	
Dibenz[a,h]anthracene	<5.3	ug/L	W	Jun-03	
Benzo[g,h,i]perylene	<5.3	ug/L	W	Jun-03	
2-Fluorophenol (surrogate)	76.	%	W	Jun-03	
Phenol-d5 (surrogate)	82.	%	W	Jun-03	
2,4,6-Tribromophenol (surrogate)	82.	%	W	Jun-03	
Nitrobenzene-d5 (surrogate)	95.	%	W	Jun-03	
2-Fluorobiphenyl (surrogate)	96.	%	W	Jun-03	
Terphenyl-d14 (surrogate)	91.	%	W	Jun-03	

Package Notes:

Sample Notes:

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Tentatively Identified Compound

(LSC) summary

Operator ID: RJP Date Acquired: 3 Jun 96 18:24

Data File: C:\HPCHEM\1\DATA\S2195.D

Name: Z1232

Disc:

LFR

Method: S521HSL

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Title: BNA 8270/625 Calibration

Library Searched: NBS75K.L

TIC Top Hit name	RT	EstConc	Units	Area	IntStd	ISRT	ISArea	ISConc
ethyl Acetate	4.17	48.8	ug/mL	3201291	ISTD01	7.90	1312900	20.0
Phenol, m-tert-butyl	11.19	2.8	ug/mL	241082	ISTD02	10.11	1718130	20.0
2(3H)-Benzothiazolon	14.98	24.5	ug/mL	2324210	ISTD04	15.93	1897038	20.0
ethanol, 2,2'-(oxybi	15.69	2.4	ug/mL	226040	ISTD04	15.93	1897038	20.0
hexadecanoic acid	17.04	2.0	ug/mL	193240	ISTD04	15.93	1897038	20.0
Dodecanamide	22.23	3.5	ug/mL	300086	ISTD06	23.09	1712483	20.0

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ANALYTICAL RESULTS

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Job No: 6009.4.517 Pkg: 9995 Sample: Z1233 Desc: Equipment Blank Number of parameters: 70
 QC Batch: 053096W1 Extracted: 05/30/96 Instrument: HP5972 GC/MS#6 Sample size: .97 L

Parameter	Result	Units	Wt	Date	Notes
bis(2-Chloroethyl)ether	<5.2	ug/L	W	Jun-03	
Phenol	<5.2	ug/L	W	Jun-03	
2-Chlorophenol	<5.2	ug/L	W	Jun-03	
1,3-Dichlorobenzene	<5.2	ug/L	W	Jun-03	
1,4-Dichlorobenzene	<5.2	ug/L	W	Jun-03	
1,2-Dichlorobenzene	<5.2	ug/L	W	Jun-03	
2-Methylphenol	<5.2	ug/L	W	Jun-03	
bis(2-Chloroisopropyl)ether	<5.2	ug/L	W	Jun-03	
4-Methylphenol	<5.2	ug/L	W	Jun-03	
N-Nitroso-di-n-propylamine	<5.2	ug/L	W	Jun-03	
Hexachloroethane	<5.2	ug/L	W	Jun-03	
Nitrobenzene	<5.2	ug/L	W	Jun-03	
Isophorone	<5.2	ug/L	W	Jun-03	
2-Nitrophenol	<5.2	ug/L	W	Jun-03	
2,4-Dimethylphenol	<5.2	ug/L	W	Jun-03	
bis(2-Chloroethoxy)methane	<5.2	ug/L	W	Jun-03	
2,4-Dichlorophenol	<5.2	ug/L	W	Jun-03	
1,2,4-Trichlorobenzene	<5.2	ug/L	W	Jun-03	
Naphthalene	<5.2	ug/L	W	Jun-03	
4-Chloroaniline	<5.2	ug/L	W	Jun-03	
Hexachlorobutadiene	<5.2	ug/L	W	Jun-03	
4-Chloro-3-methylphenol	<5.2	ug/L	W	Jun-03	
2-Methylnaphthalene	<5.2	ug/L	W	Jun-03	
Hexachlorocyclopentadiene	<5.2	ug/L	W	Jun-03	
2,4,6-Trichlorophenol	<5.2	ug/L	W	Jun-03	
2,4,5-Trichlorophenol	<26.	ug/L	W	Jun-03	
2-Chloronaphthalene	<5.2	ug/L	W	Jun-03	
2-Nitroaniline	<21.	ug/L	W	Jun-03	
Dimethyl phthalate	<5.2	ug/L	W	Jun-03	
Acenaphthylene	<5.2	ug/L	W	Jun-03	
2,6-Dinitrotoluene	<5.2	ug/L	W	Jun-03	
3-Nitroaniline	<21.	ug/L	W	Jun-03	
Acenaphthene	<5.2	ug/L	W	Jun-03	
2,4-Dinitrophenol	<21.	ug/L	W	Jun-03	
4-Nitrophenol	<21.	ug/L	W	Jun-03	
Dibenzofuran	<5.2	ug/L	W	Jun-03	
2,4-Dinitrotoluene	<5.2	ug/L	W	Jun-03	
Diethyl phthalate	<5.2	ug/L	W	Jun-03	
Fluorene	<5.2	ug/L	W	Jun-03	
4-Chlorophenyl phenyl ether	<5.2	ug/L	W	Jun-03	
4-Nitroaniline	<21.	ug/L	W	Jun-03	
4,6-Dinitro-2-methylphenol	<21.	ug/L	W	Jun-03	
N-Nitrosodiphenylamine	<5.2	ug/L	W	Jun-03	
4-Bromophenyl phenyl ether	<5.2	ug/L	W	Jun-03	

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ANALYTICAL RESULTS

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Job No: 6009.4.517 Pkg: 9995 Sample: Z1233 Desc: Equipment Blank Number of parameters: 70
 QC Batch: 053096W1 Extracted: 05/30/96 Instrument: HP5972 GC/MS#6 Sample size: .97 L

Parameter	Result	Units	Wt	Date	Notes
Hexachlorobenzene	<5.2	ug/L	W	Jun-03	
Pentachlorophenol	<21.	ug/L	W	Jun-03	
Phenanthrene	<5.2	ug/L	W	Jun-03	
Anthracene	<5.2	ug/L	W	Jun-03	
Carbazole	<10.	ug/L	W	Jun-03	
Di-n-butyl phthalate	<5.2	ug/L	W	Jun-03	
Fluoranthene	<5.2	ug/L	W	Jun-03	
Pyrene	<5.2	ug/L	W	Jun-03	
Butyl benzyl phthalate	<5.2	ug/L	W	Jun-03	
3,3'-Dichlorobenzidine	<10.	ug/L	W	Jun-03	
Benzo[a]anthracene	<5.2	ug/L	W	Jun-03	
Chrysene	<5.2	ug/L	W	Jun-03	
bis(2-Ethylhexyl)phthalate	<5.2	ug/L	W	Jun-03	
Di-n-octyl phthalate	<5.2	ug/L	W	Jun-03	
Benzo[b]fluoranthene	<5.2	ug/L	W	Jun-03	
Benzo[k]fluoranthene	<5.2	ug/L	W	Jun-03	
Benzo[a]pyrene	<5.2	ug/L	W	Jun-03	
Indeno[1,2,3-cd]pyrene	<5.2	ug/L	W	Jun-03	
Dibenz[a,h]anthracene	<5.2	ug/L	W	Jun-03	
Benzo[g,h,i]perylene	<5.2	ug/L	W	Jun-03	
2-Fluorophenol (surrogate)	72.	%	W	Jun-03	
Phenol-d5 (surrogate)	81.	%	W	Jun-03	
2,4,6-Tribromophenol (surrogate)	79.	%	W	Jun-03	
Nitrobenzene-d5 (surrogate)	101.	%	W	Jun-03	
2-Fluorobiphenyl (surrogate)	93.	%	W	Jun-03	
Terphenyl-d14 (surrogate)	90.	%	W	Jun-03	

Package Notes:

Sample Notes:

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031

Tentatively Identified Compound (LSC) summary
Operator ID: RJP Date Acquired: 3 Jun 96 18:57
Data File: C:\HPCHEM\1\DATA\S2196.D
Name: Z1233
LFR
Title: BNA 8270/625 Calibration
Library Searched: NBS75K.L

TIC Top Hit name	RT	EstConc	Units	Area	IntStd	ISRT	ISArea	ISConc
ethyl Acetate	4.14	22.1	ug/mL	1409197	ISTD01	7.90	1276298	20.0

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Job No: 6009.4.517 Pkg: 22 Sample: Z1609 Desc: CUSB-2 14'-19'
 QC Batch: 060396W2 Extracted: 06/03/96 Instrument: HP5972 GC/MS#6 Sample size: .94 L Number of parameters: 70

Parameter	Result	Units	Wt	Date	Notes
bis(2-Chloroethyl)ether	<5.3	ug/L	W	Jun-09	
Phenol	<5.3	ug/L	W	Jun-09	
2-Chlorophenol	<5.3	ug/L	W	Jun-09	
1,3-Dichlorobenzene	<5.3	ug/L	W	Jun-09	
1,4-Dichlorobenzene	<5.3	ug/L	W	Jun-09	
1,2-Dichlorobenzene	<5.3	ug/L	W	Jun-09	
2-Methylphenol	<5.3	ug/L	W	Jun-09	
bis(2-Chloroisopropyl)ether	<5.3	ug/L	W	Jun-09	
4-Methylphenol	<5.3	ug/L	W	Jun-09	
N-Nitroso-di-n-propylamine	<5.3	ug/L	W	Jun-09	
Hexachloroethane	<5.3	ug/L	W	Jun-09	
Nitrobenzene	<5.3	ug/L	W	Jun-09	
Isophorone	<5.3	ug/L	W	Jun-09	
2-Nitrophenol	<5.3	ug/L	W	Jun-09	
2,4-Dimethylphenol	<5.3	ug/L	W	Jun-09	
bis(2-Chloroethoxy)methane	<5.3	ug/L	W	Jun-09	
2,4-Dichlorophenol	<5.3	ug/L	W	Jun-09	
1,2,4-Trichlorobenzene	<5.3	ug/L	W	Jun-09	
Naphthalene	<5.3	ug/L	W	Jun-09	
4-Chloroaniline	<5.3	ug/L	W	Jun-09	
Hexachlorobutadiene	<5.3	ug/L	W	Jun-09	
4-Chloro-3-methylphenol	<5.3	ug/L	W	Jun-09	
2-Methylnaphthalene	<5.3	ug/L	W	Jun-09	
Hexachlorocyclopentadiene	<5.3	ug/L	W	Jun-09	
2,4,6-Trichlorophenol	<5.3	ug/L	W	Jun-09	
2,4,5-Trichlorophenol	<27.	ug/L	W	Jun-09	
2-Chloronaphthalene	<5.3	ug/L	W	Jun-09	
2-Nitroaniline	<21.	ug/L	W	Jun-09	
Dimethyl phthalate	<5.3	ug/L	W	Jun-09	
Acenaphthylene	<5.3	ug/L	W	Jun-09	
2,6-Dinitrotoluene	<5.3	ug/L	W	Jun-09	
3-Nitroaniline	<21.	ug/L	W	Jun-09	
Acenaphthene	<5.3	ug/L	W	Jun-09	
2,4-Dinitrophenol	<21.	ug/L	W	Jun-09	
4-Nitrophenol	<21.	ug/L	W	Jun-09	
Dibenzofuran	<5.3	ug/L	W	Jun-09	
2,4-Dinitrotoluene	<5.3	ug/L	W	Jun-09	
Diethyl phthalate	<5.3	ug/L	W	Jun-09	
Fluorene	<5.3	ug/L	W	Jun-09	
4-Chlorophenyl phenyl ether	<5.3	ug/L	W	Jun-09	
4-Nitroaniline	<21.	ug/L	W	Jun-09	
4,6-Dinitro-2-methylphenol	<21.	ug/L	W	Jun-09	
N-Nitrosodiphenylamine	<5.3	ug/L	W	Jun-09	
4-Bromophenyl phenyl ether	<5.3	ug/L	W	Jun-09	

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Job No: 6009.4.517 Pkg: 22 Sample: Z1609 Desc: CUS8-2 14'-19' Number of parameters: 70
 QC Batch: 060396W2 Extracted: 06/03/96 Instrument: HP5972 GC/MS#6 Sample size: .94 L

Parameter	Result	Units	Wt	Date	Notes
Hexachlorobenzene	<5.3	ug/L	W	Jun-09	
Pentachlorophenol	<21.	ug/L	W	Jun-09	
Phenanthrene	<5.3	ug/L	W	Jun-09	
Anthracene	<5.3	ug/L	W	Jun-09	
Carbazole	<11.	ug/L	W	Jun-09	
Di-n-butyl phthalate	10.	ug/L	W	Jun-09	
Fluoranthene	<5.3	ug/L	W	Jun-09	
Pyrene	<5.3	ug/L	W	Jun-09	
Butyl benzyl phthalate	<5.3	ug/L	W	Jun-09	
3,3'-Dichlorobenzidine	<11.	ug/L	W	Jun-09	
Benzo[a]anthracene	<5.3	ug/L	W	Jun-09	
Chrysene	<5.3	ug/L	W	Jun-09	
bis(2-Ethylhexyl)phthalate	<5.3	ug/L	W	Jun-09	
Di-n-octyl phthalate	<5.3	ug/L	W	Jun-09	
Benzo[b]fluoranthene	<5.3	ug/L	W	Jun-09	
Benzo[k]fluoranthene	<5.3	ug/L	W	Jun-09	
Benzo[a]pyrene	<5.3	ug/L	W	Jun-09	
Indeno[1,2,3-cd]pyrene	<5.3	ug/L	W	Jun-09	
Dibenz[a,h]anthracene	<5.3	ug/L	W	Jun-09	
Benzo[g,h,i]perylene	<5.3	ug/L	W	Jun-09	
2-Fluorophenol (surrogate)	110.	%	W	Jun-09	
Phenol-d5 (surrogate)	108.	%	W	Jun-09	
2,4,6-Tribromophenol (surrogate)	90.	%	W	Jun-09	
Nitrobenzene-d5 (surrogate)	101.	%	W	Jun-09	
2-Fluorobiphenyl (surrogate)	98.	%	W	Jun-09	
Terphenyl-d14 (surrogate)	131.	%	W	Jun-09	

Package Notes:

Sample Notes:

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034

Tentatively Identified Compound (LSC) summary

Operator ID: RJP Date Acquired: 9 Jun 96 13:26
 Data File: C:\HPCHEM\1\DATA\S2265.D
 Name: Z1609
 Misc:
 Method: S607FULL
 Title: BNA 8270/625 Calibration
 Library Searched: NBS75K.L

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TIC Top Hit name	RT	EstConc Units	Area	IntStd	ISRT	ISArea	ISConc
Ethyl Acetate	6.21	14.7 ug/mL	1001850	ISTD01	9.83	1359505	20.0
(3H)-Benzothiazolon	16.72	11.6 ug/mL	1226328	ISTD04	17.80	2115216	20.0
Butanoic acid, 3-hyd	21.66	4.0 ug/mL	353556	ISTD05	22.51	1762515	20.0
9-Octadecenamide, (Z	23.95	3.0 ug/mL	267734	ISTD05	22.51	1762515	20.0

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Job No: 6009.4.517 Pkg: 22 Sample: Z1610 Desc: Equipment Blank Number of parameters: 70
 QC Batch: 060396W2 Extracted: 06/03/96 Instrument: HP5972 GC/MS#6 Sample size: .97 L

Parameter	Result	Units	Wt	Date	Notes
bis(2-Chloroethyl)ether	<5.2	ug/L	W	Jun-09	
Phenol	<5.2	ug/L	W	Jun-09	
2-Chlorophenol	<5.2	ug/L	W	Jun-09	
1,3-Dichlorobenzene	<5.2	ug/L	W	Jun-09	
1,4-Dichlorobenzene	<5.2	ug/L	W	Jun-09	
1,2-Dichlorobenzene	<5.2	ug/L	W	Jun-09	
2-Methylphenol	<5.2	ug/L	W	Jun-09	
bis(2-Chloroisopropyl)ether	<5.2	ug/L	W	Jun-09	
4-Methylphenol	<5.2	ug/L	W	Jun-09	
N-Nitroso-di-n-propylamine	<5.2	ug/L	W	Jun-09	
Hexachloroethane	<5.2	ug/L	W	Jun-09	
Nitrobenzene	<5.2	ug/L	W	Jun-09	
Isophorone	<5.2	ug/L	W	Jun-09	
2-Nitrophenol	<5.2	ug/L	W	Jun-09	
2,4-Dimethylphenol	<5.2	ug/L	W	Jun-09	
bis(2-Chloroethoxy)methane	<5.2	ug/L	W	Jun-09	
2,4-Dichlorophenol	<5.2	ug/L	W	Jun-09	
1,2,4-Trichlorobenzene	<5.2	ug/L	W	Jun-09	
Naphthalene	<5.2	ug/L	W	Jun-09	
4-Chloroaniline	<5.2	ug/L	W	Jun-09	
Hexachlorobutadiene	<5.2	ug/L	W	Jun-09	
4-Chloro-3-methylphenol	<5.2	ug/L	W	Jun-09	
2-Methylnaphthalene	<5.2	ug/L	W	Jun-09	
Hexachlorocyclopentadiene	<5.2	ug/L	W	Jun-09	
2,4,6-Trichlorophenol	<5.2	ug/L	W	Jun-09	
2,4,5-Trichlorophenol	<26.	ug/L	W	Jun-09	
2-Chloronaphthalene	<5.2	ug/L	W	Jun-09	
2-Nitroaniline	<21.	ug/L	W	Jun-09	
Dimethyl phthalate	<5.2	ug/L	W	Jun-09	
Acenaphthylene	<5.2	ug/L	W	Jun-09	
2,6-Dinitrotoluene	<5.2	ug/L	W	Jun-09	
3-Nitroaniline	<21.	ug/L	W	Jun-09	
Acenaphthene	<5.2	ug/L	W	Jun-09	
2,4-Dinitrophenol	<21.	ug/L	W	Jun-09	
4-Nitrophenol	<21.	ug/L	W	Jun-09	
Dibenzofuran	<5.2	ug/L	W	Jun-09	
2,4-Dinitrotoluene	<5.2	ug/L	W	Jun-09	
Diethyl phthalate	<5.2	ug/L	W	Jun-09	
Fluorene	<5.2	ug/L	W	Jun-09	
4-Chlorophenyl phenyl ether	<5.2	ug/L	W	Jun-09	
4-Nitroaniline	<21.	ug/L	W	Jun-09	
4,6-Dinitro-2-methylphenol	<21.	ug/L	W	Jun-09	
N-Nitrosodiphenylamine	<5.2	ug/L	W	Jun-09	
4-Bromophenyl phenyl ether	<5.2	ug/L	W	Jun-09	

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Job No: 6009.4.517 Pkg: 22 Sample: Z1610 Desc: Equipment Blank Number of parameters: 70
 QC Batch: 060396W2 Extracted: 06/03/96 Instrument: HP5972 GC/MS#6 Sample size: .97 L

Parameter	Result	Units	Wt	Date	Notes
Hexachlorobenzene	<5.2	ug/L	W	Jun-09	
Pentachlorophenol	<21.	ug/L	W	Jun-09	
Phenanthrene	<5.2	ug/L	W	Jun-09	
Anthracene	<5.2	ug/L	W	Jun-09	
Carbazole	<10.	ug/L	W	Jun-09	
Di-n-butyl phthalate	9.8	ug/L	W	Jun-09	
Fluoranthene	<5.2	ug/L	W	Jun-09	
Pyrene	<5.2	ug/L	W	Jun-09	
Butyl benzyl phthalate	<5.2	ug/L	W	Jun-09	
3,3'-Dichlorobenzidine	<10.	ug/L	W	Jun-09	
Benzo(a)anthracene	<5.2	ug/L	W	Jun-09	
Chrysene	<5.2	ug/L	W	Jun-09	
bis(2-Ethylhexyl)phthalate	<5.2	ug/L	W	Jun-09	
Di-n-octyl phthalate	<5.2	ug/L	W	Jun-09	
Benzo(b)fluoranthene	<5.2	ug/L	W	Jun-09	
Benzo(k)fluoranthene	<5.2	ug/L	W	Jun-09	
Benzo(a)pyrene	<5.2	ug/L	W	Jun-09	
Indeno[1,2,3-cd]pyrene	<5.2	ug/L	W	Jun-09	
Dibenz(a,h)anthracene	<5.2	ug/L	W	Jun-09	
Benzo(g,h,i)perylene	<5.2	ug/L	W	Jun-09	
2-Fluorophenol (surrogate)	111.	%	W	Jun-09	
Phenol-d5 (surrogate)	108.	%	W	Jun-09	
2,4,6-Tribromophenol (surrogate)	88.	%	W	Jun-09	
Nitrobenzene-d5 (surrogate)	102.	%	W	Jun-09	
2-Fluorobiphenyl (surrogate)	96.	%	W	Jun-09	
Terphenyl-d14 (surrogate)	129.	%	W	Jun-09	

Package Notes:

Sample Notes:

Operator ID: RJP Date Acquired: 9 Jun 96 15:19
Data File: C:\HPCHEM\1\DATA\S2268.D
Name: Z1610
Disc:
Method: S607FULL
Title: BNA 8270/625 Calibration
Library Searched: NBS75K.L

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TIC Top Hit name	RT	EstConc	Units	Area	IntStd	ISRT	ISArea	ISConc
ethyl Acetate	6.20	13.0	ug/mL	887766	ISTD01	9.84	1370209	20.0

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ANALYTICAL RESULTS

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Sample: 21230 Package: 9995 Job Number: 6009.4.517 Sample Description: CUSB-1 25'-30'

Parameter	Result	Units	Wt	Matrix	Date Analy	Instr	QC Batch	Notes
Arsenic, filter	<.005	mg/L	W	Water	May-31	ICAP	053196W1	
Barium, filtere	.5	mg/L	W	Water	May-31	ICAP	053196W1	
Lead, filtered	<.003	mg/L	W	Water	May-31	ICAP	053196W1	

Package Notes:

Sample Notes:

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Parameter	Result	Units	Wt	Matrix	Date Analy	Instr	QC Batch	Notes
Arsenic, filter .008		mg/L	W	Water	May-31	ICAP	053196W1	
Barium, filtere .5		mg/L	W	Water	May-31	ICAP	053196W1	
Lead, filtered <.003		mg/L	W	Water	May-31	ICAP	053196W1	

Package Notes:

Sample Notes:

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ANALYTICAL RESULTS

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Parameter	Result	Units	Wt	Matrix	Date	Instr	QC Batch	Notes
Arsenic, filter	.008	mg/L	W	Water	May-31	ICAP	053196W1	
Barium, filtere	.5	mg/L	W	Water	May-31	ICAP	053196W1	
Lead, filtered	<.003	mg/L	W	Water	May-31	ICAP	053196W1	

Package Notes:

Sample Notes:

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ANALYTICAL RESULTS

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Sample: 21233 Package: 9995 Job Number: 6009.4.517 Sample Description: Equipment Blank

Parameter	Result	Units	Wt	Matrix	Date		QC Batch	Notes
					Analy	Instr		
Arsenic, filter	<.005	mg/L	W	Water	May-31	ICAP	053196W1	
Barium, filtere	<.1	mg/L	W	Water	May-31	ICAP	053196W1	
Lead, filtered	<.003	mg/L	W	Water	May-31	ICAP	053196W1	

Package Notes:

Sample Notes:

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ANALYTICAL RESULTS

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Sample: Z1609 Package: 22 Job Number: 6009.4.517 Sample Description: CUS8-2 14'-19'

Parameter	Result	Units	Wt	Matrix	Date Analy	Instr	QC Batch	Notes
Arsenic, filter	.009	mg/L	W	Water	Jun-03	ICAP	060396W1	
Barium, filter	.7	mg/L	W	Water	Jun-03	ICAP	060396W1	
Lead, filtered	<.003	mg/L	W	Water	Jun-03	ICAP	060396W1	

Package Notes:

Sample Notes:

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ANALYTICAL RESULTS

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Aug 07, 2009 17:05Sample: Z1610 Package: 22 Job Number: 6009.4.517 Sample Description: Equipment Blank

Parameter	Result	Units	Wt	Matrix	Date		QC Batch	Notes
					Analy	Instr		
Arsenic, filter	<.005	mg/L	W	Water	Jun-03	ICAP	060396W1	
Barium, filtere	<.1	mg/L	W	Water	Jun-03	ICAP	060396W1	
Lead, filtered	<.003	mg/L	W	Water	Jun-03	ICAP	060396W1	

Package Notes:

Sample Notes:

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APPENDIX C
Data Validation Memorandum - June 3, 1996

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To: SL Cormier *for JFS*
 From: JF Smith *Kas*
 Re: Windiate Park Verticle Profile data validation
 File: 6009.007.484
 Date: July 3, 1996

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cc: SW Kaczmar
 SJ Spiegel

The following is a summary of the data validation efforts for samples collected in conjunction with the Vertical Profile Ground Water Investigation at Windiate Park in Flint, Michigan. Three ground water samples were collected on May 29 and 30, 1996 and sent to O'Brien & Gere Laboratories, Inc., Syracuse, NY (O'Brien & Gere Labs) for volatile organic compound (VOC) analyses, semivolatile organic compound (SVOC) analyses, and metals analyses (for arsenic, barium, and lead) by the analytical methods presented in Table 1, below. Table 1 summarizes the field and laboratory identifications, date of collection, laboratory package identification, and analytical method.

Field ID	Laboratory ID	Date collected	Package ID	Method	Reference
CUSB-1 (25 - 30 ft)	Z1230	5/29/96	9995	8260, 8270, 6010	1
CUSB-1 (17 - 22 ft)	Z1231				
Field Dup (17 - 22 ft)	Z1232				
Equipment blank	Z1233				
Trip blank	Z1234				
CUSB-2 (14 - 19 ft)	Z1609	5/30/96	22	8260, 8270, 6010	1
Equipment blank	Z1610				
Trip blank	Z1611				

1 - USEPA. 1995. *Test Methods for Evaluating Solid Waste Physical/Chemical Methods (SW-846)*, 3rd Edition. Washington D.C. 1986, as updated through January 1995.

Data validation is a process of determining the suitability of a measurement system for providing useful analytical data. Although the term is frequently used in discussing methodologies, it applies to all aspects of the analytical system and especially to samples, their measurements, and the actual data output. Accordingly, this report outlines deviations from the applicable quality control (QC) criteria outlines in the analytical methods referenced in Table 1 and the following documents:

- USEPA. 1994. *USEPA Contract Laboratory Program (CLP) National Functional Guidelines for Organic Data Review*, USEPA-540/R-94-012. Washington D.C.
- USEPA. 1994. *USEPA CLP National Functional Guidelines for Inorganic Data Review*, USEPA-540/R-94-013. Washington D.C.

Data validation qualifiers

The following qualifiers were assigned to the sample results during the data validation process based on deviations from QC criteria. Laboratory QC samples are not qualified. Qualifiers are listed in descending order of impact.

When qualifying the data, the validator followed this hierarchy of qualifiers in cases where more than one deviation resulted in the application of more than one qualifier to the sample result. The qualifier with the greatest impact (according to the hierarchy) was applied to the data.

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- R The sample result or sample-specific reporting limit (RL) is unusable due to serious deficiencies in the data generation process. The data have been determined to be unusable for qualitative and quantitative purposes. The original data point has been removed and replaced with an R on the data result forms.
- J The analyte was positively identified. The numerical value is approximate based on deviations from QC criteria. This qualifier is also applied when the analyte concentration is greater than the method detection limit (MDL) but less than the RL.
- UJ The analyte was not detected above the MDL. The sample-specific RL is presented (adjusted for dilution as appropriate) as approximate based on deviations from calibration, surrogate, LCS, and MS/MSD criteria.
- U The analyte was not detected above the MDL. The RL is presented and adjusted for dilution, as appropriate.

Data quality evaluation

This section summarizes the QA/QC parameters that met validation criteria and describes qualifiers assigned to the sample data when QA/QC parameters did not meet criteria. Samples that required qualification are identified in the following sections by the sample identification documented on the chains-of-custody. QA/QC deviations which did not result in qualification of sample data are not discussed in this section. Laboratory QC samples were not qualified, but were used to validate environmental samples.

VOC analyses

The following QA/QC parameters met validation criteria or did not result in qualification of data: holding times and sample preservation, GC/MS instrument performance check, continuing calibration, surrogates, matrix spike/matrix spike duplicate (MS/MSD), laboratory control sample (LCS), field duplicates, internal standards, target compound identification, and reported detection limits.

Initial calibration

The average relative response factor (R.F.) did not meet the method criteria of greater than 0.050 for the initial calibration on May 29, 1996 for acetone and 2-butanone. Therefore, the results for acetone in samples CUSB-1 (17 - 22 ft), CUSB-1 (25 - 30 ft), and CUSB-2 (14 - 19 ft) were qualified as approximate. The results for 2-butanone as not detected were determined to be unusable in these three samples.

Blanks

Both equipment blanks collected for this investigation were observed to contain levels of acetone. The equipment blank collected on May 29, 1996 contained acetone at 1.3 µg/L, with a corresponding action level of 13 µg/L; therefore, the acetone results in samples CUSB-1 (17 - 22 ft) and CUSB-1 (25 - 30 ft) were flagged with a "U". The equipment blank collected on May 30, 1996 contained acetone at 4.4 µg/L, with a corresponding action level of 44 µg/L; therefore, the acetone result in sample CUSB-2 (14 - 19 ft) was flagged with a "U".

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July 3, 1996
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SVOC analyses

The following QA/QC parameters met validation criteria or did not result in qualification of data: holding times and sample preservation, GC/MS instrument performance check, initial calibration, surrogates, MS/MSD, field duplicates, internal standards, target compound identification, and reported detection limits.

Continuing calibration

The percent difference (%D) did not meet the method criteria of less than 25% for the continuing calibration on June 3, 1996 for 3,3'-dichlorobenzidine (34.9%), indeno(1,2,3-cd)pyrene (36.8%), dibenzo(a,h)anthracene (34.9%), and benzo(g,h,i)perylene (65.5%). Therefore, the results for these four analytes as not detected were qualified as approximate in samples CUSB-1 (25 - 30ft) and CUSB-1 (17 - 22 ft).

Blanks

The equipment blank collected on May 30, 1996 contained 9.8 µg/L of di-n-butyl phthalate, with a corresponding action level of 49 µg/L; therefore, the result for this analyte in sample CUSB-2 (14 - 19 ft) was flagged with a "U".

LCS analyses

The percent recovery for 3,3'-dichlorobenzidine was outside the laboratory control limits of 35-117% with a percent recovery of 30%. Therefore, the nondetected result for sample CUSB-2 (14 - 19 ft) was determined to be unusable.

Metals analyses

The following QA/QC parameters met validation criteria or did not result in qualification of data: holding times and sample preservation, initial and continuing calibration, blank analysis, ICP interference check samples, LCS, laboratory duplicate, MS, field duplicate, serial dilution, and reported detection limits. The metals data for this investigation were not affected by deviations from QA/QC parameters.

Data usability

Data quality objectives (DQOs) are quantitative and qualitative statement specifying the quality of the environmental data required to support the decision making process. DQOs define the total uncertainty that is acceptable in the data.

The following section summarizes the adherence of the data to the precision, accuracy, representativeness, comparability, and completeness (PARCC) parameters to the following typical standards:

Precision was evaluated through the analysis of laboratory duplicate samples. Data usability with respect to precision was calculated separately for each method. Percent usability with respect to precision is the number of sample analytes that were unaffected by deviations from laboratory duplicate criteria divided by the total number of sample analytes.

MS/MSD, LCS, surrogate recoveries, and calibration criteria indicate the accuracy of the data. Data usability with respect to accuracy was calculated separately for each method. Percent usability with respect to accuracy is the number of sample analytes that were unaffected by deviations from matrix spike, LCS, surrogate recovery, and calibration criteria divided by the total number of sample analytes.

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July 3, 1996
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Holding times, sample preservation, and blank sample results are indicators of the representativeness of the analytical data. Data usability with respect to representativeness was calculated separately for each method. Percent usability with respect to representativeness is the number of sample analytes that were unaffected by deviations from holding times, sample preservations, and blank contamination criteria divided by the total number of sample analytes.

Comparability is maintained provided that the analytical methods remained the same over time. A major component of comparability is the use of standard reference materials for calibration and QC. These standards are compared to other unknowns to verify their concentrations. Since standard analytical methods and reporting procedures and USEPA standard and QC materials were consistently used by O'Brien & Gere Labs, the comparability criteria for the analytical data were met. Since comparability is a qualitative measure, usability calculations were not performed.

Data completeness is the percentage of sample restyles that have been determined to be usable during the data validation process. Data usability with respect to completeness was calculated separately for each method.

The PARCC parameter evaluation was based on the USEPA's guidance related to the effect of deviations from QC measurements on the analytical data.¹ The following table summarizes the overall usability with respect to PARCC parameters for each analytical method. Percent usability values were high, generally greater than 97%. In general, overall percent usabilities are considered high if over 90%.

Method	PARCC parameter	Parameter usability	Type of deviation
VOCs	accuracy	97%	calibration: 2-butanone
SVOCs	accuracy	99%	LCS: 3,3'-dichlorobenzidine
Metals	all	100%	none

Data qualified as unusable for either qualitative or quantitative purposes resulted when a major deficiency occurred in the data generation process. A major deficiency is a QC deviation that results in uncertainty of the identity as well as the reported concentration of the analyte. Minor deficiencies in the data generation process resulted in approximation of an analyte concentration. Approximation of data indicates uncertainty in the reported concentration of the analyte but not its assigned identity.

¹ USEPA. 1992. *Guidance for Data Usability in Risk Assessment (Part A)*; 9585.7-09A. Washington D.C. Confidential under FOIA

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The use of approximated analytical data for quantitative uses is consistent with USEPA guidance². The specific QA/QC deviations that resulted in qualification of sample data were presented in the previous section of this memo.

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² USEPA. 1989. *USEPA Risk Assessment Guidance for Superfund, Volume I, Human Health Evaluation Manual (Part A)*, 540/1-89/002. Washington D.C.

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APPENDIX D

Legal Descriptions - Parcels A, B and C

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DESCRIPTION NO. 1

Land described as Lots 151, 152, 153, 154, 155, 156, and 157 of Block 152, Dixieland Subdivision, being a part of the Northeast 1/4 of Section 30 and the Northwest 1/4 of Section 29, Town 7 North, Range 7 East, City of Flint, Genessee County, Michigan, also that portion of Lot 150 and 158 of said Block and Subdivision, including Right of Way for Shelly Lane lying easterly of a line described as: BEGINNING at the South corner of Lot 158 said corner being 54.13 from the southwest corner of Lot 158 measured along the south line of said lot, thence North 15°53'17" West 306.7 feet more or less to the North corner of Lot 150, said corner being 39.53 feet from the northwest corner of Lot 150 measured along the North line of said lot for a POINT OF ENDING.
EXCEPT that portion of Lot 151 lying westerly of said line.

DESCRIPTION NO. 2

Land described as Lots 143, 144, 145, 146 of Block 152 of Dixieland Subdivision, being a part of the Northeast 1/4 of Section 30 and the Northwest 1/4 of Section 29, Town 7 North, Range 7 East, City of Flint, Genessee County, Michigan.

DESCRIPTION NO. 3

Land described as Parcel 1, Parcel 2 and Parcel 3 being a part of Lot 182 of Block 152, of Dixieland Subdivision being a part of the Northeast 1/4 of Section 30 and the Northwest 1/4 of Section 29, Town 7 North, Range 7 East, City of Flint, Genessee County, Michigan.

Descriptions prepared by:
BARTOW & KING ENGINEERS, INC.
Dated: May 24, 1996

Information taken from drawing provided by: O'Brien & Gere Engineers Inc. and prepared by: Richard H. Kraft Engineering, Inc., Dated: Feb. 2, 1996 Job No. 27459

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RESIDUAL DESCRIPTION "A"

Land described as Lots 147, 148 and 150 of Block 152, Dixieland Subdivision being a part of the Northeast 1/4 of Section 30 and the Northwest 1/4 of Section 29, Town 7 North, Range 7 East, City of Flint, Genessee County, Michigan, EXCEPT that portion of Lot 150 of said Block and Subdivision lying easterly of a line described as: BEGINNING at the South corner of Lot 158 said corner being 54.13 from the southwest corner of Lot 158 measured along the south line of said lot, thence North 15°53'17" West 306.7 feet more or less to the North corner of Lot 150, said corner being 39.53 feet from the northwest corner of Lot 150 measured along the North line of said lot for a POINT OF ENDING.

RESIDUAL DESCRIPTION "B"

Land described as Lots 149 and 151 of Block 152, Dixieland Subdivision, being a part of the Northeast 1/4 of Section 30 and the Northwest 1/4 of Section 29, Town 7 North, Range 7 East, City of Flint, Genessee County, Michigan, EXCEPT that portion of Lot 151 of said Block and Subdivision lying easterly of a line described as: BEGINNING at the South corner of Lot 158 said corner being 54.13 from the southwest corner of Lot 158 measured along the south line of said lot, thence North 15°53'17" West 306.7 feet more or less to the North corner of Lot 150, said corner being 39.53 feet from the northwest corner of Lot 150 measured along the North line of said lot for a POINT OF ENDING.

RESIDUAL DESCRIPTION "C"

Land described as Lots 158 of Block 277, Dixieland Subdivision, being a part of the Northeast 1/4 of Section 30 and the Northwest 1/4 of Section 29, Town 7 North, Range 7 East, City of Flint, Genessee County, Michigan, EXCEPT that portion of Lot 158 of said Block and Subdivision lying easterly of a line described as: BEGINNING at the South corner of Lot 158 said corner being 54.13 from the southwest corner of Lot 158 measured along the south line of said lot, thence North 15°53'17" West 306.7 feet more or less to the North corner of Lot 150, said corner being 39.53 feet from the northwest corner of Lot 150 measured along the North line of said lot for a POINT OF ENDING.

Descriptions prepared by:
BARTOW & KING ENGINEERS
Dated: May 24, 1996

Information taken from drawing provided by: O'Brien & Gere Engineers, Inc. and prepared by: Richard H. Kraft Engineering, Inc., Dated: Feb. 2, 1996 Job No. 27459

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DESCRIPTION NO. 3

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DESCRIPTION NO. 1

277

MILTON DRIVE

DESCRIPTION NO. 2

PENGELLY DRIVE

SHELLY LANE

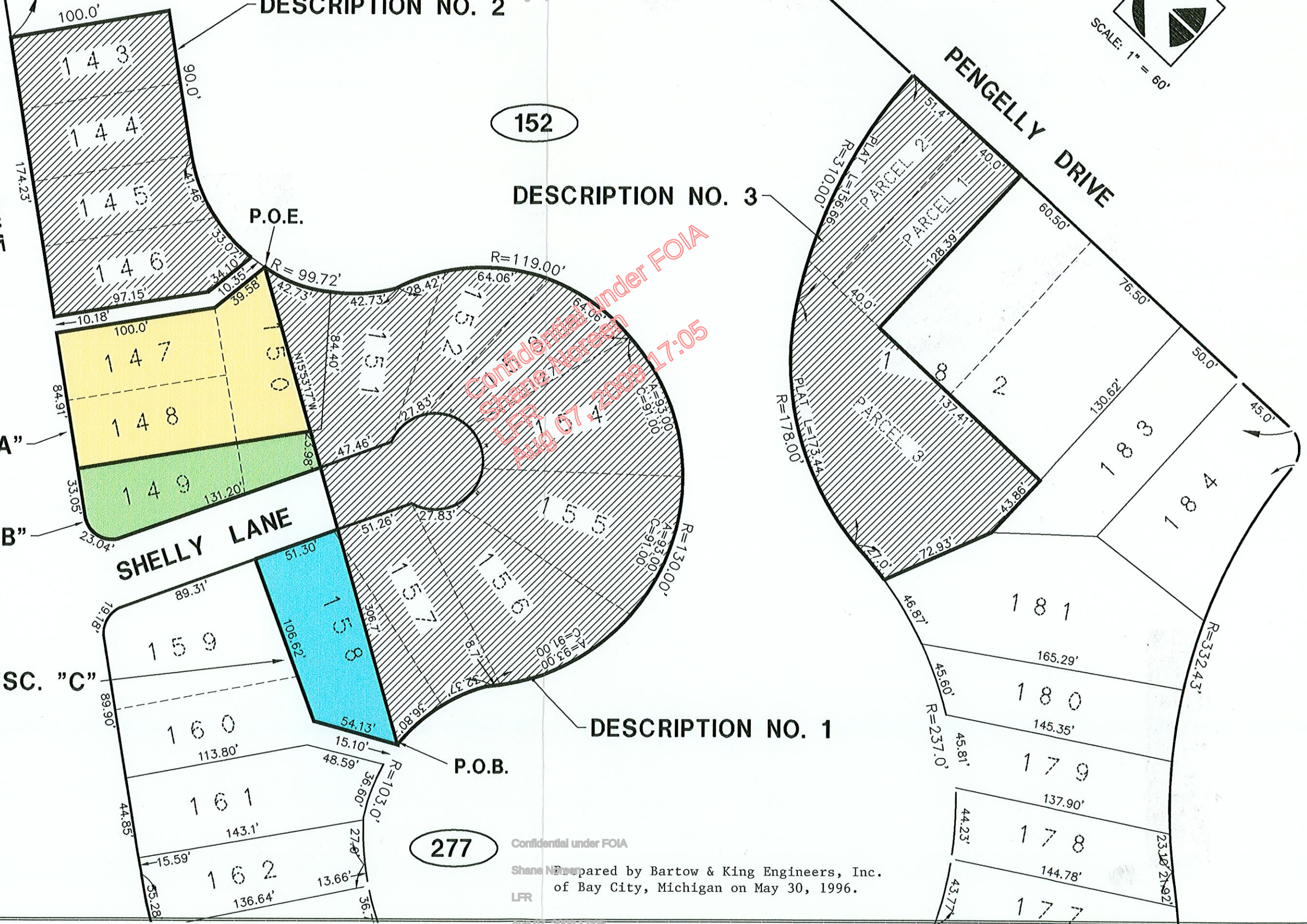
P.O.E.

P.O.B.

RESIDUAL DESC. "A"

RESIDUAL DESC. "B"

RESIDUAL DESC. "C"



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APPENDIX E

Laboratory Report Forms - Surface Soil Data for Parcel C

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CROSS REFERENCE TABLE

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Site	Sample Number	Date Collected	Date Received	Package
SS-01P (0-6")	Z0145	05/15/96	05/16/96	9869
SS-02P (0-6")	Z0146	05/15/96	05/16/96	9869
SS-03P (0-6")	Z0147	05/15/96	05/16/96	9869
SS-04P (0-6")	Z0148	05/15/96	05/16/96	9869
SS-05P (0-6")	Z0149	05/15/96	05/16/96	9869
SS-06P (12-18")	Z0150	05/15/96	05/16/96	9869
SS-07P (0-6")	Z0151	05/15/96	05/16/96	9869
SS-08P (0-6")	Z0152	05/15/96	05/16/96	9869
SS-09P (0-6")	Z0153	05/15/96	05/16/96	9869
SS-10P (0-6")	Z0154	05/15/96	05/16/96	9869
SS-11P (0-6")	Z0155	05/15/96	05/16/96	9869
SS-11P (0-6")	Z0155MS	05/15/96	05/16/96	9869
SS-11P (0-6")	Z0155D	05/15/96	05/16/96	9869
SS-12P (0-6")	Z0156	05/15/96	05/16/96	9869
Field Dup	Z0157	05/15/96	05/16/96	9869
Equipment Blank	Z0158	05/15/96	05/16/96	9869

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Analytical Results Trace Metals

Client: General Motors Corporation
Project: Windiate Park - Flint, MI
Proj. Description: Pengelly Parcels Surface Soil Investigation

Job No: 6009.004.517
Certification No.: 10155*

Sample: Z0145
Samp. Description: SS-01P (0-6")

Collected: 05/15/96
Received: 05/16/96

Matrix: Solid
% Solids: 87.4

Parameter	Result	Units	Method	Prepared	Analyzed	QC Batch	Note
Lead	100.	mg/Kg Dry Weight	6010A	05/21/96	05/22/96	052196S1	

Note:

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Date: June 5, 1996

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Analytical Results Trace Metals

Client: General Motors Corporation
Project: Windiate Park - Flint, MI
Proj. Description: Pengelly Parcels Surface Soil Investigation

Job No: 6009.004.517
Certification No.: 10155*

Sample: Z0146
Samp. Description: SS-02P (0-6")

Collected: 05/15/96
Received: 05/16/96

Matrix: Solid
% Solids: 78.5

Parameter	Result	Units	Method	Prepared	Analyzed	QC Batch	Note
Lead	210.	mg/Kg Dry Weight	6010A	05/21/96	05/22/96	052196S1	

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Client: General Motors Corporation
Project: Windiate Park - Flint, MI
Proj. Description: Pengelly Parcels Surface Soil Investigation

Job No: 6009.004.517
Certification No.: 10155*

Sample: Z0147
Samp. Description: SS-03P (0-6")

Collected: 05/15/96
Received: 05/16/96

Matrix: Solid
% Solids: 87.7

Parameter	Result	Units	Method	Prepared	Analyzed	QC Batch	Note
Lead	120.	mg/Kg Dry Weight	6010A	05/21/96	05/22/96	052196S1	

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Analytical Results Trace Metals

Client: General Motors Corporation
Project: Windiate Park - Flint, MI
Proj. Description: Pengelly Parcels Surface Soil Investigation

Job No: 6009.004.517
Certification No.: 10155*

Sample: Z0148
Samp. Description: SS-04P (0-6")

Collected: 05/15/96
Received: 05/16/96

Matrix: Solid
% Solids: 83.2

Parameter	Result	Units	Method	Prepared	Analyzed	QC Batch	Note
Lead	210.	mg/Kg Dry Weight	6010A	05/21/96	05/22/96	052196S1	

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Client: General Motors Corporation
Project: Windiate Park - Flint, MI
Proj. Description: Pengelly Parcels Surface Soil Investigation

Job No: 6009.004.517
Certification No.: 10155*

Sample: Z0149
Samp. Description: SS-05P (0-6")

Collected: 05/15/96
Received: 05/16/96

Matrix: Solid
% Solids: 85.3

Parameter	Result	Units	Method	Prepared	Analyzed	QC Batch	Note
Lead	220.	mg/Kg Dry Weight	6010A	05/21/96	05/22/96	052196S1	

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Client: General Motors Corporation
Project: Windiate Park - Flint, MI
Proj. Description: Pengelly Parcels Surface Soil Investigation

Job No: 6009.004.517
Certification No.: 10155*

Sample: Z0150
Samp. Description: SS-06P (12-18")

Collected: 05/15/96

Received: 05/16/96

Matrix: Solid

% Solids: 81.9

Parameter	Result	Units	Method	Prepared	Analyzed	QC Batch	Note
Lead	270.	mg/Kg Dry Weight	6010A	05/21/96	05/22/96	052196S1	

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Client: General Motors Corporation
Project: Windiate Park - Flint, MI
Proj. Description: Pengelly Parcels Surface Soil Investigation

Job No: 6009.004.517
Certification No.: 10155*

Sample: Z0151
Samp. Description: SS-07P (0-6")

Collected: 05/15/96
Received: 05/16/96

Matrix: Solid
% Solids: 86.4

Parameter	Result	Units	Method	Prepared	Analyzed	QC Batch	Note
Lead	230.	mg/Kg Dry Weight	6010A	05/21/96	05/22/96	052196S1	

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Client: General Motors Corporation
Project: Windiate Park - Flint, MI
Proj. Description: Pengelly Parcels Surface Soil Investigation

Job No: 6009.004.517
Certification No.: 10155*

Sample: Z0152
Samp. Description: SS-08P (0-6")

Collected: 05/15/96
Received: 05/16/96

Matrix: Solid
% Solids: 86.4

Parameter	Result	Units	Method	Prepared	Analyzed	QC Batch	Note
Lead	250.	mg/Kg Dry Weight	6010A	05/21/96	05/22/96	052196S1	

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Client: General Motors Corporation
Project: Windiate Park - Flint, MI
Proj. Description: Pengelly Parcels Surface Soil Investigation

Job No: 6009.004.517
Certification No.: 10155*

Sample: Z0153
Samp. Description: SS-09P (0-6")

Collected: 05/15/96
Received: 05/16/96

Matrix: Solid
% Solids: 82.5

Parameter	Result	Units	Method	Prepared	Analyzed	QC Batch	Note
Lead	280.	mg/Kg Dry Weight	6010A	05/21/96	05/22/96	052196S1	

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Client: General Motors Corporation
Project: Windiate Park - Flint, MI
Proj. Description: Pengelly Parcels Surface Soil Investigation

Job No: 6009.004.517
Certification No.: 10155*

Sample: Z0154
Samp. Description: SS-10P (0-6")

Collected: 05/15/96
Received: 05/16/96

Matrix: Solid
% Solids: 85.3

Parameter	Result	Units	Method	Prepared	Analyzed	QC Batch	Note
Lead	210.	mg/Kg Dry Weight	6010A	05/21/96	05/22/96	052196S1	

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Analytical Results Trace Metals

Client: General Motors Corporation
Project: Windiate Park - Flint, MI
Proj. Description: Pengelly Parcels Surface Soil Investigation

Job No: 6009.004.517
Certification No.: 10155*

Sample: Z0155
Samp. Description: SS-11P (0-6")

Collected: 05/15/96
Received: 05/16/96

Matrix: Solid
% Solids: 86.5

Parameter	Result	Units	Method	Prepared	Analyzed	QC Batch	Note
Lead	170.	mg/Kg Dry Weight	6010A	05/21/96	05/22/96	052196S1	

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Analytical Results Trace Metals

Client: General Motors Corporation
Project: Windiate Park - Flint, MI
Proj. Description: Pengelly Parcels Surface Soil Investigation

Job No: 6009.004.517
Certification No.: 10155*

Sample: Z0156
Samp. Description: SS-12P (0-6")

Collected: 05/15/96
Received: 05/16/96

Matrix: Solid
% Solids: 82.6

Parameter	Result	Units	Method	Prepared	Analyzed	QC Batch	Note
Lead	240.	mg/Kg Dry Weight	6010A	05/21/96	05/22/96	052196S1	

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Analytical Results Trace Metals

Client: General Motors Corporation
Project: Windiate Park - Flint, MI
Proj. Description: Pengelly Parcels Surface Soil Investigation

Job No: 6009.004.517
Certification No.: 10155*

Sample: Z0157
Samp. Description: Field Dup

Collected: 05/15/96
Received: 05/16/96

Matrix: Solid
% Solids: 86.9

Parameter	Result	Units	Method	Prepared	Analyzed	QC Batch	Note
Lead	150.	mg/Kg Dry Weight	6010A	05/21/96	05/22/96	052196S1	

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Date: June 5, 1996
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Analytical Results Trace Metals

Client: General Motors Corporation
Project: Windiate Park - Flint, MI
Proj. Description: Pengelly Parcels Surface Soil Investigation

Job No: 6009.004.517
Certification No.: 10155*

Sample: Z0158
Samp. Description: Equipment Blank

Collected: 05/15/96
Received: 05/16/96

Matrix: Water
% Solids:

Parameter	Result	Units	Method	Prepared	Analyzed	QC Batch	Note
Lead	<0.003	mg/L	6010A	05/20/96	05/21/96	052096W1	

Note:

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LFR
Aug 07, 2009 17:05

J - Estimated value

Authorized: Monika Santucci

Date: June 5, 1996

Monika Santucci

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5000 Brittonfield Parkway / P.O. Box 4942 / Syracuse, NY 13221 / (315) 437-0200 FAX (315) 463-7554

LFR

Aug 07, 2009 17:05



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LABORATORIES, INC.

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Aug 07, 2009 17:05

Analytical Results Wet Chemistry

Client: General Motors Corporation
Project: Windiate Park - Flint, MI
Proj. Description: Pengelly Parcels Surface Soil Investigation

Job No: 6009.004.517
Certification No.: 10155*

Sample: Z0145
Samp. Description: SS-01P (0-6")

Collected: 05/15/96
Received: 05/16/96 09:15

Matrix: Solid

Parameter	Result	Units	Method	Prepared	Analyzed	QC Batch	Note
% Total Solids	87.4	%	2540-G		05/21/96	052196S1	

Note:

Sample: Z0146
Samp. Description: SS-02P (0-6")

Collected: 05/15/96
Received: 05/16/96 09:15

Matrix: Solid

Parameter	Result	Units	Method	Prepared	Analyzed	QC Batch	Note
% Total Solids	78.5	%	2540-G		05/21/96	052196S1	

Note:

Sample: Z0147
Samp. Description: SS-03P (0-6")

Collected: 05/15/96
Received: 05/16/96 09:15

Matrix: Solid

Parameter	Result	Units	Method	Prepared	Analyzed	QC Batch	Note
% Total Solids	87.7	%	2540-G		05/21/96	052196S1	

Note:

Sample: Z0148
Samp. Description: SS-04P (0-6")

Collected: 05/15/96
Received: 05/16/96 09:15

Matrix: Solid

Parameter	Result	Units	Method	Prepared	Analyzed	QC Batch	Note
% Total Solids	83.2	%	2540-G		05/21/96	052196S1	

Note:

J - Estimated value

Authorized: Monika Santucci
Date: June 5, 1996

Monika Santucci

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Analytical Results
Wet Chemistry

Client: General Motors Corporation
Project: Windiate Park - Flint, MI
Proj. Description: Pengelly Parcels Surface Soil Investigation

Job No: 6009.004.517
Certification No.: 10155*

Sample: Z0149
Samp. Description: SS-05P (0-6")

Collected: 05/15/96
Received: 05/16/96 09:15

Matrix: Solid

Parameter	Result	Units	Method	Prepared	Analyzed	QC Batch	Note
% Total Solids	85.3	%	2540-G		05/21/96	052196S1	

Note:

Sample: Z0150
Samp. Description: SS-06P (12-18")

Collected: 05/15/96
Received: 05/16/96 09:15

Matrix: Solid

Parameter	Result	Units	Method	Prepared	Analyzed	QC Batch	Note
% Total Solids	81.9	%	2540-G		05/21/96	052196S1	

Note:

Sample: Z0151
Samp. Description: SS-07P (0-6")

Collected: 05/15/96
Received: 05/16/96 09:15

Matrix: Solid

Parameter	Result	Units	Method	Prepared	Analyzed	QC Batch	Note
% Total Solids	86.4	%	2540-G		05/21/96	052196S1	

Note:

Sample: Z0152
Samp. Description: SS-08P (0-6")

Collected: 05/15/96
Received: 05/16/96 09:15

Matrix: Solid

Parameter	Result	Units	Method	Prepared	Analyzed	QC Batch	Note
% Total Solids	86.4	%	2540-G		05/21/96	052196S1	

Note:

J - Estimated value

Authorized: Monika Santucci
Date: June 5, 1996

Monika Santucci

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Analytical Results
Wet Chemistry

Client: General Motors Corporation
Project: Windiate Park - Flint, MI
Proj. Description: Pengelly Parcels Surface Soil Investigation

Job No: 6009.004.517
Certification No.: 10155*

Sample: Z0153
Samp. Description: SS-09P (0-6")

Collected: 05/15/96
Received: 05/16/96 09:15

Matrix: Solid

Parameter	Result	Units	Method	Prepared	Analyzed	QC Batch	Note
% Total Solids	82.5	%	2540-G		05/21/96	052196S1	

Note:

Sample: Z0154
Samp. Description: SS-10P (0-6")

Collected: 05/15/96
Received: 05/16/96 09:15

Matrix: Solid

Parameter	Result	Units	Method	Prepared	Analyzed	QC Batch	Note
% Total Solids	85.3	%	2540-G		05/21/96	052196S1	

Note:

Sample: Z0155
Samp. Description: SS-11P (0-6")

Collected: 05/15/96
Received: 05/16/96 09:15

Matrix: Solid

Parameter	Result	Units	Method	Prepared	Analyzed	QC Batch	Note
% Total Solids	86.5	%	2540-G		05/21/96	052196S1	

Note:

Sample: Z0156
Samp. Description: SS-12P (0-6")

Collected: 05/15/96
Received: 05/16/96 09:15

Matrix: Solid

Parameter	Result	Units	Method	Prepared	Analyzed	QC Batch	Note
% Total Solids	82.6	%	2540-G		05/21/96	052196S1	

Note:

J - Estimated value

Authorized: Monika Santucci
Date: June 5, 1996

Monika Santucci

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Analytical Results Wet Chemistry

Client: General Motors Corporation
Project: Windiate Park - Flint, MI
Proj. Description: Pengelly Parcels Surface Soil Investigation

Job No: 6009.004.517
Certification No.: 10155*

Sample: Z0157
Samp. Description: Field Dup

Collected: 05/15/96
Received: 05/16/96 09:15

Matrix: Solid

Parameter	Result	Units	Method	Prepared	Analyzed	QC Batch	Note
% Total Solids	86.9	%	2540-G		05/21/96	052196S1	

Note:

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Authorized: Monika Santucci
Date: June 5, 1996
Monika Santucci

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APPENDIX F

Data Validation Memorandum - June 18, 1996

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LPR

Aug 07, 2009 17:05

Shane Noreen

JUN 20 1996

O'BRIEN & GERE ENGINEERS, INC.

MEMORANDUM

LFR

Aug 07, 2009 17:05

To: SL Cormier
 From: JF Smith *SJ Spiegel for*
 Re: Windiate Park Parcels: Lead data validation
 File: 6009.007.482
 Date: June 18, 1996

cc: SW Kaczmar
 SJ Spiegel
 KA Storne

The following is a summary of the data validation efforts for samples collected in conjunction with the Park Parcel Surface Soil Investigation at Windiate Park in Flint, Michigan. Thirteen surface soil samples were collected on May 15, 1996 and sent to O'Brien & Gere Laboratories, Inc. (O'Brien & Gere Labs) for lead analysis by United States Environmental Protection Agency (USEPA) SW-846¹ method 6010. Table 1, as follows, summarized the field and laboratory identifications, date of collection, laboratory package identification, and analytical method.

Table 1. Sample cross reference list

Field ID	Laboratory ID	Date collected	Package ID	Method	Reference
SS-01P (0 - 6 inches)	Z0145	5/15/96	9869	6010	1
SS-02P (0 - 6 inches)	Z0146				
SS-03P (0 - 6 inches)	Z0147				
SS-04P (0 - 6 inches)	Z0148				
SS-05P (0 - 6 inches)	Z0149				
SS-06P (12 - 18 inches)	Z0150				
SS-07P (0 - 6 inches)	Z0151				
SS-08P (0 - 6 inches)	Z0152				
SS-09P (0 - 6 inches)	Z0153				
SS-10P (0 - 6 inches)	Z0154				
SS-11P (0 - 6 inches)	Z0155				
SS-12P (0 - 6 inches)	Z0156				
Duplicate	Z0157				

1 USEPA. 1995. *Test Methods for Evaluating Solid Waste Physical/Chemical Methods (SW-846)*, 3rd Edition. Washington D.C. 1986, as updated through January 1995.

Data validation is a process of determining the suitability of a measurement system for providing useful analytical data. Although the term is frequently used in discussing methodologies, it applies to all aspects of the analytical system and especially to samples, their measurements, and the actual data output. Accordingly, this report outlines deviations from the applicable quality control (QC) criteria outlined in the analytical method referenced in Table 1 and the following document:

- ▶ USEPA. 1994. *USEPA Contract Laboratory Program (CLP) National Functional Guidelines for Inorganic Data Review*, USEPA-540/R-94-013. Washington D.C.

Data validation qualifiers

The following qualifiers would have been assigned to sample results during the data validation process if deviations from QC criteria had been detected during the data validation process. Laboratory QC samples are not qualified. Qualifiers are listed in descending order of impact.

1 USEPA. 1995. *Test Methods for Evaluating Solid Waste Physical/Chemical Methods (SW-846)*, 3rd Edition. Washington D.C. 1986, as updated through January 1995.

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SL Cormier

Aug 07, 2009 17:05

Page 2

When qualifying data, the validator followed this hierarchy of qualifiers in cases where more than one deviation resulted in the application of more than one qualifier to a sample result. The qualifier with the greatest impact (according to the hierarchy) was applied to the data.

- R The sample result or sample-specific reporting limit (RL) is unusable due to serious deficiencies in the data generation process. The data have been determined to be unusable for qualitative and quantitative purposes. The original data point has been removed and replaced with an R on the data result forms.
- J The analyte was positively identified. The numerical value is approximate based on deviations from QC criteria. This qualifier is also applied when the analyte concentration is greater than the method detection limit (MDL) but less than the RL.
- UJ The analyte was not detected above the MDL. The sample-specific RL is presented (adjusted for dilution and percent solid content, as appropriate) as approximate based on deviations from calibration, surrogate, LCS, and MS/MSD criteria.
- U The analyte was not detected above the MDL. The RL is presented and adjusted for dilution and percent solid content, as appropriate.

Data quality evaluation

This section summarizes the QA/QC parameters that met validation criteria and describes qualifiers assigned to the sample data when QA/QC parameters did not meet criteria. Samples that required qualification are identified in the following sections by the sample identification documented on the chains-of-custody. QA/QC deviations which did not result in qualification of sample data are not discussed in this section. Laboratory QC samples were not qualified, but were used to validate environmental samples.

Inorganic analyses

The following QA/QC parameters met validation criteria or did not result in the qualification of data: holding times and sample preservation, initial and continuing calibration, blank analysis, ICP interference check samples, laboratory control sample (LCS), laboratory duplicate, matrix spike (MS), field duplicate, serial dilution, and reported detection limits. The data for this investigation were not affected by deviations from QA/QC parameters.

Data usability

Data quality objectives (DQOs) are quantitative and qualitative statements specifying the quality of the environmental data required to support the decision making process. DQOs define the total uncertainty that is acceptable in the data.

The following section summarized the adherence of the data to the precision, accuracy, representativeness, comparability, and completeness (PARCC) parameters to the following typical standards:

Precision was evaluated through the analysis of laboratory duplicate samples. Data usability with respect to precision was calculated separately for each method. Percent usability with respect to precision is the

SL Cormier
Page 3

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number of sample analytes that were unaffected by deviations from laboratory duplicate criteria divided by the total number of sample analytes.

MS/MSD, LCS, surrogate recoveries, and calibration criteria indicate the accuracy of the data. Data usability with respect to accuracy was calculated separately for each method. Percent usability with respect to accuracy is the number of sample analytes that were unaffected by deviations from matrix spike, LCS, surrogate recovery, and calibration criteria divided by the total number of sample analytes.

Holding times, sample preservation, and blank sample results are indicators of the representativeness of the analytical data. Data usability with respect to representativeness was calculated separately for each method. Percent usability with respect to representativeness is the number of sample analytes that were unaffected by deviations from holding times, sample preservation, and blank contamination criteria divided by the total number of sample analytes.

Comparability is maintained provided that the analytical methods remained the same over time. A major component of comparability is the use of standard reference materials for calibration and QC. These standards are compared to other unknowns to verify their concentrations. Since standard analytical methods and reporting procedures and USEPA standard and QC materials were consistently used by O'Brien & Gere Labs, the comparability criteria for the analytical data were met. Since comparability is a qualitative measure, usability calculations were not performed.

Data completeness is the percentage of sample results that have been determined to be usable during the data validation process. Data usability with respect to completeness was calculated separately for each method.

The PARCC parameter evaluation was based on USEPA's guidance related to the effect of deviations from QC measurements on the analytical data². Since none of the analytical data were qualified for this investigation, the percent usability value was high, at 100%. In general, overall percent usabilities are considered high if over 90%.

Data qualified as unusable for either qualitative or quantitative purposes may result when a major deficiency occurs in the data generation process. A major deficiency is a QC deviation that results in uncertainty of the identity as well as the reported concentration of the analyte. Minor deficiencies in the data generation process may result in approximation of an analyte concentration. Approximation of data indicates uncertainty in the reported concentration of the analyte but not its assigned identity.

The use of approximated analytical data for quantitative uses is consistent with USEPA guidance³. Since there were no major or minor deviations from QA/QC criteria, the data were not qualified.

² USEPA. 1992. *Guidance for Data Usability in Risk Assessment (Part A)*; 9585.7-09A. Washington D.C.

³ USEPA. 1989. *USEPA Risk Assessment Guidance for Superfund, Volume 1, Human Health Evaluation Manual (Part A)*, 540/1-89/002. Washington D.C.

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APPENDIX G

Laboratory Report Forms - Soil Cover Data

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Aug 07, 2009 17:05

Shane Noreen

LFR
Thermo Analytical, Inc.
387 Airport Industrial Drive
Ypsilanti, MI 48198-7812

Young's Environmental Cleanup
G-5305 N. Dort Highway
Flint, MI 48505

Attn: Stephanie Herriman

Purchase Order: 5127
Invoice Number: 88062

Order #: E5-10-073
Date: 10/20/95 09:27
Work ID: Windiate-City of Flint
Date Received: 10/12/95
Date Completed: 10/18/95

Client Code: YOUNGS_F

SAMPLE IDENTIFICATION

Sample Number	Sample Description
02	Sand - Aldridge

SR=See attached report ND=Nondetected, detection limit in ().
< = Analyte was not detected at or above specified detection limit in (). N/A=Not applicable. *=Average of duplicate runs.
** = Higher detection limit due to matrix effects.

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Aug 07, 2009 17:05
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Certified By
Jeffrey B. Radin

TMA
Thermo Analytical

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Aug 07, 2009 17:05

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Order # E5-10-073
10/20/95 09:27Thermo Analytical, Inc.
TEST RESULTS BY SAMPLE

Page 2

Aug 07, 2009 17:05

Sample: 02A Sand

Collected: 10/11/95

Test Description	Result	Limit	Units	Analyzed	By
Ignitability in Solid	>120		C	10/13/95	CP
Percent Solids	96*		%	10/13/95	JE
Reactivity in Solid	No		yes/no	10/13/95	JB
TCLP Extraction	10/13/95		date complete		AH
pH in Solid	8.6*		soil pH in H2O	10/12/95	YL

Sample: 02B Sand

Collected: 10/11/95

TCLPEXTRACT

Test Description	Result	Limit	Units	Analyzed	By
Arsenic in Water	<0.002	0.002	mg/L	10/16/95	SL
Barium in Water	0.28	0.0005	mg/L	10/16/95	SL
Cadmium in Water	0.0021	0.0005	mg/L	10/16/95	SL
Chromium in Water	0.001	0.001	mg/L	10/16/95	SL
Copper in Water	<0.001	0.001	mg/L	10/16/95	SL
Lead in Water	0.003	0.001	mg/L	10/16/95	SL
Mercury in Water	<0.0002*	0.0002	mg/L	10/13/95	AH
Prep for ICAP - Water	10/13/95		date complete		LD
Selenium in Water	<0.002	0.002	mg/L	10/16/95	SL
Silver in Water	<0.001	0.001	mg/L	10/16/95	SL
Zinc in Water	0.049	0.001	mg/L	10/16/95	SL

Sample: 02C Sand

Collected: 10/11/95

TCLPEXTRACT

Test Description	Result	Limit	Units	Analyzed	By
Endrin	<0.30	0.30	ug/L	10/16/95	DB
Lindane in Water	<0.30	0.30	ug/L	10/16/95	DB
Methoxychlor	<3.0	3.0	ug/L	10/16/95	DB
Toxaphene	<20	20	ug/L	10/16/95	DB

Sample: 02D Sand

Collected: 10/11/95

Test Description	Result	Limit	Units	Analyzed	By
Arsenic in Solid	2.8	0.200	mg/Kg	10/18/95	SL
Barium in Solid	7.0	0.050	mg/Kg	10/18/95	SL
Cadmium in Solid	0.84	0.050	mg/Kg	10/18/95	SL
Chromium in Solid	4.3	0.100	mg/Kg	10/18/95	SL
Copper in Solid	4.7	0.100	mg/Kg	10/18/95	SL
Lead in Solid	3.5	0.100	mg/Kg	10/18/95	SL
Mercury in Solid	<0.021*	0.021	mg/Kg	10/18/95	AH
Prep for ICAP-Solid	10/18/95		date complete		LD
Selenium in Solid	<0.200	0.200	mg/Kg	10/18/95	SL
Silver in Solid	3.6	0.100	mg/Kg	10/18/95	SL
Zinc in Solid	17	0.100	mg/Kg	10/18/95	SL

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Order # E5-10-073
10/20/95 09:27

Thermo Analytical, Inc.
TEST RESULTS BY SAMPLE

Page 4

Aug 07, 2009 17:05

Sample Description: Sand
Test Description: TCLP Herbicide
Collected: 10/11/95 10:00

Lab No: 02C
Method:
Category: TCLPEXTRACT
Test Code: TCHERB

PARAMETER	RESULT
2,4-D	<8.0
2,4,5-TP	<8.0

Notes and Definitions for this Report:

EXTRACTED 10/13/95
DATE RUN 10/16/95
ANALYST SJ
UNITS ug/l

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LFR
Aug 07, 2009 17:05

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Order # E5-10-073
10/20/95 09:27

Shane Noreen
Thermo Analytical, Inc.
TEST METHODOLOGIES

Page 5

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Method 9040, SW-846 "Test Methods for Evaluating Solid Waste" Third Edition.
Method 7471, SW-846 "Test Methods for Evaluating Solid Waste", Third Edition.
Method 245.1, EPA-600 "Methods for Chemical Analysis of Water and Wastes".
Method 200.7, EPA-600 "Methods for Chemical Analysis of Water and Wastes".
Method 200.7, EPA-600 "Methods for Chemical Analysis of Water and Wastes".
Method 200.7, EPA-600 "Methods for Chemical Analysis of Water and Wastes".
Method 200.7, EPA-600/4-79-020 "Methods for Chemical Analysis of Water and Wastes", USEPA-EMSL Cincinnati; March 1983.
Method 200.7, EPA-600/4-79-020 "Methods for Chemical Analysis of Water and Wastes", USEPA-EMSL Cincinnati; March, 1983.
Method 200.7, EPA-600 "Methods for Chemical Analysis of Water and Wastes"
Method 6010, SW-846 " Test Methods for Evaluating Solid Waste" Third Edition
Method 200.7, EPA-600 "Methods for Chemical Analysis of Water and Wastes".
Method 6010, SW-846 " Test Methods for Evaluating Solid Waste" Third Edition
Method 6010, SW-846 " Test Methods for Evaluating Solid Waste" Third Edition
Method 6010, SW-846 "Test Methods for Evaluating Solid Waste".
Method 6010, SW-846 " Test Methods for Evaluating Solid Waste" Third Edition
Method 6010, SW-846 "Test Methods for Evaluating Solid Wastes", Third Edition.
Method 6010, SW-846 "Test Methods for Evaluating Solid Waste".
Method 6010, SW-846 " Test Methods for Evaluating Solid Waste" Third Edition

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Aug 07, 2009 17:05

Shane Noreen

Thermo Analytical, Inc.
 387 Airport Industrial Drive
 Ypsilanti, MI 48198-7812

Young's Environmental Cleanup
 G-5305 N. Dort Highway
 Flint, MI 48505

Attn: Stephanie Herriman
 Invoice Number:

Order #: E5-10-107
 Date: 10/24/95 13:27
 Work ID: Windiate-City of Flint
 Date Received: 10/19/95
 Date Completed: 10/24/95
 Client Code: YOUNGS_F

SAMPLE IDENTIFICATION

Sample Number	Sample Description
01	Sand

SR=See attached report ND=Nondetected, detection limit in ().
 < = Analyte was not detected at or above specified detection
 limit in (). N/A=Not applicable. *Average of duplicate runs.
 ** = Higher detection limit due to matrix effects.

Certified By
 Jeffrey B. Radin

TMA
 Thermo Analytical

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Shane Noreen

Order # E5-10-107
10/24/95 13:27

Thermo Analytical, Inc.
TEST RESULTS BY SAMPLE

Page 2

Aug 07, 2009 17:05

Sample: 01A Sand

Collected:

<u>Test Description</u>	<u>Result</u>	<u>Limit</u>	<u>Units</u>	<u>Analyzed</u>	<u>By</u>
TCLP Extraction	10/20/95		data complete	10/24/95	JR

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(313) 622-2104

Fax: (313) 662-2244

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Shane Noreen

Order # E5-10-107
10/24/95 13:27Thermo Analytical, Inc.
TEST RESULTS BY SAMPLE

Page 3

Aug 07, 2009 17:05

Sample Description: Sand
Test Description: TCLP VolatilesLab No: 01A
Method:

Test Code: TCVOAS

PARAMETER	RESULT
BENZENE	<5.0
CARBON TETRACHLORIDE	<5.0
CHLOROBENZENE	<5.0
CHLOROFORM	<5.0
1,2-DICHLOROETHANE	<5.0
1,1-DICHLOROETHYLENE	<5.0
METHYL ETHYL KETONE	<10
VINYL CHLORIDE	<10
TETRACHLOROETHYLENE	<5.0
TRICHLOROETHYLENE	<5.0

Notes and Definitions for this Report:

DATE RUN 10/23/95
ANALYST RP
UNITS mg/L**TMA**
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Aug 07, 2009 17:05

Sample 02 - Sand

YOUNG'S ENVIRONMENTAL

<u>PARAMETER</u>	<u>MEASURED CONCENTRATION</u>	<u>METHOD OF ANALYSIS</u>	<u>DETECTION LIMIT</u>
TCLP(SEMIVOLATILES)			
Total Cresols	<0.300 mg/L	8270	0.300 mg/L
2,4-Dinitrotoluene	<0.050 mg/L	8270	0.050 mg/L
Hexachlorobenzene	<0.050 mg/L	8270	0.050 mg/L
Hexachloro-1,3-butadiene	<0.100 mg/L	8270	0.100 mg/L
Hexachloroethane	<0.100 mg/L	8270	0.100 mg/L
Nitrobenzene	<0.100 mg/L	8270	0.100 mg/L
Pentachlorophenol	<1.000 mg/L	8270	1.000 mg/L
Pyridine	<1.000 mg/L	8270	1.000 mg/L
2,4,5-Trichlorophenol	<0.300 mg/L	8270	0.300 mg/L
2,4,6-Trichlorophenol	<0.300 mg/L	8270	0.300 mg/L

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Thermo Analytical, Inc.
 387 Airport Industrial Drive
 Ypsilanti, MI 48198-7812
 Ph: (313)480-2500 Fax:480-2295

File: 6009.010 #4
 CC: SLC
 JSR

Young's Environmental Cleanup
 G-5305 N. Dort Highway
 Flint, MI 48505

Attn: Stephanie Herriman

Purchase Order: 5127-15548
 Invoice Number:

Order #: E6-06-086
 Date: 07/11/96 13:13
 Work ID: GM-Windlate Park
 Date Received: 06/27/96
 Date Completed: 07/10/96

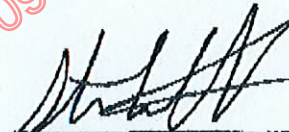
Client Code: YOUNGS_F

SAMPLE IDENTIFICATION

Sample Number	Sample Description	Sample Number	Sample Description
01	Top Soil (Bedrock Express)		

ABBREVIATION KEY

SR = See Attached Report
 ND = Nondetected at Reported Limit
 * = The Average of Duplicate Analysis


 Certified By
 Steven D. Lambright

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Order # E6-06-086
07/11/96 13:13Thermo Analytical, Inc.
TEST RESULTS BY SAMPLE
Aug 07, 2009 17:05

Page 2

Sample: 01A Top Soil (Bedrock Express) Collected: 06/26/96

Test Description	Result	Limit	Units	Analyzed	By
Corrosivity in Solid	No		yes/no	07/09/96	RP
Ignitability in Solid	>120	25	C	07/02/96	RP
Reactivity in Solid	no		yes/no	07/10/96	RP
TCLP Extraction	06/27/96		date complete		CP
Texture	Fine		Fine, Med, Coarse	07/02/96	RP
Volatiles TCLP Extraction	07/09/96		Date Complete	07/09/96	RP
pH in Solid	7.7		soil pH in H2O	07/03/96	JP

Sample: 01B Top Soil (Bedrock Express) Collected: 06/26/96

Test Description	Result	Limit	Units	Analyzed	By
Arsenic in Solid	4.6*	0.30	mg/Kg	06/30/96	LD
Barium in Solid	44*	0.020	mg/Kg	06/30/96	LD
Cadmium in Solid	0.96*	0.030	mg/Kg	06/30/96	LD
Chromium in Solid	11*	0.050	mg/Kg	06/30/96	LD
Copper in Solid	7.4*	0.080	mg/Kg	06/30/96	LD
Hg Prep	07/01/96		date complete		LD
Lead in Solid	6.5*	0.20	mg/Kg	06/30/96	LD
Mercury in Solid	<0.023*	0.023	mg/Kg	07/01/96	LD
Prep for ICAP-Solid	06/30/96		date complete		LD
Selenium in Solid	<0.003*	0.030	mg/Kg	06/30/96	LD
Silver in Solid	0.063*	0.050	mg/Kg	06/30/96	LD
Zinc in Solid	27*	0.90	mg/Kg	06/30/96	LD

Sample: 01D Top Soil (Bedrock Express) Collected: 06/26/96

EXTRACT

Test Description	Result	Limit	Units	Analyzed	By
Arsenic in Water	<0.003	0.003	mg/L	06/30/96	LD
Barium in Water	1.1	0.0002	mg/L	06/30/96	LD
Cadmium in Water	0.0007	0.0003	mg/L	06/30/96	LD
Chromium in Water	0.0008	0.0005	mg/L	06/30/96	LD
Hg Prep	07/01/96		date complete		LD
Lead in Water	0.021	0.002	mg/L	06/30/96	LD
Mercury in Water	<0.0002	0.0002	mg/L	07/01/96	LD
Prep for ICAP - Water	06/30/96		date complete		LD
Selenium in Water	0.006	0.002	mg/L	06/30/96	LD
Silver in Water	<0.0005	0.0005	mg/L	06/30/96	LD

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Order # E6-06-086
07/11/96 13:13Thermo Analytical, Inc.
TEST RESULTS BY SAMPLE

Page 3

Sample Description: Top Soil (Bedrock Exposure) Lab No: 01C
 Test Description: TCLP Volatiles Method:
 Collected: 06/26/96 13:00 Category: EXTRACT

Test Code: 8240T

PARAMETER	RESULT
Benzene	<0.010
Carbon Tetrachloride	<0.010
Chlorobenzene	<0.010
Chloroform	<0.010
1,2-Dichloroethane	<0.010
1,1-Dichloroethylene	<0.010
Methyl Ethyl Ketone	<0.010
Vinyl Chloride	<0.010
Tetrachloroethylene	<0.010
Trichloroethylene	<0.010
1,4-Dichlorobenzene	<0.010

Notes and Definitions for this Report:

DATE RUN 07/05/96
 ANALYST SL
 UNITS mg/L

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Order # E6-06-093
07/11/96 15:58Thermo Analytical, Inc.
TEST RESULTS BY SAMPLE
Aug 07, 2009 17:05

Page 3

Sample Description: Top Soil (Bedrock Express) Lab No: 01B
Test Description: TCLP Semi-Volatiles Method:
Collected: 06/26/96 Category: EXTRACT

Test Code: 8270UL

PARAMETER	RESULT
o-Cresol	<0.050
m-Cresol	<0.050
p-Cresol	<0.050
Cresol	<0.050
2,4-Dinitrotoluene	<0.020
Hexachlorobenzene	<0.020
Hexachlorobutadiene	<0.020
Hexachloroethane	<0.020
Nitrobenzene	<0.020
Pentachlorophenol	<0.050
Pyridine	<0.020
2,4,5-Trichlorophenol	<0.020
2,4,6-Trichlorophenol	<0.020
Dinitrol Cresol	<0.050

Notes and Definitions for this Report:

EXTRACTED 07/03/96
DATE RUN 07/06/96
ANALYST JAL
UNITS mg/L

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07/11/96 13:13LFR
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TEST RESULTS BY SAMPLE
Aug 07, 2009 17:05

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Sample Description: Top Soil (Bedrock Express) Lab No: 01E

Test Description: TCLP Pesticide

Method:

Test Code: TCPEST

Collected: 06/26/96 13:00

Category: EXTRACT

PARAMETER	RESULT
Endrin	<0.075
Lindane	<0.075
Methoxychlor	<0.075
Heptachlor	<0.075
Chlordane	<0.075
Toxaphene	<5.0
Heptachlor Epoxide	<0.075

Notes and Definitions for this Report:

EXTRACTED 06/28/96
DATE RUN 06/28/96
ANALYST CP
UNITS mg/L

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Order # E6-06-093
07/11/96 15:58Thermo Analytical, Inc.
TEST RESULTS BY SAMPLE

Page 2

Sample Description: Top Soil (Bedrock Express) Lab No: 01A
Test Description: TCLP Herbicide Method:
Collected: 06/26/96 Category: EXTRACT

Test Code: TCHRB

PARAMETER

RESULT

2,4-D

<0.020

2,4,5-TP

<0.0020

Notes and Definitions for this Report:

EXTRACTED 07/03/96

DATE RUN 07/05/96

ANALYST LL

UNITS mg/L

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Order # E6-06-086
07/11/96 13:13

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TEST METHODOLOGIES
Aug 07, 2009 17:05

Page 5

Ignitability, Setflash Closed Cup, USEPA Method 1020

pH, Electrometric, SW-846 Method 9045

TCLP Extraction, Method 1311

Mercury, Cold Vapor, USEPA Method - 7471

Mercury, Cold Vapor, USEPA Method 245.1

Silver, ICAP, USEPA Method 200.7

Arsenic in Water, Method 200.7

Barium, ICAP, USEPA Method 200.7

Cadmium, ICAP, USEPA Method 200.7

Chromium, ICAP, USEPA Method 200.7

Lead, ICAP, USEPA Method 200.7

Selenium, ICAP, USEPA Method 200.7

Silver, ICAP, SW-846 Method 6010

Arsenic, ICAP, USEPA Method 6010

Barium, ICAP, SW-846 Method 6010

Cadmium, ICAP, SW-846 Method 6010

Chromium, ICAP, SW-846 Method 6010

Copper, ICAP, SW-846 Method 6010

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