



**Site Investigation and
Remedial Alternative Report
(SI/RAR) for the
Former Hanna Furnace Site
Subparcel 3, 3B-00164-9
Buffalo, New York**

Prepared for:

City of Buffalo
Buffalo, New York

Prepared by:

URS Corporation
282 Delaware Avenue
Buffalo, New York 14202-1805

**March 2002
(Revised October 2002)
(Revised June 2003)**

ENGINEER CERTIFICATION

I certify that this Site Investigation/Remedial Alternatives Report (SI/RAR) was prepared by competent URS employees who work under my supervision. The document presents a reasonable assessment of geologic and environmental conditions in Parcel 3 of the Union Ship Canal property based on the data collected and evaluated by URS and recommends a reasonable remedial action for its intended future use.



6 201649

FAX TRANSMITTAL

URS

DATE: 11/10/03

640 Ellicott Street - 3rd Floor
Buffalo, NY 14203

TEL: (716) 856-5636 P FAX: (716) 856-2545

PAGE 1 OF: 5

TO: DAVE LOCEY

FROM: BOB HENSCHER

FIRM: NYSOEC

SUBJECT: UNION SHIP CANAL

FAX NO: 851-7226

CC: SUPPL COST INFO.

MEMO:

IN RESPONSE TO YOUR E-MAIL OF 10/10/03, WE HAVE REVIEWED
AND REVISED THE COST ESTIMATES FOR ALTERNATIVES 2 AND 4
FOR SUB PARCEL 3 REMEDIATION.

AS REQUESTED, FIND ENCLOSED THE BACKUP FOR THE ANNUAL
GROUNDWATER MONITORING COSTS ASSOCIATED WITH ALF 2.

ADDITIONALLY, WE HAVE REVISED THE COST ESTIMATE FOR EXCAVATION
AND DISPOSAL OF ALL CONTAMINATED SOILS ON SITE. AS YOU POINTED
OUT - THE ORIGINAL ESTIMATE IN THE SI/RAR REPORT WAS
INCORRECT. THE REVISED ESTIMATE WITH BACKUP IS ATTACHED.

SHOULD YOU HAVE ANY ADDITIONAL QUESTIONS OR REQUIRE MORE
INFORMATION, PLEASE CALL.

CC: D. SUMAN 854-0172

FILE 0535733.00 (C-1)

URSPage 1 of 4Job FORMER HANNA FURNACE SITEProject No. 11171876.00000Sheet of Description SUBPARCEL 3Computed by R. HENSCHELDate 10/30/03REMEDIAL ALTERNATIVES - COST EST.Checked by R. SWIATEKDate 10/31/03

Reference

ALTERNATIVE 2 - INSTITUTIONAL CONTROLS

- ESTIMATE COST OF MONITORING GROUNDWATER AT THE SITE FOR A 10 YEAR PERIOD.

ASSUMPTIONS

- UTILIZE 7 WELLS IN SUBPARCEL 3 (MW-301 TO 307) AND 2 EXISTING WELLS (MW-101 AND 103) FOR MONITORING
- ANALYZE GROUNDWATER SAMPLES FOR pH, VOCs, RCRA METALS AND CYANIDE
- SAMPLE QUARTERLY
- PREPARE 3 QUARTERLY AND 1 ANNUAL REPORT
- USE BATH QC, ASP w/ CATEGORY B DELIVERABLES

INITIAL COSTS / ANNUALLY

pH	-	9 SAMPLES @ \$5/SAMPLE X 4 QTRS	=	180.00
VOCs	-	" @ \$95/SAMPLE X 4 QTRS	=	3420.00
RCRA	-	" @ \$65/SAMPLE X 4 QTRS	=	2340.00
C ₁	-	" @ \$25/SAMPLE X 4 QTRS	=	900.00

6840.00

SAMPLE COLLECTION

ALLOW 2 MINN CREW 8 HRS TO PURGE/SAMPLE WELLS

SR. ENV TECH	-	8 HRS @ \$50/HR X 4 QTRS	=	1600.00
ENV TECH	-	8 HRS @ \$35/HR X 4 QTRS	=	1120.00

2720.00

URSPage 2 of 4Job FORMER HYDRA FURNACE SITEProject No. 11171876.00000Sheet of Description SUBPARCEL 3Computed by R. HENSCHERDate 10/30/03REMEDIAL ALTERNATIVES - COST EST.Checked by R. SWIATEKDate 10/31/03

Reference

ALTERNATIVE 2 (CONT'D)REPORT PREPARATION (WITH LIMITED DNR)

QUARTERLY - P. MGR	4 HRS @	110.00 / HR	=	440.00
CHEMIST	12 HRS @	65.00 / HR	=	780.00
SR CHEMIST	2 HRS @	85.00 / HR	=	170.00
WQMO PROVEN	4 HRS @	35.00 / HR	=	140.00
GIS	8 HRS @	55.00 / HR	=	440.00
				<u>1970.00</u>

MISC EXPENSES

SAY 150.00
2,120.00 / QTR

FOR 3 QUARTERS = 6,360.00

ANNUAL RPT - ALLOW 50% INCREASE OVER
QUARTERLY COST. = 3,180.00

TOTAL ANNUAL RPT COST = 9,540.00

ANNUAL MONITORING COST (YEAR 1) 19,100.00

ALLOW 3% INFLATION COSTS.

<u>YEAR 2</u>	<u>19,673.00</u>
<u>YEAR 3</u>	<u>20,263.00</u>
<u>YEAR 4</u>	<u>20,871.00</u>
<u>YEAR 5</u>	<u>21,497.00</u>
<u>YEAR 6</u>	<u>22,142.00</u>
<u>YEAR 7</u>	<u>22,806.00</u>
<u>YEAR 8</u>	<u>23,491.00</u>
<u>YEAR 9</u>	<u>24,195.00</u>
<u>YEAR 10</u>	<u>24,921.00</u>

TOTAL 218,959.00

SAY 220,000

URSPage 3 of 4Job FORMER HANNA FURNACE SITEProject No. 11171876.00000Sheet of Description SUBPARCEL 3Computed by R. HENSCHKEDate 10/30/03REMEDIAL ALTERNATIVES - COST ESTChecked by R. SWIATEKDate 10/31/03

Reference

ALTERNATIVE 4 - REMOVAL AND DISPOSAL

- ESTIMATE COST OF EXCAVATING AND DISPOSING ALL SURFACE/SUBSURFACE SOILS EXHIBITING CONTAMINANT CONCENTRATIONS EXCEEDING THE SCGS.

ASSUMPTIONS

- SOUTH SIDE OF PARCEL IS OCCUPIED BY CONCRETE ORE PADS - NO EXCAVATION REQUIRED
- NORTH SIDE PARCEL WILL BE FULLY EXCAVATED. A "WEDGE" OF SOIL/FILL WILL BE EXCAVATED. THIS WEDGE IS 20' THICK ON WEST END, TAPERING TO 8' THICK @ EAST END
- THE EASTERN PORTION OF SITE WILL BE EXCAVATED TO AN AVERAGE DEPTH OF 6'
- SOILS ARE CONTAMINATED / NON-HAZARDOUS

NORTH SIDE EXC.

$$\text{VOLUME} = 200' \text{ WIDE} \times 1900' \text{ LONG} \times \left(\frac{20' + 8'}{2} \right) = 5,320,000 \text{ ft}^3$$

$$\div 27 \text{ ft}^3/\text{cy} = 197,037 \text{ cy}$$

$$@ 1.75 \text{ TONS/cy} = 344,815 \text{ TONS}$$

EAST AREA EXC.

$$\text{VOLUME} = 200' \text{ WIDE} \times 600' \text{ LONG} \times 6' \text{ DEEP} = 720,000 \text{ ft}^3$$

$$\div 27 \text{ ft}^3/\text{cy} = 26,667 \text{ cy}$$

$$@ 1.75 \text{ TONS/cy} = 46,667 \text{ TONS}$$

URSPage 4 of 4Job FORMER HANNA FILLAGE SITEProject No. 11171876.00000Sheet of Description SUBAREA 3Computed by R. HENSCHKEDate 10/30/03REMEDIAL MTS - COST EST.Checked by R. SWIATEKDate 10/31/03

Reference

ALTERNATIVE 4 (CONT'D)LOAD / TRANSPORT / DISPOSE COSTS

$$\text{LOAD TRUCKS } 3/\text{TON} \times (344,815 + 46,667 \text{ tons}) = 1,174,446$$

$$\text{TRANSPORT / DISPOSE } 40/\text{TON} \times (344,815 + 46,667 \text{ tons}) = 15,659,266$$

\$16,833,712

BACKFILL EXAMINATION

- USE "CLEAN" IMPORTED SOIL

$$\text{DELIVERED / PLACED } 11.50/\text{TON} \times (344,815 + 46,667 \text{ tons}) =$$

\$4,502,043

TOTAL COST

\$21,335,755

SITE INVESTIGATION AND REMEDIAL ALTERNATIVES REPORT (SI/RAR)

FOR THE

FORMER HANNA FURNACE SITE

SUBPARCEL 3, 3B-00164-9

BUFFALO, NEW YORK

RECEIVED

JUN 24 2003

NYSDEC - REG. 9
FOIL
REL UNREL

Prepared for:

**CITY OF BUFFALO
BUFFALO, NEW YORK**

Prepared by:

**URS CORPORATION
282 DELAWARE AVENUE
BUFFALO, NEW YORK 14202**

March 2002

(Revised October 2002)

(Revised June 2003)

UNION SHIP CANAL SUBPARCEL 3
SITE INVESTIGATION/REMEDIAL ALTERNATIVES REPORT

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1.0 INTRODUCTION

1.1 General

URS Corporation (URS) was retained by the City of Buffalo (City) to perform a Site Investigation (SI) and Remedial Alternatives Report (RAR) for Subparcel 3 of the former Hanna Furnace Site in Buffalo, New York (Figure 1-1). This SI/RAR was performed under the NYSDEC - 1996 Clean Water/Clean Air Bond Act Environmental Restoration Projects - Title 5.

The SI included installation and sampling of:

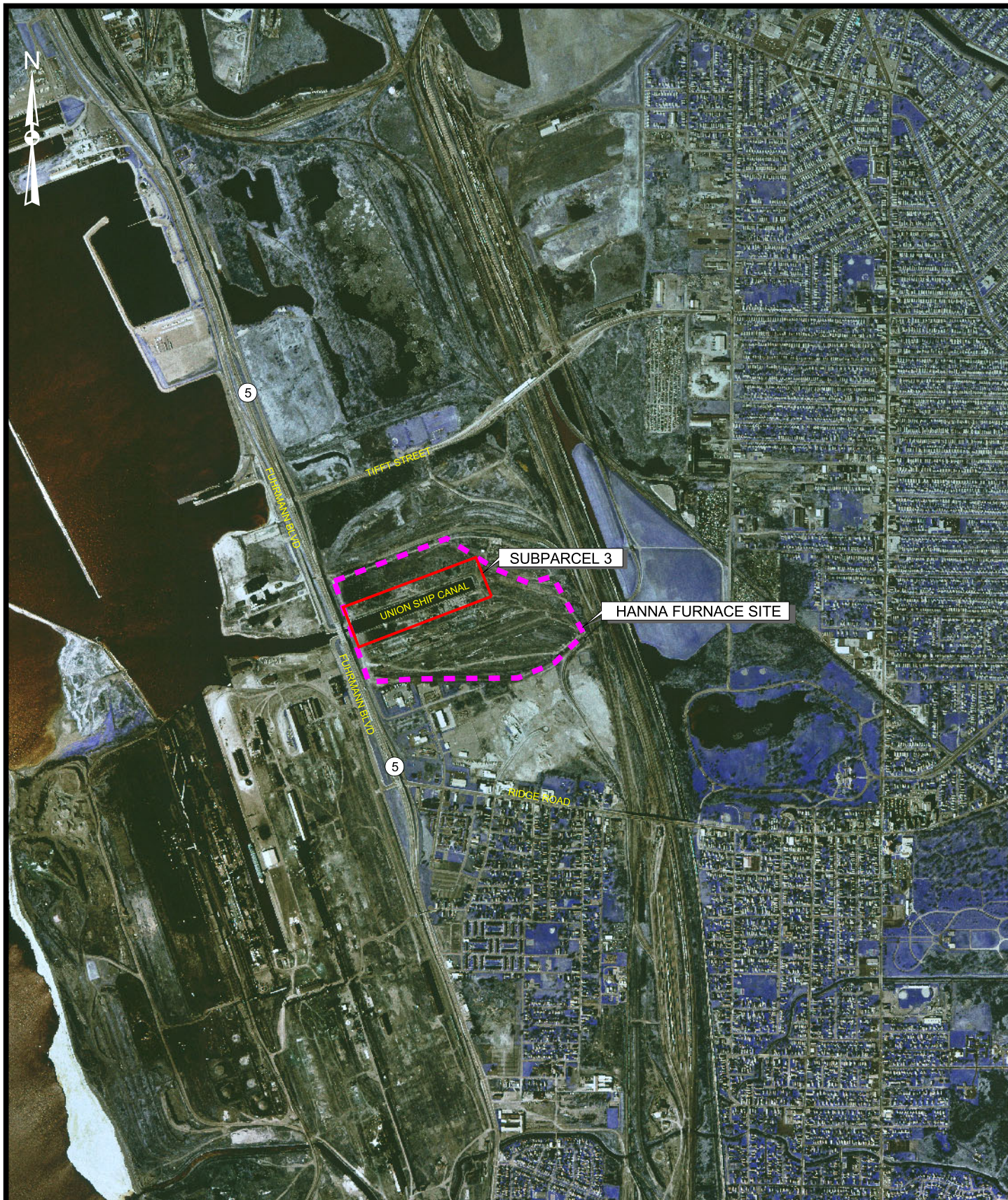
- test pits,
- soil borings, and
- groundwater monitoring wells, in the 200-foot buffer zone around the perimeter of the canal.

The US Army Corps of Engineers (USACE) also performed a structural analysis of the canal walls in conjunction with the SI. This included an underwater inspection of the canal walls; corings, borings and exploratory excavations; sediment sampling; and, geotechnical analyses. The intent of the work was to evaluate the stability of the canal walls relative to future redevelopment plans by the City and to determine the presence of any outfalls to the canal. The results of the inspection and sampling are contained in a report entitled, “ Structural Analysis – Union Ship Canal Buffalo, New York,” dated November 2002. A summary of their findings as related to Subparcel 3 has been included in this report.

1.2 Purpose of Report

The purpose of this SI/RAR is to:

- Present a summary of the SI activities and results;
- Identify remedial alternatives;
- Evaluate each remedial alternative for compliance with the selected criteria; and,



SOURCE: NYS Department of State, Division of
Coastal Resources, Digital Ortholmager
1994-1998

2000 0 2000 Feet



SITE INVESTIGATION/REMEDIAL ALTERNATIVE REPORT
SUBPARCEL 3 - FORMER HANNA FURNACE SITE
SITE LOCATION MAP

FIGURE 1-1

- Present the rationale for selection of the preferred alternative

1.3 Proposed Future Use

Following completion of the site investigation program, remedial activities, if any will be implemented. The property will then be utilized as publicly accessible greenspace. To that end, the City of Buffalo and the County of Erie have committed to keeping this property as public open space. Any attempt to change the intended use in the future would require legislative approval from both the City and County, and may require special alienation legislation from New York State. Deed restrictions limiting the reuse to greenspace purposes also will be added, as applicable. The concrete pad located on the south side of the Union Ship Canal is expected to remain in place.

2.0 BACKGROUND INFORMATION

2.1 Site Description and History

The former Hanna Furnace site is subdivided into 4 parcels (Figure 2-1). Subparcel 3, which is the subject of this report, includes the approximately 200-foot Buffer Area (about 20 acres) surrounding the 8.7 acre Union Ship Canal as shown in Figure 2-1. The site is situated in an industrial area. Properties surrounding the site include vacant properties to the east and south, railroad to the north, Route 5 and Bethlehem Steel Corporation to the west.

The site is relatively flat lying and is presently inactive. There are several piles of concrete/construction debris located along the northwest end of the Buffer Zone. Additionally, there are two piles of iron ore on the north side of the canal. One pile is near the west end and the other near the east end. The area south of the canal is occupied by a large concrete pad (Figure 2-1), estimated to be 3 feet thick. The pad, according to Sanborn maps, was used to store iron ore and limestone once it was off-loaded from lake freighters in the canal.

The Union Ship Canal was constructed in 1910 to provide iron and steel manufacturing operations access to Lake Erie and raw material transports (barges). The 25 acres of land north of the canal was first owned by The Pennsylvania Railroad who used the property for unloading ore from train cars. In 1960, the Hanna Furnace Corporation purchased the property which consisted mainly of swamps up to 15 feet in depth, with the railroad running around the perimeter of this parcel. The area was backfilled with silty sand, gravel, and some black cinders to present grade. This area also was used by Hanna Furnace for the unloading and storage of iron ore and limestone (aerial photographs, RCRA).

2.2 Regional Geology/Hydrogeology

The United States Department of Agriculture (USDA) Soil Conservation Service *Soil Survey of Erie County, New York*, (1972) describes the soil types in this area as Urban Land soil consisting of nearly level urbanized areas and areas of well drained to poorly drained soils, and disturbed soils, on lowland plains. Due to the history of this site it is likely that these soils are

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ON THIS DRAWING. IF AN ITEM IS ALTERED,
THE ALTERING ENGINEER SHALL AFFIX TO
THE ITEM HIS SEAL AND THE NOTATION
"ALTERED BY" FOLLOWED BY HIS SIGNATURE
AND THE DATE OF SUCH ALTERATION, AND
A SPECIFIC DESCRIPTION OF THE ALTERATION.

NO.	DATE	DESCRIPTION	NO.	DATE	DESCRIPTION

REVISIONS

DESIGNED BY:
DRAWN BY: KAH
CHECKED BY:
PROJ. ENGR. RH

URS Corporation
Group Consultants
282 Delaware Avenue, Buffalo, New York 14202
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JOB No. 35933.00

HANNA FURNACE

BUFFALO

NEW YORK

HANNA FURNACE/SHENANGO STEEL
MOLDS SITE PLAN

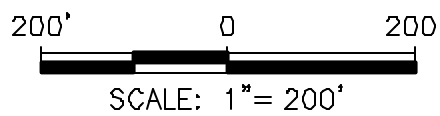
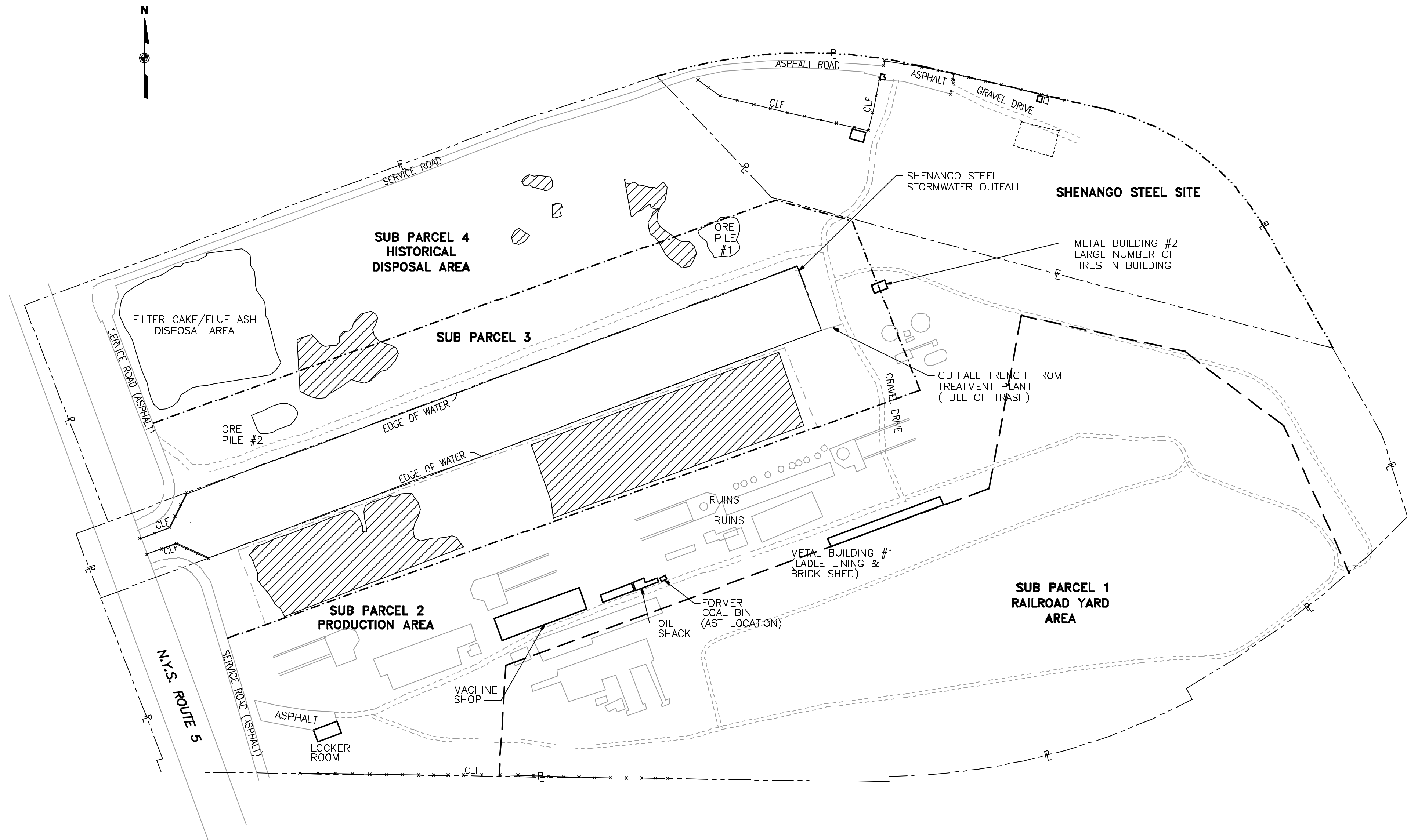
Scale: AS SHOWN

Date: MAR. 2002

FIGURE 2-1

LEGEND

- FORMER BUILDING LOCATION
- SURFACE WATER
- GRAVEL ROAD
- HANNA FURNACE SITE PROPERTY
- SHENANGO STEEL SITE PROPERTY
- SECTORS WITHIN HANNA FURNACE SITE



THIS DRAWING WAS PREPARED BY THE OFFICE OF THE ENGINEER IN CHARGE OF THE PROJECT AND IS NOT TO BE USED FOR ANY OTHER PURPOSE WITHOUT THE WRITTEN CONSENT OF THE ENGINEER IN CHARGE.

overlain by various types of fill and/or have been reworked to accommodate the industrial use of this property.

The Former Hanna Furnace site rests on a regional glacial till deposit. The till is typically comprised of unsorted clay, silt, fine sand, and fine to coarse gravel that exhibits low permeability. Underlying the till is the Marcellus and Skaneateles Shale formations (Geraghty & Miller, 1990). These rock formations are present throughout the southern half of the Erie-Niagara Basin and locally contain thin interbedded limestones. The overlying till ranges in thickness from 2 to 200 feet within the basin and is approximately 30 feet thick beneath the site. The till is overlain by a peat unit ranging in thickness from two to eight feet, and by various fill materials to the ground surface. The Shale formations typically produce small quantities of groundwater ranging from 10 to 15 gallons per minute. The overlying till is an insignificant source of groundwater. The groundwater table at the site is typically about 10 feet below ground surface.

2.3 Previous Investigations

Previous investigations at the former Hanna Furnace Site have been conducted but none of the investigations have resulted in corrective action to date. These investigations have included the Union ship Canal and Subparcel 3, as well as the other parcels surrounding Subparcel 3 (Figure 2-1). The various investigations are briefly summarized below.

In 1979, Rupley, Bahler, and Blake Consulting Engineers prepared a Solid Waste Management Facility Report. The report was an evaluation of the surface water quality in the Union Ship Canal and an on-site pond. Water samples collected from the canal contained phenols, cyanide, and iron at concentrations above NYSDEC Water Quality Guidelines.

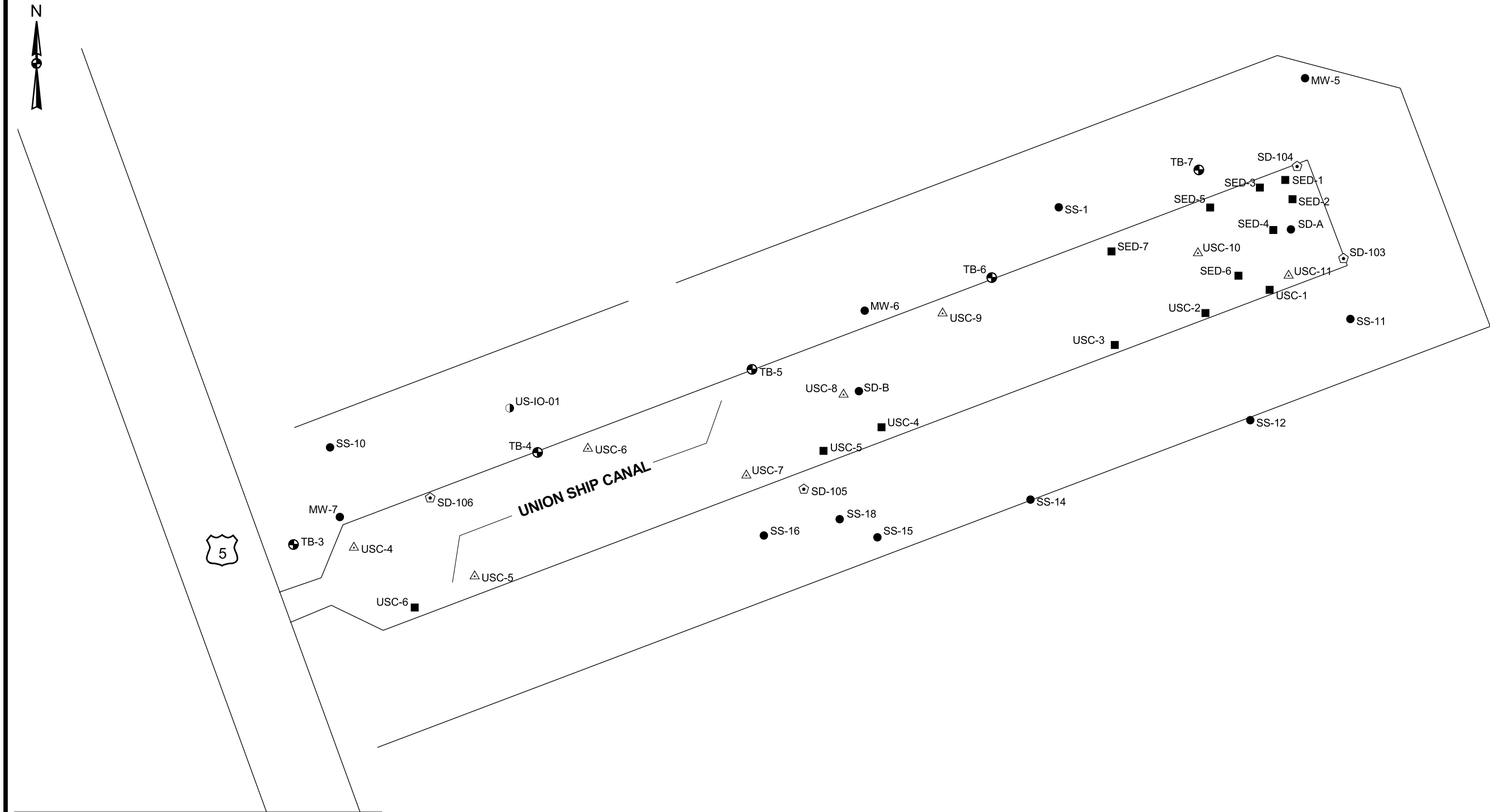
In April 1982, the Erie County Department of Environment and Planning (ECDEP) prepared a report entitled “Inactive Site Profile Report”. The report recommended that the site be downgraded to a “Class F”. A Class F site is a site where no further action is warranted or little to no environmental hazard potential exists.

In 1983, the NYSDEC prepared a report entitled "Inactive Hazardous Waste Disposal Site Report." This report deals with an inactive landfill located in Subparcel 4 which is assigned site number (#915029).

Also in 1983, the United States Geological Survey (USGS) prepared a report entitled "Draft Report of Preliminary Evaluation of Chemical Migration to Groundwater and the Niagara River from Hazardous Waste Disposal Sites in Erie and Niagara Counties." The relevant portions are presented in Appendix A. Seven test borings (TB-1 to -7) were drilled and sampled at the Hanna Furnace Site. Five of these borings (TB-3, -4, -5, -6 and -7) were located within Subparcel 3 at the locations shown in Figure 2-2. Soil samples were analyzed for chromium, copper, iron, and lead. The USGS concluded that there was a potential for lateral migration of the contaminants at and away from the site. Subsurface soil samples from Subparcel 3 were found to have copper and iron in exceedance of the NYSDEC TAGM guidelines.

In 1985, the NYSDEC and Dames & Moore performed a Phase I investigation of the areas north of the Union Ship Canal. The report indicated that the Hazard Ranking Score for the site fell below 28.5. A score above 28.5 would indicate that the site poses an immediate threat to human health and environment and would be recommended for placement on the National Priorities List. The Phase I recommended that a Phase II subsurface investigation be performed.

In 1988, Recra Environmental, Inc. performed a "Site Characterization and Environmental Assessment" for the New York State Department of Transportation. The assessment included the entire Hanna Furnace Site (133-acres). Soil, sediment, surface water and groundwater samples were collected; a risk assessment was performed; and an evaluation of remedial activities was performed. The soil, sediment, and surface water samples were analyzed for several metals, cyanide, oil and grease, and poly-chlorinated biphenyls (PCBs). Groundwater was analyzed for volatile organic compounds (VOCs), semivolatile organic compounds (SVOCs), pesticides, and PCBs. Metals were detected at concentrations above guideline values in the sediment, surface soil and groundwater samples. PCBs were detected at concentrations above guidelines in surface soil and sediment samples. Pesticides were detected at concentrations above guideline values in groundwater. No VOCs, SVOCs, or PCBs were detected in groundwater. Relevant sections of this report and the analytical results are presented



in Appendix A. The 11 sampling locations (SS-1, -10, -11, -12, -14, -15, -16, -18 and MW-5, -6 and -7) relevant to this report are shown in Figure 2-2.

In 1990 and 1994, the NYSDEC collected and analyzed surface soil samples from Subparcel 2 and the Hanna Furnace site. No samples were collected from Subparcel 3.

In 1995, ABB Environmental Services performed a Preliminary Site Assessment for the NYSDEC. The assessment included the entire Hanna Furnace site and the adjacent Shenango Steel Site (Figure 2-1). Subsurface soil, groundwater, sediment and surface water samples were collected and analyzed for Target Compound List (TCL) VOCs, SVOCs, pesticides/PCBs, Target Analyte List (TAL) metals and cyanide. No VOCs or PCBs were detected above guidelines, or method detection limits, respectively. Some SVOCs, metals, and a pesticide were detected at concentrations above regulatory limits in the samples. Four sample locations (SD-103, -104, -105 and -106) were located in Subparcel 3 and are shown in Figure 2-2. The relevant portions of the report including the analytical results are presented in Appendix A. Based upon the results, the NYSDEC removed the Hanna Furnace site from the Registry of Inactive Hazardous Waste Disposal Sites.

In 1997, Ecology and Environment, Inc. performed an Environmental Site Assessment. The object of the assessment was to identify potential areas of concern in addition to summarizing information provided in former reports. Three site inspections were performed in addition to a record review. The report concluded that the elevated analytes detected in the sediment samples in the canal are within the range for industrial areas. However, the report further concluded that these concentrations might become an issue if the canal is to be redeveloped for non-industrial use.

In November 1999, Padia Environmental collected sediment samples from the canal at 11 locations, 8 of which are in the canal portion of Subparcel 3. The report stated that there were exceedances for PAHs, and several metals at some of the sampling locations. The sample locations are presented in Figure 2-2. The report is included in Appendix A.

On June 7, 2001 the Division of Environmental Science and Assessment (DESA), Hazardous Waste Support Branch (HWSB), Superfund Contract Support Team (SCST) from the USEPA, conducted a waste pile sampling event at the Union Ship Canal site. The sampling performed on Subparcel 3 was limited to collection of one sample (US-IO-01) from the iron ore pile located on the north side of the canal towards the western end of the site. The results indicated that several metals (i.e., Arsenic, Beryllium, Cadmium, Chromium, Copper, Iron, Nickel and Zinc) detected in the pile exhibited concentrations that exceeded the TAGM 4046 criteria. This is not unexpected, inasmuch as this is the raw ore utilized in the steel making process. Only Arsenic, Cadmium, Nickel, and Zinc exceed typical Eastern U.S. background levels. The sample location is shown on Figure 2-2. A copy of the report is included in Appendix A.

ERM released the final Remedial Investigation/Feasibility Study RI/FS report on the Shenango Steel Molds site, which abuts the Hanna Furnace Site, in January 2002. Sediment sampling was conducted in July 2001 at the east end of the canal, centering on the outfall which discharges storm water from the Shenango Steel Site, which has had TAGM 4046 exceedances for PCBs. The results showed several exceedances for PCBs with the highest values being associated with samples collected near the outfall and the values decreasing with distance away from the outfall. The locations are shown in Figure 2-2. The relevant sections of the report are included in Appendix A.

Under an Agreement with the City of Buffalo, the U.S. Army Corps of Engineers conducted investigations to determine the structural integrity of the Union Ship Canal. The investigations included a structural dive inspection of the canal walls, search pattern dives to determine existing bottom conditions, locations of abandoned cars and debris; drilling, boring and exploratory excavations; geotechnical and stability analyses; sediment analyses, and a cost estimate for four alternatives. The results of testing from 11 sites indicated that the sediment was contaminated with multiple PAH compounds that exceeded the open lake reference area levels. Additionally, two PCBs (Aroclor 1254 and 1260) and heavy metals were found in the samples, with lead and zinc found in particularly high levels.

The structural dive inspection determined that the canal walls were timber crib structures supporting concrete caps. In general, the timber cribbing appeared to be tight and in good condition with the exception of approximately 1000 linear feet of wall (easternmost portion of north wall), which is showing distress in the form of bowing and rotation. The concrete cap has been removed and the soil slope graded behind the wall in this area.

The geotechnical investigation involved testing of concrete cores, determination of soil strength parameters, excavations to determine structure type and dimensions and stability analyses. The stability analyses coincided with observations from the structural dive inspection, in that it was the northeast end of the canal that did not meet stability criteria. It was concluded that some type of stabilization measure should be implemented to minimize or eliminate further deterioration of the wall in this area. Four stabilization alternatives were developed. The recommended alternative involves placement of a sand berm in the canal to support the canal walls. This would allow the existing walls to remain in place and would only require minimal upland work (e.g., grading, walkways, guardrails, etc.).

3.0 SITE INVESTIGATION

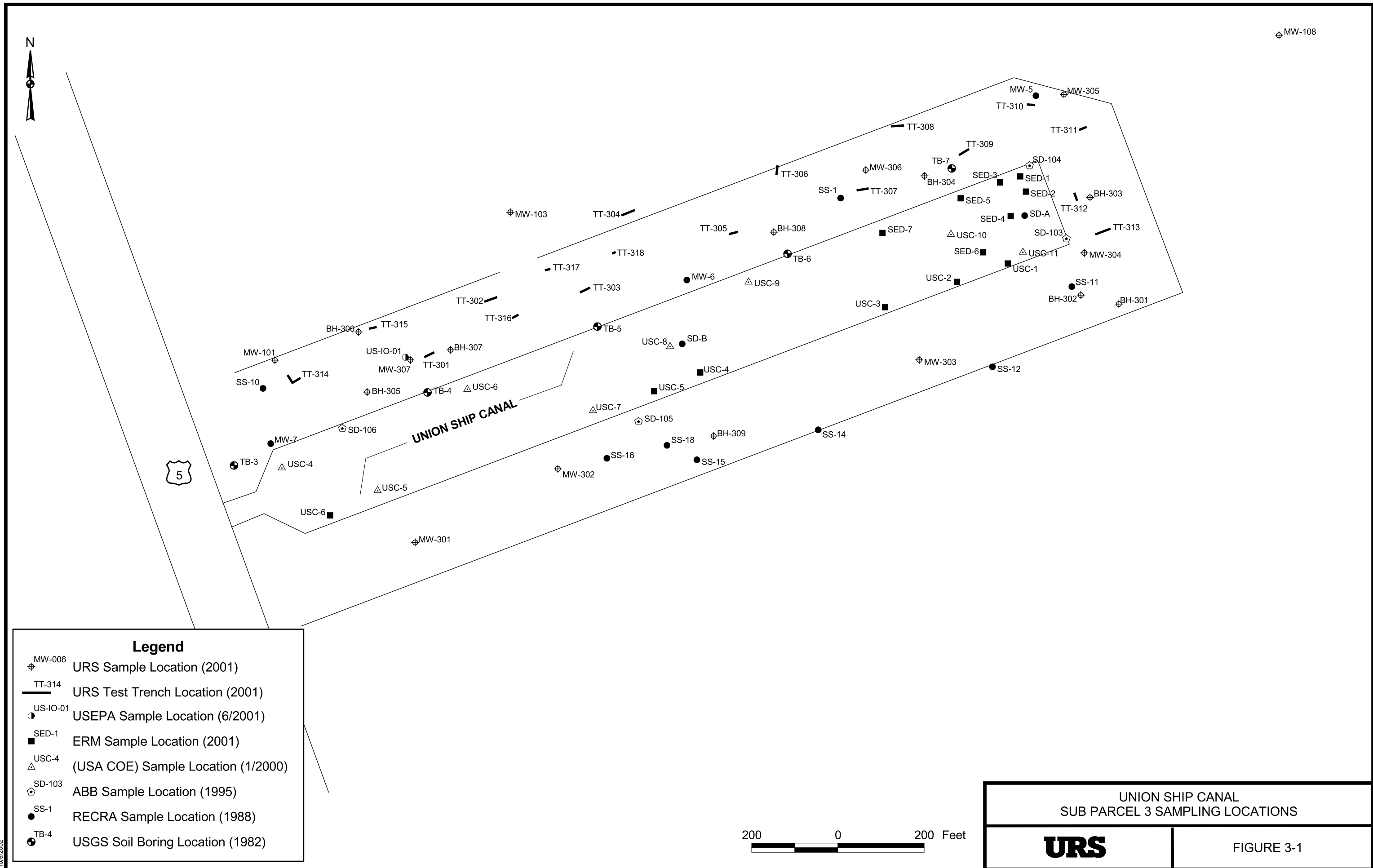
3.1 Scoping and SI Work Plan Development

Prior to initiating any site investigation activities a SI work plan was developed and submitted to the NYSDEC. In developing the work plan, URS reviewed previous investigation/sampling reports from 1979 to the present and conducted a site visit on June 20, 2001. Specific SI details and background information/site history were reviewed, including the project schedule. Additionally, a meeting was held with the City and the NYSDEC to discuss the proposed Scope of Work. The work plan subsequently was approved by the NYSDEC in September 2001.

3.2 Site Characterization

Initial SI efforts included a general site reconnaissance to identify investigation locations. Thereafter, test pits, soil borings and groundwater monitoring wells were installed and sampling of surface and subsurface soil and groundwater was conducted. A total of 18 test pits were excavated along the north and east end of the canal. Additionally, 16 soil borings, 7 of which were converted to monitoring wells, were installed and sampled. Two background samples were also to have been collected and analyzed. However, considering all of Subparcel 3 and the surrounding parcels have been impacted to some degree by past industrial activities, no suitable locations to collect these samples could be identified. Site characterization activities are described in the following sections, with environmental sampling/analysis summarized in the data tables in Section 4. Investigation locations are shown in Figure 3-1. All analytical data was evaluated for usability, summarized, and tabulated as described in Section 4.

Prior to any intrusive activity (e.g., drilling, excavation), URS contacted the Underground Facilities Protective Organization, and requested that all underground utilities be identified and clearly marked. No underground utilities were identified within the limits of Subparcel 3.



3.3 Test Trenches

As outlined in the work plan, it was originally planned to install up to 12 test trenches along the northern and eastern edges of Subparcel 3. However, due to poor accessibility and difficult drilling conditions, it was agreed with NYSDEC to install additional test trenches in lieu of some of the soil borings. A series of 18 test pits (TT-301-318) were completed in the northern and eastern portions of Subparcel 3 at the locations shown on Figure 3-1. The test pits were intended to locate former underground utilities and areas of permeable fill that may act as contaminant migration pathways.

The tests pits were excavated by Integrated Waste Removal (IWR) of Buffalo, NY, using a Daewoo 250 xl track hoe to depths which ranged from four feet at TT-313 to 15 feet at TT-314 and TT-315. Soil horizons were logged by the on-site geologist. Samples from the various soil/fill materials that were encountered were collected for analysis of TCL VOCs, SVOCs, pesticides/PCBs, TAL metals and cyanide. The soils were screened continuously with a PID, and the subsurface interval with the highest reading was selected for VOC analysis. If there were no PID hits at any depth, the sample was collected from the interval immediately above the groundwater surface. If there was no visual evidence of gross contamination, a composite sample of the fill materials encountered in the trench was collected and analyzed for TAL metals, cyanide, and the remainder of the TCL. The intent of the sampling was to collect representative samples of each different type of material. Consequently, in cases where the materials exposed in the test pit were the same as in a previous test pit and a sample had been collected, no additional sample was taken. A total of 16 representative samples of the various soil types and fill materials were collected. These included 5 surface soil samples and 11 subsurface soil samples. Copies of the test trench logs are presented in Appendix B.

3.4 Soil Borings

As indicated above, some of the 21 originally planned soil borings were replaced with test trenches, due to limited access for truck-mounted equipment and difficult drilling conditions. Consequently, a total of only 16 soil borings, BH-301 to -309 and MW-301 to -307, were advanced using hollow stem auger drilling methods to evaluate the nature of soil contamination

at specific areas of the site. The soil borings were located on the north, east and south sides of the canal at the locations shown in Figure 3-1. Seven of the soil borings were subsequently converted into monitoring wells. Borings were advanced to depths ranging from 8 to 36 feet. Soil samples were collected continuously using 2-inch diameter split spoon samplers in accordance with ASTM-D-5784-95 procedures. Eight surface soil samples (0-2") and 17 subsurface samples were collected for TCL VOCs, SVOC, pesticides/PCBs, TAL metals, and cyanide analysis. Each two-foot split spoon was screened with a PID, and the subsurface interval with the highest reading selected for VOC analysis. If there were no PID hits at any depth, then a sample was collected from the interval immediately above the groundwater surface. If there was no visual evidence of gross contamination, a composite sample from selected strata was collected and analyzed for the TAL metals, cyanide, and the remainder of the TCL. It was originally intended that three representative samples from the two iron ore piles on the north side of the canal and/or construction debris on-site were to be collected for waste characterization analysis. During the SI it was determined that one of the ore piles had been sampled on June 7, 2001 by the USEPA. The report, dated September 2001, is included in Appendix A. Consequently, no samples of these materials were collected, with approval from the NYSDEC. Details of the sampling procedures are provided in Part C of the Field Sampling Plan in the SI/RAR Work Plan. Copies of the boring logs are presented in Appendix C.

3.5 Groundwater Investigation

Seven new monitoring wells (MW-301 to MW-307) were installed during the SI. The locations are shown in Figure 3-1. Monitoring wells were drilled and installed using standard hollow stem auger drilling methods. Split-spoon samples were collected continuously in 2-foot intervals in accordance with ASTM D-5784-95 procedures. Soil samples were visually classified and stored in sealed jars for future reference. All wells were screened across the water table to obtain information about the upper portion of the aquifer. Screen length was selected based on site conditions by the onsite geologist with the approval of the NYSDEC representative.

The monitoring wells are constructed of two-inch inner diameter (ID) threaded Schedule 40 polyvinyl chloride (PVC) flush-joint casing and properly-sized machine-slotted 0.010-inch well screen equipped with a threaded end cap. The annulus around the well screen is backfilled

with No. 1 Morie sand. The sand pack extends a maximum of 2 feet above the well screen. Bentonite chips were placed above the sand pack to form a maximum 3-foot seal. A cement/bentonite grout was used to fill the remaining portion of the borehole to within 3 feet of the surface. The wells have a vented cap and a 6-inch diameter protective casing with a locking cover. A cement pad was installed around the protective casing. Copies of the well construction details are presented in Appendix D.

The seven new monitoring wells were developed to remove sediment from the well screen and sand pack. Well evacuation was accomplished using a low-flow pump and dedicated polyethylene tubing. The wells were developed until pH, conductivity, and temperature were stabilized and until the water had a turbidity of less than 50 Nephelometric turbidity units (NTU). Copies of the well development log sheets are presented in Appendix E. The development and purge water was containerized in 55-gallon drums. Groundwater samples were collected from each of the seven new monitoring wells (MW-301 to MW-307) and from two existing wells on-site (MW-101 and 103) using dedicated bailers. Groundwater samples (9 total) were analyzed for pH both in the field and laboratory. Additionally, the samples were analyzed for TCL VOCs, SVOCs, pesticides/PCBs, TAL metals and cyanide.

Based on the initial sampling results, monitoring wells MW-101, -306 and -307 were purged and re-sampled using low-flow methods in March 2003. The samples were analyzed for total and weak acid dissociable cyanide, SVOCs, and VOCs/SVOCs and weak acid dissociable cyanide, respectively.

3.6 Sediment Sampling

No sampling of the canal sediments was performed by URS as it was beyond the scope of this SI. However, sediment-sampling data collected by others was reviewed and incorporated into this SI/RAR. Sampling of the sediments in the canal was conducted by Padia Environmental for the USACE in November of 1999. A total of 11 samples were collected from the Union Ship Canal bottom, eight of which were collected from that section of the canal located adjacent to Subparcel 3. The report, entitled "Final Report Sediment Sampling and Chemical Analysis at the

Union Ship Canal in Buffalo, NY, Volume I, Technical Report,” was delivered to USACE in January 2000. The preliminary report is contained in Appendix A.

ERM, as part of the Shenango Steel RI/FS for NYSDEC in the final report, dated January 2002, collected 13 sediment samples in the eastern end of the canal, in the vicinity of the outfall of a 36-inch drainpipe from Shenango Steel Molds. The outfall is located just west of the northeastern corner of the canal. The sampling was conducted in July 2001. The results of the sampling are presented in the report entitled “Remedial Investigation Report, Shenango Steel molds, Buffalo, NY,” and dated January 2002. The locations of sediment samples are shown in Figure 3-1. The relevant sections of the report are contained in Appendix A.

3.7 Site Survey

Upon completion of the SI, the monitoring wells, test pits, and soil borings locations were surveyed for horizontal and vertical coordinates using Global Positioning Survey (GPS) techniques. The surveyed locations subsequently were plotted on the existing base map (Figure 3-1).

3.8 Data Validation and Tabulation

Both laboratories utilized during the SI for sample analysis are New York State Department of Health Environmental Laboratory Accreditation Program (ELAP) CLP-certified. In accordance with the work plan, URS validated the data from full NYSDEC ASP Category B packages, and prepared Data Usability Summary Reports (DUSR) for both the initial and supplemental sampling events. Following validation, all sample results were grouped by media (e.g., soil, groundwater) and tabulated. The DUSR reports and ELAP certificates are contained in Appendix G.

3.9 Decontamination/Investigation-Derived Waste

All of the test trench and drilling equipment was decontaminated with a high-pressure, steam cleaner after each use. As approved by NYSDEC in the field, the wash water and

sediment was discharged to the ground either over the test trench or next to the soil boring. Some of the field equipment was disposable (i.e., bailers) and did not require decontamination. Non-disposable sampling tools, downhole equipment, and other materials were decontaminated by washing with Alconox© and rinsing with deionized water. All decontamination fluids generated during well development and sampling were containerized in 55-gallon drums and staged on-site. Disposal of these fluids will be determined based on the results of the sampling. Equipment was kept in a clean environment prior to sampling.

4.0 SITE CHARACTERIZATION

4.1 Site Geology

Based on the results of the SI, it appears that naturally occurring units at the site consist of a light to dark gray, clay to silty clay unit of variable thickness (one to eight feet), overlying a water bearing, gray to brown, sandy peat unit (two to eight feet thick). A gray, silty sand occurs intermittently throughout the site beneath the sandy peat. The silty sand is also of variable thickness (from one to five feet). Underlying the silty sand is a basal silty clay unit, which in turn is underlain by a dense glacial till composed of cobbles, gravel, sand and silt sized material. The till is underlain by the Marcellus and Skaneateles Shale.

Topographic maps and aerial photographs were reviewed from the period of 1901 to present. Pre-development topographic maps, circa 1901, show the overall area of the Hanna Furnace Site as a lake margin swamp. Post development aerial photos from 1926 show the northern portion of the site remained a pond, or basin, bordered by railroad tracks that ran along the north retaining wall of the canal and looped to the north. Between 1926 and 1965 the ponded area on the north had been partially filled in from east to west. The southern area was noted to be a concrete ore-storage pad, much as it is today. Aerial photos and topographic maps dated 1965 indicate that additional backfilling had commenced in the northern area, around the perimeter of the pond area, and along the railroad. Aerial photos from 1978 show that the majority of the area had been filled, with the exception of the central portion of the north area, which was still ponded. The latest aerial photo, from 1994, shows the north area completely backfilled.

Structures were also examined in the photos. The ore-storage pad located on the south side of the canal shows in all the air photos after 1926, and appears to extend from Fuhrmann Boulevard in the west, to the east end of the canal. Iron ore and limestone piles hide the extreme ends of the pad, however, it can be assumed that these stockpiles are on the pad. Aerial photos from 1942, 1951, and 1965 show a varying number of buildings erected in the southeast corner of the site. One main building, oriented east west and located east of the southeast corner of the canal, appears consistently in the photos. Although bricks and apparently in-place foundation-

type materials were recovered during the excavation of test trench TT-301, in the northwest portion of the site (Figure 3-1), no structures were seen in any of the photos of that location.

The northern, eastern and southern portions of Subparcel 3 can be divided and characterized on the basis of the fill materials encountered during the SI. In general, the western end of the northern portion is backfilled with reworked natural material. The southern portion consists of relatively undisturbed natural soils under the concrete pad. The east end and eastern portion of the north side is characterized by an abundance of industrial fill materials. The industrial fill materials typically include slag, limestone, cinders, ash, concrete, wood plastic, rubber, and metal debris. Each area is described in more detail in the following sections.

4.1.1 Northern Portion

The western end of the northern portion of the subparcel appears to have been backfilled with reworked natural materials (i.e., dredge spoils). The natural material consists of randomly distributed masses of clay, silty clay, and shale. The materials appear to be highly comparable to the soils that are found throughout the area around the site, and are suggestive that locally derived natural materials were used as backfill. In the northwest part of the site, the depth to clearly recognizable, in situ, natural material increases from approximately 26 to over 30 feet from east to west.

Both the nature and depth of backfilling changes in the eastern portion of the northern part of Subparcel 3. In the vicinity of TT-302 and TT-316 (Figure 3-1), the backfill material becomes more industrial in nature, containing slag, ash, concrete, iron ore, limestone, and industrial debris. The thickness also decreases with depths to the top of the natural material ranging from two to ten feet. The area from TT-302 eastward to TT-304 is characterized by the existence of a zone of very hard, recemented material. The thickness of the fill material continues to decrease eastward such that in the vicinity of TT-308, -309, and BH-304, there is only a thin veneer (i.e., less than two feet) of industrial fill overlying natural clay.

A significant amount of variation was found between individual test trenches and/or boreholes. There are marked changes in the thickness and nature of the fill over relatively short

distances in the northeast part of the site. These variations are due, at least in part, to irregularities of the original terrain and the method in which the various fill materials were deposited. Considering the lack of heterogeneity observed in the fill materials, it appears that the fill was most likely deposited in discrete loads, which varied both through time and place.

At those locations where the industrial fill material has been intersected by the groundwater surface, a very hard, recemented, consolidated unit consisting primarily of gravelly slag with inclusions of wood, plastic, rubber, and metal debris was encountered. This unit is generally located at, or slightly above the groundwater surface, and ranges from two to over eight feet in thickness, and remnant structures of the original fill material were clearly observed. The material, when freshly exposed, is a bright blue color, but quickly fades to a light tan to gray, following exposure to the atmosphere. As previously stated, this recemented material was encountered in the center of the northern portion of Subparcel 3 but also in lesser thickness (i.e., two to three feet) in the northeast corner of the site at TT-310 and TT-311 (Figure 3-1).

In the northern portion, the depths at which natural materials were encountered and the materials themselves indicate a north south trending high in the vicinity of test trenches TT-308/309, and BH-304 (Figure 3-1). The top of natural material, which is about two feet below the existing ground surface, in this area, drops off to the west reaching a depth of 26-30 feet at the west end of the site. Moving toward the east end of the site, the top of natural material drops off slowly, reaching a depth of around four feet below the existing ground surface.

The USACE also conducted a structural dive inspection of the canal walls and a limited geotechnical investigation, in the area immediately adjacent (i.e., within 20 feet of the canal) to the canal retaining wall. The intent of the investigation was to determine the strength and condition of concrete in the caps, to determine soil strength parameters to be used in stability analyses, and to determine structure types and dimensions. The results of the structural and geotechnical investigations are presented in their report entitled, "Structural Analysis – Union ship Canal, Buffalo, New York," dated November 2002. Their report indicates that the native soils most likely were excavated down to bedrock prior to construction of the canal wall. Bedrock was encountered at depths ranging from 33 feet to greater than 40 feet. The walls appear to be a pinned timber crib structure with a concrete cap. In general, the timber crib

extends from the top of rock to approximately one foot below water or approximately elevation 569.4 feet. In some areas, a leveling course of masonry blocks, varying in thickness from one to four feet, has been placed between the rock surface and the base of the timber cribbing. After pouring the concrete cap for the canal wall, the areas behind the walls were backfilled. Reworked natural materials (i.e., shale, clay, till) were utilized along the north wall, while industrial fill materials, (i.e., slag, cinders, etc.) were used to back fill behind both the east and south walls.

The timber cribbing appears to be in good condition over the entire length of the north wall. However, two sections in the eastern half of the north wall (i.e., 200' and 90' long respectively) show evidence of horizontal and/or rotational movement (i.e., bowing) of the timber cribbing. Additionally, the concrete cap is missing over the easternmost 1,000 feet and the soil has been sloped back from the wall in this area. This was reportedly done to reduce the load on the timber cribbing and prevent or minimize continued movement. Stability analyses performed for the canal walls indicated that the area wherein the concrete cap was missing and the timber cribbing was misaligned or bowed did not meet the stability criteria. The USACE concluded that some type of stabilization measure should be implemented to minimize or eliminate further deterioration of the canal wall in this area.

4.1.2 Southern Portion

On the south side of the canal, the drilling data indicate that the concrete ore-storage pads rest directly on apparently undisturbed natural materials. The concrete is typically three feet thick and is underlain by very loose, gravelly sand, and sandy peat. The peat unit is five to six feet thick and overlies the basal clay unit. Both the sand and peat units are saturated, as the groundwater surface is roughly coincident with the bottom of the concrete pad.

Near the southeast corner of the canal, in the vicinity of MW-304, BH-301, and BH-302 (Figure 3-1), the industrial backfill reaches a depth of 12 feet and rests directly on the basal clay. The upper clay and sandy peat units are missing, although these two units are present both to the northeast and west of this location. Building foundations were encountered at several boring/trenching locations in that immediate area, which indicates that the upper clay and sandy

peat units may have been excavated and backfilled with more stable material to allow the structures to be built.

The canal walls on the south side are constructed the same as on the north side of the canal. However, the wall structure (i.e., timber cribbing and concrete cap) is in good condition throughout, and shows no signs of misalignment or movement.

4.2 Groundwater

During initial scoping of the project, it was anticipated that groundwater in the soils of Subparcel 3 would be encountered at the level of the water in the canal, or slightly higher. This would be typical in a hydrologic system that allows free interchange between the canal/lake waters and the groundwater. However, during installation of the test trenches, boreholes, and monitoring wells in the northern portion of the site, groundwater was encountered at depths ranging from two to eight feet below grade. Additionally, these changes were observed over short distances, sometimes less than 50 feet. The water level in the canal is typically about 9.5 feet below the existing grade in the northern portion of the site.

As noted in Table 4-1, groundwater elevations in the northern and eastern portions of the site were typically on the order of 5 to 7 feet above the elevation of water in the canal. This tends to support the conclusion that there is not a good interconnection between groundwater in the soils/fill materials on the north side of the canal and water in the canal.

Based on data from the SI, it is postulated that the variation of groundwater depths across the area, particularly on the north side of the canal, is a result of a number of factors:

- Variation in the porosity and transmissivity of the different materials, both vertically and horizontally
- Localized perching and ponding of the groundwater
- Thickness and areal distribution of the various materials encountered
- Variations in the permeability of the concrete retaining walls that restrict the free exchange between the canal and the groundwater

TABLE 4-1

SUMMARY OF GROUNDWATER ELEVATIONS
UNION SHIP CANAL

Monitoring Well No.	Top of Casing Elev. (ft.)	11/6-7/01		3/7/2003		Approx. Groundwater Height Above Canal Water Level *	
		Water Depth Below T.O.C. (ft.)	Water Elevation	Water Depth	Water Elevation	(ft.)	Comments
MW-101	584.66	6.58	578.08	6.62	578.04	7	Northwest corner
MW-103	582.11	4.45	577.66	4.26	577.85	6.7	Northwest corner
MW-301	578.35	4.18	574.17	6.23	572.12	1 - 3	Southwest - ore pad
MW-302	578.61	5.29	573.32	Bailer stuck in well		2.3	South central - ore pad
MW-303	579.04	6.3	572.71	6.33	572.71	1.7	Southeast - ore pad
MW-304	582.70	11.25	571.45	11.58	571.12	0.1 - 0.4	Southeast corner
MW-305	584.04	6.07	577.97	9.83	574.21	3 - 7	Northeast
MW-306	582.05	6.07	575.98	6.47	575.58	4.6 - 5	Northeast
MW-307	583.22	5.45	577.77	5.41	577.81	6.8	Northwest

* This assumes a canal water elevation of 571.0 ft.

The natural sedimentary units are primarily composed of clay with low porosity and low hydraulic conductivity. The irregular original topography was buried by backfilling with a variety of materials of differing hydraulic characteristics. Over time, other natural processes, such as the recementation of grains, has also contributed to the dynamics of the groundwater system. The result is a very complex series of groundwater units in the fill materials above the clay.

On the south side of the canal, groundwater was encountered roughly at the bottom of the concrete pad. As noted above, the pad rests directly on the saturated sandy peat unit. It also should be noted that the pad is generally covered by two to four-inches of standing water and is approximately five feet lower than the surrounding terrain. Considering that the pad is about three feet thick, the occurrence of groundwater in the south portion of the site is at a depth of about eight to ten feet below the level of the surrounding terrain, and approximates the level of the water in the canal. As indicated in Table 4-1, the groundwater elevations under the ore storage pads vary from about 0.5 to 3.2 feet above the canal water elevation. This information tends to indicate that there is a greater degree of interconnection between groundwater in the soil/fill materials on the south side of the canal and water in the canal, although it has not been demonstrated conclusively, that there is a free interchange between the groundwater and water in the canal.

The groundwater in the west end of the northern part is characterized by high pH values. The values are highest at the west end, MW-101 (Figure 3-1), and decrease eastward. About 300 feet to the east is the initial occurrence of the recemented material that was discussed previously. This material first occurs in an area of steadily dropping pH values. While no direct cause has been so far observed the fill in that area has a large percentage of lime-rich slag. There is a distinct possibility of leaching of lime from the slag which may result in the high pH conditions.

One monitoring well, MW-304, located in the southeast corner of the site, was screened in a saturated zone in the basal clay unit. The saturated zone was encountered at a depth of approximately 28 feet below ground surface. The elevation of the static groundwater level in the well rose until it approximated the groundwater levels in the wells located to the west, which were screened in the sandy peat unit. Those wells, MW-301 through MW-303, are screened

from four feet to nine feet below grade. MW-304 is screened from 26 to 36 feet below grade, wholly in the basal clay unit. The fact that the static water level encountered in MW-304 approximates the other three wells suggests that a hydrologic connection (i.e., the canal) may exist between the two zones.

4.3 Nature and Extent of Contamination

4.3.1 Standards, Criteria, and Guidance

Standards, criteria, and guidance (SCG's) for soil will be the NYSDEC Technical Administrative Guidance Memorandum (TAGM) 4046: *Determination of Soil Cleanup Objectives and Cleanup Levels* (dated January 1994, revised). Whereas these values were developed based on residential use scenarios and are not directly applicable to this site (which will be developed as greenspace), they will be utilized for initial screening of the site. Final cleanup goals will be developed in conjunction with the NYSDEC and NYSDOH. SCG's for groundwater will be the NYSDEC Technical and Operation Guidance Series (TOGS) 1.1.1: *Ambient Water Quality Standards and Guidance Values and Groundwater Effluent Limitations* (dated June 1998). SCGs for sediments will be the NYSDEC *Technical Guidance for the Screening of Contaminated Sediments* (dated March 1998).

4.3.2 Surface Soils

Analytical data for surface soil (i.e., 0-2") samples is summarized in Table 4-2, presented graphically in Figure 4-1, and contained in Attachment A of Appendix G. As noted in Table 4-1, no VOCs were detected at concentrations that exceed the SCGs. SVOCs, consisting primarily of polynuclear aromatic hydrocarbons (PAHs) were detected in all 13 samples. In 9 of the 13 samples, the concentrations associated with the carcinogenic PAHs (cPAHs) exceeded the SCGs. In general, the exceedances were limited to a single compound (i.e., benzo(a)pyrene or benzo(a)anthracene) in all the samples, with the exception of samples from the northeast portion of the site in the vicinity of TT-306, TT -309, and BH-304 (Figure 4-1). In this area, the number of detected compounds was greater and the concentrations were somewhat higher than in the

TABLE 4-2
SUMMARY OF DETECTED ANALYTES IN SURFACE SOIL SAMPLES
UNION SHIP CANAL

Location ID				BH-301	BH-302	BH-303	BH-304	BH-305
Sample ID				BH-301-SURFACE	BH-302-SURFACE	BH-303-SURFACE	BH-304-SURFACE	BH-305-SURFACE
Matrix				Soil	Soil	Soil	Soil	Soil
Depth Interval (ft)				0.0-0.2	0.0-0.2	0.0-0.2	0.0-0.2	0.0-0.2
Date Sampled				10/10/01	10/10/01	10/10/01	10/10/01	10/11/01
Parameter	Units	Criteria (1)	Criteria (2)					
Volatiles Organic Compounds								
Methylene chloride	UG/KG	100	-					
Toluene	UG/KG	1500	-					
Semivolatiles Organic Compounds								
1,1'-Biphenyl	UG/KG	-	-				150 J	
2-Methylnaphthalene	UG/KG	36400	-			43 J	610 J	
Acenaphthene	UG/KG	50000	-				300 J	
Acenaphthylene	UG/KG	41000	-				75 J	
Acetophenone	UG/KG	-	-					
Anthracene	UG/KG	50000	-				260 J	57 J
Benzaldehyde	UG/KG	-	-					
Benzo(a)anthracene	UG/KG	224	-	230 J	150 J	120 J	950 J	360 J
Benzo(a)pyrene	UG/KG	61	-					
Benzo(b)fluoranthene	UG/KG	1100	-	450 J	360 J	250 J	1,900 J	1,000
Benzo(g,h,i)perylene	UG/KG	50000	-	94 J	270 J	110 J	480 J	340 J
Benzo(k)fluoranthene	UG/KG	1100	-	190 J	110 J	71 J	580 J	360
Butylbenzylphthalate	UG/KG	50000	-					
Carbazole	UG/KG	-	-				65 J	
Chrysene	UG/KG	400	-	290 J	200 J	170 J	1,300 J	590
Dibenz(a,h)anthracene	UG/KG	14	-				130 J	78 J
Dibenzofuran	UG/KG	6200	-				280 J	
Di-n-butylphthalate	UG/KG	8100	-				120 J	

Criteria (1)- NYSDEC TAGM: Determination of Soil Cleanup Objectives and Cleanup Levels; HWR-94-4046 January 24, 1994 (Revised). Recommended Cleanup Objectives.

Criteria (2)- NYSDEC TAGM: Determination of Soil Cleanup Objectives and Cleanup Levels; HWR-94-4046 January 24, 1994 (Revised). Eastern USA Background values.

Flags assigned during chemistry validation are shown.



Concentration Exceeds Criteria 1



Concentration Exceeds Criteria 2

* - Typical Industrial Site Background Levels

** - Weak Acid Dissociable Cyanide

Only Detected Results Reported.

TABLE 4-2
SUMMARY OF DETECTED ANALYTES IN SURFACE SOIL SAMPLES
UNION SHIP CANAL

Location ID				BH-301	BH-302	BH-303	BH-304	BH-305
Sample ID				BH-301-SURFACE	BH-302-SURFACE	BH-303-SURFACE	BH-304-SURFACE	BH-305-SURFACE
Matrix				Soil	Soil	Soil	Soil	Soil
Depth Interval (ft)				0.0-0.2	0.0-0.2	0.0-0.2	0.0-0.2	0.0-0.2
Date Sampled				10/10/01	10/10/01	10/10/01	10/10/01	10/11/01
Parameter	Units	Criteria (1)	Criteria (2)					
Semivolatiles Organic Compounds								
Fluoranthene	UG/KG	50000	-	400 J	190 J	200 J	1,300 J	290 J
Fluorene	UG/KG	50000	-				240 J	
Indeno(1,2,3-cd)pyrene	UG/KG	3200	-	170 J	300 J	150 J	920 J	510
Naphthalene	UG/KG	13000	-				550 J	
Phenanthrene	UG/KG	50000	-	210 J	140 J	140 J	920 J	89 J
Pyrene	UG/KG	50000	-	410 J	190 J	200 J	1,300 J	450
Pesticides								
4,4'-DDE	UG/KG	2100	-					
4,4'-DDT	UG/KG	2100	-					
Endrin aldehyde	UG/KG	-	-			9.6 J		
Metals								
Aluminum	MG/KG	-	33000	26,500	25,100	20,300	6,420	18,700
Antimony	MG/KG	-	-					
Arsenic	MG/KG	7.5	3-12	8.0 J	7.5 J	9.7 J	4.5 J	4.5 J
Barium	MG/KG	300	15-600	257	210	228	75.1	161
Beryllium	MG/KG	0.16	0-1.75	3.6 J	3.7 J	4.3 J	1.3 J	4.2 J
Cadmium	MG/KG	10 *	0.1-1					1.3
Calcium	MG/KG	-	130-35000	123,000	113,000	142,000	84,400	215,000
Chromium	MG/KG	50 *	1.5-40	29.0 J	27.6 J	47.8 J	50.7 J	14.7 J
Cobalt	MG/KG	30	2.5-60	5.3 B	5.8 B	4.7 B	4.5 B	2.5 B
Copper	MG/KG	25	1-50	31.0 J	33.2 J	79.2 J	58.4 J	36.7 J

Criteria (1)- NYSDEC TAGM: Determination of Soil Cleanup Objectives and Cleanup Levels; HWR-94-4046 January 24, 1994 (Revised). Recommended Cleanup Objectives.

Criteria (2)- NYSDEC TAGM: Determination of Soil Cleanup Objectives and Cleanup Levels; HWR-94-4046 January 24, 1994 (Revised). Eastern USA Background values.

Flags assigned during chemistry validation are shown.

 Concentration Exceeds Criteria 1
 Concentration Exceeds Criteria 2

* - Typical Industrial Site Background Levels

** - Weak Acid Dissociable Cyanide

Only Detected Results Reported.

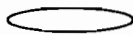
TABLE 4-2
SUMMARY OF DETECTED ANALYTES IN SURFACE SOIL SAMPLES
UNION SHIP CANAL

Location ID				BH-301	BH-302	BH-303	BH-304	BH-305
Sample ID				BH-301-SURFACE	BH-302-SURFACE	BH-303-SURFACE	BH-304-SURFACE	BH-305-SURFACE
Matrix				Soil	Soil	Soil	Soil	Soil
Depth Interval (ft)				0.0-0.2	0.0-0.2	0.0-0.2	0.0-0.2	0.0-0.2
Date Sampled				10/10/01	10/10/01	10/10/01	10/10/01	10/11/01
Parameter	Units	Criteria (1)	Criteria (2)					
Metals								
Iron	MG/KG	2000	2000-550000	58,200	69,100	51,600	68,900	14,100
Lead	MG/KG	1000 *	200-500	42.9	140	237	353	46.7
Magnesium	MG/KG	-	100-5000	12,300	10,100	29,400	22,400	33,500
Manganese	MG/KG	-	50-5000	2,700	2,280	1,920	1,560	1,670
Mercury	MG/KG	0.1	0.001-0.2					
Nickel	MG/KG	13	0.5-25	23.9 J	29.2 J	37.5 J	24.7 J	13.9 J
Potassium	MG/KG	-	8500-43000	1,740	1,880	1,770	573	1,150
Selenium	MG/KG	2	0.1-3.9					
Silver	MG/KG	-	-					1.1 J
Sodium	MG/KG	-	6000-8000	449 B	390 B	734	247 B	1,040
Strontium	MG/KG	-	-	0.29 B	1.2 B	0.81 B	0.75 B	
Vanadium	MG/KG	150	1-300	25.8 B	26.6			7.8
Zinc	MG/KG	20	9-50	172	430	344	287	102
Miscellaneous Parameters								
Cyanide, Free **	MG/KG	-	-	1.3 J	2.1 J	5.0 J	1.0 J	
Cyanide, Total	MG/KG	-	-	R	R	R	R	R
Total Solids	%	-	-	79.4	75.2	90.3	91	94.8

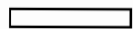
Criteria (1)- NYSDEC TAGM: Determination of Soil Cleanup Objectives and Cleanup Levels; HWR-94-4046 January 24, 1994 (Revised). Recommended Cleanup Objectives.

Criteria (2)- NYSDEC TAGM: Determination of Soil Cleanup Objectives and Cleanup Levels; HWR-94-4046 January 24, 1994 (Revised). Eastern USA Background values.

Flags assigned during chemistry validation are shown.



Concentration Exceeds Criteria 1



Concentration Exceeds Criteria 2

* - Typical Industrial Site Background Levels

** - Weak Acid Dissociable Cyanide

Only Detected Results Reported.

Advanced Selection: SURF_SOIL
J:\35933\00\dtb\Program\Program.mde
Printed: 6/5/03 3:23:10 PM
[MATRIX] = 'SO' AND [FLDSAMPID] LIKE '~SURFACE'

TABLE 4-2
SUMMARY OF DETECTED ANALYTES IN SURFACE SOIL SAMPLES
UNION SHIP CANAL

Location ID				MW-301	MW-302	MW-305	TT-304B	TT-306B
Sample ID				MW-301-SURFACE	MW-302-SURFACE	MW-305-SURFACE	TT-304-SURFACE	TT-306-SURFACE
Matrix				Soil	Soil	Soil	Soil	Soil
Depth Interval (ft)				0.0-0.2	0.0-0.2	0.0-0.2	0.0-0.5	0.0-0.1
Date Sampled				10/19/01	10/18/01	10/16/01	10/02/01	10/03/01
Parameter	Units	Criteria (1)	Criteria (2)					
Volatiles Organic Compounds								
Methylene chloride	UG/KG	100	-	5 J		15 J		
Toluene	UG/KG	1500	-			31 J		
Semivolatiles Organic Compounds								
1,1'-Biphenyl	UG/KG	-	-					
2-Methylnaphthalene	UG/KG	36400	-			600 J		46 J
Acenaphthene	UG/KG	50000	-					110 J
Acenaphthylene	UG/KG	41000	-					
Acetophenone	UG/KG	-	-			58 J		
Anthracene	UG/KG	50000	-					50 J
Benzaldehyde	UG/KG	-	-			62 J		
Benzo(a)anthracene	UG/KG	224	-	84 J	96 J	120 J		330 J
Benzo(a)pyrene	UG/KG	61	-	62 J	76 J			680 J
Benzo(b)fluoranthene	UG/KG	1100	-	140 J	180 J	220 J	41 J	1,100 J
Benzo(g,h,i)perylene	UG/KG	50000	-			58 J		330 J
Benzo(k)fluoranthene	UG/KG	1100	-	58 J	75 J	75 J		430 J
Butylbenzylphthalate	UG/KG	50000	-			78 J		
Carbazole	UG/KG	-	-					
Chrysene	UG/KG	400	-	110 J	120 J	170 J		470 J
Dibenz(a,h)anthracene	UG/KG	14	-					76 J
Dibenzofuran	UG/KG	6200	-					
Di-n-butylphthalate	UG/KG	8100	-			70 J		

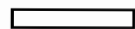
Criteria (1)- NYSDEC TAGM: Determination of Soil Cleanup Objectives and Cleanup Levels; HWR-94-4046 January 24, 1994 (Revised). Recommended Cleanup Objectives.

Criteria (2)- NYSDEC TAGM: Determination of Soil Cleanup Objectives and Cleanup Levels; HWR-94-4046 January 24, 1994 (Revised). Eastern USA Background values.

Flags assigned during chemistry validation are shown.



Concentration Exceeds Criteria 1



Concentration Exceeds Criteria 2

* - Typical Industrial Site Background Levels

** - Weak Acid Dissociable Cyanide

Only Detected Results Reported.

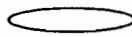
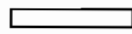
TABLE 4-2
SUMMARY OF DETECTED ANALYTES IN SURFACE SOIL SAMPLES
UNION SHIP CANAL

Location ID				MW-301	MW-302	MW-305	TT-304B	TT-306B
Sample ID				MW-301-SURFACE	MW-302-SURFACE	MW-305-SURFACE	TT-304-SURFACE	TT-306-SURFACE
Matrix				Soil	Soil	Soil	Soil	Soil
Depth Interval (ft)				0.0-0.2	0.0-0.2	0.0-0.2	0.0-0.5	0.0-0.1
Date Sampled				10/19/01	10/18/01	10/16/01	10/02/01	10/03/01
Parameter	Units	Criteria (1)	Criteria (2)					
Semivolatile Organic Compounds								
Fluoranthene	UG/KG	50000	-	150 J	190 J	220 J		390 J
Fluorene	UG/KG	50000	-					
Indeno(1,2,3-cd)pyrene	UG/KG	3200	-	51 J	52 J	97 J		520 J
Naphthalene	UG/KG	13000	-			250 J		49 J
Phenanthrene	UG/KG	50000	-	75 J	110 J	190 J		210 J
Pyrene	UG/KG	50000	-	120 J	160 J	270 J		470 J
Pesticides								
4,4'-DDE	UG/KG	2100	-			58 J		
4,4'-DDT	UG/KG	2100	-			120 J		12 JN
Endrin aldehyde	UG/KG	-	-					
Metals								
Aluminum	MG/KG	-	33000	4,050	32,000	21,600	1,160	7,190
Antimony	MG/KG	-	-			802 J		
Arsenic	MG/KG	7.5	3-12	3.4	12.0	6.3 J	0.97 B	8.7
Barium	MG/KG	300	15-600	25.4 J	281 J	2,020	13.5 B	90.1
Beryllium	MG/KG	0.16	0-1.75	0.25 BJ	6.2 J	0.74	0.26 B	1.6
Cadmium	MG/KG	10 *	0.1-1	0.80 J	1.2 J	17.0	0.88	
Calcium	MG/KG	-	130-35000	22,900	201,000	51,400	205,000	45,500
Chromium	MG/KG	50 *	1.5-40	4.1 J	12.3 J	52.2 J	5.8	221
Cobalt	MG/KG	30	2.5-60	4.4 BJ	2.7 BJ	6.2 B	1.6 B	9.4
Copper	MG/KG	25	1-50	18.7	12.9	310,000 J	20.9	542

Criteria (1)- NYSDEC TAGM: Determination of Soil Cleanup Objectives and Cleanup Levels; HWR-94-4046 January 24, 1994 (Revised). Recommended Cleanup Objectives.

Criteria (2)- NYSDEC TAGM: Determination of Soil Cleanup Objectives and Cleanup Levels; HWR-94-4046 January 24, 1994 (Revised). Eastern USA Background values.

Flags assigned during chemistry validation are shown.

 Concentration Exceeds Criteria 1
 Concentration Exceeds Criteria 2

* - Typical Industrial Site Background Levels

** - Weak Acid Dissociable Cyanide

Only Detected Results Reported.

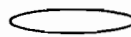
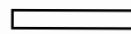
TABLE 4-2
SUMMARY OF DETECTED ANALYTES IN SURFACE SOIL SAMPLES
UNION SHIP CANAL

Location ID				MW-301	MW-302	MW-305	TT-304B	TT-306B
Sample ID				MW-301-SURFACE	MW-302-SURFACE	MW-305-SURFACE	TT-304-SURFACE	TT-306-SURFACE
Matrix				Soil	Soil	Soil	Soil	Soil
Depth Interval (ft)				0.0-0.2	0.0-0.2	0.0-0.2	0.0-0.5	0.0-0.1
Date Sampled				10/19/01	10/18/01	10/16/01	10/02/01	10/03/01
Parameter	Units	Criteria (1)	Criteria (2)					
Metals								
Iron	MG/KG	2000	2000-550000	9,970	14,300	32,500	10,100	157,000
Lead	MG/KG	1000 *	200-500	10.8	12.2	12,700	89.8	562
Magnesium	MG/KG	-	100-5000	4,630	34,000	6,470	104,000	10,300
Manganese	MG/KG	-	50-5000	409	2,080	941	372	4,570
Mercury	MG/KG	0.1	0.001-0.2	0.051 J		0.28		
Nickel	MG/KG	13	0.5-25	12.7 J	13.1 J	73.7 J	5.6	101
Potassium	MG/KG	-	8500-43000	612	3,070	526 B	282 B	1,650
Selenium	MG/KG	2	0.1-3.9					0.43 B
Silver	MG/KG	-	-		1.1 BJ	6.9 J		
Sodium	MG/KG	-	6000-8000	88.2 B	1,260 J	287 B	233 B	309 B
Strontium	MG/KG	-	-				0.36 BJ	1.2
Vanadium	MG/KG	150	1-300	7.0 J	7.1 J	33.3	3.0 B	41.0
Zinc	MG/KG	20	9-50	R	R	12,100	120	1,270
Miscellaneous Parameters								
Cyanide, Free **	MG/KG	-	-		1.7			0.98
Cyanide, Total	MG/KG	-	-	R	R	1.7 J	R	R
Total Solids	%	-	-	87	79.1	67.3	92.5	83.4

Criteria (1)- NYSDEC TAGM: Determination of Soil Cleanup Objectives and Cleanup Levels; HWR-94-4046 January 24, 1994 (Revised). Recommended Cleanup Objectives.

Criteria (2)- NYSDEC TAGM: Determination of Soil Cleanup Objectives and Cleanup Levels; HWR-94-4046 January 24, 1994 (Revised). Eastern USA Background values.

Flags assigned during chemistry validation are shown.

 Concentration Exceeds Criteria 1
 Concentration Exceeds Criteria 2

* - Typical Industrial Site Background Levels

** - Weak Acid Dissociable Cyanide

Only Detected Results Reported.

Advanced Selection: SURF_SOIL
J:\35933.00\dtb\Program\Program.mde
Printed: 6/5/03 3:23:11 PM
[MATRIX] = SC7 AND (FLOSAMPID) LIKE "SURFACE"

TABLE 4-2
SUMMARY OF DETECTED ANALYTES IN SURFACE SOIL SAMPLES
UNION SHIP CANAL

Location ID				TT-307B	TT-308B	TT-309B
Sample ID				TT-307-SURFACE	TT-308-SURFACE	TT-309-SURFACE
Matrix				Soil	Soil	Soil
Depth Interval (ft)				0.0-0.1	0.0-0.1	0.0-0.1
Date Sampled				10/03/01	10/03/01	10/03/01
Parameter	Units	Criteria (1)	Criteria (2)			
Volatiles Organic Compounds						
Methylene chloride	UG/KG	100	-			
Toluene	UG/KG	1500	-			
Semivolatiles Organic Compounds						
1,1'-Biphenyl	UG/KG	-	-			
2-Methylnaphthalene	UG/KG	36400	-	160 J		
Acenaphthene	UG/KG	50000	-			340 J
Acenaphthylene	UG/KG	41000	-			
Acetophenone	UG/KG	-	-			
Anthracene	UG/KG	50000	-			290 J
Benzaldehyde	UG/KG	-	-			
Benzo(a)anthracene	UG/KG	224	-	61 J	43 J	2,900 J
Benzo(a)pyrene	UG/KG	61	-	180 J	66 J	3,200 J
Benzo(b)fluoranthene	UG/KG	1100	-	140 J	120 J	6,500 J
Benzo(g,h,i)perylene	UG/KG	50000	-	300 J		930 J
Benzo(k)fluoranthene	UG/KG	1100	-	53 J	42 J	2,300 J
Butylbenzylphthalate	UG/KG	50000	-			
Carbazole	UG/KG	-	-			160 J
Chrysene	UG/KG	400	-	100 J	62 J	3,600 J
Dibenz(a,h)anthracene	UG/KG	14	-			620 J
Dibenzofuran	UG/KG	6200	-	55 J		
Di-n-butylphthalate	UG/KG	8100	-			

Criteria (1)- NYSDEC TAGM: Determination of Soil Cleanup Objectives and Cleanup Levels; HWR-94-4046 January 24, 1994 (Revised). Recommended Cleanup Objectives.

Criteria (2)- NYSDEC TAGM: Determination of Soil Cleanup Objectives and Cleanup Levels; HWR-94-4046 January 24, 1994 (Revised). Eastern USA Background values.

Flags assigned during chemistry validation are shown.



Concentration Exceeds Criteria 1



Concentration Exceeds Criteria 2

* - Typical Industrial Site Background Levels

** - Weak Acid Dissociable Cyanide

Only Detected Results Reported.

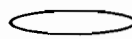
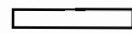
TABLE 4-2
SUMMARY OF DETECTED ANALYTES IN SURFACE SOIL SAMPLES
UNION SHIP CANAL

Location ID				TT-307B	TT-308B	TT-309B
Sample ID				TT-307-SURFACE	TT-308-SURFACE	TT-309-SURFACE
Matrix				Soil	Soil	Soil
Depth Interval (ft)				0.0-0.1	0.0-0.1	0.0-0.1
Date Sampled				10/03/01	10/03/01	10/03/01
Parameter	Units	Criteria (1)	Criteria (2)			
Semivolatiles Organic Compounds						
Fluoranthene	UG/KG	50000	-	64 J	52 J	2,800 J
Fluorene	UG/KG	50000	-			
Indeno(1,2,3-cd)pyrene	UG/KG	3200	-	230 J	53 J	1,600 J
Naphthalene	UG/KG	13000	-	95 J		150 J
Phenanthrene	UG/KG	50000	-	180 J		530 J
Pyrene	UG/KG	50000	-	170 J	56 J	4,100 J
Pesticides						
4,4'-DDE	UG/KG	2100	-			
4,4'-DDT	UG/KG	2100	-			
Endrin aldehyde	UG/KG	-	-			
Metals						
Aluminum	MG/KG	-	33000	20,800	2,670	20,700
Antimony	MG/KG	-	-			
Arsenic	MG/KG	7.5	3-12	10.9	0.97 B	7.6
Barium	MG/KG	300	15-600	183	149	182
Beryllium	MG/KG	0.16	0-1.75	3.8	0.60	4.4
Cadmium	MG/KG	10 *	0.1-1	13.3	0.79	1.4
Calcium	MG/KG	-	130-35000	118,000	19,200	166,000
Chromium	MG/KG	50 *	1.5-40	18.4	10.9	10.4
Cobalt	MG/KG	30	2.5-60	6.5	36.5	2.6 B
Copper	MG/KG	25	1-50	41.1	33.2	31.6

Criteria (1)- NYSDEC TAGM: Determination of Soil Cleanup Objectives and Cleanup Levels; HWR-94-4046 January 24, 1994 (Revised). Recommended Cleanup Objectives.

Criteria (2)- NYSDEC TAGM: Determination of Soil Cleanup Objectives and Cleanup Levels; HWR-94-4046 January 24, 1994 (Revised). Eastern USA Background values.

Flags assigned during chemistry validation are shown.

 Concentration Exceeds Criteria 1
 Concentration Exceeds Criteria 2

* - Typical Industrial Site Background Levels

** - Weak Acid Dissociable Cyanide

Only Detected Results Reported.

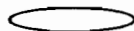
TABLE 4-2
SUMMARY OF DETECTED ANALYTES IN SURFACE SOIL SAMPLES
UNION SHIP CANAL

Location ID				TT-307B	TT-308B	TT-309B
Sample ID				TT-307-SURFACE	TT-308-SURFACE	TT-309-SURFACE
Matrix				Soil	Soil	Soil
Depth Interval (ft)				0.0-0.1	0.0-0.1	0.0-0.1
Date Sampled				10/03/01	10/03/01	10/03/01
Parameter	Units	Criteria (1)	Criteria (2)			
Metals						
Iron	MG/KG	2000	2000-550000	80,100	33,400	29,200
Lead	MG/KG	1000 *	200-500	858	55.8	64.8
Magnesium	MG/KG	-	100-5000	6,410	6,600	29,100
Manganese	MG/KG	-	50-5000	1,990	43,900	2,230
Mercury	MG/KG	0.1	0.001-0.2			
Nickel	MG/KG	13	0.5-25	18.3	201	15.6
Potassium	MG/KG	-	8500-43000	2,200	560	1,430
Selenium	MG/KG	2	0.1-3.9			
Silver	MG/KG	-	-		4.7	0.78 B
Sodium	MG/KG	-	6000-8000	467 B	155 B	1,270
Thallium	MG/KG	-	-		0.27 B	
Vanadium	MG/KG	150	1-300	37.6	8.2	7.3
Zinc	MG/KG	20	9-50	352	129	132
Miscellaneous Parameters						
Cyanide, Free **	MG/KG	-	-	0.81		
Cyanide, Total	MG/KG	-	-	R	R	R
Total Solids	%	-	-	80.2	88.8	90.4

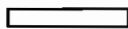
Criteria (1)- NYSDEC TAGM: Determination of Soil Cleanup Objectives and Cleanup Levels; HWR-94-4046 January 24, 1994 (Revised). Recommended Cleanup Objectives.

Criteria (2)- NYSDEC TAGM: Determination of Soil Cleanup Objectives and Cleanup Levels; HWR-94-4046 January 24, 1994 (Revised). Eastern USA Background values.

Flags assigned during chemistry validation are shown.



Concentration Exceeds Criteria 1

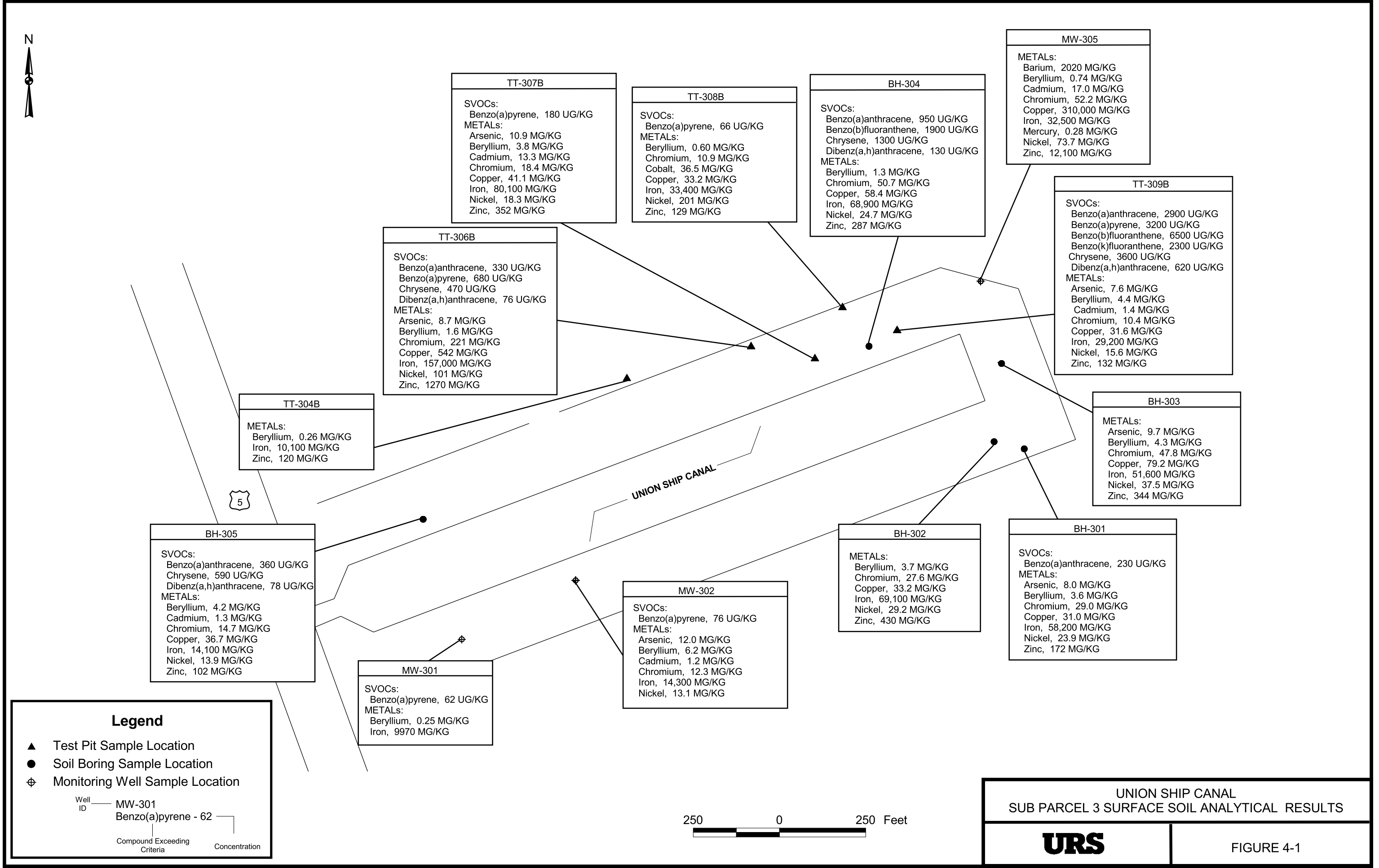


Concentration Exceeds Criteria 2

* - Typical Industrial Site Background Levels

** - Weak Acid Dissociable Cyanide

Only Detected Results Reported.



samples from the remainder of the site. However, these concentrations are still relatively low, being only about two to four times greater than the SCGs.

The presence of PAHs is extremely common in urban soils in highly industrialized cities, in general, and more specifically in soils at former industrial sites. The concentrations observed in the surface soils in Subparcel 3 are typical of levels recorded at other industrial sites and urban neighborhoods in Buffalo. The presence of the PAHs most likely resulted from past operations at the site, the railroad, and airborne deposition from other industrial facilities in the vicinity.

Various metals including arsenic, barium, beryllium, cadmium, chromium, cobalt, copper, iron, mercury, nickel, and zinc were detected in some, or all, of the soil samples at concentrations exceeding the SCGs. However, in many cases the concentrations were within the ranges of background concentrations for metals in soils in the eastern United States (Table 4-2). Total cyanide was detected in one sample at a concentration of 1.7 mg/kg. Free cyanide (i.e., weak acid dissociable) ranging from 0.81 to 5.0 mg/kg was detected in 7 of the 13 samples analyzed. NYSDEC TAGM 4046 does not specify a recommended soil cleanup level for cyanide or free cyanide. However, the U. S. Environmental Protection Agency (USEPA) has developed preliminary remediation goals (PRGs) for free cyanide based on direct contact exposure pathways of 1,200 mg/kg for residential and 12,000 mg/kg for industrial soils. The sample results are generally two to three orders of magnitude less than these criteria.

Only a limited number of pesticides were detected in a few of the samples and none at concentrations that exceeded the SCGs. No PCBs were detected in any of the samples.

In general, contamination in the surface soils is limited to various metals across the site and a few localized areas, primarily in the northeast portion of the site, with elevated levels of cPAHs.

4.3.3 Subsurface Soils

The analytical data for the subsurface soils (i.e., depth > 2") is summarized in Table 4-3, presented graphically in Figure 4-2, and contained in Attachment A of Appendix G. As

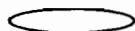
TABLE 4-3
SUMMARY OF DETECTED ANALYTES IN SUBSURFACE SOIL SAMPLES
UNION SHIP CANAL

Location ID				BH-301	BH-302	BH-303	BH-304	BH-305
Sample ID				BH-301-4-6	BH-302-4-6	BH-303-4-6	BH-304-6-8	BH-305-12-14
Matrix				Soil	Soil	Soil	Soil	Soil
Depth Interval (ft)				4.0-6.0	4.0-6.0	4.0-6.0	6.0-8.0	12.0-14.0
Date Sampled				10/10/01	10/10/01	10/10/01	10/10/01	10/11/01
Parameter	Units	Criteria (1)	Criteria (2)					
Volatiles Organic Compounds								
Acetone	UG/KG	200	-					
Benzene	UG/KG	60	-		4 J	9 J		
Carbon disulfide	UG/KG	2700	-		2 J	7 J		
Ethylbenzene	UG/KG	5500	-			4 J		
Isopropylbenzene (Cumene)	UG/KG	-	-					
m&p-Xylene	UG/KG	1200	-			14 J		
Methyl ethyl ketone (2-Butanone)	UG/KG	300	-		61 J	30 J		
Methyl tert-butyl ether	UG/KG	-	-					
Methylcyclohexane	UG/KG	-	-			10 J		
Methylene chloride	UG/KG	100	-					
p-Xylene	UG/KG	1200	-			8 J		
Toluene	UG/KG	1500	-		8 J	5 J		
Semivolatiles Organic Compounds								
1,1'-Biphenyl	UG/KG	-	-				820 J	
2-Methylnaphthalene	UG/KG	36400	-			700 J	2,400 J	
Acenaphthene	UG/KG	50000	-			580 J	3,500 J	
Acenaphthylene	UG/KG	41000	-				310 J	
Acetophenone	UG/KG	-	-					
Anthracene	UG/KG	50000	-	110 J		460 J	4,200 J	
Benzaldehyde	UG/KG	-	-					
Benzo(a)anthracene	UG/KG	224	-	150 J		320 J	4,400 J	

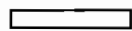
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Criteria (2)- NYSDEC TAGM: Determination of Soil Cleanup Objectives and Cleanup Levels; HWR-94-4046 January 24, 1994 (Revised). Eastern USA Background values.

Flags assigned during chemistry validation are shown.



Concentration Exceeds Criteria 1



Concentration Exceeds Criteria 2

* - Typical Industrial Site Background Levels

** - Weak Acid Dissociable Cyanide

Only Detected Results Reported.

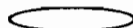
TABLE 4-3
SUMMARY OF DETECTED ANALYTES IN SUBSURFACE SOIL SAMPLES
UNION SHIP CANAL

Location ID				BH-301	BH-302	BH-303	BH-304	BH-305
Sample ID				BH-301-4-6	BH-302-4-6	BH-303-4-6	BH-304-6-8	BH-305-12-14
Matrix				Soil	Soil	Soil	Soil	Soil
Depth Interval (ft)				4.0-6.0	4.0-6.0	4.0-6.0	6.0-8.0	12.0-14.0
Date Sampled				10/10/01	10/10/01	10/10/01	10/10/01	10/11/01
Parameter	Units	Criteria (1)	Criteria (2)					
Semivolatiles Organic Compounds								
Benzo(a)pyrene	UG/KG	61	-					
Benzo(b)fluoranthene	UG/KG	1100	-	270 J		320 J	4,300 J	
Benzo(g,h,i)perylene	UG/KG	50000	-			140 J	1,000 J	
Benzo(k)fluoranthene	UG/KG	1100	-	82 J		120 J	1,500 J	
bis(2-Ethylhexyl)phthalate	UG/KG	50000	-					
Carbazole	UG/KG	-	-				1,100 J	
Chrysene	UG/KG	400	-	240 J	1,200 J	370 J	4,500 J	
Dibenz(a,h)anthracene	UG/KG	14	-				140 J	
Dibenzofuran	UG/KG	6200	-				2,800 J	
Diethylphthalate	UG/KG	7100	-					
n-butylphthalate	UG/KG	8100	-					
Di-n-octylphthalate	UG/KG	50000	-					
Fluoranthene	UG/KG	50000	-	350 J		1,000 J	13,000 DJ	
Fluorene	UG/KG	50000	-	81 J		1,100 J	3,700 J	
Indeno(1,2,3-cd)pyrene	UG/KG	3200	-	66 J		190 J	1,800 J	
Naphthalene	UG/KG	13000	-			410 J	1,900 J	
N-Nitrosodiphenylamine	UG/KG	-	-			3,500 J		
Phenanthrene	UG/KG	50000	-	290 J	1,500 J	1,600 J	15,000 DJ	
Pyrene	UG/KG	50000	-	360 J	1,300 J	760 J	9,500 DJ	
Pesticides								
4,4'-DDD	UG/KG	2900	-					

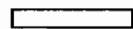
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Criteria (2)- NYSDEC TAGM: Determination of Soil Cleanup Objectives and Cleanup Levels; HWR-94-4046 January 24, 1994 (Revised). Eastern USA Background values.

Flags assigned during chemistry validation are shown.



Concentration Exceeds Criteria 1



Concentration Exceeds Criteria 2

* - Typical Industrial Site Background Levels

** - Weak Acid Dissociable Cyanide

Only Detected Results Reported.

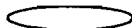
TABLE 4-3
SUMMARY OF DETECTED ANALYTES IN SUBSURFACE SOIL SAMPLES
UNION SHIP CANAL

Location ID				BH-301	BH-302	BH-303	BH-304	BH-305
Sample ID				BH-301-4-6	BH-302-4-6	BH-303-4-6	BH-304-6-8	BH-305-12-14
Matrix				Soil	Soil	Soil	Soil	Soil
Depth Interval (ft)				4.0-6.0	4.0-6.0	4.0-6.0	6.0-8.0	12.0-14.0
Date Sampled				10/10/01	10/10/01	10/10/01	10/10/01	10/11/01
Parameter	Units	Criteria (1)	Criteria (2)					
Pesticides								
4,4'-DDT	UG/KG	2100	-	14 JN				
alpha-Chlordane	UG/KG	-	-				26 R	
Dieldrin	UG/KG	44	-	10 J				
Methoxychlor	UG/KG	-	-					
Metals								
Aluminum	MG/KG	-	33000	15,600	788	14,000	35,400 J	10,600
Antimony	MG/KG	-	-					5.2 BJ
Arsenic	MG/KG	7.5	3-12	7.7 J	39.6 J	11.4 J	18.5 J	3.5 J
Barium	MG/KG	300	15-600	167	33.4	234	279 J	94.9
Beryllium	MG/KG	0.16	0-1.75	3.5 J	0.22 B	2.0 J	5.8 J	0.55 B
Cadmium	MG/KG	10 *	0.1-1				1.8 J	0.92 J
Calcium	MG/KG	-	130-35000	90,600	3,340	55,300	199,000 J	79,100
Chromium	MG/KG	50 *	1.5-40		1,170 J	25.4 J	15.3 J	15.1 J
Cobalt	MG/KG	30	2.5-60	5.4 B	41.1	7.7	3.6 BJ	8.8
Copper	MG/KG	25	1-50	25.1 J	1,550 J	130 J	30.0 J	24.1 J
Iron	MG/KG	2000	2000-550000	93,800	59,400	94,100	34,800 J	18,000
Lead	MG/KG	1000 *	200-500	453	152	175	44.5 J	8.2
Magnesium	MG/KG	-	100-5000	17,300	765	6,620	21,600 J	21,900
Manganese	MG/KG	-	50-5000	3,300	5,120	1,940	2,430 J	430
Mercury	MG/KG	0.1	0.001-0.2					
Nickel	MG/KG	13	0.5-25	25.5 J	545 J	27.2 J	20.5 J	22.6 J

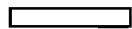
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Criteria (2)- NYSDEC TAGM: Determination of Soil Cleanup Objectives and Cleanup Levels; HWR-94-4046 January 24, 1994 (Revised). Eastern USA Background values.

Flags assigned during chemistry validation are shown.



Concentration Exceeds Criteria 1



Concentration Exceeds Criteria 2

* - Typical Industrial Site Background Levels

** - Weak Acid Dissociable Cyanide

Only Detected Results Reported.

TABLE 4-3
SUMMARY OF DETECTED ANALYTES IN SUBSURFACE SOIL SAMPLES
UNION SHIP CANAL

Location ID				BH-301	BH-302	BH-303	BH-304	BH-305
Sample ID				BH-301-4-6	BH-302-4-6	BH-303-4-6	BH-304-6-8	BH-305-12-14
Matrix				Soil	Soil	Soil	Soil	Soil
Depth Interval (ft)				4.0-6.0	4.0-6.0	4.0-6.0	6.0-8.0	12.0-14.0
Date Sampled				10/10/01	10/10/01	10/10/01	10/10/01	10/11/01
Parameter	Units	Criteria (1)	Criteria (2)					
Metals								
Potassium	MG/KG	-	8500-43000	1,730	79.9 B	1,620	1,720 J	1,330
Selenium	MG/KG	2	0.1-3.9					
Silver	MG/KG	-	-		13.1 BJ		2.0 J	
Sodium	MG/KG	-	6000-8000	525 B	59.6 B	366 B	672 BJ	225 B
Thallium	MG/KG	-	-	2.8		0.61 B		
Vanadium	MG/KG	150	1-300	21.7 B	76.0 B	28.1 B	13.0 J	22.9
Zinc	MG/KG	20	9-50	1,150	3,570	682	78.6 R	56.7
Miscellaneous Parameters								
Cyanide, Free **	MG/KG	-	-	1.8 J		0.71 J	0.70 J	
Cyanide, Total	MG/KG	-	-	15.1 R	0.37 R	1.4 R	2.1 R	0.37 R
Total Solids	%	-	-	85.5	87.4	80	50.1	82.2

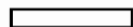
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Criteria (2)- NYSDEC TAGM: Determination of Soil Cleanup Objectives and Cleanup Levels; HWR-94-4046 January 24, 1994 (Revised). Eastern USA Background values.

Flags assigned during chemistry validation are shown.



Concentration Exceeds Criteria 1



Concentration Exceeds Criteria 2

* - Typical Industrial Site Background Levels

** - Weak Acid Dissociable Cyanide

Only Detected Results Reported.

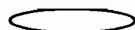
TABLE 4-3
SUMMARY OF DETECTED ANALYTES IN SUBSURFACE SOIL SAMPLES
UNION SHIP CANAL

Location ID				BH-306	BH-306	BH-307	BH-308	BH-309
Sample ID				BH-306-18-20	BH-306-24-26	BH-307-4-6	BH-308-8-10	BH-309-7-9
Matrix				Soil	Soil	Soil	Soil	Soil
Depth Interval (ft)				18.0-20.0	24.0-26.0	4.0-6.0	8.0-10.0	7.0-9.0
Date Sampled				10/11/01	10/11/01	10/15/01	10/16/01	10/18/01
Parameter	Units	Criteria (1)	Criteria (2)					
Volatiles Organic Compounds								
Acetone	UG/KG	200	-					
Benzene	UG/KG	60	-					
Carbon disulfide	UG/KG	2700	-	12 J	5 J	4 J	7 J	
Ethylbenzene	UG/KG	5500	-					
Isopropylbenzene (Cumene)	UG/KG	-	-					
m&p-Xylene	UG/KG	1200	-					
Methyl ethyl ketone (2-Butanone)	UG/KG	300	-	49 J	20 J		190 J	24 J
Methyl tert-butyl ether	UG/KG	-	-	5 J	3 J			
Methylcyclohexane	UG/KG	-	-					
Methylene chloride	UG/KG	100	-					
Xylene	UG/KG	1200	-					
Toluene	UG/KG	1500	-			4 J	4 J	
Semivolatiles Organic Compounds								
1,1'-Biphenyl	UG/KG	-	-	72 J				
2-Methylnaphthalene	UG/KG	36400	-	420 J	90 J			
Acenaphthene	UG/KG	50000	-	97 J				
Acenaphthylene	UG/KG	41000	-					
Acetophenone	UG/KG	-	-	240 J				
Anthracene	UG/KG	50000	-	150 J	81 J			
Benzaldehyde	UG/KG	-	-	170 J				
Benzo(a)anthracene	UG/KG	224	-	440 J	200 J			

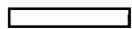
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Criteria (2)- NYSDEC TAGM: Determination of Soil Cleanup Objectives and Cleanup Levels; HWR-94-4046 January 24, 1994 (Revised). Eastern USA Background values.

Flags assigned during chemistry validation are shown.



Concentration Exceeds Criteria 1



Concentration Exceeds Criteria 2

* - Typical Industrial Site Background Levels

** - Weak Acid Dissociable Cyanide

Only Detected Results Reported.

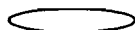
TABLE 4-3
SUMMARY OF DETECTED ANALYTES IN SUBSURFACE SOIL SAMPLES
UNION SHIP CANAL

Location ID				BH-306	BH-306	BH-307	BH-308	BH-309
Sample ID				BH-306-18-20	BH-306-24-26	BH-307-4-6	BH-308-8-10	BH-309-7-9
Matrix				Soil	Soil	Soil	Soil	Soil
Depth Interval (ft)				18.0-20.0	24.0-26.0	4.0-6.0	8.0-10.0	7.0-9.0
Date Sampled				10/11/01	10/11/01	10/15/01	10/16/01	10/18/01
Parameter	Units	Criteria (1)	Criteria (2)					
Semivolatiles Organic Compounds								
Benzo(a)pyrene	UG/KG	61	-					
Benzo(b)fluoranthene	UG/KG	1100	-	570 J	310 J			
Benzo(g,h,i)perylene	UG/KG	50000	-	150 J	92 J			
Benzo(k)fluoranthene	UG/KG	1100	-	190 J	83 J			
bis(2-Ethylhexyl)phthalate	UG/KG	50000	-	1,400 UJ				
Carbazole	UG/KG	-	-					
Chrysene	UG/KG	400	-	530 J	270 J			
Dibenz(a,h)anthracene	UG/KG	14	-					
Dibenzofuran	UG/KG	6200	-	130 J	52 J			
Diethylphthalate	UG/KG	7100	-					
n-butylphthalate	UG/KG	8100	-					
Di-n-octylphthalate	UG/KG	50000	-				230 J	
Fluoranthene	UG/KG	50000	-	780 J	380 J	71 J		42 J
Fluorene	UG/KG	50000	-	110 J	51 J			
Indeno(1,2,3-cd)pyrene	UG/KG	3200	-	270 J	150 J			
Naphthalene	UG/KG	13000	-	1,200 J	110 J	110 J		
N-Nitrosodiphenylamine	UG/KG	-	-					
Phenanthrene	UG/KG	50000	-	820 J	310 J	100 J		
Pyrene	UG/KG	50000	-	620 J	380 J	55 J		42 J
Pesticides								
4,4'-DDD	UG/KG	2900	-					

Criteria (1)- NYSDEC TAGM: Determination of Soil Cleanup Objectives and Cleanup Levels; HWR-94-4046 January 24, 1994 (Revised). Recommended Cleanup Objectives.

Criteria (2)- NYSDEC TAGM: Determination of Soil Cleanup Objectives and Cleanup Levels; HWR-94-4046 January 24, 1994 (Revised). Eastern USA Background values.

Flags assigned during chemistry validation are shown.



Concentration Exceeds Criteria 1



Concentration Exceeds Criteria 2

* - Typical Industrial Site Background Levels

** - Weak Acid Dissociable Cyanide

Only Detected Results Reported.

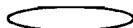
TABLE 4-3
SUMMARY OF DETECTED ANALYTES IN SUBSURFACE SOIL SAMPLES
UNION SHIP CANAL

Location ID				BH-306	BH-306	BH-307	BH-308	BH-309
Sample ID				BH-306-18-20	BH-306-24-26	BH-307-4-6	BH-308-8-10	BH-309-7-9
Matrix				Soil	Soil	Soil	Soil	Soil
Depth Interval (ft)				18.0-20.0	24.0-26.0	4.0-6.0	8.0-10.0	7.0-9.0
Date Sampled				10/11/01	10/11/01	10/15/01	10/16/01	10/18/01
Parameter	Units	Criteria (1)	Criteria (2)					
Pesticides								
4,4'-DDT	UG/KG	2100	-					
alpha-Chlordane	UG/KG	-	-					
Dieldrin	UG/KG	44	-					
Methoxychlor	UG/KG	-	-					
Metals								
Aluminum	MG/KG	-	33000	25,400 J	9,260	13,300	9,150	9,980
Antimony	MG/KG	-	-	6.5 BJ		6.5 BJ	5.5 BJ	3.6 BJ
Arsenic	MG/KG	7.5	3-12	4.2 J	3.0 J	4.4 J	3.3 J	5.4 J
Barium	MG/KG	300	15-600	267 J	94.1	118	60.0	59.8
Beryllium	MG/KG	0.16	0-1.75	2.6 J	1.1	1.5 J	0.69	0.59 B
Cadmium	MG/KG	10 *	0.1-1	3.9 J			0.72	
Calcium	MG/KG	-	130-35000	159,000 J	78,500	46,400	89,400	26,200
Chromium	MG/KG	50 *	1.5-40	62.2 J		13.6 J	13.2 J	13.7 J
Cobalt	MG/KG	30	2.5-60	10.9 J	12.9	11.8	9.7	11.5
Copper	MG/KG	25	1-50	46.4 J	25.3 J	46.5 J	88.2 J	39.9 J
Iron	MG/KG	2000	2000-550000	21,700 J	143,000	56,900	20,000	20,500
Lead	MG/KG	1000 *	200-500	106 J	87.4	38.8	13.5	16.7
Magnesium	MG/KG	-	100-5000	4,710 J	4,330	9,180	13,000	9,310
Manganese	MG/KG	-	50-5000	310 J	1,450	1,180	662	333
Mercury	MG/KG	0.1	0.001-0.2		0.14 R			
Nickel	MG/KG	13	0.5-25	27.7 J	32.4 J	33.9 J	30.2 J	28.3 J

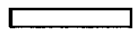
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Criteria (2)- NYSDEC TAGM: Determination of Soil Cleanup Objectives and Cleanup Levels; HWR-94-4046 January 24, 1994 (Revised). Eastern USA Background values.

Flags assigned during chemistry validation are shown.



Concentration Exceeds Criteria 1



Concentration Exceeds Criteria 2

* - Typical Industrial Site Background Levels

** - Weak Acid Dissociable Cyanide

Only Detected Results Reported.

TABLE 4-3
SUMMARY OF DETECTED ANALYTES IN SUBSURFACE SOIL SAMPLES
UNION SHIP CANAL

Location ID				BH-306	BH-306	BH-307	BH-308	BH-309
Sample ID				BH-306-18-20	BH-306-24-26	BH-307-4-6	BH-308-8-10	BH-309-7-9
Matrix				Soil	Soil	Soil	Soil	Soil
Depth Interval (ft)				18.0-20.0	24.0-26.0	4.0-6.0	8.0-10.0	7.0-9.0
Date Sampled				10/11/01	10/11/01	10/15/01	10/16/01	10/18/01
Parameter	Units	Criteria (1)	Criteria (2)					
Metals								
Potassium	MG/KG	-	8500-43000	25,400 J	9,340	3,380	2,230	1,500
Selenium	MG/KG	2	0.1-3.9					
Silver	MG/KG	-	-	2.5 J				0.95 BJ
Sodium	MG/KG	-	6000-8000	1,230 J	588 B	190 B	182 B	138 B
Thallium	MG/KG	-	-	2.6 J	0.84 B	0.31 B	0.26 B	0.27 B
Vanadium	MG/KG	150	1-300	48.5 J	43.5 B	27.6	14.5	21.5
Zinc	MG/KG	20	9-50	638 J	379	60.1 R	45.3 R	60.8
Miscellaneous Parameters								
Cyanide, Free **	MG/KG	-	-	0.96 J				
Cyanide, Total	MG/KG	-	-	78.7 R	8.1 R	0.79 R	6.4 J	0.18 B
Total Solids	%	-	-	48.6	68.1	73.8	76.5	82.3

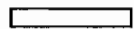
Criteria (1)- NYSDEC TAGM: Determination of Soil Cleanup Objectives and Cleanup Levels; HWR-94-4046 January 24, 1994 (Revised). Recommended Cleanup Objectives.

Criteria (2)- NYSDEC TAGM: Determination of Soil Cleanup Objectives and Cleanup Levels; HWR-94-4046 January 24, 1994 (Revised). Eastern USA Background values.

Flags assigned during chemistry validation are shown.



Concentration Exceeds Criteria 1



Concentration Exceeds Criteria 2

* - Typical Industrial Site Background Levels

** - Weak Acid Dissociable Cyanide

Only Detected Results Reported.

TABLE 4-3
SUMMARY OF DETECTED ANALYTES IN SUBSURFACE SOIL SAMPLES
UNION SHIP CANAL

Location ID				MW-301	MW-302	MW-303	MW-303	MW-304
Sample ID				MW-301-4-6	MW-302-4-6	MW-303-7-9	MW-303-9-11	MW-304-2-4
Matrix				Soil	Soil	Soil	Soil	Soil
Depth Interval (ft)				4.0-6.0	4.0-6.0	7.0-9.0	9.0-11.0	2.0-4.0
Date Sampled				10/19/01	10/18/01	11/01/01	11/01/01	10/11/01
Parameter	Units	Criteria (1)	Criteria (2)					
Volatiles Organic Compounds								
Acetone	UG/KG	200	-			NA	13	
Benzene	UG/KG	60	-			NA		3 J
Carbon disulfide	UG/KG	2700	-	21 J	4 J	NA		3 J
Ethylbenzene	UG/KG	5500	-			NA		
Isopropylbenzene (Cumene)	UG/KG	-	-			NA		
m&p-Xylene	UG/KG	1200	-			NA	NA	
Methyl ethyl ketone (2-Butanone)	UG/KG	300	-	94 J	55 J	NA	12	93 J
Methyl tert-butyl ether	UG/KG	-	-	7 J		NA		
Methylcyclohexane	UG/KG	-	-			NA		
Methylene chloride	UG/KG	100	-	13 J		NA	5 J	
Xylene	UG/KG	1200	-			NA	NA	
Toluene	UG/KG	1500	-	10 J		NA	3 J	3 J
Semivolatiles Organic Compounds								
1,1'-Biphenyl	UG/KG	-	-				NA	
2-Methylnaphthalene	UG/KG	36400	-				NA	
Acenaphthene	UG/KG	50000	-				NA	
Acenaphthylene	UG/KG	41000	-				NA	
Acetophenone	UG/KG	-	-				NA	
Anthracene	UG/KG	50000	-				NA	
Benzaldehyde	UG/KG	-	-	200 J			NA	
Benzo(a)anthracene	UG/KG	224	-				NA	

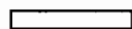
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Criteria (2)- NYSDEC TAGM: Determination of Soil Cleanup Objectives and Cleanup Levels; HWR-94-4046 January 24, 1994 (Revised). Eastern USA Background values.

Flags assigned during chemistry validation are shown.



Concentration Exceeds Criteria 1



Concentration Exceeds Criteria 2

* - Typical Industrial Site Background Levels

** - Weak Acid Dissociable Cyanide

Only Detected Results Reported.

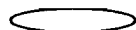
TABLE 4-3
SUMMARY OF DETECTED ANALYTES IN SUBSURFACE SOIL SAMPLES
UNION SHIP CANAL

Location ID				MW-301	MW-302	MW-303	MW-303	MW-304
Sample ID				MW-301-4-6	MW-302-4-6	MW-303-7-9	MW-303-9-11	MW-304-2-4
Matrix				Soil	Soil	Soil	Soil	Soil
Depth Interval (ft)				4.0-6.0	4.0-6.0	7.0-9.0	9.0-11.0	2.0-4.0
Date Sampled				10/19/01	10/18/01	11/01/01	11/01/01	10/11/01
Parameter	Units	Criteria (1)	Criteria (2)					
Semivolatiles Organic Compounds								
Benzo(a)pyrene	UG/KG	61	-		110 J		NA	
Benzo(b)fluoranthene	UG/KG	1100	-				NA	
Benzo(g,h,i)perylene	UG/KG	50000	-				NA	
Benzo(k)fluoranthene	UG/KG	1100	-				NA	
bis(2-Ethylhexyl)phthalate	UG/KG	50000	-			450	NA	
Carbazole	UG/KG	-	-				NA	
Chrysene	UG/KG	400	-				NA	
Dibenz(a,h)anthracene	UG/KG	14	-				NA	
Dibenzofuran	UG/KG	6200	-				NA	
Diethylphthalate	UG/KG	7100	-			1,000	NA	
n-butylphthalate	UG/KG	8100	-			500	NA	
Di-n-octylphthalate	UG/KG	50000	-				NA	
Fluoranthene	UG/KG	50000	-				NA	
Fluorene	UG/KG	50000	-				NA	
Indeno(1,2,3-cd)pyrene	UG/KG	3200	-				NA	
Naphthalene	UG/KG	13000	-				NA	
N-Nitrosodiphenylamine	UG/KG	-	-				NA	
Phenanthrene	UG/KG	50000	-				NA	
Pyrene	UG/KG	50000	-				NA	
Pesticides								
4,4'-DDD	UG/KG	2900	-				NA	14 JN

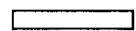
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Criteria (2)- NYSDC TAGM: Determination of Soil Cleanup Objectives and Cleanup Levels; HWR-94-4046 January 24, 1994 (Revised). Eastern USA Background values.

Flags assigned during chemistry validation are shown.



Concentration Exceeds Criteria 1



Concentration Exceeds Criteria 2

* - Typical Industrial Site Background Levels

** - Weak Acid Dissociable Cyanide

Only Detected Results Reported.

TABLE 4-3
SUMMARY OF DETECTED ANALYTES IN SUBSURFACE SOIL SAMPLES
UNION SHIP CANAL

Location ID				MW-301	MW-302	MW-303	MW-303	MW-304
Sample ID				MW-301-4-6	MW-302-4-6	MW-303-7-9	MW-303-9-11	MW-304-2-4
Matrix				Soil	Soil	Soil	Soil	Soil
Depth Interval (ft)				4.0-6.0	4.0-6.0	7.0-9.0	9.0-11.0	2.0-4.0
Date Sampled				10/19/01	10/18/01	11/01/01	11/01/01	10/11/01
Parameter	Units	Criteria (1)	Criteria (2)					
Pesticides								
4,4'-DDT	UG/KG	2100	-				NA	
alpha-Chlordane	UG/KG	-	-				NA	
Dieldrin	UG/KG	44	-				NA	7.9 R
Methoxychlor	UG/KG	-	-				NA	
Metals								
Aluminum	MG/KG	-	33000	6,840 J	14,600 J	5,420	NA	6,040
Antimony	MG/KG	-	-			0.92 UJ	NA	
Arsenic	MG/KG	7.5	3-12	5.6 J	7.2 J	2.1 B	NA	13.2 J
Barium	MG/KG	300	15-600	69.5 BJ	68.3 J	38.5 B	NA	53.3
Beryllium	MG/KG	0.16	0-1.75	0.45 BJ	0.84 BJ	0.35 B	NA	1.5 J
Cadmium	MG/KG	10 *	0.1-1			0.53 B	NA	
Calcium	MG/KG	-	130-35000	17,900 J	9,110 J	2,780	NA	43,500
Chromium	MG/KG	50 *	1.5-40	7.4 J	21.1 J	9.5 R	NA	
Cobalt	MG/KG	30	2.5-60	3.4 BJ	19.1 J	4.5 B	NA	13.0
Copper	MG/KG	25	1-50	44.4 J	33.5 J	13.4	NA	45.5 J
Iron	MG/KG	2000	2000-550000	8,420 J	21,900 J	10,600	NA	250,000
Lead	MG/KG	1000 *	200-500	9.3 J	16.8 J	8.5 J	NA	50.5
Magnesium	MG/KG	-	100-5000	2,380 J	6,060 J	2,010	NA	4,150
Manganese	MG/KG	-	50-5000	111 J	227 J	107 J	NA	2,300
Mercury	MG/KG	0.1	0.001-0.2			0.063 U	NA	
Nickel	MG/KG	13	0.5-25	21.4 J	48.3 J	11.8 J	NA	42.4 J

Criteria (1)- NYSDEC TAGM: Determination of Soil Cleanup Objectives and Cleanup Levels; HWR-94-4046 January 24, 1994 (Revised). Recommended Cleanup Objectives.

Criteria (2)- NYSDEC TAGM: Determination of Soil Cleanup Objectives and Cleanup Levels; HWR-94-4046 January 24, 1994 (Revised). Eastern USA Background values.

Flags assigned during chemistry validation are shown.



Concentration Exceeds Criteria 1



Concentration Exceeds Criteria 2

* - Typical Industrial Site Background Levels

** - Weak Acid Dissociable Cyanide

Only Detected Results Reported.

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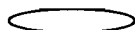
TABLE 4-3
SUMMARY OF DETECTED ANALYTES IN SUBSURFACE SOIL SAMPLES
UNION SHIP CANAL

Location ID				MW-301	MW-302	MW-303	MW-303	MW-304
Sample ID				MW-301-4-6	MW-302-4-6	MW-303-7-9	MW-303-9-11	MW-304-2-4
Matrix				Soil	Soil	Soil	Soil	Soil
Depth Interval (ft)				4.0-6.0	4.0-6.0	7.0-9.0	9.0-11.0	2.0-4.0
Date Sampled				10/19/01	10/18/01	11/01/01	11/01/01	10/11/01
Parameter	Units	Criteria (1)	Criteria (2)					
Metals								
Potassium	MG/KG	-	8500-43000	860 BJ	2,010 J	352 B	NA	622 B
Selenium	MG/KG	2	0.1-3.9	1.1 BJ		1.7 J	NA	
Silver	MG/KG	-	-			0.14 U	NA	
Sodium	MG/KG	-	6000-8000	252 BJ	256 BJ	41.1 B	NA	121 B
Thallium	MG/KG	-	-		0.67 BJ		NA	0.73 B
Vanadium	MG/KG	150	1-300	11.9 BJ	26.0 J	19.2	NA	46.3 B
Zinc	MG/KG	20	9-50	62.0 R	109 J	33.2	NA	538
Miscellaneous Parameters								
Cyanide, Free **	MG/KG	-	-			NA	NA	
Cyanide, Total	MG/KG	-	-	0.68 R	0.28 R		NA	1.7 R
Total Solids	%	-	-	22.5	46.9	79.2	83.0	72

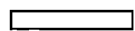
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Criteria (2)- NYSDEC TAGM: Determination of Soil Cleanup Objectives and Cleanup Levels; HWR-94-4046 January 24, 1994 (Revised). Eastern USA Background values.

Flags assigned during chemistry validation are shown.



Concentration Exceeds Criteria 1



Concentration Exceeds Criteria 2

* - Typical Industrial Site Background Levels

** - Weak Acid Dissociable Cyanide

Only Detected Results Reported.

TABLE 4-3
SUMMARY OF DETECTED ANALYTES IN SUBSURFACE SOIL SAMPLES
UNION SHIP CANAL

Location ID				MW-304	MW-306	TT-301B	TT-304B	TT-305B
Sample ID				MW-304-10-12	MW-306-6-8	TT-301-4-6	TT-304-5-7	TT-305-9-11
Matrix				Soil	Soil	Soil	Soil	Soil
Depth Interval (ft)				10.0-12.0	6.0-8.0	4.0-6.0	5.0-7.0	9.0-11.0
Date Sampled				10/12/01	10/17/01	10/02/01	10/02/01	10/02/01
Parameter	Units	Criteria (1)	Criteria (2)					
Volatiles Organic Compounds								
Acetone	UG/KG	200	-					
Benzene	UG/KG	60	-					
Carbon disulfide	UG/KG	2700	-		9 J			
Ethylbenzene	UG/KG	5500	-					
Isopropylbenzene (Cumene)	UG/KG	-	-		31 J			
m&p-Xylene	UG/KG	1200	-					
Methyl ethyl ketone (2-Butanone)	UG/KG	300	-		51 J			
Methyl tert-butyl ether	UG/KG	-	-		47 J			
Methylcyclohexane	UG/KG	-	-		16 J			
Methylene chloride	UG/KG	100	-					
Xylene	UG/KG	1200	-					
Toluene	UG/KG	1500	-					
Semivolatiles Organic Compounds								
1,1'-Biphenyl	UG/KG	-	-	38 J	170 J			
2-Methylnaphthalene	UG/KG	36400	-	94 J	310 J		72 J	
Acenaphthene	UG/KG	50000	-		1,400 J			
Acenaphthylene	UG/KG	41000	-					
Acetophenone	UG/KG	-	-					
Anthracene	UG/KG	50000	-		3,900 J			
Benzaldehyde	UG/KG	-	-					
Benzo(a)anthracene	UG/KG	224	-		9,200 DJ		86 J	

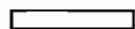
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Criteria (2)- NYSDEC TAGM: Determination of Soil Cleanup Objectives and Cleanup Levels; HWR-94-4046 January 24, 1994 (Revised). Eastern USA Background values.

Flags assigned during chemistry validation are shown.



Concentration Exceeds Criteria 1



Concentration Exceeds Criteria 2

* - Typical Industrial Site Background Levels

** - Weak Acid Dissociable Cyanide

Only Detected Results Reported.

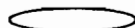
TABLE 4-3
SUMMARY OF DETECTED ANALYTES IN SUBSURFACE SOIL SAMPLES
UNION SHIP CANAL

Location ID				MW-304	MW-306	TT-301B	TT-304B	TT-305B
Sample ID				MW-304-10-12	MW-306-6-8	TT-301-4-6	TT-304-5-7	TT-305-9-11
Matrix				Soil	Soil	Soil	Soil	Soil
Depth Interval (ft)				10.0-12.0	6.0-8.0	4.0-6.0	5.0-7.0	9.0-11.0
Date Sampled				10/12/01	10/17/01	10/02/01	10/02/01	10/02/01
Parameter	Units	Criteria (1)	Criteria (2)					
Semivolatiles Organic Compounds								
Benzo(a)pyrene	UG/KG	61	-		7,000 DJ		75 J	
Benzo(b)fluoranthene	UG/KG	1100	-	51 J	9,500 DJ	51 J	150 J	
Benzo(g,h,i)perylene	UG/KG	50000	-		1,900 J			
Benzo(k)fluoranthene	UG/KG	1100	-		3,600 J		57 J	
bis(2-Ethylhexyl)phthalate	UG/KG	50000	-					
Carbazole	UG/KG	-	-		580 J			
Chrysene	UG/KG	400	-	130 J	8,900 DJ		120 J	
Dibenz(a,h)anthracene	UG/KG	14	-		1,100 J			
Dibenzofuran	UG/KG	6200	-		1,200 J			
Diethylphthalate	UG/KG	7100	-					
Di-n-butylphthalate	UG/KG	8100	-		77 J			
Di-n-octylphthalate	UG/KG	50000	-					
Fluoranthene	UG/KG	50000	-		18,000 DJ		180 J	
Fluorene	UG/KG	50000	-		1,800 J			
Indeno(1,2,3-cd)pyrene	UG/KG	3200	-		4,800 J		50 J	
Naphthalene	UG/KG	13000	-	340 J	350 J		86 J	
N-Nitrosodiphenylamine	UG/KG	-	-				290 J	
Phenanthrene	UG/KG	50000	-	110 J	14,000 DJ		210 J	
Pyrene	UG/KG	50000	-	100 J	21,000 DJ	44 J	180 J	
Pesticides								
4,4'-DDD	UG/KG	2900	-					

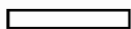
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Criteria (2)- NYSDEC TAGM: Determination of Soil Cleanup Objectives and Cleanup Levels; HWR-94-4046 January 24, 1994 (Revised). Eastern USA Background values.

Flags assigned during chemistry validation are shown.



Concentration Exceeds Criteria 1



Concentration Exceeds Criteria 2

* - Typical Industrial Site Background Levels

** - Weak Acid Dissociable Cyanide

Only Detected Results Reported.

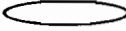
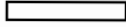
TABLE 4-3
SUMMARY OF DETECTED ANALYTES IN SUBSURFACE SOIL SAMPLES
UNION SHIP CANAL

Location ID				MW-304	MW-306	TT-301B	TT-304B	TT-305B
Sample ID				MW-304-10-12	MW-306-6-8	TT-301-4-6	TT-304-5-7	TT-305-9-11
Matrix				Soil	Soil	Soil	Soil	Soil
Depth Interval (ft)				10.0-12.0	6.0-8.0	4.0-6.0	5.0-7.0	9.0-11.0
Date Sampled				10/12/01	10/17/01	10/02/01	10/02/01	10/02/01
Parameter	Units	Criteria (1)	Criteria (2)					
Pesticides								
4,4'-DDT	UG/KG	2100	-					
alpha-Chlordane	UG/KG	-	-					
Dieldrin	UG/KG	44	-					
Methoxychlor	UG/KG	-	-					
Metals								
Aluminum	MG/KG	-	33000	486 R	22,100	17,600	11,900	6,030
Antimony	MG/KG	-	-					
Arsenic	MG/KG	7.5	3-12	13.2 J	15.5 J	4.5	8.4	4.4
Barium	MG/KG	300	15-600	37.6	235	189	131	55.3
Beryllium	MG/KG	0.16	0-1.75	0.33 B	3.2 J	1.8	2.4	0.46 B
Cadmium	MG/KG	10 *	0.1-1	19.2 J	31.9	1.2		
Calcium	MG/KG	-	130-35000	2,390	49,300	76,600	85,100	7,160
Chromium	MG/KG	50 *	1.5-40	942 J		19.7	48.8	7.6
Cobalt	MG/KG	30	2.5-60	45.3	12.1	10.1	8.2	3.8 B
Copper	MG/KG	25	1-50	625 J	336 J	21.6	38.8	17.7
Iron	MG/KG	2000	2000-550000	455,000	115,000	21,900	147,000	6,770
Lead	MG/KG	1000 *	200-500	146	688	21.9	127	11.4
Magnesium	MG/KG	-	100-5000	589	5,090	12,800	24,300	1,990
Manganese	MG/KG	-	50-5000	4,110	1,310	2,010	17,200	80.8
Mercury	MG/KG	0.1	0.001-0.2					
Nickel	MG/KG	13	0.5-25	943 J	35.9 J	40.8	81.7	11.8

Criteria (1)- NYSDEC TAGM: Determination of Soil Cleanup Objectives and Cleanup Levels; HWR-94-4046 January 24, 1994 (Revised). Recommended Cleanup Objectives.

Criteria (2)- NYSDEC TAGM: Determination of Soil Cleanup Objectives and Cleanup Levels; HWR-94-4046 January 24, 1994 (Revised). Eastern USA Background values.

Flags assigned during chemistry validation are shown.

 Concentration Exceeds Criteria 1
 Concentration Exceeds Criteria 2

* - Typical Industrial Site Background Levels

** - Weak Acid Dissociable Cyanide

Only Detected Results Reported.

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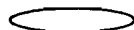
TABLE 4-3
SUMMARY OF DETECTED ANALYTES IN SUBSURFACE SOIL SAMPLES
UNION SHIP CANAL

Location ID				MW-304	MW-306	TT-301B	TT-304B	TT-305B
Sample ID				MW-304-10-12	MW-306-6-8	TT-301-4-6	TT-304-5-7	TT-305-9-11
Matrix				Soil	Soil	Soil	Soil	Soil
Depth Interval (ft)				10.0-12.0	6.0-8.0	4.0-6.0	5.0-7.0	9.0-11.0
Date Sampled				10/12/01	10/17/01	10/02/01	10/02/01	10/02/01
Parameter	Units	Criteria (1)	Criteria (2)					
Metals								
Potassium	MG/KG	-	8500-43000	89.9 B	1,740	2,100	2,360	1,510
Selenium	MG/KG	2	0.1-3.9					0.42 BJ
Silver	MG/KG	-	-					
Sodium	MG/KG	-	6000-8000	75.6 B	273 B	445 B	762	261 B
Thallium	MG/KG	-	-		0.58 B		0.58 B	0.42 B
Vanadium	MG/KG	150	1-300	110	35.2 B	17.4	72.6	11.0
Zinc	MG/KG	20	9-50	448	3,100	37.5	408	44.5
Miscellaneous Parameters								
Cyanide, Free **	MG/KG	-	-		0.84		1.6 J	1.1 J
Cyanide, Total	MG/KG	-	-	0.46 R	9.9	0.53 R	10.3 R	0.47 R
Total Solids	%	-	-	87.4	53.4	82	76.6	53.9

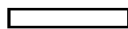
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Criteria (2)- NYSDEC TAGM: Determination of Soil Cleanup Objectives and Cleanup Levels; HWR-94-4046 January 24, 1994 (Revised). Eastern USA Background values.

Flags assigned during chemistry validation are shown.



Concentration Exceeds Criteria 1



Concentration Exceeds Criteria 2

* - Typical Industrial Site Background Levels

** - Weak Acid Dissociable Cyanide

Only Detected Results Reported.

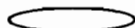
TABLE 4-3
SUMMARY OF DETECTED ANALYTES IN SUBSURFACE SOIL SAMPLES
UNION SHIP CANAL

Location ID				TT-306B	TT-307B	TT-308B	TT-309B	TT-310B
Sample ID				TT-306-9-11	TT-307-2.5-4	TT-308-3-5	TT-309-9-11	TT-310-10-12
Matrix				Soil	Soil	Soil	Soil	Soil
Depth Interval (ft)				9.0-11.0	2.5-4.0	3.0-5.0	9.0-11.0	10.0-12.0
Date Sampled				10/03/01	10/03/01	10/03/01	10/03/01	10/03/01
Parameter	Units	Criteria (1)	Criteria (2)					
Volatiles Organic Compounds								
Acetone	UG/KG	200	-					
Benzene	UG/KG	60	-					
Carbon disulfide	UG/KG	2700	-			2 J		
Ethylbenzene	UG/KG	5500	-					
Isopropylbenzene (Cumene)	UG/KG	-	-					
m&p-Xylene	UG/KG	1200	-					
Methyl ethyl ketone (2-Butanone)	UG/KG	300	-					
Methyl tert-butyl ether	UG/KG	-	-					
Methylcyclohexane	UG/KG	-	-					
Methylene chloride	UG/KG	100	-					
Xylene	UG/KG	1200	-					
Toluene	UG/KG	1500	-					
Semivolatiles Organic Compounds								
1,1'-Biphenyl	UG/KG	-	-					
2-Methylnaphthalene	UG/KG	36400	-		67 J			
Acenaphthene	UG/KG	50000	-					
Acenaphthylene	UG/KG	41000	-					
Acetophenone	UG/KG	-	-					
Anthracene	UG/KG	50000	-					
Benzaldehyde	UG/KG	-	-		66 J			
Benzo(a)anthracene	UG/KG	224	-		47 J	90 J		

Criteria (1)- NYSDEC TAGM: Determination of Soil Cleanup Objectives and Cleanup Levels; HWR-94-4046 January 24, 1994 (Revised). Recommended Cleanup Objectives.

Criteria (2)- NYSDEC TAGM: Determination of Soil Cleanup Objectives and Cleanup Levels; HWR-94-4046 January 24, 1994 (Revised). Eastern USA Background values.

Flags assigned during chemistry validation are shown.



Concentration Exceeds Criteria 1



Concentration Exceeds Criteria 2

* - Typical Industrial Site Background Levels

** - Weak Acid Dissociable Cyanide

Only Detected Results Reported.

TABLE 4-3
SUMMARY OF DETECTED ANALYTES IN SUBSURFACE SOIL SAMPLES
UNION SHIP CANAL

Location ID				TT-306B	TT-307B	TT-308B	TT-309B	TT-310B
Sample ID				TT-306-9-11	TT-307-2.5-4	TT-308-3-5	TT-309-9-11	TT-310-10-12
Matrix				Soil	Soil	Soil	Soil	Soil
Depth Interval (ft)				9.0-11.0	2.5-4.0	3.0-5.0	9.0-11.0	10.0-12.0
Date Sampled				10/03/01	10/03/01	10/03/01	10/03/01	10/03/01
Parameter	Units	Criteria (1)	Criteria (2)					
Semivolatiles Organic Compounds								
Benzo(a)pyrene	UG/KG	61	-		46 J	83 J		61 J
Benzo(b)fluoranthene	UG/KG	1100	-		110 J	200 J		
Benzo(g,h,i)perylene	UG/KG	50000	-					
Benzo(k)fluoranthene	UG/KG	1100	-			72 J		
bis(2-Ethylhexyl)phthalate	UG/KG	50000	-					
Carbazole	UG/KG	-	-					
Chrysene	UG/KG	400	-		130 J	140 J		
Dibenz(a,h)anthracene	UG/KG	14	-					
Dibenzofuran	UG/KG	6200	-					
Diethylphthalate	UG/KG	7100	-					
Di-n-butylphthalate	UG/KG	8100	-					
Di-n-octylphthalate	UG/KG	50000	-			130 J		
Fluoranthene	UG/KG	50000	-		84 J	140 J		
Fluorene	UG/KG	50000	-					
Indeno(1,2,3-cd)pyrene	UG/KG	3200	-			61 J		
Naphthalene	UG/KG	13000	-		52 J			
N-Nitrosodiphenylamine	UG/KG	-	-					
Phenanthrene	UG/KG	50000	-		120 J	94 J		
Pyrene	UG/KG	50000	-		90 J	140 J		
Pesticides								
4,4'-DDD	UG/KG	2900	-					

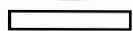
Criteria (1)- NYSDEC TAGM: Determination of Soil Cleanup Objectives and Cleanup Levels; HWR-94-4046 January 24, 1994 (Revised). Recommended Cleanup Objectives.

Criteria (2)- NYSDEC TAGM: Determination of Soil Cleanup Objectives and Cleanup Levels; HWR-94-4046 January 24, 1994 (Revised). Eastern USA Background values.

Flags assigned during chemistry validation are shown.



Concentration Exceeds Criteria 1



Concentration Exceeds Criteria 2

* - Typical Industrial Site Background Levels

** - Weak Acid Dissociable Cyanide

Only Detected Results Reported.

TABLE 4-3
SUMMARY OF DETECTED ANALYTES IN SUBSURFACE SOIL SAMPLES
UNION SHIP CANAL

Location ID				TT-306B	TT-307B	TT-308B	TT-309B	TT-310B
Sample ID				TT-306-9-11	TT-307-2.5-4	TT-308-3-5	TT-309-9-11	TT-310-10-12
Matrix				Soil	Soil	Soil	Soil	Soil
Depth Interval (ft)				9.0-11.0	2.5-4.0	3.0-5.0	9.0-11.0	10.0-12.0
Date Sampled				10/03/01	10/03/01	10/03/01	10/03/01	10/03/01
Parameter	Units	Criteria (1)	Criteria (2)					
Pesticides								
4,4'-DDT	UG/KG	2100	-					
alpha-Chlordane	UG/KG	-	-					
Dieldrin	UG/KG	44	-					
Methoxychlor	UG/KG	-	-					
Metals								
Aluminum	MG/KG	-	33000	5,880	24,400	2,310	4,370	2,470
Antimony	MG/KG	-	-			5.5 BJ	3.4 BJ	
Arsenic	MG/KG	7.5	3-12	2.8	9.2	5.7	2.2	1.2
Barium	MG/KG	300	15-600	40.6	180	36.6	21.4 B	18.8 B
Beryllium	MG/KG	0.16	0-1.75	0.43 B	3.5	0.39 B	0.38 B	0.21 B
Cadmium	MG/KG	10 *	0.1-1		1.6	1.3		
Calcium	MG/KG	-	130-35000	1,670	69,900	5,680	2,290	1,760
Chromium	MG/KG	50 *	1.5-40	8.3	3.5	4.2	4.7	2.3 J
Cobalt	MG/KG	30	2.5-60	6.3	4.0 B	3.1 B	3.3 B	1.1 B
Copper	MG/KG	25	1-50	20.6	51.5	19.2	10.0	3.7
Iron	MG/KG	2000	2000-550000	8,270	34,200	31,900	5,600	2,250
Lead	MG/KG	1000 *	200-500	8.5	52.6	52.0	4.9	3.0
Magnesium	MG/KG	-	100-5000	2,150	8,970	1,510	1,470	485 B
Manganese	MG/KG	-	50-5000	66.6	1,110	462	88.8	19.4
Mercury	MG/KG	0.1	0.001-0.2		0.41 R			
Nickel	MG/KG	13	0.5-25	16.9	13.3	9.2	10.7	2.6 B

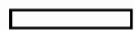
Criteria (1)- NYSDEC TAGM: Determination of Soil Cleanup Objectives and Cleanup Levels; HWR-94-4046 January 24, 1994 (Revised). Recommended Cleanup Objectives.

Criteria (2)- NYSDEC TAGM: Determination of Soil Cleanup Objectives and Cleanup Levels; HWR-94-4046 January 24, 1994 (Revised). Eastern USA Background values.

Flags assigned during chemistry validation are shown.



Concentration Exceeds Criteria 1



Concentration Exceeds Criteria 2

* - Typical Industrial Site Background Levels

** - Weak Acid Dissociable Cyanide

Only Detected Results Reported.

TABLE 4-3
SUMMARY OF DETECTED ANALYTES IN SUBSURFACE SOIL SAMPLES
UNION SHIP CANAL

Location ID				TT-306B	TT-307B	TT-308B	TT-309B	TT-310B
Sample ID				TT-306-9-11	TT-307-2.5-4	TT-308-3-5	TT-309-9-11	TT-310-10-12
Matrix				Soil	Soil	Soil	Soil	Soil
Depth Interval (ft)				9.0-11.0	2.5-4.0	3.0-5.0	9.0-11.0	10.0-12.0
Date Sampled				10/03/01	10/03/01	10/03/01	10/03/01	10/03/01
Parameter	Units	Criteria (1)	Criteria (2)					
Metals								
Potassium	MG/KG	-	8500-43000	440 B	2,160	340 B	464 B	131 B
Selenium	MG/KG	2	0.1-3.9					
Silver	MG/KG	-	-		0.86 B			
Sodium	MG/KG	-	6000-8000	83.9 B	362 B	114 B	98.9 B	115 B
Thallium	MG/KG	-	-		0.64 B	0.43 B		
Vanadium	MG/KG	150	1-300	15.7	12.6	11.6	8.8	13.0
Zinc	MG/KG	20	9-50	47.6	112	228	26.4	6.1
Miscellaneous Parameters								
Cyanide, Free **	MG/KG	-	-					
Cyanide, Total	MG/KG	-	-	0.15 R	4.7 R	1.1 R	0.98 R	0.32 R
Total Solids	%	-	-	85.5	76.7	71.5	82.9	75

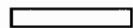
Criteria (1)- NYSDEC TAGM: Determination of Soil Cleanup Objectives and Cleanup Levels; HWR-94-4046 January 24, 1994 (Revised). Recommended Cleanup Objectives.

Criteria (2)- NYSDEC TAGM: Determination of Soil Cleanup Objectives and Cleanup Levels; HWR-94-4046 January 24, 1994 (Revised). Eastern USA Background values.

Flags assigned during chemistry validation are shown.



Concentration Exceeds Criteria 1



Concentration Exceeds Criteria 2

* - Typical Industrial Site Background Levels

** - Weak Acid Dissociable Cyanide

Only Detected Results Reported.

TABLE 4-3
SUMMARY OF DETECTED ANALYTES IN SUBSURFACE SOIL SAMPLES
UNION SHIP CANAL

Location ID				TT-311B	TT-312B	TT-314B
Sample ID				TT-311-3-4	TT-312-6-7	TT-314-8-10
Matrix				Soil	Soil	Soil
Depth Interval (ft)				3.0-4.0	6.0-7.0	8.0-10.0
Date Sampled				10/03/01	10/03/01	10/04/01
Parameter	Units	Criteria (1)	Criteria (2)			
Volatiles Organic Compounds						
Acetone	UG/KG	200	-		NA	
Benzene	UG/KG	60	-		NA	
Carbon disulfide	UG/KG	2700	-		NA	
Ethylbenzene	UG/KG	5500	-		NA	
Isopropylbenzene (Cumene)	UG/KG	-	-		NA	
m&p-Xylene	UG/KG	1200	-		NA	
Methyl ethyl ketone (2-Butanone)	UG/KG	300	-		NA	
Methyl tert-butyl ether	UG/KG	-	-		NA	
Methylcyclohexane	UG/KG	-	-		NA	
Methylene chloride	UG/KG	100	-		NA	
p-Xylene	UG/KG	1200	-		NA	
Toluene	UG/KG	1500	-		NA	
Semivolatiles Organic Compounds						
1,1'-Biphenyl	UG/KG	-	-			
2-Methylnaphthalene	UG/KG	36400	-		4,300 J	93 J
Acenaphthene	UG/KG	50000	-		1,600 J	
Acenaphthylene	UG/KG	41000	-			
Acetophenone	UG/KG	-	-			
Anthracene	UG/KG	50000	-		620 J	76 J
Benzaldehyde	UG/KG	-	-			
Benzo(a)anthracene	UG/KG	224	-			240 J

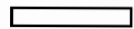
Criteria (1)- NYSDEC TAGM: Determination of Soil Cleanup Objectives and Cleanup Levels; HWR-94-4046 January 24, 1994 (Revised). Recommended Cleanup Objectives.

Criteria (2)- NYSDEC TAGM: Determination of Soil Cleanup Objectives and Cleanup Levels; HWR-94-4046 January 24, 1994 (Revised). Eastern USA Background values.

Flags assigned during chemistry validation are shown.



Concentration Exceeds Criteria 1



Concentration Exceeds Criteria 2

* - Typical Industrial Site Background Levels

** - Weak Acid Dissociable Cyanide

Only Detected Results Reported.

TABLE 4-3
SUMMARY OF DETECTED ANALYTES IN SUBSURFACE SOIL SAMPLES
UNION SHIP CANAL

Location ID				TT-311B	TT-312B	TT-314B
Sample ID				TT-311-3-4	TT-312-6-7	TT-314-8-10
Matrix				Soil	Soil	Soil
Depth Interval (ft)				3.0-4.0	6.0-7.0	8.0-10.0
Date Sampled				10/03/01	10/03/01	10/04/01
Parameter	Units	Criteria (1)	Criteria (2)			
Semivolatiles Organic Compounds						
Benzo(a)pyrene	UG/KG	61	-			220 J
Benzo(b)fluoranthene	UG/KG	1100	-			400 J
Benzo(g,h,i)perylene	UG/KG	50000	-			86 J
Benzo(k)fluoranthene	UG/KG	1100	-			140 J
bis(2-Ethylhexyl)phthalate	UG/KG	50000	-			
Carbazole	UG/KG	-	-			
Chrysene	UG/KG	400	-			280 J
Dibenz(a,h)anthracene	UG/KG	14	-			
Dibenzofuran	UG/KG	6200	-			
Diethylphthalate	UG/KG	7100	-			
n-butylphthalate	UG/KG	8100	-			
Di-n-octylphthalate	UG/KG	50000	-	150 J		
Fluoranthene	UG/KG	50000	-		440 J	510 J
Fluorene	UG/KG	50000	-		2,200 J	
Indeno(1,2,3-cd)pyrene	UG/KG	3200	-			130 J
Naphthalene	UG/KG	13000	-			94 J
N-Nitrosodiphenylamine	UG/KG	-	-			
Phenanthrene	UG/KG	50000	-		3,300 J	380 J
Pyrene	UG/KG	50000	-		690 J	450 J
Pesticides						
4,4'-DDD	UG/KG	2900	-			

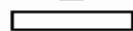
Criteria (1)- NYSDEC TAGM: Determination of Soil Cleanup Objectives and Cleanup Levels; HWR-94-4046 January 24, 1994 (Revised). Recommended Cleanup Objectives.

Criteria (2)- NYSDEC TAGM: Determination of Soil Cleanup Objectives and Cleanup Levels; HWR-94-4046 January 24, 1994 (Revised). Eastern USA Background values.

Flags assigned during chemistry validation are shown.



Concentration Exceeds Criteria 1



Concentration Exceeds Criteria 2

* - Typical Industrial Site Background Levels

** - Weak Acid Dissociable Cyanide

Only Detected Results Reported.

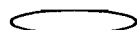
TABLE 4-3
SUMMARY OF DETECTED ANALYTES IN SUBSURFACE SOIL SAMPLES
UNION SHIP CANAL

Location ID				TT-311B	TT-312B	TT-314B
Sample ID				TT-311-3-4	TT-312-6-7	TT-314-8-10
Matrix				Soil	Soil	Soil
Depth Interval (ft)				3.0-4.0	6.0-7.0	8.0-10.0
Date Sampled				10/03/01	10/03/01	10/04/01
Parameter	Units	Criteria (1)	Criteria (2)			
Pesticides						
4,4'-DDT	UG/KG	2100	-			
alpha-Chlordane	UG/KG	-	-			
Dieldrin	UG/KG	44	-			
Methoxychlor	UG/KG	-	-	41 J		
Metals						
Aluminum	MG/KG	-	33000	28,800	40,600	17,600
Antimony	MG/KG	-	-			8.1 BJ
Arsenic	MG/KG	7.5	3-12	12.3	5.7 B	15.2
Barium	MG/KG	300	15-600	226	249	208
Beryllium	MG/KG	0.16	0-1.75	4.4	6.1	1.5
Cadmium	MG/KG	10 *	0.1-1	1.1		1.6
Calcium	MG/KG	-	130-35000	135,000	197,000	54,300
Chromium	MG/KG	50 *	1.5-40	15.6	4.1	36.0
Cobalt	MG/KG	30	2.5-60	5.1 B	2.5 B	11.6
Copper	MG/KG	25	1-50	24.8	11.9	34.8
Iron	MG/KG	2000	2000-550000	62,200	11,400	27,300
Lead	MG/KG	1000 *	200-500	37.7	0.36 B	118
Magnesium	MG/KG	-	100-5000	12,100	13,000	8,900
Manganese	MG/KG	-	50-5000	1,870	1,430	888
Mercury	MG/KG	0.1	0.001-0.2			
Nickel	MG/KG	13	0.5-25	20.6	6.1	29.0

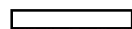
Criteria (1)- NYSDEC TAGM: Determination of Soil Cleanup Objectives and Cleanup Levels; HWR-94-4046 January 24, 1994 (Revised). Recommended Cleanup Objectives.

Criteria (2)- NYSDEC TAGM: Determination of Soil Cleanup Objectives and Cleanup Levels; HWR-94-4046 January 24, 1994 (Revised). Eastern USA Background values.

Flags assigned during chemistry validation are shown.



Concentration Exceeds Criteria 1



Concentration Exceeds Criteria 2

* - Typical Industrial Site Background Levels

** - Weak Acid Dissociable Cyanide

Only Detected Results Reported.

TABLE 4-3
SUMMARY OF DETECTED ANALYTES IN SUBSURFACE SOIL SAMPLES
UNION SHIP CANAL

Location ID				TT-311B	TT-312B	TT-314B
Sample ID				TT-311-3-4	TT-312-6-7	TT-314-8-10
Matrix				Soil	Soil	Soil
Depth Interval (ft)				3.0-4.0	6.0-7.0	8.0-10.0
Date Sampled				10/03/01	10/03/01	10/04/01
Parameter	Units	Criteria (1)	Criteria (2)			
Metals						
Potassium	MG/KG	-	8500-43000	1,640	3,430	6,670
Selenium	MG/KG	2	0.1-3.9			
Silver	MG/KG	-	-			
Sodium	MG/KG	-	6000-8000	561 B	847	340 B
Thallium	MG/KG	-	-			
Vanadium	MG/KG	150	1-300	25.6	9.6	27.1
Zinc	MG/KG	20	9-50	31.7	17.2	274
Miscellaneous Parameters						
Cyanide, Free **	MG/KG	-	-			
Cyanide, Total	MG/KG	-	-	1.0 R		3.6 R
Total Solids	%	-	-	55.6	66.7	55.3

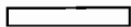
Criteria (1)- NYSDEC TAGM: Determination of Soil Cleanup Objectives and Cleanup Levels; HWR-94-4046 January 24, 1994 (Revised). Recommended Cleanup Objectives.

Criteria (2)- NYSDEC TAGM: Determination of Soil Cleanup Objectives and Cleanup Levels; HWR-94-4046 January 24, 1994 (Revised). Eastern USA Background values.

Flags assigned during chemistry validation are shown.



Concentration Exceeds Criteria 1

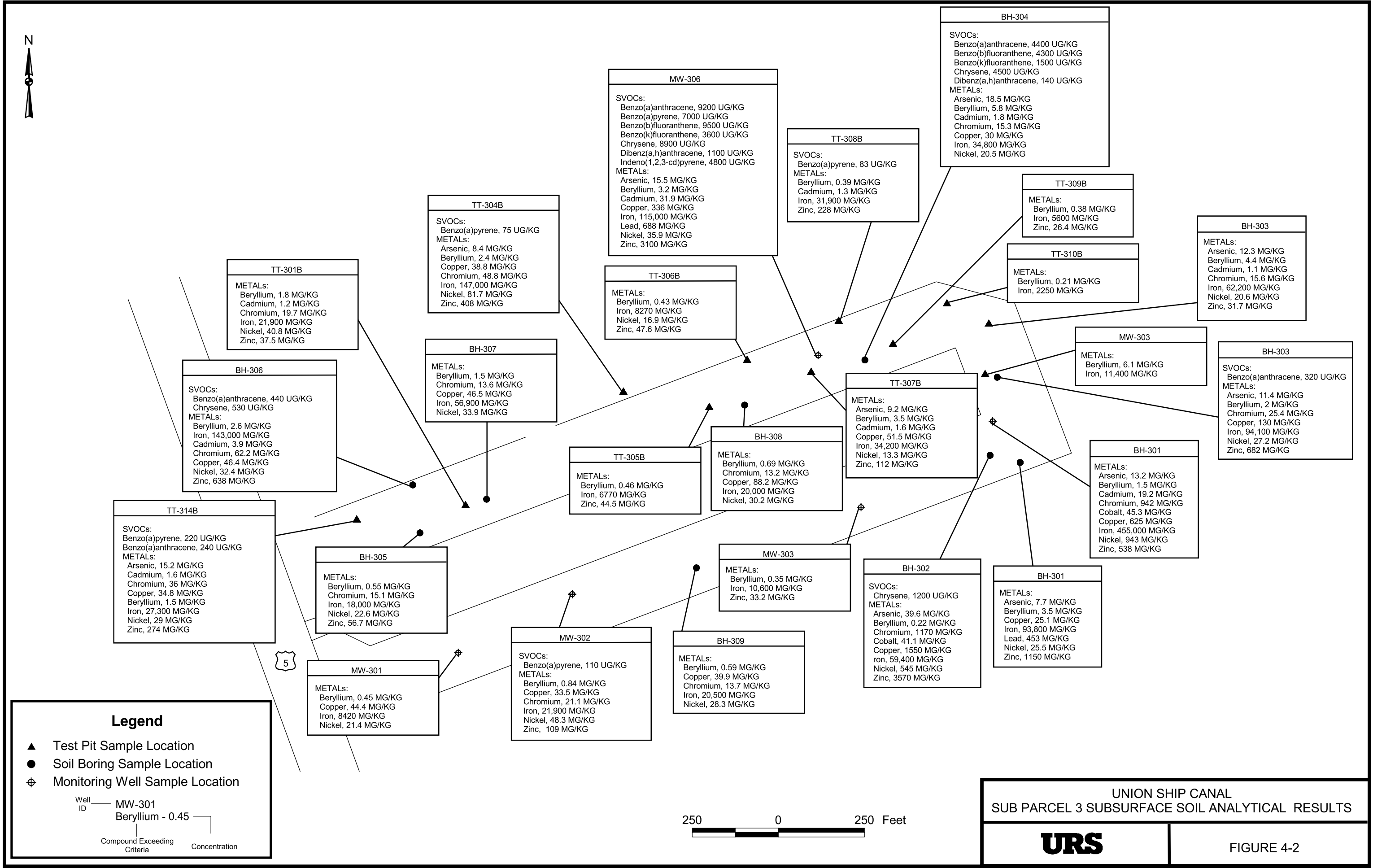


Concentration Exceeds Criteria 2

* - Typical Industrial Site Background Levels

** - Weak Acid Dissociable Cyanide

Only Detected Results Reported.



illustrated in Table 4-2, no VOCs were detected in any of the subsurface soil samples. SVOCs, consisting primarily of PAHs, were detected in 21 of 25 samples. Concentrations exceeding the SCGs were observed in 8 of the 25 samples analyzed. As with the surface soil samples, all the compounds associated with the exceedances were cPAHs. Similarly, only one or two compounds were detected in the samples, with the exception of samples from the northeast portion of the site (i.e., BH-304 and MW-306) where several cPAHs were detected at elevated levels in samples from the 6 to 8 foot depths. This area corresponds with the area of the site where slightly elevated levels of cPAHs were observed in the surface soils.

In general, the concentrations of the detected SVOCs in the subsurface soils are similar or less than the concentrations observed in the surface soils. Additionally, the number of compounds detected is generally less than in the surface soils. In almost all cases, the cPAHs were associated with samples collected from the fill materials. In a couple of cases, elevated levels of cPAHs were identified in samples of the native sand or peat immediately underlying the fill materials.

The presence of PAHs is extremely common in industrial fill materials. Considering that the fill materials encountered at depth on the site are essentially the same as those identified on the surface, it is not unexpected that the type, number, and concentrations of the PAHs are similar in both materials. Likewise, it follows that the concentrations are similar to those observed in other commercial/industrial neighborhoods in Buffalo, and that the source of the PAHs is most likely the same.

In general, the number and concentrations of the metals detected in the subsurface soils were similar to those metals detected in the surface soil samples. Additionally, total cyanide and/or free cyanide was detected in 7 of 26 samples analyzed at concentrations ranging from non-detect to 9.9 mg/kg and 0.7 to 1.8 mg/kg, respectively. As with the surface soils, these concentrations are two to three orders of magnitude below the USEPA PRGs for residential and industrial sites. Only a limited number of pesticides were detected in a few of the samples and none at concentrations that exceeded the SCGs. No PCBs were detected in any of the samples.

4.3.4 Sediments in the Canal

As indicated previously, no samples of the sediments in the canal were collected during this investigation. However, samples were collected by the USACE in November 2000 and ERM in July 2001, respectively. The data from these sampling events are summarized in Table 4-4 and presented graphically on Figure 4-3. The relevant reports or portions of the reports are in Appendix A.

As indicated in Table 4-4, ERM reported no VOCs were detected at concentrations exceeding the SCGs.

Several PAHs, primarily Phenol and Benzo(a)anthracene, were detected at concentrations exceeding the SCGs in the ERM samples. Padia reported that PAHs were ubiquitous in the sediments. As indicated in Table 4-4, several cPAHs were detected at concentrations exceeding the SCGs. Several metals (i.e., copper, iron, lead, manganese, mercury, silver, and zinc) were detected on one or more samples at concentrations exceeding the SCGs. No pesticides were detected in any of the samples; however, PCBs were detected in all sediment samples collected during both investigations. In general, the PCBs consisted of Aroclor 1260 and to a lesser degree Aroclor 1254. As indicated in Table 4-4 and Figure 4-3, the concentrations ranged from 102 µg/kg in sample number 5 (USACE) at the western end of the canal to 10,200 µg/kg in Sed-2 at the eastern end of the canal. As shown in Figure 4-3, the PCB concentrations are highest in the area immediately downstream of the 36" CMP discharge pipe from the Shenango Steel Mold site which enters the canal about 50 feet west of the northeast corner of the canal, and gradually decrease to the west. PCBs consisting of the same aroclors (i.e., 1254 and 1260) were found on the Shenango site, which is a Class II site.

Considering that no PCBs were detected in any of the surface and/or subsurface soil samples from Subparcel 3, the PCBs in the canal sediments are most likely from an offsite source. The metals and PAHs detected in the sediments are similar to those detected in surface and/or subsurface soils in Subparcel 3. However, the concentrations of the compounds detected in the canal sediments are typically an order of magnitude higher than the concentrations

TABLE 4-4
SUMMARY OF DETECTED ANALYTES IN SEDIMENT SAMPLES
UNION SHIP CANAL

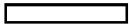
Location ID					SED-1	SED-2	SED-3	SED-4	SED-5
Sample ID					SED-1	SED-2	SED-3	SED-4	SED-5
Matrix					Sediment	Sediment	Sediment	Sediment	Sediment
Depth Interval (ft)					-	-	-	-	-
Date Sampled					07/31/01	07/31/01	07/31/01	07/31/01	07/31/01
Parameter	Units	Criteria (1)	Criteria (2)	Criteria (3)					
Volatiles Organic Compounds									
Acetone	UG/KG	-	-	-	26 J	NA		NA	11
Carbon disulfide	UG/KG	-	-	-		NA	3 J	NA	
Semivolatiles Organic Compounds									
2,2'-oxybis(1-Chloropropane)	UG/KG	-	-	-					
2-Methylnaphthalene	UG/KG	-	19760	780					
Acenaphthene	UG/KG	-	-	9100					
Acenaphthylene	UG/KG	-	-	-					
Acetophenone	UG/KG	-	-	-	NA	NA	NA	NA	NA
Anthracene	UG/KG	-	64090	6955	330 J	290 J	430 J	330 J	260 J
Benzo(a)anthracene	UG/KG	-	6091	780	1,100 J	1,100 J	1,600 J	1,000 J	870 J
Benzo(a)pyrene	UG/KG	42.9	-	-	1,400 J	1,400 J	1,700 J	1,300 J	1,100 J
Benzo(b)fluoranthene	UG/KG	-	-	-	2,200 J	2,100 J	2,800 J	2,000 J	1,900 J
Benzo(g,h,i)perylene	UG/KG	-	-	-	1,300 J	1,200 J	1,600 J	1,200 J	1,100 J
Benzo(k)fluoranthene	UG/KG	-	-	-	740 J	720 J	870 J	600 J	520 J
bis(2-Ethylhexyl)phthalate	UG/KG	-	-	12968		650 J	980 J	610 J	
Chrysene	UG/KG	-	-	-	1,400 J	1,200 J	2,000 J	1,200 J	1,000 J
Dibenz(a,h)anthracene	UG/KG	-	-	-	310 J				
Fluoranthene	UG/KG	-	-	66300	1,700 J	1,800 J	2,900 J	1,800 J	1,400 J
Fluorene	UG/KG	-	4745	520			230 J		

Criteria (1)- NYSDEC: Technical Guidance for Screening Contaminated Sediments, Human Health Bioaccumulation January 25, 1999 (Revised)

Criteria (2)- NYSDEC: Technical Guidance for Screening Contaminated Sediments, Benthic Aquatic Life, Acute Toxicity, January 25, 1999 (Revised)

Criteria (3)- NYSDEC: Technical Guidance for Screening Contaminated Sediments, Benthic Aquatic Life, Chronic Toxicity, January 25, 1999 (Revised)

Flags assigned during chemistry validation are shown.

	Concentration Exceeds Criteria 1
	Concentration Exceeds Criteria 2
	Concentration Exceeds Criteria 3

Sediment criteria calculated based on a Total Organic Carbon (TOC) content of 6.5%. TOC concentrations ranged from 6.5% - 12.2%

Only Detected Results Reported.

Advanced Selection: SEDIMENT_NO_MET
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[MATRIX] = 'SE' AND [PRCODE] <> 'MET'

TABLE 4-4
SUMMARY OF DETECTED ANALYTES IN SEDIMENT SAMPLES
UNION SHIP CANAL

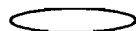
Location ID					SED-1	SED-2	SED-3	SED-4	SED-5
Sample ID					SED-1	SED-2	SED-3	SED-4	SED-5
Matrix					Sediment	Sediment	Sediment	Sediment	Sediment
Depth Interval (ft)					-	-	-	-	-
Date Sampled					07/31/01	07/31/01	07/31/01	07/31/01	07/31/01
Parameter	Units	Criteria (1)	Criteria (2)	Criteria (3)					
Semivolatiles Organic Compounds									
Indeno(1,2,3-cd)pyrene	UG/KG	-	-	-	1,100 J	980 J	1,100 J	980 J	850 J
Naphthalene	UG/KG	-	16770	1950		270 J	390 J	310	250 J
Phenanthrene	UG/KG	-	-	7800	790 J	800 J	1,100 J	740 J	630 J
Phenol	UG/KG	-	-	39					
Pyrene	UG/KG	-	5.70E+05	62465	1,900 J	1,800 J	2,700 J	1,800 J	1,500 J
Polychlorinated Biphenyls									
Aroclor 1242	UG/KG	0.052	1.79E+05	1255					
Aroclor 1254	UG/KG	0.052	1.79E+05	1255					
Aroclor 1260	UG/KG	0.052	1.79E+05	1255	6,780	10,200	1,330	3,980	818
Miscellaneous Parameters									
Total Organic Carbon	MG/KG	-	-	-	122,000	103,000	118,000	63,900	76,800
pH	S.U.	-	-	-	7.3	7.6	7.6	7.6	7.4

Criteria (1)- NYSDEC: Technical Guidance for Screening Contaminated Sediments, Human Health Bioaccumulation January 25, 1999 (Revised)

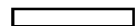
Criteria (2)- NYSDEC: Technical Guidance for Screening Contaminated Sediments, Benthic Aquatic Life, Acute Toxicity, January 25, 1999 (Revised)

Criteria (3)- NYSDEC: Technical Guidance for Screening Contaminated Sediments, Benthic Aquatic Life, Chronic Toxicity, January 25, 1999 (Revised)

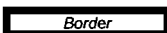
Flags assigned during chemistry validation are shown.



Concentration Exceeds Criteria 1



Concentration Exceeds Criteria 2



Concentration Exceeds Criteria 3

Sediment criteria calculated based on a Total Organic Carbon (TOC) content of 6.5%. TOC concentrations ranged from 6.5% - 12.2%

Only Detected Results Reported.

Advanced Selection: SEDIMENT_NO_MET
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TABLE 4-4
SUMMARY OF DETECTED ANALYTES IN SEDIMENT SAMPLES
UNION SHIP CANAL

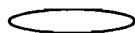
Location ID					SED-6	SED-7	USC-1	USC-1	USC-10
Sample ID					SED-6	SED-7	USC-1	USC-1	USC-10
Matrix					Sediment	Sediment	Sediment	Sediment	Sediment
Depth Interval (ft)					-	-	-	-	-
Date Sampled					07/31/01	07/31/01	11/15/99	07/31/01	11/15/99
Parameter	Units	Criteria (1)	Criteria (2)	Criteria (3)					
Volatiles Organic Compounds									
Acetone	UG/KG	-	-	-	NA	NA	NA	NA	NA
Carbon disulfide	UG/KG	-	-	-	NA	NA	NA	NA	NA
Semivolatiles Organic Compounds									
2,2'-oxybis(1-Chloropropane)	UG/KG	-	-	-			NA		NA
2-Methylnaphthalene	UG/KG	-	19760	780					
Acenaphthene	UG/KG	-	-	9100					
Acenaphthylene	UG/KG	-	-	-				250 J	
Acetophenone	UG/KG	-	-	-	NA	NA	NA	620 J	NA
Anthracene	UG/KG	-	64090	6955	300 J	470 J	239 J	290 J	364 J
Benzo(a)anthracene	UG/KG	-	6091	780	920 J	1,800 J	471	820 J	1,480
Benzo(a)pyrene	UG/KG	42.9	-	-	1,300 J	2,400 J	554	840 J	1,590
Benzo(b)fluoranthene	UG/KG	-	-	-	2,000 J	3,600 J	471	820 J	2,120
Benzo(g,h,i)perylene	UG/KG	-	-	-	1,200 J	2,200 J	338 J	750 J	1,400
Benzo(k)fluoranthene	UG/KG	-	-	-	620 J	1,100 J	540	730 J	1,230
bis(2-Ethylhexyl)phthalate	UG/KG	-	-	12968	500 J	830 J	NA		NA
Chrysene	UG/KG	-	-	-	1,100 J	2,100 J		1,000	1,520
Dibenz(a,h)anthracene	UG/KG	-	-	-		440 J		280 J	
Fluoranthene	UG/KG	-	-	66300	1,600 J	2,700 J	1,020	1,400	2,320
Fluorene	UG/KG	-	4745	520					

Criteria (1)- NYSDEC: Technical Guidance for Screening Contaminated Sediments, Human Health Bioaccumulation January 25, 1999 (Revised)

Criteria (2)- NYSDEC: Technical Guidance for Screening Contaminated Sediments, Benthic Aquatic Life, Acute Toxicity, January 25, 1999 (Revised)

Criteria (3)- NYSDEC: Technical Guidance for Screening Contaminated Sediments, Benthic Aquatic Life, Chronic Toxicity, January 25, 1999 (Revised)

Flags assigned during chemistry validation are shown.



Concentration Exceeds Criteria 1



Concentration Exceeds Criteria 2



Border

Concentration Exceeds Criteria 3

Sediment criteria calculated based on a Total Organic Carbon (TOC) content of 6.5%. TOC concentrations ranged from 6.5% - 12.2%

Only Detected Results Reported.

Advanced Selection: SEDIMENT_NO_MET
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TABLE 4-4
SUMMARY OF DETECTED ANALYTES IN SEDIMENT SAMPLES
UNION SHIP CANAL

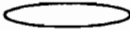
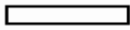
Location ID					SED-6	SED-7	USC-1	USC-1	USC-10
Sample ID					SED-6	SED-7	USC-1	USC-1	USC-10
Matrix					Sediment	Sediment	Sediment	Sediment	Sediment
Depth Interval (ft)					-	-	-	-	-
Date Sampled					07/31/01	07/31/01	11/15/99	07/31/01	11/15/99
Parameter	Units	Criteria (1)	Criteria (2)	Criteria (3)					
Semivolatiles Organic Compounds									
Indeno(1,2,3-cd)pyrene	UG/KG	-	-	-	980 J	1,600 J	386 J	700 J	1,340
Naphthalene	UG/KG	-	16770	1950	260	470		98 J	414
Phenanthrene	UG/KG	-	-	7800	610 J	860 J	616	460 J	1,060
Phenol	UG/KG	-	-	39			NA	220 J	NA
Pyrene	UG/KG	-	5.70E+05	62485	1,600 J	3,000 J	970	1,100	2,320
Polychlorinated Biphenyls									
Aroclor 1242	UG/KG	0.052	1.79E+05	1255				43.5 J	
Aroclor 1254	UG/KG	0.052	1.79E+05	1255				44.5 J	
Aroclor 1260	UG/KG	0.052	1.79E+05	1255	470	300		85.7	332
Miscellaneous Parameters									
Total Organic Carbon	MG/KG	-	-	-	60,500	94,400	NA	NA	NA
pH	S.U.	-	-	-	7.5	7.6	NA	NA	NA

Criteria (1)- NYSDEC: Technical Guidance for Screening Contaminated Sediments, Human Health Bioaccumulation January 25, 1999 (Revised)

Criteria (2)- NYSDEC: Technical Guidance for Screening Contaminated Sediments, Benthic Aquatic Life, Acute Toxicity, January 25, 1999 (Revised)

Criteria (3)- NYSDEC: Technical Guidance for Screening Contaminated Sediments, Benthic Aquatic Life, Chronic Toxicity, January 25, 1999 (Revised)

Flags assigned during chemistry validation are shown.

	Concentration Exceeds Criteria 1
	Concentration Exceeds Criteria 2
	Concentration Exceeds Criteria 3

Sediment criteria calculated based on a Total Organic Carbon (TOC) content of 6.5%. TOC concentrations ranged from 6.5% - 12.2%

Only Detected Results Reported.

Advanced Selection: SEDIMENT_NO_MET
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TABLE 4-4
SUMMARY OF DETECTED ANALYTES IN SEDIMENT SAMPLES
UNION SHIP CANAL

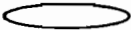
Location ID					USC-11	USC-2	USC-3	USC-3	USC-4
Sample ID					USC-11	USC-2	USC-3	USC-3	USC-4
Matrix					Sediment	Sediment	Sediment	Sediment	Sediment
Depth Interval (ft)					-	-	-	-	-
Date Sampled					11/15/99	07/31/01	11/15/99	07/31/01	11/15/99
Parameter	Units	Criteria (1)	Criteria (2)	Criteria (3)					
Volatiles Organic Compounds									
Acetone	UG/KG	-	-	-	NA	NA	NA	NA	NA
Carbon disulfide	UG/KG	-	-	-	NA	NA	NA	NA	NA
Semivolatiles Organic Compounds									
2,2'-oxybis(1-Chloropropane)	UG/KG	-	-	-	NA		NA		NA
2-Methylnaphthalene	UG/KG	-	19760	780			411		
Acenaphthene	UG/KG	-	-	9100					
Acenaphthylene	UG/KG	-	-	-			193		
Acetophenone	UG/KG	-	-	-	NA		NA		NA
Anthracene	UG/KG	-	64090	6955	326	130 J	576	110 J	244 J
Benzo(a)anthracene	UG/KG	-	6091	780	1,100	310 J	1,130	360 J	763
Benzo(a)pyrene	UG/KG	42.9	-	-	1,200	280 J	1,600	420 J	950
Benzo(b)fluoranthene	UG/KG	-	-	-	1,300	310 J	1,490	400 J	1,100
Benzo(g,h,i)perylene	UG/KG	-	-	-	863	270 J	938	420 J	589
Benzo(k)fluoranthene	UG/KG	-	-	-	1,250	260 J	1,330	430 J	915
bis(2-Ethylhexyl)phthalate	UG/KG	-	-	12968	NA		NA		NA
Chrysene	UG/KG	-	-	-	1,410	440 J	1,620	470 J	1,040
Dibenz(a,h)anthracene	UG/KG	-	-	-	228 J	97 J	195 J	140 J	161 J
Fluoranthene	UG/KG	-	-	66300	2,150	780 J	2,330	620 J	1,170
Fluorene	UG/KG	-	4745	520	158 J		401		183 J

Criteria (1)- NYSDEC: Technical Guidance for Screening Contaminated Sediments, Human Health Bioaccumulation January 25, 1999 (Revised)

Criteria (2)- NYSDEC: Technical Guidance for Screening Contaminated Sediments, Benthic Aquatic Life, Acute Toxicity, January 25, 1999 (Revised)

Criteria (3)- NYSDEC: Technical Guidance for Screening Contaminated Sediments, Benthic Aquatic Life, Chronic Toxicity, January 25, 1999 (Revised)

Flags assigned during chemistry validation are shown.

	Concentration Exceeds Criteria 1
	Concentration Exceeds Criteria 2
	Concentration Exceeds Criteria 3

Sediment criteria calculated based on a Total Organic Carbon (TOC) content of 6.5%. TOC concentrations ranged from 6.5% - 12.2%

Only Detected Results Reported.

Advanced Selection: SEDIMENT_NO_MET
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[MATRIX] = 'SE' AND [PRCODE] <> 'MET'

TABLE 4-4
SUMMARY OF DETECTED ANALYTES IN SEDIMENT SAMPLES
UNION SHIP CANAL

Location ID					USC-11	USC-2	USC-3	USC-3	USC-4
Sample ID					USC-11	USC-2	USC-3	USC-3	USC-4
Matrix					Sediment	Sediment	Sediment	Sediment	Sediment
Depth Interval (ft)					-	-	-	-	-
Date Sampled					11/15/99	07/31/01	11/15/99	07/31/01	11/15/99
Parameter	Units	Criteria (1)	Criteria (2)	Criteria (3)					
Semivolatiles Organic Compounds									
Indeno(1,2,3-cd)pyrene	UG/KG	-	-	-	824	250 J	1,030	390 J	696
Naphthalene	UG/KG	-	16770	1950			1,240	110 J	
Phenanthrene	UG/KG	-	-	7800	1,080	290 J	1,400	220 J	
Phenol	UG/KG	-	-	39	NA	120 J	NA		NA
Pyrene	UG/KG	-	5.70E+05	62485	2,240	62 J	2,380	540 J	
Polychlorinated Biphenyls									
Aroclor 1242	UG/KG	0.052	1.79E+05	1255					
Aroclor 1254	UG/KG	0.052	1.79E+05	1255			78.8		
Aroclor 1260	UG/KG	0.052	1.79E+05	1255	126	15 J	56.3	18.6 J	
Miscellaneous Parameters									
Total Organic Carbon	MG/KG	-	-	-	NA	NA	NA	NA	NA
pH	S.U.	-	-	-	NA	NA	NA	NA	NA

Criteria (1)- NYSDEC: Technical Guidance for Screening Contaminated Sediments, Human Health Bioaccumulation January 25, 1999 (Revised)

Criteria (2)- NYSDEC: Technical Guidance for Screening Contaminated Sediments, Benthic Aquatic Life, Acute Toxicity, January 25, 1999 (Revised)

Criteria (3)- NYSDEC: Technical Guidance for Screening Contaminated Sediments, Benthic Aquatic Life, Chronic Toxicity, January 25, 1999 (Revised)

Flags assigned during chemistry validation are shown.

	Concentration Exceeds Criteria 1
	Concentration Exceeds Criteria 2
	Concentration Exceeds Criteria 3

Sediment criteria calculated based on a Total Organic Carbon (TOC) content of 6.5%. TOC concentrations ranged from 6.5% - 12.2%

Only Detected Results Reported.

Advanced Selection: SEDIMENT_NO_MET
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[MATRIX] = 'SE' AND [PRCODE] <> 'MET'

TABLE 4-4
SUMMARY OF DETECTED ANALYTES IN SEDIMENT SAMPLES
UNION SHIP CANAL

Location ID					USC-4	USC-5	USC-5	USC-6	USC-6
Sample ID					USC-4	USC-5	USC-5	USC-6	USC-6
Matrix					Sediment	Sediment	Sediment	Sediment	Sediment
Depth Interval (ft)					-	-	-	-	-
Date Sampled					07/31/01	11/15/99	07/31/01	11/15/99	07/31/01
Parameter	Units	Criteria (1)	Criteria (2)	Criteria (3)					
Volatiles Organic Compounds									
Acetone	UG/KG	-	-	-	NA	NA	NA	NA	NA
Carbon disulfide	UG/KG	-	-	-	NA	NA	NA	NA	NA
Semivolatiles Organic Compounds									
2,2'-oxybis(1-Chloropropane)	UG/KG	-	-	-	900	NA		NA	
2-Methylnaphthalene	UG/KG	-	19760	780				365 J	
Acenaphthene	UG/KG	-	-	9100					
Acenaphthylene	UG/KG	-	-	-				244	
Acetophenone	UG/KG	-	-	-		NA		NA	
Anthracene	UG/KG	-	64090	6955	99 J	179 J		416	
Benzo(a)anthracene	UG/KG	-	6091	780	250 J	615	190 J	1,340	120 J
Benzo(a)pyrene	UG/KG	42.9	-	-	280 J	739	220 J	1,840	140 J
Benzo(b)fluoranthene	UG/KG	-	-	-	260 J	778	210 J	1,860	150 J
Benzo(g,h,i)perylene	UG/KG	-	-	-	280 J	504	230 J	984	78 J
Benzo(k)fluoranthene	UG/KG	-	-	-	300 J	794	200 J	1,670	130 J
bis(2-Ethylhexyl)phthalate	UG/KG	-	-	12968		NA		NA	
Chrysene	UG/KG	-	-	-	310 J	794	240 J	1,800	150 J
Dibenz(a,h)anthracene	UG/KG	-	-	-	13 J		96 J	179	700 J
Fluoranthene	UG/KG	-	-	66300	480 J	1,020	360 J	2,400	240 J
Fluorene	UG/KG	-	4745	520				401	

Criteria (1)- NYSDEC: Technical Guidance for Screening Contaminated Sediments, Human Health Bioaccumulation January 25, 1999 (Revised)

Criteria (2)- NYSDEC: Technical Guidance for Screening Contaminated Sediments, Benthic Aquatic Life, Acute Toxicity, January 25, 1999 (Revised)

Criteria (3)- NYSDEC: Technical Guidance for Screening Contaminated Sediments, Benthic Aquatic Life, Chronic Toxicity, January 25, 1999 (Revised)

Flags assigned during chemistry validation are shown.

 Concentration Exceeds Criteria 1

 Concentration Exceeds Criteria 2

 Concentration Exceeds Criteria 3

Sediment criteria calculated based on a Total Organic Carbon (TOC) content of 6.5%. TOC concentrations ranged from 6.5% - 12.2%

Only Detected Results Reported.

Advanced Selection: SEDIMENT_NO_MET
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[MATRIX] = 'SE' AND [PRCODE] <> 'MET'

TABLE 4-4
SUMMARY OF DETECTED ANALYTES IN SEDIMENT SAMPLES
UNION SHIP CANAL

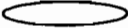
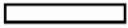
Location ID					USC-4	USC-5	USC-5	USC-6	USC-6
Sample ID					USC-4	USC-5	USC-5	USC-6	USC-6
Matrix					Sediment	Sediment	Sediment	Sediment	Sediment
Depth Interval (ft)					-	-	-	-	-
Date Sampled					07/31/01	11/15/99	07/31/01	11/15/99	07/31/01
Parameter	Units	Criteria (1)	Criteria (2)	Criteria (3)					
Semivolatiles Organic Compounds									
Indeno(1,2,3-cd)pyrene	UG/KG	-	-	-	300 J	541	220 J	965	92 J
Naphthalene	UG/KG	-	16770	1950				837	
Phenanthrene	UG/KG	-	-	7800	240 J	610	190 J	1,200	97 J
Phenol	UG/KG	-	-	39		NA		NA	
Pyrene	UG/KG	-	5.70E+05	62465	420 J	1,230	320 J	2,680	200 J
Polychlorinated Biphenyls									
Aroclor 1242	UG/KG	0.052	1.79E+05	1255					
Aroclor 1254	UG/KG	0.052	1.79E+05	1255					
Aroclor 1260	UG/KG	0.052	1.79E+05	1255	67.3	102	56.4	247	52.4
Miscellaneous Parameters									
Total Organic Carbon	MG/KG	-	-	-	NA	NA	NA	NA	NA
pH	S.U.	-	-	-	NA	NA	NA	NA	NA

Criteria (1)- NYSDEC: Technical Guidance for Screening Contaminated Sediments, Human Health Bioaccumulation January 25, 1999 (Revised)

Criteria (2)- NYSDEC: Technical Guidance for Screening Contaminated Sediments, Benthic Aquatic Life, Acute Toxicity, January 25, 1999 (Revised)

Criteria (3)- NYSDEC: Technical Guidance for Screening Contaminated Sediments, Benthic Aquatic Life, Chronic Toxicity, January 25, 1999 (Revised)

Flags assigned during chemistry validation are shown.

	Concentration Exceeds Criteria 1
	Concentration Exceeds Criteria 2
	Concentration Exceeds Criteria 3

Sediment criteria calculated based on a Total Organic Carbon (TOC) content of 6.5%. TOC concentrations ranged from 6.5% - 12.2%

Only Detected Results Reported.

Advanced Selection: SEDIMENT_NO_MET
J:\35933.00\db\Program\Program.mde
Printed: 6/5/03 3:54:43 PM
[MATRIX] = 'SE' AND [PRCODE] <> 'MET'

TABLE 4-4
SUMMARY OF DETECTED ANALYTES IN SEDIMENT SAMPLES
UNION SHIP CANAL

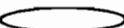
Location ID					USC-7	USC-8	USC-9	USC-9
Sample ID					USC-7	USC-8	USC-9	USC-9D
Matrix					Sediment	Sediment	Sediment	Sediment
Depth Interval (ft)					-	-	-	-
Date Sampled					11/15/99	11/15/99	11/15/99	11/15/99
Parameter	Units	Criteria (1)	Criteria (2)	Criteria (3)				Field Replicate (1-1)
Volatiles Organic Compounds								
Acetone	UG/KG	-	-	-	NA	NA	NA	NA
Carbon disulfide	UG/KG	-	-	-	NA	NA	NA	NA
Semivolatiles Organic Compounds								
2,2'-oxybis(1-Chloropropane)	UG/KG	-	-	-	NA	NA	NA	NA
2-Methylnaphthalene	UG/KG	-	19760	760		409	293 J	280 J
Acenaphthene	UG/KG	-	-	9100		167 J		
Acenaphthylene	UG/KG	-	-	-		402		
Acetophenone	UG/KG	-	-	-	NA	NA	NA	NA
Anthracene	UG/KG	-	84090	6955	284 J	580	4,840	643
Benzo(a)anthracene	UG/KG	-	6091	780	688	2,460	1,270	1,690
Benzo(a)pyrene	UG/KG	42.9	-	-	828	2,240	1,540	2,160
Benzo(b)fluoranthene	UG/KG	-	-	-	887	2,720	1,640	2,240
Benzo(g,h,i)perylene	UG/KG	-	-	-	523	1,180	828	1,150
Benzo(k)fluoranthene	UG/KG	-	-	-	918	2,440	1,520	1,840
bis(2-Ethylhexyl)phthalate	UG/KG	-	-	12968	NA	NA	NA	NA
Chrysene	UG/KG	-	-	-	874	3,180	1,910	2,460
Dibenz(a,h)anthracene	UG/KG	-	-	-		234 J	252 J	
Fluoranthene	UG/KG	-	-	66300	962	4,570	1,520	2,220
Fluorene	UG/KG	-	4745	520		618	567	287 J

Criteria (1)- NYSDEC: Technical Guidance for Screening Contaminated Sediments, Human Health Bioaccumulation January 25, 1999 (Revised)

Criteria (2)- NYSDEC: Technical Guidance for Screening Contaminated Sediments, Benthic Aquatic Life, Acute Toxicity, January 25, 1999 (Revised)

Criteria (3)- NYSDEC: Technical Guidance for Screening Contaminated Sediments, Benthic Aquatic Life, Chronic Toxicity, January 25, 1999 (Revised)

Flags assigned during chemistry validation are shown.

 Concentration Exceeds Criteria 1

 Concentration Exceeds Criteria 2

 Concentration Exceeds Criteria 3

Sediment criteria calculated based on a Total Organic Carbon (TOC) content of 6.5%. TOC concentrations ranged from 6.5% - 12.2%

Only Detected Results Reported.

Advanced Selection: SEDIMENT_NO_MET
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TABLE 4-4
SUMMARY OF DETECTED ANALYTES IN SEDIMENT SAMPLES
UNION SHIP CANAL

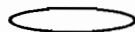
Location ID					USC-7	USC-8	USC-9	USC-9
Sample ID					USC-7	USC-8	USC-9	USC-9D
Matrix					Sediment	Sediment	Sediment	Sediment
Depth Interval (ft)					-	-	-	-
Date Sampled					11/15/99	11/15/99	11/15/99	11/15/99
Parameter	Units	Criteria (1)	Criteria (2)	Criteria (3)				Field Replicate (1-1)
Semivolatiles Organic Compounds								
Indeno(1,2,3-cd)pyrene	UG/KG	-	-	-	575	1,130	984	1,360
Naphthalene	UG/KG	-	16770	1950	242 J	857	452	521
Phenanthrene	UG/KG	-	-	7800	725	1,740	1,780	1,240
Phenol	UG/KG	-	-	39	NA	NA	NA	NA
Pyrene	UG/KG	-	5.70E+05	62465	1,440 J	4,090	2,160	3,200
Polychlorinated Biphenyls								
Aroclor 1242	UG/KG	0.052	1.79E+05	1255				
Aroclor 1254	UG/KG	0.052	1.79E+05	1255		782		
Aroclor 1260	UG/KG	0.052	1.79E+05	1255	168	559	305	290
Miscellaneous Parameters								
Total Organic Carbon	MG/KG	-	-	-	NA	NA	NA	NA
pH	S.U.	-	-	-	NA	NA	NA	NA

Criteria (1)- NYSDEC: Technical Guidance for Screening Contaminated Sediments, Human Health Bioaccumulation January 25, 1999 (Revised)

Criteria (2)- NYSDEC: Technical Guidance for Screening Contaminated Sediments, Benthic Aquatic Life, Acute Toxicity, January 25, 1999 (Revised)

Criteria (3)- NYSDEC: Technical Guidance for Screening Contaminated Sediments, Benthic Aquatic Life, Chronic Toxicity, January 25, 1999 (Revised)

Flags assigned during chemistry validation are shown.



Concentration Exceeds Criteria 1



Concentration Exceeds Criteria 2



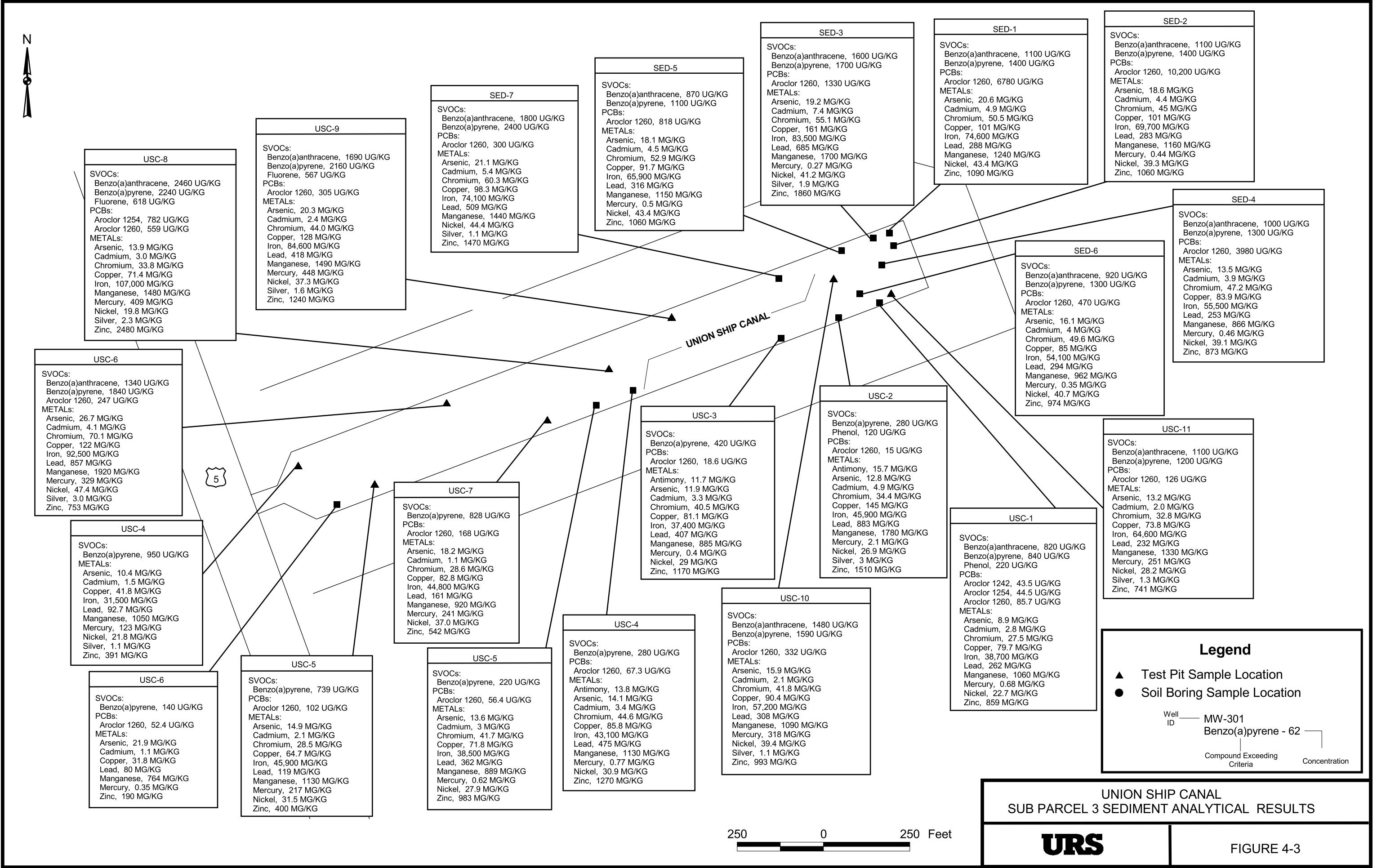
Border

Concentration Exceeds Criteria 3

Sediment criteria calculated based on a Total Organic Carbon (TOC) content of 6.5%. TOC concentrations ranged from 6.5% - 12.2%

Only Detected Results Reported.

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observed in most of the surface/subsurface soils in Subparcel 3. The exception would be the small area in the northeast portion of the site in the vicinity of BH-304 and MW-306 that had comparable levels. Based on the type of contaminants present in the canal sediments and the relatively uniform distribution throughout the canal, it is probable that there are a number of potential sources for these contaminants. These include the following:

- Sediment-laden stormwater run-off from other parcels within the vicinity of the canal including the Shenango Steel Molds site.
- Wind-blown dust from industrial sites in the vicinity of the canal.
- Bilge water pumped into the canal from the lake freighters while they were docked in the canal.
- Debris and dust that falls into the canal from the ships during off-loading operations.
- Petroleum spills from railroad trains or other equipment (i.e., ore-handling rigs) operating near the canal.
- Soot and ash emissions from furnace operations in the vicinity of use.
- Sediment-laden lake waters carried into the canal from the outer harbor area.

4.3.5 Groundwater

Groundwater samples were collected in November 2001 from the seven new monitoring wells (MW-301 to MW-307) and two existing wells (MW-101 and MW-103) installed by others. Supplemental samples were collected from monitoring wells MW-101, -306 and -307 on March 3, 2003. The well purge and sampling logs are presented in Appendix F. The analytical data is summarized in Table 4-5 and is graphically presented in Figure 4-4. The analytical data are in Attachment A of Appendix G.

VOCs consisting of acetone, which is a common laboratory contaminant, was detected at a concentration exceeding the SCGs in one sample from MW-307 during the initial sampling in November 2001. No other VOCs were detected at concentrations exceeding the SCGs. The results of the March 3rd resampling showed no detectable VOCs in MW-307. Consequently, it is concluded that the initial results for acetone were most likely incorrect, and not truly indicative of actual groundwater conditions in MW-307.

TABLE 4-5
SUMMARY OF DETECTED ANALYTES IN GROUNDWATER SAMPLES
UNION SHIP CANAL

Location ID			MW-101	MW-101	MW-103	MW-301	MW-302
Sample ID			MW-101	MW-101	MW-103	MW-301	MW-302
Matrix			Groundwater	Groundwater	Groundwater	Groundwater	Groundwater
Depth Interval (ft)			-	-	-	-	-
Date Sampled			11/13/01	03/07/03	11/13/01	11/13/01	11/13/01
Parameter	Units	Criteria*					
Volatiles Organic Compounds							
4-Methyl-2-pentanone	UG/L	-		NA			
Acetone	UG/L	50	12 J	NA			
Carbon disulfide	UG/L	60		NA			
Methyl ethyl ketone (2-Butanone)	UG/L	50		NA			
Methyl tert-butyl ether	UG/L	10		NA			
Tetrachloroethene	UG/L	5		NA			2 J
Semivolatiles Organic Compounds							
2,4-Dimethylphenol	UG/L	50	2 J	NA	23 J		
2-Methylnaphthalene	UG/L	-	1 J	NA			
2-Methylphenol (o-cresol)	UG/L	1		NA			
4-Methylphenol (p-cresol)	UG/L	1	3 J	NA			
Acenaphthene	UG/L	20		NA			
Anthracene	UG/L	50		NA			
Benzo(a)anthracene	UG/L	0.002		NA			
Benzo(a)pyrene	UG/L	-		NA			
Benzo(b)fluoranthene	UG/L	0.002		NA			
Benzo(g,h,i)perylene	UG/L	50		NA			
Benzo(k)fluoranthene	UG/L	0.002		NA			
Carbazole	UG/L	50	1 J	NA			
Chrysene	UG/L	0.002		NA			
Dibenz(a,h)anthracene	UG/L	50		NA			
Dibenzofuran	UG/L	50		NA			
Fluoranthene	UG/L	50		NA			

*Criteria- NYSDEC TOGS (1.1.1), Ambient Water Quality Standards and Guidance Values and Groundwater Effluent Limitations, June 1998 (includes 4/2000 Addendum). Class GA.

Flags assigned during chemistry validation are shown.

 Concentration Exceeds Criteria.

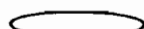
Only Detected Results Reported.

TABLE 4-5
SUMMARY OF DETECTED ANALYTES IN GROUNDWATER SAMPLES
UNION SHIP CANAL

Location ID			MW-101	MW-101	MW-103	MW-301	MW-302
Sample ID			MW-101	MW-101	MW-103	MW-301	MW-302
Matrix			Groundwater	Groundwater	Groundwater	Groundwater	Groundwater
Depth Interval (ft)			-	-	-	-	-
Date Sampled			11/13/01	03/07/03	11/13/01	11/13/01	11/13/01
Parameter	Units	Criteria*					
Semivolatiles Organic Compounds							
Fluorene	UG/L	50		NA			
Indeno(1,2,3-cd)pyrene	UG/L	0.002		NA			
Naphthalene	UG/L	10	7 J	NA	3 J		
Phenanthrene	UG/L	50		NA			
Phenol	UG/L	1	6 J	NA	31	3 J	18
Pyrene	UG/L	50		NA			
Metals							
Aluminum	UG/L	-	164 B	NA	867	1,850	1,250
Antimony	UG/L	3		NA			
Arsenic	UG/L	25		NA	7.6 BJ		7.9 BJ
Boron	UG/L	1000	88.7 B	NA	85.2 B	106 B	39.7 B
Beryllium	UG/L	3		NA			
Cadmium	UG/L	5		NA			
Calcium	UG/L	-	213,000	NA	105,000	120,000	88,700
Chromium	UG/L	50	5.7 B	NA	2.2 B	3.4 B	2.0 B
Cobalt	UG/L	-	2.0 B	NA	3.3 B	3.3 B	3.1 B
Copper	UG/L	200	4.1 B	NA	4.7 B	16.4 B	13.3 B
Iron	UG/L	300	519	NA	6,250	2,510	1,200
Lead	UG/L	25		NA	23.1 J		3.0 BJ
Magnesium	UG/L	35000	197 B	NA	5,660	8,540	968 B
Manganese	UG/L	300	1.0 B	NA	297 J	133 J	16.9 J
Mercury	UG/L	0.7	0.13 U	NA	0.13 U	0.14 U	0.14 U
Nickel	UG/L	100	4.7 B	NA		4.0 B	3.3 B

*Criteria- NYSDEC TOGS (1.1.1), Ambient Water Quality Standards and Guidance Values and Groundwater Effluent Limitations, June 1998 (includes 4/2000 Addendum). Class GA.

Flags assigned during chemistry validation are shown.

 Concentration Exceeds Criteria.

Only Detected Results Reported.

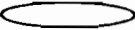
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TABLE 4-5
SUMMARY OF DETECTED ANALYTES IN GROUNDWATER SAMPLES
UNION SHIP CANAL

Location ID			MW-101	MW-101	MW-103	MW-301	MW-302
Sample ID			MW-101	MW-101	MW-103	MW-301	MW-302
Matrix			Groundwater	Groundwater	Groundwater	Groundwater	Groundwater
Depth Interval (ft)			-	-	-	-	-
Date Sampled			11/13/01	03/07/03	11/13/01	11/13/01	11/13/01
Parameter	Units	Criteria*					
Metals							
Potassium	UG/L	-	710,000	NA	406,000	25,500	22,100
Selenium	UG/L	10	17.2 R	NA	8.5 R	7.9 R	8.1 R
Silver	UG/L	50	1.9 B	NA	0.66 B	1.0 B	
Sodium	UG/L	20000	97,900	NA	152,000	37,200	23,300
Vanadium	UG/L	-	15.1 B	NA	1.5 B	3.8 B	4.2 B
Zinc	UG/L	2000		NA	102	11.8 B	8.2 B
Filtered Metals							
Aluminum	UG/L	-	125 B	NA	26.7 B	123 B	279
Antimony	UG/L	3		NA			
Arsenic	UG/L	25		NA			7.5 B.J
Barium	UG/L	1000	74.4 B	NA	64.1 B	31.6 B	29.2 B
Cadmium	UG/L	5		NA		0.51 B	
Calcium	UG/L	-	203,000	NA	91,100	102,000	80,700
Chromium	UG/L	50	5.4 B	NA	0.96 B	0.65 B	0.81 B
Cobalt	UG/L	-	1.5 B	NA	2.2 B	1.5 B	1.3 B
Copper	UG/L	200	3.2 B	NA	1.3 B	3.4 B	4.5 B
Iron	UG/L	300	432	NA	113	37.1 B	22.7 B
Magnesium	UG/L	35000	246 B	NA	5,550 J	5,610 J	722 B
Manganese	UG/L	300		NA	57.1	22.2	
Mercury	UG/L	0.7	0.14 U	NA	0.13 U	0.13 U	0.13 U
Nickel	UG/L	100	3.4 B	NA			
Potassium	UG/L	-	627,000	NA	386,000	24,600	21,000
Selenium	UG/L	10	17.6 R	NA	8.1 R	8.2 R	8.7 R

*Criteria- NYSDEC TOGS (1.1.1), Ambient Water Quality Standards and Guidance Values and Groundwater Effluent Limitations, June 1998 (includes 4/2000 Addendum). Class GA.

Flags assigned during chemistry validation are shown.

 Concentration Exceeds Criteria.

Only Detected Results Reported.

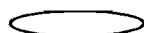
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TABLE 4-5
SUMMARY OF DETECTED ANALYTES IN GROUNDWATER SAMPLES
UNION SHIP CANAL

Location ID			MW-101	MW-101	MW-103	MW-301	MW-302
Sample ID			MW-101	MW-101	MW-103	MW-301	MW-302
Matrix			Groundwater	Groundwater	Groundwater	Groundwater	Groundwater
Depth Interval (ft)			-	-	-	-	-
Date Sampled			11/13/01	03/07/03	11/13/01	11/13/01	11/13/01
Parameter	Units	Criteria*					
Filtered Metals							
Silver	UG/L	50	2.0 B	NA	0.89 B	1.3 B	0.93 B
Sodium	UG/L	20000	94,900	NA	147,000	35,600	21,800
Vanadium	UG/L	-	12.0 B	NA		0.50 B	2.2 B
Zinc	UG/L	2000		NA			
Miscellaneous Parameters							
Cyanide	UG/L	200	1,127		642	50.0	40.8
Cyanide, Free	MGL	-	NA	0.012	NA	NA	NA
pH	S.U.	-	12.0	NA	9.3	8.6	10.0

*Criteria- NYSDEC TOGS (1.1.1), Ambient Water Quality Standards and Guidance Values and Groundwater Effluent Limitations, June 1998 (includes 4/2000 Addendum). Class GA.

Flags assigned during chemistry validation are shown.



Concentration Exceeds Criteria.

Only Detected Results Reported.

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 [MATRIX] = 'WG'

TABLE 4-5
SUMMARY OF DETECTED ANALYTES IN GROUNDWATER SAMPLES
UNION SHIP CANAL

Location ID			MW-303	MW-304	MW-305	MW-306	MW-306
Sample ID			MW-303	MW-304	MW-305	MW-306	MW-306
Matrix			Groundwater	Groundwater	Groundwater	Groundwater	Groundwater
Depth Interval (ft)			-	-	-	-	-
Date Sampled			11/13/01	11/13/01	11/13/01	11/13/01	03/07/03
Parameter	Units	Criteria*					
Volatiles Organic Compounds							
4-Methyl-2-pentanone	UG/L	-					NA
Acetone	UG/L	50		34 J	10 J		NA
Carbon disulfide	UG/L	60					NA
Methyl ethyl ketone (2-Butanone)	UG/L	50					NA
Methyl tert-butyl ether	UG/L	10					NA
Tetrachloroethene	UG/L	5					NA
Semivolatiles Organic Compounds							
2,4-Dimethylphenol	UG/L	50					
2-Methylnaphthalene	UG/L	-					
2-Methylphenol (o-cresol)	UG/L	1					
4-Methylphenol (p-cresol)	UG/L	1					
Acenaphthene	UG/L	20				2 J	
Anthracene	UG/L	50				6 J	
Benzo(a)anthracene	UG/L	0.002				16	
Benzo(a)pyrene	UG/L	-				15 J	
Benzo(b)fluoranthene	UG/L	0.002				23 J	
Benzo(g,h,i)perylene	UG/L	50				6 J	
Benzo(k)fluoranthene	UG/L	0.002				8 J	
Carbazole	UG/L	50				1 J	
Chrysene	UG/L	0.002				16	
Dibenz(a,h)anthracene	UG/L	50				2 J	
Dibenzofuran	UG/L	50				2 J	
Fluoranthene	UG/L	50				38	

*Criteria- NYSDEC TOGS (1.1.1), Ambient Water Quality Standards and Guidance Values and Groundwater Effluent Limitations, June 1998 (includes 4/2000 Addendum). Class GA.

Flags assigned during chemistry validation are shown.



Concentration Exceeds Criteria.

Only Detected Results Reported.

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[MATRIX] = 'WG'

TABLE 4-5
SUMMARY OF DETECTED ANALYTES IN GROUNDWATER SAMPLES
UNION SHIP CANAL

Location ID			MW-303	MW-304	MW-305	MW-306	MW-306
Sample ID			MW-303	MW-304	MW-305	MW-306	MW-306
Matrix			Groundwater	Groundwater	Groundwater	Groundwater	Groundwater
Depth Interval (ft)			-	-	-	-	-
Date Sampled			11/13/01	11/13/01	11/13/01	11/13/01	03/07/03
Parameter	Units	Criteria*					
Semivolatiles Organic Compounds							
Fluorene	UG/L	50				3 J	
Indeno(1,2,3-cd)pyrene	UG/L	0.002				7 J	
Naphthalene	UG/L	10				2 J	
Phenanthrene	UG/L	50				22	
Phenol	UG/L	1					
Pyrene	UG/L	50				38	
Metals							
Aluminum	UG/L	-	1,720	1,730	1,110	3,980	NA
Antimony	UG/L	3			13.2 BJ		NA
Arsenic	UG/L	25	7.1 BJ				NA
Bismuth	UG/L	1000	189 B	66.4 B	289	81.2 B	NA
Beryllium	UG/L	3				0.17 B	NA
Cadmium	UG/L	5				3.8 B	NA
Calcium	UG/L	-	126,000	20,600	106,000	107,000	NA
Chromium	UG/L	50	3.1 B	5.7 B	4.2 B	9.3 B	NA
Cobalt	UG/L	-	3.0 B	2.7 B	2.8 B	3.8 B	NA
Copper	UG/L	200	6.1 B	3.8 B	93.9	53.1	NA
Iron	UG/L	300	6,550	2,140	2,080	17,600	NA
Lead	UG/L	25			6.2 J	177 J	NA
Magnesium	UG/L	35000	20,500	15,800	42,000	29,200	NA
Manganese	UG/L	300	215 J	31.3 J	428 J	439 J	NA
Mercury	UG/L	0.7	0.14 U	0.13 U	0.13 U	0.19 B	NA
Nickel	UG/L	100	2.7 B	2.8 B	2.8 B	6.6 B	NA

*Criteria- NYSDEC TOGS (1.1.1), Ambient Water Quality Standards and Guidance Values and Groundwater Effluent Limitations, June 1998 (includes 4/2000 Addendum). Class GA.

Flags assigned during chemistry validation are shown.

 Concentration Exceeds Criteria.

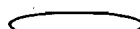
Only Detected Results Reported.

TABLE 4-5
SUMMARY OF DETECTED ANALYTES IN GROUNDWATER SAMPLES
UNION SHIP CANAL

Location ID			MW-303	MW-304	MW-305	MW-306	MW-306
Sample ID			MW-303	MW-304	MW-305	MW-306	MW-306
Matrix			Groundwater	Groundwater	Groundwater	Groundwater	Groundwater
Depth Interval (ft)			-	-	-	-	-
Date Sampled			11/13/01	11/13/01	11/13/01	11/13/01	03/07/03
Parameter	Units	Criteria*					
Metals							
Potassium	UG/L	-	46,700	121,000	2,830 B	36,300	NA
Selenium	UG/L	10	6.8 R			10.0 R	NA
Silver	UG/L	50	1.1 B		1.0 B		NA
Sodium	UG/L	20000	37,200	119,000	34,900	21,200	NA
Vanadium	UG/L	-	5.1 B	4.0 B	2.7 B	7.6 B	NA
Zinc	UG/L	2000	9.9 B	16.0 B	79.7	947	NA
Filtered Metals							
Aluminum	UG/L	-	21.4 B	23.7 B	20.6 B	18.6 B	NA
Antimony	UG/L	3			12.1 BJ		NA
Arsenic	UG/L	25					NA
Barium	UG/L	1000	157 B	17.5 B	286 J	50.5 B	NA
Cadmium	UG/L	5			2.2 B		NA
Calcium	UG/L	-	121,000	4,940 B	105,000	102,000	NA
Chromium	UG/L	50	0.71 B	2.9 B	1.1 B	0.86 B	NA
Cobalt	UG/L	-	1.3 B	0.98 B	2.8 B	1.2 B	NA
Copper	UG/L	200	2.2 B	2.0 B	30.0	3.7 B	NA
Iron	UG/L	300	7.8 B		11.6 B	18.9 B	NA
Magnesium	UG/L	35000	19,900 J	12,700 J	41,200 J	28,100 J	NA
Manganese	UG/L	300	183		409	280	NA
Mercury	UG/L	0.7	0.13 U	0.13 U	0.13 U	0.13 U	NA
Nickel	UG/L	100			1.1 B		NA
Potassium	UG/L	-	43,100	119,000	2,910 B	35,600	NA
Selenium	UG/L	10	7.9 R		5.3 R	5.5 R	NA

*Criteria- NYSDEC TOGS (1.1.1), Ambient Water Quality Standards and Guidance Values and Groundwater Effluent Limitations, June 1998 (includes 4/2000 Addendum). Class GA.

Flags assigned during chemistry validation are shown.

 Concentration Exceeds Criteria.

Only Detected Results Reported.

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TABLE 4-5
SUMMARY OF DETECTED ANALYTES IN GROUNDWATER SAMPLES
UNION SHIP CANAL

Location ID			MW-303	MW-304	MW-305	MW-306	MW-306
Sample ID			MW-303	MW-304	MW-305	MW-306	MW-306
Matrix			Groundwater	Groundwater	Groundwater	Groundwater	Groundwater
Depth Interval (ft)			-	-	-	-	-
Date Sampled			11/13/01	11/13/01	11/13/01	11/13/01	03/07/03
Parameter	Units	Criteria*					
Filtered Metals							
Silver	UG/L	50	0.92 B		0.74 B	0.89 B	NA
Sodium	UG/L	20000	35,100	116,000	32,700	21,000	NA
Vanadium	UG/L	-					NA
Zinc	UG/L	2000			21.3		NA
Miscellaneous Parameters							
Cyanide	UG/L	200	19.7	9.2 B	3.7 B	137	NA
Cyanide, Free	MGL	-	NA	NA	NA	NA	NA
pH	S.U.	-	7.0	10.0	6.8	7.8	NA

*Criteria- NYSDEC TOGS (1.1.1), Ambient Water Quality Standards and Guidance Values and Groundwater Effluent Limitations, June 1998 (includes 4/2000 Addendum). Class GA.

Flags assigned during chemistry validation are shown.



Concentration Exceeds Criteria.

Only Detected Results Reported.

Advanced Selection: GROUNDWATER
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 [MATRIX] = 'WG'

TABLE 4-5
SUMMARY OF DETECTED ANALYTES IN GROUNDWATER SAMPLES
UNION SHIP CANAL

Location ID			MW-307	MW-307
Sample ID			MW-307	MW-307
Matrix			Groundwater	Groundwater
Depth Interval (ft)			-	-
Date Sampled			11/13/01	03/07/03
Parameter	Units	Criteria*		
Volatiles Organic Compounds				
4-Methyl-2-pentanone	UG/L	-	3 J	
Acetone	UG/L	50	130 J	
Carbon disulfide	UG/L	60	12 J	17 J
Methyl ethyl ketone (2-Butanone)	UG/L	50	18	
Methyl tert-butyl ether	UG/L	10	1 J	
Tetrachloroethene	UG/L	5		
Semivolatiles Organic Compounds				
2,4-Dimethylphenol	UG/L	50	7 J	
2-Methylnaphthalene	UG/L	-		
2-Methylphenol (o-cresol)	UG/L	1	5 J	
2-Methylphenol (p-cresol)	UG/L	1	23 J	5 J
Acenaphthene	UG/L	20		
Anthracene	UG/L	50		
Benzo(a)anthracene	UG/L	0.002		
Benzo(a)pyrene	UG/L	-		
Benzo(b)fluoranthene	UG/L	0.002		
Benzo(g,h,i)perylene	UG/L	50		
Benzo(k)fluoranthene	UG/L	0.002		
Carbazole	UG/L	50		
Chrysene	UG/L	0.002		
Dibenz(a,h)anthracene	UG/L	50		
Dibenzofuran	UG/L	50		
Fluoranthene	UG/L	50		

*Criteria- NYSDEC TOGS (1.1.1), Ambient Water Quality Standards and Guidance Values and Groundwater Effluent Limitations, June 1998 (includes 4/2000 Addendum). Class GA.

Flags assigned during chemistry validation are shown.

 Concentration Exceeds Criteria.

Only Detected Results Reported.

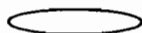
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TABLE 4-5
SUMMARY OF DETECTED ANALYTES IN GROUNDWATER SAMPLES
UNION SHIP CANAL

Location ID			MW-307	MW-307
Sample ID			MW-307	MW-307
Matrix			Groundwater	Groundwater
Depth Interval (ft)			-	-
Date Sampled			11/13/01	03/07/03
Parameter	Units	Criteria*		
Semivolatiles Organic Compounds				
Fluorene	UG/L	50		
Indeno(1,2,3-cd)pyrene	UG/L	0.002		
Naphthalene	UG/L	10		
Phenanthrene	UG/L	50		
Phenol	UG/L	1	210	18
Pyrene	UG/L	50		
Metals				
Aluminum	UG/L	-	1,700	NA
Antimony	UG/L	3		NA
Arsenic	UG/L	25	110 J	NA
Barium	UG/L	1000	60.2 B	NA
Beryllium	UG/L	3		NA
Cadmium	UG/L	5		NA
Calcium	UG/L	-	221,000	NA
Chromium	UG/L	50	2.5 B	NA
Cobalt	UG/L	-	7.1 B	NA
Copper	UG/L	200	2.7 B	NA
Iron	UG/L	300	4,220	NA
Lead	UG/L	25		NA
Magnesium	UG/L	35000	505 B	NA
Manganese	UG/L	300	14.8 B	NA
Mercury	UG/L	0.7	0.14 U	NA
Nickel	UG/L	100	56.1	NA

*Criteria- NYSDEC TOGS (1.1.1), Ambient Water Quality Standards and Guidance Values and Groundwater Effluent Limitations, June 1998 (includes 4/2000 Addendum). Class GA.

Flags assigned during chemistry validation are shown.



Concentration Exceeds Criteria.

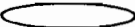
Only Detected Results Reported.

TABLE 4-5
SUMMARY OF DETECTED ANALYTES IN GROUNDWATER SAMPLES
UNION SHIP CANAL

Location ID			MW-307	MW-307
Sample ID			MW-307	MW-307
Matrix			Groundwater	Groundwater
Depth Interval (ft)			-	-
Date Sampled			11/13/01	03/07/03
Parameter	Units	Criteria*		
Metals				
Potassium	UG/L	-	919,000	NA
Selenium	UG/L	10	27.8 R	NA
Silver	UG/L	50	1.5 B	NA
Sodium	UG/L	20000	156,000	NA
Vanadium	UG/L	-	38.8 B	NA
Zinc	UG/L	2000	8.3 B	NA
Filtered Metals				
Aluminum	UG/L	-	1,020	NA
Antimony	UG/L	3		NA
Arsenic	UG/L	25	110 J	NA
Bismuth	UG/L	1000	54.8 B	NA
Cadmium	UG/L	5		NA
Calcium	UG/L	-	220,000	NA
Chromium	UG/L	50	0.99 B	NA
Cobalt	UG/L	-	6.2 B	NA
Copper	UG/L	200	2.6 B	NA
Iron	UG/L	300	3,220	NA
Magnesium	UG/L	35000	312 B	NA
Manganese	UG/L	300		NA
Mercury	UG/L	0.7	0.15 B	NA
Nickel	UG/L	100	52.2	NA
Potassium	UG/L	-	899,000	NA
Selenium	UG/L	10	28.5 R	NA

*Criteria- NYSDEC TOGS (1.1.1), Ambient Water Quality Standards and Guidance Values and Groundwater Effluent Limitations, June 1998 (includes 4/2000 Addendum). Class GA.

Flags assigned during chemistry validation are shown.

 Concentration Exceeds Criteria.

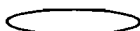
Only Detected Results Reported.

TABLE 4-5
SUMMARY OF DETECTED ANALYTES IN GROUNDWATER SAMPLES
UNION SHIP CANAL

Location ID			MW-307	MW-307
Sample ID			MW-307	MW-307
Matrix			Groundwater	Groundwater
Depth Interval (ft)			-	-
Date Sampled			11/13/01	03/07/03
Parameter	Units	Criteria*		
Filtered Metals				
Silver	UG/L	50	1.5 B	NA
Sodium	UG/L	20000	153,000	NA
Vanadium	UG/L	-	37.2 B	NA
Zinc	UG/L	2000		NA
Miscellaneous Parameters				
Cyanide	UG/L	200	7,950	7,330
Cyanide, Free	MG/L	-	NA	0.0071
pH	S.U.	-	11.0	NA

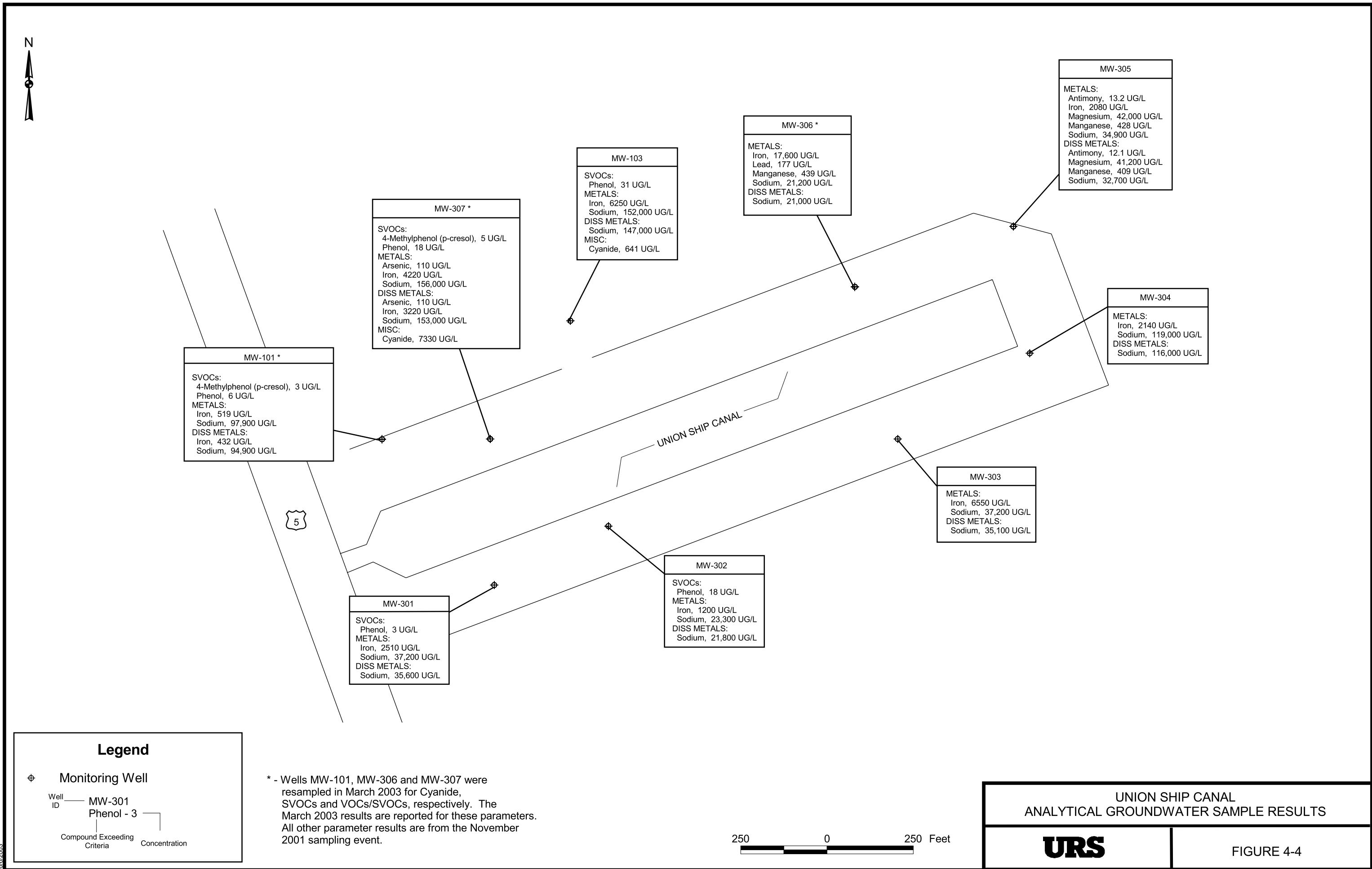
*Criteria- NYSDEC TOGS (1.1.1), Ambient Water Quality Standards and Guidance Values and Groundwater Effluent Limitations, June 1998 (includes 4/2000 Addendum). Class GA.

Flags assigned during chemistry validation are shown.

 Concentration Exceeds Criteria.

Only Detected Results Reported.

Advanced Selection: GROUNDWATER
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SVOCs consisting of phenol, 2-methylphenol, and 4-methylphenol were detected at concentrations above the SCGs in five of the wells (MW-301, -302, -307, and MW-101 and -103) sampled in November 2001 in the western half of the site. The highest levels were reported in MW-307. Resampling of MW-307 for SVOCs in March 2003 showed detectable levels of 4-methylphenol and phenol at a concentration exceeding the SCGs. However, these levels were significantly lower than those observed in November 2001.

Additionally, four cPAHs were detected at concentrations above the SCGs in MW-306 during the November 2001 sampling event. Resampling of MW-306 in March 2003 using low-flow sampling methods showed no detectable SVOCs/cPAHs. Consequently, it is likely that the elevated cPAH concentrations observed in the November samples are related to cPAHs adsorbed onto sediment particles in the samples, and not truly indicative of groundwater conditions at the site.

No pesticides or PCBs were detected in any of the samples.

Total metals, consisting primarily of iron and sodium, were detected in all nine groundwater samples at concentrations exceeding the SCGs. To a much lesser extent, arsenic (MW-307), lead (MW-306), manganese (MW-305 and -306), magnesium (MW-305), and antimony (MW-305) were detected at concentrations exceeding the SCGs. Total cyanide was detected at concentrations exceeding the SCGs in MW-101, -103, and -307. Resampling of MW-101 and MW-307 in March 2003 indicated that the concentration of free cyanide in both samples was very low (i.e., 0.012 and 0.0071 mg/kg, respectively). Whereas TOGS 1.1.1 does not have a specific criteria for free cyanide in drinking water, the USEPA has established a risk-based concentration (RBC) of 730 ug/L for tap water. The free cyanide concentrations observed onsite are considerably below this.

Dissolved (i.e., filtered) metals results indicated that only sodium exceeded the SCGs in all nine groundwater samples. Iron (MW-101 and -307), arsenic (MW-307), and antimony, manganese, and magnesium (MW-305) exceeded the SCGs in a few of the samples.

Elevated pH levels (i.e., >8.0) were observed in 6 of the 9 groundwater samples. These values range from 8.6 at MW-301 to a high of 12.0 in MW-101. These elevated levels are most likely due to lime associated with the slag materials used as fill around the site.

4.4 Summary of Contamination

- Analytical results indicate that surface and subsurface soils do not contain any VOCs, pesticides, or PCBs at concentrations that exceed the SCGs.
- With regards to SVOCs, there are only minor exceedances for one or two cPAHs in most samples with the exception of a localized area in the northeast portion of the site where the number and concentration of cPAHs were somewhat higher than the rest of the site. Although the concentrations exceed the SCGs, they are still relatively low, being on the order of two to four times the SCGs.
- Various metals were detected in the surface and subsurface soils at concentrations that exceed the SCGs. Total and free (i.e., weak acid dissociable) cyanide were detected in some samples. Whereas TAGM 4046 has no specific criteria for cyanide and free cyanide, the onsite concentrations were approximately two orders of magnitude lower than the RBCs and PRGs established by USEPA for residential sites and about three orders of magnitude lower than criteria for industrial sites.
- Dissolved metals consisting primarily of sodium, and in isolated cases iron, antimony, arsenic, lead, magnesium, and manganese, were detected in groundwater at concentrations exceeding the SCGs.
- Groundwater samples in five monitoring wells showed elevated levels of SVOCs, consisting primarily of phenols. These are most probably associated with the steel making process.
- Total cyanide concentrations exceeded the SCGs in three groundwater samples (MW-101, -103 and -307) in the northwest portion of the site. However, the concentration of free cyanide in the samples was well below the RBCs established by the USEPA for drinking water.

- Sediment samples from the canal exhibit elevated levels of SVOCs (primarily cPAHs) several metals, and PCBs. The PCB concentrations are highest in the northeast corner of the canal in the vicinity of the outfall from the Shenango Steel Molds site and decrease to the west. The metals and cPAHs appear to be uniformly distributed throughout the canal.

4.5 Analytical Testing Data Validation

A limited data validation was performed on all samples collected. This data validation was limited to a review of the following criteria:

- Holding times
- Data completeness
- Comparison of surrogate, spike, and duplicate recoveries to validation criteria
- Blank contamination
- 10% quantitation check that reported sample results are correct
- Proper sample analysis
- Sample chromatograms
- NYSDEC ASP Sample Preparation and Analysis Summary Forms

Based on this review, a data usability summary report (DUSR) was prepared.

The initial (November 2001) and supplemental (March 2003) sample analyses were generally found to be compliant with the method criteria. Those results qualified “J/UJ” (estimated) are considered conditionally usable. Those results qualified “JN” (rejected) are considered tentative identification and are conditionally usable. Those results qualified as “R” (rejected) are unusable. All other sample results are usable as reported. Sample results were rejected generally due to matrix interference (e.g., organics and metals) and/or technical holding time exceedances (e.g., total and free cyanides). Specific details concerning data qualification can be found in the Data Usability Summary Reports in Appendix G.

5.0 EXPOSURE PATHWAY ANALYSIS

5.1 Migration Pathways

An exposure pathway is the route by which an individual (i.e., receptor) comes in contact with a contaminant. The five elements of an exposure pathway are: 1) the source of contamination; 2) the environmental medium and transport mechanisms; 3) the point of exposure; 4) the route of exposure; and 5) the receptor population. In order for an individual to be affected by contamination at the site, a pathway must be complete. Pathways may be direct or indirect. Direct exposure pathways include dermal contact with, and/or inhalation or ingestion of, the contaminant. Ingestion of contaminated drinking water is an example of a complete direct exposure pathway. An example of an indirect exposure pathway is human consumption of fish which have been contaminated by eating smaller creatures living in contaminated sediments. The following sections address several potential exposure pathways at the site.

5.1.1 Sediment Exposure Pathway

No VOCs were detected in any of the samples at concentrations exceeding the SCGs. However, SVOCs consisting primarily of cPAHs, several metals, and PCBs were detected at concentrations exceeding the SCGs. The highest concentrations of PCBs were in the northeast corner of the canal. Considering the sediments are at the bottom of the canal under about 20-30' of water, there is almost no potential for direct dermal contact or ingestion. Recreational users of the canal (e.g., boaters, swimmers, fishermen, etc.) could potentially be exposed if the sediments become suspended in the canal water, such as after a large storm, and they come in contact with, or ingest, the sediment laden water.

Additionally, fisherman using the canal could potentially be exposed indirectly to PCBs. Fish in the canal that feed on plants/animals living in the sediment may ingest PCBs. Over time, the PCBs are bio-concentrated in the fish. Should the fish be caught and eaten by a fisherman, there is a potential for exposure to the PCBs.

5.1.2 Surface Soil Exposure Pathway

SVOCs were detected in surface soil samples at concentrations that exceed the SCGs. The majority of the exceedances are for cPAHs present in soil samples collected from soil borings and test trenches in the northeast portion of the site. As reported above, various metals also showed general exceedances of the SCGs. Surface soils are a potential source of contamination in localized areas of the site. Potential receptors include recreational users (i.e., fishermen, ATV riders, hikers, etc.) and on-site workers that may come in direct dermal contact or ingest/inhale the contaminants in the surface soils. Currently, a complete, although somewhat limited, exposure pathway exists which could pose a risk to human health.

5.1.3 Subsurface Soil Exposure Pathway

SVOCs were detected in subsurface soil samples at concentrations that exceed the SCGs. The majority of the exceedances are for cPAHs present in soil samples collected from 6 – 8 feet below grade from soil borings (BH-304 and MW-306) located in the northeast portion of the site. As reported above, various metals also showed general exceedances of the SCGs. Subsurface soils are a potential source of contamination in localized areas of the site. The only potential receptor population that may come in contact with the subsurface soils are construction workers performing earthwork. Currently, a complete exposure pathway does not exist that would pose a risk to human health, although future workers planning remedial or site development activities may be exposed.

5.1.4 Groundwater Exposure Pathway

Groundwater samples from the western portion of the site contained some phenols at concentrations slightly above the SCGs. Additionally, the field data indicates very high pH levels in groundwater in the northwest portion of the site in the vicinity of MW-101. Groundwater data does not suggest free interchange between the groundwater and water in the canal. Although groundwater associated with the water table aquifer in some areas of the site may be considered a source of contamination, there is no complete route of exposure as potential

receptor populations are supplied with municipal water and do not use groundwater for consumption or recreation.

5.1.5 Air Exposure Pathway

Fugitive or respirable dust is a potential concern at this site as there are open areas of soil that are inadequately vegetated and/or are covered with material that can become airborne. SVOCs as well as various metals were present in some surface soils. However, the receptor population is limited. The industries located to the south, motorists on Fuhrmann Boulevard, and recreational visitors to the site constitute the present receptor population. The potential exposure of motorists on Fuhrmann Boulevard is extremely small. The potential contact zone is only a few hundred feet long, the exposed soil areas constitute a small percentage of the total area of the site, the motorists are traveling at 55 mph and, given the average wind direction at the site, the direction of the possible dust plume is generally away from the highway. The possible receptor population at the industries to the south is also limited by the above factors as well as being no closer to Subparcel 3 than 2,000 feet. The additional distances disperse and reduce the dust concentrations potentially available for exposure by the potential receptors. The greatest risk for fugitive dust exposure is to recreational visitors and future workers at the site. The present recreational visitors use the site for off road All Terrain Vehicle (ATV) riding and fishing. The fishermen use their own vehicles to drive to their fishing locations, which creates dust from the unpaved on-site roads. The ATV riders also create dust, through which they operate their vehicles. Both circumstances can create dust plumes that can drift through the site and reach all on-site receptor populations. On-site work can also generate dust, especially bulldozing, leveling, or excavation work. However, an adequate site soils management plan would take these factors into account to minimize the potential dust exposures to on-site workers.

5.1.6 Conclusions

Based on the above exposure pathway analysis, contaminated sediment, surface, and subsurface soils and groundwater all represent potential contaminant sources. Potential completed pathways exist for surface soils and/or sediments and to a lesser degree subsurface soils and groundwater.

5.2 Habitat-Based Assessment

A habitat-based assessment is performed during a SI when it is determined that an impact to wildlife may exist as a result of contamination from the site. Field observations were made in conjunction with environmental sampling to determine if such an assessment was necessary for this SI. The potential impacts or routes of exposure to wildlife that were considered include, but are not limited to, the following:

- Uptake of contaminants by plant life on or near the site.
- Consumption of contaminated plants by animals in the area.
- Direct contact with contaminants at the surface by animal life on or near the site.
- Impacts to surface water via storm water runoff or groundwater discharge.

After consideration of the above-mentioned potential impacts with the conditions defined for the site, it was determined that potential impacts to wildlife by site-related contamination are plant uptake from contaminated soils and the uptake and bioconcentration of PCBs from the sediments. No further habitat-based assessment/evaluation is envisioned based on the data gathered to date.

6.0 IDENTIFICATION AND DEVELOPMENT OF REMEDIAL ALTERNATIVES

6.1 Introduction

This section presents the methodology and rationale used to develop remedial action alternatives for Subparcel 3 of the former Hanna Furnace Site.

6.2 Remedial Action Objectives

The objective of the NYSDEC Brownfield Program is to investigate and evaluate sites that have been impacted due to real or perceived environmental contamination so that they can be restored to pre-disposal conditions, to the extent feasible and authorized by law. This objective includes the identification and development of remedial alternatives. In order to evaluate the practicality and feasibility of meeting this objective, it has been assumed that the site will be used for greenspace purposes. Appropriate remedial action alternatives based on recreational and/or greenspace land use were subsequently developed and evaluated. A remedy for the site was then selected from these alternatives.

6.2.1 Selection of Cleanup Goals

In accordance with the NYSDEC Brownfield Program, the cleanup goals for each matrix are as follows:

Soil

NYSDEC Technical Administrative Guidance Memorandum (TAGM) 4046: *Determination of Soil Cleanup Objectives and Cleanup Levels*, January 1994, revised.

Groundwater

NYSDEC Technical and Operational Guidance Series (TOGS) 1.1.1: *Ambient Water Quality Standards and Guidance Values and Groundwater Effluent Limitations*, June 1998.

Sediment

NYSDEC Technical Guidance for Screening Contaminated Sediment, March 1998.

6.2.2 Regulatory Implications of Contaminant Concentrations

It is to be noted that the TAGM 4046 criteria for soils have been developed based on residential use scenarios. Consequently, with greenspace re-use scenarios, as proposed for this site, these criteria are used for initial screening of the site. Final cleanup goals subsequently are developed on a case by case basis with the NYSDEC and NYSDOH. Likewise, the TOGS 1.1.1 criteria are used in cases where the groundwater is utilized, or may be potentially utilized in the future, as a source of drinking water. Considering that groundwater is not now, or likely to be in the future, a source of drinking water, the TOGS 1.1.1 criteria are used for initial screening of the site. Final cleanup goals will be developed with the NYSDEC and NYSDOH.

Sediment

SVOCs consisting primarily of cPAHs, some metals, and PCBs were detected at concentrations that exceed their SCGs in sediment samples collected from the canal. The PCB concentrations are highest in the northeast corner of the canal. There is very little potential for direct contact with or, ingestion of, the sediments. However, potential indirect exposure may occur to PCBs that bioaccumulate and concentrate in fish tissues.

Soils

SVOCs, primarily cPAHs and metals, were detected in soil samples at concentrations that exceed their SCGs. These were detected in both surface and subsurface soils. Under the current site use scenario, the potential exposure pathway to humans is through direct dermal contact and/or inhalation/ingestion of airborne dust. The potential receptor population is limited to site recreational visitors and site construction workers.

Consequently, since there is a potential for exposure to surface soils, and earthwork will take place during future excavation for foundations, remedial alternatives were developed for both surface and subsurface soils.

Groundwater

There were no VOCs, pesticides, or PCBs detected in groundwater samples that exceed the SCGs. Consequently, these constituents were not considered during the development of remedial alternatives for groundwater. A few SVOCs (primarily phenols) and metals/cyanide were detected in site groundwater samples at concentrations that exceed the SCGs. Additionally, the pH levels in various portions of the site are quite high, particularly in the northwest corner. While the groundwater at the site does contain some SVOCs and metals/cyanide at concentrations exceeding the SCGs and the pH is very high at some locations, it was determined to pose only a minor risk to human health.

This is based on the fact that there has not been a demonstrated free interchange between the on-site groundwater and water in the canal. The concentrations of the exceedances are marginal and groundwater migration pathways are in an area occupied by heavy industry for approximately 100 years. There are no groundwater receptor populations and the groundwater is not a current or likely future source of drinking water. Any future development of the site, being within the City of Buffalo, will receive supplied water. The only potential exposure is to workers that encounter groundwater in onsite excavations.

6.3 General Response Actions

General response actions may be applied at the site to meet the remedial action objective. They may include treatment, containment, excavation, extraction, disposal, institutional controls, no action, or a combination of responses. The following general response actions were identified for the surface/subsurface soil, sediments, and groundwater at the site:

- No action
- Institutional controls

- Capping
- Removal

6.4 Development of Alternatives

The general response actions identified in Section 6.3 have been assembled into remedial action alternatives that address the contamination concerns within Subparcel 3.

Canal Sediments

It is to be noted that the development of remedial alternatives to address the contaminated sediments is beyond the scope of this SI/RAR. Consequently, no detailed alternatives for the remediation of the canal have been developed and/or evaluated herein. In general, the primary exposure routes associated with the SVOCs, metals, and PCBs in the sediments include:

- Dermal contact or ingestion of sediments suspended in the canal waters.
- Indirect exposure due to consumption of contaminated fish

The primary goal for any potential remedial alternative would be to prevent the contact with, ingestion of, or consumption of potentially contaminated fish. Possible remedial alternatives include:

- No Action
- Institutional Controls
- In-situ Stabilization
- Capping/Containment
- Source Removal

Subparcel 3 Soils and Groundwater

The primary exposure routes associated with the SVOCs and metals in the on-site soil and groundwater include:

- Dermal contact
- Ingestion
- Dust inhalation

Consequently, in developing the remedial action alternatives, the primary goal was to prevent contact with, ingestion of, or the inhalation of dust from the contaminated soil and groundwater. Four alternatives were developed which include:

- Alternative 1 - No Action
- Alternative 2 - Institutional Controls
- Alternative 3 - Capping
- Alternative 4 - Removal and Disposal

These alternatives are evaluated in detail in Section 7.0.

7.0 DETAILED ANALYSIS OF ALTERNATIVES

7.1 Introduction

A detailed analysis of the remedial action alternatives developed for the site consists of the presentation and analysis of relevant information necessary to select a remedy for the site. The proposed alternatives were analyzed in this report using the following seven evaluation criteria as defined in 6 NYCRR Part 375:

- Overall protection of human health and the environment
- Compliance with remedial action objectives
- Short-term effectiveness and performance
- Long-term effectiveness and performance
- Reduction of toxicity, mobility, and volume
- Implementability
- Cost

The criterion of community acceptance will be evaluated by the NYSDEC following issuance of the proposed remedial action plan.

Additionally, the potential impact that installation/construction of the sand berm in the northeast portion of the canal recommended by the Corps of Engineers might have on the potential remedial alternatives proposed for Subparcel 3 was evaluated. Inasmuch as the stabilization berm, if constructed, would be in the canal and not upland in Subparcel 3, it should not impact implementation and/or long-term operation and maintenance of any potential remedial alternatives for Subparcel 3. Consequently, it was concluded that any remedial alternatives proposed for Subparcel 3 could be implemented independently of stabilization of the canal wall.

7.2 Individual Analysis of Alternatives

The components of each alternative are further defined in the following paragraphs with regard to volume or areas of contaminated media to be addressed, the technologies to be used, and any performance requirements associated with those technologies.

7.2.1 Alternative 1 - No Action

Capital Costs:	\$0	Years of Active Remediation: 0
O & M Costs	\$0	Years of Monitoring: 0
Total Costs	\$0	

Under the No Action alternative, no remedial activities would be taken at the site to remove, contain, or treat contaminated soil and groundwater. This alternative does not comply with the remedial goals in that the contamination levels of organic and inorganic compounds that exceed the SCG values are not reduced and the direct contact hazards are not mitigated at the site.

- **Overall protection of human health and the environment** - Alternative 1 is not expected to provide adequate protection of human health and the environment.
- **Compliance with remedial action objectives** - Alternative 1 does not achieve the remedial action objectives.
- **Short-term effectiveness** - Alternative 1 includes no treatment and reduces contaminant levels by natural processes.
- **Long-term effectiveness and permanence** - Alternative 1 does not offer long-term effectiveness or permanence since it does not reduce contamination levels.
- **Reduction of toxicity, mobility, and volume** - Alternative 1 does not include treatment and will not reduce the toxicity, mobility, or volume of contaminants.
- **Implementability** - Alternative 1 does not require implementation by remedy.
- **Cost** - No costs are associated with Alternative 1.

7.2.2 Alternative 2 - Institutional Controls

Capital Costs:	\$201,240	Years of Active Remediation: 0
O & M Costs	\$263,000	Years of Monitoring: 0
Total Costs	\$463,240	

Under the Institutional Control alternative, human exposure and health risks are reduced/minimized by restricting public access and future development activities rather than by cleaning up or containing the organic and inorganic compounds. This alternative relies upon natural processes (biodegradation, volatilization, and leaching) to reduce contaminant concentrations slowly over time. The Institutional Control alternative includes deed restrictions to control future development on site (i.e., restricted earthwork) and groundwater use restrictions prohibiting withdrawal of groundwater for drinking water or other potable uses. This alternative also includes the routine monitoring of groundwater to track the natural reduction of contaminant levels as well as routine site reviews. Fencing or other measures to restrict public access to the site may also be used in this alternative. This alternative does not comply with the remedial goals in that the contamination levels of compounds that exceed the SCG values are not reduced and the direct contact hazards are not mitigated at the site. Additionally, this alternative would restrict public access to the site, which is contrary to the intended future use of the site as green space.

- **Overall protection of human health and the environment** - Alternative 2 is not expected to provide adequate protection of human health and the environment.
- **Compliance with remedial action objectives** - Alternative 2 does not achieve the remedial action objectives.
- **Short-term effectiveness** - Alternative 2 includes no treatment and reduces contaminant levels by natural processes.
- **Long-term effectiveness and permanence** - Alternative 2 does not offer long-term effectiveness or permanence since it does not reduce contamination levels. Although institutional controls, such as fencing and deed and groundwater use restrictions, lower the risk from direct contact hazards, these controls do not reduce contaminant levels.

- **Reduction of toxicity, mobility, and volume** - Alternative 2 does not include treatment and will not reduce the toxicity, mobility, or volume of contaminants.
- **Implementability** - Alternative 2 includes deed and groundwater use restrictions, which are relatively easy to implement.
- **Cost** - Legal costs and the installation of fencing represent the capital costs for Alternative 2. O&M costs include the maintenance of fencing and monitoring wells, the collection and analysis of groundwater samples, and the site reviews.

It should be noted that in the next two remedial alternatives, no action is required for the southern part of the site. This is due to the fact that the natural soils in this portion of Subparcel 3 are already capped with a three-foot thick concrete pad.

7.2.3 Alternative 3 - Capping

Capital Costs:	\$1,083,890	Years of Active Remediation: 0.5
O & M Costs	\$541,945	Years of Monitoring: 0
Total Costs	\$1,625,835	

Under the Capping alternative, the existing debris would be removed and disposed off site and the northern and eastern part of the subparcel would be graded and capped with a minimum of one foot of clean soil and seeded. A demarcation layer (e.g. filter fabric, colored ribbons) would be placed on top of the contaminated site soil/fill materials and below the clean cover soil. Additionally, a Soils Management Plan (SMP) would be developed to address any future activities requiring excavations and/or penetrations of the cap. This alternative complies with the remedial goals for the site in that the direct contact hazards are mitigated. The capping alternative would prevent direct contact with contaminants and would minimize the generation and transport of fugitive dust to the atmosphere. While, the least expensive of the remedial alternatives, it does not result in any reduction of the cPAHs and metals found in the surface and subsurface soils and associated groundwater. Although at this time there are no plans for residential development of the site, recent experiences of improperly or marginally capped sites that subsequently have undergone residential development, argue against implementation of this

alternative without inclusion of applicable deed restrictions, institutional controls, or development of a Soils Management Plan.

- **Overall protection of human health and the environment** - Alternative 3 is expected to be protective of human health and the environment.
- **Compliance with remedial action objectives** - Alternative 3 is expected to meet the remedial action objectives for both soil and groundwater.
- **Short-term effectiveness** - Alternative 3 does offer short-term effectiveness by preventing the airborne off-site migration of compounds and the isolation of the contaminants from the receptor population.
- **Long-term effectiveness and permanence** - Alternative 3 does offer long-term effectiveness and permanence since it isolates the contaminants from any direct surface contacts. However, it does not remove the potential exposure to site workers performing foundation or utility excavations on site.
- **Reduction of toxicity, mobility, and volume** - Alternative 3 does not reduce the toxicity, mobility, and volume of contaminants.
- **Implementability** - Alternative 3 would be relatively easy to implement in that it only requires removal and offsite disposal of debris and grading of the site, followed by the installation of the one-foot thick cap of clean soils. The entire process uses traditional earth moving equipment, i.e., backhoes and bulldozers.
- **Cost** - Mobilization and demobilization of personnel and equipment, debris removal, site grading, purchase of clean soil, installation of the cap and seeding represent the capital costs. O&M cost would be associated with the maintenance and repair of the cap.

7.2.4 Alternative 4 - Removal and Disposal

Capital Costs:	\$6,191,061	Years of Active Remediation: 1
O & M Costs	\$54,194	Years of Monitoring: 0
Total Costs	\$6,245,255	

Under the Removal and Disposal alternative, all surface and subsurface soils that exhibited contaminant concentrations exceeding the SCGs would be removed and disposed offsite in a permitted facility. The excavated areas would be backfilled with clean soil to original grade. Post-excavation soil samples would be collected from the walls and floor of the excavations to confirm that residual levels of contaminants of concern are below the VCA remedial action levels. Representative samples of the excavated soil would be collected and analyzed, and a waste profile prepared for the soil. The soil would be transported to an approved off-site facility for disposal as either a RCRA hazardous waste or as a non-hazardous contaminated solid waste. Once the excavated areas are backfilled, the soil portion of the site would be covered with three-four inches of soil suitable to sustain vegetative growth and seeded. This alternative complies with the remedial goals in that the contaminants in the soils are eliminated and the direct contact hazards are mitigated at the site. However, the cost associated with this alternative would be enormous considering the large volume of soil to be excavated and the equally large volume of backfill required. Additionally, the contamination in the material that would be removed is not considered particularly mobile or soluble.

- **Overall protection of human health and the environment** - Alternative 4 is expected to be protective of human health and the environment.
- **Compliance with remedial action objectives** - Alternative 4 is expected to meet the remedial action objectives.
- **Short-term effectiveness** - Alternative 4 does offer short-term effectiveness by removing the contaminants.
- **Long-term effectiveness and permanence** - Alternative 4 does offer long-term effectiveness and permanence since it removes contaminants.
- **Reduction of toxicity, mobility, and volume** - Alternative 4 would eliminate the toxicity, mobility, and volume of contaminants in the soil
- **Implementability** - Alternative 4 would be very difficult to implement due to the large volume of contaminated soils to be removed and the depth of the materials below the water table in many areas of the site.
- **Cost** - The capital costs which include mobilization and demobilization of personnel and equipment, excavation, disposal and backfilling with clean soils, grading, and seeding would be very large due to the large volumes of soil requiring

excavation/disposal and the large volume of clean backfill required. O&M costs would be associated with the maintenance of the seeded areas and the repair of any settlement areas.

7.3 Selected Remedial Alternative

Based on the analysis of alternatives presented above, it is recommended that Alternative 3 - Capping, be implemented at the site. This alternative provides a high degree of protection to human health and the environment, is cost effective, and relatively easy to implement. Leveling and capping of the whole site with at least one foot of clean soil effectively isolates the surface soil contamination, which consists primarily of cPAHs and metals, from contact with any possible receptor population.

Alternative 3 satisfies the remedial objectives in that it eliminates direct contact hazards associated with surface and subsurface soils at the site. The only potential exposure is to construction workers during remedial action or future site development excavations. This potential exposure route will be minimized by development and implementation of soils management procedures to be followed during remedial activities and/or future site development. Whereas this alternative does not reduce the volume and toxicity of the contaminants, this alternative is considerably less expensive than Alternative 4, while affording future site workers/visitors a comparable level of protection.

7.4 Proposed Soils Management Plan

In order to provide additional protection to future users and/or workers at the site, it is proposed that the following soil management strategies be employed in conjunction with capping of subparcel 3:

- The parcel is to be dedicated as greenspace. To that end, the City of Buffalo and the County of Erie have committed to keeping this property as public open space. Any attempt to change the intended use in the future would require legislative approval

from both the City and County, and may require special alienation legislation from New York State.

- The site will be capped with a minimum of 12 inches of clean soil. A demarcation layer will be placed at the base of the clean soil layer. Any soil/fill materials excavated from below this demarcation layer are to be handled as contaminated, non-hazardous soil and are to be disposed offsite in a permitted facility or placed below the demarcation layer at other onsite locations.
- It is proposed that the Site Specific Action Levels (SSALs), previously developed and approved by the NYSDEC for use in Subparcels 1 and 2, be adopted for use in Subparcel 3. A copy of the SSALs is presented in Table 7-1. Additionally, a criteria for cPAHs of 10 mg/kg has been added to this list. These SSALs will be utilized to determine the suitability of any soil/fill excavated from below the demarcation layer for reuse as subgrade fill (i.e., below the demarcation layer) elsewhere onsite. Any materials exceeding the SSALS are to be disposed offsite in a permitted facility.
- A deed restriction prohibiting the use of groundwater will be incorporated into any lease or sale agreements.
- The clean soil cover will be inspected periodically to evaluate the integrity of the cap. Repairs and maintenance will be performed as necessary to ensure that erosion features are eliminated and the vegetation is maintained. An annual certification will be provided to the NYSDEC indicating that the integrity of the 12-inch clean soil cover has been maintained and that the Soils Management Plan has been followed for any excavations on site. This certification will be signed by a professional engineer licensed to practice in New York State.

TABLE 7-1
SITE-SPECIFIC ACTION LEVELS
UNION SHIP CANAL

Parameter	Site-Specific Action Level
VOLATILE ORGANIC COMPOUNDS (mg/kg)	
Total VOCs	10 (2)
SEMIVOLATILE ORGANIC COMPOUNDS (mg/kg)	
Total SVOCs	500 (1, 2)
Carcinogenic PAHs	10
PESTICIDES/PCBs (mg/kg)	
Total Pesticides	10 (2)
Total PCBs (surface -0 to 1')	1.0
Total PCBs (subsurface - below 1')	10
METALS (mg/kg)	
Arsenic	50
Barium	500
Cadmium	20
Chromium	200
Lead	1,000
Mercury	1.0
Selenium	50
Silver	1,000
Cyanide	50
Notes: 1. In addition to the SSAL of 500 mg/kg for total concentrations of SVOCs, the the SSAL for each individual SVOC is 50 mg/kg. 2. Total concentration is the sum of concentrations of Target Compound List (TCL) compounds plus estimated concentrations of Tentatively Identified Compounds (TICs)	

8.0 CONCLUSIONS AND RECOMMENDATIONS

8.1 Conclusions

Based on the data collected during this SI and review of data collected during previous investigations, URS concludes the following:

- The canal and ore-storage pads were constructed in 1910. The canal is about 200 feet wide and 30 feet deep, and extends down into the shale bedrock. The ore pads on the south side of the canal consist of about 3 feet of concrete directly overlying native soils, including silty sands and peat. The north side of the canal, which consisted mainly of open water/swamp areas, was backfilled over a period of 60 years with dredge materials (i.e., clay, silt, till and shale) and industrial fill (i.e., slag, cinders, ash, etc.) to the existing ground surface.
- The east end of the site consists primarily of native soils, except in areas where they have been excavated and backfilled with gravel/slag to allow construction of various structures.
- Surface soils generally are contaminated with metals consisting primarily of beryllium, copper, iron and zinc at concentrations exceeding the SCGs. Some individual locations also had exceedances of other metals. A few localized areas also were contaminated with cPAHs at concentrations exceeding SCGs.
- Subsurface soils in the northeast portion of the site are contaminated with both metals and SVOCs, consisting of cPAHs. These cPAHs are present at concentrations that exceed the SCGs.
- On the south side of the canal, groundwater was encountered roughly at the base of the concrete ore-storage pad, about 8-10 feet bgs. This is approximately the same as the surface water level in the canal. However, it has not been clearly demonstrated that there is a free exchange between the groundwater and the canal. The

groundwater was found to contain SVOCs (primarily phenols) across the western part of the site, both north and south of the canal. Additionally, the pH of the groundwater is high (i.e., ≥ 8.0) in various areas of the site, particularly in the northwest portion of the site.

- On the north side of the canal, groundwater is encountered at various levels throughout the fill materials. In general, the groundwater occurs as a series of discontinuous, perched zones, and is highly dependent on the nature of the fill materials. The collected data indicates that there is no, or limited, free exchange between groundwater and the surface water in the canal.
- Sediments in the canal contained PCBs, SVOCs (primarily cPAHs), and metals at concentrations that exceed the SCGs. The SVOCs and metals concentrations are generally at similar levels throughout the canal and do not display any defined pattern of deposition that would be indicative of their source. However, the PCBs concentrations are the highest in the northeast corner of the canal, in the immediate vicinity of a 36" diameter CMP outfall from the Shenango Steel Molds site. The PCB concentrations gradually decrease to the west, with increasing distance from the outfall. PCBs consisting of the same aroclors (i.e., 1254 and 1260) were found on the Shenango site, which is a Class II site.
- The primary risks of exposure at the site are associated with dermal contact, ingestion or inhalation of fugitive dust from surface and subsurface soils contaminated with metals and cPAHs. Consequently, any remedial alternative developed for the site should be designed to minimize or eliminate dermal contact, ingestion or inhalation of site soils.
- Whereas the sediments in the canal do not represent a direct risk to site users, there is the potential for indirect exposure to recreational fishermen from ingesting fish that may have bio-accumulated PCBs from benthic organisms living in the sediments.

- The Corps of Engineers has determined that the easternmost 1000 feet of the north canal wall show signs of bowing and rotation. The concrete cap has been removed and the soil behind the wall sloped in this area. It was recommended that a sand berm be placed in the canal to support the canal wall and minimize further deterioration of the wall in this area.

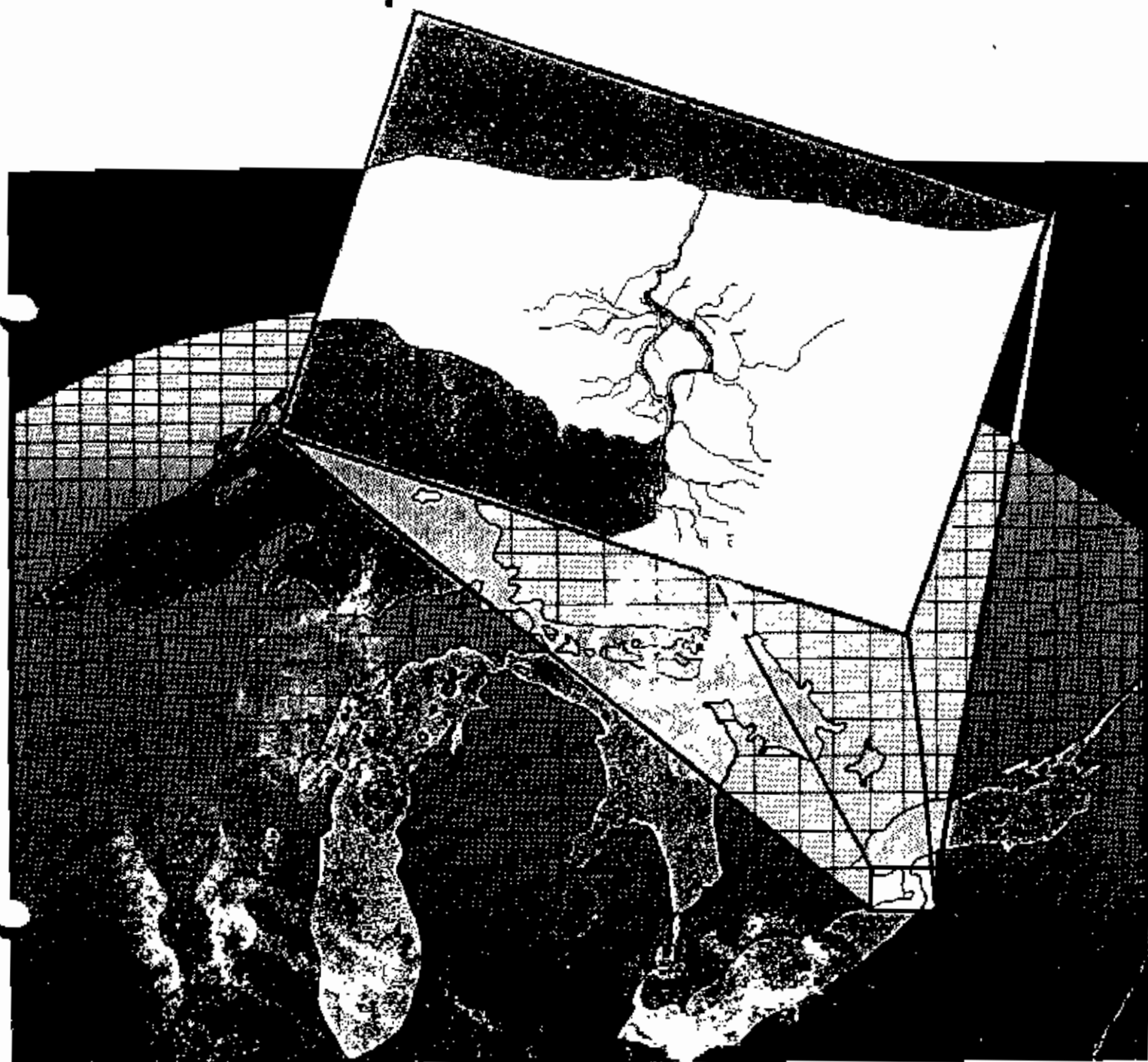
8.2 **Recommendations**

- Based on the results of the site investigations, it is recommended that remedial Alternative 3 be implemented at the site. Under this alternative, surface debris would be removed and the site graded to the required elevations for development. A demarcation layer would be placed on the final subgrade surface and the site would be capped with a minimum of one foot of clean soil. The area would be seeded to minimize erosion. The concrete ore-storage pads would be left essentially in their current condition. However, it may be necessary to remove the soils that have accumulated on top of the pad depending on contaminant levels in these soils, if any. Alternatively, these soils could be consolidated, reused as subgrade fill, or capped with clean soil.
- Although groundwater at the site does not appear to represent a significant risk to workers and future site users, deed restrictions preventing usage of groundwater should be implemented
- Whereas development of remedial alternatives for the sediments in the canal is beyond the scope of this project, given the planned future development of Subparcel 3 as greenspace/recreational areas, this issue will certainly need to be addressed. Consequently, it is recommended that additional investigations be conducted to determine the nature and extent of the metals, PAHs, and PCBs in the sediments and, more importantly, the possible sources of these contaminants. Furthermore, once the full extent of the contaminants is identified, the human health and ecological risks associated with the contaminants should be assessed further and remedial alternatives developed as necessary.

- Should the Corps of Engineers choose to implement the preferred alternative, it can be undertaken independently of remedial activities in Subparcel 3.



Preliminary Evaluation Of Chemical Migration To Groundwater and The Niagara River from Selected Waste- Disposal Sites



General information and chemical-migration potential.--The Fedders Automotive Component Company is at the intersection of Tonawanda Street and Scajaquada Creek Expressway in the city of Buffalo (pl. 1). Waste oil was spread on the ground as a dust suppressant at a rate of about 165 gal/yr. The waste oils are reported to have been light lubricating oils or hydraulic fluids, not transformer oils. No monitoring has been undertaken.

The site consists of glacial lacustrine clay underlain by Onondaga Limestone at a depth of 40 to 60 ft.

No hydrologic or chemical information are available. Thus, the potential for contaminant migration is indeterminable.

General information and contaminant-migration potential.--The Hanna Furnace Corporation site, in the southern part of the city of Buffalo, is used for the disposal of brick, slag, scrap metal, concrete, earth, rubble, and "flue dust" consisting of iron, iron oxide, alumina, silica, carbon, and magnesium.

The potential for vertical migration of contaminants is probably limited because the site is underlain by a thick clay unit. The potential for lateral dispersion of contaminants could not be evaluated, but the chemical data indicate some potential for horizontal migration of contaminants away from the site. The actual potential is indeterminable.

Geologic information.--The site consists of fill overlying units of sand and clay that are underlain by limestone bedrock, which begins approximately 25 ft below land surface. The U.S. Geological Survey drilled seven test borings in August 1982. The locations are shown in figure A-5; the geologic logs are as shown on page 105.

Hydrologic information.--Ground water was encountered at a depth of approximately 5 ft. Land-surface altitude is estimated to be 580 ft above NGVD; thus the water-table altitude was 575 ft above NGVD.

Chemical information.--The U.S. Geological Survey collected a soil sample from each test boring for chromium, copper, iron, and lead analyses; results are given in table A-6. The results indicate that the sample from borehole 1 may have been collected on the disposal site and therefore is not indicative of contaminant migration. No other samples except sample 2, which had an elevated copper concentration, exceeded the concentrations in samples from undisturbed areas.

<u>Boring no.</u>	<u>Depth</u>	<u>Description</u>
1	0 - 2.5	Topsoil and fill.
	2.5 - 4.0	Fill material, black, organic smell.
	4.0 - 15.0	Clay, light green, tight, dry. SAMPLE: 2.5 ft.
2	0 - 1.0	Topsoil and fill.
	1.0 - 2.0	Rust-colored debris and gravel.
	2.0 - 3.5	Gravel roadbed fill with coarse sand.
	3.5 - 5.5	Sand, coarse, dark, wet.
	5.5 - 6.5	Clay, greenish. SAMPLE: 3.5 ft.
3	0 - 2	Topsoil and "coal dust", dark brown to black.
	2 - 12	Sand, black, coarse, wet 5 ft.
	12 - 15	Clay, olive, tight, dry. SAMPLE: 6.5 ft.
4	0 - 1.0	Topsoil, red.
	1.0 - 3.5	Sand, light gray, coarse.
	3.5 - 4.0	Pea rock, light green-blue.
	4.0 - 6.0	Sand, reddish, coarse, with clay, wet. SAMPLE: 5.5 ft.
5	0 - 3.0	Topsoil, dark brown to dark red.
	3 - 4.0	Sand, reddish, coarse.
	4.0 - 4.5	Sand, light-colored, coarse, damp.
	4.5 - 6.0	Sand, reddish, coarse, "iron ore", damp. SAMPLE: 6 ft.
6	0 - 1.0	Topsoil, dark brown to red.
	1.0 - 3.0	Black, fine material.
	3.0 - 3.5	Same, but light gray.
	3.5 - 5.5	Sand, red, coarse, damp, some clay. SAMPLE: 5.5 ft.
7	0 - 0.5	Topsoil.
	0.5 - 1.5	Clay, red.
	1.5 - 4.0	Sand, red, coarse, with gravel, damp.
	4.0 - 6.0	Looks exactly like "Sakrete."
	6.0 - 6.5	Sand, black, coarse, wet.
	6.5 - 10.5	Same, with slag. SAMPLE: 10 ft.

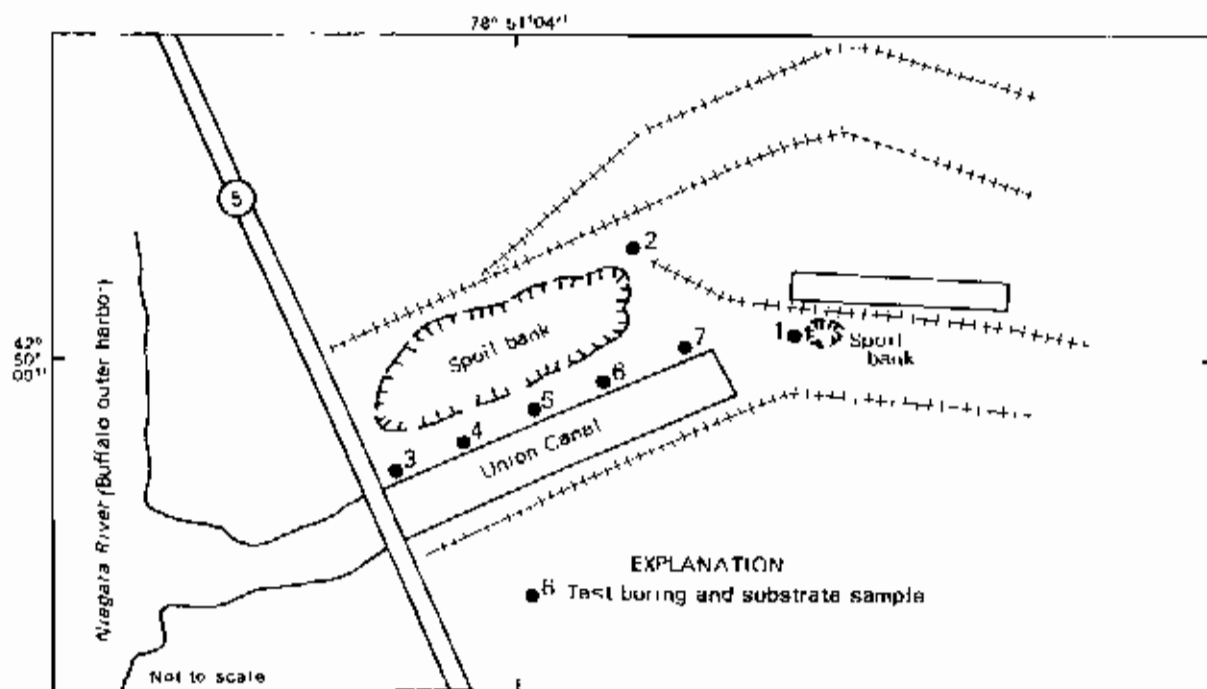
Table A-6.--Analyses of substrate samples from Hanna Furnace, site 135, Buffalo, N.Y., August 2, 1982.

[Locations shown in fig. A-5. Concentrations are in ug/kg.]

Constituents	Sample number and depth below land surface (ft)				
	1 (2.5)	(Split) (3.5)	2 (3.5)	3 (6.5)	4 (5.5)
Chromium	400,000††	(380,000††)	7,000	6,000	3,000
Copper	170,000††	(160,000††)	92,000††	4,000	11,000
Iron	83,000,000	(71,000,000)	21,000,000	8,700,000	3,700,000
Lead	40,000	(70,000)	60,000	10,000	20,000

Constituents	Sample number and depth below land surface (ft)		
	5 (6)	6 (5.5)	7 (10)
Chromium	4,000	10,000	3,000
Copper	11,000	28,000	12,000
Iron	4,200,000	6,000,000	5,000,000
Lead	30,000	30,000	10,000

†† Exceeds concentrations in samples from undisturbed soils in the Buffalo area. Undisturbed soils were not analyzed for iron.



Base from USGS Field sketch, 1982

Figure A-5. Location of sampling holes at Hanna Furnace Corporation, site 135, Buffalo.



SUPERFUND CONTRACT SUPPORT TEAM

SAMPLING REPORT

for the

UNION SHIP CANAL SITE

A.K.A. HANNA FURNACE CORPORATION SITE

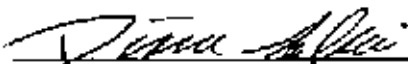
in BUFFALO, ERIE COUNTY, NEW YORK

June 7, 2001

Participating Personnel:

United States Environmental Protection Agency
Diane Salkie, Environmental Scientist
Joseph Hudek, Superfund Contract Support Team Leader
Ray Klimesak, Project Quality Assurance Officer

Report Prepared by:


Diane Salkie, Environmental Scientist

Date Prepared:

September 7, 2001

Approved for the Director by:

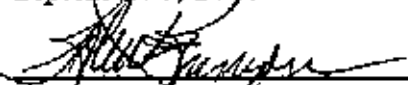

Robert Runyon, Chief, Hazardous Waste Support Branch

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APPENDIX B:	Quality Assurance Project Plan
APPENDIX C:	TCLP and PCB Data Package
APPENDIX D:	TAL and TCLP Inorganic Data Package
APPENDIX E:	Sample Data Sheets
APPENDIX F:	U.S. Code of Federal Regulations (CFR). Title 40. Protection of Environment. Part 261: Identification and Listing of Hazardous Waste. Subpart C: Characteristics of Hazardous Waste. Section 24: Toxicity Characteristic. <i>Table 1 - Maximum Concentration of Contaminants for the Toxicity Characteristic. 7-1-95 Edition.</i>
APPENDIX G:	U.S. Code of Federal Regulations (CFR). Title 40: Protection of Environment. Part 261: Identification and Listing of Hazardous Waste. Subpart C: Characteristics of Hazardous Waste. Section 21: Characteristic of ignitability, Section 22. Characteristic of corrosivity and Section 23: Characteristic of reactivity. 7-1-95 Edition.
APPENDIX H:	N.Y.D.E.C. (New York Department of Environmental Conservation) Division Technical and Administrative Guidance Memorandum on Determination of Soil Cleanup Objectives and Cleanup Levels. January 1994. <i>Tables 1 - 4 Recommended Soil Cleanup Objectives.</i>
APPENDIX I:	U.S. Environmental Protection Agency, Region III. Hazardous Site Cleanup Division. October, 2000. <i>Risk-Based Concentrations Table.</i>
APPENDIX J:	Union Ship Canal Trip Report

1.0 BACKGROUND

The approximately 131-acre Hanna Furnace site is located in the southern-most part of the City of Buffalo, Erie County, New York. Union Ship Canal traverses the property approximately in the middle, in a west-east direction. The canal extends from the eastern boundary of the site to the Buffalo Harbor in the west. A 50-foot easement and right-of-way granted to Shenango Furnace are adjacent to the northern edge of the property. To the northeast of the site is a foundry building owned by Marlen Steel Corporation and to the east is Conrail Corporation property. The south of the site is bordered by the South Buffalo Railroad Company property and directly to the west of the site is Fuhrman Boulevard and the Hamburg Turnpike. The Father Baker Bridge forms an elevated portion of the Hamburg Turnpike which formerly allowed access of canal barges to the site via the Union Ship Canal. A site map, Figure 1-1 and a schematic drawing of the Union Ship Canal, Figure 1-2, can be found in Appendix A.

Prior to cessation of activities in 1982, the site was used for pig iron manufacturing. Approximately ten acres along the eastern boundary of the site and 20 acres to the north of the Union Ship Canal were utilized for land filling generated wastes and raw material storage during the period of 1960 - 1982. The mounds of waste material rise to a maximum of 30 feet above grade. A small pond is located to the northwest of this area. Approximately 30 acres to the southeast of the canal were utilized for pig iron storage. Forty acres south of the canal were utilized for the production of pig iron and ancillary activities. In 1900, the southern portion of the property was purchased and incorporated by Buffalo Union Steel. To service the facility, the Union Ship Canal was constructed in 1910. Manufacturing of pig irons commenced with the construction of blast furnaces during the period of 1900 to 1915. In 1920, the Hanna Furnace Company acquired the site from Union Steel. In 1929, the site was purchased by National Steel Company and became known as Hanna Furnace Corporation, a part of National Steel's conglomerate.

In 1960, Hanna Furnace purchased 25 acres of swamp land north of the canal from the Pennsylvania Railroad. In 1962, approximately 18 acres of the newly-acquired property was sold to Shenango Furnace Company. Due to foreign competition and closure of Shenango Furnace Company, a primary recipient of Hanna's metal, in 1982, Hanna Furnace ceased all operations at this site. In 1983, the Jordan Foster Scrap Corporation, the current owner, purchased the site from National Steel. Jordan Foster dismantled the blast furnaces, the casting mill and several other buildings. The Jordan Foster Scrap Corporation has since filed for bankruptcy.

In 1996, the City of Buffalo acquired the property through the In Rem process after the trustees in bankruptcy sought to have it abandoned. The site is in proposal with the City of Buffalo as a Brownfields site. However, they are still concerned with large piles of material in the northern one fourth of the property that in total have been estimated to contain approximately 350,000 cubic yards of material. The Division of Environmental Science and Assessment (DESA), Hazardous Waste Support Branch (HWSB), Superfund Contract Support Team (SCST) conducted a waste pile sampling event at the Union Ship Canal site to delineate what contaminants exists in the aforementioned waste piles.

2.0 SAMPLING PROCEDURES

The sampling procedures were in accordance with the guidelines set forth in the Quality Assurance Project Plan (QAPP) which is located in Appendix B.

3.0 DESCRIPTION OF EVENTS

On June 07, 2001, two members from the U.S. EPA, Division of Environmental Science and Assessment (DESA), Superfund Contract Support Team (SCST) met with the U.S. EPA On-Scene Coordinator (OSC), Kevin Mathis and the Removal Support Team (RST) representative, Mike Mahnkopf. The OSC led the others to the site where a city-hired backhoe was waiting. Initially the OSC took the EPA personnel and the RST representative on a walking tour throughout the site. He identified the three waste piles as: flu ash pile, iron ore pile and the mountain landfill pile. See Figure A of Appendix A for a map of the site. The backhoe will dig approximately 3 to 6 feet, or until homogenized soil is encountered. A representative from the New York State Department of Environmental Conservation (NYSDEC) arrived on site prior to sampling.

The EPA employees began sampling from the flu ash (FA) pile. The first sample collected was called, US-FA-01, which is located to at the northwestern end of the flu ash pile. Large pieces of scrap metal were found in the waste pile in the areas exposed by the backhoe. The soil which was sampled from 2.0 - 2.5 feet deep at 0940, was dark brown with minimal rocks. They then moved onto US-FA-02 which is located on the southern, narrow area of the flu ash pile. They collected this sample at 1005 from 3.5 to 4.0 feet deep. The sample consisted of a soft, fine, dark brown soil with a shiny material throughout the sample. There was a slight petroleum odor associated with the sample. The next sample location, US-FA-03, was chosen at the southeastern end of the flu ash pile, on the lower gradient. This sample was collected from 3.0 - 3.5 feet at 1020 and consisted of a brown soil with rocks. The NYSDEC representative informed the OSC that many test pits had been conducted on the mountain landfill pile. Therefore, a sample was cut from the mountain landfill and added to the flu ash pile. The next sampling location was US-FA-04 which is located at the eastern end of the flu ash pile, before the elevation begins. This sample was collected from 3.5 - 4.0 feet deep at 1035 and consisted of brown soil with some black spots and small rocks.

The next pile sampled was the iron ore (IO) pile. The backhoe began digging on the southwest side of the pile which is closest to the canal. At 1055 the EPA sampled US-IO-01 and duplicate US-IO-4 at 3.5 - 4.0 feet deep. The sample consisted of a light brown clay with numerous round stones. In the meantime the backhoe dug a hole on the southeast side of the pile. The OSC determined that the sample is homogenous throughout the entire pile. Therefore, no other samples will be collected from the iron ore pile. See picture . Figure 10 on page 9.

The EPA employees then moved on to the mountain landfill (ML) pile. They began with US-ML-01 at the southwestern side of the pile. They collected this sample at 1140 from 3.5 - 4.0 feet deep with a matrix spike/matrix spike duplicate (MS/MSD). The sample consisted of a dark brown soil with few rocks and some bricks. The next sample, US ML-02 was once again collected from the side of the pile, this time from the western side. The location was sampled at 1155 from 2.5 - 3.0 feet and consisted of brown soil with a white/grey mass of clay in the sample. The back hoe then moved to the top of the mountain landfill pile. After three rejections, the backhoe was able to dig at sample location, US-ML-03, which ended up at the northeastern side of the pile. The sample was collected at 1215 from 3.0 - 3.5 feet and consisted of brown, soft soil with rocks. The final location was chosen after again, hitting rejection three times, at the top southwestern side of the mountain landfill. The sample was collected at 1225 from 4.0 - 4.5 feet deep and consisted of brown, soft soil with rocks and bricks.

The EPA personnel collected a rinsate blank at 1245 by pouring analyte-free water over a decontaminated stainless steel bowl, scoop and auger. The RST representative labeled the sample bottles, filled out the chain of custody and shipped the samples on June 07, 2001 to a subcontracted laboratory via Federal Express at 1500. The sampling event was then complete and the Trip Report can be found as Appendix J. A map of the sampling locations can be found as Figure A in Appendix A.

The following seven (7) pages consist of photographs of the sampling locations.

SITE PHOTOGRAPHS



Figure 1: This photograph of the Union Ship Canal site was taken from Furhman Boulevard looking east at the property.



These are four panoramic pictures of the site from standing on the mountain landfill. The pictures are from west to east, while standing in the south portion of the site.

FLU ASH PILE



Figure 3: This is a picture of the southwestern side of the flu ash waste pile. See Figure A of Appendix A for a map of the following sample locations.



Figure 4: This is a picture of sample, US-FA-01 which was the first sample collected from the flu ash pile. Notice the scraps of metal.

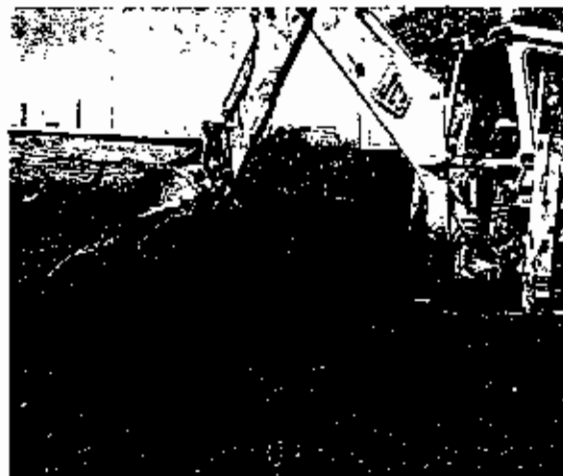


Figure 5: This is sample, US-FA-02 which is located on the canal side of the flu ash pile.



Figure 6: This is a picture of sample location, US-FA-03 which is located on the northeast tip of the flu ash pile.



Figure 7: This is the last sampling location from the flu ash pile. It was not collected from the elevated area of the pile as the other samples were, but from the entrance to the flu ash pile.

IRON ORE PILE



Figure 8: This is a picture of the iron ore pile, which was taken while standing on the northwest side of the pile. A map of the following sample locations can be found as Figure A in Appendix A.

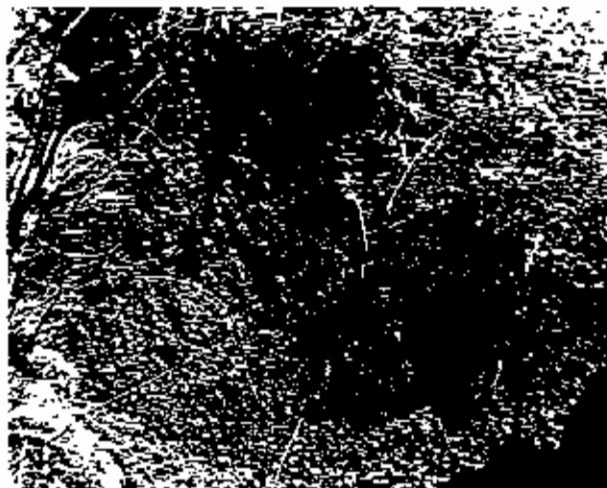


Figure 9: This is a picture of the only sampling location in the iron ore pile, US-IO-01 and a duplicate, US-IO-04. The sample was collected from the southern (canal side) of the pile.



Figure 10: This is a picture of a proposed sampling location further to the east in the iron ore pile. It was decided in the field that this matrix is the same as US-IO-01 and therefore was not sampled.

MOUNTAIN LANDFILL PILE



Figure 11: This is a picture of the mountain landfill pile and was taken from the west side of the pile. The following sample locations can be found on a map, called Figure A in Appendix A.



Figure 12: This is a picture of the first sampling location from the mountain landfill, US-ML-01. It is located on the southwest corner of the pile and was collected from the side of the pile.



Figure 13: This is sampling location, US-ML-02 which was collected from the western side of the mountain landfill.



Figure 14: This is a picture of sampling location, US-ML-03 which is located on the top north side of the mountain landfill.



Figure 15: The final sampling location, US-ML-04 was collected from the southwestern portion of the top of the mountain landfill.

4.0 RESULTS

The rinsate blank was taken for Quality Control and to determine if any outside contamination was introduced to the samples. There were no organic contaminants found in the rinsate blank. The inorganic contaminants found in the rinsate blank are antimony, barium, cadmium, calcium, chromium, cobalt, copper, iron, magnesium, manganese, nickel, potassium, sodium, vanadium and zinc. The compounds in the blanks could have been introduced during decontamination of the sampling equipment or the laboratory equipment or they may be from the analyte-free distilled water that was used. Chromium in sample US-IO-01 was rejected due to the level in the rinsate blank. The Quality Assurance/Quality Control sample data can be found in Table 1 on page 14.

All toxicity characteristic leaching procedure (TCLP) and Resource Conservation and Recovery Act (RCRA) characteristic samples were compared to the U.S. Code of Federal Regulations *Title 40: Protection of Environment, Volume 18, Part 261.21: Characteristic of Ignitability, 261.22: Characteristic of Reactivity, 261.23: Characteristic of Corrosivity and 261.24: Toxicity Characteristic, revised 7/1/00* which can be found as Appendices F and G and in Table 2 on page 15. The only inorganic contaminant that was found to exceed this applicable or relevant and appropriate requirement (ARAR) was lead in sample, US-FA-03, in the flu ash pile. The only organic contaminant that exceeded this ARAR was the pesticide, silvex, in sample, US-ML-01, in the mountain landfill pile. None of the samples analyzed for RCRA characteristics proved to be positive for either ignitability, corrosivity or reactivity. This can be seen from Table 2 on page 15 and from the raw data in Appendix C. The RCRA characteristics raw data can be found in Appendix D.

Table 3 on page 20, is a summary of the target analyte list (TAL) - total metal analysis and polychlorinated biphenol (PCB) analysis sample results. These samples were compared to the following ARARs. New York State Department of Environmental Conservation (NYSDEC) *Technical and Administrative Guidance Memorandum (TAGM): Determination of Soil Cleanup Objectives and Cleanup Levels, Appendix A: Recommended Soil Cleanup Objectives* and the U.S. EPA Region III *Risk-Based Concentration (RBC) Table*, which can be found as Appendix H and I, respectively. The TAGM cleanup levels are a conservative, remedial approach to sites and are mostly based on soil background which was not collected at this site. However, for a number of the analytes, the TAGM list has a choice of a level or the soil background. For this particular site, that level will be used as a conservative cleanup level. The samples with results that exceed the TAGM levels are as follows: US-FA-01: arsenic, beryllium, cadmium, chromium, copper, iron, nickel, selenium and zinc; US-IO-01 and duplicate, US-IO-04: arsenic, beryllium, cadmium, chromium, copper, iron, nickel, and zinc; and US-ML-01 and US-ML-03: arsenic, beryllium, cadmium, chromium, copper, iron, mercury, nickel, selenium and zinc. These results can also be found in Table 3 on page 20 and in the raw data in Appendix D. None of the TAL - total metal samples exceeded the RBC levels. Also, none of the PCB sample results exceeded either ARAR. The PCB raw data can be found in Appendix C.

In the sample summaries, Tables 2 and 3, there are a variety of qualifiers along with the data. The footnotes at the bottom of each page explain each qualifier. A "J" qualifier is an estimated value and is generally because the value recorded is less than the contract required detection limit. However, there are a variety of other reasons for the "J" qualifier is used in an analytical report. One reason that is found throughout this data package, is because the spike recoveries were outside of specified quality control limits. Another reason is because there was a difference between the duplicate samples. These reasons for the "J" qualifier and others can be found in the footnotes in Tables 2 and 3. The "B" qualifier means that the reported value was obtained from a reading that was less than the contract required detection limit (CRDL), but greater than or equal to the instrument detection limit (IDL). The "E" qualifier was given to an analyte because the serial dilution results are not within 10%. The "N" qualifier means that when the sample was spiked for the MS/MSD, the result was not within control limits. Due to high concentrations, two of the sample compounds had to be diluted: iron in US-ML-01 and US-ML-03.

5.0 CONCLUSION:

Ten waste pile samples were collected from nine locations. These sample were collected from three different waste piles: flu ash pile, iron ore pile and the mountain landfill pile. These locations can be seen on Figure A of Appendix A. In the flu ash pile, TCLP-lead exceeded the U.S. Code of Federal Regulations Title 40: *Protection of Environment, Volume 18, 261.24. Toxicity Characteristic*, ARAR, but did not detect any organics. There were some TAL analytes above the TAGM in sample, US-FA-01. There were also PCBs detected in all samples from the flu ash pile. However, they were not at levels that exceeded the ARARs. Only one sample was collected from the iron ore pile, with a duplicate. TCLP trichloroethene was detected in both those samples, but at low levels. This pile also had TAL - total metal samples that exceeded the TAGM ARARs, but no PCBs were detected. The final pile analyzed was the mountain landfill pile. One sample, US-ML-01, detected the pesticide, silvex, at a level that did exceed the U.S. Code of Federal Regulations Title 40: *Protection of Environment, Volume 18, 261.24: Toxicity Characteristic*, ARAR. The raw data packages for TCLP and PCB results and inorganics, and RCRA results can be found in Appendices C and D, respectively and on Table 2 and 3 of this report.

A map of the sampling locations can be found as Figure A in Appendix A. Table 2 and 3, pages 15 and 20, respectively, provide summaries of the detected results of the TCLP VOC, BNA, pesticides, and inorganic analysis, the TAL - total metal analysis, PCB analysis, and RCRA characteristic conducted by a contracted laboratories on the waste pile samples at the Union Ship Canal site. Also in Tables 2 and 3 are a comparison of the results to the state and federal ARARs which can be found as Appendix F, G, and H.

TABLE 1
QA/QC SAMPLE DATA

TYPE OF SAMPLE	SAMPLE NUMBERS
EQUIPMENT BLANK	RB-01
BLIND DUPLICATE	US-IO-04 is a duplicate of US-IO-01
MATRIX SPIKE/ MATRIX SPIKE DUPLICATE	US-ML-01

**TABLE 2
TCLP AND RCRA SAMPLE SUMMARY**

Sample Location	Sample Numbers	Analysis	Compounds & Concentrations (mg/L)			40 CFR Part 261 ¹ (mg/L)
			Compounds	Conc.	QC	
US-FA-01	2080-1	TCLP Volatile Organic	Non-detection			
		TCLP Semi-Volatiles	Non-detection			
		TCLP Pesticides/Herbicides	Non-detection			
		TCLP Total metals	Arsenic Barium Cadmium Chromium Lead Selenium	0.0026 0.581 0.0371 0.0018 0.209 0.0209	B B B B B B	5.0 100 1.0 5.0 5.0 1.0
		RCRA characteristics	Corrosivity (as pH) Ignitability	7.77 >140 °F		< 2 or >12.5 < 140 °F
US-FA-02	2080-2	TCLP Volatile Organic	Non-detection			
		TCLP Semi-Volatiles	Non-detection			
		TCLP Total metals	Arsenic Barium Cadmium Chromium Lead Selenium Silver	0.0022 0.836 0.107 0.0165 1.56 0.0249 0.0022	B B B B B B B	5.0 100 1.0 5.0 5.0 1.0 5.0
		RCRA characteristics	Corrosivity (as pH) Ignitability	7.11 >140 °F		< 2 or >12.5 < 140 °F
US-FA-03	2080-5	TCLP Total metals	Arsenic Barium Cadmium Chromium Lead Selenium Silver	0.0046 0.577 0.15 0.0202 14.7 0.0267 0.0025	B B B B B B B	5.0 100 1.0 5.0 5.0 1.0 5.0
		RCRA characteristics	Corrosivity (as pH) Ignitability	7.79 >140 °F		< 2 or >12.5 < 140 °F

B - The reported value was obtained from a reading that was less than the CRDL, but greater than or equal to the IOL.

† - Sample duplicate and sample results are not within control limits.

¹ - Code of Federal Regulations Title 40 - Protection of Environment, Volume 18, Part 261.21, 261.22, 261.23 and 261.24 - Revised 7/1/00

**TABLE 2
TCLP AND RCRA SAMPLE SUMMARY CONTINUED**

Sample Location	Sample Numbers	Analysis	Compounds & Concentrations (mg/L)			40 CFR Part 261 ¹ (mg/L)
			Compounds	Conc.	QC	
US-FA-04	2080-6	TCLP Total metals	Barium	0.274	B	100
			Cadmium	0.0649	B	1.0
			Chromium	0.0068	B	5.0
			Lead	0.256	B	5.0
			Selenium	0.0282	B	1.0
			Silver	0.0027	B	1.0
		RCRA characteristics	Corrosivity (as pH) Ignitability	8.13 >140 °F		< 2 or >12.5 < 140 °F
US-IO-01	2080-4	TCLP Volatile Organic	Trichloroethene	0.007	J	0.5
		TCLP Semi-Volatiles	Non-detection			
		TCLP Pesticides/ Herbicides	Non-detection			
		TCLP Total metals	Arsenic	0.0059	B	5.0
			Barium	0.0711	B	100
			Cadmium	0.0009	B	1.0
			Chromium	0.0013	B	5.0
			Lead	0.0091	B	5.0
			Selenium	0.0161	BJ [^]	1.0
			Silver	0.00075	B	5.0
		RCRA characteristics	Corrosivity (as pH) Ignitability	7.94 >140 °F	J	< 2 or >12.5 < 140 °F

B - The reported value was obtained from a reading that was less than the CRDL, but greater than or equal to the IDL.

J - The result is estimated.

J[^] - Spike recoveries were outside of specified QC control limits in the associated spike samples and because the sample results concentration is < 4X the spike added concentrations.

J - The pH/corrosivity values of these sample pairs differ > ± 0.1 pH unit.

¹ - Code of Federal Regulations Title 40, Protection of Environment, Volume 18, Part 261.21, 261.22, 261.23 and 261.24. Revised 7/1/00.

TABLE 2
TCLP AND RCRA SAMPLE SUMMARY CONTINUED

Sample Location	Sample Numbers	Analysis	Compounds & Concentrations (mg/kg)			40 CFR Part 261 ¹ (mg/L)
			Compounds	Conc.	QC	
US-IO-04 Duplicate of US-IO-01	2080-3	TCLP Volatile Organic	Trichloroethene	0.01	J	0.5
		TCLP Semi-Volatiles	Non-detection			
		TCLP Pesticides/Herbicides	Non-detection			
		TCLP Total metals	Arsenic	0.0035	B	5.0
			Barium	0.066	B	100
			Cadmium	0.00086	B	1.0
			Chromium	0.0008	B	5.0
			Lead	0.0068	B	5.0
			Selenium	0.0165	BJ [^]	1.0
			Silver	0.00085	B	5.0
		RCRA characteristics	Corrosivity (as pH) Ignitability	7.15 >140 °F	J	< 2 or >12.5 < 140 °F
US-ML-01 MS/MSD	2080-10	TCLP Volatile Organic	Non-detection			
		TCLP Semi-Volatiles	Non-detection			
		TCLP Pesticides/Herbicides	Silver	2.5	J	1.0
		TCLP Total metals	Arsenic	0.0039	B	5.0
			Barium	0.352	B	100
			Cadmium	0.0122	B	1.0
			Chromium	0.0049	B	5.0
			Lead	0.0286	B	5.0
			Selenium	0.0185	BJ [^]	1.0
			Silver	0.0009	B	5.0
		RCRA characteristics	Corrosivity (as pH) Ignitability	8.57 >140 °F		< 2 or >12.5 < 140 °F

B - The reported value was obtained from a reading that was less than the CRDL, but greater than or equal to the LDL.

J - The result is estimated.

J[^] - Spike recoveries were outside of specified QC control limits in the associated spike samples and because the sample results concentration is < 4X the spike added concentrations.

J - The pH/corrosivity values of these sample pairs differ > ± 0.1 pH unit.

¹ Code of Federal Regulations Title 40: Protection of Environment, Volume 18, Part 261.21, 261.22, 261.23 and 261.24, Revised 7/1/00

TABLE 2
TCLP AND RCRA SAMPLE SUMMARY CONTINUED

Sample Location	Sample Numbers	Analysis	Compounds & Concentrations (mg/L)			40 CFR Part 261 ¹ (mg/L)
			Compounds	Conc.	QC	
US-ML-02	2080-9	TCLP total metals	Barium	0.526	B	100
			Cadmium	0.0139	B	1.0
			Chromium	0.0067	B	5.0
			Lead	0.0551	BJ [^]	5.0
			Selenium	0.0166	B	1.0
		RCRA characteristics	Corrosivity (as pH)	8.75		< 2 or >12.5
			Ignitability	>140 °F		< 140 °F
US-ML-03	2080-7	TCLP total metals	Barium	0.468	B	100
			Cadmium	0.0088	B	1.0
			Chromium	0.0072	B	5.0
			Lead	0.0238	B	5.0
			Selenium	0.0181	BJ [^]	1.0
			Silver	0.00073	B	5.0
		RCRA characteristics	Corrosivity (as pH)	8.52		< 2 or >12.5
			Ignitability	>140 °F		< 140 °F
US-ML-04	2080-8	TCLP total metals	Arsenic	0.0034	B	5.0
			Barium	0.368	B	100
			Cadmium	0.0074	B	1.0
			Chromium	0.0105	B	5.0
			Lead	0.0224	B	5.0
			Selenium	0.0152	BJ [^]	1.0
			Silver	0.00094	B	5.0
		RCRA characteristics	Corrosivity (as pH)	8.53		< 2 or >12.5
			Ignitability	>140		< 140 °F

B - The reported value was obtained from a reading that was less than the CRDL, but greater than or equal to the 10L

J[^] - Spike recoveries were outside of specified QC control limits in the associated spike samples and because the sample results concentration is < 4X the spike added concentrations

¹ Code of Federal Regulations Title 40: Protection of Environment, Volume 18, Part 261.21, 261.22, 261.23 and 261.24. Revised 7/1/00

TABLE 2
TCLP AND RCRA SAMPLE SUMMARY CONTINUED

Sample Location	Sample Numbers	Analysis	Compounds & Concentrations (mg/L)			40 CFR Part 261 ¹ (mg/L)
			Compounds	Conc.	QC	
RB-01	2080-1	Volatile Organics	Non-detection			
		Pesticides/Herbicides	Non-detection			
		Semi-volatiles	Non-detection			
		PCBs	Non-detection			
		Total metals	Antimony	20.8	B	
			Barium	9.3	B	
			Cadmium	0.31	B	
			Calcium	262	B	
			Chromium	23.2		
			Cobalt	2.2	B	
			Copper	4.3	B	
			Iron	93.5	B	
			Magnesium	39.6	B	
			Manganese	3.2	BJ<	
			Nickel	11.1	B	
			Potassium	30.4	B	
			Sodium	177	B	
			Vanadium	2.0	B	
			Zinc	14.8	B	

B - The reported value was obtained from a reading that was less than the CRDL, but greater than or equal to the IDL.

BJ - Contract required detection limit standard percent recoveries were outside the quality control limits and because their concentration fell within "affected ranges"

¹ - Code of Federal Regulations Title 40: Protection of Environment, Volume 18, Part 261.21, 261.22, 261.23 and 261.24. Revised 7/1/00

**TABLE 3
INORGANIC AND PCB SAMPLE SUMMARY**

Sample Location	Sample Numbers	Analysis	Compounds & Concentrations (mg/kg)			TAGM (mg/kg) ¹	Region 3 RBC Ind. (mg/kg) ²
			Compounds	Conc.	QC		
US-FA-01	2080-1	TAL Total metals	Aluminum	10,200	BNJ ^A	SB	20,000,000
			Antimony	1.0		SB	8200
			Arsenic	12.4		7.5 or SB	380
			Barium	128	LJ [*]	300 or SB	1,400,000
			Beryllium	1.9		0.16 or SB	41,000
			Cadmium	6.5		1.0 or SB	10,000
			Calcium	62,400	B	SB	
			Chromium	51.4		10 or SB	
			Cobalt	2.9		30 or SB	1,200,000
			Copper	80.3	NJ ^A	25 or SB	820,000
			Iron	88,000		2000 or SB	6,100,000
			Lead	1420		SB	
			Magnesium	9620	NJ ^A	SB	
			Manganese	2490		SB	410,000
			Mercury	0.10		0.1	
			Nickel	30.6	EJ [*]	13 or SB	410,000
			Potassium	2350		SB	
			Selenium	3.9		2.0 or SB	100,000
			Silver	2.8	J [*]	SB	100,000
			Thallium	17.6		SB	1400
			Vanadium	18.6		150 or SB	14,000
			Zinc	1790	NJ ^{A*}	20 or SB	6,100,000
			Cyanide	11.8			
US-FA-02	2080-2	PCBs	Aroclor-1260	0.098	J/	10	290
		TAL	Cyanide	0.0164	NJ [*]		
US-FA-03	2080-5	PCBs	Aroclor-1242	0.17	J/N	10	290
			Aroclor-1254	0.21		10	290
			Aroclor-1260	0.11		10	290
US-FA-04	2080-6	TAL	Cyanide	0.0096	NJ [*]		
		PCBs	Aroclor-1254	0.2	J/	10	290
			Aroclor-1260	0.14		10	290
		TAL	Cyanide	0.0053	NJ [*]		

J^A - Spike recoveries were outside of specified QC control limits in the associated spike samples and because the sample results concentration is < 4X the spike added concentrations.

B - The reported value was obtained from a reading that was less than the CRDL, but greater than or equal to the IDL.

N - The sample recovery is outside of control limits.

J^{*} - The percent difference between the Initial Sample (I) result and the Serial Dilution Sample (S) result is either between 10-100% or > 100% when the concentration of I is > 10 X the instrument detection limit (IDL).

J/ - A percent difference between the primary and confirmation columns was > 25%.

* - Sample duplicate and sample results are not within control limits.

E - The serial dilution results are not within 10 %.

¹ - From the *Technical and Administrative Guidance Memorandum: Determination of Soil Cleanup Objectives and Cleanup Levels, Appendix A: Recommended Soil Cleanup Objectives*, Jan. 1994.

² - From the EPA Region III *Risk-Based Concentration Table*, October 2000.

**TABLE 3
INORGANIC SAMPLE SUMMARY CONTINUED**

Sample Location	Sample Numbers	Analysis	Compounds & Concentrations (mg/kg)			TAGM (mg/kg) ¹	Region 3 RBC Ind. (mg/kg) ²
			Compounds	Conc.	QC		
US-TO-01	2080-4	TAL total metals	Aluminum	2350		SB	20,000,000
			Antimony	3.8	BNJ ^A	SB	8200
			Arsenic	12.4		7.5 or SB	380
			Barium	9.8	B	500 or SB	1,400,000
			Beryllium	1.0		0.16 or SB	41,000
			Cadmium	1.1	EF	1.0 or SB	10,000
			Calcium	26,900	J>	SB	
			Chromium	15.6	R	10 or SB	
			Cobalt	3.4	B	30 or SB	1,200,000
			Copper	38.2	NI ^A	25 or SB	820,000
			Iron	48,100		2000 or SB	6,100,000
			Lead	8.0		SB	
			Magnesium	1340	*	SB	
			Manganese	3670		SB	410,000
			Mercury	0.081	BNJ ^A	0.1	
			Nickel	28.6	J>	13 or SB	410,000
			Potassium	270	BE	SB	
			Selenium	1.6	NI ^A	2.0 or SB	100,000
			Silver	0.23	B	SB	100,000
			Sodium	203	B	SB	
			Thallium	10.1	J ¹	SB	1400
			Vanadium	18.8		150 or SB	14,000
			Zinc	79.3		20 or SB	6,100,000
			Cyanide	0.084	BNJ ^{A*}		
		PCBs	Non-detection				

J^A - Spike recoveries were outside of specified QC control limits in the associated spike samples and because the sample results concentration is < 4X the spike added concentrations.

B - The reported value was obtained from a reading that was less than the CIDL, but greater than or equal to the IDL.

N - The sample recovery is outside of control limits.

F - The percent difference between the Initial Sample (I) result and the Serial Dilution Sample (S) result is either between 10-100% or > 100% when the concentration of I is > 10 X the instrument detection limit (IDL).

J> - The Relative Percent Difference (RPD) between the samples and corresponding field duplicate samples were outside the qualified QC criteria.

R - The onsite blank concentration was greater than contract required detection limit and sample concentrations were above the instrument detection limit but less than 5 X field blank.

* - Sample duplicate and sample results are not within control limits.

E - The serial dilution results are not within 10 %.

¹ - From the Technical and Administrative Guidance Memorandum: Determination of Soil Cleanup Objectives and Cleanup Levels, Appendix.

² - Recommended Soil Cleanup Objectives Jan. 1994.

³ - From the EPA Region III Risk Based Concentration Table October 2000.

TABLE 3
INORGANIC SAMPLE SUMMARY CONTINUED

Sample Location	Sample Numbers	Analysis	Compounds & Concentrations (mg/kg)			TAGM (mg/kg) ¹	Region 3 RBC Ind. (mg/kg) ²
			Compounds	Conc.	QC		
US-IO-04 Duplicate of US-IO-01	2080-3	TAL total metals	Aluminum	3830		SB	20,000,000
			Antimony	4.1	BNJ ⁴	SB	8200
			Arsenic	9.7		7.5 or SB	380
			Barium	10	B	300 or SB	1,400,000
			Beryllium	1.6		0.16 or SB	41,000
			Cadmium	1.4	LJ ⁵	1.0 or SB	10,000
			Calcium	8690	J ⁶	SB	
			Chromium	25		10 or SB	
			Cobalt	6.2	B	30 or SB	1,200,000
			Copper	37.8	NJ ⁴	25 or SB	820,000
			Iron	64,800		2000 or SB	6,100,000
			Lead	8.4		SB	
			Magnesium	2640	*	SB	
			Manganese	2220		SB	410,000
			Mercury	0.063	BNJ	0.1	
			Nickel	49.5	J ⁶	1.3 or SB	410,000
			Potassium	160	BE	SB	
			Selenium	0.76	BNJ ⁴	2.0 or SB	100,000
			Silver	0.28	B	SB	100,000
			Sodium	141	B	SB	
			Thallium	17.5	J ⁶	SB	1400
			Vanadium	21.6		150 or SB	14,000
			Zinc	120		20 or SB	6,100,000
			Cyanide	0.059	BNJ ^{4*}		
		PCBs	Non-detection				

J⁴ - Spike recoveries were outside of specified QC control limits in the associated spike samples and because the sample results concentration is < 4X the spike added concentrations.

R - The reported value was obtained from a reading that was less than the CRDL, but greater than or equal to the IDL.

N - The sample recovery is outside of control limits.

J⁶ - The result is estimated.

J⁴ - The percent difference between the Initial Sample (I) result and the Serial Dilution Sample (S) result is either between 10-100% or > 100% when the concentration of I is > 10 X the instrument detection limit (IDL).

J⁶ - The Relative Percent Difference (RPD) between the samples and corresponding field duplicate samples were outside the qualified QC criteria.

E - The serial dilution results are not within 10 %.

* - Sample duplicate and sample results are not within control limits.

¹ - from the Technical and Administrative Guidance Memorandum, Determination of Soil Cleanup Objectives and Cleanup Levels, Appendix A - Recommended Soil Cleanup Objectives Jan 1994

² - From the EPA Region III Risk Based Concentration Table, October 2000

**TABLE 3
INORGANIC SAMPLE SUMMARY CONTINUED**

Sample Location	Sample Numbers	Analysis	Compounds & Concentrations (mg/kg)			TAGM (mg/kg) ¹	Region 3 RBC Ind. (mg/kg) ²
			Compounds	Conc.	QC		
US-ML-01 MS/MSD	2080-10	TAL Total metals	Aluminum	6760		SB	20,000,000
			Antimony	0.64	BNJ ^A	SB	8200
			Arsenic	15.3		7.5 or SB	380
			Barium	106		300 or SB	1,400,000
			Beryllium	1.2		0.16 or SB	41,000
			Cadmium	4.9	EJ ^A	1.0 or SB	10,000
			Calcium	45,000		SB	
			Chromium	66.5		10 or SB	
			Cobalt	5.1	B	30 or SB	1,200,000
			Copper	173	NJ ^A	25 or SB	820,000
			Iron	139,000	dl	2000 or SB	6,100,000
			Lead	399		SB	
			Magnesium	10,700	*	SB	
			Manganese	3360		SB	410,000
			Mercury	0.15	NJ ^A	0.1	
			Nickel	53.2		1.5 or SB	410,000
			Potassium	2380	EJ ^A	SB	
			Selenium	3.1	NJ ^A	2.0 or SB	100,000
			Silver	0.92	B	SB	100,000
			Thallium	25	J ^A	SB	1400
			Vanadium	21.4		150 or SB	14,000
			Zinc	1050		20 or SB	6,100,000
			Cyanide	11.8	NJ ^{A*}		
		PCBs	Non-detection				

^A - Spike recoveries were outside of specified QC control limits in the associated spike samples and because the sample results concentration is < 4X the spike added concentrations.

B - The reported value was obtained from a reading that was less than the CRDL, but greater than or equal to the IDL.

N - The sample recovery is outside of control limits

L - The serial dilution results are not within 10 %

dl - The sample concentration was high and therefore had to be diluted.

J^A - The percent difference between the Initial Sample (I) result and the Serial Dilution Sample (S) result is either between 10-100% or > 100% when the concentration of I is > 10 X the instrument detection limit (IDL)

* - Sample duplicate and sample results are not within control limits

¹ From the Technical and Administrative Guidance Memorandum, Determination of Soil Cleanup Objectives and Cleanup Levels, Appendix A, Recommended Soil Cleanup Objectives, Jan. 1994

² -From the EPA Region III Risk-Based Concentration Table, October 2000.

**TABLE 3
INORGANIC SAMPLE SUMMARY CONTINUED**

Sample Location	Sample Numbers	Analysis	Compounds & Concentrations (mg/kg)			TAGM (mg/kg) ¹	Region 3 RBC Ind. (mg/kg) ²
			Compounds	Conc.	QC		
US-ML-02	2080-9	PCBs	Non-detection				
		TAL	Cyanide	0.0056	NJ*		
US-ML-03	2080-7	TAL total metals	Aluminum	7850	BNJ ^A	SB	20,000,000
			Antimony	1.0		SB	8200
			Arsenic	13.8		7.5 or SB	380
			Barium	118		300 or SB	1,400,000
			Beryllium	1.4	EJ [*]	0.16 or SB	41,000
			Cadmium	4.6		1.0 or SB	10,000
			Calcium	45,600		SB	
			Chromium	104		10 or SB	
			Cobalt	4.7	B	30 or SB	1,200,000
			Copper	169	NJ ^A	25 or SB	820,000
			Iron	132,000	d1	2000 or SB	6,100,000
			Lead	396	*	SB	
			Magnesium	9380		SB	
			Manganese	3660		SB	410,000
			Mercury	0.14		0.1	
			Nickel	56.9	NJ ^A	13 or SB	410,000
			Potassium	1710	EJ [*]	SB	
			Selenium	2.6	NJ ^A	2.0 or SB	100,000
			Silver	0.72	B	SB	100,000
			Sodium	56.5	B	SB	
			Thallium	25.8	J [*]	SB	1400
			Vanadium	21.9	NJ ^{A*}	150 or SB	14,000
			Zinc	926		20 or SB	6,100,000
			Cyanide	8.7			
US-MI-04	2080-8	PCBs	Non-detection				
		TAL	Cyanide	0.0059	NJ*		

J^A - Spike recoveries were outside of specified QC control limits in the associated spike samples and because the sample results concentration is < 4X the spike added concentrations.

B - The reported value was obtained from a reading that was less than the CRDL, but greater than or equal to the IDL.

N - The sample recovery is outside of control limits.

F - The serial dilution results are not within 10 %

* - Sample duplicate and sample results are not within control limits

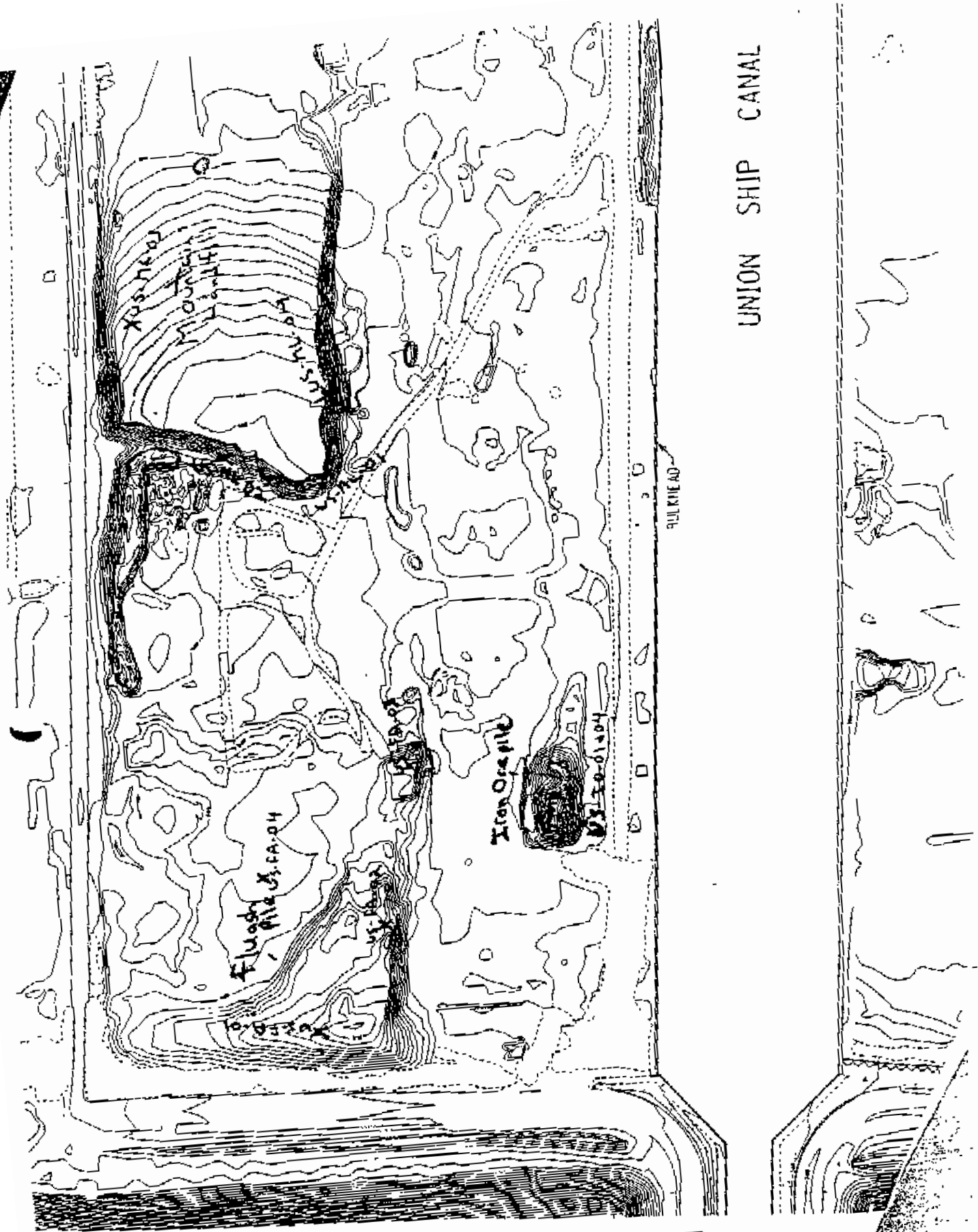
d1 - The sample concentration was high and therefore had to be diluted

J^{*} - The percent difference between the Initial Sample (I) result and the Serial Dilution Sample (S) result is either between 10-100% or > 100% when the concentration of I is > 10 X the instrument detection limit (IDL)

¹ - From the *Technical and Administrative Guidance Memorandum: Determination of Soil Cleanup Objectives and Cleanup Levels*, Appendix A: Recommended Soil Cleanup Objectives, Jan 1994

² - From the EPA Region III Risk-Based Concentration Table, October 2000

APPENDIX A
SITE MAPS



FUHRMANN BLVD. EXTENSION

UNION SHIP CANAL

Figure A. Sampling Locations



**NYSDEC SUPERFUND STANDBY CONTRACT
WORK ASSIGNMENT NO. D002472-14.1**

**PRELIMINARY SITE ASSESSMENT REPORT
VOLUME I**

**HANNA FURNACE SITE (SITE NO. 915029) AND
SHENANGO STEEL MILL
CITY OF BUFFALO, NEW YORK**

Submitted to:

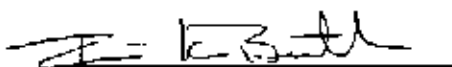
New York State Department of Environmental Conservation
Albany, New York

Submitted by:

ABB Environmental Services
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November 1995

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CD/CL-108 was collected from an open trench at the ruins/foundation of the boiler plant, located south of the oil shack building. The trench is approximately 3 feet wide and 6 feet deep, and contains approximately 8 inches of water over 1.5 feet of sediment. PID readings of the liquid and sediment were at background levels.

3.1.1.5 Surface Soil Sampling. During the week of October 10, 1994, ABB-ES personnel collected 14 surface soil samples (SS-101 through SS-114) from the filter cake/flue ash disposal area and debris landfill, and the oil shack area portions of the site (see Figure 4). The surface soil samples were collected using stainless steel spoons and buckets. At each location, soil samples were collected from just below the soil surface to approximately 1 foot bgs. Soil for TCL VOC analysis was collected first and placed directly into VOC soil jars. Enough material for all other analyses was collected and homogenized in a bucket; soil was then placed into appropriate containers for analysis for TCL SVOCs, pesticides/PCBs, inorganics, and hazardous waste characteristics - ignitability, reactivity, corrosivity, and EPTOX metals (see Table 11). Samples were screened with a PID for the presence of VOCs during the sampling activities. The sample description, location, and additional observations were recorded on sample record sheets. PID readings greater than 0 ppm were not measured by ABB-ES personnel during the sampling activities. Sampling locations and sampling rationale for each area are discussed in the following subsections.

Filter Cake/Flue Ash Disposal Area and Debris Landfill. Samples SS-101 through SS-104 (and SS-101 duplicate) were collected to characterize filter cake/flue ash disposed at this portion of the Hanna Furnace site and to assess whether the material is a characteristic hazardous waste. The filter cake/flue ash is a black, dry, friable dust. The material is unvegetated and the area is crossed with off-road vehicle tracks. PID readings of the samples were at background levels (0 ppm).

Samples SS-105 through SS-108 were collected from the sloped sides of the landfill to characterize the shallow material. The material sampled was generally a black, sandy material with a metallic luster, with some scrap metal, slag, and organic matter (roots). PID readings of the samples were at background levels.

Oil Shack Area. Surface soil samples SS-109 through SS-114 were collected from the oil shack area to assess whether surficial soils were characteristic hazardous wastes and to confirm contaminant concentrations identified in previous investigations.

SS-111 was collected in duplicate. Sample SS-109 was collected in the vicinity of the boiler plant ruins. Samples SS-110 through SS-114 were collected between the ruins of blast furnace No. 2 and the oil shack where previous investigations had detected significant concentrations of inorganics and where transformer cooling fins, insulators, and other electrical components had been observed during the walkover (see Subsections 2.3 and 2.4 and Figure 2). Soil/material sampled consisted of gray to brown or black gravelly silt or fine sand with some slag and building debris (glass, concrete, and brick fragments). PID readings of the samples were at background levels.

3.1.1.6 Test Pits. Eight test pits (TP-101 through TP-108) were excavated by backhoe during the week of October 17, 1994 to investigate the debris landfill Area. The test pits were excavated to examine subsurface soils, assess horizontal and vertical distribution of shallow soil contamination, evaluate the nature of landfill materials, and determine whether hazardous waste was present. Excavations were placed at locations on the debris landfill to characterize anomalies that were detected during the geophysical survey (see Subsection 3.1.1.1). One sample from each test pit was collected and submitted for laboratory analysis for TCL VOCs, SVOCs, pesticides/PCBs, and inorganics, and hazardous waste characteristics. Samples from each test pit were selected from the most contaminated areas based on PID readings or visual evidence of contamination. Samples were collected directly from the backhoe bucket for VOC analysis; soils for all other analytical parameters were homogenized in a stainless-steel bucket before being placed into sample containers. Depths of the test pits ranged from 5 to 11 feet bgs. Field logs of the test pits were completed before backfilling and are included in Volume II. Soils encountered during the test pitting were in all cases fill material consisting of gravelly sand, slag material, wood, bricks, and metal debris; natural in-place soils were not observed. Test pits TP-101 through TP-103 did not encounter groundwater, possibly because these were excavated in the thicker, higher, portions of the landfill. The remaining five test pits, excavated in the lower, more easterly and thinner portions of the landfill, encountered saturated (wet) conditions ranging from approximately 6 to 9 feet bgs. Elevated PID readings were not observed in any of the test pit excavations.

3.1.1.7 Surface Water and Sediment Samples. ABB-ES personnel collected seven surface water samples (SW-101 through SW-107) and six sediment samples (SD-101 through SD-105 and SD-107) during the week of October 10, 1994 (see Figure 4). At one location (SD-106), and despite numerous efforts, a sediment sample could not

be collected from the bottom of the canal. Similarly, sample SD-105 could not be collected from the canal; it was instead collected from a oil/water separator structure apparently discharging to the canal. Depending on each location's physical constraints, water samples were collected either by a Pack-bomb sampler or were directly collected into the sample containers. Surface waters were analyzed in the field for pH, temperature, conductivity, salinity, turbidity, and DO with a Horiba® Model U-10 water quality monitor. Sediment samples were collected either by stainless-steel spoons or by bucket auger, and were composited (except for the VOC sample) in the same manner as the surface soil samples. The water and sediment samples were submitted for laboratory analysis for TCL VOCs, SVOCs, pesticides/PCBs, and inorganics. Additionally, the sediment samples were submitted for hazardous waste characteristics analysis. Sampling locations and rationale are discussed in the following subsections.

Debris Landfill. Surface water/sediment sample pairs SW/SD-101 and SW/SD-102 (and SW/SD-102 duplicates) were collected to characterize water and sediment in water-filled pits located along the southern edge of the debris landfill (Figure 4). These samples had been originally planned to be collected from the low area between the debris landfill and the filter cake/flue ash disposal area; however, this area was dry during the sampling event and the locations were moved to the pits with the approval of NYSDEC. The water-filled pits were sampled to characterize shallow groundwater/surface runoff migrating toward the Union Ship Canal from the debris landfill. PID readings of the samples were at background levels. Water quality parameters (pH, specific conductivity) were monitored in the field with the Horiba Model® U-10 water quality monitor. Results for SW-101 and SW-102 are presented in the following table.

SURFACE WATER QUALITY PARAMETERS - DEBRIS LANDFILL

PARAMETER	SW-101	SW-102
Temperature (°C)	13.3	11.6
pH	9.5	9.02
Specific Conductivity (mS/cm)	3.1	2.9
DO (mg/L)	8.5	8.9
Turbidity (NTUs)	5	117
Salinity (%)	0.13	0.23

Notes:

°C	=	degrees centigrade
mS/cm	=	milliSeimens per centimeter
mg/L	=	milligrams per liter
NTUS	=	nephelometric turbidity units
%	=	percent

Union Ship Canal. Surface water/sediment samples SW/SD-103 through SW/SD-105, SW-106, and SW/SD-107 were collected from along the periphery of the Union Ship Canal to confirm previous sampling results, identify if discharges to the canal from site storm sewers or other piping are contamination migration pathways, and to assess whether the site poses a potential significant threat to the environment. SW/SD-103 was collected at the southeastern corner of the canal at a discharge point believed to be the former outfall of the wastewater treatment plant. The outfall is an open trench leading from the treatment plant ruins and contains milky-white sediment. SW/SD-103 was collected to characterize water in the canal at the discharge and characterize a delta of the sediment deposited in the corner of the canal. SW/SD-104 was collected at the northeastern corner of the canal where outfall and water intake pipes are located.

SW/SD-105 was collected along the southern wall of the canal at a structure believed to be an oil/water separator. SW-105 was collected from the canal immediately at the outfall discharge. SD-105 was planned to have been collected from the canal; due to the depth of the canal, no sample of sediment could be collected. SD-105 was instead collected to characterize sediment contained within the separator structure. This sediment was a black, soft material and caused a sheen on the water when disturbed.

ABB Environmental Services

SECTION 3

SW-106 was collected from along the northern wall of the canal adjacent to the filter cake/flue ash disposal area. A sediment sample could not be collected at this location.

SW/SD-107 was collected between the site and Buffalo Inner harbor (Lake Erie) on the west side of NYS Route 5 to characterize surface water and sediment downgradient of the site.

All PID readings of surface water and sediment samples were at background levels. Field screening of surface water samples for water quality parameters was performed. Results are summarized in the following table.

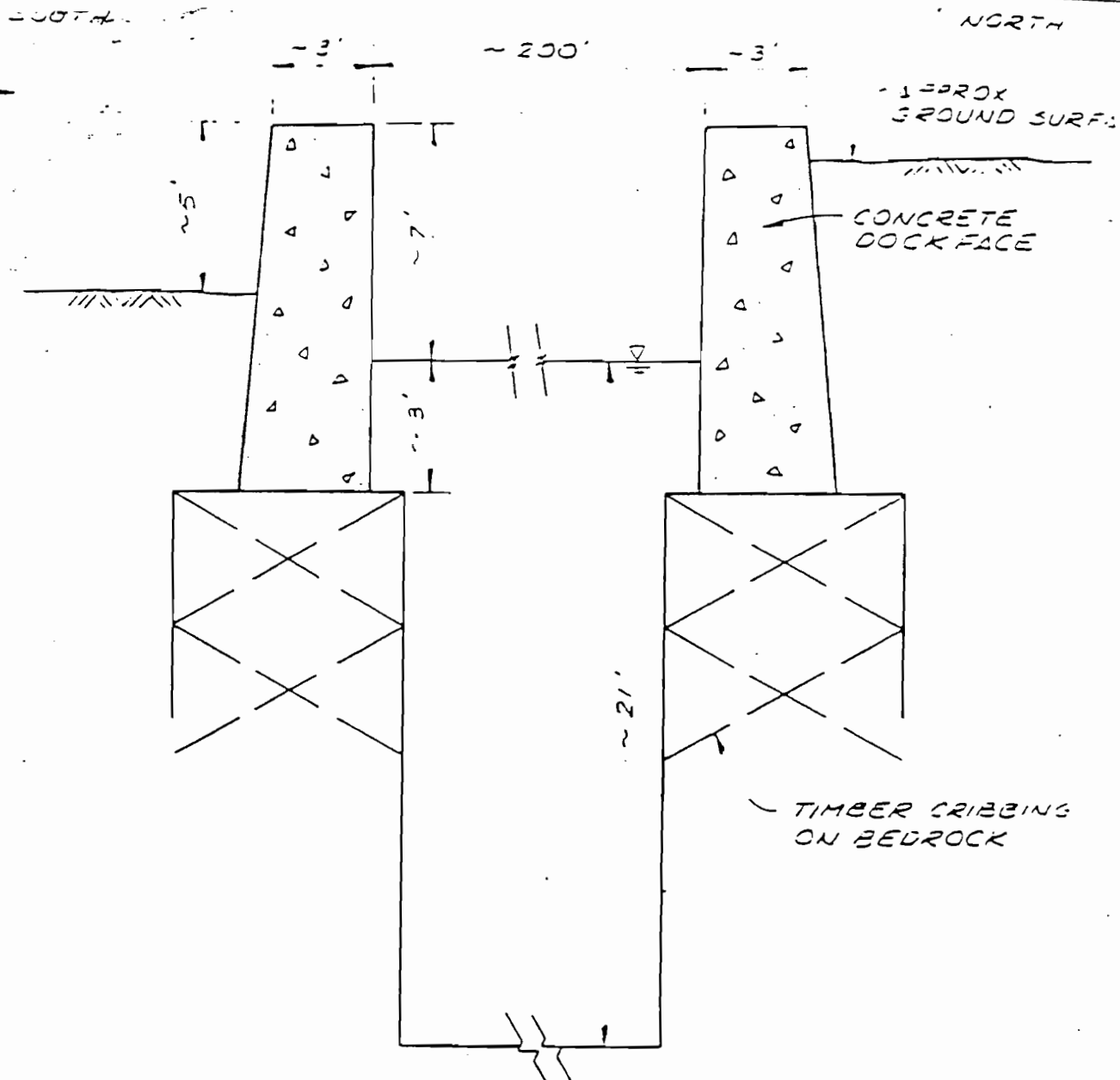
SURFACE WATER QUALITY PARAMETERS - UNION SHIP CANAL

PARAMETER	SW-103	SW-104	SW-105	SW-106	SW-107
Temperature (°C)	NA	12.1	8.2	8.7	8.4
pH	8.6	7.9	8.6	8.1	8.6
Specific Conductivity (mS/cm)	0.97	0.443	1.0	0.532	0.95
DO (mg/L)	NA	11.6	NA	NA	NA
Turbidity (NTUs)	20	14	2	3	2
Salinity (%)	0.03	0.01	0.03	0.03	0.03

Notes:

°C = degrees centigrade
mC/cm = milliSeimens per centimeter
mg/L = milligrams per liter
NTUS = nephelometric turbidity units
% = percent
NA = not analyzed

ABB Environmental Services

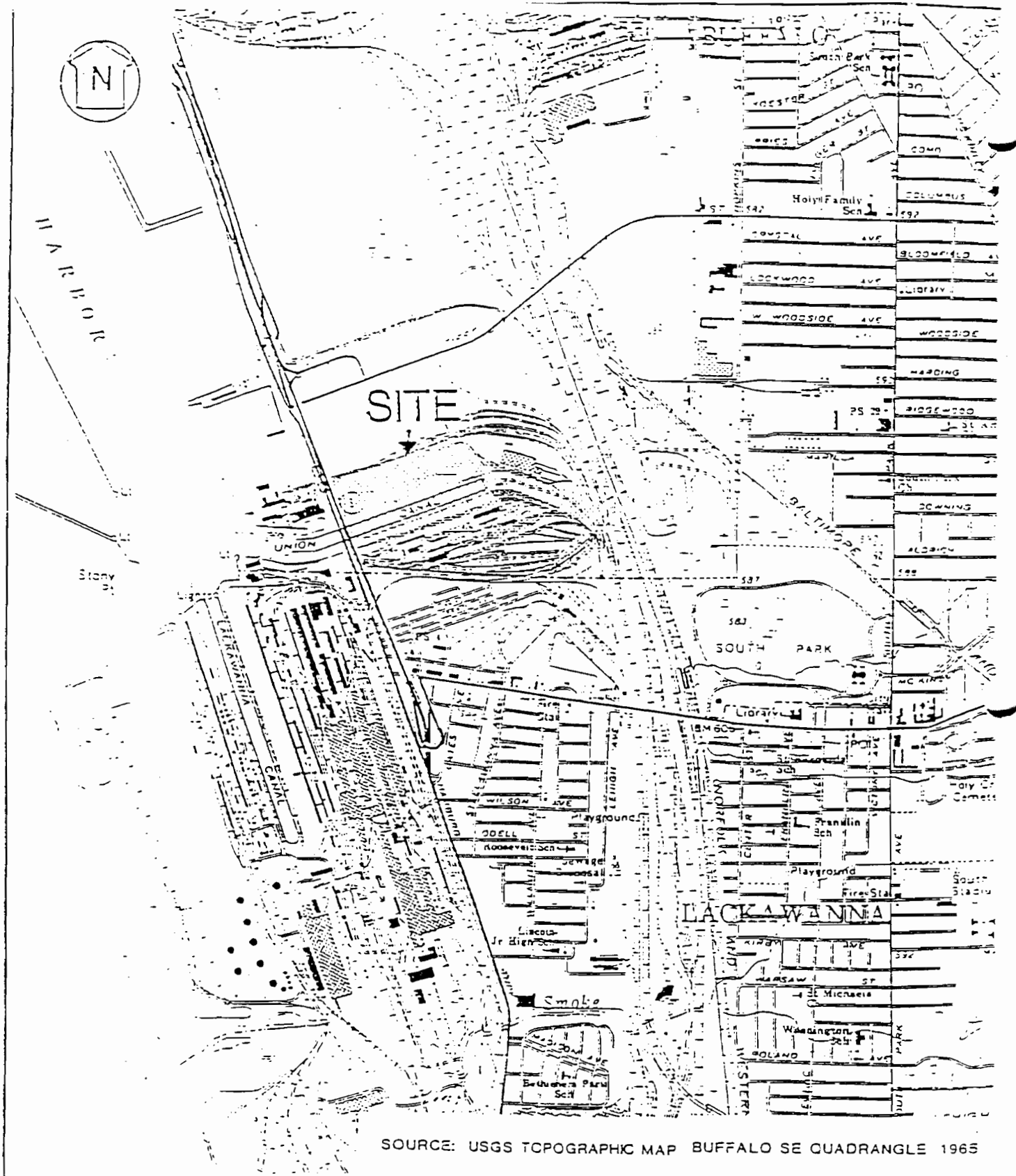


NOTES:

1. THIS DRAWING WAS ADAPTED FROM A HANNA FURNACE CORPORATION DRAWING OF UNION SHIP CANAL (DRAWING NO. 3681-JULY 1961).

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Rev. [] []

NYSDOT
ENVIRONMENTAL ASSESSMENT
OF HANNA FURNACE SITE

Project No. 7C 745

SITE VICINITY MAP

A

FIGURE 1-1

SURFACE WATER QUALITY PARAMETERS - DEBRIS LANDFILL

PARAMETER	SW-101	SW-102
Temperature (°C)	13.3	11.6
pH	9.5	9.02
Specific Conductivity (mS/cm)	3.1	2.9
DO (mg/L)	8.5	8.9
Turbidity (NTUs)	5	117
Salinity (%)	0.13	0.23

Notes:

°C	=	degrees centigrade
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Union Ship Canal. Surface water/sediment samples SW/SD-103 through SW/SD-105, SW-106, and SW/SD-107 were collected from along the periphery of the Union Ship Canal to confirm previous sampling results, identify if discharges to the canal from site storm sewers or other piping are contamination migration pathways, and to assess whether the site poses a potential significant threat to the environment. SW/SD-103 was collected at the southeastern corner of the canal at a discharge point believed to be the former outfall of the wastewater treatment plant. The outfall is an open trench leading from the treatment plant ruins and contains milky-white sediment. SW/SD-103 was collected to characterize water in the canal at the discharge and characterize a delta of the sediment deposited in the corner of the canal. SW/SD-104 was collected at the northeastern corner of the canal where outfall and water intake pipes are located.

SW/SD-105 was collected along the southern wall of the canal at a structure believed to be an oil/water separator. SW-105 was collected from the canal immediately at the outfall discharge. SD-105 was planned to have been collected from the canal; due to the depth of the canal, no sample of sediment could be collected. SD-105 was instead collected to characterize sediment contained within the separator structure. This sediment was a black, soft material and caused a sheen on the water when disturbed.

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SECTION 3

SW-106 was collected from along the northern wall of the canal adjacent to the filter cake/flue ash disposal area. A sediment sample could not be collected at this location.

SW/SD-107 was collected between the site and Buffalo Inner harbor (Lake Erie) on the west side of NYS Route 5 to characterize surface water and sediment downgradient of the site.

All PID readings of surface water and sediment samples were at background levels. Field screening of surface water samples for water quality parameters was performed. Results are summarized in the following table.

SURFACE WATER QUALITY PARAMETERS - UNION SHIP CANAL

PARAMETER	SW-103	SW-104	SW-105	SW-106	SW-107
Temperature (°C)	NA	12.1	8.2	8.7	8.4
pH	8.6	7.9	8.6	8.1	8.6
Specific Conductivity (mS/cm)	0.97	0.443	1.0	0.632	0.95
DO (mg/L)	NA	11.6	NA	NA	NA
Turbidity (NTUs)	20	14	2	3	2
Salinity (%)	0.03	0.01	0.03	0.03	0.03

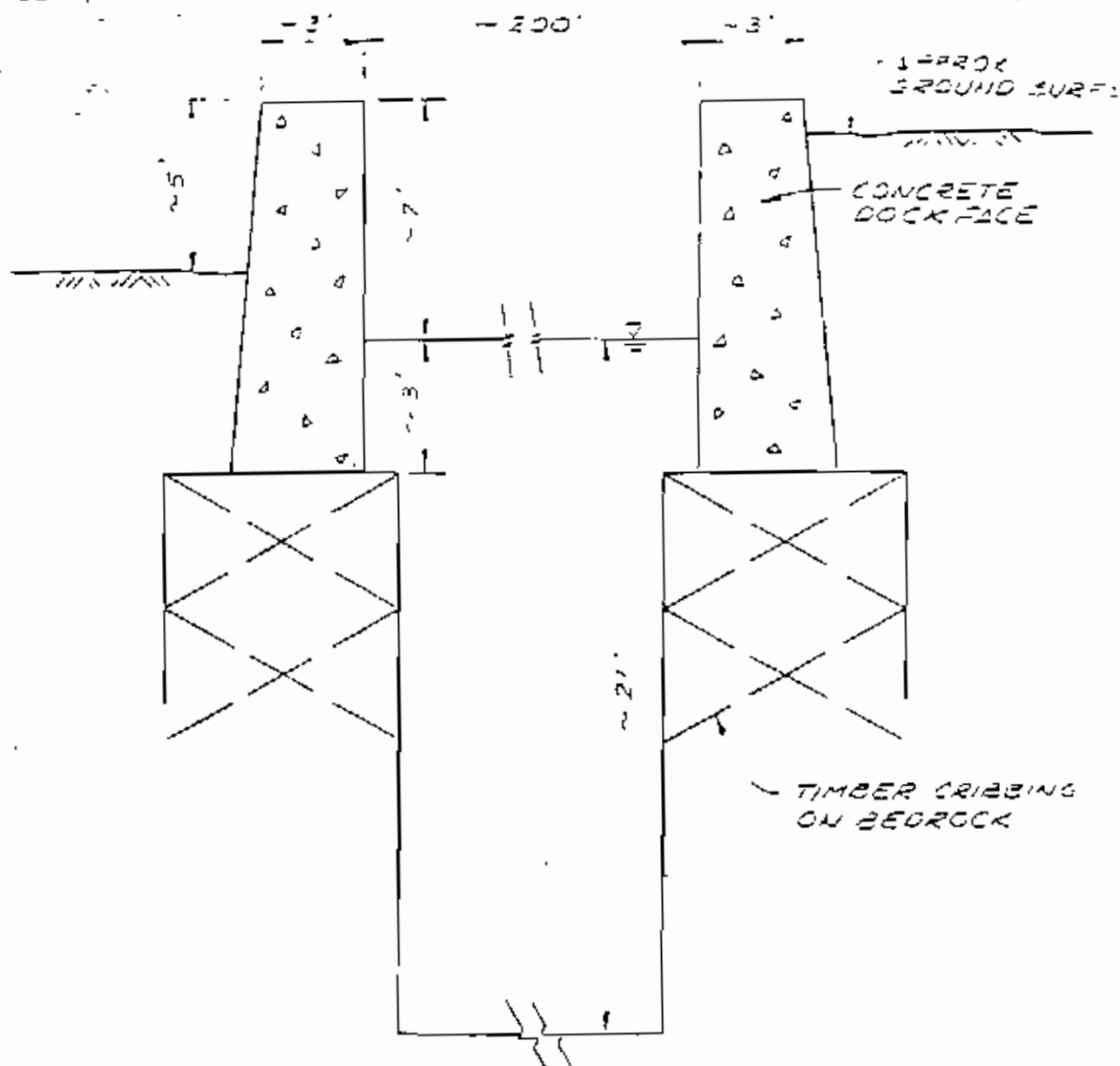
Notes:

°C = degrees centigrade
mS/cm = milliSiemens per centimeter
mg/L = milligrams per liter
NTUs = nephelometric turbidity units
% = percent
NA = not analyzed

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JOB NO.

NORTH



NOTES:

1. THIS DRAWING WAS ADAPTED FROM A HANNA FURNACE CORPORATION DRAWING OF UNION SHIP CANAL (DRAWING NO. 3681-JULY 1961).

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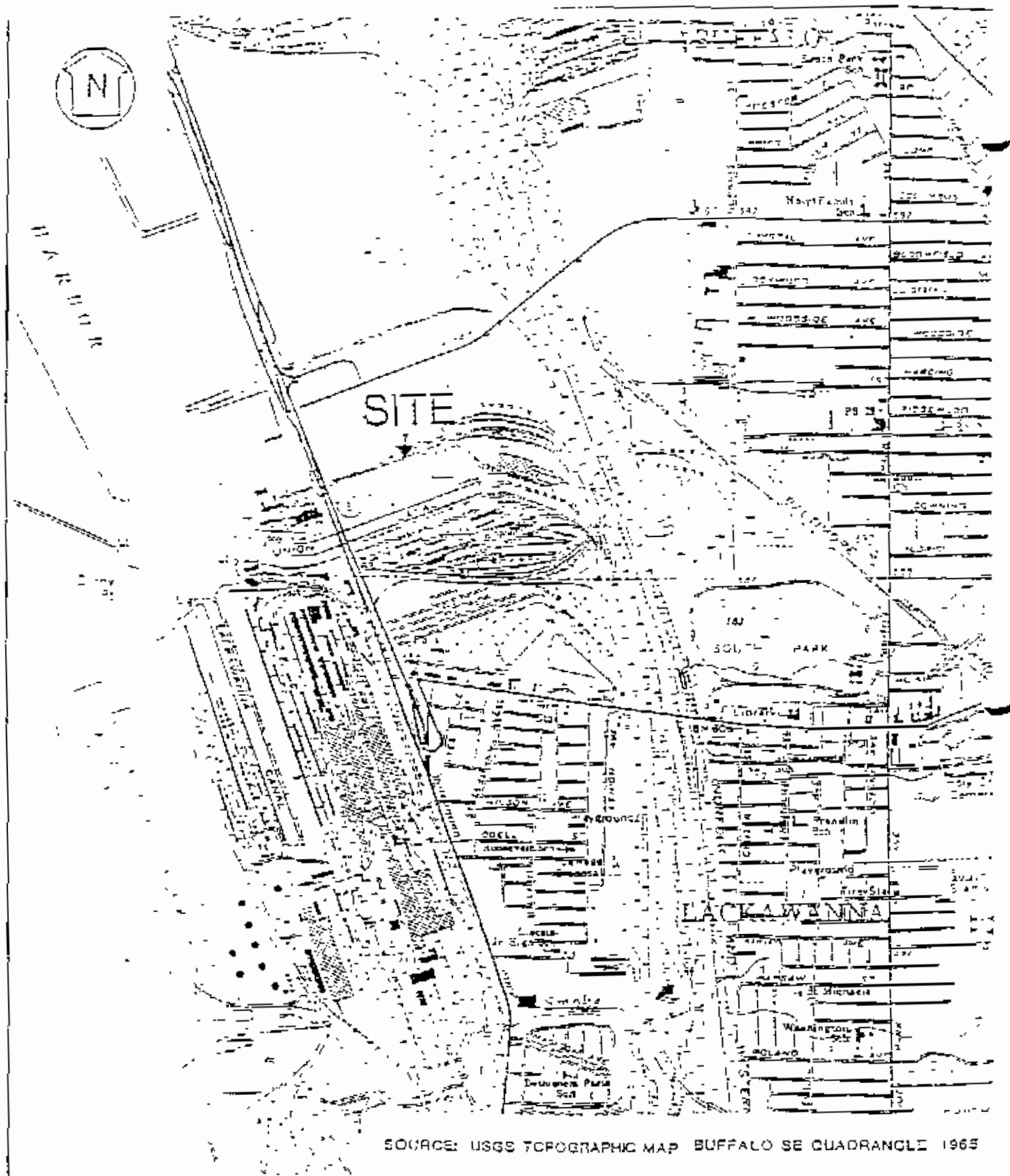


HANNA FURNACE SITE
BUFFALO, NEW YORK

SCHEMATIC DRAWING
OF UNION SHIP CANAL

JUNE 1988

FIGURE 1-2



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Dwn. LMM Date: 2/94

Ckd. JRC Date: 3/94

App'd. R. J. H. Date: 4/94

Rev. 1

NYSDOT
ENVIRONMENTAL ASSESSMENT
OF HANNA FURNACE SITE

Project No. 7C 745

SITE VICINITY MAP

A FIGURE 1-1

3.1.2 Subsurface Investigation

The subsurface investigation at the Hanna Furnace site included installation of soil borings and monitoring wells.

3.1.2.1 Soil Borings. Soil borings were drilled at three areas of the Hanna Furnace site. The purposes of the soil borings were to establish whether the subsurface soil was contaminated by previous disposal activities, to characterize subsurface geology, and to allow for monitoring well installation. Seven test borings (MW-101 through MW-107) were drilled using 4.25-inch inside diameter (ID) hollow-stem augers. Drill cuttings were not containerized, but were spread on the ground surface at each exploration location. The borings were sampled continuously to completion using a standard 2-inch outside diameter, 2-foot long split-spoon sampler driven by a 140-pound hammer dropped 30 inches, following the American Standard for Testing and Materials Standard D-1586. The borings were advanced to 15 feet bgs, approximately 8 feet below the water table.

ABB-ES personnel visually examined the soil as each split-spoon sampler was opened. Samples were described using the Unified Soil Classification System (USCS). A PID was used to screen the soil samples for the presence of VOCs as each split-spoon sampler was opened. The sample description and classification, PID split-spoon readings, split-spoon sampler blow counts, and drilling observations were recorded on the exploration boring logs (Volume II) and in the field boring notebook.

Seven subsurface soil samples were collected from the borings (one per boring) for laboratory analysis for TCL VOCs, SVOCs, and pesticides/PCBs. Samples were selected for laboratory analysis based on visual and olfactory observations, with priority to collect samples from below the water table. Soil boring details and sampling rationale are discussed in the following paragraphs.

Filter Cake/Flue Ash Disposal Area and Debris Landfill. Soil borings MW-101, MW-102, and MW-103 were drilled to characterize subsurface soils and fill at this portion of the Hanna Furnace site. MW-101 and MW-103 were drilled adjacent to the filter cake/flue ash disposal area and the debris landfill, respectively. MW-102 was drilled northeast of the debris landfill at a location believed to represent background conditions.

SECTION 3

At MW-101, fill, composed of black, dark grey, light grey, and green/brown fine grained material with some slag and brick fragments, was encountered to 15 feet bgs. PID readings were not obtained from the material. No odors or other evidence of organic chemical contamination were observed. A sample of black-to-grey material was collected for chemical analysis from 4 to 6 feet bgs.

MW-102 was drilled along the paved Shenango Steel Mill access road to characterize upgradient/background soil conditions. Fill, composed of grey-to-brown and black gravelly sand and silt, was encountered to 8 feet bgs. Fill material from 4 to 8 feet bgs had elevated PID readings (up to 95 ppm) and sweet, fuel-like odors. Based on the PID readings and fuel odors, the material was homogenized for laboratory analysis. Soil, composed of gravelly silt to silty gravel, was encountered deeper than 8 feet bgs.

MW-103 was drilled immediately downgradient (south) of the highest portion of the debris landfill, near water-filled pits sampled as SW/SD-101 and SW/SD-102. Fill, similar to that encountered at MW-101 was observed to 8 feet bgs. Black to dark brown organic silt grading downward to grey-brown silt was encountered below the fill. A sample of the black to dark brown organic silt was collected at 8 to 10 feet bgs for off-site laboratory analysis. PID readings were not obtained from the boring.

Oil Shack Area. Soil borings MW-104 through MW-107 were drilled at the oil shack area to characterize subsurface soils and fill. MW-104 was drilled along the southern site boundary to characterize upgradient/background conditions. At MW-104, fill layers composed of coal ash, yellow-to-orange and black sand, and cemented white sand were encountered to 10 feet bgs. Peat (buried marsh deposits) were encountered to approximately 12.5 feet bgs. A grey sandy silt was encountered below the peat. A sample of fill was collected from 6 to 8 feet bgs for laboratory analysis. All PID readings were at background levels.

MW-105 was drilled at the ruins of the boiler plant. Fill, comprised of dark to light brown silty sand, brick and concrete rubble, and blue to white angular sand/slag, was observed to 10 feet bgs. Dark brown to black peat was encountered to approximately 13 feet bgs. Gray silt was encountered below 13 feet bgs. A sample of the blue and white angular material was collected from 8 to 10 feet bgs for laboratory analysis.

MW-106 was drilled between the ruins of blast furnace No. 2 and a two-story brick building where electrical components (transformer cooling fins and insulator debris) were observed on the ground surface. Fill, comprised of black, brown, rusty brown, blue, pinkish white, and chalky sand-like material containing gravel and slag, and ash-like material, was encountered to 15 feet bgs. A sample of pinkish white or tan material was collected from 10 to 12 feet bgs for laboratory analysis. PID readings were not obtained from the boring.

MW-107 was drilled in an open area between the oil shack and the iron ore storage area. Fill, comprised of black, dark brown, and reddish tan ash, sand, gravel, and metallic slag, was observed to approximately 4 feet bgs; peat was encountered from 4 to 10 feet bgs. Blue gray and brown silt and silty clay were observed deeper than 10 feet bgs. A sample of blue gray and brown dense silt was collected from 12 to 14 feet bgs to characterize subsurface soil at this location. PID readings were not obtained from the boring.

3.1.2.2 Monitoring Wells and Groundwater Sampling. The monitoring well installation and groundwater sampling program for the Hanna Furnace site was designed to provide groundwater data for comparison to NYS Class GA groundwater quality standards, set forth under 6 NYCRR Parts 700-705 (NYSDEC, 1991a; NYSDEC, 1993c), and to evaluate if the site poses a significant threat to public health and the environment, as defined by 6 NYCRR Part 375. Additionally, water levels measured from the newly installed wells were used to characterize the direction of groundwater flow at the site. Monitoring wells were installed in the borings as described in Subsection 3.3.

Monitoring Well Installation. A total of seven monitoring wells were installed in the soil borings (MW-101 through MW-107) at the Hanna Furnace site. The following table presents the completed well installation details.

SECTION 3

MONITORING WELL INSTALLATION DETAILS - HANNA FURNACE SITE

MONITORING WELL	TOTAL DEPTH/ DEPTH OF FILL ¹	SCREENED INTERVAL ¹	RATIONALE
MW-101	15/≥ 15	5-15	Located adjacent to the filter cake/flue ash disposal area to determine impact to groundwater quality.
MW-102	15/10.5	5-15	Located northeast of the debris landfill to assess background conditions.
MW-103	15/8	5-15	Located adjacent to the debris landfill to determine impact to groundwater quality.
MW-104	15/10	5-15	Three of these four wells (MW-105, MW-106, MW-107) assess groundwater quality at potential source areas at the oil shack, boiler house, and segregation basins. MW-104 was placed to assess background groundwater quality.
MW-105	15/10	5-15	
MW-106	15/≥ 15	5-15	
MW-107	15/4	5-15	

Notes:

1 feet below ground surface

The monitoring wells were constructed using 2-inch ID, threaded, flush-joint, Schedule 40 polyvinyl chloride (PVC), with 10-foot lengths of 0.006-inch machine-slotted well screens. The well screens were installed with the intent of having the screens placed 2 feet above and 8 feet below the groundwater table. A silica sand filter pack of either 0 or 00-grade was placed around the well screen and extended a minimum of 1 foot above the top of the screen. A bentonite pellet seal was placed above the sand filter pack, saturated with water and allowed to swell before the final bentonite-cement grout was placed. The remaining annular space from the bentonite pellet seal to the ground surface was filled with bentonite-cement grout. Wells were completed with above-ground steel protective casings, locking caps, and protective bucking posts.

Monitoring Well Development. The monitoring wells were developed by the drilling subcontractor under the supervision of ABB-ES personnel by the pump- and surge-technique. Well development purge water was allowed to infiltrate the ground at each well location. Well development was considered complete when turbidity

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measurements were 50 NTUs units or less, when alternative criteria and procedures presented in Subsection 4.7 of the QAPP were met, or when approved by NYSDEC.

Groundwater Sampling. ABB-ES personnel sampled the seven new monitoring wells at the Hanna Furnace site on November 29, 1994. Groundwater sampling activities followed the QC procedures for sample handling, tracking, and shipping presented in Section 5.0 of the QAPP. A minimum of three well volumes were purged from each well with a bailer or peristaltic pump before sampling. Field measurements of the water quality parameters pH, temperature, specific conductivity, turbidity, DO, and salinity were recorded for each volume purged and were recorded on field data records, included in Volume II. Groundwater samples were collected using a Teflon bailer and nylon bailer line (replaced for each well) following the procedures described in Subsection 4.6.1 of the QAPP (ABB-ES, 1994c). Groundwater samples were sent to the analytical laboratory for analysis of TCL VOCs, SVOCs, pesticides/PCBs, and inorganics. The sampling and analysis program is summarized in Table 10. Water quality parameter results are summarized in the following table.

GROUNDWATER QUALITY PARAMETERS - HANNA FURNACE SITE

WELL	TEMPERATURE (°C)	pH	SPECIFIC CONDUCTIVITY (mS/cm)	DO (mg/L)	TURBIDITY (NTUs)	SALINITY (%)
MW-101	11.4	12.3	5.8	1.2	8	0.3
MW-102	11.5	7.5	0.6	1.1	0	0.02
MW-103	10.8	8.9	2.72	0.5	5	0.13
MW-104	11.3	11.3	0.832	0.6	2	0.03
MW-105	12.3	9.5	0.452	0.7	5	0.01
MW-106	10.3	10.6	0.79	1.2	9	0.03
MW-107	10.0	6.7	1.2	3.7	0	0.1

Notes:

°C = degrees centigrade
 mS/cm = milliSiemens per centimeter
 mg/L = milligrams per liter
 NTUs = nephelometric turbidity units
 % = percent

ABB Environmental Services

SECTION 3

Water quality results show groundwater at the site is generally basic (has a pH greater than 7) with the highest groundwater pH in MW-101 adjacent to the filter cake/flue ash disposal area. The pH of groundwater in MW-101 is close to the limit of 12.5 that would classify the groundwater as a caustic hazardous waste. This well also had the highest specific conductivity and salinity.

3.1.3 HRS Score

ABB-ES completed an HRS score of the Hanna Furnace Site based on existing data. The score methodology and results are documented in a separate report titled "Hazard Ranking System Score - Hanna Furnace Site, Buffalo, New York: (ABB-ES, 1995).

3.2 SHENANGO STEEL MILL

The following subsections describe the activities performed during the field investigation portion of the PSA at the Shenango Steel Mill. Locations of samples collected during this PSA are shown on Figure 4. A summary of areas, types of samples collected, and the analytical program is included in Table 12. Field data sheets, including soil sampling records, sump sampling records, boring logs, monitoring well development logs, and groundwater sampling records are presented in Volume II.

3.2.1 Environmental Sampling

Environmental sampling at the Shenango Steel Mill consisted of air monitoring, sump liquid and sediment sampling, and surface soil sampling. The following subsections describe these activities.

3.2.1.1 Air Monitoring. Air monitoring at the Shenango Steel Mill was performed as described in Subsection 3.1.1.2 for the Hanna Furnace site.

3.2.1.2 Sump Liquid and Sediment. ABB-ES personnel collected one liquid/sediment sample pair (CD/CL-109) from the Shenango Steel Mill property during the week of October 10, 1994. CD/CL-109 was collected from a 2.5-foot-diameter, 12.5-foot-deep open catch basin located adjacent to the Shenango Steel Mill building

TABLE 11
SAMPLING AND LABORATORY ANALYSIS SUMMARY - HANNA FURNACE

HANNA FURNACE SITE AND SHENANGO STEEL MILL
PRELIMINARY SITE ASSESSMENT

MEDIA	NUMBER OF SAMPLES	COLLECTION METHOD/LOCATION	ANALYSES
FILTER CAKE/FLUE ASH DISPOSAL AREA AND DEBRIS LANDFILL			
Surface Soil (SS-101 through SS-108)	8	Shovel, stainless-steel spoon and bucket	TCL VOCs, SVOCs, Pesticides/PCBs, and Inorganics; Ignitability, Reactivity, Corrosivity, EPTOX Metals
Subsurface Soil - Test Pits (PS-101 through PS-108)	8	Backhoe bucket, stainless-steel spoon and bucket	TCL VOCs, SVOCs, Pesticides/PCBs, and Inorganics
Subsurface Soil - Soil Borings (BS-101 through BS-103)	3	Split spoon sampler	TCL VOCs, SVOCs, Pesticides/PCBs, and Inorganics
Surface Water/Sediment in Pits (Sample pairs SW/SD-101 and SW/SD-102)	2 Surface Water 2 Sediment	Surface water collected by filling containers directly; Sediment collected with bucket auger.	Surface water: TCL VOCs, SVOCs, Pesticides/PCBs, and Inorganics; also pH, temperature, specific conductivity, salinity, DO, turbidity. Sediment: TCL VOCs, SVOCs, Pesticides/PCBs, and Inorganics; Ignitability, Reactivity, Corrosivity, EPTOX Metals
Groundwater (MW-101 through MW-103)	3	Bailer/peristaltic pump	TCL VOCs, SVOCs, Pesticides/PCBs, and Inorganics, also pH, temperature, specific conductivity, salinity, DO, turbidity.

TABLE 11
SAMPLING AND LABORATORY ANALYSIS SUMMARY - HANNA FURNACE

HANNA FURNACE SITE AND SHENANGO STEEL MILL
PRELIMINARY SITE ASSESSMENT

MEDIA	NUMBER OF SAMPLES	COLLECTION METHOD/LOCATION	ANALYSES
OIL SHACK AREA			
Surface Soil (SS-109 through SS-114)	5	Shovel, stainless-steel spoon/bucket	TCL VOCs, SVOCs, Pesticides/PCBs, and Inorganics; Ignitability, Reactivity, Corrosivity, EPTOX Metals
Sump liquid/sediment sample pairs (CL/CD-101 through CL/CD-108)	8 Liquid samples 8 Sediment samples	Liquid samples collected with bailer, Pack-bomb sampler, or by filling containers directly. Sediment samples collected with bucket auger, stainless-steel spoon, bucket.	Sump liquid: TCL VOCs, SVOCs, Pesticides/PCBs, and Inorganics; also pH, temperature, specific conductivity, salinity, DO, turbidity. One liquid sample (CL-107) analyzed for Ignitability, Reactivity, Corrosivity, EPTOX Metals. Sump sediment: TCL VOCs, SVOCs, Pesticides/PCBs, and Inorganics; Ignitability, Reactivity, Corrosivity, EPTOX Metals.
Drum Samples (WT-101 and WT-102)	2	Stainless-steel spoon	TCL VOCs, SVOCs, Pesticides/PCBs, and Inorganics; Ignitability, Reactivity, Corrosivity, EPTOX Metals.
Subsurface Soil - Soil Borings (BS-104 through BS-107)	4	Split-spoon sampler	TCL VOCs, SVOCs, Pesticides/PCBs, and Inorganics
Groundwater (MW-104 through MW-107)	4	Bailer/peristaltic pump	TCL VOCs, SVOCs, Pesticides/PCBs, and Inorganics; also pH, temperature, specific conductivity, salinity, DO, turbidity.

TABLE 11
SAMPLING AND LABORATORY ANALYSIS SUMMARY - HANNA FURNACE

HANNA FURNACE SITE AND SHENANGO STEEL MILL
PRELIMINARY SITE ASSESSMENT

MEDIA	NUMBER OF SAMPLES	COLLECTION METHOD/LOCATION	ANALYSES
UNION SHIP CANAL			
Surface Water (SW-103 through SW-107)	5	Pack-bomb sampler or by filling containers directly	TCL VOCs, SVOCs, Pesticides/PCBs, and Inorganics; also pH, temperature, specific conductivity, salinity, DO, turbidity.
Sediment (SD-103, SD-104, SD-107 collected from canal, SD-105 collected from oil/water separator)	4	Bucket auger, stainless steel	TCL VOCs, SVOCs, Pesticides/PCBs, and Inorganics; Ignitability, Reactivity, Corrosivity, EPTOX Metals.

Notes:

TCL	=	Target Compound List
VOC	=	volatile organic compound
SVOC	=	semivolatile organic compound
PCB	=	polychlorinated biphenyl
EPTOX	=	Extraction Procedure Toxicity
DO	=	dissolved oxygen

TABLE 12
SAMPLING AND LABORATORY ANALYSIS SUMMARY - SHENANGO STEEL MILL

HANNA FURNACE SITE AND SHENANGO STEEL MILL
PRELIMINARY SITE ASSESSMENT

MEDIA	NUMBER OF SAMPLES	COLLECTION METHOD/LOCATION	ANALYSES
Surface Soil (SS-115 through SS-125)	11	Shovel, stainless-steel spoon, bucket	TCL VOCs, SVOCs, Pesticides/PCBs, and Inorganics; Ignitability, Reactivity, Corrosivity, EPTOX Metals.
Sump liquid/sediment sample pair (CL/CD-109)	1 Sump liquid sample 1 Sump sediment sample	Liquid - pack-bomb sampler. Sediment - bucket auger, stainless-steel spoon and bucket.	Sump liquid: TCL VOCs, SVOCs, Pesticides/PCBs, and Inorganics. Sump sediment: TCL VOCs, SVOCs, Pesticides/PCBs, and Inorganics; Ignitability, Reactivity, Corrosivity, EPTOX Metals
Subsurface soil - soil borings (BS-108 through BS-110)	3	Split-spoon sampler	TCL VOCs, SVOCs, Pesticides/PCBs, and Inorganics.
Groundwater (MW-108 through MW-110)	3	Bailer/peristaltic pump	TCL VOCs, SVOCs, Pesticides/PCBs, and Inorganics; also pH, temperature, specific conductivity, salinity, DO, turbidity.

Notes.

TCL	=	Target Compound List
VOC	=	volatile organic compound
SVOC	=	semivolatile organic compound
PCB	=	polychlorinated biphenyl
EPTOX	=	Extraction Procedure Toxicity
DO	=	dissolved oxygen

4.0 SITE ASSESSMENT

This section describes the geology and hydrogeology of the site, and presents the laboratory analytical results and a contamination assessment summary for the Hanna Furnace site and the Shenango Steel Mill.

4.1 GEOLOGY AND HYDROGEOLOGY

The geology and hydrogeology of the Hanna Furnace site and Shenango Steel Mill are discussed in this subsection.

4.1.1 Geology

The Hanna Furnace site and Shenango Steel Mill are located in the Erie-Ontario Lowlands physiographic province of NYS in the City of Buffalo. Overburden is mapped as lacustrine silt and clay (USGS, 1983). Seven test borings completed at the Hanna Furnace site by USGS encountered fill from the ground surface to 13 feet bgs. The fill consists of industrial waste (i.e., fly ash, cinders, etc.), fine-to-coarse sand and brown silty clay. Underlying the fill are a black-brown organic clayey silt (USCS Class OL) and a lacustrine grey-brown clay to silty clay (USCS Class CL). A discontinuous layer of sand and/or gravel is located between the lacustrine silt and bedrock.

Bedrock at the site is the Middle Devonian, Levanna Shale member of the Skaneateles Formation, Hamilton Group (Recra, 1988; Rickard and Fisher, 1970). The Levanna Shale overlies the Marcellus Formation and the Onondaga Limestone. Bedrock ranges from 22 to 48 feet bgs, based on results of soil borings completed during a previous site assessment (Recra, 1988).

During the Hanna Furnace site and Shenango Steel Mill PSA, 10 soil borings and eight test pit explorations were completed to further define the geology. The newly-installed soil borings were advanced up to 23 feet bgs. All of the borings either terminated in fill material or lacustrine silt. Generally, the fill materials were encountered 8 to 15 feet bgs and consist of gravel, sand, demolition debris, bricks,

ash and slag material. Below the fill is a discontinuous peat deposit (USCS Class Pt) overlying a gray brown lacustrine silt (USCS Class ML).

4.1.2 Groundwater Hydrology

Groundwater is present in fill, overburden, and bedrock at the sites. The depth to the water table (groundwater in fill) is approximately 5 feet bgs (Erie County Department of Environment and Planning [ECDEP], 1982; Recra, 1988). A previous investigation at the Hanna Furnace site shows groundwater in fill and overburden flows toward the Union Ship Canal which bisects the site (Recra, 1998). This investigation used measurements from seven monitoring wells and the Union Ship Canal to characterize the direction and characteristics of groundwater flow. Groundwater seepage velocities in the vicinity of the Union Ship Canal were estimated to be between 0.0017 to 0.93 feet per day based on an estimated average porosity of 0.35, a hydraulic gradient of 0.013 to 0.046 feet per foot, and hydraulic conductivities of 1.6×10^{-3} to 2.5×10^{-3} centimeters per second (cm/sec).

An interpretation of groundwater flow conditions at the Hanna Furnace site and Shenango Steel Mill in the PSA is based upon water level observations obtained on November 29, 1994 from the 10 new monitoring wells and survey data from the Union Ship Canal. Water level observations are presented in the following table and on Figure 4 in feet above mean sea level (msl). Monitoring wells were placed in the PSA to confirm groundwater conditions described in the previous investigation. At the oil shack area, monitoring wells MW-104, MW-105, and MW-106 were placed roughly in a line extending from the Hanna Furnace site southern boundary toward the Union Ship Canal. MW-108, MW-109, and MW-110 were placed similarly in a rough line from the eastern boundary of the Shenango Steel Mill towards the canal.

WATER LEVEL DATA

MONITORING WELL	RISER ELEVATION	DEPTH TO WATER ¹	WATER ELEVATION
HANNA FURNACE SITE			
MW-101	585.17	6.73	578.44
MW-102	582.98	6.35	576.63
MW-103	582.56	4.35	578.21
MW-104	586.90	8.71	578.19
MW-105	586.03	7.79	578.24
MW-106	585.67	7.37	578.30
MW-107	582.09	5.60	576.49
SW-104	N/A	N/A	571.60
SHERANGO STEEL MILL			
MW-108	584.88	6.07	578.81
MW-109	587.60	7.80	579.8
MW-110	587.38	8.05	579.33

Notes:

¹ measured in feet below top of riser

N/A not applicable

The groundwater table is encountered in the monitoring wells at between 576.49 and 579.8 feet msl, and the water level in the canal is approximately 571.6 msl. The water levels show that groundwater is present in fill at both the Hanna Furnace site and the Shenango Steel Mill. Where wells had been installed at the oil shack area of the Hanna Furnace site and the Shenango Steel Mill in lines toward the canal, water levels do not show consistent decreases in elevation. For example, in the MW-108/MW-109/MW-110 line, MW-108 has the lowest water level and is located the furthest from the canal. Similarly, at line MW-104/MW-105/MW-106, water levels decrease with distance away from the canal. The data suggest that groundwater flow in the fill overburden is perched over the underlying peat and

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lacustrine silt deposits. Groundwater elevations are potentially higher in the vicinity of the Hanna Furnace and Shenango Steel Mill building ruins due to restricted flow in these areas caused by the building foundations (which extend below the water table) and/or increased infiltration of precipitation. The data also suggest groundwater not only flows toward the canal, but may flow towards topographically lower areas surrounding the sites such as the wetland areas located to the north and east.

4.2 ANALYTICAL RESULTS AND CONTAMINATION ASSESSMENT SUMMARY - HANNA FURNACE SITE

The following subsections summarize the analytical results and contamination assessment of the PSA activities performed by ABB-ES for the Hanna Furnace site. The subsections present the analytical results by site area as follows: filter cake/Flue ash disposal area and debris landfill (Subsection 4.2.1); oil shack area (Subsection 4.2.2); and the Union Ship Canal (Subsection 4.2.3). The complete analytical data tables, data validation information, and data usability evaluation are presented in Volume II. Surface soil and subsurface soil results of inorganic analyses are compared to NYS background and background for the eastern U.S. (Table 13).

4.2.1 Filter Cake/Flue Ash Disposal Area and Debris Landfill

The filter cake/flue ash disposal area and debris landfill are located on the north side of the Union Ship Canal. Environmental sampling consisted of collection of surface soil and subsurface soil samples to characterize wastes and fill materials, collection of surface water and sediment samples from water-filled pits adjacent to the landfill, and collection of groundwater samples to characterize groundwater quality.

4.2.1.1 Surface Soil Analytical Results. Four surface soil samples (SS-101 through SS-104) and a duplicate were collected from four locations in the filter cake/flue ash disposal area, and from four locations (SS-105 through SS-108) along the edges of the debris landfill (see Figure 7). Surface soil samples were analyzed for TCL VOCs, SVOCs, pesticides/PCBs, and inorganics; EPTOX metals; and ignitability, corrosivity, and reactivity. Results of surface soil samples are presented in Table 14.

Surface soil PCB, TCL inorganics, and EPTOX metals results are summarized in Figure 7.

Tetrachloroethene (PCE) was detected in surface soil samples SS-101 (and duplicate) through SS-106 at concentrations ranging from 3 micrograms per kilogram ($\mu\text{g}/\text{kg}$) to 14 $\mu\text{g}/\text{kg}$. Ethylbenzene was detected in SS-108 at 21 $\mu\text{g}/\text{kg}$. Several TCL SVOCs were detected in samples SS-101 (and duplicate), SS-102, and SS-104 through SS-108 including naphtha compounds (such as 2-methylnaphthalene) and PAHs (such as benzo(a)pyrene). Naphtha compounds were only detected in the SS-101 duplicate. The highest concentrations of PAHs were detected in SS-105 and SS-106 collected from the debris landfill.

The PCB Aroclor-1260 was detected in every surface soil sample from the filter cake/flue ash disposal area and the debris landfill, at concentrations ranging from 18 to 3101 $\mu\text{g}/\text{kg}$ (See Figure 6). The TCL pesticides detected in samples SS-101, SS-105, SS-106, and SS-108 are 4,4'-DDE; endosulfan I; heptachlor; and methoxychlor (see Table 13). Pesticides were not detected in samples SS-101 duplicate, SS-102, SS-103, SS-104, and SS-107.

Twenty-three TCL inorganic analytes were detected in the surface soil samples collected from the filter cake/flue ash disposal area and the debris landfill (see Table 14). Inorganic data were compared to literature values for background concentrations of inorganics found in soil of NYS and the eastern U.S. (Table 13). The inorganics antimony, thallium, and cyanide do not have established NYS or eastern U.S. background ranges, although these inorganics were detected in most of the surface soil samples. The following inorganics are present in surface soil at concentrations exceeding NYS background levels: arsenic; beryllium; cadmium; calcium; chromium; copper; iron; lead; manganese; magnesium; mercury; nickel; selenium; vanadium; and zinc. Of these inorganics, the following exceed background levels for the eastern U.S.: iron, lead, manganese, and zinc. In general, the inorganics cadmium, chromium, copper, iron, lead, nickel, selenium, vanadium, and zinc are present in samples from the filter cake/flue ash disposal area at higher concentrations than in samples from the debris landfill area.

Surface soil EPTOX metals analyses show concentrations of arsenic (at 52 micrograms per liter [$\mu\text{g}/\text{L}$] in one sample), cadmium (up to 1441 $\mu\text{g}/\text{L}$), chromium (up to 8.41 $\mu\text{g}/\text{L}$), lead (up to 1,6301 $\mu\text{g}/\text{L}$), and silver (up to 6.11 $\mu\text{g}/\text{L}$).

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Concentrations are less than regulatory limits for characteristic hazardous waste (see Table 10). Samples were not determined to be ignitable, reactive, or corrosive.

4.2.1.2 Subsurface Soil Analytical Results. Subsurface soil samples PS-101 through PS-108 were collected from eight test pit excavations (TP-101 through TP-108) from 5 to 11 feet bgs to characterize debris landfill material. Subsurface soil samples BS-101 through BS-103 were collected from three soil borings (MW-101 through MW-103). Soil boring MW-102 was drilled to characterize background soil conditions and is located off the Hanna Furnace site at the western corner of the adjacent Shenango Steel Mill property. As described in Subsection 3.3.1, conditions encountered during drilling of MW-102 (fuel odors and PID readings greater than background) suggest this boring may not represent background as originally intended. Subsurface soil was collected from soil borings MW-101 and MW-103 to characterize fill material adjacent to the filter cake/fly ash disposal area and the debris landfill, respectively. All subsurface soil samples were analyzed for TCL VOCs, SVOCs, pesticides/PCBs, and inorganics. Subsurface soil sample analytical results are presented in Table 15 (test pit samples) and Table 16 (soil boring samples), and analytical results are summarized in Figure 8.

Test Pit Sample Results. The TCL VOCs acetone (up to 6J $\mu\text{g/kg}$), benzene (up to 2J $\mu\text{g/kg}$), carbon disulfide (up to 2J $\mu\text{g/kg}$), ethylbenzene (up to 3J $\mu\text{g/kg}$), toluene (up to 2J $\mu\text{g/kg}$), and xylenes (up to 2J $\mu\text{g/kg}$) were detected sporadically in the test pit samples (see Table 15). Nineteen TCL SVOCs were detected in the test pit samples, with the highest concentrations and numbers of SVOCs in samples PS-104 and PS-104 duplicate. The SVOCs detected include naphtha compounds (such as 2-methylnaphthalene), PAHs, and phthalates.

The PCBs Aroclor-1248 and Aroclor-1260 were detected in test pit samples PS-101, PS-102, PS-103, PS-105, PS-106, and PS-107, at concentrations ranging from 68J $\mu\text{g/kg}$ to 260 $\mu\text{g/kg}$ (See Figure 8). The only TCL pesticide detected was endrin ketone in samples PS-103 and PS-105, at concentrations up to 7.8J $\mu\text{g/kg}$ (Table 15).

Twenty TCL inorganic analytes were detected in the test pit samples collected from the debris landfill. The following inorganics are present in debris landfill material at concentrations exceeding NYS background levels: beryllium, cadmium, calcium, chromium, copper, iron, lead, manganese, magnesium, mercury, nickel, vanadium,

and zinc (see Figure 8). Of these inorganics, the following exceed background levels for the eastern U.S.: iron and lead.

Soil Boring Sample Results. The TCL VOCs acetone (100J $\mu\text{g/kg}$) and 2-butanone (23J $\mu\text{g/kg}$) were detected in sample BS-103, and ethylbenzene (2J $\mu\text{g/kg}$) was detected in sample BS-102 (see Table 15). No VOCs were detected in sample BS-101 (see Table 16). Fifteen TCL SVOCs were detected in the soil boring samples with the highest concentrations and number of SVOCs in sample BS-102. The SVOCs detected are PAHs and naphtha compounds, similar to those in test pit samples. No TCL pesticides/PCBs were detected in soil boring samples at the filter cake/flue ash disposal area or the debris landfill.

Twenty-one TCL inorganic analytes were detected in the soil boring samples collected from the filter cake/flue ash disposal area and debris landfill (see Table 16). The following inorganics are present in soil boring samples at concentrations exceeding NYS background levels: aluminum, arsenic, beryllium, cadmium, calcium, chromium, copper, iron, lead, magnesium, manganese, nickel, potassium, vanadium, and zinc (see Figure 8). Of these inorganics, the following exceed background levels for the eastern U.S.: aluminum, lead, manganese, potassium, and zinc.

4.2.1.3 Surface Water/Sediment Analytical Results. Two surface water/sediment sample pairs (SW/SD-101 and SW/SD-102) and a duplicate were collected from two open, water-filled pits at the southern limit of the debris landfill. The samples were collected to assess the nature and distribution of contaminants potentially migrating from the landfill via surface runoff or shallow groundwater movement. Several similar water-filled pits were observed in the landfill itself, and along the southern limit. Surface water and sediment samples were analyzed for TCL VOCs, SVOCs, pesticides/PCBs, and inorganics. Sediment samples were also analyzed for EPTOX metals and ignitability, corrosivity, and reactivity. Surface water results and sediment results are presented in Tables 17 and 18, respectively. Sample locations and interpretive analytical results are summarized in Figures 9 (surface water) and 7 (sediment).

Surface Water Results. The only TCL VOC detected in the surface water samples was acetone (see Table 17). TCL SVOCs, pesticides, and PCBs were not detected in the samples. TCL inorganics detected in the samples were aluminum, arsenic,

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barium, calcium, copper, lead, magnesium, potassium, sodium, and zinc. Surface water results were compared to NYS Class C surface water quality standards and guidelines to assess whether concentrations in these pits pose a potential significant threat to human health or the environment. The following analytes were detected at concentrations exceeding Class C standards or guidelines:

- Acetone (at up to 21J $\mu\text{g/L}$ in SW-102 and duplicate) exceeds the NYS Class C standard of 10 $\mu\text{g/L}$.
- Aluminum (at 148J $\mu\text{g/L}$ in SW-101 and 225J $\mu\text{g/L}$ in SW-102 duplicate) exceeds the NYS Class C standard of 100 $\mu\text{g/L}$.
- Lead (at 14.8J $\mu\text{g/L}$ in SW-102 and 26.4J $\mu\text{g/L}$ in SW-102 duplicate), exceeds the calculated NYS Class C standard of 13.5 $\mu\text{g/L}$ (based on average hardness).
- pH (at 9.5 in SW-101 and 9.02 in SW-102) exceeds the NYS Class C standard of 8.5.

PCBs (Aroclor-1254 and Aroclor-1248) were detected in earlier surface water sampling in the low area (referred to as a "pond") near where SW-101 and SW-102 were collected (see Table 7) at concentrations exceeding the NYS Class C standard of 0.1 $\mu\text{g/L}$. ABB-ES was unable to collect surface water samples from this "pond" area during the PSA because it was dry. Instead, ABB-ES collected two samples (SW-101 and SW-102) from water-filled pits located along the base of the landfill, east of the "pond" area. A determination of whether PCBs are present in surface water from these pits is uncertain because the rinsate sample associated with the surface water samples contained detectable concentrations of PCBs (see Volume II, Section 5.0). However, the sediment samples, SD-101 and SD-102, collected from these pits were non-detect for PCBs.

Sediment Results. TCL VOCs, pesticides, and PCBs were not detected in the sediment samples. Fifteen TCL SVOCs were detected in samples SD-101, SD-102, and SD-102 duplicate, including naphtha compounds and PAHs (see Table 18). The highest concentrations and numbers of PAHs were detected in SD-102.

Twenty-one TCL inorganic analytes were detected in the sediment samples (see Table 18). Because the material was sampled from pits (e.g. holes) in the ground immediately adjacent to the landfill, and because the sediment visually appears to be the same as surface soil and fill at this part of the site, sediment inorganic data were compared to NYS and eastern U.S. background concentrations for soil (Table 13). The following inorganics are present in sediment at concentrations exceeding NYS soil background levels: arsenic; cadmium; calcium; chromium; copper; iron; lead; magnesium; mercury; nickel; and zinc (see Figure 7). Of these inorganics, the following exceed background levels for the eastern U.S.: iron and lead.

Sediment EPTOX metals analyses show leachable concentrations of barium (up to 549 $\mu\text{g/L}$), cadmium (up to 2.6J $\mu\text{g/L}$), chromium (up to 6.7J $\mu\text{g/L}$), and lead (up to 189J $\mu\text{g/L}$). Concentrations are less than regulatory limits for characteristic hazardous waste (see Table 10). Samples were not determined to be ignitable, reactive, or corrosive.

4.2.1.4 Groundwater Analytical Results. Monitoring well MW-102 was sampled to assess background groundwater conditions at a location believed to be hydraulically upgradient of the debris landfill. As described in Subsection 3.1.2, conditions encountered during drilling of MW-102 (fuel odors and above background PID meter readings) may not represent background. MW-101 and MW-103 were installed at locations believed to be downgradient of the filter cake/flue ash disposal area and the debris landfill, respectively, to assess whether potential contamination identified in soil/fill materials was affecting groundwater quality. Results from groundwater samples were compared to NYS Class GA groundwater quality standards and guidelines to assess whether groundwater would pose a potential significant threat to human health or the environment. Groundwater analytical results are presented in Table 19 and Figure 9.

TCL VOCs and pesticides/PCBs were not detected in groundwater samples MW-101, MW-101 duplicate, samples MW-102 or MW-103. TCL SVOCs were not detected in MW-102 and MW-103. TCL SVOCs detected in sample MW-101 and duplicate were 2,4-dimethylphenol; 4-methylphenol; pentachlorophenol; naphthalene; and bis(2-ethylhexyl)phthalate (BEHP). TCL inorganics detected in the samples were aluminum, arsenic, barium, calcium, chromium, cyanide, iron, lead, magnesium, manganese, potassium, selenium, sodium, vanadium, and zinc. Of all of the analytes detected in groundwater from samples MW-101, MW-102, and MW-103, the

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following analytes were detected at concentrations exceeding NYS Class GA groundwater quality standards or guidelines:

- Phenols (2,4-dimethylphenol; 4-methylphenol; and pentachlorophenol) in MW-101 and MW-101 duplicate exceed the NYS Class GA standard of 1 $\mu\text{g/L}$ (total phenols).
- Cyanide (in MW-101 and MW-101 duplicate at up to 3,090 $\mu\text{g/L}$) exceeds the NYS Class GA standard of 100 $\mu\text{g/L}$.
- Iron (in MW-101, MW-101 duplicate, MW-102, and MW-103 at up to 1,730 $\mu\text{g/L}$) exceeds the NYS Class GA groundwater quality standard of 300 $\mu\text{g/L}$.
- Manganese (1,220 $\mu\text{g/L}$ in MW-102) exceeds the NYS Class GA standard of 300 $\mu\text{g/L}$.
- The total concentration of iron and manganese in MW-101, MW-101 duplicate, MW-102, and MW-103 exceeds the combined NYS Class GA groundwater quality standard of 500 $\mu\text{g/L}$.
- Selenium (in MW-101 duplicate at 12.21 $\mu\text{g/L}$) exceeds the NYS Class GA groundwater quality standard of 10.0 $\mu\text{g/L}$.
- Sodium (in MW-101, MW-101 duplicate, and MW-103 at up to 191,000 $\mu\text{g/L}$) exceeds the NYS Class GA groundwater quality standard of 20,000 $\mu\text{g/L}$.
- pH (in 12.3 in MW-101 and 8.9 in MW-103) exceeds the NYS Class GA groundwater quality standard of 8.5.

4.2.1.5 Contamination Assessment Summary. The objectives of the PSA at the filter cake/flue ash disposal area and the debris landfill were to: (1) assess whether the filter cake/flue ash material was a characteristic hazardous waste and confirm previous analytical results; (2) characterize the contents of the debris landfill and assess whether the material was a characteristic hazardous waste or contained listed

waste; (3) characterize groundwater and surface water; and (4) assess whether the area posed a potential significant threat to human health or the environment.

Previous investigations (see Subsection 2.3.1) showed the following:

- Surface water ponded in a low area between the debris landfill and the filter cake/flue ash disposal area exceeded NYS Class C surface water criteria for iron, phenols, and cyanide (Rupley, Bahler, and Blake, 1979a,b,c).
- Subsurface soil (fill) exceeded NYS soil background levels for chromium, copper, iron, and lead (USGS, 1983).
- Surface soil (fill) exceeded NYS soil background levels for chromium, copper, and lead. The samples also contained PCBs, oil and grease, cyanides, and phenols. A composite soil sample analyzed for EPTOX metals from the filter cake/flue ash disposal area contained leachable concentrations of barium, cadmium, and lead, but all at less than regulatory limits for characteristic hazardous waste (Recra, 1988).
- Surface soil (fill) exceeded NYS soil background levels for arsenic, barium, cadmium, chromium, copper, lead, mercury, nickel, and selenium (NYSDEC, 1994d).

The PSA investigation of the debris landfill showed that the landfill is comprised of fine-grained slag and other solid waste from blast furnace operations. The geophysical survey and test pitting did not detect any buried ferrous materials. PSA laboratory analysis of surface and subsurface samples from the filter cake/flue ash disposal area and debris landfill detected organic and inorganic contaminants including SVOCs (naphtha compounds, phenols, and PAHs), PCBs, and inorganics (see Tables 14 through 16). Inorganics detected at concentrations exceeding NYS background in PSA samples are arsenic, beryllium, cadmium, calcium, chromium, copper, iron, lead, manganese, magnesium, mercury, nickel, selenium, vanadium, and zinc. EPTOX metals and ignitability, corrosivity, and reactivity test results do not indicate that characteristic hazardous wastes are at the filter cake/flue ash disposal area and debris landfill. In addition, PCB concentrations in soil/fill, and the pH of groundwater samples are less than hazardous waste regulatory criteria. The source

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of the PCBs in surface soil samples has not been defined. The source of the alkaline pH (12.3 in MW-101) is believed to be interaction of the groundwater with the fill and/or filter cake/flue ash.

The filter cake/flue ash disposal area and the debris landfill may pose a potential threat to human health and the environment as: (1) groundwater analyses show several inorganic constituents (cyanide, iron, selenium, and sodium), phenols (2,4-dimethylphenol; 4-methylphenol; and pentachlorophenol), and pH in groundwater to exceed NYS Class GA groundwater quality standards; and (2) surface water analytical results from pits adjacent to the debris landfill show acetone, aluminum, and zinc concentrations to exceed Class C surface water quality standards. Additional Class C exceedances for phenols and inorganics are observed in the surface water sample (SW-106) collected from the edge of the Union Ship Canal adjacent to the filter cake/flue ash disposal area (see Subsection 4.2.3.1).

4.2.2 Oil Shack Area

The oil shack area is located on the south side of the Union Ship Canal and is composed of all of the former buildings, blast furnaces, and open areas surrounding the oil shack. Environmental sampling consisted of collection of wastes found in two drums, eight liquid/sediment sample pairs from underground structures and abandoned equipment, surface soil and subsurface soil samples to characterize soil and fill materials, and groundwater samples to characterize groundwater quality.

4.2.2.1 Drum, Sump Liquid, and Sump Sediment Analytical Results. Drum, sump sediment, and sump liquid sample results are presented in Tables 20, 21, and 22, and interpretive results are summarized in Figures 10 and 11. All samples were analyzed for TCL VOCs, SVOCs, pesticides/PCBs, and inorganics. All drum and sump sediment samples, and sump liquid sample CL-107, were analyzed for EPTOX metals, ignitability, reactivity, and corrosivity.

Drum Sample Results. Samples from two drums (WT-101 and WT-102) were collected for laboratory analysis (see Table 20). Sample WT-101 (and duplicate) was actually collected from material that had flowed out of the drum and collected around the base of the drum on surface soil. The drum itself could not be sampled directly as the opening was too narrow for available sampling equipment. WT-102

was collected from a second drum nearby found lying on its side, open, and full of a viscous, brown, grease-like semisolid.

The TCL VOCs ethylbenzene (up to 170J $\mu\text{g/kg}$), toluene (up to 510J $\mu\text{g/kg}$), and xylenes (up to 3,000J $\mu\text{g/kg}$) were detected in WT-101 and duplicate (see Table 20). TCL VOCs were not detected in WT-102. TCL SVOCs were not detected in WT-101 and duplicate. The TCL SVOCs fluorene (1,400J $\mu\text{g/kg}$) and phenanthrene (8,700J $\mu\text{g/kg}$) were detected in sample WT-102. Endrin (160J $\mu\text{g/kg}$) was the only pesticide detected in the drum samples. PCBs were not detected. Twenty-two TCL inorganic analytes were detected in the drum samples collected from the oil shack area (see Table 20).

Drum sample EPTOX metals analyses show leachable concentrations of arsenic (up to 75J $\mu\text{g/L}$), barium (up to 431J $\mu\text{g/L}$), and lead (up to 1,380J $\mu\text{g/L}$) (see Figure 10). Concentrations are less than regulatory limits for characteristic hazardous waste (see Table 10). Samples were not determined to be ignitable, reactive, or corrosive.

Sump Liquid Sample Results. Eight sump liquid samples (CL-101 through CL-108) and one duplicate were collected from the oil shack area for laboratory analysis (see Table 21). TCL VOCs, pesticides, and PCBs were not detected in any of the sump liquid samples. Seven TCL SVOCs detected in the samples were: isophorone, phenanthrene, fluoranthene, pyrene, benzo(a)anthracene, chrysene, and diethylphthalate. Twenty-one TCL inorganic analytes were detected in the sump liquid samples collected from the oil shack area (see Table 21). In general, the samples with the highest concentrations and numbers of inorganics are CL-101 and its duplicate.

Sump liquid sample EPTOX metals analysis on CL-107 shows a leachable concentration of barium (22.8J $\mu\text{g/L}$). Concentrations are less than regulatory limits for characteristic hazardous waste. The liquid sample CL-107 was not determined to be ignitable, reactive, or corrosive, although the pH of the liquid was measured to be 12.3.

Sump Sediment Sample Results. Eight sump sediment samples (CD-101 through CD-108) and one duplicate were collected from the oil shack area for laboratory analysis (see Table 22). The TCL VOC ethylbenzene was detected in CD-105 at

4J $\mu\text{g}/\text{kg}$. TCL VOCs were not detected in any of the other sump sediment samples. Twenty-two TCL SVOCs were detected in the sump sediment samples, with the highest concentrations and numbers of SVOCs in CD-101 and CD-101 duplicate, CD-104, CD-105, and CD-106. The SVOCs detected include naphtha compounds (such as 2-methylnaphthalene), PAHs, and phthalates. The TCL pesticides detected in sump sediment samples were 4,4'-DDT; aldrin; endosulfan I; endrin; endrin ketone; heptachlor epoxide; and gamma-chlordane. Twenty-two TCL inorganic analytes were detected in the sump sediment samples.

Sump sediment sample EPTOX metals analyses show leachable concentrations of barium (up to 1,480 $\mu\text{g}/\text{L}$), cadmium (up to 10.2J $\mu\text{g}/\text{L}$), chromium (up to 15.5J $\mu\text{g}/\text{L}$), lead (up to 714 $\mu\text{g}/\text{L}$), and mercury (0.33J $\mu\text{g}/\text{L}$) (see Figure 10). Concentrations are less than regulatory limits for characteristic hazardous waste (see Table 10). Samples were not determined to be ignitable, reactive, or corrosive.

4.2.2.2 Surface Soil Analytical Results. Six surface soil samples (SS-109 through SS-114) and a duplicate were collected from locations in the oil shack area (see Figure 12). Surface soil samples were analyzed for TCL VOCs, SVOCs pesticides/PCBs, and inorganics, and EPTOX metals, and ignitability, corrosivity, and reactivity. Results of surface soil samples are presented in Table 23.

The TCL VOC toluene was detected in one sample (in SS-111 duplicate at 2J $\mu\text{g}/\text{kg}$). No other VOCs were detected. Twenty-one TCL SVOCs were detected, including naphtha compounds (such as 2-methylnaphthalene) and PAHs. Samples with the highest concentrations of SVOCs are SS-109 (from the boiler plant ruins) and SS-113 (from near the oil shack building).

The PCB Aroclor-1260 was detected in five of the six surface soil samples at the oil shack area at concentrations ranging from 15J $\mu\text{g}/\text{kg}$ to 270J $\mu\text{g}/\text{kg}$. TCL pesticides detected in samples SS-111, SS-111 duplicate, and SS-112 were 4,4'-DDE; dieldrin; and endosulfan II. Pesticides were not detected in samples SS-109, SS-110, SS-113, and SS-114. Twenty-one TCL inorganic analytes were detected in the surface soil samples. The following inorganics are present in surface soil at concentrations exceeding NYS background levels: aluminum, arsenic, beryllium, cadmium, calcium, chromium, copper, iron, lead, magnesium, manganese, mercury, nickel, selenium, vanadium, and zinc (see Figure 12). Of these inorganics, aluminum, copper, iron, lead, manganese, mercury, and zinc also exceed background level for the eastern U.S.

Surface soil EPTOX metals analyses show leachable concentrations of barium (up to 724J $\mu\text{g/L}$), cadmium (up to 122 $\mu\text{g/L}$), chromium (up to 10.5J $\mu\text{g/L}$), lead (up to 809J $\mu\text{g/L}$), and silver (up to 13.3J $\mu\text{g/L}$) (see Figure 12). Concentrations are less than regulatory limits for characteristic hazardous waste (see Table 10). Samples were not determined to be ignitable, reactive, or corrosive.

4.2.2.3 Subsurface Soil Analytical Results. Subsurface soil samples were collected from four soil borings, MW-104 through MW-107, to confirm the nature and distribution of PCB contamination at the oil shack area. MW-104 was designed to characterize background subsurface soil conditions. However, materials encountered during drilling (fill) do not represent background. Subsurface soil samples were collected from 8 to 14 feet bgs. All subsurface soil samples were analyzed for TCL VOCs, SVOCs, pesticides/PCBs, and inorganics. Subsurface soil sample analytical results are presented in Table 24, and analytical results are summarized in Figure 12.

The TCL VOC 2-butanone was detected in one sample (at 18J $\mu\text{g/kg}$ in sample BS-105). No TCL SVOCs or pesticides/PCBs were detected. Nineteen TCL inorganic analytes were detected in the subsurface soil samples. The following inorganics are present in subsurface soil at concentrations exceeding NYS background levels: aluminum, arsenic, beryllium, calcium, copper, iron, lead, magnesium, nickel, selenium, and zinc (see Figure 12). Of these inorganics, the following exceed background levels for the eastern U.S.: aluminum; beryllium; and selenium.

4.2.2.4 Groundwater Analytical Results. Monitoring well MW-104 was sampled to assess background groundwater conditions along the southern Hanna Furnace site boundary. As MW-104 was installed in fill similar to that encountered at other monitoring wells installed in this part of the Hanna Furnace site, it is likely that MW-104 does not adequately represent background conditions. MW-105 through MW-107 were installed to assess whether potential contamination identified in soil and the sumps was impacting groundwater quality. All samples were analyzed for TCL VOCs, SVOCs, pesticides/PCBs, and inorganics. Results from groundwater samples were compared to NYS Class GA groundwater quality standards and guidelines to assess whether groundwater would pose a potential significant threat to human health or the environment. Groundwater analytical results are presented in Table 25 and Figure 13.

Oil Shack Area Groundwater Quality. TCL VOCs, SVOCs, and pesticides/PCBs were not detected in MW-104, MW-105, MW-106, or MW-107. TCL inorganics detected in the samples were aluminum, barium, calcium, cyanide, iron, lead, magnesium, manganese, potassium, selenium, silver, sodium, and zinc.

The following analytes were detected at concentrations exceeding NYS Class GA groundwater quality standards or guidelines:

- Cyanide (in MW-104 at 240 $\mu\text{g/L}$ and in MW-106 at 190 $\mu\text{g/L}$) exceeds the NYS Class GA standard of 100 $\mu\text{g/L}$.
- Iron (in MW-106 at 836 $\mu\text{g/L}$) exceeds the NYS Class GA standard of 300 $\mu\text{g/L}$.
- Magnesium (in MW-107 at 46,800 $\mu\text{g/L}$) exceeds the NYS Class GA guidance value of 35,000 $\mu\text{g/L}$.
- Manganese (in MW-107 at 371 $\mu\text{g/L}$) exceeds the NYS Class GA standard of 300 $\mu\text{g/L}$.
- The total concentration of iron and manganese (in MW-106 and MW-107) exceeds the NYS Class GA standard of 500 $\mu\text{g/L}$.
- Sodium (in all wells at up to 45,100 $\mu\text{g/L}$) exceeds the NYS Class GA standard of 20,000 $\mu\text{g/L}$.
- pH (in MW-104 at 11.3; in MW-105 at 9.57; and in MW-106 at 10.6) exceeds the NYS Class GA standard of 8.5.

4.2.2.5 Contamination Assessment Summary. The objectives of the PSA at the oil shack area were to: (1) confirm results of previous investigations; (2) assess whether discrete soil sampling locations would meet the definition of listed hazardous waste due to leachable lead concentrations; (3) characterize the contents of abandoned utility structures and equipment; (4) assess the contents of isolated drums disposed on-site; and (5) characterize groundwater.

Results of previous investigations (see Subsection 2.3) showed the following:

- Surface soil (fill) at the oil shack area exceeded NYS soil background for arsenic, chromium, copper, and lead. The materials sampled also contained PCBs, phenols, and oil and grease. A composite sample analyzed for EPTOX metals showed leachable concentrations of lead at 3.3 mg/L, close to but not exceeding the regulatory limit for lead of 5 mg/L (Recra, 1988).
- Surface soil was shown to exceed NYS soil background levels for arsenic, cadmium, copper, lead, mercury, nickel, and selenium (NYSDEC, 1994d).

PSA environmental sampling shows that the numerous abandoned structures (sumps) associated with the building ruins and surface and subsurface fill contain contaminants similar to those identified in previous investigations. Organic and inorganic contaminants including SVOCs (naphtha compounds, phenols, and PAHs), and inorganics (primarily aluminum, copper, iron, lead, manganese, mercury, selenium, and zinc) are present in soil, fill, and abandoned utilities (sumps) and equipment. Material spilled from a 55-gallon drum found near the oil shack contained VOCs (ethylbenzene, toluene, and xylenes); samples from another 55-gallon drum contained SVOCs (PAHs). The PSA results show the presence of PCBs in surface soil. None of the soil, drum, or sump samples meet the definition of a characteristic hazardous waste. One sump liquid sample (CL-107) from the oil shack area had a pH of 12.3 which is close to the pH limit of 12.5 that would have defined the liquid as a hazardous waste.

The oil shack area may pose a potential threat to public health and the environment as groundwater analyses show several inorganic constituents (cyanide, iron, manganese, magnesium, and sodium) and pH in groundwater exceed NYS Class GA groundwater quality standards. However, groundwater in the area is not used for any purpose and the only threat it may pose is via discharge to surface waters.

4.2.3 Union Ship Canal

The Union Ship Canal runs through the middle of the Hanna Furnace site in a southwest to northeast orientation. South of the Union Ship Canal lies the oil shack

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concentrations of inorganics than SD-107, which was located between the site and the Buffalo Inner Harbor.

Sediment EPTOX metals analyses show leachable concentrations of barium (up to 1,520 $\mu\text{g/L}$), cadmium (up to 5.21 $\mu\text{g/L}$), chromium (up to 11.6 $\mu\text{g/L}$), lead (up to 153 $\mu\text{g/L}$), and silver (up to 6.81 $\mu\text{g/L}$) (see Figure 15). Concentrations are less than regulatory limits for characteristic hazardous waste. Samples were not determined to be ignitable, reactive, or corrosive.

4.2.3.3 Contamination Assessment Summary. The objectives of the PSA at the Union Ship Canal were to: (1) identify discharge locations from site sources to the canal; (2) confirm previous sampling results and assess whether sediment in the canal met the definition of a characteristic hazardous waste; and (3) characterize surface water quality and assess whether surface water in the canal poses a potential significant threat to public health and the environment.

Previous investigations (see Subsection 2.3) showed the following:

- Surface water in the canal exceeded NYS Class C surface water criteria for iron, phenols, and cyanide (Rupley, Bahler, and Blake, 1979a,b,c).
- Surface water in the canal also contained chromium, copper, and traces of PCBs (Recra, 1988).
- Sediment contained arsenic, chromium, copper, lead, and cyanide, PCBs, oil and grease, and phenols (Recra, 1988).

PSA Union Ship Canal sediment and surface water samples were collected at discharge locations entering the canal (SW-103, SW-104, SW-105), adjacent to the filter cake/flue ash disposal area (SW-106), and downstream between the site and the Buffalo Inner Harbor (Lake Erie) (SW-107). Sediment samples from the canal and an oil/water separator were found to contain SVOCs (PAHs and others), and inorganics (primarily aluminum and lead). The highest concentrations of SVOCs were found in the downstream sample. Surface water in the canal contained 4-methylphenol and inorganics (primarily aluminum, chromium, copper, lead, vanadium, and zinc), with the highest concentrations generally in the sample

- Lead (at 9.4J $\mu\text{g/L}$ in SW-104 and 455 $\mu\text{g/L}$ in SW-106) exceeds the NYS Class C hardness-specific standard of 7.0 $\mu\text{g/L}$ (based on the average hardness of surface samples).
- Mercury (at 0.54 $\mu\text{g/L}$ in SW-106) exceeds the NYS Class C guidance value of 0.2 $\mu\text{g/L}$.
- Vanadium (at 60.7 $\mu\text{g/L}$ in SW-106) exceeds the NYS Class C standard of 14 $\mu\text{g/L}$.
- Zinc (at 1,180J $\mu\text{g/L}$ in SW-106) exceeds the NYS Class C standard of 138 $\mu\text{g/L}$ (based on the average hardness of surface water samples).

PCBs (traces of Aroclor-1260) were detected in earlier canal surface water sampling (see Table 7) at concentrations below the NYS Class C standard of 0.1 $\mu\text{g/L}$. These results were not reproduced in the PSA.

4.2.3.2 Sediment Analytical Results. Four sediment samples (SD-103, SD-104, SD-105, and SD-107) were collected from the Union Ship Canal (see Figure 15). SD-106 (paired with SW-106) could not be collected due to the depth of the canal at that location. Due to the depth of the canal at SW-105, sample SD-105 could not be collected from within the canal itself and was instead collected from a oil/water separator structure on the edge of the canal with an outfall that discharged to the canal. The sediment samples were analyzed for TCL VOCs, SVOCs, pesticides/PCBs, and inorganics, and EPTOX metals. Results of the sediment samples are summarized in Table 27 and Figure 15.

Three VOCs were detected in sediment samples: 2-butanone was detected in SD-104 at a concentration of 3J $\mu\text{g/kg}$; and acetone and PCE were detected in SD-107 at 12J $\mu\text{g/kg}$ and 3J $\mu\text{g/kg}$, respectively.

Twenty TCL SVOCs were detected in sediment samples, with the highest concentrations and numbers of SVOCs in SD-105 and SD-107. The SVOCs detected include naphtha compounds (such as 2-methylnaphthalene), PAHs, and phthalates. One pesticide compound, 4,4'-DDT, was detected in SD-103. PCBs were not detected. Nineteen TCL inorganics were detected in sediment samples (see Table 27). Samples SD-103, SD-104, and SD-105 tended to have higher

area, north of the canal lies the filter cake/flue ash disposal area and debris landfill, and northeast of the canal lies the Shenango Steel Mill. Environmental sampling consisted of collecting surface water and sediment samples from the canal or adjacent to the canal to confirm the nature and distribution of PCB contamination in surface water and sediment.

4.2.3.1 Surface Water Analytical Results. Five surface water samples (SW-103 through SW-107) were collected from the Union Ship Canal. The surface water samples were analyzed for TCL VOCs, SVOCs, pesticides/PCBs, and inorganics. Results of the surface water samples are summarized in Table 26 and Figure 14.

No TCL VOCs or pesticides/PCBs were detected in the Union Ship Canal surface water samples. Two SVOCs were detected in surface water samples: 4-methylphenol was detected at 21 $\mu\text{g/L}$ in SW-106; and BEHP was detected at 11 $\mu\text{g/L}$ in SW-104. TCL inorganics detected in the samples were aluminum, arsenic, barium, calcium, chromium, copper, lead, magnesium, mercury, nickel, potassium, sodium, vanadium, and zinc. The highest concentrations and numbers of inorganics were detected in sample SW-106, collected from the side of the canal adjacent to the filter cake/flue ash disposal area.

Surface water results were compared to NYS Class C surface water quality standards and guidelines to assess whether the concentrations pose a potential significant threat to human health or the environment. The following analytes were detected at concentrations exceeding Class C standards or guidelines:

- 4-methylphenol (at 21 $\mu\text{g/L}$ in SW-106) exceeds the NYS Class C standard of 1 $\mu\text{g/L}$ (for total chlorinated phenols).
- BEHP (at 11 $\mu\text{g/L}$ in SW-104) exceeds the NYS Class C standard of 0.6 $\mu\text{g/L}$.
- Aluminum (at 2891 $\mu\text{g/L}$ in SW-104 and 21,7001 $\mu\text{g/L}$ in SW-106) exceeds the NYS Class C standard of 100 $\mu\text{g/L}$.
- Copper (at 127 $\mu\text{g/L}$ in SW-106) exceeds the NYS Class C hardness-specific standard of 20 $\mu\text{g/L}$ (based on the average hardness of surface water samples).

TABLE 13
RANGES OF BACKGROUND INORGANIC CONCENTRATIONS IN SOIL
HANNA FURNACE SITE AND SHENANGO STEEL MILL
PRELIMINARY SITE ASSESSMENT

ANALYTE	(mg/kg)	STATES (mg/kg)
Aluminum	1,000 - 25,000	7,000 - > 10,000
Antimony	NA	NA
Arsenic	3 - 12	< 0.1 - 75
Barium	15 - 600	10 - 1,500
Beryllium	0 - 1.75	< 1 - 7
Cadmium	0.01 - 2	NA
Calcium	130 - 35,000	100 - 280,000
Chromium	1.5 - 40	1 - 1,000
Cobalt	2.5 - 60	< 0.3 - 70
Copper	< 1 - 15	< 1 - 700
Cyanide	NA	NA
Iron	17,500 - 25,000	10 - > 100,000
Lead	10 - 37	< 10 - 300
Magnesium	1,700 - 6,000	50 - 50,000
Manganese	50 - 5,000	< 2 - 7,000
Mercury	0.042 - 0.066	0.01 - 3.4
Nickel	0.5 - 25	< 5 - 700
Potassium	8,500 - 43,000	50 - 37,000
Selenium	< 0.1 - 0.125	< 0.1 - 3.9
Silver	NA	NA
Sodium	6,000 - 8,000	< 50 - 50,000
Vanadium	25 - 60	< 7 - 300
Zinc	37 - 60	< 20 - 2,900

NOTES:

¹ Concentrations obtained from "Background Concentrations of 20 Elements in Soils with Special regard for New York State" (no date). Paper prepared by E. Carol McGovern, NYSDDEC Wildlife Resources Center.
² Shacklette, M.T. and J.G. Boerngen, 1984. "Element Concentrations in Soils and Other Surficial Materials of the Conterminous United States", USGS Professional Paper 1270.

mg/kg = milligrams per kilogram
 NA = Not Available
 < = less than
 > = greater than

TABLE 14
 FILTER CAKE/FLUE ASH DISPOSAL AREA AND DEBRIS LANDFILL SURFACE BOLL SAMPLE RESULTS
 HANNA FURNACE SITE AND SHENANGO STEEL MILL
 PRELIMINARY SITE ASSESSMENT

COMPOUND/ANALYTE	CRCL/CRCL	89-101	89-101 D	89-102	89-103	89-104	89-105	89-106	89-107	89-108
Cyanide	1	4.1 J	11.4 J	8.7 J	--	5.8 J	--	--	--	--
Iron	20	156000 J	181000 J	114000 J	343000 J	186000 J	159000 J	124000 J	124000 J	116000 J
Lead	0.8	4460	4460	3240	523	5880	500	294	222	837
Magnesium	1000	10600	10800	13200	5700	7800	11800	7570	10200	11400
Manganese	9	4720	4860	4220	7540	3670	4940	4310	4430	4260
Mercury	0.1	0.1	0.1	0.1	--	0.9	0.1	0.3	0.3	--
Nickel	8	82.7	85.4	37.7	183	87.6	62.4	28.8	15.9	24.5
Potassium	1000	1220	1180	9750	881 J	815 J	4250	1330	805 J	2650
Selenium	1	2.2 J	--	2.8 J	--	2.9 J	--	--	--	--
Sodium	1000	959 J	542 J	784 J	301 J	272 J	535 J	404 J	916 J	856 J
Thallium	2	7.3	6.2	8.1	--	7.7	--	1.5 J	--	--
Vanadium	10	62.2	67.2	44.1	85.2	65.5	52.8	45.8	44.4	39.8
Zinc	4	4500	4710	3280	842	4860	1010	780	437	729
Asbestos	82	52 J	--	--	--	--	--	--	--	--
Cadmium	2	52.4 J	50.4 J	96.6 J	--	144 J	5 J	2.8 J	--	--
Chromium	5	--	--	6.5 J	8 J	7.7 J	6.4 J	--	7.9 J	--
Lead	26	410 J	352 J	752 J	49.8 J	1630 J	91.2 J	--	85.4 J	55.7 J
Silver	5	--	--	--	--	6.1 J	--	--	--	--

Notes:

1. Only compounds and analytes that were detected in one or more samples are listed. Compounds not - detected in all samples are not listed.

CRCL = Contract Required Detection Limit (Inorganic)

CRCL = Contract Required Quantitation Limit (Organics)

D = Duplicate

-- = Non Detect

J = Estimated

RL = Reporting Limit

µg/L = micrograms per liter

µg/kg = micrograms per kilogram

mg/kg = milligrams per kilogram

R = Rejected result

EFTOX = Extraction Procedure Toxicity

TCL = Target Compound Limit

TABLE 15
DEBRIS LANDFILL TEST PIT SAMPLE RESULTS
HANNA FURNACE SITE AND SHENANGO STEEL MILL
PRELIMINARY SITE ASSESSMENT

COMPOUND/ANALYTE	CRQL CRQL	PS-101 9' box	PS-102 5' box	PS-103 7' box	PS-104 9' box	PS-104 D 8' box	PS-105 7' box	PS-106 11' box	PS-107 9' box	PS-108 10' box
TCL Inorganic Analytes (mg/kg)										
Aluminum	40	8310	11300	4100	7560	6110	19600	6500	5010	5290
Antimony	12	10.9 J	21.8	11.8 J	--	--	9.4 J	--	1615	--
Arsenic	2	11.5	7.7	8.7	2.2 J	2.0 J	10.8	3.9	12.8	4.8
Barium	40	87.8	155	85.4	17.1 J	12.4 J	109	17.9 J	74.1	33.2 J
Beryllium	1	1.3	2.3	0.5 J	--	--	1.3	--	0.9 J	--
Cadmium	1	4.8 J	3.8 J	5.8 J	4	--	4.4	--	5.1 J	1.5 J
Calcium	1000	40700	66000	32500	772 J	479 J	42100	1080	24800	4680
Chromium	2	33.6	84.1	112	7.7	6.1	98.8	6.4	82.7	8
Cobalt	10	14.3	11.9	12.4	--	--	12.3	--	21.3	2.8 J
Copper	5	210	163	120	2.0 J	--	136	2.3 J	214	6.4 J
Iron	20	163000	83300	124000	8690	8390	121000	8630	227000	6810
Lead	0.9	217	330	668	7.6 J	5.9 J	318	18.6 J	414	11.2 J
Magnesium	1000	8060	16300	9910	725 J	496 J	11300	--	8600	985 J
Manganese	3	5110	4290	8720	146	106	3150	102	5220	130
Mercury	0.1	0.4	0.4	0.1	--	--	0.2	--	--	--
Nickel	8	23	55.3	39.2	--	--	39.4	--	130	--
Potassium	1000	2820	1390	1470	868 J	814 J	13300	855 J	1270 J	725 J
Sodium	1000	550 J	835 J	463 J	324 J	279 J	749 J	491 J	406 J	451 J
Vanadium	10	55.2	38.7	80.2	10.8	8.8 J	45.6	10.3 J	84.9	9.5 J
Zinc	4	1440	459	417	6.2	6.4	1230	13.8	941	23.9

Notes:

* Only compounds and analytes that were detected in one or more samples are listed. Compounds not - detected in all samples are not listed.

-- = Non Detected

CRQL = Contract Required Detection Limit (Inorganics)

CRQL = Contract Required Quantitation Limit (Organics)

D = Duplicate

J = Estimated

mg/kg = milligrams per kilogram

R = Rejected Result

TCL = Target Compound List

ug/kg = micrograms per kilogram

mg/kg = milligrams per kilogram

TABLE 16
DEBRIS LANDFILL AREA SEDIMENT RESULTS

HANNA FURNACE SITE AND SHENANGO STEEL MILL
PRELIMINARY SITE ASSESSMENT

COMPOUND/ANALYTE	CRQL/ CRQL	SD-101	SD-102	SD-102 D
TCL Volatile Organic Compounds¹ (µg/kg)				
Volatile Organic Compounds were not detected in any samples.				
TCL Semivolatile Organic Compounds¹ (µg/kg)				
2-Methylnaphthalene	330	450 J	360 J	--
Acenaphthene	330	--	370 J	--
Anthracene	330	--	310 J	--
Benzo(a)Anthracene	330	810 J	1500 J	440 J
Benzo(a)Pyrene	330	1000 J	2000 J	590 J
Benzo(b)Fluoranthene	330	1300 J	2000 J	600 J
Benzo(g,h,i)perylene	330	480 J	800 J	180 J
Benzo(k)Fluoranthene	330	890 J	1800 J	590 J
Chrysene	330	1100 J	1800 J	680 J
Fluoranthene	330	1200 J	2100 J	780 J
Fluorene	330	--	340 J	--
Indeno(1,2,3-c,d)Pyrene	330	660 J	1100 J	310 J
Naphthalene	330	880 J	570 J	210 J
Phenanthrene	330	910 J	1400 J	500 J
Pyrene	330	1400 J	2600 J	920 J
TCL Pesticide/Polychlorinated Biphenyl Compounds¹ (µg/kg)				
Pesticide/Polychlorinated Biphenyl Compounds were not detected in any samples.				
TCL Inorganic Analytes¹ (mg/kg)				
Aluminum	40	8500 J	11200 J	7800 J
Antimony	12	33.6 J	27.9 J	19.8 J
Arsenic	2	14.3 J	15.8 J	14.8 J
Barium	40	76.8 J	97 J	60.9 J
Beryllium	1	0.9 J	1.8 J	1.0 J
Cadmium	1	4.0 J	1.9 J	3.9 J
Calcium	1000	114000 J	81800 J	60500 J
Chromium	2	98.6 J	50.2 J	43.5 J
Cobalt	10	19.7 J	15 J	13.7 J
Copper	5	212 J	120 J	108 J
Cyanide	1	1.4 J	--	--
Iron	20	131000 J	118000 J	96200 J
Lead	0.6	754 J	731 J	716 J
Magnesium	1000	10600 J	14900 J	10500 J
Manganese	3	4160 J	4150 J	3050 J
Mercury	0.1	0.4 J	0.4 J	0.4 J
Nickel	8	61.2 J	27.6 J	29.4 J
Potassium	1000	4390 J	4010 J	3320 J
Sodium	1000	845 J	912 J	828 J
Vanadium	10	50.1 J	50.9 J	40.3 J
Zinc	4	1470 J	1360 J	1140 J
EPTOX¹ Metals (µg/L)				
Barium	11	549	471	466
Cadmium	2	2.6 J	--	--
Chromium	5	--	--	6.7 J
Lead	26	132	144 J	189 J

Notes:

¹ Only compounds and analytes that were detected in one or more samples are listed.

Compounds non-detected in all samples are not listed.

-- = Non Detect

CRQL = Contract Required Detection Limit (Inorganics)

CRQL = Contract Required Quantitation Limit (Organics)

D = Duplicate

J = Estimated

mg/kg = milligrams per kilogram

RL = Reporting Limit

TCL = Target Compound List

µg/kg = micrograms per kilogram

µg/L = micrograms per liter

EPTOX = Extraction Procedure Toxicity

**TABLE 12
DEBRIS LANDFILL AREA GROUNDWATER SAMPLE RESULTS**

**HANNA FURNACE SITE AND SHENANGO STEEL MILL
PRELIMINARY SITE ASSESSMENT**

COMPOUND/ANALYTE	CRQL/ CRDL	NYS CLASS GA ²	MW-101	MW-101 D	MW-102	MW-103
TCL Volatile Organic Compounds¹ (µg/L)						
Volatile Organic Compounds were not detected in any samples.						
TCL Semivolatile Organic Compounds¹ (µg/L)						
2,4-Dimethylphenol	10	1 ³	--	1.0 J	--	--
4-Methylphenol	10	1 ³	2.0 J	3.0 J	--	--
Naphthalene	10	10	--	2.0 J	--	--
Pentachlorophenol	25	1 ³	1.0 J	--	--	--
bis(2-Ethylhexyl)phthalate	10	50	--	2.0 J	--	--
TCL Pesticide/Polychlorinated Biphenyl Compounds¹ (µg/L)						
Pesticide/Polychlorinated Biphenyl Compounds were not detected in any samples						
TCL Inorganic Analytes¹ (µg/L)						
Aluminum	200	NS	797	881	--	184 J
Arsenic	10	25	--	--	--	5.7 J
Barium	200	1000	100 J	104 J	60.4 J	81.3 J
Calcium	5000	NS	11000	11400	9750	7850
Chromium	10	50	12.9 J	17.7	--	--
Cyanide	10	100	3090	2960	--	510
Iron	100	300 ⁴	1100	1180	505	1730
Lead	3	25	--	--	--	3.3 J
Magnesium	5000	35000G	--	--	10900	7640
Manganese	15	300 ⁴	--	--	1220	137
Potassium	5000	NS	823000	861000	13500	467000
Selenium	5	10	8.0 J	12.2 J	--	--
Sodium	5000	20000	64800	85800	14900	191000
Vanadium	50	NS	24.1 J	25.6 J	--	--
Zinc	20	300	--	--	--	15.4 J
pH	NA	8.5	12.3	NA	7.5	8.9

Notes:

¹ Only compounds and analytes that were detected in one or more samples are listed.

Compounds non-detect in all samples are not listed.

² Class GA Groundwater Quality Standards 6 NYCRR parts 700-705.

³ NYS Groundwater Phenol Standard of 1.0 µg/L is for total phenolic compounds

⁴ When iron and manganese are both present, NYS Class GA Standard is 500 µg/L for the total concentration of both compounds.

-- = Non Detect

CRDL = Contract Required Detection Limit (Inorganics)

CRQL = Contract Required Quantitation Limit (Organics)

G = Guidance Value

J = Estimated

NA = not analyzed

NS = No standard has been promulgated for this compound.

TCL = Target Compound List

µg/L = micrograms per liter

TABLE 27
UNION SHIP CANAL SEDIMENT SAMPLE RESULTS
HANNA FURNACE SITE AND SHENANGO STEEL MILL
PRELIMINARY SITE ASSESSMENT

COMPOUND/ANALYTE	CRCL/ CRCL	SD-103	SD-104	SD-105	SD-107
TCL Volatile Organic Compounds¹ (µg/kg)					
2-Butanone	10	--	3 J	--	--
Acetone	10	--	--	--	12 J
Tetrachloroethene	10	--	--	--	3 J
TCL Semivolatile Organic Compounds¹ (µg/kg)					
1,2,4-Trichlorobenzene	330	--	--	--	760
2-Methylnaphthalene	330	--	86 J	--	--
4-Methylphenol	330	--	--	--	80 J
Acenaphthene	330	--	--	--	85 J
Acenaphthylene	330	--	--	410 J	630
Anthracene	330	--	--	330 J	1600
Benzo(a)Anthracene	330	120 J	430 J	2000 J	2700
Benzo(a)Pyrene	330	46 J	690 J	2400 J	1600
Benzo(b)Fluoranthene	330	100 J	790 J	2300 J	1600
Benzo(g,h,i)perylene	330	--	130 J	940 J	340 J
Benzo(k)Fluoranthene	330	75 J	770 J	2200 J	1100
Carbazole	330	--	--	--	96 J
Chrysene	330	220 J	700 J	3100	2600
Dibenzofuran	330	--	--	--	330 J
Fluoranthene	330	280 J	590 J	1800 J	4000
Fluorene	330	--	--	--	680
Indeno(1,2,3-c,d)Pyrene	330	--	290 J	--	440 J
Phenanthrene	330	160 J	240 J	440 J	3600
Pyrene	330	290 J	710 J	4800	4800
bis(2-Ethylhexyl)phthalate	330	67 J	--	720 J	220 J
TCL Pesticide/Polychlorinated Biphenyl Compounds¹ (µg/kg)					
4,4'-DDD	3.3	2.7 JN	--	R	R
TCL Inorganics² (mg/kg)					
Aluminum	40	19800	7260	6230	4870
Arsenic	2	9.0	3.0 J	21.4	6.1
Barium	40	188	61.2	77.3	70.8
Beryllium	1	3.5	1.0	--	--
Cadmium	1	1.8 J	2.2 J	2.8 J	--
Calcium	1000	159000	72500	42500	154000
Chromium	2	10.8	48.6	37.3 J	38.8 J
Cobalt	10	5 J	8.6 J	9.3 J	--
Copper	5	23.4	30.7	62.4	14.1
Iron	20	43400	46600	82300	11000
Lead	0.6	64.2	132	333	45.4
Magnesium	1000	18200	6200	16900	7320
Manganese	3	2500	1270	3020	420
Mercury	0.1	--	0.1	--	--
Nickel	6	11.2	17.1	26.8	--
Potassium	1000	1640	1410	335 J	591 J
Sodium	1000	530 J	496 J	--	260 J
Vanadium	10	20.6	20.2	34.8	11.9 J
Zinc	4	392	646	799	181

TABLE 27
UNION SHIP CANAL SEDIMENT SAMPLE RESULTS
HANNA FURNACE SITE AND SHENANGO STEEL MILL
PRELIMINARY SITE ASSESSMENT

COMPOUND/ANALYTE	CRQL/ CRDL	SD-103	SD-104	SD-105	SD-107
EPTOX Metals* (µg/L)	RL				
Barium	11	1520	588	834	1430
Cadmium	2	5.2 J	--	--	2.8 J
Chromium	5	9.7	9.2 J	--	11.6
Lead	26	--	153	--	31.5
Silver	5	--	6.8 J	--	--

Notes:

* Only compounds and analytes that were detected in one or more samples are listed.
Compounds non-detected in all samples are not listed.

-- = Non Detect

CRDL = Contract Required Detection Limit (Inorganics)

CRQL = Contract Required Quantitation Limit (Organics)

J = Estimated

mg/kg = milligrams per kilogram

R = Rejected Result

RL = Reporting Limit

TCL = Target Compound List

µg/L = micrograms per liter

µg/kg = micrograms per kilogram

EPTOX = Extraction Procedure Toxicity

5.0 CONCLUSIONS AND RECOMMENDATIONS

The results of the PSA performed for the Hanna Furnace site and the adjacent Shenango Steel Mill are summarized in this section. In addition, a recommendation for reclassification of the Hanna Furnace site is made based on the definitions of site classes presented previously in Section 1.0. Results for the Shenango Steel Mill are evaluated to recommend whether and under what class the property should be listed in the NYS Registry of Inactive Hazardous Waste Disposal Sites. For the Hanna Furnace site and the Shenango Steel Mill, the overall purposes of the PSA are to determine whether there is documented presence of a listed or characteristic hazardous waste and whether constituents of the hazardous waste pose a potential significant threat to public health and the environment. Summaries of the issues and findings of the PSA for the Hanna Furnace site and the Shenango Steel Mill are presented in Tables 33 and 34, respectively.

5.1 HANNA FURNACE SITE

The following subsections present conclusions about hazardous waste deposition and significant threat determinations, and make recommendations for the Hanna Furnace site.

HAZARDOUS WASTE DEPOSITION

Based on the results of the PSA, the disposal of a listed or characteristic hazardous waste at investigated portions of the Hanna Furnace site is not documented.

Surface soil samples from the Hanna Furnace site collected during the PSA and in previous investigations detected PCBs (Aroclor-1260 and others); however, the concentrations detected (generally less than 0.5 mg/kg) are less than the hazardous waste regulatory criterion of 50 mg/kg. The pH of one groundwater sample and one sump liquid sample is 12.3, close to but less than the corrosive hazardous waste criterion of 12.5.

SECTION 5

5.1.2 Significant Threat Determination

NYSDEC regulations pertaining to Inactive Hazardous Waste Disposal Sites, 6 NYCRR Part 375, set forth several definitions of significant threat (NYSDEC, 1995). The mere presence of hazardous waste at a site or in the environment is a necessary but not sufficient basis for finding that a hazardous waste disposed of at a site constitutes a significant threat to public health and the environment. Significant threat was evaluated by comparing groundwater analytical results from the Hanna Furnace site to NYS Class GA groundwater quality standards and by comparing surface water results from the Hanna Furnace site to NYS Class C surface water quality standards as set forth in 6 NYCRR Parts 700-705 (NYSDEC, 1993c). Exceedances of these standards are presented in Section 4.0 and summarized in Table 32. In particular, Hanna Furnace site surface water and groundwater results show exceedances of several standards for SVOCs, inorganics, and pH; however, the exceedances are not known to result from a hazardous waste as summarized in Subsection 5.1.1. There are no groundwater receptors in the vicinity of the Hanna Furnace site. Groundwater discharges to the Union Ship Canal and possibly to surrounding wetland and low-lying areas. The Union Ship Canal is used for fishing and discharges to Lake Erie/Buffalo Inner Harbor and has human ecological receptors.

5.1.3 Recommendations

Information was collected during the PSA to recommend reclassification of the Hanna Furnace site. The results of environmental sampling at the Hanna Furnace site (Site number 915029) did not document the presence of a listed or characteristic hazardous waste based on the definitions of hazardous waste site classes set forth in 6 NYCRR Part 375 (NYSDEC, 1992). ABB-ES recommends that the Hanna Furnace site be delisted from the Registry of Inactive Hazardous Waste Disposal Sites (see Figure 5). Based on the data collected in the PSA confirming exceedances of NYS groundwater and surface water standards, and exceedance of USEPA lead guidance values for soil (see Table 32), the HRS score for the Hanna Furnace site was recalculated to assess the potential hazards posed by the site to human trespassers who frequent the area and ecological receptors. The HRS score of 49.12 was calculated using the USEPA's PREScore software (ABB-ES, 1995).

(continued)

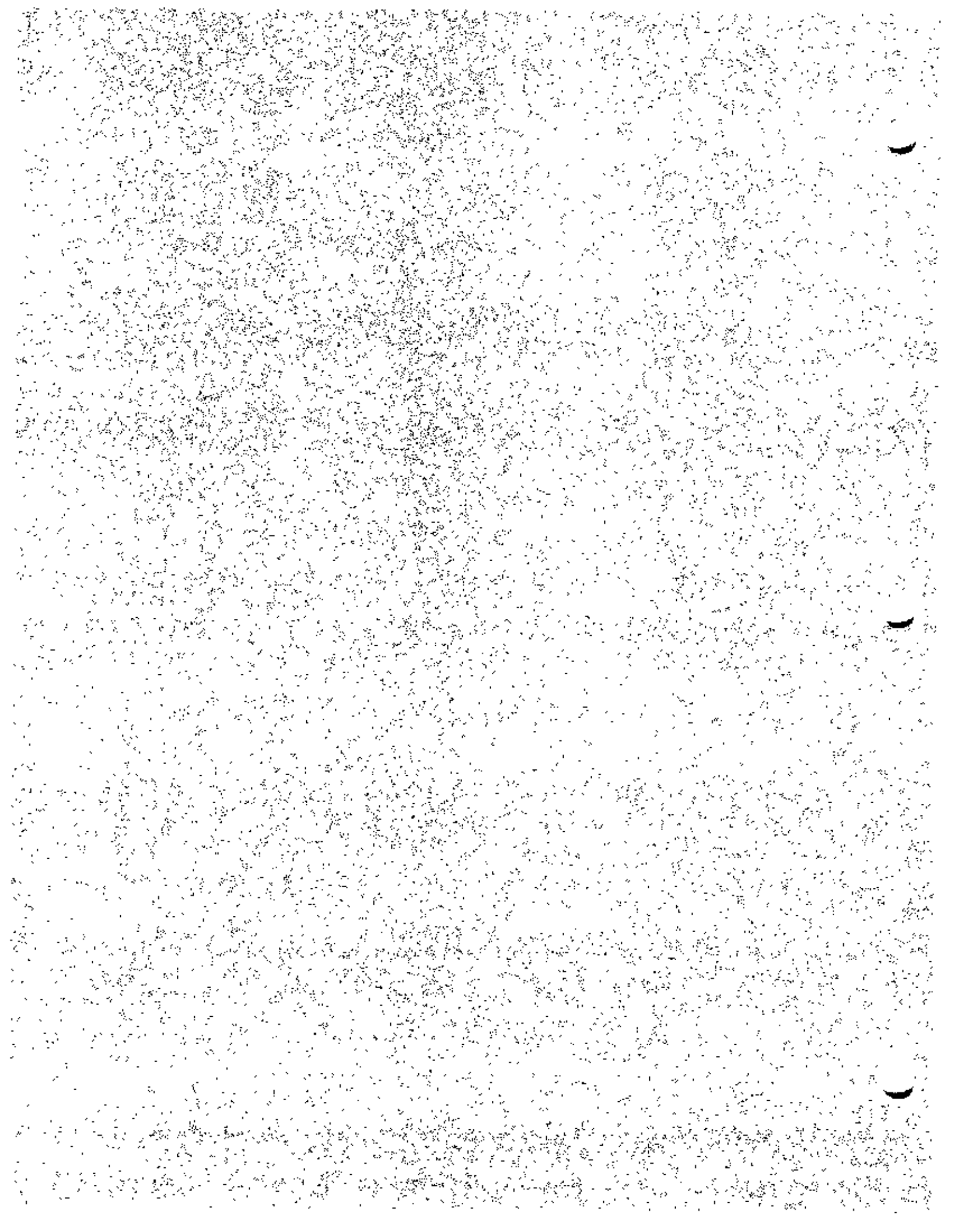
TABLE 33
SUMMARY OF FINDINGS AND RECOMMENDATION
FOR RECLASSIFICATION - HANNA FURNACE SITE

HANNA FURNACE SITE AND SHENANGO STEEL MILL
PRELIMINARY SITE ASSESSMENT

PSA Issue	FILTER CAKE/FUE ASH DISPOSAL AREA AND LANDFILL/DEBRIS DISPOSAL AREA	OIL SHACK/BLAST FURNACE AREA	UNION SHIP CANAL
Is there a potential significant threat from the area to groundwater (exceedance of NYS Class GA Groundwater Quality Standards)?	Yes - Well samples exceed Class GA standards for pentachlorophenol; 4-methylphenol; 2,4-dimethylphenol; cyanide; iron; selenium; and sodium. Also exceedance of pH criteria of 8.5.	Yes - Well samples exceed Class GA standards for cyanide, iron, magnesium, manganese, and sodium.	Not applicable
Summary - Does the Area Contain Hazardous Waste?	No	No	No
Does the Area Pose a Potential Significant Threat Directly Attributable to Hazardous Waste?	No	No	No
Reclassification Recommendation	Delist	Delist	Delist

TABLE 33
SUMMARY OF FINDINGS AND RECOMMENDATION
FOR RECLASSIFICATION - HANNA FURNACE SITE
HANNA FURNACE SITE AND SHENANGO STEEL MILL
PRELIMINARY SITE ASSESSMENT

PSA ISSUE	FILTER CAKE/FLUE ASH DISPOSAL AREA AND LANDFILL/DEBRIS DISPOSAL AREA	OIL SHACK/BLAST FURNACE AREA	UNION SHIP CANAL
Is there documented disposal of a listed hazardous waste at the area?	No	No	No
Is there a characteristic hazardous waste disposed of at the area (based on EPTOX metals, PCB, ignitability, reactivity, corrosivity data) or confirmation of the presence of a listed Hazardous Waste?	Potentially - PCBs detected in surface soil; groundwater at filter cake/flue ash disposal area has pH of 12.3 which is close to the Regulatory Limit of 12.5.	No. One sump liquid sample has pH of 12.3 which is close to the Regulatory Limit of 12.5	No
Is there a potential direct contact threat at the area due to concentrations of contaminants in soil?	Yes - Lead is present in surface soil/exposed wastes at up to 4,460 µg/kg, which exceeds USEPA guidance for direct contact for soil of 400 µg/kg.	Yes - Lead is present in surface soil at up to 2,440 µg/kg, which exceeds USEPA guidance for soil of 400 µg/kg.	Not applicable.
Is there a potential significant threat from the area to nearby surface water bodies (exceedance of NYS Class C Surface Water Standards)?	Yes - On-site surface water samples adjacent to landfill show exceedances of the following Class C Standards: acetone, aluminum, lead, zinc, and pH.	None known.	Yes - Surface water samples from canal show exceedances of the following Class C Standards: 4-methylphenol, BEHP, aluminum, copper, lead, vanadium, zinc, and pH. Exceedances occur in sample collected adjacent to filter cake/flue ash disposal area.



Final Report for Sediment Sampling and Chemical Analysis at the Union Ship Canal in Buffalo, New York Volume I - Technical Report

JANUARY, 2000 (FINAL REVISION, NOVEMBER, 2000)

Contract No. DACW49-97-D-0006
Delivery Order No. 0026

Prepared for:
U.S. Army Corps of Engineers
Buffalo District
1776 Niagara Street
Buffalo, NY 14207-3119

by
PADIA Environmental Inc.
65 East Wilson Bridge Road
Suite A
Worthington, CT 06092



January 6, 2000

Mr. David Melfi
Project Manager
Environmental Section
U.S. Army Corps of Engineers
Buffalo District
1776 Niagara Street
Buffalo, New York 14207-3199

**RE: TRANSMITTAL OF FINAL REPORT FOR THE UNION SHIP CANAL
SAMPLING PROJECT**

Dear Mr. Melfi:

Please find enclosed two (2) copies of the Final Technical Report Volume I on Sediment Sampling and Chemical Analysis Report, one (1) copy of Volume II Laboratory Analysis Report, and one (1) electronic file diskette for the Union Ship Canal sampling project in Buffalo, New York. We have included revisions to the draft report as per your comments. These copies are submitted as the final report. If you have any question(s) please do not hesitate to contact me at 614-885-9955. Thank you for giving PADIA the opportunity to assist the Buffalo District of the U.S. Army Corps of Engineers in conducting this investigation.

Sincerely,

Mikail Suleiman
Field Engineer

Enclosures (3)

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APPENDIX A - Field Notes

APPENDIX B - Selected Chemical Results

1.0 INTRODUCTION

PADIA Environmental Inc. (PADIA) has prepared this report to document field activities associated with sediment sample collection and present the results of laboratory analyses for sampling performed at locations at the Union Ship Canal in Buffalo, New York (Figure 1, Site Location Map). This effort was conducted by a sampling team from the U.S. Army Corps of Engineers (USACE) Buffalo District Office according to the work statement provided by the USACE Buffalo District Office as part of Delivery Order No 0026 of Contract DACW49-97-D-0006.

PADIA's responsibilities for this task included coordinating laboratory analyses of sediment sample collected and report preparation. Field activities were coordinated by Mr. David Melfi, the Project Manager for the USACE, Buffalo District Office. Laboratory analyses and Quality Assurance issues raised by Mr. Fred Kozminski, the Project Chemist for USACE, Buffalo District Office were addressed by Severn Trent Laboratories Inc, formerly known as CORE Laboratory Inc. The USACE, Buffalo District Office provided the sampling personnel, boat and sampling equipment needed to perform sample collection on November 15, 1999.

2.0 FIELD PROCEDURES

2.1 Sample Locations

Samples were collected at locations specified by the USACE Buffalo District Project Manager. The latitude and longitude of sample locations were not recorded due to a problem encountered with the Global Positioning Satellite System (GPSS) instrument on board the sampling boat. Provided in Table A, is summary of Field Notes for the Union Ship Canal sampling activities. Sample location points recorded in field note book are shown in Figure 2. All samples were collected as close to the designated sample location point as possible.

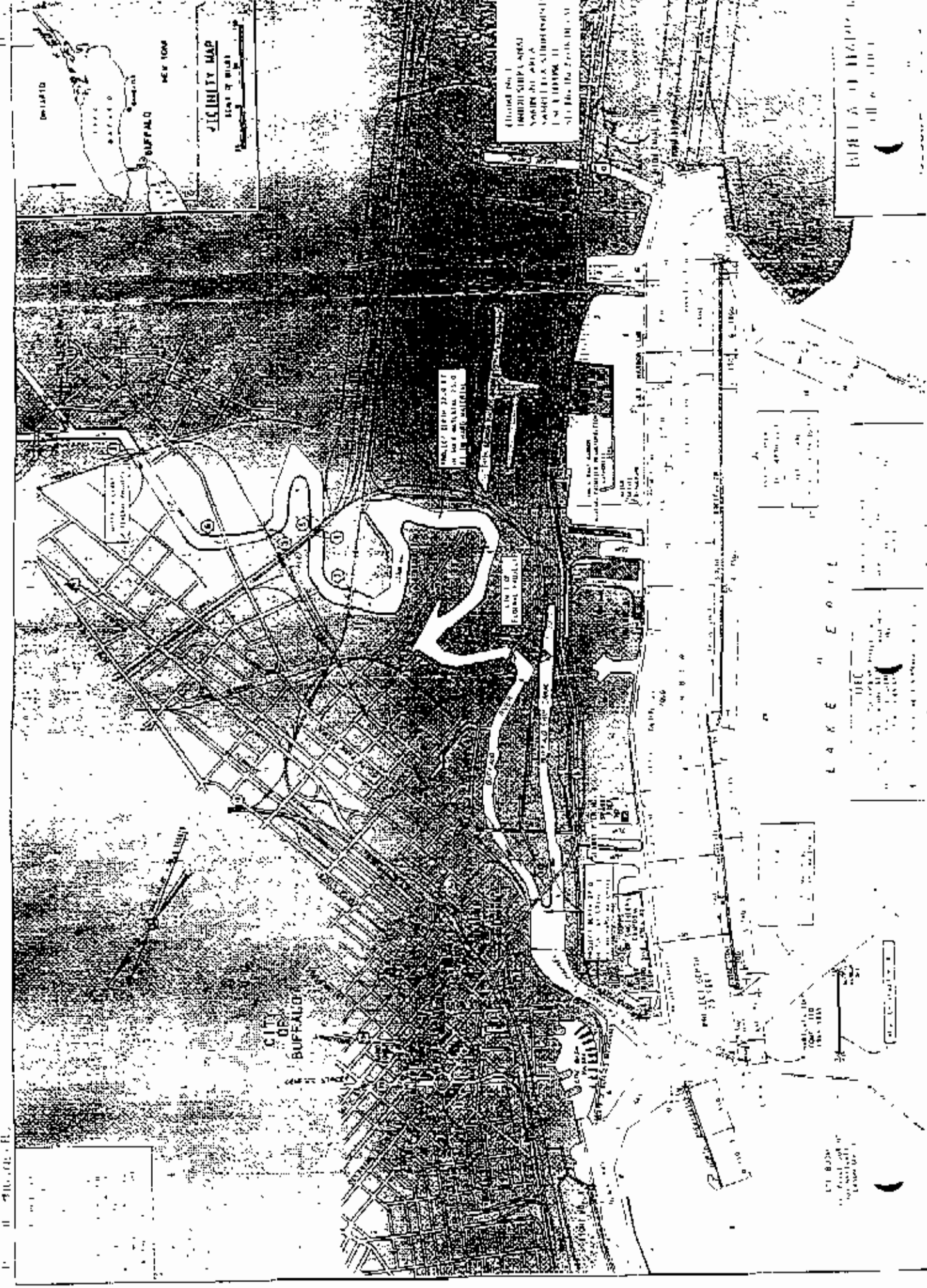
2.2 Water Sample Collection

No water samples were collected from the sample location at the Union Ship Canal area because it was not a requirement in the work statement provided by the USACE, Buffalo District Office for this task.

FIGURE 1 - Location of the Union Ship Canal

1

1000



11 410.02.11

11 410.02.11

11 410.02.11

11 410.02.11

FIGURE 2 - Union Ship Canal Sample Location

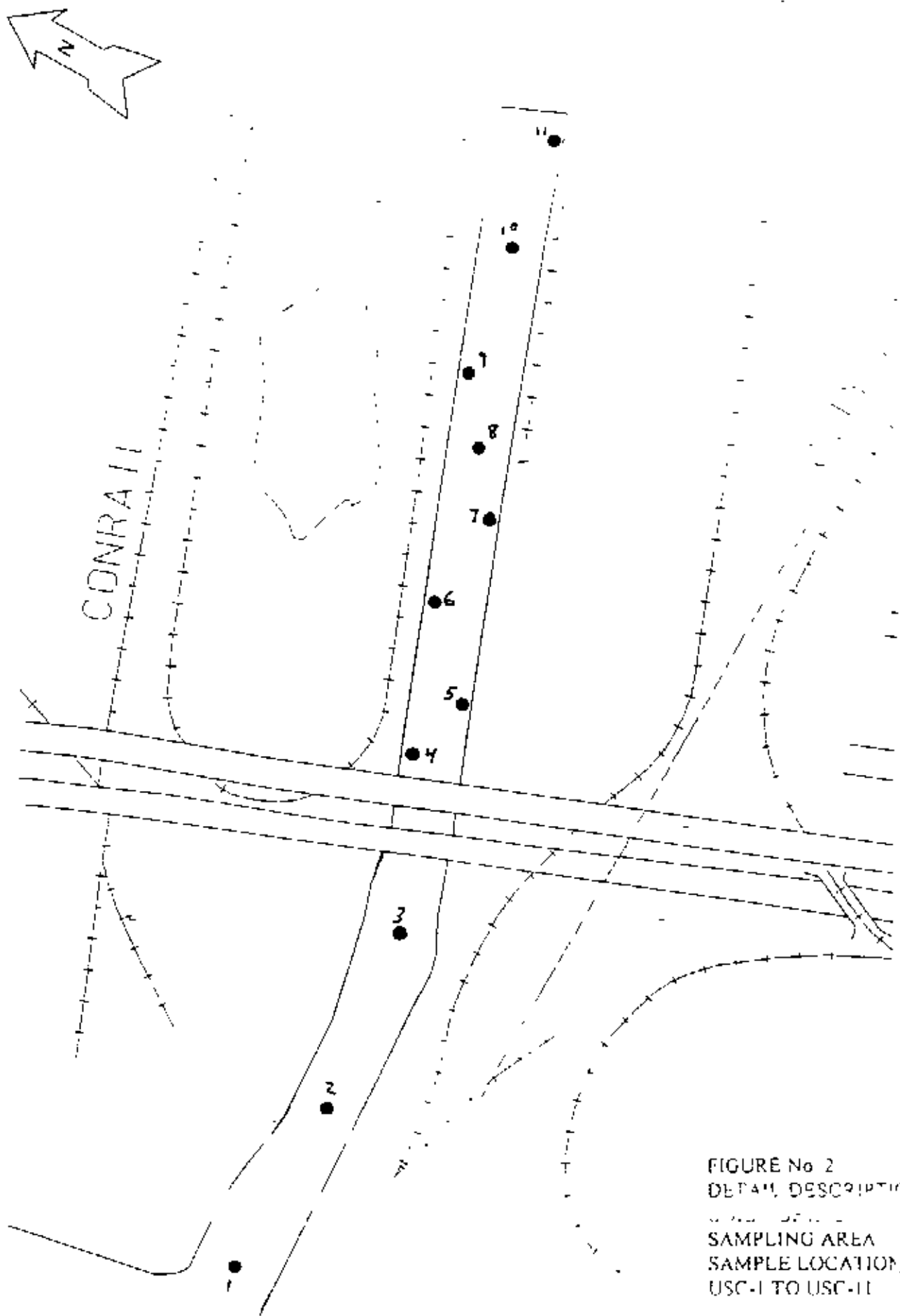


FIGURE No 2
DETAIL DESCRIPTION OF
SAMPLING AREA
SAMPLE LOCATION IN
USC-I TO USC-II

TABLE A - Summary of Field Notes for Union Ship Canal Sediment
Sample Collection

SAMPLE NO.	DEPTH (FEET)	DATE	NOTES
USC-1	26.0	11/15/99	Light brown / gray clay. At channel opening
USC-2	23.0	11/15/99	Light brown / gray clay. Outfall on north side of channel. Zebra mussels with oil sheen.
USC-3	22.0	11/15/99	Light brown / gray clay. 5 th Ballard west of Route 5. Zebra mussels was observed
USC-4	22.0	11/15/99	Brownish clay mixed w / vegetation and zebra mussels. 30 th Ballard.
USC-5	20.0	11/15/99	Soft light gray clay, less dense. 26 th Ballard.
USC-6	23.0	11/15/99	Brown gray silty clay w/some sand. Sediment has petroleum sheen odor. 21 st Ballard
USC-7	23.0	11/15/99	Brown gray silty clay w/some sand. Sediment has petroleum sheen odor. 17 th Ballard.
USC-8	22.0	11/15/99	Brown gray silty clay w/some sand. Sediment has petroleum sheen odor. 13 th Ballard.
USC-9	17.0	11/15/99	Dark gray w/ some brown sandy silt clay, has petroleum sheen odor. 11 th Ballard from east Side.
USC-10	23.0	11/15/99	Dark gray silty clay w/ petroleum odor. 8 th Ballard from east side of channel.
USC-11	18.0	11/15/99	Dark gray silty sand w/ some vegetation oil sheen odor, rotten vegetation odor. 4 th Ballard from east side of channel

NOTES

1. Weather: Cool and windy

2.3 Sediment Sample Collection

Sediment samples were obtained using a Petite Ponar Dredge to collect sample at all sample locations. At each sample location, grab samples were collected and homogenized in a stainless steel bowl with a stainless steel spoon, then placed in sample jars and sealed with a lid. A final check was made on the labels and the samples were arranged and stored in a cooler box. Each sample was identified by sample location number. Each soil sample comprised of the following jars:

- 1 - 8 oz. soil jar for metals and inorganic analyses.
- 1 - 8 oz. soil jar for organic analysis.

2.4 Equipment Decontamination

Equipment decontamination was performed to ensure that sediment sampling equipment was rinsed clean of residual sediment prior to subsequent sampling at each sampling location. This involved rinsing the stainless steel bowl, spoon, and the Petite Ponar Dredge with site water at the completion of sampling at each sample location.

2.5 Sample Custody and Shipment

Sample bottles had the appropriate labels and were pre-labeled to indicate analysis to be performed. When the sample jar was filled the following information was noted on the label in indelible ink:

- Sample Location
- Sample Identification Number
- Sample Collection Date
- Analytical Parameters
- Samplers Initials

Sample bottles were returned to the storage cooler and kept cool with ice until final preparation for shipping. Samples were prepared and shipped to Severn Trent Laboratory in Houston, Texas, following the guidelines provided in the Buffalo COE HTRW Standard Operating Procedure (SOP) and included the following steps:

- Sample label information checked for completeness
- Sample bottle label covered with clear tape
- Tag fastened to bottle indicating Sample-ID & analysis type
- Bottle placed in ZipLoc™ bag or sealed in bubble wrap bag
- Sample bottles placed in coolers to distribute the weight evenly and reduce the potential for breakage
- Sample bottles in each cooler noted on Chain-of-Custody (CoC) indicating the analysis required
- CoC release signed and dated, pink copy removed, and CoC and completed cooler inspection form sealed in in top of cooler
- Fresh ice contained in ZipLoc™ bags placed in coolers
- Coolers closed and sealed with signed and dated Custody Seals placed as per the SOP
- Coolers labeled for shipment, label attached, and cooler taped shut with strapping tape
- Cooler drain taped shut with strapping tape

2.6 Sample Identification Numbers

Samples were identified in the field based on the prescribed location numbers selected by the Project Manager and as provided in the Work Statement provided by the USAF, Buffalo District Office. The basic sample identification abbreviation relates to the facility being sampled - Union Ship Canal - USC. The number following the abbreviation for Union Ship Canal, USC is the numeric designator for the sample location assigned by the Project Manager.

For Example:

USC-4 - Soil sample location number four (4) at the Union Ship Canal

3.0 SOIL SAMPLE CHARACTERIZATION

3.1 Chemical Analyses

Sediment samples collected with the Petite Ponar Dredge and observed in stainless steel bowl were predominantly dark gray silty clay to brown silty clay mixed with some sand and decayed vegetation. Sediment sample depths and physical characteristics are noted in Table A.

Soil samples were analyzed by Severn Trent Laboratory in accordance with the analyses listed in the Work Statement or as directed by Mr. Fred Kozmurski, the Buffalo COE Project chemist. The analyses and methods for sediment samples included:

<u>ANALYTE</u>	<u>PREP METHODS</u>	<u>ANALYSIS METHOD</u>
Pesticides and Polychlorinated Biphenols (PCBs)	3510(water)/ 3550(solids)	8081/ 8082
Polynuclear Aromatic Hydrocarbons (PAHs)	3510(water)/ 3550(solids)	8310/8270
TAL Metals	3010 (ICP), 3020 (GFAA), 3050 (solids)	6010/7000
Oil and Grease	none	413.2
Ammonia	none	350.1

Results of the soil sample analyses are summarized in tables and are included in Appendix B. The actual Severn Trent Laboratory Analytical Data Package are contained in Volume II of this report. The following paragraphs describe the chemical characteristics of the sediment as determined from the sample analyses:

3.2 PCBs in Sediment

Chemical analyses were performed on sediment samples collected from the Union Ship Canal Area at sample locations (USC-1 to USC-11). Based on the analyses performed, sediment samples indicated the presence of Aroclor 1254 and Aroclor 1260 in several samples. The following table summarizes the PCB occurrences in the sediment samples. Actual sample results are provided in Appendix B.

TABLE B: Sediment Samples with Detected PCB Concentrations

All results in table are provided in parts per billion (ppb)

SAMPLE	USC-2	USC-3	USC-5	USC-6	USC-7	USC-8	USC-9	USC-10	USC-11
Aroclor 1254	79	79				781			
Aroclor 1260		56	102	247	168	559	305	331	126

TABLE B (I): Duplicate Sediment Samples with Detected PCB Concentrations

Results in table are provided in parts per billion (ppb)

SAMPLE	USC-9D
Aroclor 1254	
Aroclor 1260	290

3.3 PAHs in Sediment

PAHs concentrations in sediment samples analyzed are dispersed across the sample area. PAHs were detected at all sample locations. Total PAHs concentrations at some location are quite high. Sediment sample analyses are summarized and attached in Appendix B.

3.4 Metals in Sediment

Most of the TAL metals were detected in the sediment samples collected. Please refer to the summary tables of the metals analyses in Appendix B for information on the concentrations of the various TAL metals. Beryllium, Mercury, Selenium, Silver, Thallium and Sodium were the only metals not detected above the detection limit in the sediment sample. Please refer to the summary tables in Appendix B of the metal analyses for sediment sample.

3.5 Inorganic Analyses of Sediment

All of the sediment samples analyzed reported detectable concentrations for Ammonia - N, and Oil and Grease. As per the work statement, analysis for oil and grease was not performed on the collected duplicate sample at sample location number USC-9D. Please refer to the summary table of the inorganic analyses for the sediment samples in Appendix B for details on the inorganic characteristics.

TABLE C - Metal Concentrations in Union Ship Canal Area

METALS	UNITS	USC-1	USC-2	USC-3	USC-4	USC-5	USC-6	Mean	Average
Al	mg/kg	13300	13300	12300	8420	14900	16400	12800	13000
Sb	mg/kg	U 0.64	U 0.61	B 0.46	B 0.35	B 0.41	B 1.0	0.51	55
As	mg/kg	10.3	13.1	12.5	10.4	14.9	26.7	13.8	14.6
Ba	mg/kg	76.6	79.9	72.6	66.2	89.2	95.1	79.3	80.0
Be	mg/kg	0.27	0.42	0.33	0.14	0.36	1.1	0.36	0.44
Cd	mg/kg	1.4	0.97	0.77	1.5	2.1	4.1	1.5	1.8
Ca	mg/kg	29000	45200	37600	54400	47000	56900	43900	45000
Cr	mg/kg	41.6	51.2	43.8	22.2	28.5	70.1	40.1	42.9
Co	mg/kg	10.5	11.7	9.8	6.4	10.0	12.8	10.0	10.2
Cu	mg/kg	36.3	59.5	53.5	41.8	64.7	122	58.0	63.0
Fe	mg/kg	39100	47300	55100	31500	45900	92500	48900	51900
Pb	mg/kg	35.6	105	113	92.7	119	857	126	220
Mg	mg/kg	7150	7920	7050	5940	7970	9430	7500	7580
Mn	mg/kg	1070	1190	961	1050	1130	1920	1190	1220
Hg	ug/kg	B 144	B 371	B 224	B 123	B 217	B 329	217	235
Ni	mg/kg	31.0	35.1	31.1	21.8	31.5	47.4	32.1	33.0
K	mg/kg	2770	1880	2180	2130	1510	1920	2030	2060
Se	mg/kg	1.0	0.76	0.98	1.4	1.8	1.7	1.2	1.3
Ag	mg/kg	B 0.41	1.1	0.86	1.1	0.69	3.0	0.98	1.2
Na	mg/kg	254	251	243	432	433	310	311	321
Th	mg/kg	0.51	U 0.16	U 0.17	U 0.17	U 0.19	0.80	0.64	0.66
V	mg/kg	32.5	36.9	33.2	22.2	36.0	50.8	34.3	35.3
Zn	mg/kg	228	547	599	391	400	753	454	486

TABLE C - Metal Concentrations in Union Ship Canal Area, (Continued)

METALS	UNITS	USC-7	USC-8	USC-9	USC-9D	USC-10	USC-11	Mean	Average
Al	mg/kg	14900	6630	10700	14200	15500	8660	11300	11800
Sb	mg/kg	B 0.32	U 0.64	U 0.58	U 0.81	B 0.50	U 0.60	0.40	0.41
As	mg/kg	18.2	13.9	15.0	20.3	15.9	13.2	15.9	16.1
Ba	mg/kg	87.3	52.2	84.7	111	96.3	77.3	82.7	84.8
Be	mg/kg	0.45	0.49	0.66	0.82	0.64	0.48	0.58	0.59
Cd	mg/kg	1.1	3.0	2.0	2.4	2.1	2.0	2.0	2.1
Ca	mg/kg	34000	33900	42400	51800	44300	42400	41000	41500
Cr	mg/kg	28.6	33.8	34.8	44.0	41.8	32.8	35.6	36.0
Co	mg/kg	12.2	5.4	8.7	10.9	11.6	7.5	9.0	9.4
Cu	mg/kg	82.8	71.4	82.7	128	90.4	73.8	85.5	88.2
Fe	mg/kg	44800	107000	64400	84600	57200	64600	67700	70400
Pb	mg/kg	161	9.9	369	418	308	232	161	250
Mg	mg/kg	7930	5190	7630	9250	8490	5420	7150	7320
Mn	mg/kg	920	1480	1230	1490	1090	1330	1240	1260
Hg	µg/kg	B 241	B 409	B 396	B 448	B 318	B 251	334	344
Ni	mg/kg	37.0	19.8	29.9	37.3	39.4	28.2	31.1	31.9
K	mg/kg	2660	1940	1930	2700	2430	1370	2110	2170
Se	mg/kg	1.6	2.3	1.6	2.2	2.2	1.6	1.9	1.9
Ag	mg/kg	B 0.41	2.3	1.1	1.6	1.1	1.3	1.2	1.1
Na	mg/kg	354	305	276	350	336	309	320	322
Ti	mg/kg	U 0.18	1.7	1.1	0.99	0.96	0.60	1.0	1.1
V	mg/kg	2435.0	25.1	33.8	43.0	40.0	29.6	68.7	434
Zn	mg/kg	542	2480	1030	1240	993	741	1040	1170

4.0 QUALITY CONTROL SUMMARY

This section describes the quality control checks performed for the Union Ship Canal sediment sample analyses in conjunction with PADIA Environmental and the U.S. Army Corps of Engineers. The summary of the laboratory analytical process is broken down into the following five discussions: (1) Accuracy, (2) Precision, (3) Laboratory Contaminants, (4) Field Contamination, and (5) Holding Times. Note that for these sediment samples, the detection limits have been adjusted to reflect the dry weight values based upon the MDL studies.

4.1 Accuracy

In order to assess analytical accuracy of the various procedures used in the laboratory, a number of quality control checks were analyzed including matrix spikes, matrix spikes duplicates, surrogate and laboratory control samples.

Surrogate Recoveries

1) PCBs (Method 8082): All surrogate recoveries were within range.

3) PAHs (Method 8270): All surrogate recoveries were within range.

Matrix Spike/Matrix Spike Duplicate (MS/MSD) Recoveries

All batch MS/MSD samples were analyzed in accordance with the methodologies.

Laboratory Control Samples (LCSs)

1) PCBs (Method 8082): All parameters within acceptable range.

2) PAHs (Method 8270): All parameters within acceptable range.

3) Metals: All parameters within acceptable range.

4) Inorganic: All parameters within acceptable range.

4.2 Precision

Matrix Spike/Matrix Spike Duplicates

During analysis, the laboratory designated MS/MSD for samples collected. All batch MS/MSD samples were analyzed in accordance with the methodologies. The PCB results failed in accuracy. The control sample verified matrix interference.

Laboratory Duplicates

During laboratory analysis, the laboratory designated MS/MSD for samples collected. All batch MS/MSD samples were analyzed in accordance with the methodologies.

4.3 Laboratory Contaminants

1)PCBs (Method 8082): All results for laboratory reagent blanks were below reporting limits.

2)PAHs (Method 8270): All results for laboratory reagent blanks were below reporting limits.

3)Metals: All results for laboratory reagent blanks were below reporting limits.

4)Inorganics: All results for laboratory reagent blanks were below reporting limits.

4.4 Field Contamination

No problems to report.

4.5 Holding Times

All holding times for sample extractions /analysis were met for the project.

APPENDIX A - Field Notes

S-11 - DARK GRAY SILTY SAND; SAND: SILT RATIO
OIL SHEEN/ODOR, NO PETROLEUM SMELL
15' 2" 4' 11" BALLARD FROM EAST SIDE OF CHANNEL

S-10 - 23' DEEP DARK GRAY SILTY CLAY
PETROLEUM SHEEN + SMOELL
3' 11" BALLARD FROM EAST SIDE OF CHANNEL

S-9 - 11' 11" BALLARD FROM EAST SIDE
DARK GRAY WITH SOME BROWN SANDY ^{SILT} CLAY
17' DEEP, PETROLEUM SHEEN/ODOR

S-8 - 13' 11" BALLARD FROM EAST SIDE - 23' DEEP
BROWN GRAY SILTY CLAY W/ SOME SAND
PETROLEUM SHEEN/ODOR

S-7 - 23' - 17' 11" BALLARD
SEDIMENTS SAME

S-6 - 23' - 21' 11" BALLARD
SEDIMENTS SAME

S-5 - 21' DEEP 26' 11" BALLARD
LIGHT GRAY CLAY - LESS DENSE ^{more water}

S-4 - 30' 11" BALLARD - 23' DEEP
VEGETATION - ZEBRA MUSSELS
BROWN CLAY

S-3 - 1300 BROW JORDAN 2004
Sth BELLARD COAST OF RT 5
ZEBRA MUSSELS

23 Feb

S-2 - OUTFALL ON N SIDE OF CHANNEL 23 feet
SAME AS S-3 - MUSSELS
OIL SHEEN

S-1 - AT CHANNEL OPENING - 26 FEET DEEP
SAME SEU MONTS

APPENDIX B - Sediment Sample Analytical Results

**Summary Table for Analytical Data for Inorganic Material from the
Union Ship Canal**

INORGANIC MATERIAL	SAMPLE #	USC-1	USC-2	USC-3	USC-4	USC-5	USC-6
	UNITS						
AMMONIA N	mg/kg	35.9	54.8 ^f	43.4 ^e	46.8 ^e	52.0 ^f	36.8 ^g
OIL & GREASE	mg/kg	516	1400 ^a	1600 ^a	910	839	2560 ^c

INORGANIC MATERIAL	SAMPLE #	USC-7	USC-8	USC-9	USC-9D	USC-10	USC-11
	UNITS						
AMMONIA N	mg/kg	30.2 ^f	41.4 ^d	68.4 ^d	78.9 ^f	45.4 ^g	44.1 ^d
OIL & GREASE	mg/kg	1000 ^f	11700 ^b	5030 ^g	N/A	2970 ^c	1550 ^a

^a Denotes a Dilution Factor of 2.0 to 1

^e Denotes a Dilution Factor of 2.5 to 1

^b Denotes a Dilution Factor of 25.0 to 1

^c Denotes a Dilution Factor of 5.0 to 1

N/A - Analyte was not tested

^d Denotes a Dilution Factor of 9.60 to 1

^f Denotes a Dilution Factor of 9.70 to 1

^f Denotes a Dilution Factor of 9.90 to 1

^g Denotes a Dilution Factor of 10.0 to 1

**Summary Table of Analytical Data for Polychlorinated Bi-phenols from
the Union Ship Canal**

PCBs	SAMPLE #	USC-1	USC-2	USC-3	USC-4	USC-5	USC-6
	UNITS						
Aroclor 1016	ug/kg	U 2.7	U 2.5	U 2.8	U 2.7	U 3.1	U 2.8
Aroclor 1221	ug/kg	U 46.7	U 44.2	U 48.2	U 47.2	U 53.6	U 49.0
Aroclor 1232	ug/kg	U 16.2	U 15.3	U 16.7	U 16.4	U 18.6	U 17.0
Aroclor 1242	ug/kg	U 3.2	U 3.0	U 3.3	U 3.2	U 3.6	U 3.3
Aroclor 1248	ug/kg	U 28.5	U 27.0	U 29.5	U 28.8	U 32.7	U 30.0
Aroclor 1254	ug/kg	U 6.8	78.7	78.8	U 6.9	U 7.8	U 7.2
Aroclor 1260	ug/kg	U 6.6	U 6.3	56.3	U 6.7	102	247

PCBs	SAMPLE #	USC-7	USC-8	USC-9	USC-9D	USC-10	USC-11
	UNITS						
Aroclor 1016	ug/kg	U 3.1	U 2.6	U 2.8	U 3.4	U 3.4	U 2.5
Aroclor 1221	ug/kg	U 53.6	U 46.1	U 49.6	U 59.2	U 59.2	U 43.2
Aroclor 1232	ug/kg	U 18.6	U 16.0	U 17.2	U 20.5	U 20.5	U 15.0
Aroclor 1242	ug/kg	U 3.6	U 3.1	U 3.4	U 4.0	U 4.0	U 2.9
Aroclor 1248	ug/kg	U 32.7	U 28.2	U 30.3	U 36.1	U 36.2	U 26.4
Aroclor 1254	ug/kg	U 7.8	782 *	U 7.3	U 8.7	U 8.7	U 6.3
Aroclor 1260	ug/kg	168	559 *	305	290	332	126

U = Indicates the value was analyzed for but not detected. The sample Reporting Limit has been corrected for dilution and for percentage moisture as set forth in EPA SW-846.

* Denotes a Dilution Factor of 10 to 1.

**Summary Table of Analytical Data for Polynuclear Aromatic Hydrocarbons
(PAH) from the Union Ship Canal**

PAH	SAMPLE #	USC-1	USC-2	USC-3	USC-4	USC-5	USC-6
	UNITS						
Acenaphthene	ug/kg	U 69.0 *	1320	U 71.4 *	U 70.0 *	U 79.2 *	U 72.5 *
Acenaphthylene	ug/kg	U 55.2 *	972	193	U 55.8 *	U 63.3 *	244
Anthracene	ug/kg	J 239	2700	579	J 244	J 179	416
Benzo (a) Anthracene	ug/kg	471	4640	1130	763	615	1340
Benzo (a) Pyrene	ug/kg	554	4680	1600	950	739	1840
Benzo (b) Fluoranthene	ug/kg	471	4490	1490	1100	778	1860
Benzo (ghi) Perylene	ug/kg	J 338	2090	938	589	504	934
Benzo (k) Fluoranthene	ug/kg	540	4090	1330	915	794	1670
Chrysene	ug/kg	U 87.4 *	4600	1620	1040	794	1800
DiBenzo (a,h) Anthracene	ug/kg	U 92.0 *	457	J 195	J 161	U 106 *	179
Fluoranthene	ug/kg	1020	8000	2330	1170	1020	2400
Fluorene	ug/kg	U 96.6 *	2340	401	J 183	U 111 *	401
Indeno (1,2,3-cd) Pyrene	ug/kg	J 386	2650	1030	696	541	965
1-Methylnaphthalene	ug/kg	U 82.8 *	289	U 85.7 *	U 83.7 *	U 95.0 *	U 87.0 *
2-Methylnaphthalene	ug/kg	U 124 *	616	411	U 126 *	U 142 *	J 365
Naphthalene	ug/kg	U 73.6 *	1730	1240	279	U 84.4 *	837
Phenanthrene	ug/kg	616	6580	1400	815	610	1200
Pyrene	ug/kg	970	8290	2380	1380	1230	2680

U = Indicates the value was analyzed for but not detected. The sample Reporting Limit has been corrected for dilution and for percentage moisture. The preparatory factor of 3 which was used by the analytical laboratory to correct for matrix and preparation effects has not been used by PADIA in calculating the final Reporting Limit for undetected analytes (U) as set forth in EPA SW-846.

J = Indicates an estimated value. The mass spectral and retention time data indicate the presence of a compound that meets the volatile and semi-volatile GC/MS identification criteria, and the result is less than the Reporting Limit but greater than zero.

All results have a 2 to 1 Dilution Factor

**Summary Table of Analytical Data for Polynuclear Aromatic
Hydrocarbons(PAH) from the Union Ship Canal (cont.)**

PAH	SAMPLE #	USC-7	USC-8	USC-9	USC-9D	USC-10	USC-11
	UNITS						
Acenaphthene	ug/kg	U 77.3 *	J 167	U 73.4 *	U 87.5 *	U 87.5 *	U 64.0 *
Acenaphthylene	ug/kg	U 61.9 *	402	U 58.7 *	U 70.0 *	U 70.0 *	U 51.2 *
Anthracene	ug/kg	J 284	580	4840	643	J 364 *	326
Benzo (a) Anthracene	ug/kg	688	2460	1270	1690	1480	1100
Benzo (a) Pyrene	ug/kg	828	2240	1540	2160	1590	1200
Benzo (b) Fluoranthene	ug/kg	887	2720	1640	2240	2120	1300
Benzo (ghi) Perylene	ug/kg	523	1180	828	1150	1400	863
Benzo (k) Fluoranthene	ug/kg	918	2440	1520	1840	1230	1250
Chrysene	ug/kg	874	3180	1910	2460	1520	1410
DiBenzo (a,h) Anthracene	ug/kg	U 103 *	J 234	J 252	U 117 *	U 117 *	J 228
Fluoranthene	ug/kg	962	4570	1520	2220	2320	2150
Fluorene	ug/kg	U 108 *	618	567	J 287	U 122 *	J 158
Indeno (1,2,3-cd) Pyrene	ug/kg	575	1130	984	1360	1340	824
1-Methylnaphthalene	ug/kg	U 92.8 *	U 81.8 *	U 88.0 *	U 105 *	U 105 *	U 76.8 *
2-Methylnaphthalene	ug/kg	U 139 *	409	J 293 *	J 280	U 157 *	U 117 *
Naphthalene	ug/kg	J 242	857	452	521	414	U 617 *
Phenanthrene	ug/kg	725	1740	1780	1240	1060	1080
Pyrene	ug/kg	1440	4090	2160	3200	2320	2240

U = Indicates the value was analyzed for but not detected. The sample Reporting Limit has been corrected for dilution and for percentage moisture. The preparatory factor of 3 which used by the analytical laboratory to correct for matrix and preparation effects has not been used by PADIA in calculating the final Reporting Limit for undetected analytes (U) as set forth in EPA SW-846

J = Indicates an estimated value. The mass spectral and retention time data indicate the presence of a compound that meets the volatile and semi-volatile GC/MS identification criteria, and the result is less than the Reporting Limit but greater than zero.

All results have a 2 to 1 Dilution Factor

Summary Table of Analytical Data for Metals from the Union Ship Canal

METALS	SAMPLE #	USC-1	USC-2	USC-3	USC-4	USC-5	USC-6
	UNITS						
Aluminum	mg/kg	13300	13300	12300	8420	14900	16400
Antimony	mg/kg	U 0.64	U 0.61	B 0.46	B 0.35	B 0.41	B 1.0
Arsenic	mg/kg	10.3	13.1	12.5	10.4	14.9	26.7
Barium	mg/kg	76.6	79.9	72.6	66.2	89.2	95.1
Beryllium	mg/kg	0.27	0.42	0.33	0.14	0.36	1.1
Cadmium	mg/kg	1.4	0.97	0.77	1.5	2.1	4.1
Calcium	mg/kg	29000	45200	37600	54400	47000	56900
Chromium	mg/kg	41.6	51.2	43.8	22.2	28.5	70.1
Cobalt	mg/kg	10.5	11.7	9.8	6.4	10.0	12.8
Copper	mg/kg	36.3	59.5	53.5	41.8	64.7	122
Iron	mg/kg	39100*	47300*	55100*	31500*	45900*	92500*
Lead	mg/kg	35.6	105	113	92.7	119	857
Magnesium	mg/kg	7150	7920	7050	5940	7970	9430
Manganese	mg/kg	1070	1190	961	1050	1130	1920
Mercury	ug/kg	B 144	B 371	B 224	B 123	B 217	B 329
Nickel	mg/kg	31.0	35.1	31.1	21.8	31.5	47.4
Potassium	mg/kg	2770	1880	2180	2130	1510	1920
Selenium *	mg/kg	1.0	0.76	0.98	1.4	1.8	1.7
Silver	mg/kg	B 0.41	1.1	0.86	1.1	0.69	3.0
Sodium	mg/kg	254	251	243	432	433	310
Thallium *	mg/kg	0.51	U 0.15	U 0.16	U 0.15	U 0.18	0.80
Vanadium	mg/kg	32.5	36.9	33.2	22.2	36.0	50.8
Zinc	mg/kg	228	547	599	391	400	753

U Indicates the value was analyzed for but not detected. The sample Reporting Limit has been corrected for dilution and for percentage moisture as set forth in EPA SW-846

B = Indicates an estimated value. The result is less than the Reporting Limit but greater than zero.

* Denotes a Dilution Factor of 20 to 1

^ Denotes Graphite Furnace AA Method

* Denotes value was determined by the Method of Standard Additions

**Summary Table of Analytical Data for Metals
from the Union Ship Canal**

METALS	SAMPLE #	USC-7	USC-8	USC-9	USC-9D	USC-10	USC-11
	UNITS						
Aluminum	mg/kg	14900	6830	10700	14200	15500	8660
Antimony	mg/kg	B 0.32	U 0.64	U 0.68	U 0.81	B 0.50	U 0.60
Arsenic	mg/kg	18.2	13.9	15.0	20.3	15.9	13.2
Barium	mg/kg	87.3	52.2	84.7	111	96.3	77.3
Beryllium	mg/kg	0.45	0.49	0.66	0.82	0.64	0.48
Cadmium	mg/kg	1.1	3.0	2.0	2.4	2.1	2.0
Calcium	mg/kg	34000	33900	42400	51800	44300	42400
Chromium	mg/kg	28.6	33.8	34.8	44.0	41.8	32.8
Cobalt	mg/kg	12.2	5.4	8.7	10.9	11.6	7.5
Copper	mg/kg	82.8	71.4	82.7	128	90.4	73.8
Iron	mg/kg	44800	107000*	64400*	84600*	57200*	64600*
Lead	mg/kg	161	9.9	369	418	308	232
Magnesium	mg/kg	7930	5190	7630	9250	8490	5420
Manganese	mg/kg	920	1480	1230	1490	1090	1330
Mercury	ug/kg	B 241	B 409	B 396	B 448	B 318	B 251
Nickel	mg/kg	37.0	19.8	29.9	37.3	39.4	28.2
Potassium	mg/kg	2660	1940	1930	2700	2430	1370
Selenium ^x	mg/kg	1.6	2.3	1.6	2.2	2.2	1.6
Silver	mg/kg	B 0.41	2.3	1.1	1.6	1.1	1.3
Sodium	mg/kg	354	305	276	350	336	309
Thallium ⁺	mg/kg	U 0.17	1.7	1.1	0.99	0.96	0.60
Vanadium	mg/kg	35.0	25.1	33.8	43.0	40.0	29.6
Zinc	mg/kg	542	2480	1030	1240	993	741

U Indicates the value was analyzed for but not detected. The sample Reporting Limit has been corrected for dilution and for percentage moisture as set forth in EPA SW-846.

B = Indicates an estimated value. The result is less than the Reporting Limit but greater than zero.

* Denotes a Dilution Factor of 20 to 1.

^x Denotes Graphite Furnace AA Method.

⁺ Denotes value was determined by the Method of Standard Additions.

APPENDIX B

TEST TRENCH LOGS

TEST PIT LOG

URS
CORPORATION

PROJECT: Union Ship Canal		SHEET: 1 OF 1	
CLIENT: City of Buffalo		JOB NUMBER: 05-000535933.00	
CONTRACTOR: IWR		LOCATION:	
DATE STARTED: 10/2/01		GROUND ELEVATION: 580.67	
DATE COMPLETED: 10/2/01		OPERATOR: Dave Voffmar	
TEST PIT NUMBER: TT-301		GEOLOGIST: John Doerr	
		GROUNDWATER: ~6.5' BGS	

DEPTH	SAMPLE NO.	TYPE	DESCRIPTION
1			0.0-1.5' FILL, Dark brown to brown, silty ash and fine to coarse angular slag and gravel, moist
2			1.5-10.0' FILL, Gray, Silty clay and fine to coarse, cobble, boulder shale gravel. Appears to be reworked Skaneateles Group shale and locally derived clays used as backfill. Moist, wet below 6.5'
4	301	Grab	Sample collected from 4' to 6', for analysis for TOC, VOCs, SVOCs, PCBs/Pest, IAL Metals and CN
5	4-6		
6			Thick appearing brown oily appearing blebs floating on groundwater surface, strong "decaying" odor
7			pH 11.0
8			
9			
10			
11			Trench end at 10' BGS
12			

COMMENTS:

TEST PIT LOG

URS
CORPORATION

PROJECT: Union Ship Canal	SHEET: 1 OF 1
CLIENT: City of Buffalo	JOB NUMBER: 05-000535933 00
CONTRACTOR: IWR	LOCATION:
DATE STARTED: 10/2/01	GROUND ELEVATION: 578.51
DATE COMPLETED: 10/2/01	OPERATOR: Dave Vollmer
TEST PIT NUMBER: TT-302	GEOLOGIST: John Doerr
	GROUNDWATER: ~3.1' BGS

DEPTH	SAMPLE NO. TYPE	DESCRIPTION
0.0-0.5		FILL, Dark brown to brown silty ash, and fine to coarse angular slag and gravel, moist
0.5-9.5		FILL, Light gray, original soils and materials replaced or re cemented. Contains brick, concrete, metal, wood debris in a re cemented matrix.
3.1		Ground water at 3.1 pH 11.5
9.5		No samples collected
9.5		End trench at 9.5' BGS, refusal on re cemented material

COMMENTS.

TEST PIT LOG

URS
CORPORATION

PROJECT: Union Ship Canal

SHEET: 1 OF 1

CLIENT: City of Buffalo

JOB NUMBER: 05-000535933.00

CONTRACTOR: IWR

LOCATION:

DATE STARTED: 10/2/01

GROUND ELEVATION: 580.79

DATE COMPLETED: 10/2/01

OPERATOR: Dave Vollmer

TEST PIT NUMBER: TT-303

GEOLOGIST: John Doerr

GROUNDWATER: -6.7' BGS

DEPTH	SAMPLE NO. TYPE	DESCRIPTION
1		0.0-3.0' FILL, Brown fine sandy silt, and fine to coarse angular gravel, moist
2		
3		3.0-6.0' FILL, Light gray, original soils and materials replaced or recemented. Contains brick, concrete, metal, wood debris in a recemented matrix
4		
5		
6		6.0-9.5' FILL, Brick, concrete, wood metal, some fine to coarse gravel and fine to coarse sand
7		Water at 6.7' pH 11.5
8		
9		No samples collected.
10		End trench at 9.5' BGS
11		
12		

COMMENTS:

TEST PIT LOG

URS
CORPORATION

PROJECT: Union Ship Canal

SHEET: 1 OF 1

CLIENT: City of Buffalo

JOB NUMBER: 05-000535933.00

CONTRACTOR: IWR

LOCATION:

DATE STARTED: 10/2/01

GROUND ELEVATION: 579.75

DATE COMPLETED: 10/2/01

OPERATOR: Dave Vollmer

TEST PIT NUMBER: TT-304

GEOLOGIST: John Doerr

GROUNDWATER: ~6.6' BGS

DEPTH	SAMPLE NO.	TYPE	DESCRIPTION
	304	Grab	0.0-1.0, FILL, Gray brown sandy silt and fine to coarse rounded gravel, moist
1			
2			1.0-9.5: FILL: Dark brown silty ash, and under, slag, concrete, some wood, brick and metal. Moist, wet below 6.6'
3			
4			
5			
6	304		Samples collected for analysis for TOC, VOCs, SVOCs, PCBs/Pest and TAL Metals and CN at 0.0-0.1' and 5' to 7'
7	5-7		Water at 6.6' heavy appearing oil type substance floating on water
8			
9			
10			End trench at 9.5' BGS
11			
12			

COMMENTS:

TEST PIT LOG

URS
CORPORATION

PROJECT: Union Ship Canal	SHEET: 1 OF 1
CLIENT: City of Buffalo	JOB NUMBER: 05-000535933.00
CONTRACTOR: IWR	LOCATION:
DATE STARTED: 10/2/01	GROUND ELEVATION: 580.00
DATE COMPLETED: 10/2/01	OPERATOR: Dave Vollmer
TEST PIT NUMBER: TT-305	GEOLOGIST: John Doarr
	GROUNDWATER: -10.5' BGS

DEPTH	SAMPLE NO.	TYPE	DESCRIPTION
	305	Grab	0.0-2.8. FILL, Dark brown silty ash, cinder, some fine to coarse sand and fine to coarse gravel, moist
1			
2			
3			2.8-6.5 FILL, White to yellow medium to coarse sand, some concrete, lace brick
4			
5			
6			
7			6.5-9.0. FILL, Black silty ash and cinder, some fine to coarse to cobble slag, moist
8			Samples collected for analysis for TCL VOCs, SVOCs, PCBs/Pest and TAL Metals and CN at 0.0-0.1' and 9' to 11'.
9			9.0-10.5 PEAT; Brown, some original wood, gray clay partings
10	305		
	3-11		
11			10.5-11.5. Gray, fine SILTY SAND, some clay, wet
12			End trench at 11.5' BGS

COMMENTS:

TEST PIT LOG

URS
CORPORATION

PROJECT: Union Ship Canal		SHEET: 1 OF 1
CLIENT: City of Buffalo	JOB NUMBER:	05-000535933.00
CONTRACTOR: IWR	LOCATION:	
DATE STARTED: 10/3/01	GROUND ELEVATION:	578.12
DATE COMPLETED: 10/3/01	OPERATOR:	Dave Vollmer
TEST PIT NUMBER: TT-306	GEOLOGIST:	R. Murphy
	GROUNDWATER:	~11.0' BGS

DEPTH	SAMPLE NO.	TYPE	DESCRIPTION
	306	Grab	0.0-3.0: FILL; Dark Brown silty fine sand, some fine to coarse gravel, trace concrete and brick, moist
1			
2			
3			3.0-7.0: FILL; Light gray, original soils and materials replaced or recemented. Contains brick, concrete, metal, wood debris in a recemented matrix.
4			
5			
6			
7			7.0-9.0: PEAT; Brown, some original wood, gray clay partings.
8			Samples collected for analysis for TCL VOCs, SVOCs, PCBs/Pest and TAL Metals and CN at 0.0-0.1' and 9' to 11'.
9			9.0-12.0: Gray, fine SILTY SAND, some clay, wet.
10	306	9-11	
11			Water at 11.0' pH 7.0 sheen and "heavy" floaters noted.
12			End trench at 12.0' BGS.

COMMENTS:

TEST PIT LOG

URS
CORPORATION

PROJECT: Union Ship Canal		SHEET: 1 OF 1
CLIENT: City of Buffalo	JOB NUMBER:	05-000535933.00
CONTRACTOR: IWR	LOCATION:	
DATE STARTED: 10/3/01	GROUND ELEVATION:	579.18
DATE COMPLETED: 10/3/01	OPERATOR: Dave Vollmer	
TEST PIT NUMBER: TT-307	GEOLOGIST: R. Murphy	
		GROUNDWATER: None encountered

DEPTH	SAMPLE NO.	TYPE	DESCRIPTION
1	307	Grab	0.0-2.0. FILL. Dark Brown silty fine sand, some fine to coarse angular to subrounded gravel, cobble boulder, subrounded to rounded gravel, some wood
2			2.0-3.0' FILL; Gray fine to medium sand, some silt and clay
3	307		3.0-6.0 FILL, Gray, Silty clay and fine to coarse, cobble, boulder shale gravel. Appears to be reworked Skaneateles Group shale and locally derived clays used as backfill
4	2.5-4		Samples collected for analysis for TCL VOCs, SVOCs, PCBs/Post and TAL Metals and CN at 0.0-0.1' and 2.5' 4'
5			
6			6.0-8.0: PEAT. Brown, some original wood, gray clay partings
7			
8			8.0-13.5. Gray, fine SILTY SAND, some clay, moist
9			
10			
11			
12			End trench at 13.5'

COMMENTS

TEST PIT LOG

URS
CORPORATION

PROJECT: Union Ship Canal		SHEET: 1 OF 1
CLIENT: City of Buffalo	JOB NUMBER:	05-000535933.00
CONTRACTOR: IWR	LOCATION:	
DATE STARTED: 10/3/01	GROUND ELEVATION:	577.61
DATE COMPLETED: 10/3/01	OPERATOR: Dave Vollmer	
TEST PIT NUMBER: TT-308	GEOLOGIST: R. Murphy	
		GROUNDWATER: None Encountered

DEPTH	SAMPLE NO.	TYPE	DESCRIPTION
1	308	Grab	0.0-0.5. FILL, Red brown fine to coarse gravel, some cobble and fine silty sand, moist. Silt from drop pile
2			0.5-0.8. FILL, Dark gray imbricated coarse gravel, some fine silty sand, moist
3			0.8-3.0 FILL; Mottled gray and black fine sand, some silt, trace clay, moist
4	308		3.0-5.0. FILL, sand as above, black
5	3-5		Samples collected for analysis for TCL VOCs, SVOCs, PCBs/Pest and IAL Metals and CN at 0.0-0.1' and 3'-5'
6			5.0-5.3- PFAT; Brown, some original wood, gray clay partings
7			5.3-9.0- Gray SILTY CLAY, well laminated, some black partings
8			
9			
10			End trench at 9.0' BGS
11			
12			

COMMENTS:

TEST PIT LOG

URS
CORPORATION

PROJECT: Union Ship Canal		SHEET: 1 OF 1
CLIENT: City of Buffalo	JOB NUMBER:	05-000535933.00
CONTRACTOR: IWR	LOCATION:	
DATE STARTED: 10/3/01	GROUND ELEVATION:	580.57
DATE COMPLETED: 10/3/01	OPERATOR:	Dave Vollmer
TEST PIT NUMBER: TT-309	GEOLOGIST:	R. Murphy
	GROUNDWATER:	None Encountered

DEPTH	SAMPLE NO.	TYPE	DESCRIPTION
1	309	Grab	0.0-0.5' FILL; Brown silty ash and fine sand, dry
2			0.5-1.0' FILL; Gray to dark gray fine angular gravel, trace fine sand, pea gravel, moist
3			1.0-2.0' FILL, Light gray and medium blue, original soils and materials replaced or recemented.
4			Contains brick, concrete, metal, wood debris in a recemented matrix.
5			2.0-9.0' Gray SILTY CLAY, well laminated, some black partings
6			
7			
8			Samples collected for analysis for TCL VOCs, SVOCs, PCBs/Pest and TAL Metals and CN at 0.0-0.1' and 9'-11'
9			
10	309		9-9.5' PEAT- brown, some branches, twigs, pinches out to the west
11	9-11		9.5-12.0' Gray to light brown fine SILTY SAND moist
12			End trench at 12' BGS

COMMENTS:

TEST PIT LOG

URS
CORPORATION

PROJECT: Union Ship Canal		SHEET: 1 OF 1	
CLIENT: City of Buffalo		JOB NUMBER: 05-000535933.00	
CONTRACTOR: IWR		LOCATION:	
DATE STARTED: 10/3/01		GROUND ELEVATION: 580.42	
DATE COMPLETED: 10/3/01		OPERATOR: Dave Voilmer	
TEST PIT NUMBER: TT-310		GEOLOGIST: R. Murphy	
		GROUNDWATER: None Encountered	

DEPTH	SAMPLE NO.	TYPE	DESCRIPTION
1		Grab	0.0-1.0' FILL; Dark brown silty fine sand, trace fine to coarse gravel, dry
2			1.0-2.0' FILL; Light gray and medium blue, original soils and materials replaced or recemented Contains brick, concrete, metal, wood debris in a recemented matrix
3			
4			4.0-7.0' Gray SILTY CLAY, well laminated, some black partings
5			
6			
7			7.0-8.0' PEAT, brown, some branches, twigs
8			8.0-14.0' Gray to light brown fine SILTY SAND, moist
9			
10			
11	310	10-12'	Sample collected for analysis for TCL VOCs, SVOCs, PCBs/Pest and TAL Metals and CN at 10'-12'
12			End trench at 14' BGS

COMMENTS:

TEST PIT LOG

URS
CORPORATION

PROJECT: Union Ship Canal		SHEET: 1 OF 1	
CLIENT: City of Buffalo		JOB NUMBER: 05-000535933.00	
CONTRACTOR: IWR		LOCATION:	
DATE STARTED: 10/3/01		GROUND ELEVATION: 580.27	
DATE COMPLETED: 10/3/01		OPERATOR: Dave Vollmer	
TEST PIT NUMBER: TT-311		GEOLOGIST: R. Murphy	
		GROUNDWATER: None Encountered	

DEPTH	SAMPLE NO.	TYPE	DESCRIPTION
		Grab	0-0.1-0' Fill ; red brown fine to coarse sand and fine rounded gravel, dry
1			1.0-5.0 FILL; Medium blue to light gray, original soils and materials replaced or recemented. Contains brick, concrete, metal, wood debris in a recemented matrix.
2			
3	311		Sample collected for analysis for TCL VOCs, SVOCs, PCBs/Pest and TAL Metals and CN at 3'-4'
4	3-4		
5			5.0-7.0. Gray CLAY, some silt, hard, moist
6			
7			7.0-9.0. PEAT: brown, some branches, twigs
8			
9			
10			9.0-12.0: Gray to light brown fine SILTY SAND, moist
11			
12			End trench at 12' BGS

COMMENTS:

TEST PIT LOG

URS
CORPORATION

PROJECT: Union Ship Canal		SHEET: 1 OF 1	
CLIENT: City of Buffalo		JOB NUMBER: 05-000535933.00	
CONTRACTOR: IWR		LOCATION:	
DATE STARTED: 10/3/01		GROUND ELEVATION: 580.89	
DATE COMPLETED: 10/3/01		OPERATOR: Dave Vollmer	
TEST PIT NUMBER: TT-312		GEOLOGIST: R. Murphy	
		GROUNDWATER: ~7' BGS	

DEPTH	SAMPLE NO.	TYPE	DESCRIPTION
1		Grab	0.0-0.5: FILL; Gray, fine to coarse subangular to subrounded gravel, some fine silty sand, dry 0.5-1.0: FILL; Gray to dark gray fine angular gravel, trace fine sand, pea gravel, moist 1.0-3.0: FILL; Dark gray subangular boulder cobble gravel, some fine sand, moist
2			
3			
4			3.0-7.0: FILL; Mottled gray and black grading down to black fine sand. Strong petroleum "foundry sand odor, wet at 7"
5			
6			
7			Samples collected for analysis for TCL VOCs, SVOCs, PCBs/Pest and TAL Metals and CN at 5-7" 7.0-10.0: Gray CLAY, some silt, hard, moist
8			
9			
10			
11			10.0-12.0: Gray to light brown fine SILTY SAND, moist
12			
			End trench at 12' BGS

COMMENTS:

TEST PIT LOG

URS
CORPORATION

PROJECT: Union Ship Canal		SHEET: 1 OF 1
CLIENT: City of Buffalo	JOB NUMBER:	05-000535933.00
CONTRACTOR: IWR	LOCATION:	
DATE STARTED: 10/4/01	GROUND ELEVATION:	580.03
DATE COMPLETED: 10/4/01	OPERATOR: Dave Vollmer	
TEST PIT NUMBER: TT-313	GEOLOGIST: J. Doerr	
	GROUNDWATER: -2' BGS	

DEPTH	SAMPLE NO	TYPE	DESCRIPTION
1			0.0-1.0: FILL, Gray, fine to coarse subangular to subrounded gravel, some fine silty sand, dry
2			1.0-4.0: FILL, Gray to dark gray fine angular gravel, trace fine sand, pea gravel, moist
3			Water at 2', pH 9.0
4			Refusal on concrete foundation at 4'
5			
6			
7			
8			
9			
10			
11			
12			

COMMENTS

TEST PIT LOG

URS
CORPORATION

PROJECT: Union Ship Canal

SHEET: 1 OF 1

CLIENT: City of Buffalo

JOB NUMBER: 05-000535933 00

CONTRACTOR: IWR

LOCATION:

DATE STARTED: 10/4/01

GROUND ELEVATION: 580.57

DATE COMPLETED: 10/4/01

OPERATOR: Jim Bucki

TEST PIT NUMBER: TT-314

GEOLOGIST: J. Doerr

GROUNDWATER: 6'BGS

DEPTH	SAMPLE NO. TYPE	DESCRIPTION
1		0 0-4 0: FILL; Dark brown to dark gray silty fine to coarse sand, assorted fine to boulder size gravel, concrete, brick, metal, wood, slag.
2		
3		
4		4 0-6.0. FILL; light gray original soils and materials replaced or recemented.
5		Contains brick, concrete, metal, wood debris in a recemented matrix.
6	314	6.0-15.0. FILL. Dark brown fine to coarse to boulder gravel some fine to coarse sand. Drum located at - 8'
7	6-7	5 gallon container recovered for analysis. Large Metal container located from 8 to 11'. Wet at 6'
8		Strong "caustic" odor, green, pH 11.5
9		Sample collected for analysis for TCL VOCs, SVOCs, PCBs/Pest and TAL Metals and CN at 6' 7'
10		
11		
12		End trench at 15'

COMMENTS:

TEST PIT LOG

URS
CORPORATION

PROJECT: Union Ship Canal

SHEET: 1 OF 1

CLIENT: City of Buffalo

JOB NUMBER: 05-008535833.00

CONTRACTOR: IWR

LOCATION:

DATE STARTED: 10/4/01

GROUND ELEVATION: 579.48

DATE COMPLETED: 10/4/01

OPERATOR: Dave Vollmer

TEST PIT NUMBER: TT-315

GEOLOGIST: John Doerr

GROUNDWATER: ~6.0' BGS

DEPTH	SAMPLE NO. TYPE	DESCRIPTION
1		0.0-0.5. FILL. Red brown fine to coarse gravel, some cobble and fine silty sand, moist. Stuff from ore pile
2		0.5-15.0. FILL, Gray, Silty clay and fine to coarse, cobble, boulder shale gravel. Appears to be reworked
3		Skaneateles Group shale and locally derived clays used as backfill. Moist, wet below 6.5'
4		
5		
6		Water at 6.0' pH 11.0
7		No samples collected
8		
9		
10		
11		
12		End trench at 15' BGS

COMMENTS:

TEST PIT LOG

URS
CORPORATION

PROJECT: Union Ship Canal		SHEET: 1 OF 1
CLIENT: City of Buffalo	JOB NUMBER: 05-000535933.00	
CONTRACTOR: IWR	LOCATION:	
DATE STARTED: 10/4/01	GROUND ELEVATION: 580.43	
DATE COMPLETED: 10/4/01	OPERATOR: Dave Vollmer	
TEST PIT NUMBER: TT-316	GEOLOGIST: John Doerr	
		GROUNDWATER: -5.5' BGS

DEPTH	SAMPLE NO.	TYPE	DESCRIPTION
1			0.0-1.0: FILL, Gray, silty ash, and fine to coarse angular slag and gravel, moist
2			1.0-3.5: FILL; Light gray, original soils and materials replaced or recemented. Contains brick, concrete metal, wood debris in a recemented matrix.
3			
4			3.5-5.5 FILL, Brown silty ash, cinders, brick metal concrete slag
5			
6			5.5-11.0. FILL, Light gray, original soils and materials replaced or recemented. Contains brick, concrete metal, wood debris in a recemented matrix.
7			Groundwater at 5.5. pH 11.5
8			
9			No samples collected
10			
11			End trench at 11.0. *Refusal on recemented material
12			

COMMENTS:

TEST PIT LOG

URS
CORPORATION

PROJECT: Union Ship Canal

SHEET: 1 OF 1

CLIENT: City of Buffalo

JOB NUMBER: 05-000535933.00

CONTRACTOR: IWR

LOCATION:

DATE STARTED: 10/4/01

GROUND ELEVATION: 579.37

DATE COMPLETED: 10/4/01

OPERATOR: Dave Volmer

TEST PIT NUMBER: TT-317

GEOLOGIST: John Doerr

GROUNDWATER: None Encountered

DEPTH	SAMPLE NO.	TYPE	DESCRIPTION
1			0.0-1.8: FILL; Gray, silty ash, and fine to coarse angular slag and gravel, moist
2			1.8-2.0: FILL; Black, coal and coal dust, moist
3			2.0-8.0: FILL; Light gray, original soils and materials replaced or recemented. Contains brick, concrete, metal, wood debris in a recemented matrix
4			
5			
6			
7			
8			End trench at 8' BGS, refusal on recemented material.
9			
10			
11			
12			

COMMENTS

TEST PIT LOG

URS
CORPORATION

PROJECT: Union Ship Canal		SHEET: 1 OF 1
CLIENT: City of Buffalo	JOB NUMBER: 05-000535933.00	
CONTRACTOR: IWR	LOCATION:	
DATE STARTED: 10/4/01	GROUND ELEVATION: 580.14	
DATE COMPLETED: 10/4/01	OPERATOR: Dave Vollmer	
TEST PIT NUMBER: TT-318	GEOLOGIST: John Doerr	
	GROUNDWATER: None Encountered	

DEPTH	SAMPLE NO.	TYPE	DESCRIPTION
1			0 0-2 0 FILL ; Gray, silty ash, and fine to coarse angular slag and gravel, moist
2			2 0-8 0 FILL, light gray original soils and materials replaced or recemented. Contains brick, concrete metal, wood debris in a recemented matrix
3			
4			
5			
6			
7			
8			End trench at 8' BGS, refusal on recemented material
9			
10			
11			
12			

COMMENTS:

APPENDIX C

BORING LOGS

Test Boring Log

Project Hanna Furnace				Boring/Wall No. MW-101		Project No. 7169-40	
Client NYSDEC		Site Hanna Furnace Flue Ash			Sheet No. 1 of 1		
Logged By B. Butler		Ground Elevation 582.8		Start Date 10/20/94		Finish Date 10/20/94	
Drilling Contractor Advanced Drilling Invest			Driller's Name Brian Lambert		Rig Type Mobile B-57		
Drilling Method H.S.A			Protection Level C Dermal		Casing Size 4.25" ID		Auger Size →
Soil Drilled 1415		Rock Drilled N/A		Total Depth 1415		Depth to Groundwater/Date 8' + rising 10/20/94	
						Piez ☐ Well ☐ Boring ☒	

Depth (Feet)	Sample No. & Penetration/Recovery (Feet)	Sample Type	SPT Blows/6" or Core Rec./Req. %	SPT-N (Blows/FL)	Graphic Log	Sample Description	USCS Group Symbol	Notes on Drilling	Monitoring (ppm)		Lab Tests
									PI Meter Field Scan	PI Meter Head Space	
0	S-1		3-5-8-36	13		0-0.5' black to v. dark grey gravel/w silt, slag, coal ash moist 0-0.9' Grey gravel/w silt, dry	Fill		NR	NR	REF 63101 XN 694 XA
1	0.9/2.0	spt									
2	S-2		11-11-18-36	29		gray-brown, blocky silt-like material/w white horizontal laminae, grading @ 1' to dark green and black crumbly material w white laminae. Dry			NR	NR	
4	S-3		20-38-39-32	77		0-0.5' black crumbly material as above. 0.5-1.5' grey crumbly material as above grading to tan Dry			NR	NR	
6	S-4		23-25-36-42	61		0-1.0' Grey fine grained material as above. 1.0-1.2' black bony wet. 1.2-1.8' calc. fine sand/w 50-60% sand, wet			NR	NR	
8	S-5		13-17-21-47	38		Fine cemented sand to silt like material/w soft "rotten" CS sand to fine gravel frags. black/green to lt grey/brown.			NR	NR	
10	S-6		100 for 0.4'	Recoil		As above. One black frag. wetted/w paper thin white flaky coating. Slag frags, some bright red in color wet			NR	NR	
12	S-7		14-12-7-17	19		As above, color changing from black/Dk green down to green wet.			NR	NR	
14						Advanced w/o sampling to 15' BGS					
16						BOB					

ABB Environmental Services

Test Boring Log

Project Hanna Furnace				Boring/Well No. MW-103		Project No. 7164-40	
Client NYSDEC			Site Hanna Furnace Landfill			Sheet No. 1 of 1	
Logged By B. Butler		Ground Elevation 520.3		Start Date 10/20/94		Finish Date 10/20/94	
Drilling Contractor Advanced Drilling Invest.			Driller's Name Brian Lambert			Rig Type Mobile B-57	
Drilling Method H.S.A			Protection Level C Normal		P.I.D. (in) 10.0		Casing Size NA
Soil Drilled 15'		Rock Drilled N/A		Total Depth 15'		Depth to Groundwater/Date ~6.00' BTOR @ 10/20/94	
						Piez	Well Boring
						☐	☒ ☐

Depth (Feet)	Sample No. & Penetration/ Recovery (Feet)	Sample Type	SPT Blows/6" or Core Rec. (Feet)	SPT-N (Blows/Feet)	Graphic Log	Sample Description	USCS Group Symbol	Notes on Drilling	Monitoring (ppm)		Lab Tests
									PI Meter Field Scan	PI Meter Head Space	
0	S-1 1.4 2.0	spt	7-30-64-34	94		0-0.9' - v. dk. brown to black fine to gravelly slag, 0.1-1.0' yellow tan cemented material, 1.0-1.4' dk brown to black slag, metallic fragments.	Fill		NA		
2	S-2 1.2 2.0	spt	24/12/17-17	29		0-0.3' as above. 0.3-0.5' gray-green crumbly slag. 0.5-1.2' dk brown/black/purple moist slag, fine to coarse grained.			NA		
4	S-3 0.5 2.0	spt	12-10-24-54	34		Wet gray to black and white angular slag fragments in black silt-like matrix. v. loose.			NA		
6	S-4 0.5 2.0	spt	28-48-11-4	59		As Above, more saturated			NA		
8	S-5 1.6 2.0	spt	3-2-3-4	5		Black to dk brown piecey organic silt / lot of wood, roots.	ML		NA		
10	S-6 1.2 2.0	spt	4-4-10-10	14		As Above grading down to grey-brown silt, wet.			NA		
12	S-7 1.1 2.0	spt	10-11-26-27	37		Gray-brown mottled silt / w/ oxide staining, root holes, fractured.			NA		
14						Advanced/wo Sampling to 15' bgs					
16						BOB					

ABB Environmental Services

URS Corporation										TEST BORING LOG			
PROJECT: Union Ship Canal										BORING NO. BH-301			
CLIENT: City of Buffalo										SHEET: 1 of 1			
BORING CONTRACTOR: SJB Services										JOB NO. 05JCK035933.00			
GROUNDWATER:										BORING LOCATION:			
DATE										GROUND ELEVATION: 80.3			
TIME										DATE STARTED: 10/10/01			
LEVEL										DATE FINISHED: 10/10/01			
TYPE										DRILLER: S. Wolkevicz			
TYPE										GEOLOGIST: J. Doerr			
DIA.										REVIEWED BY: D. Lunkardt			
WT.													
FALL													
* POCKET PENETROMETER READING													
DEPTH FEET	SAMPLE					DESCRIPTION					REMARKS		
	SIRATA	NO.	TYPE	BLOWS PER 6"	RECOVERY RQD	COLOR	CONSISTENCY HARDNESS	MATERIAL DESCRIPTION	USCS	PH	WETNESS		
5		1	SS	5 21	90%	Black	Very Dense	0.0-1.2 FILL, fine to coarse sand, some silt and gravel	PT/ MH	11.0	Dry ↓ Moist ↓ Wet ↓ Moist ↓ Wet		
		2	SS	17 50/2	100%	Mottled Red / Black	1.2-2.2 FILL, Metallic sand, trace metal						
		3	SS	32 90/1	100%	Black	2.2-6.0 FILL, Silty ash and rusty metal debris						
		4	SS	25 34 27 18	100%	Black	6.0-8.0 FILL, Silty ash and some metallic sand						
10		5	SS	5 9	100%	Brown	Medium Dense	PEAT, some - 3" thick clay inclusions, some twigs, branches, wood	PT/ MH	11.0			
15								Boring ended at 10' BGS					
20													
25													
30													
35													

Comments: Boring advanced using a truck mounted Anchor Soil Max drilling utilizing
4 1/4" HSA and split spoon samplers. Samples collected from 0.0' to 0.2' and from
1' to 6' for laboratory analysis

PROJECT NO. 05JCK035933.00
BORING NO. BH-301

URS Corporation										TEST BORING LOG			
PROJECT: Union Ship Canal										BORING NO: BH-302			
CLIENT: City of Buffalo										SHEET: 1 of 1			
BORING CONTRACTOR: SJB Services										JOB NO.: 0600035933.00			
GROUNDWATER:										BORING LOCATION:			
					CAS.	SAMPLER	CORE	TUBE	GROUND ELEVATION: 579.2				
DATE	TIME	LEVEL	TYPE	TYPE		Split spoon			DATE STARTED: 10/10/01				
				DIA.		2"			DATE FINISHED: 10/10/01				
				WT.		140#			DRILLER: S. Wolkowicz				
				FALL		30"			GEOLOGIST: J. Doerr				
* POCKET PENETROMETER READING										REVIEWED BY: D. Lenhardt			
SAMPLE										DESCRIPTION			
DEPTH FEET	STRATA	NO	TYPE	BLOWS PER 6"	BRANDY RQD	COLOR	CONSISTENCY HARDNESS	MATERIAL DESCRIPTION		USCS	REMARKS		
5		1	SS	8 12 10 8	50%	Brown	Medium	0.0-0.8 FILL: fine to coarse sand, some silt and gravel		PT	0.0	Dry	
		2	SS	9 7 5 5	20%	Black	Dense	0.8-2.0 FILL: Silty ash, and gravel			0.0	Moist	
		3	SS	40 23 32 50/3	80%	Brown	Very	2.0-4.8 FILL: Coarse sand, trace brick and concrete			0.0		
		4	SS	31 7 6 5	80%	Black	Dense	4.8-7.0 FILL: Coarse sand, trace organic debris, strong "coke" odor			0.0	Wet	
						Brown	Dense	7.0-8.0 Peat, some twigs, branches					
10								Boring Ended at 8' BGS					
15													
20													
25													
30													
35													
Comments: Boring advanced using a truck mounted Acker Soil Max drilling utilizing 4 1/4" HSA and split spoon samplers. Samples collected from 0.0' to 0.2' and from 4' to 6' for laboratory analysis.										PROJECT NO. 0600035933.00			
										BORING NO. BH-302			

URS Corporation										TEST BORING LOG			
PROJECT: Union Ship Canal										BORING NO. BH-303			
CLIENT: City of Buffalo										SHEET 1 of 1			
BORING CONTRACTOR: SJB Services										JOB NO. 050035933.00			
GROUNDWATER:										BORING LOCATION:			
CAS. SAMPLER CORE TUBE										GROUND ELEVATION: 581.1			
DATE	TIME	LEVEL	TYPE	TYPE			Split spoon			DATE STARTED 11/10/05			
				DIA.			7"			DATE FINISHED: 10/10/05			
				WT.			140#			DRILLER: S. Wolfgruber			
				FALL			30"			GEOLOGIST: J. Doerr			
* POCKET PENETROMETER READING										REVIEWED BY: D. Lenhardt			
DEPTH FEET	SAMPLE					DESCRIPTION					REMARKS		
	STRATA	NO	TYPE	BLOWS PER 6"	RECOVERY RQD	COLOR	CONSISTENCY HARDNESS	MATERIAL DESCRIPTION	USCS	PID	weather		
		1	SS	22	50/4	30%	Dark Gray	Very Dense	0.0-2.0 FILL, Silty sand, some fine to coarse slag gravel		0.0	Dry ↓ Moist ↓ Wet	
		2	SS		50/1	20%	Blue Gray	↓	2.0-4.0 Recemented/recrystallized contains brick concrete, wood		0.0		
5		3	SS	4	3	100%	Black	Loose	4.0-5.5 FILL, silty ash, trace slag gravel greasy, oily appearance strong coke odor		1.0		
		4	SS	1	1	100%	Gray	Very Soft	5.5-6.8 SILTY CLAY	CL	0.0		
				1	1		Brown	Soft	6.8-8.0 PEAT	PT			
10													
15													
20													
25													
30													
35													
Comments: Boring advanced using a truck mounted Acker Soil Max drill rig utilizing 4 1/4" HSA and split spoon samplers. Samples collected from 0.0' to 0.2' and from 4' to 6' for laboratory analysis										PROJECT NO. 050035933.00			
										BORING NO. BH-303			

URS Corporation										TEST BORING LOG																									
PROJECT: Union Ship Canal										BORING NO: BH 304																									
CLIENT: City of Buffalo										SHEET: 1 of 1																									
BORING CONTRACTOR: SJB Services										JOB NO: 0500035933.00																									
GROUNDWATER										BORING LOCATION																									
CAS										GROUND ELEVATION: 560.6																									
SAMPLER										DATE STARTED: 10/10/01																									
CORE										DATE FINISHED: 10/10/01																									
TUBE										DRILLER: S. Wolkiewicz																									
DATE										GEOLOGIST: J. Doerr																									
TIME										REVIEWED BY: D. Lenhardt																									
LEVEL										* POCKET PENETROMETER READING																									
TYPE																																			
TYPE DIA.																																			
WT.																																			
FALL																																			
<table border="1"> <thead> <tr> <th rowspan="2">DEPTH FEET</th> <th rowspan="2">STRATA</th> <th colspan="4">SAMPLE</th> <th colspan="4">DESCRIPTION</th> <th colspan="2">REMARKS</th> </tr> <tr> <th>NO.</th> <th>TYPE</th> <th>BLOWS PER 6"</th> <th>RECOVERED RQD</th> <th>COLOR</th> <th>CONSISTENCY HARDNESS</th> <th>MATERIAL DESCRIPTION</th> <th>USCS</th> <th>PID</th> <th>MOISTURE</th> </tr> </thead> </table>														DEPTH FEET	STRATA	SAMPLE				DESCRIPTION				REMARKS		NO.	TYPE	BLOWS PER 6"	RECOVERED RQD	COLOR	CONSISTENCY HARDNESS	MATERIAL DESCRIPTION	USCS	PID	MOISTURE
DEPTH FEET	STRATA	SAMPLE				DESCRIPTION				REMARKS																									
		NO.	TYPE	BLOWS PER 6"	RECOVERED RQD	COLOR	CONSISTENCY HARDNESS	MATERIAL DESCRIPTION	USCS	PID	MOISTURE																								
		1	SS	18 21	40%	Brown	Dense	0.0-2.4 FILL, Silty Sand and fine to coarse slag gravel, trace wood		0.0	Dry																								
		2	SS	37 24	75%	Yellow	Medium	2.4-4.6 FILL, Medium to coarse sand some silt		0.0	Moist																								
5		3	SS	13 7	75%	Gray	Dense	4.6-6.0, SILTY CLAY, trace fine gravel	CL	0.0																									
		4	SS	4 5	50%			6.0-8.0 Fine to coarse SAND some silt and wood	SW	0.0	Wet																								
		5	SS	32 12	5%			9.0-10.0 Coarse SAND and fine to coarse rounded gravel		0.0																									
10		6	SS	5 4	15%		Medium	10.0-14.0 SILTY CLAY, some fine sand partings	CI	0.0	Moist																								
		7	SS	4 7	60%		Soft			0.0																									
				10 2			Stiff																												
15								End boring at 14' RGS																											
20																																			
25																																			
30																																			
35																																			

Comments: Boring advanced using a truck mounted Acker Soil Max drilling utilizing 4 1/4" HSA and split spoon samplers. Samples collected from 0' to 0.2' and from 6" to 8" for laboratory analysis.

PROJECT NO. 0500035933.00
BORING NO BH-304

URS Corporation										TEST BORING LOG			
PROJECT: Union Ship Canal										BORING NO BH-305			
CLIENT: City of Buffalo										SHEET 1 of 1			
BORING CONTRACTOR: SJB Services										JOB NO.: 0500035833.00			
GROUNDWATER:										BORING LOCATION:			
CAS SAMPLER CORE TUBE										GROUND ELEVATION: 579.4			
DATE	TIME	LEVEL	TYPE	TYPE		Split spoon				DATE STARTED: 10/10/01			
				DIA.		2"				DATE FINISHED: 10/10/01			
				WT.		140#				DRILLER: S. Wolkiewicz			
				FALL		30"				GEOLOGIST: J. Dorr			
* POCKET PENETROMETER READING										REVIEWED BY: D. Lenhardt			
DEPTH FEET	STRATA	SAMPLE				DESCRIPTION				USCS	REMARKS		
		NO.	TYPE	BLOWS PER FT	RECOVERY RQD	COLOR	CONSISTENCY	MATERIAL DESCRIPTION	PID		MOISTURE		
	[Pattern]	1	SS	8 14	20%	Gray-Brown	Medium Dense	0.0-3.0 FILL, Silty sand and fine angular gravel, some coarse gravel		0.0	↓ Dry ↓ Moist ↓ Wet ↓ Moist		
2		SS	12 5	25%	Gray-Brown	Loose		0.0					
5		3	SS	3 2	0%	Yellow Brown	Very Loose	3.0-7.8 FILL, Medium to coarse sand some brick and wood		0.0			
		4	SS	3 2	5%	Brown	Silt			0.0			
	[Pattern]	5	SS	2 1	75%	Gray/Brown	Very Soft	7.8-9.6 PEAT some twigs, branches	PT	0.0	Wet		
10		6	SS	4 4	90%	Gray	Stiff	9.6-11.8 PEAT and interbedded clay	PT/CL	0.0			
	[Pattern]	7	SS	6 5	40%			11.8-12.5 Fine to medium SAND	CL	0.0	Moist		
								12.5-14.0 SILTY CLAY					
15								End boring at 14' BGS					
20													
25													
30													
35													
40													

Comments: Boring advanced using a truck mounted Ackel Soil Max drill rig utilizing
4 1/4" HSA and split spoon samplers. Samples collected from 0.0' to 0.2' and from
12' to 14' for laboratory analysis.

PROJECT NO. 0500035833.00
BORING NO BH-305

URS Corporation										TEST BORING LOG			
PROJECT Union Ship Canal										BORING NO. BH-306			
CLIENT City of Buffalo										SHEET 1 of 1			
BORING CONTRACTOR SJB Services										JOB NO. 050035933.00			
GROUNDWATER:										BORING LOCATION:			
CAS. SAMPLER CORE TUBE										GROUND ELEVATION 579.5			
DATE	TIME	LEVEL	TYPE	TYPE		Split spoon				DATE STARTED 10/11/01			
				DIA.		2"				DATE FINISHED 10/11/01			
				WT		140#				DRILLER: S. Walkowiak			
				FALL		30"				GEOLOGIST: J. Doerr			
* POCKET PENETROMETER READING										REVIEWED BY: D. Lenhardt			
DEPTH FEET	STRATA	SAMPLE				DESCRIPTION				REMARKS			
		NO.	TYPE	BLOWS PER 6"	RECOVERY RQD	COLOR	CONSISTENCY HARDNESS	MATERIAL DESCRIPTION	USCS	PID	MOISTURE		
		1	SS	37 50/2	42 25%	Gray	Very Dense Loose	0.0-3.6: FILL: Silty sand and fine to coarse angular gravel		0.0	Wet ↓ Dry		
		2	SS	6 4	5 6					0.0			
5		3	SS	7 4	8 4		Stiff	3.6-18.0 FILL: silty clay and fine to coarse, cobble, boulder, shale fragments, backfill with reworked natural materials		0.0			
		4	SS	5 4	5 4					0.0			
		5	SS	3 5	4 5					0.0			
10		6	SS	5 5	5 5					0.0			
		7	SS	5 5	5 12					0.0			
15		8	SS	8 7	7 18					0.0			
		9	SS	50/4		0%	Dark Blue	Very Dense	18.0-26.0 FILL: Silty fine sand, well laminated, strong coke odor, oily appearance, green			0.0	
		10	SS	26 22	6 33	0%	Black	Medium Dense				0.0	
20		11	SS	27 25	24 26	90%		Very Dense				0.0	
		12	SS	26 18	47 13	50%						0.0	
25		13	SS	4 50/4	12	40%	Red/ Black					0.0	
		14	SS	44 50/2	50/2	10%	Multi		26.0-30.0 FILL: silty clayey sand some fine to coarse angular gravel	SP		0.0	
30		15	SS	50/2		10%						0.0	
								End boring at 30' BGS					
35													

Comments: Boring advanced using a truck mounted Acker Soil Max drill rig utilizing
4 1/4" ISA and split spoon samplers. Samples collected from 18' to 20' and from
24' to 26' for laboratory analysis.

PROJECT NO. 050035933.00

BORING NO. BH 306

URS Corporation										TEST BORING LOG																									
PROJECT: Union Ship Canal										BORING NO.: BH 308																									
CLIENT: City of Buffalo										SHEET: 1 of 1																									
BORING CONTRACTOR: SJB Services										JOB NO.: 0500035933.00																									
GROUNDWATER										BORING LOCATION:																									
CAS.										GROUND ELEVATION: 580.3																									
SAMPLER										DATE STARTED: 10/16/01																									
CORE										DATE FINISHED: 10/16/01																									
TUBE										DRILLER: S. Wolkiewicz																									
DATE										GEOLOGIST: J. Onerr																									
TIME										REVIEWED BY: D. Lenhardt																									
LEVEL										* POCKET PENETROMETER READING																									
TYPE																																			
TYPE																																			
DIA.																																			
WT.																																			
FALL																																			
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DEPTH FEET	STRATA	SAMPLE				DESCRIPTION				USCS	REMARKS																								
		NO.	TYPE	BLOWS PER 6"	RECOVERY RQD	COLOR	CONSISTENCY HARDNESS	MATERIAL DESCRIPTION	PID		Location																								
		1	SS			Dark Brown		Surface obstructions; auger to 4'		0.0	Most																								
		2	SS					FILL: Silty sand some fine to coarse subangular to subrounded gravel		0.0																									
5		3	SS	7 6	30%	Gray		4.0-8.8 FILL silty clay some fine to coarse to boulder shale fragments		0.0																									
		4	SS	8 6	40%					0.0																									
				5 5																															
		5	SS	5 4	50%					0.0																									
10				3 5		Brown		3.6-12.0 PEAT, some twigs and branches	PT	0.0																									
		6	SS	2 3	25%					0.0																									
				3 3																															
		7	SS	2 3	30%	Gray/Brown		12.-14.0 Interbedded silty clay and peat	PT/OM	0.0																									
15				3 5		Brown		14.0-16.0: SILTY CLAY	CL	0.0																									
		8	SS	4 8	60%																														
				10 16																															
								End Boring at 16' BGS																											
20																																			
25																																			
30																																			
35																																			

Comments: Boring advanced using a truck mounted Acker Soil Max drill rig utilizing 4 1/4" HSA and split spoon samplers. Samples collected from 8' to 10' for laboratory analysis

PROJECT NO: 0500035933.00
BORING NO.: BH 308

URS Corporation										TEST BORING LOG			
PROJECT: Union Ship Canal										BORING NO: BH-304			
CLIENT: City of Buffalo										SHEET: 1 of 1			
BORING CONTRACTOR: SJB Services										JOB NO.: 0500035933.00			
GROUNDWATER:										BORING LOCATION:			
DATE										GROUND ELEVATION: 570.3			
TIME										DATE STARTED: 10/18/01			
LEVEL										DATE FINISHED: 10/18/01			
TYPE										DRILLER: S. Wolkiewicz			
TYPE										GEOLOGIST: J. Unger			
DIA.										REVIEWED BY: D. Lomhardt			
WT													
FALL													
* POCKET PENETROMETER READING													
SAMPLE										DESCRIPTION			
DEPTH FEET	STRATA	NO	TYPE	BLOWS PER 6"	RECOVERY RQD	COLOR	CONSISTENCY HARDNESS	MATERIAL DESCRIPTION	USCS	REMARKS			
										PID	WGT/WT		
	Δ-Δ-Δ							0.0-3.0: Concrete			Dry		
	Δ-Δ-Δ							↓					
	Δ-Δ-Δ							3.0-3.5: Coarse SAND and GRAVEL	SW	0.0	Wet		
5	Δ-Δ-Δ	1	SS	2	1/18			3.5-8.0: PEAT occasional 3" clay	PT	0.0			
	Δ-Δ-Δ	2	SS	1/24				interbed	↓	0.0			
	Δ-Δ-Δ	3	SS	2	2			↓	CL	0.0			
	Δ-Δ-Δ			5	1+			8.0-5.0 SILTY CLAY					
10													
15													
20													
25													
30													
35													
Comments: Boring advanced using a truck mounted Anker Soil Max drilling utilizing										PROJECT NO. 0500035933.00			
4 1/4" HSA and split spoon samplers. Samples collected from 4' to 6' for										BORING NO. BH-304			
laboratory analysis													

URS Corporation										TEST BORING LOG			
PROJECT: Union Ship Canal										BORING NO: MW-301			
CLIENT: City of Buffalo										SHEET: 1 of 1			
BORING CONTRACTOR: SJB Services										JOB NO.: 0500035933.00			
GROUNDWATER:										BORING LOCATION:			
DATE										GROUND ELEVATION: 575.4			
TIME										DATE STARTED: 10/19/01			
LEVEL										DATE FINISHED: 10/19/01			
TYPE										DRILLER: S Wolkiewicz			
TYPE										GEOLOGIST: J Doerr			
DIA.										REVIEWED BY: D Lenhardt			
WT.													
FALL													
* POCKET PENETROMETER READING													
DEPTH FEET	SAMPLE					DESCRIPTION					REMARKS		
	STRATA	NO.	TYPE	BLOWS PER 6"	RECOVERY RQD	COLOR	CONSISTENCY HARDNESS	MATERIAL DESCRIPTION	USCS	PID	MOISTURE		
	△△△					Gray		0.0-2.75 Concrete					
	△△△					↓							
	△△△												
	△△△												
5	△△△	1	SS	1/24	15%	Brown	Very Soft	3.0-3.5 Coarse SAND and GRAVEL	SW	0.0	Wet		
	△△△	2	SS	1/12	40%	↓	Soft	3.5-8.0 PEAT, occasional 3" clay interbed	PT	0.0			
	△△△	3	SS	1/12			Medium						
	△△△			1	2	Gray	Stiff	8.0-9.0 SILTY CLAY	CL	0.0			
	△△△			4	9								
10													
15													
20													
25													
30													
35													
Comments: Boring advanced using a truck mounted Acker Soil Max drilling utilizing										PROJECT NO. 0500035933.00			
4 1/4" HSA and split spoon samplers. Samples collected from 4' to 6' for										BORING NO. MW-301			
laboratory analysis													

URS Corporation										TEST BORING LOG			
PROJECT: Union Ship Canal										BORING NO: MW-302			
CLIENT City of Buffalo										SHEET: 1 of 1			
BORING CONTRACTOR: SJB Services										JOB NO.: 0500035933.00			
GROUNDWATER:										BORING LOCATION:			
CAS SAMPLER CORE TUBE										GROUND ELEVATION: 575.2			
DATE	TIME	LEVEL	TYPE	TYPE		Split spoon				DATE STARTED: 10/18/01			
				DIA.		2"				DATE FINISHED: 10/18/01			
				WT.		140#				DRILLER: S. Wolkiewicz			
				FALL		30"				GEOLOGIST: J. Doerr			
* POCKET PENETROMETER READING										REVIEWED BY: D. Lenhardt			
SAMPLE										DESCRIPTION			
DEPTH FEET	STRATA	NO.	TYPE	BLOWS PER 6"	IN CORRECTION RQD	COLOR	HARDNESS	MATERIAL DESCRIPTION	USCS	REMARKS			
	△ △ △					Gray		0.0-3.0 Concrete					
	△ △ △					↓							
	△ △ △												
5	○ ○ ○	1	SS	1/24	25%	Brown	Very Soft	3.0-3.5 Coarse SAND and GRAVEL	SW	0.0	Wet		
	○ ○ ○	2	SS	1/24	50%	↓		3.5-8.0 PEAT, occasional 3" clay interbed	PT	0.0			
	○ ○ ○	3	SS	4	6	↓				0.0			
	○ ○ ○			6	16	Gray	Silt	8.0-9.0. SILTY CLAY	CI				
10													
15													
20													
25													
30													
35													
Comments: Boring advanced using a truck mounted Acker Soil Max drilling utilizing 4 1/4" HSA and split spoon samplers. Samples collected from 4' to 6' for laboratory analysis.										PROJECT NO. 0500035933.00			
										BORING NO. MW-302			

URS Corporation										TEST BORING LOG			
PROJECT: Union Ship Canal										BORING NO: MW-303			
CLIENT: City of Buffalo										SHEET: 1 of 1			
BORING CONTRACTOR: SJB Services										JOB NO.: 0500035933 00			
GROUNDWATER:										BORING LOCATION:			
CAS SAMPLER CORE TUBE										GROUND ELEVATION: 576.3			
DATE	TIME	LEVEL	TYPE	TYPE		Split spoon				DATE STARTED: 11/01/01			
				DIA.		2"				DATE FINISHED: 11/01/01			
				WT.		140#				DRILLER: Tony Jakubocha			
				FALL		30"				GEOLOGIST: R. Murphy			
POCKET PENETROMETER READING										REVIEWED BY: D. Lenhardt			
DEPTH FEET	STRATA	SAMPLE					DESCRIPTION					REMARKS	
		NO.	TYPE	BLOWS PER 6"	RECOVERY RQD		COLOR	CONSISTENCY HARDNESS	MATERIAL DESCRIPTION	USCS	PID	WET/DRY	
							Gray		0.0-3.5 Concrete				
5		1	SS	50/5	50/0	15%	Brown	Very Soft	3.5-7.0 PEAT, some woody material	PT	0.0	Wet	
		2	SS	WOH	1	0%							
				1/12									
		3	SS	1	1	33%	Gray	Very Loose	7.0-8.0 Silty fine SAND	SM	0.0		
10				1	1		Greenish	Soft	8.0-13.0 SILTY CLAY with inter	CL	0.0		
		4	SS	WOH	1	60%	Gray		bedded peat layers, trace rounded		0.0		
				2	2				medium gravel				
		5	SS	2	3	90%		Medium			0.0		
				3	3			Stiff	Less Silty				
15									Drilling completed at 13 feet				
20													
25													
30													
35													
Comments: Boring advanced using a CME 75 drill rig utilizing jack hammer, 5 1/2" roller bit, 4" casing and split spoon samplers. Monitoring well - installed in borehole										PROJECT NO: 0500035933 00			
										BORING NO: MW-303			

URS Corporation										TEST BORING LOG			
PROJECT: Union Ship Canal										BORING NO: MW-304			
CLIENT: City of Buffalo										SHEET: 1 of 1			
BORING CONTRACTOR: SJB Services										JOB NO.: 0500035933.00			
GROUNDWATER:										BORING LOCATION:			
CAS										GROUND ELEVATION: 580.2			
SAMPLER										DATE STARTED: 10/12/01			
CORE										DATE FINISHED: 10/15/01			
TUBE										DRILLER: S. Wolkiewicz			
DATE										GEOLOGIST: J. Doerr			
TIME										REVIEWED BY: D. Lenhardt			
LEVEL													
TYPE													
TYPE													
DIA.													
WT.													
FALL													
* POCKET PENETROMETER READING													
DEPTH FEET	SAMPLE					COLOR	CONSISTENCY HARDNESS	MATERIAL DESCRIPTION	USCS	REMARKS			
	STRATA	NO.	TYPE	BLOWS PER 6"	RECOVERY RQD					PID	MOISTURE		
5		1	SS	8 13	50%	Brown Black	Dense	0.0-0.8' FILL; silty sand and gravel		0.0	Moist		
				18 24									
		2	SS	35 27	80%								
				28 17			Very Dense	0.8-2.0' FILL, silty ash and lapidate balls		0.0			
		3	SS	16 40	10%			2.0-6.0' FILL, silty ash and cinder		0.0			
				50/2									
		4	SS	10 11	60%		Medium Dense	8.0-11.4' FILL, Medium to coarse sand and fine slag gravel		0.0			
				14 5									
		5	SS	4 3	75%		Loose			0.0	Wet		
				3 2									
		6	SS	6 8	60%					0.0			
				13 15									
		7	SS	6 12	80%		Hard	11.4-32.0' SILTY CLAY, trace fine rounded gravel	CI	0.0	Moist		
				18 20									
		8	SS	20 27	100%					0.0			
				24 19									
		9	SS	2 4	75%		Stiff			0.0			
				7 8									
		10	SS	3 3	80%		Soft			0.0	Dry		
				4 5									
		11	SS	3 3	90%					0.0			
				4 6									
		12	SS	4 4	100%					0.0	Moist		
				6 7									
		13	SS	WoH 1	100%					0.0			
				2 3									
		14	SS	4 3	100%					0.0			
				4 2									
		15	SS	WoH WoH	100%		Very Soft			0.0	Wet		
				WoH WoH									
		16	SS	WoH WoH	100%					0.0			
				WoH WoH									
		17	SS	3 2	100%		Loose	32.0-36.0' FILL, clayey, silty sand, Some fine angular gravel	SP	0.0			
				3 3									
		18	SS	50/4	100%		Very Dense			0.0	Dry		

Comments: Boring advanced using a truck mounted Acker Soil Max drilling utilizing 4 1/4" HSA and split spoon samplers. Samples collected from 0.0' to 0.2' and from 8' to 8' for laboratory analysis.

PROJECT NO.	0500035933.00
BORING NO.	MW 304

URS Corporation										TEST BORING LOG			
PROJECT: Union Ship Canal										BORING NO: MW-306			
CLIENT: City of Buffalo										SHEET: 1 of 1			
BORING CONTRACTOR: SJB Services										JOB NO.: 0500035933.00			
GROUNDWATER:										BORING LOCATION:			
										GROUND ELEVATION: 580.6			
DATE	TIME	LEVEL	TYPE	TYPE		CAS.	SAMPLER	CORE	TUBE	DATE STARTED 10/16/01			
				DIA.			Split spoon			DATE FINISHED: 10/17/01			
				WT.			140#			DRILLER: S. Wolkiewicz			
				FALL			30"			GEOLOGIST: J. Doerr			
* POCKET PENETROMETER READING										REVIEWED BY: D. Lenhardt			
SAMPLE DESCRIPTION													
DEPTH FEET	STRATA	NO.	TYPE	BLOWS PER 6"	RECOVERY RQD	COLOR	CONSISTENCY HARDNESS	MATERIAL DESCRIPTION		USCS	PID	REMARKS MOISTURE	
		1	SS					Surface littered with concrete, brick auger to 2'			0.0	↓ Moist	
		2	SS	26 16	22 17	60%	Black	Dense	2.0-4.0: FILL; ash, cinder, brick, metal debris		0.0		
5		3	SS	6 8	4 9	50%	Gray	Medium Dense	4.0-8.3: SILTY CLAY, trace fine rounded gravel	CL	0.0		
		4	SS	17 18	14 19	80%		Dense			0.0		
		5	SS	3 4	4 6	90%	Brown w/ Gray	Stiff	8.3-10.2: PEAT, some woody material	PT	0.0		
10		6	SS	3 4	3 9	75%			10.2-12.1: interbedded peat and clay	SW	0.0		
		7	SS	17 19	13 23	75%	Gray	Hard	12.1-13.8: fine SAND, some medium sand, sheer		0.0		Wet
		8	SS	9 19	15 23	80%			13.8-18.0: Silty Clay, trace rounded fine gravel	CL	0.0		Moist Dry
15		9	SS	25 40	39 42	90%					0.0		
20								End Boring at 18' BCS					
25													
30													
35													

Comments: Boring advanced using a truck mounted Acker Soil Max drilling utilizing 4 1/4" HSA and split spoon samplers. Samples collected from 0.0' to 0.2' for laboratory analysis										PROJECT NO. 0500035933.00			
										BORING NO. MW-306			

URS Corporation										TEST BORING LOG			
PROJECT: Union Ship Canal										BORING NO. MW 306			
CLIENT: City of Buffalo										SHEET: 1 of 1			
BORING CONTRACTOR: SJB Services										JOB NO.: 0500035933.00			
GROUNDWATER:										BORING LOCATION:			
CAS. SAMPLER CORE TUBE										GROUND ELEVATION: 578.5			
DATE	TIME	LEVEL	TYPE	TYPE			Split spoon			DATE STARTED: 10/17/01			
				DIA			2"			DATE FINISHED: 10/17/01			
				WT			140#			DRILLER: S. Wolkiewicz			
				FALL			30"			GEOLOGIST: J. Doerr			
* POCKET PENETROMETER READING										REVIEWED BY: D. L. Enhardt			
SAMPLE										DESCRIPTION			
DEPTH FEET	STRATA	NO.	TYPE	BLOWS PER 6"	HI. CON. BY RQD	COLOR	CONSISTENCY HARDNESS	MATERIAL DESCRIPTION		USCS	REMARKS		
						Red/Black		Surface filtered with concrete, brick coarse ore gravel, auger to 4'			U.U.	Moist	
											0.0		
5		3	SS	29 10	50%		Medium	4.0-7.9 Fill, Cinder, some brick, ash angular coarse ore gravel			0.0		
				9 4			Dense				0.0		
		4	SS	3 13	80%						0.0		
				4 2									
		5	SS	2 3	10%	Brown	Very	7.9-9.2 PEAT, some woody material		PT	0.0		
10				11 4		Gray	Stiff	9.2-11.2, fine SAND, some medium sand		SW		Wet	
		6	SS	7 7	90%			11.2-12.0 SILTY CLAY		CI	0.0	Moist	
				10 10									
15													
20													
25													
30													
35													

Comments: Boring advanced using a truck mounted Acker Soil Max drill rig utilizing 4 1/4" HSA and split spoon samplers. Samples collected from 6" to 8" for laboratory analysis.

PROJECT NO. 0500035933.00
BORING NO. MW-306

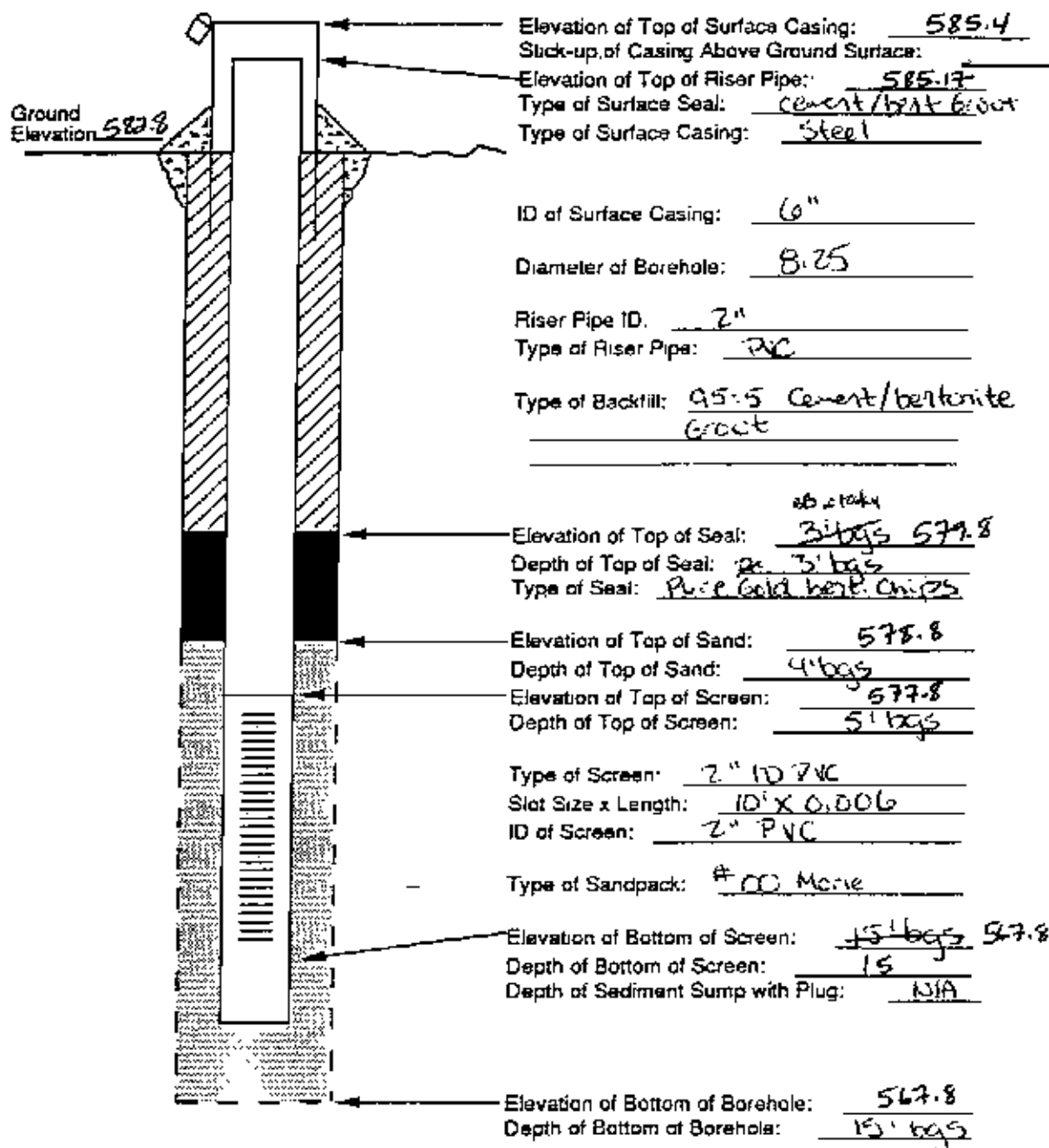
URS Corporation										TEST BORING LOG			
PROJECT: Union Ship Canal										BORING NO: MW-307			
CLIENT: City of Buffalo										SHEET: 1 of 1			
BORING CONTRACTOR: SJB Services										JOB NO.: 0500035933.00			
GROUNDWATER:										BORING LOCATION:			
CAS										GROUND ELEVATION: 580.2			
SAMPLER										DATE STARTED: 10/15/01			
CORE										DATE FINISHED: 10/16/01			
TUBE										DRILLER: S. Wolkiewicz			
DATE										GEOLOGIST: J. Dorn			
TIME										REVIEWED BY: D. Lenhardt			
LEVEL										* POCKET PENETROMETER READING			
TYPE													
TYPE													
WT.													
FALL													
DEPTH													
SAMPLE										DESCRIPTION			
DEPT										REMARKS			
FEET										MATERIAL			
STRATA										DESCRIPTION			
NO.										USCS			
TYPE										PID			
BLOWS										MOISTURE			
PER 6"													
RECOVERY													
RQD													
COLOR													
CONSISTENCY													
HARDNESS													
1										Wood, railroad ties and debris, auger to 2'			
2										2.0-4.0' FILL; silty sand, some coarse angular gravel			
3										4.0-21.7' FILL; silty clay and fine to coarse, cobble, boulder, shale fragments, backfill with reworked natural materials			
4													
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APPENDIX D

MONITORING WELL CONSTRUCTION DETAILS

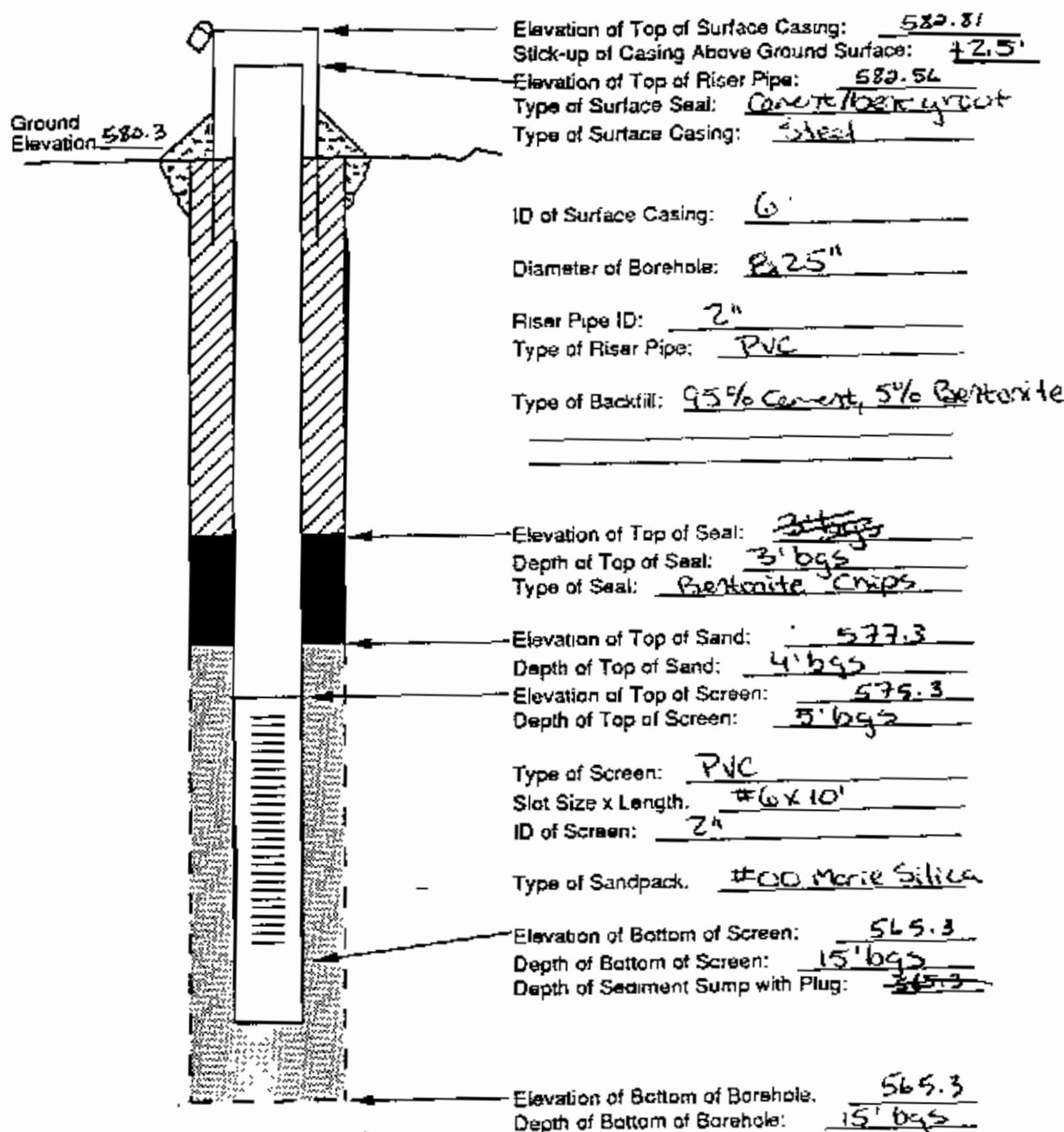
OVERBURDEN MONITORING WELL CONSTRUCTION DIAGRAM

Project Hanna Furnace Study Area Filler-Cake Area Driller Advanced Drilling
 Project No. 7169-40 Boring No. MW-101 Drilling Method 4.25" ID HSA
 Date Installed 10/20/94 Development Method Pump + Surge
 Field Geologist B. Butler



OVERBURDEN MONITORING WELL CONSTRUCTION DIAGRAM

Project Hanna Furnace Study Area Debris Landfill Driller B. Lambert
 Project No. 7164-40 Boring No. MW-103 Drilling Method 4.25" HSA
 Date Installed 10/22/94 Development Method Pump & Surge
 Field Geologist BK Butler



DRILLING SUMMARY

Geologist:

J. Doerr

Drilling Company:

SJB Services

Driller:

S. Wolkiewicz

Rig Make/Model:

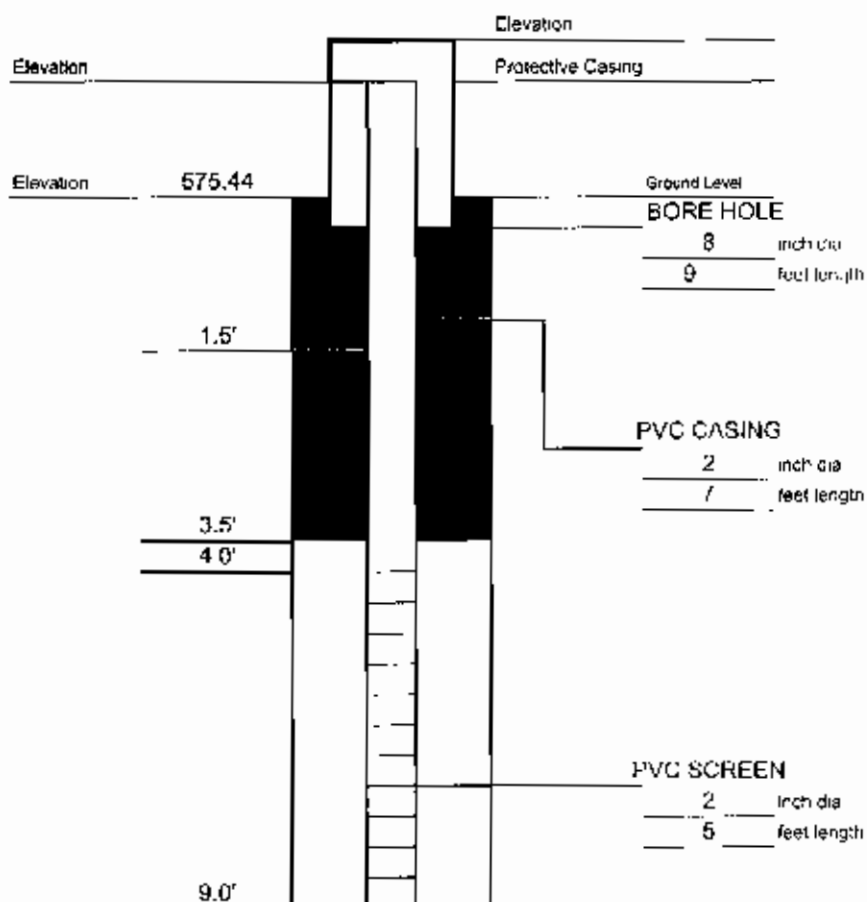
Acker Soil Max

Date:

10/19/01

GEOLOGIC LOG

Depth(ft)	Description

D
E
P
T
H**WELL DESIGN**

CASING MATERIAL		SCREEN MATERIAL		FILTER MATERIAL	
Surface	Steel Protective Casing	Type	2" PVC	Type	#2 sand Setting 3.5'-9.0'
Monitor	2" PVC	Slot Size	0.010	SEAL MATERIAL	
				Type	Bentonite Setting 1 to 3.5'

COMMENTS:

LEGEND

-  Cement/Bentonite Grout
-  Bentonite Seal
-  Silica Sandpack

Client: City of Buffalo

Location: Union Ship Canal

Project No.: 05-00035933.00

URS Corporation

MONITORING WELL
CONSTRUCTION DETAILS

Well Number: MW-301

Well Number: MW-302

DRILLING SUMMARY

Geologist:

R. Murphy

Drilling Company:

SJB Services

Driller

Tony Jakubcha

Rig Make/Model:

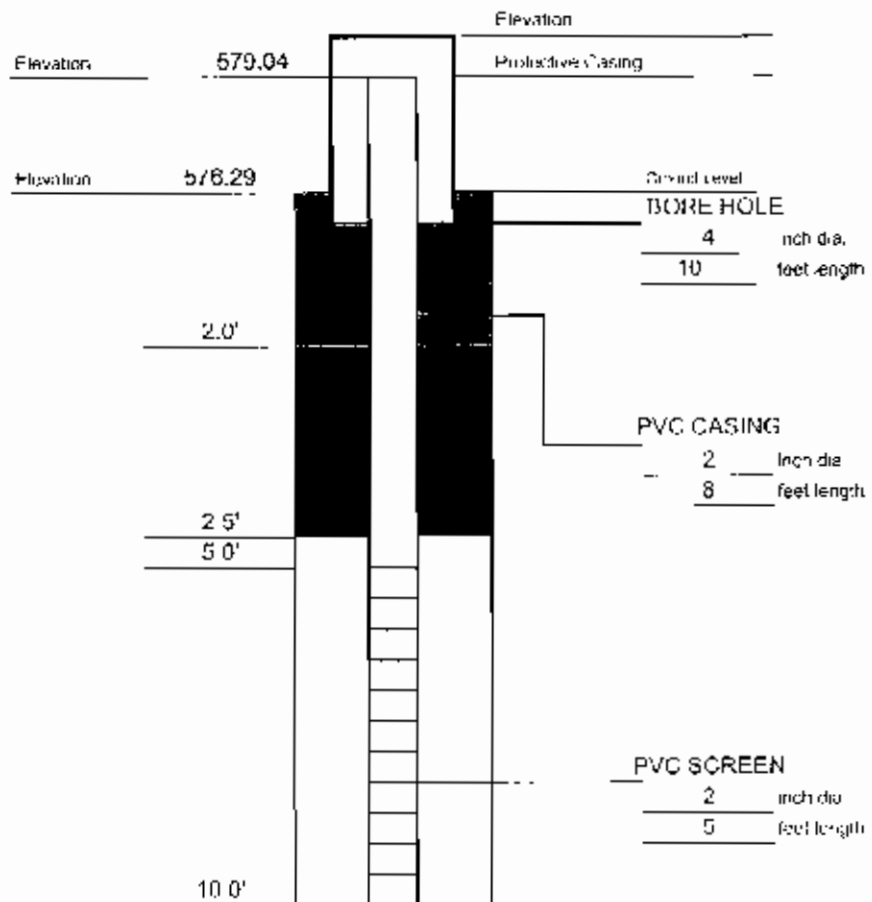
CME 75

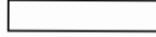
Date

11/1/01

GEOLOGIC LOG

Depth(ft.) Description

D
E
P
T
H**WELL DESIGN**

CASING MATERIAL		SCREEN MATERIAL		FILTER MATERIAL	
Surface	Steel Protective Casing	Type	2" PVC	Type	#40 sand Setting 2.5'-10.0'
Monitor	2" PVC	Slot Size	0.010	SEAL MATERIAL	
COMMENTS:				Type	Bentonite Setting 2.5'-5.0'
				LEGEND	
				 Cement/Bentonite Grout	
				 Bentonite Seal	
				 Silica Sandpack	
Client City of Buffalo		Location: Union Ship Canal		Project No.: 05-00035933.00	
URS Corporation		MONITORING WELL CONSTRUCTION DETAILS		Well Number: MW-303	

Well Number: MW-304

DRILLING SUMMARY

Geologist:

J. Doerr

Drilling Company

SJB Services

Driller

S. Wolkiewicz

Rig Make/Model

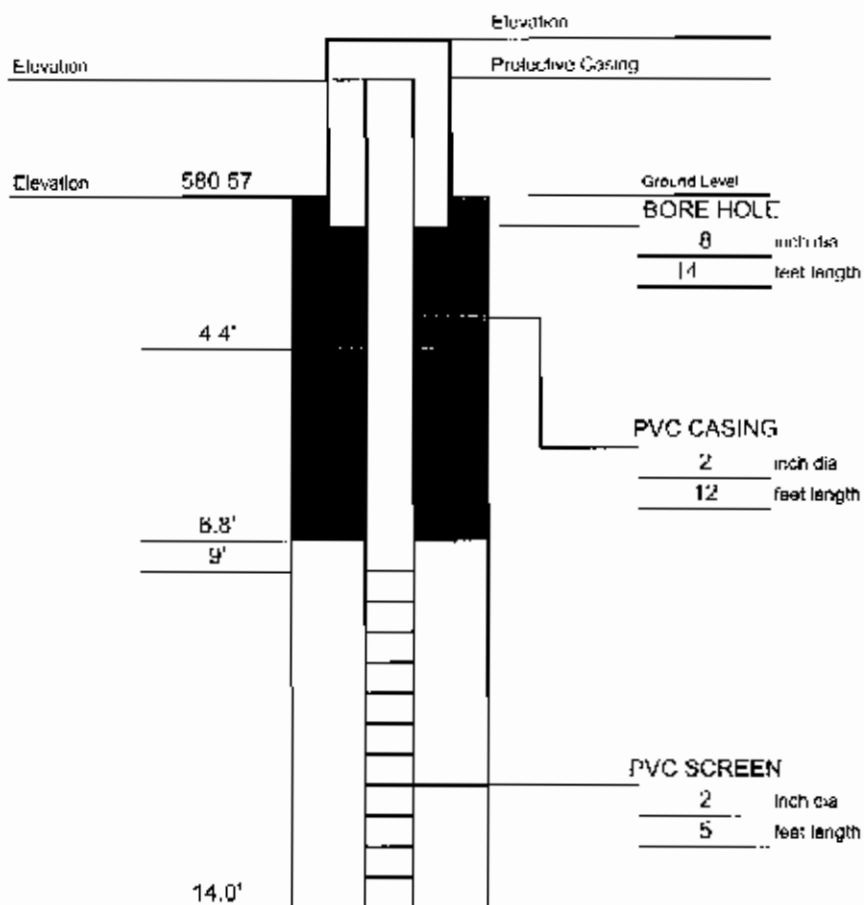
Acker Soil Max

Date:

10/17/01

GEOLOGIC LOG

Depth(ft.) Description

D
E
P
T
H**WELL DESIGN****CASING MATERIAL**

Surface Steel Protective Casing

SCREEN MATERIAL

Type 2" PVC

FILTER MATERIAL

Type #2 sand Setting 6.8'-14.0'

Monitor 2" PVC

Slot Size 0.010

SEAL MATERIAL

Type Bentonite Setting 4.4'-6.8'

COMMENTS**LEGEND**

- Cement/Bentonite Grout
- Bentonite Seal
- Silica Sandpack

Client: City of Buffalo

Location: Union Ship Canal

Project No.: 05-00035933.00

URS Corporation

**MONITORING WELL
CONSTRUCTION DETAILS**

Well Number: MW-305

DRILLING SUMMARY

Geologist:

J. Doen

Drilling Company:

SJB Services

Driller:

S. Wolkiewicz

Rlg Make/Model:

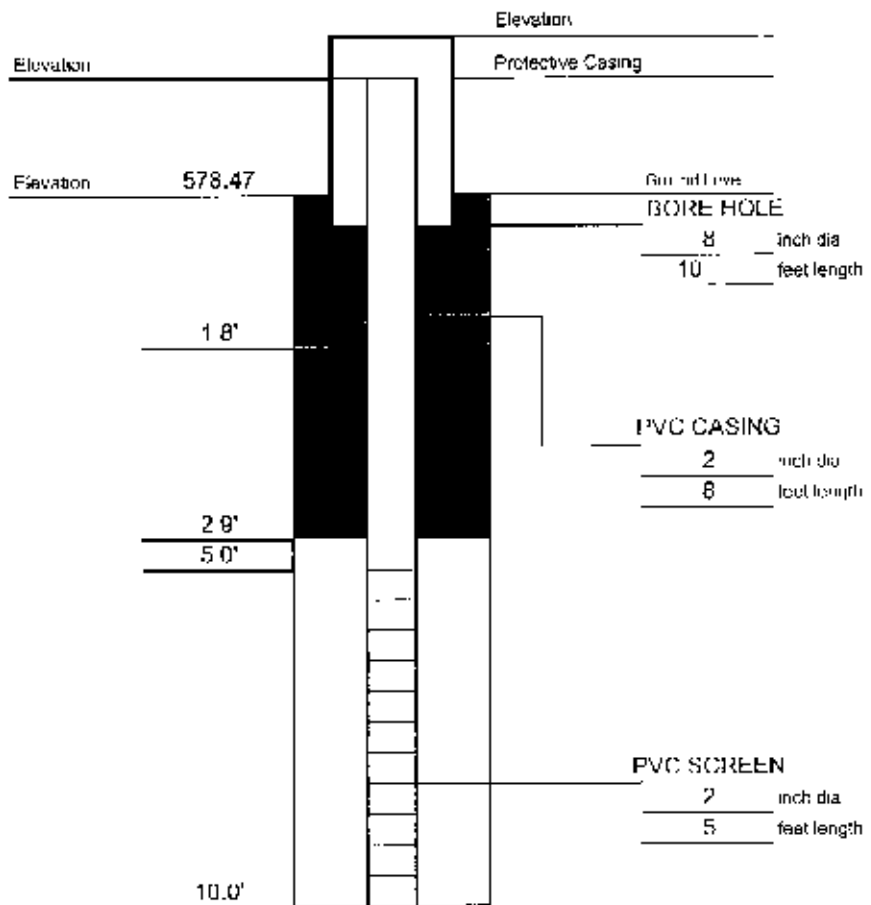
Acker Soil Max

Date:

10/17/01

GEOLOGIC LOG

Depth(ft) Description

WELL DESIGND
E
P
T
H**CASING MATERIAL**

Surface Steel Protective Casing

Monitor 2" PVC

SCREEN MATERIAL

Type 2" PVC

Slot Size 0.010

FILTER MATERIAL

Type #2 sand Setting 2.0'-3.0'

SEAL MATERIAL

Type Bentonite Setting 0.8'-2.0'

COMMENTS**LEGEND**

- Grout/Bentonite Grout
- Bentonite Seal
- Silica Sandpack

Client: City of Buffalo

Location: Union Ship Canal

Project No.: 05-00035933.00

URS Corporation

**MONITORING WELL
CONSTRUCTION DETAILS**

Well Number: MW-306

CASING MATERIAL		SCREEN MATERIAL		FILTER MATERIAL	
Surface	Steel Protective Casing	Type:	2" PVC	Type:	#2 sand Setting: 3.8'-22.0'
Monitor	2" PVC	Slot Size:	0.010	SEAL MATERIAL	
				Type:	Bentonite Setting: 2' @ 3.5'
COMMENTS:				LEGEND	
				 Cement/Bentonite Grout	
				 Bentonite Seal	
				 Silica Sandpack	
Client: City of Buffalo		Location: Union Ship Canal		Project No.: 05-00035933.00	
URS Corporation		MONITORING WELL CONSTRUCTION DETAILS		Well Number: MW-307	

APPENDIX E

WELL DEVELOPMENT LOGS

WELL DEVELOPMENT LOG

URS

PROJECT TITLE: UNIONPORT SHIP CANAL

PROJECT NO.: _____

STAFF: _____

DATE(S): _____

WELL NO.: MW 301

1. TOTAL CASING AND SCREEN LENGTH (FT.):

9' (12.32)

2. CASING INTERNAL DIAMETER (IN.):

2" PVC

3. WATER LEVEL BELOW TOP OF CASING (FT.):

4.18

4. VOLUME OF WATER IN CASING (GAL.):

1.37

#1-#3 x #2 (Gal./FT.)

WELL ID.

VOL. (GAL./FT.)

1'

0.04

2'

0.17

3'

0.38

4'

0.66

5'

1.04

6'

1.50

8'

2.80

PARAMETERS	ACCUMULATED VOLUME PURGED (GALLONS)											
	0	5	6.5	8.5	10.5	12.5	15.5					
pH	9.33	8.91	9.85	8.01	8.33	8.46	7.35					
SPEC. COND. (μ mhos)	9.63	9.17	9.85	8.11	6.87	6.52	6.71					
TURBIDITY (NTU)	26.4	906	495	534	576	501	451					
TEMPERATURE (°C)	58	58	60	62	61	61	57					
DISSOLVED OXYGEN (mg/L)												
PID	ND	-	-	ND	-	-	ND					

COMMENTS:

TIME 1305 SLOW RECHARGE

WELL DEVELOPMENT LOG

URS

PROJECT TITLE: LAWSONPORT SHIP CANAL

PROJECT NO.: _____

STAFF: _____

DATE(S): _____

WELL NO.: HW-302

1. TOTAL CASING AND SCREEN LENGTH (FT.):

9' (11.95')

2. CASING INTERNAL DIAMETER (IN.):

2" PVC

3. WATER LEVEL BELOW TOP OF CASING (FT.):

5.29

4. VOLUME OF WATER IN CASING (GAL.):

1.13

#1-#3 x #2 (Gal./Ft.)

WELL ID.

VOL. (GAL./FT.)

1"

0.04

2"

0.17

3"

0.38

4"

0.68

5"

1.04

6"

1.50

8"

2.60

PARAMETERS	#1/7 1245	#1/7 1300	#1/7 3:45	#1/8 4:25	#1/8 5:30	#1/9 7:00	#1/9 8:30	ACCUMULATED VOLUME PURGED (GALLONS)			
	0	2.5	3.5	4.5	6.0	7.0	8.5				
pH	8.34	9.46	9.21	8.09	8.42	8.35	8.52				
SPEC. COND. (µmhos)	543	639	654	539	500	534	671				
TURBIDITY (NTU)	71100	835	679	71100	71100	843	812				
TEMPERATURE (°C)	59	58	59	62	60	60	57				
DISSOLVED OXYGEN (mg/L)											
PID	ND	-	-	ND	-	-	ND				

COMMENTS: 1245 SLOW RECHARGE
1300

WELL DEVELOPMENT LOG

URS

PROJECT TITLE: UNIONPORT SHIP CANAL

PROJECT NO.: _____

STAFF: _____

DATE(S): _____

WELL NO.: MW-303

1. TOTAL CASING AND SCREEN LENGTH (FT.):

10' (12.6)

2. CASING INTERNAL DIAMETER (IN.):

2" PVC

3. WATER LEVEL BELOW TOP OF CASING (FT.):

6.3

4. VOLUME OF WATER IN CASING (GAL.):

1.07

#1-#3 x #2 (Gal./Ft.)

WELL ID.

VOL. (GAL./FT.)

1"

0.04

2"

0.17

3"

0.38

4"

0.66

5"

1.04

6"

1.50

8"

2.60

PARAMETERS	11/7 11.38	11/7	11/7	11/7 11.38	11/8 11.38	11/8 11.38	11/8 11.38	11/8 11.38	11/8 11.38	11/8 11.38	11/8 11.38
	0	5	10	12.5	16	18.5	20	24			
PH	10.70	9.43	8.71	8.41	7.96	8.08	7.95	8.13			
SPEC. COND. (µmhos)	11.89	7.98	7.81	14.5	7.74	7.36	8.29	7.44			
TURBIDITY (NTU)	<1100	334	15.7	8.5	<1100	<1100	489	521			
TEMPERATURE (°C)	61	60	60	60	62	62	62	60			
DISSOLVED OXYGEN (mg/L)											
PID	ND	-	-	-	ND	-	-	ND			

COMMENTS:

11.38 SLOW RECHARGE

WELL DEVELOPMENT LOG

URS

PROJECT TITLE: UNIONPORT SHIP CANAL

PROJECT NO.: _____

STAFF: _____

DATE(S): _____

WELL NO.: MW-304

1. TOTAL CASING AND SCREEN LENGTH (FT.):

36" (37.07)

2. CASING INTERNAL DIAMETER (IN.):

2" PVC

3. WATER LEVEL BELOW TOP OF CASING (FT.):

11.25

4. VOLUME OF WATER IN CASING (GAL.):

4.4

#1-#3 x #2 (Gal./Ft.)

WELL ID.

VOL. (GAL./FT.)

1"

0.04

2"

0.17

3"

0.38

4"

0.68

5"

1.04

6"

1.50

8"

2.80

PARAMETERS	11/7	11/7	11/7	11/8	11/8	11/8	11/8	11/8	ACCUMULATED VOLUME PURGED (GALLONS)		
	1415	1420	1530	1530	1530	1530	1530	1530	1530	1530	1530
	0	5	40	50	55	60	70	80			
pH	10.25	10.20	10.61	8.53	8.11	8.08	8.42	9.12			
SPEC. COND. (µmhos)	3.49	8.37	7.09	7.92	7.22	6.78	5.00	7.36			
TURBIDITY (NTU)	34.1	<1100	<1100	61.2	54.6	219	112	72			
TEMPERATURE (°C)	58	58	59	59	59	58	60	57			
DISSOLVED OXYGEN (mg/L)											
PID	ND	-	-	ND	1-	-	-	ND			

COMMENTS: HAND DEVEL. (MANUAL)1415

WELL DEVELOPMENT LOG

URS

PROJECT TITLE: UNIDPORT SHIP CANAL

PROJECT NO.: _____

STAFF: _____

DATE(S): 11/1/01, 11/8/01TIME 8:00WELL NO.: MW-305

1. TOTAL CASING AND SCREEN LENGTH (FT.):

14' (16.42)

2. CASING INTERNAL DIAMETER (IN.):

2" PVC

3. WATER LEVEL BELOW TOP OF CASING (FT.):

6.07

4. VOLUME OF WATER IN CASING (GAL.):

1.84

#1-#3 x #2 (Gal./Ft.)

WELL ID.

VOL. (GAL./FT.)

1"

0.04

2"

0.17

3"

0.38

4"

0.66

5"

1.04

6"

1.50

8"

2.80

PARAMETERS	11/1	11/7	11/7	11/8	11/8	11/13	ACCUMULATED VOLUME PURGED (GALLONS)				
	8:00	8:30	11:40	06:50	11:05	12:15					
	0	5	10	11.5	12.5	14					
pH	8.57	11.20	10.81	9.81	9.57	9.95					
SPEC COND. (µmhos)	8.66	8.29	8.18	7.89	8.01	8.39					
TURBIDITY (NTU)	26	35	41	263	80	65					
TEMPERATURE (°F)	55	58	58	57	58	54					
DISSOLVED OXYGEN (mg/L)											
PID	ND	-	-	ND	-	ND					

COMMENTS: SLOW RECHARGE

WELL DEVELOPMENT LOG

URS

PROJECT TITLE: UNION PORT SHIP CANAL

PROJECT NO.: _____

STAFF: _____

DATE(S): _____

WELL NO.: MW-706

1. TOTAL CASING AND SCREEN LENGTH (FT.):

10' (137)

2. CASING INTERNAL DIAMETER (IN.):

2" PVC

3. WATER LEVEL BELOW TOP OF CASING (FT.):

6.07

4. VOLUME OF WATER IN CASING (GAL.):

1.02

#1-#3 x #2 (Gal./Ft.)

WELL ID.

VOL. (GAL./FT.)

1"

0.04

2"

0.17

3"

0.38

4"

0.66

5"

1.04

6"

1.60

8"

2.60

PARAMETERS	0'	5'	10'	15'	20'	25'	30'	40'	50'		
	0	5	10	15	20	25	30	40	50		
pH	8.18	8.22	8.27	8.32	8.21	8.77	8.06	8.10	8.32		
SPEC. COND. (μ mhos)	7.13	4.18	8.64	8.79	6.43	6.57	6.68	6.92	6.72		
TURBIDITY (NTU)	80	68	85	39	77	>1100	>1100	>1100	>1100		
TEMPERATURE (°C)	56	56	56	57	57	57	61	62	55		
DISSOLVED OXYGEN (mg/L)											
PLD	ND	-	-	-	-	ND	-	-	ND		

COMMENTS:

8.54 ENCOUNTERED DARK PRODUCT/SIGNIFICANT TURBIDITY
9:30

WELL DEVELOPMENT LOG

URS

PROJECT TITLE: UNIONPORT SHIP CANAL

PROJECT NO.: _____

STAFF: _____

DATE(S): _____

WELL NO.: MW-307

1. TOTAL CASING AND SCREEN LENGTH (FT.):

22' (24.8)

2. CASING INTERNAL DIAMETER (IN.):

2" PVC

3. WATER LEVEL BELOW TOP OF CASING (FT.):

5.45

4. VOLUME OF WATER IN CASING (GAL):

3.3

#1-#3 x #2 (Gal./Ft.)

WELL ID.

VOL. (GAL./FT.)

1"

0.04

2"

0.17

3"

0.38

4"

0.68

5"

1.04

6"

1.50

8"

2.60

PARAMETERS	ACCUMULATED VOLUME PURGED (GALLONS)											
	0	5	10	15	20	25	30					
pH	8.96	12.42	13.42	13.50	14.00	9.84	12.63					
SPEC COND. (µmhos)	2.88	7.77	7.87	7.86	8.01	7.13	7.92					
TURBIDITY (NTU)	9.4	90	100	19	20	60.5	92					
TEMPERATURE (°C)	57	58	54	55	54	56	57					
DISSOLVED OXYGEN (mg/L)												
PID	ND	-	-	-	-	ND	ND					

COMMENTS: HIGH PH, STRONG CHEMICAL ODOR10001025

WELL DEVELOPMENT LOG

URS

PROJECT TITLE: UNIONPORT SHIP CANAL

PROJECT NO.: _____

STAFF: _____

DATE(S): _____

WELL NO.: MUS-101

WELL ID.

VOL. (GAL./FT.)

1. TOTAL CASING AND SCREEN LENGTH (FT.):

17.48

1'

0.04

2'

0.17

2. CASING INTERNAL DIAMETER (IN.):

2" PVC

3'

0.38

4'

0.66

3. WATER LEVEL BELOW TOP OF CASING (FT.):

6.58'

5'

1.04

6'

1.50

4. VOLUME OF WATER IN CASING (GAL.):

1.84

8'

2.60

#1-#3 x #2 (Gal./Ft.)

PARAMETERS	11/6	ACCUMULATED VOLUME PURGED (GALLONS)									
	0										
pH	12.02										
SPEC. COND. (µmhos)	1309										
TURBIDITY (NTU)	160										
TEMPERATURE (°C)	55										
DISSOLVED OXYGEN (mg/L)											
PID	ND										

COMMENTS:

WELL DEVELOPMENT LOG

URS

PROJECT TITLE: UNION SHIP CANAL

PROJECT NO.: _____

STAFF: _____

DATE(S): _____

WELL NO.: MW-103

1. TOTAL CASING AND SCREEN LENGTH (FT.):

17.50

2. CASING INTERNAL DIAMETER (IN.):

2" PVC

3. WATER LEVEL BELOW TOP OF CASING (FT.):

4.45

4. VOLUME OF WATER IN CASING (GAL.)

2.21

#1 #3 x #2 (Gal./Fl.)

WELL ID.

VOL. (GAL./FT.)

1'

0.04

2'

0.17

3'

0.38

4'

0.88

5'

1.04

6'

1.50

8'

2.60

PARAMETERS	11/6 ACCUMULATED VOLUME PURGED (GALLONS)									
	0									
pH	7.81									
SPEC. COND. (μ mhos)	19.63									
TURBIDITY (NTU)	>1100									
TEMPERATURE (°C)	64									
DISSOLVED OXYGEN (mg/L)										
PLD	ND									

COMMENTS:

APPENDIX F

WELL PURGING LOGS

URS GREINER, INC.

PURGE AND SAMPLE LOG

PROJECT: UNION SHIP CARGO 1 SUBJECT: H-13-01

DATE: 11-13-01

PURGING INFORMATION

Well Identification: MW-301 PID Reading: ND ppm
Depth to Water: 4.01 Ft Depth to Bottom: 12.32 Ft
Volume/Casing: 1.41 Gallons Start Time: 10:35
Volume Purged: 5 Gallons Stop Time: 13:55
Method: DEDICATED HDPE BOILER
Comments: _____

Note: 0.17 gallons per foot in 2-inch diameter well
0.66 gallons per foot in 4-inch diameter well

FIELD PARAMETERS

<u>Parameter</u>	<u>Initial</u>	<u>Final</u>	<u>Sample</u>
pH	<u>8.57</u> SU	<u>8.23</u> SU	<u>8.61</u> SU
Conductivity	<u>6.87</u> umhos	<u>7.93</u> umhos	<u>7.91</u> umhos
Turbidity	<u>41.1</u> NTU	<u>107</u> NTU	<u>52.3</u> NTU
Temperature	<u>57</u> C	<u>58</u> C	<u>58</u> C
Dissolved Oxygen	<u>ND</u> ppm	<u>ND</u> ppm	<u>ND</u> ppm
ORP	<u>ND</u> ppm	<u>ND</u> ppm	<u>ND</u> ppm
Appearance	<u>CLEAR</u>	<u>SL TURB GRAY</u>	<u>SL TURB GRAY</u>

SAMPLING INFORMATION

Sample Identification MW-301 Time Sampled 1355
Parameters _____
Comments: _____
Samplers: _____

URS GREINER, INC. PURGE AND SAMPLE LOG

PROJECT: UNION OIL CAMP SUBJECT: _____

DATE: 11-13-01

PURGING INFORMATION

Well Identification: MAW 303 PID Reading: ND ppm
Depth to Water: 6.23 Ft Depth to Bottom: 12.32 Ft
Volume/Casing: 1.04 Gallons Start Time: 0925
Volume Purged: 3 Gallons Stop Time: 1305
Method: DEDICATED HDPE GAUGE
Comments: _____

Note: 0.17 gallons per foot in 2-inch diameter well
0.66 gallons per foot in 4-inch diameter well

FIELD PARAMETERS

<u>Parameter</u>	<u>Initial</u>	<u>Final</u>	<u>Sample</u>
pH	<u>7.20</u> SU	<u>8.40</u> SU	<u>8.82</u> SU
Conductivity	<u>950</u> umhos	<u>895</u> umhos	<u>890</u> umhos
Turbidity	<u>89.5</u> NTU	<u>81.2</u> NTU	<u>79.7</u> NTU
Temperature	<u>58°F</u> ~~X~~	<u>57°F</u> ~~X~~	<u>60°F</u> ~~X~~
Dissolved Oxygen	<u>NA</u> ppm	<u>NA</u> ppm	<u>ND</u> ppm
ORP	<u>NA</u> ppm	<u>NA</u> ppm	<u>ND</u> ppm
Appearance	<u>SLURRY</u>	<u>TURBID</u>	<u>TURBID</u>

SAMPLING INFORMATION

Sample Identification: MAW 303 Time Sampled: 1305
Parameters: _____
Comments: _____
Samplers: _____

URS GREINER, INC. PURGE AND SAMPLE LOG

PROJECT: UNION SHIP Canal SUBJECT: 11/13/01

DATE: 11-13-01

PURGING INFORMATION

Well Identification: MW-304 PID Reading: ND ppm
Depth to Water: 11.35 Ft Depth to Bottom: 31.57 Ft
Volume/Casing: 4.31 Gallons Start Time: 1115
Volume Purged: 4 Gallons Stop Time: ~~1145~~ 1405
Method: Dedicated HDPE Bailer
Comments: _____

Note: 0.17 gallons per foot in 2-inch diameter well
0.66 gallons per foot in 4-inch diameter well

FIELD PARAMETERS

<u>Parameter</u>	<u>Initial</u>	<u>Final</u>	<u>Sample</u>
pH	<u>8.95</u> SU	<u>10.05</u> SU	<u>9.10</u> SU
Conductivity	<u>12.39</u> umhos	<u>10.81</u> umhos	<u>7.42</u> umhos
Turbidity	<u>78</u> NTU	<u>48.5</u> NTU	<u>24.0</u> NTU
Temperature	<u>58.9</u> C	<u>56.3</u> C	<u>60.1</u> C
Dissolved Oxygen	<u>NA</u> ppm	<u>NA</u> ppm	<u>NA</u> ppm
ORP	<u>NA</u> ppm	<u>NA</u> ppm	<u>NA</u> ppm
Appearance	<u>TURBID GRAY</u>	<u>CLEAR</u>	<u>CLEAR</u>

SAMPLING INFORMATION

Sample Identification: MW-304 Time Sampled: 1405
Parameters: _____
Comments: _____
Samplers: _____

URS GREINER, INC. PURGE AND SAMPLE LOG

PROJECT: UNION SHIP CANAL SUBJECT: 14-13-01

DATE: 11-13-01

PURGING INFORMATION

Well Identification: MW-305 PID Reading: ND ppm
 Depth to Water: 10.90 Ft Depth to Bottom: 16.92 Ft
 Volume/Casing: 1.02 Gallons Start Time: 0855
 Volume Purged: 5 Gallons Stop Time: 1440
 Method: DEDICATED HOPE PUMP
 Comments: _____

Note: 0.17 gallons per foot in 2-inch diameter well
 0.66 gallons per foot in 4-inch diameter well

FIELD PARAMETERS

Parameter	Initial	Final	Sample
pH	<u>9.95</u> SU	<u>9.62</u> SU	<u>8.42</u> SU
Conductivity	<u>8.39</u> umhos	<u>820</u> umhos	<u>8050</u> umhos
Turbidity	<u>05</u> NTU	<u>52.9</u> NTU	<u>45.9</u> NTU
Temperature	<u>54</u> TX	<u>58.4</u> C	<u>58.3</u> C
Dissolved Oxygen	<u>NA</u> ppm	<u>NA</u> ppm	<u>NA</u> ppm
ORP	<u>NA</u> ppm	<u>NA</u> ppm	<u>NA</u> ppm
Appearance	<u>SL. TURBID GRAY</u>	<u>TURB GRAY</u>	<u>SL. TURB GRAY</u>

SAMPLING INFORMATION

Sample Identification: MW-305 Time Sampled: 1440
 Parameters: _____

 Comments: _____

 Samplers: _____

URS GREINER, INC. PURGE AND SAMPLE LOG

PROJECT: UNION SHIP Canal SUBJECT: _____

DATE: 11-13-01

PURGING INFORMATION

Well Identification: MW-306 PID Reading: ND ppm
 Depth to Water: 6.55 Ft Depth to Bottom: 13.70 Ft
 Volume/Casing: 1.32 Gallons Start Time: ~~11:30~~ 11:30
 Volume Purged: 5 Gallons Stop Time: 14:50
 Method: Dedicated HDPE Bailer
 Comments: _____

Note: 0.17 gallons per foot in 2-inch diameter well
 0.66 gallons per foot in 4-inch diameter well

FIELD PARAMETERS

<u>Parameter</u>	<u>Initial</u>	<u>Final</u>	<u>Sample</u>
pH	<u>10.12</u> SU	<u>8.93</u> SU	<u>8.21</u> SU
Conductivity	<u>7.37</u> umhos	<u>7.09</u> umhos	<u>7.60</u> umhos
Turbidity	<u>90.0</u> NTU	<u>201</u> NTU	<u>59.5</u> NTU
Temperature	<u>37.8</u> C	<u>56.9</u> C	<u>56.1</u> C
Dissolved Oxygen	<u>N/A</u> ppm	<u>N/A</u> ppm	<u>N/A</u> ppm
ORP	<u>N/A</u> ppm	<u>N/A</u> ppm	<u>N/A</u> ppm
Appearance	<u>Turb. BRN</u>	<u>Turb. BRN</u>	<u>sl Turb. CLAY</u>

SAMPLING INFORMATION

Sample Identification: MW-306 Time Sampled: 1450

Parameters: _____

Comments: _____

Samplers: _____

URS GREINER, INC.

PURGE AND SAMPLE LOG

PROJECT: UNION STATE CANAL SUBJECT:

DATE: 11-12-94

PURGING INFORMATION

Well Identification: MW-307 PID Reading: N/D ppm
Depth to Water: 5.72 Ft Depth to Bottom: 24.8 Ft
Volume/Casing: 3.24 Gallons Start Time: 1805
Volume Purged: 4 Gallons Stop Time: 1810
Method: DEDICATED HYDRO PUMP
Comments:

Note: 0.17 gallons per foot in 2-inch diameter well
0.66 gallons per foot in 4-inch diameter well

FIELD PARAMETERS

<u>Parameter</u>	<u>Initial</u>	<u>Final</u>	<u>Sample</u>
pH	<u>9.07</u> SU	<u>8.97</u> SU	<u>8.79</u> SU
Conductivity	<u>3,430</u> umhos	<u>2,680</u> umhos	<u>2,460</u> umhos
Turbidity	<u>10.6</u> NTU	<u>27.4</u> NTU	<u>22.8</u> NTU
Temperature	<u>59</u> °F	<u>58</u> °F	<u>57</u> °F
Dissolved Oxygen	<u>NA</u> ppm	<u>NA</u> ppm	<u>NA</u> ppm
ORP	<u>NA</u> ppm	<u>NA</u> ppm	<u>NA</u> ppm
Appearance	<u>yellow huc</u>	<u>yellow huc</u>	<u>yellow huc</u>

SAMPLING INFORMATION

Sample Identification: MW-307 Time Sampled: 1510
Parameters:

Comments:

Samplers:

URS GREINER, INC. PURGE AND SAMPLE LOG

PROJECT: LEWIS SHIP CANAL SUBJECT: _____

DATE: 11-13-01

PURGING INFORMATION

Well Identification: MW-101 PID Reading: ND ppm
Depth to Water: 6.89 Ft Depth to Bottom: 17.48 Ft
Volume/Casing: 1.80 Gallons Start Time: 1215
Volume Purged: 5 Gallons Stop Time: 1525
Method: Dedicate HDPE Bailer
Comments: _____

Note: 0.17 gallons per foot in 2-inch diameter well
0.66 gallons per foot in 4-inch diameter well

FIELD PARAMETERS

<u>Parameter</u>	<u>Initial</u>	<u>Final</u>	<u>Sample</u>
pH	<u>10.32</u> SU	<u>11.29</u> SU	<u>9.81</u> SU
Conductivity	<u>3.60</u> umhos	<u>3.93</u> umhos	<u>3.02</u> umhos
Turbidity	<u>3.21</u> NTU	<u>576</u> NTU	<u>6.44</u> NTU
Temperature	<u>57</u> C	<u>57</u> C	<u>57</u> C
Dissolved Oxygen	<u>N/A</u> ppm	<u>N/A</u> ppm	<u>N/A</u> ppm
ORP	<u>N/A</u> ppm	<u>N/A</u> ppm	<u>N/A</u> ppm
Appearance	<u>clear</u>	<u>near</u>	<u>clear</u>

SAMPLING INFORMATION

Sample Identification: MW-101 Time Sampled: 1525
Parameters: _____
Comments: _____
Samplers: _____

URS GREINER, INC. PURGE AND SAMPLE LOG

PROJECT: Union Ship Canal SUBJECT: _____

DATE: 11-13-01

PURGING INFORMATION

Well Identification: MW-103 PID Reading: ND ppm
Depth to Water: 4.77 Ft Depth to Bottom: 17.50 Ft
Volume/Casing: 2.16 Gallons Start Time: 12:30
Volume Purged: 6 Gallons Stop Time: 15:50
Method: Dedicated HDPE Bailer
Comments: _____

Note: 0.17 gallons per foot in 2-inch diameter well
0.66 gallons per foot in 4-inch diameter well

FIELD PARAMETERS

<u>Parameter</u>	<u>Initial</u>	<u>Final</u>	<u>Sample</u>
pH	<u>10.60</u> SU	<u>9.80</u> SU	<u>10.56</u> SU
Conductivity	<u>1.92</u> umhos	<u>1.90</u> umhos	<u>1.46</u> umhos
Turbidity	<u>15.6</u> NTU	<u>35.0</u> NTU	<u>38.6</u> NTU
Temperature	<u>57.2</u> C	<u>58.3</u> C	<u>57.8</u> C
Dissolved Oxygen	<u>NA</u> ppm	<u>NA</u> ppm	<u>NA</u> ppm
ORP	<u>NA</u> ppm	<u>NA</u> ppm	<u>NA</u> ppm
Appearance	<u>CLEAR</u>	<u>CLEAR</u>	<u>CLEAR</u>

SAMPLING INFORMATION

Sample Identification: MW-103 Time Sampled: 15:50

Parameters: _____

Comments: _____

Samplers: _____

URS GREINER, INC. PURGE AND SAMPLE LOG

PROJECT: SHIAN SHIP CANAL

SUBJECT: _____

DATE: 11/13/01

PURGING INFORMATION

Well Identification: MW-302 PID Reading: 8 ppm
Depth to Water: 6.30 Ft Depth to Bottom: 11.95 Ft
Volume/Casing: 0.95 Gallons Start Time: 1000
Volume Purged: 2 Gallons Stop Time: 1330
Method: DEGRADED HBR SAMPLE
Comments: _____

Note: 0.17 gallons per foot in 2-inch diameter well
0.66 gallons per foot in 4-inch diameter well

FIELD PARAMETERS

<u>Parameter</u>	<u>Initial</u>	<u>Final</u>	<u>Sample</u>
pH	<u>8.55</u> SU	<u>9.65</u> SU	<u>9.13</u> SU
Conductivity	<u>4.32</u> umhos	<u>4.81</u> umhos	<u>320</u> umhos
Turbidity	<u>28.9</u> NTU	<u>471</u> NTU	<u>33.4</u> NTU
Temperature	<u>57 F</u>	<u>56 F</u>	<u>61 F</u>
Dissolved Oxygen	<u>NA</u> ppm	<u>NA</u> ppm	<u>NA</u> ppm
ORP	<u>NA</u> ppm	<u>NA</u> ppm	<u>NA</u> ppm
Appearance	<u>TURB. BRN</u>	<u>TURB. BRN</u>	<u>CLEAR</u>

SAMPLING INFORMATION

Sample Identification: MW-302

Time Sampled: 1330

Parameters: _____

Comments: _____

Samplers: _____

WELL PURGING LOG

URS Corporation

SITE NAME: Union Ship Canal, Subparcel 3 WELL NO.: MW-101
 PROJECT NO: 11171876.00
 STAFF: J. Doerr
 DATE(S): 3/7/03 - 10:42

		WELL ID	VOL (GAL/FT)
1. TOTAL CASING AND SCREEN LENGTH (FT)	= <u>17.42</u> 0.0	1"	0.040
2. WATER LEVEL BELOW TOP OF CASING (FT)	= <u>6.62</u> 0.00	2"	0.17
3. NUMBER OF FEET STANDING WATER (#1 - #2)	= <u>10.86</u> 0.00	3"	0.38
4. VOLUME OF WATER/FOOT OF CASING (GAL.)	= <u>8.163</u> 0.00	4"	0.66
5. VOLUME OF WATER IN CASING (GAL.) (#3 x #4)	= <u>1.77</u> 0.00	5"	1.04
6. VOLUME OF WATER TO REMOVE (GAL.) (#5 x #3)	= <u>5.31</u> 0.00	6"	1.50
7. VOLUME OF WATER ACTUALLY REMOVED (GAL.)	= <u>0</u>	8"	2.60

V=0.0408 x (CASING DIAMETER
IN INCHES)²

PARAMETERS	ACCUMULATED VOLUME PURGED (GALLONS)							
	0	1	2	3	4	5	6	
pH	10.48	11.26	12.3	12.62	13.11	13.74	12.8	
SPEC. COND. (umhos)	660 x 1.000	700 x 1.000						
TEMPERATURE °C	45.0	48.1	47.3	49.3	49.7	48.6	49.1	
TURBIDITY	76	31	22	14	12	8	7	
DISSOLVED OXYGEN (mg/L)								
ORP (mV)								

COMMENTS: Water
Remain clear
entire
purging

WELL PURGING LOG

URS Corporation

SITE NAME: Union Ship Canal, Subparcel 3 WELL NO: MW-306
 PROJECT NO: 11171876.00
 STAFF: J. Doerr
 DATE(S): 3/7/03 1316

1. TOTAL CASING AND SCREEN LENGTH (FT.)	= <u>13.71</u> 0.0	WELL ID	VOL (GAL/FT)
2. WATER LEVEL BELOW TOP OF CASING (FT.)	= <u>6.47</u> 0.00	1"	0.040
3. NUMBER OF FEET STANDING WATER (#1 - #2)	= <u>7.24</u> 0.00	2"	0.17
4. VOLUME OF WATER/FOOT OF CASING (GAL.)	= <u>0.163</u> 0.00	3"	0.38
5. VOLUME OF WATER IN CASING (GAL.)(#3 x #4)	= <u>1.18</u> 0.00	4"	0.66
6. VOLUME OF WATER TO REMOVE (GAL.)(#5 x 3)	= <u>3.54</u> 0.00	5"	1.04
7. VOLUME OF WATER ACTUALLY REMOVED (GAL.)	= <u>0</u>	6"	1.50
		8"	2.00

V=0.0408 x (CASING DIAMETER
IN INCHES)²

PARAMETERS	ACCUMULATED VOLUME PURGED (GALLONS)									
	0	1"	2	3	4					
pH	6.79	7.31	7.92	8.53	8.79					
SPEC COND. (umhos) x <u>1000</u>	6.49	5.49	5.47	5.51	5.47					
TEMPERATURE °C	40.3	40.6	40.8	40.7	40.6					
TURBIDITY	90	18	8	5	5					
DISSOLVED OXYGEN (mg/L)										
ORP (mV)										

COMMENTS

WELL PURGING LOG

URS Corporation

WELL NAME	Union Ship Canal, Subparcel 3	WELL NO	MW-307
PROJECT NO.	11171876.00		
STAFF	J. Doerr		
DATE(S)	3/7/03 1202		

1 TOTAL CASING AND SCREEN LENGTH (FT)	<u>12</u>	= <u>28.31</u> 0.0	WELL ID	VOL (GAL/FT)
2 WATER LEVEL BELOW TOP OF CASING (FT)		= <u>5.41</u> 0.00	1"	0.040
3 NUMBER OF FEET STANDING WATER (#1 - #2)		= <u>18.90</u> 0.00	2"	0.17
4 VOLUME OF WATER/FOOT OF CASING (GAL)		= <u>0.463</u> 0.00	3"	0.38
5 VOLUME OF WATER IN CASING (GAL) (#3 x #4)		= <u>3.08</u> 0.00	4"	0.65
6 VOLUME OF WATER TO REMOVE (GAL) (#5 x 3)		= <u>9.24</u> 0.00	5"	1.04
7 VOLUME OF WATER ACTUALLY REMOVED (GAL)		= <u>0</u>	6"	1.50
			8"	2.60

$$V = 0.0408 \times (\text{CASING DIAMETER IN INCHES})^2$$

PARAMETERS	ACCUMULATED VOLUME PURGED (GALLONS)									
	1	2	3	4	5	6	7	8	9	10
pH	8.62	9.77	8.54	8.73	8.90	9.11	9.03	9.16	9.27	9.12
SPEC COND. (umhos)	--	--	--	--	--	--	--	--	--	--
TEMPERATURE °C	43.7	45.9	46.2	45.1	45.3	45.0	48.1	47.7	46.6	48.7
TURBIDITY	>500	159	57	38	56	58	31	36	19	17
DISSOLVED OXYGEN (mg/L)										
ORP (mV)										

COMMENTS:

Water initial turned black, w/ H₂S odor. Then cleared but with a yellow/brown tinge.

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APPENDIX G

DATA USABILITY SUMMARY REPORTS

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DATA USABILITY SUMMARY REPORT
FOR THE
SITE INVESTIGATION AND REMEDIAL ALTERNATIVES REPORT (SI/RAR)

AT THE
FORMER HANNA FURNACE SITE
SUBPARCEL 3, 3B-00164-9
BUFFALO, NEW YORK

Analyses Performed by:
FRIEND LABORATORY, INC.
and
MITKEM CORPORATION

Prepared for:
CITY OF BUFFALO
BUFFALO, NEW YORK

Prepared by:
URS CORPORATION
282 DELAWARE AVENUE
BUFFALO, NY 14202

MARCH 2002

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TABLES (following text)

Table 1	Sample Identification Summary
Table 2	Summary of Data Qualifications

ATTACHMENTS

- Attachment A – Validated Analytical Results
- Attachment B – Support Documentation

I. INTRODUCTION

This Data Usability Summary Report (DUSR) has been prepared following the guidelines provided in New York State Department of Environmental Conservation (NYSDEC) Division of Environmental Remediation *Guidance for the Development of Data Usability Summary Reports*, dated June 1999.

II. ANALYTICAL METHODOLOGIES

The data being evaluated is from the October 2, 2001 through November 13, 2001 sampling of 40 soil samples, 9 groundwater samples, 3 matrix spike/matrix spike duplicates (MS/MSD), 1 rinse blank, and 1 trip blank. The analytical laboratories that performed the analyses are Friend Laboratory, Inc., located in Waverly, New York and Milken Corporation, located in Warwick, Rhode Island. The samples were analyzed for Target Compound List (TCL) volatile organic compounds (VOCs), TCL semivolatile organic compounds (SVOCs), and TCL pesticides/polychlorinated biphenyls (pesticides/PCBs) by United States Environmental Protection Agency (USEPA) Contract Laboratory Program (CLP) Statement of Work (SOW) OLM04.2, target analytic list (TAL) metals and cyanide by USEPA CLP SOW OLM04.1, and free cyanide by Standard Method 4500-CN-1. Groundwater samples were also analyzed for dissolved TAL metals. All methods are referenced in NYSDEC Analytical Services Protocol (ASP), 6/2000 with the exception of free cyanide which is referenced in Standard Methods for the Evaluation of Water and Wastewater, 20th Edition, 1998. A summary of the samples collected and associated quality control samples are provided in Table 1. The validated analytical results are presented in Attachment A.

A limited data validation was performed following the guidelines in USEPA Region II CLP Organics Data Review (CLP/SOW OLM04.2), SOP No. HW-6, Revision #12, March 2001, and USEPA Region II Evaluation of Metals Data for the CLP, SOP No. HW-2, Revision XI, January 1992. Qualifications applied to the data include "J/UJ" (estimated concentration/estimated quantitation limit), "D" (result reported from a secondary dilution analysis), "U" (not detected), "JN" (tentative identification), and "R" (rejected). A summary of data qualifications is presented in Table 2. Support documentation for the qualification of data is presented in Attachment B.

III. DATA DELIVERABLE COMPLETENESS

The laboratory deliverable data packages were provided in accordance with NYSDEC ASP, Superfund Category requirements.

IV. PRESERVATION/HOLDING TIMES

Samples MW-304-10-12 and RB-1 were received at the laboratory at 11°C. The USEPA Region II temperature criteria for the analysis of VOCs, SVOCs and pesticides/PCBs is 10°C. The results were qualified "J/UJ."

The soil samples listed in Table 2 were analyzed for VOCs more than 10 days after sample collection. The USEPA Region II technical holding time for VOC analyses of soil samples is ten days from sample collection. The results were qualified "J/UJ." It should be noted that the NYSDEC ASP contractual holding times were met for all initial sample analyses.

The SVOC and pesticide/PCB extraction of samples listed in Table 2 exceeded the USEPA Region II technical holding time criteria of seven days from sample collection. The results were qualified "J/UJ." Several pesticide/PCB extracts were analyzed more than 40 days after sample extraction. These samples were previously qualified for extraction holding time exceedance, therefore, additional qualification was not necessary. It should be noted that the NYSDEC ASP contractual holding times were met for the initial sample extractions, except the extraction of rinse blank RB-1 for pesticide/PCB analysis.

The total cyanide and free cyanide analyses of samples listed in Table 2 exceeded the USEPA Region II technical holding time criteria of 14 days from sample collection. The detected results were qualified "J" and non-detect results were rejected (R). Not all samples were analyzed within the NYSDEC ASP contractual holding time of 12 days from the validated time of sample receipt (VTSR).

V. QUALITY CONTROL DATA

A. QC Blanks

The VOC common laboratory contaminants methylene chloride and acetone were detected in the samples listed in Table 2 at a concentration less than ten times the amount detected in the associated method or rinsate blank. In accordance with USEPA Region II validation guidelines, the results were qualified "U."

The SVOC common laboratory contaminants bis(2-ethylhexyl)phthalate, di-n-butylphthalate and butylbenzylphthalate were detected in the samples listed in Table 2 at a concentration less than ten times the amount detected in the associated method or rinsate blank. Benzo(a)pyrene was detected in the samples listed in Table 2 at a concentration less than five times the amount detected in the associated method blank. In accordance with USEPA Region II validation guidelines, the results were qualified "U."

The metal zinc was detected in the samples listed in Table 2 at a concentration less than five times the amount detected in the associated field blank. In accordance with USEPA Region II validation guidelines, the results were qualified "R."

Documentation supporting the qualification of data (i.e., Form 1 for the method blanks) is presented in Attachment B.

B. Instrument Tuning Criteria

Prior to the analysis of any samples, including quality control samples or calibration standards, the laboratory must establish that the gas chromatography/mass spectrometry (GC/MS) system meets the mass spectral ion abundance criteria. All NYSDEC ASP instrument-tuning criteria were met for the VOC and SVOC analyses.

C. Initial and Continuing Calibrations

The RSD for endosulfan I exceeded the USEPA Region II QC limit of 20% in one of the pesticide ICALs. In accordance with USEPA Region II validation guidelines, the results for endosulfan I (all were non-detect) were qualified "UJ" in the samples listed in Table 2.

The percent difference (%D) between the initial and continuing calibration (CCAL) standard RRF exceeded 25% for several VOCs, SVOCs, and one pesticide (endrin). The VOCs include acetone, carbon disulfide, and carbon tetrachloride. The SVOCs include for 2,2'-oxybis (1-chloropropane), 2,4-dimethylphenol, 2,4-dinitrophenol, 2-methylnaphthalene, 2-nitroaniline, 3,3'-dichlorobenzidine, 4-chloroaniline, 4-nitroaniline, benzaldehyde, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, bis(2-chloroethyl)ether, caprolactam, di-n-octylphthalate, n-nitroso-di-n-propylamine and pentachlorophenol. In accordance with USEPA Region II validation guidelines, the associated results for these compounds were qualified "J/UJ" as listed in Table 2.

Documentation supporting the qualification of data (e.g., Form VI for the ICAL and Form VII for the CCAL) is presented in Attachment B. All other initial and continuing calibration data were compliant with USEPA Region II validation criteria. It should be noted that all NYSDEC ASP contractual calibration criteria were met.

D. Surrogate/Internal Standard Recoveries

The VOC fraction of sample IT-310 10-12 had no internal or surrogate recoveries in the initial analysis. The reanalysis also exhibited 0% recoveries. In accordance with Region II validation guidelines the results (all were non detect) were qualified "R."

Several samples for SVOC analysis exhibited low (i.e., less than the lower control limit) or very low (i.e., less than 10 %) surrogate recoveries. Reanalysis of the extracts exhibited similar results. It should be noted that the laboratory did not re-extract the samples as required by the method. The results were qualified "J/UJ" or rejected (R), as summarized in Table 2.

Sample TT-312-6-7 for pesticide/PCB analysis exhibited very low (i.e., less than 10%) surrogate recovery. Reanalysis of the extract exhibited similar results. In accordance with Region II validation guidelines, the results (all were non-detect) were rejected (R). As noted with the SVOCs, the laboratory did not re-extract the sample as required by the method.

Several samples for VOC and SVOC analyses exhibited low (i.e., less than 50%) or very low (i.e., less than 25%) internal standard (IS) recoveries. In most instances, reanalysis exhibited similar recoveries. As summarized in Table 2, the compounds associated with the internal standards were qualified estimated (J/UJ) or the non-detects were rejected. Results reported in Attachment A are from the analysis requiring the least qualification.

Documentation supporting the qualification of data (e.g., Form II for the surrogates and Form VIII for the internal standards) is presented in Attachment B.

E. Matrix Spike/Matrix Spike Duplicate and Matrix Spike Blank

The matrix spike (MS) and/or matrix spike duplicate (MSD) recoveries for antimony, arsenic, barium, beryllium, cadmium, chromium, copper, cyanide, lead, mercury, nickel, selenium, silver, thallium, vanadium, and/or zinc were outside the USEPA Region II quality control (QC) limits of 75-125%. In accordance with Region II validation guidelines, for samples associated with MS/MSD recoveries greater than 125%, only detections are qualified "J." For samples associated with MS/MSD recoveries less than 75%, detections are qualified "J" and non-detects are qualified

"UJ." For samples associated with MS/MSD recoveries less than 10%, all results are qualified "K." The samples were qualified as summarized in Table 2.

Documentation supporting the qualification of data (e.g., Form V for the matrix spikes) is presented in Attachment B.

F. Matrix Duplicates

A control limit of 50% RPD (100% RPD for soils) is used for original and duplicate sample aqueous values greater than or equal to 5 times the contract required detection limit (CRDL). Matrix duplicates were generally acceptable and no additional data qualification was necessary. Matrix duplicates are not performed on organic fractions.

G. Serial Dilutions

The %D between the sample and serial dilution results for barium, beryllium, magnesium, manganese and/or sodium associated with the samples identified in Table 2 were greater than 10%. In accordance with Region II validation guidelines, concentrations greater than ten times the instrument detection limit (IDL), [or greater than the CRDL if 10 times the IDL is less than the CRDL] were qualified "J."

Documentation supporting the qualification of data (e.g., Form IX for serial dilution) is presented in Attachment B.

VI. **SAMPLE RESULTS**

A. Raw Data vs. Reporting Forms

The final results as listed on the reporting forms (i.e., Form Is) were in agreement with the raw data. No calculation errors were detected although several transcription errors were noted in comparison of the laboratory's summary forms with the Form Is.

B. Sample Dilutions

Results for several compounds were qualified "E" by the laboratory to indicate the calibration range was exceeded during the initial analysis. Results qualified "D" indicates a result reported from a secondary dilution analysis.

C. Quantitation Limits

All quantitation limits were reported in accordance with method requirements, and were adjusted for dilution factors and moisture content. Several organic sample results were qualified "J" by the laboratory indicating estimated concentrations below the quantitation limits. Several inorganic sample results were qualified "B" by the laboratory indicating concentrations below the contract required detection limits.

The moisture content of samples BH-304-6-8, RH-306-18-20, MW-301-4-6, and MW-302-4-6 were 50% or greater. In accordance with Region II validation guidelines, all results (i.e., VOCs, SVOCs, pesticides/PCBs, metals, total cyanide and free cyanide) were qualified "J/U", unless previously qualified.

The percent recovery (%R) for cadmium and chromium in the CRDL standard were below the 80-120 %R control limits. In accordance with Region II validation guidelines, cadmium and chromium results in the associated samples identified in Table 2, that were less than or equal to two times the CRDL, were qualified "J."

Documentation supporting the qualification of data (e.g., Form II the CRDL standards and Form XIV for the analytical sequence) is presented in Attachment B.

D. Chromatography

No chromatography problems were encountered.

E. Pesticide/PCB Identification

Several compounds were qualified "P" by the laboratory, indicating that the %D between column concentrations exceeded 25%. In accordance with Region II validation guidelines, the following action was taken. Because the %D for alpha-chlordane in BH-304 6-8 and dieldrin in MW-304-6-8 was 100% or greater and no matrix interference was observed, the results were qualified "R." 4,4'-DDD in MW-304-2-4 and 4,4'-DDT in TT-306-Surface had greater than 70 %D between column concentrations, with matrix interference observed, therefore the "P" was replaced with "JN." 4,4'-DDE and 4,4'-DDT in MW-305-Surface had greater than 25 %D between column concentrations, therefore the "P" was replaced with a "J." Documentation supporting the qualification of data (e.g., Form X for pesticide identification summary) is presented in Attachment B.

VII. SUMMARY

All sample analyses were found to be compliant with the method criteria, except where previously noted. Those results qualified "J/UJ"(estimated) are considered conditionally usable. Those results qualified "JN" are considered tentative identifications and are conditionally usable. Those results qualified "R"(rejected) are unusable. All other sample results are usable as reported. URS Corporation does not recommend the recollection of any samples at this time.

TABLE 1
SAMPLE IDENTIFICATION SUMMARY
FORMER HANNA FURNACE SITE

LOCATION ID	FIELD SAMPLE ID	SAMPLE DATE	MATRIX	LAB SAMPLE ID	COMMENTS
BH-301	BH-301-Surface	10-Oct-01	Soil	L77999-01	--
BH-301	BH-301-4-6	10-Oct-01	Soil	L77999-02	--
BH-302	BH-302-Surface	10-Oct-01	Soil	L77999-03	--
BH-302	BH-302-4-6	10-Oct-01	Soil	L77999-04	--
BH-303	BH-303-Surface	10-Oct-01	Soil	L77999-05	--
BH-303	BH-303-4-6	10-Oct-01	Soil	L77999-06	--
BH-304	BH-304-Surface	10-Oct-01	Soil	L77999-07	--
BH-304	BH-304-6-8	10-Oct-01	Soil	L77999-08	--
BH-305	BH-305-Surface	11-Oct-01	Soil	L77999-09	--
BH-305	BH-305-12-14	11-Oct-01	Soil	L77999-10	--
BH-306	BH-306-18-20	11-Oct-01	Soil	L77999-11	--
BH-306	BH-306-24-26	11-Oct-01	Soil	L77999-12	--
BH-307	BH-307-4-6	15-Oct-01	Soil	L77999-17	--
BH-308	BH-308-8-10	16-Oct-01	Soil	L78240-01	--
BH-309	BH-309-7-9	18-Oct-01	Soil	L78240-04	--
MW-301	MW-301-Surface	19-Oct-01	Soil	L78360-05	--
MW-301	MW-301-4-6	19-Oct-01	Soil	L78360-06	--
MW-302	MW-302-Surface	18-Oct-01	Soil	L78360-01	MS/MSD
MW-302	MW-302-4-6	18-Oct-01	Soil	L78360-04	--
MW-303	MW-303-7-9	01-Nov-01	Soil	82259-001	--
MW-303	MW-303-9-11	01-Nov-01	Soil	82259-002	--
MW-304	MW-304-2-4	11-Oct-01	Soil	L77999-13	--
MW-304	MW-304-10-12	12-Oct-01	Soil	L77999-15	--
MW-305	MW-305-Surface	16-Oct-01	Soil	L78240-02	--
MW-306	MW-306-6-8	17-Oct-01	Soil	L78240-03	--
TT-301B	TT-301-4-6	02-Oct-01	Soil	L77443-01	--
TT-304B	TT-304-Surface	02-Oct-01	Soil	L77443-02	--
TT-304B	TT-304-5-7	02-Oct-01	Soil	L77443-03	--
TT-305B	TT-305-9-11	02-Oct-01	Soil	L77443-04	--
TT-306B	TT-306-Surface	03-Oct-01	Soil	L77443-06	--
TT-306B	TT-306-9-11	03-Oct-01	Soil	L77443-07	--
TT-307B	TT-307-Surface	03-Oct-01	Soil	L77443-08	--
TT-307B	TT-307-2-5-4	03-Oct-01	Soil	L77443-09	--
TT-308B	TT-308-Surface	03-Oct-01	Soil	L77443-10	--
TT-308B	TT-308-3-5	03-Oct-01	Soil	L77443-11	--
TT-309B	TT-309-Surface	03-Oct-01	Soil	L77443-12	MS/MSD
TT-309B	TT-309-9-11	03-Oct-01	Soil	L77443-15	--
TT-310B	TT-310-10-12	03-Oct-01	Soil	L77443-16	--
TT-311B	TT-311-3-4	03-Oct-01	Soil	L77443-17	--
TT-312B	TT-312-6-7	03-Oct-01	Soil	L77443-18	--
TT-314B	TT-314-8-10	04-Oct-01	Soil	L77443-19	--
FIELDQC	RR-1	12-Oct-01	Rinse Blank	L77999-14	--
MW-101	MW-101	13-Nov-01	Groundwater	82330-008	--
MW-103	MW-103	13-Nov-01	Groundwater	82330-009	--
MW-301	MW-301	13-Nov-01	Groundwater	82330-001	--
MW-302	MW-302	13-Nov-01	Groundwater	82330-002	--
MW-303	MW-303	13-Nov-01	Groundwater	82330-003	--
MW-304	MW-304	13-Nov-01	Groundwater	82330-004	MS/MSD
MW-305	MW-305	13-Nov-01	Groundwater	82330-005	--
MW-306	MW-306	13-Nov-01	Groundwater	82330-006	--
MW-307	MW-307	13-Nov-01	Groundwater	82330-007	--
FIELDQC	TB-1	13-Nov-01	Trp Blank	82330-010	--

TABLE 2
SUMMARY OF DATA QUALIFICATIONS

SAMPLE ID	FRACTION	ANALYTICAL DEVIATION	QUALIFICATION
BH-304-6-8, BH-306-18-20, MW-301-4-6, MW-302-4-6	VOCs, SVOCs, Pesticides, PCBs, metals, total and free cyanide	Percent moisture in sample greater than or equal to 50%	Qualify non-detects "UJ" and detects "J"
MW-304-10-12, RB-1	VOCs, SVOCs, Pesticides, PCBs	Cooler receipt temperature exceeded 10°C	Qualify non-detects "UJ" and detects "J"
MW-305-Surface, BH-306-24- 26, BH-308-8-10, TT-301-4-6, TT-304-Surface, TT-305-9-11, TT-306-Surface, TT-307- Surface, TT-307-2-5-4, TT- 308-Surface, TT-308-3-5, TT- 309-9-11, TT-311-3-4 TT-310-10-12	VOC	Technical holding time exceedance	Qualify non-detects "UJ" and detects "J"
BH-302-4-6	VOC	Surrogate and internal standard recovery were 0%	Qualify results "R"
BH-302-4-6	VOC	Internal standards bromochloromethane, 1-4- difluorobenzene and chlorobenzene-d ₃ below 50%	Qualify associated non- detects "UJ" and detects "J"
BH-301-Surface, BH-301-4-6, MW-304-10-12, TT-304-5-7, TT-306-9-11, TT-309-Surface, TT-314-8-10	VOC	Internal standards bromochloromethane, 1-4- difluorobenzene and chlorobenzene-d ₃ recovery below 25%	Qualify associated non- detects "R" and detects "J"
BH-304-Surface, BH-305- Surface, BH-307-4-6, MW-302- Surface	VOC	Internal standard chlorobenzene-d ₃ recovery below 50%	Qualify associated non- detects "UJ" and detects "J"
BH-308-8-10	VOC	Internal standard chlorobenzene-d ₃ recovery below 25%	Qualify associated non- detects "R" and detects "J"
BH-303-4-6	VOC	Internal standards, bromochloromethane and chlorobenzene-d ₃ below 50%	Qualify associated non- detects "UJ" and detects "J"
BH-309-7-9	VOC	Internal standards 1-4-difluorobenzene and chlorobenzene-d ₃ below 25%	Qualify associated non- detects "R" and detects "J"
MW-306-6-8	VOC	Internal standards bromochloromethane and chlorobenzene-d ₃ recovery below 25%	Qualify associated non- detects "R" and detects "J"
MW-306-6-8	VOC	Internal standard 1-4-difluorobenzene below 50%	Qualify associated non- detects "UJ" and detects "J"

TABLE 2 (Con't)

SAMPLE ID	FRACTION	ANALYTICAL DEVIATION	QUALIFICATION
All groundwater samples	VOC	CCAL %D greater than 25% for acetone and carbon disulfide	Qualify detects "J" and non-detects "UJ"
BH-302-Surface, BH-303-Surface, BH-304-Surface	VOC	CCAL %D greater than 25% for carbon tetrachloride	Qualify non-detects "UJ"
BH-302-Surface, BH-302-4-6, BH-303-Surface, BH-303-4-6, BH-304-Surface, BH-304-6-8, BH-305-Surface, BH-305-12-14, BH-306-18-20, BH-306-24-26, BH-307-4-6, BH-308-8-10, MW-304-2-4, MW-306-6-8	VOC	Methylene chloride contamination in associated QC blank	Qualify detects "UJ" and raise to quantitation limit
BH-302-4-6, BH-303-4-6, BH-304-6-8, BH-305-12-14, BH-306-18-20, BH-306-24-26, BH-307-4-6, BH-308-8-10, BH-309-7-9, MW-301-4-6, MW-302-4-6, MW-304-2-4, MW-306-6-8, TT-311-3-4	VOC	Acetone contamination in associated QC blank	Qualify detects "UJ" at the quantified value
BH-301-Surface, BH-301-4-6, BH-302-Surface, BH-302-4-6, BH-303-Surface, BH-303-4-6, BH-304-Surface, BH-304-6-8, BH-309-7-9, MW-302-Surface, MW-302-4-6, MW-306-6-8, TT-301-4-6, TT-304-Surface, TT-304-5-7, TT-305-9-11, TT-306-Surface, TT-306-9-11, TT-307-Surface, TT-307-2-5-4, TT-308-Surface, TT-308-3-5, TT-309-Surface, TT-309-9-11, TT-310-10-12, TT-311-3-4, TT-312-6-7	SVOC	Extraction technical holding time exceeded	Qualify non-detects "UJ" and detects "J"
TT-314-8-10	SVOC	Surrogate recoveries less than lower control limit for base-neutral and phenolic compounds	Qualify non-detects "UJ" and detects "J"
MW-302-4-6	SVOC	Surrogate recovery less than 10% for base-neutral and phenolic compounds	Qualify non-detects "R" and detects "J"
BH-306-18-20, TT-311-3-4	SVOC	Surrogate recovery less than 10% for phenolic compounds	Qualify phenolic non-detects "R"
MW-101, MW-301, MW-302, BH-303-4-6, MW-305, BH-305-12-14, BH-306-24-26, BH-308-8-10, MW-304-10-12, TT-304-5-7	SVOC	bis(2-Ethylhexyl)phthalate contamination in associated QC blank	Qualify detects "UJ" and raise to quantitation limit

TABLE 2 (Con't)

SAMPLE ID	FRACTION	ANALYTICAL DEVIATION	QUALIFICATION
BH-301-Surface, BH-304-6-8, MW-304-2-4, MW-305-Surface, BH-306-18-20, TT-301-4-6, TT-304-Surface, TT-305-9-11, TT-306-Surface, TT-306-9-11, TT-307-Surface, TT-307-2.5-4, TT-308-Surface, TT-308-3-5, TT-309-Surface, TT-309-9-11, TT-310-10-12, TT-311-3-4, TT-312-6-7, TT-314-8-10	SVOC	bis(2-Ethylhexyl)phthalate contamination in associated QC blank	Qualify detects "UJ" at the quantified value
BH-301 Surface, BH-301-4-6, BH-302-Surface, BH-303-Surface, BH-303-4-6, BH-306-18-20, BH-306-24-26, MW-305-Surface	SVOC	Benzo(a)pyrene contamination in associated QC blank	Qualify detects "UJ" and raise to quantitation limit
BH-304 Surface, BH-304-6-8	SVOC	Benzo(a)pyrene contamination in associated QC blank	Qualify detects "UJ" at the quantified value
TT-301-4-6, TT-304-Surface, TT-305-9-11, TT-306-Surface, TT-306-9-11, TT-307-Surface, TT-307-2.5-4, TT-308-Surface, TT-308-3-5, TT-309-9-11, TT-310-10-12, TT-311-3-4	SVOC	Di-n butylphthalate contamination in associated QC blank	Qualify detects "UJ" and raise to quantitation limit
TT-304-Surface, TT-306-Surface, TT-306-9-11, TT-307-Surface, TT-308-3-5	SVOC	Butylbenzylphthalate contamination in associated QC blank	Qualify detects "UJ" and raise to quantitation limit
MW-101	SVOC	Internal standard chrysene-d ₁₂ below 50%	Qualify associated non-detects "UJ" and detects "J"
MW-303-7-9, MW-305-Surface	SVOC	Internal standard perylene d ₁₂ below 50%	Qualify associated non-detects "UJ" and detects "J"
MW-101	SVOC	Internal standard perylene-d ₁₂ below 25%	Qualify associated non-detects "R" and detects "J"
MW-304-10-12	SVOC	Internal standards chrysene-d ₁₂ and perylene-d ₁₂ below 25%	Qualify associated non-detects "R" and detects "J"
MW-304	SVOC	CCAL %D greater than 25% for 2,2'-oxybis (1-chloropropane), 4-nitroaniline, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, caprolactam, di-n-octylphthalate, pentachlorophenol	Qualify non-detects "UJ"
MW-101, MW-103, MW-301, MW-302, MW-303, MW-305	SVOC	CCAL %D greater than 25% for 2,2'-oxybis (1-chloropropane), 2,4-dimethylphenol, 2-nitroaniline, 3,3'-dichlorobenzidine, 4-chloroaniline, 4-nitroaniline, benzaldehyde, bis(2-chloroethyl)ether, n-nitroso-di-n-propylamine	Qualify non-detects "UJ" and detects "J"

TABLE 2 (Con't)

SAMPLE ID	FRACTION	ANALYTICAL DEVIATION	QUALIFICATION
MW-306	SVOC	CCAL %D greater than 25% for 3,3'-dichlorobenzidine, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, di-n-octylphthalate	Qualify non-detects "UJ" and detects "J"
MW-307	SVOC	CCAL %D greater than 25% for benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, di-n-octylphthalate	Qualify non-detects "UJ"
BH-305-Surface, BH-305-12-14, BH-307-4-6, MW-305-Surface	SVOC	CCAL %D greater than 25% for 2-methylnaphthanene	Qualify non-detects "UJ"
MW-303-7-9	SVOC	CCAL %D greater than 25% for 1,1-biphenyl, 2,2'-oxybis (1-chloropropane), 2,4-dinitrophenol, 3,3'-dichlorobenzidine, 4-nitroaniline, benzaldehyde, bis(2-chloroethyl)ether, n-nitroso-di-n-propylamine, pentachlorophenol	Qualify non-detects "UJ"
BH-301-Surface, BH-301-4-6, BH-302-Surface, BH-302-4-6, BH-303-Surface, BH-303-4-6, BH-304-Surface, BH-304-6-8, BH-305-Surface, BH-305-12-14, BH-306-18-20, BH-306-24-26, MW-304-2-4, MW-306-6-8, TT-301-4-6, TT-304-Surface, TT-304-5-7, TT-305-9-11, TT-306-Surface, TT-306-9-11, TT-307-Surface, TT-307-2-5-4, TT-308-Surface, TT-308-3-5, TT-309-Surface, TT-309-9-11, TT-310-10-12, TT-311-3-4, TT-314-8-10	Pesticide/PCB	Extraction technical holding time exceeded	Qualify non-detects "UJ" and detects "J"
TT-312-6-7	Pesticide/PCB	Surrogate recovery less than 10%	Qualify results "R"
All groundwater samples, MW-303-7-9	Pesticide/PCB	ICAL %RSD for endosulfan I exceeds 20% criteria	Qualify non-detects "UJ"
BH-309-7-9, MW-301-Surface, MW-302-Surface	Pesticide/PCB	CCAL %D for endrin exceeds 25% criteria	Qualify non-detects "UJ"
BH-304-6-8	Pesticide/PCB	%D between dual column concentration greater than 100% for alpha-chlordane	Qualify results "R"
MW-304-2-4	Pesticide/PCB	%D between dual column concentration greater than 200% for dieldrin	Qualify results "R"
MW-304-2-1	Pesticide/PCB	%D between dual column concentration greater than 100% for 4,4'-DDD	Qualify results "JN"
TT-306-Surface	Pesticide/PCB	%D between dual column concentration greater than 70% for 4,4'-DDT	Qualify results "JN"
MW-305-Surface	Pesticide/PCB	%D between dual column concentration greater than 25% for 1,1'-DDE, 4,4'-DDT	Qualify results "J"

TABLE 2 (Con't)

SAMPLE ID	FRACTION	ANALYTICAL DEVIATION	QUALIFICATION
BH-305-12-14, MW-301-Surface, MW-304-10-12	Total Metals	Contract required detection limit standard recovery less than 80% for cadmium	Qualify results "J"
TT-307-2.5-4	Total Metals	Contract required detection limit standard recovery less than 80% for chromium	Qualify results "J"
MW-101, MW-103, MW-301, MW-102, MW-303, MW-305, MW-306, MW-307	Total and Dissolved Metals	The MS recovery for selenium greater than 150%	Qualify detects "R"
MW-103, MW-302, MW-303, MW-305, MW-306, MW-307	Total and Dissolved Metals	The MS and/or MSD recovery for antimony, arsenic, lead greater than 125%	Qualify detects "J"
All TT soils	Total Metals	The MS and/or MSD recovery for antimony greater than 125%	Qualify detects "J"
All BH soils, MW-304-2-4, MW-304-10-12, MW-305-Surface, MW-306-6-8	Total Metals	The MS and/or MSD recovery for antimony, arsenic, chromium, copper, nickel, silver less than 75%	Qualify detects "J" and non-detects "UJ"
MW-301-Surface, MW-302-Surface	Total Metals	The MS and/or MSD recovery for antimony, barium, beryllium, cadmium, chromium, copper, mercury, nickel, silver, vanadium, zinc less than 75%	Qualify detects "J" and non-detects "UJ"
TT-304-Surface, TT-304-5-7, TT-305-9-11, TT-306-9-11, TT-307-Surface, TT-307-2.5-4, TT-308-Surface, TT-308-3-5, TT-312-6-7, TT-314-8-10	Total Metals	The MS and/or MSD recovery for selenium less than 75%	Qualify detects "J" and non-detects "UJ"
TT-304-Surface	Total Metals	The MS recovery for thallium less than 75%	Qualify non-detect "UJ"
All BH soils (except BH-308-8-10, BH-309-7-9), all TT soils	Total Metals	The MS and/or MSD recovery for mercury less than 10%	Qualify all results "R"
MW-103, MW-301, MW-302, MW-303, MW-304, MW-305, MW-306	Total Metals	Serial dilution greater than 10 %D for manganese	Qualify detects greater than ten times IDL "J"
MW-305	Dissolved Metals	Serial dilution greater than 10 %D for barium	Qualify detects greater than ten times IDL "J"
MW-103, MW-301, MW-303, MW-304, MW-305, MW-306	Dissolved Metals	Serial dilution greater than 10 %D for magnesium	Qualify detects greater than ten times IDL "J"
All BH soils, MW-306-6-8	Total Metals	Serial dilution greater than 10 %D for beryllium	Qualify detects greater than ten times IDL "J"
MW-302-Surface	Metals	Serial dilution greater than 10 %D for sodium	Qualify detects greater than ten times IDL "J"
BH-304-6-8, BH-307-4-6, BH-308-8-10, MW-301-Surface, MW-301-4-6, MW-302-Surface	Total Metals	Zinc contamination in associated field blank	Qualify detected results "R"
BH-301-Surface, BH-301-4-6, BH-302-Surface, BH-302-4-6, BH-303-Surface, BH-303-4-6, BH-304-Surface, BH-304-6-8, BH-306-18-20, BH-307-4-6, BH-308-8-10, MW-305-Surface	Total Cyanide	Technical holding time exceeded	Qualify non-detects "R" and detects "J"

TABLE 2 (Con't)

SAMPLE ID	FRACTION	ANALYTICAL DEVIATION	QUALIFICATION
All BH soil samples (except BH-308-8-10, BH-309-7-9), all IT soil samples, MW-301-Surface, MW-301-4-6, MW-302-Surface, MW-302-4-6, MW-304-2-4, MW-304-10-12	Total Cyanide	MS recovery less than 10%	Qualify all results "R"
BH-301-Surface, BH-301-4-6, BH-302-Surface, BH-302-4-6, BH-303-Surface, BH-303-4-6, BH-304-Surface, BH-304-6-8, BH-307-4-6, BH-308-8-10, MW-305 Surface	Free Cyanide	Technical holding time exceeded	Qualify non-detects "R" and detects "J"
All BH soils not qualified for holding time exceedance	Free Cyanide	MS recovery less than 75%	Qualify non-detects "UJ" and detects "J"

ATTACHMENT A

VALIDATED ANALYTICAL RESULTS

Definition of Data Qualifiers

- U - The analyte was analyzed for, but was not detected above the reported sample quantitation limit.
- J - The analyte was positively identified, the associated numerical value is the approximate concentration of the analyte in the sample.
- N - The analysis indicates the presence of an analyte for which there is presumptive evidence to make a "tentative identification."
- NJ - The analysis indicates the presence of an analyte that has been "tentatively identified" and the associated numerical value represents its approximate concentration.
- UJ - The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.
- R - The sample results are rejected due to serious deficiencies in the ability to analyze the sample and meet quality control criteria. The presence or absence of the analyte cannot be verified.
- B - Metals Only - The analyte was positively identified, the associated numerical value is greater than the instrument detection limit (IDL) but less than the contract required detection limit (CRDL).

ATTACHMENT A
ANALYTICAL GROUNDWATER SAMPLE RESULTS
FORMER HANNA FURNACE SITE

Location ID		MW-101	MW-103	MW-301	MW-302	MW-303
Sample ID		MW-101	MW-103	MW-301	MW-302	MW-303
Matrix		Groundwater	Groundwater	Groundwater	Groundwater	Groundwater
Depth Interval (ft)		-	-	-	-	-
Date Sampled		11/13/01	11/13/01	11/13/01	11/13/01	11/13/01
Parameter	Units					
Volatiles Organic Compounds						
1,1,1-Trichloroethane	UGL	10 U	10 U	10 U	10 U	10 U
1,1,2,2-Tetrachloroethane	UGL	10 U	10 U	10 U	10 U	10 U
1,1,2-Trichloro-1,2,2-trifluoroethane	UGL	10 U	10 U	10 U	10 U	10 U
1,1,2-Trichloroethane	UGL	10 U	10 U	10 U	10 U	10 U
1,1-Dichloroethane	UGL	10 U	10 U	10 U	10 U	10 U
1,1-Dichloroethene	UGL	10 U	10 U	10 U	10 U	10 U
1,2,4-Trichlorobenzene	UGL	10 U	10 U	10 U	10 U	10 U
1,2-Dibromo-3-chloropropane	UGL	10 U	10 U	10 U	10 U	10 U
1,2-Dibromoethane (Ethylene dibromide)	UGL	10 U	10 U	10 U	10 U	10 U
1,2-Dichlorobenzene	UGL	10 U	10 U	10 U	10 U	10 U
1,2-Dichloroethane	UGL	10 U	10 U	10 U	10 U	10 U
1,2-Dichloroethene (cis)	UGL	10 U	10 U	10 U	10 U	10 U
1,2-Dichloroethene (trans)	UGL	10 U	10 U	10 U	10 U	10 U
1,2-Dichloropropane	UGL	10 U	10 U	10 U	10 U	10 U
1,3-Dichlorobenzene	UGL	10 U	10 U	10 U	10 U	10 U
1,3-Dichloropropene (cis)	UGL	10 U	10 U	10 U	10 U	10 U
1,3-Dichloropropene (trans)	UGL	10 U	10 U	10 U	10 U	10 U
1,4-Dichlorobenzene	UGL	10 U	10 U	10 U	10 U	10 U
2,4-Hexanone	UGL	10 U	10 U	10 U	10 U	10 U
4-Methyl-2-pentanone	UGL	10 U	10 U	10 U	10 U	10 U
Acetone	UGL	12 U	10 U	10 U	10 U	10 U
Benzene	UGL	10 U	10 U	10 U	10 U	10 U
Bromodichloromethane	UGL	10 U	10 U	10 U	10 U	10 U
Bromoform	UGL	10 U	10 U	10 U	10 U	10 U

Flags assigned during chemistry validation are shown

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CHKD BY: MFR 3/11/2002

Detection Limits shown are PQL

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ATTACHMENT A **ANALYTICAL GROUNDWATER SAMPLE RESULTS** **FORMER HANNA FURNACE SITE**

Location ID		MW-101	MW-103	MW-301	MW-302	MW-303
Sample ID		MW-101	MW-103	MW-301	MW-302	MW-303
Matrix		Groundwater	Groundwater	Groundwater	Groundwater	Groundwater
Depth Interval (ft)		-	-	-	-	-
Date Sampled		11/13/01	11/13/01	11/13/01	11/13/01	11/13/01
Parameter	Units					
Volatiles Organic Compounds						
Bromomethane	UG/L	10 U	10 U	10 U	10 U	10 U
Carbon disulfide	UG/L	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ
Carbon tetrachloride	UG/L	10 U	10 U	10 U	10 UJ	10 UJ
Chlorobenzene	UG/L	10 UJ	10 U	10 U	10 U	10 U
Chloroethane	UG/L	10 U	10 UJ	10 UJ	10 U	10 U
Chloroform	UG/L	10 U	10 U	10 U	10 UJ	10 U
Chloromethane	UG/L	10 U	10 UJ	10 U	10 U	10 U
Cyclohexane	UG/L	10 U	10 U	10 U	10 UJ	10 U
Dibromochloromethane	UG/L	10 UJ	10 U	10 U	10 U	10 UJ
Dichlorodibromomethane	UG/L	10 UJ	10 U	10 UJ	10 U	10 U
Ethylbenzene	UG/L	10 UJ	10 U	10 U	10 UJ	10 U
Isopropylbenzene (Cumene)	UG/L	10 U	10 UJ	10 U	10 U	10 UJ
Methyl acetate	UG/L	10 U	10 U	10 UJ	10 U	10 U
Methyl ethyl ketone (2-Butanone)	UG/L	10 UJ	10 U	10 U	10 UJ	10 U
Methyl tert-butyl ether	UG/L	10 U	10 U	10 UJ	10 U	10 U
Methylcyclohexane	UG/L	10 UJ	10 U	10 U	10 U	10 UJ
Methylene chloride	UG/L	10 UJ	10 U	10 UJ	10 U	10 U
Styrene	UG/L	10 U	10 U	10 UJ	10 U	10 UJ
Tetrachloroethene	UG/L	10 U	10 U	10 U	2 U	10 U
Toluene	UG/L	10 UJ	10 U	10 U	10 U	10 U
Trichloroethene	UG/L	10 UJ	10 U	10 U	10 UJ	10 U
Trichlorofluoromethane	UG/L	10 U	10 U	10 U	10 U	10 U
Vinyl chloride	UG/L	10 U	10 U	10 U	10 U	10 U
Xylene (total)	UG/L	10 U	10 UJ	10 U	10 U	10 UJ

Flags assigned during chemistry validation are shown

MADE BY: GFK 3/11/2002

AKS BY: MFR 3/11/2002

Detection Limits shown are PQL

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ATTACHMENT A
ANALYTICAL GROUNDWATER SAMPLE RESULTS
FORMER HANNA FURNACE SITE

Location ID		MW-101	MW-103	MW-301	MW-302	MW-303
Sample ID		MW-101	MW-103	MW-301	MW-302	MW-303
Matrix		Groundwater	Groundwater	Groundwater	Groundwater	Groundwater
Depth Interval (ft)		-	-	-	-	-
Date Sampled		11/13/01	11/13/01	11/13/01	11/13/01	11/13/01
Parameter	Units					
Semivolatile Organic Compounds						
1,1'-Biphenyl	UGL	10 U	10 U	10 U	10 U	10 U
2,2'-oxybis(1-Chloropropane)	UGL	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ
2,4,5-Trichlorophenol	UGL	25 U	25 U	25 U	25 U	25 U
2,4,6-Trichlorophenol	UGL	10 U	10 U	10 U	10 U	10 U
2,4-Dichlorophenol	UGL	10 U	10 U	10 U	10 U	10 U
2,4-Dimethylphenol	UGL	2 U	23 U	10 UJ	10 UJ	10 UJ
2,4-Dinitrophenol	UGL	25 U	25 U	25 U	25 U	25 U
2,4-Dinitrotoluene	UGL	10 U	10 U	10 U	10 U	10 U
2,6-Dinitrotoluene	UGL	10 U	10 U	10 U	10 U	10 U
2-Chloronaphthalene	UGL	10 U	10 U	10 U	10 U	10 U
2-Chlorophenol	UGL	10 U	10 U	10 U	10 U	10 U
2-Methylnaphthalene	UGL	1 U	10 U	10 U	10 U	10 U
2-Methylphenol (o-cresol)	UGL	10 U	10 U	10 U	10 U	10 U
2-Nitroaniline	UGL	25 UJ	25 UJ	25 UJ	25 UJ	25 UJ
2-Nitrophenol	UGL	10 U	10 U	10 U	10 U	10 U
3,3'-Dichlorobenzidine	UGL	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ
3-Nitroaniline	UGL	25 U	25 U	25 U	25 U	25 U
4,6-Dinitro-2-methylphenol	UGL	25 U	25 U	25 U	25 U	25 U
4-Bromophenyl-phenylether	UGL	10 U	10 U	10 U	10 U	10 U
4-Chloro-3-methylphenol	UGL	10 U	10 U	10 U	10 U	10 U
4-Chloroaniline	UGL	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ
4-Chlorophenyl phenylether	UGL	10 U	10 U	10 U	10 U	10 U
4-Methylphenol (p-cresol)	UGL	3 U	10 U	10 U	10 U	10 U
4-Nitroaniline	UGL	25 UJ	25 UJ	25 UJ	25 UJ	25 UJ

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CHECKED BY: MCB 3/11/2002

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ATTACHMENT A **ANALYTICAL GROUNDWATER SAMPLE RESULTS** **FORMER HANNA FURNACE SITE**

Location ID		MW-101	MW-103	MW-301	MW-302	MW-303
Sample ID		MW-101	MW-103	MW-301	MW-302	MW-303
Matrix		Groundwater	Groundwater	Groundwater	Groundwater	Groundwater
Depth Interval (ft)		-	-	-	-	-
Date Sampled		11/13/01	11/13/01	11/13/01	11/13/01	11/13/01
Parameter	Units					
Semivolatile Organic Compounds						
4-Nitrophenol	UG/L	25 U	25 U	25 U	25 U	25 U
Acenaphthene	UG/L	10 U	10 U	10 U	10 U	10 U
Acenaphthylene	UG/L	10 U	10 U	10 U	10 U	10 U
Acetophenone	UG/L	10 U	10 U	10 U	10 U	10 U
Anthracene	UG/L	10 U	10 U	10 U	10 U	10 U
Atrazine	UG/L	10 U	10 U	10 U	10 U	10 U
Benzaldehyde	UG/L	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ
Benzo(a)anthracene	UG/L	10 UJ	10 U	10 U	10 U	10 U
Benzo(a)pyrene	UG/L	R	10 U	10 U	10 U	10 U
Benzo(b)fluoranthene	UG/L	R	10 U	10 U	10 U	10 U
Benzo(g,h,i)perylene	UG/L	R	10 U	10 U	10 U	10 U
Benzo(k)fluoranthene	UG/L	R	10 U	10 U	10 U	10 U
bis(2-Chloroethoxy)methane	UG/L	10 U	10 U	10 U	10 U	10 U
bis(2-Chloroethyl)ether	UG/L	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ
bis(2-Ethylhexyl)phthalate	UG/L	10 UJ	10 U	10 U	10 U	10 U
Butylbenzylphthalate	UG/L	10 UJ	10 U	10 U	10 U	10 U
Caprolactam	UG/L	10 U	10 U	10 U	10 U	10 U
Carbazole	UG/L	1 U	10 U	10 U	10 U	10 U
Chrysene	UG/L	10 UJ	10 U	10 U	10 U	10 U
Dibenz(a,h)anthracene	UG/L	R	10 U	10 U	10 U	10 U
Dibenzofuran	UG/L	10 U	10 U	10 U	10 U	10 U
Diethylphthalate	UG/L	10 U	10 U	10 U	10 U	10 U
Dimethylphthalate	UG/L	10 U	10 U	10 U	10 U	10 U
Di-n-butylphthalate	UG/L	10 U	10 U	10 U	10 U	10 U

Flags assigned during Chemistry validation are shown

MADE BY: CFX 3/11/2002

THIRD BY: MCS 3/11/2002

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ATTACHMENT A **ANALYTICAL GROUNDWATER SAMPLE RESULTS** **FORMER HANNA FURNACE SITE**

Location ID		MW-101	MW-103	MW-301	MW-302	MW-303
Sample ID		MW-101	MW-103	MW-301	MW-302	MW-303
Matrix		Groundwater	Groundwater	Groundwater	Groundwater	Groundwater
Depth Interval (ft)						
Date Sampled		11/13/01	11/13/01	11/13/01	11/13/01	11/13/01
Parameter	Units					
Semi-volatiles Organic Compounds						
Di-n-octylphthalate	UG/L	R	10 U	10 U	10 U	10 U
Fluoranthene	UG/L	10 U	10 U	10 U	10 U	10 U
Fluorene	UG/L	10 U	10 U	10 U	10 U	10 U
Hexachlorobenzene	UG/L	10 U	10 U	10 U	10 U	10 U
Hexachlorobutadiene	UG/L	10 U	10 U	10 U	10 U	10 U
Hexachlorocyclopentadiene	UG/L	10 U	10 U	10 U	10 U	10 U
Hexachloroethane	UG/L	10 U	10 U	10 U	10 U	10 U
Indeno(1,2,3-cd)pyrene	UG/L	R	10 U	10 U	10 U	10 U
Isophorone	UG/L	10 U	10 U	10 U	10 U	10 U
Naphthalene	UG/L	3 J	3 J	10 U	10 U	10 U
Nitrobenzene	UG/L	10 U	10 U	10 U	10 U	10 U
N-Nitroso-di-n-propylemine	UG/L	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ
N-Nitrosodiphenylamine	UG/L	10 U	10 U	10 U	10 U	10 U
Pentachlorophenol	UG/L	25 U	25 U	25 U	25 U	25 U
Phenanthrene	UG/L	10 U	10 U	10 U	10 U	10 U
Phenol	UG/L	8 J	3 J	3 J	10	10 U
Pyrene	UG/L	10 UJ	10 U	10 U	10 U	10 U
Pesticides						
4,4'-DDD	UG/L	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
4,4'-DDE	UG/L	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
4,4'-DDT	UG/L	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Aldrin	UG/L	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
alpha-BHC	UG/L	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
alpha-Chlordane	UG/L	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U

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MADE BY: GFK 3/11/2002

CHECKED BY: MF-B 3/11/2002

Detection Limits shown are PQL

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ATTACHMENT A **ANALYTICAL GROUNDWATER SAMPLE RESULTS** **FORMER HANNA FURNACE SITE**

Location ID		MW-101	MW-103	MW-301	MW-302	MW-303
Sample ID		MW-101	MW-103	MW-301	MW-302	MW-303
Matrix		Groundwater	Groundwater	Groundwater	Groundwater	Groundwater
Depth Interval (ft)		-	-	-	-	-
Date Sampled		11/13/01	11/13/01	11/13/01	11/13/01	11/13/01
Parameter	Units					
Pesticides						
beta-BHC	UGL	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
delta-BHC	UGL	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Dieldrin	UGL	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Endosulfan I	UGL	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ
Endosulfan II	UGL	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Endosulfan sulfate	UGL	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Endrin	UGL	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Endrin aldehyde	UGL	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Endrin toluene	UGL	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
gamma-BHC (Lindane)	UGL	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
gamma-Chlordane	UGL	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Heptachlor	UGL	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Heptachlor epoxide	UGL	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Methoxychlor	UGL	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Toxaphene	UGL	5 U	5 U	5 U	5 U	5 U
Polychlorinated Biphenyls						
Aroclor 1016	UGL	1 U	1 U	1 U	1 U	1 U
Aroclor 1221	UGL	2 U	2 U	2 U	2 U	2 U
Aroclor 1232	UGL	1 U	1 U	1 U	1 U	1 U
Aroclor 1242	UGL	1 U	1 U	1 U	1 U	1 U
Aroclor 1248	UGL	1 U	1 U	1 U	1 U	1 U
Aroclor 1254	UGL	1 U	1 U	1 U	1 U	1 U
Aroclor 1260	UGL	1 U	1 U	1 U	1 U	1 U

Flags assigned during chemistry validation are shown.

MADE BY: CEK 3/11/2002

KD BY: MCH 3/11/2002

Detection Limits shown are PQL

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ATTACHMENT A **ANALYTICAL GROUNDWATER SAMPLE RESULTS** **FORMER HANNA FURNACE SITE**

Location ID		MW-101	MW-103	MW-301	MW-302	MW-303
Sample ID		MW-101	MW-103	MW-301	MW-302	MW-303
Matrix		Groundwater	Groundwater	Groundwater	Groundwater	Groundwater
Depth Interval (ft)		-	-	-	-	-
Date Sampled		11/13/01	11/13/01	11/13/01	11/13/01	11/13/01
Parameter	Units					
Metals						
Aluminum	UG/L	164 D	867	1,850	1,250	1,720
Antimony	UG/L	4.0 U	4.0 U	4.0 U	4.0 U	4.0 U
Arsenic	UG/L	7.0 U	7.6 BJ	7.0 U	7.9 BJ	7.1 BJ
Barium	UG/L	88.7 B	85.2 B	100 B	39.7 D	189 D
Beryllium	UG/L	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U
Cadmium	UG/L	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U
Calcium	UG/L	213,000	105,000	120,000	88,700	1,76,000
Chromium	UG/L	5.7 H	2.2 B	3.4 D	2.0 B	3.1 B
Cobalt	UG/L	2.0 B	3.8 H	3.8 H	3.1 H	3.0 B
Copper	UG/L	4.1 D	4.7 B	16.4 B	13.3 B	6.1 H
Iron	UG/L	519	5,250	2,510	1,200	6,550
Lead	UG/L	2.0 U	23.1 J	2.0 U	3.0 H, J	2.0 U
Magnesium	UG/L	197 H	5,990	6,540	968 B	20,500
Manganese	UG/L	1.0 D	207 J	183 J	36 H, J	215 J
Mercury	UG/L	0.13 U	0.13 U	0.14 U	0.14 U	0.14 U
Nickel	UG/L	4.7 B	0.30 U	4.0 D	3.3 B	7.7 H
Potassium	UG/L	710,000	406,000	25,500	22,100	48,700
Selenium	UG/L	R	R	R	R	R
Silver	UG/L	1.9 B	0.66 B	1.0 B	0.60 U	1.1 D
Sodium	UG/L	97,800	152,000	37,200	23,300	57,200
Thallium	UG/L	6.0 U	6.0 U	6.0 U	6.0 U	6.0 U
Vanadium	UG/L	15.1 H	1.5 B	3.6 B	4.2 B	5.1 H
Zinc	UG/L	5.0 U	107	11.8 H	8.2 B	9.9 B

Flags assigned during chemistry validation are shown

MADE BY: GFK 3/11/2002

CHKD BY: MEB 3/11/2002

Detection Limits shown are PQL

ATTACHMENT A **ANALYTICAL GROUNDWATER SAMPLE RESULTS** **FORMER HANNA FURNACE SITE**

Location ID		MW-101	MW-103	MW-301	MW-302	MW-303
Sample ID		MW-101	MW-103	MW-301	MW-302	MW-303
Matrix		Groundwater	Groundwater	Groundwater	Groundwater	Groundwater
Depth Interval (ft)						
Date Sampled		11/13/01	11/13/01	11/13/01	11/13/01	11/13/01
Parameter	Units					
Filtered Metals						
Aluminum	UG/L	126 B	28 / B	123 B	7 / B	214 B
Antimony	UG/L	4.0 U	4.0 U	4.0 U	4.0 U	4.0 U
Arsenic	UG/L	7.0 U	7.0 U	7.0 U	7.5 B	7.0 U
Barium	UG/L	744 B	641 B	316 B	297 B	157 B
Beryllium	UG/L	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U
Cadmium	UG/L	0.10 U	0.10 U	0.51 B	0.10 U	0.10 U
Calcium	UG/L	203,000	91,100	102,000	60,700	121,000
Chromium	UG/L	5.4 B	0.96 B	0.85 B	0.91 B	0.71 B
Cobalt	UG/L	1.5 B	7.2 B	1.5 B	1.3 B	1.3 B
Copper	UG/L	3.2 B	1.3 B	8.4 B	1.5 B	2.2 B
Iron	UG/L	132	113	371 B	227 B	78 B
Lead	UG/L	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
Magnesium	UG/L	246 B	5,550 J	5,810 J	722 B	19,900 J
Manganese	UG/L	0.40 U	57.1	22.2	0.40 U	183
Mercury	UG/L	0.14 U	0.13 U	0.13 U	0.13 U	0.13 U
Nickel	UG/L	3.4 B	0.30 U	0.30 U	0.30 U	0.30 U
Potassium	UG/L	627,000	386,000	24,600	71,000	43,100
Selenium	UG/L	R	R	R	R	R
Silver	UG/L	2.0 B	0.89 B	1.3 B	0.89 B	0.92 B
Sodium	UG/L	94,900	147,000	35,600	21,800	35,100
Thallium	UG/L	6.0 U	6.0 U	6.0 U	6.0 U	6.0 U
Vanadium	UG/L	12.0 B	0.40 U	0.60 B	2.2 B	0.40 U
Zinc	UG/L	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U

Flags assigned during chemistry validation are shown

MADE BY: GSK 5/11/2002

HND BY: MEB 5/11/2002

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ATTACHMENT A
ANALYTICAL GROUNDWATER SAMPLE RESULTS
FORMER HANNA FURNACE SITE

Location ID		MW-304	MW-305	MW-306	MW-307
Sample ID		MW-304	MW-305	MW-306	MW-307
Matrix		Groundwater	Groundwater	Groundwater	Groundwater
Depth Interval (ft)		-	-	-	-
Date Sampled		11/13/01	11/13/01	11/13/01	11/13/01
Parameter	Units				
Volatiles Organic Compounds					
1,1,1-Trichloroethane	UG/L	10 U	10 U	10 U	10 U
1,1,2,2-Tetrachloroethane	UG/L	10 U	10 U	10 U	10 U
1,1,2-Trichloro-1,2,2-trifluoroethane	UG/L	10 U	10 U	10 U	10 U
1,1,2-Trichloroethane	UG/L	10 U	10 U	10 U	10 U
1,1-Dichloroethane	UG/L	10 U	10 U	10 U	10 U
1,1-Dichloroethylene	UG/L	10 U	10 U	10 U	10 U
1,2,4-Trichlorobenzene	UG/L	10 U	10 U	10 U	10 U
1,2-Dibromo-3-chloropropane	UG/L	10 U	10 U	10 U	10 U
1,2-Dibromodioxane (3-ethylene dibromide)	UG/L	10 U	10 U	10 U	10 U
1,2-Dichlorobenzene	UG/L	10 U	10 U	10 U	10 U
1,1-Dichloromethane	UG/L	10 U	10 U	10 U	10 U
1,2-Dichloroethene (cis)	UG/L	10 U	10 U	10 U	10 U
1,2-Dichloroethene (trans)	UG/L	10 U	10 U	10 U	10 U
1,2-Dichloropropane	UG/L	10 U	10 U	10 U	10 U
1,3-Dichlorobenzene	UG/L	10 U	10 U	10 U	10 U
1,3-Dichloropropene (cis)	UG/L	10 U	10 U	10 U	10 U
1,3-Dichloropropene (trans)	UG/L	10 U	10 U	10 U	10 U
1,4-Dichlorobenzene	UG/L	10 U	10 U	10 U	10 U
2-Hexanone	UG/L	10 U	10 U	10 U	10 U
4-Methyl-2-pentanone	UG/L	10 U	10 U	10 U	3 U
Acetone	UG/L	31 U	10 U	10 U	130 U
Benzene	UG/L	10 U	10 U	10 U	10 U
Bromodichloromethane	UG/L	10 U	10 U	10 U	10 U
Bromocloroform	UG/L	10 U	10 U	10 U	10 U

Flags assigned during chemistry validation are shown

MADE BY: GSK 3/11/2002

CHKD BY: MFB 3/11/2002

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ATTACHMENT A
ANALYTICAL GROUNDWATER SAMPLE RESULTS
FORMER HANNA FURNACE SITE

Location ID		MW-304	MW-305	MW-306	MW-307
Sample ID		MW-304	MW-305	MW-306	MW-307
Matrix		Groundwater	Groundwater	Groundwater	Groundwater
Depth Interval (ft)		-	-	-	-
Date Sampled		11/13/01	11/13/01	11/13/01	11/13/01
Parameter	Units				
Volatiles Organic Compounds					
Bromomethane	UGL	10 U	10 U	10 U	10 U
Carbon disulfide	UGL	10 UJ	10 UJ	10 UJ	12 J
Carbon tetrachloride	UGL	10 U	10 U	10 U	10 U
Chlorobenzene	UGL	10 U	10 U	10 U	10 U
Chloroethane	UGL	10 U	10 U	10 U	10 U
Chloroform	UGL	10 U	10 U	10 U	10 U
Chloromethane	UGL	10 U	10 U	10 U	10 U
Cyclohexane	UGL	10 U	10 U	10 U	10 U
Dibromochloromethane	UGL	10 U	10 U	10 U	10 U
Dichlorodifluoromethane	UGL	10 U	10 U	10 U	10 U
Ethylbenzene	UGL	10 U	10 U	10 U	10 U
Isopropylbenzene (Cumene)	UGL	10 U	10 U	10 U	10 U
Methyl acetate	UGL	10 U	10 U	10 U	10 U
Methyl ethyl ketone (2-Butanone)	UGL	10 U	10 U	10 U	18
Methyl tert-butyl ether	UGL	10 U	10 U	10 U	1 J
Methylcyclohexane	UGL	10 U	10 U	10 U	10 U
Methylene chloride	UGL	10 U	10 U	10 U	10 U
Styrene	UGL	10 U	10 U	10 U	10 U
Tetrachloroethene	UGL	10 U	10 U	10 U	10 U
Toluene	UGL	10 U	10 U	10 U	10 U
Trichloroethene	UGL	10 U	10 U	10 U	10 U
Trichlorofluoromethane	UGL	10 U	10 U	10 U	10 U
Vinyl chloride	UGL	10 U	10 U	10 U	10 U
Xylene (total)	UGL	10 U	10 U	10 U	10 U

Flags assigned during chemistry validation are shown

MADE BY: GLR 3/11/2002

CHRU BY: MEB 3/11/2002

Detection Limits shown are PQL

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ATTACHMENT A **ANALYTICAL GROUNDWATER SAMPLE RESULTS** **FORMER HANNA FURNACE SITE**

Location ID		MW-304	MW-305	MW-306	MW-307
Sample ID		MW-304	MW-305	MW-306	MW-307
Matrix		Groundwater	Groundwater	Groundwater	Groundwater
Depth Interval (ft)		-	-	-	-
Date Sampled		11/13/01	11/13/01	11/13/01	11/13/01
Parameter	Units				
Semivolatiles Organic Compounds					
1,1'-Biphenyl	UGL	10 U	10 U	10 U	40 U
2,2'-oxybis(1-Chloropropane)	UGL	10 UJ	10 UJ	10 U	40 U
2,4,5-Trichlorophenol	UGL	25 U	25 U	25 U	100 U
2,4,6-Trichlorophenol	UGL	10 U	10 U	10 U	40 U
2,4-Dichlorophenol	UGL	10 U	10 U	10 U	40 U
2,4-Dimethylphenol	UGL	10 U	10 UJ	10 U	7 U
2,4-Dinitrophenol	UGL	25 U	25 U	25 U	100 U
2,4-Dinitrotoluene	UGL	10 U	10 U	10 U	40 U
2,6-Dinitrotoluene	UGL	10 U	10 U	10 U	40 U
2-Chloronaphthalene	UGL	10 U	10 U	10 U	40 U
2-Chlorophenol	UGL	10 U	10 U	10 U	40 U
2-Methylnaphthalene	UGL	10 U	10 U	10 U	40 U
2-Methylphenol (o-cresol)	UGL	10 U	10 U	10 U	5 U
2-Nitroaniline	UGL	25 U	25 UJ	25 U	100 U
2-Nitrophenol	UGL	10 U	10 U	10 U	40 U
3,3'-Dichlorobenzidine	UGL	10 U	10 UJ	10 UJ	40 U
3-Nitroaniline	UGL	25 U	25 U	25 U	100 U
4,6-Dinitro-2-methylphenol	UGL	25 U	25 U	25 U	100 U
4-Bromophenyl-phenylether	UGL	10 U	10 U	10 U	40 U
4-Chloro-3-methylphenol	UGL	10 U	10 U	10 U	40 U
4-Chloroaniline	UGL	10 U	10 UJ	10 U	40 U
4-Chlorophenyl-phenylether	UGL	10 U	10 U	10 U	40 U
4-Methylphenol (p-cresol)	UGL	10 U	10 U	10 U	23 U
4-Nitroaniline	UGL	25 UJ	25 UJ	25 U	100 U

Flags assigned during chemistry validation are shown.

MADE BY: GFK 3/11/2002

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ATTACHMENT A **ANALYTICAL GROUNDWATER SAMPLE RESULTS** **FORMER HANNA FURNACE SITE**

Location ID		MW-304	MW-305	MW-306	MW-307
Sample ID		MW-304	MW-305	MW-306	MW-307
Matrix		Groundwater	Groundwater	Groundwater	Groundwater
Depth Interval (ft)		-	-	-	-
Date Sampled		11/13/01	11/13/01	11/13/01	11/13/01
Parameter	Units				
Semivolatiles Organic Compounds					
4-Nitrophenol	UG/L	25 U	25 U	25 U	100 U
Acenaphthene	UG/L	10 U	10 U	2 U	40 U
Acenaphthylene	UG/L	10 U	10 U	10 U	40 U
Acetophenone	UG/L	10 U	10 U	10 U	40 U
Anthracene	UG/L	10 U	10 U	8 U	40 U
Atrazine	UG/L	10 U	10 U	10 U	40 U
Benzaldehyde	UG/L	10 U	10 U	10 U	40 U
Benzo(a)anthracene	UG/L	10 U	10 U	18	40 U
Benzo(a)pyrene	UG/L	10 U	10 U	15 U	40 U
Benzo(b)fluoranthene	UG/L	10 U	10 U	23 U	40 U
Benzo(g,h,i)perylene	UG/L	10 U	10 U	6 U	40 U
Benzo(k)fluoranthene	UG/L	10 U	10 U	8 U	40 U
bis(2-Chloroethoxy)methane	UG/L	10 U	10 U	10 U	40 U
bis(2-Chloroethyl)ether	UG/L	10 U	10 U	10 U	40 U
bis(2-Ethylhexyl)phthalate	UG/L	10 U	10 U	10 U	40 U
Bis(phenyl)phthalate	UG/L	10 U	10 U	10 U	40 U
Caproclam	UG/L	10 U	10 U	10 U	40 U
Carbazole	UG/L	10 U	10 U	1 U	40 U
Chrysene	UG/L	10 U	10 U	18	40 U
Dibenz(a,h)anthracene	UG/L	10 U	10 U	2 U	40 U
Dibenzofuran	UG/L	10 U	10 U	2 U	40 U
Diethylphthalate	UG/L	10 U	10 U	10 U	40 U
Dimethylphthalate	UG/L	10 U	10 U	10 U	40 U
Di-n-butylphthalate	UG/L	10 U	10 U	10 U	40 U

Flags assigned during chemistry validation are shown

MADE BY: GFK 3/11/2002

CHECKED BY: MCD 3/11/2002

Detection Limits shown are PQL

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ATTACHMENT A **ANALYTICAL GROUNDWATER SAMPLE RESULTS** **FORMER HANNA FURNACE SITE**

Location ID		MW-304	MW-305	MW-306	MW-307
Sample ID		MW-304	MW-305	MW-306	MW-307
Matrix		Groundwater	Groundwater	Groundwater	Groundwater
Depth Interval (ft)		-	-	-	-
Date Sampled		11/13/01	11/13/01	11/13/01	11/13/01
Parameter	Units				
Semivolatiles Organic Compounds					
Di-n-octylphthalate	UGL	10 UJ	10 U	10 UJ	40 UJ
Fluoranthene	UGL	10 U	10 U	38	40 U
Fluorene	UGL	10 U	10 U	3 J	40 U
Hexachlorobenzene	UGL	10 U	10 U	10 U	40 U
Hexachlorobutadiene	UGL	10 U	10 U	10 U	40 U
Hexachlorocyclopentadiene	UGL	10 U	10 U	10 U	40 U
Hexachlorocyclohexane	UGL	10 U	10 U	10 U	40 U
Iodeno(1,2,3-cd)pyrene	UGL	10 U	10 U	7 J	40 U
Isophthalic	UGL	10 U	10 U	10 U	40 U
Phthalic	UGL	10 U	10 U	2 J	40 U
Styrene	UGL	10 U	10 U	10 U	40 U
N-Nitrosodipropylamine	UGL	10 U	10 U	10 U	40 U
N-Nitrosodiphenylamine	UGL	10 U	10 U	10 U	40 U
Pentachlorophenol	UGL	25 UJ	25 U	25 U	100 U
Phenanthrene	UGL	10 U	10 U	22	10 U
Phenol	UGL	10 U	10 U	10 U	210
Pyrene	UGL	10 U	10 U	38	40 U
Pesticides					
4,4'-DDD	UGL	0.1 U	0.1 U	0.1 U	0.1 U
4,4'-DDE	UGL	0.1 U	0.1 U	0.1 U	0.1 U
4,4'-DDT	UGL	0.1 U	0.1 U	0.1 U	0.1 U
Aldrin	UGL	0.05 U	0.05 U	0.05 U	0.05 U
alpha-BHC	UGL	0.05 U	0.05 U	0.05 U	0.05 U
alpha-Chlordane	UGL	0.05 U	0.05 U	0.05 U	0.05 U

Flags assigned during chemistry validation are shown.

MADE BY: CFK 3/11/2002

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ATTACHMENT A
ANALYTICAL GROUNDWATER SAMPLE RESULTS
FORMER HANNA FURNACE SITE

Location ID		MW-304	MW-305	MW-306	MW-307
Sample ID		MW-304	MW-305	MW-306	MW-307
Matrix		Groundwater	Groundwater	Groundwater	Groundwater
Depth Interval (ft)		-	-	-	-
Date Sampled		11/13/01	11/13/01	11/13/01	11/13/01
Parameter	Units				
Pesticides					
beta-BHC	UGL	0.05 U	0.05 U	0.05 U	0.05 U
delta-BHC	UGL	0.05 U	0.05 U	0.05 U	0.05 U
Dieldrin	UGL	0.1 U	0.1 U	0.1 U	0.1 U
Endosulfan I	UGL	0.05 U	0.05 U	0.05 U	0.05 U
Endosulfan II	UGL	0.1 U	0.1 U	0.1 U	0.1 U
Endosulfan sulfate	UGL	0.1 U	0.1 U	0.1 U	0.1 U
Endrin	UGL	0.1 U	0.1 U	0.1 U	0.1 U
Endrin aldehyde	UGL	0.1 U	0.1 U	0.1 U	0.1 U
Endrin ketone	UGL	0.1 U	0.1 U	0.1 U	0.1 U
gamma-BHC (Lindane)	UGL	0.05 U	0.05 U	0.05 U	0.05 U
gamma-Chlordane	UGL	0.05 U	0.05 U	0.05 U	0.05 U
Heptachlor	UGL	0.05 U	0.05 U	0.05 U	0.05 U
Heptachlor epoxide	UGL	0.05 U	0.05 U	0.05 U	0.05 U
Methoxychlor	UGL	0.5 U	0.5 U	0.5 U	0.5 U
Toxaphene	UGL	5 U	5 U	5 U	5 U
Polychlorinated Biphenyls					
Aroclor 1016	UGL	1 U	1 U	1 U	1 U
Aroclor 1221	UGL	2 U	2 U	2 U	2 U
Aroclor 1232	UGL	1 U	1 U	1 U	1 U
Aroclor 1242	UGL	1 U	1 U	1 U	1 U
Aroclor 1248	UGL	1 U	1 U	1 U	1 U
Aroclor 1254	UGL	1 U	1 U	1 U	1 U
Aroclor 1260	UGL	1 U	1 U	1 U	1 U

*Units assigned during chemistry validation are shown.

MADE BY: CRK 3/11/2002

CHKD BY: MCD 3/11/2002

Detection Limits shown are PQL

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ATTACHMENT A
ANALYTICAL GROUNDWATER SAMPLE RESULTS
FORMER HANNA FURNACE SITE

Location ID		MW-304	MW-305	MW-306	MW-307
Sample ID		MW-304	MW-305	MW-306	MW-307
Matrix		Groundwater	Groundwater	Groundwater	Groundwater
Depth Interval (ft)		-	-	-	-
Date Sampled		11/13/01	11/13/01	11/13/01	11/13/01
Parameter	Units				
Metals					
Aluminum	UG/L	1,730	1,110	3,900	1,700
Antimony	UG/L	4.0 U	13.2 UJ	4.0 U	4.0 U
Arsenic	UG/L	7.0 U	7.0 U	7.0 U	110 J
Barium	UG/L	66.4 R	269	81.2 R	60.2 B
Beryllium	UG/L	0.10 U	0.10 U	0.17 B	0.10 U
Cadmium	UG/L	0.10 U	0.10 U	3.5 R	0.10 U
Calcium	UG/L	20,600	156,000	107,000	221,000
Chromium	UG/L	5.7 B	4.2 B	9.3 B	2.4 R
Cobalt	UG/L	2.7 B	2.8 B	3.8 B	7.1 B
Copper	UG/L	0.8 B	93.9	53.1	2.7 R
	UG/L	2,140	2,080	17,600	4,220
Lead	UG/L	2.0 U	6.7 J	177 J	2.0 U
Magnesium	UG/L	16,800	42,000	29,200	505 R
Manganese	UG/L	31.3 J	420 J	439 J	14.8 B
Mercury	UG/L	0.13 U	0.15 U	0.19 B	0.14 U
Nickel	UG/L	2.8 R	2.8 B	6.6 R	56 I
Potassium	UG/L	121,000	2,830 R	36,300	919,000
Selenium	UG/L	6.0 U	5.0 U	R	R
Silver	UG/L	0.80 U	1.0 B	0.60 U	1.5 B
Sodium	UG/L	119,000	31,000	21,200	156,000
Thallium	UG/L	6.0 U	6.0 U	6.0 U	6.0 U
Vanadium	UG/L	4.0 B	2.7 B	7.6 B	38.8 R
Zinc	UG/L	16.0 R	79.7	847	8.3 B

Flags assigned during chemistry validation are shown

MADE BY: GFK 3/11/2002
 CHKD BY: MCB 3/11/2002

Detection Limits shown are PQL

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ATTACHMENT A
ANALYTICAL GROUNDWATER SAMPLE RESULTS
FORMER HANNA FURNACE SITE

Location ID		MW-304	MW-305	MW-306	MW-307
Sample ID		MW-304	MW-305	MW-306	MW-307
Matrix		Groundwater	Groundwater	Groundwater	Groundwater
Depth Interval (ft)		-	-	-	-
Date Sampled		11/13/01	11/13/01	11/13/01	11/13/01
Parameter	Units				
Filtered Metals					
Aluminum	UG/L	23.7 B	20.8 B	18.6 B	1,020
Antimony	UG/L	4.0 U	12.1 BJ	4.0 U	4.0 U
Arsenic	UG/L	7.0 U	7.0 U	7.0 U	110 J
Barium	UG/L	17.5 B	280 J	50.5 B	54.8 B
Beryllium	UG/L	0.10 U	0.10 U	0.10 U	0.10 U
Cadmium	UG/L	0.10 U	2.2 B	0.10 U	0.10 U
Calcium	UG/L	4,840 H	105,000	102,600	220,000
Chromium	UG/L	2.9 B	1.1 B	0.06 B	0.99 B
Cobalt	J/G	0.98 H	2.8 H	1.2 B	6.2 B
Copper	UG/L	2.0 B	30.0	3.7 B	2.6 B
Iron	UG/L	5.0 U	11.6 H	18.8 H	3,220
Lead	UG/L	2.0 U	2.0 U	2.0 U	2.0 U
Magnesium	UG/L	12,700 J	41,200 J	28,100 J	812 H
Manganese	UG/L	0.40 U	400	280	0.40 U
Mercury	UG/L	0.13 U	0.13 U	0.13 U	0.15 B
Nickel	UG/L	0.30 U	1.1 B	0.40 U	52.2
Potassium	UG/L	118,000	2,910 H	35,600	809,000
Selenium	UG/L	5.0 U	R	R	R
Silver	UG/L	0.60 U	0.74 B	0.09 B	1.5 B
Sodium	UG/L	116,000	32,700	21,000	153,000
Thallium	UG/L	6.0 U	6.0 U	6.0 U	6.0 U
Vanadium	UG/L	0.40 U	0.40 U	0.40 U	37.2 B
Zinc	UG/L	5.0 U	21.3	5.0 U	5.0 U

Flags assigned during chemistry validation are shown

MADE BY: GEK 3/11/2002

CHKD BY: MFB 3/11/2002

Detection Limits shown are PQL

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ATTACHMENT A **ANALYTICAL GROUNDWATER SAMPLE RESULTS** **FORMER HANNA FURNACE SITE**

Location ID		MW-304	MW-305	MW-306	MW-307
Sample ID		MW-304	MW-305	MW-306	MW-307
Matrix		Groundwater	Groundwater	Groundwater	Groundwater
Depth Interval (ft)		-	-	-	-
Date Sampled		11/13/01	11/13/01	11/13/01	11/13/01
Parameter	Units				
Miscellaneous Parameters					
Cyanide	UG/L	8.2 B	3.7 H	137	7.950
pH	SI	10.0	6.8	7.8	11.0

Flags assigned during chemistry validation are shown

MADE BY: CFK 3/11/2002
 KD BY: MFH 3/11/2002

Detection Limits shown are PQL

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ATTACHMENT A **ANALYTICAL SOIL SAMPLE RESULTS** **FORMER HANNA FURNACE SITE**

Location ID		BH-301	BH-301	BH-302	DH-302	BH-303
Sample ID		BH-301-SURFACE	BH-301-4-6	BH-302-SURFACE	BH-302-4-6	BH-303-SURFACE
Matrix		Soil	Soil	Soil	Soil	Soil
Depth Interval (ft)		0.0-0.2	4.0-6.0	0.0-0.2	4.0-6.0	0.0-0.2
Date Sampled		10/10/01	10/10/01	10/10/01	10/10/01	10/10/01
Parameter	Units					
Volatiles Organic Compounds						
1,1,1-Trichloroethane	UG/KG	R	R	12 U	10 UJ	11 U
1,1,2,2-Tetrachloroethane	UG/KG	R	R	12 U	51 UJ	11 U
1,1,2-Trichloro-1,2,2-trifluoroethane	UG/KG	R	R	12 U	10 UJ	11 U
1,1,2-Trichloroethane	UG/KG	R	R	12 U	10 UJ	11 U
1,1-Dichloroethane	UG/KG	R	R	12 U	10 UJ	11 U
1,1-Trichloroethene	UG/KG	R	R	12 U	10 UJ	11 U
1,2,4-Trichlorobenzene	UG/KG	R	R	12 U	51 UJ	11 U
1,2-Dibromo-2-chloropropane	UG/KG	R	R	12 UJ	51 UJ	11 U
1,2-Dibromoethane (Ethylene dibromide)	UG/KG	R	R	12 U	51 UJ	11 U
1,2-Dichlorobenzene	UG/KG	R	R	12 U	51 UJ	11 UJ
1,2-Dichloroethane	UG/KG	R	R	12 U	10 UJ	11 U
1,2-Dichloroethene (cis)	UG/KG	R	R	12 U	10 UJ	11 U
1,2-Dichloroethene (trans)	UG/KG	R	R	12 U	10 UJ	11 U
1,2-Dichloropropane	UG/KG	R	R	12 U	10 UJ	11 U
1,3-Dichlorobenzene	UG/KG	R	R	12 U	51 UJ	11 U
1,3-Dichloropropane (cis)	UG/KG	R	R	12 U	10 UJ	11 U
1,3-Dichloropropane (trans)	UG/KG	R	R	12 U	10 UJ	11 U
1,4-Dichlorobenzene	UG/KG	R	R	12 U	51 UJ	11 U
2-Hexanone	UG/KG	R	R	12 U	51 UJ	11 U
4-Methyl-2-pentanone	UG/KG	R	R	12 U	51 UJ	11 U
Acetone	UG/KG	R	R	12 U	240 UJ	11 U
Benzene	UG/KG	R	R	12 U	4 J	11 U
Bromodichloromethane	UG/KG	R	R	12 U	10 UJ	11 U
Hexachloroethane	UG/KG	R	R	12 U	10 UJ	11 U

Flags assigned during chemistry validation are shown.

MADE BY: GLK 3/11/2002

CHKD BY: MFB 3/11/2002

Detection Limits shown are PQL

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ATTACHMENT A **ANALYTICAL SOIL SAMPLE RESULTS** **FORMER HANNA FURNACE SITE**

Location ID		BH-301	BH-301	BH-302	BH-302	BH-303
Sample ID		BH-301-SURFACE	BH-301 4-6	BH-302-SURFACE	BH-302 4-6	BH-303-SURFACE
Matrix		Soil	Soil	Soil	Soil	Soil
Depth Interval (ft)		0.0-0.2	4.0-6.0	0.0-0.2	4.0-6.0	0.0-0.2
Date Sampled		10/10/01	10/10/01	10/10/01	10/10/01	10/10/01
Parameter	Units					
Volatiles Organic Compounds						
Bromomethane	UG/KG	R	R	12 U	10 UJ	11 U
Carbon disulfide	UG/KG	R	R	12 U	2 J	11 U
Carbon tetrachloride	UG/KG	R	R	12 UJ	10 UJ	11 UJ
Chlorobenzene	UG/KG	R	R	12 UJ	51 UJ	11 U
Chloroethane	UG/KG	R	R	12 U	10 UJ	11 U
Chloroform	UG/KG	R	R	12 U	10 UJ	11 U
Chloromethane	UG/KG	R	R	12 U	10 UJ	11 U
Cyclohexane	UG/KG	R	R	12 U	10 UJ	11 U
Dibromochloromethane	UG/KG	R	R	12 U	10 UJ	11 U
1,1-Dichlorodifluoromethane	UG/KG	R	R	12 U	10 UJ	11 U
Ethylbenzene	UG/KG	R	R	12 U	51 UJ	11 U
Isopropylbenzene (Cumene)	UG/KG	R	R	12 U	51 UJ	11 U
m,p-Xylene	UG/KG	R	R	12 U	51 UJ	11 U
Methyl acetate	UG/KG	R	R	12 U	10 UJ	11 U
Methyl ethyl ketone (2-Butanone)	UG/KG	R	R	12 U	51 J	11 U
Methyl tert-butyl ether	UG/KG	R	R	12 U	10 UJ	11 U
Methylcyclohexane	UG/KG	R	R	12 U	10 UJ	11 U
Methylene chloride	UG/KG	R	R	12 U	12 UJ	11 U
o-Xylene	UG/KG	R	R	12 U	51 UJ	11 U
Styrene	UG/KG	R	R	12 U	51 UJ	11 U
Tetrachloroethene	UG/KG	R	R	12 U	51 UJ	11 U
Toluene	UG/KG	R	R	12 U	51 J	11 U
Trichloroethene	UG/KG	R	R	12 U	10 UJ	11 U
Trichlorofluoromethane	UG/KG	R	R	12 U	10 UJ	11 U

Flags assigned during chemistry validation are shown

MADE BY: GER 3/11/2002
 KID BY: MFR 3/11/2002

Detection Limits shown are PQL

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ATTACHMENT A **ANALYTICAL SOIL SAMPLE RESULTS** **FORMER HANNA FURNACE SITE**

Location ID		BH-301	BH-301	BH-302	BH-302	BH-303
Sample ID		BH-301-SURFACE	BH-301-4-6	BH-302-SURFACE	BH-302-4-6	BH-303-SURFACE
Matrix		Soil	Soil	Soil	Soil	Soil
Depth Interval (ft)		0.0-0.2	4.0-6.0	0.0-0.2	4.0-6.0	0.0-0.2
Date Sampled		10/10/01	10/10/01	10/10/01	10/10/01	10/10/01
Parameter	Units					
Volatiles Organic Compounds						
Vinyl chloride	UGRG	R	R	12 UJ	10 UJ	11 UJ
Semivolatiles Organic Compounds						
1,1'-Biphenyl	UGRG	480 UJ	390 UJ	440 UJ	8,000 UJ	370 UJ
2,2'-oxybis(1-Chloropropane)	UGRG	480 UJ	390 UJ	440 UJ	8,000 UJ	370 UJ
2,4,5-Trichlorophenol	UGRG	1,200 UJ	970 UJ	1,100 UJ	20,000 UJ	920 UJ
2,4,6-Trichlorophenol	UGRG	480 UJ	390 UJ	440 UJ	8,000 UJ	370 UJ
2,4-Dichlorophenol	UGRG	480 UJ	390 UJ	440 UJ	8,000 UJ	370 UJ
2,4-Dimethylphenol	UGRG	480 UJ	390 UJ	440 UJ	8,000 UJ	370 UJ
2,4-Dinitrophenol	UGRG	1,200 UJ	970 UJ	1,100 UJ	20,000 UJ	920 UJ
2,4-Dinitrotoluene	UGRG	480 UJ	390 UJ	440 UJ	8,000 UJ	370 UJ
2,6-Dinitrotoluene	UGRG	480 UJ	390 UJ	440 UJ	8,000 UJ	370 UJ
2-Chloronaphthalene	UGRG	480 UJ	390 UJ	440 UJ	8,000 UJ	370 UJ
2-Chlorophenol	UGRG	480 UJ	390 UJ	440 UJ	8,000 UJ	370 UJ
2-Methylnaphthalene	UGRG	480 UJ	390 UJ	440 UJ	8,000 UJ	48 UJ
2-Methylphenol (o-cresol)	UGRG	480 UJ	390 UJ	440 UJ	8,000 UJ	370 UJ
2-Nitroaniline	UGRG	1,200 UJ	970 UJ	1,100 UJ	20,000 UJ	920 UJ
2-Nitrophenol	UGRG	480 UJ	390 UJ	440 UJ	8,000 UJ	370 UJ
3,3'-Dichlorobenzidine	UGRG	480 UJ	390 UJ	440 UJ	8,000 UJ	370 UJ
3-Nitroaniline	UGRG	1,200 UJ	970 UJ	1,100 UJ	20,000 UJ	920 UJ
4,6-Dinitro-2-methylphenol	UGRG	1,200 UJ	970 UJ	1,100 UJ	20,000 UJ	920 UJ
4-Bromophenyl-phenylether	UGRG	480 UJ	390 UJ	440 UJ	8,000 UJ	370 UJ
4-Chloro-3-methylphenol	UGRG	480 UJ	390 UJ	440 UJ	8,000 UJ	370 UJ
4-Chloroaniline	UGRG	480 UJ	390 UJ	440 UJ	8,000 UJ	370 UJ
4-Chlorophenyl-phenylether	UGRG	480 UJ	390 UJ	440 UJ	8,000 UJ	370 UJ

Flags assigned during chemistry validation are shown

MADE BY: GFK 3/11/2002

CHKD BY: MFR 3/11/2002

Detection Limits shown are PQL

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ATTACHMENT A
ANALYTICAL SOIL SAMPLE RESULTS
FORMER HANNA FURNACE SITE

Location ID		BH-301	BH-301	BH-302	BH-302	BH-303
Sample ID		RH-301 SURFACE	BH-301-4-6	RH-302 SURFACE	BH-302-4-6	BH-303 SURFACE
Matrix		Soil	Soil	Soil	Soil	Soil
Depth Interval (ft)		0.0-0.2	4.0-6.0	0.0-0.2	4.0-6.0	0.0-0.2
Date Sampled		10/10/01	10/10/01	10/10/01	10/10/01	10/10/01
Parameter	Units					
Semi-volatiles Organic Compounds						
4-Methylphenol (p-cresol)	UG/KG	480 UJ	390 UJ	440 UJ	8,000 UJ	370 UJ
4-Nitroaniline	UG/KG	1,200 UJ	970 UJ	1,100 UJ	20,000 UJ	920 UJ
4-Nitrophenol	UG/KG	1,200 UJ	970 UJ	1,100 UJ	20,000 UJ	920 UJ
Acenaphthene	UG/KG	480 UJ	390 UJ	440 UJ	8,000 UJ	370 UJ
Acenaphthylene	UG/KG	480 UJ	390 UJ	440 UJ	8,000 UJ	370 UJ
Acetophenone	UG/KG	480 UJ	390 UJ	440 UJ	8,000 UJ	370 UJ
Anthracene	UG/KG	480 UJ	110 J	440 UJ	8,000 UJ	370 UJ
Atrazine	UG/KG	480 UJ	390 UJ	440 UJ	8,000 UJ	370 UJ
Benzaldehyde	UG/KG	180 UJ	300 UJ	410 UJ	8,000 UJ	370 UJ
Benzo(a)anthracene	UG/KG	230 J	150 J	150 J	6,000 UJ	120 J
Benzo(a)pyrene	UG/KG	480 UJ	390 UJ	440 UJ	8,000 UJ	370 UJ
Benzo(b)fluoranthene	UG/KG	450 J	270 J	350 J	6,000 UJ	250 J
Benzo(g,h,i)perylene	UG/KG	94 J	390 UJ	270 J	8,000 UJ	110 J
Benzo(k)fluoranthene	UG/KG	180 J	82 J	110 J	8,000 UJ	71 J
bis(2-Chloroethoxy)imide	UG/KG	480 UJ	390 UJ	440 UJ	8,000 UJ	370 UJ
bis(2-Chloroethyl)ether	UG/KG	180 UJ	300 UJ	410 UJ	8,000 UJ	370 UJ
bis(2-Ethylhexyl)phthalate	UG/KG	5,200 UJ	390 UJ	440 UJ	8,000 UJ	370 UJ
Butylbenzylphthalate	UG/KG	480 UJ	390 UJ	440 UJ	8,000 UJ	370 UJ
Caprolactam	UG/KG	480 UJ	390 UJ	440 UJ	8,000 UJ	370 UJ
Carbazole	UG/KG	180 UJ	390 UJ	140 UJ	8,000 UJ	370 UJ
Chrysene	UG/KG	290 J	240 J	200 J	1,200 J	170 J
Dibenz(a,h)anthracene	UG/KG	480 UJ	390 UJ	440 UJ	8,000 UJ	370 UJ
Dibenzofuran	UG/KG	480 UJ	390 UJ	440 UJ	8,000 UJ	370 UJ
Diethylphthalate	UG/KG	480 UJ	390 UJ	440 UJ	8,000 UJ	370 UJ

Flags assigned during laboratory validation are shown.

MADE BY: CFX 3/11/2002

CHRD BY: MCB 3/11/2002

Detection Limits shown are PQL

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ATTACHMENT A **ANALYTICAL SOIL SAMPLE RESULTS** **FORMER HANNA FURNACE SITE**

Location ID		BH-301	BH-301	BH-302	BH-302	BH-303
Sample ID		BH-301-SURFACE	BH-301-4-6	BH-302-SURFACE	BH-302-4-6	BH-303-SURFACE
Matrix		Soil	Soil	Soil	Soil	Soil
Depth Interval (ft)		0.0-0.2	4.0-6.0	0.0-0.2	4.0-6.0	0.0-0.2
Date Sampled		10/10/01	10/10/01	10/10/01	10/10/01	10/10/01
Parameter	Units					
Semivolatile Organic Compounds						
Dimethylphthalate	UGKJ	480 UJ	380 UJ	440 UJ	8,000 UJ	370 UJ
Di-n-butylphthalate	UGKG	480 UJ	390 UJ	440 UJ	8,000 UJ	370 UJ
Di-n-octylphthalate	UGKH	480 UJ	390 UJ	440 UJ	8,000 UJ	370 UJ
Fluoranthene	UGKC	400 J	350 J	190 J	8,000 UJ	200 J
Fluorene	UGKG	480 UJ	81 J	440 UJ	8,000 UJ	370 UJ
Hexachlorobenzene	UGKC	480 UJ	390 UJ	440 UJ	8,000 UJ	370 UJ
Hexachlorobutadiene	UGKG	480 UJ	390 UJ	440 UJ	8,000 UJ	370 UJ
Hexachlorocyclopentadiene	UGKL	480 UJ	390 UJ	440 UJ	8,000 UJ	370 UJ
Hexachloroethane	UGKS	480 UJ	390 UJ	440 UJ	8,000 UJ	370 UJ
Indeno(1,2,3-cd)pyrene	UGKS	170 J	68 J	300 J	8,000 UJ	150 J
Isophurone	UGKG	480 UJ	390 UJ	440 UJ	8,000 UJ	370 UJ
Naphthalene	UGKH	480 UJ	390 UJ	440 UJ	8,000 UJ	370 UJ
Nitrobenzene	UGKC	480 UJ	390 UJ	440 UJ	8,000 UJ	370 UJ
N-Nitroso-di-n-propylamine	UGKG	480 UJ	390 UJ	440 UJ	8,000 UJ	370 UJ
N-Nitrosodiphenylamine	UGKC	480 UJ	390 UJ	440 UJ	8,000 UJ	370 UJ
Pentachlorophenol	UGKG	1,200 UJ	970 UJ	1,100 UJ	20,000 UJ	620 UJ
Phenanthrene	UGKG	210 J	290 J	140 J	1,500 J	140 J
Phenol	UGKG	480 UJ	390 UJ	440 UJ	8,000 UJ	370 UJ
Pyrene	UGKL	410 J	380 J	190 J	1,900 J	200 J
Pesticides						
4,4'-DDD	UGKG	4.2 UJ	3.8 UJ	4.4 UJ	3.8 UJ	3.6 UJ
4,4'-DDE	UGKG	4.2 UJ	3.8 UJ	4.4 UJ	3.8 UJ	3.6 UJ
4,4'-DDT	UGKG	4.2 UJ	14 JN	4.4 UJ	3.8 UJ	3.6 UJ
Aldrin	UGXL	2.1 UJ	2.0 UJ	2.3 UJ	1.9 UJ	1.9 UJ

Flags assigned during chemistry validation are shown

MADE BY: GFK 3/11/002

CHKD BY: MFA 3/11/002

Detection Limits shown are POL

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ATTACHMENT A
ANALYTICAL SOIL SAMPLE RESULTS
FORMER HANNA FURNACE SITE

Location ID		BH-301	BH-301	BH-302	BH-302	BH-303
Sample ID		BH-301-SURFACE	BH-301-4-6	BH-302-SURFACE	BH-302-4-6	BH-303-SURFACE
Matrix		Soil	Soil	Soil	Soil	Soil
Depth Interval (ft)		0.0-0.2	4.0-6.0	0.0-0.2	4.0-6.0	0.0-0.2
Date Sampled		10/10/01	10/10/01	10/10/01	10/10/01	10/10/01
Parameter	Units					
Pesticides						
alpha-BHC	UG/KG	2.1 UJ	2.0 UJ	2.3 UJ	1.9 UJ	1.9 UJ
alpha-Chlordane	UG/KG	2.1 UJ	2.0 UJ	2.3 UJ	1.9 UJ	1.9 UJ
beta-BHC	UG/KG	2.1 UJ	2.0 UJ	2.3 UJ	1.9 UJ	1.9 UJ
delta-BHC	UG/KG	2.1 UJ	2.0 UJ	2.3 UJ	1.9 UJ	1.9 UJ
Dieldrin	UG/KG	4.2 UJ	10 J	4.4 UJ	3.8 UJ	3.8 UJ
Endosulfan I	UG/KG	2.1 UJ	2.0 UJ	2.3 UJ	1.9 UJ	1.9 UJ
Endosulfan II	UG/KG	4.2 UJ	3.8 UJ	4.4 UJ	3.8 UJ	3.8 UJ
Endosulfan sulfate	UG/KG	4.2 UJ	3.8 UJ	4.4 UJ	3.8 UJ	3.8 UJ
Endrin	UG/KG	4.2 UJ	3.8 UJ	4.4 UJ	3.8 UJ	3.8 UJ
Endrin aldehyde	UG/KG	4.2 UJ	3.8 UJ	4.4 UJ	3.8 UJ	3.8 UJ
gamma-BHC (lindane)	UG/KG	2.1 UJ	2.0 UJ	2.3 UJ	1.9 UJ	1.9 UJ
gamma-Chlordane	UG/KG	2.1 UJ	2.0 UJ	2.3 UJ	1.9 UJ	1.9 UJ
Heptachlor	UG/KG	2.1 UJ	2.0 UJ	2.3 UJ	1.9 UJ	1.9 UJ
Heptachlor epoxide	UG/KG	2.1 UJ	2.0 UJ	2.3 UJ	1.9 UJ	1.9 UJ
Methoxychlor	UG/KG	21 UJ	20 UJ	23 UJ	19 UJ	19 UJ
Toxaphene	UG/KG	210 UJ	200 UJ	230 UJ	190 UJ	190 UJ
Polychlorinated Biphenyls						
Aroclor 1215	UG/KG	42 UJ	38 UJ	44 UJ	38 UJ	38 UJ
Aroclor 1221	UG/KG	84 UJ	78 UJ	89 UJ	77 UJ	74 UJ
Aroclor 1232	UG/KG	42 UJ	38 UJ	44 UJ	38 UJ	38 UJ
Aroclor 1242	UG/KG	42 UJ	38 UJ	44 UJ	38 UJ	38 UJ
Aroclor 1248	UG/KG	42 UJ	38 UJ	44 UJ	38 UJ	38 UJ
Aroclor 1254	UG/KG	42 UJ	38 UJ	44 UJ	38 UJ	38 UJ

Flags assigned during chemistry validation are shown

MADE BY: GCK 3/11/2002
CHECKED BY: MLU 3/11/2002

Detection Limits shown are PQL

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ATTACHMENT A
ANALYTICAL SOIL SAMPLE RESULTS
FORMER HANNA FURNACE SITE

Location ID		BH-301	BH-301	BH-302	BH-302	BH-303
Sample ID		BH-301-SURFACE	BH-301-4-6	BH-302 SURFACE	BH-302-4-6	BH-303-SURFACE
Matrix		Soil	Soil	Soil	Soil	Soil
Depth Interval (ft)		0.0-0.2	4.0-6.0	0.0-0.2	4.0-6.0	0.0-0.2
Date Sampled		10/10/01	10/10/01	10/10/01	10/10/01	10/10/01
Parameter	Units					
Metals						
Zinc	MG/KG	172	1,150	430	J 6 ru	344
Miscellaneous Parameters						
Cyanide Free	MG/KG	1.3 J	1.8 J	2.1 J	R	5.0 J
Cyanide Total	MG/KG	R	R	R	R	R
Total Solids	%	79.4	86.5	75.2	87.4	90.9

Flags assigned during chemistry validation are shown

MADE BY: CFK 3/11/2002

IKD BY: MEB 3/11/2002

Detection Limits shown are PQL

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ATTACHMENT A **ANALYTICAL SOIL SAMPLE RESULTS** **FORMER HANNA FURNACE SITE**

Location ID		BH-303	BH-304	BH-304	BH-305	BH-305
Sample ID		BH-303-4-6	BH-304-SURFACE	BH-304-6-8	BH-305-SURFACE	BH-305-12-14
Matrix		Soil	Soil	Soil	Soil	Soil
Depth Interval (ft)		4.0-6.0	0.0-0.2	6.0-8.0	0.0-0.2	12.0-14.0
Date Sampled		10/10/01	10/10/01	10/10/01	10/11/01	10/11/01
Parameter	Units					
Volatiles Organic Compounds						
1,1,1-Trichloroethane	UG/KG	12 U	10 U	20 UJ	9 U	10 U
1,1,2,2-Tetrachloroethane	UG/KG	12 UJ	10 UJ	20 UJ	9 UJ	10 U
1,1,2-Trichloro 1,2,2-trifluoroethane	UG/KG	12 U	10 U	20 UJ	9 U	10 UJ
1,1,2-Trichloroethane	UG/KG	12 U	10 U	20 UJ	9 U	10 U
1,1-Dichloroethane	UG/KG	12 UJ	10 UJ	20 UJ	9 U	10 U
1,1-Dichloroethane	UG/KG	12 UJ	10 U	20 UJ	9 U	10 UJ
1,2,4-Trichlorobenzene	UG/KG	12 UJ	10 UJ	20 UJ	9 UJ	10 U
1,2-Dibromo 3-chloropropane	UG/KG	12 UJ	10 UJ	20 UJ	9 UJ	10 U
1,2-Dibromoethane (Ethylene dibromide)	UG/KG	12 UJ	10 UJ	20 UJ	9 UJ	10 U
1,2-Dichlorobenzene	UG/KG	12 UJ	10 UJ	20 UJ	9 UJ	10 U
1,2-Dichloroethane	UG/KG	12 UJ	10 U	20 UJ	9 U	10 U
1,2-Dichloroethane (cis)	UG/KG	12 UJ	10 U	20 UJ	9 UJ	10 U
1,2-Dichloroethane (trans)	UG/KG	12 UJ	10 U	20 UJ	9 U	10 UJ
1,2-Dichloropropane	UG/KG	12 U	10 U	20 UJ	9 UJ	10 U
1,3-Dichlorobenzene	UG/KG	12 UJ	10 UJ	20 UJ	9 UJ	10 UJ
1,3-Dichloropropane (cis)	UG/KG	12 U	10 U	20 UJ	9 U	10 UJ
1,3-Dichloropropane (trans)	UG/KG	12 UJ	10 U	20 UJ	9 U	10 UJ
1,4-Dichlorobenzene	UG/KG	12 UJ	10 UJ	20 UJ	9 UJ	10 U
2-Hexanone	UG/KG	12 UJ	10 UJ	20 UJ	9 UJ	10 U
4-Methyl-2-pentanone	UG/KG	12 UJ	10 UJ	20 UJ	9 UJ	10 U
Acetone	UG/KG	120 UJ	10 UJ	44 UJ	9 U	20 UJ
Benzene	UG/KG	9 U	10 U	20 UJ	9 U	10 UJ
Bromodichloromethane	UG/KG	12 U	10 UJ	20 UJ	9 U	10 U
Bromoforn	UG/KG	12 U	10 U	20 UJ	9 U	10 UJ

Flags assigned during chemistry validation are shown

MADE BY: GSK 3/11/2002

CHKD BY: MFB 3/11/2002

Detection Limits shown are PQL

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 (LUTS) BATH AND MATRIS - 10/1

ATTACHMENT A
ANALYTICAL SOIL SAMPLE RESULTS
FORMER HANNA FURNACE SITE

Location ID		BH-303	BH-304	BH-304	BH-305	BH-305
Sample ID		BH-303-4-6	BH-304-SURFACE	BH-304-6-8	BH-305-SURFACE	BH-305-12-14
Matrix		Soil	Soil	Soil	Soil	Soil
Depth Interval (ft)		4.0-6.0	0.0-0.2	6.0-8.0	0.0-0.2	12.0-14.0
Date Sampled		10/10/01	10/10/01	10/10/01	10/11/01	10/11/01
Parameter	Units					
Volatiles Organic Compounds						
Bromomethane	UG/KG	17 UJ	10 U	20 UJ	9 U	10 U
Carbon disulfide	UG/KG	7 J	10 U	20 UJ	9 U	10 UJ
Carbon tetrachloride	UG/KG	12 UJ	10 UJ	20 UJ	9 U	10 UJ
Chlorobenzene	UG/KG	12 UJ	10 UJ	20 UJ	9 UJ	10 UJ
Chloroethane	UG/KG	12 UJ	10 U	20 UJ	9 U	10 U
Chloroform	UG/KG	12 UJ	10 UJ	20 UJ	9 U	10 U
Chloromethane	UG/KG	12 UJ	10 U	20 UJ	9 U	10 UJ
Cyclohexane	UG/KG	12 U	10 U	20 UJ	9 U	10 U
Dibromochloromethane	UG/KG	12 U	10 UJ	20 UJ	9 U	10 U
Dichlorodifluoromethane	UG/KG	12 U	10 U	20 UJ	9 U	10 U
Ethylbenzene	UG/KG	4 J	10 UJ	20 UJ	9 UJ	10 U
Isopropylbenzene (Cumene)	UG/KG	12 UJ	10 UJ	20 UJ	9 UJ	10 U
m,p Xylene	UG/KG	14 U	10 UJ	20 UJ	9 UJ	10 U
Methyl acetate	UG/KG	12 U	10 U	20 UJ	9 U	10 U
Methyl ethyl ketone (2-Butanone)	UG/KG	10 J	10 U	20 UJ	9 U	10 UJ
Methyl tert-butyl ether	UG/KG	12 U	10 UJ	20 UJ	9 U	10 U
Methylcyclohexane	UG/KG	10 J	10 U	20 UJ	9 U	10 U
Methylene chloride	UG/KG	12 UJ	10 UJ	20 UJ	9 UJ	10 U
o Xylene	UG/KG	8 U	10 UJ	20 UJ	9 UJ	10 U
Styrene	UG/KG	12 UJ	10 UJ	20 UJ	9 UJ	10 UJ
Tetrachloroethene	UG/KG	12 UJ	10 UJ	20 UJ	9 UJ	10 U
Toluene	UG/KG	5 J	10 UJ	20 UJ	9 UJ	10 U
Trichloroethene	UG/KG	12 U	10 U	20 UJ	9 U	10 UJ
Trichlorofluoromethene	UG/KG	12 U	10 U	20 UJ	9 U	10 U

Finger assigned during chemistry validation are shown

MADE BY GLK 3/11/2002

KL BY MEH 3112903

Detection Limits shown are POL

ATTACHMENT A **ANALYTICAL SOIL SAMPLE RESULTS** **FORMER HANNA FURNACE SITE**

Location ID		BH-303	BH-304	BH-304	BH-305	BH-305
Sample ID		BH-303-4-6	BH-304-SURFACE	BH-304-6-8	BH-305-SURFACE	BH-305-12-14
Matrix		Soil	Soil	Soil	Soil	Soil
Depth Interval (ft)		4.0-6.0	0.0-0.2	6.0-8.0	0.0-0.2	12.0-14.0
Date Sampled		10/10/01	10/10/01	10/10/01	10/11/01	10/11/01
Parameter	Units					
Volatiles Organic Compounds						
Vinyl chloride	UG/KG	12 UJ	10 U	20 UJ	9 U	10 U
Semivolatiles Organic Compounds						
1,1'-Biphenyl	UG/KG	500 UJ	150 U	820 U	360 U	450 U
2,2'-oxybis(1-Chloropropane)	UG/KG	500 UJ	450 UJ	990 UJ	360 U	450 U
2,4,6-Trichlorophenol	UG/KG	1,300 UJ	1,100 UJ	2,500 UJ	900 U	1,100 U
2,4,6-Trichlorophenol	UG/KG	500 UJ	450 UJ	990 UJ	360 U	450 U
2,4-Dichlorophenol	UG/KG	500 UJ	450 UJ	990 UJ	360 U	450 U
2,4-Dimethylphenol	UG/KG	500 UJ	450 UJ	990 UJ	360 U	450 U
2,4-Dinitrophenol	UG/KG	1,300 UJ	1,100 UJ	2,500 UJ	900 U	1,100 U
2,4-Dinitrotoluene	UG/KG	500 UJ	450 UJ	990 UJ	360 U	450 U
2,6-Dinitrotoluene	UG/KG	500 UJ	450 UJ	990 UJ	360 U	450 U
2-Chloronaphthalene	UG/KG	500 UJ	450 UJ	990 UJ	360 U	450 U
2-Chlorophenol	UG/KG	500 UJ	450 UJ	990 UJ	360 U	450 U
2-Methylnaphthalene	UG/KG	700 U	810 U	2,400 U	360 UJ	450 UJ
2-Methylphenol (o-cresol)	UG/KG	500 UJ	450 UJ	990 UJ	360 U	450 U
2-Nitroaniline	UG/KG	1,300 UJ	1,100 UJ	2,500 UJ	900 U	1,100 U
2-Nitrophenol	UG/KG	500 UJ	450 UJ	990 UJ	360 U	450 U
3,3'-Dichlorobenzidine	UG/KG	500 UJ	450 UJ	990 UJ	360 U	450 U
3-Nitroaniline	UG/KG	1,300 UJ	1,100 UJ	2,500 UJ	900 U	1,100 U
4,6-Dinitro-2-methylphenol	UG/KG	1,300 UJ	1,100 UJ	2,500 UJ	900 U	1,100 U
4-Bromophenyl-phenylether	UG/KG	500 UJ	450 UJ	990 UJ	360 U	450 U
4-Chloro-3-methylphenol	UG/KG	500 UJ	450 UJ	990 UJ	360 U	450 U
4-Chloroaniline	UG/KG	500 UJ	450 UJ	990 UJ	360 U	450 U
4-Chlorophenyl-phenylether	UG/KG	500 UJ	450 UJ	990 UJ	360 U	450 U

Flags assigned during chemistry validation are shown

MADE BY: RFK 3/11/2002

CHKD BY: MFB 3/11/2002

Detection Limits shown are PQL

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 BY: RFK

ATTACHMENT A
ANALYTICAL SOIL SAMPLE RESULTS
FORMER HANNA FURNACE SITE

Location ID		BH-303	BH-304	BH-304	BH-305	BH-305
Sample ID		BH-303-4-6	BH-304-SURFACE	BH-304-6-A	BH-305-SURFACE	BH-305-12-14
Matrix		Soil	Soil	Soil	Soil	Soil
Depth Interval (ft)		4.0-6.0	0.0-0.2	6.0-8.0	0.0-0.2	12.0-14.0
Date Sampled		10/10/01	10/10/01	10/10/01	10/11/01	10/11/01
Parameter	Units					
Semivolatile Organic Compounds						
4-Methylphenol (p-cresol)	UG/KG	500 UJ	450 UJ	990 UJ	350 U	450 U
4-Nitroaniline	UG/KG	1,300 UJ	1,100 UJ	2,500 UJ	900 U	1,100 U
4-Nitrophenol	UG/KG	1,300 UJ	1,100 UJ	2,500 UJ	900 U	1,100 U
Acenaphthene	UG/KG	500 J	300 J	3,500 J	350 U	450 U
Acenaphthylene	UG/KG	500 UJ	75 J	310 J	350 U	450 U
Acetophenone	UG/KG	500 UJ	450 UJ	990 UJ	350 UJ	450 U
Anthracene	UG/KG	100 J	250 J	4,200 J	57 J	450 U
Atrazine	UG/KG	500 UJ	450 UJ	990 UJ	350 U	450 U
Benzaldehyde	UG/KG	500 UJ	450 UJ	990 UJ	350 U	450 U
Benz(a)anthracene	UG/KG	320 J	450 J	1,100 J	350 J	450 U
Benz(a)pyrene	UG/KG	500 UJ	350 UJ	2,600 UJ	420 UJ	450 U
Benz(b)fluoranthene	UG/KG	320 J	1,900 J	4,300 J	1,000	450 UJ
Benz(g,h,i)perylene	UG/KG	140 J	480 J	1,000 J	340 J	450 UJ
Benz(k)fluoranthene	UG/KG	120 J	580 J	1,500 J	380	450 U
bis(2-Chloroethoxy)methane	UG/KG	500 UJ	450 UJ	990 UJ	350 U	450 U
bis(2-Chloroethyl)ether	UG/KG	500 UJ	450 UJ	990 UJ	350 UJ	450 U
bis(2-Ethylhexyl)phthalate	UG/KG	500 UJ	450 UJ	2,100 UJ	350 U	450 U
Butylbenzylphthalate	UG/KG	500 UJ	450 UJ	990 UJ	350 U	450 UJ
Caprolactam	UG/KG	500 UJ	450 UJ	990 UJ	350 U	450 U
Carbazole	UG/KG	500 UJ	65 J	1,100 J	300 UJ	450 UJ
Chrysene	UG/KG	370 J	1,300 J	4,500 J	580	450 U
Dibenz(a,h)anthracene	UG/KG	500 UJ	130 J	140 J	78 J	450 U
Dibenzofuran	UG/KG	500 UJ	280 J	2,800 J	300 U	450 UJ
Diethylphthalate	UG/KG	500 UJ	450 UJ	990 UJ	350 U	450 U

Flags assigned during chemistry validation are shown

MADE BY: CCK 3/11/2002

MOD BY: MED 7/11/2002

Detection Limits shown are PQL

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ATTACHMENT A **ANALYTICAL SOIL SAMPLE RESULTS** **FORMER HANNA FURNACE SITE**

Location ID		BH-303	BH-304	BH-304	BH-305	BH-305
Sample ID		BH-303-4-6	BH-304-SURFACE	BH-304-6-8	BH-305-SURFACE	BH-305-12-14
Matrix		Soil	Soil	Soil	Soil	Soil
Depth Interval (ft)		4.0-8.0	0.0-0.2	6.0-8.0	0.0-0.2	12.0-14.0
Date Sampled		10/10/01	10/10/01	10/10/01	10/11/01	10/11/01
Parameter	Units					
Semivolatile Organic Compounds						
Dimethylphthalate	UG/KG	500 UJ	450 UJ	990 UJ	360 UJ	450 UJ
Di-n-butylphthalate	UG/KG	500 UJ	120 UJ	990 UJ	360 UJ	450 UJ
Di-n-octylphthalate	UG/KG	500 UJ	450 UJ	990 UJ	360 UJ	450 UJ
Fluoranthene	UG/KG	1,000 J	1,300 J	15,000 UJ	280 UJ	450 UJ
Fluorene	UG/KG	1,100 J	240 J	3,700 J	360 UJ	450 UJ
Hexachlorobenzene	UG/KG	500 UJ	450 UJ	990 UJ	360 UJ	450 UJ
Hexachlorobutadiene	UG/KG	500 UJ	450 UJ	990 UJ	360 UJ	450 UJ
Hexachlorocyclopentadiene	UG/KG	500 UJ	450 UJ	990 UJ	360 UJ	450 UJ
Hexachlorocyclopentadiene	UG/KG	500 UJ	450 UJ	990 UJ	360 UJ	450 UJ
Indeno(1,2,3-cd)pyrene	UG/KG	190 J	920 J	1,800 J	510	450 UJ
Isonaphthalene	UG/KG	500 UJ	450 UJ	990 UJ	360 UJ	450 UJ
Naphthalene	UG/KG	410 J	550 J	1,900 J	360 UJ	450 UJ
Nitrobenzene	UG/KG	500 UJ	450 UJ	990 UJ	360 UJ	450 UJ
N-Nitroso-di-n-propylamine	UG/KG	500 UJ	450 UJ	990 UJ	360 UJ	450 UJ
N-Nitrosodiphenylamine	UG/KG	3,500 J	450 UJ	990 UJ	360 UJ	450 UJ
Pentachlorophenol	UG/KG	1,300 UJ	1,100 UJ	2,500 UJ	900 UJ	1,100 UJ
Phenanthrene	UG/KG	1,000 J	920 J	15,000 UJ	89 UJ	450 UJ
Phenol	UG/KG	500 UJ	450 UJ	990 UJ	360 UJ	450 UJ
Pyrene	UG/KG	780 J	1,300 J	9,500 UJ	450	450 UJ
Pesticides						
4,4'-DDE	UG/KG	4.1 UJ	3.6 UJ	6.6 UJ	3.5 UJ	4.0 UJ
4,4'-DDE	UG/KG	4.1 UJ	3.6 UJ	6.6 UJ	3.5 UJ	4.0 UJ
4,4'-DDT	UG/KG	4.1 UJ	3.6 UJ	6.6 UJ	3.5 UJ	4.0 UJ
Aldrin	UG/KG	2.1 UJ	1.9 UJ	3.4 UJ	1.8 UJ	2.1 UJ

Flags assigned during chemistry validation are shown

MADE BY: GLK 3/11/2002

CHKD BY: MEB 3/11/2002

Detection Limits shown are PQL

PROJECT: 01-000-1203-11-000
 Project: 01-000-1203-11-000
 Project: 01-000-1203-11-000

ATTACHMENT A **ANALYTICAL SOIL SAMPLE RESULTS** **FORMER HANNA FURNACE SITE**

Location ID		BH-303	BH-304	BH-304	BH-305	BH-305
Sample ID		BH-303-4-5	BH-304-SURFACE	BH-304-8-9	BH-305-SURFACE	BH-305-12-14
Matrix		Soil	Soil	Soil	Soil	Soil
Depth Interval (ft)		4.0-6.0	0.0-0.2	5.0-5.0	0.0-0.2	12.0-14.0
Date Sampled		10/10/01	10/10/01	10/10/01	10/11/01	10/11/01
Parameter	Units					
Pesticides						
alpha-BHC	UG/KG	2.1 UJ	1.9 UJ	3.4 UJ	1.8 UJ	2.1 UJ
alpha-Chlordane	UG/KG	2.1 UJ	1.9 UJ	R	1.8 UJ	2.1 UJ
beta-BHC	UG/KG	2.1 UJ	1.9 UJ	3.4 UJ	1.8 UJ	2.1 UJ
delta-BHC	UG/KG	2.1 UJ	1.9 UJ	3.4 UJ	1.8 UJ	2.1 UJ
Dieldrin	UG/KG	4.1 UJ	3.8 UJ	6.6 UJ	3.5 UJ	4.0 UJ
Endosulfan I	UG/KG	2.1 UJ	1.9 UJ	3.4 UJ	1.8 UJ	2.1 UJ
Endosulfan II	UG/KG	4.1 UJ	3.6 UJ	6.6 UJ	3.5 UJ	4.0 UJ
Endosulfan sulfate	UG/KG	4.1 UJ	3.6 UJ	6.6 UJ	3.5 UJ	4.0 UJ
Endrin	UG/KG	4.1 UJ	3.6 UJ	6.6 UJ	3.5 UJ	4.0 UJ
Endrin alcoholide	UG/KG	4.1 UJ	3.6 UJ	6.6 UJ	3.5 UJ	4.0 UJ
Endrin ketone	UG/KG	4.1 UJ	3.8 UJ	6.6 UJ	3.5 UJ	4.0 UJ
gamma-BHC (Lindane)	UG/KG	2.1 UJ	1.9 UJ	3.4 UJ	1.8 UJ	2.1 UJ
gamma-Chlordane	UG/KG	2.1 UJ	1.9 UJ	3.4 UJ	1.8 UJ	2.1 UJ
Heptachlor	UG/KG	2.1 UJ	1.9 UJ	3.4 UJ	1.8 UJ	2.1 UJ
Heptachlor epoxide	UG/KG	2.1 UJ	1.9 UJ	3.4 UJ	1.8 UJ	2.1 UJ
Methoxychlor	UG/KG	21 UJ	19 UJ	34 UJ	18 UJ	21 UJ
Toraphene	UG/KG	210 UJ	180 UJ	340 UJ	180 UJ	210 UJ
Polychlorinated Biphenyls						
Aroclor 1015	UG/KG	41 UJ	36 UJ	66 UJ	35 UJ	40 UJ
Aroclor 1221	UG/KG	81 UJ	74 UJ	130 UJ	71 UJ	82 UJ
Aroclor 1237	UG/KG	41 UJ	36 UJ	66 UJ	35 UJ	40 UJ
Aroclor 1242	UG/KG	41 UJ	36 UJ	66 UJ	35 UJ	40 UJ
Aroclor 1243	UG/KG	41 UJ	36 UJ	66 UJ	35 UJ	40 UJ
Aroclor 1254	UG/KG	41 UJ	36 UJ	66 UJ	35 UJ	40 UJ

Flags assigned during chemistry validation are shown.

MADE BY: CFX 3/11/2002

CHKD BY: MCB 3/14/2002

Detection Limits shown are PQL

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ATTACHMENT A **ANALYTICAL SOIL SAMPLE RESULTS** **FORMER HANNA FURNACE SITE**

Location ID		BH-303	BH-304	BH-304	DI-305	BH-305
Sample ID		BH-303-4-B	BH-304-SURFACE	BH-304-6-B	BH-305-SURFACE	BH-305-12-14
Matrix		Soil	Soil	Soil	Soil	Soil
Depth Interval (ft)		4.0-6.0	0.0-0.2	6.0-8.0	0.0-0.2	12.0-14.0
Date Sampled		10/10/01	10/10/01	10/10/01	10/11/01	10/11/01
Parameter	Units					
Polychlorinated Biphenyls						
Aroclor 1260	UGRG	41 UJ	36 UJ	66 UJ	35 UJ	40 UJ
Metals						
Aluminum	MGKG	14,000	6,420	35,100 J	18,700	10,600
Antimony	MGKG	70.7 UJ	59.4 UJ	113 UJ	60.8 UJ	6.2 BJ
Arsenic	MGKG	11.4 J	4.5 J	18.5 J	4.5 J	3.5 J
Barium	MGKG	234	75.1	279 J	181	84.9
Beryllium	MGKG	2.0 J	1.3 J	5.8 J	4.2 J	0.55 B
Cadmium	MGKG	12.2 U	10.2 U	1.8 J	1.3	0.82 J
Calcium	MGKG	55,300	84,400	199,000 J	215,000	79,100
Chromium	MGKG	26.4 J	50.7 J	15.3 J	14.7 J	15.1 J
Cobalt	MGKG	7.7	4.5 B	3.6 BJ	2.5 B	8.8
Copper	MGKG	180 J	58.4 J	30.0 J	36.7 J	24.1 J
Iron	MGKG	94,100	88,000	74,800 J	14,100	18,000
Lead	MGKG	1.75	353	44.5 J	46.7	8.2
Magnesium	MGKG	6,620	22,400	21,800 J	13,500	21,800
Manganese	MGKG	1,040	1,560	2,430 J	1.6/U	430
Mercury	MGKG	R	R	R	R	R
Nickel	MGKG	27.2 J	24.7 J	20.5 J	13.9 J	22.8 J
Potassium	MGKG	1,620	573	1,720 J	1,150	1,330
Selenium	MGKG	0.24 U	0.21 U	0.40 UJ	0.20 U	0.24 U
Silver	MGKG	14.6 UJ	12.3 UJ	2.0 J	1.1 J	0.89 UJ
Sodium	MGKG	366 B	247 B	672 BJ	1,040	225 B
Thallium	MGKG	0.61 B	0.75 B	0.40 UJ	0.20 U	0.24 U
Vanadium	MGKG	28.1 H	16.4 U	13.0 J	7.8	22.9

Flags assigned during chemistry validation are shown

MADE BY: GSK 3/11/2002

CHKD BY: MCB 5/11/2002

Detection Limits shown are PQL

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ATTACHMENT A **ANALYTICAL SOIL SAMPLE RESULTS** **FORMER HANNA FURNACE SITE**

Location ID		BH-303	BH-304	BH-304	BH-305	BH-305
Sample ID		BH-303-4-6	BH-304-SURFACE	BH-304-8-8	BH-305-SURFACE	BH-305-12-14
Matrix		Soil	Soil	Soil	Soil	Soil
Depth Interval (ft)		4.0-6.0	0.0-0.2	6.0-8.0	0.0-0.2	12.0-14.0
Date Sampled		10/10/01	10/10/01	10/10/01	10/11/01	10/11/01
Parameter	Units					
Metals						
Zinc	MG/KG	682	287	R	102	56.7
Miscellaneous Parameters						
Cyanide, Free	MG/KG	0.71 JJ	1.0 JJ	0.70 JJ	0.49 JJ	0.59 JJ
Cyanide, Total	MG/KG	R	R	R	R	R
Total Solids	%	80	91	50.1	44.8	62.2

Flags assigned during chemistry validation are shown

QDC BY: GSK 3/17/2012
 IRD BY: MLB 3/17/2012

Detection Limits shown are PQL

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ATTACHMENT A **ANALYTICAL SOIL SAMPLE RESULTS** **FORMER HANNA FURNACE SITE**

Location ID		BH-306	BH-306	BH-307	BH-308	BH-309
Sample ID		BH-306-18-20	BH-306-24-26	BH-307-4-6	BH-308-8-10	BH-309-7-9
Matrix		Soil	Soil	Soil	Soil	Soil
Depth Interval (ft)		18.0-20.0	24.0-26.0	4.0-6.0	8.0-10.0	7.0-9.0
Date Sampled		10/11/01	10/11/01	10/15/01	10/16/01	10/16/01
Parameter	Units					
Volatiles Organic Compounds						
1,1,1-Trichloroethane	UG/KG	20 UJ	14 UJ	13 U	13 UJ	R
1,1,2,2-Tetrachloroethane	UG/KG	20 UJ	14 UJ	13 UJ	R	R
1,1,2-Trichloro-1,2,2-trifluoroethane	UG/KG	20 UJ	14 UJ	13 UJ	13 U	11 UJ
1,1,2-Trichloroethane	UG/KG	20 UJ	14 UJ	13 U	13 UJ	R
1,1-Dichloroethane	UG/KG	20 UJ	14 UJ	13 U	13 U	11 UJ
1,1-Dichloroethene	UG/KG	20 UJ	14 UJ	13 U	13 UJ	11 UJ
1,2,4-Trichlorobenzene	UG/KG	20 UJ	14 UJ	13 UJ	R	R
1,2-Dibromo-3-chloropropane	UG/KG	20 UJ	14 UJ	13 UJ	R	R
1,2-Dibromoethane (Ethylene dibromide)	UG/KG	20 UJ	14 UJ	13 UJ	R	R
1,2-Dichlorobenzene	UG/KG	20 UJ	14 UJ	13 UJ	R	R
1,2-Dichloroethane	UG/KG	20 UJ	14 UJ	13 U	13 UJ	11 UJ
1,2-Dichloroethene (cis)	UG/KG	20 UJ	14 UJ	13 U	13 U	11 UJ
1,2-Dichloroethene (trans)	UG/KG	20 UJ	14 UJ	13 U	13 U	11 UJ
1,2-Dichloropropane	UG/KG	20 UJ	14 UJ	13 U	13 U	R
1,3-Dichlorobenzene	UG/KG	20 UJ	14 UJ	13 UJ	R	R
1,3-Dichloropropene (cis)	UG/KG	20 UJ	14 UJ	13 U	13 U	R
1,3-Dichloropropene (trans)	UG/KG	20 UJ	14 UJ	13 U	13 U	R
1,4-Dichlorobenzene	UG/KG	20 UJ	14 UJ	13 UJ	R	R
2-Hexanone	UG/KG	20 UJ	14 UJ	13 UJ	R	R
4-Methyl-2-pentanone	UG/KG	20 UJ	14 UJ	13 UJ	R	R
Acetone	UG/KG	200 UJ	140 UJ	38 UJ	510 UJ	62 UJ
Benzene	UG/KG	20 UJ	14 UJ	13 U	13 U	R
Bromodichloromethane	UG/KG	20 UJ	14 UJ	13 U	13 U	R
Bromoform	UG/KG	20 UJ	14 UJ	13 U	13 U	R

Flags assigned during chemistry validation are shown

MADE BY: GCK 3/11/2001

CHKD BY: MEB 3/11/2002

Detection Limits shown are PQL

ATTACHMENT A **ANALYTICAL SOIL SAMPLE RESULTS** **FORMER HANNA FURNACE SITE**

Location ID		BH-305	BH-306	BH-307	BH-308	BH-309
Sample ID		BH-305-18-20	BH-306-24-26	BH-307-4-6	BH-308-8-10	BH-309-7-9
Matrix		Soil	Soil	Soil	Soil	Soil
Depth Interval (ft)		18.0-20.0	24.0-26.0	4.0-6.0	8.0-10.0	7.0-9.0
Date Sampled		10/11/01	10/11/01	10/16/01	10/16/01	10/18/01
Parameter	Units					
Volatiles Organic Compounds						
Bromomethane	UG/KG	20 UJ	14 UJ	13 U	13 U	11 UJ
Carbon disulfide	UG/KG	12 J	5 J	4 J	7 J	11 UJ
Carbon tetrachloride	UG/KG	20 UJ	14 UJ	13 U	13 U	R
Chlorobenzene	UG/KG	20 UJ	14 UJ	13 UJ	R	R
Chloroethane	UG/KG	20 UJ	14 UJ	13 U	13 U	11 UJ
Chloroform	UG/KG	20 UJ	14 UJ	13 U	13 U	11 UJ
Chloromethane	UG/KG	20 UJ	14 UJ	13 U	13 U	11 UJ
Cyclohexane	UG/KG	20 UJ	14 UJ	13 U	13 U	R
Dibromochloromethane	UG/KG	20 UJ	14 UJ	13 U	13 U	R
monofluoromethane	UG/KG	20 UJ	14 UJ	13 U	13 U	11 UJ
Ethylbenzene	UG/KG	20 UJ	14 UJ	13 UJ	R	R
Isopropylbenzene (Cumene)	UG/KG	20 UJ	14 UJ	13 UJ	R	R
m&p-Xylene	UG/KG	20 UJ	14 UJ	13 UJ	R	R
Methyl acetate	UG/KG	20 UJ	14 UJ	13 U	13 U	11 UJ
Methyl ethyl ketone (2-Butanone)	UG/KG	49 J	20 J	19 U	19 U	24 J
Methyl tert-butyl ether	UG/KG	6 J	3 J	13 U	13 U	11 UJ
Methylcyclohexane	UG/KG	20 UJ	14 UJ	13 U	13 U	R
Methylene chloride	UG/KG	20 UJ	14 UJ	13 U	13 U	11 UJ
o-Xylene	UG/KG	20 UJ	14 UJ	13 UJ	R	R
Styrene	UG/KG	20 UJ	14 UJ	13 UJ	R	R
Tetrachloroethene	UG/KG	20 UJ	14 UJ	13 UJ	R	R
Toluene	UG/KG	20 UJ	14 UJ	4 J	4 J	R
Trichloroethene	UG/KG	20 UJ	14 UJ	13 U	13 U	R
Trichlorofluoromethane	UG/KG	20 UJ	14 UJ	13 U	13 U	11 UJ

Flags assigned during chemistry validation are shown

DE BY GEK 3/11/2002
 SD BY MFS 3/11/2002

Detection Limits shown are PQL

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ATTACHMENT A **ANALYTICAL SOIL SAMPLE RESULTS** **FORMER HANNA FURNACE SITE**

Location ID		BH-306	BH-306	BH-307	BH-308	BH-309
Sample ID		BH-306-18-20	BH-306-24-26	BH-307-4-6	BH-308-8-10	BH-309-7-9
Matrix		Soil	Soil	Soil	Soil	Soil
Depth Interval (ft)		18.0-20.0	24.0-26.0	4.0-6.0	8.0-10.0	7.0-9.0
Date Sampled		10/11/01	10/11/01	10/15/01	10/16/01	10/18/01
Parameter	Units					
Volatiles Organic Compounds						
Vinyl chloride	UG/KG	20 UJ	14 UJ	13 U	13 U	11 UJ
Semivolatiles Organic Compounds						
1,1'-Biphenyl	UG/KG	72 J	490 U	450 U	440 U	410 UJ
1,2'-oxybis(1-Chloropropane)	UG/KG	720 UJ	490 U	450 U	440 U	410 UJ
2,4,5-Trichlorophenol	UG/KG	R	1,200 UJ	1,100 UJ	1,100 UJ	1,000 UJ
2,4,6-Trichlorophenol	UG/KG	R	490 U	450 U	440 U	410 UJ
2,4-Dichlorophenol	UG/KG	R	490 UJ	450 UJ	440 UJ	410 UJ
2,4-Dimethylphenol	UG/KG	R	490 U	450 U	440 U	410 UJ
2,4-Dinitrophenol	UG/KG	R	1,200 U	1,100 U	1,100 U	1,000 UJ
2,4-Dinitrotoluene	UG/KG	720 UJ	490 U	450 U	440 UJ	410 UJ
2,6-Dinitrotoluene	UG/KG	720 UJ	490 U	450 U	440 U	410 UJ
2-Chloronaphthalene	UG/KG	720 UJ	490 U	450 U	440 U	410 UJ
2-Chlorophenol	UG/KG	R	490 U	450 U	440 U	410 UJ
2-Methylnaphthalene	UG/KG	420 J	90 J	150 UJ	440 U	410 UJ
2-Methylphenol (o-cresol)	UG/KG	R	490 UJ	450 UJ	440 UJ	410 UJ
2-Nitroaniline	UG/KG	1,800 UJ	1,200 U	1,100 UJ	1,100 UJ	1,000 UJ
2-Nitrophenol	UG/KG	R	490 U	450 UJ	440 U	410 UJ
3,3'-Dichlorobenzidine	UG/KG	720 UJ	490 U	450 U	440 U	410 UJ
3-Nitroaniline	UG/KG	1,800 UJ	1,200 UJ	1,100 U	1,100 U	1,000 UJ
4,6-Dinitro-2-methylphenol	UG/KG	R	1,200 U	1,100 UJ	1,100 U	1,000 UJ
4-Bromophenyl-phenylether	UG/KG	720 UJ	490 U	450 UJ	440 U	410 UJ
4-Chloro-3-methylphenol	UG/KG	R	490 U	450 U	440 U	410 UJ
4-Chloroaniline	UG/KG	720 UJ	490 U	450 U	440 U	410 UJ
4-Chlorophenyl-phenylether	UG/KG	720 UJ	490 U	450 U	440 U	410 UJ

Flags assigned during chemistry validation are shown

MADE BY: CRK 3/11/2002

CHKD BY: MCB 3/11/2002

Detection Limits shown are PQL

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Accepted: 2011/07/27

ATTACHMENT A
ANALYTICAL SOIL SAMPLE RESULTS
FORMER HANNA FURNACE SITE

Location ID		BH-306	BH-306	BH-307	BH-308	BH-309
Sample ID		BH-306-18-20	BH-306-24-26	BH-307-4-6	BH-308-8-10	BH-309-7-9
Matrix		Soil	Soil	Soil	Soil	Soil
Depth Interval (ft)		18.0-20.0	24.0-26.0	4.0-6.0	8.0-10.0	7.0-9.0
Date Sampled		10/11/01	10/11/01	10/15/01	10/16/01	10/16/01
Parameter	Units					
Pesticides						
alpha-BHC	UG/KG	3.5 UJ	2.5 UJ	2.3 U	2.2 U	2.1 U
alpha-Chlordane	UG/KG	8.8 UJ	2.5 UJ	2.3 U	2.2 U	2.1 U
beta-BHC	UG/KG	3.5 UJ	2.5 UJ	2.3 U	2.2 U	2.1 U
delta-BHC	UG/KG	3.5 UJ	2.5 UJ	2.3 U	2.2 U	2.1 U
Dieldrin	UG/KG	8.8 UJ	4.8 UJ	4.5 U	4.3 U	4.0 U
Endosulfan I	UG/KG	3.5 UJ	2.5 UJ	2.3 U	2.2 U	2.1 U
Endosulfan II	UG/KG	8.8 UJ	4.8 UJ	4.5 U	4.3 U	4.0 U
Endosulfan sulfate	UG/KG	8.8 UJ	4.8 UJ	4.5 U	4.3 U	4.0 U
Endrin	UG/KG	8.8 UJ	4.8 UJ	4.5 U	4.3 U	4.0 UJ
Endrin aldehyde	UG/KG	8.8 UJ	4.8 UJ	4.5 U	4.3 U	4.0 U
Endrin ketone	UG/KG	8.8 UJ	4.8 UJ	4.5 U	4.3 U	4.0 U
gamma-BHC (lindane)	UG/KG	3.5 UJ	2.5 UJ	2.3 U	2.2 U	2.1 U
gamma-Chlordane	UG/KG	3.5 UJ	2.5 UJ	2.3 U	2.2 U	2.1 U
Heptachlor	UG/KG	3.5 UJ	2.5 UJ	2.3 U	2.2 U	2.1 U
Heptachlor epoxide	UG/KG	3.5 UJ	2.5 UJ	2.3 U	2.2 U	2.1 U
Methoxychlor	UG/KG	35 UJ	25 UJ	23 U	22 U	21 U
Toxaphene	UG/KG	350 UJ	250 UJ	230 U	220 U	210 U
Polychlorinated Biphenyls						
Aroclor 1016	UG/KG	60 UJ	40 UJ	45 U	43 U	40 U
Aroclor 1221	UG/KG	140 UJ	90 UJ	91 U	88 U	81 U
Aroclor 1237	UG/KG	68 UJ	48 UJ	45 U	43 U	40 U
Aroclor 1242	UG/KG	68 UJ	48 UJ	45 U	43 U	40 U
Aroclor 1248	UG/KG	60 UJ	40 UJ	45 U	43 U	40 U
Aroclor 1254	UG/KG	68 UJ	48 UJ	45 U	43 U	40 U

Flags assigned during chemistry validation are shown

MADE BY: GEK 3/11/2002

CHECKED BY: MLD 3/11/2002

Detection Limits shown are PQL

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 Project: W1401210117M
 LOGGING: TMR AND JMT/ST/11/01

ATTACHMENT A
ANALYTICAL SOIL SAMPLE RESULTS
FORMER HANNA FURNACE SITE

Location ID		BH-305	BH-306	BH-307	BH-308	BH-309
Sample ID		BH-305-18-20	BH-306-24-26	BH-307-4-6	BH-308-8-10	BH-309-7-9
Matrix		Soil	Soil	Soil	Soil	Soil
Depth Interval (ft)		18.0-20.0	24.0-26.0	4.0-6.0	8.0-10.0	7.0-9.0
Date Sampled		10/11/01	10/11/01	10/15/01	10/16/01	10/18/01
Parameter	Units					
Polychlorinated Biphenyls						
Aroclor 1260	UGRG	88 UJ	48 UJ	45 UJ	43 UJ	40 UJ
Metals						
Aluminum	MGKG	25,400 J	9,260	13,300	9,150	8,980
Antimony	MGKG	6.6 BJ	83.1 UJ	6.5 BJ	5.5 BJ	3.6 BJ
Arsenic	MGKG	4.2 J	3.0 J	4.4 J	3.3 J	5.4 J
Barium	MGKG	267 J	54.1	118	60.0	59.8
Beryllium	MGKG	2.6 J	1.1	1.5 J	0.69	0.59 B
Cadmium	MGKG	3.9 J	14.3 UJ	13.6 UJ	0.72	0.69 UJ
Calcium	MGKG	159,000 J	78,500	46,400	89,400	26,200
Chromium	MGKG	62.2 J	28.7 UJ	13.6 J	13.2 J	13.7 J
Cobalt	MGKG	10.9 J	12.9	11.8	9.7	11.5
Copper	MGKG	40.4 J	25.3 J	46.5 J	66.2 J	39.9 J
Iron	MGKG	21,700 J	143,000	56,900	20,000	20,500
Lead	MGKG	100 J	87.4	38.8	13.5	16.7
Magnesium	MGKG	4,710 J	4,330	0.180	13,000	9,310
Manganese	MGKG	310 J	1,450	1,180	662	333
Mercury	MGKG	R	R	R	0.057 UJ	0.057 UJ
Nickel	MGKG	27.7 J	32.4 J	33.9 J	30.2 J	28.3 J
Potassium	MGKG	25,400 J	9,340	3,380	2,230	1,500
Selenium	MGKG	0.40 UJ	0.20 UJ	0.28 UJ	0.25 UJ	0.23 UJ
Silver	MGKG	2.5 J	17.2 UJ	16.2 UJ	0.78 UJ	0.95 BJ
Sodium	MGKG	1,230 J	588 B	190 B	182 B	138 B
Thallium	MGKG	2.6 J	0.64 B	0.31 B	0.26 B	0.77 B
Vanadium	MGKG	48.5 J	43.5 B	27.8	14.5	21.5

Flags assigned during chemistry validation are shown

MADE BY: GSK 3/11/2002

CHKD BY: MFB 3/11/2002

Detection Limits shown are PQL

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ATTACHMENT A **ANALYTICAL SOIL SAMPLE RESULTS** **FORMER HANNA FURNACE SITE**

Location ID		BH-305	BH-306	BH-307	BH-308	BH-309
Sample ID		BH-305-18-20	BH-306-24-26	BH-307-4-8	BH-308-8-10	BH-309-7-9
Matrix		Soil	Soil	Soil	Soil	Soil
Depth Interval (ft)		18.0-20.0	24.0-26.0	4.0-6.0	8.0-10.0	7.0-9.0
Date Sampled		10/11/01	10/11/01	10/15/01	10/16/01	10/18/01
Parameter	Units					
Metals						
Zinc	MG/KG	638 J	379	R	R	60.8
Miscellaneous Parameters						
Cyanide, Free	MG/KG	0.06 J	0.03 UJ	R	R	0.41 U
Cyanide, Total	MG/KG	R	R	R	0.4 J	0.10 U
Total Solids	%	48.6	68.1	73.8	76.5	82.8

Flags assigned during chemistry validation are shown

MADE BY: GEK 3/11/2002

KID BY: MCB 3/11/2002

Detection Limits shown are PQL

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ATTACHMENT A **ANALYTICAL SOIL SAMPLE RESULTS** **FORMER HANNA FURNACE SITE**

Location ID		MW-301	MW-301	MW-302	MW-302	MW-303
Sample ID		MW-301-SURFACE	MW-301-4-6	MW-302-SURFACE	MW-302-4-6	MW-303-7-9
Matrix		Soil	Soil	Soil	Soil	Soil
Depth Interval (ft)		0.0-0.2	4.0-6.0	0.0-0.2	4.0-6.0	7.0-9.0
Date Sampled		10/19/01	10/19/01	10/16/01	10/16/01	11/01/01
Parameter	Units					
Volatiles Organic Compounds						
1,1,1-Trichloroethane	UG/KG	10 U	39 UJ	11 U	19 UJ	NA
1,1,2,2-Tetrachloroethane	UG/KG	10 U	39 UJ	11 UJ	19 UJ	NA
1,1,2-Trichloro-1,2,2-trifluoroethane	UG/KG	10 U	39 UJ	11 U	19 UJ	NA
1,1,2-Trichloroethane	UG/KJ	10 UJ	39 UJ	11 UJ	19 UJ	NA
1,1-Dichloroethane	UG/KG	10 U	39 UJ	11 U	19 UJ	NA
1,1-Dichloroethane	UG/KJ	10 UJ	39 UJ	11 UJ	19 UJ	NA
1,2,4-Trichlorobenzene	UG/KG	10 U	39 UJ	11 UJ	19 UJ	NA
1,2-Dibromo-3-chloropropane	UG/KJ	10 UJ	39 UJ	11 UJ	19 UJ	NA
1,2-Dibromoethane (Ethylene dibromide)	UG/KG	10 U	39 UJ	11 UJ	19 UJ	NA
1,2-Dichlorobenzene	UG/KJ	10 UJ	39 UJ	11 UJ	19 UJ	NA
1,2-Dichloroethane	UG/KG	10 U	39 UJ	11 U	19 UJ	NA
1,2-Dichloroethene (cis)	UG/KG	10 U	39 UJ	11 U	19 UJ	NA
1,2-Dichloroethene (trans)	UG/KJ	10 UJ	39 UJ	11 UJ	19 UJ	NA
1,2-Dichloropropane	UG/KG	10 U	39 UJ	11 U	19 UJ	NA
1,3-Dichlorobenzene	UG/KJ	10 UJ	39 UJ	11 UJ	19 UJ	NA
1,3-Dichloropropene (cis)	UG/KJ	10 UJ	39 UJ	11 UJ	19 UJ	NA
1,3-Dichloropropene (trans)	UG/KG	10 U	39 UJ	11 U	19 UJ	NA
1,4-Dichlorobenzene	UG/KG	10 U	39 UJ	11 UJ	19 UJ	NA
2-Hexanone	UG/KG	10 U	39 UJ	11 UJ	19 UJ	NA
4-Methyl-2-pentanone	UG/KG	10 U	39 UJ	11 UJ	19 UJ	NA
Acetone	UG/KG	10 U	330 UJ	11 U	170 UJ	NA
Benzene	UG/KJ	10 UJ	39 UJ	11 UJ	19 UJ	NA
Bromodichloromethane	UG/KG	10 U	39 UJ	11 U	19 UJ	NA
Bromoform	UG/KJ	10 UJ	39 UJ	11 UJ	19 UJ	NA

Flags assigned during chemistry validation are shown

MADE BY: GSK 3/11/2002

CHKD BY: MFR 3/11/2002

Detection Limits shown are PQL

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ATTACHMENT A **ANALYTICAL SOIL SAMPLE RESULTS** **FORMER HANNA FURNACE SITE**

Location ID		MW-301	MW-301	MW-302	MW-302	MW-303
Sample ID		MW-301-SURFACE	MW-301-4-6	MW-302-SURFACE	MW-302-4-6	MW-303-7-9
Matrix		Soil	Soil	Soil	Soil	Soil
Depth Interval (ft)		0.0-0.2	4.0-6.0	0.0-0.2	4.0-6.0	7.0-9.0
Date Sampled		10/18/01	10/19/01	10/18/01	10/18/01	11/01/01
Parameter	Units					
Volatiles Organic Compounds						
Bromomethane	UG/KG	10 UJ	39 UJ	11 U	19 UJ	NA
Carbon disulfide	UG/KG	10 U	21 J	11 U	4 J	NA
Carbon tetrachloride	UG/KG	10 U	39 UJ	11 U	19 UJ	NA
Chlorobenzene	UG/KG	10 UJ	39 UJ	11 UJ	19 UJ	NA
Chloroethane	UG/KG	10 U	39 UJ	11 U	19 UJ	NA
Chloroform	UG/KG	10 UJ	39 UJ	11 U	19 UJ	NA
Chloroformethane	UG/KG	10 U	39 UJ	11 U	19 UJ	NA
Cyclohexane	UG/KG	10 UJ	39 UJ	11 U	19 UJ	NA
Dibromochloromethane	UG/KG	10 UJ	39 UJ	11 U	19 UJ	NA
Chlorodifluoromethane	UG/KG	10 UJ	39 UJ	11 U	19 UJ	NA
Ethylbenzene	UG/KG	10 UJ	39 UJ	11 UJ	19 UJ	NA
Isopropylbenzene (Cumene)	UG/KG	10 U	39 UJ	11 UJ	19 UJ	NA
m&p-Xylene	UG/KG	10 UJ	39 UJ	11 UJ	19 UJ	NA
Methyl acetate	UG/KG	10 U	39 UJ	11 UJ	19 UJ	NA
Methyl ethyl ketone (2-Butanone)	UG/KG	10 U	91 J	11 U	55 J	NA
Methyl tert-butyl ether	UG/KG	10 U	7 J	11 UJ	19 UJ	NA
Methylcyclohexane	UG/KG	10 UJ	39 UJ	11 U	19 UJ	NA
Methylene chloride	UG/KG	5 J	10 J	11 U	19 UJ	NA
o-Xylene	UG/KG	10 UJ	39 UJ	11 UJ	19 UJ	NA
Styrene	UG/KG	10 U	39 UJ	11 UJ	19 UJ	NA
Tetrachloroethene	UG/KG	10 U	39 UJ	11 UJ	19 UJ	NA
Toluene	UG/KG	10 UJ	10 J	11 UJ	19 UJ	NA
Trichloroethene	UG/KG	10 U	39 UJ	11 U	19 UJ	NA
Trichlorofluoromethane	UG/KG	10 U	39 UJ	11 U	19 UJ	NA

Flags assigned during chemistry validation are shown

MADE BY: GFK 3/11/2002

*KD BY: MEB 3/11/2002

Detection Limits shown are PQL

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ATTACHMENT A **ANALYTICAL SOIL SAMPLE RESULTS** **FORMER HANNA FURNACE SITE**

Location ID		MW-301	MW-301	MW-302	MW-302	MW-303
Sample ID		MW-301-SURFACE	MW-301-4-6	MW-302-SURFACE	MW-302-4-6	MW-303-7-9
Matrix		Soil	Soil	Soil	Soil	Soil
Depth Interval (ft)		0.0-0.2	4.0-6.0	0.0-0.2	4.0-6.0	7.0-9.0
Date Sampled		10/19/01	10/18/01	10/18/01	10/18/01	11/01/01
Parameter	Units					
Volatiles Organic Compounds						
Vinyl chloride	UG/KG	10 U	39 UJ	11 U	19 UJ	NA
Xylene (total)	UG/KG	NA	NA	NA	NA	NA
Semivolatiles Organic Compounds						
1,1'-Biphenyl	UG/KG	380 U	1,500 UJ	420 UJ	R	420 UJ
2,2'-oxybis(1-Chloropropane)	UG/KG	380 U	1,500 UJ	420 UJ	R	420 UJ
2,4,5-Trichlorophenol	UG/KG	960 U	3,700 UJ	1,100 UJ	R	1,100 UJ
2,4,6-Trichlorophenol	UG/KG	380 U	1,500 UJ	420 UJ	R	420 U
2,4-Dichlorophenol	UG/KG	380 U	1,500 UJ	420 UJ	R	420 U
2,4-Dimethylphenol	UG/KG	380 U	1,500 UJ	420 UJ	R	420 U
2,4-Dinitrophenol	UG/KG	960 U	3,700 UJ	1,100 UJ	R	1,100 UJ
2,4-Dinitrotoluene	UG/KG	380 U	1,500 UJ	420 UJ	R	420 U
2,6-Dinitrotoluene	UG/KG	380 U	1,500 UJ	420 UJ	R	420 U
2-Chloronaphthalene	UG/KG	380 U	1,500 UJ	420 UJ	R	420 U
2-Chlorophenol	UG/KG	380 U	1,500 UJ	420 UJ	R	420 U
2-Methylnaphthalene	UG/KG	380 U	1,500 UJ	420 UJ	R	420 U
2-Methylphenol (o-cresol)	UG/KG	380 U	1,500 UJ	420 UJ	R	420 U
2-Nitroaniline	UG/KG	960 U	3,700 UJ	1,100 UJ	R	1,100 UJ
2-Nitrophenol	UG/KG	380 U	1,500 UJ	420 UJ	R	420 U
3,3'-Dichlorodiphenyls	UG/KG	380 U	1,500 UJ	420 UJ	R	420 UJ
3-Nitroaniline	UG/KG	960 U	3,700 UJ	1,100 UJ	R	1,100 UJ
4,6-Dinitro-2-methylphenol	UG/KG	960 U	3,700 UJ	1,100 UJ	R	1,100 U
4-Bromophenyl-phenylsulfon	UG/KG	380 U	1,500 UJ	420 UJ	R	420 U
4-Chloro-3-methylphenol	UG/KG	380 U	1,500 UJ	420 UJ	R	420 U
4-Chloroaniline	UG/KG	380 U	1,500 UJ	420 UJ	R	420 U

Flags assigned during chemistry validation are shown

MADE BY: GEC 3/11/2002

CIRCU BY: MEB 3/11/2002

Detection Limits shown are PQL

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ATTACHMENT A **ANALYTICAL SOIL SAMPLE RESULTS** **FORMER HANNA FURNACE SITE**

Location ID		MW-301	MW-301	MW-302	MW-302	MW-303
Sample ID		MW-301-SURFACE	MW-301-4-6	MW-302-SURFACE	MW-302-4-6	MW-303-7-9
Matrix		Soil	Soil	Soil	Soil	Soil
Depth Interval (ft)		0.0-0.2	4.0-6.0	0.0-0.2	4.0-6.0	7.0-9.0
Date Sampled		10/19/01	10/19/01	10/18/01	10/18/01	11/01/01
Parameter	Units					
Semivolatiles Organic Compounds						
4-Chlorophenyl-phenylether	UG/KG	380 U	1,500 UJ	420 UJ	R	420 U
4-Methylphenol (p-cresol)	UG/KG	380 U	1,500 UJ	420 UJ	R	420 U
4-Nitroaniline	UG/KG	960 U	3,700 UJ	1,100 UJ	R	1,100 UJ
4-Nitrophenol	UG/KG	960 U	3,700 UJ	1,100 UJ	R	1,100 U
Acenaphthene	UG/KG	380 U	1,500 UJ	420 UJ	R	420 U
Acenaphthylene	UG/KG	380 U	1,500 UJ	420 UJ	R	420 U
Acetophenone	UG/KG	380 U	1,500 UJ	420 UJ	R	420 UJ
Anthracene	UG/KG	380 U	1,500 UJ	420 UJ	R	420 U
Mineral	UG/KG	380 U	1,500 UJ	420 UJ	R	420 U
benzaldehyde	UG/KG	380 U	200 J	420 UJ	R	420 UJ
Benzo(a)anthracene	UG/KG	81 J	1,500 UJ	96 J	R	420 U
Benzo(a)pyrene	UG/KG	62 J	1,500 UJ	76 J	110 J	420 UJ
Benzo(b)fluoranthene	UG/KG	140 J	1,500 UJ	160 J	R	420 UJ
Benzo(g,h,i)perylene	UG/KG	380 UJ	1,500 UJ	420 UJ	R	420 UJ
Benzo(k)fluoranthene	UG/KG	58 J	1,500 UJ	75 J	R	420 UJ
bis(2-Chloroethoxy)methane	UG/KG	380 U	1,500 UJ	420 UJ	R	420 U
bis(2-Chloroethyl)ether	UG/KG	380 U	1,500 UJ	420 UJ	R	420 UJ
bis(2-Ethylhexyl)phthalate	UG/KG	380 U	1,500 UJ	420 UJ	R	450
Butylbenzylphthalate	UG/KG	380 U	1,500 UJ	420 UJ	R	420 U
Caprolactam	UG/KG	380 U	1,500 UJ	420 UJ	R	420 U
Carbon disulfide	UG/KG	380 U	1,500 UJ	420 UJ	R	420 U
Chrysene	UG/KG	110 J	1,500 UJ	120 J	R	420 U
Dibenz(a,h)anthracene	UG/KG	380 U	1,500 UJ	420 UJ	R	420 UJ
Dibenzofuran	UG/KG	380 U	1,500 UJ	420 UJ	R	420 U

Flags assigned during chemistry validation are shown

MADE BY: GER 01/12/2002
 DUE BY: MLH 01/12/2002

Detection Limits shown are POL

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ATTACHMENT A **ANALYTICAL SOIL SAMPLE RESULTS** **FORMER HANNA FURNACE SITE**

Location ID		MW-301	MW-301	MW-302	MW-302	MW-303
Sample ID		MW-301-SURFACE	MW-301-4-6	MW-302 SURFACE	MW-302-4-6	MW-303-7-9
Matrix		Soil	Soil	Soil	Soil	Soil
Depth Interval (ft)		0.0-0.2	4.0-5.0	0.0-0.2	4.0-6.0	7.0-9.0
Date Sampled		10/19/01	10/19/01	10/18/01	10/18/01	11/01/01
Parameter	Units					
Semivolatiles Organic Compounds						
Diethylphthalate	UGKH	380 U	1,500 UJ	420 UJ	R	1,100
Dimethylphthalate	UGKG	380 U	1,500 UJ	420 UJ	R	420 U
Di-n-butylphthalate	UGKG	380 U	1,500 UJ	420 UJ	R	500
Di-n-octylphthalate	UGKC	380 U	1,500 UJ	420 UJ	R	420 UJ
Fluoranthene	UGKG	150 J	1,500 UJ	190 J	R	420 U
Fluorene	UGKC	380 U	1,500 UJ	420 UJ	R	420 U
Hexachlorobenzene	UGKG	380 U	1,500 UJ	420 UJ	R	420 U
Hexachlorobutadiene	UGKC	380 U	1,500 UJ	420 UJ	R	420 U
Hexachlorocyclopentadiene	UGKG	380 U	1,500 UJ	420 UJ	R	420 U
Hexachloroethane	UGKH	380 U	1,500 UJ	420 UJ	R	420 U
Indeno(1,2,3-cd)pyrene	UGKC	51 J	1,500 UJ	52 J	R	420 UJ
Isophorne	UGKG	380 U	1,500 UJ	420 UJ	R	420 U
Naphthalene	UGKG	380 U	1,500 UJ	420 UJ	R	420 U
Nitrobenzene	UGKH	380 U	1,500 UJ	420 UJ	R	420 U
N-Nitroso-di-n-propylamine	UGKH	380 U	1,500 UJ	420 UJ	R	420 UJ
N-Nitrosodiphenylamine	UGKC	380 U	1,500 UJ	420 UJ	R	420 U
Pentachlorophenol	UGKC	960 U	3,700 UJ	1,100 UJ	R	1,100 UJ
Phenanthrene	UGKG	75 J	1,500 UJ	110 J	R	420 U
Phenol	UGKG	380 U	1,500 UJ	420 UJ	R	420 U
Pyrene	UGKC	120 J	1,500 UJ	160 J	R	420 U
Pesticides						
4,4'-DDD	UGKC	3.8 U	15 UJ	4.2 U	7.0 UJ	4.1 U
4,4'-DDE	UGKG	3.8 U	15 UJ	4.2 U	7.0 UJ	4.1 U
4,4'-DDT	UGKC	3.8 U	15 UJ	4.2 U	7.0 UJ	4.1 U

Flags assigned during chemistry validation are shown

MADE BY: GCK 3/11/2002

CHKD BY: MLU 3/11/2002

Detection Limits shown are PQL

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ATTACHMENT A **ANALYTICAL SOIL SAMPLE RESULTS** **FORMER HANNA FURNACE SITE**

Location ID		MW-301	MW-301	MW-302	MW-302	MW-303
Sample ID		MW-301-SURFACE	MW-301-4-6	MW-302-SURFACE	MW-302-4-6	MW-303-7-9
Matrix		Soil	Soil	Soil	Soil	Soil
Depth Interval (ft)		0.0-0.2	4.0-6.0	0.0-0.2	4.0-6.0	7.0-9.0
Date Sampled		10/19/01	10/19/01	10/19/01	10/19/01	11/01/01
Parameter	Units					
Polychlorinated Biphenyls						
Aroclor 1254	UG/KG	38 U	160 UJ	42 U	70 UJ	41 U
Aroclor 1260	UG/KG	38 U	150 UJ	42 UJ	70 UJ	41 U
Metals						
Aluminum	MG/KG	4,060	6,840 J	37,000	14,600 J	5,420
Antimony	MG/KG	3.2 UJ	12.6 UJ	71.8 UJ	5.9 UJ	0.92 UJ
Arsenic	MG/KG	0.4	5.6 J	12 U	7.2 J	2.1 R
Barium	MG/KG	25.4 J	69.5 BJ	281 J	68 J J	38.5 B
Beryllium	MG/KG	0.25 BJ	0.46 RJ	6.2 J	0.84 BJ	0.36 B
Cadmium	MG/KG	0.80 J	2.2 UJ	12 J	2.0 UJ	0.53 B
Calcium	MG/KG	22,900	17,900 J	201,000	9,110 J	2,790
Chromium	MG/KG	4.1 J	7.4 J	12.8 J	21.1 J	R
Cobalt	MG/KG	4.4 BJ	8.4 RJ	2.7 BJ	19.1 J	4.5 B
Copper	MG/KG	18 J	44.4 J	12.9	33.5 J	18.4
Iron	MG/KG	9,970	8,120 J	14,300	21,900 J	10,600
Lead	MG/KG	10.6	9.3 J	12 J	16.8 J	8.5 J
Magnesium	MG/KG	1,630	2,380 J	34,000	6,060 J	2,010
Manganese	MG/KG	409	111 J	2,080	227 J	107 J
Mercury	MG/KG	0.051 J	0.21 UJ	0.060 UJ	0.087 UJ	0.083 U
Nickel	MG/KG	12.7 J	21.4 J	13.1 J	48.3 J	11.8 J
Potassium	MG/KG	612	860 BJ	3,070	2,010 J	352 B
Selenium	MG/KG	0.22 U	1.1 BJ	0.25 U	0.41 UJ	1.7 J
Silver	MG/KG	0.06 UJ	2.6 UJ	1.1 RJ	1.2 UJ	0.14 U
Sodium	MG/KG	88.2 R	252 BJ	1,260 J	756 BJ	41.1 R
Thallium	MG/KG	0.22 U	0.87 UJ	0.25 U	0.67 BJ	1.4 U

Flags assigned during chemistry validation are shown.

MADE BY: GER 1/11/2002

CHKD BY: MES 3/11/2002

Detection Limits shown are PQL

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ATTACHMENT A **ANALYTICAL SOIL SAMPLE RESULTS** **FORMER HANNA FURNACE SITE**

Location ID		MW-301	MW-301	MW-302	MW-302	MW-303
Sample ID		MW-301-SURFACE	MW-301-4-6	MW-302-SURFACE	MW-302-4-6	MW-303-7-9
Matrix		Soil	Soil	Soil	Soil	Soil
Depth Interval (ft)		0.0-0.2	4.0-6.0	0.0-0.2	4.0-6.0	7.0-9.0
Date Sampled		10/19/01	10/19/01	10/18/01	10/18/01	11/01/01
Parameter	Units					
Metals						
Vanadium	MG/KG	7.0 J	11.9 BJ	7.1 J	25.0 J	19.2
Zinc	MG/KG	R	R	R	109 J	33.7
Miscellaneous Parameters						
Cyanide, Free	MG/KG	0.45 UJ	1.5 UJ	1.7	0.80 UJ	NA
Cyanide, Total	MG/KG	R	R	R	R	0.16 UJ
Total Solids	%	R7	22.5	79.1	46.9	79.2

Flags assigned during chemistry validation are shown

MADE BY: GJK 3/11/2002

REV BY: MEB 3/11/2002

Detection Limits shown are PQL

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ATTACHMENT A
ANALYTICAL SOIL SAMPLE RESULTS
FORMER HANNA FURNACE SITE

Location ID		MW-303	MW-304	MW-304	MW-305	MW-306
Sample ID		MW-303-9-11	MW-304-2-4	MW-304-10-12	MW-305-SURFACE	MW-306-6-8
Matrix		Soil	Soil	Soil	Soil	Soil
Depth Interval (ft)		9.0-11.0	2.0-4.0	10.0-12.0	0.0-0.2	6.0-8.0
Date Sampled		11/01/01	10/11/01	10/12/01	10/16/01	10/17/01
Parameter	Units					
Volatiles Organic Compounds						
1,1,1-Trichloroethane	UG/KG	12 U	12 U	R	R	18 UJ
1,1,2,2-Tetrachloroethane	UG/KG	12 U	12 U	R	R	R
1,1,2-Trichloro-1,2,2-trichloroethane	UG/KG	12 U	12 U	R	R	R
1,1,2-Trichloroethane	UG/KG	12 U	12 U	R	R	18 UJ
1,1-Dichloroethane	UG/KG	12 U	12 U	R	R	R
1,1-Dichloroethene	UG/KG	12 U	12 U	R	R	R
1,2,4-Trichlorobenzene	UG/KG	12 U	12 U	R	R	R
1,2-Dibromo-3-chloropropane	UG/KG	12 U	12 U	R	R	R
1,2-Dibromoethane (Ethylene dibromide)	UG/KG	12 U	12 U	R	R	R
1,2-Dichlorobenzene	UG/KG	12 U	12 U	R	R	R
1,2-Dichloroethane	UG/KG	12 U	12 U	R	R	R
1,4-Dichloroethene (cis)	UG/KG	12 U	12 U	R	R	R
1,2-Dichloroethene (trans)	UG/KG	12 U	12 U	R	R	R
1,2-Dichloropropane	UG/KG	12 U	12 U	R	R	18 UJ
1,3-Dichlorobenzene	UG/KG	12 U	12 U	R	R	R
1,3-Dichloropropene (cis)	UG/KG	12 U	12 U	R	R	18 UJ
1,3-Dichloropropene (trans)	UG/KG	12 U	12 U	R	R	18 UJ
1,4-Dichlorobenzene	UG/KG	12 U	12 U	R	R	R
2-Hexanone	UG/KG	12 U	12 U	R	R	R
4-Methyl-2-pentanone	UG/KG	12 U	12 U	R	R	R
Acetone	UG/KG	13	410 UJ	R	R	R
Benzene	UG/KG	12 U	9 J	R	R	18 UJ
Bromodichloromethane	UG/KG	12 U	12 U	R	R	18 UJ
Bromoform	UG/KG	12 U	12 U	R	R	18 UJ

Flags assigned during chemistry validation are shown

MADE BY: GCK 3/11/2032

CHECKED BY: MLG 3/11/2002

Detection Limits shown are PQL

Method: Multi-Elemental Analysis
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 (1) GC/MS (2) HPLC (3) ICP-MS

**ATTACHMENT A
ANALYTICAL SOIL SAMPLE RESULTS
FORMER HANNA FURNACE SITE**

Location ID		MW-303	MW-304	MW-304	MW-305	MW-306
Sample ID		MW-303-9-11	MW-304-2-4	MW-304-10-12	MW-305-SURFACE	MW-306-6-A
Matrix		Soil	Soil	Soil	Soil	Soil
Depth Interval (ft)		9.0-11.0	2.0-4.0	10.0-12.0	0.0-0.2	6.0-8.0
Date Sampled		11/01/01	10/11/01	10/12/01	10/16/01	10/17/01
Parameter	Units					
Volatiles Organic Compounds						
Bromomethane	UG/KG	12 U	12 U	R	H	H
Carbon disulfide	UG/KG	12 U	3 J	R	R	9 J
Carbon tetrachloride	UG/KG	12 U	12 U	R	R	18 UJ
Chlorobenzene	UG/KG	12 U	12 U	R	R	R
Chloromethane	UG/KG	12 U	12 U	R	R	R
Chloroform	UG/KG	12 U	12 U	R	R	H
Chloromethane	UG/KG	12 U	12 U	R	R	R
Cyclohexane	UG/KG	12 U	12 U	R	H	18 UJ
Dibromochloromethane	UG/KG	12 U	12 U	R	R	18 UJ
Trichlorodifluoromethane	UG/KG	12 U	12 U	R	H	R
Ethylbenzene	UG/KG	12 U	12 U	R	R	H
Isopropylbenzene (Cumene)	UG/KG	12 U	12 U	R	R	31 J
m&p-Xylene	UG/KG	NA	12 U	R	R	R
Methyl acetate	UG/KG	12 U	12 U	R	R	R
Methyl ethyl ketone (2-Butanone)	UG/KG	12	93 J	R	H	51 J
Methyl tert-butyl ether	UG/KG	12 U	12 U	R	R	47 J
Methylcyclohexane	UG/KG	12 U	12 U	R	H	16 J
Methylene chloride	UG/KG	5 J	12 U	R	15 J	R
o-Xylene	UG/KG	NA	12 U	R	R	H
Styrene	UG/KG	12 U	12 U	R	R	H
Tetrachloroethene	UG/KG	12 U	12 U	R	R	R
Toluene	UG/KG	3 J	3 J	R	31 J	R
Trichloroethene	UG/KG	12 U	12 U	R	R	18 UJ
Trichlorofluoromethane	UG/KG	12 U	12 U	H	R	H

Flags assigned during chemistry validation are shown.

MADE BY: CFC 4/1/2002

CHKD BY: MCB 3/1/2002

Detection Limits shown are PQL

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ATTACHMENT A **ANALYTICAL SOIL SAMPLE RESULTS** **FORMER HANNA FURNACE SITE**

Location ID		MW-303	MW-304	MW-304	MW-305	MW-306
Sample ID		MW-303-9-11	MW-304-2-4	MW-304-10-12	MW-305-SURFACE	MW-306-6-8
Matrix		Soil	Soil	Soil	Soil	Soil
Depth Interval (ft)		9.0-11.0	2.0-4.0	10.0-12.0	0.0-0.2	6.0-8.0
Date Sampled		11/01/01	10/11/01	10/12/01	10/16/01	10/17/01
Parameter	Units					
Volatiles Organic Compounds						
Vinyl chloride	UG/KG	12 U	12 U	R	R	R
Xylene (total)	UG/KG	12 U	NA	NA	NA	NA
Semivolatiles Organic Compounds						
1,1'-Biphenyl	UG/KG	NA	490 U	38 J	490 U	170 J
2,2'-oxybis(1-Chloropropane)	UG/KG	NA	490 U	380 UJ	490 U	620 UJ
2,4,5-Trichlorophenol	UG/KG	NA	1,200 U	950 UJ	1,200 U	1,600 UJ
2,4,6-Trichlorophenol	UG/KG	NA	490 U	380 UJ	490 U	620 UJ
2,4-Dichlorophenol	UG/KG	NA	490 U	380 UJ	490 U	620 UJ
2,4-Dimethylphenol	UG/KG	NA	490 U	380 UJ	490 U	620 UJ
2,4-Dinitrophenol	UG/KG	NA	1,200 U	950 UJ	1,200 U	1,600 UJ
2,4-Dinitrotoluene	UG/KG	NA	490 U	380 UJ	490 U	620 UJ
2,6-Dinitrotoluene	UG/KG	NA	490 U	380 UJ	490 U	620 UJ
2-Chloronaphthalene	UG/KG	NA	490 U	380 UJ	490 U	620 UJ
2-Chlorophenol	UG/KG	NA	490 U	380 UJ	490 U	620 UJ
2-Methylnaphthalene	UG/KG	NA	490 U	94 J	490 U	310 J
2-Methylphenol (o-cresol)	UG/KG	NA	490 U	380 UJ	490 U	620 UJ
2-Nitroaniline	UG/KG	NA	1,200 U	950 UJ	1,200 U	1,600 UJ
2-Nitrophenol	UG/KG	NA	490 U	380 UJ	490 U	620 UJ
3,3'-Dichlorobenzidine	UG/KG	NA	490 U	R	490 U	620 UJ
3-Nitroaniline	UG/KG	NA	1,200 U	950 UJ	1,200 U	1,600 UJ
4,6-Dinitro-2-methylphenol	UG/KG	NA	1,200 U	950 UJ	1,200 U	1,600 UJ
4-Bromobiphenyl phenylether	UG/KG	NA	490 U	380 UJ	490 U	620 UJ
4-Chloro-3-methylphenol	UG/KG	NA	490 U	380 UJ	490 U	620 UJ
4-Chloroaniline	UG/KG	NA	490 U	380 UJ	490 U	620 UJ

Flags assigned during chemistry validation are shown

MADE BY: CFX 3/13/2002

CHECKED BY: MCB 3/13/2002

Detection Limits shown are PQL

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WJHY MEB 3/13/2002

Адрес: 603000 Нижегородская область, г. Нижний Новгород
ул. Горького, д. 87
Тел./факс: 8(800) 100-90-90

ATTACHMENT A **ANALYTICAL SOIL SAMPLE RESULTS** **FORMER HANNA FURNACE SITE**

Location ID		MW-303	MW-304	MW-304	MW-305	MW-306
Sample ID		MW-303-9-11	MW-304-2-4	MW-304-10-12	MW-305-SURFACE	MW-306-9-8
Matrix		Soil	Soil	Soil	Soil	Soil
Depth Interval (ft)		9.0-11.0	2.0-4.0	10.0-12.0	0.0-0.2	6.0-8.0
Date Sampled		11/01/01	10/11/01	10/12/01	10/16/01	10/17/01
Parameter	Units					
Semivolatiles Organic Compounds						
Diethylphthalate	UG/KG	NA	490 U	380 UJ	490 U	620 UJ
Dimethylphthalate	UG/KG	NA	400 U	380 UJ	490 U	620 UJ
Di-n-butylphthalate	UG/KG	NA	490 UJ	380 UJ	70 J	77 J
Di-n-octylphthalate	UG/KG	NA	490 UJ	R	490 U	3,100 UJ
Fluoranthene	UG/KG	NA	490 U	380 UJ	220 J	18,000 DJ
Fluorene	UG/KG	NA	490 U	380 UJ	490 U	1,800 J
Hexachlorobenzene	UG/KG	NA	490 U	380 UJ	490 U	620 UJ
Hexachlorocyclopentadiene	UG/KG	NA	490 U	380 UJ	490 U	620 UJ
Hexachlorocyclopentadiene	UG/KG	NA	490 U	380 UJ	490 U	620 UJ
Hexachloroethane	UG/KG	NA	490 UJ	380 UJ	490 U	620 UJ
Indeno(1,2,3-cd)pyrene	UG/KG	NA	490 UJ	R	97 J	4,800 J
Isophorone	UG/KG	NA	490 U	380 UJ	400 U	820 UJ
Naphthalene	UG/KG	NA	490 U	340 J	250 J	350 J
Nitrobenzene	UG/KG	NA	490 U	380 UJ	490 U	620 UJ
N-Nitroso-di-n-propylamine	UG/KG	NA	490 U	380 UJ	490 U	620 UJ
N-Nitrosodiphenylamine	UG/KG	NA	490 U	380 UJ	490 U	620 UJ
Pentachlorophenol	UG/KG	NA	1,200 U	950 UJ	1,200 U	1,600 UJ
Phenanthrene	UG/KG	NA	490 U	110 J	190 J	14,000 DJ
Phenol	UG/KG	NA	480 UJ	380 UJ	400 U	620 UJ
Pyrene	UG/KG	NA	400 U	100 J	270 J	21,000 DJ
Pesticides						
4,4'-DDD	UG/KG	NA	14 JN	8.8 UJ	49 U	6.2 UJ
4,4'-DDE	UG/KG	NA	4.6 UJ	3.8 UJ	58 J	6.2 UJ
4,4'-DDT	UG/KG	NA	4.8 UJ	3.8 UJ	120 J	6.2 UJ

Flags assigned during chemistry validation are shown

MADE BY: GFK 3/11/2002

CHKD BY: MFR 3/11/2002

Detection Limits shown are PQL

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ATTACHMENT A **ANALYTICAL SOIL SAMPLE RESULTS** **FORMER HANNA FURNACE SITE**

Location ID		MW-303	MW-304	MW-304	MW-305	MW-306
Sample ID		MW-303-9-11	MW-304-2-4	MW-304-10-12	MW-305 SURFACE	MW-306-6-8
Matrix		Soil	Soil	Soil	Soil	Soil
Depth Interval (ft)		9.0-11.0	2.0-4.0	10.0-12.0	0.0-0.2	8.0-8.0
Date Sampled		11/01/01	10/11/01	10/12/01	10/16/01	10/17/01
Parameter	Units					
Pesticides						
Aldrin	UG/KG	NA	2.4 UJ	1.8 UJ	25 U	3.2 UJ
alpha-BHC	UG/KG	NA	2.4 UJ	1.0 UJ	25 U	3.2 UJ
alpha-Chlordane	UG/KG	NA	2.4 UJ	1.9 UJ	25 U	3.2 UJ
beta-BHC	UG/KG	NA	2.4 UJ	1.9 UJ	25 U	3.2 UJ
delta-BHC	UG/KG	NA	2.4 UJ	1.9 UJ	25 U	3.2 UJ
Dieldrin	UG/KG	NA	R	1.8 UJ	49 U	6.2 UJ
Endosulfan I	UG/KG	NA	2.4 UJ	1.9 UJ	25 U	3.2 UJ
Endosulfan II	UG/KG	NA	4.6 UJ	3.8 UJ	49 U	6.2 UJ
Endosulfan sulfate	UG/KG	NA	4.6 UJ	3.8 UJ	49 U	6.2 UJ
drn	UG/KG	NA	4.6 UJ	3.8 UJ	49 U	6.2 UJ
Endrin aldehyde	UG/KG	NA	4.6 UJ	3.8 UJ	49 U	6.2 UJ
Endrin ketone	UG/KG	NA	4.6 UJ	3.8 UJ	49 U	6.2 UJ
gamma-BHC (Lindane)	UG/KG	NA	2.4 UJ	1.9 UJ	25 U	3.2 UJ
gamma-Chlordane	UG/KG	NA	2.4 UJ	1.9 UJ	25 U	3.2 UJ
Heptachlor	UG/KG	NA	2.4 UJ	1.9 UJ	25 U	3.2 UJ
Heptachlor epoxide	UG/KG	NA	2.4 UJ	1.9 UJ	25 U	3.2 UJ
Methoxychlor	UG/KG	NA	24 UJ	19 UJ	250 U	32 UJ
Toxaphene	UG/KG	NA	240 UJ	180 UJ	2,000 U	320 UJ
Polychlorinated Biphenyls						
Aroclor 1016	UG/KG	NA	46 UJ	38 UJ	490 U	62 UJ
Aroclor 1221	UG/KG	NA	93 UJ	77 UJ	1,000 U	120 UJ
Aroclor 1232	UG/KG	NA	46 UJ	38 UJ	490 U	62 UJ
Aroclor 1242	UG/KG	NA	46 UJ	38 UJ	490 U	62 UJ
Aroclor 1248	UG/KG	NA	46 UJ	38 UJ	490 U	62 UJ

Flags assigned during descriptive validation are shown

MADE BY: CEM 3/11/2002

REV BY: MCB 3/11/2002

Detection Limits shown are PQL

2/12/2003 07:00:02 Project: Hanna Furnace Site
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 Project Manager: MCB (M11155) - 3.0

ATTACHMENT A
ANALYTICAL SOIL SAMPLE RESULTS
FORMER HANNA FURNACE SITE

Location ID		MW-303	MW-304	MW-304	MW-305	MW-306
Sample ID		MW-303-9-11	MW-304-2-4	MW-304-10-12	MW-305-SURFACE	MW-306-6-8
Matrix		Soil	Soil	Soil	Soil	Soil
Depth interval (ft)		9.0-11.0	2.0-4.0	10.0-12.0	0.0-0.2	6.0-8.0
Date Sampled		11/01/01	10/11/01	10/12/01	10/16/01	10/17/01
Parameter	Units					
Polychlorinated Biphenyls						
Aroclor 1254	UG/KG	NA	16 UJ	38 UJ	490 U	62 UJ
Aroclor 1280	UG/KG	NA	46 UJ	38 UJ	480 U	62 UJ
Metals						
Aluminum	MG/KG	NA	8,040	R	21,000	22,100
Antimony	MG/KG	NA	74.2 UJ	61.3 UJ	802 J	108 UJ
Arsenic	MG/KG	NA	18.2 J	13.2 J	0.3 J	15.5 J
Barium	MG/KG	NA	53.3	37.6	2,020	235
Beryllium	MG/KG	NA	1.5 J	0.33 B	0.74	3.2 J
Cadmium	MG/KG	NA	12.8 U	10.2 J	17 n	31.9
Calcium	MG/KG	NA	43,500	2,390	51,400	49,300
Chromium	MG/KG	NA	25.6 UJ	942 J	52.2 J	37.3 UJ
Cobalt	MG/KG	NA	13.0	45.3	6.2 B	12.1
Copper	MG/KG	NA	45.5 J	670 J	310,000 J	336 J
Iron	MG/KG	NA	250,000	455,000	32,500	115,000
Lead	MG/KG	NA	50.5	146	12,700	688
Magnesium	MG/KG	NA	4,150	589	0,470	5,090
Manganese	MG/KG	NA	2,300	4,110	941	1,310
Mercury	MG/KG	NA	R	R	0.28	0.080 U
Nickel	MG/KG	NA	42.4 J	943 J	73.7 J	35.9 J
Potassium	MG/KG	NA	822 B	88.9 K	526 B	1,740
Selenium	MG/KG	NA	0.27 U	0.22 U	0.28 U	0.37 U
Silver	MG/KG	NA	15.3 UJ	17.1 UJ	6.9 J	22.4 UJ
Sodium	MG/KG	NA	121 B	75.6 B	287 B	270 B
Thallium	MG/KG	NA	0.73 B	0.22 U	0.20 U	0.58 B

Flags assigned during chemistry validation are shown.

MADE BY: GEX 3/11/2002

CHKD BY: MEB 3/11/2002

Detection Limits shown are PQL

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ATTACHMENT A
ANALYTICAL SOIL SAMPLE RESULTS
FORMER HANNA FURNACE SITE

Location ID		MW-303	MW-304	MW-304	MW-305	MW-306
Sample ID		MW-303-11	MW-304-2-4	MW-304-10-12	MW-306-SURFACE	MW-306-6-8
Matrix		Soil	Soil	Soil	Soil	Soil
Depth Interval (ft)		0.0-11.0	2.0-4.0	10.0-12.0	0.0-0.2	6.0-8.0
Date Sampled		11/01/01	10/11/01	10/12/01	10/16/01	10/17/01
Parameter	Units					
Metals						
Vanadium	MG/KG	NA	46.3 R	110	33.1	35.2 R
Zinc	MG/KG	NA	538	448	12,100	3,100
Miscellaneous Parameters						
Cyanide, Free	MG/KG	NA	0.52 UJ	0.50 UJ	R	0.84
Cyanide, Total	MG/KG	NA	R	R	1.7 J	8.9
Total Solids	%	83.0	72	87.4	67.9	53.4

Flags assigned during chemistry validation are shown

MADE BY: GEX 3/11/2007

KD BY: MFR 3/11/2007

Detection Limits shown are PQL

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ATTACHMENT A **ANALYTICAL SOIL SAMPLE RESULTS** **FORMER HANNA FURNACE SITE**

Location ID		TT-301B	TT-304B	TT-304R	TT-306B	TT-306B
Sample ID		TT-301-4-5	TT-304-SURFACE	TT-304-8-7	TT-306-9-11	TT-306-SURFACE
Matrix		Soil	Soil	Soil	Soil	Soil
Depth Interval (ft)		4.0-6.0	0.0-0.5	5.0-7.0	9.0-11.0	0.0-0.1
Date Sampled		10/02/01	10/02/01	10/02/01	10/02/01	10/03/01
Parameter	Units					
Volatiles Organic Compounds						
1,1,1-Trichloroethane	UG/KG	12 UJ	10 UJ	R	15 UJ	11 UJ
1,1,2,2-Tetrachloroethane	UG/KG	12 UJ	10 UJ	R	15 UJ	11 UJ
1,1,2-Trichloro-1,2,2-trifluoroethane	UG/KG	12 UJ	10 UJ	R	15 UJ	11 UJ
1,1,2-Trichloroethane	UG/KG	12 UJ	10 UJ	R	15 UJ	11 UJ
1,1-Dichloroethane	UG/KG	12 UJ	10 UJ	R	15 UJ	11 UJ
1,1-Dichloroethane	UG/KG	12 UJ	10 UJ	R	15 UJ	11 UJ
1,2,4-Trichlorobenzene	UG/KG	12 UJ	10 UJ	R	15 UJ	11 UJ
1,2-Dibromo-3-chloropropane	UG/KG	12 UJ	10 UJ	R	15 UJ	11 UJ
1,2-Dibromoethane (Ethylene dibromide)	UG/KG	12 UJ	10 UJ	R	15 UJ	11 UJ
1,2-Dichlorobenzene	UG/KG	12 UJ	10 UJ	R	15 UJ	11 UJ
1,2-Dichloromethane	UG/KG	12 UJ	10 UJ	R	15 UJ	11 UJ
1,2-Dichloroethane (cis)	UG/KG	12 UJ	10 UJ	R	15 UJ	11 UJ
1,2-Dichloroethane (trans)	UG/KG	12 UJ	10 UJ	R	15 UJ	11 UJ
1,2-Dichloropropane	UG/KG	12 UJ	10 UJ	R	15 UJ	11 UJ
1,3-Dichlorobenzene	UG/KG	12 UJ	10 UJ	R	15 UJ	11 UJ
1,3-Dichloropropene (cis)	UG/KG	12 UJ	10 UJ	R	15 UJ	11 UJ
1,3-Dichloropropene (trans)	UG/KG	12 UJ	10 UJ	R	15 UJ	11 UJ
1,4-Dichlorobenzene	UG/KG	12 UJ	10 UJ	R	15 UJ	11 UJ
2-Hexanone	UG/KG	12 UJ	10 UJ	R	15 UJ	11 UJ
4-Methyl-2-pentanone	UG/KG	12 UJ	10 UJ	R	15 UJ	11 UJ
Acetone	UG/KG	12 UJ	10 UJ	R	15 UJ	11 UJ
Benzene	UG/KG	12 UJ	10 UJ	R	15 UJ	11 UJ
Bromodichloromethane	UG/KG	12 UJ	10 UJ	R	15 UJ	11 UJ
Bromoform	UG/KG	12 UJ	10 UJ	R	15 UJ	11 UJ

Flags assigned during chemistry validation are shown.

MADE BY: GEK 3/13/2002

CHKD BY: MFB 3/13/2002

Detection Limits shown are PQL

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ATTACHMENT A
ANALYTICAL SOIL SAMPLE RESULTS
FORMER HANNA FURNACE SITE

Location ID		TT-301B	TT-304B	TT-304B	TT-305R	TT-306B
Sample ID		TT-301-4-6	TT-304-SURFACE	TT-304-5-7	TT-305-B-11	TT-306-SURFACE
Matrix		Soil	Soil	Soil	Soil	Soil
Depth Interval (ft)		4.0-6.0	0.0-0.5	5.0-7.0	9.0-11.0	0.0-0.1
Date Sampled		10/02/01	10/02/01	10/02/01	10/02/01	10/03/01
Parameter	Units					
Volatiles Organic Compounds						
Bromomethane	UG/KG	12 UJ	10 UJ	R	15 UJ	11 UJ
Carbon disulfide	UG/KG	12 UJ	10 UJ	R	15 UJ	11 UJ
Carbon tetrachloride	UG/KG	12 UJ	10 UJ	R	15 UJ	11 UJ
Chlorobenzene	UG/KG	12 UJ	10 UJ	R	15 UJ	11 UJ
Chloroethane	UG/KG	12 UJ	10 UJ	R	15 UJ	11 UJ
Chloroform	UG/KG	12 UJ	10 UJ	R	15 UJ	11 UJ
Chloromethane	UG/KG	12 UJ	10 UJ	R	15 UJ	11 UJ
Cyclohexane	UG/KG	12 UJ	10 UJ	R	15 UJ	11 UJ
Dibromochloromethane	UG/KG	12 UJ	10 UJ	R	15 UJ	11 UJ
Dichlorodifluoromethane	UG/KG	12 UJ	10 UJ	R	15 UJ	11 UJ
1,4-Dichlorobenzene	UG/KG	12 UJ	10 UJ	R	15 UJ	11 UJ
Isopropylbenzene (Cumene)	UG/KG	12 UJ	10 UJ	R	15 UJ	11 UJ
m&p-Xylene	UG/KG	12 UJ	10 UJ	R	15 UJ	11 UJ
Methyl acetate	UG/KG	12 UJ	10 UJ	R	15 UJ	11 UJ
Methyl ethyl ketone (2-Butanone)	UG/KG	12 UJ	10 UJ	R	15 UJ	11 UJ
Methyl tert-butyl ether	UG/KG	12 UJ	10 UJ	R	15 UJ	11 UJ
Methylcyclohexane	UG/KG	12 UJ	10 UJ	R	15 UJ	11 UJ
Methylene chloride	UG/KG	12 UJ	10 UJ	R	15 UJ	11 UJ
o-Xylene	UG/KG	12 UJ	10 UJ	R	15 UJ	11 UJ
Styrene	UG/KG	12 UJ	10 UJ	R	15 UJ	11 UJ
Tetrachloroethene	UG/KG	12 UJ	10 UJ	R	15 UJ	11 UJ
Toluene	UG/KG	12 UJ	10 UJ	R	15 UJ	11 UJ
Trichloroethene	UG/KG	12 UJ	10 UJ	R	15 UJ	11 UJ
Trichlorofluoromethane	UG/KG	12 UJ	10 UJ	R	15 UJ	11 UJ

Flags assigned during chemistry validation are shown.

MADE BY: CEK 3/11/2002

CHKD BY: MEB 3/11/2002

Detection Limits shown are PQI

LABORATORY ANALYST SIGNATURE
 ANALYST: JAMES J. KELLEY
 DATE: 10/11/01 (MAY 11/01) - 001

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Date: 31.07.19.06.07 PM
[S.K.G.H. 'T' AND 'M' TRIS] - 'NO'

ATTACHMENT A **ANALYTICAL SOIL SAMPLE RESULTS** **FORMER HANNA FURNACE SITE**

Location ID		TT-301B	TT-304B	TT-304B	TT-305B	TT-306B
Sample ID		TT-301-4-6	TT-304-SURFACL	TT-304-5-7	TT-305-9-11	TT-306-SURFACE
Matrix		Soil	Soil	Soil	Soil	Soil
Depth Interval (ft)		4.0-5.0	0.0-0.5	5.0-7.0	9.0-11.0	0.0-0.1
Date Sampled		10/02/01	10/02/01	10/02/01	10/02/01	10/03/01
Parameter	Units					
Semivolatiles Organic Compounds						
4-Methylphenol (p-cresol)	UG/KG	410 UJ	360 UJ	440 UJ	620 UJ	400 UJ
4-Nitroaniline	UG/KG	1,000 UJ	900 UJ	1,100 UJ	1,500 UJ	1,000 UJ
4-Nitrophenol	UG/KG	1,000 UJ	900 UJ	1,100 UJ	1,500 UJ	1,000 UJ
Acenaphthene	UG/KG	410 UJ	360 UJ	440 UJ	620 UJ	400 UJ
Acenaphthylene	UG/KG	110 UJ	360 UJ	440 UJ	620 UJ	400 UJ
Acetophenone	UG/KG	410 UJ	360 UJ	440 UJ	620 UJ	400 UJ
Anthracene	UG/KG	410 UJ	360 UJ	440 UJ	620 UJ	400 UJ
Benzo(a)anthracene	UG/KG	410 UJ	360 UJ	440 UJ	620 UJ	400 UJ
Benzo(b)fluoranthene	UG/KG	410 UJ	360 UJ	440 UJ	620 UJ	400 UJ
Benzo(k)fluoranthene	UG/KG	410 UJ	360 UJ	440 UJ	620 UJ	400 UJ
bis(2-Chloroethoxy)methane	UG/KG	410 UJ	360 UJ	440 UJ	620 UJ	400 UJ
bis(2-Chloroethyl)ether	UG/KG	410 UJ	360 UJ	440 UJ	620 UJ	400 UJ
bis(2-Ethylhexyl)phthalate	UG/KG	410 UJ	360 UJ	440 UJ	620 UJ	400 UJ
Butylbenzylphthalate	UG/KG	410 UJ	360 UJ	440 UJ	620 UJ	400 UJ
Caprolactam	UG/KG	410 UJ	360 UJ	440 UJ	620 UJ	400 UJ
Carbazole	UG/KG	410 UJ	360 UJ	440 UJ	620 UJ	400 UJ
Chrysene	UG/KG	410 UJ	360 UJ	440 UJ	620 UJ	400 UJ
Dibenz(a,h)anthracene	UG/KG	410 UJ	360 UJ	440 UJ	620 UJ	400 UJ
Dibenzofuran	UG/KG	410 UJ	360 UJ	440 UJ	620 UJ	400 UJ
Diethylphthalate	UG/KG	410 UJ	360 UJ	440 UJ	620 UJ	400 UJ

Flags assigned during chemistry validation are shown

MADE BY: GFK 3/11/2002

CHKD BY: MEB 3/11/2002

Detection Limits shown are PQL

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 Project: MHS\12-0500-104
 Location: MHS\12-0500-104

Received 24/10/2024; Accepted 24/10/2024
Published 24/10/2024

ATTACHMENT A **ANALYTICAL SOIL SAMPLE RESULTS** **FORMER HANNA FURNACE SITE**

Location ID		TT-301B	TT-304B	TT-304B	TT-305B	TT-306B
Sample ID		TT-301-4-6	TT-304-SURFACE	TT-304-5-7	TT-305-8-11	TT-306-SURFACE
Matrix		Soil	Soil	Soil	Soil	Soil
Depth Interval (ft)		4.0-6.0	0.0-0.5	5.0-7.0	9.0-11.0	0.0-0.1
Date Sampled		10/02/01	10/02/01	10/02/01	10/02/01	10/03/01
Parameter	Units					
Pesticides						
alpha-BHC	UG/KG	2.1 UJ	1.8 UJ	2.2 UJ	3.2 UJ	2.0 UJ
alpha-Chlordane	UG/KG	2.1 UJ	1.8 UJ	2.2 UJ	3.2 UJ	2.0 UJ
beta-BHC	UG/KG	2.1 UJ	1.8 UJ	2.2 UJ	3.2 UJ	2.0 UJ
delta-BHC	UG/KG	2.1 UJ	1.8 UJ	2.2 UJ	3.2 UJ	2.0 UJ
Dieldrin	UG/KG	4.0 UJ	3.6 UJ	4.3 UJ	6.1 UJ	4.0 UJ
Endosulfan I	UG/KG	2.1 UJ	1.8 UJ	2.2 UJ	3.2 UJ	2.0 UJ
Endosulfan II	UG/KG	4.0 UJ	3.6 UJ	4.3 UJ	6.1 UJ	4.0 UJ
Endosulfan sulfate	UG/KG	4.0 UJ	3.6 UJ	4.3 UJ	6.1 UJ	4.0 UJ
Endrin	UG/KG	4.0 UJ	3.6 UJ	4.3 UJ	6.1 UJ	4.0 UJ
trln aldehyde	UG/KG	4.0 UJ	3.6 UJ	4.3 UJ	6.1 UJ	4.0 UJ
Endrin ketone	UG/KG	4.0 UJ	3.6 UJ	4.3 UJ	6.1 UJ	4.0 UJ
gamma-BHC (lindane)	UG/KG	2.1 UJ	1.8 UJ	2.2 UJ	3.2 UJ	2.0 UJ
gamma-Chlordane	UG/KG	2.1 UJ	1.8 UJ	2.2 UJ	3.2 UJ	2.0 UJ
Heptachlor	UG/KG	2.1 UJ	1.8 UJ	2.2 UJ	3.2 UJ	2.0 UJ
Heptachlor epoxide	UG/KG	2.1 UJ	1.8 UJ	2.2 UJ	3.2 UJ	2.0 UJ
Methoxychlor	UG/KG	21 UJ	18 UJ	22 UJ	32 UJ	20 UJ
Toxaphene	UG/KG	210 UJ	180 UJ	220 UJ	320 UJ	200 UJ
Polychlorinated Biphenyls						
Aroclor 1016	UG/KG	40 UJ	36 UJ	43 UJ	61 UJ	40 UJ
Aroclor 1221	UG/KG	82 UJ	72 UJ	87 UJ	120 UJ	80 UJ
Aroclor 1232	UG/KG	40 UJ	36 UJ	43 UJ	61 UJ	40 UJ
Aroclor 1242	UG/KG	40 UJ	36 UJ	43 UJ	61 UJ	40 UJ
Aroclor 1246	UG/KG	40 UJ	36 UJ	43 UJ	61 UJ	40 UJ
Aroclor 1254	UG/KG	40 UJ	36 UJ	43 UJ	61 UJ	40 UJ

Flags assigned during chemistry validation are shown.

MADE BY: GCK 3/11/2002

SD BY: MEB 3/11/2002

Detection Limits shown are PQL

ATTACHMENT A **ANALYTICAL SOIL SAMPLE RESULTS** **FORMER HANNA FURNACE SITE**

Location ID		TT-301B	TT-304B	TT-304B	TT-305B	TT-305B
Sample ID		TT-301-4-6	TT-304-SURFACE	TT-304-5-7	TT-305-9-11	TT-305-SURFACE
Matrix		Soil	Soil	Soil	Soil	Soil
Depth Interval (ft)		4.0-6.0	0.0-0.5	5.0-7.0	9.0-11.0	0.0-0.1
Date Sampled		10/02/01	10/02/01	10/02/01	10/02/01	10/03/01
Parameter	Units					
Polychlorinated Biphenyls						
Aroclor 1260	UG/KG	40 UJ	36 UJ	43 UJ	61 UJ	40 UJ
Metals						
Aluminum	MG/KG	17,600	1,180	11,900	6,030	7,100
Antimony	MG/KG	16.7 U	59.7 U	75.0 UJ	5.1 U	64.4 U
Arsenic	MG/KG	4.5	0.97 B	0.4	4.4	8.7
Barium	MG/KG	109	13.5 B	131	55.3	90.1
Beryllium	MG/KG	1.8	0.20 B	2.4	0.48 B	1.8
Cadmium	MG/KG	1.2	0.88	12.9 UJ	0.80 U	11.1 U
Calcium	MG/KG	78,800	205,000	85,100	7,180	45,500
Chromium	MG/KG	19.7	5.8	18.8	7.6	221
Cobalt	MG/KG	10.1	1.6 B	8.2	8.8 B	9.4
Copper	MG/KG	21.6	20.9	38.8	17.7	542
Iron	MG/KG	21,900	10,100	147,000	6,770	157,000
Lead	MG/KG	21.9	89.8	127	11.4	562
Magnesium	MG/KG	12,800	104,000	24,300	1,990	10,800
Manganese	MG/KG	2,010	972	17,200	80.8	4,570
Mercury	MG/KG	R	R	R	R	R
Nickel	MG/KG	40.8	5.6	81.7	11.8	101
Potassium	MG/KG	2,100	282.8	2,360	1,510	1,050
Selenium	MG/KG	0.23 U	0.21 UJ	0.25 UJ	0.42 UJ	0.43 B
Silver	MG/KG	0.89 UJ	0.62 U	15.5 U	1.1 B	13.3 U
Sodium	MG/KG	445.0	233.8	762	281.0	309.8
Thallium	MG/KG	0.23 UJ	0.36 UJ	0.58 B	0.42 B	1.2
Vanadium	MG/KG	17.4	3.0 B	72.6	11.0	41.0

Flags assigned during chemistry validation are shown

MADE BY: CCK 3/1/2002

CCKD BY: MEB 3/1/2002

Detection Limits shown are PQL

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ATTACHMENT A
ANALYTICAL SOIL SAMPLE RESULTS
FORMER HANNA FURNACE SITE

Location ID		TT-301B	TT-304B	TT-304B	TT-305B	TT-306R
Sample ID		TT-301-4-6	TT-304-SURFACE	TT-304-5-7	TT-305-9-11	TT-306-SURFACE
Matrix		Soil	Soil	Soil	Soil	Soil
Depth Interval (ft)		4.0-6.0	0.0-0.6	5.0-7.0	9.0-11.0	0.0-0.1
Date Sampled		10/02/01	10/02/01	10/02/01	10/02/01	10/03/01
Parameter	Units					
Metals						
Zinc	MG/KG	97.5	120	408	44.5	1,270
Miscellaneous Parameters						
Cyanide, Free	MG/KG	R	R	1.6 J	1.1 J	0.98
Cyanide, Total	MG/KG	R	R	R	R	R
Total Solids	%	87	92.5	76.8	63.5	83.4

Flags assigned during chemistry validation are shown.

MADE BY: CFE 3/11/2002

CHKD BY: MEG 3/13/2002

Detection Limits shown are PQL

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ATTACHMENT A **ANALYTICAL SOIL SAMPLE RESULTS** **FORMER HANNA FURNACE SITE**

Location ID		TT-306B	TT-307B	TT-307B	TT-308B	TT-308B
Sample ID		TT-306-3-11	TT-307-SURFACE	TT-307 2.6-4	TT-308-SURFACE	TT-308-3-5
Matrix		Soil	Soil	Soil	Soil	Soil
Depth Interval (ft)		5.0-11.0	0.0 D-1	2.6-4.0	0.0 D-1	3.0-5.0
Date Sampled		10/03/01	10/03/01	10/03/01	10/03/01	10/03/01
Parameter	Units					
Volatiles Organic Compounds						
1,1,1-Trichloroethane	UG/KG	R	12 UJ	13 UJ	9 UJ	13 UJ
1,1,2,2-Tetrachloroethane	UG/KG	R	12 UJ	13 UJ	9 UJ	13 UJ
1,1,2-Trichloro-1,2,2-trifluoroethane	UG/KG	R	12 UJ	13 UJ	9 UJ	13 UJ
1,1,2-Trichloromethane	UG/KG	R	12 UJ	13 UJ	9 UJ	13 UJ
1,1-Dichloroethane	UG/KG	R	12 UJ	13 UJ	9 UJ	13 UJ
1,1-Dichloroethene	UG/KG	R	12 UJ	13 UJ	9 UJ	13 UJ
1,2,4-Trichlorobenzene	UG/KG	R	12 UJ	13 UJ	9 UJ	13 UJ
1,2-Dibromo-3-chloropropane	UG/KG	R	12 UJ	13 UJ	9 UJ	13 UJ
1,2-Dibromochloroethane (Ethylene dibromide)	UG/KG	R	12 UJ	13 UJ	9 UJ	13 UJ
1,2-Dichlorobenzene	UG/KG	R	12 UJ	13 UJ	9 UJ	13 UJ
1,2-Dichloromethane	UG/KG	R	12 UJ	13 UJ	9 UJ	13 UJ
1,2-Dichloroethene (cis)	UG/KG	R	12 UJ	13 UJ	9 UJ	13 UJ
1,2-Dichloroethene (trans)	UG/KG	R	12 UJ	13 UJ	9 UJ	13 UJ
1,2-Dichloropropane	UG/KG	R	12 UJ	13 UJ	9 UJ	13 UJ
1,3-Dichlorobenzene	UG/KG	R	12 UJ	13 UJ	9 UJ	13 UJ
1,3-Dichloropropene (cis)	UG/KG	R	12 UJ	13 UJ	9 UJ	13 UJ
1,3-Dichloropropene (trans)	UG/KG	R	12 UJ	13 UJ	9 UJ	13 UJ
1,4-Dichlorobenzene	UG/KG	R	12 UJ	13 UJ	9 UJ	13 UJ
2-Hexanone	UG/KG	R	12 UJ	13 UJ	9 UJ	13 UJ
4-Methyl-2-pentanone	UG/KG	R	12 UJ	13 UJ	9 UJ	13 UJ
Acetone	UG/KG	R	12 UJ	13 UJ	9 UJ	13 UJ
Benzene	UG/KG	R	12 UJ	13 UJ	9 UJ	13 UJ
Bromochloromethane	UG/KG	R	12 UJ	13 UJ	9 UJ	13 UJ
Bromoform	UG/KG	R	12 UJ	13 UJ	9 UJ	13 UJ

Flags assigned during chemistry validation are shown

MADE BY: GEL 3/11/2002

CHKD BY: MEB 3/11/2002

Detection Limits shown are PQL

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ATTACHMENT A
ANALYTICAL SOIL SAMPLE RESULTS
FORMER HANNA FURNACE SITE

Location ID		TT-306B	TT-307B	TT-307B	TT-308B	TT-308B
Sample ID		TT-306-S-11	TT-307-SURFACE	TT-307-2.5-4	TT-308-SURFACE	TT-308-3-6
Matrix		Soil	Soil	Soil	Soil	Soil
Depth Interval (ft)		9.0-11.0	0.0-0.1	2.5-4.0	0.0-0.1	3.0-6.0
Date Sampled		10/03/01	10/03/01	10/03/01	10/03/01	10/03/01
Parameter	Units					
Volatiles Organic Compounds						
Vinyl chloride	UG/KG	R	12 UJ	13 UJ	9 UJ	13 UJ
SemiVolatiles Organic Compounds						
1,1'-Biphenyl	UG/KG	350 UJ	420 UJ	430 UJ	370 UJ	470 UJ
2,2'-oxybis(1-Chloropropane)	UG/KG	390 UJ	420 UJ	430 UJ	370 UJ	470 UJ
2,4,5-Trichlorophenol	UG/KG	970 UJ	1,000 UJ	1,100 UJ	940 UJ	1,200 UJ
2,4,6-Trichlorophenol	UG/KG	390 UJ	420 UJ	430 UJ	370 UJ	470 UJ
2,4-Dichlorophenol	UG/KG	390 UJ	420 UJ	430 UJ	370 UJ	470 UJ
2,4-Dimethylphenol	UG/KG	390 UJ	420 UJ	430 UJ	370 UJ	470 UJ
2,4-Dinitrophenol	UG/KG	970 UJ	1,000 UJ	1,100 UJ	940 UJ	1,200 UJ
2,4-Dinitrotoluene	UG/KG	390 UJ	420 UJ	430 UJ	370 UJ	470 UJ
2,6-Dinitrotoluene	UG/KG	390 UJ	420 UJ	430 UJ	370 UJ	470 UJ
2-Chlorophenyltoluene	UG/KG	390 UJ	420 UJ	430 UJ	370 UJ	470 UJ
2-Chlorophenol	UG/KG	390 UJ	420 UJ	430 UJ	370 UJ	470 UJ
2-Methylnaphthalene	UG/KG	390 UJ	420 UJ	430 UJ	370 UJ	470 UJ
2-Methylphenol (o-cresol)	UG/KG	390 UJ	420 UJ	430 UJ	370 UJ	470 UJ
2-Nitroaniline	UG/KG	970 UJ	1,000 UJ	1,100 UJ	940 UJ	1,200 UJ
2-Nitrophenol	UG/KG	390 UJ	420 UJ	430 UJ	370 UJ	470 UJ
3,3'-Dichlorobenzidine	UG/KG	390 UJ	420 UJ	430 UJ	370 UJ	470 UJ
3-Nitroaniline	UG/KG	970 UJ	1,000 UJ	1,100 UJ	940 UJ	1,200 UJ
4,6-Dinitro-2-methylphenol	UG/KG	970 UJ	1,000 UJ	1,100 UJ	940 UJ	1,200 UJ
4-Bromophenyl-phenylether	UG/KG	390 UJ	420 UJ	430 UJ	370 UJ	470 UJ
4-Chloro-3-methylphenol	UG/KG	390 UJ	420 UJ	430 UJ	370 UJ	470 UJ
4-Chloroaniline	UG/KG	390 UJ	420 UJ	430 UJ	370 UJ	470 UJ
4-Chlorophenyl-phenylether	UG/KG	390 UJ	420 UJ	430 UJ	370 UJ	470 UJ

Flags assigned during chemistry validation are shown

MADE BY: GSK 3/11/2002
 CHECKED BY: MEB 3/11/2002

Detection Limits shown are PQL

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ATTACHMENT A **ANALYTICAL SOIL SAMPLE RESULTS** **FORMER HANNA FURNACE SITE**

Location ID		TT-306B	TT-307B	TT-307B	TT-308B	TT-308B
Sample ID		TT-306B-11	TT-307B-SURFACE	TT-307B-2,5-4	TT-308B-SURFACE	TT-308B-3,6
Matrix		Soil	Soil	Soil	Soil	Soil
Depth Interval (ft)		9.0-11.0	0.0-0.1	2.5-4.0	0.0-0.1	3.0-5.0
Date Sampled		10/03/01	10/03/01	10/03/01	10/03/01	10/03/01
Parameter	Units					
Semivolatile Organic Compounds						
Dimethylphthalate	UG/KG	390 UJ	420 UJ	430 UJ	370 UJ	470 UJ
Di-n-butylphthalate	UG/KG	300 UJ	420 UJ	430 UJ	370 UJ	470 UJ
Di-n-octylphthalate	UG/KG	390 UJ	R	430 UJ	370 UJ	130 J
Fluoranthene	UG/KG	390 UJ	84 J	84 J	52 J	140 J
Fluorene	UG/KG	390 UJ	420 UJ	430 UJ	370 UJ	470 UJ
Hexachlorobenzene	UG/KG	390 UJ	420 UJ	430 UJ	370 UJ	470 UJ
Hexachlorobutadiene	UG/KG	300 UJ	420 UJ	430 UJ	370 UJ	470 UJ
Hexachlorocyclopentadiene	UG/KG	390 UJ	420 UJ	430 UJ	370 UJ	470 UJ
Hexachloroethane	UG/KG	390 UJ	420 UJ	430 UJ	370 UJ	470 UJ
Indeno(1,2,3-cd)pyrene	UG/KG	390 UJ	230 J	430 UJ	53 J	61 J
Isophorone	UG/KG	390 UJ	420 UJ	430 UJ	370 UJ	470 UJ
Naphthalene	UG/KG	390 UJ	95 J	52 J	370 UJ	470 UJ
Nitrobenzene	UG/KG	390 UJ	120 UJ	430 UJ	370 UJ	470 UJ
N-Nitroso-di-n-propylamine	UG/KG	300 UJ	420 UJ	430 UJ	370 UJ	470 UJ
N-Nitrosodiphenylamine	UG/KG	390 UJ	420 UJ	430 UJ	370 UJ	470 UJ
Pentachlorophenol	UG/KG	970 UJ	1,000 UJ	1,100 UJ	940 UJ	1,200 UJ
Phenanthrene	UG/KG	390 UJ	180 J	120 J	370 UJ	94 J
Phenol	UG/KG	390 UJ	420 UJ	430 UJ	370 UJ	470 UJ
Pyrene	UG/KG	390 UJ	170 J	90 J	56 J	140 J
Pesticides						
4,4'-DDD	UG/KG	3.8 UJ	8.2 UJ	4.3 UJ	3.7 UJ	4.6 UJ
4,4'-DDE	UG/KG	3.8 UJ	8.2 UJ	4.3 UJ	3.7 UJ	4.6 UJ
4,4'-DDE	UG/KG	3.8 UJ	8.2 UJ	4.3 UJ	3.7 UJ	4.6 UJ
Aldrin	UG/KG	2.0 UJ	4.2 UJ	2.2 UJ	1.8 UJ	2.4 UJ

Flags assigned during chemistry validation are shown

MADE BY: GSK 3/11/2002

LHKD BY: MFR 3/11/2002

Detection Limits shown are PQL

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ATTACHMENT A
ANALYTICAL SOIL SAMPLE RESULTS
FORMER HANNA FURNACE SITE

Location ID		TT-306B	TT-307B	TT-307B	TT-308B	TT-308B
Sample ID		TT-306-B-11	TT-307-SURFACE	TT-307-2.5-4	TT-308 SURFACE	TT-308-3-4
Matrix		Soil	Soil	Soil	Soil	Soil
Depth Interval (ft)		0.0-11.0	0.0-0.1	2.5-4.0	0.0-0.1	3.0-5.0
Date Sampled		10/03/01	10/03/01	10/03/01	10/03/01	10/03/01
Parameter	Units					
Polychlorinated Biphenyls						
Aroclor 1260	UG/KG	38 UJ	82 UJ	43 UJ	37 UJ	46 UJ
Metals						
Aluminum	MG/KG	5,880	20,800	24,400	2,870	2,310
Antimony	MG/KG	3.1 U	68.9 U	72.7 U	3.2 U	5.5 BJ
Arsenic	MG/KG	2.8	10.9	9.2	0.97 B	5.7
Barium	MG/KG	40.6	183	180	149	36.6
Beryllium	MG/KG	0.43 B	3.8	3.5	0.80	0.39 B
Cadmium	MG/KG	0.53 U	13.3	1.6	0.79	1.3
Calcium	MG/KG	1,670	110,000	69,900	19,200	5,680
Chromium	MG/KG	8.8	18.4	8.5	10.9	4.2
Cobalt	MG/KG	6.3	6.5	4.0 B	36.5	3.1 B
Copper	MG/KG	20.6	41.1	51.5	33.2	19.7
Iron	MG/KG	8,270	80,100	34,200	33,400	31,900
Lead	MG/KG	8.5	898	52.6	50.8	52.0
Magnesium	MG/KG	2,150	6,410	8,970	6,600	1,510
Manganese	MG/KG	88.6	1,090	1,110	43,900	462
Mercury	MG/KG	R	R	R	R	R
Nickel	MG/KG	16.9	10.3	13.3	201	9.2
Potassium	MG/KG	440 B	2,200	2,160	580	340 B
Selenium	MG/KG	0.22 UJ	0.58 UJ	0.64 UJ	0.21 UJ	0.24 UJ
Silver	MG/KG	0.63 U	14.3 U	0.06 B	4.7	0.73 U
Sodium	MG/KG	83.9 B	487 B	382 B	155 B	114 B
Thallium	MG/KG	0.22 U	0.23 U	0.64 B	0.27 B	0.43 B
Vanadium	MG/KG	15.7	87.8	12.8	8.2	11.8

Flags assigned during chemistry validation are shown.

MADE BY: GCK 3/11/2002

CHKD BY: MEB 3/11/2002

Detection Limits shown are PQL

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ATTACHMENT A
ANALYTICAL SOIL SAMPLE RESULTS
FORMER HANNA FURNACE SITE

Location ID		TT-306B	TT-307B	TT-307B	TT-308B	TT-308B
Sample ID		TT-306-S-14	TT-307-SURFACE	TT-307-2.5-4	TT-308-SURFACE	TT-308-3-5
Matrix		Soil	Soil	Soil	Soil	Soil
Depth Interval (ft)		9.0-11.0	0.0-0.1	2.5-4.0	0.0-0.1	3.0-5.0
Date Sampled		10/03/01	10/03/01	10/03/01	10/03/01	10/03/01
Parameter	Units					
Metals						
Zinc	MG/KG	47.6	352	112	129	228
Miscellaneous Parameters						
Cyanide, Free	MG/KG	R	0.81	0.75 U	0.43 U	0.40 U
Cyanide, Total	MG/KG	R	R	R	R	R
Total Solids	%	86.5	80.2	76.7	88.5	71.5

Flags assigned during chemistry validation are shown.

MADE BY: GFK 3/11/2007
 CHKD BY: MCB 3/11/2007

Detection Limits shown are POL.

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ATTACHMENT A
ANALYTICAL SOIL SAMPLE RESULTS
FORMER HANNA FURNACE SITE

Location ID		TT-309B	TT-309B	TT-310B	TT-311B	TT-312B
Sample ID		TT-309-SURFACE	TT-309-8-11	TT-310-10-12	TT-311-3-4	TT-312-6-7
Matrix		Soil	Soil	Soil	Soil	Soil
Depth Interval (ft)		0.0-0.1	9.0-11.0	10.0-12.0	3.0-4.0	6.0-7.0
Date Sampled		10/03/01	10/03/01	10/03/01	10/03/01	10/03/01
Parameter	Units					
Volatiles Organic Compounds						
1,1,1-Trichloroethane	UG/KG	R	11 UJ	R	18 UJ	NA
1,1,2,2-Tetrachloroethane	UG/KG	R	11 UJ	R	18 UJ	NA
1,1,2-Trichloro-1,2,2-trifluoroethane	UG/KG	R	11 UJ	R	18 UJ	NA
1,1,2-Trichloroethane	UG/KG	R	11 UJ	R	18 UJ	NA
1,1-Dichloromethane	UG/KG	R	11 UJ	R	18 UJ	NA
1,1-Dichloroethene	UG/KG	R	11 UJ	R	18 UJ	NA
1,2,4-Trichlorobenzene	UG/KG	R	11 UJ	R	18 UJ	NA
1,2-Dibromo-3-chloropropane	UG/KG	R	11 UJ	R	18 UJ	NA
1,2-Dibromoethane (Ethylene dibromide)	UG/KG	R	11 UJ	R	18 UJ	NA
1,2-Dichlorobenzene	UG/KG	R	11 UJ	R	18 UJ	NA
1,2-Dichloroethene	UG/KG	R	11 UJ	R	18 UJ	NA
1,2-Dichloroethene (cis)	UG/KG	R	11 UJ	R	18 UJ	NA
1,2-Dichloroethene (trans)	UG/KG	R	11 UJ	R	18 UJ	NA
1,2-Dichloropropane	UG/KG	R	11 UJ	R	18 UJ	NA
1,3-Dichlorobenzene	UG/KG	R	11 UJ	R	18 UJ	NA
1,3-Dichloropropene (cis)	UG/KG	R	11 UJ	R	18 UJ	NA
1,3-Dichloropropene (trans)	UG/KG	R	11 UJ	R	18 UJ	NA
1,4-Dichlorobenzene	UG/KG	R	11 UJ	R	18 UJ	NA
2-Hexanone	UG/KG	R	11 UJ	R	18 UJ	NA
4-Methyl-2-pentanone	UG/KG	R	11 UJ	R	18 UJ	NA
Acetone	UG/KG	R	11 UJ	R	18 UJ	NA
Benzene	UG/KG	R	11 UJ	R	18 UJ	NA
Bromodichloromethane	UG/KG	R	11 UJ	R	18 UJ	NA
Bromoform	UG/KG	R	11 UJ	R	18 UJ	NA

Flags assigned during chemistry validation are shown

MAQC BY: GER 3/11/2002

CHKD BY: MFR 3/11/2002

Detection Limits shown are PQL

ATTACHMENT A
ANALYTICAL SOIL SAMPLE RESULTS
FORMER HANNA FURNACE SITE

Location ID		TT-309D	TT-309B	TT-310B	TT-311H	TT-312B
Sample ID		TT-309-SURFACE	TT-309-9-11	TT-310-10-12	TT-311-3-4	TT-312-6-7
Matrix		Soil	Soil	Soil	Soil	Soil
Depth Interval (ft)		0.0-0.1	9.0-11.0	10.0-12.0	3.0-4.0	6.0-7.0
Date Sampled		10/03/01	10/03/01	10/03/01	10/03/01	10/03/01
Parameter	Units					
Volatiles Organic Compounds						
Bromomethane	UG/KG	R	11 UJ	R	18 UJ	NA
Carbon disulfide	UG/KG	R	11 UJ	R	18 UJ	NA
Carbon tetrachloride	UG/KG	R	11 UJ	R	18 UJ	NA
Chlorobenzene	UG/KG	R	11 UJ	R	18 UJ	NA
Chloroethane	UG/KG	R	11 UJ	R	18 UJ	NA
Chloroform	UG/KG	R	11 UJ	R	18 UJ	NA
Chloromethane	UG/KG	R	11 UJ	R	18 UJ	NA
Cyclohexane	UG/KG	R	11 UJ	R	18 UJ	NA
Dibromochloromethane	UG/KG	R	11 UJ	R	18 UJ	NA
Dichlorodifluoromethane	UG/KG	R	11 UJ	R	18 UJ	NA
o-Xylenzene	UG/KG	R	11 UJ	R	18 UJ	NA
Isopropylbenzene (Cumene)	UG/KG	R	11 UJ	R	18 UJ	NA
m&p-Xylene	UG/KG	R	11 UJ	R	18 UJ	NA
Methyl acetate	UG/KG	R	11 UJ	R	18 UJ	NA
Methyl ethyl ketone (2-Butanone)	UG/KG	R	11 UJ	R	18 UJ	NA
Methyl tert-butyl ether	UG/KG	R	11 UJ	R	18 UJ	NA
Methylcyclohexane	UG/KG	R	11 UJ	R	18 UJ	NA
Methylene chloride	UG/KG	R	11 UJ	R	18 UJ	NA
o-Xylene	UG/KG	R	11 UJ	R	18 UJ	NA
Styrene	UG/KG	R	11 UJ	R	18 UJ	NA
Tetrachloroethene	UG/KG	R	11 UJ	R	18 UJ	NA
Toluene	UG/KG	R	11 UJ	R	18 UJ	NA
Trichloroethene	UG/KG	R	11 UJ	R	18 UJ	NA
Trichlorofluoromethane	UG/KG	R	11 UJ	R	18 UJ	NA

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MADE BY: CEK 3/11/2002

CHKD BY: NED 3/11/2002

Detection Limits shown are PQL

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ATTACHMENT A **ANALYTICAL SOIL SAMPLE RESULTS** **FORMER HANNA FURNACE SITE**

Location ID		TT-309B	TT-309B	TT-310B	TT-311B	TT-312B
Sample ID		TT-309-SURFACE	TT-309-9-11	TT-310-10-12	TT-311-3-4	TT-312-6-7
Matrix		Soil	Soil	Soil	Soil	Soil
Depth Interval (ft)		0.0-0.1	9.0-11.0	10.0-12.0	3.0-4.0	6.0-7.0
Date Sampled		10/03/01	10/03/01	10/03/01	10/03/01	10/03/01
Parameter	Units					
Semivolatile Organic Compounds						
4-Methylphenol (p-cresol)	MG/KG	1,100 UJ	400 UJ	440 UJ	R	2,000 UJ
4-Nitroaniline	UG/KG	2,000 UJ	1,000 UJ	1,100 UJ	1,500 UJ	5,000 UJ
4-Nitrophenol	MG/KG	2,000 UJ	1,000 UJ	1,100 UJ	R	5,000 UJ
Acenaphthene	UG/KG	340 J	400 UJ	440 UJ	600 UJ	1,000 J
Acenaphthylene	UG/KG	1,100 UJ	400 UJ	440 UJ	600 UJ	2,000 UJ
Acetophenone	UG/KG	1,100 UJ	400 UJ	440 UJ	600 UJ	2,000 UJ
Anthracene	JG/KG	290 J	400 UJ	440 UJ	600 UJ	620 J
Atrazine	UG/KG	1,100 UJ	400 UJ	440 UJ	600 UJ	2,000 UJ
Benzaldehyde	UG/KG	1,100 UJ	400 UJ	440 UJ	600 UJ	2,000 UJ
Benzo(a)anthracene	UG/KG	2,000 J	400 UJ	440 UJ	600 UJ	2,000 UJ
Benzo(a)pyrene	JG/KG	3,200 J	400 UJ	61 J	600 UJ	2,000 UJ
Benzo(b)fluoranthene	UG/KG	6,500 J	400 UJ	440 UJ	600 UJ	2,000 UJ
Benzo(g,h,i)perylene	UG/KG	930 J	400 UJ	440 UJ	600 UJ	2,000 UJ
Benzo(k)fluoranthene	UG/KG	2,300 J	400 UJ	440 UJ	600 UJ	2,000 UJ
bis(2-Chloroethoxy) methane	UG/KG	1,100 UJ	400 UJ	440 UJ	600 UJ	2,000 UJ
bis(2-Chloroethyl) ether	UG/KG	1,100 UJ	400 UJ	440 UJ	600 UJ	2,000 UJ
bis(2-Ethylhexyl)phthalate	UG/KG	1,100 UJ	550 UJ	550 UJ	910 UJ	2,000 UJ
Butylbenzylphthalate	UG/KG	1,100 UJ	400 UJ	440 UJ	600 UJ	2,000 UJ
Caprolactam	UG/KG	1,100 UJ	400 UJ	440 UJ	600 UJ	2,000 UJ
Carbazole	UG/KG	160 J	400 UJ	440 UJ	600 UJ	2,000 UJ
Chrysene	UG/KG	3,000 J	400 UJ	440 UJ	600 UJ	2,000 UJ
Dibenz(a,h)anthracene	UG/KG	620 J	400 UJ	440 UJ	600 UJ	2,000 UJ
Dibenzofuran	UG/KG	1,100 UJ	400 UJ	440 UJ	600 UJ	2,000 UJ
Diethylphthalate	UG/KG	1,100 UJ	400 UJ	440 UJ	600 UJ	2,000 UJ

Flags assigned during chemistry validation are shown

MADE BY: GSK 3/11/2001

CHKD BY: MFR 3/11/2002

Detection Limits shown are PQL

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 Period: 3/11/02 12:05:42 PM
 Location: TT-311B (MAY 1992) = 1552

ATTACHMENT A
ANALYTICAL SOIL SAMPLE RESULTS
FORMER HANNA FURNACE SITE

Location ID		TT-309B	TT-309B	TT-310B	TT-311B	TT-312B
Sample ID		TT-309-SURFACE	TT-309-9-11	TT-310-10-12	TT-311-3-4	TT-312-6-7
Matrix		Soil	Soil	Soil	Soil	Soil
Depth Interval (ft)		0.0-0.1	9.0-11.0	10.0-12.0	3.0-4.0	6.0-7.0
Date Sampled		10/03/01	10/03/01	10/03/01	10/03/01	10/03/01
Parameter	Units					
Semivolatiles Organic Compounds						
Dimethylphthalate	UG/KG	1,100 UJ	400 UJ	440 UJ	600 UJ	2,000 UJ
Di-n-butylphthalate	UG/KG	1,100 UJ	400 UJ	440 UJ	600 UJ	2,000 UJ
Di-n-octylphthalate	UG/KG	1,100 UJ	400 UJ	440 UJ	150 J	2,000 UJ
Fluoranthene	UG/KG	2,800 J	400 UJ	440 UJ	600 UJ	440 J
Fluorene	UG/KG	1,100 UJ	400 UJ	440 UJ	600 UJ	2,200 J
Hexachlorobenzene	UG/KG	1,100 UJ	400 UJ	440 UJ	600 UJ	2,000 UJ
Hexachlorobutadiene	UG/KG	1,100 UJ	400 UJ	440 UJ	600 UJ	2,000 UJ
Hexachlorocyclopentadiene	UG/KG	1,100 UJ	400 UJ	440 UJ	600 UJ	2,000 UJ
Hexachloroethane	UG/KG	1,100 UJ	400 UJ	440 UJ	600 UJ	2,000 UJ
Indeno(1,2,3-cd)pyrene	UG/KG	1,600 J	400 UJ	440 UJ	600 UJ	2,000 UJ
Isochloro	UG/KG	1,100 UJ	400 UJ	440 UJ	600 UJ	2,000 UJ
Naphthalene	UG/KG	150 J	400 UJ	440 UJ	600 UJ	2,000 UJ
Nitrobenzene	UG/KG	1,100 UJ	400 UJ	440 UJ	600 UJ	2,000 UJ
N-Nitroso-di-n-propylamine	UG/KG	1,100 UJ	400 UJ	440 UJ	600 UJ	2,000 UJ
N-Nitrosodiphenylamine	UG/KG	1,100 UJ	400 UJ	440 UJ	600 UJ	2,000 UJ
Pentachlorobenzol	UG/KG	2,800 UJ	1,000 UJ	1,100 UJ	R	5,000 UJ
Phenanthrene	UG/KG	530 J	400 UJ	440 UJ	600 UJ	3,300 J
Phenol	UG/KG	1,100 UJ	400 UJ	440 UJ	R	2,000 UJ
Pyrene	UG/KG	4,100 J	400 UJ	440 UJ	600 UJ	690 J
Pesticides						
4,4'-DDD	UG/KG	3.6 UJ	4.0 UJ	4.4 UJ	5.9 UJ	R
4,4'-DDE	UG/KG	3.6 UJ	4.0 UJ	4.4 UJ	5.9 UJ	R
4,4'-DDT	UG/KG	3.6 UJ	4.0 UJ	4.4 UJ	5.9 UJ	R
Aldrin	UG/KG	1.9 UJ	2.0 UJ	2.3 UJ	3.0 UJ	R

Flags assigned during chemistry validation are shown.

MADE BY: GSK 3/11/2002

CHKD BY: MFB 3/11/2002

Detection Limits shown are PQL

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 Page: 10 of 10
 10/03/01 10:00:00 AM

ATTACHMENT A
ANALYTICAL SOIL SAMPLE RESULTS
FORMER HANNA FURNACE SITE

Location ID		TT-309B	TT-309B-11	TT-310B	TT-311B	TT-312B
Sample ID		TT-309-SURFACE	TT-309-B-11	TT-310-B-12	TT-311-3-4	TT-312-B-7
Matrix		Soil	Soil	Soil	Soil	Soil
Depth Interval (ft)		0.0-0.1	8.0-11.0	10.0-12.0	3.0-4.0	6.0-7.0
Date Sampled		10/03/01	10/03/01	10/03/01	10/03/01	10/03/01
Parameter	Units					
Pesticides						
alpha-BHC	UG/KG	1.9 UJ	2.0 UJ	2.3 UJ	3.0 UJ	R
alpha-Chlordane	UG/KG	1.9 UJ	2.0 UJ	2.3 UJ	3.0 UJ	R
beta-BHC	UG/KG	1.9 UJ	2.0 UJ	2.3 UJ	3.0 UJ	R
delta-BHC	UG/KG	1.9 UJ	2.0 UJ	2.3 UJ	3.0 UJ	R
Dieldrin	UG/KG	3.0 UJ	4.0 UJ	4.4 UJ	5.9 UJ	R
Endosulfan I	UG/KG	1.9 UJ	2.0 UJ	2.3 UJ	3.0 UJ	R
Endosulfan II	UG/KG	3.6 UJ	4.0 UJ	4.4 UJ	5.9 UJ	R
Endosulfan sulfate	UG/KG	3.6 UJ	4.0 UJ	4.4 UJ	5.9 UJ	R
Endrin	UG/KG	3.6 UJ	4.0 UJ	4.4 UJ	5.9 UJ	R
Endrin aldehyde	UG/KG	3.6 UJ	4.0 UJ	4.4 UJ	5.9 UJ	R
Endrin ketone	UG/KG	3.6 UJ	4.0 UJ	4.4 UJ	5.9 UJ	R
gamma-BHC (Lindane)	UG/KG	1.9 UJ	2.0 UJ	2.3 UJ	3.0 UJ	R
gamma-Chlordane	UG/KG	1.9 UJ	2.0 UJ	2.3 UJ	3.0 UJ	R
Heptachlor	UG/KG	1.9 UJ	2.0 UJ	2.3 UJ	3.0 UJ	R
Heptachlor epoxide	UG/KG	1.9 UJ	2.0 UJ	2.3 UJ	3.0 UJ	R
Methoxychlor	UG/KG	10 UJ	20 UJ	23 UJ	41 UJ	R
Toxaphene	UG/KG	190 UJ	200 UJ	230 UJ	300 UJ	R
Polychlorinated Biphenyls						
Aroclor 1218	UG/KG	36 UJ	40 UJ	44 UJ	59 UJ	R
Aroclor 1221	UG/KG	74 UJ	81 UJ	89 UJ	120 UJ	R
Aroclor 1232	UG/KG	36 UJ	40 UJ	44 UJ	59 UJ	R
Aroclor 1242	UG/KG	30 UJ	40 UJ	44 UJ	59 UJ	R
Aroclor 1248	UG/KG	36 UJ	40 UJ	44 UJ	59 UJ	R
Aroclor 1254	UG/KG	36 UJ	40 UJ	44 UJ	59 UJ	R

Flags assigned during chemistry validation are shown:

MADE BY GEEK 3/11/2000

'KD BY MFR 311500Z

Detection Limits shown are PQL

ATTACHMENT A **ANALYTICAL SOIL SAMPLE RESULTS** **FORMER HANNA FURNACE SITE**

Location ID		TT-309B	TT-309B	TY-310B	TT-311B	TT-312B
Sample ID		TT-309-SURFACE	TT-309-B-11	TT-310-10-12	TT-311-3-4	TT-312-6-7
Matrix		Soil	Soil	Soil	Soil	Soil
Depth Interval (ft)		0.0-0.1	8.0-11.0	10.0-12.0	3.0-4.0	6.0-7.0
Date Sampled		10/03/01	10/03/01	10/03/01	10/03/01	10/03/01
Parameter	Units					
Polychlorinated Biphenyls						
Aroclor 1260	UG/KG	35 UJ	40 UJ	44 UJ	59 UJ	R
Metals						
Aluminum	MG/KG	20,700	4,370	2,470	28,800	40,800
Antimony	MG/KG	58.3 U	3.4 HJ	3.6 U	91.5 U	82.8 U
Arsenic	MG/KG	7.6	2.2	1.2	12.3	5.7 H
Barium	MG/KG	182	21.4 B	18.8 B	226	245
Beryllium	MG/KG	4.4	0.38 B	0.21 B	4.4	6.1
Cadmium	MG/KG	1.4	0.54 U	0.62 U	1.1	0.71 U
Calcium	MG/KG	166,000	2,290	1,760	135,000	197,000
Chromium	MG/KG	10.4	4.7	2.3 J	15.6	4.1
Cobalt	MG/KG	2.8 B	3.3 B	1.1 B	5.1 B	2.5 B
Copper	MG/KG	31.6	10.0	3.7	24.8	11.8
Iron	MG/KG	28,200	5,600	2,250	62,200	11,400
Lead	MG/KG	64.8	4.9	3.0	37.7	0.30 B
Magnesium	MG/KG	28,100	1,470	485 B	12,100	13,000
Manganese	MG/KG	2,230	88.8	19.4	1,670	1,430
Mercury	MG/KG	R	R	R	R	R
Nickel	MG/KG	15.6	10.7	2.6 B	20.6	0.1
Potassium	MG/KG	1,430	464 B	131 B	1,640	3,130
Selenium	MG/KG	0.22 U	0.22 U	0.24 U	0.35 U	0.72 UJ
Silver	MG/KG	0.78 B	0.85 U	0.75 U	0.95 U	0.86 U
Sodium	MG/KG	1,270	98.9 B	115 B	561 B	847
Thallium	MG/KG	0.22 U	0.22 U	0.24 U	0.35 U	0.29 U
Vanadium	MG/KG	7.3	8.8	13.0	25.6	9.8

Flags assigned during chemistry validation are shown

MADE BY: GEK 3/11/2002

CHKD BY: MFR 3/11/2002

Detection Limits shown are PQL

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ATTACHMENT A **ANALYTICAL SOIL SAMPLE RESULTS** **FORMER HANNA FURNACE SITE**

Location ID		TT-309B	TT-309B	TT-310B	TT-311B	TT-312B
Sample ID		TT-309-SURFACE	TT-309-9-11	TT-310-10-12	TT-311-3-4	TT-312-6-7
Matrix		Soil	Soil	Soil	Soil	Soil
Depth Interval (ft)		0.0-0.1	9.0-11.0	10.0-12.0	3.0-4.0	6.0-7.0
Date Sampled		10/03/01	10/03/01	10/03/01	10/03/01	10/03/01
Parameter	Units					
Metals						
Zinc	MG/KG	132	26.4	8.1	31.7	17.2
Miscellaneous Parameters						
Cyanide, Free	MG/KG	0.39 U	0.41 U	R	0.72 U	0.48 U
Cyanide, Total	MG/KG	R	R	R	R	R
Total Solids	%	90.4	82.9	75	55.6	86.7

Flags assigned during chemistry validation are shown.

MADE BY: GJK 3/11/2002

TRK BY: MEB 3/11/2002

Detection Limits shown are PQI

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ATTACHMENT A **ANALYTICAL SOIL SAMPLE RESULTS** **FORMER HANNA FURNACE SITE**

Location ID		TT-314B
Sample ID		TT-314-B-10
Matrix		Soil
Depth Interval (ft)		8.0-10.0
Date Sampled		10/04/01
Parameter	Units	
Volatile Organic Compounds		
1,1,1-Trichloroethane	UG/KG	R
1,1,1,2-Tetrachloroethane	UG/KG	R
1,1,2-Trichloro-1,2,2-tetrafluoroethane	UG/KG	R
1,1,2-Trichloroethane	UG/KG	R
1,1-Dichloroethane	UG/KG	R
1,1-Dichloroethene	UG/KG	R
1,2,4-Trichlorobenzene	UG/KG	R
1,2-Dibromo-3-chloropropane	UG/KG	R
1,2-Dibromoethane (Ethylene dibromide)	UG/KG	R
1,2-Dichlorobenzene	UG/KG	R
1,2-Dichloroethane	UG/KG	R
1,2-Dichloroethene (cis)	UG/KG	R
1,2-Dichloroethene (trans)	UG/KG	R
1,2-Dichloropropane	UG/KG	R
1,3-Dichlorobenzene	UG/KG	R
1,3-Dichloropropene (cis)	UG/KG	R
1,3-Dichloropropene (trans)	UG/KG	R
1,4-Dichlorobenzene	UG/KG	R
2-Hexanone	UG/KG	R
4-Methyl-2-pentanone	UG/KG	R
Acetone	UG/KG	R
Benzene	UG/KG	R
Bromodichloromethane	UG/KG	R
Bromoform	UG/KG	R

Flags assigned during chemistry validation are shown.

MADE BY: GSK 3/11/2002

CHKD BY: MFR 3/11/2002

Detection Limits shown are PQL

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 Project: 10-10-01 T314B-10
 10/04/01 TT-314B (MATRIX) = 80

J. WOODWARD, *Woodward Program Coordinator*
 PHOENIX, ARIZONA 85006-1699
 [760/964-7777 FAX] [949/435-1101]

ATTACHMENT A
ANALYTICAL SOIL SAMPLE RESULTS
FORMER HANNA FURNACE SITE

Location ID		TT-314B
Sample ID		TT-314-B-10
Matrix		Soil
Depth Interval (ft)		8.0-10.0
Date Sampled		10/04/01
Parameter	Units	
Volatiles Organic Compounds		
Vinyl chloride	UG/KG	R
Semivolatiles Organic Compounds		
1,1-Diphenyl	UG/KG	600 UJ
2,2'-oxybis(1-Chloropropane)	UG/KG	600 UJ
2,4,5-Trichlorophenol	UG/KG	1,500 UJ
2,4,6-Trichlorophenol	UG/KG	600 UJ
2,4-Dichlorophenol	UG/KG	600 UJ
2,4-Dimethylphenol	UG/KG	600 UJ
2,4-Dinitrophenol	UG/KG	1,500 UJ
2,4-Dinitrotoluene	UG/KG	600 UJ
2,6-Dinitrotoluene	UG/KG	600 UJ
2-Chloronaphthalene	UG/KG	600 UJ
2-Chlorophenol	UG/KG	600 UJ
2-Methylnaphthalene	UG/KG	93 J
2-Methylphenol (o-cresol)	UG/KG	600 UJ
2-Nitroaniline	UG/KG	1,500 UJ
2-Nitrophenol	UG/KG	600 UJ
3,3'-Dichlorobenzidine	UG/KG	600 UJ
3-Nitroaniline	UG/KG	1,500 UJ
4,6-Dinitro-2-methylphenol	UG/KG	1,500 UJ
1-Bromophenyl-phenylether	UG/KG	600 UJ
4-Chloro-3-methylphenol	UG/KG	600 UJ
1-Chloroaniline	UG/KG	600 UJ
4-Chlorophenyl-phenylether	UG/KG	600 UJ

Flags assigned during chemistry validation are shown

MADE BY: GEK 3/11/2007

CHKD BY: MED 3/11/2007

Detection Limits shown are PQL

2,2,4,4-Tetrachlorobiphenyl-1,1-diol
 2,2,4,4-Tetrachlorobiphenyl-1,1-diol
 2,2,4,4-Tetrachlorobiphenyl-1,1-diol

ATTACHMENT A **ANALYTICAL SOIL SAMPLE RESULTS** **FORMER HANNA FURNACE SITE**

Location ID		TT-314B
Sample ID		TT-314-B-10
Matrix		Soil
Depth Interval (ft)		8.0-10.0
Data Sampled		10/04/01
Parameter	Units	
Semivolatile Organic Compounds		
4-Methylphenol (p-cresol)	UG/KG	600 UJ
1 Nitroaniline	UG/KG	1,500 UJ
4-Nitrophenol	UG/KG	1,500 UJ
Acenaphthene	UG/KG	600 UJ
Acenaphthylene	UG/KG	600 UJ
Acenaphthene	UG/KG	600 UJ
Anthracene	UG/KG	75 J
Atrazine	UG/KG	600 UJ
Benzaldehyde	UG/KG	600 UJ
Benzo(a)anthracene	UG/KG	240 J
Benzo(a)pyrene	UG/KG	120 J
Benzo(b)fluoranthene	UG/KG	400 J
Benzo(g,h,i)perylene	UG/KG	80 J
Benzo(k)fluoranthene	UG/KG	140 J
bis(2-Chloroethoxy)methane	UG/KG	600 UJ
bis(2-Chloroethyl)ether	UG/KG	600 UJ
bis(2-Ethylhexyl)phthalate	UG/KG	710 UJ
Butylbenzylphthalate	UG/KG	600 UJ
Caprolactam	UG/KG	600 UJ
Carbazole	UG/KG	600 UJ
Chrysene	UG/KG	280 J
Dibenz(a,h)anthracene	UG/KG	600 UJ
Dibenzofuran	UG/KG	600 UJ
Dimethylphthalate	UG/KG	600 UJ

Flags assigned during on-site validation are shown

MADE BY: GEL 3/11/2002

CHKD BY: MEB 3/11/2003

Detection Limits shown are PQL

ATTACHMENT A
ANALYTICAL SOIL SAMPLE RESULTS
FORMER HANNA FURNACE SITE

Location ID		TT-314B
Sample ID		TT-314 B 10
Matrix		Soil
Depth Interval (ft)		8.0-10.0
Date Sampled		10/04/01
Parameter	Units	
Semivolatile Organic Compounds		
Dimethylphthalate	UG/KG	600 UJ
Di-n-butylphthalate	UG/KG	600 UJ
Di-n-octylphthalate	UG/KG	600 UJ
Fluoranthene	UG/KG	510 J
Fluorene	UG/KG	600 UJ
Hexachlorobenzene	UG/KG	600 UJ
Hexachlorobutadiene	UG/KG	600 UJ
Hexachlorocyclopentadiene	UG/KG	600 UJ
Hexachloroethane	UG/KG	600 UJ
Indeno(1,2,3-cd)pyrene	UG/KG	130 J
Isophorone	UG/KG	600 UJ
Naphthalene	UG/KG	94 J
Nitrobenzene	UG/KG	600 UJ
N-Nitroso-di-n-propylamine	UG/KG	600 UJ
N-Nitrosodiphenylamine	UG/KG	600 UJ
Pentachlorophenol	UG/KG	1,500 UJ
Phenanthrene	UG/KG	380 J
Phenol	UG/KG	600 UJ
Pyrene	UG/KG	450 J
Pesticides		
4,4'-DDD	UG/KG	6.0 UJ
4,4'-DDE	UG/KG	6.0 UJ
4,4'-DDT	UG/KG	6.0 UJ
Aldrin	UG/KG	3.1 UJ

Flags assigned during laboratory validation are shown

MADE BY: CEC 3/11/2002

CHKB BY: MCB 3/11/2002

Detection Limits shown are PQL

ATTACHMENT A **ANALYTICAL SOIL SAMPLE RESULTS** **FORMER HANNA FURNACE SITE**

Location ID		11 3148
Sample ID		TT 314-8-10
Matrix		Soil
Depth Interval (ft)		8.0-10.0
Date Sampled		10/04/01
Parameter	Units	
Pesticides		
alpha-BHC	UG/KG	3.1 UJ
alpha-Chlordane	UG/KG	3.1 UJ
beta-BHC	UG/KG	3.1 UJ
delta-BHC	UG/KG	3.1 UJ
Dieldrin	UG/KG	0.0 UJ
Endosulfan I	UG/KG	3.1 UJ
Endosulfan II	UG/KG	0.0 UJ
Endosulfan sulfate	UG/KG	8.0 UJ
Endrin	UG/KG	0.0 UJ
Endrin aldehyde	UG/KG	6.0 UJ
Endrin ketone	UG/KG	6.0 UJ
gamma-BHC (lindane)	UG/KG	3.1 UJ
gamma-Chlordane	UG/KG	3.1 UJ
Heptachlor	UG/KG	3.1 UJ
Heptachlor epoxide	UG/KG	3.1 UJ
Methoxychlor	UG/KG	3.1 UJ
Toxaphene	UG/KG	3.1 UJ
Polychlorinated Biphenyls		
Aroclor 1016	UG/KG	60 UJ
Aroclor 1221	UG/KG	120 UJ
Aroclor 1237	UG/KG	60 UJ
Aroclor 1242	UG/KG	60 UJ
Aroclor 1248	UG/KG	60 UJ
Aroclor 1254	UG/KG	60 UJ

Flags assigned during chemistry validation are shown

MADE BY: JPK 3/11/2002

CHKD BY: MED 3/11/2002

Detection Limits shown are POL

ATTACHMENT A
ANALYTICAL SOIL SAMPLE RESULTS
FORMER HANNA FURNACE SITE

Location ID		TT-314B
Sample ID		TT-314 B-10
Matrix		Soil
Depth Interval (ft)		8.0-10.0
Date Sampled		10/04/01
Parameter	Units	
Polychlorinated Biphenyls		
Aroclor 1260	UG/KG	60 UJ
Metals		
Aluminum	MG/KG	17,600
Antimony	MG/KG	8.1 BJ
Arsenic	MG/KG	15.2
Barium	MG/KG	208
Beryllium	MG/KG	1.5
Cadmium	MG/KG	1.6
Calcium	MG/KG	64,300
Chromium	MG/KG	38.0
Cobalt	MG/KG	11.6
Copper	MG/KG	34.8
Iron	MG/KG	27,300
Lead	MG/KG	11.8
Magnesium	MG/KG	8,900
Manganese	MG/KG	688
Mercury	MG/KG	R
Nickel	MG/KG	29.0
Potassium	MG/KG	6,670
Selenium	MG/KG	0.85 UJ
Silver	MG/KG	1.0 UJ
Sodium	MG/KG	340 B
Thallium	MG/KG	0.34 UJ
Vanadium	MG/KG	27.1

Flags assigned during chemistry validation are shown

MADE BY: GER 3/11/2002

CHKD BY: MFB 3/11/2002

Detection Limits shown are PQL

ATTACHMENT A
ANALYTICAL SOIL SAMPLE RESULTS
FORMER HANNA FURNACE SITE

Location ID		TT-314B
Sample ID		TT-314-B-10
Matrix		Soil
Depth Interval (ft)		8.0-10.0
Date Sampled		10/04/01
Parameter	Units	
Metals		
Zinc	MG/KG	274
Miscellaneous Parameters		
Cyanide, Free	MG/KG	0.62 U
Cyanide, Total	MG/KG	R
Total Solids	%	55.3

Flags assigned during laboratory validation are shown

MADE BY: GFK 3/11/2002

CHKD BY: MFB 3/11/2002

Detection Limits shown are PQL

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ATTACHMENT A
ANALYTICAL FIELD QC SAMPLE RESULTS
FORMER HANNA FURNACE SITE

Location ID		FIELDQC	FIELDQC
Sample ID		RR-1	IR-1
Matrix		Quality Control	Quality Control
Depth Interval (ft)		-	-
Date Sampled		10/12/01	11/13/01
Parameter	Units	Final Blank (1-1)	Top Blank (1-1)
Volatiles Organic Compounds			
1,1,1 Trichloroethane	UG/L	10 UJ	10 UJ
1,1,2,2-Tetrachloroethane	UG/L	10 UJ	10 UJ
1,1,2 Trichloro-1,2,2-trifluoroethane	UG/L	10 UJ	10 UJ
1,1,2-Trichloroethane	UG/L	10 UJ	10 UJ
1,1-Dichloroethane	UG/L	10 UJ	10 UJ
1,1 Dichloroethene	UG/L	10 UJ	10 UJ
1,2,4-Trichlorobenzene	UG/L	10 UJ	10 UJ
1,2 Dichloro-3-chloropropane	UG/L	10 UJ	10 UJ
1,2-Dibromochloro- (Ethylene dibromide)	UG/L	10 UJ	10 UJ
1,2-Dichlorobenzene	UG/L	10 UJ	10 UJ
1,2-Dichloromethane	UG/L	10 UJ	10 UJ
1,2-Dichloroethene (cis)	UG/L	10 UJ	10 UJ
1,2-Dichloroethene (trans)	UG/L	10 UJ	10 UJ
1,2-Dichloropropane	UG/L	10 UJ	10 UJ
1,3-Dichlorobenzene	UG/L	10 UJ	10 UJ
1,3 Dichloropropene (cis)	UG/L	10 UJ	10 UJ
1,3-Dichloropropene (trans)	UG/L	10 UJ	10 UJ
1,4-Dichlorobenzene	UG/L	10 UJ	10 UJ
2-Hexanone	UG/L	10 UJ	10 UJ
4 Methyl-2-pentanone	UG/L	10 UJ	10 UJ
Acetone	UG/L	110 J	10 UJ
Benzene	UG/L	10 UJ	10 UJ
Bromodichloromethane	UG/L	10 UJ	10 UJ
Bromoform	UG/L	10 UJ	10 UJ

Flags assigned during chemistry validation are shown

MADE BY: GEL 3/11/2002

CHKD BY: MEB 3/11/2002

Detection Limits shown are PQL

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ATTACHMENT A **ANALYTICAL FIELD QC SAMPLE RESULTS** **FORMER HANNA FURNACE SITE**

Location ID		FIELDQC	FIELDQC
Sample ID		RB-1	TB-1
Matrix		Quality Control	Quality Control
Depth Interval (ft)		-	-
Date Sampled		10/12/01	11/13/01
Parameter	Units	Recess Blank (1:1)	Trip Blank (1:1)
Volatiles Organic Compounds			
Bromomethane	UG/L	10 U/L	10 U/L
Carbon disulfide	UG/L	10 U/L	10 U
Carbon tetrachloride	UG/L	10 U/L	10 U
Chlorobenzene	UG/L	10 U/L	10 U
Chloroethane	UG/L	10 U/L	10 U
Chloroform	UG/L	10 U/L	10 U
Chloromethane	UG/L	10 U/L	10 U/L
Cyclohexane	UG/L	10 U/L	10 U
Debromochloromethane	UG/L	10 U/L	10 U
1,1-dichlorodifluoromethane	UG/L	10 U/L	10 U
Ethylbenzene	UG/L	10 U/L	10 U
Isopropylbenzene (Cumene)	UG/L	10 U/L	10 U
m&p-Xylene	UG/L	10 U/L	NA
Methyl acetate	UG/L	10 U/L	10 U
Methyl ethyl ketone (2-Butanone)	UG/L	10 U/L	10 U
Methyl tert-butyl ether	UG/L	10 U/L	10 U
Methylcyclohexane	UG/L	10 U/L	10 U
Methylene chloride	UG/L	10 U/L	10 U
n-Xylene	UG/L	10 U/L	NA
Styrene	UG/L	10 U/L	10 U
Tetrachloroethene	UG/L	10 U/L	10 U/L
Toluene	UG/L	10 U/L	10 U
Trichloroethene	UG/L	10 U/L	10 U
1,1,1-trichloro-2,2,2-trifluoroethane	UG/L	10 U/L	10 U

Flags assigned during chemistry validation are shown.

MADE BY: GLK 5/11/2002
 MKJ BY: MEB 5/11/2002

Detection Limits shown are PQL

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ATTACHMENT A **ANALYTICAL FIELD QC SAMPLE RESULTS** **FORMER HANNA FURNACE SITE**

Location ID		FIELDQC	FIELDQC
Sample ID		RB-1	TB-1
Matrix		Quality Control	Quality Control
Depth Interval (ft)		-	-
Date Sampled		10/12/01	11/13/01
Parameter	Units	Rinse Blank (1-1)	Trip Blank (1-1)
Volatiles Organic Compounds			
Vinyl chloride	UG/L	10 UJ	10 U
Xylene (total)	UG/L	NA	10 U
Semivolatiles Organic Compounds			
1,1'-Biphenyl	UG/L	10 UJ	NA
2,2'-oxybis(1-Chloropropane)	UG/L	10 UJ	NA
2,4,5-Trichlorophenol	UG/L	25 UJ	NA
2,4,6-Trichlorophenol	UG/L	10 UJ	NA
2,4-Dichlorophenol	UG/L	10 UJ	NA
2,4-Dimethylphenol	UG/L	10 UJ	NA
2,4-Dinitrophenol	UG/L	25 UJ	NA
2,4-Dinitrotoluene	UG/L	10 UJ	NA
2,6-Dinitrotoluene	UG/L	10 UJ	NA
2-Chloronaphthalene	UG/L	10 UJ	NA
2-Chlorophenol	UG/L	10 UJ	NA
2-Methylnaphthalene	UG/L	10 UJ	NA
2-Methylphenol (o-cresol)	UG/L	10 UJ	NA
2-Nitroaniline	UG/L	25 UJ	NA
2-Nitrophenol	UG/L	10 UJ	NA
3,3'-Dichlorobenzidine	UG/L	10 UJ	NA
3-Nitroaniline	UG/L	25 UJ	NA
4,6-Dinitro-2-methylphenol	UG/L	25 UJ	NA
4-Bromophenyl-phenyl ether	UG/L	10 UJ	NA
4-Chloro-3-methylphenol	UG/L	10 UJ	NA
4-Chloroaniline	UG/L	10 UJ	NA

† Lags assigned during chemistry validation are shown

MADE BY: GER 3/11/2002

CHRD BY: MLH 3/11/2002

Detection Limits shown are PQL

ATTACHMENT A **ANALYTICAL FIELD QC SAMPLE RESULTS** **FORMER HANNA FURNACE SITE**

Location ID		FIELDQC	FIELDQC
Sample ID		RB-1	TB-1
Matrix		Quality Control	Quality Control
Depth Interval (ft)		-	-
Date Sampled		10/12/01	11/13/01
Parameter	Units	Runa Blank (1.1)	Top Blank (1.1)
Semivolatiles Organic Compounds			
4-Chlorophenyl-phenylether	UG/L	10 UJ	NA
4-Methylphenol (p-cresol)	UG/L	10 UJ	NA
4-Nitroaniline	UG/L	25 UJ	NA
4-Nitrophenol	UG/L	25 UJ	NA
Acenaphthene	UG/L	10 UJ	NA
Acenaphthylene	UG/L	10 UJ	NA
Acetophenone	UG/L	10 UJ	NA
Anthracene	UG/L	10 UJ	NA
Atrazine	UG/L	10 UJ	NA
Benzaldehyde	UG/L	10 UJ	NA
Benzo(a)anthracene	UG/L	10 UJ	NA
Benzo(a)pyrene	UG/L	10 UJ	NA
Benzo(b)fluoranthene	UG/L	10 UJ	NA
Benzo(g,h)perylene	UG/L	10 UJ	NA
Benzo(k)fluoranthene	UG/L	10 UJ	NA
bis(2-Chloroethoxy)methane	UG/L	10 UJ	NA
bis(2-Chloroethyl)ether	UG/L	10 UJ	NA
bis(2-Ethylhexyl)phthalate	UG/L	28 UJ	NA
Butylbenzylphthalate	UG/L	10 UJ	NA
Caprolactam	UG/L	10 UJ	NA
Carbazole	UG/L	10 UJ	NA
Chrysene	UG/L	10 UJ	NA
Dibenz(a,h)anthracene	UG/L	10 UJ	NA
Dibenzofuran	UG/L	10 UJ	NA

Flags assigned during chemistry validation are shown

MADE BY: GCR 3/11/2002

CHKD BY: MBB 3/11/2002

Detection Limits shown are PQL

ATTACHMENT A **ANALYTICAL FIELD QC SAMPLE RESULTS** **FORMER HANNA FURNACE SITE**

Location ID		FIELDQC	FIELDQC
Sample ID		RB-1	1B-1
Matrix		Quality Control	Quality Control
Depth Interval (ft)		-	-
Date Sampled		10/12/01	11/13/01
Parameter	Units	Rinse Blank (1-1)	Trip Blank (1-1)
Semivolatile Organic Compounds			
Diethylphthalate	UG/L	10 UJ	NA
Dimethylphthalate	UG/L	10 UJ	NA
Di-n-butylphthalate	UG/L	10 UJ	NA
Di-n-octylphthalate	UG/L	10 UJ	NA
Fluoranthene	UG/L	10 UJ	NA
Fluorene	UG/L	10 UJ	NA
Hexachlorobenzene	UG/L	10 UJ	NA
Hexachlorobutadiene	UG/L	10 UJ	NA
Hexachlorocyclopentadiene	UG/L	10 UJ	NA
Hexachloroethane	UG/L	10 UJ	NA
Indeno(1,2,3-cd)pyrene	UG/L	10 UJ	NA
Isophthalene	UG/L	10 UJ	NA
Naphthalene	UG/L	10 UJ	NA
Nitrobenzene	UG/L	10 UJ	NA
N-Nitroso-di-n-propylamine	UG/L	10 UJ	NA
N-Nitrosodiphenylamine	UG/L	10 UJ	NA
Pentachlorophenol	UG/L	25 UJ	NA
Phenanthrene	UG/L	10 UJ	NA
Phenol	UG/L	10 UJ	NA
Pyrene	UG/L	10 UJ	NA
Pesticides			
4,4'-DDD	UG/L	0.10 UJ	NA
4,4'-DDE	UG/L	0.10 UJ	NA
4,4'-DDT	UG/L	0.10 UJ	NA

Flags assigned during chemistry validation are shown

MADE BY: GEK 3/14/2002

CHKD BY: MED 3/13/2002

Detection Limits shown are PQL

ATTACHMENT A **ANALYTICAL FIELD QC SAMPLE RESULTS** **FORMER HANNA FURNACE SITE**

Location ID		FIELDQC	FIELDQC
Sample ID		RB-1	TB-1
Matrix		Quality Control	Quality Control
Depth Interval (ft)		-	-
Date Sampled		10/12/01	11/13/01
Parameter	Units	Ree Blank (1-1)	Top Blank (1-1)
Pesticides			
Aldrin	UG/L	0.050 UJ	NA
alpha-BHC	UG/L	0.050 UJ	NA
alpha-Chlordane	UG/L	0.050 UJ	NA
beta-BHC	UG/L	0.050 UJ	NA
delta-BHC	UG/L	0.050 UJ	NA
Dieldrin	UG/L	0.10 UJ	NA
Endosulfan I	UG/L	0.050 UJ	NA
Endosulfan II	UG/L	0.10 UJ	NA
Endosulfan sulfate	UG/L	0.10 UJ	NA
Endrin	UG/L	0.10 UJ	NA
Endrin aldehyde	UG/L	0.10 UJ	NA
Endrin ketone	UG/L	0.10 UJ	NA
gamma-BHC (Lindane)	UG/L	0.050 UJ	NA
gamma-Chlordane	UG/L	0.050 UJ	NA
Heptachlor	UG/L	0.050 UJ	NA
Heptachlor epoxide	UG/L	0.050 UJ	NA
Methoxychlor	UG/L	0.50 UJ	NA
Toxaphene	UG/L	5.0 UJ	NA
Polychlorinated Biphenyls			
Aroclor 1016	UG/L	1.0 UJ	NA
Aroclor 1221	UG/L	2.0 UJ	NA
Aroclor 1232	UG/L	1.0 UJ	NA
Aroclor 1242	UG/L	1.0 UJ	NA
Aroclor 1248	UG/L	1.0 UJ	NA

Flags assigned during chemistry validation are shown.

MADE BY: CEK 3/11/2002

CHKD BY: MLU 3/11/2002

Detection Limits shown are PQL

ATTACHMENT A
ANALYTICAL FIELD QC SAMPLE RESULTS
FORMER HANNA FURNACE SITE

Location ID		FIELDQC	FIELDDQC
Sample ID		RB-1	TB-1
Matrix		Quality Control	Quality Control
Depth Interval (ft)		-	-
Data Sampled		10/12/01	11/13/01
Parameter	Units	Rinse Blank (1-1)	Trip Blank (1-1)
Polychlorinated Biphenyls			
Aroclor 1254	UG/L	1.0 UJ	NA
Aroclor 1260	UG/L	1.0 UJ	NA
Metals			
Aluminum	UG/L	181 B	NA
Antimony	UG/L	29.0 U	NA
Arsenic	PPM	2.0 U	NA
Barium	UG/L	2.6 B	NA
Beryllium	UG/L	1.0 U	NA
Cadmium	UG/L	6.0 U	NA
Calcium	UG/L	1,820 B	NA
Chromium	UG/L	10.0 U	NA
Cobalt	UG/L	7.0 U	NA
Copper	UG/L	3.6 RJ	NA
Iron	UG/L	3,230	NA
Lead	UG/L	4.1	NA
Magnesium	UG/L	158 B	NA
Manganese	UG/L	37.8	NA
Mercury	UG/L	0.20 U	NA
Nickel	UG/L	8.1 B	NA
Potassium	PPM	188 B	NA
Selenium	UG/L	2.0 U	NA
Silver	UG/L	6.0 U	NA
Sodium	UG/L	268 B	NA
Thallium	UG/L	2.0 U	NA

Flags assigned during chemist validation are shown

MADE BY: CPE 3/11/2002

CHKD BY: MCD 3/11/2002

Detection Limits shown are PQL

ATTACHMENT A
ANALYTICAL FIELD QC SAMPLE RESULTS
FORMER HANNA FURNACE SITE

Location ID		FIELDQC	FIELDQC
Sample ID		RB-1	TD-1
Matrix		Quality Control	Quality Control
Depth Interval (ft)		-	-
Date Sampled		10/12/01	11/13/01
Parameter	Units	Purge Blank (1-1)	Top Blank (1-1)
Metals			
Vanadium	UG/L	0.0 U	NA
Zinc	UG/L	89.5	NA
Miscellaneous Parameters			
Cyanide	UG/L	0.0 U	NA

Flags assigned during chemistry validation are shown.

MADE BY: CEK 3/11/2002
CHKD BY: MEU 3/11/2002

Detection Limits shown are PQL

ATTACHMENT B

SUPPORT DOCUMENTATION

4A
VOLATILE METHOD BLANK SUMMARY

NYSDEC Sample NO

Lab Name FRIEND LABORATORY, INC. Contract VBLKS1
 Lab Code 10252 Case No SAS No SUG No USC
 Lab File ID D9821.D Lab Sample ID: vb1k1
 Date Analyzed 10/17/01 Time Analyzed: 19.40
 GC Column: RTX-624 ID. 0.53 (mm) Heated Purge. (Y/N) Y
 Instrument ID: MSD-D

THIS METHOD BLANK APPLIES TO THE FOLLOWING SAMPLES. MS, MSD AND MSB

	NYSDEC SAMPLE NO	LAB SAMPLE ID	LAB FILE ID	TIME ANALYZED
01	VBLKSTMS	BLKMS1	D9822.D	20:13
02	301-4-6	L77443-1	D9823.D	20:47
03	304-SRFC	L77443-2	D9824.D	21:21
04	304-5-7	L77443-3	D9825.D	21:54
05	305-9-11	L77443-4	D9826.D	22:27
06	306-SRFC	L77443-6	D9827.D	23:01
07	306-9-11	L77443-7	D9828.D	23:34
08	307-SRFC	L77443-8	D9829.D	00:07
09	307-2-5-4	L77443-9	D9830.D	00:41
10	308-SRFC	L77443-10	D9831.D	01:14
11	308-3-5	L77443-11	D9832.D	01:47
12	309-SRFC	L77443-12	D9833.D	02:21
13	309-SRFC MS	L77443-13, -12MS	D9834.D	02:54
14	309-SRFC MSD	L77443-14, -12MSD	D9835.D	03:27

COMMENTS

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

NYSDEC SAMPLE NO.

VBK91

Lab Name: FRIEND LABORATORY, INC. Contract: _____
 Lab Code: 10252 Case No.: _____ SAS No.: _____ SDG No.: USC
 Matrix: (soil/water) SOIL Lab Sample ID: vblk1
 Sample wt/vol: 5.3 (g/ml) G Lab File ID: D9821.D
 Level: (low/med) LOW Date Received: _____
 % Moisture: not dec. 0 Date Analyzed: 10/17/01
 GC Column: RTX-624 ID: 0.53 (mm) Dilution Factor: 1.0
 Soil Extract Volume: _____ (uL) Soil Aliquot Volume: _____ (uL)

CONCENTRATION UNITS:

CAS NO. COMPOUND (ug/L or ug/Kg) UG/KG Q

75-71-8	Dichlorodifluoromethane	9	U
74-87-3	Chloromethane	9	U
75-01-4	Vinyl Chloride	9	U
74-83-9	Bromomethane	9	U
75-00-3	Chloroethane	9	U
75-69-4	Trichlorofluoromethane	9	U
75-35-4	1,1-Dichloroethene	9	U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	9	U
67-64-1	Acetone	18	
75-15-0	Carbon Disulfide	9	U
78-20-9	Methyl Acetate	9	U
75-09-2	Methylene Chloride	9	U
156-80-5	trans-1,2-Dichloroethene	9	U
1634-04-4	Methyl tert-Butyl Ether	9	U
75-34-3	1,1-Dichloroethane	9	U
156-59-2	cis-1,2-Dichloroethene	9	U
78-93-3	2-Butanone	9	U
67-66-3	Chloroform	9	U
71-55-6	1,1,1-Trichloroethane	9	U
110-82-7	Cyclohexane	9	U
56-23-5	Carbon Tetrachloride	9	U
71-43-2	Benzene	9	U
107-06-2	1,2-Dichloroethane	9	U
78-01-6	Trichloroethene	9	U
108-87-2	Methylcyclohexane	9	U
78-87-5	1,2-Dichloropropane	9	U
75-27-4	Bromodichloromethane	9	U
10061-01-5	cis-1,3-Dichloropropene	9	U
108-10-1	4-Methyl-2-pentanone	9	U
108-88-3	Toluene	9	U
10061-02-6	trans-1,3-Dichloropropene	9	U
79-00-5	1,1,2-Trichloroethane	9	U
127-18-4	Tetrachloroethene	9	U
591-78-8	2-Hexanone	9	U
124-48-1	Dibromochloromethane	9	U
106-93-4	1,2-Dibromoethane	9	U
108-90-7	Chlorobenzene	9	U
100-41-4	Ethylbenzene	9	U
106-42-3/108-38-3	p-Xylene/m-Xylene	9	U

4A
VOLATILE METHOD BLANK SUMMARY

NYSDEC Sample NO.

VBKMS2

Lab Name: FRIEND LABORATORY, INC. Contract: _____
 Lab Code: 10252 Case No: _____ PAS No: _____ SDG No: _____ USC: _____
 Lab File ID: D9838.D Lab Sample ID: vbk2
 Date Analyzed: 10/18/01 Time Analyzed: 05:03
 GC Column: RTX-624 ID: 0.53 (mm) Heated Purge (Y/N): Y
 Instrument ID: MSD-0

THIS METHOD BLANK APPLIES TO THE FOLLOWING SAMPLES MS, MSD AND MSB

	NYSDEC SAMPLE NO	LAB SAMPLE ID	LAB FILE ID	TIME ANALYZED
01	VBKMS2	VBKMS2	D9838.D	05:36
02	308-9-11	L77443-15	D9840.D	06:09
03	310-10-12	L77443-16	D9841.D	06:42
04	311-3-4	L77443-17	D9842.D	07:15
05	314-8-10	L77443-19	D9843.D	07:48

COMMENTS

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

NYSDEC SAMPLE NO.

VBKLS2

Lab Name: FRIEND LABORATORY, INC.

Contract: _____

Lab Code: 10252

Case No.: _____

SAS No.: _____

SDG No.: USC

Matrix: (soil/water) SOIL

Lab Sample ID: vbk2

Sample wt/vol: 5.6 (g/ml) G

Lab File ID: D9838.D

Level: (low/med) LOW

Date Received: _____

% Moisture: not dec. 0

Date Analyzed: 10/18/01

GC Column: RTX-624 ID: 0.53 (mm)

Dilution Factor: 1.0

Soil Extract Volume: _____ (uL)

Soil Aliquot Volume: _____ (uL)

CONCENTRATION UNITS:

CAS NO.

COMPOUND

(ug/L or ug/Kg) UG/KG

Q

75-71-8	Dichlorodifluoromethane	9	U
74-87-3	Chloromethane	9	U
75-01-4	Vinyl Chloride	9	U
74-83-9	Bromomethane	9	U
75-00-3	Chloroethane	9	U
75-69-4	Trichlorofluoromethane	9	U
75-35-4	1,1-Dichloroethene	9	U
78-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	9	U
67-64-1	Acetone	15	
75-15-0	Carbon Disulfide	9	U
79-20-9	Methyl Acetate	9	U
75-09-2	Methylene Chloride	9	U
156-60-5	trans-1,2-Dichloroethene	9	U
1634-04-4	Methyl tert-Butyl Ether	9	U
75-34-3	1,1-Dichloroethane	9	U
156-59-2	cis-1,2-Dichloroethene	9	U
78-93-3	2-Butanone	9	U
67-66-3	Chloroform	9	U
71-55-6	1,1,1-Trichloroethane	9	U
110-82-7	Cyclohexane	9	U
56-23-5	Carbon Tetrachloride	9	U
71-43-2	Benzene	9	U
107-06-2	1,2-Dichloroethane	9	U
79-01-6	Trichloroethene	9	U
108-87-2	Methylcyclohexane	9	U
78-87-5	1,2-Dichloropropane	9	U
75-27-4	Bromodichloromethane	9	U
10061-01-5	cis-1,3-Dichloropropene	9	U
108-10-1	4-Methyl-2-pentanone	9	U
108-88-3	Toluene	9	U
10061-02-6	trans-1,3-Dichloropropene	9	U
79-00-5	1,1,2-Trichloroethane	9	U
127-18-4	Tetrachloroethene	9	U
591-78-6	2-Hexanone	9	U
124-48-1	Dibromochloromethane	9	U
108-93-4	1,2-Dibromoethane	9	U
108-90-7	Chlorobenzene	9	U
100-41-4	Ethylbenzene	9	U
106-42-3/108-38-3	p-Xylene/m-Xylene	9	U

4A
VOLATILE METHOD BLANK SUMMARY

NYSDEC Sample NO.

VBK51

Lab Name: FRIEND LABORATORY, INC. Contract: _____
 Lab Code: 10252 Case No.: _____ SAS No.: _____ SDG No.: USC
 Lab File ID: D9863.D Lab Sample ID: VBK
 Date Analyzed: 10/19/01 Time Analyzed: 14:49
 GC Column: RTX-624 ID: 0.53 (mm) Heated Purge: (Y/N) Y
 Instrument ID: MSD-D

THIS METHOD BLANK APPLIES TO THE FOLLOWING SAMPLES, MS, MSD AND MSB

	NYSDEC SAMPLE NO.	LAB SAMPLE ID	LAB FILE ID	TIME ANALYZED
01	VBK51MS	VBKMS	D9864.D	15:23
02	301-SRFC	L77999-1	D9871.D	19:19
03	301-SRFC MS	L77999-1MS	D9872.D	19:52
04	301-SRFC MSD	L77999-1MSD	D9873.D	20:26
05	301-4-6	L77999-2	D9874.D	21:00
06	302-SRFC	L77999-3	D9875.D	21:33
07	302-4-6	L77999-4	D9876.D	22:06
08	303-SRFC	L77999-5	D9877.D	22:40
09	303-4-6	L77999-6	D9878.D	23:13
10	304-SRFC	L77999-7	D9879.D	23:47
11	304-6-8	L77999-8	D9880.D	00:21
12	305-SRFC	L77999-9	D9885.D	03:04
13	305-12-14	L77999-10	D9886.D	03:38
14	306-18-20	L77999-11	D9887.D	04:12
15	306-24-28	L77999-12	D9888.D	04:45
16	304-2-4	L77999-13	D9889.D	05:18
17	304-10-12 RE	L77999-15	D9890.D	05:52
18	307-4-6	L77999-17	D9891.D	06:25

COMMENTS

4A
VOLATILE METHOD BLANK SUMMARY

NYSDEC Sample NO.

VBKLS1

Lab Name: FRIEND LABORATORY, INC. Contract: _____
 Lab Code: 10252 Case No.: _____ SAS No.: _____ SDG No.: USC
 Lab File ID: D9863.D Lab Sample ID: VBK
 Date Analyzed: 10/19/01 Time Analyzed: 14:49
 GC Column: RTX-624 ID: 0.53 (mm) Heated Purge: (Y/N) Y
 Instrument ID: MSD-D

THIS METHOD BLANK APPLIES TO THE FOLLOWING SAMPLES, MS, MSD AND MSB

	NYSDEC SAMPLE NO.	LAB SAMPLE ID	LAB FILE ID	TIME ANALYZED
01	VBKLS1MS	VBKMS	D9864.D	15:23
02	VBKLD1	VBK	D9883.D	01:58
BH 03	308-B-10 RE	L78240-1	D9892.D	06:59
MW 04	305-SRFC RE	L78240-2	D9893.D	07:33
MW 05	308-B-8 RE	L78240-3	D9894.D	08:07
BH 06	309 RE	L78240-4	D9895.D	08:40

COMMENTS

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

NYSDEC SAMPLE NO.

VBLKS1

Lab Name: FRIEND LABORATORY, INC. Contract: _____

Lab Code: 10252 Case No.: _____ SAS No.: _____ SDG No.: USC

Matrix: (soil/water) SOIL Lab Sample ID: VBLK

Sample wt/vol: 5.7 (g/ml) G Lab File ID: D9863.D

Level: (low/med) LOW Date Received: _____

% Moisture: not dec. 0 Date Analyzed: 10/19/01

GC Column: RTX-624 ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume: _____ (uL) Soil Aliquot Volume: _____ (uL)

CONCENTRATION UNITS:

CAS NO. COMPOUND (ug/L or ug/Kg) UG/KG Q

75-71-8	Dichlorodifluoromethane	9	U
74-87-3	Chloromethane	9	U
75-01-4	Vinyl Chloride	9	U
74-83-9	Bromomethane	9	U
75-00-3	Chloroethane	9	U
75-69-4	Trichlorofluoromethane	9	U
75-35-4	1,1-Dichloroethene	9	U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	9	U
67-64-1	Acetone	8	J
75-15-0	Carbon Disulfide	9	U
79-20-9	Methyl Acetate	9	U
75-09-2	Methylene Chloride	3	J
156-60-5	trans-1,2-Dichloroethene	9	U
1634-04-4	Methyl tert-Butyl Ether	2	J
75-34-3	1,1-Dichloroethane	9	U
156-59-2	cis-1,2-Dichloroethene	9	U
78-93-3	2-Butanone	8	U
67-68-3	Chloroform	9	U
71-55-6	1,1,1-Trichloroethane	9	U
110-82-7	Cyclohexane	9	U
58-23-5	Carbon Tetrachloride	9	U
71-43-2	Benzene	9	U
107-06-2	1,2-Dichloroethane	9	U
79-01-6	Trichloroethene	9	U
108-87-2	Methylcyclohexane	9	U
78-87-5	1,2-Dichloropropane	9	U
75-27-4	Bromodichloromethane	9	U
10061-01-5	cis-1,3-Dichloropropene	9	U
108-10-1	4-Methyl-2-pentanone	9	U
108-88-3	Toluene	9	U
10061-02-6	trans-1,3-Dichloropropene	9	U
79-00-5	1,1,2-Trichloroethane	9	U
127-18-4	Tetrachloroethene	9	U
591-78-6	2-Hexanone	9	U
124-48-1	Dibromochloromethane	9	U
108-93-4	1,2-Dibromoethane	9	U
108-90-7	Chlorobenzene	9	U
100-41-4	Ethylbenzene	9	U
108-42-3/108-38-3	p-Xylene/m-Xylene	9	U

4A
VOLATILE METHOD BLANK SUMMARY

NYSDEC Sample NO

VBLKS3

Lab Name: FRIEND LABORATORY, INC. Contract: _____
 Lab Code 10252 Case No.: _____ SAS No _____ SDG No USC
 Lab File ID: D9863.D Lab Sample ID VBLK
 Date Analyzed 10/19/01 Time Analyzed 14.40
 GC Column: R1X-624 ID: 0.53 (mm) Heated Purg. (Y/N) Y
 Instrument ID: MSD-D

THIS METHOD BLANK APPLIES TO THE FOLLOWING SAMPLES, MS, MSD AND MSB

	NYSDEC SAMPLE NO.	LAB SAMPLE ID	LAB FILE ID	TIME ANALYZED
01	VBLK83MS	VBLKMS	D9864.D	15:23
02	304-5-7 RE	L77443-3	D9865.D	15:56
03	306-8-11 RE	L77443-7	D9867.D	17:03
04	310-10-12 RE	L77443-16	D9869.D	18:11
05	314-8 10 RF	L77443-19	D9870.D	18:45

COMMENTS

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

NYSDEC SAMPLE NO.

VBLK33

Lab Name: FRIEND LABORATORY, INC.

Contract: _____

Lab Code: 10252

Case No.: _____

SAS No.: _____

SDG No.: USC

Matrix: (soil/water) SOIL

Lab Sample ID: VBLX

Sample wt/vol: 5.7 (g/ml) G

Lab File ID: D9863.D

Level: (low/med) LOW

Date Received: _____

% Moisture: not dec. 0

Date Analyzed: 10/19/01

GC Column: RTX-624 ID: 0.53 (mm)

Dilution Factor: 1.0

Soil Extract Volume: _____ (uL)

Soil Aliquot Volume: _____ (uL)

CONCENTRATION UNITS:

CAS NO.

COMPOUND

(ug/L or ug/Kg) UG/KG

Q

75-71-8	Dichlorodifluoromethane	9	U
74-87-3	Chloromethane	9	U
75-01-4	Vinyl Chloride	9	U
74-83-9	Bromomethane	9	U
75-00-3	Chloroethane	9	U
75-69-4	Trichlorofluoromethane	9	U
75-35-4	1,1-Dichloroethene	9	U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	9	U
67-64-1	Acetone	8	J
75-15-0	Carbon Disulfide	9	U
79-20-9	Methyl Acetate	9	U
75-09-2	Methylene Chloride	3 9	U J real 1/14/02
156-60-5	trans-1,2-Dichloroethene	9	U
1634-04-4	Methyl tert-Butyl Ether	2	J
75-34-3	1,1-Dichloroethane	9	U
156-59-2	cis-1,2-Dichloroethene	9	U
78-93-3	2-Butanone	9	U
67-66-3	Chloroform	9	U
71-55-6	1,1,1-Trichloroethane	9	U
110-82-7	Cyclohexane	9	U
56-23-5	Carbon Tetrachloride	9	U
71-43-2	Benzene	9	U
107-06-2	1,2-Dichloroethane	9	U
79-01-6	Trichloroethene	9	U
108-87-2	Methylcyclohexane	9	U
78-87-5	1,2-Dichloropropane	9	U
75-27-4	Bromodichloromethane	9	U
10061-01-5	cis-1,3-Dichloropropene	9	U
108-10-1	4-Methyl-2-pentanone	9	U
108-88-3	Toluene	9	U
10061-02-6	trans-1,3-Dichloropropene	9	U
79-00-5	1,1,2-Trichloroethane	9	U
127-18-4	Tetrachloroethene	9	U
591-78-6	2-Hexanone	9	U
124-48-1	Dibromochloromethane	9	U
106-93-4	1,2-Dibromoethane	9	U
108-90-7	Chlorobenzene	9	U
100-41-4	Ethylbenzene	9	U
106-42-3/108-38-3	p-Xylene/m-Xylene	9	U

4B
SEMIVOLATILE METHOD BLANK SUMMARY

NYSDEC SAMPLE NO.

SBLK13

Lab Name: FRIEND LABORATORY, INC. Contract: _____
 Lab Code: 10252 Case No.: _____ SAS No.: _____ SDG No.: USC
 Lab File ID: A3058.D Lab Sample ID: SBLK13
 Instrument ID: MSD-A Date Extracted: 10/11/01
 Matrix: (soil/water) SOIL Date Analyzed: 10/18/01
 Level: (low/med) LOW Time Analyzed: 16:19

THIS METHOD BLANK APPLIES TO THE FOLLOWING SAMPLES, MS, MSD, AND MSB

	NYSDEC SAMPLE NO.	LAB SAMPLE ID	LAB FILE ID	DATE ANALYZED
01	SBLK13MS	SBLKMS13	A3067.D	10/19/01
02	311-3-4 RE	L77443-17	A3069.D	10/19/01
03	306-9-11	L77443-7	B3249.D	10/24/01
04	309-9-11	L77443-15	B3250.D	10/24/01
05	310-10-12	L77443-16	B3251.D	10/24/01
06	301-4-8	L77443-1	B3252.D	10/24/01
07	312-6-7 DLRE	L77443-18, 4X	B3253.D	10/24/01
08	308-SRFC	L77443-10	B3254.D	10/24/01
09	308-3-5	L77443-11	B3255.D	10/24/01
10	314-8-10	L77443-19	B3258.D	10/25/01
11	307-2-5-4	L77443-9	B3257.D	10/25/01
12	305-9-11	L77443-4	B3258.D	10/25/01
13	304-5-7 RE	L77443-3	B3259.D	10/25/01
14	304-SRFC	L77443-2	B3262.D	10/25/01
15	311-3-4	L77443-17	B3263.D	10/25/01
16	308-3-5 RE	L77443-11	B3264.D	10/25/01
17	305-9-11 RE	L77443-4	B3265.D	10/25/01
18	314-8-10 RE	L77443-19	B3268.D	10/25/01
19	307-2-5-4 RE	L77443-9	B3269.D	10/25/01
20	312-6-7 DL	L77443-18, 4X	B3270.D	10/25/01
21	304-5-7	L77443-3	B3273.D	10/26/01
22	306-SRFC	L77443-6	B3274.D	10/26/01
23	309-SRFC DL	L77443-12, 3X	B3275.D	10/26/01
24	307-SRFC	L77443-8	B3276.D	10/26/01
25	309-SRFC MS	L77443-13, -12MS, 1X	B3277.D	10/26/01
26	309-SRFC MSD	L77443-14, -12MSD, 1X	B3278.D	10/26/01
27	306-SRFC RE	L77443-6	B3281.D	10/28/01
28	307-SRFC RE	L77443-8	B3282.D	10/28/01

COMMENTS:

1G
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

NYSDEC SAMPLE NO.

SBLK13

Lab Name: FRIEND LABORATORY, INC. Contract: _____

Lab Code: 10252 Case No.: _____ SAS No.: _____ SDG No.: USC

Matrix: (soil/water) SOIL Lab Sample ID: SBLK13

Sample wt/vol: 30.035 (g/ml) G Lab File ID: A3058.D

Level: (low/med) LOW Date Received: _____

% Moisture: 0 decanted: (Y/N) N Date Extracted: 10/11/01

Concentrated Extract Volume: 500 (uL) Date Analyzed: 10/18/01

Injection Volume: 2.0 (uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) Y pH: _____

CONCENTRATION UNITS

CAS NO. COMPOUND (ug/L or ug/Kg) UG/KG Q

84-66-2	Diethyl phthalate	330	U
86-73-7	Fluorene	330	U
7005-72-3	4-Chlorophenylphenylether	330	U
100-01-6	4-Nitroaniline	830	U
534-52-1	2-Methyl-4-6-dinitrophenol	830	U
86-30-6	n-Nitrosodiphenylamine	330	U
101-55-3	4-Bromophenylphenylether	330	U
118-74-1	Hexachlorobenzene	330	U
1912-24-9	Atrazine	330	U
87-86-5	Pentachlorophenol	830	U
85-01-8	Phenanthrene	330	U
120-12-7	Anthracene	330	U
86-74-8	Carbazole	330	U
84-74-2	Di-n-butyl phthalate	70	J
206-44-0	Fluoranthene	330	U
129-00-0	Pyrene	330	U
85-68-7	Butylbenzyl phthalate	38	J
91-94-1	3,3'-Dichlorobenzidine	330	U
56-55-3	Benzo(a)anthracene	330	U
218-01-9	Chrysene	330	U
117-81-7	bis-2-Ethylhexyl phthalate	510	
117-84-0	Di-n-octyl phthalate	330	U
205-99-2	Benzo(b)fluoranthene	330	U
207-08-8	Benzo(k)fluoranthene	330	U
50-32-8	Benzo(a)pyrene	330	U
193-39-5	Indeno(1,2,3-cd)pyrene	330	U
53-70-3	Dibenzo(a,h)anthracene	330	U
191-24-2	Benzo(g,h,i)perylene	330	U

**4B
SEMIVOLATILE METHOD BLANK SUMMARY**

NYSDEC SAMPLE NO.

8BLK17

Lab Name: FRIEND LABORATORY, INC. Contract: _____

Lab Code: 10252 Case No.: _____ SAS No.: _____ SDG No.: USC

Lab File ID: B3293.D Lab Sample ID: SBLK17

Instrument ID: MSD-B Date Extracted: 10/18/01

Matrix: (soil/water) SOIL Date Analyzed: 11/05/01

Level: (low/med) LOW Time Analyzed: 16:50

THIS METHOD BLANK APPLIES TO THE FOLLOWING SAMPLES, MS, MSD, AND MSB

	NYSDEC SAMPLE NO.	LAB SAMPLE ID	LAB FILE ID	DATE ANALYZED
01	SBLK17MS	SBLKMS17	B3294.D	11/05/01
02	305-12-14	L77999-10	B3297.D	11/06/01
03	307-4-6	L77999-17	B3298.D	11/06/01
04	304-2-4 RE	L77999-13	B3299.D	11/06/01
05	304-10-12	L77999-15	B3300.D	11/06/01
06	302-SRFC	L77999-3	B3310.D	11/07/01
07	303-SRFC	L77999-5	B3311.D	11/07/01
08	306-18-20	L77999-11	B3312.D	11/07/01
09	306-24-26	L77999-12	B3313.D	11/07/01
10	304-6-8	L77999-8	B3314.D	11/07/01
11	303-4-6	L77999-6	B3315.D	11/07/01
12	304-SRFC	L77999-7	B3316.D	11/07/01
13	305-SRFC	L77999-9	B3317.D	11/07/01
14	304-2-4	L77999-13	B3321.D	11/08/01
15	304-10-12 RE	L77999-15	B3322.D	11/08/01
16	306-18-20 RE	L77999-11	B3323.D	11/08/01
17	301-4-6	L77999-2	B3330.D	11/09/01
18	304-6-8 DL	L77999-8, 3X	B3332.D	11/09/01
19	302-4-6 DL	L77999-4, 20X	B3337.D	11/09/01
20	303-4-6 RE	L77999-6	B3338.D	11/09/01
21	301-SRFC	L77999-1	B3343.D	11/12/01
22	301-4-6 RE	L77999-2	B3345.D	11/12/01
23	302-4-6 DLRE	L77999-4, 20X	B3346.D	11/12/01
24	301-SRFC DL	L77999-1, 2X	B3354.D	11/13/01

COMMENTS:

4B
SEMIVOLATILE METHOD BLANK SUMMARY

NYSDEC SAMPLE NO.

SBLK17

Lab Name: FRIEND LABORATORY, INC. Contract: _____
 Lab Code: 10252 Case No.: _____ SAS No.: _____ SDG No.: USC
 Lab File ID: B3293.D Lab Sample ID: SBLK17
 Instrument ID: MSD-B Date Extracted: 10/18/01
 Matrix: (soil/water) SOIL Date Analyzed: 11/05/01
 Level: (low/med) LOW Time Analyzed: 16:50

THIS METHOD BLANK APPLIES TO THE FOLLOWING SAMPLES, MS, MSD, AND MSB

	NYSDEC SAMPLE NO.	LAB SAMPLE ID	LAB FILE ID	DATE ANALYZED
01	SBLK17MS	SBLKMS17	B3294.D	11/05/01
02	308-8-10	L78240-1	B3320.D	11/08/01
03	305-SRFC	L78240-2	B3333.D	11/09/01
04	305-SRFC RE	L78240-2	B3344.D	11/12/01

COMMENTS:

1C
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

NYSDEC SAMPLE NO.

SBLK17

Lab Name: FRIEND LABORATORY, INC. Contract: _____

Lab Code: 10252 Case No.: _____ SAS No.: _____ SDG No.: USC

Matrix: (soil/water) SOIL Lab Sample ID: SBLK17

Sample wt/vol: 30.001 (g/ml) G Lab File ID: B3283.D

Level: (low/med) LOW Date Received: _____

% Moisture: 0 decanted: (Y/N) N Date Extracted: 10/18/01

Concentrated Extract Volume: 500 (uL) Date Analyzed: 11/05/01

Injection Volume: 2.0 (uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) Y pH: _____

CONCENTRATION UNITS:

CAS NO. COMPOUND (ug/L or ug/Kg) UG/KG Q

84-66-2	Diethyl phthalate	330	U
86-73-7	Fluorene	330	U
7005-72-3	4-Chlorophenylphenylether	330	U
100-01-6	4-Nitroaniline	830	U
534-52-1	2-Methyl-4,6-dinitrophenol	830	U
86-30-6	n-Nitrosodiphenylamine	330	U
101-55-3	4-Bromophenylphenylether	330	U
118-74-1	Hexachlorobenzene	330	U
1912-24-9	Atrazine	330	U
87-86-5	Pentachlorophenol	830	U
85-01-8	Phenanthrene	330	U
120-12-7	Anthracene	330	U
86-74-8	Carbazole	330	U
84-74-2	Di-n-butyl phthalate	330	U
206-44-0	Fluoranthene	330	U
129-00-0	Pyrene	330	U
85-68-7	Butylbenzyl phthalate	330	U
91-94-1	3,3'-Dichlorobenzidine	330	U
58-55-3	Benzo(a)anthracene	330	U
218-01-9	Chrysene	330	U
117-81-7	bis-2-Ethylhexyl phthalate	94	J
117-84-0	Di-n-octyl phthalate	330	U
205-99-2	Benzo(b)fluoranthene	330	U
207-08-9	Benzo(k)fluoranthene	330	U
50-32-8	Benzo(a)pyrene	2300	
193-39-5	Indeno(1,2,3-cd)pyrene	330	U
53-70-3	Dibenzo(a,h)anthracene	330	U
191-24-2	Benzo(g,h,i)perylene	330	U

4B
SEMIVOLATILE METHOD BLANK SUMMARY

EPA SAMPLE NO.

SBLK2E

Lab Name: MITKEM CORPORATION

Contract: _____

Lab Code: MITKEM Case No.: _____

SAS No.: _____ SDG No.: 82259

Lab File ID: S2C3405

Lab Sample ID: S1106-BS4

Instrument ID: S2

Date Extracted: 11/06/01

Matrix: (soil/water) SOIL

Date Analyzed: 11/14/01

Level: (low/med) LOW

Time Analyzed: 0336

THIS METHOD BLANK APPLIES TO THE FOLLOWING SAMPLES, MS, and MSD:

	EPA SAMPLE NO.	LAB SAMPLE ID	LAB FILE ID	DATE ANALYZED
01	S2DLCS	S1106-LS1	S2C3406	11/14/01
02	30379	82259001	S2C3427	11/14/01
03	30379MS	82259004	S2C3428	11/14/01
04	30379MSD	82259005	S2C3429	11/14/01
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COMMENTS: _____

1D
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

SBLK2R

Lab Name: MITKEM CORPORATION Contract: _____
 Lab Code: MITKEM Case No.: _____ SAS No.: _____ SDG No.: 82259
 Matrix: (soil/water) SOIL Lab Sample ID: S1106-BS4
 Sample wt/vol: 30.0(g/mL) G Lab File ID: S2C3405
 Level: (low/med) LOW Date Received: _____
 % Moisture: 0 Decanted: (Y/N) N Date Extracted: 11/06/01
 Concentrated Extract Volume: 500(uL) Date Analyzed: 11/14/01
 Injection Volume: 2.0(uL) Dilution Factor: 1.0
 GPC Cleanup: (Y/N) Y pH: _____ Extraction: (Type) SONC

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/KG Q

CAS NO.	COMPOUND		
51-28-5	2,4 Dinitrophenol	830	U
100-02-7	4-Nitrophenol	830	U
132-64-9	Dibenzofuran	330	U
121-14-2	2,4-Dinitrotoluene	330	U
84-66-2	Diethylphthalate	330	U
86-73-7	Fluorene	330	U
7005-72-3	4-Chlorophenyl-phenylether	330	U
100-01-6	4-Nitroaniline	830	U
534-52-1	4,6-Dinitro-2-methylphenol	830	U
86-30-6	N-Nitrosodiphenylamine (1)	330	U
101-55-3	4-Bromophenyl-phenylether	330	U
118-74-1	Hexachlorobenzene	330	U
1912-24-9	Alazine	330	U
87-86-5	Pentachlorophenol	830	U
85-01-8	Phenanthrene	330	U
120-12-7	Anthracene	330	U
86-74-8	Carbazole	330	U
84-74-2	Di-n-butylphthalate	330	U
206-44-0	Fluoranthene	330	U
129-00-0	Pyrene	330	U
85-68-7	Butylbenzylphthalate	330	U
91-94-1	3,3'-Dichlorobenzidine	330	U
56-55-3	Benzo(a)anthracene	330	U
218-01-9	Chrysene	330	U
117-81-7	bis(2-Ethylhexyl)phthalate	39	J
117-84-0	Di-n-octylphthalate	330	U
205-99-2	Benzo(b)fluoranthene	330	U
207-08-9	Benzo(k)fluoranthene	330	U
50-32-8	Benzo(a)pyrene	330	U
193-39-5	Indeno(1,2,3-cd)pyrene	330	U
53-70-3	Dibenzo(a,h)anthracene	330	U
191-24-2	Benzo(g,h,i)perylene	330	U

(1) - Cannot be separated from Diphenylamine

4B
SEMIVOLATILE METHOD BLANK SUMMARY

EPA SAMPLE NO.

SBLK2A

Lab Name: MITKEM CORPORATION Contract: _____
 Lab Code: MITKEM Case No.: _____ SAS No.: _____ SDG No.: 82330
 Lab File ID: S2C3556 Lab Sample ID: S1114-BW2
 Instrument ID: S2 Date Extracted: 11/14/01
 Matrix: (soil/water) WATER Date Analyzed: 11/23/01
 Level: (low/med) LOW Time Analyzed: 1151

THIS METHOD BLANK APPLIES TO THE FOLLOWING SAMPLES, MS, and MSD:

	EPA SAMPLE NO.	LAB SAMPLE ID	LAB FILE ID	DATE ANALYZED
01	S2ALCS	S1114-LW2	S2C3557	11/23/01
02	MW-304	82330004	S2C3560	11/23/01
03	MW-304MS	82330011	S2C3561	11/23/01
04	MW-304MSD	82330012	S2C3562	11/23/01
05	MW-305	82330005	S2C3595	11/24/01
06	MW-301	82330001	S2C3596	11/24/01
07	MW-303	82330003	S2C3597	11/24/01
08	MW-103	82330009	S2C3598	11/24/01
09	MW-302	82330002	S2C3599	11/24/01
10	MW-101	82330008	S2C3600	11/24/01
11	MW-306	82330006	S2C3607	11/24/01
12	S2ALCSRE	S1114-LW2RE	S2C3635	11/28/01
13	MW-306RE	82330006RE	S2C3645	11/28/01
14	MW-307	82330007	S2C3669	11/29/01
15	MW-101RE	82330008RE	S2C3721	12/01/01
16				
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COMMENTS: _____

1D
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

SBLK2A

Lab Name: MITKEM CORPORATION

Contract: _____

Lab Code: MITKEM

Case No.: _____

SAS No.: _____

SDG No.: 82330

Matrix: (soil/water) WATER

Lab Sample ID: SL114-HW2

Sample wt/vol: 1000 (g/mL) ML

Lab File ID: S2C3556

Level: (low/med) LOW

Date Received: _____

% Moisture: _____ Decanted: (Y/N)

Date Extracted: 11/14/01

Concentrated Extract Volume: 1000 (uL)

Date Analyzed: 11/23/01

Injection Volume: 2.0 (uL)

Dilution Factor: 1.0

GPC Cleanup: (Y/N) N

pH: _____

Extraction: (Type) CONT

CAS NO. COMPOUND CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/L Q

51-28-5	2,4 Dinitrophenol	25	U
100-02-7	4-Nitrophenol	25	U
132-64-9	Dibenzofuran	10	U
121-14-2	2,4 Dinitrotoluene	10	U
84-66-2	Diethylphthalate	10	U
86-73-7	Fluorene	10	U
7005-72-3	4-Chlorophenyl-phenylether	10	U
100-01-6	4-Nitroaniline	25	U
534-52-1	4,6-Dinitro-2-methylphenol	25	U
86-30-6	N-Nitrosodiphenylamine (1)	10	U
101-55-3	4-Bromophenyl-phenylether	10	U
118-74-1	Hexachlorobenzene	10	U
1912-24-9	Atrazine	10	U
87-86-5	Pentachlorophenol	25	U
85-01-8	Phenanthrene	10	U
120-12-7	Anthracene	10	U
86-74-8	Carbazole	10	U
84-74-2	Di-n-butylphthalate	10	U
206-44-0	Fluoranthene	10	U
129-00-0	Pyrene	10	U
85-68-7	Butylbenzylphthalate	10	U
91-94-1	3,3'-Dichlorobenzidine	10	U
56-55-3	Benzo(a)anthracene	10	U
218-01-9	Chrysene	10	U
117-81-7	bis(2-Ethylhexyl)phthalate	1	J
117-84-0	Di-n-octylphthalate	10	U
205-99-2	Benzo(b)fluoranthene	10	U
207-08-9	Benzo(k)fluoranthene	10	U
50-32-8	Benzo(a)pyrene	10	U
193-39-5	Indeno(1,2,3-cd)pyrene	10	U
53-70-3	Dibenzo(a,h)anthracene	10	U
191-24-2	Benzo(g,h,i)perylene	10	U

(1) - Cannot be separated from Diphenylamine

6A
VOLATILE ORGANICS INITIAL CALIBRATION DATA

Lab Name: MITKEM CORPORATION Contract: _____
 Lab Code: MITKEM Case No.: _____ SAS No.: _____ SDG No.: 82330
 Instrument ID: V1 Calibration Date(s): 10/24/01 10/24/01
 Heated Purge: (Y/N) N Calibration Times: 1141 1338
 GC Column: DB-624 ID: 0.25 (mm)

LAB FILE ID:		RRF10 =	V1E2371	RRF20 =	V1E2375			
RRF50 =		V1E2372	RRF100=	V1E2374	RRF200=	V1E2373		
COMPOUND		RRF10	RRF20	RRF50	RRF100	RRF200	% RSD	
Dichlorodifluoromethane		1.984	2.174	2.110	2.264	2.091	2.125	4.9
Chloromethane		3.551	3.868	3.708	4.090	3.697	3.783	5.4
Vinyl Chloride	*	2.719	3.031	3.012	3.327	3.042	3.026	7.1*
Bromomethane	*	1.646	1.537	1.236	1.549	1.310	1.456	12.0*
Chloroethane		1.565	1.524	1.498	1.647	1.464	1.540	4.6
Trichlorofluoromethane		1.946	2.135	2.089	2.234	2.018	2.084	5.3
1,1-Dichloroethene	*	2.389	2.372	2.427	2.501	2.380	2.414	2.2*
1,1,2-Trichloro- 1,2,2-trifluoroethane		1.822	1.921	1.739	1.736	1.614	1.766	6.5
Acetone		0.954	0.530	0.603	0.482	0.374	0.589	37.5
Carbon Disulfide		5.382	5.276	5.610	5.835	5.750	5.571	4.3
Methyl Acetate		1.828	1.651	1.797	1.747	1.646	1.734	4.8
Methylene Chloride		2.286	2.220	2.292	2.364	2.252	2.283	2.3
trans-1,2-Dichloroethene		2.260	2.216	2.340	2.366	2.223	2.281	3.0
Methyl tert-Butyl Ether		4.767	4.818	5.232	5.530	5.232	5.116	6.2
1,1-Dichloroethane	*	3.710	3.695	3.897	4.105	3.768	3.835	4.5*
cis-1,2-Dichloroethene		2.194	2.185	2.389	2.493	2.410	2.334	5.9
2-Butanone		0.829	0.858	0.935	0.982	0.863	0.893	7.1
Chloroform	*	3.410	3.469	3.611	3.740	3.517	3.549	3.7*
1,1,1-Trichloroethane	*	0.268	0.284	0.280	0.302	0.264	0.280	5.3*
Cyclohexane		0.570	0.575	0.615	0.670	0.623	0.611	6.6
Carbon Tetrachloride	*	0.255	0.268	0.273	0.299	0.277	0.274	5.8*
Benzene	*	1.439	1.450	1.526	1.685	1.596	1.539	6.7*
1,2-Dichloroethane	*	2.236	2.369	2.376	2.534	2.381	2.379	4.4*
Trichloroethene	*	0.292	0.302	0.322	0.356	0.338	0.322	8.1*
Methylcyclohexane		0.575	0.526	0.553	0.593	0.543	0.558	4.7

* Compounds with required minimum RRF and maximum %RSD values.
 All other compounds must meet a minimum RRF of 0.010.

Method : C:\HPCHEM\1\METHODS\1026NCLP.M (Chemstation Integrator)
 Title :
 Last Update : Mon Oct 29 09:02:39 2001
 Response via : Continuing Calibration

Calibration Files

10 =D0138.D 20 =D0139.D 50 =D0140.D
 100 =D0141.D 200 =D0142.D

Compound	10	20	50	100	200	Avg	%RSD
1) Bromochloromethane	-----ISTD-----						
2) p Dichlorodifluorometha	1.305	1.415	1.511	1.347	1.191	1.354	8.85
3) pc Chloromethane	1.535	1.640	1.656	1.487	1.477	1.559	5.41
4) pc Vinyl chloride	1.652	1.851	2.002	1.816	1.721	1.809	7.39
5) pc Bromomethane	0.432	0.439	0.520	0.466	0.472	0.466	7.45
6) pc Chloroethane	0.776	1.139	0.907	0.876	0.795	0.899	16.13
7) pc Trichlorofluoromethan	2.155	2.245	2.297	1.808	1.505	2.002	16.82
8) pc 1,1,2-Trichloro-1,2,2	2.251	2.343	2.398	2.105	1.857	2.191	9.92
9) Mpc 1,1-Dichloroethene	1.169	1.236	1.285	1.144	1.032	1.173	8.23
10) pc Acetone	0.846	0.638	0.611	0.426	0.314	0.567	36.22
11) pc Carbon disulfide	4.712	4.859	5.037	4.508	4.036	4.631	8.31
12) pc Methyl acetate	0.199	0.211	0.245	0.217	0.190	0.212	9.94
13) pc Methylene chloride	1.478	1.491	1.546	1.366	1.278	1.432	7.54
14) pc trans-1,2-Dichloroeth	1.169	1.236	1.285	1.144	1.032	1.173	8.23
15) pc MTBE(Methyl tert-butyl	3.836	3.874	4.041	3.530	3.249	3.706	8.51
16) pc 1,1-Dichloroethane	3.593	3.815	4.043	3.635	3.397	3.697	6.60
17) pc cis-1,2-Dichloroethen	1.259	1.345	1.377	1.241	1.159	1.276	6.81
18) pc MEK(2-Butanone)	1.295	1.111	1.072	0.912	0.778	1.034	19.08
19) pc Chloroform	2.723	2.900	3.041	2.747	2.593	2.801	6.18
20) pc 1,2-Dichloroethane	1.926	1.988	2.172	1.937	1.808	1.966	6.75
21) Spc 1,2-Dichloroethane-d4	1.323	1.263	1.622	1.193	1.112	1.303	14.97
22) 1,4-Difluorobenzene	-----ISTD-----						
23) pc 1,1,1-Trichloroethane	0.456	0.467	0.481	0.441	0.444	0.458	3.61
24) pc Cyclohexane	0.665	0.700	0.713	0.648	0.620	0.669	5.65
25) pc Carbon tetrachloride	0.402	0.440	0.458	0.427	0.418	0.429	4.97
26) Mpc Benzene	1.098	1.145	1.151	1.059	1.079	1.106	3.64
27) Mpc Trichloroethene	0.438	0.448	0.463	0.421	0.424	0.439	3.90
28) pc Methyl cyclohexane	0.461	0.503	0.523	0.473	0.457	0.483	5.92
29) pc 1,2-Dichloropropane	0.533	0.564	0.587	0.537	0.550	0.554	4.00
30) pc Bromodichloromethane	0.590	0.628	0.648	0.606	0.627	0.620	3.61
31) pc cis-1,3-Dichloroprope	0.622	0.656	0.709	0.658	0.669	0.663	4.72
32) pc trans-1,3-Dichloropro	0.485	0.519	0.565	0.535	0.543	0.529	5.63
33) pc 1,1,2-Trichloroethane	0.303	0.311	0.336	0.298	0.315	0.313	4.62
34) pc Dibromochloromethane	0.552	0.587	0.629	0.581	0.592	0.588	4.73
35) pc Bromoform	0.297	0.324	0.355	0.330	0.335	0.328	6.36
36) Chlorobenzene-d5	-----ISTD-----						
37) pc MIBK(4-Methyl-2-penta	0.625	0.628	0.691	0.627	0.624	0.639	4.59
38) Spc Toluene-d8	0.864	0.882	1.055	0.857	0.849	0.901	9.62
39) Mpc Toluene	1.252	1.302	1.308	1.227	1.226	1.263	3.16
40) pc Tetrachloroethene	0.358	0.381	0.389	0.361	0.354	0.369	4.16
41) pc 2-Hexanone	0.625	0.628	0.691	0.627	0.624	0.639	4.59

(#) = Out of Range
 1026NCLP.M

Fri Jan 18 09:15:57 2002

QC3

00216
 Page 1

Response Factor Report MSD-D

Method : C:\HPCHEM\1\METHODS\1026NCLP.M (Chemstation Integrator)
 Title :
 Last Update : Mon Oct 29 09:02:39 2001
 Response via : Continuing Calibration

Calibration Files

10 =D0138.D 20 =D0139.D 50 =D0140.D
 100 =D0141.D 200 =D0142.D

Compound	10	20	50	100	200	Avg	%RSD
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5) pc Bromomethane	0.432	0.439	0.520	0.466	0.472	0.466	7.45
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13) pc Methylene chloride	1.478	1.491	1.546	1.366	1.278	1.432	7.54
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35) pc Bromoform	0.297	0.324	0.355	0.330	0.335	0.328	6.36
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39) Mpc Toluene	1.252	1.302	1.308	1.227	1.226	1.263	3.16
40) pc Tetrachloroethene	0.358	0.381	0.389	0.361	0.354	0.369	4.16
41) pc 2-Hexanone	0.625	0.628	0.691	0.627	0.624	0.639	4.59

VOLATILE CONTINUING CALIBRATION CHECK

Lab Name: MITKEM CORPORATION Contract: _____

Lab Code: MITKEM Case No.: _____ SAS No.: _____ SDG No.: 82330

Instrument ID: V1 Calibration Date: 11/19/01 Time: 1039

Lab File ID: V1E2901 Init. Calib. Date(s): 10/24/01 10/24/01

EPA Sample No. (VSTD050##): VSTD0501K Init. Calib. Times: 1141 1338

Heated Purge: (Y/N) N

GC Column: DB-624 ID: 0.25 (mm)

COMPOUND	RRF	RRF50	MIN RRF	%D	MAX %D
Dichlorodifluoromethane	2.125	1.732		-18.5	
Chloromethane	3.783	2.956		-21.9	
Vinyl Chloride	3.026	2.673	0.100	-11.7	25.0
Bromomethane	1.456	1.480	0.100	1.6	25.0
Chloroethane	1.540	1.446		-6.1	
Trichlorofluoromethane	2.084	1.749		-16.1	
1,1-Dichloroethene	2.414	2.095	0.100	-13.2	25.0
1,1,2-Trichloro-1,2,2-trifluoroethane	1.766	1.574		-10.9	
Acetone	0.589	0.986		67.4	
Carbon Disulfide	5.571	7.486		34.4	
Methyl Acetate	1.734	1.480		-14.6	
Methylene Chloride	2.283	2.024		-11.3	
trans-1,2-Dichloroethene	2.281	2.078		-8.9	
Methyl tert-Butyl Ether	5.116	4.553		-11.0	
1,1-Dichloroethane	3.835	3.452	0.200	-10.0	25.0
cis-1,2-Dichloroethene	2.334	2.161		-7.4	
2-Butanone	0.893	0.998		11.8	
Chloroform	3.549	2.954	0.200	-16.8	25.0
1,1,1-Trichloroethane	0.280	0.219	0.100	-21.8	25.0
Cyclohexane	0.611	0.468		-23.4	
Carbon Tetrachloride	0.274	0.232	0.100	-15.3	25.0
Benzene	1.539	1.365	0.500	-11.3	25.0
1,2-Dichloroethane	2.379	1.908	0.100	-19.8	25.0
Trichloroethene	0.322	0.321	0.300	-0.3	25.0
Methylcyclohexane	0.558	0.438		-21.5	

All other compounds must meet a minimum RRF of 0.010.

Data File : C:\HPCHEM\MSD-D8-2\DATA1\D9862.D
 Acq On : 19 Oct 101 2:16 pm
 Sample : VSTD050
 Misc : 25 UL 01-166-6-1 IN 5 ML H2O
 MS Integration Params: events.e

Vial: 2
 Operator: kjm
 Inst : MSD-D
 Multiplr: 1.00

Method : C:\HPCHEM\MSD-D8-2\METHODS\1017NCLP.M (Chemstation Integrator)
 Title :
 Last Update : Thu Oct 18 08:34:44 2001
 Response via : Multiple Level Calibration

Min. RRF : 0.000 Min. Rel. Area : 50% Max. R.T. Dev 0.50min
 Max. RRF Dev : 25% Max. Rel. Area : 150%

	Compound	AvgRF	CCRF	%Dev	Area%	Dev(min)
1	Bromochloromethane	1.000	1.000	0.0	130	0.03
2 p	Dichlorodifluoromethane	1.417	1.593	-12.4	149	0.05
3 pc	Chloromethane	1.804	1.843	-2.2	136	0.06
4 pc	Vinyl chloride	1.958	2.152	-9.9	145	0.06
5 pc	Bromomethane	0.795	0.783	1.5	136	0.06
6 pc	Chloroethane	0.937	0.953	-1.7	137	0.06
7 pc	Trichlorofluoromethane	2.090	2.355	-12.7	145	0.07
8 pc	1,1,2-Trichloro-1,2,2-trifl	2.333	2.504	-7.3	144	0.07
9 Mpc	1,1-Dichloroethene	1.213	1.329	-9.6	147	0.06
10 pc	Acetone	0.626	0.631	-0.8	147	0.05
11 pc	Carbon disulfide	4.765	5.278	-10.8	148	0.06
12 pc	Methyl acetate	0.226	0.237	-4.9	140	0.04
13 pc	Methylene chloride	1.508	1.458	3.3	132	0.06
14 pc	trans-1,2-Dichloroethene	1.213	1.329	-9.6	147	0.06
15 pc	MTBE(Methyl tert-butyl ethe	4.296	4.150	3.4	133	0.04
16 pc	1,1-Dichloroethane	3.958	4.083	-3.2	136	0.04
17 pc	cis-1,2-Dichloroethene	1.305	1.407	-7.8	145	0.05
18 pc	MEK(2-Butanone)	1.094	0.994	9.1	124	0.03
19 pc	Chloroform	2.919	3.088	-5.8	140	0.03
20 pc	1,2-Dichloroethane	2.133	2.097	1.7	130	0.03
21 Spc	1,2-Dichloroethane-d4	1.319	1.566	-18.7	154#	0.03
22	1,4-Difluorobenzene	1.000	1.000	0.0	130	0.02
23 pc	1,1,1-Trichloroethane	0.473	0.500	-5.7	141	0.03
24 pc	Cyclohexane	0.719	0.747	-3.9	139	0.03
25 pc	Carbon tetrachloride	0.263	0.339	-28.9#	163#	0.03
26 Mpc	Benzene	1.159	1.219	-5.2	140	0.03
27 Mpc	Trichloroethene	0.446	0.476	-6.7	141	0.02
28 pc	Methyl cyclohexane	0.502	0.558	-11.2	148	0.02
29 pc	1,2-Dichloropropane	0.601	0.589	2.0	130	0.02
30 pc	Bromodichloromethane	0.647	0.681	-5.3	140	0.03
31 pc	cis-1,3-Dichloropropene	0.687	0.712	-3.6	139	0.02
32 pc	trans-1,3-Dichloropropene	0.552	0.563	-2.0	136	0.01
33 pc	1,1,2-Trichloroethane	0.331	0.330	0.3	133	0.02
34 pc	Dibromochloromethane	0.589	0.592	-0.5	133	0.01
35 pc	Bromoform	0.324	0.335	-3.4	136	0.01
36	Chlorobenzene-d5	1.000	1.000	0.0	130	0.01
37 pc	MIBK(4-Methyl-2-pentanone)	0.672	0.641	4.6	123	0.02
38 Spc	Toluene-d8	0.888	1.073	-20.8	162#	0.02
39 Mpc	Toluene	1.251	1.338	-7.0	140	0.02
40 pc	Tetrachloroethene	0.356	0.401	-12.6	151#	0.02
41 pc	2-Hexanone	0.672	0.641	4.6	123	0.02
42 pc	EDB(1,2-Dibromoethane)	0.552	0.548	0.7	130	0.01
43 Mpc	Chlorobenzene	0.924	0.955	-3.4	135	0.01

Evaluate Continuing Calibration Report

Data File : C:\HPCHEM\2\DATA\B3296.D
 Acq On : 6 Nov 2010 8:13 am
 Sample : SST0050
 Misc : 97-151-67-F
 MS Integration Params: rteint.p

Vial: 2
 Operator: CPW
 Inst : MSD-B
 Multiplr: 1.00

Method : C:\HPCHEM\2\METHODS\CLPB1105.M (RTE Integrator)
 Title : 95 2,2uL INJ.,HP5MS25MM ID X 30M X 0.25uM THICK
 Last Update : Mon Nov 05 15:59:49 2001
 Response via : Multiple Level Calibration

Min. RRF : 0.010 Min. Rel. Area : 10% Max. R.T. Dev 0.50min
 Max. RRF Dev : 25% Max. Rel. Area : 500%

	Compound	AvgRF	CCRF	%Dev	Area%	Dev(min)
1 I	1,4 DICHLOROBENZENE d4	1.000	1.000	0.0	128	0.02
2 S	2-FLUOROPHENOL	1.201	1.066	11.2	123	0.02
3	BENZALDEHYDE	0.873	0.915	-4.8	135	0.02
4 S	PHENOL D5	1.572	1.522	3.2	133	0.02
5 c,m	PHENOL	1.568	1.532	2.3	133	0.02
6	BIS(2-CHLOROETHYLETHYR)	1.289	1.206	6.4	130	0.02
7 S	2-CHLOROPHENOL-d4	1.242	1.194	3.9	131	0.02
8 m	2 CHLOROPHENOL	1.376	1.279	7.0	127	0.01
9 S	1,2 DICHLOROBENZENE-d4	1.076	1.108	-3.0	130	0.01
10	2-METHYLPHENOL	1.205	1.153	4.3	131	0.01
11	2,2'-OXYBIS(1-CHLOROPROPANE)	2.092	1.962	6.2	130	0.01
12 c,m	N-NITROSODI-N-PROPYLAMINE	1.090	1.003	8.0	133	0.02
13	ACETOPHENONE	1.843	1.716	6.9	123	0.01
14	HEXACHLOROETHANE	0.673	0.647	3.9	125	0.01
15	4 METHYLPHENOL	1.250	1.181	5.5	131	0.02
16 I	NAPHTHALENE-d-8	1.000	1.000	0.0	130	0.01
17 S	NITROBENZENE d5	0.486	0.492	-1.2	127	0.02
18	NITROBENZENE	0.431	0.393	8.8	124	0.01
19	ISOPHORONE	0.740	0.683	7.7	129	0.02
20 c	2-NITROPHENOL	0.246	0.231	6.1	131	0.02
21	2,4-DIMETHYLPHENOL	0.404	0.378	6.4	127	0.01
22	BIS(2-CHLOROETHOXYMETHANE)	0.489	0.461	5.7	131	0.01
23 c	2,4-DICHLOROPHENOL	0.346	0.327	5.5	133	0.01
24	NAPHTHALENE	1.144	1.090	4.7	130	0.01
25	4 CHLOROANILINE	0.476	0.461	3.2	130	0.01
26 c	HEXACHLOROBUTADIENE	0.235	0.222	5.5	127	0.01
27 c,m	CAPROLACTAM	0.112	0.087	22.3	91	0.02
28 c,m	4-CHLORO 3-METHYLPHENOL	0.335	0.337	-0.6	127	0.01
29	2 METHYLNAPHTHALENE	0.989	0.728	26.4#	94	0.01
30 I	ACENAPHTHENE d10	1.000	1.000	0.0	131	0.01
31 c	HEXACHLOROCYCLOPENTADIENE	0.499	0.452	9.4	127	0.00
32 c	2,4,6-TRICHLOROPHENOL	0.446	0.408	8.5	129	0.00
33	2,4,5-TRICHLOROPHENOL	0.475	0.434	8.6	129	0.01
34 S	2 FLUOROBIPHENYL	1.503	1.520	-1.1	128	0.00
35	2-CHLORONAPHTHALENE	1.235	1.142	7.5	129	0.01
36	1,1'-BIPHENYL	1.500	1.367	8.9	126	0.00
37	2 NITROANILINE	0.397	0.361	9.1	126	0.00
38	DIMETHYL PHTHALATE	1.532	1.425	7.0	128	0.01
39	2,6-DINITROTOLUENE	0.370	0.348	5.9	130	0.00

(#) = Out of Range

B3296.D CLPB1105.M

Tue Nov 06 09:05:00 2001

MSD-A

01509
Page 1

Data File : C:\HPCHEM\2\DATA\B3305.D
 Acq On : 7 Nov 2010 8:41 am
 Sample : SST0050
 Misc : 97 151 67 F
 MS Integration Params: rleint.p

Vial: 2
 Operator: CFW
 Inst : MSD B
 Multiplr: 1.00

Method : C:\HPCHEM\2\METHODS\CLPB1105.M (RTE Integrator)
 Title : 95-2,2uL INT.,HP5MS25MM ID X 30M X 0.25uM THICK
 Last Update : Mon Nov 05 15:59:49 2001
 Response via : Multiple Level Calibration

Min. RRF : 0.010 Min. Rel. Area : 10% Max. R.T. Dev 0.50min
 Max. RRF Dev : 25% Max. Rel. Area : 500%

	Compound	AvRRF	CRRF	%Dev	Area%	Dev(min)
1	T 1,4 DICHLOROBENZENE d4	1.000	1.000	0.0	110	0.06
2	S 2-FLUOROPHENOL	1.201	1.063	11.5	106	-0.12
3	BENZALDEHYDE	0.873	0.859	1.6	110	-0.08
4	S PHENOL-D5	1.572	1.503	4.4	113	-0.05
5	c,m PHENOL	1.568	1.506	4.0	113	0.05
6	BIS(2-CHLOROETHYLEETHER)	1.289	1.197	7.1	111	-0.06
7	S 2 CHLOROPHENOL d4	1.242	1.171	5.7	111	-0.07
8	m 2-CHLOROPHENOL	1.376	1.274	7.4	109	-0.07
9	S 1,2-DICHLOROBENZENE-d4	1.076	1.113	-3.4	112	0.07
10	2-METHYLPHENOL	1.205	1.136	5.7	112	-0.04
11	2,2' OXYBIS(1-CHLOROPROPANE)	2.092	2.006	4.1	115	-0.06
12	c,m N-NITROSODI N PROPYLAMINE	1.090	1.050	3.7	120	-0.06
13	ACETOPHENONE	1.843	1.728	6.2	107	-0.06
14	HEXACHLOROETHANE	0.673	0.655	2.7	109	0.06
15	4 METHYLPHENOL	1.250	1.193	4.6	114	-0.05
16	I NAPHTHALENE-d-8	1.000	1.000	0.0	112	-0.06
17	S NITROBENZENE-d5	0.485	0.484	0.4	109	0.06
18	NITROBENZENE	0.431	0.385	10.7	105	-0.06
19	ISOPHORONE	0.740	0.676	8.6	111	-0.05
20	c 2-NITROPHENOL	0.216	0.227	7.7	112	-0.05
21	2,4-DIMETHYLPHENOL	0.404	0.383	5.2	112	0.05
22	BIS(2-CHLOROETHOXYMETHANE)	0.489	0.450	8.0	111	0.05
23	c 2,4 DICHLOROPHENOL	0.346	0.321	7.2	113	-0.05
24	NAPHTHALENE	1.144	1.094	4.4	114	-0.05
25	4 CHLOROANILINE	0.476	0.454	4.6	111	-0.06
26	c HEXACHLOROBTADIENE	0.235	0.226	3.8	112	-0.05
27	c,m CAPROLACTAM	0.112	0.116	-3.6	105	-0.07
28	c,m 4-CHLORO-3-METHYLPHENOL	0.335	0.330	1.5	109	0.04
29	2 METHYLNAPHTHALENE	0.989	0.714	27.8#	80	0.04
30	I ACENAPHTHENE d10	1.000	1.000	0.0	114	-0.05
31	c HEXACHLOROCYCLOPENTADIENE	0.499	0.427	14.4	105	0.05
32	c 2,4,6-TRICHLOROPHENOL	0.446	0.402	9.9	111	-0.05
33	2,4,5-TRICHLOROPHENOL	0.475	0.435	8.4	113	-0.04
34	S 2-FLUOROBIPHENYL	1.503	1.521	-1.2	112	-0.05
35	2 CHLORONAPHTHALENE	1.235	1.129	8.6	111	-0.05
36	1,1'-BIPHENYL	1.500	1.378	8.1	111	0.05
37	2 NITROANILINE	0.397	0.356	10.3	109	-0.05
38	DIMETHYL PHTHALATE	1.532	1.387	9.5	109	-0.05
39	2,6 DINITROTOLUENE	0.370	0.340	8.1	111	-0.06

(#) = Out of Range

B3305.D CLPB1105.M

Wed Nov 07 09:33:31 2001

MSD-A

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01512

CFW

Evaluate Continuing Calibration Report

Data File : C:\HPCHEM\2\DATA\B3326.D
 Acq On : 9 Nov 2010 7:28 am
 Sample : SSTD050
 Misc : 97-151-67 F
 MS Integration Params: rteint.p

Vial: 2
 Operator: CPW
 Inst : MSD B
 Multiplr: 1.00

Method : C:\HPCHEM\2\METHODS\CLPB1105.M (RTE Integrator)
 Title : 95-2,2uL INJ.,HP5MS25MM 1D X 30M X 0.25uM THICK
 Last Update : Mon Nov 05 15:59:49 2001
 Response via : Multiple Level Calibration

Min. RRF : 0.010 Min. Rel. Area : 10% Max. R.T. Dev 0.50min
 Max. RRF Dev : 25% Max. Rel. Area : 500%

	Compound	AvgRRF	CCRF	%Dev	Area%	Dev(min)
1 I	1,4-DICHLOROBENZENE-d4	1.000	1.000	0.0	144	0.02
2 S	2-FLUOROPHENOL	1.201	1.102	8.2	143	0.03
3	BENZALDEHYDE	0.873	0.914	-4.7	152	0.00
4 S	PHENOL D5	1.572	1.540	2.0	151	0.03
5 C,m	PHENOL	1.568	1.539	1.8	151	0.03
6	BIS(2-CHLOROETHYLETHER)	1.289	1.238	4.0	150	0.02
7 S	2-CHLOROPHENOL-d4	1.242	1.210	2.6	149	0.02
8 m	2-CHLOROPHENOL	1.376	1.316	4.4	146	0.00
9 S	1,2-DICHLOROBENZENE-d4	1.076	1.128	4.8	148	0.00
10	2-METHYLPHENOL	1.205	1.163	3.5	149	0.00
11	2,2'-OXYBIS(1 CHLOROPROPANE	2.092	2.015	3.7	150	0.00
12 C,m	N NITROSODI-N-PROPYLAMINE	1.090	1.020	6.4	152	0.00
13	ACETOPHENONE	1.843	1.738	5.7	139	0.00
14	HEXACHLOROETHANE	0.673	0.658	2.2	143	0.00
15	4-METHYLPHENOL	1.250	1.177	5.8	147	0.02
16 I	NAPHTHALENE-d-8	1.000	1.000	0.0	144	0.00
17 S	NITROBENZENE-d5	0.486	0.406	-2.1	143	0.00
18	NITROBENZENE	0.431	0.402	6.7	141	0.00
19	ISOPHORONE	0.740	0.686	7.3	144	0.00
20 C	2-NITROPHENOL	0.246	0.230	6.5	146	0.00
21	2,4-DIMETHYLPHENOL	0.404	0.380	5.9	142	0.00
22	BIS(2-CHLOROETHOXYMETHANE)	0.489	0.471	3.7	149	0.00
23 C	2,4-DICHLOROPHENOL	0.346	0.322	6.9	146	0.00
24	NAPHTHALENE	1.144	1.088	4.9	145	0.00
25	4-CHLOROANILINE	0.476	0.466	2.1	146	0.00
26 C	HEXACHLOROCYCLOPENTADIENE	0.235	0.227	3.4	144	0.00
27 C,m	CAPROLACTAM	0.112	0.098	12.5	114	0.02
28 C,m	4-CHLORO-3-METHYLPHENOL	0.335	0.336	0.3	142	0.01
29	2-METHYLNAPHTHALENE	0.989	0.720	26.3#	105	0.00
30 I	ACENAPHTHENE-d10	1.000	1.000	0.0	145	0.00
31 C	HEXACHLOROCYCLOPENTADIENE	0.499	0.446	10.6	140	0.00
32 C	2,4,6-TRICHLOROPHENOL	0.446	0.412	7.6	145	0.00
33	2,4,5 TRICHLOROPHENOL	0.475	0.429	9.7	142	0.00
34 S	2-FLUOROBIPHENYL	1.503	1.541	-2.5	144	0.00
35	2-CHLORONAPHTHALENE	1.235	1.131	8.4	142	0.00
36	1,1'-BIPHENYL	1.500	1.389	7.4	142	0.00
37	2-NITROANILINE	0.397	0.368	7.3	143	0.00
38	DIMETHYL PHTHALATE	1.532	1.425	7.0	143	0.00
39	2,6-DINITROTOLUENE	0.370	0.342	7.6	142	0.00

#) = Out of Range

Evaluate Continuing Calibration Report

Data File : C:\HPCHEM\2\DATA\B3350.D
 Acq On : 13 Nov 2010 1:06 pm
 Sample : SST050
 Misc : 97-151-67-F
 MS Integration Params: rteint.p

Vial: 2
 Operator: CPW
 Inst : MSD B
 Multiplr: 1.00

Method : C:\HPCHEM\2\METHODS\CLPB1105.M (RTE Integrator)
 Title : 95 2,2uL INJ., HP5MS25MM ID X 30M X 0.25uM THICK
 Last Update : Mon Nov 05 15:59:49 2001
 Response via : Multiple Level Calibration

Min. RRF : 0.010 Min. Rel. Area : 10% Max. R.T. Dev 0.50min
 Max. RRF Dev : 25% Max. Rel. Area : 500%

	Compound	AvgRF	CCRF	%Dev	Area%	Dev(min)
1 I	1,4-DICHLOROBENZENE-d4	1.000	1.000	0.0	85	-0.21
2 S	2-FLUOROPHENOL	1.201	1.046	12.9	81	0.29
3	BENZALDEHYDE	0.873	0.838	4.0	82	-0.23
4 S	PHENOL-D5	1.572	1.430	9.0	83	-0.20
5 C, m	PHENOL	1.568	1.471	6.2	85	-0.20
6	BIS(2-CHLOROETHYLETHYR)	1.289	1.232	4.4	88	0.21
7 S	2-CHLOROPHENOL-d4	1.242	1.148	7.6	84	-0.22
8 m	2-CHLOROPHENOL	1.376	1.276	7.3	84	-0.22
9 S	1,2-DICHLOROBENZENE d4	1.076	1.073	0.3	83	0.21
10	2-METHYLPHENOL	1.205	1.120	7.1	85	-0.18
11	2,2' OXYBIS(1-CHLOROPROPANE)	2.092	2.062	1.4	91	-0.20
12 C, m	N-NITROSODI N PROPYLAMINE	1.090	1.014	7.0	89	0.21
13	ACETOPHENONE	1.843	1.656	10.1	79	0.21
14	HEXACHLOROETHANE	0.673	0.659	2.1	85	-0.21
15	4-METHYLPHENOL	1.250	1.142	8.6	85	-0.19
16 I	NAPHTHALENE-d-8	1.000	1.000	0.0	86	0.20
17 S	NITROBENZENE-d5	0.486	0.450	7.4	77	-0.20
18	NITROBENZENE	0.431	0.375	13.0	78	-0.21
19	ISOPHORONE	0.740	0.629	15.0	79	0.20
20 C	2-NITROPHENOL	0.246	0.222	9.8	84	0.19
21	2,4-DIMETHYLPHENOL	0.404	0.362	10.4	81	-0.19
22	BIS(2-CHLOROETHOXYMETHANE)	0.489	0.453	7.4	85	-0.19
23 C	2,4-DICHLOROPHENOL	0.346	0.310	10.4	84	0.19
24	NAPHTHALENE	1.144	1.045	8.7	83	0.20
25	4-CHLOROANILINE	0.476	0.424	10.9	79	-0.19
26 C	HEXACHLOROBTADIENE	0.235	0.223	5.1	85	0.19
27 C, m	CAPROLACTAM	0.112	0.095	15.2	66	0.24
28 C, m	4-CHLORO-3-METHYLPHENOL	0.335	0.320	4.5	80	-0.19
29	2-METHYLNAPHTHALENE	0.989	0.695	29.7#	60	-0.19
30 I	ACENAPHTHENE-d10	1.000	1.000	0.0	89	0.20
31 C	HEXACHLOROCYCLOPENTADIENE	0.499	0.398	20.2	76	-0.20
32 C	2,4,6-TRICHLOROPHENOL	0.446	0.390	12.6	83	-0.20
33	2,4,5-TRICHLOROPHENOL	0.475	0.430	9.5	87	-0.19
34 S	2-FLUOROBIPHENYL	1.503	1.412	6.1	81	0.21
35	2-CHLORONAPHTHALENE	1.235	1.089	11.8	83	-0.21
36	1,1'-BIPHENYL	1.500	1.311	12.6	82	-0.21
37	2-NITROANILINE	0.397	0.348	12.3	83	0.21
38	DIMETHYL PHTHALATE	1.532	1.514	1.2	92	-0.20
39	2,6-DINITROTOLUENE	0.370	0.339	8.4	86	-0.21

(#) = Out of Range

B3350.D CLPB1105.M

Tue Nov 13 13:58:35 2001

MSD-A

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01524

7C
SEMIVOLATILE CONTINUING CALIBRATION CHECK

Lab Name: MITKEM CORPORATION Contract: _____
 Lab Code: MITKEM Case No.: _____ SAS No.: _____ SDG No.: 82259
 Instrument ID: S2 Calibration Date: 11/14/01 Time: 1631
 Lab File ID: S2C3421 Init. Calib. Date(s): 11/12/01 11/12/01
 EPA Sample No. (SSTD050##): SSTD0502S Init. Calib. Times: 1118 1352
 GC Column: DB-SMS ID: 0.25 (mm)

COMPOUND	RRF	RRF50	MIN RRF	%D	MAX %D
Benzaldehyde	0.846	1.155		(36.5)	
Phenol	1.706	1.947	0.800	14.1	25.0
bis(2-Chloroethyl) Ether	1.244	1.597	0.700	(28.4)	25.0
2-Chlorophenol	1.272	1.396	0.800	9.7	25.0
2-Methylphenol	1.191	1.293	0.700	8.6	25.0
2,2'-oxybis(1-Chloropropane)	1.770	2.219		(25.4)	
Acetophenone	1.684	2.030		20.5	
4-Methylphenol	1.190	1.432	0.600	20.3	25.0
N-Nitroso-di-n-propylamine	0.834	1.075	0.500	(28.9)	25.0
Hexachlorocyclohexane	0.543	0.622	0.300	14.5	25.0
Nitrobenzene	0.356	0.390	0.200	9.6	25.0
Isophorone	0.718	0.812	0.400	13.1	25.0
2-Nitrophenol	0.209	0.202	0.100	-3.3	25.0
2,4-Dimethylphenol	0.309	0.308	0.200	-0.3	25.0
bis(2-Chloroethoxy)methane	0.444	0.505	0.300	13.7	25.0
2,4-Dichlorophenol	0.282	0.278	0.200	-1.4	25.0
Naphthalene	0.942	1.040	0.700	10.4	25.0
4-Chloroaniline	0.381	0.442		16.0	
Hexachlorobutadiene	0.146	0.142		-2.7	
Caprolactam	0.100	0.120		20.0	
4-Chloro-3-Methylphenol	0.268	0.286	0.200	6.7	25.0
2-Methylnaphthalene	0.605	0.676	0.400	11.7	25.0
Hexachlorocyclopentadiene	0.325	0.287		-11.7	
2,4,6-Trichlorophenol	0.329	0.311	0.200	-5.5	25.0
2,4,5-Trichlorophenol	0.345	0.324	0.200	-6.1	25.0
1,1'-Biphenyl	1.143	1.505		(31.7)	
2-Chloronaphthalene	1.000	1.185	0.800	18.5	25.0
2-Nitroaniline	0.311	0.352		13.2	
Dimethylphthalate	1.208	1.286		6.5	
2,6-Dinitrotoluene	0.314	0.313	0.200	-0.3	25.0
Acenaphthylene	1.724	1.812	0.900	5.1	25.0
3-Nitroaniline	0.326	0.349		7.1	
Acenaphthene	1.054	1.175	0.900	11.5	25.0
2,4-Dinitrophenol	0.180	0.127		(-29.4)	
4-Nitrophenol	0.130	0.135		3.8	
Dibenzofuran	1.449	1.555	0.800	7.3	25.0

All other compounds must meet a minimum RRF of 0.010.

7D
SEMIVOLATILE CONTINUING CALIBRATION CHECK

Lab Name: MITKEM CORPORATION Contract: _____
 Lab Code: MITKRM Case No.: _____ SAS No.: _____ SDG No.: 82259
 Instrument ID: S2 Calibration Date: 11/14/01 Time: 1631
 Lab File ID: S2C3421 Init. Calib. Date(s): 11/12/01 11/12/01
 EPA Sample No. (SSTD050##): SSTD0502S Init. Calib. Times: 1118 1352
 GC Column: DB-5MS ID: 0.25 (mm)

COMPOUND	RRF	RRF50	MIN RRF	%D	MAX %D
2,4-Dinitrotoluene	0.408	0.427	0.200	4.7	25.0
Diethylphthalate	1.207	1.358		12.5	
Fluorene	1.132	1.210	0.900	6.9	25.0
4-Chlorophenyl-phenylether	0.507	0.527	0.400	3.9	25.0
4-Nitroaniline	0.208	0.360		73.1	
4,6-Dinitro-2-methylphenol	0.178	0.143		-19.7	
N-Nitrosodiphenylamine (1)	0.594	0.605		1.9	
4-Bromophenyl-phenylether	0.225	0.215	0.100	-4.4	25.0
Hexachlorobenzene	0.256	0.233	0.100	9.0	25.0
Atrazine	0.216	0.212		-1.9	
Pentachlorophenol	0.173	0.128	0.050	-26.0	25.0
Phenanthrene	1.122	1.174	0.700	4.6	25.0
Anthracene	1.129	1.194	0.700	5.8	25.0
Carbazole	0.978	1.105		13.0	
Di-n-butylphthalate	1.476	1.690		14.5	
Fluoranthene	1.031	1.084	0.600	5.1	25.0
Pyrene	1.552	1.349	0.600	-13.1	25.0
Butylbenzylphthalate	0.895	0.799		-10.7	
3,3'-Dichlorobenzidine	0.161	0.271		68.3	
Benzo(a)anthracene	1.166	1.149	0.800	-1.5	25.0
Chrysene	1.020	0.981	0.700	-3.8	25.0
bis(2-Ethylhexyl)phthalate	1.191	1.096		-8.0	
Di-n-octylphthalate	4.216	3.502		-16.9	
Benzo(b)fluoranthene	1.976	1.721	0.700	-12.9	25.0
Benzo(k)fluoranthene	1.922	2.021	0.700	5.2	25.0
Benzo(a)pyrene	1.535	1.476	0.700	-3.8	25.0
Indeno(1,2,3-cd)pyrene	0.905	0.802	0.500	-11.4	25.0
Dibenzo(a,h)anthracene	0.941	0.850	0.400	-9.7	25.0
Benzo(g,h,i)perylene	0.903	0.797	0.500	-11.7	25.0
Nitrobenzene-d5	0.395	0.418	0.200	5.8	25.0
2-Fluorobiphenyl	1.201	1.251	0.700	4.2	25.0
Terphenyl-d14	1.082	0.980	0.500	-9.4	25.0
Phenol-d5	1.694	1.825	0.800	7.7	25.0
2-Fluorophenol	1.323	1.342	0.600	1.4	25.0
2,4,6-Tribromophenol	0.132	0.109		-17.4	
2-Chlorophenol-d4	1.323	1.463	0.800	10.6	25.0
1,2-Dichlorobenzene-d4	0.890	0.961	0.400	8.0	25.0

(1) Cannot be separated from Diphenylamine
 All other compounds must meet a minimum RRF of 0.010.

7C
SEMIVOLATILE CONTINUING CALIBRATION CHECK

Lab Name: MITKEM CORPORATION Contract: _____
 Lab Code: MITKEM Case No.: _____ SAS No.: _____ SDG No.: 82330
 Instrument ID: S2 Calibration Date: 11/23/01 Time: 1113
 Lab File ID: S2C3555 Init. Calib. Date(s): 11/12/01 11/12/01
 RPA Sample No. (SSTD050##): SSTD0502A Init. Calib. Times: 1118 1352
 GC Column: DB-5MS ID: 0.25 (mm)

COMPOUND	RRF	RRF50	MIN RRF	RD	MAX RD
Benzaldehyde	0.846	0.766		-9.5	
Phenol	1.706	1.862	0.800	9.1	25.0
bis(2-Chloroethyl) Ether	1.244	1.470	0.700	18.2	25.0
2-Chlorophenol	1.272	1.291	0.800	1.5	25.0
2-Methylphenol	1.191	1.262	0.700	6.0	25.0
2,2'-oxybis(1-Chloropropane)	1.770	2.303		30.1	
Acetophenone	1.684	1.815		7.8	
4-Methylphenol	1.190	1.315	0.600	10.5	25.0
N-Nitroso-di-n-propylamine	0.834	1.016	0.500	21.8	25.0
Hexachloroethane	0.543	0.550	0.300	1.3	25.0
Nitrobenzene	0.356	0.389	0.200	9.3	25.0
Isophorone	0.718	0.784	0.400	9.2	25.0
2-Nitrophenol	0.209	0.202	0.100	-3.3	25.0
2,4-Dimethylphenol	0.309	0.314	0.200	1.6	25.0
bis(2-Chloroethoxy)methane	0.444	0.469	0.300	5.6	25.0
2,4-Dichlorophenol	0.282	0.263	0.200	-6.7	25.0
Naphthalene	0.942	0.959	0.700	1.8	25.0
4-Chloroaniline	0.381	0.438		15.0	
Hexachlorobutadiene	0.146	0.124		-15.1	
Caprolactam	0.100	0.128		28.0	
4-Chloro-3-Methylphenol	0.268	0.283	0.200	5.6	25.0
2-Methylnaphthalene	0.605	0.609	0.400	0.7	25.0
Hexachlorocyclopentadiene	0.325	0.254		21.8	
2,4,6-Trichlorophenol	0.329	0.295	0.200	-10.3	25.0
2,4,5-Trichlorophenol	0.345	0.323	0.200	-6.4	25.0
1,1'-Biphenyl	1.143	1.274		11.5	
2-Chloronaphthalene	1.000	1.010	0.800	1.0	25.0
2-Nitroaniline	0.311	0.368		18.3	
Dimethylphthalate	1.208	1.150		-4.8	
2,6-Dinitrotoluene	0.314	0.295	0.200	-6.1	25.0
Acenaphthylene	1.724	1.646	0.900	-4.5	25.0
3-Nitroaniline	0.326	0.306		-6.1	
Acenaphthene	1.054	1.005	0.900	-4.6	25.0
2,4-Dinitrophenol	0.180	0.135		-25.0	
4-Nitrophenol	0.130	0.147		13.1	
Dibenzofuran	1.449	1.386	0.800	-4.3	25.0

All other compounds must meet a minimum RRF of 0.010.

7D
SEMIVOLATILE CONTINUING CALIBRATION CHECK

Lab Name: MITKEM CORPORATION Contract: _____
 Lab Code: MITKEM Case No.: _____ SAS No.: _____ SDG No.: 82330
 Instrument ID: S2 Calibration Date: 11/23/01 Time: 1113
 Lab File ID: S2C3555 Init. Calib. Date(s): 11/12/01 11/12/01
 EPA Sample No. (SSTD050##): SSTD0502A Init. Calib. Times: 1118 1352
 GC Column: DB 5MS ID: 0.25 (mm)

COMPOUND	RRF	RRF50	MIN RRF	RD	MAX RD
2,4-Dinitrotoluene	0.400	0.394	0.200	-3.4	25.0
Diethylphthalate	1.207	1.245		3.1	
Fluorene	1.132	1.078	0.900	-4.8	25.0
4-Chlorophenyl-phenylether	0.507	0.466	0.400	8.1	25.0
4-Nitroaniline	0.208	0.265		27.4	
4,6-Dinitro 2 methylphenol	0.178	0.137		-23.0	
N-Nitrosodiphenylamine (1)	0.594	0.499		-16.0	
4-Bromophenyl-phenylether	0.225	0.181	0.100	-19.6	25.0
Hexachlorobenzene	0.256	0.208	0.100	-18.8	25.0
Atrazine	0.216	0.183		-15.3	
Pentachlorophenol	0.173	0.119	0.050	-31.2	25.0
Phenanthrene	1.122	0.999	0.700	-11.0	25.0
Anthracene	1.129	1.012	0.700	-10.4	25.0
Carbazole	0.978	0.961		-1.7	
Di-n-butylphthalate	1.476	1.483		0.5	
Fluoranthene	1.031	1.007	0.600	-2.3	25.0
Pyrene	1.552	1.201	0.600	-22.6	25.0
Butylbenzylphthalate	0.895	0.751		-16.1	
3,3'-Dichlorobenzidine	0.161	0.188		16.8	
Benzo(a)anthracene	1.166	1.039	0.800	-10.9	25.0
Chrysene	1.020	0.926	0.700	-9.2	25.0
bis(2-Ethylhexyl)phthalate	1.191	1.003		-15.8	
Di-n-octylphthalate	4.216	2.375		43.7	
Benzo(b)fluoranthene	1.976	1.231	0.700	-37.7	25.0
Benzo(k)fluoranthene	1.922	1.290	0.700	-32.9	25.0
Benzo(a)pyrene	1.535	1.077	0.700	-29.8	25.0
Indeno(1,2,3-cd)pyrene	0.905	0.714	0.500	-24.1	25.0
Dibenzo(a,h)anthracene	0.941	0.722	0.400	-23.3	25.0
Benzo(g,h,i)perylene	0.903	0.709	0.500	-21.5	25.0
Nitrobenzene-d5	0.395	0.414	0.200	4.8	25.0
2-Fluorobiphenyl	1.201	1.093	0.700	-9.0	25.0
Terphenyl-d14	1.082	0.828	0.500	-23.5	25.0
Phenol-d5	1.694	1.727	0.800	1.9	25.0
2-Fluorophenol	1.323	1.216	0.600	-8.1	25.0
2,4,6-Tribromophenol	0.132	0.102		-22.7	
2-Chlorophenol-d4	1.323	1.329	0.800	0.5	25.0
1,2-Dichlorobenzene-d4	0.890	0.834	0.400	-6.3	25.0

(1) Cannot be separated from Diphenylamine
 All other compounds must meet a minimum RRF of 0.010.

7C
SEMIVOLATILE CONTINUING CALIBRATION CHECK

Lab Name: MITKEM CORPORATION Contract: _____
 Lab Code: MITKUM Case No.: _____ SAS No.: _____ SDG No.: 82330
 Instrument ID: S2 Calibration Date: 11/24/01 Time: 1308
 Lab File ID: S2C3592 Init. Calib. Date(s): 11/12/01 11/12/01
 EPA Sample No. (SSTD050##): SSTD0502C Init. Calib. Times: 1118 1352
 GC Column: DB-5MS ID: 0.25 (mm)

COMPOUND	RRP	RRP50	MIN RRP	%D	MAX %D
Benzaldehyde	0.846	1.268		(49.9)	
Phenol	1.706	2.056	0.800	20.5	25.0
bis(2-Chloroethyl) Ether	1.244	1.581	0.700	(27.1)	25.0
2-Chlorophenol	1.272	1.476	0.800	16.0	25.0
2-Methylphenol	1.191	1.330	0.700	11.7	25.0
2,2'-oxybis(1-Chloropropane)	1.770	2.287		(29.2)	
Acetophenone	1.684	2.040		21.1	
4-Methylphenol	1.190	1.385	0.600	16.4	25.0
N-Nitroso-di-n-propylamine	0.834	1.146	0.500	(37.4)	25.0
Hexachloroethane	0.543	0.628	0.300	15.7	25.0
Nitrobenzene	0.356	0.396	0.200	11.2	25.0
Isophorone	0.718	0.824	0.400	14.8	25.0
2-Nitrophenol	0.209	0.224	0.100	7.2	25.0
2,4-Dimethylphenol	0.309	0.187	0.200	(-39.5)	25.0
bis(2-Chloroethoxy)methane	0.444	0.494	0.300	11.3	25.0
2,4-Dichlorophenol	0.282	0.291	0.200	3.2	25.0
Naphthalene	0.942	0.977	0.700	3.7	25.0
4-Chloroaniline	0.381	0.216		(-43.3)	
Hexachlorobutadiene	0.146	0.145		-0.7	
Caprolactam	0.100	0.114		14.0	
4-Chloro-3-Methylphenol	0.268	0.296	0.200	10.4	25.0
2-Methylnaphthalene	0.605	0.635	0.400	5.0	25.0
Hexachlorocyclopentadiene	0.325	0.304		-6.5	
2,4,6-Trichlorophenol	0.329	0.350	0.200	6.4	25.0
2,4,5-Trichlorophenol	0.345	0.369	0.200	7.0	25.0
1,1'-Biphenyl	1.143	1.190		4.1	
2-Chloronaphthalene	1.000	0.999	0.800	-0.1	25.0
2-Nitroaniline	0.311	0.391		(25.7)	
Dimethylphthalate	1.208	1.368		13.2	
2,6-Dinitrotoluene	0.314	0.361	0.200	15.0	25.0
Acenaphthylene	1.724	1.779	0.900	3.2	25.0
3-Nitroaniline	0.326	0.371		13.8	
Acenaphthene	1.054	1.123	0.900	6.5	25.0
2,4-Dinitrophenol	0.180	0.174		-3.3	
4-Nitrophenol	0.130	0.161		23.8	
Dibenzofuran	1.449	1.550	0.800	7.0	25.0

All other compounds must meet a minimum RRP of 0.010.

SEMIVOLATILE CONTINUING CALIBRATION CHECK

Lab Name: MITKRM CORPORATION

Contract: _ _ _

Lab Code: MITKRM

Case No.: _ _ _

SAS No.: _ _ _

SDG No.: 82330

Instrument ID: S2

Calibration Date: 11/24/01 Time: 1308

Lab File ID: S2C3592

Init. Calib. Date(s): 11/12/01 11/12/01

KPA Sample No. (SSTD050##): SSTD0502C

Init. Calib. Times: 1118 1352

GC Column: DB-5MS ID: 0.25 (mm)

COMPOUND	RRF	RRF50	MIN RRF	%D	MAX %D
2,4-Dinitrotoluene	0.408	0.484	0.200	18.6	25.0
Diethylphthalate	1.207	1.457		20.7	
Fluorene	1.132	1.204	0.900	6.4	25.0
4-Chlorophenyl-phenylether	0.507	0.562	0.400	10.8	25.0
4-Nitroaniline	0.208	0.393		(88.9)	
4,6-Dinitro-2-methylphenol	0.178	0.176		-1.1	
N-Nitrosodiphenylamine (1)	0.594	0.537		-9.6	
4-Bromophenyl-phenylether	0.225	0.223	0.100	-0.9	25.0
Hexachlorobenzene	0.256	0.251	0.100	-2.0	25.0
Atrazine	0.216	0.245		13.4	
Pentachlorophenol	0.173	0.162	0.050	-6.4	25.0
Phenanthrene	1.122	1.111	0.700	1.0	25.0
Anthracene	1.129	1.065	0.700	-5.7	25.0
Carbazole	0.978	1.087		11.1	
Di-n-butylphthalate	1.476	1.683		14.0	
Fluoranthene	1.031	1.128	0.600	9.4	25.0
Pyrene	1.552	1.402	0.600	-9.7	25.0
Butylbenzylphthalate	0.895	0.921		2.9	
3,3'-Dichlorobenzidine	0.161	0.281		(74.5)	
Benzo(a)anthracene	1.166	1.200	0.800	2.9	25.0
Chrysene	1.020	1.131	0.700	10.9	25.0
bis(2-Ethylhexyl)phthalate	1.191	1.278		7.3	
Di-n-octylphthalate	4.216	3.188		24.4	
Benzo(b)fluoranthene	1.976	1.688	0.700	-14.6	25.0
Benzo(k)fluoranthene	1.922	1.718	0.700	-10.6	25.0
Benzo(a)pyrene	1.535	1.337	0.700	-12.9	25.0
Indeno(1,2,3-cd)pyrene	0.905	0.964	0.500	6.5	25.0
Dibenzo(a,h)anthracene	0.941	1.035	0.400	10.0	25.0
Benzo(g,h,i)perylene	0.903	0.909	0.500	0.7	25.0
Nitrobenzene-d5	0.395	0.429	0.200	8.6	25.0
2-Fluorobiphenyl	1.201	1.242	0.700	3.4	25.0
Terphenyl d14	1.082	0.997	0.500	-7.9	25.0
Phenol-d5	1.694	1.929	0.800	13.9	25.0
2-Fluorophenol	1.323	1.322	0.600	-0.1	25.0
2,4,6-Tribromophenol	0.132	0.134		1.5	
2-Chlorophenol-d4	1.323	1.523	0.800	15.1	25.0
1,2-Dichlorobenzene-d4	0.890	0.976	0.400	9.7	25.0

(1) Cannot be separated from Diphenylamine

All other compounds must meet a minimum RRF of 0.010.

7D
SEMIVOLATILE CONTINUING CALIBRATION CHECK

Lab Name: MITKEM CORPORATION Contract: _____
 Lab Code: MITKEM Case No.: _____ SAS No.: _____ SDC No.: 82330
 Instrument ID: S2 Calibration Date: 11/28/01 Time: 1115
 Lab File ID: S2C3631 Init. Calib. Date(s): 11/12/01 11/12/01
 EPA Sample No. (SSTD050##): SSTD0502K Init. Calib. Times: 1118 1352
 GC Column: DB-5MS ID: 0.25 (mm)

COMPOUND	RRF	RRF50	MIN RRF	%D	MAX %D
2,4-Dinitrotoluene	0.408	0.420	0.200	2.9	25.0
Diethylphthalate	1.207	1.250		3.6	
Fluorene	1.132	1.102	0.900	-2.7	25.0
4-Chlorophenyl-phenylether	0.507	0.530	0.400	4.5	25.0
4-Nitroaniline	0.208	0.243		16.8	
4,6-Dinitro-2-methylphenol	0.178	0.165		-7.3	
N-Nitrosodiphenylamine (1)	0.594	0.494		-16.8	
4-Bromophenyl-phenylether	0.225	0.199	0.100	-11.6	25.0
Hexachlorobenzene	0.256	0.247	0.100	-3.5	25.0
Atrazine	0.216	0.216		0.0	
Pentachlorophenol	0.173	0.143	0.050	17.3	25.0
Phenanthrene	1.122	0.957	0.700	-14.7	25.0
Anthracene	1.129	0.966	0.700	-14.4	25.0
Carbazole	0.978	0.855		-12.6	
Di-n-butylphthalate	1.476	1.270		-14.0	
Fluoranthene	1.031	0.934	0.600	-9.4	25.0
Pyrene	1.552	1.376	0.600	-11.3	25.0
Butylbenzylphthalate	0.895	0.766		-14.4	
3,3'-Dichlorobenzidine	0.161	0.215		(33.5)	
Benzo(a)anthracene	1.166	1.083	0.800	-7.1	25.0
Chrysene	1.020	0.982	0.700	-3.7	25.0
Bis(2-Ethylhexyl)phthalate	1.191	1.056		-11.3	
Di-n-octylphthalate	4.216	2.185		(-48.2)	
Benzo(b)fluoranthene	1.976	1.233	0.700	(-37.6)	25.0
Benzo(k)fluoranthene	1.922	1.258	0.700	(-34.5)	25.0
Benzo(a)pyrene	1.535	1.059	0.700	(-31.0)	25.0
Indeno(1,2,3-cd)pyrene	0.905	0.878	0.500	-3.0	25.0
Dibenzo(a,h)anthracene	0.941	0.866	0.400	-8.0	25.0
Benzo(g,h,i)perylene	0.903	0.871	0.500	-3.5	25.0
Nitrobenzene-d5	0.395	0.407	0.200	3.0	25.0
2-Fluorobiphenyl	1.201	1.224	0.700	1.9	25.0
Terphenyl-d14	1.082	0.968	0.500	-10.5	25.0
Phenol-d5	1.694	1.439	0.800	-15.1	25.0
2-Fluorophenol	1.323	1.173	0.600	-11.3	25.0
2,4,6-Tribromophenol	0.132	0.133		0.8	
2-Chlorophenol-d4	1.323	1.131	0.800	-14.5	25.0
1,2-Dichlorobenzene-d4	0.890	0.806	0.400	-9.4	25.0

(1) Cannot be separated from Diphenylamine
 All other compounds must meet a minimum RRF of 0.010.

7D
SEMIVOLATILE CONTINUING CALIBRATION CHECK

Lab Name: MITKEM CORPORATION Contract: _____
 Lab Code: MITKEM Case No.: _____ SAS No.: _____ SDG No.: 82330
 Instrument ID: S2 Calibration Date: 11/29/01 Time: 1121
 Lab File ID: S2C3652 Init. Calib. Date(s): 11/12/01 11/12/01
 EPA Sample No. (SSTD050##): SSTD0502F Init. Calib. Times: 1118 1352
 GC Column: DB-5MS ID: 0.25 (mm)

COMPOUND	RRF	RRF50	MIN RRF	%D	MAX %D
2,4-Dinitrotoluene	0.408	0.400	0.200	-2.0	25.0
Diethylphthalate	1.207	1.194		-1.1	
Fluorene	1.132	1.053	0.900	-7.0	25.0
4-Chlorophenyl-phenylether	0.507	0.511	0.400	0.8	25.0
4-Nitroaniline	0.208	0.224		7.7	
4,6-Dinitro-2-methylphenol	0.178	0.168		-5.6	
N-Nitrosodiphenylamine (1)	0.594	0.489		-17.7	
4-Bromophenyl-phenylether	0.225	0.203	0.100	-9.8	25.0
Hexachlorobenzene	0.256	0.245	0.100	-4.3	25.0
Atrazine	0.216	0.212		-1.9	
Pentachlorophenol	0.173	0.147	0.050	-15.0	25.0
Phenanthrene	1.122	0.956	0.700	-14.8	25.0
Anthracene	1.129	0.953	0.700	15.6	25.0
Carbazole	0.978	0.836		-14.5	
Di-n-butylphthalate	1.476	1.250		15.3	
Fluoranthene	1.031	0.936	0.600	-9.2	25.0
Pyrene	1.552	1.459	0.600	-6.0	25.0
Butylbenzylphthalate	0.895	0.803		-10.3	
3,3'-Dichlorobenzidine	0.161	0.183		13.7	
Benzo(a)anthracene	1.166	1.087	0.800	-6.8	25.0
Chrysene	1.020	0.978	0.700	4.1	25.0
bis(2-Ethylhexyl)phthalate	1.191	1.083		-9.1	
Di-n-octylphthalate	4.216	2.328		-44.8	
Benzo(b)fluoranthene	1.976	1.282	0.700	-35.1	25.0
Benzo(k)fluoranthene	1.922	1.208	0.700	-37.1	25.0
Benzo(a)pyrene	1.535	1.049	0.700	-31.7	25.0
Indeno(1,2,3-cd)pyrene	0.905	0.918	0.500	1.4	25.0
Dibenzo(a,h)anthracene	0.941	0.931	0.400	-1.1	25.0
Benzo(g,h,i)perylene	0.903	0.945	0.500	4.7	25.0
Nitrobenzene-d5	0.395	0.412	0.200	4.3	25.0
2-Fluorobiphenyl	1.201	1.217	0.700	1.3	25.0
Terphenyl-d14	1.082	1.041	0.500	-3.8	25.0
Phenol-d5	1.694	1.456	0.800	-14.0	25.0
2-Fluorophenol	1.323	1.188	0.600	-10.2	25.0
2,4,6-Tribromophenol	0.132	0.137		3.8	
2-Chlorophenol-d4	1.323	1.130	0.800	-14.6	25.0
1,2-Dichlorobenzene-d4	0.890	0.801	0.400	-10.0	25.0

(1) Cannot be separated from Diphenylamine
 All other compounds must meet a minimum RRF of 0.010.

7C
SEMIVOLATILE CONTINUING CALIBRATION CHECK

Lab Name: MITKEM CORPORATION Contract: _____
 Lab Code: MITKEM Case No.: _____ SAS No.: _____ SDG No.: 82330
 Instrument ID: S2 Calibration Date: 12/01/01 Time: 1833
 Lab File ID: S2C3714 Init. Calib. Date(s): 12/01/01 12/01/01
 EPA Sample No. (SSTD050##): SSTD0502J Init. Calib. Times: 1321 1654
 GC Column: DB-5MS ID: 0.25 (mm)

COMPOUND	RRF	RRF50	MIN RRF	%D	MAX %D
Benzaldehyde	0.881	1.048		19.0	
Phenol	1.482	1.573	0.800	6.1	25.0
bis(2-Chloroethyl) Ether	1.107	1.176	0.700	6.2	25.0
2-Chlorophenol	1.145	1.182	0.800	3.2	25.0
2-Methylphenol	1.076	1.068	0.700	-0.7	25.0
2,2'-oxybis(1-Chloropropane)	1.607	1.740		8.3	
Acetophenone	1.767	1.846		4.5	
4-Methylphenol	1.082	1.082	0.600	0.0	25.0
N-Nitroso-di-n-propylamine	0.881	0.938	0.500	6.5	25.0
Hexachloroethane	0.476	0.499	0.300	4.8	25.0
Nitrobenzene	0.355	0.367	0.200	3.4	25.0
Isophorone	0.734	0.746	0.400	1.6	25.0
2-Nitrophenol	0.208	0.212	0.100	1.9	25.0
2,4-Dimethylphenol	0.271	0.196	0.200	-27.7	25.0
bis(2-Chloroethoxy)methane	0.419	0.435	0.300	3.8	25.0
2,4-Dichlorophenol	0.295	0.297	0.200	0.7	25.0
Naphthalene	0.887	0.910	0.700	2.6	25.0
4-Chloroaniline	0.339	0.200		-41.0	
Hexachlorobutadiene	0.165	0.165		0.0	
Caprolactam	0.109	0.110		0.9	
4-Chloro-3-Methylphenol	0.312	0.322	0.200	3.2	25.0
2-Methylnaphthalene	0.596	0.616	0.400	3.4	25.0
Hexachlorocyclopentadiene	0.293	0.242		-17.4	
2,4,6-Trichlorophenol	0.334	0.334	0.200	0.0	25.0
2,4,5-Trichlorophenol	0.355	0.373	0.200	5.1	25.0
1,1'-Biphenyl	1.051	1.126		7.1	
2-Chloronaphthalene	0.888	0.931	0.800	4.8	25.0
2-Nitroaniline	0.316	0.340		7.6	
Dimethylphthalate	1.238	1.289		4.1	
2,6-Dinitrotoluene	0.298	0.307	0.200	3.0	25.0
Acenaphthylene	1.454	1.514	0.900	4.1	25.0
3-Nitroaniline	0.296	0.304		2.7	
Acenaphthene	0.929	0.980	0.900	5.5	25.0
2,4-Dinitrophenol	0.164	0.164		0.0	
4-Nitrophenol	0.156	0.166		6.4	
Dibenzofuran	1.381	1.441	0.800	4.3	25.0

All other compounds must meet a minimum RRF of 0.010.

PESTIC

Lab Name: MITKEM CORPORATION Contract: _____Lab Code: MITKEM Case No.: _____ SAS No.: _____ SDG No.: 82259Instrument ID: E5 Level (x low): low 1.0 mid 4.0 high 16.0GC Column: DB-608 ID: 0.53 (mm) Date(s) Analyzed: 11/09/01 11/10/01

COMPOUND	CALIBRATION FACTORS				%RSD
	LOW	MID	HIGH	MEAN	
alpha-BHC	654898600	703825950	782609388	713777979	9.0
beta-BHC	356031000	329686000	316221900	333979633	6.1
delta-BHC	619567200	656840450	746979113	674462254	9.7
gamma-BHC (Lindane)	632387400	661835900	708234775	667486025	5.7
Heptachlor	677925600	674968500	703523925	685472675	2.3
Aldrin	656403800	663419150	716546488	678789813	4.8
Heptachlor epoxide	697010800	656090700	665986138	673029213	3.2
Endosulfan I	874859400	606456600	592919825	691411942	23.0
Dieldrin	625827900	631254850	665917863	641000204	3.4
4,4'-DDE	577387900	594320775	642821744	604843473	5.6
Endrin	452731000	431479400	449127431	444445944	2.6
Endosulfan II	591764300	548243300	560799213	566935604	4.0
4,4'-DDD	459737400	471641750	492492219	474623790	3.5
Endosulfan sulfate	519716200	501399800	500253519	507123173	2.2
4,4'-DDT	482256600	483745275	516571506	494191127	3.9
Methoxychlor	277497540	271233360	267579616	272103505	1.8
Endrin ketone	591550800	567692125	569613644	576285523	2.3
Endrin aldehyde	458219400	449938550	439769225	449309058	2.1
alpha-Chlordane	658116600	639105850	645494088	647572179	1.5
gamma-Chlordane	692978000	671785100	696520175	687094425	1.9
Tetrachloro-m-xylene	497964400	471208800	458657775	475943658	4.2
Decachlorobiphenyl	665206700	597496800	532246138	598316546	11.1

* Surrogate calibration factors are measured from Standard Mix A analyses.

7D
PCB CALIBRATION VERIFICATION SUMMARY

Lab Name: Contract:
 Lab Code: Case No.: SAS No.: SDG No.: ASP1128
 GC Column: RTX-CLPEST 2 ID: 0.32 (mm) Init. Calib. Date(s): 11/28/1 11/29/1
 EPA Sample No. (PIBLK): PIBLK05 Date Analyzed: 12/04/01
 Lab Sample ID (PIBLK): PIBLK05 Time Analyzed: 0017
 EPA Sample No. (PEM): PEM04 Date Analyzed: 12/04/1
 Lab Sample ID (PEM): PEM04 Time Analyzed: 0048

PEM COMPOUND	RT	RT WINDOW FROM TO		CALC AMOUNT (ng)	NOM AMOUNT (ng)	%D
alpha-BHC	12.76	12.69	12.79	0.012	0.010	20.0
beta-BHC	13.77	13.70	13.80	0.012	0.010	20.0
gamma-BHC (Lindane)	13.59	13.52	13.62	0.012	0.010	20.0
Endrin	18.34	18.26	18.40	0.064	0.050	28.0
4,4'-DDT	19.09	19.00	19.14	0.11	0.10	10.0
Methoxychlor	20.36	20.27	20.41	0.28	0.25	12.0
Tetrachloro-m-xylene	11.21	11.14	11.24	0.024	0.020	20.0
Decachlorobiphenyl	23.26	23.14	23.34	0.022	0.020	10.0

4,4'-DDT % breakdown (1): 17.02 Endrin % breakdown (1): 5.46
 Combined % breakdown (1): 22.49

QC LIMITS:

RPD of amounts in PEM must be less than or equal to 25.0%
 4,4'-DDT breakdown must be less than or equal to 20.0%
 Endrin breakdown must be less than or equal to 20.0%
 Combined breakdown must be less than or equal to 30.0%

7D
PCB CALIBRATION VERIFICATION SUMMARY

Lab Name: Contract:
Lab Code: Case No.: SAS No.: SDG No.: ASP1128
GC Column: RTX-CLPEST 2 ID: 0.32 (mm) Init. Calib. Date(s): 11/28/1 11/29/1

EPA Sample No. (PIBLK): PIBLK05 Date Analyzed : 12/04/01
Lab Sample ID (PIBLK): PIBLK05 Time Analyzed : 0017
EPA Sample No. (PEM): PEM04 Date Analyzed : 12/04/1
Lab Sample ID (PEM): PEM04 Time Analyzed : 0048

PEM COMPOUND	RT	RT WINDOW		CALC AMOUNT (ng)	NOM AMOUNT (ng)	ID
		FROM	TO			
alpha-BHC	12.76	12.69	12.79	0.012	0.010	20.0
beta-BHC	13.77	13.70	13.80	0.012	0.010	20.0
gamma-BHC (Lindane)	13.59	13.52	13.62	0.012	0.010	20.0
Endrin	18.34	18.26	18.40	0.064	0.050	28.0
4,4'-DDT	19.09	19.00	19.14	0.11	0.10	10.0
Methoxychlor	20.36	20.27	20.41	0.28	0.25	12.0
Tetrachloro-m-xylene	11.21	11.14	11.24	0.024	0.020	20.0
Decachlorobiphenyl	23.26	23.14	23.34	0.022	0.020	10.0

4,4'-DDT % breakdown (1): 17.02 Endrin % breakdown (1): 5.46
Combined % breakdown (1): 22.49

QC LIMITS:

RPD of amounts in PEM must be less than or equal to 25.0%

4,4'-DDT breakdown must be less than or equal to 20.0%

Endrin breakdown must be less than or equal to 20.0%

Combined breakdown must be less than or equal to 30.0%

2B
SOIL VOLATILE SYSTEM MONITORING COMPOUND RECOVERY

Lab Name: FRIEND LABORATORY, INC. Contract: _____
 Lab Code: 10252 Case No.: _____ SAS No.: _____ SDG No.: USC _____
 Level: (low/med) LOW

	NYSDEC SAMPLE NO.	SMC1 DCE #	SMC2 BFB #	SMC3 TOL #	TOT OUT
01	VBKLS1	109	98	100	0
02	VBKLS1MS	105	104	99	0
03	301-SRFC	136*	88	117	1
04	301-SRFC MS	111	83	112	0
05	301-SRFC MSD	241*	84	119	1
06	301-4-6	169*	77	118	1
07	302-SRFC	112	86	108	0
08	302-4-6	139*	73	124	1
09	303-SRFC	113	82	115	0
10	303-4-6	116	122*	132	1
11	304-SRFC	103	96	114	0
12	304-6-8	108	96	105	0
13	305-SRFC	107	91	112	0
14	305-12-14	106	92	109	0
15	306-18-20	116	92	111	0
16	306-24-26	115	87	116	0
17	304-2-4	115	85	116	0
18	304-10-12 RE	0*	0*	0*	3
19	307-4-6	112	75	133	0
20	VBKLS2	102	101	103	0
21	VBKLS2MS	98	101	101	0
22	301-4-6 RE	0*	0*	0*	3
23	302-4-6 RE	123*	80	112	1
24	303-4-6 RE	112	99	115	0
25	305-SRFC RE	101	81	111	0
26	306-18-20 RE	118	86	117	0
27	308-24-26 RE	111	77	121	0
28	304-10-12	140*	107	108	1
29	307-4-6 RE	109	76	134	0

QC LIMITS

SMC1 DCE = 1,2-Dichloroethane-d4 (70-121)
 SMC2 BFB = 4-Bromofluorobenzene (58-113)
 SMC3 TOL = Toluene-d8 (84-138)

Column to be used to flag recovery values
 * Values outside of contract required QC limits
 D System Monitoring Compound diluted out

2B
SOIL VOLATILE SYSTEM MONITORING COMPOUND RECOVERY

Lab Name: FRIEND LABORATORY, INC. Contract: _____
 Lab Code: 10252 Case No.: _____ SAS No.: _____ SDG No.: USC
 Level: (low/med) LOW

	NYSDEC SAMPLE NO.	SMC1 DCE #	SMC2 BFB #	SMC3 TOL #	TOT OUT
01	VBLK81	109	98	100	0
02	VBLKS1MS	105	104	99	0
03	308-B-10 RE	112	71	146 *	1
04	305-SRFC RE	127 *	71	113	1
05	306-B-8 RE	97	70	169 *	1
06	309 RE	118	88	103	0
07	VBLKS2	102	101	103	0
08	VBLKS2MS	98	101	101	0
09	308-B-10	109	70	145 *	1
10	305-SRFC	100	98	78 *	1
11	306-B-8	95	74	189 *	1
12	309	115	128 *	84	1

QC LIMITS

SMC1	DCE	=	1,2-Dichloroethane-d4	(70-121)
SMC2	BFB	=	4-Bromofluorobenzene	(59-113)
SMC3	TOL	=	Toluene-d8	(84-138)

Column to be used to flag recovery values

* Values outside of contract required QC limits

D System Monitoring Compound diluted out

2B
SOIL VOLATILE SYSTEM MONITORING COMPOUND RECOVERY

Lab Name: FRIEND LABORATORY, INC. Contract: _____
 Lab Code: 10252 Case No.: _____ SAS No.: _____ SDG No.: USC
 Level: (low/med) LOW

	NYSDEC SAMPLE NO.	SMC1 DCE #	SMC2 BFB #	SMC3 TOL #	TOT OUT
01	VBLS1	130*	119*	120	2
02	VBLS1MS	129*	126*	117	2
03	301-4-6	133*	108	137	1
04	304-SRFC	132*	107	127	1
05	304-5-7	180*	97	141*	2
06	305-9-11	127*	92	148*	2
07	306-SRFC	131*	110	127	1
08	308-9-11	144*	109	127	1
09	307-SRFC	133*	95	142*	2
10	307-2-5-4	129*	86	156*	2
11	308-SRFC	133*	105	130	1
12	308-3-5	131*	98	139*	2
13	309-SRFC	146*	100	131	1
14	309-SRFC MS	131*	107	127	1
15	309-SRFC MSD	131*	106	132	1
16	VBLS2	107	98	100	0
17	VBLS2MS	101	104	101	0
18	309-9-11	107	97	103	0
19	310-10-12	0*	0*	0*	3
20	311-3-4	109	95	105	0
21	314-8-10	127*	77	119	1
22	VBLS3	109	98	100	0
23	VBLS3MS	105	104	99	0
24	304-5-7 RE	0*	0*	0*	3
25	306-9-11 RE	120	94	102	0
26	310-10-12 RE	0*	0*	0*	3
27	314-8-10 RE	0*	0*	0*	3

QC LIMITS

SMC1 DCE = 1,2-Dichloroethane-d4 (70-121)
 SMC2 BFB = 4-Bromofluorobenzene (59-113)
 SMC3 TOL = Toluene-d8 (84-139)

Column to be used to flag recovery values
 * Values outside of contract required QC limits
 D System Monitoring Compound diluted out

2D
SOIL SEMIVOLATILE SURROGATE RECOVERY

Lab Name: FRIEND LABORATORY, INC. Contract: _____
 Lab Code: 10252 Case No.: _____ SAS No.: _____ SDG No.: USC
 Level: (low/med) LOW

	NYSDEC SAMPLE NO.	S1 (NBZ) #	S2 (FBP) #	S3 (TPH) #	S4 (PHL) #	S5 (2FP) #	S6 (TBP) #	S7 (2CP) #	S8 (DCB) #	TOT OUT
01	~~302-48 RE~~									~~0~~
02	SBLK22	53	54	49	59	62	57	66	51	0
03	SBLK22MS	5*	6*	6*	6*	6*	7*	7*	8*	8
04	302-SRFC	57	58	63	67	66	68	75	53	0
05	302-SRFC M8	63	65	71	72	75	78	79	58	0
06	302-SRFC MSD	57	58	66	65	68	72	72	52	0
07	302-48	1*	7*	73	4*	2*	71	3*	1*	6
08	301-SRFC	53	54	60	59	53	55	67	48	0
09	302-48 RE	1*	7*	69	3*	2*	74	3*	1*	6
10	301-48	53	55	63	57	60	69	65	45	0

QC LIMITS

S1 (NBZ)	=	Nitrobenzene-d5	(23-120)
S2 (FBP)	=	2-Fluorobiphenyl	(30-115)
S3 (TPH)	=	Terphenyl-d14	(18-137)
S4 (PHL)	=	Phenol-d5	(24-113)
S5 (2FP)	=	2-Fluorophenol	(25-121)
S6 (TBP)	=	2,4,6-Tribromophenol	(19-122)
S7 (2CP)	=	2-Chlorophenol-d4	(20-130)
S8 (DCB)	=	1,2-Dichlorobenzene-d4	(20-130)

* Column to be used to flag recovery values

* Values outside of contract required QC limits

D Surrogate diluted out

2D
SOIL SEMIVOLATILE SURROGATE RECOVERY

Lab Name: FRIEND LABORATORY, INC. Contract: _____
 Lab Code: 10252 Case No.: _____ SAS No.: _____ SDG No.: USC
 Level: (low/med) LOW

	NYSDEC SAMPLE NO.	S1 (NBZ) #	S2 (FBP) #	S3 (TPH) #	S4 (PHL) #	S5 (ZFP) #	S6 (TBP) #	S7 (ZCP) #	S8 (DCB) #	TOT OUT
01	~~SBK104~~									
02	SBK17	68	72	74	79	76	68	88	68	0
03	SBK17MS	64	69	72	77	77	79	85	64	0
04	305-12-14	64	69	74	74	76	73	82	65	0
05	307-46	57	62	66	64	69	77	74	53	0
06	304-2-4 RE	49	61	117	59	58	112	67	48	0
07	304-10-12	89	101	148 *	95	93	82	100	74	1
08	302-SRFC	63	69	70	72	68	71	82	60	0
09	303-SRFC	59	66	66	72	69	68	81	59	0
10	306-18-20	80	85	84	90	45	9*	61	75	1
11	306-24-26	70	74	78	81	62	30	80	66	0
12	304-8-8	65	70	72	76	71	26	84	63	0
13	303-4-6	76	94	78	75	72	73	86	61	0
14	304-SRFC	71	73	72	81	76	70	89	65	0
15	305-SRFC	69	76	75	82	76	75	90	66	0
16	304-2-4	47	58	109	55	52	100	63	43	0
17	304-10-12 RE	92	99	132	95	89	75	103	74	0
18	306-18-20 RE	84	87	82	90	47	9*	61	76	1
19	~~SBK107~~									
20	301-4-6	28	34	36	29	32	21	36	26	0
21	304-6-8 DL	65	72	73	76	74	24	85	64	0
22	302-4-6 DL	36	59	69	42	33	24	49	47	0
23	303-4-6 RE	81	135 *	95	73	74	89	83	57	1
24	301-SRFC	86	91	102	96	84	60	107	81	0
25	301-4-6 RE	32	39	48	31	29	22	39	28	0
26	302-4-6 DLRE	44	66	87	45	29	22	55	51	0
27	301-SRFC DL	84	89	114	98	88	60	106	78	0

QC LIMITS

S1 (NBZ)	=	Nitrobenzene-d5	(23-120)
S2 (FBP)	=	2-Fluorobiphenyl	(30-115)
S3 (TPH)	=	Terphenyl-d14	(18-137)
S4 (PHL)	=	Phenol-d5	(24-113)
S5 (ZFP)	=	2-Fluorophenol	(25-121)
S6 (TBP)	=	2,4,6-Tribromophenol	(19-122)
S7 (ZCP)	=	2-Chlorophenol-d4	(20-130)
S8 (DCB)	=	1,2-Dichlorobenzene-d4	(20-130)

Column to be used to flag recovery values

* Values outside of contract required QC limits

D Surrogate diluted out

2D
SOIL SEMIVOLATILE SURROGATE RECOVERY

Lab Name: FRIEND LABORATORY, INC. Contract: _____
 Lab Code: 10252 Case No.: _____ SAS No.: _____ SDG No.: USC
 Level: (low/med) LOW

	NYSDEC SAMPLE NO.	S1 (NBZ) #	S2 (FBP) #	S3 (TPH) #	S4 (PHL) #	S5 (2FP) #	S6 (TBP) #	S7 (2CP) #	S8 (DCB) #	TOT OUT
01	~~SBLK17~~									
02	SBLK17	68	72	74	79	78	68	88	68	0
03	SBLK17MS	64	69	72	77	77	79	85	64	0
04	306-B-10	69	69	66	77	73	63	86	62	0
05	~~GPCRLK27~~									
06	SBLK22	53	54	49	59	62	57	66	51	0
07	SBLK22MS	5*	8*	6*	6*	6*	7*	7*	8*	8
08	309	55	58	54	64	63	59	70	52	0
09	305-SRFC	64	69	95	67	57	37	68	55	0
10	305-SRFC RE	72	82	117	73	55	36	75	61	0
11	306-6-8	59	64	89	64	58	61	74	52	0
12	306-6-8 DL	51	59	73	59	58	61	69	48	0

QC LIMITS

S1 (NBZ)	=	Nitrobenzene-d5	(23-120)
S2 (FBP)	=	2-Fluorobiphenyl	(30-115)
S3 (TPH)	=	Terphenyl-d14	(18-137)
S4 (PHL)	=	Phenol-d5	(24-113)
S5 (2FP)	=	2-Fluorophenol	(25-121)
S6 (TBP)	=	2,4,6-Tribromophenol	(19-122)
S7 (2CP)	=	2-Chlorophenol-d4	(20-130)
S8 (DCB)	=	1,2-Dichlorobenzene-d4	(20-130)

Column to be used to flag recovery values

* Values outside of contract required QC limits

D Surrogate diluted out

2D
SOIL SEMIVOLATILE SURROGATE RECOVERY

Lab Name: FRIEND LABORATORY, INC. Contract: _____
 Lab Code: 10252 Case No.: _____ SAS No.: _____ SDG No.: USC
 Level: (low/med) LOW

	NYSDEC SAMPLE NO.	S1 (NBZ) #	S2 (FBP) #	S3 (TPH) #	S4 (PHL) #	S5 (2FP) #	S6 (TBP) #	S7 (2CP) #	S8 (DCB) #	TOT OUT
01	88LK13	69	75	86	80	85	79	93	64	0
02	88LK13MS	74	72	153 *	83	*	80	93	68	2
03	311-3-4 RE	66	67	95	70	53	7*	72	61	1
04	308-9-11	74	76	73	82	80	88	91	69	0
05	308-9-11	70	71	71	75	70	64	82	64	0
06	310-10-12	64	64	62	67	68	69	75	57	0
07	301-4-6	87	87	64	75	74	73	84	81	0
08	312-6-7 DLRE	78	73	61	57	49	53	66	48	0
09	308-SRFC	61	63	64	64	59	53	71	57	0
10	308-3-5	94	98	94	100	100	94	114	85	0
11	314-8-10	27	29 *	30	28	25 *	15 *	31	24	3
12	307-2-5-4	64	69	71	70	69	68	79	58	0
13	305-9-11	57	62	70	64	62	74	72	51	0
14	304-5-7 RE	50	56	65	55	50	47	62	45	0
15	304-SRFC	59	61	67	65	58	53	72	56	0
16	311-3-4	61	62	68	67	48	8 *	70	61	1
17	308-3-5 RE	90	91	100	97	88	89	111	85	0
18	305-9-11 RE	59	61	73	66	61	75	76	53	0
19	314-8-10 RE	24	25 *	33	25	20 *	14 *	29	22	3
20	307-2-5-4 RE	63	63	79	68	61	66	78	56	0
21	312-6-7 DL	67	68	73	57	45	18 D	66	49	0
22	304-5-7	48	55	54	53	52	47	58	44	0
23	308-SRFC	61	64	65	69	64	57	78	62	0
24	309-SRFC DL	110	123 D	141 D	130 D	124 D	133 D	146 D	105	0
25	307-SRFC	66	71	110	75	73	76	83	81	0
26	308-SRFC MS	68	81	142 *	76	74	94	83	61	1
27	309-SRFC MSD	72	78	124	81	81	87	88	67	0
28	306-SRFC RE	92	102	91	99	93	80	111	88	0
29	307-SRFC RE	86	98	144 *	92	95	99	105	78	1

QC LIMITS

S1 (NBZ)	=	Nitrobenzene-d5	(23-120)
S2 (FBP)	=	2-Fluorobiphenyl	(30-115)
S3 (TPH)	=	Terphenyl-d14	(18-137)
S4 (PHL)	=	Phenol-d5	(24-113)
S5 (2FP)	=	2-Fluorophenol	(25-121)
S6 (TBP)	=	2,4,6-Trichlorophenol	(19-122)
S7 (2CP)	=	2-Chlorophenol-d4	(20-130)
S8 (DCB)	=	1,2-Dichlorobenzene-d4	(20-130)

* Column to be used to flag recovery values

* Values outside of contract required QC limits

D Surrogate diluted out

2F
SOIL PESTICIDE SURROGATE RECOVERY

Lab Name:

Contract:

Lab Code:

Case No.:

SAS No.:

SDG No.: URS443

GC Column(1): RTX-CLPEST 1 ID: 0.32 (mm) GC Column(2): RTX-CLPEST 2 ID: 0.32 (mm)

	EPA SAMPLE NO.	TCX 1 %REC #	TCX 2 %REC #	DCB 1 %REC #	DCB 2 %REC #	OTHER (1)	OTHER (2)	TOT OUT
01	L77443-17	262*	241*	232*	218*			4
02	L77443-18	13*	2*	51*	57*			24 <i>ask 1/15/02</i>
03	L77443-19	67	61	80	77			0
04	~~L77443-20~~ DL	101	62	545D	365D			0
05	~~L77443-21~~ DL	311D	219D	560D	206D			0
06								
07								
08								
09								
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28								
29								
30								

ADVISORY
QC LIMITS

S1 (TCX) = Tetrachloro-m-xylene 30(50-150)

S2 (DCB) = Decachlorobiphenyl 30(50-150)

Column to be used to flag recovery values

* Values outside of QC limits

D Surrogate diluted out

8A
VOLATILE INTERNAL STANDARD AREA AND RT SUMMARY

Lab Name: FRIEND LABORATORY, INC. Contract _____
 Lab Code 10252 Case No.: _____ SAS No.: _____ SDG No.: USC
 Lab File ID (Standard): D9818 D Date Analyzed 10/17/01
 Instrument ID MSD-D Time Analyzed: 17:58
 GC Column: RTX-624 ID: 0.53 (mm) Heated Purge (Y/N): Y

	IS1BCM AREA #	RT #	IS2DFB AREA #	RT #	IS3CB AREA #	RT #
12 HOUR STD	863536	12.65	3924556	14.51	3153322	20.00
UPPER LIMIT	1727072	13.15	7849112	15.01	6306644	20.50
LOWER LIMIT	431768	12.15	1962278	14.01	1576661	19.50
NYSDEC SAMPLE NO.						
01 VBLKS1	870668	12.66	3719290	14.51	3146805	20.00
02 VBLKS1MS	758508	12.66	2976282	14.51	2632022	20.00
03 301-4-6	735202	12.66	3408845	14.52	2446027	20.00
04 304-SRFC	821187	12.67	3708099	14.52	2924062	20.00
05 304-5-7	15148*	12.76	108519*	14.59	78827*	20.02
06 305-9-11	622179	12.68	2772953	14.53	1806581	20.00
07 306-SRFC	706567	12.68	2958082	14.52	2325688	20.00
08 306-9-11	57250*	12.74	253095*	14.58	208083*	20.02
09 307-SRFC	695649	12.68	3113376	14.53	2146512	20.00
10 307-2-5-4	616671	12.69	2880996	14.53	1761949	20.00
11 308-SRFC	708006	12.69	3208599	14.53	2418309	20.00
12 308-3-5	661853	12.69	3172445	14.53	2237632	20.00
13 309 SRFC	103084*	12.72	518693*	14.56	382610*	20.01
14 309-SRFC MS	529224	12.70	2307687	14.54	1784361	20.01
15 309-SRFC MSD	415693*	12.70	1733829*	14.54	1292037*	20.01

IS1 BCM = Bromochloromethane
 IS2 DFB = 1,4-Difluorobenzene
 IS3 CB = Chlorobenzene-d5

255- 215884, 981139, 788330.5

AREA UPPER LIMIT = +100% of internal standard area

AREA LOWER LIMIT = -50% of internal standard area

RT UPPER LIMIT = +0.50 minutes of internal standard RT

RT LOWER LIMIT = -0.50 minutes of internal standard RT

Column to be used to flag values outside QC limit with an asterisk

* Values outside of contract required QC limits

cal
1/14/02

VOLATILE INTERNAL STANDARD AREA AND RT SUMMARY

Lab Name: FRIEND LABORATORY, INC. Contract: _____
 Lab Code: 10252 Case No.: _____ SAS No.: _____ SDG No.: USC
 Lab File ID (Standard): D9837.D Date Analyzed: 10/18/01
 Instrument ID: MSD-D Time Analyzed: 04:30
 GC Column: RTX-624 ID: 0.53 (mm) Heated Purge (Y/N): Y

	IS1BCM AREA #	RT #	IS2DFB AREA #	RT #	IS3CB AREA #	RT #
12 HOUR STD	919195	12.75	4039349	14.58	3200753	20.03
UPPER LIMIT	1838390	13.25	8078698	15.08	6401506	20.53
LOWER LIMIT	459598	12.25	2019675	14.08	1600377	19.53
NYSDEC SAMPLE NO.						
01 VBLKS2	936647	12.71	3974465	14.55	3201481	20.01
02 VBLKS2MS	913183	12.71	3833549	14.54	3056352	20.01
03 309-9-11	8589915	12.71	3854792	14.55	2904594	20.01
04 310-10-12	0*	.00*	0*	.00*	0*	.00*
05 311-3-4	740901	12.68	3444521	14.53	2584889	19.99
06 314-8-10	164086*	12.88	765228*	14.53	479618*	20.00

25.80 22.9, 19.8 / 1,009,831 / 600,158

IS1 BCM = Bromochloromethane
 IS2 DFB = 1,4-Difluorobenzene
 IS3 CB = Chlorobenzene-d5

AREA UPPER LIMIT = +100% of internal standard area
 AREA LOWER LIMIT = -50% of internal standard area
 RT UPPER LIMIT = +0.50 minutes of internal standard RT
 RT LOWER LIMIT = -0.50 minutes of internal standard RT

Column to be used to flag values outside QC limit with an asterisk.

* Values outside of contract required QC limits

22.9
1/14/02

8A
VOLATILE INTERNAL STANDARD AREA AND RT SUMMARY

Lab Name: FRIEND LABORATORY, INC. Contract: _____
 Lab Code: 10252 Case No.: _____ SAS No.: _____ SDG No.: USC
 Lab File ID (Standard): D9862.D Date Analyzed: 10/19/01
 Instrument ID: MSD-D Time Analyzed: 14:16
 GC Column: RTX-624 ID: 0.53 (mm) Heated Purge (Y/N): Y

	IS1BCM AREA #	RT #	IS2DFB AREA #	RT #	IS3CB AREA #	RT #
12 HOUR STD	1122897	12.68	5091191	14.53	4093909	20.01
UPPER LIMIT	2245794	13.18	10182382	15.03	8187818	20.51
LOWER LIMIT	561449	12.18	2545596	14.03	2046955	19.51
NYSDEC SAMPLE NO.						
01 VBLK91	1130919	12.65	5065134	14.50	4116908	19.99
02 VBLK91MS	1052099	12.64	4900912	14.50	4023041	19.99
03 301-SRFC	33222 *	12.74	160515 *	14.58	96822 *	20.01
04 301-SRFC MS	577809	12.66	2845315	14.51	1879437 *	20.00
05 301-SRFC MSD	8801 *	12.76	69778 *	14.58	46096 *	20.01
06 301-4-6	15514 *	12.77	102352 *	14.59	69470 *	20.03
07 302-SRFC	715815	12.65	3263200	14.50	2312113	19.99
08 302-4-6	456290 *	12.66	1770101 *	14.51	813254 *	19.99
09 303-SRFC	643766	12.66	3138838	14.51	2067862	19.99
10 303-4-6	465662 *	12.66	2618489	14.51	1546822 *	19.99
11 304-SRFC	649118	12.65	3004179	14.50	1994681 *	19.99
12 304-6-8	814928	12.65	3618182	14.50	2673386	19.99

IS1 BCM = Bromochloromethane
 IS2 DFB = 1,4-Difluorobenzene
 IS3 CB = Chlorobenzene-d5

AREA UPPER LIMIT = +100% of internal standard area
 AREA LOWER LIMIT = - 50% of internal standard area
 RT UPPER LIMIT = +0.50 minutes of internal standard RT
 RT LOWER LIMIT = -0.50 minutes of internal standard RT

Column to be used to flag values outside QC limit with an asterisk.

* Values outside of contract required QC limits

8A
VOLATILE INTERNAL STANDARD AREA AND RT SUMMARY

Lab Name: FRIEND LABORATORY, INC. Contract: _____
 Lab Code: 10252 Case No.: _____ SAS No.: _____ SDG No.: USC
 Lab File ID (Standard): D9862.D Date Analyzed: 10/19/01
 Instrument ID: MSD-D Time Analyzed: 14:16
 GC Column: RTX-624 ID: 0.53 (mm) Heated Purge (Y/N): Y

	IS1BCM AREA #	RT #	IS2DFB AREA #	RT #	IS3CB AREA #	RT #
12 HOUR STD	1122897	12.68	5091191	14.53	4093809	20.01
UPPER LIMIT	2245794	13.18	10182382	15.03	8187818	20.51
LOWER LIMIT	561449	12.18	2545596	14.03	2046955	19.51
NYSDEC SAMPLE NO.						
01 VBLKS3	1130919	12.65	5085134	14.50	4116908	19.99
02 VBLKS3MS	1052099	12.64	4900812	14.50	4023041	19.99
03 304-5-7 RE	0*	.00*	0*	.00*	0*	.00*
04 306-9-11 RE	78558*	12.74	341116*	14.57	278326*	20.02
05 310-10-12 RE	0*	.00*	0*	.00*	0*	.00*
06 314-8-10 RE	0*	.00*	0*	.00*	0*	.00*
~~07 1/STD01004~~	~~1052099~~	~~12.78~~	~~4781894~~	~~14.57~~	~~4047881~~	~~20.00~~

258 280724/1212798/1023471.5

IS1 BCM = Bromochloromethane
 IS2 DFB = 1,4-Difluorobenzene
 IS3 CB = Chlorobenzene-d5

AREA UPPER LIMIT = +100% of internal standard area
 AREA LOWER LIMIT = - 50% of internal standard area
 RT UPPER LIMIT = +0.50 minutes of internal standard RT
 RT LOWER LIMIT = -0.50 minutes of internal standard RT

Column to be used to flag values outside QC limit with an asterisk.
 * Values outside of contract required QC limits

8A
VOLATILE INTERNAL STANDARD AREA AND RT SUMMARY

Lab Name: FRIEND LABORATORY, INC. Contract: _____
 Lab Code: 10252 Case No.: _____ SAS No.: _____ SDG No.: USC
 Lab File ID (Standard): D9882.D Date Analyzed: 10/20/01
 Instrument ID: MSD-D Time Analyzed: 01:24
 GC Column: RTX-624 ID: 0.53 (mm) Heated Purge (Y/N): Y

	IS1BCM AREA #	RT #	IS2DFB AREA #	RT #	IS3CB AREA #	RT #
12 HOUR STD	998323	12.68	4398132	14.53	3671418	20.01
UPPER LIMIT	1998848	13.18	8796264	15.03	7342836	20.51
LOWER LIMIT	499162	12.18	2199066	14.03	1835709	19.51
NYSDEC SAMPLE NO.						
01 VBLKW1	1025310	12.65	4225247	14.51	3416532	19.99
02 VBLKW1MS	928318	12.64	3717713	14.50	2956354	19.99
03 305-SRFC	605990	12.66	2490369	14.51	1623353 *	20.00
04 305-12-14	825835	12.64	3452802	14.50	2492213	19.99
05 306-18-20	495247 *	12.65	2170476 *	14.50	1585722 *	19.99
06 306-24-26	443657 *	12.65	1843329 *	14.50	1281937 *	19.99
07 304-2-4	666240	12.65	3003627	14.50	1968156	19.99
08 304-10-12 RE	0 *	.00 *	0 *	.00 *	0 *	.00 *
09 307-4-6	551235	12.65	2288675	14.50	1302830 *	19.99
10 RB-1	893429	12.64	3733754	14.50	3032280	19.99
11 VHBLK01	892209	12.65	3674902	14.50	2973437	20.00

IS1 BCM = Bromochloromethane
 IS2 DFB = 1,4-Difluorobenzene
 IS3 CB = Chlorobenzene-d5

AREA UPPER LIMIT = +100% of internal standard area
 AREA LOWER LIMIT = - 50% of internal standard area
 RT UPPER LIMIT = +0.50 minutes of internal standard RT
 RT LOWER LIMIT = -0.50 minutes of internal standard RT

Column to be used to flag values outside QC limit with an asterisk.

* Values outside of contract required QC limits

8A
VOLATILE INTERNAL STANDARD AREA AND RT SUMMARY

Lab Name: FRIEND LABORATORY, INC. Contract: _____
 Lab Code: 10252 Case No.: _____ SAS No.: _____ SDG No.: USC
 Lab File ID (Standard): D9882.D Date Analyzed: 10/20/01
 Instrument ID: MSD-D Time Analyzed: 01:24
 GC Column: RTX-824 ID: 0.53 (mm) Heated Purge (Y/N): Y

	IS1BCM AREA #	RT #	IS2DFB AREA #	RT #	IS3CB AREA #	RT #
12 HOUR STD	998323	12.68	4398132	14.53	3671418	20.01
UPPER LIMIT	1996646	13.18	8796264	15.03	7342836	20.51
LOWER LIMIT	499182	12.18	2199066	14.03	1835709	19.51
NYSDEC SAMPLE NO.						
01 VIBLKD1	1025310	12.65	4225247	14.51	3416532	19.99
02 308-B-10 RE	398545 *	12.65	1581868 *	14.50	785695 *	20.00
03 305-SRFC RE	127502 *	12.68	704095 *	14.51	213317 *	19.99
04 306-B-8 RE	214641 *	12.65	1151704 *	14.51	480778 *	19.99
05 309 RE	295442 *	12.64	1023868 *	14.50	828864 *	19.98

IS1 BCM = Bromochloromethane
 IS2 DFB = 1,4-Difluorobenzene
 IS3 CB = Chlorobenzene-d5

AREA UPPER LIMIT = +100% of internal standard area
 AREA LOWER LIMIT = - 50% of internal standard area
 RT UPPER LIMIT = +0.50 minutes of internal standard RT
 RT LOWER LIMIT = -0.50 minutes of internal standard RT

Column to be used to flag values outside QC limit with an asterisk.
 * Values outside of contract required QC limits

8A
VOLATILE INTERNAL STANDARD AREA AND RT SUMMARY

Lab Name: FRIEND LABORATORY, INC. Contract: _____
 Lab Code: 10252 Case No.: _____ SAS No.: _____ SDG No.: USC
 Lab File ID (Standard): D0140.D Date Analyzed: 10/26/01
 Instrument ID: MSD-D Time Analyzed: 10:45
 GC Column: RTX-624 ID: 0.53 (mm) Heated Purge (Y/N): Y

	IS1BCM AREA #	RT #	IS2DFB AREA #	RT #	IS3CB AREA #	RT #
12 HOUR STD	946443	12.68	4438900	14.53	3588469	20.02
UPPER LIMIT	1892886	13.18	8877800	15.03	7176938	20.52
LOWER LIMIT	473222	12.18	2219450	14.03	1794235	19.52
NYSDEC SAMPLE NO.						
01 VBLK82	1014219	12.68	4619875	14.53	3876955	20.01
02 VBLK32MS	945800	12.68	4363411	14.54	3503680	20.02
03 301-4-8 RE	0 *	.00 *	0 *	.00 *	0 *	.00 *
04 302-4-8 RE	528843	12.72	2308818	14.56	1449325 *	20.03
05 303-4-8 RE	489517	12.72	2422518	14.56	1585102 *	20.03
06 305-SRFC RE	658150	12.71	3013633	14.55	1994488	20.03

IS1 BCM = Bromochloromethane
 IS2 DFB = 1,4-Difluorobenzene
 IS3 CB = Chlorobenzene-d5

AREA UPPER LIMIT = +100% of internal standard area
 AREA LOWER LIMIT = - 50% of internal standard area
 RT UPPER LIMIT = +0.50 minutes of internal standard RT
 RT LOWER LIMIT = -0.50 minutes of internal standard RT

Column to be used to flag values outside QC limit with an asterisk.
 * Values outside of contract required QC limits

gar
1/18/02

8A
VOLATILE INTERNAL STANDARD AREA AND RT SUMMARY

Lab Name: FRIEND LABORATORY, INC. Contract: _____
 Lab Code: 10252 Case No.: _____ SAS No.: _____ SDG No.: USC
 Lab File ID (Standard): D0140.D Date Analyzed: 10/26/01
 Instrument ID: MSD-D Time Analyzed: 10:45
 GC Column: RTX-624 ID: 0.53 (mm) Heated Purge (Y/N): Y

	IS1BCM AREA #	RT #	IS2DFB AREA #	RT #	IS3CB AREA #	RT #
12 HOUR STD	946443	12.68	4438900	14.53	3588489	20.02
UPPER LIMIT	1892886	13.18	8877800	15.03	7176938	20.52
LOWER LIMIT	473222	12.18	2219450	14.03	1794235	19.52
NYSDEC SAMPLE NO.						
01 VBLK81	1014219	12.68	4619875	14.53	3676955	20.01
02 VHBLK01	947317	12.67	4548929	14.52	3673118	20.01
03 VBLK81MS	945800	12.69	4363411	14.54	3503680	20.02
04 302-SRFC	523041	12.70	2310149	14.55	1499866 *	20.03
05 302-SRFC MS	0 *	.00 *	0 *	.00 *	0 *	.00 *
06 302-SRFC MSD	504429	12.70	2336598	14.55	1445340 *	20.02
07 302-4-6	651562	12.68	2865023	14.54	1828959 *	20.01
08 301-4-6	718988	12.71	3289873	14.56	2203697	20.03

IS1 BCM = Bromochloromethane
 IS2 DFB = 1,4-Difluorobenzene
 IS3 CB = Chlorobenzene-d5

AREA UPPER LIMIT = +100% of internal standard area
 AREA LOWER LIMIT = - 50% of internal standard area
 RT UPPER LIMIT = +0.50 minutes of internal standard RT
 RT LOWER LIMIT = -0.50 minutes of internal standard RT

Column to be used to flag values outside QC limit with an asterisk.

* Values outside of contract required QC limits

8A
VOLATILE INTERNAL STANDARD AREA AND RT SUMMARY

Lab Name: FRIEND LABORATORY, INC. Contract: _____
 Lab Code: 10252 Case No.: _____ SAS No.: _____ SDG No.: USC
 Lab File ID (Standard): D0158.D Date Analyzed: 10/26/01
 Instrument ID: MSD-D Time Analyzed: 20:48
 GC Column: RTX-624 ID: 0.53 (mm) Heated Purge (Y/N): Y

	IS1BCM AREA #	RT #	IS2DFB AREA #	RT #	IS3CB AREA #	RT #
12 HOUR STD	976127	12.77	4479400	14.61	3818275	20.05
UPPER LIMIT	1952254	13.27	8958800	15.11	7236550	20.55
LOWER LIMIT	488064	12.27	2239700	14.11	1809138	19.55
NYSDEC SAMPLE NO						
01 VIBLKD1	983291	12.73	4403499	14.57	3568640	20.03
02 302-4-B RE	571290	12.74	2471084	14.58	1338293 *	20.03
03 301-SRFC	743014	12.74	3235097	14.58	2105514	20.04

IS1 BCM = Bromochloromethane
 IS2 DFB = 1,4-Difluorobenzene
 IS3 CB = Chlorobenzene-d5

AREA UPPER LIMIT = +100% of internal standard area
 AREA LOWER LIMIT = - 50% of internal standard area
 RT UPPER LIMIT = +0.50 minutes of internal standard RT
 RT LOWER LIMIT = -0.50 minutes of internal standard RT

Column to be used to flag values outside QC limit with an asterisk.

* Values outside of contract required QC limits

gar
1/28/02

8A
VOLATILE INTERNAL STANDARD AREA AND RT SUMMARY

Lab Name: FRIEND LABORATORY, INC. Contract: _____
 Lab Code: 10252 Case No.: _____ SAS No.: _____ SDG No.: USC
 Lab File ID (Standard): D0158.D Date Analyzed: 10/26/01
 Instrument ID: MSD-D Time Analyzed: 20:46
 GC Column: RTX-624 ID: 0.53 (mm) Heated Purge (Y/N): Y

	IS1BCM AREA #	RT #	IS2DFB AREA #	RT #	IS3CB AREA #	RT #
12 HOUR STD	976127	12.77	4479400	14.61	3618275	20.05
UPPER LIMIT	1952254	13.27	8958800	15.11	7236550	20.55
LOWER LIMIT	488064	12.27	2239700	14.11	1809138	19.55
NYSDEC SAMPLE NO.						
01 VIBLKD1	983291	12.73	4403499	14.57	3588940	20.03
02 306-18-20 RE	573203	12.73	2965159	14.57	1978537	20.03
03 306-24-26 RE	598729	12.73	2864250	14.58	1768127 *	20.03
04 304-10-12	52861 *	12.78	257234 *	14.61	136848 *	20.05
05 307-4-8 RE	529220	12.74	2057813 *	14.58	1076627 *	20.04

IS1 BCM = Bromochloromethane
 IS2 DFB = 1,4-Difluorobenzene
 IS3 CB = Chlorobenzene-d5

AREA UPPER LIMIT = +100% of internal standard area
 AREA LOWER LIMIT = - 50% of internal standard area
 RT UPPER LIMIT = +0.50 minutes of internal standard RT
 RT LOWER LIMIT = -0.50 minutes of internal standard RT

Column to be used to flag values outside QC limit with an asterisk.
 * Values outside of contract required QC limits

BA
VOLATILE INTERNAL STANDARD AREA AND RT SUMMARY

Lab Name: FRIEND LABORATORY, INC. Contract: _____
 Lab Code: 10252 Case No.: _____ SAS No.: _____ SDG No.: USC
 Lab File ID (Standard): D0158.D Date Analyzed: 10/26/01
 Instrument ID: MSD-D Time Analyzed: 20:46
 GC Column: RTX-624 ID: 0.53 (mm) Heated Purge (Y/N): Y

	IS1BCM AREA #	RT #	IS2DFB AREA #	RT #	IS3CB AREA #	RT #
12 HOUR STD	978127	12.77	4479400	14.61	3618275	20.05
UPPER LIMIT	1852254	13.27	8958800	15.11	7236550	20.55
LOWER LIMIT	488064	12.27	2239700	14.11	1809138	19.55
NYSDEC SAMPLE NO.						
01 VIBLKD2	983291	12.73	4403499	14.57	3568640	20.03
02 308-B-10	396913 *	12.74	1584074 *	14.58	749160 *	20.04
03 305-SRFC	130159 *	12.74	588047 *	14.58	129185 *	20.04
04 306-B-8	168684 *	12.74	837521 *	14.58	300546 *	20.04
05 309	141013 *	12.74	447218 *	14.58	228847 *	20.04

IS1 BCM = Bromochloromethane
 IS2 DFB = 1,4-Difluorobenzene
 IS3 CB = Chlorobenzene-d5

AREA UPPER LIMIT = +100% of internal standard area
 AREA LOWER LIMIT = - 50% of internal standard area
 RT UPPER LIMIT = +0.50 minutes of internal standard RT
 RT LOWER LIMIT = -0.50 minutes of internal standard RT

Column to be used to flag values outside QC limit with an asterisk.
 * Values outside of contract required QC limits

*for
1/23/02*

8C
SEMIVOLATILE INTERNAL STANDARD AREA AND RT SUMMARY

Lab Name: FRIEND LABORATORY, INC. Contract: _____
 Lab Code: 10252 Case No.: _____ SAS No.: _____ SDG No.: USC
 Lab File ID (Standard): A3060.D Date Analyzed: 10/19/01
 Instrument ID: MSD-A Time Analyzed: 08:03

	IS4(PHN) AREA #	RT #	IS5(CRY) AREA #	RT #	IS6(PRY) AREA #	RT #
12 HOUR STD	1573672	24.62	1368373	32.94	862472	37.06
UPPER LIMIT	3147344	25.12	2736746	33.44	1724944	37.56
LOWER LIMIT	786836	24.12	684187	32.44	431236	36.56
NYSDEC SAMPLE NO.						
01 SBLK13MS	1506005	24.61	509421 *	32.91	149595 *	37.05
02 311-3-4 RE	1417699	24.61	799783	32.93	281645 *	37.06

IS1 (DCB) = 1,4-Dichlorobenzene-d4
 IS2 (NPT) = Naphthalene-d8
 IS3 (ANT) = Acenaphthene-d10
 IS4 (PHN) = Phenanthrene-d10
 IS5 (CRY) = Chrysene-d12
 IS6 (PRY) = Perylene-d12

AREA UPPER LIMIT = +100% of internal standard area
 AREA LOWER LIMIT = - 50% of internal standard area
 RT UPPER LIMIT = +0.50 minutes of internal standard RT
 RT LOWER LIMIT = -0.50 minutes of internal standard RT

Column to be used to flag values outside QC limit with an asterisk.
 * Values outside of contract required QC limits

8C
SEMIVOLATILE INTERNAL STANDARD AREA AND RT SUMMARY

Lab Name: FRIEND LABORATORY, INC. Contract:
 Lab Code: 10252 Case No.: SAS No.: SDG No.: USC
 Lab File ID (Standard): B3247.D Date Analyzed: 10/24/01
 Instrument ID: MSD-B Time Analyzed: 16:38

	IS4(PHN) AREA #	RT #	IS5(CRY) AREA #	RT #	IS6(PRY) AREA #	RT #
12 HOUR STD	3918814	24.32	2627519	32.63	1847739	36.75
UPPER LIMIT	7837628	24.82	5255038	33.13	3695478	37.25
LOWER LIMIT	1959407	23.82	1313760	32.13	923870	36.25
NYSDEC SAMPLE NO						
01 306-9-11	2828511	24.32	1767153	32.61	1255870	36.74
02 309-9-11	3414368	24.32	2098979	32.61	1337844	36.74
03 310-10-12	3041970	24.32	1807789	32.61	937875	36.74
04 301-4-6	3368965	24.32	2106572	32.62	1327621	36.76
05 312-8-7 DLRE	1918753 *	24.45	1832574	32.63	1136364	36.76
06 308-SRFC	3213598	24.32	1950636	32.62	1036581	36.75
07 308-3-5	3302686	24.33	1827575	32.63	799930 *	36.75
08 314-8-10	3261701	24.33	1950211	32.63	837341 *	36.75
09 307-2.5-4	2816343	24.33	1548322	32.63	609866 *	36.76
10 305-9-11	3151423	24.33	1544397	32.62	571848 *	36.75
11 304-5-7 RE	2641084	24.34	1284659 *	32.64	473336 *	36.78

IS1 (DCB) = 1,4-Dichlorobenzene-d4
 IS2 (NPT) = Naphthalene-d8
 IS3 (ANT) = Acenaphthene-d10
 IS4 (PHN) = Phenanthrene-d10
 IS5 (CRY) = Chrysene-d12
 IS6 (PRY) = Perylene-d12

AREA UPPER LIMIT = +100% of internal standard area
 AREA LOWER LIMIT = - 50% of internal standard area
 RT UPPER LIMIT = +0.50 minutes of internal standard RT
 RT LOWER LIMIT = -0.50 minutes of internal standard RT

Column to be used to flag values outside QC limit with an asterisk.

* Values outside of contract required QC limits

8C
SEMIVOLATILE INTERNAL STANDARD AREA AND RT SUMMARY

Lab Name: FRIEND LABORATORY, INC. Contract: _____
 Lab Code: 10252 Case No.: _____ SAS No.: _____ SDG No.: USC
 Lab File ID (Standard): B3281.D Date Analyzed: 10/25/01
 Instrument ID: MSD-B Time Analyzed: 09:48

	IS4(PHN) AREA #	RT #	IS5(CRY) AREA #	RT #	IS6(PRY) AREA #	RT #
12 HOUR STD	3190100	24.23	3190291	32.54	2292711	36.66
UPPER LIMIT	6380200	24.73	6380582	33.04	4585422	37.16
LOWER LIMIT	1585050	23.73	1595146	32.04	1146356	36.16
NYSDEC SAMPLE NO						
01 304-SRFC	3038723	24.22	2435733	32.52	1852056	36.64
02 311-3-4	2854978	24.22	2264673	32.51	1559451	36.65
03 308-3-5 RE	2664595	24.22	1974699	32.53	1035818*	36.64
04 305-9-11 RE	2656175	24.23	1854897	32.53	812305*	36.65
05 314-8-10 RE	2510003	24.23	1754483	32.53	818050*	36.65
06 307-2.5-4 RE	2527974	24.23	1626198	32.54	701603*	36.65
07 312-6-7 DL	2049223	24.40	2009838	32.54	1059327*	36.66

IS1 (DCB) = 1,4-Dichlorobenzene-d4
 IS2 (NPT) = Naphthalene-d8
 IS3 (ANT) = Acenaphthene-d10
 IS4 (PHN) = Phenanthrene-d10
 IS5 (CRY) = Chrysene-d12
 IS6 (PRY) = Perylene-d12

AREA UPPER LIMIT = +100% of internal standard area
 AREA LOWER LIMIT = - 50% of internal standard area
 RT UPPER LIMIT = +0.50 minutes of internal standard RT
 RT LOWER LIMIT = -0.50 minutes of internal standard RT

Column to be used to flag values outside QC limit with an asterisk.

* Values outside of contract required QC limits

8C
SEMIVOLATILE INTERNAL STANDARD AREA AND RT SUMMARY

Lab Name: FRIEND LABORATORY, INC. Contract: _____
 Lab Code: 10252 Case No.: _____ SAS No.: _____ SDG No.: USC
 Lab File ID (Standard): B3272.D Date Analyzed: 10/26/01
 Instrument ID: MSD-B Time Analyzed: 09:38

	IS4(PHN) AREA #	RT #	IS5(CRY) AREA #	RT #	IS6(PRY) AREA #	RT #
12 HOUR STD	3723960	24.36	2602927	32.66	1992957	36.79
UPPER LIMIT	7447920	24.86	5205854	33.16	3985914	37.29
LOWER LIMIT	1861980	23.86	1301464	32.16	996479	36.29
NYSDEC SAMPLE NO						
01 304-5-7	2574724	24.35	1503274	32.66	658006 *	36.79
02 306-SRFC	3151916	24.35	1879378	32.68	664858 *	36.81
03 309-SRFC DL	3246324	24.35	1756640	32.88	598391 *	36.79
04 307-SRFC	2848920	24.35	692515 *	32.85	342497 *	36.81
05 309-SRFC MS	2827943	24.37	768576 *	32.69	378144 *	36.82
06 308-SRFC MS	3182154	24.38	1081727 *	32.70	430406 *	36.83

IS1 (DCB) = 1,4-Dichlorobenzene-d4
 IS2 (NPT) = Naphthalene-d8
 IS3 (ANT) = Acenaphthene-d10
 IS4 (PHN) = Phenanthrene-d10
 IS5 (CRY) = Chrysene-d12
 IS6 (PRY) = Perylene-d12

AREA UPPER LIMIT = +100% of internal standard area
 AREA LOWER LIMIT = - 50% of internal standard area
 RT UPPER LIMIT = +0.50 minutes of internal standard RT
 RT LOWER LIMIT = -0.50 minutes of internal standard RT

Column to be used to flag values outside QC limit with an asterisk.
 * Values outside of contract required QC limits

8C
SEMIVOLATILE INTERNAL STANDARD AREA AND RT SUMMARY

Lab Name: FRIEND LABORATORY, INC. Contract: _____
 Lab Code: 10252 Case No.: _____ SAS No.: _____ SDG No.: USC
 Lab File ID (Standard): B3280.D Date Analyzed: 10/29/01
 Instrument ID: MSD-B Time Analyzed: 14:18

	IS4(PHN) AREA #	RT #	IS5(CRY) AREA #	RT #	IS6(PRY) AREA #	RT #
12 HOUR STD	2962922	24.22	2094657	32.52	1461819	36.64
UPPER LIMIT	5925844	24.72	4189314	33.02	2923638	37.14
LOWER LIMIT	1461461	23.72	1047329	32.02	730910	36.14
NYSDEC SAMPLE NO.						
01 306-SRFC RE	1736026	24.22	1107024	32.53	428641 *	36.65
02 307-SRFC RE	1781066	24.21	513454 *	32.50	264223 *	36.66

IS1 (DCB) = 1,4-Dichlorobenzene-d4
 IS2 (NPT) = Naphthalene-d8
 IS3 (ANT) = Acenaphthene-d10
 IS4 (PHN) = Phenanthrene-d10
 IS5 (CRY) = Chrysene-d12
 IS6 (PRY) = Perylene-d12

AREA UPPER LIMIT = +100% of internal standard area
 AREA LOWER LIMIT = - 50% of internal standard area
 RT UPPER LIMIT = +0.50 minutes of internal standard RT
 RT LOWER LIMIT = -0.50 minutes of internal standard RT

Column to be used to flag values outside QC limit with an asterisk.
 * Values outside of contract required QC limits

8C
SEMIVOLATILE INTERNAL STANDARD AREA AND RT SUMMARY

Lab Name: FRIEND LABORATORY, INC. Contract: _____
 Lab Code: 10252 Case No.: _____ SAS No.: _____ SDG No.: USC
 Lab File ID (Standard): B3298.D Date Analyzed: 11/06/01
 Instrument ID: MSD-B Time Analyzed: 08:13

	IS4(PHN) AREA #	RT #	IS5(CRY) AREA #	RT #	IS6(PRY) AREA #	RT #
12 HOUR STD	2591765	24.31	1952700	32.61	1382685	36.72
UPPER LIMIT	6183530	24.81	3905400	33.11	2785370	37.22
LOWER LIMIT	1295883	23.81	976350	32.11	691343	36.22
NYSDEC SAMPLE NO.						
01 305-12-14	2077372	24.28	1604995	32.58	1205854	36.71
02 307-4-6	1881467	24.28	1297866	32.57	858477	36.71
03 304-2-4 RE	1773652	24.29	886291 *	32.61	362053 *	36.73
04 304-10-12	1332160	24.33	356346 *	32.68	190330 *	36.81

IS1 (DCB) = 1,4-Dichlorobenzene-d4
 IS2 (NPT) = Naphthalene-d8
 IS3 (ANT) = Acenaphthene-d10
 IS4 (PHN) = Phenanthrene-d10
 IS5 (CRY) = Chrysene-d12
 IS6 (PRY) = Perylene-d12

AREA UPPER LIMIT = +100% of internal standard area
 AREA LOWER LIMIT = - 50% of internal standard area
 RT UPPER LIMIT = +0.50 minutes of internal standard RT
 RT LOWER LIMIT = -0.50 minutes of internal standard RT

Column to be used to flag values outside QC limit with an asterisk.

* Values outside of contract required QC limits

8B
SEMIVOLATILE INTERNAL STANDARD AREA AND RT SUMMARY

Lab Name: FRIEND LABORATORY, INC. Contract: _____
 Lab Code: 10252 Case No.: _____ SAS No.: _____ SDG No.: USC
 Lab File ID (Standard): B3305.D Date Analyzed: 11/07/01
 Instrument ID: MSD-B Time Analyzed: 08:41

	IS1(DCB) AREA #	RT #	IS2(NPT) AREA #	RT #	IS3(ANT) AREA #	RT #
12 HOUR STD	577718	10.18	2021693	14.13	1325009	19.63
UPPER LIMIT	1155436	10.68	4043386	14.63	2650018	20.13
LOWER LIMIT	288859	9.68	1010847	13.63	662505	19.13
NYSDEC SAMPLE NO						
01 302-SRFC	567260	10.17	2074298	14.11	1261237	19.61
02 303-SRFC	628999	10.17	2370717	14.11	1380863	19.62
03 306-18-20	628158	10.18	2346215	14.12	1424673	19.62
04 306-24-26	645642	10.18	2380082	14.11	1452277	19.62
05 304-6-8	652013	10.18	2468452	14.11	1490780	19.62
06 303-4-6	623661	10.17	1899983	14.15	570399*	19.70
07 304-SRFC	704967	10.18	2566706	14.12	1576220	19.62
08 305-SRFC	680740	10.18	2519332	14.12	1504583	19.62

IS1 (DCB) = 1,4-Dichlorobenzene-d4
 IS2 (NPT) = Naphthalene-d8
 IS3 (ANT) = Acenaphthene-d10
 IS4 (PHN) = Phenanthrene-d10
 IS5 (GRY) = Chrysene-d12
 IS6 (PRY) = Pyrene-d12

AREA UPPER LIMIT = +100% of internal standard area
 AREA LOWER LIMIT = -50% of internal standard area
 RT UPPER LIMIT = +0.50 minutes of internal standard RT
 RT LOWER LIMIT = -0.50 minutes of internal standard RT

* Column to be used to flag values outside QC limit with an asterisk.
 * Values outside of contract required QC limits

8C
SEMIVOLATILE INTERNAL STANDARD AREA AND RT SUMMARY

Lab Name: FRIEND LABORATORY, INC. Contract: _____
 Lab Code: 10252 Case No.: _____ SAS No.: _____ SDG No.: USC
 Lab File ID (Standard): B3305.D Date Analyzed: 11/07/01
 Instrument ID: MSD-8 Time Analyzed: 08:41

	IS4(PHN) AREA #	RT #	IS5(CRY) AREA #	RT #	IS6(PRY) AREA #	RT #
12 HOUR STD	2214479	24.25	1604382	32.55	1079433	36.67
UPPER LIMIT	4428958	24.75	3208764	33.05	2158866	37.17
LOWER LIMIT	1107240	23.75	802191	32.05	539717	36.17
NYSDEC SAMPLE NO.						
01 302-SRFC	1897509	24.22	1185468	32.52	903867	36.67
02 303-SRFC	1903444	24.23	1203425	32.54	879183	36.68
03 306-18-20	2007456	24.24	1274151	32.53	990438	36.67
04 308-24-26	2125868	24.23	1198860	32.54	926238	36.68
05 304-6-8	2195909	24.25	1236219	32.56	985276	36.69
06 303-4-8	1105217 *	24.42	1278488	32.58	1075530	36.72
07 304-SRFC	2276834	24.24	1485504	32.56	1138589	36.70
08 305-SRFC	2109589	24.23	1255988	32.54	967745	36.70

IS1 (DCB) = 1,4-Dichlorobenzene-d4
 IS2 (NPT) = Naphthalene-d8
 IS3 (ANT) = Acenaphthene-d10
 IS4 (PHN) = Phenanthrene-d10
 IS5 (CRY) = Chrysene-d12
 IS6 (PRY) = Perylene-d12

AREA UPPER LIMIT = +100% of internal standard area
 AREA LOWER LIMIT = - 50% of internal standard area
 RT UPPER LIMIT = +0.50 minutes of internal standard RT
 RT LOWER LIMIT = -0.50 minutes of internal standard RT

Column to be used to flag values outside QC limit with an asterisk.
 * Values outside of contract required QC limits

8C
SEMIVOLATILE INTERNAL STANDARD AREA AND RT SUMMARY

Lab Name: FRIEND LABORATORY, INC. Contract: _____
 Lab Code: 10252 Case No.: _____ SAS No.: _____ SDG No.: USC
 Lab File ID (Standard): B3319.D Date Analyzed: 11/08/01
 Instrument ID: MSD-B Time Analyzed: 10:48

	IS4(PHN) AREA #	RT #	IS5(CRY) AREA #	RT #	IS6(PRY) AREA #	RT #
12 HOUR STD	3332685	24.11	2426654	32.40	1623348	36.52
UPPER LIMIT	6665370	24.61	4853308	32.90	3246696	37.02
LOWER LIMIT	1666343	23.61	1213327	31.90	811674	36.02
NYSDEC SAMPLE NO.						
01 304-2-4	2790320	24.12	1378397	32.43	486078 *	36.53
02 304-10-12 RE	1559443 *	24.17	473029 *	32.52	276886 *	36.63
03 306-18-20 RE	1686585	24.18	1231867	32.42	606003 *	36.54

IS1 (DCB) = 1,4-Dichlorobenzene-d4
 IS2 (NPT) = Naphthalene-d8
 IS3 (ANT) = Acenaphthene-d10
 IS4 (PHN) = Phenanthrene-d10
 IS5 (CRY) = Chrysene-d12
 IS6 (PRY) = Perylene-d12

AREA UPPER LIMIT = +100% of internal standard area
 AREA LOWER LIMIT = - 50% of internal standard area
 RT UPPER LIMIT = +0.50 minutes of internal standard RT
 RT LOWER LIMIT = -0.50 minutes of internal standard RT

Column to be used to flag values outside QC limit with an asterisk.
 * Values outside of contract required QC limits

SEMIVOLATILE INTERNAL STANDARD AREA AND RT SUMMARY

Lab Name: FRIEND LABORATORY, INC. Contract: _____
 Lab Code: 10252 Case No.: _____ SAS No.: _____ SDG No.: USC
 Lab File ID (Standard): B3326.D Date Analyzed: 11/09/01
 Instrument ID: MSD-B Time Analyzed: 07:28

	IS1(DCB) AREA #	RT #	IS2(NPT) AREA #	RT #	IS3(ANT) AREA #	RT #
12 HOUR STD	751758	10.26	2591064	14.18	1686877	19.68
UPPER LIMIT	1503516	10.76	5182128	14.68	3373754	20.18
LOWER LIMIT	375879	9.76	1295532	13.68	843439	19.18
NYSDEC SAMPLE NO.						
01 GPCBLK07	749033	10.25	2553522	14.17	1606941	19.67
02 301-4-6	718489	10.25	2612360	14.17	1472597	19.68
03 304-6-8 DL	803389	10.26	2929211	14.18	1792167	19.68
04 302-4-6 DL	832433	10.25	2993843	14.18	1596565	19.68
05 303-4-6 RE	861829	10.28	2456060	14.22	677293 *	19.91

IS1 (DCB) = 1,4-Dichlorobenzene-d4

IS2 (NPT) = Naphthalene-d8

IS3 (ANT) = Acenaphthene-d10

IS4 (PHN) = Phenanthrene-d10

IS5 (CRY) = Chrysene-d12

IS6 (PRY) = Perylene-d12

AREA UPPER LIMIT = +100% of internal standard area

AREA LOWER LIMIT = - 50% of internal standard area

RT UPPER LIMIT = +0.50 minutes of internal standard RT

RT LOWER LIMIT = -0.50 minutes of internal standard RT

Column to be used to flag values outside QC limit with an asterisk.

* Values outside of contract required QC limits

00726

8C
SEMIVOLATILE INTERNAL STANDARD AREA AND RT SUMMARY

Lab Name: FRIEND LABORATORY, INC. Contract: _____
 Lab Code: 10252 Case No.: _____ SAS No.: _____ SDG No.: USC
 Lab File ID (Standard): B3326.D Date Analyzed: 11/09/01
 Instrument ID: MSD-B Time Analyzed: 07:28

	IS4(PHN) AREA #	RT #	IS5(CRY) AREA #	RT #	IS6(PRY) AREA #	RT #
12 HOUR STD	2753511	24.29	1741124	32.60	1272112	36.73
UPPER LIMIT	5507022	24.79	3482248	33.10	2544224	37.23
LOWER LIMIT	1376756	23.79	870562	32.10	638058	36.23
NYSDEC SAMPLE NO.						
01 GPCBLK07	2516447	24.29	2179773	32.59	1594903	36.72
02 301-4-6	2089122	24.30	1255612	32.63	575703 *	36.75
03 304-6-8 DL	2801332	24.30	1627088	32.61	987054	36.73
04 302-4-6 DL	2027571	24.31	943667	32.67	383063 *	36.78
05 303-4-6 RE	1315210 *	24.52	1022840	32.65	455830 *	36.76

IS1 (DCB) = 1,4-Dichlorobenzene-d4
 IS2 (NPT) = Naphthalene-d8
 IS3 (ANT) = Acenaphthene-d10
 IS4 (PHN) = Phenanthrene-d10
 IS5 (CRY) = Chrysene-d12
 IS6 (PRY) = Perylene-d12

AREA UPPER LIMIT = +100% of internal standard area
 AREA LOWER LIMIT = - 50% of internal standard area
 RT UPPER LIMIT = +0.50 minutes of internal standard RT
 RT LOWER LIMIT = -0.50 minutes of internal standard RT

Column to be used to flag values outside QC limit with an asterisk.

* Values outside of contract required QC limits

8C
SEMIVOLATILE INTERNAL STANDARD AREA AND RT SUMMARY

Lab Name: FRIEND LABORATORY, INC. Contract: _____
 Lab Code: 10252 Case No.: _____ SAS No.: _____ SDG No.: USC
 Lab File ID (Standard): B3326.D Date Analyzed: 11/09/01
 Instrument ID: MSD-B Time Analyzed: 07:28

	IS4(PHN) AREA #	RT #	IS5(CRY) AREA #	RT #	IS6(PRY) AREA #	RT #
12 HOUR STD	2753511	24.29	1741124	32.60	1272112	36.73
UPPER LIMIT	5507022	24.79	3482248	33.10	2544224	37.23
LOWER LIMIT	1376756	23.79	870562	32.10	636056	36.23
NYSDEC SAMPLE NO.						
01 GPCBLK07	2516447	24.29	2179773	32.59	1594903	36.72
02 SBLK22	2519892	24.28	1892557	32.58	1520329	36.72
03 SBLK22MS	2590976	24.28	2203573	32.58	1665833	36.73
04 302-SRFC	2698904	24.29	1436664	32.59	629153*	36.72
05 302-SRFC MS	2549254	24.30	1370122	32.59	702762	36.73
06 302-SRFC MSP	2965031	24.30	1552186	32.59	769580	36.73

IS1 (DCB) = 1,4-Dichlorobenzene-d4
 IS2 (NPT) = Naphthalene-d8
 IS3 (ANT) = Acenaphthene-d10
 IS4 (PHN) = Phenanthrene-d10
 IS5 (CRY) = Chrysene-d12
 IS6 (PRY) = Perylene-d12

AREA UPPER LIMIT = +100% of internal standard area
 AREA LOWER LIMIT = - 50% of internal standard area
 RT UPPER LIMIT = +0.50 minutes of internal standard RT
 RT LOWER LIMIT = -0.50 minutes of internal standard RT

Column to be used to flag values outside QC limit with an asterisk.

* Values outside of contract required QC limits

8C
SEMIVOLATILE INTERNAL STANDARD AREA AND RT SUMMARY

Lab Name: FRIEND LABORATORY, INC. Contract: _____
 Lab Code: 10252 Case No.: _____ SAS No.: _____ SDG No.: USC
 Lab File ID (Standard): B3326.D Date Analyzed: 11/09/01
 Instrument ID: MSD-8 Time Analyzed: 07:28

	IS4(PHN) AREA #	RT #	IS5(CRY) AREA #	RT #	IS6(PRY) AREA #	RT #
12 HOUR STD	2753511	24.29	1741124	32.60	1272112	36.73
UPPER LIMIT	5507022	24.79	3482248	33.10	2544224	37.23
LOWER LIMIT	1376756	23.79	870562	32.10	638056	36.23
NYSDEC SAMPLE NO.						
01 GPCBLK07	2516447	24.29	2178773	32.59	1594903	36.72
02 SBLK22	2519892	24.28	1892557	32.58	1520329	36.72
03 SBLK22MS	2590976	24.28	2203573	32.58	1665833	36.73
04 309	2807193	24.29	1989139	32.59	1377914	36.73
05 305-SRFC	2090894	24.29	899451	32.59	389605*	36.73

IS1 (DCB) = 1,4-Dichlorobenzene-d4
 IS2 (NPT) = Naphthalene-d8
 IS3 (ANT) = Acenaphthene-d10
 IS4 (PHN) = Phenanthrene-d10
 IS5 (CRY) = Chrysene-d12
 IS6 (PRY) = Perylene-d12

AREA UPPER LIMIT = +100% of internal standard area
 AREA LOWER LIMIT = - 50% of internal standard area
 RT UPPER LIMIT = +0.50 minutes of internal standard RT
 RT LOWER LIMIT = -0.50 minutes of internal standard RT

Column to be used to flag values outside QC limit with an asterisk.

* Values outside of contract required QC limits

BC
SEMIVOLATILE INTERNAL STANDARD AREA AND RT SUMMARY

Lab Name: FRIEND LABORATORY, INC. Contract: _____
 Lab Code: 10252 Case No.: _____ SAS No.: _____ SDG No.: USC
 Lab File ID (Standard): B3340.D Date Analyzed: 11/12/01
 Instrument ID: MSD-B Time Analyzed: 13:32

	IS4(PHN) AREA #	RT #	IS5(CRY) AREA #	RT #	IS6(PRY) AREA #	RT #
12 HOUR STD	3391761	24.16	2279467	32.44	1626050	36.56
UPPER LIMIT	6783522	24.66	4558934	32.94	3252100	37.06
LOWER LIMIT	1695881	23.66	1139734	31.94	813025	36.06
NYSDEC SAMPLE NO						
01 301-SRFC	2315011	24.14	1226169	32.42	535842 *	36.54
02 301-4-6 RE	1935814	24.17	954951 *	32.48	436767 *	36.59
03 302-4-6 DLRE	1856944	24.17	816412 *	32.51	368397 *	36.61

IS1 (DCB) = 1,4-Dichlorobenzene-d4
 IS2 (NPT) = Naphthalene-d8
 IS3 (ANT) = Acenaphthene-d10
 IS4 (PHN) = Phenanthrene-d10
 IS5 (CRY) = Chrysene-d12
 IS6 (PRY) = Perylene-d12

AREA UPPER LIMIT = +100% of internal standard area
 AREA LOWER LIMIT = - 50% of internal standard area
 RT UPPER LIMIT = +0.50 minutes of internal standard RT
 RT LOWER LIMIT = -0.50 minutes of internal standard RT

Column to be used to flag values outside QC limit with an asterisk.

* Values outside of contract required QC limits

8C
SEMIVOLATILE INTERNAL STANDARD AREA AND RT SUMMARY

Lab Name: FRIEND LABORATORY, INC. Contract: _____
 Lab Code: 10252 Case No.: _____ SAS No.: _____ SDG No.: USC
 Lab File ID (Standard): B3340.D Date Analyzed: 11/12/01
 Instrument ID: MSD-8 Time Analyzed: 13:32

	IS4(PHN) AREA #	RT #	IS5(CRY) AREA #	RT #	IS6(PRY) AREA #	RT #
12 HOUR STD	3391761	24.16	2279467	32.44	1626050	36.56
UPPER LIMIT	6783522	24.68	4558934	32.94	3252100	37.06
LOWER LIMIT	1695881	23.66	1139734	31.94	813025	36.06
NYSDEC SAMPLE NO.						
01 305-SRFC RE	1923130	24.15	745484 *	32.43	319288 *	36.58
02 306-6-8	1939112	24.17	774323 *	32.50	347858 *	36.59

IS1 (DCB) = 1,4-Dichlorobenzene-d4
 IS2 (NPT) = Naphthalene-d8
 IS3 (ANT) = Acenaphthene-d10
 IS4 (PHN) = Phenanthrene-d10
 IS5 (CRY) = Chrysene-d12
 IS6 (PRY) = Perylene-d12

AREA UPPER LIMIT = +100% of internal standard area
 AREA LOWER LIMIT = - 50% of internal standard area
 RT UPPER LIMIT = +0.50 minutes of internal standard RT
 RT LOWER LIMIT = -0.50 minutes of internal standard RT

Column to be used to flag values outside QC limit with an asterisk
 * Values outside of contract required QC limits

8C
SEMIVOLATILE INTERNAL STANDARD AREA AND RT SUMMARY

Lab Name: MITKEM CORPORATION Contract: _____
 Lab Code: MITKEM Case No.: _____ SAS No.: _____ SDG No.: 82259
 EPA Sample No. (SSTD050##): SSTD0502S Date Analyzed: 11/14/01
 Lab File ID (Standard): S2C3421 Time Analyzed: 1631
 Instrument ID: S2 GC Column: DB-5MS ID: 0.25 (mm)

	IS4 (PHN)	RT #	IS5 (CRY)	RT #	IS6 (PRY)	RT #
	AREA #		AREA #		AREA #	
=====	=====	=====	=====	=====	=====	=====
12 HOUR STD	626516	15.72	521064	21.04	227821	23.70
UPPER LIMIT	1253032	16.22	1042128	21.54	455642	24.20
LOWER LIMIT	313258	15.22	260532	20.54	113911	23.20
=====	=====	=====	=====	=====	=====	=====
EPA SAMPLE NO.						
=====	=====	=====	=====	=====	=====	=====
01 30379	484075	15.72	307447	21.04	110443*	23.70
02 30379MS	707873	15.71	468643	21.04	170584	23.70
03 30379MSD	673269	15.72	420614	21.04	148296	23.70
04						
05						
06						
07						
08						
09						
10						
11						
12						
13						
14						
15						
16						
17						
18						
19						
20						
21						
22						

IS4 (PHN) = Phenanthrene-d10
 IS5 (CRY) = Chrysene-d12
 IS6 (PRY) = Perylene-d12

AREA UPPER LIMIT = +100% of internal standard area
 AREA LOWER LIMIT = - 50% of internal standard area
 RT UPPER LIMIT = + 0.50 minutes of internal standard RT
 RT LOWER LIMIT = - 0.50 minutes of internal standard RT

Column used to flag values outside QC limits with an asterisk.
 * Values outside of QC limits

8C
SEMIVOLATILE INTERNAL STANDARD AREA AND RT SUMMARY

Lab Name: MITKEM CORPORATION Contract: _____
 Lab Code: MITKEM Case No.: _____ SAS No.: _____ SDG No.: 82330
 EPA Sample No. (SSTD050##): SSTD0502C Date Analyzed: 11/24/01
 Lab File ID (Standard): S2C3592 Time Analyzed: 1308
 Instrument ID: S2 GC Column: DB-5MS ID: 0.25(mm)

	IS4 (PHN) AREA #	RT #	IS5 (CRY) AREA #	RT #	IS6 (PRY) AREA #	RT #
12 HOUR STD	1705771	15.16	1460039	20.46	929144	23.10
UPPER LIMIT	3411542	15.66	2920078	20.96	1858288	23.60
LOWER LIMIT	852886	14.66	730020	19.96	464572	22.60
EPA SAMPLE NO.						
01 MW-305	1267985	15.15	1125631	20.47	729731	23.09
02 MW-301	1317510	15.16	1043267	20.45	638739	23.08
03 MW-303	1168824	15.16	905619	20.46	495984	23.08
04 MW-103	1280788	15.16	1034698	20.45	742498	23.08
05 MW-302	1185957	15.15	968446	20.46	527245	23.08
06 MW-101	1343954	15.16	542974*	20.45	128873*	23.08
07 MW-306	1299892	15.15	925798	20.45	333752*	23.08
08						
09						
10						
11						
12						
13						
14						
15						
16						
17						
18						
19						
20						
21						
22						

IS4 (PHN) - Phenanthrene d10
 IS5 (CRY) - Chrysene-d12
 IS6 (PRY) - Perylene-d12

AREA UPPER LIMIT = +100% of internal standard area
 AREA LOWER LIMIT = 50% of internal standard area
 RT UPPER LIMIT = + 0.50 minutes of internal standard RT
 RT LOWER LIMIT = - 0.50 minutes of internal standard RT

Column used to flag values outside QC limits with an asterisk.
 * Values outside of QC limits.

8C
SEMIVOLATILE INTERNAL STANDARD AREA AND RT SUMMARY

Lab Name: MITKEM CORPORATION Contract: _____
 Lab Code: MITKEM Case No.: _____ SAS No.: _____ SDC No.: 82330
 EPA Sample No. (SSTD050##): SSTD0502E Date Analyzed: 11/28/01
 Lab File ID (Standard): S2C3631 Time Analyzed: 1115
 Instrument ID: S2 GC Column: DB-5MS ID: 0.25 (mm)

	IS4 (PHN)		IS5 (CRY)		IS6 (PRY)	
	AREA #	RT #	AREA #	RT #	AREA #	RT #
=====	=====	=====	=====	=====	=====	=====
12 HOUR STD	948796	14.98	659851	20.27	492045	22.89
UPPER LIMIT	1897592	15.48	1319702	20.77	984090	23.39
LOWER LIMIT	474398	14.48	329926	19.77	246023	22.39
=====	=====	=====	=====	=====	=====	=====
EPA SAMPLE NO.						
=====	=====	=====	=====	=====	=====	=====
01 S2ALCSRE	763909	14.97	535025	20.25	404843	22.87
02 MW-306RE	724252	14.98	414158	20.26	217657*	22.88
03						
04						
05						
06						
07						
08						
09						
10						
11						
12						
13						
14						
15						
16						
17						
18						
19						
20						
21						
22						

IS4 (PHN) = Phenanthrene-d10
 IS5 (CRY) = Chrysene-d12
 IS6 (PRY) = Perylene-d12

AREA UPPER LIMIT = +100% of internal standard area
 AREA LOWER LIMIT = - 50% of internal standard area
 RT UPPER LIMIT = + 0.50 minutes of internal standard RT
 RT LOWER LIMIT = 0.50 minutes of internal standard RT

Column used to flag values outside QC limits with an asterisk.
 * Values outside of QC limits

8C
SEMIVOLATILE INTERNAL STANDARD AREA AND RT SUMMARY

Lab Name: MITKEM CORPORATION

Contract: _____

Lab Code: MITKEM Case No.: _____

SAS No.: _____ SDG No.: 82330

EPA Sample No. (SSTD050##): SSTD0502J

Date Analyzed: 12/01/01

Lab File ID (Standard): S2C3714

Time Analyzed: 1833

Instrument ID: S2

GC Column: DB-SMS ID: 0.25(mm)

	IS4 (PHN) AREA #	RT #	IS5 (CRY) AREA #	RT #	IS6 (PRY) AREA #	RT #
=====	=====	=====	=====	=====	=====	=====
12 HOUR STD	1071027	14.69	759447	19.96	463174	22.56
UPPER LIMIT	2142054	15.19	1518894	20.46	926348	23.06
LOWER LIMIT	535514	14.19	379724	19.46	231587	22.06
=====	=====	=====	=====	=====	=====	=====
EPA SAMPLE NO.						
=====	=====	=====	=====	=====	=====	=====
01 MW-101RE	489757*	14.68	134975*	19.94	48633*	22.55
02						
03						
04						
05						
06						
07						
08						
09						
10						
11						
12						
13						
14						
15						
16						
17						
18						
19						
20						
21						
22						

IS4 (PHN) = Phenanthrene d10

IS5 (CRY) = Chrysene-d12

IS6 (PRY) = Perylene-d12

AREA UPPER LIMIT = +100% of internal standard area

AREA LOWER LIMIT = - 50% of internal standard area

RT UPPER LIMIT = + 0.50 minutes of internal standard RT

RT LOWER LIMIT = - 0.50 minutes of internal standard RT

Column used to flag values outside QC limits with an asterisk.

* Values outside of QC limits

U.S. EPA - CLP

5A
SPIKE SAMPLE RECOVERY

EPA SAMPLE NO.

BH-301-SURF S

Lab Name: FRIEND LABORATORY, INC. Contract: _____

Lab Code: 10252 Case No.: _____ SAS No.: _____ SDG No.: USC _____

Matrix (soil/water): SOIL Level (low/med): LOW _____

% Solids for Sample: 79.4 _____

Concentration Units (ug/L or mg/kg dry weight): MG/KG

Analyte	Control Limit %R	Spiked Sample Result (SSR) C	Sample Result (SR) C	Spike Added (SA)	%R	Q	M
Aluminum							NR
Antimony	75-125	~~36.000~~ 70.1709	~~9.37~~ 69.6357	~~U~~ 60.49	~~44.2%~~ 0.0	N	P
Arsenic							NR
Barium	75-125	500.5485	257.1965	241.97	100.6	P	
Beryllium	75-125	9.3936	3.6018	6.05	95.7	P	
Cadmium	75-125	~~1.275~~ 12.0984	~~U~~ 12.0062	~~U~~ 6.05	~~75.0%~~ 0.0	N	P
Calcium							NR
Chromium	75-125	~~29.904~~ 25.2932	~~DL 16.127~~ 29.0302	~~DL~~ 24.20	~~54.1%~~ 15.4	N	P
Cobalt	75-125	51.4275	5.3305	60.49	76.2	P	
Copper	75-125	51.5625	31.0363	30.25	67.9	N	P
Iron							NR
Lead	75-125	93.3107	42.8927	60.49	83.3	P	
Magnesium							NR
Manganese		2601.7869	2700.2962	60.49	-162.9	P	
Mercury	75-125	~~5442~~ 0.0591	0.0614	0.30	0.0	N	CV
Nickel	75-125	66.0427	23.8669	60.49	69.7	N	P
Potassium							NR
Selenium							NR
Silver	75-125	~~1.604~~ 14.5181	~~U~~ 14.4074	~~U~~ 6.05	~~69.1%~~ 0.0	N	P
Sodium							NR
Thallium							NR
Vanadium	75-125	71.0891	25.7803	60.49	74.9	P	
Zinc	75-125	246.5637	172.1700	60.49	123.0	P	
Cyanide							NR

Comments:

3L = Sample results were taken from a 1:20 dilution. MLB 012907

Form V (Part 1) - IN

02326

ILM04.0

B1-31-2

00056

U.S. EPA - CLP

5A
SPIKE SAMPLE RECOVERY

EPA SAMPLE NO.

BH-302-SURF S

Lab Name: FRIEND LABORATORY, INC. Contract: _____

Lab Code: 10252

Case No.: _____

SAS No.: _____

SDG No.: USC _____

Matrix (soil/water): SOIL _____

Level (low/med): LOW _____

% Solids for Sample: 75.2 _____

Concentration Units (ug/L or mg/kg dry weight): MG/KG

Analyte	Control Limit %R	Spiked Sample Result (SSR) C	Sample Result (SR) C	Spike Added (SA)	%R	Q	M
Aluminum							NR
Antimony							NR
Arsenic	75-125	8.3806	7.4833	5.17	17.4	N	F
Barium							NR
Beryllium							NR
Cadmium							NR
Calcium							NR
Chromium							NR
Cobalt							NR
Copper							NR
Iron							NR
Lead							NR
Magnesium							NR
Manganese							NR
Mercury							NR
Nickel							NR
Potassium							NR
Selenium	75-125	1.5857	0.2607	U	1.29		F
Silver							NR
Sodium							NR
Thallium	75-125	6.2251	1.2411	B	6.46		F
Vanadium							NR
Zinc							NR
Cyanide							NR

Comments:

Form V (Part 1) - IN

02327

ILM04.0

PB 1-31-02

-00057-

U.S. EPA - CLP

5A
SPIKE SAMPLE RECOVERY

EPA SAMPLE NO.

BH-304-6-R S

Lab Name: FRIEND LABORATORY, INC. Contract: _____

Lab Code: 10252 Case No.: _____ SAS No.: _____ SDG No.: USC

Matrix (soil/water): SOIL Level (low/med): LOW

% Solids for Sample: 50.1

Concentration Units (ug/L or mg/kg dry weight): MG/KG

Analyte	Control Limit %R	Spiked Sample Result (SSR) C	Sample Result (SR) C	Spike Added (SA)	%R	Q	M
Aluminum							NR
Antimony							NR
Arsenic							NR
Barium							NR
Beryllium							NR
Cadmium							NR
Calcium							NR
Chromium							NR
Cobalt							NR
Copper							NR
Iron							NR
Lead							NR
Magnesium							NR
Manganese							NR
Mercury							NR
Nickel							NR
Potassium							NR
Selenium							NR
Silver							NR
Sodium							NR
Thallium							NR
Vanadium							NR
Zinc							NR
Cyanide	75-125	0.8562	2.1328	4.86	-26.3	N	AS

Comments:

02328

Form V (Part 1) - IN

ILM04.0

GB 1-31-0
00058

5A
SPIKE SAMPLE RECOVERY

EPA SAMPLE NO.

MW-307-SURF S

Name: FRIEND LABORATORY, INC. Contract: _____

Lab Code: 10252 Case No.: _____ SAS No.: _____ SDG No.: USC _____

Matrix (soil/water): SOIL Level (low/med): LOW _____

% Solids for Sample: 79.1 _____

Concentration Units (ug/L or mg/kg dry weight): MG/KG

Analyte	Control Limit %R	Spiked Sample Result (SSR)	C	Sample Result (SR)	C	Spike Added (SA)	%R	Q	M
Aluminum									NR
Antimony	75-125	20.5919		71.9577	U	62.03	16.7	0.0	N P
Arsenic	75-125			16.6017		4.90	93.8		F
Barium	75-125			441.1836		248.13	64.2		N P
Beryllium	75-125			10.5000		6.20	69.2		N P
Cadmium	75-125			5.3052		6.20	66.6		N P
Calcium									NR
Chromium	75-125			28.0348		24.81	63.5		N P
Cobalt	75-125			46.2430		62.03	70.2		N P
Copper	75-125			45.1116		30.99	104.0		P
Lead				16.7666		2.45	187.8		NR
Magnesium									NR
Manganese				1885.6606		62.03	306.7		P
Mercury	75-125			0.0911		0.27	33.2		N CV
Nickel	75-125			55.3872		62.03	68.2		N P
Potassium									NR
Selenium	75-125			1.0806		1.22	88.6		F
Silver	75-125			5.3059		6.20	67.5		N P
Sodium									NR
Thallium	75-125			6.5463		6.12	107.0		F
Vanadium	75-125			52.6436		62.03	73.4		N P
Zinc	75-125			70.9876		62.03	67.0		N P
Cyanide	75-125			2.4838		4.16	14.0		N AS

Comments:

DL: result was taken from 1:20 dilution

SAMPLE NO.

SA
SPIKE SAMPLE RECOVERY

EPA SAMPLE NO.

101798

Lab Code: MITKEM CORPORATION

Contract:

Lab Code: MITKEM

Case No.

SAS No.:

SDG No: 82259

Matrix (soil/water):

SOH

Level (low/med):

MED

% Solids for Sample:

79.0

Concentration Units (ug/L or mg/kg dry weight).

MG/KG

Analyte	Control Limit %R	Spiked Sample Result (SSR)	C	Sample Result (SR)	C	Spike Added (SA)	%R	Q	M
Aluminum									NR
Antimony	75-125	6.4999	B	0.9206	U	23.01	28.2	N	P
Arsenic	75-125	11.6803		2.0793	B	9.21	104.2		P
Barium	75-125	524.8791		38.4955	B	460.30	105.7		P
Beryllium	75-125	11.8891		0.3483	B	11.51	100.3		P
Cadmium	75-125	1.9084		0.5277	B	1.15	120.1		P
Calcium									NR
Chromium	75-125	56.9830		9.4988		46.03	103.2		P
Cobalt	75-125	123.7705		4.4880	B	115.07	103.7		P
Copper	75-125	70.8206		13.4159		57.54	99.8		P
									NR
	75-125	13.4967		8.4871		4.60	108.9		P
Magnesium									NR
Manganese	75-125	202.1455		106.6267		115.07	83.0		P
Mercury	75-125	1.3876		0.0633	U	1.27	109.3		CV
Nickel	75-125	130.8627		11.7644		115.07	103.5		P
Potassium									NR
Selenium	75-125	4.5247		1.6805		2.30	173.7		P
Silver	75-125	11.2708		0.1381	U	11.51	97.9		P
Sodium									NR
Thallium	75-125	14.9797		1.3809	U	11.51	130.1	N	P
Vanadium	75-125	129.7614		19.1980		115.07	96.1		P
Zinc	75-125	151.3870		33.1675		115.07	102.7		P
Cyanide									NR

Comments:

U.S. EPA - CLP
5A
SPIKE SAMPLE RECOVERY

EPA SAMPLE NO.

Lab Name: MITKEM CORPORATION Contract:

MW 3045

Lab Code: MITKEM Case No.: SAS No.: SDG No.: R2130

Matrix (soil/water): WATER Level (low/med): MED

% Solids for Sampler: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

Analyte	Control Limit %R	Spiked Sample Result (SSR)	Sample Result (SR)	Spike Added (SA)	%R	Q
Aluminum	75-125	3796.7572	1731.3021	2000.00	103.3	P
Antimony	75-125	131.7165	4.0000	100.00	131.7	N P
Arsenic	75-125	53.2225	7.0000	40.00	133.1	N P
Barium	75-125	2253.4655	66.3942	2000.00	109.4	P
Beryllium	75-125	52.5357	0.1000	50.00	105.1	P
Cadmium	75-125	5.5169	0.1000	5.00	110.3	P
Calcium						NR
Chromium	75-125	215.9822	5.7074	200.00	105.1	P
Cobalt	75-125	534.9415	2.7040	500.00	106.4	P
Copper	75-125	280.4107	3.7584	250.00	110.7	P
Iron	75-125	3191.8005	2138.7845	1000.00	105.3	P
Lead	75-125	25.7776	2.0000	20.00	128.9	N P
Magnesium						NR
Manganese	75-125	562.5087	31.2644	500.00	106.2	P
Mercury	75-125	1.1415	0.1340	1.01	113.0	CV
Nickel	75-125	538.9566	2.7666	500.00	107.2	P
Potassium						NR
Selenium	75-125	16.1116	5.0000	10.00	161.1	N P
Silver	75-125	56.1328	0.6000	50.00	112.3	P
Sodium						NR
Thallium	75-125	62.2633	6.0000	50.00	124.5	P
Vanadium	75-125	527.8632	3.9969	500.00	104.8	P
Zinc	75-125	557.5279	16.0390	500.00	108.3	P
Cyanide	75-125	111.2070	9.1245	100.00	102.0	CA

Comments:

U.S. EPA - CLP
5A
SPIKE SAMPLE RECOVERY

EPA SAMPLE NO.

MW-1045

Lab Name: MITKEM CORPORATION

Contract:

Lab Code: MITKEM

Case No.:

SAS No.:

SIX No.: 02330

Matrix (soil/water): WATER

Level (low/med): MED

% Solids for Sample: 0.0

Concentration Units (ug/l. or mg/kg dry weight):

UG/L

Analyte	Control Limit	Spiked Sample Result (SSR)	C	Sample Result (SR)	C	Spike Added (SA)	SR	Q
Aluminum	75-125	2176.2942		23.7441	B	2000.00	107.6	P
Antimony	75-125	129.1197		4.0000	U	100.00	129.1	IN
Arsenic	75-125	50.9332		7.0000	U	40.00	127.3	IN
Barium	75-125	2298.3800		17.5333	B	2000.00	114.0	P
Beryllium	75-125	53.9209		0.1000	U	50.00	107.8	P
Cadmium	75-125	5.6438		0.1000	U	5.00	112.9	P
Calcium								NR
Chromium	75-125	219.9886		2.9174	D	200.00	108.5	P
Cobalt	75-125	559.3312		0.9821	B	500.00	111.7	P
Copper	75-125	288.3905		1.9601	B	250.00	114.6	P
Iron	75-125	1072.9216		5.0000	U	1000.00	107.3	P
Lead	75-125	24.4619		2.0000	U	20.00	122.3	P
Magnesium								NR
Manganese	75-125	557.7185		0.4800	U	500.00	111.5	P
Mercury	75-125	1.1083		0.1300	U	0.91	121.0	CV
Nickel	75-125	557.9781		0.3000	U	500.00	111.6	P
Potassium								NR
Selenium	75-125	16.3510		5.0000	U	10.00	163.5	IN
Silver	75-125	54.8731		0.6000	U	50.00	109.7	P
Sodium								NR
Thallium	75-125	61.4599		6.0000	U	50.00	122.9	P
Vanadium	75-125	541.7088		0.4000	U	500.00	108.3	P
Zinc	75-125	564.9510		5.0000	U	500.00	113.0	P
Cyanide								NR

Comments:

000872

9
ICP SERIAL DILUTIONS

EPA SAMPLE NO.

MW-301-SURF L

Lab Name: FRIEND LABORATORY, INC.

Contract:

Lab Code: 10252 Case No.:

SAS No.:

SDG No.: USC

Matrix (soil/water): SOIL

Level (low/med): LOW

Concentration Units: ug/L

Analyte	Initial Sample Result (I)	C	Serial Dilution Result (S)	C	% Differ- ence	Q	M
Aluminum	36708.81		37933.38		3.3		P
Antimony	29.00	U	145.00	U			P
Arsenic							NR
Barium	230.35		222.83	B	3.3		P
Beryllium	2.27	B	5.00	U	100.0		P
Cadmium	7.26		25.00	U	100.0		P
Calcium	207818.90		218799.59		5.3		P
Chromium	37.48		56.80		51.5		P
Cobalt	40.20	B	45.11	B	12.2		P
Copper							NR
Iron	90352.95		96429.55		6.7		P
Lead							NR
Magnesium	41967.36		43748.32		4.2		P
Manganese	3708.06		3905.41		5.3		P
Mercury							NR
Nickel	115.18		143.68	B	24.7		P
Potassium	5545.82		5763.16	B	3.9		P
Selenium							NR
Silver	6.00	U	30.00	U			P
Sodium	799.20	B	1073.81	B	34.4		P
Thallium							NR
Vanadium	63.49		63.49	B	0.0		P
Zinc	432.63		460.35		6.4		P

U.S. EPA - CLP

9
ICP SERIAL DILUTIONS

EPA SAMPLE NO.

BH-306-18-20 L

Lab Name: FRIEND LABORATORY, INC. _ _

Contract: _ _ _

Lab Code: 10252 Case No.: _ _ _

SAS No.: _ _ _

SDG No.: USC _ _

Matrix (soil/water): SOIL _

Level (low/med): LOW _

Concentration Units: ug/L

Analyte	Initial Sample Result (I)	C	Serial Dilution Result (S)	C	% Differ- ence	Q	M
Aluminum	128137.55		132718.51		3.6		P
Antimony	32.64	B	145.00	U	100.0		P
Arsenic							NR
Barium	1348.84		1368.03		1.4		P
Beryllium	13.22		14.94	B	13.0		P
Cadmium	19.53		25.00	U	100.0		P
Calcium							NR
Chromium	314.58		352.08		11.9		P
Cobalt	55.19		67.68	B	22.6		P
Copper	234.65		240.00		2.3		P
Iron	109710.64		117908.40		7.5		P
Lead	534.12		534.18		0.0		P
Magnesium	23809.83		24731.62	B	3.9		P
Manganese	1566.72		1657.37		5.8		P
Mercury							NR
Nickel	139.92		184.20	B	31.6		P
Potassium	128405.63		130795.62		1.9		P
Selenium							NR
Silver	12.77		30.00	U	100.0		P
Sodium	6223.07		6494.94	B	4.4		P
Thallium							NR
Vanadium	244.93		252.86		3.2		P
Zinc	3222.45		3439.07		6.7		P

FORM IX - IN

ILM04.0

PB 1-31-02
00067
02337

U.S. EPA CLP
9
ICP SERIAL DILUTIONS

EPA SAMPLE NO. _____

MW-304L

Lab Name: MITKEM CORPORATION _____

Contract: _____

Lab Code: MITKEM Case No.: _____

SAS No.: _____

SIG No.: 82170

Matrix (Soil/Water): WATER _____

Level (low/med): MED _____

Concentration Units: ug/L

Analyte	Initial Sample Result (I)	C	Serial Dilution Result (S)	C	% Differ- ence	Q	IM
Aluminum	23.74	B	58.21	B	145.2		P
Antimony	4.00	U	20.00	U			P
Arsenic	7.00	U	35.00	U			P
Barium	17.53	B	12.31	B	29.8		P
Beryllium	0.10	U	0.50	U			P
Cadmium	0.10	U	0.50	U			P
Calcium	4944.32	B	4819.63	B	2.5		P
Chromium	2.92	B	5.34	B	82.9		P
Cobalt	0.98	B	1.00	U	100.0		P
Copper	1.96	B	4.00	U	100.0		P
Iron	5.00	U	25.00	U			P
Lead	2.00	U	10.00	U			P
Magnesium	12708.17		14075.15	B	10.8		P
Manganese	0.40	U	2.00	U			P
Mercury							NR
Nickel	0.30	U	1.50	U			P
Potassium	118883.83		120258.70		1.2		P
Selenium	5.00	U	25.00	U			P
Silver	0.60	U	3.00	U			P
Sodium	116403.74		119218.23		2.4		P
Thallium	6.00	U	30.00	U			P
Vanadium	0.40	U	2.00	U			P
Zinc	5.00	U	25.00	U			P

FORM IX IN

TL04.1

600879

CRDL STANDARD FOR AA AND ICP

Lab Name: FRIEND LABORATORY, INC.

Contract:

Lab Code: 10252 Case No.:

SDG No. : USC

AA CRDL Standard Source: BAKER

ICP CRDL Standard Source: IV CRA 1-3

Concentration Units: UG/L

[illegible]

Control Limits: no limits have been established at this time

FORM II (PART 2) - IN

02660

U.S. EPA - CLP

2B

CRDL STANDARD FOR AA AND ICP

Lab Name: FRIEND LABORATORY, INC.

Contract:

Lab Code: 10252

Case No.: _____

SAS No.: .

SDG No.: USC

AA CRDL Standard Source: _____

ICP CRDL Standard Source: IV__CRA 1-3

Concentration Units: ug/L

Analyte	CRDL Standard for AA			CRDL Standard for ICP				
	True	Found	%R	Initial True	Initial Found	%R	Final Found	%R
Aluminum								
Antimony				120.0			157.20	131.0
Arsenic								
Barium								
Beryllium				10.0			10.00	100.0
Cadmium				10.0			5.90	59.0
Calcium								
Chromium				20.0			25.30	126.5
Cobalt				100.0			102.80	102.8
Copper				50.0			45.40	90.8
Iron								
Lead								
Magnesium								
Manganese				30.0			32.50	108.3
Mercury								
Nickel				80.0			84.90	106.1
Potassium								
Selenium								
Silver				20.0			19.30	96.5
Sodium								
Thallium								
Vanadium				100.0			103.60	103.6
Zinc				40.0			40.60	101.5

Control Limits: no limits have been established by EPA at this time

2B

CRDL STANDARD FOR AA AND ICP

Lab Name: FRIEND LABORATORY, INC.

Contract: _____

Lab Code: 10252

Case No.: _____

SAS No.: _____

SDG No.: USC _____

AA CRDL Standard Source: BAKER _____

ICP CRDL Standard Source: IV CRA 1-3 _____

Concentration Units: ug/L

Analyte	CRDL Standard for AA			CRDL Standard for ICP				
	True	Found	%R	True	Initial Found	%R	Final Found	%R
Aluminum								
Antimony				120.0			157.20	131.0
Arsenic	10.0	10.91	109.1					
Barium								
Beryllium				10.0			10.00	100.0
Cadmium				10.0			5.90	59.0
Calcium								
Chromium				20.0			25.30	126.5
Cobalt				100.0			102.80	102.8
Copper				50.0			88.40	176.8
Cron								
Lead								
Magnesium								
Manganese				30.0			32.50	108.3
Mercury								
Nickel				80.0			84.90	106.1
Potassium								
Selenium	5.0	5.60	112.0					
Silver				20.0			19.30	96.5
Sodium								
Thallium	10.0	9.96	99.6					
Vanadium				100.0			103.60	103.6
Zinc				40.0			40.60	101.5

Control Limits: no limits have been established by EPA at this time

2B
CRDL STANDARD FOR AA AND ICP

Lab Name: FRIEND LABORATORY, INC.

Contract: _____

Lab Code: 10252 Case No.: _____

SAS No.: _____

SDG No.: USC _____

AA CRDL Standard Source: BAKER _____

ICP CRDL Standard Source: IV CRA 1-3 _____

Concentration Units: ug/L

Analyte	CRDL Standard for AA			CRDL Standard for ICP				
	True	Found	%R	Initial True	Initial Found	Initial %R	Final Found	Final %R
Aluminum								
Antimony				120.0	101.20	84.3	77.90	64.9
Arsenic	10.0	9.39	93.9					
Barium								
Beryllium								
Cadmium				10.0	7.40	74.0	9.10	91.0
Calcium								
Chromium								
Cobalt								
Copper				50.0	48.60	97.2	46.90	93.8
Iron								
Lead								
Magnesium								
Manganese								
Mercury								
Nickel								
Potassium								
Selenium	5.0	5.11	102.2					
Silver								
Sodium								
Thallium								
Vanadium								
Zinc								

Control Limits: no limits have been established by EPA at this time

GB 1-21-02
02307

2B
CRDL STANDARD FOR AA AND ICP

Lab Name: FRIEND LABORATORY, INC.

Contract: _____

Lab Code: 10252 Case No.: _____

SAS No.: _____

SDG No.: USC _____

AA CRDL Standard Source: BAKER _____

ICP CRDL Standard Source: IV CRA 1-3 _____

Concentration Units: ug/L

Analyte	CRDL Standard for AA			CRDL Standard for ICP				
	True	Found	%R	True	Initial Found	%R	Final Found	%R
Aluminum								
Antimony				120.0			85.90	71.6
Arsenic								
Barium								
Beryllium								
Cadmium				10.0			6.50	65.0
Calcium								
Chromium								
Cobalt								
Copper				50.0			54.10	108.2
Iron								
Lead								
Magnesium								
Manganese								
Mercury								
Nickel								
Potassium								
Selenium	5.0	4.83	96.6					
Silver								
Sodium								
Thallium								
Vanadium								
Zinc								

Control Limits: no limits have been established by EPA at this time

GB 1-31-02
02308

00038

10 A
PESTICIDE IDENTIFICATION SUMMARY
FOR SINGLE COMPONENT ANALYTES

NYSDEC SAMPLE NO.

Lab Name: FRIEND LABORATORY, INC.

Contract: _____

Lab Code: 10252

Case No.: _____

SAS No.: _____

L77999-8

BH-304-6-8

SDG No.: USC

Lab Sample ID: L77999-8

Date(s) Analyzed: 11/21/01 11/21/01

Instrument ID (1): HP3

Instrument ID (2): HP3

GC Column (1): RTX-CLPEST 1 (ID): 0.32 (mm)

GC Column (2): RTX-CLPEST 2 (ID): 0.32 (mm)

ANALYTE	COL	RT	RT WINDOW		CONCENTRATION	% D
			FROM	TO		
alpha-Chlordane	1	15.96	15.88	16.02	26	100.0
	2	16.97	16.92	17.06	52	
	1					
	2					
	1					
	2					
	1					
	2					
	1					
	2					
	1					
	2					
	1					
	2					
	1					
	2					

page 1 of 1

FORM X-CLP-PEST-1

10A
PESTICIDE IDENTIFICATION SUMMARY
FOR SINGLE COMPONENT ANALYTES

EPA SAMPLE NO.

L77999-13

MW-304-2-4

Lab Name:

Contract:

Lab Code:

Case No.:

SAS No.:

SDG No.: URS999

Lab Sample ID: L77999-13

Date(s) Analyzed: 11/21/1 11/21/1

Instrument ID (1): HP3

Instrument ID (2): HP3

GC Column(1): RTX-CLPEST 1 ID: 0.32(mm) GC Column(2): RTX-CLPEST 2 ID: 0.32(mm)

ANALYTE	COL	RT	RT WINDOW		CONCENTRATION	%D
			FROM	TO		
Dieldrin	1	16.69	16.65	16.79	7.9	
	2	17.72	17.68	17.82	26	229.1
4,4'-DDD	1	17.26	17.22	17.36	26	
	2	18.48	18.42	18.56	14	85.7
	1					
	2					
	1					
	2					
	1					
	2					
	1					
	2					
	1					
	2					
	1					
	2					

10A
PESTICIDE IDENTIFICATION SUMMARY
FOR SINGLE COMPONENT ANALYTES

EPA SAMPLE NO.

L77999-2

TT-304-Surf. 0

Lab Name:

Contract:

Lab Code:

Case No.:

SAS No.:

SDG No.: URS999

Lab Sample ID: L77999-2

Date(s) Analyzed: 11/21/1 11/21/1

Instrument ID (1): HP3

Instrument ID (2): HP3

GC Column(1): RTX-CLPEST 1 ID: 0.32(mm) GC Column(2): RTX-CLPEST 2 ID: 0.32(mm)

ANALYTE	COL	RT	RT WINDOW		CONCENTRATION	%D
			FROM	TO		
Dieldrin	1	16.68	16.65	16.79	10	
	2	17.70	17.68	17.82	16	60.0
4,4'-DDT	1	17.78	17.77	17.91	14	
	2	19.13	19.02	19.16	38	171.4
	1					
	2					
	1					
	2					
	1					
	2					
	1					
	2					
	1					
	2					
	1					
	2					

10A
PESTICIDE IDENTIFICATION SUMMARY
FOR SINGLE COMPONENT ANALYTES

EPA SAMPLE NO.

Lab Name:

Contract:

L78240-2DL

MUJ-305-Surface

Lab Code:

Case No.:

SAS No.:

SDC No.: URS240

Lab Sample ID: L78240-2DL

Date(s) Analyzed: 11/21/1 11/21/1

Instrument ID (1): HP3

Instrument ID (2): HP3

GC Column(1): RTX-CLPEST 1 ID: 0.32(mm) GC Column(2): RTX-CLPEST 2 ID: 0.32(mm)

ANALYTE	COL	RT	RT WINDOW		CONCENTRATION	%D
			FROM	TO		
4,4'-DDE	1	16.08	16.03	16.17	58	
	2	17.41	17.31	17.45	88	51.7
4,4'-DDT	1	17.83	17.77	17.91	120	
	2	19.12	19.02	19.16	160	33.3
	1					
	2					
	1					
	2					
	1					
	2					
	1					
	2					
	1					
	2					
	1					
	2					

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—

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Analyses Performed by:
SEVERN TRENT LABORATORIES, INC.

Prepared by:
URS CORPORATION
282 DELAWARE AVENUE
BUFFALO, NY 14202

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TABLE OF CONTENTS

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II. ANALYTICAL METHODOLOGIES	1
III. QUALITY CONTROL DATA	2
A. Initial and Continuing Calibrations	2
B. Surrogate/Internal Standard Recoveries	2
IV. SAMPLE RESULTS.....	2
V. SUMMARY	3

TABLES (following text)

Table 1 Sample Identification Summary

ATTACHMENTS

Attachment A - Validated Analytical Results

Attachment B - Support Documentation

I. INTRODUCTION

This Supplemental Data Usability Summary Report (DUSR) has been prepared following the guidelines provided in New York State Department of Environmental Conservation (NYSDEC) Division of Environmental Remediation *Guidance for the Development of Data Usability Summary Reports*, dated June 1999. This is an addendum to the March 2002 DUSR for the Site Investigation and Remedial Alternatives Report (SIRAR) at the Former Hanna Furnace Site in Buffalo, New York.

II. ANALYTICAL METHODOLOGIES

The data being evaluated is from the March 7, 2003 supplemental sampling of three groundwater samples. The analytical laboratory that performed the analyses is Severn Trent Laboratories, Inc., located in Amherst, New York. The samples were analyzed for Target Compound List (TCL) volatile organic compounds (VOCs) by United States Environmental Protection Agency (USEPA) Method 8260B, TCL semivolatile organic compounds (SVOCs) by USEPA Method 8270C, total cyanide by USEPA Method 9012, and weak acid dissociable (free) cyanide by Standard Method 4500-CN-1. All methods are referenced in NYSDEC Analytical Services Protocol (ASP), 6/2000 with the exception of free cyanide which is referenced in Standard Methods for the Evaluation of Water and Wastewater, 19th Edition, 1995. A summary of the samples collected is provided in Table I. The validated analytical results are presented in Attachment A.

A limited data validation was performed following the guidelines presented in USEPA Region II Validating Volatile Organic Compounds by SW-846 Method 8260B, HW-24, Revision 1, June 1999, Validating Semivolatile Organic Compounds by SW-846 Method 8270, HW-22, Revision 2, June 2001; and USEPA Region II Evaluation of Metals Data for the CLP, SOP No. HW-2, Revision XI, January 1992. Qualifications applied to the data include "F/UJ" (estimated concentration/estimated quantitation limit) and "R" (rejected). Only data requiring qualification is discussed in this report. Support documentation for the qualification of data is presented in Attachment B.

III. QUALITY CONTROL DATA

A. Initial and Continuing Calibrations

The average relative response factor (RRF) for the VOCs acetone and 1,2-dibromo-3-chloropropane was less than 0.05 in the initial calibration (ICAL) and the continuing calibration (CCAL). The results for acetone and 1,2-dibromo-3-chloropropane in sample MW-307 were rejected (R).

The percent difference (%D) between the ICAL average RRF and the CCAL RRF was greater than 20% for the SVOCs caprolactam, 2,4 dinitrophenol, and benzo(k)fluoranthene. The results for these SVOCs in samples MW-306 and MW-307 were qualified "UJ" (estimated quantitation limit).

Documentation supporting the qualification of data (e.g., Form VI for the ICAL and Form VII for the CCAL) is presented in Attachment B.

B. Surrogate/Internal Standard Recoveries

The VOC fraction of sample MW-307 exhibited low (i.e., less than the lower control limit) recovery of the surrogate toluene- d_8 . The reanalysis exhibited similar results. In accordance with the Region II validation guidelines the results were qualified "J/UJ", with the exception of the compounds previously rejected for RRF outliers.

Documentation supporting the qualification of data (e.g., Form II for the surrogates) is presented in Attachment B.

IV. SAMPLE RESULTS

Sample MW-307 for VOC analysis required dilution prior to analysis because the sample matrix resulted in the sample foaming during purging. A lower quantitation limit could not be achieved.

V. SUMMARY

All sample analyses were found to be compliant with the method criteria, except where previously noted. Those results qualified "I/II"(estimated) are considered conditionally usable. Those results qualified "R"(rejected) are unusable. All other sample results are usable as reported.

TABLE 1
SAMPLE IDENTIFICATION SUMMARY

SAMPLE ID	SAMPLE COLLECTION DATE	MATRIX	TCL VOCs	TCL SVOCs	CYANIDE	FREE CYANIDE	COMMENTS
MW-101	03/07/03	Groundwater	--	--	X	X	--
MW-306	03/07/03	Groundwater	--	X	--	--	--
MW-307	03/07/03	Groundwater	X	X	X	X	--

TCL - Target Compound List

VOCs - Volatile Organic Compounds

SVOCs - Semivolatile Organic Compounds

MW - Monitoring Well

X - Analysis requested.

-- - Analysis not requested, no comment.

ATTACHMENT A

VALIDATED ANALYTICAL RESULTS

Definition of Data Qualifiers

- U - The analyte was analyzed for, but was not detected above the reported sample quantitation limit
- J - The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.
- UJ - The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.
- R - The sample results are rejected due to serious deficiencies in the ability to analyze the sample and meet quality control criteria. The presence or absence of the analyte cannot be verified.

ATTACHMENT A
ANALYTICAL GROUNDWATER SAMPLE RESULTS
FORMER HANNA FURNACE SITE

Location ID		MW-101	MW-306	MW-307
Sample ID		MW-101	MW-306	MW-307
Matrix		Groundwater	Groundwater	Groundwater
Depth Interval (ft)		-	-	-
Date Sampled		03/07/03	03/07/03	03/07/03
Parameter	Units			
Volatiles Organic Compounds				
1,1,1-Trichloroethane	UG/L	NA	NA	25 UJ
1,1,2,2-Tetrachloroethane	UG/L	NA	NA	25 UJ
1,1,2-Trichloro-1,2,2-trifluoroethane	UG/L	NA	NA	250 UJ
1,1,2-Trichloroethane	UG/L	NA	NA	25 UJ
1,1-Dichloroethane	UG/L	NA	NA	25 UJ
1,1-Dichloroethene	UG/L	NA	NA	25 UJ
1,2,4-Trichlorobenzene	UG/L	NA	NA	25 UJ
1,2-Dibromo-3-chloropropane	UG/L	NA	NA	R
1,2-Dibromoethane (Ethylene dibromide)	UG/L	NA	NA	25 UJ
Dichlorobenzene	UG/L	NA	NA	25 UJ
1,2-Dichloroethane	UG/L	NA	NA	25 UJ
1,2-Dichloroethene (cis)	UG/L	NA	NA	25 UJ
1,2-Dichloroethene (trans)	UG/L	NA	NA	25 UJ
1,2-Dichloropropane	UG/L	NA	NA	25 UJ
1,3-Dichlorobenzene	UG/L	NA	NA	25 UJ
1,3-Dichloropropene (cis)	UG/L	NA	NA	25 UJ
1,3-Dichloropropene (trans)	UG/L	NA	NA	25 UJ
1,4-Dichlorobenzene	UG/L	NA	NA	25 UJ
2-Hexanone	UG/L	NA	NA	120 UJ
4-Methyl-2-pentanone	UG/L	NA	NA	120 UJ
Acetone	UG/L	NA	NA	R
Benzene	UG/L	NA	NA	25 UJ
Bromodichloromethane	UG/L	NA	NA	25 UJ
Bromoform	UG/L	NA	NA	25 UJ

Flags assigned during chemistry validation are shown

MADE BY: GE 05/19/2003

VD BY: GKK 04/19/2003

Detection Limits shown are PQL

ATTACHMENT A **ANALYTICAL GROUNDWATER SAMPLE RESULTS** **FORMER HANNA FURNACE SITE**

Location ID		MW-101	MW-306	MW-307
Sample ID		MW-101	MW-306	MW-307
Matrix		Groundwater	Groundwater	Groundwater
Depth Interval (ft)		-	-	-
Date Sampled		03/07/03	03/07/03	03/07/03
Parameter	Units			
Volatiles Organic Compounds				
Bromomethane	UG/L	NA	NA	25 UJ
Carbon disulfide	UG/L	NA	NA	17 UJ
Carbon tetrachloride	UG/L	NA	NA	25 UJ
Chlorobenzene	UG/L	NA	NA	25 UJ
Chloroethane	UG/L	NA	NA	25 UJ
Chloroform	UG/L	NA	NA	25 UJ
Chloromethane	UG/L	NA	NA	25 UJ
Cyclohexane	UG/L	NA	NA	250 UJ
1,1-Dibromo-2-chloroethane	UG/L	NA	NA	25 UJ
Dichlorodifluoromethane	UG/L	NA	NA	25 UJ
Ethylbenzene	UG/L	NA	NA	25 UJ
Isopropylbenzene (Cumene)	UG/L	NA	NA	25 UJ
Methyl acetate	UG/L	NA	NA	250 UJ
Methyl ethyl ketone (2-Butanone)	UG/L	NA	NA	120 UJ
Methyl tert-butyl ether	UG/L	NA	NA	250 UJ
Methylcyclohexane	UG/L	NA	NA	250 UJ
Methylene chloride	UG/L	NA	NA	50 UJ
Styrene	UG/L	NA	NA	25 UJ
Tetrachloroethene	UG/L	NA	NA	25 UJ
Toluene	UG/L	NA	NA	25 UJ
Trichloroethene	UG/L	NA	NA	25 UJ
Trichlorofluoromethane	UG/L	NA	NA	25 UJ
Vinyl chloride	UG/L	NA	NA	25 UJ
Xylene (total)	UG/L	NA	NA	25 UJ

Flags assigned during chemistry validation are shown

MADE BY: CE 05/19/2003
 CRKD BY: GFK 05/19/2003

Detection Limits shown are PQL

ATTACHMENT A **ANALYTICAL GROUNDWATER SAMPLE RESULTS** **FORMER HANNA FURNACE SITE**

Location ID		MW-101	MW-306	MW-307
Sample ID		MW-101	MW-306	MW-307
Matrix		Groundwater	Groundwater	Groundwater
Depth Interval (ft)		-	-	-
Date Sampled		03/07/03	03/07/03	03/07/03
Parameter	Units			
Semivolatile Organic Compounds				
1,1'-Biphenyl	IRGL	NA	10 U	10 U
2,2'-oxybis(1-Chloropropane)	UGL	NA	10 U	10 U
2,4,6-Trichlorophenol	UGL	NA	10 U	10 U
2,4,6-Trichlorophenol	UGL	NA	10 U	10 U
2,4-Dichlorophenol	UGL	NA	10 U	10 U
2,4-Dimethylphenol	IRGL	NA	10 U	10 U
2,4-Dinitrophenol	UGL	NA	24 U	25 U
2,4-Dinitrotoluene	UGL	NA	10 U	10 U
2,6-Dinitrotoluene	UGL	NA	10 U	10 U
1,2,3,4-Tetrahydronaphthalene	IRGL	NA	10 U	10 U
2-Chlorophenol	UGL	NA	10 U	10 U
2-Methylnaphthalene	UGL	NA	10 U	10 U
2-Methylphenol (o-cresol)	UGL	NA	10 U	10 U
2-Nitroaniline	UGL	NA	24 U	25 U
2-Nitrophenol	IRGL	NA	10 U	10 U
3,3'-Dichlorobenzidine	UGL	NA	10 U	10 U
3-Nitroaniline	UGL	NA	24 U	25 U
4,6-Dinitro-2-methylphenol	IRGL	NA	24 U	25 U
4-Bromophenyl-phenylether	UGL	NA	10 U	10 U
4-Chloro-3-methylphenol	UGL	NA	10 U	10 U
4-Chloroaniline	UGL	NA	10 U	10 U
4-Chlorophenyl-phenylether	IRGL	NA	10 U	10 U
4-Methylphenol (p-cresol)	UGL	NA	10 U	10 U
4-Nitroaniline	UGL	NA	24 U	25 U

Flags assigned during chemistry validation are shown

MADE BY: CF 06/10/2003

BY: GCK 05/19/2003

Detection Limits shown are PQL

ATTACHMENT A **ANALYTICAL GROUNDWATER SAMPLE RESULTS** **FORMER HANNA FURNACE SITE**

Location ID		MW-101	MW-306	MW-307
Sample ID		MW-101	MW-306	MW-307
Matrix		Groundwater	Groundwater	Groundwater
Depth Interval (ft)				
Date Sampled		03/07/03	03/07/03	03/07/03
Parameter	Units			
Semivolatile Organic Compounds				
4-Nitrophenol	UGL	NA	24 U	25 U
Acenaphthene	UGL	NA	10 U	10 U
Acenaphthylene	UGL	NA	10 U	10 U
Acetophenone	UGL	NA	10 U	10 U
Anthracene	UGL	NA	10 U	10 U
Atrazine	UGL	NA	10 U	10 U
Benzaldehyde	UGL	NA	10 U	10 U
Benzo(a)anthracene	UGL	NA	10 U	10 U
Benzo(a)pyrene	UGL	NA	10 U	10 U
Benzo(b)fluoranthene	UGL	NA	10 U	10 U
Benzo(g,h,i)perylene	UGL	NA	10 U	10 U
Benzo(k)fluoranthene	UGL	NA	10 U	10 U
bis(2-Chloroethoxy)methane	UGL	NA	10 U	10 U
bis(2-Chloroethyl)ether	UGL	NA	10 U	10 U
bis(2-Ethoxyethyl)phthalate	UGL	NA	10 U	10 U
Butylbenzylphthalate	UGL	NA	10 U	10 U
Caprolactam	UGL	NA	10 U	10 U
Carbazole	UGL	NA	10 U	10 U
Chrysene	UGL	NA	10 U	10 U
Dibenz(a,h)anthracene	UGL	NA	10 U	10 U
Dibenzofuran	UGL	NA	10 U	10 U
Diethylphthalate	UGL	NA	10 U	10 U
Dimethylphthalate	UGL	NA	10 U	10 U
Dinonylphthalate	UGL	NA	10 U	10 U

Flags assigned during chemistry validation are shown

MADE BY: GE 05/19/2003
 CHKD BY: GEK 05/19/2003

Detection Limits shown are PQL

ATTACHMENT A
ANALYTICAL GROUNDWATER SAMPLE RESULTS
FORMER HANNA FURNACE SITE

Location ID		MW-101	MW-306	MW-307
Sample ID		MW-101	MW-306	MW-307
Matrix		Groundwater	Groundwater	Groundwater
Depth Interval (ft)		-	-	-
Date Sampled		03/07/03	03/07/03	03/07/03
Parameter	Units			
Semivolatiles Organic Compounds				
Di-n-octylphthalate	UG/L	NA	10 U	10 U
Fluoreanthene	UG/L	NA	10 U	10 U
Fluorene	UG/L	NA	10 U	10 U
Hexachlorobenzene	UG/L	NA	10 U	10 U
Hexachlorobutadiene	UG/L	NA	10 U	10 U
Hexachlorocyclopentadiene	UG/L	NA	10 U	10 U
Hexachloroethane	UG/L	NA	10 U	10 U
Indeno(1,2,3-cd)pyrene	UG/L	NA	10 U	10 U
Isophurone	UG/L	NA	10 U	10 U
1-naphthalene	UG/L	NA	10 U	10 U
1-nitrobenzene	UG/L	NA	10 U	10 U
N-Nitroso-di-n-propylamine	UG/L	NA	10 U	10 U
N-Nitrosodiphenylamine	UG/L	NA	10 U	10 U
Pentachlorophenol	UG/L	NA	24 U	25 U
Phenanthrene	UG/L	NA	10 U	10 U
Phenol	UG/L	NA	10 U	10
Pyrene	UG/L	NA	10 U	10 U
Miscellaneous Parameters				
Cyanide	UG/L	40 U	NA	7,330
Cyanide, Free	MG/L	0.012	NA	0.0071

Flags assigned during chemistry validation are shown.

MADE BY: CE US/19/2003

CHKD BY: GEK 05/18/2003

Detection Limits shown are PQL.

11/11/18 J:\MAGS\Program\Program.mxd
 11/11/18 2:54:41 PM
 [SHEET] - 26/26

ATTACHMENT B

SUPPORT DOCUMENTATION

CHAIN OF CUSTODY RECORD

PROJECT NO. 117876-0000 SITE NAME Union Ship Canal
 SAMPLERS (PRINT SIGNATURE) John Deery / J. Deery

DELIVERY SERVICE _____ AIRBILL NO.: _____

LOCATION IDENTIFIER	DATE	TIME	CONC/GRAB	SAMPLE ID	MATRIX
M42101	3/7/03	11:37	Grab	Union Ship Canal M42101	WQ
M42307	↓	13:04	↓	Union Ship Canal M42307	↓
M42306	↓	13:36	↓	Union Ship Canal M42306	↓

TOTAL NO. OF CONTAINERS

BOTTLE TYPE AND PRESERVATIVE

REMARKS

SAMPLE TYPE
 DEQUIRY NO.
 DEPTH (IN FEET)
 FIELD LOT NO. & (GRAPHS)

URS

LAB Severn Trent
 COOLER 100
 PAGE 1

SPECIAL INSTRUCTIONS

DATE	TIME
3/7/03	15:10

RECEIVED FOR LAB BY (SIGNATURE) _____

RECEIVED BY (SIGNATURE) _____

DATE _____ TIME _____

DATE _____ TIME _____

RELINQUISHED BY (SIGNATURE) _____

RELINQUISHED BY (SIGNATURE) _____

Distribution: Original accompanies shipment, copy to coordinator field files

Lab Name: STL Buffalo

Contract: _____

Lab Sample ID: A310000372-1Lab Code: RECNY

Case No.: _____

SAS No.: _____

SDG No: _____

Instrument ID: I50MCalibration Dates(s): 03/14/2003 03/14/2003Heated Purge (Y/N): N

Calibration Times:

09:4511:58GC Column: DB-624 ID: 0.25(mm)

Lab File ID:	RRF1	=	M0358.RR	RRF2	=	M0357.RR		
RRF5	=	M0356.RR	RRF10	=	M0355.RR	RRF25	=	M0354.RR
COMPOUND	RRF1	RRF2	RRF5	RRF10	RRF25	AVG RRF	% RSD	
Chloromethane	0.572	0.370	0.366	0.357	0.388	0.4100	22.200	
Bromomethane	* 0.245	0.152	0.177	0.152	0.183	0.1820	20.900	
Vinyl chloride	* 0.422	0.306	0.297	0.287	0.316	0.3260	16.900*	
Chloroethane	0.263	0.185	0.197	0.182	0.228	0.2110	16.200	
Methylene chloride	0.373	0.294	0.299	0.249	0.275	0.2980	15.500	
Acetone	0.059	0.038	0.033	0.036	0.037	0.0410	26.300	
Carbon Disulfide	1.165	0.891	0.781	0.792	0.891	0.9040	17.100	
1,1-Dichloroethene	* 0.194	0.190	0.189	0.163	0.215	0.1900	9.700*	
1,1-Dichloroethane	* 0.834	0.723	0.758	0.710	0.784	0.7620	6.500*	
cis-1,2-Dichloroethene	0.319	0.321	0.351	0.353	0.412	0.3510	10.600	
trans-1,2-Dichloroethene	0.340	0.338	0.333	0.326	0.368	0.3410	4.600	
Chloroform	* 0.822	0.763	0.795	0.716	0.781	0.7750	5.100*	
1,2-Dichloroethane	* 0.549	0.483	0.550	0.537	0.502	0.5240	5.700*	
2-Butanone	0.072	0.055	0.072	0.069	0.076	0.0690	11.800	
1,1,1-Trichloroethane	* 0.476	0.508	0.502	0.500	0.537	0.5040	4.300*	
Carbon Tetrachloride	* 0.430	0.456	0.453	0.452	0.480	0.4540	4.0	
Bromodichloromethane	* 0.395	0.404	0.425	0.407	0.434	0.4130	3.900*	
1,2-Dichloropropane	0.275	0.286	0.308	0.289	0.332	0.2980	7.600	
cis-1,3-Dichloropropene	* 0.315	0.343	0.389	0.399	0.482	0.3850	16.500*	
Trichloroethene	* 0.265	0.277	0.288	0.290	0.329	0.2900	8.300*	
Dibromochloromethane	* 0.210	0.210	0.247	0.242	0.256	0.2350	8.500*	
1,1,2-Trichloroethane	* 0.149	0.161	0.176	0.180	0.191	0.1720	9.500*	
Benzene	* 1.074	1.071	1.123	1.152	1.336	1.1510	9.400*	
trans-1,3-Dichloropropene	* 0.285	0.306	0.355	0.387	0.398	0.3460	14.200*	
Bromoform	* 0.178	0.193	0.200	0.221	0.239	0.2060	11.600*	
4-Methyl-2-pentanone	0.124	0.124	0.153	0.178	0.166	0.1490	16.400	
2-Hexanone	0.060	0.067	0.098	0.116	0.109	0.0900	27.900	
Tetrachloroethene	* 0.433	0.464	0.428	0.403	0.425	0.4310	5.000*	
1,1,2,2-Tetrachloroethane	* 0.243	0.205	0.223	0.206	0.195	0.2140	8.800*	
1,2-Dibromoethane	* 0.121	0.121	0.154	0.150	0.150	0.1400	13.000*	
Toluene	* 1.470	1.452	1.468	1.456	1.549	1.4790	2.700*	
Chlorobenzene	* 1.268	1.086	1.015	0.891	0.958	1.0430	13.800*	
Ethylbenzene	* 1.792	1.763	1.728	1.619	1.708	1.7220	3.800*	
Styrene	* 0.935	0.897	1.036	0.987	1.043	0.9800	6.500*	
Total Xylenes	* 0.579	0.572	0.655	0.621	0.647	0.6150	6.200*	
1,3-Dichlorobenzene	* 1.651	1.462	1.409	1.344	1.340	1.4410	8.900*	
1,4-Dichlorobenzene	* 1.696	1.505	1.415	1.364	1.311	1.4580	10.300*	

INITIAL CALIBRATION DATA

Lab Name: STL Buffalo Contract: _____ Lab Sample ID: A3I0000372-1

Lab Code: RECNY Case No.: _____ SAS No.: _____ SDG No: _____

Instrument ID: ISOM Calibration Dates(s): 03/14/2003 03/14/2003

Heated Purge (Y/N): N Calibration Times: 09:45 11:58

GC Column: DB-624 ID: 0.25 (mm)

Lab File ID: _____ RRF1 = M0358.RR RRF2 = M0357.RR
RRF5 = M0356.RR RRF10 = M0355.RR RRF25 = M0354.RR

COMPOUND	RRF1	RRF2	RRF5	RRF10	RRF25	AVG RRF	% RSD
1,2-Dichlorobenzene *	1.312	1.119	1.126	1.101	1.109	1.1530	7.800*
1,2-Dibromo-3-chloropropane	0.027	0.034	0.046	0.049	0.049	0.0410	24.600
Dichlorodifluoromethane	0.390	0.311	0.327	0.317	0.305	0.3300	10.400
Trichlorofluoromethane	0.580	0.463	0.457	0.417	0.467	0.4770	12.800
1,2,4-Trichlorobenzene	0.918	0.774	0.719	0.714	0.675	0.7600	12.500
1,1,2-Trichloro-1,2,2-trifl	0.264	0.225	0.202	0.213	0.242	0.2290	10.700
Methyl tert butyl ether	0.499	0.459	0.471	0.505	0.419	0.4700	7.400
Cyclohexane	0.664	0.587	0.637	0.748	0.782	0.6840	11.800
Methylcyclohexane	0.538	0.525	0.540	0.625	0.653	0.5760	10.200
Isopropylbenzene	2.329	2.251	2.168	2.197	2.202	2.2300	2.800
Methyl acetate	1.926	1.674	2.010	2.146	2.188	1.9890	10.300
=====							
p-Bromofluorobenzene *	0.694	0.604	0.615	0.574	0.502	0.5980	11.600*
Toluene-D8	1.287	1.371	1.322	1.315	1.332	1.3250	2.300
1,2-Dichloroethane-D4	0.484	0.447	0.477	0.430	0.381	0.4440	9.400

Comments:

Lab Name: STL Buffalo Contract: _____ Lab Samp ID: A3C0001531 1
Lab Code: RECNY Case No.: _____ SAS No.: _____ SDG No.: _____
Lab File Id: M0359.RR Calibration Date: 03/14/2003 Time: 16:08
Instrument ID: I50M Init. Calib. Date(s): 03/14/2003 03/14/2003
Heated Purge (Y/N): N Init. Calib. Times: 09:45 11:58
GC Column: DB 624 ID: 0.25(mm)

COMPOUND	AVG RRF	RRF5	MIN RRF	% D	MAX % D
Chloromethane	0.4100	0.4897	0.0100	-19.400	100.00
Bromomethane	0.1820	0.2143	0.1000	-17.700	30.00
Vinyl chloride	0.3260	0.3504	0.1000	-7.500	30.00
Chloroethane	0.2110	0.2515	0.0100	-19.200	100.00
Methylene chloride	0.2980	0.3075	0.0100	-3.200	100.00
Acetone	0.0410	0.0394	0.0001	3.900	100.00
Carbon Disulfide	0.9040	0.9175	0.0100	-1.500	100.00
1,1-Dichloroethene	0.1900	0.2093	0.1000	-10.200	30.00
1,1-Dichloroethane	0.7620	0.7536	0.2000	1.100	30.00
cis-1,2-Dichloroethene	0.3510	0.3583	0.0100	-2.100	100.00
trans-1,2 Dichloroethene	0.3410	0.3435	0.0100	-0.700	100.00
Chloroform	0.7750	0.7694	0.2000	0.700	30.00
1,2-Dichloroethane	0.5240	0.5020	0.1000	4.200	30.00
2-Butanone	0.0690	0.0720	0.0001	-4.300	100.00
1,1,1-Trichloroethane	0.5040	0.4780	0.1000	5.200	30.00
Carbon Tetrachloride	0.4540	0.4506	0.1000	0.800	30.00
Bromodichloromethane	0.4130	0.4276	0.2000	-3.500	30.00
1,2-Dichloropropane	0.2980	0.2955	0.0100	0.800	100.00
cis-1,3-Dichloropropene	0.3850	0.3716	0.2000	3.500	30.00
Trichloroethene	0.2900	0.2913	0.3000	0.500	30.00
Dibromochloromethane	0.2350	0.2361	0.1000	-0.500	30.00
1,1,2-Trichloroethane	0.1720	0.1773	0.1000	-3.100	30.00
Benzene	1.1510	1.1451	0.4000	0.500	30.00
trans-1,3-Dichloropropene	0.3460	0.3247	0.1000	6.200	30.00
Bromoform	0.2060	0.1992	0.0500	3.300	30.00
4-Methyl-2-pentanone	0.1490	0.1298	0.0001	12.900	100.00
2-Hexanone	0.0900	0.0828	0.0001	8.000	100.00
Tetrachloroethene	0.4310	0.4132	0.1000	4.100	30.00
1,1,2,2-Tetrachloroethane	0.2140	0.2062	0.1000	3.600	30.00
1,2-Dibromoethane	0.1400	0.1389	0.1000	0.800	30.00
Toluene	1.4790	1.4277	0.4000	3.500	30.00
Chlorobenzene	1.0430	0.9779	0.5000	6.200	30.00
Ethylbenzene	1.7220	1.6872	0.1000	2.000	30.00
Styrene	0.9800	0.9863	0.3000	-0.600	30.00
Total Xylenes	0.6150	0.6150	0.3000	0.000	30.00
1,3-Dichlorobenzene	1.4410	1.4093	0.4000	2.200	30.00
1,4-Dichlorobenzene	1.4580	1.3967	0.4000	4.200	30.00
1,2-Dichlorobenzene	1.1530	1.0991	0.4000	4.700	30.00
1,2-Dibromo-3-chloropropane	0.0410	0.0414	0.0001	-1.000	100.00

LOW CONC. VOLATILES, 3/95, AG995 4
CONTINUING CALIBRATION CHECK

0000003

Lab Name: STL Buffalo Contract: _____ Lab Samp ID: A3C0001531-1

Code: RECNY Case No.: _____ SAS No.: _____ SDG No: _____

Lab File Id: M0359.RR Calibration Date: 03/14/2003 Time: 16:08

Instrument ID: I50M Init. Calib. Date(s): 03/14/2003 03/14/2003

Heated Purge (Y/N): N Init. Calib. Times: 09:45 11:58

GC Column: DB-624 ID: 0.25 (mm)

COMPOUND	AVG RRF	RRFL	MIN RRF	% D	MAX % D
Dichlorodifluoromethane	0.3300	0.3605	0.0100	-9.200	100.00
Trichlorofluoromethane	0.4770	0.4938	0.0100	-3.500	100.00
1,2,4-Trichlorobenzene	0.7500	0.6530	0.0001	14.100	100.00
1,1,2 Trichloro-1,2,2-trifluoro	0.2290	0.2456	0.0100	-7.200	100.00
Methyl tert butyl ether	0.4700	0.4181	0.0100	11.000	100.00
Cyclohexane	0.6840	0.6448	0.0100	5.700	100.00
Methylcyclohexane	0.5760	0.5452	0.0100	5.300	100.00
Isopropylbenzene	2.2300	2.2676	0.0100	-1.700	100.00
Methyl acetate	1.9890	1.8658	0.0100	6.200	100.00
=====					
p-Bromofluorobenzene	0.5980	0.5706	0.2000	4.600	30.00
Toluene-D8	1.3250	1.2569	0.0100	5.100	100.00
1,2-Dichloroethane D4	0.4440	0.4399	0.0100	0.900	100.00

GCMS VOLATILE INJECTION LOG

DATE	TIME	ANALYST	FILE #	SAMPLE ID	JOB #	INJ VOL	EXT. WHT	D.F.	SVR. #	STANDARD MIX #	IS. /
3/13/03	1610	LH	M03213	A32151-01	2154	25ul	7	1	7	7	15
	1639		M03441	02	1			1			
	1708		M03445	A32197-01	2197			10			
	1737		M03446	02	1			1			
	1806		M03447	A32201-01	2201			1			
	1835		M03448	02	1			1			
	1903		M03449	A32214-02	2214			1			
	1932		M03550	01	1			102			
			M03551	01m5	1			102	#70	WS3A-1	
			M03552	01s0	1			102			
3/14/03	0104	LH	M03553	031408BAM1	7	25ul	7	7	#75	MS5A1-2	15
	0105		M03554	VS120025	1			1		WS12A-1	
	0107		M03555	VS120010	1			1			
	0107		M03556	VS120005	1			1			
	0107		M03557	VS120002	1			1			
	0108		M03558	VS120001	1			1			
	0108		M03559	VS120005	1			1			
	0108		M03560	VS120058	1			1	#70	WS12A-8 WS12A-1	
	0108		M03561	VS120005	1			1			
	0108	CNC	M03562	A3208802	2088			25			
	0109		M03563	VS120005	1			25			
	0109		M03564	VS120005	1			25			
	0109		M03565	VS120005	1			25			
	0109		M03566	VS120005	1			25			
	0109		M03567	VS120005	1			25			
	0109		M03568	VS120005	1			25			
	0109		M03569	VS120005	1			25			
	0109		M03570	VS120005	1			25			
	0109		M03571	VS120005	1			25			
	0109		M03572	VS120005	1			25			
	0109		M03573	VS120005	1			25			
	0109		M03574	VS120005	1			25			
	0109		M03575	VS120005	1			25			
	0109		M03576	VS120005	1			25			
	0109		M03577	VS120005	1			25			
	0109		M03578	VS120005	1			25			
	0109		M03579	VS120005	1			25			
	0109		M03580	VS120005	1			25			
	0109		M03581	VS120005	1			25			
	0109		M03582	VS120005	1			25			
	0109		M03583	VS120005	1			25			
	0109		M03584	VS120005	1			25			
	0109		M03585	VS120005	1			25			
	0109		M03586	VS120005	1			25			
	0109		M03587	VS120005	1			25			
	0109		M03588	VS120005	1			25			
	0109		M03589	VS120005	1			25			
	0109		M03590	VS120005	1			25			
	0109		M03591	VS120005	1			25			
	0109		M03592	VS120005	1			25			
	0109		M03593	VS120005	1			25			
	0109		M03594	VS120005	1			25			
	0109		M03595	VS120005	1			25			
	0109		M03596	VS120005	1			25			
	0109		M03597	VS120005	1			25			
	0109		M03598	VS120005	1			25			
	0109		M03599	VS120005	1			25			
	0109		M03600	VS120005	1			25			
	0109		M03601	VS120005	1			25			
	0109		M03602	VS120005	1			25			
	0109		M03603	VS120005	1			25			
	0109		M03604	VS120005	1			25			
	0109		M03605	VS120005	1			25			
	0109		M03606	VS120005	1			25			
	0109		M03607	VS120005	1			25			
	0109		M03608	VS120005	1			25			
	0109		M03609	VS120005	1			25			
	0109		M03610	VS120005	1			25			
	0109		M03611	VS120005	1			25			
	0109		M03612	VS120005	1			25			
	0109		M03613	VS120005	1			25			
	0109		M03614	VS120005	1			25			
	0109		M03615	VS120005	1			25			
	0109		M03616	VS120005	1			25			
	0109		M03617	VS120005	1			25			
	0109		M03618	VS120005	1			25			
	0109		M03619	VS120005	1			25			
	0109		M03620	VS120005	1			25			
	0109		M03621	VS120005	1			25			
	0109		M03622	VS120005	1			25			
	0109		M03623	VS120005	1			25			
	0109		M03624	VS120005	1			25			
	0109		M03625	VS120005	1			25			
	0109		M03626	VS120005	1			25			
	0109		M03627	VS120005	1			25			
	0109		M03628	VS120005	1			25			
	0109		M03629	VS120005	1			25			
	0109		M03630	VS120005	1			25			
	0109		M03631	VS120005	1			25			
	0109		M03632	VS120005	1			25			
	0109		M03633	VS120005	1			25			
	0109		M03634	VS120005	1			25			
	0109		M03635	VS120005	1			25			
	0109		M03636	VS120005	1			25			
	0109		M03637	VS120005	1			25			
	0109		M03638	VS120005	1			25			
	0109		M03639	VS120005	1			25			
	0109		M03640	VS120005	1			25			
	0109		M03641	VS120005	1			25			
	0109		M03642	VS120005	1			25			
	0109		M03643	VS120005	1			25			
	0109		M03644	VS120005	1			25			
	0109		M03645	VS120005	1			25			
	0109		M03646	VS120005	1			25			
	0109		M03647	VS120005	1			25			
	0109		M03648	VS120005	1			25			
	0109		M03649	VS120005	1			25			
	0109		M03650	VS120005	1			25			
	0109		M03651	VS120005	1			25			
	0109		M03652	VS120005	1			25			
	0109		M03653	VS120005	1			25			
	0109		M03654	VS120005	1			25			
	0109		M03655	VS120005	1			25			
	0109		M03656	VS120005	1			25			
	0109		M03657	VS120005	1			25			
	0109		M03658	VS120005	1			25			
	0109		M03659	VS120005	1			25			
	0109		M03660	VS120005	1			25			
	0109		M03661	VS120005	1			25			
	0109		M03662	VS120005	1			25			
	0109		M03663	VS120005	1			25			
	0109		M03664	VS120005	1			25			
	0109		M03665	VS120005	1			25			
	0109		M03666	VS120005	1			25			
	0109		M03667	VS120005	1			25			
	0109		M03668	VS120005	1			25			
	0109		M03669	VS120005	1			25			
	0109		M03670	VS120005	1			25			
	0109		M03671	VS120005	1			25			
	0109		M03672	VS120005	1			25			
	0109		M03673	VS120005	1			25			
	0109		M03674	VS120005	1			25			
	0109		M03675	VS120005	1			25			
	0109		M03676	VS120005	1			25			
	0109		M03677	VS120005	1			25			
	0109		M03678	VS120005	1			25			
	0109		M03679	VS120005	1			25			
	0109		M03680	VS120005	1			25			
	0109		M03681	VS120005	1			25			
	0109		M03682	VS120005	1			25			
	0109		M03683	VS120005	1			25			
	0109		M03684	VS120005	1			25			
	0109		M03685	VS120005	1			25			
	0109		M03686	VS120005	1			25			
	0109		M03687	VS120005	1			25			
	0109		M03688	VS120005	1			25			
	0109		M03689	VS120005	1			25			
	0109		M03690	VS120005	1			25			
	0109		M03691	VS120005	1			25			
	0109		M03692	VS120005	1			25			
	0109		M03693	VS120005	1			25			
	0109		M03694	VS120005	1			25			
	0109		M03695	VS120005	1			25			
	0109		M03696	VS120005	1			25			
	0109		M03697	VS120005	1			25			
	0109		M03698	VS120005	1			25			

[illegible]

SEMIVOLATILE 3/90 AND ASP '91
CONTINUING CALIBRATION CHECK

Lab Name: STL Buffalo Contract: _____ Lab Samp ID: A3C0001501.1
Lab Code: RECNY Case No.: _____ SAS No.: _____ SDG No.: _____
Lab File Id: 755133.RR Calibration Date: 03/17/2003 Time: 09:52
Instrument ID: 150Z-A Init. Calib. Date(s): 01/22/2003 01/22/2003
Init. Calib. Times: 15:00 17:23

COMPOUND	AVG RRF	RRF50	MIN RRF	% D	MAX % D
Phenol	1.6790	1.7051	0.8000	-1.600	25.00
Bis(2-chloroethyl) ether	1.4170	1.4822	0.7000	-4.600	25.00
2-Chlorophenol	1.3070	1.3647	0.8000	-1.400	25.00
2-Methylphenol	1.1090	1.1796	0.7000	-6.400	25.00
2,2' Oxybis(1-Chloropropane)	2.2200	2.3062	0.0100	-3.900	100.00
4-Methylphenol	1.1990	1.2809	0.6000	-6.800	25.00
N-Nitroso-Di-n-propylamine	0.9330	1.0140	0.5000	-8.700	25.00
Hexachloroethane	0.5510	0.6414	0.3000	-16.400	25.00
Nitrobenzene	0.3860	0.3905	0.2000	1.200	25.00
Isophorone	0.7410	0.7063	0.4000	4.700	25.00
2-Nitrophenol	0.2040	0.1793	0.1000	12.100	25.00
2,4-Dimethylphenol	0.3210	0.3141	0.2000	2.100	25.00
Bis(2-chloroethoxy) methane	0.4540	0.4490	0.3000	1.100	25.00
2,4-Dichlorophenol	0.2920	0.2751	0.2000	5.800	25.00
Naphthalene	1.0220	1.0365	0.7000	-1.400	25.00
4-Chloroaniline	0.4410	0.3870	0.0100	12.200	100.00
Hexachlorobutadiene	0.1610	0.1610	0.0100	0.000	100.00
4-Chloro-3-methylphenol	0.3030	0.2898	0.2000	4.400	25.00
2-Methylnaphthalene	0.6520	0.6487	0.4000	0.500	25.00
Hexachlorocyclopentadiene	0.1740	0.1809	0.0100	-4.000	100.00
2,4,6-Trichlorophenol	0.3450	0.3383	0.2000	1.900	25.00
2,4,5-Trichlorophenol	0.3680	0.3534	0.2000	4.000	25.00
2-Chloronaphthalene	1.0510	1.1443	0.8000	-8.900	25.00
2-Nitroaniline	0.3580	0.3577	0.0100	0.100	100.00
Dimethyl phthalate	1.1600	1.2600	0.0100	-8.600	100.00
Acenaphthylene	1.6320	1.6748	1.3000	-2.600	25.00
2,6-Dinitrotoluene	0.2870	0.2845	0.2000	0.900	25.00
3-Nitroaniline	0.4290	0.3670	0.0100	14.400	100.00
Acenaphthene	0.9680	1.0237	0.8000	-5.800	25.00
2,4-Dinitrophenol	0.1350	0.0782	0.0100	42.100	100.00
4-Nitrophenol	0.1280	0.1341	0.0100	10.800	100.00
Dibenzofuran	1.4170	1.5342	0.8000	-8.300	25.00
2,4-Dinitrotoluene	0.3860	0.3659	0.2000	5.200	25.00
Diethyl phthalate	1.1180	1.2919	0.0100	-15.600	100.00
4-Chlorophenyl phenyl ether	0.5690	0.6188	0.4000	-8.800	25.00
Fluorene	1.1010	1.2236	0.9000	-11.100	25.00
4-Nitroaniline	0.3680	0.3114	0.0100	15.400	100.00
4,6-Dinitro-2-methylphenol	0.1220	0.1323	0.0100	-8.400	100.00
N-nitrosodiphenylamine	0.5670	0.6059	0.0100	-6.900	100.00

SEMIVOLATILE 3/90 AND ASP '91
CONTINUING CALIBRATION CHECK

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Lab Name: STL Buffalo Contract: _____ Lab Samp ID: A3C0001501-1
Code: RECNY Case No.: _____ SAS No.: _____ SIG No.: _____
Lab File Id: Z55133.RR Calibration Date: 03/17/2003 Time: 09:52
Instrument ID: I50Z-A Init. Calib. Date(s): 01/22/2003 01/22/2003
Init. Calib. Times: 15:00 17:23

COMPOUND	AVG RRF	RRF50	MIN RRF	% D	MAX % D
4-Bromophenyl phenyl ether	0.2020	0.1986	0.1000	1.700	25.00
Hexachlorobenzene	0.2230	0.2349	0.1000	-5.300	25.00
Pentachlorophenol	0.1240	0.1173	0.0500	5.400	25.00
Phenanthrene	0.9670	1.1135	0.7000	-15.100	25.00
Anthracene	1.0010	1.0794	0.7000	-7.800	25.00
Carbazole	0.9640	1.0166	0.0100	5.400	100.00
Di-n-butyl phthalate	1.1870	1.2559	0.0100	-5.800	100.00
Fluoranthene	0.9780	1.0120	0.6000	-3.600	25.00
Pyrene	1.0310	1.1614	0.6000	-12.600	25.00
Butyl benzyl phthalate	0.6170	0.7086	0.0100	-14.800	100.00
3,3'-Dichlorobenzidine	0.3690	0.3508	0.0100	4.900	100.00
Benzo(a)anthracene	1.0130	1.1021	0.8000	-8.800	25.00
Chrysene	1.0270	1.0918	0.7000	6.300	25.00
Bis(2-ethylhexyl) phthalate	0.8700	0.9015	0.0100	-3.600	100.00
Di-n-octyl phthalate	1.3870	1.5279	0.0100	-10.200	100.00
Benzo(b)fluoranthene	1.0500	1.0075	0.7000	4.900	25.00
Benzo(k)fluoranthene	0.8910	1.2098	0.7000	-35.800	25.00
Benzo(a)pyrene	0.9900	1.0866	0.7000	-9.800	25.00
Indeno(1,2,3-cd)pyrene	1.1970	1.3318	0.5000	-11.300	25.00
Dibenzo(a,h)anthracene	0.9600	1.1294	0.4000	17.600	25.00
Benzo(ghi)perylene	1.0040	1.1709	0.5000	16.600	25.00
=====					
Nitrobenzene-D5	0.3750	0.3747	0.2000	0.100	25.00
2-Fluorobiphenyl	1.1460	1.2822	0.7000	-11.900	25.00
p-Terphenyl-d14	0.7190	0.7667	0.5000	-6.600	25.00
Phenol-D5	1.5730	1.5687	0.8000	0.100	25.00
2-Fluorophenol	1.2180	1.2321	0.6000	-1.200	25.00
2,4,6-Tribromophenol	0.1020	0.1149	0.0100	-12.600	100.00
2-Chlorophenol-d4	1.3420	1.3201	0.8000	1.600	25.00
1,2-Dichlorobenzene-d4	0.8310	0.8734	0.4000	-5.100	25.00

SEMIVOLATILE 3/90 AND ASP '91
CONTINUING CALIBRATION CHECK

000207

Lab Name: STL Buffalo Contract: _____ Lab Samp ID: A3C0001501-2
Lab Code: RECNY Case No.: _____ SAS No.: _____ SDG No: _____
Lab File Id: _____ Calibration Date: 03/17/2003 Time: 09:52
Instrument ID: 1502-A Init. Calib. Date(s): 01/22/2003 01/22/2003
Init. Calib. Times: 15:00 17:23

COMPOUND	AVG RRF	RRF50	MIN RRF	% D	MAX % D
Acetophenone	1.5520	1.7180	0.0100	-10.700	100.00
Benzaldehyde	0.6380	0.5550	0.0100	13.000	100.00
Caprolactam	0.1230	0.0960	0.0100	22.000	100.00
Biphenyl	1.3060	1.3490	0.0100	3.300	100.00
Atrazine	0.1420	0.1640	0.0100	-15.500	100.00

GC/MS SEMI-VOLATILE INJECTION LOG

DATE	TIME	ANALYST	PRN	SAMPLE ID	VIAL #	JOB #	INJ VOL	FW	DF	KQ IS	IS ID	SVR ID	LS .91 % SEC.	LS .92 % SEC.
01/28/03	14:34	EM	254133	DET0000	SP1-10A		2.0							
	15:00		254134	SS00000	CLE-100/100									
	15:35		254135	SS00000										
	16:12		254136	SS00000										
	16:47		254137	SS00000										
	17:03		254138	SS00000										
	17:58		254139	SS00000										
	18:23		254140	SS00000										
	19:08		254141	SS00000										
	19:43		254142	SS00000										
	20:18		254143	SS00000										
	20:53		254144	SS00000										
	21:38		254145	SS00000										
	22:03		254146	SS00000										
	22:38		254147	SS00000										
	23:13		254148	SS00000										
	23:48		254149	SS00000										
	01/28/03		254150	SS00000										
	00:58		254151	SS00000										
	01:33		254152	SS00000										
	02:08		254153	SS00000										
	02:43		254154	SS00000										
	03:18		254155	SS00000										
	03:53		254156	SS00000										
	04:28		254157	SS00000										
	05:03		254158	SS00000										
	05:38		254159	SS00000										
	06:13		254160	SS00000										
	06:48		254161	SS00000										
	07:23		254162	SS00000										
	07:58		254163	SS00000										
	08:33		254164	SS00000										
	09:08		254165	SS00000										
	09:43		254166	SS00000										
	10:18		254167	SS00000										
	10:53		254168	SS00000										
	11:28		254169	SS00000										
	12:03		254170	SS00000										
	12:38		254171	SS00000										
	13:13		254172	SS00000										
	13:48		254173	SS00000										
	14:23		254174	SS00000										
	14:58		254175	SS00000										
	15:33		254176	SS00000										
	16:08		254177	SS00000										
	16:43		254178	SS00000										
	17:18		254179	SS00000										
	17:53		254180	SS00000										
	18:28		254181	SS00000										
	19:03		254182	SS00000										
	19:38		254183	SS00000										
	20:13		254184	SS00000										
	20:48		254185	SS00000										
	21:23		254186	SS00000										
	21:58		254187	SS00000										
	22:33		254188	SS00000										
	23:08		254189	SS00000										
	23:43		254190	SS00000										
	01/29/03		254191	SS00000										
	00:18		254192	SS00000										
	00:53		254193	SS00000										
	01:28		254194	SS00000										
	02:03		254195	SS00000										
	02:38		254196	SS00000										
	03:13		254197	SS00000										
	03:48		254198	SS00000										
	04:23		254199	SS00000										
	04:58		254200	SS00000										
	05:33		254201	SS00000										
	06:08		254202	SS00000										
	06:43		254203	SS00000										
	07:18		254204	SS00000										
	07:53		254205	SS00000										
	08:28		254206	SS00000										
	09:03		254207	SS00000										
	09:38		254208	SS00000										
	10:13		254209	SS00000										
	10:48		254210	SS00000										
	11:23		254211	SS00000										
	11:58		254212	SS00000										
	12:33		254213	SS00000										
	13:08		254214	SS00000										
	13:43		254215	SS00000										
	14:18		254216	SS00000										
	14:53		254217	SS00000										
	15:28		254218	SS00000										
	16:03		254219	SS00000										
	16:38		254220	SS00000										
	17:13		254221	SS00000										
	17:48		254222	SS00000										
	18:23		254223	SS00000										
	18:58		254224	SS00000										
	19:33		254225	SS00000										
	20:08		254226	SS00000										
	20:43		254227	SS00000										
	21:18		254228	SS00000										
	21:53		254229	SS00000										
	22:28		254230	SS00000										
	23:03		254231	SS00000										
	23:38		254232	SS00000										
	01/30/03		254233	SS00000										
	00:08		254234	SS00000										
	00:43		254235	SS00000										
	01:18		254236	SS00000										
	01:53		254237	SS00000										
	02:28		254238	SS00000										
	03:03		254239	SS00000										
	03:38		254240	SS00000										
	04:13		254241	SS00000										
	04:48		254242	SS00000										
	05:23		254243	SS00000										
	05:58		254244	SS00000										
	06:33		254245	SS00000										
	07:08		254246	SS00000										
	07:43		254247	SS00000										
	08:18		254248	SS00000										
	08:53		254249	SS00000										
	09:28		254250	SS00000										
	10:03		254251	SS00000										
	10:38		254252	SS00000										
	11:13		254253	SS00000										
	11:48		254254	SS00000										
	12:23		254255	SS00000										
	12:58		254256	SS00000										
	13:33		254257	SS00000										
	14:08		254258	SS00000										
	14:43		254259	SS00000										
	15:18		254260	SS00000										
	15:53		254261	SS00000										
	16:28		254262	SS00000										
	17:03		254263	SS00000										
	17:38		254264	SS00000										
	18:13		254265	SS00000										
	18:48		254266	SS00000										
	19:23		254267	SS00000										
	19:58		254268	SS00000										
	20:33		254269	SS00000										
	21:08		254270	SS00000										
	21:43		254271	SS00000										
	22:18		254272	SS00000										
	22:53		254273	SS00000										
	23:28		254274	SS00000										
	01/31/03		254275	SS00000										
	00:03		254276	SS00000										
	00:38		254277	SS00000										
	01:13		254278	SS00000										

SEVERN TRENT LABORATORIES, INC.

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Reviewed By

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SEVERN TRENT LABORATORIES, INC.

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Reviewed By

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GCMS SEMIVOLATILE INJECTION LOG

[illegible]

EPA ASP 2000 - METHOD 8260 VOLATILES
WATER SURROGATE RECOVERY

Lab Name: STL Buffalo

Contract: _____

Lab Code: RECN

Case No.: _____

SAS No.: _____

SDG No.: _____

	Client Sample ID	RFB %REC #	DCE %REC #	TOL %REC #						TOT OUT
1	MSB58	102	108	101						0
2	MW307	106	106	85 *						1
3	MW307 RI	90	102	86 *						1
4	VBK58	92	106	90						0

QC LIMITS

RFB = p Bromofluorobenzene
DCE = 1,2-Dichloroethane-D4
TOL = Toluene-D8

(86-111)
(76-114)
(88-110)

Column to be used to flag recovery values
* Values outside of contract required QC limits
D Surrogates diluted out

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**ELAP CERTIFICATIONS FOR MITKEM CORPORATION
AND FRIEND LABORATORY, INC. (FLI)**

✓

✓

✓

NEW YORK STATE DEPARTMENT OF HEALTH
WADSWORTH CENTER

Antonia C. Novello, M.D., M.P.H., Dr.P.H. Commissioner



Expires 12:01 AM April 01, 2003
Issued June 28, 2002

CERTIFICATE OF APPROVAL FOR LABORATORY SERVICE

Issued in accordance with and pursuant to section 502 Public Health Law of New York State

DR. KIN S. CHIU
MITKEM CORPORATION
175 METRO CENTER BLVD
WARWICK RI 02886 USA

NY Lab Id No: 11522
EPA Lab Code: RI00907

*is hereby APPROVED as an Environmental Laboratory in conformance with the
National Environmental Laboratory Accreditation Conference Standards for the category
ENVIRONMENTAL ANALYSES POTABLE WATER
All approved analytes are listed below.*

Drinking Water Metals I

Arsenic, Total	EPA 200.7
Barium, Total	EPA 200.7
Cadmium, Total	EPA 200.7
Chromium, Total	EPA 200.7
Copper, Total	EPA 200.7
Iron, Total	EPA 200.7
Mercury, Total	EPA 245.2
Silver, Total	EPA 200.7

Drinking Water Metals II

Beryllium, Total	EPA 200.7
Nickel, Total	EPA 200.7

Drinking Water Trihalomethanes

Bromochloromethane	EPA 524.2
Bromoform	EPA 524.2
Chloroform	EPA 524.2
Dibromochloromethane	EPA 524.2

Microextractibles

1,2-Dibromo-3-chloropropane	EPA 504.1
1,2-Dibromomethane	EPA 504.1

Volatile Aromatics

1,2,3-Trichlorobenzene	EPA 524.2
1,2,4-Trichlorobenzene	EPA 524.2

Volatile Aromatics

1,2,4-Trimethylbenzene	EPA 524.2
1,2-Dichlorobenzene	EPA 524.2
1,3,5-Trimethylbenzene	EPA 524.2
1,3-Dichlorobenzene	EPA 524.2
1,4-Dichlorobenzene	EPA 524.2
2-Chlorotoluene	EPA 524.2
4-Chlorotoluene	EPA 524.2
Benzene	EPA 524.2
Bromobenzene	EPA 524.2
Chlorobenzene	EPA 524.2
Ethyl benzene	EPA 524.2
Hexachlorobutadiene	EPA 524.2
Isopropylbenzene	EPA 524.2
m-Xylene	EPA 524.2
n-Butylbenzene	EPA 524.2
n-Propylbenzene	EPA 524.2
o-Xylene	EPA 524.2
p-Isopropyltoluene (P-Cymene)	EPA 524.2
p-Xylene	EPA 524.2
sec-Butylbenzene	EPA 524.2
Styrene	EPA 524.2
tert-Butylbenzene	EPA 524.2
Toluene	EPA 524.2

Serial No.: 16081

Property of the New York State Department of Health. Valid only at the address shown.
Must be conspicuously posted. Valid certificates have a raised seal and may be
verified by calling (516) 485-5570.

NOH-1317 (3/02)



NEW YORK STATE DEPARTMENT OF HEALTH
WADSWORTH CENTER

Antonia C. Novello, M.D., M.P.H., Dr.P.H. Commissioner



Expires 12:01 AM April 01, 2003
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DR. KIN S. CHIU
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175 METRO CENTER BLVD
WARWICK RI 02886 USA

NY Lab Id No: 11522
EPA Lab Code: RI00907

*is hereby APPROVED as an Environmental Laboratory in conformance with the
National Environmental Laboratory Accreditation Conference Standards for the category
ENVIRONMENTAL ANALYSES POTABLE WATER
All approved analytes are listed below:*

Volatile Halocarbons

1,1,1,2-Tetrachloroethane	EPA 524.2
1,1,1-Trichloroethane	EPA 524.2
1,1,2,2-Tetrachloroethane	EPA 524.2
1,1,2-Trichloroethane	EPA 524.2
1,1-Dichloroethane	EPA 524.2
1,1-Dichloroethene	EPA 524.2
1,1-Dichloropropene	EPA 524.2
1,2,3-Trichloropropane	EPA 524.2
1,2-Dichloroethane	EPA 524.2
1,2-Dichloropropane	EPA 524.2
1,3-Dichloropropane	EPA 524.2
2,2-Dichloropropane	EPA 524.2
Bromochloromethane	EPA 524.2
Bromomethane	EPA 524.2
Carbon tetrachloride	EPA 524.2
Chloroethane	EPA 524.2
Chloromethane	EPA 524.2
cis-1,2-Dichloroethene	EPA 524.2
cis-1,3-Dichloropropene	EPA 524.2
Dibromomethane	EPA 524.2
Dichlorodifluoromethane	EPA 524.2
Tetrachloroethene	EPA 524.2
trans-1,2-Dichloroethene	EPA 524.2
trans-1,3-Dichloropropene	EPA 524.2

Volatile Halocarbons

Trichloroethene	EPA 524.2
Trichlorofluoromethane	EPA 524.2
Vinyl chloride	EPA 524.2

Serial No 16081

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Must be conspicuously posted. Valid certificates have a raised seal and may be
verified by calling (516) 465-5570.

DOH-43317 (3/97)



NEW YORK STATE DEPARTMENT OF HEALTH
WADSWORTH CENTER

Antonia C. Novello, M.D., M.P.H., Dr.P.H. Commissioner



Expires 12 01 AM April 01, 2003
Issued June 28, 2002

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DR. KIN S. CHIU
MITKEM CORPORATION
175 METRO CENTER BLVD
WARWICK RI 02886 USA

NY Lab Id No. 11522
EPA Lab Code: RI00907

is hereby APPROVED as an Environmental Laboratory for the category
ENVIRONMENTAL ANALYSES POTABLE WATER
All approved subcategories and/or analytes are listed below:

Drinking Water Metals I

Lead, Total	Method Not Specified
Selenium, Total	Method Not Specified

Drinking Water Metals II

Antimony, Total	Method Not Specified
Thallium, Total	Method Not Specified

Volatile Halocarbons

Methylene chloride	Method Not Specified

Serial No.: 16082

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DOH 3317 (3/97)

NEW YORK STATE DEPARTMENT OF HEALTH
WADSWORTH CENTER

Antonia C. Novello, M.D., M.P.H., Dr.P.H. Commissioner



Expires 12:01 AM April 01, 2003
Issued June 28, 2002

CERTIFICATE OF APPROVAL FOR LABORATORY SERVICE

Issued in accordance with and pursuant to section 502 Public Health Law of New York State

DR. KIN S. CHIU
MITKEM CORPORATION
175 METRO CENTER BLVD
WARWICK RI 02886 USA

NY Lab Id No. 11522
EPA Lab Code RI00907

Is hereby APPROVED as an Environmental Laboratory in conformance with the
National Environmental Laboratory Accreditation Conference Standards for the category
ENVIRONMENTAL ANALYSES NON POTABLE WATER
All approved analytes are listed below.

Acrolein and Acrylonitrile

Acrolein EPA 624
Acrylonitrile EPA 624

Benzidines

3,3'-dichlorobenzidine EPA 625
Benzidine EPA 625

Chlorinated Hydrocarbon Pesticides

4,4'-DDE EPA 608
4,4'-DDT EPA 608
4,4'-DDD EPA 608
Aldrin EPA 608
alpha-BHC EPA 608
beta-BHC EPA 608
Chlordane Total EPA 608
delta-BHC EPA 608
Dieldrin EPA 608
Endosulfan I EPA 608
Endosulfan II EPA 608
Fenitro EPA 608
Endon aldehyde EPA 608
Heptachlor EPA 608
Heptachlor epoxide EPA 608
Lindane EPA 608
Toxaphene EPA 608

Chlorinated Hydrocarbons

1,2,4-Trichlorobenzene EPA 625
2-Chloronaphthalene EPA 625
Hexachlorobenzene EPA 625
Hexachlorobutadiene EPA 625
Hexachlorocyclopentadiene EPA 625
Hexachloroethane EPA 625

Demand

Chemical Oxygen Demand SM18 5220D

Haloethers

4-Bromophenylphenyl ether EPA 625
4-Chlorophenylphenyl ether EPA 625
Bis (2-chloroisopropyl) ether EPA 625
Bis(2-chloroethoxy)methane EPA 625
Bis(2-chloroethyl)ether EPA 625

Mineral

Chloride SM18 4500Cl-B
Hardness, Total SM 18 2340 B
Sulfate (as SO4) SM18 4500-SO4 D

Nitroaromatics and Isophorone

2,4-Dinitrotoluene EPA 625
2,6-Dinitrotoluene EPA 625
Isophorone EPA 625

Serial No.. 16083

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DOH-3317 (3/97)

Page 1 of 4



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WADSWORTH CENTER**

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Nitroaromatics and Isophorone

Nitrobenzene EPA 626

Nitrosamines

N-Nitrosodimethylamine EPA 625

N-Nitrosodipropylamine EPA 625

N-Nitrosodiphenylamine EPA 625

Nutrient

Ammonia (as N) SM18.4500-NH3B

Kjeldahl Nitrogen Total SM18.4500-NH3C

Nitrate (as N) EPA 353.2

Orthophosphate (as P) SM18.4500-P E

Phosphorus, Total SM18.4500-P E

Phthalate Esters

Benzyl butyl phthalate EPA 625

Bis(2-ethylhexyl) phthalate EPA 625

Diethyl phthalate EPA 625

Dimethyl phthalate EPA 625

Dih-n-butyl phthalate EPA 625

Dih-n-octyl phthalate EPA 625

Polychlorinated Biphenyls

PCB-1016 EPA 608

PCB-1221 EPA 608

PCB-1232 EPA 608

Polychlorinated Biphenyls

PCB-1242 EPA 608

PCB-1248 EPA 608

PCB-1254 EPA 608

PCB-1260 EPA 625

Polynuclear Aromatics

Acenaphthene EPA 625

Acenaphthylene EPA 625

Anthracene EPA 625

Benzo(a)anthracene EPA 625

Benzo(a)pyrene EPA 625

Benzo(b)fluoranthene EPA 625

Benzo(ghi)perylene EPA 625

Benzo(k)fluoranthene EPA 625

Chrysene EPA 625

Dibenzo(a,h)anthracene EPA 625

Fluoranthene EPA 625

Fluorene EPA 625

Indeno(1,2,3-cd)pyrene EPA 625

Naphthalene EPA 625

Phenanthrene EPA 625

Pyrene EPA 625

Priority Pollutant Phenols

2,4,5-Trichlorophenol CLP 05-2

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DOH-3317 (3/97)



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ENVIRONMENTAL ANALYSES NON POTABLE WATER
All approved analytes are listed below

Priority Pollutant Phenols

2,4,5-Trichlorophenol	SW-846 8270C
2,4,6-Trichlorophenol	EPA 625
2,4-Dichlorophenol	EPA 625
2,4-Dimethylphenol	EPA 625
2,4-Dinitrophenol	EPA 625
2-Chlorophenol	EPA 625
2-Methyl-4,6-dinitrophenol	EPA 625
2-Nitrophenol	EPA 625
4-Chloro-3-methylphenol	EPA 625
4-Nitrophenol	EPA 625
Pentachlorophenol	EPA 625
Phenol	EPA 625

Purgeable Aromatics

1,2-Dichlorobenzene	EPA 624
	EPA 625
1,3-Dichlorobenzene	EPA 624
	EPA 625
1,4-Dichlorobenzene	EPA 624
	EPA 625
Benzene	EPA 624
Chlorobenzene	EPA 624
Ethyl benzene	EPA 624
Toluene	EPA 624

Purgeable Aromatics

Total Xylenes EPA 624

Purgeable Halocarbons

1,1,1-Trichloroethane	EPA 624
1,1,2,2-Tetrachloroethane	EPA 624
1,1,2-Trichloroethane	EPA 624
1,1-Dichloroethane	EPA 624
1,1-Dichloroethene	EPA 624
1,2-Dichloroethane	EPA 624
1,2-Dichloroethene (total)	EPA 624
1,2-Dichloropropane	EPA 624
Bromodichloromethane	EPA 624
Bromoform	EPA 624
Bromomethane	EPA 624
Carbon tetrachloride	EPA 624
Chloroethane	EPA 624
Chloroform	EPA 624
Chloromethane	EPA 624
cis-1,3-Dichloropropene	EPA 624
Dibromochloromethane	EPA 624
Methylene chloride	EPA 624
Tetrachloroethane	EPA 624
trans-1,3-Dichloropropene	EPA 624
Vinyl chloride	EPA 624

Serial No. 16083

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DOI-2217 (3/87)



NEW YORK STATE DEPARTMENT OF HEALTH
WADSWORTH CENTER

Antonia C. Novello, M.D., M.P.H., Dr.P.H. Commissioner



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ENVIRONMENTAL ANALYSES NON POTABLE WATER
All approved analytes are listed below:*

Residue

Solids, Total	SM18 25400
Solids, Total Dissolved	SM18 25400
Solids, Total Suspended	SM18 25400

Wastewater Metals I

Barium, Total	EPA 200.7
Cadmium, Total	EPA 200.7
Calcium, Total	EPA 200.7
Chromium, Total	EPA 200.7
Copper, Total	EPA 200.7
Iron, Total	EPA 200.7
Lead, Total	EPA 200.7
Magnesium, Total	EPA 200.7
Manganese, Total	EPA 200.7
Nickel, Total	EPA 200.7
Potassium, Total	EPA 200.7
Silver, Total	EPA 200.7
Sodium, Total	EPA 200.7

Wastewater Metals II

Aluminum, Total	EPA 200.7
Antimony, Total	EPA 200.7
Arsenic, Total	EPA 200.7
Beryllium, Total	EPA 200.7
Mercury, Total	EPA 245.2

Wastewater Metals II

Selenium, Total	EPA 200.7
Vanadium, Total	EPA 200.7
Zinc, Total	EPA 200.7

Wastewater Metals III

Cobalt, Total	EPA 200.7
Molybdenum, Total	EPA 200.7
Niellium, Total	EPA 200.7
Tin, Total	EPA 200.7

Wastewater Miscellaneous

Boron, Total	EPA 200.7
Cyanide, Total	SM18 4500-CN-E SM18,4500CN-C
Hydrogen Ion (pH)	SM18 4500-H-R
Oil & Grease Total Recoverable	EPA 1664-A
Phenols	EPA 420.1
Silica, Dissolved	EPA 200.7

Serial No., 16083

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DOH-3317 (3/97)



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MITKEM CORPORATION
175 METRO CENTER BLVD
WARWICK RI 02886 USA

NY Lab Id No: 11522
EPA Lab Code: RI00907

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ENVIRONMENTAL ANALYSES NON POTABLE WATER
All approved subcategories and/or analytes are listed below*

Chlorinated Hydrocarbon Pesticides

Endosulfan sulfate	Method Not Specified
Mathoxychlor	Method Not Specified

Chlorophenoxy Acid Pesticides

2,4,5-T	Method Not Specified
2,4,5-TP (Silvex)	Method Not Specified
2,4-D	Method Not Specified
Dicamba	Method Not Specified

Nutrient

Nitrite (as N)	SM18 4500-NO2B

Purgeable Halocarbons

2-Chloroethylvinyl ether	Method Not Specified
Dichlorodifluoromethane	Method Not Specified
Trichlorofluoromethane	Method Not Specified

TCLP Additional Compounds

Cresol	Method Not Specified
Methylmethyl ketone (2-butanon)	SW-846 8260B
Pyridine	SW-846 8270C

Wastewater Metals II

Chromium VI	EPA 218.4

Wastewater Metals III

Gold, Total	Method Not Specified

Wastewater Metals III

Palladium, Total	Method Not Specified
Platinum, Total	Method Not Specified

Wastewater Miscellaneous

Organic Carbon, Total	Method Not Specified
Sulfide (as S)	Method Not Specified

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DOH-3317 (3/97)

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ENVIRONMENTAL ANALYSES SOLID AND HAZARDOUS WASTE
All approved analytes are listed below:*

Acrolein and Acrylonitrile

Acrolein SW-846 8260B
Acrylonitrile SW-846 8260B

Characteristic Testing

Ignitability SW-846 1010
Reactivity SW-846 Ch7, Sec 7.3
TCLP FED REG 1311

Chlorinated Hydrocarbon Pesticides

4,4'-DDE SW-846 8081A
4,4'-DDT SW-846 8081A
4,4'-DDO SW-846 8081A
Aldrin SW-846 8081A
alpha-BHC SW-846 8081A
beta-BHC SW-846 8081A
Chlordane Total SW-846 8081A
delta-BHC SW-846 8081A
Dieldrin SW-846 8081A
Endosulfan I SW-846 8081A
Endosulfan II SW-846 8081A
Endosulfan sulfate SW-846 8081A
Erdin SW-846 8081A
Erdin aldehyde SW-846 8081A
Heptachlor SW-846 8081A
Heptachlor epoxide SW-846 8081A

Chlorinated Hydrocarbon Pesticides

Lindane SW-846 8081A
Methoxychlor SW-846 8081A
Toxaphene SW-846 8081A

Chlorinated Hydrocarbons

1,2,4-Trichlorobenzene SW-846 8270C
2-Chloronaphthalene SW-846 8270C
Hexachlorobenzene SW-846 8270C
Hexachlorobutadiene SW-846 8270C
Hexachlorocyclopentadiene SW-846 8270C
Hexachloroethane SW-846 8270C

Haloothers

Bis (2-chloroisopropyl) ether SW-846 8270C
Bis (2-chloroethoxy) methane SW-846 8270C

Metals I

Barium, Total SW-846 6010B
Cadmium, Total SW-846 6010B
Chromium, Total SW-846 6010B
Lead, Total SW-846 6010B
Nickel, Total SW-846 6010B
Silver, Total SW-846 6010B

Metals II

Antimony, Total SW-846 6010B

Serial No.: 16085

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DDH-3317 (3/97)



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ENVIRONMENTAL ANALYSES SOLID AND HAZARDOUS WASTE
All approved analytes are listed below.

Metals II

Arsenic, Total SW-846 6010B
Selenium, Total SW 846 6010S

Miscellaneous

Sulfide (as S) SW-846 9030B

Nitroaromatics and Isophorone

2,4-Dinitrotoluene SW-846 8270C
2,6-Dinitrotoluene SW-846 8270C
Isophorone SW-846 8270C
Nitrobenzene SW-846 8270C

Phthalate Esters

Benzyl butyl phthalate SW-846 8270C
Bis(2-ethylhexyl) phthalate SW-846 8270C
Diethyl phthalate SW-846 8270C
Dimethyl phthalate SW-846 8270C
Di-n-butyl phthalate SW-846 8270C
Di-n-octyl phthalate SW-846 8270C

Polychlorinated Biphenyls

PCB-1016 SW-846 8082
PCB-1221 SW-846 8082
PCB-1232 SW 846 8082
PCB-1242 SW-846 8082
PCB-1248 SW-846 8082

Polychlorinated Biphenyls

PCB-1254 SW-846 8082
PCB-1260 SW-846 8082

Polynuclear Aromatic Hydrocarbons

Acenaphthene SW-846 8270C
Acenaphthylene SW-846 8270C
Anthracene SW-846 8270C
Benzo(a)anthracene SW-846 8270C
Benzo(a)pyrene SW-846 8270C
Benzo(b)fluoranthene SW-846 8270C
Benzo(ghi)perylene SW-846 8270C
Chrysene SW 846 8270C
Dibenzo(a,h)anthracene SW-846 8270C
Fluoranthene SW-846 8270C
Fluorene SW-846 8270C
Indeno(1,2,3-cd)pyrene SW-846 8270C
Naphthalene SW-846 8270C
Phenanthrene SW-846 8270C
Pyrene SW-846 8270C

Priority Pollutant Phenols

2,4,6-Trichlorophenol SW-846 8270C
2,4-Dichlorophenol SW-846 8270C
2,4-Dimethylphenol SW-846 8270C
2,4-Dinitrophenol SW-846 8270C

Serial No 16085

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DOH-3917 (3/97)



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ENVIRONMENTAL ANALYSES SOLID AND HAZARDOUS WASTE
All approved analytes are listed below*

Priority Pollutant Phenols

2-Chlorophenol	SW-846 8270C
2-Methyl-4,6-dinitrophenol	SW-846 8270C
2-Nitrophenol	SW 846 8270C
4-Chloro-3-methylphenol	SW-846 8270C
4-Nitrophenol	SW-846 8270C
Pentachlorophenol	SW 846 8270C
Phenol	SW-846 8270C

Purgeable Aromatics

1,2-Dichlorobenzene	SW-846 8021B
	SW-846 8260B
1,3-Dichlorobenzene	SW-846 8021B
	SW-846 8260B
1,4-Dichlorobenzene	SW 846 8021B
	SW-846 8260B

Purgeable Halocarbons

Bromomethane	SW 846 8260B

Serial No.: 16085

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DOH-2317 (3/97)



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WADSWORTH CENTER

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NY Lab Id No: 11522
EPA Lab Code: RI00907

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ENVIRONMENTAL ANALYSES SOLID AND HAZARDOUS WASTE
All approved subcategories and/or analytes are listed below:

Metals II

Chromium VI	SW-846 7195A
Mercury, Total	SW846 7470A
	SW846 7471A

Miscellaneous

Cyanide, Total	Method Not Specified
Hydrogen Ion (pH)	Method Not Specified

Purgeable Aromatics

Benzene	SW-846 8021B
	SW-846 8260B
Chlorobenzene	SW-846 8021D
	SW-846 8260B
Ethyl benzene	SW-846 8021D
	SW-846 8260B
Toluene	SW-846 8021B
	SW-846 8260B
Total Xylenes	SW-846 8021B
	SW-846 8260B

Purgeable Halocarbons

1,1,1-Trichloroethane	SW-846 8260B
1,1,2,2-Tetrachloroethane	SW-846 8260B
1,1,2-Trichloroethane	SW-846 8260B
1,1-Dichloroethane	SW-846 8260B
1,1-Dichloroethene	SW-846 8260B

Purgeable Halocarbons

1,2-Dichloroethane	SW-846 8260B
1,2-Dichloropropane	SW-846 8260B
2-Chloroethylvinyl ether	SW-846 8260B
Bromodichloromethane	SW-846 8260B
Bromoform	SW-846 8260B
Carbon tetrachloride	SW-846 8260B
Chloroethane	SW-846 8260B
Chloroform	SW-846 8260B
Chloromethane	SW-846 8260B
cis-1,3-Dichloropropene	SW-846 8260B
Dibromochloromethane	SW-846 8260B
Dichlorodifluoromethane	SW-846 8260B
Methylene chloride	SW-846 8260B
Tetrachloroethane	SW-846 8260B
trans-1,3-Dichloropropene	SW-846 8260B
Trichloroethene	SW-846 8260B
Trichlorofluoromethane	SW-846 8260B
Vinyl chloride	SW-846 8260B

Serial No.: 16086

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DOH-3317 (3/97)

**NEW YORK STATE DEPARTMENT OF HEALTH
WADSWORTH CENTER**

Antonia C. Novello, M.D., M.P.H., Dr.P.H. Commissioner



Expires 12:01 AM April 01, 2003
Issued June 28, 2002

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**DR. KIN S. CHIU
MITKEM CORPORATION
175 METRO CENTER BLVD
WARWICK RI 02886 USA**

**NY Lab Id No. 11522
EPA Lab Code: RI00907**

*is hereby APPROVED as an Environmental Laboratory for the category
ENVIRONMENTAL ANALYSES ANALYTICAL SERVICES PROTOCOL
All approved subcategories and/or analytes are listed below.*

CLP PCB/Pesticides
CLP Semi-Volatile Organics
CLP Inorganics

Serial No.: 16087

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DOI-3317 (3/97)

Friend Laboratory, Inc.
32 Ithaca St.
Waverly, NY 14892
P: 607.565.3500 F: 607.565.4083



Fax

Company: VDS From: QA - Mandi Druso
Attention: [REDACTED] Phone: Ext. 37
Fax: 716 864 2545 Email: mndruso@friendlab.com
Re: NY Certifications Date: 10 16 02

☐ Urgent ☐ For Review ☐ Please Comment ☐ Please Reply ☐ Please Recycle

Mr. Henschel:
Please note that we are awaiting revised Certificates for the addition of the following:
DW Methanol & 3-hydroxyacetone by 531.1,
WW PCB 1221 by 1008, & CUP Pest/PCB.
I will fax updated certificates upon our receipt.
Please contact me with any questions.
Thanks.

Mandi

Total Number of Pages: 31

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NEW YORK STATE DEPARTMENT OF HEALTH
WADSWORTH CENTER
Antonio C. Novello, M.D., M.P.H., Dr.P.H. Commissioner



Expires 12:01 AM April 01, 2003
Issued May 02, 2002
Revised October 07, 2002

CERTIFICATE OF APPROVAL FOR LABORATORY SERVICE

Issued in accordance with and pursuant to section 602 Public Health Law of New York State

MR. JOHN KEUHN
FRIEND LABORATORY INC
ONE RESEARCH CIRCLE
WAVERLY NY 14892 USA

NY Lab Id No: 10252
EPA Lab Code: NY00033

is hereby **APPROVED** as an Environmental Laboratory in conformance with the
National Environmental Laboratory Accreditation Conference Standards for the category
ENVIRONMENTAL ANALYSES POTABLE WATER
All approved analytes are listed below:

Drinking Water Bacteriology

Coliform, Total	SM18, 8222B - MF
Standard Plate Count	SM 18 8215B

Drinking Water Chlorinated Acids

2,4,5-TP (Silvex)	EPA 515.1
2,4-D	EPA 515.1
Dalapon	EPA 515.1
Dicamba	EPA 515.1
Dinoseb	EPA 515.1
Pentachlorophenol	EPA 515.1
Picloram	EPA 515.1

Drinking Water Metals I

Arsenic, Total	EPA 200.7
	EPA 200.8
Barium, Total	EPA 200.7
	EPA 200.8
Cadmium, Total	EPA 200.8
	EPA 200.9
Chromium, Total	EPA 200.7
	EPA 200.8
Copper, Total	EPA 200.7
	EPA 200.8

Drinking Water Metals I

Iron, Total	EPA 200.7
Lead, Total	EPA 200.8
	EPA 200.9
Manganese, Total	EPA 200.7
	EPA 200.8
Mercury, Total	EPA 200.8
	EPA 245.1
Selenium, Total	EPA 200.8
	SM18 3114-B
Silver, Total	EPA 200.7
	EPA 200.8
Sodium, Total	EPA 200.7
Zinc, Total	EPA 200.7
	EPA 200.8

Drinking Water Metals II

Antimony, Total	EPA 200.8
	EPA 200.9
Beryllium, Total	EPA 200.7
	EPA 200.8
Nickel, Total	EPA 200.7
	EPA 200.8

Serial No.: 17453

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DQH-3317 (3/97)



NEW YORK STATE DEPARTMENT OF HEALTH
WADSWORTH CENTER
Antonia C. Novello, M.D., M.P.H., Dr.P.H. Commissioner



Expires 12:01 AM April 01, 2003
Issued May 02, 2002
Revised October 07, 2002

CERTIFICATE OF APPROVAL FOR LABORATORY SERVICE

Issued in accordance with and pursuant to section 502 Public Health Law of New York State

MR. JOHN KEUHN
FRIEND LABORATORY INC
ONE RESEARCH CIRCLE
WAVERLY NY 14892 USA

NY Lab Id No: 10252
EPA Lab Code: NY00093

is hereby **APPROVED** as an Environmental Laboratory in conformance with the
National Environmental Laboratory Accreditation Conference Standards for the category
ENVIRONMENTAL ANALYSES POTABLE WATER
All approved analytes are listed below:

Drinking Water Metals II

Thallium, Total	EPA 200.8
	EPA 200.9

Drinking Water Methylcarbamate Pesticides

Aldicarb	EPA 531.1
Aldicarb Sulfone	EPA 531.1
Aldicarb Sulfoxide	EPA 531.1
Carbaryl	EPA 531.1
Carbofuran	EPA 531.1
Oxamyl	EPA 531.1

Drinking Water Miscellaneous

Butachlor	EPA 525.2
Hexachlorobenzene	EPA 508
Hexachlorocyclopentadiene	EPA 525.2
Propachlor	EPA 525.2

Drinking Water Non-Metals

Alkalinity	SM 18 2320-B
Calcium Hardness	EPA 200.7
	SM 18 3500-Ca-D
Chloride	EPA 300.0
Color	SM 18/19 2120B
Corrosivity	SM 18/19 2330

Drinking Water Non-Metals

Cyanide	EPA 335.4
Fluoride, Total	EPA 300.0
Hydrogen Ion (pH)	EPA 150.1
Nitrate (as N)	EPA 300.0
	EPA 353.2
Nitrite (as N)	EPA 300.0
	EPA 353.2
Solids, Total Dissolved	SM 18 2540C
Specific Conductance	SM 18 25 10B
Sulfate (as SO ₄)	EPA 300.0

Drinking Water Organohalide Pesticides

Alachlor	EPA 525.2
Aldrin	EPA 508
Atrazine	EPA 525.2
Chlordane Total	EPA 508
Dieldrin	EPA 508
Endrin	EPA 508
Heptachlor	EPA 508
Heptachlor epoxide	EPA 508
Lindane	EPA 508
Methoxychlor	EPA 508

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DOH-3317 (3/97)



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WAVERLY NY 14892 USA**

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EPA Lab Code: NY00033**

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ENVIRONMENTAL ANALYSES POTABLE WATER
All approved analytes are listed below:

Drinking Water Organohalide Pesticides

Metolachlor	EPA 525.2
Metribuzin	EPA 525.2
Simazine	EPA 525.2
Toxaphene	EPA 508

Drinking Water Trihalomethanes

Monochloromethane	EPA 524.2
Bromoform	EPA 524.2
Chloroform	EPA 524.2
Dibromochloromethane	EPA 524.2

Microextractibles

1,2-Dibromo-3-chloropropane	EPA 504.1
1,2-Dibromoethane	EPA 504.1

Polychlorinated Biphenyls

PCB-1016	EPA 508
PCB-1221	EPA 508
PCB-1232	EPA 508
PCB-1242	EPA 508
PCB-1248	EPA 508
PCB-1264	EPA 508
PCB-1260	EPA 508

Volatile Aromatics

1,2,3-Trichlorobenzene	EPA 524.2
1,2,4-Trichlorobenzene	EPA 524.2
1,2,4-Trimethylbenzene	EPA 524.2
1,2-Dichlorobenzene	EPA 524.2
1,3,5-Trimethylbenzene	EPA 524.2
1,3-Dichlorobenzene	EPA 524.2
1,4-Dichlorobenzene	EPA 524.2
2-Chlorotoluene	EPA 524.2
4-Chlorotoluene	EPA 524.2
Benzene	EPA 524.2
Bromobenzene	EPA 524.2
Chlorobenzene	EPA 524.2
Ethyl benzene	EPA 524.2
Hexachlorobutadiene	EPA 524.2
Isopropylbenzene	EPA 524.2
m-Xylene	EPA 524.2
n-Butylbenzene	EPA 524.2
n-Propylbenzene	EPA 524.2
o-Xylene	EPA 524.2
p-Isopropyltoluene (P-Cymene)	EPA 524.2
sec-Butylbenzene	EPA 524.2

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Volatile Aromatics

Styrene	EPA 524.2
tert-Butylbenzene	EPA 524.2
Toluene	EPA 524.2

Volatile Halocarbons

1,1,1,2-Tetrachloroethane	EPA 524.2
1,1,1-Trichloroethane	EPA 524.2
1,1,2,2-Tetrachloroethane	EPA 524.2
1,1,2-Trichloroethane	EPA 524.2
1,1-Dichloroethane	EPA 524.2
1,1-Dichloroethene	EPA 524.2
1,1-Dichloropropane	EPA 524.2
1,2,3-Trichloropropane	EPA 524.2
1,2-Dichloroethane	EPA 524.2
1,2-Dichloropropene	EPA 524.2
1,3-Dichloropropane	EPA 524.2
2,2-Dichloropropane	EPA 524.2
Bromochloromethane	EPA 524.2
Bromomethane	EPA 524.2
Carbon tetrachloride	EPA 524.2
Chloroethane	EPA 524.2
Chloromethane	EPA 524.2

Volatile Halocarbons

cis-1,2-Dichloroethane	EPA 524.2
cis-1,3-Dichloropropene	EPA 524.2
Dibromomethane	EPA 524.2
Dichlorodifluoromethane	EPA 524.2
Methylene chloride	EPA 524.2
Tetrachloroethene	EPA 524.2
trans-1,2-Dichloroethene	EPA 524.2
trans-1,3-Dichloropropene	EPA 524.2
Trichloroethene	EPA 524.2
Trichlorofluoromethane	EPA 524.2
Vinyl chloride	EPA 524.2

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DQH-3317 (5/87)



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Acrolein and Acrylonitrile		Chlorinated Hydrocarbon Pesticides	
Acrolein	EPA 624	Heptachlor epoxide	EPA 608
Acrylonitrile	EPA 624	Lindane	EPA 608
Benzidines		Methoxychlor	SM18 8830C
3,3'-dichlorobenzidine	EPA 625	Toxaphene	EPA 608
Benzidine	EPA 625	Chlorinated Hydrocarbons	
Chlorinated Hydrocarbon Pesticides		1,2,4-Trichlorobenzene	EPA 625
4,4'-DDE	EPA 608	2-Chloronaphthalene	EPA 625
4,4'-DDT	EPA 608	Hexachlorobenzene	EPA 625
4,4'-DDD	EPA 608	Hexachlorobutadiene	EPA 625
Aldrin	EPA 608	Heptachlorocyclopentadiene	EPA 625
alpha-BHC	EPA 608	Hexachloroethane	EPA 625
beta-BHC	EPA 608	Chlorophenoxy Acid Pesticides	
Chlordane Total	EPA 608	2,4,5-T	EPA 1978, p.115
delta-BHC	EPA 608	2,4,5-TP (Silvex)	EPA 1978, p.115
Dieldrin	EPA 608	2,4-D	EPA 1978, p.115
Endosulfan I	EPA 608	Dicamba	EPA 1978, p.115
Endosulfan II	EPA 608	Demand	
Endosulfan sulfate	EPA 608	Biochemical Oxygen Demand	EPA 405.1
Endrin	EPA 608	Chemical Oxygen Demand	HACH 8000
Endrin aldehyde	EPA 608		
Heptachlor	EPA 608		

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DOM-3317 (3/97)



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Halocethers		Nitrosamines		
4-Bromophenylphenyl ether	EPA 625	N-Nitrosodiphenylamine	EPA 625	
4-Chlorophenylphenyl ether	EPA 625	Nutrient		
Bis (2-chloroisopropyl) ether	EPA 625			
Bis(2-chloroethoxy)methane	EPA 625			
Bis(2-chloroethyl)ether	EPA 625			
Mineral				
Acidity	EPA 305.1	Nitrite (as N)	EPA 300.0	
Alkalinity	EPA 310.1		EPA 353.2	
Calcium Hardness	EPA 215.2	Orthophosphate (as P)	EPA 300.0	
Chloride	EPA 300.0		EPA 365.2	
Hardness, Total	EPA 130.2	Phosphorus, Total	EPA 355.2	
	EPA 200.7	Phthalate Esters		
Sulfate (as SO4)	EPA 300.0			
Nitroaromatics and isophorone				
2,4-Dinitrotoluene	EPA 625		Benzyl butyl phthalate	EPA 625
2,6-Dinitrotoluene	EPA 625		Bis(2-ethylhexyl) phthalate	EPA 625
Isophorone	EPA 625	Diethyl phthalate	EPA 625	
Nitrobenzene	EPA 625	Dimethyl phthalate	EPA 625	
Nitrosamines		Di-n-butyl phthalate	EPA 625	
N-Nitrosodimethylamine	EPA 625	Di-n-octyl phthalate	EPA 625	
N-Nitrosodi-n-propylamine	EPA 625	Polychlorinated Biphenyls		
			PCB-1016	EPA 608
			PCB-1232	EPA 608

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DOH-3317 (3/97)



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Polychlorinated Biphenyls

PCB-1242	EPA 608
PCB-1248	EPA 608
PCB-1254	EPA 608
PCB-1280	EPA 608

Polynuclear Aromatics

Acenaphthene	EPA 625
Acenaphthylene	EPA 625
Anthracene	EPA 625
Benzo(a)anthracene	EPA 625
Benzo(a)pyrene	EPA 625
Benzo(b)fluoranthene	EPA 625
Benzo(ghi)perylene	EPA 625
Benzo(k)fluoranthene	EPA 625
Chrysene	EPA 625
Dibenzo(a,h)anthracene	EPA 625
Fluoranthene	EPA 625
Fluorone	EPA 625
Indeno(1,2,3-cd)pyrene	EPA 625
Naphthalene	EPA 625
Phenanthrene	EPA 625
Pyrene	EPA 625

Priority Pollutant Phenols

2,4,5-Trichlorophenol	SW-846 8270C
2,4,6-Trichlorophenol	EPA 625
2,4-Dichlorophenol	EPA 625
2,4-Dimethylphenol	EPA 625
2,4-Dinitrophenol	EPA 625
2-Chlorophenol	EPA 625
2-Methyl-4,6-dinitrophenol	EPA 625
2-Nitrophenol	EPA 625
4-Chloro-3-methylphenol	EPA 625
4-Nitrophenol	EPA 625
Pentachlorophenol	EPA 625
Phenol	EPA 625

Purgeable Aromatics

1,2-Dichlorobenzene	EPA 601
	EPA 602
	EPA 624
	EPA 626
1,3-Dichlorobenzene	EPA 601
	EPA 602
	EPA 624
	EPA 625

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DCH-3317 (3/97)



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Purgeable Aromatics		Purgeable Halocarbons	
1,4-Dichlorobenzene	EPA 801	1,1,2-Trichloroethane	EPA 824
	EPA 802	1,1-Dichloroethane	EPA 801
	EPA 824		EPA 824
	EPA 825	1,1-Dichloroethene	EPA 801
Benzene	EPA 802		EPA 824
	EPA 824	1,2-Dichloroethane	EPA 801
Chlorobenzene	EPA 801		EPA 824
	EPA 802	1,2-Dichloropropane	EPA 801
	EPA 824		EPA 824
Ethyl benzene	EPA 802	2-Chloroethylvinyl ether	EPA 801
	EPA 824		EPA 824
Toluene	EPA 802	Bromodichloromethane	EPA 801
	EPA 824		EPA 824
Total Xylenes	EPA 802	Bromoform	EPA 801
	EPA 824		EPA 824
Purgeable Halocarbons		Bromomethane	EPA 801
1,1,1-Trichloroethane	EPA 801		EPA 824
	EPA 824	Carbon tetrachloride	EPA 801
1,1,2,2-Tetrachloroethane	EPA 801		EPA 824
	EPA 824	Chloroethane	EPA 801
1,1,2-Trichloroethane	EPA 801		EPA 824

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DOH-3317 (3/97)



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ENVIRONMENTAL ANALYSES NON POTABLE WATER
All approved analytes are listed below:*

Purgeable Halocarbons		Purgeable Halocarbons	
Chloroform	EPA 801	Vinyl chloride	EPA 624
	EPA 624		
Chloromethane	EPA 801	Residue	
	EPA 624	Solids, Total	EPA 160.3
cis-1,3-Dichloropropene	EPA 801	Solids, Total Dissolved	EPA 160.1
	EPA 624	Solids, Total Suspended	EPA 160.2
Dibromochloromethane	EPA 801	Wastewater Bacteriology	
	EPA 624	Coliform, fecal	SM18, 9222D - MF
Dichlorodifluoromethane	EPA 801	Coliform, Total	SM10, 9222B - MF
Methylene chloride	EPA 801	Standard Plate Count	SM 18 9215B
	EPA 624	Wastewater Metals I	
Tetrachloroethene	EPA 801	Barium, Total	EPA 200.7
	EPA 624		EPA 200.8
trans-1,2-Dichloroethene	EPA 801	Cadmium, Total	EPA 200.8
	EPA 624		EPA 200.9
trans-1,3-Dichloropropene	EPA 801		EPA 213.1
	EPA 624	Calcium, Total	EPA 200.7
Trichloroethene	EPA 801	Chromium, Total	EPA 200.7
	EPA 624		EPA 200.8
Trichlorofluoromethane	EPA 824	Copper, Total	EPA 200.8
	EPA 801		EPA 220.1
Vinyl chloride		Iron, Total	EPA 200.7

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DOH-3317 (9/97)



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ENVIRONMENTAL ANALYSES NON POTABLE WATER
All approved analytes are listed below:*

Wastewater Metals I

Lead, Total	EPA 200.8
	EPA 200.9
Magnesium, Total	EPA 200.7
Manganese, Total	EPA 200.8
Nickel, Total	EPA 200.7
	EPA 200.8
Potassium, Total	EPA 200.7
Silver, Total	EPA 200.7
	EPA 200.8
Sodium, Total	EPA 200.7

Wastewater Metals II

Aluminum, Total	EPA 200.7
	EPA 200.8
Antimony, Total	EPA 200.8
	EPA 200.9
Arsenic, Total	EPA 200.7
	EPA 200.8
	EPA 200.8
	EPA 208.5
Beryllium, Total	EPA 200.7
	EPA 200.8

Wastewater Metals II

Mercury, Total	EPA 200.8
	EPA 245.1
Selenium, Total	EPA 200.7
	EPA 200.8
	SM 16 3114-B
Vanadium, Total	EPA 200.7
	EPA 200.8
Zinc, Total	EPA 200.7
	EPA 200.8

Wastewater Metals III

Cobalt, Total	EPA 200.7
	EPA 200.8
Gold, Total	EPA 231.1
Molybdenum, Total	EPA 246.1
Thallium, Total	EPA 200.8
	EPA 200.8
Tin, Total	EPA 262.1
Titanium, Total	EPA 283.1

Wastewater Miscellaneous

Boron, Total	EPA 200.7
Bromide	EPA 320.1

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DOH-3317 (2/97)



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Wastewater Miscellaneous

Color	EPA 110.2
Corrosivity	SM 18/19 2330
Cyanide, Total	EPA 335.3
Hydrogen Ion (pH)	EPA 150.1
Oil & Grease Total Recoverable	EPA 413.1
Total Carbon, Total	EPA 415.1
Phenols	EPA 420.2
Specific Conductance	EPA 120.1
Sulfide (as S)	EPA 375.1
Surfactant (MBAS)	EPA 425.1
Temperature	EPA 170.1

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DOH-8317 (3/97)

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ENVIRONMENTAL ANALYSES NON POTABLE WATER
All approved subcategories and/or analytes are listed below:

TCLP Additional Compounds

Cresol	SW-846 8270C
Methylethyl ketone (2-butanone)	SW-846 8280B
Pyridine	SW-846 8280B

Wastewater Metals II

Chromium VI	Method Not Specified
	SM 18 3500-CrD

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DOH-3317 (3/97)

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ENVIRONMENTAL ANALYSES SOLID AND HAZARDOUS WASTE
All approved analytes are listed below:

Acrolein and Acrylonitrile

Acrolein	SW-846 8280B
Acrylonitrile	SW-846 8280B

Characteristic Testing

Corrosivity	SW846 1110
Toxicity	SW846 1310
Ignitability	SW846 1010
Reactivity	SW846 Ch7, Sec. 7.3
TCLP	FED REG 1311

Chlorinated Hydrocarbon Pesticides

4,4'-DDE	SW-846 8081A
4,4'-DDT	SW-846 8081A
4,4'-DDD	SW-846 8081A
Aldrin	SW-846 8081A
alpha-BHC	SW-846 8081A
beta-BHC	SW-846 8081A
Chlordane Total	SW-846 8081A
delta-BHC	SW-846 8081A
Dieldrin	SW-846 8081A
Endosulfan I	SW-846 8081A
Endosulfan II	SW-846 8081A
Endosulfan sulfate	SW-846 8081A
Endrin	SW-846 8081A
Endrin aldehyde	SW-846 8081A

Chlorinated Hydrocarbon Pesticides

Heptachlor	SW-846 8081A
Heptachlor epoxide	SW-846 8081A
Lindane	SW-846 8081A
Methoxychlor	SW-846 8081A
Toxaphene	SW-846 8081A

Chlorinated Hydrocarbons

1,2,4-Trichlorobenzene	SW 846 8270C
2-Chloronaphthalene	SW-846 8270C
Hexachlorobenzene	SW-846 8270C
Hexachlorobutadiene	SW-846 8270C
Hexachlorocyclopentadiene	SW-846 8270C
Hexachloroethane	SW-846 8270C

Chlorophenoxy Acid Pesticides

2,4,5-T	SW846 8151-A
2,4,5-TP (Silvex)	SW846 8151-A
2,4-D	SW846 8151-A
Dicamba	SW846 8151-A

Haloethers

Bis (2-chloroisopropyl) ether	SW-846 8270C
Bis(2-chloroethoxy)methane	SW-846 8270C

Metals I

Barium, Total	SW-846 8010B

Seal No.: 16742

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DOH-3317 (3/97)



NEW YORK STATE DEPARTMENT OF HEALTH
WADSWORTH CENTER

Antonia G. Novello, M.D., M.P.H., Dr.P.H. Commissioner



Expires 12:01 AM April 01, 2003
Issued July 17, 2002

CERTIFICATE OF APPROVAL FOR LABORATORY SERVICE

Issued in accordance with and pursuant to section 502 Public Health Law of New York State

MR. JOHN KEUHN
FRIEND LABORATORY INC
ONE RESEARCH CIRCLE
WAVERLY NY 14892 USA

NY Lab Id No: 10252
EPA Lab Code: NY00033

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National Environmental Laboratory Accreditation Conference Standards for the category
ENVIRONMENTAL ANALYSES SOLID AND HAZARDOUS WASTE
All approved analytes are listed below:*

Metals I		Miscellaneous	
Barium, Total	SW-846 8020	Lead In Dust Wipes	APP. 14.2, HUD JUNE 1995
Cadmium, Total	SW-846 8010B	Sulfide (as S)	SW-846 8030B
	SW-846 8020		SW-846 8034
Chromium, Total	SW-846 8010B	Nitroaromatics and Isophorone	
	SW-846 8020	2,4-Dinitrotoluene	SW-846 8270C
Lead, Total	SW-846 8010B	2,6-Dinitrotoluene	SW-846 8270C
	SW-846 8020	Isophorone	SW-846 8270C
Nickel, Total	SW-846 8010B	Nitrobenzene	SW-846 8270C
	SW-846 8020	Phthalate Esters	
Silver, Total	SW-846 8010B	Benzyl butyl phthalate	SW-846 8270C
	SW-846 8020	Bis(2-ethylhexyl) phthalate	SW-846 8270C
Metals II		Diethyl phthalate	SW-846 8270C
Antimony, Total	SW-846 8010B	Dimethyl phthalate	SW-846 8270C
	SW-846 8020	Di-n-butyl phthalate	SW-846 8270C
Arsenic, Total	SW-846 8020	Di-n-octyl phthalate	SW-846 8270C
	SW-846 7080A	Polychlorinated Biphenyls	
Selenium, Total	SW-846 8010B	PCB-1016	SW-846 8082
	SW-846 8020	PCB-1221	SW-846 8082
Miscellaneous		PCB-1232	SW-846 8082
Asbestos in Friable Material	EPA 800/M4/82/020	PCB-1242	SW-846 8082
Cyanide, Total	SW-846 9012A	PCB-1246	SW-846 8082
Hydrogen Ion (pH)	SW-846 8040B	PCB-1254	SW-846 8082
	SW-846 9045C	PCB-1260	SW-846 8082

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DDH-3317 (3/87)



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WAVERLY NY 14892 USA

NY Lab Id No: 10262
EPA Lab Code: NY00033

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National Environmental Laboratory Accreditation Conference Standards for the category
ENVIRONMENTAL ANALYSES SOLID AND HAZARDOUS WASTE
All approved analytes are listed below:*

Polynuclear Aromatic Hydrocarbons

Acenaphthene	SW-846 8270C
Acenaphthylene	SW-846 8270C
Anthracene	SW-846 8270C
Benzo(a)anthracene	SW-846 8270C
Benzo(a)pyrene	SW-846 8270C
Benzo(b)fluoranthene	SW-846 8270C
Benzo(ghi)perylene	SW-846 8270C
Chrysene	SW-846 8270C
Dibenzo(a,h)anthracene	SW-846 8270C
Fluoranthene	SW-846 8270C
Fluorene	SW-846 8270C
Indeno(1,2,3-cd)pyrene	SW-846 8270C
Naphthalene	SW-846 8270C
Phenanthrene	SW-846 8270C
Pyrene	SW-846 8270C

Priority Pollutant Phenols

2,4,6-Trichlorophenol	SW-846 8270C
2,4-Dichlorophenol	SW-846 8270C
2,4-Dimethylphenol	SW-846 8270C
2,4-Dinitrophenol	SW-846 8270C
2-Chlorophenol	SW-846 8270C
2-Methyl-4,6-dinitrophenol	SW-846 8270C
4-Chloro-3-methylphenol	SW-846 8270C

Priority Pollutant Phenols

4-Nitrophenol	SW-846 8270C
Pentachlorophenol	SW-846 8270C
Phenol	SW-846 8270C

Purgeable Aromatics

1,2-Dichlorobenzene	SW-846 8021B
	SW-846 8260B
1,3-Dichlorobenzene	SW-846 8021B
	SW-846 8260B
1,4-Dichlorobenzene	SW-846 8021B
	SW-846 8260B

Purgeable Halocarbons

Bromomethane	SW-846 8021B
	SW-846 8260B
cis-1,3-Dichloropropene	SW-846 8021B
	SW-846 8260B
trans-1,3-Dichloropropene	SW-846 8021B
	SW-846 8260B

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DOH-3317 (3/97)



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WAVERLY NY 14892 USA

NY Lab Id No: 10252
EPA Lab Code: NY00033

is hereby APPROVED as an Environmental Laboratory for the category
ENVIRONMENTAL ANALYSES SOLID AND HAZARDOUS WASTE
All approved subcategories and/or analytes are listed below:

Metals II		Purgeable Halocarbons	
Chromium VI	SW-846 7195 SW-846 7195A	1,1,2,2-Tetrachloroethane	SW-846 8260B
Mercury, Total	SW-846 7470A	1,1,2-Trichloroethane	SW-846 8021B
Miscellaneous		1,1-Dichloroethane	SW-846 8021B
Lead in Paint	Method Not Specified	SW-846 8260B	SW-846 8260B
Priority Pollutant Phenols		1,1-Dichloroethane	SW-846 8021B
2-Nitrophenol	Method Not Specified	SW-846 8260B	SW-846 8260B
Purgeable Aromatics		1,2-Dichloroethane	SW-846 8021B
Benzene	SW-846 8021B SW-846 8260B	1,2-Dichloropropane	SW-846 8021B
Chlorobenzene	SW-846 8021B SW-846 8260B	2-Chloroethylvinyl ether	SW-846 8021B
Ethyl benzene	SW-846 8021B SW-846 8260B	Bromodichloromethane	SW-846 8021B
Toluene	SW-846 8021B SW-846 8260B	Bromoform	SW-846 8021B
Total Xylenes	SW-846 8021B SW-846 8260B	Carbon tetrachloride	SW-846 8021B
Purgeable Halocarbons		Chloroethane	SW-846 8021B
1,1,1-Trichloroethane	SW-846 8021B SW-846 8260B	Chloroform	SW-846 8021B
1,1,2,2-Tetrachloroethane	SW-846 8021B	Chloromethane	SW-846 8021B

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DOH-3317 (3/97)

NEW YORK STATE DEPARTMENT OF HEALTH
WADSWORTH CENTER

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WAVERLY NY 14892 USA

NY Lab Id No: 10252
EPA Lab Code: NY00033

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ENVIRONMENTAL ANALYSES SOLID AND HAZARDOUS WASTE
All approved subcategories and/or analytes are listed below:*

Purgeable Halocarbons

Chloromethane	SW-846 8260B
Dibromochloromethane	SW-846 8021B
	SW-846 8260B
Dichlorodifluoromethane	SW-846 8021B
	SW-846 8260B
Methylene chloride	SW-846 8021B
	SW-846 8260B
Tetrachloroethane	SW-846 8021B
	SW-846 8260B
Trichloroethane	SW-846 8260B
Trichlorofluoromethane	SW-846 8021B
	SW-846 8260B
Vinyl chloride	SW-846 8021B
	SW-846 8260B

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DOH-3517 (3/97)

NEW YORK STATE DEPARTMENT OF HEALTH
WADSWORTH CENTER

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ONE RESEARCH CIRCLE
WAVERLY NY 14892 USA

NY Lab Id No. 10252
EPA Lab Code: NY00033

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National Environmental Laboratory Accreditation Conference Standards for the category
ENVIRONMENTAL ANALYSES AIR AND EMISSIONS
All approved analytes are listed below:

Metals I		Purgeable Aromatics	
Lead, Total	EPA 239.1	Total Xylenes	40 CFR PART 60 1984 METH 18
Metals II		Purgeable Halocarbons	
Mercury, Total	EPA 245.1	1,1,2,2-Tetrachloroethane	40 CFR PART 60 1984 METH 18
Miscellaneous Air		1,1-Dichloroethane	40 CFR PART 60 1984 METH 18
Particulates	40 CFR PART 60 1985 APP. B	1,1-Dichloroethene	40 CFR PART 60 1984 METH 18
Polychlorinated Biphenyls		1,2-Dichloroethane	40 CFR PART 60 1984 METH 18
PCB-1016	NYS DOH 311-1	1,2-Dichloropropane	40 CFR PART 60 1984 METH 18
PCB-1221	NYS DOH 311-1	Carbon tetrachloride	40 CFR PART 60 1984 METH 18
PCB-1232	NYS DOH 311-1	Chloroform	40 CFR PART 60 1984 METH 18
PCB-1248	NYS DOH 311-1	Methylene chloride	40 CFR PART 60 1984 METH 18
PCB-1254	NYS DOH 311-1	Tetrachloroethene	40 CFR PART 60 1984 METH 18
PCB-1260	NYS DOH 311-1	Vinyl chloride	40 CFR PART 60 1984 APP. B METH 1
Polynuclear Aromatics			
Benzo(a)pyrene	40 CFR PART 60 1984 APP. B		
Naphthalene	40 CFR PART 60 1984 METH 18		
Purgeable Aromatics			
1,2-Dichlorobenzene	40 CFR PART 60 1984 METH 18		
1,4-Dichlorobenzene	40 CFR PART 60 1984 METH 18		
Benzene	40 CFR PART 60 1984 METH 18		
Chlorobenzene	40 CFR PART 60 1984 METH 18		
Ethyl benzene	40 CFR PART 60 1984 METH 18		
Toluene	40 CFR PART 60 1984 METH 18		

Serial No.: 16744

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DOH-3317 (3/97)



**NEW YORK STATE DEPARTMENT OF HEALTH
WADSWORTH CENTER**

Antonia C. Novello, M.D., M.P.H., Dr.P.H. Commissioner

**Expires 12:01 AM April 01, 2003
Issued July 17, 2002**



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ENVIRONMENTAL ANALYSES AIR AND EMISSIONS
All approved subcategories and/or analytes are listed below:*

Miscellaneous Air

Fibers

NIOSH 7400 A RULES

Polychlorinated Biphenyls

PCB-1242

Method Not Specified

Serial No.: 16745

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DOH-3317 (3/97)

**NEW YORK STATE DEPARTMENT OF HEALTH
WADSWORTH CENTER**
Antonia C. Novello, M.D., M.P.H., Dr.P.H. Commissioner



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Issued July 17, 2002
Revised October 07, 2002

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**NY Lab Id No: 10252
EPA Lab Code: NY00033**

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ENVIRONMENTAL ANALYSES ANALYTICAL SERVICES PROTOCOL
All approved subcategories and/or analytes are listed below:*

CLP Semi-Volatile Organics

CLP Volatile Organics

CLP Inorganics

Serial No.: 17456

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