# FINAL

# ANNUAL GROUNDWATER MONITORING REPORT – 2011

## MARSH RUN PARK
## NEW CUMBERLAND, FAIRVIEW TOWNSHIP,
## YORK COUNTY, PENNSYLVANIA
## FUDS No. C03PA040301

U.S. Army Corps of Engineers
Baltimore District

EA Engineering, Science,
and Technology, Inc.

**MAY 2012**

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# NEW CUMBERLAND, FAIRVIEW TOWNSHIP,
# YORK COUNTY, PENNSYLVANIA
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***Prepared for***

**U.S. Army Corps of Engineers, Baltimore District**
**Engineering Division-HTRW Branch**
**10 South Howard Street**
**10th Floor – CENAB-EN-HT**
**Baltimore, Maryland 21201**
**Contract W912DR-09-D-0018**
**Delivery Order 0003**

***Prepared by***

**EA Engineering, Science, and Technology, Inc.**
**15 Loveton Circle**
**Sparks, Maryland 21152**

**May 2012**

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REGISTERED PROFESSIONAL
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May 2012

62330.03

## QUALITY REVIEW STATEMENT

| | |
|---|---|
| **Contract No.:** | W912DR-09-D-0018 |
| **Task Order No.:** | 0003 |
| **EA Project No.:** | 6233003 |
| **Description of Report/Deliverable:** | Final Annual Groundwater Monitoring Report - 2011 |
| **EA Project Manager:** | Sandra Staigerwald |

In compliance with EA's Senior Technical Review Program, I hereby certify that I reviewed this final deliverable as the assigned Senior Technical Reviewer for this project. I consequently conclude that the information presented in this report/deliverable was prepared in accordance with the approved scope of services for the project and reflects a proper presentation of the data and/or the conclusions drawn and/or the analyses or design completed during the conduct of the work. This statement is based upon the standards identified in the contract and/or the standard of care existing at the time of the preparation.

Senior Technical Reviewer Signature:

22 February 2012

Frank T. Barranco, P.G. Date
Lead Senior Technical Reviewer

## INDEPENDENT TECHNICAL REVIEW STATEMENT

This document has been produced within the framework of EA's total quality management system. As such, an independent technical review has been conducted, appropriate to the level of risk and complexity inherent in the project. This included review of assumptions (methods, procedures, and material used in analyses); alternatives evaluated; the appropriateness of data used and level of data obtained; and reasonableness of the results, including whether the product meets the project objectives. Comments and concerns resulting from review of the document have been addressed and corrected as necessary.

Independent Technical Reviewer Signature:

23 February 2012

Barbara C. Roeper, P.E. Date
Independent Technical Reviewer

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## LIST OF ACRONYMS, ABBREVIATIONS, AND SYMBOLS

| | |
|---|---|
| ALSI | Analytical Laboratory Services, Inc. |
| amsl | Above Mean Sea Level |
| Ave. | Avenue |
| B | Blank Contamination (Data Qualifier) |
| bgs | Below Ground Surface |
| $^{o}$C | Degrees Celsius |
| cis-1,2-DCE | cis-1,2-dichloroethene |
| cm/sec | Centimeters per Second |
| COC | Constituent of Concern |
| DDSP | Defense Depot Susquehanna, Pennsylvania |
| DERP | Defense Environmental Restoration Program |
| DLA | Defense Logistics Agency |
| DQO | Data Quality Objective |
| DO | Dissolved Oxygen |
| DUP | Duplicate |
| EA | EA Engineering, Science, and Technology, Inc. |
| EDS | Environmental Data Services, Inc. |
| ESD | Explanation of Significant Differences |
| EW | Extraction Well |
| FD | Field Duplicate |
| FLUTe™ | Water Flexible Liner Underground Technologies |
| FSP | Field Sampling Plan |
| ft | Foot/Feet |
| FUDS | Formerly Used Defense Site |
| GHASP | General Health and Safety Plan |
| GPS | Global Positioning System |
| HTRW | Hazardous, Toxic, and Radioactive Waste |
| in. | Inch |
| J | Estimated Value, Between Method Detection Limit and Reporting Limit (Data Qualifier) |
| K | Estimated Value, Biased High (Data Qualifier) |
| L | Analyte present. Reported value may be biased low. Actual value is expected to be higher (Data Qualifier) |
| L-M | Low to Moderate Turbidity |
| MACW | Mifflin Avenue Cabin Well |

| | |
|---|---|
| MADW | Mifflin Avenue Deep Well |
| MARW | Mifflin Avenue Residential Well |
| MDL | Method Detection Limit |
| mg/kg | Milligrams per Kilogram |
| mg/L | Milligrams per Liter |
| M-H | Moderate to High Turbidity |
| MNA | Monitored Natural Attenuation |
| MS | Matrix Spike |
| MSD | Matrix Spike Duplicate |
| MSC | Medium Specific Concentration |
| mS/cm | MilliSiemens per centimeter |
| mV | Millivolt |
| MW | Monitoring Well |
| $\mu g/m^3$ | Micrograms per Cubic Meter |
| µg/kg | Micrograms per Kilogram |
| µg/L | Micrograms per Liter |
| | |
| NA | Not Applicable |
| NG | Not Gauged |
| NM | Not Measured |
| NS | Not Sampled |
| NTU | Nephelometric Turbidity Units |
| | |
| OP | Observation Point |
| ORP | Oxidation Reduction Potential |
| | |
| PA | Pennsylvania |
| PADEP | Pennsylvania Department of Environmental Protection |
| PAH | Polycyclic Aromatic Hydrocarbon |
| PCE | Tetrachloroethene |
| P.E. | Professional Engineer |
| P.G. | Professional Geologist |
| psi | Pounds per Square Inch |
| | |
| QAPP | Quality Assurance Project Plan |
| QA/QC | Quality Assurance/Quality Control |
| | |
| R | Unreliable Results (Data Qualifier) |
| RAO | Remedial Action Objective |
| RB | Rinsate Blank |
| Rd. | Road |
| RDC | Residential Direct Contact |
| RI/FS | Remedial Investigation/Feasibility Study |
| RL | Reporting Limit |
| ROD | Record of Decision |
| RPD | Relative Percent Difference |
| RSL | Regional Screening Level |

## LIST OF ACRONYMS, ABBREVIATIONS, AND SYMBOLS, continued

| | |
|---|---|
| SAP | Sampling and Analysis Plan |
| SB | Soil Boring |
| SHS | Statewide Health Standard |
| SIM | Selective Ion Monitoring |
| SM | Standard Methods |
| SOP | Standard Operating Procedure |
| SS | Surface Soil |
| SU | Standard Units |
| SVE | Soil Vapor Extraction |
| SVOC | Semivolatile Organic Compound |
| SW | Solid Waste |
| TAL | Target Analyte List |
| TB | Trip Blank |
| TCE | Trichloroethene |
| TOC | Top of Casing |
| TP | Test Pit |
| trans-1,2-DCE | trans-1,2-dichloroethene |
| U | Not Detected (Data Qualifier) |
| UJ | Not Detected. Quantitation limit may be inaccurate or imprecise (Data Qualifier) |
| UL | Not Detected. Quantitation limit is probably higher (Data Qualifier) |
| US | United States |
| USACE | United States Army Corps of Engineers |
| U.S. EPA | United States Environmental Protection Agency |
| USGS | United States Geological Survey |
| VOC | Volatile Organic Compound |
| vs. | Versus |
| WCC | Woodward-Clyde Consultants |
| WP | Well Point |

# 1. INTRODUCTION

The U.S. Army Corps of Engineers (USACE) – Baltimore District contracted EA Engineering, Science, and Technology, Inc. (EA) to perform groundwater monitoring at the Marsh Run Park Formerly Used Defense Site (FUDS) in Fairview Township, York County, Pennsylvania, in support of an ongoing monitoring program. In addition, during this 2011 sampling event, surface water, wetland soil (sediment), and soil sampling were performed to confirm historical soil sampling results and further delineate reported constituents to provide additional data in support of obtaining relief of liability under Pennsylvania Department of Environmental Protection (PADEP) Act 2 program, as detailed in Section 2. The work is being performed under contract W912DR-09-D-0018, Delivery Order 03.

This annual groundwater monitoring report summarizes the groundwater, soil, wetland soil (sediment), and surface water results of the 31 May through 02 June and 09 December 2011 sampling events. Work was conducted in accordance with the 2011 Final Sampling and Analysis Plan (SAP) (EA 2011a) which includes the 2011 Final Field Sampling Plan (FSP) and Quality Assurance Project Plan (QAPP) and the site-specific addendum to the 2011 General Health and Safety Plan (GHASP) (EA 2011b). Additionally, the 07 December 2011 Addendum to the Final 2011 SAP detailed the activities conducted during the 09 December sampling event (EA 2011d). Deviations from the planning documents, including those stemming from subsequent discussions with USACE, are noted in Section 3.0. The following sections discuss the background of the project and the purpose and scope of site activities. They also summarize current and historical analytical results and trends, and provide conclusions.

## 1.1 SITE LOCATION

The Marsh Run Park site consists of approximately 14 acres of land located in New Cumberland, Fairview Township, York County, Pennsylvania (Figure 1-1), and is bounded to the south and southwest by Mifflin Avenue and to the north by Norfolk-Southern railroad right-of-way and the Susquehanna River. The Defense Depot Susquehanna, Pennsylvania (DDSP), utilized by the Defense Logistics Agency (DLA), is located adjacent to and west of Mifflin Avenue. Marsh Run Creek traverses the southern portion of the site and flows west to east through a wetland area to the east of the site, and ultimately discharges to the Susquehanna River northeast of the site. Site geology and hydrogeology information were included in the Final EA 2010 Annual Groundwater Monitoring Report (EA 2011c).

## 1.2 SITE HISTORY

The Marsh Run Park property was previously owned by New Cumberland Army Depot. A portion of the property was used as a landfill for the disposal of base-derived waste material starting in approximately 1917 and continuing until the late 1950's. The property was transferred to Fairview Township (the Township) in April 1976. The Township covered the cleared area of the site with offsite topsoil and graded it for use as a recreational field.

In August 1986, the Marsh Run Park site was identified as eligible for the Defense Environmental Restoration Program (DERP) for FUDS. As such, USACE performed a Confirmation Study in 1987 to evaluate subsurface soil, groundwater, surface water, and sediment. Preliminary results from the 1987 investigation indicated potential soil and groundwater contamination and prompted Fairview Township to close the park in 1987. Additional surface soil sampling was performed by USACE and United States Environmental Protection Agency (U.S. EPA) in May and June 1988, respectively. The results of these three investigations prompted the Army to recommend that a follow-up study be conducted to determine the extent of the volatile organic compounds (VOC) and metals in groundwater.

A remedial investigation/feasibility study (RI/FS) was conducted between 1988 and 1990 (EA 1990). The RI/FS concluded that VOCs were present in the source area and groundwater at the site (Section 1.2.2). A record of decision (ROD) signed July 1992 stipulated that the preferred remedial action was groundwater treatment combined with source area soil vapor extraction (SVE). An Explanation of Significant Differences (ESD) to the ROD, signed in 1999, stipulated that monitored natural attenuation (MNA) would address VOCs in the bedrock aquifer, and the remedy in the source area would continue to be soil vapor and groundwater extraction.

The source area remediation was completed in October 2004, and USACE entered the site into the PADEP Act 2 program prior to returning use of the property back to Fairview Township. As part of the Act 2 process, environmental covenants will be placed on the property to restrict property use and limit exposure to subsurface soil and groundwater. The intended future use of the property is recreational soccer fields, which is allowable within the proposed use restrictions. The Act 2 documentation will be prepared under separate cover, but data acquired through the sampling events described in this report will be utilized therein.

### 1.2.1 Summary of Historical Soil Sampling Results and Data Gaps

During the 1987 Confirmation Study, subsurface soil samples were collected from test pits installed to characterize the nature and extent of fill material. These results indicated metals and polycyclic aromatic hydrocarbons (PAHs) in exceedance of the PADEP Residential Direct Contact (RDC) Medium Specific Concentration (MSC). As a follow up to the 1987 Confirmation Study, eight surface soil samples were collected by USACE and 15 surface soil samples were collected by the U.S. EPA in May and June 1988, respectively. It is unknown as to whether the 1988 surface soil samples represented the cover material, the underlying native soil, or both. Additional surface and subsurface soils samples were collected during well installation in support of the remedial investigation (RI) (EA 1990). Samples collected during the 1988 and RI evaluations also exhibited concentrations of metals and PAHs exceeding the PADEP RDC MSC.

Soil sampling results were assessed in the RI, but soil was not identified as a media of concern. Although the soil data collected during the RI and earlier sampling events are valid, usable data, toxicity values and associated human health screening criteria have been updated since the RI, resulting in the need for re-evaluation of the reported soil results to support the Act 2 process. As documented in the SAP (EA 2011a) and as presented in Figure 1-2, arsenic, thallium, lead, and PAHs were reported in soil at concentrations that exceed the current PADEP RDC MSC; these areas required additional delineation. Furthermore, PADEP recommended that, because of the age of the soil data (collected prior to 1990), collection of more recent data to confirm the prior results be performed prior to seeking relief of liability.

### 1.2.2 Summary of Historical Groundwater Sampling Results, Treatment, and Monitoring

Groundwater at the site is impacted by chlorinated solvents, most notably trichloroethene (TCE). The suspected source area is the northern portion of the onsite landfill. TCE, cis-1,2-dichloroethene (1,2-DCE), trans-1,2-dichloroethene (trans-1,2-DCE), tetrachloroethene (PCE), and vinyl chloride were reported in groundwater samples collected from bedrock monitoring wells (MW) (particularly MW-1, MW-4, and MW-8), whereas the shallow aquifer (overburden) wells were impacted by TCE, 1,2-DCE, and other daughter products of TCE.

Per the 1991 ROD, a groundwater treatment system operated at the site from 1995 until November 1996 when it was destroyed by fire. As documented in the 1999 ESD, MNA was selected as the new remedy for groundwater in the bedrock aquifer. The ESD also stated that a soil vapor extraction system (water table drawdown and soil vapor recovery) would be more effective in treating the overburden source than the original system. The new SVE system, installed in April 2002, was shut down in October 2004, when it was determined that additional

VOC removal was no longer efficient, as the majority of VOC mass was removed near the beginning of operation. Thereafter, groundwater was monitored quarterly for 2 years and periodically thereafter. Groundwater samples were collected and analyzed for ROD-stipulated VOCs[1] during each monitoring event, and periodically for metals and natural attenuation parameters.

In 2003, USACE identified a well on Mifflin Avenue that supported a summer cabin and a cistern (a hand-dug well) located on an adjacent property with no residence northeast of the site along the Susquehanna River, both of which had not been previously sampled. The Mifflin Avenue Cabin Well[2] (MACW) and the cistern were sampled in 2003. The sample from the cistern had no detectable levels of VOCs; the MACW groundwater sample contained measurable concentrations of TCE and, therefore, was added to the quarterly monitoring program.
In March 2005, USACE installed five bedrock monitoring wells along the Susquehanna River (MW-10 through MW-14, Figure 1-1) to assess potential VOC offsite migration. Since concentrations in MW-11, MW-12, and MW-13 decreased since 2005, and only groundwater results from MW-12 exceeded the PADEP MSC after 2005, MW-10, MW-11, and MW-13 were removed from the monitoring program.

In Spring 2010, two deep bedrock monitoring wells, the Mifflin Avenue Deep Well (MADW) and MW-15 (screened from 160 to 170 foot [ft] bgs), were installed to delineate the vertical extent of TCE in groundwater. MADW was installed with a Water Flexible Liner Underground Technologies (FLUTe™) liner with a multiport sampling system, which isolates specific bedrock fracture intervals at 41 to 52 ft bgs, 121 to 132 ft bgs, 170 to 181 ft bgs, and 184 to 195 ft bgs. MADW and MW-15 were added to the monitoring program in 2010. All wells currently included in the monitoring program are presented in Section 2.1. The purpose, methodology, and results of sampling for wells currently in the monitoring program are discussed in Sections 2.1, 3.3 and 4.3, respectively.

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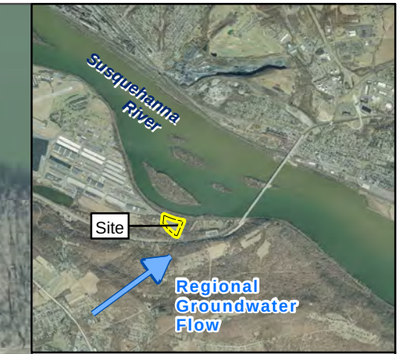
[1] The ROD-stipulated VOCs are trichloroethene (TCE), PCE, cis-1,2-DCE, trans-1,2-DCE, and vinyl chloride.

[2] The MACW may have also been referred to as the Mifflin Avenue Residential Well in prior groundwater monitoring reports.




**Legend**

- Groundwater Well/ Well Point
- Formerly Used Defense Site (FUDS) Boundary
- Stream

MW = Monitoring Well
EW = Extraction Well
WP/OP = Well Point

Aerial Photograph Source:
PAMAP Program, PA Department of Conservation and Natural Resources, Bureau of Topographic and Geologic Survey, 2008

# Marsh Run Park FUDS

**Fairview Township, New Cumberland, Pennsylvania**
**FUDS Project No. C03PA040301**

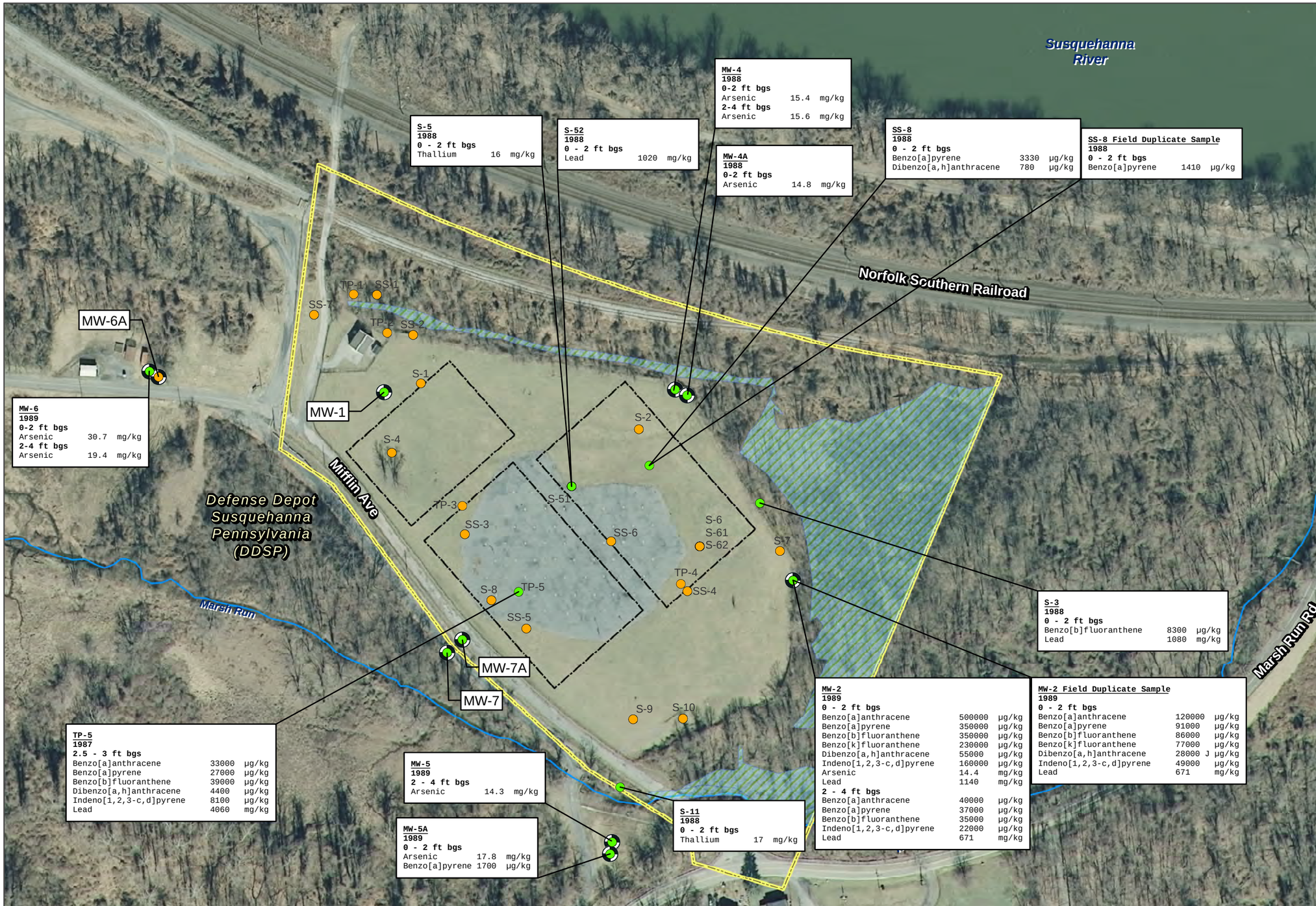
Project Number: 6233003

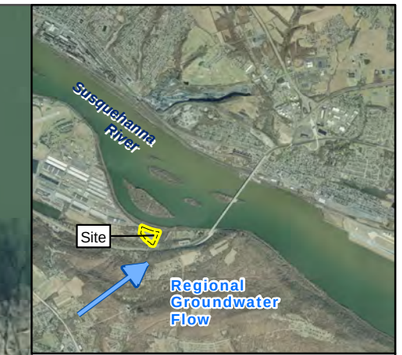
Date: May 2012

0 100 200
Feet
1 inch = 200 feet

Figure 1-1
Site Location Map

\\LOVETONFEDERAL\GISData\Northeast\Pennsylvania\MarshRun\Mxd\RevisionsSAR\SiteLocationMap.mxd




## Legend

- Historical Soil Sample Location, No Exceedance of PADEP MSC
- Historical Soil Sample Location, At Least One Constituent in Either Surface or Subsurface Exceeds PADEP MSC
- Groundwater Wells
- Formerly Used Defense Site (FUDS) Boundary
- Proposed Soccer Fields
- Wetlands Within FUDS Boundary
- Stream

MW = Monitoring Well (surface and subsurface soil)
S or SS = Surface Soil Sample
TP = Test Pit (subsurface soil)
J = Estimated value
µg/kg = micrograms per kilogram
mg/kg = milligrams per kilogram
ft bgs = feet below ground surface
PADEP = Pennsylvania Department of Environmental Protection

Notes:
1. Surface and subsurface soil sample locations approximate, georeferenced data not available.
2. Results shown exceed the 2011 PADEP Residential Direct Contact Medium Specific Concentration.
3. Historical data labels show results exceeding criteria for PAHs, arsenic, lead, and thallium from 0-4 foot. These constitutents may also exceed criteria at other sample depths. Other constituents may also exceed criteria.

Aerial Photograph Source:
PAMAP Program, PA Department of Conservation and Natural Resources, Bureau of Topographic and Geologic Survey, 2008

# Marsh Run Park FUDS

**Fairview Township, New Cumberland, Pennsylvania**
**FUDS Project No. C03PA040301**

Project Number: 6233003
Date: May 2012

0 100 200
Feet
1 inch = 150 feet

Figure 1-2
Historical Soil Samples (0-4 ft bgs) Exceeding PADEP Medium Specific Concentrations for Residential Direct Contact

\\LOVETONFEDERAL\GIS\Data\Northeast\Pennsylvania\MarshRun\Mxd\RevisionsSAR\HistoricalSampleResults_v2.mxd

# 2. PURPOSE AND SCOPE

The scope of the 2011 sampling included groundwater, surface water, wetland soil (sediment), and soil sample collection and analysis as detailed in the EA May 2011 Final SAP (EA 2011a) and the December 2011 SAP addendum (EA 2011d). The rationale for sampling of specific groundwater, soil, and surface water locations is presented in the SAPs, and locations are summarized in Section 4.

## 2.1 GROUNDWATER

The overall objective of the May/June 2011 (spring) groundwater sampling event was to continue monitoring the constituents of concern (COCs) as presented in the ROD and to collect data to assist in obtaining a relief of liability through the PADEP Act 2 program.

The reported concentrations of the COCs listed in the ROD in overburden and bedrock aquifer groundwater samples were compared to PADEP MSCs to assess whether constituent concentrations are stable, decreasing, or increasing. Additional constituents of potential concern, polycyclic aromatic hydrocarbon (PAHs), were identified in soil during the first Five Year Review (currently in progress). Groundwater samples collected from wells located in the vicinity of these soils (at MW-2A and MADW [41-52 ft]) were submitted for laboratory analysis of PAHs. Additionally, cyanide is included in the ROD for the site; therefore, groundwater samples for free cyanide analyses were collected during the 2011 sampling event at selected monitoring wells and the MACW.

Not all monitoring wells were included in the 2011 monitoring program; only wells with reported concentrations of COCs that previously exceeded or nearly exceeded the PADEP MSCs were included. In addition, as this site continues in the PADEP Act 2 process and environmental covenants are approved, it is expected that the groundwater monitoring program will be discontinued for the majority of the wells. Prior to discontinuation of groundwater monitoring, USACE collected this last round of data from wells located in or near the fill area, as well as near the MACW. Wells included in the groundwater monitoring program for the Spring 2011 monitoring event were: MW-1, MW-1A, MW-2, MW-2A, MW-3A, MW-4, MW-4A, MW-8, MW-8A, MW-9, MW-9A, MW-12, MW-14, MW-15, MACW, and each interval of the MADW.

## 2.2 SOIL

PADEP recommended the collection of recent soil data to supplement and confirm historical site data. Additionally, soil samples were collected to address the data gaps identified in Section 1.2.1; specifically, additional delineation of PAHs and metals reported in soil in concentrations

exceeding the PADEP RDC MSC. The Spring 2011 sampling event was the first sampling event to include soils, surface water and wetland soils (sediment) since the RI/FS (EA 1990). The data will be used in the PADEP Act 2 process in conjunction with the valid, usable soil data collected during previous events from 1987 through 1990. The rationale for each soil sample and its corresponding historical sampling location was presented in the EA May 2011 Final SAP (EA 2011a) and the EA December 2011 SAP addendum (EA 2011d) and is presented in tabular format in Section 4.4.1 and Section 4.4.2 of this report. The intent of the soil sampling effort was two-fold:

1. Confirm historically reported concentrations in soil that exceed the PADEP RDC MSCs; and
2. Delineate the extent of constituents in areas with prior exceedances to less than PADEP RDC MSCs on a site-wide basis to establish a boundary to support an Act 2 relief of liability.

Wetland soils (sediment) sampling was performed in December 2011 to delineate elevated concentrations of COCs that were identified in surface soil near the east edge of the fill at the western boundary of the wetlands during the Spring 2011 soil sampling event.

## 2.3 SURFACE WATER

Two surface water samples were collected in December 2011 to document current surface water conditions and to be used in conjunction with valid, usable surface water data from previous events as part of the PADEP Act 2 process.

# 3. FIELD ACTIVITIES AND METHODOLOGY

During the 31 May and 01–02 and 06–07 June 2011 sampling event, 19 groundwater (plus three field duplicates) and 17 soil (plus two field duplicates) samples were collected. During the 09 December sampling event, two surface water (plus one field duplicate) and five wetland soil (sediment) (plus one field duplicate) samples were collected. Sample locations are illustrated on Figure 3-1 and were collected as proposed in the SAP (EA 2011a) and addendum to the SAP (EA 2011d) and as summarized in Section 4. Copies of the equipment calibration logs and well purging and sampling record forms are provided in Appendix A.

Field activities were performed in accordance with the procedures outlined in the SAP (EA 2011a) and addendum to the SAP (EA 2011d) with the exception of the following deviations:

- The field duplicate (FD) sample type code included in the QAPP was “FD”; however, the code used during the sampling event was “DUP” (duplicate).
- The trip blank (TB) sample type code included in the QAPP was “TB”; however, the code used during the sampling event was “Trip Blank”.
- The global positioning system (GPS) equipment could not be utilized to establish some locations within the wooded area (locations SB-4 and SB-11). The locations were established by measuring from nearby features (e.g., monitoring wells).
- A dedicated bladder pump either did not exist or malfunctioned in the following wells: MW-1, MW-2A, MW-4, MW-4A, and MW-15. Therefore, a 2-inch (in.) submersible pump was used to purge and sample these wells.
- To reduce the possibility of cross contamination across separate intervals, subsurface soil samples were collected using a soil corer and slide hammer rather than a hand auger.
- Locations for wetland soil (sediment) and surface water samples collected on 09 December 2011 were different from those depicted on the Proposed Wetland Sampling Locations figure in the December 2011 addendum to the May 2011 SAP. This change was the result of discussions with the USACE Project Geologist (08 December 2011 email). Initial sample locations were moved approximately 25 ft east from the toe of the fill and subsequent locations were placed another 25 ft beyond the initial sample locations. Figure 3-1 depicts locations of Spring 2011 and December 2011 sample locations.

## 3.1 GROUNDWATER ELEVATION MEASUREMENTS

On 31 May 2011, prior to initiating groundwater sampling, data for depth to groundwater was measured at each monitoring well in the overburden and upper bedrock aquifers to calculate groundwater elevation and thereby interpret groundwater flow at the site. Depth to water from the surveyed measuring point on the top of each monitoring well casing was measured to the nearest 0.01 ft using an electronic water-level indicator in accordance with the SAP (EA 2011a). The deep bedrock wells, MW-15, MACW, and the MADW, were not included for gauging as these wells potentially reflect a different (deeper) potentiometric surface. Historically, the extraction wells were not included for gauging groundwater elevation; similarly, they were not included during the 31 May 2011 event.

## 3.2 MIFFLIN AVENUE CABIN WELL SAMPLING AND ANALYSES

A groundwater sample was collected from the MACW on 31 May 2011. Following procedures outlined in the SAP and as performed in 2010, the well was purged for 15 minutes prior to sample collection to ensure that a representative sample of water was drawn directly from the aquifer. Purging and sampling was performed from a spigot located at the pressure tank in the basement of the cabin. During purging, field analyses of water quality parameters (temperature, oxidation reduction potential (ORP), turbidity, specific conductance, dissolved oxygen (DO), and pH) were monitored (Appendix B).

The MACW sample was submitted to Analytical Laboratory Services, Inc. (ALSI) of Middletown, Pennsylvania, for analysis of ROD-stipulated VOCs by U.S. EPA Method SW846 8260B, total and dissolved metals by U.S. EPA Method SW846 6020A, and free cyanide by Standard Methods (SM) 20-4500I.

## 3.3 MONITORING WELL SAMPLING AND ANALYSES

Groundwater samples were collected from the following monitoring wells: MW-1, MW-1A, MW-2, MW-2A, MW-3A, MW-4, MW-4A, MW-8, MW-8A, MW-9, MW-9A, MW-12, MW-14, MW-15, and the MADW (Figure 3-1). One sample was collected from each of the wells, with the exception of MADW, where one sample from each of four separate fracture intervals—41 to 52 ft bgs; 121 to 132 ft bgs; 170 to 181 ft bgs; and 184 to 195 ft bgs—was collected via the FLUTe™ water system. Groundwater was collected and analyzed in accordance with the 2011 Final Field Sampling Plan (FSP), which was approved as Volume I of the 2011 SAP (EA 2011a) and as shown below on Table 3-1.

Groundwater samples were collected from conventional monitoring wells according to low-flow purging and sampling protocols with either a dedicated bladder pump (preferred method) or a Grundfos® pump and low-flow controller. For wells without dedicated bladder pumps, the submersible pump was used to purge and sample wells. Wells sampled using a submersible pump included MW-1, MW-1, MW-2A, MW-4, MW-4A, and MW-15. Field documentation of purging and sampling is presented in Appendix A. During purging, field analyses of water quality parameters (temperature, ORP, turbidity, specific conductance, DO, and pH) were monitored (Appendix B).

The MADW FLUTe™ well was sampled according to the manufacturer's standard operating procedure (SOP), which was presented in the SAP. Each port was purged four times, allowing for recharge between purges. Water quality parameters (temperature, ORP, turbidity, specific conductance, DO, and pH) were collected prior to sample collection. Field documentation of purging and sampling is presented in Appendix A.

Samples were submitted to ALSI for analysis of some or all (depending on which monitoring well) of the following (per the SAP): ROD-stipulated VOCs via U.S. EPA Method SW846 8260B, total and/or dissolved metals by U.S. EPA Method SW846 6020A, PAHs via U.S. EPA Method SW846 8270D, and free cyanide by SM20-4500I. Samples for analysis of free cyanide in groundwater were not collected during prior groundwater monitoring events. However, as cyanide is included in the ROD for the site, groundwater samples for free cyanide analyses were collected during the 2011 sampling event from MADW (41-52 ft) and MACW. Groundwater laboratory analytical results are tabulated in Table 4-2. Laboratory analytical reports are presented in Appendix D.

## 3.4 SOIL SAMPLING AND ANALYSIS

A total of 12 discrete confirmatory soil samples and seven discrete delineation soil samples were collected in accordance with the SAP (Figure 3-1) (EA 2011a). Nine of the eleven proposed soil sampling locations were positioned in accordance with established coordinates using a GPS (+/- 3 ft accuracy). Two locations, SB-4 and SB-11, could not be placed using a GPS. These locations were established by measuring from known locations (e.g., MW-2 and the perimeter fence). Surface soil samples were collected in accordance with the EA 2011 SAP (EA 2011a). Subsurface soil samples were collected using a clean decontaminated soil corer. The soil corer was advanced to the target depth using a slide hammer. The aliquot for VOC analysis was collected first using a syringe, then preserved with sodium bisulphate, in accordance with preparatory method U.S. EPA 5035. Remaining soil from the targeted sampling interval was homogenized in a stainless steel bowl using a decontaminated stainless steel trowel. Aliquots for

PAHs and metals were collected from the homogenized soil and placed into appropriate sample jars.

Soil samples were submitted to ALSI for analysis of metals via U.S. EPA Methods SW846 6010B/7471B, VOCs via U.S. EPA Method SW846 8260B (including preparatory method 5035), and PAHs via U.S. EPA Method SW846 8270D. The analyte list for metals in soils was location-specific as specified in the SAP (EA 2011a). Additionally, the requested analyses at each location are presented within Tables 4-4 and 4-6.

Additionally, five discrete wetland soil (sediment) samples were collected in accordance with the December 2011 SAP Addendum. The analyte list for metals in wetland soils (sediment) was location-specific as specified in the SAP Addendum. Samples were submitted to ALSI for analysis via U.S. EPA Method SW846 6010B for lead and thallium and PAHs via U.S. EPA Method SW846 8270D.

## 3.5 SURFACE WATER SAMPLING AND ANALYSIS

Two discrete surface water samples were collected at two locations with standing surface water sufficient for sample collection and close to the edge of the fill. Surface water samples were collected before wetland soil (sediment) sample collection so that no sediment was disturbed and entrained into the surface water samples. Sampling was conducted using laboratory cleaned dedicated glass jars for unfiltered samples. Care was taken to avoid aeration of the sample. The field duplicate sample was collected by placing equal aliquots into the parent and duplicate sample jars.

Samples were submitted to ALSI for analysis of SVOCs via U.S. EPA Method 8270D/8270SIM and total target analyte list (TAL) metals by U.S. EPA Method SW846 6020A as specified in the addendum to the SAP (EA 2011d).

## 3.6 SAMPLE HANDLING AND DOCUMENTATION

ALSI supplied pre-cleaned sample containers with the proper type and amount of preservative compatible with the analyses performed. Samples for chemical analysis were packed in insulated coolers and kept at a temperature of approximately 4 degrees Celsius (°C) with ice. Samples were delivered to the analytical laboratory within 24 hours of sample collection to ensure that holding times were not exceeded. The completed chain-of-custody forms were released to and signed by the laboratory sample custodian. Sample documentation protocols, which are described in the SAP (EA 2011a), consisted of sample labels and chain-of-custody forms.

## 3.7 SAMPLE QUALITY ASSURANCE AND QUALITY CONTROL

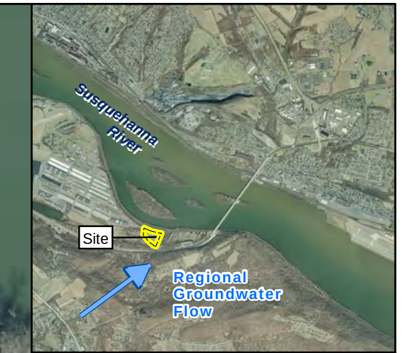
The following Quality Assurance/Quality Control (QA/QC) samples were collected during the Spring 2011 sampling event in accordance with the frequency indicated in the SAP (EA 2011a):

- Three field duplicates of groundwater samples were collected: DUP-1 (a duplicate of MW-8A) was submitted for analysis of ROD-stipulated VOCs and metals; DUP-2 (a duplicate of MW-2A) was submitted for analysis of PAHs and cyanide; DUP-3 (a duplicate of MW-4) was submitted for analysis of ROD-stipulated VOCs.
- Two matrix spike and matrix spike duplicates were collected for groundwater and submitted for ROD-stipulated VOC analysis (MW-14) and for metals, free cyanide, and PAHs (MW-2A).
- Two field duplicates of soil samples were collected: SB-DUP-1 (a duplicate of SB-2-0-0.5) was submitted for analysis of ROD-stipulated VOCs and metals; and SB-DUP-2 (a duplicate of SB-3-0-0.5) was submitted for analysis of PAHs.
- Two matrix spike and matrix spike duplicates were collected for soil and submitted for ROD-stipulated VOC and metals (SB-2-0-0.5) and PAHs (SB-3-2-4).
- Three rinsate blanks (RB-1, RB-2, and RB-3) were collected to address the effectiveness of the decontamination of the submersible pump and soil sampling equipment. RB-1 was associated with the Grundfos® pump used for groundwater sample collection from MW-15. RB-2 was associated with the Grundfos® pump used for groundwater sample collection from MW-1, MW-2A, MW-4, and MW-4A. RB-3 is associated with soil sampling equipment.
- One trip blank sample accompanied each shipping container transporting site samples collected for ROD-stipulated VOC analysis on each of three days of sample collection (31 May, 01 June and 02 June 2011). The trip blanks were prepared by the laboratory and were analyzed only for ROD-stipulated VOCs.

The following QA/QC samples were collected during the December 2011 sampling event in accordance with the December 2011 SAP Addendum (EA 2011d):

- One wetland soil (sediment) field duplicate.
- One surface water field duplicate.
- One site specific matrix spike (MS), matrix spike duplicate (MSD) on a wetland soil (sediment) sample.

- One wetland soil (sediment) (at SD-8) and one surface water sample (at SW-8) were split and the split samples were submitted to Microbac Laboratories, Inc. as QA samples for semivolatile organic (SVOC) and TAL metals analysis.
- No site specific MS, MSD, or rinsate blank samples were required for the surface water or wetland soil (sediment) samples.




## Legend

- Wetland Soil (Sediment) Sample Location
- Wetland Surface Water Sample Location
- Groundwater Well (Sampled in Spring 2011)
- Residential Well (Sampled in Spring 2011)
- Groundwater Well (Not Sampled in Spring 2011)
- Delineation Soil Sample Location
- Confirmatory Soil Sample Location
- Formerly Used Defense Site (FUDS) Boundary
- Proposed Soccer Fields
- Wetlands Within FUDS Boundary
- Stream

MW = Monitoring Well

Aerial Photograph Source:
PAMAP Program, PA Department of Conservation and Natural Resources, Bureau of Topographic and Geologic Survey, 2008

# Marsh Run Park FUDS

**Fairview Township, New Cumberland, Pennsylvania**
**FUDS Project No. C03PA040301**

Project Number: 6233003

Date: May 2012

0 100 200
Feet
1 inch = 200 feet

Figure 3-1
Groundwater, Soil, and Surface Water Sampling Locations, 2011 Sample Events

Path: \\LOVETON\FEDERAL\GISData\Northeast\Pennsylvania\MarshRun\Mxd\RevisionsSAR\GW_Soil.mxd

## TABLE 3-1 SUMMARY OF GROUNDWATER ANALYTICAL PROGRAM

| Well | Aquifer | Location | Laboratory Anaylsis | | |
|---|---|---|---|---|---|
| | | | Inorganics (metals and free cyanide)[a] | PAHs | ROD VOCs |
| MW-1 | Upper Bedrock | Onsite | X | | X |
| MW-1A | Overburden | Onsite | X | | X |
| MW-2 | Upper Bedrock | Onsite | X | | X |
| MW-2A | Overburden | Onsite | X | X | X |
| MW-3A | Overburden | Onsite | X | | X |
| MW-4 | Upper Bedrock | Onsite | X | | X |
| MW-4A | Overburden | Onsite | X | | X |
| MW-8 | Upper Bedrock | Onsite | X | | X |
| MW-8A | Overburden | Onsite | | | X |
| MW-9 | Upper Bedrock | Onsite | X | | X |
| MW-9A | Overburden | Onsite | X | | X |
| MW-12 | Upper Bedrock | Offsite Downgradient | | | X |
| MW-14 | Upper Bedrock | Offsite Downgradient | | | X |
| MW-15 | Deep Bedrock | Onsite | X | | X |
| Mifflin Avenue Deep Well | Deep Bedrock | Offsite | X* | X | X |
| Mifflin Avenue Deep Well | Deep Bedrock | Offsite | | | X |
| Mifflin Avenue Deep Well | Deep Bedrock | Offsite | | | X |
| Mifflin Avenue Deep Well | Deep Bedrock | Offsite | | | X |
| Mifflin Avenue Cabin Well | Deep Bedrock | Offiste Downgradient | X* | | X |

Blank cell = Analyses not performed.
VOCs - Volatile Organic Compounds via EPA Method SW 846 8260B (targeted VOCs are based on the Record of Decision [ROD] and are limited to TCE, PCE, trans and cis 1,2 DCE, and vinyl chloride)
N/A - not applicable
[a] Dissolved inorganics (metals and free cyanide) only unless otherwise noted by "*". An "X" indicates that metals and free cyanide analysis was performed. Target analyte list for metals in groundwater include arsenic, barium, beryllium, cadmium, chromium, copper, iron, lead, manganese, and mercury. Samples were analyzed for free cyanide.
*Mifflin Avenue Deep Well, 41-52 ft interval, and Mifflin Avenue Cabin Well will also require analysis of the total metals aliquot
PAHs - Polyaromatic Hydrocarbons
ORP - Oxidation Reduction Potential
DO - Dissolved Oxygen
MW - Monitoring Well

# 4. FIELD AND ANALYTICAL DATA RESULTS

Data collected during the 31 May 2011 monitoring well gauging and the 31 May, 01–02 June and 06–07 June 2011 sampling events are detailed on Table 4-1. The results of groundwater, surface water, and soil laboratory analysis, as well as a discussion and interpretation of the groundwater elevation data, are summarized herein.

For reference, the ROD-stipulated Remedial Action Objectives (RAOs), which also correspond to current PADEP groundwater MSCs, and these include:

- TCE – 5 micrograms per liter (µg/L)
- PCE – 5 µg/L
- cis-1,2-DCE – 70 µg/L
- trans-1,2-DCE – 100 µg/L
- Vinyl chloride – 2 µg/L

PADEP groundwater MSCs and PADEP RDC MSCs for soil are included for reference in the data tables presented in the sections below.

## 4.1 GROUNDWATER ELEVATION RESULTS

Groundwater elevation data were collected from monitoring wells on 31 May 2011 during the Spring 2011 sampling event (Table 4-1). The groundwater potentiometric surface for overburden wells is illustrated in Figure 4-1 and for upper bedrock wells in Figure 4-2.

It appeared from the 31 May 2011 groundwater elevation data that there is a low area in the center of the site that acted as a groundwater trough. Groundwater flow beyond the trough was to the southwest and east. Groundwater flowed to the north from the area of Marsh Run Creek toward the center of the site. Relatively high groundwater elevations to the north and lower elevations to the west indicated that flow from the central part of the site was toward the west. Note, however, that flow interpretations did not include data from well MW-4A, which is believed to be screened within both the overburden and upper bedrock zones, resulting in an anomalous water level. Additionally, groundwater flow directions in the overburden aquifer (Figure 4-1) are difficult to discern, because there are no monitoring points in the center of the site.

In the upper bedrock aquifer, the apparent groundwater flow direction in May 2011 was toward the north and northeast. This flow direction appeared similar to November 2010 (EA 2011c), but the overall water levels were higher on 31 May 2011 than during November 2010.

## 4.2 MIFFLIN AVENUE CABIN WELL SAMPLING RESULTS

ROD-stipulated VOC, metals and cyanide results are summarized in Table 4-2. Laboratory summary reports are included as Appendix D. Groundwater sample results for the MACW were compared against the ROD-stipulated RAOs and PADEP Residential MSCs (Total Dissolved Solids ≤ 2,500 for Used Aquifers). Reported VOC and metals analytical results were generally consistent with the previous sampling events. Historical VOC and metals sampling results are provided in Appendix C for reference. The reported TCE concentration (most recently reported as 20.4 µg/L) remains variable and may be hydraulically influenced by the nearby river (Figure 4-3). Figure 4-3 presents the reported TCE concentrations at MACW over time in comparison to Susquehanna River discharge as reported by the U.S. Geological Survey (USGS) at Harrisburg, Pennsylvania (USGS 2011).

## 4.3 MONITORING WELL SAMPLING RESULTS

ROD-stipulated VOC, PAH, metals and cyanide results are summarized on Table 4-2. Laboratory summary reports are included as Appendix D. Historical sampling results are provided in Appendix C for reference. Groundwater results were compared against the ROD-stipulated RAOs and PADEP MSCs (Total Dissolved Solids ≤ 2,500 for Used Aquifers). Reported VOC and metals analytical results were generally consistent with the previous sampling events, with the exception of the following:

- MW-1: The reported concentrations of cis-1,2-DCE (20.2 µg/L and 59.0 µg/L) during the July and November 2010 sampling events were less than the PADEP MSC of 70 µg/L, while the reported concentration for the 2011 sampling event was 72 µg/L, which exceeds the PADEP MSC. Although the cis-1,2-DCE concentration in Spring 2011 was higher than those reported in the previous sampling events (with the exception of 88 µg/L in the 2002 event), the reported cis-1,2-DCE analytical result represents one of only two events where the concentration exceeded the MSC, and there is no definitive concentration trend. Historical ROD-stipulated VOC sampling results are provided in Appendix C for reference.
- MW-2A: A trace concentration of anthracene (0.027J µg/L) was reported in MW-2A, but this concentration did not exceed the MSC.

Trend plots of TCE and other target VOCs in select wells are presented in Figure 4-4 (MW-8) and Figure 4-5 (MW-9). Historical VOC and metals sampling results are provided in Appendix C for reference. Decreasing trends in concentration continue at MW-8. Overall, the TCE concentration trends in MW-9 are decreasing, although there has been a slight increase in the reported TCE concentration at MW-9 since May 2009 (ranging from 10.6 µg/L to 17.1J µg/L)

which may be associated with inherent variability in the laboratory analytical method rather than a true increase in TCE concentrations.

## 4.4 SOIL SAMPLING RESULTS

As discussed in Section 2.2, soil samples were collected to confirm historical results and delineate constituents reported in exceedance of the PADEP RDC MSC. The analytical results for the confirmatory and delineation soil samples are discussed in the following sections. Confirmatory results and historical sample results are presented side by side in Table 4-3, and delineation soil sample results are summarized on Table 4-5. On Table 4-3 and Table 4-5, shaded column headers correspond to historical samples. Laboratory analytical reports are presented in Appendix D. Results were compared with the PADEP RDC MSCs. Recent confirmatory and delineation soil sample results that exceeded PADEP RDC MSCs are illustrated on Figure 4-6. Historical soil sample results are illustrated on Figure 1-2 and tabulated in Appendix C. The historical sample locations may slightly vary from the location selected during this sampling event and there is also inherent variability between historical and recent results due to the heterogeneity of soil samples.

### 4.4.1 Confirmatory Soil Sampling Results

Confirmatory sample laboratory analytical data and historical sample laboratory analytical data are presented side by side in Table 4-3. On Table 4-3, shaded column headers correspond to historical samples. The confirmatory soil sample results are evaluated in Table 4-4 as compared to the objective of the sample. Laboratory analytical reports are presented in Appendix D.

The objective of the confirmatory samples was to evaluate, by comparison of the historical and 2011 confirmatory results, whether the nature and magnitude of the reported constituents in the historical samples continue to be representative of current site conditions. No significant change in the nature of the reported constituents was observed when comparing 2011 soil confirmatory samples results to historical results (Table 4-4). However, comparison of the reported historical constituent concentrations to the reported 2011 constituent concentrations revealed some trends in the magnitude of the reported concentrations as discussed below:

- The reported concentrations of arsenic in the 2011 samples were approximately half the historical results. This was observed in every sample with the exception of SB-2, where the 2011 results exceeded the reported historical concentrations (S-9 and S-10). However, the historical and 2011 arsenic results were less than the PADEP RDC MSC, and the 2011 location was not placed at the exact location of either S-9 or S-10, as the intent was to confirm that metals (including arsenic) were less than the PADEP RDC MSC in this area.

- The reported concentration of thallium in the 2011 samples from SB-5 and SB-6 were significantly less than the associated historical results (S-3 and S-5, respectively).
- The reported concentrations of lead in the 2011 surface soil samples collected from SB-3, SB-5, and SB-6 were significantly less than the associated historical results (MW-2 S-1, S-3, and S-5, respectively).
- The reported concentration of PAHs in the 2011 surface soil sample collected at SB-3 were an order of magnitude lower than the historical results (MW-2 S-1). However, the historical sample was collected from the 0 to 2 ft interval bgs, whereas the 2011 sample was collected from 0 to 0.5 bgs. In addition, the concentrations reported in the historical duplicate from MW-2 S-1 were also much lower in concentration than the parent sample. Therefore, the difference in reported historical and 2011 concentrations may be due to sample variability or the difference in the sample collection interval.
- The reported concentration of lead in the 2011 subsurface sample at SB-3 was significantly greater than the historical result (MW-2 S-1).

In addition, the originally reported concentration of metals in several historical samples exceeded the respective PADEP RDC MSC, but the 2011 confirmatory sample concentrations were less than the respective PADEP RDC MSC. This occurred for arsenic in samples SB-7 4-6 ft, SB-3 0-0.5 ft, SB-8 0-0.5 ft, and SB-8 2-4 ft; for lead in samples SB-3 0-0.5 ft and SB-6 0-0.5 ft; and for thallium in sample SB-6 0-0.5 ft.

### 4.4.2 Delineation Soil Sampling Results

Delineation sample laboratory analytical data and historical sample laboratory analytical data are presented in Table 4-5. On Table 4-5, shaded column headers correspond to historical sample results. The delineation soil sample results are shown in Table 4-6 as compared to the objective of the sample. Laboratory analytical reports are presented in Appendix D.

The reported lead and thallium results for surface soil samples collected at SB-9 and SD-8 were less than the PADEP RDC MSC, indicating that the extent of these metals in surface soil, as reported in samples collected from S-3, S-5, S-52, and SB-4, has been delineated. However, lead was reported in exceedance of the PADEP RDC MSC in the deepest subsurface soil sample (2.5 to 3 ft bgs) collected from SB-4.

The reported results from the surface soil samples collected at SB-9 indicate that the PAHs reported at historical location SS-8 and confirmatory location SB-10 have been delineated along the northern portion of the site.

Reported PAH concentrations in subsurface soil results at location SB-1 were less than the PADEP RDC MSC, indicating that the previously reported PAHs in the subsurface soil sample collected from TP-5 are delineated along the west side of the site. ROD-stipulated VOC analysis was also performed on samples collected from SB-1 to support the Act 2 process. No ROD-stipulated VOCs were detected.

Reported PAHs in surface soil samples collected from 2011 locations SB-4, SD-8, and SD-9 indicate that PAHs previously reported in historical sample S-3 were not fully delineated. Specifically, benzo(a)pyrene was reported in concentrations exceeding the PADEP RDC MSC in samples collected from the furthest most northwest locations (SD-8 and SD-9). In addition, PAH concentrations reported in the deepest subsurface soil sample collected from SB-4 (2.5-3 ft bgs) exceeded the PADEP RDC MSC, indicating that the PAHs at depth were not fully delineated. However, PAH concentrations decrease significantly from the surface (0 to 0.5 ft bgs) to the subsurface (2.5 to 3 ft bgs), suggesting that the concentrations attenuate with depth. Furthermore, the number of PAHs and concentration of PAHs in the surface soil attenuate significantly to the northeast of SB-4.

Reported concentrations of arsenic and lead at SB-11 (as well as confirmatory location SB-3) indicate that these metals, previously reported in exceedance of the PADEP RDC MSC in the historical samples collected from MW-2, were laterally and vertically delineated to less than the PADEP RDC MSC along the east side of the site. As discussed above, results from subsurface soil samples collected from SB-4 indicate that the depth of lead was not fully delineated north of MW-2.

Reported concentrations of PAHs in surface soil samples collected from SB-11, SD-5, and SD-6 indicated that PAHs were delineated to less than the PADEP RDC MSC in surface soil east of historical sample location MW-2 and confirmatory sample location SB-3. However, PAH (benzo[a]anthracene; benzo[a]pyrene; benzo[b]fluoranthene; and dibenzo[a,h]anthracene) concentrations reported in the deepest subsurface soil sample collected from SB-11 (2-4 ft bgs) exceeded the PADEP RDC MSC, indicating that the PAHs were not fully delineated at depth along the east side of the site.

## 4.5 SURFACE WATER SAMPLING RESULTS

Surface water sample laboratory analytical data are presented in Table 4-7. Laboratory analytical reports are presented in Appendix D. The surface water data will be used to support the Act 2 process.

Surface water laboratory analytical results were compared to the 2009 PADEP Water Quality Criteria for Toxic Substances for Human Health. Concentrations of six PAHs (benzo[a]anthracene, benzo[a]pyrene, benzo[b]fluoranthene, benzo[k]fluoranthene, chrysene, and indeno[1,2,3-c,d]pyrene) in sample SW-8 exceeded the 2009 PADEP Water Quality Criteria for Toxic Substances for Human Health of 0.0038 mg/L. Sample SW-5 had no exceedances of the 2009 PADEP Water Quality Criteria for Toxic Substances for Human Health.

## 4.6 SAMPLE QUALITY ASSURANCE AND QUALITY CONTROL RESULTS

Data validation was performed by Environmental Data Services, Inc. (EDS). Validated laboratory analytical summary reports are presented in Appendix D. Rinsate blank and trip blank results are reported on Table 4-8. As discussed below, there are numerous qualifications to the data. However, all data were deemed usable for the intended purpose, despite the qualifications as noted below (with the exception of the non-detected hexachloropentadiene result for SD-6, which was rejected due to severely low MS/MSD recoveries).

With regard to groundwater analytical data accuracy, the percent recoveries of some metals concentrations in groundwater matrix spikes and/or matrix spike duplicates exceeded the upper acceptable limit, indicating some reported concentrations may be biased high as indicated by a "K" data qualifier. Some surrogate VOC spike recoveries in groundwater were less than the acceptable percent recovery range, suggesting that some results may be estimated, as indicated with a "J" or "UJ" qualifier. The percent difference between serial dilutions for barium in groundwater was greater than the acceptable range in two groundwater sample batches, resulting in a "J" qualifier to indicate the result is estimated.

With regard to accuracy of soil results, some VOC surrogate spike recoveries in soil were less than the acceptable percent recovery range, suggesting that some results may be estimated, as indicated with a "J" or "UJ" qualifier. In addition, some internal standard responses were low during soil analyses, resulting in estimated concentrations as identified by a "J" qualifier. The percent recoveries of some metals concentrations in soil and wetlands soil (sediment) matrix spikes and/or matrix spike duplicates exceeded the upper acceptable limit, indicating some reported concentrations may be biased high as indicated by a "K" data qualifier. Conversely, recovery of silver in the wetlands soil (sediment) was less than the lower acceptable limit, resulting in application of a "L" qualifier.

The percent recoveries of some SVOC concentrations in wetland soil (sediment) matrix spikes and/or matrix spike duplicates was less than the lower acceptable limit, indicating some reported concentrations may be biased low as indicated by a "L" data qualifier. Similarly, laboratory control sample and internal standard recoveries were low for some SVOCs, also resulting in an

“L” or “J”, respectively. Conversely, some laboratory control sample recoveries for selected SVOCs were high, resulting in a “K” qualifier.

To assess precision, inclusive of potential error introduced from sample collection activities, the relative percent difference (RPD) between the field duplicate and parent samples were compared to the data quality objective (DQO) of 50%. The RPDs for constituents detected in both the parent and duplicate samples are reported in the laboratory data validation reports (Appendix D). All were within the project DQO with the exception of the following:

- The soil duplicate sample (SB-DUP-1) of sample SB-2-0-0.5: The RPD for chromium was 73% and the RPD for lead was 78%. The RPD for other metals reported in the parent and duplicate sample were within the DQO. The RPDs for PAHs met the DQO.
- The soil duplicate sample (SB-DUP-2) of SB-3-0-0.5: The RPDs for acenaphthylene and naphthalene was 80% and 93% respectively. The RPDs for the other reported PAHs met the DQO.
- The wetland soil (sediment) duplicate sample (DUP-1) of SD-9: The RPDs for benzo[g,h,i]perylene (69%), mp-cresol (63%), dibenzo[a,h]anthracene (57%), and aluminum (56%) did not meet the precision DQO of 50%. The RPDs for the other reported PAHs and metals met the DQO.
- The surface water duplicate sample (DUP-2) of SW-8: The RPDs for aluminum (56%) and copper (57%) did not meet the precision DQO of 50%. The RPDs for the other reported metals met the DQO.

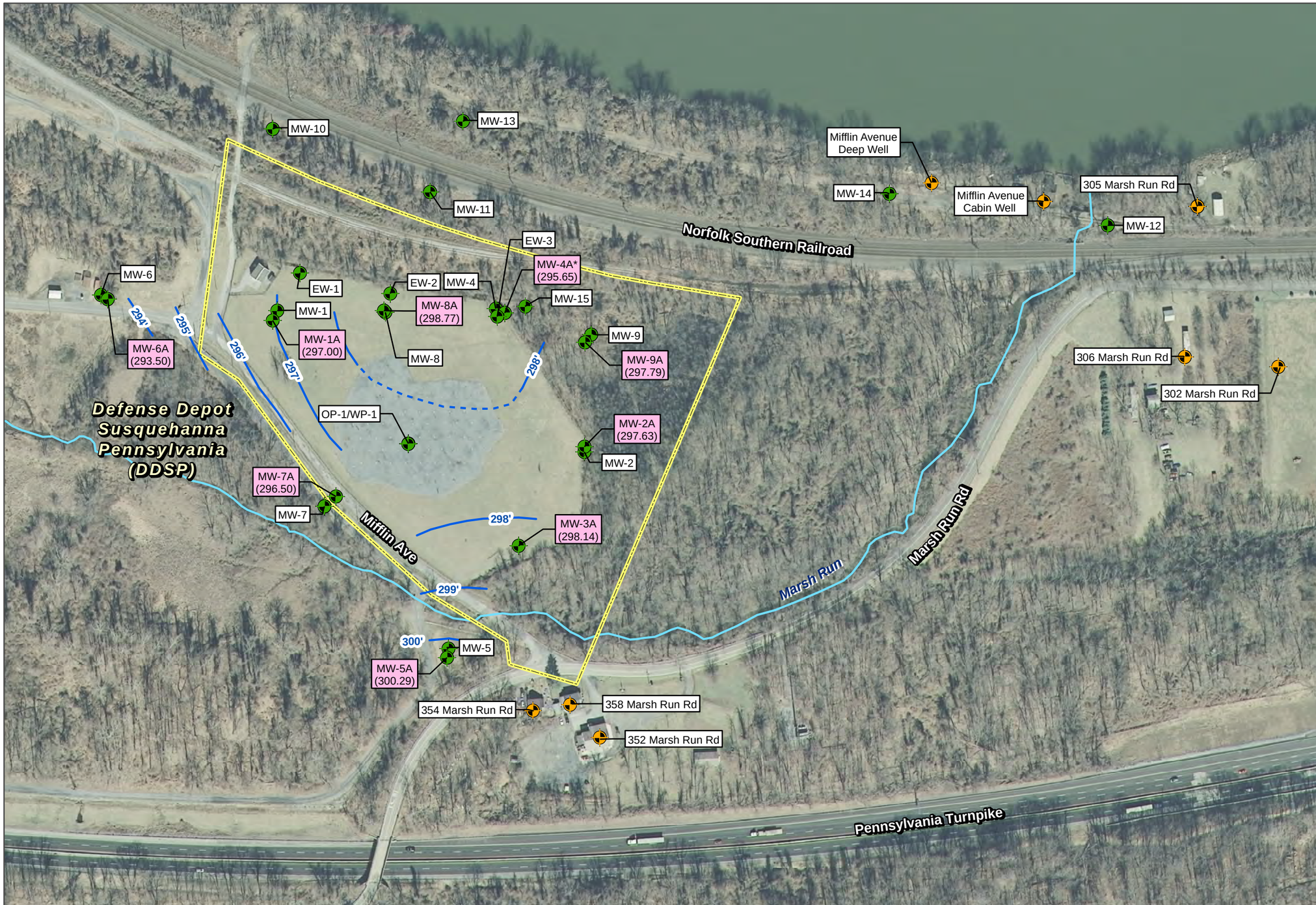
Results indicate some variability in the data, particularly with regard to solid samples, but do not impact the usability of the data.

With regard to potential laboratory contamination, the method blanks for some groundwater sample batches exhibited metals concentrations, suggesting the potential for some metals contamination from the laboratory and resulting in application by the data validator of a “B” qualifier to some data, indicating the analyte in the sample was not detected substantially greater than the level reported in laboratory blanks (e.g. beryllium, chromium, and iron in MACW and/or MADW).

Three rinsate blanks were collected as part of the QA/QC procedures to address the efficiency of the decontamination of the submersible pump and soil sampling equipment during the Spring 2011 sampling event. Rinsate blanks were prepared using laboratory-prepared deionized water. Analytical results for rinsate blanks were within the project DQOs (DQO of non-detect) with the

exception of some inorganic analytes (Table 4-8). Analyte concentrations reported in the rinsate blanks are significantly less than the PADEP MSCs, but did result in application of a “B” qualifier by the data validator (indicating the analyte in the sample was not detected substantially greater than the level reported in laboratory or field blanks) to some sample data. For example, barium, copper, iron and manganese were reported in RB-2, indicating a possibility of cross contamination, and resulting in application of a “B” qualifier to the iron and manganese result for MW-4, and to the copper, iron, and manganese result for MW-1. However, the “B” qualifications do not affect the usability of the data.

No COCs were reported by the laboratory in the trip blanks analysis results.



## Legend

- Groundwater Well
- Residential Well
- Overburden Groundwater Potentiometric Contours (Dashed Where Inferred)
- 292' Groundwater Elevation (Feet Above Mean Sea Level)
- Formerly Used Defense Site (FUDS) Boundary
- Stream
- MW-14 (291.18) Overburden Well (Feet Above Mean Sea Level)

MW = Monitoring Well
EW = Extraction Well
WP/OP = Well Point

Note: Groundwater Elevation contour data was collected during the 31 May 2011 gauging event.

* There appears to be a potential interconnection between MW-4 and MW-4A. Therefore, MW-4A was not included in the groundwater contours illustrated on this figure.

Aerial Photograph Source:
PAMAP Program, PA Department of Conservation and Natural Resources, Bureau of Topographic and Geologic Survey, 2008

# Marsh Run Park FUDS

**Fairview Township, New Cumberland, Pennsylvania**
**FUDS Project No. C03PA040301**

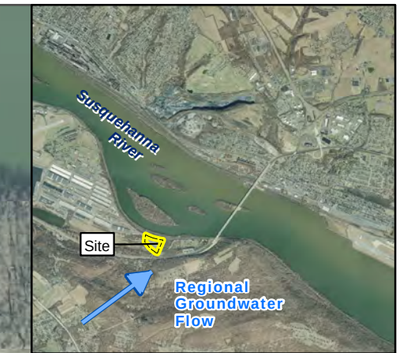
Project Number: 6233003

Date: May 2012

0 100 200
Feet
1 inch = 200 feet

Figure 4-1
Overburden Groundwater Contour, 31 May 2011

\\LOVETON\FEDERAL\GISData\Northeast\Pennsylvania\MarshRun\Mxd\RevisionsSAR\OBGW_May2011.mxd




## Legend

- Groundwater Well
- Residential Well
- Upper Bedrock Groundwater Potentiometric Contours (Dashed Where Inferred)
- 292' Groundwater Elevation (Feet Above Mean Sea Level)
- Formerly Used Defense Site (FUDS) Boundary
- Stream
- MW-14 (291.18) Upper Bedrock Well (Feet Above Mean Sea Level)

MW = Monitoring Well
EW = Extraction Well
WP/OP = Well Point

Note: Groundwater Elevation contour data was collected during the 31 May 2011 gauging event.

Aerial Photograph Source:
PAMAP Program, PA Department of Conservation and Natural Resources, Bureau of Topographic and Geologic Survey, 2008

# Marsh Run Park FUDS

**Fairview Township, New Cumberland, Pennsylvania**
**FUDS Project No. C03PA040301**

Project Number: 6233003

Date: May 2012

0 100 200
Feet
1 inch = 200 feet

Figure 4-2
Upper Bedrock Groundwater Contour, 31 May 2011

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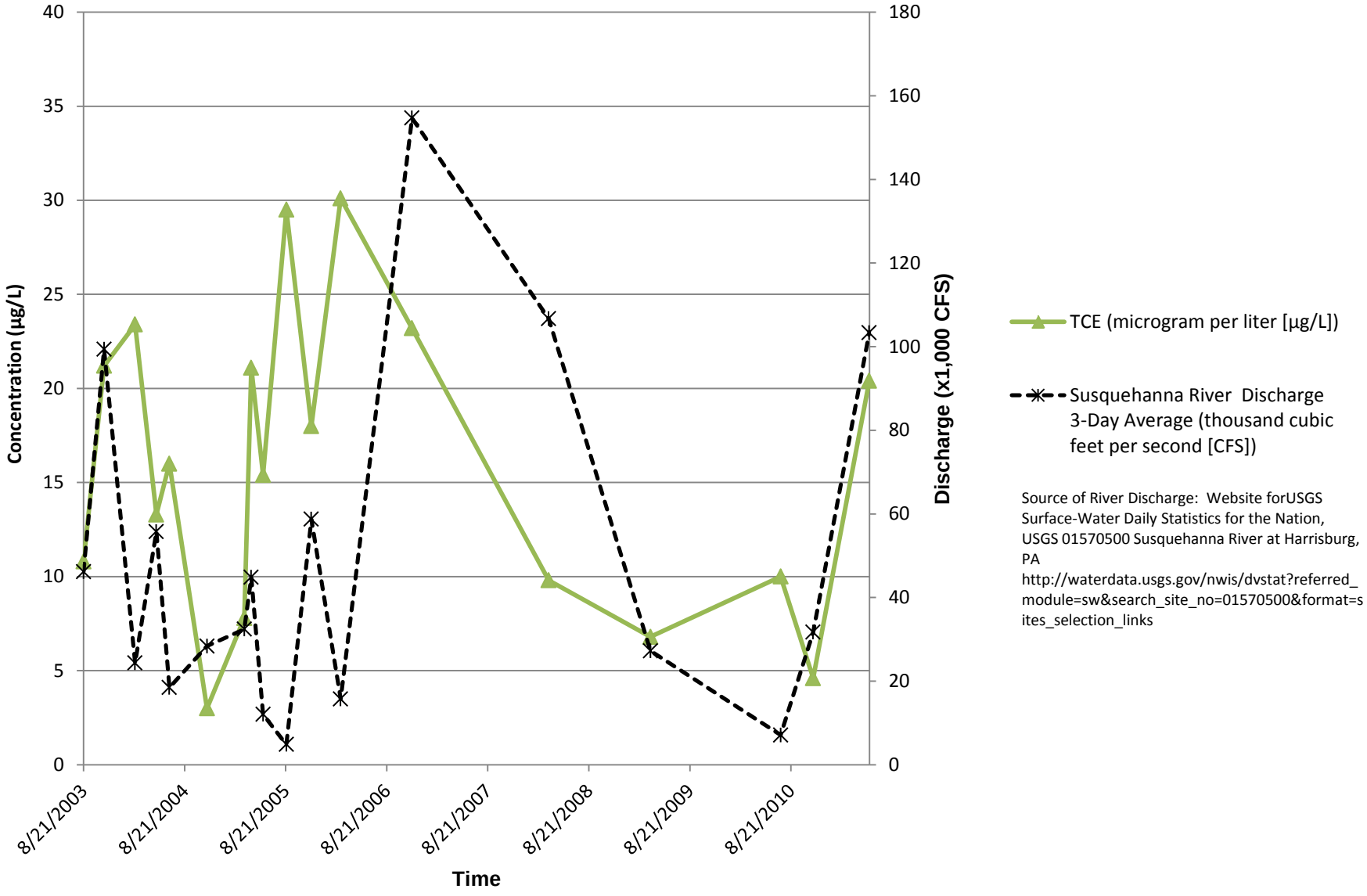
**Figure 4-3**
**Trend Plot of Mifflin Avenue Cabin Well TCE Concentrations vs. Time at Marsh Run Park**




Source of River Discharge: Website forUSGS Surface-Water Daily Statistics for the Nation, USGS 01570500 Susquehanna River at Harrisburg, PA
http://waterdata.usgs.gov/nwis/dvstat?referred_module=sw&search_site_no=01570500&format=sites_selection_links

**Figure 4-4**
**Trend Plot of MW-8 Target VOC Concentrations vs. Time at Marsh Run Park**

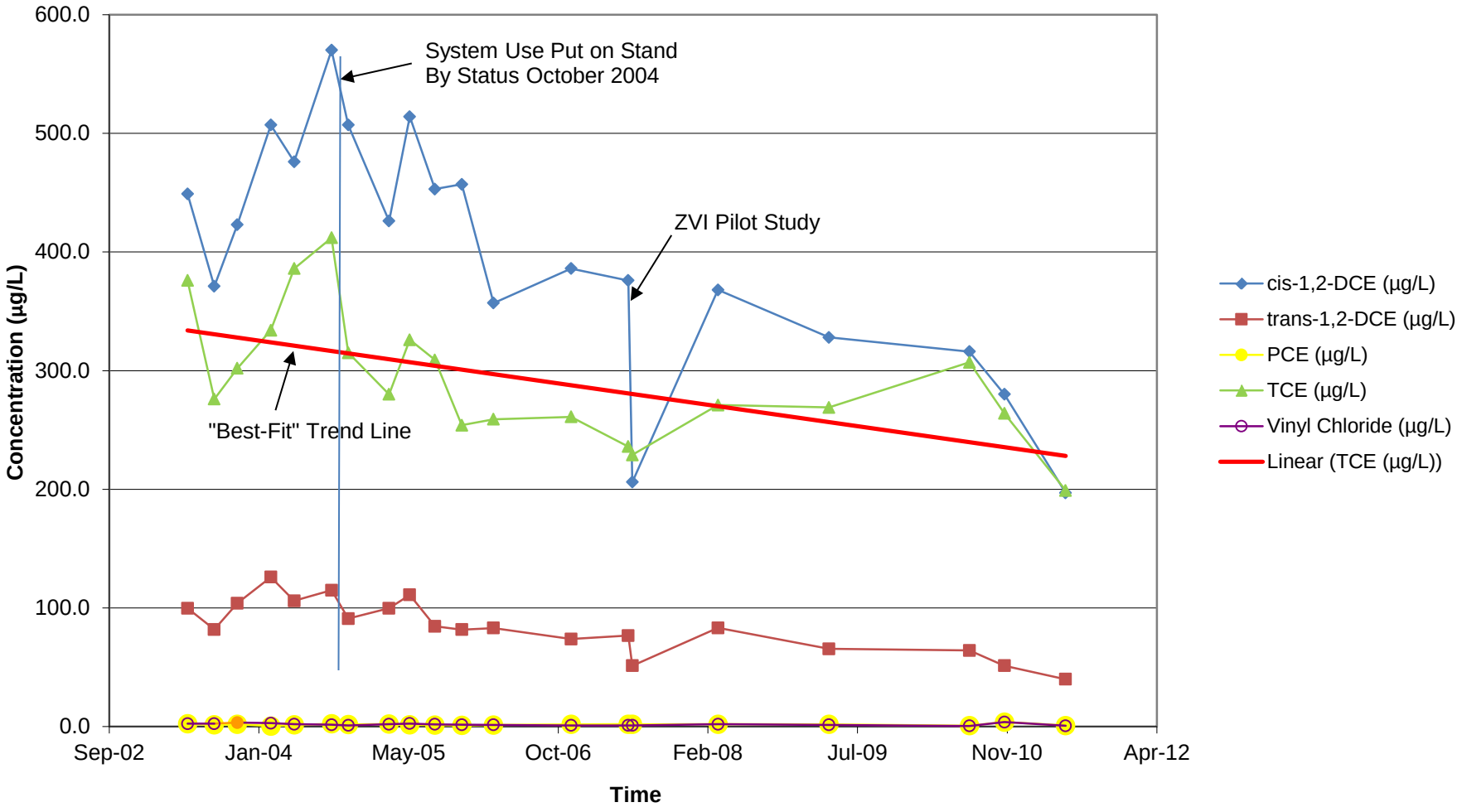
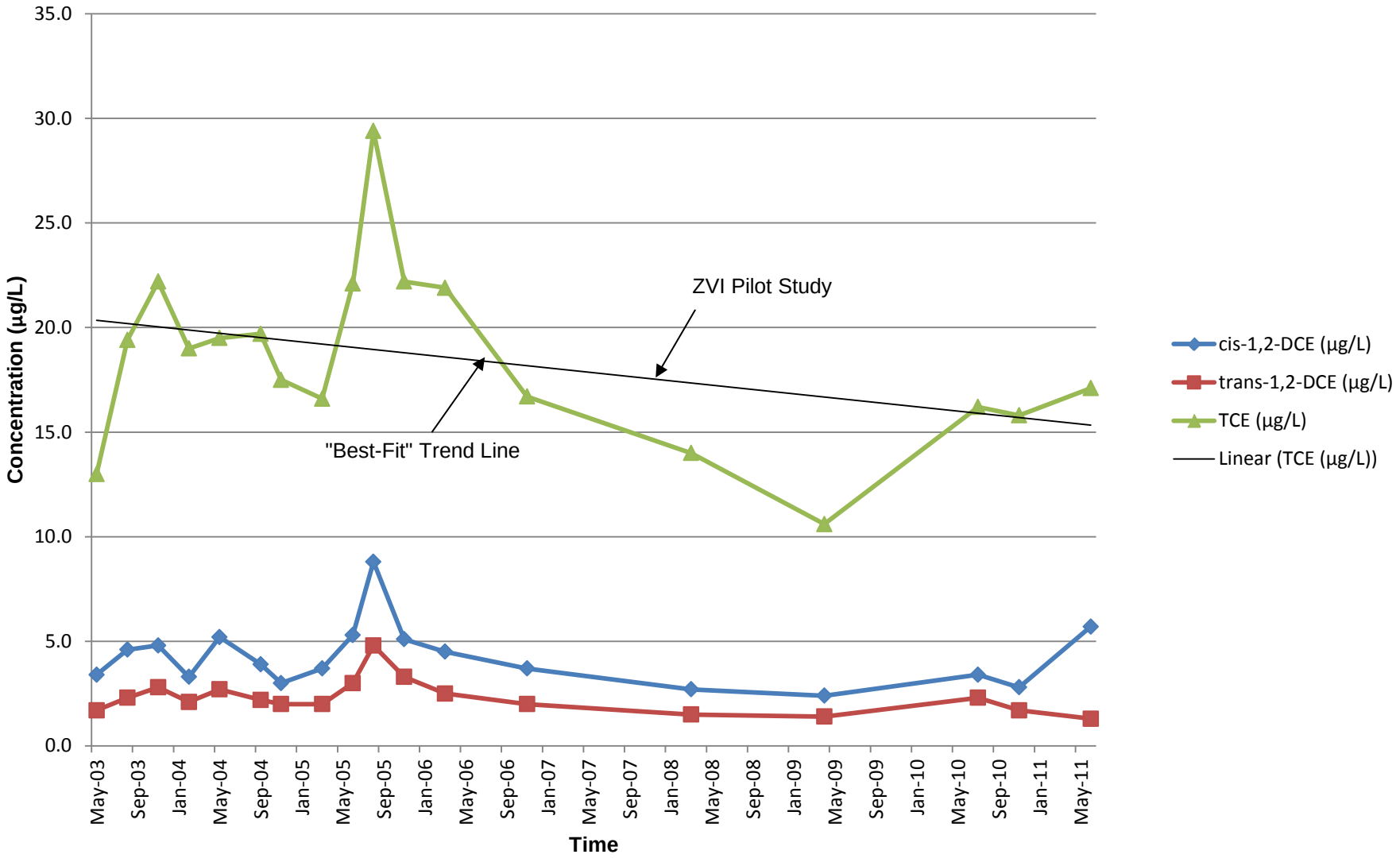
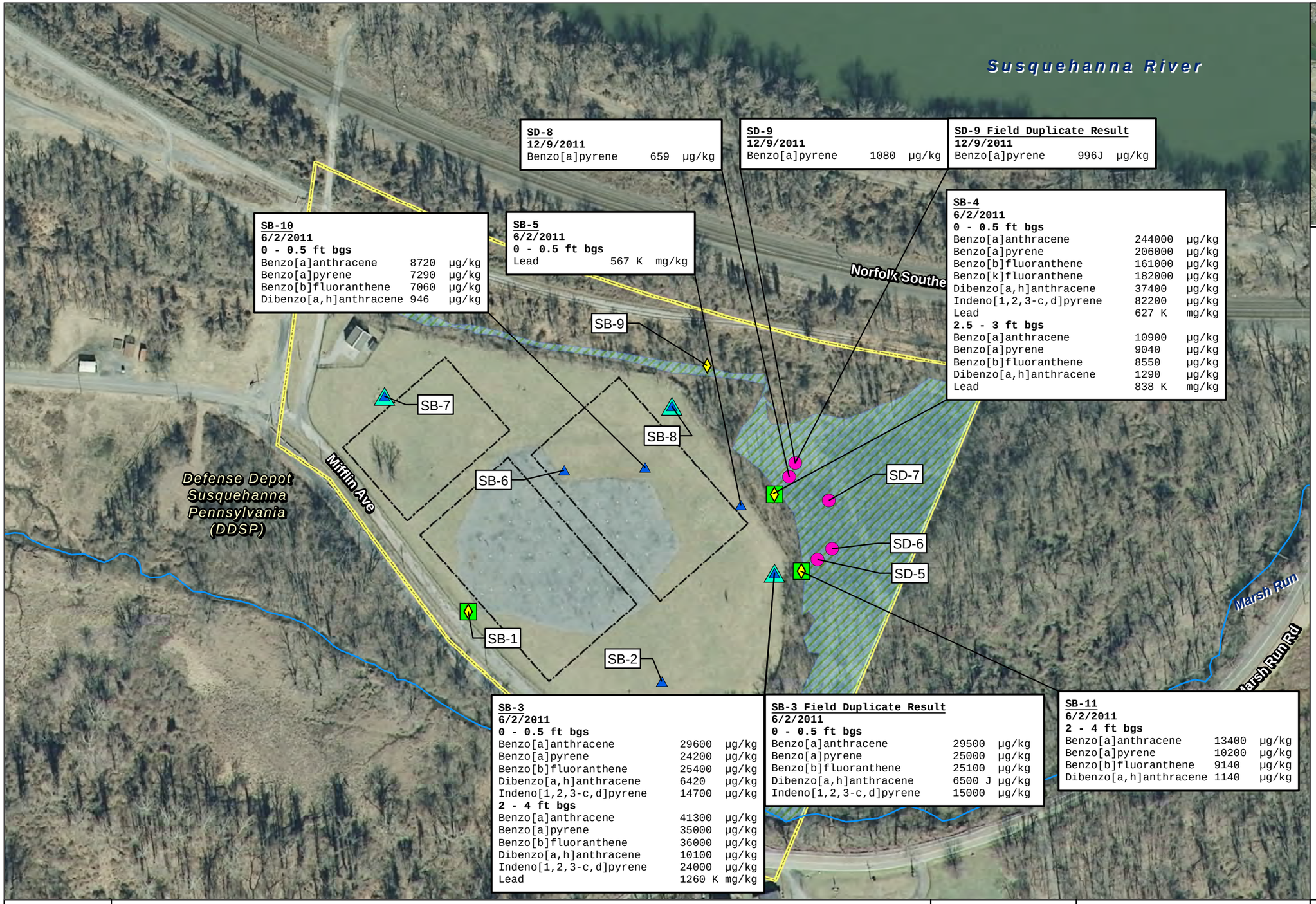


**Figure 4-5**
**Trend Plot of MW-9 Target VOC Concentrations vs. Time at Marsh Run Park**





## Legend

- Wetland Soil (Sediment) Sample Locations
- Surface Confirmation Soil Sample Location
- Subsurface Confirmation Soil Sample Location
- Co-Located Surface and Subsurface Confirmation Soil Sample Location
- Surface Delineation Soil Sample Location
- Subsurface Delineation Soil Sample Location
- Co-Located Surface and Subsurface Delineation Soil Sample Location
- Formerly Used Defense Site (FUDS) Boundary
- Proposed Soccer Fields
- Wetlands Within FUDS Boundary
- Stream

J = Estimated value
K = Value biased high
µg/kg = micrograms per kilogram
mg/kg = milligrams per kilogram
ft bgs = feet below ground surface
PADEP = Pennsylvania Department of Environmental Protection

Notes:
1. Surface and subsurface soil sample locations approximate, georeferenced data not available.
2. Results shown exceed the 2011 PADEP Residential Direct Contact Medium Specific Concentration.

Aerial Photograph Source:
PAMAP Program, PA Department of Conservation and Natural Resources, Bureau of Topographic and Geologic Survey, 2008

**Marsh Run Park FUDS**
**Fairview Township, New Cumberland, Pennsylvania**
**FUDS Project No. C03PA040301**

Project Number: 6233003
Date: May 2012

0 100 200
Feet
1 inch = 150 feet

Figure 4-6
Confirmatory and Delineation Soil Sample Results Exceeding PADEP Medium Specific Concentrations for Residential Direct Contact, 2011

\\LOVETONFEDERAL\GISData\Northeast\Pennsylvania\MarshRun\Mxd\RevisionsSAR\SoilSampleResultsV2.mxd

# TABLE 4-1 FIELD SAMPLING DATA 2011

| Monitoring Well | Aquifer | Date Gauged | Depth to Water at Gauging from TOC (ft) | Groundwater Elevation (ft) at Gauging | Sample Date | Depth to Water at Sampling from TOC (ft) | pH (SU) | Specific Conductance (mS/cm) | Turbidity (NTU) | Dissolved Oxygen (mg/L) | Temperature (°C) | ORP (mV) | Sampling Rate (mL/min) | Purge Pressure / Sampling Pressure (psi) | Top of Casing Elevation (ft)[1] |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MW-1 | Bedrock | 5/31/2011 | 9.95 | 296.95 | 6/2/2011 | 10.04 | 6.54 | 0.522 | 35 | 0.74 | 15.82 | 244.7 | 300 | NA | 306.90 |
| MW-1A | Overburden | 5/31/2011 | 9.23 | 297.00 | 5/31/2011 | 9.23 | 6.30 | 0.331 | 6.5 | 2.85 | 12.98 | 125.9 | 400 | NA | 306.23 |
| MW-2 | Bedrock | 5/31/2011 | 5.62 | 296.67 | 6/1/2011 | 5.76 | 6.91 | 0.882 | 46.2 | 0.11 | 13.28 | 150.7 | 400 | NA | 302.29 |
| MW-2A | Overburden | 5/31/2011 | 5.09 | 297.63 | 6/1/2011 | 5.12 | 6.74 | 0.846 | 109.9 | 1.30 | 21.03 | 64.7 | 400 | NA | 302.72 |
| MW-3A | Overburden | 5/31/2011 | 5.71 | 298.14 | 5/31/2011 | 5.71 | 6.67 | 0.773 | 17 | 0.53 | 14.68 | 180.7 | 400 | NA | 303.85 |
| MW-4 | Bedrock | 5/31/2011 | 8.94 | 296.95 | 6/1/2011 | 9.42 | 7.11 | 0.407 | 83.8 | 1.27 | 14.44 | 105.9 | 500 | NA | 305.89 |
| MW-4A* | Overburden | 5/31/2011 | 7.40 | 295.65* | 6/1/2011 | 7.11 | 6.60 | 0.199 | 159 | 2.75 | 13.01 | 83.1 | 500 | NA | 303.05 |
| MW-5 | Bedrock | 5/31/2011 | 5.27 | 297.86 | NA | NG | NS | NS | NS | NS | NS | NS | NS | NA | 303.13 |
| MW-5A | Overburden | 5/31/2011 | 4.69 | 300.29 | NA | NG | NS | NS | NS | NS | NS | NS | NS | NA | 304.98 |
| MW-6 | Bedrock | 5/31/2011 | 6.81 | 297.13 | NA | NG | NS | NS | NS | NS | NS | NS | NS | NA | 303.94 |
| MW-6A | Overburden | 5/31/2011 | 8.12 | 293.50 | NA | NG | NS | NS | NS | NS | NS | NS | NS | NA | 301.62 |
| MW-7 | Bedrock | 5/31/2011 | 5.78 | 296.48 | NA | NG | NS | NS | NS | NS | NS | NS | NS | NA | 302.26 |
| MW-7A | Overburden | 5/31/2011 | 5.39 | 296.50 | NA | NG | NS | NS | NS | NS | NS | NS | NS | NA | 301.89 |
| MW-8 | Bedrock | 5/31/2011 | 8.32 | 297.55 | 6/1/2011 | 8.41 | 6.71 | 0.613 | 36.6 | 0.49 | 14.26 | 224.3 | 300 | NA | 305.87 |
| MW-8A | Overburden | 5/31/2011 | 7.21 | 298.77 | 6/1/2011 | 7.40 | 6.05 | 0.131 | 30.4 | 3.37 | 13.59 | 262.7 | 450 | NA | 305.98 |
| MW-9 | Bedrock | 5/31/2011 | 5.05 | 297.11 | 6/1/2011 | 7.17 | 7.50 | 0.548 | 370.2 | 1.13 | 12.38 | 145.0 | 500 | NA | 302.16 |
| MW-9A | Overburden | 5/31/2011 | 5.66 | 297.79 | 6/1/2011 | 6.09 | 6.49 | 0.250 | 61.6 | 1.32 | 14.66 | 145.4 | 300 | NA | 303.45 |
| MW-10 | Bedrock | 5/31/2011 | 19.12 | 295.93 | NA | NG | NS | NS | NS | NS | NS | NS | NS | NA | 315.05 |
| MW-11 | Bedrock | 5/31/2011 | 20.43 | 295.53 | NA | NG | NS | NS | NS | NS | NS | NS | NS | NA | 315.96 |
| MW-12 | Bedrock | 5/31/2011 | 17.19 | 290.97 | 5/31/2011 | 17.19 | 7.26 | 0.657 | 42.6 | 0.14 | 14.56 | -76.5 | 300 | NA | 308.16 |
| MW-13 | Bedrock | 5/31/2011 | 17.07 | 294.40 | NA | NG | NS | NS | NS | NS | NS | NS | NS | NA | 311.47 |
| MW-14 | Bedrock | 5/31/2011 | 17.61 | 291.18 | 5/31/2011 | 17.61 | 7.49 | 0.490 | 31.9 | 0.08 | 14.31 | -144.6 | 200 | NA | 308.79 |
| MW-15 | Deep Bedrock | 5/31/2011 | 8.56 | NA | 5/31/2011 | 8.57 | 7.35 | 0.686 | 13.8 | 2.75 | 13.14 | 52.8 | 625 | NA | 304.43 |
| MADW Port 1 (41-52 ft) | Bedrock | NA | NG | NA | 5/31/2011 | 10.84 | 7.22 | 0.490 | 210.1 | 5.23 | 14.12 | 55.1 | NA | 20 | 300.87 |
| MADW Port 2 (121-132 ft) | Deep Bedrock | NA | NG | NA | 5/31/2011 | 11.13 | 7.46 | 0.416 | 390.3 | 3.39 | 14.04 | 55.6 | NA | 20 | 300.87 |
| MADW Port 3 (170-181 ft) | Deep Bedrock | NA | NG | NA | 5/31/2011 | 10.94 | 7.76 | 0.315 | 119.3 | 3.45 | 14.40 | 50.3 | NA | 20 | 300.87 |
| MADW Port 4 (184-195 ft) | Deep Bedrock | NA | NG | NA | 5/31/2011 | 10.95 | 7.78 | 0.319 | 529.1 | 2.58 | 15.12 | 4.4 | NA | 20 | 300.87 |
| MACW | Bedrock | NA | NG | NA | 5/31/2011 | 15.56 | 7.08 | 0.710 | 3.9 | 3.03 | 13.74 | 163.1 | NA | NA | NA |

Notes:
* Elevation result is anomalous and was not used for contouring
NG = Not Gauged TOC = top of casing
NA = Not Applicable / Available
NS = Not Sampled SU = Standard Units
ORP = Oxidation Reduction Potential
mS/cm = milliSiemens per centimeter
mg/L = milligrams per liter
°C = Degrees Celsius
mV = millivolts
mL/min = milliliters per minute
psi = pounds per square inch
ft = foot/feet
NTU = Nephelometric Turbidity Units
MADW = Mifflin Avenue Deep Well
MACW = Mifflin Avenue Cabin Well referred to previously as Mifflin Avenue Residential Well/Yetter Well
Data in the "Depth to water at sampling" field represents depth from top of casing prior to start of well purging.
Depth to water at gauging represents depth to water from top of casing measured on 31 May 2011 for groundwater potentiometric surface contouring.
[1]Top of Casing Measurements are from the Plexus 2009 Annual Groundwater Monitoring Report; MW-15 measurement collected by EA.
MW = Monitoring Well

# TABLE 4-2 GROUNDWATER SAMPLE RESULTS 2011

| | | **Location ID** | MADW | MADW | MADW | MADW | MACW | MW-1 | MW-1A | MW-2 | MW-2A | MW-2A | MW-3A | MW-4 | MW-4 | MW-4A | MW-8 | MW-8A |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | **Sample Name** | MADW [41-52] | MADW [121-132] | MADW [170-181] | MADW [184-195] | MARW | MW-1 | MW-1A | MW-2 | DUP-2 | MW-2A | MW-3A | DUP-3 | MW-4 | MW-4A | MW-8 | DUP-1 |
| | | **Date** | 5/31/2011 | 5/31/2011 | 5/31/2011 | 5/31/2011 | 5/31/2011 | 6/2/2011 | 5/31/2011 | 6/1/2011 | 6/1/2011 | 6/1/2011 | 5/31/2011 | 6/1/2011 | 6/1/2011 | 6/1/2011 | 6/1/2011 | 6/1/2011 |
| | | **Parent Sample Name** | | | | | | | | | MW-2A | | | MW-4 | | | | MW-8A |
| Analyte | Unit | PADEP MSC | | | | | | | | | | | | | | | | |
| **VOCs (SW846 8260B)** | | | | | | | | | | | | | | | | | | |
| cis-1,2-dichloroethene | µg/L | 70 | < 0.75 UJ | 0.59 J | 6.7 | 13.6 | < 0.75 U | **72** | 53.1 J | 1.1 | NS | < 0.75 U | < 0.75 U | 15.5 | 15 J | < 3.8 UJ | 197 J | < 0.75 U |
| Tetrachloroethene | µg/L | 5 | < 0.75 UJ | < 0.75 UJ | 3 | 1.5 | < 0.75 U | < 0.75 U | < 0.75 UJ | < 0.75 U | NS | < 0.75 U | < 0.75 U | < 0.75 U | < 0.75 UJ | < 3.8 UJ | 0.93 J | < 0.75 U |
| trans-1,2-dichloroethene | µg/L | 100 | < 0.75 UJ | < 0.75 UJ | 3.3 | 3 | < 0.75 U | 8.9 | 6.1 J | < 0.75 U | NS | < 0.75 U | < 0.75 U | 3.4 | 3.3 J | < 3.8 UJ | 40 J | < 0.75 U |
| Trichloroethene | µg/L | 5 | 2.3 J | **18 J** | **358** | **245** | **20.4** | **15.8** | **10.7 J** | 0.79 J | NS | 0.84 J | < 0.75 U | **36** | **35.3 J** | < 3.8 UJ | **199 J** | < 0.75 U |
| Vinyl chloride | µg/L | 2 | < 0.75 UJ | < 0.75 UJ | < 0.75 U | < 0.75 U | < 0.75 U | 0.88 J | 0.37 J | < 0.75 U | NS | < 0.75 U | < 0.75 U | < 0.75 U | < 0.75 UJ | < 3.8 UJ | 0.75 J | < 0.75 U |
| **PAHs (SW846 8270D/8270 SIM)** | | | | | | | | | | | | | | | | | | |
| Acenaphthene | µg/L | 2,200 | < 0.038 U | NS | NS | NS | NS | NS | NS | NS | < 0.038 U | < 0.038 U | NS | NS | NS | NS | NS | NS |
| Acenaphthylene | µg/L | 2,200 | < 0.038 U | NS | NS | NS | NS | NS | NS | NS | < 0.038 U | < 0.038 U | NS | NS | NS | NS | NS | NS |
| Anthracene | µg/L | 66 | < 0.038 U | NS | NS | NS | NS | NS | NS | NS | 0.027 J | 0.027 J | NS | NS | NS | NS | NS | NS |
| Benzo[a]anthracene | µg/L | 0.29 | < 0.038 U | NS | NS | NS | NS | NS | NS | NS | < 0.038 U | < 0.038 U | NS | NS | NS | NS | NS | NS |
| Benzo[a]pyrene | µg/L | 0.2 | < 0.038 U | NS | NS | NS | NS | NS | NS | NS | < 0.038 U | < 0.038 U | NS | NS | NS | NS | NS | NS |
| Benzo[b]fluoranthene | µg/L | 0.29 | < 0.038 U | NS | NS | NS | NS | NS | NS | NS | < 0.038 U | < 0.038 U | NS | NS | NS | NS | NS | NS |
| Benzo[g,h,i]perylene | µg/L | 0.26 | < 0.038 U | NS | NS | NS | NS | NS | NS | NS | < 0.038 U | < 0.038 U | NS | NS | NS | NS | NS | NS |
| Benzo[k]fluoranthene | µg/L | 0.55 | < 0.038 U | NS | NS | NS | NS | NS | NS | NS | < 0.038 U | < 0.038 U | NS | NS | NS | NS | NS | NS |
| Chrysene | µg/L | 1.9 | < 0.038 U | NS | NS | NS | NS | NS | NS | NS | < 0.038 U | < 0.038 U | NS | NS | NS | NS | NS | NS |
| Dibenz[a,h]anthracene | µg/L | 0.029 | < 0.038 U | NS | NS | NS | NS | NS | NS | NS | < 0.038 U | < 0.038 U | NS | NS | NS | NS | NS | NS |
| Fluoranthene | µg/L | 260 | < 0.038 U | NS | NS | NS | NS | NS | NS | NS | < 0.038 U | < 0.038 U | NS | NS | NS | NS | NS | NS |
| Fluorene | µg/L | 1,500 | < 0.038 U | NS | NS | NS | NS | NS | NS | NS | < 0.038 U | < 0.038 U | NS | NS | NS | NS | NS | NS |
| Indeno[1,2,3-c,d]pyrene | µg/L | 0.29 | < 0.038 U | NS | NS | NS | NS | NS | NS | NS | < 0.038 U | < 0.038 U | NS | NS | NS | NS | NS | NS |
| Naphthalene | µg/L | 100 | < 0.047 U | NS | NS | NS | NS | NS | NS | NS | < 0.048 U | < 0.048 U | NS | NS | NS | NS | NS | NS |
| Phenanthrene | µg/L | 1,100 | < 0.038 U | NS | NS | NS | NS | NS | NS | NS | < 0.038 U | < 0.038 U | NS | NS | NS | NS | NS | NS |
| Pyrene | µg/L | 130 | < 0.038 U | NS | NS | NS | NS | NS | NS | NS | < 0.038 U | < 0.038 U | NS | NS | NS | NS | NS | NS |
| **Cyanide (SM20-4500CNI)** | | | | | | | | | | | | | | | | | | |
| Cyanide,Weak/Dissociable (Free) | mg/L | 0.2 | < 0.005 U | NS | NS | NS | < 0.005 U | < 0.005 U | < 0.005 U | < 0.005 U | < 0.005 U | 0.002 B | < 0.005 U | NS | < 0.005 U | < 0.005 U | < 0.005 U | NS |
| **Metals (SW846 6020A)** | | | | | | | | | | | | | | | | | | |
| Arsenic, Dissolved | mg/L | 0.01 | 0.0026 J | NS | NS | NS | 0.0019 J | < 0.002 U | < 0.002 U | 0.0014 K | NS | < 0.002 U | < 0.002 U | NS | < 0.002 U | < 0.002 U | 0.0017 J | < 0.002 U |
| Arsenic, Total | mg/L | | 0.0015 K | NS | NS | NS | 0.0011 K | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| Barium, Dissolved | mg/L | 2 | 0.12 J | NS | NS | NS | 0.072 J | 0.095 J | 0.033 J | 0.1 J | NS | 0.087 J | 0.084 J | NS | 0.14 J | 0.031 J | 0.071 J | 0.087 J |
| Barium, Total | mg/L | | 0.14 K | NS | NS | NS | 0.077 K | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| Beryllium, Dissolved | mg/L | 0.004 | < 0.00067 U | NS | NS | NS | < 0.00067 U | < 0.00067 U | < 0.00067 U | < 0.00067 U | NS | < 0.00067 U | < 0.00067 U | NS | < 0.00067 U | < 0.00067 U | < 0.00067 U | < 0.00067 U |
| Beryllium, Total | mg/L | | 0.00031 B | NS | NS | NS | 0.00033 B | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| Cadmium, Dissolved | mg/L | 0.005 | < 0.00067 U | NS | NS | NS | < 0.00067 U | < 0.00067 U | < 0.00067 U | < 0.00067 U | NS | < 0.00067 U | 0.0003 J | NS | < 0.00067 U | < 0.00067 U | < 0.00067 U | < 0.00067 U |
| Cadmium, Total | mg/L | | < 0.0007 U | NS | NS | NS | < 0.0007 U | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| Chromium, Dissolved | mg/L | 0.1 | 0.0027 | NS | NS | NS | 0.0057 | < 0.0013 U | 0.0014 J | < 0.0013 U | NS | 0.00095 J | 0.011 | NS | 0.0029 | 0.0016 J | 0.004 | 0.0015 J |
| Chromium, Total | mg/L | | 0.0016 B | NS | NS | NS | 0.0016 B | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| Copper, Dissolved | mg/L | 1.3 | < 0.0033 U | NS | NS | NS | 0.0044 J | 0.0057 B | < 0.0033 U | < 0.0033 U | NS | 0.021 | 0.0018 J | NS | < 0.0033 U | < 0.0033 U | < 0.0033 U | 0.02 |
| Copper, Total | mg/L | | < 0.0037 U | NS | NS | NS | 0.088 | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| Iron, Dissolved | mg/L | 0.3* | 0.16 | NS | NS | NS | 0.19 | 0.2 B | 0.13 | 0.24 | NS | 0.31 | 0.26 | NS | 0.16 B | 1.3 | 0.2 | 0.32 |
| Iron, Total | mg/L | | 0.18 B | NS | NS | NS | 0.36 K | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| Lead, Dissolved | mg/L | 0.005 | < 0.0013 U | NS | NS | NS | < 0.0013 U | < 0.0013 U | < 0.0013 U | < 0.0013 U | NS | < 0.0013 U | < 0.0013 U | NS | < 0.0013 U | < 0.0013 U | < 0.0013 U | < 0.0013 U |
| Lead, Total | mg/L | | < 0.0015 U | NS | NS | NS | 0.011 K | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| Manganese, Dissolved | mg/L | 0.3* | < 0.0033 U | NS | NS | NS | 0.032 | 0.06 B | 0.0088 | < 0.0033 U | NS | 0.24 | < 0.0033 U | NS | 0.074 B | 0.43 | 0.046 | 0.24 |
| Manganese, Total | mg/L | | < 0.0037 U | NS | NS | NS | 0.043 K | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| Mercury, Dissolved | mg/L | 0.002 | 0.00017 J | NS | NS | NS | 0.00012 J | < 0.00013 U | < 0.00013 U | 0.00011 J | NS | < 0.00013 U | < 0.00013 U | NS | < 0.00013 U | < 0.00013 U | < 0.00013 U | 0.0005 |
| Mercury, Total | mg/L | | < 0.00013 U | NS | NS | NS | < 0.00013 U | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |

Notes:

PADEP = Pennsylvania Department of Environmental Protection

MSC = Medium Specific Concentration

MADW = Mifflin Avenue Deep Well

MARW = Mifflin Avenue Residential Well

MACW = Mifflin Avenue Cabin Well

NS = Not Sampled

NA = Not Applicable

U = Not detected. The associated number indicates approximate sample concentration necessary to be detected.

K = Analyte present. Reported value may be biased high. Actual value is expected lower.

J = Analyte present. Reported value may not be accurate or precise.

UJ = Not detected. Quantitation limit may be inaccurate or imprecise.

B = Not detected substantially above the level reported in laboratory or field blanks.

Shaded and **Bolded** Results Represent Exceedences of PADEP RDC MSC

* - USEPA National Secondary Drinking Water Standards (non-enforceable) Guidelines

mg/L = milligrams per liter µg/L = micrograms per liter

VOC = volatile organic compounds

SIM = selective ion monitoring

PAH = polycyclic aromatic hydrocarbons

## TABLE 4-2 GROUNDWATER SAMPLE RESULTS 2011

| | | **Location ID** | MW-8A | MW-9 | MW-9A | MW-12 | MW-14 | MW-15 |
|---|---|---|---|---|---|---|---|---|
| | | **Sample Name** | MW-8A | MW-9 | MW-9A | MW-12 | MW-14 | MW-15 |
| | | **Date** | 6/1/2011 | 6/1/2011 | 6/1/2011 | 5/31/2011 | 5/31/2011 | 5/31/2011 |
| | | **Parent Sample Name** | | | | | | |
| Analyte | Unit | PADEP MSC | | | | | | |
| **VOCs (SW846 8260B)** | | | | | | | | |
| cis-1,2-dichloroethene | µg/L | 70 | < 0.75 U | 5.7 J | < 0.75 UJ | 2 J | < 0.75 UJ | 2.1 J |
| Tetrachloroethene | µg/L | 5 | < 0.75 U | < 0.75 UJ | < 0.75 UJ | < 0.75 UJ | < 0.75 UJ | < 0.75 UJ |
| trans-1,2-dichloroethene | µg/L | 100 | < 0.75 U | 1.3 J | < 0.75 UJ | 0.87 J | < 0.75 UJ | 0.36 J |
| Trichloroethene | µg/L | 5 | < 0.75 U | **17.1 J** | < 0.75 UJ | **6.3 J** | 0.46 J | 1.4 J |
| Vinyl chloride | µg/L | 2 | < 0.75 U | < 0.75 UJ | < 0.75 UJ | < 0.75 UJ | < 0.75 UJ | < 0.75 UJ |
| **PAHs (SW846 8270D/8270 SIM)** | | | | | | | | |
| Acenaphthene | µg/L | 2,200 | NS | NS | NS | NS | NS | NS |
| Acenaphthylene | µg/L | 2,200 | NS | NS | NS | NS | NS | NS |
| Anthracene | µg/L | 66 | NS | NS | NS | NS | NS | NS |
| Benzo[a]anthracene | µg/L | 0.29 | NS | NS | NS | NS | NS | NS |
| Benzo[a]pyrene | µg/L | 0.2 | NS | NS | NS | NS | NS | NS |
| Benzo[b]fluoranthene | µg/L | 0.29 | NS | NS | NS | NS | NS | NS |
| Benzo[g,h,i]perylene | µg/L | 0.26 | NS | NS | NS | NS | NS | NS |
| Benzo[k]fluoranthene | µg/L | 0.55 | NS | NS | NS | NS | NS | NS |
| Chrysene | µg/L | 1.9 | NS | NS | NS | NS | NS | NS |
| Dibenz[a,h]anthracene | µg/L | 0.029 | NS | NS | NS | NS | NS | NS |
| Fluoranthene | µg/L | 260 | NS | NS | NS | NS | NS | NS |
| Fluorene | µg/L | 1,500 | NS | NS | NS | NS | NS | NS |
| Indeno[1,2,3-c,d]pyrene | µg/L | 0.29 | NS | NS | NS | NS | NS | NS |
| Naphthalene | µg/L | 100 | NS | NS | NS | NS | NS | NS |
| Phenanthrene | µg/L | 1,100 | NS | NS | NS | NS | NS | NS |
| Pyrene | µg/L | 130 | NS | NS | NS | NS | NS | NS |
| **Cyanide (SM20-4500CNI)** | | | | | | | | |
| Cyanide,Weak/Dissociable (Free) | mg/L | 0.2 | NS | < 0.005 U | < 0.005 U | NS | NS | < 0.005 U |
| **Metals (SW846 6020A)** | | | | | | | | |
| Arsenic, Dissolved | mg/L | 0.01 | NS | 0.0012 K | < 0.002 U | NS | NS | 0.0029 J |
| Arsenic, Total | mg/L | | NS | NS | NS | NS | NS | NS |
| Barium, Dissolved | mg/L | 2 | NS | 0.4 J | 0.018 J | NS | NS | 0.3 J |
| Barium, Total | mg/L | | NS | NS | NS | NS | NS | NS |
| Beryllium, Dissolved | mg/L | 0.004 | NS | < 0.00067 U | < 0.00067 U | NS | NS | < 0.00067 U |
| Beryllium, Total | mg/L | | NS | NS | NS | NS | NS | NS |
| Cadmium, Dissolved | mg/L | 0.005 | NS | < 0.00067 U | < 0.00067 U | NS | NS | < 0.00067 U |
| Cadmium, Total | mg/L | | NS | NS | NS | NS | NS | NS |
| Chromium, Dissolved | mg/L | 0.1 | NS | < 0.0013 U | < 0.0013 U | NS | NS | 0.0011 J |
| Chromium, Total | mg/L | | NS | NS | NS | NS | NS | NS |
| Copper, Dissolved | mg/L | 1.3 | NS | < 0.0033 U | 0.0047 J | NS | NS | < 0.0033 U |
| Copper, Total | mg/L | | NS | NS | NS | NS | NS | NS |
| Iron, Dissolved | mg/L | 0.3* | NS | 0.25 | 0.081 | NS | NS | 0.18 |
| Iron, Total | mg/L | | NS | NS | NS | NS | NS | NS |
| Lead, Dissolved | mg/L | 0.005 | NS | < 0.0013 U | < 0.0013 U | NS | NS | < 0.0013 U |
| Lead, Total | mg/L | | NS | NS | NS | NS | NS | NS |
| Manganese, Dissolved | mg/L | 0.3* | NS | < 0.0033 U | 0.088 | NS | NS | < 0.0033 U |
| Manganese, Total | mg/L | | NS | NS | NS | NS | NS | NS |
| Mercury, Dissolved | mg/L | 0.002 | NS | < 0.00013 U | 0.00007 J | NS | NS | < 0.00013 U |
| Mercury, Total | mg/L | | NS | NS | NS | NS | NS | NS |

Notes:

PADEP = Pennsylvania Department of Environmental Protection

MSC = Medium Specific Concentration

MADW = Mifflin Avenue Deep Well

MARW = Mifflin Avenue Residential Well

MACW = Mifflin Avenue Cabin Well

NS = Not Sampled

NA = Not Applicable

U = Not detected. The associated number indicates approximate sample concentration necessary to be detected.

K = Analyte present. Reported value may be biased high. Actual value is expected lower.

J = Analyte present. Reported value may not be accurate or precise.

UJ = Not detected. Quantitation limit may be inaccurate or imprecise.

B = Not detected substantially above the level reported in laboratory or field blanks.

Shaded and **Bolded** Results Represent Exceedences of PADEP RDC MSC

* - USEPA National Secondary Drinking Water Standards (non-enforceable) Guidelines

mg/L = milligrams per liter µg/L = micrograms per liter

VOC = volatile organic compounds

SIM = selective ion monitoring

PAH = polycyclic aromatic hydrocarbons

## TABLE 4-3 COMPARISON OF HISTORICAL AND 2011 CONFIRMATORY SOIL SAMPLE RESULTS

| | | **Sample Name** | MW-2 S-1 | MW-2 S-1 DUP | SB-3 0-0.5 | SB-DUP-2 | MW-2 S-2 | SB-3-2-4 | S3 | SB-5-0-0.5 | S5 | S52 | SB-6-0-0.5 | MW-1 S-1 | SB-7-0-0.5 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | **Sample Date** | 1989 | 1989 | 6/2/2011 | 6/2/2011 | 1989 | 6/2/2011 | 1988 | 6/2/2011 | 6/23/1988 | 6/23/1988 | 6/2/2011 | 1989 | 6/2/2011 |
| | | **Parent Sample Name** | | MW-2 S-1 | | SB-3 0-0.5 | | | | | | | | | |
| | | **Historical Sample Being Confirmed** | | | MW-2 S-1 | MW-2 S-1 | | MW-2 2-4 | | S-3 | | | S-5/S-52 | | MW-1 |
| | | **Depth (ft)** | 0-2 | 0-2 | 0-0.5 | 0-0.5 | 2-4 | 2-4 | 0-2 | 0-0.5 | 0-2 | 0-2 | 0-0.5 | 0-2 | 0-0.5 |
| Analyte | PADEP RDC MSC | Unit | | | | | | | | | | | | | |
| **General Chemistry (SM2540G)** | | | | | | | | | | | | | | | |
| Moisture Content | | % | -- | -- | 12.9 | 31.7 | -- | 28.6 | -- | 18.9 | -- | -- | 11.9 | -- | 13.3 |
| Solid | | % | -- | -- | 87.1 | 68.3 | -- | 71.4 | -- | 81.1 | -- | -- | 88.1 | -- | 86.7 |
| **Metals (SW846 6010C)** | | | | | | | | | | | | | | | |
| Arsenic | 12 | mg/kg | **14.4** | -- | 7.3 | -- | 8.4 | -- | 2.4 | -- | 1.3 | 2.6 | -- | 2.2 | -- |
| Barium | 44,000 | mg/kg | 1,400 | -- | -- | -- | 719 | -- | -- | -- | -- | -- | -- | -- | -- |
| Beryllium | 440 | mg/kg | 0.96 | -- | -- | -- | 0.59 B | -- | < 2.5 U | -- | < 2.5 U | < 2.5 U | -- | -- | -- |
| Cadmium | 110 | mg/kg | 2 | -- | -- | -- | 0.79 | -- | 5.6 | -- | 3.8 | 7.7 | -- | -- | -- |
| Chromium | 190,000 | mg/kg | 70.2 | -- | -- | -- | 47.4 | -- | 33 | -- | 1.5 | 49 | -- | -- | -- |
| Copper | 8,100 | mg/kg | 1,970 | -- | -- | -- | 1,360 | -- | 797 | -- | 26.6 | 185 | -- | -- | -- |
| Iron | 150,000 | mg/kg | 38,500 | -- | -- | -- | 41,700 | -- | -- | -- | -- | -- | -- | 62.6 | -- |
| Lead | 500 | mg/kg | **1,140** | **671** | 46 K | -- | **671** | **1,260 K** | **1,080** | **567 K** | 175 | **1,020** | 36.6 K | 1.8 | -- |
| Manganese | 10,000 | mg/kg | 590 | -- | -- | -- | 540 | -- | -- | -- | -- | -- | -- | -- | -- |
| Thallium | 15 | mg/kg | -- | -- | -- | -- | -- | -- | 13 | < 2.2 U | **16** | 11 | < 2 U | -- | -- |
| **Mercury (SW846 7471B)** | | | | | | | | | | | | | | | |
| Mercury | 35 | mg/kg | -- | -- | -- | -- | -- | -- | 0.07 | -- | -- | 0.09 | -- | -- | -- |
| **VOCs (SW846 8260B)** | | | | | | | | | | | | | | | |
| cis-1,2-dichloroethene | 2,200,000 | µg/kg | -- | -- | < 1.1 U | -- | -- | 16.9 | -- | < 1.3 UJ | -- | -- | < 1 U | -- | < 1 UJ |
| Tetrachloroethene (PCE) | 340,000 | µg/kg | -- | -- | < 1.1 U | -- | -- | 14.3 J | < 500 U | < 1.3 UJ | < 500 U | < 500 U | < 1 U | -- | < 1 UJ |
| trans-1,2-dichloroethene | 1,100,000 | µg/kg | -- | -- | < 1.1 U | -- | -- | 2.3 J | -- | < 1.3 UJ | -- | -- | < 1 U | -- | < 1 UJ |
| Trichloroethene (TCE) | 260,000 | µg/kg | -- | -- | 0.88 J | -- | -- | 109 | < 500 U | 9.3 J | < 500 U | 2,600 | 1.9 J | -- | < 1 UJ |
| Vinyl chloride | 1,900 | µg/kg | -- | -- | < 1.1 U | -- | -- | < 1.8 U | -- | < 1.3 UJ | -- | -- | < 1 U | -- | < 1 UJ |
| **PAHs (SW846 8270D)** | | µg/kg | | | | | | | | | | | | | |
| Acenaphthene | 13,000,000 | µg/kg | 200,000 | 34,000 J | 5,720 | 5,190 | 5,900 J | 8,420 | 920 | -- | U | U | -- | < 1200 U | -- |
| Acenaphthylene | 13,000,000 | µg/kg | U | -- | 236 J | 548 | U | 652 | U | -- | U | U | -- | < 1200 U | -- |
| Anthracene | 66,000,000 | µg/kg | 410,000 | 70,000 | 16,900 | 14,000 | 14,000 | 20,600 | U | -- | U | U | -- | < 1200 U | -- |
| Benzo[a]anthracene | 5,700 | µg/kg | **500,000** | **120,000** | **29,600** | **29,500** | **40,000** | **41,300** | U | -- | U | U | -- | < 1200 U | -- |
| Benzo[a]pyrene | 570 | µg/kg | **350,000** | **91,000** | **24,200** | **25,000** | **37,000** | **35,000** | U | -- | U | U | -- | < 1200 U | -- |
| Benzo[b]fluoranthene | 5,700 | µg/kg | **350,000** | **86,000** | **25,400** | **25,100** | **35,000** | **36,000** | **8,300** | -- | < 330 U | < 330 U | -- | < 1200 U | -- |
| Benzo[k]fluoranthene | 57,000 | µg/kg | **230,000** | **77,000** | 21,200 | 24,300 | 36,000 | 30,800 | 7,300 | -- | < 330 U | < 330 U | -- | < 1200 U | -- |
| Chrysene | 570,000 | µg/kg | 450,000 | 110,000 | 28,700 | 28,400 | 42,000 | 39,300 | 4,600 | -- | < 330 U | < 330 U | -- | < 1200 U | -- |
| Dibenzo[a,h]anthracene | 570 | µg/kg | **55,000** | **28,000 J** | **6,420** | **6,500 J** | **<50,000 U** | **10,100** | U | -- | U | U | -- | < 1200 U | -- |
| Fluoranthene | 8,800,000 | µg/kg | 1,100,000 | 280,000 | 64,600 | 57,700 | 79,000 | 81,300 | 7,300 | -- | < 330 U | < 330 U | -- | < 1200 U | -- |
| Fluorene | 8,800,000 | µg/kg | 280 | 51,000 | 8,500 | 7,510 J | 6,300 J | 11,200 | U | -- | U | U | -- | < 1200 U | -- |
| Indeno[1,2,3-c,d]pyrene | 5,700 | µg/kg | **160,000** | **49,000** | **14,700** | **15,000** | **22,000** | **24,000** | U | -- | U | U | -- | < 1200 U | -- |
| Naphthalene | 4,400,000 | µg/kg | 120,000 | 47,000 | 1,710 | 4,710 | 13,000 | 3,270 | 400 | -- | < 330 U | < 330 U | -- | < 1200 U | -- |
| Phenanthrene | 66,000,000 | µg/kg | 1,200,000 | 250,000 | 60,700 | 50,200 | 63,000 | 72,400 | 1,900 | -- | < 330 U | < 330 U | -- | < 1200 U | -- |
| Pyrene | 6,600,000 | µg/kg | 790,000 | 210,000 | 52,700 | 52,000 | 58,000 | 70,500 | 6,600 | -- | < 330 U | < 330 U | -- | < 1200 U | -- |

Shaded column headers are historical sample results (for comparison with 2011 data).

Shaded and **Bolded** Results Represent Exceedences of 2011 PADEP RDC MSC

PADEP = Pennsylvania Department of Environmental Protection

MSC = Medium Specific Concentration

RDC = Residential Direct Contact

U = Not detected. The associated number indicates approximate sample concentration necessary to be detected.

K = Analyte present. Reported value may be biased high. Actual value is expected lower.

J = Analyte present. Reported value may not be accurate or precise.

UJ = Not detected. Quantitation limit may be inaccurate or imprecise.

B = Not detected substantially above the level reported in laboratory or field blanks.

µg/kg = micrograms per kilogram  mg/kg = milligrams per kilogram

-- : No data

(for 2011 data: Indicates analysis not performed)

(for historic data: Indicates analysis not performed or data not in database)

VOC = volatile organic compound

PAH = polycyclic aromatic hydrocarbon

## TABLE 4-3 COMPARISON OF HISTORICAL AND 2011 CONFIRMATORY SOIL SAMPLE RESULTS

| | | **Sample Name** | MW-1 S-3 | SB-7-4-6 | MW-4 S-1 | SB-8-0-0.5 | MW-4 S-2 | SB-8-2-4 | S9 | S10 | SB-DUP-1 | SB-2-0-0.5 | SS8 | SS8D | SB-10-0-0.5 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | **Sample Date** | 1989 | 6/2/2011 | 1989 | 6/2/2011 | 1989 | 6/2/2011 | 6/23/1988 | 6/23/1988 | 6/2/2011 | 6/2/2011 | 5/25/1988 | 5/25/1988 | 6/2/2011 |
| | | **Parent Sample Name** | | | | | | | | | SB-2-0-0.5 | | SS8 | SS8 | |
| | | **Historical Sample Being Confirmed** | | MW-1 | | MW-4 | | MW-4 | | | S-9/S-10 | S-9/S-10 | | SS8D | SS-8 |
| | | **Depth (ft)** | 4-6 | 4-6 | 0-2 | 0-0.5 | 2-4 | 2-4 | 0-2 | 0-2 | 0-0.5 | 0-0.5 | 0-2 | 0-2 | 0-0.5 |
| Analyte | PADEP RDC MSC | Unit | | | | | | | | | | | | | |
| **General Chemistry (SM2540G)** | | | | | | | | | | | | | | | |
| Moisture Content | | % | -- | 16.6 | -- | 20.5 | -- | 20 | -- | -- | 22.1 | 14.9 | -- | | 16.7 |
| Solid | | % | -- | 83.4 | -- | 79.5 | -- | 80 | -- | -- | 77.9 | 85.1 | -- | | 83.3 |
| **Metals (SW846 6010C)** | | | | | | | | | | | | | | | |
| Arsenic | 12 | mg/kg | **22.6** | 7.2 | **15.4** | 6.7 | **15.6** | 6.5 | 1 | 1.5 | 8.5 | 9.2 | 6.22 | 5.63 | -- |
| Barium | 44,000 | mg/kg | 46.4 | -- | 130 | -- | 141 | -- | -- | -- | 65.5 | 76.7 | -- | -- | -- |
| Beryllium | 440 | mg/kg | 0.78 | -- | 0.72 | -- | 0.88 | -- | < 2.5 U | < 2.5 U | 0.6 J | 0.63 J | < 1 U | < 1 U | -- |
| Cadmium | 110 | mg/kg | U | -- | U | -- | U | -- | 3.6 | 5.7 | < 0.39 U | < 0.36 U | < 1 U | < 1 U | -- |
| Chromium | 190,000 | mg/kg | 23.9 | -- | 12.7 | -- | 15.6 | -- | 5.7 | 7.4 | 15.7 | 33.8 | 8.36 | 16.6 | -- |
| Copper | 8,100 | mg/kg | 17.7 | -- | 4 | -- | 9.5 | -- | 8.8 | 16 | 36.9 | 36.7 | 39.9 | 37.5 | -- |
| Iron | 150,000 | mg/kg | 35,300 | -- | 18,000 | -- | 18,100 | -- | -- | -- | 21,300 | 25,200 | -- | -- | -- |
| Lead | 500 | mg/kg | 18.1 | -- | 14.6 | -- | 17.1 | -- | 35 | 66 | 58.2 K | 132 K | 44 | 32.7 | -- |
| Manganese | 10,000 | mg/kg | 423 | -- | 1,440 | -- | 1,650 | -- | -- | -- | 464 | 466 | -- | -- | -- |
| Thallium | 15 | mg/kg | -- | -- | -- | -- | -- | -- | < 5 U | < 5 U | -- | -- | < 2 U | < 2 U | -- |
| **Mercury (SW846 7471B)** | | | | | | | | | | | | | | | |
| Mercury | 35 | mg/kg | -- | -- | -- | -- | -- | -- | 0.32 | < 0.05 U | < 0.15 U | < 0.15 U | 0.4 | < 0.04 U | -- |
| **VOCs (SW846 8260B)** | | | | | | | | | | | | | | | |
| cis-1,2-dichloroethene | 2,200,000 | µg/kg | -- | < 1 UJ | -- | < 1.1 U | -- | < 1.2 UJ | -- | -- | < 1.2 U | < 1.1 U | -- | -- | < 1.1 U |
| Tetrachloroethene (PCE) | 340,000 | µg/kg | -- | < 1 UJ | -- | < 1.1 UJ | -- | < 1.2 UJ | <500 U | < 500 U | < 1.2 U | < 1.1 U | -- | -- | < 1.1 U |
| trans-1,2-dichloroethene | 1,100,000 | µg/kg | -- | < 1 UJ | -- | < 1.1 U | -- | < 1.2 UJ | -- | -- | < 1.2 U | < 1.1 U | -- | -- | < 1.1 U |
| Trichloroethene (TCE) | 260,000 | µg/kg | -- | < 1 UJ | -- | < 1.1 U | -- | < 1.2 UJ | < 500 U | < 500 U | 4.7 | < 1.1 U | -- | -- | < 1.1 U |
| Vinyl chloride | 1,900 | µg/kg | -- | < 1 UJ | -- | < 1.1 U | -- | < 1.2 UJ | -- | -- | < 1.2 U | < 1.1 U | -- | -- | < 1.1 U |
| **PAHs (SW846 8270D)** | | µg/kg | | | | | | | | | | | | | |
| Acenaphthene | 13,000,000 | µg/kg | < 1200 U | -- | < 1200 U | -- | < 1200 U | -- | < 330 U | < 330 U | -- | -- | 960 | 380 | 1,780 |
| Acenaphthylene | 13,000,000 | µg/kg | < 1200 U | -- | < 1200 U | -- | < 1200 U | -- | U | U | -- | -- | U | -- | 108 J |
| Anthracene | 66,000,000 | µg/kg | < 1200 U | -- | < 1200 U | -- | < 1200 U | -- | U | U | -- | -- | 1,490 | 700 | 3,550 |
| Benzo[a]anthracene | 5,700 | µg/kg | < 1200 U | -- | < 1200 U | -- | < 1200 U | -- | U | U | -- | -- | 4,200 | 1,970 | **8,720** |
| Benzo[a]pyrene | 570 | µg/kg | < 1200 U | -- | < 1200 U | -- | < 1200 U | -- | U | U | -- | -- | **3,330** | **1,410** | **7,290** |
| Benzo[b]fluoranthene | 5,700 | µg/kg | < 1200 U | -- | < 1200 U | -- | < 1200 U | -- | < 330 U | < 330 U | -- | -- | 2,010 | 900 | **7,060** |
| Benzo[k]fluoranthene | 57,000 | µg/kg | < 1200 U | -- | < 1200 U | -- | < 1200 U | -- | < 330 U | < 330 U | -- | -- | 1,770 | 890 | 6,710 |
| Chrysene | 570,000 | µg/kg | < 1200 U | -- | < 1200 U | -- | < 1200 U | -- | < 330 U | < 330 U | -- | -- | 3,970 | 1,930 | 8,060 |
| Dibenzo[a,h]anthracene | 570 | µg/kg | < 1200 U | -- | < 1200 U | -- | < 1200 U | -- | U | U | -- | -- | **780** | < 330 U | **946** |
| Fluoranthene | 8,800,000 | µg/kg | < 1200 U | -- | 240 J | -- | < 1200 U | -- | < 330 U | < 330 U | -- | -- | 8,100 | 4,840 | 17,500 |
| Fluorene | 8,800,000 | µg/kg | < 1200 U | -- | < 1200 U | -- | < 1200 U | -- | U | U | -- | -- | 980 | 420 | 1,840 |
| Indeno[1,2,3-c,d]pyrene | 5,700 | µg/kg | < 1200 U | -- | < 1200 U | -- | < 1200 U | -- | U | U | -- | -- | 1,930 | 750 | 1,880 |
| Naphthalene | 4,400,000 | µg/kg | < 1200 U | -- | < 1200 U | -- | < 1200 U | -- | < 330 U | < 330 U | -- | -- | 410 | 80 | 505 |
| Phenanthrene | 66,000,000 | µg/kg | < 1200 U | -- | 200 J | -- | < 1200 U | -- | < 330 U | < 330 U | -- | -- | 7,150 | 3,630 | 14,900 |
| Pyrene | 6,600,000 | µg/kg | < 1200 U | -- | 210 J | -- | < 1200 U | -- | < 330 U | < 330 U | -- | -- | 6,860 | 4,100 | 15,400 |

Shaded column headers are historical sample results (for comparison with 2011 data).

Shaded and **Bolded** Results Represent Exceedences of 2011 PADEP RDC MSC

PADEP = Pennsylvania Department of Environmental Protection

MSC = Medium Specific Concentration

RDC = Residential Direct Contact

U = Not detected. The associated number indicates approximate sample concentration necessary to be detected.

K = Analyte present. Reported value may be biased high. Actual value is expected lower.

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B = Not detected substantially above the level reported in laboratory or field blanks.

µg/kg = micrograms per kilogram  mg/kg = milligrams per kilogram

-- : No data

(for 2011 data: Indicates analysis not performed)

(for historic data: Indicates analysis not performed or data not in database)

VOC = volatile organic compound

PAH = polycyclic aromatic hydrocarbon

**TABLE 4-4 EVALUATION OF CONFIRMATORY SOIL SAMPLES**

| Historical Sampling Results | | | | Objective of 2011 Sampling Events | Confirmatory Sampling and Analysis Plan | | | Results |
|---|---|---|---|---|---|---|---|---|
| Historical Sampling Location | Depth (ft) | Constituents Exceeding PADEP RDC MSC | | | Analysis | Depth (ft bgs) | Confirmatory Sampling Location | |
| MW-1 | Surface | 0-2 | None | Establish no exceedances of ROD VOCs in the vicinity of MW-1 in surface soil to support Act 2 reporting. | ROD VOCs | 0-0.5 | 7 | ROD VOCs: Concentrations in surface soil were non-detect. |
| | Subsurface | 2-4 | None | NA | NA | NA | NA | NA |
| | | 4-6 | Arsenic | Confirm prior arsenic results in surface soil because although ubiquitous across the site, arsenic exceeded the PADEP RDC MSC at this location. Establish no exceedances of ROD VOCs in the vicinity of MW-1 in surface soil to support Act 2 reporting. | Arsenic, ROD VOCs | 4-6 | 7 | Arsenic: The reported historical arsenic concentration (22.6 mg/kg) exceeded the PADEP RDC MSC, while the reported concentration (7.2 mg/kg) for the confirmatory result was less than the PADEP RDC MSC. The historical concentration of arsenic was significantly higher than the confirmatory result.<br>ROD VOCs: Concentrations in subsurface soils were non-detect. |
| | | 6-8 | | None. Arsenic is ubiquitous across the site. | NA | NA | NA | NA |
| MW-2 | Surface | 0-2 | PAHs, Arsenic, Lead | Confirm reported PAHs and lead in surface soil. Confirm prior arsenic results in surface soil because although ubiquitous across the site, arsenic exceeded the PADEP RDC MSC at this location. Establish no VOC exceedances in surface soil in the vicinity of MW-2 to support Act 2 reporting. | ROD VOCs, PAHs, Arsenic, Lead | 0-0.5 | 3 | Arsenic: The reported historical arsenic concentration (14.4 mg/kg) exceeded the PADEP RDC MSC, and was twice the reported concentration (7.3 mg/kg) of the confirmatory result. The confirmatory result is less than the PADEP RDC MSC.<br>Lead: The reported historical lead concentrations (1,140 mg/kg; 671 mg/kg in duplicate sample) exceeded the PADEP RDC MSC, while the reported concentration (46 mg/kg) for the confirmatory result is less than the PADEP RDC MSC and is significantly less than the historical sample result.<br>PAHs: PAHs in surface soil are one order of magnitude lower than historical sampling results, but exceed PADEP RDC MSCs.<br>ROD VOCs: no ROD VOCs exceed PADEP RDC MSCs. |
| | Subsurface | 2-4 | PAHs, Lead | Confirm PAHs and lead in subsurface soil. Location 3 placed approximately 5-7 ft west of MW-2, to avoid potential metals from well casing and bollards. Establish no VOC exceedances in subsurface soil in the vicinity of MW-2 to support Act 2 reporting. | ROD VOCs, PAHs, Lead | 2-4 | | Lead: The reported historical lead concentration was 671 mg/kg and was approximately half the confirmatory result (1,260 mg/kg); both exceed PADEP RDC MSC.<br>PAHs: PAHs in subsurface soils were similar to those in historical sampling results; PAHs in subsurface soil exceed PADEP RDC MSCs.<br>ROD VOCs: no ROD VOCs exceed PADEP RDC MSCs.<br>Black, flexible material was noted in SB-3, 2-4 ft bgs. The material had a melted appearance and may have been plastic or tar/asphalt. |
| | | 4-6 | None | NA | NA | NA | NA | NA |
| | | 6-8 | 1 PAH | None. No confirmation of PAHs included because historical concentrations decreased significantly with depth. | NA | NA | NA | NA |
| | | 8-10 | 1 PAH | None. No confirmation of PAHs included because historical concentrations decreased significantly with depth. | NA | NA | NA | NA |

**TABLE 4-4 EVALUATION OF CONFIRMATORY SOIL SAMPLES**

| Historical Sampling Results | | | | Objective of 2011 Sampling Events | Confirmatory Sampling and Analysis Plan | | | Results |
|---|---|---|---|---|---|---|---|---|
| Historical Sampling Location | Depth (ft) | Constituents Exceeding PADEP RDC MSC | | | Analysis | Depth (ft bgs) | Confirmatory Sampling Location | |
| MW-4 | Surface | 0-2 | Arsenic | Confirm prior arsenic results in surface soil because although ubiquitous across the site, arsenic exceeded the PADEP RDC MSC at this location. Evalute no exceedances of ROD VOCs in surface soil in the vicinity of MW-4 to support Act 2 reporting. | Arsenic, ROD VOCs | 0-0.5 | 8 | Arsenic: The reported historical arsenic concentration (15.4 mg/kg) exceeded the PADEP RDC MSC, while the reported concentration (6.7 mg/kg) for the confirmatory result is less than the PADEP RDC MSC. The confirmatory result is approximately half of the historical sample result.<br>ROD VOCs: Concentrations in surface soil were non-detect. |
| | Subsurface | 2-4 | | | | 2-4 | | Arsenic: The reported historical arsenic concentration (15.6 mg/kg) exceeded the PADEP RDC MSC, while the reported concentration (6.5 mg/kg) for the confirmatory result is less than the PADEP RDC MSC. The confirmatory result is approximately half of the historical sample result.<br>ROD VOCs: Concentrations in subsurface soils were non-detect. |
| | Subsurface | 4-6<br>6-8 | | None. Arsenic is ubiquitous across the site. | NA | NA | NA | NA |
| S-3 | Surface | 0-0.5 | Lead | Confirm reported lead. Confirm reported thallium because it was reported at 75% of the MSC. Establish no exceedances of ROD VOCs in surface soil to support Act 2 reporting. | ROD VOCs, Lead, Thallium | 0-0.5 | 5 | Lead: The reported historical concentration of 1,080 mg/kg is nearly twice the confirmatory sample concentration of 567 mg/kg; both exceed PADEP RDC MSC.<br>Thallium: The reported historical thallium concentration of 13 mg/kg is significantly greater than the confirmatory sample concentration of <2.2U mg/kg; both are less than the PADEP RDC MSC.<br>ROD VOCs: no ROD VOCs exceed PADEP RDC MSCs.<br>Black material, possibly plastic or hardened asphalt, was encountered in SB-5, 0-0.5 ft bgs. |
| | Subsurface | None | NA | NA | NA | NA | NA | NA |
| S-5/S-52 | Surface | 0-0.5 | Lead, Thallium | Confirm lead and thallium. Establish no exceedances of ROD VOCs and PAHs in surface soil in the vicinity of S-52 to support Act 2 reporting. | ROD VOCs, Lead, Thallium | 0-0.5 | 6 | Thallium: The reported historical thallium concentration (16 mg/kg) exceeded the PADEP RDC MSC, while the reported concentration (<2 mg/kg) for the confirmatory result was less than the PADEP RDC MSC. The confirmatory result is significantly less than the historical sample result.<br>Lead: The reported historical lead concentration (1,020 mg/kg) exceeded the PADEP RDC MSC, while the reported concentration (36.6 mg/kg) for the confirmatory result is significantly less than the historical results and is less than the PADEP RDC MSC.<br>ROD VOCs: no ROD VOCs exceed PADEP RDC MSCs. |
| | Subsurface | None | NA | NA | NA | NA | NA | NA |

**TABLE 4-4 EVALUATION OF CONFIRMATORY SOIL SAMPLES**

| Historical Sampling Results | | | | Objective of 2011 Sampling Events | Confirmatory Sampling and Analysis Plan | | | Results |
|---|---|---|---|---|---|---|---|---|
| Historical Sampling Location | Depth (ft) | Constituents Exceeding PADEP RDC MSC | | | Analysis | Depth (ft bgs) | Confirmatory Sampling Location | |
| SS-8 | Surface | 0-0.5 | PAHs | Confirm PAHs. Establish no ROD VOC exceedances to support Act 2 reporting. | ROD VOCs, PAHs | 0-0.5 | 10 | PAHs: Two reported historical PAH (benzo[a]anthracene and dibenzo[a,h]anthracene) concentrations exceeded the PADEP RDC MSCs in the historical sample, while the reported concentrations for four PAHs (benzo[a]anthracene; benzo[a]pyrene; benzo[b]fluoranthene; and dibenzo[a,h]anthracene) in the confirmatory sample exceeded the PADEP RDC MSCs.<br>ROD VOCs: Concentrations in surface soil were non-detect.<br>Black material, possibly plastic or hardened asphalt, was encountered in SB-10, 0-0.5 ft bgs. |
| S-9/S-10 | Surface | 0-0.5 | None | Establish no ROD VOC or TAL metal exceedances in the vicinity of prior locations S-9 and S-10 to support Act 2 reporting. | ROD VOCs, TAL metals | 0-0.5 | 2 | TAL metals: No TAL metals exceed PADEP RDC MSCs.<br>ROD VOCs: Concentrations in surface soil were non-detect. |
| | Subsurface | None | NA | NA | NA | NA | NA | NA |

ft = feet/foot NA = Not Applicable PAH = Polycyclic Aromatic Hydrocarbons VOCs = Volatile Organic Compounds bgs = below ground surface ROD = Record of Decision
PADEP RDC MSC = Pennsylvania Department of Environmental Protection Residential Direct Contact Medium Specific Concentration
bgs = below ground surface MW = monitoring well

# TABLE 4-5 COMPARISON OF HISTORICAL AND 2011 DELINEATION SOIL SAMPLE RESULTS

| | | **Sample Name** | MW-2 S-1 | MW-2 S-1 DUP | S3 | SB-4 | SB-11 | MW-2 S-2 | SB-4 | SB-11 | SD-5 | SD-6 | SD-7 | SD-8 | SD-9 | DUP-1 | S5 | S52 | SS8 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | **Sample Date** | 1989 | 1989 | 6/23/1988 | 6/2/2011 | 6/2/2011 | 1989 | 6/2/2011 | 6/2/2011 | 12/9/2011 | 12/9/2011 | 12/9/2011 | 12/9/2011 | 12/9/2011 | 12/9/2011 | 6/23/1988 | 6/23/1988 | 5/25/1988 |
| | | **Historical Sample Being Delineated** | | | | S-3 | MW-2 | | MW-2 | MW-2 | | | | | | | | | |
| | | **Parent Sample Name** | | MW-2 S-1 | | | | | | | | | | | | SD-9 | | | SS8 |
| | | **Depth (ft)** | 0-2 | 0-2 | 0-2 | 0-0.5 | 0-0.5 | 2-4 | 2.5-3 | 2-4 | | | | | | | 0-2 | 0-2 | 0-2 |
| Analyte | PADEP RDC MSC | Unit | | | | | | | | | | | | | | | | | |
| **General Chemistry (SM2540G)** | | | | | | | | | | | | | | | | | | | |
| Moisture Content | | % | -- | -- | -- | 18.3 | 5.4 | -- | 12 | 20.9 | 32 | 41.3 | 33.8 | 43.2 | 38.3 | 42.2 | -- | -- | -- |
| Solid | | % | -- | -- | -- | 81.7 | 94.6 | -- | 88 | 79.1 | 68 | 58.7 | 66.2 | 56.8 | 61.7 | 57.8 | -- | -- | -- |
| **Metals (SW846 6010C)** | | | | | | | | | | | | | | | | | | | |
| Arsenic | 12 | mg/kg | **14.4** | -- | 2.4 | -- | 2.5 J | 8.4 | -- | -- | 8 | 8.6 | 11.1 | 7 | 9.8 | 10.2 | 1.3 | 2.6 | 6.22 |
| Lead | 500 | mg/kg | **1,140** | **671** | **1,080** | **627 K** | 14.5 K | **671** | **838 K** | 49.3 K | 61 | 69.2 | 70.9 | 44.1 | 62.3 | 64.6 | 175 | **1,020** | **44** |
| Thallium | 15 | mg/kg | -- | -- | 13 | < 2.3 U | -- | -- | -- | -- | 2.4 U | 3.3 U | 2.9 U | 3.5 U | 3 U | 3.1 U | **16** | 11 | < 2 U |
| **VOCs (SW846 8260B)** | | | | | | | | | | | | | | | | | | | |
| cis-1,2-dichloroethene | 2,200,000 | µg/kg | -- | -- | -- | -- | -- | -- | -- | < 1.1 UJ | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| Tetrachloroethene (PCE) | 340,000 | µg/kg | -- | -- | -- | -- | -- | -- | -- | < 1.1 UJ | -- | -- | -- | -- | -- | -- | -- | 2,600 | -- |
| trans-1,2-dichloroethene | 1,100,000 | µg/kg | -- | -- | -- | -- | -- | -- | -- | < 1.1 UJ | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| Trichloroethene (TCE) | 260,000 | µg/kg | -- | -- | -- | -- | -- | -- | -- | < 1.1 UJ | -- | -- | -- | -- | -- | -- | -- | 2,600 | -- |
| Vinyl chloride | 1,900 | µg/kg | -- | -- | -- | -- | -- | -- | -- | < 1.1 UJ | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| **PAHs (SW846 8270D)** | | | | | | | | | | | | | | | | | | | |
| Acenaphthene | 13,000,000 | µg/kg | 200,000 | 34,000 J | 920 | 49,000 | 49.1 J | 5,900 J | 1,920 | 3,660 | 47.7 U | 55.1 U | 49.2 U | 35.6 J | 67 J | 77.5 J | < 330 U | < 330 U | 960 |
| Acenaphthylene | 13,000,000 | µg/kg | -- | -- | -- | < 2020 U | < 34.9 U | U | 198 J | 268 J | 25.5 J | 37.7 J | 41.6 J | 76.2 J | 102 J | 115 J | -- | -- | U |
| Anthracene | 66,000,000 | µg/kg | 410,000 | 70,000 | -- | 147,000 | 138 J | 14,000 | 4,430 | 9,420 | 42.4 J | 39.3 J | 52.3 J | 124 J | 193 J | 222 J | -- | -- | 1,490 |
| Benzo[a]anthracene | 5,700 | µg/kg | **500,000** | **120,000** | -- | **244,000** | 378 | **40,000** | **10,900** | **13,400** | 191 J | 180 J | 251 J | 579 | 965 | 931 | -- | -- | 4,200 |
| Benzo[a]pyrene | 570 | µg/kg | **350,000** | **91,000** | -- | **206,000** | 307 | **37,000** | **9,040** | **10,200** | 221 J | 228 J | 293 J | 659 | 1,080 | 996 J | -- | -- | 3,330 |
| Benzo[b]fluoranthene | 5,700 | µg/kg | **350,000** | **86,000** | **8,300** | **161,000** | 302 | **35,000** | **8,550** | **9,140** | 347 J | 389 J | 522 | 1,080 | 1,680 | 1,720 J | < 330 U | < 330 U | 2,010 |
| Benzo[k]fluoranthene | 57,000 | µg/kg | **230,000** | **77,000** | 7,300 | **182,000** | 300 | 36,000 | 8,760 | 9,530 | 151 J | 151 J | 510 | 472 | 573 | 673 J | < 330 U | < 330 U | 1,770 |
| Chrysene | 570,000 | µg/kg | 450,000 | 110,000 | 4,600 | 227,000 | 357 | 42,000 | 10,300 | 11,700 | 259 J | 273 J | 346 J | 711 | 1,200 | 1,070 | < 330 U | < 330 U | 3,970 |
| Dibenzo[a,h]anthracene | 570 | µg/kg | **55,000** | **28,000 J** | -- | **37,400** | 61 J | <50,000 U | **1,290** | **1,140** | 47.7 U | 55.1 U | 49.2 U | 79.7 J | 202 J | 112 J | -- | -- | 780 |
| Fluoranthene | 8,800,000 | µg/kg | 1,100,000 | 280,000 | 7,300 | 612,000 | 773 | 79,000 | 21,100 | 26,500 | 442 | 441 J | 609 | 1,260 | 2,020 | 1,870 | < 330 U | < 330 U | 8,100 |
| Fluorene | 8,800,000 | µg/kg | 280 | 51,000 | -- | 72,900 | 52.3 J | 6,300 J | 2,130 | 4,780 | 14.1 J | 55.1 U | 16.7 J | 44.8 J | 86.1 J | 96.9 J | -- | -- | 980 |
| Indeno[1,2,3-c,d]pyrene | 5,700 | µg/kg | **160,000** | **49,000** | -- | **82,200** | 205 J | **22,000** | 2,630 | 2,150 | 104 J | 100 J | 119 J | 242 J | 644 | 361 J | -- | -- | 1,930 |
| Naphthalene | 4,400,000 | µg/kg | 120,000 | 47,000 | 400 | 29,200 | < 34.9 U | 13,000 | 656 | 2,370 | 47.7 U | 55.1 U | 49.2 U | 57.1 U | 43.5 J | 49.9 J | < 330 U | < 330 U | 410 |
| Phenanthrene | 66,000,000 | µg/kg | 1,200,000 | 250,000 | 1,900 | 503,000 | 547 | 63,000 | 16,800 | 29,400 | 177 J | 183 J | 241 J | 508 | 928 | 890 | < 330 U | < 330 U | 7,150 |
| Pyrene | 6,600,000 | µg/kg | 790,000 | 210,000 | 6,600 | 406,000 | 725 | 58,000 | 18,100 | 23,700 | 356 J | 364 J | 513 | 1,070 | 1,750 | 1,650 | < 330 U | < 330 U | 6,860 |

Shaded column headers are historical sample results (for comparison with 2011 data).

Shaded and **Bolded** Results Represent Exceedences of 2011 PADEP RDC MSC

PADEP = Pennsylvania Department of Environmental Protection
MSC = Medium Specific Concentration
RDC = Residential Direct Contact
U = Not detected. The associated number indicates approximate sample concentration necessary to be detected.
K = Analyte present. Reported value may be biased high. Actual value is expected lower.
J = Analyte present. Reported value may not be accurate or precise.
UJ = Not detected. Quantitation limit may be inaccurate or imprecise.
mg/kg = milligrams per kilogram µg/kg = micrograms per kilogram
-- : No data
(for 2011 data: Indicates analysis not performed)
(for historic data: Indicates analysis not performed or data not in database)
VOC = volatile organic compound
PAH = polycyclic aromatic hydrocarbon

## TABLE 4-5 COMPARISON OF HISTORICAL AND 2011 DELINEATION SOIL SAMPLE RESULTS

| | | **Sample Name** | SS9 | SB-9 | TP-5 | SB-1 | SB-1 |
|---|---|---|---|---|---|---|---|
| | | **Sample Date** | 5/25/1988 | 6/2/2011 | 4/1/1987 | 6/2/2011 | 6/2/2011 |
| | | **Historical Sample Being Delineated** | | S-5/S-52 | | TP-5 | TP-5 |
| | | **Parent Sample Name** | SS9 | | | | |
| | | **Depth (ft)** | 0-2 | 0-0.5 | 2.5-3 | 0-0.5 | 2.5-3 |
| Analyte | PADEP RDC MSC | Unit | | | | | |
| **General Chemistry (SM2540G)** | | | | | | | |
| Moisture Content | | % | -- | 23.7 | -- | 16 | 18.4 |
| Solid | | % | -- | 76.3 | -- | 84 | 81.6 |
| **Metals (SW846 6010C)** | | | | | | | |
| Arsenic | 12 | mg/kg | 5.63 | -- | -- | -- | -- |
| Lead | 500 | mg/kg | **33** | 27.2 K | **4,060** | -- | 16.9 K |
| Thallium | 15 | mg/kg | < 2 U | < 2.3 U | -- | -- | -- |
| **VOCs (SW846 8260B)** | | | | | | | |
| cis-1,2-dichloroethene | 2,200,000 | µg/kg | -- | -- | -- | < 1.1 U | < 1.1 UJ |
| Tetrachloroethene (PCE) | 340,000 | µg/kg | -- | -- | -- | < 1.1 UJ | < 1.1 UJ |
| trans-1,2-dichloroethene | 1,100,000 | µg/kg | -- | -- | -- | < 1.1 U | < 1.1 UJ |
| Trichloroethene (TCE) | 260,000 | µg/kg | -- | -- | -- | < 1.1 U | < 1.1 UJ |
| Vinyl chloride | 1,900 | µg/kg | -- | -- | -- | < 1.1 U | < 1.1 UJ |
| **PAHs (SW846 8270D)** | | | | | | | |
| Acenaphthene | 13,000,000 | µg/kg | 380 | < 43 U | 2400 J | < 38.2 U | < 39.4 U |
| Acenaphthylene | 13,000,000 | µg/kg | -- | < 43 U | < 330 U | 16.7 J | < 39.4 U |
| Anthracene | 66,000,000 | µg/kg | 700 | 42.2 J | 10,000 | 21.9 J | < 39.4 U |
| Benzo[a]anthracene | 5,700 | µg/kg | 1,970 | 37.9 J | **33,000** | 77.4 J | < 39.4 U |
| Benzo[a]pyrene | 570 | µg/kg | 1,410 | 34.9 J | **27,000** | 71 J | < 39.4 U |
| Benzo[b]fluoranthene | 5,700 | µg/kg | 900 | 44.7 J | **39,000** | 72.4 J | < 39.4 U |
| Benzo[k]fluoranthene | 57,000 | µg/kg | 890 | 41.8 J | 39,000 | 70.9 J | < 39.4 U |
| Chrysene | 570,000 | µg/kg | 1,930 | 51.5 J | 26,000 | 92.8 J | < 39.4 U |
| Dibenzo[a,h]anthracene | 570 | µg/kg | < 330 U | < 43 U | **4,400** | < 38.2 U | < 39.4 U |
| Fluoranthene | 8,800,000 | µg/kg | 4,840 | 62.7 J | 50,000 | 155 J | < 39.4 U |
| Fluorene | 8,800,000 | µg/kg | 420 | < 43 U | < 330 U | < 38.2 U | < 39.4 U |
| Indeno[1,2,3-c,d]pyrene | 5,700 | µg/kg | 750 | 30.8 J | **8,100** | 46.3 J | < 39.4 U |
| Naphthalene | 4,400,000 | µg/kg | 80 | < 43 U | 1900 J | < 38.2 U | < 39.4 U |
| Phenanthrene | 66,000,000 | µg/kg | 3,630 | 43 J | 55,000 | 102 J | < 39.4 U |
| Pyrene | 6,600,000 | µg/kg | 4,100 | 66 J | 38,000 | 162 J | < 39.4 U |

Shaded column headers are historical sample results (for comparison with 2011 data).

Shaded and **Bolded** Results Represent Exceedences of 2011 PADEP RDC MSC

PADEP = Pennsylvania Department of Environmental Protection
MSC = Medium Specific Concentration
RDC = Residential Direct Contact
U = Not detected. The associated number indicates approximate sample concentration necessary to be detected.
K = Analyte present. Reported value may be biased high. Actual value is expected lower.
J = Analyte present. Reported value may not be accurate or precise.
UJ = Not detected. Quantitation limit may be inaccurate or imprecise.
mg/kg = milligrams per kilogram µg/kg = micrograms per kilogram
-- : No data
(for 2011 data: Indicates analysis not performed)
(for historic data: Indicates analysis not performed or data not in database)
VOC = volatile organic compound
PAH = polycyclic aromatic hydrocarbon

# TABLE 4-6 EVALUATION OF DELINEATION SOILSAMPLES

| Historical Sampling Results | | | | Objective of 2011 Sampling Events | Delineation Sampling and Analysis Plan | | | Results |
|---|---|---|---|---|---|---|---|---|
| Historical Sampling Location | Depth (ft) | | Constituents Exceeding PADEP RDC MSC | | Analysis | Depth (ft bgs) | Delineation Sampling Location | |
| MW-1 | Surface | 0-2 | None | None. No delineation of arsenic was conducted due to widespread reported arsenic concentrations both onsite and off site. | NA | NA | NA | NA |
| | Subsurface | 2-4 | None | | | | | |
| | | 4-6 | Arsenic | | | | | |
| | | 6-8 | Arsenic | | | | | |
| MW-2 | Surface | 0-2 | PAHs, Arsenic, Lead | Locations 4 and 11 to delineate PAHs and lead in Spring 2011. The December 2011 wetland soil (sediment) samples were collected to further delineate elevated PAHs identified at SB-4 and SB-11 during the Spring 2011 sampling event. Although ubiquitous throughout the site, arsenic was included at the SB-11 location. | PAHs, Lead | 0-0.5 | 4, 11 / SD-5 through SD-9 | **Arsenic:** Arsenic delineation was achieved by sample SB-4 (2.5J mg/kg). **PAHs:** Delineation achieved for PAHs except for benzo[a]pyrene. Reported concentrations for 6 PAHs (benzo[a]anthracene; benzo[a]pyrene; benzo[b]fluoranthene; benzo[k]fluoranthene; dibenzo[a,h]anthracene; and indeno[1,2,3-c,d] pyrene) exceeded the PADEP RDC MSC in SB-4 at 0-0.5 ft. These concentrations are less than concentrations reported in the historical sample 0-2 ft interval at MW-2, but delineation was not achieved by the SB-4 sample. Therefore, SB-4 was further delineated by December 2011 samples SD-5 through SD-9. Benzo[a]pyrene exceeded the PADEP RDC MSC at SD-8 and SD-9 (659 mg/kg and 1,080 mg/kg, respectively). Delineation was achieved for PAHs at SB-11. **Lead:** Delineation was achieved for historical sample location MW-2 by location SB-11 for lead (14.5K mg/kg) and by samples SD-5 through SD-9 (concentrations range from 44.1 mg/kg at SDS-8 to 70.9 mg/kg at SD-7). Although the concentration of lead at SB-4 0-0.5 ft bgs (627 mg/kg) was less than the concentration reported in MW-2 0-2 (1,140 mg/kg), the reported concentration in SB-4 at 0-0.5 ft exceeded the PADEP RDC MSC. Therefore, SB-4 was further delineated for lead by December 2011 samples SD-5 through SD-9 (concentrations range from 44.1 mg/kg at SDS-8 to 70.9 mg/kg at SD-7). In conclusion, the MW-2 0-2 ft bgs historical lead exceedance is now delineated.<br>In SB-4 no non-native material was noted however, water entered the borehole at approximately 2.5 ft bgs. Native soil was encountered at approximately 2 ft bgs. In SB-11, 3 ft bgs no non-native material was noted; however, water entered the borehole at approximately 3 ft bgs. Native soil was encountered at approximately 2 ft bgs. |
| | Subsurface | 2-4 | PAHs, Lead | Locations 4 and 11 to delineate PAHs and lead in Spring 2011. The December 2011 wetland soil (sediment) samples were collected to further delineate elevated PAHs identified at SB-4 and SB-11 during the Spring 2011 sampling event. | PAHs, Lead | 2.5-3 | | **PAHs:** Although reported concentrations of 4 PAHs (benzo[a]anthracene; benzo[a]pyrene; benzo[b]fluoranthene; and dibenzo[a,h]anthracene)in SB-4 at 2.5-3 ft are less than the historical results at MW-2 2-4 ft, results for SB-4 2.5-3 ft and SB-11 2-4 ft exceeded the PADEP RDC MSC. Since the December 2011 samples did not include a subsurface interval, vertical delineation has not yet been achieved at SB-4 and SB-11. **Lead:** The reported concentration (838 mg/kg) in SB-4 at 2.5-3 ft exceeded the PADEP RDC MSC and is greater than the lead concentration (671 mg/kg) reported in the 2-4 ft interval at MW-2. Lead delineation was achieved at SB-11 2-4 (49.3K mg/kg), but vertical delineation was not achieved for lead in SB-4. |
| | | 4-6 | None | None. No confirmation of PAHs included because historical concentrations decreased significantly with depth and were limited to | NA | NA | NA | NA |
| | | 6-8 | 1 PAH | | | | | |
| | | 8-10 | 1 PAH | | | | | |
| MW-4 | Surface | 0-2 | Arsenic | None. No delineation of arsenic was conducted due to widespread reported arsenic concentrations both onsite and off site. | NA | NA | NA | NA |
| | Subsurface | 2-4 | Arsenic | | | | | |
| | | 4-6 | Arsenic | | | | | |
| | | 6-8 | Arsenic | | | | | |

# TABLE 4-6 EVALUATION OF DELINEATION SOILSAMPLES

| Historical Sampling Results | | | | Objective of 2011 Sampling Events | Delineation Sampling and Analysis Plan | | | Results |
|---|---|---|---|---|---|---|---|---|
| Historical Sampling Location | Depth (ft) | | Constituents Exceeding PADEP RDC MSC | | Analysis | Depth (ft bgs) | Delineation Sampling Location | |
| S-3 | Surface | 0-0.5 | Lead | Delineate lead and thallium. Although thallium was not reported above the MSC, it was reported at 75% of the MSC. The December 2011 wetland soil (sediment) samples (SD-5 through SD-9) were collected to further delineate elevated lead at SB-4 during the Spring 2011 sampling event. | Lead, Thallium | 0-0.5 | 4 / SD-5 through SD-9 | **Lead:** The reported concentration (627 mg/kg) in SB-4 at 0-0.5 ft exceeded the PADEP RDC MSC, but is less than the concentration reported in historical sample S-3 (1,080 mg/kg). Since SB-4 delineation was not achieved, further sampling was performed to delineate lead at SB-4 in December 2011. Lead delineation was achieved here by the results of December 2011 samples SD-5 through SD-9, which are less than the PADEP RDC MSC (concentrations range from 44.1 mg/kg at SDS-8 to 70.9 mg/kg at SD-7). **Thallium:** Delineation achieved. Thallium was reported at 13 mg/kg in historical sample S3; thallium reported at a concentration of <2.3U mg/kg in SB-4 0-0.5 ft, which is less than the PADEP RDC MSC. In SB-4 no foreign material was noted however, water entered the borehole at approximately 2.5 ft bgs. Native soil was encountered at approximately 2 ft bgs. |
| | Subsurface | None | NA | NA | NA | NA | NA | NA |
| S-5/S-52 | Surface | 0-0.5 | Lead, Thallium | Delineate lead and thallium. | Lead, Thallium | 0-0.5 | 9 | **Lead:** Delineation achieved. The reported concentration (27.2K mg/kg) in SB-9 0-0.5 ft was less than the PADEP RDC. **Thallium:** Delineation achieved. Thallium reported at a concentration of <2.3U mg/kg in SB-9 0-0.5 ft, which is less than the PADEP RDC MSC. |
| | Subsurface | None | NA | NA | NA | NA | NA | NA |
| SS-8 | Surface | 0-0.5 | PAHs | Delineate PAHs. | PAHs | 0-0.5 | 9 | **PAHs:** PAHs were less than PADEP RDC MSCs in sample SB-9 0-0-5 ft. |
| TP-5 | Surface | None | NA | Establish no ROD VOC or PAH exceedances. (Samples could not be re-collected at TP-5 because TP-5 is under the cap; SB-1 is located southwest of TP-5.) | ROD VOCs, PAHs | 0-0.5 | 1 | **PAHs:** PAHs were less than PADEP RDC MSCs in sample SB-1 0-0-5 ft. **ROD VOCs:** ROD VOCs sample results are less than PADEP RDC MSCs. |
| | Subsurface | 3 | PAHs, Arsenic, Lead | No delineation of arsenic was conducted due to widespread reported arsenic concentrations both onsite and off site. Delineate lead and PAHs. Establish no ROD VOC exceedances. | PAHs, Lead, ROD VOCs | 2.5-3 | | **PAHs:** 5 PAHs (benzo[a]anthracene; benzo[a]pyrene; benzo[b]fluoranthene; dibenzo[a,h]anthracene; and indeno[1,2,3-c,d] pyrene) exceeded the PADEP RDC MSCs in historical sample TP-5. Delineation was achieved for these PAHs by sample SB-1 2.5 -3 ft, which has concentrations of PAHs at less than the PADEP RDC MSCs. **ROD VOCs:** ROD VOC sample results are non-detect. **Lead:** Delineation achieved. The reported concentration (16.9 mg/kg) in SB-1 2.5-3 ft is less than the PADEP RDC MSC. |

ft = feet/foot NA = Not applicable PAH = polycyclic aromatic hydrocarbons VOCs = Volatile Organic Compounds bgs = below ground surface ROD = Record of Decision
PADEP RDC MSC = Pennsylvania Department of Environmental Protection Residential Direct Contact Medium Specific Concentration
bgs = below ground surface MW = monitoring well

# TABLE 4-7 SURFACE WATER SAMPLE RESULTS 2011

| | | Sample Name | SW-5 | SW-8 | DUP-2 |
|---|---|---|---|---|---|
| | | Parent Sample Name | | | SW-8 |
| | | Sample Date | 12/9/2011 | 12/9/2011 | 12/9/2011 |
| Analyte | Crit 1 | Units | | | |
| **Metals (SW846 6020A)** | | | | | |
| Aluminum | NSA | mg/L | 0.27 | 0.13 J | 0.23 J |
| Antimony | 5.6 | mg/L | 0.0015 U | 0.0015 U | 0.0015 U |
| Arsenic | 10 | mg/L | 0.002 U | 0.0013 J | 0.0015 J |
| Barium | 2400 | mg/L | 0.033 | 0.037 | 0.041 |
| Beryllium | NSA | mg/L | 0.0007 U | 0.0007 U | 0.0007 U |
| Cadmium | NSA | mg/L | 0.0007 U | 0.0007 U | 0.00047 J |
| Calcium | NSA | mg/L | 52 | 56.1 | 56 |
| Chromium | NSA | mg/L | 0.0015 U | 0.0015 U | 0.0015 U |
| Cobalt | NSA | mg/L | 0.0037 U | 0.0037 U | 0.0037 U |
| Copper | NSA | mg/L | 0.003 J | 0.0021 J | 0.0038 J |
| Iron | NSA | mg/L | 0.46 | 3.3 | 3.4 |
| Lead | NSA | mg/L | 0.0015 U | 0.0015 J | 0.0019 J |
| Magnesium | NSA | mg/L | 9.1 | 11.5 | 11.2 |
| Manganese | NSA | mg/L | 0.03 | 1.2 | 1.2 |
| Mercury | 0.05 | mg/L | 0.00013 U | 0.00013 U | 0.00013 U |
| Nickel | 610 | mg/L | 0.0037 U | 0.0037 U | 0.0037 U |
| Potassium | NSA | mg/L | 2.1 | 2.7 | 2.7 |
| Selenium | NSA | mg/L | 0.0037 U | 0.0037 U | 0.0037 U |
| Silver | NSA | mg/L | 0.0015 U | 0.0015 U | 0.0015 U |
| Sodium | NSA | mg/L | 3.7 | 9 | 6.8 |
| Thallium | 0.24 | mg/L | 0.0007 U | 0.0007 U | 0.0007 U |
| Vanadium | NSA | mg/L | 0.0012 J | 0.0012 J | 0.0014 J |
| Zinc | NSA | mg/L | 0.0094 | 0.011 | 0.012 |
| Hardness | NSA | mg/L as CaCO3 | 167 | 187 | 186 |
| *(continued on next page)* | | | | | |

# TABLE 4-7 SURFACE WATER SAMPLE RESULTS 2011

| | | Sample Name | SW-5 | SW-8 | DUP-2 |
|---|---|---|---|---|---|
| | | Parent Sample Name | | | SW-8 |
| | | Sample Date | 12/9/2011 | 12/9/2011 | 12/9/2011 |
| Analyte | Crit 1 | Units | | | |
| **SVOCS (SW846 8070D)** | 35 | µg/L | 0.94 U | 0.94 U | 0.94 U |
| 1,2-dichlorobenzene | 420 | µg/L | 0.94 U | 0.94 U | 0.94 U |
| 1,3-dichlorobenzene | 420 | µg/L | 0.94 U | 0.94 U | 0.94 U |
| 1,4-dichlorobenzene | 420 | µg/L | 0.94 U | 0.94 U | 0.94 U |
| 2,2-oxybis(1-chloropropane) | 1400 | µg/L | 0.94 U | 0.94 U | 0.94 U |
| 2,4,5-trichlorophenol | NSA | µg/L | 2.8 U | 2.8 U | 2.8 U |
| 2,4,6-trichlorophenol | 1.4 | µg/L | 0.94 U | 0.94 U | 0.94 U |
| 2,4-dichlorophenol | 77 | µg/L | 0.94 U | 0.94 U | 0.94 U |
| 2,4-dimethylphenol | 380 | µg/L | 2.8 U | 2.8 U | 2.8 U |
| 2,4-dinitrophenol | 69 | µg/L | 7.5 U | 7.5 U | 7.5 U |
| 2,4-dinitrotoluene | 0.05 | µg/L | 0.94 U | 0.94 U | 0.94 U |
| 2,6-dinitrotoluene | 0.05 | µg/L | 0.94 U | 0.94 U | 0.94 U |
| 2-chloronaphthalene | 1000 | µg/L | 0.94 U | 0.94 U | 0.94 U |
| 2-chlorophenol | 81 | µg/L | 1.9 U | 1.9 U | 1.9 U |
| 2-Methyl-4,6-dinitrophenol | 13 | µg/L | 4.7 U | 4.7 U | 4.7 U |
| 2-methylnaphthalene | NSA | µg/L | 0.94 U | 0.94 U | 0.94 U |
| 2-methylphenol | NSA | µg/L | 0.94 U | 0.94 U | 0.94 U |
| 2-nitroaniline | NSA | µg/L | 0.94 U | 0.94 U | 0.94 U |
| 2-nitrophenol | NSA | µg/L | 1.9 U | 1.9 U | 1.9 U |
| 3,3-dichlorobenzidine | 0.021 | µg/L | 2.8 U | 2.8 U | 2.8 U |
| 3-nitroaniline | NSA | µg/L | 1.9 U | 1.9 U | 1.9 U |
| 4-bromophenyl phenyl ether | NSA | µg/L | 0.94 U | 0.94 U | 0.94 U |
| 4-chloro-3-methylphenol | NSA | µg/L | 0.94 U | 0.94 U | 0.94 U |
| 4-chloroaniline | NSA | µg/L | 0.94 U | 0.94 U | 0.94 U |
| 4-chlorophenyl phenyl ether | NSA | µg/L | 0.94 U | 0.94 U | 0.94 U |
| 4-nitroaniline | NSA | µg/L | 0.94 U | 0.94 U | 0.94 U |
| 4-nitrophenol | NSA | µg/L | 4.7 U | 4.7 U | 4.7 U |
| Benzyl butyl phthalate | 150 | µg/L | 0.94 U | 0.94 U | 0.94 U |
| Bis(2-chloroethoxy) methane | NSA | µg/L | 0.94 U | 0.94 U | 0.94 U |
| Bis(2-chloroethyl) ether | 0.030 | µg/L | 0.94 U | 0.94 U | 0.94 U |
| Bis(2-ethylhexyl) phthalate | 1.2 | µg/L | 0.94 U | 0.94 U | 0.94 U |
| *(continued on next page)* | | | | | |

# TABLE 4-7 SURFACE WATER SAMPLE RESULTS 2011

| | | Sample Name | SW-5 | SW-8 | DUP-2 |
|---|---|---|---|---|---|
| | | Parent Sample Name | | | SW-8 |
| | | Sample Date | 12/9/2011 | 12/9/2011 | 12/9/2011 |
| Analyte | Crit 1 | Units | | | |
| Carbazole | NSA | µg/L | 0.94 U | 0.94 U | 0.94 U |
| Dibenzofuran | NSA | µg/L | 0.94 U | 0.94 U | 0.94 U |
| Diethyl phthalate | 17000 | µg/L | 0.94 U | 0.94 U | 0.94 U |
| Dimethyl phthalate | 270000 | µg/L | 0.94 U | 0.94 U | 0.94 U |
| Di-n-butyl phthalate | 2000 | µg/L | 0.94 U | 0.94 U | 0.94 U |
| Di-n-octyl phthalate | NSA | µg/L | 0.94 U | 0.94 U | 0.94 U |
| Hexachloro-1,3-butadiene | 0.44 | µg/L | 0.94 U | 0.94 U | 0.94 U |
| Hexachlorobenzene | 0.00028 | µg/L | 0.94 U | 0.94 U | 0.94 U |
| Hexachlorocyclopentadiene | 40 | µg/L | 0.94 UL | 0.94 UL | 0.94 UL |
| Hexachloroethane | 1.4 | µg/L | 0.94 U | 0.94 U | 0.94 U |
| Isophorone | 35 | µg/L | 0.94 U | 0.94 U | 0.94 U |
| mp-Cresol | NSA | µg/L | 0.94 U | 0.94 U | 0.94 U |
| Nitrobenzene | 17 | µg/L | 1.9 U | 1.9 U | 1.9 U |
| N-nitrosodi-n-propylamine | 0.005 | µg/L | 0.94 U | 0.94 U | 0.94 U |
| N-nitrosodiphenylamine | 3.3 | µg/L | 0.94 U | 0.94 U | 0.94 U |
| Pentachlorophenol | 0.27 | µg/L | 7.5 U | 7.5 U | 7.5 U |
| Phenol | 21000 | µg/L | 0.94 U | 0.94 U | 0.94 U |
| *(continued on next page)* | | | | | |

# TABLE 4-7 SURFACE WATER SAMPLE RESULTS 2011

| | | Sample Name | SW-5 | SW-8 | DUP-2 |
|---|---|---|---|---|---|
| | | Parent Sample Name | | | SW-8 |
| | | Sample Date | 12/9/2011 | 12/9/2011 | 12/9/2011 |
| Analyte | Crit 1 | Units | | | |
| **PAHS (SW846 8270D/8270 SIM)** | | | | | |
| Acenaphthene | 670 | µg/L | 0.038 U | 0.038 U | 0.038 U |
| Acenaphthylene | NSA | µg/L | 0.038 U | 0.038 U | 0.038 U |
| Anthracene | 8300 | µg/L | 0.038 U | 0.018 J | 0.017 J |
| Benzo[a]anthracene | 0.0038 | µg/L | 0.038 U | **0.062** | **0.047** |
| Benzo[a]pyrene | 0.0038 | µg/L | 0.038 U | **0.066** | **0.05** |
| Benzo[b]fluoranthene | 0.0038 | µg/L | 0.038 U | **0.1** | **0.09** |
| Benzo[g,h,i]perylene | NSA | µg/L | 0.038 U | 0.039 J | 0.032 J |
| Benzo[k]fluoranthene | 0.0038 | µg/L | 0.038 U | **0.046 J** | **0.034 J** |
| Chrysene | 0.0038 | µg/L | 0.038 U | **0.066** | **0.053** |
| Dibenz[a,h]anthracene | 0.0038 | µg/L | 0.038 U | 0.038 U | 0.038 U |
| Fluoranthene | 130 | µg/L | 0.02 J | 0.13 | 0.11 |
| Fluorene | 1100 | µg/L | 0.038 U | 0.038 U | 0.038 U |
| Indeno[1,2,3-c,d]pyrene | 0.0038 | µg/L | 0.038 U | **0.034 J** | **0.028 J** |
| Naphthalene | NSA | µg/L | 0.043 J | 0.11 | 0.087 |
| Phenanthrene | NSA | µg/L | 0.038 U | 0.056 | 0.05 |
| Pyrene | 830 | µg/L | 0.02 J | 0.12 | 0.095 |

Crit1: 2009 Pennsylvania DEP Water Quality Criteria for Toxic Substances, Human Health.

**Bolded Values exceed Crit 1** VOC = volatile organic compound

NSA = No Screening Level Available PAH = polycyclic aromatic hydrocarbon

U = Not detected. The associated number indicates approximate sample concentration necessary to be detected.

J = Analyte present. Reported value may not be accurate or precise.

UL = Not detected. Quantitation limit is probably higher. SIM = selective ion monitoring

µg/L = micrograms per liter mg/L = milligrams per liter

$CaCO_{3\,=}$ Calcium Carbonate SVOC = semivolatile organic compound

# TABLE 4-8 RINSATE AND TRIP BLANK SAMPLE RESULTS 2011

| | Sample Name: | RB-1 | RB-2 | RB-3 | Trip Blank | Trip Blank | Trip Blank |
|---|---|---|---|---|---|---|---|
| | **Sample Date:** | 6/2/2011 | 6/2/2011 | 6/2/2011 | 5/31/2011 | 6/1/2011 | 6/2/2011 |
| **Analyte** | **Unit** | | | | | | |
| **Volatile Organic Compounds (SW846 8260B)** | | | | | | | |
| cis-1,2-dichloroethene | µg/L | 0.75 UJ | 0.75 UJ | 0.75 U | 0.75 UJ | 0.75 UJ | 0.75 U |
| Tetrachloroethene | µg/L | 0.75 UJ | 0.75 UJ | 0.75 U | 0.75 UJ | 0.75 UJ | 0.75 U |
| trans-1,2-dichloroethene | µg/L | 0.75 UJ | 0.75 UJ | 0.75 U | 0.75 UJ | 0.75 UJ | 0.75 U |
| Trichloroethene | µg/L | 0.75 UJ | 0.75 UJ | 0.75 U | 0.75 UJ | 0.75 UJ | 0.75 U |
| Vinyl chloride | µg/L | 0.75 UJ | 0.75 UJ | 0.75 U | 0.75 UJ | 0.75 UJ | 0.75 U |
| **Semivolatile Organic Compounds (SW846 8270D/8270 SIM)** | | | | | | | |
| Acenaphthene | µg/L | 0.04 U | -- | 0.038 U | -- | -- | -- |
| Acenaphthylene | µg/L | 0.04 U | -- | 0.038 U | -- | -- | -- |
| Anthracene | µg/L | 0.04 U | -- | 0.038 U | -- | -- | -- |
| Benzo[a]anthracene | µg/L | 0.04 U | -- | 0.038 U | -- | -- | -- |
| Benzo[a]pyrene | µg/L | 0.04 U | -- | 0.038 U | -- | -- | -- |
| Benzo[b]fluoranthene | µg/L | 0.04 U | -- | 0.038 U | -- | -- | -- |
| Benzo[g,h,i]perylene | µg/L | 0.04 U | -- | 0.038 U | -- | -- | -- |
| Benzo[k]fluoranthene | µg/L | 0.04 U | -- | 0.038 U | -- | -- | -- |
| Chrysene | µg/L | 0.04 U | -- | 0.038 U | -- | -- | -- |
| Dibenz[a,h]anthracene | µg/L | 0.04 U | -- | 0.038 U | -- | -- | -- |
| Fluoranthene | µg/L | 0.04 U | -- | 0.038 U | -- | -- | -- |
| Fluorene | µg/L | 0.04 U | -- | 0.038 U | -- | -- | -- |
| Indeno[1,2,3-c,d]pyrene | µg/L | 0.04 U | -- | 0.038 U | -- | -- | -- |
| Naphthalene | µg/L | 0.05 U | -- | 0.047 U | -- | -- | -- |
| Phenanthrene | µg/L | 0.04 U | -- | 0.038 U | -- | -- | -- |
| Pyrene | µg/L | 0.04 U | -- | 0.038 U | -- | -- | -- |
| **Metals (SW846 6020A)** | | | | | | | |
| Arsenic | mg/L | 0.002 U | 0.002 U | 0.002 U | -- | -- | -- |
| Barium | mg/L | 0.0033 U | 0.0021 J | 0.0033 U | -- | -- | -- |
| Beryllium | mg/L | 0.0013 U | 0.0013 U | 0.0013 U | -- | -- | -- |
| Cadmium | mg/L | 0.00067 U | 0.00067 U | 0.00067 U | -- | -- | -- |
| Chromium | mg/L | 0.0013 U | 0.0013 U | 0.0017 J | -- | -- | -- |
| Copper | mg/L | 0.0033 U | 0.0018 J | 0.0029 J | -- | -- | -- |
| Iron | mg/L | 0.021 J | 0.24 J | 0.083 J | -- | -- | -- |
| Lead | mg/L | 0.0013 U | 0.0013 U | 0.0013 U | -- | -- | -- |
| Manganese | mg/L | 0.0029 J | 0.022 | 0.0034 J | -- | -- | -- |
| Mercury | mg/L | 0.00013 U | 0.00013 U | 0.00013 U | -- | -- | -- |
| **Cyanide (SM-20 4500CNI)** | | | | | | | |
| Cyanide,Weak/Dissociable (Free) | mg/L | 0.005 U | 0.002 J | -- | -- | -- | -- |

Blank Cell = Not Analyzed

U = Not detected. The associated number indicates approximate sample concentration necessary to be detected.

UJ = Not detected. Quantitation limit may be inaccurate or imprecise.

J = Analyte present. Reported value may not be accurate or precise.

mg/L = milligrams per liter µg/L = micrograms per liter

-- : No data. Indicates analysis not performed.

SIM - Seleective ion monitoring

PAH - polycyclic aromatic hydrocarbon

VOC - volatile organic compound

# 5. CONCLUSIONS

The specific scope of the 2011 sampling included groundwater, surface water, wetland soil (sediment), and soil sample collection and analysis as detailed in the EA May 2011 Final SAP (EA 2011a) and the December 2011 SAP Addendum (EA 2011d).

## 5.1 GROUNDWATER

Based on elevation data collected on 31 May 2011, there is a low area in the center of the site that acts as a groundwater trough in the overburden aquifer. Groundwater beyond the trough is to the southwest and east. Groundwater flows to the north from the area of Marsh Run Creek toward the center of the site. Relatively high groundwater elevations to the north and lower elevations to the west indicate that flow from the central part of the site is toward the west.

In the upper bedrock aquifer, the apparent groundwater flow direction based on 31 May 2011 elevations was away from the site toward the north and northeast, similar to other events.

Reported groundwater ROD-stipulated VOC and metals analytical results were generally consistent with the previous sampling events. Concentrations of ROD-stipulated VOCs in the offsite, down gradient wells exceeded PADEP MSCs in the deeper intervals of the MADW, in MW-12, and in the MACW. Neither PAHs nor cyanide were reported in exceedance of the PADEP MSCs.

## 5.2 SOIL

### 5.2.1 Confirmatory Soil Samples

No significant change in the nature of the reported constituents was observed when comparing 2011 soil confirmatory samples results to historical results. Comparison of the reported historical constituent concentrations versus the reported 2011 constituent concentrations indicated there is no difference in the magnitude of concentrations with regard to PAHs. However, reported metals concentrations in the 2011 samples were generally much less than the reported historical concentrations, with some exceptions likely due to sample location.

### 5.2.2 Delineation Soil Samples

Based on historical sampling results, arsenic, lead, thallium, and PAHs were reported in site soil in concentrations exceeding the PADEP RDC MSC.

Arsenic is ubiquitous throughout the site, and confirmatory results (Section 5.2.1) suggest that the arsenic concentrations are generally lower than those reported historically, and do not exceed the PADEP RDC MSC.

Lead and thallium were fully delineated to concentrations less than the PADEP RDC MSC outside of the known fill area, with the exception of the area northeast of the fill where lead was reported in exceedance of the PADEP RDC MSC in the deepest sample interval. Lead in surface soil was fully delineated.

Similarly, PAHs in the surface soil outside of the known fill area were delineated to concentrations less than the PADEP RDC MSC with the exception of the area northeast of the fill. In subsurface soil, PAHs were delineated with the exception of the area east and northeast of the fill. However, concentrations of PAHs generally attenuate with depth and with distance from the fill area.

The edge of the fill material is visible along the east side of the site and drops approximately 1.5 ft to the elevation of the wetlands east of the perimeter fence, in the vicinity of SB-4 and SB-11. The PAHs reported in SB-11, SB-4, SD-8, and SD-9 are likely associated with the fill material that was placed for grading purposes.

## 5.3 SURFACE WATER

One of the two surface water samples (SW-8) had concentrations of six PAHs (benzo[a]anthracene, benzo[a]pyrene, benzo[b]fluoranthene, benzo[k]fluoranthene, chrysene, and indeno[1,2,3-c,d]pyrene) that exceeded the 2009 PADEP Water Quality Criteria for Toxic Substances for Human Health of 0.0038 mg/L. This sample location was proximal to wetland soil (sediment) sample SD-8, which also had elevated concentrations of PAHs. The PAHs reported in SW-8 (and SD-8) are likely associated with the fill material that was placed for grading purposes.

# 6. REFERENCES


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# APPENDIX A

# FIELD DOCUMENTATION

EA Engineering, Science, and Technology, Inc.

# WELL PURGING AND SAMPLING RECORD

WELL ID MW-1 SAMPLE NO. MW-1

WELL/SITE DESCRIPTION stickup in field

DATE 6/2/11 TIME 830 AIR TEMP. 70's

WELL DEPTH 50 ft CASING HEIGHT ____ ft

WATER DEPTH 10.04 ft WELL DIAMETER 2 in

WATER COL. HEIGHT 39.96 ft SANDPACK DIAM. ____ in

EQUIVALENT VOLUME OF STANDING WATER 6.5 (gal) (L)

PUMP RATE 300 (gpm) (LPM)

PUMP TIME 35 min

WELL WENT DRY? ( ) Yes (X) No PUMP TIME 35 min

VOL. REMOVED 11.5 (gal) (L) RECOVERY TIME ____ min

PURGE AGAIN? ( ) Yes (X) No TOTAL VOL. REMOVED 11.5 (gal) (L)

| Date | Time | Volume Removed Unit: ml | pH | Cond. | Temp. | ORP | Turb. | DO | Depth to Water from TOC | Pump Rate | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 6/2 | ~~828~~ 854 | | 6.85 | 477 | 13.46 | 255.6 | 87.1 | 2.37 | 11.14 | 500 | lowered rate |
| | 859 | 2500 | 6.51 | 488 | 14.27 | 261.3 | 38.0 | 1.02 | 10.50 | 300 | |
| | 904 | 4000 | 6.52 | 561 | 15.12 | 254.1 | 37.5 | 0.98 | 10.64 | | |
| | 909 | 5500 | 6.52 | 508 | 15.21 | 251.1 | 36.5 | 0.86 | 10.64 | | |
| | 914 | 7000 | 6.52 | 511 | 15.36 | 248.7 | 35.7 | 0.81 | 10.64 | | |
| | 919 | 8500 | 6.52 | 515 | 15.48 | 246.7 | 35.3 | 0.76 | 10.64 | | |
| | 924 | 10000 | 6.52 | 519 | 15.6 | 245.0 | 35.0 | 0.72 | 10.64 | | |
| | 929 | 11500 | 6.54 | 522 | 15.82 | 244.7 | 35.0 | 0.74 | 10.64 | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |

COMMENTS VOCs Metals Cyanide field filtered
grundfos @ 72
Sampled @ 925

SIGNATURE [signature]

EA Engineering, Science, and Technology, Inc.

# WELL PURGING AND SAMPLING RECORD

WELL ID MW-1A SAMPLE NO. Same

WELL/SITE DESCRIPTION Same

DATE 5/31/11 TIME 1644 AIR TEMP. 93°F

WELL DEPTH 15.25 ft CASING HEIGHT — ft

WATER DEPTH 9.23 ft WELL DIAMETER 2" in

WATER COL. HEIGHT 6.02 ft SANDPACK DIAM. 6" in

EQUIVALENT VOLUME OF STANDING WATER 0.96 (gal) (L)

PUMP RATE See Below (gpm) (LPM)

PUMP TIME 1645 Begin Purge – 95 min min

WELL WENT DRY? ( ) Yes (✓) No PUMP TIME NA min

VOL. REMOVED NA (gal) (L) RECOVERY TIME NM min

PURGE AGAIN? ( ) Yes (✓) No TOTAL VOL. REMOVED ~10.45 (gal) (L)

| Date | Time | Volume Removed Unit: | pH | Cond. mS/cm | Temp. C | ORP | Turb. NTU | DO mg/L | Depth to Water from TOC | Pump Rate mL/min |
|---|---|---|---|---|---|---|---|---|---|---|
| 5/31/11 | 1650 | | 6.29 | 409. | 13.33 | 108.2 | 20.7 | 3.56 | 9.26 | 450 |
| 5/31/11 | 1657 | | 6.29 | 404 | 13.14 | 109.8 | 18.0 | 3.44 | 9.28 | 375 |
| 5/31/11 | 1703 | | 6.29 | 398 | 13.05 | 115.7 | 15.8 | 2.35 | 9.28 | 425 |
| 5/31/11 | 1709 | | 6.29 | 390 | 13.06 | 117.9 | 14.9 | 2.81 | 9.28 | 450 |
| 5/31/11 | 1716 | | 6.29 | 381 | 13.10 | 119.2 | 12.4 | 2.06 | ~~9.29~~ 9.27 | 400 |
| | | | | | | | | | 9.27 | — |
| 5/31/11 | 1721 | | 6.28 | 372 | 12.96 | 124.3 | 25.8 | 2.57 | 9.27 | 400 |
| 5/31/11 | 1735 | | 6.30 | 358 | 12.94 | 128.1 | 58.3 | 3.22 | 9.27 | 400 |
| 5/31/11 | 1740 | | 6.29 | 354 | 12.94 | 128.2 | 16.6 | 2.20 | 9.28 | 400 |
| 5/31/11 | 1745 | | 6.30 | 348 | 12.88 | 126.4 | 15.8 | 2.73 | 9.27 | 400 |
| 5/31/11 | 1800 | | 6.29 | 339 | 12.92 | 122.7 | 13.5 | 3.65 | 9.28 | 375 |
| 5/31/11 | 1805 | | 6.30 | 334 | 12.88 | 124.6 | 13.9 | 2.76 | 9.28 | 400 |
| 5/31/11 | 1810 | | 6.30 | 333 | 12.94 | 125.1 | 6.6 | 2.81 | 9.27 | 400 |
| 5/31/11 | 1815 | | 6.30 | 331 | 12.96 | 125.9 | 6.5 | 2.85 | 9.28 | 400 |

← Assist Denise w/ offload of truck

COMMENTS

Sample Time ~1820

VOCs, Diss Metals, Diss Cyanide

Purge sample w/ Bladder pump

SIGNATURE

EA Engineering, Science, and Technology, Inc.

# WELL PURGING AND SAMPLING RECORD

WELL ID MW-2 SAMPLE NO. MW-2

WELL/SITE DESCRIPTION Stickup

DATE 6 / 1 / 11 TIME 1230 AIR TEMP. 90's

WELL DEPTH 50 ft CASING HEIGHT ____ ft

WATER DEPTH 5.76 ft WELL DIAMETER 2 in

WATER COL. HEIGHT 44.24 ft SANDPACK DIAM. ____ in

EQUIVALENT VOLUME OF STANDING WATER 7.2 (gal) (L)

PUMP RATE 400 (gpm) (LPM)

PUMP TIME 29 min

WELL WENT DRY? ( ) Yes (X) No PUMP TIME ____ min

VOL. REMOVED ____ (gal) (L) RECOVERY TIME ____ min

PURGE AGAIN? ( )Yes ( ) No TOTAL VOL. REMOVED 12 (gal) (L)

| Date | Time | Volume Removed Unit: ML | pH | Cond. | Temp. | ORP | Turb. | DO | Depth to Water from TOC | Pump Rate LPM |
|---|---|---|---|---|---|---|---|---|---|---|
| 6/1 | 1237 | 0 | 6.92 | 890 | 13.56 | 154.3 | 47.0 | 0.27 | 5.76 | 400 |
| | 1242 | 2000 | 6.87 | 896 | 13.07 | 154.2 | 45.4 | 0.15 | 6.23 | |
| | 1247 | 4000 | 6.87 | 893 | 13.10 | 152.8 | 45.0 | 0.14 | 6.26 | |
| | 1252 | 6000 | 6.88 | 888 | 13.01 | 152.4 | 45.0 | 0.13 | 6.39 | |
| | 1257 | 8000 | 6.88 | 886 | 13.06 | 152.2 | 44.9 | 0.13 | 6.39 | |
| | 1302 | 10000 | 6.89 | 883 | 13.17 | 151.2 | 46.0 | 0.11 | 6.39 | |
| | 1306 | 12000 | 6.91 | 882 | 13.28 | 150.7 | 46.2 | 0.11 | 6.39 | |
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COMMENTS Sampled @ 1310
VOCs Metals / Cyanide

SIGNATURE [illegible]

EA Engineering, Science, and Technology, Inc.

# WELL PURGING AND SAMPLING RECORD

WELL ID MW-2A SAMPLE NO. MW-2A

WELL/SITE DESCRIPTION

DATE 6/7/11 TIME 1030 AIR TEMP. 80's

WELL DEPTH 13 ft CASING HEIGHT ft

WATER DEPTH 5.12 ft WELL DIAMETER 2 in

WATER COL. HEIGHT 7.88 ft SANDPACK DIAM. in

EQUIVALENT VOLUME OF STANDING WATER 1.28 (gal) (L)

PUMP RATE 400 (gpm) (LPM)

PUMP TIME 60 min

WELL WENT DRY? (X) Yes ( ) No while sampling PUMP TIME min

VOL. REMOVED (gal) (L) RECOVERY TIME min

PURGE AGAIN? ( )Yes ( ) No TOTAL VOL. REMOVED (gal) (L)

| Date | Time | Volume Removed Unit: L | pH | Cond. | Temp. | ORP | Turb. | DO | Depth to Water from TOC | Pump Rate mLpM |
|---|---|---|---|---|---|---|---|---|---|---|
| 6/11 | 1041 | 2 | 6.69 | 823 | 17.17 | 60.8 | 193.8 | 1.14 | 5.12 | 400 |
| | 1046 | 4 | 6.79 | 844 | 18.50 | 73.6 | 95.1 | 1.09 | 7.35 | |
| | 1051 | 6 | 6.74 | 857 | 22.68 | 71.9 | 65.2 | 0.89 | 7.24 | |
| | 1056 | 8 | 6.76 | 856 | 22.62 | 74.5 | 73.0 | 0.75 | 7.24 | |
| | 1101 | 10 | 6.76 | 853 | 21.72 | 84.5 | 54.5 | 1.12 | 7.24 | |
| | 1106 | 12 | 6.77 | 854 | 22.61 | 86.1 | 53.1 | 1.20 | 7.24 | |
| | 1111 | 14 | 6.77 | 851 | 23.20 | 89.7 | 50.4 | 1.16 | 7.24 | |
| | 1116 | 16 | 6.78 | 850 | 19.71 | 95.5 | 48.2 | 1.48 | 7.24 | |
| | 1121 | 18 | 6.73 | 856 | 19.45 | 105 | +1200 | 1.57 | 7.24 | pump slipped sed. |
| | 1126 | 20 | 6.75 | 846 | 19.05 | 62.4 | 127.4 | 0.44 | 7.24 | |
| | 1031 | 22 | 6.74 | 847 | 20.51 | 66.6 | 81.1 | ~~0.58~~ 1.04 | ~~1.00~~ | |
| | 1036 | 24 | 6.78 | 842 | 20.97 | 75.5 | 100.7 | 1.33 | 7.24 | |
| | 1041 | 26 | 6.74 | 846 | 20.03 | 64.7 | 109.9 | 1.30 | 7.24 | |

COMMENTS PAH Metals VOC
Sampled @ 1145
DUP-2 collected / MS/MSD

SIGNATURE

EA Engineering, Science, and Technology, Inc.

# WELL PURGING AND SAMPLING RECORD

WELL ID MW-3A SAMPLE NO. MW-3A

WELL/SITE DESCRIPTION

DATE 5/31/11 TIME 1525 AIR TEMP. 96°F

WELL DEPTH 15 ft CASING HEIGHT ft

WATER DEPTH 5.71 ft WELL DIAMETER 2 in

WATER COL. HEIGHT 9.29 ft SANDPACK DIAM. in

EQUIVALENT VOLUME OF STANDING WATER 1.5 (gal) (L)

PUMP RATE .400 na (gpm) (LPM)

PUMP TIME 38 min

WELL WENT DRY? ( ) Yes (✓) No PUMP TIME 38 min

VOL. REMOVED (gal) (L) RECOVERY TIME min

PURGE AGAIN? ( )Yes ( ) No TOTAL VOL. REMOVED (gal) (L)

| Date | Time | Volume Removed Unit: L | pH | Cond. | Temp. | ORP | Turb. | DO | Depth to Water from TOC | Pump Rate mLPM |
|---|---|---|---|---|---|---|---|---|---|---|
| 5/31 | 1520 | 0 | 7.89 | 782 | 15.24 | 206.4 | 27.4 | 0.87 | 5.71 | 400 |
| | 1531 | 2 | 6.78 | 775 | 15.44 | 201.3 | 21.0 | 0.68 | 5.76 | |
| | 1536 | 4 | 6.77 | 775 | 14.82 | 200.9 | 20.6 | 0.66 | 5.76 | |
| | 1541 | 6 | 6.76 | 773 | 15.60 | 199.3 | 18.7 | 0.69 | 5.76 | |
| | 1546 | 8 | 6.72 | 777 | 14.93 | 197.8 | 18.5 | 0.58 | 5.76 | |
| | 1551 | 10 - Ran out of gas - missed | | | | | | | | |
| 25 | 1554 | 12 | 6.73 | 778 | 14.95 | 197.8 | 18.4 | 0.55 | 5.76 | |
| Bailed dry | 1559 | 14 | 6.75 | 788 | | | | | 5.76 | |
| | 1643 | 16 | 6.70 | 777 | 14.49 | 196.1 | 16.9 | 0.55 | 5.76 | |
| | 1648 | 18 | 6.68 | 771 | 14.71 | 190.9 | 17.1 | 0.54 | 5.76 | |
| | 1653 | 20 | 6.67 | 773 | 14.68 | 190.7 | 17.0 | 0.53 | 5.76 | |
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COMMENTS Sampled @ 1655

H2O in line, bled, battery adjusted in box

SIGNATURE

EA Engineering, Science, and Technology, Inc.

# WELL PURGING AND SAMPLING RECORD

WELL ID MW-4 SAMPLE NO. Same

WELL/SITE DESCRIPTION Same

DATE 6/1/11 TIME 1550 AIR TEMP. 95°

WELL DEPTH 50 ft CASING HEIGHT — ft

WATER DEPTH 9.42 ft WELL DIAMETER 2 in

WATER COL. HEIGHT 40.58 ft SANDPACK DIAM. 6 in

EQUIVALENT VOLUME OF STANDING WATER 6.62 (gal) (L)

PUMP RATE See Below (gpm) (LPM)

PUMP TIME 104 min min

WELL WENT DRY? ( ) Yes ( ) No PUMP TIME NA min

VOL. REMOVED ~13.5 (gal) (L) RECOVERY TIME NA min

PURGE AGAIN? ( ) Yes ( ) No TOTAL VOL. REMOVED ~13.5 (gal) (L)

| Date | Time | Volume Removed Unit: / | pH | Cond. | Temp. | ORP | Turb. | DO | Depth to Water from TOC | Pump Rate |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | µS/cm | C | | NTU | mg/L | | mL/min |
| 6/1/11 | 1556 | | 7.14 | 404 | 14.73 | 111.3 | 3.055 | 0.68 | 10.83 | 475 |
| 6/1/11 | 1601 | | 7.05 | 407 | 14.48 | 123.3 | 1592 | 1.00 | 10.82 | 500 |
| 6/1/11 | 1606 | | 7.05 | 409 | 14.51 | 114.1 | 730.1 | 1.25 | 10.71 | 475 |
| 6/1/11 | 1611 | | 7.08 | 411 | 14.57 | 109.7 | 334.1 | 1.33 | 10.73 | 475 |
| 6/1/11 | 1617 | | 7.09 | 408 | 14.40 | 104.7 | 209.8 | 1.34 | 10.81 | 500 |
| 6/1/11 | 1623 | | 7.09 | 407 | 14.42 | 99.1 | 215.1 | 1.33 | 10.83 | 500 |
| 6/1/11 | 1639 | | 7.10 | 405 | 14.40 | 100. | 181.9 | 1.35 | 10.84 | 500 |
| 6/1/11 | 1644 | | 7.10 | 404 | 14.39 | 101.4 | 133.4 | 1.32 | 10.84 | 500 |
| 6/1/11 | 1649 | | 7.11 | 404 | 14.38 | 103.1 | 117.0 | 1.30 | 10.83 | 500 |
| 6/1/11 | 1654 | | 7.11 | 406 | 14.46 | 102.6 | 110.9 | 1.31 | 10.82 | 500 |
| 6/1/11 | 1659 | | 7.12 | 403 | 14.34 | 102.3 | 93.7 | 1.24 | 10.80 | 475 |
| 6/1/11 | 1707 | | 7.11 | 404 | 14.39 | 103.5 | 108.2 | 1.26 | 10.81 | 475 |
| 6/1/11 | 1716 | | 7.11 | 406 | 14.57 | 105.0 | 78.3 | 1.26 | 10.69 | 475 |
| 6/1/11 | 1722 | | 7.12 | 405 | 14.33 | 105.5 | 80.9 | 1.26 | 10.84 | 500 |
| 6/1/11 | 1729 | | 7.11 | 407 | 14.44 | 105.9 | 83.6 | 1.27 | 10.83 | 500 |

COMMENTS

- Bladder pump removed and placed in building (not working), Grundfos pump utilized for purge/pumping (Per FSP)
- 1735 → Sample Time
- 1740 → Collect DUP-3

SIGNATURE

EA Engineering, Science, and Technology, Inc.

# WELL PURGING AND SAMPLING RECORD

WELL ID MW-4A SAMPLE NO. Same

WELL/SITE DESCRIPTION Same

DATE 6 / 1 / 11 TIME 1417 AIR TEMP. _____

WELL DEPTH 15 ft CASING HEIGHT – ft

WATER DEPTH ~~6.95~~ 7.11 ft WELL DIAMETER 2 in

WATER COL. HEIGHT 7.89 ft SANDPACK DIAM. 6 in

EQUIVALENT VOLUME OF STANDING WATER 1.3 (gal) (L)

PUMP RATE BPS See Below (gpm) (LPM)

PUMP TIME ~~1430~~ BPS – Begin Purge 1 – 1420 min

WELL WENT DRY? (X) Yes ( ) No PUMP TIME 18 min

VOL. REMOVED ~2.5 gal (gal) (L) RECOVERY TIME 30 min

PURGE AGAIN? (X) Yes ( ) No TOTAL VOL. REMOVED ~6.5 (gal) (L)

| | Date | Time | Volume Removed Unit: | pH | Cond. µS/cm | Temp. C | ORP ~~mV~~ BPS | Turb. NTU | DO mg/L | Depth to Water from TOC | Pump Rate ml/min | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Purge 1 | 6/1/11 | 1427 | | 6.16 | 220 | 19.70 | 123.7 | 206.9 | 0.53 | 9.21 | 300 | – start pump, ra too high d back |
| | 6/1/11 | 1439 | | 6.12 | 207 | 17.35 | 117.9 | 189.5 | 0.44 | 8.37 | 500 | – Pump sputtering – reset and bea again |
| | 6/1/11 | 1446 | | 6.05 | 197 | 16.89 | 134 | 233 | 0.51 | 13.5 | 500 | |
| | 6/1/11 | 1450 | | | | | | | | Dry | | |
| | Allow 30 min to recover per FSP | | | | | | | | | | | |
| Purge 2 | 6/1/11 | 1525 | | 6.11 | 235 | 16.85 | 115.2 | 251 | 0.52 | 8.52 | 500 | |
| | 6/1/11 | 1530 | | 6.08 | 221 | 16.79 | 118.1 | 246 | 0.50 | 12.96 | 500 | |
| | 6/1/11 | 1543 BPS | | | | | | | | Dry | | |
| | Approx. 2.5 gal removed during purge | | | | | | | | | | | |
| Purge 3 1832 – set backup on well DTW → 7.52 1835 → Begin Purge 3 | | 1837 | | 6.60 | 199 | 13.01 | 83.1 | 159 | 2.75 | 10.15 | 500 | |
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COMMENTS – Grundfos pump used for purge/sample
1840 – Sample Time

SIGNATURE [signature]

EA Engineering, Science, and Technology, Inc.

# WELL PURGING AND SAMPLING RECORD

WELL ID MW-6 SAMPLE NO. Same

WELL/SITE DESCRIPTION Same

DATE 6 / 1 / 11 TIME 1100 AIR TEMP. _____

WELL DEPTH 55 ft CASING HEIGHT — ft

WATER DEPTH 8.41 ft WELL DIAMETER 2 in

WATER COL. HEIGHT 46.59 ft SANDPACK DIAM. 6 in

EQUIVALENT VOLUME OF STANDING WATER 7.59 (gal) (L)

PUMP RATE See Below (gpm) (LPM)

PUMP TIME 1140 - 42 min min

WELL WENT DRY? ( ) Yes (X) No PUMP TIME NA min

VOL. REMOVED NA (gal) (L) RECOVERY TIME NM min

PURGE AGAIN? ( )Yes (X) No TOTAL VOL. REMOVED 3.36 (gal) (L)

| Date | Time | Volume Removed Unit: | pH | Cond. uS/cm | Temp. C | ORP | Turb. NTU | DO mg/L | Depth to Water from TOC | Pump Rate ml/min |
|---|---|---|---|---|---|---|---|---|---|---|
| 6/1/11 | 1145 | | 6.75 | 616 | 14.23 | 228.5 | 93.2 | 2.66 | 8.98 | 300 |
| 6/1/11 | 1150 | | 6.72 | 616 | 14.21 | 228.1 | 32.5 | 1.90 | 9.10 | 300 |
| 6/1/11 | 1155 | | 6.71 | 615 | 14.22 | 227.6 | 33.8 | 1.56 | 9.15 | 300 |
| 6/1/11 | 1200 | | 6.70 | 615 | 14.28 | 226.9 | 33.5 | 1.18 | 9.17 | 300 |
| 6/1/11 | 1205 | | 6.71 | 615 | 14.22 | 226.1 | 34.1 | 1.13 | 9.18 | 300 |
| 6/1/11 | 1214 | | 6.71 | 615 | 14.29 | 225.0 | 36.1 | 0.51 | 9.20 | 300 |
| 6/1/11 | 1222 | | 6.71 | 613 | 14.26 | 224.3 | 36.6 | 0.49 | 9.20 | 300 |
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COMMENTS - Begin Purge @ 1140
- Sample Time → 1230

SIGNATURE [illegible]

EA Engineering, Science, and Technology, Inc.

# WELL PURGING AND SAMPLING RECORD

WELL ID MW-8A SAMPLE NO. Same

WELL/SITE DESCRIPTION Same

DATE 6/1/11 TIME 0920 AIR TEMP. 85°F

WELL DEPTH 14 ft CASING HEIGHT — ft

WATER DEPTH 7.40 ft WELL DIAMETER 2 in

WATER COL. HEIGHT 6.6 ft SANDPACK DIAM. 6 in

EQUIVALENT VOLUME OF STANDING WATER 1.1 (gal) (L)

PUMP RATE See Below (gpm) (LPM)

PUMP TIME 60 min

WELL WENT DRY? ( ) Yes (X) No PUMP TIME NA min

VOL. REMOVED NA (gal) (L) RECOVERY TIME NM min

PURGE AGAIN? ( ) Yes (X) No TOTAL VOL. REMOVED 7.2 (gal) (L)

| Date | Time | Volume Removed Unit: | pH | Cond. uS/cm | Temp. C | ORP | Turb. NTU | DO mg/L | Depth to Water from TOC | Pump Rate mL/min |
|---|---|---|---|---|---|---|---|---|---|---|
| 6/1/11 | 0930 | | 6.02 | 122 | 14.11 | 260.6 | 32.2 | 3.97 | 7.90 | 450 |
| 6/1/11 | 0937 | | 6.01 | 126 | 13.55 | 259.1 | 32.8 | 3.58 | 7.89 | 450 |
| 6/1/11 | 0944 | | 6.02 | 128 | 13.43 | 259.6 | 31.9 | 3.42 | 7.91 | 425 |
| 6/1/11 | 0950 | | 6.03 | 129 | 13.43 | 260.1 | 31.6 | 3.36 | 7.97 | 450 |
| 6/1/11 | 1005 | | 6.05 | 130 | 13.38 | 261.4 | 30.7 | 3.32 | 8.03 | 450 |
| 6/1/11 | 1011 | | 6.05 | 130 | 13.51 | 262.3 | 30.6 | 3.35 | 8.04 | 450 |
| 6/1/11 | 1016 | | 6.05 | 131 | 13.59 | 262.7 | 30.4 | 3.37 | 8.05 | 450 |
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— call w/ SS.

COMMENTS 1020 - Sample collected (VOCs + VOC (Dupl. 1))
1030 - Purge Stop
- Note: Purged/Sampled using bladder pump

SIGNATURE [signature]

EA Engineering, Science, and Technology, Inc.

# WELL PURGING AND SAMPLING RECORD

WELL ID MW-9 SAMPLE NO. MW-9

WELL/SITE DESCRIPTION Stickup in woods

DATE 6/1/11 TIME 1515 AIR TEMP. 80's

WELL DEPTH 60 ft CASING HEIGHT ____ ft

WATER DEPTH 7.17 ft WELL DIAMETER 2 in

WATER COL. HEIGHT 52.83 ft SANDPACK DIAM. ____ in

EQUIVALENT VOLUME OF STANDING WATER 8.6 (gal) (L)

PUMP RATE 400 ~~400~~ 500 (gpm) (LPM)

PUMP TIME 60 min

WELL WENT DRY? ( ) Yes (X) No PUMP TIME 60 min

VOL. REMOVED 29.7 (gal) (L) RECOVERY TIME ____ min

PURGE AGAIN? ( )Yes ( ) No TOTAL VOL. REMOVED ____ (gal) (L)

| Date | Time | Volume Removed Unit: L | pH | Cond. | Temp. | ORP | Turb. | DO | Depth to Water from TOC | Pump Rate |
|---|---|---|---|---|---|---|---|---|---|---|
| 6/1/11 | 1526 | 0 | 7.70 | 492 | 15.68 | 148.7 | 132.5 | 1.63 | 7.17 | 400 |
| | 1534 | 3.2 | 7.56 | 499 | 13.18 | 152.3 | 247.9 | 1.14 | 7.02 | 400 |
| | 1539 | 5.2 | 7.51 | 501 | 13.00 | 144.8 | 307.6 | 1.25 | 7.08 | |
| | 1544 | 7.2 | 7.50 | 514 | 12.88 | 139.4 | 351.7 | 1.22 | 7.08 | |
| | 1549 | 9.2 | 7.51 | 517 | 12.78 | 134.2 | 457.8 | 1.15 | 7.08 | |
| | 1555 | 11.2 | 7.51 | 520 | 12.69 | 133.9 | 443.8 | 1.23 | 7.08 | |
| | 1600 | 13.2 | 7.51 | 529 | 13.45 | 135.1 | 461.2 | 1.18 | 7.08 | |
| | 1605 | 15.2 | 7.50 | 548 | 13.22 | 136.6 | 492.9 | 1.10 | 7.08 | |
| | 1610 | 17.2 | 7.51 | 538 | 13.32 | 138.2 | 435.7 | 1.14 | 7.08 | |
| | 1615 | 19.7 | 7.52 | 526 | 12.51 | 140.4 | 388.6 | 1.23 | 7.27 | 500 |
| | 1620 | 22.2 | 7.51 | 526 | 12.60 | 142.1 | 368.5 | 1.22 | 7.27 | |
| | 1625 | 24.7 | 7.50 | 539 | 12.32 | 143.6 | 392.2 | 1.16 | 7.27 | |
| | 1630 | 27.2 | 7.50 | 547 | 12.38 | 145.0 | 375.2 | 1.13 | 7.27 | |
| | 1635 | 29.7 | 7.50 | 548 | 12.38 | 145.0 | 370.2 | 1.13 | 7.27 | |

COMMENTS VOC metals cyanide field filtered
Sampled @ 1640

SIGNATURE [signature]

EA Engineering, Science, and Technology, Inc.

# WELL PURGING AND SAMPLING RECORD

WELL ID MW-9A SAMPLE NO. MW-9A

WELL/SITE DESCRIPTION stick up in woods

DATE 6 / 7 / 11 TIME 1700 AIR TEMP. upper 80's

WELL DEPTH 12 ft CASING HEIGHT _____ ft

WATER DEPTH 6.09 ft WELL DIAMETER 2 in

WATER COL. HEIGHT 5.91 ft SANDPACK DIAM. _____ in

EQUIVALENT VOLUME OF STANDING WATER 0.96 (gal) (L)

PUMP RATE 300 mLPM (gpm) (LPM)

PUMP TIME 61 min

WELL WENT DRY? ( ) Yes (X) No PUMP TIME 61 min

VOL. REMOVED 13.5 (gal) (L) RECOVERY TIME _____ min

PURGE AGAIN? ( ) Yes (X) No TOTAL VOL. REMOVED _____ (gal) (L)

| Date | Time | Volume Removed Unit: | pH | Cond. | Temp. | ORP | Turb. | DO | Depth to Water from TOC | Pump Rate 300 mL |
|---|---|---|---|---|---|---|---|---|---|---|
| 6/7 | 1705 | 0 | 7.42 | 6 | 20.03 | 146.8 | 45.8 | 4.41 | 6.09 | 300 |
| | 1710 | 1.5 | 7.43 | 265 | 20.78 | 154.6 | 91.3 | 6.63 | 6.28 | |
| | 1715 | 3 | 6.70 | 261 | 14.84 | 122.8 | 94.8 | 1.56 | 6.28 | |
| | 1720 | 4.5 | 6.58 | 260 | 14.64 | 126.1 | 86.1 | 1.29 | 6.28 | |
| | 1725 | 6 | 6.54 | 257 | 14.70 | 129.4 | 79.2 | 1.09 | 6.28 | |
| | 1730 | 7.5 | 6.52 | 255 | 14.66 | 132.4 | 74.4 | 1.53 | 6.28 | |
| | 1739 | 9 | 6.48 | 251 | 14.79 | 138.5 | 68.7 | 1.34 | 6.28 | |
| | 1744 | 10.5 | 6.50 | 251 | 14.45 | 140.2 | 65.4 | 1.38 | 6.28 | |
| | 1749 | 12 | 6.49 | 256 | 14.54 | 143.4 | 62.3 | 1.36 | 6.28 | |
| | 1754 | 13.5 | 6.49 | 250 | 14.66 | 145.4 | 61.6 | 1.32 | 6.28 | |
| | | | | | | | | | | |
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COMMENTS Metals Cyanide field filtered VOCs
Sampled @ 1755

SIGNATURE [signature]

EA Engineering, Science, and Technology, Inc.

# WELL PURGING AND SAMPLING RECORD

WELL ID MW-12 SAMPLE NO. MW-12

WELL/SITE DESCRIPTION Stick up along rd

DATE 5/31/11 TIME 1255 AIR TEMP. 90's

WELL DEPTH 60 ft CASING HEIGHT ____ ft

WATER DEPTH 17.19 ft WELL DIAMETER 2 in

WATER COL. HEIGHT 42.81 ft SANDPACK DIAM. ____ in

26-60 open
pump ≈ 37.5

EQUIVALENT VOLUME OF STANDING WATER 6.98 (gal) (L)

PUMP RATE 3 (gpm) (LPM)

PUMP TIME ____ min

WELL WENT DRY? ( ) Yes (x) No PUMP TIME ____ min

VOL. REMOVED ____ (gal) (L) RECOVERY TIME ____ min

PURGE AGAIN? ( )Yes ( ) No TOTAL VOL. REMOVED ____ (gal) (L)

| Date | Time | Volume Removed Unit: | pH | Cond. mS/cm | Temp. °C | ORP mV | Turb. NTU | DO mg/L | Depth to Water from TOC | Pump Rate LPM |
|---|---|---|---|---|---|---|---|---|---|---|
| 5/31/11 | 1312 | 0 | 7.22 | 659 | 14.26 | -58.7 | 83.5 | 0.40 | 17.19 | 30x |
| | 1317 | 1.5 | 7.22 | 656 | 13.84 | -67.5 | 69.1 | 0.27 | 17.70 | |
| | 1322 | 3 | 7.22 | 659 | 14.29 | -66.1 | 55.9 | 0.22 | 17.99 | |
| | 1327 | 4.5 | 7.25 | 654 | 14.85 | -74.4 | 51.7 | 0.17 | 18.09 | |
| | 1332 | 6 | 7.25 | 657 | 14.92 | -75.9 | 49.0 | 0.16 | 18.21 | |
| | 1346 | 7.5 | 7.24 | 656 | 14.93 | -75.5 | 42.5 | 0.16 | 18.29 | |
| | 1352 | 9 | 7.26 | 657 | 14.56 | -76.5 | 42.6 | 0.14 | 18.34 | |
| | | | | | | | | | | |
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| | | | | | | | | | | |

time off due to diff. bet. watch & 451 clock

COMMENTS sampled @ 1355

SIGNATURE [signature]

EA Engineering, Science, and Technology, Inc.

# WELL PURGING AND SAMPLING RECORD

WELL ID MW-14 SAMPLE NO. _____

WELL/SITE DESCRIPTION _____

DATE 31/5/11 TIME _____ AIR TEMP. _____

WELL DEPTH 41 ft CASING HEIGHT _____ ft

WATER DEPTH 17.61 ft WELL DIAMETER 2 in

WATER COL. HEIGHT 23.39 ft SANDPACK DIAM. _____ in

EQUIVALENT VOLUME OF STANDING WATER 3.8 (gal) (L)

PUMP RATE .5-.6-.2 gLPM (gpm) (LPM) 28-41 open

PUMP TIME 45 min 38.5 pump

WELL WENT DRY? ( ) Yes (X) No PUMP TIME 45 min

VOL. REMOVED _____ (gal) (L) RECOVERY TIME _____ min

PURGE AGAIN? ( )Yes ( ) No TOTAL VOL. REMOVED _____ (gal) (L)

| Date | Time | Volume Removed Unit: | pH | Cond. ~~uS/cm~~ | °C Temp. ~~13.28~~ | ORP ~~-124.5~~ | Turb. ~~42.7~~ | DO ~~mg/L~~ ~~0.07~~ | Depth to Water from TOC | Pump Rate ~~gLPM~~ |
|---|---|---|---|---|---|---|---|---|---|---|
| 5/31 | 1103 | 0 | 7.29 | 488 | 13.28 | -124.5 | 42.7 | 0.15 | 17.65 | .5 |
| | 1108 | 2.5 | 7.45 | 488 | 13.15 | -135.8 | 42.8 | 0.16 | 18.74 | |
| | 1113 | 5 | 7.45 | 488 | 13.14 | -138.0 | 39.2 | 0.09 | 19.18 | |
| | 1118 | 7.5 | 7.48 | 485 | 13.28 | -140.1 | 35.2 | 0.07 | 19.65 | |
| | 1123 | 10.3 | 7.47 | 488 | 13.24 | -142.8 | 32.9 | 0.06 | 19.84 | 600 ml/min |
| | 1128 | 13.5 | 7.50 | 489 | 13.45 | -145.0 | 35.5 | 0.05 | 20.26 | |
| | 1133 | 16.5 | 7.51 | 489 | 13.54 | -146.0 | 33.3 | 0.08 | 20.45 | |
| | 1138 | 17.5 | 7.52 | 491 | 13.87 | -145.7 | 33.6 | 0.07 | 20.62 | 200 ml/min |
| | 1143 | 18.5 | 7.51 | 491 | 14.29 | -144.7 | 31.5 | 0.07 | 20.82 | |
| | 1148 | 19.5 | 7.49 | 490 | 14.31 | -144.6 | 31.9 | 0.08 | 20.98 | |
| | | | | | | | | | | |
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| | | | | | | | | | | |

COMMENTS PID = 0 @ 1086

Sampled @ 1155

MS/MSD collected

check ambient air do post sampling 93.5%

SIGNATURE [signature]

EA Engineering, Science, and Technology, Inc.

# WELL PURGING AND SAMPLING RECORD

WELL ID MW-15 SAMPLE NO. Same

WELL/SITE DESCRIPTION Same

DATE 31 MAY 2011 TIME 1422 AIR TEMP. 95°F

WELL DEPTH 166 ft CASING HEIGHT — ft

WATER DEPTH 8.57 ft WELL DIAMETER 2 in

WATER COL. HEIGHT 159.43 ft SANDPACK DIAM. 6 in

EQUIVALENT VOLUME OF STANDING WATER 26 (gal) (L)

PUMP RATE See Below (gpm) (LPM)

PUMP TIME 1426 BEGIN PURGE – 37 min min

WELL WENT DRY? ( ) Yes (X) No PUMP TIME NA min

VOL. REMOVED (gal) (L) RECOVERY TIME NM min

PURGE AGAIN? ( )Yes ( ) No TOTAL VOL. REMOVED 5.92 (gal) (L)

.1 ~~1/10~~ 3/10 10/min 10/10

| Date | Time | Volume Removed Unit: | pH | Cond. uS/cm | Temp. C | ORP | Turb. NTU | DO mg/L | Depth to Water from TOC | Pump Rate ml/min |
|---|---|---|---|---|---|---|---|---|---|---|
| 5/31/11 | 1426 | | 7.71 | 674 | 12.66 | 52.3 | 9.0 | 6.52 | 8.67 | 325 ml |
| 5/31/11 | 1431 | | 7.42 | 686 | 13.02 | 59.6 | 10.2 | 2.61 | 8.66 | 700 ml/min |
| 5/31/11 | 1435 | | | | | | | | 8.71 | 600 ml/min |
| 5/31/11 | 1437 | | 7.37 | 680 | 12.74 | 46.4 | 19.7 | 2.81 | — | — |
| 5/31/11 | 1446 | | 7.35 | 683 | 12.85 | 49.0 | 14.7 | 2.81 | 8.75 | 650 ml/min |
| 5/31/11 | 1453 | | 7.35 | 685 | 13.07 | 52.1 | 14.3 | 2.77 | 8.76 | 650 |
| 5/31/11 | 1458 | | 7.35 | 686 | 13.13 | 52.5 | 13.8 | 2.76 | 8.76 | — |
| 5/31/11 | 1503 | | 7.35 | 686 | 13.14 | 52.8 | 13.8 | 2.75 | 8.76 | 625 |
| | | | | | | | | | | |
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COMMENTS Purge sample w/ 2 in Cornell log
VOCs, 8133 herbicides, 8135 cyanide
Sample time = 1515

SIGNATURE [illegible]

EA Engineering, Science, and Technology, Inc.

# FLUTe WELL PURGING AND SAMPLING RECORD

WELL ID Mifflin Ave Deep well SAMPLE NO. Same
WELL/SITE DESCRIPTION Same

DATE 5/31/11 TIME 1000 AIR TEMP. 85° F
FORMATION WATER LEVEL ~10.9 ft LINER WATER LEVEL ~1.2 ft
PURGE PRESSURE ~65 psi SAMPLING PRESSURE ~20 psi
PORT NUMBER 1 PORT INTERVAL 41-52 ft INITIAL WATER LEVEL 10.84 ft
PORT NUMBER 2 PORT INTERVAL 121-132 ft INITIAL WATER LEVEL 11.13 ft
PORT NUMBER 3 PORT INTERVAL 170-181 ft INITIAL WATER LEVEL 10.94 ft
PORT NUMBER 4 PORT INTERVAL 184-195 ft INITIAL WATER LEVEL 10.95 ft

| Port Number | Depth to Water Pre-Purge | Time | pH | Cond. Units = | Temp. Units = | ORP Units = | Turb. (NTU) | DO (mg/L) | Depth to Water Post-Purge (ft) | Initial Purge Volume (L) |
|---|---|---|---|---|---|---|---|---|---|---|
| PURGE ONE | | | | | | | | | | |
| 1 | 10.84 | 1105 | | | | | | | 40.45 | 4.2 |
| 2 | 11.13 | 1107 | | Not Collected (see comment) | | | | | 15.60 | 3.125 |
| 3 | 10.94 | 1107 | | | | | | | 12.00 | 3.45 |
| 4 | 10.95 | 1107 | | | | | | | 22.60 | 3.45 |
| PURGE TWO | | | | | | | | | | |
| 1 | BTS 11.64 | 1141 | | | | | | | NM - (see comment) | ~3.8 |
| 2 | 15.60 | 1141 | | | | | | | NM - (see comment) | ~3.8 |
| 3 | 12.00 | 1141 | | | | | | | NM - (see comment) | ~3.8 |
| 4 | 22.60 | 1141 | | | | | | | NM - see comment | ~3.8 |
| PURGE THREE | | | | | | | | | | |
| 1-4 | NM - see comment | 1156 | | | | | | | | ~3.8 |
| PURGE FOUR | | | | | | | | | | |
| 1-4 | NM - see comment | 1212 | | | | | | | | ~3.8 |
| PURGE FIVE | | | | | | | | | | |
| 1-4 | NM - see comment | 1224 | | | | | | | | ~3.8 |
| PURGE SIX | | | | | | | | | | |
| 1 | — | 1239 | 7.22 | 490 BTS | 14.12 BTS | 55.1 | 210.1 | 5.23 | — | ~3.8 |
| 2 | — | 1239 | 7.46 | 416 | 14.04 | 55.6 | 390.3 | 3.39 | — | ~3.8 |
| 3 | — | 1239 | 7.76 | 315 | 14.40 | 50.3 | 119.3 | 3.45 | — | ~3.8 |
| 4 | — | 1239 | 7.78 | 319 | 15.12 | 4.4 | 529.1 | 2.58 | — | ~3.8 |
| PURGE SEVEN → Sample (Port 1) Collection | | | | | | | | | | |
| 1 BTS | — | 1305 | | | | | | | | ~3.8 |

See Comment

EA Engineering, Science, and Technology, Inc.

# FLUTe WELL PURGING AND SAMPLING RECORD

WELL ID Mifflin Ave Deep well SAMPLE NO. Same

WELL/SITE DESCRIPTION Same

DATE 5 / 31 / 11 TIME 1000 AIR TEMP. 85°F

BPS 2 1320 ~3.8

| PURGE EIGHT - Sample (Ports, 2, 3, 4) Collection | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| 3 - 4 BPS | ~~1340~~ 1340 BPS | | | | | | | | | ~3.8 |

COMMENTS Per USACE (Ethan Weikel) on-site direction natural parameters were only monitored for purge water collected immediately preceding sample collection (Purge Six); Pre- and post-water levels were not monitored for purges three through eight as an established rate of recovery (determined between Purge 1 and Purge 2) was deemed acceptable; and individual purge volumes for each purge were not monitored, instead a cumulative purge volume for each port interval was monitored totaling to approximately 5 gallons, prior to sample collection

SIGNATURE [signature]

EA Engineering, Science, and Technology, Inc.

# WELL PURGING AND SAMPLING RECORD

WELL ID Mifflin Ave Res. well SAMPLE NO. MARW
WELL/SITE DESCRIPTION Yetter well

DATE 5 /31 / ~~10~~ 11 dew TIME 1410 AIR TEMP. 90's

WELL DEPTH 60 ft CASING HEIGHT _____ ft
WATER DEPTH 15.56 ft WELL DIAMETER _____ in
WATER COL. HEIGHT _____ ft SANDPACK DIAM. _____ in
EQUIVALENT VOLUME OF STANDING WATER _____ (gal) (L)
PUMP RATE _____ (gpm) (LPM)
PUMP TIME _____ min
WELL WENT DRY? ( ) Yes ( ) No PUMP TIME _____ min
VOL. REMOVED _____ (gal) (L) RECOVERY TIME _____ min
PURGE AGAIN? ( )Yes ( ) No TOTAL VOL. REMOVED _____ (gal) (L)

| Date | Time | Volume Removed Unit: | pH | Cond. | Temp. | ORP | Turb. | DO | Depth to Water from TOC | Pump Rate |
|---|---|---|---|---|---|---|---|---|---|---|
| 5/31/11 | 1415 | | | | | | | | | |
| | 1420 | | 7.54 | 715 | 14.69 | 150.4 | 4.1 | 3.17 | | |
| | 1425 | | 7.63 | 719 | 14.05 | 161.1 | 4.4 | 4.49 | | |
| | 1430 | | 7.68 | 710 | 13.74 | 163.1 | 3.9 | 3.03 | | |
| | | | | | | | | | | |
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COMMENTS Sampled @ 1430
Purged in sink, Sampled @ valve before pressure tank

SIGNATURE [illegible]

# FIELD CALIBRATION FORM
**YSI 3800**
**pH, CONDUCTIVITY, TEMPERATURE, TURBIDITY, ORP, AND DISSOVED OXYGEN**

## TURBIDITY CALIBRATION

| STANDARD | INITIAL READING | FINAL READING |
|---|---|---|
| 0 NTU | 0.1 | 0.1 |
| 200 NTU | 199 | 200 |
| 800 NTU | | |

## ORP CALIBRATION

| STANDARD | FINAL READING |
|---|---|
| 231 MV | |

## DISSOLVED OXYGEN CALIBRATION

| STANDARD | INTITIAL READING | FINAL READING |
|---|---|---|
| 100% AIR SATURATION | 90.5 | 100.0 % |

## COMMENTS

**SIGNATURE**

# FIELD CALIBRATION FORM
**YSI 3800**
**pH, CONDUCTIVITY, TEMPERATURE, TURBIDITY, ORP, AND DISSOVED OXYGEN**

| CALIBRATION |
|---|
| DATE: 31 may 2011 |
| TIME: 0920 |
| METER ID: YSI #2 98C0697 |

## pH CALIBRATION

| pH STANDARD | INITIAL READING | FINAL READING |
|---|---|---|
| 4.0 | 3.84 | |
| 7.0 | 8.17 | 6.99 |
| 10.0 | | |

## CONDUCTIVITY CALIBARATION

| CONDUCTIVITY STANDARD | STANDARD READING | FINAL READING |
|---|---|---|
| 0 | 1343 | 1463 |
| | | |

## TEMPERATURE CALIBRATION

| | NBS THERMOMETOR | YSI READING |
|---|---|---|
| AMBIENT WATER | — | |

24.21°C

# FIELD CALIBRATION FORM
**YSI 3800**
**pH, CONDUCTIVITY, TEMPERATURE, TURBIDITY, ORP, AND DISSOVED OXYGEN**

## TURBIDITY CALIBRATION

| STANDARD | INITIAL READING | FINAL READING |
|---|---|---|
| 0 NTU | 0.5 | 0.0 |
| 100 NTU | 38.9 | 99.0 |
| ~~800 NTU~~ | | |
| 100 NTU 2nd | 113.0 | 100.6 |

## ORP CALIBRATION

| STANDARD | FINAL READING |
|---|---|
| 231 MV | 230.9 |

## DISSOLVED OXYGEN CALIBRATION

| STANDARD | INTITIAL READING | FINAL READING |
|---|---|---|
| 100% AIR SATURATION | 98.8 | 97.8 |

## COMMENTS

**SIGNATURE**

# FIELD CALIBRATION FORM
**YSI 3800**
**pH, CONDUCTIVITY, TEMPERATURE, TURBIDITY, ORP, AND DISSOVED OXYGEN**

| CALIBRATION | |
|---|---|
| DATE: | 6/17/11 |
| TIME: | 7Am |
| METER ID: | 45 |

## pH CALIBRATION

| pH STANDARD | INITIAL READING | FINAL READING |
|---|---|---|
| 4.0 | 3.96 | 4.00 |
| 7.0 | 6.97 | 7.00 |
| 10.0 | — | — |

## CONDUCTIVITY CALIBARATION

| CONDUCTIVITY STANDARD | STANDARD READING | FINAL READING |
|---|---|---|
| 1.409 | 1435 | 1402 |
| | | |

## TEMPERATURE CALIBRATION

| | NBS THERMOMETOR | YSI READING |
|---|---|---|
| AMBIENT ~~WATER~~ AIR | | 23.98 |

# FIELD CALIBRATION FORM
**YSI 3800**
**pH, CONDUCTIVITY, TEMPERATURE, TURBIDITY, ORP, AND DISSOVED OXYGEN**

| CALIBRATION |
|---|
| DATE: 31 MAY |
| TIME: 0830 |
| METER ID: YSI 6920 #5 SN 10E101801 |

## pH CALIBRATION

| pH STANDARD | INITIAL READING | FINAL READING |
|---|---|---|
| 4.0 | 4.10 | 4.01 |
| 7.0 | 7.41 | 7.01 |
| 10.0 | — | — |

## CONDUCTIVITY CALIBARATION

| CONDUCTIVITY STANDARD | ~~STANDARD~~ CALIBRATING READING | FINAL READING |
|---|---|---|
| 1409 µmho/cm | 1301 | 1409 |
| | | |

## TEMPERATURE CALIBRATION

| | NBS THERMOMETOR | YSI READING |
|---|---|---|
| AMBIENT WATER | ~~NA~~ 23.46 °C | — |

# FIELD CALIBRATION FORM
**YSI 3800**
**pH, CONDUCTIVITY, TEMPERATURE, TURBIDITY, ORP, AND DISSOVED OXYGEN**

## TURBIDITY CALIBRATION

| STANDARD | INITIAL READING | FINAL READING |
|---|---|---|
| 0 NTU | 1.1 | 0.6 |
| ~~200~~ NTU (ans 100) | 99 | 100 |
| 800 NTU | | |

CAL CHECK ON HACH 2100 95630007341:
0 = 0.
4.3 = 4 ok

## ORP CALIBRATION

| STANDARD | FINAL READING |
|---|---|
| 231 MV | 234 |

## DISSOLVED OXYGEN CALIBRATION

| STANDARD | INTITIAL READING | FINAL READING |
|---|---|---|
| 100% AIR SATURATION | 96.3 % | 100.1 % |

## COMMENTS

## SIGNATURE

# FIELD CALIBRATION FORM
**YSI 3800**
**pH, CONDUCTIVITY, TEMPERATURE, TURBIDITY, ORP, AND DISSOVED OXYGEN**

## TURBIDITY CALIBRATION

| STANDARD | INITIAL READING | FINAL READING |
|---|---|---|
| 0 NTU | -0.2 | 0.0 |
| 100 ~~200~~ NTU | 93.6 | 99.2 |
| 800 NTU | | |

## ORP CALIBRATION

| STANDARD | FINAL READING |
|---|---|
| 231 MV | 230.4 |

## DISSOLVED OXYGEN CALIBRATION

| STANDARD | INTITIAL READING | FINAL READING |
|---|---|---|
| 100% AIR SATURATION | 99.1 | 100.8% |

## COMMENTS

**SIGNATURE**

Denise Hill

# FIELD CALIBRATION FORM
**YSI 3800**
**pH, CONDUCTIVITY, TEMPERATURE, TURBIDITY, ORP, AND DISSOVED OXYGEN**

| CALIBRATION |
|---|
| DATE: 6/2/11 |
| TIME: 0720 |
| METER ID: YSI #2 9810697 |

## pH CALIBRATION

| pH STANDARD | INITIAL READING | FINAL READING |
|---|---|---|
| 4.0 | 3.99 | 4.00 |
| 7.0 | 7.02 | 7.00 |
| 10.0 | — | — |

## CONDUCTIVITY CALIBARATION

| CONDUCTIVITY STANDARD | STANDARD READING | FINAL READING |
|---|---|---|
| 1409 | 1365 | 1408 |
| | | |

## TEMPERATURE CALIBRATION

| | NBS THERMOMETOR | YSI READING |
|---|---|---|
| AMBIENT WATER | NA | — |

23.47°C

# FIELD CALIBRATION FORM
**YSI 3800**
**pH, CONDUCTIVITY, TEMPERATURE, TURBIDITY, ORP, AND DISSOVED OXYGEN**

| CALIBRATION |
|---|
| DATE: 6/1/11 |
| TIME: 0710 |
| METER ID: YSI #2 9&C0697 |

## pH CALIBRATION

| pH STANDARD | INITIAL READING | FINAL READING |
|---|---|---|
| 4.0 | 4.07 | 4.00 |
| 7.0 | 7.04 | 7.00 |
| 10.0 | | |

## CONDUCTIVITY CALIBARATION

| CONDUCTIVITY STANDARD | STANDARD READING | FINAL READING |
|---|---|---|
| 1409 | 1406 | 1409 |
| | | |

## TEMPERATURE CALIBRATION

| | NBS THERMOMETOR | YSI READING |
|---|---|---|
| AMBIENT WATER | NA | — |

25.14 °C

# FIELD CALIBRATION FORM
**YSI 3800**
**pH, CONDUCTIVITY, TEMPERATURE, TURBIDITY, ORP, AND DISSOVED OXYGEN**

## TURBIDITY CALIBRATION

| STANDARD | INITIAL READING | FINAL READING |
|---|---|---|
| 0 NTU | -0.4 | 0.0 |
| BPS 100 ~~200~~ NTU | 41.7 | 99.6 |
| 800 NTU | | |

## ORP CALIBRATION

| STANDARD | FINAL READING |
|---|---|
| 231 MV | 230.9 |

## DISSOLVED OXYGEN CALIBRATION

| STANDARD | INTITIAL READING | FINAL READING |
|---|---|---|
| 100% AIR SATURATION | 99.1% | 99.4% |

## COMMENTS

**SIGNATURE**

Denise Hill

HEALTH AND SAFETY EQUIPMENT CALIBRATION LOG

Project Name: MARSH RUN Project Number: 62 33 003

| Date | Time | Initials | Instrument Type and ID (i.e., serial number) | Calibration Gas Type and Concentration (units) | Initial Reading (units) | Adjustments Required and Comments | Final Reading (units) |
|---|---|---|---|---|---|---|---|
| 31 MAY | 0924 | BMS | Rae 2000 FEI | 100 ppm isobutylene | 104 | cal | 100 |
| 1 June | 0820 | BPS | Rae 2000 FEI | 100 ppm isobutylene | 87 | cal | 99.5 |
| 2 June | 0800 | BPS | Rae 2000 FEI | 100 ppm isobutylene | 106 | cal | 100.7 |
| | | | | | | | |
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Signature of SSHO: Dennis Hill

# APPENDIX B

# HISTORICAL FIELD PARAMETERS DATA

# Appendix B - Historical Field Parameters Data

| Monitoring Well | Date | Depth to Water at Sampling (ft)* | pH (SU) | Specific Conductance (mS/cm) | Turbidity (NTU) | Dissolved Oxygen (mg/L) | Temperature (°C) | Oxidation Reduction Potential (mV) | Sampling Rate (mL/min) | Top of Casing Elevation | Groundwater Elevation |
|---|---|---|---|---|---|---|---|---|---|---|---|
| MW-1 | 4/2/2002 | NM[a] | 6.48 | 0.533 | 183 | 0.29 | 12.60 | NM | 400 | 306.90 | NM |
| | 8/2/2002 | 14.11 | 6.60 | 0.568 | 15 | 1.33 | 18.20 | 139 | 50 | 306.90 | 292.79 |
| | 10/9/2002 | 14.78 | 6.84 | 0.584 | 16 | 1.98 | 16.30 | 73 | 55 | 306.90 | 292.12 |
| | 2/24/2003 | 11.82 | 6.24 | 0.602 | 9.3 | NM[c] | 7.90 | 238 | 80 | 306.90 | 295.08 |
| | 5/19/2003 | 11.64 | 6.52 | 0.570 | 17.6 | 0.20 | 12.60 | 224 | 67 | 306.90 | 295.26 |
| | 8/18/2003 | 11.63 | 6.16 | 0.491 | 30.1 | 0.79 | 16.90 | 102 | 80 | 306.90 | 295.27 |
| | 11/3/2003 | 11.46 | 6.47 | 0.571 | 28 | 0.45 | 15.20 | 36 | 50 | 306.90 | 295.44 |
| | 2/23/2004 | 11.34 | 7.16 | 0.543 | 201[f] | 1.20 | 11.00 | 123 | 50 | 306.90 | 295.56 |
| | 5/10/2004 | 11.32 | 7.01 | 0.528 | 33.2 | 1.42 | 14.00 | 122 | 70 | 306.90 | 295.58 |
| | 9/13/2004 | 12.17 | 6.48 | 0.653 | 20.7 | 1.79 | 16.40 | -68 | 65 | 306.90 | 294.73 |
| | 11/8/2004 | 11.72 | 6.50 | 0.496 | 15.2 | 0.03 | 14.10 | 14 | 50 | 306.90 | 295.18 |
| | 3/24/2005 | 11.20 | 6.36 | 0.560 | 18 | 0.74 | 11.00 | 71 | 100 | 306.90 | 295.70 |
| | 6/1/2005 | 12.27 | 6.68 | 0.686 | 20 | 1.08 | 13.50 | 29 | 110 | 306.90 | 294.63 |
| | 8/24/2005 | 13.32 | 6.03 | 0.853 | 18.3 | 0.00 | 16.76 | 159 | 100 | 306.90 | 293.58 |
| | 11/22/2005 | 12.11 | 6.71 | 0.587 | 3.8 | 2.36 | 12.50 | 278 | 80 | 306.90 | 294.79 |
| | 3/9/2006 | 11.65 | 6.74 | 0.651 | 10.2 | 3.26 | 11.90 | 200 | 100 | 306.90 | 295.25 |
| | 11/22/2006 | 11.13 | 6.79 | 0.496 | 18.1 | 0.17 | 13.26 | 108 | 200 | 306.90 | 295.77 |
| | 3/26/2008 | 10.45 | 6.51 | 0.655 | Low | 4.00 | 12.39 | 354 | 110 | 306.90 | 296.45 |
| | 3/30/2009 | 12.24 | 6.30 | 99.9[k] | 1 | 0.00 | 10.8 | 151 | 140 | 306.90 | 294.66 |
| | 6/2/2011 | 9.95 | 6.54 | 0.522 | 35 | 0.74 | 15.82 | 244.7 | 300 | 306.90 | 296.95 |
| MW-1A | 4/2/2002 | NM[a] | 6.30 | 0.401 | 23 | 1.07 | 11 | NM | 77 | 306.23 | NM |
| | 8/1/2002 | NM[a] | 6.25 | 0.433 | 64 | 2.33 | 22.3 | 150 | 60 | 306.23 | NM |
| | 10/9/2002 | NM[a] | 5.99 | 0.470 | 88 | 3.36 | 17.3 | 202 | 60 | 306.23 | NM |
| | 2/25/2003 | 10.63 | 6.29 | 0.482 | 65 | 0.00 | 8.6 | 241 | 200 | 306.23 | 295.60 |
| | 5/19/2003 | 11.46 | 5.87 | 0.453 | 2.5 | 0.09 | 12.4 | 271 | 150 | 306.23 | 294.77 |
| | 8/18/2003 | 11.20 | 5.76 | 0.390 | 2.6 | 1.15 | 15.5 | 171 | 180 | 306.23 | 295.03 |
| | 11/3/2003 | 11.26 | 5.95 | 0.357 | 3.9 | 0.78 | 16.28 | 160 | 180 | 306.23 | 294.97 |
| | 2/23/2004 | 11.24 | 6.19 | 0.356 | 80.5[f] | 0.40 | 9.8 | 182 | 170 | 306.23 | 294.99 |
| | 5/10/2004 | 11.36 | 6.03 | 0.352 | 13.3 | 0.22 | 11.3 | 156 | 160 | 306.23 | 294.87 |
| | 9/13/2004 | 11.93 | 5.74 | 0.401 | 25.4 | 1.65 | 18.7 | 20 | 160 | 306.23 | 294.30 |
| | 11/8/2004 | 11.43 | 5.95 | 0.363 | 1.1 | 0.00 | 15.9 | 86 | 160 | 306.23 | 294.80 |
| | 3/9/2006 | 11.36 | 5.81 | 0.624 | 17.5 | 2.47 | 9.8 | 237 | 170 | 306.23 | 294.87 |
| | 11/22/2006 | 10.50 | 6.32 | 0.400 | 38 | 0.88 | 14.65 | 156 | 100 | 306.23 | 295.73 |
| | 3/26/2008 | 11.02 | 5.84 | 0.566 | Low | 4.12 | 9.51 | 371 | 600 | 306.23 | 295.21 |
| | 3/30/2009 | 11.69 | 6.13 | 92.3[k] | 18 | 2.32 | 7.7 | 172 | 100 | 306.23 | 294.54 |
| | 5/31/2011 | 9.23 | 6.3 | 0.331 | 6.5 | 2.85 | 12.98 | 125.9 | 400 | 306.25 | 297.02 |

# Appendix B - Historical Field Parameters Data

| Monitoring Well | Date | Depth to Water at Sampling (ft)* | pH (SU) | Specific Conductance (mS/cm) | Turbidity (NTU) | Dissolved Oxygen (mg/L) | Temperature (°C) | Oxidation Reduction Potential (mV) | Sampling Rate (mL/min) | Top of Casing Elevation | Groundwater Elevation |
|---|---|---|---|---|---|---|---|---|---|---|---|
| MW-2 | 4/2/2002 | 6.29 | 7.27 | 0.774 | 19 | 0.60 | 12.1 | NM | 200 | 302.29 | 296.00 |
| | 7/31/2002 | 8.94 | 7.29 | 0.619 | 63 | 2.06 | 19.4 | 73 | 63 | 302.29 | 293.35 |
| | 10/9/2002 | 8.29 | 6.84 | 0.807 | 0 | 1.00 | 13.0 | 100 | 140 | 302.29 | 294.00 |
| | 2/26/2003 | 6.2 | 7.00 | 0.848 | 0 | 0.00 | 9.1 | 164 | 80 | 302.29 | 296.09 |
| | 5/20/2003 | 6.23 | 6.72 | 0.866 | 12.1 | 0.31 | 11.3 | 269 | 45 | 302.29 | 296.06 |
| | 8/20/2003 | 6.30 | 6.69 | 0.916 | 2.7 | 1.37 | 17.0 | 100 | 45 | 302.29 | 295.99 |
| | 11/4/2003 | 5.83 | 6.80 | 0.979 | 1.3 | 0.32 | 16.1 | 33 | 110 | 302.29 | 296.46 |
| | 2/24/2004 | 5.89 | 7.16 | 0.825 | 0 | 0.33 | 8.3 | 92 | 70 | 302.29 | 296.40 |
| | 5/12/2004 | 6.11 | 6.98 | 0.922 | 9.5 | 0.12 | 13.51 | 61 | 85 | 302.29 | 296.18 |
| | 9/13/2004 | 6.55 | 6.72 | 1.02 | 44.5 | 1.26 | 16.7 | 29 | 85 | 302.29 | 295.74 |
| | 11/9/2004 | 6.23 | 7.03 | 0.827 | 1.4 | 0.00 | 12.8 | 43 | 85 | 302.29 | 296.06 |
| | 3/25/2005 | 5.79 | 7.72 | 0.929 | 0 | 0.89 | 9.6 | 135 | 90 | 302.29 | 296.50 |
| | 6/1/2005 | 7.41 | 7.02 | 0.978 | 0 | 1.19 | 15.0 | 54 | 80 | 302.29 | 294.88 |
| | 8/25/2005 | 8.45 | 6.84 | 0.999 | 28.8 | 0.00 | 14.66 | 59 | 100 | 302.29 | 293.84 |
| | 11/22/2005 | 6.27 | 7.04 | 0.862 | 0 | 2.12 | 11.7 | 191 | 100 | 302.29 | 296.02 |
| | 3/9/2006 | 6.19 | 6.83 | 0.98 | 1.5 | 2.28 | 10.6 | 123 | 80 | 302.29 | 296.10 |
| | 11/21/2006 | 5.40 | 7.12 | 0.695 | 22.2 | 0.10 | 12.99 | 41 | 100 | 302.29 | 296.89 |
| | 3/26/2008 | 5.87 | 6.67 | 0.934 | Low | 2.72 | 12.17 | 302 | 450 | 302.29 | 296.42 |
| | 3/31/2009 | 7.00 | 6.89 | 0.104[k] | 0 | 1.07 | 10.4 | 167 | 200 | 302.29 | 295.29 |
| | 6/1/2011 | 5.62 | 6.91 | 0.882 | 46.2 | 0.11 | 13.28 | 150.7 | 400 | 302.29 | 296.67 |
| MW-2A | 4/3/2002 | NM[a] | 7.05 | 1.800 | 18 | 1.59 | 10.6 | NM | 333 | 302.72 | NM |
| | 7/31/2002 | 11.25 | 6.69 | 1.330 | 66 | 1.03 | 17.7 | 59 | 55 | 302.72 | 291.47 |
| | 10/8/2002 | 7.20 | 6.48 | 0.99 | 0 | 0.09 | 16.5 | -16 | 80 | 302.72 | 295.52 |
| | 2/26/2003 | 4.98 | 7.01 | 1.12 | 8 | 1.95 | 6.1 | 161 | 60 | 302.72 | 297.74 |
| | 5/20/2003 | 6.36 | 6.71 | 1.25 | 18 | 0.00 | 12.3 | 70 | 45 | 302.72 | 296.36 |
| | 8/20/2003 | 6.20 | 6.38 | 1.40 | 20.5 | 1.08 | 16.8 | 21 | 40 | 302.72 | 296.52 |
| | 11/4/2003 | 6.38 | 6.61 | 1.45 | 20.8 | 0.26 | 16.07 | -17 | 70 | 302.72 | 296.34 |
| | 2/24/2004 | 6.25 | 7.03 | 0.883 | 47.2 | 1.77 | 6.5 | 75 | 50 | 302.72 | 296.47 |
| | 5/12/2004 | 6.65 | 6.81 | 1.14 | 48.8 | 6.00 | 14.95 | -1 | 65 | 302.72 | 296.07 |
| | 9/13/2004 | 7.12 | 6.38 | 1.31 | 26.3 | 2.02 | 17.3 | -50 | 65 | 302.72 | 295.60 |
| | 11/9/2004 | 6.10 | 6.80 | 1.19 | 24.1 | 0.57 | 13.0 | -9 | 65 | 302.72 | 296.62 |
| | 3/9/2006 | 6.86 | 6.80 | 0.94 | 42.3 | 4.62 | 9.9 | 206 | 80 | 302.72 | 295.86 |
| | 11/21/2006 | 6.03 | 6.98 | 0.778 | 29 | 1.21 | 13.45 | 97 | 150 | 302.72 | 296.69 |
| | 3/26/2008 | 5.34 | 6.63 | 0.812 | Low | 4.77 | 9.25 | 291 | 1000 | 302.72 | 297.38 |
| | 3/31/2009 | 6.16 | 6.87 | 0.1[k] | 0 | 6.51 | 8.3 | 178 | [m] | 302.72 | 296.56 |
| | 6/1/2011 | 5.09 | 6.74 | 0.846 | 109.9 | 1.30 | 21.03 | 64.7 | 400 | 302.72 | 297.63 |

# Appendix B - Historical Field Parameters Data

| Monitoring Well | Date | Depth to Water at Sampling (ft)* | pH (SU) | Specific Conductance (mS/cm) | Turbidity (NTU) | Dissolved Oxygen (mg/L) | Temperature (°C) | Oxidation Reduction Potential (mV) | Sampling Rate (mL/min) | Top of Casing Elevation | Groundwater Elevation |
|---|---|---|---|---|---|---|---|---|---|---|---|
| MW-3A | 4/3/2002 | 6.75 | 6.90 | 0.745 | 4 | 3.70 | 10.2 | NM | 200 | 303.85 | 297.10 |
| | 8/1/2002 | 11.43 | 6.74 | 1.040 | 22 | 0.63 | 13.8 | 134 | 280 | 303.85 | 292.42 |
| | 10/8/2002 | 10.50 | 6.50 | 1.000 | 0 | 0.00 | 14.8 | 138 | 300 | 303.85 | 293.35 |
| | 2/26/2003 | 7.35 | 6.81 | 0.831 | 0 | 1.42 | 9.0 | 186 | 300 | 303.85 | 296.50 |
| | 5/19/2003 | 7.26 | 6.83 | 1.710 | 10 | 3.00 | 10.3 | 238 | 300 | 303.85 | 296.59 |
| | 8/19/2003 | 6.92 | 6.31 | 1.71 | 15.7 | 0.63 | 14.6 | 65 | 460 | 303.85 | 296.93 |
| | 11/3/2003 | 6.51 | 6.53 | 1.13 | 20.8 | 3.06 | 14.79 | 168 | 460 | 303.85 | 297.34 |
| | 2/24/2004 | 6.90 | 6.94 | 1.00 | 0 | 3.02 | 8.3 | 259 | 250 | 303.85 | 296.95 |
| | 5/10/2004 | 6.94 | 6.74 | 1.20 | 10.4 | 2.54 | 11.5 | 127 | 250 | 303.85 | 296.91 |
| | 9/13/2004 | 6.38 | 6.49 | 1.25 | 1 | 1.28 | 18.7 | 65 | 260 | 303.85 | 297.47 |
| | 11/8/2004 | 6.60 | 6.79 | 0.89 | 0 | 2.03 | 15.2 | 89 | 260 | 303.85 | 297.25 |
| | 3/9/2006 | 6.81 | 6.75 | 0.95 | 2.8 | 4.98 | 8.6 | 250 | 230 | 303.85 | 297.04 |
| | 11/21/2006 | 5.68 | 6.97 | 0.702 | 26.4 | 1.26 | 12.89 | 105 | 180 | 303.85 | 298.17 |
| | 3/26/2008 | 6.12 | 6.65 | 0.769 | Low | 6.06 | 12.89 | 105 | 556 | 303.85 | 297.73 |
| | 4/3/2009 | 7.51 | 6.58 | 0.090[k] | 0 | 4.42 | 8.9 | 103 | 100 | 303.85 | 296.34 |
| | 5/31/2011 | 5.71 | 6.67 | 0.773 | 17 | 0.53 | 14.68 | 180.7 | 400 | 303.85 | 298.14 |
| MW-4 | 4/2/2002 | 14.30 | 7.15 | 0.588 | 28 | 2.41 | 12.3 | NM | 333 | 305.89 | 291.59 |
| | 8/1/2002 | 18.64 | 7.17 | 0.735 | 37 | 0.82 | 14.3 | 83 | 125 | 305.89 | 287.25 |
| | 10/10/2002 | 18.86 | 6.95 | 0.812 | 7.6 | 0.69 | 14.3 | 180 | 75 | 305.89 | 287.03 |
| | 2/25/2003 | 13.82 | 7.12 | 0.764 | 10 | 0 | 11.3 | 138 | 125 | 305.89 | 292.07 |
| | 5/19/2003 | 13.00 | 7.16 | 0.693 | 2.1 | 1.28 | 12.2 | 219 | 220 | 305.89 | 292.89 |
| | 8/19/2003 | 14.02 | 6.90 | 0.720 | 5.4 | 1.56 | 13.6 | 149 | 170 | 305.89 | 291.87 |
| | 11/4/2003 | 12.64 | 6.94 | 0.631 | 0 | 4.00 | 16.66 | 114 | 50 | 305.89 | 293.25 |
| | 2/23/2004 | 12.90 | 7.26 | 0.663 | 38.2 | 1.28 | 11.0 | 128 | 70 | 305.89 | 292.99 |
| | 5/12/2004 | 12.19 | 7.06 | 0.686 | 11.6 | 1.17 | 12.0 | 120 | 100 | 305.89 | 293.70 |
| | 9/14/2004 | 13.69 | 6.58 | 0.605 | 35.1 | 4.40 | 14.9 | 51 | 100 | 305.89 | 292.20 |
| | 11/8/2004 | 13.77 | 7.10 | 0.646 | 0 | 0.61 | 13.7 | 66 | 110 | 305.89 | 292.12 |
| | 3/25/2005 | 12.82 | 6.97 | 0.694 | 0 | 1.65 | 9.6 | 143 | 80 | 305.89 | 293.07 |
| | 6/1/2005 | 14.62 | 7.05 | 0.789 | 1 | 1.75 | 13.4 | -3 | 140 | 305.89 | 291.27 |
| | 8/24/2005 | 17.73 | 6.62 | 0.900 | 35.6 | 0.00 | 14.0 | 162 | 140 | 305.89 | 288.16 |
| | 11/22/2005 | 14.19 | 6.90 | 0.549 | 0 | 4.91 | 12.3 | 310 | 100 | 305.89 | 291.70 |
| | 3/8/2006 | 13.43 | 6.89 | 0.903 | 2.2 | 2.61 | 10.6 | 206 | 105 | 305.89 | 292.46 |
| | 11/22/2006 | 11.59 | 7.08 | 0.392 | 20.9 | 4.81 | 12.25 | 78 | 110 | 305.89 | 294.30 |
| | 3/26/2008 | 10.02 | 7.09 | 0.522 | High | 2.84 | 12.27 | 234 | 875 | 305.89 | 295.87 |
| | 3/31/2009 | 14.48 | 6.97 | 99.9[k] | 257 | 1.66 | 11.3 | -45 | 250 | 305.89 | 291.41 |
| | 6/1/2011 | 8.94 | 7.11 | 0.407 | 83.8 | 1.27 | 14.44 | 105.9 | 500 | 305.89 | 296.95 |

# Appendix B - Historical Field Parameters Data

| Monitoring Well | Date | Depth to Water at Sampling (ft)* | pH (SU) | Specific Conductance (mS/cm) | Turbidity (NTU) | Dissolved Oxygen (mg/L) | Temperature (°C) | Oxidation Reduction Potential (mV) | Sampling Rate (mL/min) | Top of Casing Elevation | Groundwater Elevation |
|---|---|---|---|---|---|---|---|---|---|---|---|
| MW-4A | 4/2/2002 | NM[a] | 6.28 | 0.240 | [n] | 7.30 | 11.6 | NM | 200 | 303.05 | NM |
| | 8/2/2002[b] | NA | 6.05 | 0.246 | [n] | 6.10 | 16.2 | 16 | NA | 303.05 | NM |
| | 10/10/2002[b] | NM | 6.08 | 0.241 | [n] | 4.66 | 15.8 | 14 | NA | 303.05 | NM |
| | 2/25/2003 | NM[d] | 6.38 | 0.348 | [n] | 3.77 | 7.4 | -61 | 80 | 303.05 | NM |
| | 5/19/2003 | 10.65 | 5.98 | 0.253 | 325 | 2.84 | 15.8 | 163 | 50 | 303.05 | 292.40 |
| | 8/19/2003 | 11.49 | 6.15 | 0.389 | 49.4 | 2.40 | 20.5 | -112 | 50 | 303.05 | 291.56 |
| | 11/4/2003 | 10.70 | 6.16 | 0.343 | 87.1 | 2.62 | 17.2 | -30 | 60 | 303.05 | 292.35 |
| | 2/23/2004 | 9.86 | 6.32 | 0.262 | 204[f] | 4.83 | 9.0 | 191 | 191 | 303.05 | 293.19 |
| | 5/12/2004 | 10.39 | 6.10 | 0.244 | 702 | 6.39 | 12.09 | 124 | 50 | 303.05 | 292.66 |
| | 9/14/2004 | 11.84 | 6.05 | 0.342 | 49.2 | 2.15 | 17.1 | -109 | 50 | 303.05 | 291.21 |
| | 11/8/2004 | 11.20 | 6.15 | 0.245 | 20.1 | 1.68 | 15.9 | 37 | 60 | 303.05 | 291.85 |
| | 3/25/2005 | 10.88 | 7.39 | 0.274 | 79 | 4.85 | 7.9 | 163 | 70 | 303.05 | 292.17 |
| | 6/1/2005 | 12.41 | 6.15 | 0.284 | 14 | 1.89 | 12.4 | 24 | 90 | 303.05 | 290.64 |
| | 8/25/2005[i] | NM[a] | 5.31 | 0.776 | 175 | 0.43 | 20.66 | 84 | 80 | 303.05 | NM |
| | 11/22/2005 | 12.34 | 5.80 | 0.280 | 1.4 | 5.65 | 13.1 | 16 | 90 | 303.05 | 290.71 |
| | 3/8/2006 | 11.57 | 5.78 | 0.349 | 22 | 2.05 | 9.0 | 13 | 80 | 303.05 | 291.48 |
| | 11/22/2006 | 9.73 | 6.36 | 0.181 | 45 | 0.92 | 12.66 | 80 | 100 | 303.05 | 293.32 |
| | 4/3/2009 | 11.38 | 5.94 | 49.4[k] | [n] | 3.38 | 12.4 | 11 | 150 | 303.05 | 291.67 |
| | 6/1/2011 | 7.40 | 6.60 | 0.199 | 159 | 2.75 | 13.01 | 83.1 | 500 | 303.05 | 295.65 |
| MW-5 | 4/4/2002 | 9.60 | 7.52 | 0.676 | 66 | 2.18 | 11.9 | NM | 150 | 303.13 | 293.53 |
| | 7/29/2002 | 14.55 | 7.24 | 0.699 | 70 | 0.71 | 18.7 | NM | 75 | 303.13 | 288.58 |
| | 10/14/2002 | 11.01 | 6.99 | 0.957 | 10.6 | 0.51 | 14.8 | -61 | 46 | 303.13 | 292.12 |
| | 2/27/2003 | 9.56 | 7.05 | 0.834 | 0 | 0 | 6.3 | 176 | 40 | 303.13 | 293.57 |
| | 5/22/2003 | 8.29 | 7.03 | 0.818 | 9 | 0.95 | 11.5 | 169 | 40 | 303.13 | 294.84 |
| | 8/21/2003 | 8.00 | 6.74 | 0.932 | 10.5 | 2.67 | 17.1 | -56 | 50 | 303.13 | 295.13 |
| | 11/5/2003 | 7.90 | 6.40 | 1.14 | 40.3 | 0.51 | 13.42 | -28 | 50 | 303.13 | 295.23 |
| | 2/25/2004 | 7.75 | 6.97 | 0.923 | 32.5 | 2.81 | 7.53 | 66 | 50 | 303.13 | 295.38 |
| | 5/11/2004 | 7.66 | 7.02 | 1.09 | 15.9 | 2.69 | 16.64 | -32 | 60 | 303.13 | 295.47 |
| | 9/15/2004 | 9.13 | 6.88 | 0.872 | 43.2 | 1.97 | 15.7 | 18 | 60 | 303.13 | 294.00 |
| | 11/9/2004 | 10.25 | 7.15 | 0.487 | 27.3 | 0.68 | 11.3 | 15 | 60 | 303.13 | 292.88 |
| | 3/24/2005 | 9.30 | 6.67 | 0.874 | 10 | 1.15 | 9.0 | -26 | 70 | 303.13 | 293.83 |
| | 5/31/2005 | 10.23 | 7.05 | 0.911 | 1 | 2.01 | 13.1 | -41 | 65 | 303.13 | 292.90 |
| | 8/23/2005 | 11.95 | 6.05 | 0.999 | 1 | 2.17 | 18.4 | 110 | 80 | 303.13 | 291.18 |
| | 11/21/2005 | 11.30 | 6.93 | 0.698 | 1.7 | 0.00 | 11.3 | 131 | 80 | 303.13 | 291.83 |
| | 3/7/2006 | 10.98 | 6.67 | 0.929 | 30.8 | 2.30 | 8.8 | 208 | 70 | 303.13 | 292.15 |
| | 11/21/2006 | 7.99 | 7.26 | 0.663 | 41.8 | 2.23 | 10.95 | 101 | 75 | 303.13 | 295.14 |
| | 4/1/2009 | 7.49 | 7.07 | 0.096[k] | 0 | 3.07 | 10.0 | 17 | 200 | 303.13 | 295.64 |

# Appendix B - Historical Field Parameters Data

| Monitoring Well | Date | Depth to Water at Sampling (ft)* | pH (SU) | Specific Conductance (mS/cm) | Turbidity (NTU) | Dissolved Oxygen (mg/L) | Temperature (°C) | Oxidation Reduction Potential (mV) | Sampling Rate (mL/min) | Top of Casing Elevation | Groundwater Elevation |
|---|---|---|---|---|---|---|---|---|---|---|---|
| MW-5A | 4/4/2002 | 5.80 | 6.65 | 0.548 | 168 | 0.78 | 8.1 | NM | 200 | 304.98 | 299.18 |
| | 7/29/2002 | 11.60 | 6.50 | 0.576 | 199 | 0.53 | 16.1 | NM | 125 | 304.98 | 293.38 |
| | 10/14/2002 | 8.34 | 6.35 | 0.621 | 105 | 0.00 | 13.3 | -135 | 65 | 304.98 | 296.64 |
| | 2/28/2003 | 6.01 | 6.37 | 0.532 | 563 | 0.00 | 5.8 | -93 | 50 | 304.98 | 298.97 |
| | 5/22/2003 | 5.92 | 6.52 | 0.63 | 113 | 0.00 | 11.6 | -113 | 50 | 304.98 | 299.06 |
| | 8/21/2003 | 6.30 | 6.20 | 0.643 | 38.1 | 1.14 | 17.3 | -119 | 50 | 304.98 | 298.68 |
| | 11/5/2003 | 5.70 | 6.30 | 0.775 | 33.2 | 0.07 | 13.84 | -118 | 55 | 304.98 | 299.28 |
| | 2/25/2004 | 5.35 | 6.55 | 0.707 | 35.1 | 0.00 | 6.21 | -115 | 55 | 304.98 | 299.63 |
| | 5/11/2004 | 6.17 | 6.57 | 0.704 | 25.7 | 0.00 | 14.13 | -137 | 60 | 304.98 | 298.81 |
| | 9/15/2004 | 8.07 | 6.29 | 0.720 | 37.8 | 0.97 | 16.6 | -161 | 60 | 304.98 | 296.91 |
| | 11/9/2004 | 5.91 | 6.63 | 0.582 | 36.5 | 0.00 | 12.1 | -143 | 60 | 304.98 | 299.07 |
| | 3/24/2005 | 5.12 | 6.18 | 0.654 | 49 | 0.73 | 6.7 | -97 | 65 | 304.98 | 299.86 |
| | 5/31/2005 | 8.10 | 6.42 | 0.929 | 41 | 0.33 | 10.6 | -111 | 60 | 304.98 | 296.88 |
| | 8/23/2005 | 10.74 | 6.06 | 0.830 | 471[f] | 2.80 | 17.1 | -154 | 100 | 304.98 | 294.24 |
| | 11/21/2005 | 8.67 | 6.56 | 0.562 | 7.8 | 0.00 | 11.8 | 33 | 80 | 304.98 | 296.31 |
| | 3/7/2006 | 6.89 | 6.43 | 0.701 | 22.3 | 2.21 | 8.5 | -135 | 90 | 304.98 | 298.09 |
| | 11/21/2006 | 5.07 | 6.74 | 0.426 | 36.1 | 0.16 | 12.26 | -120 | 125 | 304.98 | 299.91 |
| | 4/1/2009 | 9.84 | 6.36 | 99.9[k] | 198 | 0.00 | 7.1 | -95 | 175 | 304.98 | 295.14 |
| MW-6 | 4/4/2002 | 12.40 | 7.76 | 0.765 | 27 | 2.77 | 12.9 | NM | 250 | 303.94 | 291.54 |
| | 7/30/2002 | 11.68 | 7.41 | 0.847 | 23 | 0.46 | 20.8 | NM | 60 | 303.94 | 292.26 |
| | 10/11/2002 | 10.76 | 7.17 | 0.987 | 1 | 0 | 16.5 | 4 | 50 | 303.94 | 293.18 |
| | 2/27/2003 | 10.07 | 7.39 | 0.857 | 0 | 0 | 8.0 | 46 | 50 | 303.94 | 293.87 |
| | 5/21/2003 | 9.57 | 7.24 | 0.925 | 14.1 | 0.77 | 13.3 | 88 | 50 | 303.94 | 294.37 |
| | 8/21/2003 | 9.87 | 7.15 | 0.941 | 3.8 | 1.16 | 19.2 | -11 | 50 | 303.94 | 294.07 |
| | 11/5/2003 | 8.90 | 7.01 | 1.10 | 5.2 | 0.41 | 14.9 | -21 | 70 | 303.94 | 295.04 |
| | 2/25/2004 | 8.60 | 7.08 | 1.04 | 0 | 0.21 | 7.23 | 112 | 40 | 303.94 | 295.34 |
| | 5/11/2004 | 9.05 | 7.33 | 1.02 | 9.2 | 1.80 | 13.58 | 146 | 60 | 303.94 | 294.89 |
| | 9/15/2004 | 9.99 | 7.11 | 0.94 | 21.3 | 1.59 | 16.2 | 146 | 60 | 303.94 | 293.95 |
| | 11/9/2004 | 9.63 | 7.39 | 0.57 | 8.2 | 0.65 | 13.3 | 101 | 50 | 303.94 | 294.31 |
| | 4/1/2009 | 9.02 | 7.79 | 0.090[k] | 8 | 6.12 | 10.7 | 55 | 100 | 303.94 | 294.92 |
| MW-6A | 4/4/2002 | 9.91 | 6.57 | 0.687 | 140 | 3.16 | 12.6 | NM | 200 | 301.62 | 291.71 |
| | 7/30/2002 | 12.14 | 6.48 | 0.831 | 61 | 0.53 | 18.9 | NM | 72 | 301.62 | 289.48 |
| | 10/11/2002 | 11.70 | 6.39 | 0.98 | 10.2 | 0.45 | 16.4 | -114 | 50 | 301.62 | 289.92 |
| | 2/26/2003 | 8.84 | 6.58 | 0.852 | 54 | 0 | 5.3 | 206 | 50 | 301.62 | 292.78 |
| | 5/21/2003 | 9.45 | 6.39 | 0.89 | 85 | 0.25 | 13.3 | -26 | 45 | 301.62 | 292.17 |
| | 8/21/2003 | 10.10 | 6.31 | 0.891 | 48.3 | 1.77 | 21.1 | 16 | 55 | 301.62 | 291.52 |

# Appendix B - Historical Field Parameters Data

| Monitoring Well | Date | Depth to Water at Sampling (ft)* | pH (SU) | Specific Conductance (mS/cm) | Turbidity (NTU) | Dissolved Oxygen (mg/L) | Temperature (°C) | Oxidation Reduction Potential (mV) | Sampling Rate (mL/min) | Top of Casing Elevation | Groundwater Elevation |
|---|---|---|---|---|---|---|---|---|---|---|---|
| MW-6A | 11/5/2003 | 9.13 | 6.17 | 1.06 | 370 | 0.30 | 15.64 | -48 | 50 | 301.62 | 292.49 |
| | 2/25/2004 | 8.80 | 6.59 | 0.956 | 0 | 0.00 | 8.72 | -51 | 50 | 301.62 | 292.82 |
| | 5/11/2004 | 9.12 | 6.61 | 1.07 | 7.1 | 0.11 | 14.55 | -177 | 60 | 301.62 | 292.50 |
| | 9/15/2004 | 10.11 | 6.19 | 0.792 | 7.7 | 1.50 | 18.0 | -73 | 60 | 301.62 | 291.51 |
| | 11/9/2004 | 9.43 | 6.44 | 0.732 | 1.3 | 0.00 | 15.0 | -115 | 60 | 301.62 | 292.19 |
| | 4/1/2009 | 9.84 | 6.61 | 99.9[k] | 254 | 3.88 | 10.3 | 93 | 200 | 301.62 | 291.78 |
| MW-7 | 4/4/2002 | 6.50 | 7.20 | 0.747 | 119 | 2.70 | 10.8 | NM | 250 | 302.26 | 295.76 |
| | 7/30/2002 | 8.21 | 6.99 | 0.721 | 35 | 3.13 | 14.9 | NM | 200 | 302.26 | 294.05 |
| | 10/14/2002 | 7.25 | 7.06 | 0.808 | 66 | 3.34 | 13.5 | 129 | 140 | 302.26 | 295.01 |
| | 2/28/2003 | 6.40 | 7.18 | 0.752 | 0 | 0.00 | 10.5 | 88 | 250 | 302.26 | 295.86 |
| | 5/22/2003 | 6.51 | 7.07 | 0.848 | 0 | 2.31 | 12.2 | 99 | 170 | 302.26 | 295.75 |
| | 8/21/2003 | 6.60 | 6.91 | 0.907 | 4.4 | 2.97 | 15.4 | 78 | 180 | 302.26 | 295.66 |
| | 11/5/2003 | 5.85 | 6.83 | 1.01 | 6.5 | 2.60 | 13.67 | -11 | 160 | 302.26 | 296.41 |
| | 2/25/2004 | 5.68 | 7.01 | 0.877 | 0 | 2.42 | 9.83 | 66 | 225 | 302.26 | 296.58 |
| | 5/11/2004 | 5.90 | 7.13 | 0.96 | 9.3 | 2.58 | 13.06 | -45 | 140 | 302.26 | 296.36 |
| | 9/15/2004 | 6.45 | 6.88 | 0.894 | 29.5 | 3.47 | 14.9 | 57 | 200 | 302.26 | 295.81 |
| | 11/9/2004 | 6.23 | 7.15 | 0.881 | 0.3 | 1.58 | 12.3 | -9 | 140 | 302.26 | 296.03 |
| | 4/1/2009 | 6.73 | 7.07 | 0.112[k] | 0 | 2.97 | 10.0 | 69 | 100 | 302.26 | 295.53 |
| MW-7A | 4/3/2002 | 6.22 | 6.77 | 0.356 | 20 | 2.04 | 9.2 | NM | 250 | 301.89 | 295.67 |
| | 7/31/2002 | 8.74 | 6.98 | 1.270 | 31 | 0.35 | 18.8 | NM | 70 | 301.89 | 293.15 |
| | 10/10/2002 | 8.35 | 6.89 | 0.990 | 9.1 | 0.39 | 17.6 | 103 | 50 | 301.89 | 293.54 |
| | 2/25/2003 | 6.17 | 7.04 | 0.907 | 74 | 0 | 4.6 | 105 | 40 | 301.89 | 295.72 |
| | 5/20/2003 | 7.34 | 6.67 | 0.481 | 67 | 1.2 | 16.2 | 207 | 55 | 301.89 | 294.55 |
| | 8/20/2003 | 6.18 | 6.25 | 0.485 | 0 | 1.47 | 23.2 | 99 | 45 | 301.89 | 295.71 |
| | 11/5/2003 | 5.83 | 6.33 | 0.537 | 16.1 | 1.37 | 15.36 | 77 | 60 | 301.89 | 296.06 |
| | 2/24/2004 | 5.46 | 6.69 | 0.472 | 0 | 1.20 | 6.0 | 181 | 60 | 301.89 | 296.43 |
| | 5/10/2004 | 5.85 | 6.44 | 0.411 | 29.6 | 0.91 | 17.06 | 129 | 60 | 301.89 | 296.04 |
| | 9/14/2004 | 6.68 | 6.13 | 0.682 | 27 | 1.54 | 19.1 | 126 | 60 | 301.89 | 295.21 |
| | 11/8/2004 | 6.15 | 6.24 | 0.644 | 3.2 | 0.00 | 14.3 | 126 | 60 | 301.89 | 295.74 |
| | 4/1/2009 | 6.91 | 6.50 | 67.9[k] | 0 | 1.16 | 10.2 | 118 | 200 | 301.89 | 294.98 |
| MW-8[e] | 5/21/2003 | 11.82 | 6.66 | 0.888 | 40 | 0 | 12.2 | -36 | 140 | 305.87 | 294.05 |
| | 8/18/2003 | 12.39 | 6.52 | 0.826 | 18 | 3.70 | 17.6 | -63 | 65 | 305.87 | 293.48 |
| | 11/3/2003 | 14.33 | 6.54 | 0.951 | 141 | 0.24 | 17.96 | 62 | 60 | 305.87 | 291.54 |
| | 2/23/2004 | 10.84 | 6.82 | 0.840 | 79.9[f] | 0.50 | 10.0 | 107 | 60 | 305.87 | 295.03 |
| | 5/11/2004 | 10.90 | 6.70 | 0.899 | 0 | 6.26 | 14.73 | 77 | 70 | 305.87 | 294.97 |
| | 9/13/2004 | 12.07 | 6.39 | 1.050 | 37.8 | 1.15 | 18.2 | 52 | 90 | 305.87 | 293.80 |

# Appendix B - Historical Field Parameters Data

| Monitoring Well | Date | Depth to Water at Sampling (ft)* | pH (SU) | Specific Conductance (mS/cm) | Turbidity (NTU) | Dissolved Oxygen (mg/L) | Temperature (°C) | Oxidation Reduction Potential (mV) | Sampling Rate (mL/min) | Top of Casing Elevation | Groundwater Elevation |
|---|---|---|---|---|---|---|---|---|---|---|---|
| MW-8[e] | 11/8/2004 | 12.19 | 6.66 | 0.792 | 0.3 | 0.00 | 14.3 | 53 | 90 | 305.87 | 293.68 |
| | 3/24/2005 | 11.51 | 6.46 | 0.875 | 9 | 0.82 | 9.9 | 48 | 70 | 305.87 | 294.36 |
| | 6/1/2005 | 12.79 | 6.70 | 1.030 | 7 | 2.10 | 15.4 | 38 | 70 | 305.87 | 293.08 |
| | 8/24/2005 | 15.70 | 6.37 | 0.930 | 5.2 | 0.00 | 17.99 | 40 | 70 | 305.87 | 290.17 |
| | 11/22/2005 | 12.90 | 6.77 | 0.817 | 0 | 2.55 | 12.2 | 255 | 80 | 305.87 | 292.97 |
| | 3/8/2006 | 11.78 | 6.51 | 0.990 | 13.6 | 2.28 | 11.1 | 90 | 100 | 305.87 | 294.09 |
| | 11/22/2006 | 10.21 | 7.03 | 0.661 | 26 | 0.03 | 12.42 | 8 | 120 | 305.87 | 295.66 |
| | 3/27/2008 | 9.35 | 6.55 | 0.852 | Moderate | 2.69 | 11.69 | 371 | 405 | 305.87 | 296.52 |
| | 4/2/2009 | 12.77 | 6.77 | 0.093[k] | 0 | 0.96 | 14.1 | 103 | 100 | 305.87 | 293.10 |
| | 7/15/2010 | 12.59 | 6.49 | 0.712 | 14.9 | 4.89 | 16.32 | 73.1 | 250 | 305.87 | 293.28 |
| | 11/9/2010 | 12.88 | 6.94 | 0.794 | 4.5 | 0.64 | 14.74 | 113.9 | 400 | 305.87 | 292.99 |
| | 6/1/2011 | 8.32 | 6.71 | 0.613 | 36.6 | 0.49 | 14.26 | 224.3 | 300 | 305.87 | 297.55 |
| MW-8A[e] | 5/20/2003 | NM[a] | 5.65 | 0.174 | 999 | 3.98 | 18.2 | 202 | 53 | 305.98 | NM |
| | 8/18/2003 | 8.91 | 5.39 | 0.166 | 2.9 | 2.65 | 19.7 | 230 | 160 | 305.98 | 297.07 |
| | 11/3/2003 | 9.84 | 5.71 | 0.183 | 5.7 | 1.68 | 19.5 | 191 | 75 | 305.98 | 296.14 |
| | 2/23/2004 | 9.00 | 6.08 | 0.180 | 139[f] | 2.51 | 9.1 | 176 | 90 | 305.98 | 296.98 |
| | 5/11/2004 | NM[a] | 5.92 | 0.211 | 20.4 | 6.33 | 18.04 | 127 | 60 | 305.98 | NM |
| | 9/13/2004 | NM[a] | 5.68 | 0.236 | 27.3 | 3.99 | 21.1 | 91 | 60 | 305.98 | NM |
| MW-8A[e] | 11/8/2004 | NM[a] | 5.83 | 0.173 | 21.1 | 1.37 | 15.1 | 131 | 60 | 305.98 | NM |
| MW-8A[e] | 3/8/2006 | NM[a] | 5.78 | 0.256 | 8.9 | 7.10 | 7.9 | 235 | 100 | 305.98 | NM |
| | 11/22/2006 | 8.01 | 6.36 | 0.157 | 22.9 | 3.37 | 14.0 | 136 | 130 | 305.98 | 297.97 |
| | 3/26/2008 | 8.00 | 5.73 | 0.168 | Low | 6.87 | 9.26 | 371 | 270 | 305.98 | 297.98 |
| | 4/2/2009 | NG | 5.33 | 39.0[k] | 1 | 6.21 | 10.9 | 215 | 30 | 305.98 | NG |
| | 6/1/2011 | 7.21 | 6.05 | 0.131 | 30.4 | 3.37 | 13.59 | 262.7 | 450 | 305.98 | 298.77 |
| MW-9[e] | 5/21/2003 | 7.39 | 7.04 | 0.447 | 145 | 1.85 | 11.5 | 62 | 65 | 302.16 | 294.77 |
| | 8/19/2003 | 7.79 | 9.28 | 0.435 | 45.9 | 2.64 | 16.8 | 43 | 45 | 302.16 | 294.37 |
| | 11/4/2003 | 7.38 | 7.41 | 0.468 | 25.4 | 1.16 | 12.68 | 168 | 115 | 302.16 | 294.78 |
| | 2/24/2004 | 6.93 | 7.71 | 0.421 | 0 | 1.40 | 7.2 | 147 | 55 | 302.16 | 295.23 |
| | 5/10/2004 | 7.20 | 7.55 | 0.424 | 7.3 | 8.85 | 16.11 | 78 | 50 | 302.16 | 294.96 |
| | 9/14/2004 | 6.68 | 7.32 | 0.507 | 20.8 | 2.21 | 17.0 | 87 | 50 | 302.16 | 295.48 |

# Appendix B - Historical Field Parameters Data

| Monitoring Well | Date | Depth to Water at Sampling (ft)* | pH (SU) | Specific Conductance (mS/cm) | Turbidity (NTU) | Dissolved Oxygen (mg/L) | Temperature (°C) | Oxidation Reduction Potential (mV) | Sampling Rate (mL/min) | Top of Casing Elevation | Groundwater Elevation |
|---|---|---|---|---|---|---|---|---|---|---|---|
| MW-9[e] | 11/9/2004 | 7.82 | 7.72 | 0.414 | 0 | 0.56 | 12.1 | 26 | 60 | 302.16 | 294.34 |
| | 3/24/2005 | 7.05 | 7.29 | 0.469 | 12 | 1.74 | 9.1 | 21 | 70 | 302.16 | 295.11 |
| | 6/1/2005 | 9.06 | 7.55 | 0.535 | 6 | 1.50 | 14.5 | 24 | 75 | 302.16 | 293.10 |
| | 8/25/2005 | 10.51 | 7.20 | 0.749 | 3.8 | 0.00 | 15.82 | 70 | 90 | 302.16 | 291.65 |
| | 11/21/2005 | 7.40 | 7.73 | 0.37 | 0 | 0.09 | 12.0 | 6 | 80 | 302.16 | 294.76 |
| | 3/8/2006 | 7.63 | 7.08 | 0.547 | 1.5 | 2.23 | 9.4 | 188 | 80 | 302.16 | 294.53 |
| | 11/22/2006 | 6.39 | 7.84 | 0.339 | 30.7 | 0.85 | 11.93 | 83 | 110 | 302.16 | 295.77 |
| | 3/27/2008 | 6.79 | 7.20 | 0.453 | L-M | 3.62 | 10.5 | 371 | 446 | 302.16 | 295.37 |
| | 4/2/2009 | 8.28 | 7.55 | 81.6[k] | 106 | 2.66 | 10.4 | 91 | 300 | 302.16 | 293.88 |
| | 7/15/2010 | 7.25 | 7.41 | 0.381 | 26.8 | 4.34 | 15.62 | 31.7 | 500 | 302.16 | 294.91 |
| | 11/9/2010 | 7.51 | 7.80 | 0.443 | 2.2 | 0.80 | 14.77 | 81.1 | 340 | 302.16 | 294.65 |
| | 6/1/2011 | 5.05 | 7.50 | 0.547 | 375.2 | 1.13 | 12.38 | 145.0 | 500 | 302.16 | 297.11 |
| MW-9A[e] | 5/21/2003 | 6.04 | 6.30 | 0.332 | 50 | 2.2 | 11.1 | 128 | 155 | 303.45 | 297.41 |
| | 8/19/2003 | 6.04 | 6.08 | 0.340 | 48.7 | 7.91 | 17.9 | 107 | 160 | 303.45 | 297.41 |
| | 11/4/2003 | 5.94 | 6.23 | 0.307 | 6.4 | 1.53 | 13.66 | 204 | 140 | 303.45 | 297.51 |
| | 2/24/2004 | 5.69 | 6.41 | 0.729 | 359[f] | 3.04 | 5.1 | 193 | 120 | 303.45 | 297.76 |
| | 5/10/2004 | 6.05 | 6.24 | 0.357 | 270 | 3.62 | 12.53 | 173 | 130 | 303.45 | 297.40 |
| | 9/14/2004 | 7.51 | 6.15 | 0.408 | 48.3 | 1.22 | 18.5 | 107 | 90 | 303.45 | 295.94 |
| | 11/9/2004 | 6.10 | 6.35 | 0.271 | 49 | 0.20 | 14.1 | 92 | 130 | 303.45 | 297.35 |
| | 3/8/2006 | 6.23 | 6.18 | 0.338 | 203 | 4.66 | 6.4 | 215 | 160 | 303.45 | 297.22 |
| | 11/22/2006 | 6.00 | 6.78 | 0.236 | 222 | 2.08 | 12.2 | 134 | 140 | 303.45 | 297.45 |
| | 3/27/2008 | 6.02 | 6.37 | 0.363 | Moderate | 6.72 | 6.19 | 371 | 380 | 303.45 | 297.43 |
| | 4/2/2009 | 6.92 | 6.13 | 78.7[k] | 144 | 9.42 | 9.4 | 165 | 200 | 303.45 | 296.53 |
| | 6/1/2011 | 5.66 | 6.49 | 0.250 | 61.6 | 1.32 | 14.66 | 145.4 | 300 | 303.45 | 297.79 |
| MW-10[h] | 4/18/2005 | 19.34 | 6.98 | 0.698 | 22.6 | 0.23 | 12.9 | -228 | 300 | 315.05 | 295.71 |
| | 6/1/2005 | 22.13 | 6.38 | 0.553 | 95 | 0.89 | 11.8 | -47 | 280 | 315.05 | 292.92 |
| | 8/24/2005 | 26.23 | 5.67 | 0.683 | 99.2 | 0.00 | 13.04 | 40 | 200 | 315.05 | 288.82 |
| | 11/22/2005 | 23.36 | 6.79 | 0.502 | 42.7 | 6.12 | 10.9 | -165 | 110 | 315.05 | 291.69 |
| | 3/9/2006 | 21.84 | 6.68 | 0.533 | 203 | 2.01 | 11.0 | -166 | 280 | 315.05 | 293.21 |
| | 11/21/2006 | 23.71 | 7.29 | 0.36 | 319 | 0.01 | 11.47 | -160 | 110 | 315.05 | 291.34 |
| | 3/26/2008 | 20.55 | 6.92 | 0.462 | Moderate | 2.80 | 11.92 | 150 | 400 | 315.05 | 294.50 |
| | 3/30/2009 | 23.77 | 6.97 | 95.5[k] | 180 | 0.30 | 11.5 | -115 | 250 | 315.05 | 291.28 |
| MW-11[h] | 4/18/2005 | 20.87 | 6.37 | 0.775 | 181 | 0.51 | 14.4 | -22 | 120 | 315.96 | 295.09 |
| | 6/1/2005 | 24.88 | 6.91 | 1.31 | 110 | 2.75 | 12.8 | -175 | 80 | 315.96 | 291.08 |
| | 8/24/2005 | 27.85 | 5.60 | 0.878 | 102 | 3.11 | 13.82 | 147 | 100 | 315.96 | 288.11 |
| | 11/22/2005 | 25.44 | 6.92 | 0.735 | 40.2 | 8.96 | 9.1 | -141 | 90 | 315.96 | 290.52 |
| | 3/9/2006 | 24.17 | 6.43 | 0.8 | 183 | 1.92 | 8.6 | -90 | 70 | 315.96 | 291.79 |
| MW-11[h] | 11/21/2006 | 23.20 | 7.14 | 0.527 | 221 | 0.07 | 10.97 | -125 | 100 | 315.96 | 292.76 |

# Appendix B - Historical Field Parameters Data

| Monitoring Well | Date | Depth to Water at Sampling (ft)* | pH (SU) | Specific Conductance (mS/cm) | Turbidity (NTU) | Dissolved Oxygen (mg/L) | Temperature (°C) | Oxidation Reduction Potential (mV) | Sampling Rate (mL/min) | Top of Casing Elevation | Groundwater Elevation |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | 3/26/2008 | 21.78 | 6.90 | 0.641 | Moderate | 2.64 | 11.54 | 2.6 | 375 | 315.96 | 294.18 |
| | 3/30/2009 | 25.56 | 6.84 | 99.9[k] | 273 | 0.61 | 11.6 | -104 | 100 | 315.96 | 290.40 |
| MW-12[h] | 4/18/2005 | 19.32 | 7.37 | 0.98 | 42.4 | 0.10 | 14.5 | -206 | 200 | 308.16 | 288.84 |
| | 5/31/2005 | 22.22 | 7.27 | 1.02 | 43 | 0.68 | 17.1 | -173 | 80 | 308.16 | 285.94 |
| | 8/23/2005 | 23.70 | 9.62[r] | 1.37 | 92.3[f] | 1.10 | 18.9 | -149 | 60 | 308.16 | 284.46 |
| | 11/21/2005 | 17.60 | 7.57 | 0.573 | 30 | 0.00 | 10.6 | -102 | 80 | 308.16 | 290.56 |
| | 3/7/2006 | 20.90 | 7.18 | 0.709 | 116 | 2.06 | 9.8 | -191 | 70 | 308.16 | 287.26 |
| | 11/20/2006 | 14.21 | 7.31 | 0.511 | 332 | 0.03 | 11.94 | -87 | 80 | 308.16 | 293.95 |
| | 3/27/2008 | 17.81 | 7.19 | 0.608 | Moderate | 2.23 | 10.9 | 301 | 260 | 308.16 | 290.35 |
| | 4/2/2009 | 21.28 | 6.55 | 99.9[k] | 119 | 0.00 | 12.3 | -150 | 200 | 308.16 | 286.88 |
| | 5/31/2011 | 17.19 | 7.26 | 0.657 | 42.6 | 0.14 | 14.56 | -76.5 | 300 | 308.16 | 290.97 |
| MW-13[h] | 4/18/2005 | 17.85 | 6.25 | 0.607 | 111 | 0.79 | 15.6 | 13 | 100 | 311.47 | 293.62 |
| | 5/31/2005 | 21.91 | 5.96 | 1.14 | 83 | 4.18 | 14.6 | -75 | 80 | 311.47 | 289.56 |
| | 8/25/2005 | 26.56 | 6.20 | 0.9 | 36.6 | 0.00 | 13.81 | 52 | 100 | 311.47 | 284.91 |
| | 11/21/2005 | 21.52 | 7.28 | 0.511 | 10.1 | 0.00 | 11.5 | -70 | 110 | 311.47 | 289.95 |
| | 3/10/2006 | 21.35 | 5.90 | 0.583 | 172 | 2.72 | 12.6 | -25 | 80 | 311.47 | 290.12 |
| | 11/21/2006 | 18.65 | 6.93 | 0.441 | 209 | 0.23 | 10.9 | -110 | 110 | 311.47 | 292.82 |
| | 3/27/2008 | 18.36 | 6.68 | 0.554 | M-H | 2.21 | 11.34 | 103 | 400 | 311.47 | 293.11 |
| | 4/3/2009 | 23.12 | 6.63 | 90.0[k] | 135 | 0.00 | 11.9 | -107 | 150 | 311.47 | 288.35 |
| MW-14[h] | 4/18/2005 | 20.55 | 7.36 | 0.82 | 37.2 | 0.57 | 19.7 | -203 | 70 | 308.79 | 288.24 |
| | 5/31/2005 | 23.39 | 7.04 | 0.883 | 8 | 0.71 | 14.3 | -162 | 90 | 308.79 | 285.40 |
| | 8/25/2005 | 24.94 | 6.90 | 0.93 | 13.8 | 0.00 | 13.94 | -217 | 100 | 308.79 | 283.85 |
| | 11/21/2005 | 18.47 | 7.96 | 0.581 | 0 | 0.00 | 12.2 | -164 | 80 | 308.79 | 290.32 |
| | 3/10/2006 | 22.20 | 6.66 | 0.794 | 17.4 | 2.62 | 12.2 | -191 | 80 | 308.79 | 286.59 |
| | 11/21/2006 | 14.65 | 7.31 | 0.552 | 36 | 0.47 | 11.58 | -188 | 80 | 308.79 | 294.14 |
| | 3/27/2008 | 18.70 | 6.74 | 0.654 | Moderate | 2.07 | 11.97 | 174 | 358 | 308.79 | 290.09 |
| | 4/3/2009 | 22.29 | 6.67 | 99.9[k] | 94.2 | 0.41 | 12.4 | -92 | 150 | 308.79 | 286.50 |
| | 7/15/2010 | 23.23 | 6.42 | 0.550 | 22.2 | 5.65 | 16.86 | -17.8 | 180 | 308.79 | 285.56 |
| | 11/9/2010 | 23.37 | 7.44 | 0.398 | 34.4 | 0.27 | 12.64 | -118.4 | 280 | 308.79 | 285.42 |
| | 5/31/2011 | 17.61 | 7.49 | 0.490 | 31.9 | 0.08 | 14.31 | -144.6 | 200 | 308.79 | 291.18 |
| MW-15 | 7/15/2010 | 9.67 | 7.09 | 0.721 | 14.9 | 8.42 | 14.0 | 64.7 | 500 | 304.43 | 294.76 |
| | 11/9/2010 | 10.09 | 7.55 | 0.863 | 14.1 | 2.87 | 13.74 | 68.1 | 390 | 304.43 | 294.34 |
| | 5/31/2011 | 8.56 | 7.35 | 0.686 | 13.8 | 2.75 | 13.14 | 52.8 | 625 | 304.43 | 295.87 |

# Appendix B - Historical Field Parameters Data

| Monitoring Well | Date | Depth to Water at Sampling (ft)* | pH (SU) | Specific Conductance (mS/cm) | Turbidity (NTU) | Dissolved Oxygen (mg/L) | Temperature (°C) | Oxidation Reduction Potential (mV) | Sampling Rate (mL/min) | Top of Casing Elevation | Groundwater Elevation |
|---|---|---|---|---|---|---|---|---|---|---|---|
| PW-1 | 4/3/2009 | 10.84 | NS | NS | NS | NS | NS | NS | NS | 306.66 | 295.82 |
| EW-1 | 4/3/2009 | 15.06 | 6.34 | 99.9[k] | 289 | 0.07 | 12.7 | 118 | 250 | 309.09 | 294.03 |
| EW-2 | 3/31/2009 | 17.32 | 6.53 | 0.098[k] | 120 | 0.00 | 13.8 | -119 | 600 | 308.25 | 290.93 |
| EW-3 | 4/3/2009 | 13.22 | 7.51 | 74.0[k] | 35.7 | 0.93 | 12.1 | -192 | 160 | 305.77 | 292.55 |
| 270A | 3/30/2009 | NA | 6.63 | 71.7[k] | 0 | 9.95 | 10.3 | 150 | [p] | NA | NA |
| 270B | 3/30/2009 | NA | 7.23 | 60.6[k] | 0 | 9.74 | 11.7 | 153 | [q] | NA | NA |
| 284A | 3/30/2009 | NA | 6.70 | 0.249[k] | 0 | 10.36 | 14.1 | 191 | [p] | NA | NA |
| 284B | 3/30/2009 | NA | 6.02 | 0.243[k] | 0 | 11.29 | 12.4 | 181 | [q] | NA | NA |
| 288A | 3/30/2009 | NA | 5.75 | 0.269[k] | 0 | 8.37 | 11.5 | 212 | [p] | NA | NA |
| 288B | 3/30/2009 | NA | 7.14 | 0.271[k] | 0 | 5.27 | 11.9 | 151 | [q] | NA | NA |
| 302A | 3/30/2009 | NA | 6.12 | 89.3[k] | 0 | 9.48 | 12.4 | 19 | [p] | NA | NA |
| 302B | 3/30/2009 | NA | 6.48 | 92.2[k] | 0 | 10.37 | 11.8 | 160 | [q] | NA | NA |
| 305 | 3/30/2009 | NA | 6.88 | 93.2[k] | 0 | 8.18 | 10.5 | 78 | [m] | NA | NA |
| MADW Port 1 | 7/15/2010 | 16.75 | 7.40 | 0.556 | < 5 | 4.49 | 15.54 | 98.1 | NA | NA | NA |
| MADW Port 2 | 7/15/2010 | 17.41 | 7.41 | 0.512 | < 5 | 2.91 | 14.07 | 84.8 | NA | NA | NA |
| MADW Port 3 | 7/15/2010 | 16.50 | 7.68 | 0.378 | < 5 | 3.62 | 15.29 | 83.4 | NA | NA | NA |
| MADW Port 4 | 7/15/2010 | 16.31 | 7.75 | 0.386 | < 5 | 2.60 | 14.45 | 77.3 | NA | NA | NA |
| MADW Port 1 | 11/9/2010 | 16.75 | 7.40 | 0.556 | < 5 | 4.49 | 15.54 | 98.1 | NA | NA | NA |
| MADW Port 2 | 11/9/2010 | 17.41 | 7.41 | 0.512 | < 5 | 2.91 | 14.07 | 84.8 | NA | NA | NA |
| MADW Port 3 | 11/9/2010 | 16.50 | 7.68 | 0.378 | < 5 | 3.62 | 15.29 | 83.4 | NA | NA | NA |
| MADW Port 4 | 11/9/2010 | 16.31 | 7.75 | 0.386 | < 5 | 2.60 | 14.45 | 77.3 | NA | NA | NA |
| MADW Port 1 | 5/31/2011 | 10.84 | 7.22 | 0.490 | 210.10 | 5.23 | 14.12 | 55.1 | NA | 300.87 | 290.03 |
| MADW Port 2 | 5/31/2011 | 11.13 | 7.46 | 0.416 | 390.30 | 3.39 | 14.04 | 55.6 | NA | 300.87 | 289.74 |
| MADW Port 3 | 5/31/2011 | 10.94 | 7.76 | 0.315 | 119.30 | 3.45 | 14.4 | 50.3 | NA | 300.87 | 289.93 |
| MADW Port 4 | 5/31/2011 | 10.95 | 7.78 | 0.319 | 529.10 | 2.58 | 15.12 | 4.4 | NA | 300.87 | 289.92 |

# Appendix B - Historical Field Parameters Data

| Monitoring Well | Date | Depth to Water at Sampling (ft)* | pH (SU) | Specific Conductance (mS/cm) | Turbidity (NTU) | Dissolved Oxygen (mg/L) | Temperature (°C) | Oxidation Reduction Potential (mV) | Sampling Rate (mL/min) | Top of Casing Elevation | Groundwater Elevation |
|---|---|---|---|---|---|---|---|---|---|---|---|
| MACW | 2/23/2004 | 14.27 | 7.13 | 0.704 | 27 | 5.04 | 12.5 | 193 | 11,355 | NA | NA |
| | 5/10/2004 | NG[g] | 6.92 | 0.673 | 12.6 | 8.75 | 12.26 | 140 | 7,600 | NA | NA |
| | 9/13/2004 | NG[g] | 6.76 | 0.812 | 7.6 | 9.32 | 13.2 | 98 | 7,600 | NA | NA |
| | 11/9/2004 | NG[g] | 6.87 | 0.642 | 0 | 5.68 | 12.7 | 86 | 7,600 | NA | NA |
| | 3/24/2005 | 12.86 | 7.85 | 0.773 | 21 | 6.62 | 12.1 | 42 | 7,600 | NA | NA |
| | 4/18/2005 | NG[g] | 6.89 | 0.847 | 2.2 | 4.35 | 13.1 | 97 | 7,600 | NA | NA |
| | 5/31/2005 | NG[g] | 6.80 | 0.829 | 1 | 7.63 | 13.9 | 99 | 7,600 | NA | NA |
| | 8/23/2005 | NG[g] | 6.69 | 0.827 | 392[f] | 9.76 | 14.1 | 11 | 7,600 | NA | NA |
| | 11/21/2005 | 11.90 | 7.16 | 0.515 | 0 | 4.93 | 13.5 | 33 | 7,600 | NA | NA |
| | 3/7/2006 | 16.25 | 6.72 | 0.793 | 5.3 | 6.09 | 12.2 | 91 | 7,600 | NA | NA |
| | 11/20/2006 | 6.70 | 7.12 | 0.631 | 40.5 | 2.02 | 12.12 | 86 | 7,500 | NA | NA |
| | 3/28/2008 | 9.65 | NM | NM | NM | NM | NM | NM | NM | NA | NA |
| | 3/31/2009 | NA | 6.52 | 0.090[k] | 21.7 | 11.16 | 11.8 | 144 | [m] | NA | NA |
| | 7/15/2010 | NA | 6.93 | 0.768 | < 5 | 4.11 | 16.55 | 105.7 | 800 | NA | NA |
| | 11/9/2010 | 12.30 | 7.14 | 0.699 | 6.24 | 3.88 | 14.86 | 77.4 | 330 | NA | NA |
| | 5/31/2011 | 15.56 | 7.08 | 0.710 | 3.9 | 3.03 | 13.74 | 163.1 | NA | NA | NA |

NM = Not Measured
NS = Not Sampled
SU = Standard Units
M-H = Moderate to High Turbidity
ft = feet
NTU = Nephelometric Turbidity Units
mg/L = Milligrams per liter
L-M = Low to Moderate Turbidity
mV = millivolts
mL/min = milliliters per minute
°C = degrees Celsius
NG = Not Gauged
MADW = Mifflin Avenue Deep Well
MACW = Mifflin Avenue Cabin Well (previously known as Mifflin Avenue Residential Well)

a) Water table elevation was below the top of the bladder pump and, therefore, could not be measured during purging
b) Well MW-4A did not have sufficient recharge to micropurge; pumped dry with peristaltic pump and allowed to recover sufficiently to collect a sample; field parameters taken during initial evacuation of well with peristaltic pump
c) Dissolved oxygen not measured because probe not working properly on 2/24/2003
d) During purging, water level dropped below top of pump and could not be measured prior to sampling
e) Wells installed February 2003
f) Problem with turbidity probe resulted in artificially high readings
g) Sampling from faucet, unable to measure depth to water
h) Well installed March 2005
i) Well cavitated after purging one liter; parameters were not stabilized; allowed well to recharge before collecting sample
k) Specific conductance readings are inconsistent with historical data and are apparently unreliable
m) Sample collected with a bailer
n) Turbidity reading was greater than the instrument's upper detection limit
p) Sample collected from potable well as a "first-draw" without purging
q) Sample collected from potable well at approximately 5 gallons per minute
r) Defective pH probe. With pH test strips, the pH of the groundwater was approximately 6 standard units.
s) Depth to water for MADW measured prior to first purging
*For 2011, the data in this column is actually the Depth to Water at Gauging (from data collected 5/31/2010), not Depth to Water at Sampling.

# APPENDIX C

# HISTORICAL LABORATORY ANALYTICAL DATA

## Appendix C - Post Remedy In Place Groundwater Monitoring Results - Organics

| Monitoring Well | Date | PCE 5 ug/L | TCE 5 µg/L | Cis 1,2-DCE 70 µg/L | Trans 1,2-DCE 100 µg/L | Vinyl Chloride 2 µg/L |
|---|---|---|---|---|---|---|
| MW-1 | 4/2/2002 | ND | **14.0** | **88.0** | 16.0 | ND |
| | 8/2/2002 | ND | **7.0** | 42 | 5.6 | ND |
| | 10/9/2002 | ND | 3.6 | 7.1 | ND | ND |
| | 2/24/2003 | ND | **9.2** | 37.2 | 5.5 | ND |
| | 5/19/2003 | ND | **9.7** | 23.4 | 3.5 | ND |
| | 8/18/2003 | ND | **7.0** | 20.3 | 3.0 | ND |
| | 11/3/2003 | ND | **7.1** | 12.6 | 1.9 | ND |
| | 2/23/2004 | ND | **5.6** | 4.4 | ND | ND |
| | 5/10/2004 | ND | 3.6 | 2.7 | ND | ND |
| | 9/13/2004 | ND | **8.6**[c] | 7.7[c] | 1.1[c] | ND |
| | 11/8/2004 | ND | **9.2** | 14.1 | 2.2[c] | ND |
| | 3/24/2005 | ND | **10.5** | 14.0 | 2.4 | ND |
| | 6/1/2005 | ND | **9.7** | 11.4 | 2.0 | ND |
| | 8/24/2005 | ND | **11.6** | 18.0 | 3.9 | ND |
| | 11/22/2005 | ND | **8.2** | 12.6 | 2.5 | ND |
| | 3/9/2006 | ND | **7.2** | 7.1 | 1.2 | ND |
| | 11/22/2006 | ND | **19.1** | 37.7 | 7.3 | ND |
| | 3/26/2008 | ND | **9.8** | 20.2 | 3.2 | ND |
| | 3/30/2009 | ND | **19.2** | 59.0 | 9.8 | ND |
| | 6/2/2011 | <0.75 U | **15.8** | **72.0** | 8.9 | 0.88 J |
| MW-1A | 4/2/2002 | ND | 2.6 | 16.0 | 2.7 | ND |
| | 8/1/2002 | ND | 1.6 | 6.3 | ND | ND |
| | 10/9/2002 | ND | 1.3 | 6.0 | ND | ND |
| | 2/25/2003 | ND | 1.3[c] | 10.7 | 1.7 | ND |
| MW-1A (dup)[a] | 2/25/2003 | ND | 1.4[c] | 10.3 | 1.7 | ND |
| | 5/19/2003 | ND | 1.4 | 10.8 | 2.0 | ND |
| MW-1A[a] | 5/19/2003 | ND | 1.4 | 9.4 | 1.8 | ND |
| | 8/18/2003 | ND | 1.9 | 10.3 | 1.8 | ND |
| MW-1A (dup)[a] | 8/18/2003 | ND | 2.1 | 9.3 | 1.7 | ND |
| | 11/3/2003 | ND | 1.6 | 5.9 | ND | ND |
| MW-1A (dup)[a] | 11/3/2003 | ND | 1.8 | 6.0 | 1.3 | ND |
| | 2/23/2004 | ND | 2.7 | 7.7 | 1.5 | ND |
| MW-1A (dup)[a] | 2/23/2004 | ND | 2.5 | 7.4 | 1.6 | ND |
| | 5/10/2004 | ND | ND | 6.9 | 1.2 | ND |
| MW-1A (dup)* | 5/10/2004 | ND | ND | 6.7 | 1.2 | ND |
| | 9/13/2004 | ND | 2.2[c] | 3.8[c] | ND | ND |
| | 11/8/2004 | ND | 4.2 | 7.8 | 1.3 | ND |
| | 3/9/2006 | ND | **13.5** | 25.3 | 5.2 | ND |
| | 11/22/2006 | ND | **16.2** | 35.2 | 7.4 | ND |
| | 3/26/2008 | ND | **14.0** | 43.9 | 7.8 | ND |
| | 3/30/2009 | ND | **12.4** | 40.7 | 6.8 | ND |
| | 5/31/2011 | < 0.75 UJ | **10.7 J** | 53.1 J | 6.1 J | 0.37 J |
| MW-2 | 4/2/2002 | ND | 1.1 | 2.5 | ND | ND |
| MW-2 (dup)[a] | 4/2/2002 | ND | 1.0 | 2.3 | ND | ND |
| | 7/31/2002 | ND | ND | ND | ND | ND |
| | 10/9/2002 | ND | ND | 2.3 | ND | ND |
| | 2/26/2003 | ND | ND | 2.8 | ND | ND |
| | 5/20/2003 | ND | ND | 1.9 | ND | ND |
| | 8/20/2003 | ND | ND | 1.2 | ND | ND |
| | 11/4/2003 | ND | ND | 1.5 | ND | ND |
| | 2/24/2004 | ND | ND | 1.1 | ND | ND |
| | 5/12/2004 | ND | ND | 1.8 | ND | ND |
| | 9/13/2004 | ND | ND | 1.7[c] | ND | ND |
| | 11/9/2004 | ND | ND | 1.0 | ND | ND |

## Appendix C - Post Remedy In Place Groundwater Monitoring Results - Organics

| Monitoring Well | Date | PCE 5 ug/L | TCE 5 µg/L | Cis 1,2-DCE 70 µg/L | Trans 1,2-DCE 100 µg/L | Vinyl Chloride 2 µg/L |
|---|---|---|---|---|---|---|
| MW-2 | 3/25/2005 | ND | ND | 1.4 | ND | ND |
| | 6/1/2005 | ND | ND | ND | ND | ND |
| | 8/25/2005 | ND | ND | ND | ND | ND |
| | 11/22/2005 | ND | ND | 1.1 | ND | ND |
| | 3/9/2006 | ND | ND | 1.1 | ND | ND |
| | 11/21/2006 | ND | ND | 1.1 | ND | ND |
| | 3/26/2008 | ND | ND | 1.7 | ND | ND |
| | 3/31/2009 | ND | ND | 1.6 | ND | ND |
| | 6/1/2011 | <0.75 U | 0.79 J | 1.1 | <0.75 U | <0.75 U |
| MW-2A | 4/3/2002 | ND | ND | ND | ND | ND |
| | 7/31/2002 | ND | ND | 1.4 | ND | ND |
| MW-2A (dup)[a] | 7/31/2002 | ND | ND | 1.2 | ND | ND |
| | 10/8/2002 | ND | 1.1 | ND | ND | ND |
| | 2/26/2003 | ND | 1.4 | ND | ND | ND |
| | 5/20/2003 | ND | ND | ND | ND | ND |
| | 8/20/2003 | ND | 1.6 | ND | ND | ND |
| | 11/4/2003 | ND | 1.6 | ND | ND | ND |
| | 2/24/2004 | ND | ND | ND | ND | ND |
| | 5/12/2004 | ND | ND | ND | ND | ND |
| | 9/13/2004 | ND | ND | ND | ND | ND |
| | 11/9/2004 | ND | ND | ND | ND | ND |
| | 3/9/2006 | ND | ND | ND | ND | ND |
| | 11/21/2006 | ND | 1.1 | ND | ND | ND |
| | 3/26/2008 | ND | 1.0 | ND | ND | ND |
| | 3/31/2009 | ND | ND | ND | ND | ND |
| | 6/1/2011 | <0.75 U | 0.84 J | <0.75 U | <0.75 U | <0.75 U |
| MW-3A | 4/3/2002 | ND | ND | 1.6 | ND | ND |
| MW-3A (dup)[a] | 4/3/2002 | ND | ND | 1.6 | ND | ND |
| | 8/1/2002 | ND | ND | 2.0 | 1.1 | ND |
| | 10/8/2002 | ND | ND | 3.6 | 1.9 | ND |
| | 2/26/2003 | ND | ND | ND | ND | ND |
| | 5/19/2003 | ND | ND | ND | ND | ND |
| | 8/19/2003 | ND | ND | ND | ND | ND |
| | 11/3/2003 | ND | ND | ND | ND | ND |
| | 2/24/2004 | ND | ND | ND | ND | ND |
| | 5/10/2004 | ND | ND | ND | ND | ND |
| | 9/13/2004 | ND | ND | ND | ND | ND |
| | 11/8/2004 | ND | ND | ND | ND | ND |
| | 3/9/2006 | ND | ND | ND | ND | ND |
| | 11/21/2006 | ND | ND | ND | ND | ND |
| | 3/26/2008 | ND | ND | ND | ND | ND |
| | 4/3/2009 | ND | ND | ND | ND | ND |
| | 5/31/2011 | <0.75 U | <0.75 U | <0.75 U | <0.75 U | <0.75 U |
| MW-4 | 4/2/2002 | **6.2** | **557** | 65.0 | 26.0 | ND |
| | 8/1/2002 | 1.7 | **248** | **108** | 32 | **2.3** |
| | 10/10/2002 | 1.7 | **339** | **114** | 36 | ND |
| MW-4 (dup)[a] | 10/10/2002 | 1.8 | **313** | **116** | 37 | ND |
| | 2/25/2003 | 1.7 | **256** | 69 | 22 | ND |
| | 5/19/2003 | 2.9 | **217** | **88.0** | 31.9 | ND |
| | 8/19/2003 | 2.2 | **288** | **92.1** | 31.2 | ND |
| | 11/4/2003 | ND | **147** | 34.8 | 10.1 | ND |
| | 2/23/2004 | 2.3 | **352** | **119** | 42.1 | ND |
| | 5/12/2004 | 1.9 | **429** | **120** | 43.1 | ND |
| | 9/14/2004 | ND | **156** | 34.4 | 10.8 | ND |
| | 11/8/2004 | 2.2 | **313** | **101** | 37.3 | ND |

## Appendix C - Post Remedy In Place Groundwater Monitoring Results - Organics

| Monitoring Well | Date | PCE 5 ug/L | TCE 5 µg/L | Cis 1,2-DCE 70 µg/L | Trans 1,2-DCE 100 µg/L | Vinyl Chloride 2 µg/L |
|---|---|---|---|---|---|---|
| MW-4 | 3/25/2005 | 2.4 | **303** | **111** | 37.2 | ND |
| | 6/1/2005 | 2.8 | **434** | **166** | 56.5 | ND |
| | 8/24/2005 | 2.2 | **387** | **146** | 50.4 | ND |
| | 11/22/2005 | 2.0 | **226** | 33.8 | 11.5 | ND |
| | 3/8/2006 | 2.3 | **348**[e] | **139**[e] | 49.2 | ND |
| | 11/22/2006 | 1.6 | **145** | 14.8 | 5.8 | ND |
| MW-4 (dup)[a] | 11/22/2006 | 1.6 | **145** | 13.9 | 5.5 | ND |
| | 6/1/2007 | 2.3 | **320** | **83.7** | 27.5 | ND |
| | 6/15/2007 | 0.5 | **77.1** | 26.8 | 7.2 | ND |
| | 3/26/2008 | ND | **66.4** | 13.3 | 4.6 | ND |
| | 3/31/2009 | ND | **91.0**[f] | 35.4 | 10.1[f] | ND |
| | 6/1/2011 | <0.75 U | **35.3 J** | 15.0 J | 3.3 | <0.75 U |
| MW-4 (dup)[a] | 6/1/2011 | <0.75 U | **36** | 15.5 | 3.4 | <0.75 U |
| MW-4A | 4/2/2002 | ND | **5.7** | 1.3 | ND | ND |
| | 8/2/2002 | ND | **24.0** | 10.0 | 4.1 | ND |
| | 10/10/2002 | ND | **33** | 13 | 3.1 | ND |
| | 2/25/2003 | ND | **7.9**[c] | 17 | 1.1 | ND |
| | 5/19/2003 | ND | 3.4 | ND | ND | ND |
| | 8/19/2003 | ND | 1.5 | 3.4 | ND | ND |
| | 11/4/2003 | ND | ND | 1.6 | ND | ND |
| | 2/23/2004 | ND | 1.2 | ND | ND | ND |
| | 5/12/2004 | ND | ND | ND | ND | ND |
| | 9/14/2004 | ND | ND | 1.5 | ND | ND |
| | 11/8/2004 | ND | 1.5 | ND | ND | ND |
| | 3/25/2005 | ND | 1.8 | ND | ND | ND |
| | 6/1/2005 | ND | 2.8 | ND | ND | ND |
| | 8/25/2005 | ND | 4.4 | 1.4 | ND | ND |
| | 11/22/2005 | ND | **31.9** | 8.7 | 2.1 | ND |
| | 3/8/2006 | ND | **5.3** | 11.5 | ND | ND |
| | 11/22/2006 | ND | **14.8** | 4.9 | ND | ND |
| | 4/3/2009 | ND | ND | ND | ND | ND |
| | 6/1/2011 | < 3.8 UJ | < 3.8 UJ | < 3.8 UJ | < 3.8 UJ | < 3.8 UJ |
| MW-5 | 4/4/2002 | ND | ND | ND | ND | ND |
| | 7/29/2002 | ND | ND | ND | ND | ND |
| | 10/14/2002 | ND | ND | ND | ND | ND |
| | 2/27/2003 | ND | ND | ND | ND | ND |
| | 5/22/2003 | ND | ND | ND | ND | ND |
| | 8/21/2003 | ND | ND | ND | ND | ND |
| | 11/5/2003 | ND | ND | ND | ND | ND |
| | 2/25/2004 | ND | ND | ND | ND | ND |
| | 5/11/2004 | ND | ND | ND | ND | ND |
| | 9/15/2004 | ND | ND | ND | ND | ND |
| | 11/9/2004 | ND | ND | ND | ND | ND |
| | 3/24/2005 | ND | ND | ND | ND | ND |
| | 5/31/2005 | ND | ND | ND | ND | ND |
| | 8/23/2005 | ND | ND | ND | ND | ND |
| | 11/21/2005 | ND | ND | ND | ND | ND |
| | 3/7/2006 | ND | ND | ND | ND | ND |
| | 11/21/2006 | ND | ND | ND | ND | ND |
| | 4/1/2009 | ND | ND | ND | ND | ND |
| MW-5A | 4/4/2002 | ND | ND | ND | ND | ND |
| | 7/29/2002 | ND | ND | ND | ND | ND |
| | 10/14/2002 | ND | ND | ND | ND | ND |
| | 2/28/2003 | ND | ND | ND | ND | ND |
| | 5/22/2003 | ND | ND | ND | ND | ND |

## Appendix C - Post Remedy In Place Groundwater Monitoring Results - Organics

| Monitoring Well | Date | PCE 5 ug/L | TCE 5 µg/L | Cis 1,2-DCE 70 µg/L | Trans 1,2-DCE 100 µg/L | Vinyl Chloride 2 µg/L |
|---|---|---|---|---|---|---|
| MW-5A | 8/21/2003 | ND | ND | ND | ND | ND |
| | 11/5/2003 | ND | ND | ND | ND | ND |
| | 2/25/2004 | ND | ND | ND | ND | ND |
| | 5/11/2004 | ND | ND | ND | ND | ND |
| | 9/15/2004 | ND | ND | ND | ND | ND |
| | 11/9/2004 | ND | ND | ND | ND | ND |
| | 3/24/2005 | ND | ND | ND | ND | ND |
| | 5/31/2005 | ND | ND | ND | ND | ND |
| | 8/23/2005 | ND | ND | ND | ND | ND |
| | 11/21/2005 | ND | ND | ND | ND | ND |
| | 3/7/2006 | ND | ND | ND | ND | ND |
| | 11/21/2006 | ND | ND | ND | ND | ND |
| | 4/1/2009 | ND | ND | ND | ND[e] | ND |
| MW-5A (dup)[g] | 4/1/2009 | ND | ND | ND | ND | ND |
| MW-6 | 4/4/2002 | ND | ND | ND | ND | ND |
| MW-6 (dup)[a] | 4/4/2002 | ND | ND | ND | ND | ND |
| | 7/30/2002 | ND | ND | ND | ND | ND |
| | 10/11/2002 | ND | ND | ND | ND | ND |
| | 2/27/2003 | ND | ND | ND | ND | ND |
| | 5/21/2003 | ND | ND | ND | ND | ND |
| | 8/21/2003 | ND | ND | ND | ND | ND |
| | 11/5/2003 | ND | ND | ND | ND | ND |
| | 2/25/2004 | ND | ND | ND | ND | ND |
| | 5/11/2004 | ND | ND | ND | ND | ND |
| | 9/15/2004 | ND | ND | ND | ND | ND |
| | 11/9/2004 | ND | ND | ND | ND | ND |
| | 4/1/2009 | ND | ND | ND | ND | ND |
| MW-6A | 4/4/2002 | ND | ND | ND | ND | ND |
| | 7/30/2002 | ND | ND | ND | ND | ND |
| | 10/11/2002 | ND | ND | ND | ND | ND |
| | 2/26/2003 | ND | ND | ND | ND | ND |
| | 5/21/2003 | ND | ND | ND | ND | ND |
| | 8/21/2003 | ND | ND | ND | ND | ND |
| | 11/5/2003 | ND | ND | ND | ND | ND |
| | 2/25/2004 | ND | ND | ND | ND | ND |
| | 5/11/2004 | ND | ND | ND | ND | ND |
| | 9/15/2004 | ND | ND | ND | ND | ND |
| | 11/9/2004 | ND | ND | ND | ND | ND |
| | 4/1/2009 | ND | ND | ND | ND | ND |
| MW-7 | 4/4/2002 | ND | ND | ND | ND | ND |
| | 7/30/2002 | ND | ND | ND | ND | ND |
| | 10/14/2002 | ND | ND | ND | ND | ND |
| | 2/28/2003 | ND | ND | ND | ND | ND |
| | 5/22/2003 | ND | ND | ND | ND | ND |
| | 8/21/2003 | ND | ND | ND | ND | ND |
| | 11/5/2003 | ND | ND | ND | ND | ND |
| | 2/25/2004 | ND | ND | ND | ND | ND |
| | 5/11/2004 | ND | ND | ND | ND | ND |
| | 9/15/2004 | ND | ND | ND | ND | ND |
| | 11/9/2004 | ND | ND | ND | ND | ND |
| | 4/1/2009 | ND | ND | ND | ND | ND |
| MW-7A | 4/3/2002 | ND | ND | ND | ND | ND |
| | 7/31/2002 | ND | ND | ND | ND | ND |
| | 10/10/2002 | ND | ND | ND | ND | ND |
| | 2/25/2003 | ND | ND | ND | ND | ND |
| | 5/20/2003 | ND | ND | ND | ND | ND |
| | 8/20/2003 | ND | ND | ND | ND | ND |
| | 11/5/2003 | ND | ND | ND | ND | ND |
| | 2/24/2004 | ND | ND | ND | ND | ND |
| | 5/10/2004 | ND | ND | ND | ND | ND |
| | 9/14/2004 | ND | ND | ND | ND | ND |
| | 11/8/2004 | ND | ND | 1.5 | ND | ND |
| | 4/1/2009 | ND | ND | ND | ND | ND |

## Appendix C - Post Remedy In Place Groundwater Monitoring Results - Organics

| Monitoring Well | Date | PCE 5 ug/L | TCE 5 µg/L | Cis 1,2-DCE 70 µg/L | Trans 1,2-DCE 100 µg/L | Vinyl Chloride 2 µg/L |
|---|---|---|---|---|---|---|
| MW-8[b] | 5/21/2003 | 2.4 | **376** | **449.0** | 99.7 | **2.5** |
| | 8/18/2003 | 1.5 | **276** | **371** | 81.9 | **2.5** |
| | 11/3/2003 | 2.0 | **302** | **423** | **104** | **3.4** |
| | 2/23/2004 | ND | **334** | **507** | **126** | **2.9** |
| | 5/11/2004 | 1.5 | **386** | **476** | **106** | **2.0** |
| | 9/13/2004 | 2.4[c] | **412[c]** | **570** | **115[c]** | 1.6 |
| MW-8 (dup)[a] | 9/13/2004 | 2.7[c] | **373[c]** | **549** | **120[c]** | 1.4 |
| | 11/8/2004 | 1.8 | **315** | **507** | 91 | 1.1 |
| MW-8 (dup)[a] | 11/8/2004 | 1.7 | **321** | **525** | 92.5 | 1.1 |
| | 3/24/2005 | 2.2 | **280** | **426** | 99.8 | 2.0 |
| MW-8 (dup)[a] | 3/24/2005 | 2.0 | **289** | **438** | 97.6 | 2.0 |
| | 6/1/2005 | 1.5 | **326** | **514[c]** | **111** | **2.6** |
| | 8/24/2005 | 1.4 | **309** | **453** | 84.6 | 1.9 |
| MW-8 (dup)[a] | 8/24/2005 | 1.9 | **285** | **418** | 92.6 | **2.2** |
| | 11/22/2005 | 1.1 | **254** | **457** | 81.7 | 1.6 |
| | 3/8/2006 | 1.4 | **259** | **357** | 83.1 | 1.5 |
| MW-8 (dup)[a] | 3/8/2006 | 1.5 | **259** | **359** | 86.9 | 1.5 |
| | 11/22/2006 | 1.9 | **261** | **386** | 73.8 | 1.1 |
| | 6/1/2007 | 2.1 | **236** | **376** | 76.7 | ND |
| | 6/15/2007 | 1.9 | **229** | **206** | 51.3 | ND |
| | 3/27/2008 | 2.1 | **271** | **368** | 83.2 | 2.1 |
| | 4/2/2009 | 1.9 | **269** | **328** | 65.6 | 1.5 |
| | 7/15/2010 | 0.85J | **307** | **316** | 64.2 | 0.56J |
| | 11/9/2010 | 3.8U | **264** | **280** | 51.3 | 3.8U |
| | 6/1/2011 | 0.93 J | **199 J** | **197 J** | 40.0 J | 0.75 J |
| MW-8A[b] | 5/20/2003 | ND | ND | ND | ND | ND |
| | 8/18/2003 | ND | ND | ND | ND | ND |
| | 11/3/2003 | ND | ND | ND | ND | ND |
| | 2/23/2004 | ND | ND | ND | ND | ND |
| | 5/11/2004 | ND | ND | ND | ND | ND |
| | 9/13/2004 | ND | ND | ND | ND | ND |
| | 11/8/2004 | ND | ND | ND | ND | ND |
| | 3/8/2006 | ND | ND | ND | ND | ND |
| | 11/22/2006 | ND | ND | ND | ND | ND |
| | 3/26/2008 | ND | ND | ND | ND | ND |
| MW-8 (dup)[a] | 3/26/2008 | ND | ND | ND | ND | ND |
| | 4/2/2009 | ND | ND | 2.9 | ND | ND |
| | 6/1/2011 | <0.75 U | <0.75 U | <0.75 U | <0.75 U | <0.75 U |
| MW-8 (dup)[a] | 6/1/2011 | <0.75 U | <0.75 U | <0.75 U | <0.75 U | <0.75 U |
| MW-9[b] | 5/21/2003 | ND | **13.0** | 3.4 | 1.7 | ND |
| | 8/19/2003 | ND | **19.4** | 4.6 | 2.3 | ND |
| | 11/4/2003 | ND | **22.2** | 4.8 | 2.8 | ND |
| | 2/24/2004 | ND | **19.0** | 3.3 | 2.1 | ND |
| | 5/10/2004 | ND | **19.5** | 5.2 | 2.7 | ND |
| | 9/14/2004 | ND | **19.7** | 3.9 | 2.2 | ND |
| | 11/9/2004 | ND | **17.5** | 3.0 | 2.0 | ND |
| | 3/24/2005 | ND | **16.6** | 3.7 | 2.0 | ND |
| | 6/1/2005 | ND | **22.1** | 5.3 | 3.0 | ND |
| | 8/25/2005 | ND | **29.4** | 8.8 | 4.8 | ND |
| | 11/21/2005 | ND | **22.2** | 5.1 | 3.3 | ND |
| | 3/8/2006 | ND | **21.9** | 4.5 | 2.5 | ND |
| | 11/22/2006 | ND | **16.7** | 3.7 | 2.0 | ND |
| | 3/27/2008 | ND | **14.0** | 2.7 | 1.5 | ND |
| | 4/2/2009 | ND | **10.6** | 2.4 | 1.4 | ND |
| | 7/15/2010 | ND | **16.2** | 3.4 | 2.3 | ND |
| | 11/9/2010 | ND | **15.8** | 2.8 | 1.7 | ND |
| | 6/1/2011 | < 0.75 UJ | **17.1 J** | 5.7 J | 1.3 J | < 0.75 UJ |

## Appendix C - Post Remedy In Place Groundwater Monitoring Results - Organics

| Monitoring Well | Date | PCE 5 ug/L | TCE 5 µg/L | Cis 1,2-DCE 70 µg/L | Trans 1,2-DCE 100 µg/L | Vinyl Chloride 2 µg/L |
|---|---|---|---|---|---|---|
| MW-9A[b] | 5/21/2003 | ND | ND | ND | ND | ND |
| | 8/19/2003 | ND | ND | ND | ND | ND |
| | 11/4/2003 | ND | ND | ND | ND | ND |
| | 2/24/2004 | ND | ND | ND | ND | ND |
| | 5/10/2004 | ND | ND | ND | ND | ND |
| | 9/14/2004 | ND | ND | ND | ND | ND |
| | 11/9/2004 | ND | ND | ND | ND | ND |
| | 3/8/2006 | ND | ND | ND | ND | ND |
| | 11/21/2006 | ND | ND | ND | ND | ND |
| | 3/27/2008 | ND | ND | ND | ND | ND |
| | 4/2/2009 | ND | ND | ND | ND | ND |
| | 6/1/2011 | < 0.75 UJ | < 0.75 UJ | < 0.75 UJ | < 0.75 UJ | < 0.75 UJ |
| MW-10[d] | 4/18/2005 | ND | ND | ND | ND | ND |
| | 6/1/2005 | ND | ND | ND | ND | ND |
| | 8/24/2005 | ND | ND | ND | ND | ND |
| | 11/22/2005 | ND | ND | ND | ND | ND |
| | 3/9/2006 | ND | ND | ND | ND | ND |
| | 11/21/2006 | ND | ND | ND | ND | ND |
| | 3/26/2008 | ND | ND | ND | ND | ND |
| | 3/30/2009 | ND | ND | ND | ND | ND |
| MW-11[d] | 4/18/2005 | ND | 1.5 | ND | ND | ND |
| | 6/1/2005 | ND | ND | ND | ND | ND |
| | 8/24/2005 | ND | ND | ND | ND | ND |
| | 11/22/2005 | ND | **8.9** | 2.3 | ND | ND |
| | 3/9/2006 | ND | 3.0 | 1.8 | ND | ND |
| | 11/20/2006 | ND | 2.1 | 1.4 | ND | ND |
| | 3/26/2008 | ND | 2.7 | 2.5 | ND | ND |
| | 3/30/2009 | ND | ND | ND | ND | ND |
| MW-12[d] | 4/18/2005 | ND | **8.3** | ND | ND | ND |
| | 5/31/2005 | ND | **14.4** | 1.3 | ND | ND |
| | 8/23/2005 | ND | **30.4** | 2.0 | ND | ND |
| | 11/21/2005 | ND | **17.6** | 1.7 | ND | ND |
| | 3/7/2006 | ND | **16.7** | 2.3 | ND | ND |
| | 11/20/2006 | ND | **15.0** | 3.0 | ND | ND |
| | 3/27/2008 | ND | 4.9 | 2.1 | ND | ND |
| | 4/2/2009 | ND | 3.7 | 2.9 | 2.0 | ND |
| | 5/31/2011 | < 0.75 UJ | **6.3 J** | 2.0 J | 0.87 J | < 0.75 UJ |
| MW-13[d] | 4/18/2005 | ND | 1.1 | ND | ND | ND |
| MW-13 (dup)[a] | 4/18/2005 | ND | 1.1 | ND | ND | ND |
| | 5/31/2005 | ND | ND | ND | ND | ND |
| MW-13 (dup)[a] | 5/31/2005 | ND | 1.0 | ND | ND | ND |
| | 8/25/2005 | ND | **12.3** | 2.2 | ND | ND |
| | 11/21/2005 | ND | **8.9** | 2.1 | ND | ND |
| MW-13 (dup)[a] | 11/21/2005 | ND | **9.8** | 2.7 | ND | ND |
| | 3/10/2006 | ND | 2.5 | ND | ND | ND |
| | 11/21/2006 | ND | 3.8 | 1.6 | ND | ND |
| | 3/27/2008 | ND | 1.8 | 1.2 | ND | ND |
| | 4/3/2009 | ND | ND | ND | ND | ND |
| MW-14[d] | 4/18/2005 | ND | ND | ND | ND | ND |
| | 5/31/2005 | ND | ND | ND | ND | ND |
| | 8/25/2005 | ND | ND | ND | ND | ND |
| | 11/21/2005 | ND | ND | ND | ND | ND |
| | 3/10/2006 | ND | ND | ND | ND | ND |
| | 11/21/2006 | ND | ND | ND | ND | ND |
| | 3/27/2008 | ND | 1.8 | ND | ND | ND |
| | 4/3/2009 | ND | ND | ND | ND | ND |
| MW-14 (dup)[g] | 4/3/2009 | ND | ND | ND | ND | ND |
| | 7/15/2010 | ND | ND | ND | ND | ND |
| | 11/9/2010 | ND | ND | ND | ND | ND |
| | 5/31/2011 | < 0.75 UJ | 0.46 J | < 0.75 UJ | < 0.75 UJ | < 0.75 UJ |

## Appendix C - Post Remedy In Place Groundwater Monitoring Results - Organics

| Monitoring Well | Date | PCE 5 ug/L | TCE 5 µg/L | Cis 1,2-DCE 70 µg/L | Trans 1,2-DCE 100 µg/L | Vinyl Chloride 2 µg/L |
|---|---|---|---|---|---|---|
| MW-15 | 7/15/2010 | ND | 0.85 J | 1.6 | ND | ND |
| | 11/9/2010 | ND | 0.55J | 0.63J | ND | ND |
| | 5/31/2011 | < 0.75 UJ | 1.4 J | 2.1 J | 0.36 J | < 0.75 UJ |
| PW-1 | NS | NS | NS | NS | NS | NS |
| EW-1 | 4/3/2009 | ND | **23.3** | 60.7[e] | 10.4 | ND |
| EW-2 | 3/31/2009 | ND | **11.9[f]** | **554** | 42.5[f] | **14.9** |
| EW-3 | 4/3/2009 | ND | **18.8** | 29.0 | 4.2 | ND |
| 270A | 3/30/2009 | ND | ND | ND | ND | ND |
| 270B | 3/30/2009 | ND | ND | ND | ND | ND |
| 284A | 3/30/2009 | ND | ND | ND | ND | ND |
| 284B | 3/30/2009 | ND | ND | ND | ND | ND |
| 288A | 3/30/2009 | ND | ND | ND | ND | ND |
| 288B | 3/30/2009 | ND | ND | ND | ND | ND |
| 302A | 3/30/2009 | ND | ND | ND | ND | ND |
| 302B | 3/30/2009 | ND | ND | ND | ND | ND |
| 305 | 3/30/2009 | ND | ND | ND | ND | ND |
| MADW 41-52 | 7/15/2010 | ND | 0.64J | ND | ND | ND |
| DUP-1 (MADW 41-52) | 7/15/2010 | ND | ND | ND | ND | ND |
| | 11/9/2010 | ND | ND | 1.2 | ND | ND |
| | 5/31/2011 | < 0.75 UJ | 2.3 J | < 0.75 UJ | < 0.75 UJ | < 0.75 UJ |
| MADW 121-132 | 7/15/2010 | ND | **17.5** | ND | ND | ND |
| | 11/9/2010 | ND | **17.4** | 0.37J | ND | ND |
| DUP-1 (MADW 121-132) | 11/9/2010 | ND | **17.2** | 0.40J | ND | ND |
| | 5/31/2011 | < 0.75 UJ | **18.0 J** | 0.59 J | < 0.75 UJ | < 0.75 UJ |
| MADW 170-181 | 7/15/2010 | 3.5 | **432** | 7.6 | 3.9 | ND |
| | 11/9/2010 | 3.8 | **580** | 9.1 | 4.4 | ND |
| | 5/31/2011 | 3.0 | **358** | 6.7 | 3.3 | < 0.75 U |
| MADW 184-195 | 7/15/2010 | 0.90 J | **270** | 6.4 | 3.0 | ND |
| | 11/9/2010 | 1.9 | **351** | 7.7 | 3.5 | ND |
| | 5/31/2011 | 1.5 | **245** | 13.6 | 3.0 | <0.75 U |

## Appendix C - Post Remedy In Place Groundwater Monitoring Results - Organics

| Monitoring Well | Date | PCE 5 ug/L | TCE 5 µg/L | Cis 1,2-DCE 70 µg/L | Trans 1,2-DCE 100 µg/L | Vinyl Chloride 2 µg/L |
|---|---|---|---|---|---|---|
| MACW | 8/21/2003 | ND | **10.8** | ND | ND | ND |
| | 11/3/2003 | ND | **21.2** | ND | ND | ND |
| | 2/23/2004 | ND | **23.4** | ND | ND | ND |
| | 5/10/2004 | ND | **13.3** | ND | ND | ND |
| | 9/13/2994 | ND | **16.0**[c] | ND | ND | ND |
| | 11/9/2004 | ND | 3.0 | ND | ND | ND |
| | 3/24/2005 | ND | **7.8** | ND | ND | ND |
| | 4/18/2005 | ND | **21.1** | ND | ND | ND |
| | 5/31/2005 | ND | **15.4** | ND | ND | ND |
| | 8/23/2005 | ND | **29.5** | ND | ND | ND |
| | 11/21/2005 | ND | **18.0** | ND | ND | ND |
| | 3/7/2006 | ND | **30.1** | ND | ND | ND |
| | 11/20/2006 | ND | **23.2** | ND | ND | ND |
| | 3/28/2008 | ND | **9.8** | ND | ND | ND |
| | 3/31/2009 | ND | **6.8** | ND | ND | ND |
| | 7/15/2010 | ND | **10.0** | ND | ND | ND |
| | 11/9/2010 | ND | 4.6 | ND | ND | ND |
| | 5/31/2011 | < 0.75 U | **20.4** | < 0.75 U | < 0.75 U | < 0.75 U |

Notes:

Shaded and **Bolded** results represent exceedances of 2011 PADEP RDC MSC

PADEP = Pennsylvania Department of Environmental Protection

MSC = Medium Specific Concentration

RDC = Residential Direct Contact

ND = Not Detected above the laboratory method detection limit

NA = Not Available

NS = Not Sampled

a) Duplicate samples were submitted to the laboratory as blind duplicates.

b) Wells installed February 2003.

c) This compound was recovered above quality control criteria in the QC associated with this sample. The data user is cautioned that results may be biased high.

d) Wells installed March 2005.

e) This compound failed set criteria for the associated matrix spike and/or matrix spike duplicate but passed in the laboratory control sample, satisfying method criteria.

f) Laboratory result may be biased higher than the actual result

g) Duplicate samples were submitted as field duplicates.

All analytical results are in micrograms per liter (µg/L)

TCE = Trichloroethene

Cis 1,2-DCE = Cis 1,2-dichloroethylene

Trans 1,2-DCE = Trans 1,2-dichloroethylene

PCE = Tetrachloroethene

U = Not detected. The associated number indicates approximate sample concentration necessary to be detected.

J = Analyte present. Reported value may not be accurate or precise.

UJ = Not detected. Quantitation limit may be inaccurate or imprecise.

MADW = Mifflin Avenue Deep Well

MACW = Mifflin Avenue Cabin Well (previously referred to as the Mifflin Avenue Residential Well)

# Appendix C - Post Remedy-In-Place Groundwater Monitoring Results - Inorganics

| | | | | | Analyte (PADEP MSC/ROD RAO) | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Arsenic | Barium | Beryllium | Cadmium | Chromium | Copper | Iron | Lead | Manganese |
| Sample ID | Date | (0.01/0.05) | (2/1) | (0.004/0.0005) | (0.005/0.01) | (0.1/0.05) | (1/1.3) | (0.3*/NA) | (0.005/0.005) | (0.3*/NA) |
| MW-1 | 4/2/2002 | ND | 0.56 | ND | ND | 0.007 | ND | 3.5 | ND | 0.16 |
| | 8/2/2002 | ND | 0.3 | ND | ND | ND | ND | 0.26 | ND | 0.2 |
| | 10/9/2002 | ND | 0.3 | ND | ND | ND | ND | 0.16 | ND | 0.006 |
| | 2/24/2003 | ND | 0.31 | ND | ND | ND | ND | 0.5 | ND | 0.023 |
| | 5/19/2003 | ND | 0.358 | ND | ND | ND | ND | 1.06 | ND | 0.035 |
| | 8/18/2003 | ND | 0.371 | ND | ND | ND | ND | 0.91 | ND | 0.45 |
| | 11/3/2003 | ND | 0.308 | ND | ND | ND | ND | 0.45 | ND | 0.018 |
| | 2/23/2004 | ND | 0.327 | ND | ND | ND | ND | 1.81 | ND | 0.047 |
| | 5/10/2004 | ND | 0.301 | ND | ND | ND | 0.025 | 0.68 | ND | 0.023 |
| | 9/13/2004 | ND | 0.31 | ND | ND | 0.008 | 0.013 | 0.59 | ND | 0.02 |
| | 11/8/2004 | ND | 0.364 | ND | ND | ND | ND | 1 | ND | 0.023 |
| ** | 6/2/2011 | <0.0020 U | 0.095 J | <0.00067 U | <0.00067 U | <0.0013 U | 0.0057 B | 0.20 B | <0.0013 U | 0.060 B |
| MW-1A | 4/2/2002 | ND | 0.04 | ND | ND | ND | 0.018 | 0.1 | ND | 0.008 |
| | 8/1/2002 | ND | 0.052 | ND | ND | ND | ND | 0.87 | ND | 0.043 |
| | 10/9/2002 | ND | 0.6 | ND | ND | ND | ND | 1.4 | ND | 0.063 |
| | 2/25/2003 | ND | 0.046 | ND | ND | ND | ND | 0.4 | ND | 0.08 |
| MW-1A (DUP) | 2/25/2003 | ND | 0.05 | ND | ND | ND | ND | 0.94 | ND | 0.131 |
| | 5/19/2003 | ND | 0.049 | ND | ND | ND | ND | 0.26 | ND | 0.057 |
| MW-1A (DUP) | 5/19/2003 | ND | 0.045 | ND | ND | ND | ND | 0.12 | ND | 0.076 |
| | 8/18/2003 | ND | 0.053 | ND | ND | ND | ND | ND | ND | 0.014 |
| MW-1A (DUP) | 8/18/2003 | ND | 0.053 | ND | ND | ND | ND | ND | ND | 0.014 |
| | 11/3/2003 | ND | 0.047 | ND | ND | ND | ND | ND | ND | 0.093 |
| MW-1A (DUP) | 11/3/2003 | ND | 0.047 | ND | ND | ND | ND | ND | ND | 0.091 |
| | 2/23/2004 | ND | 0.047 | ND | ND | ND | ND | 0.15 | ND | 0.038 |
| MW-1A (DUP) | 2/23/2004 | ND | 0.046 | ND | ND | ND | ND | 0.15 | ND | 0.041 |
| | 5/10/2004 | ND | 0.051 | ND | ND | ND | 0.015 | 0.12 | ND | 0.028 |
| | 9/13/2004 | ND | 0.052 | ND | ND | ND | ND | 0.13 | ND | 0.03 |
| | 11/8/2004 | ND | 0.056 | ND | ND | ND | ND | 0.08 | ND | 0.409 |
| MW-1A (DUP) | 5/10/2004 | ND | 0.05 | ND | ND | ND | 0.015 | 0.11 | ND | 0.025 |
| ** | 6/1/2011 | <0.0020 U | 0.033 J | <0.00067 U | <0.00067 U | 0.0014 J | <0.0033 U | 0.13 | <0.0013 U | 0.0088 |

# Appendix C - Post Remedy-In-Place Groundwater Monitoring Results - Inorganics

| | | | | | Analyte (PADEP MSC/ROD RAO) | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | **Arsenic** | **Barium** | **Beryllium** | **Cadmium** | **Chromium** | **Copper** | **Iron** | **Lead** | **Manganese** |
| **Sample ID** | **Date** | **(0.01/0.05)** | **(2/1)** | **(0.004/0.0005)** | **(0.005/0.01)** | **(0.1/0.05)** | **(1/1.3)** | **(0.3*/NA)** | **(0.005/0.005)** | **(0.3*/NA)** |
| MW-2 | 4/2/2002 | ND | 0.16 | ND | ND | ND | ND | 0.16 | ND | ND |
| | 7/31/2002 | ND | 0.1 | ND | ND | ND | ND | ND | ND | ND |
| | 10/9/2002 | ND | 0.18 | ND | ND | ND | ND | ND | ND | ND |
| | 2/26/2003 | ND | 0.15 | ND | ND | ND | ND | ND | ND | ND |
| | 5/20/2003 | ND | 0.13 | ND | ND | ND | ND | ND | ND | ND |
| | 8/20/2003 | ND | 0.126 | ND | ND | ND | ND | 0.22 | ND | ND |
| | 11/4/2003 | ND | 0.117 | ND | ND | ND | ND | ND | ND | ND |
| | 2/24/2004 | ND | 0.12 | ND | ND | ND | ND | ND | ND | ND |
| | 5/12/2004 | ND | 0.131 | ND | ND | ND | ND | ND | ND | ND |
| | 9/13/2004 | ND | 0.109 | ND | ND | ND | ND | ND | ND | ND |
| | 11/9/2004 | ND | 0.117 | ND | ND | ND | ND | ND | ND | ND |
| MW-2 (DUP) | 4/2/2002 | ND | 0.16 | ND | ND | ND | ND | ND | ND | ND |
| ** | 6/1/2011 | 0.0014 K | 0.10 J | <0.00067 U | <0.00067 U | <0.0013 U | <0.0033 | 0.24 | <0.0013 U | <0.0033 U |
| MW-2A | 4/3/2002 | ND | 0.08 | ND | ND | ND | 0.033 | 0.23 | ND | 0.098 |
| | 7/31/2002 | ND | 0.07 | ND | 0.002 | ND | 0.029 | 1.2 | ND | 2.4 |
| | 10/8/2002 | ND | 0.07 | ND | 0.002 | ND | 0.19 | 0.91 | ND | 2.6 |
| | 2/26/2003 | ND | 0.042 | ND | ND | ND | 0.04 | 1.02 | **0.007** | 0.103 |
| | 5/20/2003 | ND | 0.068 | ND | ND | ND | 0.05 | 2.11 | **0.007** | 1.23 |
| | 8/20/2003 | ND | 0.099 | ND | ND | ND | 0.065 | 1.02 | ND | 1.05 |
| | 11/4/2003 | ND | 0.084 | ND | ND | ND | 0.035 | 1.15 | ND | 0.58 |
| | 2/24/2004 | ND | 0.061 | ND | ND | ND | 0.042 | 4.3 | **0.008** | 0.166 |
| | 5/12/2004 | ND | 0.1 | ND | ND | ND | 0.105 | 15.6 | **0.03** | 1.4 |
| | 9/13/2004 | ND | 0.129 | ND | ND | ND | 0.09 | 3.65 | **0.009** | 1.16 |
| | 11/9/2004 | ND | 0.15 | ND | ND | ND | 0.064 | 3.55 | ND | 0.888 |
| MW-2A (DUP) | 7/31/2002 | ND | 0.07 | ND | 0.002 | ND | 0.027 | 1.1 | ND | 2.4 |
| ** | 6/1/2011 | <0.0020 J | 0.087 J | <0.00067 U | <0.00067 U | 0.00095 J | 0.021 | 0.31 | <0.0013 U | 0.24 |
| MW-3 | 4/3/2002 | ND | 0.07 | ND | ND | ND | ND | ND | ND | ND |
| MW-3 (DUP) | 4/3/2002 | ND | 0.07 | ND | ND | ND | ND | ND | ND | ND |
| | 8/1/2002 | ND | 0.078 | ND | ND | ND | ND | ND | ND | ND |
| | 10/8/2002 | ND | 0.088 | ND | ND | ND | ND | ND | ND | ND |
| | 2/26/2003 | ND | 0.052 | ND | ND | ND | ND | ND | ND | ND |
| | 5/19/2003 | ND | 0.078 | ND | ND | ND | ND | ND | ND | ND |

# Appendix C - Post Remedy-In-Place Groundwater Monitoring Results - Inorganics

| | | | | | Analyte (PADEP MSC/ROD RAO) | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | **Arsenic** | **Barium** | **Beryllium** | **Cadmium** | **Chromium** | **Copper** | **Iron** | **Lead** | **Manganese** |
| **Sample ID** | **Date** | **(0.01/0.05)** | **(2/1)** | **(0.004/0.0005)** | **(0.005/0.01)** | **(0.1/0.05)** | **(1/1.3)** | **(0.3*/NA)** | **(0.005/0.005)** | **(0.3*/NA)** |
| MW-3 | 8/19/2003 | ND | 0.053 | ND | ND | 0.008 | ND | ND | ND | ND |
| | 11/3/2003 | ND | 0.059 | ND | ND | ND | ND | ND | ND | ND |
| | 2/24/2004 | ND | 0.043 | ND | ND | ND | ND | ND | ND | ND |
| | 5/10/2004 | ND | 0.052 | ND | ND | ND | ND | 0.08 | ND | ND |
| | 9/13/2004 | ND | 0.052 | ND | ND | ND | ND | ND | ND | ND |
| | 11/8/2004 | ND | 0.072 | ND | ND | ND | ND | ND | ND | ND |
| MW-3A ** | 5/31/2011 | <0.0020 U | 0.084 J | <0.00067 U | 0.0003 J | 0.011 | 0.0018 J | 0.26 | <0.0013 U | ND |
| MW-4 | 4/2/2002 | ND | 0.21 | ND | ND | ND | ND | ND | ND | ND |
| | 8/1/2002 | ND | 0.21 | ND | ND | ND | ND | ND | ND | ND |
| | 10/10/2002 | ND | 0.22 | ND | ND | ND | ND | ND | ND | ND |
| MW-4 (DUP) | 10/10/2002 | ND | 0.23 | ND | ND | ND | ND | ND | ND | ND |
| | 2/25/2003 | ND | 0.19 | ND | ND | ND | ND | ND | ND | ND |
| | 5/19/2003 | ND | 0.189 | ND | ND | ND | ND | ND | ND | ND |
| | 8/19/2003 | ND | 0.189 | ND | ND | ND | ND | ND | ND | ND |
| | 11/4/2003 | ND | 0.168 | ND | ND | 0.014 | ND | ND | ND | ND |
| | 2/23/2004 | ND | 0.186 | ND | ND | ND | ND | ND | ND | ND |
| | 5/12/2004 | ND | 0.191 | ND | ND | ND | ND | ND | ND | ND |
| | 9/14/2004 | ND | 0.164 | ND | ND | ND | ND | ND | ND | ND |
| | 11/8/2004 | ND | 0.186 | ND | ND | ND | ND | ND | ND | ND |
| ** | 6/1/2011 | <0.0020 U | 0.14 J | <0.00067 U | <0.00067 U | 0.0029 | <0.0033 U | 0.16 B | <0.0013 U | 0.074 B |
| MW-4A | 4/2/2002 | **0.062** | 0.88 | **0.17** | **0.028** | **0.98** | 0.15 | 160 | **0.31** | 2.2 |
| | 8/2/2002 | ND | 0.082 | ND | ND | ND | ND | 7.6 | **0.021** | 1.6 |
| | 10/10/2002 | ND | 0.099 | ND | ND | 0.007 | ND | 12 | **0.27** | 1.1 |
| | 2/25/2003 | 0.01 | 0.144 | ND | ND | 0.011 | 0.018 | 25 | **0.03** | 2.2 |
| | 5/19/2003 | ND | 0.088 | ND | ND | 0.011 | 0.021 | 14.7 | **0.024** | 0.335 |
| | 8/19/2003 | 0.014 | 0.046 | ND | ND | ND | ND | 15.3 | ND | 3.19 |
| | 11/4/2003 | ND | 0.056 | ND | ND | ND | 0.031 | 11.6 | ND | 3.97 |
| | 2/23/2004 | ND | 0.039 | ND | ND | ND | 0.063 | 4.6 | **0.03** | 0.216 |
| | 5/12/2004 | ND | 0.048 | ND | ND | ND | 0.04 | 5.23 | **0.019** | 0.306 |
| | 9/14/2004 | ND | 0.051 | ND | ND | ND | 0.02 | 8.92 | ND | 4.7 |
| | 11/8/2004 | ND | 0.049 | ND | ND | ND | 0.034 | 2.71 | **0.008** | 1.39 |
| ** | 6/1/2011 | <0.0020 | 0.031 J | <0.0067 U | <0.0067 U | 0.0016 J | <0.0033 U | 1.3 | <0.0013 U | 0.43 |

# Appendix C - Post Remedy-In-Place Groundwater Monitoring Results - Inorganics

| | | | | | Analyte (PADEP MSC/ROD RAO) | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Arsenic | Barium | Beryllium | Cadmium | Chromium | Copper | Iron | Lead | Manganese |
| Sample ID | Date | (0.01/0.05) | (2/1) | (0.004/0.0005) | (0.005/0.01) | (0.1/0.05) | (1/1.3) | (0.3*/NA) | (0.005/0.005) | (0.3*/NA) |
| MW-5 | 4/4/2002 | ND | 0.05 | ND | ND | ND | ND | 0.3 | ND | 0.01 |
| | 7/29/2002 | ND | 0.22 | ND | ND | ND | ND | 0.33 | ND | 0.064 |
| | 10/14/2002 | ND | 0.29 | ND | ND | ND | ND | ND | ND | 0.013 |
| | 2/27/2003 | ND | 0.26 | ND | ND | ND | ND | 0.07 | ND | ND |
| | 5/22/2003 | ND | 0.23 | ND | 0.001 | ND | 0.014 | ND | ND | 0.01 |
| | 8/21/2003 | ND | 0.252 | ND | ND | 0.05 | 0.012 | 0.6 | ND | 0.032 |
| | 11/5/2003 | ND | 0.288 | ND | ND | **0.151** | ND | 1.3 | ND | 0.357 |
| | 2/25/2004 | ND | 0.256 | ND | ND | **0.573** | 0.037 | 5.53 | ND | 0.087 |
| | 5/11/2004 | ND | 0.212 | ND | ND | **0.074** | 0.049 | 0.69 | ND | 0.013 |
| | 9/15/2004 | ND | 0.237 | ND | ND | **0.097** | 0.039 | 0.93 | ND | 0.017 |
| | 11/9/2004 | ND | 0.168 | ND | 0.002 | 0.023 | 0.053 | 1.36 | **0.025** | 0.033 |
| MW-5A | 4/4/2002 | ND | 0.14 | ND | 0.006 | ND | ND | 33 | **0.012** | 4.8 |
| | 7/29/2002 | ND | 0.14 | ND | ND | ND | ND | 29 | ND | 4.1 |
| | 10/14/2002 | ND | 0.14 | ND | ND | ND | ND | 26 | ND | 4.1 |
| | 2/28/2003 | ND | 0.22 | ND | 0.003 | 0.017 | 0.03 | 41.8 | **0.015** | 4.38 |
| | 5/22/2003 | ND | 0.18 | ND | 0.002 | 0.009 | ND | 35.2 | **0.011** | 4.57 |
| | 8/21/2003 | ND | 0.143 | ND | ND | ND | ND | 29.3 | ND | 4.25 |
| | 11/5/2003 | ND | 0.148 | ND | ND | ND | 0.011 | 36.9 | ND | 4.76 |
| | 2/25/2004 | ND | 0.146 | ND | ND | ND | 0.011 | 31.4 | ND | 4.57 |
| | 5/11/2004 | ND | 0.147 | ND | ND | ND | 0.012 | 30.2 | ND | 4.42 |
| MW-6 | 9/15/2004 | ND | 0.16 | ND | ND | ND | 0.041 | 23 | ND | 3.85 |
| | 11/9/2004 | ND | 0.148 | ND | ND | ND | 0.039 | 28.1 | ND | 3.72 |
| | 4/4/2002 | ND | 0.5 | ND | ND | ND | ND | ND | ND | 0.06 |
| MW-6 (DUP) | 4/4/2002 | ND | 0.43 | ND | ND | ND | ND | 0.09 | ND | 0.03 |
| MW-6 | 7/30/2002 | ND | 0.063 | ND | ND | ND | ND | 2.6 | ND | 0.19 |
| | 10/11/2002 | ND | 0.52 | ND | ND | ND | ND | ND | ND | 0.088 |
| | 2/27/2003 | ND | 0.519 | ND | ND | ND | ND | ND | ND | 0.057 |
| | 5/21/2003 | ND | 0.485 | ND | ND | ND | ND | ND | ND | 0.024 |
| | 8/21/2003 | ND | 0.472 | ND | ND | 0.008 | ND | 0.31 | ND | 0.043 |
| | 11/5/2003 | ND | 0.515 | ND | ND | ND | ND | 0.47 | ND | 0.054 |
| | 2/25/2004 | ND | 0.448 | ND | ND | ND | ND | 0.09 | ND | 0.026 |
| | 5/11/2004 | ND | 0.444 | ND | ND | ND | ND | 0.08 | ND | 0.013 |
| | 9/15/2004 | ND | 0.41 | ND | ND | ND | ND | ND | ND | 0.019 |
| | 11/9/2004 | ND | 0.295 | ND | ND | ND | 0.013 | 0.97 | **0.007** | 0.044 |

# Appendix C - Post Remedy-In-Place Groundwater Monitoring Results - Inorganics

| | | | | | Analyte (PADEP MSC/ROD RAO) | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Arsenic | Barium | Beryllium | Cadmium | Chromium | Copper | Iron | Lead | Manganese |
| Sample ID | Date | (0.01/0.05) | (2/1) | (0.004/0.0005) | (0.005/0.01) | (0.1/0.05) | (1/1.3) | (0.3*/NA) | (0.005/0.005) | (0.3*/NA) |
| MW-6A | 4/4/2002 | ND | 0.059 | ND | ND | ND | ND | 0.82 | ND | 0.01 |
| | 7/30/2002 | ND | 0.5 | ND | ND | ND | ND | ND | ND | 0.096 |
| | 10/11/2002 | ND | 0.076 | ND | ND | ND | ND | 3.1 | ND | 0.33 |
| | 2/26/2003 | ND | 0.069 | ND | ND | ND | 0.028 | 0.85 | **0.009** | 0.022 |
| | 5/21/2003 | ND | 0.085 | ND | ND | ND | 0.062 | 4.37 | **0.032** | 0.172 |
| | 8/21/2003 | ND | 0.1 | ND | ND | ND | 0.124 | 1.92 | **0.02** | 0.054 |
| | 11/5/2003 | ND | 0.062 | ND | ND | ND | ND | 1.89 | ND | 0.216 |
| | 2/25/2004 | ND | 0.052 | ND | ND | ND | 0.014 | 1.06 | ND | 1.02 |
| | 5/11/2004 | ND | 0.073 | ND | ND | ND | ND | 1.32 | ND | 0.92 |
| | 9/15/2004 | ND | 0.074 | ND | ND | 0.006 | 0.538 | 4.69 | **0.055** | 0.138 |
| | 11/9/2004 | ND | 0.064 | ND | ND | ND | ND | 2.96 | ND | 0.737 |
| MW-7 | 4/4/2002 | ND | 0.42 | ND | ND | ND | ND | ND | ND | 0.027 |
| | 7/30/2002 | ND | 0.24 | ND | ND | ND | 0.012 | ND | ND | ND |
| | 10/14/2002 | ND | 0.27 | ND | ND | ND | ND | ND | ND | ND |
| | 2/28/2003 | ND | 0.362 | ND | ND | ND | ND | ND | ND | ND |
| | 5/22/2003 | ND | 0.246 | ND | ND | ND | ND | ND | ND | ND |
| | 8/21/2003 | ND | 0.257 | ND | ND | ND | ND | ND | ND | ND |
| | 11/5/2003 | ND | 0.248 | ND | ND | 0.009 | ND | 0.15 | ND | ND |
| | 2/25/2004 | ND | 0.228 | ND | ND | ND | ND | 0.1 | ND | ND |
| | 5/11/2004 | ND | 0.251 | ND | ND | 0.015 | ND | 0.08 | ND | ND |
| | 9/15/2004 | ND | 0.25 | ND | ND | ND | ND | 0.39 | ND | ND |
| | 11/9/2004 | ND | 0.257 | ND | ND | 0.006 | ND | 0.33 | ND | ND |
| MW-7A | 4/3/2002 | ND | 0.092 | ND | ND | ND | ND | ND | ND | ND |
| | 7/31/2002 | ND | 0.54 | ND | ND | ND | ND | ND | ND | 0.13 |
| | 10/10/2002 | ND | 0.51 | ND | ND | ND | ND | ND | ND | 0.16 |
| | 2/25/2003 | ND | 0.332 | ND | ND | ND | 0.044 | 1.54 | ND | 0.038 |
| | 5/20/2003 | ND | 0.119 | ND | ND | ND | 0.018 | 0.11 | ND | ND |
| | 8/20/2003 | ND | 0.115 | ND | ND | ND | ND | ND | ND | ND |
| | 11/5/2003 | ND | 0.119 | ND | ND | ND | 0.017 | 0.48 | ND | 0.014 |
| | 2/24/2004 | ND | 0.1 | ND | ND | ND | ND | ND | ND | ND |
| | 5/10/2004 | ND | 0.084 | ND | ND | ND | 0.02 | 0.09 | ND | ND |
| | 9/14/2004 | ND | 0.114 | ND | ND | ND | ND | 0.22 | ND | 0.046 |
| | 11/8/2004 | ND | 0.135 | ND | ND | ND | ND | 0.11 | ND | 0.317 |

# Appendix C - Post Remedy-In-Place Groundwater Monitoring Results - Inorganics

| | | | | | Analyte (PADEP MSC/ROD RAO) | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Arsenic | Barium | Beryllium | Cadmium | Chromium | Copper | Iron | Lead | Manganese |
| Sample ID | Date | (0.01/0.05) | (2/1) | (0.004/0.0005) | (0.005/0.01) | (0.1/0.05) | (1/1.3) | (0.3*/NA) | (0.005/0.005) | (0.3*/NA) |
| MW-8 | 5/21/2003 | ND | 0.134 | ND | ND | ND | ND | 6.19 | ND | 0.223 |
| | 8/18/2003 | ND | 0.143 | ND | ND | ND | ND | 3.32 | ND | 0.429 |
| | 11/3/2003 | ND | 0.126 | ND | ND | ND | ND | 4.94 | ND | 0.178 |
| | 2/23/2004 | ND | 0.12 | ND | ND | ND | ND | 0.8 | ND | 0.085 |
| | 5/11/2004 | ND | 0.108 | ND | ND | ND | ND | 0.19 | ND | 0.066 |
| | 9/13/2004 | ND | 0.106 | ND | ND | ND | ND | 0.08 | ND | 0.049 |
| MW-8 (DUP) | 9/13/2004 | ND | 0.105 | ND | ND | ND | ND | 0.1 | ND | 0.049 |
| | 11/8/2004 | ND | 0.106 | ND | ND | ND | ND | 0.1 | ND | 0.051 |
| MW-8 (DUP) | 11/8/2004 | ND | 0.109 | ND | ND | ND | ND | 0.13 | ND | 0.058 |
| ** | 6/1/2011 | 0.0017 J | 0.071 J | <0.0067 U | <0.0067 | 0.004 | <0.0033 | 0.20 | <0.0013 U | 0.046 |
| MW-8A | 5/20/2003 | ND | 0.043 | ND | ND | ND | ND | 0.26 | ND | 0.217 |
| | 8/18/2003 | ND | 0.048 | ND | ND | ND | ND | 0.25 | ND | 0.063 |
| | 11/3/2003 | ND | 0.046 | ND | ND | ND | ND | 0.23 | ND | 0.037 |
| | 2/23/2004 | ND | 0.046 | ND | ND | ND | ND | 0.2 | ND | 0.01 |
| | 5/11/2004 | ND | 0.05 | ND | ND | ND | ND | 0.25 | ND | 0.012 |
| | 9/13/2004 | ND | 0.062 | ND | ND | ND | ND | ND | ND | ND |
| | 11/8/2004 | ND | 0.054 | ND | ND | ND | ND | ND | ND | ND |
| MW-8A (DUP)** | 6/1/2011 | ND | 0.087 J | ND | ND | 0.0015 J | 0.02 | 0.32 | ND | 0.24 |
| MW-9 | 5/21/2003 | ND | 0.217 | ND | ND | ND | ND | 2.26 | ND | 0.046 |
| | 8/19/2003 | ND | 0.338 | ND | ND | ND | ND | 0.76 | ND | 0.025 |
| | 11/4/2003 | 0.011 | 0.358 | ND | ND | ND | ND | 0.19 | ND | 0.01 |
| | 2/24/2004 | ND | 0.339 | ND | ND | ND | ND | ND | ND | ND |
| | 5/10/2004 | 0.01 | 0.367 | ND | ND | ND | 0.012 | ND | **0.009** | ND |
| | 9/14/2004 | ND | 0.346 | ND | ND | ND | ND | ND | ND | ND |
| | 11/9/2004 | 0.01 | 0.356 | ND | ND | ND | ND | 0.13 | ND | ND |
| ** | 6/1/2011 | 0.0012 K | 0.40 J | <0.00067 U | <0.00067 U | <0.0013 U | <0.0033 U | 0.25 | <0.0013 U | <0.0033 U |
| MW-9A | 5/21/2003 | ND | 0.04 | ND | ND | ND | ND | 1.15 | ND | 0.189 |
| | 8/19/2003 | ND | 0.054 | ND | 0.002 | ND | ND | 1.6 | ND | 0.322 |
| | 11/4/2003 | ND | 0.039 | ND | ND | ND | 0.015 | 0.17 | ND | 0.119 |
| | 2/24/2004 | ND | 0.07 | ND | ND | ND | ND | 0.14 | ND | 0.024 |
| | 5/10/2004 | ND | 0.087 | ND | ND | 0.01 | 0.013 | 6.71 | ND | 0.18 |
| | 9/14/2004 | ND | 0.061 | ND | ND | ND | ND | 2.56 | ND | 0.152 |
| | 11/9/2004 | ND | 0.047 | ND | ND | ND | ND | 1.22 | ND | 0.052 |
| ** | 6/1/2011 | <0.0020 U | 0.018 J | <0.00067 U | <0.00067 U | <0.0013 U | 0.0047 J | 0.081 | <0.0013 U | 0.088 |
| LW-1 ** | 3/31/2009 | ND | ND | **0.115** | ND | ND | ND | 8.331 | ND | 0.391 |

# Appendix C - Post Remedy-In-Place Groundwater Monitoring Results - Inorganics

| | | | | | Analyte (PADEP MSC/ROD RAO) | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Arsenic | Barium | Beryllium | Cadmium | Chromium | Copper | Iron | Lead | Manganese |
| Sample ID | Date | (0.01/0.05) | (2/1) | (0.004/0.0005) | (0.005/0.01) | (0.1/0.05) | (1/1.3) | (0.3*/NA) | (0.005/0.005) | (0.3*/NA) |
| MADW 41-52 | 7/15/2010** | 0.0044J | 0.12 | ND | ND | ND | ND | ND | 0.0032J | 0.031 |
| | 5/31/2011 | 0.0015 K | 0.14 K | 0.00031 J | < 0.0007 U | 0.0016 J | < 0.0037 U | 0.18 | < 0.0015 U | < 0.0037 U |
| MACW | 8/21/2003 | ND | 0.07 | ND | ND | ND | ND | ND | ND | ND |
| | 11/3/2003 | ND | 0.075 | ND | ND | ND | 0.013 | 0.23 | ND | ND |
| | 2/23/2004 | ND | 0.075 | ND | ND | ND | ND | 1.48 | ND | 0.055 |
| | 5/10/2004 | ND | 0.067 | ND | ND | ND | 0.028 | 0.53 | ND | ND |
| | 9/13/2004 | ND | 0.065 | ND | ND | ND | ND | 0.1 | ND | ND |
| | 11/9/2004 | ND | 0.059 | ND | ND | ND | ND | ND | ND | ND |
| | 3/31/2009 | ND | 0.064 | ND | ND | ND | ND | 0.049 | ND | ND |
| | 7/15/2010 | <0059 U | 0.073 | <0.0029 U | <0.0014 U | <0.00 4U | 0.04 | <0.045 U | **0.0094** | <0.0037 U |
| | 11/9/2010 | 0.0035 | 0.06 | <0.0007 U | <0.0007 U | 0.0016J | 0.0024 J | 1.2 | <0.0015 U | 0.028 |
| | 5/31/2011 | 0.0011 K | 0.077 K | 0.00033 J | <0.0007 U | 0.0016 J | 0.088 | 0.36 K | **0.011 K** | 0.043 K |
| MW-15 ** | 5/31/2011 | 0.0029 J | 0.30 J | <0.00067 U | <0.00067 U | 0.0011 J | <0.0033 U | 0.18 | <0.0013 U | <0.0033 |

Notes:

U = Not detected. The associated number indicates approximate sample concentration necessary tc

K = Analyte present. Reported value may be biased high. Actual value is expected lower.

J = Analyte present. Reported value may not be accurate or precise.

B = Not detected substantially above the level reported in laboratory or field blanks.

MW-5, 5A, 6, 6A, 7, and 7A are located offsite and upgradient. Wells with an "A" designator are overburden wells.

All concentrations are total metals unless noted

All concentrations are milligrams per liter (mg/L)

Analysis included target analyte list metals, only detected metals shown on table

ROD - Record of Decision

RAO - Remedial Action Objective, valid for overburden wells

* - Secondary contaminant MSC, included for reference

** - Dissolved concentrations

PADEP - Pennsylvania Department of Environmental Protection

MSC - Medium specific concentration

NA - Not Applicable - no RAO required for analyte

Shading indicates concentration above primary MSC, **bold text** indicates concentration exceeds RAO. Note that the MSCs are applicable only to the dissolved fraction, but shading has been added to those concentrations in the total fraction exceeding the MSC for reference.

ND = non-detect NA = Not applicable

MADW = Mifflin Avenue Deep Well

MACW = Mifflin Avenue Cabin Well (previously referred to as the Mifflin Avenue Residential Well)

# APPENDIX D

# VALIDATED LABORATORY ANALYTICAL REPORTS

# QUALITY ASSURANCE SAMPLING

Split samples were collected from SW-8 and SD-8 and were submitted to Microbac Laboratories, Inc. of Harrisburg Pennsylvania for analysis of metals and SVOCs. Results from the split sample analyses are included herein (Appendix D). The samples were collected to qualitatively evaluate the performance of the primary laboratory, ALS.

With regard to surface water, there were several SVOCs and metals reported by ALS that were not reported by Microbac. This may be due to low recovery, as suggested by some surrogate recoveries less than 80% in the Microbac sample batch, as well as a higher quantitation limit. Of those analytes that were detected by both Microbac and ALS, the relative percent difference was less than 50% for all analytes except aluminum (see Table D-1).

Similarly, with regard to wetlands soil (sediment) there were several SVOCs and metals reported by ALS that were not reported by Microbac. This may be attributable to Microbac's to higher quantitation limits. Of those analytes that were detected by both Microbac and ALS, the relative percent difference was less than 50% for all analytes except vanadium (see Table D-2).

# TABLE D-1 QUALITY ASSURANCE SAMPLING
# PRECISION ANALYSIS FOR SURFACE WATER ANALYTICAL RESULTS

| | Sample Name | SW-8 | SW-8 | DUP-2 | SW-8* | RPD |
|---|---|---|---|---|---|---|
| | Parent Sample Name | | | SW-8 | | |
| | Laboratory | Microbac | ALSI | ALSI | ALSI | % |
| | Sample Date | 12/9/2011 | 12/9/2011 | 12/9/2011 | 12/9/2011 | |
| **Metals** | Units | | | | | |
| Aluminum | mg/L | 1.1 | 0.13 J | 0.23 J | 0.18 J | 143.8 |
| Calcium | mg/L | 66 | 56.1 | 56 | 56.05 | 16.3 |
| Iron | mg/L | 4.3 | 3.3 | 3.4 | 3.35 | 24.8 |
| Magnesium | mg/L | 11 | 11.5 | 11.2 | 11.35 | 3.1 |
| Manganese | mg/L | 1.3 | 1.2 | 1.2 | 1.2 | 8.0 |
| Potassium | mg/L | 2.9 | 2.7 | 2.7 | 2.7 | 7.1 |
| Sodium | mg/L | 7.2 | 9 | 6.8 | 7.9 | 9.3 |

Notes:

* = Averaged result for SW-8 and DUP-2

mg/L = milligrams per liter

ALSI = Analytical Laboratory Services, Inc

RPD = Relative percent difference

J = Analyte present. Reported value may not be accurate or precise.

# TABLE D-2 QUALITY ASSURANCE SAMPLING
# PRECISION ANALYSIS FOR SEDIMENT SAMPLING RESULTS

| | | | | |
|---|---|---|---|---|
| | Sample Name | SD-8 | SD-8 | RPD |
| | Parent Sample Name | | | |
| | Laboratory | Microbac | ALSI | % |
| | Sample Date | 12/9/2011 | 12/9/2011 | |
| Analyte | Units | | | |
| **Metals** | | | | |
| Aluminum | mg/kg | 10300 | 17100 | 49.6 |
| Barium | mg/kg | 54.7 | 84 K | 42.2 |
| Calcium | mg/kg | 4710 | 4610 | 2.1 |
| Cobalt | mg/kg | 6.38 | 7.4 | 14.8 |
| Copper | mg/kg | 18.3 | 20.5 | 11.3 |
| Iron | mg/kg | 14800 | 20600 | 32.8 |
| Lead | mg/kg | 34.5 | 44.1 | 24.4 |
| Magnesium | mg/kg | 2040 | 2950 K | 36.5 |
| Manganese | mg/kg | 504 | 720 | 35.3 |
| Nickel | mg/kg | 13 | 17 | 26.7 |
| Sodium | mg/kg | 121 | 117 | 3.4 |
| Vanadium | mg/kg | 17.9 | 31.1 K | 53.9 |
| Zinc | mg/kg | 140 | 157 | 11.4 |

Notes:

ALSI = Analytical Laboratory Services, Inc

RPD = Relative percent difference

mg/kg = milligrams per kilogram

K = Analyte present. Reported value may be biased high. Actual value is expected lower.

# Microbac Laboratories, Inc.

## Central Pennsylvania Division

**Laboratory ID: 1129517**

# Certificate of Analysis

Contact: Brian Shedd

**EA Engineering, Science, and Technology, Inc.**
Brian Shedd
11019 McCormick Road
Hunt Valley, MD 21031

**Project Name: Marsh Run TAL**
Project / PO Number: 6233003
Date Received: December 09, 2011
Time Received: 3:00 pm

**Analytical Testing Parameters**

Client Sample ID: **SW-8**
Lab Sample ID: **1129517-01**

Collection Date: **12/9/2011**
Collection Time: **1:10 pm**
Collected By: BPS

**METALS**

| Parameter | Result | | Units | PQL | Method | Prepared | Analyzed | Analyst |
|---|---|---|---|---|---|---|---|---|
| Aluminum | **1.1** | **QM5** | mg/L | 0.22 | EPA 6010B | 12/13/2011 1715 | 12/14/2011 1408 | JAJ |
| Antimony | <0.0050 | | mg/L | 0.0050 | EPA 6020 | 12/13/2011 1525 | 12/13/2011 1818 | BCK |
| Arsenic | <0.0050 | | mg/L | 0.0050 | EPA 6020 | 12/13/2011 1525 | 12/13/2011 1818 | BCK |
| Barium | <0.11 | | mg/L | 0.11 | EPA 6010B | 12/13/2011 1715 | 12/14/2011 1408 | JAJ |
| Beryllium | <0.060 | | mg/L | 0.060 | EPA 6010B | 12/13/2011 1715 | 12/14/2011 1408 | JAJ |
| Cadmium | <0.060 | | mg/L | 0.060 | EPA 6010B | 12/13/2011 1715 | 12/14/2011 1408 | JAJ |
| Calcium | **66** | **NSC** | mg/L | 0.56 | EPA 6010B | 12/13/2011 1715 | 12/14/2011 1408 | JAJ |
| Chromium | <0.11 | | mg/L | 0.11 | EPA 6010B | 12/13/2011 1715 | 12/14/2011 1408 | JAJ |
| Cobalt | <0.060 | | mg/L | 0.060 | EPA 6010B | 12/13/2011 1715 | 12/14/2011 1408 | JAJ |
| Copper | <0.060 | | mg/L | 0.060 | EPA 6010B | 12/13/2011 1715 | 12/14/2011 1408 | JAJ |
| Iron | **4.3** | | mg/L | 0.22 | EPA 6010B | 12/13/2011 1715 | 12/14/2011 1408 | JAJ |
| Lead | <0.0050 | | mg/L | 0.0050 | EPA 6020 | 12/13/2011 1525 | 12/13/2011 1818 | BCK |
| Magnesium | **11** | | mg/L | 0.56 | EPA 6010B | 12/13/2011 1715 | 12/14/2011 1408 | JAJ |
| Manganese | **1.3** | **NSC** | mg/L | 0.12 | EPA 6010B | 12/13/2011 1715 | 12/14/2011 1414 | JAJ |
| Mercury | <0.00050 | | mg/L | 0.00050 | EPA 7470A | 12/12/2011 1715 | 12/13/2011 1100 | JAJ |
| Nickel | <0.060 | | mg/L | 0.060 | EPA 6010B | 12/13/2011 1715 | 12/14/2011 1408 | JAJ |
| Potassium | **2.9** | | mg/L | 0.56 | EPA 6010B | 12/13/2011 1715 | 12/16/2011 1237 | WWS |
| Selenium | <0.11 | | mg/L | 0.11 | EPA 6010B | 12/13/2011 1715 | 12/14/2011 1408 | JAJ |
| Silver | <0.060 | | mg/L | 0.060 | EPA 6010B | 12/13/2011 1715 | 12/14/2011 1408 | JAJ |
| Sodium | **7.2** | **QM5** | mg/L | 0.56 | EPA 6010B | 12/13/2011 1715 | 12/14/2011 1408 | JAJ |
| Thallium | <0.0050 | | mg/L | 0.0050 | EPA 6020 | 12/13/2011 1525 | 12/13/2011 1818 | BCK |
| Vanadium | <0.060 | | mg/L | 0.060 | EPA 6010B | 12/13/2011 1715 | 12/14/2011 1408 | JAJ |
| Zinc | <0.110 | | mg/L | 0.110 | EPA 6010B | 12/13/2011 1715 | 12/14/2011 1408 | JAJ |

**SEMIVOLATILE ORGANIC COMPOUNDS**

| Parameter | Result | | Units | PQL | Method | Prepared | Analyzed | Analyst |
|---|---|---|---|---|---|---|---|---|
| Acenaphthene | <9.43 | **QR2** | ug/L | 9.43 | EPA 8270C | 12/14/2011 1023 | 12/16/2011 1922 | BEH |
| Acenaphthylene | <0.943 | | ug/L | 0.943 | EPA 8270C | 12/14/2011 1023 | 12/16/2011 1922 | BEH |
| Aniline | <0.943 | | ug/L | 0.943 | EPA 8270C | 12/14/2011 1023 | 12/16/2011 1922 | BEH |
| Anthracene | <0.849 | | ug/L | 0.849 | EPA 8270C | 12/14/2011 1023 | 12/16/2011 1922 | BEH |
| Azobenzene | <0.472 | | ug/L | 0.472 | EPA 8270C | 12/14/2011 1023 | 12/16/2011 1922 | BEH |

# Microbac Laboratories, Inc

## Central Pennsylvania Division

**Laboratory ID: 1129517**

# Certificate of Analysis

**SEMIVOLATILE ORGANIC COMPOUNDS**

| Parameter | Result | | Units | PQL | Method | Prepared | Analyzed | Analyst |
|---|---|---|---|---|---|---|---|---|
| Benzo (a) anthracene | <0.283 | | ug/L | 0.283 | EPA 8270C | 12/14/2011 1023 | 12/16/2011 1922 | BEH |
| Benzo (a) pyrene | <0.189 | | ug/L | 0.189 | EPA 8270C | 12/14/2011 1023 | 12/16/2011 1922 | BEH |
| Benzo (b) fluoranthene | <0.283 | | ug/L | 0.283 | EPA 8270C | 12/14/2011 1023 | 12/16/2011 1922 | BEH |
| Benzo (g,h,i) perylene | <0.255 | | ug/L | 0.255 | EPA 8270C | 12/14/2011 1023 | 12/16/2011 1922 | BEH |
| Benzo (k) fluoranthene | <0.472 | | ug/L | 0.472 | EPA 8270C | 12/14/2011 1023 | 12/16/2011 1922 | BEH |
| Benzyl alcohol | <9.43 | | ug/L | 9.43 | EPA 8270C | 12/14/2011 1023 | 12/16/2011 1922 | BEH |
| Bis(2-chloroethoxy)methane | <0.943 | | ug/L | 0.943 | EPA 8270C | 12/14/2011 1023 | 12/16/2011 1922 | BEH |
| Bis(2-chloroethyl)ether | <0.566 | | ug/L | 0.566 | EPA 8270C | 12/14/2011 1023 | 12/16/2011 1922 | BEH |
| Bis(2-chloroisopropyl)ether | <4.72 | | ug/L | 4.72 | EPA 8270C | 12/14/2011 1023 | 12/16/2011 1922 | BEH |
| Bis(2-ethylhexyl)phthalate | <4.72 | | ug/L | 4.72 | EPA 8270C | 12/14/2011 1023 | 12/16/2011 1922 | BEH |
| 4-Bromophenyl phenyl ether | <0.943 | | ug/L | 0.943 | EPA 8270C | 12/14/2011 1023 | 12/16/2011 1922 | BEH |
| Butyl benzyl phthalate | <4.72 | | ug/L | 4.72 | EPA 8270C | 12/14/2011 1023 | 12/16/2011 1922 | BEH |
| Carbazole | <1.89 | | ug/L | 1.89 | EPA 8270C | 12/14/2011 1023 | 12/16/2011 1922 | BEH |
| 4-Chloro-3-methylphenol | <3.77 | **QR2** | ug/L | 3.77 | EPA 8270C | 12/14/2011 1023 | 12/16/2011 1922 | BEH |
| 4-Chloroaniline | <4.72 | | ug/L | 4.72 | EPA 8270C | 12/14/2011 1023 | 12/16/2011 1922 | BEH |
| 2-Chloronaphthalene | <0.943 | | ug/L | 0.943 | EPA 8270C | 12/14/2011 1023 | 12/16/2011 1922 | BEH |
| 2-Chlorophenol | <3.77 | **A-01a** | ug/L | 3.77 | EPA 8270C | 12/14/2011 1023 | 12/16/2011 1922 | BEH |
| 4-Chlorophenyl phenyl ether | <0.943 | | ug/L | 0.943 | EPA 8270C | 12/14/2011 1023 | 12/16/2011 1922 | BEH |
| Chrysene | <0.849 | | ug/L | 0.849 | EPA 8270C | 12/14/2011 1023 | 12/16/2011 1922 | BEH |
| Dibenz (a,h) anthracene | <0.472 | | ug/L | 0.472 | EPA 8270C | 12/14/2011 1023 | 12/16/2011 1922 | BEH |
| Dibenzofuran | <4.72 | | ug/L | 4.72 | EPA 8270C | 12/14/2011 1023 | 12/16/2011 1922 | BEH |
| 1,2-Dichlorobenzene | <0.943 | | ug/L | 0.943 | EPA 8270C | 12/14/2011 1023 | 12/16/2011 1922 | BEH |
| 1,3-Dichlorobenzene | <0.472 | | ug/L | 0.472 | EPA 8270C | 12/14/2011 1023 | 12/16/2011 1922 | BEH |
| 1,4-Dichlorobenzene | <2.83 | **A-01a** | ug/L | 2.83 | EPA 8270C | 12/14/2011 1023 | 12/16/2011 1922 | BEH |
| 3,3´-Dichlorobenzidine | <1.42 | | ug/L | 1.42 | EPA 8270C | 12/14/2011 1023 | 12/16/2011 1922 | BEH |
| 2,4-Dichlorophenol | <4.72 | | ug/L | 4.72 | EPA 8270C | 12/14/2011 1023 | 12/16/2011 1922 | BEH |
| 2,6-Dichlorophenol | <3.77 | | ug/L | 3.77 | EPA 8270C | 12/14/2011 1023 | 12/16/2011 1922 | BEH |
| Diethyl phthalate | <4.72 | | ug/L | 4.72 | EPA 8270C | 12/14/2011 1023 | 12/16/2011 1922 | BEH |
| Dimethyl phthalate | <1.89 | | ug/L | 1.89 | EPA 8270C | 12/14/2011 1023 | 12/16/2011 1922 | BEH |
| 2,4-Dimethylphenol | <4.72 | | ug/L | 4.72 | EPA 8270C | 12/14/2011 1023 | 12/16/2011 1922 | BEH |
| Di-n-butyl phthalate | <9.43 | | ug/L | 9.43 | EPA 8270C | 12/14/2011 1023 | 12/16/2011 1922 | BEH |
| 2,4-Dinitrophenol | <9.43 | | ug/L | 9.43 | EPA 8270C | 12/14/2011 1023 | 12/16/2011 1922 | BEH |
| 2,4-Dinitrotoluene | <1.42 | | ug/L | 1.42 | EPA 8270C | 12/14/2011 1023 | 12/16/2011 1922 | BEH |
| 2,6-Dinitrotoluene | <0.943 | | ug/L | 0.943 | EPA 8270C | 12/14/2011 1023 | 12/16/2011 1922 | BEH |
| Di-n-octyl phthalate | <4.72 | | ug/L | 4.72 | EPA 8270C | 12/14/2011 1023 | 12/16/2011 1922 | BEH |
| Diphenylamine | <1.89 | | ug/L | 1.89 | EPA 8270C | 12/14/2011 1023 | 12/16/2011 1922 | BEH |
| Fluoranthene | <0.849 | | ug/L | 0.849 | EPA 8270C | 12/14/2011 1023 | 12/16/2011 1922 | BEH |
| Fluorene | <0.849 | | ug/L | 0.849 | EPA 8270C | 12/14/2011 1023 | 12/16/2011 1922 | BEH |
| Hexachlorobenzene | <0.472 | | ug/L | 0.472 | EPA 8270C | 12/14/2011 1023 | 12/16/2011 1922 | BEH |
| Hexachlorobutadiene | <0.755 | | ug/L | 0.755 | EPA 8270C | 12/14/2011 1023 | 12/16/2011 1922 | BEH |
| Hexachlorocyclopentadiene | <4.72 | | ug/L | 4.72 | EPA 8270C | 12/14/2011 1023 | 12/16/2011 1922 | BEH |
| Hexachloroethane | <0.943 | | ug/L | 0.943 | EPA 8270C | 12/14/2011 1023 | 12/16/2011 1922 | BEH |

# Microbac Laboratories, Inc

## Central Pennsylvania Division

**Laboratory ID: 1129517**

# Certificate of Analysis

**SEMIVOLATILE ORGANIC COMPOUNDS**

| Parameter | Result | | Units | PQL | Method | Prepared | Analyzed | Analyst |
|---|---|---|---|---|---|---|---|---|
| Hexachloropropene | <0.943 | | ug/L | 0.943 | EPA 8270C | 12/14/2011 1023 | 12/16/2011 1922 | BEH |
| Indeno (1,2,3-cd) pyrene | <0.236 | | ug/L | 0.236 | EPA 8270C | 12/14/2011 1023 | 12/16/2011 1922 | BEH |
| Isophorone | <0.943 | | ug/L | 0.943 | EPA 8270C | 12/14/2011 1023 | 12/16/2011 1922 | BEH |
| 2-Methyl-4,6-dinitrophenol | <4.72 | | ug/L | 4.72 | EPA 8270C | 12/14/2011 1023 | 12/16/2011 1922 | BEH |
| 1-Methylnaphthalene | <0.943 | | ug/L | 0.943 | EPA 8270C | 12/14/2011 1023 | 12/16/2011 1922 | BEH |
| 2-Methylnaphthalene | <0.943 | | ug/L | 0.943 | EPA 8270C | 12/14/2011 1023 | 12/16/2011 1922 | BEH |
| 2-Methylphenol | <1.89 | | ug/L | 1.89 | EPA 8270C | 12/14/2011 1023 | 12/16/2011 1922 | BEH |
| 3&4- Methyl Phenol | <3.77 | | ug/L | 3.77 | EPA 8270C | 12/14/2011 1023 | 12/16/2011 1922 | BEH |
| Naphthalene | <0.849 | | ug/L | 0.849 | EPA 8270C | 12/14/2011 1023 | 12/16/2011 1922 | BEH |
| 2-Nitroaniline | <1.42 | | ug/L | 1.42 | EPA 8270C | 12/14/2011 1023 | 12/16/2011 1922 | BEH |
| 3-Nitroaniline | <1.42 | | ug/L | 1.42 | EPA 8270C | 12/14/2011 1023 | 12/16/2011 1922 | BEH |
| 4-Nitroaniline | <1.42 | | ug/L | 1.42 | EPA 8270C | 12/14/2011 1023 | 12/16/2011 1922 | BEH |
| Nitrobenzene | <1.89 | | ug/L | 1.89 | EPA 8270C | 12/14/2011 1023 | 12/16/2011 1922 | BEH |
| 2-Nitrophenol | <4.72 | | ug/L | 4.72 | EPA 8270C | 12/14/2011 1023 | 12/16/2011 1922 | BEH |
| 4-Nitrophenol | <4.72 | | ug/L | 4.72 | EPA 8270C | 12/14/2011 1023 | 12/16/2011 1922 | BEH |
| N-Nitrosodimethylamine | <1.89 | | ug/L | 1.89 | EPA 8270C | 12/14/2011 1023 | 12/16/2011 1922 | BEH |
| N-Nitrosodi-n-propylamine | <1.18 | **QR2** | ug/L | 1.18 | EPA 8270C | 12/14/2011 1023 | 12/16/2011 1922 | BEH |
| N-Nitrosodiphenylamine | <1.89 | | ug/L | 1.89 | EPA 8270C | 12/14/2011 1023 | 12/16/2011 1922 | BEH |
| Pentachlorophenol | <1.18 | | ug/L | 1.18 | EPA 8270C | 12/14/2011 1023 | 12/16/2011 1922 | BEH |
| Phenanthrene | <0.849 | | ug/L | 0.849 | EPA 8270C | 12/14/2011 1023 | 12/16/2011 1922 | BEH |
| Phenol | <9.43 | **A-01a** | ug/L | 9.43 | EPA 8270C | 12/14/2011 1023 | 12/16/2011 1922 | BEH |
| Pyrene | <0.849 | | ug/L | 0.849 | EPA 8270C | 12/14/2011 1023 | 12/16/2011 1922 | BEH |
| 1,2,4-Trichlorobenzene | <2.36 | **A-01a** | ug/L | 2.36 | EPA 8270C | 12/14/2011 1023 | 12/16/2011 1922 | BEH |
| 2,4,5-Trichlorophenol | <2.36 | | ug/L | 2.36 | EPA 8270C | 12/14/2011 1023 | 12/16/2011 1922 | BEH |
| 2,4,6-Trichlorophenol | <2.36 | | ug/L | 2.36 | EPA 8270C | 12/14/2011 1023 | 12/16/2011 1922 | BEH |
| *Surr: 2,4,6-Tribromophenol* | 83.0 | | % Rec | 1-132 | EPA 8270C | 12/14/2011 1023 | 12/16/2011 1922 | BEH |
| *Surr: 2-Fluorobiphenyl* | 36.1 | | % Rec | 8-127 | EPA 8270C | 12/14/2011 1023 | 12/16/2011 1922 | BEH |
| *Surr: 2-Fluorophenol* | 1.32 | | % Rec | 1-116 | EPA 8270C | 12/14/2011 1023 | 12/16/2011 1922 | BEH |
| *Surr: Nitrobenzene-d5* | 5.80 | **S-04** | % Rec | 12-141 | EPA 8270C | 12/14/2011 1023 | 12/16/2011 1922 | BEH |
| *Surr: Phenol-d6* | 2.34 | | % Rec | 1-104 | EPA 8270C | 12/14/2011 1023 | 12/16/2011 1922 | BEH |
| *Surr: p-Terphenyl-d14* | 84.6 | | % Rec | 8-103 | EPA 8270C | 12/14/2011 1023 | 12/16/2011 1922 | BEH |

**Analytical Testing Parameters**

Client Sample ID: **SD-8**
Lab Sample ID: **1129517-02**

Collection Date: **12/9/2011**
Collection Time: **1:20 pm**
Collected By: BPS

**METALS**

| Parameter | Result | Units | PQL | Method | Prepared | Analyzed | Analyst |
|---|---|---|---|---|---|---|---|
| Aluminum | **10300** | mg/kg dry | 497 | EPA 6010B | 12/13/2011 1715 | 12/15/2011 1207 | JAJ |
| Antimony | <24.9 | mg/kg dry | 24.9 | EPA 6010B | 12/13/2011 1715 | 12/15/2011 1200 | JAJ |
| Arsenic | <12.4 | mg/kg dry | 12.4 | EPA 6010B | 12/13/2011 1715 | 12/15/2011 1200 | JAJ |
| Barium | **54.7** | mg/kg dry | 12.4 | EPA 6010B | 12/13/2011 1715 | 12/15/2011 1200 | JAJ |

# Microbac Laboratories, Inc

## Central Pennsylvania Division

**Laboratory ID: 1129517**

# Certificate of Analysis

**METALS**

| Parameter | Result | Units | PQL | Method | Prepared | Analyzed | Analyst |
|---|---|---|---|---|---|---|---|
| Beryllium | <2.49 | mg/kg dry | 2.49 | EPA 6010B | 12/13/2011 1715 | 12/15/2011 1200 | JAJ |
| Cadmium | <2.49 | mg/kg dry | 2.49 | EPA 6010B | 12/13/2011 1715 | 12/15/2011 1200 | JAJ |
| Calcium | **4710** | mg/kg dry | 62.1 | EPA 6010B | 12/13/2011 1715 | 12/15/2011 1200 | JAJ |
| Chromium | <12.4 | mg/kg dry | 12.4 | EPA 6010B | 12/13/2011 1715 | 12/15/2011 1200 | JAJ |
| Cobalt | **6.38** | mg/kg dry | 6.21 | EPA 6010B | 12/13/2011 1715 | 12/15/2011 1200 | JAJ |
| Copper | **18.3** | mg/kg dry | 12.4 | EPA 6010B | 12/13/2011 1715 | 12/15/2011 1200 | JAJ |
| Iron | **14800** | mg/kg dry | 497 | EPA 6010B | 12/13/2011 1715 | 12/15/2011 1207 | JAJ |
| Lead | **34.5** | mg/kg dry | 12.4 | EPA 6010B | 12/13/2011 1715 | 12/15/2011 1200 | JAJ |
| Magnesium | **2040** | mg/kg dry | 62.1 | EPA 6010B | 12/13/2011 1715 | 12/15/2011 1200 | JAJ |
| Manganese | **504** | mg/kg dry | 124 | EPA 6010B | 12/13/2011 1715 | 12/15/2011 1207 | JAJ |
| Mercury | <0.0599 | mg/kg dry | 0.0599 | EPA 7471A | 12/20/2011 1400 | 12/20/2011 2006 | BCK |
| Nickel | **13.0** | mg/kg dry | 6.21 | EPA 6010B | 12/13/2011 1715 | 12/15/2011 1200 | JAJ |
| Potassium | <1240 | mg/kg dry | 1240 | EPA 6010B | 12/13/2011 1715 | 12/15/2011 1207 | JAJ |
| Selenium | <12.4 | mg/kg dry | 12.4 | EPA 6010B | 12/13/2011 1715 | 12/15/2011 1200 | JAJ |
| Silver | <6.21 | mg/kg dry | 6.21 | EPA 6010B | 12/13/2011 1715 | 12/15/2011 1200 | JAJ |
| Sodium | **121** | mg/kg dry | 62.1 | EPA 6010B | 12/13/2011 1715 | 12/15/2011 1200 | JAJ |
| Thallium | <12.4 | mg/kg dry | 12.4 | EPA 6010B | 12/13/2011 1715 | 12/15/2011 1200 | JAJ |
| Vanadium | **17.9** | mg/kg dry | 6.21 | EPA 6010B | 12/13/2011 1715 | 12/15/2011 1200 | JAJ |
| Zinc | **140** | mg/kg dry | 12.4 | EPA 6010B | 12/13/2011 1715 | 12/15/2011 1200 | JAJ |

**SEMIVOLATILE ORGANIC COMPOUNDS**

| Parameter | Result | Units | PQL | Method | Prepared | Analyzed | Analyst |
|---|---|---|---|---|---|---|---|
| Acenaphthene | <0.400 | mg/kg dry | 0.400 | EPA 8270C | 12/15/2011 1000 | 12/16/2011 1659 | BEH |
| Acenaphthylene | <0.400 | mg/kg dry | 0.400 | EPA 8270C | 12/15/2011 1000 | 12/16/2011 1659 | BEH |
| Aniline | <0.800 | mg/kg dry | 0.800 | EPA 8270C | 12/15/2011 1000 | 12/16/2011 1659 | BEH |
| Anthracene | <0.800 | mg/kg dry | 0.800 | EPA 8270C | 12/15/2011 1000 | 12/16/2011 1659 | BEH |
| Azobenzene | <0.200 | mg/kg dry | 0.200 | EPA 8270C | 12/15/2011 1000 | 12/16/2011 1659 | BEH |
| Benzo (a) anthracene | <0.400 | mg/kg dry | 0.400 | EPA 8270C | 12/15/2011 1000 | 12/16/2011 1659 | BEH |
| Benzo (a) pyrene | <0.0664 | mg/kg dry | 0.0664 | EPA 8270C | 12/15/2011 1000 | 12/16/2011 1659 | BEH |
| Benzo (b) fluoranthene | <0.400 | mg/kg dry | 0.400 | EPA 8270C | 12/15/2011 1000 | 12/16/2011 1659 | BEH |
| Benzo (g,h,i) perylene | <0.400 | mg/kg dry | 0.400 | EPA 8270C | 12/15/2011 1000 | 12/16/2011 1659 | BEH |
| Benzo (k) fluoranthene | <0.400 | mg/kg dry | 0.400 | EPA 8270C | 12/15/2011 1000 | 12/16/2011 1659 | BEH |
| Benzyl alcohol | <8.00 | mg/kg dry | 8.00 | EPA 8270C | 12/15/2011 1000 | 12/16/2011 1659 | BEH |
| Bis(2-chloroethoxy)methane | <0.800 | mg/kg dry | 0.800 | EPA 8270C | 12/15/2011 1000 | 12/16/2011 1659 | BEH |
| Bis(2-chloroethyl)ether | <0.800 | mg/kg dry | 0.800 | EPA 8270C | 12/15/2011 1000 | 12/16/2011 1659 | BEH |
| Bis(2-chloroisopropyl)ether | <0.800 | mg/kg dry | 0.800 | EPA 8270C | 12/15/2011 1000 | 12/16/2011 1659 | BEH |
| Bis(2-ethylhexyl)phthalate | <8.00 | mg/kg dry | 8.00 | EPA 8270C | 12/15/2011 1000 | 12/16/2011 1659 | BEH |
| 4-Bromophenyl phenyl ether | <0.800 | mg/kg dry | 0.800 | EPA 8270C | 12/15/2011 1000 | 12/16/2011 1659 | BEH |
| Butyl benzyl phthalate | <8.00 | mg/kg dry | 8.00 | EPA 8270C | 12/15/2011 1000 | 12/16/2011 1659 | BEH |
| Carbazole | <0.800 | mg/kg dry | 0.800 | EPA 8270C | 12/15/2011 1000 | 12/16/2011 1659 | BEH |
| 4-Chloro-3-methylphenol | <1.60 | mg/kg dry | 1.60 | EPA 8270C | 12/15/2011 1000 | 12/16/2011 1659 | BEH |
| 4-Chloroaniline | <0.800 | mg/kg dry | 0.800 | EPA 8270C | 12/15/2011 1000 | 12/16/2011 1659 | BEH |
| 2-Chloronaphthalene | <0.800 | mg/kg dry | 0.800 | EPA 8270C | 12/15/2011 1000 | 12/16/2011 1659 | BEH |

# Microbac Laboratories, Inc

## Central Pennsylvania Division

**Laboratory ID: 1129517**

# Certificate of Analysis

**SEMIVOLATILE ORGANIC COMPOUNDS**

| Parameter | Result | Units | PQL | Method | Prepared | Analyzed | Analyst |
|---|---|---|---|---|---|---|---|
| 2-Chlorophenol | <1.60 | mg/kg dry | 1.60 | EPA 8270C | 12/15/2011 1000 | 12/16/2011 1659 | BEH |
| 4-Chlorophenyl phenyl ether | <0.800 | mg/kg dry | 0.800 | EPA 8270C | 12/15/2011 1000 | 12/16/2011 1659 | BEH |
| Chrysene | <0.400 | mg/kg dry | 0.400 | EPA 8270C | 12/15/2011 1000 | 12/16/2011 1659 | BEH |
| Dibenz (a,h) anthracene | <0.320 | mg/kg dry | 0.320 | EPA 8270C | 12/15/2011 1000 | 12/16/2011 1659 | BEH |
| Dibenzofuran | <0.800 | mg/kg dry | 0.800 | EPA 8270C | 12/15/2011 1000 | 12/16/2011 1659 | BEH |
| 1,2-Dichlorobenzene | <0.800 | mg/kg dry | 0.800 | EPA 8270C | 12/15/2011 1000 | 12/16/2011 1659 | BEH |
| 1,3-Dichlorobenzene | <0.800 | mg/kg dry | 0.800 | EPA 8270C | 12/15/2011 1000 | 12/16/2011 1659 | BEH |
| 1,4-Dichlorobenzene | <0.800 | mg/kg dry | 0.800 | EPA 8270C | 12/15/2011 1000 | 12/16/2011 1659 | BEH |
| 3,3´-Dichlorobenzidine | <1.60 | mg/kg dry | 1.60 | EPA 8270C | 12/15/2011 1000 | 12/16/2011 1659 | BEH |
| 2,4-Dichlorophenol | <1.60 | mg/kg dry | 1.60 | EPA 8270C | 12/15/2011 1000 | 12/16/2011 1659 | BEH |
| 2,6-Dichlorophenol | <1.60 | mg/kg dry | 1.60 | EPA 8270C | 12/15/2011 1000 | 12/16/2011 1659 | BEH |
| Diethyl phthalate | <8.00 | mg/kg dry | 8.00 | EPA 8270C | 12/15/2011 1000 | 12/16/2011 1659 | BEH |
| Dimethyl phthalate | <0.800 | mg/kg dry | 0.800 | EPA 8270C | 12/15/2011 1000 | 12/16/2011 1659 | BEH |
| 2,4-Dimethylphenol | <3.20 | mg/kg dry | 3.20 | EPA 8270C | 12/15/2011 1000 | 12/16/2011 1659 | BEH |
| Di-n-butyl phthalate | <8.00 | mg/kg dry | 8.00 | EPA 8270C | 12/15/2011 1000 | 12/16/2011 1659 | BEH |
| 2,4-Dinitrophenol | <4.00 | mg/kg dry | 4.00 | EPA 8270C | 12/15/2011 1000 | 12/16/2011 1659 | BEH |
| 2,4-Dinitrotoluene | <0.200 | mg/kg dry | 0.200 | EPA 8270C | 12/15/2011 1000 | 12/16/2011 1659 | BEH |
| 2,6-Dinitrotoluene | <0.800 | mg/kg dry | 0.800 | EPA 8270C | 12/15/2011 1000 | 12/16/2011 1659 | BEH |
| Di-n-octyl phthalate | <8.00 | mg/kg dry | 8.00 | EPA 8270C | 12/15/2011 1000 | 12/16/2011 1659 | BEH |
| Diphenylamine | <0.800 | mg/kg dry | 0.800 | EPA 8270C | 12/15/2011 1000 | 12/16/2011 1659 | BEH |
| Fluoranthene | <0.400 | mg/kg dry | 0.400 | EPA 8270C | 12/15/2011 1000 | 12/16/2011 1659 | BEH |
| Fluorene | <0.400 | mg/kg dry | 0.400 | EPA 8270C | 12/15/2011 1000 | 12/16/2011 1659 | BEH |
| Hexachlorobenzene | <0.800 | mg/kg dry | 0.800 | EPA 8270C | 12/15/2011 1000 | 12/16/2011 1659 | BEH |
| Hexachlorobutadiene | <0.800 | mg/kg dry | 0.800 | EPA 8270C | 12/15/2011 1000 | 12/16/2011 1659 | BEH |
| Hexachlorocyclopentadiene | <0.800 | mg/kg dry | 0.800 | EPA 8270C | 12/15/2011 1000 | 12/16/2011 1659 | BEH |
| Hexachloroethane | <0.400 | mg/kg dry | 0.400 | EPA 8270C | 12/15/2011 1000 | 12/16/2011 1659 | BEH |
| Hexachloropropene | <0.800 | mg/kg dry | 0.800 | EPA 8270C | 12/15/2011 1000 | 12/16/2011 1659 | BEH |
| Indeno (1,2,3-cd) pyrene | <0.400 | mg/kg dry | 0.400 | EPA 8270C | 12/15/2011 1000 | 12/16/2011 1659 | BEH |
| Isophorone | <0.800 | mg/kg dry | 0.800 | EPA 8270C | 12/15/2011 1000 | 12/16/2011 1659 | BEH |
| 2-Methyl-4,6-dinitrophenol | <1.60 | mg/kg dry | 1.60 | EPA 8270C | 12/15/2011 1000 | 12/16/2011 1659 | BEH |
| 1-Methylnaphthalene | <0.800 | mg/kg dry | 0.800 | EPA 8270C | 12/15/2011 1000 | 12/16/2011 1659 | BEH |
| 2-Methylnaphthalene | <0.800 | mg/kg dry | 0.800 | EPA 8270C | 12/15/2011 1000 | 12/16/2011 1659 | BEH |
| 2-Methylphenol | <4.00 | mg/kg dry | 4.00 | EPA 8270C | 12/15/2011 1000 | 12/16/2011 1659 | BEH |
| 3&4- Methyl Phenol | <4.00 | mg/kg dry | 4.00 | EPA 8270C | 12/15/2011 1000 | 12/16/2011 1659 | BEH |
| Naphthalene | <0.400 | mg/kg dry | 0.400 | EPA 8270C | 12/15/2011 1000 | 12/16/2011 1659 | BEH |
| 2-Nitroaniline | <0.800 | mg/kg dry | 0.800 | EPA 8270C | 12/15/2011 1000 | 12/16/2011 1659 | BEH |
| 3-Nitroaniline | <0.800 | mg/kg dry | 0.800 | EPA 8270C | 12/15/2011 1000 | 12/16/2011 1659 | BEH |
| 4-Nitroaniline | <0.800 | mg/kg dry | 0.800 | EPA 8270C | 12/15/2011 1000 | 12/16/2011 1659 | BEH |
| Nitrobenzene | <0.400 | mg/kg dry | 0.400 | EPA 8270C | 12/15/2011 1000 | 12/16/2011 1659 | BEH |
| 2-Nitrophenol | <1.60 | mg/kg dry | 1.60 | EPA 8270C | 12/15/2011 1000 | 12/16/2011 1659 | BEH |
| 4-Nitrophenol | <1.60 | mg/kg dry | 1.60 | EPA 8270C | 12/15/2011 1000 | 12/16/2011 1659 | BEH |
| N-Nitrosodimethylamine | <0.800 | mg/kg dry | 0.800 | EPA 8270C | 12/15/2011 1000 | 12/16/2011 1659 | BEH |

# Microbac Laboratories, Inc

## Central Pennsylvania Division

**Laboratory ID: 1129517**

# Certificate of Analysis

**SEMIVOLATILE ORGANIC COMPOUNDS**

| Parameter | Result | Units | PQL | Method | Prepared | Analyzed | Analyst |
|---|---|---|---|---|---|---|---|
| N-Nitrosodi-n-propylamine | <0.800 | mg/kg dry | 0.800 | EPA 8270C | 12/15/2011 1000 | 12/16/2011 1659 | BEH |
| N-Nitrosodiphenylamine | <0.800 | mg/kg dry | 0.800 | EPA 8270C | 12/15/2011 1000 | 12/16/2011 1659 | BEH |
| Pentachlorophenol | <1.60 | mg/kg dry | 1.60 | EPA 8270C | 12/15/2011 1000 | 12/16/2011 1659 | BEH |
| Phenanthrene | <0.800 | mg/kg dry | 0.800 | EPA 8270C | 12/15/2011 1000 | 12/16/2011 1659 | BEH |
| Phenol | <0.800 | mg/kg dry | 0.800 | EPA 8270C | 12/15/2011 1000 | 12/16/2011 1659 | BEH |
| Pyrene | <0.800 | mg/kg dry | 0.800 | EPA 8270C | 12/15/2011 1000 | 12/16/2011 1659 | BEH |
| 1,2,4-Trichlorobenzene | <0.800 | mg/kg dry | 0.800 | EPA 8270C | 12/15/2011 1000 | 12/16/2011 1659 | BEH |
| 2,4,5-Trichlorophenol | <1.60 | mg/kg dry | 1.60 | EPA 8270C | 12/15/2011 1000 | 12/16/2011 1659 | BEH |
| 2,4,6-Trichlorophenol | <1.60 | mg/kg dry | 1.60 | EPA 8270C | 12/15/2011 1000 | 12/16/2011 1659 | BEH |
| *Surr: 2,4,6-Tribromophenol* | 63.4 | % Rec | 1-134 | EPA 8270C | 12/15/2011 1000 | 12/16/2011 1659 | BEH |
| *Surr: 2-Fluorobiphenyl* | 46.8 | % Rec | 1-139 | EPA 8270C | 12/15/2011 1000 | 12/16/2011 1659 | BEH |
| *Surr: 2-Fluorophenol* | 50.4 | % Rec | 1-125 | EPA 8270C | 12/15/2011 1000 | 12/16/2011 1659 | BEH |
| *Surr: Nitrobenzene-d5* | 45.0 | % Rec | 1-129 | EPA 8270C | 12/15/2011 1000 | 12/16/2011 1659 | BEH |
| *Surr: Phenol-d6* | 63.5 | % Rec | 1-128 | EPA 8270C | 12/15/2011 1000 | 12/16/2011 1659 | BEH |
| *Surr: p-Terphenyl-d14* | 97.4 | % Rec | 1-132 | EPA 8270C | 12/15/2011 1000 | 12/16/2011 1659 | BEH |

**WET CHEMISTRY**

| Parameter | Result | Units | PQL | Method | Prepared | Analyzed | Analyst |
|---|---|---|---|---|---|---|---|
| % Solids | **61.60** | % by Weight | 0.10 | SM 2540G | 12/12/2011 1746 | 12/13/2011 0913 | SMS |

**Definitions:**

- **S-04:** The surrogate recovery for this sample is outside of established control limits due to a sample matrix effect.
- **QR2:** The RPD result exceeded the QC control limits; however, both percent recoveries were acceptable. Sample results for the QC batch were accepted based on percent recoveries and completeness of QC data.
- **QM5:** The spike recovery was outside acceptance limits for the MS and/or MSD due to matrix interference. The LCS and/or LCSD were within acceptance limits showing that the laboratory is in control and the data is acceptable.
- **NSC:** No Spike Calculated. The analyte concentration was greater than 4X the spike level.
- **A-01a:** The recovery of the laboratory control sample duplicate was low; however, the recovery of the laboratory control sample was within limits. As a result, the relative percent difference between them was greater than the recommended 40%.

4359 Linglestown Road
Harrisburg, PA 17112

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Phone: 717-651-9700
Fax: 717-657-0752

# Microbac Laboratories, Inc

## Central Pennsylvania Division

**Laboratory ID: 1129517**

# Certificate of Analysis

**Laboratory Certifications:**

*Below is a list of certifications maintained by Microbac Laboratories, Inc. All data included in this report has been reviewed for and meets all project specific and quality control requirements of the applicable accreditation, unless otherwise noted. A complete list of individual analytes pursuant to each certification below is available upon request.*

- NELAP (PA): 22-00578
- NELAP (NJ): PA019
- Delaware: DE-PA
- Indiana: C-PA09
- Kentucky: 90143
- Massachusetts: M-PA1401
- New York: 11650
- North Carolina: 42708
- Tennessee: TN02865
- Virginia: 00433

**Report Comments:**

The **PQL** is the **Practical Quantitation Limit**, which is defined as the lowest quantitation level of an analyte that can be readily achieved within the specified limits of precision and accuracy of an analytical method during routine laboratory operating conditions. The value may be raised depending on the characteristics or behavior of the target analyte.

All samples were analyzed **"as received"** from the client. Microbac Laboratories, Inc.- Central Pennsylvania Division can only assume that all samples were collected and submitted by the CLIENT following the appropriate protocols set forth by the regulatory requirements. This document shall not be reproduced, except in full, without the written approval of Microbac Laboratories, Inc.- Central Pennsylvania Division. If there are any technical questions pertaining to this laboratory report please contact a Client Services Coordinator or the Laboratory Director at (717) 651-9700.

**Reviewed and Approved By:**

Cherie Gudz

Cherie Gudz

Vice President

**Date Reviewed and Approved:**

12/27/2011

*For any feedback concerning our services, please contact Cherie Gudz, the Division Manager at 717.651.9700. You may also contact both James Nokes, President at president@microbac.com and Sean Hyde, Chief Operating Officer at sean.hyde@microbac.com.*

Please help us in meeting our Go Green initiative by selecting to have reports and invoices submitted via email only. Please contact Cherie.Gudz@microbac.com to set up email reporting and invoicing options.

# Microbac Laboratories, Inc. - Central Pennsylvania Division
## Chain of Custody Form

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NELAP accredited by PADEP. See www.microbac.com or contact laboratory for other accreditations.

ACCREDITED IN ACCORDANCE WITH ilac

PA DEP ID #22-578

| SUBMIT LAB REPORT TO: | | SUBMIT INVOICE TO: | |
|---|---|---|---|
| Company: | PA Engineering | Company: | SAA |
| Contact: | Sandy Staigerwald | Contact: | |
| Address: | 15 Laveton Circle | Address: | |
| City: | Sparks | City: | |
| State: | MD | State: | |
| Zip: | 21152 | Zip: | |
| Phone: | 410-329-5701 | Phone: | |
| Fax: | 410-771-4704 | Fax: | |
| Report Delivery: | ☐ Mail ☐ Fax ☑ Email (enter address below) | Invoice Delivery: | ☐ Mail ☑ Email (enter address below) |
| | sstaigerwald@epest.com | | |

**KEY**

C = HCL, N = HNO3, S = H2SO4, E = EDTA, O = NaOH, M = MeOH, NA= None, X = Other, B = Sodium Bisulfate, A = Ascorbic Acid, T = Sodium ThioSulfate, Z = ZnAcetate/NaOH

P = Plastic, CG = Clear Glass, AG = Amber Glass, X = Other

SS = Solid/Sludge, GW = Groundwater, WW = Wastewater, DW = Drinking Water, SW=Storm/Surface, OL=Oil, A=Air, O=Other

**LABORATORY USE ONLY**

| | | | |
|---|---|---|---|
| Samples received on ice? Temp: 3 °C | Y | N | NA |
| Cooler temp. within acceptable limits? | Y | N | NA |
| Correct bottles/enough volume for analysis? | Y | N | NA |
| Sample bottles in good condition (unbroken)? | Y | N | NA |
| Samples within required holding time? | Y | N | NA |
| Zero headspace samples collected correctly? | Y | N | NA |
| Samples preserved to pH <2 and/or pH >12? | Y | N | NA |

Delivery Method: ☑ Drop Off ☐ Microbac Pickup ☐ Courier:

**CLIENT PROJECT INFORMATION**

Project Name: Marsh Run

Project/PO Number: 67333003

Project Location/State: ☑ PA ☐ Other:

Purpose: ☐ *Regulatory* ☐ *Informational* ☐ *PWSID:*

MICROBAC Field Services Used? ☐ NO ☐ YES *(See Field Log)*

MICROBAC Quote/MSA No:

Data Deliverables/Report Type: ☐ *Level I (Standard)* OR

Additional Fee Deliverables: ☐ *Level II* ☐ *Level III* ☐ *Level IV*

State Monitoring Period: ☐ *Monthly* ☐ *Quarterly* ☐ *Annual*

**Results TAT Requested * :** ☑ **6-10 Day (Standard) OR** ☐ **RUSH* (INDICATE DUE DATE):**

NOTES: *RUSH TATs will include surcharge unless otherwise agreed to in writing and must be pre-arranged to ensure the due date can be met.

**ANALYSIS REQUESTED**

| LAB ID | SAMPLE IDENTIFICATION / LOCATION DESCRIPTION | SAMPLE DATE | SAMPLE TIME | SAMPLED BY | Total # of Containers | Sample Type | Grab 'G' or Composite 'C' | SVOCs 8270 | TAL Metals 6010B | TAL Metals 6020B | BOTTLEWARE: SIZE / TYPE / PRESERVAT |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 01 | SW-8 | 12/9/11 | 1310 | BPS | 2 | SW | G | AG/NA | | P/N | |
| 02 | SD-8 | ↓ | 1320 | ↓ | 2 | SED | G | CG/NA | CG/NA | | |
| 03 | | | | | | | | | | | |
| 04 | | | | | | | | | | | |
| 05 | | | | | | | | | | | |
| 06 | | | | | | | | | | | |
| 07 | | | | | | | | | | | |
| 08 | | | | | | | | | | | |
| 09 | | | | | | | | | | | |
| 10 | | | | | | | | | | | |

1129517

| CUSTODY CHAIN | PRINT NAME | SIGNATURE | DATE | TIME |
|---|---|---|---|---|
| Relinquished by: | Caron Milczak | [signature] | 12/9/11 | 1500 |
| Accepted by: | | | | |
| Relinquished by: | | | | |
| Accepted by: | | | | |
| Relinquished by: | | | | |
| Accepted by: | | | | |
| Relinquished by: | | | | |
| Received at MICROBAC: | Amy Heefer | [signature] | 12/9/11 | 15:00 |

**COMMENTS, NOTES, OR SPECIAL INSTRUCTIONS**

* TAL metals includes all 23 metals: Aluminum, antimony, arsenic, barium, beryllium, cadmium, calcium, chromium, cobalt, copper, iron, lead, magnesium, manganese, mercury, nickel, potassium, selenium, silver, sodium, thallium, vanadium, zinc

By relinquishing this form, I hereby agree to the terms & conditions printed on the reverse side.

WHITE - Original YELLOW - Laboratory Copy PINK - Client Copy

Page ____ of ____

ENVIRONMENTAL
Data Services, Inc.

# DATA VALIDATION SUMMARY REPORT
# MARSH RUN PARK, FAIRVIEW TOWNSHIP, PENNSYLVANIA

Client: EA Engineering, Science & Technology, Inc., Sparks, Maryland
SDG: EMS-010
Laboratory: Analytical Laboratory Services, Middletown, Pennsylvania
Site: Marsh Run Park, Fairview Township, Pennsylvania
Date: August 17, 2011

| EDS ID | Client Sample ID | Laboratory Sample ID | Matrix |
|---|---|---|---|
| 1* | MW-14 | 9908076001 | Water |
| 1MS* | MW-14MS | 9908076001MS | Water |
| 1MSD* | MW-14MSD | 9908076001MSD | Water |
| 2* | MW-12 | 9908076002 | Water |
| 3** | MARW | 9908076003 | Water |
| 3MS† | MARWMS | 9908076003MS | Water |
| 3MSD†† | MARWMSD | 9908076003MSD | Water |
| 4α | MW-3A | 9908076004 | Water |
| 5 | MADW [41-52] | 9908076005 | Water |
| 6* | MADW [121-132] | 9908076006 | Water |
| 7* | MADW [170-181] | 9908076007 | Water |
| 8* | MADW [184-195] | 9908076008 | Water |
| 9α | MW-15 | 9908076009 | Water |
| 10α | MW-1A | 9908076010 | Water |
| 11* | TRIP BLANK | 9908076011 | Water |

* - Analyzed for VOCs only
** - Not analyzed for PAHs
† - Analyzed for Total Metals/Hg and Total Cyanide only
†† - Analyzed for Total Metals only
α - Analyzed for VOCs, Dissolved Metals/Hg, and Weak/Dissociable Cyanide only

A full data validation was performed on the analytical data for ten water samples and one aqueous trip blank sample collected on May 31, 2011 by EA Engineering at the Marsh Run Park site in Fairview Township, Pennsylvania. The samples were analyzed under the Environmental Protection Agency (USEPA) "Test Methods for the Evaluation of Solid Waste, USEPA SW-846, Third Edition, September 1986, with revisions".

Specific method references are as follows:

| *Analysis* | *Method References* |
|---|---|
| VOCs | USEPA SW-846 Method 8260B |
| PAHs by SIM | USEPA SW-846 Method 8270 SIM |
| Total & Dissolved Metals/Hg | USEPA SW-846 Method 6020A |
| Total Cyanide | USEPA SW-846 Method 9012B |
| Weak/Dissociable Cyanide | USEPA Method SM20-4500CNI |

The data have been validated according to the protocols and quality control (QC) requirements of the analytical methods, the USEPA Region III data validation guidelines as follows:

The data have been validated according to the protocols and quality control (QC) requirements of the analytical methods, the USEPA Region III data validation guidelines as follows:

- The USEPA Region III Modifications to the National Functional Guidelines for Organic Data Review," September 1994;
- The USEPA Region III Modifications to the National Functional Guidelines for Evaluating Inorganic Analyses," April 1003;
- and the reviewer's professional judgment.

The following items/criteria were reviewed for this report:

***Organics***

- Holding times and sample preservation
- Surrogate Spike recoveries
- Matrix Spike/Matrix Spike Duplicate (MS/MSD) recoveries
- Laboratory Control Sample/Duplicate (LCS/LCSD) recoveries
- Method blank and field blank contamination
- Gas Chromatography (GC)/Mass Spectroscopy (MS) tuning
- Initial and continuing calibration summaries
- Compound Quantitation
- Internal standard area and retention time summary forms
- Field Duplicate sample precision

***Inorganics***

- Holding times and sample preservation
- Matrix Spike/Matrix Spike Duplicate (MS/MSD) recoveries
- Laboratory Control Sample/Duplicate (LCS/LCSD) recoveries
- Method blank and field blank contamination
- Initial and continuing calibration verifications
- Compound Quantitation
- ICP Serial Dilution
- Field Duplicate sample precision

**Overall Usability Issues:**

There were no rejections of data.

Overall the data is acceptable for the intended purposes as qualified for the deficiencies detailed in this report.

## Volatile Organic Compounds (VOC)

### Holding Times

- All samples were analyzed within 14 days for preserved water samples.

### Surrogate Spike Recoveries

- All samples exhibited acceptable surrogate %R values except the following.

| Sample ID | Surrogate | %R | Qualifier |
|---|---|---|---|
| 1 | S2= Dibromofluoromethane | 84.2% | J/UJ |
| 2 | S2= Dibromofluoromethane | 83.1% | J/UJ |
| 5 | S2= Dibromofluoromethane | 84.0% | J/UJ |
| | S4= Toluene-d8 | 84.0% | J/UJ |
| 6 | S2= Dibromofluoromethane | 82.0% | J/UJ |
| 9 | S2= Dibromofluoromethane | 83.2% | J/UJ |
| 10 | S2= Dibromofluoromethane | 84.0% | J/UJ |
| 11 | S2= Dibromofluoromethane | 84.5% | J/UJ |

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

- The MS/MSD sample exhibited acceptable %R and RPD values.

### Laboratory Control Samples

- The LCS samples exhibited acceptable %R values.

### Method Blank

- The method blanks were free of contamination.

### Field Blank

- Field QC results are summarized below.

| Blank ID | Compound | Conc. ug/L | Action Level ug/L | Qualifier | Affected Samples |
|---|---|---|---|---|---|
| RB-1 (from EMS-014) | None- ND | - | - | - | - |
| TRIP BLANK | None- ND | - | - | - | - |

## GC/MS Tuning

- All criteria were met.

## Initial Calibration

- The initial calibrations exhibited acceptable %RSD and mean RRF values.

## Continuing Calibration

- The continuing calibrations exhibited acceptable %D and RRF values.

## Compound Quantitation

- All criteria were met.

## Internal Standard (IS) Area Performance

- All internal standards met response and retention time (RT) criteria.

## Field Duplicate Sample Precision

- Field duplicate samples were not analyzed.

## Polynuclear Aromatic Hydrocarbons (PAHs) by SIM

### Holding Times

- All samples were extracted within 7 days for water samples and analyzed within 40 days.

### Surrogate Spike Recoveries

- All samples exhibited acceptable surrogate %R values.

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

- A MS/MSD sample was not analyzed.

### Laboratory Control Samples

- The LCS samples exhibited acceptable %R values.

### Method Blank

- The method blanks were free of contamination.

### Field Blank

- Field QC results are summarized below.

| Blank ID | Compound | Conc. ug/L | Action Level ug/L | Qualifier | Affected Samples |
|---|---|---|---|---|---|
| RB-1 (from EMS-014) | None- ND | - | - | - | - |

### GC/MS Tuning

- All criteria were met.

### Initial Calibration

- The initial calibrations exhibited acceptable %RSD and mean RRF values.

## Continuing Calibration

- The continuing calibrations exhibited acceptable %D and RRF values.

## Compound Quantitation

- All criteria were met.

## Internal Standard (IS) Area Performance

- All internal standards met response and retention time (RT) criteria.

## Field Duplicate Sample Precision

- Field duplicate samples were not analyzed.

## Total & Dissolved Metals & Mercury

### Holding Times

- All samples were prepared and analyzed within 28 days for mercury and 180 days for all other metals.

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

- The MS/MSD sample exhibited acceptable %R and RPD values except the following.

| MS/MSD Sample ID | Compound | MS %R/MSD %R/ RPD | Qualifier | Affected Samples |
|---|---|---|---|---|
| 3 (Total) | Arsenic | 125%/134%/OK | K | 3, 5 |
| | Barium | OK/131%/OK | K | 3, 5 |
| | Beryllium | 121%/128%/OK | None | See Method Blank |
| | Iron | OK/122%/OK | K | 3 |
| | Lead | OK/122%/OK | K | 3 |
| | Manganese | OK/126%/OK | K | 3 |
| | Mercury | OK/127%/OK | None | All ND |

### Laboratory Control Samples

- The LCS sample exhibited acceptable recoveries except the following.

| LCS ID | Compound | %R | Qualifier | Affected Samples |
|---|---|---|---|---|
| 848585 | Beryllium | 121% | None | See Method Blank |

### Method Blank

- The method blanks exhibited the following contamination.

| Blank ID | Compound | Conc. mg/L | Action Level mg/L | Qualifier | Affected Samples |
|---|---|---|---|---|---|
| 848584 | Beryllium | 0.0003 | 0.0015 | B | 3, 5 |
| | Chromium | 0.0012 | 0.0060 | B | 3, 5 |
| | Iron | 0.0375 | 0.1875 | B | 5 |

### Field Blank

- Field QC results are summarized below.

| Blank ID | Compound | Conc. mg/L | Action Level mg/L | Qualifier | Affected Samples |
|---|---|---|---|---|---|
| RB-1 (from EMS-014) Dissolved | Iron | 0.021 | 0.105 | None | All > 5X |
| | Manganese | 0.0029 | 0.0145 | None | All ND |

## Initial Calibration Verification

- All initial calibration criteria were met.

## Continuing Calibration Verification

- All continuing calibration criteria were met.

## Compound Quantitation

- All criteria were met.

## ICP Serial Dilution

- ICP serial dilution percent differences (%D) were within acceptance limits except the following.

| ICP Sample ID | Compound | %D | Qualifier | Affected Samples |
|---|---|---|---|---|
| Reference (diss.) | Barium (diss.) | 15% | J | 3-5, 9, 10 |

## Field Duplicate Sample Precision

- Field duplicate samples were not analyzed.

## Total & Weak/Dissociable Cyanide

### Holding Times

- All samples were analyzed within 14 days for cyanide.

### Matrix Spike (MS) Recoveries

- The MS sample exhibited an acceptable %R value.

### Laboratory Control Samples

- The LCS sample exhibited acceptable %R values.

### Method Blank

- The method blanks were free of contamination.

### Initial Calibration

- All %RSD and/or correlation coefficient criteria were met.

### Continuing Calibration

- All %D criteria were met.

### Compound Quantitation

- All criteria were met.

### Field Blank

- Field QC results are summarized below.

| Blank ID | Compound | Conc. mg/L | Action Level mg/L | Qualifier | Affected Samples |
|---|---|---|---|---|---|
| RB-1 (from EMS-014) | None- ND | - | - | - | - |

**Field Duplicate Sample Precision**

- Field duplicate samples were not analyzed.

***Package Summary:***

Please contact the undersigned at (757) 564-0090 if you have any questions or need further information.

Signed: Nancy Weaver Dated: 8/19/11

Nancy Weaver
Senior Chemist

**Data Qualifiers**

| | | |
|---|---|---|
| U | = | Not detected. The associated number indicates approximate sample concentration necessary to be detected. |
| B | = | Not detected substantially above the level reported in laboratory or field blanks. |
| R | = | Unreliable result. Analyte may or may not be present in the sample. Supporting data necessary to confirm result. |
| N | = | Tentative identification. Consider present. Special methods may be needed to confirm its presence or absence in future sampling efforts.. |
| J | = | Analyte present. Reported value may not be accurate or precise. |
| K | = | Analyte present. Reported value may be biased high. Actual value is expected lower. |
| L | = | Analyte present. Reported value may be biased low. Actual value is expected higher. |
| UJ | = | Not detected. Quantitation limit may be inaccurate or imprecise. |
| UL | = | Not detected. Quantitation limit is probably higher. |
| Q | = | No analytical result. |
| NJ | = | Qualitative identification questionable due to poor resolution. Presumptively present at approximate quantity. |

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NELAP Certifications: NJ PA010 , NY 11759 , PA 22-293 DoD ELAP: A2LA 0818.01
State Certifications: CT PH-0224 , DE ID 11 , GA 914 , MA PA0102 , MD 128 , LA 04162 , VA 421 , WY EPA Region 8 , WV 343

## ANALYTICAL RESULTS

Workorder 9908076 EMS010|DOD USACE MARSH RUN

Lab ID: **9908076001** Date Collected: 5/31/2011 11:55 Matrix: Ground Water
Sample ID: **MW-14** Date Received: 5/31/2011 19:50

| Parameters | Results | Units | Footnote | LOQ | LOD | DL | Method | Prepared | Analyzed | By | Cntr |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **VOLATILE ORGANICS** | | | | | | | | | | | |
| cis-1,2-Dichloroethene | 0.75U UJ | ug/L | | 1.0 | 0.75 | 0.33 | SW846 8260B | | 6/13/11 06:53 | MES | B |
| trans-1,2-Dichloroethene | 0.75U | ug/L | | 1.0 | 0.75 | 0.33 | SW846 8260B | | 6/13/11 06:53 | MES | B |
| Tetrachloroethene | 0.75U | ug/L | | 1.0 | 0.75 | 0.33 | SW846 8260B | | 6/13/11 06:53 | MES | B |
| Trichloroethene | 0.46J J | ug/L | | 1.0 | 0.75 | 0.33 | SW846 8260B | | 6/13/11 06:53 | MES | B |
| Vinyl Chloride | 0.75U UJ | ug/L | | 1.0 | 0.75 | 0.33 | SW846 8260B | | 6/13/11 06:53 | MES | B |
| *Surrogate Recoveries* | *Results* | *Units* | *Footnote* | *Limits* | | | *Method* | *Prepared* | *Analyzed* | *By* | *Cntr* |
| 1,2-Dichloroethane-d4 (S) | 86.3 | % | | 70-120 | | | SW846 8260B | | 6/13/11 06:53 | MES | B |
| 4-Bromofluorobenzene (S) | 85.4 | % | | 75-120 | | | SW846 8260B | | 6/13/11 06:53 | MES | B |
| Dibromofluoromethane (S) | 84.2 | % | | 85-115 | | | SW846 8260B | | 6/13/11 06:53 | MES | B |
| Toluene-d8 (S) | 86.5 | % | | 85-120 | | | SW846 8260B | | 6/13/11 06:53 | MES | B |

***Sample Comments:***

Anna G Milliken
Technical Manager



NW 8/17/11

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State Certifications: CT PH-0224 , DE ID 11 , GA 914 , MA PA0102 , MD 128 , LA 04162 , VA 421 , WY EPA Region 8 , WV 343

## ANALYTICAL RESULTS

2

Workorder 9908076 EMS010|DOD USACE MARSH RUN

Lab ID: **9908076002** Date Collected: 5/31/2011 13:55 Matrix: Ground Water

Sample ID: **MW-12** Date Received: 5/31/2011 19:50

| Parameters | Results | Units | Footnote | LOQ | LOD | DL | Method | Prepared | Analyzed | By | Cntr |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **VOLATILE ORGANICS** | | | | | | | | | | | |
| cis-1,2-Dichloroethene | 2.0 J | ug/L | | 1.0 | 0.75 | 0.33 | SW846 8260B | | 6/13/11 07:27 | MES | B |
| trans-1,2-Dichloroethene | 0.87 J | ug/L | | 1.0 | 0.75 | 0.33 | SW846 8260B | | 6/13/11 07:27 | MES | B |
| Tetrachloroethene | 0.75 UJ | ug/L | | 1.0 | 0.75 | 0.33 | SW846 8260B | | 6/13/11 07:27 | MES | B |
| Trichloroethene | 6.3 J | ug/L | | 1.0 | 0.75 | 0.33 | SW846 8260B | | 6/13/11 07:27 | MES | B |
| Vinyl Chloride | 0.75 UJ | ug/L | | 1.0 | 0.75 | 0.33 | SW846 8260B | | 6/13/11 07:27 | MES | B |
| *Surrogate Recoveries* | *Results* | *Units* | *Footnote* | *Limits* | | | *Method* | *Prepared* | *Analyzed* | *By* | *Cntr* |
| 1,2-Dichloroethane-d4 (S) | 86.8 | % | | 70-120 | | | SW846 8260B | | 6/13/11 07:27 | MES | B |
| 4-Bromofluorobenzene (S) | 81.4 | % | | 75-120 | | | SW846 8260B | | 6/13/11 07:27 | MES | B |
| Dibromofluoromethane (S) | 83.1 | % | Z | 85-115 | | | SW846 8260B | | 6/13/11 07:27 | MES | B |
| Toluene-d8 (S) | 88.1 | % | | 85-120 | | | SW846 8260B | | 6/13/11 07:27 | MES | B |

***Sample Comments:***

Anna G Milliken
Technical Manager

ALS Environmental | Analytical Laboratory Services, Inc.
Now part of the ALS Group

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NELAP Certifications: NJ PA010 , NY 11759 , PA 22-293 DoD ELAP: A2LA 0818.01
State Certifications: CT PH-0224 , DE ID 11 , GA 914 , MA PA0102 , MD 128 , LA 04162 , VA 421 , WY EPA Region 8 , WV 343

## ANALYTICAL RESULTS

3

Workorder 9908076 EMS010|DOD USACE MARSH RUN

Lab ID: **9908076003** Date Collected: 5/31/2011 14:30 Matrix: Ground Water
Sample ID: **MARW** Date Received: 5/31/2011 19:50

| Parameters | Results | Units | Footnote | LOQ | LOD | DL | Method | Prepared | Analyzed | By | Cntr |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **VOLATILE ORGANICS** | | | | | | | | | | | |
| cis-1,2-Dichloroethene | 0.75U | ug/L | | 1.0 | 0.75 | 0.33 | SW846 8260B | | 6/13/11 11:25 | MES | B |
| trans-1,2-Dichloroethene | 0.75U | ug/L | | 1.0 | 0.75 | 0.33 | SW846 8260B | | 6/13/11 11:25 | MES | B |
| Tetrachloroethene | 0.75U | ug/L | | 1.0 | 0.75 | 0.33 | SW846 8260B | | 6/13/11 11:25 | MES | B |
| Trichloroethene | 20.4 | ug/L | | 1.0 | 0.75 | 0.33 | SW846 8260B | | 6/13/11 11:25 | MES | B |
| Vinyl Chloride | 0.75U | ug/L | | 1.0 | 0.75 | 0.33 | SW846 8260B | | 6/13/11 11:25 | MES | B |
| *Surrogate Recoveries* | *Results* | *Units* | *Footnote* | *Limits* | | | *Method* | *Prepared* | *Analyzed* | *By* | *Cntr* |
| 1,2-Dichloroethane-d4 (S) | 87.5 | % | | 70-120 | | | SW846 8260B | | 6/13/11 11:25 | MES | B |
| 4-Bromofluorobenzene (S) | 85.8 | % | | 75-120 | | | SW846 8260B | | 6/13/11 11:25 | MES | B |
| Dibromofluoromethane (S) | 85.8 | % | | 85-115 | | | SW846 8260B | | 6/13/11 11:25 | MES | B |
| Toluene-d8 (S) | 87.5 | % | | 85-120 | | | SW846 8260B | | 6/13/11 11:25 | MES | B |
| **WET CHEMISTRY** | | | | | | | | | | | |
| Cyanide, Total | 0.0010J | mg/L | | 0.0050 | 0.0030 | 0.0010 | SW846 9012B | 6/13/11 | 6/14/11 14:52 | KLR | K |
| Cyanide,Weak/Dissociable(Free) | 0.0050 U | mg/L | | 0.0050 | 0.0050 | 0.0015 | SM20-4500CNI | 6/7/11 | 6/7/11 02:30 | KRK | G1 |
| **METALS** | | | | | | | | | | | |
| Arsenic, Total | 0.0011 K | mg/L | 2 | 0.0030 | 0.0020 | 0.0010 | SW846 6020A | 6/6/11 | 6/15/11 11:49 | AJB | F1 |
| Arsenic, Dissolved | 0.0019J | mg/L | | 0.0030 | 0.0020 | 0.0010 | SW846 6020A | 6/9/11 | 6/17/11 11:40 | AJB | E1 |
| Barium, Total | 0.077 K | mg/L | 4 | 0.0056 | 0.0037 | 0.0019 | SW846 6020A | 6/6/11 | 6/15/11 11:49 | AJB | F1 |
| Barium, Dissolved | 0.072 J | mg/L | | 0.0050 | 0.0033 | 0.0016 | SW846 6020A | 6/9/11 | 6/17/11 11:40 | AJB | E1 |
| Beryllium, Total | 0.00033 J | mg/L | 3 | 0.0010 | 0.00070 | 0.00030 | SW846 6020A | 6/6/11 | 6/15/11 11:49 | AJB | F1 |
| Beryllium, Dissolved | 0.00067 U | mg/L | | 0.0010 | 0.00067 | 0.00030 | SW846 6020A | 6/9/11 | 6/17/11 11:40 | AJB | E1 |
| Cadmium, Total | 0.00070 U | mg/L | 5 | 0.0011 | 0.00070 | 0.00037 | SW846 6020A | 6/6/11 | 6/15/11 11:49 | AJB | F1 |
| Cadmium, Dissolved | 0.00067 U | mg/L | | 0.0010 | 0.00067 | 0.00030 | SW846 6020A | 6/9/11 | 6/17/11 11:40 | AJB | E1 |
| Chromium, Total | 0.0016J | mg/L | | 0.0022 | 0.0015 | 0.00074 | SW846 6020A | 6/6/11 | 6/16/11 09:13 | AJB | F1 |
| Chromium, Dissolved | 0.0057 | mg/L | | 0.0020 | 0.0013 | 0.00066 | SW846 6020A | 6/9/11 | 6/17/11 11:40 | AJB | E1 |
| Copper, Total | 0.088 | mg/L | | 0.0056 | 0.0037 | 0.0019 | SW846 6020A | 6/6/11 | 6/15/11 11:49 | AJB | F1 |
| Copper, Dissolved | 0.0044J | mg/L | | 0.0050 | 0.0033 | 0.0016 | SW846 6020A | 6/9/11 | 6/17/11 11:40 | AJB | E1 |
| Iron, Total | 0.36 K | mg/L | 5 | 0.056 | 0.037 | 0.019 | SW846 6020A | 6/6/11 | 6/15/11 11:49 | AJB | F1 |
| Iron, Dissolved | 0.19 | mg/L | | 0.050 | 0.033 | 0.016 | SW846 6020A | 6/9/11 | 6/17/11 11:40 | AJB | E1 |
| Lead, Total | 0.011 K | mg/L | 5 | 0.0022 | 0.0015 | 0.00074 | SW846 6020A | 6/6/11 | 6/15/11 11:49 | AJB | F1 |
| Lead, Dissolved | 0.0013 U | mg/L | | 0.0020 | 0.0013 | 0.00066 | SW846 6020A | 6/9/11 | 6/17/11 11:40 | AJB | E1 |
| Manganese, Total | 0.043 K | mg/L | 5 | 0.0056 | 0.0037 | 0.0019 | SW846 6020A | 6/6/11 | 6/15/11 11:49 | AJB | F1 |
| Manganese, Dissolved | 0.032 | mg/L | | 0.0050 | 0.0033 | 0.0016 | SW846 6020A | 6/9/11 | 6/17/11 11:40 | AJB | E1 |
| Mercury, Total | 0.00013 U | mg/L | 5 | 0.00022 | 0.00013 | 0.000074 | SW846 6020A | 6/6/11 | 6/15/11 11:49 | AJB | F1 |



MW 8/18/11

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## ANALYTICAL RESULTS

3

Workorder 9908076 EMS010|DOD USACE MARSH RUN

Lab ID: **9908076003** Date Collected: 5/31/2011 14:30 Matrix: Ground Water

Sample ID: **MARW** Date Received: 5/31/2011 19:50

| Parameters | Results | Units | Footnote | LOQ | LOD | DL | Method | Prepared | Analyzed | By | Cntr |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Mercury, Dissolved | 0.00012 J | mg/L | | 0.00020 | 0.00013 | 0.000066 | SW846 6020A | 6/9/11 | 6/20/11 11:01 | AJB | E1 |

***Sample Comments:***

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## ANALYTICAL RESULTS

4

Workorder 9908076 EMS010|DOD USACE MARSH RUN

Lab ID: **9908076004** Date Collected: 5/31/2011 16:55 Matrix: Ground Water

Sample ID: **MW-3A** Date Received: 5/31/2011 19:50

| Parameters | Results | Units | Footnote | LOQ | LOD | DL | Method | Prepared | Analyzed | By | Cntr |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **VOLATILE ORGANICS** | | | | | | | | | | | |
| cis-1,2-Dichloroethene | 0.75U | ug/L | | 1.0 | 0.75 | 0.33 | SW846 8260B | | 6/13/11 08:01 | MES | B |
| trans-1,2-Dichloroethene | 0.75U | ug/L | | 1.0 | 0.75 | 0.33 | SW846 8260B | | 6/13/11 08:01 | MES | B |
| Tetrachloroethene | 0.75U | ug/L | | 1.0 | 0.75 | 0.33 | SW846 8260B | | 6/13/11 08:01 | MES | B |
| Trichloroethene | 0.75U | ug/L | | 1.0 | 0.75 | 0.33 | SW846 8260B | | 6/13/11 08:01 | MES | B |
| Vinyl Chloride | 0.75U | ug/L | | 1.0 | 0.75 | 0.33 | SW846 8260B | | 6/13/11 08:01 | MES | B |
| *Surrogate Recoveries* | *Results* | *Units* | *Footnote* | *Limits* | | | *Method* | *Prepared* | *Analyzed* | *By* | *Cntr* |
| 1,2-Dichloroethane-d4 (S) | 87.7 | % | | 70-120 | | | SW846 8260B | | 6/13/11 08:01 | MES | B |
| 4-Bromofluorobenzene (S) | 84 | % | | 75-120 | | | SW846 8260B | | 6/13/11 08:01 | MES | B |
| Dibromofluoromethane (S) | 86 | % | | 85-115 | | | SW846 8260B | | 6/13/11 08:01 | MES | B |
| Toluene-d8 (S) | 85.6 | % | | 85-120 | | | SW846 8260B | | 6/13/11 08:01 | MES | B |
| **WET CHEMISTRY** | | | | | | | | | | | |
| Cyanide,Weak/Dissociable(Free) | 0.0050 U | mg/L | | 0.0050 | 0.0050 | 0.0015 | SM20-4500CNI | 6/7/11 | 6/7/11 02:30 | KRK | F1 |
| **METALS** | | | | | | | | | | | |
| Arsenic, Dissolved | 0.0020 U | mg/L | | 0.0030 | 0.0020 | 0.0010 | SW846 6020A | 6/9/11 | 6/17/11 13:21 | AJB | E1 |
| Barium, Dissolved | 0.084 J | mg/L | | 0.0050 | 0.0033 | 0.0016 | SW846 6020A | 6/9/11 | 6/20/11 11:07 | AJB | E1 |
| Beryllium, Dissolved | 0.00067 U | mg/L | | 0.0010 | 0.00067 | 0.00030 | SW846 6020A | 6/9/11 | 6/17/11 13:21 | AJB | E1 |
| Cadmium, Dissolved | 0.00030 J | mg/L | | 0.0010 | 0.00067 | 0.00030 | SW846 6020A | 6/9/11 | 6/17/11 13:21 | AJB | E1 |
| Chromium, Dissolved | 0.011 | mg/L | | 0.0020 | 0.0013 | 0.00066 | SW846 6020A | 6/9/11 | 6/17/11 13:21 | AJB | E1 |
| Copper, Dissolved | 0.0018J | mg/L | | 0.0050 | 0.0033 | 0.0016 | SW846 6020A | 6/9/11 | 6/17/11 13:21 | AJB | E1 |
| Iron, Dissolved | 0.26 | mg/L | | 0.050 | 0.033 | 0.016 | SW846 6020A | 6/9/11 | 6/17/11 13:21 | AJB | E1 |
| Lead, Dissolved | 0.0013 U | mg/L | | 0.0020 | 0.0013 | 0.00066 | SW846 6020A | 6/9/11 | 6/17/11 13:21 | AJB | E1 |
| Manganese, Dissolved | 0.0033 U | mg/L | | 0.0050 | 0.0033 | 0.0016 | SW846 6020A | 6/9/11 | 6/17/11 13:21 | AJB | E1 |
| Mercury, Dissolved | 0.00013 U | mg/L | | 0.00020 | 0.00013 | 0.000066 | SW846 6020A | 6/9/11 | 6/20/11 11:07 | AJB | E1 |

***Sample Comments:***

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## ANALYTICAL RESULTS

5

Workorder 9908076 EMS010|DOD USACE MARSH RUN

Lab ID: **9908076005** Date Collected: 5/31/2011 13:05 Matrix: Ground Water

Sample ID: **MADW [41-52]** Date Received: 5/31/2011 19:50

| Parameters | Results | Units | Footnote | LOQ | LOD | DL | Method | Prepared | Analyzed | By | Cntr |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **VOLATILE ORGANICS** | | | | | | | | | | | |
| cis-1,2-Dichloroethene | 0.75U UJ | ug/L | | 1.0 | 0.75 | 0.33 | SW846 8260B | | 6/13/11 08:35 | MES | C |
| trans-1,2-Dichloroethene | 0.75U | ug/L | | 1.0 | 0.75 | 0.33 | SW846 8260B | | 6/13/11 08:35 | MES | C |
| Tetrachloroethene | 0.75U | ug/L | | 1.0 | 0.75 | 0.33 | SW846 8260B | | 6/13/11 08:35 | MES | C |
| Trichloroethene | 2.3 J | ug/L | | 1.0 | 0.75 | 0.33 | SW846 8260B | | 6/13/11 08:35 | MES | C |
| Vinyl Chloride | 0.75U UJ | ug/L | | 1.0 | 0.75 | 0.33 | SW846 8260B | | 6/13/11 08:35 | MES | C |
| *Surrogate Recoveries* | *Results* | *Units* | *Footnote* | *Limits* | | | *Method* | *Prepared* | *Analyzed* | *By* | *Cntr* |
| 1,2-Dichloroethane-d4 (S) | 86.9 | % | | 70-120 | | | SW846 8260B | | 6/13/11 08:35 | MES | C |
| 4-Bromofluorobenzene (S) | 80.8 | % | | 75-120 | | | SW846 8260B | | 6/13/11 08:35 | MES | C |
| Dibromofluoromethane (S) | 84 | % | | 85-115 | | | SW846 8260B | | 6/13/11 08:35 | MES | C |
| Toluene-d8 (S) | 84 | % | | 85-120 | | | SW846 8260B | | 6/13/11 08:35 | MES | C |
| **SEMIVOLATILES** | | | | | | | | | | | |
| Acenaphthene | 0.94U | ug/L | | 1.9 | 0.94 | 0.48 | SW846 8270D | 6/7/11 | 6/8/11 04:12 | CGS | E1 |
| Acenaphthylene | 0.94U | ug/L | | 1.9 | 0.94 | 0.32 | SW846 8270D | 6/7/11 | 6/8/11 04:12 | CGS | E1 |
| Anthracene | 0.94U | ug/L | | 1.9 | 0.94 | 0.42 | SW846 8270D | 6/7/11 | 6/8/11 04:12 | CGS | E1 |
| Benzo(a)anthracene | 0.94U | ug/L | | 1.9 | 0.94 | 0.29 | SW846 8270D | 6/7/11 | 6/8/11 04:12 | CGS | E1 |
| Benzo(a)pyrene | 0.94U | ug/L | | 1.9 | 0.94 | 0.31 | SW846 8270D | 6/7/11 | 6/8/11 04:12 | CGS | E1 |
| Benzo(b)fluoranthene | 0.94U | ug/L | | 1.9 | 0.94 | 0.32 | SW846 8270D | 6/7/11 | 6/8/11 04:12 | CGS | E1 |
| Benzo(g,h,i)perylene | 0.94U | ug/L | | 1.9 | 0.94 | 0.41 | SW846 8270D | 6/7/11 | 6/8/11 04:12 | CGS | E1 |
| Benzo(k)fluoranthene | 0.94U | ug/L | | 1.9 | 0.94 | 0.36 | SW846 8270D | 6/7/11 | 6/8/11 04:12 | CGS | E1 |
| Chrysene | 0.94U | ug/L | | 1.9 | 0.94 | 0.24 | SW846 8270D | 6/7/11 | 6/8/11 04:12 | CGS | E1 |
| Dibenzo(a,h)anthracene | 0.94U | ug/L | | 1.9 | 0.94 | 0.89 | SW846 8270D | 6/7/11 | 6/8/11 04:12 | CGS | E1 |
| Fluoranthene | 0.94U | ug/L | | 1.9 | 0.94 | 0.33 | SW846 8270D | 6/7/11 | 6/8/11 04:12 | CGS | E1 |
| Fluorene | 0.94U | ug/L | | 1.9 | 0.94 | 0.38 | SW846 8270D | 6/7/11 | 6/8/11 04:12 | CGS | E1 |
| Indeno(1,2,3-cd)pyrene | 0.94U | ug/L | | 1.9 | 0.94 | 0.24 | SW846 8270D | 6/7/11 | 6/8/11 04:12 | CGS | E1 |
| Naphthalene | 0.94U | ug/L | | 1.9 | 0.94 | 0.43 | SW846 8270D | 6/7/11 | 6/8/11 04:12 | CGS | E1 |
| Phenanthrene | 0.94U | ug/L | | 1.9 | 0.94 | 0.31 | SW846 8270D | 6/7/11 | 6/8/11 04:12 | CGS | E1 |
| Pyrene | 0.94U | ug/L | | 1.9 | 0.94 | 0.48 | SW846 8270D | 6/7/11 | 6/8/11 04:12 | CGS | E1 |
| *Surrogate Recoveries* | *Results* | *Units* | *Footnote* | *Limits* | | | *Method* | *Prepared* | *Analyzed* | *By* | *Cntr* |
| 2-Fluorobiphenyl (S) | 81 | % | | 50-110 | | | SW846 8270D | 6/7/11 | 6/8/11 04:12 | CGS | E1 |
| Nitrobenzene-d5 (S) | 85.8 | % | | 40-110 | | | SW846 8270D | 6/7/11 | 6/8/11 04:12 | CGS | E1 |
| Terphenyl-d14 (S) | 96.5 | % | | 50-135 | | | SW846 8270D | 6/7/11 | 6/8/11 04:12 | CGS | E1 |
| **SEMIVOLATILE SIM** | | | | | | | | | | | |
| Acenaphthene | 0.038U | ug/L | | 0.047 | 0.038 | 0.014 | 8270 SIM | 6/7/11 | 6/9/11 20:45 | DHF | E2 |
| Acenaphthylene | 0.038U | ug/L | | 0.047 | 0.038 | 0.017 | 8270 SIM | 6/7/11 | 6/9/11 20:45 | DHF | E2 |
| Anthracene | 0.038U | ug/L | | 0.047 | 0.038 | 0.012 | 8270 SIM | 6/7/11 | 6/9/11 20:45 | DHF | E2 |
| Benzo(a)anthracene | 0.038U | ug/L | | 0.047 | 0.038 | 0.020 | 8270 SIM | 6/7/11 | 6/9/11 20:45 | DHF | E2 |
| Benzo(a)pyrene | 0.038U | ug/L | | 0.047 | 0.038 | 0.028 | 8270 SIM | 6/7/11 | 6/9/11 20:45 | DHF | E2 |



NW 8/17/11

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# ANALYTICAL RESULTS

Workorder 9908076 EMS010|DOD USACE MARSH RUN

Lab ID: **9908076005** Date Collected: 5/31/2011 13:05 Matrix: Ground Water

Sample ID: **MADW [41-52]** Date Received: 5/31/2011 19:50

| Parameters | Results | Units | Footnote | LOQ | LOD | DL | Method | Prepared | Analyzed | By | Cntr |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Benzo(b)fluoranthene | 0.038U | ug/L | | 0.047 | 0.038 | 0.023 | 8270 SIM | 6/7/11 | 6/9/11 20:45 | DHF | E2 |
| Benzo(g,h,i)perylene | 0.038U | ug/L | | 0.047 | 0.038 | 0.015 | 8270 SIM | 6/7/11 | 6/9/11 20:45 | DHF | E2 |
| Benzo(k)fluoranthene | 0.038U | ug/L | | 0.047 | 0.038 | 0.021 | 8270 SIM | 6/7/11 | 6/9/11 20:45 | DHF | E2 |
| Chrysene | 0.038U | ug/L | | 0.047 | 0.038 | 0.020 | 8270 SIM | 6/7/11 | 6/9/11 20:45 | DHF | E2 |
| Dibenzo(a,h)anthracene | 0.038U | ug/L | | 0.047 | 0.038 | 0.014 | 8270 SIM | 6/7/11 | 6/9/11 20:45 | DHF | E2 |
| Fluoranthene | 0.038U | ug/L | | 0.047 | 0.038 | 0.020 | 8270 SIM | 6/7/11 | 6/9/11 20:45 | DHF | E2 |
| Fluorene | 0.038U | ug/L | | 0.047 | 0.038 | 0.014 | 8270 SIM | 6/7/11 | 6/9/11 20:45 | DHF | E2 |
| Indeno(1,2,3-cd)pyrene | 0.038U | ug/L | | 0.047 | 0.038 | 0.014 | 8270 SIM | 6/7/11 | 6/9/11 20:45 | DHF | E2 |
| Naphthalene | 0.047U | ug/L | | 0.047 | 0.047 | 0.039 | 8270 SIM | 6/7/11 | 6/9/11 20:45 | DHF | E2 |
| Phenanthrene | 0.038U | ug/L | | 0.047 | 0.038 | 0.026 | 8270 SIM | 6/7/11 | 6/9/11 20:45 | DHF | E2 |
| Pyrene | 0.038U | ug/L | | 0.047 | 0.038 | 0.018 | 8270 SIM | 6/7/11 | 6/9/11 20:45 | DHF | E2 |
| *Surrogate Recoveries* | *Results* | *Units* | *Footnote* | *Limits* | | | *Method* | *Prepared* | *Analyzed* | *By* | *Cntr* |
| 2-Methylnapthalene-d10 (S) | 86.5 | % | | 29-112 | | | 8270 SIM | 6/7/11 | 6/9/11 20:45 | DHF | E2 |
| Fluoranthene-d10 (S) | 95.9 | % | | 45-130 | | | 8270 SIM | 6/7/11 | 6/9/11 20:45 | DHF | E2 |
| **WET CHEMISTRY** | | | | | | | | | | | |
| Cyanide, Total | 0.0030 U | mg/L | | 0.0050 | 0.0030 | 0.0010 | SW846 9012B | 6/13/11 | 6/13/11 15:18 | KLR | O |
| Cyanide,Weak/Dissociable(Free) | 0.0050 U | mg/L | | 0.0050 | 0.0050 | 0.0015 | SM20-4500CNI | 6/7/11 | 6/7/11 02:30 | KRK | I1 |
| **METALS** | | | | | | | | | | | |
| Arsenic, Total | 0.0015 K | mg/L | | 0.0030 | 0.0020 | 0.0010 | SW846 6020A | 6/6/11 | 6/15/11 12:14 | AJB | H1 |
| Arsenic, Dissolved | 0.0026J | mg/L | | 0.0030 | 0.0020 | 0.0010 | SW846 6020A | 6/9/11 | 6/17/11 13:12 | AJB | G1 |
| Barium, Total | 0.14 K | mg/L | | 0.0056 | 0.0037 | 0.0019 | SW846 6020A | 6/6/11 | 6/15/11 12:14 | AJB | H1 |
| Barium, Dissolved | 0.12 J | mg/L | | 0.0050 | 0.0033 | 0.0016 | SW846 6020A | 6/9/11 | 6/20/11 11:09 | AJB | G1 |
| Beryllium, Total | 0.00031 J | mg/L | | 0.0010 | 0.00070 | 0.00030 | SW846 6020A | 6/6/11 | 6/15/11 12:14 | AJB | H1 |
| Beryllium, Dissolved | 0.00067 U | mg/L | | 0.0010 | 0.00067 | 0.00030 | SW846 6020A | 6/9/11 | 6/17/11 13:12 | AJB | G1 |
| Cadmium, Total | 0.00070 U | mg/L | | 0.0011 | 0.00070 | 0.00037 | SW846 6020A | 6/6/11 | 6/15/11 12:14 | AJB | H1 |
| Cadmium, Dissolved | 0.00067 U | mg/L | | 0.0010 | 0.00067 | 0.00030 | SW846 6020A | 6/9/11 | 6/17/11 13:12 | AJB | G1 |
| Chromium, Total | 0.0016J | mg/L | | 0.0022 | 0.0015 | 0.00074 | SW846 6020A | 6/6/11 | 6/16/11 09:28 | AJB | H1 |
| Chromium, Dissolved | 0.0027 | mg/L | | 0.0020 | 0.0013 | 0.00066 | SW846 6020A | 6/9/11 | 6/17/11 13:12 | AJB | G1 |
| Copper, Total | 0.0037 U | mg/L | | 0.0056 | 0.0037 | 0.0019 | SW846 6020A | 6/6/11 | 6/15/11 12:14 | AJB | H1 |
| Copper, Dissolved | 0.0033 U | mg/L | | 0.0050 | 0.0033 | 0.0016 | SW846 6020A | 6/9/11 | 6/17/11 13:12 | AJB | G1 |
| Iron, Total | 0.18 | mg/L | | 0.056 | 0.037 | 0.019 | SW846 6020A | 6/6/11 | 6/15/11 12:14 | AJB | H1 |
| Iron, Dissolved | 0.16 | mg/L | | 0.050 | 0.033 | 0.016 | SW846 6020A | 6/9/11 | 6/17/11 13:12 | AJB | G1 |
| Lead, Total | 0.0015 U | mg/L | | 0.0022 | 0.0015 | 0.00074 | SW846 6020A | 6/6/11 | 6/15/11 12:14 | AJB | H1 |

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## ANALYTICAL RESULTS

5

Workorder 9908076 EMS010|DOD USACE MARSH RUN

Lab ID: **9908076005** Date Collected: 5/31/2011 13:05 Matrix: Ground Water

Sample ID: **MADW [41-52]** Date Received: 5/31/2011 19:50

| Parameters | Results | Units | Footnote | LOQ | LOD | DL | Method | Prepared | Analyzed | By | Cntr |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Lead, Dissolved | 0.0013 U | mg/L | | 0.0020 | 0.0013 | 0.00066 | SW846 6020A | 6/9/11 | 6/17/11 13:12 | AJB | G1 |
| Manganese, Total | 0.0037 U | mg/L | | 0.0056 | 0.0037 | 0.0019 | SW846 6020A | 6/6/11 | 6/15/11 12:14 | AJB | H1 |
| Manganese, Dissolved | 0.0033 U | mg/L | | 0.0050 | 0.0033 | 0.0016 | SW846 6020A | 6/9/11 | 6/17/11 13:12 | AJB | G1 |
| Mercury, Total | 0.00013 U | mg/L | | 0.00022 | 0.00013 | 0.000074 | SW846 6020A | 6/6/11 | 6/15/11 12:14 | AJB | H1 |
| Mercury, Dissolved | 0.00017 J | mg/L | | 0.00020 | 0.00013 | 0.000066 | SW846 6020A | 6/9/11 | 6/20/11 11:09 | AJB | G1 |

***Sample Comments:***

Anna G Milliken
Technical Manager

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## ANALYTICAL RESULTS

6

Workorder 9908076 EMS010|DOD USACE MARSH RUN

Lab ID: **9908076006** Date Collected: 5/31/2011 13:20 Matrix: Ground Water

Sample ID: **MADW [121-132]** Date Received: 5/31/2011 19:50

| Parameters | Results | Units | Footnote | LOQ | LOD | DL | Method | Prepared | Analyzed | By | Cntr |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **VOLATILE ORGANICS** | | | | | | | | | | | |
| cis-1,2-Dichloroethene | 0.59J J | ug/L | | 1.0 | 0.75 | 0.33 | SW846 8260B | | 6/13/11 09:09 | MES | B |
| trans-1,2-Dichloroethene | 0.75U UJ | ug/L | | 1.0 | 0.75 | 0.33 | SW846 8260B | | 6/13/11 09:09 | MES | B |
| Tetrachloroethene | 0.75U ↓ | ug/L | | 1.0 | 0.75 | 0.33 | SW846 8260B | | 6/13/11 09:09 | MES | B |
| Trichloroethene | 18.0 J | ug/L | | 1.0 | 0.75 | 0.33 | SW846 8260B | | 6/13/11 09:09 | MES | B |
| Vinyl Chloride | 0.75U UJ | ug/L | | 1.0 | 0.75 | 0.33 | SW846 8260B | | 6/13/11 09:09 | MES | B |
| *Surrogate Recoveries* | *Results* | *Units* | *Footnote* | *Limits* | | | *Method* | *Prepared* | *Analyzed* | *By* | *Cntr* |
| 1,2-Dichloroethane-d4 (S) | 86 | % | | 70-120 | | | SW846 8260B | | 6/13/11 09:09 | MES | B |
| 4-Bromofluorobenzene (S) | 85.9 | % | | 75-120 | | | SW846 8260B | | 6/13/11 09:09 | MES | B |
| Dibromofluoromethane (S) | 82 | % | | 85-115 | | | SW846 8260B | | 6/13/11 09:09 | MES | B |
| Toluene-d8 (S) | 86.2 | % | | 85-120 | | | SW846 8260B | | 6/13/11 09:09 | MES | B |

***Sample Comments:***

Anna G Milliken
Technical Manager



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## ANALYTICAL RESULTS

7

Workorder 9908076 EMS010|DOD USACE MARSH RUN

Lab ID: **9908076007** Date Collected: 5/31/2011 13:40 Matrix: Ground Water

Sample ID: **MADW [170-181]** Date Received: 5/31/2011 19:50

| Parameters | Results | Units | Footnote | LOQ | LOD | DL | Method | Prepared | Analyzed | By | Cntr |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **VOLATILE ORGANICS** | | | | | | | | | | | |
| cis-1,2-Dichloroethene | 6.7 | ug/L | | 1.0 | 0.75 | 0.33 | SW846 8260B | | 6/13/11 09:43 | MES | B |
| trans-1,2-Dichloroethene | 3.3 | ug/L | | 1.0 | 0.75 | 0.33 | SW846 8260B | | 6/13/11 09:43 | MES | B |
| Tetrachloroethene | 3.0 | ug/L | | 1.0 | 0.75 | 0.33 | SW846 8260B | | 6/13/11 09:43 | MES | B |
| Trichloroethene | 358 | ug/L | | 10.0 | 7.5 | 3.3 | SW846 8260B | | 6/14/11 19:27 | DJB | C |
| Vinyl Chloride | 0.75U | ug/L | | 1.0 | 0.75 | 0.33 | SW846 8260B | | 6/13/11 09:43 | MES | B |
| *Surrogate Recoveries* | *Results* | *Units* | *Footnote* | *Limits* | | | *Method* | *Prepared* | *Analyzed* | *By* | *Cntr* |
| 1,2-Dichloroethane-d4 (S) | 87.4 | % | | 70-120 | | | SW846 8260B | | 6/13/11 09:43 | MES | B |
| 4-Bromofluorobenzene (S) | 86.4 | % | | 75-120 | | | SW846 8260B | | 6/13/11 09:43 | MES | B |
| Dibromofluoromethane (S) | 85.2 | % | | 85-115 | | | SW846 8260B | | 6/13/11 09:43 | MES | B |
| Toluene-d8 (S) | 85.6 | % | | 85-120 | | | SW846 8260B | | 6/13/11 09:43 | MES | B |
| 1,2-Dichloroethane-d4 (S) | 91.1 | % | | 70-120 | | | SW846 8260B | | 6/14/11 19:27 | DJB | C |
| 4-Bromofluorobenzene (S) | 86.6 | % | | 75-120 | | | SW846 8260B | | 6/14/11 19:27 | DJB | C |
| Dibromofluoromethane (S) | 86.2 | % | | 85-115 | | | SW846 8260B | | 6/14/11 19:27 | DJB | C |
| Toluene-d8 (S) | 86.4 | % | | 85-120 | | | SW846 8260B | | 6/14/11 19:27 | DJB | C |

***Sample Comments:***

The GCMS volatiles analysis was performed at a dilution due to the level of target compounds.

Anna G Milliken
Technical Manager



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## ANALYTICAL RESULTS

8

Workorder 9908076 EMS010|DOD USACE MARSH RUN

Lab ID: **9908076008** Date Collected: 5/31/2011 13:40 Matrix: Ground Water

Sample ID: **MADW [184-195]** Date Received: 5/31/2011 19:50

| Parameters | Results | Units | Footnote | LOQ | LOD | DL | Method | Prepared | Analyzed | By | Cntr |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **VOLATILE ORGANICS** | | | | | | | | | | | |
| cis-1,2-Dichloroethene | 13.6 | ug/L | | 1.0 | 0.75 | 0.33 | SW846 8260B | | 6/13/11 10:51 | MES | B |
| trans-1,2-Dichloroethene | 3.0 | ug/L | | 1.0 | 0.75 | 0.33 | SW846 8260B | | 6/13/11 10:51 | MES | B |
| Tetrachloroethene | 1.5 | ug/L | | 1.0 | 0.75 | 0.33 | SW846 8260B | | 6/13/11 10:51 | MES | B |
| Trichloroethene | 245 | ug/L | | 10.0 | 7.5 | 3.3 | SW846 8260B | | 6/14/11 20:01 | DJB | C |
| Vinyl Chloride | 0.75U | ug/L | | 1.0 | 0.75 | 0.33 | SW846 8260B | | 6/13/11 10:51 | MES | B |
| *Surrogate Recoveries* | *Results* | *Units* | *Footnote* | *Limits* | | | *Method* | *Prepared* | *Analyzed* | *By* | *Cntr* |
| 1,2-Dichloroethane-d4 (S) | 87 | % | | 70-120 | | | SW846 8260B | | 6/13/11 10:51 | MES | B |
| 4-Bromofluorobenzene (S) | 84.9 | % | | 75-120 | | | SW846 8260B | | 6/13/11 10:51 | MES | B |
| Dibromofluoromethane (S) | 85.9 | % | | 85-115 | | | SW846 8260B | | 6/13/11 10:51 | MES | B |
| Toluene-d8 (S) | 87.5 | % | | 85-120 | | | SW846 8260B | | 6/13/11 10:51 | MES | B |
| 1,2-Dichloroethane-d4 (S) | 88.1 | % | | 70-120 | | | SW846 8260B | | 6/14/11 20:01 | DJB | C |
| 4-Bromofluorobenzene (S) | 84 | % | | 75-120 | | | SW846 8260B | | 6/14/11 20:01 | DJB | C |
| Dibromofluoromethane (S) | 90 | % | | 85-115 | | | SW846 8260B | | 6/14/11 20:01 | DJB | C |
| Toluene-d8 (S) | 88.8 | % | | 85-120 | | | SW846 8260B | | 6/14/11 20:01 | DJB | C |

***Sample Comments:***

The GCMS volatiles analysis was performed at a dilution due to the level of target compounds.

Anna G Milliken
Technical Manager



KW 8/17/11

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# ANALYTICAL RESULTS

Workorder 9908076 EMS010|DOD USACE MARSH RUN

Lab ID: **9908076009** Date Collected: 5/31/2011 15:15 Matrix: Ground Water

Sample ID: **MW-15** Date Received: 5/31/2011 19:50

| Parameters | Results | Units | Footnote | LOQ | LOD | DL | Method | Prepared | Analyzed | By | Cntr |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **VOLATILE ORGANICS** | | | | | | | | | | | |
| cis-1,2-Dichloroethene | 2.1 J | ug/L | | 1.0 | 0.75 | 0.33 | SW846 8260B | | 6/14/11 18:19 | DJB | C |
| trans-1,2-Dichloroethene | 0.36J J | ug/L | | 1.0 | 0.75 | 0.33 | SW846 8260B | | 6/14/11 18:19 | DJB | C |
| Tetrachloroethene | 0.75U UJ | ug/L | | 1.0 | 0.75 | 0.33 | SW846 8260B | | 6/14/11 18:19 | DJB | C |
| Trichloroethene | 1.4 J | ug/L | | 1.0 | 0.75 | 0.33 | SW846 8260B | | 6/14/11 18:19 | DJB | C |
| Vinyl Chloride | 0.75U UJ | ug/L | | 1.0 | 0.75 | 0.33 | SW846 8260B | | 6/14/11 18:19 | DJB | C |
| *Surrogate Recoveries* | *Results* | *Units* | *Footnote* | *Limits* | | | *Method* | *Prepared* | *Analyzed* | *By* | *Cntr* |
| 1,2-Dichloroethane-d4 (S) | 87.7 | % | | 70-120 | | | SW846 8260B | | 6/14/11 18:19 | DJB | C |
| 4-Bromofluorobenzene (S) | 86.1 | % | | 75-120 | | | SW846 8260B | | 6/14/11 18:19 | DJB | C |
| Dibromofluoromethane (S) | 83.2 | % | | 85-115 | | | SW846 8260B | | 6/14/11 18:19 | DJB | C |
| Toluene-d8 (S) | 86.2 | % | | 85-120 | | | SW846 8260B | | 6/14/11 18:19 | DJB | C |
| **WET CHEMISTRY** | | | | | | | | | | | |
| Cyanide,Weak/Dissociable(Free) | 0.0050 U | mg/L | | 0.0050 | 0.0050 | 0.0015 | SM20-4500CNI | 6/7/11 | 6/7/11 02:30 | KRK | F1 |
| **METALS** | | | | | | | | | | | |
| Arsenic, Dissolved | 0.0029J | mg/L | | 0.0030 | 0.0020 | 0.0010 | SW846 6020A | 6/9/11 | 6/17/11 13:27 | AJB | E1 |
| Barium, Dissolved | 0.30 J | mg/L | | 0.0050 | 0.0033 | 0.0016 | SW846 6020A | 6/9/11 | 6/20/11 11:12 | AJB | E1 |
| Beryllium, Dissolved | 0.00067 U | mg/L | | 0.0010 | 0.00067 | 0.00030 | SW846 6020A | 6/9/11 | 6/17/11 13:27 | AJB | E1 |
| Cadmium, Dissolved | 0.00067 U | mg/L | | 0.0010 | 0.00067 | 0.00030 | SW846 6020A | 6/9/11 | 6/17/11 13:27 | AJB | E1 |
| Chromium, Dissolved | 0.0011J | mg/L | | 0.0020 | 0.0013 | 0.00066 | SW846 6020A | 6/9/11 | 6/17/11 13:27 | AJB | E1 |
| Copper, Dissolved | 0.0033 U | mg/L | | 0.0050 | 0.0033 | 0.0016 | SW846 6020A | 6/9/11 | 6/17/11 13:27 | AJB | E1 |
| Iron, Dissolved | 0.18 | mg/L | | 0.050 | 0.033 | 0.016 | SW846 6020A | 6/9/11 | 6/17/11 13:27 | AJB | E1 |
| Lead, Dissolved | 0.0013 U | mg/L | | 0.0020 | 0.0013 | 0.00066 | SW846 6020A | 6/9/11 | 6/17/11 13:27 | AJB | E1 |
| Manganese, Dissolved | 0.0033 U | mg/L | | 0.0050 | 0.0033 | 0.0016 | SW846 6020A | 6/9/11 | 6/17/11 13:27 | AJB | E1 |
| Mercury, Dissolved | 0.00013 U | mg/L | | 0.00020 | 0.00013 | 0.000066 | SW846 6020A | 6/9/11 | 6/20/11 11:12 | AJB | E1 |

***Sample Comments:***

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## ANALYTICAL RESULTS

Workorder 9908076 EMS010|DOD USACE MARSH RUN

Lab ID: **9908076010** Date Collected: 5/31/2011 18:20 Matrix: Ground Water

Sample ID: **MW-1A** Date Received: 5/31/2011 19:50

| Parameters | Results | Units | Footnote | LOQ | LOD | DL | Method | Prepared | Analyzed | By | Cntr |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **VOLATILE ORGANICS** | | | | | | | | | | | |
| cis-1,2-Dichloroethene | 53.1 J | ug/L | | 1.0 | 0.75 | 0.33 | SW846 8260B | | 6/13/11 21:57 | DJB | B |
| trans-1,2-Dichloroethene | 6.1 J | ug/L | | 1.0 | 0.75 | 0.33 | SW846 8260B | | 6/13/11 21:57 | DJB | B |
| Tetrachloroethene | 0.75 YUJ | ug/L | | 1.0 | 0.75 | 0.33 | SW846 8260B | | 6/13/11 21:57 | DJB | B |
| Trichloroethene | 10.7 J | ug/L | | 1.0 | 0.75 | 0.33 | SW846 8260B | | 6/13/11 21:57 | DJB | B |
| Vinyl Chloride | 0.37 J | ug/L | | 1.0 | 0.75 | 0.33 | SW846 8260B | | 6/13/11 21:57 | DJB | B |
| *Surrogate Recoveries* | *Results* | *Units* | *Footnote* | *Limits* | | | *Method* | *Prepared* | *Analyzed* | *By* | *Cntr* |
| 1,2-Dichloroethane-d4 (S) | 85.6 | % | | 70-120 | | | SW846 8260B | | 6/13/11 21:57 | DJB | B |
| 4-Bromofluorobenzene (S) | 85.1 | % | | 75-120 | | | SW846 8260B | | 6/13/11 21:57 | DJB | B |
| Dibromofluoromethane (S) | 84 | % | 6 | 85-115 | | | SW846 8260B | | 6/13/11 21:57 | DJB | B |
| Toluene-d8 (S) | 85.3 | % | | 85-120 | | | SW846 8260B | | 6/13/11 21:57 | DJB | B |
| **WET CHEMISTRY** | | | | | | | | | | | |
| Cyanide,Weak/Dissociable(Free) | 0.0050 U | mg/L | | 0.0050 | 0.0050 | 0.0015 | SM20-4500CNI | 6/7/11 | 6/7/11 02:30 | KRK | F1 |
| **METALS** | | | | | | | | | | | |
| Arsenic, Dissolved | 0.0020 U | mg/L | | 0.0030 | 0.0020 | 0.0010 | SW846 6020A | 6/9/11 | 6/17/11 13:34 | AJB | E1 |
| Barium, Dissolved | 0.033 J | mg/L | | 0.0050 | 0.0033 | 0.0016 | SW846 6020A | 6/9/11 | 6/20/11 11:24 | AJB | E1 |
| Beryllium, Dissolved | 0.00067 U | mg/L | | 0.0010 | 0.00067 | 0.00030 | SW846 6020A | 6/9/11 | 6/17/11 13:34 | AJB | E1 |
| Cadmium, Dissolved | 0.00067 U | mg/L | | 0.0010 | 0.00067 | 0.00030 | SW846 6020A | 6/9/11 | 6/17/11 13:34 | AJB | E1 |
| Chromium, Dissolved | 0.0014J | mg/L | | 0.0020 | 0.0013 | 0.00066 | SW846 6020A | 6/9/11 | 6/17/11 13:34 | AJB | E1 |
| Copper, Dissolved | 0.0033 U | mg/L | | 0.0050 | 0.0033 | 0.0016 | SW846 6020A | 6/9/11 | 6/17/11 13:34 | AJB | E1 |
| Iron, Dissolved | 0.13 | mg/L | | 0.050 | 0.033 | 0.016 | SW846 6020A | 6/9/11 | 6/17/11 13:34 | AJB | E1 |
| Lead, Dissolved | 0.0013 U | mg/L | | 0.0020 | 0.0013 | 0.00066 | SW846 6020A | 6/9/11 | 6/17/11 13:34 | AJB | E1 |
| Manganese, Dissolved | 0.0088 | mg/L | | 0.0050 | 0.0033 | 0.0016 | SW846 6020A | 6/9/11 | 6/17/11 13:34 | AJB | E1 |
| Mercury, Dissolved | 0.00013 U | mg/L | | 0.00020 | 0.00013 | 0.000066 | SW846 6020A | 6/9/11 | 6/20/11 11:24 | AJB | E1 |

***Sample Comments:***

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## ANALYTICAL RESULTS

11

Workorder 9908076 EMS010|DOD USACE MARSH RUN

Lab ID: **9908076011** Date Collected: 5/31/2011 13:20 Matrix: Ground Water

Sample ID: **Trip Blank** Date Received: 5/31/2011 19:50

| Parameters | Results | Units | Footnote | LOQ | LOD | DL | Method | Prepared | Analyzed | By | Cntr |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **VOLATILE ORGANICS** | | | | | | | | | | | |
| cis-1,2-Dichloroethene | 0.75U UJ | ug/L | | 1.0 | 0.75 | 0.33 | SW846 8260B | | 6/13/11 17:58 | DJB | B |
| trans-1,2-Dichloroethene | 0.75U | ug/L | | 1.0 | 0.75 | 0.33 | SW846 8260B | | 6/13/11 17:58 | DJB | B |
| Tetrachloroethene | 0.75U | ug/L | | 1.0 | 0.75 | 0.33 | SW846 8260B | | 6/13/11 17:58 | DJB | B |
| Trichloroethene | 0.75U | ug/L | | 1.0 | 0.75 | 0.33 | SW846 8260B | | 6/13/11 17:58 | DJB | B |
| Vinyl Chloride | 0.75U | ug/L | | 1.0 | 0.75 | 0.33 | SW846 8260B | | 6/13/11 17:58 | DJB | B |

| *Surrogate Recoveries* | *Results* | *Units* | *Footnote* | *Limits* | *Method* | *Prepared* | *Analyzed* | *By* | *Cntr* |
|---|---|---|---|---|---|---|---|---|---|
| 1,2-Dichloroethane-d4 (S) | 84.1 | % | | 70-120 | SW846 8260B | | 6/13/11 17:58 | DJB | B |
| 4-Bromofluorobenzene (S) | 82.5 | % | | 75-120 | SW846 8260B | | 6/13/11 17:58 | DJB | B |
| Dibromofluoromethane (S) | 84.5 | % | 10 | 85-115 | SW846 8260B | | 6/13/11 17:58 | DJB | B |
| Toluene-d8 (S) | 86.5 | % | | 85-120 | SW846 8260B | | 6/13/11 17:58 | DJB | B |

***Sample Comments:***

Anna G Milliken
Technical Manager

**ENVIRONMENTAL**
Data Services, Inc.

# DATA VALIDATION SUMMARY REPORT
# MARSH RUN PARK, FAIRVIEW TOWNSHIP, PENNSYLVANIA

Client: EA Engineering, Science & Technology, Inc., Sparks, Maryland
SDG: EMS-011
Laboratory: Analytical Laboratory Services, Middletown, Pennsylvania
Site: Marsh Run Park, Fairview Township, Pennsylvania
Date: August 17, 2011

| EDS ID | Client Sample ID | Laboratory Sample ID | Matrix |
|---|---|---|---|
| 1 | MW-8 | 9908211001 | Water |
| 2* | MW-8A | 9908211002 | Water |
| 3 | MW-4 | 9908211003 | Water |
| 4 | MW-4A | 9908211004 | Water |

* - Analyzed for VOCs only

A full data validation was performed on the analytical data for four water samples collected on June 1, 2011 by EA Engineering at the Marsh Run Park site in Fairview Township, Pennsylvania. The samples were analyzed under the Environmental Protection Agency (USEPA) "Test Methods for the Evaluation of Solid Waste, USEPA SW-846, Third Edition, September 1986, with revisions".

Specific method references are as follows:

| *Analysis* | *Method References* |
|---|---|
| VOCs | USEPA SW-846 Method 8260B |
| Dissolved Metals/Hg | USEPA SW-846 Method 6020A |
| Weak/Dissociable Cyanide | USEPA Method SM20-4500CNI |

The data have been validated according to the protocols and quality control (QC) requirements of the analytical methods, the USEPA Region III data validation guidelines as follows:

- The USEPA Region III Modifications to the National Functional Guidelines for Organic Data Review," September 1994;
- The USEPA Region III Modifications to the National Functional Guidelines for Evaluating Inorganic Analyses," April 1003;
- and the reviewer's professional judgment.

The following items/criteria were reviewed for this report:

## *Organics*

- Holding times and sample preservation
- Surrogate Spike recoveries
- Matrix Spike/Matrix Spike Duplicate (MS/MSD) recoveries

- Laboratory Control Sample/Duplicate (LCS/LCSD) recoveries
- Method blank and field blank contamination
- Gas Chromatography (GC)/Mass Spectroscopy (MS) tuning
- Initial and continuing calibration summaries
- Compound Quantitation
- Internal standard area and retention time summary forms
- Field Duplicate sample precision

***Inorganics***

- Holding times and sample preservation
- Matrix Spike/Matrix Spike Duplicate (MS/MSD) recoveries
- Laboratory Control Sample/Duplicate (LCS/LCSD) recoveries
- Method blank and field blank contamination
- Initial and continuing calibration verifications
- Compound Quantitation
- ICP Serial Dilution
- Field Duplicate sample precision

## Overall Usability Issues:

There were no rejections of data.

Overall the data is acceptable for the intended purposes as qualified for the deficiencies detailed in this report.

## Volatile Organic Compounds (VOC)

## Holding Times

- All samples were analyzed within 14 days for preserved water samples.

## Surrogate Spike Recoveries

- All samples exhibited acceptable surrogate %R values except the following.

| Sample ID | Surrogate | %R | Qualifier |
|---|---|---|---|
| 1 | S2= Dibromofluoromethane | 84.6% | J/UJ |
| | S4= Toluene-d8 | 83.6% | J/UJ |
| 3 | S2= Dibromofluoromethane | 83.3% | J/UJ |
| 4 | S2= Dibromofluoromethane | 84.5% | J/UJ |

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

- A MS/MSD sample was not analyzed.

## Laboratory Control Samples

- The LCS samples exhibited acceptable %R values.

## Method Blank

- The method blanks were free of contamination.

## Field Blank

- Field QC results are summarized below.

| Blank ID | Compound | Conc. ug/L | Action Level ug/L | Qualifier | Affected Samples |
|---|---|---|---|---|---|
| RB-2 (from EMS-014) | None- ND | - | - | - | - |

## GC/MS Tuning

- All criteria were met.

## Initial Calibration

- The initial calibrations exhibited acceptable %RSD and mean RRF values.

## Continuing Calibration

- The continuing calibrations exhibited acceptable %D and RRF values.

## Compound Quantitation

- All criteria were met.

## Internal Standard (IS) Area Performance

- All internal standards met response and retention time (RT) criteria.

## Field Duplicate Sample Precision

- Field duplicate samples were not analyzed.

## Dissolved Metals & Mercury

## Holding Times

- All samples were prepared and analyzed within 28 days for mercury and 180 days for all other metals.

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

- A MS/MSD sample was not analyzed.

## Laboratory Control Samples

- The LCS sample exhibited acceptable recoveries.

## Method Blank

- The method blanks were free of contamination.

## Field Blank

- Field QC results are summarized below.

| Blank ID | Compound | Conc. mg/L | Action Level mg/L | Qualifier | Affected Samples |
|---|---|---|---|---|---|
| RB-2 (from EMS-014) Dissolved | Barium | 0.0021 | 0.0105 | None | All > 5X |
| | Copper | 0.0018 | 0.009 | None | All ND |
| | Iron | 0.24 | 1.2 | B | 3 |
| | Manganese | 0.022 | 0.11 | B | 3 |

## Initial Calibration Verification

- All initial calibration criteria were met.

## Continuing Calibration Verification

- All continuing calibration criteria were met.

## Compound Quantitation

- All criteria were met.

## ICP Serial Dilution

- ICP serial dilution percent differences (%D) were within acceptance limits except the following.

| ICP Sample ID | Compound | %D | Qualifier | Affected Samples |
|---|---|---|---|---|
| Reference (diss.) | Barium (diss.) | 15% | J | 1, 3, 4 |

## Field Duplicate Sample Precision

- Field duplicate samples were not analyzed.

## Weak/Dissociable Cyanide

### Holding Times

- All samples were analyzed within 14 days for cyanide.

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

- A MS/MSD sample was not analyzed.

### Laboratory Control Samples

- The LCS sample exhibited acceptable %R values.

### Method Blank

- The method blanks were free of contamination.

### Initial Calibration

- All %RSD and/or correlation coefficient criteria were met.

### Continuing Calibration

- All %D criteria were met.

### Compound Quantitation

- All criteria were met.

### Field Blank

- Field QC results are summarized below.

| Blank ID | Compound | Conc. mg/L | Action Level mg/L | Qualifier | Affected Samples |
|---|---|---|---|---|---|
| RB-2 (from EMS-014) | Cyanide, Weak/Diss. | 0.0020 | 0.010 | None | All ND |

## Field Duplicate Sample Precision

- Field duplicate samples were not analyzed.

***Package Summary:***

Please contact the undersigned at (757) 564-0090 if you have any questions or need further information.

Signed: Nancy Weaver Dated: 8/19/11

Nancy Weaver
Senior Chemist

**Data Qualifiers**

| | | |
|---|---|---|
| U | = | Not detected. The associated number indicates approximate sample concentration necessary to be detected. |
| B | = | Not detected substantially above the level reported in laboratory or field blanks. |
| R | = | Unreliable result. Analyte may or may not be present in the sample. Supporting data necessary to confirm result. |
| N | = | Tentative identification. Consider present. Special methods may be needed to confirm its presence or absence in future sampling efforts.. |
| J | = | Analyte present. Reported value may not be accurate or precise. |
| K | = | Analyte present. Reported value may be biased high. Actual value is expected lower. |
| L | = | Analyte present. Reported value may be biased low. Actual value is expected higher. |
| UJ | = | Not detected. Quantitation limit may be inaccurate or imprecise. |
| UL | = | Not detected. Quantitation limit is probably higher. |
| Q | = | No analytical result. |
| NJ | = | Qualitative identification questionable due to poor resolution. Presumptively present at approximate quantity. |

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# ANALYTICAL RESULTS

Workorder 9908211 EMS011|2011DOD USACE MARSH RUN

Lab ID: **9908211001** Date Collected: 6/1/2011 12:30 Matrix: Ground Water

Sample ID: **MW-8** Date Received: 6/1/2011 19:46

| Parameters | Results | Units | Footnote | LOQ | LOD | DL | Method | Prepared | Analyzed | By | Cntr |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **VOLATILE ORGANICS** | | | | | | | | | | | |
| cis-1,2-Dichloroethene | 197 J | ug/L | | 5.0 | 3.8 | 1.7 | SW846 8260B | | 6/15/11 01:06 | DJB | C |
| trans-1,2-Dichloroethene | 40.0 J | ug/L | | 1.0 | 0.75 | 0.33 | SW846 8260B | | 6/15/11 01:40 | DJB | C |
| Tetrachloroethene | 0.93 J | ug/L | | 1.0 | 0.75 | 0.33 | SW846 8260B | | 6/15/11 01:40 | DJB | C |
| Trichloroethene | 199 | ug/L | | 1.0 | 0.75 | 0.33 | SW846 8260B | | 6/15/11 01:40 | DJB | C |
| Vinyl Chloride | 0.75 | ug/L | | 1.0 | 0.75 | 0.33 | SW846 8260B | | 6/15/11 01:40 | DJB | C |
| *Surrogate Recoveries* | *Results* | *Units* | *Footnote* | *Limits* | | | *Method* | *Prepared* | *Analyzed* | *By* | *Cntr* |
| 1,2-Dichloroethane-d4 (S) | 88.6 | % | | 70-120 | | | SW846 8260B | | 6/15/11 01:06 | DJB | C |
| 4-Bromofluorobenzene (S) | 85.3 | % | | 75-120 | | | SW846 8260B | | 6/15/11 01:06 | DJB | C |
| Dibromofluoromethane (S) | 84.6 | % | | 85-115 | | | SW846 8260B | | 6/15/11 01:06 | DJB | C |
| Toluene-d8 (S) | 83.6 | % | | 85-120 | | | SW846 8260B | | 6/15/11 01:06 | DJB | C |
| 1,2-Dichloroethane-d4 (S) | 88.8 | % | | 70-120 | | | SW846 8260B | | 6/15/11 01:40 | DJB | C |
| 4-Bromofluorobenzene (S) | 84.9 | % | | 75-120 | | | SW846 8260B | | 6/15/11 01:40 | DJB | C |
| Dibromofluoromethane (S) | 88 | % | | 85-115 | | | SW846 8260B | | 6/15/11 01:40 | DJB | C |
| Toluene-d8 (S) | 85.8 | % | | 85-120 | | | SW846 8260B | | 6/15/11 01:40 | DJB | C |
| **WET CHEMISTRY** | | | | | | | | | | | |
| Cyanide,Weak/Dissociable(Free) | 0.0050 U | mg/L | | 0.0050 | 0.0050 | 0.0015 | SM20-4500CNI | 6/7/11 | 6/7/11 02:30 | KRK | F1 |
| **METALS** | | | | | | | | | | | |
| Arsenic, Dissolved | 0.0017J | mg/L | | 0.0030 | 0.0020 | 0.0010 | SW846 6020A | 6/9/11 | 6/17/11 13:41 | AJB | E1 |
| Barium, Dissolved | 0.071 J | mg/L | | 0.0050 | 0.0033 | 0.0016 | SW846 6020A | 6/9/11 | 6/20/11 11:26 | AJB | E1 |
| Beryllium, Dissolved | 0.00067 U | mg/L | | 0.0010 | 0.00067 | 0.00030 | SW846 6020A | 6/9/11 | 6/17/11 13:41 | AJB | E1 |
| Cadmium, Dissolved | 0.00067 U | mg/L | | 0.0010 | 0.00067 | 0.00030 | SW846 6020A | 6/9/11 | 6/17/11 13:41 | AJB | E1 |
| Chromium, Dissolved | 0.0040 | mg/L | | 0.0020 | 0.0013 | 0.00066 | SW846 6020A | 6/9/11 | 6/17/11 13:41 | AJB | E1 |
| Copper, Dissolved | 0.0033 U | mg/L | | 0.0050 | 0.0033 | 0.0016 | SW846 6020A | 6/9/11 | 6/17/11 13:41 | AJB | E1 |
| Iron, Dissolved | 0.20 | mg/L | | 0.050 | 0.033 | 0.016 | SW846 6020A | 6/9/11 | 6/17/11 13:41 | AJB | E1 |
| Lead, Dissolved | 0.0013 U | mg/L | | 0.0020 | 0.0013 | 0.00066 | SW846 6020A | 6/9/11 | 6/17/11 13:41 | AJB | E1 |
| Manganese, Dissolved | 0.046 | mg/L | | 0.0050 | 0.0033 | 0.0016 | SW846 6020A | 6/9/11 | 6/17/11 13:41 | AJB | E1 |
| Mercury, Dissolved | 0.00013 U | mg/L | | 0.00020 | 0.00013 | 0.000066 | SW846 6020A | 6/9/11 | 6/20/11 11:26 | AJB | E1 |

***Sample Comments:***

The GCMS volatiles analysis was performed at a dilution due to the level of target compounds.

This report was modified to correct the analysis time. LAM 6/29/11



NW 8/17/11

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## ANALYTICAL RESULTS

Workorder 9908211 EMS011|2011DOD USACE MARSH RUN

Lab ID: **9908211002** Date Collected: 6/1/2011 10:20 Matrix: Ground Water

Sample ID: **MW-8A** Date Received: 6/1/2011 19:46

| Parameters | Results | Units | Footnote | LOQ | LOD | DL | Method | Prepared | Analyzed | By | Cntr |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **VOLATILE ORGANICS** | | | | | | | | | | | |
| cis-1,2-Dichloroethene | 0.75U | ug/L | | 1.0 | 0.75 | 0.33 | SW846 8260B | | 6/13/11 23:05 | DJB | B |
| trans-1,2-Dichloroethene | 0.75U | ug/L | | 1.0 | 0.75 | 0.33 | SW846 8260B | | 6/13/11 23:05 | DJB | B |
| Tetrachloroethene | 0.75U | ug/L | | 1.0 | 0.75 | 0.33 | SW846 8260B | | 6/13/11 23:05 | DJB | B |
| Trichloroethene | 0.75U | ug/L | | 1.0 | 0.75 | 0.33 | SW846 8260B | | 6/13/11 23:05 | DJB | B |
| Vinyl Chloride | 0.75U | ug/L | | 1.0 | 0.75 | 0.33 | SW846 8260B | | 6/13/11 23:05 | DJB | B |
| *Surrogate Recoveries* | *Results* | *Units* | *Footnote* | *Limits* | | | *Method* | *Prepared* | *Analyzed* | *By* | *Cntr* |
| 1,2-Dichloroethane-d4 (S) | 86 | % | | 70-120 | | | SW846 8260B | | 6/13/11 23:05 | DJB | B |
| 4-Bromofluorobenzene (S) | 82.6 | % | | 75-120 | | | SW846 8260B | | 6/13/11 23:05 | DJB | B |
| Dibromofluoromethane (S) | 86.6 | % | | 85-115 | | | SW846 8260B | | 6/13/11 23:05 | DJB | B |
| Toluene-d8 (S) | 85 | % | | 85-120 | | | SW846 8260B | | 6/13/11 23:05 | DJB | B |

***Sample Comments:***

Anna G Milliken
Technical Manager



MW 8/17/11

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## ANALYTICAL RESULTS

Workorder 9908211 EMS011|2011DOD USACE MARSH RUN

Lab ID: **9908211003** Date Collected: 6/1/2011 17:35 Matrix: Ground Water
Sample ID: **MW-4** Date Received: 6/1/2011 19:46

| Parameters | Results | Units | Footnote | LOQ | LOD | DL | Method | Prepared | Analyzed | By | Cntr |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **VOLATILE ORGANICS** | | | | | | | | | | | |
| cis-1,2-Dichloroethene | 15.0 J | ug/L | | 1.0 | 0.75 | 0.33 | SW846 8260B | | 6/13/11 22:31 | DJB | B |
| trans-1,2-Dichloroethene | 3.3 J | ug/L | | 1.0 | 0.75 | 0.33 | SW846 8260B | | 6/13/11 22:31 | DJB | B |
| Tetrachloroethene | 0.75 ~~U~~ UJ | ug/L | | 1.0 | 0.75 | 0.33 | SW846 8260B | | 6/13/11 22:31 | DJB | B |
| Trichloroethene | 35.3 J | ug/L | | 1.0 | 0.75 | 0.33 | SW846 8260B | | 6/13/11 22:31 | DJB | B |
| Vinyl Chloride | 0.75 ~~U~~ UJ | ug/L | | 1.0 | 0.75 | 0.33 | SW846 8260B | | 6/13/11 22:31 | DJB | B |
| *Surrogate Recoveries* | *Results* | *Units* | *Footnote* | *Limits* | | | *Method* | *Prepared* | *Analyzed* | *By* | *Cntr* |
| 1,2-Dichloroethane-d4 (S) | 85.9 | % | | 70-120 | | | SW846 8260B | | 6/13/11 22:31 | DJB | B |
| 4-Bromofluorobenzene (S) | 84.9 | % | | 75-120 | | | SW846 8260B | | 6/13/11 22:31 | DJB | B |
| Dibromofluoromethane (S) | 83.3 | % | ~~B~~ | 85-115 | | | SW846 8260B | | 6/13/11 22:31 | DJB | B |
| Toluene-d8 (S) | 86 | % | | 85-120 | | | SW846 8260B | | 6/13/11 22:31 | DJB | B |
| **WET CHEMISTRY** | | | | | | | | | | | |
| Cyanide,Weak/Dissociable(Free) | 0.0050 U | mg/L | | 0.0050 | 0.0050 | 0.0015 | SM20-4500CNI | 6/7/11 | 6/7/11 02:30 | KRK | F1 |
| **METALS** | | | | | | | | | | | |
| Arsenic, Dissolved | 0.0020 U | mg/L | | 0.0030 | 0.0020 | 0.0010 | SW846 6020A | 6/9/11 | 6/17/11 13:54 | AJB | E1 |
| Barium, Dissolved | 0.14 J | mg/L | | 0.0050 | 0.0033 | 0.0016 | SW846 6020A | 6/9/11 | 6/20/11 11:32 | AJB | E1 |
| Beryllium, Dissolved | 0.00067 U | mg/L | | 0.0010 | 0.00067 | 0.00030 | SW846 6020A | 6/9/11 | 6/17/11 13:54 | AJB | E1 |
| Cadmium, Dissolved | 0.00067 U | mg/L | | 0.0010 | 0.00067 | 0.00030 | SW846 6020A | 6/9/11 | 6/17/11 13:54 | AJB | E1 |
| Chromium, Dissolved | 0.0029 | mg/L | | 0.0020 | 0.0013 | 0.00066 | SW846 6020A | 6/9/11 | 6/17/11 13:54 | AJB | E1 |
| Copper, Dissolved | 0.0033 U | mg/L | | 0.0050 | 0.0033 | 0.0016 | SW846 6020A | 6/9/11 | 6/17/11 13:54 | AJB | E1 |
| Iron, Dissolved | 0.16 B | mg/L | | 0.050 | 0.033 | 0.016 | SW846 6020A | 6/9/11 | 6/17/11 13:54 | AJB | E1 |
| Lead, Dissolved | 0.0013 U | mg/L | | 0.0020 | 0.0013 | 0.00066 | SW846 6020A | 6/9/11 | 6/17/11 13:54 | AJB | E1 |
| Manganese, Dissolved | 0.074 B | mg/L | | 0.0050 | 0.0033 | 0.0016 | SW846 6020A | 6/9/11 | 6/17/11 13:54 | AJB | E1 |
| Mercury, Dissolved | 0.00013 U | mg/L | | 0.00020 | 0.00013 | 0.000066 | SW846 6020A | 6/9/11 | 6/20/11 11:32 | AJB | E1 |

***Sample Comments:***

This report was modified to correct the analysis time and results. LAM 6/29/11



NW 8/17/11

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# ANALYTICAL RESULTS

Workorder 9908211 EMS011|2011DOD USACE MARSH RUN

Lab ID: **9908211004** Date Collected: 6/1/2011 18:40 Matrix: Ground Water

Sample ID: **MW-4A** Date Received: 6/1/2011 19:46

| Parameters | Results | Units | Footnote | LOQ | LOD | DL | Method | Prepared | Analyzed | By | Cntr |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **VOLATILE ORGANICS** | | | | | | | | | | | |
| cis-1,2-Dichloroethene | 3.8U UJ | ug/L | | 5.0 | 3.8 | 1.7 | SW846 8260B | | 6/14/11 01:22 | DJB | B |
| trans-1,2-Dichloroethene | 3.8U | ug/L | | 5.0 | 3.8 | 1.7 | SW846 8260B | | 6/14/11 01:22 | DJB | B |
| Tetrachloroethene | 3.8U | ug/L | | 5.0 | 3.8 | 1.7 | SW846 8260B | | 6/14/11 01:22 | DJB | B |
| Trichloroethene | 3.8U | ug/L | | 5.0 | 3.8 | 1.7 | SW846 8260B | | 6/14/11 01:22 | DJB | B |
| Vinyl Chloride | 3.8U | ug/L | | 5.0 | 3.8 | 1.7 | SW846 8260B | | 6/14/11 01:22 | DJB | B |
| *Surrogate Recoveries* | *Results* | *Units* | *Footnote* | *Limits* | | | *Method* | *Prepared* | *Analyzed* | *By* | *Cntr* |
| 1,2-Dichloroethane-d4 (S) | 86.6 | % | | 70-120 | | | SW846 8260B | | 6/14/11 01:22 | DJB | B |
| 4-Bromofluorobenzene (S) | 81.8 | % | | 75-120 | | | SW846 8260B | | 6/14/11 01:22 | DJB | B |
| Dibromofluoromethane (S) | 85 | % | | 85-115 | | | SW846 8260B | | 6/14/11 01:22 | DJB | B |
| Toluene-d8 (S) | 84.5 | % | | 85-120 | | | SW846 8260B | | 6/14/11 01:22 | DJB | B |
| **WET CHEMISTRY** | | | | | | | | | | | |
| Cyanide,Weak/Dissociable(Free) | 0.0050 U | mg/L | | 0.0050 | 0.0050 | 0.0015 | SM20-4500CNI | 6/7/11 | 6/7/11 02:30 | KRK | F1 |
| **METALS** | | | | | | | | | | | |
| Arsenic, Dissolved | 0.0020 U | mg/L | | 0.0030 | 0.0020 | 0.0010 | SW846 6020A | 6/9/11 | 6/17/11 14:06 | AJB | E1 |
| Barium, Dissolved | 0.031 J | mg/L | | 0.0050 | 0.0033 | 0.0016 | SW846 6020A | 6/9/11 | 6/20/11 11:35 | AJB | E1 |
| Beryllium, Dissolved | 0.00067 U | mg/L | | 0.0010 | 0.00067 | 0.00030 | SW846 6020A | 6/9/11 | 6/17/11 14:06 | AJB | E1 |
| Cadmium, Dissolved | 0.00067 U | mg/L | | 0.0010 | 0.00067 | 0.00030 | SW846 6020A | 6/9/11 | 6/17/11 14:06 | AJB | E1 |
| Chromium, Dissolved | 0.0016 J | mg/L | | 0.0020 | 0.0013 | 0.00066 | SW846 6020A | 6/9/11 | 6/17/11 14:06 | AJB | E1 |
| Copper, Dissolved | 0.0033 U | mg/L | | 0.0050 | 0.0033 | 0.0016 | SW846 6020A | 6/9/11 | 6/17/11 14:06 | AJB | E1 |
| Iron, Dissolved | 1.3 | mg/L | | 0.050 | 0.033 | 0.016 | SW846 6020A | 6/9/11 | 6/17/11 14:06 | AJB | E1 |
| Lead, Dissolved | 0.0013 U | mg/L | | 0.0020 | 0.0013 | 0.00066 | SW846 6020A | 6/9/11 | 6/17/11 14:06 | AJB | E1 |
| Manganese, Dissolved | 0.43 | mg/L | | 0.0050 | 0.0033 | 0.0016 | SW846 6020A | 6/9/11 | 6/17/11 14:06 | AJB | E1 |
| Mercury, Dissolved | 0.00013 U | mg/L | | 0.00020 | 0.00013 | 0.000066 | SW846 6020A | 6/9/11 | 6/20/11 11:35 | AJB | E1 |

***Sample Comments:***

The reporting limits for GCMS volatile analytes were raised due to the dilution of the sample caused by matrix.

This report was modified to correct the analysis time and results. LAM 6/29/11



NEW 8/17/11

ENVIRONMENTAL
Data Services, Inc.

# DATA VALIDATION SUMMARY REPORT
# MARSH RUN PARK, FAIRVIEW TOWNSHIP, PENNSYLVANIA

Client: EA Engineering, Science & Technology, Inc., Sparks, Maryland
SDG: EMS-012
Laboratory: Analytical Laboratory Services, Middletown, Pennsylvania
Site: Marsh Run Park, Fairview Township, Pennsylvania
Date: August 18, 2011

| EDS ID | Client Sample ID | Laboratory Sample ID | Matrix |
|---|---|---|---|
| 1 | MW-2A | 9908212001 | Water |
| 1MS* | MW-2AMS | 9908212001MS | Water |
| 1MSD* | MW-2AMSD | 9908212001MSD | Water |
| 2** | MW-2 | 9908212002 | Water |
| 3** | MW-9 | 9908212003 | Water |
| 4** | MW-9A | 9908212004 | Water |
| 5† | DUP-1 | 9908212005 | Water |
| 6†† | DUP-2 | 9908212006 | Water |
| 7α | DUP-3 | 9908212007 | Water |
| 8α | TRIP BLANK | 9908212008 | Water |

* - Analyzed for Dissolved Metals/Hg only
† - Analyzed for VOCs & Dissolved Metals/Hg only
α - Analyzed for VOCs only
** - Not analyzed for PAHs
†† - Analyzed for PAHs & W/D Cyanide only

A full data validation was performed on the analytical data for seven water samples and one aqueous trip blank sample collected on June 1, 2011 by EA Engineering at the Marsh Run Park site in Fairview Township, Pennsylvania. The samples were analyzed under the Environmental Protection Agency (USEPA) "Test Methods for the Evaluation of Solid Waste, USEPA SW-846, Third Edition, September 1986, with revisions".

Specific method references are as follows:

| *Analysis* | *Method References* |
|---|---|
| VOCs | USEPA SW-846 Method 8260B |
| PAHs by SIM | USEPA SW-846 Method 8270 SIM |
| Dissolved Metals/Hg | USEPA SW-846 Method 6020A |
| Weak/Dissociable Cyanide | USEPA Method SM20-4500CNI |

The data have been validated according to the protocols and quality control (QC) requirements of the analytical methods, the USEPA Region III data validation guidelines as follows:

- The USEPA Region III Modifications to the National Functional Guidelines for Organic Data Review," September 1994;
- The USEPA Region III Modifications to the National Functional Guidelines for Evaluating Inorganic Analyses," April 1003;

- and the reviewer's professional judgment.

The following items/criteria were reviewed for this report:

***Organics***

- Holding times and sample preservation
- Surrogate Spike recoveries
- Matrix Spike/Matrix Spike Duplicate (MS/MSD) recoveries
- Laboratory Control Sample/Duplicate (LCS/LCSD) recoveries
- Method blank and field blank contamination
- Gas Chromatography (GC)/Mass Spectroscopy (MS) tuning
- Initial and continuing calibration summaries
- Compound Quantitation
- Internal standard area and retention time summary forms
- Field Duplicate sample precision

***Inorganics***

- Holding times and sample preservation
- Matrix Spike/Matrix Spike Duplicate (MS/MSD) recoveries
- Laboratory Control Sample/Duplicate (LCS/LCSD) recoveries
- Method blank and field blank contamination
- Initial and continuing calibration verifications
- Compound Quantitation
- ICP Serial Dilution
- Field Duplicate sample precision

## Overall Usability Issues:

There were no rejections of data.

Overall the data is acceptable for the intended purposes as qualified for the deficiencies detailed in this report.

## Volatile Organic Compounds (VOC)

## Holding Times

- All samples were analyzed within 14 days for preserved water samples.

## Surrogate Spike Recoveries

- All samples exhibited acceptable surrogate %R values except the following.

| Sample ID | Surrogate | %R | Qualifier |
|---|---|---|---|
| 3 | S2= Dibromofluoromethane | 84.3% | J/UJ |
| 4 | S4= Toluene-d8 | 77.5% | J/UJ |
| 8 | S2= Dibromofluoromethane | 84.0% | J/UJ |

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

- A MS/MSD sample was not analyzed.

## Laboratory Control Samples

- The LCS samples exhibited acceptable %R values.

## Method Blank

- The method blanks were free of contamination.

## Field Blank

- Field QC results are summarized below.

| Blank ID | Compound | Conc. ug/L | Action Level ug/L | Qualifier | Affected Samples |
|---|---|---|---|---|---|
| TRIP BLANK | None- ND | - | - | - | - |

## GC/MS Tuning

- All criteria were met.

## Initial Calibration

- The initial calibrations exhibited acceptable %RSD and mean RRF values.

## Continuing Calibration

- The continuing calibrations exhibited acceptable %D and RRF values.

## Compound Quantitation

- All criteria were met.

## Internal Standard (IS) Area Performance

- All internal standards met response and retention time (RT) criteria.

## Field Duplicate Sample Precision

- Field duplicate results are summarized below.

| VOC | | | | |
|---|---|---|---|---|
| Compound | MW-8A ug/L | DUP-1 ug/L | RPD | Qualifier |
| None | ND | ND | - | - |

| VOC | | | | |
|---|---|---|---|---|
| Compound | MW-4 ug/L | DUP-3 ug/L | RPD | Qualifier |
| cis-1,2-Dichloroethene | 15.0 | 15.5 | 3% | None |
| trans-1,2-Dichloroethene | 3.3 | 3.4 | 3% | None |
| Trichloroethene | 35.3 | 36.0 | 2% | None |

## Polynuclear Aromatic Hydrocarbons (PAHs) by SIM

### Holding Times

- Both samples were extracted within 7 days for water samples and analyzed within 40 days.

### Surrogate Spike Recoveries

- Both samples exhibited acceptable surrogate %R values.

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

- A MS/MSD sample was not analyzed.

### Laboratory Control Samples

- The LCS samples exhibited acceptable %R values.

### Method Blank

- The method blanks were free of contamination.

### Field Blank

- Field QC samples were not analyzed.

### GC/MS Tuning

- All criteria were met.

### Initial Calibration

- The initial calibrations exhibited acceptable %RSD and mean RRF values.

### Continuing Calibration

- The continuing calibrations exhibited acceptable %D and RRF values.

## Compound Quantitation

- All criteria were met.

## Internal Standard (IS) Area Performance

- All internal standards met response and retention time (RT) criteria.

## Field Duplicate Sample Precision

- Field duplicate results are summarized below.

| PAH | | | | |
|---|---|---|---|---|
| Compound | MW-2A ug/L | DUP-2 ug/L | RPD | Qualifier |
| Anthracene | 0.027 | 0.027 | 0% | None |

## Dissolved Metals & Mercury

## Holding Times

- All samples were prepared and analyzed within 28 days for mercury and 180 days for all other metals.

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

- The MS/MSD sample exhibited acceptable %R and RPD values except the following.

| MS/MSD Sample ID | Compound | MS %R/MSD %R/ RPD | Qualifier | Affected Samples |
|---|---|---|---|---|
| 1 (Dissolved) | Arsenic | OK/124%/OK | K | 2, 3 |

## Laboratory Control Samples

- The LCS sample exhibited acceptable recoveries.

## Method Blank

- The method blanks were free of contamination.

## Field Blank

- Field QC samples were not analyzed.

## Initial Calibration Verification

- All initial calibration criteria were met.

## Continuing Calibration Verification

- All continuing calibration criteria were met.

## Compound Quantitation

- All criteria were met.

## ICP Serial Dilution

- ICP serial dilution percent differences (%D) were within acceptance limits except the following.

| ICP Sample ID | Compound | %D | Qualifier | Affected Samples |
|---|---|---|---|---|
| Reference (diss.) | Barium (diss.) | 15% | J | 1-5 |

## Field Duplicate Sample Precision

- Field duplicate samples were not analyzed.

## Weak/Dissociable Cyanide

### Holding Times

- All samples were analyzed within 14 days for cyanide.

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

- A MS/MSD sample was not analyzed.

### Laboratory Control Samples

- The LCS sample exhibited acceptable %R values.

### Method Blank

- The method blanks were free of contamination.

### Initial Calibration

- All %RSD and/or correlation coefficient criteria were met.

### Continuing Calibration

- All %D criteria were met.

### Compound Quantitation

- All criteria were met.

### Field Blank

- Field QC samples were not analyzed.

## Field Duplicate Sample Precision

- Field duplicate results are summarized below.

| Weak/Dissociable Cyanide | | | | |
|---|---|---|---|---|
| Compound | MW-2A mg/L | DUP-2 mg/L | RPD | Qualifier |
| None | ND | ND | - | - |

***Package Summary:***

Please contact the undersigned at (757) 564-0090 if you have any questions or need further information.

Signed: Nancy Weaver Dated: 8/19/11

Nancy Weaver
Senior Chemist

## Data Qualifiers

U = Not detected. The associated number indicates approximate sample concentration necessary to be detected.

B = Not detected substantially above the level reported in laboratory or field blanks.

R = Unreliable result. Analyte may or may not be present in the sample. Supporting data necessary to confirm result.

N = Tentative identification. Consider present. Special methods may be needed to confirm its presence or absence in future sampling efforts..

J = Analyte present. Reported value may not be accurate or precise.

K = Analyte present. Reported value may be biased high. Actual value is expected lower.

L = Analyte present. Reported value may be biased low. Actual value is expected higher.

UJ = Not detected. Quantitation limit may be inaccurate or imprecise.

UL = Not detected. Quantitation limit is probably higher.

Q = No analytical result.

NJ = Qualitative identification questionable due to poor resolution. Presumptively present at approximate quantity.

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# ANALYTICAL RESULTS

Workorder 9908212 EMS012|2011DOD USACE MARSH RUN

Lab ID: **9908212001** Date Collected: 6/1/2011 11:45 Matrix: Ground Water

Sample ID: **MW-2A** Date Received: 6/1/2011 19:46

| Parameters | Results | Units | Footnote | LOQ | LOD | DL | Method | Prepared | Analyzed | By | Cntr |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **VOLATILE ORGANICS** | | | | | | | | | | | |
| cis-1,2-Dichloroethene | 0.75U | ug/L | | 1.0 | 0.75 | 0.33 | SW846 8260B | | 6/13/11 23:39 | DJB | B |
| trans-1,2-Dichloroethene | 0.75U | ug/L | | 1.0 | 0.75 | 0.33 | SW846 8260B | | 6/13/11 23:39 | DJB | B |
| Tetrachloroethene | 0.75U | ug/L | | 1.0 | 0.75 | 0.33 | SW846 8260B | | 6/13/11 23:39 | DJB | B |
| Trichloroethene | 0.84J | ug/L | | 1.0 | 0.75 | 0.33 | SW846 8260B | | 6/13/11 23:39 | DJB | B |
| Vinyl Chloride | 0.75U | ug/L | | 1.0 | 0.75 | 0.33 | SW846 8260B | | 6/13/11 23:39 | DJB | B |
| *Surrogate Recoveries* | *Results* | *Units* | *Footnote* | *Limits* | | | *Method* | *Prepared* | *Analyzed* | *By* | *Cntr* |
| 1,2-Dichloroethane-d4 (S) | 87.3 | % | | 70-120 | | | SW846 8260B | | 6/13/11 23:39 | DJB | B |
| 4-Bromofluorobenzene (S) | 81.8 | % | | 75-120 | | | SW846 8260B | | 6/13/11 23:39 | DJB | B |
| Dibromofluoromethane (S) | 85.3 | % | | 85-115 | | | SW846 8260B | | 6/13/11 23:39 | DJB | B |
| Toluene-d8 (S) | 85.4 | % | | 85-120 | | | SW846 8260B | | 6/13/11 23:39 | DJB | B |
| **SEMIVOLATILES** | | | | | | | | | | | |
| Acenaphthene | 0.95U | ug/L | | 1.9 | 0.95 | 0.49 | SW846 8270D | 6/7/11 | 6/8/11 15:27 | SAS | E1 |
| Acenaphthylene | 0.95U | ug/L | | 1.9 | 0.95 | 0.32 | SW846 8270D | 6/7/11 | 6/8/11 15:27 | SAS | E1 |
| Anthracene | 0.95U | ug/L | | 1.9 | 0.95 | 0.42 | SW846 8270D | 6/7/11 | 6/8/11 15:27 | SAS | E1 |
| Benzo(a)anthracene | 0.95U | ug/L | | 1.9 | 0.95 | 0.30 | SW846 8270D | 6/7/11 | 6/8/11 15:27 | SAS | E1 |
| Benzo(a)pyrene | 0.95U | ug/L | | 1.9 | 0.95 | 0.31 | SW846 8270D | 6/7/11 | 6/8/11 15:27 | SAS | E1 |
| Benzo(b)fluoranthene | 0.95U | ug/L | | 1.9 | 0.95 | 0.32 | SW846 8270D | 6/7/11 | 6/8/11 15:27 | SAS | E1 |
| Benzo(g,h,i)perylene | 0.95U | ug/L | | 1.9 | 0.95 | 0.41 | SW846 8270D | 6/7/11 | 6/8/11 15:27 | SAS | E1 |
| Benzo(k)fluoranthene | 0.95U | ug/L | | 1.9 | 0.95 | 0.36 | SW846 8270D | 6/7/11 | 6/8/11 15:27 | SAS | E1 |
| Chrysene | 0.95U | ug/L | | 1.9 | 0.95 | 0.24 | SW846 8270D | 6/7/11 | 6/8/11 15:27 | SAS | E1 |
| Dibenzo(a,h)anthracene | 0.95U | ug/L | | 1.9 | 0.95 | 0.90 | SW846 8270D | 6/7/11 | 6/8/11 15:27 | SAS | E1 |
| Fluoranthene | 0.95U | ug/L | | 1.9 | 0.95 | 0.33 | SW846 8270D | 6/7/11 | 6/8/11 15:27 | SAS | E1 |
| Fluorene | 0.95U | ug/L | | 1.9 | 0.95 | 0.38 | SW846 8270D | 6/7/11 | 6/8/11 15:27 | SAS | E1 |
| Indeno(1,2,3-cd)pyrene | 0.95U | ug/L | | 1.9 | 0.95 | 0.24 | SW846 8270D | 6/7/11 | 6/8/11 15:27 | SAS | E1 |
| Naphthalene | 0.95U | ug/L | | 1.9 | 0.95 | 0.44 | SW846 8270D | 6/7/11 | 6/8/11 15:27 | SAS | E1 |
| Phenanthrene | 0.95U | ug/L | | 1.9 | 0.95 | 0.31 | SW846 8270D | 6/7/11 | 6/8/11 15:27 | SAS | E1 |
| Pyrene | 0.95U | ug/L | | 1.9 | 0.95 | 0.49 | SW846 8270D | 6/7/11 | 6/8/11 15:27 | SAS | E1 |
| *Surrogate Recoveries* | *Results* | *Units* | *Footnote* | *Limits* | | | *Method* | *Prepared* | *Analyzed* | *By* | *Cntr* |
| 2-Fluorobiphenyl (S) | 69.3 | % | | 50-110 | | | SW846 8270D | 6/7/11 | 6/8/11 15:27 | SAS | E1 |
| Nitrobenzene-d5 (S) | 84.8 | % | | 40-110 | | | SW846 8270D | 6/7/11 | 6/8/11 15:27 | SAS | E1 |
| Terphenyl-d14 (S) | 87.2 | % | | 50-135 | | | SW846 8270D | 6/7/11 | 6/8/11 15:27 | SAS | E1 |
| **SEMIVOLATILE SIM** | | | | | | | | | | | |
| Acenaphthene | 0.038U | ug/L | | 0.048 | 0.038 | 0.014 | 8270 SIM | 6/7/11 | 6/9/11 21:27 | DHF | E2 |
| Acenaphthylene | 0.038U | ug/L | | 0.048 | 0.038 | 0.017 | 8270 SIM | 6/7/11 | 6/9/11 21:27 | DHF | E2 |
| Anthracene | 0.027J | ug/L | | 0.048 | 0.038 | 0.012 | 8270 SIM | 6/7/11 | 6/9/11 21:27 | DHF | E2 |
| Benzo(a)anthracene | 0.038U | ug/L | | 0.048 | 0.038 | 0.020 | 8270 SIM | 6/7/11 | 6/9/11 21:27 | DHF | E2 |
| Benzo(a)pyrene | 0.038U | ug/L | | 0.048 | 0.038 | 0.029 | 8270 SIM | 6/7/11 | 6/9/11 21:27 | DHF | E2 |



NW 8/18/11

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# ANALYTICAL RESULTS

Workorder 9908212 EMS012|2011DOD USACE MARSH RUN

Lab ID: **9908212001** Date Collected: 6/1/2011 11:45 Matrix: Ground Water

Sample ID: **MW-2A** Date Received: 6/1/2011 19:46

| Parameters | Results | Units | Footnote | LOQ | LOD | DL | Method | Prepared | Analyzed | By | Cntr |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Benzo(b)fluoranthene | 0.038U | ug/L | | 0.048 | 0.038 | 0.023 | 8270 SIM | 6/7/11 | 6/9/11 21:27 | DHF | E2 |
| Benzo(g,h,i)perylene | 0.038U | ug/L | | 0.048 | 0.038 | 0.015 | 8270 SIM | 6/7/11 | 6/9/11 21:27 | DHF | E2 |
| Benzo(k)fluoranthene | 0.038U | ug/L | | 0.048 | 0.038 | 0.021 | 8270 SIM | 6/7/11 | 6/9/11 21:27 | DHF | E2 |
| Chrysene | 0.038U | ug/L | | 0.048 | 0.038 | 0.020 | 8270 SIM | 6/7/11 | 6/9/11 21:27 | DHF | E2 |
| Dibenzo(a,h)anthracene | 0.038U | ug/L | | 0.048 | 0.038 | 0.014 | 8270 SIM | 6/7/11 | 6/9/11 21:27 | DHF | E2 |
| Fluoranthene | 0.038U | ug/L | | 0.048 | 0.038 | 0.020 | 8270 SIM | 6/7/11 | 6/9/11 21:27 | DHF | E2 |
| Fluorene | 0.038U | ug/L | | 0.048 | 0.038 | 0.014 | 8270 SIM | 6/7/11 | 6/9/11 21:27 | DHF | E2 |
| Indeno(1,2,3-cd)pyrene | 0.038U | ug/L | | 0.048 | 0.038 | 0.014 | 8270 SIM | 6/7/11 | 6/9/11 21:27 | DHF | E2 |
| Naphthalene | 0.048U | ug/L | | 0.048 | 0.048 | 0.039 | 8270 SIM | 6/7/11 | 6/9/11 21:27 | DHF | E2 |
| Phenanthrene | 0.038U | ug/L | | 0.048 | 0.038 | 0.027 | 8270 SIM | 6/7/11 | 6/9/11 21:27 | DHF | E2 |
| Pyrene | 0.038U | ug/L | | 0.048 | 0.038 | 0.018 | 8270 SIM | 6/7/11 | 6/9/11 21:27 | DHF | E2 |
| *Surrogate Recoveries* | *Results* | *Units* | *Footnote* | *Limits* | | | *Method* | *Prepared* | *Analyzed* | *By* | *Cntr* |
| 2-Methylnapthalene-d10 (S) | 81.6 | % | | 29-112 | | | 8270 SIM | 6/7/11 | 6/9/11 21:27 | DHF | E2 |
| Fluoranthene-d10 (S) | 95.5 | % | | 45-130 | | | 8270 SIM | 6/7/11 | 6/9/11 21:27 | DHF | E2 |
| **WET CHEMISTRY** | | | | | | | | | | | |
| Cyanide,Weak/Dissociable(Free) | 0.0020J | mg/L | | 0.0050 | 0.0050 | 0.0015 | SM20-4500CNI | 6/9/11 | 6/9/11 14:45 | KLR | L2 |
| Arsenic, Dissolved | 0.0020 U | mg/L | | 0.0030 | 0.0020 | 0.0010 | SW846 6020A | 6/9/11 | 6/17/11 14:44 | AJB | I1 |
| Barium, Dissolved | 0.087 J | mg/L | | 0.0050 | 0.0033 | 0.0016 | SW846 6020A | 6/9/11 | 6/20/11 11:38 | AJB | I1 |
| Beryllium, Dissolved | 0.00067 U | mg/L | | 0.0010 | 0.00067 | 0.00030 | SW846 6020A | 6/9/11 | 6/20/11 11:38 | AJB | I1 |
| Cadmium, Dissolved | 0.00067 U | mg/L | | 0.0010 | 0.00067 | 0.00030 | SW846 6020A | 6/9/11 | 6/17/11 14:44 | AJB | I1 |
| Chromium, Dissolved | 0.00095 J | mg/L | | 0.0020 | 0.0013 | 0.00066 | SW846 6020A | 6/9/11 | 6/17/11 14:44 | AJB | I1 |
| Copper, Dissolved | 0.021 | mg/L | | 0.0050 | 0.0033 | 0.0016 | SW846 6020A | 6/9/11 | 6/17/11 14:44 | AJB | I1 |
| Iron, Dissolved | 0.31 | mg/L | | 0.050 | 0.033 | 0.016 | SW846 6020A | 6/9/11 | 6/17/11 14:44 | AJB | I1 |
| Lead, Dissolved | 0.0013 U | mg/L | | 0.0020 | 0.0013 | 0.00066 | SW846 6020A | 6/9/11 | 6/17/11 14:44 | AJB | I1 |
| Manganese, Dissolved | 0.24 | mg/L | | 0.0050 | 0.0033 | 0.0016 | SW846 6020A | 6/9/11 | 6/17/11 14:44 | AJB | I1 |
| Mercury, Dissolved | 0.00013 U | mg/L | | 0.00020 | 0.00013 | 0.000066 | SW846 6020A | 6/9/11 | 6/20/11 11:38 | AJB | I1 |

***Sample Comments:***

This report was modified to correct the analysis time and results. LAM 6/29/11

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# ANALYTICAL RESULTS

Workorder 9908212 EMS012|2011DOD USACE MARSH RUN

Lab ID: **9908212002** Date Collected: 6/1/2011 13:10 Matrix: Ground Water

Sample ID: **MW-2** Date Received: 6/1/2011 19:46

| Parameters | Results | Units | Footnote | LOQ | LOD | DL | Method | Prepared | Analyzed | By | Cntr |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **VOLATILE ORGANICS** | | | | | | | | | | | |
| cis-1,2-Dichloroethene | 1.1 | ug/L | | 1.0 | 0.75 | 0.33 | SW846 8260B | | 6/14/11 00:14 | DJB | B |
| trans-1,2-Dichloroethene | 0.75U | ug/L | | 1.0 | 0.75 | 0.33 | SW846 8260B | | 6/14/11 00:14 | DJB | B |
| Tetrachloroethene | 0.75U | ug/L | | 1.0 | 0.75 | 0.33 | SW846 8260B | | 6/14/11 00:14 | DJB | B |
| Trichloroethene | 0.79J | ug/L | | 1.0 | 0.75 | 0.33 | SW846 8260B | | 6/14/11 00:14 | DJB | B |
| Vinyl Chloride | 0.75U | ug/L | | 1.0 | 0.75 | 0.33 | SW846 8260B | | 6/14/11 00:14 | DJB | B |
| *Surrogate Recoveries* | *Results* | *Units* | *Footnote* | *Limits* | | | *Method* | *Prepared* | *Analyzed* | *By* | *Cntr* |
| 1,2-Dichloroethane-d4 (S) | 87.6 | % | | 70-120 | | | SW846 8260B | | 6/14/11 00:14 | DJB | B |
| 4-Bromofluorobenzene (S) | 82.7 | % | | 75-120 | | | SW846 8260B | | 6/14/11 00:14 | DJB | B |
| Dibromofluoromethane (S) | 85.2 | % | | 85-115 | | | SW846 8260B | | 6/14/11 00:14 | DJB | B |
| Toluene-d8 (S) | 85.4 | % | | 85-120 | | | SW846 8260B | | 6/14/11 00:14 | DJB | B |
| **WET CHEMISTRY** | | | | | | | | | | | |
| Cyanide,Weak/Dissociable(Free) | 0.0050 U | mg/L | | 0.0050 | 0.0050 | 0.0015 | SM20-4500CNI | 6/7/11 | 6/7/11 02:30 | KRK | F1 |
| **METALS** | | | | | | | | | | | |
| Arsenic, Dissolved | 0.0014 K | mg/L | | 0.0030 | 0.0020 | 0.0010 | SW846 6020A | 6/9/11 | 6/17/11 15:13 | AJB | E1 |
| Barium, Dissolved | 0.10 J | mg/L | | 0.0050 | 0.0033 | 0.0016 | SW846 6020A | 6/9/11 | 6/20/11 11:46 | AJB | E1 |
| Beryllium, Dissolved | 0.00067 U | mg/L | | 0.0010 | 0.00067 | 0.00030 | SW846 6020A | 6/9/11 | 6/20/11 11:46 | AJB | E1 |
| Cadmium, Dissolved | 0.00067 U | mg/L | | 0.0010 | 0.00067 | 0.00030 | SW846 6020A | 6/9/11 | 6/17/11 15:13 | AJB | E1 |
| Chromium, Dissolved | 0.0013 U | mg/L | | 0.0020 | 0.0013 | 0.00066 | SW846 6020A | 6/9/11 | 6/17/11 15:13 | AJB | E1 |
| Copper, Dissolved | 0.0033 U | mg/L | | 0.0050 | 0.0033 | 0.0016 | SW846 6020A | 6/9/11 | 6/17/11 15:13 | AJB | E1 |
| Iron, Dissolved | 0.24 | mg/L | | 0.050 | 0.033 | 0.016 | SW846 6020A | 6/9/11 | 6/17/11 15:13 | AJB | E1 |
| Lead, Dissolved | 0.0013 U | mg/L | | 0.0020 | 0.0013 | 0.00066 | SW846 6020A | 6/9/11 | 6/17/11 15:13 | AJB | E1 |
| Manganese, Dissolved | 0.0033 U | mg/L | | 0.0050 | 0.0033 | 0.0016 | SW846 6020A | 6/9/11 | 6/17/11 15:13 | AJB | E1 |
| Mercury, Dissolved | 0.00011 J | mg/L | | 0.00020 | 0.00013 | 0.000066 | SW846 6020A | 6/9/11 | 6/20/11 11:46 | AJB | E1 |

***Sample Comments:***

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# ANALYTICAL RESULTS

Workorder 9908212 EMS012|2011DOD USACE MARSH RUN

Lab ID: **9908212003** Date Collected: 6/1/2011 16:40 Matrix: Ground Water

Sample ID: **MW-9** Date Received: 6/1/2011 19:46

| Parameters | Results | Units | Footnote | LOQ | LOD | DL | Method | Prepared | Analyzed | By | Cntr |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **VOLATILE ORGANICS** | | | | | | | | | | | |
| cis-1,2-Dichloroethene | 5.7 J | ug/L | | 1.0 | 0.75 | 0.33 | SW846 8260B | | 6/13/11 21:23 | DJB | B |
| trans-1,2-Dichloroethene | 1.3 J | ug/L | | 1.0 | 0.75 | 0.33 | SW846 8260B | | 6/13/11 21:23 | DJB | B |
| Tetrachloroethene | 0.75U UJ | ug/L | | 1.0 | 0.75 | 0.33 | SW846 8260B | | 6/13/11 21:23 | DJB | B |
| Trichloroethene | 17.1 J | ug/L | | 1.0 | 0.75 | 0.33 | SW846 8260B | | 6/13/11 21:23 | DJB | B |
| Vinyl Chloride | 0.75U UJ | ug/L | | 1.0 | 0.75 | 0.33 | SW846 8260B | | 6/13/11 21:23 | DJB | B |
| *Surrogate Recoveries* | *Results* | *Units* | *Footnote* | *Limits* | | | *Method* | *Prepared* | *Analyzed* | *By* | *Cntr* |
| 1,2-Dichloroethane-d4 (S) | 87.1 | % | | 70-120 | | | SW846 8260B | | 6/13/11 21:23 | DJB | B |
| 4-Bromofluorobenzene (S) | 85.4 | % | | 75-120 | | | SW846 8260B | | 6/13/11 21:23 | DJB | B |
| Dibromofluoromethane (S) | 84.3 | % | Y | 85-115 | | | SW846 8260B | | 6/13/11 21:23 | DJB | B |
| Toluene-d8 (S) | 85.5 | % | | 85-120 | | | SW846 8260B | | 6/13/11 21:23 | DJB | B |
| **WET CHEMISTRY** | | | | | | | | | | | |
| Cyanide,Weak/Dissociable(Free) | 0.0050 U | mg/L | | 0.0050 | 0.0050 | 0.0015 | SM20-4500CNI | 6/7/11 | 6/7/11 02:30 | KRK | F1 |
| **METALS** | | | | | | | | | | | |
| Arsenic, Dissolved | 0.0012 JK | mg/L | | 0.0030 | 0.0020 | 0.0010 | SW846 6020A | 6/9/11 | 6/17/11 15:31 | AJB | E1 |
| Barium, Dissolved | 0.40 J | mg/L | | 0.0050 | 0.0033 | 0.0016 | SW846 6020A | 6/9/11 | 6/20/11 11:49 | AJB | E1 |
| Beryllium, Dissolved | 0.00067 U | mg/L | | 0.0010 | 0.00067 | 0.00030 | SW846 6020A | 6/9/11 | 6/20/11 11:49 | AJB | E1 |
| Cadmium, Dissolved | 0.00067 U | mg/L | | 0.0010 | 0.00067 | 0.00030 | SW846 6020A | 6/9/11 | 6/17/11 15:31 | AJB | E1 |
| Chromium, Dissolved | 0.0013 U | mg/L | | 0.0020 | 0.0013 | 0.00066 | SW846 6020A | 6/9/11 | 6/17/11 15:31 | AJB | E1 |
| Copper, Dissolved | 0.0033 U | mg/L | | 0.0050 | 0.0033 | 0.0016 | SW846 6020A | 6/9/11 | 6/17/11 15:31 | AJB | E1 |
| Iron, Dissolved | 0.25 | mg/L | | 0.050 | 0.033 | 0.016 | SW846 6020A | 6/9/11 | 6/17/11 15:31 | AJB | E1 |
| Lead, Dissolved | 0.0013 U | mg/L | | 0.0020 | 0.0013 | 0.00066 | SW846 6020A | 6/9/11 | 6/17/11 15:31 | AJB | E1 |
| Manganese, Dissolved | 0.0033 U | mg/L | | 0.0050 | 0.0033 | 0.0016 | SW846 6020A | 6/9/11 | 6/17/11 15:31 | AJB | E1 |
| Mercury, Dissolved | 0.00013 U | mg/L | | 0.00020 | 0.00013 | 0.000066 | SW846 6020A | 6/9/11 | 6/20/11 11:49 | AJB | E1 |

***Sample Comments:***

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# ANALYTICAL RESULTS

Workorder 9908212 EMS012|2011DOD USACE MARSH RUN

Lab ID: **9908212004** Date Collected: 6/1/2011 17:55 Matrix: Ground Water

Sample ID: **MW-9A** Date Received: 6/1/2011 19:46

| Parameters | Results | Units | Footnote | LOQ | LOD | DL | Method | Prepared | Analyzed | By | Cntr |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **VOLATILE ORGANICS** | | | | | | | | | | | |
| cis-1,2-Dichloroethene | 0.75U UJ | ug/L | | 1.0 | 0.75 | 0.33 | SW846 8260B | | 6/14/11 00:48 | DJB | B |
| trans-1,2-Dichloroethene | 0.75U | ug/L | | 1.0 | 0.75 | 0.33 | SW846 8260B | | 6/14/11 00:48 | DJB | B |
| Tetrachloroethene | 0.75U | ug/L | | 1.0 | 0.75 | 0.33 | SW846 8260B | | 6/14/11 00:48 | DJB | B |
| Trichloroethene | 0.75U | ug/L | | 1.0 | 0.75 | 0.33 | SW846 8260B | | 6/14/11 00:48 | DJB | B |
| Vinyl Chloride | 0.75U | ug/L | | 1.0 | 0.75 | 0.33 | SW846 8260B | | 6/14/11 00:48 | DJB | B |
| *Surrogate Recoveries* | *Results* | *Units* | *Footnote* | *Limits* | | | *Method* | *Prepared* | *Analyzed* | *By* | *Cntr* |
| 1,2-Dichloroethane-d4 (S) | 87.1 | % | | 70-120 | | | SW846 8260B | | 6/14/11 00:48 | DJB | B |
| 4-Bromofluorobenzene (S) | 85.7 | % | | 75-120 | | | SW846 8260B | | 6/14/11 00:48 | DJB | B |
| Dibromofluoromethane (S) | 90.6 | % | | 85-115 | | | SW846 8260B | | 6/14/11 00:48 | DJB | B |
| Toluene-d8 (S) | 77.5 | % | | 85-120 | | | SW846 8260B | | 6/14/11 00:48 | DJB | B |
| **WET CHEMISTRY** | | | | | | | | | | | |
| Cyanide,Weak/Dissociable(Free) | 0.0050 U | mg/L | | 0.0050 | 0.0050 | 0.0015 | SM20-4500CNI | 6/7/11 | 6/7/11 02:30 | KRK | F1 |
| **METALS** | | | | | | | | | | | |
| Arsenic, Dissolved | 0.0020 U | mg/L | | 0.0030 | 0.0020 | 0.0010 | SW846 6020A | 6/9/11 | 6/17/11 15:37 | AJB | E1 |
| Barium, Dissolved | 0.018 J | mg/L | | 0.0050 | 0.0033 | 0.0016 | SW846 6020A | 6/9/11 | 6/20/11 12:00 | AJB | E1 |
| Beryllium, Dissolved | 0.00067 U | mg/L | | 0.0010 | 0.00067 | 0.00030 | SW846 6020A | 6/9/11 | 6/20/11 12:00 | AJB | E1 |
| Cadmium, Dissolved | 0.00067 U | mg/L | | 0.0010 | 0.00067 | 0.00030 | SW846 6020A | 6/9/11 | 6/17/11 15:37 | AJB | E1 |
| Chromium, Dissolved | 0.0013 U | mg/L | | 0.0020 | 0.0013 | 0.00066 | SW846 6020A | 6/9/11 | 6/17/11 15:37 | AJB | E1 |
| Copper, Dissolved | 0.0047J | mg/L | | 0.0050 | 0.0033 | 0.0016 | SW846 6020A | 6/9/11 | 6/17/11 15:37 | AJB | E1 |
| Iron, Dissolved | 0.081 | mg/L | | 0.050 | 0.033 | 0.016 | SW846 6020A | 6/9/11 | 6/17/11 15:37 | AJB | E1 |
| Lead, Dissolved | 0.0013 U | mg/L | | 0.0020 | 0.0013 | 0.00066 | SW846 6020A | 6/9/11 | 6/17/11 15:37 | AJB | E1 |
| Manganese, Dissolved | 0.088 | mg/L | | 0.0050 | 0.0033 | 0.0016 | SW846 6020A | 6/9/11 | 6/17/11 15:37 | AJB | E1 |
| Mercury, Dissolved | 0.000070J | mg/L | | 0.00020 | 0.00013 | 0.000066 | SW846 6020A | 6/9/11 | 6/20/11 12:00 | AJB | E1 |

***Sample Comments:***

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## ANALYTICAL RESULTS

Workorder 9908212 EMS012|2011DOD USACE MARSH RUN

Lab ID: **9908212005** Date Collected: 6/1/2011 00:00 Matrix: Ground Water

Sample ID: **DUP-1** Date Received: 6/1/2011 19:46

| Parameters | Results | Units | Footnote | LOQ | LOD | DL | Method | Prepared | Analyzed | By | Cntr |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **VOLATILE ORGANICS** | | | | | | | | | | | |
| cis-1,2-Dichloroethene | 0.75U | ug/L | | 1.0 | 0.75 | 0.33 | SW846 8260B | | 6/13/11 20:49 | DJB | B |
| trans-1,2-Dichloroethene | 0.75U | ug/L | | 1.0 | 0.75 | 0.33 | SW846 8260B | | 6/13/11 20:49 | DJB | B |
| Tetrachloroethene | 0.75U | ug/L | | 1.0 | 0.75 | 0.33 | SW846 8260B | | 6/13/11 20:49 | DJB | B |
| Trichloroethene | 0.75U | ug/L | | 1.0 | 0.75 | 0.33 | SW846 8260B | | 6/13/11 20:49 | DJB | B |
| Vinyl Chloride | 0.75U | ug/L | | 1.0 | 0.75 | 0.33 | SW846 8260B | | 6/13/11 20:49 | DJB | B |
| *Surrogate Recoveries* | *Results* | *Units* | *Footnote* | *Limits* | | | *Method* | *Prepared* | *Analyzed* | *By* | *Cntr* |
| 1,2-Dichloroethane-d4 (S) | 86.7 | % | | 70-120 | | | SW846 8260B | | 6/13/11 20:49 | DJB | B |
| 4-Bromofluorobenzene (S) | 84.7 | % | | 75-120 | | | SW846 8260B | | 6/13/11 20:49 | DJB | B |
| Dibromofluoromethane (S) | 85.2 | % | | 85-115 | | | SW846 8260B | | 6/13/11 20:49 | DJB | B |
| Toluene-d8 (S) | 85.7 | % | | 85-120 | | | SW846 8260B | | 6/13/11 20:49 | DJB | B |
| **METALS** | | | | | | | | | | | |
| Arsenic, Dissolved | 0.0020 U | mg/L | | 0.0030 | 0.0020 | 0.0010 | SW846 6020A | 6/9/11 | 6/17/11 15:50 | AJB | E1 |
| Barium, Dissolved | 0.087 J | mg/L | | 0.0050 | 0.0033 | 0.0016 | SW846 6020A | 6/9/11 | 6/20/11 12:03 | AJB | E1 |
| Beryllium, Dissolved | 0.00067 U | mg/L | | 0.0010 | 0.00067 | 0.00030 | SW846 6020A | 6/9/11 | 6/20/11 12:03 | AJB | E1 |
| Cadmium, Dissolved | 0.00067 U | mg/L | | 0.0010 | 0.00067 | 0.00030 | SW846 6020A | 6/9/11 | 6/17/11 15:50 | AJB | E1 |
| Chromium, Dissolved | 0.0015J | mg/L | | 0.0020 | 0.0013 | 0.00066 | SW846 6020A | 6/9/11 | 6/17/11 15:50 | AJB | E1 |
| Copper, Dissolved | 0.020 | mg/L | | 0.0050 | 0.0033 | 0.0016 | SW846 6020A | 6/9/11 | 6/17/11 15:50 | AJB | E1 |
| Iron, Dissolved | 0.32 | mg/L | | 0.050 | 0.033 | 0.016 | SW846 6020A | 6/9/11 | 6/17/11 15:50 | AJB | E1 |
| Lead, Dissolved | 0.0013 U | mg/L | | 0.0020 | 0.0013 | 0.00066 | SW846 6020A | 6/9/11 | 6/17/11 15:50 | AJB | E1 |
| Manganese, Dissolved | 0.24 | mg/L | | 0.0050 | 0.0033 | 0.0016 | SW846 6020A | 6/9/11 | 6/17/11 15:50 | AJB | E1 |
| Mercury, Dissolved | 0.00050 | mg/L | | 0.00020 | 0.00013 | 0.000066 | SW846 6020A | 6/9/11 | 6/20/11 12:03 | AJB | E1 |

***Sample Comments:***

Anna G Milliken
Technical Manager

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# ANALYTICAL RESULTS

Workorder 9908212 EMS012|2011DOD USACE MARSH RUN

Lab ID: **9908212006** Date Collected: 6/1/2011 00:00 Matrix: Ground Water
Sample ID: **DUP-2** Date Received: 6/1/2011 19:46

| Parameters | Results | Units | Footnote | LOQ | LOD | DL | Method | Prepared | Analyzed | By | Cntr |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **SEMIVOLATILES** | | | | | | | | | | | |
| Acenaphthene | 0.96U | ug/L | | 1.9 | 0.96 | 0.49 | SW846 8270D | 6/7/11 | 6/8/11 04:37 | CGS | B1 |
| Acenaphthylene | 0.96U | ug/L | | 1.9 | 0.96 | 0.33 | SW846 8270D | 6/7/11 | 6/8/11 04:37 | CGS | B1 |
| Anthracene | 0.96U | ug/L | | 1.9 | 0.96 | 0.42 | SW846 8270D | 6/7/11 | 6/8/11 04:37 | CGS | B1 |
| Benzo(a)anthracene | 0.96U | ug/L | | 1.9 | 0.96 | 0.30 | SW846 8270D | 6/7/11 | 6/8/11 04:37 | CGS | B1 |
| Benzo(a)pyrene | 0.96U | ug/L | | 1.9 | 0.96 | 0.32 | SW846 8270D | 6/7/11 | 6/8/11 04:37 | CGS | B1 |
| Benzo(b)fluoranthene | 0.96U | ug/L | | 1.9 | 0.96 | 0.33 | SW846 8270D | 6/7/11 | 6/8/11 04:37 | CGS | B1 |
| Benzo(g,h,i)perylene | 0.96U | ug/L | | 1.9 | 0.96 | 0.41 | SW846 8270D | 6/7/11 | 6/8/11 04:37 | CGS | B1 |
| Benzo(k)fluoranthene | 0.96U | ug/L | | 1.9 | 0.96 | 0.36 | SW846 8270D | 6/7/11 | 6/8/11 04:37 | CGS | B1 |
| Chrysene | 0.96U | ug/L | | 1.9 | 0.96 | 0.24 | SW846 8270D | 6/7/11 | 6/8/11 04:37 | CGS | B1 |
| Dibenzo(a,h)anthracene | 0.96U | ug/L | | 1.9 | 0.96 | 0.90 | SW846 8270D | 6/7/11 | 6/8/11 04:37 | CGS | B1 |
| Fluoranthene | 0.96U | ug/L | | 1.9 | 0.96 | 0.33 | SW846 8270D | 6/7/11 | 6/8/11 04:37 | CGS | B1 |
| Fluorene | 0.96U | ug/L | | 1.9 | 0.96 | 0.38 | SW846 8270D | 6/7/11 | 6/8/11 04:37 | CGS | B1 |
| Indeno(1,2,3-cd)pyrene | 0.96U | ug/L | | 1.9 | 0.96 | 0.24 | SW846 8270D | 6/7/11 | 6/8/11 04:37 | CGS | B1 |
| Naphthalene | 0.96U | ug/L | | 1.9 | 0.96 | 0.44 | SW846 8270D | 6/7/11 | 6/8/11 04:37 | CGS | B1 |
| Phenanthrene | 0.96U | ug/L | | 1.9 | 0.96 | 0.32 | SW846 8270D | 6/7/11 | 6/8/11 04:37 | CGS | B1 |
| Pyrene | 0.96U | ug/L | | 1.9 | 0.96 | 0.49 | SW846 8270D | 6/7/11 | 6/8/11 04:37 | CGS | B1 |
| *Surrogate Recoveries* | *Results* | *Units* | *Footnote* | *Limits* | | | *Method* | *Prepared* | *Analyzed* | *By* | *Cntr* |
| 2-Fluorobiphenyl (S) | 81.4 | % | | 50-110 | | | SW846 8270D | 6/7/11 | 6/8/11 04:37 | CGS | B1 |
| Nitrobenzene-d5 (S) | 86 | % | | 40-110 | | | SW846 8270D | 6/7/11 | 6/8/11 04:37 | CGS | B1 |
| Terphenyl-d14 (S) | 96.1 | % | | 50-135 | | | SW846 8270D | 6/7/11 | 6/8/11 04:37 | CGS | B1 |
| **SEMIVOLATILE SIM** | | | | | | | | | | | |
| Acenaphthene | 0.038U | ug/L | | 0.048 | 0.038 | 0.014 | 8270 SIM | 6/7/11 | 6/9/11 21:06 | DHF | B2 |
| Acenaphthylene | 0.038U | ug/L | | 0.048 | 0.038 | 0.017 | 8270 SIM | 6/7/11 | 6/9/11 21:06 | DHF | B2 |
| Anthracene | 0.027J | ug/L | | 0.048 | 0.038 | 0.012 | 8270 SIM | 6/7/11 | 6/9/11 21:06 | DHF | B2 |
| Benzo(a)anthracene | 0.038U | ug/L | | 0.048 | 0.038 | 0.020 | 8270 SIM | 6/7/11 | 6/9/11 21:06 | DHF | B2 |
| Benzo(a)pyrene | 0.038U | ug/L | | 0.048 | 0.038 | 0.029 | 8270 SIM | 6/7/11 | 6/9/11 21:06 | DHF | B2 |
| Benzo(b)fluoranthene | 0.038U | ug/L | | 0.048 | 0.038 | 0.023 | 8270 SIM | 6/7/11 | 6/9/11 21:06 | DHF | B2 |
| Benzo(g,h,i)perylene | 0.038U | ug/L | | 0.048 | 0.038 | 0.015 | 8270 SIM | 6/7/11 | 6/9/11 21:06 | DHF | B2 |
| Benzo(k)fluoranthene | 0.038U | ug/L | | 0.048 | 0.038 | 0.021 | 8270 SIM | 6/7/11 | 6/9/11 21:06 | DHF | B2 |
| Chrysene | 0.038U | ug/L | | 0.048 | 0.038 | 0.020 | 8270 SIM | 6/7/11 | 6/9/11 21:06 | DHF | B2 |
| Dibenzo(a,h)anthracene | 0.038U | ug/L | | 0.048 | 0.038 | 0.014 | 8270 SIM | 6/7/11 | 6/9/11 21:06 | DHF | B2 |
| Fluoranthene | 0.038U | ug/L | | 0.048 | 0.038 | 0.020 | 8270 SIM | 6/7/11 | 6/9/11 21:06 | DHF | B2 |
| Fluorene | 0.038U | ug/L | | 0.048 | 0.038 | 0.014 | 8270 SIM | 6/7/11 | 6/9/11 21:06 | DHF | B2 |
| Indeno(1,2,3-cd)pyrene | 0.038U | ug/L | | 0.048 | 0.038 | 0.014 | 8270 SIM | 6/7/11 | 6/9/11 21:06 | DHF | B2 |
| Naphthalene | 0.048U | ug/L | | 0.048 | 0.048 | 0.039 | 8270 SIM | 6/7/11 | 6/9/11 21:06 | DHF | B2 |
| Phenanthrene | 0.038U | ug/L | | 0.048 | 0.038 | 0.027 | 8270 SIM | 6/7/11 | 6/9/11 21:06 | DHF | B2 |
| Pyrene | 0.038U | ug/L | | 0.048 | 0.038 | 0.018 | 8270 SIM | 6/7/11 | 6/9/11 21:06 | DHF | B2 |
| *Surrogate Recoveries* | *Results* | *Units* | *Footnote* | *Limits* | | | *Method* | *Prepared* | *Analyzed* | *By* | *Cntr* |



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## ANALYTICAL RESULTS

Workorder 9908212 EMS012|2011DOD USACE MARSH RUN

Lab ID: **9908212006** Date Collected: 6/1/2011 00:00 Matrix: Ground Water

Sample ID: **DUP-2** Date Received: 6/1/2011 19:46

| Parameters | Results | Units | Footnote | LOQ | LOD | DL | Method | Prepared | Analyzed | By | Cntr |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 2-Methylnapthalene-d10 (S) | 82.1 | % | | 29-112 | | | 8270 SIM | 6/7/11 | 6/9/11 21:06 | DHF | B2 |
| Fluoranthene-d10 (S) | 94.9 | % | | 45-130 | | | 8270 SIM | 6/7/11 | 6/9/11 21:06 | DHF | B2 |
| **WET CHEMISTRY** | | | | | | | | | | | |
| Cyanide,Weak/Dissociable(Free) | 0.0050 U | mg/L | | 0.0050 | 0.0050 | 0.0015 | SM20-4500CNI | 6/7/11 | 6/7/11 02:30 | KRK | D1 |

***Sample Comments:***

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## ANALYTICAL RESULTS

Workorder 9908212 EMS012|2011DOD USACE MARSH RUN

Lab ID: **9908212007** Date Collected: 6/1/2011 00:00 Matrix: Ground Water
Sample ID: **DUP-3** Date Received: 6/1/2011 19:46

| Parameters | Results | Units | Footnote | LOQ | LOD | DL | Method | Prepared | Analyzed | By | Cntr |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **VOLATILE ORGANICS** | | | | | | | | | | | |
| cis-1,2-Dichloroethene | 15.5 | ug/L | | 1.0 | 0.75 | 0.33 | SW846 8260B | | 6/13/11 20:15 | DJB | B |
| trans-1,2-Dichloroethene | 3.4 | ug/L | | 1.0 | 0.75 | 0.33 | SW846 8260B | | 6/13/11 20:15 | DJB | B |
| Tetrachloroethene | 0.75U | ug/L | | 1.0 | 0.75 | 0.33 | SW846 8260B | | 6/13/11 20:15 | DJB | B |
| Trichloroethene | 36.0 | ug/L | | 1.0 | 0.75 | 0.33 | SW846 8260B | | 6/13/11 20:15 | DJB | B |
| Vinyl Chloride | 0.75U | ug/L | | 1.0 | 0.75 | 0.33 | SW846 8260B | | 6/13/11 20:15 | DJB | B |
| *Surrogate Recoveries* | *Results* | *Units* | *Footnote* | *Limits* | | | *Method* | *Prepared* | *Analyzed* | *By* | *Cntr* |
| 1,2-Dichloroethane-d4 (S) | 85.4 | % | | 70-120 | | | SW846 8260B | | 6/13/11 20:15 | DJB | B |
| 4-Bromofluorobenzene (S) | 84.4 | % | | 75-120 | | | SW846 8260B | | 6/13/11 20:15 | DJB | B |
| Dibromofluoromethane (S) | 85.7 | % | | 85-115 | | | SW846 8260B | | 6/13/11 20:15 | DJB | B |
| Toluene-d8 (S) | 85.7 | % | | 85-120 | | | SW846 8260B | | 6/13/11 20:15 | DJB | B |

***Sample Comments:***

Anna G Milliken
Technical Manager

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State Certifications: CT PH-0224 , DE ID 11 , GA 914 , MA PA0102 , MD 128 , LA 04162 , VA 421 , WY EPA Region 8 , WV 343

# ANALYTICAL RESULTS

Workorder 9908212 EMS012|2011DOD USACE MARSH RUN

Lab ID: **9908212008** Date Collected: 6/1/2011 19:46 Matrix: Ground Water

Sample ID: **Trip Blank** Date Received: 6/1/2011 19:46

| Parameters | Results | Units | Footnote | LOQ | LOD | DL | Method | Prepared | Analyzed | By | Cntr |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **VOLATILE ORGANICS** | | | | | | | | | | | |
| cis-1,2-Dichloroethene | 0.75U UJ | ug/L | | 1.0 | 0.75 | 0.33 | SW846 8260B | | 6/13/11 18:32 | DJB | B |
| trans-1,2-Dichloroethene | 0.75U | ug/L | | 1.0 | 0.75 | 0.33 | SW846 8260B | | 6/13/11 18:32 | DJB | B |
| Tetrachloroethene | 0.75U | ug/L | | 1.0 | 0.75 | 0.33 | SW846 8260B | | 6/13/11 18:32 | DJB | B |
| Trichloroethene | 0.75U | ug/L | | 1.0 | 0.75 | 0.33 | SW846 8260B | | 6/13/11 18:32 | DJB | B |
| Vinyl Chloride | 0.75U | ug/L | | 1.0 | 0.75 | 0.33 | SW846 8260B | | 6/13/11 18:32 | DJB | B |
| *Surrogate Recoveries* | *Results* | *Units* | *Footnote* | *Limits* | | | *Method* | *Prepared* | *Analyzed* | *By* | *Cntr* |
| 1,2-Dichloroethane-d4 (S) | 87.1 | % | | 70-120 | | | SW846 8260B | | 6/13/11 18:32 | DJB | B |
| 4-Bromofluorobenzene (S) | 82.9 | % | | 75-120 | | | SW846 8260B | | 6/13/11 18:32 | DJB | B |
| Dibromofluoromethane (S) | 84 | % | | 85-115 | | | SW846 8260B | | 6/13/11 18:32 | DJB | B |
| Toluene-d8 (S) | 85.1 | % | | 85-120 | | | SW846 8260B | | 6/13/11 18:32 | DJB | B |

***Sample Comments:***

Anna G Milliken
Technical Manager

ENVIRONMENTAL
Data Services, Inc.

# DATA VALIDATION SUMMARY REPORT
# MARSH RUN PARK, FAIRVIEW TOWNSHIP, PENNSYLVANIA

Client: EA Engineering, Science & Technology, Inc., Sparks, Maryland
SDG: EMS-013
Laboratory: Analytical Laboratory Services, Middletown, Pennsylvania
Site: Marsh Run Park, Fairview Township, Pennsylvania
Date: August 18, 2011

| EDS ID | Client Sample ID | Laboratory Sample ID | Matrix |
|---|---|---|---|
| 1 | SB-DUP-1 | 9908509001 | Soil |
| 2* | SB-DUP-2 | 9908509002 | Soil |
| 3** | SB-1-0-0.5 | 9908509003 | Soil |
| 4 | SB-2-0-0.5 | 9908509004 | Soil |
| 5† | SB-1-2.5-3 | 9908509005 | Soil |
| 6† | SB-3-0-0.5 | 9908509006 | Soil |
| 6MS†† | SB-3-0-0.5MS | 9908509006MS | Soil |
| 6MSD†† | SB-3-0-0.5MSD | 9908509006MSD | Soil |
| 7† | SB-3-2-4 | 9908509007 | Soil |
| 8†† | SB-4-0-0.5 | 9908509008 | Soil |
| 9†† | SB-4-2.5-3 | 9908509009 | Soil |
| 10† | SB-5-0-0.5 | 9908509010 | Soil |
| 10MS** | SB-5-0-0.5MS | 9908509010MS | Soil |
| 10MSD** | SB-5-0-0.5MSD | 9908509010MSD | Soil |
| 11† | SB-6-0-0.5 | 9908509011 | Soil |
| 12** | SB-7-0-0.5 | 9908509012 | Soil |
| 13† | SB-7-4-6 | 9908509013 | Soil |
| 14† | SB-8-0-0.5 | 9908509014 | Soil |
| 15† | SB-8-2-4 | 9908509015 | Soil |
| 16†† | SB-9-0-0.5 | 9908509016 | Soil |
| 17** | SB-10-0-0.5 | 9908509017 | Soil |
| 18†† | SB-11-0-0.5 | 9908509018 | Soil |
| 19† | SB-11-2-4 | 9908509019 | Soil |

* - Not analyzed for parameters in this report
† - Not analyzed for Total Mercury
** - Analyzed for VOCs only
†† - Analyzed for Total Metals only

A full data validation was performed on the analytical data for nineteen soil samples collected on June 2, 2011 by EA Engineering at the Marsh Run Park site in Fairview Township, Pennsylvania. The samples were analyzed under the Environmental Protection Agency (USEPA) "Test Methods for the Evaluation of Solid Waste, USEPA SW-846, Third Edition, September 1986, with revisions".

Specific method references are as follows:

| *Analysis* | *Method References* |
|---|---|
| VOCs | USEPA SW-846 Method 8260B |
| Total Metals/Hg | USEPA SW-846 Method 6010C/7471B |

The data have been validated according to the protocols and quality control (QC) requirements of the analytical methods, the USEPA Region III data validation guidelines as follows:

- The USEPA Region III Modifications to the National Functional Guidelines for Organic Data Review," September 1994;
- The USEPA Region III Modifications to the National Functional Guidelines for Evaluating Inorganic Analyses," April 1003;
- and the reviewer's professional judgment.

The following items/criteria were reviewed for this report:

***Organics***

- Holding times and sample preservation
- Surrogate Spike recoveries
- Matrix Spike/Matrix Spike Duplicate (MS/MSD) recoveries
- Laboratory Control Sample/Duplicate (LCS/LCSD) recoveries
- Method blank and field blank contamination
- Gas Chromatography (GC)/Mass Spectroscopy (MS) tuning
- Initial and continuing calibration summaries
- Compound Quantitation
- Internal standard area and retention time summary forms
- Field Duplicate sample precision

***Inorganics***

- Holding times and sample preservation
- Matrix Spike/Matrix Spike Duplicate (MS/MSD) recoveries
- Laboratory Control Sample/Duplicate (LCS/LCSD) recoveries
- Method blank and field blank contamination
- Initial and continuing calibration verifications
- Compound Quantitation
- ICP Serial Dilution
- Field Duplicate sample precision

**Overall Usability Issues:**

There were no rejections of data.

Overall the data is acceptable for the intended purposes as qualified for the deficiencies detailed in this report.

## Volatile Organic Compounds (VOC)

### Holding Times

- All samples were analyzed within 14 days for soil samples.

### Surrogate Spike Recoveries

- All samples exhibited acceptable surrogate %R values except the following.

| Sample ID | Surrogate | %R | Qualifier |
|---|---|---|---|
| 5 | S1= 4-Bromofluorobenzene | 80.1% | J/UJ |
| | S4= Toluene-d8 | 83.3% | J/UJ |
| 10 | S1= 4-Bromofluorobenzene | 75.5% | J/UJ |
| | S4= Toluene-d8 | 81.7% | J/UJ |
| 12 | S1= 4-Bromofluorobenzene | 79.1% | J/UJ |
| 13 | S1= 4-Bromofluorobenzene | 78.7% | J/UJ |
| | S4= Toluene-d8 | 84.9% | J/UJ |
| 15 | S1= 4-Bromofluorobenzene | 83.5% | J/UJ |
| | S4= Toluene-d8 | 82.5% | J/UJ |
| 19 | S1= 4-Bromofluorobenzene | 68.8% | J/UJ |
| | S4= Toluene-d8 | 76.9% | J/UJ |

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

- The MS/MSD sample exhibited acceptable %R and RPD values except the following.

| MS/MSD Sample ID | Compound | MS %R/MSD %R/ RPD | Qualifier |
|---|---|---|---|
| 10 | Trichloroethene | 66.9%/35.9%/35 | None- See Surrogates |
| | trans-1,2-Dichloroethene | OK/60.1%/OK | |
| | Tetrachloroethene | OK/64.6%/OK | |

### Laboratory Control Samples

- The LCS samples exhibited acceptable %R values.

### Method Blank

- The method blanks were free of contamination.

### Field Blank

- Field QC results are summarized below.

| Blank ID | Compound | Conc. ug/L | Action Level ug/L | Qualifier | Affected Samples |
|---|---|---|---|---|---|
| RB-3 (from EMS-014) | None- ND | - | - | - | - |

## GC/MS Tuning

- All criteria were met.

## Initial Calibration

- The initial calibrations exhibited acceptable %RSD and mean RRF values.

## Continuing Calibration

- The continuing calibrations exhibited acceptable %D and RRF values.

## Compound Quantitation

- All criteria were met.

## Internal Standard (IS) Area Performance

- All internal standards met response and retention time (RT) criteria except the following.

| Sample ID | Internal Standard | Area Count | Qualifier |
|---|---|---|---|
| 3 | IS1= Chlorobenzene-d5 | Low | J/UJ |
| 7 | IS1= Chlorobenzene-d5 | Low | J/UJ |
| 14 | IS1= Chlorobenzene-d5 | Low | J/UJ |

## Field Duplicate Sample Precision

- Field duplicate results are summarized below.

| VOC | | | | |
|---|---|---|---|---|
| Compound | SB-2-0-0.5 ug/kg | SB-DUP-1 ug/kg | RPD | Qualifier |
| Trichloroethene | 1.1 U | 4.7 | NC | None |

## Total Metals & Mercury

### Holding Times

- All samples were prepared and analyzed within 28 days for mercury and 180 days for all other metals.

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

- The MS/MSD sample exhibited acceptable %R and RPD values except the following.

| MS/MSD Sample ID | Compound | MS %R/MSD %R/ RPD | Qualifier | Affected Samples |
|---|---|---|---|---|
| 6 | Lead | 132%/133%/OK | K | 1, 4-11, 16, 18, 19 |

### Laboratory Control Samples

- The LCS sample exhibited acceptable recoveries.

### Method Blank

- The method blanks were free of contamination.

### Field Blank

- Field QC results are summarized below.

| Blank ID | Compound | Conc. mg/L | Action Level mg/L | Qualifier | Affected Samples |
|---|---|---|---|---|---|
| RB-3 (from EMS-014) Dissolved | Chromium | 0.0017 | 0.0085 | None | Does not apply to total metals |
| | Copper | 0.0029 | 0.0145 | None | |
| | Iron | 0.083 | 0.415 | None | |
| | Manganese | 0.0034 | 0.017 | None | |

### Initial Calibration Verification

- All initial calibration criteria were met.

### Continuing Calibration Verification

- All continuing calibration criteria were met.

## Compound Quantitation

- All criteria were met.

## ICP Serial Dilution

- ICP serial dilution percent differences (%D) were within acceptance limits.

## Field Duplicate Sample Precision

- Field duplicate results are summarized below.

| Total Metals & Mercury | | | | |
|---|---|---|---|---|
| Compound | SB-2-0-0.5 mg/kg | SB-DUP-1 mg/kg | RPD | Qualifier |
| Arsenic | 9.2 | 8.5 | 8% | None |
| Barium | 76.7 | 65.5 | 16% | None |
| Beryllium | 0.63 | 0.60 | 5% | None |
| Chromium | 33.8 | 15.7 | 73% | None |
| Copper | 36.7 | 36.9 | 1% | None |
| Iron | 25200 | 21300 | 17% | None |
| Lead | 132 | 58.2 | 78% | None |
| Manganese | 466 | 464 | 0% | None |

***Package Summary:***

Please contact the undersigned at (757) 564-0090 if you have any questions or need further information.

Signed: Nancy Weaver Dated: 8/19/11

Nancy Weaver
Senior Chemist

**Data Qualifiers**

| | | |
|---|---|---|
| U | = | Not detected. The associated number indicates approximate sample concentration necessary to be detected. |
| B | = | Not detected substantially above the level reported in laboratory or field blanks. |
| R | = | Unreliable result. Analyte may or may not be present in the sample. Supporting data necessary to confirm result. |
| N | = | Tentative identification. Consider present. Special methods may be needed to confirm its presence or absence in future sampling efforts.. |
| J | = | Analyte present. Reported value may not be accurate or precise. |
| K | = | Analyte present. Reported value may be biased high. Actual value is expected lower. |
| L | = | Analyte present. Reported value may be biased low. Actual value is expected higher. |
| UJ | = | Not detected. Quantitation limit may be inaccurate or imprecise. |
| UL | = | Not detected. Quantitation limit is probably higher. |
| Q | = | No analytical result. |
| NJ | = | Qualitative identification questionable due to poor resolution. Presumptively present at approximate quantity. |

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## ANALYTICAL RESULTS

Workorder: 9908509 EMS013|Marsh Run 06/02/11

Lab ID: **9908509001** Date Collected: 6/2/2011 00:00 Matrix: Solid
Sample ID: **SB-DUP-1** Date Received: 6/2/2011 20:00

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **VOLATILE ORGANICS** | | | | | | | | | | | |
| cis-1,2-Dichloroethene | 1.2U | ug/kg | | 2.5 | 1.2 | 0.62 | SW846 8260B | 6/3/11 | 6/15/11 17:58 | DJB | B |
| trans-1,2-Dichloroethene | 1.2U | ug/kg | | 2.5 | 1.2 | 0.62 | SW846 8260B | 6/3/11 | 6/15/11 17:58 | DJB | B |
| Tetrachloroethene | 1.2U | ug/kg | | 2.5 | 1.2 | 0.62 | SW846 8260B | 6/3/11 | 6/15/11 17:58 | DJB | B |
| Trichloroethene | 4.7 | ug/kg | | 2.5 | 1.2 | 0.62 | SW846 8260B | 6/3/11 | 6/15/11 17:58 | DJB | B |
| Vinyl Chloride | 1.2U | ug/kg | | 2.5 | 1.2 | 0.62 | SW846 8260B | 6/3/11 | 6/15/11 17:58 | DJB | B |
| *Surrogate Recoveries* | *Results* | *Units* | *Footnotes* | *Limits* | | | *Method* | *Prepared* | *Analyzed* | *By* | *Cntr* |
| 1,2-Dichloroethane-d4 (S) | 84.6 | % | | 56-124 | | | SW846 8260B | 6/3/11 | 6/15/11 17:58 | DJB | B |
| 4-Bromofluorobenzene (S) | 115 | % | | 85-120 | | | SW846 8260B | 6/3/11 | 6/15/11 17:58 | DJB | B |
| Dibromofluoromethane (S) | 86.2 | % | | 62-123 | | | SW846 8260B | 6/3/11 | 6/15/11 17:58 | DJB | B |
| Toluene-d8 (S) | 94.5 | % | | 85-115 | | | SW846 8260B | 6/3/11 | 6/15/11 17:58 | DJB | B |
| **WET CHEMISTRY** | | | | | | | | | | | |
| Moisture | 22.1 | % | | 0.1 | 0.1 | 0.01 | SM20-2540 G | | 6/4/11 11:25 | KAK | D |
| Total Solids | 77.9 | % | | 0.1 | 0.1 | 0.01 | SM20-2540 G | | 6/4/11 11:25 | KAK | D |
| **METALS** | | | | | | | | | | | |
| Arsenic, Total | 8.5 | mg/kg | | 2.3 | 1.6 | 0.78 | SW846 6010C | 6/9/11 | 6/14/11 02:14 | SRT | D2 |
| Barium, Total | 65.5 | mg/kg | | 1.2 | 0.78 | 0.39 | SW846 6010C | 6/9/11 | 6/14/11 02:14 | SRT | D2 |
| Beryllium, Total | 0.60J | mg/kg | | 1.2 | 0.78 | 0.39 | SW846 6010C | 6/9/11 | 6/14/11 02:14 | SRT | D2 |
| Cadmium, Total | 0.39U | mg/kg | | 0.58 | 0.39 | 0.19 | SW846 6010C | 6/9/11 | 6/14/11 02:14 | SRT | D2 |
| Chromium, Total | 15.7 | mg/kg | | 1.2 | 0.78 | 0.39 | SW846 6010C | 6/9/11 | 6/14/11 02:14 | SRT | D2 |
| Copper, Total | 36.9 | mg/kg | | 2.3 | 1.6 | 0.78 | SW846 6010C | 6/9/11 | 6/14/11 02:14 | SRT | D2 |
| Iron, Total | 21300 | mg/kg | | 11.7 | 7.8 | 3.9 | SW846 6010C | 6/9/11 | 6/14/11 02:14 | SRT | D2 |
| Lead, Total | 58.2 K | mg/kg | | 2.3 | 1.6 | 0.78 | SW846 6010C | 6/9/11 | 6/14/11 02:14 | SRT | D2 |
| Manganese, Total | 464 | mg/kg | | 1.2 | 0.78 | 0.39 | SW846 6010C | 6/9/11 | 6/14/11 02:14 | SRT | D2 |
| Mercury, Total | 0.15U | mg/kg | | 0.23 | 0.15 | 0.074 | SW846 7471B | 6/9/11 | 6/9/11 10:45 | MNP | D1 |

***Sample Comments:***

One or more of the method 8260 internal standards were recovered outside of the control limits indicating a significant matrix interference.

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## ANALYTICAL RESULTS

Workorder: 9908509 EMS013|Marsh Run 06/02/11

Lab ID: **9908509002** Date Collected: 6/2/2011 00:00 Matrix: Solid
Sample ID: **SB-DUP-2** Date Received: 6/2/2011 20:00

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **SEMIVOLATILES** | | | | | | | | | | |
| Acenaphthene | 5190 | ug/kg | 395 | 48.3 | 29.3 | SW846 8270D | 6/15/11 | 6/17/11 00:43 | DHF | A1 |
| Acenaphthylene | 548 | ug/kg | 395 | 48.3 | 16.1 | SW846 8270D | 6/15/11 | 6/17/11 00:43 | DHF | A1 |
| Anthracene | 14000 | ug/kg | 7910 | 967 | 351 | SW846 8270D | 6/15/11 | 6/17/11 23:32 | CGS | A1 |
| Benzo(a)anthracene | 29500 | ug/kg | 7910 | 967 | 527 | SW846 8270D | 6/15/11 | 6/17/11 23:32 | CGS | A1 |
| Benzo(a)pyrene | 25000 | ug/kg | 7910 | 967 | 234 | SW846 8270D | 6/15/11 | 6/17/11 23:32 | CGS | A1 |
| Benzo(b)fluoranthene | 25100 | ug/kg | 7910 | 967 | 410 | SW846 8270D | 6/15/11 | 6/17/11 23:32 | CGS | A1 |
| Benzo(k)fluoranthene | 24300 | ug/kg | 7910 | 967 | 381 | SW846 8270D | 6/15/11 | 6/17/11 23:32 | CGS | A1 |
| Chrysene | 28400 | ug/kg | 7910 | 967 | 264 | SW846 8270D | 6/15/11 | 6/17/11 23:32 | CGS | A1 |
| Dibenzo(a,h)anthracene | 6500J | ug/kg | 7910 | 967 | 820 | SW846 8270D | 6/15/11 | 6/17/11 23:32 | CGS | A1 |
| Fluoranthene | 57700 | ug/kg | 7910 | 967 | 322 | SW846 8270D | 6/15/11 | 6/17/11 23:32 | CGS | A1 |
| Fluorene | 7510J | ug/kg | 7910 | 967 | 272 | SW846 8270D | 6/15/11 | 6/17/11 23:32 | CGS | A1 |
| Indeno(1,2,3-cd)pyrene | 15000 | ug/kg | 7910 | 967 | 234 | SW846 8270D | 6/15/11 | 6/17/11 23:32 | CGS | A1 |
| Naphthalene | 4710 | ug/kg | 395 | 48.3 | 26.4 | SW846 8270D | 6/15/11 | 6/17/11 00:43 | DHF | A1 |
| Phenanthrene | 50200 | ug/kg | 7910 | 967 | 381 | SW846 8270D | 6/15/11 | 6/17/11 23:32 | CGS | A1 |
| Pyrene | 52000 | ug/kg | 7910 | 967 | 293 | SW846 8270D | 6/15/11 | 6/17/11 23:32 | CGS | A1 |

| *Surrogate Recoveries* | *Results* | *Units* | *Footnotes* | *Limits* | *Method* | *Prepared* | *Analyzed* | *By* | *Cntr* |
|---|---|---|---|---|---|---|---|---|---|
| 2-Fluorobiphenyl (S) | 85.4 | % | | 45-105 | SW846 8270D | 6/15/11 | 6/17/11 00:43 | DHF | A1 |
| Nitrobenzene-d5 (S) | 71.1 | % | | 35-100 | SW846 8270D | 6/15/11 | 6/17/11 00:43 | DHF | A1 |
| Terphenyl-d14 (S) | 103 | % | | 30-125 | SW846 8270D | 6/15/11 | 6/17/11 00:43 | DHF | A1 |
| 2-Fluorobiphenyl (S) | 85.5 | % | | 45-105 | SW846 8270D | 6/15/11 | 6/17/11 23:32 | CGS | A1 |
| Nitrobenzene-d5 (S) | 76.5 | % | | 35-100 | SW846 8270D | 6/15/11 | 6/17/11 23:32 | CGS | A1 |
| Terphenyl-d14 (S) | 106 | % | | 30-125 | SW846 8270D | 6/15/11 | 6/17/11 23:32 | CGS | A1 |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **WET CHEMISTRY** | | | | | | | | | |
| Moisture | 31.7 | % | 0.1 | 0.1 | 0.01 | SM20-2540 G | 6/4/11 11:25 | KAK | A |
| Total Solids | 68.3 | % | 0.1 | 0.1 | 0.01 | SM20-2540 G | 6/4/11 11:25 | KAK | A |

***Sample Comments:***

Anna G Milliken
Technical Manager

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## ANALYTICAL RESULTS

Workorder: 9908509 EMS013|Marsh Run 06/02/11

Lab ID: **9908509003** Date Collected: 6/2/2011 10:04 Matrix: Solid

Sample ID: **SB-1-0-0.5** Date Received: 6/2/2011 20:00

**VOLATILE ORGANICS**

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| cis-1,2-Dichloroethene | 1.1U | ug/kg | | 2.1 | 1.1 | 0.53 | SW846 8260B | 6/3/11 | 6/15/11 18:27 | DJB | B |
| trans-1,2-Dichloroethene | 1.1U | ug/kg | | 2.1 | 1.1 | 0.53 | SW846 8260B | 6/3/11 | 6/15/11 18:27 | DJB | B |
| Tetrachloroethene | 1.1U UJ | ug/kg | | 2.1 | 1.1 | 0.53 | SW846 8260B | 6/3/11 | 6/15/11 18:27 | DJB | B |
| Trichloroethene | 1.1U | ug/kg | | 2.1 | 1.1 | 0.53 | SW846 8260B | 6/3/11 | 6/15/11 18:27 | DJB | B |
| Vinyl Chloride | 1.1U | ug/kg | | 2.1 | 1.1 | 0.53 | SW846 8260B | 6/3/11 | 6/15/11 18:27 | DJB | B |
| *Surrogate Recoveries* | *Results* | *Units* | *Footnotes* | *Limits* | | | *Method* | *Prepared* | *Analyzed* | *By* | *Cntr* |
| 1,2-Dichloroethane-d4 (S) | 92.7 | % | | 56-124 | | | SW846 8260B | 6/3/11 | 6/15/11 18:27 | DJB | B |
| 4-Bromofluorobenzene (S) | 106 | % | | 85-120 | | | SW846 8260B | 6/3/11 | 6/15/11 18:27 | DJB | B |
| Dibromofluoromethane (S) | 87.9 | % | | 62-123 | | | SW846 8260B | 6/3/11 | 6/15/11 18:27 | DJB | B |
| Toluene-d8 (S) | 88 | % | | 85-115 | | | SW846 8260B | 6/3/11 | 6/15/11 18:27 | DJB | B |

**SEMIVOLATILES**

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Acenaphthene | 38.2U | ug/kg | | 312 | 38.2 | 23.1 | SW846 8270D | 6/15/11 | 6/16/11 20:43 | DHF | D1 |
| Acenaphthylene | 16.7J | ug/kg | | 312 | 38.2 | 12.7 | SW846 8270D | 6/15/11 | 6/16/11 20:43 | DHF | D1 |
| Anthracene | 21.9J | ug/kg | | 312 | 38.2 | 13.9 | SW846 8270D | 6/15/11 | 6/16/11 20:43 | DHF | D1 |
| Benzo(a)anthracene | 77.4J | ug/kg | | 312 | 38.2 | 20.8 | SW846 8270D | 6/15/11 | 6/16/11 20:43 | DHF | D1 |
| Benzo(a)pyrene | 71.0J | ug/kg | | 312 | 38.2 | 9.2 | SW846 8270D | 6/15/11 | 6/16/11 20:43 | DHF | D1 |
| Benzo(b)fluoranthene | 72.4J | ug/kg | | 312 | 38.2 | 16.2 | SW846 8270D | 6/15/11 | 6/16/11 20:43 | DHF | D1 |
| Benzo(k)fluoranthene | 70.9J | ug/kg | | 312 | 38.2 | 15.0 | SW846 8270D | 6/15/11 | 6/16/11 20:43 | DHF | D1 |
| Chrysene | 92.8J | ug/kg | | 312 | 38.2 | 10.4 | SW846 8270D | 6/15/11 | 6/16/11 20:43 | DHF | D1 |
| Dibenzo(a,h)anthracene | 38.2U | ug/kg | | 312 | 38.2 | 32.4 | SW846 8270D | 6/15/11 | 6/16/11 20:43 | DHF | D1 |
| Fluoranthene | 155J | ug/kg | | 312 | 38.2 | 12.7 | SW846 8270D | 6/15/11 | 6/16/11 20:43 | DHF | D1 |
| Fluorene | 38.2U | ug/kg | | 312 | 38.2 | 10.8 | SW846 8270D | 6/15/11 | 6/16/11 20:43 | DHF | D1 |
| Indeno(1,2,3-cd)pyrene | 46.3J | ug/kg | | 312 | 38.2 | 9.2 | SW846 8270D | 6/15/11 | 6/16/11 20:43 | DHF | D1 |
| Naphthalene | 38.2U | ug/kg | | 312 | 38.2 | 20.8 | SW846 8270D | 6/15/11 | 6/16/11 20:43 | DHF | D1 |
| Phenanthrene | 102J | ug/kg | | 312 | 38.2 | 15.0 | SW846 8270D | 6/15/11 | 6/16/11 20:43 | DHF | D1 |
| Pyrene | 162J | ug/kg | | 312 | 38.2 | 11.6 | SW846 8270D | 6/15/11 | 6/16/11 20:43 | DHF | D1 |
| *Surrogate Recoveries* | *Results* | *Units* | *Footnotes* | *Limits* | | | *Method* | *Prepared* | *Analyzed* | *By* | *Cntr* |
| 2-Fluorobiphenyl (S) | 78.9 | % | | 45-105 | | | SW846 8270D | 6/15/11 | 6/16/11 20:43 | DHF | D1 |
| Nitrobenzene-d5 (S) | 78.1 | % | | 35-100 | | | SW846 8270D | 6/15/11 | 6/16/11 20:43 | DHF | D1 |
| Terphenyl-d14 (S) | 99.8 | % | | 30-125 | | | SW846 8270D | 6/15/11 | 6/16/11 20:43 | DHF | D1 |

**WET CHEMISTRY**

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Moisture | 16.0 | % | | 0.1 | 0.1 | 0.01 | SM20-2540 G | | 6/4/11 11:25 | KAK | D |
| Total Solids | 84.0 | % | | 0.1 | 0.1 | 0.01 | SM20-2540 G | | 6/4/11 11:25 | KAK | D |

***Sample Comments:***

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## ANALYTICAL RESULTS

Workorder: 9908509 EMS013|Marsh Run 06/02/11

Lab ID: **9908509004** Date Collected: 6/2/2011 13:15 Matrix: Solid
Sample ID: **SB-2-0-0.5** Date Received: 6/2/2011 20:00

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **VOLATILE ORGANICS** | | | | | | | | | | |
| cis-1,2-Dichloroethene | 1.1U | ug/kg | 2.1 | 1.1 | 0.54 | SW846 8260B | 6/3/11 | 6/15/11 18:56 | DJB | B |
| trans-1,2-Dichloroethene | 1.1U | ug/kg | 2.1 | 1.1 | 0.54 | SW846 8260B | 6/3/11 | 6/15/11 18:56 | DJB | B |
| Tetrachloroethene | 1.1U | ug/kg | 2.1 | 1.1 | 0.54 | SW846 8260B | 6/3/11 | 6/15/11 18:56 | DJB | B |
| Trichloroethene | 1.1U | ug/kg | 2.1 | 1.1 | 0.54 | SW846 8260B | 6/3/11 | 6/15/11 18:56 | DJB | B |
| Vinyl Chloride | 1.1U | ug/kg | 2.1 | 1.1 | 0.54 | SW846 8260B | 6/3/11 | 6/15/11 18:56 | DJB | B |
| *Surrogate Recoveries* | *Results* | *Units* | *Footnotes* | *Limits* | | *Method* | *Prepared* | *Analyzed* | *By* | *Cntr* |
| 1,2-Dichloroethane-d4 (S) | 96.4 | % | | 56-124 | | SW846 8260B | 6/3/11 | 6/15/11 18:56 | DJB | B |
| 4-Bromofluorobenzene (S) | 85.2 | % | | 85-120 | | SW846 8260B | 6/3/11 | 6/15/11 18:56 | DJB | B |
| Dibromofluoromethane (S) | 93.5 | % | | 62-123 | | SW846 8260B | 6/3/11 | 6/15/11 18:56 | DJB | B |
| Toluene-d8 (S) | 87 | % | | 85-115 | | SW846 8260B | 6/3/11 | 6/15/11 18:56 | DJB | B |
| **WET CHEMISTRY** | | | | | | | | | | |
| Moisture | 14.9 | % | | 0.1 | 0.1 | 0.01 | SM20-2540 G | | 6/4/11 11:25 | KAK | D |
| Total Solids | 85.1 | % | | 0.1 | 0.1 | 0.01 | SM20-2540 G | | 6/4/11 11:25 | KAK | D |
| **METALS** | | | | | | | | | | |
| Arsenic, Total | 9.2 | mg/kg | | 2.2 | 1.4 | 0.73 | SW846 6010C | 6/9/11 | 6/14/11 02:24 | SRT | D1 |
| Barium, Total | 76.7 | mg/kg | | 1.1 | 0.73 | 0.36 | SW846 6010C | 6/9/11 | 6/14/11 02:24 | SRT | D1 |
| Beryllium, Total | 0.63J | mg/kg | | 1.1 | 0.73 | 0.36 | SW846 6010C | 6/9/11 | 6/14/11 02:24 | SRT | D1 |
| Cadmium, Total | 0.36U | mg/kg | | 0.54 | 0.36 | 0.18 | SW846 6010C | 6/9/11 | 6/14/11 02:24 | SRT | D1 |
| Chromium, Total | 33.8 | mg/kg | | 1.1 | 0.73 | 0.36 | SW846 6010C | 6/9/11 | 6/14/11 02:24 | SRT | D1 |
| Copper, Total | 36.7 | mg/kg | | 2.2 | 1.4 | 0.73 | SW846 6010C | 6/9/11 | 6/14/11 02:24 | SRT | D1 |
| Iron, Total | 25200 | mg/kg | | 10.9 | 7.3 | 3.6 | SW846 6010C | 6/9/11 | 6/14/11 02:24 | SRT | D1 |
| Lead, Total | 132 K | mg/kg | | 2.2 | 1.4 | 0.73 | SW846 6010C | 6/9/11 | 6/14/11 02:24 | SRT | D1 |
| Manganese, Total | 466 | mg/kg | | 1.1 | 0.73 | 0.36 | SW846 6010C | 6/9/11 | 6/14/11 02:24 | SRT | D1 |
| Mercury, Total | 0.15U | mg/kg | | 0.24 | 0.15 | 0.078 | SW846 7471B | 6/9/11 | 6/9/11 10:46 | MNP | F1 |

***Sample Comments:***

Anna G Milliken
Technical Manager



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# ANALYTICAL RESULTS

Workorder: 9908509 EMS013|Marsh Run 06/02/11

Lab ID: **9908509005** Date Collected: 6/2/2011 10:55 Matrix: Solid

Sample ID: **SB-1-2.5-3** Date Received: 6/2/2011 20:00

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **VOLATILE ORGANICS** | | | | | | | | | | | |
| cis-1,2-Dichloroethene | 1.1U UJ | ug/kg | | 2.2 | 1.1 | 0.55 | SW846 8260B | 6/3/11 | 6/15/11 19:26 | DJB | B |
| trans-1,2-Dichloroethene | 1.1U | ug/kg | | 2.2 | 1.1 | 0.55 | SW846 8260B | 6/3/11 | 6/15/11 19:26 | DJB | B |
| Tetrachloroethene | 1.1U | ug/kg | | 2.2 | 1.1 | 0.55 | SW846 8260B | 6/3/11 | 6/15/11 19:26 | DJB | B |
| Trichloroethene | 1.1U | ug/kg | | 2.2 | 1.1 | 0.55 | SW846 8260B | 6/3/11 | 6/15/11 19:26 | DJB | B |
| Vinyl Chloride | 1.1U | ug/kg | | 2.2 | 1.1 | 0.55 | SW846 8260B | 6/3/11 | 6/15/11 19:26 | DJB | B |
| *Surrogate Recoveries* | *Results* | *Units* | *Footnotes* | *Limits* | | | *Method* | *Prepared* | *Analyzed* | *By* | *Cntr* |
| 1,2-Dichloroethane-d4 (S) | 94.8 | % | | 56-124 | | | SW846 8260B | 6/3/11 | 6/15/11 19:26 | DJB | B |
| 4-Bromofluorobenzene (S) | 80.1 | % | | 85-120 | | | SW846 8260B | 6/3/11 | 6/15/11 19:26 | DJB | B |
| Dibromofluoromethane (S) | 93 | % | | 62-123 | | | SW846 8260B | 6/3/11 | 6/15/11 19:26 | DJB | B |
| Toluene-d8 (S) | 83.3 | % | | 85-115 | | | SW846 8260B | 6/3/11 | 6/15/11 19:26 | DJB | B |
| **SEMIVOLATILES** | | | | | | | | | | | |
| Acenaphthene | 39.4U | ug/kg | | 322 | 39.4 | 23.9 | SW846 8270D | 6/15/11 | 6/16/11 21:31 | DHF | D2 |
| Acenaphthylene | 39.4U | ug/kg | | 322 | 39.4 | 13.1 | SW846 8270D | 6/15/11 | 6/16/11 21:31 | DHF | D2 |
| Anthracene | 39.4U | ug/kg | | 322 | 39.4 | 14.3 | SW846 8270D | 6/15/11 | 6/16/11 21:31 | DHF | D2 |
| Benzo(a)anthracene | 39.4U | ug/kg | | 322 | 39.4 | 21.5 | SW846 8270D | 6/15/11 | 6/16/11 21:31 | DHF | D2 |
| Benzo(a)pyrene | 39.4U | ug/kg | | 322 | 39.4 | 9.5 | SW846 8270D | 6/15/11 | 6/16/11 21:31 | DHF | D2 |
| Benzo(b)fluoranthene | 39.4U | ug/kg | | 322 | 39.4 | 16.7 | SW846 8270D | 6/15/11 | 6/16/11 21:31 | DHF | D2 |
| Benzo(k)fluoranthene | 39.4U | ug/kg | | 322 | 39.4 | 15.5 | SW846 8270D | 6/15/11 | 6/16/11 21:31 | DHF | D2 |
| Chrysene | 39.4U | ug/kg | | 322 | 39.4 | 10.7 | SW846 8270D | 6/15/11 | 6/16/11 21:31 | DHF | D2 |
| Dibenzo(a,h)anthracene | 39.4U | ug/kg | | 322 | 39.4 | 33.4 | SW846 8270D | 6/15/11 | 6/16/11 21:31 | DHF | D2 |
| Fluoranthene | 39.4U | ug/kg | | 322 | 39.4 | 13.1 | SW846 8270D | 6/15/11 | 6/16/11 21:31 | DHF | D2 |
| Fluorene | 39.4U | ug/kg | | 322 | 39.4 | 11.1 | SW846 8270D | 6/15/11 | 6/16/11 21:31 | DHF | D2 |
| Indeno(1,2,3-cd)pyrene | 39.4U | ug/kg | | 322 | 39.4 | 9.5 | SW846 8270D | 6/15/11 | 6/16/11 21:31 | DHF | D2 |
| Naphthalene | 39.4U | ug/kg | | 322 | 39.4 | 21.5 | SW846 8270D | 6/15/11 | 6/16/11 21:31 | DHF | D2 |
| Phenanthrene | 39.4U | ug/kg | | 322 | 39.4 | 15.5 | SW846 8270D | 6/15/11 | 6/16/11 21:31 | DHF | D2 |
| Pyrene | 39.4U | ug/kg | | 322 | 39.4 | 11.9 | SW846 8270D | 6/15/11 | 6/16/11 21:31 | DHF | D2 |
| *Surrogate Recoveries* | *Results* | *Units* | *Footnotes* | *Limits* | | | *Method* | *Prepared* | *Analyzed* | *By* | *Cntr* |
| 2-Fluorobiphenyl (S) | 78.5 | % | | 45-105 | | | SW846 8270D | 6/15/11 | 6/16/11 21:31 | DHF | D2 |
| Nitrobenzene-d5 (S) | 79.5 | % | | 35-100 | | | SW846 8270D | 6/15/11 | 6/16/11 21:31 | DHF | D2 |
| Terphenyl-d14 (S) | 101 | % | | 30-125 | | | SW846 8270D | 6/15/11 | 6/16/11 21:31 | DHF | D2 |
| **WET CHEMISTRY** | | | | | | | | | | | |
| Moisture | 18.4 | % | | 0.1 | 0.1 | 0.01 | SM20-2540 G | | 6/4/11 11:25 | KAK | D |
| Total Solids | 81.6 | % | | 0.1 | 0.1 | 0.01 | SM20-2540 G | | 6/4/11 11:25 | KAK | D |
| **METALS** | | | | | | | | | | | |
| Lead, Total | 16.9 K | mg/kg | | 2.4 | 1.6 | 0.79 | SW846 6010C | 6/9/11 | 6/14/11 02:29 | SRT | D1 |



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# ANALYTICAL RESULTS

Workorder: 9908509 EMS013|Marsh Run 06/02/11

Lab ID: **9908509006** Date Collected: 6/2/2011 11:45 Matrix: Solid
Sample ID: **SB-3-0-0.5** Date Received: 6/2/2011 20:00

**VOLATILE ORGANICS**

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| cis-1,2-Dichloroethene | 1.1U | ug/kg | 2.2 | 1.1 | 0.56 | SW846 8260B | 6/3/11 | 6/15/11 19:55 | DJB | B |
| trans-1,2-Dichloroethene | 1.1U | ug/kg | 2.2 | 1.1 | 0.56 | SW846 8260B | 6/3/11 | 6/15/11 19:55 | DJB | B |
| Tetrachloroethene | 1.1U | ug/kg | 2.2 | 1.1 | 0.56 | SW846 8260B | 6/3/11 | 6/15/11 19:55 | DJB | B |
| Trichloroethene | 0.88J | ug/kg | 2.2 | 1.1 | 0.56 | SW846 8260B | 6/3/11 | 6/15/11 19:55 | DJB | B |
| Vinyl Chloride | 1.1U | ug/kg | 2.2 | 1.1 | 0.56 | SW846 8260B | 6/3/11 | 6/15/11 19:55 | DJB | B |

| *Surrogate Recoveries* | *Results* | *Units* | *Footnotes* | *Limits* | *Method* | *Prepared* | *Analyzed* | *By* | *Cntr* |
|---|---|---|---|---|---|---|---|---|---|
| 1,2-Dichloroethane-d4 (S) | 90.3 | % | | 56-124 | SW846 8260B | 6/3/11 | 6/15/11 19:55 | DJB | B |
| 4-Bromofluorobenzene (S) | 100 | % | | 85-120 | SW846 8260B | 6/3/11 | 6/15/11 19:55 | DJB | B |
| Dibromofluoromethane (S) | 91.2 | % | | 62-123 | SW846 8260B | 6/3/11 | 6/15/11 19:55 | DJB | B |
| Toluene-d8 (S) | 94.2 | % | | 85-115 | SW846 8260B | 6/3/11 | 6/15/11 19:55 | DJB | B |

**SEMIVOLATILES**

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Acenaphthene | 5720 | ug/kg | 308 | 37.7 | 22.8 | SW846 8270D | 6/15/11 | 6/17/11 01:32 | DHF | D2 |
| Acenaphthylene | 236J | ug/kg | 308 | 37.7 | 12.6 | SW846 8270D | 6/15/11 | 6/17/11 01:32 | DHF | D2 |
| Anthracene | 16900 | ug/kg | 6160 | 753 | 274 | SW846 8270D | 6/15/11 | 6/18/11 00:20 | CGS | D2 |
| Benzo(a)anthracene | 29600 | ug/kg | 6160 | 753 | 411 | SW846 8270D | 6/15/11 | 6/18/11 00:20 | CGS | D2 |
| Benzo(a)pyrene | 24200 | ug/kg | 6160 | 753 | 183 | SW846 8270D | 6/15/11 | 6/18/11 00:20 | CGS | D2 |
| Benzo(b)fluoranthene | 25400 | ug/kg | 6160 | 753 | 319 | SW846 8270D | 6/15/11 | 6/18/11 00:20 | CGS | D2 |
| Benzo(k)fluoranthene | 21200 | ug/kg | 6160 | 753 | 297 | SW846 8270D | 6/15/11 | 6/18/11 00:20 | CGS | D2 |
| Chrysene | 28700 | ug/kg | 6160 | 753 | 205 | SW846 8270D | 6/15/11 | 6/18/11 00:20 | CGS | D2 |
| Dibenzo(a,h)anthracene | 6420 | ug/kg | 6160 | 753 | 639 | SW846 8270D | 6/15/11 | 6/18/11 00:20 | CGS | D2 |
| Fluoranthene | 64600 | ug/kg | 6160 | 753 | 251 | SW846 8270D | 6/15/11 | 6/18/11 00:20 | CGS | D2 |
| Fluorene | 8500 | ug/kg | 6160 | 753 | 212 | SW846 8270D | 6/15/11 | 6/18/11 00:20 | CGS | D2 |
| Indeno(1,2,3-cd)pyrene | 14700 | ug/kg | 6160 | 753 | 183 | SW846 8270D | 6/15/11 | 6/18/11 00:20 | CGS | D2 |
| Naphthalene | 1710 | ug/kg | 308 | 37.7 | 20.5 | SW846 8270D | 6/15/11 | 6/17/11 01:32 | DHF | D2 |
| Phenanthrene | 60700 | ug/kg | 6160 | 753 | 297 | SW846 8270D | 6/15/11 | 6/18/11 00:20 | CGS | D2 |
| Pyrene | 52700 | ug/kg | 6160 | 753 | 228 | SW846 8270D | 6/15/11 | 6/18/11 00:20 | CGS | D2 |

| *Surrogate Recoveries* | *Results* | *Units* | *Footnotes* | *Limits* | *Method* | *Prepared* | *Analyzed* | *By* | *Cntr* |
|---|---|---|---|---|---|---|---|---|---|
| 2-Fluorobiphenyl (S) | 89.8 | % | | 45-105 | SW846 8270D | 6/15/11 | 6/17/11 01:32 | DHF | D2 |
| Nitrobenzene-d5 (S) | 68.7 | % | | 35-100 | SW846 8270D | 6/15/11 | 6/17/11 01:32 | DHF | D2 |
| Terphenyl-d14 (S) | 103 | % | | 30-125 | SW846 8270D | 6/15/11 | 6/17/11 01:32 | DHF | D2 |
| 2-Fluorobiphenyl (S) | 89.6 | % | | 45-105 | SW846 8270D | 6/15/11 | 6/18/11 00:20 | CGS | D2 |
| Nitrobenzene-d5 (S) | 71.7 | % | | 35-100 | SW846 8270D | 6/15/11 | 6/18/11 00:20 | CGS | D2 |
| Terphenyl-d14 (S) | 116 | % | | 30-125 | SW846 8270D | 6/15/11 | 6/18/11 00:20 | CGS | D2 |

**WET CHEMISTRY**

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Moisture | 12.9 | % | 0.1 | 0.1 | 0.01 | SM20-2540 G | | 6/4/11 11:25 | KAK | D |
| Total Solids | 87.1 | % | 0.1 | 0.1 | 0.01 | SM20-2540 G | | 6/4/11 11:25 | KAK | D |

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## ANALYTICAL RESULTS

Workorder: 9908509 EMS013|Marsh Run 06/02/11

| | | | | | |
|---|---|---|---|---|---|
| Lab ID: | **9908509006** | Date Collected: | 6/2/2011 11:45 | Matrix: | Solid |
| Sample ID: | **SB-3-0-0.5** | Date Received: | 6/2/2011 20:00 | | |

**METALS**

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Lead, Total | 46.0 K | mg/kg | 2.1 | 1.4 | 0.71 | SW846 6010C | 6/9/11 | 6/14/11 02:33 | JWK |

***Sample Comments:***

One or more of the method 8260 internal standards were recovered outside of the control limits indicating a significant matrix interference.

Anna G Milliken
Technical Manager



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# ANALYTICAL RESULTS

Workorder: 9908509 EMS013|Marsh Run 06/02/11

Lab ID: **9908509007** Date Collected: 6/2/2011 12:35 Matrix: Solid
Sample ID: **SB-3-2-4** Date Received: 6/2/2011 20:00

## VOLATILE ORGANICS

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| cis-1,2-Dichloroethene | 16.9 | ug/kg | 3.6 | 1.8 | 0.89 | SW846 8260B | 6/3/11 | 6/15/11 20:24 | DJB | B |
| trans-1,2-Dichloroethene | 2.3J | ug/kg | 3.6 | 1.8 | 0.89 | SW846 8260B | 6/3/11 | 6/15/11 20:24 | DJB | B |
| Tetrachloroethene | 14.3 J | ug/kg | 3.6 | 1.8 | 0.89 | SW846 8260B | 6/3/11 | 6/15/11 20:24 | DJB | B |
| Trichloroethene | 109 | ug/kg | 3.6 | 1.8 | 0.89 | SW846 8260B | 6/3/11 | 6/15/11 20:24 | DJB | B |
| Vinyl Chloride | 1.8U | ug/kg | 3.6 | 1.8 | 0.89 | SW846 8260B | 6/3/11 | 6/15/11 20:24 | DJB | B |

| *Surrogate Recoveries* | *Results* | *Units* | *Footnotes* | *Limits* | *Method* | *Prepared* | *Analyzed* | *By* | *Cntr* |
|---|---|---|---|---|---|---|---|---|---|
| 1,2-Dichloroethane-d4 (S) | 98.5 | % | | 56-124 | SW846 8260B | 6/3/11 | 6/15/11 20:24 | DJB | B |
| 4-Bromofluorobenzene (S) | 98.1 | % | | 85-120 | SW846 8260B | 6/3/11 | 6/15/11 20:24 | DJB | B |
| Dibromofluoromethane (S) | 99.4 | % | | 62-123 | SW846 8260B | 6/3/11 | 6/15/11 20:24 | DJB | B |
| Toluene-d8 (S) | 107 | % | | 85-115 | SW846 8260B | 6/3/11 | 6/15/11 20:24 | DJB | B |

## SEMIVOLATILES

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Acenaphthene | 8420 | ug/kg | 7490 | 915 | 555 | SW846 8270D | 6/15/11 | 6/18/11 01:09 | CGS | D2 |
| Acenaphthylene | 652 | ug/kg | 374 | 45.7 | 15.2 | SW846 8270D | 6/15/11 | 6/17/11 02:22 | DHF | D2 |
| Anthracene | 20600 | ug/kg | 7490 | 915 | 333 | SW846 8270D | 6/15/11 | 6/18/11 01:09 | CGS | D2 |
| Benzo(a)anthracene | 41300 | ug/kg | 7490 | 915 | 499 | SW846 8270D | 6/15/11 | 6/18/11 01:09 | CGS | D2 |
| Benzo(a)pyrene | 35000 | ug/kg | 7490 | 915 | 222 | SW846 8270D | 6/15/11 | 6/18/11 01:09 | CGS | D2 |
| Benzo(b)fluoranthene | 36000 | ug/kg | 7490 | 915 | 388 | SW846 8270D | 6/15/11 | 6/18/11 01:09 | CGS | D2 |
| Benzo(k)fluoranthene | 30800 | ug/kg | 7490 | 915 | 360 | SW846 8270D | 6/15/11 | 6/18/11 01:09 | CGS | D2 |
| Chrysene | 39300 | ug/kg | 7490 | 915 | 250 | SW846 8270D | 6/15/11 | 6/18/11 01:09 | CGS | D2 |
| Dibenzo(a,h)anthracene | 10100 | ug/kg | 7490 | 915 | 776 | SW846 8270D | 6/15/11 | 6/18/11 01:09 | CGS | D2 |
| Fluoranthene | 81300 | ug/kg | 7490 | 915 | 305 | SW846 8270D | 6/15/11 | 6/18/11 01:09 | CGS | D2 |
| Fluorene | 11200 | ug/kg | 7490 | 915 | 258 | SW846 8270D | 6/15/11 | 6/18/11 01:09 | CGS | D2 |
| Indeno(1,2,3-cd)pyrene | 24000 | ug/kg | 7490 | 915 | 222 | SW846 8270D | 6/15/11 | 6/18/11 01:09 | CGS | D2 |
| Naphthalene | 3270 | ug/kg | 374 | 45.7 | 25.0 | SW846 8270D | 6/15/11 | 6/17/11 02:22 | DHF | D2 |
| Phenanthrene | 72400 | ug/kg | 7490 | 915 | 360 | SW846 8270D | 6/15/11 | 6/18/11 01:09 | CGS | D2 |
| Pyrene | 70500 | ug/kg | 7490 | 915 | 277 | SW846 8270D | 6/15/11 | 6/18/11 01:09 | CGS | D2 |

| *Surrogate Recoveries* | *Results* | *Units* | *Footnotes* | *Limits* | *Method* | *Prepared* | *Analyzed* | *By* | *Cntr* |
|---|---|---|---|---|---|---|---|---|---|
| 2-Fluorobiphenyl (S) | 67 | % | | 45-105 | SW846 8270D | 6/15/11 | 6/17/11 02:22 | DHF | D2 |
| Nitrobenzene-d5 (S) | 75 | % | | 35-100 | SW846 8270D | 6/15/11 | 6/17/11 02:22 | DHF | D2 |
| Terphenyl-d14 (S) | 97.2 | % | | 30-125 | SW846 8270D | 6/15/11 | 6/17/11 02:22 | DHF | D2 |
| 2-Fluorobiphenyl (S) | 94.2 | % | | 45-105 | SW846 8270D | 6/15/11 | 6/18/11 01:09 | CGS | D2 |
| Nitrobenzene-d5 (S) | 82.3 | % | | 35-100 | SW846 8270D | 6/15/11 | 6/18/11 01:09 | CGS | D2 |
| Terphenyl-d14 (S) | 116 | % | | 30-125 | SW846 8270D | 6/15/11 | 6/18/11 01:09 | CGS | D2 |

## WET CHEMISTRY

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Moisture | 28.6 | % | 0.1 | 0.1 | 0.01 | SM20-2540 G | 6/4/11 11:25 | KAK | D |
| Total Solids | 71.4 | % | 0.1 | 0.1 | 0.01 | SM20-2540 G | 6/4/11 11:25 | KAK | D |

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## ANALYTICAL RESULTS

Workorder: 9908509 EMS013|Marsh Run 06/02/11

| | | | | | |
|---|---|---|---|---|---|
| Lab ID: | **9908509007** | Date Collected: | 6/2/2011 12:35 | Matrix: | Solid |
| Sample ID: | **SB-3-2-4** | Date Received: | 6/2/2011 20:00 | | |

**METALS**

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Lead, Total | 1260 K | mg/kg | 2.8 | 1.9 | 0.93 | SW846 6010C | 6/9/11 | 6/14/11 02:48 | SRT | D1 |

***Sample Comments:***

One or more of the method 8260 internal standards were recovered outside of the control limits indicating a significant matrix interference.

Anna G Milliken
Technical Manager

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## ANALYTICAL RESULTS

Workorder: 9908509 EMS013|Marsh Run 06/02/11

Lab ID: **9908509008** Date Collected: 6/2/2011 17:30 Matrix: Solid
Sample ID: **SB-4-0-0.5** Date Received: 6/2/2011 20:00

**SEMIVOLATILES**

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Acenaphthene | 49000 | ug/kg | 16500 | 2020 | 1220 | SW846 8270D | 6/15/11 | 6/22/11 01:26 | CGS | A2 |
| Acenaphthylene | 2020U | ug/kg | 16500 | 2020 | 673 | SW846 8270D | 6/15/11 | 6/22/11 01:26 | CGS | A2 |
| Anthracene | 147000 | ug/kg | 16500 | 2020 | 734 | SW846 8270D | 6/15/11 | 6/22/11 01:26 | CGS | A2 |
| Benzo(a)anthracene | 244000 | ug/kg | 82600 | 10100 | 5510 | SW846 8270D | 6/15/11 | 6/22/11 00:54 | CGS | A2 |
| Benzo(a)pyrene | 206000 | ug/kg | 16500 | 2020 | 489 | SW846 8270D | 6/15/11 | 6/22/11 01:26 | CGS | A2 |
| Benzo(b)fluoranthene | 161000 | ug/kg | 82600 | 10100 | 4280 | SW846 8270D | 6/15/11 | 6/22/11 00:54 | CGS | A2 |
| Benzo(k)fluoranthene | 182000 | ug/kg | 82600 | 10100 | 3980 | SW846 8270D | 6/15/11 | 6/22/11 00:54 | CGS | A2 |
| Chrysene | 227000 | ug/kg | 82600 | 10100 | 2750 | SW846 8270D | 6/15/11 | 6/22/11 00:54 | CGS | A2 |
| Dibenzo(a,h)anthracene | 37400 | ug/kg | 16500 | 2020 | 1710 | SW846 8270D | 6/15/11 | 6/22/11 01:26 | CGS | A2 |
| Fluoranthene | 612000 | ug/kg | 82600 | 10100 | 3360 | SW846 8270D | 6/15/11 | 6/22/11 00:54 | CGS | A2 |
| Fluorene | 72900 | ug/kg | 16500 | 2020 | 569 | SW846 8270D | 6/15/11 | 6/22/11 01:26 | CGS | A2 |
| Indeno(1,2,3-cd)pyrene | 82200 | ug/kg | 16500 | 2020 | 489 | SW846 8270D | 6/15/11 | 6/22/11 01:26 | CGS | A2 |
| Naphthalene | 29200 | ug/kg | 16500 | 2020 | 1100 | SW846 8270D | 6/15/11 | 6/22/11 01:26 | CGS | A2 |
| Phenanthrene | 503000 | ug/kg | 82600 | 10100 | 3980 | SW846 8270D | 6/15/11 | 6/22/11 00:54 | CGS | A2 |
| Pyrene | 406000 | ug/kg | 82600 | 10100 | 3060 | SW846 8270D | 6/15/11 | 6/22/11 00:54 | CGS | A2 |

| *Surrogate Recoveries* | *Results* | *Units* | *Footnotes* | *Limits* | *Method* | *Prepared* | *Analyzed* | *By* | *Cntr* |
|---|---|---|---|---|---|---|---|---|---|
| 2-Fluorobiphenyl (S) | 0 | % | 4 | 45-105 | SW846 8270D | 6/15/11 | 6/22/11 00:54 | CGS | A2 |
| Nitrobenzene-d5 (S) | 0 | % | 3 | 35-100 | SW846 8270D | 6/15/11 | 6/22/11 00:54 | CGS | A2 |
| Terphenyl-d14 (S) | 0 | % | 5 | 30-125 | SW846 8270D | 6/15/11 | 6/22/11 00:54 | CGS | A2 |
| 2-Fluorobiphenyl (S) | 100 | % | | 45-105 | SW846 8270D | 6/15/11 | 6/22/11 01:26 | CGS | A2 |
| Nitrobenzene-d5 (S) | 83.3 | % | | 35-100 | SW846 8270D | 6/15/11 | 6/22/11 01:26 | CGS | A2 |
| Terphenyl-d14 (S) | 104 | % | | 30-125 | SW846 8270D | 6/15/11 | 6/22/11 01:26 | CGS | A2 |

**WET CHEMISTRY**

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Moisture | 18.3 | % | 0.1 | 0.1 | 0.01 | SM20-2540 G | | 6/4/11 11:25 | KAK | A |
| Total Solids | 81.7 | % | 0.1 | 0.1 | 0.01 | SM20-2540 G | | 6/4/11 11:25 | KAK | A |

**METALS**

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Lead, Total | 627 K | mg/kg | 2.3 | 1.5 | 0.76 | SW846 6010C | 6/9/11 | 6/14/11 03:12 | SRT | A1 |
| Thallium, Total | 2.3U | mg/kg | 3.4 | 2.3 | 1.1 | SW846 6010C | 6/9/11 | 6/14/11 03:12 | SRT | A1 |

***Sample Comments:***

This sample was analyzed at a dilution in the Method 8270 analysis due to the level of target analyte detected. Reporting limits were adjusted accordingly. One or more of the surrogates could not be evaluated as a result of the dilution.



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## ANALYTICAL RESULTS

Workorder: 9908509 EMS013|Marsh Run 06/02/11

Lab ID: **9908509009** Date Collected: 6/2/2011 17:50 Matrix: Solid
Sample ID: **SB-4-2.5-3** Date Received: 6/2/2011 20:00

**SEMIVOLATILES**

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Acenaphthene | 1920 | ug/kg | 303 | 37.0 | 22.4 | SW846 8270D | 6/15/11 | 6/17/11 03:58 | DHF | A2 |
| Acenaphthylene | 198J | ug/kg | 303 | 37.0 | 12.3 | SW846 8270D | 6/15/11 | 6/17/11 03:58 | DHF | A2 |
| Anthracene | 4430 | ug/kg | 303 | 37.0 | 13.5 | SW846 8270D | 6/15/11 | 6/17/11 03:58 | DHF | A2 |
| Benzo(a)anthracene | 10900 | ug/kg | 3030 | 370 | 202 | SW846 8270D | 6/15/11 | 6/18/11 02:46 | CGS | A2 |
| Benzo(a)pyrene | 9040 | ug/kg | 3030 | 370 | 89.7 | SW846 8270D | 6/15/11 | 6/18/11 02:46 | CGS | A2 |
| Benzo(b)fluoranthene | 8550 | ug/kg | 3030 | 370 | 157 | SW846 8270D | 6/15/11 | 6/18/11 02:46 | CGS | A2 |
| Benzo(k)fluoranthene | 8760 | ug/kg | 3030 | 370 | 146 | SW846 8270D | 6/15/11 | 6/18/11 02:46 | CGS | A2 |
| Chrysene | 10300 | ug/kg | 3030 | 370 | 101 | SW846 8270D | 6/15/11 | 6/18/11 02:46 | CGS | A2 |
| Dibenzo(a,h)anthracene | 1290 | ug/kg | 303 | 37.0 | 31.4 | SW846 8270D | 6/15/11 | 6/17/11 03:58 | DHF | A2 |
| Fluoranthene | 21100 | ug/kg | 3030 | 370 | 123 | SW846 8270D | 6/15/11 | 6/18/11 02:46 | CGS | A2 |
| Fluorene | 2130 | ug/kg | 303 | 37.0 | 10.4 | SW846 8270D | 6/15/11 | 6/17/11 03:58 | DHF | A2 |
| Indeno(1,2,3-cd)pyrene | 2630 | ug/kg | 303 | 37.0 | 9.0 | SW846 8270D | 6/15/11 | 6/17/11 03:58 | DHF | A2 |
| Naphthalene | 656 | ug/kg | 303 | 37.0 | 20.2 | SW846 8270D | 6/15/11 | 6/17/11 03:58 | DHF | A2 |
| Phenanthrene | 16800 | ug/kg | 3030 | 370 | 146 | SW846 8270D | 6/15/11 | 6/18/11 02:46 | CGS | A2 |
| Pyrene | 18100 | ug/kg | 3030 | 370 | 112 | SW846 8270D | 6/15/11 | 6/18/11 02:46 | CGS | A2 |

| *Surrogate Recoveries* | *Results* | *Units* | *Footnotes* | *Limits* | *Method* | *Prepared* | *Analyzed* | *By* | *Cntr* |
|---|---|---|---|---|---|---|---|---|---|
| 2-Fluorobiphenyl (S) | 83.7 | % | | 45-105 | SW846 8270D | 6/15/11 | 6/17/11 03:58 | DHF | A2 |
| Nitrobenzene-d5 (S) | 72.9 | % | | 35-100 | SW846 8270D | 6/15/11 | 6/17/11 03:58 | DHF | A2 |
| Terphenyl-d14 (S) | 98.5 | % | | 30-125 | SW846 8270D | 6/15/11 | 6/17/11 03:58 | DHF | A2 |
| 2-Fluorobiphenyl (S) | 89.6 | % | | 45-105 | SW846 8270D | 6/15/11 | 6/18/11 02:46 | CGS | A2 |
| Nitrobenzene-d5 (S) | 79 | % | | 35-100 | SW846 8270D | 6/15/11 | 6/18/11 02:46 | CGS | A2 |
| Terphenyl-d14 (S) | 105 | % | | 30-125 | SW846 8270D | 6/15/11 | 6/18/11 02:46 | CGS | A2 |

**WET CHEMISTRY**

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Moisture | 12.0 | % | | 0.1 | 0.1 | 0.01 | SM20-2540 G | | 6/4/11 11:25 | KAK | A |
| Total Solids | 88.0 | % | | 0.1 | 0.1 | 0.01 | SM20-2540 G | | 6/4/11 11:25 | KAK | A |

**METALS**

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Lead, Total | 838 K | mg/kg | | 2.0 | 1.3 | 0.68 | SW846 6010C | 6/9/11 | 6/14/11 03:17 | SRT | A1 |

***Sample Comments:***



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## ANALYTICAL RESULTS

Workorder: 9908509 EMS013|Marsh Run 06/02/11

| | | | | | |
|---|---|---|---|---|---|
| Lab ID: | **9908509010** | Date Collected: | 6/2/2011 16:03 | Matrix: | Solid |
| Sample ID: | **SB-5-0-0.5** | Date Received: | 6/2/2011 20:00 | | |

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **VOLATILE ORGANICS** | | | | | | | | | | | |
| cis-1,2-Dichloroethene | 1.3~~U~~ UJ | ug/kg | | 2.6 | 1.3 | 0.65 | SW846 8260B | 6/3/11 | 6/15/11 20:54 | DJB | B |
| trans-1,2-Dichloroethene | 1.3~~U~~ ↓ | ug/kg | ~~8~~ | 2.6 | 1.3 | 0.65 | SW846 8260B | 6/3/11 | 6/15/11 20:54 | DJB | B |
| Tetrachloroethene | 1.3~~U~~ ↓ | ug/kg | ~~7~~ | 2.6 | 1.3 | 0.65 | SW846 8260B | 6/3/11 | 6/15/11 20:54 | DJB | B |
| Trichloroethene | 9.3 J | ug/kg | ~~10,8,9~~ | 2.6 | 1.3 | 0.65 | SW846 8260B | 6/3/11 | 6/15/11 20:54 | DJB | B |
| Vinyl Chloride | 1.3~~U~~ UJ | ug/kg | | 2.6 | 1.3 | 0.65 | SW846 8260B | 6/3/11 | 6/15/11 20:54 | DJB | B |
| *Surrogate Recoveries* | *Results* | *Units* | *Footnotes* | *Limits* | | | *Method* | *Prepared* | *Analyzed* | *By* | *Cntr* |
| 1,2-Dichloroethane-d4 (S) | 90.4 | % | | 56-124 | | | SW846 8260B | 6/3/11 | 6/15/11 20:54 | DJB | B |
| 4-Bromofluorobenzene (S) | 75.5 | % | ~~12~~ | 85-120 | | | SW846 8260B | 6/3/11 | 6/15/11 20:54 | DJB | B |
| Dibromofluoromethane (S) | 84.1 | % | | 62-123 | | | SW846 8260B | 6/3/11 | 6/15/11 20:54 | DJB | B |
| Toluene-d8 (S) | 81.7 | % | ~~11~~ | 85-115 | | | SW846 8260B | 6/3/11 | 6/15/11 20:54 | DJB | B |
| **WET CHEMISTRY** | | | | | | | | | | | |
| Moisture | 18.9 | % | | 0.1 | 0.1 | 0.01 | SM20-2540 G | | 6/4/11 11:25 | KAK | J |
| Total Solids | 81.1 | % | | 0.1 | 0.1 | 0.01 | SM20-2540 G | | 6/4/11 11:25 | KAK | J |
| **METALS** | | | | | | | | | | | |
| Lead, Total | 567 K | mg/kg | | 2.2 | 1.5 | 0.75 | SW846 6010C | 6/9/11 | 6/14/11 03:22 | SRT | J1 |
| Thallium, Total | 2.2U | mg/kg | | 3.4 | 2.2 | 1.1 | SW846 6010C | 6/9/11 | 6/14/11 03:22 | SRT | J1 |

***Sample Comments:***

One or more of the method 8260 internal standards were recovered outside of the control limits indicating a significant matrix interference.

One or more of the method 8260 surrogates were recovered outside of the control limits indicating a significant matrix interference.

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## ANALYTICAL RESULTS

Workorder: 9908509 EMS013|Marsh Run 06/02/11

| | | | | | |
|---|---|---|---|---|---|
| Lab ID: | **9908509011** | Date Collected: | 6/2/2011 13:50 | Matrix: | Solid |
| Sample ID: | **SB-6-0-0.5** | Date Received: | 6/2/2011 20:00 | | |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **VOLATILE ORGANICS** | | | | | | | | | | |
| cis-1,2-Dichloroethene | 1.0U | ug/kg | | 2.1 | 1.0 | 0.51 | SW846 8260B | 6/3/11 | 6/15/11 21:23 | DJB | B |
| trans-1,2-Dichloroethene | 1.0U | ug/kg | | 2.1 | 1.0 | 0.51 | SW846 8260B | 6/3/11 | 6/15/11 21:23 | DJB | B |
| Tetrachloroethene | 1.0U | ug/kg | | 2.1 | 1.0 | 0.51 | SW846 8260B | 6/3/11 | 6/15/11 21:23 | DJB | B |
| Trichloroethene | 1.9J | ug/kg | | 2.1 | 1.0 | 0.51 | SW846 8260B | 6/3/11 | 6/15/11 21:23 | DJB | B |
| Vinyl Chloride | 1.0U | ug/kg | | 2.1 | 1.0 | 0.51 | SW846 8260B | 6/3/11 | 6/15/11 21:23 | DJB | B |
| *Surrogate Recoveries* | *Results* | *Units* | *Footnotes* | *Limits* | | | *Method* | *Prepared* | *Analyzed* | *By* | *Cntr* |
| 1,2-Dichloroethane-d4 (S) | 97.4 | % | | 56-124 | | | SW846 8260B | 6/3/11 | 6/15/11 21:23 | DJB | B |
| 4-Bromofluorobenzene (S) | 92.8 | % | | 85-120 | | | SW846 8260B | 6/3/11 | 6/15/11 21:23 | DJB | B |
| Dibromofluoromethane (S) | 95.1 | % | | 62-123 | | | SW846 8260B | 6/3/11 | 6/15/11 21:23 | DJB | B |
| Toluene-d8 (S) | 86.7 | % | | 85-115 | | | SW846 8260B | 6/3/11 | 6/15/11 21:23 | DJB | B |
| **WET CHEMISTRY** | | | | | | | | | | | |
| Moisture | 11.9 | % | | 0.1 | 0.1 | 0.01 | SM20-2540 G | | 6/4/11 11:25 | KAK | D |
| Total Solids | 88.1 | % | | 0.1 | 0.1 | 0.01 | SM20-2540 G | | 6/4/11 11:25 | KAK | D |
| **METALS** | | | | | | | | | | | |
| Lead, Total | 36.6 K | mg/kg | | 2.0 | 1.3 | 0.68 | SW846 6010C | 6/9/11 | 6/14/11 03:27 | SRT | D1 |
| Thallium, Total | 2.0U | mg/kg | | 3.0 | 2.0 | 1.0 | SW846 6010C | 6/9/11 | 6/14/11 03:27 | SRT | D1 |

***Sample Comments:***

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## ANALYTICAL RESULTS

Workorder: 9908509 EMS013|Marsh Run 06/02/11

Lab ID: **9908509012** Date Collected: 6/2/2011 14:09 Matrix: Solid
Sample ID: **SB-7-0-0.5** Date Received: 6/2/2011 20:00

**VOLATILE ORGANICS**

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| cis-1,2-Dichloroethene | 1.0U UJ | ug/kg | | 2.1 | 1.0 | 0.52 | SW846 8260B | 6/3/11 | 6/15/11 21:52 | DJB | B |
| trans-1,2-Dichloroethene | 1.0U | ug/kg | | 2.1 | 1.0 | 0.52 | SW846 8260B | 6/3/11 | 6/15/11 21:52 | DJB | B |
| Tetrachloroethene | 1.0U | ug/kg | | 2.1 | 1.0 | 0.52 | SW846 8260B | 6/3/11 | 6/15/11 21:52 | DJB | B |
| Trichloroethene | 1.0U | ug/kg | | 2.1 | 1.0 | 0.52 | SW846 8260B | 6/3/11 | 6/15/11 21:52 | DJB | B |
| Vinyl Chloride | 1.0U | ug/kg | | 2.1 | 1.0 | 0.52 | SW846 8260B | 6/3/11 | 6/15/11 21:52 | DJB | B |
| *Surrogate Recoveries* | *Results* | *Units* | *Footnotes* | *Limits* | | | *Method* | *Prepared* | *Analyzed* | *By* | *Cntr* |
| 1,2-Dichloroethane-d4 (S) | 91.7 | % | | 56-124 | | | SW846 8260B | 6/3/11 | 6/15/11 21:52 | DJB | B |
| 4-Bromofluorobenzene (S) | 79.1 | % | J8 | 85-120 | | | SW846 8260B | 6/3/11 | 6/15/11 21:52 | DJB | B |
| Dibromofluoromethane (S) | 89 | % | | 62-123 | | | SW846 8260B | 6/3/11 | 6/15/11 21:52 | DJB | B |
| Toluene-d8 (S) | 88.8 | % | | 85-115 | | | SW846 8260B | 6/3/11 | 6/15/11 21:52 | DJB | B |

**WET CHEMISTRY**

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Moisture | 13.3 | % | | 0.1 | 0.1 | 0.01 | SM20-2540 G | | 6/4/11 11:25 | KAK | D |
| Total Solids | 86.7 | % | | 0.1 | 0.1 | 0.01 | SM20-2540 G | | 6/4/11 11:25 | KAK | D |

***Sample Comments:***

One or more of the method 8260 surrogates were recovered outside of the control limits indicating a significant matrix interference.

Anna G Milliken
Technical Manager



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State Certifications: CT PH-0224 , DE ID 11 , GA 914 , MA PA0102 , MD 128 , LA 04162 , VA 421 , WY EPA Region 8 , WV 343

## ANALYTICAL RESULTS

Workorder: 9908509 EMS013|Marsh Run 06/02/11

Lab ID: **9908509013** Date Collected: 6/2/2011 14:50 Matrix: Solid

Sample ID: **SB-7-4-6** Date Received: 6/2/2011 20:00

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **VOLATILE ORGANICS** | | | | | | | | | | | |
| cis-1,2-Dichloroethene | 1.0U UJ | ug/kg | | 2.1 | 1.0 | 0.51 | SW846 8260B | 6/3/11 | 6/15/11 22:21 | DJB | B |
| trans-1,2-Dichloroethene | 1.0U | ug/kg | | 2.1 | 1.0 | 0.51 | SW846 8260B | 6/3/11 | 6/15/11 22:21 | DJB | B |
| Tetrachloroethene | 1.0U | ug/kg | | 2.1 | 1.0 | 0.51 | SW846 8260B | 6/3/11 | 6/15/11 22:21 | DJB | B |
| Trichloroethene | 1.0U | ug/kg | | 2.1 | 1.0 | 0.51 | SW846 8260B | 6/3/11 | 6/15/11 22:21 | DJB | B |
| Vinyl Chloride | 1.0U | ug/kg | | 2.1 | 1.0 | 0.51 | SW846 8260B | 6/3/11 | 6/15/11 22:21 | DJB | B |
| *Surrogate Recoveries* | *Results* | *Units* | *Footnotes* | *Limits* | | | *Method* | *Prepared* | *Analyzed* | *By* | *Cntr* |
| 1,2-Dichloroethane-d4 (S) | 89.5 | % | | 56-124 | | | SW846 8260B | 6/3/11 | 6/15/11 22:21 | DJB | B |
| 4-Bromofluorobenzene (S) | 78.7 | % | 15 | 85-120 | | | SW846 8260B | 6/3/11 | 6/15/11 22:21 | DJB | B |
| Dibromofluoromethane (S) | 90.1 | % | | 62-123 | | | SW846 8260B | 6/3/11 | 6/15/11 22:21 | DJB | B |
| Toluene-d8 (S) | 84.9 | % | 14 | 85-115 | | | SW846 8260B | 6/3/11 | 6/15/11 22:21 | DJB | B |
| **WET CHEMISTRY** | | | | | | | | | | | |
| Moisture | 16.6 | % | | 0.1 | 0.1 | 0.01 | SM20-2540 G | | 6/4/11 11:25 | KAK | E |
| Total Solids | 83.4 | % | | 0.1 | 0.1 | 0.01 | SM20-2540 G | | 6/4/11 11:25 | KAK | E |
| **METALS** | | | | | | | | | | | |
| Arsenic, Total | 7.2 | mg/kg | | 2.3 | 1.5 | 0.75 | SW846 6010C | 6/9/11 | 6/14/11 03:32 | SRT | E1 |

***Sample Comments:***

One or more of the method 8260 surrogates were recovered outside of the control limits indicating a significant matrix interference.

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State Certifications: CT PH-0224 , DE ID 11 , GA 914 , MA PA0102 , MD 128 , LA 04162 , VA 421 , WY EPA Region 8 , WV 343

## ANALYTICAL RESULTS

Workorder: 9908509 EMS013|Marsh Run 06/02/11

| | | | | | |
|---|---|---|---|---|---|
| Lab ID: | **9908509014** | Date Collected: | 6/2/2011 15:50 | Matrix: | Solid |
| Sample ID: | **SB-8-0-0.5** | Date Received: | 6/2/2011 20:00 | | |

**VOLATILE ORGANICS**

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| cis-1,2-Dichloroethene | 1.1U | ug/kg | 2.3 | 1.1 | 0.56 | SW846 8260B | 6/3/11 | 6/15/11 22:51 | DJB | B |
| trans-1,2-Dichloroethene | 1.1U | ug/kg | 2.3 | 1.1 | 0.56 | SW846 8260B | 6/3/11 | 6/15/11 22:51 | DJB | B |
| Tetrachloroethene | 1.1U UJ | ug/kg | 2.3 | 1.1 | 0.56 | SW846 8260B | 6/3/11 | 6/15/11 22:51 | DJB | B |
| Trichloroethene | 1.1U | ug/kg | 2.3 | 1.1 | 0.56 | SW846 8260B | 6/3/11 | 6/15/11 22:51 | DJB | B |
| Vinyl Chloride | 1.1U | ug/kg | 2.3 | 1.1 | 0.56 | SW846 8260B | 6/3/11 | 6/15/11 22:51 | DJB | B |

| *Surrogate Recoveries* | *Results* | *Units* | *Footnotes* | *Limits* | *Method* | *Prepared* | *Analyzed* | *By* | *Cntr* |
|---|---|---|---|---|---|---|---|---|---|
| 1,2-Dichloroethane-d4 (S) | 101 | % | | 56-124 | SW846 8260B | 6/3/11 | 6/15/11 22:51 | DJB | B |
| 4-Bromofluorobenzene (S) | 106 | % | | 85-120 | SW846 8260B | 6/3/11 | 6/15/11 22:51 | DJB | B |
| Dibromofluoromethane (S) | 99.9 | % | | 62-123 | SW846 8260B | 6/3/11 | 6/15/11 22:51 | DJB | B |
| Toluene-d8 (S) | 107 | % | | 85-115 | SW846 8260B | 6/3/11 | 6/15/11 22:51 | DJB | B |

**WET CHEMISTRY**

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Moisture | 20.5 | % | 0.1 | 0.1 | 0.01 | SM20-2540 G | | 6/4/11 11:25 | KAK | E |
| Total Solids | 79.5 | % | 0.1 | 0.1 | 0.01 | SM20-2540 G | | 6/4/11 11:25 | KAK | E |

**METALS**

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Arsenic, Total | 6.7 | mg/kg | 2.3 | 1.5 | 0.78 | SW846 6010C | 6/9/11 | 6/14/11 03:37 | SRT | E1 |

***Sample Comments:***

One or more of the method 8260 internal standards were recovered outside of the control limits indicating a significant matrix interference.

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## ANALYTICAL RESULTS

Workorder: 9908509 EMS013|Marsh Run 06/02/11

Lab ID: **9908509015** Date Collected: 6/2/2011 16:45 Matrix: Solid
Sample ID: **SB-8-2-4** Date Received: 6/2/2011 20:00

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **VOLATILE ORGANICS** | | | | | | | | | | | |
| cis-1,2-Dichloroethene | 1.2U UJ | ug/kg | | 2.4 | 1.2 | 0.61 | SW846 8260B | 6/3/11 | 6/15/11 23:20 | DJB | B |
| trans-1,2-Dichloroethene | 1.2U | ug/kg | | 2.4 | 1.2 | 0.61 | SW846 8260B | 6/3/11 | 6/15/11 23:20 | DJB | B |
| Tetrachloroethene | 1.2U | ug/kg | | 2.4 | 1.2 | 0.61 | SW846 8260B | 6/3/11 | 6/15/11 23:20 | DJB | B |
| Trichloroethene | 1.2U | ug/kg | | 2.4 | 1.2 | 0.61 | SW846 8260B | 6/3/11 | 6/15/11 23:20 | DJB | B |
| Vinyl Chloride | 1.2U | ug/kg | | 2.4 | 1.2 | 0.61 | SW846 8260B | 6/3/11 | 6/15/11 23:20 | DJB | B |
| *Surrogate Recoveries* | *Results* | *Units* | *Footnotes* | *Limits* | | | *Method* | *Prepared* | *Analyzed* | *By* | *Cntr* |
| 1,2-Dichloroethane-d4 (S) | 95.4 | % | | 56-124 | | | SW846 8260B | 6/3/11 | 6/15/11 23:20 | DJB | B |
| 4-Bromofluorobenzene (S) | 83.5 | % | 17 | 85-120 | | | SW846 8260B | 6/3/11 | 6/15/11 23:20 | DJB | B |
| Dibromofluoromethane (S) | 90.9 | % | | 62-123 | | | SW846 8260B | 6/3/11 | 6/15/11 23:20 | DJB | B |
| Toluene-d8 (S) | 82.5 | % | 16 | 85-115 | | | SW846 8260B | 6/3/11 | 6/15/11 23:20 | DJB | B |
| **WET CHEMISTRY** | | | | | | | | | | | |
| Moisture | 20.0 | % | | 0.1 | 0.1 | 0.01 | SM20-2540 G | | 6/4/11 11:25 | KAK | E |
| Total Solids | 80.0 | % | | 0.1 | 0.1 | 0.01 | SM20-2540 G | | 6/4/11 11:25 | KAK | E |
| **METALS** | | | | | | | | | | | |
| Arsenic, Total | 6.5 | mg/kg | | 2.5 | 1.7 | 0.83 | SW846 6010C | 6/9/11 | 6/14/11 03:41 | SRT | E1 |

***Sample Comments:***

One or more of the method 8260 surrogates were recovered outside of the control limits indicating a significant matrix interference.

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## ANALYTICAL RESULTS

Workorder: 9908509 EMS013|Marsh Run 06/02/11

Lab ID: **9908509016** Date Collected: 6/2/2011 17:10 Matrix: Solid

Sample ID: **SB-9-0-0.5** Date Received: 6/2/2011 20:00

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **SEMIVOLATILES** | | | | | | | | | | | |
| Acenaphthene | 43.0U | ug/kg | | 352 | 43.0 | 26.1 | SW846 8270D | 6/15/11 | 6/16/11 22:19 | DHF | A2 |
| Acenaphthylene | 43.0U | ug/kg | | 352 | 43.0 | 14.3 | SW846 8270D | 6/15/11 | 6/16/11 22:19 | DHF | A2 |
| Anthracene | 42.2J | ug/kg | | 352 | 43.0 | 15.6 | SW846 8270D | 6/15/11 | 6/16/11 22:19 | DHF | A2 |
| Benzo(a)anthracene | 37.9J | ug/kg | | 352 | 43.0 | 23.4 | SW846 8270D | 6/15/11 | 6/16/11 22:19 | DHF | A2 |
| Benzo(a)pyrene | 34.9J | ug/kg | | 352 | 43.0 | 10.4 | SW846 8270D | 6/15/11 | 6/16/11 22:19 | DHF | A2 |
| Benzo(b)fluoranthene | 44.7J | ug/kg | | 352 | 43.0 | 18.2 | SW846 8270D | 6/15/11 | 6/16/11 22:19 | DHF | A2 |
| Benzo(k)fluoranthene | 41.8J | ug/kg | | 352 | 43.0 | 16.9 | SW846 8270D | 6/15/11 | 6/16/11 22:19 | DHF | A2 |
| Chrysene | 51.5J | ug/kg | | 352 | 43.0 | 11.7 | SW846 8270D | 6/15/11 | 6/16/11 22:19 | DHF | A2 |
| Dibenzo(a,h)anthracene | 43.0U | ug/kg | | 352 | 43.0 | 36.5 | SW846 8270D | 6/15/11 | 6/16/11 22:19 | DHF | A2 |
| Fluoranthene | 62.7J | ug/kg | | 352 | 43.0 | 14.3 | SW846 8270D | 6/15/11 | 6/16/11 22:19 | DHF | A2 |
| Fluorene | 43.0U | ug/kg | | 352 | 43.0 | 12.1 | SW846 8270D | 6/15/11 | 6/16/11 22:19 | DHF | A2 |
| Indeno(1,2,3-cd)pyrene | 30.8J | ug/kg | | 352 | 43.0 | 10.4 | SW846 8270D | 6/15/11 | 6/16/11 22:19 | DHF | A2 |
| Naphthalene | 43.0U | ug/kg | | 352 | 43.0 | 23.4 | SW846 8270D | 6/15/11 | 6/16/11 22:19 | DHF | A2 |
| Phenanthrene | 43.0J | ug/kg | | 352 | 43.0 | 16.9 | SW846 8270D | 6/15/11 | 6/16/11 22:19 | DHF | A2 |
| Pyrene | 66.0J | ug/kg | | 352 | 43.0 | 13.0 | SW846 8270D | 6/15/11 | 6/16/11 22:19 | DHF | A2 |
| *Surrogate Recoveries* | *Results* | *Units* | *Footnotes* | *Limits* | | | *Method* | *Prepared* | *Analyzed* | *By* | *Cntr* |
| 2-Fluorobiphenyl (S) | 89.3 | % | | 45-105 | | | SW846 8270D | 6/15/11 | 6/16/11 22:19 | DHF | A2 |
| Nitrobenzene-d5 (S) | 81.5 | % | | 35-100 | | | SW846 8270D | 6/15/11 | 6/16/11 22:19 | DHF | A2 |
| Terphenyl-d14 (S) | 100 | % | | 30-125 | | | SW846 8270D | 6/15/11 | 6/16/11 22:19 | DHF | A2 |
| **WET CHEMISTRY** | | | | | | | | | | | |
| Moisture | 23.7 | % | | 0.1 | 0.1 | 0.01 | SM20-2540 G | | 6/4/11 11:25 | KAK | A |
| Total Solids | 76.3 | % | | 0.1 | 0.1 | 0.01 | SM20-2540 G | | 6/4/11 11:25 | KAK | A |
| **METALS** | | | | | | | | | | | |
| Lead, Total | 27.2 K | mg/kg | | 2.3 | 1.5 | 0.77 | SW846 6010C | 6/9/11 | 6/14/11 03:46 | SRT | A1 |
| Thallium, Total | 2.3U | mg/kg | | 3.5 | 2.3 | 1.2 | SW846 6010C | 6/9/11 | 6/14/11 03:46 | SRT | A1 |

***Sample Comments:***

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## ANALYTICAL RESULTS

Workorder: 9908509 EMS013|Marsh Run 06/02/11

Lab ID: **9908509017** Date Collected: 6/2/2011 16:45 Matrix: Solid
Sample ID: **SB-10-0-0.5** Date Received: 6/2/2011 20:00

| | Results | Units | Footnotes | Limits | | | Method | Prepared | Analyzed | By | Cntr |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **VOLATILE ORGANICS** | | | | | | | | | | | |
| cis-1,2-Dichloroethene | 1.1U | ug/kg | | 2.2 | 1.1 | 0.55 | SW846 8260B | 6/3/11 | 6/15/11 23:49 | DJB | B |
| trans-1,2-Dichloroethene | 1.1U | ug/kg | | 2.2 | 1.1 | 0.55 | SW846 8260B | 6/3/11 | 6/15/11 23:49 | DJB | B |
| Tetrachloroethene | 1.1U | ug/kg | | 2.2 | 1.1 | 0.55 | SW846 8260B | 6/3/11 | 6/15/11 23:49 | DJB | B |
| Trichloroethene | 1.1U | ug/kg | | 2.2 | 1.1 | 0.55 | SW846 8260B | 6/3/11 | 6/15/11 23:49 | DJB | B |
| Vinyl Chloride | 1.1U | ug/kg | | 2.2 | 1.1 | 0.55 | SW846 8260B | 6/3/11 | 6/15/11 23:49 | DJB | B |
| *Surrogate Recoveries* | *Results* | *Units* | *Footnotes* | *Limits* | | | *Method* | *Prepared* | *Analyzed* | *By* | *Cntr* |
| 1,2-Dichloroethane-d4 (S) | 83.5 | % | | 56-124 | | | SW846 8260B | 6/3/11 | 6/15/11 23:49 | DJB | B |
| 4-Bromofluorobenzene (S) | 85 | % | | 85-120 | | | SW846 8260B | 6/3/11 | 6/15/11 23:49 | DJB | B |
| Dibromofluoromethane (S) | 84.3 | % | | 62-123 | | | SW846 8260B | 6/3/11 | 6/15/11 23:49 | DJB | B |
| Toluene-d8 (S) | 86.1 | % | | 85-115 | | | SW846 8260B | 6/3/11 | 6/15/11 23:49 | DJB | B |
| **SEMIVOLATILES** | | | | | | | | | | | |
| Acenaphthene | 1780 | ug/kg | | 324 | 39.6 | 24.0 | SW846 8270D | 6/15/11 | 6/17/11 04:46 | DHF | D1 |
| Acenaphthylene | 108J | ug/kg | | 324 | 39.6 | 13.2 | SW846 8270D | 6/15/11 | 6/17/11 04:46 | DHF | D1 |
| Anthracene | 3550 | ug/kg | | 324 | 39.6 | 14.4 | SW846 8270D | 6/15/11 | 6/17/11 04:46 | DHF | D1 |
| Benzo(a)anthracene | 8720 | ug/kg | | 3240 | 396 | 216 | SW846 8270D | 6/15/11 | 6/18/11 03:35 | CGS | D1 |
| Benzo(a)pyrene | 7290 | ug/kg | | 3240 | 396 | 96.1 | SW846 8270D | 6/15/11 | 6/18/11 03:35 | CGS | D1 |
| Benzo(b)fluoranthene | 7060 | ug/kg | | 3240 | 396 | 168 | SW846 8270D | 6/15/11 | 6/18/11 03:35 | CGS | D1 |
| Benzo(k)fluoranthene | 6710 | ug/kg | | 3240 | 396 | 156 | SW846 8270D | 6/15/11 | 6/18/11 03:35 | CGS | D1 |
| Chrysene | 8060 | ug/kg | | 3240 | 396 | 108 | SW846 8270D | 6/15/11 | 6/18/11 03:35 | CGS | D1 |
| Dibenzo(a,h)anthracene | 946 | ug/kg | | 324 | 39.6 | 33.6 | SW846 8270D | 6/15/11 | 6/17/11 04:46 | DHF | D1 |
| Fluoranthene | 17500 | ug/kg | | 3240 | 396 | 132 | SW846 8270D | 6/15/11 | 6/18/11 03:35 | CGS | D1 |
| Fluorene | 1840 | ug/kg | | 324 | 39.6 | 11.2 | SW846 8270D | 6/15/11 | 6/17/11 04:46 | DHF | D1 |
| Indeno(1,2,3-cd)pyrene | 1880 | ug/kg | | 324 | 39.6 | 9.6 | SW846 8270D | 6/15/11 | 6/17/11 04:46 | DHF | D1 |
| Naphthalene | 505 | ug/kg | | 324 | 39.6 | 21.6 | SW846 8270D | 6/15/11 | 6/17/11 04:46 | DHF | D1 |
| Phenanthrene | 14900 | ug/kg | | 3240 | 396 | 156 | SW846 8270D | 6/15/11 | 6/18/11 03:35 | CGS | D1 |
| Pyrene | 15400 | ug/kg | | 3240 | 396 | 120 | SW846 8270D | 6/15/11 | 6/18/11 03:35 | CGS | D1 |
| *Surrogate Recoveries* | *Results* | *Units* | *Footnotes* | *Limits* | | | *Method* | *Prepared* | *Analyzed* | *By* | *Cntr* |
| 2-Fluorobiphenyl (S) | 75.5 | % | | 45-105 | | | SW846 8270D | 6/15/11 | 6/17/11 04:46 | DHF | D1 |
| Nitrobenzene-d5 (S) | 71.1 | % | | 35-100 | | | SW846 8270D | 6/15/11 | 6/17/11 04:46 | DHF | D1 |
| Terphenyl-d14 (S) | 89.3 | % | | 30-125 | | | SW846 8270D | 6/15/11 | 6/17/11 04:46 | DHF | D1 |
| 2-Fluorobiphenyl (S) | 79 | % | | 45-105 | | | SW846 8270D | 6/15/11 | 6/18/11 03:35 | CGS | D1 |
| Nitrobenzene-d5 (S) | 74.5 | % | | 35-100 | | | SW846 8270D | 6/15/11 | 6/18/11 03:35 | CGS | D1 |
| Terphenyl-d14 (S) | 101 | % | | 30-125 | | | SW846 8270D | 6/15/11 | 6/18/11 03:35 | CGS | D1 |
| **WET CHEMISTRY** | | | | | | | | | | | |
| Moisture | 16.7 | % | | 0.1 | 0.1 | 0.01 | SM20-2540 G | | 6/4/11 11:25 | KAK | D |
| Total Solids | 83.3 | % | | 0.1 | 0.1 | 0.01 | SM20-2540 G | | 6/4/11 11:25 | KAK | D |



Report ID: 9908509

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## ANALYTICAL RESULTS

Workorder: 9908509 EMS013|Marsh Run 06/02/11

Lab ID: **9908509018** Date Collected: 6/2/2011 18:30 Matrix: Solid
Sample ID: **SB-11-0-0.5** Date Received: 6/2/2011 20:00

**SEMIVOLATILES**

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Acenaphthene | 49.1J | ug/kg | 285 | 34.9 | 21.1 | SW846 8270D | 6/15/11 | 6/16/11 23:07 | DHF | A2 |
| Acenaphthylene | 34.9U | ug/kg | 285 | 34.9 | 11.6 | SW846 8270D | 6/15/11 | 6/16/11 23:07 | DHF | A2 |
| Anthracene | 138J | ug/kg | 285 | 34.9 | 12.7 | SW846 8270D | 6/15/11 | 6/16/11 23:07 | DHF | A2 |
| Benzo(a)anthracene | 378 | ug/kg | 285 | 34.9 | 19.0 | SW846 8270D | 6/15/11 | 6/16/11 23:07 | DHF | A2 |
| Benzo(a)pyrene | 307 | ug/kg | 285 | 34.9 | 8.5 | SW846 8270D | 6/15/11 | 6/16/11 23:07 | DHF | A2 |
| Benzo(b)fluoranthene | 302 | ug/kg | 285 | 34.9 | 14.8 | SW846 8270D | 6/15/11 | 6/16/11 23:07 | DHF | A2 |
| Benzo(k)fluoranthene | 300 | ug/kg | 285 | 34.9 | 13.7 | SW846 8270D | 6/15/11 | 6/16/11 23:07 | DHF | A2 |
| Chrysene | 357 | ug/kg | 285 | 34.9 | 9.5 | SW846 8270D | 6/15/11 | 6/16/11 23:07 | DHF | A2 |
| Dibenzo(a,h)anthracene | 61.0J | ug/kg | 285 | 34.9 | 29.6 | SW846 8270D | 6/15/11 | 6/16/11 23:07 | DHF | A2 |
| Fluoranthene | 773 | ug/kg | 285 | 34.9 | 11.6 | SW846 8270D | 6/15/11 | 6/16/11 23:07 | DHF | A2 |
| Fluorene | 52.3J | ug/kg | 285 | 34.9 | 9.8 | SW846 8270D | 6/15/11 | 6/16/11 23:07 | DHF | A2 |
| Indeno(1,2,3-cd)pyrene | 205J | ug/kg | 285 | 34.9 | 8.5 | SW846 8270D | 6/15/11 | 6/16/11 23:07 | DHF | A2 |
| Naphthalene | 34.9U | ug/kg | 285 | 34.9 | 19.0 | SW846 8270D | 6/15/11 | 6/16/11 23:07 | DHF | A2 |
| Phenanthrene | 547 | ug/kg | 285 | 34.9 | 13.7 | SW846 8270D | 6/15/11 | 6/16/11 23:07 | DHF | A2 |
| Pyrene | 725 | ug/kg | 285 | 34.9 | 10.6 | SW846 8270D | 6/15/11 | 6/16/11 23:07 | DHF | A2 |

| *Surrogate Recoveries* | *Results* | *Units* | *Footnotes* | *Limits* | *Method* | *Prepared* | *Analyzed* | *By* | *Cntr* |
|---|---|---|---|---|---|---|---|---|---|
| 2-Fluorobiphenyl (S) | 86.3 | % | | 45-105 | SW846 8270D | 6/15/11 | 6/16/11 23:07 | DHF | A2 |
| Nitrobenzene-d5 (S) | 81.3 | % | | 35-100 | SW846 8270D | 6/15/11 | 6/16/11 23:07 | DHF | A2 |
| Terphenyl-d14 (S) | 106 | % | | 30-125 | SW846 8270D | 6/15/11 | 6/16/11 23:07 | DHF | A2 |

**WET CHEMISTRY**

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Moisture | 5.4 | % | 0.1 | 0.1 | 0.01 | SM20-2540 G | | 6/4/11 11:25 | KAK | A |
| Total Solids | 94.6 | % | 0.1 | 0.1 | 0.01 | SM20-2540 G | | 6/4/11 11:25 | KAK | A |

**METALS**

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Arsenic, Total | 2.5J | mg/kg | 3.6 | 2.4 | 1.2 | SW846 6010C | 6/9/11 | 6/14/11 04:31 | SRT | A1 |
| Lead, Total | 14.5 K | mg/kg | 3.6 | 2.4 | 1.2 | SW846 6010C | 6/9/11 | 6/14/11 04:31 | SRT | A1 |

***Sample Comments:***

Due to spectral interference from Calcium, this sample was diluted 1/2 for the 6010C soil metals analysis. The detection limits were raised accordingly. SRT 06.14.11

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## ANALYTICAL RESULTS

Workorder: 9908509 EMS013|Marsh Run 06/02/11

Lab ID: **9908509019** Date Collected: 6/2/2011 18:45 Matrix: Solid
Sample ID: **SB-11-2-4** Date Received: 6/2/2011 20:00

### VOLATILE ORGANICS

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| cis-1,2-Dichloroethene | 1.1U UJ | ug/kg | | 2.1 | 1.1 | 0.53 | SW846 8260B | 6/3/11 | 6/16/11 00:18 | DJB | B |
| trans-1,2-Dichloroethene | 1.1U | ug/kg | | 2.1 | 1.1 | 0.53 | SW846 8260B | 6/3/11 | 6/16/11 00:18 | DJB | B |
| Tetrachloroethene | 1.1U | ug/kg | | 2.1 | 1.1 | 0.53 | SW846 8260B | 6/3/11 | 6/16/11 00:18 | DJB | B |
| Trichloroethene | 1.1U | ug/kg | | 2.1 | 1.1 | 0.53 | SW846 8260B | 6/3/11 | 6/16/11 00:18 | DJB | B |
| Vinyl Chloride | 1.1U | ug/kg | | 2.1 | 1.1 | 0.53 | SW846 8260B | 6/3/11 | 6/16/11 00:18 | DJB | B |

| *Surrogate Recoveries* | *Results* | *Units* | *Footnotes* | *Limits* | *Method* | *Prepared* | *Analyzed* | *By* | *Cntr* |
|---|---|---|---|---|---|---|---|---|---|
| 1,2-Dichloroethane-d4 (S) | 83.4 | % | | 56-124 | SW846 8260B | 6/3/11 | 6/16/11 00:18 | DJB | B |
| 4-Bromofluorobenzene (S) | 68.8 | % | 18 | 85-120 | SW846 8260B | 6/3/11 | 6/16/11 00:18 | DJB | B |
| Dibromofluoromethane (S) | 83.8 | % | | 62-123 | SW846 8260B | 6/3/11 | 6/16/11 00:18 | DJB | B |
| Toluene-d8 (S) | 76.9 | % | 18 | 85-115 | SW846 8260B | 6/3/11 | 6/16/11 00:18 | DJB | B |

### SEMIVOLATILES

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Acenaphthene | 3660 | ug/kg | 326 | 39.9 | 24.2 | SW846 8270D | 6/15/11 | 6/17/11 05:34 | DHF | D2 |
| Acenaphthylene | 268J | ug/kg | 326 | 39.9 | 13.3 | SW846 8270D | 6/15/11 | 6/17/11 05:34 | DHF | D2 |
| Anthracene | 9420 | ug/kg | 3260 | 399 | 145 | SW846 8270D | 6/15/11 | 6/18/11 04:23 | CGS | D2 |
| Benzo(a)anthracene | 13400 | ug/kg | 3260 | 399 | 217 | SW846 8270D | 6/15/11 | 6/18/11 04:23 | CGS | D2 |
| Benzo(a)pyrene | 10200 | ug/kg | 3260 | 399 | 96.6 | SW846 8270D | 6/15/11 | 6/18/11 04:23 | CGS | D2 |
| Benzo(b)fluoranthene | 9140 | ug/kg | 3260 | 399 | 109 | SW846 8270D | 6/15/11 | 6/18/11 04:23 | CGS | D2 |
| Benzo(k)fluoranthene | 9530 | ug/kg | 3260 | 399 | 157 | SW846 8270D | 6/15/11 | 6/18/11 04:23 | CGS | D2 |
| Chrysene | 11700 | ug/kg | 3260 | 399 | 109 | SW846 8270D | 6/15/11 | 6/18/11 04:23 | CGS | D2 |
| Dibenzo(a,h)anthracene | 1140 | ug/kg | 326 | 39.9 | 33.8 | SW846 8270D | 6/15/11 | 6/17/11 05:34 | DHF | D2 |
| Fluoranthene | 26500 | ug/kg | 3260 | 399 | 133 | SW846 8270D | 6/15/11 | 6/18/11 04:23 | CGS | D2 |
| Fluorene | 4780 | ug/kg | 326 | 39.9 | 11.2 | SW846 8270D | 6/15/11 | 6/17/11 05:34 | DHF | D2 |
| Indeno(1,2,3-cd)pyrene | 2150 | ug/kg | 326 | 39.9 | 9.7 | SW846 8270D | 6/15/11 | 6/17/11 05:34 | DHF | D2 |
| Naphthalene | 2370 | ug/kg | 326 | 39.9 | 21.7 | SW846 8270D | 6/15/11 | 6/17/11 05:34 | DHF | D2 |
| Phenanthrene | 29400 | ug/kg | 3260 | 399 | 157 | SW846 8270D | 6/15/11 | 6/18/11 04:23 | CGS | D2 |
| Pyrene | 23700 | ug/kg | 3260 | 399 | 121 | SW846 8270D | 6/15/11 | 6/18/11 04:23 | CGS | D2 |

| *Surrogate Recoveries* | *Results* | *Units* | *Footnotes* | *Limits* | *Method* | *Prepared* | *Analyzed* | *By* | *Cntr* |
|---|---|---|---|---|---|---|---|---|---|
| 2-Fluorobiphenyl (S) | 83.3 | % | | 45-105 | SW846 8270D | 6/15/11 | 6/17/11 05:34 | DHF | D2 |
| Nitrobenzene-d5 (S) | 75.7 | % | | 35-100 | SW846 8270D | 6/15/11 | 6/17/11 05:34 | DHF | D2 |
| Terphenyl-d14 (S) | 96.7 | % | | 30-125 | SW846 8270D | 6/15/11 | 6/17/11 05:34 | DHF | D2 |
| 2-Fluorobiphenyl (S) | 86.4 | % | | 45-105 | SW846 8270D | 6/15/11 | 6/18/11 04:23 | CGS | D2 |
| Nitrobenzene-d5 (S) | 78.6 | % | | 35-100 | SW846 8270D | 6/15/11 | 6/18/11 04:23 | CGS | D2 |
| Terphenyl-d14 (S) | 109 | % | | 30-125 | SW846 8270D | 6/15/11 | 6/18/11 04:23 | CGS | D2 |

### WET CHEMISTRY

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Moisture | 20.9 | % | 0.1 | 0.1 | 0.01 | SM20-2540 G | 6/4/11 11:25 | KAK | D |
| Total Solids | 79.1 | % | 0.1 | 0.1 | 0.01 | SM20-2540 G | 6/4/11 11:25 | KAK | D |

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## ANALYTICAL RESULTS

Workorder: 9908509 EMS013|Marsh Run 06/02/11

| | | | | | |
|---|---|---|---|---|---|
| Lab ID: | **9908509019** | Date Collected: | 6/2/2011 18:45 | Matrix: | Solid |
| Sample ID: | **SB-11-2-4** | Date Received: | 6/2/2011 20:00 | | |

**METALS**

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Lead, Total | 49.3 K | mg/kg | 2.1 | 1.4 | 0.70 | SW846 6010C | 6/9/11 | 6/14/11 03:56 | SRT | D1 |

***Sample Comments:***

One or more of the method 8260 surrogates were recovered outside of the control limits indicating a significant matrix interference.

Anna G Milliken
Technical Manager

ENVIRONMENTAL
Data Services, Inc.

# DATA VALIDATION SUMMARY REPORT
# MARSH RUN PARK, FAIRVIEW TOWNSHIP, PENNSYLVANIA

Client: EA Engineering, Science & Technology, Inc., Sparks, Maryland
SDG: EMS-013
Laboratory: Analytical Laboratory Services, Middletown, Pennsylvania
Site: Marsh Run Park, Fairview Township, Pennsylvania
Date: January 16, 2012

| EDS ID | Client Sample ID | Laboratory Sample ID | Matrix |
|---|---|---|---|
| 2 | SB-DUP-2 | 9908509002 | Soil |
| 3 | SB-1-0-0.5 | 9908509003 | Soil |
| 5 | SB-1-2.5-3 | 9908509005 | Soil |
| 6 | SB-3-0-0.5 | 9908509006 | Soil |
| 7 | SB-3-2-4 | 9908509007 | Soil |
| 8 | SB-4-0-0.5 | 9908509008 | Soil |
| 9 | SB-4-2.5-3 | 9908509009 | Soil |
| 16 | SB-9-0-0.5 | 9908509016 | Soil |
| 17 | SB-10-0-0.5 | 9908509017 | Soil |
| 18 | SB-11-0-0.5 | 9908509018 | Soil |
| 19 | SB-11-2-4 | 9908509019 | Soil |

A full data validation was performed on the analytical data for eleven soil samples collected on June 2, 2011 by EA Engineering at the Marsh Run Park site in Fairview Township, Pennsylvania. The samples were analyzed under the Environmental Protection Agency (USEPA) "Test Methods for the Evaluation of Solid Waste, USEPA SW-846, Third Edition, September 1986, with revisions".

Specific method references are as follows:

| *Analysis* | *Method References* |
|---|---|
| PAH | USEPA SW-846 Method 8270D |

The data have been validated according to the protocols and quality control (QC) requirements of the analytical methods, the USEPA Region III data validation guidelines as follows:

- The USEPA Region III Modifications to the National Functional Guidelines for Organic Data Review," September 1994;
- and the reviewer's professional judgment.

The following items/criteria were reviewed for this report:

## *Organics*

- Holding times and sample preservation

- Surrogate Spike recoveries
- Matrix Spike/Matrix Spike Duplicate (MS/MSD) recoveries
- Laboratory Control Sample/Duplicate (LCS/LCSD) recoveries
- Method blank and field blank contamination
- Gas Chromatography (GC)/Mass Spectroscopy (MS) tuning
- Initial and continuing calibration summaries
- Compound Quantitation
- Internal standard area and retention time summary forms
- Field Duplicate sample precision

**Overall Usability Issues:**

There were no rejections of data.

Overall the data is acceptable for the intended purposes as qualified for the deficiencies detailed in this report.

**Polynuclear Aromatic Hydrocarbons (PAH)**

**Holding Times**

- All samples were extracted within 14 days and analyzed within 40 days for soil samples.

**Surrogate Spike Recoveries**

- All samples exhibited acceptable surrogate %R values except the following.

| Sample ID | Surrogate | %R | Qualifier |
|---|---|---|---|
| 8 | All Diluted Out | 0%D | None |

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

- A MS/MSD sample was not analyzed in this package.

**Laboratory Control Samples**

- The LCS samples exhibited acceptable %R values.

**Method Blank**

- The method blanks were free of contamination.

## Field Blank

- Field QC results are summarized below.

| Blank ID | Compound | Conc. ug/L | Action Level ug/L | Qualifier | Affected Samples |
|---|---|---|---|---|---|
| RB1 and RB-3 (from EMS-014) | None- ND | - | - | - | - |

## GC/MS Tuning

- All criteria were met.

## Initial Calibration

- The initial calibrations exhibited acceptable %RSD and mean RRF values.

## Continuing Calibration

- The continuing calibrations exhibited acceptable %D and RRF values.

## Compound Quantitation

- Many samples were reanalyzed at various dilutions due to very high concentrations of target compounds. All results were reported on one page.

## Internal Standard (IS) Area Performance

- All internal standards met response and retention time (RT) criteria.

## Field Duplicate Sample Precision

- Field duplicate results are summarized below.

| PAH | | | | |
|---|---|---|---|---|
| Compound | SB-3-0-0.5 ug/kg | SB-DUP-2 ug/kg | RPD | Qualifier |
| Acenaphthene | 5720 | 5190 | 10% | None |
| Acenaphthylene | 236 | 548 | 80% | |
| Anthracene | 16900 | 14000 | 19% | |
| Benzo(a)anthracene | 29600 | 29500 | 0% | |
| Benzo(a)pyrene | 24200 | 25000 | 3% | |
| Benzo(b)fluorene | 25400 | 25100 | 1% | |
| Benzo(k)fluoranthene | 21200 | 24300 | 14% | |
| Chrysene | 28700 | 28400 | 1% | |

| PAH | | | | |
|---|---|---|---|---|
| Compound | SB-3-0-0.5 ug/kg | SB-DUP-2 ug/kg | RPD | Qualifier |
| Dibenzo(a,h)anthracene | 6420 | 6500 | 1% | None |
| Fluoranthene | 64600 | 57700 | 11% | |
| Fluorene | 8500 | 7510 | 12% | |
| Indeno(1,2,3-cd)pyrene | 14700 | 15000 | 2% | |
| Naphthalene | 1710 | 4710 | 93% | |
| Phenanthrene | 60700 | 50200 | 19% | |
| Pyrene | 52700 | 52000 | 1% | |

***Package Summary:***

Please contact the undersigned at (757) 564-0090 if you have any questions or need further information.

Signed: Nancy Weaver Dated: 1/17/12

Nancy Weaver
Senior Chemist

**Data Qualifiers**

| | | |
|---|---|---|
| U | = | Not detected. The associated number indicates approximate sample concentration necessary to be detected. |
| B | = | Not detected substantially above the level reported in laboratory or field blanks. |
| R | = | Unreliable result. Analyte may or may not be present in the sample. Supporting data necessary to confirm result. |
| N | = | Tentative identification. Consider present. Special methods may be needed to confirm its presence or absence in future sampling efforts.. |
| J | = | Analyte present. Reported value may not be accurate or precise. |
| K | = | Analyte present. Reported value may be biased high. Actual value is expected lower. |
| L | = | Analyte present. Reported value may be biased low. Actual value is expected higher. |
| UJ | = | Not detected. Quantitation limit may be inaccurate or imprecise. |
| UL | = | Not detected. Quantitation limit is probably higher. |
| Q | = | No analytical result. |
| NJ | = | Qualitative identification questionable due to poor resolution. Presumptively present at approximate quantity. |

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## ANALYTICAL RESULTS

Workorder: 9908509 EMS013|Marsh Run 06/02/11

Lab ID: **9908509002** Date Collected: 6/2/2011 00:00 Matrix: Solid
Sample ID: **SB-DUP-2** Date Received: 6/2/2011 20:00

**SEMIVOLATILES**

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Acenaphthene | 5190 | ug/kg | | 395 | 48.3 | 29.3 | SW846 8270D | 6/15/11 | 6/17/11 00:43 | DHF | A1 |
| Acenaphthylene | 548 | ug/kg | | 395 | 48.3 | 16.1 | SW846 8270D | 6/15/11 | 6/17/11 00:43 | DHF | A1 |
| Anthracene | 14000 | ug/kg | | 7910 | 967 | 351 | SW846 8270D | 6/15/11 | 6/17/11 23:32 | CGS | A1 |
| Benzo(a)anthracene | 29500 | ug/kg | | 7910 | 967 | 527 | SW846 8270D | 6/15/11 | 6/17/11 23:32 | CGS | A1 |
| Benzo(a)pyrene | 25000 | ug/kg | | 7910 | 967 | 234 | SW846 8270D | 6/15/11 | 6/17/11 23:32 | CGS | A1 |
| Benzo(b)fluoranthene | 25100 | ug/kg | | 7910 | 967 | 410 | SW846 8270D | 6/15/11 | 6/17/11 23:32 | CGS | A1 |
| Benzo(k)fluoranthene | 24300 | ug/kg | | 7910 | 967 | 381 | SW846 8270D | 6/15/11 | 6/17/11 23:32 | CGS | A1 |
| Chrysene | 28400 | ug/kg | | 7910 | 967 | 264 | SW846 8270D | 6/15/11 | 6/17/11 23:32 | CGS | A1 |
| Dibenzo(a,h)anthracene | 6500J | ug/kg | | 7910 | 967 | 820 | SW846 8270D | 6/15/11 | 6/17/11 23:32 | CGS | A1 |
| Fluoranthene | 57700 | ug/kg | | 7910 | 967 | 322 | SW846 8270D | 6/15/11 | 6/17/11 23:32 | CGS | A1 |
| Fluorene | 7510J | ug/kg | | 7910 | 967 | 272 | SW846 8270D | 6/15/11 | 6/17/11 23:32 | CGS | A1 |
| Indeno(1,2,3-cd)pyrene | 15000 | ug/kg | | 7910 | 967 | 234 | SW846 8270D | 6/15/11 | 6/17/11 23:32 | CGS | A1 |
| Naphthalene | 4710 | ug/kg | | 395 | 48.3 | 26.4 | SW846 8270D | 6/15/11 | 6/17/11 00:43 | DHF | A1 |
| Phenanthrene | 50200 | ug/kg | | 7910 | 967 | 381 | SW846 8270D | 6/15/11 | 6/17/11 23:32 | CGS | A1 |
| Pyrene | 52000 | ug/kg | | 7910 | 967 | 293 | SW846 8270D | 6/15/11 | 6/17/11 23:32 | CGS | A1 |
| *Surrogate Recoveries* | *Results* | *Units* | *Footnotes* | *Limits* | | | *Method* | *Prepared* | *Analyzed* | *By* | *Cntr* |
| 2-Fluorobiphenyl (S) | 85.4 | % | | 45-105 | | | SW846 8270D | 6/15/11 | 6/17/11 00:43 | DHF | A1 |
| Nitrobenzene-d5 (S) | 71.1 | % | | 35-100 | | | SW846 8270D | 6/15/11 | 6/17/11 00:43 | DHF | A1 |
| Terphenyl-d14 (S) | 103 | % | | 30-125 | | | SW846 8270D | 6/15/11 | 6/17/11 00:43 | DHF | A1 |
| 2-Fluorobiphenyl (S) | 85.5 | % | | 45-105 | | | SW846 8270D | 6/15/11 | 6/17/11 23:32 | CGS | A1 |
| Nitrobenzene-d5 (S) | 76.5 | % | | 35-100 | | | SW846 8270D | 6/15/11 | 6/17/11 23:32 | CGS | A1 |
| Terphenyl-d14 (S) | 106 | % | | 30-125 | | | SW846 8270D | 6/15/11 | 6/17/11 23:32 | CGS | A1 |

**~~WET CHEMISTRY~~**

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Moisture | 31.7 | % | 0.1 | 0.1 | 0.01 | SM20-2540 G | | 6/4/11 11:25 | KAK | A |
| ~~Total Solids~~ | ~~68.3~~ | ~~%~~ | ~~0.1~~ | ~~0.1~~ | ~~0.01~~ | ~~SM20-2540 G~~ | | ~~6/4/11 11:25~~ | KAK | A |

***Sample Comments:***

Anna G Milliken
Technical Manager



NW 1/16/12

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## ANALYTICAL RESULTS

Workorder: 9908509 EMS013|Marsh Run 06/02/11

Lab ID: **9908509003** Date Collected: 6/2/2011 10:04 Matrix: Solid

Sample ID: **SB-1-0-0.5** Date Received: 6/2/2011 20:00

**VOLATILE ORGANICS**

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| cis-1,2-Dichloroethene | 1.1U | ug/kg | 2.1 | 1.1 | 0.53 | SW846 8260B | 6/3/11 | 6/15/11 18:27 | DJB | B |
| trans-1,2-Dichloroethene | 1.1U | ug/kg | 2.1 | 1.1 | 0.53 | SW846 8260B | 6/3/11 | 6/15/11 18:27 | DJB | B |
| Tetrachloroethene | 1.1U UJ | ug/kg | 2.1 | 1.1 | 0.53 | SW846 8260B | 6/3/11 | 6/15/11 18:27 | DJB | B |
| Trichloroethene | 1.1U | ug/kg | 2.1 | 1.1 | 0.53 | SW846 8260B | 6/3/11 | 6/15/11 18:27 | DJB | B |
| Vinyl Chloride | 1.1U | ug/kg | 2.1 | 1.1 | 0.53 | SW846 8260B | 6/3/11 | 6/15/11 18:27 | DJB | B |

| *Surrogate Recoveries* | *Results* | *Units* | *Footnotes* | *Limits* | *Method* | *Prepared* | *Analyzed* | *By* | *Cntr* |
|---|---|---|---|---|---|---|---|---|---|
| 1,2-Dichloroethane-d4 (S) | 92.7 | % | | 56-124 | SW846 8260B | 6/3/11 | 6/15/11 18:27 | DJB | B |
| 4-Bromofluorobenzene (S) | 106 | % | | 85-120 | SW846 8260B | 6/3/11 | 6/15/11 18:27 | DJB | B |
| Dibromofluoromethane (S) | 87.9 | % | | 62-123 | SW846 8260B | 6/3/11 | 6/15/11 18:27 | DJB | B |
| Toluene-d8 (S) | 88 | % | | 85-115 | SW846 8260B | 6/3/11 | 6/15/11 18:27 | DJB | B |

**SEMIVOLATILES**

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Acenaphthene | 38.2U | ug/kg | 312 | 38.2 | 23.1 | SW846 8270D | 6/15/11 | 6/16/11 20:43 | DHF | D1 |
| Acenaphthylene | 16.7J | ug/kg | 312 | 38.2 | 12.7 | SW846 8270D | 6/15/11 | 6/16/11 20:43 | DHF | D1 |
| Anthracene | 21.9J | ug/kg | 312 | 38.2 | 13.9 | SW846 8270D | 6/15/11 | 6/16/11 20:43 | DHF | D1 |
| Benzo(a)anthracene | 77.4J | ug/kg | 312 | 38.2 | 20.8 | SW846 8270D | 6/15/11 | 6/16/11 20:43 | DHF | D1 |
| Benzo(a)pyrene | 71.0J | ug/kg | 312 | 38.2 | 9.2 | SW846 8270D | 6/15/11 | 6/16/11 20:43 | DHF | D1 |
| Benzo(b)fluoranthene | 72.4J | ug/kg | 312 | 38.2 | 16.2 | SW846 8270D | 6/15/11 | 6/16/11 20:43 | DHF | D1 |
| Benzo(k)fluoranthene | 70.9J | ug/kg | 312 | 38.2 | 15.0 | SW846 8270D | 6/15/11 | 6/16/11 20:43 | DHF | D1 |
| Chrysene | 92.8J | ug/kg | 312 | 38.2 | 10.4 | SW846 8270D | 6/15/11 | 6/16/11 20:43 | DHF | D1 |
| Dibenzo(a,h)anthracene | 38.2U | ug/kg | 312 | 38.2 | 32.4 | SW846 8270D | 6/15/11 | 6/16/11 20:43 | DHF | D1 |
| Fluoranthene | 155J | ug/kg | 312 | 38.2 | 12.7 | SW846 8270D | 6/15/11 | 6/16/11 20:43 | DHF | D1 |
| Fluorene | 38.2U | ug/kg | 312 | 38.2 | 10.8 | SW846 8270D | 6/15/11 | 6/16/11 20:43 | DHF | D1 |
| Indeno(1,2,3-cd)pyrene | 46.3J | ug/kg | 312 | 38.2 | 9.2 | SW846 8270D | 6/15/11 | 6/16/11 20:43 | DHF | D1 |
| Naphthalene | 38.2U | ug/kg | 312 | 38.2 | 20.8 | SW846 8270D | 6/15/11 | 6/16/11 20:43 | DHF | D1 |
| Phenanthrene | 102J | ug/kg | 312 | 38.2 | 15.0 | SW846 8270D | 6/15/11 | 6/16/11 20:43 | DHF | D1 |
| Pyrene | 162J | ug/kg | 312 | 38.2 | 11.6 | SW846 8270D | 6/15/11 | 6/16/11 20:43 | DHF | D1 |

| *Surrogate Recoveries* | *Results* | *Units* | *Footnotes* | *Limits* | *Method* | *Prepared* | *Analyzed* | *By* | *Cntr* |
|---|---|---|---|---|---|---|---|---|---|
| 2-Fluorobiphenyl (S) | 78.9 | % | | 45-105 | SW846 8270D | 6/15/11 | 6/16/11 20:43 | DHF | D1 |
| Nitrobenzene-d5 (S) | 78.1 | % | | 35-100 | SW846 8270D | 6/15/11 | 6/16/11 20:43 | DHF | D1 |
| Terphenyl-d14 (S) | 99.8 | % | | 30-125 | SW846 8270D | 6/15/11 | 6/16/11 20:43 | DHF | D1 |

**WET CHEMISTRY**

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Moisture | 16.0 | % | 0.1 | 0.1 | 0.01 | SM20-2540 G | 6/4/11 11:25 | KAK | D |
| Total Solids | 84.0 | % | 0.1 | 0.1 | 0.01 | SM20-2540 G | 6/4/11 11:25 | KAK | D |

***Sample Comments:***



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State Certifications: CT PH-0224 , DE ID 11 , GA 914 , MA PA0102 , MD 128 , LA 04162 , VA 421 , WY EPA Region 8 , WV 343

## ANALYTICAL RESULTS

Workorder: 9908509 EMS013|Marsh Run 06/02/11

| | | | | | |
|---|---|---|---|---|---|
| Lab ID: | **9908509005** | Date Collected: | 6/2/2011 10:55 | Matrix: | Solid |
| Sample ID: | **SB-1-2.5-3** | Date Received: | 6/2/2011 20:00 | | |

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **VOLATILE ORGANICS** | | | | | | | | | | | |
| cis-1,2-Dichloroethene | 1.1U UJ | ug/kg | | 2.2 | 1.1 | 0.55 | SW846 8260B | 6/3/11 | 6/15/11 19:26 | DJB | B |
| trans-1,2-Dichloroethene | 1.1U | ug/kg | | 2.2 | 1.1 | 0.55 | SW846 8260B | 6/3/11 | 6/15/11 19:26 | DJB | B |
| Tetrachloroethene | 1.1U | ug/kg | | 2.2 | 1.1 | 0.55 | SW846 8260B | 6/3/11 | 6/15/11 19:26 | DJB | B |
| Trichloroethene | 1.1U | ug/kg | | 2.2 | 1.1 | 0.55 | SW846 8260B | 6/3/11 | 6/15/11 19:26 | DJB | B |
| Vinyl Chloride | 1.1U | ug/kg | | 2.2 | 1.1 | 0.55 | SW846 8260B | 6/3/11 | 6/15/11 19:26 | DJB | B |
| *Surrogate Recoveries* | *Results* | *Units* | *Footnotes* | *Limits* | | | *Method* | *Prepared* | *Analyzed* | *By* | *Cntr* |
| 1,2-Dichloroethane-d4 (S) | 94.8 | % | | 56-124 | | | SW846 8260B | 6/3/11 | 6/15/11 19:26 | DJB | B |
| 4-Bromofluorobenzene (S) | 80.1 | % | Z | 85-120 | | | SW846 8260B | 6/3/11 | 6/15/11 19:26 | DJB | B |
| Dibromofluoromethane (S) | 93 | % | | 62-123 | | | SW846 8260B | 6/3/11 | 6/15/11 19:26 | DJB | B |
| Toluene-d8 (S) | 83.3 | % | Z | 85-115 | | | SW846 8260B | 6/3/11 | 6/15/11 19:26 | DJB | B |
| **SEMIVOLATILES** | | | | | | | | | | | |
| Acenaphthene | 39.4U | ug/kg | | 322 | 39.4 | 23.9 | SW846 8270D | 6/15/11 | 6/16/11 21:31 | DHF | D2 |
| Acenaphthylene | 39.4U | ug/kg | | 322 | 39.4 | 13.1 | SW846 8270D | 6/15/11 | 6/16/11 21:31 | DHF | D2 |
| Anthracene | 39.4U | ug/kg | | 322 | 39.4 | 14.3 | SW846 8270D | 6/15/11 | 6/16/11 21:31 | DHF | D2 |
| Benzo(a)anthracene | 39.4U | ug/kg | | 322 | 39.4 | 21.5 | SW846 8270D | 6/15/11 | 6/16/11 21:31 | DHF | D2 |
| Benzo(a)pyrene | 39.4U | ug/kg | | 322 | 39.4 | 9.5 | SW846 8270D | 6/15/11 | 6/16/11 21:31 | DHF | D2 |
| Benzo(b)fluoranthene | 39.4U | ug/kg | | 322 | 39.4 | 16.7 | SW846 8270D | 6/15/11 | 6/16/11 21:31 | DHF | D2 |
| Benzo(k)fluoranthene | 39.4U | ug/kg | | 322 | 39.4 | 15.5 | SW846 8270D | 6/15/11 | 6/16/11 21:31 | DHF | D2 |
| Chrysene | 39.4U | ug/kg | | 322 | 39.4 | 10.7 | SW846 8270D | 6/15/11 | 6/16/11 21:31 | DHF | D2 |
| Dibenzo(a,h)anthracene | 39.4U | ug/kg | | 322 | 39.4 | 33.4 | SW846 8270D | 6/15/11 | 6/16/11 21:31 | DHF | D2 |
| Fluoranthene | 39.4U | ug/kg | | 322 | 39.4 | 13.1 | SW846 8270D | 6/15/11 | 6/16/11 21:31 | DHF | D2 |
| Fluorene | 39.4U | ug/kg | | 322 | 39.4 | 11.1 | SW846 8270D | 6/15/11 | 6/16/11 21:31 | DHF | D2 |
| Indeno(1,2,3-cd)pyrene | 39.4U | ug/kg | | 322 | 39.4 | 9.5 | SW846 8270D | 6/15/11 | 6/16/11 21:31 | DHF | D2 |
| Naphthalene | 39.4U | ug/kg | | 322 | 39.4 | 21.5 | SW846 8270D | 6/15/11 | 6/16/11 21:31 | DHF | D2 |
| Phenanthrene | 39.4U | ug/kg | | 322 | 39.4 | 15.5 | SW846 8270D | 6/15/11 | 6/16/11 21:31 | DHF | D2 |
| Pyrene | 39.4U | ug/kg | | 322 | 39.4 | 11.9 | SW846 8270D | 6/15/11 | 6/16/11 21:31 | DHF | D2 |
| *Surrogate Recoveries* | *Results* | *Units* | *Footnotes* | *Limits* | | | *Method* | *Prepared* | *Analyzed* | *By* | *Cntr* |
| 2-Fluorobiphenyl (S) | 78.5 | % | | 45-105 | | | SW846 8270D | 6/15/11 | 6/16/11 21:31 | DHF | D2 |
| Nitrobenzene-d5 (S) | 79.5 | % | | 35-100 | | | SW846 8270D | 6/15/11 | 6/16/11 21:31 | DHF | D2 |
| Terphenyl-d14 (S) | 101 | % | | 30-125 | | | SW846 8270D | 6/15/11 | 6/16/11 21:31 | DHF | D2 |
| **WET CHEMISTRY** | | | | | | | | | | | |
| Moisture | 18.4 | % | | 0.1 | 0.1 | 0.01 | SM20-2540 G | | 6/4/11 11:25 | KAK | D |
| Total Solids | 81.6 | % | | 0.1 | 0.1 | 0.01 | SM20-2540 G | | 6/4/11 11:25 | KAK | D |
| **METALS** | | | | | | | | | | | |
| Lead, Total | 16.9 K | mg/kg | | 2.4 | 1.6 | 0.79 | SW846 6010C | 6/9/11 | 6/14/11 02:29 | SRT | D1 |



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State Certifications: CT PH-0224 , DE ID 11 , GA 914 , MA PA0102 , MD 128 , LA 04162 , VA 421 , WY EPA Region 8 , WV 343

## ANALYTICAL RESULTS

Workorder: 9908509 EMS013|Marsh Run 06/02/11

Lab ID: **9908509006** Date Collected: 6/2/2011 11:45 Matrix: Solid
Sample ID: **SB-3-0-0.5** Date Received: 6/2/2011 20:00

**VOLATILE ORGANICS**

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| cis-1,2-Dichloroethene | 1.1U | ug/kg | 2.2 | 1.1 | 0.56 | SW846 8260B | 6/3/11 | 6/15/11 19:55 | DJB | B |
| trans-1,2-Dichloroethene | 1.1U | ug/kg | 2.2 | 1.1 | 0.56 | SW846 8260B | 6/3/11 | 6/15/11 19:55 | DJB | B |
| Tetrachloroethene | 1.1U | ug/kg | 2.2 | 1.1 | 0.56 | SW846 8260B | 6/3/11 | 6/15/11 19:55 | DJB | B |
| Trichloroethene | 0.88J | ug/kg | 2.2 | 1.1 | 0.56 | SW846 8260B | 6/3/11 | 6/15/11 19:55 | DJB | B |
| Vinyl Chloride | 1.1U | ug/kg | 2.2 | 1.1 | 0.56 | SW846 8260B | 6/3/11 | 6/15/11 19:55 | DJB | B |

| *Surrogate Recoveries* | *Results* | *Units* | *Footnotes* | *Limits* | *Method* | *Prepared* | *Analyzed* | *By* | *Cntr* |
|---|---|---|---|---|---|---|---|---|---|
| 1,2-Dichloroethane-d4 (S) | 90.3 | % | | 56-124 | SW846 8260B | 6/3/11 | 6/15/11 19:55 | DJB | B |
| 4-Bromofluorobenzene (S) | 100 | % | | 85-120 | SW846 8260B | 6/3/11 | 6/15/11 19:55 | DJB | B |
| Dibromofluoromethane (S) | 91.2 | % | | 62-123 | SW846 8260B | 6/3/11 | 6/15/11 19:55 | DJB | B |
| Toluene-d8 (S) | 94.2 | % | | 85-115 | SW846 8260B | 6/3/11 | 6/15/11 19:55 | DJB | B |

**SEMIVOLATILES**

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Acenaphthene | 5720 | ug/kg | 308 | 37.7 | 22.8 | SW846 8270D | 6/15/11 | 6/17/11 01:32 | DHF | D2 |
| Acenaphthylene | 236J | ug/kg | 308 | 37.7 | 12.6 | SW846 8270D | 6/15/11 | 6/17/11 01:32 | DHF | D2 |
| Anthracene | 16900 | ug/kg | 6160 | 753 | 274 | SW846 8270D | 6/15/11 | 6/18/11 00:20 | CGS | D2 |
| Benzo(a)anthracene | 29600 | ug/kg | 6160 | 753 | 411 | SW846 8270D | 6/15/11 | 6/18/11 00:20 | CGS | D2 |
| Benzo(a)pyrene | 24200 | ug/kg | 6160 | 753 | 183 | SW846 8270D | 6/15/11 | 6/18/11 00:20 | CGS | D2 |
| Benzo(b)fluoranthene | 25400 | ug/kg | 6160 | 753 | 319 | SW846 8270D | 6/15/11 | 6/18/11 00:20 | CGS | D2 |
| Benzo(k)fluoranthene | 21200 | ug/kg | 6160 | 753 | 297 | SW846 8270D | 6/15/11 | 6/18/11 00:20 | CGS | D2 |
| Chrysene | 28700 | ug/kg | 6160 | 753 | 205 | SW846 8270D | 6/15/11 | 6/18/11 00:20 | CGS | D2 |
| Dibenzo(a,h)anthracene | 6420 | ug/kg | 6160 | 753 | 639 | SW846 8270D | 6/15/11 | 6/18/11 00:20 | CGS | D2 |
| Fluoranthene | 64600 | ug/kg | 6160 | 753 | 251 | SW846 8270D | 6/15/11 | 6/18/11 00:20 | CGS | D2 |
| Fluorene | 8500 | ug/kg | 6160 | 753 | 212 | SW846 8270D | 6/15/11 | 6/18/11 00:20 | CGS | D2 |
| Indeno(1,2,3-cd)pyrene | 14700 | ug/kg | 6160 | 753 | 183 | SW846 8270D | 6/15/11 | 6/18/11 00:20 | CGS | D2 |
| Naphthalene | 1710 | ug/kg | 308 | 37.7 | 20.5 | SW846 8270D | 6/15/11 | 6/17/11 01:32 | DHF | D2 |
| Phenanthrene | 60700 | ug/kg | 6160 | 753 | 297 | SW846 8270D | 6/15/11 | 6/18/11 00:20 | CGS | D2 |
| Pyrene | 52700 | ug/kg | 6160 | 753 | 228 | SW846 8270D | 6/15/11 | 6/18/11 00:20 | CGS | D2 |

| *Surrogate Recoveries* | *Results* | *Units* | *Footnotes* | *Limits* | *Method* | *Prepared* | *Analyzed* | *By* | *Cntr* |
|---|---|---|---|---|---|---|---|---|---|
| 2-Fluorobiphenyl (S) | 89.8 | % | | 45-105 | SW846 8270D | 6/15/11 | 6/17/11 01:32 | DHF | D2 |
| Nitrobenzene-d5 (S) | 68.7 | % | | 35-100 | SW846 8270D | 6/15/11 | 6/17/11 01:32 | DHF | D2 |
| Terphenyl-d14 (S) | 103 | % | | 30-125 | SW846 8270D | 6/15/11 | 6/17/11 01:32 | DHF | D2 |
| 2-Fluorobiphenyl (S) | 89.6 | % | | 45-105 | SW846 8270D | 6/15/11 | 6/18/11 00:20 | CGS | D2 |
| Nitrobenzene-d5 (S) | 71.7 | % | | 35-100 | SW846 8270D | 6/15/11 | 6/18/11 00:20 | CGS | D2 |
| Terphenyl-d14 (S) | 116 | % | | 30-125 | SW846 8270D | 6/15/11 | 6/18/11 00:20 | CGS | D2 |

**WET CHEMISTRY**

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Moisture | 12.9 | % | 0.1 | 0.1 | 0.01 | SM20-2540 G | 6/4/11 11:25 | KAK | D |
| Total Solids | 87.1 | % | 0.1 | 0.1 | 0.01 | SM20-2540 G | 6/4/11 11:25 | KAK | D |



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State Certifications: CT PH-0224 , DE ID 11 , GA 914 , MA PA0102 , MD 128 , LA 04162 , VA 421 , WY EPA Region 8 , WV 343

## ANALYTICAL RESULTS

Workorder: 9908509 EMS013|Marsh Run 06/02/11

Lab ID: **9908509007** Date Collected: 6/2/2011 12:35 Matrix: Solid
Sample ID: **SB-3-2-4** Date Received: 6/2/2011 20:00

**VOLATILE ORGANICS**

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| cis-1,2-Dichloroethene | 16.9 | ug/kg | 3.6 | 1.8 | 0.89 | SW846 8260B | 6/3/11 | 6/15/11 20:24 | DJB | B |
| trans-1,2-Dichloroethene | 2.3J | ug/kg | 3.6 | 1.8 | 0.89 | SW846 8260B | 6/3/11 | 6/15/11 20:24 | DJB | B |
| Tetrachloroethene | 14.3 J | ug/kg | 3.6 | 1.8 | 0.89 | SW846 8260B | 6/3/11 | 6/15/11 20:24 | DJB | B |
| Trichloroethene | 109 | ug/kg | 3.6 | 1.8 | 0.89 | SW846 8260B | 6/3/11 | 6/15/11 20:24 | DJB | B |
| Vinyl Chloride | 1.8U | ug/kg | 3.6 | 1.8 | 0.89 | SW846 8260B | 6/3/11 | 6/15/11 20:24 | DJB | B |

| *Surrogate Recoveries* | *Results* | *Units* | *Footnotes* | *Limits* | *Method* | *Prepared* | *Analyzed* | *By* | *Cntr* |
|---|---|---|---|---|---|---|---|---|---|
| 1,2-Dichloroethane-d4 (S) | 98.5 | % | | 56-124 | SW846 8260B | 6/3/11 | 6/15/11 20:24 | DJB | B |
| 4-Bromofluorobenzene (S) | 98.1 | % | | 85-120 | SW846 8260B | 6/3/11 | 6/15/11 20:24 | DJB | B |
| Dibromofluoromethane (S) | 99.4 | % | | 62-123 | SW846 8260B | 6/3/11 | 6/15/11 20:24 | DJB | B |
| Toluene-d8 (S) | 107 | % | | 85-115 | SW846 8260B | 6/3/11 | 6/15/11 20:24 | DJB | B |

**SEMIVOLATILES**

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Acenaphthene | 8420 | ug/kg | 7490 | 915 | 555 | SW846 8270D | 6/15/11 | 6/18/11 01:09 | CGS | D2 |
| Acenaphthylene | 652 | ug/kg | 374 | 45.7 | 15.2 | SW846 8270D | 6/15/11 | 6/17/11 02:22 | DHF | D2 |
| Anthracene | 20600 | ug/kg | 7490 | 915 | 333 | SW846 8270D | 6/15/11 | 6/18/11 01:09 | CGS | D2 |
| Benzo(a)anthracene | 41300 | ug/kg | 7490 | 915 | 499 | SW846 8270D | 6/15/11 | 6/18/11 01:09 | CGS | D2 |
| Benzo(a)pyrene | 35000 | ug/kg | 7490 | 915 | 222 | SW846 8270D | 6/15/11 | 6/18/11 01:09 | CGS | D2 |
| Benzo(b)fluoranthene | 36000 | ug/kg | 7490 | 915 | 388 | SW846 8270D | 6/15/11 | 6/18/11 01:09 | CGS | D2 |
| Benzo(k)fluoranthene | 30800 | ug/kg | 7490 | 915 | 360 | SW846 8270D | 6/15/11 | 6/18/11 01:09 | CGS | D2 |
| Chrysene | 39300 | ug/kg | 7490 | 915 | 250 | SW846 8270D | 6/15/11 | 6/18/11 01:09 | CGS | D2 |
| Dibenzo(a,h)anthracene | 10100 | ug/kg | 7490 | 915 | 776 | SW846 8270D | 6/15/11 | 6/18/11 01:09 | CGS | D2 |
| Fluoranthene | 81300 | ug/kg | 7490 | 915 | 305 | SW846 8270D | 6/15/11 | 6/18/11 01:09 | CGS | D2 |
| Fluorene | 11200 | ug/kg | 7490 | 915 | 258 | SW846 8270D | 6/15/11 | 6/18/11 01:09 | CGS | D2 |
| Indeno(1,2,3-cd)pyrene | 24000 | ug/kg | 7490 | 915 | 222 | SW846 8270D | 6/15/11 | 6/18/11 01:09 | CGS | D2 |
| Naphthalene | 3270 | ug/kg | 374 | 45.7 | 25.0 | SW846 8270D | 6/15/11 | 6/17/11 02:22 | DHF | D2 |
| Phenanthrene | 72400 | ug/kg | 7490 | 915 | 360 | SW846 8270D | 6/15/11 | 6/18/11 01:09 | CGS | D2 |
| Pyrene | 70500 | ug/kg | 7490 | 915 | 277 | SW846 8270D | 6/15/11 | 6/18/11 01:09 | CGS | D2 |

| *Surrogate Recoveries* | *Results* | *Units* | *Footnotes* | *Limits* | *Method* | *Prepared* | *Analyzed* | *By* | *Cntr* |
|---|---|---|---|---|---|---|---|---|---|
| 2-Fluorobiphenyl (S) | 87 | % | | 45-105 | SW846 8270D | 6/15/11 | 6/17/11 02:22 | DHF | D2 |
| Nitrobenzene-d5 (S) | 75 | % | | 35-100 | SW846 8270D | 6/15/11 | 6/17/11 02:22 | DHF | D2 |
| Terphenyl-d14 (S) | 97.2 | % | | 30-125 | SW846 8270D | 6/15/11 | 6/17/11 02:22 | DHF | D2 |
| 2-Fluorobiphenyl (S) | 94.2 | % | | 45-105 | SW846 8270D | 6/15/11 | 6/18/11 01:09 | CGS | D2 |
| Nitrobenzene-d5 (S) | 82.3 | % | | 35-100 | SW846 8270D | 6/15/11 | 6/18/11 01:09 | CGS | D2 |
| Terphenyl-d14 (S) | 116 | % | | 30-125 | SW846 8270D | 6/15/11 | 6/18/11 01:09 | CGS | D2 |

**WET CHEMISTRY**

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Moisture | 28.6 | % | 0.1 | 0.1 | 0.01 | SM20-2540 G | 6/4/11 11:25 | KAK | D |
| Total Solids | 71.4 | % | 0.1 | 0.1 | 0.01 | SM20-2540 G | 6/4/11 11:25 | KAK | D |



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## ANALYTICAL RESULTS

Workorder: 9908509 EMS013|Marsh Run 06/02/11

Lab ID: **9908509008** Date Collected: 6/2/2011 17:30 Matrix: Solid

Sample ID: **SB-4-0-0.5** Date Received: 6/2/2011 20:00

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **SEMIVOLATILES** | | | | | | | | | | | |
| Acenaphthene | 49000 | ug/kg | | 16500 | 2020 | 1220 | SW846 8270D | 6/15/11 | 6/22/11 01:26 | CGS | A2 |
| Acenaphthylene | 2020U | ug/kg | | 16500 | 2020 | 673 | SW846 8270D | 6/15/11 | 6/22/11 01:26 | CGS | A2 |
| Anthracene | 147000 | ug/kg | | 16500 | 2020 | 734 | SW846 8270D | 6/15/11 | 6/22/11 01:26 | CGS | A2 |
| Benzo(a)anthracene | 244000 | ug/kg | | 82600 | 10100 | 5510 | SW846 8270D | 6/15/11 | 6/22/11 00:54 | CGS | A2 |
| Benzo(a)pyrene | 206000 | ug/kg | | 16500 | 2020 | 489 | SW846 8270D | 6/15/11 | 6/22/11 01:26 | CGS | A2 |
| Benzo(b)fluoranthene | 161000 | ug/kg | | 82600 | 10100 | 4280 | SW846 8270D | 6/15/11 | 6/22/11 00:54 | CGS | A2 |
| Benzo(k)fluoranthene | 182000 | ug/kg | | 82600 | 10100 | 3980 | SW846 8270D | 6/15/11 | 6/22/11 00:54 | CGS | A2 |
| Chrysene | 227000 | ug/kg | | 82600 | 10100 | 2750 | SW846 8270D | 6/15/11 | 6/22/11 00:54 | CGS | A2 |
| Dibenzo(a,h)anthracene | 37400 | ug/kg | | 16500 | 2020 | 1710 | SW846 8270D | 6/15/11 | 6/22/11 01:26 | CGS | A2 |
| Fluoranthene | 612000 | ug/kg | | 82600 | 10100 | 3360 | SW846 8270D | 6/15/11 | 6/22/11 00:54 | CGS | A2 |
| Fluorene | 72900 | ug/kg | | 16500 | 2020 | 569 | SW846 8270D | 6/15/11 | 6/22/11 01:26 | CGS | A2 |
| Indeno(1,2,3-cd)pyrene | 82200 | ug/kg | | 16500 | 2020 | 489 | SW846 8270D | 6/15/11 | 6/22/11 01:26 | CGS | A2 |
| Naphthalene | 29200 | ug/kg | | 16500 | 2020 | 1100 | SW846 8270D | 6/15/11 | 6/22/11 01:26 | CGS | A2 |
| Phenanthrene | 503000 | ug/kg | | 82600 | 10100 | 3980 | SW846 8270D | 6/15/11 | 6/22/11 00:54 | CGS | A2 |
| Pyrene | 406000 | ug/kg | | 82600 | 10100 | 3060 | SW846 8270D | 6/15/11 | 6/22/11 00:54 | CGS | A2 |
| *Surrogate Recoveries* | *Results* | *Units* | *Footnotes* | *Limits* | | | *Method* | *Prepared* | *Analyzed* | *By* | *Cntr* |
| 2-Fluorobiphenyl (S) | 0 | % | 4 | 45-105 | | | SW846 8270D | 6/15/11 | 6/22/11 00:54 | CGS | A2 |
| Nitrobenzene-d5 (S) | 0 | % | 3 | 35-100 | | | SW846 8270D | 6/15/11 | 6/22/11 00:54 | CGS | A2 |
| Terphenyl-d14 (S) | 0 | % | 5 | 30-125 | | | SW846 8270D | 6/15/11 | 6/22/11 00:54 | CGS | A2 |
| 2-Fluorobiphenyl (S) | 100 | % | | 45-105 | | | SW846 8270D | 6/15/11 | 6/22/11 01:26 | CGS | A2 |
| Nitrobenzene-d5 (S) | 83.3 | % | | 35-100 | | | SW846 8270D | 6/15/11 | 6/22/11 01:26 | CGS | A2 |
| Terphenyl-d14 (S) | 104 | % | | 30-125 | | | SW846 8270D | 6/15/11 | 6/22/11 01:26 | CGS | A2 |
| **WET CHEMISTRY** | | | | | | | | | | | |
| Moisture | 18.3 | % | | 0.1 | 0.1 | 0.01 | SM20-2540 G | | 6/4/11 11:25 | KAK | A |
| Total Solids | 81.7 | % | | 0.1 | 0.1 | 0.01 | SM20-2540 G | | 6/4/11 11:25 | KAK | A |
| **METALS** | | | | | | | | | | | |
| Lead, Total | 627 K | mg/kg | | 2.3 | 1.5 | 0.76 | SW846 6010C | 6/9/11 | 6/14/11 03:12 | SRT | A1 |
| Thallium, Total | 2.3U | mg/kg | | 3.4 | 2.3 | 1.1 | SW846 6010C | 6/9/11 | 6/14/11 03:12 | SRT | A1 |

***Sample Comments:***

This sample was analyzed at a dilution in the Method 8270 analysis due to the level of target analyte detected. Reporting limits were adjusted accordingly. One or more of the surrogates could not be evaluated as a result of the dilution.



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## ANALYTICAL RESULTS

Workorder: 9908509 EMS013|Marsh Run 06/02/11

Lab ID: **9908509009** Date Collected: 6/2/2011 17:50 Matrix: Solid
Sample ID: **SB-4-2.5-3** Date Received: 6/2/2011 20:00

**SEMIVOLATILES**

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Acenaphthene | 1920 | ug/kg | 303 | 37.0 | 22.4 | SW846 8270D | 6/15/11 | 6/17/11 03:58 | DHF | A2 |
| Acenaphthylene | 198J | ug/kg | 303 | 37.0 | 12.3 | SW846 8270D | 6/15/11 | 6/17/11 03:58 | DHF | A2 |
| Anthracene | 4430 | ug/kg | 303 | 37.0 | 13.5 | SW846 8270D | 6/15/11 | 6/17/11 03:58 | DHF | A2 |
| Benzo(a)anthracene | 10900 | ug/kg | 3030 | 370 | 202 | SW846 8270D | 6/15/11 | 6/18/11 02:46 | CGS | A2 |
| Benzo(a)pyrene | 9040 | ug/kg | 3030 | 370 | 89.7 | SW846 8270D | 6/15/11 | 6/18/11 02:46 | CGS | A2 |
| Benzo(b)fluoranthene | 8550 | ug/kg | 3030 | 370 | 157 | SW846 8270D | 6/15/11 | 6/18/11 02:46 | CGS | A2 |
| Benzo(k)fluoranthene | 8760 | ug/kg | 3030 | 370 | 146 | SW846 8270D | 6/15/11 | 6/18/11 02:46 | CGS | A2 |
| Chrysene | 10300 | ug/kg | 3030 | 370 | 101 | SW846 8270D | 6/15/11 | 6/18/11 02:46 | CGS | A2 |
| Dibenzo(a,h)anthracene | 1290 | ug/kg | 303 | 37.0 | 31.4 | SW846 8270D | 6/15/11 | 6/17/11 03:58 | DHF | A2 |
| Fluoranthene | 21100 | ug/kg | 3030 | 370 | 123 | SW846 8270D | 6/15/11 | 6/18/11 02:46 | CGS | A2 |
| Fluorene | 2130 | ug/kg | 303 | 37.0 | 10.4 | SW846 8270D | 6/15/11 | 6/17/11 03:58 | DHF | A2 |
| Indeno(1,2,3-cd)pyrene | 2630 | ug/kg | 303 | 37.0 | 9.0 | SW846 8270D | 6/15/11 | 6/17/11 03:58 | DHF | A2 |
| Naphthalene | 656 | ug/kg | 303 | 37.0 | 20.2 | SW846 8270D | 6/15/11 | 6/17/11 03:58 | DHF | A2 |
| Phenanthrene | 16800 | ug/kg | 3030 | 370 | 146 | SW846 8270D | 6/15/11 | 6/18/11 02:46 | CGS | A2 |
| Pyrene | 18100 | ug/kg | 3030 | 370 | 112 | SW846 8270D | 6/15/11 | 6/18/11 02:46 | CGS | A2 |

| *Surrogate Recoveries* | *Results* | *Units* | *Footnotes* | *Limits* | *Method* | *Prepared* | *Analyzed* | *By* | *Cntr* |
|---|---|---|---|---|---|---|---|---|---|
| 2-Fluorobiphenyl (S) | 83.7 | % | | 45-105 | SW846 8270D | 6/15/11 | 6/17/11 03:58 | DHF | A2 |
| Nitrobenzene-d5 (S) | 72.9 | % | | 35-100 | SW846 8270D | 6/15/11 | 6/17/11 03:58 | DHF | A2 |
| Terphenyl-d14 (S) | 98.5 | % | | 30-125 | SW846 8270D | 6/15/11 | 6/17/11 03:58 | DHF | A2 |
| 2-Fluorobiphenyl (S) | 89.6 | % | | 45-105 | SW846 8270D | 6/15/11 | 6/18/11 02:46 | CGS | A2 |
| Nitrobenzene-d5 (S) | 79 | % | | 35-100 | SW846 8270D | 6/15/11 | 6/18/11 02:46 | CGS | A2 |
| Terphenyl-d14 (S) | 105 | % | | 30-125 | SW846 8270D | 6/15/11 | 6/18/11 02:46 | CGS | A2 |

**WET CHEMISTRY**

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Moisture | 12.0 | % | | 0.1 | 0.1 | 0.01 | SM20-2540 G | | 6/4/11 11:25 | KAK | A |
| Total Solids | 88.0 | % | | 0.1 | 0.1 | 0.01 | SM20-2540 G | | 6/4/11 11:25 | KAK | A |

**METALS**

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Lead, Total | 838 K | mg/kg | | 2.0 | 1.3 | 0.68 | SW846 6010C | 6/9/11 | 6/14/11 03:17 | SRT | A1 |

***Sample Comments:***



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## ANALYTICAL RESULTS

Workorder: 9908509 EMS013|Marsh Run 06/02/11

Lab ID: **9908509016** Date Collected: 6/2/2011 17:10 Matrix: Solid
Sample ID: **SB-9-0-0.5** Date Received: 6/2/2011 20:00

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **SEMIVOLATILES** | | | | | | | | | | | |
| Acenaphthene | 43.0U | ug/kg | | 352 | 43.0 | 26.1 | SW846 8270D | 6/15/11 | 6/16/11 22:19 | DHF | A2 |
| Acenaphthylene | 43.0U | ug/kg | | 352 | 43.0 | 14.3 | SW846 8270D | 6/15/11 | 6/16/11 22:19 | DHF | A2 |
| Anthracene | 42.2J | ug/kg | | 352 | 43.0 | 15.6 | SW846 8270D | 6/15/11 | 6/16/11 22:19 | DHF | A2 |
| Benzo(a)anthracene | 37.9J | ug/kg | | 352 | 43.0 | 23.4 | SW846 8270D | 6/15/11 | 6/16/11 22:19 | DHF | A2 |
| Benzo(a)pyrene | 34.9J | ug/kg | | 352 | 43.0 | 10.4 | SW846 8270D | 6/15/11 | 6/16/11 22:19 | DHF | A2 |
| Benzo(b)fluoranthene | 44.7J | ug/kg | | 352 | 43.0 | 18.2 | SW846 8270D | 6/15/11 | 6/16/11 22:19 | DHF | A2 |
| Benzo(k)fluoranthene | 41.8J | ug/kg | | 352 | 43.0 | 16.9 | SW846 8270D | 6/15/11 | 6/16/11 22:19 | DHF | A2 |
| Chrysene | 51.5J | ug/kg | | 352 | 43.0 | 11.7 | SW846 8270D | 6/15/11 | 6/16/11 22:19 | DHF | A2 |
| Dibenzo(a,h)anthracene | 43.0U | ug/kg | | 352 | 43.0 | 36.5 | SW846 8270D | 6/15/11 | 6/16/11 22:19 | DHF | A2 |
| Fluoranthene | 62.7J | ug/kg | | 352 | 43.0 | 14.3 | SW846 8270D | 6/15/11 | 6/16/11 22:19 | DHF | A2 |
| Fluorene | 43.0U | ug/kg | | 352 | 43.0 | 12.1 | SW846 8270D | 6/15/11 | 6/16/11 22:19 | DHF | A2 |
| Indeno(1,2,3-cd)pyrene | 30.8J | ug/kg | | 352 | 43.0 | 10.4 | SW846 8270D | 6/15/11 | 6/16/11 22:19 | DHF | A2 |
| Naphthalene | 43.0U | ug/kg | | 352 | 43.0 | 23.4 | SW846 8270D | 6/15/11 | 6/16/11 22:19 | DHF | A2 |
| Phenanthrene | 43.0J | ug/kg | | 352 | 43.0 | 16.9 | SW846 8270D | 6/15/11 | 6/16/11 22:19 | DHF | A2 |
| Pyrene | 66.0J | ug/kg | | 352 | 43.0 | 13.0 | SW846 8270D | 6/15/11 | 6/16/11 22:19 | DHF | A2 |
| *Surrogate Recoveries* | *Results* | *Units* | *Footnotes* | *Limits* | | | *Method* | *Prepared* | *Analyzed* | *By* | *Cntr* |
| 2-Fluorobiphenyl (S) | 89.3 | % | | 45-105 | | | SW846 8270D | 6/15/11 | 6/16/11 22:19 | DHF | A2 |
| Nitrobenzene-d5 (S) | 81.5 | % | | 35-100 | | | SW846 8270D | 6/15/11 | 6/16/11 22:19 | DHF | A2 |
| Terphenyl-d14 (S) | 100 | % | | 30-125 | | | SW846 8270D | 6/15/11 | 6/16/11 22:19 | DHF | A2 |
| **WET CHEMISTRY** | | | | | | | | | | | |
| Moisture | 23.7 | % | | 0.1 | 0.1 | 0.01 | SM20-2540 G | | 6/4/11 11:25 | KAK | A |
| Total Solids | 76.3 | % | | 0.1 | 0.1 | 0.01 | SM20-2540 G | | 6/4/11 11:25 | KAK | A |
| **METALS** | | | | | | | | | | | |
| Lead, Total | 27.2K | mg/kg | | 2.3 | 1.5 | 0.77 | SW846 6010C | 6/9/11 | 6/14/11 03:46 | SRT | A1 |
| Thallium, Total | 2.3U | mg/kg | | 3.5 | 2.3 | 1.2 | SW846 6010C | 6/9/11 | 6/14/11 03:46 | SRT | A1 |

***Sample Comments:***

Anna G Milliken
Technical Manager



MW 1/16/12

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## ANALYTICAL RESULTS

Workorder: 9908509 EMS013|Marsh Run 06/02/11

Lab ID: **9908509017** Date Collected: 6/2/2011 16:45 Matrix: Solid

Sample ID: **SB-10-0-0.5** Date Received: 6/2/2011 20:00

**VOLATILE ORGANICS**

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| cis-1,2-Dichloroethene | 1.1U | ug/kg | 2.2 | 1.1 | 0.55 | SW846 8260B | 6/3/11 | 6/15/11 23:49 | DJB | B |
| trans-1,2-Dichloroethene | 1.1U | ug/kg | 2.2 | 1.1 | 0.55 | SW846 8260B | 6/3/11 | 6/15/11 23:49 | DJB | B |
| Tetrachloroethene | 1.1U | ug/kg | 2.2 | 1.1 | 0.55 | SW846 8260B | 6/3/11 | 6/15/11 23:49 | DJB | B |
| Trichloroethene | 1.1U | ug/kg | 2.2 | 1.1 | 0.55 | SW846 8260B | 6/3/11 | 6/15/11 23:49 | DJB | B |
| Vinyl Chloride | 1.1U | ug/kg | 2.2 | 1.1 | 0.55 | SW846 8260B | 6/3/11 | 6/15/11 23:49 | DJB | B |

| *Surrogate Recoveries* | *Results* | *Units* | *Footnotes* | *Limits* | *Method* | *Prepared* | *Analyzed* | *By* | *Cntr* |
|---|---|---|---|---|---|---|---|---|---|
| 1,2-Dichloroethane-d4 (S) | 83.5 | % | | 56-124 | SW846 8260B | 6/3/11 | 6/15/11 23:49 | DJB | B |
| 4-Bromofluorobenzene (S) | 85 | % | | 85-120 | SW846 8260B | 6/3/11 | 6/15/11 23:49 | DJB | B |
| Dibromofluoromethane (S) | 84.3 | % | | 62-123 | SW846 8260B | 6/3/11 | 6/15/11 23:49 | DJB | B |
| Toluene-d8 (S) | 86.1 | % | | 85-115 | SW846 8260B | 6/3/11 | 6/15/11 23:49 | DJB | B |

**SEMIVOLATILES**

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Acenaphthene | 1780 | ug/kg | 324 | 39.6 | 24.0 | SW846 8270D | 6/15/11 | 6/17/11 04:46 | DHF | D1 |
| Acenaphthylene | 108J | ug/kg | 324 | 39.6 | 13.2 | SW846 8270D | 6/15/11 | 6/17/11 04:46 | DHF | D1 |
| Anthracene | 3550 | ug/kg | 324 | 39.6 | 14.4 | SW846 8270D | 6/15/11 | 6/17/11 04:46 | DHF | D1 |
| Benzo(a)anthracene | 8720 | ug/kg | 3240 | 396 | 216 | SW846 8270D | 6/15/11 | 6/18/11 03:35 | CGS | D1 |
| Benzo(a)pyrene | 7290 | ug/kg | 3240 | 396 | 96.1 | SW846 8270D | 6/15/11 | 6/18/11 03:35 | CGS | D1 |
| Benzo(b)fluoranthene | 7060 | ug/kg | 3240 | 396 | 168 | SW846 8270D | 6/15/11 | 6/18/11 03:35 | CGS | D1 |
| Benzo(k)fluoranthene | 6710 | ug/kg | 3240 | 396 | 156 | SW846 8270D | 6/15/11 | 6/18/11 03:35 | CGS | D1 |
| Chrysene | 8060 | ug/kg | 3240 | 396 | 108 | SW846 8270D | 6/15/11 | 6/18/11 03:35 | CGS | D1 |
| Dibenzo(a,h)anthracene | 946 | ug/kg | 324 | 39.6 | 33.6 | SW846 8270D | 6/15/11 | 6/17/11 04:46 | DHF | D1 |
| Fluoranthene | 17500 | ug/kg | 3240 | 396 | 132 | SW846 8270D | 6/15/11 | 6/18/11 03:35 | CGS | D1 |
| Fluorene | 1840 | ug/kg | 324 | 39.6 | 11.2 | SW846 8270D | 6/15/11 | 6/17/11 04:46 | DHF | D1 |
| Indeno(1,2,3-cd)pyrene | 1880 | ug/kg | 324 | 39.6 | 9.6 | SW846 8270D | 6/15/11 | 6/17/11 04:46 | DHF | D1 |
| Naphthalene | 505 | ug/kg | 324 | 39.6 | 21.6 | SW846 8270D | 6/15/11 | 6/17/11 04:46 | DHF | D1 |
| Phenanthrene | 14900 | ug/kg | 3240 | 396 | 156 | SW846 8270D | 6/15/11 | 6/18/11 03:35 | CGS | D1 |
| Pyrene | 15400 | ug/kg | 3240 | 396 | 120 | SW846 8270D | 6/15/11 | 6/18/11 03:35 | CGS | D1 |

| *Surrogate Recoveries* | *Results* | *Units* | *Footnotes* | *Limits* | *Method* | *Prepared* | *Analyzed* | *By* | *Cntr* |
|---|---|---|---|---|---|---|---|---|---|
| 2-Fluorobiphenyl (S) | 75.5 | % | | 45-105 | SW846 8270D | 6/15/11 | 6/17/11 04:46 | DHF | D1 |
| Nitrobenzene-d5 (S) | 71.1 | % | | 35-100 | SW846 8270D | 6/15/11 | 6/17/11 04:46 | DHF | D1 |
| Terphenyl-d14 (S) | 89.3 | % | | 30-125 | SW846 8270D | 6/15/11 | 6/17/11 04:46 | DHF | D1 |
| 2-Fluorobiphenyl (S) | 79 | % | | 45-105 | SW846 8270D | 6/15/11 | 6/18/11 03:35 | CGS | D1 |
| Nitrobenzene-d5 (S) | 74.5 | % | | 35-100 | SW846 8270D | 6/15/11 | 6/18/11 03:35 | CGS | D1 |
| Terphenyl-d14 (S) | 101 | % | | 30-125 | SW846 8270D | 6/15/11 | 6/18/11 03:35 | CGS | D1 |

**WET CHEMISTRY**

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Moisture | 16.7 | % | 0.1 | 0.1 | 0.01 | SM20-2540 G | 6/4/11 11:25 | KAK | D |
| Total Solids | 83.3 | % | 0.1 | 0.1 | 0.01 | SM20-2540 G | 6/4/11 11:25 | KAK | D |



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## ANALYTICAL RESULTS

Workorder: 9908509 EMS013|Marsh Run 06/02/11

Lab ID: **9908509018** Date Collected: 6/2/2011 18:30 Matrix: Solid
Sample ID: **SB-11-0-0.5** Date Received: 6/2/2011 20:00

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **SEMIVOLATILES** | | | | | | | | | | | |
| Acenaphthene | 49.1J | ug/kg | | 285 | 34.9 | 21.1 | SW846 8270D | 6/15/11 | 6/16/11 23:07 | DHF | A2 |
| Acenaphthylene | 34.9U | ug/kg | | 285 | 34.9 | 11.6 | SW846 8270D | 6/15/11 | 6/16/11 23:07 | DHF | A2 |
| Anthracene | 138J | ug/kg | | 285 | 34.9 | 12.7 | SW846 8270D | 6/15/11 | 6/16/11 23:07 | DHF | A2 |
| Benzo(a)anthracene | 378 | ug/kg | | 285 | 34.9 | 19.0 | SW846 8270D | 6/15/11 | 6/16/11 23:07 | DHF | A2 |
| Benzo(a)pyrene | 307 | ug/kg | | 285 | 34.9 | 8.5 | SW846 8270D | 6/15/11 | 6/16/11 23:07 | DHF | A2 |
| Benzo(b)fluoranthene | 302 | ug/kg | | 285 | 34.9 | 14.8 | SW846 8270D | 6/15/11 | 6/16/11 23:07 | DHF | A2 |
| Benzo(k)fluoranthene | 300 | ug/kg | | 285 | 34.9 | 13.7 | SW846 8270D | 6/15/11 | 6/16/11 23:07 | DHF | A2 |
| Chrysene | 357 | ug/kg | | 285 | 34.9 | 9.5 | SW846 8270D | 6/15/11 | 6/16/11 23:07 | DHF | A2 |
| Dibenzo(a,h)anthracene | 61.0J | ug/kg | | 285 | 34.9 | 29.6 | SW846 8270D | 6/15/11 | 6/16/11 23:07 | DHF | A2 |
| Fluoranthene | 773 | ug/kg | | 285 | 34.9 | 11.6 | SW846 8270D | 6/15/11 | 6/16/11 23:07 | DHF | A2 |
| Fluorene | 52.3J | ug/kg | | 285 | 34.9 | 9.8 | SW846 8270D | 6/15/11 | 6/16/11 23:07 | DHF | A2 |
| Indeno(1,2,3-cd)pyrene | 205J | ug/kg | | 285 | 34.9 | 8.5 | SW846 8270D | 6/15/11 | 6/16/11 23:07 | DHF | A2 |
| Naphthalene | 34.9U | ug/kg | | 285 | 34.9 | 19.0 | SW846 8270D | 6/15/11 | 6/16/11 23:07 | DHF | A2 |
| Phenanthrene | 547 | ug/kg | | 285 | 34.9 | 13.7 | SW846 8270D | 6/15/11 | 6/16/11 23:07 | DHF | A2 |
| Pyrene | 725 | ug/kg | | 285 | 34.9 | 10.6 | SW846 8270D | 6/15/11 | 6/16/11 23:07 | DHF | A2 |
| *Surrogate Recoveries* | *Results* | *Units* | *Footnotes* | *Limits* | | | *Method* | *Prepared* | *Analyzed* | *By* | *Cntr* |
| 2-Fluorobiphenyl (S) | 86.3 | % | | 45-105 | | | SW846 8270D | 6/15/11 | 6/16/11 23:07 | DHF | A2 |
| Nitrobenzene-d5 (S) | 81.3 | % | | 35-100 | | | SW846 8270D | 6/15/11 | 6/16/11 23:07 | DHF | A2 |
| Terphenyl-d14 (S) | 106 | % | | 30-125 | | | SW846 8270D | 6/15/11 | 6/16/11 23:07 | DHF | A2 |
| **WET CHEMISTRY** | | | | | | | | | | | |
| Moisture | 5.4 | % | | 0.1 | 0.1 | 0.01 | SM20-2540 G | | 6/4/11 11:25 | KAK | A |
| Total Solids | 94.6 | % | | 0.1 | 0.1 | 0.01 | SM20-2540 G | | 6/4/11 11:25 | KAK | A |
| **METALS** | | | | | | | | | | | |
| Arsenic, Total | 2.5J | mg/kg | | 3.6 | 2.4 | 1.2 | SW846 6010C | 6/9/11 | 6/14/11 04:31 | SRT | A1 |
| Lead, Total | 14.5 | mg/kg | | 3.6 | 2.4 | 1.2 | SW846 6010C | 6/9/11 | 6/14/11 04:31 | SRT | A1 |

***Sample Comments:***

Due to spectral interference from Calcium, this sample was diluted 1/2 for the 6010C soil metals analysis. The detection limits were raised accordingly. SRT 06.14.11



nw 1/16/12

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State Certifications: CT PH-0224 , DE ID 11 , GA 914 , MA PA0102 , MD 128 , LA 04162 , VA 421 , WY EPA Region 8 , WV 343

## ANALYTICAL RESULTS

Workorder: 9908509 EMS013|Marsh Run 06/02/11

Lab ID: **9908509019** Date Collected: 6/2/2011 18:45 Matrix: Solid
Sample ID: **SB-11-2-4** Date Received: 6/2/2011 20:00

### VOLATILE ORGANICS

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| cis-1,2-Dichloroethene | 1.1U UJ | ug/kg | | 2.1 | 1.1 | 0.53 | SW846 8260B | 6/3/11 | 6/16/11 00:18 | DJB | B |
| trans-1,2-Dichloroethene | 1.1U | ug/kg | | 2.1 | 1.1 | 0.53 | SW846 8260B | 6/3/11 | 6/16/11 00:18 | DJB | B |
| Tetrachloroethene | 1.1U | ug/kg | | 2.1 | 1.1 | 0.53 | SW846 8260B | 6/3/11 | 6/16/11 00:18 | DJB | B |
| Trichloroethene | 1.1U | ug/kg | | 2.1 | 1.1 | 0.53 | SW846 8260B | 6/3/11 | 6/16/11 00:18 | DJB | B |
| Vinyl Chloride | 1.1U | ug/kg | | 2.1 | 1.1 | 0.53 | SW846 8260B | 6/3/11 | 6/16/11 00:18 | DJB | B |

| *Surrogate Recoveries* | *Results* | *Units* | *Footnotes* | *Limits* | *Method* | *Prepared* | *Analyzed* | *By* | *Cntr* |
|---|---|---|---|---|---|---|---|---|---|
| 1,2-Dichloroethane-d4 (S) | 83.4 | % | | 56-124 | SW846 8260B | 6/3/11 | 6/16/11 00:18 | DJB | B |
| 4-Bromofluorobenzene (S) | 68.8 | % | 19 | 85-120 | SW846 8260B | 6/3/11 | 6/16/11 00:18 | DJB | B |
| Dibromofluoromethane (S) | 83.8 | % | | 62-123 | SW846 8260B | 6/3/11 | 6/16/11 00:18 | DJB | B |
| Toluene-d8 (S) | 76.9 | % | 18 | 85-115 | SW846 8260B | 6/3/11 | 6/16/11 00:18 | DJB | B |

### SEMIVOLATILES

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Acenaphthene | 3660 | ug/kg | | 326 | 39.9 | 24.2 | SW846 8270D | 6/15/11 | 6/17/11 05:34 | DHF | D2 |
| Acenaphthylene | 268J | ug/kg | | 326 | 39.9 | 13.3 | SW846 8270D | 6/15/11 | 6/17/11 05:34 | DHF | D2 |
| Anthracene | 9420 | ug/kg | | 3260 | 399 | 145 | SW846 8270D | 6/15/11 | 6/18/11 04:23 | CGS | D2 |
| Benzo(a)anthracene | 13400 | ug/kg | | 3260 | 399 | 217 | SW846 8270D | 6/15/11 | 6/18/11 04:23 | CGS | D2 |
| Benzo(a)pyrene | 10200 | ug/kg | | 3260 | 399 | 96.6 | SW846 8270D | 6/15/11 | 6/18/11 04:23 | CGS | D2 |
| Benzo(b)fluoranthene | 9140 | ug/kg | | 3260 | 399 | 169 | SW846 8270D | 6/15/11 | 6/18/11 04:23 | CGS | D2 |
| Benzo(k)fluoranthene | 9530 | ug/kg | | 3260 | 399 | 157 | SW846 8270D | 6/15/11 | 6/18/11 04:23 | CGS | D2 |
| Chrysene | 11700 | ug/kg | | 3260 | 399 | 109 | SW846 8270D | 6/15/11 | 6/18/11 04:23 | CGS | D2 |
| Dibenzo(a,h)anthracene | 1140 | ug/kg | | 326 | 39.9 | 33.8 | SW846 8270D | 6/15/11 | 6/17/11 05:34 | DHF | D2 |
| Fluoranthene | 26500 | ug/kg | | 3260 | 399 | 133 | SW846 8270D | 6/15/11 | 6/18/11 04:23 | CGS | D2 |
| Fluorene | 4780 | ug/kg | | 326 | 39.9 | 11.2 | SW846 8270D | 6/15/11 | 6/17/11 05:34 | DHF | D2 |
| Indeno(1,2,3-cd)pyrene | 2150 | ug/kg | | 326 | 39.9 | 9.7 | SW846 8270D | 6/15/11 | 6/17/11 05:34 | DHF | D2 |
| Naphthalene | 2370 | ug/kg | | 326 | 39.9 | 21.7 | SW846 8270D | 6/15/11 | 6/17/11 05:34 | DHF | D2 |
| Phenanthrene | 29400 | ug/kg | | 3260 | 399 | 157 | SW846 8270D | 6/15/11 | 6/18/11 04:23 | CGS | D2 |
| Pyrene | 23700 | ug/kg | | 3260 | 399 | 121 | SW846 8270D | 6/15/11 | 6/18/11 04:23 | CGS | D2 |

| *Surrogate Recoveries* | *Results* | *Units* | *Footnotes* | *Limits* | *Method* | *Prepared* | *Analyzed* | *By* | *Cntr* |
|---|---|---|---|---|---|---|---|---|---|
| 2-Fluorobiphenyl (S) | 83.3 | % | | 45-105 | SW846 8270D | 6/15/11 | 6/17/11 05:34 | DHF | D2 |
| Nitrobenzene-d5 (S) | 75.7 | % | | 35-100 | SW846 8270D | 6/15/11 | 6/17/11 05:34 | DHF | D2 |
| Terphenyl-d14 (S) | 96.7 | % | | 30-125 | SW846 8270D | 6/15/11 | 6/17/11 05:34 | DHF | D2 |
| 2-Fluorobiphenyl (S) | 86.4 | % | | 45-105 | SW846 8270D | 6/15/11 | 6/18/11 04:23 | CGS | D2 |
| Nitrobenzene-d5 (S) | 78.6 | % | | 35-100 | SW846 8270D | 6/15/11 | 6/18/11 04:23 | CGS | D2 |
| Terphenyl-d14 (S) | 109 | % | | 30-125 | SW846 8270D | 6/15/11 | 6/18/11 04:23 | CGS | D2 |

### WET CHEMISTRY

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Moisture | 20.9 | % | 0.1 | 0.1 | 0.01 | SM20-2540 G | 6/4/11 11:25 | KAK | D |
| Total Solids | 79.1 | % | 0.1 | 0.1 | 0.01 | SM20-2540 G | 6/4/11 11:25 | KAK | D |



MW 1/16/12

ENVIRONMENTAL
Data Services, Inc.

# DATA VALIDATION SUMMARY REPORT
# MARSH RUN PARK, FAIRVIEW TOWNSHIP, PENNSYLVANIA

Client: EA Engineering, Science & Technology, Inc., Sparks, Maryland
SDG: EMS-014
Laboratory: Analytical Laboratory Services, Middletown, Pennsylvania
Site: Marsh Run Park, Fairview Township, Pennsylvania
Date: August 18, 2011

| EDS ID | Client Sample ID | Laboratory Sample ID | Matrix |
|---|---|---|---|
| 1* | MW-1 | 9908515001 | Water |
| 2 | RB-1 | 9908515002 | Water |
| 3* | RB-2 | 9908515003 | Water |
| 4** | RB-3 | 9908515004 | Water |
| 5† | TRIP BLANK | 9908515005 | Water |

* - Not analyzed for PAHs
** - Not analyzed for Weak/Dissociable Cyanide
† - Analyzed for VOCs only

A full data validation was performed on the analytical data for one water sample, three aqueous rinsate blank samples, and one aqueous trip blank sample collected on June 2, 2011 by EA Engineering at the Marsh Run Park site in Fairview Township, Pennsylvania. The samples were analyzed under the Environmental Protection Agency (USEPA) "Test Methods for the Evaluation of Solid Waste, USEPA SW-846, Third Edition, September 1986, with revisions".

Specific method references are as follows:

| *Analysis* | *Method References* |
|---|---|
| VOCs | USEPA SW-846 Method 8260B |
| PAHs by SIM | USEPA SW-846 Method 8270 SIM |
| Dissolved Metals/Hg | USEPA SW-846 Method 6020A |
| Weak/Dissociable Cyanide | USEPA Method SM20-4500CNI |

The data have been validated according to the protocols and quality control (QC) requirements of the analytical methods, the USEPA Region III data validation guidelines as follows:

- The USEPA Region III Modifications to the National Functional Guidelines for Organic Data Review," September 1994;
- The USEPA Region III Modifications to the National Functional Guidelines for Evaluating Inorganic Analyses," April 1003;
- and the reviewer's professional judgment.

The following items/criteria were reviewed for this report:

### *Organics*

- Holding times and sample preservation
- Surrogate Spike recoveries
- Matrix Spike/Matrix Spike Duplicate (MS/MSD) recoveries
- Laboratory Control Sample/Duplicate (LCS/LCSD) recoveries
- Method blank and field blank contamination
- Gas Chromatography (GC)/Mass Spectroscopy (MS) tuning
- Initial and continuing calibration summaries
- Compound Quantitation
- Internal standard area and retention time summary forms
- Field Duplicate sample precision

### *Inorganics*

- Holding times and sample preservation
- Matrix Spike/Matrix Spike Duplicate (MS/MSD) recoveries
- Laboratory Control Sample/Duplicate (LCS/LCSD) recoveries
- Method blank and field blank contamination
- Initial and continuing calibration verifications
- Compound Quantitation
- ICP Serial Dilution
- Field Duplicate sample precision

## Overall Usability Issues:

There were no rejections of data.

Overall the data is acceptable for the intended purposes as qualified for the deficiencies detailed in this report.

## Volatile Organic Compounds (VOC)

## Holding Times

- All samples were analyzed within 14 days for preserved water samples.

## Surrogate Spike Recoveries

- All samples exhibited acceptable surrogate %R values except the following.

| Sample ID | Surrogate | %R | Qualifier |
|---|---|---|---|
| 2 | S2= Dibromofluoromethane | 83.9% | J/UJ |
| 3 | S4= Toluene-d8 | 84.6% | J/UJ |

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

- A MS/MSD sample was not analyzed.

## Laboratory Control Samples

- The LCS samples exhibited acceptable %R values.

## Method Blank

- The method blanks were free of contamination.

## Field Blank

- Field QC results are summarized below.

| Blank ID | Compound | Conc. ug/L | Action Level ug/L | Qualifier | Affected Samples |
|---|---|---|---|---|---|
| RB-1 | None- ND | - | - | - | - |
| RB-2 | None- ND | - | - | - | - |
| RB-3 | None- ND | - | - | - | - |
| TRIP BLANK | None- ND | - | - | - | - |

## GC/MS Tuning

- All criteria were met.

## Initial Calibration

- The initial calibrations exhibited acceptable %RSD and mean RRF values.

## Continuing Calibration

- The continuing calibrations exhibited acceptable %D and RRF values.

## Compound Quantitation

- All criteria were met.

## Internal Standard (IS) Area Performance

- All internal standards met response and retention time (RT) criteria.

## Field Duplicate Sample Precision

- Field duplicate samples were not analyzed.

## Polynuclear Aromatic Hydrocarbons (PAHs) by SIM

### Holding Times

- All samples were extracted within 7 days for water samples and analyzed within 40 days.

### Surrogate Spike Recoveries

- All samples exhibited acceptable surrogate %R values.

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

- A MS/MSD sample was not analyzed.

### Laboratory Control Samples

- The LCS samples exhibited acceptable %R values.

### Method Blank

- The method blanks were free of contamination.

### Field Blank

- Field QC results are summarized below.

| Blank ID | Compound | Conc. ug/L | Action Level ug/L | Qualifier | Affected Samples |
|---|---|---|---|---|---|
| RB-1 | None- ND | - | - | - | - |
| RB-2 | None- ND | - | - | - | - |
| RB-3 | None- ND | - | - | - | - |

### GC/MS Tuning

- All criteria were met.

### Initial Calibration

- The initial calibrations exhibited acceptable %RSD and mean RRF values.

## Continuing Calibration

- The continuing calibrations exhibited acceptable %D and RRF values.

## Compound Quantitation

- All criteria were met.

## Internal Standard (IS) Area Performance

- All internal standards met response and retention time (RT) criteria.

## Field Duplicate Sample Precision

- Field duplicate samples were not analyzed.

## Dissolved Metals & Mercury

### Holding Times

- All samples were prepared and analyzed within 28 days for mercury and 180 days for all other metals.

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

- The MS/MSD sample exhibited acceptable %R and RPD values except the following.

| MS/MSD Sample ID | Compound | MS %R/MSD %R/ RPD | Qualifier | Affected Samples |
|---|---|---|---|---|
| Reference | Arsenic | 124%/OK/OK | None | All ND |

### Laboratory Control Samples

- The LCS sample exhibited acceptable recoveries.

### Method Blank

- The method blanks were free of contamination.

### Field Blank

- Field QC results are summarized below.

| Blank ID | Compound | Conc. mg/L | Action Level mg/L | Qualifier | Affected Samples |
|---|---|---|---|---|---|
| RB-1 | Iron | 0.021 | 0.105 | None | See RB-2 |
| | Manganese | 0.0029 | 0.0145 | None | See RB-2 |
| RB-2 | Barium | 0.0021 | 0.0105 | None | All > 5X |
| | Copper | 0.0018 | 0.009 | B | 1 |
| | Iron | 0.24 | 1.2 | B | 1 |
| | Manganese | 0.022 | 0.11 | B | 1 |
| RB-3 | Chromium | 0.0017 | 0.0085 | None | All ND |
| | Copper | 0.0029 | 0.0145 | None | See RB-2 |
| | Iron | 0.083 | 0.415 | None | See RB-2 |
| | Manganese | 0.0034 | 0.017 | None | See RB-2 |

### Initial Calibration Verification

- All initial calibration criteria were met.

## Continuing Calibration Verification

- All continuing calibration criteria were met.

## Compound Quantitation

- All criteria were met.

## ICP Serial Dilution

- ICP serial dilution percent differences (%D) were within acceptance limits except the following.

| ICP Sample ID | Compound | %D | Qualifier | Affected Samples |
|---|---|---|---|---|
| Reference | Barium | 11% | J | 1, 3 |
| | Iron | 13% | J | 2-4 |

## Field Duplicate Sample Precision

- Field duplicate samples were not analyzed.

## Weak/Dissociable Cyanide

## Holding Times

- All samples were analyzed within 14 days for cyanide.

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

- A MS/MSD sample was not analyzed.

## Laboratory Control Samples

- The LCS sample exhibited acceptable %R values.

## Method Blank

- The method blanks were free of contamination.

## Initial Calibration

- All %RSD and/or correlation coefficient criteria were met.

## Continuing Calibration

- All %D criteria were met.

## Compound Quantitation

- All criteria were met.

## Field Blank

- Field QC results are summarized below.

| Blank ID | Compound | Conc. mg/L | Action Level mg/L | Qualifier | Affected Samples |
|---|---|---|---|---|---|
| RB-1 | None- ND | - | - | - | - |
| RB-2 | Cyanide, Weak/Diss. | 0.0020 | 0.010 | None | All ND |
| RB-3 | None- ND | - | - | - | - |

## Field Duplicate Sample Precision

- Field duplicate samples were not analyzed.

***Package Summary:***

Please contact the undersigned at (757) 564-0090 if you have any questions or need further information.

Signed: Nancy Weaver Dated: 8/19/11

Nancy Weaver
Senior Chemist

## Data Qualifiers

| | | |
|---|---|---|
| U | = | Not detected. The associated number indicates approximate sample concentration necessary to be detected. |
| B | = | Not detected substantially above the level reported in laboratory or field blanks. |
| R | = | Unreliable result. Analyte may or may not be present in the sample. Supporting data necessary to confirm result. |
| N | = | Tentative identification. Consider present. Special methods may be needed to confirm its presence or absence in future sampling efforts.. |
| J | = | Analyte present. Reported value may not be accurate or precise. |
| K | = | Analyte present. Reported value may be biased high. Actual value is expected lower. |
| L | = | Analyte present. Reported value may be biased low. Actual value is expected higher. |
| UJ | = | Not detected. Quantitation limit may be inaccurate or imprecise. |
| UL | = | Not detected. Quantitation limit is probably higher. |
| Q | = | No analytical result. |
| NJ | = | Qualitative identification questionable due to poor resolution. Presumptively present at approximate quantity. |

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State Certifications: CT PH-0224 , DE ID 11 , GA 914 , MA PA0102 , MD 128 , LA 04162 , VA 421 , WY EPA Region 8 , WV 343

# ANALYTICAL RESULTS

Workorder 9908515 EMS014|Marsh Run 06/02/11

Lab ID: **9908515001** Date Collected: 6/2/2011 09:30 Matrix: Ground Water
Sample ID: **MW-1** Date Received: 6/2/2011 20:00

| Parameters | Results | Units | Footnote | LOQ | LOD | DL | Method | Prepared | Analyzed | By | Cntr |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **VOLATILE ORGANICS** | | | | | | | | | | | |
| cis-1,2-Dichloroethene | 72.0 | ug/L | | 1.0 | 0.75 | 0.33 | SW846 8260B | | 6/14/11 20:34 | DJB | C |
| trans-1,2-Dichloroethene | 8.9 | ug/L | | 1.0 | 0.75 | 0.33 | SW846 8260B | | 6/14/11 20:34 | DJB | C |
| Tetrachloroethene | 0.75U | ug/L | | 1.0 | 0.75 | 0.33 | SW846 8260B | | 6/14/11 20:34 | DJB | C |
| Trichloroethene | 15.8 | ug/L | | 1.0 | 0.75 | 0.33 | SW846 8260B | | 6/14/11 20:34 | DJB | C |
| Vinyl Chloride | 0.88J | ug/L | | 1.0 | 0.75 | 0.33 | SW846 8260B | | 6/14/11 20:34 | DJB | C |
| *Surrogate Recoveries* | *Results* | *Units* | *Footnote* | *Limits* | | | *Method* | *Prepared* | *Analyzed* | *By* | *Cntr* |
| 1,2-Dichloroethane-d4 (S) | 91.7 | % | | 70-120 | | | SW846 8260B | | 6/14/11 20:34 | DJB | C |
| 4-Bromofluorobenzene (S) | 87.4 | % | | 75-120 | | | SW846 8260B | | 6/14/11 20:34 | DJB | C |
| Dibromofluoromethane (S) | 87.7 | % | | 85-115 | | | SW846 8260B | | 6/14/11 20:34 | DJB | C |
| Toluene-d8 (S) | 87.2 | % | | 85-120 | | | SW846 8260B | | 6/14/11 20:34 | DJB | C |
| **WET CHEMISTRY** | | | | | | | | | | | |
| Cyanide,Weak/Dissociable(Free) | 0.0050 U | mg/L | | 0.0050 | 0.0050 | 0.0015 | SM20-4500CNI | 6/7/11 | 6/7/11 03:55 | KRK | E1 |
| **METALS** | | | | | | | | | | | |
| Arsenic, Dissolved | 0.0020 U | mg/L | | 0.0030 | 0.0020 | 0.0010 | SW846 6020A | 6/9/11 | 6/17/11 16:08 | AJB | F1 |
| Barium, Dissolved | 0.095 J | mg/L | | 0.0050 | 0.0033 | 0.0016 | SW846 6020A | 6/9/11 | 6/20/11 12:09 | AJB | F1 |
| Beryllium, Dissolved | 0.00067 U | mg/L | | 0.0010 | 0.00067 | 0.00030 | SW846 6020A | 6/9/11 | 6/20/11 12:09 | AJB | F1 |
| Cadmium, Dissolved | 0.00067 U | mg/L | | 0.0010 | 0.00067 | 0.00030 | SW846 6020A | 6/9/11 | 6/17/11 16:08 | AJB | F1 |
| Chromium, Dissolved | 0.0013 U | mg/L | | 0.0020 | 0.0013 | 0.00066 | SW846 6020A | 6/9/11 | 6/17/11 16:08 | AJB | F1 |
| Copper, Dissolved | 0.0057 B | mg/L | | 0.0050 | 0.0033 | 0.0016 | SW846 6020A | 6/9/11 | 6/17/11 16:08 | AJB | F1 |
| Iron, Dissolved | 0.20 B | mg/L | | 0.050 | 0.033 | 0.016 | SW846 6020A | 6/9/11 | 6/17/11 16:08 | AJB | F1 |
| Lead, Dissolved | 0.0013 U | mg/L | | 0.0020 | 0.0013 | 0.00066 | SW846 6020A | 6/9/11 | 6/17/11 16:08 | AJB | F1 |
| Manganese, Dissolved | 0.060 B | mg/L | | 0.0050 | 0.0033 | 0.0016 | SW846 6020A | 6/9/11 | 6/17/11 16:08 | AJB | F1 |
| Mercury, Dissolved | 0.00013 U | mg/L | | 0.00020 | 0.00013 | 0.000066 | SW846 6020A | 6/9/11 | 6/20/11 12:09 | AJB | F1 |

***Sample Comments:***

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State Certifications: CT PH-0224 , DE ID 11 , GA 914 , MA PA0102 , MD 128 , LA 04162 , VA 421 , WY EPA Region 8 , WV 343

# ANALYTICAL RESULTS

Workorder 9908515 EMS014|Marsh Run 06/02/11

Lab ID: **9908515002** Date Collected: 6/2/2011 10:40 Matrix: Ground Water
Sample ID: **RB-1** Date Received: 6/2/2011 20:00

| Parameters | Results | Units | Footnote | LOQ | LOD | DL | Method | Prepared | Analyzed | By | Cntr |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **VOLATILE ORGANICS** | | | | | | | | | | | |
| cis-1,2-Dichloroethene | 0.75U UJ | ug/L | | 1.0 | 0.75 | 0.33 | SW846 8260B | | 6/13/11 19:07 | DJB | B |
| trans-1,2-Dichloroethene | 0.75U | ug/L | | 1.0 | 0.75 | 0.33 | SW846 8260B | | 6/13/11 19:07 | DJB | B |
| Tetrachloroethene | 0.75U | ug/L | | 1.0 | 0.75 | 0.33 | SW846 8260B | | 6/13/11 19:07 | DJB | B |
| Trichloroethene | 0.75U | ug/L | | 1.0 | 0.75 | 0.33 | SW846 8260B | | 6/13/11 19:07 | DJB | B |
| Vinyl Chloride | 0.75U | ug/L | | 1.0 | 0.75 | 0.33 | SW846 8260B | | 6/13/11 19:07 | DJB | B |
| *Surrogate Recoveries* | *Results* | *Units* | *Footnote* | *Limits* | | | *Method* | *Prepared* | *Analyzed* | *By* | *Cntr* |
| 1,2-Dichloroethane-d4 (S) | 86.7 | % | | 70-120 | | | SW846 8260B | | 6/13/11 19:07 | DJB | B |
| 4-Bromofluorobenzene (S) | 86.1 | % | | 75-120 | | | SW846 8260B | | 6/13/11 19:07 | DJB | B |
| Dibromofluoromethane (S) | 83.9 | % | | 85-115 | | | SW846 8260B | | 6/13/11 19:07 | DJB | B |
| Toluene-d8 (S) | 85.3 | % | | 85-120 | | | SW846 8260B | | 6/13/11 19:07 | DJB | B |
| **SEMIVOLATILES** | | | | | | | | | | | |
| Acenaphthene | 0.99U | ug/L | | 2.0 | 0.99 | 0.50 | SW846 8270D | 6/7/11 | 6/8/11 15:53 | SAS | G1 |
| Acenaphthylene | 0.99U | ug/L | | 2.0 | 0.99 | 0.34 | SW846 8270D | 6/7/11 | 6/8/11 15:53 | SAS | G1 |
| Anthracene | 0.99U | ug/L | | 2.0 | 0.99 | 0.44 | SW846 8270D | 6/7/11 | 6/8/11 15:53 | SAS | G1 |
| Benzo(a)anthracene | 0.99U | ug/L | | 2.0 | 0.99 | 0.31 | SW846 8270D | 6/7/11 | 6/8/11 15:53 | SAS | G1 |
| Benzo(a)pyrene | 0.99U | ug/L | | 2.0 | 0.99 | 0.33 | SW846 8270D | 6/7/11 | 6/8/11 15:53 | SAS | G1 |
| Benzo(b)fluoranthene | 0.99U | ug/L | | 2.0 | 0.99 | 0.34 | SW846 8270D | 6/7/11 | 6/8/11 15:53 | SAS | G1 |
| Benzo(g,h,i)perylene | 0.99U | ug/L | | 2.0 | 0.99 | 0.43 | SW846 8270D | 6/7/11 | 6/8/11 15:53 | SAS | G1 |
| Benzo(k)fluoranthene | 0.99U | ug/L | | 2.0 | 0.99 | 0.38 | SW846 8270D | 6/7/11 | 6/8/11 15:53 | SAS | G1 |
| Chrysene | 0.99U | ug/L | | 2.0 | 0.99 | 0.25 | SW846 8270D | 6/7/11 | 6/8/11 15:53 | SAS | G1 |
| Dibenzo(a,h)anthracene | 0.99U | ug/L | | 2.0 | 0.99 | 0.93 | SW846 8270D | 6/7/11 | 6/8/11 15:53 | SAS | G1 |
| Fluoranthene | 0.99U | ug/L | | 2.0 | 0.99 | 0.35 | SW846 8270D | 6/7/11 | 6/8/11 15:53 | SAS | G1 |
| Fluorene | 0.99U | ug/L | | 2.0 | 0.99 | 0.40 | SW846 8270D | 6/7/11 | 6/8/11 15:53 | SAS | G1 |
| Indeno(1,2,3-cd)pyrene | 0.99U | ug/L | | 2.0 | 0.99 | 0.25 | SW846 8270D | 6/7/11 | 6/8/11 15:53 | SAS | G1 |
| Naphthalene | 0.99U | ug/L | | 2.0 | 0.99 | 0.46 | SW846 8270D | 6/7/11 | 6/8/11 15:53 | SAS | G1 |
| Phenanthrene | 0.99U | ug/L | | 2.0 | 0.99 | 0.33 | SW846 8270D | 6/7/11 | 6/8/11 15:53 | SAS | G1 |
| Pyrene | 0.99U | ug/L | | 2.0 | 0.99 | 0.50 | SW846 8270D | 6/7/11 | 6/8/11 15:53 | SAS | G1 |
| *Surrogate Recoveries* | *Results* | *Units* | *Footnote* | *Limits* | | | *Method* | *Prepared* | *Analyzed* | *By* | *Cntr* |
| 2-Fluorobiphenyl (S) | 68.1 | % | | 50-110 | | | SW846 8270D | 6/7/11 | 6/8/11 15:53 | SAS | G1 |
| Nitrobenzene-d5 (S) | 80.7 | % | | 40-110 | | | SW846 8270D | 6/7/11 | 6/8/11 15:53 | SAS | G1 |
| Terphenyl-d14 (S) | 87.3 | % | | 50-135 | | | SW846 8270D | 6/7/11 | 6/8/11 15:53 | SAS | G1 |
| **SEMIVOLATILE SIM** | | | | | | | | | | | |
| Acenaphthene | 0.040U | ug/L | | 0.050 | 0.040 | 0.015 | 8270 SIM | 6/7/11 | 6/9/11 21:48 | DHF | G2 |
| Acenaphthylene | 0.040U | ug/L | | 0.050 | 0.040 | 0.018 | 8270 SIM | 6/7/11 | 6/9/11 21:48 | DHF | G2 |
| Anthracene | 0.040U | ug/L | | 0.050 | 0.040 | 0.013 | 8270 SIM | 6/7/11 | 6/9/11 21:48 | DHF | G2 |
| Benzo(a)anthracene | 0.040U | ug/L | | 0.050 | 0.040 | 0.021 | 8270 SIM | 6/7/11 | 6/9/11 21:48 | DHF | G2 |
| Benzo(a)pyrene | 0.040U | ug/L | | 0.050 | 0.040 | 0.030 | 8270 SIM | 6/7/11 | 6/9/11 21:48 | DHF | G2 |



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State Certifications: CT PH-0224 , DE ID 11 , GA 914 , MA PA0102 , MD 128 , LA 04162 , VA 421 , WY EPA Region 8 , WV 343

# ANALYTICAL RESULTS

Workorder 9908515 EMS014|Marsh Run 06/02/11

Lab ID: **9908515002** Date Collected: 6/2/2011 10:40 Matrix: Ground Water

Sample ID: **RB-1** Date Received: 6/2/2011 20:00

| Parameters | Results | Units | Footnote | LOQ | LOD | DL | Method | Prepared | Analyzed | By | Cntr |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Benzo(b)fluoranthene | 0.040U | ug/L | | 0.050 | 0.040 | 0.024 | 8270 SIM | 6/7/11 | 6/9/11 21:48 | DHF | G2 |
| Benzo(g,h,i)perylene | 0.040U | ug/L | | 0.050 | 0.040 | 0.016 | 8270 SIM | 6/7/11 | 6/9/11 21:48 | DHF | G2 |
| Benzo(k)fluoranthene | 0.040U | ug/L | | 0.050 | 0.040 | 0.022 | 8270 SIM | 6/7/11 | 6/9/11 21:48 | DHF | G2 |
| Chrysene | 0.040U | ug/L | | 0.050 | 0.040 | 0.021 | 8270 SIM | 6/7/11 | 6/9/11 21:48 | DHF | G2 |
| Dibenzo(a,h)anthracene | 0.040U | ug/L | | 0.050 | 0.040 | 0.015 | 8270 SIM | 6/7/11 | 6/9/11 21:48 | DHF | G2 |
| Fluoranthene | 0.040U | ug/L | | 0.050 | 0.040 | 0.021 | 8270 SIM | 6/7/11 | 6/9/11 21:48 | DHF | G2 |
| Fluorene | 0.040U | ug/L | | 0.050 | 0.040 | 0.015 | 8270 SIM | 6/7/11 | 6/9/11 21:48 | DHF | G2 |
| Indeno(1,2,3-cd)pyrene | 0.040U | ug/L | | 0.050 | 0.040 | 0.015 | 8270 SIM | 6/7/11 | 6/9/11 21:48 | DHF | G2 |
| Naphthalene | 0.050U | ug/L | | 0.050 | 0.050 | 0.041 | 8270 SIM | 6/7/11 | 6/9/11 21:48 | DHF | G2 |
| Phenanthrene | 0.040U | ug/L | | 0.050 | 0.040 | 0.028 | 8270 SIM | 6/7/11 | 6/9/11 21:48 | DHF | G2 |
| Pyrene | 0.040U | ug/L | | 0.050 | 0.040 | 0.019 | 8270 SIM | 6/7/11 | 6/9/11 21:48 | DHF | G2 |
| *Surrogate Recoveries* | *Results* | *Units* | *Footnote* | *Limits* | | | *Method* | *Prepared* | *Analyzed* | *By* | *Cntr* |
| 2-Methylnapthalene-d10 (S) | 83 | % | | 29-112 | | | 8270 SIM | 6/7/11 | 6/9/11 21:48 | DHF | G2 |
| Fluoranthene-d10 (S) | 92.4 | % | | 45-130 | | | 8270 SIM | 6/7/11 | 6/9/11 21:48 | DHF | G2 |
| **WET CHEMISTRY** | | | | | | | | | | | |
| Cyanide,Weak/Dissociable(Free) | 0.0050 U | mg/L | | 0.0050 | 0.0050 | 0.0015 | SM20-4500CNI | 6/7/11 | 6/7/11 03:55 | KRK | E |
| **METALS** | | | | | | | | | | | |
| Arsenic, Dissolved | 0.0020 U | mg/L | | 0.0030 | 0.0020 | 0.0010 | SW846 6020A | 6/9/11 | 6/17/11 17:02 | AJB | F1 |
| Barium, Dissolved | 0.0033 U | mg/L | | 0.0050 | 0.0033 | 0.0016 | SW846 6020A | 6/9/11 | 6/20/11 12:14 | AJB | F1 |
| Beryllium, Dissolved | 0.0013 U | mg/L | | 0.0020 | 0.0013 | 0.00060 | SW846 6020A | 6/9/11 | 6/20/11 17:46 | AJB | F1 |
| Cadmium, Dissolved | 0.00067 U | mg/L | | 0.0010 | 0.00067 | 0.00030 | SW846 6020A | 6/9/11 | 6/17/11 17:02 | AJB | F1 |
| Chromium, Dissolved | 0.0013 U | mg/L | | 0.0020 | 0.0013 | 0.00066 | SW846 6020A | 6/9/11 | 6/17/11 17:02 | AJB | F1 |
| Copper, Dissolved | 0.0033 U | mg/L | | 0.0050 | 0.0033 | 0.0016 | SW846 6020A | 6/9/11 | 6/17/11 17:02 | AJB | F1 |
| Iron, Dissolved | 0.021 J | mg/L | | 0.050 | 0.033 | 0.016 | SW846 6020A | 6/9/11 | 6/17/11 17:02 | AJB | F1 |
| Lead, Dissolved | 0.0013 U | mg/L | | 0.0020 | 0.0013 | 0.00066 | SW846 6020A | 6/9/11 | 6/17/11 17:02 | AJB | F1 |
| Manganese, Dissolved | 0.0029J | mg/L | | 0.0050 | 0.0033 | 0.0016 | SW846 6020A | 6/9/11 | 6/17/11 17:02 | AJB | F1 |
| Mercury, Dissolved | 0.00013 U | mg/L | | 0.00020 | 0.00013 | 0.000066 | SW846 6020A | 6/9/11 | 6/20/11 12:14 | AJB | F1 |

***Sample Comments:***



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# ANALYTICAL RESULTS

Workorder 9908515 EMS014|Marsh Run 06/02/11

Lab ID: **9908515003** Date Collected: 6/2/2011 10:45 Matrix: Ground Water

Sample ID: **RB-2** Date Received: 6/2/2011 20:00

| Parameters | Results | Units | Footnote | LOQ | LOD | DL | Method | Prepared | Analyzed | By | Cntr |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **VOLATILE ORGANICS** | | | | | | | | | | | |
| cis-1,2-Dichloroethene | 0.75U UJ | ug/L | | 1.0 | 0.75 | 0.33 | SW846 8260B | | 6/13/11 19:41 | DJB | B |
| trans-1,2-Dichloroethene | 0.75U | ug/L | | 1.0 | 0.75 | 0.33 | SW846 8260B | | 6/13/11 19:41 | DJB | B |
| Tetrachloroethene | 0.75U | ug/L | | 1.0 | 0.75 | 0.33 | SW846 8260B | | 6/13/11 19:41 | DJB | B |
| Trichloroethene | 0.75U | ug/L | | 1.0 | 0.75 | 0.33 | SW846 8260B | | 6/13/11 19:41 | DJB | B |
| Vinyl Chloride | 0.75U | ug/L | | 1.0 | 0.75 | 0.33 | SW846 8260B | | 6/13/11 19:41 | DJB | B |
| *Surrogate Recoveries* | *Results* | *Units* | *Footnote* | *Limits* | | | *Method* | *Prepared* | *Analyzed* | *By* | *Cntr* |
| 1,2-Dichloroethane-d4 (S) | 87.1 | % | | 70-120 | | | SW846 8260B | | 6/13/11 19:41 | DJB | B |
| 4-Bromofluorobenzene (S) | 82.5 | % | | 75-120 | | | SW846 8260B | | 6/13/11 19:41 | DJB | B |
| Dibromofluoromethane (S) | 87.1 | % | | 85-115 | | | SW846 8260B | | 6/13/11 19:41 | DJB | B |
| Toluene-d8 (S) | 84.6 | % | 2 | 85-120 | | | SW846 8260B | | 6/13/11 19:41 | DJB | B |
| **WET CHEMISTRY** | | | | | | | | | | | |
| Cyanide,Weak/Dissociable(Free) | 0.0020J | mg/L | | 0.0050 | 0.0050 | 0.0015 | SM20-4500CNI | 6/9/11 | 6/9/11 14:45 | KLR | F1 |
| **METALS** | | | | | | | | | | | |
| Arsenic, Dissolved | 0.0020 U | mg/L | | 0.0030 | 0.0020 | 0.0010 | SW846 6020A | 6/9/11 | 6/17/11 17:08 | AJB | E1 |
| Barium, Dissolved | 0.0021 J | mg/L | | 0.0050 | 0.0033 | 0.0016 | SW846 6020A | 6/9/11 | 6/20/11 12:17 | AJB | E1 |
| Beryllium, Dissolved | 0.0013 U | mg/L | | 0.0020 | 0.0013 | 0.00060 | SW846 6020A | 6/9/11 | 6/20/11 17:49 | AJB | E1 |
| Cadmium, Dissolved | 0.00067 U | mg/L | | 0.0010 | 0.00067 | 0.00030 | SW846 6020A | 6/9/11 | 6/17/11 17:08 | AJB | E1 |
| Chromium, Dissolved | 0.0013 U | mg/L | | 0.0020 | 0.0013 | 0.00066 | SW846 6020A | 6/9/11 | 6/17/11 17:08 | AJB | E1 |
| Copper, Dissolved | 0.0018J | mg/L | | 0.0050 | 0.0033 | 0.0016 | SW846 6020A | 6/9/11 | 6/17/11 17:08 | AJB | E1 |
| Iron, Dissolved | 0.24 J | mg/L | | 0.050 | 0.033 | 0.016 | SW846 6020A | 6/9/11 | 6/17/11 17:08 | AJB | E1 |
| Lead, Dissolved | 0.0013 U | mg/L | | 0.0020 | 0.0013 | 0.00066 | SW846 6020A | 6/9/11 | 6/17/11 17:08 | AJB | E1 |
| Manganese, Dissolved | 0.022 | mg/L | | 0.0050 | 0.0033 | 0.0016 | SW846 6020A | 6/9/11 | 6/17/11 17:08 | AJB | E1 |
| Mercury, Dissolved | 0.00013 U | mg/L | | 0.00020 | 0.00013 | 0.000066 | SW846 6020A | 6/9/11 | 6/20/11 12:17 | AJB | E1 |

***Sample Comments:***

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State Certifications: CT PH-0224 , DE ID 11 , GA 914 , MA PA0102 , MD 128 , LA 04162 , VA 421 , WY EPA Region 8 , WV 343

# ANALYTICAL RESULTS

Workorder 9908515 EMS014|Marsh Run 06/02/11

Lab ID: **9908515004** Date Collected: 6/2/2011 19:15 Matrix: Ground Water

Sample ID: **RB-3** Date Received: 6/2/2011 20:00

| Parameters | Results | Units | Footnote | LOQ | LOD | DL | Method | Prepared | Analyzed | By | Cntr |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **VOLATILE ORGANICS** | | | | | | | | | | | |
| cis-1,2-Dichloroethene | 0.75U | ug/L | | 1.0 | 0.75 | 0.33 | SW846 8260B | | 6/14/11 07:58 | MES | B |
| trans-1,2-Dichloroethene | 0.75U | ug/L | | 1.0 | 0.75 | 0.33 | SW846 8260B | | 6/14/11 07:58 | MES | B |
| Tetrachloroethene | 0.75U | ug/L | | 1.0 | 0.75 | 0.33 | SW846 8260B | | 6/14/11 07:58 | MES | B |
| Trichloroethene | 0.75U | ug/L | | 1.0 | 0.75 | 0.33 | SW846 8260B | | 6/14/11 07:58 | MES | B |
| Vinyl Chloride | 0.75U | ug/L | | 1.0 | 0.75 | 0.33 | SW846 8260B | | 6/14/11 07:58 | MES | B |
| *Surrogate Recoveries* | *Results* | *Units* | *Footnote* | *Limits* | | | *Method* | *Prepared* | *Analyzed* | *By* | *Cntr* |
| 1,2-Dichloroethane-d4 (S) | 87.7 | % | | 70-120 | | | SW846 8260B | | 6/14/11 07:58 | MES | B |
| 4-Bromofluorobenzene (S) | 85.2 | % | | 75-120 | | | SW846 8260B | | 6/14/11 07:58 | MES | B |
| Dibromofluoromethane (S) | 88.5 | % | | 85-115 | | | SW846 8260B | | 6/14/11 07:58 | MES | B |
| Toluene-d8 (S) | 85.5 | % | | 85-120 | | | SW846 8260B | | 6/14/11 07:58 | MES | B |
| **SEMIVOLATILES** | | | | | | | | | | | |
| Acenaphthene | 0.94U | ug/L | | 1.9 | 0.94 | 0.48 | SW846 8270D | 6/7/11 | 6/8/11 16:18 | SAS | F1 |
| Acenaphthylene | 0.94U | ug/L | | 1.9 | 0.94 | 0.32 | SW846 8270D | 6/7/11 | 6/8/11 16:18 | SAS | F1 |
| Anthracene | 0.94U | ug/L | | 1.9 | 0.94 | 0.42 | SW846 8270D | 6/7/11 | 6/8/11 16:18 | SAS | F1 |
| Benzo(a)anthracene | 0.94U | ug/L | | 1.9 | 0.94 | 0.29 | SW846 8270D | 6/7/11 | 6/8/11 16:18 | SAS | F1 |
| Benzo(a)pyrene | 0.94U | ug/L | | 1.9 | 0.94 | 0.31 | SW846 8270D | 6/7/11 | 6/8/11 16:18 | SAS | F1 |
| Benzo(b)fluoranthene | 0.94U | ug/L | | 1.9 | 0.94 | 0.32 | SW846 8270D | 6/7/11 | 6/8/11 16:18 | SAS | F1 |
| Benzo(g,h,i)perylene | 0.94U | ug/L | | 1.9 | 0.94 | 0.41 | SW846 8270D | 6/7/11 | 6/8/11 16:18 | SAS | F1 |
| Benzo(k)fluoranthene | 0.94U | ug/L | | 1.9 | 0.94 | 0.36 | SW846 8270D | 6/7/11 | 6/8/11 16:18 | SAS | F1 |
| Chrysene | 0.94U | ug/L | | 1.9 | 0.94 | 0.24 | SW846 8270D | 6/7/11 | 6/8/11 16:18 | SAS | F1 |
| Dibenzo(a,h)anthracene | 0.94U | ug/L | | 1.9 | 0.94 | 0.89 | SW846 8270D | 6/7/11 | 6/8/11 16:18 | SAS | F1 |
| Fluoranthene | 0.94U | ug/L | | 1.9 | 0.94 | 0.33 | SW846 8270D | 6/7/11 | 6/8/11 16:18 | SAS | F1 |
| Fluorene | 0.94U | ug/L | | 1.9 | 0.94 | 0.38 | SW846 8270D | 6/7/11 | 6/8/11 16:18 | SAS | F1 |
| Indeno(1,2,3-cd)pyrene | 0.94U | ug/L | | 1.9 | 0.94 | 0.24 | SW846 8270D | 6/7/11 | 6/8/11 16:18 | SAS | F1 |
| Naphthalene | 0.94U | ug/L | | 1.9 | 0.94 | 0.43 | SW846 8270D | 6/7/11 | 6/8/11 16:18 | SAS | F1 |
| Phenanthrene | 0.94U | ug/L | | 1.9 | 0.94 | 0.31 | SW846 8270D | 6/7/11 | 6/8/11 16:18 | SAS | F1 |
| Pyrene | 0.94U | ug/L | | 1.9 | 0.94 | 0.48 | SW846 8270D | 6/7/11 | 6/8/11 16:18 | SAS | F1 |
| *Surrogate Recoveries* | *Results* | *Units* | *Footnote* | *Limits* | | | *Method* | *Prepared* | *Analyzed* | *By* | *Cntr* |
| 2-Fluorobiphenyl (S) | 60.7 | % | | 50-110 | | | SW846 8270D | 6/7/11 | 6/8/11 16:18 | SAS | F1 |
| Nitrobenzene-d5 (S) | 72.5 | % | | 40-110 | | | SW846 8270D | 6/7/11 | 6/8/11 16:18 | SAS | F1 |
| Terphenyl-d14 (S) | 80.2 | % | | 50-135 | | | SW846 8270D | 6/7/11 | 6/8/11 16:18 | SAS | F1 |
| **SEMIVOLATILE SIM** | | | | | | | | | | | |
| Acenaphthene | 0.038U | ug/L | | 0.047 | 0.038 | 0.014 | 8270 SIM | 6/7/11 | 6/9/11 22:09 | DHF | F2 |
| Acenaphthylene | 0.038U | ug/L | | 0.047 | 0.038 | 0.017 | 8270 SIM | 6/7/11 | 6/9/11 22:09 | DHF | F2 |
| Anthracene | 0.038U | ug/L | | 0.047 | 0.038 | 0.012 | 8270 SIM | 6/7/11 | 6/9/11 22:09 | DHF | F2 |
| Benzo(a)anthracene | 0.038U | ug/L | | 0.047 | 0.038 | 0.020 | 8270 SIM | 6/7/11 | 6/9/11 22:09 | DHF | F2 |
| Benzo(a)pyrene | 0.038U | ug/L | | 0.047 | 0.038 | 0.028 | 8270 SIM | 6/7/11 | 6/9/11 22:09 | DHF | F2 |



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# ANALYTICAL RESULTS

Workorder 9908515 EMS014|Marsh Run 06/02/11

Lab ID: **9908515004** Date Collected: 6/2/2011 19:15 Matrix: Ground Water

Sample ID: **RB-3** Date Received: 6/2/2011 20:00

| Parameters | Results | Units | Footnote | LOQ | LOD | DL | Method | Prepared | Analyzed | By | Cntr |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Benzo(b)fluoranthene | 0.038U | ug/L | | 0.047 | 0.038 | 0.023 | 8270 SIM | 6/7/11 | 6/9/11 22:09 | DHF | F2 |
| Benzo(g,h,i)perylene | 0.038U | ug/L | | 0.047 | 0.038 | 0.015 | 8270 SIM | 6/7/11 | 6/9/11 22:09 | DHF | F2 |
| Benzo(k)fluoranthene | 0.038U | ug/L | | 0.047 | 0.038 | 0.021 | 8270 SIM | 6/7/11 | 6/9/11 22:09 | DHF | F2 |
| Chrysene | 0.038U | ug/L | | 0.047 | 0.038 | 0.020 | 8270 SIM | 6/7/11 | 6/9/11 22:09 | DHF | F2 |
| Dibenzo(a,h)anthracene | 0.038U | ug/L | | 0.047 | 0.038 | 0.014 | 8270 SIM | 6/7/11 | 6/9/11 22:09 | DHF | F2 |
| Fluoranthene | 0.038U | ug/L | | 0.047 | 0.038 | 0.020 | 8270 SIM | 6/7/11 | 6/9/11 22:09 | DHF | F2 |
| Fluorene | 0.038U | ug/L | | 0.047 | 0.038 | 0.014 | 8270 SIM | 6/7/11 | 6/9/11 22:09 | DHF | F2 |
| Indeno(1,2,3-cd)pyrene | 0.038U | ug/L | | 0.047 | 0.038 | 0.014 | 8270 SIM | 6/7/11 | 6/9/11 22:09 | DHF | F2 |
| Naphthalene | 0.047U | ug/L | | 0.047 | 0.047 | 0.039 | 8270 SIM | 6/7/11 | 6/9/11 22:09 | DHF | F2 |
| Phenanthrene | 0.038U | ug/L | | 0.047 | 0.038 | 0.026 | 8270 SIM | 6/7/11 | 6/9/11 22:09 | DHF | F2 |
| Pyrene | 0.038U | ug/L | | 0.047 | 0.038 | 0.018 | 8270 SIM | 6/7/11 | 6/9/11 22:09 | DHF | F2 |
| *Surrogate Recoveries* | *Results* | *Units* | *Footnote* | *Limits* | | | *Method* | *Prepared* | *Analyzed* | *By* | *Cntr* |
| 2-Methylnapthalene-d10 (S) | 79.4 | % | | 29-112 | | | 8270 SIM | 6/7/11 | 6/9/11 22:09 | DHF | F2 |
| Fluoranthene-d10 (S) | 95.3 | % | | 45-130 | | | 8270 SIM | 6/7/11 | 6/9/11 22:09 | DHF | F2 |
| **METALS** | | | | | | | | | | | |
| Arsenic, Dissolved | 0.0020 U | mg/L | | 0.0030 | 0.0020 | 0.0010 | SW846 6020A | 6/9/11 | 6/17/11 17:46 | AJB | E1 |
| Barium, Dissolved | 0.0033 U | mg/L | | 0.0050 | 0.0033 | 0.0016 | SW846 6020A | 6/9/11 | 6/20/11 12:17 | AJB | E1 |
| Beryllium, Dissolved | 0.0013 U | mg/L | | 0.0020 | 0.0013 | 0.00060 | SW846 6020A | 6/9/11 | 6/20/11 17:52 | AJB | E1 |
| Cadmium, Dissolved | 0.00067 U | mg/L | | 0.0010 | 0.00067 | 0.00030 | SW846 6020A | 6/9/11 | 6/17/11 17:46 | AJB | E1 |
| Chromium, Dissolved | 0.0017J | mg/L | | 0.0020 | 0.0013 | 0.00066 | SW846 6020A | 6/9/11 | 6/17/11 17:46 | AJB | E1 |
| Copper, Dissolved | 0.0029J | mg/L | | 0.0050 | 0.0033 | 0.0016 | SW846 6020A | 6/9/11 | 6/17/11 17:46 | AJB | E1 |
| Iron, Dissolved | 0.083 J | mg/L | | 0.050 | 0.033 | 0.016 | SW846 6020A | 6/9/11 | 6/17/11 17:46 | AJB | E1 |
| Lead, Dissolved | 0.0013 U | mg/L | | 0.0020 | 0.0013 | 0.00066 | SW846 6020A | 6/9/11 | 6/17/11 17:46 | AJB | E1 |
| Manganese, Dissolved | 0.0034J | mg/L | | 0.0050 | 0.0033 | 0.0016 | SW846 6020A | 6/9/11 | 6/17/11 17:46 | AJB | E1 |
| Mercury, Dissolved | 0.00013 U | mg/L | | 0.00020 | 0.00013 | 0.000066 | SW846 6020A | 6/9/11 | 6/20/11 12:17 | AJB | E1 |

***Sample Comments:***

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Now part of the ALS Group
34 Dogwood Lane ■ Middletown, PA 17057 ■ Phone: 717-944-5541 ■ Fax: 717-944-1430 ■ www.analyticallab.com ■ www.alsglobal.com

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NELAP Certifications: NJ PA010 , NY 11759 , PA 22-293 DoD ELAP: A2LA 0818.01
State Certifications: CT PH-0224 , DE ID 11 , GA 914 , MA PA0102 , MD 128 , LA 04162 , VA 421 , WY EPA Region 8 , WV 343

# ANALYTICAL RESULTS

Workorder 9908515 EMS014|Marsh Run 06/02/11

Lab ID: **9908515005** Date Collected: 6/2/2011 20:00 Matrix: Ground Water

Sample ID: **Trip Blank** Date Received: 6/2/2011 20:00

| Parameters | Results | Units | Footnote | LOQ | LOD | DL | Method | Prepared | Analyzed | By | Cntr |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **VOLATILE ORGANICS** | | | | | | | | | | | |
| cis-1,2-Dichloroethene | 0.75U | ug/L | | 1.0 | 0.75 | 0.33 | SW846 8260B | | 6/14/11 21:42 | DJB | C |
| trans-1,2-Dichloroethene | 0.75U | ug/L | | 1.0 | 0.75 | 0.33 | SW846 8260B | | 6/14/11 21:42 | DJB | C |
| Tetrachloroethene | 0.75U | ug/L | | 1.0 | 0.75 | 0.33 | SW846 8260B | | 6/14/11 21:42 | DJB | C |
| Trichloroethene | 0.75U | ug/L | | 1.0 | 0.75 | 0.33 | SW846 8260B | | 6/14/11 21:42 | DJB | C |
| Vinyl Chloride | 0.75U | ug/L | | 1.0 | 0.75 | 0.33 | SW846 8260B | | 6/14/11 21:42 | DJB | C |
| *Surrogate Recoveries* | *Results* | *Units* | *Footnote* | *Limits* | | | *Method* | *Prepared* | *Analyzed* | *By* | *Cntr* |
| 1,2-Dichloroethane-d4 (S) | 87 | % | | 70-120 | | | SW846 8260B | | 6/14/11 21:42 | DJB | C |
| 4-Bromofluorobenzene (S) | 86.4 | % | | 75-120 | | | SW846 8260B | | 6/14/11 21:42 | DJB | C |
| Dibromofluoromethane (S) | 86.6 | % | | 85-115 | | | SW846 8260B | | 6/14/11 21:42 | DJB | C |
| Toluene-d8 (S) | 85.1 | % | | 85-120 | | | SW846 8260B | | 6/14/11 21:42 | DJB | C |

***Sample Comments:***

Anna G Milliken
Technical Manager

ENVIRONMENTAL
Data Services, Inc.

# DATA VALIDATION SUMMARY REPORT
# MARSH RUN PARK, FAIRVIEW TOWNSHIP, PENNSYLVANIA

Client: EA Engineering, Science & Technology, Inc., Sparks, Maryland
SDG: EMS-020
Laboratory: Analytical Laboratory Services, Middletown, Pennsylvania
Site: Marsh Run Park, Fairview Township, Pennsylvania
Date: January 30, 2012

| EDS ID | Client Sample ID | Laboratory Sample ID | Matrix |
|---|---|---|---|
| 1† | SD-5 | 9941932001 | Soil |
| 2† | SD-6 | 9941932002 | Soil |
| 2MS* | SD-6MS | 9941932002MS | Soil |
| 2MSD* | SD-6MSD | 9941932002MSD | Soil |
| 3† | SD-7 | 9941932003 | Soil |
| 4† | SD-8 | 9941932004 | Soil |
| 4MS** | SD-8MS | 9941932004MS | Soil |
| 4MSD** | SD-8MSD | 9941932004MSD | Soil |
| 5†† | SW-5 | 9941932005 | Water |
| 6† | DUP-1 | 9941932006 | Soil |
| 7†† | DUP-2 | 9941932007 | Water |
| 8† | SD-9 | 9941932008 | Soil |
| 9†† | SW-8 | 9941932009 | Water |

* - SVOC, Hg ** - Metals † - SVOC, Metals/Hg †† - SVOC, PAH, Metals/Hg

A full data validation was performed on the analytical data for six soil samples and three water samples collected on December 9, 2011 by EA Engineering at the Marsh Run Park site in Fairview Township, Pennsylvania. The samples were analyzed under the Environmental Protection Agency (USEPA) "Test Methods for the Evaluation of Solid Waste, USEPA SW-846, Third Edition, September 1986, with revisions".

Specific method references are as follows:

| *Analysis* | *Method References* |
|---|---|
| SVOCs | USEPA SW-846 Method 8270D |
| PAHs by SIM | USEPA SW-846 Method 8270SIM |
| Total Metals/Hg | USEPA SW-846 Method 6010C/6020A/7471B |

The data have been validated according to the protocols and quality control (QC) requirements of the analytical methods, the USEPA Region III data validation guidelines as follows:

- The USEPA Region III Modifications to the National Functional Guidelines for Organic Data Review," September 1994;

- The USEPA Region III Modifications to the National Functional Guidelines for Evaluating Inorganic Analyses," April 1003;
- and the reviewer's professional judgment.

The following items/criteria were reviewed for this report:

### *Organics*

- Holding times and sample preservation
- Surrogate Spike recoveries
- Matrix Spike/Matrix Spike Duplicate (MS/MSD) recoveries
- Laboratory Control Sample/Duplicate (LCS/LCSD) recoveries
- Method blank and field blank contamination
- Gas Chromatography (GC)/Mass Spectroscopy (MS) tuning
- Initial and continuing calibration summaries
- Compound Quantitation
- Internal standard area and retention time summary forms
- Field Duplicate sample precision

### *Inorganics*

- Holding times and sample preservation
- Matrix Spike/Matrix Spike Duplicate (MS/MSD) recoveries
- Laboratory Control Sample/Duplicate (LCS/LCSD) recoveries
- Method blank and field blank contamination
- Initial and continuing calibration verifications
- Compound Quantitation
- ICP Serial Dilution
- Field Duplicate sample precision

## **Overall Usability Issues:**

There were minor rejections of data. This data cannot be used in the decision-making process for this project.

- Hexachlorocyclopentadiene was rejected in one sample due to severely low MS/MSD recoveries.

Overall the data is acceptable for the intended purposes as qualified for the deficiencies detailed in this report.

## Semivolatile Organic Compounds (SVOC)

### Holding Times

- All samples were extracted within 7 days for water samples and 14 days for soil samples and all samples analyzed within 40 days for all samples.

### Surrogate Spike Recoveries

- All samples exhibited acceptable surrogate %R values.

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

- A MS/MSD sample exhibited acceptable %R and RPD values except the following.

| MS/MSD Sample ID | Compound | MS %R/MSD %R/ RPD | Qualifier |
|---|---|---|---|
| 2 | Hexachlorocyclopentadiene | 0%/0%/NC | L/R |
| | 2-Methyl-4,6-dinitrophenol | 20.6%/20.9%/OK | L/UL |

### Laboratory Control Samples

- The LCS samples exhibited acceptable %R values except the following.

| LCS ID | Compound | %R | Qualifier | Affected Samples |
|---|---|---|---|---|
| 927909 | Hexachlorocyclopentadiene | 18.9% | L/UL | 5, 7, 9 |
| 929330 | N-Nitrosodiphenylamine | 116% | K | 3 |
| | Pentachlorophenol | 124% | None | All ND |

### Method Blank

- The method blanks were free of contamination.

### Field Blank

- A field QC sample was not included in this data package.

### GC/MS Tuning

- All criteria were met.

## Initial Calibration

- The initial calibrations exhibited acceptable %RSD and mean RRF values except the following.

| ICAL Date | Compound | %RSD/RRF | Qualifier | Affected Samples |
|---|---|---|---|---|
| 12/19/11 | Hexachlorocyclopentadiene | 34.9% | None | All ND |
| | 2,4-Dinitrophenol | 65.8% | | |
| | 2-Methyl-4,6-dinitrophenol | 44.6% | | |

## Continuing Calibration

- The continuing calibrations exhibited acceptable %D and RRF values.

## Compound Quantitation

- Several samples were analyzed at various dilutions due to high concentrations of target compounds.

## Internal Standard (IS) Area Performance

- All internal standards met response and retention time (RT) criteria except the following.

| Sample ID | Internal Standard | Area Count | Qualifier |
|---|---|---|---|
| 6 | IS6-Perylene-d12 | Low | J/UJ - All Associated Compounds |

## Field Duplicate Sample Precision

- Field duplicate results are summarized below.

| SVOC | | | | |
|---|---|---|---|---|
| Compound | DUP-1 ug/kg | SD-9 ug/kg | RPD | Qualifier |
| Acenaphthene | 77.5 | 67.0 | 15% | None |
| Acenaphthylene | 115 | 102 | 12% | |
| Anthracene | 222 | 193 | 14% | |
| Benzo(a)anthracene | 931 | 965 | 4% | |
| Benzo(a)pyrene | 996 | 1080 | 8% | |
| Benzo(b)fluoranthene | 1720 | 1680 | 2% | |
| Benzo(g,h,i)perylene | 355 | 728 | 69% | |
| Benzo(k)fluoranthene | 673 | 573 | 16% | |
| Carbazole | 131 | 122 | 7% | |
| Chrysene | 1070 | 1200 | 11% | |
| mp-Cresol | 469 | 904 | 63% | |
| Dibenzo(a,h)anthracene | 112 | 202 | 57% | |
| Dibenzofuran | 61.1 | 50.6 | 19% | |

| SVOC | | | | |
|---|---|---|---|---|
| Compound | DUP-1 ug/kg | SD-9 ug/kg | RPD | Qualifier |
| Bis(2-ethylhexyl)phthalate | 264 | 160 | 49% | None |
| Fluoranthene | 1870 | 2020 | 8% | |
| Fluorene | 96.9 | 86.1 | 12% | |
| Indeno(1,2,3-cd)pyrene | 361 | 644 | NC | |
| 2-Methylnaphthalene | 64.3 | 63.4 | 1% | |
| Naphthalene | 49.9 | 43.5 | 14% | |
| Phenanthrene | 890 | 928 | 4% | |
| Pyrene | 1650 | 1750 | 6% | |

| SVOC | | | | |
|---|---|---|---|---|
| Compound | DUP-2 ug/L | SW-8 ug/L | RPD | Qualifier |
| None | ND | ND | - | - |

## Polynuclear Aromatic Hydrocarbons (PAHs) by SIM

### Holding Times

- All samples were extracted within 7 days for water samples and analyzed within 40 days.

### Surrogate Spike Recoveries

- All samples exhibited acceptable surrogate %R values.

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

- A MS/MSD sample was not analyzed.

### Laboratory Control Samples

- The LCS samples exhibited acceptable %R values.

### Method Blank

- The method blanks were free of contamination.

### Field Blank

- Field QC results were not included in this data package.

### GC/MS Tuning

- All criteria were met.

### Initial Calibration

- The initial calibrations exhibited acceptable %RSD and mean RRF values and/or correlation coefficients.

### Continuing Calibration

- The continuing calibrations exhibited acceptable %D and RRF values.

## Compound Quantitation

- All criteria were met.

## Internal Standard (IS) Area Performance

- All internal standards met response and retention time (RT) criteria.

## Field Duplicate Sample Precision

- Field duplicate results are summarized below.

| PAHs | | | | |
|---|---|---|---|---|
| Compound | DUP-2 ug/L | SW-8 ug/L | RPD | Qualifier |
| Anthracene | 0.017 | 0.018 | 6% | None |
| Benzo(a)anthracene | 0.047 | 0.062 | 28% | |
| Benzo(a)pyrene | 0.050 | 0.066 | 28% | |
| Benzo(b)fluoranthene | 0.090 | 0.10 | 11% | |
| Benzo(g,h,i)perylene | 0.032 | 0.039 | 20% | |
| Benzo(k)fluoranthene | 0.034 | 0.046 | 30% | |
| Chrysene | 0.053 | 0.066 | 22% | |
| Fluoranthene | 0.11 | 0.13 | 17% | |
| Indeno(1,2,3-cd)pyrene | 0.028 | 0.034 | 19% | |
| Naphthalene | 0.087 | 0.11 | 23% | |
| Phenanthrene | 0.050 | 0.056 | 11% | |
| Pyrene | 0.095 | 0.12 | 23% | |

## Total Metals & Mercury

## Holding Times

- All samples were prepared and analyzed within 28 days for mercury and 180 days for all other metals.

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

- The MS/MSD sample exhibited acceptable %R and RPD values except the following.

| MS/MSD Sample ID | Compound | MS %R/MSD %R/ RPD | Qualifier | Affected Samples |
|---|---|---|---|---|
| 6 | Barium | 126%/OK/OK | K | 1-4, 6, 8 |
| | Magnesium | 160%/OK/OK | K | |
| | Potassium | 472%/300%/OK | K | |
| | Silver | 50%/OK/63 | L/UL | |
| | Vanadium | 130%/121%/OK | K | |

## Laboratory Control Samples

- The LCS sample exhibited acceptable recoveries.

## Method Blank

- The method blanks were free of contamination except the following.

| Blank ID | Compound | Conc. mg/kg | Action Level mg/kg | Qualifier | Affected Samples |
|---|---|---|---|---|---|
| 927194 | Calcium | 4.620 | 23.1 | None | All >5X |
| | Iron | 4.940 | 24.7 | | |

## Field Blank

- A field QC sample was not included in this data package.

## Initial Calibration Verification

- All initial calibration criteria were met.

## Continuing Calibration Verification

- All continuing calibration criteria were met.

## Compound Quantitation

- All criteria were met.

## ICP Serial Dilution

- ICP serial dilution percent differences (%D) were within acceptance limits.

## Field Duplicate Sample Precision

- Field duplicate results are summarized below.

| Total Metals/Hg | | | | |
|---|---|---|---|---|
| Compound | SD-9 mg/kg | DUP-1 mg/kg | RPD | Qualifier |
| Aluminum, total | 24400 | 26200 | 7% | None |
| Antimony, total | 1.6 | 2.1U | NC | |
| Arsenic, total | 9.8 | 10.2 | 4% | |
| Barium, total | 115 | 122 | 6% | |
| Beryllium, total | 0.86 | 0.91 | 6% | |
| Cadmium, total | 2.1 | 2.4 | 13% | |
| Calcium, total | 2850 | 3190 | 11% | |
| Chromium, total | 32.6 | 34.4 | 5% | |
| Cobalt, total | 9.6 | 10.5 | 9% | |
| Copper, total | 22.8 | 24.7 | 8% | |
| Iron, total | 26000 | 26400 | 2% | |
| Lead, total | 62.3 | 64.6 | 4% | |
| Magnesium, total | 3580 | 3770 | 5% | |
| Manganese, total | 808 | 899 | 11% | |
| Nickel, total | 21.0 | 22.4 | 6% | |
| Potassium, total | 4540 | 4900 | 8% | |
| Sodium, total | 151 | 172 | 13% | |
| Vanadium, total | 43.5 | 45.1 | 4% | |
| Zinc, total | 200 | 211 | 5% | |

| Total Metals/Hg | | | | |
|---|---|---|---|---|
| Compound | SW-8 mg/L | DUP-2 mg/L | RPD | Qualifier |
| Aluminum, total | 0.13 | 0.23 | 56% | J |
| Arsenic, total | 0.0013 | 0.0015 | 14% | None |
| Barium, total | 0.037 | 0.041 | 10% | None |
| Cadmium, total | 0.00070U | 0.00047 | NC | None |
| Calcium, total | 56.1 | 56.0 | 0% | None |
| Copper | 0.0021 | 0.0038 | 57% | J |
| Iron, total | 3.3 | 3.4 | 3% | None |

| Total Metals/Hg | | | | |
|---|---|---|---|---|
| Compound | SW-8 mg/L | DUP-2 mg/L | RPD | Qualifier |
| Lead, total | 0.0015 | 0.0019 | 24% | None |
| Magnesium, total | 11.5 | 11.2 | 3% | |
| Manganese, total | 1.2 | 1.2 | 0% | |
| Potassium, total | 2.7 | 2.7 | 0% | |
| Sodium, total | 9.0 | 6.8 | 28% | |
| Vanadium, total | 0.0012 | 0.0014 | 15% | |
| Zinc, total | 0.011 | 0.012 | 9% | |

## *Package Summary:*

Please contact the undersigned at (757) 564-0090 if you have any questions or need further information.

Signed: Nancy Weaver Dated: 1/31/12

Nancy Weaver
Senior Chemist

**Data Qualifiers**

| | | |
|---|---|---|
| U | = | Not detected. The associated number indicates approximate sample concentration necessary to be detected. |
| B | = | Not detected substantially above the level reported in laboratory or field blanks. |
| R | = | Unreliable result. Analyte may or may not be present in the sample. Supporting data necessary to confirm result. |
| N | = | Tentative identification. Consider present. Special methods may be needed to confirm its presence or absence in future sampling efforts.. |
| J | = | Analyte present. Reported value may not be accurate or precise. |
| K | = | Analyte present. Reported value may be biased high. Actual value is expected lower. |
| L | = | Analyte present. Reported value may be biased low. Actual value is expected higher. |
| UJ | = | Not detected. Quantitation limit may be inaccurate or imprecise. |
| UL | = | Not detected. Quantitation limit is probably higher. |
| Q | = | No analytical result. |
| NJ | = | Qualitative identification questionable due to poor resolution. Presumptively present at approximate quantity. |

ALS Environmental

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## ANALYTICAL RESULTS

nw
1/28/12

Workorder 9941932 EMS020|Marsh Run/633003

Lab ID: 9941932001 Date Collected: 12/9/2011 13:40 Matrix: Solid

Sample ID: SD-5 Date Received: 12/9/2011 18:30

| Parameters | Results | Units | Footnote | LOQ | LOD | DL | Method | Prepared | Analyzed | By | Cntr |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **SEMIVOLATILES** | | | | | | | | | | | |
| Acenaphthene | 47.7U | ug/kg | | 390 | 47.7 | 28.9 | SW846 8270D | 12/20/11 | 12/21/11 17:10 | SAS | A |
| Acenaphthylene | 25.5J | ug/kg | | 390 | 47.7 | 15.9 | SW846 8270D | 12/20/11 | 12/21/11 17:10 | SAS | A |
| Anthracene | 42.4J | ug/kg | | 390 | 47.7 | 17.3 | SW846 8270D | 12/20/11 | 12/21/11 17:10 | SAS | A |
| Benzo(a)anthracene | 191J | ug/kg | | 390 | 47.7 | 26.0 | SW846 8270D | 12/20/11 | 12/21/11 17:10 | SAS | A |
| Benzo(a)pyrene | 221J | ug/kg | | 390 | 47.7 | 11.6 | SW846 8270D | 12/20/11 | 12/21/11 17:10 | SAS | A |
| Benzo(b)fluoranthene | 347J | ug/kg | | 390 | 47.7 | 20.2 | SW846 8270D | 12/20/11 | 12/21/11 17:10 | SAS | A |
| Benzo(g,h,i)perylene | 103J | ug/kg | | 390 | 47.7 | 11.6 | SW846 8270D | 12/20/11 | 12/21/11 17:10 | SAS | A |
| Benzo(k)fluoranthene | 151J | ug/kg | | 390 | 47.7 | 18.8 | SW846 8270D | 12/20/11 | 12/21/11 17:10 | SAS | A |
| 4-Bromophenyl-phenylether | 47.7U | ug/kg | | 390 | 47.7 | 26.0 | SW846 8270D | 12/20/11 | 12/21/11 17:10 | SAS | A |
| Butylbenzylphthalate | 47.7U | ug/kg | | 390 | 47.7 | 13.0 | SW846 8270D | 12/20/11 | 12/21/11 17:10 | SAS | A |
| Carbazole | 22.2J | ug/kg | | 390 | 47.7 | 17.3 | SW846 8270D | 12/20/11 | 12/21/11 17:10 | SAS | A |
| 4-Chloro-3-methylphenol | 47.7U | ug/kg | | 390 | 47.7 | 30.4 | SW846 8270D | 12/20/11 | 12/21/11 17:10 | SAS | A |
| 4-Chloroaniline | 241U | ug/kg | | 390 | 241 | 121 | SW846 8270D | 12/20/11 | 12/21/11 17:10 | SAS | A |
| bis(2-Chloroethoxy)methane | 47.7U | ug/kg | | 390 | 47.7 | 15.9 | SW846 8270D | 12/20/11 | 12/21/11 17:10 | SAS | A |
| bis(2-Chloroethyl)ether | 47.7U | ug/kg | | 390 | 47.7 | 39.0 | SW846 8270D | 12/20/11 | 12/21/11 17:10 | SAS | A |
| bis(2-Chloroisopropyl)ether | 47.7U | ug/kg | | 390 | 47.7 | 18.8 | SW846 8270D | 12/20/11 | 12/21/11 17:10 | SAS | A |
| 2-Chloronaphthalene | 47.7U | ug/kg | | 390 | 47.7 | 18.8 | SW846 8270D | 12/20/11 | 12/21/11 17:10 | SAS | A |
| 2-Chlorophenol | 47.7U | ug/kg | | 390 | 47.7 | 33.3 | SW846 8270D | 12/20/11 | 12/21/11 17:10 | SAS | A |
| 4-Chlorophenyl-phenylether | 47.7U | ug/kg | | 390 | 47.7 | 20.2 | SW846 8270D | 12/20/11 | 12/21/11 17:10 | SAS | A |
| Chrysene | 259J | ug/kg | | 390 | 47.7 | 13.0 | SW846 8270D | 12/20/11 | 12/21/11 17:10 | SAS | A |
| mp-Cresol | 47.7U | ug/kg | | 390 | 47.7 | 18.8 | SW846 8270D | 12/20/11 | 12/21/11 17:10 | SAS | A |
| o-Cresol | 47.7U | ug/kg | | 390 | 47.7 | 39.0 | SW846 8270D | 12/20/11 | 12/21/11 17:10 | SAS | A |
| Di-n-Butylphthalate | 47.7U | ug/kg | | 390 | 47.7 | 15.9 | SW846 8270D | 12/20/11 | 12/21/11 17:10 | SAS | A |
| Di-n-Octylphthalate | 47.7U | ug/kg | | 390 | 47.7 | 11.6 | SW846 8270D | 12/20/11 | 12/21/11 17:10 | SAS | A |
| Dibenzo(a,h)anthracene | 47.7U | ug/kg | | 390 | 47.7 | 40.5 | SW846 8270D | 12/20/11 | 12/21/11 17:10 | SAS | A |
| Dibenzofuran | 47.7U | ug/kg | | 390 | 47.7 | 21.7 | SW846 8270D | 12/20/11 | 12/21/11 17:10 | SAS | A |
| 1,2-Dichlorobenzene | 47.7U | ug/kg | | 390 | 47.7 | 28.9 | SW846 8270D | 12/20/11 | 12/21/11 17:10 | SAS | A |
| 1,3-Dichlorobenzene | 47.7U | ug/kg | | 390 | 47.7 | 21.7 | SW846 8270D | 12/20/11 | 12/21/11 17:10 | SAS | A |
| 1,4-Dichlorobenzene | 47.7U | ug/kg | | 390 | 47.7 | 14.5 | SW846 8270D | 12/20/11 | 12/21/11 17:10 | SAS | A |
| 3,3-Dichlorobenzidine | 145U | ug/kg | | 781 | 145 | 82.4 | SW846 8270D | 12/20/11 | 12/21/11 17:10 | SAS | A |
| 2,4-Dichlorophenol | 47.7U | ug/kg | | 390 | 47.7 | 24.6 | SW846 8270D | 12/20/11 | 12/21/11 17:10 | SAS | A |
| Diethylphthalate | 47.7U | ug/kg | | 390 | 47.7 | 12.0 | SW846 8270D | 12/20/11 | 12/21/11 17:10 | SAS | A |
| 2,4-Dimethylphenol | 145U | ug/kg | | 390 | 145 | 73.7 | SW846 8270D | 12/20/11 | 12/21/11 17:10 | SAS | A |
| Dimethylphthalate | 47.7U | ug/kg | | 390 | 47.7 | 23.1 | SW846 8270D | 12/20/11 | 12/21/11 17:10 | SAS | A |
| 2,4-Dinitrophenol | 241U | ug/kg | | 781 | 241 | 137 | SW846 8270D | 12/20/11 | 12/21/11 17:10 | SAS | A |
| 2,4-Dinitrotoluene | 47.7U | ug/kg | | 390 | 47.7 | 15.9 | SW846 8270D | 12/20/11 | 12/21/11 17:10 | SAS | A |
| 2,6-Dinitrotoluene | 145U | ug/kg | | 390 | 145 | 17.3 | SW846 8270D | 12/20/11 | 12/21/11 17:10 | SAS | A |
| bis(2-Ethylhexyl)phthalate | 30.3J | ug/kg | | 390 | 47.7 | 20.2 | SW846 8270D | 12/20/11 | 12/21/11 17:10 | SAS | A |
| Fluoranthene | 442 | ug/kg | | 390 | 47.7 | 15.9 | SW846 8270D | 12/20/11 | 12/21/11 17:10 | SAS | A |
| Fluorene | 14.1J | ug/kg | | 390 | 47.7 | 13.4 | SW846 8270D | 12/20/11 | 12/21/11 17:10 | SAS | A |
| Hexachlorobenzene | 47.7U | ug/kg | | 390 | 47.7 | 33.3 | SW846 8270D | 12/20/11 | 12/21/11 17:10 | SAS | A |

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State Certifications: CT PH-0224 , DE ID 11 , GA 914 , MA PA0102 , MD 128 , LA 04162 , VA 421 , WY EPA Region 8 , WV 343

## ANALYTICAL RESULTS

NW 1/28/12

Workorder 9941932 EMS020|Marsh Run/633003

Lab ID: 9941932001 Date Collected: 12/9/2011 13:40 Matrix: Solid

Sample ID: SD-5 Date Received: 12/9/2011 18:30

| Parameters | Results | Units | Footnote | LOQ | LOD | DL | Method | Prepared | Analyzed | By | Cntr |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Hexachlorobutadiene | 47.7U | ug/kg | | 390 | 47.7 | 28.9 | SW846 8270D | 12/20/11 | 12/21/11 17:10 | SAS | A |
| Hexachlorocyclopentadiene | 145U | ug/kg | | 390 | 145 | 113 | SW846 8270D | 12/20/11 | 12/21/11 17:10 | SAS | A |
| Hexachloroethane | 47.7U | ug/kg | | 390 | 47.7 | 31.8 | SW846 8270D | 12/20/11 | 12/21/11 17:10 | SAS | A |
| Indeno(1,2,3-cd)pyrene | 104J | ug/kg | | 390 | 47.7 | 11.6 | SW846 8270D | 12/20/11 | 12/21/11 17:10 | SAS | A |
| Isophorone | 47.7U | ug/kg | | 390 | 47.7 | 18.8 | SW846 8270D | 12/20/11 | 12/21/11 17:10 | SAS | A |
| 2-Methyl-4,6-dinitrophenol | 241U | ug/kg | | 390 | 241 | 124 | SW846 8270D | 12/20/11 | 12/21/11 17:10 | SAS | A |
| 2-Methylnaphthalene | 14.2J | ug/kg | | 390 | 47.7 | 12.3 | SW846 8270D | 12/20/11 | 12/21/11 17:10 | SAS | A |
| Naphthalene | 47.7U | ug/kg | | 390 | 47.7 | 26.0 | SW846 8270D | 12/20/11 | 12/21/11 17:10 | SAS | A |
| 2-Nitroaniline | 145U | ug/kg | | 390 | 145 | 91.1 | SW846 8270D | 12/20/11 | 12/21/11 17:10 | SAS | A |
| 3-Nitroaniline | 145U | ug/kg | | 390 | 145 | 85.3 | SW846 8270D | 12/20/11 | 12/21/11 17:10 | SAS | A |
| 4-Nitroaniline | 145U | ug/kg | | 390 | 145 | 116 | SW846 8270D | 12/20/11 | 12/21/11 17:10 | SAS | A |
| Nitrobenzene | 241U | ug/kg | | 390 | 241 | 73.7 | SW846 8270D | 12/20/11 | 12/21/11 17:10 | SAS | A |
| 2-Nitrophenol | 145U | ug/kg | | 390 | 145 | 40.5 | SW846 8270D | 12/20/11 | 12/21/11 17:10 | SAS | A |
| 4-Nitrophenol | 241U | ug/kg | | 390 | 241 | 116 | SW846 8270D | 12/20/11 | 12/21/11 17:10 | SAS | A |
| N-Nitroso-di-n-propylamine | 47.7U | ug/kg | | 390 | 47.7 | 40.5 | SW846 8270D | 12/20/11 | 12/21/11 17:10 | SAS | A |
| N-Nitrosodiphenylamine | 47.7U | ug/kg | | 390 | 47.7 | 17.3 | SW846 8270D | 12/20/11 | 12/21/11 17:10 | SAS | A |
| Pentachlorophenol | 145U | ug/kg | | 781 | 145 | 92.5 | SW846 8270D | 12/20/11 | 12/21/11 17:10 | SAS | A |
| Phenanthrene | 177J | ug/kg | | 390 | 47.7 | 18.8 | SW846 8270D | 12/20/11 | 12/21/11 17:10 | SAS | A |
| Phenol | 145U | ug/kg | | 390 | 145 | 59.3 | SW846 8270D | 12/20/11 | 12/21/11 17:10 | SAS | A |
| Pyrene | 356J | ug/kg | | 390 | 47.7 | 14.5 | SW846 8270D | 12/20/11 | 12/21/11 17:10 | SAS | A |
| 1,2,4-Trichlorobenzene | 47.7U | ug/kg | | 390 | 47.7 | 13.3 | SW846 8270D | 12/20/11 | 12/21/11 17:10 | SAS | A |
| 2,4,5-Trichlorophenol | 145U | ug/kg | | 390 | 145 | 86.7 | SW846 8270D | 12/20/11 | 12/21/11 17:10 | SAS | A |
| 2,4,6-Trichlorophenol | 145U | ug/kg | | 390 | 145 | 44.8 | SW846 8270D | 12/20/11 | 12/21/11 17:10 | SAS | A |
| *Surrogate Recoveries* | *Results* | *Units* | *Footnote* | *Limits* | | | *Method* | *Prepared* | *Analyzed* | *By* | *Cntr* |
| 2,4,6-Tribromophenol (S) | 97.2 | % | | 35-125 | | | SW846 8270D | 12/20/11 | 12/21/11 17:10 | SAS | A |
| 2-Fluorobiphenyl (S) | 76.7 | % | | 45-105 | | | SW846 8270D | 12/20/11 | 12/21/11 17:10 | SAS | A |
| Nitrobenzene-d5 (S) | 69.3 | % | | 35-100 | | | SW846 8270D | 12/20/11 | 12/21/11 17:10 | SAS | A |
| Phenol-d5 (S) | 71.9 | % | | 40-100 | | | SW846 8270D | 12/20/11 | 12/21/11 17:10 | SAS | A |
| Terphenyl-d14 (S) | 87.5 | % | | 30-125 | | | SW846 8270D | 12/20/11 | 12/21/11 17:10 | SAS | A |
| **WET CHEMISTRY** | | | | | | | | | | | |
| Moisture | 32.0 | % | | 0.1 | 0.1 | 0.01 | SM20-2540 G | | 12/10/11 15:55 | KAK | A |
| Total Solids | 68.0 | % | | 0.1 | 0.1 | 0.01 | SM20-2540 G | | 12/10/11 15:55 | KAK | A |
| **METALS** | | | | | | | | | | | |
| Aluminum, Total | 37200 | mg/kg | | 12.2 | 8.2 | 4.1 | SW846 6010C | 12/15/11 | 12/19/11 13:43 | SRT | A2 |
| Antimony, Total | 1.2J | mg/kg | | 2.4 | 1.6 | 0.82 | SW846 6010C | 12/15/11 | 12/19/11 13:43 | SRT | A2 |
| Arsenic, Total | 8.0 | mg/kg | | 2.4 | 1.6 | 0.82 | SW846 6010C | 12/15/11 | 12/19/11 13:43 | SRT | A2 |
| Barium, Total | 185 K | mg/kg | | 1.2 | 0.82 | 0.41 | SW846 6010C | 12/15/11 | 12/19/11 13:43 | SRT | A2 |
| Beryllium, Total | 1.1J | mg/kg | | 1.2 | 0.82 | 0.41 | SW846 6010C | 12/15/11 | 12/19/11 13:43 | SRT | A2 |
| Cadmium, Total | 0.72 | mg/kg | | 0.61 | 0.41 | 0.20 | SW846 6010C | 12/15/11 | 12/19/11 13:43 | SRT | A2 |

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## ANALYTICAL RESULTS

NW 1/28/12

Workorder 9941932 EMS020|Marsh Run/633003

Lab ID: 9941932001 Date Collected: 12/9/2011 13:40 Matrix: Solid

Sample ID: SD-5 Date Received: 12/9/2011 18:30

| Parameters | Results | Units | Footnote | LOQ | LOD | DL | Method | Prepared | Analyzed | By | Cntr |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Calcium, Total | 3370 | mg/kg | | 12.2 | 8.2 | 4.1 | SW846 6010C | 12/15/11 | 12/19/11 13:43 | SRT | A2 |
| Chromium, Total | 38.9 | mg/kg | | 1.2 | 0.82 | 0.41 | SW846 6010C | 12/15/11 | 12/19/11 13:43 | SRT | A2 |
| Cobalt, Total | 7.0 | mg/kg | | 1.2 | 0.82 | 0.41 | SW846 6010C | 12/15/11 | 12/19/11 13:43 | SRT | A2 |
| Copper, Total | 23.6 | mg/kg | | 2.4 | 1.6 | 0.82 | SW846 6010C | 12/15/11 | 12/19/11 13:43 | SRT | A2 |
| Iron, Total | 21400 | mg/kg | | 12.2 | 8.2 | 4.1 | SW846 6010C | 12/15/11 | 12/19/11 13:43 | SRT | A2 |
| Lead, Total | 61.0 | mg/kg | | 2.4 | 1.6 | 0.82 | SW846 6010C | 12/15/11 | 12/19/11 13:43 | SRT | A2 |
| Magnesium, Total | 3310 K | mg/kg | | 12.2 | 8.2 | 4.1 | SW846 6010C | 12/15/11 | 12/19/11 13:43 | SRT | A2 |
| Manganese, Total | 189 | mg/kg | | 1.2 | 0.82 | 0.41 | SW846 6010C | 12/15/11 | 12/19/11 13:43 | SRT | A2 |
| Mercury, Total | 0.17U | mg/kg | | 0.27 | 0.17 | 0.088 | SW846 7471B | 12/15/11 | 12/15/11 10:08 | MNP | A1 |
| Nickel, Total | 18.3 | mg/kg | | 2.4 | 1.6 | 0.82 | SW846 6010C | 12/15/11 | 12/19/11 13:43 | SRT | A2 |
| Potassium, Total | 4610 K | mg/kg | | 61.2 | 40.8 | 20.3 | SW846 6010C | 12/15/11 | 12/19/11 13:43 | SRT | A2 |
| Selenium, Total | 4.1U | mg/kg | | 6.1 | 4.1 | 2.0 | SW846 6010C | 12/15/11 | 12/19/11 13:43 | SRT | A2 |
| Silver, Total | 0.41U UL | mg/kg | | 0.61 | 0.41 | 0.20 | SW846 6010C | 12/15/11 | 12/19/11 13:43 | SRT | A2 |
| Sodium, Total | 194 | mg/kg | | 61.2 | 40.8 | 20.3 | SW846 6010C | 12/15/11 | 12/19/11 13:43 | SRT | A2 |
| Thallium, Total | 2.4U | mg/kg | | 3.7 | 2.4 | 1.2 | SW846 6010C | 12/15/11 | 12/19/11 13:43 | SRT | A2 |
| Vanadium, Total | 60.1 K | mg/kg | | 1.2 | 0.82 | 0.41 | SW846 6010C | 12/15/11 | 12/19/11 13:43 | SRT | A2 |
| Zinc, Total | 192 | mg/kg | | 2.4 | 1.6 | 0.82 | SW846 6010C | 12/15/11 | 12/19/11 13:43 | SRT | A2 |

***Sample Comments:***

Anna G Milliken
Technical Manager

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## ANALYTICAL RESULTS

NW 1/28/12

Workorder 9941932 EMS020|Marsh Run/633003

Lab ID: 9941932002 Date Collected: 12/9/2011 12:32 Matrix: Solid

Sample ID: SD-6 Date Received: 12/9/2011 18:30

| Parameters | Results | Units | Footnote | LOQ | LOD | DL | Method | Prepared | Analyzed | By | Cntr |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **SEMIVOLATILES** | | | | | | | | | | | |
| Acenaphthene | 55.1U | ug/kg | | 451 | 55.1 | 33.4 | SW846 8270D | 12/20/11 | 12/21/11 17:41 | SAS | B |
| Acenaphthylene | 37.7J | ug/kg | | 451 | 55.1 | 18.4 | SW846 8270D | 12/20/11 | 12/21/11 17:41 | SAS | B |
| Anthracene | 39.3J | ug/kg | | 451 | 55.1 | 20.0 | SW846 8270D | 12/20/11 | 12/21/11 17:41 | SAS | B |
| Benzo(a)anthracene | 180J | ug/kg | | 451 | 55.1 | 30.1 | SW846 8270D | 12/20/11 | 12/21/11 17:41 | SAS | B |
| Benzo(a)pyrene | 228J | ug/kg | | 451 | 55.1 | 13.4 | SW846 8270D | 12/20/11 | 12/21/11 17:41 | SAS | B |
| Benzo(b)fluoranthene | 389J | ug/kg | | 451 | 55.1 | 23.4 | SW846 8270D | 12/20/11 | 12/21/11 17:41 | SAS | B |
| Benzo(g,h,i)perylene | 100J | ug/kg | | 451 | 55.1 | 13.4 | SW846 8270D | 12/20/11 | 12/21/11 17:41 | SAS | B |
| Benzo(k)fluoranthene | 151J | ug/kg | | 451 | 55.1 | 21.7 | SW846 8270D | 12/20/11 | 12/21/11 17:41 | SAS | B |
| 4-Bromophenyl-phenylether | 55.1U | ug/kg | | 451 | 55.1 | 30.1 | SW846 8270D | 12/20/11 | 12/21/11 17:41 | SAS | B |
| Butylbenzylphthalate | 55.1U | ug/kg | | 451 | 55.1 | 15.0 | SW846 8270D | 12/20/11 | 12/21/11 17:41 | SAS | B |
| Carbazole | 26.1J | ug/kg | | 451 | 55.1 | 20.0 | SW846 8270D | 12/20/11 | 12/21/11 17:41 | SAS | B |
| 4-Chloro-3-methylphenol | 55.1U | ug/kg | | 451 | 55.1 | 35.1 | SW846 8270D | 12/20/11 | 12/21/11 17:41 | SAS | B |
| 4-Chloroaniline | 279U | ug/kg | | 451 | 279 | 140 | SW846 8270D | 12/20/11 | 12/21/11 17:41 | SAS | B |
| bis(2-Chloroethoxy)methane | 55.1U | ug/kg | | 451 | 55.1 | 18.4 | SW846 8270D | 12/20/11 | 12/21/11 17:41 | SAS | B |
| bis(2-Chloroethyl)ether | 55.1U | ug/kg | | 451 | 55.1 | 45.1 | SW846 8270D | 12/20/11 | 12/21/11 17:41 | SAS | B |
| bis(2-Chloroisopropyl)ether | 55.1U | ug/kg | | 451 | 55.1 | 21.7 | SW846 8270D | 12/20/11 | 12/21/11 17:41 | SAS | B |
| 2-Chloronaphthalene | 55.1U | ug/kg | | 451 | 55.1 | 21.7 | SW846 8270D | 12/20/11 | 12/21/11 17:41 | SAS | B |
| 2-Chlorophenol | 55.1U | ug/kg | | 451 | 55.1 | 38.4 | SW846 8270D | 12/20/11 | 12/21/11 17:41 | SAS | B |
| 4-Chlorophenyl-phenylether | 55.1U | ug/kg | | 451 | 55.1 | 23.4 | SW846 8270D | 12/20/11 | 12/21/11 17:41 | SAS | B |
| Chrysene | 273J | ug/kg | | 451 | 55.1 | 15.0 | SW846 8270D | 12/20/11 | 12/21/11 17:41 | SAS | B |
| mp-Cresol | 55.1U | ug/kg | | 451 | 55.1 | 21.7 | SW846 8270D | 12/20/11 | 12/21/11 17:41 | SAS | B |
| o-Cresol | 55.1U | ug/kg | | 451 | 55.1 | 45.1 | SW846 8270D | 12/20/11 | 12/21/11 17:41 | SAS | B |
| Di-n-Butylphthalate | 55.1U | ug/kg | | 451 | 55.1 | 18.4 | SW846 8270D | 12/20/11 | 12/21/11 17:41 | SAS | B |
| Di-n-Octylphthalate | 55.1U | ug/kg | | 451 | 55.1 | 13.4 | SW846 8270D | 12/20/11 | 12/21/11 17:41 | SAS | B |
| Dibenzo(a,h)anthracene | 55.1U | ug/kg | | 451 | 55.1 | 46.8 | SW846 8270D | 12/20/11 | 12/21/11 17:41 | SAS | B |
| Dibenzofuran | 55.1U | ug/kg | | 451 | 55.1 | 25.0 | SW846 8270D | 12/20/11 | 12/21/11 17:41 | SAS | B |
| 1,2-Dichlorobenzene | 55.1U | ug/kg | | 451 | 55.1 | 33.4 | SW846 8270D | 12/20/11 | 12/21/11 17:41 | SAS | B |
| 1,3-Dichlorobenzene | 55.1U | ug/kg | | 451 | 55.1 | 25.0 | SW846 8270D | 12/20/11 | 12/21/11 17:41 | SAS | B |
| 1,4-Dichlorobenzene | 55.1U | ug/kg | | 451 | 55.1 | 16.7 | SW846 8270D | 12/20/11 | 12/21/11 17:41 | SAS | B |
| 3,3-Dichlorobenzidine | 167U | ug/kg | | 902 | 167 | 95.2 | SW846 8270D | 12/20/11 | 12/21/11 17:41 | SAS | B |
| 2,4-Dichlorophenol | 55.1U | ug/kg | | 451 | 55.1 | 28.4 | SW846 8270D | 12/20/11 | 12/21/11 17:41 | SAS | B |
| Diethylphthalate | 55.1U | ug/kg | | 451 | 55.1 | 13.9 | SW846 8270D | 12/20/11 | 12/21/11 17:41 | SAS | B |
| 2,4-Dimethylphenol | 167U | ug/kg | | 451 | 167 | 85.2 | SW846 8270D | 12/20/11 | 12/21/11 17:41 | SAS | B |
| Dimethylphthalate | 55.1U | ug/kg | | 451 | 55.1 | 26.7 | SW846 8270D | 12/20/11 | 12/21/11 17:41 | SAS | B |
| 2,4-Dinitrophenol | 279U | ug/kg | | 902 | 279 | 159 | SW846 8270D | 12/20/11 | 12/21/11 17:41 | SAS | B |
| 2,4-Dinitrotoluene | 55.1U | ug/kg | | 451 | 55.1 | 18.4 | SW846 8270D | 12/20/11 | 12/21/11 17:41 | SAS | B |
| 2,6-Dinitrotoluene | 167U | ug/kg | | 451 | 167 | 20.0 | SW846 8270D | 12/20/11 | 12/21/11 17:41 | SAS | B |
| bis(2-Ethylhexyl)phthalate | 55.1U | ug/kg | | 451 | 55.1 | 23.4 | SW846 8270D | 12/20/11 | 12/21/11 17:41 | SAS | B |
| Fluoranthene | 441J | ug/kg | | 451 | 55.1 | 18.4 | SW846 8270D | 12/20/11 | 12/21/11 17:41 | SAS | B |
| Fluorene | 55.1U | ug/kg | | 451 | 55.1 | 15.5 | SW846 8270D | 12/20/11 | 12/21/11 17:41 | SAS | B |
| Hexachlorobenzene | 55.1U | ug/kg | | 451 | 55.1 | 38.4 | SW846 8270D | 12/20/11 | 12/21/11 17:41 | SAS | B |

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State Certifications: CT PH-0224 , DE ID 11 , GA 914 , MA PA0102 , MD 128 , LA 04162 , VA 421 , WY EPA Region 8 , WV 343

## ANALYTICAL RESULTS

hd 1/28/12

Workorder 9941932 EMS020|Marsh Run/633003

Lab ID: 9941932002 Date Collected: 12/9/2011 12:32 Matrix: Solid

Sample ID: SD-6 Date Received: 12/9/2011 18:30

| Parameters | Results | Units | Footnote | LOQ | LOD | DL | Method | Prepared | Analyzed | By | Cntr |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Hexachlorobutadiene | 55.1U | ug/kg | | 451 | 55.1 | 33.4 | SW846 8270D | 12/20/11 | 12/21/11 17:41 | SAS | B |
| Hexachlorocyclopentadiene | 167U R | ug/kg | ~~1,2~~ | 451 | 167 | 130 | SW846 8270D | 12/20/11 | 12/21/11 17:41 | SAS | B |
| Hexachloroethane | 55.1U | ug/kg | | 451 | 55.1 | 36.7 | SW846 8270D | 12/20/11 | 12/21/11 17:41 | SAS | B |
| Indeno(1,2,3-cd)pyrene | 100J | ug/kg | | 451 | 55.1 | 13.4 | SW846 8270D | 12/20/11 | 12/21/11 17:41 | SAS | B |
| Isophorone | 55.1U | ug/kg | | 451 | 55.1 | 21.7 | SW846 8270D | 12/20/11 | 12/21/11 17:41 | SAS | B |
| 2-Methyl-4,6-dinitrophenol | 279U UL | ug/kg | ~~3,4~~ | 451 | 279 | 144 | SW846 8270D | 12/20/11 | 12/21/11 17:41 | SAS | B |
| 2-Methylnaphthalene | 18.2J | ug/kg | | 451 | 55.1 | 14.2 | SW846 8270D | 12/20/11 | 12/21/11 17:41 | SAS | B |
| Naphthalene | 55.1U | ug/kg | | 451 | 55.1 | 30.1 | SW846 8270D | 12/20/11 | 12/21/11 17:41 | SAS | B |
| 2-Nitroaniline | 167U | ug/kg | | 451 | 167 | 105 | SW846 8270D | 12/20/11 | 12/21/11 17:41 | SAS | B |
| 3-Nitroaniline | 167U | ug/kg | | 451 | 167 | 98.5 | SW846 8270D | 12/20/11 | 12/21/11 17:41 | SAS | B |
| 4-Nitroaniline | 167U | ug/kg | | 451 | 167 | 134 | SW846 8270D | 12/20/11 | 12/21/11 17:41 | SAS | B |
| Nitrobenzene | 279U | ug/kg | | 451 | 279 | 85.2 | SW846 8270D | 12/20/11 | 12/21/11 17:41 | SAS | B |
| 2-Nitrophenol | 167U | ug/kg | | 451 | 167 | 46.8 | SW846 8270D | 12/20/11 | 12/21/11 17:41 | SAS | B |
| 4-Nitrophenol | 279U | ug/kg | | 451 | 279 | 134 | SW846 8270D | 12/20/11 | 12/21/11 17:41 | SAS | B |
| N-Nitroso-di-n-propylamine | 55.1U | ug/kg | | 451 | 55.1 | 46.8 | SW846 8270D | 12/20/11 | 12/21/11 17:41 | SAS | B |
| N-Nitrosodiphenylamine | 55.1U | ug/kg | | 451 | 55.1 | 20.0 | SW846 8270D | 12/20/11 | 12/21/11 17:41 | SAS | B |
| Pentachlorophenol | 167U | ug/kg | | 902 | 167 | 107 | SW846 8270D | 12/20/11 | 12/21/11 17:41 | SAS | B |
| Phenanthrene | 183J | ug/kg | | 451 | 55.1 | 21.7 | SW846 8270D | 12/20/11 | 12/21/11 17:41 | SAS | B |
| Phenol | 167U | ug/kg | | 451 | 167 | 68.5 | SW846 8270D | 12/20/11 | 12/21/11 17:41 | SAS | B |
| Pyrene | 364J | ug/kg | | 451 | 55.1 | 16.7 | SW846 8270D | 12/20/11 | 12/21/11 17:41 | SAS | B |
| 1,2,4-Trichlorobenzene | 55.1U | ug/kg | | 451 | 55.1 | 15.4 | SW846 8270D | 12/20/11 | 12/21/11 17:41 | SAS | B |
| 2,4,5-Trichlorophenol | 167U | ug/kg | | 451 | 167 | 100 | SW846 8270D | 12/20/11 | 12/21/11 17:41 | SAS | B |
| 2,4,6-Trichlorophenol | 167U | ug/kg | | 451 | 167 | 51.8 | SW846 8270D | 12/20/11 | 12/21/11 17:41 | SAS | B |
| *Surrogate Recoveries* | *Results* | *Units* | *Footnote* | *Limits* | | | *Method* | *Prepared* | *Analyzed* | *By* | *Cntr* |
| 2,4,6-Tribromophenol (S) | 104 | % | | 35-125 | | | SW846 8270D | 12/20/11 | 12/21/11 17:41 | SAS | B |
| 2-Fluorobiphenyl (S) | 82.3 | % | | 45-105 | | | SW846 8270D | 12/20/11 | 12/21/11 17:41 | SAS | B |
| Nitrobenzene-d5 (S) | 68.9 | % | | 35-100 | | | SW846 8270D | 12/20/11 | 12/21/11 17:41 | SAS | B |
| Phenol-d5 (S) | 75.5 | % | | 40-100 | | | SW846 8270D | 12/20/11 | 12/21/11 17:41 | SAS | B |
| Terphenyl-d14 (S) | 92.1 | % | | 30-125 | | | SW846 8270D | 12/20/11 | 12/21/11 17:41 | SAS | B |
| **WET CHEMISTRY** | | | | | | | | | | | |
| Moisture | 41.3 | % | | 0.1 | 0.1 | 0.01 | SM20-2540 G | | 12/10/11 15:55 | KAK | A |
| Total Solids | 58.7 | % | | 0.1 | 0.1 | 0.01 | SM20-2540 G | | 12/10/11 15:55 | KAK | A |
| **METALS** | | | | | | | | | | | |
| Aluminum, Total | 33100 | mg/kg | | 16.4 | 10.9 | 5.5 | SW846 6010C | 12/15/11 | 12/19/11 13:53 | SRT | A2 |
| Antimony, Total | 2.6J | mg/kg | | 3.3 | 2.2 | 1.1 | SW846 6010C | 12/15/11 | 12/19/11 13:53 | SRT | A2 |
| Arsenic, Total | 8.6 | mg/kg | | 3.3 | 2.2 | 1.1 | SW846 6010C | 12/15/11 | 12/19/11 13:53 | SRT | A2 |
| Barium, Total | 178 K | mg/kg | | 1.6 | 1.1 | 0.55 | SW846 6010C | 12/15/11 | 12/19/11 13:53 | SRT | A2 |
| Beryllium, Total | 1.1J | mg/kg | | 1.6 | 1.1 | 0.55 | SW846 6010C | 12/15/11 | 12/19/11 13:53 | SRT | A2 |
| Cadmium, Total | 1.4 | mg/kg | | 0.82 | 0.55 | 0.27 | SW846 6010C | 12/15/11 | 12/19/11 13:53 | SRT | A2 |

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State Certifications: CT PH-0224 , DE ID 11 , GA 914 , MA PA0102 , MD 128 , LA 04162 , VA 421 , WY EPA Region 8 , WV 343

## ANALYTICAL RESULTS

MW 1/28/12

Workorder 9941932 EMS020|Marsh Run/633003

Lab ID: 9941932002 Date Collected: 12/9/2011 12:32 Matrix: Solid

Sample ID: SD-6 Date Received: 12/9/2011 18:30

| Parameters | Results | Units | Footnote | LOQ | LOD | DL | Method | Prepared | Analyzed | By | Cntr |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Calcium, Total | 4120 | mg/kg | | 16.4 | 10.9 | 5.5 | SW846 6010C | 12/15/11 | 12/19/11 13:53 | SRT | A2 |
| Chromium, Total | 36.9 | mg/kg | | 1.6 | 1.1 | 0.55 | SW846 6010C | 12/15/11 | 12/19/11 13:53 | SRT | A2 |
| Cobalt, Total | 7.7 | mg/kg | | 1.6 | 1.1 | 0.55 | SW846 6010C | 12/15/11 | 12/19/11 13:53 | SRT | A2 |
| Copper, Total | 24.8 | mg/kg | | 3.3 | 2.2 | 1.1 | SW846 6010C | 12/15/11 | 12/19/11 13:53 | SRT | A2 |
| Iron, Total | 22100 | mg/kg | | 16.4 | 10.9 | 5.5 | SW846 6010C | 12/15/11 | 12/19/11 13:53 | SRT | A2 |
| Lead, Total | 69.2 | mg/kg | | 3.3 | 2.2 | 1.1 | SW846 6010C | 12/15/11 | 12/19/11 13:53 | SRT | A2 |
| Magnesium, Total | 3470 K | mg/kg | | 16.4 | 10.9 | 5.5 | SW846 6010C | 12/15/11 | 12/19/11 13:53 | SRT | A2 |
| Manganese, Total | 195 | mg/kg | | 1.6 | 1.1 | 0.55 | SW846 6010C | 12/15/11 | 12/19/11 13:53 | SRT | A2 |
| Mercury, Total | 0.19U | mg/kg | | 0.30 | 0.19 | 0.099 | SW846 7471B | 12/15/11 | 12/15/11 10:09 | MNP | A1 |
| Nickel, Total | 19.9 | mg/kg | | 3.3 | 2.2 | 1.1 | SW846 6010C | 12/15/11 | 12/19/11 13:53 | SRT | A2 |
| Potassium, Total | 3540 K | mg/kg | | 81.9 | 54.5 | 27.2 | SW846 6010C | 12/15/11 | 12/19/11 13:53 | SRT | A2 |
| Selenium, Total | 5.5U | mg/kg | | 8.2 | 5.5 | 2.7 | SW846 6010C | 12/15/11 | 12/19/11 13:53 | SRT | A2 |
| Silver, Total | 0.55U UL | mg/kg | | 0.82 | 0.55 | 0.27 | SW846 6010C | 12/15/11 | 12/19/11 13:53 | SRT | A2 |
| Sodium, Total | 137 | mg/kg | | 81.9 | 54.5 | 27.2 | SW846 6010C | 12/15/11 | 12/19/11 13:53 | SRT | A2 |
| Thallium, Total | 3.3U | mg/kg | | 4.9 | 3.3 | 1.6 | SW846 6010C | 12/15/11 | 12/19/11 13:53 | SRT | A2 |
| Vanadium, Total | 56.2 K | mg/kg | | 1.6 | 1.1 | 0.55 | SW846 6010C | 12/15/11 | 12/19/11 13:53 | SRT | A2 |
| Zinc, Total | 188 | mg/kg | | 3.3 | 2.2 | 1.1 | SW846 6010C | 12/15/11 | 12/19/11 13:53 | SRT | A2 |

***Sample Comments:***

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State Certifications: CT PH-0224 , DE ID 11 , GA 914 , MA PA0102 , MD 128 , LA 04162 , VA 421 , WY EPA Region 8 , WV 343

## ANALYTICAL RESULTS

MW 1/28/12

Workorder 9941932 EMS020|Marsh Run/633003

Lab ID: 9941932003 Date Collected: 12/9/2011 12:18 Matrix: Solid

Sample ID: SD-7 Date Received: 12/9/2011 18:30

| Parameters | Results | Units | Footnote | LOQ | LOD | DL | Method | Prepared | Analyzed | By | Cntr |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **SEMIVOLATILES** | | | | | | | | | | | |
| Acenaphthene | 49.2U | ug/kg | | 403 | 49.2 | 29.8 | SW846 8270D | 12/20/11 | 12/21/11 19:16 | SAS | A |
| Acenaphthylene | 41.6J | ug/kg | | 403 | 49.2 | 16.4 | SW846 8270D | 12/20/11 | 12/21/11 19:16 | SAS | A |
| Anthracene | 52.3J | ug/kg | | 403 | 49.2 | 17.9 | SW846 8270D | 12/20/11 | 12/21/11 19:16 | SAS | A |
| Benzo(a)anthracene | 251J | ug/kg | | 403 | 49.2 | 26.8 | SW846 8270D | 12/20/11 | 12/21/11 19:16 | SAS | A |
| Benzo(a)pyrene | 293J | ug/kg | | 403 | 49.2 | 11.9 | SW846 8270D | 12/20/11 | 12/21/11 19:16 | SAS | A |
| Benzo(b)fluoranthene | 522 | ug/kg | | 403 | 49.2 | 20.9 | SW846 8270D | 12/20/11 | 12/21/11 19:16 | SAS | A |
| Benzo(g,h,i)perylene | 118J | ug/kg | | 403 | 49.2 | 11.9 | SW846 8270D | 12/20/11 | 12/21/11 19:16 | SAS | A |
| Benzo(k)fluoranthene | 510 | ug/kg | | 403 | 49.2 | 19.4 | SW846 8270D | 12/20/11 | 12/21/11 19:16 | SAS | A |
| 4-Bromophenyl-phenylether | 168J | ug/kg | | 403 | 49.2 | 26.8 | SW846 8270D | 12/20/11 | 12/21/11 19:16 | SAS | A |
| Butylbenzylphthalate | 49.2U | ug/kg | | 403 | 49.2 | 13.4 | SW846 8270D | 12/20/11 | 12/21/11 19:16 | SAS | A |
| Carbazole | 30.9J | ug/kg | | 403 | 49.2 | 17.9 | SW846 8270D | 12/20/11 | 12/21/11 19:16 | SAS | A |
| 4-Chloro-3-methylphenol | 49.2U | ug/kg | | 403 | 49.2 | 31.3 | SW846 8270D | 12/20/11 | 12/21/11 19:16 | SAS | A |
| 4-Chloroaniline | 249U | ug/kg | | 403 | 249 | 125 | SW846 8270D | 12/20/11 | 12/21/11 19:16 | SAS | A |
| bis(2-Chloroethoxy)methane | 49.2U | ug/kg | | 403 | 49.2 | 16.4 | SW846 8270D | 12/20/11 | 12/21/11 19:16 | SAS | A |
| bis(2-Chloroethyl)ether | 49.2U | ug/kg | | 403 | 49.2 | 40.3 | SW846 8270D | 12/20/11 | 12/21/11 19:16 | SAS | A |
| bis(2-Chloroisopropyl)ether | 50.6J | ug/kg | | 403 | 49.2 | 19.4 | SW846 8270D | 12/20/11 | 12/21/11 19:16 | SAS | A |
| 2-Chloronaphthalene | 49.2U | ug/kg | | 403 | 49.2 | 19.4 | SW846 8270D | 12/20/11 | 12/21/11 19:16 | SAS | A |
| 2-Chlorophenol | 49.2U | ug/kg | | 403 | 49.2 | 34.3 | SW846 8270D | 12/20/11 | 12/21/11 19:16 | SAS | A |
| 4-Chlorophenyl-phenylether | 49.2U | ug/kg | | 403 | 49.2 | 20.9 | SW846 8270D | 12/20/11 | 12/21/11 19:16 | SAS | A |
| Chrysene | 346J | ug/kg | | 403 | 49.2 | 13.4 | SW846 8270D | 12/20/11 | 12/21/11 19:16 | SAS | A |
| mp-Cresol | 49.2U | ug/kg | | 403 | 49.2 | 19.4 | SW846 8270D | 12/20/11 | 12/21/11 19:16 | SAS | A |
| o-Cresol | 49.2U | ug/kg | | 403 | 49.2 | 40.3 | SW846 8270D | 12/20/11 | 12/21/11 19:16 | SAS | A |
| Di-n-Butylphthalate | 49.2U | ug/kg | | 403 | 49.2 | 16.4 | SW846 8270D | 12/20/11 | 12/21/11 19:16 | SAS | A |
| Di-n-Octylphthalate | 49.2U | ug/kg | | 403 | 49.2 | 11.9 | SW846 8270D | 12/20/11 | 12/21/11 19:16 | SAS | A |
| Dibenzo(a,h)anthracene | 49.2U | ug/kg | | 403 | 49.2 | 41.7 | SW846 8270D | 12/20/11 | 12/21/11 19:16 | SAS | A |
| Dibenzofuran | 49.2U | ug/kg | | 403 | 49.2 | 22.4 | SW846 8270D | 12/20/11 | 12/21/11 19:16 | SAS | A |
| 1,2-Dichlorobenzene | 49.2U | ug/kg | | 403 | 49.2 | 29.8 | SW846 8270D | 12/20/11 | 12/21/11 19:16 | SAS | A |
| 1,3-Dichlorobenzene | 49.2U | ug/kg | | 403 | 49.2 | 22.4 | SW846 8270D | 12/20/11 | 12/21/11 19:16 | SAS | A |
| 1,4-Dichlorobenzene | 49.2U | ug/kg | | 403 | 49.2 | 14.9 | SW846 8270D | 12/20/11 | 12/21/11 19:16 | SAS | A |
| 3,3-Dichlorobenzidine | 149U | ug/kg | | 805 | 149 | 85.0 | SW846 8270D | 12/20/11 | 12/21/11 19:16 | SAS | A |
| 2,4-Dichlorophenol | 49.2U | ug/kg | | 403 | 49.2 | 25.3 | SW846 8270D | 12/20/11 | 12/21/11 19:16 | SAS | A |
| Diethylphthalate | 49.2U | ug/kg | | 403 | 49.2 | 12.4 | SW846 8270D | 12/20/11 | 12/21/11 19:16 | SAS | A |
| 2,4-Dimethylphenol | 149U | ug/kg | | 403 | 149 | 76.0 | SW846 8270D | 12/20/11 | 12/21/11 19:16 | SAS | A |
| Dimethylphthalate | 245J | ug/kg | | 403 | 49.2 | 23.9 | SW846 8270D | 12/20/11 | 12/21/11 19:16 | SAS | A |
| 2,4-Dinitrophenol | 249U | ug/kg | | 805 | 249 | 142 | SW846 8270D | 12/20/11 | 12/21/11 19:16 | SAS | A |
| 2,4-Dinitrotoluene | 624 | ug/kg | | 403 | 49.2 | 16.4 | SW846 8270D | 12/20/11 | 12/21/11 19:16 | SAS | A |
| 2,6-Dinitrotoluene | 758 | ug/kg | | 403 | 149 | 17.9 | SW846 8270D | 12/20/11 | 12/21/11 19:16 | SAS | A |
| bis(2-Ethylhexyl)phthalate | 32.0J | ug/kg | | 403 | 49.2 | 20.9 | SW846 8270D | 12/20/11 | 12/21/11 19:16 | SAS | A |
| Fluoranthene | 609 | ug/kg | | 403 | 49.2 | 16.4 | SW846 8270D | 12/20/11 | 12/21/11 19:16 | SAS | A |
| Fluorene | 16.7J | ug/kg | | 403 | 49.2 | 13.9 | SW846 8270D | 12/20/11 | 12/21/11 19:16 | SAS | A |
| Hexachlorobenzene | 49.2U | ug/kg | | 403 | 49.2 | 34.3 | SW846 8270D | 12/20/11 | 12/21/11 19:16 | SAS | A |

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State Certifications: CT PH-0224 , DE ID 11 , GA 914 , MA PA0102 , MD 128 , LA 04162 , VA 421 , WY EPA Region 8 , WV 343

## ANALYTICAL RESULTS

MW 1/28/12

Workorder 9941932 EMS020|Marsh Run/633003

Lab ID: 9941932003 Date Collected: 12/9/2011 12:18 Matrix: Solid

Sample ID: SD-7 Date Received: 12/9/2011 18:30

| Parameters | Results | Units | Footnote | LOQ | LOD | DL | Method | Prepared | Analyzed | By | Cntr |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Hexachlorobutadiene | 49.2U | ug/kg | | 403 | 49.2 | 29.8 | SW846 8270D | 12/20/11 | 12/21/11 19:16 | SAS | A |
| Hexachlorocyclopentadiene | 149U | ug/kg | | 403 | 149 | 116 | SW846 8270D | 12/20/11 | 12/21/11 19:16 | SAS | A |
| Hexachloroethane | 49.2U | ug/kg | | 403 | 49.2 | 32.8 | SW846 8270D | 12/20/11 | 12/21/11 19:16 | SAS | A |
| Indeno(1,2,3-cd)pyrene | 119J | ug/kg | | 403 | 49.2 | 11.9 | SW846 8270D | 12/20/11 | 12/21/11 19:16 | SAS | A |
| Isophorone | 1120 | ug/kg | | 403 | 49.2 | 19.4 | SW846 8270D | 12/20/11 | 12/21/11 19:16 | SAS | A |
| 2-Methyl-4,6-dinitrophenol | 249U | ug/kg | | 403 | 249 | 128 | SW846 8270D | 12/20/11 | 12/21/11 19:16 | SAS | A |
| 2-Methylnaphthalene | 37.3J | ug/kg | | 403 | 49.2 | 12.7 | SW846 8270D | 12/20/11 | 12/21/11 19:16 | SAS | A |
| Naphthalene | 49.2U | ug/kg | | 403 | 49.2 | 26.8 | SW846 8270D | 12/20/11 | 12/21/11 19:16 | SAS | A |
| 2-Nitroaniline | 149U | ug/kg | | 403 | 149 | 93.9 | SW846 8270D | 12/20/11 | 12/21/11 19:16 | SAS | A |
| 3-Nitroaniline | 149U | ug/kg | | 403 | 149 | 88.0 | SW846 8270D | 12/20/11 | 12/21/11 19:16 | SAS | A |
| 4-Nitroaniline | 149U | ug/kg | | 403 | 149 | 119 | SW846 8270D | 12/20/11 | 12/21/11 19:16 | SAS | A |
| Nitrobenzene | 249U | ug/kg | | 403 | 249 | 76.0 | SW846 8270D | 12/20/11 | 12/21/11 19:16 | SAS | A |
| 2-Nitrophenol | 149U | ug/kg | | 403 | 149 | 41.7 | SW846 8270D | 12/20/11 | 12/21/11 19:16 | SAS | A |
| 4-Nitrophenol | 249U | ug/kg | | 403 | 249 | 119 | SW846 8270D | 12/20/11 | 12/21/11 19:16 | SAS | A |
| N-Nitroso-di-n-propylamine | 502 | ug/kg | | 403 | 49.2 | 41.7 | SW846 8270D | 12/20/11 | 12/21/11 19:16 | SAS | A |
| N-Nitrosodiphenylamine | 51.2 K | ug/kg | 5 | 403 | 49.2 | 17.9 | SW846 8270D | 12/20/11 | 12/21/11 19:16 | SAS | A |
| Pentachlorophenol | 149U | ug/kg | | 805 | 149 | 95.4 | SW846 8270D | 12/20/11 | 12/21/11 19:16 | SAS | A |
| Phenanthrene | 241J | ug/kg | | 403 | 49.2 | 19.4 | SW846 8270D | 12/20/11 | 12/21/11 19:16 | SAS | A |
| Phenol | 149U | ug/kg | | 403 | 149 | 61.1 | SW846 8270D | 12/20/11 | 12/21/11 19:16 | SAS | A |
| Pyrene | 513 | ug/kg | | 403 | 49.2 | 14.9 | SW846 8270D | 12/20/11 | 12/21/11 19:16 | SAS | A |
| 1,2,4-Trichlorobenzene | 49.2U | ug/kg | | 403 | 49.2 | 13.7 | SW846 8270D | 12/20/11 | 12/21/11 19:16 | SAS | A |
| 2,4,5-Trichlorophenol | 149U | ug/kg | | 403 | 149 | 89.5 | SW846 8270D | 12/20/11 | 12/21/11 19:16 | SAS | A |
| 2,4,6-Trichlorophenol | 149U | ug/kg | | 403 | 149 | 46.2 | SW846 8270D | 12/20/11 | 12/21/11 19:16 | SAS | A |
| *Surrogate Recoveries* | *Results* | *Units* | *Footnote* | *Limits* | | | *Method* | *Prepared* | *Analyzed* | *By* | *Cntr* |
| 2,4,6-Tribromophenol (S) | 105 | % | | 35-125 | | | SW846 8270D | 12/20/11 | 12/21/11 19:16 | SAS | A |
| 2-Fluorobiphenyl (S) | 83.4 | % | | 45-105 | | | SW846 8270D | 12/20/11 | 12/21/11 19:16 | SAS | A |
| Nitrobenzene-d5 (S) | 69.3 | % | | 35-100 | | | SW846 8270D | 12/20/11 | 12/21/11 19:16 | SAS | A |
| Phenol-d5 (S) | 77.6 | % | | 40-100 | | | SW846 8270D | 12/20/11 | 12/21/11 19:16 | SAS | A |
| Terphenyl-d14 (S) | 96.3 | % | | 30-125 | | | SW846 8270D | 12/20/11 | 12/21/11 19:16 | SAS | A |
| **WET CHEMISTRY** | | | | | | | | | | | |
| Moisture | 33.8 | % | | 0.1 | 0.1 | 0.01 | SM20-2540 G | | 12/10/11 15:55 | KAK | A |
| Total Solids | 66.2 | % | | 0.1 | 0.1 | 0.01 | SM20-2540 G | | 12/10/11 15:55 | KAK | A |
| **METALS** | | | | | | | | | | | |
| Aluminum, Total | 27600 | mg/kg | | 14.5 | 9.7 | 4.8 | SW846 6010C | 12/15/11 | 12/19/11 13:57 | SRT | A2 |
| Antimony, Total | 2.2J | mg/kg | | 2.9 | 1.9 | 0.97 | SW846 6010C | 12/15/11 | 12/19/11 13:57 | SRT | A2 |
| Arsenic, Total | 11.1 | mg/kg | | 2.9 | 1.9 | 0.97 | SW846 6010C | 12/15/11 | 12/19/11 13:57 | SRT | A2 |
| Barium, Total | 149 K | mg/kg | | 1.5 | 0.97 | 0.48 | SW846 6010C | 12/15/11 | 12/19/11 13:57 | SRT | A2 |
| Beryllium, Total | 0.89J | mg/kg | | 1.5 | 0.97 | 0.48 | SW846 6010C | 12/15/11 | 12/19/11 13:57 | SRT | A2 |
| Cadmium, Total | 0.80 | mg/kg | | 0.73 | 0.48 | 0.24 | SW846 6010C | 12/15/11 | 12/19/11 13:57 | SRT | A2 |

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State Certifications: CT PH-0224 , DE ID 11 , GA 914 , MA PA0102 , MD 128 , LA 04162 , VA 421 , WY EPA Region 8 , WV 343

## ANALYTICAL RESULTS

nw 1/28/12

Workorder 9941932 EMS020|Marsh Run/633003

Lab ID: 9941932003 Date Collected: 12/9/2011 12:18 Matrix: Solid

Sample ID: SD-7 Date Received: 12/9/2011 18:30

| Parameters | Results | Units | Footnote | LOQ | LOD | DL | Method | Prepared | Analyzed | By | Cntr |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Calcium, Total | 2680 | mg/kg | | 14.5 | 9.7 | 4.8 | SW846 6010C | 12/15/11 | 12/19/11 13:57 | SRT | A2 |
| Chromium, Total | 32.7 | mg/kg | | 1.5 | 0.97 | 0.48 | SW846 6010C | 12/15/11 | 12/19/11 13:57 | SRT | A2 |
| Cobalt, Total | 8.0 | mg/kg | | 1.5 | 0.97 | 0.48 | SW846 6010C | 12/15/11 | 12/19/11 13:57 | SRT | A2 |
| Copper, Total | 16.8 | mg/kg | | 2.9 | 1.9 | 0.97 | SW846 6010C | 12/15/11 | 12/19/11 13:57 | SRT | A2 |
| Iron, Total | 24500 | mg/kg | | 14.5 | 9.7 | 4.8 | SW846 6010C | 12/15/11 | 12/19/11 13:57 | SRT | A2 |
| Lead, Total | 70.9 | mg/kg | | 2.9 | 1.9 | 0.97 | SW846 6010C | 12/15/11 | 12/19/11 13:57 | SRT | A2 |
| Magnesium, Total | 2900 K | mg/kg | | 14.5 | 9.7 | 4.8 | SW846 6010C | 12/15/11 | 12/19/11 13:57 | SRT | A2 |
| Manganese, Total | 211 | mg/kg | | 1.5 | 0.97 | 0.48 | SW846 6010C | 12/15/11 | 12/19/11 13:57 | SRT | A2 |
| Mercury, Total | 0.18U | mg/kg | | 0.27 | 0.18 | 0.089 | SW846 7471B | 12/15/11 | 12/15/11 10:12 | MNP | A1 |
| Nickel, Total | 17.9 | mg/kg | | 2.9 | 1.9 | 0.97 | SW846 6010C | 12/15/11 | 12/19/11 13:57 | SRT | A2 |
| Potassium, Total | 3110 K | mg/kg | | 72.6 | 48.4 | 24.1 | SW846 6010C | 12/15/11 | 12/19/11 13:57 | SRT | A2 |
| Selenium, Total | 4.8U | mg/kg | | 7.3 | 4.8 | 2.4 | SW846 6010C | 12/15/11 | 12/19/11 13:57 | SRT | A2 |
| Silver, Total | 0.48U UL | mg/kg | | 0.73 | 0.48 | 0.24 | SW846 6010C | 12/15/11 | 12/19/11 13:57 | SRT | A2 |
| Sodium, Total | 114 | mg/kg | | 72.6 | 48.4 | 24.1 | SW846 6010C | 12/15/11 | 12/19/11 13:57 | SRT | A2 |
| Thallium, Total | 2.9U | mg/kg | | 4.4 | 2.9 | 1.5 | SW846 6010C | 12/15/11 | 12/19/11 13:57 | SRT | A2 |
| Vanadium, Total | 49.1 K | mg/kg | | 1.5 | 0.97 | 0.48 | SW846 6010C | 12/15/11 | 12/19/11 13:57 | SRT | A2 |
| Zinc, Total | 185 | mg/kg | | 2.9 | 1.9 | 0.97 | SW846 6010C | 12/15/11 | 12/19/11 13:57 | SRT | A2 |

***Sample Comments:***

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NELAP Certifications: NJ PA010 , NY 11759 , PA 22-293 DoD ELAP: A2LA 0818.01
State Certifications: CT PH-0224 , DE ID 11 , GA 914 , MA PA0102 , MD 128 , LA 04162 , VA 421 , WY EPA Region 8 , WV 343

## ANALYTICAL RESULTS

NW 1/28/12

Workorder 9941932 EMS020|Marsh Run/633003

Lab ID: 9941932004 Date Collected: 12/9/2011 13:20 Matrix: Solid

Sample ID: SD-8 Date Received: 12/9/2011 18:30

| Parameters | Results | Units | Footnote | LOQ | LOD | DL | Method | Prepared | Analyzed | By | Cntr |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **SEMIVOLATILES** | | | | | | | | | | | |
| Acenaphthene | 35.6J | ug/kg | | 468 | 57.1 | 34.6 | SW846 8270D | 12/20/11 | 12/21/11 19:48 | SAS | A |
| Acenaphthylene | 76.2J | ug/kg | | 468 | 57.1 | 19.0 | SW846 8270D | 12/20/11 | 12/21/11 19:48 | SAS | A |
| Anthracene | 124J | ug/kg | | 468 | 57.1 | 20.8 | SW846 8270D | 12/20/11 | 12/21/11 19:48 | SAS | A |
| Benzo(a)anthracene | 579 | ug/kg | | 468 | 57.1 | 31.2 | SW846 8270D | 12/20/11 | 12/21/11 19:48 | SAS | A |
| Benzo(a)pyrene | 659 | ug/kg | | 468 | 57.1 | 13.9 | SW846 8270D | 12/20/11 | 12/21/11 19:48 | SAS | A |
| Benzo(b)fluoranthene | 1080 | ug/kg | | 468 | 57.1 | 24.2 | SW846 8270D | 12/20/11 | 12/21/11 19:48 | SAS | A |
| Benzo(g,h,i)perylene | 234J | ug/kg | | 468 | 57.1 | 13.9 | SW846 8270D | 12/20/11 | 12/21/11 19:48 | SAS | A |
| Benzo(k)fluoranthene | 472 | ug/kg | | 468 | 57.1 | 22.5 | SW846 8270D | 12/20/11 | 12/21/11 19:48 | SAS | A |
| 4-Bromophenyl-phenylether | 57.1U | ug/kg | | 468 | 57.1 | 31.2 | SW846 8270D | 12/20/11 | 12/21/11 19:48 | SAS | A |
| Butylbenzylphthalate | 57.1U | ug/kg | | 468 | 57.1 | 15.6 | SW846 8270D | 12/20/11 | 12/21/11 19:48 | SAS | A |
| Carbazole | 75.8J | ug/kg | | 468 | 57.1 | 20.8 | SW846 8270D | 12/20/11 | 12/21/11 19:48 | SAS | A |
| 4-Chloro-3-methylphenol | 57.1U | ug/kg | | 468 | 57.1 | 36.4 | SW846 8270D | 12/20/11 | 12/21/11 19:48 | SAS | A |
| 4-Chloroaniline | 289U | ug/kg | | 468 | 289 | 145 | SW846 8270D | 12/20/11 | 12/21/11 19:48 | SAS | A |
| bis(2-Chloroethoxy)methane | 57.1U | ug/kg | | 468 | 57.1 | 19.0 | SW846 8270D | 12/20/11 | 12/21/11 19:48 | SAS | A |
| bis(2-Chloroethyl)ether | 57.1U | ug/kg | | 468 | 57.1 | 46.8 | SW846 8270D | 12/20/11 | 12/21/11 19:48 | SAS | A |
| bis(2-Chloroisopropyl)ether | 57.1U | ug/kg | | 468 | 57.1 | 22.5 | SW846 8270D | 12/20/11 | 12/21/11 19:48 | SAS | A |
| 2-Chloronaphthalene | 57.1U | ug/kg | | 468 | 57.1 | 22.5 | SW846 8270D | 12/20/11 | 12/21/11 19:48 | SAS | A |
| 2-Chlorophenol | 57.1U | ug/kg | | 468 | 57.1 | 39.8 | SW846 8270D | 12/20/11 | 12/21/11 19:48 | SAS | A |
| 4-Chlorophenyl-phenylether | 57.1U | ug/kg | | 468 | 57.1 | 24.2 | SW846 8270D | 12/20/11 | 12/21/11 19:48 | SAS | A |
| Chrysene | 711 | ug/kg | | 468 | 57.1 | 15.6 | SW846 8270D | 12/20/11 | 12/21/11 19:48 | SAS | A |
| mp-Cresol | 195J | ug/kg | | 468 | 57.1 | 22.5 | SW846 8270D | 12/20/11 | 12/21/11 19:48 | SAS | A |
| o-Cresol | 57.1U | ug/kg | | 468 | 57.1 | 46.8 | SW846 8270D | 12/20/11 | 12/21/11 19:48 | SAS | A |
| Di-n-Butylphthalate | 57.1U | ug/kg | | 468 | 57.1 | 19.0 | SW846 8270D | 12/20/11 | 12/21/11 19:48 | SAS | A |
| Di-n-Octylphthalate | 57.1U | ug/kg | | 468 | 57.1 | 13.9 | SW846 8270D | 12/20/11 | 12/21/11 19:48 | SAS | A |
| Dibenzo(a,h)anthracene | 79.7J | ug/kg | | 468 | 57.1 | 48.5 | SW846 8270D | 12/20/11 | 12/21/11 19:48 | SAS | A |
| Dibenzofuran | 32.0J | ug/kg | | 468 | 57.1 | 26.0 | SW846 8270D | 12/20/11 | 12/21/11 19:48 | SAS | A |
| 1,2-Dichlorobenzene | 57.1U | ug/kg | | 468 | 57.1 | 34.6 | SW846 8270D | 12/20/11 | 12/21/11 19:48 | SAS | A |
| 1,3-Dichlorobenzene | 57.1U | ug/kg | | 468 | 57.1 | 26.0 | SW846 8270D | 12/20/11 | 12/21/11 19:48 | SAS | A |
| 1,4-Dichlorobenzene | 57.1U | ug/kg | | 468 | 57.1 | 17.3 | SW846 8270D | 12/20/11 | 12/21/11 19:48 | SAS | A |
| 3,3-Dichlorobenzidine | 173U | ug/kg | | 935 | 173 | 98.7 | SW846 8270D | 12/20/11 | 12/21/11 19:48 | SAS | A |
| 2,4-Dichlorophenol | 57.1U | ug/kg | | 468 | 57.1 | 29.4 | SW846 8270D | 12/20/11 | 12/21/11 19:48 | SAS | A |
| Diethylphthalate | 57.1U | ug/kg | | 468 | 57.1 | 14.4 | SW846 8270D | 12/20/11 | 12/21/11 19:48 | SAS | A |
| 2,4-Dimethylphenol | 173U | ug/kg | | 468 | 173 | 88.3 | SW846 8270D | 12/20/11 | 12/21/11 19:48 | SAS | A |
| Dimethylphthalate | 57.1U | ug/kg | | 468 | 57.1 | 27.7 | SW846 8270D | 12/20/11 | 12/21/11 19:48 | SAS | A |
| 2,4-Dinitrophenol | 289U | ug/kg | | 935 | 289 | 165 | SW846 8270D | 12/20/11 | 12/21/11 19:48 | SAS | A |
| 2,4-Dinitrotoluene | 57.1U | ug/kg | | 468 | 57.1 | 19.0 | SW846 8270D | 12/20/11 | 12/21/11 19:48 | SAS | A |
| 2,6-Dinitrotoluene | 173U | ug/kg | | 468 | 173 | 20.8 | SW846 8270D | 12/20/11 | 12/21/11 19:48 | SAS | A |
| bis(2-Ethylhexyl)phthalate | 118J | ug/kg | | 468 | 57.1 | 24.2 | SW846 8270D | 12/20/11 | 12/21/11 19:48 | SAS | A |
| Fluoranthene | 1260 | ug/kg | | 468 | 57.1 | 19.0 | SW846 8270D | 12/20/11 | 12/21/11 19:48 | SAS | A |
| Fluorene | 44.8J | ug/kg | | 468 | 57.1 | 16.1 | SW846 8270D | 12/20/11 | 12/21/11 19:48 | SAS | A |
| Hexachlorobenzene | 57.1U | ug/kg | | 468 | 57.1 | 39.8 | SW846 8270D | 12/20/11 | 12/21/11 19:48 | SAS | A |

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State Certifications: CT PH-0224 , DE ID 11 , GA 914 , MA PA0102 , MD 128 , LA 04162 , VA 421 , WY EPA Region 8 , WV 343

## ANALYTICAL RESULTS

NW 1/28/12

Workorder 9941932 EMS020|Marsh Run/633003

Lab ID: 9941932004 Date Collected: 12/9/2011 13:20 Matrix: Solid

Sample ID: SD-8 Date Received: 12/9/2011 18:30

| Parameters | Results | Units | Footnote | LOQ | LOD | DL | Method | Prepared | Analyzed | By | Cntr |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Hexachlorobutadiene | 57.1U | ug/kg | | 468 | 57.1 | 34.6 | SW846 8270D | 12/20/11 | 12/21/11 19:48 | SAS | A |
| Hexachlorocyclopentadiene | 173U | ug/kg | | 468 | 173 | 135 | SW846 8270D | 12/20/11 | 12/21/11 19:48 | SAS | A |
| Hexachloroethane | 57.1U | ug/kg | | 468 | 57.1 | 38.1 | SW846 8270D | 12/20/11 | 12/21/11 19:48 | SAS | A |
| Indeno(1,2,3-cd)pyrene | 242J | ug/kg | | 468 | 57.1 | 13.9 | SW846 8270D | 12/20/11 | 12/21/11 19:48 | SAS | A |
| Isophorone | 57.1U | ug/kg | | 468 | 57.1 | 22.5 | SW846 8270D | 12/20/11 | 12/21/11 19:48 | SAS | A |
| 2-Methyl-4,6-dinitrophenol | 289U | ug/kg | | 468 | 289 | 149 | SW846 8270D | 12/20/11 | 12/21/11 19:48 | SAS | A |
| 2-Methylnaphthalene | 39.2J | ug/kg | | 468 | 57.1 | 14.7 | SW846 8270D | 12/20/11 | 12/21/11 19:48 | SAS | A |
| Naphthalene | 57.1U | ug/kg | | 468 | 57.1 | 31.2 | SW846 8270D | 12/20/11 | 12/21/11 19:48 | SAS | A |
| 2-Nitroaniline | 173U | ug/kg | | 468 | 173 | 109 | SW846 8270D | 12/20/11 | 12/21/11 19:48 | SAS | A |
| 3-Nitroaniline | 173U | ug/kg | | 468 | 173 | 102 | SW846 8270D | 12/20/11 | 12/21/11 19:48 | SAS | A |
| 4-Nitroaniline | 173U | ug/kg | | 468 | 173 | 139 | SW846 8270D | 12/20/11 | 12/21/11 19:48 | SAS | A |
| Nitrobenzene | 289U | ug/kg | | 468 | 289 | 88.3 | SW846 8270D | 12/20/11 | 12/21/11 19:48 | SAS | A |
| 2-Nitrophenol | 173U | ug/kg | | 468 | 173 | 48.5 | SW846 8270D | 12/20/11 | 12/21/11 19:48 | SAS | A |
| 4-Nitrophenol | 289U | ug/kg | | 468 | 289 | 139 | SW846 8270D | 12/20/11 | 12/21/11 19:48 | SAS | A |
| N-Nitroso-di-n-propylamine | 57.1U | ug/kg | | 468 | 57.1 | 48.5 | SW846 8270D | 12/20/11 | 12/21/11 19:48 | SAS | A |
| N-Nitrosodiphenylamine | 57.1U | ug/kg | | 468 | 57.1 | 20.8 | SW846 8270D | 12/20/11 | 12/21/11 19:48 | SAS | A |
| Pentachlorophenol | 173U | ug/kg | | 935 | 173 | 111 | SW846 8270D | 12/20/11 | 12/21/11 19:48 | SAS | A |
| Phenanthrene | 508 | ug/kg | | 468 | 57.1 | 22.5 | SW846 8270D | 12/20/11 | 12/21/11 19:48 | SAS | A |
| Phenol | 173U | ug/kg | | 468 | 173 | 71.0 | SW846 8270D | 12/20/11 | 12/21/11 19:48 | SAS | A |
| Pyrene | 1070 | ug/kg | | 468 | 57.1 | 17.3 | SW846 8270D | 12/20/11 | 12/21/11 19:48 | SAS | A |
| 1,2,4-Trichlorobenzene | 57.1U | ug/kg | | 468 | 57.1 | 15.9 | SW846 8270D | 12/20/11 | 12/21/11 19:48 | SAS | A |
| 2,4,5-Trichlorophenol | 173U | ug/kg | | 468 | 173 | 104 | SW846 8270D | 12/20/11 | 12/21/11 19:48 | SAS | A |
| 2,4,6-Trichlorophenol | 173U | ug/kg | | 468 | 173 | 53.7 | SW846 8270D | 12/20/11 | 12/21/11 19:48 | SAS | A |
| *Surrogate Recoveries* | *Results* | *Units* | *Footnote* | *Limits* | | | *Method* | *Prepared* | *Analyzed* | *By* | *Cntr* |
| 2,4,6-Tribromophenol (S) | 97.6 | % | | 35-125 | | | SW846 8270D | 12/20/11 | 12/21/11 19:48 | SAS | A |
| 2-Fluorobiphenyl (S) | 77.4 | % | | 45-105 | | | SW846 8270D | 12/20/11 | 12/21/11 19:48 | SAS | A |
| Nitrobenzene-d5 (S) | 64 | % | | 35-100 | | | SW846 8270D | 12/20/11 | 12/21/11 19:48 | SAS | A |
| Phenol-d5 (S) | 70.9 | % | | 40-100 | | | SW846 8270D | 12/20/11 | 12/21/11 19:48 | SAS | A |
| Terphenyl-d14 (S) | 92 | % | | 30-125 | | | SW846 8270D | 12/20/11 | 12/21/11 19:48 | SAS | A |
| **WET CHEMISTRY** | | | | | | | | | | | |
| Moisture | 43.2 | % | | 0.1 | 0.1 | 0.01 | SM20-2540 G | | 12/10/11 15:55 | KAK | A |
| Total Solids | 56.8 | % | | 0.1 | 0.1 | 0.01 | SM20-2540 G | | 12/10/11 15:55 | KAK | A |
| **METALS** | | | | | | | | | | | |
| Aluminum, Total | 17100 | mg/kg | | 17.3 | 11.5 | 5.7 | SW846 6010C | 12/15/11 | 12/19/11 14:02 | SRT | A2 |
| Antimony, Total | 1.4J | mg/kg | | 3.5 | 2.3 | 1.2 | SW846 6010C | 12/15/11 | 12/19/11 14:02 | SRT | A2 |
| Arsenic, Total | 7.0 | mg/kg | | 3.5 | 2.3 | 1.2 | SW846 6010C | 12/15/11 | 12/19/11 14:02 | SRT | A2 |
| Barium, Total | 84.0 K | mg/kg | | 1.7 | 1.2 | 0.57 | SW846 6010C | 12/15/11 | 12/19/11 14:02 | SRT | A2 |
| Beryllium, Total | 0.64J | mg/kg | | 1.7 | 1.2 | 0.57 | SW846 6010C | 12/15/11 | 12/19/11 14:02 | SRT | A2 |
| Cadmium, Total | 1.6 | mg/kg | | 0.86 | 0.57 | 0.29 | SW846 6010C | 12/15/11 | 12/19/11 14:02 | SRT | A2 |

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State Certifications: CT PH-0224 , DE ID 11 , GA 914 , MA PA0102 , MD 128 , LA 04162 , VA 421 , WY EPA Region 8 , WV 343

## ANALYTICAL RESULTS

NW 1/28/12

Workorder 9941932 EMS020|Marsh Run/633003

Lab ID: 9941932004 Date Collected: 12/9/2011 13:20 Matrix: Solid
Sample ID: SD-8 Date Received: 12/9/2011 18:30

| Parameters | Results | Units | Footnote | LOQ | LOD | DL | Method | Prepared | Analyzed | By | Cntr |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Calcium, Total | 4610 | mg/kg | ~~6~~ | 17.3 | 11.5 | 5.7 | SW846 6010C | 12/15/11 | 12/19/11 14:02 | SRT | A2 |
| Chromium, Total | 23.7 | mg/kg | | 1.7 | 1.2 | 0.57 | SW846 6010C | 12/15/11 | 12/19/11 14:02 | SRT | A2 |
| Cobalt, Total | 7.4 | mg/kg | | 1.7 | 1.2 | 0.57 | SW846 6010C | 12/15/11 | 12/19/11 14:02 | SRT | A2 |
| Copper, Total | 20.5 | mg/kg | | 3.5 | 2.3 | 1.2 | SW846 6010C | 12/15/11 | 12/19/11 14:02 | SRT | A2 |
| Iron, Total | 20600 | mg/kg | | 17.3 | 11.5 | 5.7 | SW846 6010C | 12/15/11 | 12/19/11 14:02 | SRT | A2 |
| Lead, Total | 44.1 | mg/kg | | 3.5 | 2.3 | 1.2 | SW846 6010C | 12/15/11 | 12/19/11 14:02 | SRT | A2 |
| Magnesium, Total | 2950 K | mg/kg | ~~6~~ | 17.3 | 11.5 | 5.7 | SW846 6010C | 12/15/11 | 12/19/11 14:02 | SRT | A2 |
| Manganese, Total | 720 | mg/kg | | 1.7 | 1.2 | 0.57 | SW846 6010C | 12/15/11 | 12/19/11 14:02 | SRT | A2 |
| Mercury, Total | 0.20U | mg/kg | | 0.30 | 0.20 | 0.10 | SW846 7471B | 12/15/11 | 12/15/11 10:13 | MNP | A1 |
| Nickel, Total | 17.0 | mg/kg | | 3.5 | 2.3 | 1.2 | SW846 6010C | 12/15/11 | 12/19/11 14:02 | SRT | A2 |
| Potassium, Total | 2970 K | mg/kg | | 86.3 | 57.5 | 28.7 | SW846 6010C | 12/15/11 | 12/19/11 14:02 | SRT | A2 |
| Selenium, Total | 5.7U | mg/kg | | 8.6 | 5.7 | 2.9 | SW846 6010C | 12/15/11 | 12/19/11 14:02 | SRT | A2 |
| Silver, Total | 0.57U UL | mg/kg | ~~6~~ | 0.86 | 0.57 | 0.29 | SW846 6010C | 12/15/11 | 12/19/11 14:02 | SRT | A2 |
| Sodium, Total | 117 | mg/kg | | 86.3 | 57.5 | 28.7 | SW846 6010C | 12/15/11 | 12/19/11 14:02 | SRT | A2 |
| Thallium, Total | 3.5U | mg/kg | | 5.2 | 3.5 | 1.7 | SW846 6010C | 12/15/11 | 12/19/11 14:02 | SRT | A2 |
| Vanadium, Total | 31.1 K | mg/kg | ~~7~~ | 1.7 | 1.2 | 0.57 | SW846 6010C | 12/15/11 | 12/19/11 14:02 | SRT | A2 |
| Zinc, Total | 157 | mg/kg | | 3.5 | 2.3 | 1.2 | SW846 6010C | 12/15/11 | 12/19/11 14:02 | SRT | A2 |

***Sample Comments:***

Anna G Milliken
Technical Manager

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## ANALYTICAL RESULTS

NW 1/28/12

Workorder 9941932 EMS020|Marsh Run/633003

Lab ID: 9941932005 Date Collected: 12/9/2011 13:38 Matrix: Ground Water

Sample ID: SW-5 Date Received: 12/9/2011 18:30

| Parameters | Results | Units | Footnote | LOQ | LOD | DL | Method | Prepared | Analyzed | By | Cntr |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **SEMIVOLATILES** | | | | | | | | | | | |
| Acenaphthene | 0.94U | ug/L | | 1.9 | 0.94 | 0.48 | SW846 8270D | 12/16/11 | 12/20/11 22:55 | CGS | A1 |
| Acenaphthylene | 0.94U | ug/L | | 1.9 | 0.94 | 0.32 | SW846 8270D | 12/16/11 | 12/20/11 22:55 | CGS | A1 |
| Anthracene | 0.94U | ug/L | | 1.9 | 0.94 | 0.42 | SW846 8270D | 12/16/11 | 12/20/11 22:55 | CGS | A1 |
| Benzo(a)anthracene | 0.94U | ug/L | | 1.9 | 0.94 | 0.29 | SW846 8270D | 12/16/11 | 12/20/11 22:55 | CGS | A1 |
| Benzo(a)pyrene | 0.94U | ug/L | | 1.9 | 0.94 | 0.31 | SW846 8270D | 12/16/11 | 12/20/11 22:55 | CGS | A1 |
| Benzo(b)fluoranthene | 0.94U | ug/L | | 1.9 | 0.94 | 0.32 | SW846 8270D | 12/16/11 | 12/20/11 22:55 | CGS | A1 |
| Benzo(g,h,i)perylene | 0.94U | ug/L | | 1.9 | 0.94 | 0.41 | SW846 8270D | 12/16/11 | 12/20/11 22:55 | CGS | A1 |
| Benzo(k)fluoranthene | 0.94U | ug/L | | 1.9 | 0.94 | 0.36 | SW846 8270D | 12/16/11 | 12/20/11 22:55 | CGS | A1 |
| 4-Bromophenyl-phenylether | 0.94U | ug/L | | 7.5 | 0.94 | 0.37 | SW846 8270D | 12/16/11 | 12/20/11 22:55 | CGS | A1 |
| Butylbenzylphthalate | 0.94U | ug/L | | 7.5 | 0.94 | 0.38 | SW846 8270D | 12/16/11 | 12/20/11 22:55 | CGS | A1 |
| Carbazole | 0.94U | ug/L | | 7.5 | 0.94 | 0.24 | SW846 8270D | 12/16/11 | 12/20/11 22:55 | CGS | A1 |
| 4-Chloro-3-methylphenol | 0.94U | ug/L | | 7.5 | 0.94 | 0.89 | SW846 8270D | 12/16/11 | 12/20/11 22:55 | CGS | A1 |
| 4-Chloroaniline | 0.94U | ug/L | | 7.5 | 0.94 | 0.85 | SW846 8270D | 12/16/11 | 12/20/11 22:55 | CGS | A1 |
| bis(2-Chloroethoxy)methane | 0.94U | ug/L | | 7.5 | 0.94 | 0.75 | SW846 8270D | 12/16/11 | 12/20/11 22:55 | CGS | A1 |
| bis(2-Chloroethyl)ether | 0.94U | ug/L | | 7.5 | 0.94 | 0.47 | SW846 8270D | 12/16/11 | 12/20/11 22:55 | CGS | A1 |
| bis(2-Chloroisopropyl)ether | 0.94U | ug/L | | 7.5 | 0.94 | 0.58 | SW846 8270D | 12/16/11 | 12/20/11 22:55 | CGS | A1 |
| 2-Chloronaphthalene | 0.94U | ug/L | | 7.5 | 0.94 | 0.37 | SW846 8270D | 12/16/11 | 12/20/11 22:55 | CGS | A1 |
| 2-Chlorophenol | 1.9U | ug/L | | 7.5 | 1.9 | 0.79 | SW846 8270D | 12/16/11 | 12/20/11 22:55 | CGS | A1 |
| 4-Chlorophenyl-phenylether | 0.94U | ug/L | | 7.5 | 0.94 | 0.51 | SW846 8270D | 12/16/11 | 12/20/11 22:55 | CGS | A1 |
| Chrysene | 0.94U | ug/L | | 1.9 | 0.94 | 0.24 | SW846 8270D | 12/16/11 | 12/20/11 22:55 | CGS | A1 |
| mp-Cresol | 0.94U | ug/L | | 7.5 | 0.94 | 0.48 | SW846 8270D | 12/16/11 | 12/20/11 22:55 | CGS | A1 |
| o-Cresol | 0.94U | ug/L | | 7.5 | 0.94 | 0.46 | SW846 8270D | 12/16/11 | 12/20/11 22:55 | CGS | A1 |
| Di-n-Butylphthalate | 0.94U | ug/L | | 7.5 | 0.94 | 0.31 | SW846 8270D | 12/16/11 | 12/20/11 22:55 | CGS | A1 |
| Di-n-Octylphthalate | 0.94U | ug/L | | 7.5 | 0.94 | 0.24 | SW846 8270D | 12/16/11 | 12/20/11 22:55 | CGS | A1 |
| Dibenzo(a,h)anthracene | 0.94U | ug/L | | 1.9 | 0.94 | 0.89 | SW846 8270D | 12/16/11 | 12/20/11 22:55 | CGS | A1 |
| Dibenzofuran | 0.94U | ug/L | | 7.5 | 0.94 | 0.69 | SW846 8270D | 12/16/11 | 12/20/11 22:55 | CGS | A1 |
| 1,2-Dichlorobenzene | 0.94U | ug/L | | 7.5 | 0.94 | 0.35 | SW846 8270D | 12/16/11 | 12/20/11 22:55 | CGS | A1 |
| 1,3-Dichlorobenzene | 0.94U | ug/L | | 7.5 | 0.94 | 0.44 | SW846 8270D | 12/16/11 | 12/20/11 22:55 | CGS | A1 |
| 1,4-Dichlorobenzene | 0.94U | ug/L | | 7.5 | 0.94 | 0.59 | SW846 8270D | 12/16/11 | 12/20/11 22:55 | CGS | A1 |
| 3,3-Dichlorobenzidine | 2.8U | ug/L | | 15.1 | 2.8 | 1.5 | SW846 8270D | 12/16/11 | 12/20/11 22:55 | CGS | A1 |
| 2,4-Dichlorophenol | 0.94U | ug/L | | 7.5 | 0.94 | 0.58 | SW846 8270D | 12/16/11 | 12/20/11 22:55 | CGS | A1 |
| Diethylphthalate | 0.94U | ug/L | | 7.5 | 0.94 | 0.31 | SW846 8270D | 12/16/11 | 12/20/11 22:55 | CGS | A1 |
| 2,4-Dimethylphenol | 2.8U | ug/L | | 7.5 | 2.8 | 2.0 | SW846 8270D | 12/16/11 | 12/20/11 22:55 | CGS | A1 |
| Dimethylphthalate | 0.94U | ug/L | | 7.5 | 0.94 | 0.51 | SW846 8270D | 12/16/11 | 12/20/11 22:55 | CGS | A1 |
| 2,4-Dinitrophenol | 7.5U | ug/L | | 15.1 | 7.5 | 3.4 | SW846 8270D | 12/16/11 | 12/20/11 22:55 | CGS | A1 |
| 2,4-Dinitrotoluene | 0.94U | ug/L | | 7.5 | 0.94 | 0.37 | SW846 8270D | 12/16/11 | 12/20/11 22:55 | CGS | A1 |
| 2,6-Dinitrotoluene | 0.94U | ug/L | | 7.5 | 0.94 | 0.33 | SW846 8270D | 12/16/11 | 12/20/11 22:55 | CGS | A1 |
| bis(2-Ethylhexyl)phthalate | 0.94U | ug/L | | 7.5 | 0.94 | 0.25 | SW846 8270D | 12/16/11 | 12/20/11 22:55 | CGS | A1 |
| Fluoranthene | 0.94U | ug/L | | 1.9 | 0.94 | 0.33 | SW846 8270D | 12/16/11 | 12/20/11 22:55 | CGS | A1 |
| Fluorene | 0.94U | ug/L | | 1.9 | 0.94 | 0.38 | SW846 8270D | 12/16/11 | 12/20/11 22:55 | CGS | A1 |
| Hexachlorobenzene | 0.94U | ug/L | | 7.5 | 0.94 | 0.51 | SW846 8270D | 12/16/11 | 12/20/11 22:55 | CGS | A1 |

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State Certifications: CT PH-0224 , DE ID 11 , GA 914 , MA PA0102 , MD 128 , LA 04162 , VA 421 , WY EPA Region 8 , WV 343

## ANALYTICAL RESULTS

NW 1/28/12

Workorder 9941932 EMS020|Marsh Run/633003

Lab ID: 9941932005 Date Collected: 12/9/2011 13:38 Matrix: Ground Water

Sample ID: SW-5 Date Received: 12/9/2011 18:30

| Parameters | Results | Units | Footnote | LOQ | LOD | DL | Method | Prepared | Analyzed | By | Cntr |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Hexachlorobutadiene | 0.94U | ug/L | | 7.5 | 0.94 | 0.47 | SW846 8270D | 12/16/11 | 12/20/11 22:55 | CGS | A1 |
| Hexachlorocyclopentadiene | 0.94U UL | ug/L | | 7.5 | 0.94 | 0.92 | SW846 8270D | 12/16/11 | 12/20/11 22:55 | CGS | A1 |
| Hexachloroethane | 0.94U | ug/L | | 7.5 | 0.94 | 0.82 | SW846 8270D | 12/16/11 | 12/20/11 22:55 | CGS | A1 |
| Indeno(1,2,3-cd)pyrene | 0.94U | ug/L | | 1.9 | 0.94 | 0.24 | SW846 8270D | 12/16/11 | 12/20/11 22:55 | CGS | A1 |
| Isophorone | 0.94U | ug/L | | 7.5 | 0.94 | 0.58 | SW846 8270D | 12/16/11 | 12/20/11 22:55 | CGS | A1 |
| 2-Methyl-4,6-dinitrophenol | 4.7U | ug/L | | 7.5 | 4.7 | 1.7 | SW846 8270D | 12/16/11 | 12/20/11 22:55 | CGS | A1 |
| 2-Methylnaphthalene | 0.94U | ug/L | | 1.9 | 0.94 | 0.90 | SW846 8270D | 12/16/11 | 12/20/11 22:55 | CGS | A1 |
| Naphthalene | 0.94U | ug/L | | 1.9 | 0.94 | 0.43 | SW846 8270D | 12/16/11 | 12/20/11 22:55 | CGS | A1 |
| 2-Nitroaniline | 0.94U | ug/L | | 7.5 | 0.94 | 0.33 | SW846 8270D | 12/16/11 | 12/20/11 22:55 | CGS | A1 |
| 3-Nitroaniline | 1.9U | ug/L | | 7.5 | 1.9 | 1.0 | SW846 8270D | 12/16/11 | 12/20/11 22:55 | CGS | A1 |
| 4-Nitroaniline | 0.94U | ug/L | | 7.5 | 0.94 | 0.42 | SW846 8270D | 12/16/11 | 12/20/11 22:55 | CGS | A1 |
| Nitrobenzene | 1.9U | ug/L | | 7.5 | 1.9 | 0.65 | SW846 8270D | 12/16/11 | 12/20/11 22:55 | CGS | A1 |
| 2-Nitrophenol | 1.9U | ug/L | | 7.5 | 1.9 | 1.3 | SW846 8270D | 12/16/11 | 12/20/11 22:55 | CGS | A1 |
| 4-Nitrophenol | 4.7U | ug/L | | 7.5 | 4.7 | 2.8 | SW846 8270D | 12/16/11 | 12/20/11 22:55 | CGS | A1 |
| N-Nitroso-di-n-propylamine | 0.94U | ug/L | | 7.5 | 0.94 | 0.53 | SW846 8270D | 12/16/11 | 12/20/11 22:55 | CGS | A1 |
| N-Nitrosodiphenylamine | 0.94U | ug/L | | 7.5 | 0.94 | 0.78 | SW846 8270D | 12/16/11 | 12/20/11 22:55 | CGS | A1 |
| Pentachlorophenol | 7.5U | ug/L | | 15.1 | 7.5 | 2.5 | SW846 8270D | 12/16/11 | 12/20/11 22:55 | CGS | A1 |
| Phenanthrene | 0.94U | ug/L | | 1.9 | 0.94 | 0.31 | SW846 8270D | 12/16/11 | 12/20/11 22:55 | CGS | A1 |
| Phenol | 0.94U | ug/L | | 7.5 | 0.94 | 0.68 | SW846 8270D | 12/16/11 | 12/20/11 22:55 | CGS | A1 |
| Pyrene | 0.94U | ug/L | | 1.9 | 0.94 | 0.48 | SW846 8270D | 12/16/11 | 12/20/11 22:55 | CGS | A1 |
| 1,2,4-Trichlorobenzene | 0.94U | ug/L | | 7.5 | 0.94 | 0.60 | SW846 8270D | 12/16/11 | 12/20/11 22:55 | CGS | A1 |
| 2,4,5-Trichlorophenol | 2.8U | ug/L | | 7.5 | 2.8 | 1.6 | SW846 8270D | 12/16/11 | 12/20/11 22:55 | CGS | A1 |
| 2,4,6-Trichlorophenol | 0.94U | ug/L | | 7.5 | 0.94 | 0.52 | SW846 8270D | 12/16/11 | 12/20/11 22:55 | CGS | A1 |
| *Surrogate Recoveries* | *Results* | *Units* | *Footnote* | *Limits* | | | *Method* | *Prepared* | *Analyzed* | *By* | *Cntr* |
| 2,4,6-Tribromophenol (S) | 63.9 | % | | 40-125 | | | SW846 8270D | 12/16/11 | 12/20/11 22:55 | CGS | A1 |
| 2-Fluorobiphenyl (S) | 61.5 | % | | 50-110 | | | SW846 8270D | 12/16/11 | 12/20/11 22:55 | CGS | A1 |
| 2-Fluorophenol (S) | 44.2 | % | | 20-110 | | | SW846 8270D | 12/16/11 | 12/20/11 22:55 | CGS | A1 |
| Nitrobenzene-d5 (S) | 68.8 | % | | 40-110 | | | SW846 8270D | 12/16/11 | 12/20/11 22:55 | CGS | A1 |
| Phenol-d5 (S) | 25.3 | % | | 10-115 | | | SW846 8270D | 12/16/11 | 12/20/11 22:55 | CGS | A1 |
| Terphenyl-d14 (S) | 82.3 | % | | 50-135 | | | SW846 8270D | 12/16/11 | 12/20/11 22:55 | CGS | A1 |
| **SEMIVOLATILE SIM** | | | | | | | | | | | |
| Acenaphthene | 0.038U | ug/L | | 0.047 | 0.038 | 0.014 | 8270 SIM | 12/16/11 | 12/18/11 17:57 | DHF | A2 |
| Acenaphthylene | 0.038U | ug/L | | 0.047 | 0.038 | 0.017 | 8270 SIM | 12/16/11 | 12/18/11 17:57 | DHF | A2 |
| Anthracene | 0.038U | ug/L | | 0.047 | 0.038 | 0.012 | 8270 SIM | 12/16/11 | 12/18/11 17:57 | DHF | A2 |
| Benzo(a)anthracene | 0.038U | ug/L | | 0.047 | 0.038 | 0.020 | 8270 SIM | 12/16/11 | 12/18/11 17:57 | DHF | A2 |
| Benzo(a)pyrene | 0.038U | ug/L | | 0.047 | 0.038 | 0.028 | 8270 SIM | 12/16/11 | 12/18/11 17:57 | DHF | A2 |
| Benzo(b)fluoranthene | 0.038U | ug/L | | 0.047 | 0.038 | 0.023 | 8270 SIM | 12/16/11 | 12/18/11 17:57 | DHF | A2 |
| Benzo(g,h,i)perylene | 0.038U | ug/L | | 0.047 | 0.038 | 0.015 | 8270 SIM | 12/16/11 | 12/18/11 17:57 | DHF | A2 |
| Benzo(k)fluoranthene | 0.038U | ug/L | | 0.047 | 0.038 | 0.021 | 8270 SIM | 12/16/11 | 12/18/11 17:57 | DHF | A2 |
| Chrysene | 0.038U | ug/L | | 0.047 | 0.038 | 0.020 | 8270 SIM | 12/16/11 | 12/18/11 17:57 | DHF | A2 |

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State Certifications: CT PH-0224 , DE ID 11 , GA 914 , MA PA0102 , MD 128 , LA 04162 , VA 421 , WY EPA Region 8 , WV 343

## ANALYTICAL RESULTS

uw 1/28/12

Workorder 9941932 EMS020|Marsh Run/633003

Lab ID: 9941932005 Date Collected: 12/9/2011 13:38 Matrix: Ground Water

Sample ID: SW-5 Date Received: 12/9/2011 18:30

| Parameters | Results | Units | Footnote | LOQ | LOD | DL | Method | Prepared | Analyzed | By | Cntr |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Dibenzo(a,h)anthracene | 0.038U | ug/L | | 0.047 | 0.038 | 0.014 | 8270 SIM | 12/16/11 | 12/18/11 17:57 | DHF | A2 |
| Fluoranthene | 0.020J | ug/L | | 0.047 | 0.038 | 0.020 | 8270 SIM | 12/16/11 | 12/18/11 17:57 | DHF | A2 |
| Fluorene | 0.038U | ug/L | | 0.047 | 0.038 | 0.014 | 8270 SIM | 12/16/11 | 12/18/11 17:57 | DHF | A2 |
| Indeno(1,2,3-cd)pyrene | 0.038U | ug/L | | 0.047 | 0.038 | 0.014 | 8270 SIM | 12/16/11 | 12/18/11 17:57 | DHF | A2 |
| Naphthalene | 0.043J | ug/L | | 0.047 | 0.047 | 0.039 | 8270 SIM | 12/16/11 | 12/18/11 17:57 | DHF | A2 |
| Phenanthrene | 0.038U | ug/L | | 0.047 | 0.038 | 0.026 | 8270 SIM | 12/16/11 | 12/18/11 17:57 | DHF | A2 |
| Pyrene | 0.020J | ug/L | | 0.047 | 0.038 | 0.018 | 8270 SIM | 12/16/11 | 12/18/11 17:57 | DHF | A2 |
| *Surrogate Recoveries* | *Results* | *Units* | *Footnote* | *Limits* | | | *Method* | *Prepared* | *Analyzed* | *By* | *Cntr* |
| 2-Methylnapthalene-d10 (S) | 65.4 | % | | 29-112 | | | 8270 SIM | 12/16/11 | 12/18/11 17:57 | DHF | A2 |
| Fluoranthene-d10 (S) | 75.1 | % | | 45-130 | | | 8270 SIM | 12/16/11 | 12/18/11 17:57 | DHF | A2 |
| **METALS** | | | | | | | | | | | |
| Aluminum, Total | 0.27 | mg/L | | 0.089 | 0.059 | 0.030 | SW846 6020A | 12/13/11 | 12/15/11 10:46 | LAM | C1 |
| Antimony, Total | 0.0015 U | mg/L | | 0.0022 | 0.0015 | 0.00074 | SW846 6020A | 12/13/11 | 12/15/11 10:46 | LAM | C1 |
| Arsenic, Total | 0.0020 U | mg/L | | 0.0030 | 0.0020 | 0.0010 | SW846 6020A | 12/13/11 | 12/15/11 10:46 | LAM | C1 |
| Barium, Total | 0.033 | mg/L | | 0.0056 | 0.0037 | 0.0019 | SW846 6020A | 12/13/11 | 12/15/11 10:46 | LAM | C1 |
| Beryllium, Total | 0.00070 U | mg/L | | 0.0010 | 0.00070 | 0.00030 | SW846 6020A | 12/13/11 | 12/15/11 10:46 | LAM | C1 |
| Cadmium, Total | 0.00070 U | mg/L | | 0.0011 | 0.00070 | 0.00037 | SW846 6020A | 12/13/11 | 12/15/11 10:46 | LAM | C1 |
| Calcium, Total | 52.0 | mg/L | | 0.11 | 0.073 | 0.037 | SW846 6020A | 12/13/11 | 12/15/11 10:46 | LAM | C1 |
| Chromium, Total | 0.0015 U | mg/L | | 0.0022 | 0.0015 | 0.00074 | SW846 6020A | 12/13/11 | 12/15/11 10:46 | LAM | C1 |
| Cobalt, Total | 0.0037 U | mg/L | | 0.0056 | 0.0037 | 0.0019 | SW846 6020A | 12/13/11 | 12/15/11 10:46 | LAM | C1 |
| Copper, Total | 0.0030J | mg/L | | 0.0056 | 0.0037 | 0.0019 | SW846 6020A | 12/13/11 | 12/15/11 10:46 | LAM | C1 |
| Iron, Total | 0.46 | mg/L | | 0.056 | 0.037 | 0.019 | SW846 6020A | 12/13/11 | 12/15/11 10:46 | LAM | C1 |
| Lead, Total | 0.0015 U | mg/L | | 0.0022 | 0.0015 | 0.00074 | SW846 6020A | 12/13/11 | 12/15/11 10:46 | LAM | C1 |
| Magnesium, Total | 9.1 | mg/L | | 0.11 | 0.073 | 0.037 | SW846 6020A | 12/13/11 | 12/15/11 10:46 | LAM | C1 |
| Manganese, Total | 0.030 | mg/L | | 0.0056 | 0.0037 | 0.0019 | SW846 6020A | 12/13/11 | 12/15/11 10:46 | LAM | C1 |
| Mercury, Total | 0.00013 U | mg/L | | 0.00022 | 0.00013 | 0.000074 | SW846 6020A | 12/13/11 | 12/15/11 10:46 | LAM | C1 |
| Nickel, Total | 0.0037 U | mg/L | | 0.0056 | 0.0037 | 0.0019 | SW846 6020A | 12/13/11 | 12/15/11 10:46 | LAM | C1 |
| Potassium, Total | 2.1 | mg/L | | 0.11 | 0.073 | 0.037 | SW846 6020A | 12/13/11 | 12/15/11 10:46 | LAM | C1 |
| Selenium, Total | 0.0037 U | mg/L | | 0.0056 | 0.0037 | 0.0019 | SW846 6020A | 12/13/11 | 12/15/11 10:46 | LAM | C1 |
| Silver, Total | 0.0015 U | mg/L | | 0.0022 | 0.0015 | 0.00074 | SW846 6020A | 12/13/11 | 12/15/11 10:46 | LAM | C1 |
| Sodium, Total | 3.7 | mg/L | | 0.11 | 0.073 | 0.037 | SW846 6020A | 12/13/11 | 12/15/11 10:46 | LAM | C1 |
| Thallium, Total | 0.00070 U | mg/L | | 0.0010 | 0.00070 | 0.00030 | SW846 6020A | 12/13/11 | 12/15/11 10:46 | LAM | C1 |

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State Certifications: CT PH-0224 , DE ID 11 , GA 914 , MA PA0102 , MD 128 , LA 04162 , VA 421 , WY EPA Region 8 , WV 343

## ANALYTICAL RESULTS

NW 1/28/12

Workorder 9941932 EMS020|Marsh Run/633003

Lab ID: 9941932005 Date Collected: 12/9/2011 13:38 Matrix: Ground Water

Sample ID: SW-5 Date Received: 12/9/2011 18:30

| Parameters | Results | Units | Footnote | LOQ | LOD | DL | Method | Prepared | Analyzed | By | Cntr |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Vanadium, Total | 0.0012J | mg/L | | 0.0022 | 0.0015 | 0.00074 | SW846 6020A | 12/13/11 | 12/15/11 10:46 | LAM | C1 |
| Zinc, Total | 0.0094 | mg/L | | 0.0056 | 0.0037 | 0.0019 | SW846 6020A | 12/13/11 | 12/15/11 10:46 | LAM | C1 |

***Sample Comments:***

Anna G Milliken
Technical Manager

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## ANALYTICAL RESULTS

MW 1/28/12

Workorder 9941932 EMS020|Marsh Run/633003

Lab ID: 9941932006 Date Collected: 12/9/2011 00:00 Matrix: Solid

Sample ID: DUP-1 Date Received: 12/9/2011 18:30

| Parameters | Results | Units | Footnote | LOQ | LOD | DL | Method | Prepared | Analyzed | By | Cntr |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **SEMIVOLATILES** | | | | | | | | | | | |
| Acenaphthene | 77.5J | ug/kg | | 456 | 55.8 | 33.8 | SW846 8270D | 12/20/11 | 12/21/11 20:20 | SAS | A |
| Acenaphthylene | 115J | ug/kg | | 456 | 55.8 | 18.6 | SW846 8270D | 12/20/11 | 12/21/11 20:20 | SAS | A |
| Anthracene | 222J | ug/kg | | 456 | 55.8 | 20.3 | SW846 8270D | 12/20/11 | 12/21/11 20:20 | SAS | A |
| Benzo(a)anthracene | 931 | ug/kg | | 456 | 55.8 | 30.4 | SW846 8270D | 12/20/11 | 12/21/11 20:20 | SAS | A |
| Benzo(a)pyrene | 996 J | ug/kg | | 456 | 55.8 | 13.5 | SW846 8270D | 12/20/11 | 12/21/11 20:20 | SAS | A |
| Benzo(b)fluoranthene | 1720 J | ug/kg | | 456 | 55.8 | 23.7 | SW846 8270D | 12/20/11 | 12/21/11 20:20 | SAS | A |
| Benzo(g,h,i)perylene | 355 J | ug/kg | | 456 | 55.8 | 13.5 | SW846 8270D | 12/20/11 | 12/21/11 20:20 | SAS | A |
| Benzo(k)fluoranthene | 673 J | ug/kg | | 456 | 55.8 | 22.0 | SW846 8270D | 12/20/11 | 12/21/11 20:20 | SAS | A |
| 4-Bromophenyl-phenylether | 55.8U | ug/kg | | 456 | 55.8 | 30.4 | SW846 8270D | 12/20/11 | 12/21/11 20:20 | SAS | A |
| Butylbenzylphthalate | 55.8U | ug/kg | | 456 | 55.8 | 15.2 | SW846 8270D | 12/20/11 | 12/21/11 20:20 | SAS | A |
| Carbazole | 131J | ug/kg | | 456 | 55.8 | 20.3 | SW846 8270D | 12/20/11 | 12/21/11 20:20 | SAS | A |
| 4-Chloro-3-methylphenol | 55.8U | ug/kg | | 456 | 55.8 | 35.5 | SW846 8270D | 12/20/11 | 12/21/11 20:20 | SAS | A |
| 4-Chloroaniline | 282U | ug/kg | | 456 | 282 | 142 | SW846 8270D | 12/20/11 | 12/21/11 20:20 | SAS | A |
| bis(2-Chloroethoxy)methane | 55.8U | ug/kg | | 456 | 55.8 | 18.6 | SW846 8270D | 12/20/11 | 12/21/11 20:20 | SAS | A |
| bis(2-Chloroethyl)ether | 55.8U | ug/kg | | 456 | 55.8 | 45.6 | SW846 8270D | 12/20/11 | 12/21/11 20:20 | SAS | A |
| bis(2-Chloroisopropyl)ether | 55.8U | ug/kg | | 456 | 55.8 | 22.0 | SW846 8270D | 12/20/11 | 12/21/11 20:20 | SAS | A |
| 2-Chloronaphthalene | 55.8U | ug/kg | | 456 | 55.8 | 22.0 | SW846 8270D | 12/20/11 | 12/21/11 20:20 | SAS | A |
| 2-Chlorophenol | 55.8U | ug/kg | | 456 | 55.8 | 38.9 | SW846 8270D | 12/20/11 | 12/21/11 20:20 | SAS | A |
| 4-Chlorophenyl-phenylether | 55.8U | ug/kg | | 456 | 55.8 | 23.7 | SW846 8270D | 12/20/11 | 12/21/11 20:20 | SAS | A |
| Chrysene | 1070 | ug/kg | | 456 | 55.8 | 15.2 | SW846 8270D | 12/20/11 | 12/21/11 20:20 | SAS | A |
| mp-Cresol | 469 | ug/kg | | 456 | 55.8 | 22.0 | SW846 8270D | 12/20/11 | 12/21/11 20:20 | SAS | A |
| o-Cresol | 55.8U | ug/kg | | 456 | 55.8 | 45.6 | SW846 8270D | 12/20/11 | 12/21/11 20:20 | SAS | A |
| Di-n-Butylphthalate | 55.8U | ug/kg | | 456 | 55.8 | 18.6 | SW846 8270D | 12/20/11 | 12/21/11 20:20 | SAS | A |
| Di-n-Octylphthalate | 55.8U | ug/kg | | 456 | 55.8 | 13.5 | SW846 8270D | 12/20/11 | 12/21/11 20:20 | SAS | A |
| Dibenzo(a,h)anthracene | 112 J | ug/kg | | 456 | 55.8 | 47.3 | SW846 8270D | 12/20/11 | 12/21/11 20:20 | SAS | A |
| Dibenzofuran | 61.1J | ug/kg | | 456 | 55.8 | 25.3 | SW846 8270D | 12/20/11 | 12/21/11 20:20 | SAS | A |
| 1,2-Dichlorobenzene | 55.8U | ug/kg | | 456 | 55.8 | 33.8 | SW846 8270D | 12/20/11 | 12/21/11 20:20 | SAS | A |
| 1,3-Dichlorobenzene | 55.8U | ug/kg | | 456 | 55.8 | 25.3 | SW846 8270D | 12/20/11 | 12/21/11 20:20 | SAS | A |
| 1,4-Dichlorobenzene | 55.8U | ug/kg | | 456 | 55.8 | 16.9 | SW846 8270D | 12/20/11 | 12/21/11 20:20 | SAS | A |
| 3,3-Dichlorobenzidine | 169U | ug/kg | | 912 | 169 | 98.3 | SW846 8270D | 12/20/11 | 12/21/11 20:20 | SAS | A |
| 2,4-Dichlorophenol | 55.8U | ug/kg | | 456 | 55.8 | 28.7 | SW846 8270D | 12/20/11 | 12/21/11 20:20 | SAS | A |
| Diethylphthalate | 55.8U | ug/kg | | 456 | 55.8 | 14.0 | SW846 8270D | 12/20/11 | 12/21/11 20:20 | SAS | A |
| 2,4-Dimethylphenol | 169U | ug/kg | | 456 | 169 | 86.2 | SW846 8270D | 12/20/11 | 12/21/11 20:20 | SAS | A |
| Dimethylphthalate | 55.8U | ug/kg | | 456 | 55.8 | 27.0 | SW846 8270D | 12/20/11 | 12/21/11 20:20 | SAS | A |
| 2,4-Dinitrophenol | 282U | ug/kg | | 912 | 282 | 161 | SW846 8270D | 12/20/11 | 12/21/11 20:20 | SAS | A |
| 2,4-Dinitrotoluene | 55.8U | ug/kg | | 456 | 55.8 | 18.6 | SW846 8270D | 12/20/11 | 12/21/11 20:20 | SAS | A |
| 2,6-Dinitrotoluene | 169U | ug/kg | | 456 | 169 | 20.3 | SW846 8270D | 12/20/11 | 12/21/11 20:20 | SAS | A |
| bis(2-Ethylhexyl)phthalate | 264J | ug/kg | | 456 | 55.8 | 23.7 | SW846 8270D | 12/20/11 | 12/21/11 20:20 | SAS | A |
| Fluoranthene | 1870 | ug/kg | | 456 | 55.8 | 18.6 | SW846 8270D | 12/20/11 | 12/21/11 20:20 | SAS | A |
| Fluorene | 96.9J | ug/kg | | 456 | 55.8 | 15.7 | SW846 8270D | 12/20/11 | 12/21/11 20:20 | SAS | A |
| Hexachlorobenzene | 55.8U | ug/kg | | 456 | 55.8 | 38.9 | SW846 8270D | 12/20/11 | 12/21/11 20:20 | SAS | A |

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State Certifications: CT PH-0224 , DE ID 11 , GA 914 , MA PA0102 , MD 128 , LA 04162 , VA 421 , WY EPA Region 8 , WV 343

## ANALYTICAL RESULTS

WW 1/28/12

Workorder 9941932 EMS020|Marsh Run/633003

Lab ID: 9941932006 Date Collected: 12/9/2011 00:00 Matrix: Solid

Sample ID: DUP-1 Date Received: 12/9/2011 18:30

| Parameters | Results | Units | Footnote | LOQ | LOD | DL | Method | Prepared | Analyzed | By | Cntr |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Hexachlorobutadiene | 55.8U | ug/kg | | 456 | 55.8 | 33.8 | SW846 8270D | 12/20/11 | 12/21/11 20:20 | SAS | A |
| Hexachlorocyclopentadiene | 169U | ug/kg | | 456 | 169 | 132 | SW846 8270D | 12/20/11 | 12/21/11 20:20 | SAS | A |
| Hexachloroethane | 55.8U | ug/kg | | 456 | 55.8 | 37.2 | SW846 8270D | 12/20/11 | 12/21/11 20:20 | SAS | A |
| Indeno(1,2,3-cd)pyrene | 361 J | ug/kg | | 456 | 55.8 | 13.5 | SW846 8270D | 12/20/11 | 12/21/11 20:20 | SAS | A |
| Isophorone | 55.8U | ug/kg | | 456 | 55.8 | 22.0 | SW846 8270D | 12/20/11 | 12/21/11 20:20 | SAS | A |
| 2-Methyl-4,6-dinitrophenol | 282U | ug/kg | | 456 | 282 | 145 | SW846 8270D | 12/20/11 | 12/21/11 20:20 | SAS | A |
| 2-Methylnaphthalene | 64.3J | ug/kg | | 456 | 55.8 | 14.4 | SW846 8270D | 12/20/11 | 12/21/11 20:20 | SAS | A |
| Naphthalene | 49.9J | ug/kg | | 456 | 55.8 | 30.4 | SW846 8270D | 12/20/11 | 12/21/11 20:20 | SAS | A |
| 2-Nitroaniline | 169U | ug/kg | | 456 | 169 | 106 | SW846 8270D | 12/20/11 | 12/21/11 20:20 | SAS | A |
| 3-Nitroaniline | 169U | ug/kg | | 456 | 169 | 99.7 | SW846 8270D | 12/20/11 | 12/21/11 20:20 | SAS | A |
| 4-Nitroaniline | 169U | ug/kg | | 456 | 169 | 135 | SW846 8270D | 12/20/11 | 12/21/11 20:20 | SAS | A |
| Nitrobenzene | 282U | ug/kg | | 456 | 282 | 86.2 | SW846 8270D | 12/20/11 | 12/21/11 20:20 | SAS | A |
| 2-Nitrophenol | 169U | ug/kg | | 456 | 169 | 47.3 | SW846 8270D | 12/20/11 | 12/21/11 20:20 | SAS | A |
| 4-Nitrophenol | 282U | ug/kg | | 456 | 282 | 135 | SW846 8270D | 12/20/11 | 12/21/11 20:20 | SAS | A |
| N-Nitroso-di-n-propylamine | 55.8U | ug/kg | | 456 | 55.8 | 47.3 | SW846 8270D | 12/20/11 | 12/21/11 20:20 | SAS | A |
| N-Nitrosodiphenylamine | 55.8U | ug/kg | | 456 | 55.8 | 20.3 | SW846 8270D | 12/20/11 | 12/21/11 20:20 | SAS | A |
| Pentachlorophenol | 169U | ug/kg | | 912 | 169 | 108 | SW846 8270D | 12/20/11 | 12/21/11 20:20 | SAS | A |
| Phenanthrene | 890 | ug/kg | | 456 | 55.8 | 22.0 | SW846 8270D | 12/20/11 | 12/21/11 20:20 | SAS | A |
| Phenol | 169U | ug/kg | | 456 | 169 | 69.3 | SW846 8270D | 12/20/11 | 12/21/11 20:20 | SAS | A |
| Pyrene | 1650 | ug/kg | | 456 | 55.8 | 16.9 | SW846 8270D | 12/20/11 | 12/21/11 20:20 | SAS | A |
| 1,2,4-Trichlorobenzene | 55.8U | ug/kg | | 456 | 55.8 | 15.5 | SW846 8270D | 12/20/11 | 12/21/11 20:20 | SAS | A |
| 2,4,5-Trichlorophenol | 169U | ug/kg | | 456 | 169 | 101 | SW846 8270D | 12/20/11 | 12/21/11 20:20 | SAS | A |
| 2,4,6-Trichlorophenol | 169U | ug/kg | | 456 | 169 | 52.4 | SW846 8270D | 12/20/11 | 12/21/11 20:20 | SAS | A |
| *Surrogate Recoveries* | *Results* | *Units* | *Footnote* | *Limits* | | | *Method* | *Prepared* | *Analyzed* | *By* | *Cntr* |
| 2,4,6-Tribromophenol (S) | 98.3 | % | | 35-125 | | | SW846 8270D | 12/20/11 | 12/21/11 20:20 | SAS | A |
| 2-Fluorobiphenyl (S) | 78.5 | % | | 45-105 | | | SW846 8270D | 12/20/11 | 12/21/11 20:20 | SAS | A |
| Nitrobenzene-d5 (S) | 69.2 | % | | 35-100 | | | SW846 8270D | 12/20/11 | 12/21/11 20:20 | SAS | A |
| Phenol-d5 (S) | 73.6 | % | | 40-100 | | | SW846 8270D | 12/20/11 | 12/21/11 20:20 | SAS | A |
| Terphenyl-d14 (S) | 96.2 | % | | 30-125 | | | SW846 8270D | 12/20/11 | 12/21/11 20:20 | SAS | A |
| **WET CHEMISTRY** | | | | | | | | | | | |
| Moisture | 42.2 | % | | 0.1 | 0.1 | 0.01 | SM20-2540 G | | 12/10/11 15:55 | KAK | A |
| Total Solids | 57.8 | % | | 0.1 | 0.1 | 0.01 | SM20-2540 G | | 12/10/11 15:55 | KAK | A |
| **METALS** | | | | | | | | | | | |
| Aluminum, Total | 26200 | mg/kg | | 15.4 | 10.3 | 5.1 | SW846 6010C | 12/15/11 | 12/19/11 14:19 | SRT | A2 |
| Antimony, Total | 2.1U | mg/kg | | 3.1 | 2.1 | 1.0 | SW846 6010C | 12/15/11 | 12/19/11 14:19 | SRT | A2 |
| Arsenic, Total | 10.2 | mg/kg | | 3.1 | 2.1 | 1.0 | SW846 6010C | 12/15/11 | 12/19/11 14:19 | SRT | A2 |
| Barium, Total | 122 K | mg/kg | | 1.5 | 1.0 | 0.51 | SW846 6010C | 12/15/11 | 12/19/11 14:19 | SRT | A2 |
| Beryllium, Total | 0.91J | mg/kg | | 1.5 | 1.0 | 0.51 | SW846 6010C | 12/15/11 | 12/19/11 14:19 | SRT | A2 |
| Cadmium, Total | 2.4 | mg/kg | | 0.77 | 0.51 | 0.26 | SW846 6010C | 12/15/11 | 12/19/11 14:19 | SRT | A2 |

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## ANALYTICAL RESULTS

NW 1/28/12

Workorder 9941932 EMS020|Marsh Run/633003

Lab ID: 9941932006 Date Collected: 12/9/2011 00:00 Matrix: Solid

Sample ID: DUP-1 Date Received: 12/9/2011 18:30

| Parameters | Results | Units | Footnote | LOQ | LOD | DL | Method | Prepared | Analyzed | By | Cntr |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Calcium, Total | 3190 | mg/kg | | 15.4 | 10.3 | 5.1 | SW846 6010C | 12/15/11 | 12/19/11 14:19 | SRT | A2 |
| Chromium, Total | 34.4 | mg/kg | | 1.5 | 1.0 | 0.51 | SW846 6010C | 12/15/11 | 12/19/11 14:19 | SRT | A2 |
| Cobalt, Total | 10.5 | mg/kg | | 1.5 | 1.0 | 0.51 | SW846 6010C | 12/15/11 | 12/19/11 14:19 | SRT | A2 |
| Copper, Total | 24.7 | mg/kg | | 3.1 | 2.1 | 1.0 | SW846 6010C | 12/15/11 | 12/19/11 14:19 | SRT | A2 |
| Iron, Total | 26400 | mg/kg | | 15.4 | 10.3 | 5.1 | SW846 6010C | 12/15/11 | 12/19/11 14:19 | SRT | A2 |
| Lead, Total | 64.6 | mg/kg | | 3.1 | 2.1 | 1.0 | SW846 6010C | 12/15/11 | 12/19/11 14:19 | SRT | A2 |
| Magnesium, Total | 3770 K | mg/kg | | 15.4 | 10.3 | 5.1 | SW846 6010C | 12/15/11 | 12/19/11 14:19 | SRT | A2 |
| Manganese, Total | 899 | mg/kg | | 1.5 | 1.0 | 0.51 | SW846 6010C | 12/15/11 | 12/19/11 14:19 | SRT | A2 |
| Mercury, Total | 0.20U | mg/kg | | 0.31 | 0.20 | 0.10 | SW846 7471B | 12/15/11 | 12/15/11 10:14 | MNP | A1 |
| Nickel, Total | 22.4 | mg/kg | | 3.1 | 2.1 | 1.0 | SW846 6010C | 12/15/11 | 12/19/11 14:19 | SRT | A2 |
| Potassium, Total | 4900 K | mg/kg | | 77.2 | 51.4 | 25.6 | SW846 6010C | 12/15/11 | 12/19/11 14:19 | SRT | A2 |
| Selenium, Total | 5.1U | mg/kg | | 7.7 | 5.1 | 2.6 | SW846 6010C | 12/15/11 | 12/19/11 14:19 | SRT | A2 |
| Silver, Total | 0.51U UL | mg/kg | | 0.77 | 0.51 | 0.26 | SW846 6010C | 12/15/11 | 12/19/11 14:19 | SRT | A2 |
| Sodium, Total | 172 | mg/kg | | 77.2 | 51.4 | 25.6 | SW846 6010C | 12/15/11 | 12/19/11 14:19 | SRT | A2 |
| Thallium, Total | 3.1U | mg/kg | | 4.6 | 3.1 | 1.5 | SW846 6010C | 12/15/11 | 12/19/11 14:19 | SRT | A2 |
| Vanadium, Total | 45.1 K | mg/kg | | 1.5 | 1.0 | 0.51 | SW846 6010C | 12/15/11 | 12/19/11 14:19 | SRT | A2 |
| Zinc, Total | 211 | mg/kg | | 3.1 | 2.1 | 1.0 | SW846 6010C | 12/15/11 | 12/19/11 14:19 | SRT | A2 |

***Sample Comments:***

Anna G Milliken
Technical Manager

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State Certifications: CT PH-0224 , DE ID 11 , GA 914 , MA PA0102 , MD 128 , LA 04162 , VA 421 , WY EPA Region 8 , WV 343

## ANALYTICAL RESULTS

NW 1/28/12

Workorder 9941932 EMS020|Marsh Run/633003

Lab ID: 9941932007 Date Collected: 12/9/2011 00:00 Matrix: Ground Water

Sample ID: DUP-2 Date Received: 12/9/2011 18:30

| Parameters | Results | Units | Footnote | LOQ | LOD | DL | Method | Prepared | Analyzed | By | Cntr |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **SEMIVOLATILES** | | | | | | | | | | | |
| Acenaphthene | 0.94U | ug/L | | 1.9 | 0.94 | 0.48 | SW846 8270D | 12/16/11 | 12/20/11 23:19 | CGS | A1 |
| Acenaphthylene | 0.94U | ug/L | | 1.9 | 0.94 | 0.32 | SW846 8270D | 12/16/11 | 12/20/11 23:19 | CGS | A1 |
| Anthracene | 0.94U | ug/L | | 1.9 | 0.94 | 0.42 | SW846 8270D | 12/16/11 | 12/20/11 23:19 | CGS | A1 |
| Benzo(a)anthracene | 0.94U | ug/L | | 1.9 | 0.94 | 0.29 | SW846 8270D | 12/16/11 | 12/20/11 23:19 | CGS | A1 |
| Benzo(a)pyrene | 0.94U | ug/L | | 1.9 | 0.94 | 0.31 | SW846 8270D | 12/16/11 | 12/20/11 23:19 | CGS | A1 |
| Benzo(b)fluoranthene | 0.94U | ug/L | | 1.9 | 0.94 | 0.32 | SW846 8270D | 12/16/11 | 12/20/11 23:19 | CGS | A1 |
| Benzo(g,h,i)perylene | 0.94U | ug/L | | 1.9 | 0.94 | 0.41 | SW846 8270D | 12/16/11 | 12/20/11 23:19 | CGS | A1 |
| Benzo(k)fluoranthene | 0.94U | ug/L | | 1.9 | 0.94 | 0.36 | SW846 8270D | 12/16/11 | 12/20/11 23:19 | CGS | A1 |
| 4-Bromophenyl-phenylether | 0.94U | ug/L | | 7.5 | 0.94 | 0.37 | SW846 8270D | 12/16/11 | 12/20/11 23:19 | CGS | A1 |
| Butylbenzylphthalate | 0.94U | ug/L | | 7.5 | 0.94 | 0.38 | SW846 8270D | 12/16/11 | 12/20/11 23:19 | CGS | A1 |
| Carbazole | 0.94U | ug/L | | 7.5 | 0.94 | 0.24 | SW846 8270D | 12/16/11 | 12/20/11 23:19 | CGS | A1 |
| 4-Chloro-3-methylphenol | 0.94U | ug/L | | 7.5 | 0.94 | 0.89 | SW846 8270D | 12/16/11 | 12/20/11 23:19 | CGS | A1 |
| 4-Chloroaniline | 0.94U | ug/L | | 7.5 | 0.94 | 0.85 | SW846 8270D | 12/16/11 | 12/20/11 23:19 | CGS | A1 |
| bis(2-Chloroethoxy)methane | 0.94U | ug/L | | 7.5 | 0.94 | 0.75 | SW846 8270D | 12/16/11 | 12/20/11 23:19 | CGS | A1 |
| bis(2-Chloroethyl)ether | 0.94U | ug/L | | 7.5 | 0.94 | 0.47 | SW846 8270D | 12/16/11 | 12/20/11 23:19 | CGS | A1 |
| bis(2-Chloroisopropyl)ether | 0.94U | ug/L | | 7.5 | 0.94 | 0.58 | SW846 8270D | 12/16/11 | 12/20/11 23:19 | CGS | A1 |
| 2-Chloronaphthalene | 0.94U | ug/L | | 7.5 | 0.94 | 0.37 | SW846 8270D | 12/16/11 | 12/20/11 23:19 | CGS | A1 |
| 2-Chlorophenol | 1.9U | ug/L | | 7.5 | 1.9 | 0.79 | SW846 8270D | 12/16/11 | 12/20/11 23:19 | CGS | A1 |
| 4-Chlorophenyl-phenylether | 0.94U | ug/L | | 7.5 | 0.94 | 0.51 | SW846 8270D | 12/16/11 | 12/20/11 23:19 | CGS | A1 |
| Chrysene | 0.94U | ug/L | | 1.9 | 0.94 | 0.24 | SW846 8270D | 12/16/11 | 12/20/11 23:19 | CGS | A1 |
| mp-Cresol | 0.94U | ug/L | | 7.5 | 0.94 | 0.48 | SW846 8270D | 12/16/11 | 12/20/11 23:19 | CGS | A1 |
| o-Cresol | 0.94U | ug/L | | 7.5 | 0.94 | 0.46 | SW846 8270D | 12/16/11 | 12/20/11 23:19 | CGS | A1 |
| Di-n-Butylphthalate | 0.94U | ug/L | | 7.5 | 0.94 | 0.31 | SW846 8270D | 12/16/11 | 12/20/11 23:19 | CGS | A1 |
| Di-n-Octylphthalate | 0.94U | ug/L | | 7.5 | 0.94 | 0.24 | SW846 8270D | 12/16/11 | 12/20/11 23:19 | CGS | A1 |
| Dibenzo(a,h)anthracene | 0.94U | ug/L | | 1.9 | 0.94 | 0.89 | SW846 8270D | 12/16/11 | 12/20/11 23:19 | CGS | A1 |
| Dibenzofuran | 0.94U | ug/L | | 7.5 | 0.94 | 0.69 | SW846 8270D | 12/16/11 | 12/20/11 23:19 | CGS | A1 |
| 1,2-Dichlorobenzene | 0.94U | ug/L | | 7.5 | 0.94 | 0.35 | SW846 8270D | 12/16/11 | 12/20/11 23:19 | CGS | A1 |
| 1,3-Dichlorobenzene | 0.94U | ug/L | | 7.5 | 0.94 | 0.44 | SW846 8270D | 12/16/11 | 12/20/11 23:19 | CGS | A1 |
| 1,4-Dichlorobenzene | 0.94U | ug/L | | 7.5 | 0.94 | 0.59 | SW846 8270D | 12/16/11 | 12/20/11 23:19 | CGS | A1 |
| 3,3-Dichlorobenzidine | 2.8U | ug/L | | 15.1 | 2.8 | 1.5 | SW846 8270D | 12/16/11 | 12/20/11 23:19 | CGS | A1 |
| 2,4-Dichlorophenol | 0.94U | ug/L | | 7.5 | 0.94 | 0.58 | SW846 8270D | 12/16/11 | 12/20/11 23:19 | CGS | A1 |
| Diethylphthalate | 0.94U | ug/L | | 7.5 | 0.94 | 0.31 | SW846 8270D | 12/16/11 | 12/20/11 23:19 | CGS | A1 |
| 2,4-Dimethylphenol | 2.8U | ug/L | | 7.5 | 2.8 | 2.0 | SW846 8270D | 12/16/11 | 12/20/11 23:19 | CGS | A1 |
| Dimethylphthalate | 0.94U | ug/L | | 7.5 | 0.94 | 0.51 | SW846 8270D | 12/16/11 | 12/20/11 23:19 | CGS | A1 |
| 2,4-Dinitrophenol | 7.5U | ug/L | | 15.1 | 7.5 | 3.4 | SW846 8270D | 12/16/11 | 12/20/11 23:19 | CGS | A1 |
| 2,4-Dinitrotoluene | 0.94U | ug/L | | 7.5 | 0.94 | 0.37 | SW846 8270D | 12/16/11 | 12/20/11 23:19 | CGS | A1 |
| 2,6-Dinitrotoluene | 0.94U | ug/L | | 7.5 | 0.94 | 0.33 | SW846 8270D | 12/16/11 | 12/20/11 23:19 | CGS | A1 |
| bis(2-Ethylhexyl)phthalate | 0.94U | ug/L | | 7.5 | 0.94 | 0.25 | SW846 8270D | 12/16/11 | 12/20/11 23:19 | CGS | A1 |
| Fluoranthene | 0.94U | ug/L | | 1.9 | 0.94 | 0.33 | SW846 8270D | 12/16/11 | 12/20/11 23:19 | CGS | A1 |
| Fluorene | 0.94U | ug/L | | 1.9 | 0.94 | 0.38 | SW846 8270D | 12/16/11 | 12/20/11 23:19 | CGS | A1 |
| Hexachlorobenzene | 0.94U | ug/L | | 7.5 | 0.94 | 0.51 | SW846 8270D | 12/16/11 | 12/20/11 23:19 | CGS | A1 |

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State Certifications: CT PH-0224 , DE ID 11 , GA 914 , MA PA0102 , MD 128 , LA 04162 , VA 421 , WY EPA Region 8 , WV 343

## ANALYTICAL RESULTS

NW 1/28/12

Workorder 9941932 EMS020|Marsh Run/633003

Lab ID: 9941932007 Date Collected: 12/9/2011 00:00 Matrix: Ground Water
Sample ID: DUP-2 Date Received: 12/9/2011 18:30

| Parameters | Results | Units | Footnote | LOQ | LOD | DL | Method | Prepared | Analyzed | By | Cntr |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Hexachlorobutadiene | 0.94U | ug/L | | 7.5 | 0.94 | 0.47 | SW846 8270D | 12/16/11 | 12/20/11 23:19 | CGS | A1 |
| Hexachlorocyclopentadiene | 0.94U UL | ug/L | 8 | 7.5 | 0.94 | 0.92 | SW846 8270D | 12/16/11 | 12/20/11 23:19 | CGS | A1 |
| Hexachloroethane | 0.94U | ug/L | | 7.5 | 0.94 | 0.82 | SW846 8270D | 12/16/11 | 12/20/11 23:19 | CGS | A1 |
| Indeno(1,2,3-cd)pyrene | 0.94U | ug/L | | 1.9 | 0.94 | 0.24 | SW846 8270D | 12/16/11 | 12/20/11 23:19 | CGS | A1 |
| Isophorone | 0.94U | ug/L | | 7.5 | 0.94 | 0.58 | SW846 8270D | 12/16/11 | 12/20/11 23:19 | CGS | A1 |
| 2-Methyl-4,6-dinitrophenol | 4.7U | ug/L | | 7.5 | 4.7 | 1.7 | SW846 8270D | 12/16/11 | 12/20/11 23:19 | CGS | A1 |
| 2-Methylnaphthalene | 0.94U | ug/L | | 1.9 | 0.94 | 0.90 | SW846 8270D | 12/16/11 | 12/20/11 23:19 | CGS | A1 |
| Naphthalene | 0.94U | ug/L | | 1.9 | 0.94 | 0.43 | SW846 8270D | 12/16/11 | 12/20/11 23:19 | CGS | A1 |
| 2-Nitroaniline | 0.94U | ug/L | | 7.5 | 0.94 | 0.33 | SW846 8270D | 12/16/11 | 12/20/11 23:19 | CGS | A1 |
| 3-Nitroaniline | 1.9U | ug/L | | 7.5 | 1.9 | 1.0 | SW846 8270D | 12/16/11 | 12/20/11 23:19 | CGS | A1 |
| 4-Nitroaniline | 0.94U | ug/L | | 7.5 | 0.94 | 0.42 | SW846 8270D | 12/16/11 | 12/20/11 23:19 | CGS | A1 |
| Nitrobenzene | 1.9U | ug/L | | 7.5 | 1.9 | 0.65 | SW846 8270D | 12/16/11 | 12/20/11 23:19 | CGS | A1 |
| 2-Nitrophenol | 1.9U | ug/L | | 7.5 | 1.9 | 1.3 | SW846 8270D | 12/16/11 | 12/20/11 23:19 | CGS | A1 |
| 4-Nitrophenol | 4.7U | ug/L | | 7.5 | 4.7 | 2.8 | SW846 8270D | 12/16/11 | 12/20/11 23:19 | CGS | A1 |
| N-Nitrosodimethylamine | 1.9U | ug/L | | 7.5 | 1.9 | 1.1 | SW846 8270D | 12/16/11 | 12/20/11 23:19 | CGS | A1 |
| N-Nitrosodiphenylamine | 0.94U | ug/L | | 7.5 | 0.94 | 0.78 | SW846 8270D | 12/16/11 | 12/20/11 23:19 | CGS | A1 |
| Pentachlorophenol | 7.5U | ug/L | | 15.1 | 7.5 | 2.5 | SW846 8270D | 12/16/11 | 12/20/11 23:19 | CGS | A1 |
| Phenanthrene | 0.94U | ug/L | | 1.9 | 0.94 | 0.31 | SW846 8270D | 12/16/11 | 12/20/11 23:19 | CGS | A1 |
| Phenol | 0.94U | ug/L | | 7.5 | 0.94 | 0.68 | SW846 8270D | 12/16/11 | 12/20/11 23:19 | CGS | A1 |
| Pyrene | 0.94U | ug/L | | 1.9 | 0.94 | 0.48 | SW846 8270D | 12/16/11 | 12/20/11 23:19 | CGS | A1 |
| 1,2,4-Trichlorobenzene | 0.94U | ug/L | | 7.5 | 0.94 | 0.60 | SW846 8270D | 12/16/11 | 12/20/11 23:19 | CGS | A1 |
| 2,4,5-Trichlorophenol | 2.8U | ug/L | | 7.5 | 2.8 | 1.6 | SW846 8270D | 12/16/11 | 12/20/11 23:19 | CGS | A1 |
| 2,4,6-Trichlorophenol | 0.94U | ug/L | | 7.5 | 0.94 | 0.52 | SW846 8270D | 12/16/11 | 12/20/11 23:19 | CGS | A1 |
| *Surrogate Recoveries* | *Results* | *Units* | *Footnote* | *Limits* | | | *Method* | *Prepared* | *Analyzed* | *By* | *Cntr* |
| 2,4,6-Tribromophenol (S) | 57.2 | % | | 40-125 | | | SW846 8270D | 12/16/11 | 12/20/11 23:19 | CGS | A1 |
| 2-Fluorobiphenyl (S) | 57.1 | % | | 50-110 | | | SW846 8270D | 12/16/11 | 12/20/11 23:19 | CGS | A1 |
| 2-Fluorophenol (S) | 39 | % | | 20-110 | | | SW846 8270D | 12/16/11 | 12/20/11 23:19 | CGS | A1 |
| Nitrobenzene-d5 (S) | 63.8 | % | | 40-110 | | | SW846 8270D | 12/16/11 | 12/20/11 23:19 | CGS | A1 |
| Phenol-d5 (S) | 22.5 | % | | 10-115 | | | SW846 8270D | 12/16/11 | 12/20/11 23:19 | CGS | A1 |
| Terphenyl-d14 (S) | 80.7 | % | | 50-135 | | | SW846 8270D | 12/16/11 | 12/20/11 23:19 | CGS | A1 |
| **SEMIVOLATILE SIM** | | | | | | | | | | | |
| Acenaphthene | 0.038U | ug/L | | 0.047 | 0.038 | 0.014 | 8270 SIM | 12/16/11 | 12/18/11 18:18 | DHF | A2 |
| Acenaphthylene | 0.038U | ug/L | | 0.047 | 0.038 | 0.017 | 8270 SIM | 12/16/11 | 12/18/11 18:18 | DHF | A2 |
| Anthracene | 0.017J | ug/L | | 0.047 | 0.038 | 0.012 | 8270 SIM | 12/16/11 | 12/18/11 18:18 | DHF | A2 |
| Benzo(a)anthracene | 0.047 | ug/L | | 0.047 | 0.038 | 0.020 | 8270 SIM | 12/16/11 | 12/18/11 18:18 | DHF | A2 |
| Benzo(a)pyrene | 0.050 | ug/L | | 0.047 | 0.038 | 0.028 | 8270 SIM | 12/16/11 | 12/18/11 18:18 | DHF | A2 |
| Benzo(b)fluoranthene | 0.090 | ug/L | | 0.047 | 0.038 | 0.023 | 8270 SIM | 12/16/11 | 12/18/11 18:18 | DHF | A2 |
| Benzo(g,h,i)perylene | 0.032J | ug/L | | 0.047 | 0.038 | 0.015 | 8270 SIM | 12/16/11 | 12/18/11 18:18 | DHF | A2 |
| Benzo(k)fluoranthene | 0.034J | ug/L | | 0.047 | 0.038 | 0.021 | 8270 SIM | 12/16/11 | 12/18/11 18:18 | DHF | A2 |
| Chrysene | 0.053 | ug/L | | 0.047 | 0.038 | 0.020 | 8270 SIM | 12/16/11 | 12/18/11 18:18 | DHF | A2 |

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NELAP Certifications: NJ PA010 , NY 11759 , PA 22-293 DoD ELAP: A2LA 0818.01
State Certifications: CT PH-0224 , DE ID 11 , GA 914 , MA PA0102 , MD 128 , LA 04162 , VA 421 , WY EPA Region 8 , WV 343

## ANALYTICAL RESULTS

MW 1/28/12

Workorder 9941932 EMS020|Marsh Run/633003

Lab ID: 9941932007 Date Collected: 12/9/2011 00:00 Matrix: Ground Water

Sample ID: DUP-2 Date Received: 12/9/2011 18:30

| Parameters | Results | Units | Footnote | LOQ | LOD | DL | Method | Prepared | Analyzed | By | Cntr |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Dibenzo(a,h)anthracene | 0.038U | ug/L | | 0.047 | 0.038 | 0.014 | 8270 SIM | 12/16/11 | 12/18/11 18:18 | DHF | A2 |
| Fluoranthene | 0.11 | ug/L | | 0.047 | 0.038 | 0.020 | 8270 SIM | 12/16/11 | 12/18/11 18:18 | DHF | A2 |
| Fluorene | 0.038U | ug/L | | 0.047 | 0.038 | 0.014 | 8270 SIM | 12/16/11 | 12/18/11 18:18 | DHF | A2 |
| Indeno(1,2,3-cd)pyrene | 0.028J | ug/L | | 0.047 | 0.038 | 0.014 | 8270 SIM | 12/16/11 | 12/18/11 18:18 | DHF | A2 |
| Naphthalene | 0.087 | ug/L | | 0.047 | 0.047 | 0.039 | 8270 SIM | 12/16/11 | 12/18/11 18:18 | DHF | A2 |
| Phenanthrene | 0.050 | ug/L | | 0.047 | 0.038 | 0.026 | 8270 SIM | 12/16/11 | 12/18/11 18:18 | DHF | A2 |
| Pyrene | 0.095 | ug/L | | 0.047 | 0.038 | 0.018 | 8270 SIM | 12/16/11 | 12/18/11 18:18 | DHF | A2 |
| *Surrogate Recoveries* | *Results* | *Units* | *Footnote* | *Limits* | | | *Method* | *Prepared* | *Analyzed* | *By* | *Cntr* |
| 2-Methylnapthalene-d10 (S) | 61 | % | | 29-112 | | | 8270 SIM | 12/16/11 | 12/18/11 18:18 | DHF | A2 |
| Fluoranthene-d10 (S) | 69.7 | % | | 45-130 | | | 8270 SIM | 12/16/11 | 12/18/11 18:18 | DHF | A2 |
| **METALS** | | | | | | | | | | | |
| Aluminum, Total | 0.23 J | mg/L | | 0.089 | 0.059 | 0.030 | SW846 6020A | 12/13/11 | 12/15/11 10:49 | LAM | C1 |
| Antimony, Total | 0.0015 U | mg/L | | 0.0022 | 0.0015 | 0.00074 | SW846 6020A | 12/13/11 | 12/15/11 10:49 | LAM | C1 |
| Arsenic, Total | 0.0015J | mg/L | | 0.0030 | 0.0020 | 0.0010 | SW846 6020A | 12/13/11 | 12/15/11 10:49 | LAM | C1 |
| Barium, Total | 0.041 | mg/L | | 0.0056 | 0.0037 | 0.0019 | SW846 6020A | 12/13/11 | 12/15/11 10:49 | LAM | C1 |
| Beryllium, Total | 0.00070 U | mg/L | | 0.0010 | 0.00070 | 0.00030 | SW846 6020A | 12/13/11 | 12/15/11 10:49 | LAM | C1 |
| Cadmium, Total | 0.00047 J | mg/L | | 0.0011 | 0.00070 | 0.00037 | SW846 6020A | 12/13/11 | 12/15/11 10:49 | LAM | C1 |
| Calcium, Total | 56.0 | mg/L | | 0.11 | 0.073 | 0.037 | SW846 6020A | 12/13/11 | 12/15/11 10:49 | LAM | C1 |
| Chromium, Total | 0.0015 U | mg/L | | 0.0022 | 0.0015 | 0.00074 | SW846 6020A | 12/13/11 | 12/15/11 10:49 | LAM | C1 |
| Cobalt, Total | 0.0037 U | mg/L | | 0.0056 | 0.0037 | 0.0019 | SW846 6020A | 12/13/11 | 12/15/11 10:49 | LAM | C1 |
| Copper, Total | 0.0038J J | mg/L | | 0.0056 | 0.0037 | 0.0019 | SW846 6020A | 12/13/11 | 12/15/11 10:49 | LAM | C1 |
| Iron, Total | 3.4 | mg/L | | 0.056 | 0.037 | 0.019 | SW846 6020A | 12/13/11 | 12/15/11 10:49 | LAM | C1 |
| Lead, Total | 0.0019J | mg/L | | 0.0022 | 0.0015 | 0.00074 | SW846 6020A | 12/13/11 | 12/15/11 10:49 | LAM | C1 |
| Magnesium, Total | 11.2 | mg/L | | 0.11 | 0.073 | 0.037 | SW846 6020A | 12/13/11 | 12/15/11 10:49 | LAM | C1 |
| Manganese, Total | 1.2 | mg/L | | 0.0056 | 0.0037 | 0.0019 | SW846 6020A | 12/13/11 | 12/15/11 10:49 | LAM | C1 |
| Mercury, Total | 0.00013 U | mg/L | | 0.00022 | 0.00013 | 0.000074 | SW846 6020A | 12/13/11 | 12/15/11 10:49 | LAM | C1 |
| Nickel, Total | 0.0037 U | mg/L | | 0.0056 | 0.0037 | 0.0019 | SW846 6020A | 12/13/11 | 12/15/11 10:49 | LAM | C1 |
| Potassium, Total | 2.7 | mg/L | | 0.11 | 0.073 | 0.037 | SW846 6020A | 12/13/11 | 12/15/11 10:49 | LAM | C1 |
| Selenium, Total | 0.0037 U | mg/L | | 0.0056 | 0.0037 | 0.0019 | SW846 6020A | 12/13/11 | 12/15/11 10:49 | LAM | C1 |
| Silver, Total | 0.0015 U | mg/L | | 0.0022 | 0.0015 | 0.00074 | SW846 6020A | 12/13/11 | 12/15/11 10:49 | LAM | C1 |
| Sodium, Total | 6.8 | mg/L | | 0.11 | 0.073 | 0.037 | SW846 6020A | 12/13/11 | 12/15/11 10:49 | LAM | C1 |
| Thallium, Total | 0.00070 U | mg/L | | 0.0010 | 0.00070 | 0.00030 | SW846 6020A | 12/13/11 | 12/15/11 10:49 | LAM | C1 |
| Vanadium, Total | 0.0014J | mg/L | | 0.0022 | 0.0015 | 0.00074 | SW846 6020A | 12/13/11 | 12/15/11 10:49 | LAM | C1 |

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State Certifications: CT PH-0224 , DE ID 11 , GA 914 , MA PA0102 , MD 128 , LA 04162 , VA 421 , WY EPA Region 8 , WV 343

## ANALYTICAL RESULTS

NW 1/28/12

Workorder 9941932 EMS020|Marsh Run/633003

Lab ID: 9941932007 Date Collected: 12/9/2011 00:00 Matrix: Ground Water

Sample ID: DUP-2 Date Received: 12/9/2011 18:30

| Parameters | Results | Units | Footnote | LOQ | LOD | DL | Method | Prepared | Analyzed | By | Cntr |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Zinc, Total | 0.012 | mg/L | | 0.0056 | 0.0037 | 0.0019 | SW846 6020A | 12/13/11 | 12/15/11 10:49 | LAM | C1 |

***Sample Comments:***

Anna G Milliken
Technical Manager

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State Certifications: CT PH-0224 , DE ID 11 , GA 914 , MA PA0102 , MD 128 , LA 04162 , VA 421 , WY EPA Region 8 , WV 343

## ANALYTICAL RESULTS

NW 1/28/12

Workorder 9941932 EMS020|Marsh Run/633003

Lab ID: 9941932008 Date Collected: 12/9/2011 12:10 Matrix: Solid

Sample ID: SD-9 Date Received: 12/9/2011 18:30

| Parameters | Results | Units | Footnote | LOQ | LOD | DL | Method | Prepared | Analyzed | By | Cntr |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **SEMIVOLATILES** | | | | | | | | | | | |
| Acenaphthene | 67.0J | ug/kg | | 418 | 51.1 | 31.0 | SW846 8270D | 12/20/11 | 12/22/11 14:02 | DHF | A |
| Acenaphthylene | 102J | ug/kg | | 418 | 51.1 | 17.0 | SW846 8270D | 12/20/11 | 12/22/11 14:02 | DHF | A |
| Anthracene | 193J | ug/kg | | 418 | 51.1 | 18.6 | SW846 8270D | 12/20/11 | 12/22/11 14:02 | DHF | A |
| Benzo(a)anthracene | 965 | ug/kg | | 418 | 51.1 | 27.9 | SW846 8270D | 12/20/11 | 12/22/11 14:02 | DHF | A |
| Benzo(a)pyrene | 1080 | ug/kg | | 418 | 51.1 | 12.4 | SW846 8270D | 12/20/11 | 12/22/11 14:02 | DHF | A |
| Benzo(b)fluoranthene | 1680 | ug/kg | | 418 | 51.1 | 21.7 | SW846 8270D | 12/20/11 | 12/22/11 14:02 | DHF | A |
| Benzo(g,h,i)perylene | 728 | ug/kg | | 418 | 51.1 | 12.4 | SW846 8270D | 12/20/11 | 12/22/11 14:02 | DHF | A |
| Benzo(k)fluoranthene | 573 | ug/kg | | 418 | 51.1 | 20.1 | SW846 8270D | 12/20/11 | 12/22/11 14:02 | DHF | A |
| 4-Bromophenyl-phenylether | 51.1U | ug/kg | | 418 | 51.1 | 27.9 | SW846 8270D | 12/20/11 | 12/22/11 14:02 | DHF | A |
| Butylbenzylphthalate | 51.1U | ug/kg | | 418 | 51.1 | 13.9 | SW846 8270D | 12/20/11 | 12/22/11 14:02 | DHF | A |
| Carbazole | 122J | ug/kg | | 418 | 51.1 | 18.6 | SW846 8270D | 12/20/11 | 12/22/11 14:02 | DHF | A |
| 4-Chloro-3-methylphenol | 51.1U | ug/kg | | 418 | 51.1 | 32.5 | SW846 8270D | 12/20/11 | 12/22/11 14:02 | DHF | A |
| 4-Chloroaniline | 259U | ug/kg | | 418 | 259 | 130 | SW846 8270D | 12/20/11 | 12/22/11 14:02 | DHF | A |
| bis(2-Chloroethoxy)methane | 51.1U | ug/kg | | 418 | 51.1 | 17.0 | SW846 8270D | 12/20/11 | 12/22/11 14:02 | DHF | A |
| bis(2-Chloroethyl)ether | 51.1U | ug/kg | | 418 | 51.1 | 41.8 | SW846 8270D | 12/20/11 | 12/22/11 14:02 | DHF | A |
| bis(2-Chloroisopropyl)ether | 51.1U | ug/kg | | 418 | 51.1 | 20.1 | SW846 8270D | 12/20/11 | 12/22/11 14:02 | DHF | A |
| 2-Chloronaphthalene | 51.1U | ug/kg | | 418 | 51.1 | 20.1 | SW846 8270D | 12/20/11 | 12/22/11 14:02 | DHF | A |
| 2-Chlorophenol | 51.1U | ug/kg | | 418 | 51.1 | 35.6 | SW846 8270D | 12/20/11 | 12/22/11 14:02 | DHF | A |
| 4-Chlorophenyl-phenylether | 51.1U | ug/kg | | 418 | 51.1 | 21.7 | SW846 8270D | 12/20/11 | 12/22/11 14:02 | DHF | A |
| Chrysene | 1200 | ug/kg | | 418 | 51.1 | 13.9 | SW846 8270D | 12/20/11 | 12/22/11 14:02 | DHF | A |
| mp-Cresol | 904 | ug/kg | | 418 | 51.1 | 20.1 | SW846 8270D | 12/20/11 | 12/22/11 14:02 | DHF | A |
| o-Cresol | 51.1U | ug/kg | | 418 | 51.1 | 41.8 | SW846 8270D | 12/20/11 | 12/22/11 14:02 | DHF | A |
| Di-n-Butylphthalate | 51.1U | ug/kg | | 418 | 51.1 | 17.0 | SW846 8270D | 12/20/11 | 12/22/11 14:02 | DHF | A |
| Di-n-Octylphthalate | 51.1U | ug/kg | | 418 | 51.1 | 12.4 | SW846 8270D | 12/20/11 | 12/22/11 14:02 | DHF | A |
| Dibenzo(a,h)anthracene | 202J | ug/kg | | 418 | 51.1 | 43.3 | SW846 8270D | 12/20/11 | 12/22/11 14:02 | DHF | A |
| Dibenzofuran | 50.6J | ug/kg | | 418 | 51.1 | 23.2 | SW846 8270D | 12/20/11 | 12/22/11 14:02 | DHF | A |
| 1,2-Dichlorobenzene | 51.1U | ug/kg | | 418 | 51.1 | 31.0 | SW846 8270D | 12/20/11 | 12/22/11 14:02 | DHF | A |
| 1,3-Dichlorobenzene | 51.1U | ug/kg | | 418 | 51.1 | 23.2 | SW846 8270D | 12/20/11 | 12/22/11 14:02 | DHF | A |
| 1,4-Dichlorobenzene | 51.1U | ug/kg | | 418 | 51.1 | 15.5 | SW846 8270D | 12/20/11 | 12/22/11 14:02 | DHF | A |
| 3,3-Dichlorobenzidine | 155U | ug/kg | | 836 | 155 | 88.2 | SW846 8270D | 12/20/11 | 12/22/11 14:02 | DHF | A |
| 2,4-Dichlorophenol | 51.1U | ug/kg | | 418 | 51.1 | 26.3 | SW846 8270D | 12/20/11 | 12/22/11 14:02 | DHF | A |
| Diethylphthalate | 51.1U | ug/kg | | 418 | 51.1 | 12.8 | SW846 8270D | 12/20/11 | 12/22/11 14:02 | DHF | A |
| 2,4-Dimethylphenol | 155U | ug/kg | | 418 | 155 | 78.9 | SW846 8270D | 12/20/11 | 12/22/11 14:02 | DHF | A |
| Dimethylphthalate | 51.1U | ug/kg | | 418 | 51.1 | 24.8 | SW846 8270D | 12/20/11 | 12/22/11 14:02 | DHF | A |
| 2,4-Dinitrophenol | 259U | ug/kg | | 836 | 259 | 147 | SW846 8270D | 12/20/11 | 12/22/11 14:02 | DHF | A |
| 2,4-Dinitrotoluene | 51.1U | ug/kg | | 418 | 51.1 | 17.0 | SW846 8270D | 12/20/11 | 12/22/11 14:02 | DHF | A |
| 2,6-Dinitrotoluene | 155U | ug/kg | | 418 | 155 | 18.6 | SW846 8270D | 12/20/11 | 12/22/11 14:02 | DHF | A |
| bis(2-Ethylhexyl)phthalate | 160J | ug/kg | | 418 | 51.1 | 21.7 | SW846 8270D | 12/20/11 | 12/22/11 14:02 | DHF | A |
| Fluoranthene | 2020 | ug/kg | | 418 | 51.1 | 17.0 | SW846 8270D | 12/20/11 | 12/22/11 14:02 | DHF | A |
| Fluorene | 86.1J | ug/kg | | 418 | 51.1 | 14.4 | SW846 8270D | 12/20/11 | 12/22/11 14:02 | DHF | A |
| Hexachlorobenzene | 51.1U | ug/kg | | 418 | 51.1 | 35.6 | SW846 8270D | 12/20/11 | 12/22/11 14:02 | DHF | A |

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State Certifications: CT PH-0224 , DE ID 11 , GA 914 , MA PA0102 , MD 128 , LA 04162 , VA 421 , WY EPA Region 8 , WV 343

## ANALYTICAL RESULTS

NW 1/28/12

Workorder 9941932 EMS020|Marsh Run/633003

Lab ID: 9941932008 Date Collected: 12/9/2011 12:10 Matrix: Solid

Sample ID: SD-9 Date Received: 12/9/2011 18:30

| Parameters | Results | Units | Footnote | LOQ | LOD | DL | Method | Prepared | Analyzed | By | Cntr |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Hexachlorobutadiene | 51.1U | ug/kg | | 418 | 51.1 | 31.0 | SW846 8270D | 12/20/11 | 12/22/11 14:02 | DHF | A |
| Hexachlorocyclopentadiene | 155U | ug/kg | | 418 | 155 | 121 | SW846 8270D | 12/20/11 | 12/22/11 14:02 | DHF | A |
| Hexachloroethane | 51.1U | ug/kg | | 418 | 51.1 | 34.1 | SW846 8270D | 12/20/11 | 12/22/11 14:02 | DHF | A |
| Indeno(1,2,3-cd)pyrene | 644 | ug/kg | | 418 | 51.1 | 12.4 | SW846 8270D | 12/20/11 | 12/22/11 14:02 | DHF | A |
| Isophorone | 51.1U | ug/kg | | 418 | 51.1 | 20.1 | SW846 8270D | 12/20/11 | 12/22/11 14:02 | DHF | A |
| 2-Methyl-4,6-dinitrophenol | 259U | ug/kg | | 418 | 259 | 133 | SW846 8270D | 12/20/11 | 12/22/11 14:02 | DHF | A |
| 2-Methylnaphthalene | 63.4J | ug/kg | | 418 | 51.1 | 13.2 | SW846 8270D | 12/20/11 | 12/22/11 14:02 | DHF | A |
| Naphthalene | 43.5J | ug/kg | | 418 | 51.1 | 27.9 | SW846 8270D | 12/20/11 | 12/22/11 14:02 | DHF | A |
| 2-Nitroaniline | 155U | ug/kg | | 418 | 155 | 97.5 | SW846 8270D | 12/20/11 | 12/22/11 14:02 | DHF | A |
| 3-Nitroaniline | 155U | ug/kg | | 418 | 155 | 91.3 | SW846 8270D | 12/20/11 | 12/22/11 14:02 | DHF | A |
| 4-Nitroaniline | 155U | ug/kg | | 418 | 155 | 124 | SW846 8270D | 12/20/11 | 12/22/11 14:02 | DHF | A |
| Nitrobenzene | 259U | ug/kg | | 418 | 259 | 78.9 | SW846 8270D | 12/20/11 | 12/22/11 14:02 | DHF | A |
| 2-Nitrophenol | 155U | ug/kg | | 418 | 155 | 43.3 | SW846 8270D | 12/20/11 | 12/22/11 14:02 | DHF | A |
| 4-Nitrophenol | 259U | ug/kg | | 418 | 259 | 124 | SW846 8270D | 12/20/11 | 12/22/11 14:02 | DHF | A |
| N-Nitroso-di-n-propylamine | 51.1U | ug/kg | | 418 | 51.1 | 43.3 | SW846 8270D | 12/20/11 | 12/22/11 14:02 | DHF | A |
| N-Nitrosodiphenylamine | 51.1U | ug/kg | | 418 | 51.1 | 18.6 | SW846 8270D | 12/20/11 | 12/22/11 14:02 | DHF | A |
| Pentachlorophenol | 155U | ug/kg | | 836 | 155 | 99.1 | SW846 8270D | 12/20/11 | 12/22/11 14:02 | DHF | A |
| Phenanthrene | 928 | ug/kg | | 418 | 51.1 | 20.1 | SW846 8270D | 12/20/11 | 12/22/11 14:02 | DHF | A |
| Phenol | 155U | ug/kg | | 418 | 155 | 63.5 | SW846 8270D | 12/20/11 | 12/22/11 14:02 | DHF | A |
| Pyrene | 1750 | ug/kg | | 418 | 51.1 | 15.5 | SW846 8270D | 12/20/11 | 12/22/11 14:02 | DHF | A |
| 1,2,4-Trichlorobenzene | 51.1U | ug/kg | | 418 | 51.1 | 14.2 | SW846 8270D | 12/20/11 | 12/22/11 14:02 | DHF | A |
| 2,4,5-Trichlorophenol | 155U | ug/kg | | 418 | 155 | 92.9 | SW846 8270D | 12/20/11 | 12/22/11 14:02 | DHF | A |
| 2,4,6-Trichlorophenol | 155U | ug/kg | | 418 | 155 | 48.0 | SW846 8270D | 12/20/11 | 12/22/11 14:02 | DHF | A |
| *Surrogate Recoveries* | *Results* | *Units* | *Footnote* | *Limits* | | | *Method* | *Prepared* | *Analyzed* | *By* | *Cntr* |
| 2,4,6-Tribromophenol (S) | 108 | % | | 35-125 | | | SW846 8270D | 12/20/11 | 12/22/11 14:02 | DHF | A |
| 2-Fluorobiphenyl (S) | 101 | % | | 45-105 | | | SW846 8270D | 12/20/11 | 12/22/11 14:02 | DHF | A |
| Nitrobenzene-d5 (S) | 87.2 | % | | 35-100 | | | SW846 8270D | 12/20/11 | 12/22/11 14:02 | DHF | A |
| Phenol-d5 (S) | 89.3 | % | | 40-100 | | | SW846 8270D | 12/20/11 | 12/22/11 14:02 | DHF | A |
| Terphenyl-d14 (S) | 113 | % | | 30-125 | | | SW846 8270D | 12/20/11 | 12/22/11 14:02 | DHF | A |
| **WET CHEMISTRY** | | | | | | | | | | | |
| Moisture | 38.3 | % | | 0.1 | 0.1 | 0.01 | SM20-2540 G | | 12/10/11 15:55 | KAK | A |
| Total Solids | 61.7 | % | | 0.1 | 0.1 | 0.01 | SM20-2540 G | | 12/10/11 15:55 | KAK | A |
| **METALS** | | | | | | | | | | | |
| Aluminum, Total | 24400 | mg/kg | | 15.0 | 10.0 | 5.0 | SW846 6010C | 12/15/11 | 12/19/11 14:33 | SRT | A2 |
| Antimony, Total | 1.6J | mg/kg | | 3.0 | 2.0 | 1.0 | SW846 6010C | 12/15/11 | 12/19/11 14:33 | SRT | A2 |
| Arsenic, Total | 9.8 | mg/kg | | 3.0 | 2.0 | 1.0 | SW846 6010C | 12/15/11 | 12/19/11 14:33 | SRT | A2 |
| Barium, Total | 115 K | mg/kg | | 1.5 | 1.0 | 0.50 | SW846 6010C | 12/15/11 | 12/19/11 14:33 | SRT | A2 |
| Beryllium, Total | 0.86J | mg/kg | | 1.5 | 1.0 | 0.50 | SW846 6010C | 12/15/11 | 12/19/11 14:33 | SRT | A2 |
| Cadmium, Total | 2.1 | mg/kg | | 0.75 | 0.50 | 0.25 | SW846 6010C | 12/15/11 | 12/19/11 14:33 | SRT | A2 |

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State Certifications: CT PH-0224 , DE ID 11 , GA 914 , MA PA0102 , MD 128 , LA 04162 , VA 421 , WY EPA Region 8 , WV 343

## ANALYTICAL RESULTS

NW 11/28/12

Workorder 9941932 EMS020|Marsh Run/633003

Lab ID: 9941932008 Date Collected: 12/9/2011 12:10 Matrix: Solid

Sample ID: SD-9 Date Received: 12/9/2011 18:30

| Parameters | Results | Units | Footnote | LOQ | LOD | DL | Method | Prepared | Analyzed | By | Cntr |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Calcium, Total | 2850 | mg/kg | | 15.0 | 10.0 | 5.0 | SW846 6010C | 12/15/11 | 12/19/11 14:33 | SRT | A2 |
| Chromium, Total | 32.6 | mg/kg | | 1.5 | 1.0 | 0.50 | SW846 6010C | 12/15/11 | 12/19/11 14:33 | SRT | A2 |
| Cobalt, Total | 9.6 | mg/kg | | 1.5 | 1.0 | 0.50 | SW846 6010C | 12/15/11 | 12/19/11 14:33 | SRT | A2 |
| Copper, Total | 22.8 | mg/kg | | 3.0 | 2.0 | 1.0 | SW846 6010C | 12/15/11 | 12/19/11 14:33 | SRT | A2 |
| Iron, Total | 26000 | mg/kg | | 15.0 | 10.0 | 5.0 | SW846 6010C | 12/15/11 | 12/19/11 14:33 | SRT | A2 |
| Lead, Total | 62.3 | mg/kg | | 3.0 | 2.0 | 1.0 | SW846 6010C | 12/15/11 | 12/19/11 14:33 | SRT | A2 |
| Magnesium, Total | 3580 K | mg/kg | | 15.0 | 10.0 | 5.0 | SW846 6010C | 12/15/11 | 12/19/11 14:33 | SRT | A2 |
| Manganese, Total | 808 | mg/kg | | 1.5 | 1.0 | 0.50 | SW846 6010C | 12/15/11 | 12/19/11 14:33 | SRT | A2 |
| Mercury, Total | 0.18U | mg/kg | | 0.28 | 0.18 | 0.094 | SW846 7471B | 12/15/11 | 12/15/11 10:15 | MNP | A1 |
| Nickel, Total | 21.0 | mg/kg | | 3.0 | 2.0 | 1.0 | SW846 6010C | 12/15/11 | 12/19/11 14:33 | SRT | A2 |
| Potassium, Total | 4540 K | mg/kg | | 75.0 | 50.0 | 24.9 | SW846 6010C | 12/15/11 | 12/19/11 14:33 | SRT | A2 |
| Selenium, Total | 5.0U | mg/kg | | 7.5 | 5.0 | 2.5 | SW846 6010C | 12/15/11 | 12/19/11 14:33 | SRT | A2 |
| Silver, Total | 0.50U UL | mg/kg | | 0.75 | 0.50 | 0.25 | SW846 6010C | 12/15/11 | 12/19/11 14:33 | SRT | A2 |
| Sodium, Total | 151 | mg/kg | | 75.0 | 50.0 | 24.9 | SW846 6010C | 12/15/11 | 12/19/11 14:33 | SRT | A2 |
| Thallium, Total | 3.0U | mg/kg | | 4.5 | 3.0 | 1.5 | SW846 6010C | 12/15/11 | 12/19/11 14:33 | SRT | A2 |
| Vanadium, Total | 43.5 K | mg/kg | | 1.5 | 1.0 | 0.50 | SW846 6010C | 12/15/11 | 12/19/11 14:33 | SRT | A2 |
| Zinc, Total | 200 | mg/kg | | 3.0 | 2.0 | 1.0 | SW846 6010C | 12/15/11 | 12/19/11 14:33 | SRT | A2 |

***Sample Comments:***

Anna G Milliken
Technical Manager

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State Certifications: CT PH-0224 , DE ID 11 , GA 914 , MA PA0102 , MD 128 , LA 04162 , VA 421 , WY EPA Region 8 , WV 343

## ANALYTICAL RESULTS

NW 1/28/12

Workorder 9941932 EMS020|Marsh Run/633003

Lab ID: 9941932009 Date Collected: 12/9/2011 13:10 Matrix: Ground Water

Sample ID: SW-8 Date Received: 12/9/2011 18:30

| Parameters | Results | Units | Foothote | LOQ | LOD | DL | Method | Prepared | Analyzed | By | Cntr |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **SEMIVOLATILES** | | | | | | | | | | | |
| Acenaphthene | 0.94U | ug/L | | 1.9 | 0.94 | 0.48 | SW846 8270D | 12/16/11 | 12/20/11 23:42 | CGS | A1 |
| Acenaphthylene | 0.94U | ug/L | | 1.9 | 0.94 | 0.32 | SW846 8270D | 12/16/11 | 12/20/11 23:42 | CGS | A1 |
| Anthracene | 0.94U | ug/L | | 1.9 | 0.94 | 0.42 | SW846 8270D | 12/16/11 | 12/20/11 23:42 | CGS | A1 |
| Benzo(a)anthracene | 0.94U | ug/L | | 1.9 | 0.94 | 0.29 | SW846 8270D | 12/16/11 | 12/20/11 23:42 | CGS | A1 |
| Benzo(a)pyrene | 0.94U | ug/L | | 1.9 | 0.94 | 0.31 | SW846 8270D | 12/16/11 | 12/20/11 23:42 | CGS | A1 |
| Benzo(b)fluoranthene | 0.94U | ug/L | | 1.9 | 0.94 | 0.32 | SW846 8270D | 12/16/11 | 12/20/11 23:42 | CGS | A1 |
| Benzo(g,h,i)perylene | 0.94U | ug/L | | 1.9 | 0.94 | 0.41 | SW846 8270D | 12/16/11 | 12/20/11 23:42 | CGS | A1 |
| Benzo(k)fluoranthene | 0.94U | ug/L | | 1.9 | 0.94 | 0.36 | SW846 8270D | 12/16/11 | 12/20/11 23:42 | CGS | A1 |
| 4-Bromophenyl-phenylether | 0.94U | ug/L | | 7.5 | 0.94 | 0.37 | SW846 8270D | 12/16/11 | 12/20/11 23:42 | CGS | A1 |
| Butylbenzylphthalate | 0.94U | ug/L | | 7.5 | 0.94 | 0.38 | SW846 8270D | 12/16/11 | 12/20/11 23:42 | CGS | A1 |
| Carbazole | 0.94U | ug/L | | 7.5 | 0.94 | 0.24 | SW846 8270D | 12/16/11 | 12/20/11 23:42 | CGS | A1 |
| 4-Chloro-3-methylphenol | 0.94U | ug/L | | 7.5 | 0.94 | 0.89 | SW846 8270D | 12/16/11 | 12/20/11 23:42 | CGS | A1 |
| 4-Chloroaniline | 0.94U | ug/L | | 7.5 | 0.94 | 0.85 | SW846 8270D | 12/16/11 | 12/20/11 23:42 | CGS | A1 |
| bis(2-Chloroethoxy)methane | 0.94U | ug/L | | 7.5 | 0.94 | 0.75 | SW846 8270D | 12/16/11 | 12/20/11 23:42 | CGS | A1 |
| bis(2-Chloroethyl)ether | 0.94U | ug/L | | 7.5 | 0.94 | 0.47 | SW846 8270D | 12/16/11 | 12/20/11 23:42 | CGS | A1 |
| bis(2-Chloroisopropyl)ether | 0.94U | ug/L | | 7.5 | 0.94 | 0.58 | SW846 8270D | 12/16/11 | 12/20/11 23:42 | CGS | A1 |
| 2-Chloronaphthalene | 0.94U | ug/L | | 7.5 | 0.94 | 0.37 | SW846 8270D | 12/16/11 | 12/20/11 23:42 | CGS | A1 |
| 2-Chlorophenol | 1.9U | ug/L | | 7.5 | 1.9 | 0.79 | SW846 8270D | 12/16/11 | 12/20/11 23:42 | CGS | A1 |
| 4-Chlorophenyl-phenylether | 0.94U | ug/L | | 7.5 | 0.94 | 0.51 | SW846 8270D | 12/16/11 | 12/20/11 23:42 | CGS | A1 |
| Chrysene | 0.94U | ug/L | | 1.9 | 0.94 | 0.24 | SW846 8270D | 12/16/11 | 12/20/11 23:42 | CGS | A1 |
| mp-Cresol | 0.94U | ug/L | | 7.5 | 0.94 | 0.48 | SW846 8270D | 12/16/11 | 12/20/11 23:42 | CGS | A1 |
| o-Cresol | 0.94U | ug/L | | 7.5 | 0.94 | 0.46 | SW846 8270D | 12/16/11 | 12/20/11 23:42 | CGS | A1 |
| Di-n-Butylphthalate | 0.94U | ug/L | | 7.5 | 0.94 | 0.31 | SW846 8270D | 12/16/11 | 12/20/11 23:42 | CGS | A1 |
| Di-n-Octylphthalate | 0.94U | ug/L | | 7.5 | 0.94 | 0.24 | SW846 8270D | 12/16/11 | 12/20/11 23:42 | CGS | A1 |
| Dibenzo(a,h)anthracene | 0.94U | ug/L | | 1.9 | 0.94 | 0.89 | SW846 8270D | 12/16/11 | 12/20/11 23:42 | CGS | A1 |
| Dibenzofuran | 0.94U | ug/L | | 7.5 | 0.94 | 0.69 | SW846 8270D | 12/16/11 | 12/20/11 23:42 | CGS | A1 |
| 1,2-Dichlorobenzene | 0.94U | ug/L | | 7.5 | 0.94 | 0.35 | SW846 8270D | 12/16/11 | 12/20/11 23:42 | CGS | A1 |
| 1,3-Dichlorobenzene | 0.94U | ug/L | | 7.5 | 0.94 | 0.44 | SW846 8270D | 12/16/11 | 12/20/11 23:42 | CGS | A1 |
| 1,4-Dichlorobenzene | 0.94U | ug/L | | 7.5 | 0.94 | 0.59 | SW846 8270D | 12/16/11 | 12/20/11 23:42 | CGS | A1 |
| 3,3-Dichlorobenzidine | 2.8U | ug/L | | 15.1 | 2.8 | 1.5 | SW846 8270D | 12/16/11 | 12/20/11 23:42 | CGS | A1 |
| 2,4-Dichlorophenol | 0.94U | ug/L | | 7.5 | 0.94 | 0.58 | SW846 8270D | 12/16/11 | 12/20/11 23:42 | CGS | A1 |
| Diethylphthalate | 0.94U | ug/L | | 7.5 | 0.94 | 0.31 | SW846 8270D | 12/16/11 | 12/20/11 23:42 | CGS | A1 |
| 2,4-Dimethylphenol | 2.8U | ug/L | | 7.5 | 2.8 | 2.0 | SW846 8270D | 12/16/11 | 12/20/11 23:42 | CGS | A1 |
| Dimethylphthalate | 0.94U | ug/L | | 7.5 | 0.94 | 0.51 | SW846 8270D | 12/16/11 | 12/20/11 23:42 | CGS | A1 |
| 2,4-Dinitrophenol | 7.5U | ug/L | | 15.1 | 7.5 | 3.4 | SW846 8270D | 12/16/11 | 12/20/11 23:42 | CGS | A1 |
| 2,4-Dinitrotoluene | 0.94U | ug/L | | 7.5 | 0.94 | 0.37 | SW846 8270D | 12/16/11 | 12/20/11 23:42 | CGS | A1 |
| 2,6-Dinitrotoluene | 0.94U | ug/L | | 7.5 | 0.94 | 0.33 | SW846 8270D | 12/16/11 | 12/20/11 23:42 | CGS | A1 |
| bis(2-Ethylhexyl)phthalate | 0.94U | ug/L | | 7.5 | 0.94 | 0.25 | SW846 8270D | 12/16/11 | 12/20/11 23:42 | CGS | A1 |
| Fluoranthene | 0.94U | ug/L | | 1.9 | 0.94 | 0.33 | SW846 8270D | 12/16/11 | 12/20/11 23:42 | CGS | A1 |
| Fluorene | 0.94U | ug/L | | 1.9 | 0.94 | 0.38 | SW846 8270D | 12/16/11 | 12/20/11 23:42 | CGS | A1 |
| Hexachlorobenzene | 0.94U | ug/L | | 7.5 | 0.94 | 0.51 | SW846 8270D | 12/16/11 | 12/20/11 23:42 | CGS | A1 |

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State Certifications: CT PH-0224 , DE ID 11 , GA 914 , MA PA0102 , MD 128 , LA 04162 , VA 421 , WY EPA Region 8 , WV 343

## ANALYTICAL RESULTS

NW 1/28/12

Workorder 9941932 EMS020|Marsh Run/633003

Lab ID: 9941932009 Date Collected: 12/9/2011 13:10 Matrix: Ground Water
Sample ID: SW-8 Date Received: 12/9/2011 18:30

| Parameters | Results | Units | Footnote | LOQ | LOD | DL | Method | Prepared | Analyzed | By | Cntr |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Hexachlorobutadiene | 0.94U | ug/L | | 7.5 | 0.94 | 0.47 | SW846 8270D | 12/16/11 | 12/20/11 23:42 | CGS | A1 |
| Hexachlorocyclopentadiene | 0.94U UL | ug/L | B | 7.5 | 0.94 | 0.92 | SW846 8270D | 12/16/11 | 12/20/11 23:42 | CGS | A1 |
| Hexachloroethane | 0.94U | ug/L | | 7.5 | 0.94 | 0.82 | SW846 8270D | 12/16/11 | 12/20/11 23:42 | CGS | A1 |
| Indeno(1,2,3-cd)pyrene | 0.94U | ug/L | | 1.9 | 0.94 | 0.24 | SW846 8270D | 12/16/11 | 12/20/11 23:42 | CGS | A1 |
| Isophorone | 0.94U | ug/L | | 7.5 | 0.94 | 0.58 | SW846 8270D | 12/16/11 | 12/20/11 23:42 | CGS | A1 |
| 2-Methyl-4,6-dinitrophenol | 4.7U | ug/L | | 7.5 | 4.7 | 1.7 | SW846 8270D | 12/16/11 | 12/20/11 23:42 | CGS | A1 |
| 2-Methylnaphthalene | 0.94U | ug/L | | 1.9 | 0.94 | 0.90 | SW846 8270D | 12/16/11 | 12/20/11 23:42 | CGS | A1 |
| Naphthalene | 0.94U | ug/L | | 1.9 | 0.94 | 0.43 | SW846 8270D | 12/16/11 | 12/20/11 23:42 | CGS | A1 |
| 2-Nitroaniline | 0.94U | ug/L | | 7.5 | 0.94 | 0.33 | SW846 8270D | 12/16/11 | 12/20/11 23:42 | CGS | A1 |
| 3-Nitroaniline | 1.9U | ug/L | | 7.5 | 1.9 | 1.0 | SW846 8270D | 12/16/11 | 12/20/11 23:42 | CGS | A1 |
| 4-Nitroaniline | 0.94U | ug/L | | 7.5 | 0.94 | 0.42 | SW846 8270D | 12/16/11 | 12/20/11 23:42 | CGS | A1 |
| Nitrobenzene | 1.9U | ug/L | | 7.5 | 1.9 | 0.65 | SW846 8270D | 12/16/11 | 12/20/11 23:42 | CGS | A1 |
| 2-Nitrophenol | 1.9U | ug/L | | 7.5 | 1.9 | 1.3 | SW846 8270D | 12/16/11 | 12/20/11 23:42 | CGS | A1 |
| 4-Nitrophenol | 4.7U | ug/L | | 7.5 | 4.7 | 2.8 | SW846 8270D | 12/16/11 | 12/20/11 23:42 | CGS | A1 |
| N-Nitroso-di-n-propylamine | 0.94U | ug/L | | 7.5 | 0.94 | 0.53 | SW846 8270D | 12/16/11 | 12/20/11 23:42 | CGS | A1 |
| N-Nitrosodiphenylamine | 0.94U | ug/L | | 7.5 | 0.94 | 0.78 | SW846 8270D | 12/16/11 | 12/20/11 23:42 | CGS | A1 |
| Pentachlorophenol | 7.5U | ug/L | | 15.1 | 7.5 | 2.5 | SW846 8270D | 12/16/11 | 12/20/11 23:42 | CGS | A1 |
| Phenanthrene | 0.94U | ug/L | | 1.9 | 0.94 | 0.31 | SW846 8270D | 12/16/11 | 12/20/11 23:42 | CGS | A1 |
| Phenol | 0.94U | ug/L | | 7.5 | 0.94 | 0.68 | SW846 8270D | 12/16/11 | 12/20/11 23:42 | CGS | A1 |
| Pyrene | 0.94U | ug/L | | 1.9 | 0.94 | 0.48 | SW846 8270D | 12/16/11 | 12/20/11 23:42 | CGS | A1 |
| 1,2,4-Trichlorobenzene | 0.94U | ug/L | | 7.5 | 0.94 | 0.60 | SW846 8270D | 12/16/11 | 12/20/11 23:42 | CGS | A1 |
| 2,4,5-Trichlorophenol | 2.8U | ug/L | | 7.5 | 2.8 | 1.6 | SW846 8270D | 12/16/11 | 12/20/11 23:42 | CGS | A1 |
| 2,4,6-Trichlorophenol | 0.94U | ug/L | | 7.5 | 0.94 | 0.52 | SW846 8270D | 12/16/11 | 12/20/11 23:42 | CGS | A1 |
| *Surrogate Recoveries* | *Results* | *Units* | *Footnote* | *Limits* | | | *Method* | *Prepared* | *Analyzed* | *By* | *Cntr* |
| 2,4,6-Tribromophenol (S) | 68.8 | % | | 40-125 | | | SW846 8270D | 12/16/11 | 12/20/11 23:42 | CGS | A1 |
| 2-Fluorobiphenyl (S) | 69.2 | % | | 50-110 | | | SW846 8270D | 12/16/11 | 12/20/11 23:42 | CGS | A1 |
| 2-Fluorophenol (S) | 50.2 | % | | 20-110 | | | SW846 8270D | 12/16/11 | 12/20/11 23:42 | CGS | A1 |
| Nitrobenzene-d5 (S) | 77.8 | % | | 40-110 | | | SW846 8270D | 12/16/11 | 12/20/11 23:42 | CGS | A1 |
| Phenol-d5 (S) | 28.2 | % | | 10-115 | | | SW846 8270D | 12/16/11 | 12/20/11 23:42 | CGS | A1 |
| Terphenyl-d14 (S) | 90.6 | % | | 50-135 | | | SW846 8270D | 12/16/11 | 12/20/11 23:42 | CGS | A1 |
| **SEMIVOLATILE SIM** | | | | | | | | | | | |
| Acenaphthene | 0.038U | ug/L | | 0.047 | 0.038 | 0.014 | 8270 SIM | 12/16/11 | 12/18/11 18:40 | DHF | A2 |
| Acenaphthylene | 0.038U | ug/L | | 0.047 | 0.038 | 0.017 | 8270 SIM | 12/16/11 | 12/18/11 18:40 | DHF | A2 |
| Anthracene | 0.018J | ug/L | | 0.047 | 0.038 | 0.012 | 8270 SIM | 12/16/11 | 12/18/11 18:40 | DHF | A2 |
| Benzo(a)anthracene | 0.062 | ug/L | | 0.047 | 0.038 | 0.020 | 8270 SIM | 12/16/11 | 12/18/11 18:40 | DHF | A2 |
| Benzo(a)pyrene | 0.066 | ug/L | | 0.047 | 0.038 | 0.028 | 8270 SIM | 12/16/11 | 12/18/11 18:40 | DHF | A2 |
| Benzo(b)fluoranthene | 0.10 | ug/L | | 0.047 | 0.038 | 0.023 | 8270 SIM | 12/16/11 | 12/18/11 18:40 | DHF | A2 |
| Benzo(g,h,i)perylene | 0.039J | ug/L | | 0.047 | 0.038 | 0.015 | 8270 SIM | 12/16/11 | 12/18/11 18:40 | DHF | A2 |
| Benzo(k)fluoranthene | 0.046J | ug/L | | 0.047 | 0.038 | 0.021 | 8270 SIM | 12/16/11 | 12/18/11 18:40 | DHF | A2 |
| Chrysene | 0.066 | ug/L | | 0.047 | 0.038 | 0.020 | 8270 SIM | 12/16/11 | 12/18/11 18:40 | DHF | A2 |

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State Certifications: CT PH-0224 , DE ID 11 , GA 914 , MA PA0102 , MD 128 , LA 04162 , VA 421 , WY EPA Region 8 , WV 343

## ANALYTICAL RESULTS

NW 1/28/12

Workorder 9941932 EMS020|Marsh Run/633003

Lab ID: 9941932009 Date Collected: 12/9/2011 13:10 Matrix: Ground Water
Sample ID: SW-8 Date Received: 12/9/2011 18:30

| Parameters | Results | Units | Footnote | LOQ | LOD | DL | Method | Prepared | Analyzed | By | Cntr |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Dibenzo(a,h)anthracene | 0.038U | ug/L | | 0.047 | 0.038 | 0.014 | 8270 SIM | 12/16/11 | 12/18/11 18:40 | DHF | A2 |
| Fluoranthene | 0.13 | ug/L | | 0.047 | 0.038 | 0.020 | 8270 SIM | 12/16/11 | 12/18/11 18:40 | DHF | A2 |
| Fluorene | 0.038U | ug/L | | 0.047 | 0.038 | 0.014 | 8270 SIM | 12/16/11 | 12/18/11 18:40 | DHF | A2 |
| Indeno(1,2,3-cd)pyrene | 0.034J | ug/L | | 0.047 | 0.038 | 0.014 | 8270 SIM | 12/16/11 | 12/18/11 18:40 | DHF | A2 |
| Naphthalene | 0.11 | ug/L | | 0.047 | 0.047 | 0.039 | 8270 SIM | 12/16/11 | 12/18/11 18:40 | DHF | A2 |
| Phenanthrene | 0.056 | ug/L | | 0.047 | 0.038 | 0.026 | 8270 SIM | 12/16/11 | 12/18/11 18:40 | DHF | A2 |
| Pyrene | 0.12 | ug/L | | 0.047 | 0.038 | 0.018 | 8270 SIM | 12/16/11 | 12/18/11 18:40 | DHF | A2 |
| *Surrogate Recoveries* | *Results* | *Units* | *Footnote* | *Limits* | | | *Method* | *Prepared* | *Analyzed* | *By* | *Cntr* |
| 2-Methylnapthalene-d10 (S) | 80 | % | | 29-112 | | | 8270 SIM | 12/16/11 | 12/18/11 18:40 | DHF | A2 |
| Fluoranthene-d10 (S) | 84.5 | % | | 45-130 | | | 8270 SIM | 12/16/11 | 12/18/11 18:40 | DHF | A2 |
| **METALS** | | | | | | | | | | | |
| Aluminum, Total | 0.13 J | mg/L | ~~B~~ | 0.089 | 0.059 | 0.030 | SW846 6020A | 12/13/11 | 12/15/11 11:24 | LAM | C1 |
| Antimony, Total | 0.0015 U | mg/L | | 0.0022 | 0.0015 | 0.00074 | SW846 6020A | 12/13/11 | 12/15/11 11:24 | LAM | C1 |
| Arsenic, Total | 0.0013J | mg/L | | 0.0030 | 0.0020 | 0.0010 | SW846 6020A | 12/13/11 | 12/15/11 11:24 | LAM | C1 |
| Barium, Total | 0.037 | mg/L | | 0.0056 | 0.0037 | 0.0019 | SW846 6020A | 12/13/11 | 12/15/11 11:24 | LAM | C1 |
| Beryllium, Total | 0.00070 U | mg/L | | 0.0010 | 0.00070 | 0.00030 | SW846 6020A | 12/13/11 | 12/15/11 11:24 | LAM | C1 |
| Cadmium, Total | 0.00070 U | mg/L | | 0.0011 | 0.00070 | 0.00037 | SW846 6020A | 12/13/11 | 12/15/11 11:24 | LAM | C1 |
| Calcium, Total | 56.1 | mg/L | | 0.11 | 0.073 | 0.037 | SW846 6020A | 12/13/11 | 12/15/11 11:24 | LAM | C1 |
| Chromium, Total | 0.0015 U | mg/L | | 0.0022 | 0.0015 | 0.00074 | SW846 6020A | 12/13/11 | 12/15/11 11:24 | LAM | C1 |
| Cobalt, Total | 0.0037 U | mg/L | | 0.0056 | 0.0037 | 0.0019 | SW846 6020A | 12/13/11 | 12/15/11 11:24 | LAM | C1 |
| Copper, Total | 0.0021 J | mg/L | | 0.0056 | 0.0037 | 0.0019 | SW846 6020A | 12/13/11 | 12/15/11 11:24 | LAM | C1 |
| Iron, Total | 3.3 | mg/L | ~~B~~ | 0.056 | 0.037 | 0.019 | SW846 6020A | 12/13/11 | 12/15/11 11:24 | LAM | C1 |
| Lead, Total | 0.0015J | mg/L | | 0.0022 | 0.0015 | 0.00074 | SW846 6020A | 12/13/11 | 12/15/11 11:24 | LAM | C1 |
| Magnesium, Total | 11.5 | mg/L | | 0.11 | 0.073 | 0.037 | SW846 6020A | 12/13/11 | 12/15/11 11:24 | LAM | C1 |
| Manganese, Total | 1.2 | mg/L | | 0.0056 | 0.0037 | 0.0019 | SW846 6020A | 12/13/11 | 12/15/11 11:24 | LAM | C1 |
| Mercury, Total | 0.00013 U | mg/L | | 0.00022 | 0.00013 | 0.000074 | SW846 6020A | 12/13/11 | 12/15/11 11:24 | LAM | C1 |
| Nickel, Total | 0.0037 U | mg/L | | 0.0056 | 0.0037 | 0.0019 | SW846 6020A | 12/13/11 | 12/15/11 11:24 | LAM | C1 |
| Potassium, Total | 2.7 | mg/L | | 0.11 | 0.073 | 0.037 | SW846 6020A | 12/13/11 | 12/15/11 11:24 | LAM | C1 |
| Selenium, Total | 0.0037 U | mg/L | | 0.0056 | 0.0037 | 0.0019 | SW846 6020A | 12/13/11 | 12/15/11 11:24 | LAM | C1 |
| Silver, Total | 0.0015 U | mg/L | | 0.0022 | 0.0015 | 0.00074 | SW846 6020A | 12/13/11 | 12/15/11 11:24 | LAM | C1 |
| Sodium, Total | 9.0 | mg/L | | 0.11 | 0.073 | 0.037 | SW846 6020A | 12/13/11 | 12/15/11 11:24 | LAM | C1 |
| Thallium, Total | 0.00070 U | mg/L | | 0.0010 | 0.00070 | 0.00030 | SW846 6020A | 12/13/11 | 12/15/11 11:24 | LAM | C1 |
| Vanadium, Total | 0.0012J | mg/L | | 0.0022 | 0.0015 | 0.00074 | SW846 6020A | 12/13/11 | 12/15/11 11:24 | LAM | C1 |

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NELAP Certifications: NJ PA010 , NY 11759 , PA 22-293 DoD ELAP: A2LA 0818.01
State Certifications: CT PH-0224 , DE ID 11 , GA 914 , MA PA0102 , MD 128 , LA 04162 , VA 421 , WY EPA Region 8 , WV 343

## ANALYTICAL RESULTS

AW 1/28/12

Workorder 9941932 EMS020|Marsh Run/633003

Lab ID: 9941932009 Date Collected: 12/9/2011 13:10 Matrix: Ground Water
Sample ID: SW-8 Date Received: 12/9/2011 18:30

| Parameters | Results | Units | Footnote | LOQ | LOD | DL | Method | Prepared | Analyzed | By | Cntr |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Zinc, Total | 0.011 | mg/L | | 0.0056 | 0.0037 | 0.0019 | SW846 6020A | 12/13/11 | 12/15/11 11:24 | LAM | C1 |

***Sample Comments:***

Anna G Milliken
Technical Manager